MVW01
Medium Voltage Variable Speed Drive
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WEG MVW01
Variable Speed Drive (VSD)

Efficient, Reliable, Safe Motor Control
for a Wide Range of Industrial Applications

WEG introduces second generation of Medium Voltage Variable Speed Drives MVW01 G2.
Second Generation MVW01 delivers higher power output and higher reliability on existing footprint.
Higher performance is achieved by the use of latest HV IGBTs with larger safe operating area and higher short circuit capability.

Friendly operator interface, identical to that of Low Voltage VSD product line, presents familiarity and ease of use.

MVW G2 is perfectly suitable for a variety of variable speed industrial applications such as compressors, pumps, fans, conveyors and grinding mills.

For new installations or revamps, MVW01 G2 offers robust solutions to optimize your process and save significantly on operating costs.
Features
- Voltage Source Inverter (VSI) featuring NPC topology
- Latest generation power components including 6.5 kV IGBTs
- Optimum number of power and control components resulting into the highest efficiency design on the market
- High power factor over entire speed range
- Power: 500 to 22,500 HP (400 to 16,000 kW)
- Voltage: 2.3 kV to 6.9 kV
- Output frequency: up to 120 Hz

Certifications
- Efficiency
- Reliability
- Safety
Offering Solutions to a Wide Variety of Industrial Segments

Key Industry Sectors for Medium-Voltage Drives

- **Petrochemicals**: Downhole pumps, pipeline pumps, gas compressors, water injection pumps, blowers
- **Mining**: Slurry pumps, conveyors, crushers and mills
- **Water/Waste**: Fresh water pumps, sewage and effluent pumps
- **Plastic & Rubber**: Banbury mixers
- **Pulp & Paper**: Fans and pumps, grinders, chippers, yankee blowers, winders, refiners
- **Cement**: Kiln and baghouse fans, cooler exhaust, forced draft and induced draft fans, crushers and mills
- **Chemicals**: Pumps, compressors, extruders
- **Power generation**: Forced draft and induced draft fans, boiler feed pumps, recirculating pumps
- **Metals**: Descaling pumps, cooling pumps and fans
- **Marine**: Propulsion, thrusters, off-load pumps
- **Sugar & Ethanol**: Sugarcane mills, fans, blowers, centrifuges
- **Infrastructure**: Pumps, compressors
MV Components for a MV VSD

- Voltage Source Inverter (VSI) technology with Neutral Point Clamp (NPC) multilevel power topology featuring optimum number of power components with HV 6.5 kV IGBTs
- Phase shifting transformer: 12-, 18-, 24-, 36-Pulse
- Option to active front end (4 Q)
- Optimum synchronous PWM control (OPPTM) to minimize current harmonics in the motor circuit
- Long life plastic film capacitors for DC link voltage source (no electrolytic capacitors)
- DC link voltage balance using transistor (IGBT) switching states
- Floating DC link circuit to minimize voltage stress on motor insulation
- Arc sensor for each power module for self protection
- Fuseless design for improved reliability
- Draw-out style power modules with stab power connections that eliminates connecting or disconnecting of power cables for easy and fast servicing

Topology with minimum number of power and control components equals to reliability and efficiency.
Nine Good Reasons Why you Should Consider WEG for your Complete MV VSD System Solution

1 - WEG team delivers an aptly engineered and manufactured VSD system that provides the best solution, while its customers are free to pursue bigger business opportunities

2 - VSDs are built with standard safety features such as mechanical interlocking (kirk key), line of sight protection for louvered filter covers and arc flash detection via light sensors

3 - Motor friendly output waveform limits dv/dt, peak voltage levels, current harmonics and with choice of output filters allows use of existing motors with older insulation system, maintaining motor longevity

4 - Phase shifting transformer can be installed outside electrical room to save significantly on HVAC equipment and its maintenance costs

5 - License free PC based software is available for download for paperless recording of parameters and events

6 - Complete system testing including Switchgear, Transformer, VSD and Motor under full load conditions using dynamometer at largest motors & drives facility in South America

7 - Factory specialists can provide customers total assistance with quick response time when necessary and actively provide support via authorized service centers

8 - Quality Control: ISO 9001 and ISO 14000 certified factory with strict QA procedures mandate functional tests for all control boards and two hour load testing for each VSD shipped

9 - WEG R&D team dedicated exclusively for the MV VSD, helps in developing state of the art hardware and software functions

WEG provides the COMPLETE SOLUTION
**Input Switchgear**

- System input protection
- Mechanically and electrically interlocked with VSD
- Metal clad switchgear with CB or metal enclosed with disconnect switch + vacuum contactor + MV fuses
- Opens under VSD command in less than 100ms
- Existing switchgear can also be used with basic open/close/trip signals and feedback

**Phase Shifting Transformer**

- Provides complete system isolation for common-mode voltage stress mitigation on the motor
- Natural harmonic reduction on the power supply
- Fault current limitation
- Voltage matching
- Flexibility of installation with dry type or oil type
- Installation can be indoor or outdoor
- Isolates the system from supply side grounding and in case of ground fault, VSD generates alarm while keeping motor operation under control or can be programmed for safe trip

**MVW01 MV VSD**

- Latest generation of 6.5 kV power transistors (IGBTs)
- Modular rectifier section: 12P, 18P, 24P or 36P rectifier
- Long life plastic film capacitors for DC link voltage
- Optimum synchronous PWM control (OPP) to minimize voltage harmonics in the motor circuit
- Draw-out style power modules
- Optimized for inverter duty motors
- Customized with optional filters for standard motors

**WEG MV Motor**

- Synchronous or induction motor control
- Standard motor voltages: 2.3 kV, 3.3 kV, 4.16 kV, 5.5 kV, 6.6 kV, 6.9 kV
- System optimization with inverter duty motors
- Possibility of working with non inverter duty motors or old motors (retrofitting)
MVW01 Main Product Features

**Air-Cooling**
- Redundant fans
- Low heat dissipation
- Low noise level
- No maintenance hassle of water cooled systems

**Input: 12-, 18-, 24-, 36-Pulse Rectifier Bridge or AFE (Active Front End) Option**
- High power factor (>0.95)
- High power quality
- IEEE 519 compliance

**Cable Connections**
- Standard product available with both top entry/top exit or bottom entry/bottom exit for power/control cables

**Power Arms**
- Latest generation of power semiconductors and capacitors
- Simple control connection with fiber optics
- Draw-out style power modules with stab power connections that eliminates connecting or disconnecting of power cables allowing easy and fast servicing

**DC Link Voltage Monitoring**
- Visual indication of presence of voltage on the DC link for additional personnel safety
Monitoring and Protections
- Arc and pressure sensors for special self-protection
- Real time temperature monitoring
- Pressure sensors for cooling monitoring

Thermal Protection
- Pt-100 individual monitoring for motor thermal protection (bearings and windings)

Fiber Optic Interface
- Noise immunity
- Isolation between the control and power section
- Gate drivers, temperature monitoring, feedbacks, etc.

Standard HMI (Keypad)
- Graphic display
- Full operation, navigation, programming and monitoring
- Complete parameters instructions and fault descriptions
- Numerical and/or bars display

Mechanical Lock
- Safety operation with mechanical lock for the power sections
- Electro-mechanical interlocking with the main input breaker to prevent access to MV section when the main breaker is closed

Air Inlet Filters
- Washable and replaceable from the front without disturbing the normal operation
### MVW01 G2 - Standard VSD - 3,300 V & 4,160 V

<table>
<thead>
<tr>
<th>Product</th>
<th>Rated current</th>
<th>Motor</th>
<th>Frame size</th>
<th>Rect. pulses</th>
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</table>

Notes: 1) Overload capacity:
- **Mx**: Maximum current/power without overload.
- **ND**: Normal Duty: maximum current/power with 115% overload for 60 seconds, every 10 minutes.
- **HD**: Heavy Duty: maximum current/power with 150% overload for 60 seconds, every 10 minutes.

- Motor power is for 4P motor with 0.87 P.F. and 97% efficiency at full load.
- The ratings apply at 40 °C ambient temperature and 1,000 meters above sea level.
- VSD input number pulses can be optimized according to the harmonics requirements.

12 | MVW01 - Medium Voltage Variable Speed Drive
### MVW01 G2 - Standard VSD - 6,000–6,300 V & 6,600–6,900 V

<table>
<thead>
<tr>
<th>Product</th>
<th>Rated current</th>
<th>Motor</th>
<th>Frame size</th>
<th>Rect. pulses</th>
</tr>
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<tr>
<td></td>
<td>Mx ND HD</td>
<td>ND HD</td>
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<td>C1 C2 C3</td>
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<td></td>
<td>A HP</td>
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- **1) Overload capacity:**
  - **Mx** = Maximum current/power without overload.
  - **ND** = Normal Duty: maximum current/power with 115% overload for 60 seconds, every 10 minutes.
  - **HD** = Heavy Duty: maximum current/power with 150% overload for 60 seconds, every 10 minutes.

- Motor power is for reference only and it is based on 4P motor, with 0.87 P.F. and 97% efficiency at full load.
- Ratings apply at 40 °C ambient temperature and up to 1,000 meters above sea level.
- VSD Input rectifier number pulses can be changed according to the harmonics requirement.
- Refer to page 24 for dimensions.
MVW01 Compact Integrated VSD

MVW01 integral drive system includes all components that are required for a MV VSD standard system design on a small footprint.

**Standard Arrangement and Features**

**Input Switchgear**
- Load break switch fuse with vacuum contactor - for up to 6.9 kV, 3 Ph, 60 Hz input
- Mechanical interlocking to prevent access to HV section until switch is in OFF position
- Bottom cable entry or top cable entry

**Phase Shifting Transformer 18-Pulse as Standard**
- With surge arresters on primary HV side
- Impedance matched secondary windings to minimize line side harmonics & reduce losses
- Winding temperature monitoring (Pt-100 in windings) available via 8 channel temperature monitor

**Assembly Features**
- Cable connection arrangement top entry/top exit or bottom entry/bottom exit
- Kirk-key locked enclosure sections for switchgear, transformer and VFD
MVWCi/MVWMi Integrated VSD

Integrated solution with 24P rectifier generates very low harmonics at Point of Common Coupling (PCC).

Variations/Features
- 400 HP - 3,000 HP, 4.16 kV, 60 Hz
- Standard NEMA1 (IP21 to IP43) panel assembly for indoor installation
- Kirk-key locked fused disconnect switch with vacuum contactor
- Double tier base frame for passing of power cables/control cables between sections
- VFD transformer can be installed in drive lineup or away from the lineup
- Transformer is available in VPI design for indoor installation or outdoor installation
- Transformer is also available in oil type (mineral oil or FR3) for outdoor installation (pad mount)

Notes: Motor current is for 4P motor operating at 4.16 kV, 60 Hz, with 0.87 P.F. and 97% efficiency at full load.
Overload 115% for 60 seconds (for 1,350 HP, overloads 110%).
1 kW = 3,412.14 BTU/hr. for heat loss.
Indoor heat loss can be reduced by 50% or more, with transformer installed outdoors. Check with manufacturer for this option.
Interfaces

**MVW01 Standard Graphical Keypad**

Designed to provide full operation, navigation, programming and monitoring of WEG MVW01 in a way that is very similar to WEG LV drives, making its use even easier to those familiar with WEG product line.

WEG standard graphic keypad allows text and graphic visualization modes with monitoring of six variables simultaneously, built-in help, remote mounting and much more.

- Complete fault descriptions
- Customization of characters size
- Complete parameters instructions
- Numerical display

**Touch Screen Keypad**

WEG team for SCADA (Supervisory Control and Data Acquisition) is able to add intelligence and agility with customized software for any kind of application.

WEG touch screen keypad gives operators total access to real-time operational data in graphic form allowing them to remotely monitor and control the processes from the VSD front door or a remote location.
Fieldbus Communication

The MVW01 supports various communications protocols including Modbus-TCP (standard built-in), DeviceNet, Profinet or Profinet-DPV1, Ethernet/IP, CANopen and others, allowing total process monitoring, controlling and complete integration of the system.

Superdrive G2
License free software (available at WEG website) for total control and monitoring of WEG MVW01.
- Parameter upload and download
- VSD operation
- VSD monitoring
- On-line and off-line programming

Trace function
Innovative Topology Results in an Efficient and Reliable MV Drive System

WEG MVW01 Voltage Source Inverter with 3/5 level NPC is a very simple and reliable topology able to delivery full MV motors control with the minimum number of power semiconductors.

- **Latest generation of HV 6.5 kV IGBTs**
- **Optimized sandwich bus-bars to provide a high insulation and short partial discharge levels**
- **Long life plastic film capacitors for DC link voltage source (same capacitors used by the aero-space industry in satellites)**
- **Stab power connections that eliminates connecting or disconnecting of power cables**
- **Draw-out style power modules allowing easy and fast servicing**

Diagram:
- Input transformer
- 12 pulse input rectifier
- Neutral point
- DC link
- Three level NPC Inverter
- M
- INVERTER POWER ARM
Take the Latest Technology Available for One of the Most Technological Product in Industry

Power Semiconductor Devices are the heart of VSDs. Selection and control of these devices is very important point in performance and reliability of VSD system.

MVW01 G2 VSD employees latest generation HV IGBT devices.

- MOS – FET Technology
- Metal Oxide Semiconductor - Field Effect Transistor
- HV IGBT 6.5 kV
- Latest Generation
- Reduced Losses
- Dynamic Ruggedness


IGBT invented
Integrated Gate Bipolar Transistor
LV IGBT 600 V
HV IGBT 3.3 kV
HV IGBT 6.5 kV

Advanced thermal studies of WEG R&D team together with one of the most important semiconductors manufacturer in the market, allowed WEG to develop the first MV VSD with the latest generation of 6.5 kV IGBTs for general industrial purpose in the world.

Why Should I Choose HV IGBTs Instead of Other Power Devices?
- Natural strength against short-circuits and over-currents (other devices need extra power components)
- Simplified gate driver circuit (others are much more complex and need electrolytic capacitors)
- Simpler for parallel configuration when compared to other power component devices
- Module with isolated base (easy and fast servicing)
- Positive temperature coefficient for saturation voltages (do not need special snubber circuits)
- IGBTs became standard for LV drives now it is the trend in MV drives with multiple manufacturers
MVW01 Main Features

**Ride Through**
The MVW01 VSD is designed and manufactured to take intelligent remedial action to prevent transient supply faults or overload conditions from tripping the VSD.

**Flying Start**
The MVW01 VSD is capable of restarting and taking control of a motor attached to a spinning load in the forward or reverse direction.

**Auto-Restart Capability**
The MVW01 VSD is capable of automatically restarting in the event of a momentary loss of power, or a clearing of a drive trip.

**Ground Fault Protection**
In the event of a ground fault, the MVW01 is capable of annunciating the ground fault condition, safely operating and, by user selection, either trip or continue operation.

---

**Optimal Pulse Pattern (OPP™)**
Optimum synchronous PWM control minimizes voltage harmonics in the motor circuit and provides the capability to adjust PWM frequency to an optimal use at every speed for every type of application.

**Main Benefits of WEG OPP**
- Low commutation losses
- Low motor current THD
- Operation at very low frequency with full torque
- Low noise and vibration on the motor

---

**Output Harmonics with OPP Modulation**
MVV 01

**Output Harmonics with Standard SVM Modulation**
General Features
- Fault registers: 100 last fault and alarm records with date and time
- Slip compensation
- Adjustable speed and current limits
- Adjustable overload curve
- Copy function of the programming keypad (HMI)
- Flying Start & Ride Through
- Multi-Speed function (up to 8 speeds)
- Skip (critical) speed function
- Alarms and fault messages with date and time
- Motor rated frequency adjustments
- 03 differential analog inputs (10 or 12 bits resolution analog input)
- 04 analog inputs (2x 0…10 V and 2x 4…20 mA)
- 08 fully programmable digital inputs
- 08 fully programmable digital outputs

Main Protections
- Overload protection (I x t)
- Over/under voltage protection
- Phase loss protection
- Pre-charge circuit fault
- Ground fault
- Optical fiber feedback circuits fault
- CPU Watchdog/EPROM
- External fault
- Speed feedback encoder loss
- Network communication failure
- “Power on” errors
- Output over current
- Input/output short-circuit
- Power supply phase fault
- DC Link checking (power on, short circuit, over/under voltage)
- IGBT fault (optical fiber problem, gate fault, firing fault, etc.) with individual identification
WEG customized solutions are based on standard VSD designs and experience gained through testing on a big variety of applications.

- MVW01 AFE/REGENERATIVE/4Q Version
- MVW01 with 2,300 V output
- MVW01 WC - Water Cooled Version
- Field excitation panel for synchronous motors (w/ and w/o bypass) to be connected in the same lineup of the VSD
- Earth-switch (grounding switch)
- Output filters: reactors, dv/dt and sine-wave filter
- Frozen charge software control for SAG mills
- UPS back up control power
- Special painting plan for marine duty application
- IP41/42 enclosure
- Air duct for external venting of exhaust air flow
- Multimotor with sync transfer
- Start and bypass
## Specification Table

<table>
<thead>
<tr>
<th>Number</th>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Customer</td>
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<tr>
<td>2</td>
<td>Application</td>
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<tr>
<td></td>
<td>Fan ☐ Blower ☐ Pump ☐ Compressor ☐ Extruder ☐ Conveyor ☐ Agitator ☐ Other (specify)</td>
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<td>3</td>
<td>Load speed/torque</td>
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<td>VT ☐ CT ☐ Constant power ☐ Other (specify)</td>
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<td></td>
<td>Starting torque ____% Overload ____% ___s ____Times/hr</td>
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<td>4</td>
<td>Regenerative</td>
<td>Y / N</td>
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<td>5</td>
<td>Motor data</td>
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<tr>
<td></td>
<td>Existing ☐ New ☐ SCIM ☐ SM</td>
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<tr>
<td></td>
<td>Output _______(HP / kW) Voltage ______V Current ______A</td>
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</tr>
<tr>
<td></td>
<td>Frequency _____Hz Number of poles ____ Speed ______rpm</td>
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<tr>
<td></td>
<td>Efficiency ____ Power factor ____</td>
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<td>6</td>
<td>Operating speed range</td>
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<td></td>
<td>_____ rpm - _____ rpm</td>
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<td>7</td>
<td>Speed sensor</td>
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</tr>
<tr>
<td></td>
<td>Encoder (______ ppr) ☐ Resolver ____</td>
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</tr>
<tr>
<td>8</td>
<td>Bypass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DOL bypass (emergency) ☐ Synchronous bypass (synch transfer)</td>
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</tr>
<tr>
<td>9</td>
<td>Power supply</td>
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</tr>
<tr>
<td></td>
<td>Voltage ______V Frequency _____Hz Short Circuit KA (or MVA) ______ka or MVA</td>
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<tr>
<td>10</td>
<td>VSD transformer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dry (VPI) ☐ Dry (Cast Coil) ☐ Oil Filled</td>
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</tr>
<tr>
<td>11</td>
<td>Control power</td>
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</tr>
<tr>
<td></td>
<td>Voltage _____ Frequency _____ Capacity ____kVA</td>
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<tr>
<td>12</td>
<td>Installation (indoors)</td>
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<tr>
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<td>Altitude ______ m Ambient temperature______ °C</td>
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<td>13</td>
<td>Special requirements</td>
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<td></td>
<td>Please specify any special requirements</td>
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</table>
# MVW01 VSD Panel Dimensions

<table>
<thead>
<tr>
<th>MVW</th>
<th>Size</th>
<th>Height (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0</td>
<td>A</td>
<td>2,190</td>
<td>2,600</td>
<td>960</td>
<td>1,560</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>2,190</td>
<td>2,400</td>
<td>960</td>
<td>1,560</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
<td>2,190</td>
<td>4,160</td>
<td>960</td>
<td>2,700</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
<td>2,190</td>
<td>5,920</td>
<td>960</td>
<td>4,500</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>2,190</td>
<td>7,200</td>
<td>960</td>
<td>5,000</td>
</tr>
<tr>
<td>E</td>
<td>2D</td>
<td>2,190</td>
<td>5,920</td>
<td>1,920&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>9,000</td>
</tr>
<tr>
<td>2D</td>
<td>2E</td>
<td>2,190</td>
<td>7,200&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>1,920&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>10,000</td>
</tr>
<tr>
<td>2E</td>
<td>C1</td>
<td>2,306</td>
<td>1,800</td>
<td>1,200</td>
<td>1,700</td>
</tr>
<tr>
<td>C1</td>
<td>C2</td>
<td>2,223</td>
<td>3,300</td>
<td>1,000</td>
<td>3,100</td>
</tr>
<tr>
<td>C2</td>
<td>C3</td>
<td>2,223</td>
<td>7,480</td>
<td>1,000</td>
<td>6,200</td>
</tr>
</tbody>
</table>

Notes: 1) Back-to-back configuration. Dimensions for the standard product.
:: Product Code ::

MVW01 series

<table>
<thead>
<tr>
<th>VSD rated voltage</th>
<th>Language</th>
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<tbody>
<tr>
<td>72300</td>
<td>P - Portuguese</td>
</tr>
<tr>
<td>73300</td>
<td>E - English</td>
</tr>
<tr>
<td>74160</td>
<td>S - Spanish</td>
</tr>
<tr>
<td>75300</td>
<td></td>
</tr>
<tr>
<td>76900</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rectifier configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>H20 - 12-pulse</td>
</tr>
<tr>
<td>H30 - 18-pulse</td>
</tr>
<tr>
<td>H40 - 24-pulse</td>
</tr>
<tr>
<td>H60 - 36-pulse</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN - DeviceNet</td>
</tr>
<tr>
<td>PD - Profibus</td>
</tr>
<tr>
<td>ET - Ethernet</td>
</tr>
<tr>
<td>A1 - EBA card</td>
</tr>
<tr>
<td>B1 - EBB card</td>
</tr>
<tr>
<td>LR - Load reactor</td>
</tr>
<tr>
<td>DF - dv/dt filter</td>
</tr>
<tr>
<td>SF - Sinusoidal filter</td>
</tr>
<tr>
<td>TK - Touch screen keypad</td>
</tr>
</tbody>
</table>

Product Code: MVW01 0070 T4160 E H20 G2 _ Z

:: Dimensions ::

Height (H)

Depth (D)

Width (W)
## General Technical Characteristics

### Main power supply
- **Voltage**: Standard up to 13.8 kV\(^{2}\)
- **Frequency**: 50 or 60 Hz (±3 Hz)
- **Phase unbalance**: Less than 3 %
- **Cos φ (power factor)**: Greater than 0.97

### Control power supply
- **Voltage**: Three-phase external supply: 110 to 690 V
- **Frequency**: 50 or 60 Hz (±3 Hz)
- **Phase unbalance**: Less than 3%

### Output
- **Motor voltage**: From 2.3 kV up to 6.9 kV
- **Switching device**: High voltage IGBT (HV - IGBT)
- **Frequency range**: 0...120 Hz
- **Overload capacity**: 150 % for 60 seconds, every 10 minutes (1.50 x \(I_{\text{rated}}\) - HD)
  - 115 % for 60 seconds, every 10 minutes (1.15 x \(I_{\text{rated}}\) - ND)
- **Efficiency**: Up to 99 % (up to 98 % including isolation transformer)

### Enclosure
- **Standard**: NEMA1/IP41 (IP42 under request)

### Ambient conditions
- **Temperature**: 0...40 °C (104 °F)
  - Up to 50 °C (122 °F) with current derating of 2.5% for every 1 °C above 40 °C
- **Humidity**: 5...90% non-condensing
- **Altitude**: 0...1,000 m
  - Up to 4,000 m (13,100 ft) with current derating of 10% for every 1,000 m above

### Control
- **Microprocessor**: 32 bits
- **Control method**: SVM (Space Vector Modulation) and OPP™ (Synchronous Optimal Pulse Patterns)
- **Control types**: Scalar (V/F), sensorless vector control and closed loop vector control

### Performance
- **Speed control**
  - Scalar (V/F): Regulation: 1% of rated speed with slip compensation
  - Sensorless vector control: Speed regulation: 0.5% of rated speed
  - Closed loop vector control: Speed variation range: 1:100

### Inputs
- **Analog**
  - 2 programmable differential inputs (10 bits): 0...10 V, 0...20 mA or 4...20 mA
  - 1 programmable isolated input (10 bits): 0...10 V, 0...20 mA or 4...20 mA
  - 1 programmable isolated input (10 bits): 0...10 V, 0...20 mA or 4...20 mA
  - 1 programmable bipolar input (14 bits): -10...+10 V

- **Digital**
  - 8 programmable isolated inputs: 24 V dc
  - 1 programmable isolated input: 24 V dc

### Outputs
- **Analog**
  - 2 programmable outputs (11 bits): 0...10 V
  - 2 programmable isolated outputs (11 bits): 0...20 mA or 4...20 mA

- **Relay**
  - 5 programmable outputs, form C contacts (NO/NC): 240 V ac, 1 A

- **Transistor**
  - 2 programmable isolated outputs (open collector): 24 V dc, 50 mA

### Communication
- **Serial interface**: RS232 (point-to-point)
- **Fieldbus network**: Modbus-RTU, Modbus-TCP, CANopen, Ethernet/IP, Profinet-DP or DeviceNet
- **Communications**: RS485, isolated, with EBA or EBB expansion boards (multi-point up to 30 drives)\(^{2}\)

### Safety
- **Protection (fault log of the last 100 faults/alarms with date and time)**
  - DC link overvoltage
  - DC link under voltage
  - VSD and motor overtemperature
  - Output overcurrent
  - Motor overload (I x t)
  - Dynamic braking resistor overload
  - CPU/EPROM error (Watchdog)

- **Ground fault**: Output ground fault
- **External fault**: External fault
- **Self-diagnosis fault and programming error**: Self-diagnosis fault
- **Serial communication fault**: Serial communication fault
- **Power supply phase loss**: Power supply phase loss
- **Keypad connection fault**: Keypad connection fault

### Finishing
- **Color**: Light blue (doors)
  - Dark blue (base, roof and shutter)
## Conformities/Standards

| Electromagnetic compatibility | EMC directive 89/336/EEC - Industrial Environment  
CEI standard - IEC61800-3 (EMC - Emission and Immunity) |
|-----------------------------|----------------------------------------------------------|
| CEI - IEC61800              | Adjustable speed electrical power drive system  
Part 4 - general requirements  
Part 5 - safety requirements |
| Underwriters laboratories   | UL 347, UL 347A |
| European commission         | CE |

## Commands

- Start/stop, general functions programming
- Increase/decrease speed
- JOG, FWD/REV and local/remote

## Keypad

### Monitoring

- Speed reference (rpm)
- Motor speed (rpm)
- DC link voltage (V)
- DC link voltage (V)
- Motor torque (%)
- Motor running hours (h)
- VSD enabled hours (h)
- Output current (A)
- Drive status
- Status of digital inputs
- Status of digital inputs
- Status of relay outputs
- Analog inputs value
- Status of relay outputs
- fault/alert messages

## Control Features

### Standard

- Keypad with LCD displays
- Password to protect drive programming
- LCD display language selection: English, Spanish, French, Deutsch and Portuguese
- Fault auto-diagnosis and auto-reset
- Parameters reset to factory or user default
- Specific unit indication (Ex: m/s, t/h, %, etc.)
- Slip compensation (V/Hz mode)
- Manual and automatic torque boost - I x R (V/Hz mode)
- Adjustable V/Hz curve (V/Hz mode)
- Minimum and maximum set-points for speed, current, and DC-link voltage
- Adjustable motor overload protection
- Adjustable digital gain and offset for the analog inputs
- Adjustable digital gain for the analog outputs
- JOG +/-JOG - function (momentary speed increase/decrease)
- Copy-paste/backup function (drive ↔ keypad)
- Comparison functions for the digital outputs:
  - \( N_i > N_c \); \( N < N_c \); \( N = N_c \); \( N_i = N_c \); \( Is > I_x \); \( Is < I_x \); \( T > T_x \) and \( T < T_x \)
  Where: \( N = Motor\ speed; N_i = Speed\ reference; Is = Output current and T = Motor\ torque |
- Linear and “S type” ramps and double ramp
- Independent acceleration and deceleration ramps
- Multi-speed function (up to 8 preset speeds)
- Special indicators (hour meter and wattmeter)
- Overlapped PID regulator (for automatic level, flow, pressure, and weight control)
- Direction of rotation selection (FWD/REV)
- Local/remote operation selection
- Flying start function (restart with a spinning load)
- Critical speed avoidance (skip up to 3 speeds)
- Ride-through function (operation during momentary power loss)

## Interface

### Accessories

- NEMA 4 remote keypad (LCD display)
- Remote keypad cable (3.3, 6, 10, 16, 25 and 35 ft)
- Blank keypad for local installation
- Blank keypad for remote installation
- Remote keypad frame kit
- Expansion boards with special functions
- Communication boards
- SUPERDRIVE kit with RS232 serial interface communication (drive ↔ PC)
- PLC2 integrated for PLC functions and logics
- Touch screen HMI with process information

Notes: 1) Expansion board.
2) Other configurations, consult WEG.
Environmental Policy

Guarantee the lowest environmental impact of our products and manufacturing processes by:

- Being in compliance with the applicable **environmental legislation**
- Improving continuously by establishing **environmental goals and targets**
- Acting preventively with the aim of **protecting the environment**
- **Ecoefficient** processes and products, saving **natural resources**

**WEG Green**

**Certifications**
- ISO 50001:2011
- ISO 14001:2014
- ISO 9001:2008
Efficiency for us is to create sustainable solutions!

As global market keeps growing every day, as energy demands grow together. Be part of sustainable economy is our responsibility, this way WEG supplies smart and efficient solutions.

Medium voltage loads are commonly part of the largest consumers inside industries, the use of medium voltage VSDs for these applications most of the times can dramatically decrease the use of energy and power consumption, consequently reducing CO₂ and other emissions.
Global presence is essential, as much as understanding your needs.

Global Presence
With more than 30,000 employees worldwide, WEG is one of the largest electric motors, electronic equipments and systems manufacturers. We are constantly expanding our portfolio of products and services with expertise and market knowledge. We create integrated and customized solutions ranging from innovative products to complete after-sales service.

WEG’s know-how guarantees our medium voltage variable speed drive MVW01 is the right choice for your application and business, assuring safety, efficiency and reliability.

- **Availability** is to have a global support network
- **Partnership** is to create solutions that suits your needs
- **Competitive edge** is to unite technology and innovation
High performance and reliable products to improve your production process.

Excellence is to provide a whole solution in industrial automation that improves our customers productivity.
For those countries where there is not a WEG own operation, find our local distributor at www.weg.net.