DATASHEET
Variable Speed Drives

Main Features

Reference	: CFW900A04P6T2DB20Y2B
Product code	: 14326157
Product reference	: CFW900

Basic data

Rated voltage	: 200 up to 240 V
Input minimum-maximum voltage	: 170-264 V
Number of phases:	
- Input	: 3
- Output	: 3

Supply voltage range	200-240V	
Overload specification	Normal Duty (ND)	Heavy Duty (HD)
Rated output current	4.6 A	4,6 A
Overload output current 60 s	5.06 A	6.9 A
Overload output current 3 s	6.9 A	9.2 A

Maximum applicable motor

Voltage / Frequency	Rated power (HP / kW) [1]	
	Normal Duty (ND) overload [1]	Heavy Duty (HD) overload [1]
220V / 60Hz	1.5 / 1.1	1.5 / 1.1
230V / 50Hz	1.5 / 1.1	1.5 / 1.1
230V / 60Hz	1.5 / 1.1	1.5 / 1.1

Dynamic braking [2]	: Yes
EMC filter	: Yes, emissions and immunity category C3
Conducted issue	: Categories C2 and C3
Link Inductor	: Yes
Disconnect switch	: Not applicable
Safety function	: STO/SS1
Electronic external power	: Yes (24 Vdc ±10%)
Hardware	: Standard

VSD power specifications

Line frequency	: 50/60 Hz
Line frequency range (minimum - maximum)	: 48-63 Hz
Phase unbalance	: Less or equal to 3% of input rated line voltage
Transient voltage and overvoltage	: Category III

Three-phase input rated current:

- Three-phase input current ND	: 4.6 A
- Three-phase input current HD	: 4.6 A
Typical input power factor	: 0.93
Displacement factor	: > 0.98
Rated efficiency	: ≥ 96%
Efficiency class	: IE2
Maximum connections (power up cycles - on/off) per hour	: 60

Direct current power supply : Allow, specified input DC voltage range: 229 up to 400 Vdc

Standard switching frequency:

- Rated switching frequency ND	: 4 kHz
- Rated switching frequency HD	: 4 kHz
Selectable switching frequency	: 1 to 16 kHz
Memory card	: MicroSD (card not included)
Real-time clock	: Yes, on the control board
Copy Function	: Yes, by microSD card or WPS

Dissipated power

Inverter part	200-240V	
	Normal Duty (ND)	Heavy Duty (HD)
Complete inverter	70 W	70 W
Front part of the inverter [3]	30 W	30 W

VSD control specifications

Motor control / performance data

Control types:

- Control method - induction motor	: Scalar, VVW, Vector with and without encoder
- Control type - PM motor	: VVW
Control output frequency [5]	: 0-500 Hz
Frequency resolution	: Equivalent to 1 rpm
Encoder interface	: Yes (input A/B, 24V, 32kHz)
Encoder accessory	: CFW900-ENC-01: ABZ, 5-30 V, 310 kHz (not included)

Induction motor

Scalar control:

- Speed regulation	: 1% of rated speed
- Speed variation	: 1:20

VVW control:

- Speed regulation	: 1% of rated speed
- Speed variation	: 1:30

Sensorless vector control:

- Speed regulation	: 0,5% of rated speed
- Speed variation	: 1:100

Vector control with encoder:

- Speed regulation	: 0,05% of rated speed
- Speed variation	: Up to 0 rpm

Permanent magnet motor

VVW control:

- Speed regulation	: 0.05% of rated speed
- Speed variation	: 1:10

General control specification

Power supply available to the user:

- Output voltage	: 24 Vdc ±10%
- Maximum capacity [4]	: 0,75 A
Backplane	: CFW900-4SLOTS (Total slots for function expansion: 4).

Control modules assembled on the VSD:

- Slot A	: CFW900-REL-01
- Slot X	: CFW900-IOS

Inputs and outputs

Analog inputs [CFW900-IOS (Slot X) - included]

Quantity (standard)	: 2
Levels	: -10/0 to 10V; 0/4 to 20mA

Impedance:

- Impedance for voltage input	: 400 kΩ
- Impedance for current input	: 250 Ω
Function	: Programmable
Maximum allowed voltage	: ± 30 Vcc

Digital inputs [CFW900-IOS (Slot X) - included]

Quantity (standard)	: 6
Type	: Configurable, NPN or PNP
Maximum low level	: 5 V (DI1 to DI6)
Minimum high level	: 11 V (DI1 to DI4) and 15 V (DI5/DI6)
Input current	: 11 mA
Maximum input current	: 13 mA
Maximum frequency	: 32 kHz (DI5/6) - Not avail. V1.xx
Function	: Programmable
Maximum allowed voltage	: 30 Vcc

Saídas analógicas [CFW900-IOS (Slot X) - included]

Quantity (standard)	: 2
Levels	: 0 to 10V, 0 to 20mA and 4 to 20mA
RL for voltage output	: 10 kΩ
RL for current output	: 600 Ω
Function	: Programmable

Relay digital outputs [CFW900-IOS (Slot X) - included]

Transistor digital output	: 2 (NPN)
Maximum voltage	: 24 Vdc
Maximum current	: 40 mA
Maximum frequency	: 32 kHz (Not avail. version V1.xx)
Function	: Programmable

Relay outputs [accessory CFW900-REL-01 (included)]

Quantity (standard)	: 2 relays NO; 1 relay NO/NC
Maximum output voltage	: 250 Vac / 30 Vdc, OVC III
Maximum current	: 2 A
Function	: Programmable

Functional safety

Safety funcions:
- Safe torque off (STO) according to IEC 61800-5-2 - Stop category 0 according to IEC 60204-1
- Safe stop 1 time controlled (SS1-t), according to IEC 61800-5-2 - Stop category 1 according to IEC 60204-1

Safety category:
- SIL 3, according to IEC 61508 / IEC 62061 / IEC 61800-5-2
- PLe, category 4, according to EN ISO 13849-1

Number of inputs: 2

Communication

Bluetooth interface	: Yes, included in HMI
USB port	: Yes, available in HMI
RS-485 port	: Yes, included
RS-485 protocol	: Modbus RTU
Dual Ethernet port	: Yes, included
Ethernet protocol 1	: Modbus TCP
Ethernet protocol 2	: Direct cloud connection (MQTT) - Embedded drive scan
CAN port	: Yes, with CFW900-CCAN-W accessory (not included)
CAN Protocol 1	: CANOpen
CAN Protocol 2	: DeviceNet

Available protections/faults

- Overcurrent/short circuit in the output
- Phase loss
- Under/Overvoltage on the DC link
- Overtemperature
- Motor overload
- Overload in the power module (IGBTs)
- External alarm/fault
- Braking resistor overload
- CPU or memory fault
- Phase-ground short circuit in the output

Keypad (HMI)

Avaliability	: Included in the product
HMI installation	: Local (on the inverter) or remote (via cable - not included)
Number of HMI buttons	: 12
Display	: Graphic LCD
Indication accuracy	: 5% of rated current
Speed resolution	: 1 rpm
Standard HMI degree of protection	: IP65 (IEC) / UL Type 12 (UL)
Remote HMI frame	: Accessory
Remote HMI degree of protection	: IP65 (IEC) / UL Type 12 (UL)

Ambient conditions

Degree of protection of VSD enclosure:

- Front	: IP20 (IEC) / Open-Type (UL)
- Front with accessory	: IP21 (IEC) / UL Type 1 (UL)
- Rear	: IP55 (IEC) / UL Type 12 (UL)
Pollution degree	: 2 (EN50178 and UL508C)

Temperature:

- Minimum	: -10 °C / 14 °F
- Maximum (front side)	: 60 °C
- Maximum (back)	: 50 °C

Current derating:

- Switching frequency of 2 kHz: 2%/°C from 50°C (1.1%/°F from 122°F) on the rear part.
- Switching frequency ≥ 4 kHz: 1%/°C from 40 to 50°C (0.56%/°F from 104 to 122°F) on the back and 2%/°C from 50°C (1.1%/°F from 122°F) on the rear part.

Relative humidity (non-condensing)

- Minimum	: 5%
- Maximum	: 90%

Altitude

- Rated conditions	: 1000 m (3281 ft)
- Maximum allowed for operation (with derating factor)	: 4000 m (13123 ft)

Current and voltage deratings as a function of altitude:

- Current derating factor (for altitudes above rated)	: 1% for each 100 m above (0,3% for each 100 ft above)
- Voltage derating factor (for altitudes above 2000 m / 6562 ft)	: 1,1% for each 100 m above (0,33% for each 100 ft above)

Sustainability Directives

RoHS	: Yes
Conformal Coating	: 3C2 (IEC 60721-3-3:2002)

Frame size, dimensions and weight

Size	: A
Height	: 269.3 mm / 10.6 in
Width	: 145 mm / 5.71 in
Depth	: 221.8 mm / 8.73 in
Weight	: 4.5 kg / 9,92 lb

Mechanical installation

Mounting position	: Surface or flange
Fixing screw	: M5
Tightening torque	: 5 N.m / 3.69 lb.ft
Allows side-by-side assembly	: Yes, IP20 degree of protection
- Top	: 25 mm / 0.98 in
- Bottom	: 25 mm / 0.98 in
- Front	: 10 mm / 0.39 in
- Between inverters (IP20)	: 0 mm / 0 in
- Between inverters (IP21 or UL Type 1)	: 30 mm / 1.18 in
Allows horizontal mounting	: Yes

Electrical connections

	Recommended cable gauge @ 75 °C (167 °F)	Recommended tightening torque
Power supply and motor	2.5 mm² (14 AWG)	1.2 N.m / 0.89 lb.ft
Braking	2.5 mm² (14 AWG)	1.2 N.m / 0.89 lb.ft
Grounding	2.5 mm² (14 AWG)	1.2 N.m / 0.89 lb.ft
Control	XC1/XC2: 0.2-1.5mm² (24-16AWG) XC30: 0.2-2.5mm² (24-12AWG)	Spring push-in connection

Additional specifications

Maximum breaking current	: 10.0 A
Minimum resistance for the brake resistor	: 43 Ω
Recommended aR fuse [6]	: FNH000-20K-A
Recommended aR fuse [6]	: Not applicable
Recommended circuit breaker [6]	: ACW100H-FMU40-3
Recommended circuit breaker [6]	: UBW225H-FTU40-3A
HMI battery type	: CR2032
HMI battery life expectancy	: 10 years

Power loss data according to Ecodesign Directive 2019/1781 (IEC 61800-9 standard)

Rated supply voltage	: 230 V
Rated output current	: 4.6 A
Motor power	: 1.1 kW
Switching frequency	: 4 kHz
Aparent power of the inverter (Sr,equ)	: 1.8 kVA

VSD (CDM) power losses at the following operating points (speed, torque) [7]:

	Torque: 25%	Torque: 50%	Torque: 100%
Speed: 0%	2.4%	2.6%	3.0%
Speed: 50%	2.4%	2.7%	3.3%
Speed: 90%		2.9%	3.9%

Standby power losses: 24 W / 1.3%

Efficiency class : IE2

Standards

Safety standards	- UL61800-5-1 - Adjustable Speed Electricla Power Drive Systems - Part 5-1: Safety Requirements - Electrical, Thermal and Energy - EN 61800-5-1 - Safety requirements electrical, thermal and energy - EN 50178 - Electronic equipment for use in power instalations - EN 60146 (IEC 146) - Semiconductor converters
Specifications standard	- EN 61800-2 - Adjustable speed electrical power drive systems - Part 2: General requirements - Rating especifications 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 specific test methods - EN 55011 - Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment - CISPR 11 - Industrial, scientific and medical (ISM) radio-frequency equipment - Eletromagnetic disturbance characteristics - Limits and methods of measurement - EN 61000-4-2 - Eletromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Eletrostatic discharge immunity test - EN 61000-4-3 - Eletromagnetic compatibility (EMC) - Part4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test - EN 61000-4-4 - Eletromagnetic compatibility (EMC) - Part4: Testing and measurement techniques - Section 4: Electrical fast transient/ burst immunity test - EN 61000-4-5 - Eletromagnetic compatibility (EMC) - Part4: Testing and measurement techniques - Section 5: Surge immunity test - EN 61000-4-6 - Eletromagnetic compatibility (EMC) - Part4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields - EN 61000-4-11 - Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
Mechanical construction standards	- EN 60529 - Degrees of protection provided by enclosures (IP code) - UL 50 - Enclosures for electrical equipment
Ecodesign standards	- IEC 61800-9 Parts 1&2 - Adjustable speed electrical power drive systems - Ecodesign for power drive systems, motor starters, power electronics and their driven applications
Functional safety standards	- EN 61800-5-2 - Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional - EN ISO 13849-1 - Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design - EN 62061 - Safety of machinery - Functional safety of safety-related control systems - IEC 61508 Parts 1-7 - Functional safety of electrical/electronic/ programmable electronic safety-related systems - EN 60204-1 - Safety of machinery - Electrical equipment of machines - Part 1: General requirements

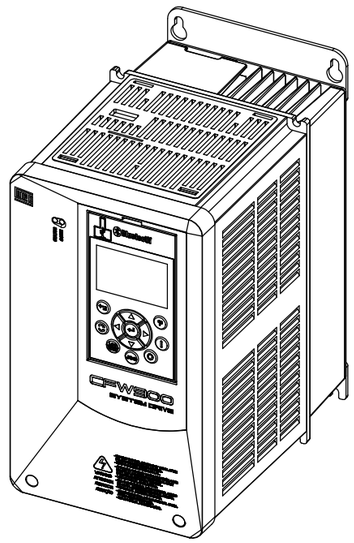
Certifications

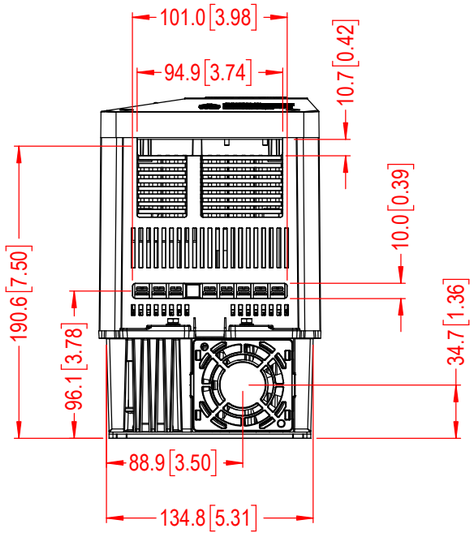
Product certification : UL, CE, RCM, EAC, UKCA, TÜV Rheinland-FS and UL-NOM

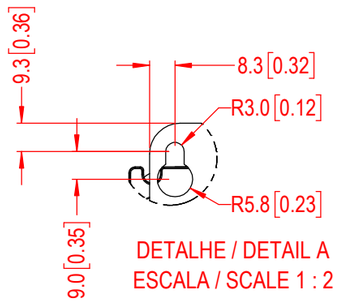
Notes

1) Orientative motor power, valid for WEG Motors standard of IV poles. The correct sizing must be done according to the rated current of the used motor, which must be equal or lower than the rated output current of the VSD.
2) Braking resistor is not included.
3) When VSD is flange mounted, that power losses data refer to the power losses of the front part of the VSD that is inside the cabinet (the rest of the VSD losses are outside the cabinet).
4) That power supply is also used to feed the control modules (accessories). Information on correct sizing is provided in CFW900 User's Manual.

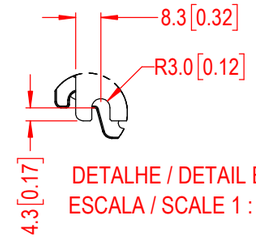
5) Typical maximum value considering the switching frequency settings as per factory default (it is possible to increase the maximum output frequency that can be generated by the VSD by increasing the switching frequency). Maximum possible value: switching frequency / 10.
6) There are variations to meet UL and CE standards. For further information refer to CFW900 User's Manual.
7) VSD power losses in relation to its rated apparent power (Sr,equ).
8) All images are merely illustrative.
9) For further information refer to CFW900 User's Manual.



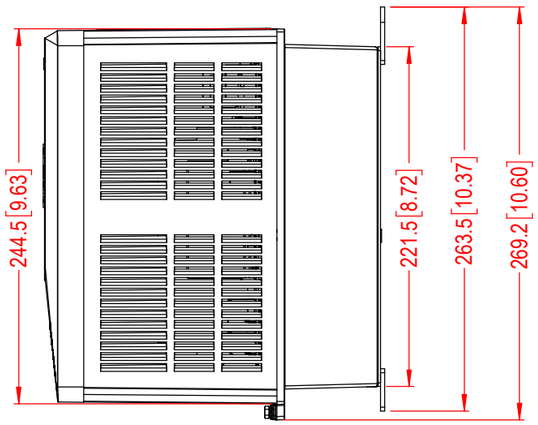


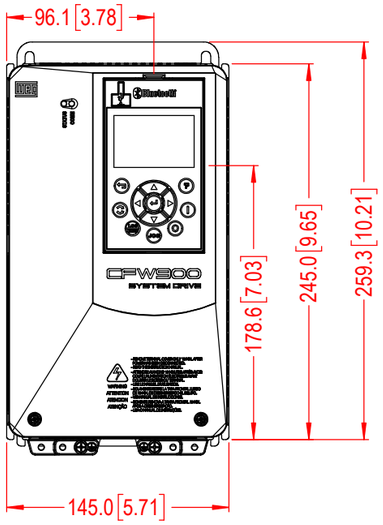


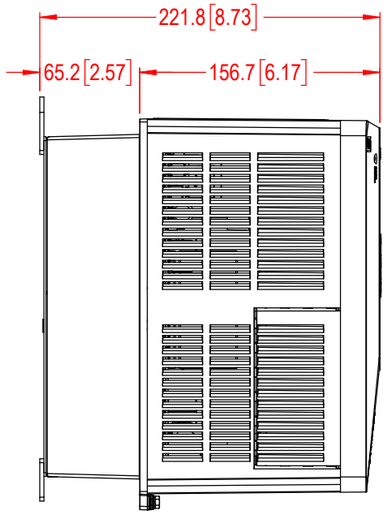
DETALHE / DETAIL A
ESCALA / SCALE 1 : 2

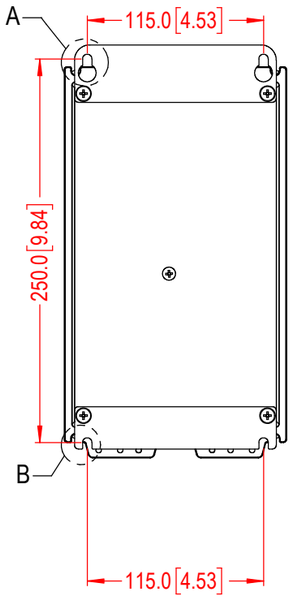


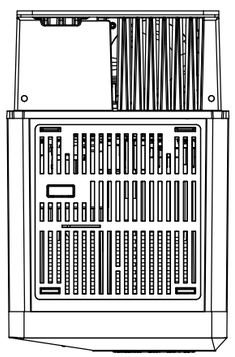
DETALHE / DETAIL B
ESCALA / SCALE 1 : 2











MASSA BRUTA/GROSS WEIGHT		kg	MASSA LÍQUIDA/NET WEIGHT		kg	ESCALA/SCALE	1:4	
ECM	LOC	RESUMO DE MODIFICAÇÕES *SUMMARY OF MODIFICATIONS*		EXECUTADO *EXECUTED*	VERIFICADO *CHECKED*	LIBERADO *RELEASED*	DATA *DATE*	VER
EXEC		CFW900		45016237				
VERIF/CHECKED		MEC A / SIZE A						
LIBER/RELEASED		IP20		00				
DT LIBER/REL DT				FOL/SHEET 1 / 1				

SWD - A3