



Quick Installation Guide

CFW300 Micro Drive

1 SAFETY INSTRUCTIONS

This quick installation guide contains the basic information necessary to commission the CFW300. It has been written to be used by qualified personnel with suitable training or technical qualification for operating this type of equipment. The personnel must 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 THE MANUAL AND IN THE PRODUCT

NOTE!
It is not the intention of this guide to present all the possibilities for the application of the CFW300, as well as WEG cannot take any liability for the use of the CFW300 which is not based on this guide. For further information about installation, full parameter list and recommendations, visit the website www.weg.net.

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.

High voltages are present.

Components sensitive to electrostatic discharge. Do not touch them.

Mandatory connection to the protective ground (PE).

Connection of the shield to the ground.

3 PRELIMINARY RECOMMENDATIONS

DANGER!
■ Always disconnect the main power supply before touching any electrical component associated to the inverter. Several components can remain charged with high voltages or remain in movement (fans) even after the AC power is disconnected or switched off. Wait at least ten minutes after turning off the input power for the complete discharge of the power capacitors. Always connect the grounding point of the inverter to the protection earth (PE).
■ The XC10 connector is not USB compatible, therefore, it cannot be connected to USB ports. This connectors serve only as interface between the CFW300 frequency inverter and its accessories.

NOTE!
Frequency Inverter may interfere with other electronic equipment. Follow the precautions recommended in user's manual available for download on the website: www.weg.net.

**Do not perform any withstand voltage test (hi-pot test)!
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!
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.

4 ABOUT THE CFW300

The CFW300 frequency inverter is a high-performance product which allows speed and torque control of three-phase induction motors. This product provides the user with the options of vector (VW) or scalar (V/f) control, both programmable according to the application.

5 TERMINOLOGY

Table 1: Terminology of the CFW300 inverters

Product and Series	Model Identification							
	Frame Size	Rated Current	Phase Number	Rated Voltage	Brake	Degree of Protection	Hardware Version	Software Version
Ex.: CFW300	A	01P6	S	2	NB	20	---	---
Available options							Blank = standard	
							Sx = special software	
							DB = with dynamic braking	
							Hx = special hardware	
							20 = IP20	

NOTE!
■ **200 V Line:** Models with power supply of 110 to 127 Vac, 200 to 240 Vac or 280 to 340 Vdc (S1, S2, B2, T2 or D3).
■ **400 V Line:** Models with power supply of 380 to 480 Vac or 513 to 650 Vdc (T4).

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

Frame Size	Output Rated Current	Nº of Phases	Rated Voltage	Brake
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	01P6 = 1.6 A		1 = 110...127 Vac	
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	10P0 = 10.0 A			
	15P2 = 15.2 A			
	01P1 = 1.1 A			
	01P8 = 1.8 A			
	02P6 = 2.6 A			
	03P5 = 3.5 A			
	04P8 = 4.8 A			
	06P5 = 6.5 A			
	08P2 = 8.2 A			
	10P0 = 10.0 A			
	12P0 = 12.0 A			
	15P0 = 15.0 A			
	01P1 = 1.1 A			
	01P8 = 1.8 A			
	02P6 = 2.6 A			
	03P5 = 3.5 A			
	04P8 = 4.8 A			
	06P5 = 6.5 A			
	08P2 = 8.2 A			
	10P0 = 10.0 A			
	12P0 = 12.0 A			
	15P0 = 15.0 A			
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	10P0 = 10.0 A			
	15P2 = 15.2 A			
	01P1 = 1.1 A			
	01P8 = 1.8 A			
	02P6 = 2.6 A			
	03P5 = 3.5 A			
	04P8 = 4.8 A			
	06P5 = 6.5 A			
	08P2 = 8.2 A			
	10P0 = 10.0 A			
	12P0 = 12.0 A			
	15P0 = 15.0 A			
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	10P0 = 10.0 A			
	15P2 = 15.2 A			
	01P1 = 1.1 A			
	01P8 = 1.8 A			
	02P6 = 2.6 A			
	03P5 = 3.5 A			
	04P8 = 4.8 A			
	06P5 = 6.5 A			
	08P2 = 8.2 A			
	10P0 = 10.0 A			
	12P0 = 12.0 A			
	15P0 = 15.0 A			
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	10P0 = 10.0 A			
	15P2 = 15.2 A			
	01P1 = 1.1 A			
	01P8 = 1.8 A			
	02P6 = 2.6 A			
	03P5 = 3.5 A			
	04P8 = 4.8 A			
	06P5 = 6.5 A			
	08P2 = 8.2 A			
	10P0 = 10.0 A			
	12P0 = 12.0 A			
	15P0 = 15.0 A			
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	10P0 = 10.0 A			
	15P2 = 15.2 A			
	01P1 = 1.1 A			
	01P8 = 1.8 A			
	02P6 = 2.6 A			
	03P5 = 3.5 A			
	04P8 = 4.8 A			
	06P5 = 6.5 A			
	08P2 = 8.2 A			
	10P0 = 10.0 A			
	12P0 = 12.0 A			
	15P0 = 15.0 A			
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	10P0 = 10.0 A			
	15P2 = 15.2 A			
	01P1 = 1.1 A			
	01P8 = 1.8 A			
	02P6 = 2.6 A			
	03P5 = 3.5 A			
	04P8 = 4.8 A			
	06P5 = 6.5 A			
	08P2 = 8.2 A			
	10P0 = 10.0 A			
	12P0 = 12.0 A			
	15P0 = 15.0 A			
	01P6 = 1.6 A			
	02P6 = 2.6 A			
	04P2 = 4.2 A			
	06P0 = 6.0 A			
	07P3 = 7.3 A			
	10P0 = 10.0 A			
	15P2 = 15.2 A			
	01P1 = 1.1 A			
	01P8 = 1.8 A			
	02P6 = 2.6 A			
	03P5 = 3.5 A			
	04P8 = 4.8 A			
	06P5 = 6.5 A		</td	

9.3.1.1 Short Circuit Current Ratings (SCCR)

- The CFW300 is suitable for use in circuits capable of delivering not more than (see column "SCCR") KA_{rms} symmetrical (127 V, 240 V or 480 V), when protected by fuses or circuit breakers as specified in Table 10.
- In case the CFW300 is installed in power supplies with current capacity over the specified, it is necessary to use protection circuits, such as fuses or circuit breakers, proper for those power supplies.

ATTENTION!

The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the inverter or cabinet should be examined and replaced if damaged. If the burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

9.3.2 Power Supply Reactance

In order to prevent damages to the inverter and assure the expected useful life, you must have a minimum line impedance that provides a line voltage drop of 1 %. For more details, refer to the user's manual available at www.weg.net.

9.3.3 Dynamic Braking

NOTE!

The dynamic braking is available on DB models from frame size B onwards.

Refer to Table 10 for the following specifications of the dynamic braking: maximum current, minimum braking resistance, rms current and cable gauge.

Refer to the user's manual available at www.weg.net for correct installation, sizing and protection.

9.3.4 Output Connections

The characteristics of the cable used to connect the motor to the inverter, as well as its interconnection and routing, are extremely important to avoid electromagnetic interference in other equipment. Keep motor cables away from other cables (signal cables, sensor cables, control cables, etc.), according to Table 4. For more information, refer to the user's manual available at www.weg.net.

9.4 GROUNDING CONNECTIONS

DANGER!

- The inverter must be connected to a protective ground (PE).
- Use a minimum wire gauge for ground connection equal to the indicated in Table 10.
- Connect the inverter grounding connections to a ground bus bar, to a single ground point or to a common grounding point (impedance $\leq 10 \Omega$).
- The neutral conductor of the line that feeds the inverter must be solidly grounded; however this conductor must not be used to ground the inverter.
- Do not share the grounding wiring with other equipment that operate with high currents (e.g.: high voltage motors, welding machines, etc.).

9.5 CONTROL CONNECTIONS

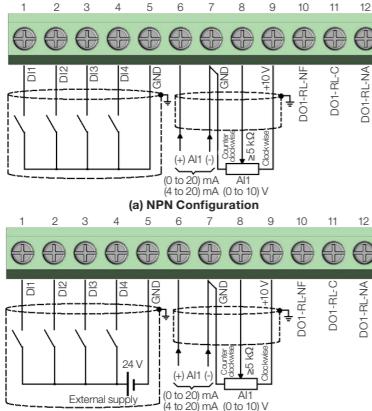


Figure 6: (a) and (b) Signals of C300 control card connector

For the correct connection of the control, use:

- Gauge of the cables: 0.5 mm² (20 AWG) to 1.5 mm² (14 AWG).
- Maximum torque: 0.4 N.m (3.54 lb.in).
- Wiring of the connector of the control board with shielded cable and separated from the other wiring (power, command in 110 V / 220 Vac, etc.).
- Relays, contactors, solenoids or coils of electromechanical brake installed close to the inverters may occasionally generate interference in the control circuitry. To eliminate this effect, RC suppressors (with AC power supply) or freewheel diodes (with DC power supply) must be connected in parallel to the coils of these devices.
- Provide separation between the control and the power cables according to Table 4.

Table 4: Separation distance between cables

Output Rated Current of the Inverter	Cable Length	Minimum Separation Distance
$\leq 24 \text{ A}$	$\leq 100 \text{ m (330 ft)}$	$\geq 10 \text{ cm (3.94 in)}$
	$> 100 \text{ m (330 ft)}$	$\geq 25 \text{ cm (9.84 in)}$

9.6 INSTALLATIONS ACCORDING TO EUROPEAN DIRECTIVE OF ELECTROMAGNETIC COMPATIBILITY

The CFW300 inverter series, when properly installed, meet the requirements of the directive of the electromagnetic compatibility (2014/30/EU).

These inverters were developed for professional applications only. Therefore, the emission limits of harmonic currents established by the EN 61000-3-2 and EN 61000-3-2/A 14 standards are not applicable.

9.6.1 Conformal Installation

- Shielded output cables (motor cables) with shield connected at both ends, motor and inverter, by means of a low impedance to high frequency connection. Maximum motor cable length and conducted and radiated emission levels according to Table 7.
- Shielded control cables, keeping the separation distance from other cables according to Table 4.
- Grounding of the inverter according to instructions of the Section 9.4 GROUNDING CONNECTIONS.
- Grounded power supply.
- Use short wiring to ground the external filter or inverter.
- Ground the mounting plate using a flexible braid as short as possible. Flat conductors have lower impedance at high frequencies.
- Use cord grips for strain relief on conduits.

9.6.2 Emission and Immunity Levels

Table 5: Emission and immunity levels

EMC Phenomenon	Basic Standard	Level
Emission:		
Mains terminal disturbance voltage Frequency range: 150 kHz to 30 MHz	IEC/EN 61800-3	It depends on the inverter model and also on the length of motor cable. Refer to Table 7
Electromagnetic radiation disturbance Frequency Range: 30 MHz to 1000 MHz		
Conducted Radio-Frequency Common Mode	IEC 61000-4-6	0.15 to 80 MHz; 10 V; 80 % AM (1 kHz) Motor, control and remote HMI cables
Surges	IEC 61000-4-5	1.2/50 μ s, 8/20 μ s 1 kV line-to-line coupling 2 kV line-to-ground coupling
Radio-Frequency Electromagnetic Field	IEC 61000-4-3	80 to 1000 MHz 10 V/m 80 % AM (1 kHz)

Definition of Standard IEC/EN 61800-3: "Adjustable Speed Electrical Power Drives Systems"

■ Environments:

First Environment: environments that include domestic installations, as well as establishments directly connected without intermediate transformer to a low-voltage power supply network which supplies buildings used for domestic purposes.

Second Environment: includes all establishments other than those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes.

■ Categories:

Category C1: inverters with a voltage rating less than 1000 V and intended for use in the First Environment.

Category C2: inverters with a voltage rating less than 1000 V intended for use in the First Environment, not provided with a plug connector or movable installations. They must be installed and commissioned by a professional.

Category C3: inverters with a voltage rating less than 1000 V and intended for use in the Second Environment only (not designed for use in the First Environment).

NOTE!

A professional is a person or organization familiar with the installation and/or commissioning of inverters, including their EMC aspects.

9.6.3 Characteristics of the RFI Filter

CFW300 inverters, when installed with external filter, comply with the directive for electromagnetic compatibility (2014/30/EU). The use of RFI filter kit indicated in the table 6, or equivalent, is required to reduce the disturbance conducted from the inverter to the power line in the high frequency band ($> 150 \text{ kHz}$) observing the maximum conducted emission levels of electromagnetic compatibility standards, such as EN 61800-3.

For further information about the RFI filter kit accessory model, refer to Table 6.

The Figure 7 demonstrate the connection of the filter to the inverter:

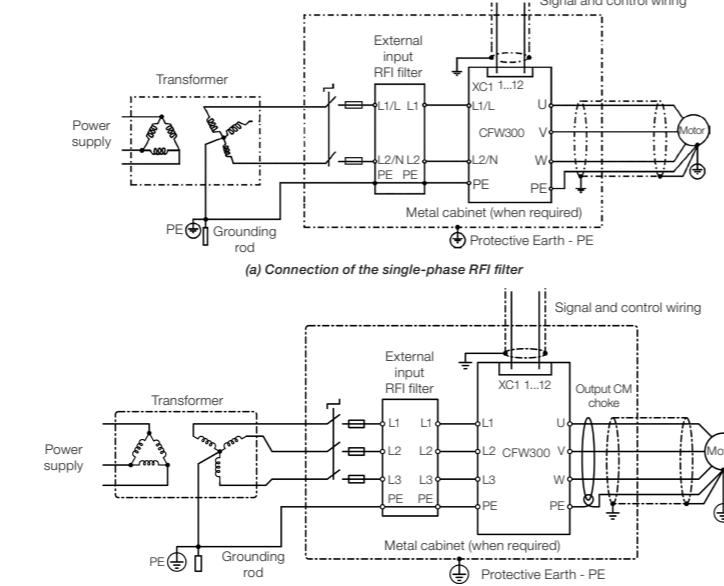


Figure 7: (a) and (b) Connection of the RFI filter - general conditions

Table 6: External RFI filter models for CFW300

WEG Item	Name	Description
13015615	CFW300-KFA-S1-S2	RFI filter kit CFW300 frame size A single-phase (200 V Line) (1)
13015616	CFW300-KFB-S2	RFI filter kit CFW300 frame size B single-phase (200 V Line) (1)
14606604	CFW300-KFA-T2	RFI filter kit CFW300 frame size A three-phase (200 V Line) (1)
14606606	CFW300-KFB-T2	RFI filter kit CFW300 frame size B three-phase (200 V Line) (1)
14136636	CFW300-KFA-T4	RFI filter kit CFW300 frame size A three-phase (400 V Line) (2)
14136669	CFW300-KFB-T4	RFI filter kit CFW300 frame size B three-phase (400 V Line) (2)
14136672	CFW300-KT4	RFI filter kit CFW300 frame size C three-phase (400 V Line) (2)

(1) For the models of 400 V Line, use the ferrite available with the RFI filter accessory on the motor cables (according to Table 6).

(2) Where there is an "X", it is assumed as any corresponding value of Table 2.

9.7 ACCESSORIES

The accessories are hardware resources that can be added to the application with the CFW300. The accessories are incorporated to the inverters in an easy and quick way by using the "Plug and Play" concept. The accessory must be installed or modified with the inverter de-energized. They may be ordered separately, and will be shipped in individual packages containing the components and manuals with detailed instructions for their installation, operation and setting.

For the list of accessories available for the CFW300, see Chapter 7 of the user's manual, available at www.weg.net.

10 TECHNICAL SPECIFICATIONS

10.1 POWER DATA

Power Supply:

- Tolerance: -15 % to +10 %.
- Frequency: 50/60 Hz (48 Hz to 62 Hz).
- Phase imbalance: $\leq 3\%$ of the rated phase-to-phase input voltage.
- Overvoltage according to Category III (EN 61010/UL508C/UL61800-5-1).
- Transient voltages according to Category III.

Maximum of 10 connections per hour (1 every 6 minutes).

Typical efficiency: $\geq 97\%$.

Classification of chemically active substances: level 3C2.

Mechanical condition rating (vibration): level 3M4.

Audible noise level: $< 60\text{dB}$.

Outputs	Relay	1 relay with NO/NC contact ■ Maximum voltage: 250 Vac ■ Maximum current: 0.5 A ■ Programmable functions
Power supply	Protection	■ 0 to 10 Vdc power supply, Maximum capacity: 50 mA ■ Overcurrent/phase-phase short circuit in the output ■ Under/overvoltage ■ Motor overload ■ Overtemperature in the power module (IGBTs) ■ Fault / external alarm ■ Programming error
Safety		■ 4 keys: Start/Stop, Up arrow, Down arrow and Programming ■ LCD Display ■ View/edit of all parameters ■ Indication accuracy: - current: 10 % of the rated current - speed resolution: 0.1 Hz
Integral keypad (HMI)	Standard keypad	■ Frame sizes A, B and C
Enclosure	IP20	

11 CODES AND STANDARDS

Table 9: Codes and standards

Safety standards	■ UL 508C - power conversion equipment ■ UL 61800-5-1 - adjustable speed electrical power drive systems - Part 5-1: Safety requirements - electrical, thermal and energy ■ UL 640 - insulation coordination including clearances and creepage distances for electrical equipment ■ EN 61010-5-1 - safety requirements electrical, thermal and energy ■ EN 50170-5-1 - safety of machinery. Electrical equipment of machines. Part 1: general requirements ■ Note: final assembler of the machine is responsible for installing a safety stop device and a supply disconnecting device ■ EN 60146 (IEC 146) - semiconductor converters ■ EN 61800-2 - adjustable speed electrical power drive systems - Part 2: general requirements - rating specifications for low voltage adjustable frequency AC power drive systems
Mechanical standards	■ EN 60529 - degrees of protection provided by enclosures (IP code) ■ UL 50 - enclosures for electrical equipment ■ IEC 60721-3-3 - classification of environmental conditions
Electromagnetic compatibility (EMC) standards	■ EN 61800-3 - adjustable speed electrical power drive systems - part 3: EMC product standard including specific test methods ■ CISPR 11 - industrial, scientific and medical (ISM) radio-frequency equipment - electromagnetic disturbance characteristics - limits and methods of measurement ■ EN 61000-4-2 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 2: electrostatic discharge immunity test ■ EN 61000-4-3 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 3: radiated, radio-frequency, electromagnetic field immunity test ■ EN 61000-4-4 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 4: electrical fast transient/burst immunity test ■ EN 61000-4-5 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 5: surge immunity test ■ EN 61000-4-6 - immunity to conducted disturbances, induced by radio-frequency fields ■ EN 61000-4-7 - immunity to conducted disturbances, induced by radio-frequency fields

(*) Compliance with standards upon installation of RFI filter. For further details refer to user's manual available for download on the website: www.weg.net.