



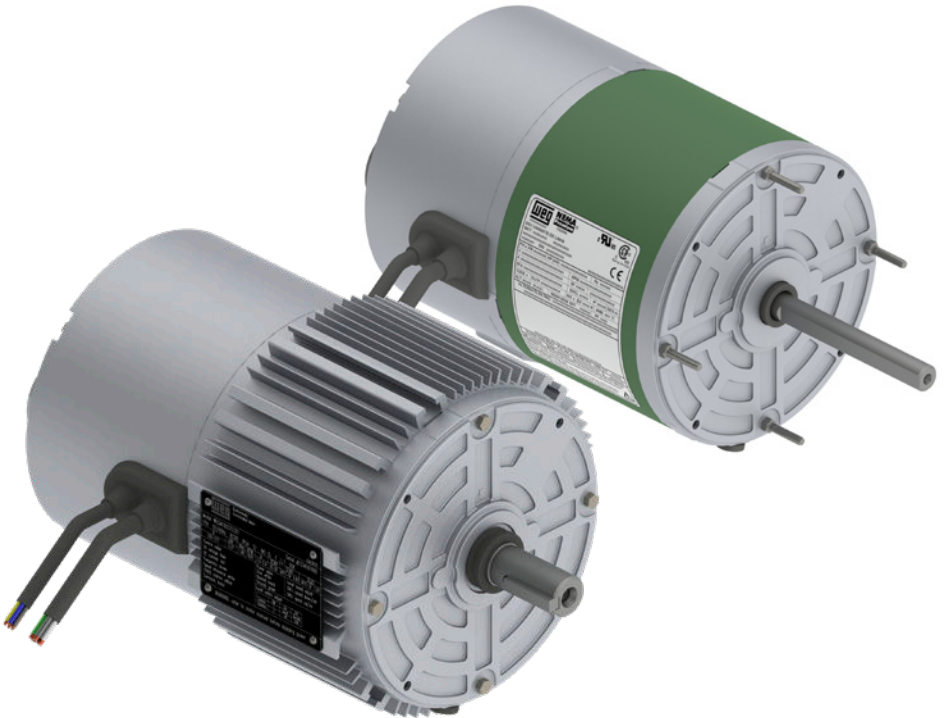
**B&P** Elektromotoren

Driving efficiency and sustainability



## **WECM / Emerald eZA**

Installation, Operation and  
Maintenance Manual



## ***Read carefully this manual before installing and configuring the equipment***

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The objective of this manual is to provide important information, which must be considered during the shipment, storage, installation, operation and maintenance of WEG motors. Therefore, we advise to make a careful and detailed study of the instructions contained herein before performing any procedures on the motor. The noncompliance with the instructions informed in this manual and others mentioned on the website [www.weg.net](http://www.weg.net) voids the product warranty and may cause serious personal injuries and material damages. For further information or explanations, check our FAQ at [www.weg.net/br/faq](http://www.weg.net/br/faq).

The instructions presented in this document are valid for WECM / Emerald eZA products.

## 1. GENERAL INFORMATION

**WECM / Emerald eZA** product is an Electronically Commutated Motor composed by a permanent magnet motor and a drive with features customized for commercial ventilation solutions. This Manual contains only the required information that allows qualified and trained personnel to carry out their services. The product images are shown for illustrative purpose only.

### 1.1. WARNINGS IN THIS MANUAL

**DANGER!**

The procedures recommended in this warning have the purpose of protecting the user against death, serious injuries and considerable material damage.

**ATTENTION!**

The procedures recommended in this warning have the purpose of avoiding material damage.

**NOTE!**

The information mentioned in this warning is important for the proper understanding and good operation of the product.

## 2. SAFETY MEASURES

Only trained personnel, with proper qualifications, and familiar with this kind of equipment and associated machinery shall plan and implement the installation, starting, operation and maintenance of this equipment. The personnel shall follow all the safety instructions described in this manual and/or defined by the local regulations.

**ATTENTION!**

Any service on the internal parts of the motor must be performed by qualified personnel only, since, due to the attraction between metallic parts caused by the magnets, risk of accident is present both in the assembly and disassembly of the motor.

**DANGER!**

Contains permanent magnets. For pacemaker users, it is recommended to avoid close or prolonged contact with this product, as it may interfere with the proper operation of the device.

**DANGER!**

Always disconnect the main power supply before touching any electrical device associated with the product. Several components may remain charged with high voltage and/or in movement and may cause injuries to people, even after the AC power supply has been disconnected or turned off. Wait at least 10 minutes to guarantee the fully discharge of capacitors. Always connect the equipment to the ground protection (PE).

### 3. SHIPMENT, STORAGE AND HANDLING

Check the conditions of the motor immediately upon receipt. Where any damage is noticed, this must be reported in writing to the transportation company, and immediately communicated to the insurance company and to WEG. In this case, no installation job can be started before the detected problem has been solved.

Check if the nameplate data matches the invoice data and the environmental conditions in which the motor will be installed. If the motor is not immediately installed, it must be stored in a clean and dry room protected against dust, vibrations, gases and corrosive agents, and with relative humidity not exceeding 60%.

If the motors are stored for more than two years, it is recommended to change the bearings, or to remove, wash, inspect and relubricate them before the motor is started.

If the drive is stocked (out of operation), every year from the manufacturing date indicated on the identification label of the drive (page 5), supply the drive with single-phase or three-phase voltage between 220 and 277 Vac, 50 or 60 Hz, for at least one hour then de-energize and wait for at least 24 hours before using the drive. If the drive has been in operation for at least 10 years, it is recommended to replace it. For instructions, contact WEG technical support.

#### **DANGER!**



- Always handle the motor carefully in order to prevent personal injuries and impacts that could damage the bearings.
- Do not lift and/or carry the product holding by the input cables.
- When available, use only the eyebolts to lift the motor. However these eyebolts are designed for the motor weight only. Thus never use these eyebolts to lift the motor with additional loads coupled to it. For multimounting motors (with removable feet/base), the eyebolts must be positioned according to the motor mounting position so that the lifting angle is vertically aligned (lifting at 0°).
- Additional information regarding the maximum allowable angle-of-inclination is indicated in the general manual available on the website [www.weg.net](http://www.weg.net).

### 4. IDENTIFICATION LABELS

There is one nameplate with general product information on the WECM / Emerald eZA product that is affixed to the side of the motor frame and one label with basic electronic information that is affixed to the drive (back cover).

<b>Model:</b> WEG-ECM-G1	
<b>Line(1ph):</b> 220-277Vac,50/60Hz,9Amax	
<b>Output(3ph):</b> 0-245Vac,16-155Hz, 0.55A	
<b>Drive code:</b> WECMAAS400FAIP5501300X00H00	
<b>Software:</b> V1.05 <b>Firmware:</b> V1.06S01	
<b>Made in China</b>	  

Figure 1 - Drive label

	<b>Electronically Commutated Motor</b>	 E491296																					
			MODEL: EZA.7518A1RT48YZ <sup>⑤</sup> LOT: 000xxxxxx <sup>③</sup> MAT. No: 14653508 <sup>③</sup> UL Model: WECM-ST80-60A <sup>④</sup> FRAME: 48YZ SF: 0.85 (TENV 40°C) <sup>⑤</sup> 1.00 (TEAO 60°C)	IE5 Sep.2019 <sup>①</sup> PH:1Φ HP:3/4 <sup>②</sup> HZ:50/60 INS:F DUTY:CONT ΔT:80K EPL																			
<b>Performance</b>																							
<b>VOLT. 115/220-277V</b>																							
<table border="1"> <thead> <tr> <th>HP</th> <th>RPM</th> <th>Lb.ft</th> <th>AMPS</th> </tr> </thead> <tbody> <tr> <td>0.75</td> <td>1800</td> <td>2.19</td> <td>7.7/4.7-3.7</td> </tr> <tr> <td>0.58</td> <td>1400</td> <td>2.19</td> <td>7.4/3.9-3.1</td> </tr> <tr> <td>0.42</td> <td>1000</td> <td>2.19</td> <td>5.8/3.0-2.4</td> </tr> <tr> <td>0.25</td> <td>600</td> <td>2.19</td> <td>3.6/1.9-1.5</td> </tr> </tbody> </table>				HP	RPM	Lb.ft	AMPS	0.75	1800	2.19	7.7/4.7-3.7	0.58	1400	2.19	7.4/3.9-3.1	0.42	1000	2.19	5.8/3.0-2.4	0.25	600	2.19	3.6/1.9-1.5
HP	RPM	Lb.ft	AMPS																				
0.75	1800	2.19	7.7/4.7-3.7																				
0.58	1400	2.19	7.4/3.9-3.1																				
0.42	1000	2.19	5.8/3.0-2.4																				
0.25	600	2.19	3.6/1.9-1.5																				
<b>Voltage selection</b> <sup>⑥</sup> 115V – Red leads interconnected 220-277V – Red leads disconnected																							
<b>Power leads</b> Line: white Neutral: black Ground: green		<b>Control cable</b> DC voltage [2-10V]: blue DC current [4-20mA]: red Frequency [10-95%]: brown Speed reference: white 10VDC source: yellow Common: black																					
<b>Local switch adjust</b>																							
	SW	On	Off																				
Control	1	Local	Remote																				
Rotation	2	CCW-SE	CW-SE																				
<b>Local speed adjust</b> SW1: speed down/off                      SW2: speed up/on																							
<b>WARNING: refer to motor manual before applying power</b> <b>AVERTISSEMENT: se référer au manuel du moteur avant de mettre sous tension</b>																							

Figure 2 - USA/Canada market motor nameplate

	<b>Electronically Commutated Motor</b>		 E491296		Jun.2021		
					14634981      Model WECM-AL80-85A2      Batch No#000XXXXXXX		
1PH 50/60HZ IEC80 IP55 S1 INS CL F ΔT 80 K IE6 SF1.0 EP							
V	kW	Nm	RPM	A	EFF	TENV	TEAO
220-277	1.1	5.84	1800	8.9-7.1	89.7%	NA	60°C
<b>Control cable</b> DC voltage[2-10V]: blue DC current[4-20mA]: red PWM[10-95%]: brown Speed feedback: white 10VDC source: yellow Common: black			<b>Power cable</b> Line: brown Neutral: blue PE: green/yellow		<b>Local speed adjust</b> SW1:speed down/off SW2:speed up/on		
<b>Local switch adjust</b> * looking from DE							
	SW	On	Off				
Control	1	Local	Remote				
Rotation*	2	CCW	CW				
<b>WARNING: refer to motor manual before applying power</b>							

Figure 3 - Motor nameplate

## 5. INSTALLATION

**DANGER!**



- Make sure the AC power supply is disconnected and protected against accidental energization before starting the installation;
- Check the motor direction of rotation, turning it without load before it is coupled to the load;
- To prevent accidents, ensure that the grounding connection has been performed according to the applicable standards and that the shaft key has been securely fastened before the motor is started;
- Do not lift and/or carry the product holding by the input cables.

Motors must be only installed in places compatible with their mounting features and in applications and environments for which they are intended.

Those motors with feet must be installed on bases duly planned in order to prevent vibrations and assure perfect alignment. The motor shaft must be properly aligned with the shaft of the driven machine. Incorrect alignment, as well as improper belt tension, will certainly damage the bearings, resulting in excessive vibrations and even causing the shaft to rupture. The admissible shaft radial and axial loads for standard bearings are specified on the table below. Use flexible coupling whenever possible.

Maximum permissible thrust - Fr in (kN) 26280 hours					
Direction	Mounting position	Type	1500rpm	1800rpm	3000rpm
			Force (kN)	Force (kN)	Force (kN)
Axial*	Horizontal	Pushing	0.31	0,29	0.25
		Pulling	0.17	0.16	0.12
	Vertical shaft down	Pushing	0.35	0.33	0.27
		Pulling	0.14	0.14	0.10
	Vertical shaft up	Pushing	0.27	0.27	0.23
		Pulling	0.23	0.20	0.15
Radial**	All	L	0.11	0.11	0.12
		L/2	0.19	0.19	0.16

Table 1 - Allowed loads for Emerald eZA (NEMA 48) motors

Maximum permissible thrust - Fr in (kN) 20000 hours					
Direction	Mounting position	Type	1500rpm	1800rpm	3000rpm
			Force (kN)	Force (kN)	Force (kN)
Axial*	Horizontal	Pushing	0.90	0.86	0.74
		Pulling	0.50	0.46	0.34
	Vertical shaft down	Pushing	0.96	0.91	0.77
		Pulling	0.47	0.44	0.33
	Vertical shaft up	Pushing	0.87	0.84	0.73
		Pulling	0.56	0.51	0.37
Radial**	All	L	0.66	0.61	0.49
		L/2	0.74	0.69	0.56

Table 2 - Allowed loads for WEEM (IEC 80) motors, according maximum speed

Notes:

\* Axial max. load (radial zero).

\*\* Radial max load (axial zero).

1 - All belt loads are considered to act in vertically downward direction.

2 - Overhung loads include belt tension and weight of sheave.

3 - Overhung load limits do not include any effect of unbalanced magnetic pull.

Only remove the corrosion protection grease from the shaft end and flange immediately before the motor installation.

Unless specified otherwise in the purchase order, WEG motors are dynamically balanced with “half key” and without load (uncoupled).

The driving elements, such as pulleys, couplings, etc., must be balanced with “half key” before they are mounted on the shaft of the motors.

### ATTENTION!

- The air used for cooling the motor must be at ambient temperature, limited to the temperature indicated on the motor nameplate;
- Take the required measures in order to ensure the degree of protection indicated on the motor nameplate:
  - Unused cable inlet holes in the terminal boxes must be properly closed with blanking plugs;
  - The cable entries used must be fitted with components, such as, cable glands and conduits;
  - Components supplied loose (for example, terminal boxes mounted separately) must be properly closed and sealed;
  - Fixing elements mounted in the threaded through holes in the motor enclosure (for example, the flange) must be properly sealed.
- For flying leads motors, do not push the overlength of leads into the motor in order to prevent that they touch the rotor.



Drain hole: WECM / Emerald product can be supplied with drains. Below pictures give details about the mounting configuration.

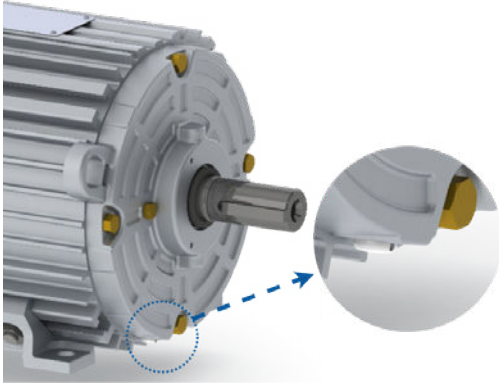


Figure 4 - Drain position

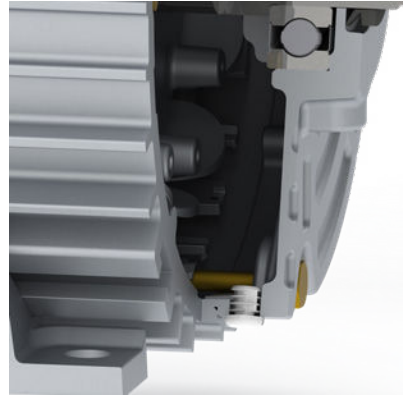


Figure 5 - Drain sectional



**ATTENTION!**

- The motor must always be positioned so the drain hole is at the lowest position;

Slinger: WECM / Emerald product in vertical shaft up mounting should be fitted with water slinger ring to prevent water ingress inside the motor. Consult WEG about this optional.



**ATTENTION!**

Motors installed outdoors or in the vertical position require the use of additional shelter to protect them from water.

Allowed inertias for WECM frames IEC80 single phase, according to output power and speed:

Power (kW)	1500rpm (kgm <sup>2</sup> )	1800rpm (kgm <sup>2</sup> )	3000rpm (kgm <sup>2</sup> )
0.12	0.05	0.05	0.05
0.18	0.05	0.05	0.05
0.25	0.05	0.05	0.05
0.37	0.05	0.05	0.05
0.55	0.05	0.05	0.05
0.75	0.05	0.05	0.05
1.10	0.05	0.05	0.05

Table 3 - Inertias allowed for single phase line



## 5.1. POWER CONNECTIONS



### DANGER!

Connect the motor properly to the power supply by means of safe and permanent contacts, always considering the data informed on the nameplate, such as rated voltage, wiring diagram, etc.

For power cables, switching and protection devices dimensioning, consider the rated motor current, the service factor, and the cable length, among others. For motors without terminal block, insulate the motor terminal cables by using insulating materials that are compatible with the insulation class informed on the nameplate. The minimum insulation distance between the non-insulated live parts themselves and between live parts and the grounding must meet the applicable standards and regulations for each country.

- Input voltage selection (if available):
  - Interconnect the jumper leads to an 115V input voltage;
  - Keep the jumper leads disconnected to 208V or higher input voltage (according nameplate indication);
- Make the line, neutral and ground connections according nameplate indication;
- If used, connect the optional external harmonic filter (passive PFC) in series to the line conductor, according to Item 6.6 - PASSIVE POWER FACTOR CORRECTION (PFC) (OPTIONAL). WEG declares that the WECM / Emerald eZA motor line is intended to be used as a part of an end-product and thus is not an independently used machine. All cables of this product need to be internally installed into the enclosure of the final product.



### DANGER!

- Make sure the jumper terminals in power cable are insulated to avoid electrical shock.
- SHOCK RISK! Do not touch the jumper terminals after the product is fed.
- Always connect the equipment to the ground protection (PE).



### ATTENTION!

- The power supply that feeds the inverter shall have a solid grounded neutral.

## 5.2. CONTROL CONNECTIONS

- Make the control connections according nameplate indication.



### ATTENTION!

Make sure that all unused conductors in control cable are insulated to avoid product damage.

### 5.3. EMC REQUIREMENTS FOR CONFORMING INSTALLATIONS

The standard WECM / Emerald eZA mounting solution (Drive attached to the motor) comply with the IEC 61800-3 / FCC requirements with the corresponding categories as per the Table 5.1 below.

Power	Conducted	Radiated
≤0,55kW	Class C2	Class C2
0,75kW - 1,1kW	Class C2	Class C2

Table 4 - WECM - EMC category compliance for drive attached to the motor, according to IEC 61800-3

For optional decentralized mounting the following characteristics are required to comply with different values of the standard:

Decentralized motor with external Filter (motor cable length≤3meters)			
Power	Conducted	Radiated	Notes
≤0.55kW	C2	C2	(1)Filter is FT121-10, (2)control cable is shielded type, (3)power supply cable between inverter and filter is shielded type, (4)motor cable is shielded type (5) EMC cable gland 4pcs
0.75 - 1.1kW	C2	C2	(1)Filter is FT121-20, (2)control cable is shielded type, (3)power supply cable between inverter and filter is shielded type. (4)motor cable is shielded type (5) EMC cable gland 4pcs

Table 5 - WECM - EMC category compliance for decentralized mounting drive, according to IEC 61800-3

For any other condition different than here described please consult WEG for specifying a solution that better comply with your installation requirements.

Only Equipment intended to be use in First environment that have a total rated power lower or equal than 1kW are required to use an external passive filter (PFC) in order to comply with the IEC 61000-3-2 and comply with the C2 requirement for Low-frequency disturbance voltage as indicated in the IEC 61800-3 requirements for the electromagnetic compatibility (EMC)

In case the final equipment ascribes to the conditions above, please refer to item 6.6 for more information regarding the WEG optional PFC filter



**NOTE!**

The end user takes personal responsibility for the EMC compliance of the whole installation.

### 6. OPERATION INSTRUCTIONS



**DANGER!**

During operation, do not touch the non-insulated energized parts and never touch or stay too close to rotating parts.

The rated performance values and the operating conditions are specified on the motor nameplate. The voltage and frequency variations of the power supply should never exceed the limits established in the applicable standards.

Occasional different behavior during the normal operation (actuation of thermal protections, noise level, vibration level, temperature and current increase) must always be assessed by qualified personnel. In case of doubt, turn off the motor immediately and contact the nearest WEG service center.

## 6.1. SELECTING THE ROTATION DIRECTION

On the standard communication version of the WECM:

- Remove the plastic lid from the back side of the drive cover;
- Use the DIP switch number 2 to select the rotation direction between counter-clockwise (CCW: switch in ON position) or clockwise (CW), looking from the motor drive end (shaft);
- Reinstall the plastic lid to the back side of the drive cover after the adjust;



### NOTE!

If the rotation direction is changed while the product is running, the motor will decelerate, reverse the direction and accelerate to the same speed that was running before.



### ATTENTION!

After remove and reinstall, make sure that the plastic lid from the back side of the drive cover is securely closed to guarantee the protection degree.

For MODBUS optional please refer to specific [manual](#) accesible in [www.weg.net](#).

## 6.2. HOW TO ADJUST SPEED

On the standard communication version of the WECM, the product speed can be changed by local adjust (buttons) or remote adjust (control cable);

- To select between local or remote speed adjust:
  - Remove the plastic lid from the back side of the drive cover;
  - Use the DIP switch number 1 to select between local (switch in ON position) or remote adjust;
  - Reinstall the plastic lid to the back side of the drive cover after the adjust.



### ATTENTION!

After remove and reinstall, make sure that the plastic lid from the back side of the drive cover is securely closed to guarantee the protection degree.

- Local speed adjust:
  - Remove the plastic lid from the back side of the drive cover;
  - Use the two tact buttons located in the opening on the back cover to change speed;
  - Keep pressing button SW1 to decelerate or button SW2 to accelerate the motor;
  - The motor will turn off when the speed reaches a value lower than the minimum speed of the range;
  - Pressing the button <1s, the rotation increase / decrease rate is 100 RPM/s
  - Pressing the button >1s, the rotation increase / decrease rate is 300 RPM/s
  - The product will not go to speeds higher than the value adjusted to be the maximum speed by WEG EC Motor Speed Controller; or, case not used, the nominal Nameplate Speed;
  - Reinstall the plastic lid to the back side of the drive cover after the adjust.

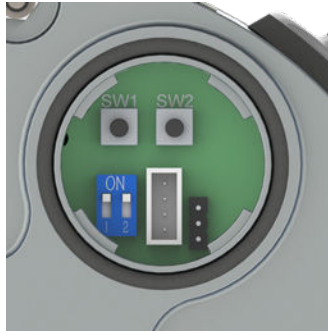


Figure 6 - Product standard control switches

**NOTE!**



- The standard maximum speed value is preset at WEG to be the highest value of the speed range but, can be changed by the user (see item 6.3).
- The product has speed memory when operating in local speed adjustment. The last speed adjusted will be kept in memory when the input power supply is removed. The motor will accelerate to the memorized speed when the input power supply is reconnected.
- The local controls inside the opening on the back cover are totally insulated. There is no risk of shock when touch any internal part of this opening, even when the solution is running.



**ATTENTION!**

After remove and reinstall, make sure that the plastic lid from the back side of the drive cover is securely closed to guarantee the protection degree.

- Remote speed adjust:
  - The speed can be adjusted by the input signals available in the control cable:
  - DC voltage: 2 to 10V DC [tolerance: +10%];
  - DC current: 4 to 20mA DC [tolerance: +10%];
  - Frequency duty-cycle: 10 to 95%
  - Voltage: 10 to 24Vpk [tolerance: -5%/+10%];
  - Frequency: 80Hz [tolerance: -2,5%/+2,5%];
  - The product will turn off if imposed signals lower than 2V DC, 4mA DC or 10%.
  - The speed can be adjusted using the external speed controller (see item 6.4).
- Control input reference:

Signal type	Condition	Resulting speed value	Conductors	
			1	2
DC voltage <sup>a</sup>	Lower than 2V DC	Zero (motor is off)	Blue	Black
	From 2 to 10V DC	$((Max^b - Min^c)/8) \times (IS^d - 2) + Min$		
DC current	Lower than 4mA DC	Zero (motor is off)	Red	
	From 4 to 20mA DC	$((Max^b - Min^c)/16) \times (IS^d - 4) + Min$		
Frequency	Lower than 10%	Zero (motor is off)	Brown	
	From 10 to 95%	$((Max^b - Min^c)/85) \times (IS^d - 10) + Min$		

Table 6 - Control input reference

Notes:

- The DC voltage signal can be applied by an external power supply or using the built-in 10VDC source and an additional potentiometer (5kΩ to 10kΩ);
- Maximum speed adjusted (see item 6.3);
- Solution minimum speed (lowest value of the speed range);
- Input signal (V DC, mA DC, %) supplied to the respective remote input.

Control cable electrical connections diagram:

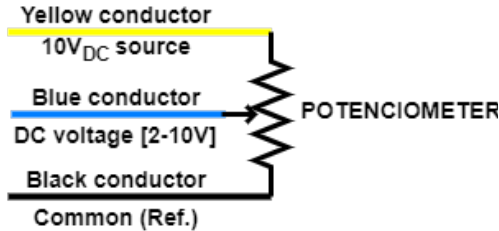


Figure 7 - DC voltage input (using built-in power supply)

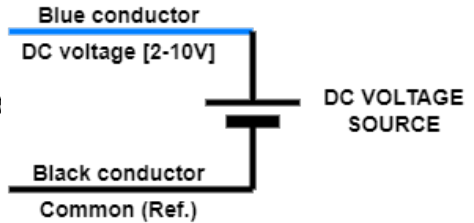


Figure 8 - DC voltage input (using external power supply)

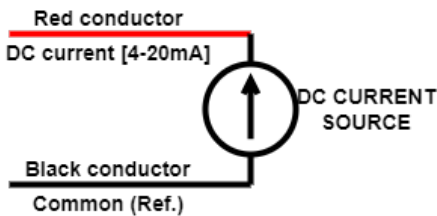


Figure 9 - DC current input

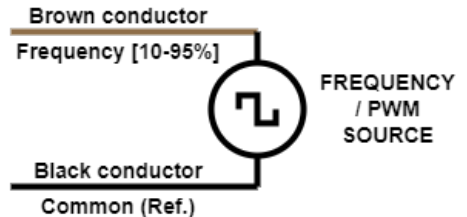


Figure 10 - Frequency input

Recommendation for maximum conductors' length to avoid signal drop for each connection type.

Signal Type	Conductors			Maximum Length (m)	Cable specification
DC voltage (built-in power supply)	Yellow	Blue	Black	150 m	24 AWG
DC voltage (external power supply)	Blue		Blue	150 m	24 AWG
DC current	Red		Blue	150 m	24 AWG
Frequency	Brown		Blue	150 m	24 AWG
Modbus (optional)	Yellow	Red	Black	150 m	24 AWG

Table 7 - Maximum conductors' length recommended for signal wires

**ATTENTION!**



- The built-in power supply has an output limit of 25mW or 2,5mA;
- The product can be permanently damaged if imposed signals out of the specification;
- Make sure that all unused conductors in control cable are insulated to avoid product malfunction or damage.
- The connection between the Yellow cable (10VDC power source) and the red cable (DC current) will damage permanently the DC current speed control.

### 6.3. CONTROL OUTPUT REFERENCE

The WECM includes a speed reference. This signal is on at the white control cable. Whenever the white control cable is measured against the ground, a train of pulses with maximum peak value of 4,8V can be measured. The frequency of this train of pulses is proportional to the speed of the motor as per explained on the table 6.2 below

Control output reference:

Signal Type	Condition	Resulting frequency value	Conductors	
			1	2
Frequency (speed reference)	Speed = zero	zero (output voltage: 4,8V)	white	black
	Speed > zero	speed(rpm) x 0,6015		

Table 8 - Control output reference

### 6.4. HOW TO ADJUST THE MAXIMUM AND MINIMUM SPEED VALUE

#### 6.4.1. MAXIMUM SPEED

On the WECM standard communication version, there are two ways to change the maximum speed value for the remote speed adjust signals:

- Using the product local tact buttons (only up to the maximum speed set by WEG EC Motor Speed Controller)
  - Select local speed reference in the DIP switch number 1 (switch in ON position - see item 6.2);
  - Using the tact buttons, adjust the speed to the value desired to be the maximum;
  - Select remote speed reference in the DIP switch number 1;
- Using the optional WEG EC motor external speed controller (see item 6.4) (up to the nameplate speed).

**NOTE!**



- The standard manufacturing preset value for the maximum speed is the rated speed informed in the product nameplate;
- Consult WEG about different standard maximum speed values.

#### 6.4.2. MINIMUM SPEED

The minimum speed of the WECM motor line is fixed and cannot be change with the use of a standard software. The minimum speed of the line follows the logic of the table below:

Rated speed	≤400rpm	>400rpm and ≤1800rpm	>1800rpm
Minimum speed	45rpm	200rpm	500rpm

Table 9 - Minimum speed according to motor rated speed

Consult WEG about different factory minimum speed values.

For [MODBUS](#) optional please refer to specific manual accesible in [www.weg.net](http://www.weg.net)

## 6.5. EXTERNAL SPEED CONTROLLER (OPTIONAL)

The running speed and the maximum speed adjust can be done using the external WEG EC Motor speed controller.

Connect the control cables at the WEG EC Motor speed controller borne. Below picture gives the connection sequence.



Figure 11 - WEG EC Motor speed controller

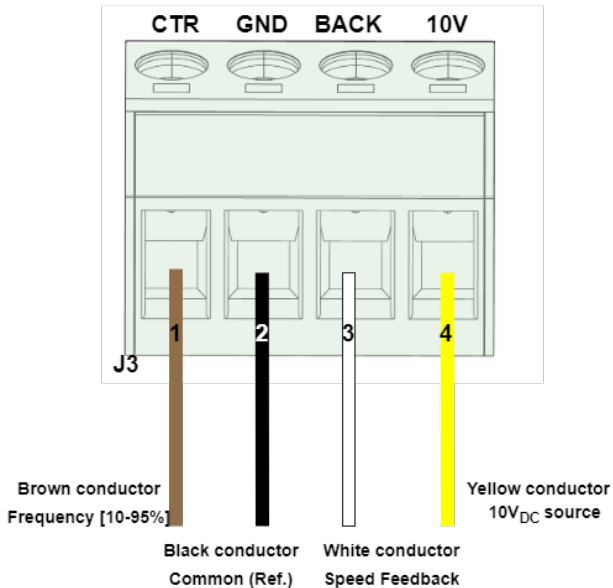


Figure 12 - Controller sequence connection

- Fed the EC motor following the instructions of the item 5.1;
- Running speed adjust
  - Connect the conductors from the control cable to the external speed controller according to Figure 6.5;
  - Rotate CTR in clockwise direction (CW) to increase the running speed;
  - Rotate CTR in counter-clockwise direction (CCW) to reduce the running speed;
  - During the adjust, the running speed can be verified in the display;

#### Maximum speed adjust

- Remove the plastic lid from the back side of the drive cover;
- Connect the external controller to the EC motor using the cable supplied with the external controller and the connector inside the EC motor back opening;
- Rotate MAX in clockwise direction (CW) to increase the maximum speed;
- Rotate MAX in counter-clockwise direction (CCW) to reduce the maximum speed;
- During the adjust, the maximum speed can be verified in the display, during 5s;
- While the max. speed is displayed on the screen, push the button "Enter" to set the maximum speed;
- Disconnect the cable from the EC motor back opening connector;
- Reinstall the plastic lid to the back side of drive cover after the adjust;
- If the maximum speed set is lower than the running speed, the motor will decelerate until reaching the new maximum speed set.



#### ATTENTION!

After remove and reinstall, make sure that the plastic lid from the back side of the drive cover is securely closed to guarantee the protection degree.

## 6.6. FIRE MODE FUNCTION (OPTIONAL)

### DANGER!

- Notice that the WECM / Emerald eZA is just one of the components of the ventilation system, and it is configurable for different functions, including the "Fire Mode" function;
- Thus, the full operation of the "Fire Mode" function depends on the accuracy of the project and on the joint performance of the components of the system;
- Ventilation systems that work on life safety applications must be certified or approved by the Fire Department and/or other public authority, according to local regulations;
- The non-interruption of the operation of the WECM / Emerald eZA, when configured for operation in the "Fire Mode" function, is critical and must be taken into account in the preparation of safety plans in the environments in which they are installed, since damages may occur to the WECM / Emerald eZA itself and to other components of the ventilation system, to the environment in which it is installed and to people with risk of death;
- The operation in the "Fire Mode" function may, under certain circumstances, result in fire, since the protection devices will be disabled;
- Only personnel from engineering and safety must consider the configuration of the equipment for the "Fire Mode" function;
- WEG strongly recommends to follow the cares and procedures above before using the WECM / Emerald eZA in the "Fire Mode" function, and it will not be liable to the final user or third parties for any losses or damages direct or indirectly incurred due to the programming and operation of the WECM / Emerald eZA in "Fire Mode" regime, considering the critical and special use of this function.







WECM are not 'smoke extraction' motors (as defined in EN 12101-3) and may not under any circumstances be installed inside the high temperature airstream.

#### NOTE!



When the user activates the "Fire Mode" function, he/she acknowledges that the protection functions of the WECM / Emerald eZA are disabled, which may result in damages to the WECM / Emerald eZA itself, to the components connected to it, to the environment in which it is installed and to people present in such environment; therefore, the user takes full responsibility for the risks arising from such operating condition. Operation with the "Fire Mode" function programmed voids the warranty of the product. The operation in this condition is internally registered by the WECM / Emerald eZA and must be validated by a duly qualified professional of engineering and occupational safety, since such procedure significantly increases the operating risk.

The "Fire Mode" function is intended to make the WECM / Emerald eZA continue work under adverse conditions, inhibiting most faults generated by the electronic in order to protect itself or protect the motor.

The "Fire Mode" is selected by applying 10VDC to the frequency input during 5 seconds. The built-in 10VDC source can be used. When selected, the motor will speed up to the maximum speed set and will disable all motor software protections.

The only possible way to turn off the "Fire Mode" operation function is to de-energize the complete solution and energize it back again.

## 6.7. PASSIVE POWER FACTOR CORRECTION (PFC) (OPTIONAL)

Only Equipment intended to be use in First environment that have a total rated power lower or equal than 1kW are required to use an external passive filter (PFC) in order to comply with the IEC 61000-3-2 and comply with the C2 requirement for Low-frequency disturbance voltage as indicated in the 61800-3 requirements for the electromagnetic compatibility (EMC) The passive PFC filter shall be installed in series with the line (L) power cable as shown on diagram below.

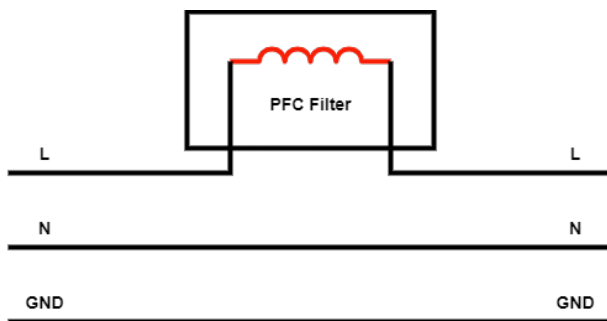


Figure 13 - Passive PFC filter diagram



#### NOTE!

The end user takes personal responsibility for the EMC compliance of the whole installation.

## 7. PRODUCT PROTECTIONS AND FAULT DIAGNOSIS

WECM / Emerald eZA products have many incorporated electronic protections:

- Input under voltage protection;
- Locked rotor protection;
- Overload protection;
- Over temperature protection.
- Output overcurrent / short-circuit protection;

WECM / Emerald eZA products have a LED in the opening on the back side that indicate the solution status and to help in the fault diagnosis:

The LED will stay ON while the motor is running (speed bigger than zero);

- The LED will stay OFF while the motor is stopped (speed equals to zero);

### DANGER!



- The LED in OFF condition doesn't mean that there is no power supply to the drive;
- Make sure that the input power supply is disconnected before do any maintenance in the product.
- If the Fire Mode function is active, the failures will be detected, but ignored by WECM / Emerald eZA, i.e., will not block the IGBTs. If the motor was spinning, will continue spinning. For more information see item 6.5.

The LED will blink in case of any fault. The below table indicates the blinking behavior according the fault type:

Blinking periods	Fault description	ON time	Off time	Wait interval time (off)	Probable Causes	Solution	Fault Recovery	Modbus code Error*3
2 (Fast flash)	Under Voltage	0.1	0.1	-	- Voltage supply lower than nameplate limitation; - Input power cable Connection problem; - Hardware problem (Contact WEG)	- Check the power supply voltage; - Check the input power cable connection;	Recovers automatically after power supply recovers;	0x01
3	Overload / Over current	0.25	0.25	2	- Load used over the motor maximum value; - Higher Ambient temperature than limitation;	- Check the real load application (Measure current from drive to motor*2); - Measure the ambient conditions (temperature and air over the motor);	Recovers automatically after conditions are back to specification	0x03
5	IPM Temperature Limitation				- High Ambient temperature or lower cooling conditions than the minimum. (See user manual)	- Wait temperature recovery - Consult WEG if this problem persists;	Recovers automatically after temperature gets lower than the limitation	0x04
6	Overvoltage				-Voltage supply higher than specified in the nameplate;	- Waiting power supplier recovered;	Recovers automatically after power supply recovers;	0x02

Table 10 - The blinking behavior according to fault type

\*1 Valid for all Software / Firmware versions of WECM / Emerald eZA single-phase line products.

\*2 Only to be performed by a professional technical service authorized by WEG

\*3 Only valid for MODBUS communication versions at address 0x0050.

The missing blinking periods (no.1 / no.4, no.7, no.8, no.13) are free values with no set functionality from the factory.

## 7.1. INFORMATION FOR CONTACTING TECHNICAL SUPPORT

For technical support and servicing, it is important to have the following information in hands:

- Motor model, Batch number, and manufacturing date available in the motor nameplate (refer to item 4);
- Installed software version available in the drive label (refer to item 4).

## 8. MAINTENANCE

### **DANGER!**



- Before any service is performed, ensure that motor is at standstill, disconnected from the power supply and protected against accidental energization. Even when the motor is stopped, dangerous voltages may be present in space heater terminals;
- For motors with permanent magnet rotor (WECM and Emerald eZA), the motor assembly and disassembly require the use of proper devices due to the attracting or repelling forces that occur between metallic parts. This work must only be performed by a WEG Authorized service center specifically trained for such an operation. People with pacemakers cannot handle these motors. The permanent magnets can also cause disturbances or damages to other electric equipment and components during maintenance.

### **ATTENTION!**



- Motor disassembly during the warranty period must be performed by a WEG authorized service center only;
- Regularly inspect the operation of the motor, according to its application, and ensure a free air flow. Inspect the seals, the fastening bolts, the bearings, the vibration and noise levels, the drain operation, etc. The lubrication interval is specified on the motor nameplate.

## 9. ENVIRONMENTAL INFORMATION

For information regarding disposal at end of life cycle refer to the manual

"[Disposal and Environmental Information](#)" available in the website [www.weg.net](http://www.weg.net) or contact WEG.

## 10. ADDITIONAL INFORMATION

For further information about shipment, storage, handling, installation, operation and maintenance of electric motors, access the website [www.weg.net](http://www.weg.net) .

For special applications and operating conditions refer to the manual 50033244 available in the website or contact WEG.

When contacting WEG, please, have the full description of the motor at hand, as well as the Motor model, Batch Number and manufacturing date, indicated on the motor nameplate.

## 10.1. WARRANTY TERM

WEG Equipamentos Elétricos S/A, Motors Unit (“WEG”), offers warranty against defects in workmanship and materials for its products for a period of 18 months from the invoice date issued by the factory or distributor/dealer, limited to 24 months from the date of manufacture.

The paragraphs above contain the legal warranty periods.

If a warranty period is defined in a different way in the commercial/technical proposal of a particular sale, that will supersede the time limits set out above.

The warranty periods above are independent of the product installation date and the startup.

If any defect or abnormal occurrence is detected during machine operation, the customer must immediately notify WEG in writing about the occurred defect, and make the product available for WEG or its Authorized Service Center for the period required to identify the cause of the defect, check the warranty coverage, and perform the proper repairs.

In order for the warranty to be valid, the customer must be sure to follow the requirements of WEG’s technical documents, especially those set out in the product Installation, Operation and Maintenance Manual, as well as the applicable standards and regulations in force in each country.

Defects arising from the inappropriate or negligent use, operation, and/or installation of the equipment, non-execution of regular preventive maintenance, as well as defects resulting from external factors or equipment and components not supplied by WEG, will not be covered by the warranty.

The warranty will not apply if the customer at its own discretion makes repairs and/or modifications to the equipment without prior written consent from WEG.

The warranty will not cover equipment, components, parts and materials whose lifetime is usually shorter than the warranty period. It will not cover defects and/or problems resulting from force majeure or other causes not imputable to WEG, such as, but not limited to: incorrect or incomplete specifications or data supplied by the customer; transportation, storage, handling, installation, operation and maintenance not complying with the provided instructions; accidents; defects in the construction works; use in applications and/or environments for which the machine was not designed; equipment and/or components not included in the scope of WEG supply. The warranty does not include disassembly services at the buyer’s premises, product transportation costs and travel, lodging and meal expenses for the technical staff of the Service Centers, when requested by the customer.

The services under warranty will be provided exclusively at WEG authorized Service Centers or at one of its manufacturing plants.

Under no circumstances will the warranty services extend the equipment warranty period.

WEG’s Civil Liability is limited to the supplied product; WEG will not be liable for indirect or consequential damages, such as losses of profit and revenue losses and alike which may arise from the contract signed between the parties.

## 11. TECHNICAL SPECIFICATIONS

### 11.1. POWER SUPPLY

- Rated voltage: according product nameplate;
- Voltage tolerance: -10% to +10%;
- Frequency: 50/60 Hz (48Hz to 62Hz);
- Phase imbalance:  $\leq 3\%$  of the rated phase-to-phase input voltage;
- Minimum interval between consecutive power-cycle (ON/OFF) of the WECM input: 5 minutes.
- Maximum 1 connection from power supply cycle per 5 minutes.

## 11.2. STANDARDS AND DIRECTIVES

WECM motors comply with the latest versions of the following standards and regulations:

- EN 60034-1: Rotating electrical machines - Part 1: Rating and performance
- EN 60034-2-1: Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)
- EN 60034-5: Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification
- EN 60034-6: Rotating electrical machines - Part 6: Methods of cooling (IC code)
- EN 60034-7: Rotating electrical machines - Part 7: Classification of types of constructions, mounting arrangements and terminal box position (IM code)
- EN 60034-8: Rotating electrical machines - Part 8: Terminal markings and direction of rotation
- EN 60034-9: Rotating electrical machines - Part 9: Noise limits
- EN 60034-14: Rotating electrical machines - Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - measurement, evaluation and limits of vibration
- IEC TS 60034-30-2: Rotating electrical machines - Part 30-2: Efficiency classes of variable speed AC motors (IE-code)
- IEC 60072-1: Dimensions and Output Series for Rotating Electrical Machines Part 1: Frame Numbers 56 to 400 and Flange Numbers 55 to 1080
- EN 60204-1: Safety of machinery - electrical equipment of machines - Part 1: General requirements
- IEC 61800-3: Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
- IEC 61000-3-2: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions
- IEC 61000-3-3: Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current  $\leq 16\text{A}$  per phase and not subject to conditional connection
- UL/IEC 61800-5-1:2007: Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
- 2017/2102 (amending 2011/65/EU) - RoHS
- 2014/35/EU - The Low Voltage Directive (LVD)
- 2014/30/EU - Electromagnetic Compatibility (EMC) Directive

# UK CA Declaration of Conformity

**Manufacturers:**  
Changzhou Yatong Jiewei Electromotor Co.,LTD

No.118, Dongdu West Road, Luoyang Town, Wujin,  
Changzhou, Jiangsu, China.  
www.weg.net/cn

WEG (Chang Zhou) Automation Equipment Co.,Ltd  
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www.weg.net/cn  
WEGeuro – Industria Electrica S.A.  
Headquarters:

Rua Eng Frederico Ulrich, Apartado 6074  
4476-908 – Maia – Porto – Portugal  
www.weg.net/pt  
Contact person: Luís Filipe Oliveira Silva Castro Araújo  
Authorised Representative in the European Union  
(Single Contact Point)  
The manufacturer declares under sole responsibility  
that:

WEG electric motors and components used for following motor lines:


## **WECM – WEG Electronically Commutated Motor BLDC – Permanent Magnetic Synchronous Motor (AI)**

when installed, maintained and used in applications for which they were designed, and in compliance with the relevant installation standards and manufacturer's instructions, comply with the provisions of the following relevant United Kingdom statutory requirements, wherever applicable:

### **The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 – S.I. 2012/3032 Electrical Equipment (Safety) Regulations 2016 – S.I. 2016/1101 Electromagnetic Compatibility Regulations 2016 – S.I. 2016/1091**

The fulfilment of the safety objectives of the relevant United Kingdom statutory requirements has been demonstrated by compliance with the following designated standards, wherever applicable:

**EN 60034-2-1: 2014 / EN 60034-1: 2010 / EN IEC 60034-5: 2020 / EN IEC 60034-6: 1993 / IEC 60034-7: 2020 / EN 60034-8: 2007/A1: 2014 / EN 60034-9: 2005/A1: 2007 / EN IEC 60034-14: 2018 / CLC/TS 60034-25: 2008 / CLC IEC/TS 60034-30-2: 2021 / EN IEC 63000: 2018 / EN IEC 61800-3: 2018 / EN 60204-1: 2018 / WECM and BLDC: EN 61800-5-1: 2007/A1:2017/A11:2021**



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Signed for and on behalf of the manufacturer  
Rogerio Aguiar Rodrigues  
Managing Director

Changzhou, May 10, 2022

# EU Declaration of Conformity

**Manufacturers:**

**Changzhou Yatong Jiewei Electromotor Co.,LTD**  
No.118, Dongdu West Road, Luoyang Town, Wujin,  
Changzhou, Jiangsu, China.  
[www.yatongmotor.com](http://www.yatongmotor.com)

**WEG (Jiangsu) Electric Equipment CO., LTD.**

No. 15 Group, North City Street, Dengyuan  
Community  
Rugao City, Jiangsu Province – China [www.weg.net/cn](http://www.weg.net/cn)

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**(Single Contact Point)**

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[www.weg.net/pt](http://www.weg.net/pt)

The manufacturer declares under sole responsibility that:

WEG electric motors and components used for following motor lines:

**WECM – WEG Electronically Commutated Motor**

when installed, maintained and used in applications for which they were designed, and in compliance with the relevant installation standards and manufacturer's instructions, comply with the provisions of the following relevant European Union harmonisation legislation, wherever applicable:

**Low Voltage Directive 2014/35/EU**  
**EMC Directive 2014/30/EU**  
**RoHS Directive 2011/65/EU and its amendments**

The fulfilment of the safety objectives of the relevant European Union harmonisation legislation has been demonstrated by compliance with the following standards, wherever applicable:

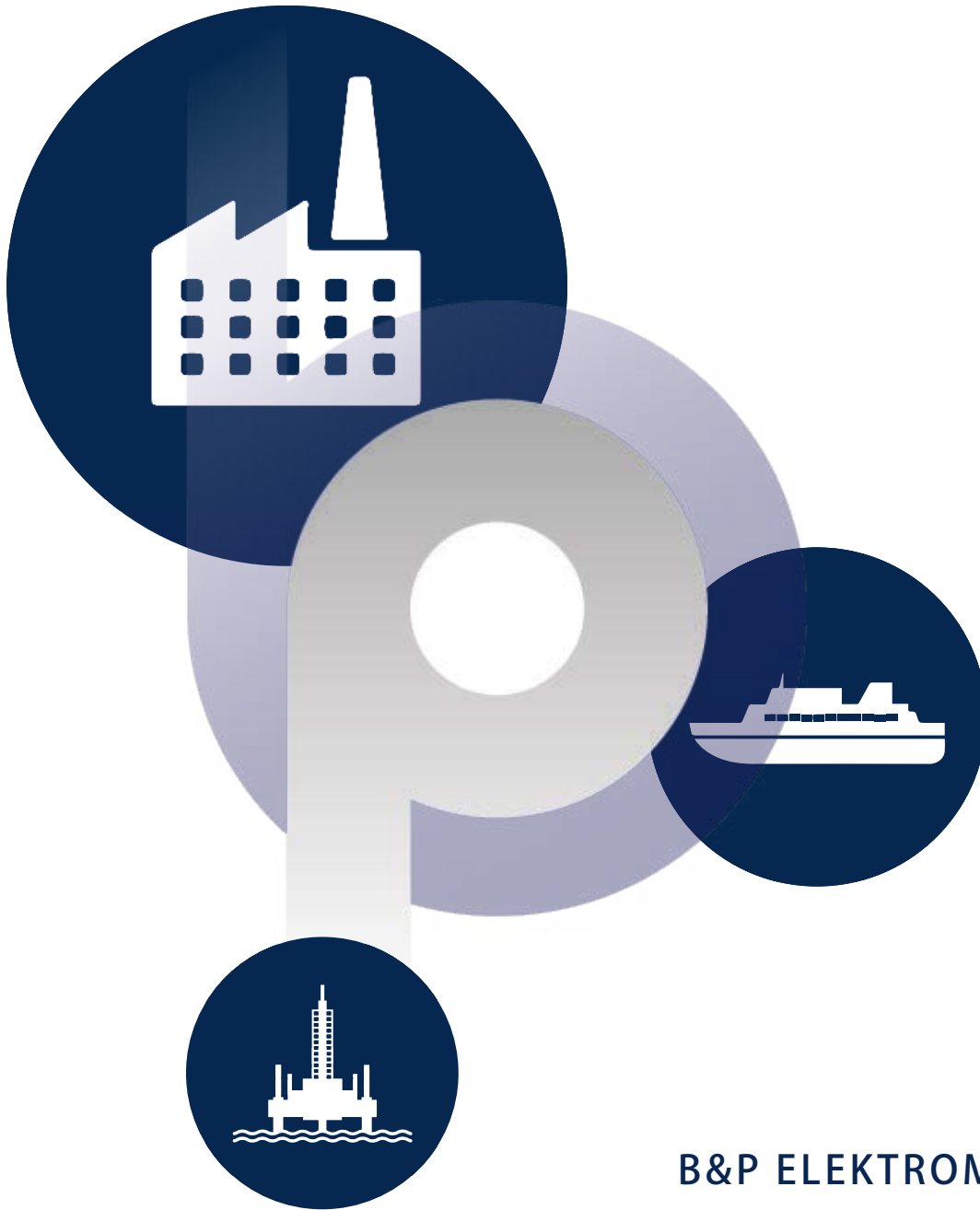
**EN 60034-1\*:2010 + AC:2010**  
**IEC 61800-3 / IEC 61800-5-1**

CE marking in: 2018

\* with all relevant parts and supplements



Signed for and on behalf of the manufacturer:  
**Rogerio Aguiar Rodrigues**  
Managing Director



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