





**Definition of Standard IEC/EM 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.

**10.3.2 Characteristics of the RFI Filter**

CFW300 inverters are installed with external filter when it is intended to reduce the disturbance conducted from the inverter to the power line in the high frequency band (> 150). It is observed the maximum levels of conducted emission of electromagnetic compatibility standards, such as EN 61800-3 and EN 55011. For further information about the RFI filter model, refer to Table 5. The figure below demonstrate the connection of the filter to the inverter:

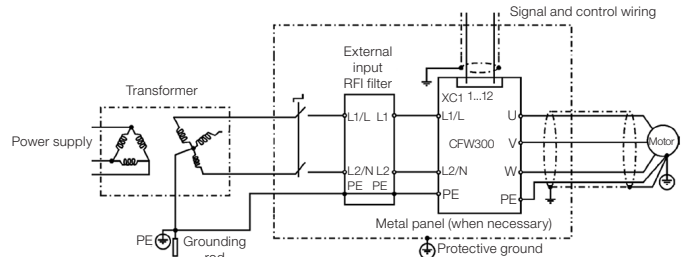


Figure 6: Connection of the RFI filter - general conditions

Table 5: External RFI filter models for CFW300

WEG Item	Name	Description
13015615	CFW300-KFA	RFI filter kit CFW300 frame size A
13015616	CFW300-KFB	RFI filter kit CFW300 frame size B

Table 6: Conducted and radiated emission levels, and additional information

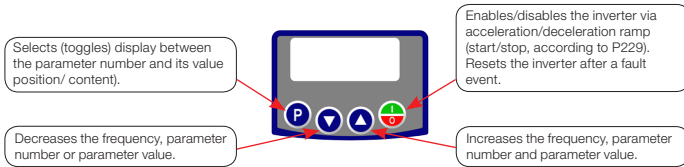
Inverter Model	Conducted Emission - Maximum Motor Cable Length		Radiated Emission Category
	Category C3	Category C2	
1 CFW300AXXPXS1XX20™	27 m (1063 in)	3 m (118 in)	C3
2 CFW300AXXPXS2XX20™	27 m (1063 in)	20 m (787 in)	C3
3 CFW300B10P0B2DB20	27 m (1063 in)	27 m (1063 in)	C3

- The switching frequency is 5 kHz.  
 (1) Where there is an "X", it is assumed as any corresponding value of Table 2.

**10.4 ACCESSORIES**

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

**11 USE OF THE KEYPAD TO OPERATE THE INVERTER**



**11.1 INDICATIONS OF DISPLAY**



**11.2 OPERATING MODES OF THE HMI**

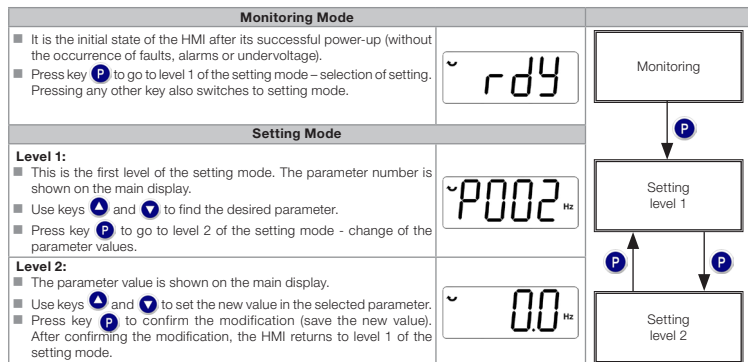


Figure 7: HMI operating modes

**12 START-UP PREPARATION**

**DANGER!**  
 Always disconnect the main power supply before making any connection.

1. Check if the power, grounding and control connections are correct and firm.
2. Remove all the materials left behind from the installation work from inside the inverter or the cabinet.
3. Verify the motor connections and if its voltage and current are within the inverter rated value.
4. Mechanically uncouple the motor from the load. If the motor cannot be uncoupled, make sure that any speed direction (forward or reverse) will not result in personnel injury and/or equipment damage.
5. Close the inverter or cabinet covers.
6. Measure the power supply and verify if it is within the allowed range.
7. Apply power to the input: close the input disconnecting switch.
8. Check the result of the first time power-up:  
 The HMI display indicates:



**12.1 BASIC APPLICATION**

Seq	Display Indication/Action	Seq	Display Indication/Action
1	Initialization mode. Press key <b>P</b> to enter the first level of the parameterization mode. Press keys <b>A</b> or <b>V</b> to select the parameter P100.	2	Press key <b>P</b> if you need to change the content of P100 - "Acceleration Time" or press key <b>A</b> for the next parameter.
3	If necessary, change the content of "P101 - Deceleration Time". Use key <b>A</b> to select the parameter P133.	4	If necessary, change the content of "P133 - Minimum Speed". Press key <b>A</b> for the next parameter.
5	If necessary, change the content of "P134 - Maximum Speed". Press key <b>A</b> for the next parameter.	6	If necessary, change the content of "P135 - Output Maximum Current". Press key <b>V</b> to select parameter P002.
7	Press key <b>P</b> to view the parameter content.	8	Press key <b>V</b> that the motor will accelerate up to 3.0 Hz (factory default setting of P133 - Minimum Frequency). Press <b>A</b> and hold it until it reaches 60.0 Hz.
9	Press key <b>V</b> . The motor will decelerate to a stop.	10	When the motor stops, the display will indicate "ready".

**12.2 TYPE OF CONTROL V/f (P202 = 0)**

Seq	Display Indication/Action	Seq	Display Indication/Action
1	Initialization mode. Press key <b>P</b> to enter the first level of the parameterization mode.	2	Press keys <b>A</b> or <b>V</b> to select parameter P202.
3	Press key <b>P</b> if you need to change the content of "P202 - Type of Control" for P202 = 0 (V/f). Press key <b>A</b> to select parameter P401.	4	If necessary, change the content of parameter "P401 - Motor Rated Current" according to the nameplate. Press key <b>A</b> for the next parameter.
5	Se necessário altere o conteúdo de "P402 - Rotação Nominal Motor". Press key <b>A</b> for the next parameter.	6	If necessary, change the content of "P403 - Motor Rated Frequency".

**13 TECHNICAL SPECIFICATIONS**

**POWER DATA**

- Power Supply:
- Tolerance: -15 % to +10 %.
  - Frequência: 50/60 Hz (48 Hz a 62 Hz).
  - Phase imbalance: ≤ 3 % of the rated phase-to-phase input voltage.
  - Overvoltage according to Category III (EM 61010/UL 508C).
  - Transient voltages according to Category III.
  - Maximum of 10 connections per hour (1 every 6 minutes).
  - Typical efficiency: ≥ 97 %.
  - Classification of chemically active substances: level 3C2.
  - Mechanical condition rating (vibration): level 3M4.
  - Audible noise level: < 60dB.

**14 ELECTRONICS/GENERAL DATA**

Table 7: Electronics/general data

Control	Method	Types of control: - V/f (Scalar) - V/W: voltage vector control. - PWM SVM (Space Vector Modulation)
Performance	Output frequency	0 to 400 Hz, resolution of 0.1 Hz
	V/f control	Speed regulation: 1 % of the rated speed (with slip compensation) Speed variation range: 1:20
	Vector control (V/W)	Regulação de velocidade: 1 % da velocidade nominal Faixa de variação de velocidade: 1:30
Inputs	Analog	1 insulated input. Levels: (0 to 10) V or (0 a 20) mA or (4 to 20) mA Linearity error ≤ 0.25 % Impedance: 100 kΩ for voltage input, 500 Ω for current input. Programmable functions Maximum voltage permitted in the input: 30 Vdc

Inputs	Digital	<ul style="list-style-type: none"> <li>■ 4 isolated inputs</li> <li>■ Programmable functions: - active high (PNP); maximum low level of 10 Vdc / minimum high level of 20 Vdc</li> <li>- active low (NPN); maximum low level of 5 Vdc / minimum high level of 10 Vdc</li> <li>■ Maximum input voltage of 30 Vdc</li> <li>■ Input current: 11 mA</li> <li>■ Maximum input current: 20 mA</li> </ul>
Outputs	Relay	<ul style="list-style-type: none"> <li>■ 1 relay with NO/NC contact</li> <li>■ Maximum voltage: 250 Vac</li> <li>■ Maximum current: 0.5 A</li> <li>■ Programmable functions</li> </ul>
	Power supply	■ 10 Vdc power supply. Maximum capacity: 50 mA
Safety	Protection	<ul style="list-style-type: none"> <li>■ Overcurrent/phase-phase short circuit in the output</li> <li>■ Under/overvoltage</li> <li>■ Motor overload</li> <li>■ Overtemperature in the power module (IGBTs)</li> <li>■ Fault / external alarm</li> <li>■ Programming error</li> </ul>
Integral keypad (HMI)	Standard keypad	<ul style="list-style-type: none"> <li>■ 4 keys: Start/Stop, Up arrow, Down arrow and Programming</li> <li>■ LCD Display</li> <li>■ View/editing of all parameters</li> <li>■ Indication accuracy: - current: 5 % of the rated current</li> <li>- speed resolution: 0.1 Hz</li> </ul>
Enclosure	IP20	■ Frames sizes A and B

**15 CONSIDERED STANDARDS**

Table 8: Considered standards

Safety standards	<ul style="list-style-type: none"> <li>■ UL 508C - power conversion equipment</li> <li>■ UL 840 - insulation coordination including clearances and creepage distances for electrical equipment</li> <li>■ EN 61800-5-1 - safety requirements electrical, thermal and energy</li> <li>■ EN 50178 - electronic equipment for use in power installations</li> <li>■ EN 60204-1 - safety of machinery. Electrical equipment of machines. Part 1: general requirements</li> <li>■ EN 60146 (IEC 146) - semiconductor converters</li> <li>■ EN 61800-2 - adjustable speed electrical power drive systems - Part 2: general requirements - rating specifications for low voltage adjustable frequency AC power drive systems</li> </ul>
Mechanical standards	<ul style="list-style-type: none"> <li>■ EN 60529 - degrees of protection provided by enclosures (IP code)</li> <li>■ UL 50 - enclosures for electrical equipment</li> <li>■ IEC 60721-3-3 - classification of environmental conditions</li> </ul>
Electromagnetic compatibility (EMC) standards	<ul style="list-style-type: none"> <li>■ EN 61800-3 - adjustable speed electrical power drive systems - part 3: EMC product standard including specific test methods</li> <li>■ EN 55011 - limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment</li> <li>■ CISPR 11 - industrial, scientific and medical (ISM) radio-frequency equipment - electromagnetic disturbance characteristics - limits and methods of measurement</li> <li>■ EN 61000-4-2 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 2: electrostatic discharge immunity test</li> <li>■ EN 61000-4-3 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 3: radiated, radio-frequency, electromagnetic field immunity test</li> <li>■ EN 61000-4-4 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 4: electrical fast transient/burst immunity test.</li> <li>■ EN 61000-4-5 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 5: surge immunity test.</li> <li>■ EN 61000-4-6 - electromagnetic compatibility (EMC) - part 4: testing and measurement techniques - section 6: immunity to conducted disturbances, induced by radio-frequency fields.</li> </ul>

(\*) Compliance with standards upon installation of RFI filter. For further details refer to consulte www.weg.net.

**16 MAIN PARAMETERS**

The table below contains the mains parameters of the CFW300.

**NOTE!**  
 ro = read only parameter.  
 V/f = parameter available in V/f mode.  
 cfg = configuration parameter, value can only be changed with the motor stopped.

Param.	Description	Adjustable Range	Factory Setting	Prop.
P000	Access to Parameters	0 to 9999	1	
P001	Speed Reference	0 to 9999		ro
P002	Output Speed (Motor)	0 to 9999		ro
P003	Motor Current	0.0 to 40.0 A		ro
P004	DC Link Voltage (Ud)	0 to 524 V		ro
P005	Output Frequency (Motor)	0.0 to 400.0 Hz		ro
P006	Inverter Status	0 = Ready 1 = Run 2 = Undervoltage 3 = Fault	4 = Self-Tuning 5 = Configuration 6 = DC Braking	ro
P007	Output Voltage	0 to 240 V		ro
P012	DiB to Di1 Status	0 to FF (hexa) Bit 0 = Di1 Bit 1 = Di2 Bit 2 = Di3 Bit 3 = Di4	Bit 4 = Di5 Bit 5 = Di6 Bit 6 = Di7 Bit 7 = Di8	ro
P022	Fl Value in Hz	1 to 3000 Hz		ro
P023	Main SW Version	0.00 to 99.99		ro
P030	Module Temperature	0.0 to 200.0 °C		ro
P037	Motor Overload tkt	0.0 to 100.0 %		ro
P047	CONFIG Status	0 to 999		ro
P048	Present Alarm	0 to 999		ro
P049	Present Fault	0 to 999		ro
P050	Last Fault	0 to 999		ro
P100	Acceleration Time	0.1 to 999.9 s		
P101	Deceleration Time	0.1 to 999.9 s	10.0 s	
P120	Speed Ref. Backup	0 = Inactive 1 = Active 2 = Backup by P121	1	
P121	Reference via HMI	0.0 to 400.0 Hz	3.0 Hz	
P124	Multispeed Ref. 1	-400.0 to 400.0 Hz	3.0 Hz	
P125	Multispeed Ref. 2	-400.0 to 400.0 Hz	10.0 (5.0) Hz	
P126	Multispeed Ref. 3	-400.0 to 400.0 Hz	20.0 (10.0) Hz	
P127	Multispeed Ref. 4	-400.0 to 400.0 Hz	30.0 (20.0) Hz	
P128	Multispeed Ref. 5	-400.0 to 400.0 Hz	40.0 (30.0) Hz	
P129	Multispeed Ref. 6	-400.0 to 400.0 Hz	50.0 (40.0) Hz	
P130	Multispeed Ref. 7	-400.0 to 400.0 Hz	60.0 (50.0) Hz	
P131	Multispeed Ref. 8	-400.0 to 400.0 Hz	66.0 (55.0) Hz	
P133	Minimum Frequency	0.0 to 400.0 Hz	3.0 Hz	
P134	Maximum Frequency	0.0 to 400.0 Hz	66.0 (55.0) Hz	
P135	Maximum Output Current	0.0 to 40.0 A	1.5 x I <sub>nom</sub>	
P136	Manual Torque Boost	0.0 to 30.0 %	5.0 %	V/f
P137	Automatic Torque Boost	0.0 to 30.0 %	0.0 %	V/f
P138	Slip Compensation	-10.0 to 10.0 %	0.0 %	V/f
P139	Output Current Filter	0.000 to 9.999 s	0.005 s	
P142	Maximum Output Voltage	0.0 to 100.0 %	100.0 %	cfg, V/f
P143	Intermediate Output Voltage	0.0 to 100.0 %	50.0 %	cfg, V/f
P145	Field Weakening Start Frequency	0.0 to 400.0 Hz	60.0 (50.0) Hz	cfg, V/f
P146	Intermediate Frequency	0.0 to 400.0 Hz	30.0 (25.0) Hz	cfg, V/f
P156	Rated Speed Overload Current	0.1 to 2.0 x I <sub>nom</sub>	1.2 x I <sub>nom</sub>	
P157	Overload Curr. 50 % Nom. Speed	0.1 to 2.0 x I <sub>nom</sub>	1.2 x I <sub>nom</sub>	
P158	Overload Curr. 20 % Nom. Speed	0.1 to 2.0 x I <sub>nom</sub>	1.2 x I <sub>nom</sub>	
P202	Type of Control	0 = V/f 1 = V/f Quadratic	2 to 4 = Not Used 5 = V/W	0 cfg

Param.	Description	Adjustable Range	Factory Setting	Prop.	
P204	Load/Save Parameters	0 to 4 = Not Used 5 = Load 60 Hz 6 = Load 50 Hz 7 = Load User 8 = Not Used	9 = Save User 10 = Not Used 11 = Load Default SoftPLC 12 to 13 = Reserved	0	cfg
P220	LOC/REM Selection Source	0 = Always Local 1 = Always Remote 2 to 3 = Not Used 4 = Dix 5 = Serial/USB (LOC)	6 = Serial/USB (REM) 7 to 8 = Not Used 9 = CO/DN/DP (LOC) 10 = CO/DN/DP (REM) 11 = SoftPLC	0	cfg
P221	LOC Reference Sel	0 = HMI 1 = A1 2 = A2 3 = Not Used 4 = FI 5 = A1 + A2 > 0 6 = A1 + A2 7 = E.P. 8 = Multispeed	9 = Serial/USB 10 = Not Used 11 = CO/DN/DP 12 = SoftPLC 13 = Not Used 14 = A1 > 0 15 = A2 > 0 16 = Not Used 17 = FI > 0	0	cfg
P222	REM Reference Sel.	See Options in P221		1	cfg
P223	LOC FWD/REV Sel.	0 = Forward 1 = Reverse 2 to 3 = Not Used 4 = Dix 5 = Serial/USB (FWD) 6 = Serial/USB (REV)	7 to 8 = Not Used 9 = CO/DN/DP (FWD) 10 = CO/DN/DP (REV) 11 = Not Used 12 = SoftPLC	0	cfg
P263	Di1 Input Function	0 = Not Used 1 = Run/Stop 2 = General Enable 3 = Fast Stop 4 = Forward 5 = Reverse 6 = Start 7 = Stop 8 = Direction of Rotation 9 = LOC/REM 10 = JOG 11 = Increase E.P. 12 = Decelerate E.P. 13 = Multispeed 14 = 2 <sup>nd</sup> Ramp 15 to 17 = Not Used 18 = No Ext. Alarm 19 = No Ext. Fault 20 = Reset 21 to 23 = Not Used 24 = Disab. Flying Start	25 = Not Used 26 = Lock Prog. 27 to 31 = Not Used 32 = 2 <sup>nd</sup> Ramp Multispeed 33 = 2 <sup>nd</sup> Ramp E.P. Ac. 34 = 2 <sup>nd</sup> Ramp E.P. De. 35 = 2 <sup>nd</sup> Ramp FWD Flun 36 = 2 <sup>nd</sup> Ramp Rev Run 37 = Turn ON / Ac. E.P. 38 = De. E.P. / Turn OFF 39 = Stop 40 = Safety Switch 41 = Function 1 Application 42 = Function 2 Application 43 = Function 3 Application 44 = Function 4 Application 45 = Function 5 Application 46 = Function 6 Application 47 = Function 7 Application 48 = Function 8 Application	1	cfg
P264	Di2 Input Function	See Options in P263		0	cfg
P265	Di3 Input Function	See Options in P263		8	cfg
P266	Di4 Input Function	See Options in P263		0	cfg
P267	Di5 Input Function	See Options in P263		0	cfg
P268	Di6 Input Function	See Options in P263		0	cfg
P269	Di7 Input Function	See Options in P263		0	cfg
P270	Di8 Input Function	See Options in P263		0	cfg
P295	Invr. Rated Current	1.6 to 15.2 A			ro
P296	Line Rated Voltage	0 = Reserved 1 = 110 / 127 Vac	2 = 200 / 240 Vac or 310 Vdc		ro
P297	Switching Frequency	2.5 to 15.0 kHz		5.0 kHz	cfg
P401	Motor Rated Current	0.0 to 40.0 A		1.0 x I <sub>nom</sub>	cfg
P402	Motor Rated Speed	0 to 9999 rpm		1720 (1310) rpm	cfg
P403	Motor Rated Frequency	0 to 400 Hz		60 (50) Hz	cfg

**17 FAULTS AND ALARMS**

Most common faults and alarms

Fault / Alarm	Description	Possible Causes
A046 Motor Overload	Motor overload alarm	<ul style="list-style-type: none"> <li>■ Settings of P156 is too low for the used motor</li> <li>■ Overload on the motor shaft</li> </ul>
A050 Power Module Overtemperature	Overtemperature alarm from the power module temperature sensor (NTC)	<ul style="list-style-type: none"> <li>■ High temperature at IGBTs: P030 &gt; 90 °C (&gt; 194 °F) (Frame size A) and P030 &gt; 116 °C (&gt; 240.8 °F) (Frame size B)</li> <li>■ High ambient temperature around the inverter (&gt; 50 °C (&gt; 122 °F)) and high output current</li> <li>■ Blocked or defective fan</li> <li>■ Heatsink is too dirty, preventing the air flow</li> </ul>
A090 External Alarm	External alarm via Dix (option "no external alarm" in P263 to P270)	<ul style="list-style-type: none"> <li>■ Wiring on Di1 to Di8 inputs are open or have poor contact</li> </ul>
A700 Remote HMI Communication	No communication with remote HMI, but here is frequency command or reference for this source	<ul style="list-style-type: none"> <li>■ Check if the communication interface with the HMI is properly configured in parameter P312</li> <li>■ HMI cable disconnected</li> </ul>
F021 Undervoltage on the DC Link	Undervoltage fault on the intermediate circuit	<ul style="list-style-type: none"> <li>■ Wrong voltage supply; check if the data on the inverter label comply with the power supply and parameter P296</li> <li>■ Supply voltage too low, producing voltage on the DC link below the minimum value (in P004): Ud &lt; 250 Vdc in 110 / 127 Vac (P296 = 1) or Ud &lt; 200 Vdc in 200 / 240 Vac (P296 = 2)</li> <li>■ Phase fault in the input</li> <li>■ Fault in the pre-charge circuit</li> </ul>
F022 Overvoltage on the DC Link	Overvoltage fault on the intermediate circuit	<ul style="list-style-type: none"> <li>■ Wrong voltage supply; check if the data on the inverter label comply with the power supply and parameter P296</li> <li>■ Supply voltage is too high, producing voltage on the DC link above the maximum value (in P004): Ud &gt; 460 Vdc in 110 / 127 Vac (P296 = 1) or Ud &gt; 410 Vdc in 200 / 240 Vac (P296 = 2)</li> <li>■ Load inertia is too high or deceleration ramp is too fast</li> <li>■ P151 setting is too high</li> </ul>
F031 Fault in Communication with I/Os Expansion Accessory	Main control cannot establish the communication link with the I/Os expansion accessory	<ul style="list-style-type: none"> <li>■ Accessory damaged</li> <li>■ Poor connection of the accessory</li> <li>■ Problem in the identification of the accessory; refer to P027</li> </ul>
F032 Fault in Communication with I/Os Communication Accessory	Main control cannot establish the communication link with the communication accessory	<ul style="list-style-type: none"> <li>■ Accessory damaged</li> <li>■ Poor connection of the accessory</li> <li>■ Problem in the identification of the accessory; refer to P028</li> </ul>
F051 IGBTs Overtemperatures	Overtemperature fault measured on the temperature sensor of the power pack	<ul style="list-style-type: none"> <li>■ High temperature at IGBTs: P030 &gt; 100 °C (&gt; 212 °F) (Frame size A) e P030 &gt; 126 °C (&gt; 258.8 °F) (Frame size B)</li> <li>■ High ambient temperature around the inverter (&gt; 50 °C (&gt; 122 °F)) and high output current</li> <li>■ Blocked or defective fan</li> <li>■ Heatsink is too dirty, preventing the air flow</li> </ul>