

CFW11 - System Drive

Variable Speed Drives



CFW11 - System Drive

The CFW11 is a system drive designed for the control of squirrel cage induction motor as well as permanent magnet type ones. Since it was developed for running on Normal and Heavy Duty mode, a big variety of applications can be achieved.

Designed for exclusively industrial or professional use, provides increased productivity with excellent performance and an improvement in the quality of the process in which it is used.

Innovative and Simple

The CFW11 presents many innovations that are helpful and beneficial to customers, mainly due to the simplicity of its installation and operation. The CFW11 was developed based on Plug & Play philosophy (connect and use) allowing simple and fast installation of the VSD and its accessories.

The Keypad has a navigation and programming system similar to mobile phones, with soft-key buttons. It is possible to access the parameters sequentially or through groups of parameters. The Keypad also makes the Oriented Start-up function available, guiding the user through the necessary programming.

Flexibility

The CFW11 adapts to the customer's needs through a broad range of accessories which are easily installed. Besides this, the standard product comes with a small PLC, called SoftPLC, that offers PLC functionalities and it allows the customer for creation of his/her own user applications through the WLP software (Ladder programming).



1.1 to 2.2 kW - 1.5 to 3 HP
200-240 V ac - Single-phase

1.1 to 55 kW - 1.5 to 75 HP
200-240 V ac - Three-phase

1.5 to 415 kW - 2 to 600 HP
380-480 V ac - Three-phase

1.5 to 630 kW - 2 to 900 HP
500-600 V ac - Three-phase

1.5 to 630 kW - 3 to 900 HP
660-690 V ac - Three-phase

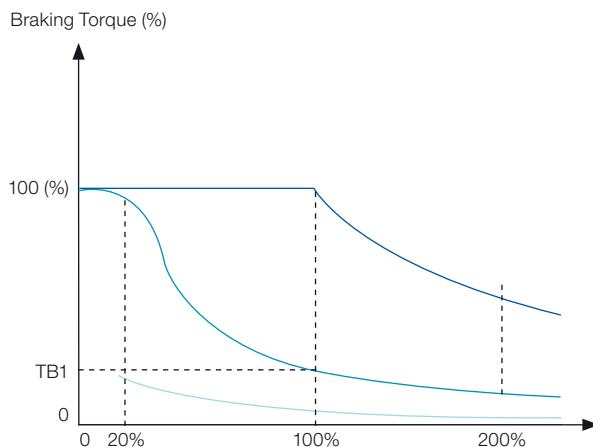
Certifications



Own Technology

Vectrue Technology®

- Linear and adjustable V/F, VVV (Voltage Vector WEG) and vector control are available in the same product
- Two types of vector control: sensorless and closed loop vector control (encoder Interface required)
- Sensorless vector control permits high torque and quick response in open loop, even at low speeds
- The self-tuning function automatically matches the vector control or VVV to the motor and load used
- Through the adjustable V/F control, it is possible, for example, to adjust a quadratic V/F curve, providing energy savings for quadratic torque loads (e.g.: centrifugal pumps and fans)



Typical Braking Torque x Speed Graph for a 10 HP / 7.5 kW motor driven by a CFW11

- Dynamic Braking Torque Curve
- Optimal Braking® Torque Curve
- DC Braking Torque Curve

Optimal Braking®

Applications involving high inertia loads and, when short deceleration times are required, a large amount of energy is returned from the motor to the VSD. To handle this energy, traditional VSDs have to dissipate it as heat in power resistors. Such resistors are usually large and some installation criteria must be considered due to their heat dissipation. As an alternative to the use of braking resistors, CFW11 features a special braking method in vector control mode known as Optimal Braking®. This innovation delivers a high performance braking torque without requiring a braking resistor. The following graph shows the advantages of using Optimal Braking® compared to other methods, thus ensuring an optimized and low cost solution for braking applications.



WMagnet Drive System®

Variable Speed Drive controlling permanent magnet motors. The WMagnet System (WMagnet motor + CFW11) has the highest efficiency levels in the market. It is a perfect match for applications where speed variation, low noise level and reduced size are required. In Sensorless mode the WMagnet System is able to perform torque control at zero speed without the need for forced ventilation.

Main Characteristics of the Set CFW11 + WMagnet Motor

- Voltage range: 380 V to 480 V ac
- Power rating: 11 to 160 kW (15 to 220 HP)
- Methods of control: sensorless vector and closed loop control (vector with encoder)
- WMagnet control algorithm included on the CFW11 standard version
- All Communication Modules available in the standard product



Optimal Flux®

Technology for motors driven by VSDs in applications with constant torque loads:

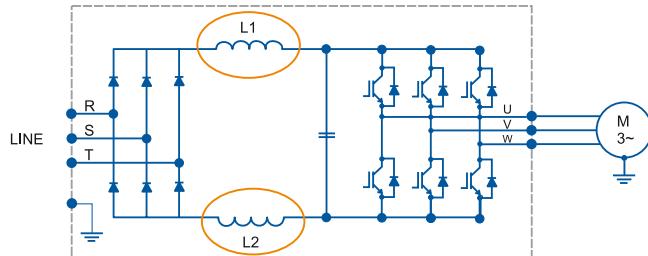
- Rated torque at low speeds eliminating the need for independent ventilation or motor oversizing
- Space saving and cost reduction of the application
- Improved performance of the package VSD and motor (an exclusive WEG solution)

The Optimal flux function works when the set: high efficiency WEG motor + CFW11 is used.

Technical Features

Built-In DC Link Reactor

- Allows the VSD to be installed in any network (there is no minimum impedance restriction)
- Typical power factor (PF) for rated condition:
 - 0.94 for models with three-phase supply
 - 0.70 for models with single-phase 0.70 for models with single-phase supply/three-phase supply = 0.94
- Displacement power factor > 0.98
- Meets the 61000-3-12 standard, related to low order current harmonics in the network
- Available until frame size G, for the frame size H is mandatory use external reactor



Note: no need for external line reactor, up to frame size G.

Conformal Coating

An special varnish is applied on electronic boards of the CFW11, extending lifespan, protecting against dust, humidity, high temperatures and chemical substances. Classified as 3C2 according to IEC 60721-3-3 as standard for the complete line.



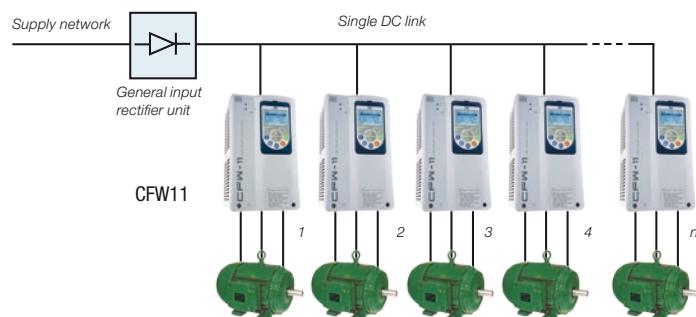
Single DC Busbar

Usually used in multi-motor systems, common DC bus configuration is a good solution for energy savings. In this configuration, individual VSD rectifier bridges are replaced with a common input rectifier unit. Each VSD is then directly fed from the DC bus to its DC link terminals.

This solution allows the energy in the DC bus to be shared among the VSDs connected to it, thus optimizing the power consumption in the system.

The standard CFW11 sizes A to E and special hardware version (DC) for frame sizes F, G and H can be connected to a DC bus system. (When required, the factory should be consulted for further details)

Note: an extra pre-charge circuit must be added to each of the VSDs.



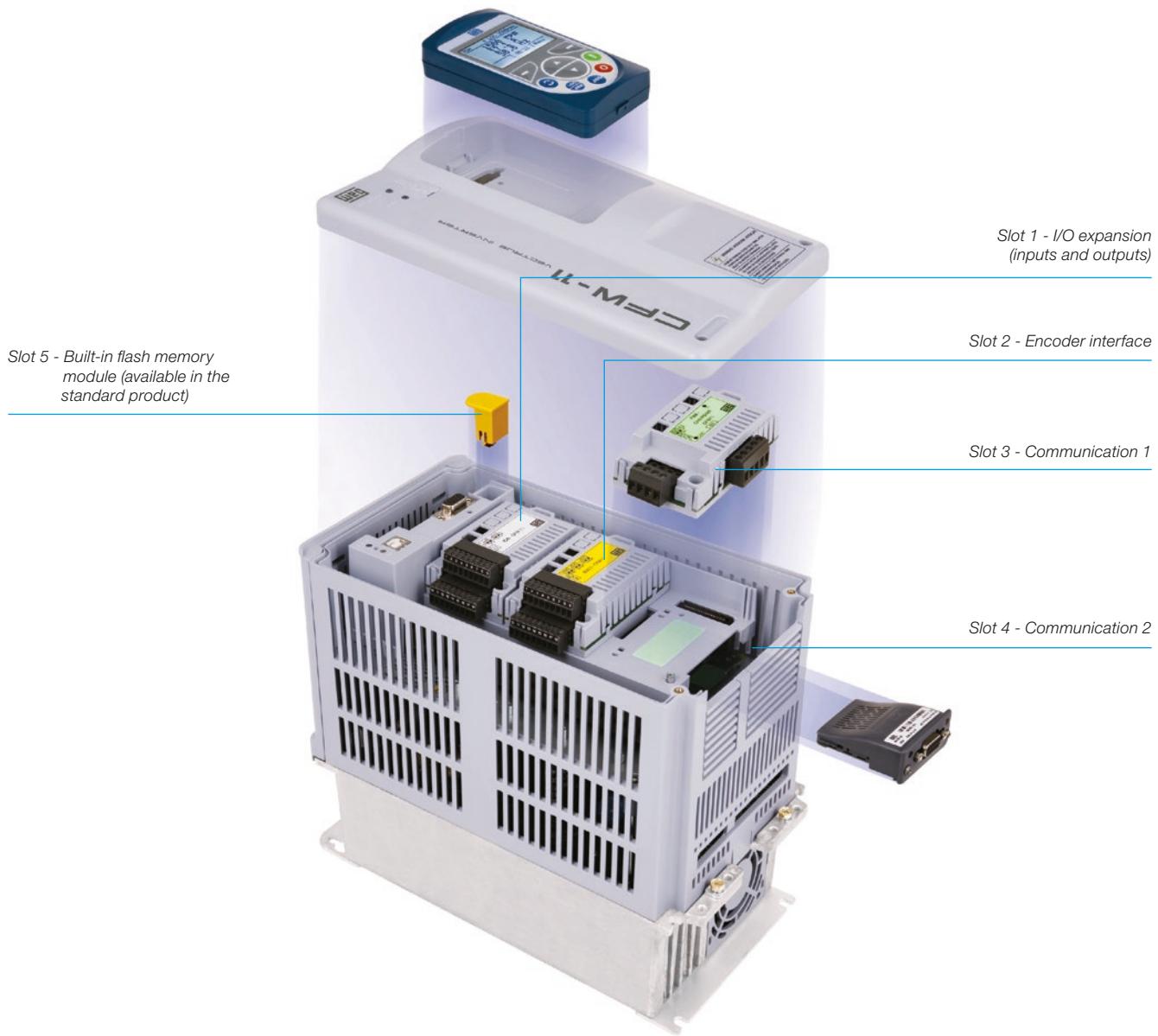
Intelligent Thermal Management

- Monitoring of the heatsink and internal air temperatures of the electronic boards, providing total protection of the IGBTs and the CFW11 as a whole
- The heatsink fan is turned on and off automatically, depending on the temperature of the power modules
- The speed and the fan's operation hours number are monitored and indicated in corresponding parameters. Alarm or fault messages are generated related to these variables
- The fan can be easily removed for cleaning or replacement



Flexibility is Our Philosophy

The CFW11 was developed based on Plug & Play philosophy, identifying automatically the accessories plugged in, as well as easy installation and safe operation with no need for extra configuration.



Functions

- **Multi-speed:** up to 8 pre-programmed speeds
- **PID regulator:** automatic control of level, pressure, flow, weight, etc.
- **Ride-through:** operation during momentary loss of the power supply
- **Skip frequency:** rejection of critical or resonant speeds
- **S ramp:** smooth acceleration / deceleration

- IGBT braking (chopper) can be offered built-in or with external module (DBW03)
- Encoder module can do the interface between the Drive and Motor, promoting the closed-loop speed and position control
- Temperature monitoring of motor probes (PTC, PT-100, KTY84), providing thermal protection to the motor (accessory is necessary)
- Operating air temperature up to 60 °C (140 °F) for sizes A to D, and up to 55 °C (131 °F) for size E, F, G and H with derating (check page 26)
- Motor overload protection according to IEC 60497-4-2 and UL 508 C

Applications

The CFW11 can be used in both simple and sophisticated applications, due to its broad range of functions and easy configuration, installation and operation. The CFW11, through its vectrue inverter technology, presents excellent static and dynamic performance, precise torque and speed control, dynamic response, positioning precision, and high overload capacity. The CFW11 was also developed for applications where the decisive factor is safety, through several built-in protections and alarms as well as through the safety stop function in accordance with EN 954-1, category III.



Cement and Mining

- Robust and large overload capacity (models sized in HD)
- Provided in a compact design the CFW11 Series allows the assembly directly next to one another with no derating
- Possibility to be integrated in a variety of communication protocols commonly used in industry
- Quick and simplified programming
- Highly reliable and robust
- For large power ratings, modular topology is used

Pumps and Fans

- Precise control of process variables (pressure, flow, temperature, etc.) through a PID regulator superposed to the speed control
- Optimization of power consumption through speed control with an adjustable V/F curve
- Possibility of safety and maintenance signalling, and alarms of pumps and fans
- Availability of PID regulators to control other process accessories like valves, dumpers, other VSDs, etc.

Compressors

- Optimization of system pressurization control with energy savings and improvement of compressor efficiency
- Reduction of motor startup current, minimizing wear and tear of the mechanical system, avoiding fees charged by the power supplier company
- Possibility of safety and maintenance signaling and alarms of pressurization system
- Provides startup system control of other compressor units with an increased efficiency of the pressurization system



Sugar and Alcohol

- Modular and compact
- 12-pulse rectifier for reduction of harmonic content
- Regenerative braking for centrifuges
- Highly robust and reliable

OverHead Cranes / Lifting

- SoftPLC function
- Three modes of vector control
- Highly compact
- Intelligent control of ventilation system

Process Machines

- Built-in PLC and real time clock
- Easeiness and flexibility for connecting to the most used fieldbus network
- Fieldbus
- Precise speed and torque in all speed ranges
- User friendly interface and programming

Applications



Paper and Cellulose / Wood

- Four monitoring parameters displayed at once on the keypad
- USB communication port at the front of the VSD for data monitoring and parameters configuration via software SuperDrive
- Precise speed and torque control
- Flexible hardware programming and configuration, making applications where syncronism is required easier
- Possibility to be integrated in a variety of communication protocols commonly used in industry
- Provided in a compact design the CFW11 Series allows the assembly directly next to one another with no derating
- Quick and simplified programming
- Highly reliable and robust
- For large power ratings, modular topology can be used



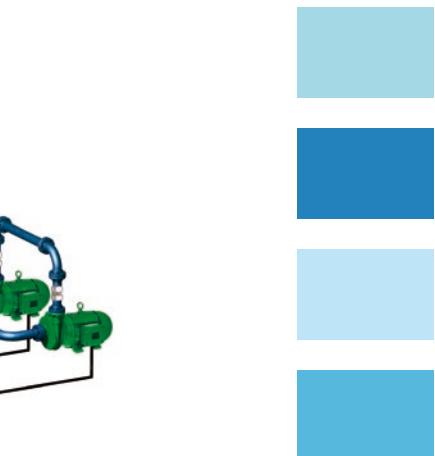
Ironworks and Metallurgy

- Highly precise speed and torque control
- Large overload capacity (models sized in HD)
- Flexible hardware programming and configuration
- Possibility to be integrated in a variety of communication protocols mainly used in the industry
- Provided in a compact design the CFW11 series allows the assembly directly next to one another with no derating
- For large power ratings, modular topology is used

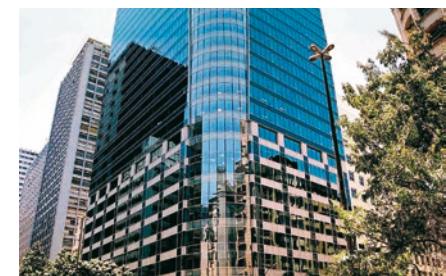


Multi-Pump Control

The CFW11 features the Multipump Control, which permits the CFW11 to control up to 5 pumps in order to keep constant pressure regardless of the flow fluctuations. In this system, an intelligent algorithm control of pumps provided by means of a user application developed to run on CFW11 decides when to start or stop each pump based on the system demand. Besides that, the VSD also monitors the suction pressure and the tank level. The CFW11 also alternates the pumps according to their operating time, thus ensuring an uniform wear and tear of



motors and pumps. Two types of Multipump Control are available: fixed and floating controls. In fixed control, the VSD is able to control one of the pumps at variable speed and to start and stop another 4 pumps at fixed speed. In floating control, the VSD is able to control up to 4 pumps, all of them at variable speed. The Multipump Control for CFW11 is available as an user application for running on SoftPLC (see page 16) and can be downloaded from WEG website.



Chemical and Petrochemical

- Highly reliable and robust
- Provided in a compact design the CFW11 Series allows the assembly directly next to one another with no derating
- Plug & Play system for additional modules, ensuring greater flexibility in adapting to existing systems
- Possibility to be integrated in a variety of communication protocols commonly used in the industry

Cooling

- SoftPLC function built in the standard product enabling the use of two controllers simultaneously. This characteristic is for HVAC applications
- Three monitoring parameters displayed at once on the keypad
- USB communication port at the front of the VSD for data monitoring and parameters configuration via software SuperDrive G2

Intuitive

The CFW11 keypad was developed for simple and fast interaction while providing excellent visibility for the user.

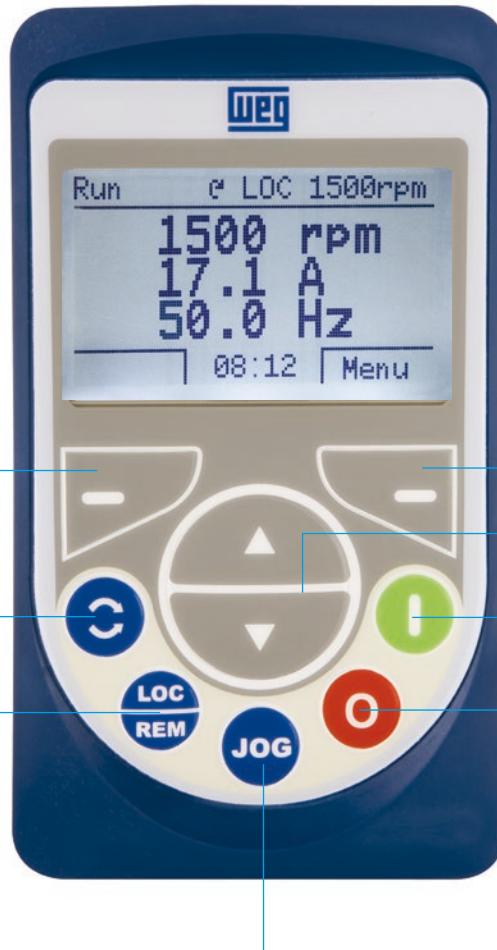
Easy to Use Interface Tools

- Graphic display
- Soft-keys for easy operation
- Backlight
- Real time clock
- Copy function
- Plug-in (connection with CFW11 turned on)
- Language selection
- Remote keypad

Left soft-key: function defined by the display

FWD/REV selection key

Local / Remote selection key



Right soft-key: function defined by the display

Key for scrolling through menus and parameters and for modifying parameter content

Start key

Stop key

JOG key

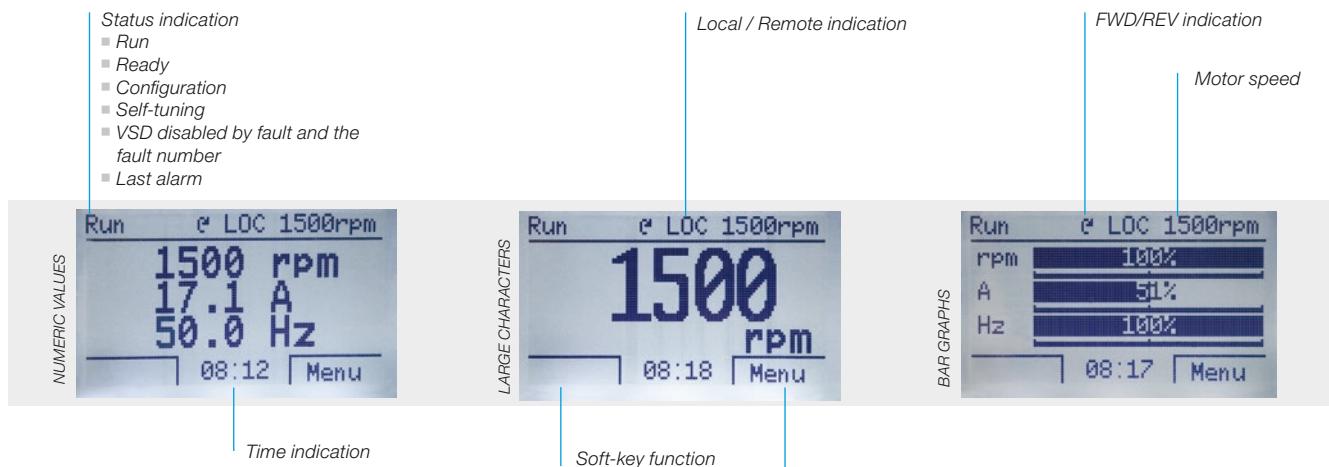


Remote Keypad

The keypad can be installed on panel doors or machine consoles with a IP56 protection degree.

Human Machine Interface

The keypad can be configured to display reading parameters in three different modes.



The keypad displays parameters in a hierarchy mode organized by groups.

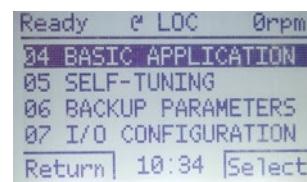
Oriented Start-Up

For simplified Start-up, the CFW11 guides the user through the necessary programming to adjust the VSD to the motor and power supply.



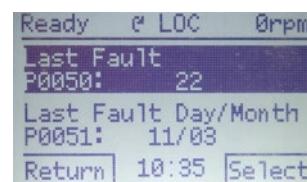
Basic Application

The Basic Application Group contains the basic parameters, which need to be adjusted in most applications. The CFW11 guides the user through these parameters.



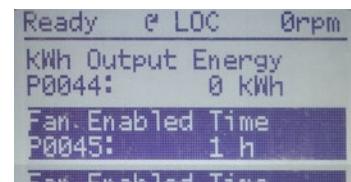
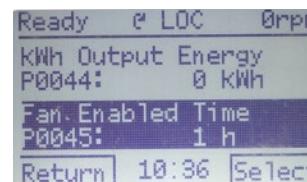
Fault History Group

It shows the parameters with the last 10 faults and the day, month, year and time when they occurred.



Read Only Parameters Group

It shows reading parameters only.



Backup Parameters Group

The Backup Parameters Group allows CFW11 parameters to be transferred to the Keypad or FLASH memory module (available in the standard product) and vice versa. During CFW11 operation, the modified parameters are saved in the FLASH memory module automatically.

Functions Group

The keypad offers the functionality of displaying parameter groups in individual folders where each of them shows specific configurations. For example: I/O configuration, self-tuning procedure, basic parameters, etc.

Selectable Language

The user can choose the keypad language: portuguese, english, spanish, german, french.

Changed Parameters Group

It shows only the parameters that have been programmed differently from the factory default.

Accessories

	Name	Description	Slot	Appearance
I/O expansion	IOA-01	1 14-bit analog inputs in voltage or current 2 digital inputs 2 14-bit analog outputs in voltage or current 2 open collector digital outputs	1	
	IOB-01	2 isolated 12-bit analog inputs 2 digital inputs 2 isolated 11-bit analog outputs in voltage or current 2 open collector digital outputs	1	
	IOC-01	8 digital inputs 4 digital outputs (use with SoftPLC)	1	
	IOC-02	8 digital inputs 8 open collector digital outputs (use with SoftPLC)	1	
Temperature transducers	IOE-01	5 PTC type temperature sensor inputs	1	
	IOE-02	5 PT-100 type temperature sensor inputs	1	
	IOE-03	5 KTY84 type temperature sensor inputs	1	
Interface with encoder	ENC-01	Incremental encoder module 5 to 12 V dc (internal power supply) 100 kHz With encoder signal repeater (external power supply needed)	2	
	ENC-02	Incremental encoder module 5 to 12 V dc (internal power supply) 100 kHz	2	

Blank Cover - HMID - 01 ¹⁾

Blank cover to replace the standard VSD keypad, when it is not used.



Note: 1) This optional must be factory fitted and orders must specify on the product coding (page 17) the desired option.

Remote Keypad Frame - RHMF-01

Frame for keypad installation on panel door or machine console.
IP56 protection degree.



Accessories

	Name	Description	Slot	Appearance
Communication	RS485-01	RS485 serial communication module (Modbus-RTU and BACnet)	3	
	RS232-01	RS232C serial communication module (Modbus-RTU)	3	
	CAN/RS485-01	CAN/RS485 interface module (CANopen, DeviceNet, Modbus-RTU and BACnet)	3	
	CAN-01	CAN interface module (CANopen and DeviceNet)	3	
	PROFIBUSDP-01	Profibus-DP-V1 interface module	3	
	EtherCAT	EtherCAT interface module	3	
	PROFIBUS-05	Profibus-DP-V1 module (Anybus-CC)	4	
	DeviceNet-05	DeviceNet module (Anybus-CC)	4	
	RS232-05	RS232 interface module (passive) (Modbus-RTU)	4	
	RS485-05	RS485 interface module (passive) (Modbus-RTU)	4	
	Modbus-TCP-05	RS485 Modbus-TCP interface module - 1 port	4	
		RS485 Modbus-TCP interface module - 2 ports	4	
	PROFINETIO-05	Profinet IO interface module (Anybus-CC)	4	
	ETHERNET/IP-05	Ethernet/IP interface module - 1 port	4	
		Ethernet/IP interface module - 2 ports	4	
PLC functions	PLC11-01	Module with PLC functions (see page 14)	1, 2 and 3	
	PLC11-02	Module with PLC functions (see page 14)		

Accessories

Kit for Power Cable Shielding

CFW11 has a kit to simplify the connection of the motor cable shield to ground, providing a low-impedance connection for high frequencies.

Name	Description
PCSA-01	Kit for power cable shielding for frame size A
PCSB-01	Kit for power cable shielding for frame size B
PCSC-01	Kit for power cable shielding for frame size C
PCSD-01	Kit for power cable shielding for frame size D or 2D (IP54)
PCSE-01	Kit for power cable shielding for frame size E or 3 (IP54)
PCS1-01	Kit for power cable shielding for frame size 1 (IP54)
PCSC-02	Kit for power cable shielding for frame size 2C

Notes: 1) The kit for power cable shielding PCSD-01, PCSE-01 is provided along with VSDs having factory fitted RFI filter. Example: EU CFW11 0007 T 2 O FA Z.
 2) In frame sizes D and E the power cable shielding kit is factory standard, even for VSDs without internal RFI filter.
 3) N/A for frame sizes F, G and H.



Enclosures

Standards	Ratings	Frame sizes						
		A	B	C	D	E	F & G	Mec H
IEC	IP20	-	-	-	X	X	X	X
	IP21	X	X	X	KIP21D-01	-	-	-
NEMA	TYPE 1	KN1A-01	KN1B-01	KN1C-01	X	KN1E-01 / KN1E-02	KN1F-01 / KN1G-01	-

Note: (X) Standard
 (-) N/A

Standard	Accessory	Composition
NEMA Type1	KN1A-01	Conduit kit frame size A
	KN1B-01	Conduit kit frame size B
	KN1C-01	Conduit kit frame size C
	KN1E-01	Top cover size E models 105 and 142
	KN1E-02	Top cover + Conduit kit size E models 180 and 211
	KN1F-01	Conduit kit for frame size F
	KN1G-01	Conduit kit for frame size G
IEC	KIP21A-01	Top cover kit frame size A
	KIP21B-01	Top cover kit frame size B
	KIP21C-01	Top cover kit frame size C
	KIP21D-01	Top cover kit frame size D

Note: in the KN1X-01 conduit kit (frame sizes A, B and C) power cable shielding is also provided.



Options

Safety Stop in Accordance with EN 61800-5-2, EN ISO 13849-1, IEC 62061, IEC 61508 Parts 1-7, EN 50178, IEC 60204-1, Cat. 3/PL d acc. and SIL CL2 acc.

With the activation of the safety stop function, the PWM pulses of the IGBTs are disabled. Since no torque is applied to the motor thus, it is ensured that the motor remains stopped providing system safety.



Note: this optional must be factory fitted (see product coding on page 17).

External Control Supply in 24 V dc ¹⁾

Used with communication networks (Profibus-DP, DeviceNet, EtherNet/IP, etc.) so that the control circuit and the interface for the communication network still working even removing the main (AC supply).



Note: 1) This optional must be factory fitted and orders must specify on the product coding (page 17) the desired option.

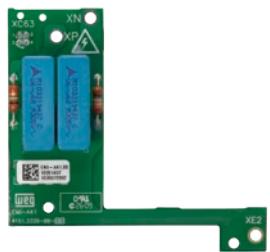
RFI Suppressor Filter ¹⁾ (for the VSD to be in Accordance with EN 61800-3 and EN 55011)

CFW11 models with built-in RFI filter, when properly installed, meet the requirements of the electromagnetic compatibility directive – “EMC Directive 2004/108/EC”.

Example: EU CFW11 0007 T 2 O FA Z

For models from frame size A to D, the RFI filter is optional. But for models in frame size E, F, G, and H, the RFI filter is included in the standard product.

Note: 1) This optional must be factory fitted and orders must specify on the product coding (page 17) the desired option.



CFW11 - Dynamic Braking Module DBW03D

The DBW03, with its autonomous capability, allows for the energy to return from regenerative cycles or even from motors when running high inertia load requiring short deceleration times to dissipate it in resistors.

This breaking unit was developed specially for VSDs with unavailability of the breaking circuit factory integrated, e.g. frame sizes F, G, H and Modular Drive. Its voltage ranges from 380 to 480 V ac, from 500 to 690 V ac and its main function is to limit DC bus voltage in order to avoid the VSD from tripping due to overvoltage caused by applications where breaking is mandatory.



Braking module model		
	DBW03 0380 D 3848SZ	DBW03 0250 D 5069SZ
Maximum output current	380 A	250 A
Minimum resistor	1.8 Ω	2.6 Ω
External power supply for fans	220 V ac +/- 5%@250 mA	

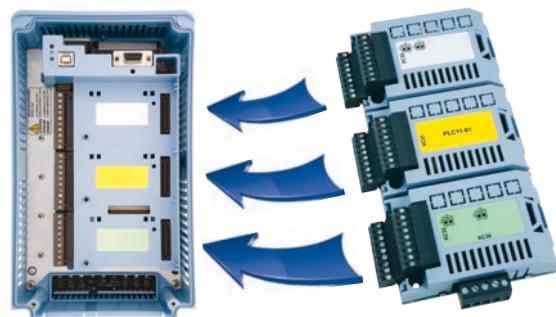
PLC11

PLC Accessories

PLC11 accessory provides the CFW11 with PLC functionality, speed reference generator and motion control functions.

It comes in two options: PLC11-01 and PLC11-02 (see differences in the table below).

In many applications, these accessories allows the CFW11 to replace an external PLC, reducing application costs.



CFW11's PLC module installation

PLC11 module

Features

- Motion control with trapezoidal “S” profiles (absolute and relative)
- Machine initial position search (homing)
- Ladder programming through WLP software with timers, counters, coils and contacts
- RS485 serial interface with Modbus-RTU protocol
- 100 configurable parameters available to the user via keypad or WLP
- Master/Slave function (electronic gearbox)
- CAN interface for CANopen and DeviceNet protocols
- CANopen Master, which allows CFW11 to control up to 25 slave devices
- WLP/ WSCAN software: network configuration and programming software in the same environment

Technical Specification

Inputs/Outputs

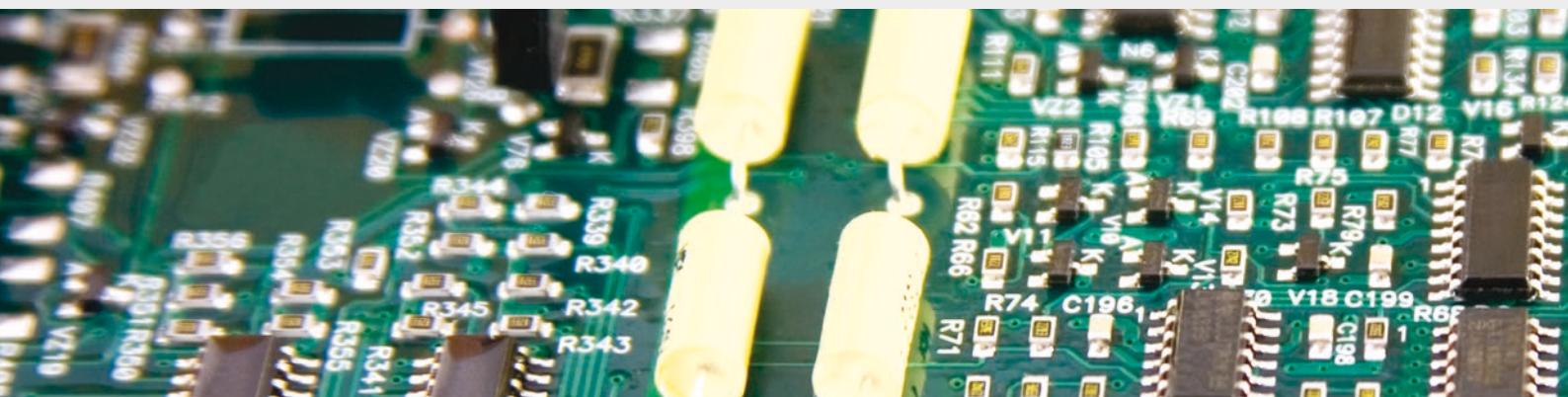
- Digital inputs
- Digital outputs
- Relay outputs
- Encoder interface inputs
- RS485 interface
- CANopen interface
- Analog outputs
- Analog inputs

PLC11-01

- 9 bidirectional isolated inputs 24 V
- 3 bidirectional isolated open-collector outputs: 24 V dc, 500 mA
- 3 outputs NO contacts: 250 V ac, 3 A
- 2 incremental encoder inputs 5...12 V dc, 500 mA (internal power supply)
- 1 RS485 port (Modbus-RTU available)
- 1 CAN port (CANopen and DeviceNet available)
- 1 differential input: -10...+10 V dc / 0...20 mA, 14 bits
- 2 analog outputs: -10...+10 V dc / 0...20 mA, 12 bits

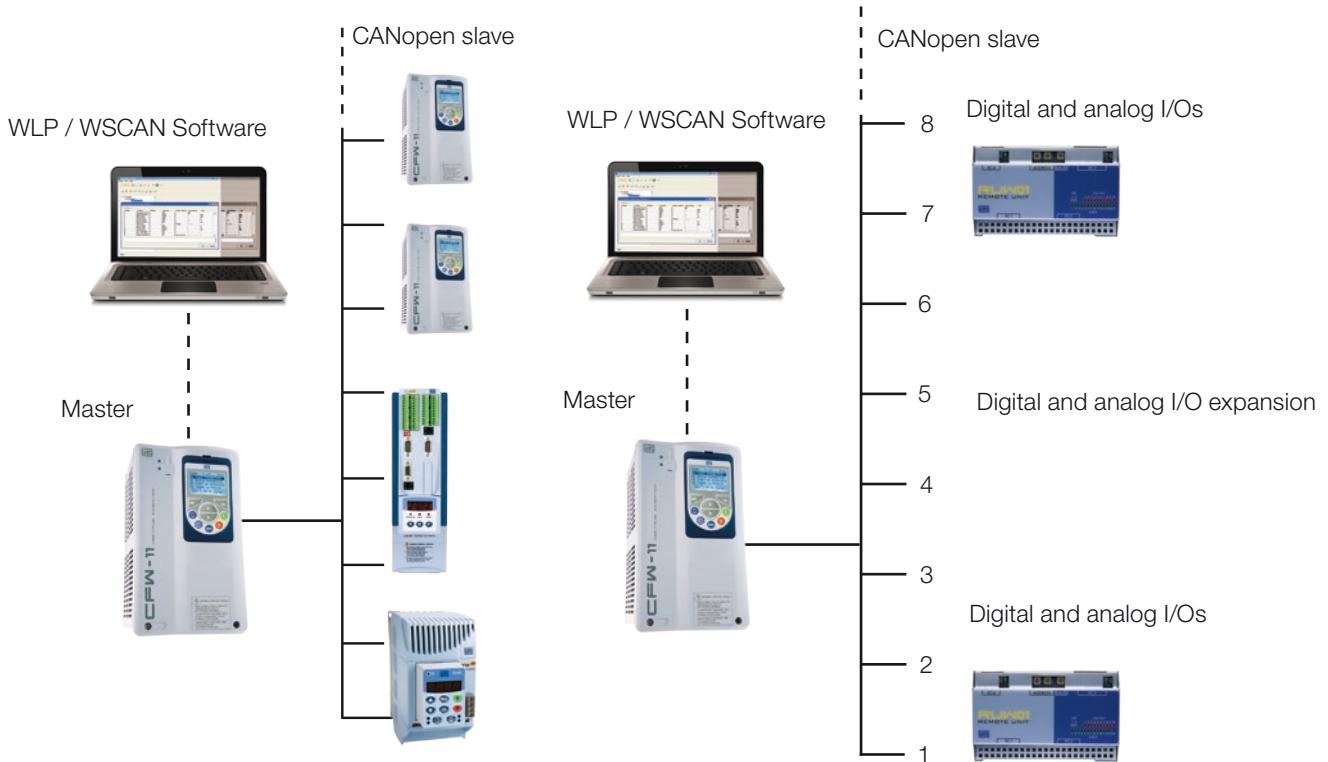
PLC11-02

- 4 bidirectional isolated inputs 24 V
- 3 bidirectional isolated open-collector outputs: 24 V dc, 500 mA
- 1 outputs NO contacts: 250 V ac, 3 A
- 2 incremental encoder inputs 5...12 V dc, 500 mA (internal power supply)
- 1 RS485 port (Modbus-RTU available)
- 1 CAN port (CANopen and DeviceNet available)



PLC11

PLC11-01 as CANopen Network Master



Flash Memory Module

- It stores CFW11 parameters. It ensures that the programming will not be lost as there is a backup of the parameters
- It permits the transfer of parameters stored in the flash memory module to the CFW11 and vice versa. It is an useful function for machine manufactures or in processes where parameter settings are repeated (copy function)
- It stores the applicative software generated by the SoftPLC function

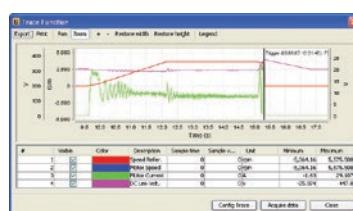
The flash memory module comes as standard on CFW11 series.



USB Connection

Trace Function

Trace function is used to register CFW11 variables (like current, voltage, speed, etc.) when a given event occurs in the system (eg.: alarm / fault, overload, overvoltage, etc.). When a given event takes place, the trigger function activates data storage process. The stored variables can be visualized in the form of graphs by using the SuperDrive G2 software. Trace function simulates a 4-channel oscilloscope. It is a very powerful tool to be used on start-up procedures of systems and on faults diagnosis.



Example of graph visualization screen



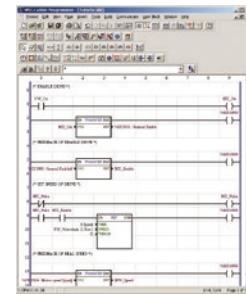
Trace function configuration in the SuperDrive G2

SoftPLC Function

It is a resource that provides PLC features to the CFW11 without the addition of any accessories. It provides flexibility to the product, allowing the user to create his/her own applicative software (user's program).

The SoftPLC main features are:

- Ladder language programming using WLP software
- Access to all VSD parameters and I/Os
- Configurable PLC, mathematical and control blocks
- Applicative software download, upload and online monitoring via USB connection
- Storage of user application in the CFW11 flash memory module (see below)
- Memory capacity of 15 kB for user application storage



Simple and practical programming environment

- 49 User parameter settings that can be individually programmed allowing tags, units, minimum and maximum values, number of decimal digits and other characteristics to be changed.

Parameter	Tag	Unit	Minimum	Maximum	D	H	R	S	I	S	R	A
P1011	UV_Velocidade	0	32767	0	0	0	0	0	0	1	0	C
P1012	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1013	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1014	Parametro PLC	0	32767	0	0	0	0	0	0	1	0	C
P1015	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1016	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1017	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1018	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1019	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1020	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1021	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1022	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C
P1023	Parametro PLC	0	32767	0	0	0	0	0	0	0	1	C

SuperDrive G2

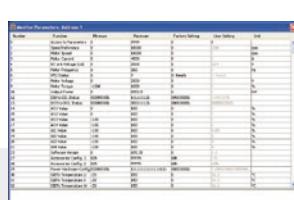
It is a Windows-based software for CFW11 programming, control and monitoring.

The following features are available in the software:

- Automatic CFW11 identification
- Monitoring of CFW11 parameters
- Online parameter changing in the CFW11
- Offline parameter changing in the PC
- Application documents creation
- Trace function (see above)
- Upload of SoftPLC applicative software in the CFW11 flash memory (see page 15)
- Online troubleshooting



This software is available, free of charge, at WEG website.



Monitoring and parameterization of the parameter list. Comparison to factory default is easy.



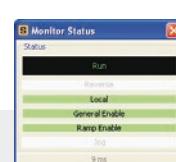
Integrated environment



Monitoring and command window using virtual Keypad. Start/Stop function, JOG, local / remote, Reverse and reset



Parameter setting



Status monitoring

Coding

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
EU	CFW11	0016	T	4	S	-	-	-	-	-	-	-	-	

■ 1 - Market identification

It defines the language of the manual and the factory parameterization

BR = Brazil

NA = North America

MS = Mercosul

EU = Europe

SA = South Africa

■ 2 - Line

CFW11 = WEG Variable Speed Drive Series CFW11

■ 3 - Rated Output current for normal overload system

Supply	Single-phase (S)	Single-phase or Three-phase (B)	Three-phase (T)							
			200-240 V ac (2)	200-240 V ac (2)	380-480 V ac (4)	500-600 V ac (5)	660-690 V ac (6)			
Voltage	200-240 V ac (2)	0010 = 10 A	0006 = 6 A	0007 = 7 A	0003 = 3 A	0088 = 88 A	0002 = 2.9 A	0063 = 63 A	0002 = 2.9 A	0063 = 54 A
			0010 = 10 A	0005 = 5 A	0105 = 105 A	0004 = 4.2 A	0080 = 80 A	0004 = 4.2 A	0080 = 73 A	
Current			0013 = 13 A	0007 = 7 A	0142 = 142 A	0007 = 7 A	0107 = 107 A	0007 = 7 A	0107 = 100 A	
			0016 = 16 A	0010 = 10 A	0180 = 180 A	0010 = 10 A	0125 = 125 A	0010 = 8.5 A	0125 = 108 A	
			0024 = 24 A	0013 = 13 A	0211 = 211 A	0012 = 12 A	0150 = 150 A	0012 = 11 A	0150 = 130 A	
			0028 = 28 A	0017 = 17 A	0242 = 242 A	0017 = 17 A	0170 = 170 A	0017 = 15 A	0170 = 147 A	
			0033 = 33 A	0024 = 24 A	0312 = 312 A	0022 = 22 A	0216 = 216 A	0022 = 20 A	0216 = 195 A	
			0045 = 45 A	0031 = 31 A	0370 = 370 A	0027 = 27 A	0289 = 289 A	0027 = 24 A	0289 = 259 A	
			0054 = 54 A	0038 = 38 A	0477 = 477 A	0032 = 32 A	0315 = 315 A	0032 = 30 A	0315 = 259 A	
			0070 = 70 A	0045 = 45 A	0515 = 515 A	0044 = 44 A	0365 = 365 A	0044 = 35 A	0365 = 312 A	
			0086 = 86 A	0058 = 58 A	0601 = 601 A	0053 = 53 A	0435 = 435 A	0053 = 46 A	0435 = 365 A	
			0105 = 105 A	0070 = 70 A	0720 = 720 A		0584 = 584 A		0584 = 478 A	
			0142 = 142 A				0625 = 625 A		0625 = 518 A	
			0180 = 180 A				0758 = 758 A		0758 = 628 A	
			0211 = 211 A				0804 = 804 A		0804 = 703 A	

■ 4 - Number of phases

S = Single-phase

B = Single-phase or three-phase

T = Three-phase

■ 10 - RFI filter

Blank = factory model

FA = with built-in RFI filter

NF = without built-in RFI filter

■ 5 - Voltage

2 = 200-240 V

4 = 380-480 V

5 = 500-600 V

6 = 660-690 V

■ 11 - Safety stop

Blank = factory model

Y = with Safety Stop function (STO)

■ 6 - Optional accessories

S = factory model

O = product with optional accessories

■ 12 - External electronic supply 24 V dc

Blank = factory model

W = with external electronic power supply 24 V dc

■ 7 - Protection degree

Blank = factory model

N1 = NEMA 1

21 = IP21

54 = IP54

■ 13 - Special hardware

Blank = factory model

H1 = special hardware

DC = common / DC Bus Version (without rectifier bridge)

■ 14 - Special software

Blank = factory model

S1 = special software

■ 8 - Keypad

Blank = factory standard

IC = without interface (blind cover)

■ 15 - End of code indicator digit

Z = end of code indicator

■ 9 - Braking

Blank = factory model

DB = with built-in IGBT braking (chopper)

NB = without built-in IGBT braking (chopper)

Drive Ratings

Normal Duty (ND) Cycle

- 110% for 60s every 10 minutes
- 150% for 3s every 10 minutes

Heavy Duty (HD) Cycle

- 150% for 60s every 10 minutes
- 200% for 3s every 10 minutes



Sizing the Drive

The correct way to select a VSD is matching its output current with the motor rated current. However, the following tables present the expected motor power for each VSD model.

Use the motor power ratings following only as a guidance. Motor rated currents may vary with speed and manufacturer. IEC motor powers are based on WEG 4-poles motors, NEMA motor powers are based on NEC table 430-150.



CFW11 - Standard

Motor Voltages Between 220 V ac and 230 V ac

Power supply	Model	Normal duty (ND)	IEC		Heavy duty (HD)	IEC		NEMA
			50 Hz 220 V ac 230 V ac	60 Hz 230 V ac		50 Hz 220 V ac 230 V ac	60 Hz 230 V ac	
		A	kW	HP	A	kW	HP	
200-240 V ac	10	CFW11 0006 S2	6	1.1	1.5	5	1.1	1
		CFW11 0007 S2	7	1.5	2	7	1.5	2
		CFW11 0010 S2	10	2.2	3	10	2.2	3
	30	CFW11 0006 B2	6	1.1	1.5	5	1.1	1
		CFW11 0007 B2	7	1.5	2	7	1.5	2
		CFW11 0007 T2	7	1.5	2	5.5	1.1	1
		CFW11 0010 T2	10	2.2	3	8	1.5	2
		CFW11 0013 T2	13	3	3	11	2.2	3
		CFW11 0016 T2	16	4	5	13	3	3
		CFW11 0024 T2	24	5.5	7.5	20	5.5	5
		CFW11 0028 T2	28	7.5	10	24	5.5	7.5
		CFW11 0033 T2	33.5	9.2	10	28	7.5	10
		CFW11 0045 T2	45	11	15	36	9.2	10
		CFW11 0054 T2	54	15	20	45	11	15
		CFW11 0070 T2	70	18.5	25	56	15	20
220-230 V ac	30	CFW11 0086 T2	86	22	30	70	18.5	25
		CFW11 0105 T2	105	30	40	86	22	30
		CFW11 0142 T2	142	37	50	115	30	40
		CFW11 0180 T2	180	55	60	142	37	50
		CFW11 0211 T2	211	55	75	180	55	60

Motor Voltages Between 380 V ac and 480 V ac

Power supply	Model	Normal duty (ND)	IEC		NEMA	Heavy duty (HD)	IEC		NEMA
			50 Hz 380 V ac 415 V ac	60 Hz 440 V ac 460 V ac			50 Hz 380 V ac 415 V ac	60 Hz 440 V ac 460 V ac	
		A	kW	HP	HP	A	kW	HP	HP
380-480 V ac	30	CFW11 0003 T4	3.6	1.5	2	2	3.6	1.5	2
		CFW11 0005 T4	5	2.2	3	3	5	2.2	3
		CFW11 0007 T4	7	3	4	3	5.5	2.2	3
		CFW11 0010 T4	10	4	7.5	5	10	4	7.5
		CFW11 0013 T4	13.5	5.5	10	7.5	11	5.5	7.5
		CFW11 0017 T4	17	7.5	12.5	10	13.5	5.5	10
		CFW11 0024 T4	24	11	15	15	19	9.2	12.5
		CFW11 0031 T4	31	15	20	20	25	11	15
		CFW11 0038 T4	38	18.5	30	25	33	15	25
		CFW11 0045 T4	45	22	30	30	38	18.5	30
		CFW11 0058 T4	58.5	30	40	40	47	22	30
		CFW11 0070 T4	70.5	37	50	50	61	30	50
		CFW11 0088 T4	88	45	75	60	73	37	60
		CFW11 0105 T4	105	55	75	75	88	45	75
		CFW11 0142 T4	142	75	100	100	115	55	75
		CFW11 0180 T4	180	90	150	150	142	75	100
		CFW11 0211 T4	211	110	175	150	180	90	150
		CFW11 0242 T4	242	132	200	200	211	110	150
		CFW11 0312 T4	312	160	250	250	242	132	200
		CFW11 0370 T4	370	200	300	300	312	160	250
		CFW11 0477 T4	477	250	400	400	370	200	300
		CFW11 0515 T4	515	280	400	450	477	250	400
		CFW11 0601 T4	601	315	500	500	515	280	400
		CFW11 0720 T4	720	370	600	600	560	300	450

CFW11 - Standard

Motor Voltages Between 500 V ac and 600 V ac

Power supply	Model	Normal duty (ND)	IEC		NEMA	Heavy duty (HD)	IEC		NEMA
			50 Hz 525 V ac	50 Hz 575 V ac			50 Hz 575 V ac	60 Hz 575 V ac	
A	kW	kW	HP	A	kW	kW	HP	A	HP
500-600 V ac	CFW11 0002 T5	2.9	1.5	1.5	2	2.7	1.5	1.5	2
	CFW11 0004 T5	4.2	2.2	2.2	3	3.8	2.2	2.2	3
	CFW11 0007 T5	7.0	4	4	5	6.5	4	4	5
	CFW11 0010 T5	10	5.5	5.5	7.5	9.0	5.5	5.5	7.5
	CFW11 0012 T5	12	7.5	7.5	10	10	5.5	7.5	10
	CFW11 0017 T5	17	11	11	15	17	11	11	15
	CFW11 0022 T6	22	15	15	20	19	11	11	15
	CFW11 0027 T6	27	18.5	18.5	25	22	15	15	20
	CFW11 0032 T6	32	22	22	30	27	18.5	18.5	25
	CFW11 0044 T6	44	30	30	40	36	22	22	30
	CFW11 0053 T6	53	37	37	50	44	30	30	40
	CFW11 0063 T6	63	45	45	60	53	37	37	50
	CFW11 0080 T6	80	55	55	75	66	45	45	60
	CFW11 0107 T6	107	75	75	100	90	55	55	75
	CFW11 0125 T6	125	90	90	125	107	75	75	100
	CFW11 0150 T6	150	110	110	150	122	90	90	125
	CFW11 0170 T6	170	110	132	150	150	110	110	150
	CFW11 0216 T6	216	160	160	200	180	132	132	200
	CFW11 0289 T6	289	200	220	300	240	160	185	250
	CFW11 0315 T6	315	220	250	300	289	200	220	300
	CFW11 0365 T6	365	250	280	350	315	220	250	300
	CFW11 0435 T6	435	315	315	450	357	250	280	350
	CFW11 0584 T6	584	450	450	600	504	370	400	500
	CFW11 0625 T6	625	450	500	700	540	400	450	600
	CFW11 0758 T6	758	560	560	800	614	450	500	700
	CFW11 0804 T6	804	560	630	900	682	500	560	700

Motor Voltages Between 660 V ac and 690 V ac

Power supply	Model	Normal duty (ND)	IEC		NEMA	Heavy duty (HD)	IEC		NEMA
			50 Hz 660 V ac	50 Hz 690 V ac			50 Hz 660 V ac	60 Hz 660 V ac	
A	kW	kW	HP	A	kW	kW	HP	A	HP
660-690 V ac	CFW11 0002 T6	2.9	2.2	2.2	3	2.7	1.5	1.5	2
	CFW11 0004 T6	4.2	3	3	4	3.8	2.2	3	4
	CFW11 0007 T6	7.0	5.5	5.5	7.5	6.5	4	5.5	6
	CFW11 0010 T6	8.5	5.5	7.5	10	7.0	5.5	5.5	7.5
	CFW11 0012 T6	11	9.2	9.2	12.5	9.0	7.5	7.5	10
	CFW11 0017 T6	15	11	11	15	13	11	11	15
	CFW11 0022 T6	20	15	15	20	17	15	15	15
	CFW11 0027 T6	24	18.5	22	25	20	15	15	20
	CFW11 0032 T6	30	22	22	30	24	18.5	22	25
	CFW11 0044 T6	35	30	30	40	30	22	22	30
	CFW11 0053 T6	46	37	37	50	39	30	37	40
	CFW11 0063 T6	54	45	45	60	46	37	37	50
	CFW11 0080 T6	73	55	55	75	61	55	55	75
	CFW11 0107 T6	100	90	90	125	85	75	75	100
	CFW11 0125 T6	108	90	90	125	95	75	90	100
	CFW11 0150 T6	130	110	110	125	108	90	90	125
	CFW11 0170 T6	147	132	132	175	127	110	110	150
	CFW11 0216 T6	195	185	185	200	165	132	160	200
	CFW11 0289 T6	225	200	200	250	195	185	185	200
	CFW11 0315 T6	259	220	250	300	225	200	220	270
	CFW11 0365 T6	312	280	300	350	259	220	250	300
	CFW11 0435 T6	365	315	355	450	312	280	300	350
	CFW11 0584 T6	478	450	450	600	410	370	400	500
	CFW11 0625 T6	518	500	500	650	447	400	450	550
	CFW11 0758 T6	628	560	560	800	518	500	500	650
	CFW11 0804 T6	703	630	630	900	597	560	560	750

CFW11 - IP54

The CFW11 IP54 features an IP54 enclosure that protects the drive from splashing water, corrosion and dust. Improved cooling fans ensure perfect functionality when operating at maximum loading capacity. Its design is suitable for wall mounting with no need for customized panels allowing for severe environments exposure.

- Chemical Industry
- Petrochemical Industry
- Food Industry

Same communication protocols from the standard CFW11 can be applied on the CFW11 IP54 version.

Note: the operation temperature of the CFW11 - IP54 is from -10 °C to 40 °C (up to 50 °C with 2% current derating for each °C over 40 °C)



Motor Voltages 220 V ac / 240 V ac: IP54

Power supply		Model		Normal duty (ND)	IEC		NEMA		Heavy duty (HD)	IEC		NEMA		
		1/30	10		A	kW	HP	50 Hz 220 V ac 230 V ac	60 Hz 230 V ac	A	kW	HP	50 Hz 220 V ac 230 V ac	60 Hz 230 V ac
200-240 V ac	30	CFW11 0006S2054		6	1.1	1.5				5	1.1	1		
		CFW11 0007S2054		7	1.5	2				7	1.5	2		
		CFW11 0010S2054		10	2.2	3				10	2.2	3		
		CFW11 0006B2054		6	1.1	1.5				5	1.1	1		
		CFW11 0007B2054		7	1.5	2				7	1.5	2		
		CFW11 0007T2054		7	1.5	2				5.5	1.1	1		
		CFW11 0010T2054		10	2.2	3				8	1.5	2		
		CFW11 0013T2054		13	3	3				11	2.2	3		
		CFW11 0016T2054		16	4	5				13	3	3		
		CFW11 0024T2054		24	5.5	7.5				20	5.5	5		
		CFW11 0028T2054		28	7.5	10				24	5.5	7.5		
		CFW11 0033T2054		33.5	9.2	10				28	7.5	10		
		CFW11 0045T2054		45	11	15				36	9.2	10		
		CFW11 0054T2054		54	15	20				45	11	15		
		CFW11 0070T2054		70	18.5	25				56	15	20		
		CFW11 0086T2054		86	22	30				70	18.5	25		
		CFW11 0105T2054		105	30	40				86	22	30		
		CFW11 0142T2054		142	37	50				115	30	40		
220-230 V ac	30													

Motor Voltages 380 V ac / 480 V ac: IP54

Power supply		Model		Normal duty (ND)	IEC		NEMA		Heavy duty (HD)	IEC		NEMA		
		1/30	30		A	kW	HP	50 Hz 380 V ac 415 V ac	60 Hz 440 V ac 460 V ac	A	kW	HP	50 Hz 380 V ac 415 V ac	60 Hz 440 V ac 460 V ac
380-480 V ac	30	CFW11 0003T4054		3.6	1.5	2	2			3.6	1.5	2		
		CFW11 0005T4054		5	2.2	3	3			5	2.2	3		
		CFW11 0007T4054		7	3	4	3			5.5	2.2	3		
		CFW11 0010T4054		10	4	7.5	5			10	4	7.5		
		CFW11 0013T4054		13.5	5.5	10	7.5			11	4	7.5		
		CFW11 0017T4054		17	7.5	12.5	10			13.5	5.5	10		
		CFW11 0024T4054		24	11	15	15			19	9.2	12.5		
		CFW11 0031T4054		31	15	20	20			25	11	15		
		CFW11 0038T4054		38	18.5	30	25			33	15	25		
		CFW11 0045T4054		45	22	30	30			38	18.5	30		
		CFW11 0058T4054		58.5	30	40	40			47	22	30		
		CFW11 0070T4054		70.5	37	50	50			61	30	50		
		CFW11 0088T4054		88	45	75	60			73	37	60		
		CFW11 0105T4054		105	55	75	75			88	45	75		
		CFW11 0142T4054		142	75	100	100			115	55	75		
380-480 V ac	30													

Dimensions and Weight

Model	Size	Standard version			Weight kg (lb)	Size	IP54 version			Weight kg (lb)
		Height (H)	Width (W)	Depth (D)			Height (H)	Width (W)	Depth (D)	
CFW11 0006 S2										
CFW11 0006 B2										
CFW11 0007 S2										
CFW11 0007 B2										
CFW11 0007 T2										
CFW11 0010 S2										
CFW11 0010 T2										
CFW11 0013 T2										
CFW11 0016 T2										
CFW11 0024 T2										
CFW11 0028 T2										
CFW11 0033 T2										
CFW11 0045 T2										
CFW11 0054 T2										
CFW11 0070 T2										
CFW11 0086 T2										
CFW11 0105 T2										
CFW11 0142 T2										
CFW11 0180 T2										
CFW11 0211 T2										
CFW11 0003 T4										
CFW11 0005 T4										
CFW11 0007 T4										
CFW11 0010 T4										
CFW11 0013 T4										
CFW11 0017 T4										
CFW11 0024 T4										
CFW11 0031 T4										
CFW11 0038 T4										
CFW11 0045 T4										
CFW11 0058 T4										
CFW11 0070 T4										
CFW11 0088 T4										
CFW11 0105 T4										
CFW11 0142 T4										
CFW11 0180 T4										
CFW11 0211 T4										
CFW11 0242 T4										
CFW11 0312 T4										
CFW11 0370 T4										
CFW11 0477 T4										
CFW11 0515 T4										
CFW11 0601 T4										
CFW11 0720 T4										

Model	Size	Standard version			Weight kg
		Dimensions mm			
		Height (H)	Width (W)	Depth (D)	
CFW11 0002 T5					
CFW11 0004 T5					
CFW11 0007 T5					
CFW11 0010 T5					
CFW11 0012 T5					
CFW11 0017 T5					
CFW11 0002 T6					
CFW11 0004 T6					
CFW11 0007 T6					
CFW11 0010 T6					
CFW11 0012 T6					
CFW11 0017 T6					
CFW11 0022 T6					
CFW11 0027 T6					
CFW11 0032 T6					
CFW11 0044 T6					
CFW11 0053 T6					
CFW11 0063 T6					
CFW11 0080 T6					
CFW11 0107 T6					
CFW11 0125 T6					
CFW11 0150 T6					
CFW11 0170 T6					
CFW11 0216 T6					
CFW11 0289 T6					
CFW11 0315 T6					
CFW11 0365 T6					
CFW11 0435 T6					
CFW11 0584 T6					
CFW11 0625 T6					
CFW11 0758 T6					
CFW11 0804 T6					



Note: 1) These options must be supplied already installed in the CFW11. See the smart code on page 17 for the solicitation of the options presented above.

Mechanical Mounting

Standard Installation



Frame size	Minimum mounting clearance with top cover			
	A mm (in)	B mm (in)	C mm (in)	D mm (in)
A	25 (0.98)	25 (0.98)	10 (0.39)	30 (0.39)
B	40 (1.57)	45 (1.57)	10 (0.39)	30 (0.39)
C	110 (4.33)	130 (5.12)	10 (0.39)	30 (0.39)
D	110 (4.33)	130 (5.12)	10 (0.39)	30 (0.39)
E	150 (5.91)	250 (9.84)	20 (0.78)	80 (3.15)
F, G and H	150 (5.91)	250 (9.84)	20 (0.78)	80 (3.15)

Note: when one VSD is assembled above another, use the distance A+B and deflect the hot air coming from the VSD below.

Side by Side Installation



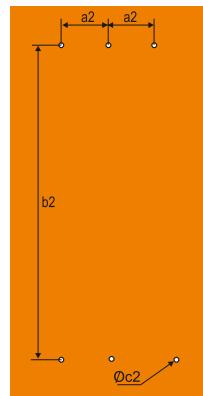
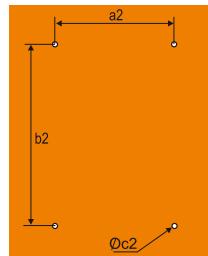
Note: for frame size A, B and C: side by side assembly without lateral spacing and with the removal of the top cover.



Mechanical Installation | Panel Assembly

Surface Assembly

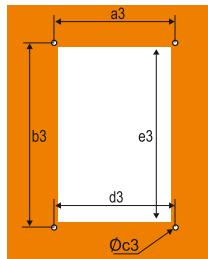
Frame size	a2 mm (in)	b2 mm (in)	c2 mm (in)
A	115 (4.53)	250 (9.85)	M5
B	150 (5.91)	300 (11.82)	M5
C	150 (5.91)	375 (14.77)	M6
D	200 (7.88)	525 (20.67)	M8
E	200 (7.88)	650 (25.60)	M8
F	150 (5.91)	1,200 (47.24)	M10
G	200 (7.87)	1,225 (48.23)	M10
H	175 (6.89)	1,350 (53.15)	M10



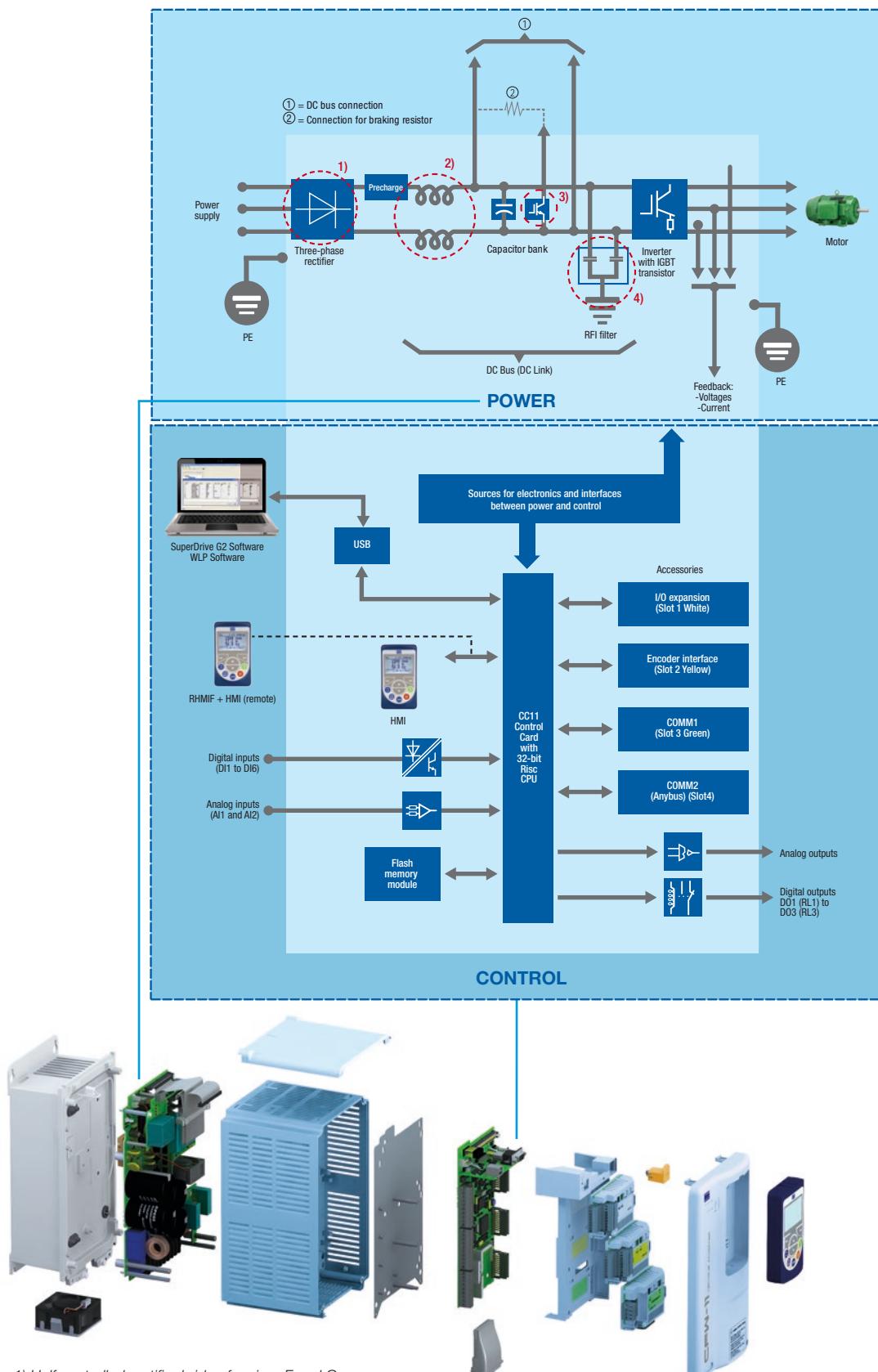
Flange Assembly (IP54 Rated When Mounting the Heat-Sink Outside the Enclosure)

- * From sizes A to E the inverter area that will be outside the panel, has IP54 protection degree.
- * For sizes F, G and H the inverter area that will be outside the panel, has IP20 protection degree.

Frame size	a3 mm (in)	b3 mm (in)	c3 mm (in)	d3 mm (in)	e3 mm (in)
A	130 (5.12)	240 (9.45)	M5	135 (5.32)	225 (8.86)
B	175 (6.84)	285 (11.23)	M5	179 (7.05)	271 (10.65)
C	195 (7.68)	365 (14.38)	M6	205 (8.08)	345 (13.59)
D	275 (10.83)	517 (20.36)	M8	285 (11.23)	485 (19.10)
E	275 (10.83)	635 (25.00)	M8	315 (12.40)	615 (24.21)
F	350 (13.78)	1,185 (46.61)	M10	391 (15.39)	1,146 (45.12)
G	400 (15.75)	1,220 (48.03)	M10	495 (19.49)	1,182 (46.53)
H	595 (23.43)	1,345 (52.95)	M10	647 (25.47)	1,307 (51.46)



CFW11 - Block Diagram



Notes: 1) Half controlled rectifier bridge for sizes F and G.
 2) Available until frame size G.
 3) IGBT braking (chopper).
 4) Standard RFI filter for sizes E, F, G and H.
 5) Notes 1 and 2 are not available for frame size H and DC hardware version.

Please refer to the user manual for more information.

Technical Data

Power supply and power range			Braking methods	
Voltage and power range	Single phase	220-240 V ac (+10%, -15%) (1.5 to 3 HP) 1.1 to 2.2 kW	Rheostatic braking (chopper)	Supply available built-in or with external module (DBW03) External braking resistor (not provided)
	Three phases	220-240 V ac (+10%, -15%) (1.5 to 75 HP) 1.1 to 55 kW	Optimal braking	Does not need braking resistor
		380-480 V ac (+10%, -15%) (2 to 600 HP) 1.5 to 415 kW	DC braking	Direct current applied to the motor
		500-600 V ac (+10%, -15%) (2 to 900 HP) 1.5 to 630 kW		
		660-690 V ac (+10%, -15%) (3 to 900 HP) 1.5 to 630 kW		
Frequency	50/60 Hz (+/-2%: 48 a 63 Hz)			
Displacement factor	Greater than 0.98			
Efficiency	Greater than 0.97			
Inverter output			Performance	
Voltage range	Three phase, 0 up to power supply voltage		V/F	Regulation: 1% of rated speed Speed variation range: 1:20
Frequency range	0 to 3.4x motor rated frequency ¹⁾		Voltage vector (VVW)	Regulation: 1% of rated speed Speed variation range: 1:30
Switching frequency	Standard: 5 kHz (frame sizes A, B, C, D); 2.5 kHz (frame size E); 2 kHz (frame size F, G and H) Options available 2.5 / 5 / 10 kHz		Sensorless vector	Regulation: 0.5% of rated speed Speed variation range: 1:100
Overload	Normal duty cycle	110% for 1min every 10min 150% for 3s every 10min	Vector with encoder (with accessory ENC-01, ENC-02, PLC11-01 and PLC11-02)	Regulation: $\pm 0.01\%$ of rated speed with 14-bit analog input (IOA) Regulation: $\pm 0.01\%$ of rated speed with digital reference (keyboard, serial fieldbus, electronic potentiometer, multispeed)
	Heavy duty cycle	150% for 1min every 10min 200% for 3s every 10min		Regulation: $\pm 0.05\%$ of rated speed with 12-bit analog input Range: 10 to 180% Regulation: $\pm 5\%$ of rated torque
Time (ramps)	Acceleration	0 to 999s	Torque control	Range: 20 to 180% Regulation: $\pm 10\%$ of rated torque (above 3 Hz)
	Deceleration	0 to 999s		
Inputs and outputs (I/Os) in the standard product				
Environment	Operation temperature	Digital	6 isolated inputs, 24 V dc, programmable functions	
		Analog	2 differential inputs isolated by differential amplifier, programmable functions	
			Resolution: - AI1: 12 bits - AI2: 11 bits + signal	
			Signals: 0 to 10 V dc, 0 to 20 mA or 4 to 20 mA	
			Impedance: - 400 k Ω for signal 0 to 10 V dc - 500 Ω for signal 0 to 20 mA or 4 to 20 mA	
			Relay	
Protection degree	Outputs	Relay	3 relays with NO / NC contacts, 240 V ac / 1A, programmable functions	
		Analog	2 isolated outputs, programmable functions	
			Resolution: 11 bits	
			Load: 0 to 10 V: $R_L \geq 10$ k Ω 0 to 20 mA or 4 to 20 mA: $R_L < 500\Omega$	
	Available supply to user		24 V dc + -20%, 500 mA	
IP21	Standard for frame sizes A, B, C. For frame size D the top cover kit has to be added. Frame Sizes E, F, G and H option not available			
IP20	Standard for frame sizes D, E, F, G and H. Frame sizes A, B and C the top cover has to be removed			
NEMA1	Standard for frame size D Optional for frame sizes A, B, C, E, F and G			
IP54	Frame sizes 1, 2 and 3			

Note: 1) This maximum value can change according to the used control mode and switching frequency. The maximum permissible speed is 18,000 rpm.

Technical Data

Communication		Protections
Profibus-DP	Profibus-DP-01 (slot 3) PROFDP-05 (slot 4)	Overcurrent / short circuit
DeviceNet	CAN/RS485-01 (slot 3)	Under / overvoltage in the power circuit
	CAN-01 (slot 3)	Phase loss
	DeviceNet-05 (slot 4)	Overtemperature in the VSD (IGBTs, rectifier and internal air in the electronic cards)
CANopen	CAN/RS485-01 (slot 3)	Overtemperature in the motor
	CAN-01 (slot 3)	Overload in the braking resistor
CANopen Master/Slave	PLC11-01 1, 2 and 3	Overload in the IGBTs
Ethernet / IP	ETHERNET/IP-05 (slot 4)	Overload in the motor
Modbus-TCP	Modbus-TCP-05 (slot 4)	Fault / external alarm
Profinet IO	PROFINETIO-05 (slot 4)	Fault in the CPU or memory
Modbus-RTU (RS485)	RS485-01 (slot 3)	Phase-to-ground short circuit at the output
	CAN/RS485-01 (slot 3)	Fault in the heatsink fan
	RS485-05 (slot 4)	Motor overspeed
Modbus-RTU (RS232)	RS232-01 and RS232-02 (slot 3)	Incorrect connection of encoder
	RS232-05 (slot 4)	
USB	Built into the standard product	
	Communication with SuperDrive G2 software	
	Communication with WLP Software used for programming and monitoring the SoftPLC function and the PLC11 accessories	
Safety standards		Electromagnetic compatibility standards (EMC)
UL 508C Power conversion equipment		EN 61800-3 - Adjustable speed electrical power drive systems Part 3: EMC product standard including specific test methods
UL 840 Insulation coordination including clearances and creepage distances for electrical equipment		EN 55011 - Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment
EN 61800-5-1 Safety requirements electrical, thermal and energy		CISPR 11 - Industrial, scientific and medical (ISM) radio-frequency equipment Electromagnetic disturbance characteristics Limits and methods of measurement
EN 50178 Electronic equipment for use in power installations		EN 61000-4-2 - Electromagnetic Compatibility Standards (EMC) Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test
EN 60204-1 Safety of machinery. Electrical equipment of machines. Part 1: General requirements.		EN 61000-4-3 - Electromagnetic Compatibility Standards (EMC) Part 4: Testing and measurement techniques - Section 3: Radiated, radiofrequency, electromagnetic field immunity test
Note: in order to have a machine in conformity with this norm, the machine manufacturer is responsible for the installation of an emergency shutdown device and an equipment for network sectioning		EN 61000-4-4 - Electromagnetic Compatibility Standards (EMC) Part 4: Testing and measurement techniques - Section 4: Electrical fast transient / burst immunity test
EN 60146 (IEC 146) Semiconductor converters		EN 61000-4-5 - Electromagnetic Compatibility Standards (EMC) Part 4: Testing and measurement techniques - Section 5: Surge immunity test
EN 61800-2 Adjustable speed electrical power drive systems - Part 2: General requirements - rating specifications for low voltage adjustable frequency a.c. power drive systems		EN 61000-4-6 - Electromagnetic Compatibility Standards (EMC) Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
Mechanical construction standards		
EN 60529 - Degrees of protection provided by enclosures (IP Code)		
UL 50 - Enclosures for electrical equipment		