

## CHAPTER 8 STANDARD SPECIFICATIONS

|  |  |  |  |
|--|--|--|--|
| Max. Applicable Motor Output Range   |  | 1-Phase, 100 ~ 120VAC, 50/60Hz: 0.2 ~ 1.5kW (0.25 ~ 2Hp)   |  |
|  |  | 1-Phase, 200 ~ 240VAC, 50/60Hz: 0.2 ~ 2.2kW (0.25 ~ 3Hp)   |  |
|  |  | 3-Phase, 200 ~ 230VAC, 50/60Hz: 0.4 ~ 7.5kW (0.5 ~ 10Hp)   |  |
|  |  | 3-Phase, 380 ~ 460VAC, 50/60Hz: 0.4 ~ 7.5kW (0.5 ~ 10Hp)   |  |
| Output   | Output Frequency   | 0.1 - 600Hz  |  |
|  | Overload Endurance   | 150% of rated current for 1 minute/10 minutes, Ta ≤40; 200% of rated current for 2 seconds   |  |
|  | Maximum Output Voltage   | Proportional to Input Voltage, 3-Phase (For 100V class, output voltage is twice of the input voltage)  |  |
|  | Power factor/Efficiency  | Power factor no lower than 0.95. Efficiency no lower than 95% at full load   |  |
| Control Characteristics  | Control System   | SPWM (Sinusoidal Pulse Width Modulation), V/F control and Sensorless Vector Control  |  |
|  | Speed Control  | V/F Control 1:20; Sensorless Control 1:50  |  |
|  | Output Frequency   | 0.1 - 600Hz, Programable   |  |
|  | Output Frequency Resolution  | 0.01Hz   |  |
|  | PWM Carrier Frequency  | 1kHz -18kHz Adjustable (Some models are limited)   |  |
|  | Torque Characteristics   | Including the auto-torque, auto-slip compensation; starting torque can be 150% at 1.0Hz  |  |
|  | Skip Frequency   | Setting range 0.1-600Hz, Max. 3 points   |  |
|  | Accel/Decel Time   | 0.1-6000 seconds (2 Independent settings for Accel/Decel Time)   |  |
|  | Stall Prevention Level   | 10 to 250%, Setting of Rated Current. Setting range 0.1-600Hz while stop.  |  |
|  | DC Braking   | DC Braking Current Level: 0 to 125% of rated output current. DC Braking time: 0 to 60 seconds. Start-Point for DC Braking: 0.1-600Hz both when start up and stop.  |  |
|  | Dynamic Braking Torque   | Approx. 20%. Dynamic Brake chopper built-in.   |  |
|  | V/F Pattern  | Adjustable V/F curve using 4 independent points.   |  |
| Operating Characteristics  | Frequency Setting  | Keypad   | By a rotary encoder (setting resolution 0.01Hz/step)   |
|  |  | 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, (Option) RS-485 Interface MODBUS protocol. |
|  | Operation Setting  | Keypad   | Set by RUN, STOP and JOG   |
|  |  | External Signal  | FWD, REV, MI1 to MI6 can be combined to offer various modes of operation, (Option) RS-485 serial interface MODBUS protocol   |
|  | Multi-Function Input Signal (6 signals)                                  | Multi-step selection 0 to 15, first to second accel/decel switches, accel/decel inhibit, EF Input, Emergency Stop, auxiliary motor control is invalid, ACI/AVI/AUI speed command selection, Reset, PLC Run, Jog, Up/Down command, Sink/Source selection  |  |
|  | Multi-Function Output Indication, (2 signals, extra 3 signals as option) | Drive Operating, Frequency Attained, Non-zero, Base Block, Fault Indication, Local/Remote indication, PLC Operation indication, and Auxiliary Motor Output   |  |
|  | Analog Output Signal (Option)  | Analog signal output proportional to output frequency, output current, voltage, frequency command or motor's speed.  |  |
|  | Fault Indication   | The output will be activated when faults occur (1 Relay contact point RA, RB, RC. or 2 Open-collector output)  |  |
| Communication  |  | (Option) RS-485 serial interface MODBUS protocol   |  |
| Other Functions  |  | PID feedback control, automatic voltage regulation, Momentary Power Loss restart, S-Curve, External Fault, Fault Reset, Auto Restart, Fault Records, Frequency Limits, Fan & Pump Control, Parameter Lock/Reset, Auto Tuning, Reverse Inhibition, Over-Voltage/ Over-Current Stall Prevention, automatic energy-saving, DC Braking, Speed Search during Start-up, PLC, MODBUS Communication, |  |
| Protection   |  | Self-testing, AC source Over Voltage, Over Voltage, Over Current, Under Voltage, Over Load, Overheating, External Fault, Electronic thermal, Ground Fault, Stall Prevention, Output short circuit, IGBT short circuit  |  |
| (Option) PU-02 with Copy Function<br>(Option) PU-03 with LCD Display and Operation | Digital Keypad   | 8 Function keys  | Access Run, Stop, Reset/ Digit Shift, Forward/ Reverse run, Display mode, Keypad Enable, Programming data and Jog operation.   |
|  |  | 360 degree Rotary Encoder  | Sets the parameter number and changes the numerical data   |
|  |  | 6 digits 7 segment display   | Display the Setting frequency/actual operation frequency, Output current/Voltage, User defined unit.   |
|  |  | Six LED Display for status indication  | Display the AC drive's run/stop status, forward/Reverse run status, Keypad enable, and Frequency command source.   |
|  |  | Removable Keypad   | Remote control distance up to 150 meters.  |
| Environment  | CE Safety  | Meet LVD: EN50178 standards; When combining with Toptek's filter, meet EMC: EN61800-3 standards  |  |
|  | UL Safety  | Meet UL508C standards  |  |
|  | Temperature  | Ambient: -10℃ ~ +50℃ (Non-Condensing and not frozen). Storage: -20℃ ~ +60℃   |  |
|  | Humidity   | Below 98%RH (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, IEC, CE and UL standard.

| 1-Phase, 100 ~ 120VAC, 50/60 Hz (Tolerance Range:90 ~ 132V,47 ~ 63Hz) Output Voltage :200~240VAC |                                |                        |                   |                |                                |                   |                |                        |                                    |                         |            |
|--|--------------------------------|------------------------|-------------------|----------------|--------------------------------|-------------------|----------------|------------------------|------------------------------------|-------------------------|------------|
| Model  | Applicable Motor<br>(230V 4 P) |                        | Rated Output      |                |                                |                   | Source         | Enclosure Construction |                                    |                         |            |
| TOPVERT<br>E1-xxxxx  | Power<br>(kW)                  | Horse<br>Power<br>(Hp) | Capacity<br>(kVA) | Current<br>(A) | Voltage<br>(V)                 | Frequency<br>(Hz) | Current<br>(A) | Cooling<br>Methods     | Protection<br>Methods<br>(IP/NEMA) | Gross<br>Weight<br>(kg) | Frame Code |
| 110P2  | 0.2                            | 0.25                   | 0.6               | 1.6            | 3-<br>Phase,<br>0-240<br>(Max) | 0.1- 600          | 6.1            | Fan- cooled            | IP 20<br>NEMA 1                    |                         | E1-A       |
| 110P4  | 0.4                            | 0.5                    | 1.2               | 3              |                                |                   | 11.4           |                        |                                    |                         |            |
| 110P7  | 0.75                           | 1                      | 2                 | 5              |                                |                   | 19.1           |                        |                                    |                         |            |
| 111P5  | 1.5                            | 2                      | 3                 | 7.5            |                                |                   | 28.6           |                        |                                    |                         |            |

| 1-Phase, 200 ~ 240VAC, 50/60 Hz (Tolerance Range:180 ~ 264V,47 ~ 63Hz) |                                |                        |                   |                |                                |                   |                |                        |                                    |                         |            |
|--|--------------------------------|------------------------|-------------------|----------------|--------------------------------|-------------------|----------------|------------------------|------------------------------------|-------------------------|------------|
| Model  | Applicable Motor<br>(230V 4 P) |                        | Rated Output      |                |                                |                   | Source         | Enclosure Construction |                                    |                         |            |
| TOPVERT<br>E1-xxxxx  | Power<br>(kW)                  | Horse<br>Power<br>(Hp) | Capacity<br>(kVA) | Current<br>(A) | Voltage<br>(V)                 | Frequency<br>(Hz) | Current<br>(A) | Cooling<br>Methods     | Protection<br>Methods<br>(IP/NEMA) | Gross<br>Weight<br>(kg) | Frame Code |
| 210P2  | 0.2                            | 0.25                   | 0.6               | 1.6            | 3-<br>Phase,<br>0-240<br>(Max) | 0.1-600           | 3              | Fan-<br>cooled         | IP 20<br>NEMA 1                    | 1.5                     | E1-A       |
| 210P4  | 0.4                            | 0.5                    | 1.2               | 3              |                                |                   | 5.7            |                        |                                    | 1.51                    |            |
| 210P7  | 0.75                           | 1                      | 2                 | 5              |                                |                   | 9.5            |                        |                                    | 1.56                    |            |
| 211P5  | 1.5                            | 2                      | 3                 | 7.5            |                                |                   | 14.3           |                        |                                    | 1.62                    |            |
| 212P2  | 2.2                            | 3                      | 4.4               | 11             |                                |                   | 21             |                        |                                    | 1.68                    |            |

| 3-Phase, 200 ~ 240VAC, 50/60 Hz (Tolerance Range:180 ~ 264V,47 ~ 63Hz) |                                |                        |                   |                |                                |                   |                |                        |                                    |                         |            |
|--|--------------------------------|------------------------|-------------------|----------------|--------------------------------|-------------------|----------------|------------------------|------------------------------------|-------------------------|------------|
| Model  | Applicable Motor<br>(230V 4 P) |                        | Rated Output      |                |                                |                   | Source         | Enclosure Construction |                                    |                         |            |
| TOPVERT<br>E1-xxxxx  | Power<br>(kW)                  | Horse<br>Power<br>(Hp) | Capacity<br>(kVA) | Current<br>(A) | Voltage<br>(V)                 | Frequency<br>(Hz) | Current<br>(A) | Cooling<br>Methods     | Protection<br>Methods<br>(IP/NEMA) | Gross<br>Weight<br>(kg) | Frame Code |
| 230P4  | 0.4                            | 0.5                    | 1.2               | 3              | 3-<br>Phase,<br>0-240<br>(Max) | 0.1-600           | 3.3            | Fan-<br>cooled         | IP 20<br>NEMA 1                    | 1.5                     | E1-A       |
| 230P7  | 0.75                           | 1                      | 2                 | 5              |                                |                   | 5.5            |                        |                                    | 1.51                    |            |
| 231P5  | 1.5                            | 2                      | 3                 | 7.5            |                                |                   | 8.3            |                        |                                    | 1.56                    |            |
| 232P2  | 2.2                            | 3                      | 4.4               | 11             |                                |                   | 12.1           |                        |                                    | 1.62                    |            |
| 233P7  | 3.7                            | 5                      | 6.8               | 17             |                                |                   | 18.7           |                        |                                    | 1.68                    |            |
| 235P5  | 5.5                            | 7.5                    | 10                | 25             |                                |                   | 27.5           |                        |                                    |                         | E1-B       |
| 237P5  | 7.5                            | 10                     | 13                | 33             |                                |                   | 36.3           |                        |                                    |                         |            |

| 3-Phase, 380 ~ 460VAC, 50/60 Hz (Tolerance Range: 342 ~ 528V,47 ~ 63Hz) |                                |                        |                   |                |                                |                   |                |                        |                                    |                         |            |
|---|--------------------------------|------------------------|-------------------|----------------|--------------------------------|-------------------|----------------|------------------------|------------------------------------|-------------------------|------------|
| Model   | Applicable Motor<br>(460V 4 P) |                        | Rated Output      |                |                                |                   | Source         | Enclosure Construction |                                    |                         |            |
| TOPVERT<br>E1-xxxxx   | Power<br>(kW)                  | Horse<br>Power<br>(Hp) | Capacity<br>(kVA) | Current<br>(A) | Voltage<br>(V)                 | Frequency<br>(Hz) | Current<br>(A) | Cooling<br>Methods     | Protection<br>Methods<br>(IP/NEMA) | Gross<br>Weight<br>(kg) | Frame Code |
| 430P4   | 0.4                            | 0.5                    | 1.3               | 1.6            | 3-<br>Phase,<br>0-460<br>(Max) | 0.1-600           | 1.8            | Fan-<br>cooled         | IP 20<br>NEMA 1                    | 1.57                    | E1-A       |
| 430P7   | 0.75                           | 1                      | 2.4               | 3              |                                |                   | 3.3            |                        |                                    | 1.57                    |            |
| 431P5   | 1.5                            | 2                      | 3.3               | 4.2            |                                |                   | 4.6            |                        |                                    | 1.62                    |            |
| 432P2   | 2.2                            | 3                      | 4.8               | 6              |                                |                   | 6.6            |                        |                                    | 1.64                    |            |
| 433P7   | 3.7                            | 5                      | 6.8               | 8.5            |                                |                   | 9.4            |                        |                                    | 1.74                    |            |
| 435P5   | 5.5                            | 7.5                    | 10                | 13             |                                |                   | 14.3           |                        |                                    |                         | E1-B       |
| 437P5   | 7.5                            | 10                     | 14                | 18             |                                |                   | 19.8           |                        |                                    |                         |            |