

# CFW09

## Drive

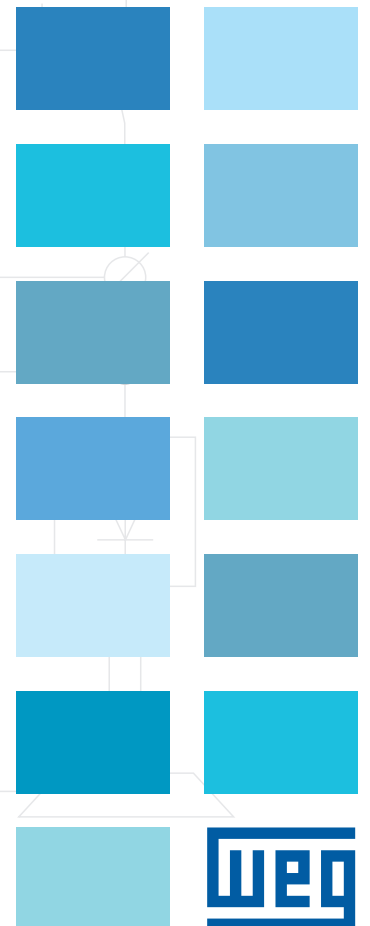
- Tough
- Reliable
- Durable
- Quality

Purchase contact: [invotric@gmail.com](mailto:invotric@gmail.com)

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USACFW09





# Variable Frequency Drives

## CFW09 Vectrue Inverter

The WEG CFW09 Series of Variable Frequency Drives incorporates the world's most advanced technology in drives for three-phase AC induction motors. The Vectrue Technology™ represents a significant innovation, allowing this generation of WEG VFD's to combine Volts/Hertz, Sensorless Vector and Closed Loop Vector (with encoder) control techniques all in one product. In addition, WEG's exclusive Optimal Braking™ technology eliminates the need for the dynamic braking resistor in some applications allowing a simpler, more compact and economic solution.



### Applications

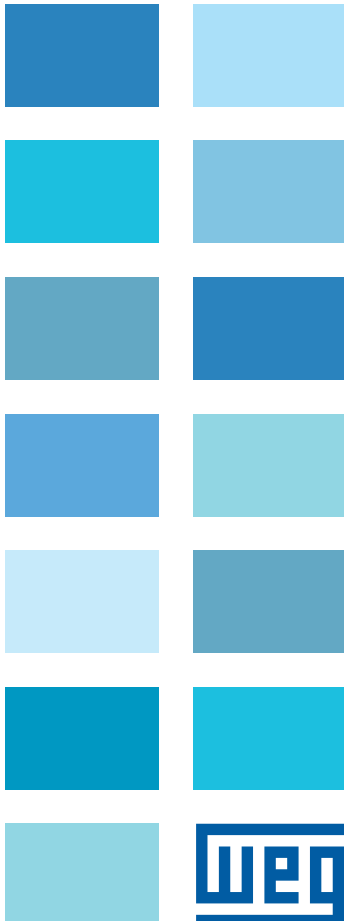
- Pumps
- Fans / Blowers
- Conveyors
- Compressors
- Agitators and Mixers
- Extruders
- Grizzly Feeders
- Centrifuges
- Cranes and Hoists
- Rollout Tables
- Presses
- Saws

### Standard Features

- V/Hz or Sensorless Vector Control via parameter selection
- Self Tuning to motor parameters
- NEMA 1 Enclosure up to 200HP
- IP20 "Finger Safe" Enclosure from 250 to 500HP
- 200-240V or 380-480V input voltage
- Single or Three-phase input voltage up to 3HP/230V
- 150% current overload capacity
- DC bus connections accessible
- Detachable Smart Keypad with dual display and Copy Function
- 32 bit RISC microprocessor controlled PWM output
- 1.25 / 2.5 / 5 / 10 kHz adjustable switching frequency
- Six isolated programmable digital inputs
- Three programmable relay outputs (250Vac / 1A)
- Two isolated programmable analog inputs
- Two programmable analog outputs
- Protective features: Over current, motor overload, drive over temperature, output phase-to-phase and phase-to-ground short circuit, DC bus over and under voltage, power supply under voltage and phase loss and external fault
- Control features: Linear and "S" amp acceleration and deceleration, local/remote control, DC braking, torque boost, motor slip compensation, electronic pot, preset speeds, adjustable V/Hz profile, maximum and minimum adjustable motor speed limits, three skip frequencies, adjustable output current limit, JOG, ride-thru, flying start and PID regulator
- Display readings: Motor speed, frequency, voltage, current and torque, output power (kW), last four faults, drive status, digital and analog I/O status, hours powered and hours running
- Ambient: 32°F (0°C) to 104°F (40°C), 3300 ft (1000m) altitude, 90% humidity, non- condensing

### Optional Features

- Closed loop vector control
  - Remote keypad with cable and mounting frame
  - RS-232 or RS-485 Serial Interface
  - On/Off line PC programming with Superdrive
  - Fieldbus Comm: Profibus DP, DeviceNet or Modbus RTU\*
  - Encoder buffered output
  - Additional digital and analog I/O
  - Dynamic Braking Resistors available for most models
- \*Requires optional RS-232 or RS-485 Interface



# Variable Frequency Drives CFW09

NEMA 1 Enclosure and compact product



Motor Volts	Motor HP		Drive AMPS		Catalog Number	Braking Transistor	Frame Size	Dimensions (in.) H x W x D	App. Shpg. Wt. (lbs.)	
	CT*	VT*	CT*	VT*						
230V	INPUT POWER SUPPLY: SINGLE OR THREE-PHASE - 230V									
	1 or 1.5		6		CFW-090006TDZ	YES	1	8.3 X 5.6 X 7.7	9	
	2		7		CFW-090007TDZ		1	8.3 X 5.6 X 7.7	9	
	3		10		CFW-090010TDZ		1	8.3 X 5.6 X 7.7	9	
	INPUT POWER SUPPLY: THREE-PHASE - 230V									
		3		13		CFW-090013TDZ	YES	1	8.3 X 5.6 X 7.7	9
		5		16		CFW-090016TDZ		2	11.4 X 7.2 X 7.7	15
		7.5		24		CFW-090024TDZ		2	11.4 X 7.2 X 7.7	15
		10		28		CFW-090028TDZ		2	11.4 X 7.2 X 7.7	15
		15		45		CFW-090045TDZ		3	15.3 X 8.9 X 10.8	46
		20	25	54	68	CFW-090054TDZ	NO use CFW-09 0XXXXTDDZ BELOW	4	18.7 X 9.8 X 10.8	55
		25	30	70	86	CFW-090070TDZ		5	21.6 X 13.2 X 10.8	101
		30	40	86	105	CFW-090086TDZ		5	21.6 X 13.2 X 10.8	101
		40	50	105	130	CFW-090105TDZ		6	26.6 X 13.2 X 11.8	135
		50		130	150	CFW-090130TDZ		6	26.6 X 13.2 X 11.8	135
		50	60	142	174	CFW-090142TDZ	(I)	7	32.9 X 13.2 X 11.8	172
		20	25	54	68	CFW-090054TDDBZ	YES	4	18.7 X 9.8 X 10.8	55
		25	30	70	86	CFW-090070TDDBZ		5	21.6 X 13.2 X 10.8	101
		30	40	86	105	CFW-090086TDDBZ		5	21.6 X 13.2 X 10.8	101
		40	50	105	130	CFW-090105TDDBZ		6	26.6 X 13.2 X 11.8	135
		50		130	150	CFW-090130TDDBZ		6	26.6 X 13.2 X 11.8	135
		50	60	142	174	CFW-090142TDDBZ	(I)	7	32.9 X 13.2 X 11.8	172
		60		180		CFW-090180TDZ	(I)	8	38.4 X 16.1 X 14.6	243
		75		240		CFW-090240TDZ	(I)	8	38.4 X 16.1 X 14.6	243
	460V <sup>(4)</sup>	INPUT POWER SUPPLY: THREE PHASE - 460V								
		1 or 1.5	2	3.6		CFW-090003TGZ	YES	1	8.3 x 5.6 x 7.7	9
		2		4		CFW-090004TGZ		1	8.3 x 5.6 x 7.7	9
		3		5.5		CFW-090005TGZ		1	8.3 x 5.6 x 7.7	9
5			9		CFW-090009TGZ	1		8.3 x 5.6 x 7.7	9	
7.5			13		CFW-090013TGZ	2		11.4 x 7.2 x 7.7	15	
10			16		CFW-090016TGZ	2		11.4 x 7.2 x 7.7	15	
15			24		CFW-090024TGZ	2		11.4 x 7.2 x 7.7	15	
20		25	30	36	CFW-090030TGZ	NO USE CFW-09XXXXTGDBZ BELOW	3	15.3 x 8.9 x 10.8	46	
25		30	38	45	CFW-090038TGZ		4	18.7 x 9.8 x 10.8	55	
30		40	45	54	CFW-090045TGZ		4	18.7 x 9.8 x 10.8	55	
40		50	60	70	CFW-090060TGZ		5	21.6 x 13.2 x 10.8	101	
50		60	70	86	CFW-090070TGZ		5	21.6 x 13.2 x 10.8	101	
60		75	86	105	CFW-090086TGZ		6	26.6 x 13.2 x 11.8	135	
75		100	105	130	CFW-090105TGZ		6	26.6 x 13.2 x 11.8	135	
100		125	142	174	CFW-090142TGZ	7	32.9 x 13.2 x 12.2	172		
25		30	38	45	CFW-090038TGDBZ	YES	4	18.7 x 9.8 x 10.8	55	
30		40	45	54	CFW-090045TGDBZ		4	18.7 x 9.8 x 10.8	55	
40		50	60	70	CFW-090060TGDBZ		5	21.6 x 13.2 x 10.8	101	
50		60	70	86	CFW-090070TGDBZ		5	21.6 x 13.2 x 10.8	101	
60		75	86	105	CFW-090086TGDBZ		6	26.6 x 13.2 x 11.8	135	
75		100	105	130	CFW-090105TGDBZ		6	26.6 x 13.2 x 11.8	135	
100		125	142	174	CFW-090142TGDBZ		7	32.9 x 13.2 x 12.2	172	
150			180		CFW-090180TGZ	EXTERNAL**	8	38.4 x 16.1 x 14.6	243	
150			211		CFW-090211TGZ		8	38.4 x 16.1 x 14.6	243	
200			240		CFW-090240TGZ		8	38.4 x 16.1 x 14.6	243	
250			312		CFW-090312TGZ		9	39.4 x 27.5 x 19.3	529	
300			361		CFW-090361TGZ		9	39.4 x 27.5 x 19.3	529	
350			450		CFW-090450TGZ		10	46.6 x 27.5 x 19.3	635	
400			515		CFW-090515TGZ		10	46.6 x 27.5 x 19.3	635	
500			600		CFW-090600TGZ		10	46.6 x 27.5 x 19.3	635	

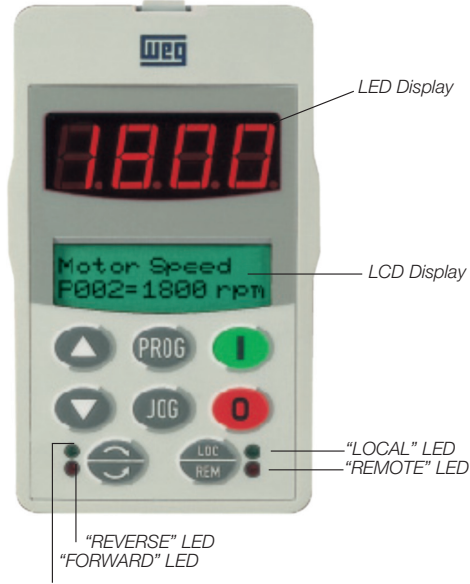
\* CT = Constant Torque; VT = Variable Torque  
 \*\* See Options and Accessories  
 (I) Non-Stocked Item, consult WEG for availability  
 1) \*HP\* rating based on TABLE 430 - 150NEC. ALWAYS compare motor FLA to Nominal AMPS of drive.  
 2) The 6, 7, and 10A/230V models and be single-phase powered without output current derating.  
 3) Above 200HP enclosure is IP20 "finger safe".  
 4) 575 also available.



# Variable Frequency Drives CFW09

**CFW09 Vectrue Inverter – A complete, flexible and compact product**

## Keypad



### Intelligent Keypad

Intelligent operator 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 language of the LCD display messages can be selected by the operator. English, Spanish and Portuguese are available.

### Oriented Start-up

The CFW09 “Oriented Start-up” feature was specially created to facilitate and expedite the start-up procedure. At the first power-up or after a reset to factory default parameters, an automatic programming routine guides the operator through a sequence of steps to plug in the minimum parameters necessary for a perfect relationship between drive and 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 can store two complete sets of user parameters.

## Keypad Functions

	Starts the VFD via a controlled acceleration ramp. When running switches the display indication: rpm - Volts - Status - Torque - Hz -Amps
	Stop the VFD via a controlled deceleration ramp. Resets the VFD 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 VFD operating mode as Local or Remote.



# Variable Frequency Drives CFW09

## Options and Accessories



**External Braking Modules DBW Series**



**NEMA 4 Remote Keypad HMI - CFW09 - LCDN4**

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



**Remote Keypad Frame Kit KMR - CFW09**

Frame for remote keypad mounting on panel door or operator station. Optional up to 15ft (5m) cable. Maximum cable length; 33 ft (10m)



**Remote Keypad Cables CAB - HMI - 09 - X**

Cables with lengths (x) of 3.3, 6.6, 10, ,15, 25 and 33ft (1, 2, 3, 5, 7.5 and 10m) 7.5 and 10m must use the KMRCFW09 frame kit. Special cables available upon request.



**Remote Control Station-22mm CSW-SP3PBS**

The remote control station is a 3-hole NEMA 4 pushbutton station with 22mm Start and Stop push buttons and a 5K potentiometer. Alternative configurations are available, consult factory for details.



**Remote Control Station-30mm CSW30-SP3PBS**

The remote control station is a 3-hole NEMA 4 pushbutton station with 30mm Start and Stop push buttons and a 5K potentiometer. Alternative configurations are available, consult factory for details. Alternative configurations are available, consult factory for details.



**RS-232 Serial Interface KCS - CFW09**

RS-232 Serial Interface Module to connect the CFW09 to a PC or other equipment via a RS-232 Serial Link, Profibus, Deuceuet Ethernet, Devicenet Profile communication.



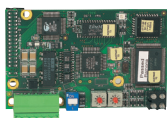
**PC Communication Kit KSD - CFW09**

WEG Superdrive is a windows based software program that allows serial (RS-232 or RS-485) communication between a PC and WEG Soft Starters and Variable Frequency Drives. Superdrive is an excellent programming, documentation and troubleshooting tool for WEG Soft Starters and VFD's. Superdrive is available for free download at [www.wegelectric.com](http://www.wegelectric.com). Hardware accessories may be required, depending on the Soft Starter or VFD line. Not available for SSW06.



**PLC / Motion Control Board PLC 1.01 & PLC 2.00**

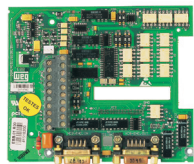
PLC-01 / PLC-02 : WEG Integral PLC – The PLC01/02 boards add important PLC (Programmable Logical Controller) functions to the CFW-09, enabling the execution of complex logic program by using the digital and analog inputs and outputs as well as the digital and analog inputs and outputs of the own inverter which can be accessed by the user program. Functions include simple contacts and coils up to functions that uses floating point, such as sum, subtraction, multiplication, division, trigonometry, square root functions, etc. Other important functions are the PID blocks, high-pass and low-pass filters, saturation, comparison. All these functions operate with floating point. Besides the functions mentioned above, the PLC1 provides blocks for motor speed and motor position control, that is a trapezoidal-profile positioning and a S-profile positioning, speed reference generation with trapezoidal acceleration ramp, etc. (Note: when position functions used, the coupling of an encoder on motor shaft is required). All functions can interact with the user through the 100 programmable parameters that can be accessed directly through the inverter HMI. The texts and user units of the programmable parameters can be customized by the WLP.



**Ethernet IP KFB - EN**

**Profibus DP KFB - PD**

**DeviceNet KFB - DN**



**I/O EXPANSION BOARDS**

**EBA.0X - CFW09**

**EBB.0X - CFW09**

**EBC1.0X - CFW09**

**EBE.0X - CFW09**

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 Output				•		•	•	•					
Digital Inputs and Outputs Thermistor (PTC) Input	•	•	•	•	•	•	•						•
Internal Power Supply					•		•			•	•		





# Variable Frequency Drives CFW09

## Technical Data

<b>Power Supply</b>	Voltage	Three Phase	220–230 V: 220 / 230 V (+10%, -15%) - 1 Ø up to 3HP without de-rating 380 - 480 V: 380 / 400 / 415 / 440 / 460 / 480 V (+10%, -15%)	
	Frequency	50 / 60 Hz +/- 2 Hz (48...62 Hz)		
	Phase Unbalance	Up to 3%		
	Cos (Displacement Power Factor)	Greater than 0.98		
<b>Enclosure</b>	Degree of Protection	NEMA 1 / IP 20 (sizes 1 to 8) IP 20 (Sizes 9 and 10)		
	Finishing Color	Plastic Cover – Light Gray PANTONE 413C (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)		
<b>Control</b>	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	Scalar (Voltage Source – V/F) Sensorless Vector (without encoder) Flux Vector with Encoder		
	Switching Frequency	1.25 / 2.5 / 5.0 / 10 kHz		
	Frequency Range	0...204 Hz for V / F and Vector with Encoder Control (60 Hz Motor) 0...170 Hz for V / F and Vector with Encoder Control (50 Hz Motor) 0...100 Hz for Sensorless Vector Control (50 or 60 Hz Motor)		
	Overload Capacity	150% for 60 seconds, every 10 minutes 180% for 1 second every 10 minutes		
	Efficiency	Greater than 97%		
	<b>Performance</b>	Speed Control	V / F Mode	Regulation (with Slip Compensation) 1% of Motor Rated Speed Resolution : 1 rpm (keypad reference) Speed Regulation Range : 20:1
			Sensorless Vector Mode	Regulation : 0.5% of Motor Rated Speed Resolution : 1 rpm (keypad reference) Range : 100:1
Flux Vector Mode with Encoder			Regulation with: 10 bit Analog Reference: +/- 0.1% of Motor Rated Speed 14 bit Analog Reference: +/- 0.01% of Motor Rated Speed Digital Reference (Ex: Keypad or Serial): +/- 0.01% of Motor Rated Speed Range : Down to 0 rpm	
Torque Control		Flux Vector Modes	Regulation: +/- 10% of Motor Rated Torque Range : 0...150% of Motor Rated Torque	
<b>Control Inputs</b>	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 Programmable Isolated Input (10 bit) : 0...10 V, 0...20 mA or 4...20 mA		
	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		
<b>Control Outputs</b>	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		
<b>Communication</b>	Serial	RS-232 with KCS-CFW09 Kit 1 RS-485, Isolated, with EBA, EBE or EBB Board 1		
	Field Bus	Profibus DP, DeviceNet or Modbus RTU, with KFB kits 1		
<b>Safety</b>	Protections	DC Link Over Voltage	Output Short Circuit	
		DC Link Under Voltage	Output Ground Fault	
		VFD 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			
<b>Ambient</b>	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 12100 ft (4000 m) with 10% / 1000 m Output Current De-Rating		





# Variable Frequency Drives

## CFW09

### Technical Data

<b>Conformities</b>	EMC Directive 89 / 336/ EEC EN 61800-3	Electromagnetic Compatibility – Industrial Environment EMC - Emission and Immunity		
	LVC 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		
<b>Certifications</b>	UL (USA) and cUL (Canada)	Underwriters Laboratories Inc. USA		
	CE (Europe)	Phoenix Test - Labs GmbH - Germany		
<b>Keypad</b>	Programming	General VFD 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)	VFD 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		
<b>Control Features and Options</b>	Standard	Keypad with LCD + LED displays (HMI: CFW09-LCD)		
		Password to protect VFD 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		
		VFD Self-tuning to motor and load (Vector Modes)		
		Specific unit indication (Ex: l/s, th, %, 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 adjustments for the analog outputs		
		JOG function		
		JOG +/- JOG - function (momentary speed increase/decrease, phase shift)		
		COPY function (VFD / Keypad or Keypad / VFD)		
		Comparison functions for the digital outputs:		
		N* > Nx; N > Nx; N < Nx; N = 0; N = N*; Is > lx; Is < lx; T > Tx and T < Tx		
		Where: N = Motor speed; N* = Speed reference is; 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 and 30A / 380-480V		
		Multi-speed function (up to 8 preset speeds)		
		Speed Profiling function		
		Hour meter and Wattmeter		
		PID regulation (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 ... 45A / 220-230V and 3.6 ... 30A / 380-480V				
Options	Remote keypad cable (3.3, 6.6, 10, 16, 25 and 35ft) Blank keypad for local installation			
	Blank keypad for remote installation Remote Keypad frame kit			
	I/O Expansion Boards			
		FieldBus Communications Kit (Mounted inside VFD)		





**24/7 Technical  
Support**

*for Drives and Soft Starters*

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**1-877-WEG-DRIV**  
(934-3748)

[www.weg.net](http://www.weg.net)



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USACFW09