



Automation for a Changing World

Delta Vector Control AC Motor Drive



www.deltaww.com

 **DELTA**
Smarter. Greener. Together.



Smarter. Greener. Together.

Who We Are

Delta is a market leader that has won wide recognition as a:

- Global power and thermal solution provider for Apple, IBM, HP, Lenovo and more; No.1 in Switching Power Supplies since 2002, DC Fans since 2006.
- Leading telecom power system provider for telecom carriers in Europe, the Americas, Asia and emerging markets; Long term partnerships with Vodafone, Orange, China Mobile, Telefonica and more.
- Leading brand in industrial automation applications, factories, processes, machines, and robots; specific solutions for textile, packaging, machine tools and more.

About Delta Industrial Automation

Since the launch of our first AC motor drive in 1995, the Delta industrial Automation Business Group (IABG) has focused on automation technology with quality, reliability and precision to realize our promise of "Automation for a Changing World". We provide innovative automation products that include AC motor drives, power quality improvement devices, sensors, and control and motion devices. With enhanced integration and industrial network development, our industrial automation solutions find application in a broad range of machinery, including: metal processing machines used in the food industry, textile industry, chemical industry, electronics industry, plastic industry and more; automation equipment used in the pharmaceutical industry and printing industry; and energy-saving air-conditioning and water supply facilities used in buildings. Our mission is: "To elevate our living environment through advanced automation technology and value added innovation". With Delta's innovative, reliable, energy-saving automation solutions and rapid global service, we help make the world "Smarter. Greener. Together." with our partners and customers.

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C2000 Series



Features

- ▶ Field oriented control
- ▶ Built-in PLC function
- ▶ Wide variety of applications
- ▶ Modular design for easy maintenance and many extensions
- ▶ Built-in MODBUS communication
- ▶ Long-life design and self diagnosis
- ▶ Enhanced protections and adaptation to ambient conditions
- ▶ Complies with global safety standards, including CE, UL and cUL
- ▶ Wide range of models to meet requirements
- ▶ High-speed communication interface (optional cards for PROFIBUS-DP, DeviceNet, MODBUS TCP and EtherNet/IP)
- ▶ Fully prepared CANopen master and slave functions, the only option needed is the CMC-COP01
- ▶ Capable of constructing controlling network by built-in PLC, fieldbus, and PLC remote I/O modules
- ▶ Supports multi-drives synchronous deceleration to stop

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)



▶ **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



▶ **High-performance Variable-frequency Technology**

- Speed/torque/position control mode
- 4-quadrant torque control and limit
- A drive for induction motors and synchronous motors

▶ **Versatile Driving Controls**

- Built-in safe stop function
- Built-in brake unit
- Supports various network protocols
- Synchronous point-to-point control

▶ **Modular Design**

- Hot plug LCD keypad
- I/O extension cards
- Various PG (encoder) feedback cards
- Network cards for fieldbus modules

▶ **Environmental Adaptability**

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

Modular Design

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

The diagram illustrates the modular design of a Delta VFD drive. A central image shows the internal drive chassis with various slots and components. Blue lines connect these slots to external component images. Green lines connect specific features to safety-related text boxes.

PG (Encoder) cards

- EMC-PG010
- EMC-PG01U
- EMC-PG01L
- EMC-PG01R

I/O cards

- EMC-R6AA
- EMC-D42A
- EMC-D611A
- EMC-BPS01

Communication cards

- CMC-PD01
- CMC-DN01
- CMC-MOD01
- CMC-EIP01
- EMC-COP01

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.

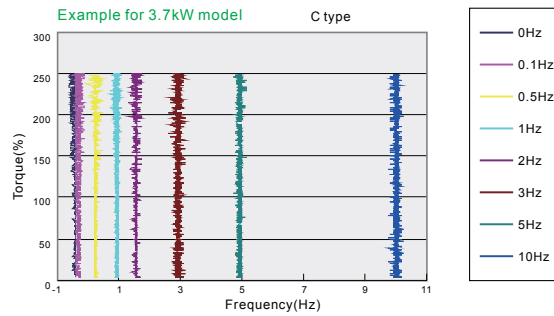
Removable terminals
Convenient wiring and safety equipment.

*NOTE: *●* are optional accessories.



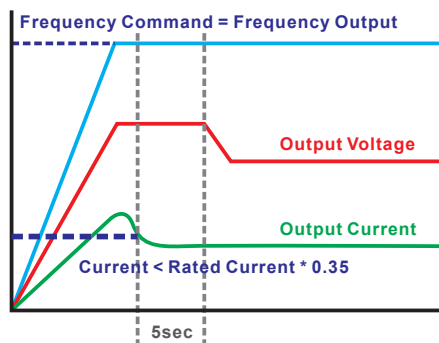
High-performance Field Oriented Control

In FOC+PG mode, C2000 is capable of creating a start-up torque up to 200% at extremely low speed for much more stable speed control



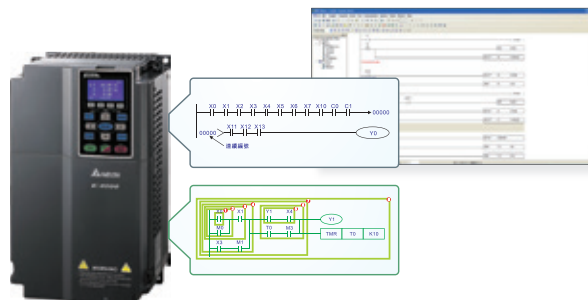
Auto Energy-Saving

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



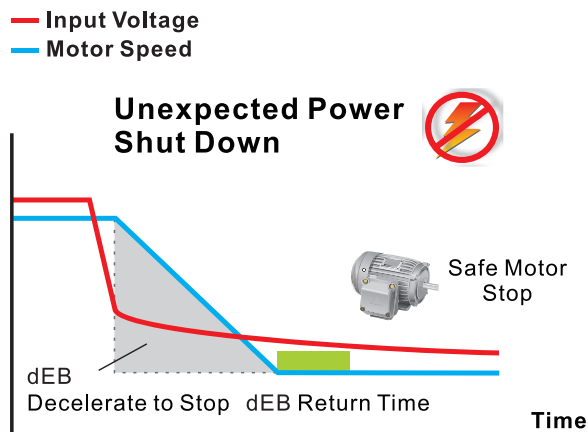
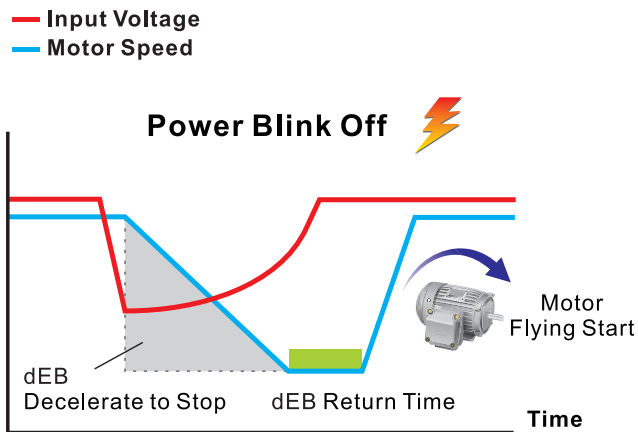
Built-in PLC Function

Built-in PLC programs. Distributed control and independent operation can be easily achieved via the network system.



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.



Standard Models (IP20/NEMA1)

► Power Range

3-phase 230V series: 0.75~90kW (1hp~125hp)

3-phase 400V series: 0.75~355kW (1hp~475hp)

Model Name

VFD 007 C 43 A

Version Type

A : Asia rev.
E : Europe rev.
C : Floor Mounted.

S : Wall-Mounted (Compact size)
U : Wall-Mounted (NEMA 1)

Input Voltage

23 : 230V 3-Phase
43 : 460V 3-Phase

C2000 Series

Applicable Motor Capacity

007 : 0.75kW	150 : 15kW	550 : 55kW	1850 : 180kW
015 : 1.5kW	185 : 18.5kW	750 : 75kW	2200 : 220kW
022 : 2.2kW	220 : 22kW	900 : 90kW	2800 : 280kW
037 : 3.7kW	300 : 30kW	1100 : 110kW	3150 : 315kW
055 : 5.5kW	370 : 37kW	1320 : 132kW	3550 : 350kW
075 : 7.5kW	450 : 45kW	1600 : 160kW	4000 : 400kW
110 : 11kW			

Series Name

(Variable Frequency Drive)

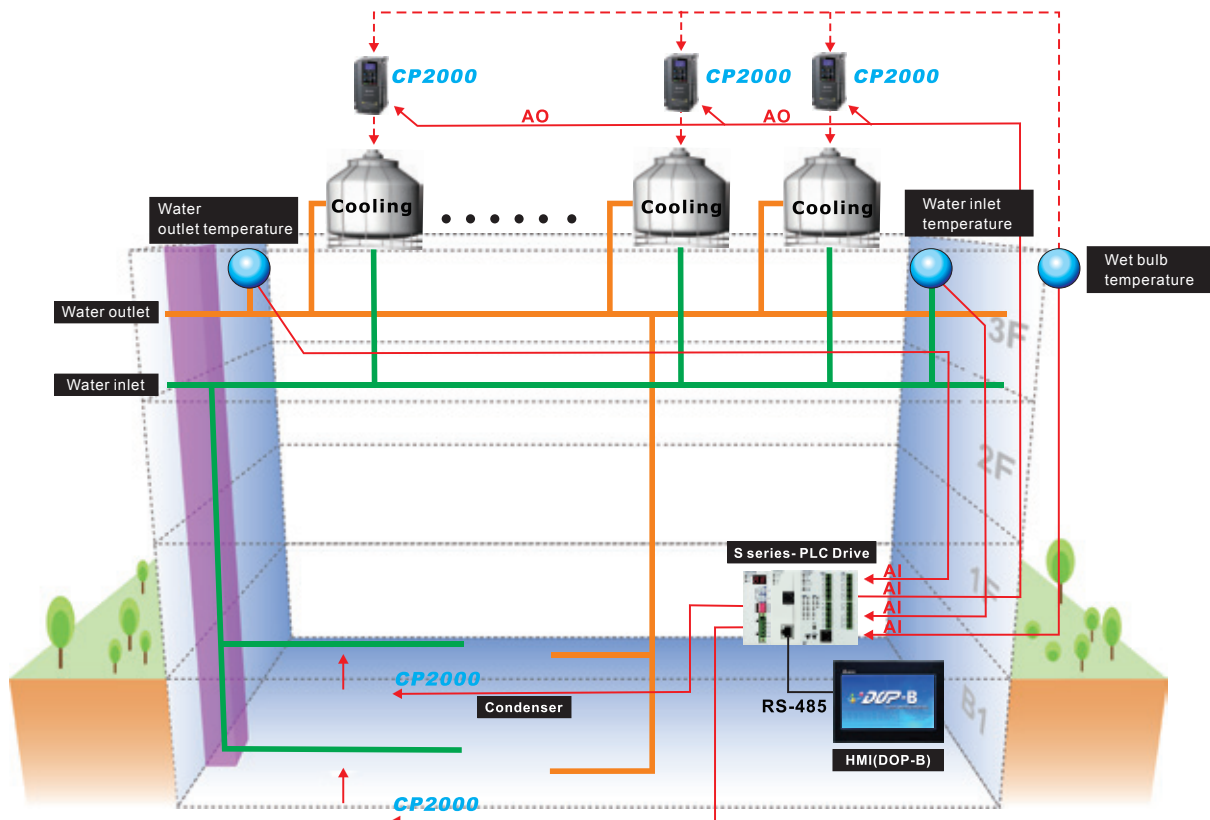
CP2000 Series

Features

- ▶ LCD keypad offers a user-friendly operation interface. The display screen can be defined by the user with TP-Editor soft.
- ▶ Quick setting, user defined parameter management, and parameter copy functions make the installation fast and easy.
- ▶ Modular design for flexible extension and easy maintenance.
- ▶ Built-in BACnet and MODBUS RS-485. Various optional communication cards such as ProfiBUS-DP, DeviceNet, MODBUS TCP, EtherNet-IP, and CANopen.



- ▶ Long-life design.
- ▶ The PCB (Printed Circuit Board) coating enhances reliability and durability.
- ▶ Fire mode and Bypass functions provide safe operation in an emergency.
- ▶ Useful functions for pump and fan applications, such as: PID control, sleep/wake up functions, flying start, and skip frequency.
- ▶ Multi-pumps control functions, such as: fixed time, fixed quantity, circulating controls. The driver can control a maximum of eight pumps at the same time. An optional relay extension card is available depending on the pump quantity.
- ▶ Built-in PLC 10K step and Real Time Clock.



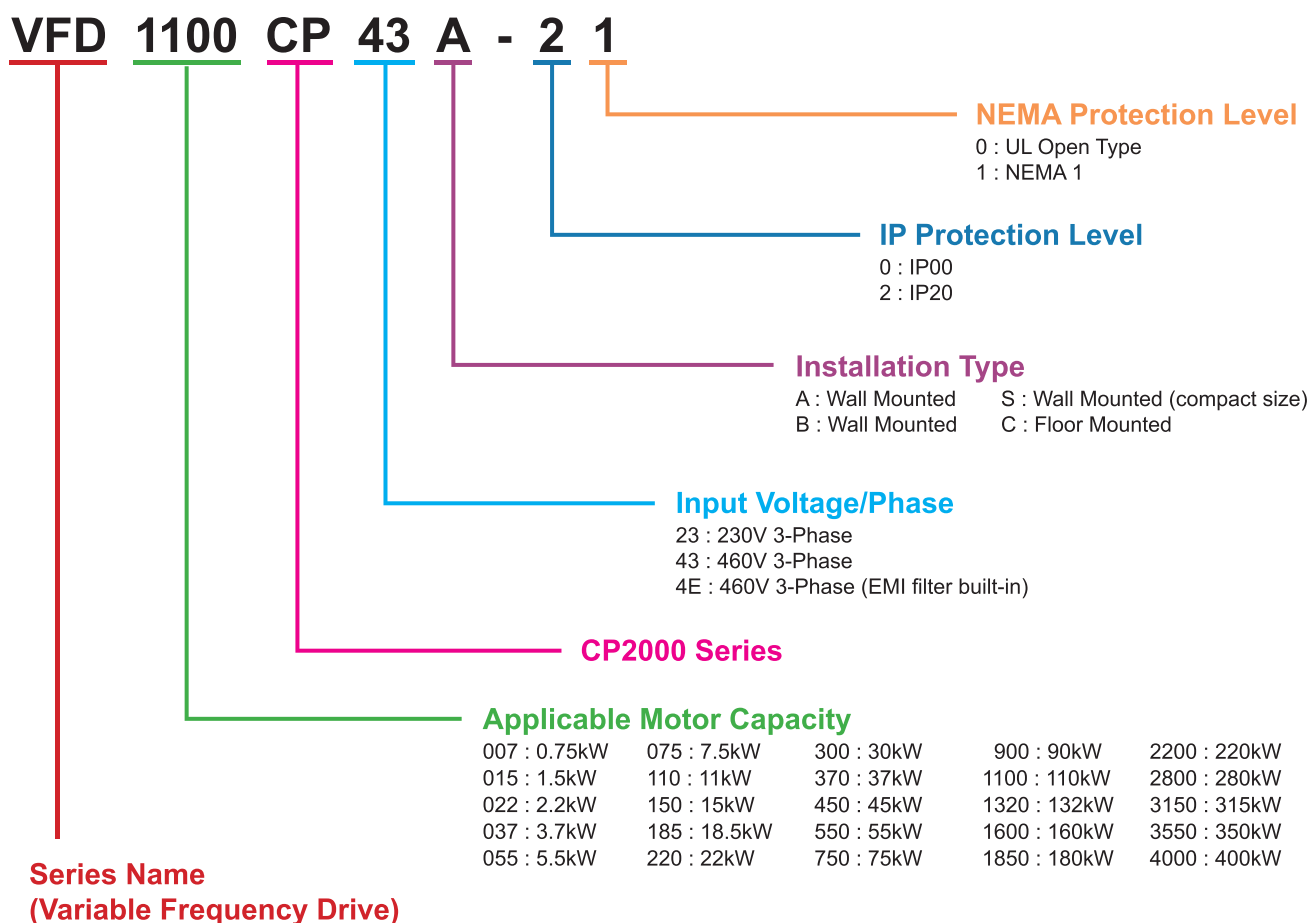
Improves Motor Performance

- ▶ The sensorless vector control (SVC) and AUTO-TUNING functions increase motor performance for variable torque loads applications.
- ▶ Deceleration Energy Backup (DEB): when a power loss occurs the drive decelerates and stops the motor to protect the equipment.
- ▶ Optimal Acceleration/Deceleration function makes the motor run smoothly and reduces vibration during start and stop.
- ▶ Various control functions for saving energy, such as: PID control, sleep/wake up function, and auto energy saving mode.

Standard Models

- ▶ Power Range
 - 3-phase 230V series: 0.75~90kW (1hp~125hp)
 - 3-phase 460V series: 0.75~400kW (1hp~536hp)

Model Name

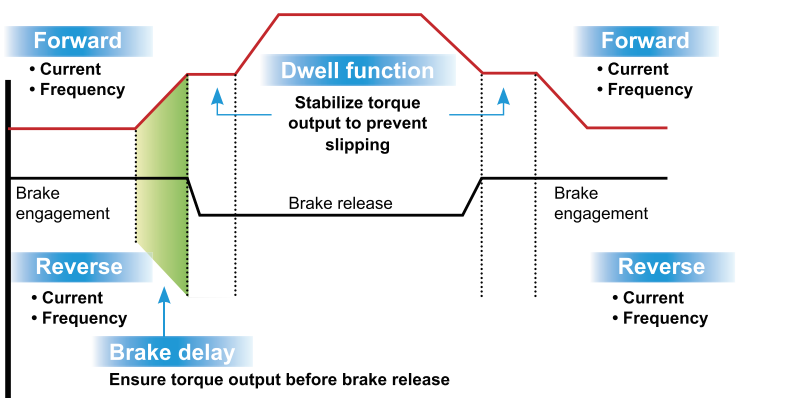


CH2000 Series

Features

- ▶ Built-in 10K steps PLC programming capacity
- ▶ Fast response to impact loads
- ▶ Single super heavy duty setting
- ▶ Various communication and network functions
- ▶ Modular design facilitates installation process and is easy to maintain
- ▶ Supports both asynchronous and synchronous motors
- ▶ Various crane functions provide high operation performance
- ▶ High overload capability: 150% of rated current for 60 seconds and 200% of rated current for 3 seconds
- ▶ Large starting torque: above 200% at 0.5Hz, and 200% at 0Hz in FOC+PG mode

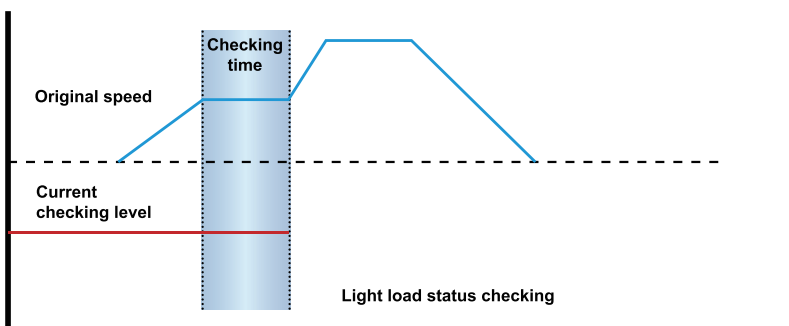
Advanced Crane Function



- **Advanced Crane Time Sequence**
Brake delay and dwell function for smooth operation
- **Mechanical Brake Control**
Eight independent conditions for brake control for safety and complex applications

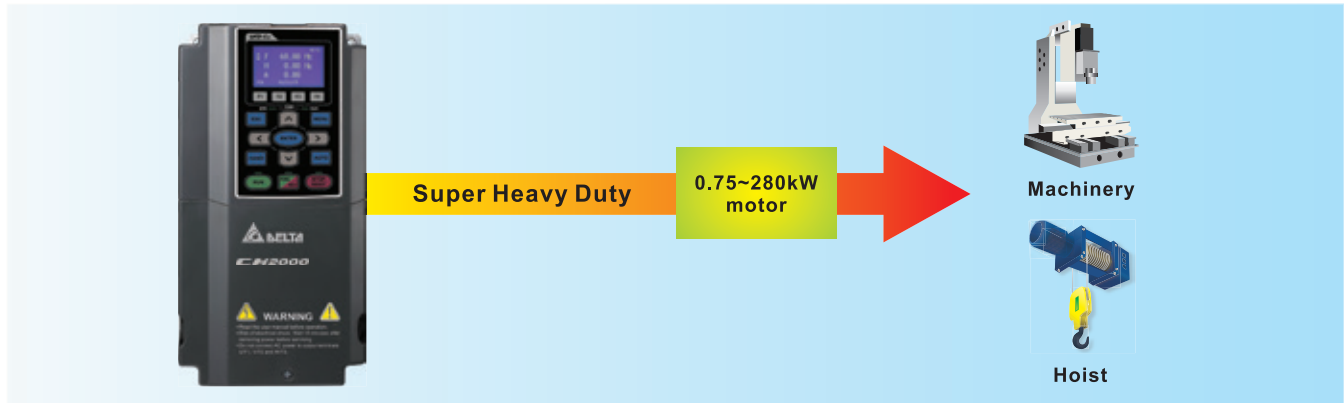


Light Load Auto-Acceleration



Excellent Overload Capability

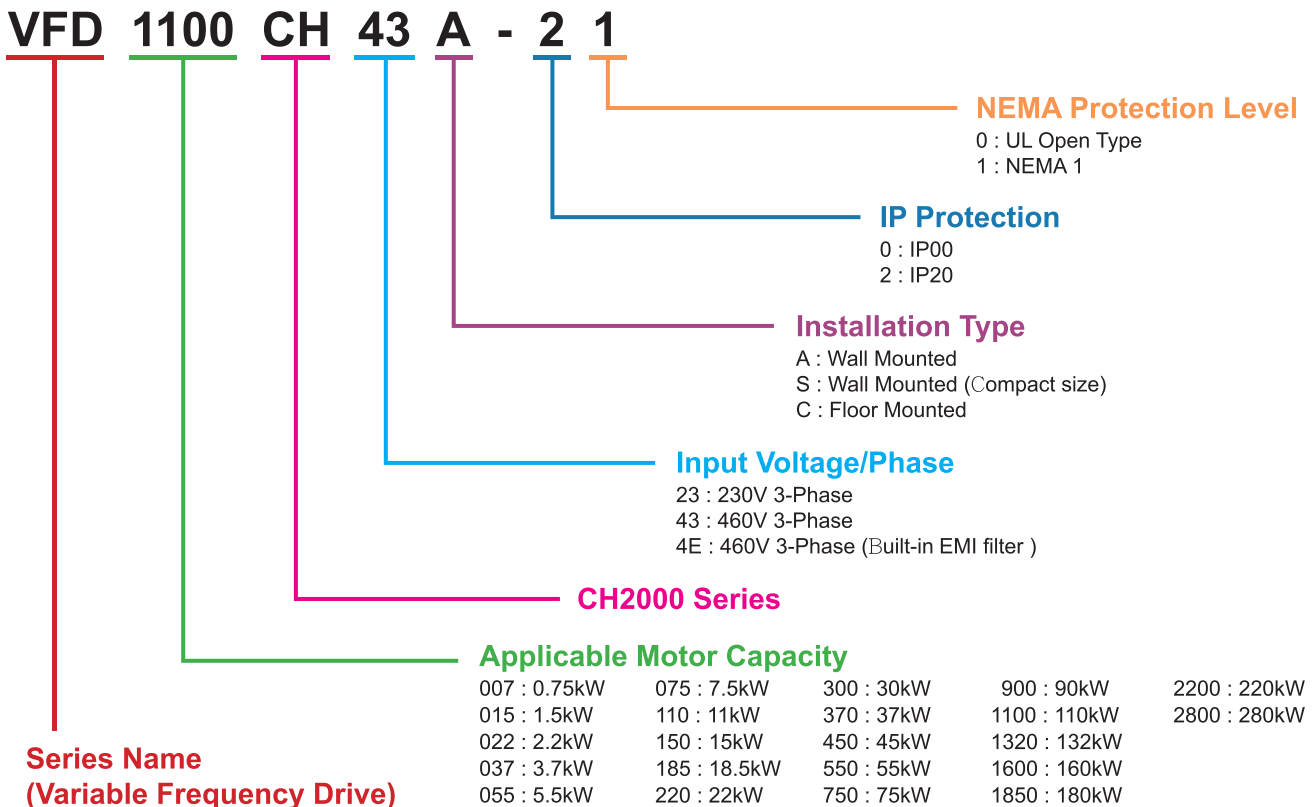
The super heavy duty setting is suitable for harsh environment applications with its excellent overload capability. The current overload capability is 150% for 60 seconds and 200% for 3 seconds.



Standard Models

- ▶ Power Range
 - 3-phase 230V series: 0.75 ~ 75kW (1hp~100hp)
 - 3-phase 460V series: 0.75 ~ 280kW (1hp~375hp)

Model Name



C200

Series



Features

- ▶ Applicable to asynchronous and synchronous motors
- ▶ Built-in PLC program capacity of 5,000 steps
- ▶ Supports torque and speed control modes
- ▶ Max. output frequency up to 3,333Hz
- ▶ Removable high brightness LED keypad with extension cable to maximize operation distance
- ▶ Controls multiple drives to synchronously decelerate to stop

Built-in High-speed Fieldbus

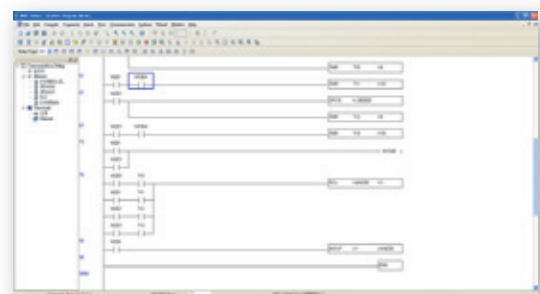
- ▶ Built-in standard MODBUS RS-485 communication interfaces
- ▶ **CANopen** (DS402)
 - Delta CANopen Builder software facilitates the planning process. Optional Accessories for CANopen
 - Slave only



MKCB-HUB01

Built-in PLC function

- ▶ Built-in PLC programs. Distributed control and independent operation can be easily achieved via the network system.



Permanent Magnet Synchronous Motor

- ▶ The C200 Series provides a PM Sensorless control function for open-loop speed control. It is suitable for compressors and vacuum pumps.

Applications

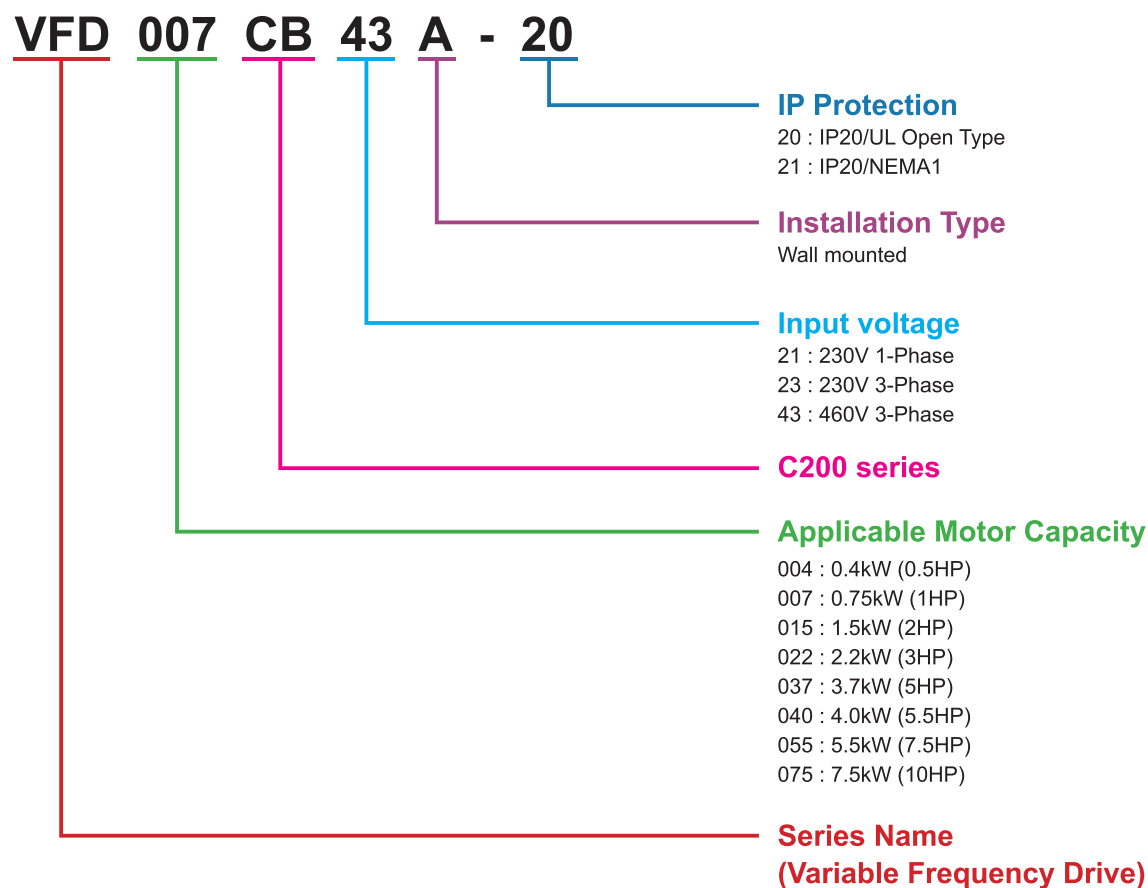
The C200 Series can be used in a wide range of applications. It is designed for strict safety standards, complete control functions and easy operation.

- ▶ Processing machines
- ▶ Packaging machines
- ▶ Printing machines
- ▶ Material handling machines
- ▶ Treadmills
- ▶ Fans and pumps
- ▶ Solar equipment

Standard Models

- ▶ Power Range
 - 1-phase 230V series: 0.4~2.2kW (0.5hp~3hp)
 - 3-phase 230V series: 0.4~3.7kW (0.5hp~5hp)
 - 3-phase 460V series: 0.75~7.5kW (1hp~10hp)

Model Name



VFD-E/EL Series

Features

▶ Compact Design

Space saving and easy DIN rail mounting with optional DIN rail adapter (Built in Frame B)

▶ Built-in EMI Filter (230V 1-phase and 460V 3-phase)

Reduces electromagnetic interference efficiently

▶ Flexible Extension (VFD-E Series Only)

Via optional cards, such as I/O card, Relay card, PG (Encoder) card and USB card, to meet your application requirements



▶ RFI Switch for IT Mains

Removable "Y" capacitor to use with IT mains supplies

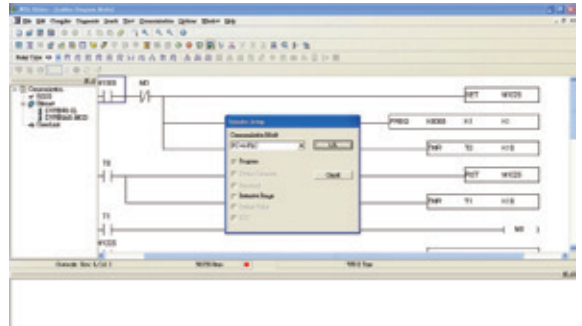


▶ Standard MODBUS Protocol

Standard MODBUS Protocol via RS-485

▶ Built-in PLC Function (VFD-E Series Only)

Easy to write PLC program without additional PLC



▶ Side-by-side Installation (40°C)

High-efficiency cooling and flexible spacing



Accessories

▶ Fieldbus Modules



- Profibus
- DeviceNet
- CANopen

▶ Others



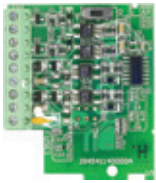
- Digital keypad
- Keypad for communication (VFD-PU06)
- Grounding plate



- Brake resistor
- Brake unit
- DIN rail (Width 35mm)

Accessories

▶ Optional Cards (VFD-E Series Only)



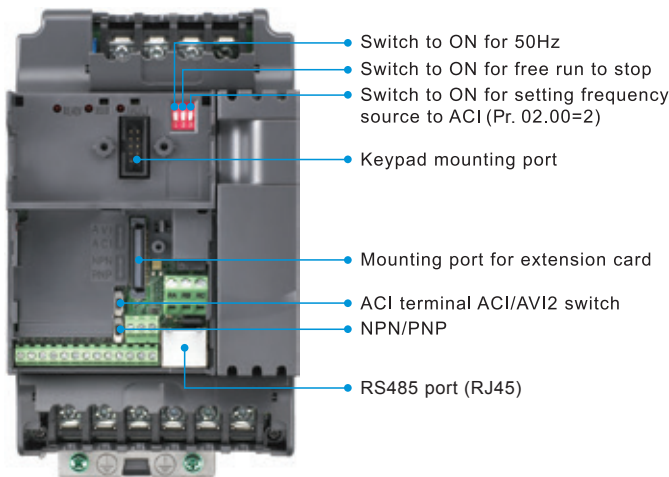
- **EME-R3AA**
Relay card (3 form A/ NO contacts)
- **EME-R2CA**
Relay card (2 form C/ Change-over contacts)
- **EME-33A**
I/O card (photocoupler 3in + 3out)

■ **EME-PG01**
PG card

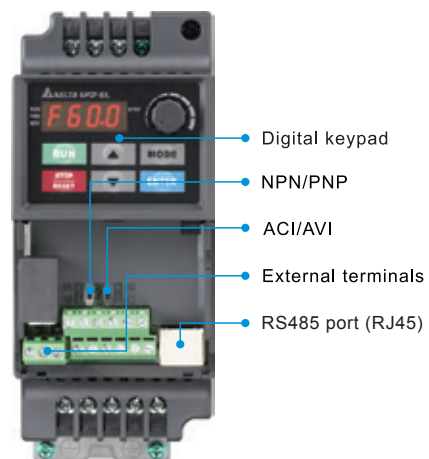
- **EME-A22A**
Analog I/O Card (12 bits)
- **CME-USB01**
Second communication card (USB1.1)

External Parts

▶ VFD-E Series



▶ VFD-EL Series



Standard Models

▶ Power Range

VFD-E Series:

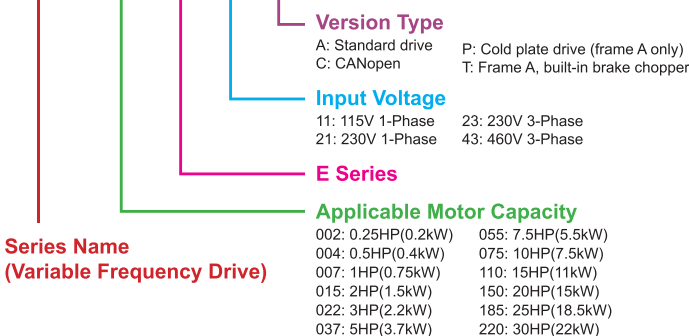
- 1-phase 115V series: 0.2~0.75kW (0.25~1hp)
- 1-phase 230V series: 0.2~2.2kW (0.25~3hp)
- 3-phase 230V series: 0.2~7.5kW (0.25~20hp)
- 3-phase 460V series: 0.4~22kW (0.50~30hp)

VFD-EL Series:

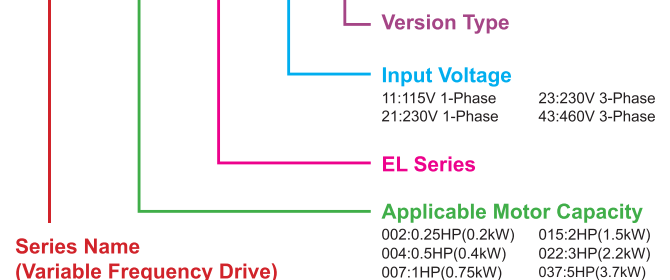
- 1-phase 115V series: 0.2~0.75kW (0.25~1hp)
- 1-phase 230V series: 0.2~2.2kW (0.25~3hp)
- 3-phase 230V series: 0.2~3.7kW (0.25~5hp)
- 3-phase 460V series: 0.4~3.7kW (0.50~5hp)

Model Name

VFD 007 E 23 A



VFD 007 EL 23 A





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Industrial Automation Headquarters

Delta Electronics, Inc.

Taoyuan Technology Center
No.18, Xinglong Rd., Taoyuan City,
Taoyuan County 33068, Taiwan
TEL: 886-3-362-6301 / FAX: 886-3-371-6301

Asia

Delta Electronics (Jiangsu) Ltd.

Wujiang Plant 3
1688 Jiangxing East Road,
Wujiang Economic Development Zone
Wujiang City, Jiang Su Province, P.R.C. 215200
TEL: 86-512-6340-3008 / FAX: 86-769-6340-7290

Delta Greentech (China) Co., Ltd.

238 Min-Xia Road, Pudong District,
ShangHai, P.R.C. 201209
TEL: 86-21-58635678 / FAX: 86-21-58630003

Delta Electronics (Japan), Inc.

Tokyo Office
2-1-14 Minato-ku Shibadaimon,
Tokyo 105-0012, Japan
TEL: 81-3-5733-1111 / FAX: 81-3-5733-1211

Delta Electronics (Korea), Inc.

1511, Byucksan Digital Valley 6-cha, Gasan-dong,
Geumcheon-gu, Seoul, Korea, 153-704
TEL: 82-2-515-5303 / FAX: 82-2-515-5302

Delta Electronics Int'l (S) Pte Ltd.

4 Kaki Bukit Ave 1, #05-05, Singapore 417939
TEL: 65-6747-5155 / FAX: 65-6744-9228

Delta Electronics (India) Pvt. Ltd.

Plot No 43 Sector 35, HSIDC
Gurgaon, PIN 122001, Haryana, India
TEL : 91-124-4874900 / FAX : 91-124-4874945

Americas

Delta Products Corporation (USA)

Raleigh Office
P.O. Box 12173, 5101 Davis Drive,
Research Triangle Park, NC 27709, U.S.A.
TEL: 1-919-767-3800 / FAX: 1-919-767-8080

Delta Greentech (Brasil) S.A.

Sao Paulo Office
Rua Itapeva, 26 - 3º andar Edificio Itapeva One-Bela Vista
01332-000-São Paulo-SP-Brazil
TEL: 55 11 3568-3855 / FAX: 55 11 3568-3865

Europe

Deltronics (The Netherlands) B.V.

Eindhoven Office
De Witbogt 20, 5652 AG Eindhoven, The Netherlands
TEL: 31-40-2592850 / FAX: 31-40-2592851

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