CFW701 HVAC-R

Variable Speed 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

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



Highlights

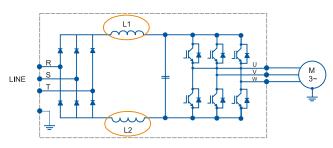


Conformal Coated (3C2)

VSD lifetime is extended: protection against chemically active substances, related to contamination from the atmosphere

Harmonic Mitigation with Inductor

- No line reactance required
- No restrictions for installation, minimum impedance is not required
- Meets IEC 61000-3-12 requirements with built-in DC link choke



Safety Stop

Lieg

In Accordance with EN 61800-5-2, EN ISO 13849-1, IEC 62061, IEC 61508 Parts 1-7, EN 50178, IEC 60204-1, Cat. 3/pL d acc. and SIL CL2 acc.)

 With this option when the safety circuit is tripped by external causes, the IGBT firing circuit is deactivated, thus the power drive system will not provide energy to the motor, which will not generate torque.



Communication Protocols as Standard

- BACnet MS/TP
- Metasys N2
- Modbus-RTU



Thermal Management

- It is possible to monitor heat sink and inside air temperature thus ensuring protection to critical components e.g. IGBTs and control board
- Fans installed closed to heatsink are controlled based on the temperature of power modules
- Readings of fan operation hours can be analyzed through parameters as well as alarm or fault messages are displayed
- Easy removal of fans for easy maintenance and/or replacement



PLC Function Built-In

Programming flexibility combined with network and I/O make the CFW701 a powerful part of an integrated system. (free WLP software at <u>www.weg.nef</u>)



IP55/NEMA12 Protection Degreee Excellent protection against contact with internal live parts, avoiding the entrance of water coming from jets.

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.



Fire Mode

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



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.





Broken Belt

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



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.



Dry Pump Prevents the pump from running with no load.



PTC For monitoring PTC sensor.



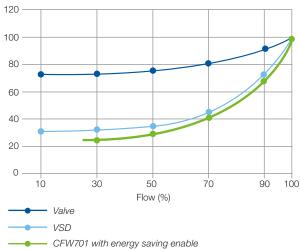
Filter Maintenance Alarm Warns about the need to replace the filter.



Short Cycle Protection

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





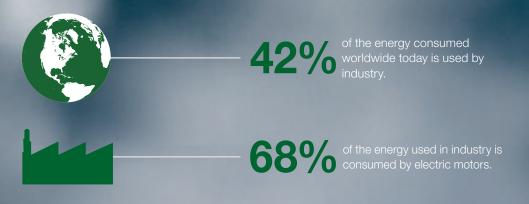


Energy Saving

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

Energy Saving

The future depends on conscious and sustainable actions as the world grows fast and for this, modern automated solutions are required. Technology is already present in our lives, and, in order to produce the energy that drives all the innovations, somebody has to foot the bill. What are you doing to grow sustainably?



Save even more energy by using the CFW701 HVAC-R together with the W22 Premium motors, which have the best efficiency in the market. This solution can help you reduce power consumption by approximately 15%, thus contributing to sustainable development of the planet.

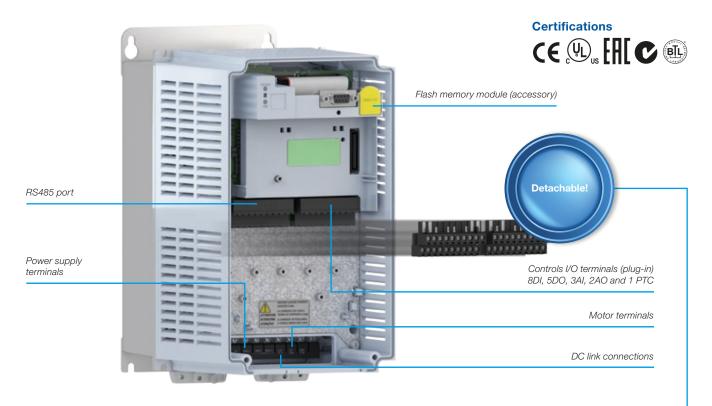
Use energy in a conscious way

Go Green!

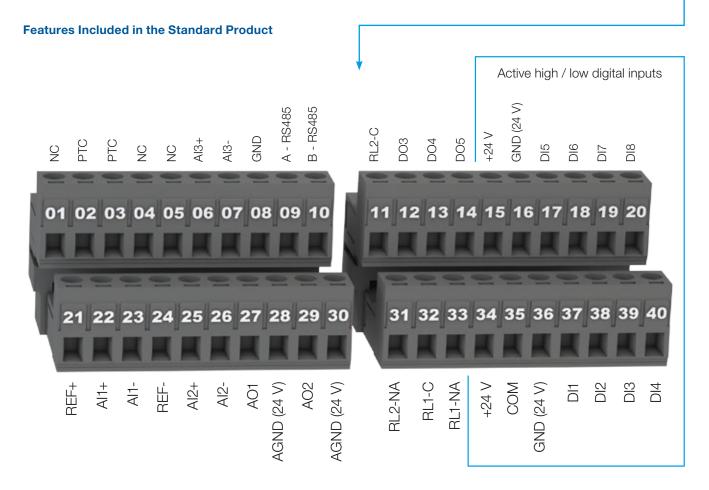
Calculate on our website the payback of the investment achieved by the use of frequency inverters in your application: <u>www.weg.net</u>



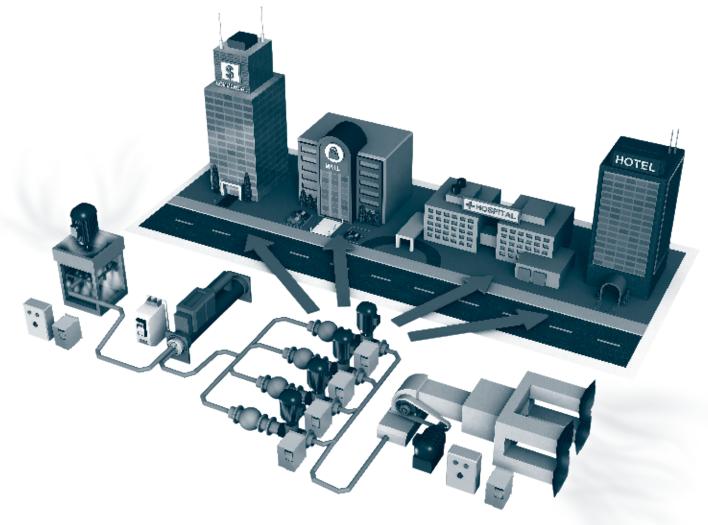
Simplicity



Technical Features



HVAC-R Systems



Applications

- Hospitals
- Airports
- Malls
- Stadiums
- Schools and universities
- Hotels and restaurants
- Commercial building
- Residential
- Pumps and fans
- Compressors
- Condensers
- Evaporators
- Cooling towers
- Boilers
- Chillers











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		Drive ide	entification		Braking	Protection	Conducted	Disconnector	Safety	External	Hardware	Software
and series	Frame	Rated current	Supply phases	Rated voltage	option	degree	emission level	switch	stop	control voltage	revision	version
CFW701	А	03P6	т	4	DB	20	C3 ¹⁾²⁾	DS	¥1	W1		
CFW701	C3 = meets cate Blank = without DS = with Disco Blank = without	namic braking mic braking vailable for fran MA12 (not avail agory 3 of IEC 6 Disconnector S nnector Switch STO (Safe Torqu Safe Torque Off) 24 V dc power supply d cpower supply d rdware d	lable for frame siz 1800-3 standard, witch (available only wi ue Off) function function, meets E supply	e A) with internal RFI f th IP55 / NEMA12 :N 954-1/ISO 138-	versions)	y 3						

Frame size	Output current	Input	Supply voltage	Braking feature	Protection degree	Conducted emission level ¹⁾²⁾
	06P0 = 6.0 A				20 = IP20	
А	07P0 = 7.0 A	S = single-phase	2 = 200240 V ac	DB	21 = IP21	
	10P0 = 10.0 A				N1 = NEMA1	
	07P0 = 7.0 A					
А	10P0 = 10.0 A				20 = IP20 21 = IP21	
А	13P0 = 13.0 A				N1 = NEMA1	
	16P0 = 16.0 A					
	24P0 = 24.0 A					
В	28P0 = 28.0 A				20 = IP20	
	33P5 = 33.5 A			DB	21 = IP21	
	45P0 = 45.0 A	T = three-phase	2 = 200240 V ac		N1 = NEMA1	
С	54P0 = 54.0 A				N12 = IP55/NEMA12	
	70P0 = 70.0 A					
-	86P0 = 86.0 A					
D	0105 = 105.0 A				N1 = NEMA1 N12 = IP55/NEMA12	
	0142 = 142.0 A	-			20 = IP20	1
Е	0180 = 180.0 A			NB or DB	N1 = NEMA1	
	0211 = 211.0 A				N12 = IP55/NEMA12	C3
	03P6 = 3.6 A				20 = IP20 21 = IP21 N1 = NEMA1	
	05P0 = 5.0 A					
А	07P0 = 7.0 A					
	10P0 = 10.0 A					
	13P5 = 13.5 A					
	17P0 = 17.0 A					1
В	24P0 = 24.0 A			DB	20 = IP20	
	31P0 = 31.0 A				21 = IP21	
	38P0 = 38.0 A	T = three-phase	4 = 380480 V ac		N1 = NEMA1 N12 = IP55/NEMA12	
С	45P0 = 45.0 A					
	58P5 = 58.0 A					
2	70P5 = 70.0 A				21 = IP21	
D	88P0 = 88.0 A				N1 = NEMA1 N12 = IP55/NEMA12	
	0105 = 105.0 A					
F	0142 = 142.0 A			NB or DB	20 = IP20	
E	0180 = 180.0 A				N1 = NEMA1 N12 = IP55/NEMA12	
	0211 = 211.0 A					



Product Coding

Frame size	Rated output current	Supply phases	Supply voltage	Braking feature	Protection class	RFI emission level ¹⁾²⁾
	02P9 = 2.9 A					
	04P2 = 4.2 A					
В	07P0 = 7.0 A			DB	20 = IP20 21 = IP21 N1 = NEMA1	
D	10P0 = 10.0 A			סע		
	12P0 = 12.0 A					
	17P0 = 17.0 A					С3
	22P0 = 22.0 A				21 = IP21 N1 = NEMA1	
D	27P0 = 27.0 A	T = three-phase	5 = 500600 V ac			
	32P0 = 32.0 A	I = uiree-pilase	5 = 500600 v ac			
	44P0 = 44.0 A					
	53P0 = 53.0 A			NB or DB		
	63P0 = 63.0 A					
E	80P0 = 80.0 A				20 = IP20	
Ē	0107 = 107.0 A				N1 = NEMA1	
	0125 = 125.0 A					
	0150 = 150.0 A					

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, refer to Appendix B of User's Manual to get that information and installation instruction.



Drive Ratings

The correct way to sizing 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.

Note: motor power stated on these tables are based on IEC and NEMA standard for IV poles motor.

Motor Voltages 220 V and 230 V

				IEC	NEMA		IEC	NEMA
	Power Model		Normal Duty (ND)	50 Hz 220 V	60 Hz 230 V	Heavy Duty (HD)	50 Hz 220 V	60 Hz 230 V
supp	ly		А	kW	HP	А	kW	HP
		CFW701 A 06P0 S2	6	1.1	1.5	5	1.1	1
	10	CFW701 A 07P0 S2	7	1.5	2	7	1.5	2
		CFW701 A 10P0 S2	10	2.2	3	10	2.2	3
	1/3Ø	CFW701 A 06P0 B2	6	1.1	1.5	5	1.1	1
	1/3	CFW701 A 07P0 B2	7	1.5	2	7	1.5	2
		CFW701 A 07P0 T2	7	1.5	2	5.5	1.1	1
		CFW701 A 10P0 T2	10	2.2	3	8	1.5	2
V O		CFW701 A 13P0 T2	13	3	3	11	2.2	3
200-240 V	30	CFW701 A 16P0 T2	16	4	5	13	3	3
200		CFW701 B 24P0 T2	24	5.5	7.5	20	5.5	5
		CFW701 B 28P0 T2	28	7.5	10	24	5.5	7.5
	3	CFW701 B 33P5 T2	33.5	9.2	10	28	7.5	10
		CFW701 C 45P0 T2	45	11	15	36	9.2	10
		CFW701 C 54P0 T2	54	15	20	45	11	15
		CFW701 C 70P0 T2	70	18.5	25	56	15	20
		CFW701 D 86P0 T2	86	22	30	70	18.5	25
		CFW701 D 0105 T2	105	30	40	86	22	30
. >		CFW701 E 0142 T2	142	37	50	115	30	40
220- 230 V	30	CFW701 E 0180 T2	180	55	60	142	37	50
50		CFW701 E 0211 T2	211	55	75	180	55	60

Motor Voltages 380 V and 460 V

			Normal	IEC	NEMA	Heavy	IEC	NEMA
	Power Model		Duty (ND)	50 Hz 415 V	60 Hz 460 V	Duty (HD)	50 Hz 415 V	60 Hz 460 V
- Ou	ppij		A	kW	HP	A	kW	HP
		CFW701 A 03P6 T4	3.6	1.5	2	3.6	1.5	2
		CFW701 A 05P0 T4	5	2.2	3	5	2.2	3
		CFW701 A 07P0 T4	7	3	3	5.5	2.2	3
		CFW701 A 10P0 T4	10	4	5	10	4	5
		CFW701 A 13P5 T4	13.5	5.5	7.5	11	4	7.5
		CFW701 B 17P0 T4	17	7.5	10	13.5	5.5	7.5
		CFW701 B 24P0 T4	24	11	15	19	9.2	10
20		CFW701 B 31P0 T4	31	15	20	25	11	15
380-480 V	30	CFW701 C 38P0 T4	38	18.5	25	33	15	20
380		CFW701 C 45P0 T4	45	22	30	38	18.5	25
		CFW701 C 58P5 T4	58.5	30	40	47	22	30
		CFW701 D 70P5 T4	70.5	37	50	61	30	40
		CFW701 D 88P0 T4	88	45	60	73	37	50
		CFW701 E 0105 T4	105	55	75	88	45	60
		CFW701 E 0142 T4	142	75	100	115	55	75
		CFW701 E 0180 T4	180	90	150	142	75	100
		CFW701 E 0211 T4	211	110	175	180	90	150

Motor Voltages 500 V and 600 V

			Normal	IEC	NEMA	Heavy	IEC	NEMA
	Power Model		Duty (ND)	50 Hz 525 V	60 Hz 575 V	Duty (HD)	50 Hz 525 V	60 Hz 575 V
su	pply		Α	kW	HP	Α	kW	HP
		CFW701 B 02P9 T5	2.9	1.5	2	2.7	1.5	2
		CFW701 B 04P2 T5	4.2	2.2	3	3.8	2.2	2
		CFW701 B 07P0 T5	7	4	5	6.5	4	5
		CFW701 B 10P0 T5	10	5.5	7.5	9	5.5	7.5
		CFW701 B 12P0 T5	12	7.5	10	10	5.5	7.5
		CFW701 B 17P0 T5	17	11	15	17	11	15
>		CFW701 D 22P0 T5	22	15	20	19	11	15
500-600 V	30	CFW701 D 27P0 T5	27	18.5	25	22	15	20
9	3	CFW701 D 32P0 T5	32	22	30	27	18.5	25
2		CFW701 D 44P0 T5	44	30	40	36	22	30
		CFW701 E 53P0 T5	53	37	50	44	30	40
		CFW701 E 63P0 T5	63	45	60	53	37	50
		CFW701 E 80P0 T5	80	55	75	66	45	60
		CFW701 E 0107 T5	107	75	100	90	55	75
		CFW701 E 0125 T5	125	90	125	107	75	100
		CFW701 E 0150 T5	150	110	150	122	90	100



Accessories and Optional

The CFW701 VSD was developed to meet the hardware configurations required by a wide range of applications. The table below presents the available options:

Feature	Type ¹⁾	Description	Optional item code ²⁾	Accessory code	Available
Braking IGBT	Optional	Used in high-inertia applications for the fast stop of the motor by means of an external braking resistance. Resistance not included. For the calculation of the braking resistance, refer to the CFW701 user manual	DB	-	Factory installation only
		For an IP20 product according to IEC standards. This version does not come with a KIP21X or KN1X kit inside the product box	20 ³⁾	-	User installation ³⁾
Degree of protection	Accessory	For a IP21 product according to IEC standards. This version comes with a KIP21X kit inside the product box but not installed on the CFW701	21 ⁴⁾	KIP21A-01 (frame size A) KIP21B-01 (frame size B) KIP21C-01 (frame size C) KIP21D-01 (frame size D)	
		For a NEMA1 product according to NEMA standards. This product comes with a KN1X kit inside the product box but not installed on the CFW701	N1 ⁵⁾	KN1A-02 (frame size A) KN1B-02 (frame size B) KN1C-02 (frame size C) KN1E-01 (frame size D - 105 A and 142 A) KN1E-02 (frame size D - 180 A and 211 A)	User installation ⁵⁾
	Optional	For a IP55 or NEMA12 protection degree according to standard	N12	-	Factory installation only
Switch-disconnector	Optional	A switch-disconnector built-in the product	DS	-	Factory installation only
Safety stop	Optional	After the activation of the safety stop function, the PWM pulses in the output of the drive are blocked. It is according to ISO 13849-1 and EN 954-1 / category 3	¥1	-	Factory installation only
24 V dc external power supply for feeding control circuit	Optional	It is a board on the power circuit containing a DC converter with a 24 V dc input and outputs suitable to supply voltage to the control circuit of CFW701	W1	-	Factory installation only
Relay output module	Accessory	A relay outputs expansion module - CCK-01, which has two relay outputs with reversible contacts and capacity of 1 A / 250 V for each contact	-	CCK-01	User installation
Flash memory module	Accessory	Used to download the programming of a CFW701 to others (copy function)	-	MMF-02	User installation
Mounting frame for remote keypad	Accessory	Used to transfer the operation to the panel door or machine console. Maximum distance of 10 m. Degree of protection IP56	-	RHMIF-03	User installation
Cables for remote keypad	Accessory	Used to connect the CFW701 to the remote keypad (CAB-RS-XM)	-	CAB-RS-XM, where cables with lengths (X) of 1, 2, 3, 5, 7.5 and 10 meters	User installation

Notes: 1) Optional = hardware resources added to the CFW701 in the manufacturing process. Accessory = hardware resource requested as a separated item. 2) Request the product according to the Product Coding table.

3) If you have N1 or 21 version, the VSD can be used as IP20 without installing the KIP21X and/or KN1X kit.

4) Frame size E it is IP21 as standard without KIP21X kit.

5) Frame size D it is NEMA1 as standard without KN1X kit.

Dimensions and Weights

Frame size IP20	Height in. (mm)	Width in. (mm)	Depth in. (mm)	Weight lbs. (kg)
A	9.73 (247)	5.71 (145)	8.94 (227)	13.9 (6.3)
В	11.53 (293)	7.46 (190)	8.94 (227)	22.9 (10.4)
С	14.88 (378)	8.67 (220)	11.52 (293)	45.2 (20.5)
D	19.84 (504)	11.81 (300)	12.00 (305)	71.8 (32.6)
E	24.4 (620)	13.2 (335)	14.1 (358)	143.3 (65.0)

Frame size NEMA1	Height in. (mm)	Width in. (mm)	Depth in. (mm)	Weight Ibs. (kg)
A	12.02 (305)	5.71 (145)	8.94 (227)	15.7 (7.1)
В	13.82 (351)	7.46 (190)	8.94 (227)	24.9 (11.3)
С	17.64 (448.1)	8.67 (220)	11.52 (293)	47.2 (21.4)
D	19.84 (504)	11.81 (300)	12.00 (305)	71.8 (32.6)
E	1)	13.2 (335)	14.1 (358)	2)

Frame size IP55 / NEMA 12	Height in. (mm)	Width in. (mm)	Depth in. (mm)	Weight Ibs. (kg)
В	13.82 (351)	7.46 (190)	8.94 (227)	24.9 (11.3)
С	17.64 (448.1)	8.67 (220)	11.52 (293)	47.2 (21.4)
D	19.84 (504)	11.81 (300)	12.00 (305)	71.8 (32.6)
E	1)	13.2 (335)	14.1 (358)	2)





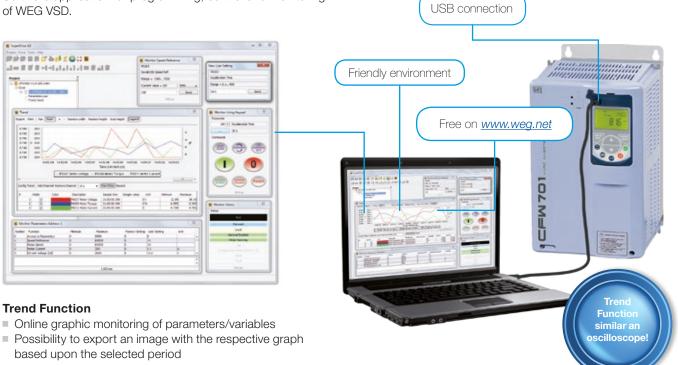
Notes: 1) 28.94 (735) = 0142 T2, 0105 T4, 0142 T4 and T5 models 32.63 (828.9) = 0180 T2/T4, 0211 T2/T4. 2) 147.97 (67.12) = 0142 T2, 0105 T4, 0142 T4 and T5 models 152.78 (69.3) = 0180 T2/T4, 0211 T2/T4.



Free Software

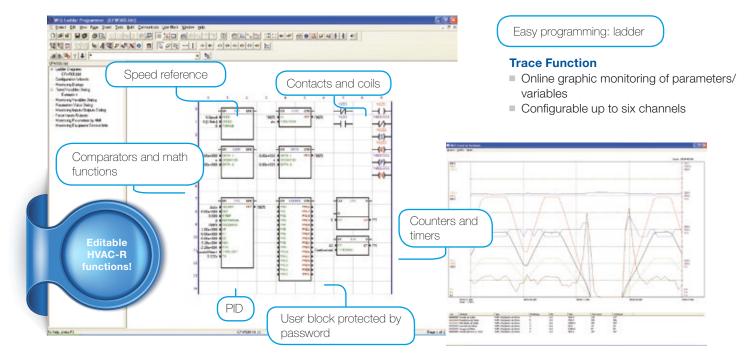
SuperDrive G2

Software application for programming, control and monitoring of WEG VSD.

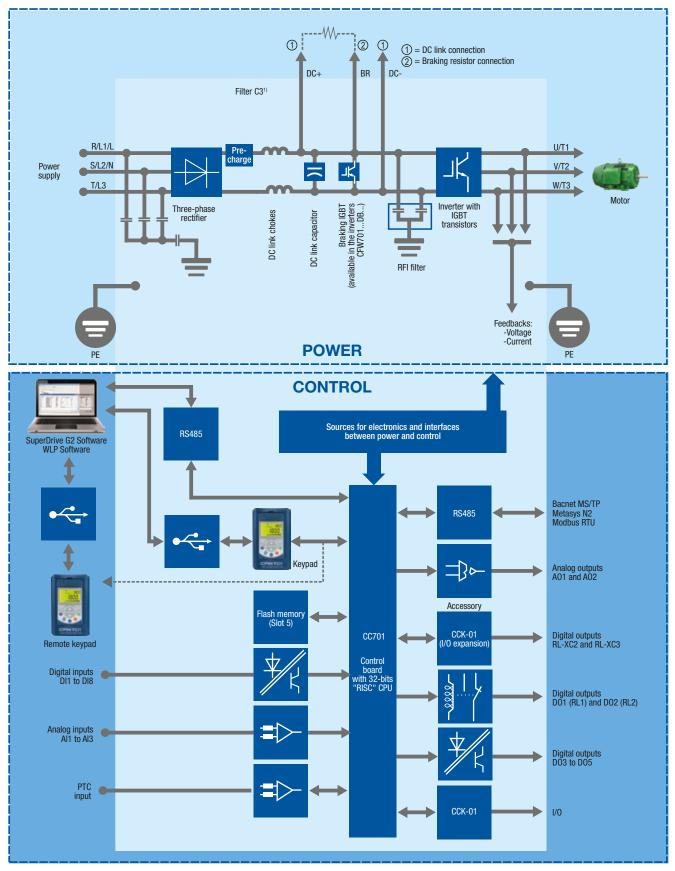


SoftPLC - Built-in on the Standard Product

Functionalities of a PLC available as standard, allowing the creation of applications. The WLP software and the SoftPLC functionality are a smart and simple way to make your CFW701, motor and application work together.



Block Diagram



Note: 1) The capacitor against the ground filter C3 (in the models size A, it is possible to meet category C2) must be disconnected for IT networks and grounded delta. Refer to the input connections on CFW701 user manual.

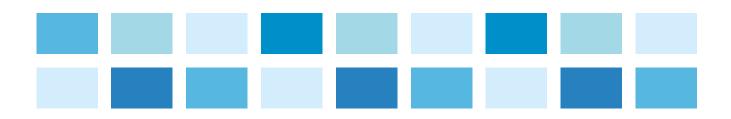


Technical Data

Permission heads a prover single heads a prover single heads a prover sin									
Prover supply Writings and power range Springs 200-200 V (e+10% - 15%) - 3prings 300-400 V (e+10% - 15%) - 2pring 100 000 000 000 000 000 000 000 000 00									
Power supply Weing and power range 2 sphere. 308-400 v (e + 10% - 15%) 2 sphere. 506-400 v (e + 10% - 10%) 2 sphere. 506-400 v (e + 10			3-phase, 200-240	V ac (+10% - 15%)					
Control local 2 is 100 Pr(1,5 to 10 kW) 3 plane, 300 600 V e (-10% - 15%) 2 is 100 Pr(1,5 to 10 kW) Pregamory 56.0 Dift (-12%, 48 to 38 H) Control 24 100 Pr(1,5 to 110 kW) Efficiency 347% Power factor 0.93% Pregamory 64 to fore opticable liquid at continuit conditional 0.71 No single-phase input at monital conditional 0.71 No single-phase input at monital conditional 0.71 No single-phase input at monital conditional 0.71 No single-phase input at monital conditional 0.71 No single-phase input at monital conditional 0.71 No single-phase input at monital conditional 2.55 Motional mice control into compare) 2.55 Motional mice control into compare) 2.55 Motional mice control into compare) 2.55 Motional mice control into compare) 2.55 Motional mice control into compare) 2.55 Motional mice control into compare) Analtable control into compare) 2.55 Motional mice control into compare) More factor intervint 0 is 9.50% Environment 0 is 9.50% More factor intervint 0 is 9.50% Analtale control into meany 10min Analtale control into montol in control into montol intervinto into mice c	Power oupply	Voltage and power range							
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	Communication	USB built in	SuperDrive and WL	P software					

Technical Data - 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
Safety standards	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
	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
Electromagnetic compatibility standards	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	EN 60529	Degrees of protection provided by enclosures (IP code)
standards	UL 50	Enclosures for electrical equipment



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