

# DATASHEET

## Variable Speed Drives



### Main Features

Reference : NACFW110024T20N1Z  
 Product code : 10574727  
 Product line : CFW11

### Basic data

Power supply : 200-240 V  
 Input minimum-maximum voltage : 170-264 V  
 Number of phases : 3  
 Input : 3  
 Output : 3

Supply voltage range	200-240 V	
Overload regime	Normal (ND)	Heavy (HD)
Rated current	24 A	20 A
Overload current at 60 s	26,4A	30A
Overload current at 3 s	36A	40A

### Maximum applicable motor

Voltage/Frequency	Power (HP / kW) [1]	
	Normal Overload (ND)	Heavy Overload (HD)
220V / 50Hz	7.5 / 5.5	7.5 / 5.5
220V / 60Hz	7.5 / 5.5	7,5 / 5.5
230V / 50Hz	7.5 / 5.5	7.5 / 5.5
230V / 60Hz	7.5 / 5.5	7.5 / 5.5

Dynamic braking [2] : Standard with braking  
 Electronic supply : Internal  
 Safety Stop : No  
 RFI internal filter [3] : Without filter  
 External filter : Not available  
 Link Inductor : Yes  
 Memory card : Included in the product  
 USB port : Standard in the product  
 Line frequency : 50/60Hz  
 Line frequency range (minimum - maximum) : 48-62 Hz  
 Phase unbalance : Less or equal to 3% of input rated line voltage  
 Transient voltage and overvoltage : Category III  
 Rated current of single-phase input :  
 - Overload (ND) :  
 - Overload (HD) :  
 Rated current of three-phase input :  
 - Overload (ND) : 24A  
 - Overload (HD) : 20A  
 Typical input power factor : 0.94  
 Displacement factor : 0.98  
 Rated efficiency : ≥ 97%  
 Maximum connections (power up cycles - on/off) per hour : 60  
 DC power supply : Allow  
 Standard switching frequency :  
 - Overload ND : 5 kHz  
 - Overload HD : 5 kHz  
 Selectable switching frequency : 1.25; 2; 2.5; 5 and 10 kHz  
 Real-time clock : Yes, in the HMI  
 Copy Function : Yes, by HMI/MMF  
 Dissipated power:

Mounting type	Overload		Overload (*)	
	ND	HD	ND	HD
Surface	310 W	250 W	Not applicable	Not applicable
Flange	50 W	40 W	Not applicable	Not applicable

### Source available to the user

Output voltage : 24 Vcc  
 Maximum capacity : 500 mA

### Control/performance data

Power supply : Switched-mode power supply  
 Control method - induction motor : V/f, VVW, Vector and PM motor  
 Encoder interface : Only with 'Slot 2' accessory

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### Control/performance data

Control output frequency [5]	: 0 to 300 Hz
Frequency resolution	: Equivalent to 1 rpm
V/F 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

### Analog inputs

Quantity (standard)	: 2
Levels	: 0-10V, 0/4-20mA and -10-+10V
Impedance	
- Impedance for voltage input	: 400 kΩ
- Impedance for current input	: 500 Ω
Function	: Programmable
Maximum allowed voltage	: ± 30 Vcc

### Digital inputs

Quantity (standard)	: 6
Activation	: Active low and high
Maximum low level	: 3 V
Minimum high level	: 18 V
Input current	: 11 mA
Maximum input current	: 13.5 mA
Function	: Programmable
Maximum allowed voltage	: 30 Vcc

### Analog outputs

Quantity (standard)	: 2
Levels	: 0 to 10V, 0 to 20mA and 4 to 20mA
RL for voltage output	: 10 kΩ
RL for current output	: 500 Ω
Function	: Programmable

### Digital outputs

Quantity (standard)	: 3 NO/NC relays
Maximum voltage	: 240 Vca
Maximum current	: 1 A
Function	: Programmable

### Communication

- Modbus-RTU (with accessory: RS485-01; RS485-05; CAN/RS485-01; RS232-01 or RS232-05)
- Modbus/TCP (with accessory: MODBUSTCP-05)
- Profibus DP (with accessory: PROFDP-05)
- Profibus DPV1 (with accessory: PROFIBUS DP-01)
- Profinet (with accessory: PROFINETIO-05)
- CANopen (with accessory: CAN/RS485-01 or CAN-01)
- DeviceNet (with accessory: DEVICENET-05; CAN/RS485-01 or CAN-01)
- EtherNet/IP (with accessory: ETHERNET/IP-05 or ETHERNETIP-2P-05)
- EtherCAT (with accessory: ETHERCAT-01)
- BACnet (with accessory: RS485-01 or CAN/RS485-01)

### Protections available

- Output overcurrent/short circuit
- Power supply phase loss
- Under/Overvoltage in power
- Overtemperature
- Motor overload
- IGBT's modules overload
- Fault/External alarm
- Breaking resistor overload
- CPU or memory failure
- Output phase-ground short circuit

### Operation interface (HMI)

Availability	: Included in the product
HMI installation	: Local
Number of HMI buttons	: 9
Display	: Graphic LCD
Indication accuracy	: 5% of rated current
Speed resolution	: 1 rpm

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### Operation interface (HMI)

Standard HMI degree of protection	: IP56
HMI battery type	: CR2032
HMI battery life expectancy	: 10 years
Remote HMI type	: Detachable of the inverter
Remote HMI frame	: Accessory
Remote HMI degree of protection	: IP56

### Ambient conditions

Enclosure	: NEMA1
Pollution degree	: 2 (EN50178 and UL508C)
Temperature	
- Minimum	: -10 °C / 14 °F
- Nominal [4]	: 50 °C / 122 °F
Current reduction factor [5]	: 2 % per °C of 50 (122) o 60 °C (140 °F)
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 Reduction factor[6]	
- 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 policies

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

### Dimensions

Size	: B
Height	: 378 mm / 14.9 in
Width	: 190 mm / 7.48 in
Depth	: 227 mm / 8.94 in
Weight	: 10 kg / 22 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, without top cap
Minimum spacing around the inverter	
- Top	: 40 mm / 1.57 in
- Bottom	: 45 mm / 1.77 in
- Front	: 10 mm / 0.39 in
- Between inverters (IP20)	: 30 mm / 1.18 in

### Electrical connections

Cable gauges and tightening torque:

	Recommended cable gauge to 75 °C (167 °F)	Recommended tightening torque
Power	6.0 mm <sup>2</sup> (10 AWG)	1.2 N.m / 0.89 lb.ft
Braking	6.0 mm <sup>2</sup> (10 AWG)	1.2 N.m / 0.89 lb.ft
Grounding	6.0 mm <sup>2</sup> (10 AWG)	1.7 N.m / 1.25 lb.ft
Control	0.5 to 1.5 mm <sup>2</sup> (20 to 14 AWG)	0,5 N.m / 0.37 lb.ft

### Additional specifications

Maximum breaking current	: 26.7 A
Minimum resistance for the brake resistor	: 15 Ω
Recommended aR fuse [6]	: FNH00-40K-A
Recommended aR fuse [6]	: Not applicable
Recommended circuit breaker [6]	: ACW100H-FMU32-3
Recommended circuit breaker [6]	: Not applicable

### Standards

Safety	<ul style="list-style-type: none"> <li>- UL 508C - Power conversion equipment.</li> <li>- UL 840 - Insulation coordination including clearances and creepage distances for electrical equipment.</li> <li>- EN 61800-5-1 - Safety requirements electrical, thermal and energy.</li> <li>- EN 50178 - Electronic equipment for use in power instalations</li> <li>- EN 60204-1 - Safety of machinery. Electrical equipment of machines. Part 1: General requirements. Note: To have a machine in accordance with this standard, the machine manufacturer is responsible for installing an emergency stop device and supply disconnecting device.</li> <li>- EN 60146 (IEC 146) - Semiconductor converters.</li> <li>- EN 61800-2 - Adjustable speed electrical power drive systems - Part 2: General requirements - Rating especifications for low voltage adjustable frequency AC power drive systems.</li> </ul>
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Electromagnetic compatibility	<p>EN 61800-3 - Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods.</p> <ul style="list-style-type: none"> <li>- EN 55011 - Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.</li> <li>- CISPR 11 - Industrial, scientific and medical (ISM) radio-frequency equipment</li> <li>- Eletromagnetic disturbance characteristics - Limits and methods of measurement.</li> <li>- EN 61000-4-2 - Eletromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Eletrostatic discharge immunity test.</li> <li>- EN 61000-4-3 - Eletromagnetic compatibility (EMC) - Part4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test.</li> <li>- EN 61000-4-4 - Eletromagnetic compatibility (EMC) - Part4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test.</li> <li>- EN 61000-4-5 - Eletromagnetic compatibility (EMC) - Part4: Testing and measurement techniques - Section 5: Surge immunity test.</li> <li>- EN 61000-4-6 - Eletromagnetic compatibility (EMC) - Part4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields.</li> </ul>
Mechanical construction	<ul style="list-style-type: none"> <li>- EN 60529 - Degrees of protection provided by enclosures (IP code).</li> <li>- UL 50 - Enclosures for electrical equipment.</li> <li>- EN 60529 e UL 50</li> </ul>

### Certifications

UL, CE, C-Tick, CS and IRAM

### Notes

- 1) Orientative motor power, valid for WEG Motors standard of IV poles. The correct sizing must be done according to the nominal current of the motor used, which must be less than or equal to the rated output current of the inverter;
- 2) Braking resistor is not included;
- 3) With category for emission level conducted;
- 4) Without derating and with minimum spaces;
- 5) For temperatures above the nominal and maximum temperature (with derating of current and minimum spaces);
- 6) For altitude over of specified;
- 7) All images are merely illustrative;
- 8) For more information, see the users manual of the CFW-11 (size B).