



SINGLE-PHASE

ELECTRONICALLY  
COMMUTATED MOTORS



50081135

Installation, Operation and Maintenance Guide

1 FOREWORD



ATTENTION!

The installation, operation and maintenance of the motor must be always performed by qualified personnel using proper tools and methods and following the instructions contained in the documents supplied with the motor.

The instructions presented in this document are valid for WEG motors with the following characteristics:

- Single-phase input W30 Smart EC and Emerald eZA.

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 check the W30 Smart EC / Emerald eZA documentation on WEG website.



NOTE!

Electric motors have energized circuits and exposed rotating parts which may cause injuries to people.

2 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, with temperature between -25 °C and 60 °C and 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, 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.

Always handle the motor carefully in order to prevent personal injuries and impacts that could damage the bearings.

- When available, 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).

3 INSTALLATION

- 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.
- When available, 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 mentioned on the website documentation. Use flexible coupling whenever possible.

- 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.

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.

W30 Smart EC / Emerald product can be supplied with drains and slinger. For further information check the documentation on WEG website.

- The motor must always be positioned so the drain hole is at the lowest position.
- Motors supplied with rubber drain plugs leave the factory in the closed position and must be opened periodically to allow the exit of condensed water.
- For environments with high water condensation levels and motor with degree of protection IP55, the drain plugs can be mounted in open position.
- For motors with degree of protection IP56, IP65 or IP66, the drain plugs must remain at closed position, being opened only during the motor maintenance procedures.
- Motors installed outdoors or in the vertical position require the use of additional shelter to protect them from water.

Power Connections

Make the power connections following nameplate indication.

- Power input: Line and Neutral leads
- Protective earth: PE lead
- Input voltage selection (if available):
  - Interconnect the jumper leads to an 115 V input voltage.
  - Keep the jumper leads disconnected to 208 V or higher voltage.
- 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.
- Always connect the equipment to the ground protection (PE).

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

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.

Control Connections

Make the control connections following nameplate indication.

Table 3.1: Control connections

| Description                                  | Cable Color |
|----------------------------------------------|-------------|
| VSP - DC Voltage analog input (0 - 10 V)     | BLUE        |
| ISP - DC Current analog input (4 - 20 mA)    | RED         |
| PWM - Frequency duty-cycle input (10 - 95 %) | BROWN       |
| 10 V <sub>DC</sub> Output source             | YELLOW      |
| Speed reference output Frequency signal      | WHITE       |
| Common                                       | BLACK       |

Note: For the MODBUS version, please follow the cable colors indicated on the motor nameplate or refer to Item 9.1 from user manual.

EMC Requirements for Conforming Installations

The standard W30 Smart EC / Emerald eZA mounting solution (drive attached to the motor) comply with IEC61800-3 / FCC requirements. For optional decentralized mounting, the product class may change and the product may require the use of external filters. Consult WEG for the solution that better comply with your installation requirements.

PASSIVE POWER FACTOR CORRECTION (PFC)

W30 Smart EC / Emerald eZA require the use of an external filter (passive PFC) to comply with harmonic current emissions requirements (EN 61000-3-2). The passive PFC filter shall be installed in series with the line (L) power cable. Consult WEG about the optional external filters.

4 OPERATION



ATTENTION!

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.

Selecting the Rotation Direction

Use the DIP switch identified as CW / CCW to select the rotation direction between counter-clockwise (CCW) or clockwise (CW), looking from the motor drive end (shaft).

How to Adjust Speed

The product speed can be changed by local adjust (buttons) or remote adjust (control inputs). Use the DIP switch identified as R / L to select between remote (R) or local (L).

■ Local Speed Adjust

Use the two tact buttons located in the opening on the back cover to change speed. Keep pressing button identified as - to decelerate or button identified as + to accelerate the motor.

■ Remote Speed Adjusts:

- DC voltage: 2 to 10 V DC.
- DC current: 4 to 20 mA DC.
- Frequency duty-cycle / PWM: 10 to 95 %.

The product will turn off if imposed signals lower than 2 V DC, 4 mA DC or 10 %.

- After remove and reinstall, make sure that the lid from the back side of the drive cover is securely closed to guarantee the protection degree.
- The product will not go to speeds higher than the value adjusted to be the maximum speed.
- For further information check the documentation on WEG website.

Product Additional Features

W30 Smart EC / Emerald eZA may have additional features.

For Fire Mode function, adjust the minimum and maximum speed, serial communication, alarm relay and others, check the documentation on WEG website.

5 PRODUCT PROTECTIONS AND FAULT DIAGNOSIS

W30 Smart EC / Emerald eZA have a LED to help in the fault diagnosis:

- 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 W30 Smart EC / Emerald eZA, i.e., will not block the IGBTs. If the motor was spinning, will continue spinning. For more information check the documentation on WEG website.

Table 5.1: Common fault causes and blink codes

| Blinking Periods | Fault                             | ON Time | Off Time | Wait / Interval Time (OFF) |
|------------------|-----------------------------------|---------|----------|----------------------------|
| 2                | Under voltage                     | 0.1 s   | 0.1 s    | -                          |
| 3                | Overload / over current           | 0.25 s  | 0.25 s   | 2 s                        |
| 5                | IPM Temperature limitation        |         |          |                            |
| 6                | Overvoltage                       |         |          |                            |
| 9                | Communication timeout             |         |          |                            |
| 10               | Watchdog timeout                  |         |          |                            |
| 11               | Locked rotor                      |         |          |                            |
| 12               | Voltage transient                 |         |          |                            |
| 14               | Modbus communication time-out (*) |         |          |                            |

Note: (\*) Only valid for MODBUS communication versions at address 0x0050.

6 MAINTENANCE

- Before any service is performed, ensure that motor is it 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 (W30 Smart EC 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.
- 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.

| UK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  | EU DECLARATION OF CONFORMITY |                                                                                                                                                                                                                                                                                                                                                                                        |  |  |
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| Manufacturers:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |                                                                                                                                                                                                                                                                                                                                                                                        |  |  |
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| <p>Declare under sole responsibility that WEG electric motors and components used below comply with the following standards:</p> <p>EN IEC 60034-1:2011 EN IEC 60034-2:2011 EN IEC 60034-3:2011 EN IEC 60034-4:2011 EN IEC 60034-5:2011 EN IEC 60034-6:2011 EN IEC 60034-7:2011 EN IEC 60034-8:2011 EN IEC 60034-9:2011 EN IEC 60034-10:2011 EN IEC 60034-11:2011 EN IEC 60034-12:2011 EN IEC 60034-13:2011 EN IEC 60034-14:2011 EN IEC 60034-15:2011 EN IEC 60034-16:2011 EN IEC 60034-17:2011 EN IEC 60034-18:2011 EN IEC 60034-19:2011 EN IEC 60034-20:2011 EN IEC 60034-21:2011 EN IEC 60034-22:2011 EN IEC 60034-23:2011 EN IEC 60034-24:2011 EN IEC 60034-25:2011 EN IEC 60034-26:2011 EN IEC 60034-27:2011 EN IEC 60034-28:2011 EN IEC 60034-29:2011 EN IEC 60034-30:2011 EN IEC 60034-31:2011 EN IEC 60034-32:2011 EN IEC 60034-33:2011 EN IEC 60034-34:2011 EN IEC 60034-35:2011 EN IEC 60034-36:2011 EN IEC 60034-37:2011 EN IEC 60034-38:2011 EN IEC 60034-39:2011 EN IEC 60034-40:2011 EN IEC 60034-41:2011 EN IEC 60034-42:2011 EN IEC 60034-43:2011 EN IEC 60034-44:2011 EN IEC 60034-45:2011 EN IEC 60034-46:2011 EN IEC 60034-47:2011 EN IEC 60034-48:2011 EN IEC 60034-49:2011 EN IEC 60034-50:2011 EN IEC 60034-51:2011 EN IEC 60034-52:2011 EN IEC 60034-53:2011 EN IEC 60034-54:2011 EN IEC 60034-55:2011 EN IEC 60034-56:2011 EN IEC 60034-57:2011 EN IEC 60034-58:2011 EN IEC 60034-59:2011 EN IEC 60034-60:2011 EN IEC 60034-61:2011 EN IEC 60034-62:2011 EN IEC 60034-63:2011 EN IEC 60034-64:2011 EN IEC 60034-65:2011 EN IEC 60034-66:2011 EN IEC 60034-67:2011 EN IEC 60034-68:2011 EN IEC 60034-69:2011 EN IEC 60034-70:2011 EN IEC 60034-71:2011 EN IEC 60034-72:2011 EN IEC 60034-73:2011 EN IEC 60034-74:2011 EN IEC 60034-75:2011 EN IEC 60034-76:2011 EN IEC 60034-77:2011 EN IEC 60034-78:2011 EN IEC 60034-79:2011 EN IEC 60034-80:2011 EN IEC 60034-81:2011 EN IEC 60034-82:2011 EN IEC 60034-83:2011 EN IEC 60034-84:2011 EN IEC 60034-85:2011 EN IEC 60034-86:2011 EN IEC 60034-87:2011 EN IEC 60034-88:2011 EN IEC 60034-89:2011 EN IEC 60034-90:2011 EN IEC 60034-91:2011 EN IEC 60034-92:2011 EN IEC 60034-93:2011 EN IEC 60034-94:2011 EN IEC 60034-95:2011 EN IEC 60034-96:2011 EN IEC 60034-97:2011 EN IEC 60034-98:2011 EN IEC 60034-99:2011 EN IEC 60034-100:2011 EN IEC 60034-101:2011 EN IEC 60034-102:2011 EN IEC 60034-103:2011 EN IEC 60034-104:2011 EN IEC 60034-105:2011 EN IEC 60034-106:2011 EN IEC 60034-107:2011 EN IEC 60034-108:2011 EN IEC 60034-109:2011 EN IEC 60034-110:2011 EN IEC 60034-111:2011 EN IEC 60034-112:2011 EN IEC 60034-113:2011 EN IEC 60034-114:2011 EN IEC 60034-115:2011 EN IEC 60034-116:2011 EN IEC 60034-117:2011 EN IEC 60034-118:2011 EN IEC 60034-119:2011 EN IEC 60034-120:2011 EN IEC 60034-121:2011 EN IEC 60034-122:2011 EN IEC 60034-123:2011 EN IEC 60034-124:2011 EN IEC 60034-125:2011 EN IEC 60034-126:2011 EN IEC 60034-127:2011 EN IEC 60034-128:2011 EN IEC 60034-129:2011 EN IEC 60034-130:2011 EN IEC 60034-131:2011 EN IEC 60034-132:2011 EN IEC 60034-133:2011 EN IEC 60034-134:2011 EN IEC 60034-135:2011 EN IEC 60034-136:2011 EN IEC 60034-137:2011 EN IEC 60034-138:2011 EN IEC 60034-139:2011 EN IEC 60034-140:2011 EN IEC 60034-141:2011 EN IEC 60034-142:2011 EN IEC 60034-143:2011 EN IEC 60034-144:2011 EN IEC 60034-145:2011 EN IEC 60034-146:2011 EN IEC 60034-147:2011 EN IEC 60034-148:2011 EN IEC 60034-149:2011 EN IEC 60034-150:2011 EN IEC 60034-151:2011 EN IEC 60034-152:2011 EN IEC 60034-153:2011 EN IEC 60034-154:2011 EN IEC 60034-155:2011 EN IEC 60034-156:2011 EN IEC 60034-157:2011 EN IEC 60034-158:2011 EN IEC 60034-159:2011 EN IEC 60034-160:2011 EN IEC 60034-161:2011 EN IEC 60034-162:2011 EN IEC 60034-163:2011 EN IEC 60034-164:2011 EN IEC 60034-165:2011 EN IEC 60034-166:2011 EN IEC 60034-167:2011 EN IEC 60034-168:2011 EN IEC 60034-169:20</p> |  |                              |                                                                                                                                                                                                                                                                                                                                                                                        |  |  |