240v CLASS 400v CLASS 690v CLASS

Low Voltage Products

Advanced Motor Control, Protection and Monitoring

MOTORTRONICS™

VMX / VMX-SGY
VMX-AGY / VMX-PFE / VMX-HFE

LOW VOLTAGE SOLID STATE SOFT STARTER

MOTORTRONICS™
Solid State AC Motor Control

VMX Series

MOTORTRONICS high performance LV Soft starters

Motortronics VMX soft starters take motor control to a new level. Soft torque starting, intelligent load monitoring and smart stops are all included and accompanied by a robust and compact design. By developing the Motortronics VMX range of electronic soft starters MOTORTRONICS has taken a major step towards the ideal motor controller for applications where variable speed is not required. You simply get everything except variable speed!

Ratings

Model Number	Adjustable Range (AMPS)	Max FLA		Nominal Motor Rating(50/60Hz) Maximum kW					
				220V		380V		415V	
		HD	SD	HD	SD	HD	SD	HD	SD
VMX-18-BP	9-18	11	18	2.2	3.7	3.7	7.5	5.5	7.5
VMX-28-BP	14-28	21	28	5.5	7.5	7.5	11	7.5	11
VMX-39-BP	19-39	27	39	7.5	11	11	18.5	11	18.5
VMX-48-BP	24-48	40	48	11	11	18.5	22	18.5	22
VMX-62-BP	31-62	45	72	11	15	22	30	22	30
VMX-78-BP	39-78	55	78	15	18.5	22	37	30	37
VMX-92-BP	46-92	68	92	18.5	22	30	45	37	45
VMX-112-BP	56-112	80	112	22	30	37	55	45	55
VMX-150-BP	75-150	96	150	22	45	45	75	55	75
VMX-160-BP	80-160	125	160	30	45	55	75	55	75
VMX-210-BP	105-210	156	210	45	55	75	110	75	110
VMX-275-BP	138-275	220	275	55	75	110	132	110	150
VMX-361-BP	181-361	248	361	75	110	132	185	132	200
VMX-450-BP	225-450	400	450	110	132	200	220	220	250
VMX-550-BP	275-550	480	550	132	160	250	285	262	305
VMX-600-BP	300-600	600	600	185	185	300	315	330	330
VMX-862-BP	431-862	690	862	200	250	350	450	380	475
VMX-900-BP	450-900	800	900	220	275	420	470	440	500
VMX-1006-BP	503-1006	960	1006	255	310	475	525	500	555
VMX-1250-BP	625-1250	1080	1250	330	385	565	655	600	695
VMX-1500-BP	750-1500	1350	1500	360	463	619	800	676	873
VMX-2000	1000-2000	1800	2000	478	617	826	1,066	902	1,164

Notes:

1. Data is based on NEC Table 430-150, full load current three phase motors. Size soft starter based on actual motor nameplate FLA.
2. Heavy Duty Rating (HD) : 500% capacity for 60 seconds, 1.15 S.F., Line start (A-T-L) full voltage bypass
3. Standard Duty Rating (SD) : 500% capacity for 20 seconds, 1.0 S.F.,

VMX Series for 690V

690V

VMX soft starters for 690V rated unit. Soft torque starting, intelligent load monitoring and smart stops are all included and accompanied by a robust and compact design.

Model	Adjustable Range (A)	Max kW
VMX -210-BP	105-210	126
VMX -275-BP	138-275	165
VMX -361-BP	181-361	217
VMX -450-BP	225-450	270
VMX -550-BP	275-550	330
VMX -600-BP	300-600	360
VMX -862-BP	431-862	519
VMX -900-BP	450-900	540
VMX -1006-BP	503-1006	600
VMX -1250-BP	625-1250	756
VMX -1500-BP	750-1500	900
VMX -2000	1000-2000	1200

VMX Specifications

Power Components
- 6 SCRs in inverse parallel pairs for full phase angle soft start control(1600V PIV)
- RC snubber for dv/dt protection of SCR pair

Line Voltage Range
- 200 to 690 VAC, 3phase +10%/-15%, 50/60Hz

Current Ratings
- 18-2000A depending on unit selection
- Range of each unit is 50-100% of max current rating

AC Supply Voltage
- User supplied 120VAC +10%-15% tolerance
- Optional 240VAC control available

Start/Stop Control Choices
- 2-wire Run-Stop using dry contacts
- 3-wire Start/Stop with built-in seal in contact
- N.C. Interlock input (dry contact) for remote devices

Ramp Control Choices (4 built-in)
- Voltage Ramp
- Voltage Ramp with Current Limit
- CLT©closed Loop Torque Ramp (Current Ramp)
- Current Step (current limit only)
- Ramp times adjustable 1-120 seconds
- Current Limit adjustable 200-600% of FLA

Dual Ramps
- Select via dry contact closure between any combinations of the above

Jog
- Dry contact closure selects a non-ramping Jog function at an adjustable torque level

Kick Start
- 10-100% starting torque for 0.1-2 seconds

Pump-Flex™ Deceleration Ramp
- Fully adjustable to match field conditions:
- Begin Decel setting, 0-100% of line voltage
- Decel ramp time, 1-60 seconds
- End Decel setting (Off), 0-1% of Begin setting

Restart Delay Timer (Sequential Start Delay)
- Programmable time delay 1-999 seconds after loss of control power for staggered restarts

Time Clock Controller
- 24 hour / 7 day time clock to provide automatic start
- Up to 7 start events per day
- Select operation from 1 through 7 days per week
- Run time determined by process control timer

RS-485 Serial Communications
- Up to 247 starters per link
- Modbus RTU protocol built-in

Process Control Timer (choice of either)
- Minimum Run (Batch) Timer
  - 1-999 minutes
  - Runs until time expires, resets only if expired
  - Resumes and finishes if stopped or power is lost
- Permissive Run Timer
  - 1-999 minutes
  - Only allows operation during active run time

Operator Interface
- Tactile feedback keypad
- Easy to read LED display
- Run and fault
- Status indicators

VMX-SGY Series

With a unique combination of features, performance and size, Motortronics has redefined the benchmark for soft starter design.
The incorporation of Motortronics's unique iERS technology allows VMX-SGY to deliver unrivalled soft start performance alongside energy saving capability on partially loaded motors.
With product size and cabinet capacity becoming an increasing focus we developed VMX-SGY to deliver the greatest power to size ratio of any other soft starter.
In addition VMX-SGY uses Motortronics's globally renowned Automatic Setup feature which allows the user to programme the unit to any common application using a simple 4 button process. To keep pace with the modern technology, VMX-SGY removes the need for buttons and uses intuitive touch screen technology.
With built in full motor overload protection as well as full data logging, field serviceable fans, upgradeable firmware and extensive input/output programmability, VMX-SGY meets all of the key design criteria.

Energy Saving through iERS

Energy Saving

With rising energy costs, products offering energy savings are becoming increasingly important. To help businesses reduce energy usage, Motortronics have developed a range of energy saving products.

The vast majority of electric motors in use today are fixed speed, fixed voltage AC induction motors. These motors consume two thirds of the total electricity used in industry. With this in mind, using a technology that could save energy on fixed speed induction motors should be a consideration when replacing motor starters or designing new systems.

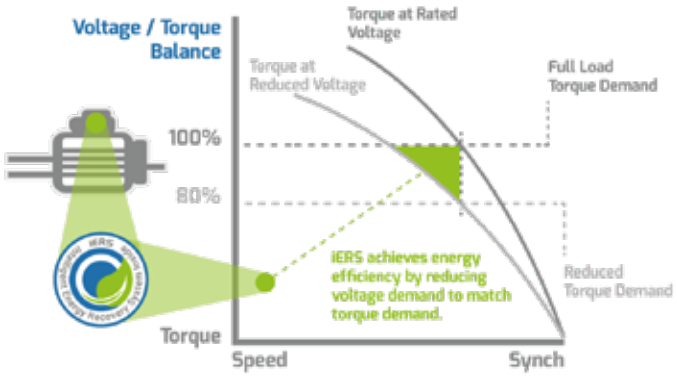
Energy recovery with Internal bypass as standard

iERS is our patented energy saving system with a combined internal bypass to save energy on lightly loaded motors. iERS reduces the voltage and current supplied to a lightly loaded motor to only allow the motor to consume the exact amount of energy required to maintain the speed at that load. When the motor is at full load, the internal bypass reduces the losses produced by the control element. This combined approach enables iERS to save more energy in more applications than any other competing technology.

iERS has been market proven over the past 10 years and has now reached its latest development realising even greater savings. Applications such as fans, pumps and chillers can typically see savings of around 8-40% of total energy consumption.

How it works

Motortronics's energy saving system works by reducing the current and iron losses of a motor not running at full load. The energy savings will depend on a number of factors including the efficiency of the motor and the load.



Motortronics Soft Starters will also save businesses money by reducing the electrical and mechanical strain placed on applications – resulting in less 'down time' and maintenance cost on electrical circuits, gearboxes, belts and associated mechanical components.

iERS is a technology that monitors the voltage, current and power factor during the start of a motor and then uses this information to ensure the motor runs efficiently under all load conditions.

When any AC induction motor becomes lightly loaded, the power factor and the efficiency decrease. This is caused by the inherent design of the motor and the laws of physics, and leads to energy being wasted. These are known as excitation losses.

iERS continually monitors the power factor, recognizing when the motor is becoming lightly loaded and then instantly employing strategies to reduce the losses by controlling the voltage and current supplied to the motor to match the load conditions. This not only increases the part load power factor, but reduces the energy consumption in kW.

When the motor becomes fully loaded, the power factor increases, and iERS automatically bypasses itself to ensure the most efficient use of energy in all motor load conditions.

Ratings

Minimum current ratings based on typical rated operation currents of motors for the corresponding rated operational powers.

Current rating optimised for kW@400V & HP@440-480V - Ref IEC 60947-4-1:2009 Table G.1

In Line				In Delta				Trip Class 10	Trip Class 20	Trip Class 30
IEC	IEC	UL	UL	IEC	IEC	UL	UL	AC-53a	AC-53a	AC-53a
	kW		HP		kW		HP	3-23: 90-5		
A	400V	A	440-480V	A	400V	A	440-480V	3.5-17:90-5	4-19: 90-5	4-29: 90-5
17	7.5	17	10	29	15	29	20	VMX-SGY-101	VMX-SGY-103	VMX-SGY-105
22	11	21	15	38	18.5	36	25	VMX-SGY-103	VMX-SGY-105	VMX-SGY-107
29	15	27	20	50	22	47	30	VMX-SGY-105	VMX-SGY-107	VMX-SGY-109
35	18.5	34	25	61	30	59	40	VMX-SGY-107	VMX-SGY-109	VMX-SGY-111
41	22	40	30	71	37	69	50	VMX-SGY-109	VMX-SGY-111	VMX-SGY-113
55	30	52	40	95	45	90	60	VMX-SGY-111	VMX-SGY-113	VMX-SGY-115
66	37	65	50	114	55	113	75	VMX-SGY-113	VMX-SGY-115	VMX-SGY-117
80	45	77	60	139	75	133	100	VMX-SGY-115	VMX-SGY-117	VMX-SGY-201
100	55	96	75	173	90	166	125	VMX-SGY-117	VMX-SGY-201	VMX-SGY-203
132	75	124	100	229	110	215	150	VMX-SGY-201	VMX-SGY-203	VMX-SGY-205
160	90	156	125	277	150	270	200	VMX-SGY-203	VMX-SGY-205	VMX-SGY-301
195	110	180	150	338	185	312	250	VMX-SGY-205	VMX-SGY-301	VMX-SGY-303
242	132	242	200	419	220	419	350	VMX-SGY-301	VMX-SGY-303	VMX-SGY-305
302	160	302	250	523	300	523	450	VMX-SGY-303	VMX-SGY-305	VMX-SGY-307
361	200	361	300	625	355	625	500	VMX-SGY-305	VMX-SGY-307	VMX-SGY-309
430	250	414	350	745	425	717	500	VMX-SGY-307	VMX-SGY-309	VMX-SGY-401
500	280	477	400	866	500	826	600	VMX-SGY-309	VMX-SGY-401	VMX-SGY-403
600	355	590	500	1057	600	1022	800	VMX-SGY-401	VMX-SGY-403	VMX-SGY-501
722	400	722	600	1251	710	1251	1000	VMX-SGY-403	VMX-SGY-501	VMX-SGY-503
850	500	840	700	1472	850	1455	1100	VMX-SGY-501	VMX-SGY-503	VMX-SGY-505
960	560	960	800	1663	950	1663	1250	VMX-SGY-503	VMX-SGY-505	-
1080	630	1080	900	1871	1100	1871	1500	VMX-SGY-505	-	-

* no internal bypass on size 4, 5

Specifications

Designation
3-phase SCR Energy Saving Motor Controller

Current
Size 1 up to 100A
Size 2 up to 195A
Size 3 up to 500A
Size 4 up to 722A
Size 5 up to 1080A

Bypass
Internally Bypassed up to size 3

Motor Protection
Full I^2T Motor Overload with memory.
Current limit set at 4.5x to meet IEC standards.

Supply Voltages
208, 230, 400,460 volts as standard
Allowing for varying supply frequency 45Hz-65Hz

Standard Duty Rating
Trip Class 10
3x 23 or 3.5x 17
5 starts/hour
90% duty
(Trip class 20 & 30 available)

Frame Sizes
Up to 100Amps 95mm wide
Up to 195Amps 142mm wide
Up to 500Amps 205mm wide

Enclosure Type
Up to 195Amps IP20/NEMA 1 – with finger guard
Above 195Amps IP00/NEMA 1
Optional Finger Guards up to 195A to ensure full IP20 enclosures.

Enclosure Construction
Main chassis: Metal
Front Cover: Injection Moulded Plastic
Terminal Covers: Injection Moulded Plastic

Terminal Position
Terminal position/spacing to match common contactors.

Terminal Construction
Up to 195Amps Cage Clamp
Above 195Amps Plain Busbar

Control Voltages
24V DC, 110/230V AC

Ambient Operating Conditions
-20deg C to 50deg C

Motortronics iERS Energy Saving Technology

In Delta/6 wire connection
-Yes

Display Technology
3.5" Colour-TFT Touch Screen

Keypad
Optional IP55 full colour touch keypad available for remote/door fitting.

Languages
Multiple language options.

Input/Outputs
3 x NO programmable output relays
1 x NC programmable output relays
3 x programmable digital inputs
1 x PTC thermistor input
1 x 0-10V/4-20m Analogue input
1 x 0-10V/4-20m Analogue output
1 x USB

Comms
Standard: ModBus
Optional: Anybus providing CAN, Profibus, Ethernet, DeviceNET

Data Logging
Equipped with 4GB memory, allowing the logging of every event.
Date of first start (warranty date)
Total number of soft starts.
Number of soft stops.
Number of error events.
Display event logs.
Export data in CSV format.

EU/IEC Legislation
IEC 60947-4-2: 2012
Low Voltage Directive
Battery Directive
Energy Using Products/Energy Related Product Directives

Environmental
Products comply to REACH, SVHC, RoHS and WEEE.

Standards
CE, ASME, CSA, UL

Reliability
Fan efficiency detected, logged and reported.

Field Serviceability
Firmware upgrade from USB port.

VMX-AGY Series

The VMX-AGY Series is the only fully integrated, compact, world-class design offering uncompromised power and control capabilities. Integral bypass contactors are standard on all sizes and provide maximum efficiency of panel space while maintaining the Motortronics reputation for being able to soft start most any load.

Operational Voltage	200–600 VAC
Rated Frequency	50–60 Hz ± 5 Hz
Index Rating	Trip Class 10: 3.5-17: 90-5 (Trip Class 20 & 30 available)
Starts per Hour	Standard - 5 starts/stops per hour With Optional Fan 40 starts/stops per hour
Internally Bypassed Control Supply	Yes Standard - 24 VDC Optional - 110 to 230 VAC
Inputs	2 Digital Inputs, 1 Programmable Standard - 24 VDC Optional - 110 to 230 VAC
Outputs	2 Digital Outputs, 1 Programmable
Overload	Full I2t Motor Overload
Communications	Modbus RTU
IP/NEMA rating	IP20/NEMA Class 1 *with finger guard fitted
Ambient	-20 °C to 40 °C without de-rating
Temperature	60 °C with de-rating
Standards	CE, UL, RCM

Ratings

Model Selection

For standard operating conditions of 40 °C and 1000 m above sea level.
See manual for de-rating and other conditions.

	Trip Class 10	Trip Class 20	Trip Class 30
Rated Starting Capability	3 × Motor Current – 23 secs 3.5 × Motor Current – 17 secs	4 × Motor Current – 19 secs	4 × Motor Current – 29 secs
Typical Applications	Agitator Compressor Rotary Vane Unloaded Scroll Conveyor Unloaded Bow Thruster Zero Pitch Fan Low Inertia or <85A Feeder Screw Lathe Machines Mixer Unloaded Moulding Machine Plastic and Textile Machines Pump Submersible - Centrifugal Submersible - Rotodynamic Saw Band Transformers Voltage Regulators	Compressor Centrifugal Reciprocating Rotary Screw Ball Mill Bow Thruster Loaded Conveyor Loaded Grinder Hammer Mill Mills Flour etc. Mixer Loaded Pelletizers Press, Flywheel Positive Displacement Pump Reciprocating Rotary Pump Jack Rolling Mill Roots Blower Saw Circular Screen Vibrating Tumblers	Crusher* Shredder Wood Chipper Fan* High Inertia or > 85 A * start time > 30 secs

Motor Rating

Ie	kW		
A	230 V	400 V	500 V
17	4	7.5	7.5
22	5.5	11	11
29	7.5	15	15
35	7.5	18.5	22
41	11	22	22
55	15	30	37
66	18.5	37	45
80	22	45	55
106	30	55	75
132	37	75	90
160	45	90	110
195	55	110	132
242	75	132	160
302	90	160	200
361	110	200	250

Select Model	Select Model	Select Model
VMX-AGY- 101	VMX-AGY- 103	VMX-AGY- 105
VMX-AGY- 103	VMX-AGY- 105	VMX-AGY- 107
VMX-AGY- 105	VMX-AGY- 107	VMX-AGY- 109
VMX-AGY- 107	VMX-AGY- 109	VMX-AGY- 111
VMX-AGY- 109	VMX-AGY- 111	VMX-AGY- 113
VMX-AGY- 111	VMX-AGY- 113	VMX-AGY- 201
VMX-AGY- 113	VMX-AGY- 201	VMX-AGY- 203
VMX-AGY- 201	VMX-AGY- 203	VMX-AGY- 205
VMX-AGY- 203	VMX-AGY- 205	VMX-AGY- 207
VMX-AGY- 205	VMX-AGY- 207	VMX-AGY- 209
VMX-AGY- 207	VMX-AGY- 209	VMX-AGY- 301
VMX-AGY- 209	VMX-AGY- 301	VMX-AGY- 303
VMX-AGY- 301	VMX-AGY- 303	VMX-AGY- 305
VMX-AGY- 303	VMX-AGY- 305	—
VMX-AGY- 305	—	—

VMX-PFE Series

The VMX-PFE is an innovative development from Motortronics, who have 30 years of experience producing innovative designs in the soft starter market.
With ratings from 1.1kW to 15kW, the VMX-PFE is ideally placed to support any AC induction motors in use today. This makes the VMX-PFE the natural choice for distributors and customers alike. Benefiting from Motortronics's excellence in engineering, the VMX-PFE combines the quality and reliability you have come to expect. This is one product that ticks all the boxes.

Features and Benefits

Internally Bypassed
Reduces cost because the Soft Starter is out of circuit once it has done its job. This reduces cabinet size and the heat produced which again reduces cost.

Over Current Protected
Protects the Soft Starter against use above its duty rating.

45mm Wide (Size 1)
Same width as typical existing control gear for easy connectability and enables a more compact cabinet to be used.

DIN Rail Mounted
For easy installation, it just clips on.

Ratings & Specification

Operational Voltage (Ue)
230-460 VAC rms 3-Phase
(-15% +10%)

Rated Frequency
50 - 60Hz +/- 2Hz

Index Rating
Class 10 AC53b: 3-23: 697

Control Supply
24V DC approx 4VA supplied externally to terminals 0 - 24.

Enable and Start/Soft Stop
24V DC galvanically isolated terminals -A2, EN, +A1.

Indication
Multi function LEDs on front panel.

Start Time
1 to 30 seconds.

Stop Time
0 to 30 seconds.

Start Duty
3 x FLC for 23 seconds at Trip Class 10 rating.

Starts / Hour
Up to total of 5 starts / stops per hour.

Optimum Starts / Hour
Up to 30 Starts/Hr with Optional Fan.

Internally Bypassed
Power Terminals (BOLD)
Input 1/L1, 3/L2 & 5/L3
Output 2/T1, 4/T2 & 6/T3
IP20 Rated wire clamping terminals (unit is IP20)

Ambient Temperature
0°C to 40°C. Above 40°C de-rate linearly by 2% of unit FLC per °C to a derate of 40% at 60°C

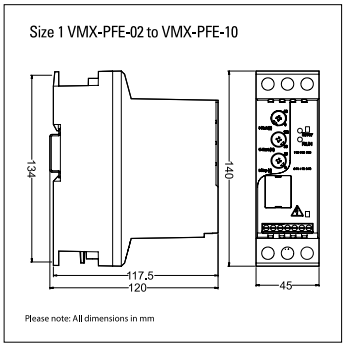
Transport and Storage
-25°C to +60°C

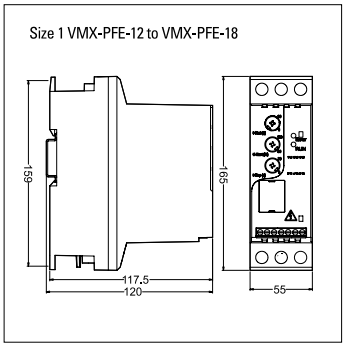
Altitude
1000m. Above 1000m de-rate linearly by 1% of unit FLC per 100m to a max altitude of 2000m.

Humidity
Max. 85% non-condensing, not exceeding 50% at 40°C

Protection/IP Rating
IP20, NEMA 1

Design Standards
IEC 60947-4-2; EN60947-4-2 "AC Semiconductor Motor Controllers and Starters", UL, C-Tick & CE

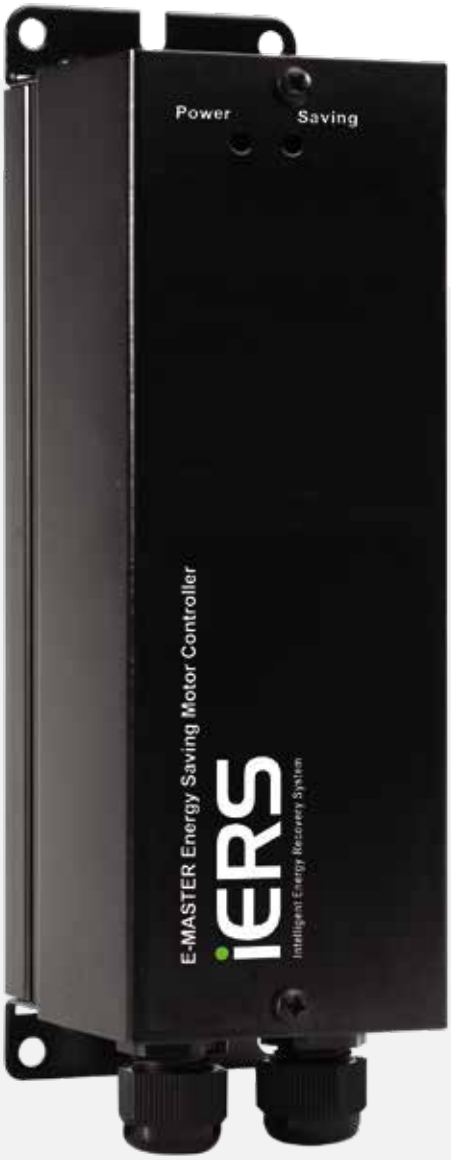




Model	400V		460V	
	Current Ie (A)	Motor (kW)	Current Ie (A)	Motor (HP)
VMX-PFE-02	2.7	1.1	3	1.5
VMX-PFE-04	3.6	1.5	3.4	2
VMX-PFE-06	4.9	2.2	4.8	3
VMX-PFE-08	6.5	3	4.8	3
VMX-PFE-10	8.5	4	7.6	5
VMX-PFE-12	11.5	5.5	11	7.5
VMX-PFE-14	15.5	7.5	14	10
VMX-PFE-16	15.5	7.5	14	10
VMX-PFE-18	22	11	21	15
VMX-PFE-18+FAN	29	15	27	20

VMX-HFE Series

The VMX-HFE has a rugged tin lid construction and can be mounted easily next to the machine or control panel. Installation of the unit is quick and simple due to the 'two wires in, two wires out' design. The unit is 'fit and forget' and there is no maintenance for the user.



Main Features

Retrofit, quick fit, simple wiring Quick and simple two wire in/out implementation means low cost install in existing equipment and rapid return on investment through energy and maintenance cost reduction.

LED Indication

Two LED's showing power and energy saving.

Energy Optimizing

Reduces required energy consumption when the motor is not under load -10 ~ 32% saving in energy and related cost and carbon emissions.

Torque Reduction

Mechanical and electrical stress reduction or elimination means compressors and motors last longer and require less maintenance.

'Fit and Forget'

No maintenance time or associated cost.

Energy Saving through iERS

iERS
Intelligent Energy Recovery System

Ratings & Specification

Operational Voltage (Ue)
110 – 230 VAC or (-15% to +10%)
Single Phase

Frequency
50/60 Hz +/- 2Hz

Operational Current (Ie)
VMX-HFE 1 – 10A
VMX-HFE 2 – 30A

Ingress Protection
IP30 with standard cover

Start Time
Approx 0.5 to 5 Seconds
continuously variable

Pedestal Voltage
Fixed at approx 15%

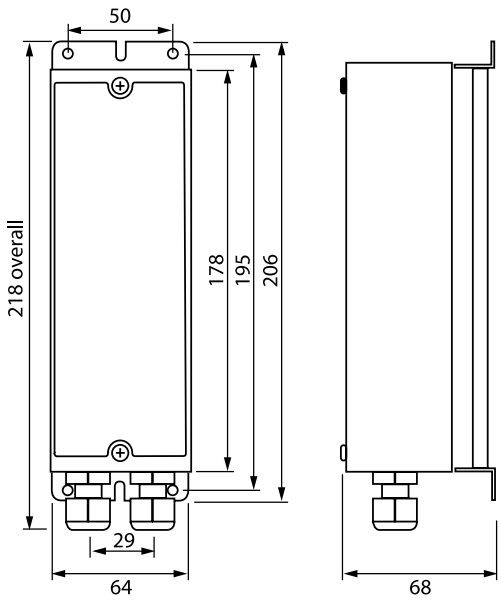
Ambient Temperature
0°C to 40°C without de rating

Design Standards
IEC 60947-4-2, EN 60947 –
4- 2 "AC Semiconductor Motor
Controllers and Starters"

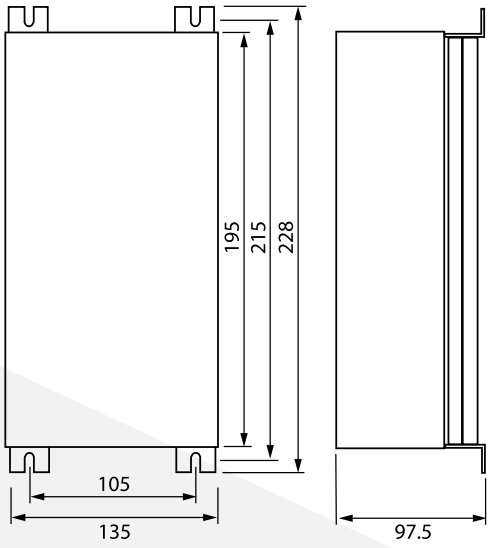
Ideal Applications
- Refrigeration Systems
- Conveyors
- Oven Fans
- Chillers
- Coolers
- Air Conditioners

Model	Current (I)	Motor kW (230V)	Motor HP (230V)
VMX-HFE 1	10A	1.1kW	1.5HP
VMX-HFE 2	30A	4kW	5.5HP
Model	**Current (I)**	**Motor kW (110V)**	**Motor HP (110V)**
VMX-HFE 1	10A	0.56kW	0.75HP
VMX-HFE 2	30A	1.5kW	2HP

VMX-HFE 1



VMX-HFE 2



Please note: All dimensions in mm

MOTORTRONICS™

VMX / VMX-SGY
VMX-AGY / VMX-PFE / VMX-HFE

MOTORTRONICS™
Solid State AC Motor Control

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