CFW700
General Purpose Drive
Variable Speed Drives
CFW700 - General Purpose Drive

The CFW700 was developed for controlling squirrel cage three-phase induction motors, it is a general purpose drive that gives customers the flexibility needed for the control of applications ranging from simple speed control to more demanding ones as torque control. Designed for exclusively industrial or professional use the CFW700 features Sensorless and Closed Loop control as standard utilising the internal micro PLC, the SoftPLC means that the CFW700 can be used for more sophisticated applications like overhead cranes, PCP (Progressive Cavity Pump), pump jack and many more.

Own Technology

**Vectrue Technology® - WEG Variable Speed Drive Control Technology**
- Four control modes in one drive, linear and adjustable V/F, VVW (Voltage Vector WEG), sensorless vector and closed loop vector (encoder interface factory built)
- Sensorless vector control allows for high torque and quick response in open loop, even at low speeds
- Self-tuning function automatically matches VSD with motor - load when on Sensorless, VVW and closed loop vector mode
- Through adjustable V/F control it is possible to adjust a quadratic V/F curve and that implies energy saving when quadratic torque loads (e.g.: centrifugal pumps and fans) are being driven

**Optimal Braking®**
WEG Frequency Inverters Braking Technology

In applications where high inertia and short deceleration times are involved, a large amount of energy is returned from the motor to the VSD.
To handle this energy traditional VSDs have to dissipate it as heat in power resistors, such resistors are usually large and very expensive also the heat dissipation has to be taken into consideration during installation.
As an alternative to the use of braking resistors the CFW700 features a special braking method in vector control mode named Optimal Braking®.
This innovation delivers rated torque with high performance requiring no resistor.
The graph illustrated shows a comparison of the braking torque offered by the different braking methods used.

**Optimal Flux® - WEG Technology for the Control of High Efficiency Induction Motors Applied to Constant Torque Load**
- Rated torque at very low speed discarding the use for forced ventilation or even motor oversizing, thus costs are reduced.
- Better performance results can be achieved with the set motor + VSD, as losses are decreased (tests were conducted based on the set WEG high efficiency MOTOR + WEG VSD).
Simplicity

The new CFW700 was designed based on the Plug & Play technology concept where by plugging in expansion modules hardware and software recognize it automatically. Also this feature allows for easy installation and safe operation with no need for additional configuration.

Certifications

- 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
Technical Features

Characteristics Integrated in the Standard Product

**Encoder Interface**
- For applications requiring closed loop control the encoder module is available at the control terminals
- No need for external power supply for the encoder module (5 V dc)
- 5 V line drive or push pull types can be used

**RS485 Port Built-In**
- Modbus-RTU communication protocol ready

**I/Os Capability**
- 8 digital inputs / 5 digital outputs
- 2 analog inputs / 2 analog outputs

**Built-in DC Link Reactor**
- Allows the VSD to be installed in any network (no restriction for power supply impedance)
- Typical power factor (PF) for steady condition:
  - 0.94 for three-phase models
  - 0.70 for single-phase and single/three-phase
  - Models fed from single-phase power supply
- Displacement power factor >0.98
- It meets 61000-3-12 standard (limits for harmonic currents)
- No need for an extra line reactor
Technical Features

**USB Port Built-In**
- USB connection in the display ready

**Conformal Coating**
- Increasing the lifetime, protecting the electronic boards against corrosive atmospheres. Classified as 3C2 according to IEC 60721-3-3

### Common DC Bus Connection
In multi motor applications it is possible to supply the CFW700 (AC drive) with DC voltage, this offers extra flexibility and energy savings. By sharing a common DC bus in some applications the energy consumption can be lowered as the power needed to run any of the motors can be drawn from the stored energy at the VSD DC link.

*Note: an external pre-charge circuit must be added to each of the VSDs.*

### 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 turned on and off depending 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 makes maintenance and/or replacement a lot faster
Technical Features

Drive Features

- **Multi-Speed:** up to 8 preset speeds can be programmed.
- **PID Regulation:** eliminates the use of an external controller for closed loop control, thus great performance of speed and torque can be achieved.
- **Ride Through:** embedded in the CFW700 control this function prevents the drive from tripping during some power outage. It uses the kinetic energy stored through a forced deceleration imposed to the load by the VSD control algorithm.
- **Speed/Torque Regulation:** open and closed loop (encoder feedback required).
- **Flying Start:** it is able to start smoothly a motor connected to a rotating load regardless of rotation direction.
- **Control Options for DC Bus Regulation:** prevents the drive from tripping when short deceleration time is required, vital for applications with high inertia loads.
- **S ramp:** the smoothness at the starting can be mandatory for process e.g. the beverage industry, by setting up properly this functionality production losses caused by traditional starting methods can be avoided.
- **Three-Wire Start/Stop Control:** no retentive contact can command the drive to start/stop the motor.
- **Electronic Potentiometer:** the drive keeps increasing motor speed as long as the digital input remains closed.
- **Skip Frequency:** for some applications specific frequencies must be avoided in order to protect the machine against resonance effect.
- **Motor Thermal Curve Adjustment:** the possibility for separate adjustment between motor and drive allows for a much more effective protection for overload cycles.
- **Copy Function:** by using the flash memory card MMF-02 parameter settings can be easily stored ensuring integrity and safety in case of replacement of the drive is needed.
Applications

**Pumps and Fans**
- Precise control of process variables (pressure, flow, temperature, etc.) through a PID regulator superposed to the speed control
- Optimization of power consumption through speed control with an adjustable V/F curve
- Safety and maintenance signaling and alarms of pumps and fans
- Availability of PID regulators to control other process accessories like valves, dumpers, other VSDs, etc.

**Compressors**
- Optimization of system pressurization control with energy savings and improvement of compressor efficiency
- Reduction of motor startup current minimizing wear and tear of the mechanical system avoiding fees charged by the power supplier company
- Safety and maintenance signaling and alarms available for pressurization system
- Provides startup system control of other compressor units with an increased efficiency of the pressurization system

**Pulp & Paper / Wood**
- Precise speed and torque control.
- Flexible hardware programming and configuration, making applications where synchronism is required easier.
- Can be integrated in a variety of communication protocols commonly used in the industry.
- Provided in a compact design the CFW700 series allows for side by side assembly.
- Quick and simplified programming.
- Highly reliable and robust.

**Chemical & Petrochemical**
- Highly reliable and robust.
- Plug & Play system for additional modules, ensuring greater flexibility in adapting to existing system.
- Possibility to be integrated in a variety of communication protocols commonly used in the industry.

**Ironworks and Metallurgy**
- Highly precise speed and torque control.
- Large overload capacity (models sized in HD).
- Flexible hardware programming and configuration.
- Possibility to be integrated in a variety of communication protocols mainly used in the industry.
Keypad

The CFW700 comes equipped with a LCD display capable of providing readings for programming, guided start-up and troubleshooting. This customized numeric LCD display features the following functionalities:
- LCD display with backlight
- Allows adjust programming through menu separate in folders
- Remote mounting for panel assembly solutions (it can be placed 30 m distant from the drive)

Remote Keypad

The keypad can be remote assembled by using this configuration, degree of protection IP56 can be achieved.
Allows for Showing 3 Variables at Once Through Three Viewing Modes

Menu (parameters group selection) only one parameters group is shown each time.

Inverter status

Auxiliary display

Units of measurement (refers to the main display value)

Variable monitoring bar

Main display

Viewing Modes

**Programming Mode**

**Monitoring Mode**
Accessories

**Blank Cover - HMID - 01**
Used when there is no need for keypad.

**Remote Keypad Frame - RHMIF-02**
Used when remote keypad is needed, it can be installed at the panel door as well as machine console. IP56 degree of protection.

**CAN-01 (CANopen and DeviceNet)**
The possibility to connect the CFW700 into a CANopen or DeviceNet network.

**Flash Memory Module MMF - 02**
This module allows for backup of VSD parameters ensuring the programming to be safely stored. Also it makes possible the programming to be passed on to other VSDs on the same plant avoiding repetitive programming. The SoftPLC applicative can also be store into this memory.

**Profibus-DP-01 (Profibus-DP-V1)**
The possibility to connect the CFW700 into a Profibus-DP-01 network.

1) These options must be provided already installed in the CFW700 (please see coding on page 21).
Accessories

Kit for Shielded Cable

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCSA-01</td>
<td>Shielded cable Kit frame size A</td>
</tr>
<tr>
<td>PCSB-01</td>
<td>Shielded cable Kit frame size B</td>
</tr>
<tr>
<td>PSCC-01</td>
<td>Shielded cable Kit frame size C</td>
</tr>
</tbody>
</table>

Notes: The shielded cable kit for frame Sizes D and E is included in the standard version. For models with RFI filter fitted in shielded cable kit comes as standard.

Enclosures

<table>
<thead>
<tr>
<th>Standards</th>
<th>Ratings</th>
<th>Frame sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>IP20</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>IP21</td>
<td>KIP21A-01</td>
<td>KIP21B-01</td>
</tr>
<tr>
<td>NEMA</td>
<td>Type 1</td>
<td>KN1A-02</td>
</tr>
</tbody>
</table>

Notes: (x) Standard, (-) NA.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Accessory</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEMA</td>
<td>KN1A-02</td>
<td>Conduit kit frame size A</td>
</tr>
<tr>
<td></td>
<td>KN1B-02</td>
<td>Conduit kit frame size B</td>
</tr>
<tr>
<td></td>
<td>KN1C-02</td>
<td>Conduit kit frame size C</td>
</tr>
<tr>
<td></td>
<td>KN1E-01</td>
<td>Top cover size E models 165, 142 and all 600 V frame size E</td>
</tr>
<tr>
<td></td>
<td>KN1E-02</td>
<td>Top Cover + Conduit kit size E models 180 and 211</td>
</tr>
<tr>
<td>IEC</td>
<td>KIP21A-01</td>
<td>Top cover kit frame size A</td>
</tr>
<tr>
<td></td>
<td>KIP21B-01</td>
<td>Top cover kit frame size B</td>
</tr>
<tr>
<td></td>
<td>KIP21C-01</td>
<td>Top cover kit frame size C</td>
</tr>
<tr>
<td></td>
<td>KIP21D-01</td>
<td>Top cover kit frame size D</td>
</tr>
</tbody>
</table>

Note: in the KN1X-01 Conduit kit (frame sizes A, B and C) power cable shielding is also provided.
Optionals (Factory Built)

**External Control Power Supply 24 V dc**
Used mainly for communication networks allowing data exchange even when there is no power at the VSD input (this module must be fed from a power supply different from the one connected to the VSD).

---

**RFI Suppressor Filter (for the VSD to be in Accordance with EN 61800-3 and EN 55011)**
When properly installed the CFW700 meet requirements of the electromagnetic compatibility directive - EMC Directive 2004/108/EC.
For models ranging from size A to D, the RFI filter is optional and for size E it is included.

---

**Safety Stop (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 can generate torque.
SoftPLC

The new CFW700 incorporates PLC functionalities by means of a factory built micro PLC named SoftPLC. This extra tool gives more flexibility to the product as well as allowing the user to develop his own application through a USB or RS485 port available at the control terminal. The SoftPLC features the following characteristics:

- Access to CFW700 I/Os and parameters
- PLC mathematics and control blocks
- Allows user password
- User can save software in the memory flash card to be downloaded into other VSDs

Free of Charge Software

WLP (WEG Ladder Programmer)
Software designed for development of user application through the micro PLC embedded in the CFW700 hardware.
The WLP tool features the following capabilities:
- Ladder programming
- PLC, math and control blocks are available
- Access to all CFW700 parameters
- On-line monitoring as well as help topics
- RS485 connection with the drive
- 49 user parameters can be individually accessed allowing for creation of a variety of applications

Software SuperDrive G2
It is a windows-based software designed for the programming, commanding and monitoring of WEG VSDs.
The following features the user can benefit from:
- Automatic CFW700 recognition
- CFW700 parameters monitoring
- Off-line/On-line change of parameters
- Reports can be created
- Backup of parameters
- Start/Stop command as well as speed reference can be sent to the drive
Drive Ratings

Normal Duty (ND) Cycle:
- 110% for 60 seconds every 10 minutes
- 150% for 3 seconds every 10 minutes

Heavy Duty (HD) Cycle:
- 150% for 60 seconds every 10 minutes
- 200% for 3 seconds every 10 minutes

Sizing a VFD:
The correct way to size a frequency inverter is by matching its output current with the motor rated current. However, tables below present the expected motor power for each VSD model. The purpose of the table below is for guidance as motor rated current may vary with number of poles and manufacturer.

Note: motor power stated on this table is based on IEC standard for IV poles motor.

Motor Voltages 220 V and 230 V

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Model</th>
<th>Normal Duty (ND)</th>
<th>IEC</th>
<th>NEMA</th>
<th>Heavy Duty (HD)</th>
<th>IEC</th>
<th>NEMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>200-240 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Ø</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200-240 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Ø</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Motor Voltages 380 V and 460 V

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Model</th>
<th>Normal Duty (ND)</th>
<th>IEC</th>
<th>NEMA</th>
<th>Heavy Duty (HD)</th>
<th>IEC</th>
<th>NEMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>380-460 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Ø</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>380 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>380-460 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Ø</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>380 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Motor Voltages 500 V and 600 V

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Model</th>
<th>Normal Duty (ND)</th>
<th>IEC</th>
<th>NEMA</th>
<th>Heavy Duty (HD)</th>
<th>IEC</th>
<th>NEMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-600 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Ø</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500-600 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3Ø</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Dimension, Weight and Temperature

<table>
<thead>
<tr>
<th>Model</th>
<th>Frame size</th>
<th>NEMA1</th>
<th>IP20 / IP21</th>
<th>IP20</th>
<th>NEMA1 / IP21</th>
<th>Weight (kg)</th>
<th>Braking IGBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFW700A06P0T2</td>
<td>A</td>
<td>305 (12.02)</td>
<td>145 (5.71)</td>
<td>227 (8.94)</td>
<td>247 (9.73)</td>
<td>145 (5.71)</td>
<td>227 (8.94)</td>
</tr>
<tr>
<td>CFW700A07P0T2</td>
<td>A</td>
<td>351 (13.82)</td>
<td>190 (7.46)</td>
<td>227 (8.94)</td>
<td>293 (11.53)</td>
<td>190 (7.46)</td>
<td>227 (8.94)</td>
</tr>
<tr>
<td>CFW700A08P0T2</td>
<td>C</td>
<td>448.1 (17.64)</td>
<td>220 (8.67)</td>
<td>293 (11.52)</td>
<td>378 (14.88)</td>
<td>220 (8.67)</td>
<td>293 (11.52)</td>
</tr>
<tr>
<td>CFW700A09P0T2</td>
<td>D</td>
<td>550 (21.63)</td>
<td>300 (11.81)</td>
<td>305 (12.00)</td>
<td>504 (19.84)</td>
<td>300 (11.81)</td>
<td>305 (12.00)</td>
</tr>
<tr>
<td>CFW700A10P0T2</td>
<td>E</td>
<td>735 (28.94)</td>
<td>335 (13.2)</td>
<td>358 (14.1)</td>
<td>620 (24.4)</td>
<td>335 (13.2)</td>
<td>358 (14.1)</td>
</tr>
</tbody>
</table>

Note: weight data is for the VSD as IP20 enclosure, if IP21 and NEMA1 kits are being added the total weight will change. Consult the user manual for additional information.
Technical Features

Main Parts

Frames A, B and C

- Control accessory module
- Mounting supports (for through the wall mounting)
- Fan with mounting support
- Front cover
- Rear part of the inverter (external part for flange mounting)
- Flash memory module (not included)
- CC700 control board
- Keypad
- Status LED
Technical Features

Main Parts

Frames D and E

- Flash memory module (not included)
- CC700 control board
- Control accessory module
- Status LED
- Keypad
- Control rack cover
- Bottom front cover
- Mounting supports (for through the wall mounting)
- Rear part of the inverter (external part for plange mounting)
- Hoisting eye (only on frame E)
- Fan with mounting support
Mounting Considerations

**Standard Installation**
Innovative design allows the CFW700 to be assembled in three different ways.

**Frame size**

<table>
<thead>
<tr>
<th>Frame size</th>
<th>A mm (in)</th>
<th>B mm (in)</th>
<th>C mm (in)</th>
<th>D mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>25 (0.98)</td>
<td>25 (0.98)</td>
<td>10 (0.39)</td>
<td>30 (1.18)</td>
</tr>
<tr>
<td>B</td>
<td>40 (1.57)</td>
<td>45 (1.77)</td>
<td>10 (0.39)</td>
<td>30 (1.18)</td>
</tr>
<tr>
<td>C</td>
<td>110 (4.33)</td>
<td>130 (5.12)</td>
<td>10 (0.39)</td>
<td>30 (1.18)</td>
</tr>
<tr>
<td>D</td>
<td>110 (4.33)</td>
<td>130 (5.12)</td>
<td>10 (0.39)</td>
<td>30 (1.18)</td>
</tr>
<tr>
<td>E</td>
<td>100 (3.94)</td>
<td>250 (9.84)</td>
<td>20 (0.78)</td>
<td>80 (3.15)</td>
</tr>
</tbody>
</table>

**Side by Side Installation**
The possibility for installing CFW700 series with no space in between allows for panel space saving.

---

Note: for side by side assembly option check user manual for further operating temperature details.
Mounting Considerations / Panel Assembly

Surface Installation

Flange Mounting (IP54 Rated When Mounting the Heatsink Outside the Enclosure)

<table>
<thead>
<tr>
<th>Frame size</th>
<th>a2 (mm/in)</th>
<th>b2 (mm/in)</th>
<th>c2 (M)</th>
<th>a3 (mm/in)</th>
<th>b3 (mm/in)</th>
<th>c3 (M)</th>
<th>d3 (mm/in)</th>
<th>e3 (mm/in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>115 (4.53)</td>
<td>250 (9.85)</td>
<td>M5</td>
<td>130 (5.12)</td>
<td>240 (9.45)</td>
<td>M5</td>
<td>135 (5.32)</td>
<td>225 (8.86)</td>
</tr>
<tr>
<td>B</td>
<td>150 (5.91)</td>
<td>300 (11.82)</td>
<td>M5</td>
<td>175 (6.89)</td>
<td>285 (11.23)</td>
<td>M5</td>
<td>179 (7.05)</td>
<td>271 (10.65)</td>
</tr>
<tr>
<td>C</td>
<td>150 (5.91)</td>
<td>375 (14.77)</td>
<td>M6</td>
<td>195 (7.68)</td>
<td>365 (14.38)</td>
<td>M6</td>
<td>205 (8.08)</td>
<td>345 (13.59)</td>
</tr>
<tr>
<td>D</td>
<td>200 (7.88)</td>
<td>525 (20.67)</td>
<td>M8</td>
<td>275 (10.83)</td>
<td>517 (20.36)</td>
<td>M8</td>
<td>285 (11.23)</td>
<td>485 (19.10)</td>
</tr>
<tr>
<td>E</td>
<td>200 (7.8)</td>
<td>650 (25.6)</td>
<td>M8</td>
<td>275 (10.8)</td>
<td>635 (25)</td>
<td>M8</td>
<td>315 (12.40)</td>
<td>615 (24.21)</td>
</tr>
</tbody>
</table>
Technical Features

Notes:
1) Diode type rectifier bridge;
2) Standard for frame sizes A to D;
3) RFI filter factory built for frame size E.
### Coding

#### Model identification

<table>
<thead>
<tr>
<th>Product and series</th>
<th>Frame size</th>
<th>Rated current</th>
<th>No. of phases</th>
<th>Rated voltage</th>
<th>Braking</th>
<th>Degree of protection</th>
<th>Conducted emission level</th>
<th>Safety stop</th>
<th>External power supply for control</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFW700</td>
<td>A</td>
<td>06P0 = 6.0 A</td>
<td>T</td>
<td>2 / 4 / 5</td>
<td>NB</td>
<td>20</td>
<td>C3</td>
<td>Y1</td>
<td>W1</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>07P0 = 7.0 A</td>
<td></td>
<td></td>
<td>DB</td>
<td>20, 21 or N1</td>
<td>Blank</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>06P0 = 6.0 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>07P0 = 7.0 A</td>
<td>S = single-phase power supply</td>
<td>2 = 200...240 V</td>
<td>DB</td>
<td>20, 21 or N1</td>
<td>C3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>10P0 = 10 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>07P0 = 7.0 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>10P0 = 10 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>13P0 = 13 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>16P0 = 16 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>24P0 = 24 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>28P0 = 28 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>33P0 = 33.5 A</td>
<td>S = three-phase power supply</td>
<td>2 = 200...240 V</td>
<td>DB</td>
<td>20, 21 or N1</td>
<td>Blank or C3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>45P0 = 45 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>54P0 = 54 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>70P0 = 70 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>86P0 = 86 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>0105 = 105 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>0142 = 142 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>0180 = 180 A</td>
<td>B = single/three-phase power supply</td>
<td>2 = 200...240 V</td>
<td>DB</td>
<td>20, 21 or N1</td>
<td>C3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>0211 = 211 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>06P0 = 6.0 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>07P0 = 7.0 A</td>
<td>S = single-phase power supply</td>
<td>2 = 200...240 V</td>
<td>DB</td>
<td>20, 21 or N1</td>
<td>C3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>10P0 = 10 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>07P0 = 7.0 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>10P0 = 10 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>13P0 = 13 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>16P0 = 16 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>17P0 = 17 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>24P0 = 24 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>33P0 = 33.5 A</td>
<td>T = three-phase power supply</td>
<td>4 = 380...480 V</td>
<td>DB</td>
<td>20, 21 or N1</td>
<td>Blank or C3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>45P0 = 45 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>54P0 = 54 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>58P5 = 58.5 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>70P5 = 70.5 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>88P0 = 88 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>0105 = 105 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>0142 = 142 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>0180 = 180 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>0211 = 211 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Frame size E comes equipped with RFI filter as standard.
2. This option is not available for models frame size A with the option for NEMA1.
**Technical Data**

<table>
<thead>
<tr>
<th>Voltage and rating features</th>
<th>Power supply voltage</th>
<th>Braking</th>
<th>Degree of protection</th>
<th>Conducted emission level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>200-220 V ac (+10%-15%)</td>
<td>DB</td>
<td>20</td>
<td>Blank</td>
</tr>
<tr>
<td>Voltage</td>
<td>380-480 V ac (+10%-15%)</td>
<td>NB</td>
<td>20</td>
<td>C3</td>
</tr>
<tr>
<td>Voltage</td>
<td>500-600 V ac (+10%-15%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>1.5 to 3 HP (1.1 to 2.2 kW)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>1.5 to 75 HP (1.1 to 55 kW)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>50...60 Hz (+/-2%, 48 to 63 Hz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displacement factor</td>
<td>Greater than 0.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>Greater than 0.97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power factor</td>
<td>0.94 for three-phase input at nominal conditional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.70 for single-phase input at nominal conditional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency range</td>
<td>0 to 3.4 x rated motor frequency (P0403). The rated motor frequency is programmable from 0 Hz to 300 Hz in the V/F and VVW modes and from 30 Hz to 120 Hz in the vector mode. Maximum output frequency limit according to the switching frequency:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 125 Hz (switching frequency = 1.25 kHz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 250 Hz (switching frequency = 2.5 kHz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 500 Hz (switching frequency ≥ 5 kHz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>Standard: 5 kHz (A, B, C e D frames)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.5 kHz for all 380 V models frame E</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.5 kHz for frame E 220 V models 142/180 Amps (ND)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.5 kHz for frame E 220 V model 211 Amps (ND/HD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 kHz for frame E 220 V models 142/180 Amps (HD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Available options for 2.5/5/10 kHz (check for derating)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload</td>
<td>Normal Duty (ND)</td>
<td>110% for 1 min every 10 min</td>
<td>150% for 3 s every 10 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heavy Duty (HD)</td>
<td>150% for 1 min every 10 min</td>
<td>200% for 3 s every 10 min</td>
<td></td>
</tr>
<tr>
<td>Acceleration</td>
<td>0 to 999 s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deceleration</td>
<td>0 to 999 s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Temperature</td>
<td>-10 to 50 °C (14 to 122 °F) for most of models. For operating temperature of each model the table Dimensions, Weight and Temperature shall be checked.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-10...60 °C for frames A, B, C and D (up to 45 °C without derating for models 13 A and 24 A/200...240 V 7 and 10 A/380...480 V and up to 50 °C without derating for the other models) and-10...55 °C for frame E (up to 45 °C without derating). If derating has to be considered have 2% current reduction for each °C above the specific operating temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humidity</td>
<td>5 to 90% with no condensation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Altitude</td>
<td>0 to 1,000 meters with no derating</td>
<td>Up to 4,000 meters with current reduction of 1% for each 100 meters above 1,000 meters</td>
<td></td>
</tr>
<tr>
<td>Braking methods</td>
<td>Dynamic braking</td>
<td>Available as standard for frame sizes A, B, C and D for 460 V and D for 600 V. For frame size E “DB” models has to be used. An extra resistor must be fitted in for dynamic braking capability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Optimal Braking®</td>
<td>There is no need for braking resistor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DC braking</td>
<td>DC current applied to motor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Technical Data

### Performance

<table>
<thead>
<tr>
<th>Type</th>
<th>Speed Control</th>
<th>Reg. % of rated speed</th>
<th>Range 1:20</th>
<th>Range 1:30</th>
<th>Range 1:100</th>
<th>Range +/− 0.1% with digital reference (snake, serial fieldbus, multi-speed)</th>
<th>Regulation +/− 0.2% with 12 bits analog input</th>
<th>Range +/− 5% of rated torque</th>
<th>Range 10 to 180%</th>
<th>Range 20 to 180%</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/F</td>
<td></td>
<td>1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage vector VW</td>
<td></td>
<td>1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vector with encoder (encoder interface built-in)</td>
<td>Torque control</td>
<td>0.5%</td>
<td>10 to 180%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensorless vector</td>
<td></td>
<td>+/− 10% (above 3 Hz)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### I/Os

<table>
<thead>
<tr>
<th>Type</th>
<th>Digital</th>
<th>Analog</th>
<th>Impedance: 400 kΩ for voltage signal / 500 Ω for current signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>8 x isolated bidirectional 24 V</td>
<td>2 x +/−10 V, 11 bits + (differential) or 0/4…20 mA, 11 bits (differential)</td>
<td>1 x relay NO/NC contact (240 V ac / 1 A)</td>
</tr>
<tr>
<td>Output</td>
<td>Relay</td>
<td>4 x open drain (24 V/200 mA)</td>
<td>2 x 0…10 V or 0/4…20 mA, 11 bits (not isolated from inverter ground)</td>
</tr>
</tbody>
</table>

### Connectivity

<table>
<thead>
<tr>
<th>Type</th>
<th>USB in the display / SuperDrive and WLP communication</th>
<th>Modbus-RTU RS485 built-in / SuperDrive and WLP communication</th>
<th>Modbus-RTU RS485 built-in (available at the control terminals)</th>
<th>DeviceNet CAN-01 (slot 3)</th>
<th>CANopen CAN-01 (slot 3)</th>
<th>Profibus-DP Profibus-DP-V1 (slot 3)</th>
</tr>
</thead>
</table>

### Communication protocols

<table>
<thead>
<tr>
<th>Modbus-RTU</th>
<th>CANopen</th>
<th>DeviceNet</th>
<th>Modbus-RTU</th>
<th>CANopen</th>
<th>Enet 10/100</th>
<th>CANopen</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS485</td>
<td>RS485</td>
<td>RS485</td>
<td>RS485</td>
<td>RS485</td>
<td>RS485</td>
<td>RS485</td>
</tr>
</tbody>
</table>

### 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 50173 - Electronic equipment for use in power installations.
- EN 60204-1 - Safety of machinery. Electrical equipment of machines. Part 1: General requirements. In order to have a machine in conformity with this regulation, the machine builder is responsible for the installation of an emergency shutdown device and a means of disconnection.
- EN 60146 (IEC 146) - Semiconductor converters.
- EN 61800-3 - Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency A.C. power drive systems
- EN 60529 - Degrees of protection provided by enclosures (IP code)
- UL 50 - Enclosures for electrical equipment
- 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 - 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 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, induced by radio-frequency fields.

### Mechanical construction standards

<table>
<thead>
<tr>
<th>Type</th>
<th>Overcurrent / short circuit</th>
<th>Under / overvoltage in the power section</th>
<th>Phase Loss</th>
<th>VSD thermal overload (IGBTs, rectifier and in the electronics)</th>
<th>Motor thermal overload</th>
<th>Braking resistor overload</th>
<th>IGBTs overload</th>
<th>Motor overload</th>
<th>Fault / external alarm</th>
<th>CPU failure</th>
<th>Phase-to-ground short circuit at the output</th>
<th>Failure at the heatsink fan</th>
<th>Motor overspeed</th>
<th>Wrong connection of encoder wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Protections

- Overcurrent / short circuit
- Under / overvoltage in the power section
- Phase Loss
- VSD thermal overload (IGBTs, rectifier and in the electronics)
- Motor thermal overload
- Braking resistor overload
- IGBTs overload
- Motor overload
- Fault / external alarm
- CPU failure
- Phase-to-ground short circuit at the output
- Failure at the heatsink fan
- Motor overspeed
- Wrong connection of encoder wiring
ARGENTINA  
WEG EQUIPAMIENTOS ELECTRICOS  
San Francisco - Cordoba  
Phone: +54 3564 421 484  
info-ar@weg.net  
www.weg.net/ar

WEG PINTURAS - Pulverlux  
Buenos Aires  
Phone: +54 11 4299 8000  
tintas@weg.net

AUSTRALIA  
WEG AUSTRALIA  
Victoria  
Phone: +61 3 9765 4600  
info-au@weg.net  
www.weg.net/au

AUSTRIA  
WATT DRIVE - WEG Group  
Markt Piesting - Vienna  
Phone: +43 2633 404 0  
watt@wattdrive.com  
www.wattdrive.com

BELGIUM  
WEG BENELUX  
Nivelles - Belgium  
Phone: +32 67 88 84 20  
info-be@weg.net  
www.weg.net/be

BRAZIL  
WEG EQUIPAMENTOS ELÉTRICOS  
Jaraguá do Sul - Santa Catarina  
Phone: +55 47 3276-4002  
info-br@weg.net  
www.weg.net/br

ECUADOR  
WEG ECUADOR  
quito  
Phone: 5144 339/342/317  
wegecuador@weg.net  
www.weg.net/ec

FRANCE  
WEG FRANCE  
Saint Quentin Fallavier - Lyon  
Phone: +33 4 74 99 11 35  
info-fr@weg.net  
www.weg.net/fr

GERMANY  
WEG GERMANY  
Kerpen - North Rhine Westphalia  
Phone: +49 2237 9291 0  
info-de@weg.net  
www.weg.net/de

GHANA  
ZEST ELECTRIC GHANA  
Accra  
Phone: +233 30 27 664 90  
info@zestghana.com.gh  
www.zestghana.com.gh

INDIA  
WEG ELECTRIC INDIA  
Bangalore - Karnataka  
Phone: +91 80 4128 2007  
info-in@weg.net  
www.weg.net/in

NETHERLANDS  
WEG NETHERLANDS  
Oldenzaal - Overijssel  
Phone: +31 541 571 080  
info-nl@weg.net  
www.weg.net/nl

MALAYSIA  
WATT EURO-DRIVE - WEG Group  
Shah Alam, Selangor  
Phone: 603 78591626  
info@wattdrive.com.my  
www.wattdrive.com

MEXICO  
WEG MEXICO  
Huaehuetoca  
Phone: +52 55 5321 4231  
info-mx@weg.net  
www.weg.net/mx

PERU  
WEG PERU  
Lima  
Phone: +51 1 209 7600  
info-pe@weg.net  
www.weg.net.pe

PORTUGAL  
WEG EURO  
Maia - Porto  
Phone: +351 22 9477705  
info-pt@weg.net  
www.weg.net/pt

SPAIN  
WEG IBERIA  
Madrid  
Phone: +34 91 655 30 08  
info-es@weg.net  
www.weg.net/es

SINGAPORE  
WEG SINGAPORE  
Singapore  
Phone: +65 68589081  
info-sg@weg.net  
www.weg.net/sg

SCANDINAVIA  
WEG SCANDINAVIA  
Kungsbacka - Sweden  
Phone: +46 30 73 400  
info-se@weg.net  
www.weg.net/se

UK  
WEG ELECTRIC MOTORS U.K.  
Redditch - Worcestershire  
Phone: +44 1527 513 800  
info-uk@weg.net  
www.weg.net/uk

UNITED ARAB EMIRATES  
WEG MIDDLE EAST  
Dubai  
Phone: +971 4 813 0800  
info-ae@weg.net  
www.weg.net/ae

USA  
WEG ELECTRIC  
Duluth - Georgia  
Phone: +1 678 249 2000  
info-us@weg.net  
www.weg.net/us

VENEZUELA  
WEG INDUSTRIAS VENEZUELA  
Valencia - Carabobo  
Phone: +58 241 821 0592  
info-ve@weg.net  
www.weg.net/ve

For those countries where there is not a WEG own operation, find our local distributor at www.weg.net.