



Automation for a Changing World

Delta Field Oriented Control Drive C2000 Series



www.delta.com.tw/ia

 **DELTA**
Smarter. Greener. Together.



Power Features. High Efficiency.

The C2000 series AC motor drive provides the most efficient and cost-effective solution for all types of drive applications. It features precise speed, torque and position control functions that are suitable for both sensor and sensorless types of synchronous and asynchronous motors. The C2000 series is also equipped with built-in PLC functions and supports the CANopen Master/Slave extension for the ultimate in system flexibility and fast data exchange.

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Standard Models (IP20/NEMA1)

Power range: 230V 0.75~90kW, 460V 0.75~450kW

| | | | | | | | | | | | | | | | | |
|------------------|----------|-----|-----|-----|-----|-----|----|----|------|----|-------------|----|----|----|-----|-----|
| 230V (kW) | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 90 |
| 230V (HP) | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 100 | 125 |
| Frame Size | A | | | | B | | | C | | | D | | E | | | F |
| Braking Chopper | Built-in | | | | | | | | | | Optional | | | | | |
| DC Reactor | None | | | | | | | | | | Built-in | | | | | |
| EMI Filter | Optional | | | | | | | | | | | | | | | |
| Protection Level | IP20 | | | | | | | | | | IP00 / IP20 | | | | | |

| | | | | | | | | | | | | | | | | | |
|------------------|-----------------------|-----|-----|-----|-----|-----|-----|----|----|------|----|----|----|----|----|-----|-----|
| 460V (kW) | 0.75 | 1.5 | 2.2 | 3.7 | 4.0 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 90 |
| 460V (HP) | 1 | 2 | 3 | 5 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 100 | 125 |
| Frame Size | A | | | | | | B | | | C | | | D | | | | |
| Braking Chopper | Built-in | | | | | | | | | | | | | | | | |
| DC Reactor | None | | | | | | | | | | | | | | | | |
| EMI Filter | Built-in (VFDXXXC43E) | | | | | | | | | | | | | | | | |
| Protection Level | IP20 | | | | | | | | | | | | | | | | |

* Available in China and Taiwan only.

Advanced Drive Controls

High performance

1. High bandwidth control
2. Speed/torque/position control mode
3. Dual rating design (Normal duty/heavy duty)
4. 4-quadrant torque control and limit
5. For both synchronous and asynchronous motors

Environmental Adaptability

1. 50°C operating temperature
2. Built-in DC reactor
3. Coated circuit boards
4. Built-in EMI filter
5. Global safety standards (CE/UL/cUL)

*Note: Please refer to the Product Specification



| | | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|------|
| 110 | 132 | 160 | 185 | 220 | 280 | 315 | 355 | 450* |
| 150 | 175 | 215 | 250 | 300 | 375 | 425 | 475 | 600 |
| E | F | G | H | | | | | |
| Optional | | | | | | | | |
| Built-in | | | | | | | | |
| Optional | | | | | | | | |
| IP00 / IP20 | | | | | | | | |

■ Versatile Drive Controls

1. Built-in safe stop function
2. Built-in PLC function
3. Built-in brake unit
4. Supports various network protocols
5. Synchronous point-to-point control

■ Modular Design

1. Hot plug LCD keypad
2. I/O extension cards
3. Various PG (encoder) feedback cards
4. Network cards for fieldbus modules
5. Removable fan



Modular Design

- Various accessories options, such as I/O extension cards, encoder feedback cards, communication cards, hot plug LCD keypad, removable terminals and removable fans.

▶ PG (Encoder) cards



▶ I/O cards



▶ Communication cards



■ Removable fan

To ensure personal safety, do not begin wiring before the indicator light is off.

■ Power indicator

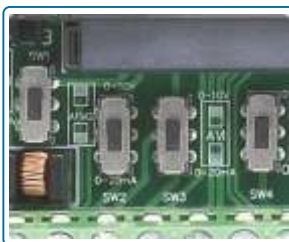
To prevent personal injury, please do not perform wiring before power indicator is off.

*NOTE: "▶" are optional accessories.

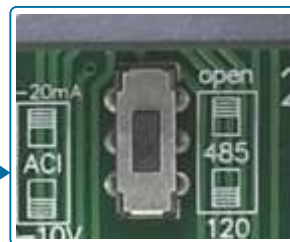
■ Removable terminals

Convenient wiring and safety equipment.

Analog I/O switch



Termination resistor



Dual RJ45 communication ports



■ The modular design fulfills the needs of system applications and equipment maintenance.

- KPC-CC01 keypad
- Standard RJ45 network cable.
- Convenient push-on/push-off, to install or remove easily.
- The product nameplate shows the input/output voltage, input/output current, the frequency range, and more.
- RFI Switch
- Loosen the safety screw on the top cover, press left and right side to remove the cover then start wiring.
- Modularized fan design, easy to change, easy to clean for longer product life.

Excellent Environment Adaptability

- Built-in DC choke to suppress harmonics*
- Built-in EMI filter to filter noise*
- Conformal coating (Class 3C3 of IEC60721-3-3 standard) ensures drive operation stability and safety in critical environments.
- Flange mounting: designed to completely separate the heat dissipating system and other electronic components. Its installation can disperse heat out of the VFD. Cooling fan method can blow cold air into aluminum heat sink. Both heat dissipating methods are efficient, choose the one that fits the working environment for the best heat dissipation results.

*Note: Please refer to the Product Specification

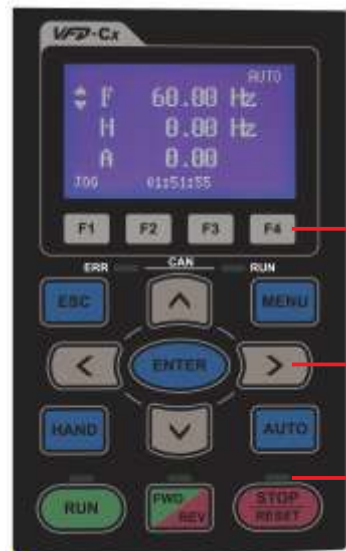


Certifications

| | |
|----------------|---|
| UL, cUL | CE |
| C-Tick | Low Voltage: EN61800-5-1 |
| ROHS | EMC: EN61000-3-12, EN61800-3, IEC61000-6-2, IEC61000-6-4, IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, |

Quick and easy parameters setting via the editable LCD keypad

- Multi-column display for the drive status
- Simple and intuitive operation
- User-defined parameter groups
- Real Time Clock and calendar function
- Language selection for display
- Copy function saves parameters and PLC programs to the keypad memory for later transfer to another drive
- IP56 protection level



F1 to F4: User-defined function keys

Selection keys

LED displays the current drive status



Create homepage logo



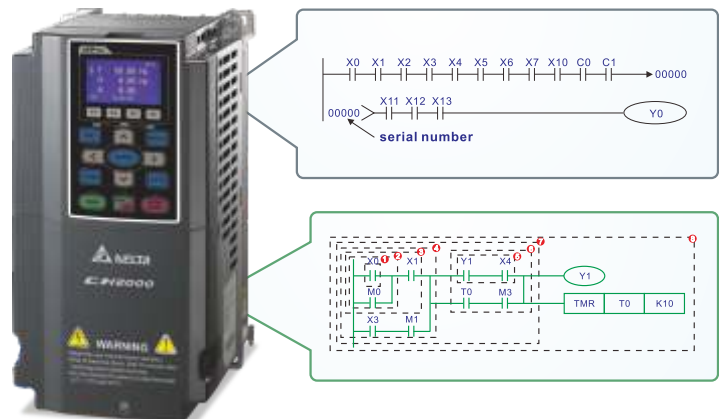
Editable message display



Editable chart display

Intelligent PLC Functions

- Built-in 10K steps capacity of PLC functions. Distributed control and independent operation are easily achieved via network connection.
- CANopen Master protocol and PLC functions provide synchronous control and fast data exchange.



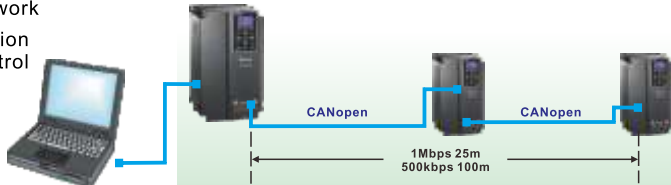
High-speed Network

- Provides optional MODBUS RTU and various fieldbus cards for flexible communication applications
- Advanced network functions
- Built-in MODBUS communication interface
- **CANopen (DS402)**



Ability to control up to 8 Slave drives via the CANopen Master function

- Supports all Delta industrial automation products (all EDS files of Delta industrial automation products are built-in)
- I/O data layout of each piece of equipment on the CANopen Network
- Planning function for motion control
- WPL Soft



- TAP-CN03 distribution box for long distances



- RJ45 cable



DeviceNet

Delta DeviceNet Builder software is specially designed for DeviceNet communication. With this software, it is easy to plan DeviceNet equipment and remote I/O via parameters to build a standard DeviceNet monitoring structure.

- Supports all Delta industrial automation products (all EDS files of Delta industrial automation products are built-in)
- I/O data layout of each piece of equipment in the DeviceNet network
- DeviceNet layout software



EtherNet/IP

MODBUS TCP

Delta's communication integrator software not only provides graphic module setting and human interface design but also supports settings and online monitoring for all Ethernet products

- Delta software for Ethernet/MODBUS TCP products
- Graphic module setting and human interface design
- Auto search function
- Setting interface for virtual COM port



Convenient Operation Platform for Drive System Management

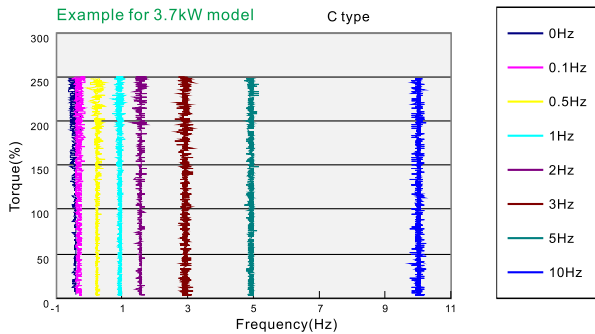
- Provides a complete operation platform for users' easy control and monitoring via PC, including parameters save/setting, real-time wave monitor, quick setup, for multiple languages and with multi-language operation systems.

- Start-up display**
 Displays horsepower, rated voltage and current of present model
- Parameter management**
 Provides parameter setting/save/copy/comparison for convenient parameter management.
- Trend records**
 Monitors operation curve of the drive by communication and displays I/O terminal status. Useful for tasks such as "trial run monitoring".
- Quick setup**
 Guides the user step-by-step through the drive settings according to quick setup wizard.

*NOTE: please download the software above at Delta website

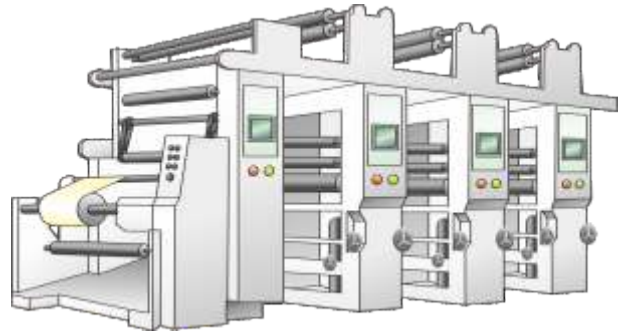
High-performance Field Oriented Control

The FOC+PG mode of C2000 series can output 200% of starting torque at extremely low speeds for precise and stable speed control.



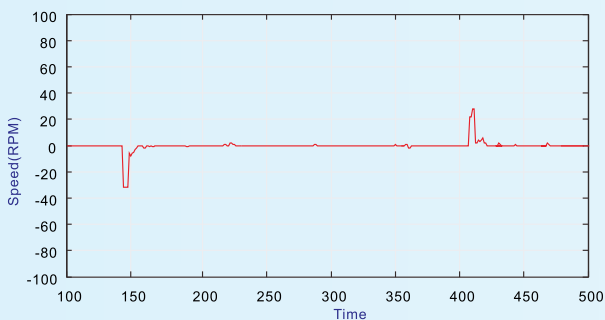
High-performance Field Oriented Control

Precise position and speed control ideal for printing machine applications.



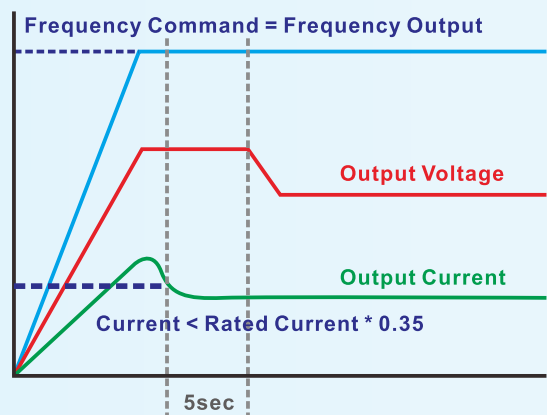
Fast Response to Impact Load

When load changes, VFD-C2000 will provide a best torque response by FOC to minimize the vibration of load impact.



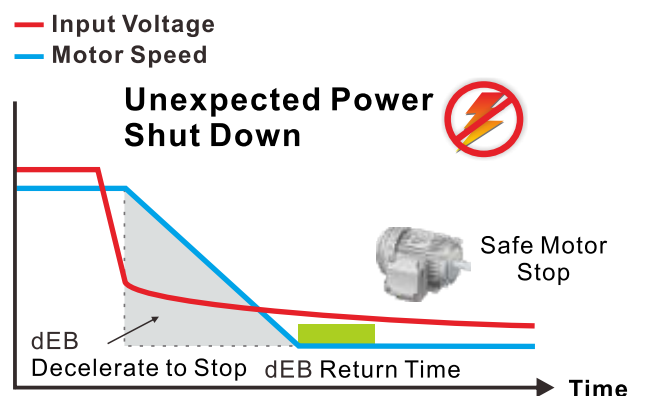
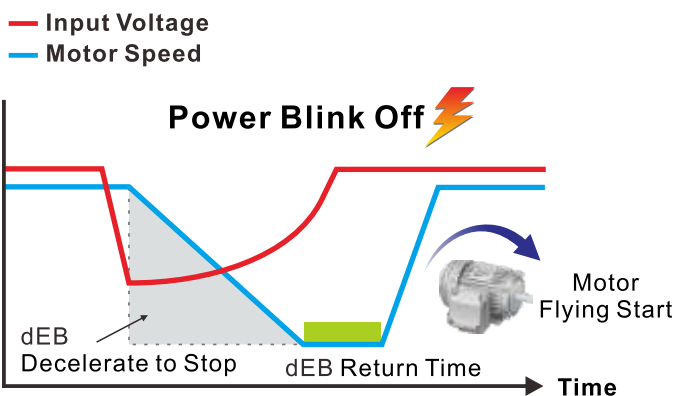
Auto Energy-Saving Operation

During constant speed operation, this function auto-calculates the best voltage value by the load power for the load.



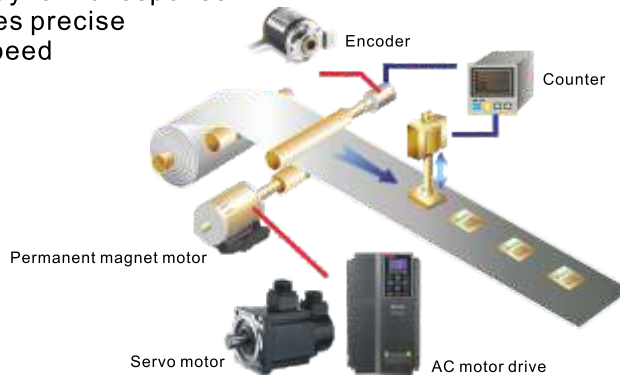
Deceleration Energy Backup (dEB)

This function controls the motor's deceleration to a stop when sudden power failure occurs to prevent mechanical damage. It then returns the motor to its previous speed when power comes back on.



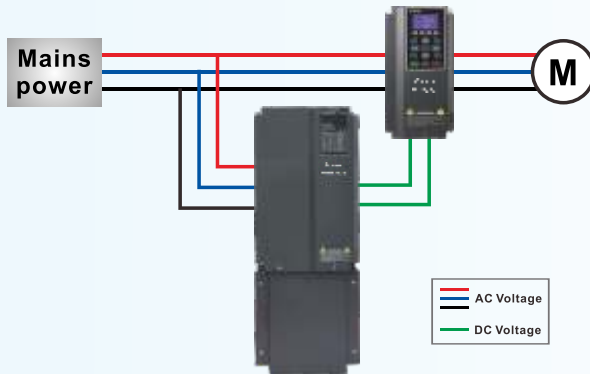
A Drive for Permanent Magnet (PM) Motors

VFD-C2000 is a dual mode drive for induction motors and permanent magnet motors. The dynamic response of a PM motor provides precise control of position, speed and torque.



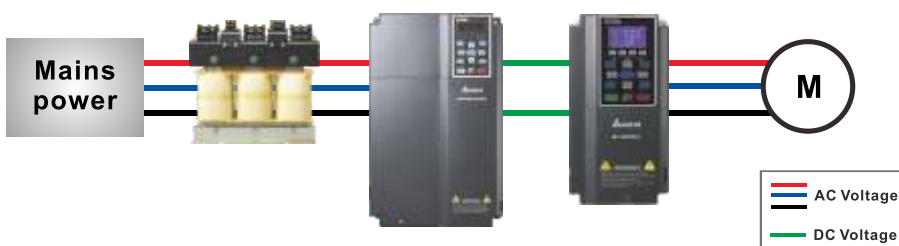
Delta REG2000 Series for Power Regeneration

Using the REG2000 with the CH2000 in a crane and hoist application provides the user with a four-quadrant operation and energy saving results.



Delta AFE2000 Series for Power Regeneration and Power Quality Improvement

The Active Front End Unit (AFE2000) helps to reduce torque ripple and harmonics with higher power factor to provide excellent production quality with energy saving results.



Delta Active Front End AFE2000 Series

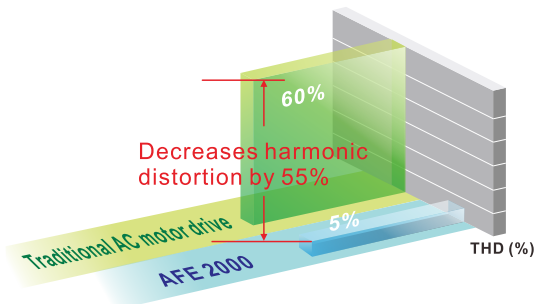
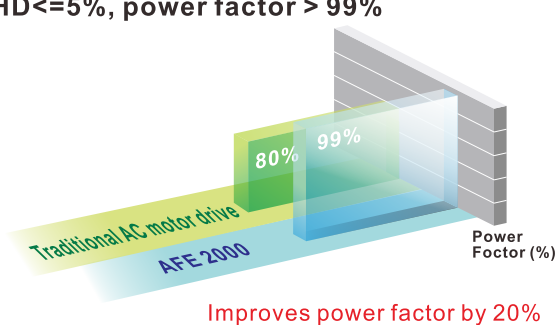
Features

- Replaces traditional brake resistor to reduce heat energy.
- Clear energy savings: more than 95% of the regenerative energy is converted into electricity and supplied back to the mains.
- Full-load operation: input-side current THD lower than 5% and improves power factor up to 99%.
- AC motor drives with AFE2000: supports 4-quadrant operation with variable frequencies and adjustable system.
- Constant DC bus voltage: unaffected by mains voltage fluctuations.



● Improves power factor and decreases harmonic distortion.

- ▶ THD $\leq 5\%$, power factor > 99%




Applications

- Large-inertia loads, such as centrifuge equipment, dewatering machines and roving machines.
- 4-quadrant loads including elevators, cranes and pumpjacks (oil extraction machines)
- Quick braking, such as machine tools, bag making machines, auto storage and retrieval systems, and lathes
- Long-term energy feedback, such as wind power, water power, steel printing and paper making machinery (winding equipment).
- Improves power quality for industries such as semiconductor and panel industries



Environment for Operation, Storage and Transportation

DO NOT expose the AC motor drive to bad environments, such as dust, direct sunlight, corrosive/ inflammable gasses, humidity, liquid or vibrations. The salt in the air must be less than 0.01mg/cm² every year.

| | | |
|--------------------------------|---|--|
| Installation location | IEC60364-1/IEC60664-1 Pollution degree 2, Indoor use only | |
| Surrounding Temperature | Storage/ Transportation | -25°C ~ +70°C |
| | No condensation, no frost | |
| Rated Humidity | Operation | Max. 90% |
| | Storage/ Transportation | Max. 95% |
| | No condensation, no frost | |
| Air Pressure | Operation/ Storage | 86 to 106 kPa |
| | Transportation | 70 to 106 kPa |
| Pollution Level | IEC60721-3-3 | |
| | Operation | Class 3C2 : Class 3S2 |
| | Storage | Class 2C2 : Class 2S2 |
| | Transportation | Class 1C2 : Class 1S2 |
| No condensation, no frost | | |
| Altitude | Operation | If AC motor drive is installed at altitude 0~1000m, follow normal operation restriction. If it is install at altitude 1000~3000m, decrease 2% of rated current or lower 0.5°C of temperature for every 100m increase in altitude. Maximum altitude for Corner Grounded is 2000m. |
| Package Drop | Storage/ Transportation | ISTA procedure 1A(according to weight) IEC60068-2-31 |
| Vibration | 1.0mm, peak to peak value range from 2Hz to 13.2 Hz; 0.7G~1.0G range from 13.2Hz to 55Hz; 1.0G range from 55Hz to 512 Hz. Comply with IEC 60068-2-6 | |
| Impact | IEC/EN 60068-2-27 | |
| Operation Position | Max. allowed offset angle ± 10° (under normal installation position) |  |

Specification for Operation Temperature and Protection Level

| Model | Frame | Top Cover | Conduit Box | Protection Level | Operation Temperature |
|--------------------------|---|-------------------------|------------------------|---------------------------|-----------------------|
| VFDxxxCxxA VFDxxxCxxS | Frame A~C 230V: 0.75~22kW 460V: 0.75~30kW | Remove top cover | Standard conduit plate | IP20/UL Open Type | -10°C ~50°C |
| | | Standard with top cover | | IP20/UL Type1/NEMA1 | -10°C ~40°C |
| | Frame D~H 230V: >22kW 460V: >30kW | N/A | No conduit box | IP00 IP20/UL Open Type | -10°C ~50°C |
| VFDxxxCxxE VFDxxxCxxU | Frame A~C 460V: 0.75~30kW | Remove top cover | Standard conduit plate | IP20/UL Open Type | -10°C ~50°C |
| | | Standard with top cover | | IP20/UL Type1/NEMA1 | -10°C ~40°C |
| | Frame D~H 230V: >22kW 460V: >30kW | N/A | Standard conduit box | IP20/UL Type1/NEMA1 | -10°C ~40°C |



Specifications

230V

| Frame Size | | A | | | | B | | | C | | | D | | E | | F | | | |
|------------------------------|-------------------------------|---|---|---|-----|----------|-----|-----|----------------|------|-----------------------------|-------------|-----|---------------|-----|-------------|-----|-----|-----|
| Model VFD-___C__ | | 007 | 015 | 022 | 037 | 055 | 075 | 110 | 150 | 185 | 220 | 300 | 370 | 450 | 550 | 750 | 900 | | |
| Applicable Motor Output (kW) | | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 90 | | |
| Applicable Motor Output (HP) | | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 100 | 125 | | |
| Output Rating | NORMAL DUTY | Rated Output Capacity (kVA) | | 2.0 | 3.2 | 4.4 | 6.8 | 10 | 13 | 20 | 26 | 30 | 36 | 48 | 58 | 72 | 86 | 102 | 138 |
| | | Rated Output Current (A) | | 5 | 8 | 11 | 17 | 25 | 33 | 49 | 65 | 75 | 90 | 120 | 146 | 180 | 215 | 255 | 346 |
| | | Overload Capacity | | Rated output current: 120% for 1 minute | | | | | | | | | | | | | | | |
| | HEAVY DUTY | Max. Output Frequency (Hz) | | 0.00~600.00Hz | | | | | | | | | | | | | | | |
| | | Carrier Frequency (kHz) | | 2~15kHz (8kHz) | | | | | 2~10kHz (6kHz) | | | | | 2~9kHz (4kHz) | | | | | |
| | | Rated Output Capacity (kVA) | | 1.9 | 2.8 | 4.0 | 6.4 | 9.6 | 12 | 19 | 25 | 28 | 34 | 45 | 55 | 68 | 81 | 96 | 131 |
| Rated Output Current (A) | | 4.8 | 7.1 | 10 | 16 | 24 | 31 | 47 | 62 | 71 | 86 | 114 | 139 | 171 | 204 | 242 | 329 | | |
| Overload Capacity | | Rated output current: 150% for 1 minute | | | | | | | | | | | | | | | | | |
| Max. Output Frequency (Hz) | | 0.00~300.00Hz | | | | | | | | | | | | | | | | | |
| Carrier Frequency (kHz) | | 2~6kHz (2kHz) | | | | | | | | | | | | | | | | | |
| Input Rating | Input Current (A) Normal Duty | | 6.4 | 12 | 16 | 20 | 28 | 36 | 52 | 72 | 83 | 99 | 124 | 143 | 171 | 206 | 245 | 331 | |
| | Input Current (A) Heavy Duty | | 6.1 | 11 | 15 | 18.5 | 26 | 34 | 50 | 68 | 78 | 95 | 118 | 136 | 162 | 196 | 233 | 315 | |
| | Rated Voltage/Frequency | | 3-phase AC 200V~240V (-15%~+10%), 50/60Hz | | | | | | | | | | | | | | | | |
| | Operating Voltage Range | | 170~265Vac | | | | | | | | | | | | | | | | |
| Frequency Tolerance | | 47~63Hz | | | | | | | | | | | | | | | | | |
| Drive Weight | | 2.6± 0.3Kg | | | | 5.4± 1Kg | | | 9.8± 1.5Kg | | | 38.5± 1.5Kg | | 64.8± 1.5Kg | | 86.5± 1.5Kg | | | |
| Cooling Method | | Natural cooling | | Fan cooling | | | | | | | | | | | | | | | |
| Braking Chopper | | Frame A, B, C: built-in | | | | | | | | | Frame D and above: optional | | | | | | | | |
| DC Choke | | Frame A, B, C: optional | | | | | | | | | Frame D and above: built-in | | | | | | | | |
| EMI Filter | | Optional external EMI filter is available upon purchase | | | | | | | | | | | | | | | | | |
| EMC-COP01 | | VFDXXXC23A: optional; VFDXXC23E: built-in | | | | | | | | | | | | | | | | | |

460V

| Frame Size | | A | | | | | B | | | C | | | | | |
|------------------------------|-------------------------------|--|---|---|-------------|-----|----------|------|-----|----------------|------|-----|-----|----|----|
| Model VFD-___C__ | | 007 | 015 | 022 | 037 | 040 | 055 | 075 | 110 | 150 | 185 | 220 | 300 | | |
| Applicable Motor Output (kW) | | 0.75 | 1.5 | 2.2 | 3.7 | 4.0 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | | |
| Applicable Motor Output (HP) | | 1 | 2 | 3 | 5 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | | |
| Output Rating | NORMAL DUTY | Rated Output Capacity (kVA) | | 2.4 | 3.2 | 4.8 | 7.2 | 8.4 | 10 | 14 | 19 | 25 | 30 | 36 | 48 |
| | | Rated Output Current (A) | | 3.0 | 4.0 | 6.0 | 9.0 | 10.5 | 12 | 18 | 24 | 32 | 38 | 45 | 60 |
| | | Overload Capacity | | Rated output current: 120% for 1 minute | | | | | | | | | | | |
| | HEAVY DUTY | Max. Output Frequency (Hz) | | 0.00~600.00Hz | | | | | | | | | | | |
| | | Carrier Frequency (kHz) | | 2~15kHz (8kHz) | | | | | | 2~10kHz (6kHz) | | | | | |
| | | Rated Output Capacity (kVA) | | 2.3 | 3.0 | 4.5 | 6.5 | 7.6 | 9.6 | 14 | 18 | 24 | 29 | 34 | 45 |
| Rated Output Current (A) | | 2.9 | 3.8 | 5.7 | 8.1 | 9.5 | 11 | 17 | 23 | 30 | 36 | 43 | 57 | | |
| Overload Capacity | | Rated output current: 150% for 1 minute | | | | | | | | | | | | | |
| Max. Output Frequency (Hz) | | 0.00~300.00Hz | | | | | | | | | | | | | |
| Carrier Frequency (kHz) | | 2~6kHz (2kHz) | | | | | | | | | | | | | |
| Input Rating | Input Current (A) Normal Duty | | 4.3 | 5.9 | 8.7 | 14 | 15.5 | 17 | 20 | 26 | 35 | 40 | 47 | 63 | |
| | Input Current (A) Heavy Duty | | 4.1 | 5.6 | 8.3 | 13 | 14.5 | 16 | 19 | 25 | 33 | 38 | 45 | 60 | |
| | Rated Voltage/Frequency | | 3-phase AC 380V~480V (-15%~+10%), 50/60Hz | | | | | | | | | | | | |
| | Operating Voltage Range | | 323~528Vac | | | | | | | | | | | | |
| Frequency Tolerance | | 47~63Hz | | | | | | | | | | | | | |
| Drive Weight | | 2.6± 0.3Kg | | | | | 5.4± 1Kg | | | 9.8± 1.5Kg | | | | | |
| Cooling Method | | Natural cooling | | | Fan cooling | | | | | | | | | | |
| Braking Chopper | | Frame A, B, C: built-in ; Frame D and above: optional | | | | | | | | | | | | | |
| DC Choke | | Frame A, B, C: optional ; Frame D and above: built-in | | | | | | | | | | | | | |
| EMI Filter | | Frame A,B,C VFDXXXC43E: built-in EMI filter Frame A,B,C VFDXXXC43A: no EMI filter (Optional external EMI filter is available upon purchase) | | | | | | | | | | | | | |
| EMC-COP01 | | VFDXXXC43A: optional; VFDXXC43E: built-in | | | | | | | | | | | | | |

NOTES:

- The carrier frequency is default. Increasing the carrier frequency requires a reduction in current.
- The motor drive should operate in derating current when its control method is set to TQC+PG, PM, FOC Sensorless or TQC Sensorless mode.
- The application of the load characteristics is the impact load. The motor drive requires big one grade.
- For FRAME A, B and C, Model VFDXXXC43A is under IP20/NEMA1/UL TYPE1 protection level.
- For FRAME D and above, if the last character of the model is A then it is under IP20 protection level but the wiring terminal is under IP00 protection level; if the last character of the model is E, it is under IP20/NEMA1/UL TYPE1 protection level.

460V

| Frame Size | | D | | | | E | | F | | G | | H | | | | |
|------------------------------|-------------------------------|---|---|-----|-----|------------|------|------------|---------------|---------|------|------|------|------|------|-----|
| Model VFD-__C__ | | 370 | 450 | 550 | 750 | 900 | 1100 | 1320 | 1600 | 1850 | 2200 | 2800 | 3150 | 3550 | 4500 | |
| Applicable Motor Output (kW) | | 37 | 45 | 55 | 75 | 90 | 110 | 132 | 160 | 185 | 220 | 280 | 315 | 355 | 450 | |
| Applicable Motor Output (HP) | | 50 | 60 | 75 | 100 | 125 | 150 | 175 | 215 | 250 | 300 | 375 | 425 | 475 | 600 | |
| Output Rating | NORMAL DUTY | Rated Output Capacity (kVA) | 58 | 73 | 88 | 120 | 143 | 175 | 207 | 247 | 295 | 367 | 438 | 491 | 544 | 720 |
| | | Rated Output Current (A) | 73 | 91 | 110 | 150 | 180 | 220 | 260 | 310 | 370 | 460 | 550 | 616 | 683 | 866 |
| | | Overload Capacity | Rated output current: 120% for 1 minute | | | | | | | | | | | | | |
| | | Max. Output Frequency (Hz) | 0.00~600.00Hz | | | | | | | | | | | | | |
| | | Carrier Frequency (kHz) | 2~10kHz (6kHz) | | | | | | 2~9kHz (4kHz) | | | | | | | |
| | HEAVY DUTY | Rated Output Capacity (kVA) | 55 | 69 | 84 | 114 | 136 | 167 | 197 | 235 | 280 | 348 | 417 | 466 | 517 | 677 |
| | | Rated Output Current (A) | 69 | 86 | 105 | 143 | 171 | 209 | 247 | 295 | 352 | 437 | 523 | 585 | 649 | 816 |
| | | Overload Capacity | Rated output current: 150% for 1 minute | | | | | | | | | | | | | |
| | | Max. Output Frequency (Hz) | 0.00~300.00Hz | | | | | | | | | | | | | |
| | | Carrier Frequency (kHz) | 2~6kHz (2kHz) | | | | | | | | | | | | | |
| Input Rating | Input Current (A) Normal Duty | 74 | 101 | 114 | 157 | 167 | 207 | 240 | 300 | 380 | 400 | 494 | 555 | 625 | 866 | |
| | Input Current (A) Heavy Duty | 70 | 96 | 108 | 149 | 159 | 197 | 228 | 285 | 361 | 380 | 469 | 527 | 594 | 816 | |
| | Rated Voltage/Frequency | 3-phase AC 380V~480V (-15%~+10%), 50/60Hz | | | | | | | | | | | | | | |
| | Operating Voltage Range | 323~528Vac | | | | | | | | | | | | | | |
| | Frequency Tolerance | 47~63Hz | | | | | | | | | | | | | | |
| | Drive Weight | 38.5±1.5Kg | | | | 64.8±1.5Kg | | 86.5±1.5Kg | | 134±4Kg | | 228 | | | | |
| | Cooling Method | Fan cooling | | | | | | | | | | | | | | |
| | Braking Chopper | Frame A, B, C: built-in ; Frame D and above: optional | | | | | | | | | | | | | | |
| | DC Choke | Frame A, B, C: optional ; Frame D and above: built-in | | | | | | | | | | | | | | |
| | EMI Filter | Optional external EMI filter is available upon purchase | | | | | | | | | | | | | | |
| | EMC-COP01 | VFDXXC43A: optional; VFDXXC43E: built-in | | | | | | | | | | | | | | |

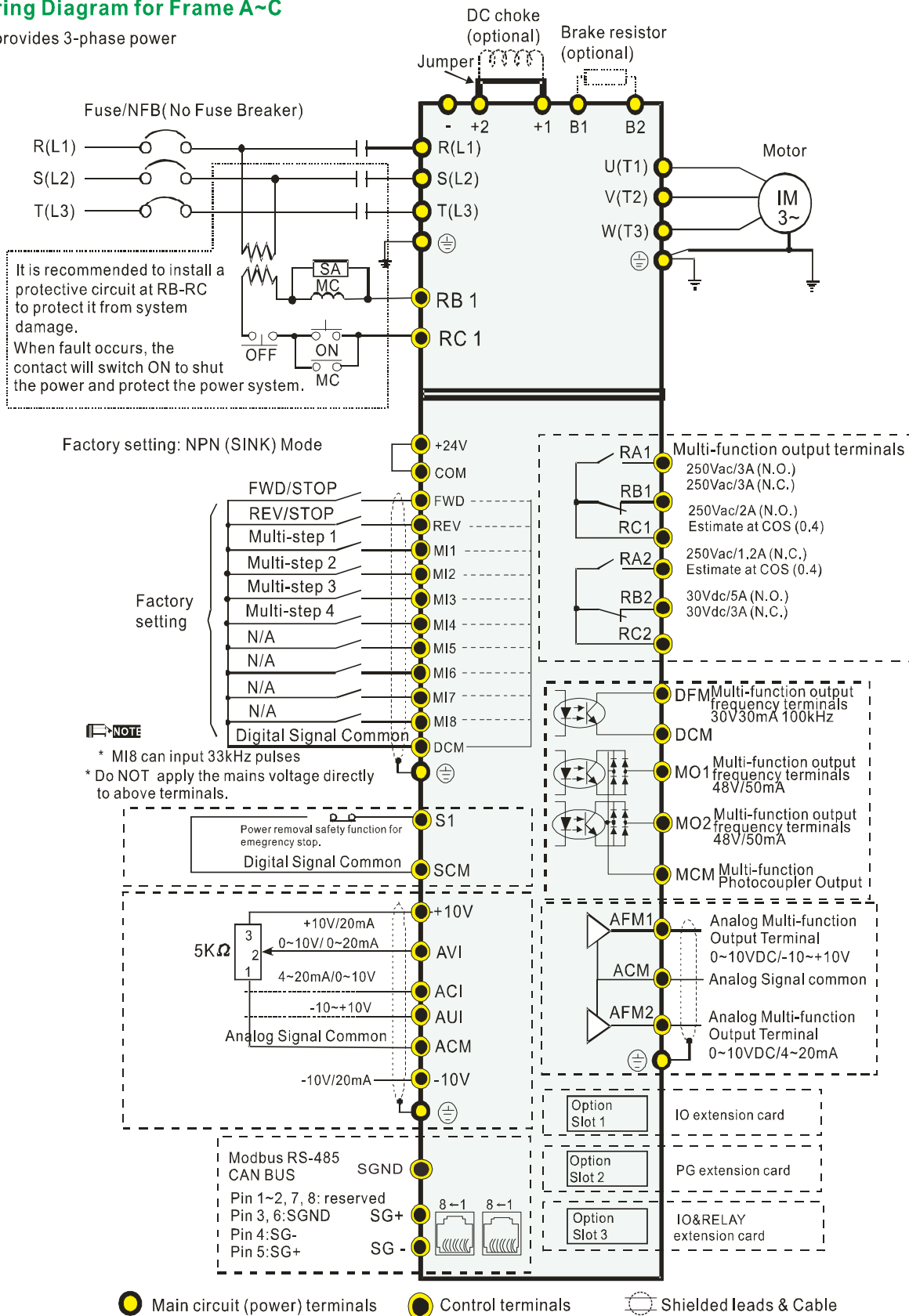
General Specifications

| | | |
|--------------------------------------|--|---|
| Control Characteristics | Control Method | Pulse Width Modulated (PWM) |
| | Control Mode | 1: V/F, 2: SVC, 3: VF+PG, 4: FOC+PG, 5: TQC+PG, 6: PM+PG, 7: FOC sensorless, 8: TQC sensorless, 9: PM sensorless |
| | Starting Torque | Reach up to 150% or above at 0.5Hz. Under FOC+PG mode, starting torque can reach 150% at 0Hz. |
| | V/f Curve | 4-point adjustable V/f curve and square curve |
| | Speed Response Ability | 5Hz (vector control can reach up to 40Hz) |
| | Torque Limit | Max. 200% torque current |
| | Torque Accuracy | ±5% |
| | Max. Output Frequency (Hz) | Normal duty: 0.00~600.00Hz; Heavy duty: 0.00 ~ 300.00 Hz |
| | Frequency Output Accuracy | Digital command: ±0.01%, -10°C ~ +40°C, Analog command: ±0.1%, 25±10°C |
| | Output Frequency Resolution | Digital command: 0.01Hz, Analog command: 0.03 X max. output frequency/60 Hz (±11 bit) |
| | Overload Capacity | Normal duty: rated output current is 120% for 60seconds Heavy duty: rated output current is 150% for 60seconds |
| | Frequency Setting Signal | +10V~-10, 0~+10V, 4~20mA, 0~20mA, Pulse input |
| | Accel./decel. Time | 0.00~600.00/0.0~6000.0 Seconds |
| | Main Control Function | Torque control, Droop control, Speed/torque control switching, Feed forward control, Zero-servo control, Momentary power loss ride thru, Speed search, Over-torque detection, Torque limit, 17-step speed (max), Accel./decel time switch, S-curve accel./decel, 3-wire sequence, Auto-Tuning (rotational, stationary), Dwell, Cooling fan on/off switch, Slip compensation, Torque compensation, JOG frequency, Frequency upper/lower limit settings, DC injection braking at start/stop, High slip braking, PID control (with sleep function), Energy saving control, MODOBUS communication (RS-485 RJ45, max. 115.2 kbps), Fault restart, Parameter copy |
| Fan Control | 230V model: VFD150C23A(include) and series above: PMW control; VFD150C23A and series below: on/off switch control 460V model: VFD150C43A(include) and series above: PMW control; VFD150C43A and series below: on/off switch control | |
| Protection Characteristics | Motor Protection | Electronic thermal relay protection |
| | Over-current Protection | Over-current protection for 240% rated current current clamp 『Normal duty: around 170~175%』 ; 『Heavy duty: around 180~185%』 |
| | Over-voltage Protection | 230: drive will stop when DC-BUS voltage exceeds 410V 460: drive will stop when DC-BUS voltage exceeds 820V |
| | Over-temperature Protection | Built-in temperature sensor |
| | Stall Prevention | Stall prevention during acceleration, deceleration and running independently. |
| | Restart after Instantaneous Power Failure | Parameter setting up to 20 seconds |
| Grounding Leakage Current Protection | Leakage current is higher than 50% of rated current of the AC motor drive | |

Wiring

Wiring Diagram for Frame A~C

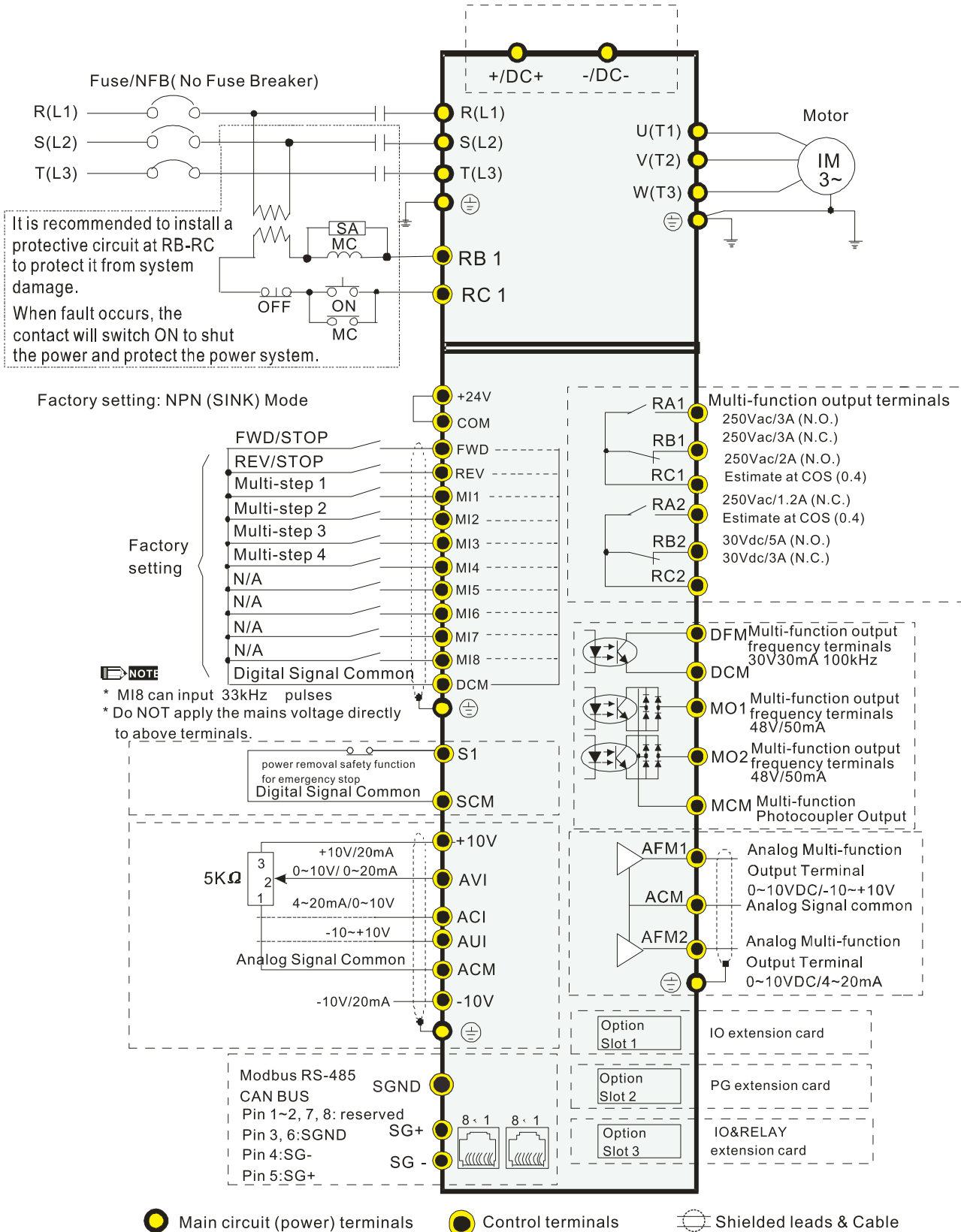
* It provides 3-phase power



NOTE: It is recommended NOT to connect any phase advance capacitor or automatic power factor regulator (APFR) directly to the motor drive. If it is necessary to connect any of them, please make sure a reactor is installed between the motor drive and phase advance capacitor/APFR.

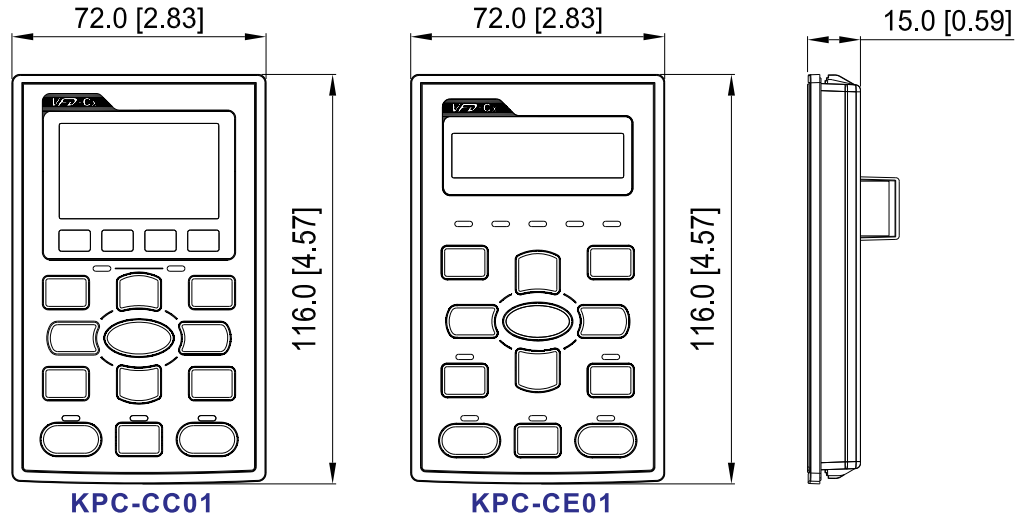
Wiring Diagram for Frame D and Frames Above

* It provides 3-phase power

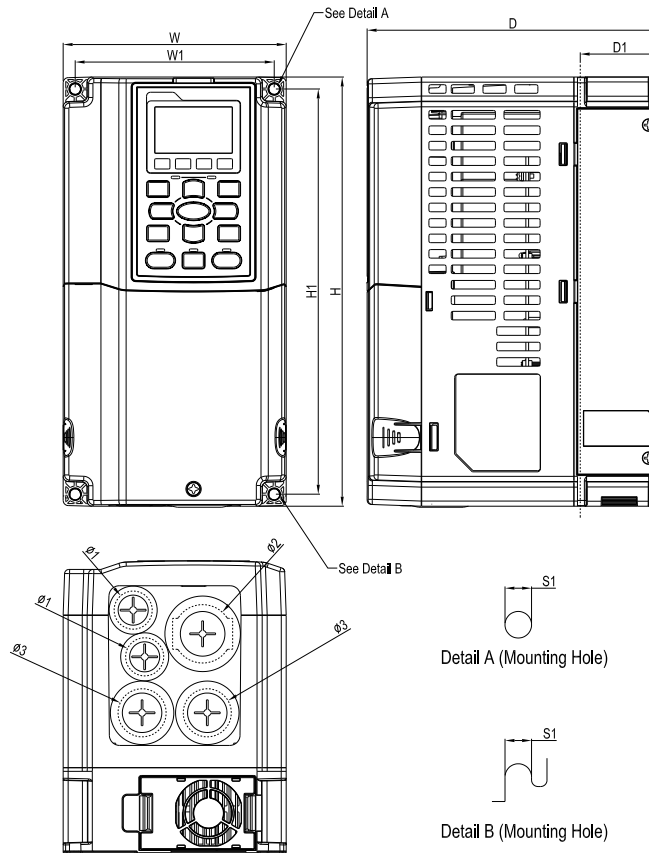


Dimensions

Digital Keypad



Frame A



MODEL

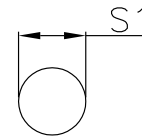
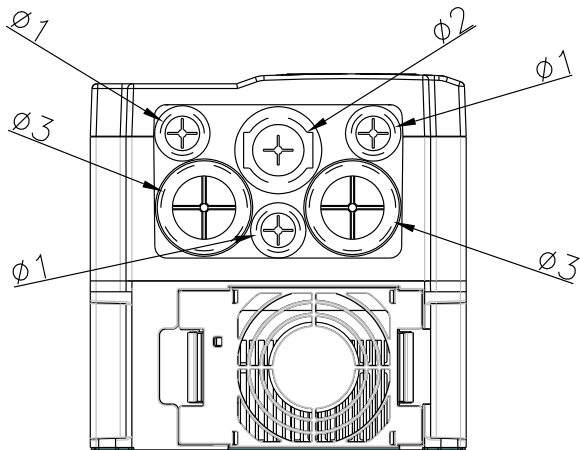
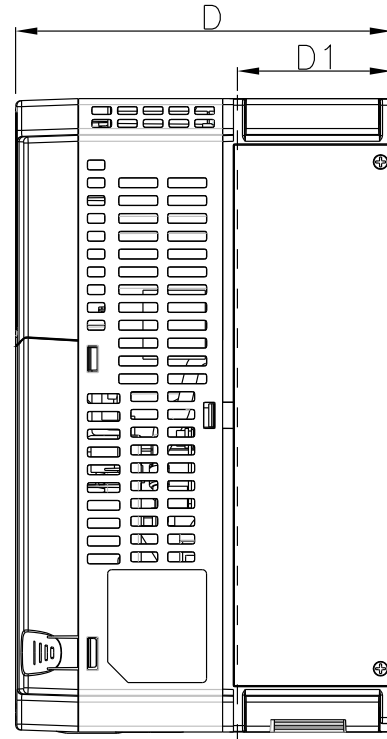
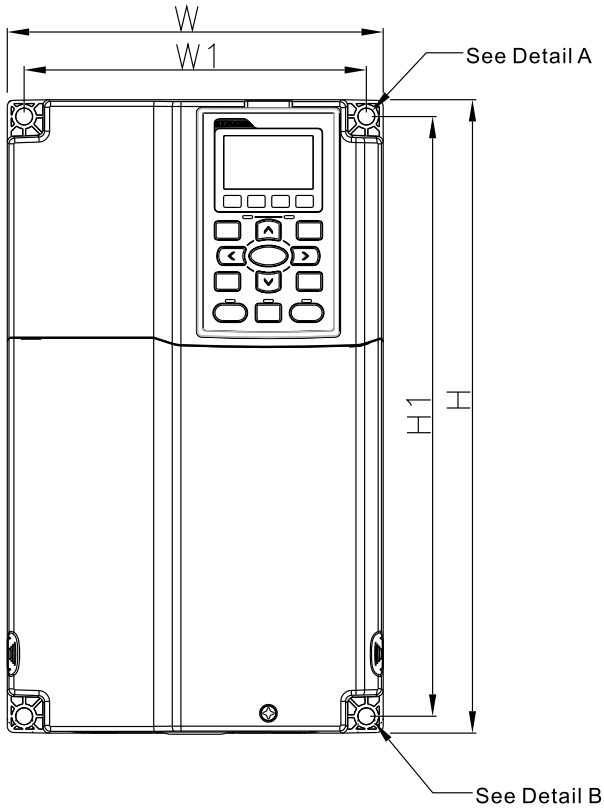
- VFD007C23A
- VFD007C43A/43E
- VFD015C23A
- VFD015C43A/43E
- VFD022C23A
- VFD022C43A/43E
- VFD037C23A
- VFD037C43A/43E
- VFD040C43A/43E
- VFD055C43A/43E

Unit : mm[inch]

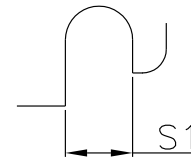
| Frame | | W | H | D | W1 | H1 | D1* | Ø | Ø1 | Ø2 | Ø3 |
|-------|------|-------|-------|-------|-------|-------|------|------|------|------|------|
| A1 | mm | 130.0 | 250.0 | 170.0 | 116.0 | 236.0 | 45.8 | 6.2 | 22.2 | 34.0 | 28.0 |
| | inch | 5.12 | 9.84 | 6.69 | 4.57 | 9.29 | 1.80 | 0.24 | 0.87 | 1.34 | 1.10 |

D1* : Flange mounting

Frame B



Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

VFD055C23A
 VFD075C23A
 VFD075C43A/43E
 VFD110C23A
 VFD110C43A/43E
 VFD150C43A/43E

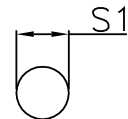
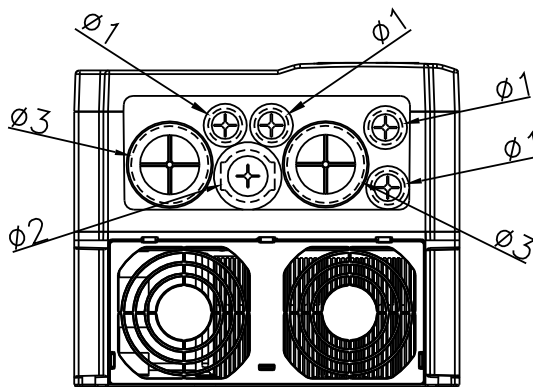
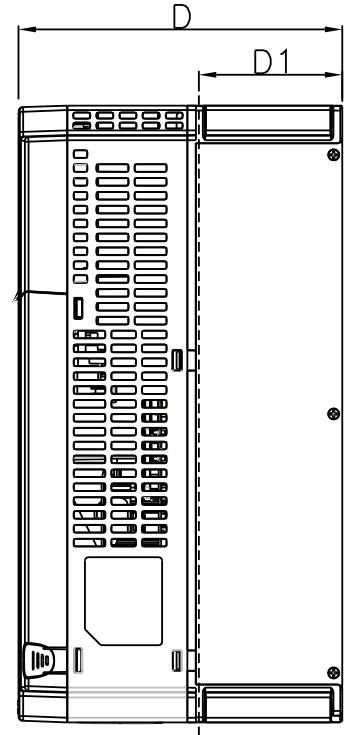
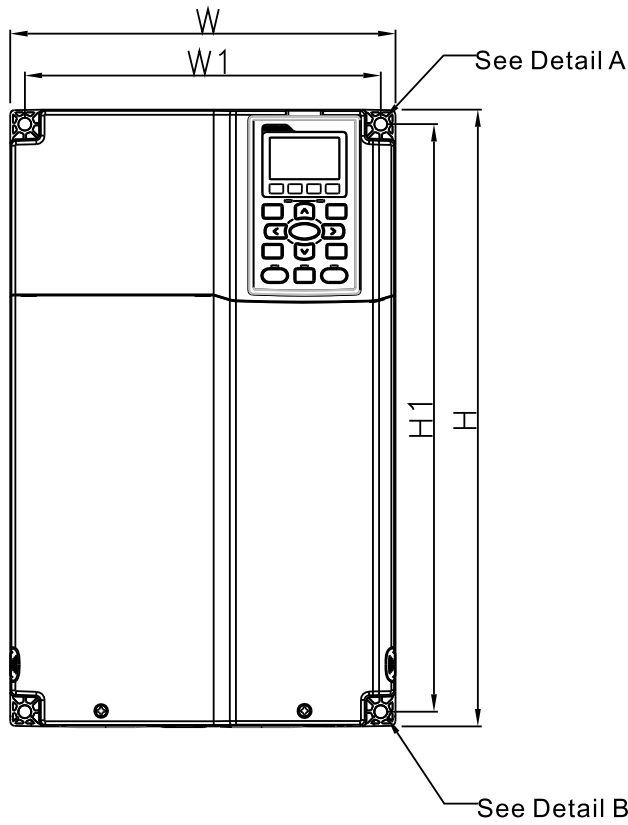
Unit : mm[inch]

| Frame | W | H | D | W1 | H1 | D1* | S1 | Ø1 | Ø2 | Ø3 | |
|-------|------|-------|-------|-------|-------|-------|------|------|------|------|------|
| B1 | mm | 190.0 | 320.0 | 190.0 | 173.0 | 303.0 | 77.9 | 8.5 | 22.2 | 34.0 | 28.0 |
| | inch | 7.48 | 12.60 | 7.48 | 6.81 | 11.93 | 3.07 | 0.33 | 0.87 | 1.34 | 1.10 |

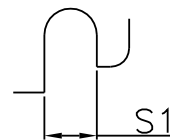
D1* : Flange mounting

Dimensions

Frame C



Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

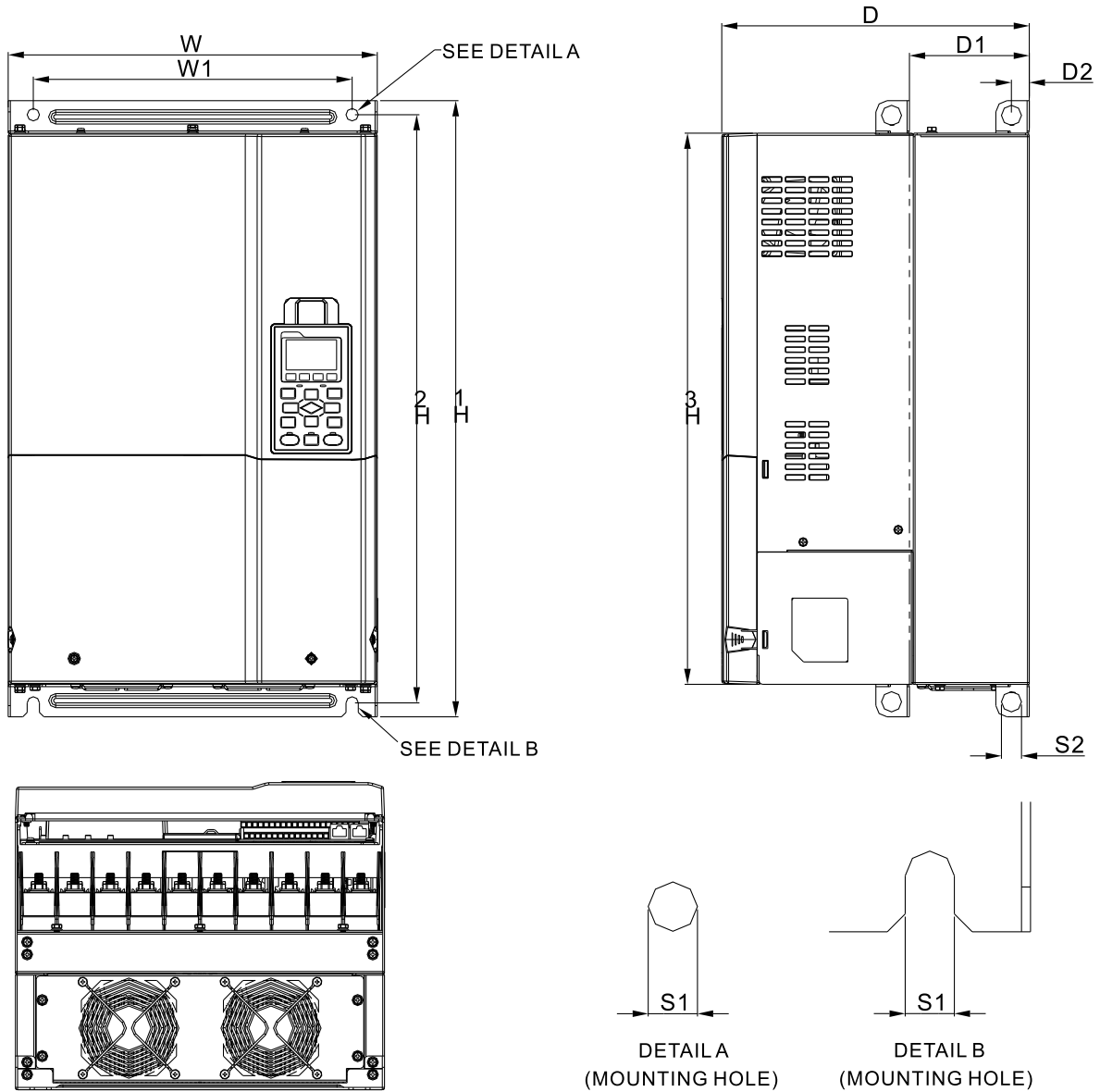
- VFD150C23A
- VFD185C23A
- VFD185C43A/43E
- VFD220C23A
- VFD220C43A/43E
- VFD300C43A/43E

Unit : mm[inch]

| Frame | | W | H | D | W1 | H1 | D1* | S1 | Ø1 | Ø2 | Ø3 |
|-------|------|-------|-------|-------|-------|-------|------|------|------|------|------|
| C1 | mm | 250.0 | 400.0 | 210.0 | 231.0 | 381.0 | 92.9 | 8.5 | 22.2 | 34.0 | 50.0 |
| | inch | 9.84 | 15.75 | 8.27 | 9.09 | 15.00 | 3.66 | 0.33 | 0.87 | 1.34 | 1.97 |

D1* : Flange mounting

Frame D



MODEL

| FRAME_D1 | FRAME_D0-1 |
|------------|------------|
| VFD300C23A | VFD370C43S |
| VFD370C23A | VFD450C43S |
| VFD370C43A | |
| VFD450C43A | |
| VFD550C43A | |
| VFD750C43A | |

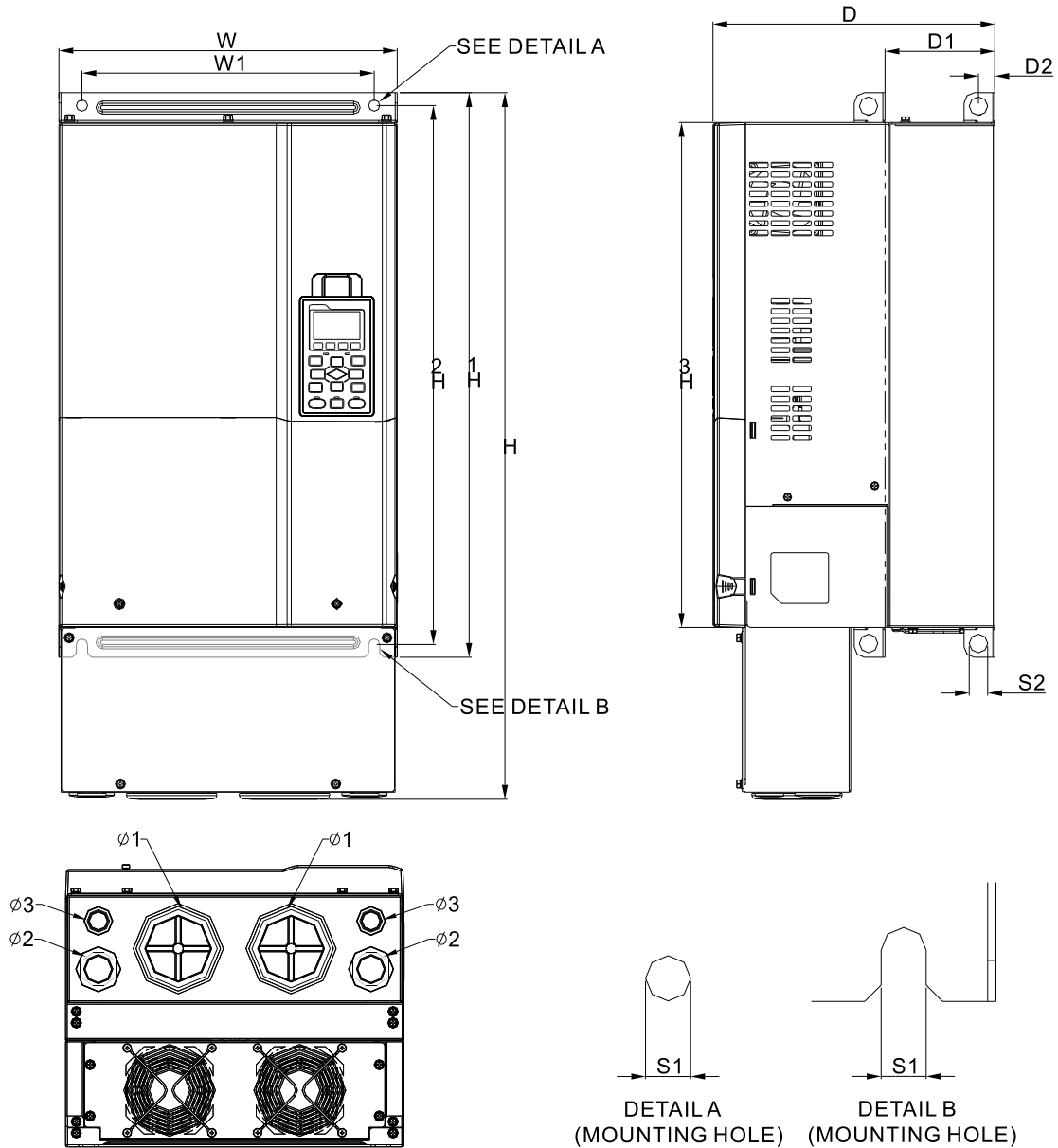
Unit : mm[inch]

| Frame | W | H | D | W1 | H1 | H2 | H3 | D1* | D2 | S1 | S2 | Ø1 | Ø2 | Ø3 | |
|-------|------|-------|---|-------|-------|-------|-------|-------|-------|------|------|------|----|----|---|
| D1 | mm | 330.0 | - | 275.0 | 285.0 | 550.0 | 525.0 | 492.0 | 107.2 | 16.0 | 11.0 | 18.0 | - | - | - |
| | inch | 12.99 | - | 10.83 | 11.22 | 21.65 | 20.67 | 19.37 | 4.22 | 0.63 | 0.43 | 0.71 | - | - | - |
| D0-1 | mm | 280.0 | - | 255.0 | 235.0 | 500.0 | 475.0 | 442.0 | 94.2 | 16.0 | 11.0 | 18.0 | - | - | - |
| | inch | 11.02 | - | 10.04 | 9.25 | 19.69 | 18.70 | 17.40 | 3.71 | 0.63 | 0.43 | 0.71 | - | - | - |

D1* : Flange mounting

Dimensions

Frame D



MODEL

FRAME_D2
 VFD300C23E
 VFD370C23E
 VFD370C43E
 VFD450C43E
 VFD550C43E
 VFD750C43E

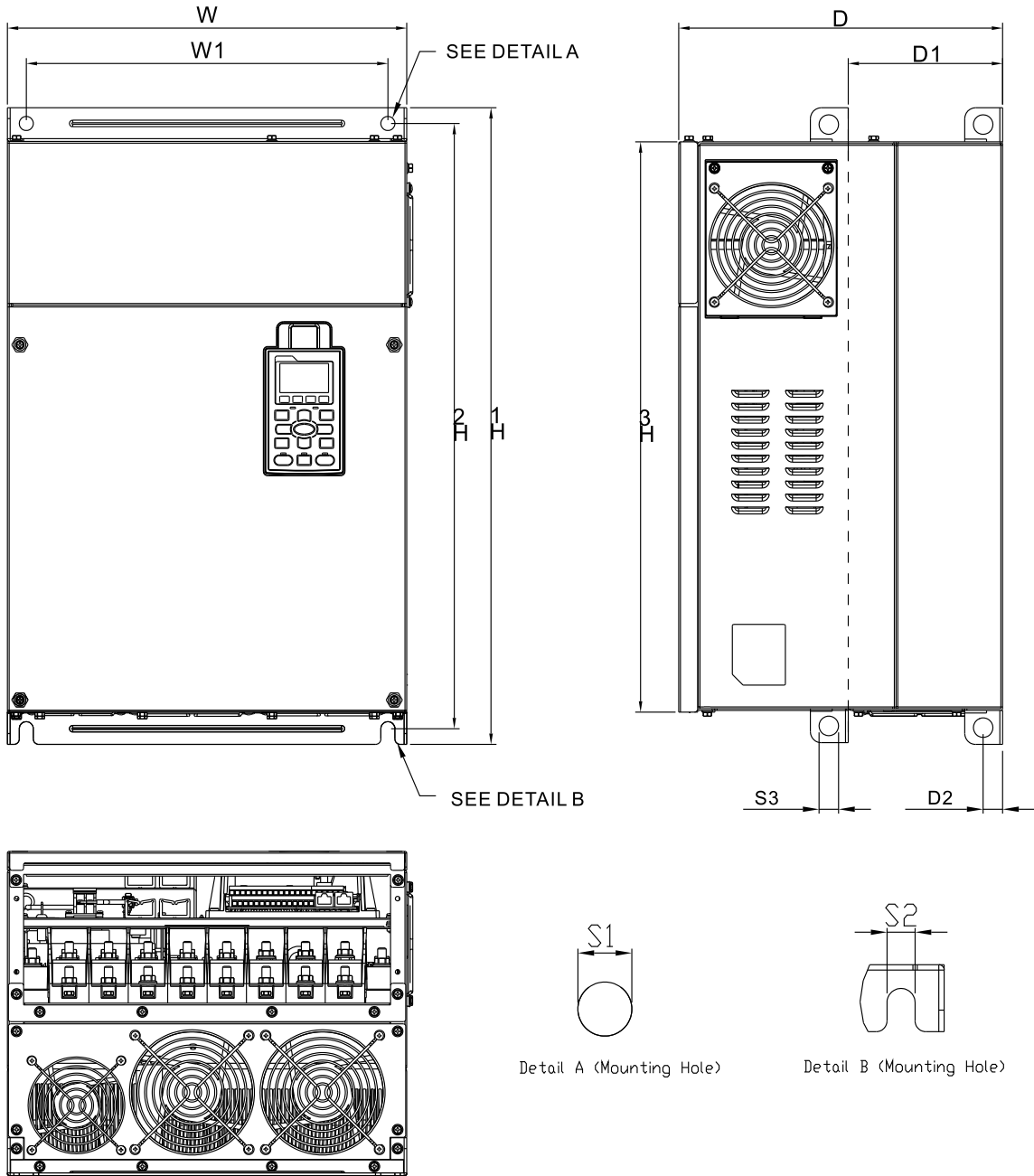
FRAME_D0-2
 VFD370C43U
 VFD450C43U

Unit : mm[inch]

| Frame | | W | H | D | W1 | H1 | H2 | H3 | D1* | D2 | S1 | S2 | Ø1 | Ø2 | Ø3 |
|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|
| D2 | mm | 330.0 | 688.3 | 275.0 | 285.0 | 550.0 | 525.0 | 492.0 | 107.2 | 16.0 | 11.0 | 18.0 | 76.2 | 34.0 | 22.0 |
| | inch | 12.99 | 27.10 | 10.83 | 11.22 | 21.65 | 20.67 | 19.37 | 4.22 | 0.63 | 0.43 | 0.71 | 3.00 | 1.34 | 0.87 |
| D0-2 | mm | 280.0 | 614.4 | 255.0 | 235.0 | 500.0 | 475.0 | 442.0 | 94.2 | 16.0 | 11.0 | 18.0 | 62.7 | 34.0 | 22.0 |
| | inch | 11.02 | 24.19 | 10.04 | 9.25 | 19.69 | 18.70 | 17.40 | 3.71 | 0.63 | 0.43 | 0.71 | 2.47 | 1.34 | 0.87 |

D1* : Flange mounting

Frame E



Detail A (Mounting Hole)

Detail B (Mounting Hole)

MODEL

FRAME_E1

VFD450C23A
 VFD550C23A
 VFD750C23A
 VFD900C43A
 VFD1100C43A

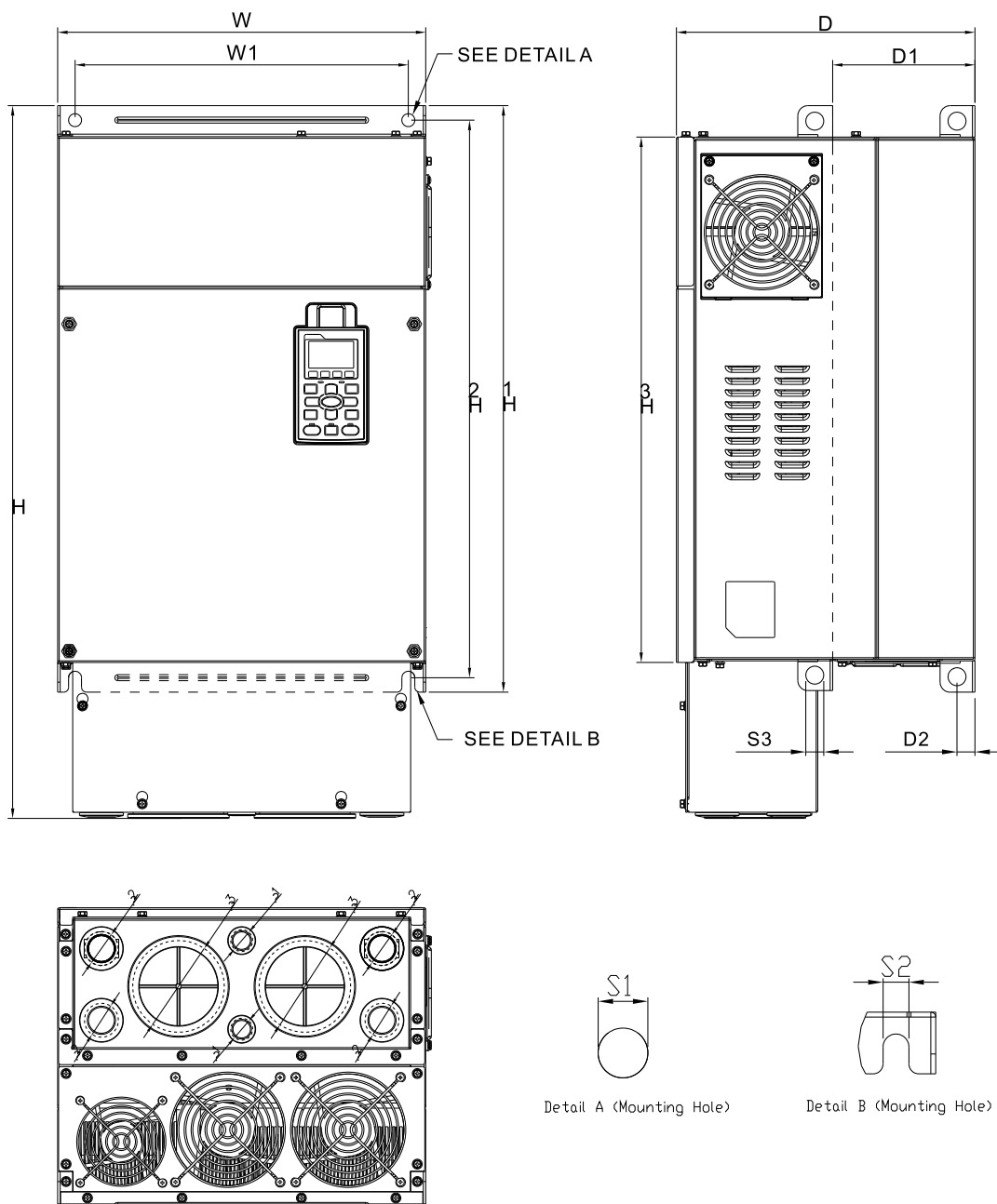
Unit : mm[inch]

| Frame | W | H | D | W1 | H1 | H2 | H3 | D1* | D2 | S1 | S2 | S3 | Ø1 | Ø2 | Ø3 | |
|-------|------|-------|---|-------|-------|-------|-------|-------|-------|------|------|------|------|----|----|---|
| E1 | mm | 370.0 | - | 300.0 | 335.0 | 589 | 560.0 | 528.0 | 143.0 | 18.0 | 13.0 | 13.0 | 18.0 | - | - | - |
| | inch | 14.57 | - | 11.81 | 13.19 | 23.19 | 22.05 | 20.80 | 5.63 | 0.71 | 0.51 | 0.51 | 0.71 | - | - | - |

D1* : Flange mounting

Dimensions

Frame E



MODEL

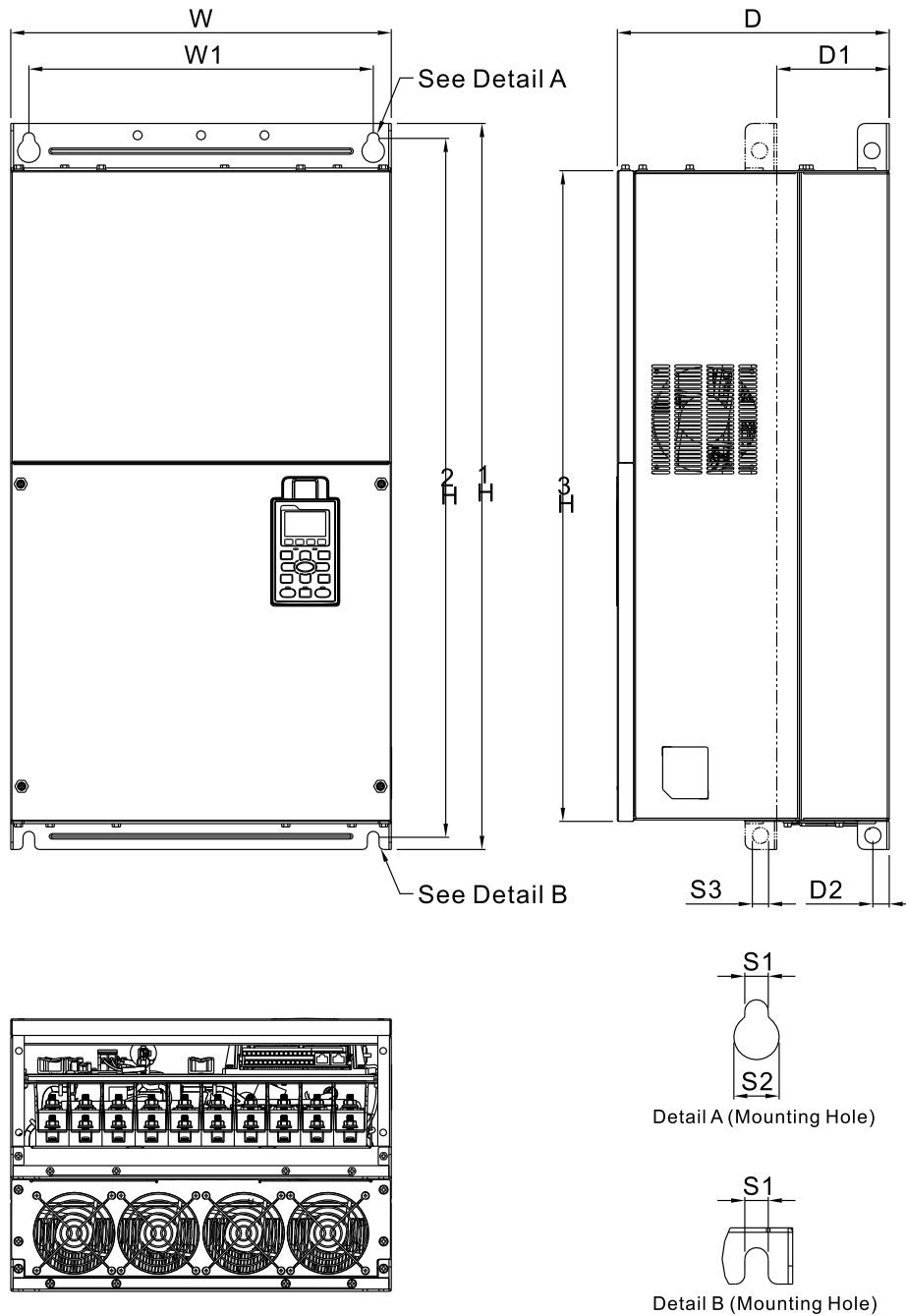
FRAME_E2
 VFD450C23E
 VFD550C23E
 VFD750C23E
 VFD900C43E
 VFD1100C43E

Unit : mm[inch]

| Frame | W | H | D | W1 | H1 | H2 | H3 | D1* | D2 | S1 | S2 | S3 | Ø1 | Ø2 | Ø3 | |
|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|
| E2 | mm | 370.0 | 715.8 | 300.0 | 335.0 | 589 | 560.0 | 528.0 | 143.0 | 18.0 | 13.0 | 13.0 | 18.0 | 22.0 | 34.0 | 92.0 |
| | inch | 14.57 | 28.18 | 11.81 | 13.19 | 23.19 | 22.05 | 20.80 | 5.63 | 0.71 | 0.51 | 0.51 | 0.71 | 0.87 | 1.34 | 3.62 |

D1* : Flange mounting

Frame F



MODEL
FRAME_F1
 VFD900C23A
 VFD1320C23A
 VFD1600C23A

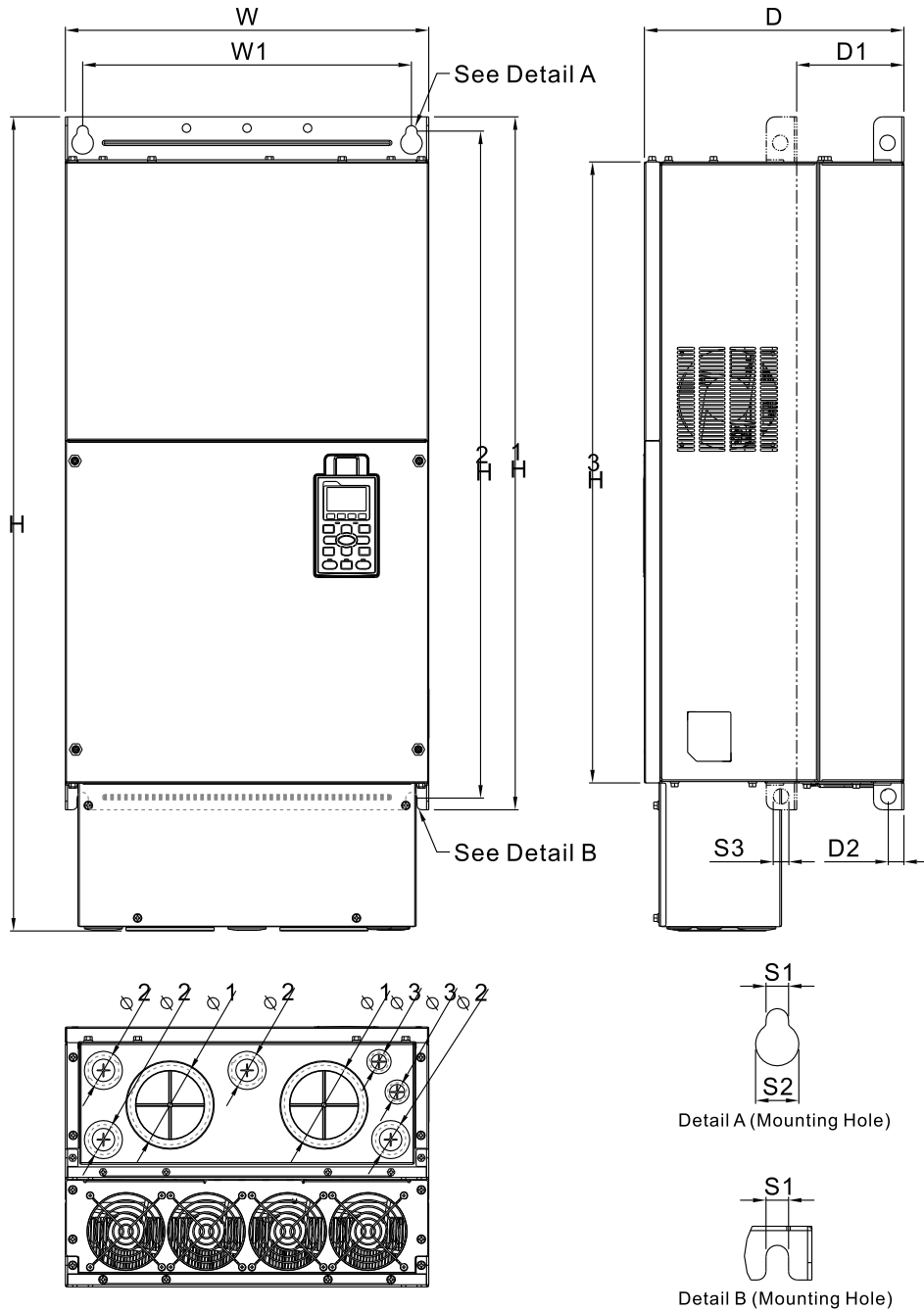
Unit : mm[inch]

| Frame | | W | H | D | W1 | H1 | H2 | H3 | D1* | D2 | S1 | S2 | S3 | Ø1 | Ø2 | Ø3 |
|-------|------|-------|---|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|
| F1 | mm | 420.0 | - | 300.0 | 380.0 | 800.0 | 770.0 | 717.0 | 124.0 | 18.0 | 13.0 | 25.0 | 18.0 | 92.0 | 35.0 | 22.0 |
| | inch | 16.54 | - | 11.81 | 14.96 | 31.50 | 30.32 | 28.23 | 4.88 | 0.71 | 0.51 | 0.98 | 0.71 | 3.62 | 1.38 | 0.87 |

D1* : Flange mounting

Dimensions

Frame F



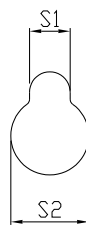
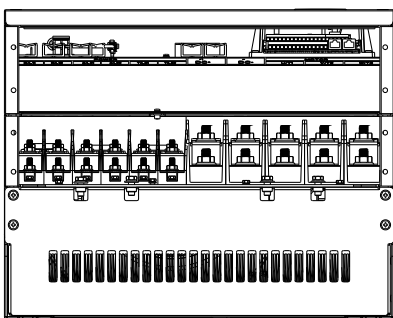
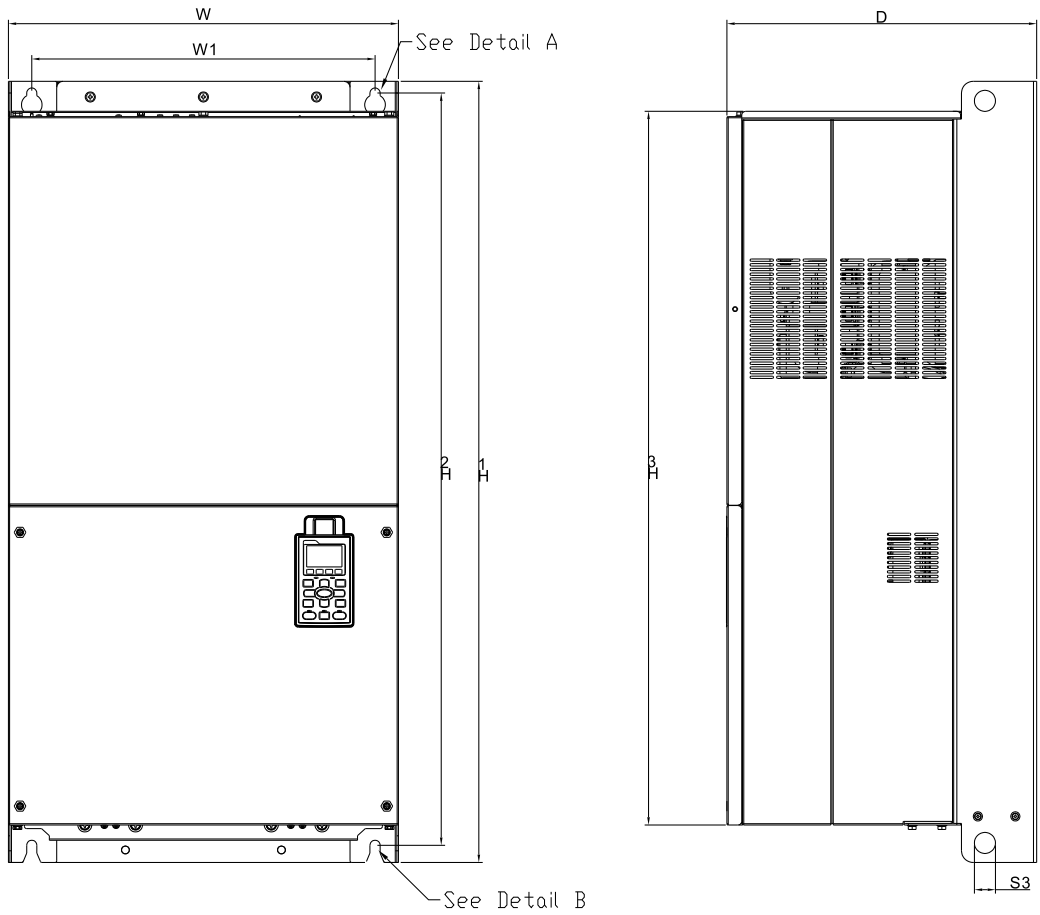
MODEL
FRAME_F2
 VFD900C23E
 VFD1320C43E
 VFD1600C43E

Unit : mm[inch]

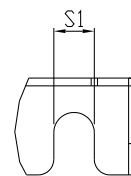
| Frame | W | H | D | W1 | H1 | H2 | H3 | D1* | D2 | S1 | S2 | S3 | Ø1 | Ø2 | Ø3 |
|-------|------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|
| F2 | mm | 420.0 | 940.0 | 380.0 | 800.0 | 770.0 | 717.0 | 124.0 | 18.0 | 13.0 | 25.0 | 18.0 | 92.0 | 35.0 | 22.0 |
| | inch | 16.54 | 37.00 | 11.81 | 14.96 | 31.50 | 30.32 | 28.23 | 4.88 | 0.71 | 0.51 | 0.98 | 0.71 | 3.62 | 1.38 |

D1* : Flange mounting

Frame G



Detail A (Mounting Hole)



Detail B (Mounting Hole)

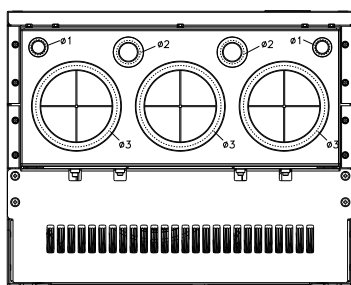
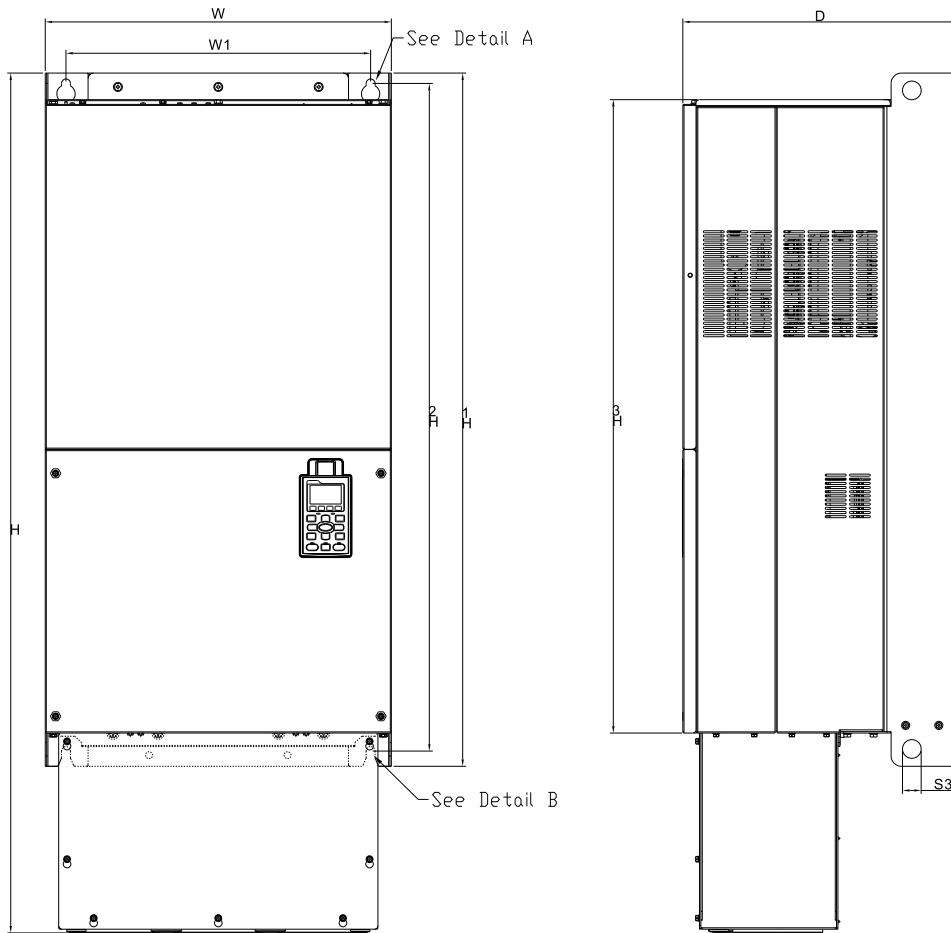
MODEL
FRAME_G1
 VFD1850C43A
 VFD2200C43A

Unit : mm[inch]

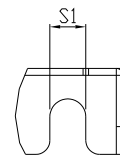
| Frame | W | H | D | W1 | H1 | H2 | H3 | S1 | S2 | S3 | Ø1 | Ø2 | Ø3 | |
|-------|------|-------|---|-------|--------|--------|-------|-------|------|------|------|----|----|---|
| G1 | mm | 500.0 | - | 397.0 | 440.0 | 1000.0 | 963.0 | 913.6 | 13.0 | 26.5 | 27.0 | - | - | - |
| | inch | 19.69 | - | 15.63 | 217.32 | 39.37 | 37.91 | 35.97 | 0.51 | 1.04 | 1.06 | - | - | - |

Dimensions

Frame G



Detail A (Mounting Hole)



Detail B (Mounting Hole)

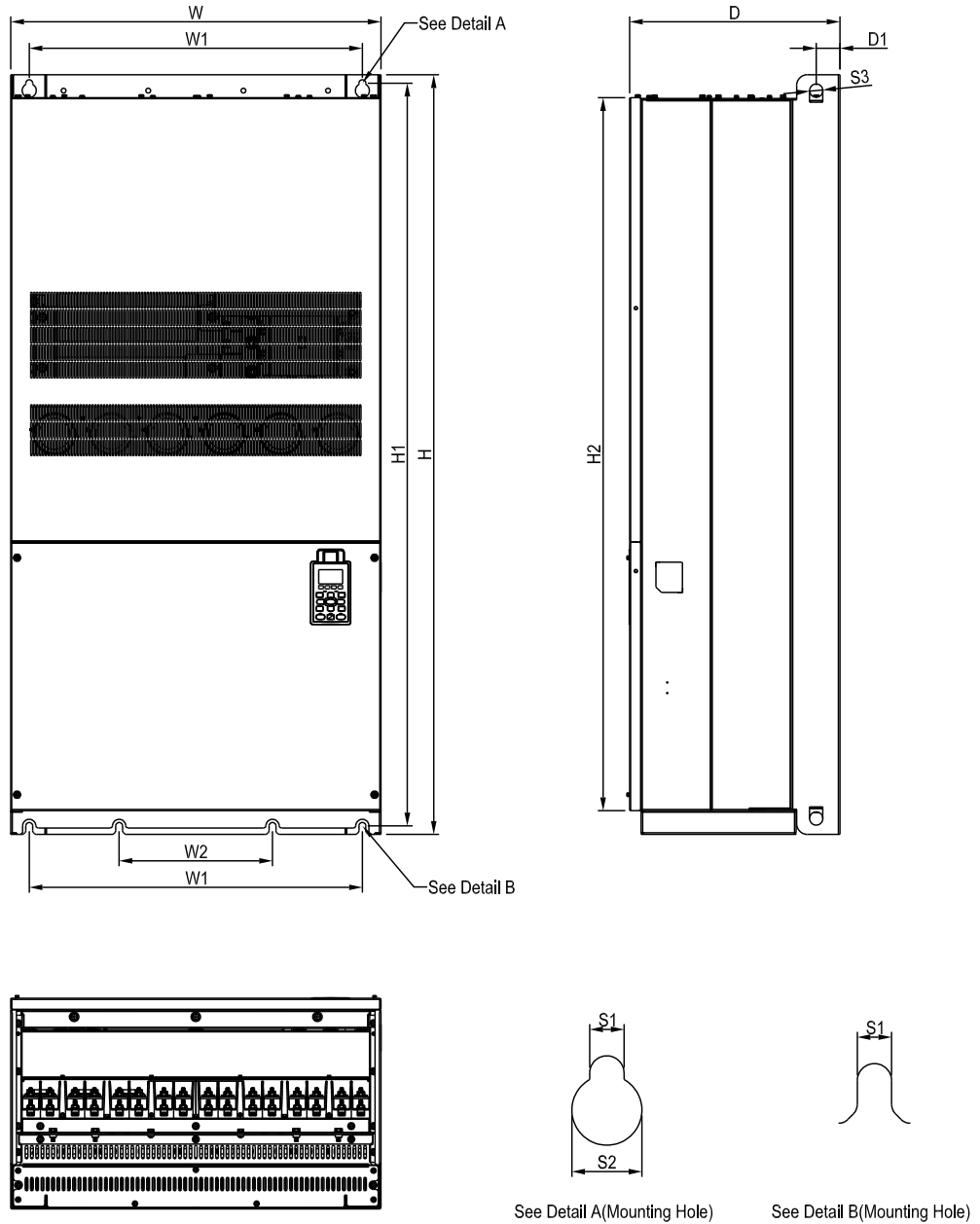
MODEL

FRAME_G2
VFD1850C43E
VFD2200C43E

Unit : mm[inch]

| Frame | | W | H | D | W1 | H1 | H2 | H3 | S1 | S2 | S3 | $\phi 1$ | $\phi 2$ | $\phi 3$ |
|-------|------|-------|--------|-------|--------|--------|-------|-------|------|------|------|----------|----------|----------|
| G2 | mm | 500.0 | 1240.2 | 397.0 | 440.0 | 1000.0 | 963.0 | 913.6 | 13.0 | 26.5 | 27.0 | 22.0 | 34.0 | 117.5 |
| | inch | 19.69 | 48.83 | 15.63 | 217.32 | 39.37 | 37.91 | 35.97 | 0.51 | 1.04 | 1.06 | 0.87 | 1.34 | 4.63 |

Frame H



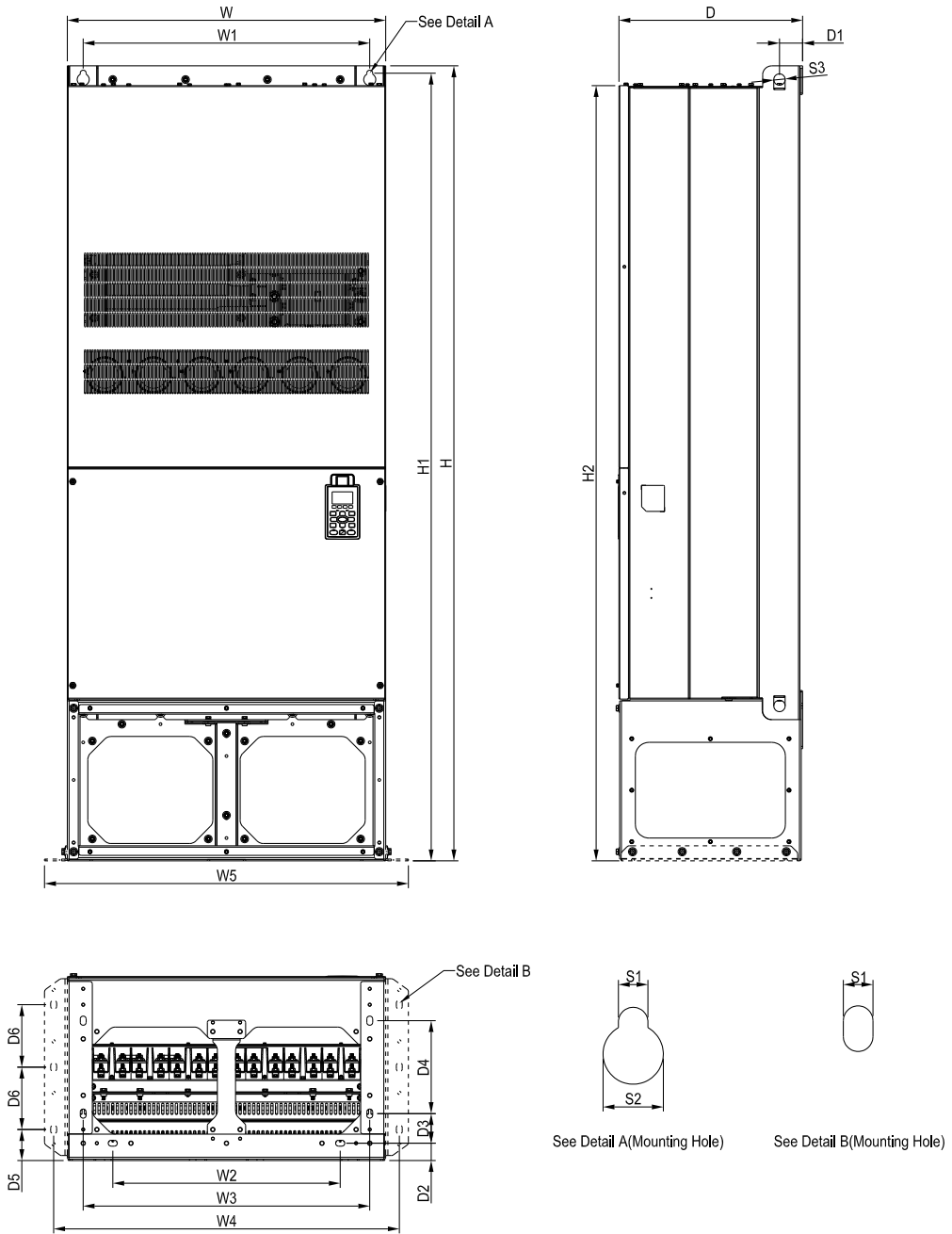
MODEL
FRAME_H1
 VFD2800C43A
 VFD3150C43A
 VFD3550C43A

Unit : mm[inch]

| Frame | | W | H | D | W1 | W2 | W3 | W4 | W5 | W6 | H1 | H2 | H3 | H4 |
|-------|------|--------|------|-------|----|-------|-------|----|------|------|------|--------|--------|----|
| H1 | mm | 700.0 | - | 398.0 | - | 630.0 | 290.0 | - | - | - | - | 1435.0 | 1403.0 | - |
| | inch | 27.56 | - | 15.67 | - | 24.80 | 11.42 | - | - | - | - | 56.50 | 55.24 | - |
| Frame | | H5 | D1 | D2 | D3 | D4 | D5 | D6 | S1 | S2 | S3 | Ø1 | Ø2 | Ø3 |
| H1 | mm | 1346.6 | 45.0 | - | - | - | - | - | 13.0 | 26.5 | 25.0 | - | - | - |
| | inch | 53.02 | 1.77 | - | - | - | - | - | 0.51 | 1.04 | 0.98 | - | - | - |

Dimensions

Frame H



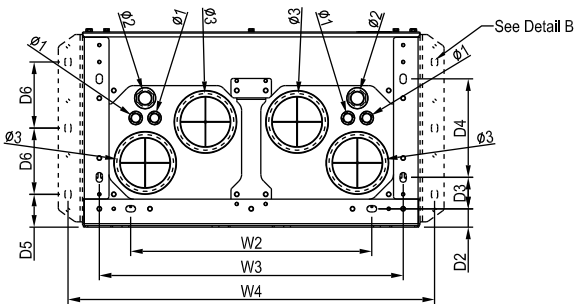
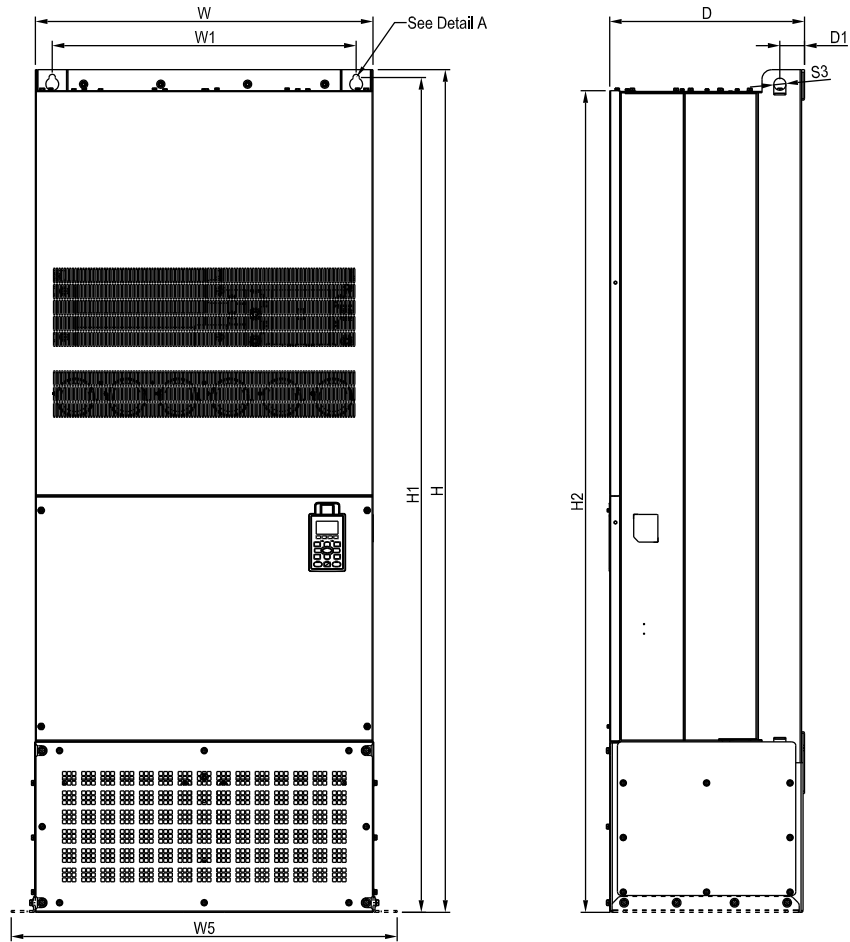
MODEL
FRAME_H2
 VFD2800C43E-1
 VFD3150C43E-1
 VFD3550C43E-1

Unit : mm[inch]

| Frame | W | H | D | W1 | W2 | W3 | W4 | W5 | W6 | H1 | H2 | H3 | H4 | |
|-------|------|-------|--------|-------|-------|----|----|-------|-------|-------|--------|----|----|--------|
| H2 | mm | 700.0 | 1745.0 | 404.0 | 800.0 | - | - | 500.0 | 630.0 | 760.0 | 1729.0 | - | - | 1701.6 |
| | inch | 27.56 | 68.70 | 15.91 | 31.50 | - | - | 19.69 | 24.80 | 29.92 | 68.07 | - | - | 66.99 |

| Frame | H5 | D1 | D2 | D3 | D4 | D5 | D6 | S1 | S2 | S3 | Ø1 | Ø2 | Ø3 | |
|-------|------|--------|------|------|------|-------|------|-------|------|------|------|----|----|---|
| H2 | mm | 1346.6 | 51.0 | 38.0 | 65.0 | 204.0 | 68.0 | 137.0 | 13.0 | 26.5 | 25.0 | - | - | - |
| | inch | 53.02 | 2.01 | 1.50 | 2.56 | 8.03 | 2.68 | 5.39 | 0.51 | 1.04 | 0.98 | - | - | - |

Frame H



MODEL
FRAME_H3
 VFD2800C43E
 VFD3150C43E
 VFD3550C43E


Unit : mm[inch]

| Frame | W | H | D | W1 | W2 | W3 | W4 | W5 | W6 | H1 | H2 | H3 | H4 | |
|-------|------|-------|--------|-------|-------|----|----|-------|-------|-------|--------|----|----|--------|
| H3 | mm | 700.0 | 1745.0 | 404.0 | 800.0 | - | - | 500.0 | 630.0 | 760.0 | 1729.0 | - | - | 1701.6 |
| | inch | 27.56 | 68.70 | 15.91 | 31.50 | - | - | 19.69 | 24.80 | 29.92 | 68.07 | - | - | 66.99 |

| Frame | H5 | D1 | D2 | D3 | D4 | D5 | D6 | S1 | S2 | S3 | Ø1 | Ø2 | Ø3 | |
|-------|------|--------|------|------|------|-------|------|-------|------|------|------|------|------|-------|
| H3 | mm | 1346.6 | 51.0 | 38.0 | 65.0 | 204.0 | 68.0 | 137.0 | 13.0 | 26.5 | 25.0 | 22.0 | 34.0 | 117.5 |
| | inch | 53.02 | 2.01 | 1.50 | 2.56 | 8.03 | 2.68 | 5.39 | 0.51 | 1.04 | 0.98 | 0.87 | 1.34 | 4.63 |

Option Cards


EMC-PG01L



Set by Pr.10-00~10-02

| Terminals | | Descriptions |
|-----------|-------------------------------|---|
| PG1 | VP | Output voltage for power: +5V/+12V ± 5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA |
| | DCM | Common for power and signal |
| | A1, /A1, B1, /B1, Z1, /Z1 | Encoder input signal (Line Driver) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec |
| PG2 | A2, /A2, B2, /B2 | Pulse input signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec. |
| PG OUT | AO, /AO, BO, /BO, ZO, /ZO, SG | PG card output signals. It has division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA; Max. output frequency: 300kP/sec SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained. |


EMC-PG01O



Set by Pr.10-00~10-02

| Terminals | | Descriptions |
|-----------|---------------------------|--|
| PG1 | VP | Output voltage for power: +5V/+12V ± 5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA |
| | DCM | Common for power and signal |
| | A1, /A1, B1, /B1, Z1, /Z1 | Encoder input signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec |
| PG2 | A2, /A2, B2, /B2 | Pulse input signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec. |
| PG OUT | V+, /V+ | Needs external power source for PG OUT circuit. Input voltage of power: +12V ~ +24V |
| | V- | Negative power supply input |
| | A/O, B/O, Z/O | PG card output signals. It has division frequency function: 1~255 times Add a pull-up resistor to the open collector output signals to avoid signal interferences. [Three pull-up resistors are included in the package (1.8kΩ/1W)] Max. Output current: 20mA; Max output frequency: 300kP/Sec |

EMC-PG01R




Set by Pr.10-00~10-02

| Terminals | | Descriptions |
|-----------|-------------------------------|---|
| PG1 | R1- R2 | Resolver output power 7Vrms, 10kHz |
| | S1, S2, S3, S4, | Resolver input signal 3.5 ± 0.175Vrms, 10kHz |
| PG2 | A2, /A2, B2, /B2 | Pulse input signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec. |
| PG OUT | AO, /AO, BO, /BO, ZO, /ZO, SG | PG card output signals. It has division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA Max. output frequency: 300kP/sec SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained. |

EMC-PG01U

■ FJMP1 **S**: Standard UVW Output Encoder; **D**: Delta Encoder

| | | Terminals | Descriptions |
|--|--------|-------------------------------------|--|
|  <p>Set by Pr.10-00~10-02</p> | PG1 | VP | Output voltage for power: +5V/+12V5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA |
| | | DCM | Common for power and signal |
| | | A1, /A1, B1, /B1, Z1, /Z1 | Encoder input signal (Line Driver) 1-phase or 2-phase input. Max. input frequency: 300kP/sec |
| | | U1, /U1, V1, /V1, W1, /W1 | Encoder input signal |
| | PG2 | A2, /A2 B2, /B2 | Pulse Input signal Open collector input: +5V/+12V (Note1) 1-phase or 2-phase input; Max. input frequency: 300kP/sec. |
| | PG OUT | AO, /AO, BO, /BO, ZO, /ZO, SG | PG card output signals. Division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA Max. output frequency: 300kP/sec SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained. |

Note 1: For the Open Collector, set input voltage to 5~15mA and install a pull-up resistor

[5V] Recommend pull-up resistor: 100~220Ω · 1/2W and above

[12V] Recommend pull-up resistor: 510~1.35kΩ · 1/2W and above

[24V] Recommend pull-up resistor: 1.8k~3.3kΩ · 1/2W and above


Screw Specifications for Option Card Terminals

| | | |
|--|------------|---|
| EMC-D42A / EMC-D611A EMC-BPS01 | Wire gauge | 24~12AWG (0.205~3.31mm ²) |
| | Torque | 4Kg-cm [3.47lb-in] |
| EMC-R6AA | Wire gauge | 24~16AWG (0.205~1.31mm ²) |
| | Torque | 6Kg-cm [5.21lb-in] |
| EMC-PG01L / EMC-PG01O EMC-PG01R / EMC-PG01U | Wire gauge | 30~16AWG (0.0509~1.31mm ²) |
| | Torque | 2Kg-cm [1.74lb-in] |




Option Cards

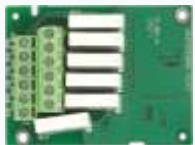
EMC-D42A

|  I/O Extension Card | Terminals | Descriptions |
|---|------------|--|
| | COM | Common for multi-function input terminals Select SINK (NPN) /SOURCE (PNP) in J1 jumper / external power supply |
| | MI10~ MI13 | Refer to parameters 02-26~02-29 to program the multi-function inputs MI10~MI13. Internal power is applied from terminal E24: +24Vdc±5% 200mA, 5W External power +24Vdc: max. voltage 30Vdc, min. voltage 19Vdc, 30W ON: the activation current is 6.5mA; OFF: leakage current tolerance is 10iA |
| | MO10~MO11 | Multi-function output terminals (photocoupler) Duty-cycle: 50%; Max. output frequency: 100Hz Max. current: 50mA; Max. voltage: 48Vdc |
| | MXM | Common for multi-function output terminals MO10, MO11(photocoupler) Max 48Vdc 50mA |


EMC-D611A

|  I/O Extension Card | Terminals | Descriptions |
|---|---|---|
| | AC | AC power common for multi-function input terminal (Neutral) |
| MI10~ Mi15 | Refer to Pr. 02.26~ Pr. 02.31 for multi-function input selection Input voltage: 100~130VAC; Input frequency: 57~63Hz Input impedance: 27Kohm Terminal response time: ON: 10ms; OFF: 20ms | |

EMC-R6AA

|  Relay Extension Card | Terminals | Descriptions |
|---|------------------------|---|
| | RA10~RA15 RC10~RC15 | Refer to Pr. 02.36~ Pr. 02.41 for multi-function input selection Resistive load: 3A(N.O.)/250VAC 5A(N.O.)/30Vdc Inductive load (COS 0.4) 2.0A(N.O.)/250VAC 2.0A(N.O.)/30Vdc It is used to output each monitor signal, such as for drive in operation, frequency attained or overload indication. |

EMC-BPS01

|  Power Shift Card | Terminals | Descriptions |
|---|------------|--|
| | 24V GND | When the AC motor drive power is off, the external power supply card provides external power to the network system, PLC function, and other functions to allow continued operations. Input power: 24V±5% Maximum input current:0.5A Note: (1) Do not connect the control terminal +24V (Digital control signal common: SOURCE) directly to the EMC-BPS01 input terminal 24V. (2) Do not connect control terminal GND directly to the EMC-BPS01 input terminal GND. |

CMC-MOD01



Features

- MDI/MDI-X auto-detect
- Virtual serial port.
- Supports MODBUS TCP protocol
- AC motor drive keypad/Ethernet configuration
- E-mail alarm
- Baud rate: 10/100Mbps auto-detect

Network Interface

| | | | |
|---------------------|----------------------------|--------------------|---|
| Interface | RJ-45 with Auto MDI/MDIX | Transmission speed | 10/100 Mbps Auto-Detect |
| Number of ports | 1 Port | Network protocol | ICMP, IP, TCP, UDP, DHCP, SMTP, MODBUS OVER TCP/IP, Delta Configuration |
| Transmission method | IEEE 802.3, IEEE 802.3u | | |
| Transmission cable | Category 5e shielding 100M | | |

CMC-EIP01



Features

- MDI/MDI-X auto-detect
- Supports MODBUS TCP and Ethernet/IP protocol
- Baud rate: 10/100Mbps auto-detect
- AC motor drive keypad/Ethernet configuration
- Virtual serial port

Network Interface

| | |
|---------------------|----------------------------|
| Interface | RJ-45 with Auto MDI/MDIX |
| Number of ports | 1 Port |
| Transmission method | IEEE 802.3, IEEE 802.3u |
| Transmission cable | Category 5e shielding 100M |

| | |
|--------------------|---|
| Transmission speed | 10/100 Mbps Auto-Detect |
| Network protocol | ICMP, IP, TCP, UDP, DHCP, SMTP, MODBUS OVER TCP/IP, Delta Configuration |

CMC-PD01



Features

- Supports PZD control data exchange.
- Supports PKW polling AC motor drive parameters.
- Supports user diagnosis function.
- Auto-detects baud rates; supports Max. 12Mbps.

PROFIBUS DP Connector

| | |
|----------------------|-----------------------------|
| Interface | DB9 connector |
| Transmission method | High-speed RS-485 |
| Transmission cable | Shielded twisted pair cable |
| Electrical isolation | 500VDC |

Communication

| | |
|--|---|
| Message type | Cyclic data exchange |
| Module name | CMC-PD01 |
| GSD document | DELA08DB.GSD |
| Company ID | 08DB (HEX) |
| Serial transmission speed supported (auto-detection) | 9.6kbps; 19.2kbps; 93.75kbps; 187.5kbps; 125kbps; 250kbps; 500kbps; 1.5Mbps; 3Mbps; 6Mbps; 12Mbps (bits per second) |

CMC-DN01



Features

- Based on the high-speed communication interface of Delta HSSP protocol, able to conduct immediate control of AC motor drive.
- Supports Group 2 only connection and polling I/O data exchange.
- For I/O mapping, supports Max. 32 words of input and 32 words of output.
- Supports EDS file configuration in DeviceNet configuration software.
- Supports all baud rates on DeviceNet bus: 125kbps, 250kbps, 500kbps and extendable serial transmission speed mode.
- Node address and serial transmission speed can be set up on AC motor drive.
- Power supplied from AC motor drive.

DeviceNet Connector

| | |
|---------------------|---|
| Interface | 5-PIN open removable connector. Of 5.08mm PIN interval |
| Transmission method | CAN |
| Transmission cable | Shielded twisted pair cable (with 2 power cables) |
| Transmission speed | 125kbps, 250kbps, 500kbps and extendable serial transmission speed mode |
| Network protocol | DeviceNet protocol |

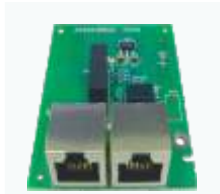
AC Motor Drive Connection Port

| | |
|------------------------|--|
| Interface | 50 PIN communication terminal |
| Transmission method | SPI communication |
| Terminal function | 1. Communicating with AC motor drive 2. Transmitting power supply from AC motor drive |
| Communication protocol | Delta HSSP protocol |

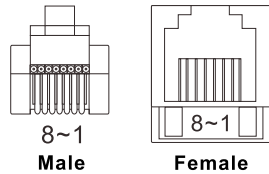
Option Cards

EMC-COP01

Built-in EMC-COP01 card are available for VFDXXC23E and VFDXXC43E.



RJ-45 Pin definition



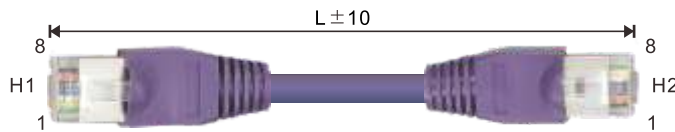
| Pin | Pin name | Definition |
|-----|----------|--------------------------------|
| 1 | CAN_H | CAN_H bus line (dominant high) |
| 2 | CAN_L | CAN_L bus line (dominant low) |
| 3 | CAN_GND | Ground/0V/V- |
| 6 | CAN_GND | Ground/0V/V- |

Specification

| | |
|------------------------|----------------------------|
| Interface | RJ-45 |
| Number of ports | 1 Port |
| Transmission method | CAN |
| Transmission cable | CAN standard cable |
| Transmission speed | 1M 500k 250k 125k 100k 50k |
| Communication protocol | CANopen |

CANopen Communication Cable

Model: TAP-CB03, TAP-CB04



| Title | Part No. | L | |
|-------|----------|-----------|----------|
| | | mm | inch |
| 1 | TAP-CB03 | 500 ± 10 | 19 ± 0.4 |
| 2 | TAP-CB04 | 1000 ± 10 | 39 ± 0.4 |

Digital Keypad Accessories: RJ45 Extension Leads and CMC-EIP01 Cables

Applicable Models : CBC-K3FT \ CBC-K5FT \ CBC-K7FT \ CBC-K10F \ CBC-K16FT

| Title | Part No. | Explanation |
|-------|-----------|---|
| 1 | CBC-K3FT | RJ45 extension lead, 3 feet (approximately 0.9m) |
| 2 | CBC-K5FT | RJ45 extension lead, 5 feet (approximately 1.5m) |
| 3 | CBC-K7FT | RJ45 extension lead, 7 feet (approximately 2.1m) |
| 4 | CBC-K10FT | RJ45 extension lead, 10 feet (approximately 3m) |
| 5 | CBC-K16FT | RJ45 extension lead, 16 feet (approximately 4.9m) |

Ordering information

■ Nameplate

AC Drive Model → MODEL:VFD007C43A
 Input Voltage/ Current → INPUT:
 Normal Duty: 3PH 380-480V 50/60Hz 4.3A
 Heavy Duty: 3PH 380-480V 50/60Hz 4.1A
 Output Voltage/ Current → OUTPUT:
 Normal Duty: 3PH 0-480V 3A 2.4KVA 1HP
 Heavy Duty: 3PH 0-480V 2.9A 2.3KVA 1HP
 Frequency Range → FREQUENCY RANGE:
 Normal Duty: 0-600Hz
 Heavy Duty: 0-300Hz
 Firmware Version → Version: VX.XX
 Certifications →
 Enclosure rating (IPXX) →
 Serial Number → 007C43A7T9300002
 DELTA ELECTRONICS, INC.
 MADE IN XXXXXXX

■ Model name

VFD 007 C 43 A

- VFD**: Series name (Variable Frequency Drive)
- 007**: Applicable motor power in kW
007: 1HP(0.75kW)~3550: 475HP(355kW)
Refer to the specifications for details
- C**: C2000 series
- 43**: Input voltage
23: 230V 3-Phase
43: 460V 3-Phase
- A**: Version type

Ordering information

| | | | | |
|---|---|--|--|---|
| <p>Frame A</p>  | <p>230V : ND : 0.75~3.7kW HD : 0.4~2.2kW</p> <p>460V : ND : 0.75~5.5kW HD : 0.4~4.0kW</p> | <p>VFD007C23A VFD015C23A VFD022C23A VFD037C23A</p> | <p>VFD007C43A VFD015C43A VFD022C43A VFD037C43A VFD040C43A VFD055C43A</p> | <p>VFD007C43E VFD015C43E VFD022C43E VFD037C43E VFD040C43E VFD055C43E</p> |
| <p>Frame B</p>  | <p>230V : ND : 5.5~11kW HD : 3.7~7.5kW</p> <p>460V : ND : 7.5~15 kW HD : 5.5~11kW</p> | <p>VFD055C23A VFD075C23A VFD110C23A</p> | <p>VFD075C43A VFD110C43A VFD150C43A</p> | <p>VFD075C43E VFD110C43E VFD150C43E</p> |
| <p>Frame C</p>  | <p>230V : ND : 15~22 kW HD : 11~18.5 kW</p> <p>460V : ND : 18.5~30 kW HD : 15~22 kW</p> | <p>VFD150C23A VFD185C23A VFD220C23A</p> | <p>VFD185C43A VFD220C43A VFD300C43A</p> | <p>VFD185C43E VFD220C43E VFD300C43E</p> |
| <p>Frame D</p>  | <p>230V : ND : 30~37 kW HD : 20~30 kW</p> <p>460V : ND : 37~75 kW HD : 30~45 kW</p> | <p>Frame_D1 VFD300C23A VFD370C23A VFD550C43A VFD750C43A</p> | <p>Frame_D0-1 VFD370C43S VFD450C43S</p> | <p>Frame_D2 VFD300C23E VFD370C23E VFD550C43E VFD750C43E</p> <p>Frame_D0-2 VFD370C43U VFD450C43U</p> |
| <p>Frame E</p>  | <p>230V : ND : 45~75 kW HD : 37~55 kW</p> <p>460V : ND : 90~110 kW HD : 55~90 kW</p> | <p>Frame_E1 VFD450C23A VFD550C23A VFD750C23A VFD900C43A VFD1100C43A</p> | <p>Frame_E2 VFD450C23E VFD550C23E VFD750C23E VFD900C43E VFD1100C43E</p> | |
| <p>Frame F</p>  | <p>230V : ND : 90 kW HD : 75kW</p> <p>460V : ND : 132~160 kW HD : 110~132 kW</p> | <p>Frame_F1 VFD900C23A VFD1320C43A VFD1600C43A</p> | <p>Frame_F2 VFD900C23E VFD1320C43E VFD1600C43E</p> | |
| <p>Frame G</p>  | <p>460V : ND : 185~220 kW HD : 160~185 kW</p> | <p>Frame_G1 VFD1850C43A VFD2200C43A</p> | <p>Frame_G2 VFD1850C43E VFD2200C43E</p> | |
| <p>Frame H</p>  | <p>460V : ND : 280~355 kW HD : 220~315 kW</p> | <p>Frame_H1 VFD2800C43A VFD3150C43A VFD3550C43A VFD4500C43A</p> | <p>Frame_H2 VFD2800C43E-1 VFD3150C43E-1 VFD3550C43E-1 VFD4500C43E-1</p> | <p>Frame_H3 VFD2800C43E VFD3150C43E VFD3550C43E VFD4500C43E</p> |



Attention

Standard Motors

Used with 400V Standard Motors

It is recommended to add an AC output reactor when using with a 400V standard motor to prevent damage to motor insulation.

Torque Characteristics and Temperature Rise

When a standard motor is drive controlled, the motor temperature will be higher than with DOL operation.

Please reduce the motor output torque when operating at low speeds to compensate for less cooling efficiency.

For continuous constant torque at low speeds, external forced motor cooling is recommended.

Vibration

When the motor drives the machine, resonances may occur, including machine resonances.

Abnormal vibration may occur when operating a 2-pole motor at 60Hz or higher.

Noise

When a standard motor is drive controlled, the motor noise will be higher than with DOL operation.

To lower the noise, please increase the carrier frequency of the drive. The motor fan can be very noisy when the motor speed exceeds 60Hz.

Special Motors

High-speed Motor

To ensure safety, please try the frequency setting with another motor before operating the high-speed motor at 120Hz or higher.

Explosion-proof Motor

Please use a motor and drive that comply with explosion-proof requirements.

Submersible Motor & Pump

The rated current is higher than that of a standard motor.

Please check before operation and select the capacity of the AC motor drive carefully. The motor temperature characteristics differ from a standard motor, please set the motor thermal time constant to a lower value.

Brake Motor

When the motor is equipped with a mechanical brake, the brake should be powered by the mains supply.

Damage may occur when the brake is powered by the drive output. Please DO NOT drive the motor with the brake engaged.

Gear Motor

In gearboxes or reduction gears, lubrication may be reduced if the motor is continuously operated at low speeds.

Please DO NOT operate in this way.

Synchronous Motor

These motors need suitable software for control. Please contact Delta for more information.

Single-phase Motor

Single-phase motors are not suitable for being operated by an AC Motor Drive. Please use a 3-phase motor instead when necessary.

Environmental Conditions

Installation Position

1. The drive is suitable for installation in a place with ambient temperature from -10 to 50°C.
2. The surface temperature of the drive and brake resistor will rise under specific operation conditions. Therefore, please install the drive on materials that are noncombustible.
3. Ensure that the installation site complies with the ambient conditions as stated in the manual.

Wiring

Limit of Wiring Distance

For the remote operation, please use twist-shielding cable and the distance between the drive and control box should be less than 20m.

Maximum Motor Cable Length

Motor cables that are too long may cause overheating of the drive or current peaks due to stray capacitance.

Please ensure that the motor cable is less than 30m.

If the cable length can't be reduced, please lower the carrier frequency or use an AC reactor.

Choose the Right Cable

Please refer to current value to choose the right cable section with enough capacity or use recommended cables.

Grounding

Please ground the drive completely by using the grounding terminal.

How to Choose the Drive Capacity

Standard Motor

Please select the drive according to applicable motor rated current listed in the drive specification.

Please select the next higher power AC drive in case higher starting torque or quick acceleration/deceleration is needed.

Special Motor

Please select the drive according to: Rated current of the drive > rated current of the motor

Transportation and Storage

Please transport and store the drive in a place that meets environment specifications.

Peripheral Equipment

Molded-Case Circuit Breakers (MCCB)

Please install the recommended MCCB or ELCB in the main circuit of the drive and make sure that the capacity of the breaker is equal to or lower than the recommended one.

Add a Magnetic Contactor(MC) in the Output Circuit

When a MC is installed in the output circuit of the drive to switch the motor to commercial power or other purposes, please make sure that the drive and motor are completely stopped and remove the surge absorbers from the MC before switching it.

Add a Magnetic Contactor (MC) in the Input Circuit

Please only switch the MC ONCE per hour or it may damage the drive. Please use RUN/STOP signal to switch many times during motor operation.

Motor Protection

The thermal protection function of the drive can be used to protect the motor by setting the operation level and motor type (standard motor or variable motor).

When using a high-speed motor or a water-cooled motor the thermal time constant should be set to a lower value.

When using a longer cable to connect the motor thermal relay to a motor, high-frequency currents may enter via the stray capacitance.

It may result in malfunctioning of the relay as the real current is lower than the setting of thermal relay. Under this condition, please lower the carrier frequency or add an AC reactor to solve this.

DO NOT Use Capacitors to Improve the Power Factor

Use a DC reactor to improve the power factor of the drive. Please DO NOT install power factor correction capacitors on the main circuit of the drive to prevent motor faults due to over current.

Do NOT Use Surge Absorber

Please DO NOT install surge absorbers on the output circuit of the drive.

Lower the Noise

To ensure compliance with EMC regulations, usually a filter and shielded wiring is used to lower the noise.

Method Used to Reduce the Surge Current

Surge currents may occur in the phase-lead capacitor of the power system, causing an overvoltage when the drive is stopped or at low loads.

It is recommended to add a DC reactor to the drive.



Smarter. Greener. Together.

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