CFW701 HVAC-R

Variable Frequency Drives

Full **HVAC-R Capability**

WEG, a leading supplier of drive technology, as well as automation solutions, has enhanced the line of variable frequency drives for heating, ventilation, air conditioning and refrigeration. The CFW701 was designed with the features and functions required for HVAC systems, with the same reliability, rubustness and energy-efficient control known in our industrial lines. WEG now brings this technology to hospitals, airports, office buildings, hotels, shopping centers or other similar facilities.

Complete Range

- 1.5 to 3 HP (1.1 to 2.2 kW): 200-240 V ac - Single-phase
- 1.5 to 75 HP (1.1 to 55 kW): 220-240 V ac - Three-phase
- 2 to 175 HP (1.5 to 132 kW): 380-480 V ac - Three-phase
- 2 to 150 HP (1.5 to 110 kW): 500-600 V ac - Three-phase

Friendly Programming

- Oriented start-up: step by step
- Easy and intuitive operation
- Parameter groups: shortcut to the parameters of interest
- Engineering units, such as: °C, °F, bar, mbar, psi, m³, gal, kW, rpm and others

Special Functions

Bypass
Using one of its relay outputs the CFW701 allows the motor to be started cross the line. External circuit is needed for this operation.

Sleep / Wake-Up Mode
Prevents the operation of the motor at low speeds for a amount of time programmed. Wake-up mode determines the time the drive is restarted.

Fire Mode
This function makes the drive inhibit its internal faults, making the motor run during adverse conditions without stopping the process.

Dry Pump
Prevents the pump from running with no load.

Advanced PID - 3 x PID
Three PID control loops: one controls the process by itself (the one the motor is running) and two are additional PID loops for use to control independent process variables (it might be for the control of external process not related to what the main PID loop is handling). This eliminates the use of an additional PID controller.

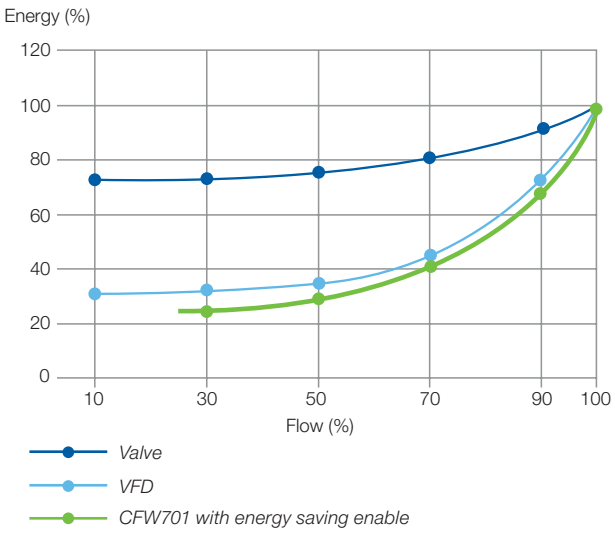
PTC
For monitoring PTC sensor.

Filter Maintenance Alarm
Warns about the need to replace the filter.

Broken Belt
Monitors motor torque and prevents the drive from running with no load in case of a broken belt.

Short Cycle Protection
Prevents a compressor / motor from being switched on and off in short periods of time.

Energy Saving
Depending on the motor speed and load conditions, flux is reduced decreasing losses and therefore efficiency is improved.



Product Coding

The CFW701 code identifies its construction characteristics, nominal current, voltage range and options. Using the product code, you may select the CFW701 required for your application simply and quickly.

Product and series	Drive identification				Braking option	Protection class	RFI emmision level	Safety stop	External control voltage	Hardware revision	Software version
	Frame	Rated current	Supply phases	Rated voltage							
CFW701	A	03P6	T	4	NB	N1	C3[1)2)]	Y1	W1	- - -	- - -
CFW701	Check table below										
	NB = without dynamic braking DB = with dynamic braking										
	20 = IP20 21 = IP21 (not available for frame size E) N1 = NEMA1										
	Blank = with no RFI filter C3 = meets category 3 of IEC 61800-3 standard, with internal RFI filter										
	Blank = without STO (Safe Torque Off) function Y1 = with STO (Safe Torque Off) function, meets EN 954-1/ISO 13849-1, category 3										
	Blank = without 24 V dc power supply W1 = with 24 V dc power supply										
	Blank = standard Hx = special hardaware										
	Blank = standard Sx = special software										

Frame size	Rated output current	Supply phases	Supply voltage	Braking feature	Protection class	RFI emission level[1)2)]
A	06P0 = 6.0 Amps 07P0 = 7.0 Amps 10P0 = 10.0 Amps	S = single-phase	2 = 200...240 V ac	DB	20 = IP20 21 = IP21 N1 = NEMA1	C3
A	07P0 = 7.0 Amps 10P0 = 10.0 Amps 13P0 = 13.0 Amps 16P0 = 16.0 Amps	T = three-phase	2 = 200...240 V ac	DB	20 = IP20 21 = IP21 N1 = NEMA1	
B	24P0 = 24.0 Amps 28P0 = 28.0 Amps 33P5 = 33.5 Amps					
C	45P0 = 45.0 Amps 54P0 = 54.0 Amps 70P0 = 70.0 Amps					
D	86P0 = 86.0 Amps 0105 = 105.0 Amps				21 = IP21 N1 = NEMA1	
E	0142 = 142.0 Amps 0180 = 180.0 Amps 0211 = 211.0 Amps			NB or DB	20 = IP20 N1 = NEMA1	
A	03P6 = 3.6 Amps 05P0 = 5.0 Amps 07P0 = 7.0 Amps 10P0 = 10.0 Amps 13P5 = 13.5 Amps	T = three-phase	4 = 380...480 V ac	DB	20 = IP20 21 = IP21 N1 = NEMA1	
B	17P0 = 17.0 Amps 24P0 = 24.0 Amps 31P0 = 31.0 Amps					
C	38P0 = 38.0 Amps 45P0 = 45.0 Amps 58P5 = 58.0 Amps					
D	70P5 = 70.0 Amps 88P0 = 88.0 Amps				21 = IP21 N1 = NEMA1	
E	0105 = 105.0 Amps 0142 = 142.0 Amps 0180 = 180.0 Amps 0211 = 211.0 Amps			NB or DB	20 = IP20 N1 = NEMA1	

Product Coding

Frame size	Rated output current	Supply phases	Supply voltage	Braking feature	Protection class	RFI emission level[1)2)]
B	02P9 = 2.9 Amps	T = three-phase	5 = 500...600 V ac	DB	20 = IP20 21 = IP21 N1 = NEMA1	C3
	04P2 = 4.2 Amps					
	07P0 = 7.0 Amps					
	10P0 = 10.0 Amps					
	12P0 = 12.0 Amps					
	17P0 = 17.0 Amps					
D	22P0 = 22.0 Amps			NB or DB	21 = IP21 N1 = NEMA1	
	27P0 = 27.0 Amps					
	32P0 = 32.0 Amps					
	44P0 = 44.0 Amps					
E	53P0 = 53.0 Amps				20 = IP20 N1 = NEMA1	
	63P0 = 63.0 Amps					
	80P0 = 80.0 Amps					
	0107 = 107.0 Amps					
	0125 = 125.0 Amps					
	0150 = 150.0 Amps					

Notes: 1) RFI filter.

Categories:

- Category C1: inverters with voltages below 1,000 V, for use in the first environment.

- Category C2: inverters with voltages below 1,000 V, with plugs or mobile installation, when used in the first environment, must be installed and started-up by a qualified professional.

- Category C3: inverters with voltages below 1,000 V, developed for use in the second environment and not designed for use in the first environment.

Environments:

- First environment: environments that include household installations, such as buildings directly connected, without intermediate transformer, to a low-voltage power supply grid, which supplies buildings used for domestic purposes.

- Second environment: includes all the buildings other than those directly connected to a low-voltage power supply grid, which supplies buildings used for domestic purposes.

For the RFI filters of external installations, refer to the CFW701 user manual.

2) For C2 or C1 categories, according to Appendix B of User's Manual to get that information and installation instruction.

Drive Ratings

The correct way to select a VFD is to match its output current with the motor rated current. However, the tables below present the approximate motor power for each VFD model. Use the motor power ratings below only as a guide. Motor rated currents may vary with speed and manufacturer.

Motor volts	Motor HP	Rated current (A)	Catalog number	Frame size	Enclosure	Braking transistor
230 V	Input power supply: single-phase 200-240 V					
	1.5	6	CFW701 A 06P0 S2 DB N1 C3	A	NEMA1	Yes
	2	7	CFW701 A 07P0 S2 DB N1 C3	A	NEMA1	Yes
	3	10	CFW701 A 10P0 S2 DB N1 C3	A	NEMA1	Yes
	Input power supply: three-phase 200-240 V					
	2	7	CFW701 A 07P0 T2 DB N1 C3	A	NEMA1	Yes
	3	10	CFW701 A 10P0 T2 DB N1 C3	A	NEMA1	Yes
	5	13	CFW701 A 13P0 T2 DB N1 C3	A	NEMA1	Yes
	5	16	CFW701 A 16P0 T2 DB N1 C3	A	NEMA1	Yes
	7.5	24	CFW701 B 24P0 T2 DB N1 C3	B	NEMA1	Yes
	10	28	CFW701 B 28P0 T2 DB N1 C3	B	NEMA1	Yes
	10	33.5	CFW701 B 33P5 T2 DB N1 C3	B	NEMA1	Yes
	15	45	CFW701 C 45P0 T2 DB N1 C3	C	NEMA1	Yes
	20	54	CFW701 C 54P0 T2 DB N1 C3	C	NEMA1	Yes
	25	70	CFW701 C 70P0 T2 DB N1 C3	C	NEMA1	Yes
	30	86	CFW701 D 86P0 T2 DB N1 C3	D	NEMA1	Yes
	40	105	CFW701 D 0105 T2 DB N1 C3	D	NEMA1	Yes
	50/60	142	CFW701 E 0142 T2 NB N1 C3	E	NEMA1	No
	75	180	CFW701 E 0180 T2 NB N1 C3	E	NEMA1	No
	75	211	CFW701 E 0211 T2 NB N1 C3	E	NEMA1	No
460 V	Input power supply: three-phase 380-480 V					
	2	3.6	CFW701 A 03P6 T4 DB N1 C3	A	NEMA1	Yes
	3	5	CFW701 A 05P0 T4 DB N1 C3	A	NEMA1	Yes
	5	7	CFW701 A 07P0 T4 DB N1 C3	A	NEMA1	Yes
	7.5	10	CFW701 A 10P0 T4 DB N1 C3	A	NEMA1	Yes
	10	13	CFW701 A 13P5 T4 DB N1 C3	A	NEMA1	Yes
	10/15	17	CFW701 B 17P0 T4 DB N1 C3	B	NEMA1	Yes
	15/20	24	CFW701 B 24P0 T4 DB N1 C3	B	NEMA1	Yes
	25	31	CFW701 B 31P0 T4 DB N1 C3	B	NEMA1	Yes
	30	38	CFW701 C 38P0 T4 DB N1 C3	C	NEMA1	Yes
	30	45	CFW701 C 45P0 T4 DB N1 C3	C	NEMA1	Yes
	40/50	58.5	CFW701 C 58P5 T4 DB N1 C3	C	NEMA1	Yes
	60	70.5	CFW701 D 70P5 T4 DB N1 C3	D	NEMA1	Yes
	75	88	CFW701 D 88P0 T4 DB N1 C3	D	NEMA1	Yes
	75	105	CFW701 E 0105 T4 NB N1 C3	E	NEMA1	No
	100	142	CFW701 E 0142 T4 NB N1 C3	E	NEMA1	No
	150	180	CFW701 E 0180 T4 NB N1 C3	E	NEMA1	No
	150	211	CFW701 E 0211 T4 NB N1 C3	E	NEMA1	No
575 V	Input power supply: three-phase 500-600 V					
	2	2.9	CFW701 B 02P9 T5 DB N1 C3	B	NEMA1	Yes
	3	4.2	CFW701 B 04P2 T5 DB N1 C3	B	NEMA1	Yes
	5	7	CFW701 B 07P0 T5 DB N1 C3	B	NEMA1	Yes
	7.5	10	CFW701 B 10P0 T5 DB N1 C3	B	NEMA1	Yes
	10	12	CFW701 B 12P0 T5 DB N1 C3	B	NEMA1	Yes
	15	17	CFW701 B 17P0 T5 DB N1 C3	B	NEMA1	Yes
	20	22	CFW701 D 22P0 T5 NB N1 C3	D	NEMA1	No
	25	27	CFW701 D 27P0 T5 NB N1 C3	D	NEMA1	No
	30	32	CFW701 D 32P0 T5 NB N1 C3	D	NEMA1	No
	40	44	CFW701 D 44P0 T5 NB N1 C3	D	NEMA1	No
	50	53	CFW701 E 53P0 T5 NB N1 C3	E	NEMA1	No
	60	63	CFW701 E 63P0 T5 NB N1 C3	E	NEMA1	No
	75	80	CFW701 E 80P0 T5 NB N1 C3	E	NEMA1	No
	100	107	CFW701 E 0107 T5 NB N1 C3	E	NEMA1	No
	125	125	CFW701 E 0125 T5 NB N1 C3	E	NEMA1	No
	150	150	CFW701 E 0150 T5 NB N1 C3	E	NEMA1	No

Notes: HP rating based on FLA values from WEG W22, 2 and 4 poles, 230 V ac, 460 V ac and 575 V ac, NEMA premium motors.
Use as a guide only. Motor FLA may vary with speed and manufacturer.
Always compare motor FLA to nominal AMPS of VFD and overload conditions.

Technical Data

Power supply	Voltage and power range	1-phase, 200-240 V ac (+10% - 15%) 1.5 to 3 HP (1.1 to 2.2 kW)	
		3-phase, 200-240 V ac (+10% - 15%) 1.5 to 75 HP (1.1 to 55 kW)	
		3-phase, 380-480 V ac (+10% - 15%) 2 to 150 HP (1.5 to 110 kW)	
		3-phase, 500-600 V ac (+10% - 15%) 2 to 150 HP (1.5 to 110 kW)	
	Frequency	50...60 Hz (+/-2%_48 to 63 Hz)	
Control	Displacement factor	>0.98	
	Efficiency	>97%	
	Power factor	0.94 for three-phase input at nominal conditional 0.70 for single-phase input at nominal conditional	
	Frequency range	0 to 3.4 x motor rated frequency (0403). The rated frequency is programable up to 300 Hz (V/Hz) and 120 Hz (vector mode) Switching Frequency data must be observed for speed limits	
	Switching frequency	Standard: 5 kHz (A, B, C, D frames)	
		2.5 kHz for all models frame E 380-480 V	
		2.5 kHz for frame E models 142/180 Amps (ND) 200-240 V	
		2.5 kHz for frame E model 211 Amps (ND/HD) 200-240 V	
		Available options for 2.5/5/10 kHz (check for derating)	
	Overload capacity	Normal duty (ND)	110% for 1min every 10min
	Aceleration time	0 to 999s	
	Deceleration time	0 to 999s	
	Normal Duty (ND)	110% for 1min every 10min	
	Heavy Duty (HD)	150% for 1min every 10min	
Environment	Temperature	-10 to 50 ºC (14 to 122 ºF) for most of models. For operating temperature of each model the table “dimentions, weight and temperature” shall be checked	
		-10...60 ºC for frames A, B, C and D (up to 45 ºC without derating for models 13 A and 24 A / 200...240 V, 7 and 10 A / 380...480 V and up to 50 ºC without derating for the other models) and -10...55 ºC for frame E (up to 45 ºC without derating). If derating has to be considered have 2% current reduction for each ºC above the specific operating temperature	
	Humidity	5 to 90% with no condensation	
	Altitude	0 to 1,000 meters with no derating	
		Up to 4,000 meters with current reduction of 1% for each 100 meters above 1,000 meters	
Braking methods	Dynamic braking	Available as standard for frame sizes A, B, C and D for 460 V and D for 660 V. For frame size E “DB” models has to be used. An extra resistor must be fitted in for dynamic braking capability	
	Optimal braking	There is no need for braking resistor	
	DC braking	DC current applied to motor	
Performance	V/F	Speed control	Regulation: 1% of rated speed
			Speed variation range 1:20
	Voltage vector WW		Regulation: 1% of rated speed
			Speed variation range 1:30
I/Os	Inputs	Digital	8 x isolated bidirectional 24 V
		Analog	2 x +/-10 V, 11 bits + signal (differencial) or 0/4...20 mA, 11 bits (differencial)
			Impedance: 400 kW for voltage signal / 500 W for current signal
	Output	Relay	2 x relay NO/NC contact (240 V ac/1 A)
			4 x open drain (24 V/200 mA)
		Analog	1 x 0/4 - 20 mA 11 bits
			2 x 0...10 V or 0/4...20 mA, 11 bits (not isolates from inverter ground)
	24 V power supply capacity	500 mA (available for the user, including I/Os)	
Communication	Modbus-RTU BACnet MS/TP Metasys N2	RS485 built-in (available in controlterminals)	
		RS485 built-in / SuperDrive and WLP software	
	USB built in	SuperDrive and WLP software	

Technical Data - Standards

Safety standards	**UL 508C**	Power conversion equipment
	UL 840	Insulation coordination including clearances and creepage distances for electrical equipment
	EN 61800-51	Safety requirements electrical thermal and energy
	EN 50178	Electronic equipment for use in power installations
	EN 60204-1	Safety of machinery. Electrical equipment of machines. Part: General requirement Note: For a machine to comply with this standard, the manufacturer of the machine is responsible for installing an emergency stop device and a device for disconnection from the power line
	EN 60146 (IEC)	Semiconductor converters
	EN 61800-2	Adjustable speed electrical power drive systems - Part 2: General requirements - Ratings specifications for low voltage adjustable frequency AC power drive systems
Electromagnetic compatibility standards	EN 61800-3	Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods
	EN 55011	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment CISPR11 - Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
	EN 61000-4-2	Electromagnetic Compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test
	EN 61000-4-3	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test
	EN 61000-4-4	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test
	EN 61000-4-5	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test
	EN 61000-4-6	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, inducted by radio-frequency fields
Mechanical construction standards	EN 60529	Degrees of protection provided by enclosures (IP code)
	UL 50	Enclosures for electrical equipment