**MVW01**

Medium Voltage Variable Frequency Drive
WEG is a supplier of speed variation systems for Medium Voltage that can offer a complete package: Input Switchgear, Dry-type or Oil-type Phase-shifting Transformer, Variable Frequency Drive (VFD) and Medium Voltage Motor. WEG Medium Voltage Variable Frequency Drives are designed with state of the art technology and use a multilevel structure with high voltage IGBTs (6,5kV) reducing the motor harmonic currents to extremely low levels. The input rectifier configuration with 12-pulse or 18-pulse results in high power factor fully meeting IEEE-519 requirements. The MVW-01 is designed with multiprocessing control architecture and uses a 32-bit high performance processor (64-bits bus) with floating-point capability, ensuring a high performance control of the drive and motor. The MVW-01 follows the same programming philosophy of the LV WEG drive, resulting in a simple speed variation solution for MV applications. The MVW-01 drives introduce remarkable innovation on the segment of medium voltage speed variation, combining robustness, simplicity, reliability and safety in a compact solution with the latest generation technology.

### Main characteristics
- Totally digital with high performance 32-bits processor (64-bits bus)
- Smart keypad with dual display (LCD and LED)
- Motor voltages: 2.3, 3.3 or 4.16kV
- Power ratings up to 4500HP
- IP41/NEMA 1 Enclosure
- Air-cooled
- 12-pulse Input Rectifier (18-pulse as an option): high power factor (> 0.95)
- Multilevel topology (NPC - Neutral Point Clamp - 3/5 levels)
- Fiber optic insulation between the control section and the high voltage power section
- Voltage Source Inverter (VSI)
- Latest generation technology of High Voltage IGBT's (6.5kV) results in a reduced number of components, hence improving the system efficiency / reliability
- Ultra-reliable dry-type plastic film power capacitors
- Withdrawable power arms (easy and fast maintenance)
- High efficiency (> 98.5%)
- Low noise level (< 75dB)
- Low drive losses (low heat generation)
Applications

**Chemical, Petrochemical, Oil and Gas Industries**
- Pumps
- Fans / Exhausters
- Compressors
- Mixers/Agitators

**Cement and Mining**
- Pumps
- Fans / Exhausters
- Conveyors
- Cement Kilns

**Steel and Metallurgy**
- Pumps
- Fans / Exhausters
- Steel Mill
- Winders / Unwinders

**Sugar and Alcohol**
- Sugar Mill
- Fans
- Exhausters

**Pulp and Paper**
- Pumps
- Fans
- Exhausters
- Refiners

**Plastic and Rubber**
- Banburys
- Extruders

**Waste Water**
- Pumps

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**Pumps**
The variable frequency drive can vary the pump flow by adjusting the motor speed. In such a way, not only the improvement on the process control is obtained (better precision, higher production) but also energy saving. The use of a variable frequency drive also introduces another advantage: smooth starting - electrical (reducing the starting impact to the network) and mechanical (reducing the impact for the load and for the coupling) - resulting in reduced maintenance.

**Banbury®**
The speed control flexibility as well as the capability of driving high torque applications, makes the variable frequency drive the ideal device for Banburys applications, ensuring a perfect and homogeneous mix and resulting in quality improvement for the final product.

**Mills**
The variable frequency drive can be used with high starting torque loads to control and limit the motor current. Energy saving is obtained with constant torque loads, since the absorbed power is directly proportional to the speed \( P \sim N \). Therefore, reduction on the speed results in reduction on the absorbed power. The drive can be used to run the cylinders independently, which improves the extraction process and renders the milling process much more flexible.
Technical Data

**MAIN POWER SUPPLY**
- Voltage: 2300, 3300 or 4160V (+10%, -20% with output power de-rating)
- Frequency: 50 or 60Hz (+3%)
- Phase Unbalance: Less than 3%
- Cos (Power Factor): Greater than 0.97

**CONTROL POWER SUPPLY**
- Frequency: 50 or 60Hz (+3Hz)
- Phase Unbalance: Less than 3%

**ENCLOSURE**
- Standard: NEMA 1 / IP41

**Control**
- Microprocessor: 32 bits
- Control Type: SVM Sinusoidal PWM (Space Vector Modulation) and optimal pulses (OPP)
- Fully Digital
- Control Mode: V / Hz – Voltage Source
- Switching Mode: High Voltage IGBT (HV – IGBT)
- Frequency Range: 0 ... 100 Hz
- Overload Capacity:
  - 150% for 60 seconds, every 10 minutes (1,5 x I rated - CT)
  - 115% for 60 seconds, every 10 minutes (1,15 x I rated - VT)
- Efficiency: Greater than 98.5%

**PERFORMANCE**
- Speed Control:
  - Regulation (with Slip Compensation): 0.5% of Motor Rated Speed
  - V / Hz Resolution: 1 rpm (Keypad Reference)
  - Speed Regulation Range: 1:20
- Analog:
  - 2 Programmable Differential Inputs (10 bits): 0...10V, 0...20mA or 4...20mA
  - 1 Programmable Isolated Input (10 bits): 0...10V, 0...20mA or 4...20mA
  - 1 Programmable Bipolar Input (14 bits): -10 ... +10 V, 0...20mA or 4...20mA *
  - 1 Programmable Isolated Input (10 bits): 0...10V, 0...20mA or 4...20mA *
- Digital:
  - 8 Programmable Isolated Inputs: 24Vdc
  - 1 Programmable Isolated Input: 24Vdc *
  - 1 Programmable Isolated Input: 24Vdc (for Motor PTC Thermistor) *

**CONTROL INPUTS**
- 2 Programmable Outputs (11 bits): 0...10V
- 2 Programmable Isolated Outputs (11 bits): 0 ... 20mA or 4 ... 20mA
- 2 Programmable Bipolar Outputs (14 bits): -10 ... +10V *
- 2 Programmable Isolated Outputs (11 bits): 0 ... 20mA or 4 ... 20mA *

**CONTROL OUTPUTS**
- Relay:
  - 5 Programmable Outputs, Form C Contacts (NO/NC): 240Vac, 1A
- Transistor:
  - 2 Programmable Isolated Outputs (Open Collector): 24Vdc, 50mA *

**COMMUNICATION**
- Serial Interface:
  - RS-232 (point-to-point)
  - RS-485, Isolated, with EBA or EBB Expansion Boards (multi-point up to 30 drives) *
- Fieldbus Communication:
  - Modbus RTU (Built-in) via RS-485 serial
  - Proffbus DP or DeviceNet (via Communication Board)

**SAFETY**
- DC Link Overvoltage
- DC Link Undervoltage
- Drive and Motor Overtemperature
- Output Overcurrent
- Motor Overload (I x t)
- Dynamic Braking Resistor Overload
- CPU / EPROM Error (Watchdog)
- Keypad Connection Fault

**AMBIENT**
- Temperature: 0 ... 104 °F (40 °C) (up to 122 °F (50 °C) with 2.5% Output Current De-rating / °C)
- Humidity: 5 ... 90% Non Condensing
- Altitude: 0 ... 3300 ft (1000 m) (up to 13100 ft (4000 m) with 10% output current derating / 1000m

**FINISHING**
- Color:
  - Munsell Gray 5PB7/4 (Doors)
  - Munsell Blue 5PB2/6 (Base, Roof and Shutter)

**CONFORMITIES/STANDARDS**
- Electromagnetic Compatibility:
  - CEI Standard – IEC 61800-3 (EMC – Emission and Immunity
- CEI – IEC 61800
  - Adjustable Speed Electrical Power Drive System
  - Part 4 – General Requirements
  - Part 5 – Safety Requirements
- UL (USA)
  - Underwriters Laboratories Inc. USA (File E253837)

* Optional
## Technical Data

### KEYPAD

<table>
<thead>
<tr>
<th>Commands</th>
<th>Monitoring</th>
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<tbody>
<tr>
<td>Start / Stop, General Functions Programming</td>
<td>Speed Reference (rpm)</td>
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<tr>
<td>Increase / Decrease Speed</td>
<td>Output Current (A)</td>
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<tr>
<td>JOG, FWD/VER and Local/Remote</td>
<td>Motor Speed (rpm)</td>
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<td></td>
<td>Output Voltage (V)</td>
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<td>Speed Proportional Value (Ex: ft/min)</td>
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<td>Drive Status</td>
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<td></td>
<td>Output Frequency (Hz)</td>
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<td>Status of Digital Inputs</td>
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<td>DC Link Voltage (V)</td>
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<td>Status of Digital Outputs</td>
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<td>Motor Torque (%)</td>
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<td>Output Power (kW)</td>
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<td>Hours Powered Up (h)</td>
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<td>100 Last Faults with Date and Time</td>
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<td></td>
<td>Hours Enabled (h)</td>
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</table>

### CONTROL FEATURES

#### Standard

- Keypad with LCD + LED displays
- Password to protect drive programming
- LCD display language selection: English, Spanish and Portuguese
- Fault auto-diagnosis and auto-reset
- Parameters reset to factory or user default
- Inverter Self-tuning to motor and load (Vector Modes)
- Specific unit indication (Ex: l/s, l/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 speed limits
- Maximum current limit
- Adjustable motor overload protection
- Adjustable digital gain and offset for the analog inputs
- Adjustable digital gain for the analog outputs
- JOG function
- JOG = / JOG – Function (momentary speed increase/decrease)
- COPY Function (Drive Keypad or Keypad Drive)
- Comparison functions for the digital outputs:
  - \( N^* > N; N > N^*; N < N^*; N = 0; N = N^*; Is > Ix; Is < Ix; T > Tx \) and \( T < Tx \)
- Where: \( N \) = Motor speed; \( N^* \) = Speed reference; \( Is \) = Output Current and \( T \) = Motor torque
- Linear and “S type” ramps / double ramp
- Independent acceleration and deceleration ramps
- Multi-speed function (up to 8 preset speeds)
- Special resources (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 Speed)
- Ride-Through function (operation during momentary power loss)
- Built-in Modbus RTU (needs the RS-232 or RS-485 interface)

#### Options

- NEMA 4 Remote Keypad (LCD display)
- Remote Keypad cable (3.3, 6.6, 10, 16, 25 and 35 ft)
- Remote Keypad frame kit
- Expansion Boards with special functions
- Profinet-DP
- DeviceNet
- SUPERDRIVE Kit with RS-232 Serial Interface Communication (Drive PC)

*These data is subject to change without previous notice*
Air-cooling
- Simple maintenance
- Low drive losses (low heat generation)
- Low noise level

12-pulse or 18-pulse Input Rectifier
- Low harmonic distortion
- High power factor (> 0.95)

Withdrawable IGBT Arms
- Withdrawable Power Arms
- Gate-drives / feedbacks / monitoring – optic fiber
- Simple control connections
- Stabs for power connections
- Simple and fast maintenance

DC Link Monitoring
- Visual indication of the voltage presence on the DC Link
Monitoring and Protections
- Arc detection for the power section
- Temperature monitoring
- Ventilation monitoring through pressure sensor

Fiber Optic Interface
- Noise immunity
- High Voltage insulation
- Fiber optic for the power and control interconnection: gate drives, feedbacks, temperature monitoring, voltage.

Simple Keypad
- Double display (LED and LCD) for easy visualization and programming
- Uses the same keypad of the low voltage drives (graphical keypad as an option)
- MV Drive programming follows the same philosophy of the LV drives

Safety Operation
- Mechanical interlocking for the power sections
- Electro-mechanical interlocking with the main input circuit breaker, which does not allow the doors opening when the circuit breaker is on.
## Technical Data

<table>
<thead>
<tr>
<th>Rated Voltage (V)</th>
<th>MVW01 Basic Model</th>
<th>Rated Drive Current (A)</th>
<th>Motor</th>
<th>Size</th>
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<td>VT</td>
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<td>HP kW</td>
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<td>542</td>
<td>4000</td>
<td>2900</td>
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</tbody>
</table>

**Note:**
1- Suggested ratings. Size the drive based on the motor current and on the load duty cycle.
2- CT = Constant Torque - 150% overload for 60 seconds every 10 minutes.
3- VT= Variable Torque - 115 % overload for 60 seconds every 10 minutes.
Dimensions and Weight

<table>
<thead>
<tr>
<th>Size</th>
<th>Width in (mm)</th>
<th>Height in (mm)</th>
<th>Depth in (mm)</th>
<th>Weight (Kg)</th>
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<tbody>
<tr>
<td>A</td>
<td>95 (2400)</td>
<td>87 (2190)</td>
<td>38 (980)</td>
<td>1560</td>
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<tr>
<td>B</td>
<td>103 (2600)</td>
<td>1700</td>
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<tr>
<td>C</td>
<td>158 (4000)</td>
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<td></td>
<td>2700</td>
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</tbody>
</table>

SIZE A

SIZE B

SIZE C
Keypad Functions

Starts the drive through a controlled acceleration ramp. The display shows alternately the following data when this key is pressed: rpm – Volts – Status – Torque – Hz – Amps.

Stops the drive through a controlled deceleration ramp. Resets the drive after a fault event.

Increases the drive speed or parameter number/setting

Decreases the drive speed or parameter number/setting

Shows on the display the parameter number or its content (for programming purposes)

Runs the JOG function (momentary speed impulse) while pressed.

Changes the motor direction of rotation (Forward/Reverse)

Selects the drive operation mode (Local or Remote)

Configuration
Superdrive

Software for Drives Programming
SuperDrive is a programming software for the MVW-01 drives. The software incorporates functions such as: parameters upload and download, drive operation and monitoring, off-line programming, and trace function. SuperDrive is a Windows compatible software (Windows 95, Windows 98, Windows ME, Windows NT Workstation 4.0, Windows 2000 Professional, Windows XP). The Drive-PC communication uses a RS-232 or a RS-485 interface.

Ordering Code

<table>
<thead>
<tr>
<th>MVW-01</th>
<th>0070</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
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<td>Three-phase Power Supply</td>
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<td>S = Spanish</td>
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<td>06 -</td>
<td>Product Version: S = Standard</td>
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<td>O = Optional</td>
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<td>07 -</td>
<td>Enclosure: 00 = Standard (IP41/NEMA 1)</td>
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<td>08 -</td>
<td>Keypad: 00 = Standard</td>
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<td>09 -</td>
<td>Dynamic Braking: 00 = Standard (without dynamic braking)</td>
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<td>DB = Dynamic Braking</td>
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<td>10 -</td>
<td>Expansion Board: 00 = none</td>
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<td>A1 = complete EBA board</td>
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<td>B1 = complete EBB board</td>
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<td>C1 = complete EBC board</td>
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<td>11 -</td>
<td>Fieldbus Communication Board: 00 = none</td>
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<td>DN = DeviceNet</td>
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<td>PD = Profield DP</td>
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<td>12 -</td>
<td>Special Hardware: 00 = none</td>
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<td>H1 = special door and special mounting plate</td>
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<td>13 -</td>
<td>Special Software: 00 = none</td>
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<td>14 -</td>
<td>End of code: Z</td>
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www.weg.net/in  

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