

English

Quick Installation Guide

CFW500 Frequency Inverter



13348698

1 SAFETY INSTRUCTIONS

This quick installation guide contains the basic information necessary to commission the CFW500. It has been written to be used by qualified personnel with suitable training or technical qualification for operating this type of equipment. The personnel shall follow all the safety instructions described in this manual defined by the local regulations. Failure to comply with the safety instructions may result in death, serious injury, and/or equipment damage.

2 SAFETY WARNINGS IN THIS MANUAL AND IN THE PRODUCT

DANGER! The procedures recommended in this warning aim at protecting the user against death, serious injuries and considerable material damages.

ATTENTION! The procedures recommended in this warning aim at preventing material damages.

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

High voltages present.

Components sensitive to electrostatic discharges. Do not touch them.

The connection to the protection grounding is required (PE).

Connection of the shield to the grounding.

3 PRELIMINARY RECOMMENDATIONS

DANGER! Always disconnect the general power supply before changing any electric component associated to the inverter. Many components may remain loaded with high voltages and/or moving (fans), even after the AC power supply input is disconnected or turned off. Wait for at least ten minutes in order to guarantee the full discharge of the capacitors. Always connect the grounding point of the inverter to the protection grounding.

NOTE! Frequency Inverter may interfere with other electronic equipment. Follow the precautions recommended in manual available in www.weg.net.

NOTE! It is not the intention of this guide to present all the possibilities for the application of the CFW500, as well as WEG cannot take any liability for the use of the CFW500 which is not based on this guide. For further information about installation, full parameter list and recommendations, visit the website www.weg.net.

Do not execute any applied potential test on the inverter! If necessary, contact WEG.

ATTENTION! Electronic boards have components sensitive to electrostatic discharges. Do not touch directly on components or connectors. If necessary, first touch the grounding point of the inverter, which must be connected to the protection earth (PE) or use a proper grounding strap.

DANGER! Crushing Hazard In order to ensure safety in load lifting applications, electric and/or mechanical devices must be installed outside the inverter for protection against accidental fall of load.

DANGER! This product was not designed to be used as a safety element. Additional measures must be taken so as to avoid material and personal damages. The product was manufactured under strict quality control, however, if installed in systems where its failure causes risks of material or personal damages, additional external safety devices must ensure a safety condition in case of a product failure, preventing accidents.

ATTENTION! The operation of this equipment requires detailed installation and operation instructions provided in the user's manual, programming manual and communication manuals.

4 ABOUT THE CFW500

The frequency inverter CFW500 is a high-performance product which allows the speed and torque control of three-phase induction motors. This product provides the user with the options of vector (V/V) or scalar (V/f) control, both programmable according to the application. In the vector mode (V/V), the operation is optimized for the motor in use, obtaining a better performance in terms of speed regulation. The scalar mode (V/f) is recommended for simpler applications, such as the activation of most pumps and fans. The V/f mode is used when more than a motor is activated by an inverter simultaneously (multimotor applications).

5 NOMENCLATURA

Table 1: Nomenclature of the inverters CFW500

Product and Series	Identification of the Model				Brake	Protection Rate	Conducted Emission Level	Hardware Version	Special Software Version
	Frame	Rated Current	N° of Phases	Rated Voltage					
Ex.: CFW500	A	02P6	T	4	NB	20	C2	---	---
Available options	See Table 2								Blank = standard
	NB = without dynamic braking								Sx = special software
	DB = with dynamic braking								Blank = standard plug-in module
	20 = IP20								H00 = without plug-in
	N1 = cabinet Nema1 (type 1 as per UL) (protection rate according to standard IEC IP20)								Blank = it does not meet the levels of standards for conducted emission
									C2 or C3 = as per category 2 (C2) or 3 (C3) of IEC 61800-3, with internal RFI filter

Table 2: Available options for each field of the nomenclature according to the rated current and voltage of the inverter

Frame	Output Rated Current	N° de Phases	Rated Voltage	Available Options for the Remaining Identification Codes of the Inverters			
				Brake	Protection Rate	Conducted Emission Level	Hardware Version
A	01P6 = 1,6 A	S = single-phase power supply	2 = 200... 240 V	NB	20 or N1	Blank or C2	Blank or H00
	02P6 = 2,6 A						
	04P3 = 4,3 A						
	07P0 = 7,0 A						
B	07P3 = 7,3 A	B = single-phase or three-phase power supply	4 = 380...480 V	DB	20 or N1	Blank or C2	Blank or H00
	10P0 = 10 A						
	01P6 = 1,6 A						
	02P6 = 2,6 A						
C	04P3 = 4,3 A	T = three-phase power supply	5 = 500...600 V	DB	20 or N1	Blank or C2	Blank or H00
	07P3 = 7,3 A						
	10P0 = 10 A						
	12P0 = 12 A						

6 IDENTIFICATION LABEL

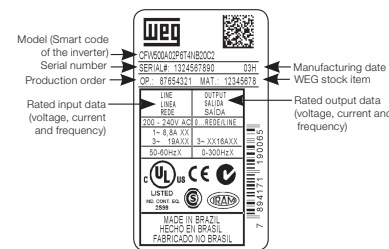


Figure 1: Description of the identification labels on the CFW500

7 RECEIVING AND STORAGE

The CFW500 is supplied packed in a cardboard box. On this package, there is an identification label which is the same as the one attached to the side of the inverter. Check it:

- The identification of the CFW500 matches the model purchased.
- Any damages occurred during transportation.

Report any damage immediately to the carrier. If the CFW500 is not installed soon, store it in a clean and dry location (temperature between -25 °C and 60 °C (-77 °F and 140 °F)), with a cover to prevent dust accumulation inside it.

ATTENTION! When the inverter is stored for a long period, it becomes necessary to perform the capacitor reforming. Refer to the procedure recommended in www.weg.net.

8 INSTALLATION AND CONNECTION

8.1 Environmental Conditions:

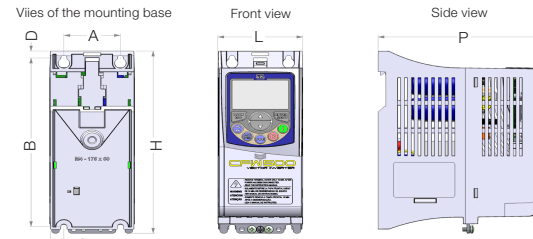
- Avoid:**
 - Direct exposure to sunlight, rain, high humidity or sea-air.
 - Inflammable or corrosive liquids or gases.
 - Excessive vibration.
 - Dust, metallic particles or oil mist.

Environmental conditions permitted for the operation of the inverter:

- Temperature surrounding the inverter: from -10 °C (14 °F) to the nominal temperature.
- For temperatures surrounding the inverter higher than the specifications in Table B.2 in the user's manual, it is necessary to apply of 2 % of current derating for each Celsius degree, limited to an increase of 10 °C (50 °F).
- Air relative humidity: 5 % to 95 % non-condensing.
- Maximum altitude: up to 1000 m (3.300 ft) - nominal conditions.
- 1000 m to 4000 m (3.300 ft to 13.200 ft) - 1 % of current derating for each 100 m (328 ft) above 1000 m of altitude.
- From 2000 m to 4000 m (6.600 ft to 13.200 ft) above sea level - maximum voltage reduction (240 V for 200...240 V models, 480 V for 380...480 V models and 600 V for 500...600 V models) of 1.1 % for each 100 m (330 ft) above 2000 m (6.600 ft).
- Pollution degree: 2 (according to EN 50178 and UL 508C), with non-conductive pollution. Condensation must not originate conduction through the accumulated residues.

8.2 Positioning and Mounting

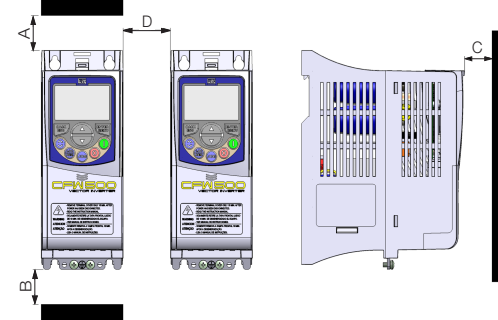
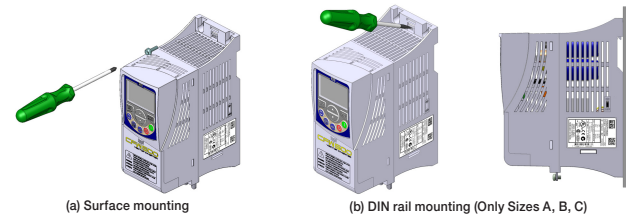
The external dimensions and the drilling for the mounting, as well as the net weight (mass) of the inverter are presented in Figure 2. Mount the inverter in the upright position on a flat and vertical surface. First, put the screws on the surface where the inverter will be installed, install the inverter and then tighten the screws observing the maximum torque for the screws indicated in Figure 2. Allow the minimum clearances indicated in Figure 3, in order to allow the cooling air circulation. Do not install heat sensitive components right above the inverter.



Frame	A	B	C	D	H	L	P	Weight	Mounting Bolt	Recommended Torque
										N.m (lbf.in)
A	50 (1.97)	175 (6.89)	11,9 (0.47)	7,2 (0.28)	189 (7.44)	75 (2.95)	150 (5.91)	0,8 (1,76) (1)	M4	2 (17,7)
B	75 (2,95)	185 (7,30)	11,8 (0,46)	7,3 (0,29)	199 (7,83)	100 (3,94)	160 (6,30)	1,2 (2,65) (1)	M4	2 (17,7)
C	100 (3,94)	195 (7,70)	16,7 (0,66)	5,8 (0,23)	210 (8,27)	135 (5,31)	165 (6,50)	2 (4,4)	M5	3 (26,5)
D	125 (4,92)	290 (11,41)	27,5 (1,08)	10,2 (0,40)	306,6 (12,1)	180 (7,08)	166,5 (6,55)	4,3 (0,16)	M6	4,5 (39,82)
E	150 (5,9)	330 (13)	34 (1,34)	10,6 (0,4)	350 (13,8)	220 (8,7)	191,5 (7,5)	10 (22,05)	M6	4,5 (39,82)

Dimension tolerance: ±1,0 mm (±0,039 in)
(1) This value refers to the heaviest weight of the frame size.

Figure 2: Inverter dimensions for mechanical installation



Frame	Minimum ventilation free spaces			
	A	B	C	D
A	15 (0.59)	40 (1.57)	30 (1.18)	10 (0.39) (1)
B	35 (1.38)	50 (1.97)	40 (1.57)	15 (0.59) (1)
C	40 (1.57)	50 (1.97)	50 (1.97)	30 (1.18)
D	40 (1.57)	50 (1.97)	50 (1.97)	40 (1.57)
E	110 (4.33)	130 (5.11)	50 (1.96)	40 (1.57)

Dimension tolerance: ±1,0 mm (±0,039 in)
(1) It is possible to mount inverters side by side without lateral free space (D = 0), however with maximum ambient temperature of 40 °C (104 °F).

Figure 3: (a) to (c) - Mechanical installation data (surface mounting and minimum ventilation free spaces)

ATTENTION!

- When installing two or more inverters vertically, respect the minimum clearance A + B (as per Figure 3) and provide an air deflecting plate so that the heat rising up from the bottom inverter does not affect the top inverter.
- Provide independent conduits for the physical separation of signal, control, and power cables (refer to the Chapter 9 ELECTRICAL INSTALLATION).

8.3 Cabinet Mounting

For inverters installed inside cabinets or metallic boxes, provide proper exhaustion, so that the temperature remains within the allowed range. Refer to the dissipated powers in Table 3 shows the air flow of nominal ventilation for each frame. **Cooling Method:** fan with air flow upwards.

Table 3: Air flow of the fan

Frame	CFM	l/s	m³/min
A	20	9.4	0.56
B	30	14.1	0.85
C	30	14.1	0.85
D (T2)*	100	47.2	2.83
E (T4)**	80	37.8	2.27
E	180	84.5	5.09

(*) T2 - CFW500 frame D line 200 V (200...240 V).
(**) T4 - CFW500 frame D line 400 V (380...480 V).

8.4 Surface Mounting

Figure 3 illustrates the procedure for the installation of the CFW500 on the mounting surface.

8.5 DIN-Rail Mounting

In frames A, B and C, the inverter CFW500 can also be mounted directly on 35-mm rail as per DIN EN 50.022. For this mounting, you must first position the lock⁽¹⁾ down and then place the inverter on the rail, position the lock⁽¹⁾ up, fixing the inverter.

(1) The fastening lock of the inverter on the rail is indicated with a screwdriver in Figure 3.

9 ELECTRICAL INSTALLATION

DANGER!

- The following information is merely a guide for proper installation. Comply with applicable local regulations for electrical installations.
- Make sure the power supply is disconnected before starting the installation.
- The CFW500 must not be used as an emergency stop device. Provide other devices for that purpose.

ATTENTION! Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with applicable local codes.

9.1 Identification of the Power Terminals and Grounding Points

The power terminals can be of different sizes and configurations, depending on the model of the inverter, according to Table 4. The maximum torque of the power terminals and grounding points must be checked in Table 4.

Table 4: Power terminals, grounding points and recommended tightening torque

Frame	Power Supply	Grounding Points		Power Terminals	
		N.m	Lbf.in	N.m	Lbf.in
A	200...240 V	0,5	4,34	0,5	4,34
	380...480 V	0,5	4,34	0,5	4,34
B	200...240 V	0,5	4,34	0,5	4,34
	380...480 V	0,5	4,34	0,5	4,34
C	200...240 V	0,5	4,34	1,7	15,00
	380...480 V	0,5	4,34	1,8	15,93
	500...600 V	0,5	4,34	1,0	8,69
D	200...240 V	0,5	4,34	2,4	21,24
	380...480 V	0,5	4,34	1,76	15,57
E	200...240 V	0,5	4,34	3,05	27
	380...480 V	0,5	4,34	3,05	27

Description of the power terminals:
L/L1, N/L2, L3 (R, S, Y, T): AC power supply. Some models of voltage 200-240 V (see option of models in Table 10) can operate in 2 or 3 phases (single-phase/ three-phase inverters) without derating of the rated current. In this case, the AC power supply can be connected to two of the three input terminals without distinction. For the single-phase models only, the power voltage must be connected to L/L1 and N/L2.

U, V, W: connection for the motor.
-UD: negative pole of the voltage of the DC bus.
+UD: positive pole of the voltage of the DC bus.
BR: connection of the brake resistor.
DCR: connection to the external DC link inductor (optional). Only available for models 28 A, 33 A, 47 A and 56 A / 200-240 V and 24 A, 31 A, 39 A and 49 A / 380-480 V.

9.2 Power and Grounding Wiring, Circuit Breakers and Fuses

ATTENTION!

- Use proper cable lugs for the power and grounding connection cables. Refer to Table 10 for recommended wiring, circuit breakers and fuses.
- Keep sensitive equipment and wiring at a minimum distance of 0.25 m from the inverter and from the cables connecting the inverter to the motor.
- It is not recommended the use of mini circuit breakers (MDU), because of the actuation level of the magnet.

ATTENTION! Residual Current Device (RCD):

- When installing an RCD to guard against electrical shock, only devices with a trip current of 300 mA should be used on the supply side of the inverter.
- Depending on the installation (motor cable length, cable type, multimotor configuration, etc.), the RCD protection may be activated. Contact the RCD manufacturer for selecting the most appropriate device to be used with inverters.

NOTE!

- The wire gauges listed in Table 10 are orientative values. Installation conditions and the maximum permitted voltage drop must be considered for the proper wiring sizing.
- In order to meet UL requirements, use ultra fast (for frame sizes A, B and C), and use fuse type J or circuit breaker (for frame sizes D and E) fuses at the inverter supply with a current not higher than the values presented in Table 10.

9.3 Power Connections

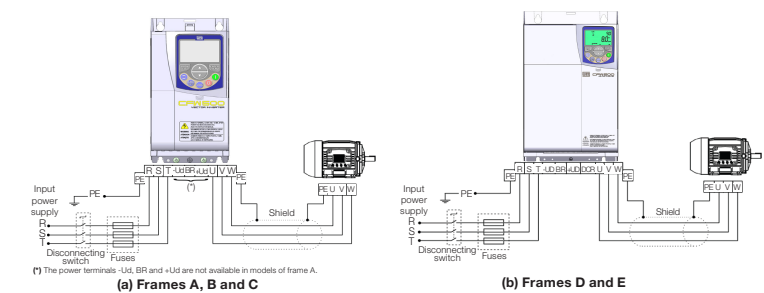


Figure 4: (a) and (b) - Power and grounding connections

9.3.1 Input Connections

DANGER! Provide a disconnect device for the inverter power supply. This device must cut off the power supply whenever necessary (during maintenance for instance).

ATTENTION! The power supply that feeds the inverter must have a grounded neutral. In case of IT networks, follow the instructions described in the user's manual.

NOTE!

- The input power supply voltage must be compatible with the inverter rated voltage.
- Power factor correction capacitors are not needed at the inverter input (L/L1, N/L2, L3 or R, S, T) and must not be installed at the output (U, V, W).

Power supply capacity

Suitable for use in circuits capable of delivering not more than 30.000 Arms symmetrical (200 V, 480 V or 600 V), when protected by fuses as specified in Table 10.

9.3.2 Inductor of the DC Link/ Reactance of the Power Supply

In order to prevent damages to the inverter and assure the expected useful life, you must have a minimum impedance that provide a voltage drop of the input power supply of 1 %. If the impedance of the input power supply (due to the transformers and cabling) is below the values listed in this table, we recommend the use of reactance in the input power supply.

