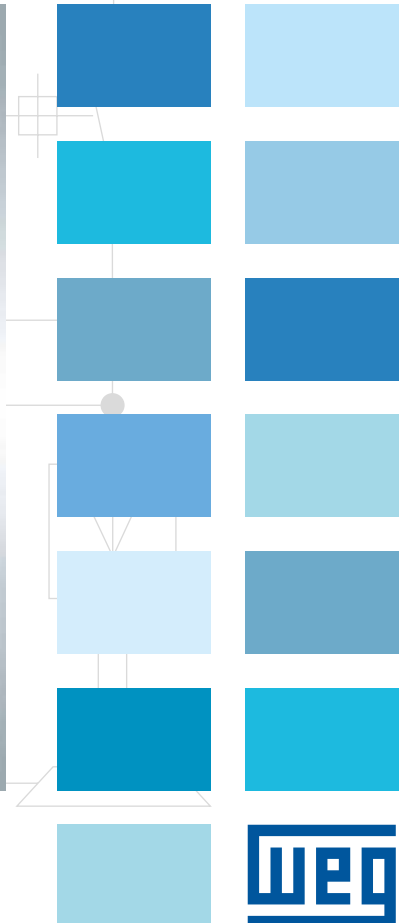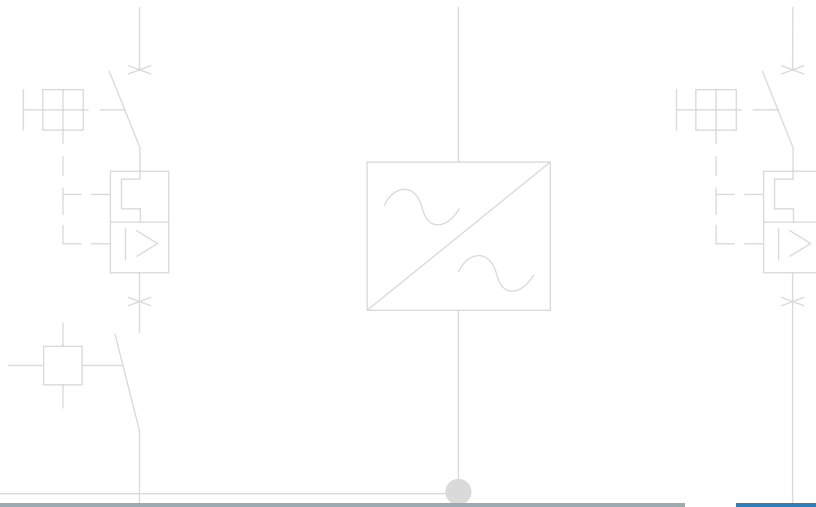# MVW01

Medium Voltage
Frequency Inverter

MVW01 - Medium Voltage Frequency Inverter

WEG is a traditional supplier of solutions in speed variation, manufacturing all the parts of a system: Input switchgear, transformer(dry-type or oil-type), frequency inverter and electric motor.

The MVW01 is designed to control medium voltage induction motors. It features unique innovations, combining hardware robustness with simplicity, reliability and safety in a compact solution with few components and state-of-the-art generation technology.

MVW01 follows the same programming philosophy of the WEG low voltage inverter line, simplifying its application. It has a multilevel topology with high-voltage IGBTs (3.3 or 6.5 kV) and optimal switching reducing the motor harmonic currents to extremely low levels. The few number of power component parts, increasing its efficiency and reliability.

The multipulse diode configuration of the input rectifier gives a high power factor in the power supply meeting IEEE 519 requirements.

In the control stage, it has a multiprocessing architecture using 32-bit processors (64-bit bus) with floating point capability and high performance, ensuring high efficiency in motor control.

Main characteristics
- Motor voltage: 2.3 kV, 3.3 kV, 4.16 kV or up to 6.0 kV - 6.9 kV
- Power ratings up to 8,000 hp (6,000 kW)
- 12-pulse diode input rectifier (18 or 24 pulses are also available)
- In the compact model, the 18-pulse rectifier is standard
- Reduced number of components, which results in high efficiency and reliability
- Assembled in IP41/NEMA1 panel
- Multilevel power topology: Neutral Point Clamped (NPC)
  - 3/5 level up to 4160 V
  - 5/9 level above 6000 V
- Power and control sections isolated by fiber optic
- Network communication: DeviceNet, Modbus, Profibus-DP and Ethernet
- Dry-type plastic film power capacitors of high reliability and long useful life
- Voltage Source Inverter (VSI)
- Air-cooled
- High efficiency (> 99%)
- High power factor (> 95%)
- Low noise level (< 75 dBa)
- Low heat dissipation

Characteristics

Software for Drives Programming

SuperDrive is a programming software for the MVW01 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 and Windows 7). The Drive-PC communication uses a RS-232 or a RS-485 interface.

Trace Function
- Registration and graphical view of MVW01 variables
- Simulates an oscilloscope

Graphical Programming Interface

Functions

Enables MVW01 through a ramp (start). After enabled, it switches the display indications. Rpm - Volts - Status - Torque - Hz - Amps

Disables MVW01 through a ramp (stop). Resets the inverter after a fault event.

Increases decreases the speed or parameter number and value.

When pressed, it performs the JOG function (*momentary speed impulse*).

Inverts the direction of rotation of the motor toggling between clockwise or counterclockwise.

Selects the inverter operation mode by setting the origin of the controls, which may be Local or Remote.

Help Function

Characteristics

Monitoring and Protections

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

12, 18, 24 or 36 Pulse Rectifier Bridge

- Low harmonic distortion
- High power factor (>0.95)
- Monitoring – fiber optic

Note:
36 Pulse rectifier bridge is available for 6kV-6.9kV models only

Withdrawable IGBT Arms

- Withdrawable power arms
- Gate drivers / feedbacks / monitoring - fiber optic
- Simple control connections
- Plug in power connections
- Simple and fast replacement

Air-cooling

- No need for special care for maintenance
- Redundant cooling
- Low heat dissipation
- Low noise level

Fiber optic interface

- Noise immunity
- Fiber optic connection between control and power sections: gate drivers; feedbacks,temperature monitoring, voltage.

Operating interface - HMI

- Graphical: sequential access to the parameters or groups through the access keys of the display functions
- Same HMI standard of the low voltage inverters
- Parameterization follows the same philosophy of the low voltage inverters
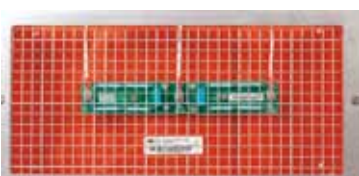
DC Link Monitoring

- Visual indication of the voltage presence on the DC link

Mechanical Lock

- Mechanical lock for the power sections
- Electro-mechanical interlocking with the main circuit breaker
- Unable to open power sections with the main circuit breaker energized

Applications

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

Cement and Mining
Ovens
Fans / Exhausters
Conveyors
Mills

Steel and Metallurgy
Pumps
Fans / Exhausters
Steel Mill
Winders

Sugar and Chemical
Sugarcane mill
Fans
Exhausters
Preparation

Pulp and Paper
Pumps
Fans
Exhausters
Refiners

Plastic and Rubber
Banburys®
Extruders

Water & Waste
Water Management
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.

Fans
The variable frequency drive allows great energy saving, mainly in times of reduced flow, eliminating the need of using dumpers. In addition, it reduces dramatically starting current levels of the equipment.

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~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

Product Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
MVW01	C	0070	T	6900	P	0	-	-	-	-	DN	-	-	Z

1 - WEG Medium Voltage Frequency Inverter

MVW01

2 - MVW01 Model

C	Compact
(blank)	Standard

3 - Output rated current (constant torque - CT

2300 V	3300 V	4160 V	6300 V [2]	6900 Vca [2]
0120 = 120 A	0085 = 85 A [1]	0070 = 70 A [1]	0058 = 58 A	0053 = 53 A [1]
0140 = 140 A	0100 = 100 A [1]	0080 = 80 A [1]	0078 = 78 A	0070 = 70 A [1]
0165 = 165 A	0112 = 112 A [1]	0094 = 94 A [1]	0104 = 104 A	0094 = 94 A [1]
0175 = 175 A	0138 = 138	0110 = 110 A [1]	0124 = 124 A	0112 = 112 A [1]
0210 = 210 A	0150 = 150	0120 = 120 A [1]	0140 = 140 A	0130 = 130 A [1]
0250 = 250 A	0160 = 160 A	0130 = 130 A	0166 = 166 A	0150 = 150 A
0280 = 280 A	0186 = 186 A	0162 = 162 A	0188 = 188 A	0170 = 170 A
0386 = 386 A	0235 = 235 A	0170 = 170 A	0214 = 214 A	0188 = 188 A
0450 = 450 A	0265 = 265 A	0188 = 188 A	0260 = 260 A	0235 = 235 A
0490 = 490 A	0310 = 310 A	0250 = 250 A	0288 = 288 A	0265 = 265 A
0560 = 560 A	0375 = 375 A	0300 = 300 A	0330 = 330 A	0300 = 300 A
0733 = 733 A	0500 = 500 A	0357 = 357 A	0420 = 420 A	0375 = 375 A
0880 = 880 A	0580 = 580 A	0475 = 475 A	0495 = 495 A	0450 = 450 A
0931 = 931 A	0880 = 880 A	0712 = 712 A	0575 = 575 A	0520 = 520 A
1064 = 1064 A	1178 = 1178 A	0950 = 950 A		

*(*1) Output rated current ranges available for the compact model*
*(*2) Overload of 115%, other models : overload of 150%*

4 - Number of power supply phases

T	3-phase power supply

5 - Rated Voltage

2300	2,3 kV
3300	3,3 kV
4160	4,16 kV
6300	6,3 kV
6900	6,9 kV

6 – User manual language

P	Portuguese
E	English
S	Spanish

7 - Optional kits

0	With optional kits
blank	Standard

8 - Enclosure protection degree

(blank)	IP41/Nema 1 (standard)

9 - Operation Interface - HMI

G	Graphical

10 - Braking

DB	With rheostatic braking
(blank)	Without rheostatic braking

11 - Expansion cards

A1	Complete EBA card
B1	Complete EBB card
(blank)	Standard (without expansion card)

12 - Cards for communication networks

DN	Devicenet
PD	Profibus-DP
ET	Ethernet
(blank)	Without network card

13 - Special Hardware Version

H1	Door and special assembling plate [3]
(blank)	None

*(*3) for details see the Sales Department*

14 - Special Software Version

(blank)	None

15 - End of code

Z	Add "Z" to end code

Specification

Models

Rated voltage (V)	Standard Model	Rated output current (A) [*5]		Motor Power [*4]				Size
				Constant torque (CT)		Variable torque (VT)		
		CT	VT	HP	kW	HP	kW	
2300 Vca	MVW010120T2300PSZ	120	137	500	400	600	450	A
	MVW010140T2300PSZ	140	160	600	450	700	500	
	MVW010165T2300PSZ	165	175	700	500	750	560	
	MVW010175T2300PSZ	175	200	750	560	900	710	
	MVW010210T2300PSZ	210	240	900	710	1000	750	
	MVW010250T2300PSZ	250	280	1000	800	1250	900	
	MVW010280T2300PSZ	280	320	1250	900	1500	1120	B
	MVW010386T2300PSZ	386	440	1750	1250	2000	1400	
	MVW010450T2300PSZ	450	490	2000	1400	2250	1600	
	MVW010490T2300PSZ	490	560	2250	1600	2500	1600	
	MVW010560T2300PSZ	560	640	2500	1800	3000	2200	
	MVW010733T2300PSZ	733	837	3100	2300	3650	2700	C
	MVW010880T2300PSZ	880	1000	3800	2800	4300	3200	
	MVW010931T2300PSZ	931	1064	4000	3000	4600	3400	
	MVW011064T2300PSZ	1064	1215	4500	3400	5200	3900	
3300 Vca	MVW010085T3300PSZ	85	97	500	400	600	450	A / A0
	MVW010100T3300PSZ	100	112	600	450	700	500	
	MVW010112T3300PSZ	112	128	700	500	800	630	
	MVW010138T3300PSZ	138	150	800	630	900	710	A
	MVW010150T3300PSZ	150	160	900	710	1000	800	
	MVW010160T3300PSZ	160	182	1000	800	1250	900	
	MVW010186T3300PSZ	186	212	1250	900	1500	1120	
	MVW010235T3300PSZ	235	265	1500	1120	1750	1250	
	MVW010265T3300PSZ	265	312	1750	1250	2000	1400	
	MVW010310T3300PSZ	310	354	2000	1400	2250	1600	
	MVW010375T3300PSZ	375	428	2500	1800	2750	2000	C
	MVW010500T3300PSZ	500	571	3000	2200	3750	2800	
	MVW010580T3300PSZ	580	650	3750	2800	4000	3000	
	MVW010880T3300PSZ	880	1008	5500	4100	6000	4500	D
	MVW011178T3300PSZ	1178	1235	7000	5225	8000	6000	E
4160 Vca	MVW010070T4160PSZ	70	80	500	400	600	450	A / A0
	MVW010080T4160PSZ	80	91	600	450	700	500	
	MVW010094T4160PSZ	94	107	700	500	800	630	
	MVW010110T4160PSZ	110	120	800	630	900	710	
	MVW010120T4160PSZ	120	130	900	710	1000	800	
	MVW010130T4160PSZ	130	148	1000	800	1250	900	A
	MVW010162T4160PSZ	162	170	1250	900	1350	1000	
	MVW010170T4160PSZ	170	188	1350	1000	1500	1120	
	MVW010188T4160PSZ	188	214	1500	1120	1750	1300	
	MVW010250T4160PSZ	250	286	2000	1400	2250	1600	
	MVW010300T4160PSZ	300	342	2250	1600	2750	2000	C
	MVW010357T4160PSZ	357	403	3000	2250	3900	2600	
	MVW010475T4160PSZ	475	542	4000	2900	4500	3300	
	MVW010712T4160PSZ	712	815	5500	4100	6000	4500	D
	MVW010950T4160PSZ	950	1086	7000	5225	8000	6000	E

Notes
*(*4) Power rating guide, specify the MVW01 through the inverter output rated current*
*(*5) CT= Constant torque – allowable overload of 150% for 60s, every 10 min*
  VT= Variable torque – allowable overload of 115% for 60s, every 10 min

Specification

Models

Rated voltage	Standard Model	Rated output current (A) (*6)	Motor Power (*7)		Size
			HP	kW	
6000 Vac to 6300 Vac	MVW010058T6300ESZ	58	500	373	C1
	MVW010078T6300ESZ	78	750	560	
	MVW010104T6300ESZ	104	1000	750	
	MVW010124T6300ESZ	124	1500	1120	
	MVW010140T6300ESZ	140	1750	1300	
	MVW010166T6300ESZ	166	2000	1500	C2
	MVW010188T6300ESZ	188	2250	1680	
	MVW010214T6300ESZ	214	2500	1865	
	MVW010260T6300ESZ	260	3000	2240	
	MVW010288T6300ESZ	288	3500	2600	
	MVW010330T6300ESZ	330	4000	3000	C3
	MVW010420T6300ESZ	420	5000	3730	
	MVW010495T6300ESZ	495	6000	4475	
	MVW010575T6300ESZ	575	7000	5225	

Rated voltage	Standard Model	Rated output current (A) (*6)	Motor Power (*7)		Size
			HP	kW	
6600 Vac to 6900 Vac	MVW01C0053T6900ESZ	53	500	373	C1
	MVW01C0070T6900ESZ	70	750	560	
	MVW01C0094T6900ESZ	94	1000	750	
	MVW01C0112T6900ESZ	112	1500	1120	
	MVW01C0123T6900ESZ	130	1750	1300	
	MVW010150T6900ESZ	150	2000	1500	C2
	MVW010170T6900ESZ	170	2250	1680	
	MVW010188T6900ESZ	188	2500	1865	
	MVW010235T6900ESZ	235	3000	2240	
	MVW010265T6900ESZ	265	3500	2600	
	MVW010300T6900ESZ	300	4000	3000	C3
	MVW010375T6900ESZ	375	5000	3730	
	MVW010450T6900ESZ	450	6000	4475	
	MVW010520T6900ESZ	520	7000	5225	

Notes
(*6) Power rating guide, specify the MVW01 through the inverter output rated current
(*7) VT= Variable torque – allowable overload of 115% for 60s, every 10 min
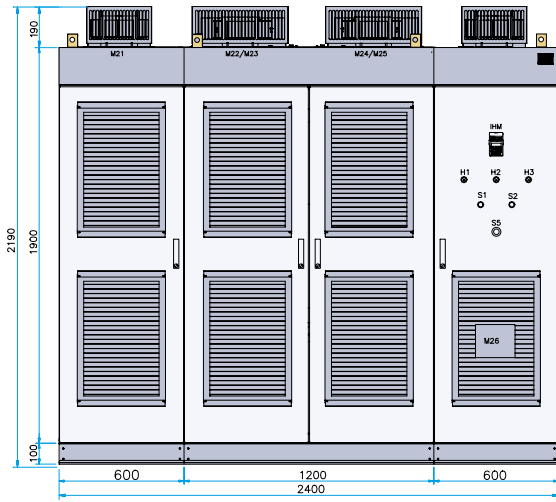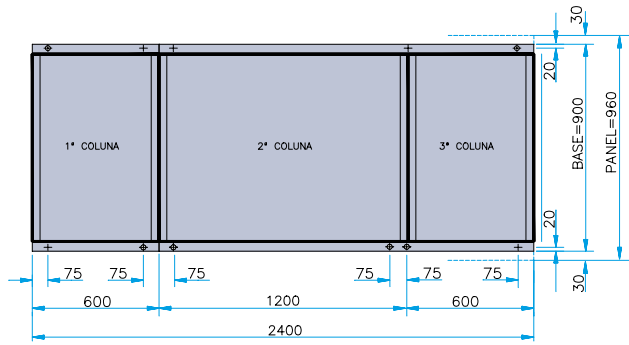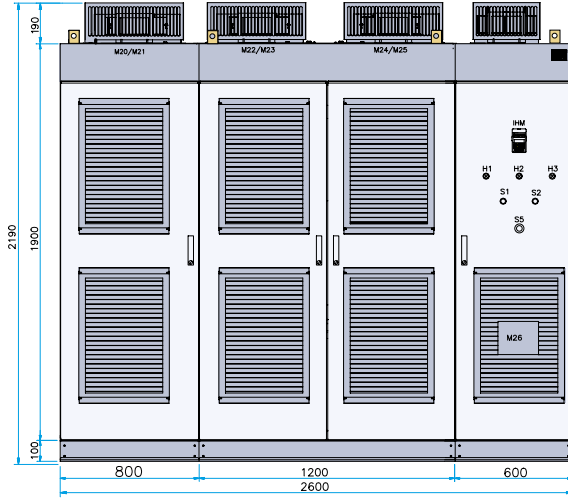
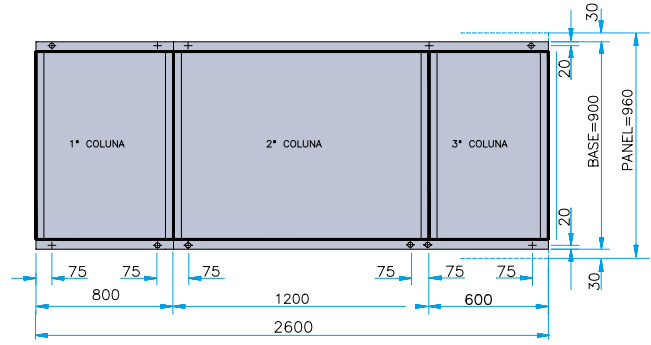## Dimensions and Weights

Size AO
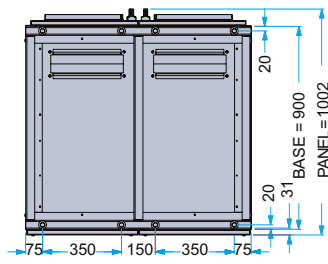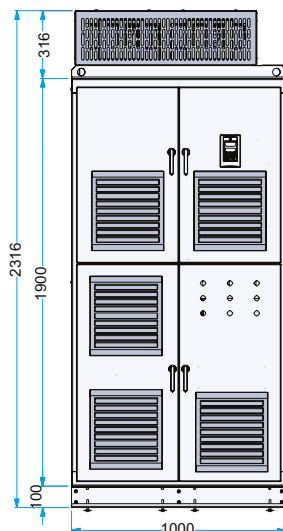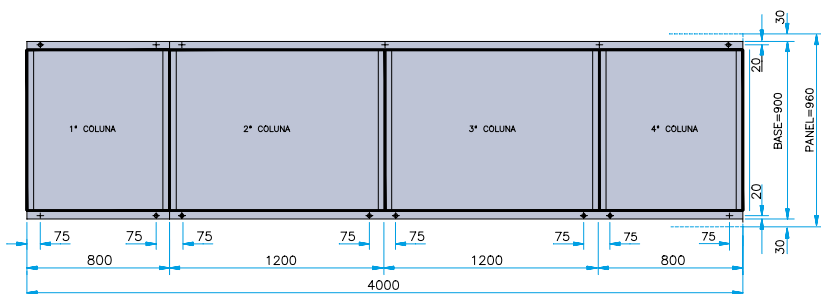

Weight: 900 Kg

Dimensions and Weights

Size A

Weight: 1560 Kg
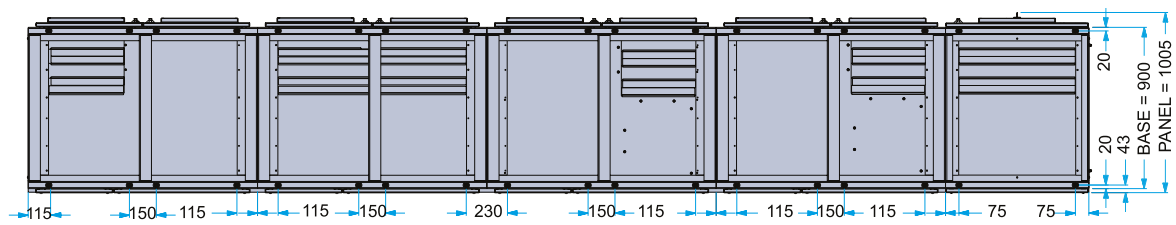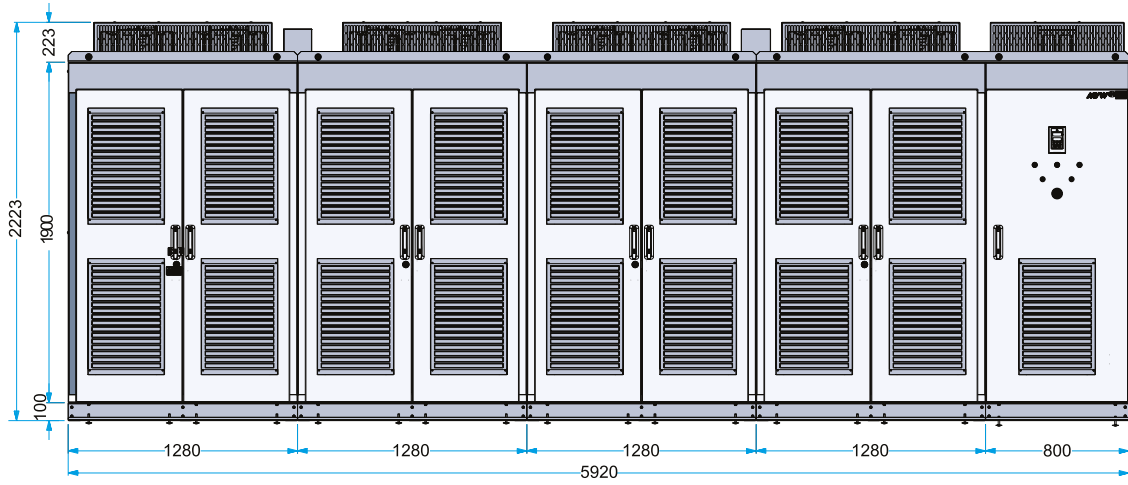
Size B

Weight: 1700 Kg
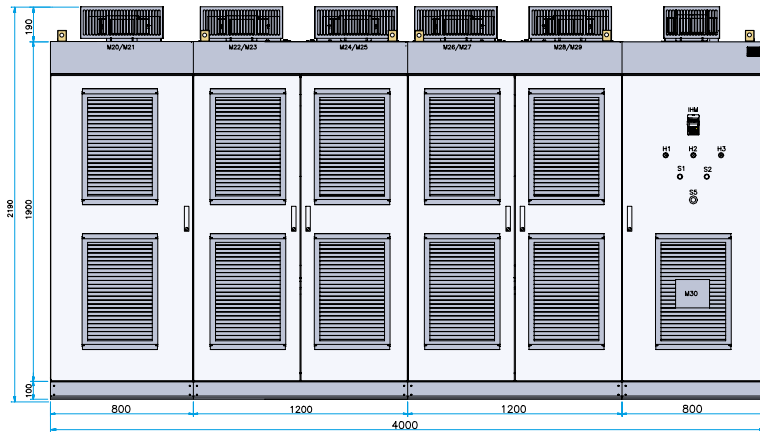
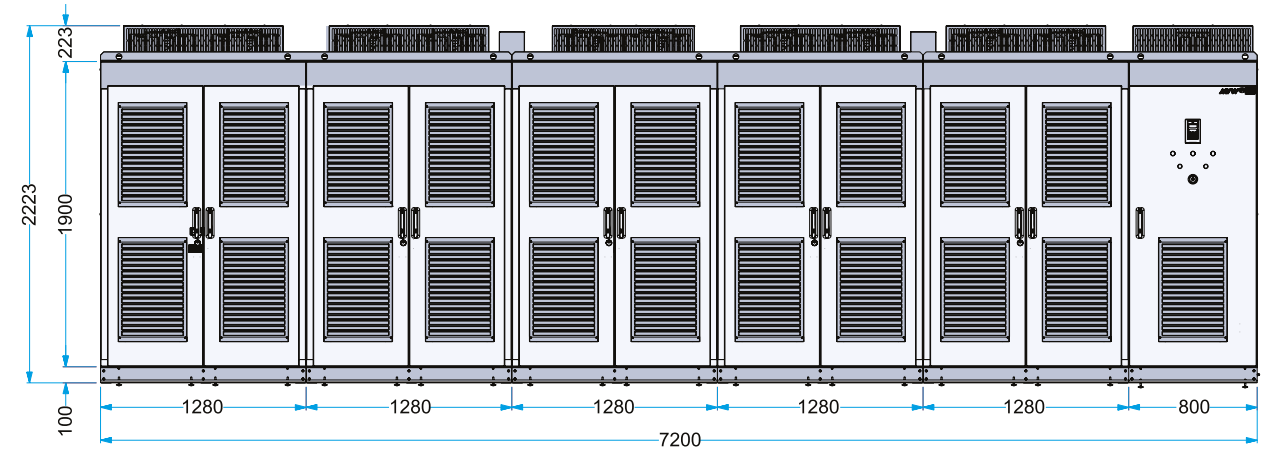## Size C

Weight: 2700 Kg
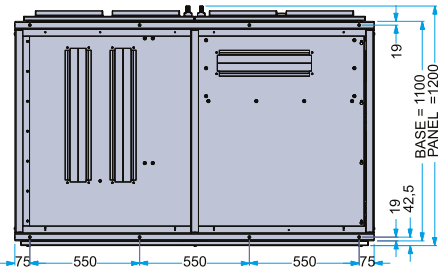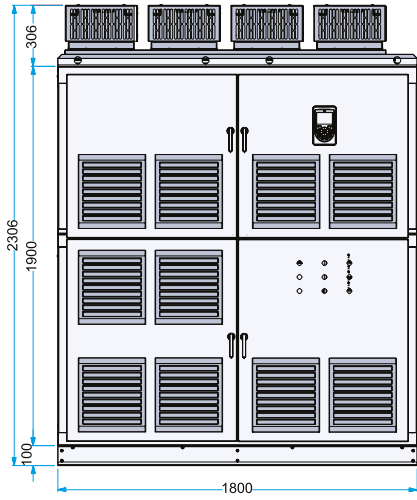
Dimensions and Weights

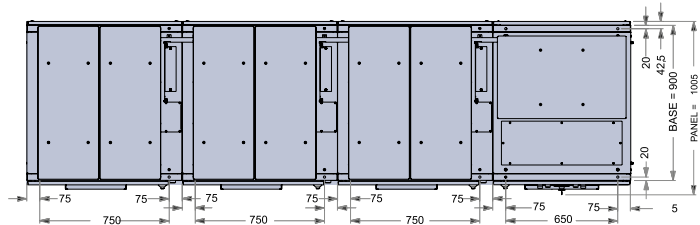**Size D**

Weight: 4500 Kg
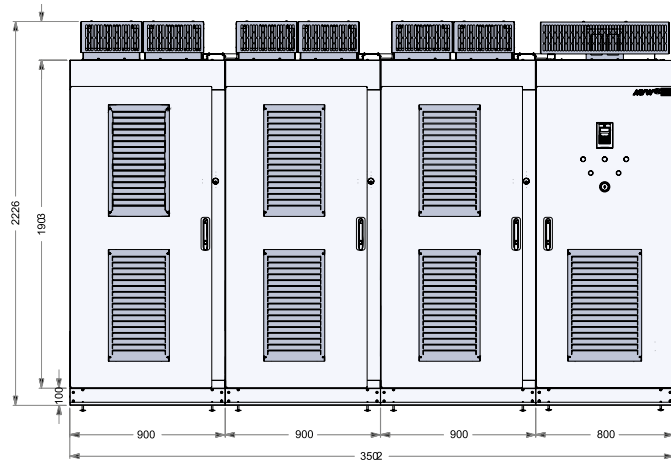
Size E
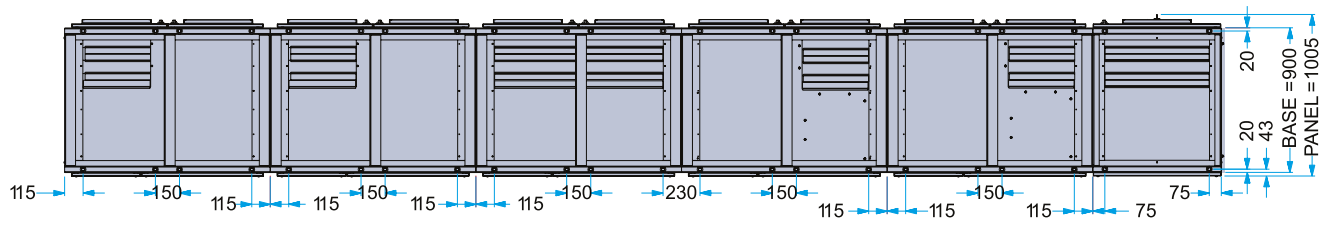
Weight: 5000 Kg

Dimensions and Weights

Size C1

Weight: 1700 Kg

Size C2

Weight: 3100 Kg

Size C3
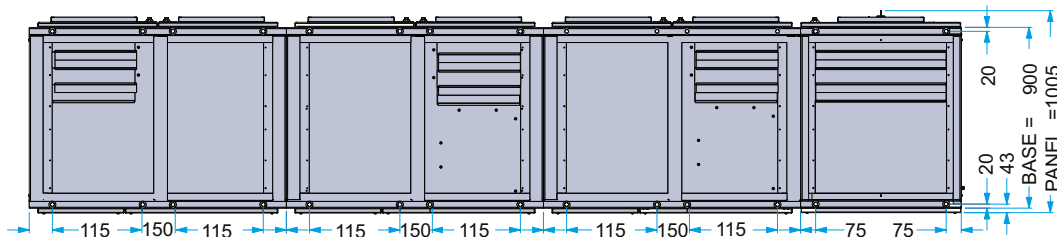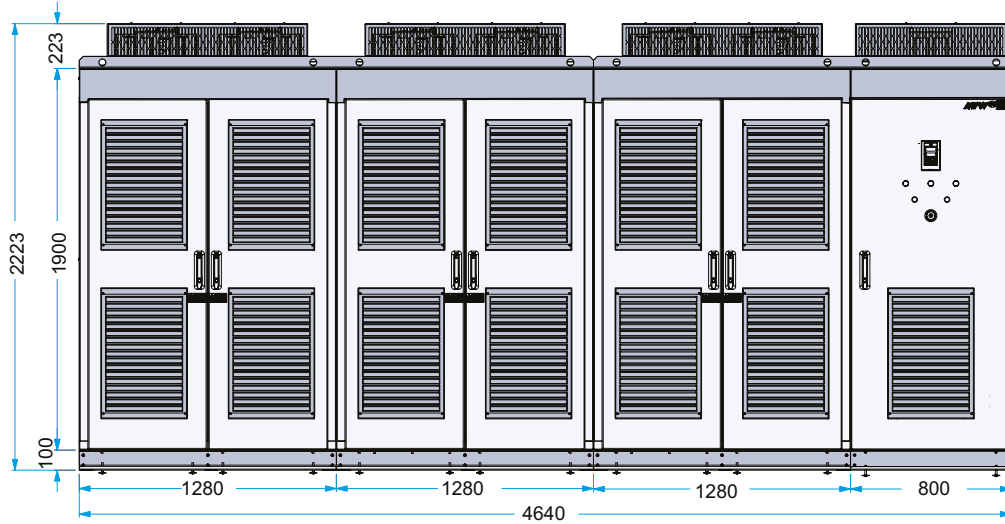
Weight: 5000 Kg

Technical Characteristics
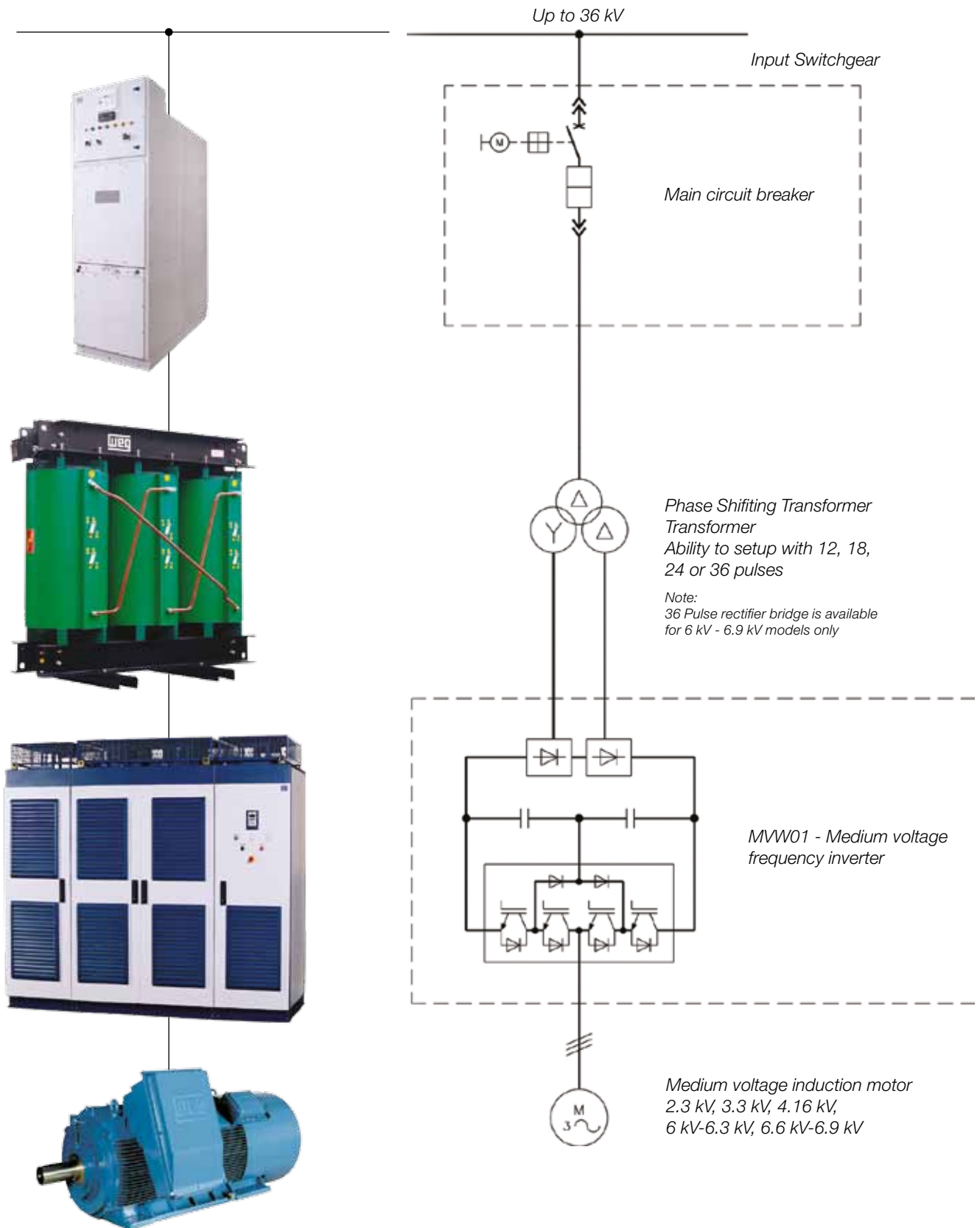
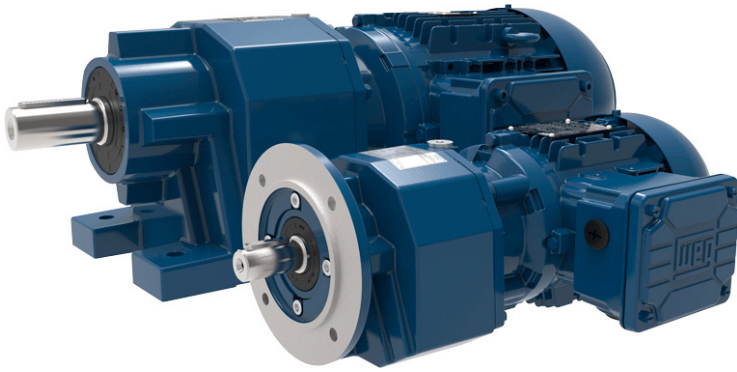|			
Main Power Supply	Voltage	2300, 3300, 4160, 6300 or 6900 V (± 10%, -20% with reduced output power)	
	Frequency	50 or 60 Hz (specify)± 3%	
	Phase Unbalance	<3%	
	Cos φ	>0,97	
	Overvoltage category	Category III	
Auxiliary supply	Voltages	220, 380, 400, 415, 440, 460 , 480, 525, 575, 660 or 690 V	
	Frequency	50 or 60 Hz,)±3 %	
	Phase Unbalance	<3%	
Protection degree	Standard	IP41	
Dimensions	Width / Height / Depth (mm)	7 different mechanics (see item 9.4)	
Environmental Conditions	Temperature	0 to 40º C (up to 50º C with reduction of 2.5% / ºC on the output current)	
	Humidity	5 to 90% noncondensing	
	Altitude	0 to 1000 m (up to 4000 m with reduction of 10% / 1000 m)	
	Pollution degree	2	
Finishing	Color (Standard)	Light Blue cod. 14040 (Doors)	
		Dark Blue cod 42350 (Base, roof, shutters)	
Control	Microprocessor	32 bits	
	Control Method	PWM sinusoidal SVM (Space Vector Modulation) and optimal pulse patterns (OPP)	
	Control Types	Scalar (Imposed voltage - V/F), sensorless vector and closed loop vector	
	Switching Device	High voltage IGBT (HV – IGBT)	
	Frequency variation	0 to 100 Hz	
	Overload capacity	150 % for 60 seconds, every 10 min. (1.5 x I rated. – CT)	
		115 % for 60 seconds, every 10 min. (1.15 x I rated – VT)	
	Efficiency	99%	
Performance	Speed Control	V / F	Regulation 1 % of rated speed with slip compensation
			Resolution: 1 rpm (keypad reference)
		Sensorless	Speed regulation: 0.5% of rated speed
			Speed variation range:1:100
		With Encoder (Use EBA or EBB card)	Regulation: ± 0.1% of rated speed with analog input of 14 bits (EBA); ± 0.1% of rated spedd wth digital reference (keyboard, serial, Fieldbus, Electronic Potetionmeter, multispeed); ± 0.1% of rated speed with analog input of 10 bits (CC9)
Inputs	Analog	2 Programmable differential inputs (10 bits): 0 to 10 V, 0 to 20 mA ou 4 to 20 mA	
		1 Programmable bipolar input (14 bits): -10 to + 10 V, 0 to 20 mA or 4...20 mA [1]	
		1 Programmable isolated input (10 bits): 0 to 10 V, 0 a 20 mA or 4 to 20 mA [1]	
		1 Programmable isolated input (10 bits): 0 to 10 V, 0 a 20 mA or 4 to 20 mA	
	Digital	8 Programmable isolated inputs: 24 Vdc	
		1 Programmable isolated input: 24 Vdc [1]	
		1 Programmable isolated input: 24 Vdc (for motor PTC thermistor) [1]	
Outputs	Analog	2 Programmable outputs (11 bits) : 0 to 10 V	
		2 Programmable bipolar outputs (14 bits) : (-10 to + 10) V1	
		2 Programmable isolated outputs (11 bits) : 0 to 20 mA or 4 to 20 mA [1]	
		2 Programmable isolated outputs (11 bits) : 0 to 20 mA or 4 to 20 mA	
	Relay	5 Programmable outputs, contacts NA/NF (NO/NC) : 240 Vac, 1 A	
	Transistor	2 OC Programmable isolated outputs: 24 Vdc, 50 mA [1]	
Communication	Serial Interface	RS-232 (point to point)	
		RS-485, isolated via EBA or EBB cards (multi-point up to 30 inverters) [1]	
	FieldBus Networks	Modbus RTU (embedded software) via serial interface RS-485	
		Ethernet, Profibus DP or DeviceNet via additional kits KFB [1]	
Safety	Protections (memories of the last 100 faults/ alarms with date and time)	Overvoltage in the circuit: intermediate	Output short-circuit
		Undervoltage in the circuit: intermediate	Output ground-short-circuit
		Overtemperature in the inverter and the motor	External fault
		Overcurrent in the output	Failed self-test and programming
		Motor overload (I x t)	Failed self-test and programming
		Overload in braking resistor	Phase fault in power supply
		Failed CPU (Watchdog) / EPROM	Interface MMI-MVW-01 connection fault
		Incremental Encoder fault	

1) Optional

Technical Characteristics

Compliances / Standards	**Electromagnetic compatibility**	EMC directive 89 / 336 / EEC – industrial environment	
		CEI Standard - IEC 61800-3 (EMC – Emisson and Immunity)	
	CEI - IEC 61800	Adjustable Speed Electrical Power Drive System	
		Part 4 – General Requirements	
		Part 5 – Safety Requirements	
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* > Nx; N > Nx; N < Nx ; 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	
		Profibus-DP	
		DeviceNet	
		SUPERDRIVE Kit with RS-232 Serial Interface Communication (Drive – PC)	

Block Diagram

Up to 36 kV

Input Switchgear

Main circuit breaker

*Phase Shifiting Transformer
Transformer
Ability to setup with 12, 18,
24 or 36 pulses*

Note:
36 Pulse rectifier bridge is available
for 6 kV - 6.9 kV models only

*MVW01 - Medium voltage
frequency inverter*

*Medium voltage induction motor
2.3 kV, 3.3 kV, 4.16 kV,
6 kV-6.3 kV, 6.6 kV-6.9 kV*

Industrial Motors and Gears Limited

Tel. 01642 467999 | Mob. 07815 889460
Fax. 01642 467988
Email. sales@imag-uk.com
Web. www.imag-uk.com

The Quality Choice

Industrial Motors and Gears Limited is a limited company
registered in England and Wales.
Registration Number 4293316.
VAT Registration Number 780154731.