CFW500 Machinery Drives

Variable Speed Drives







One VSD, endless possibilities

The CFW500 has advanced technology Plug & Play options, developed for fast commissioning, providing great flexibility and competitive advantage while offering excellent performance and reliability. Designed for exclusively industrial or professional use, is perfect for OEM, system integrators, panel installers and End Users providing great benefit and added value.



Advantages

The optional communication network and I/O modules are fast and easily installed, allowing adaptation of the standard VSD to each application.

Within seconds, it is possible to download the SoftPLC program and parameter set from a CFW500 to others without powering them up.

Built-in PLC (SoftPLC), allowing the VSD, motor and application to work in an interactive way. It allows the user to implement customised logic and applications.

It withstands an overload of 150% for one minute every 6 minutes, at an ambient temperature of 50 °C.

> PID: process control. Sleep: disables the VSD automatically.

Flying start: allows control of a motor that is turning freely, accelerating it from the speed at which it was running.

Ride through: keeps the VSD in operation during voltage dips.

100% of the VSDs are tested with load at the factory under rated conditions.

Protection against ground fault, short circuit, overtemperature and others.

Thermal protection of IGBTs based on manufacturer curve.

Conformal Coating (Tropicalization) as Standard. Classified as 3C2 according to IEC 60721-3-3.

CANopen, DeviceNet, Profibus-DP, Ethernet-IP, Profinet-IO, Modbus-TCP and Modbus-RTU.

Benefits

Time saving, standardization and optimized costs according to the necessity.

Fast, easy and reliable programming for manufacturers that produce machines in large scale.

It eliminates the necessity of an external PLC, reducing costs, optimizing space and simplifying the system.

It does not require oversizing the VSD.

Energy saving.

It allows fast operating response of the machine and prevents occasional mechanical breakdowns.

It prevents machine stoppage and downtime.

High reliability.

It prevents damage to the inverter which can be caused by adverse situations, normally external factors.

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

Full integration with process network.



Easy Configuration



- Fast commissioning
- Innovative design, compact and uniform
- Optimised cost x benefit





With plug-in module CFW500-IOS

- 1 Power terminals
- 2 Access to DC link
- 3 Motor terminals
- 4 Control terminals (I/Os)
- 5 RS485 port

Applications

- Centrifugal pumpsProcess dosing pumps
- Fans / exhausters
- Mixers
- Compressors

- Conveyor belts
- Roller tables
- Granulators / palletizers
- Dryers
- Rotary filters









Human-Machine Interface



Friendly Programming

- Oriented start-up: programming step by step
- Easy and intuitive operation, fast access to the parameters
- Parameter group: it directs to the parameters of interest

Remote HMI

Solution for panel door or machine console.



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Energy Efficiency

In industry, electric motors are responsible for nearly 70% of all the electric energy consumed. Using a VSD, it is possible to reduce consumption by up to 40%.

Besides being efficient in the control of electric motors, they also reduce machine wear, save raw materials, improve process quality and increase productivity.

Visit the WEG website to calculate how much energy can be saved by using the CFW500 VSD.

Ensures energy efficiency for your equipment and machines. Save money and contribute to the conservation of the environment.

Certifications







SuperDrive G2

Software application to program, control and monitor WEG VSDs. To connect to a computer a plug-in is needed.



Possibility to export an image with the respective graph based upon the selected period

Changing and Monitoring Parameters in a List/Table Parameter settings can be stored in a computer file format.

Ranber	Punction	Henright	Havenum	Factory Setting	Liter Setting	Lint	
	Access to Parameters	10	39900		8		
	Doesd Reference	8	#5335		DH .		
	Motor Speed	1	#3535	1	10		
	Mata Current	10	300	101	81	A	
	DC LPR Voltage (LND)	10	2000		311	W	
	Plute Prequency		900		45.	94	
	VPD Status	8	1	D: Ready	2:Ram		
,	Pluta Yullage		2000		23	W	
	Note Taigue	-1000	3000	8	1.5.2	15	
11	Motor Current	-4	1	201	8.75		
UT I	DDB to DE1 Statut	000000008	111111111	10000000tb	00000003	_	
d.	DOT to DO1 Status	D0000000	CITITITE CONTRACTOR	000000000	H000000115		-
14	AO1 Value	10	100	D .	4.3	- No	
13	ACZ Valuet	10 C	100		1.4	14	
10	FO % Value	8	300		1		
.7	FO Hz Value		20000		1	24	
18	ALL Value	-300	100	101	1	1.	
19	AL2 VALUE	-100	100		1	15	
20	ALS VALUE	- 100	100	10	100	.7%	
28	PI % Value	-100	100		1	15	
22	PTH: Value	19	20000		0	Ha	
23	Main 207 Version	8	#55.35	1.00//	1.14		
24	Sec. SW Vension	8	655.35	1.11	1		
17	Plug-In Mod. Config.	00000008	1000010018	00000000B	300000015		
29	Fover HN Config.	00000008	00111111	100000000e	000000115		
10	Preature Temperature	-35	155		US	1C	
17	Motor Overload Ist	10	100	18.0	8	19	
40	PID Process Hariable	8	3000	101	8	1 1 1 1	
41	PID Sepont value	1	3000	10 ···	1	_	
47	CONF State	10	909	101			
45	Present Alarm	10	3999		1		
**	PresentFault		1999		1		
50	LastFault	0	999		1		
11	Current At Last Pault		200			A	
12	DC Link At Last Fault		2000				
11	Scend all art Fmill		3445		1		
-							-

- Upload/download parameters from the PC to the CFW500 and vice versa
- Offline editing of the parameters stored on the PC

Status Monitoring



Operation with HMI

Online parameter editing.



SoftPLC - Built-in 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 CFW500, motor and application work together. To connect to a computer a plug-in is needed.



Online Monitoring Parameters/Variables List

WLP Variables Moni	WLP Variables Monitoring										
Elle Help	je Beb										
Symbol Motor Current Motor Frequency Motor Volkage DC Link Volkage (Ud) Analog Input A11 Digital Input D11	Type 3/PD: Drive Parameter 3/PD: Drive Param	Address 3 5 7 4 1 1	9 511 188 301 32193 0	Edit Vite Delete Up Down F Signed							
<			>								

Parameter Edition

For changing the parameters values.

Parameter P0000 P0001 P0002	Value 0 516 0	Upload Download	Padento [3] Motor Careed	
P0003 P0004 P0005 P0005	0 305 0	Open Save	Actual Value Range: 0.0200.0.4	1.5
P0007 P0009 Edt		Close	J	0

Enable/Disable I/Os

It simplifies and speeds up the validation of the application.



I/Os Monitoring

19 170 M	onstorsin	8				E lini	
Ditt	DI2	D13	D14	05	Dis O	D17	D18
Dutputs							
D01	002	003	004	DD5			
0							



Coding

The CFW500 code identifies its construction characteristics, nominal current, voltage range and optionals. Using the smart code, it is possible to select the CFW500 required for your application simple and quickly.

Product and		Model ide	ntification		Braking1)	Degree of	Conducted	Hardware	Software
series	Frame size	Rated current	N° of phases	Rated voltage	Diaking	protection ¹⁾	emission level ¹⁾	version	version
CFW500	A	02P6	Т	4	NB	20	C2	H00	
	Check table below	V							
	NB = without dynamic $DB =$ with dynamic	amic braking ic braking							
	20 = IP20 N1 = NEMA1 enclosure								
CFW500	Blank = with no RFI filter C2 = according to category 2 of IEC 61800-3 standard, with internal RFI filter C3 = according to category 3 of IEC 61800-3 standard, with internal RFI filter								
	H00 = without plug-in module								
	Blank = standard Sx = special softw	vare							

Frame sizes	Output current	Input	Power supply voltage	Braking IGBT ²⁾	Degree of protection	Conducted emission level ³⁾
	01P6 = 1.6 A					
٨	02P6 = 2.6 A			NB		Blank or C2
	04P3 = 4.3 A	S = single phase				
	07P0 = 7.0 A	power supply				Blank or C3
R	07P3 = 7.3 A			DB		C2
	10P0 = 10 A					
	01P6 = 1.6 A					
А	02P6 = 2.6 A	B = single-phase		NB		
	04P3 = 4.3 A	or three-phase	2 = 200 240 V			
P	07P3 = 7.3 A	power supply		DB		
D	10P0 = 10 A					Blank
^	07P0 = 7.0 A			NR		
A	09P6 = 9.6 A	T = three-phase power supply		ND	_	
В	16P0 = 16 A			DB		
С	24P0 = 24 A			DB		
	28P0 = 28 A				20 or N1	
D	33P0 = 33 A			DB		Blank or C3
	47P0 = 47 A					
	01P0 = 1.0 A					
	01P6 = 1.6 A					Plank or C2
А	02P6 = 2.6 A			NB		DIALIK OF 62
C	04P3 = 4.3 A					
	06P1 = 6.1 A					Blank or C3
	02P7 = 2.7 A	T				
D	04P3 = 4.3 A	I = three-phase	4 = 380480 V	קח		Blank or C2
D	06P5 = 6.5 A	power suppry				
	10P0 = 10 A					Blank or C3
0	14P0 = 14 A			DP		Plank or C2
U U	16P0 = 16 A			au		DIALIK OF US
D	24P0 = 24 A			DD		Diank or C2
U	31P0 = 31 A			DR		DIALIK OF U3

Notes: 1) To know which models have these options in the standard product the table above should be checked.

2) 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.

To install external RFI filters, refer to the CFW500 user manual.

Drive Ratings

The correct way to select a VSD is matching its output current with the motor rated current. The tables below present the expected motor power for each VSD model. Use the motor power ratings below only as a guideline. Motor rated currents may vary with speed and manufacturer. IEC motor powers are based on WEG 4-pole motors; NEMA motor powers are based on NEC table 430-150.

Motor Voltages Between 220 V and 230 V

				IE	iC	NEMA
			Rated current	50 Hz	60 Hz	60 Hz
Power		Model		230 V	220 V	230 V
sup	oply		A	kW	HP	HP
		CFW500 A 01P6 S2	1.6	0.25	0.25	0.33
	0	CFW500 A 02P6 S2	2.6	0.55	0.5	0.5
	-	CFW500 A 04P3 S2	4.3	1.1	1	1
		CFW500 A 07P0 S2	7	1.5	2	2
		CFW500 A 01P6 B2	1.6	0.25	0.25	0.33
	_	CFW500 A 02P6 B2	2.6	0.55	0.5	0.5
>	/36	CFW500 A 04P3 B2	4.3	1.1	1	1
240		CFW500 B 07P3 B2	7.3	1.5	2	2
-0		CFW500 B 10P0 B2	10	2.2	3	3
30		CFW500 A 07P0 T2	7	1.5	2	2
		CFW500 A 09P6 T2	9.6	2.2	3	3
		CFW500 B 16P0 T2	16	4	5	5
	30	CFW500 C 24P0 T2	24	5.5	7.5	7.5
		CFW500 D 28P0 T2	28	7.5	10	10
		CFW500 D 33P0 T2	33	9.2	12.5	10
		CFW500 D 47P0 T2	47	11	15	15

					IE	C	NEMA
			Rated current	400V	50 Hz	60 Hz	60 Hz
Power		Model			415 V	460 V	460 V
sup	ply		Α		kW	HP	HP
		CFW500 A 01P0 T4	1	0.25	0.25	0.5	0.33
		CFW500 A 01P6 T4	1.6	0.55	0.75	1	0.75
		CFW500 A 02P6 T4	2.6	1.1	1.1	1.5	1
		CFW500 A 04P3 T4	4.3	1.5	1.5	3	2
		CFW500 A 06P1 T4	6.1	3	3	4	3
N 0		CFW500 B 02P6 T4	2.6	1.1	1.1	1.5	1
-48	30	CFW500 B 04P3 T4	4.3	1.5	1.5	3	2
38		CFW500 B 06P5 T4	6.5	3	3	4	3
		CFW500 B 10P0 T4	10	4	4	7.5	7.5
		CFW500 C 14P0 T4	14	5.5	7.5	10	10
		CFW500 C 16P0 T4	16	7.5	7.5	12.5	10
		CFW500 D 24P0 T4	24	11	11	15	15
		CFW500 D 31P0 T4	31	15	15	25	25

Motor Voltages Between 380 V and 480 V

Dimensions and Weights

IP20

Frame size	H mm	W mm	D mm	Weight Kg
A	189.1	75.2	149.5	0.8
В	199.1	100.2	160.1	1.2
С	210	135.2	165.1	2
D	306.6	180	166.5	4.3

NEMA1

Frame size	H mm	W mm	D mm	Weight Kg
A	223	75.2	149.5	1.05
В	243.3	100.2	160.1	1.49
С	254.8	135.2	165.1	2.35
D	362	180	166.5	4.8



Accessories and Optionals

The CFW500 VSD was developed to meet the hardware configurations required by a wide range of applications. The table below presents the available options:

Option	Type ¹⁾	Description	Optional item code ²⁾	Accessory model	Available
RFI filter	Optional	Used to reduce the disturbance conducted from the CFW500 to the power supply, in the high frequency band (>150 kHz), according to standards 61800-3 and EN 55011.	C2 or C3	-	Factory installation only
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. To specify the braking resistance, refer to the CFW500 user manual.	DB	-	Factory installation only
Degree of protection NEMA1	Optional or accessory	Used for the CFW500 VSD to have degree of protection NEMA1 and/or when metallic conduits are used for the cables.	N1	CFW500-KN1A (frame size A) CFW500-KN1B (frame size B) CFW500-KN1C (frame size C) CFW500-KN1D (frame size D)	Factory or user installation
Cable shield kit	Accessory	Used to shield the power and control cables. Important: for the version with RFI filter, this filter comes with the product.	-	CFW500-KPCSA (frame size A) CFW500-KPCSB (frame size B) CFW500-KPCSC (frame size C) CFW500-KPCSD (frame size D)	User installation
I/O expansion modules (plug-in) ³⁾	Accessory	Used to configure the I/O points according to the needs of the application/machine.	-	CFW500-IOS CFW500-IOD CFW500-IOAD CFW500-IOR	-
Communication module (plug-in)	Accessory	Used to communicate CFW500 with the main networks of the market (Fieldbus).	-	CFW500-CUSB (USB) CFW500-CCAN (CANopen /DeviceNet) CFW500-CRS232 CFW500-CRS485 CFW500-CPDP (Profibus-DP) CFW500-CEMB-TCP (Modbus-TCP) CFW500-CENN-I0 (Profinet-I0) CFW500-CETH-IP (Ethernet-IP)	-
Flash memory module (plug-in)	Accessory	Used to download the program from a CFW500 to others without having to power them up.	-	CFW500-MMF	-
Remote HMI	Accessory	Used to transfer the operation to the panel door or machine console. Maximum distance of 10 m. Degree of protection IP54.	-	CFW500-HMIR	-
Cables for remote HMI	Accessory	Used to interconnect the CFW500 to the remote HMI (CFW500-HMIR).	-	CFW500-CCHMIRXM, where cables with lengths (X) of 1, 2, 3, 5, 7,5 and 10 meters	-

	Inp	uts		Outputs			Fieldbus	communication	Power	supply
Plug-in module	Digital	Analog	Analog	Digital relay	Digital transistor	USB Port	Modbus-RTU RS485	Others	10 V	24 V
CFW500-IOS	4	1	1	1	1	-	1	-	1	1
CFW500-IOD	8	1	1	1	4	-	1	-	1	1
CFW500-IOAD	6	3	2	1	3	-	1	-	1	1
CFW500-IOR	5	1	1	4	1	-	1	-	1	1
CFW500-CUSB	4	1	1	1	1	1	1	-	1	1
CFW500-CRS485	4	2	1	2	1	-	2	-	1	1
CFW500-CRS232	2	1	1	1	1	-	1	RS232	-	1
CFW500-CCAN	2	1	1	1	1	-	1	CANopen / DeviceNet	1	1
CFW500-CPDP	2	1	1	1	1	-	1	Profibus-DP	-	1
CFW500-CEMB-TCP	2	1	1	1	1	-	1	Modbus-TCP	-	1
CFW500-CEPN-IO	2	1	1	1	1	-	1	Profinet-IO	-	1
CFW500-CETH-IP	2	1	1	1	1	-	1	Ethernet-IP	-	1

Notes: 1) Optional = hardware resources added to the CFW500 in the manufacturing process accessory = hardware resource requested as a separated item. 2) Request the product according to the code available on page 10.

3) All plug-in modules have at least one RS485 port. The CFW500-CRS485 plug-in module has two RS485 ports. The CFW500 allows installing one plug-in module per unit.





Block Diagram



Notes: 1) The number of inputs and outputs (analog and digital), as well as other resources, may vary according to the used plug-in module. For further information, refer to the CFW500 user manual.

2) Not available for frame size A. Braking resistance not included.

3) Available for frame size D only. DC link inductor not included.



Technical Data

Power supply	Voltage and power range	1-phase, 200-240 V ac (+10%-15%)
		0.25 to 2 HP (0.25 to 1.5 kW)
		1-phase/3-phase, 200-240 V ac (+10%-15%) 0.25 to 3 HP (0.25 to 2.2 kW)
		3-phase, 200-240 V ac (+10%-15%) 2 to 15 HP (1.5 to 5.5 kW)
		3-phase, 380-480 V ac (+10%-15%) 0.5 to 25 HP (0.25 to 15 kW)
	Supply frequency	50/60 Hz (48 Hz to 62 Hz)
Motor connection	Voltage	3-phase, 0-100% of supplied voltage
	Output frequency	0 a 500 Hz
	Displacement power factor	>0.97
	Overload capacity	1.5 x ln (drive) for 1 minute every 6 minutes
	Switching frequency	Default 5 kHz (selectable 2.5 to 15 kHz)
	Aceleration time	0.1 to 999s
	Deceleration time	0.1 to 999s
	Temperature	40 °C - NEMA1
		40 °C - IP20 side by side and/or with RFI filter
		50 °C - IP20 without RFI filter (except the models for 9.6 A and 24 A for 200-240 V)
Environment		2% of current derating for each °C above the specific operating temperature, limited to an increase of 10 °C
Linnoint	Humidity	5% to 95% non-condensing
	Altitude	Up to 1,000 m - rated conditions
	Altitude	1,000 m to 4,000 m - 1% of current derating for each 100 m above 1,000 m of altitude
	Degree of protection	IP20 or NEMA1 (with kit NEMA1)
	V/f control	Speed regulation: 1% of the rated speed (with slip compensation)
Deufermene		Speed variation range: 1:20
Performance	Vector control (VVW)	Speed regulation: 1% of the rated speed
		Speed variation range: 1:30
Braking methods	Dynamic braking	Braking IGBT available as standard for frame sizes B, C and D. An external resistor must be installed for dynamic braking capability
	DC braking	DC current applied to the motor
Safety	Protection	Overcurrent/phase-phase short circuit in the output
		Overcurrent/phase-ground short circuit in the output
		Under/overvoltage
		Overtemperature in the heatsink
		Overload in the motor
		Overload in the power module (IGBTs)
		External alarm / fault
		Setting error
Communication	Modbus-RTU	All plug-in modules for RS485 and CFW500-CRS232 for RS232
	Profibus-DP	Plug-in module CFW500-CPDP
	DeviceNet	Plug-in module CFW500-CCAN
	CANopen	Plug-in module CFW500-CCAN
	Modbus-TCP	Plug-in module CFW500-CEMB-TCP
	Profinet-IO	Plug-in module CFW500-CEPN-IO
	Ethernet-IP	Plug-in module CFW500-CETH-IP
Chokes	AC input chokes	To reduce THD
(external as accessory)	AC output chokes	For longer motor cables

Technical Data - Standards

Safety standards	UL 508C	Power conversion equipment.
	UL 840	Insulation coordination including clearances and creepage distances for electrical equipment.
	EN 61800-5-1	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 1: General requirements. Note: For the machine to comply with this standard, the manufacturer of the machine is responsible for installing an emergency stop device and equipment to disconnect the input power supply.
	EN 60146 (IEC 146)	Semiconductor converters.
	EN 61800-2	Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency AC power drive systems.
Electromagnetic Compatibility (EMC) Standards	EN 61800-3	Adjustable speed electrical power drive systems - Part 3: EMC product standard including specifc test methods.
	EN 55011	Limits and methods of measurement of radio disturbance characteristics of industrial, scientifc and medical (ISM) radio-frequency equipment.
	CISPR 11	Industrial, scientifc 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 feld 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, induced by radio-frequency fields.
Mechanical construction standards	EN 60529	Degrees of protection provided by enclosures (IP code).
	UL 50	Enclosures for electrical equipment.



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Shaw Controls

Motor Control Centres, Packaged Switchgear Solutions

18 Mt. Ida Road, Robertsham P O Box 39195, Booysens 2016 GPS: S 26° 14' 43.8" E 28° 00' 59.3" Tel: +27 (0) 11 680 4534 Fax: +27 (0) 11 433 3569 enquiries@shaw.zest.co.za

Zest Energy

Integrated Power Generation, Co–Generation and Energy Solutions

21 Galaxy Avenue, Linbro Business Park Private Bag X10011, Sandton 2146 GPS: S 26° 4' 23.4" E 28° 6' 49.5" Tel: +27 (0) 11 723 6000 Fax: +27 (0) 11 723 6001 info@zestenergy.co.za

WEG Transformers Africa

Locally Manufactured Transformers and Mini-Substations 38 Van Deventer Street, Wadeville Germiston GPS: S 26° 15.941' E 28° 12.46' Tel: +27 (0) 11 827 3458 Fax: +27 (0) 11 827 1668 info@wegtransformersafrica.co.za



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