



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

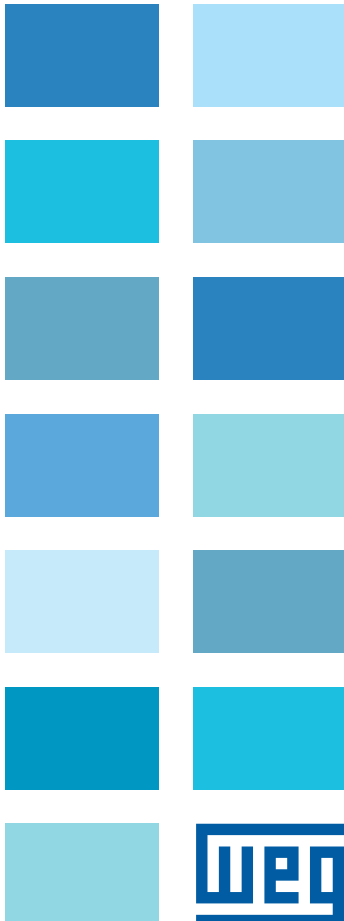
- Pumps
- Fans / Blowers
- Conveyors
- Compressors
- Agitators and Mixers
- Extruders
- Grizzly Feeders
- Centrifuges
- Cranes and Hoists
- Rollout Tables
- Presses
- Saws

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



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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 0XXXTDDB 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	(l) YES	7	32.9 X 13.2 X 11.8	172
		20	25	54	68	CFW-090054TDDBZ		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	(l) EXTERNAL**	6	26.6 X 13.2 X 11.8	135
		50	60	142	174	CFW-090142TDDBZ		7	32.9 X 13.2 X 11.8	172
		60		180		CFW-090180TDZ		8	38.4 X 16.1 X 14.6	243
		75		240		CFW-090240TDZ		8	38.4 X 16.1 X 14.6	243
								(l)		
	460V ⁽⁴⁾	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	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	NO USE CFW-090XXXTGDBZ BELOW	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		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		YES	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
 (l) 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.





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Technical Data

Power Supply	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	
Enclosure	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)	
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	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%	
Performance	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
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 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	
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, EBE or EBB Board 1	
	Field Bus	Profibus DP, DeviceNet or Modbus RTU, with KFB kits 1	
Safety	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) 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 12100 ft (4000 m) with 10% / 1000 m Output Current De-Rating	



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Technical Data

Conformities	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		
Certifications	UL (USA) and cUL (Canada)	Underwriters Laboratories Inc. USA		
	CE (Europe)	Phoenix Test - Labs GmbH - Germany		
Keypad	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	
Control Features and Options		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)			

