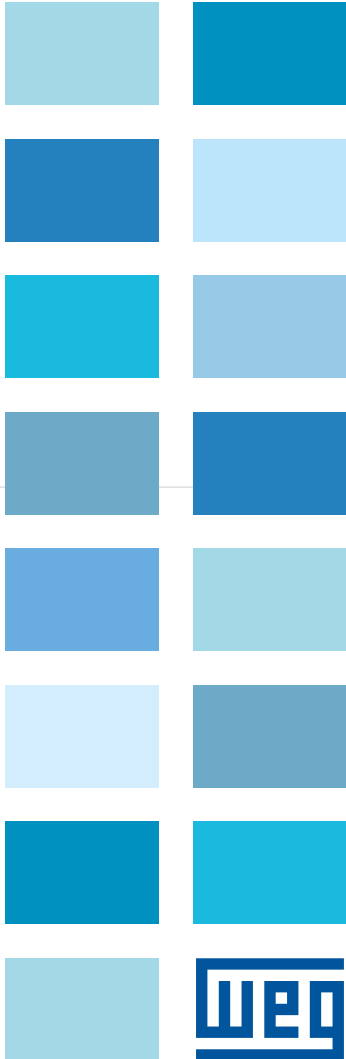
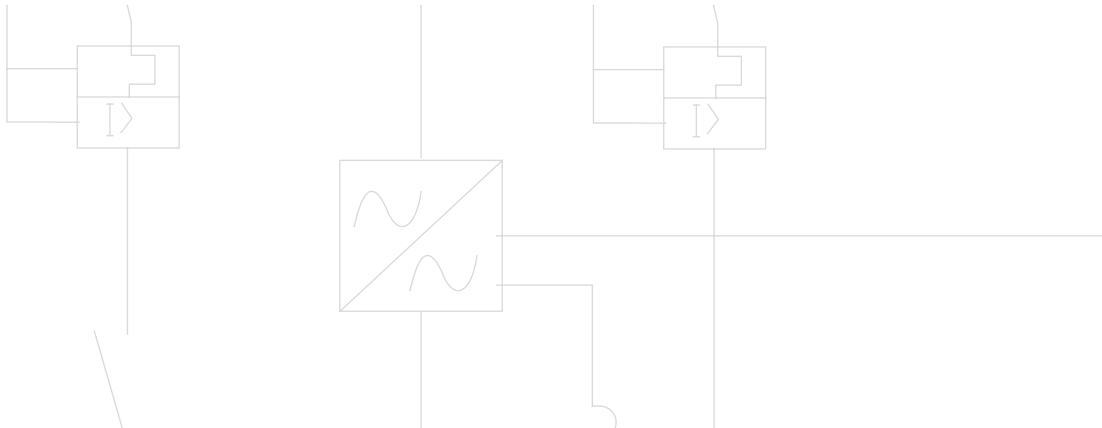
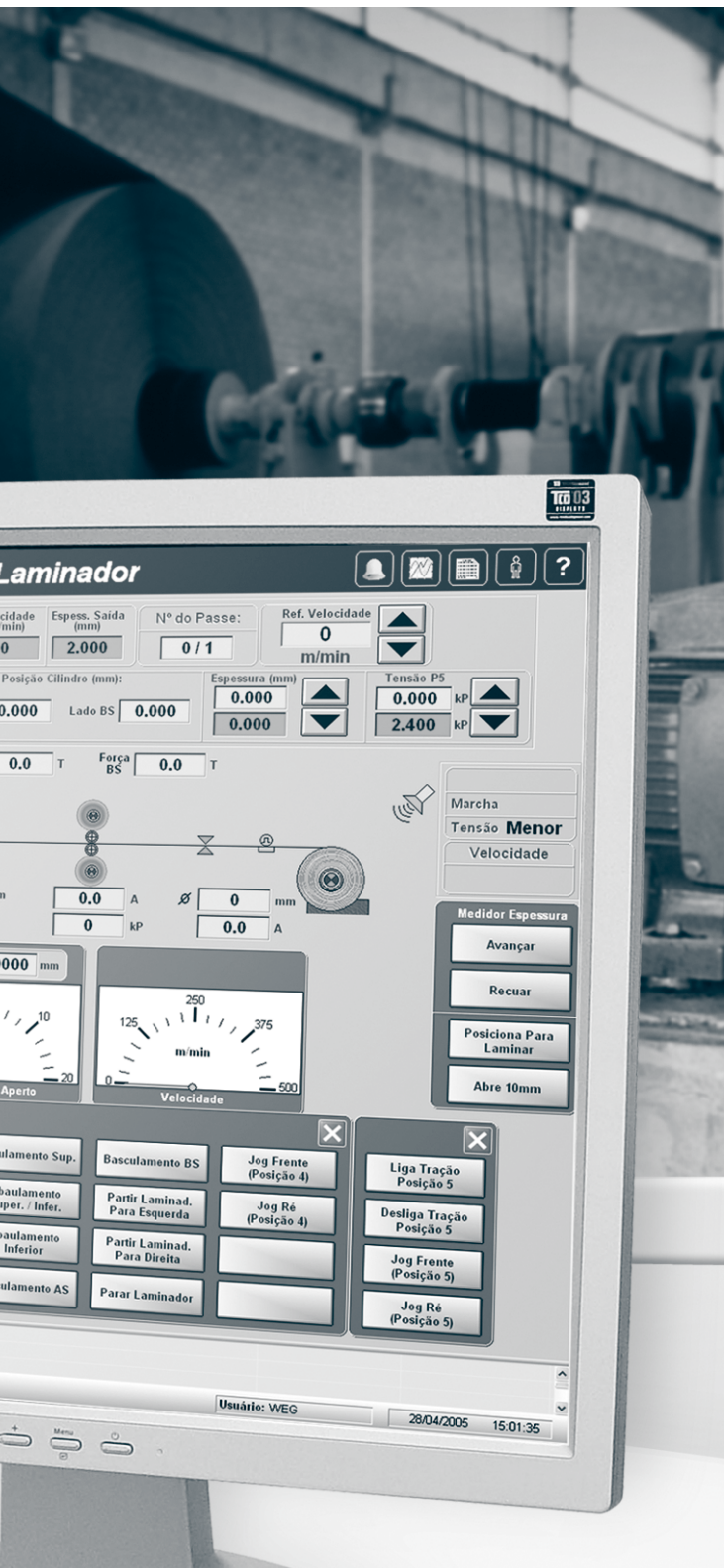


# Automation

## Variable Speed Drives



# VSD



VSDs are intended for speed control of three-phase induction motors in a wide variety of industrial applications. The WEG VSD series offers state-of-the-art technology in motor control with a modern design, great number of features, and easy installation and operation.

These products are designed with high-software optimization and are easily set through a simple Human-Machine Interface (keypad). Additionally, they comprise functions and resources that allow protection and control of electric motors an extremely easy and efficient way. They are suitable to operate with V/f or vector control.



# CFW-08

The CFW-08 VSDs incorporate the most advanced technology features in a compact product, with a complete set of special functions available. CFW-08 VSDs are easy to install and operate. They are equipped with an optimized software that can be easily set through a keypad, which enables CFW-08 to process and control most of industrial machines. In addition, the CFW-08 is equipped with dead time compensation technique, which avoids motor instability and provides increase of torque at low speeds.

## Features

- DSP (Digital Signal Processor) control provides a reasonable improvement of inverter performance
- State-of-the-Art Technology with the newest generation of IGBTs
- Electronics with SMD components
- V/F or sensorless vector control
- Sinusoidal PWM modulation- Space Vector Modulation
- Considerable motor noise reduction
- Interface with membrane keypad (standard or remote HMI)
- Flexible programming
- Compact dimensions
- Easy installation and operation
- High starting torque
- Conduit installation kit
- Optional class A (internal) and class B (external) EMC filters

## Main Applications

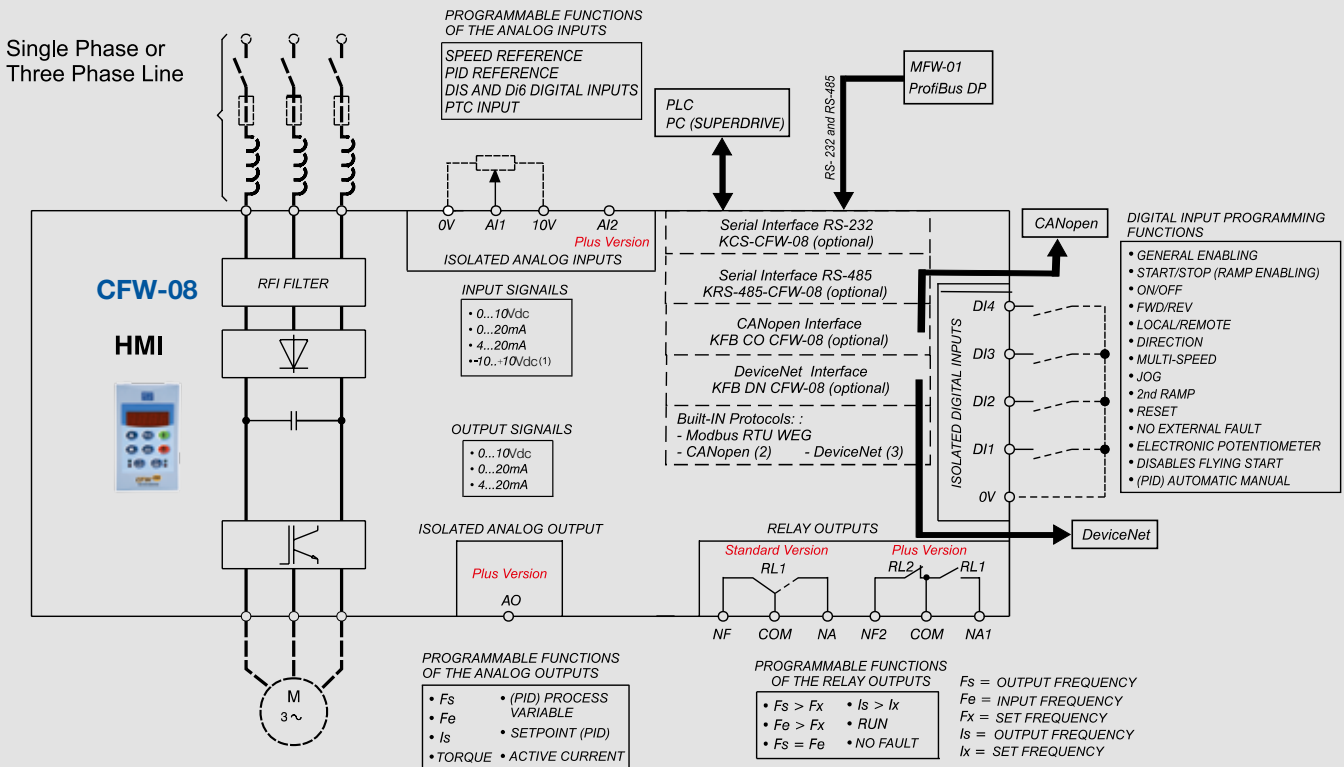
- Centrifugal pumps
- Process pumps
- Fans / Exhaust fans
- Stirrers / Mixers
- Extruding machines
- Conveyors
- Roller tables
- Granulators / Pelletizers
- Driers / Rotary kilns
- Rotating filters
- Winding / Unwinding machines
- Cutting and welding machines



## Certifications



## Block Diagram



(1) Only available with control board A2  
 (2) Only available with control board A3  
 (3) Only available with control board A4  
 (4) Not available for 500-600V

## CFW-08 - Models and optional accessories

### Standard



Standard Model with keypad (HMI-CFW08-P)



### No Keypad



Optional Model without keypad (with blank cover)



### Serial Interface Module RS-485



Optional Kit: Serial communication RS-485 (KRS-485-CFW08)



### Serial Interface Module RS-232 Remote Serial Keypad



Optional Kit: Serial communication RS-232 (KCS-CFW08)

Optional Kit: Serial, remote keypad interface (MIS-CFW08-RS)



### Remote Parallel Keypad



Optional Kit: Parallel remote keypad interface (MIP-CFW08-RP)



### DIN Rail Mounting Base\*



Optional Kit: DIN rail mounting base (KMD-CFW08-M1)



\* Available only for frame size 1

### NEMA 1/IP20 Kit\*



Optional Kit: NEMA 1/IP20 degree of protection and connection in metallic conduits (KN1-CFW08-MX)



\* Available only for frame size 1 and 2

### Digital Inputs in 120 Vac



Optional Kit: Digital inputs in 120 Vac (KAC-120-CFW08)



### 24VDC Power Supply



Optional Kit: 24VDC Power Supply with local HMI (KDC-24V-CFW08)



### 24VDC Power Supply



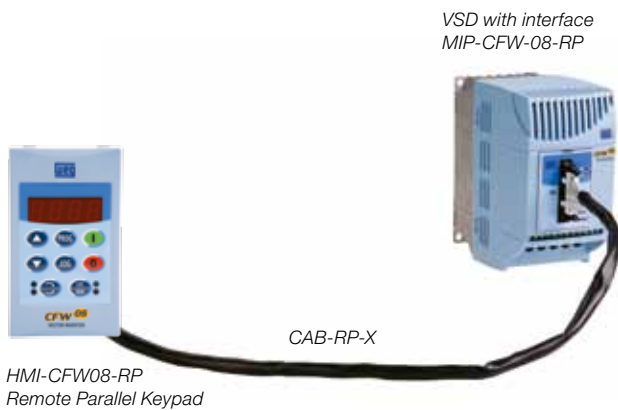
Optional Kit: 24VDC Power Supply with remote HMI (KDC-24VR-CFW08)



## CFW-08 - Remote Keypad

### Remote parallel keypad

- NEMA 12/IP 54 keypad that can be assembled at the panel door at a maximum distance of 10m from the VSD.



### Remote serial keypad

- NEMA 12/IP54 keypad that can be assembled at the panel door at a maximum distance of 150m from the VSD( distance above 10m requires external power supply 12V/250mA).
- Copy function available.



## SuperDrive



WEG SuperDrive is a Windows-based software that provides communication between a PC and all WEG Soft-starters and Variable Speed Drives (VSD) via a RS-232 or RS-485 port. The Superdrive is a Software tool which through user friendly screens provides possibility for programming, troubleshooting as well as user applications storage. Another benefit given by the use of this Software is the Online and Offline access which allows the customer to be able to create his own user application without a need of a VSD.

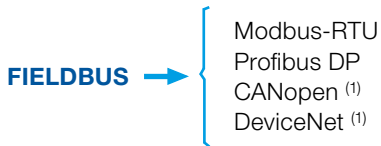
SuperDrive is available for free download at [www.weg.net](http://www.weg.net).

Model with  
SuperDrive Kit  
KSD-CFW08



## CFW-08 - Communication

CFW-08 can be connected to the most wide spread fieldbus protocols in the industry. The following options are available to the customer:

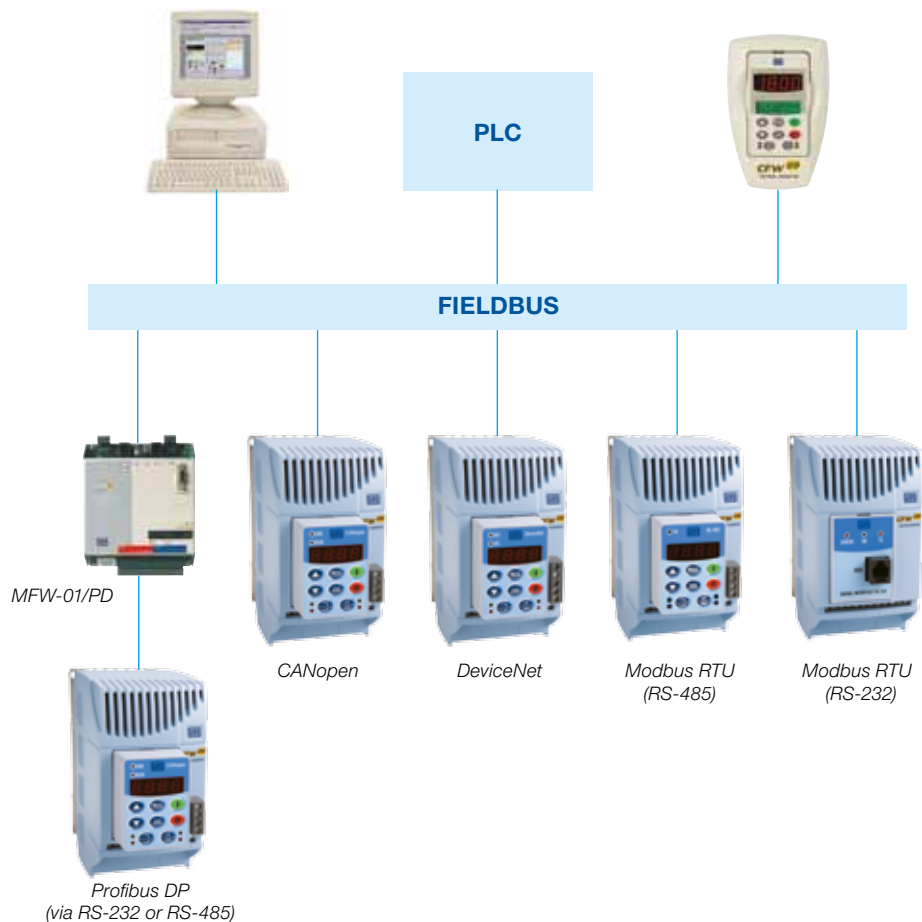


Intended mainly for the integration of automation in industrial plants, these fast communication networks provide advantages in the supervision, monitoring and control of the drives, increasing the efficiency and cost-effectiveness of the complete system.

CFW-08 can be easily connected to these networks with the following fieldbus kits:

- Modbus-RTU: KCS-CFW08 (RS-232) or KRS-485-CFW08 (RS-485).
- Profibus DP: KCS-CFW08 or KRS-485-CFW08 connected to the Profibus DP gateway MFW-01/PD.
- CANopen: KFB-CO-CFW08 and A3 control board.
- DeviceNet: KFB-DN-CFW08 and A4 control board.

<sup>(1)</sup> Not available in 500-600V models



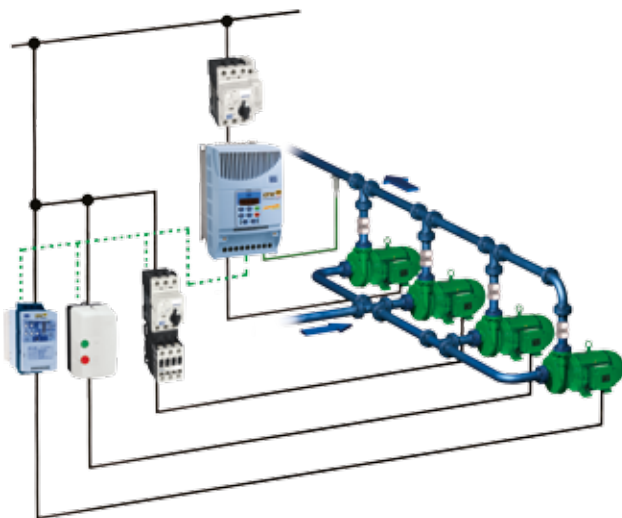
## CFW-08 - Multipump Drive

VSDs allow a system to maintain the pressure in pipelines constant, no matter how the fluctuations in outflow demand are. The CFW-08 Multipump Drive controls up to 4 pumps simultaneously. The Multipump control algorithm provides two ways of pump control:

Besides controlling the pumps output pressure, the drive also monitors the suction pressure and the level of the capture reservoir.

- Fixed Control: This method of control features the speed variation for just one motor and the others are turned on by DOL starting.
- Floating Control: This method of control features the speed variation not just for one motor but any pump in a 4 pump system can be driven by the VSD according to its operation time, it allows each pump equal use.

Besides controlling the pumps output pressure, the drive also monitors the suction pressure and the level of the capture reservoir.



### Advantages of the multipump control

- Saves energy;
- Extends the lifetime of the pumps;
- Maintains the line pressure constant;
- Provides the necessary outflow according to the demand of the system;
- Protects the mechanical and electrical installations, avoiding “water hammer” in the pipeline;
- Alternates the use of the pumps based on each operating hours.

## CFW-08 - Wash

Coming from the original CFW-08, the NEMA 4X AC Drive features an IP56 rated enclosure that protects against high-pressure water, corrosion and dust.

The drive is designed to be mounted directly and can be used in wash-down applications without the need for a custom enclosure in severe environments such as:

- Chemical Industry
- Petrochemical

Communication protocols such as Devicenet, Modbus-RTU and CANopen can be added using optional cards.

The new CFW-08 IP-56 drive has improved cooling fans that ensure functionality at full load condition.



## CFW-08 - Drive ratings

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

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

### Motor voltages between 220V and 230V

Power Supply		Model	Output Current	IEC		NEMA
			A	50Hz 220V 230V	60Hz 220V 230V	60Hz 230V
200-240 V	10	CFW080016S2024	1.6	kW	HP	HP
		CFW080026S2024	2.6	0.25	0.33	0.25
		CFW080040S2024	4	0.55	0.5	0.5
	10 / 30	CFW080016B2024	1.6	0.75	1	0.75
		CFW080026B2024	2.6	0.25	0.33	0.25
		CFW080040B2024	4	0.55	0.5	0.5
		CFW080073B2024	7.3	0.75	1	0.75
		CFW080100B2024	10	1.5	2	2
		CFW080160B2024	16	2.2	3	3
	30	CFW080070T2024	7	1.5	2	2
		CFW080160T2024	16	4	5	5
		CFW080220T2024	22	5.5	7.5	7.5
		CFW080280T2024	28	7.5	10	10
		CFW080330T2024	33	9.2	12.5	10

### Motor voltages between 380V and 460V

Power Supply		Model	Output Current	IEC		NEMA
			A	50Hz 380V 415V	60Hz 440V 460V	60Hz 460V
380-480 V	30	CFW080010T3848	1	kW	HP	HP
		CFW080016T3848	1.6	0.25	0.33	0.33
		CFW080026T3848	2.6	0.55	1	0.75
		CFW080027T3848	2.7	1.1	1.5	1
		CFW080040T3848	4	1.1	1.5	1
		CFW080043T3848	4.3	1.5	2	2
		CFW080065T3848	6.5	1.5	2	2
		CFW080100T3848	10	2.2	4	3
		CFW080130T3848	13	4	7.5	5
		CFW080160T3848	16	5.5	10	7.5
		CFW080240T3848	24	7.5	10	10
		CFW080300T3848	30	11	15	15
					15	20

### Motor voltages between 525V and 575V

Power Supply		Model	Output Current	IEC	NEMA
			A	50Hz 525V	60Hz 575V
500-600 V	30	CFW080017T5060	1.7	kW	HP
		CFW080030T5060	3	0.75	1
		CFW080043T5060	4.3	1.5	2
		CFW080070T5060	7	2.2	3
		CFW080100T5060	10	4	5
		CFW080120T5060	12	5.5	7.5
				7.5	10

NOTE: The maximum motor power ratings listed above were based on WEG II and IV-pole motors. For motors with different number of poles (ex.: VI and VIII poles), other voltages (ex.: 220V, 380V and 460V) and/or motors from other manufacturers, specify the VSD according to the rated motor current.



## CFW-08 - Dimensions and Weight

Model	NEMA 1 / IP20					NEMA 4X / IP56					Braking IGBT
	Frame Size	Dimensions mm (in)			Weight kg (lb)	Frame Size	Dimensions mm (in)			Weight kg (lb)	
		H	W	D			H	W	D		
CFW080016S2024	1	75 (2.95)	151 (5.95)	131 (5.16)	1 (2.2)	-	-	-	-	-	No
CFW080016B2024											
CFW080026S2024											
CFW080026B2024											
CFW080040S2024											
CFW080040B2024											
CFW080070T2024	2	115 (4.53)	200 (7.87)	150 (5.91)	2 (4.4)	A	265 (10.43)	165 (6.50)	216 (8.50)	5.3 (11.7)	Yes
CFW080073B2024											
CFW080100B2024											
CFW080160T2024	3	143 (5.63)	203 (7.99)	165 (6.50)	2.5 (5.5)	B	340 (13.39)	215 (8.46)	216 (8.50)	7.9 (17.4)	
CFW080220T2024											
CFW080280T2024	4	182 (7.16)	290 (11.41)	196 (7.71)	6 (13.2)	B	340 (13.39)	215 (8.46)	216 (8.50)	7.9 (17.4)	
CFW080330T2024											
CFW080010T3848	1	75 (2.95)	151 (5.95)	131 (5.16)	1 (2.2)	-	-	-	-	-	No
CFW080016T3848											
CFW080026T3848											
CFW080040T3848											
CFW080027T3848	2	115 (4.53)	200 (7.87)	150 (5.91)	2 (4.4)	A	265 (10.43)	165 (6.50)	216 (8.50)	5.3 (11.7)	Yes
CFW080043T3848											
CFW080065T3848											
CFW080100T3848											
CFW080130T3848	3	143 (5.63)	203 (7.99)	165 (6.50)	2.5 (5.5)	B	340 (13.39)	215 (8.46)	216 (8.50)	7.9 (17.4)	
CFW080160T3848											
CFW080240T3848	4	182 (7.16)	290 (11.41)	196 (7.71)	6 (13.2)	B	340 (13.39)	215 (8.46)	216 (8.50)	7.9 (17.4)	
CFW080300T3848											
CFW080017T5060	3	143 (5.63)	203 (7.99)	165 (6.50)	2.5 (5.5)	B	340 (13.39)	215 (8.46)	216 (8.50)	7.9 (17.4)	Yes
CFW080030T5060											
CFW080043T5060											
CFW080070T5060											
CFW080100T5060											
CFW080120T5060											



## CFW-08 - Technical Data

Model		CFW-08 Standard	CFW-08 Plus
POWER SUPPLY	Voltage	Single Phase	200-240Vac (+10%, -15%)
		Three Phase	200-240Vac (+10%, -15%) 380-480Vac (+10%, -15%) 500-600Vac (+10%, -15%)
	Frequency		50 / 60 Hz, +/- 2 Hz ( 48...62 Hz)
	cos φ (Displacement Power Factor)		> 0.98
ENCLOSURE	Drive	Standard	NEMA 1/IP20 in sizes 3 and 4   NEMA IP20 in sizes 1 and 2   NEMA 1/IP20 in sizes 3 and 4   NEMA IP20 in sizes 1 and 2   NEMA 4X / IP56
	Keypad	Optional	NEMA 1 with optional kit for connection in metallic conduit (KN1-CFW08-MX)
		Optional	NEMA 12/IP54 remote parallel keypad (HMI-CFW08-RP) NEMA 12/IP54 remote serial keypad (HMI-CFW08-RS)
CONTROL	Power Supply		Switched mode power supply
	Microprocessor		DSP (Digital Signal Processor), 16 bits, sinusoidal PWM (Space Vector Modulation)
	Control Type		Imposed voltage - linear or quadratic V/f Sensorless vector (open loop)
	Switching Frequency		2.5 / 5.0 / 10 / 15 kHz
	Output Frequency		0...300Hz
	Frequency Resolution		Analog Ref.: 0.1% of fmax. Digital ref.: 0.01 Hz (f<100Hz); 0.1 Hz (f>100 Hz)
PERFORMANCE	Accuracy		Analog Ref.: 0.5% and digital Ref.: 0.01% (at 25°C +/- 10°C)
	Overload capacity		150% for 60 sec. every 10 min (1.5 x Rated Current)
	Efficiency		>95%
Speed control		Regulation: 1% of the rated speed with slip compensation * Adicionar Sensorless	
CONTROL INPUTS	Analog		1 isolated input 0...10Vdc, 0/4...20 mA or -10...+10Vdc (AI1) <sup>1</sup>   2 isolated inputs 0...10Vdc, 0/4...20mA or -10...+10Vdc (AI1 and AI2) <sup>1</sup>
	Digital		4 programmable isolated inputs - with NPN or PNP logic (DI1...DI4)   - 1 isolated PTC input via AI1   2 isolated PTC inputs via AI1 and AI2
CONTROL OUTPUTS	Relay (2)		1 programmable output, 1 reversal contact (NO/NC)   2 programmable outputs, 1 NO and 1 NC Programming options: Is > Ix; Fs > Fx; Fe > Fx; Fs = Fe; Run; No fault
	Analog (2)		-   1 isolated analog output 0...10Vdc, 0/4...20mA (8 bits)
COMMUNICATION	Serial Interface		RS-232 or RS-485 (optional)
	Fieldbus Networks		Modbus-RTU, Profibus DP, DeviceNet and CANopen
SAFETY	Protections		DC link overvoltage / undervoltage
			Overtemperature
			Output overcurrent
			Motor overload ( i x t )
			Hardware fault, external fault and serial communication error
			Output phase to phase and phase to ground short circuit
			Programming fault and self-tuning error
KEYPAD	Commands		Start/Stop
			Parameter Setting
			Frequency Up/Down (Speed)
	Monitoring		JOG, Reverse and Local/Remote Selection
			Motor Output Frequency (Hz)
			DC Link Voltage (V)
			Value proportional to the frequency (e.g.:rpm)
			Heatsink Temperature
			Motor Output Current (A)
			Motor Output Voltage (V)
Ambient		Temperature	0...40 °C (32...104 °F), up to 50 °C (122 °F) with 2%/°C (1,1%/°F) output current derating
		Humidity	5 ... 90%, non-condensing
Altitude		0...1000 m (3300 ft), up to 4000 m (13100 ft) with 1%/100 m (3%/1000 ft) output current derating	
FINISHING		Color	Politherm 20 mt gray and Politherm 20 mt blue
CONFORMITIES	Electromagnetic Compatibility		EMC Directive 89/336/EEC - Industrial Environment; EN 61800-3 (EMC - Emission and Immunity)
	Low Voltage		LVD 73/23/EEC - Low Voltage Directive / UL 508C
	IEC 146		Semiconductors converters
	UL 508C		Power conversion equipment
	EN 50178		Electronic equipment for use in power installations
EN 61010		Safety requirements for electrical equipment for measurement, control and laboratory use	
CERTIFICATIONS	UL (USA) and cUL (CANADA)		Underwriters Laboratories Inc. / USA
	CE (EUROPE)		SGS / England
	IRAM (ARGENTINA)		Instituto Argentino de Normalización
	C-Tick (AUSTRALIA)		Australian Communications Authority

(1) Available only with the A2 control board.

(2) In the A5 control board (multipump) there are 3 relay outputs (NO) and no analog output.

## CFW-08 - Standard and Optional Features

### Standard / Plus Features

- Local keypad - 7 segment LED display
- Parameters access upon password entered
- Self-diagnosis and Auto-Reset
- Specific value indication (programmable) - (e.g.: m/min; rpm, etc)
- Slip compensation (V/F control)
- Manual and automatic torque boost
- Adjustable V/F curve
- Self-tuning (sensorless vector control)
- Dynamic braking
- JOG Function (transitory speed pulses)
- COPY Function via remote keypad (HMI-CFW08-RS)
- Linear, 'S' type and double ramps
- Acceleration and deceleration ramps (independent)
- DC braking (DC Current)
- Multi-speed Function (up to 8 programmable speeds)
- FWD/REV Selection
- Local/Remote Operation selection
- PID Regulator (automatic level, pressure control, etc)
- Start with spinning motor (Flying Start)
- Rejection of critical or resonant frequencies (Skip Frequency)
- Operation during transitory line loss (Ride-through)

### Optional Features

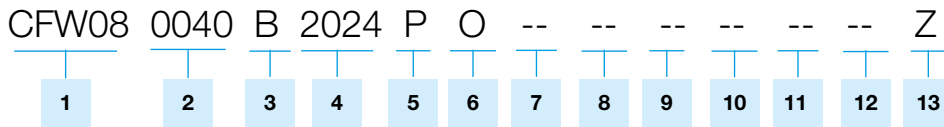
- Remote Parallel Keypad:
  - Parallel keypad with 7-segment LED display: HMI-CFW08-RP
  - Interface module for remote parallel keypad: MIP-CFW08-RP
  - Cable for remote parallel keypad (1, 2, 3, 5, 7.5 and 10 m): CAB-HMI08-RP-X
- Remote Serial Keypad:
  - Serial keypad with 7-segment LED display: HMI-CFW08-RS
  - Interface module for remote serial keypad: MIS-CFW08-RS
  - Cable for remote serial keypad (1, 2, 3, 5, 7.5 and 10 m): CAB-RS-X
- Expansion board with digital inputs in 120 Vac: KAC-120-CFW08

### Serial

- Communication modules:
  - RS-232 module: KCS-CFW08
  - RS-485 module: KRS-485-CFW08
  - RS-232 to RS-485 converter: MIW-02
- Fieldbus communication modules:
  - Modbus-RTU: requires either RS-485 or RS-232 module
  - Profibus DP gateway: MFW-01/PD (requires either RS-485 or RS-232 module)
  - CANopen module: KFB-CO-CFW08
  - DeviceNet module: KFB-DN-CFW08
- Windows based programming software - SuperDrive
- NEMA 1 Kit for metallic conduit connection - KN1-CFW08-MX
- DIN rail mounting kit - KMD-CFW08-M1
- Internal Class A EMC filter
- External Class B EMC filter



# CFW-08 - Coding



## 1 - CFW-08 VSD Series

### 2 - Output Rated Current:

200-240 V		380-480 V		500-600 V	
0016	1.6 A	0010	1.0 A	0017	1.7 A
0026	2.6 A	0016	1.6 A	0030	3.0 A
0040	4.0 A	0026	2.6 A	0043	4.3 A
0070	7.0 A	0027	2.7 A	0070	7.0 A
0073	7.3 A	0040	4.0 A	0100	10 A
0100	10 A	0043	4.3 A	0120	12 A
0160	16 A	0065	6.5 A		
0170	17 A	0100	10 A		
0220	22 A	0130	13 A		
0280	28 A	0160	16 A		
0330	33 A	0240	24 A		
		0300	30 A		

### 3 - Number of Phases

S = single phase  
 T = three phases  
 B = single phase or three phases

### 4 - Power Supply Voltage

2024 = 200-240 Vac  
 3848 = 380-480 Vac  
 5060 = 500-600 Vac

### 5 - Manual Language

P = Portuguese  
 E = English  
 S = Spanish  
 G = German

### 6 - Options

S = Standard (no optionals)  
 O = with optionals

### 7 - Degree of Protection

Blank = standard  
 N1 = NEMA1 (for frame sizes 1 and 2)  
 N4 = NEMA4X (for frame sizes A and B)

### 8 - Keypad

Blank = standard  
 SI = without keypad (with blank cover)

### 9 - Control Board

Blank = standard (CFW-08 Standard)  
 A1 = controlboard 1 (CFW-08 Plus)  
 A2 = controlboard 2 (CFW-08 Plus with bipolar analog inputs)  
 A3 = CANopen <sup>(1)</sup>  
 A4 = DeviceNet <sup>(1)</sup>  
 A5 = Multipump Drive

### 10 - EMC Filter

Blank = without filter  
 FA = Internal Class A filter

### 11 - Special Hardware

Blank = standard (no special hardware)  
 Hx = special hardware version X

### 12 - Special Software

Blank = standard (no special software)  
 Sx = special software version X

Ex.: CFW080040B2024EOA1Z  
 CFW-08, 4.0 A, single phase or three phases in 200-240 Vac, manual in English and control board 1 (CFW-08 Plus).

### 13 - End of Code

<sup>(1)</sup> Not available in 500-600V models

## CFW-09



CFW-09 Variable Speed Drive series incorporates the world's most advanced technology in drives for three-phase AC induction motors.

The Vectrue Technology™ represents a great advance, allowing the generation of WEG VSDs to combine V/f, Sensorless Vector and Closed Loop Vector control techniques, all in one product.

CFW-09 features the WEG exclusive braking method: the Optimal Braking®. This function eliminates in some applications the necessity of braking resistor, allowing a simple, compact and economic solution.



### *Vectrue Technology*®

This technology was developed by WEG for variable speed applications with three-phase AC induction motors, providing the following advantages:

- V/f or Vector Control modes via parameter selection;
- True Flux Vector Control in either open or closed loop vector modes;
- True Open Loop Vector Control with high torque and fast dynamic response, even at very low speeds;
- Self-tuning in vector modes, which automatically matches the CFW-09 parameters to the motor and the load characteristics.

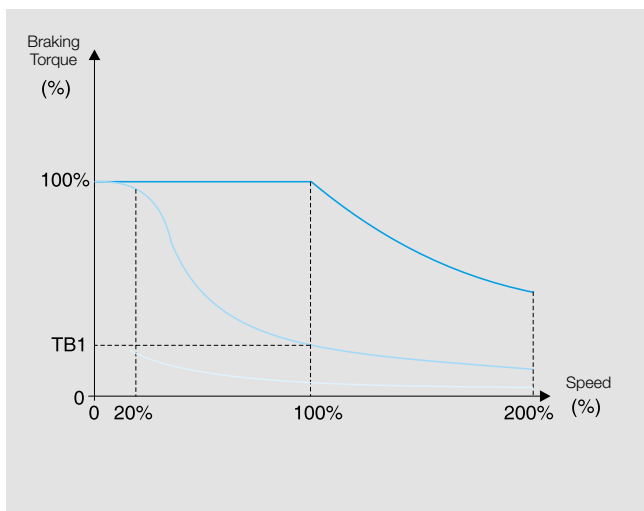
## CFW-09 - Optimal Braking®

Some sorts of application require reduced braking times or stop of high inertia loads. In this process, great amount of energy is returned by motor to the VSD. To handle this energy, traditional VSDs have to dissipate it as heat in braking resistors. Such resistors usually are heavy and costly, and also require specific places for installation due to their heat dissipation.

As an option to the use of braking resistors, CFW-09 features a special braking method in vector mode called Optimal Braking®.

This innovation provides the load a high performance braking torque without requiring a braking resistor.

The graph below shows the advantages of Optimal Braking compared to other methods, this ensures an ideal, optimized and low cost solution for braking applications.



Typical Braking Torque x Speed curve for motors driven by CFW-09

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

## CFW-09 - Other Advantages

- High performance RISC 32-bit microprocessor;
- V/f and Vector Control selected via parameter;
- Detachable keypad with dual display (LCD and LED);
- Wide power range: 1.1 to 1200 kW;
- Variable and Constant Torque ratings;
- Degree of Protection NEMA 1 / IP20 as standard up to 160kW, IP20 up to 400kW, and NEMA 4X / IP56 in stainless steel enclosure up to 7.5kW;
- Compact design;
- Simplified installation and programming;
- Oriented start-up;
- Through panel (flange) mounting option;
- Online PC programming with SuperDrive software (optional);
- DC bus connections available;
- Fieldbus communication: Modbus-RTU, Profibus DP, DeviceNet, CANopen Metasys N2 and Ethernet/IP;
- International certifications including UL and cUL, CE, C-Tick and IRAM.



## CFW-09 - Applications

### Chemical and Petrochemical

- Fans / Exhaust Fans
- Centrifugal Pumps
- Metering / Processing Pumps
- Mixers
- Compressors
- Extruders

### Mining and Cement

- Fans / Exhaustfans
- Pumps
- Screeners
- Vibratory Feeders
- Crushers
- Dynamic Separators
- Conveyors
- Rotary Kilns

### Steel

- Fans / Exhaustfans
- Roller Tables
- Winders / Unwinders
- Overhead Cranes
- Presses / Lathes / Milling Cutters
- Drillers / Grinders
- Laminators
- Cutting Lines
- Ingot Molding Lines
- Pipe Forming Machines
- Wire Drawing Machines
- Pumps

### Lumber

- Veneer Lathes
- Chippers
- Planes
- Saws

### HVAC

- Processing Pumps
- Fans / Exhaustfans
- Air Conditioning Systems

### Pulp and Paper

- Metering Pumps
- Processing Pumps
- Fans / Exhaust Fans
- Agitators / Mixers
- Rotating Filters
- Rotating Ovens
- Scrap Conveyors
- Paper Machines
- Paper Rewinders
- Calenders

### Sugar

- Sugar Centrifuges
- Process Pumps
- Conveyors
- Bagasse Dosers

### Ceramic

- Fans / Exhaustfans
- Driers / Ovens
- Ball Mills
- Roller Tables
- Glazing machine
- Conveyors

### Beverage

- Metering / Processing Pumps
- Bottlers
- Mixers
- Roller Tables
- Conveyors

### Plastic and Rubber

- Extruders
- Injection Machines
- Mixers
- Calenders / Pullers
- Winders / Unwinders
- Cutting and Welding Machines
- Granulators

### Waste Water

- Centrifugal Pumps
- Booster Systems

### Textile

- Mixers / Agitators
- Washers / Driers
- Looms
- Spinning Machines
- Carding Machines
- Warpors
- Winders

### Food

- Metering / Process Pumps
- Fans / Exhausters
- Mixers
- Driers / Ovens
- Palletizers
- Monorails
- Conveyors

### Glass

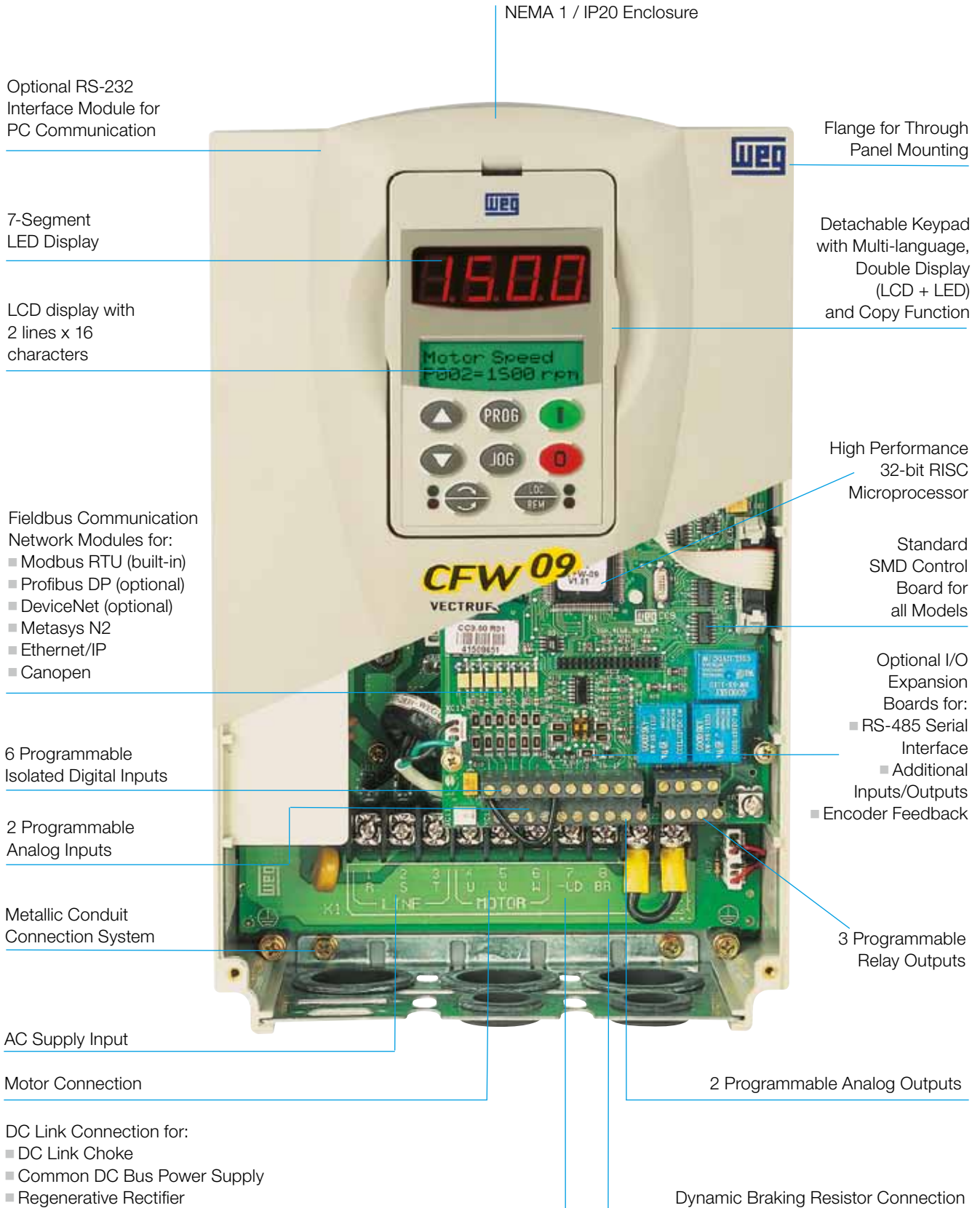
- Fans / Exhaustfans
- Bottlers
- Roller Tables
- Conveyors

### Elevators

- Load Elevators
- Commercial Elevators
- Overhead Cranes
- Hoists



# CFW-09 - A Complete, Flexible and Compact Product



NEMA 1 / IP20 Enclosure

Optional RS-232 Interface Module for PC Communication

Flange for Through Panel Mounting

7-Segment LED Display

Detachable Keypad with Multi-language, Double Display (LCD + LED) and Copy Function

LCD display with 2 lines x 16 characters

High Performance 32-bit RISC Microprocessor

Fieldbus Communication Network Modules for:

- Modbus RTU (built-in)
- Profibus DP (optional)
- DeviceNet (optional)
- Metasys N2
- Ethernet/IP
- Canopen

Standard SMD Control Board for all Models

6 Programmable Isolated Digital Inputs

Optional I/O Expansion Boards for:

- RS-485 Serial Interface
- Additional Inputs/Outputs
- Encoder Feedback

2 Programmable Analog Inputs

3 Programmable Relay Outputs

Metallic Conduit Connection System

AC Supply Input

Motor Connection

2 Programmable Analog Outputs

DC Link Connection for:

- DC Link Choke
- Common DC Bus Power Supply
- Regenerative Rectifier

Dynamic Braking Resistor Connection



## CFW-09 - Mounting Clearances

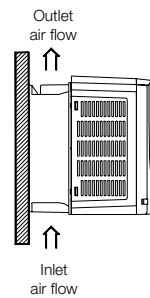


CFW-09 has flexible mounting configurations. Besides the traditional Base mounting, CFW-09 can be Flange mounted (through panel), where the heatsink can be assembled outside of the panel or mounting plate.

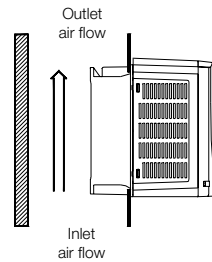
As a result, the heat generated by the VSD is dissipated externally, reducing the panel internal temperature.

This mounting configuration allows smaller panels and reduces the ventilation requirements.

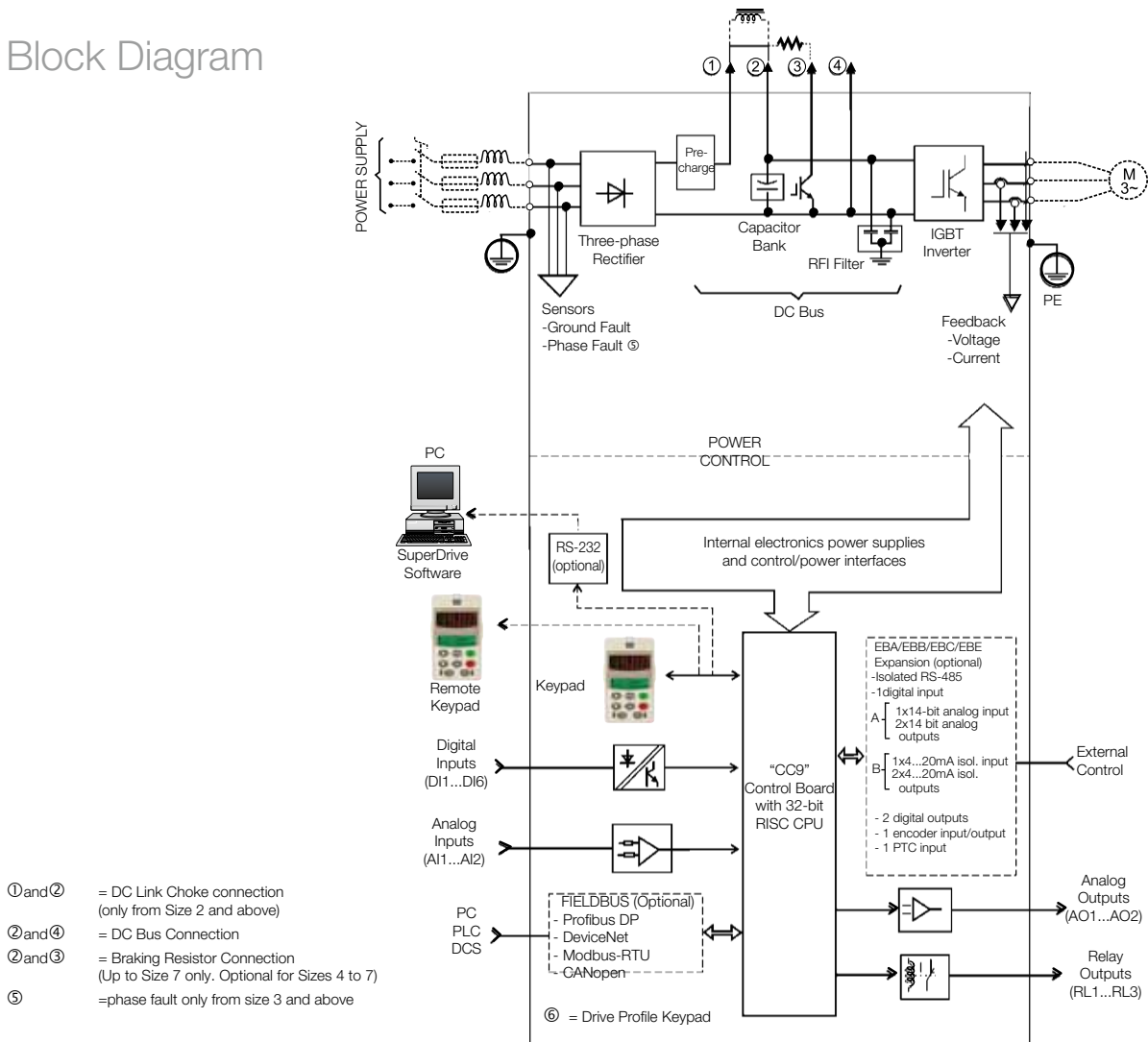
### Base mounting



### Flange mounting



## Block Diagram



## CFW-09 - Keypad

### Intelligent Keypad

CFW-09 keypad is an intelligent operating interface with double display, LED (7 segments) and LCD (2 lines with 16 characters), that provides excellent distant view along with a detailed description of all parameters and messages.

### Language Selection

The intelligent operating interface also allows the user to choose the language to be used in programming, reading and display of parameters and alphanumeric messages in the LCD display.

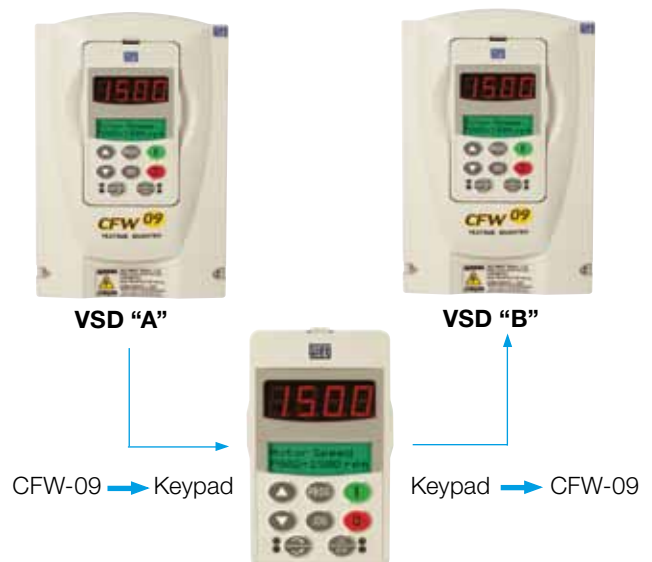
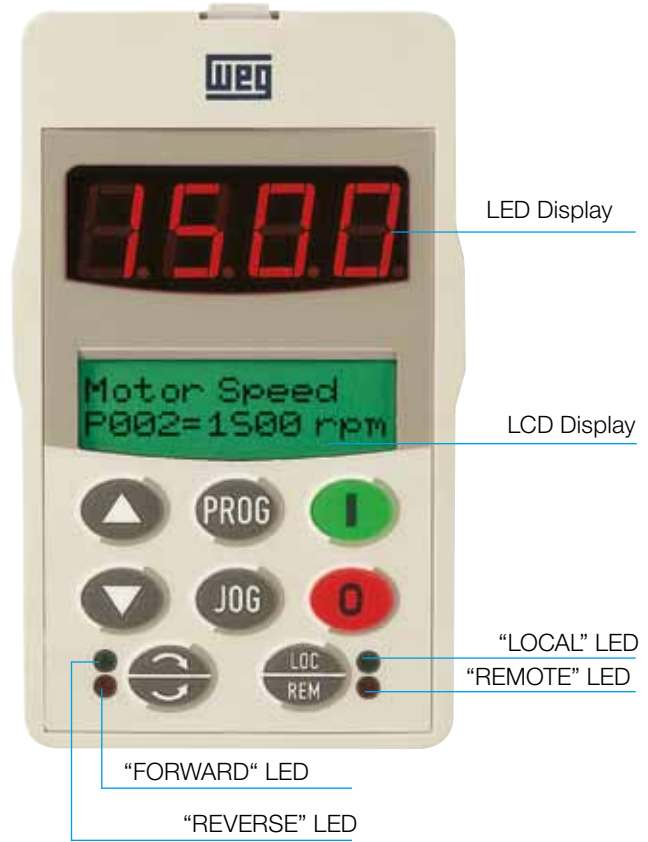
CFW-09 permits the user to choose among several languages such as English, Spanish and Portuguese.

### Oriented Start-up

The CFW-09 "Oriented Start-Up" feature was specially created to facilitate and expedite the VSD start-up procedure. At the first power-up or after a reset to factory default parameters, an automatic programming routine will guide the user through a sequence of parameters, which are the minimum necessary data to match VSD and motor.

### COPY Function

This intelligent keypad also incorporates a "Copy Function", which allows the user to copy parameters from one drive to another, providing easy and reliable programming repeatability for duplicate applications.



## CFW-09 - Keypad Functions



Starts the drive via a controlled acceleration ramp. When the drive is running, switches the display indication:  
 → rpm - Volts - Status - Torque - Hz - Amps →



Stops the drive via a controlled deceleration ramp. Resets the drive when a trip occurs.



Increases the speed or parameter number/content.



Decreases the speed or parameter number/content.



Accesses the parameters content for programming.



While pressed, runs the motor at JOG speed.



FWD/REV key. When pressed, reverses the direction of rotation.



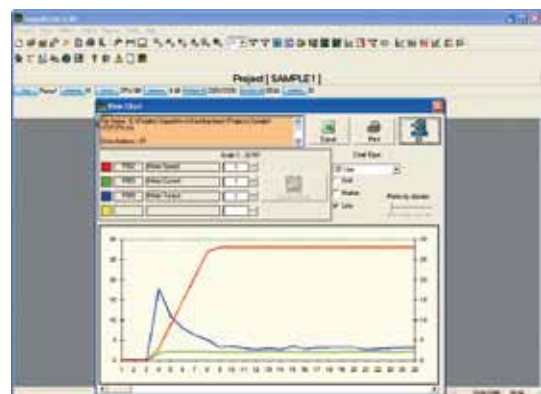
Selects the drive operating mode as Local or Remote.

## SuperDrive Programming Software

SuperDrive is a Windows-based software that allows the user to program, control and monitor the CFW-09 through the PC. The user can also change CFW-09 parameters online or to save changes made offline in the PC. SuperDrive also permits the user to plot curves of the monitored parameters as well as to save these data in parameter files.

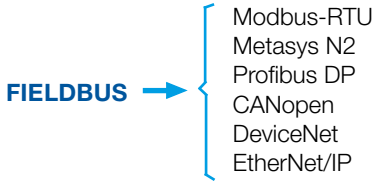
The communication between VSD and PC is made via RS-232 or RS-485 serial interfaces.

SuperDrive is available for free download at [www.weg.net](http://www.weg.net)



## CFW-09 - Communication

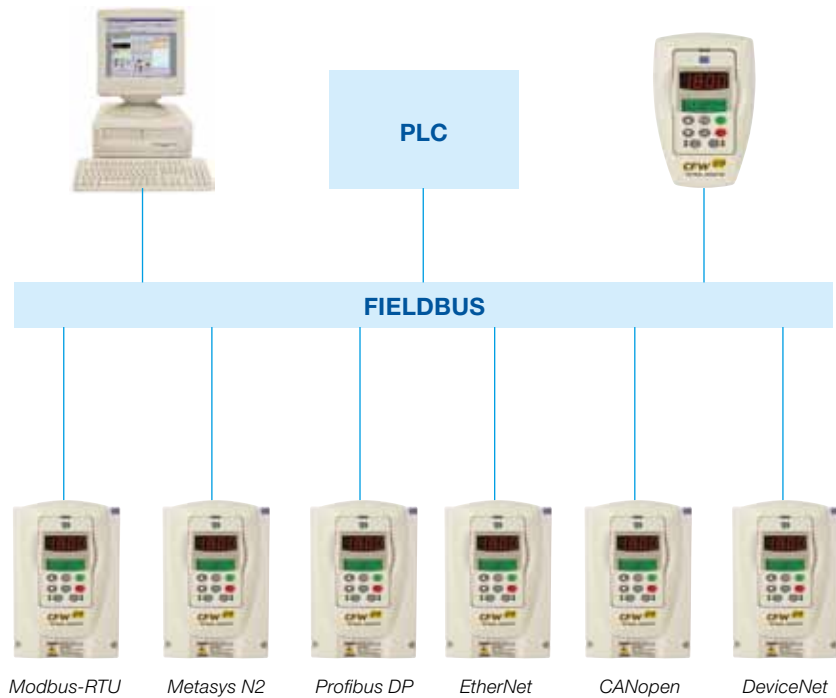
CFW-09 can be connected to the most widespread fieldbus protocols in the industry. The following options are available to the customer:



Intended mainly for the integration of automation in industrial plants, these fast communication networks provide advantages in the supervision, monitoring and control of the drives, increasing the efficiency and cost-effectiveness of the complete system!

CFW-09 can be easily connected to these networks with the following fieldbus kits:

- Modbus-RTU: KCS-CFW09 (RS-232) or EBA.01-CFW09, EBA.02-CFW09, EBB.01-CFW09, EBB.04-CFW09 (RS-485).
- Metasys N2: Special firmware VE2.03 and EBA.01-CFW09, EBA.02-CFW09, EBB.01-CFW09, EBB.04-CFW09 (RS-485).
- Profibus DP: KFB-PD (DP-V0) or KFB-PDPV1 (DP-V1).
- CANopen: PLC1.01 or PLC2.00.
- DeviceNet: KFB-DN or KFB-DD (AC Drive Profile).
- EtherNet/IP: KFB-EN.



## CFW-09 - Common DC Bus and Regenerative System

CFW-09 has available DC link terminals, which allow CFW-09 to be connected to a common DC bus or to a regenerative system.

### Common DC Bus

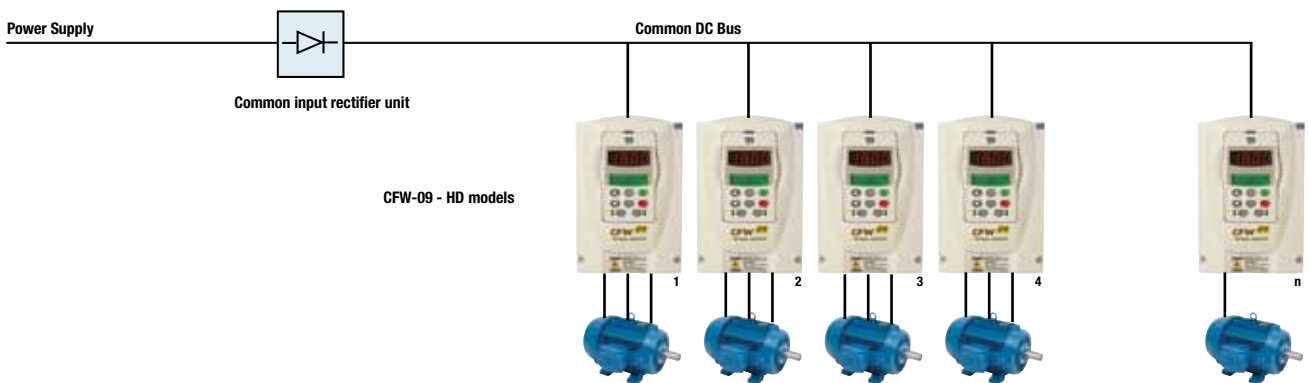
Usually used in multi-motor systems, common DC bus configuration is a good solution for energy savings.

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 CFW-09 can be connected to a DC bus system. Optionally, CFW-09 models can be supplied without rectifier bridges (CFW-09 HD models), especially designed for this type of application.



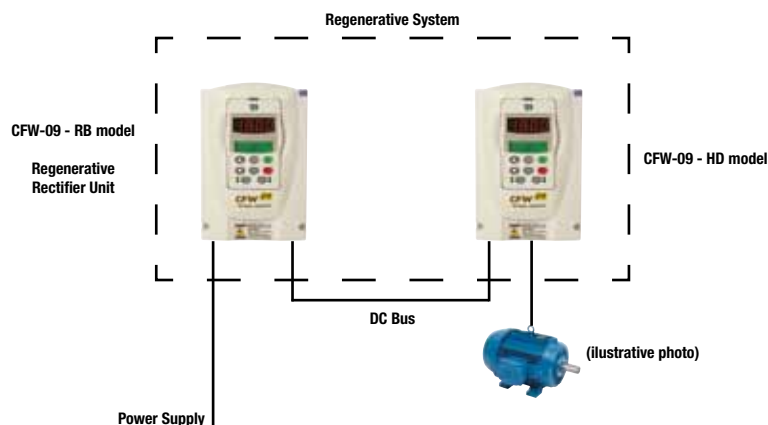
### Regenerative System

Some types of applications, such as centrifuges, paper winders/unwinders and cranes, have constant braking cycles, returning great amounts of energy back to the VSD DC link. This energy cannot be handled by the VSD and usually is dissipated through braking resistors. However, it is possible to recycle this energy through a Regenerative System.

In this system, the excessive energy in the DC link is regenerated to the mains, thus promoting significant energy saving.

The WEG solution in Regenerative Rectifier Unit (CFW-09 RB model) feeding a CFW-09 HD model through the DC link.

Besides the energy savings, a regenerative system provides many other advantages, such as input power factor near to 1 and elimination of harmonic distortion in the power supply.



## CFW-09 - Accessories

Intelligent Operating Interface with double display (LED and LCD), plain text messages and COPY Function. Local or remote installation.



**STANDARD KEYPAD  
HMI-CFW09-LCD**

Blank Keypad Module to replace the standard VSD keypad when not used.



**BLANK KEYPAD  
TCL-CFW09**

RS-232 Serial Interface Kit composed by a serial interface module and accessories (cable, connectors and SuperDrive Software CD) to connect the CFW-09 to a PC or other equipment via RS-232 serial link.



**RS-232 SERIAL  
INTERFACE KIT  
KCS-CFW09**

Remote Keypad Frame for panel door or operating station mounting. Maximum cable length: 10 m (33 ft)



**REMOTE KEYPAD  
FRAME KIT  
KMR-CFW09**

NEMA 4/IP56 Remote Keypad for panel door or operating station mounting, designed for wet or harsh environments. Maximum cable length: 10 m (33 ft)



**NEMA4/IP56 REMOTE  
KEYPAD  
HMI-CFW09-LCD-N4**

Cables with lengths (X) of 1, 2, 3, 5, 7.5 and 10 m (3.3, 6.6, 10, 16, 25 and 33ft). Special cables available on request



**REMOTE KEYPAD CABLES  
CAB-HMI09-X**

Profibus DP V0  
Profibus DP V1  
DeviceNet  
DeviceNet Drive Profile  
Ethernet/IP



**FIELDBUS  
COMMUNICATION  
KITS**

## CFW-09 - Accessories

Functions	Models			EBA					EBB					EBC1			EBE
	01	02	03	01	02	03	04	05	01	02	03	01	02	03	01		
Encoder output 12Vdc (internal)	1	-	-	1	1	-	-	-	-	-	1	-	-	-	-		
Encoder input 5Vdc (internal)	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-		
Encoder input 5 ... 15Vdc (external)	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-		
Encoder output 5 ... 15Vdc (external)	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-		
Isolated RS-485 serial interface	1	1	-	1	-	-	1	-	-	-	-	-	-	-	1		
Diferential analog input (10 bits)	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-		
Diferential analog output (14 bits)	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-		
Isolated analog input (10 bits)	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-		
Isolated analog output (11 bits)	-	-	-	2	-	2	2	2	-	-	-	-	-	-	-		
Digital input	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-		
Motor PTC input	1	1	1	1	1	1	1	-	-	-	-	-	-	-	1		
Digital output (open-collector)	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-		



I/O EXPANSION BOARDS

- EBA.0X-CFW09
- EBB.0X-CFW09
- EBC1.0X-CFW09
- EBE.0X-CFW09

The PLC1 and PLC2 boards allow the CFW-09 to features the functions of a PLC, a speed reference renerator and a positioning module.

### Technical features

- Motion Control with trapezoidal and “S” profiles (absolute and relative)
- Machine initial position search (homing)
- Ladder programming through WLP Software with timers, counters, coils and contacts
- RS-232 serial interface with Modbus-RTU protocol
- Real time clock
- 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 (PLC2 only), which allows CFW-09 to control up to 8 slave devices.



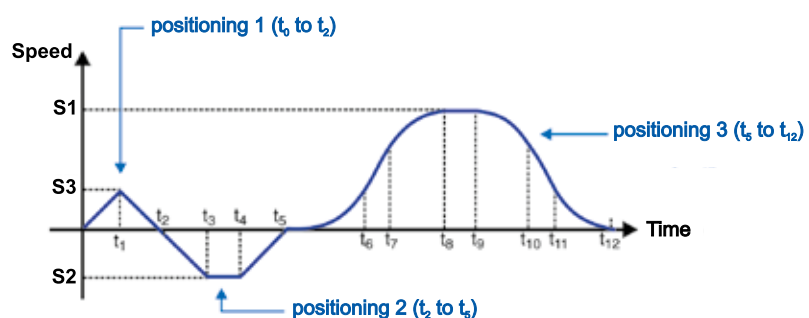
PLC Functions Expansion Boards PLC1 and PLC2



### Technical specification

Inputs and Outputs	PLC1	PLC2
Digital inputs	9 bipolar inputs: 24 Vdc	9 bipolar inputs: 24Vdc
Digital outputs	3 isolated open-collector bidirectional outputs: 24Vdc, 500mA	3 isolated open-collector bidirectional outputs: 24Vdc, 500mA
Relay outputs	3 outputs NO contacts: 250Vac, 3A	3 outputs NO contacts: 250Vac, 3A
Encoder inputs	1 incremental encoder input: 15Vdc, 300mA, internal	2 incremental encoder inputs: 5...24
RS-232 serial interface	1 port for Modbus-RTU protocol	1 port for Modbus-RTU protocol
CAN interface	1 port for CANopen (slave) and DeviceNet protocols	1 port for CANopen (master or slave) and DeviceNet protocols
Analog inputs	-	1 differential input: -10...+10Vdc / -20...20mA, 14 bits
Analog outputs	-	2 outputs: -10...+10Vdc / -20...20mA, 12 bits
Motor PTC input	-	1 input. Minimum resistance: 100W

Example of a positioning application with PLC1 or PLC2 board

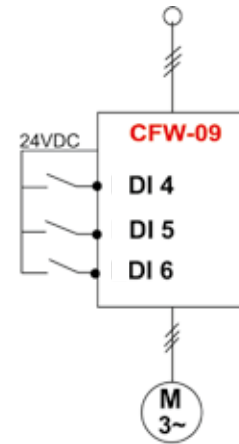


## CFW-09 - Special Functions

### Multi-speed

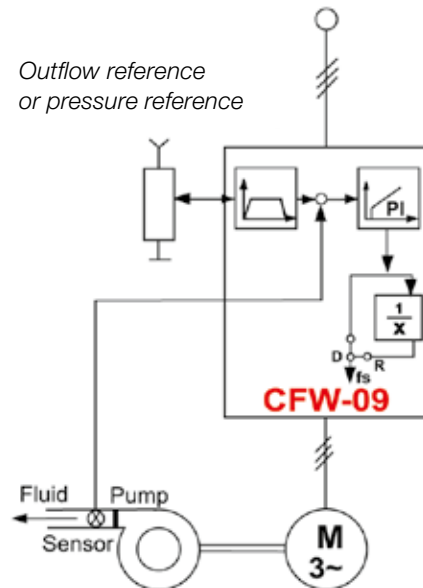
Up to eight different speeds can be programmed by the user and selected via the combination of three digital inputs. These inputs can be controlled by any external device such as limit switches, photocells, proximity sensors, PLCs, etc.

DI	4	5	6
$n_1$	0	0	0
$n_2$	0	0	1
$n_3$	0	1	0
$n_4$	0	1	1
$n_5$	1	0	0
$n_6$	1	0	1
$n_7$	1	1	0
$n_8$	1	1	1



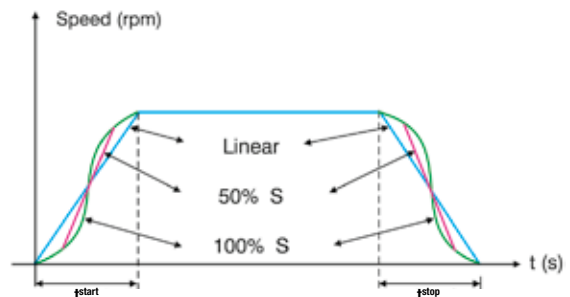
### Overlapping PID Regulator

This built-in digital PID regulator was designed for applications where a process variable (flow, pressure, level, etc.) has to be controlled by the motor speed. To implement this regulator, the CFW-09 needs a setpoint and a feedback signal from the process variable sensor so that a closed loop is formed. This function eliminates the need of an external regulator to control the process, thus reducing the total solution cost.



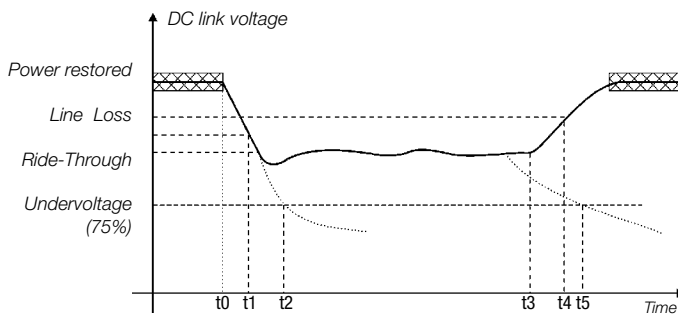
### “S” Ramp

This function replaces the traditional linear acceleration and deceleration ramps with type “S” ramps, which provide curves with smoother starting, braking and approximation to the set curves. The practical result is the elimination of mechanical shocks, which are undesirable and sometimes unpractical for certain applications.





## CFW-09 - Special Functions

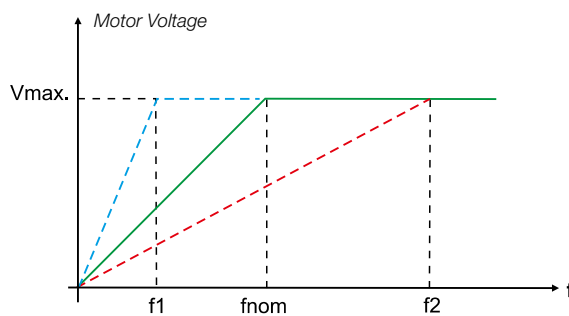


t0: Line loss;  
 t1: Line loss detection;  
 t2: Trip by Undervoltage (without Ride-Through);  
 t3: Power restored;  
 t4: Power restored detection;  
 t5: Trip by Undervoltage (with Ride-Through)

### Ride-Through

The purpose of the Ride-Through function is to ensure that the VSD maintains the motor running during a brief voltage drop, preventing the load from stopping and the VSD from tripping by undervoltage.

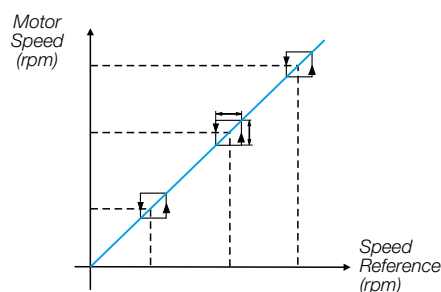
The energy required to keep the motor running is obtained from the kinetic energy of the load (inertia) during its deceleration. When the power is restored, the motor is accelerated again to the speed defined by the reference.



### Ajustable V/f Curve

Modifying the standard V/f curve has the purpose to permit the VSD to run special motors that have rated frequency different from the line frequency (e.g 200Hz motors).

In such cases, this function allows the user to move the base frequency (the one that the VSD applies the rated motor voltage) to a new frequency above or below the usual ones (50 or 60Hz).



### Critical Speed Rejection

This function allows the VSD to prevent the motor from running at critical speeds that may cause mechanical resonance in the motor/load system, leading to excessive noise or vibration.

Up to three speeds can be programmed, as well as the rejection band around those speeds.

## CFW-09 - Drive ratings

The correct way to select a VSD is matching its output current to the motor rated current. However, the tables below present the expected motor power for each VSD model. Use the motor power ratings below only as a guidance. Motor rated currents may vary with speed and manufacturer. IEC motor powers are based on WEG 4-pole motors, NEMA motor powers are based on NEC table 430-150.

### Motor voltages between 220V and 230V

Power Supply		Model	Constant Torque (CT)	IEC		NEMA	
				50Hz 220V 230V	60Hz 230V	60Hz 230V	60Hz 230V
			A	kW	HP	A	HP
220-230V	10 / 30	CFW090006T2223	6	1.1	1.5	6	1.5
		CFW090007T2223	7	1.5	2	7	2
		CFW090010T2223	10	2.2	3	10	3
	30	CFW090013T2223	13	3	3	13	3
		CFW090016T2223	16	4	5	16	5
		CFW090024T2223	24	5.5	7.5	24	7.5
		CFW090028T2223	28	7.5	10	28	10
		CFW090033T2223	33	9.2	10	33	10
		CFW090038T2223	38	9.2	10	38	10
		CFW090045T2223	45	11	15	45	15
		CFW090054T2223	54	15	20	68	25
		CFW090070T2223	70	18.5	25	86	30
		CFW090086T2223	86	22	30	105	40
		CFW090105T2223	105	30	40	130	50
		CFW090130T2223	130	37	50	150	50
		CFW090142T2223	142	37	50	174	60
		CFW090180T2223	180	55	60	180	60
		CFW090240T2223	240	75	75	240	75
		CFW090361T2223	361	110	150	361	150

### Motor voltages between 380V and 460V

Power Supply		Model	Constant Torque (CT)	IEC		NEMA	
				50Hz 380V 415V	60Hz 380V 415V	60Hz 460V	60Hz 460V
			A	kW	HP	A	HP
380-480V	30	CFW090003T3848	3.6	1.5	2	2	2
		CFW090004T3848	4	1.5	2	2	2
		CFW090005T3848	5.5	2.2	3	3	3
		CFW090009T3848	9	4	6	5	5
		CFW090013T3848	13	5.5	10	7.5	7.5
		CFW090016T3848	16	7.5	10	10	10
		CFW090024T3848	24	11	15	15	15
		CFW090030T3848	30	15	20	20	25
		CFW090038T3848	38	18.5	30	25	30
		CFW090045T3848	45	22	30	30	40
		CFW090060T3848	60	30	40	40	50
		CFW090070T3848	70	37	50	50	60
		CFW090086T3848	86	45	60	60	75
		CFW090105T3848	105	55	75	75	100
		CFW090142T3848	142	75	100	100	125
		CFW090180T3848	180	90	150	150	150
		CFW090211T3848	211	110	175	150	150
		CFW090240T3848	240	132	200	200	200
		CFW090312T3848	312	160	250	250	250
		CFW090361T3848	361	185	300	300	300
CFW090450T3848	450	220	350	350	350		
CFW090515T3848	515	280	450	450	450		
CFW090600T3848	600	315	500	500	500		

# CFW-09 - Drive ratings

## Motor voltages between 525V and 690V

Power Supply	Model	Constant Torque (CT)	IEC		NEMA	Variable Torque (VT)	IEC		NEMA	
			50Hz 525V	50Hz 690V	60Hz 575V		50Hz 525V	50Hz 690V	60Hz 575V	
		A	kW	kW	HP	A	kW	kW	HP	
500-600V	30	CFW090002T5060	2.9	1.5	-	2	4.2	2.2	-	3
		CFW090004T5060	4.2	2.2	-	3	7	4	-	5
		CFW090007T5060	7	4	-	5	10	5.5	-	7.5
		CFW090010T5060	10	5.5	-	7.5	12	7.5	-	10
		CFW090012T5060	12	7.5	-	10	14	9.2	-	10
		CFW090014T5060	14	9.2	-	10	14	9.2	-	10
		CFW090022T5060	22	15	-	20	27	18.5	-	25
		CFW090027T5060	27	18.5	-	25	32	22	-	30
		CFW090032T5060	32	22	-	30	32	22	-	30
		CFW090044T5060	44	30	-	40	53	37	-	50
		CFW090053T5060	53	37	-	50	63	45	-	60
		CFW090063T5060	63	45	-	60	79	55	-	75
		79	55	-	75	99	55	-	100	
500-690V	30	CFW090107T5069	107	75	90	100	147	90	110	150
		CFW090147T5069	147	90	110	150	196	132	160	200
		CFW090211T5069	211	132	160	200	211	132	160	200
		CFW090247T5069	247	160	220	250	315	220	250	300
		CFW090315T5069	315	220	250	300	343	250	280	350
		CFW090343T5069	343	250	280	350	418	300	315	450
		CFW090418T5069	418	300	315	450	472	315	400	500
		CFW090472T5069	472	315	400	500	555	400	400	600
660-690V	30	CFW090100T6669	100	-	90	-	127	-	110	-
		CFW090127T6669	127	-	110	-	179	-	160	-
		CFW090179T6669	179	-	160	-	179	-	160	-
		CFW090225T6669	225	-	220	-	259	-	250	-
		CFW090259T6669	259	-	250	-	305	-	280	-
		CFW090305T6669	305	-	280	-	340	-	315	-
		CFW090340T6669	340	-	315	-	428	-	400	-
		CFW090428T6669	428	-	400	-	428	-	400	-

## CFW-09 - Dimensions and Weight

Model	NEMA 1 / IP20					NEMA 4X / IP56					Braking IGBT						
	Frame Size	Dimensions mm (in)			Weight kg (lb)		Dimensions mm (in)			Weight kg (lb)							
		H	W	D			H	W	D								
CFW090006T2223	1	210 (8.27)	143 (5.63)	196 (7.72)	3.5 (7.7)	1	360 (14.17)	234 (9.21)	221 (8.70)	12.2 (26.9)	Standard						
CFW090007T2223																	
CFW090010T2223																	
CFW090013T2223																	
CFW090016T2223	2	290 (11.42)	182 (7.16)	196 (7.72)	6 (13.2)	2	410 (16.14)	280 (11.02)	221 (8.70)	17.3 (38.1)							
CFW090024T2223																	
CFW090028T2223																	
CFW090033T2223																	
CFW090038T2223	3	390 (15.35)	223 (8.78)	274 (10.79)	19 (41.9)												
CFW090045T2223																	
CFW090054T2223	4	475 (18.70)	250 (9.84)	274 (10.79)	22.5 (49.6)	-	-	-	-	-	Optional						
CFW090070T2223	5	550 (21.65)	335 (13.19)	274 (10.79)	41 (90.4)												
CFW090086T2223	6	675 (26.57)	335 (13.19)	300 (11.81)	55 (121.3)												
CFW090105T2223																	
CFW090130T2223	7	835 (32.87)	335 (13.19)	300 (11.81)	70 (154.3)							-	-	-	-	-	External Module
CFW090142T2223	8	975 (38.38)	410 (16.14)	370 (14.57)	100 (220.5)												
CFW090180T2223																	
CFW090240T2223	9	1020 (40.16)	688 (27.09)	492 (19.33)	261 (476.2)												
CFW090361T2223																	
CFW090003T3848	1	210 (8.27)	143 (5.63)	196 (7.72)	3.5 (7.7)	1	360 (14.17)	234 (9.21)	221 (8.70)	12.2 (26.9)	Standard						
CFW090004T3848																	
CFW090005T3848																	
CFW090009T3848																	
CFW090013T3848	2	290 (11.42)	182 (7.16)	196 (7.72)	6 (13.2)	2	410 (16.14)	280 (11.02)	221 (8.70)	17.3 (38.1)							
CFW090016T3848																	
CFW090024T3848																	
CFW090030T3848																	
CFW090038T3848	4	475 (18.70)	250 (9.84)	274 (10.79)	22.5 (49.6)	-	-	-	-	-	Optional						
CFW090045T3848																	
CFW090060T3848	5	550 (21.65)	335 (13.19)	274 (10.79)	41 (90.4)												
CFW090070T3848																	
CFW090086T3848	6	675 (26.57)	335 (13.19)	300 (11.81)	55 (121.3)												
CFW090105T3848																	
CFW090142T3848	7	835 (32.87)	335 (13.19)	300 (11.81)	70 (154.3)							-	-	-	-	-	External Module
CFW090180T3848	8	975 (38.38)	410 (16.14)	370 (14.57)	100 (220.5)												
CFW090211T3848																	
CFW090240T3848	9	1020 (40.16)	688 (27.09)	492 (19.33)	261 (476.2)												
CFW090312T3848	10	1185 (46.65)	700 (27.56)	492 (19.33)	259 (571.0)	-	-	-	-	-	-						
CFW090361T3848																	
CFW090450T3848																	
CFW090515T3848																	
CFW090600T3848																	

## CFW-09 - Dimensions and Weight

CFW090002T5060	2	290 (11.42)	182 (7.16)	196 (7.72)	6 (13.2)	-	-	-	-	-	Standard
CFW090004T5060											
CFW090007T5060											
CFW090010T5060											
CFW090012T5060											
CFW090014T5060											
CFW090022T5060	4	475 (18.70)	250 (9.84)	274 (10.79)	22.5 (49.6)	-	-	-	-	-	Optional
CFW090027T5060											
CFW090032T5060											
CFW090044T5060	7	835 (32.87)	335 (13.19)	300 (11.81)	70 (154.3)	-	-	-	-	-	Optional
CFW090053T5060											
CFW090063T5060											
CFW090079T5060	8E	1145 (45.08)	410 (16.14)	370 (14.57)	115 (253.5)	-	-	-	-	-	Optional
CFW090107T5069											
CFW090147T5069											
CFW090211T5069	10E	1185 (46.65)	700 (27.56)	582 (22.91)	310 (683.4)	-	-	-	-	-	External Module
CFW090247T5069											
CFW090315T5069											
CFW090343T5069											
CFW090418T5069											
CFW090472T5069											
CFW090100T6669	8E	1145 (45.08)	410 (16.14)	370 (14.57)	115 (253.5)	-	-	-	-	-	Optional
CFW090127T6669											
CFW090179T6669											
CFW090225T6669	10E	1185 (46.65)	700 (27.56)	582 (22.91)	310 (683.4)	-	-	-	-	-	External Module
CFW090259T6669											
CFW090305T6669											
CFW090340T6669											
CFW090428T6669											



## CFW-09 - Technical Data

POWER SUPPLY	Voltage	Three phases	220 - 230 Vac (+10%, -15%) - 380 - 480 Vac (+10%, -15%)	
			500 - 600 Vac (+ 10%, -15%) - 500 - 690 Vac (+ 10%, -15%)	
			660 - 690 Vac (+ 10%, -15%)	
	Frequency		50 / 60 Hz, +/- 2 Hz (48 ... 62 Hz)	
	Phase Unbalance		Up to 3%	
cos φ (Displacement Power Factor)		> 0.98		
ENCLOSURE	Degree of Protection		NEMA 1 / IP20 (sizes 1..8 and 8E), IP20 (sizes 9,10 and 10E) NEMA 4X IP56 (models up to 10HP/7.5kW)	
	Finishing Color		Plastic Cover - Light Gray PANTONE 413 C (sizes 1 and 2)	
			Metallic Cover and Sides - Light Gray RAL 7032 (sizes 3 to 10)	
			Base - Dark Gray RAL 7022 (sizes 3 to 10)	
CONTROL	Power Supply		Switched Mode Power Supply	
	Microprocessor		32-bit RISC Technology	
	PWM Technique		SVM Sine wave PWM (Space Vector Modulation)	
	Control Modes		Current flux and Speed Regulators Implemented in Software (Full Digital)	
			V/f	
			Sensorless Vector (open loop)	
			Vector with Encoder (closed loop)	
Switching Frequency		1.25 / 2.5 / 5.0 / 10 kHz		
Output Frequency		0...1020 Hz for V/f Control		
		0...408 Hz for Vector Control		
PERFORMANCE	Overload Capacity	Constant Torque (CT)	150% for 60 sec. every 10 min./180% for 1 sec. every 10 min.	
		Variable Torque (VT)	110% for 1 sec. every 10 min./150% for 1 sec. every 10 min.	
	Efficiency		> 97%	
	Speed Control	V/f Mode	Regulation (with Slip Compensation) : 1% of Motor Rated Speed Resolution: 1 rpm (Keypad Reference) / Speed Regulation Range: 1:20	
		Sensorless Vector Mode	Regulation: 0.5% of Motor Rated Speed Resolution: 1 rpm (Keypad Reference) / Speed Regulation Range: 1:100	
		Encoder Vector Mode	Regulation with: 10-bit Analog Reference: +/- 0.1% of Motor Rated Speed 14-bit Analog Reference: +/- 0.01% of Motor Rated Speed Digital Reference (e.g.: Keypad): +/- 0.01% of Motor Rated Speed Speed Regulation Range: Down to 0 rpm	
	Torque Control	Vector Modes	Regulation: +/- 10% of Motor Rated Torque   Range: 0...150% of Motor Rated Torque	
CONTROL INPUTS	Analog		2 Programmable Differential Inputs (10 bits) : 0...10 Vdc, 0...20 mA or 4...20 mA (1)	
			1 Programmable Bipolar Input (14 bits): -10...+10 Vdc, 0...20 mA or 4...20 mA (1)	
			1 Programmable Isolated Input (10 bits) : 0...10 Vdc, 0...20 mA or 4...20 mA (1)	
	Digital		6 Programmable Isolated Input: 24 Vdc	
1 Programmable Isolated Input: 24 Vdc (1)				
Encoder		1 Programmable Isolated Input: 24 Vdc (for Motor PTC/Thermistor) (1)		
		1 Isolated Differential Encoder Signals Output: 5 ...15 Vdc External Power Supply (1)		
CONTROL OUTPUTS	Analog		2 programmable outputs (11bits): 0...10Vdc	
			2 programmable bipolar outputs (14bits): -10...+10Vdc <sup>1</sup>	
	Relay		2 programmable isolated outputs (11bits): 0...20mA or 4...20mA <sup>1</sup>	
			2 programmable NO outputs : 240Vac,1A	
	Transistor		1 programmable NO output : 240Vac,1A	
Encoder		2 programmable isolated open-colector outputs 24Vdc,50mA <sup>1</sup>		
COMMUNICATION	Serial		1 isolated differential encoder signal output: external power supply: 5...15Vdc <sup>1</sup>	
	Fieldbus (1)		RS-232 with KCS-CFW09 (1) / RS-485 Isolated with EBA or EBB Board (1)	
			1 isolated differential encoder signal output: external power supply: 5...15Vdc <sup>1</sup>	
SAFETY	Protections		DC Link Under voltage	Output Short Circuit
			DC Link Over voltage	Output Ground Fault
			Drive Over Temperature	External Fault
			Motor Over Temperature	Self-diagnosis Fault
			Output Overcurrent	Programming Error
			Motor Overload (i x t)	Serial Communication Fault
			Braking Resistor Overload	Motor or Encoder Connection Fault
			CPU / EPROM Error (watchdog)	Power Supply Phase Loss (30 A and above models)
			Encoder Fault	Keypad Connection Fault
AMBIENT	Temperature		0°C (32°F)/...40°C (104°F), up to 50°C (122°F) with 2%/°C (1.1%/°F) output current derating	
	Humidity		5...90% Non-condensing	
	Altitude		0...1000m (3300 ft), up to 4000m (13100 ft) with 10%/100m (3%/1000 ft) output current derating	
CONFORMITIES	EMC Directive 89 / 336 / EEC - EN 61800-3		Electromagnetic Compatibility -Industrial Environment - EMC - Emission and Immunity	
	LVD 73 / 23 / EEC		Low Voltage Directive	
	IEC 146		Semiconductor drive	
	UL 508C		Power Conversion Equipment	
	EN 50178		Electronic Equipment for Use in Power Installations	
CERTIFICATIONS	EN 61010		Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use	
	UL (USA) and cUL (CANADA)		Underwriters Laboratories Inc. USA	
	CE (EUROPE)		Phoenix Test-Lab GmbH – Germany (Competent Body)	
	IRAM (ARGENTINA)		Instituto Argentino de Normalización	
C-Tiek (AUSTRALIA) 2250/1132383		Australian Communications Authority		

(1) Optional board required

(2) Special firmware required

# CFW-09 - Technical Data

<b>KEYPAD</b>	<b>Programming</b>	<b>General Drive Functions Programming</b>			
	<b>Controls</b>	Start/Stop, Increase/Decrease Speed, JOG, FWD/REV and Local/Remote			
	<b>Monitoring</b>	Speed Reference (rpm)	Output Current (A)		
		Motor Speed (rpm)	Output Voltage (Vac)		
		Value Proportional to Speed (e.g.: ft/min)	Drive Status		
		Output Frequency (Hz)	Digital Inputs Status		
		DC Link Voltage (Vdc)	Transistor Outputs Status		
		Motor Torque (%)	Relay Outputs Status		
		Output Power (kW)	Analog Inputs Value		
		Hours Powered Up (h)	Last Ten Faults		
Hours Running (h)	Fault Messages				
<b>FEATURES</b>	<b>Standard</b>	Keypad with LCD + LED displays (HMI-CFW09-LCD)			
		Password to protect drive programming			
		LCD display language selection: English, Spanish and Portuguese			
		Control mode selection (via parameter): V/f, Sensorless Vector or Vector with Encoder			
		Self-diagnosis fault and auto-reset			
		Parameters reset to factory or user default			
		Drive Self-tuning to motor and load (Vector Modes)			
		Specific unit indication (e.g.: l/s, t/h, %, etc.)			
		Motor slip compensation (V/f Mode)			
		Manual and automatic Torque Boost (V/f Mode)			
		Adjustable V/f Curve (V/f Mode)			
		Minimum and maximum speed limits			
		Output current limit			
		Adjustable motor overload protection			
		Digital gain and offset adjustments for analog inputs			
		Digital gain adjustment for analog outputs			
		JOG function (momentary FWD/REV)			
		COPY Function (Drive-> Keypad or Keypad-Drive)			
		Comparison functions for digital outputs: N* > Nx; N > Nx; N < Nx; N = 0; N = N*; Is > lx; Is < lx; T > Tx and T < Tx Where: N = Motor speed; N* = Speed reference; Is = Output Current and T = Motor torque			
		Linear and "S" independent acceleration and deceleration ramps, two sets of ramps			
		DC Braking			
		Optimal Braking (Vector Modes)			
		Built-in dynamic braking transistor – Models up to 45A/220-230V, up to 30A/380-480V and up to 14A/500-600V			
		Multi-speed function (up to 8 preset speeds)			
		Speed Profiling function			
		Hour meter and Wattmeter			
		Overlapping PID Regulator (for automatic control of level, pressure, flow, etc.)			
		FWD / REV selection			
		Local / Remote operation selection			
		Flying Start function (start with spinning motor)			
		Skip Speed (critical speed rejection)			
		Ride-Through (operation during momentary power loss)			
		<b>Options</b>	<b>Options</b>	IP55 Remote keypad (LCD + LED displays)	HMI-CFW09-LCD-N4
				Remote Keypad cable (3.3, 6.6, 10, 16, 25 and 35 ft)	CAB-HMI09-X
				Blank Keypad for local Installation	TCL-CFW09
				Remote Keypad frame kit	KMR-CFW09
				I/O Expansion Boards	EBA.OX-CFW09
					EBB.OX-CFW09
					EBC1.OX-CFW09
					EBE.OX-CFW09
KFB-PD					
Fieldbus Communication kits (Mounted inside drive)	Profibus DPV0			KFB-PD	
	Profibus DPV 1			KFB-PDPV1	
	DeviceNet			KFB-DN	
	DeviceNet Drive Profile			KFB-DD	
PC Communication kit	Ethernet/IP			KFB-EN	
	SuperDrive Software			KSD-CFW09	
	Cables and Connectors				
KCS-CFW09					
RS-232 Serial Interface Module	KCS-CFW09				
External dynamic braking module	Built-in dynamic braking transistor Models: 54...130 A / 220-230 V and 38...142 A / 380-480 V			"DB" Models	
	Models 180...600A/380-480V			DBW-01	
	Models 107...472A/500-690V	DBW-02			
Models 100...428A/660-690V					
Easy mounting kit with flange (for sizes 3...8)	KMF-CFW09				
VSD Extractable mounting kit (for sizes 9...10)	KME-CFW09				
Inductor kit for DC link (for sizes 2...8)	KIL-CFW09				
External EMC filter	RF				

## CFW-09 Shark

CFW-09 model with degree of protection NEMA 4X /IP 56 designed for highly aggressive environments, such as:

- Chemical industry
- Petrochemical
- Food industry
- Other applications that require full protection of electronic equipments.

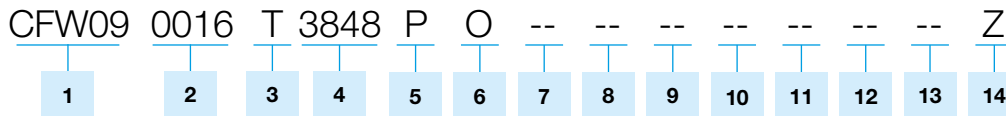


Power Supply Voltage	CFW-09 Shark				Maximum Applicable Motor			Frame Size	
	Number of Phases	Model	Built-in Braking Transistor	Rated Current (A)		Voltage (V)	CT / VT		
				CT(1)	VT(1)		kW		HP
220-230 V	Single phase or Three phases	CFW090006T2223EON4Z	Yes	6	230	1.1	1.5	1	
		CFW090007T2223EON4Z		7		1.5	2		
		CFW090010T2223EON4Z		10		2.2	3		
	Three phases	CFW090016T2223EON4Z		16		4	5	2	
380-480 V	Three phases	CFW090003T3848EON4Z	Yes	3.6	400	1.1	1.5	1	
		CFW090004T3848EON4Z		4		1.5	2		
		CFW090005T3848EON4Z		5.5		2.2	3		
		CFW090009T3848EON4Z		9		4	5		
		CFW090013T3848EON4Z		13		5.5	7.5	2	
		CFW090016T3848EON4Z		16		7.5	10		
	Three Phases	Yes	CFW090003T3848EON4Z	3.6	460	1.5	2	1	
			CFW090004T3848EON4Z	4		1.5	2		
			CFW090005T3848EON4Z	5.5		2.2	3		
			CFW090009T3848EON4Z	9		4	5		
			CFW090013T3848EON4Z	13		5.5	7.5	2	
			CFW090016T3848EON4Z	16		7.5	10		





## CFW-09 - Coding



### 1 - CFW-09 VSD Series

### 2 - Output Rated Current in Constant Torque (CT) Made:

3 - Number of Phases: T = Three phases

4 - Power Supply Voltage: 2223 = 220 ... 230 Vac  
3848 = 380 ... 480 Vac  
5060 = 500 ... 600 Vac  
5069 = 500 ... 690 Vac  
6669 = 660 ... 690 Vac

5 - Languages: P = Portuguese  
E = English  
G = German  
S = Spanish  
F = French  
R = Russian  
Sw = Swedish

6 - Options: S = Standard (no optionals)  
O = With optional

7 - Degree of Protection: Blank = Standard (see technical specifications table)  
N4 = NEMA 4x / IP56 (models up to 10HP/7.5 kW)

8 - Keypad: Blank = Standard (keypad with LED + LCD displays)  
SI = Without keypad (with blank cover)

9 - Braking: Blank = Standard  
DB = With Built-in Dynamic Braking Transistor  
RB = Regenerative rectifying unit (models from 105A at 220V, and from 86A at 380-480V)

10 - Expansion Boards:

00 = Standard (no expansion board)	B5 = EBB.05-CFW09
A1 = EBA.01-CFW09	C1 = EBC1.01-CFW09
A2 = EBA.02-CFW09	C2 = EBC1.02-CFW09
A3 = EBA.03-CFW09	C3 = EBC1.03-CFW09
B1 = EBB.01-CFW09	E1 = EBE.01-CFW09
B2 = EBB.02-CFW09	P1 = PLC1.01
B3 = EBB.03-CFW09	P2 = PLC2.00
B4 = EBB.04-CFW09	

11 - Fieldbus Communication kits: Blank = Standard (no fieldbus kit)  
PD = KFB-PD - Profibus DP VØ  
V1 = KFB-PDV1 - Profibus DPV1  
DN = KFB-DN - DeviceNet  
DD = KFB-DD - DeviceNet Drive Profile  
EN = KFB-EN - EtherNet / IP

12 - Special Hardware: Blank = Standard (no special hardware)  
H1...Hn = Special Hardware version-Optional  
HD = Models from 105A at 220V, and from 86A at 380-480V power supplied via DC link  
HC/HV = The CFW09 VSDs frame sizes from 2 to 8 have and inductor line for the DC link built into the product.  
To request the VSD with the inductor in place just add the code "HC" (for drives operating on Variable Torque).

13 - Special Software: Blank = Standard (no special software)  
S1...Sn = Optional with version a special software  
SF = Special version for Metasys N2 communication  
SC = Hoist functions  
SN = Winder I with power calculation

### 14 - End of Code

Example:  
CFW09 0013 T 2223 E S Z  
CFW09 0105 T 3848 E O IL A1 PD Z  
CFW09 0086 T 3848 E O SI DB B2 S3 Z

220 - 230 V	380 - 480 V	500 - 600 V	500 - 690 V	660 - 690 V
0006 = 6,0 A	0003 = 3,6 A	0002 = 2,9 A	0107 = 107 A	0100 = 100 A
0007 = 7,0 A	0004 = 4,0 A	0004 = 4,2 A	0147 = 147 A	0127 = 127 A
0010 = 10 A	0005 = 5,5 A	0007 = 7,0 A	0211 = 211 A	0179 = 179 A
0013 = 13 A	0009 = 9,0 A	0010 = 10 A	0247 = 247 A	0225 = 225 A
0016 = 16 A	0013 = 13 A	0012 = 12 A	0315 = 315 A	0259 = 259 A
0024 = 24 A	0016 = 16 A	0014 = 14 A	0343 = 343 A	0305 = 305 A
0028 = 28 A	0024 = 24 A	0022 = 22 A	0418 = 418 A	0340 = 340 A
0033 = 33 A	0030 = 30 A	0027 = 27 A	0472 = 472 A	0428 = 428 A
0038 = 38 A	0038 = 38 A	0032 = 32 A		
0045 = 45 A	0045 = 45 A	0044 = 44 A		
0054 = 54 A	0060 = 60 A	0053 = 53 A		
0070 = 70 A	0070 = 70 A	0063 = 63 A		
0086 = 86 A	0086 = 86 A	0079 = 79 A		
0105 = 105 A	0105 = 105 A	0107 = 107 A		
0130 = 130 A	0142 = 142 A	0147 = 147 A		
0142 = 142 A	0180 = 180 A	0211 = 211 A		
0180 = 180 A	0211 = 211 A	0247 = 247 A		
0240 = 240 A	0240 = 240 A	0315 = 315 A		
0361 = 361 A	0312 = 312 A	0418 = 418 A		
	0361 = 361 A	0472 = 472 A		
	0450 = 450 A			
	0515 = 515 A			
	0600 = 600 A			

# CFW-10

The CFW-10 VSD line is designed for the control and speed variation of three-phase induction motors. CFW-10 combines modern design with cutting-edge technology, and stands out for its small profile and easy programming. In addition, CFW-10 is simple to install and operate, due to its built-in standard keypad.



## Features

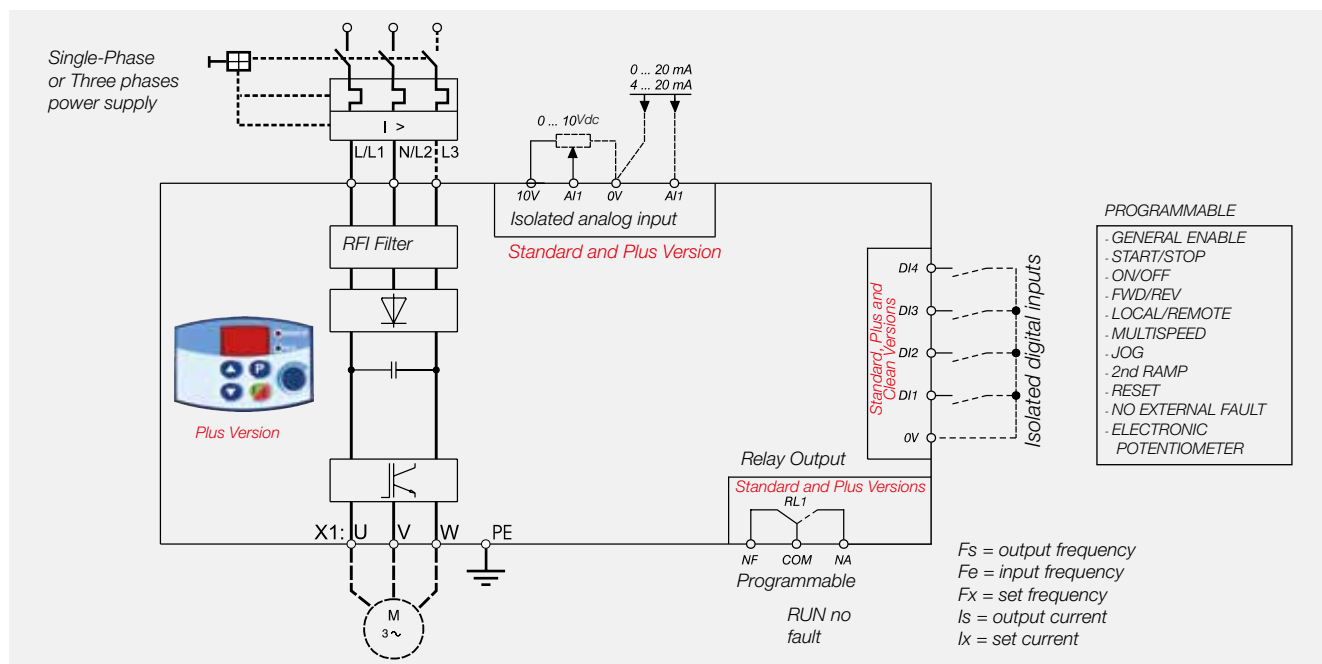
- V/f control
- IP20 Finger-safe Enclosure
- Single-phase 110-127 line voltage up to 0.75 kW / 1 hp
- Single-phase 200-240 line voltage up to 2.2 kW / 3 hp
- Three-phase 200-240 line voltage up to 4 kW / 5 hp
- 150% current overload capacity
- DSP controlled PWM output
- 2.5 - 15 kHz adjustable switching frequency
- Four isolated programmable digital inputs
- Programmable relay output
- One isolated programmable analog input
- Motor and VSD protections: Overcurrent, motor overload, drive overtemperature, output short circuit, DC link over and undervoltage, and external fault
- Control features: Linear and "S" acceleration and deceleration ramps, local/remote control, DC braking, torque boost, motor slip compensation, electronic pot, preset speeds, maximum and minimum adjustable frequency limits, adjustable output current limit, JOG function
- Display readings: Motor speed, frequency, voltage, current, last fault, heatsink temperature and drive status
- Ambient: 50°C (122°F), 1000m (3300ft) altitude, 90% humidity, non-condensing.



## Applications

- Centrifugal pumps
- Extruding Machines
- Rotating filters
- Processing pumps
- Roller tables
- Cutting machines
- Fans / Exhaust Fans
- Driers
- Conveyors
- Stirrers / Mixers

## Block Diagram



## CFW-10 - Drive Ratings

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

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

### Motor voltages between 220V and 230V

Power Supply	Model	Output Current A	IEC	NEMA
			50Hz 220V 230V kW	60Hz 230V HP
110-127V	10	CFW100016S1112	0.25	-
		CFW100026S1112	0.55	0.5
		CFW100040S1112	0.75	0.75
220-230V	10 / 30	CFW100016S2024	0.25	-
		CFW100026S2024	0.55	0.5
		CFW100040S2024	0.75	0.75
		CFW100073S2024	1.5	2
		CFW100100S2024	2.2	3
		CFW100016T2024	0.25	-
	30	CFW100026T2024	0.55	0.5
		CFW100040T2024	0.75	0.75
		CFW100073T2024	1.5	2
		CFW100100T2024	2.2	3
		CFW100152T2024	4	5
				15.2

## CFW-10 “Cold Plate” - Drive Ratings

Power Supply Voltage	CFW-10 Cold Plate				Maximum Applicable Motor			Frame Size	Dimensions mm (in)			Weight Kg (lb)	
	Number of phases	Model	In Output (A)	Braking Transistor	Voltage (V)	Power rating			H	W	D		
						kW	HP						
110-127V	Single phase	CFW100016S1112E0CPZ	1.6		230	0.18	0.25	1	132 (5.2)	100 (3.9)	82 (3.2)	0.7 (1.5)	
		CFW100026S1112E0CPZ	2.6			0.37	0.5	1				1.0 (2.2)	
		CFW100040S1112E0CPZ	4.0			0.75	1	2				161 (6.3)	120 (4.7)
CFW100016S2024E0CPZ	1.6		0.18	0.25		1	132 (5.2)	100 (3.9)	0.7 (1.5)				
CFW100026S2024E0CPZ	2.6		0.37	0.5		1			1.0 (2.2)				
CFW100040S2024E0CPZ	4.0		0.75	1		1			120 (4.7)	1.2 (2.6)			
200-240V	Single phase	CFW100073S2024E0CPZ	7.3			1.5	2	2	161 (6.3)	120 (4.7)	82 (3.2)	1.0 (2.2)	
		CFW100100S2024E0CPZ	10			2.2	3	3	191 (7.5)			1.2 (2.6)	
		CFW100016T2024E0CPZ	1.6			0.18	0.25	1	132 (5.2)			100 (3.9)	0.7 (1.5)
		CFW100026T2024E0CPZ	2.6			0.37	0.5	1					1.0 (2.2)
		CFW100040T2024E0CPZ	4.0			0.75	1	1					120 (4.7)
		Three phases *	CFW100073T2024E0CPZ	7.3			1.5	2	1			161 (6.3)	120 (4.7)
	CFW100100T2024E0CPZ		10.0		2.2	3	2	1.2 (2.6)					
	CFW100152T2024E0CPZ		15.2		4	5	3	191 (7.5)	1.2 (2.6)				

\* CE Certification pending.

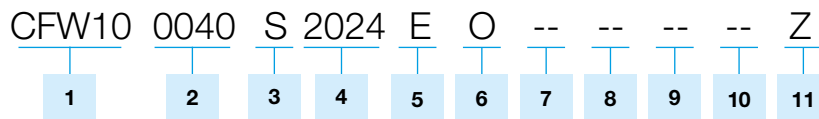
## CFW-10 - Dimensions and Weight

Model	Standard frame size					Cold Plate version					Braking IGBT
	Frame Size	Dimensions mm (in)			Weight kg (lb)	Frame Size	Dimensions mm (in)			Weight kg (lb)	
		H	W	D			H	W	D		
CFW100016S1112	1	95	132	121	0.9	1	95	132	82	0.7	No
CFW100026S1112		(3.74)	(5.20)	(4.76)	(1.98)		(3.74)	(5.20)	(3.23)	(1.54)	
CFW100040S1112	2	115	161	122	1.5	2	115	161	82	1.0	Yes
CFW100016S2024	1	95	132	121	0.9	1	95	132	82	0.7	No
CFW100026S2024		(3.74)	(5.20)	(4.76)	(1.98)		(3.74)	(5.20)	(3.23)	(1.54)	
CFW100040S2024											
CFW100073S2024	2	115	161	122	1.5	2	115	161	82	1.0	Yes
CFW100100S2024	3	115	191	122	1.8	3	115	191	82	1.2	
CFW100016T2024	1	95	132	121	0.9	1	95	132	82	0.7	No
CFW100026T2024		(3.74)	(5.20)	(4.76)	(1.98)		(3.74)	(5.20)	(3.23)	(1.54)	
CFW100040T2024											
CFW100073T2024											
CFW100100T2024	2	115	161	122	1.5	2	115	161	82	1.0	Yes
CFW100152T2024	3	115	191	122	1.8	3	115	191	82	1.2	

## CFW-10 - Technical Data

MODEL		CFW-10 Standard	CFW-10 Clean	CFW-10 plus
POWER SUPPLY	Voltage	Single phase	110 - 127VAC: 110 / 127VAC (+10%, -15%)	
		Single phase or Three phases	200 - 240 Vac (+10%, -15%)	
	Frequency		50 / 60 Hz, +/- 2 Hz (48 - 62 Hz)	
	cos φ (Displacement Power Factor)		> 0.98	
ENCLOSURE	Degree of Protection		IP20	
CONTROL	Power Supply		Switched mode power supply	
	Control Method		Sinusoidal PWM modulation (Space Vector Modulation), Linear or quadratic V/f	
	Switching Frequency		Frequencies: from 2.5 kHz to 15 kHz	
	Output Frequency		0 - 300 Hz	
	Frequency Setting Resolution		Analog Ref.: 0.1% of max. frequency and Digital ref.: 0.01 Hz (f<100Hz); 0.1Hz (f>100Hz)	
Output Frequency Accuracy		Analog Ref.: 0.5% Digital Ref.: 0.01%		
PERFORMANCE	Overload capacity		150% during 60 sec. every 10 min.	
CONTROL INPUTS	Analog	1 programmable isolated Input 0 -10Vdc, 0 - 20mA or 4 - 0mA	-	1 programmable isolated Input 0 -10Vdc, 0 - 20mA or 4 - 0mA
	Digital	4 programmable isolated inputs 12 Vdc		
CONTROL OUTPUTS	Relay	1 programmable output, form C Contacts (NO/NC)	-	1 programmable output, form C Contacts (NO/NC)
		Programming Options: Is > Ix ; Fs > Fx ; Fe > Fx ; Fs = Fe ; Run; No Fault		
SAFETY	Protections	DC Link Overvoltage / Undervoltage		
		VSD Overtemperature		
		Keypad Connection Fault		
		Motor Overload (i x t)		
		CPU Error (Watchdog), External Fault		
		Output short-circuit		
		Programming Error / Self-diagnosis Error		
KEYPAD	Programming	Start/Stop		
	Commands	Parameters Setting		
		Frequency UP/Down (Speed)		
	Monitoring	-	-	Variable speed potentiometer
		Motor Output Frequency (Hz)		
		DC Link Voltage (Vdc)		
		Value proportional to the frequency (e.d.: rpm)		
		Heatsink temperature		
		Output Current (Amps)		
		Output Voltage		
Fault Indication				
AMBIENT	Temperature	Models up to 10 Amps: 0 ... 50 °C (32 ... 122 °F) without derating 15.2 Amps model: 0 ... 40 °C (32 ... 104 °F) without derating		
	Humidity	5 ... 90% non-condensing		
	Altitude	0 ... 1000 m (3300 ft), up to 4000 m (13100 ft) with 1%/100m (3%/1000 ft) output current derating		
ENCLOSURE	Color		Opaque gray - WEG development 205E1404	
CONFORMITIES	Electromagnetic Compatibility		EMC directive 89 / 336 / EEC EN 61800-3	
	Low Voltage		LVD 73/23/EEC - Low Voltage Directive / UL 508C	
FEATURES	Standard	Keypad with 7-segment LED display		
		Password to protect VSD Programming		
		Self-diagnosis fault and auto-reset		
		Motor Slip compensation		
		Manual and automatic torque boost (I x R)		
		Linear and "S" acceleration ramp, two sets of ramps		
		JOG function		
		DC braking		
		Multi-Speed function (up to 8 programmable speeds)		
		Forward/Reverse Speed Selection via DI Local/Remote Reference Selection via DI		

## CFW-10 - Coding



### 1 - CFW-10 VSD Series

### 2 - Output rated current:

110-127 V	
0016	1.6 A
0026	2.6 A
0040	4.0 A

200-240 V	
0016	1.6A
0026	2.6A
0040	4.0A
0073	7.3A
0100	10.0A
0152	15.2A

### 3 - Number of Phases

S = single phase  
T = Three phases

\* Three-phase model only

### 4- Power Supply Voltage

1112 = 110-127 V (Single-phase only)  
2024 = 200-240 V

### 5 -Manual Language

P = Portuguese  
E = English  
S = Spanish

### 6 -Options

S = standard (no optionals)  
O = with optionals

### 7 - Control card

Blank = standard  
CL = clean (without analog input and relay output)  
PL = plus (with potentiometer)

### 8- EMC filter

Blank = without filter  
FA = with built-in Class A EMC filter  
(only 200-240V single-phase models)

### 9 - Special hardware

Blank = standard (no special hardware)  
Hx = special hardware in version X  
CP = Cold Plate heatsink version

### 10 - Special software

Blank = standard (no special software)  
Sx = special software in version X

### 11 - End of code

Ex.: CFW100040S2024ESZ  
VSD of CFW-10 series, 4.0 A, single -phase  
at 200-240 VAC and manual in English.

## VSD Comparison

		MODELS		
		CFW-08	CFW-09	CFW-10
Power Supply	Single-phase Voltage	-	-	110 - 127Vac (+10 %, -15%)
		200 - 240Vac (+10%, -15%)	-	200 - 240Vac (+10%, -15%)
	3-phase voltage	200 - 240Vac (+10%, -15%)	220 - 230Vac (+10%, -15%)	200-240V (+10%, -15%)
		380 - 480Vac (+10%, -15%)	380 - 480Vac (+10%, -15%)	-
		500 - 600Vac (+10%, -15%)	500 - 600Vac (+10%, -15%)	-
		-	500 - 690Vac (+10%, -15%)	-
	-	660 - 690Vac (+10%, -15%)	-	
	Frequency	50 / 60 Hz, +/- 2 Hz (48 ... 62Hz)		
cos φ (displacement power factor)	Greater than 0.98			
Power factor	-			
Degree of Protection	Drive	NEMA 1/IP20 in sizes 3 and 4 IP20 in sizes 1 and 2	NEMA 1 / IP20 (Size 1...8E) IP20 (Size 9...10E)	IP20
		NEMA 1 with additional metallic conduit connection kit		
		NEMA4X / IP56		
	Remote Keypad	Parallel keypad NEMA 12/IP54	NEMA 4X / IP56	-
Serial keypad NEMA 12/IP54				
Flange mounting (through panel)	-	Size 2, 3 and 4	Yes	-
Control	Power Supply type	Switched Mode Power Supply		
	Control type	V/f linear or quadratic	V/f	V/f linear or quadratic
		VVW Sensorless vector control (Voltage Vector-Control WEG)	VVW (Voltage Vector-Control WEG)	
			Sensorless vector (without encoder)	
	Switching frequency	2.5 / 5.0 / 10 / 15 kHz	1.25/ 2.5 / 5.0 / 10 kHz	2.5 to 15 kHz
	Output frequency	0 ... 300 Hz	0...204Hz (Supply frequency 60Hz)	0 ... 300 Hz
0...170Hz (Supply frequency 50Hz)				
		Above 204 Hz (please contact WEG)		
Performance	Permitted overload	150% for 60 sec every 10 min	CT: 150% for 60 sec every 10 min VT: 110 for 60 sec every 10 min	150% for 60 sec every 10 min
	Efficiency	> 95%	> 97%	> 95%
	V/f Speed control	Regulation 1% Rated Speed with Slip Compensation	Regulation 1% Rated Speed with Slip Compensation	Regulation 1% Rated Speed with Slip Compensation
		Resolution: 0.01 Hz (f<100Hz); 0.1 Hz (f<100Hz) (keypad reference)	Resolution: 1 rpm (keypad reference) regulation rate = 1:20	Resolution: 0.01 Hz (f<100Hz); 0.1 Hz (f<100Hz) (keypad reference)
	VVW Speed Control	Regulation: 0.5% of the rated speed	Regulation: 0.5% of the rated speed	-
		Resolution: 1 rpm (keypad reference)	Resolution: 1 rpm (keypad reference) regulation rate = 1:30	
	Sensorless vector Speed control	Regulation: 0.5% of the rated speed	Regulation: 0.5% of the rated speed	-
		Resolution: 1 rpm (keypad reference) regulation rate = 1:100	Resolution: 1 rpm (keypad reference) regulation rate = 1:100	
	Vector with encoder Speed control	-	10-bit analog reference: +/-0.1% Rated Speed; 14-bit analog reference: +/-0.01% Rated Speed; keypad reference: +/- 0.01% Rated Speed	-
		-	Regulation Rate: Down to 0 rpm Rated Torque	
Vector modes Torque Control	-	Regulation: +/- 10% (sensorless) +/- 5% (encoder) Rated torque	-	
	-	Range: 0...150% (encoder) motor Rated torque		

## VSD Comparison

		MODELS			
		CFW-08	CFW-09	CFW-10	
Inputs and Outputs	Digital	4 programmable isolated digital inputs with NPN or PNP logic (DI1...DI4)	6 programmable inputs, optoisolated, bidirectional, 24Vdc	4 programmable isolated inputs	
		PTC isolated inputs via AI1 and AI2 Programmable isolated inputs via AI1 and AI2 with NPN or PNP logic (DI5 and DI6)	2 outputs with reverser contacts (NO/NC) and 1 output with NO contact, programmable		
	Relay	2 Programmable outputs, reversible NO/NC contacts	2 programmable outputs, NO/NC contacts	1 programmable output, NO contact	1 programmable output, reversible NO/NC contacts
			1 programmable output, NO contact		
Analog	1 isolated input 0 ...10V, (0)4 ... 20mA, 8 bits	2 isolated analog inputs 0...10V/ 4...20mA / -10 ...10V, 8 bits	2 programmable differential inputs, 10 bits	1 isolated input 0...10 V, 0...20 mA or 4...20 mA	
		2 programmable outputs, 0 a 10V, 11 bits	2 programmable outputs bipolares (-10...10V), 14 bits (optional)		
		2 programmable outputs isoladas, 11 bits (optional)			
Communication	Serial Interface	RS-232 or RS-485	RS-232 or RS-485	-	
	Fieldbus Protocols	Modbus-RTU, Profibus DP CANopen and DeviceNet	Modbus-RTU, Profibus DP, DeviceNet, Ethernet/IP, CANopen and Metasys N2	-	
Safety	Protections	Output overcurrent			-
		DC link under and overvoltage			
		VSD overtemperature			
		Motor overload ( i x t )			
		External fault			
		Internal fault			
		Keypad connection fault			
		Motor overtemperature			
		Communication error			
		Output short-circuit			
		Ground fault			
Line and Motor phase loss					
Motor overspeed					
Motor and Encoder connection fault					
Braking resistor overload					
Ambient	Temperature	0...40 °C (up to 50 C with reduction of 2%/ ° C in the output current)	0...40 °C (up to 50 C with reduction of 2%/ ° C in the output current)	0...50 °C (without reduction in the output current)	
	Humidity	5...90% without condensation	5...90% without condensation	5...90% without condensation	
	Altitude	0.....1000 m (up to 4000 m with 1% / 100 m in the output current)	0.....1000 m (up to 4000 m with 1% / 100 m in the output current)	0.....1000 m (up to 4000 m with 1% / 100 m in the output current)	
Keypad	Control	Start/Stop			
		Up/Down (Speed)			
		Parameter Setting			
		JOG, reverse and local/remote selection	Variable speed potentiometer		
	Monitoring	Motor output frequency			
		Intermediate circuit voltage	Inverter status	Intermediate circuit voltage	
		Frequency proportional value	Digital input and output status	Speed proportional value	
		Heatsink temperature	Motor speed	Heat sink temperature	
		Motor output current (A)			
		Motor output voltage (V)			
		Fault indication	Fault indication with descriptive message	Fault indication	
Load torque					
VSD status	Relay output status	-			
Features	Braking transistor	Frame sizes 2,3 and 4	Standard in sizes 1, 2 and 3 Optional in sizes 4 to 7 External in sizes 8 to 10E	Frame sizes 2 and 3	
	DC braking	Yes	Yes	Yes	
	Optimal Braking	-	Built-in	-	
	+24 Vdc source available	-	Yes	-	
	PID	Yes	Yes	Yes	

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