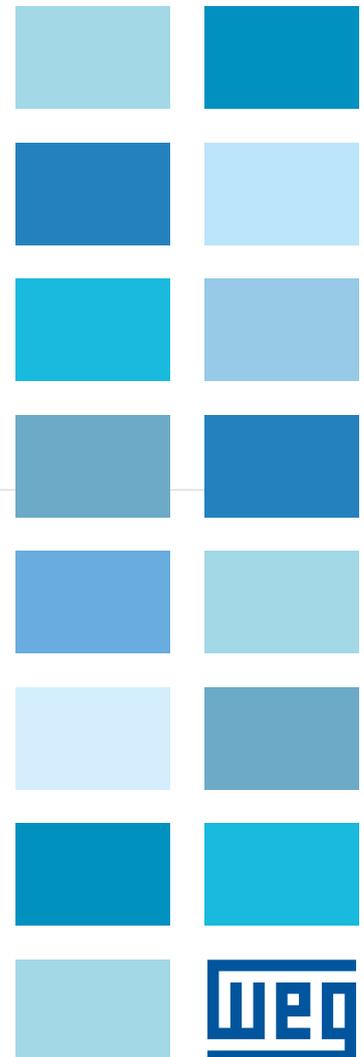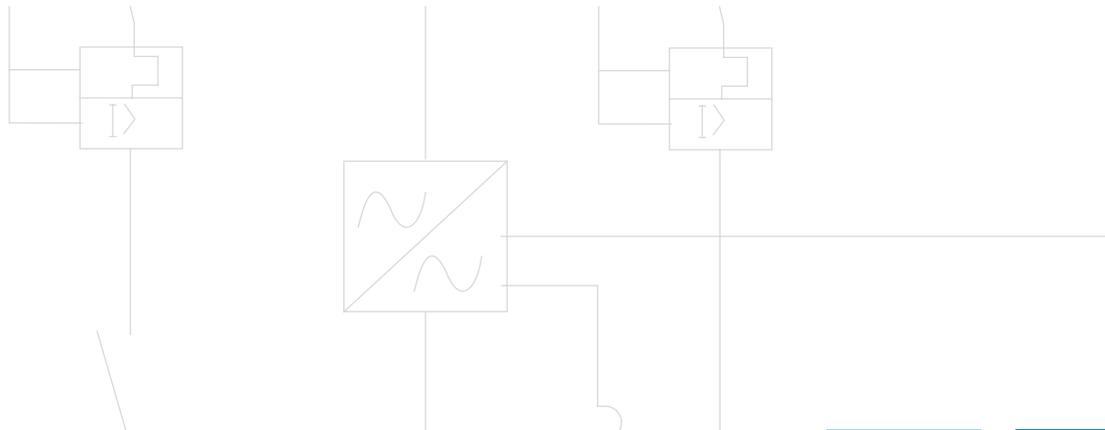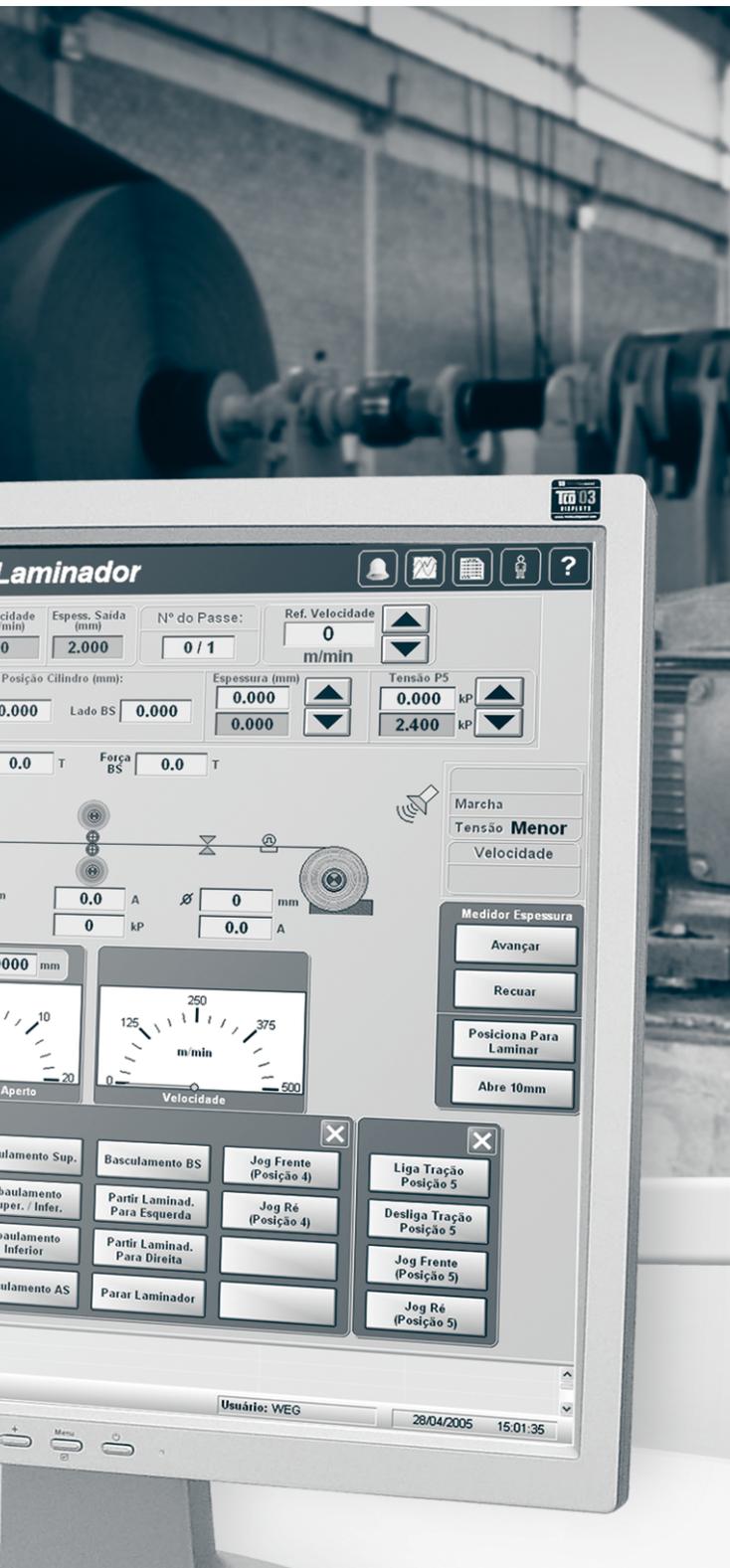# Automation
Variable Speed Drives

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
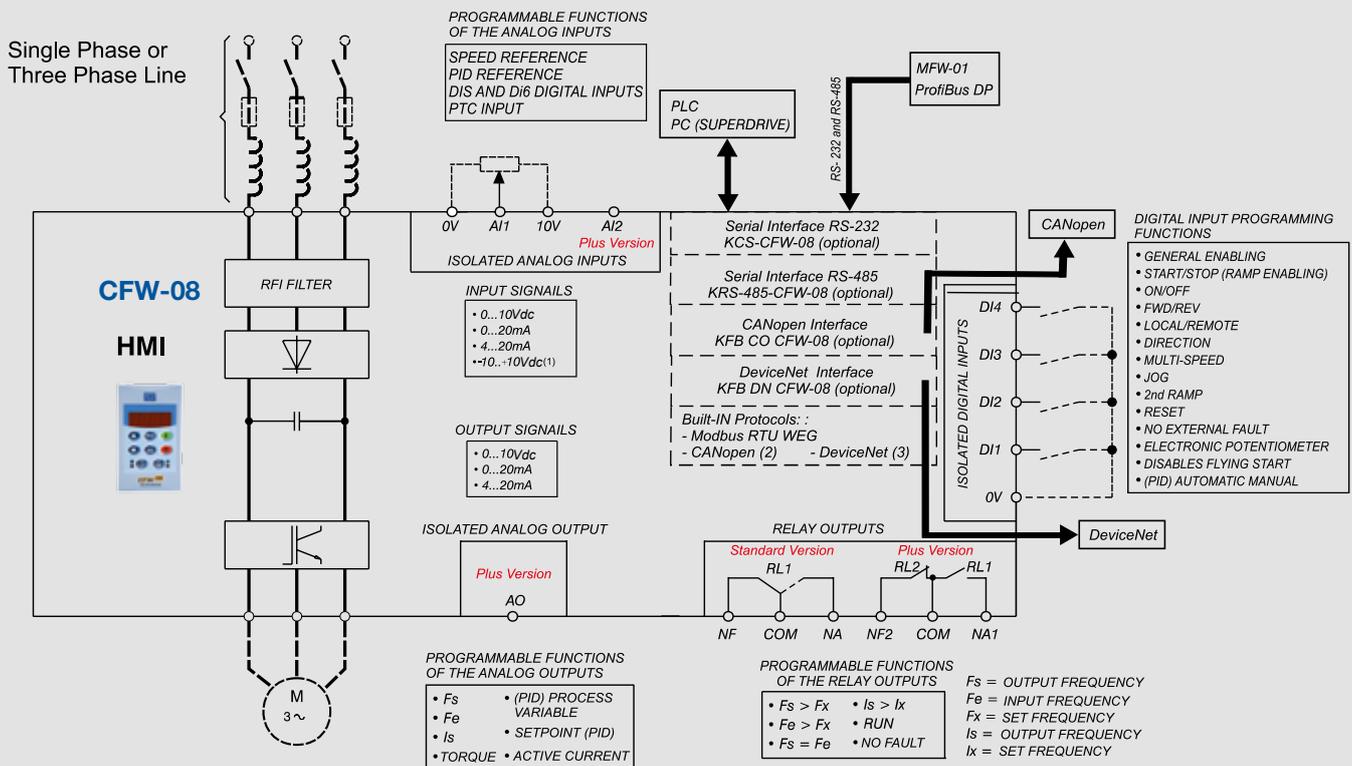
Main Applications

- 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

Single Phase or Three Phase Line

CFW-08

HMI

RFI FILTER

PROGRAMMABLE FUNCTIONS OF THE ANALOG INPUTS

SPEED REFERENCE
PID REFERENCE
DIS AND Di6 DIGITAL INPUTS
PTC INPUT

0V   AI1   10V   AI2
Plus Version
ISOLATED ANALOG INPUTS

INPUT SIGNAILS
- 0...10Vdc
- 0...20mA
- 4...20mA
- -10..+10Vdc(1)

OUTPUT SIGNAILS
- 0...10Vdc
- 0...20mA
- 4...20mA

ISOLATED ANALOG OUTPUT

Plus Version

AO

M
3~

PROGRAMMABLE FUNCTIONS OF THE ANALOG OUTPUTS
- Fs
- Fe
- Is
- TORQUE
- (PID) PROCESS VARIABLE
- SETPOINT (PID)
- ACTIVE CURRENT

PLC
PC (SUPERDRIVE)

RS- 232 and RS-485

MFW-01
ProfiBus DP

Serial Interface RS-232
KCS-CFW-08 (optional)

Serial Interface RS-485
KRS-485-CFW-08 (optional)

CANopen Interface
KFB CO CFW-08 (optional)

DeviceNet Interface
KFB DN CFW-08 (optional)

Built-IN Protocols: :
- Modbus RTU WEG
- CANopen (2)   - DeviceNet (3)

CANopen

ISOLATED DIGITAL INPUTS
DI4
DI3
DI2
DI1
0V

DeviceNet

DIGITAL INPUT PROGRAMMING FUNCTIONS
- GENERAL ENABLING
- START/STOP (RAMP ENABLING)
- ON/OFF
- FWD/REV
- LOCAL/REMOTE
- DIRECTION
- MULTI-SPEED
- JOG
- 2nd RAMP
- RESET
- NO EXTERNAL FAULT
- ELECTRONIC POTENTIOMETER
- DISABLES FLYING START
- (PID) AUTOMATIC MANUAL

RELAY OUTPUTS
Standard Version   Plus Version
RL1   RL2   RL1

NF   COM   NA   NF2   COM   NA1

PROGRAMMABLE FUNCTIONS OF THE RELAY OUTPUTS
- Fs > Fx
- Fe > Fx
- Fs = Fe
- Is > Ix
- RUN
- NO FAULT

Fs = OUTPUT FREQUENCY
Fe = INPUT FREQUENCY
Fx = SET FREQUENCY
Is = OUTPUT FREQUENCY
Ix = SET FREQUENCY

(1) Only avaliable with control board A2
(2) Only avaliable with control board A3
(3) Only avaliable with control board A4
(4) Not avaliable 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)

Avaiable 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)

Avaiable 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 Supplpy with local HMI (KDC-24V-CFW08)
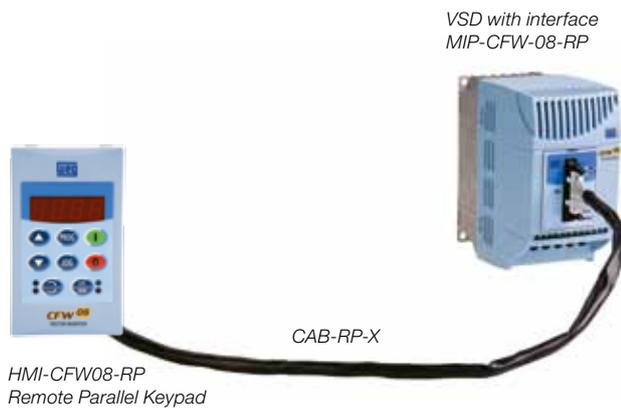
24VDC Power Supply

Optional Kit: 24VDC Power Supplpy 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.

VSD with interface MIP-CFW-08-RP

CAB-RP-X

HMI-CFW08-RP Remote Parallel Keypad

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.

VSD with interface MIS-CFW-08-RS

HMI-CFW08-RS Remote Serial Keypad

CAB-RS-X
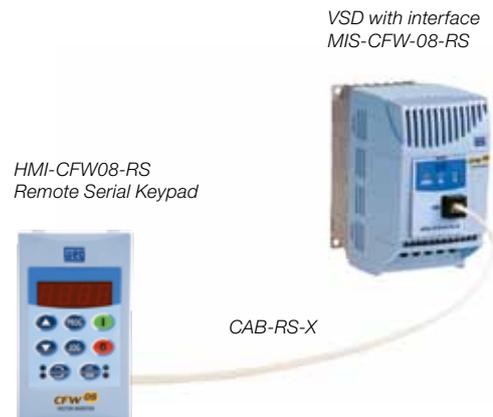
SuperDrive

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 programmning, troubleshooting as well as user applications storage. Another benefit given by the use of this Software is the Online and Offline acess which allows the costumer to be able to create his own user application without a need of a VSD.
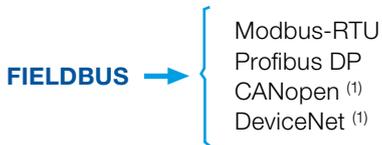
SuperDrive is available for free download at www.weg.net.

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 avaiable to the customer:

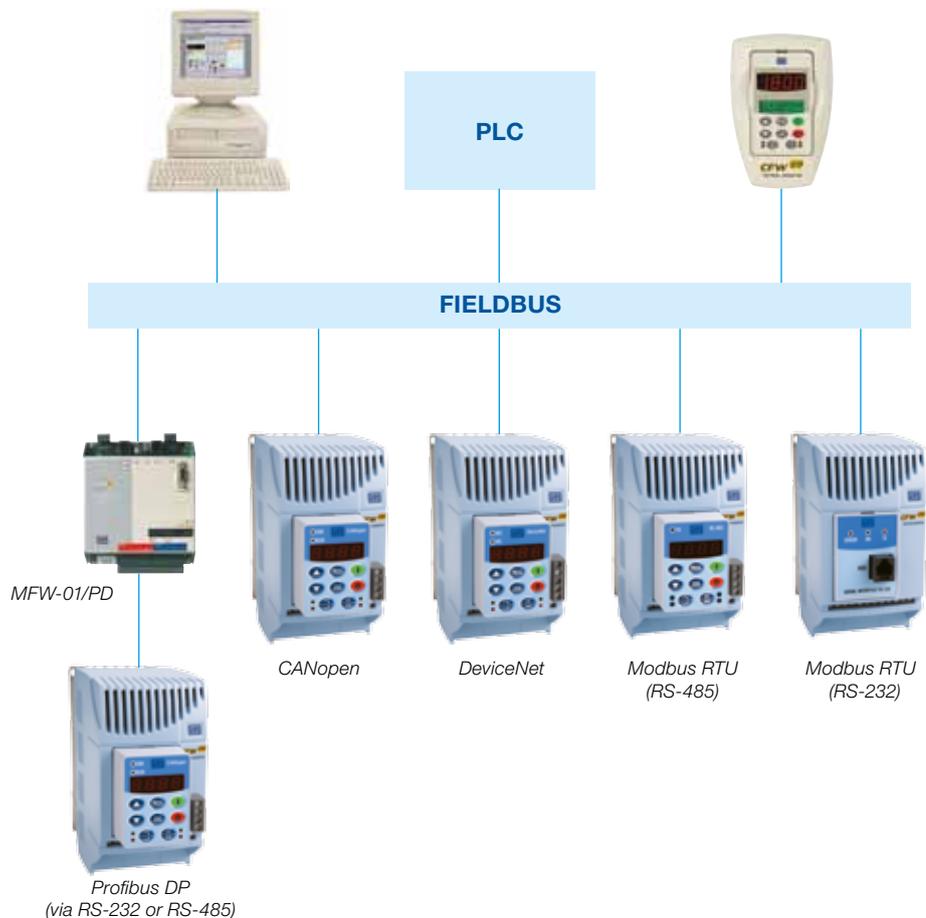**FIELDBUS** → Modbus-RTU
Profibus DP
CANopen [1]
DeviceNet [1]

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-effetiveness 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.

[1] Not avaiable in 500-600V models

PLC

FIELDBUS

MFW-01/PD

CANopen

DeviceNet

Modbus RTU
(RS-485)

Modbus RTU
(RS-232)

Profibus DP
(via RS-232 or RS-485)

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 algoritm 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.
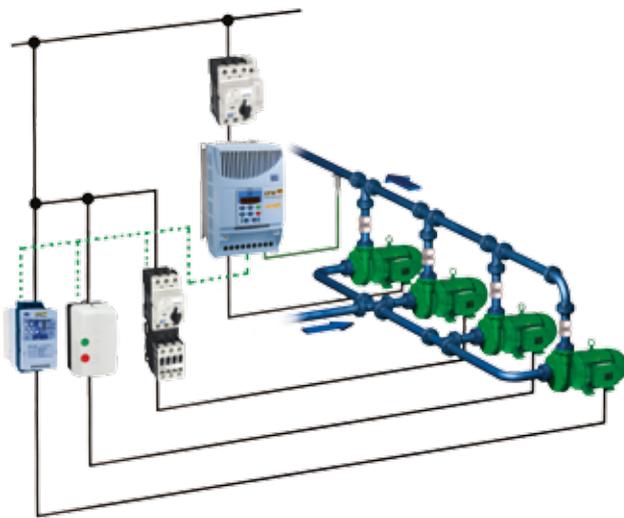
Advantages of the multipump control

- 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 a IP56 rated enclosure that protects against high-pressure water, corrosion and dust.

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

Comunication protocol such as Devicenet, Modbus-RTU, CANopen can be added using optional cards.
Due to the fact that the CFW-08 IP-56 drive has improved cooling fans it ensures 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
				50Hz 220V 230V	60Hz 220V 230V	60Hz 230V
			A	kW	HP	HP
200-240 V	1∅	CFW080016S2024	1.6	0.25	0.33	0.25
		CFW080026S2024	2.6	0.55	0.5	0.5
		CFW080040S2024	4	0.75	1	0.75
	1∅ / 3∅	CFW080016B2024	1.6	0.25	0.33	0.25
		CFW080026B2024	2.6	0.55	0.5	0.5
		CFW080040B2024	4	0.75	1	0.75
		CFW080073B2024	7.3	1.5	2	2
		CFW080100B2024	10	2.2	3	3
	3∅	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
				50Hz 380V 415V	60Hz 440V 460V	60Hz 460V
			A	kW	HP	HP
380-480 V	3∅	CFW080010T3848	1	0.25	0.33	0.33
		CFW080016T3848	1.6	0.55	1	0.75
		CFW080026T3848	2.6	1.1	1.5	1
		CFW080027T3848	2.7	1.1	1.5	1
		CFW080040T3848	4	1.5	2	2
		CFW080043T3848	4.3	1.5	2	2
		CFW080065T3848	6.5	2.2	4	3
		CFW080100T3848	10	4	7.5	5
		CFW080130T3848	13	5.5	10	7.5
		CFW080160T3848	16	7.5	10	10
		CFW080240T3848	24	11	15	15
		CFW080300T3848	30	15	20	20

Motor voltages between 525V and 575V

Power Supply		Model	Output Current	IEC	NEMA
				50Hz 525V	60Hz 575V
			A	kW	HP
500-600 V	3∅	CFW080017T5060	1.7	0.75	1
		CFW080030T5060	3	1.5	2
		CFW080043T5060	4.3	2.2	3
		CFW080070T5060	7	4	5
		CFW080100T5060	10	5.5	7.5
		CFW080120T5060	12	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	Frame Size	NEMA 1 / IP20 Dimensions mm (in)			Weight kg (lb)	Frame Size	NEMA 4X / IP56 Dimensions mm (in)			Weight kg (lb)	Braking IGBT
		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											
CFW080073B2024	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
CFW080100B2024											
CFW080160T2024											
CFW080220T2024	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)	
CFW080280T2024	4	182 (7.16)	290 (11.41)	196 (7.71)	6 (13.2)						
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)						
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
		Optional	NEMA 1 with optional kit for connection in metalic conduit (KN1-CFW08-MX)				
	keypad	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				
	Fequency Resolution		Analog Ref.: 0.1% of fmax. Digital ref.: 0.01 Hz (f<100Hz); 0.1 Hz (f>100 Hz)				
	Accuracy		Analog Ref.: 0.5% and digital Ref.: 0.01% (at 25°C +/- 10°C)				
PERFOMANCE	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 (Al1)[1]		2 isolated inputs 0..10Vdc, 0/4...20mA or -10...+10Vdc (Al1 and Al2)[1]		
	Digital		4 programmable isolated inputs - with NPN or PNP logic (DI1...DI4)		-		
			1 isolated PTC input via Al1		2 isolated PTC inputs via Al1 and Al2		
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)				
			JOG, Reverse and Local/Remote Selection				
	Monitoring		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)				
			Fault Indication				
			Load Torque				
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) Avaiable 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

CFW08 0040 B 2024 P O -- -- -- -- -- -- Z

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
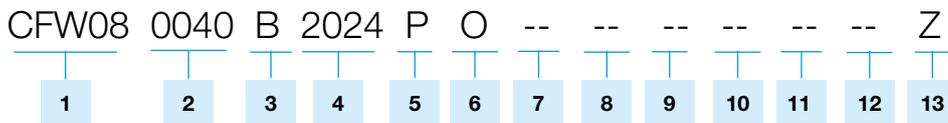
1 - CFW-08 VSD Series

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 [1]
A4 = DeviceNet [1]
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

13 - End of Code

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).

[1] Not avaliable 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.
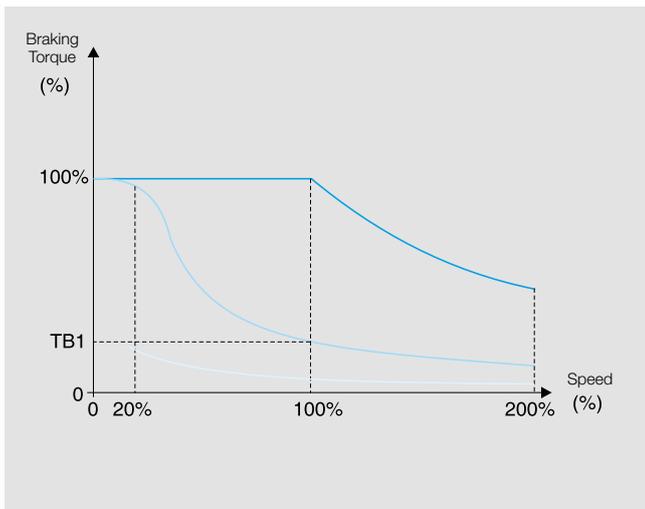
CFW-09 - *Optimal Braking*®

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 costhy, 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
- Warpers
- Winders

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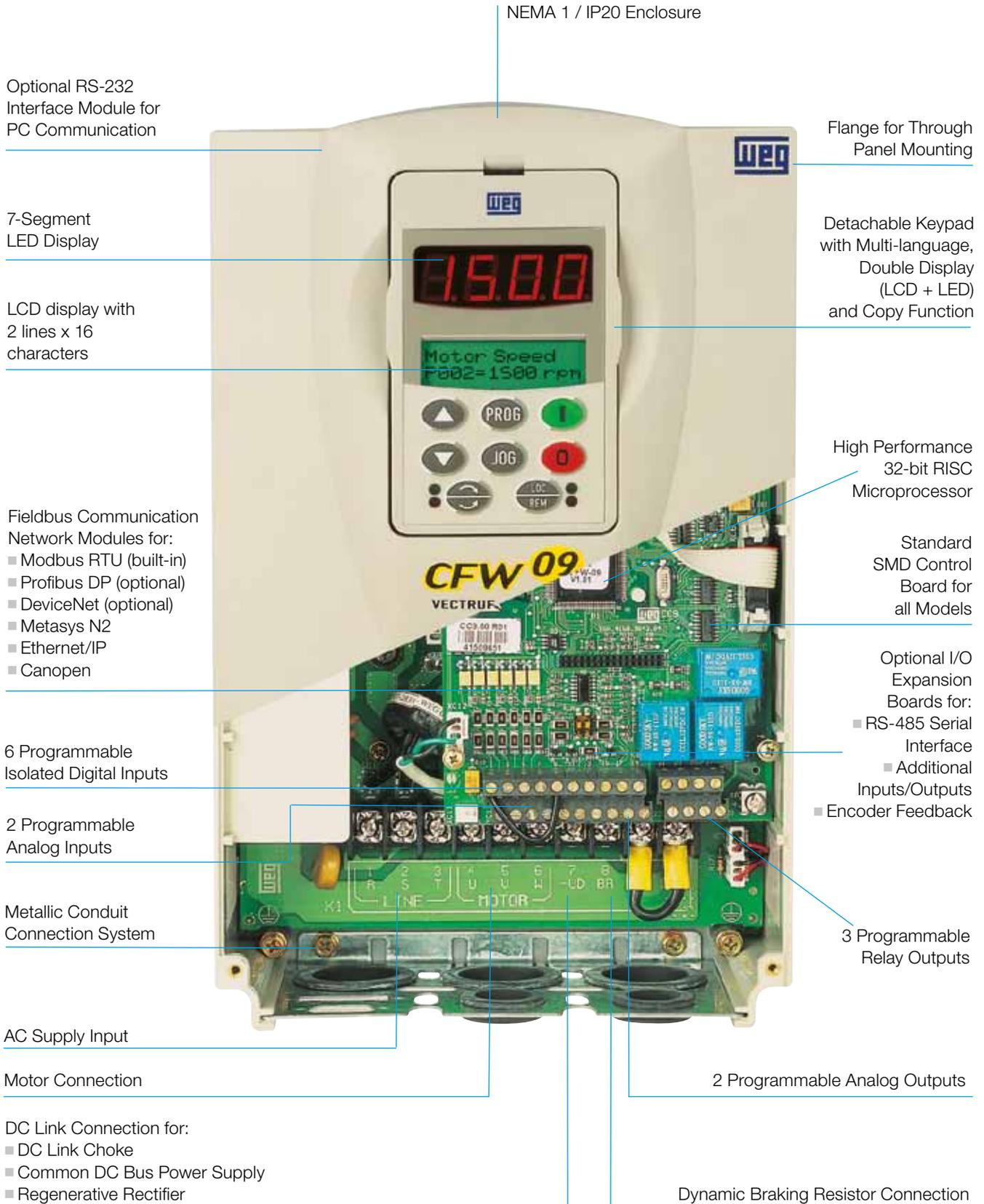- Driers / Ovens
- Palletizers
- Monorails
- Conveyors

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

Optional I/O
Expansion
Boards for:
■ RS-485 Serial
Interface
■ Additional
Inputs/Outputs
■ Encoder Feedback

6 Programmable
Isolated Digital Inputs

2 Programmable
Analog Inputs

Metallic Conduit
Connection System

3 Programmable
Relay Outputs

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

Outlet air flow

Inlet air flow

Flange mounting

Outlet air flow

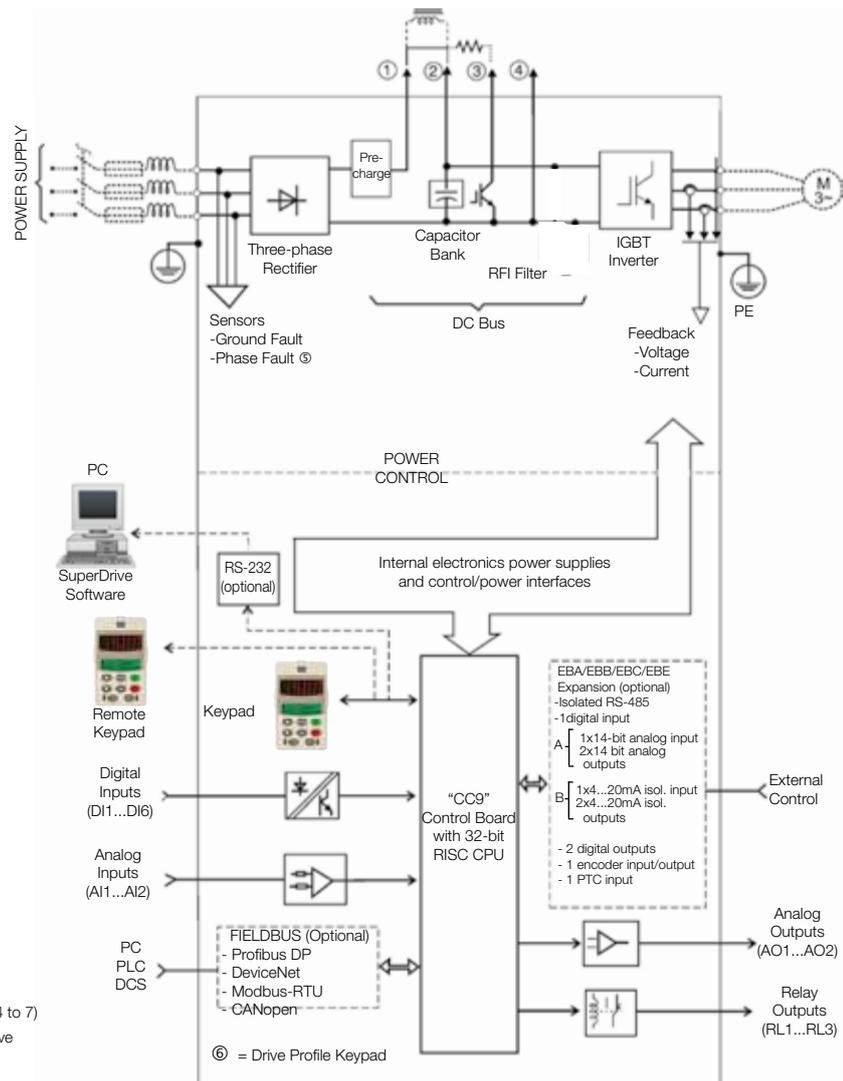Inlet air flow
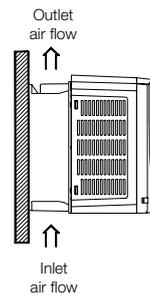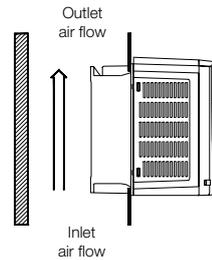
Block Diagram

① and ② = DC Link Choke connection (only from Size 2 and above)

② and ④ = DC Bus Connection

② and ③ = Braking Resistor Connection (Up to Size 7 only. Optional for Sizes 4 to 7)

⑤ = phase fault only from size 3 and above

⑥ = Drive Profile Keypad

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 excelent 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 alphanumerical messages in the LCD display.
CFW-09 permits the user to choose among several languagens such as English, Spanish and Portuguese.

Oriented Start-up
The CFW-09 "Oriented Start-Up" feature was specially created to facilite 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.

LED Display

LCD Display

"LOCAL" LED
"REMOTE" LED

"FORWARD" LED

"REVERSE" LED

VSD "A"　　　　**VSD "B"**

CFW-09 → Keypad　　　Keypad → CFW-09
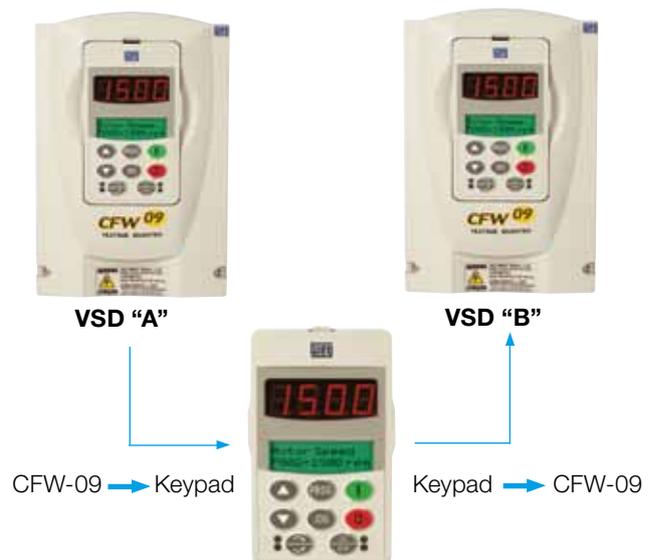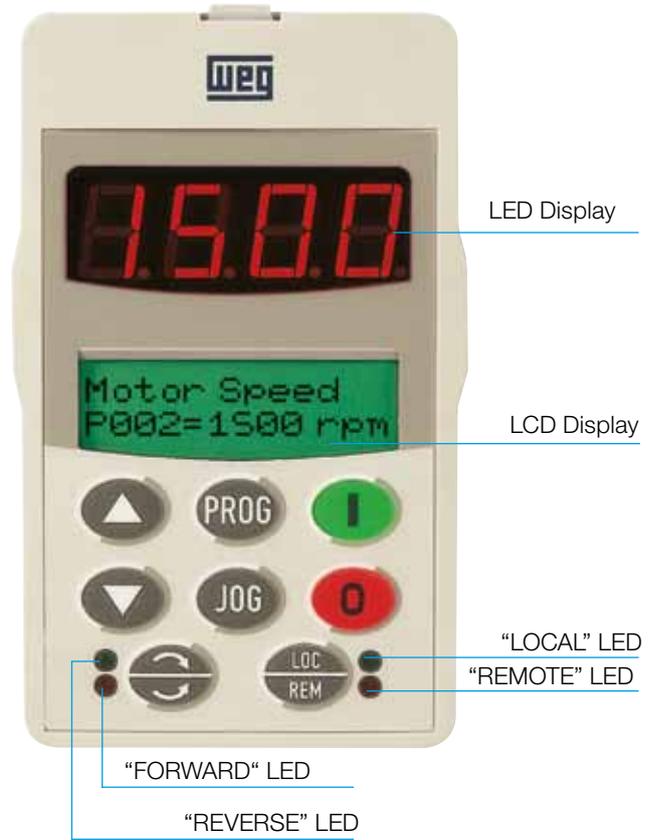
CFW-09 - Keypad Functions

I — Starts the drive via a controlled acceleration ramp. When the drive is running, switches the display indication:

rpm - Volts - Status - Torque - Hz - Amps

0 — Stops the drive via a controlled deceleration ramp. Resets the drive when a trip occurrs.

▲ — Increases the speed or parameter number/content.

▼ — Decreases the speed or parameter number/content.

PROG — Accesses the parameters content for programming.

JOG — While pressed, runs the motor at JOG speed.

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

LOC/REM — 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. DuperDrive 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 interfazes.
SuperDrive is avaialble for free download at **www.weg.net**
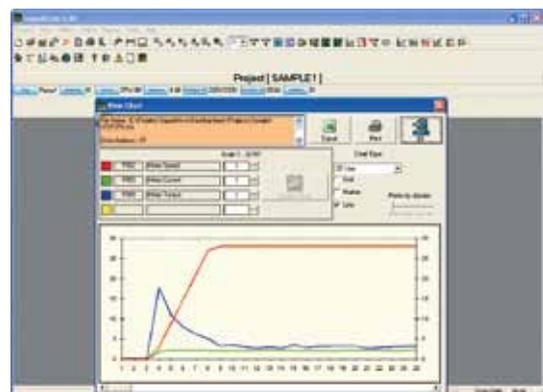
CFW-09 - Communication

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

FIELDBUS →
- Modbus-RTU
- Metasys N2
- Profibus DP
- CANopen
- DeviceNet
- EtherNet/IP
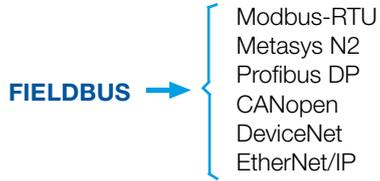
Intended mainly for the integration of automation in industrial plants, these fast communication networks
provide advantages in the supervision, monitoring and control of the drives, increasing the efficiency and
cost-effectiveness of the complete system!

CFW-09 can be easily connected to these networks with the following fielbus 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.

Modbus-RTU	Metasys N2	Profibus DP	EtherNet	CANopen	DeviceNet
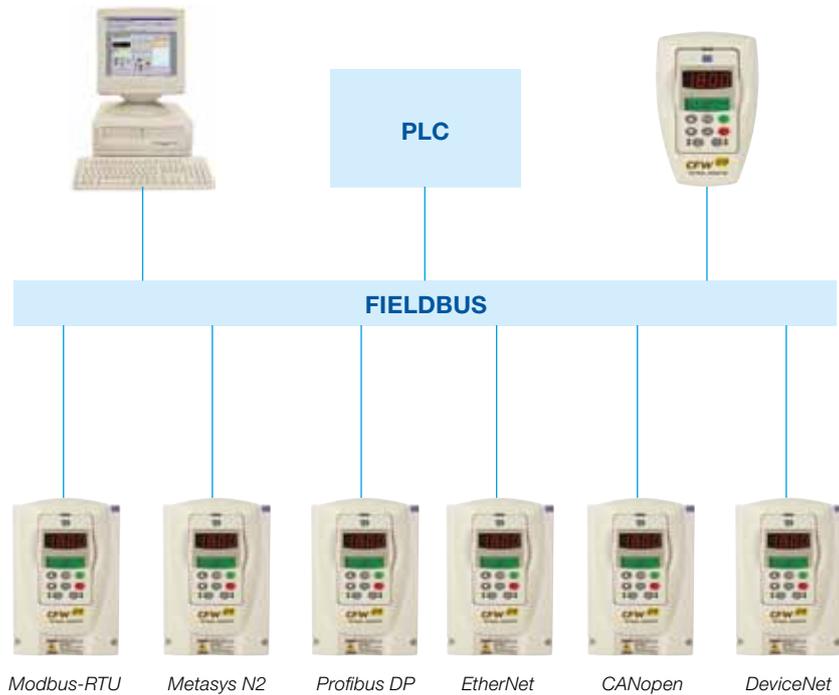
CFW-09 - Common DC Bus and Regenerative System

CFW-09 has avaiable 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 consuption in the system.
The standard CFW-09 can be conected 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.
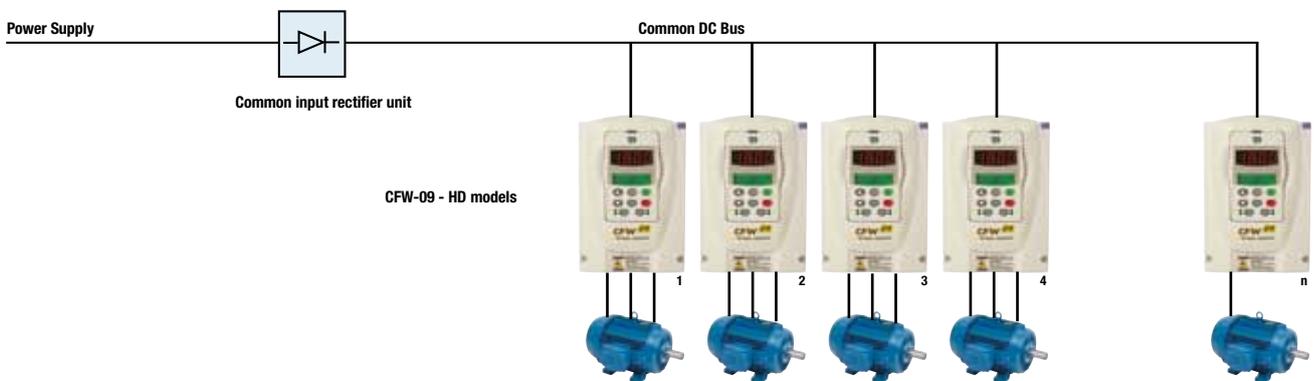
Regenerative System

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.
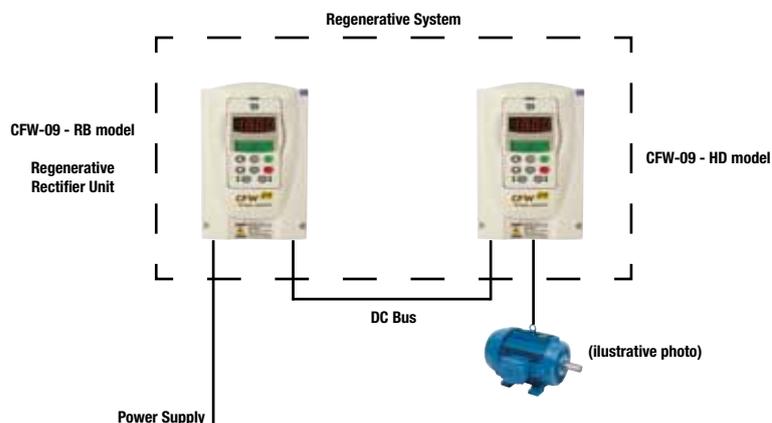
CFW-09 - Accessories

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 equipament via RS-232 serial link.

RS-232 SERIAL INTERFACE KIT
KCS-CFW09

Remote Keypad Frame for panel door or operating station mouting. 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 avaiable on request

REMOTE KEYPAD CABLES
CAB-HMI09-X

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

FIELDBUS COMMUNICATION KITS

CFW-09 - Accessories

Models / Functions	EBA 01	EBA 02	EBA 03	EBB 01	EBB 02	EBB 03	EBB 04	EBB 05	EBC1 01	EBC1 02	EBC1 03	EBE 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

PLC Functions Expansion Boards PLC1 and PLC2

- 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 avaiable 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.

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
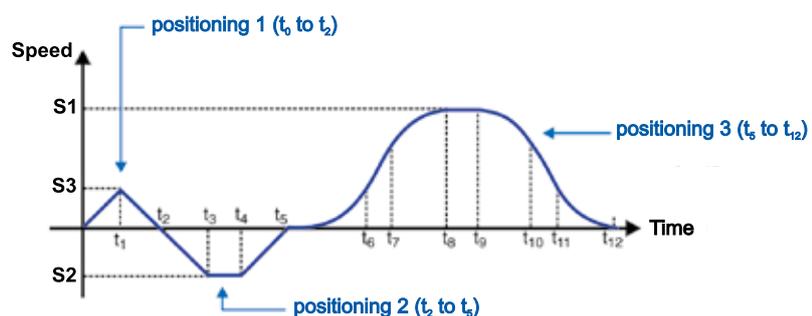
CFW-09 - Special Functions

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
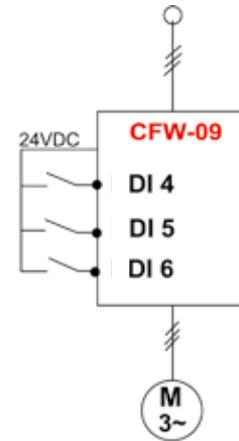
Overlapping PID Regulator

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.

Outflow reference or pressure reference
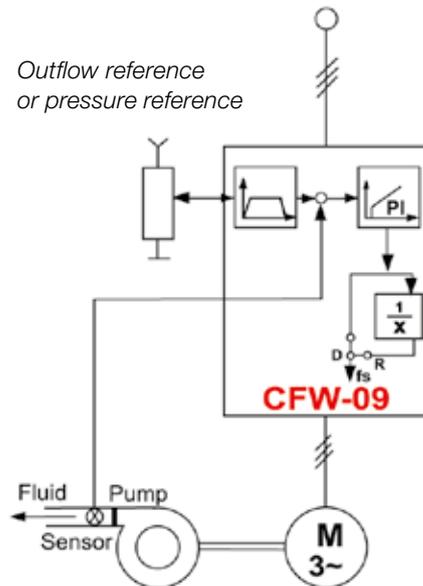
"S" Ramp

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

DC link voltage

Power restored

Line Loss

Ride-Through

Undervoltage (75%)

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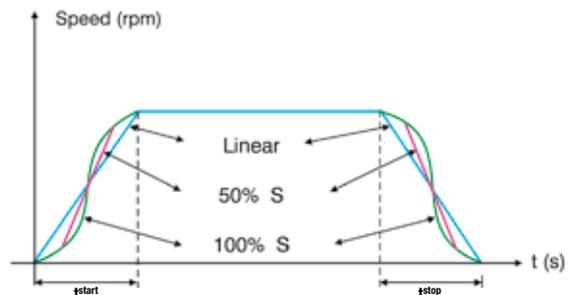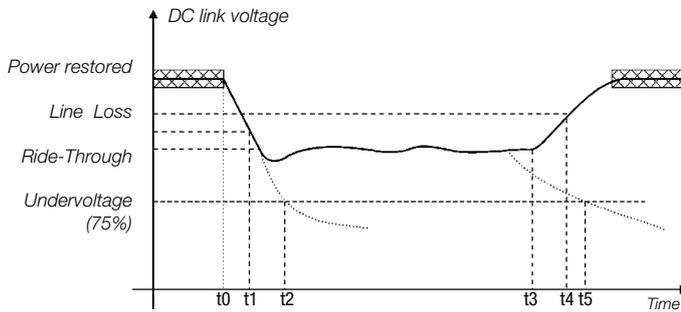
t0: Line loss;
t1: Line loss detection;
t2: Trip by Undervoltage (without Ride-Through);
t3: Power restored;
t4: Power restored detection;
t5: Trip by Undervoltage (with Ride-Through)

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 powers is restored, the motor is accelerated again to the speed defined by the reference.

Motor Voltage

Vmax.

f1   fnom   f2   **f**
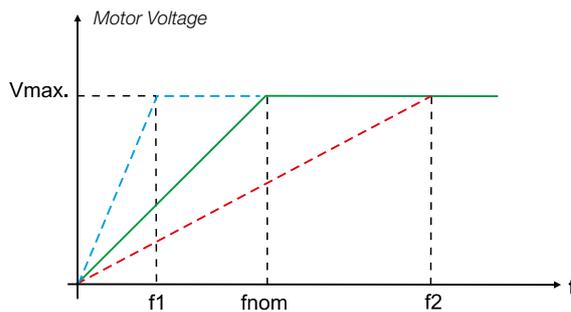
Ajustable V/f Curve

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).

Motor Speed (rpm)

Speed Reference (rpm)
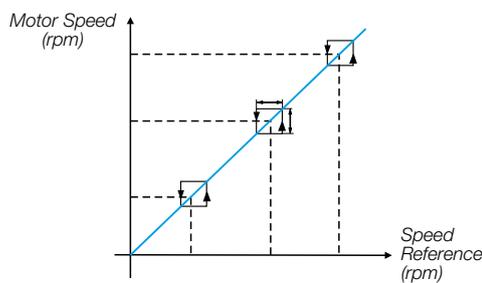
Critical Speed Rejection

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 50Hz 220V 230V	NEMA 60Hz 230V	Variable Torque (VT)	IEC 50Hz 220V 230V	NEMA 60Hz 230V
			A	kW	HP	A	kW	HP
220-230 V	1∅ / 3∅	CFW090006T2223	6	1.1	1.5	6	1.1	1.5
		CFW090007T2223	7	1.5	2	7	1.5	2
		CFW090010T2223	10	2.2	3	10	2.2	3
	3∅	CFW090013T2223	13	3	3	13	3	3
		CFW090016T2223	16	4	5	16	4	5
		CFW090024T2223	24	5.5	7.5	24	5.5	7.5
		CFW090028T2223	28	7.5	10	28	7.5	10
		CFW090033T2223	33	9.2	10	33	9.2	10
		CFW090038T2223	38	9.2	10	38	9.2	10
		CFW090045T2223	45	11	15	45	11	15
		CFW090054T2223	54	15	20	68	18.5	25
		CFW090070T2223	70	18.5	25	86	22	30
		CFW090086T2223	86	22	30	105	30	40
		CFW090105T2223	105	30	40	130	37	50
		CFW090130T2223	130	37	50	150	45	50
		CFW090142T2223	142	37	50	174	55	60
		CFW090180T2223	180	55	60	180	55	60
		CFW090240T2223	240	75	75	240	75	75
		CFW090361T2223	361	110	150	361	110	150

Motor voltages between 380V and 460V

Power Supply		Model	Constant Torque (CT)	IEC 50Hz 380V 415V	IEC 60Hz 380V 415V	NEMA 60Hz 460V	Variable Torque (VT)	IEC 50Hz 380V 415V	IEC 60Hz 440V 460V	NEMA 60Hz 460V
			A	kW	HP	HP	A	kW	HP	HP
380-480 V	3∅	CFW090003T3848	3.6	1.5	2	2	3.6	1.5	2	2
		CFW090004T3848	4	1.5	2	2	4	1.5	2	2
		CFW090005T3848	5.5	2.2	3	3	5.5	2.2	3	3
		CFW090009T3848	9	4	6	5	9	4	6	5
		CFW090013T3848	13	5.5	10	7.5	13	5.5	10	7.5
		CFW090016T3848	16	7.5	10	10	16	7.5	10	10
		CFW090024T3848	24	11	15	15	24	11	15	15
		CFW090030T3848	30	15	20	20	36	18.5	25	25
		CFW090038T3848	38	18.5	30	25	45	22	30	30
		CFW090045T3848	45	22	30	30	54	22	40	40
		CFW090060T3848	60	30	40	40	70	37	50	50
		CFW090070T3848	70	37	50	50	86	45	60	60
		CFW090086T3848	86	45	60	60	105	55	75	75
		CFW090105T3848	105	55	75	75	130	55	100	100
		CFW090142T3848	142	75	100	100	174	90	125	125
		CFW090180T3848	180	90	150	150	180	90	150	150
		CFW090211T3848	211	110	175	150	211	110	175	150
		CFW090240T3848	240	132	200	200	240	132	200	200
		CFW090312T3848	312	160	250	250	312	160	250	250
		CFW090361T3848	361	185	300	300	361	185	300	300
		CFW090450T3848	450	220	350	350	450	220	350	350
		CFW090515T3848	515	280	450	450	515	280	450	450
		CFW090600T3848	600	315	500	500	600	315	500	500

CFW-09 - Drive ratings

Motor voltages between 525V and 690V

Power Supply		Model	Constant Torque (CT)	IEC 50Hz 525V	IEC 50Hz 690V	NEMA 60Hz 575V	Variable Torque (VT)	IEC 50Hz 525V	IEC 50Hz 690V	NEMA 60Hz 575V
			A	kW	kW	HP	A	kW	kW	HP
500-600 V	3Ø	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
		CFW090079T5060	79	55	-	75	99	55	-	100
500-690 V	3Ø	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
660-690 V	3Ø	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	Frame Size	NEMA 1 / IP20 Dimensions mm (in)			NEMA 1 / IP20 Weight kg (lb)		NEMA 4X / IP56 Dimensions mm (in)			NEMA 4X / IP56 Weight kg (lb)	Braking IGBT
		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)	-	-	-	-	-	Opcional
CFW090045T2223											
CFW090054T2223	4	475 (18.70)	250 (9.84)	274 (10.79)	22.5 (49.6)						
CFW090070T2223	5	550 (21.65)	335 (13.19)	274 (10.79)	41 (90.4)						
CFW090086T2223											
CFW090105T2223	6	675 (26.57)	335 (13.19)	300 (11.81)	55 (121.3)						
CFW090130T2223											
CFW090142T2223	7	835 (32.87)	335 (13.19)	300 (11.81)	70 (154.3)	-	-	-	-	-	Expernal Module
CFW090180T2223	8	975 (38.38)	410 (16.14)	370 (14.57)	100 (220.5)						
CFW090240T2223											
CFW090361T2223	9	1020 (40.16)	688 (27.09)	492 (19.33)	261 (476.2)						
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	410 (16.14)	280 (11.02)	221 (8.70)	17.3 (38.1)	
CFW090016T3848	2	290 (11.42)	182 (7.16)	196 (7.72)	6 (13.2)						
CFW090024T3848											
CFW090030T3848	3	390 (15.35)	223 (8.78)	274 (10.79)	19 (41.9)	-	-	-	-	-	
CFW090038T3848	4	475 (18.70)	250 (9.84)	274 (10.79)	22.5 (49.6)						Opcional
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)						
CFW090180T3848	8	975 (38.38)	410 (16.14)	370 (14.57)	100 (220.5)	-	-	-	-	-	Expernal Module
CFW090211T3848											
CFW090240T3848											
CFW090312T3848	9	1020 (40.16)	688 (27.09)	492 (19.33)	261 (476.2)						
CFW090361T3848											
CFW090450T3848	10	1185 (46.65)	700 (27.56)	492 (19.33)	259 (571.0)						
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)	-	-	-	-	-	Opcional
CFW090027T5060											
CFW090032T5060											
CFW090044T5060	7	835 (32.87)	335 (13.19)	300 (11.81)	70 (154.3)						
CFW090053T5060											
CFW090063T5060											
CFW090079T5060											
CFW090107T5069	8E	1145 (45.08)	410 (16.14)	370 (14.57)	115 (253.5)	-	-	-	-	-	Expernal Module
CFW090147T5069											
CFW090211T5069											
CFW090247T5069	10E	1185 (46.65)	700 (27.56)	582 (22.91)	310 (683.4)						
CFW090315T5069											
CFW090343T5069											
CFW090418T5069											
CFW090472T5069											
CFW090100T6669	8E	1145 (45.08)	410 (16.14)	370 (14.57)	115 (253.5)	-	-	-	-	-	Expernal Module
CFW090127T6669											
CFW090179T6669											
CFW090225T6669	10E	1185 (46.65)	700 (27.56)	582 (22.91)	310 (683.4)						
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)
			Current flux and Speed Regulators Implemented in Software (Full Digital)
	Control Modes		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 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]
			1 Programmable Isolated Input: 24 Vdc (for Motor PTC/Thermistor) [1]
	Encoder		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[1]
			2 programmable isolated outputs (11bits): 0...20mA or 4...20mA[1]
	Relay		2 programmable NO outputs : 240Vac,1A
			1 programmable NO output : 240Vac,1A
	Transistor		2 programmable isolated open-colector outputs 24Vdc,50mA][1]
	Encoder		1 isolated differential encoder signal output: external power supply: 5....15Vdc[1]
COMMUNICATION	Serial		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[1]
	Fieldbus [1]		Modbus-RTU, Profibus DP, DeviceNet, EtherNet/IP, DeviceNet Drive Profile, CANopen and Metasys N2 [2].
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		0ºC (32ºF)/...40ºC (104ºF), up to 50ºC (122ºF) with 2%/ºC (1.1%/ºF) 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
	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)		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

KEYPAD	Programming	General Drive Functions Programming		
	Controls	Start/Stop, Increase/Decrease Speed, JOG, FWD/REV and Local/Remote		
	Monitoring	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

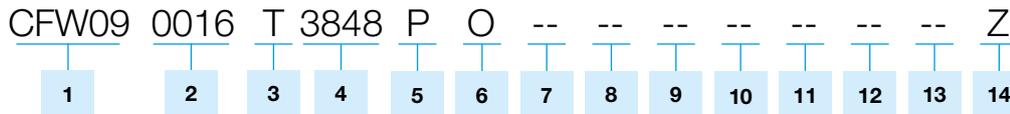|				
FEATURES	Standard	Keypad with LCD + LED displays (HMI-CFW09-LCD)		
		Password to protect drive programming		
		LCD display language selection: English, Spanish and Portuguese		
		Control mode selection (via parameter): V/f, Sensorless Vector or Vector with Encoder		
		Self-diagnosis fault and auto-reset		
		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 > Ix ; Is < Ix; 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)		
	Options	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.0X-CFW09
				EBB.0X-CFW09
				EBC1.0X-CFW09
				EBE.0X-CFW09
		Fieldbus Communication kits (Mounted inside drive)	Profibus DPV0	KFB-PD
			Profibus DPV 1	KFB-PDPV1
			DeviceNet	KFB-DN
			DeviceNet Drive Profile	KFB-DD
			Elhernet/IP	KFB-EN
		PC Communication kit	SuperDrive Software	KSD-CFW09
			Cables and Connectors	
			KCS-CFW09	
		RS-232 Serial Interface Module		KCS-CFW09
		Built-in dynamic braking transistor Models: 54...130 A / 220-230 V and 38...142 A / 380-480 V		"DB" Models
		External dynamic braking module	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			Built-in Braking Transistor	Rated Current (A)		Maximum Applicable Motor			Frame Size
	Number of Phases	Model					Voltage (V)	CT / VT		
					CT(1)	VT(1)		kW	HP	
220-230 V	Single phase or Three phases	CFW090006T2223E0N4Z		Yes	6		230	1.1	1.5	1
		CFW090007T2223E0N4Z			7			1.5	2	
		CFW090010T2223E0N4Z			10			2.2	3	
	Three phases	CFW090016T2223E0N4Z			16			4	5	2
380-480 V	Three phases	CFW090003T3848E0N4Z		Yes	3.6		400	1.1	1.5	1
		CFW090004T3848E0N4Z			4			1.5	2	
		CFW090005T3848E0N4Z			5.5			2.2	3	
		CFW090009T3848E0N4Z			9			4	5	
		CFW090013T3848E0N4Z			13			5.5	7.5	2
		CFW090016T3848E0N4Z			16			7.5	10	
	Three Phases	CFW090003T3848E0N4Z		Yes	3.6		460	1.5	2	1
		CFW090004T3848E0N4Z			4			1.5	2	
		CFW090005T3848E0N4Z			5.5			2.2	3	
		CFW090009T3848E0N4Z			9			4	5	
		CFW090013T3848E0N4Z			13			5.5	7.5	2
		CFW090016T3848E0N4Z			16			7.5	10	

CFW-09 - Coding

```
CFW09  0016  T  3848  P  O  --  --  --  --  --  --  --  Z
  1      2    3   4    5  6   7   8   9  10  11  12  13  14
```

1 - CFW-09 VSD Series

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

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 = 0107 A		
0130 = 130 A	0142 = 142 A	0147 = 0147 A		
0142 = 142 A	0180 = 180 A	0211 = 0211 A		
0180 = 180 A	0211 = 211 A	0247 = 0247 A		
0240 = 240 A	0240 = 240 A	0315 = 0315 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			

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 = Regenative rectifying unit (models from 105A at 220V, and from 86A at 380-480V)

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

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

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 ajustable 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: 50ºC (122ºF), 1000m (3300ft) altitude, 90% humidity, non-condensing.

Applications

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

Block Diagram
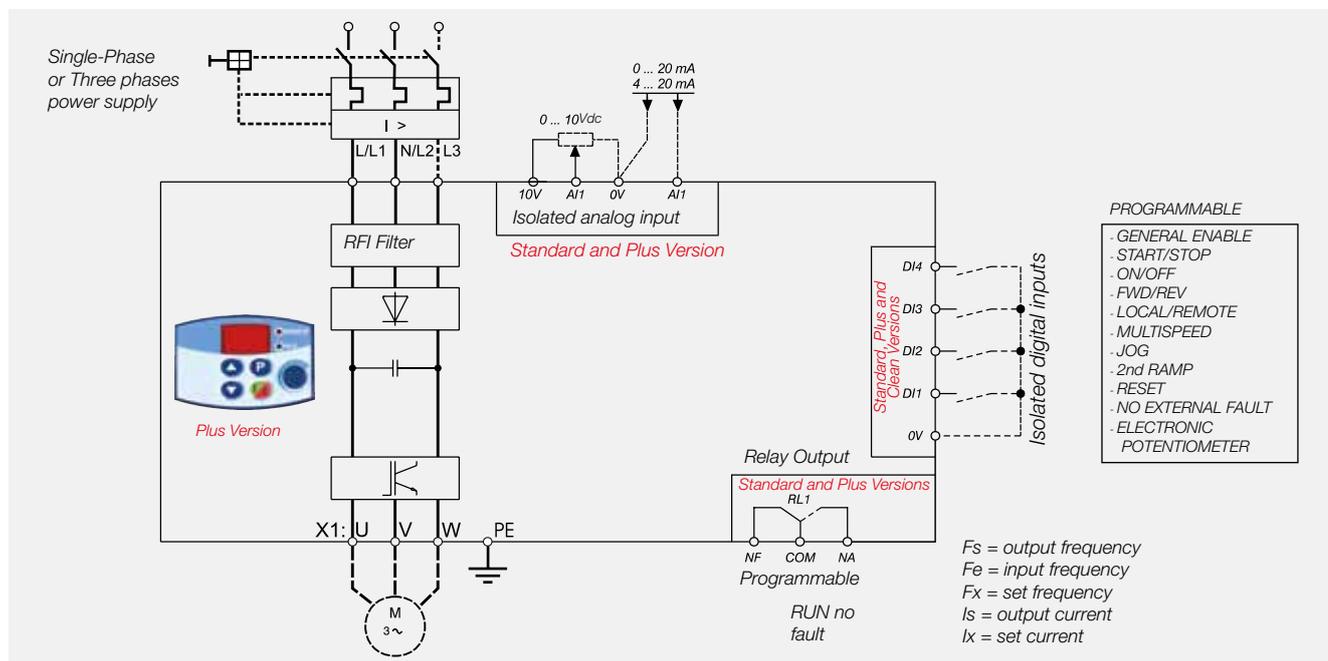
CFW-10 - Drive Ratings

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	IEC	NEMA
				50Hz 220V 230V	60Hz 230V
			A	kW	HP
110-127V	1Ø	CFW100016S1112	1.6	0.25	-
		CFW100026S1112	2.6	0.55	0.5
		CFW100040S1112	4	0.75	0.75
220-230 V	1Ø / 3Ø	CFW100016S2024	1.6	0.25	-
		CFW100026S2024	2.6	0.55	0.5
		CFW100040S2024	4	0.75	0.75
		CFW100073S2024	7.3	1.5	2
		CFW100100S2024	10	2.2	3
	3Ø	CFW100016T2024	1.6	0.25	-
		CFW100026T2024	2.6	0.55	0.5
		CFW100040T2024	4	0.75	0.75
		CFW100073T2024	7.3	1.5	2
		CFW100100T2024	10	2.2	3
		CFW100152T2024	15.2	4	5

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					
110-127 V	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				
		CFW100040S1112E0CPZ	4.0			0.75	1	2	161 (6.3)	120 (4.7)		1.0 (2.2)
200-240 V		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				
		CFW100040S2024E0CPZ	4.0			0.75	1	1				
		CFW100073S2024E0CPZ	7.3			1.5	2	2	161 (6.3)	120 (4.7)		1.0 (2.2)
		CFW100100S2024E0CPZ	10			2.2	3	3	191 (7.5)			1.2 (2.6)
	Three phases *	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				
		CFW100040T2024E0CPZ	4.0			0.75	1	1				
		CFW100073T2024E0CPZ	7.3			1.5	2	1				
		CFW100100T2024E0CPZ	10.0			2.2	3	2	161 (6.3)	120 (4.7)		1.0 (2.2)
		CFW100152T2024E0CPZ	15.2			4	5	3	191 (7.5)			1.2 (2.6)

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 (3.74)	132 (5.20)	121 (4.76)	0.9 (1.98)	1	95 (3.74)	132 (5.20)	82 (3.23)	0.7 (1.54)	No
CFW100026S1112											
CFW100040S1112	2	115 (4.53)	161 (6.34)	122 (4.80)	1.5 (3.31)	2	115 (4.53)	161 (6.34)	82 (3.23)	1.0 (2.20)	Yes
CFW100016S2024	1	95 (3.74)	132 (5.20)	121 (4.76)	0.9 (1.98)	1	95 (3.74)	132 (5.20)	82 (3.23)	0.7 (1.54)	No
CFW100026S2024											
CFW100040S2024											
CFW100073S2024	2	115 (4.53)	161 (6.34)	122 (4.80)	1.5 (3.31)	2	115 (4.53)	161 (6.34)	82 (3.23)	1.0 (2.20)	Yes
CFW100100S2024	3	115 (4.53)	191 (7.52)	122 (4.80)	1.8 (3.96)	3	115 (4.53)	191 (7.52)	82 (3.23)	1.2 (2.65)	
CFW100016T2024	1	95 (3.74)	132 (5.20)	121 (4.76)	0.9 (1.98)	1	95 (3.74)	132 (5.20)	82 (3.23)	0.7 (1.54)	No
CFW100026T2024											
CFW100040T2024											
CFW100073T2024											
CFW100100T2024	2	115 (4.53)	161 (6.34)	122 (4.80)	1.5 (3.31)	2	115 (4.53)	161 (6.34)	82 (3.23)	1.0 (2.20)	Yes
CFW100152T2024	3	115 (4.53)	191 (7.52)	122 (4.80)	1.8 (3.96)	3	115 (4.53)	191 (7.52)	82 (3.23)	1.2 (2.65)	

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)		
			-	-	Variable speed potentiometer
	Monitoring		Motor Output Frequency (Hz)		
			DC Link Voltage (Vdc)		
			Value proportial 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 Voltge 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

CFW10 0040 S 2024 E O -- -- -- -- Z

1 **2** **3** **4** **5** **6** **7** **8** **9** **10** **11**
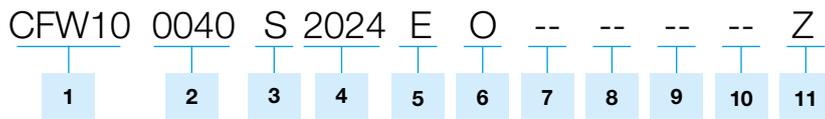
1 - CFW-10 VSD Series

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

* Three-phase model only

3 - Number of Phases

S = single phase
T = Three phases

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 additonal 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)	
			Vector with 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 programable isolated inputs
		PTC isolated inputs via AI1 and AI2	2 outputs with reverser contacts (NO/NC) and 1 output with NO contact, programmable	
		Programmable isolated inputs via AI1 and AI2 with NPN or PNP logic (DI5 and DI6)		
	Relay	2 Programmable outputs, reversible NO/NC contacts	2 programmable outputs, NO/NC contacts	1 programable output, reversible NO/NC contacts
			1 programmable output, NO contact	
	Analog	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
		1 isolated input 0 ...10V, (0)4 ... 20mA, 8 bits	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 ºC (up to 50 C with reduction of 2%/ º C in the output current)	0...40 ºC (up to 50 C with reduction of 2%/ º C in the output current)	0...50 ºC (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

WEG Worldwide Operations

ARGENTINA
WEG EQUIPAMIENTOS
ELECTRICOS S.A.
(Headquarters San
Francisco-Cordoba)
Sgo. Pampiglione 4849
Parque Industrial San Francisco
2400 - San Francisco
Phone(s): +54 (3564) 421484
Fax: +54 (3564) 421459
info-ar@weg.net
www.weg.net/ar

AUSTRALIA
WEG AUSTRALIA PTY. LTD.
3 Dalmore Drive
Carribean Park Industrial Estate
Scoresby VIC 3179 - Melbourne
Phone(s): 61 (3) 9765 4600
Fax: 61 (3) 9753 2088
info-au@weg.net
www.weg.net/au

BELGIUM
WEG BENELUX S.A.
Rue de l'Industrie 30 D,
1400 Nivelles
Phone(s): + 32 (67) 88-8420
Fax: + 32 (67) 84-1748
info-be@weg.net
www.weg.net/be

CHILE
WEG CHILE S.A.
Los Canteros 8600
La Reina - Santiago
Phone(s): (56-2) 784 8900
Fax: (56-2) 784 8950
info-cl@weg.net
www.weg.net/cl

CHINA
WEG (NANTONG) ELECTRIC
MOTOR MANUFACTURING CO.,
LTD.
No. 128# - Xinkai South Road,
Nantong Economic &
Technical Development Zone,
Nantong, Jiangsu Province.
Phone(s): (86) 0513-85989333
Fax: (86) 0513-85922161
info-cn@weg.net
www.weg.net/cn

COLOMBIA
WEG COLOMBIA LTDA
Calle 46A N82 - 54
Portería II - Bodega 7 - San
Cayetano II - Bogotá
Phone(s): (57 1) 416 0166
Fax: (57 1) 416 2077
info-co@weg.net
www.weg.net/co

FRANCE
WEG FRANCE SAS
ZI de Chenes – Le Loup
13 Rue du Morellon – BP 738
38297 Saint Quentin Fallavier
Phone(s): +33 (0) 4 74 99 11 35
Fax: +33 (0) 4 74 99 11 44
info-fr@weg.net
www.weg.net/fr

GERMANY
WEG GERMANY GmbH
Industriegebiet Turnich 3
Geigerstrasse 7
D-50169 Kerpen-Turnich
Phone(s): +49 (0) 2237 9291-0
Fax: +49 (0) 2237 9291-10
info-de@weg.net
www.weg.net/de

INDIA
WEG Electric (India) Pvt. Ltd.
#38, Ground Floor, 1st Main
Road, Lower Palace Orchards,
Bangalore – 560 003
Phone(s): +91-80-4128 2007
+91-80-4128 2006
Fax: +91-80-2336 7624
info-in@weg.net
www.weg.net/in

ITALY
WEG ITALIA S.R.L.
V.le Brianza 20 - 20092 - Cinisello
Balsamo - Milano
Phone(s): (39) 02 6129-3535
Fax: (39) 02 6601-3738
info-it@weg.net
www.weg.net/it

JAPAN
WEG ELECTRIC MOTORS
JAPAN CO., LTD.
Matsumoto Bldg. 2F, 3-23-7
Kamata, Ohta-ku,
Tokyo, Japan 144-0052
Phone(s): (81) 3 3736-2998
Fax: (81) 3 3736-2995
info-jp@weg.net
www.weg.net/jp

MEXICO
WEG MEXICO, S.A. DE C.V.
Carretera Jorobas-Tula Km. 3.5,
Manzana 5, Lote 1
Fraccionamiento Parque
Industrial - Huehuetoca,
Estado de México - C.P. 54680
Phone(s): + 52 (55) 5321 4275
Fax: + 52 (55) 5321 4262
info-mx@weg.net
www.weg.net/mx

NETHERLANDS
WEG NETHERLANDS
Sales Office of
WEG Benelux S.A.
Hanzepoort 23C
7575 DB Oldenzaal
Phone(s): +31 (0) 541-571080
Fax: +31 (0) 541-571090
info-nl@weg.net
www.weg.net/nl

PORTUGAL
WEG EURO - INDÚSTRIA
ELÉCTRICA, S.A.
Rua Eng. Frederico Ulrich
Apartado 6074
4476-908 - Maia
Phone(s): +351 229 477 705
Fax: +351 229 477 792
info-pt@weg.net
www.weg.net/pt

RUSSIA
WEG RUSSIA
Pochainskaya Str. 17
Nizhny Novgorod
603001 - Russia
Phone(s): +7-831-2780425
Fax: +7-831-2780424
info-ru@weg.net
www.weg.net/ru

SPAIN
WEG IBERIA S.L.
Avenida de la Industria,25
28823 Coslada - Madrid
Phone(s) : (34) 916 553 008
Fax : (34) 916 553 058
info-es@weg.net
www.weg.net/es

SINGAPORE
WEG SINGAPORE PTE LTD
159, Kampong Ampat,
#06-02A KA PLACE.
 Singapore 368328.
Phone(s): +65 6858 9081
Fax: +65 6858 1081
info-sg@weg.net
www.weg.net/sg

SWEDEN
WEG SCANDINAVIA AB
Box 10196
Verkstadgatan 9
434 22 Kungsbacka
Phone(s): (46) 300 73400
Fax: (46) 300 70264
info-se@weg.net
www.weg.net/se

UK
WEG ELECTRIC
MOTORS (U.K.) LTD.
28/29 Walkers Road
Manorside Industrial Estate
North Moons Moat - Redditch
Worcestershire B98 9HE
Phone(s): 44 (0)1527 596-748
Fax: 44 (0)1527 591-133
info-uk@weg.net
www.weg.net/uk

UNITED ARAB EMIRATES
WEG MIDDLE EAST FZE
JAFZA – JEBEL ALI FREE ZONE
Tower 18, 19th Floor,
Office LB181905
Dubai – United Arab Emirates
info-ae@weg.net
www.weg.net/ae

USA
WEG ELECTRIC CORP.
1327 Northbrook Parkway,
Suite 490
Suwanee 30024
Phone(s): 1-770-338-5656
Fax: 1-770-338-1632
info-us@weg.net
www.weg.net/us

VENEZUELA
WEG INDUSTRIAS VENEZUELA C.A.
Avenida 138-A
Edificio Torre Banco Occidental de
Descuento, Piso 6 Oficina 6-12
Urbanizacion San Jose de Tarbes
Zona Postal 2001
Valencia, Edo. Carabobo
Phone(s): (58) 241 8210582
               (58) 241 8210799
               (58) 241 8211457
Fax: (58) 241 8210966
info-ve@weg.net
www.weg.net/ve

WEG Equipamentos Elétricos S.A.
International Division
Av. Prefeito Waldemar Grubba, 3000
89256-900 - Jaraguá do Sul - SC - Brazil
Phone: 55 (47) 3276-4002
Fax: 55 (47) 3276-4060
www.weg.net

788.04/102009 - The values shown are subject to change without prior notice. The information is for reference only.