



Medium Voltage Variable Frequency Drive **MVV01**

Complete Solution for Medium
Voltage Speed Variation



*Transforming energy
into solutions*

WEG Medium Voltage Variable Frequency Drives are designed with the state of the art technology and use a multilevel structure with high voltage IGBT's (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 multiprocessor 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)
- Optic fiber 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 ($< 75\text{dB}$)
- 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

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.

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.

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.

TECHNICAL DATA

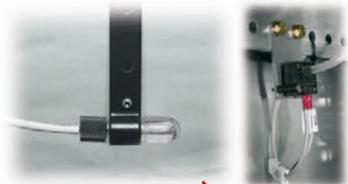
MAIN POWER SUPPLY	Voltage	2300, 3300 or 4160V (+ 10%, -20% with output power de-rating)	
	Frequency	50 or 60Hz (\pm 3%)	
	Phase Unbalance	Less than 3%	
	Cos ϕ (Power Factor)	Greater than 0.97	
CONTROL POWER SUPPLY	Voltage	220V / 380V / 400V / 415V / 440V / 460V / 480V (Three – phase) Single – phase (under request)	
	Frequency	50 or 60Hz (\pm 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	V / Hz
CONTROL INPUTS		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		
	1 Programmable Isolated Input (10 bits): 0...10V, 0...20mA or 4...20mA ①		
Digital	8 Programmable Isolated Inputs: 24Vdc		
	1 Programmable Isolated Input: 24Vdc ①		
	1 Programmable Isolated Input: 24Vdc (for Motor PTC Thermistor) ①		
CONTROL OUTPUTS	Analog	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 ①	
		2 Programmable Isolated Outputs (11 bits): 0 ... 20mA or 4 ... 20mA ①	
	Relay	5 Programmable Outputs, Form C Contacts (NO/NC): 240Vac, 1A	
Transistor	2 Programmable Isolated Outputs (Open Collector): 24Vdc, 50mA ①		
COMMUNICATION	Serial Interface	RS-232 (point-to-point) RS-485, Isolated, with EBA or EBB Expansion Boards (multi-point up to 30 drives) ①	
	Fieldbus Communication	Modbus RTU (Built-in) via RS-485 serial interface Profibus DP or DeviceNet (via Communication Board)	
SAFETY	Protections (storage of the last 100 faults / alarms with date and time)	DC Link Overvoltage	Output Short Circuit
		DC Link Undervoltage	Output Ground Fault
		Drive and Motor Overtemperature	External Fault
		Output Overcurrent	Self-diagnosis Fault and Programming Error
		Motor Overload (I x t)	Serial Communication Fault
		Dynamic Braking Resistor Overload	Power Supply Phase Loss
		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	EMC Directive 89 / 336 / EEC – Industrial Environment 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)	

①Optional

TECHNICAL DATA

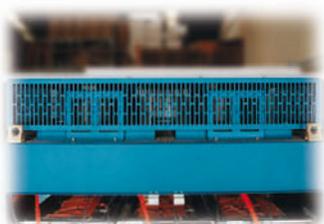
KEYPAD	Commands	Start / Stop, General Functions Programming	
		Increase / Decrease Speed	
		JOG, FWD/VER and Local/Remote	
	Monitoring	Speed Reference (rpm)	Output Current (A)
		Motor Speed (rpm)	Output Voltage (V)
		Speed Proportional Value (Ex: ft/min)	Drive Status
		Output Frequency (Hz)	Status of Digital Inputs
		DC Link Voltage (V)	Status of Digital Outputs
		Motor Torque (%)	Status of Relay Outputs
		Output Power (kW)	Analog Inputs Value
Hours Powered Up (h)		100 Last Faults with Date and Time	
Hours Enabled (h)		Fault / Alert Messages	
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, 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 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:	
		$N^* > N_x$; $N > N_x$; $N < N_x$; $N = 0$; $N = N^*$; $I_s > I_x$; $I_s < I_x$; $T > T_x$ and $T < T_x$	
		Where: N = Motor speed; N^* = Speed reference; I_s = 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			
Profibus-DP			
DeviceNet			
SUPERDRIVE Kit with RS-232 Serial Interface Communication (Drive↔PC)			

These data is subject to change without previous notice.



MONITORING AND PROTECTIONS

- Arc detection for the power section
- Temperature monitoring
- Ventilation monitoring through pressure sensor



AIR-COOLING

- Simple maintenance
- Low drive losses (low heat generation)
- Low noise level



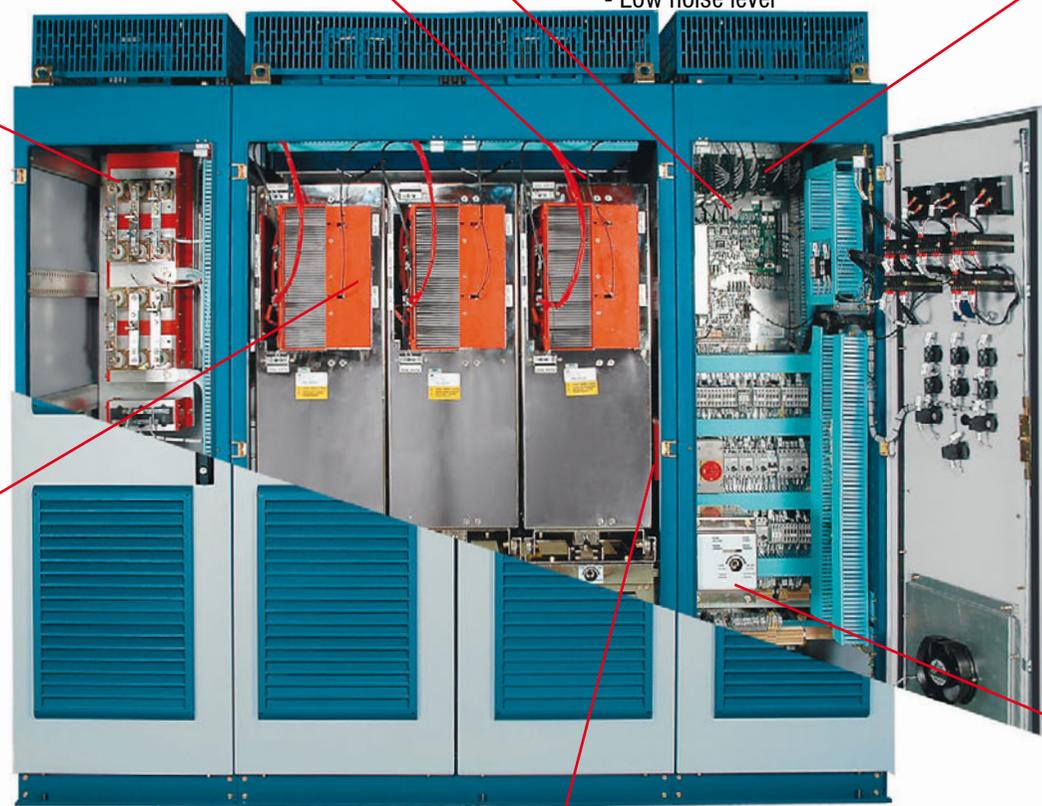
OPTIC FIBER INTERFACE

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



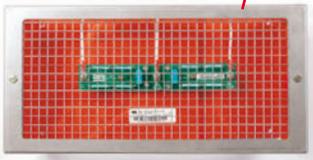
12-PULSE OR 18-PULSE INPUT RECTIFIER

- 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



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.

SPECIFICATION TABLE

Rated Voltage (V)	MVW01 Basic Model	Rated Drive Current (A)		Motor				Size
				Constant Torque		Variable Torque		
		CT	VT	HP	kW	HP	kW	
2300	0120 T 2300 ESZ	120	137	500	400	600	450	A
	0140 T 2300 ESZ	140	160	600	450	700	500	
	0165 T 2300 ESZ	165	175	700	500	750	560	
	0175 T 2300 ESZ	175	200	750	560	900	710	
	0210 T 2300 ESZ	210	240	900	710	1000	750	
	0250 T 2300 ESZ	250	280	1000	800	1250	900	
	0280 T 2300 ESZ	280	320	1250	900	1500	1120	
	0386 T 2300 ESZ	386	440	1750	1250	2000	1400	B
	0450 T 2300 ESZ	450	490	2000	1400	2250	1600	
	0490 T 2300 ESZ	490	560	2250	1600	2500	1800	
	0560 T 2300 ESZ	560	640	2500	1800	3000	2200	
3300	0085 T 3300 ESZ	85	97	500	400	600	450	A
	0100 T 3300 ESZ	100	112	600	450	700	500	
	0112 T 3300 ESZ	112	128	700	500	800	630	
	0138 T 3300 ESZ	138	150	800	630	900	710	
	0150 T 3300 ESZ	150	160	900	710	1000	800	
	0160 T 3300 ESZ	160	182	1000	800	1250	900	
	0186 T 3300 ESZ	186	212	1250	900	1500	1120	
	0235 T 3300 ESZ	235	265	1500	1120	1750	1250	
	0265 T 3300 ESZ	265	302	1750	1250	2000	1400	
	0310 T 3300 ESZ	310	354	2000	1400	2250	1600	
	0375 T 3300 ESZ	375	428	2500	1800	2750	2000	C
	0500 T 3300 ESZ	500	571	3000	2200	3750	2800	
	0580 T 3300 ESZ	580	650	3750	2800	4000	3000	
4160	0070 T 4160 ESZ	70	80	500	400	600	450	A
	0080 T 4160 ESZ	80	91	600	450	700	500	
	0094 T 4160 ESZ	94	107	700	500	800	630	
	0110 T 4160 ESZ	110	120	800	630	900	710	
	0120 T 4160 ESZ	120	130	900	710	1000	800	
	0130 T 4160 ESZ	130	148	1000	800	1250	900	
	0162 T 4160 ESZ	162	170	1250	900	1350	1000	
	0170 T 4160 ESZ	170	188	1350	1000	1500	1120	
	0188 T 4160 ESZ	188	214	1500	1120	1750	1300	
	0250 T 4160 ESZ	250	286	2000	1400	2250	1600	
	0300 T 4160 ESZ	300	342	2250	1600	2750	2000	
	0357 T 4160 ESZ	357	408	3000	2200	3500	2600	
		0475 T 4160 ESZ	475	542	4000	2900	4500	3300

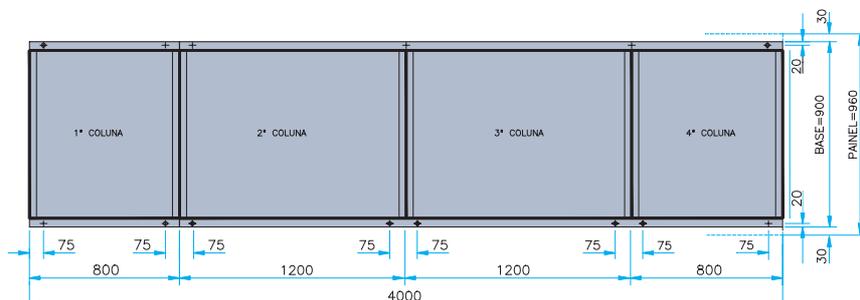
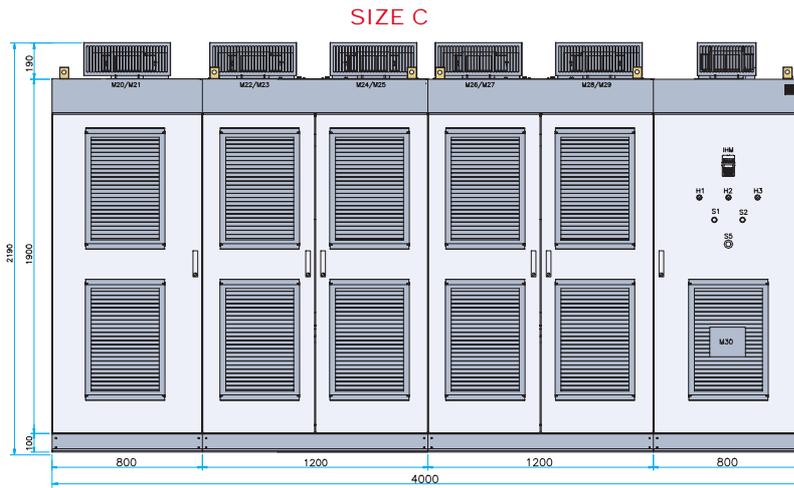
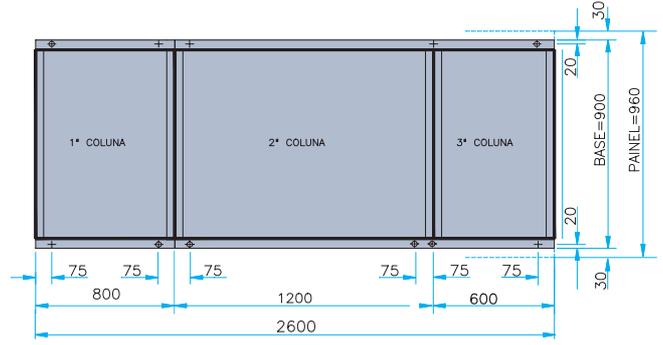
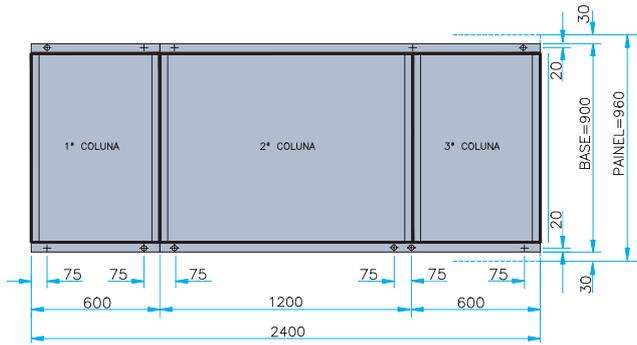
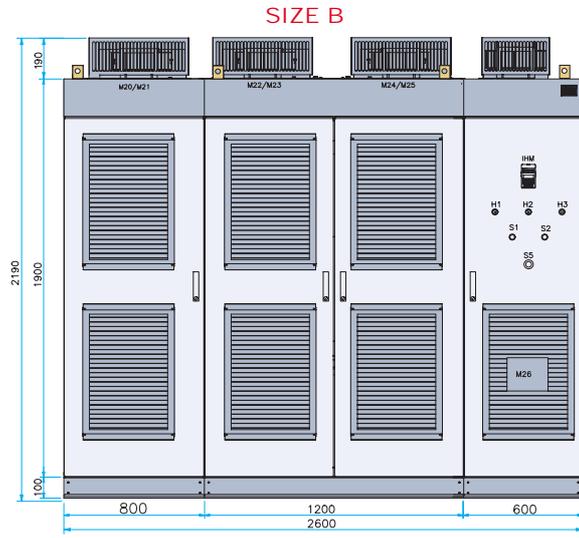
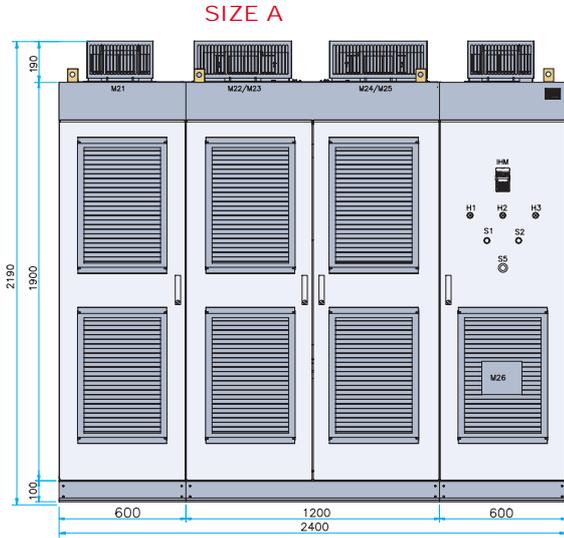
Notes: 1 – Suggested ratings. Size the drive based on the motor current and on the load duty cycle.

2 – CT = Constant Torque – 150% overload for 60 seconds every 10 minutes.

VT = Variable Torque – 115% overload for 60 seconds every 10 minutes.

DIMENSIONS AND WEIGHT

Size	Width in (mm)	Height in (mm)	Depth in (mm)	Weight (Kg)
A	95 (2400)	87 (2190)	38 (980)	1560
B	103 (2600)			1700
C	158 (4000)			2700

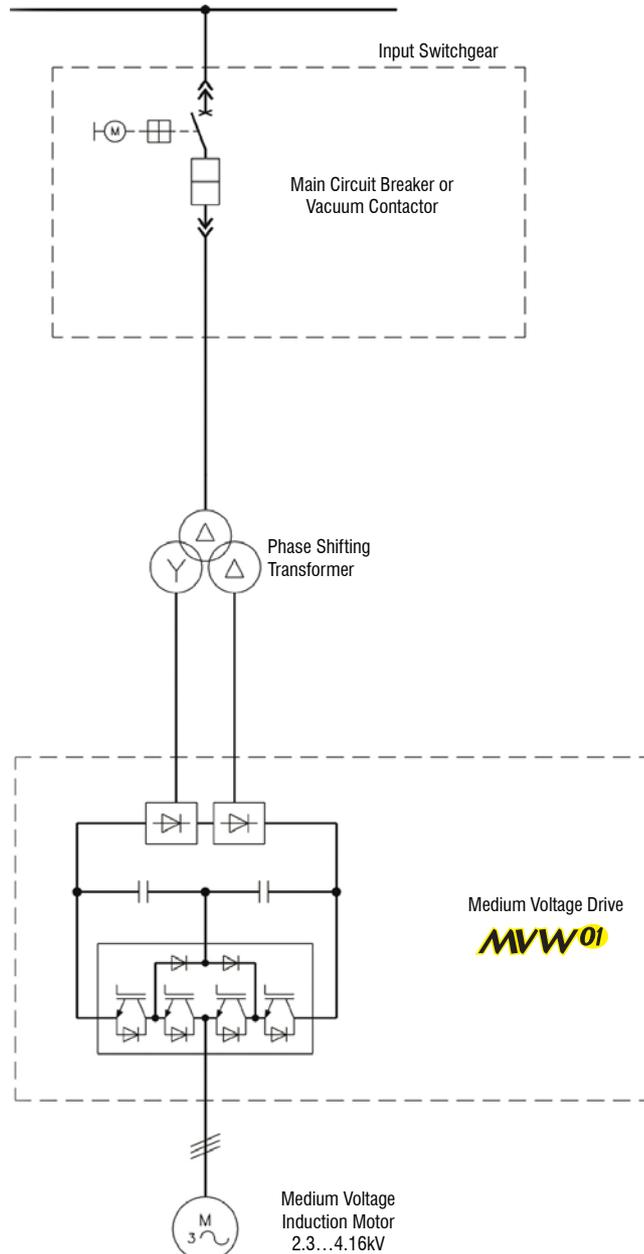


KEYPAD FUNCTIONS



-  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

MVW-01 0070 T 4160 P 0 00 00 00 00 DN 00 00 Z

01
02
03
04
05
06
07
08
09
10
11
12
13
14

01 - Medium Voltage Variable Frequency Drive MVW-01 Series

02 - Output Rated Current for Constant Torque (CT)

03 - Three-phase Power Supply

04 - Rated Voltage: 2300=2,3kV
 3300=3,3kV
 4160=4,16kV

05 - Manual Language: P = Portuguese
 E = English
 G = Germany
 S = Spanish

06 - Product Version: S = Standard
 O = Optional

07 - Enclosure: 00 = Standard (IP41/NEMA 1)

08 - Keypad: 00 = Standard

09 - Dynamic Braking: 00 = Standard (without dynamic braking)
 DB = Dynamic Braking

10 - Expansion Board: 00 = none
 A1 = complete EBA board
 B1 = complete EBB board
 C1 = complete EBC board

11- Fieldbus Communication Board: 00 = none
 DN = DeviceNet
 PD = Profibus DP

12 - Special Hardware: 00 = none
 H1 = special door and special mounting plate

13 - Special Software: 00 = none

14 - End of code: Z

	2300V	3300V	4160V
	0120 = 120 A	0085=85 A	0070=70 A
	0140 = 140 A	0100=100 A	0080=80 A
	0165 = 165 A	0112=112 A	0094=94 A
	0175 = 175 A	0138=138 A	0110=110 A
	0210 = 210 A	0150=150 A	0120=120 A
	0250 = 250 A	0160=160 A	0130=130 A
	0250 = 280 A	0186=186 A	0162=162 A
	0386 = 386 A	0235=235 A	0170=170 A
	0450 = 450 A	0265=265 A	0188=188 A
	0490 = 490 A	0310=310 A	0250=250 A
	0560 = 560 A	0375=375 A	0300=300 A
		0500=500 A	0375=375 A
		0580=580 A	0475=475 A

DATA SHEET FOR SIZING

Fill out the form below and send it to WEG or to one of our distributors so that we can provide you the best solution for controlling the speed of your application.

General Data

Company:	Phone:
City / State:	FAX:
Contact Person:	E-mail:
Application / Type of Load:	

Application Data

Motor	Rated Power:CVkW	Number of Poles / Rated Speed: <input type="checkbox"/> 2 poles (3600 rpm) <input type="checkbox"/> 4 poles (1800 rpm) <input type="checkbox"/> 6 poles (1200 rpm) <input type="checkbox"/> 8 poles (900 rpm) Poles (.....rpm)	Nameplate Voltage and Current: <input type="checkbox"/> 2.300V →A <input type="checkbox"/> 3.300V →A <input type="checkbox"/> 4.160V →AV →A	Temperature Sensor: <input type="checkbox"/> Thermostat Qty:..... <input type="checkbox"/> PTC Qty:..... <input type="checkbox"/> PT100 Qty:..... <input type="checkbox"/> Bearings Qty:..... <input type="checkbox"/> Qty:.....
	Service Factor: S.F.=..... Is it used? <input type="checkbox"/> Yes <input type="checkbox"/> No	Required speed range: From..... to rpm	Number of starters per hour: Starters/hour	Ventilation: <input type="checkbox"/> Self-ventilated <input type="checkbox"/> Forced ventilation
Load	Load Type: <input type="checkbox"/> Constant Torque <input type="checkbox"/> Variable Torque <input type="checkbox"/> Undefined Torque	Reduction ratio between motor shaft and load: Ratio → 1 : Motor Speed: rpm Load Speed: rpm	Starting / Operation Overload: <input type="checkbox"/> 115% for 60 seconds (every 10 minutes) <input type="checkbox"/> 150% for 60 seconds (every 10 minutes)% for	
	Type of stopping (braking) required: <input type="checkbox"/> Cost to stop (By turning-off the motor and the drive) <input type="checkbox"/> Soft stop with deceleration ramp → (Required time of seconds) <input type="checkbox"/> Fast stop with electrical braking → (Required time of seconds)			
Installation	Power Supply: <input type="checkbox"/> 2.300V <input type="checkbox"/> 50Hz <input type="checkbox"/> 3.300V <input type="checkbox"/> 60Hz <input type="checkbox"/> 4.160VV	Ambient Conditions: Temperature: Altitude: Environment: <input type="checkbox"/> Up to 40°C <input type="checkbox"/> Up to 1000m <input type="checkbox"/> Normal <input type="checkbox"/>°C <input type="checkbox"/> m <input type="checkbox"/> Aggressive		Installation Short-Circuit Level: kA symmetrical
	Number of pulses for the Input Rectifier: <input type="checkbox"/> 12-pulsepulses	Type of Phase Shifting Transformer: <input type="checkbox"/> Oil-type <input type="checkbox"/> Dry-type Enclosure <input type="checkbox"/> IP00 <input type="checkbox"/> IP54 <input type="checkbox"/> IP20 <input type="checkbox"/>	Distance between Motor and Drive: Cable length:m Distance between the Drive and the Phase-shifting Transformer: Cable length:m	
Drive	Control Mode: <input type="checkbox"/> V/Hz <input type="checkbox"/> Vector Sensorless <input type="checkbox"/> Vector with Encoder	Fieldbus Communication: <input type="checkbox"/> Modbus RTU <input type="checkbox"/> DeviceNet <input type="checkbox"/> DeviceNet Drive Profile <input type="checkbox"/> Profibus DP		



WEG EXPORTADORA S.A.
Phone: +55 47 372 4002
Fax: +55 47 372 4060
wex-mark@weg.com.br
www.weg.com.br

WEG AUSTRALIA PTY. LTD.
Phone: +61 (3) 9765 4600
Fax: +61 (3) 9753 2088
sales.drives@weg.com.au
waa.weg.com.br

**WEG EURO
INDÚSTRIA ELÉCTRICA, S.A.**
Phone: +351 229 477 708/700
sales@weg.com.pt
www.weg.com.pt

**WEG NETHERLANDS
WEG Europe S.A.**
Phone: +31 (0) 570-620550
info@weg-netherlands.nl
www.weg-netherlands.nl

WEG GERMANY GmbH
Phone: +49 (2234) 9 5353-0
info@weg-germany.de
wg.weg.com.br

WEG ITALIA S.R.L.
Phone: (39) 02 6129-3535
info@wegitalia.com

WEG EUROPE S.A.
Phone: + 32 (67) 88-8420
info@wegeurope.be
www.wegeurope.be

WEG SCANDINAVIA AB
Phone: (46) 300 73400
info@weg.se

WEG IBERIA S.A.
Phone: (34) 916 553 008
wegiberia@wegiberia.es
www.wegiberia.es

WEG ELECTRIC MOTORS (U.K.) LTD.
Phone : 44 (01527) 596-748
wegsales@wegelectricmotors.co.uk