

# DATASHEET

## Variable Speed Drives



### Main Features



Reference : CFW701B04P2T5DBN1C3  
 Product code : 12263653  
 Product line : CFW701 HVAC

### Basic data

Power supply : 500-600 V  
 Input minimum-maximum voltage : 425-660 V  
 Number of phases : 3  
 Input : 3  
 Output : 3

| Supply voltage range     | 500-600 V   |            | 500-600 V   |            |
|--------------------------|-------------|------------|-------------|------------|
|                          | Normal (ND) | Heavy (HD) | Normal (ND) | Heavy (HD) |
| Overload regime          |             |            |             |            |
| Rated current            | 4,2A        | 3.8        |             |            |
| Overload current at 60 s | 4,6A        | 4,6A       |             |            |
| Overload current at 3 s  | 4,8A        | 5          |             |            |

### Maximum applicable motor

| Voltage/Frequency | Power (HP / kW) [1]  |                     |
|-------------------|----------------------|---------------------|
|                   | Normal Overload (ND) | Heavy Overload (HD) |
| 525V / 50Hz       | 3 / 2,2              | 3 / 2,2             |
| 575V / 60Hz       | 3 / 2,2              | 3 / 2,2             |

Dynamic braking [2] : Standard with braking  
 Electronic supply : Internal  
 Safety Stop : No  
 RFI internal filter [3] : With filter (C3 category)  
 External filter : Not available  
 Link Inductor : Yes  
 Memory card : Not included in the product  
 USB port : Yes, available in HMI  
 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) : 4,2A  
 - Overload (HD) : 3.8A  
 Typical input power factor : 0,94  
 Displacement factor : 0,98  
 Rated efficiency :  $\geq 97\%$   
 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; 2,5 and 5 kHz  
 Real-time clock : Not available  
 Copy Function : Yes, by MMF  
 Dissipated power:

| Mounting type | Overload |       | Overload (*)   |                |
|---------------|----------|-------|----------------|----------------|
|               | ND       | HD    | ND             | HD             |
| Surface       | 133 W    | 125 W | Not applicable | Not applicable |
| Flange        | 62 W     | 61 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, Sensorless  
 Encoder interface : Available in inverter  
 Control output frequency [5] : 0 to 300 Hz  
 Frequency resolution : Equivalent to 1 rpm

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The information contained are reference values. Subject to change without notice.

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### Control/performance data

|                             |                       |
|-----------------------------|-----------------------|
| 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          | : Not applicable      |
| - Speed variation           | : Not applicable      |

### Analog inputs

|                               |                                |
|-------------------------------|--------------------------------|
| Quantity (standard)           | : 3                            |
| Levels                        | : 0-10V, 0/4-20mA and -10-+10V |
| Impedance                     |                                |
| - Impedance for voltage input | : 400 k $\Omega$               |
| - Impedance for current input | : 500 $\Omega$                 |
| Function                      | : Programmable                 |
| Maximum allowed voltage       | : $\pm 15$ Vdc                 |

### Digital inputs

|                         |                       |
|-------------------------|-----------------------|
| Quantity (standard)     | : 8                   |
| Activation              | : Active low and high |
| Maximum low level       | : 2 V                 |
| Minimum high level      | : 10 V                |
| Input current           | : 7.5 mA              |
| Maximum input current   | : 9.5 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 k $\Omega$                     |
| RL for current output | : 500 $\Omega$                      |
| Function              | : Programmable                      |

### Digital outputs

|                     |                                  |
|---------------------|----------------------------------|
| Quantity (standard) | : 2 NO/NC relay and 3 transistor |
| Maximum voltage     | : 240 Vac and 30 Vdc             |
| Maximum current     | : 0.75 A and 80 mA               |
| Function            | : Programmable                   |

### Communication

- Modbus-RTU (Standard)
- Modbus/TCP (Not available)
- Profibus DP (with accessory: PROFIBUS DP-01)
- Profibus DPV1 (Not available)
- Profinet (Not available)
- CANopen (with accessory: CAN-01)
- DeviceNet (with accessory: CAN-01)
- EtherNet/IP (Not available)
- EtherCAT (Not available)
- BACnet (Not available for CFW700 series. Available by default on the CFW701 series)

### Protections available

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

### Operation interface (HMI)

|                                   |                           |
|-----------------------------------|---------------------------|
| Avaliability                      | : 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                   |
| Standard HMI degree of protection | : IP56                    |
| HMI battery type                  | : Not applicable          |
| HMI battery life expectancy       | : Not applicable          |

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### Operation interface (HMI)

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 : 95%  
 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 : 351 mm / 13.8 in  
 Width : 190 mm / 7.48 in  
 Depth : 227 mm / 8.94 in  
 Weight : 10,4 kg / 22.9 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     | 1,5 mm <sup>2</sup> (14 AWG)              | 1,2 N.m / 0.89 lb.ft          |
| Braking   | 6,0 mm <sup>2</sup> (8 AWG)               | 1,2 N.m / 0.89 lb.ft          |
| Grounding | 2,5 mm <sup>2</sup> (14 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 : 36,4 A  
 Minimum resistance for the brake resistor : 33 Ω  
 Recommended aR fuse [6] : FNH00-20K-A  
 Recommended aR fuse [6] : Not applicable  
 Recommended circuit breaker [6] : To define  
 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> |
| Electromagnetic compatibility | EN 61800-3 - Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods.  |

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## Variable Speed Drives



- 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: Electrostatic 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.

Mechanical construction

- EN 60529 - Degrees of protection provided by enclosures (IP code).
- UL 50 - Enclosures for electrical equipment.
- EN 60529 e UL 50

### Certifications

#### 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 CFW700 (size B).