PLC Function
(Optional)

Variable Speed Drives CFW 09

VECTRUE INVERTER

Transforming energy into solutions

The WEG CFW-09 Series of Variable Speed Drives incorporate the world's most advanced technology in drives for three-phase AC induction motors.

The ***Vectrue Technology***™ represents a siginificant advancement, allowing this new generation of WEG inverters to combine V/F, Sensorless Vector and Closed Loop Vector (with encoder) control techniques, all in one product.

An innovation was also introduced to simplify applications that require braking torque. A new feature named ***Optimal Braking***™ eliminates the need for the dynamic braking resistor in some applications allowing a simpler, more compact and economic solution.

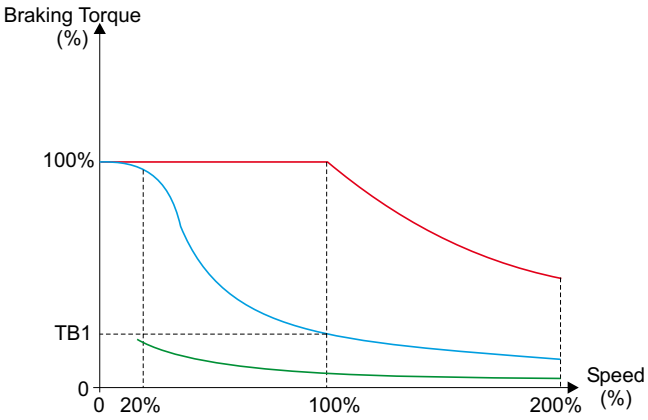
Vectrue Technology ®

This technology was developped 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 for automatic drive set-up to match the drive to motor and load in vector modes.

Optimal Braking TM

For applications requiring short stopping times and/or stops under high inertial loading, the traditional braking devices call for Rheostatic Braking, in which the cargo's kinetic energy is regenerated to the inverter DC link and the excess of which is dissipated in the form of heat in a braking resistor which is interlinked to the power circuit. The CFW-09 inverters have a built-in "Optimal Braking ®" function, for the vector mode, enabling an optimal braking which can cater to many applications that could previously only be solved by rheostatic braking. This technological innovation enables high dynamic performance activation/starts to be obtained with braking torques about 5 times the DC braking torque besides the great advantage of eliminating the need for a braking resistor.
The graph shows the advantage of this new braking system " Optimal Braking ®", thereby ensuring an ideal solution for braking applications, at a low cost.



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

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

Other Advantages

- High performance RISC 32 bit microprocessor;
- Vector and Scale Control with selection by parameter;
- Detachable SMART keypad with dual display (LCD and LED);
- Wide power range: 1.1.. 1,100 kW;
- Variable and Constant Torque ratings;
- Degree of Protection NEMA 1 / IP 20 standard up to 132kW, IP 20 up to 330kW and NEMA 4X / IP 56 in stainless steel enclosure up to 7.5kW;
- High Compacting
- Simplified installation and programming;
- Oriented start-up;
- Through surface mounting option;
- On/Off-line PC programming with SuperDrive software (Optional);
- DC bus connections available;
- Fieldbus network communication: Profibus DP or DeviceNet (optional). Modbus RTU (built-in) also available.
- International certifications including UL and cUL, CE, C-Tick and IRAM.

Applications

CHEMICAL AND PETROCHEMICAL

Fans / Exhausts
Centrifugal Pumps
Metering / Process Pumps
Centrifuges
Mixers
Compressors
Extruders

PULP AND PAPER

Metering Pumps
Process Pumps
Fans / Exhausts
Agitators / Mixers
Rotating Filters
Rotating Kilns
Scrap Conveyors
Paper Machines
Paper Rewinders
Calenders

PLASTIC AND RUBBER

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

MINING AND CEMENT

Fans / Exhausts
Pumps
Screeners
Vibratory Feeders
Crushers
Dynamic Separators
Conveyors
Cement Kilns

SUGAR

Sugar Centrifuges
Process Pumps
Conveyors
Bagasse Dosers

TEXTILE

Mixers / Agitators
Washers / Driers
Looms
Spinning Machines
Carding Machines
Warpers
Winders

STEEL

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

CERAMIC

Fans / Exhausts
Driers / Ovens
Ball Mills
Rollout Tables
Enamellers
Conveyors

FOOD

Metering / Process Pumps
Fans / Exhausts
Mixers
Driers / Ovens
Palletizers
Monorails
Conveyors

LUMBER

Veneer Lathes
Chippers
Planers
Saws

BEVERAGE

Metering / Process Pumps
Bottlers
Mixers
Rollout Tables
Conveyors

GLASS

Fans / Exhausts
Bottlers
Rollout Tables
Conveyors

HVAC

Process Pumps
Fans / Exhausts
Air Conditioning Units

WASTE WATER

Centrifugal Pumps
Booster Systems

ELEVATORS

Load Elevators
Commercial Elevators
Overhead Cranes
Hoists

A Complete, Flexible and Compact Product

Optional RS-232 Interface Module for PC Communication

NEMA 1 / IP20 Enclosure

Flange for Through Surface Mounting

7 Segment LED Display

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

2 Lines with 16 Characters LCD Display

High Performance 32 bit RISC Micro-processor

Fieldbus Communication Network Modules for:
-Profibus DP (optional)
-DeviceNet (optional)
-DeviceNet Drive Profile (optional)
-Modbus RTU (built-in)

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

3 Programmable Relay Outputs

Metallic Conduit Connection System

2 Programmable Analog Outputs

AC Supply Input

Dynamic Braking Resistor Connection

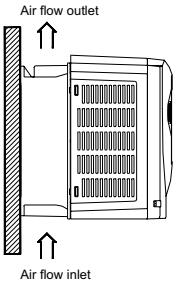
Motor Connection Output

DC Bus Connection for:
- DC Bus Choke
- Common DC BusC
- Regenerative Rectifier

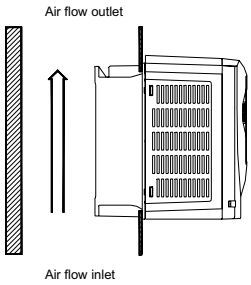
Mounting Configurations

The CFW-09 allows flexible mounting configurations. Besides the traditional **Base mounting**, it allows **flange mounting,** where the heat sink is mounted at the back of the mounting plate.
As a result, the warm air generated by the power components inside the panel is so blown out that minimizes drive overheating, which is caused by heating sources inside the panel.

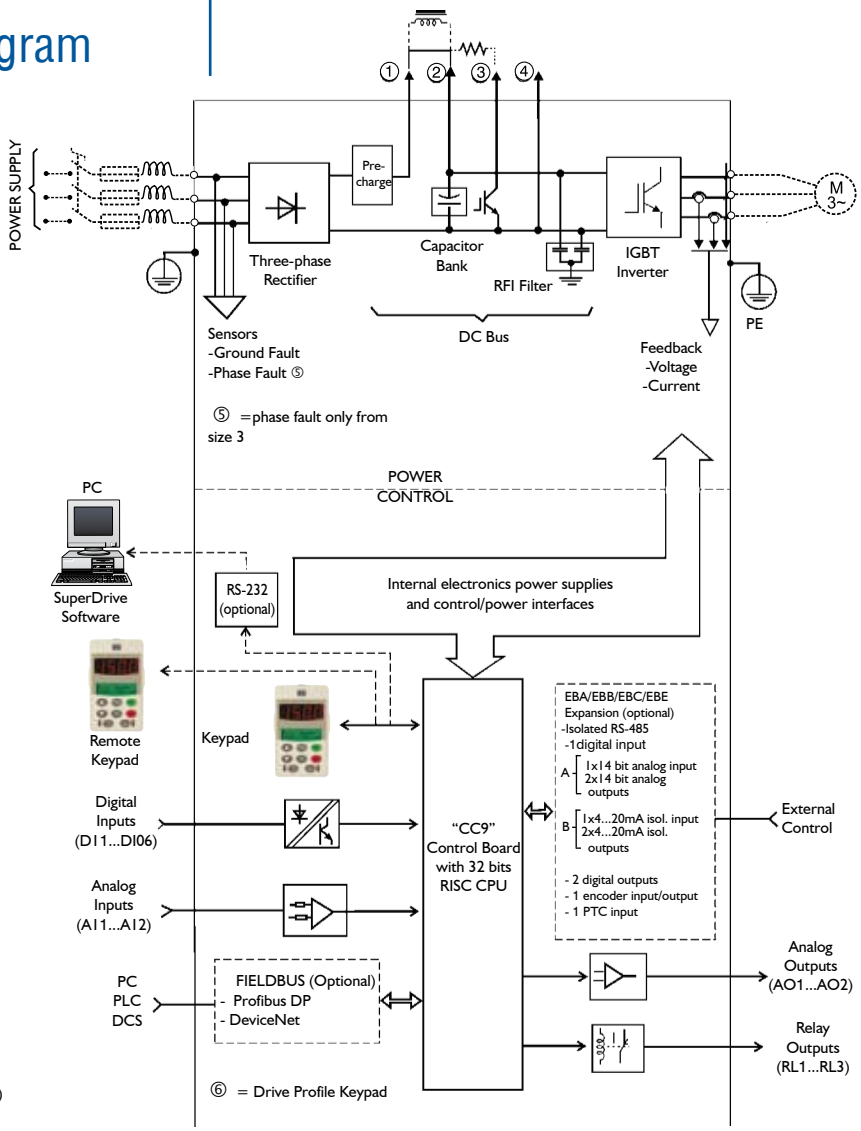
Base mounting



Flange mounting



Block Diagram

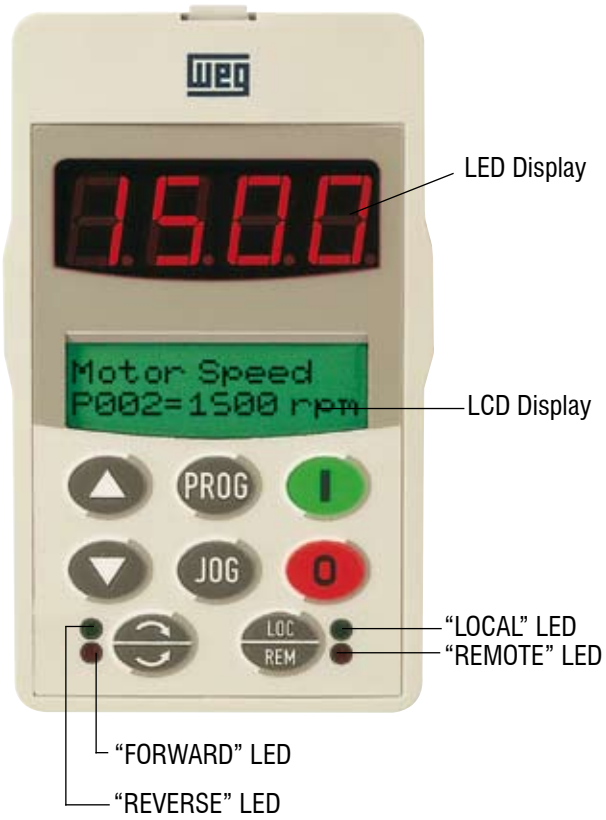


①e② = DC Bus Choke connection (Optional)
(only from Size 2 and up)
②e④ = DC Bus Connection
②e③ = DB Resistor Connection
(Up to Size 7 only. Option for Sizes 4 to 7)

Keypad

Intelligent Keypad

Intelligent operating interface with double display, LED (7 segment) and LCD (2 lines with 16 characters), providing optimum distant viewing along with a detailed description of all parameters and messages.

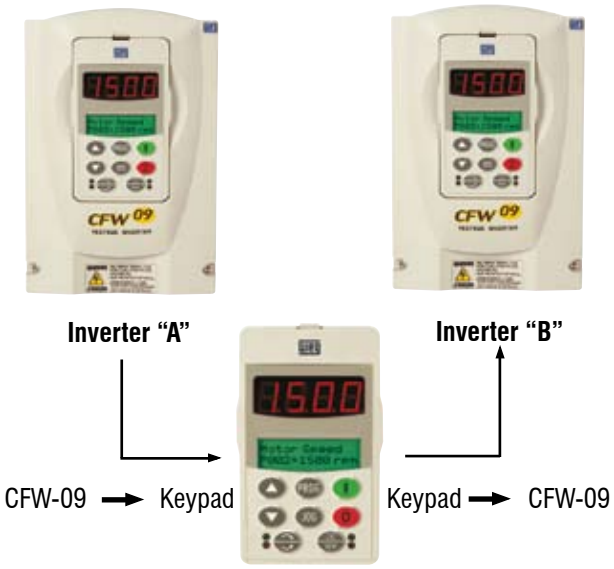


Selectable Language

The intelligent operation interface also allows the product user to choose, for his comfort, the language to be used in programming, reading and presenting the parameters and alphanumerical messages through the LCD display.
The product's high hardware and software capacity enables the user to use various languages such as Portuguese, English and Spanish so as to make it adaptable for users throughout the world.

Oriented Start-up

Frequency inverters are equipment for activating induction motors, the adaptation and performance of which are directly related to its characteristics as well as to the power source network. The CFW-09 line inverters have a built-in programming capability which has been specially developed for the purpose of making easy and speeding up the start-up of the product, according to a guided and automatic sequence which leads the user through the sequential introduction of the minimum characteristics required for perfect adaptation of the inverter to the activated motor.



COPY Function

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

Keypad Functions

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

Stops the inverter via a controlled deceleration ramp.
Resets the inverter after a fault trip has occurred.

Increases the speed or parameter number/content.

Decreases the speed or parameter number/content.

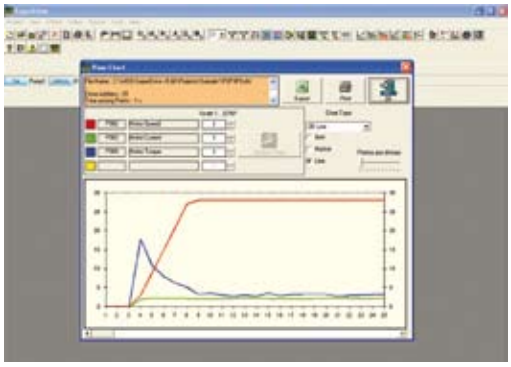
Switches the display between the parameter number and its content (position/content) for programming.

While pressed the motor is run at JOG speed.

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

Selects the inverter operating mode as Local or Remote.

SUPERDRIVE Programming Software



Drive Programming Software

Windows Programming software via PC microcomputer, for parameterization, control and monitoring of CFW-09 drives.
It allows editing of "on-line" parameters, directly on the drive or editing "off-line" parameter files, saved in the microcomputer.
It also allows storage of parameter files of all CFW-09 drives available on the installation.
The software also incorporates functions to transfer the set of parameters from the microcomputer to the drive, as well as from the drive to the microcomputer.
The communication between drive and microcomputer is made via serial interface RS-232 (point to point) or RS-485 for network interconnection.

"FieldBus" Communication Networks

Fast Network Interconnection

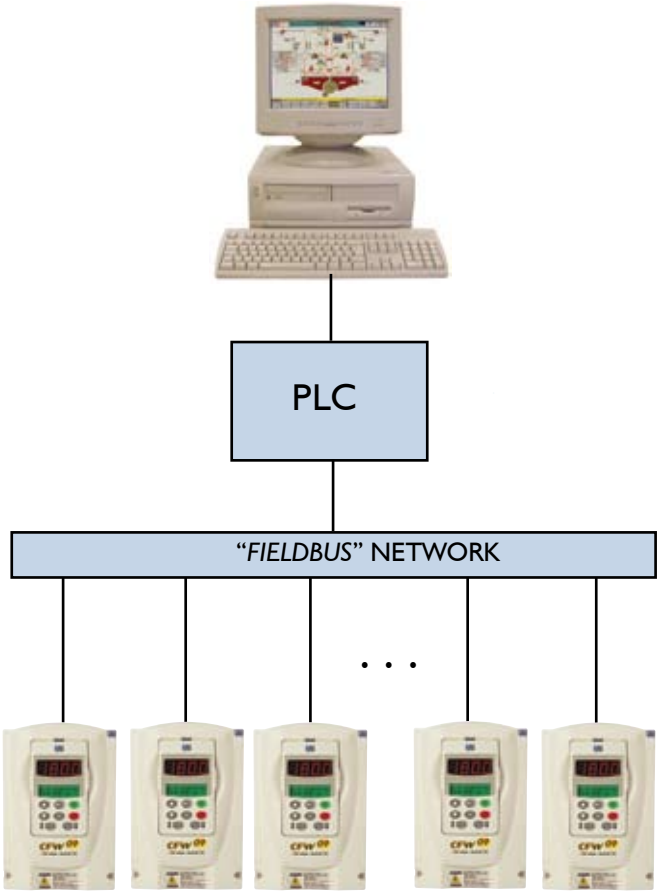
The CFW-09 drives can be interconnected in fast FieldBus communication networks, through standardized protocols mostly worldwide used such as:

FIELDBUS →
- Profibus DP (optional)
- DeviceNet (optional)
- DeviceNet Drive Profile (optional)
- Modbus RTU (built-in)
- CANopen (using a PLC card)

Basically designed to integrate large industrial automation plants, the fast communication networks offer "on line" and overall supervising, monitoring and controlling advantages on drives. As a result, high operating performance and great operational flexibility are provided. These characteristics are required on applications of complex and/or integrated systems.

For FieldBus, Profibus and DeviceNet communication network interconnection, the CFW-09 drives allow internal incorporation of network card, based on required protocol.
For interconnection of Fieldbus and Modbus RTU communication networks, the connection must be used via RS-232 interface (optional) or RS-485 interface (available on EBA or EBB cards).

Besides the DeviNet protocol, the CANopen protocol is also available through the use of PLC1 and PLC2 cards, which can be configured as network master.

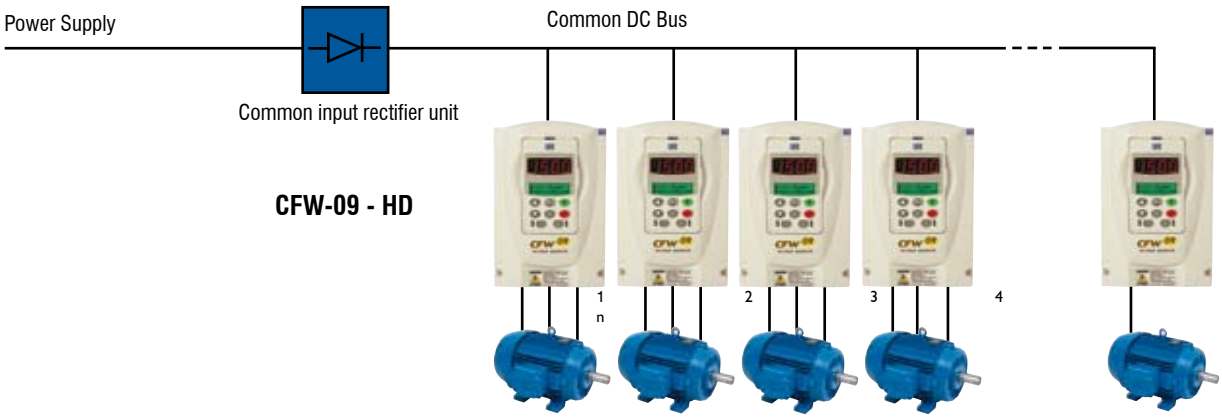


Common DC Bus Configuration

The CFW-09 inverters have DC Bus access allowing the implementation of applications that require a Common DC Bus Configuration as well as Regenerative Systems.

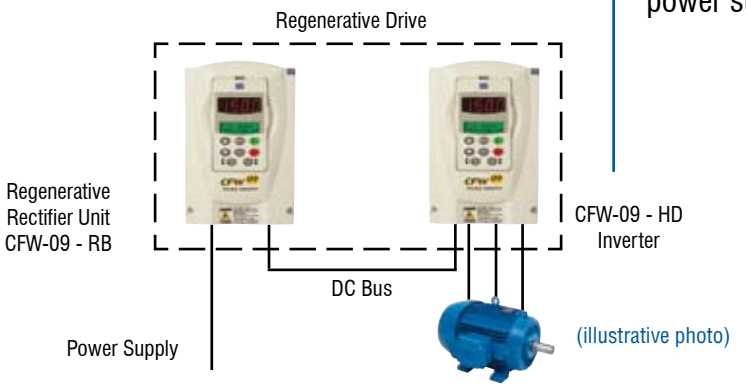
Common DC Bus

Used in multi-motor drive systems where the individual rectifier bridges are replaced by a common input rectifier unit and the multiple drives are fed directly to their DC Buses in a parallel configuration.
This solution allows energy transfer between the inverter units, optimizing the power consumption from the system.



Regenerative Drive

A Regenerative Drive can be implemented connecting the DC Bus of a standard CFW-09 to the output of a CFW-09-RB Regenerative Rectifier Unit.
This solution provides line regenerative braking capability and input power factor near 1.0
Such a drive configuration is recommended for application with cyclic braking duty, extremely short braking times and high dynamic performance requirements, such as: Paper Re-winders, Centrifuges, Cranes, etc.
Besides the advantages mentioned above, this option eliminates harmonics at drive inlet and it is suitable for applications where current harmonic distortions on the power supply are not allowed.



Accessories and Peripherals

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

COMPLETE KEYPAD (Standard)

HMI - CFW09 - LCD

Simplified Operating Interface with LED display only.
An option for reduced cost solutions.
Local or remote installation.

SIMPLIFIED KEYPAD (Optional)

HMI - CFW09 - LED

Blank Keypad Modules to fill up clear space when the keypad is not mounted. TCL for Local (on the inverter cover/door) installation and TCR for Remote (on remote keypad frame) installation.

LOCAL

REMOTE

BLANK KEYPADS
TCL - CFW09
TCR - CFW09

RS-232 Serial composed by a **Serial Interface Module** and accessories (cable, connectors and SuperDrive Software) to connect the CFW-09 to a PC or other equipment via an RS-232 Serial Link.

RS-232 SERIAL INTERFACE KIT

KCS - CFW09

Frame for remote keypad mounting on panel door or operating station.
Optional up to 16 ft (5m) cable.
Maximum cable length: 33 ft (10 m)

REMOTE KEYPAD FRAME KIT

KMR - CFW09

NEMA 4/IP55 remote keypad, for installation on panel door or remote operating station in harsh environments, such as splashing or hose-directed water and windblown dust.
Maximum cable length: 33 ft (10 m)

IP55 REMOTE KEYPAD

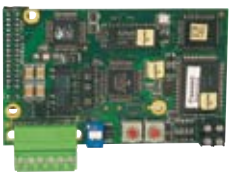
HMI - CFW09 - LCD - N4

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

REMOTE KEYPAD CABLES

CAB - HMI09 - X

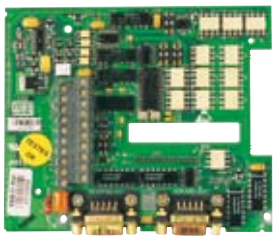
Profibus DP → **KFB - PD**
DeviceNet → **KFB - DN**
DeviceNet Drive Profile → **KFB - DD**



"FIELDBUS" COMMUNICATION KITS

Accessories and Peripherals

Configurations / Functions	EBA ...			EBB...					EBC			EBE
	01	02	03	01	02	03	04	05	01	02	03	01
Encoder Input	•			•	•		•		•	•	•	
Encoder Output	•			•			•					
RS-485 Serial Interface	•	•		•			•					•
14 bit A/D	•		•									
14 bit D/A´S	•		•									
Isolated Analog Input				•		•	•					
Isolated Analog Outputs				•		•	•	•				
Digital Inputs and Outputs + Thermistor (PTC) Input	•	•	•	•	•	•	•					•



I/O EXPANSION BOARDS

EBA.0X - CFW09
EBB.0X - CFW09
EBC.0X - CFW09
EBE 1.0X - CFW09

EBC.01 – External power supply is needed for encoder.
EBC.02 – Power supply for encoder: 5V.
EBC.03 – Power supply for encoder: 12V.

The PLC1 and PLC2 cards allow the CFW-09 drive to have PLC function, speed reference and positioning modules.

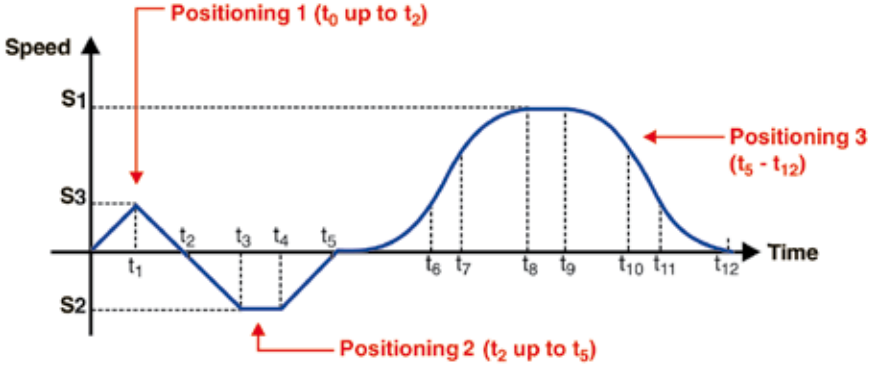
Technical features

- Positioning with trapezoidal profile and “S” profile (absolute and relative)
- Zero machine search (homing)
- Ladder programming through WLP software, timers, counters, coils and contacts
- RS – 232 with ModBus RTU Protocole
- Real time clock
- Availability of 100 configuration parameters via Software or keypad
- CAN interface with CANopen and DeviceNet protocols
- Master/Slave function (ElectronicGear Box)
- CANopen Master, can operate as the CANopen network master, allowing a set of up of up to 8 slaves to be controlled, at a total 1024 points (512 entry points and 512 exit points)

OPTIONAL BUILT-IN PROGRAMMABLE CONTROLLER PLC1AND PLC2 CARDS

Technical Specification				
Inputs / Outputs	PLC 1		PLC 2	
	Quantities	Description	Quantities	Description
Digital inputs	9	24 Vdc bipolar	9	24 Vdc bipolar
Relay outputs	3	250 Vac/3 A ou 250 Vdc/3 A	3	250Vac/3 A or 250Vdc/3 A
Transistorized outputs	3	24 Vdc/500 mA	3	24 Vdc/500 mA
Encoder power supply	1	15 V	2	5 to 24 V
Analog outputs	-	-	2	12 bits (-10 V to 10 V or 0 to 20 mA)
Analog inputs	-	-	1	14 bits (-10 V to 10 V or -20 to 20 mA)
Motor PTC isolated input	-	-	1	Motor PTC isolated input

Example of transient with application of PLC-01 / PLC-02



Technical Data

POWER SUPPLY	Voltage	Three-phase:	220 – 230 V: 220 / 230 V (+10%, -15%)
			380 - 480 V: 380 / 400 / 415 / 440 / 460 / 480 V (+10%, -15%)
			660 - 690 V: 660 / 690 (+10%, -15%)
	Frequency	50 / 60 Hz +/- 2 Hz (48 ... 62 Hz)	
	Phase Unbalance	Up to 3 %	
	Cos φ (Displacement Power Factor)	Greater than 0.98	
ENCLOSURE	Degree of Protection	NEMA 1 / IP 20 (sizes 1...8), IP20 (sizes 9...10) and	
		NEMA 4X / IP 56 (modules up to 10HP)	
	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 Fed from the DC Link	
	Microprocessor	32 bit RISC Technology	
	PWM Technique	SVM Sine wave PWM (Space Vector Modulation)	
		Software Implemented Current, Flux and Speed Regulators (Full Digital)	
	Control Modes	V / F	
		Sensorless Vector (without encoder)	
		Vector with Encoder	
	Switching Frequency	1.25 / 2.5 / 5.0 / 10 kHz	
	Frequency Range	0 ... 1020 Hz for V / Hz Control	
		0 ... 408 Hz for Vector Control	
	Overload Capacity	150% for 60 seconds, every 10 minutes	
		180% for 1 second every 10 minutes	
	Efficiency	Greater than 97%	
PERFORMANCE	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)
			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 ①
			Digital Reference (Ex: Keypad or Serial): +/- 0.01% of Motor Rated Speed
			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 bit): 0...10 V, 0...20 mA or 4...20 mA	
		1 Programmable Bipolar Input (14 bit): -10 ... +10 V, 0...20 mA or 4...20 mA ①	
		1 Programmable Isolated Input (10 bit): 0 ... 10 V, 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 Differential Input, with 12 Vdc Internal Isolated Power Supply (14 bit resolution) ①	
CONTROL OUTPUTS	Analog	2 Programmable Outputs (11 bit): 0 ... 10 V	
		2 Programmable Bipolar Outputs (14 bit): -10 ... +10 V ①	
		2 Programmable Isolated Outputs (11 bit): 0 ... 20 mA or 4 ... 20 mA ①	
	Relay	2 Programmable Outputs, Form C Contacts (NO/NC): 240 Vac, 1 A	
		1 Programmable Output , Form A Contact (NO): 240 Vac, 1 A	
	Transistor	2 Programmable Isolated Outputs (Open Collector): 24 Vdc, 50 mA ①	
	Encoder	1 Isolated Differential Encoder Signals Output: 5 ... 15 Vdc External Power Supply ①	
COMMUNICATION	Serial	RS-232 with KCS-CFW09 Kit ① - RS-485, Isolated, with EBA or EBB Board ①	
		Protocolo Johnson Contols-N2 (optional)	
	Fieldbus	Profibus DP, DeviceNet, DeviceNet Drive Profile with KFB kits, Modbus RTU Standard ①	
SAFETY	Protections	DC Link Over Voltage	Output Short Circuit
		DC Link Under Voltage	Output Ground Fault
		Inverter Over Temperature	External Fault
		Motor Over Temperature ①	Self-diagnosis Fault
		Output Over Current	Programming Error
		Motor Overload (i x t)	Serial Communication Fault
		Dynamic Braking Resistor Overload	Motor or Encoder Connection Fault
		CPU / EPROM Error (Watchdog)	Power Supply Phase Fault (30 A and above models)
		Encoder Fault	Keypad Connection Fault
AMBIENT	Temperature	0 ... 104 °F (40 °C), up to 122 °F (50 °C) with 2% / °C Output Current De-rating	
	Humidity	5 ... 90% Non Condensing	
	Altitude	0 ... 3300 ft (1000 m) (up to 13100 ft (4000 m) with 10% / 1000 m Output Current De-rating	
CONFORMITIES	EMC Directive 89 / 336 /EEC	Electromagnetic Compatibility – Industrial Environment	
	EN 61800-3	EMC - Emission and Immunity	
	LVD 73/23/EEC	Low Voltage Directive	
	IEC 146	Semiconductor Inverters	
	UL 508 C	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 CERTIFI-	
CATIONS	UL (USA) and cUL (CANADA)	Underwriters Laboratories Inc. USA	
	CE (EUROPE)	Competent Body: Phoenix Test-Lab GmbH - Germany	
	IRAM (ARGENTINA)	Instituto Argentino de Normalización	
	C-Tick (AUSTRALIA) 2250/1132383	Australian Communications Authority	

① Optional

Technical Data

KEYPAD	Programming	General Inverter Functions Programming	
	Commands	Start / Stop , Increase / Decrease Speed, JOG, FWD/REV and Local/Remote	
	Monitoring	Speed Reference (rpm)	Output Current (A)
		Motor Speed (rpm)	Output Voltage (Vac)
		Speed Proportional Value (Ex: ft/min)	Inverter 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)	Four Last Faults
		Hours Enabled (h)	Fault Messages
CONTROL FEATURES AND OTPIONS	Standard	Keypad with LCD + LED displays (HMI-CFW09-LCD)	
		Password to protect inverter programming	
		LCD display language selection: English, Spanish and Portuguese	
		Control mode selection (via parameter): V / F, Sensorless Vector or Vector with Encoder	
		Fault auto-diagnosis and auto-reset	
		Parameters reset to factory or user default	
		Inverter Self-tuning to motor and load (Vector Modes)	
		Specific unit indication (Ex: 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 the analog inputs	
		Digital gain adjustment for the analog outputs	
		JOG function	
		JOG + / JOG – Function (momentary speed increase/decrease)	
		COPY Function (Inverter ® Keypad or Keypad ® Inverter)	
		Comparison functions for the 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 45 A / 220-230 V and 30 A / 380-480 V	
		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 (restart with the motor spinning)	
		Skip Speed (critical speed rejection)	
		Ride-Through (operation during momentary power loss)	
		Built-in dynamic braking transistor:	
		Models: 6 ... 45 A / 220 - 230 V and 36 ... 30 A / 380 - 480 V	
		FieldBus communication: Modbus RTU built-in	
	Options	Simplified keypad (with LED display only)	HMI-CFW09-LED
		IP 55 Remote keypad (LED display only)	HMI-CFW09-LED-N4
		IP 55 Remote keypad (LCD + LED displays)	HMI-CFW09-LCD-N4
		Remote Keypad cable (3.3, 6.6, 10, 16, 25 and 35 ft)	CAB – HMI 09 - X
		Blank Keypad for local installation	TCL – CFW09
		Blank Keypad for remote installation	TCR – CFW09
		Remote Keypad frame kit	KMR – CFW09
		I/O Expansion Boards	EBA . 0X – CFW09
			EBB . 0X – CFW09
			EBC1. 0X - CFW09
			EBE1. 0 X - CFW09
		FieldBus Communications kits (Mounted inside inverter)	Profibus DP: KFB – PD
			DeviceNet: KFB – DN
			DeviceNet Drive Profile: KFB – DD
			EtherNet / IP: KFB – EN
		VSD / PC Communication kit	Software SUPERDRIVE
			Conectores e Cabos
			KCS - CFW09: KSD – CFW09
		Interface Serial Módule RS-232	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 / 220-230 V e 380-480 V: DBW – 01
			Models 107...472A / 500-690V: DBW – 02
		Easy mounting kit with flange (for sizes 3...8)	KMF - CFW09
		Removable mounting kit (for sizes 9...10)	KME - CFW09
		Inductor kit for DC link (for sizes 2...8)	KIL - CFW09
		EMC filter with high attenuation capacity	RF

ADDITIONAL

*CT = Constant Torque (T load = CTE); VT = Variable Torque (Ex.: Quadratic Torque => T load ~ n2)

Notes: 1 – The maximum powers of the above engines were calculated based on the WEG 2 and 3 pole models.
For other polarity motors (Ex.: 6 and 8 poles), other (Ex.: 230, 400, and 460 V) and/or motors from other suppliers, specify the inverter through the nominal motor current.
2 – The CFW09 6, 7 and 10 A inverter models, may optionally be fed by the single-phase without outlet current (power) reduction.
3 – Models with currents equal to or above 44A / 500-600 V and all the 500-690 V and 660-690 V models do not require minimum line impedance as they have a link in the internal DC current in the standard product.
4 – The values between parentheses refer to the nominal outlet current for 660 and 690V feed.

Sizing Table

AC LINE VOLTAGE	CFW-09 INVERTER				MAXIMUM APPLICABLE MOTOR ①				SIZE
	Part Number CFW-09...	Built-in Dynamic Braking	Rated Current (A)		Voltage (V)	Constant Torque		Variable Torque		
			CT*	VT*		kW	HP	kW	HP	
220 / 230V	0006 T 2223 E S	Yes	6 ②		230	1.1	1.5	1.1	1.5	1
	0007 T 2223 E S		7 ②			1.5	2	1.5	2	
	0010 T 2223 E S		10 ②			2.2	3	2.2	3	
	0013 T 2223 E S		13			2.2	3	2.2	3	
	0016 T 2223 E S		16			3.7	5	3.7	5	2
	0024 T 2223 E S		24			5.5	7.5	5.5	5.5	
	0028 T 2223 E S		28			7.5	10	7.5	10	
	0045 T 2223 E S		45			11	15	11	15	3
	0054 T 2223 E S	Optional Built-in	54	68		15	20	18.5	25	4
	0070 T 2223 E S		70	86		18.5	25	22	30	5
	0086 T 2223 E S		86	105		22	30	30	40	
	0105 T 2223 E S		105	130		30	40	37	50	6
	0130 T 2223 E S		130	150		37	50	45	60	
380 / 400 / 415 / 440 / 460 / 480V	0003 T 3848 E S	Yes	3.6		400/415	1.1	1.5	1.1	1.5	1
	0004 T 3848 E S		4			1.5	2	1.5	2	
	0005 T 3848 E S		5.5			2.2	3	2.2	3	
	0009 T 3848 E S		9			4	5.5	4	5.5	
	0013 T 3848 E S		13			5.5	7.5	5.5	7.5	2
	0016 T 3848 E S		16			7.5	10	7.5	10	
	0024 T 3848 E S		24			11	15	11	15	
	0030 T 3848 E S		30	36		15	20	18.5	25	3
	0038 T 3848 E S	Optional Built-in	38	45		18.5	25	22	30	4
	0045 T 3848 E S		45	54		22	30	22	30	
	0060 T 3848 E S		60	70		30	40	37	50	5
	0070 T 3848 E S		70	86		37	50	45	60	
	0086 T 3848 E S		86	105		45	60	55	75	6
	0105 T 3848 E S		105	130		55	75	75	100	
	0142 T 3848 E S		142	174		75	100	90	125	7
	0180 T 3848 E S	External DB Module	180			90	125	90	125	8
	0211 T 3848 E S		211			110	150	110	150	
	0240 T 3848 E S		240			132	175	132	175	
	0312 T 3848 E S		312			160	220	160	220	9
	0361 T 3848 E S		361			200	270	200	270	
	0450 T 3848 E S		450			250	340	250	340	10
	0515 T 3848 E S		515			300	400	300	400	
	0600 T 3848 E S		600			315	430	315	430	
660/690V	0100 T 6669 E S	External	100	127	690	90	125	110	150	8E
	0127 T 6669 E S		127	179		110	150	160	220	
	0179 T 6669 E S		179			160	220	160	220	
	0225 T 6669 E S		225	259		200	275	250	350	10E
	0259 T 6669 E S		259	305		250	350	280	370	
	0305 T 6669 E S		305	340		280	370	315	430	
	0340 T 6669 E S		340	428		315	430	400	500	
	0428 T 6669 E S		428			400	500	400	500	

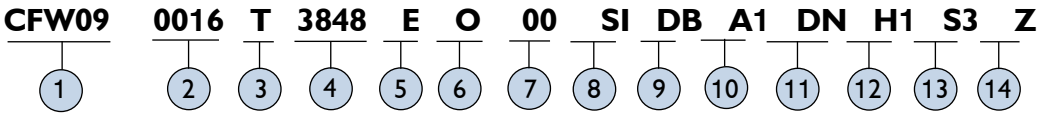
*CT = Constant Torque; VT = Variable Torque

Note: 1 - Recommended Motors 230/400VAC are based on WEG motors II and IV pole w21 line.

2 - The 6, 7 and 10A/230V models can be single-phase powered without output current de-rating
Enclosure: IP20 Protected Chassis for all sizes.

3 - Special Voltages 500 / 525 / 550 / 575 / 600 available under request.

CFW-09 Part Number Specification



1 - WEG Frequency Inverter CFW-09 Series

2 - Output Rated Current for Constant Torque (CT) Sizing

220 ... 230 V			380 ... 480 V			660 ... 690 V		
0006	=	6.0 A	0003	=	3.6 A	0100	=	100 A
0007	=	7.0 A	0004	=	4.0 A	0127	=	127 A
0010	=	10 A	0005	=	5.5 A	0179	=	179 A
0013	=	13 A	0009	=	9.0 A	0225	=	225 A
0016	=	16 A	0013	=	13 A	0259	=	259 A
0024	=	24 A	0016	=	16 A	0305	=	305 A
0028	=	28 A	0024	=	24 A	0340	=	340 A
0045	=	45 A	0030	=	30 A	0428	=	428 A
0054	=	54 A	0038	=	38 A			
0070	=	70 A	0045	=	45 A			
0086	=	86 A	0060	=	60 A			
0105	=	105 A	0070	=	70 A			
0130	=	130 A	0086	=	86 A			
0142	=	142 A	0105	=	105 A			
0180	=	180 A	0142	=	142 A			
0240	=	240 A	0180	=	180 A			
			0240	=	240 A			
			0361	=	361 A			
			0450	=	450 A			
			0600	=	600 A			

3 - Power Supply: T = Three-phase

4 - Power Supply Voltage: 2223 = 220 ... 230 VAC
3848 = 380 ... 480 VAC
6669 = 660 ... 690 VAC

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

6 - Product Version: S = Standard
O = Optional

7 - Enclosure: 00 = Standard (see technical specifications table)
N4 = NEMA 4 x IP 56 (models up to 10HP)

8 - HMI - Human Machine Interface:
00 = standard (with HMI of LED´S + LCD)
SI = Without HMI
IL = Optional solely with LED HMI

9 - Dynamic Braking: 00 = 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 = Not provided
A1 = EBA.01-CFW09 optional
A2 = EBA.02-CFW09 optional
A3 = EBA.03-CFW09 optional
B1 = EBB.01-CFW09 optional
B2 = EBB.02-CFW09 optional
B3 = EBB.03-CFW09 optional
B4 = EBB.04-CFW09 optional
B5 = EBB.05-CFW09 optional
C1 = EBC.01-CFW09 optional
C2 = EBC.02-CFW09 optional
E1 = Optional with EBE1.00 - CFW09
C3 = EBC.03-CFW09 optional
P1 = PLC1.01-CFW09 optional
P2 = PLC2.00-CFW09 optional

11 - FieldBus Communications cards:
00 = Standard (not provided)
PD = KFB-PD optional (Profibus DP)
DN = KFB-DN optional (Device Net)
DD = Optional with KFB – DD
(Device Net Drive Profile / Special software)

12 - Special Hardware:
00 = not provided
H1...Hn = Special Hardware version-Optional
HD = Models from 105A at 220V, and from 86A at 380-480V are power supplied via DC link
HC/HV = The CFW09 inverters mechanics from 2 to 8 have and inductor line for the DC link built into the product. To request the inverter with the inductor in place just add the code “HC” (for inverters operating on Variable Torque).

13 - Special Software:
00 = Standard
S1...Sn = Optional with version of a special software
SF = Protocol Metasys N2
SC = Hoist functions
SN = Winder I with power calculation
SQ = Special version for Kit Device Net Drive Profile

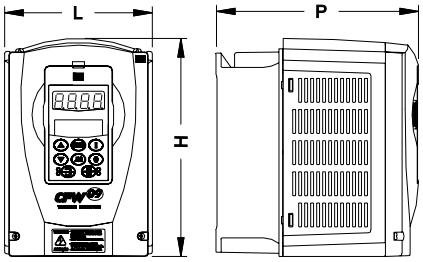
14 - Z = End of Code

Example:

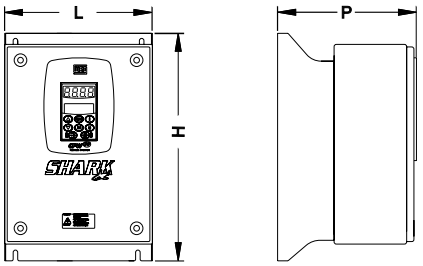
CFW09 0013 T 2223 E S Z
CFW09 0105 T 3848 E O IL A1 PD Z
CFW09 0086 T 3848 E O SI DB B2 MR S3 Z

Dimensions and Weight

NEMA 1 / IP 20



SIZE	Width - W		Heigth - H		Depth - D		Weight	
	mm	(in)	mm	(in)	mm	(in)	lb	(kg)
1			210	(8.3)	196	(7.7)	7.7	(3.5)
2	143	(5.6)	290	(11.4)			13.2	(6.0)
3	182	(7.2)	390	(15.3)	274	(10.8)	41.9	(19.0)
4	223	(8.9)	475	(18.7)			49.6	(22.5)
5	250	(9.8)	550	(21.6)			90.4	(41.0)
6			675	(26.6)	300	(11.8)	121.3	(55.0)
7	335	(13.2)	835	(32.9)			154.3	(70.0)
8			975	(38.4)	370	(14.6)	220.5	(100.0)
8 E	410	(16.1)	1145	(45.1)			253.0	(115.0)
9			1020	(40.2)	492	(19.3)	476.2	(240.0)
10	688	(27.1)	1185	(46.6)			571.0	(288.0)
10 E	700	(27.5)			582	(22.9)	682.0	(310.0)



NEMA 4X / IP 56

SIZE	Width - W		Heigth - H		Depth - D		Weight	
	mm	(in)	mm	(in)	mm	(in)	lb	(kg)
1	234	(9.2)	360	(14.2)	221	(8.5)	10	(22)
2	280	(10.2)	410	(16.2)			15	(33)

SHARK

NEMA 4 INOX

CFW-09 Drives with Degree of Protection **NEMA 4X (IP 56)**, designed for highly aggressive environments including:

- Chemical industry
- Petrochemical
- Food industry
- Other applications requiring full protection to the electronic equipment.

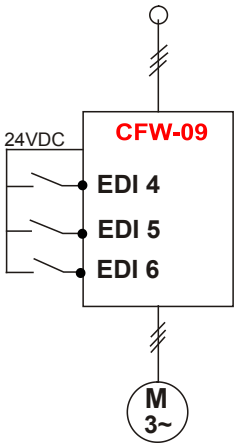
POWER SUPPLY VOLTAGE	CFW-09 DRIVE			MAXIMUM APLICABLE MOTOR①			MECHANICAL
	MODEL CFW09...	Rheostatic Braking	Outlet rated current (A)	Voltage (V)	Constant (CT*) / Variable (VT*) Torque		
			CT* VT*		HP	kW	
220-230	0006 T 2223 E O N4 Z	Standard built-in to the product	6	230	1.5	1.1	1
	0007 T 2223 E O N4 Z		7		2	1.5	
	0010 T 2223 E O N4 Z		10		3	2.2	
	0016 T 2223 E O N4 Z		16		5	3.7	2
380-480	0003 T 3848 E O N4 Z	Standard built-in to the product	3.6	400/415	1.5	1.1	1
	0004 T 3848 E O N4 Z		4		2	1.5	
	0005 T 3848 E O N4 Z		5.5		3	2.2	
	0009 T 3848 E O N4 Z		9		5	3.7	2
	0013 T 3848 E O N4 Z		13		7.5	5.5	
	0016 T 3848 E O N4 Z		16		10	7.5	

*CT = Constant Torque; VT = Variable Torque

Note: 1 - Recommended Motors 230/400VAC are based on WEG motors II and IV pole w21 line.
2 - The 6, 7 and 10A/230V models can be single-phase powered without output current de-rating
Enclosure: IP20 Protected Chassis for all sizes.
3 - Special Voltages 500 / 525 / 550 / 575 / 600 available under request.

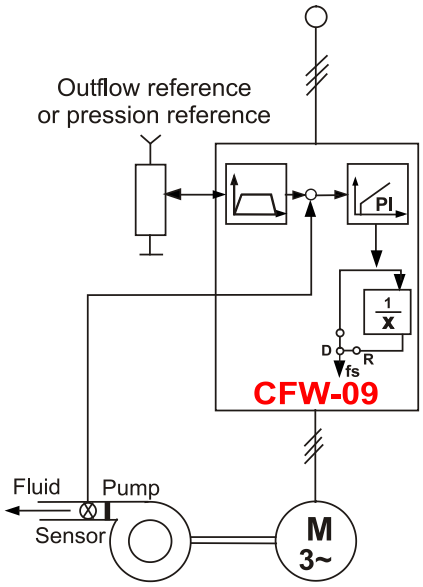
Special Functions

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



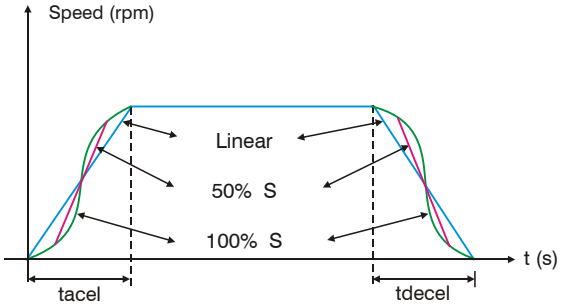
Multi-speed

Up to eight different speeds can be programmed by the user and selected via the combination of three Digital Inputs. These Inputs can be switched by any external device such as Limit Switches, Photocells, Proximity Sensors, PLC, etc.



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 set point and a feedback signal from the process variable sensor so that a closed loop is formed. This function eliminates the need for an external regulator to control the process reducing the solution cost.

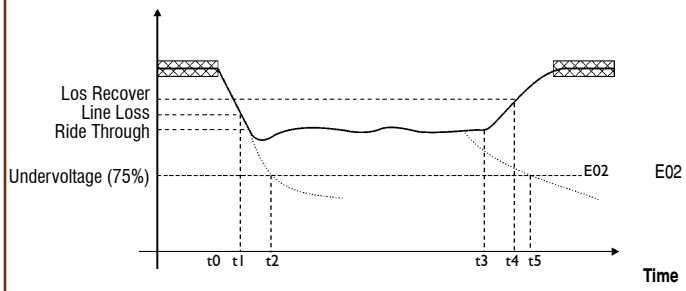


"S" Ramp

This function replaces the traditional linear acceleration and deceleration ramps by Type "S" Ramps providing smoother starting, braking and approximation to the set speed curves. The practical result is the elimination of mechanical shocks, which are undesirable and some times unpractical for certain applications.

Ride-Through

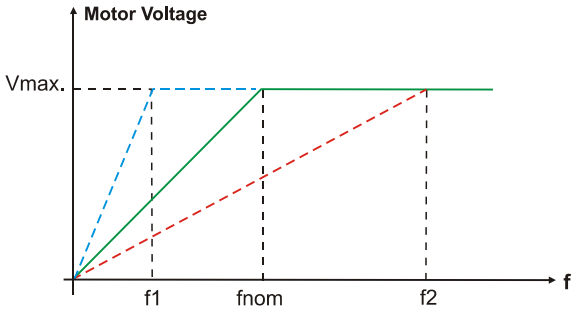
The purpose of the Ride-Through function is to ensure that the inverter maintains the motor running during the line loss, not allowing interruption or fault storing. The energy required for motor running is obtained from the kinetic energy of the motor (inertia) during its deceleration. As soon as the line is reestablished, the motor accelerates again to the speed defined by the reference.



- t0 - Line loss;
- t1 - Line loss detection;
- t2 - Trip by Undervoltage (E02 without Ride-Through);
- t3 - Line Recover;
- t4 - Line Recover detection;
- t5 - Trip by Undervoltage (E02 with Ride-Through);

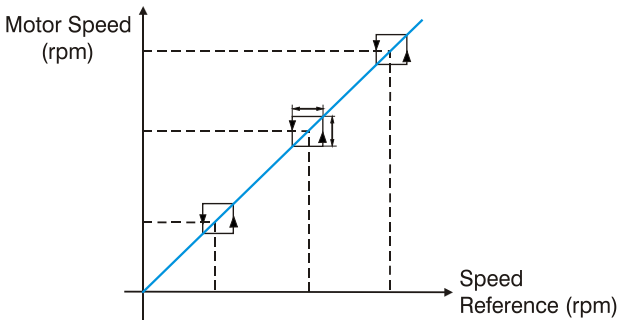
Adjustable V/F Curve

The purpose of the alteration to the standard U/F curve is enable the activation of special motors with nominal tensions at nominal frequencies (base) different from the network frequency. In these cases this function allows the user to move the “base” frequency, the one in which the inverter determines the nominal motor voltage for a new frequency above or below the conventional frequency. (Ex.: 60 Hz)
Application example:
Timber finishing machine
Special motor with Unom = 220V to fnom = 200Hz



Critical Speeds Rejection

This function avoids the possibility of running the motor at critical speeds that may provoke mechanical resonance on the motor/load system causing excessive noise or vibration. Up to three speeds and a rejection band can be programmed.



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look for WEG's nearest branch office or representative.

ACP&D Limited
86 Rose Hill Road,
Ashton-under-Lyne,
Lancashire,
England,
OL6 8YF.

Tel: +44 (0)161 343 1884
Fax: +44 (0)161 343 7773
e-mail; sales@acpd.co.uk
Websites: www.acpd.com &
www.acpd.co.uk

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