



High performance general purpose compact drive



Topvert E1 series

Toptek Electronics Corporation



Compact E1 is the best for a small and cost effective configuration

● Smart

● Sensorless vector control :

The E1 adopts sensorless vector control algorithm, and it improves not only the torque control characteristics, but the speed control-ability in an uncertain condition caused by the load variation as well.

● Auto tuning : (V/F mode & Sensorless Vector mode switchable)

The auto tuning algorithm in the E1 sets the motor factors automatically that brings the traditional commissioning difficulties mainly in low speed by the load variation and the low torque generation to a settlement.

● Auto carrier frequency adjust according temperature:

When the internal temperature of the inverter increases too high, it is detected and then the inverter will control the carrier frequency automatically.

No noise—PWM Carrier frequency up to 18 kHz

● Optimum acceleration and deceleration & S-curves:

To make a maximum torque during the acceleration and deceleration, so called "trip free" function will be acting, to ensure the procedure of motor start or motor stop to be successful.

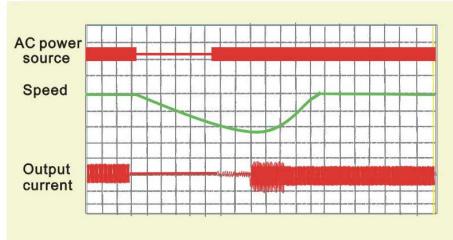
● Automatic torque boost & slip compensation

● Powerful

● Bi-Directional Speed search Flying

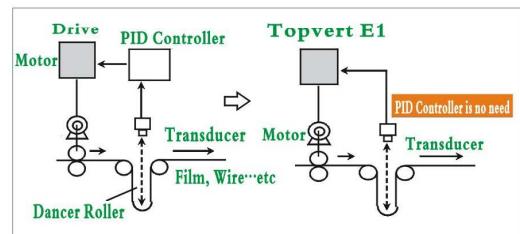
Restart into a spinning load:

Smoothly restart a motor that is rotating even in the opposite direction due to the windmill.



● Programmable PID process control:

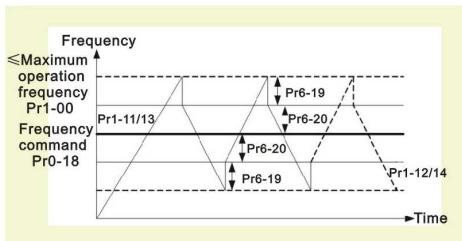
PID process control is used in E1 to make speed corrections quickly with a minimal amount of overshoot and oscillation for the control of flow, temperature, pressure ... etc.



PID function in Tension control

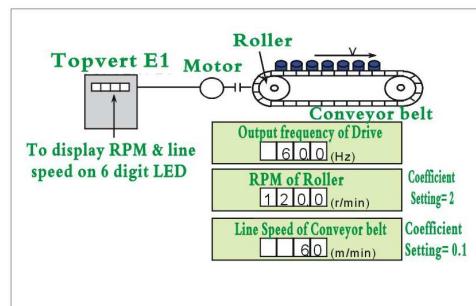
● Traverse Control function:

Specific for artificial fiber textile machinery



Pr1-11/13: 1st/2nd Acceleration time Pr6-19: The Amplitude of traverse Vibration
 Pr1-12/14: 1st/2nd Deceleration time Pr6-20:traverse Skip Frequency
 Pr0-18: Main speed frequency command source

● User-Defined Multi-Function Display:



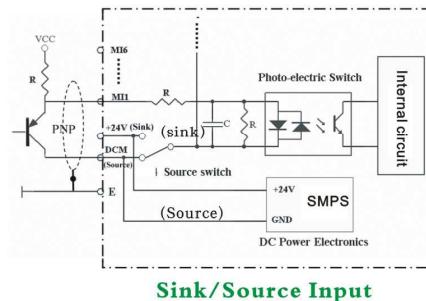
Applicable motor

AC power source	0.2kW	0.4kW	0.75kW	1.5kW	2.2kW	7.5kW
3 phase 460V class						
3 phase 230V class						
1 phase 230V class						
1 phase 115V class						



Flexible

- 6 Programmable Multi-Function Digital input terminals
- 2 Programmable Analog input terminals
- 2 Programmable Multi-Function relay output terminals (1 optional)
- 2 Programmable Analog output voltage & current signals (optional)
- 2 Programmable digital output terminals (optional)
- Sink/Source (NPN/PNP) switchable dual signals
- Communication interface, ModBus (ASCII & RTU) (Baud rate up to 125k bps) (optional).



Convenient

- Easy operation and control by Fly-Shuttle Removable digital keypad up to 150 meters.



Easy DIN rail mounting



Single cover for all wiring

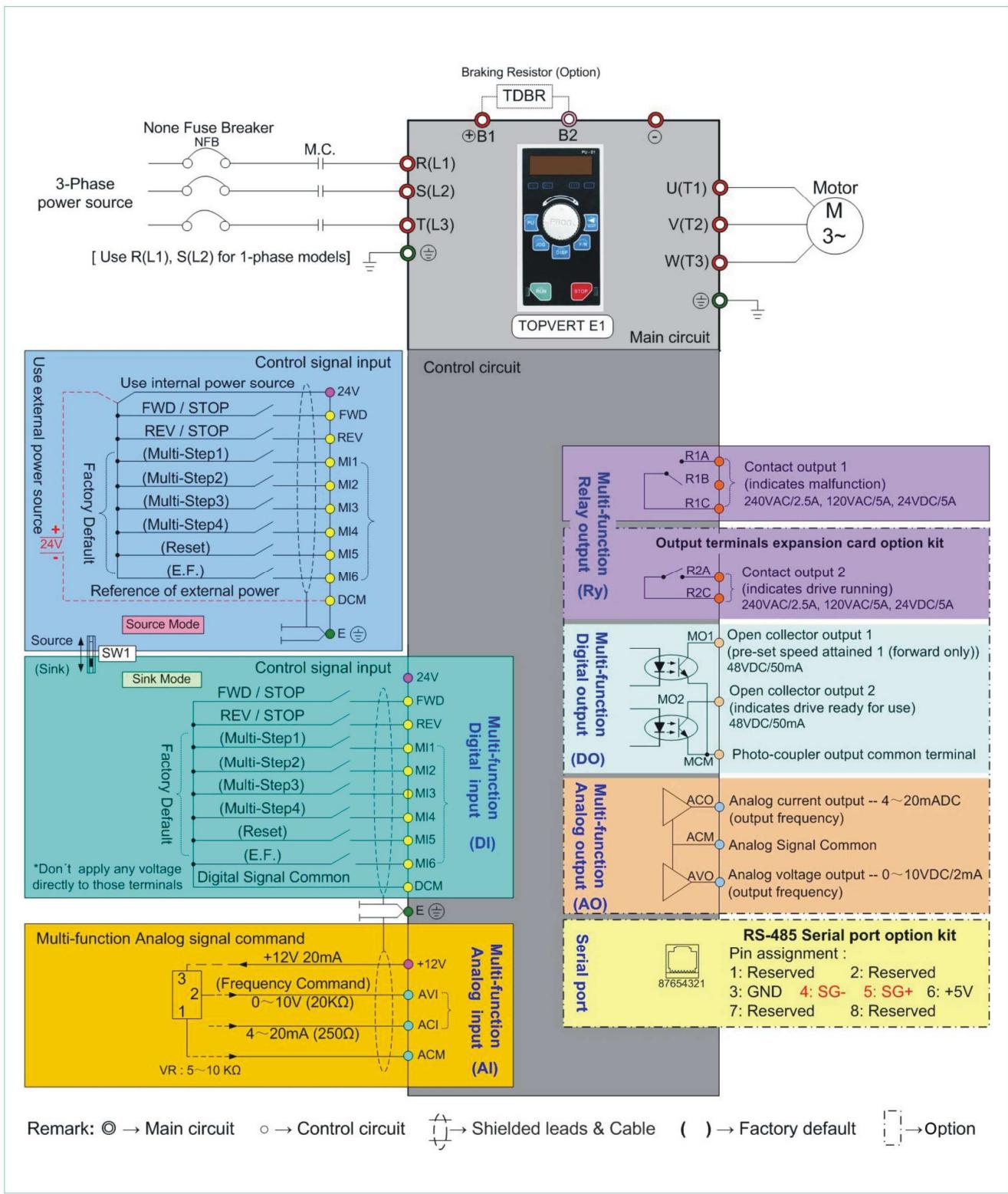


Safe & Intelligent

- Auto restart after fault
- Stall prevention & Over torque detection
- Full protect functions (LU, OU, OC, SC, OH, OL, GF...etc.)
- DC bus capacitor life time monitoring
- Easy change and controlled cooling fan
- Running data & Fault history up to 16 records
- IGBT/ Heatsink temperature display & Pre-warning



Wiring diagram



Standard specifications

Series		TOPVERT E1 series High performance general purpose compact drive
Control Characteristics	Output frequency range	0.1 - 600Hz, Programmable
	Overload endurance	150% of rated current for 1 minute/10 minutes, Ta <=40, 200% of rated current for 3 seconds
	Maximum output voltage	Proportional to Input Voltage, 3-Phase output
	Power factor/efficiency	Power factor no lower than 0.95. Efficiency no lower than 95% at full load
	Control system	SPWM (Sinusoidal Pulse Width Modulation), 2 control mode :V/F, SVC modes
	Speed control range	V/F mode 20:1; SVC mode 120:1
	Output frequency resolution	Analog input: 10 Bit(1/1024), Digital input: 0.01Hz, Fly-Shuttle dial input: 0.01Hz
	Output frequency accuracy	Analog input: Within ± 0.2% of max.output frequency (25°C ± 10°C).Digital input: Within 0.01% of set output frequency
	PWM carrier frequency	0.7 -18kHz, Adjustable
	Torque characteristics	auto-torque boost, auto-slip compensation; starting torque can be 150% at 1.0Hz
	Skip frequency	Setting range 0.00 -600Hz, Max. 6 points, skip width are adjustable
	Accel/Decel time	0.1-60000 seconds (2 Independent settings for Accel/Decel Time)
	Stall prevention	0 to 250% of Rated Current, independent adjustable both in acceleration and constant speed operation.
	DC Braking	DC Braking both when start up and stop , Braking Current Level: 0 to 125% of rated output current. Braking time: 0 to 60 seconds. Braking Start-Point when stop: 0.1-600Hz
Operating Characteristics	Dynamic braking torque	Braking torque Approx. 20%(10%E.D.). Dynamic Brake chopper built-in in
	V/F Pattern	2 of adjustable Random V/F curve. Constant Torque curve & Reduced Torque curve are available.
	Frequency Setting	By an Encoder style Fly-Shuttle dial(setting resolution 0.01Hz/0.1Hz/1Hz/10Hz adjustable)
	External Signal	0 ~ +10VDC((Input impedance 20kΩ),4 ~20mA DC ((Input impedance 250Ω),Multi-Function Inputs 1 ~ 6 (15 Steps Jog, up/down), PLC run, RS-485 port MODBUS protocol
	Operation Setting	Set by RUN, STOP and JOG. Switch-able between Keypad and External signal
	Keypad	2 wire control(FWD/STOP、REV/STOP、RUN/STOP、FWD/REV), 3 wire control, FWD, REV, MI1 to MI6 can be combined to offer various modes of operation, RS-485 serial interface MODBUS protocol
	Multi-Function Digital Input (DI) (6 terminals)	Multi-step selection 0 to 15, first to second accel/decel switches, accel/decel inhibit, Input the counter, Pause Stop, EF Input, Emergency Stop, auxiliary motor control is invalid, ACI/AVI speed command selection,, Reset, PLC Run, Jog, Up/Down command, Sink/Source selection, Parameter team selection...etc, up to 43 functions.
	Multi-Function Output Indication (DO) (4 indications, 2 of them are optional)	Include a form C relay contact, a form A relay contact and 2 Open collector output. They can be programmed to below indications: Drive Operating, Frequency Attained, zero speed, Base Block, Over torque, Fault Indication, Local/Remote indication, PLC Operation indication, and Auxiliary Motor Output, Drive ready for use, IGBT over-heat indication...etc, up to 63 functions.
	Multi-Function Analog Input(AI)	AVI: 0 ~ +10VDC((Input impedance 20kΩ), ACI: 4 ~ 20mA DC ((Input impedance 250Ω). 2 different Input terminals can be programmed to 15 functions
	Multi-Function Analog Output (AO) (Optional)	Include ACO and AVO, They can be programmed to Proportional to output frequency, output current, voltage, frequency command or motor's speed etc, up to 15 functions.
Other Functions	Fault Indication	The output will be activated when faults occur (User may get 1 or up to 4 indications from below terminals:2 Relay contact point RA, RB, RC. or 2 Open-collector
	Communication function	RS-485 serial port, MODBUS protocol, ASCII & RTU. (Baud rate up to 125 k bps) (Optional) PID feedback control, Flying start, Automatic voltage regulation (AVR), 2 accel./decel time selection , Auto-optimum accel./decel. Time, S-curves, External fault interlock, External fault reset, Auto Restart after fault, 16 Fault records, Automatic energy-saving, Upper/Lower limit, Programmable pulse output, Password protection, Pump and Fan process control, Sleep/Wakeup function , Auto-Tuning, By-Pass, Y-Delta control, Bi-Directional Speed search, Reverse inhibit, Automatic torque boost & slip compensation, 16-step PLC run, 16 step preset speed, Coast or ramp to stop, Random V/F curve, Mechanical brake release control, IGBT / Heatsink temperature display & Pre-warning, Quiet operation mode (No noise), User define Multi-function display, Over torque detection, Over current/voltage stall prevention, Sink/Source (NPN/PNP) mode, Electronic Thermal Relay, Internal Counter, DC injection brake both in start and stop, Dynamic brake, Controlled cooling Fan, Removable keypad operator, Programmable Multi-Function DI,DO,AI,AO and Ry terminals. Self-testing, AC source Over Voltage, Phase loss, Over Voltage, Over Current, Under Voltage, Over Torque, External Fault, Motor over-load, IGBT Over-temperature, Heat-sink Over-temperature, Electronic thermal, Ground Fault, Output short circuit, Stall Prevention, Fuse protection, IGBT short circuit , Drive Over Load , DC bus capacitor life monitoring, Auto carrier frequency adjust according temperature, 16 Trip records, Run information of latest Fault such like DC-BUS voltage, Output voltage /Frequency/Current, Command frequency, IGBT temperature, Heat-sink temperature...etc.
Intelligent Protection Functions		Digital Keypad (PU-02 Digital Keypad with copy function and PU-03 Digital Keypad with LCD display are available as an option)
		8 Function keys: Access R un, Stop, Reset/ Digit Shift, Forward/ Reverse run, Display mode, Keypad Enable, Programming data and Jog operation...etc. One Encoder style Fly-Shuttle dial: Sets the parameter number and changes the numerical data One 6 digits 7 segment display: Display the Setting frequency/actual operation frequency, Output current/Voltage, motor speed, Fault trip, User defined unit(up to 88 type)...etc. 6 LED Display for status indication: Display the Drive run/stop status, Forward/Reverse run status, Keypad enable, and Frequency command source. One RJ-45 connector: Removable Keypad, remote control distance up to 150 meters.
Environment	Certificate	Complies with CE (EN61800-3) standard
	Temperature	Ambient: -10°C ~ +40°C /(-10°C ~ + 50°C) (Non-Condensing and not frozen). Storage: -20°C~ +60°C
	Humidity	Below 98% R.H. (Non-Condensing)
	Vibration	Below 20Hz: 1G, above 20Hz: 0.6G
	Installation Location	Altitude 1,000 m or lower, keep away from corrosive gasses, liquid and dust



※TOPVERT E1 series are designed and manufactured base on CNS and IEC, IEEE, CE & UL standard.

MODEL SPECIFICATIONS

1-Phase, 100 ~ 120VAC, 50/60 Hz (Tolerance Range: 90 ~ 132V, 47 ~ 63Hz) Output Voltage : 200~240VAC

Model TOPVRET E1-XXXXX	Applicable Motor (230V 4 P)		Rated Output				Source	Enclosure Construction			
	Power (kW)	Horse Power (Hp)	Capacity (kVA)	Current (A)	Voltage (V)	Frequency (Hz)		Cooling Methods	Protection Methods (IP/NEMA)	Net Weight (kg)	Frame Code
110P2	0.2	0.25	0.6	1.5	3- Phase, 0-240 (Max)	0.1-600	2.9	Fan- cooled	IP 20 NEMA 1	1.5	E1-A
110P4	0.4	0.5	1.2	3			5.7			1.6	
110P7	0.75	1	2	5			9.5			1.6	
111P5	1.5	2	3	7.5			14			1.7	

1-Phase, 200~240VAC, 50/60 Hz (Tolerance Range: 180~264V, 47~63Hz)

Model TOPVRET E1-XXXXX	Applicable Motor (230V 4 P)		Rated Output				Source	Enclosure Construction			
	Power (kW)	Horse Power (Hp)	Capacity (kVA)	Current (A)	Voltage (V)	Frequency (Hz)		Cooling Methods	Protection Methods (IP/NEMA)	Net Weight (kg)	Frame Code
210P2*	0.2	0.25	0.6	1.5	3- Phase, 0-240 (Max)	0.1-600	2.9	Fan- cooled	IP 20 NEMA 1	1.5	E1-A
210P2A							5.7			1.24	E1-S
210P4*	0.4	0.5	1.2	3			9.5			1.51	E1-A
210P4A							14			1.24	E1-S
210P7*	0.75	1	2	5			21			1.56	E1-A
210P7A										1.28	E1-S
211P5*	1.5	2	3	7.5						1.62	E1-A
211P5A										1.32	E1-S
212P2	2.2	3	4.4	11						1.68	E1-A

3-Phase, 200~240VAC, 50/60 Hz (Tolerance Range: 180~264V, 47~63Hz)

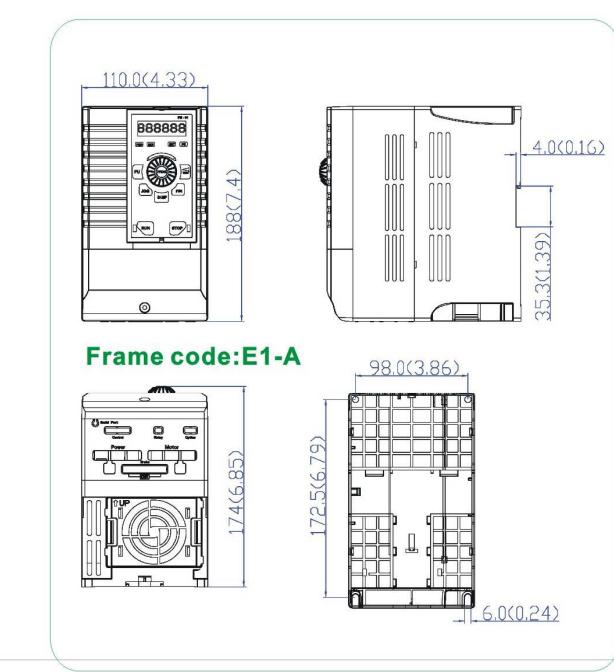
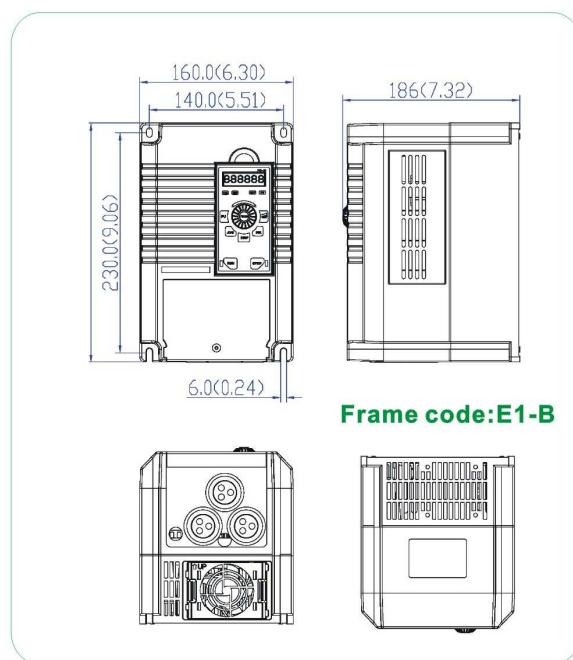
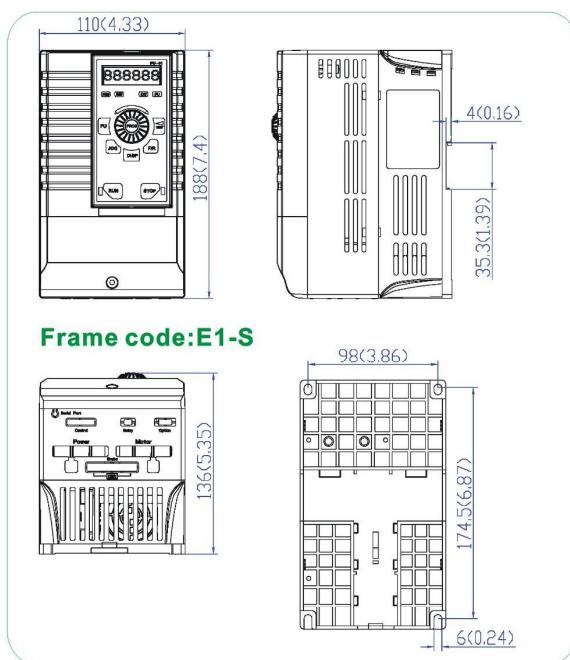
Model TOPVRET E1-XXXXX	Applicable Motor (230V 4 P)		Rated Output				Source	Enclosure Construction			
	Power (kW)	Horse Power (Hp)	Capacity (kVA)	Current (A)	Voltage (V)	Frequency (Hz)		Cooling Methods	Protection Methods (IP/NEMA)	Net Weight (kg)	Frame Code
230P4*	0.4	0.5	1.2	3	3- Phase, 0-240 (Max)	0.1-600	3.3	Fan- cooled	IP 20 NEMA 1	1.5	E1-A
230P4A							5.5			1.24	E1-S
230P7*	0.75	1	2	5			8.3			1.51	E1-A
230P7A							12			1.25	E1-S
231P5*	1.5	2	3	7.5			19			1.56	E1-A
231P5A							28			1.28	E1-S
232P2	2.2	3	4.4	11			36			1.62	E1-A
233P7	3.7	5	6.8	17						1.68	
235P5	5.5	7.5	10	25							
237P5	7.5	10	13	33							E1-B

3-Phase, 380~480VAC, 50/60 Hz (Tolerance Range: 323~528V, 47~63Hz)

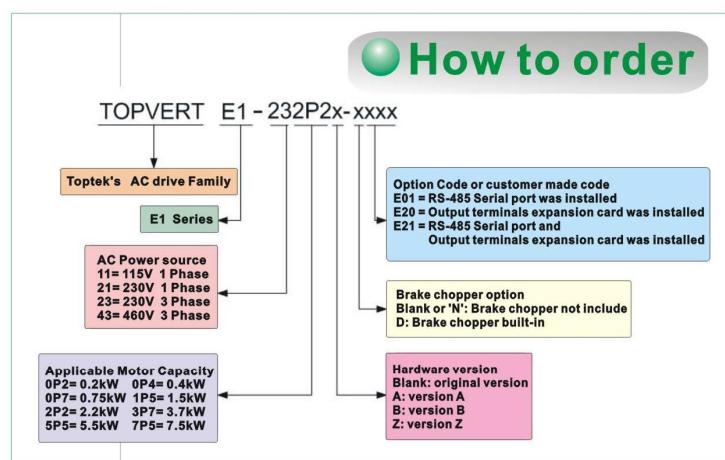
Model TOPVRET E1-XXXXX	Applicable Motor (460V 4 P)		Rated Output				Source	Enclosure Construction			
	Power (kW)	Horse Power (Hp)	Capacity (kVA)	Current (A)	Voltage (V)	Frequency (Hz)		Cooling Methods	Protection Methods (IP/NEMA)	Net Weight (kg)	Frame Code
430P4*	0.4	0.5	1.3	1.6	3- Phase, 0-240 (Max)	0.1-600	1.8	Fan- cooled	IP 20 NEMA 1	1.57	E1-A
430P4A							3.3				E1-S
430P7*	0.75	1	2.4	3			4.6			1.57	E1-A
430P7A							6.6			1.62	E1-S
431P5*	1.5	2	3.3	4.2			9.4			1.64	E1-A
431P5A							14			1.74	
432P2	2.2	3	4.8	6			20				
433P7	3.7	5	6.8	8.5							E1-B
435P5	5.5	7.5	10	13							
437P5	7.5	10	14	18							

Remark: * Not for new design

Dimension



Unit: mm (inch)



Toptek Electronics Corporation

No.1, Tzu-Chiang 6 Road, Chung-Li City,
Taoyuan County, Taiwan
Tel: (886)-3-462-9199
Fax: (886)-3-462-8829
<http://www.toptek.biz>
e-mail:tt@toptek.biz



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