



Automation for a Changing World

# Delta Vector Control AC Motor Drive



[www.deltaww.com](http://www.deltaww.com)

 **DELTA**  
Smarter. Greener. Together.





# Smarter. Greener. Together.

## Who We Are

- A global leader in power and thermal management technology with world-class customers in several industries.
- A leading brand of smart automation and energy management solutions for smart factories, industrial processes, data centers, telecom networks, green buildings and more.
- Our mission is “To provide innovative, clean and energy-efficient solutions for a better tomorrow”

## 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 industries such as food, textiles, chemicals, electronics, and plastics; automation equipment used in the pharmaceutical and printing industries; 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.

# Table of Contents

## **C2000 Series 03**

- Features
- Modular Design
- Excellent Functions
- Model Name

## **CP2000 Series 07**

- Features
- Standard Models
- Model Name

## **CH2000 Series 09**

- Features
- Standard Models
- Model Name

## **C200 Series 11**

- Features
- Excellent Functions
- Applications
- Model Name

## **VFD-E/EL Series 13**

- Features
- Accessories
- External Parts
- Model Name



# C2000 Series



## Features

- ▶ Supports both asynchronous and synchronous motors
- ▶ Field oriented vector control
- ▶ Wide power range for different industry needs
- ▶ Built-in 10K steps PLC programming capacity
- ▶ Long service life design
- ▶ Enhanced protections and adaptation to industrial environments
- ▶ Modular design for easy maintenance and many extensions
- ▶ Built-in MODBUS communication and provides for optional communication cards:



CANopen (DS402)

DeviceNet

EtherNet/IP

MODBUS TCP

## High-Speed Network

- ▶ Provides optional MODBUS RTU and various fieldbus cards for flexible applications
- ▶ Advanced network functions
- ▶ Built-in MODBUS communication

▶ CANopen (DS402)



▶ EtherNet/IP



▶ MODBUS TCP

Delta provides communication integrator software that offers graphic module settings and a user friendly interface to support all Ethernet products settings and online monitoring.

- Delta software for Ethernet/MODBUS TCP products
- Graphic module settings and a user friendly interface
- Auto search function
- Supports Virtual COM settings





▶ **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 EMC 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.

**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.

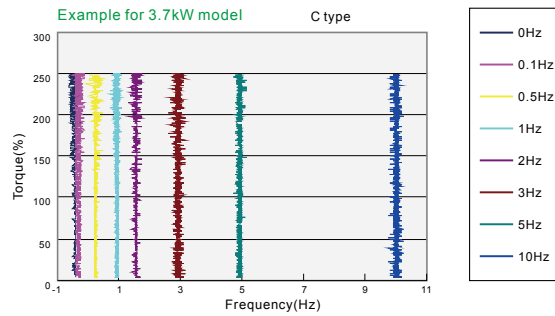
**Removable terminals**  
Convenient wiring and safety equipment.

\*NOTE: \*●\* are optional accessories.



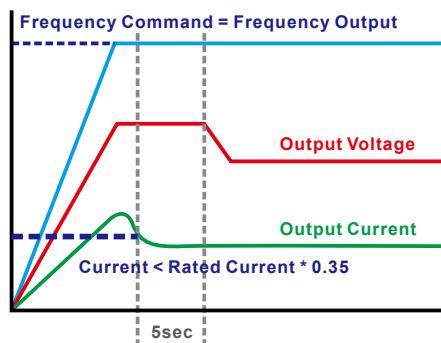
## High-performance Field Oriented Control

The FOC+PG mode of C2000 Series can output 150% of starting torque at extremely low speeds for precise and stable speed control



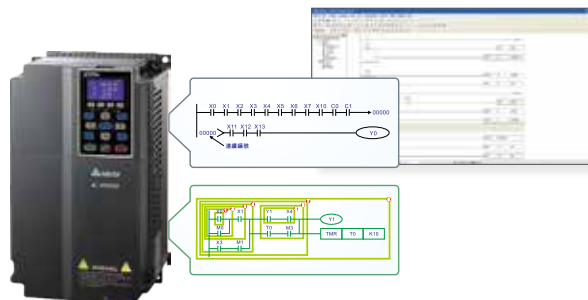
## Auto Energy-Saving

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



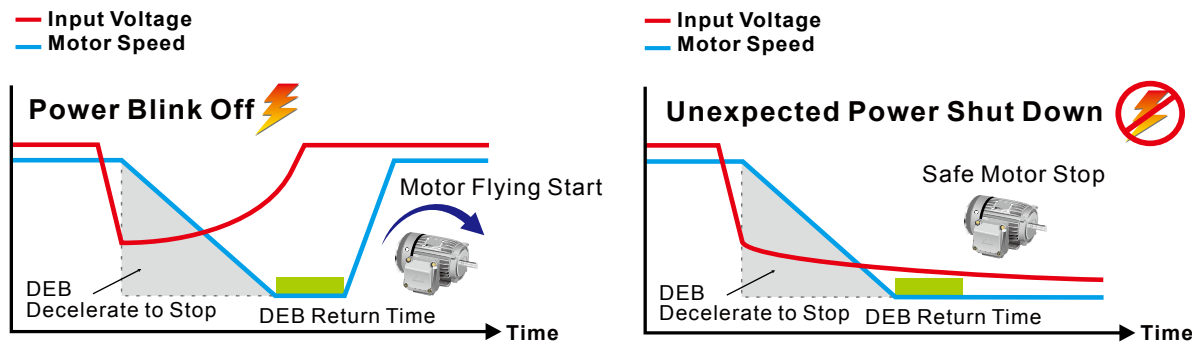
## Built-in PLC Function

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 deceleration for stopping when an unexpected power shut down occurs to prevent mechanical damage. When power resumes, the motor will return to its previous speed.



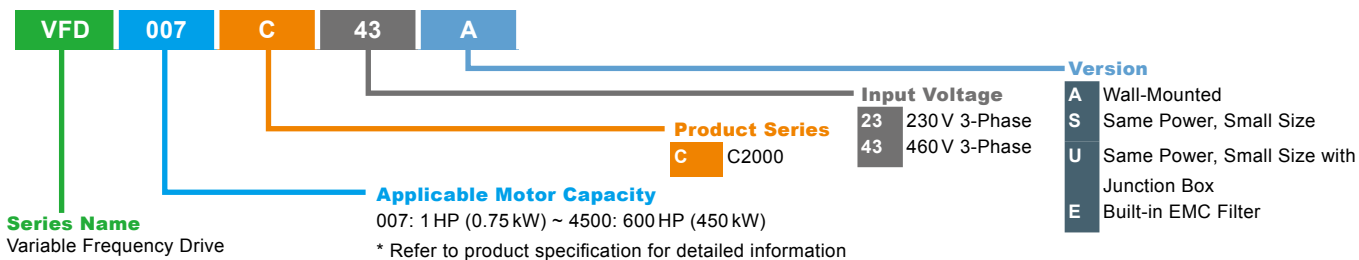
## Standard Models (IP20/NEMA1)

### ► Power Range

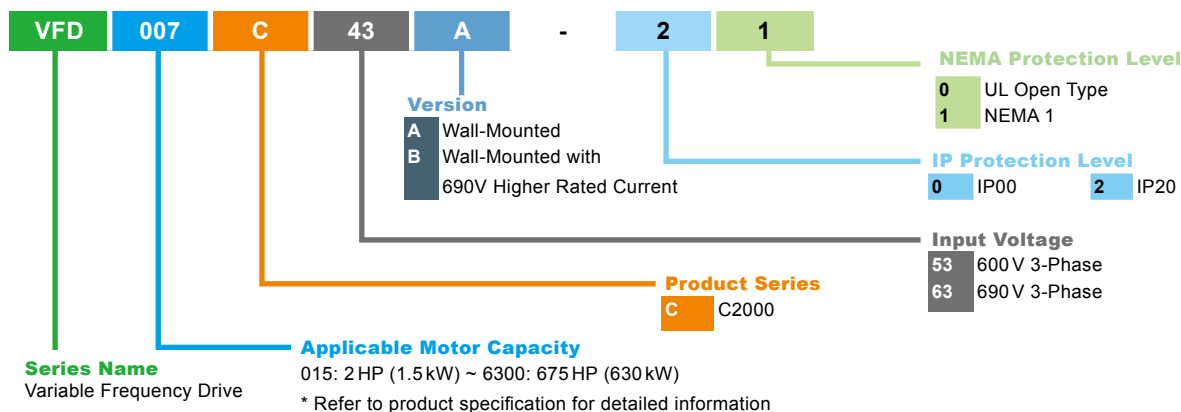
- 3-phase 230 V series: 0.75~90 kW (1 hp~125 hp)
- 3-phase 400 V series: 0.75~355 kW (1 hp~475 hp)
- 3-phase 600 V series: 1.5~15 kW (2 hp~20 hp)
- 3-phase 690 V series: 1.85~630 kW (25 hp~745 hp)

## Model Name

### ■ 230 V / 460 V:



### ■ 600 V / 690 V:



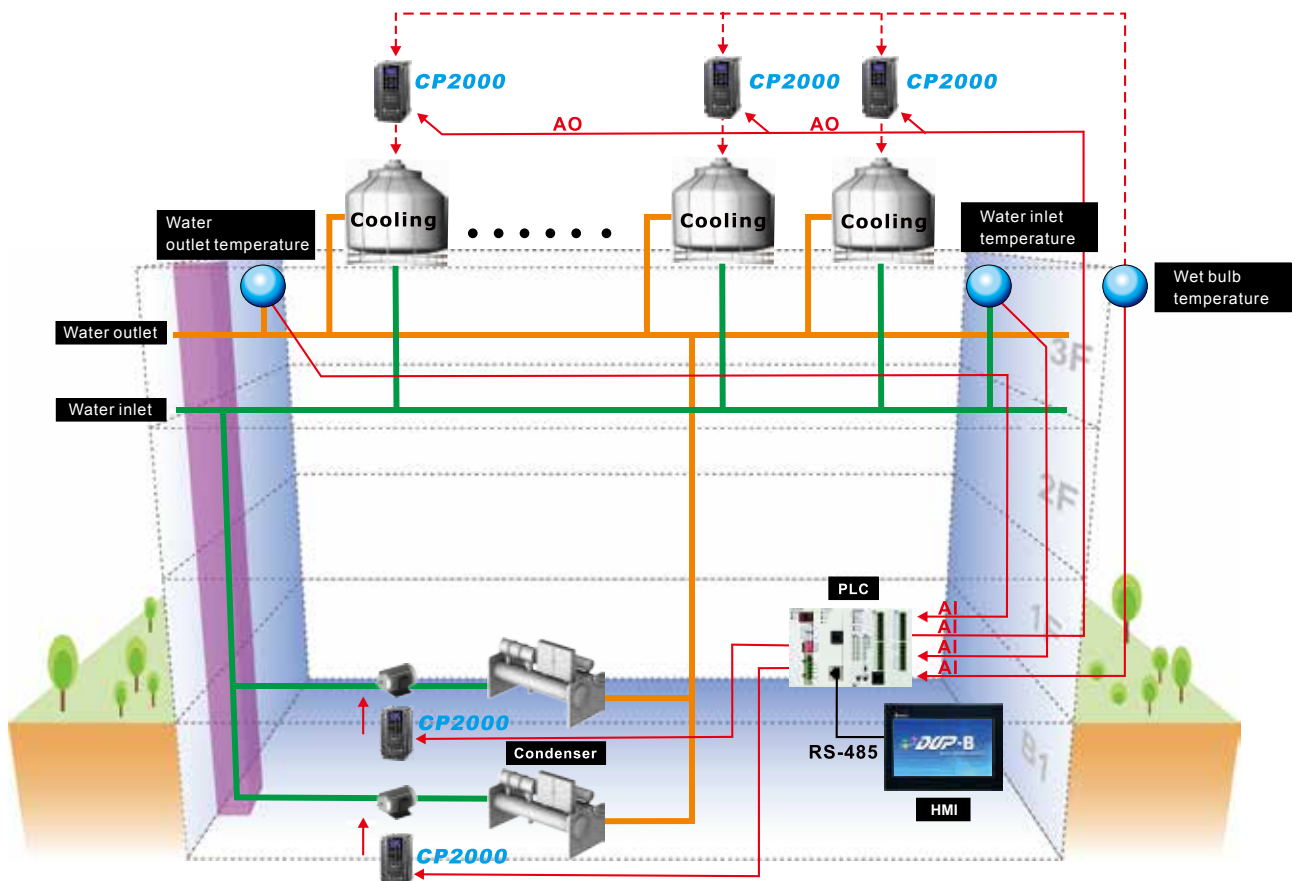
# CP2000 Series

## Features

- ▶ LCD keypad - An easy-to-use text panel with TP Editor software allows users to self-define the main page screen
- ▶ Quick setting functions to support self-defined parameter groups and parameter duplication for fast and easy installation
- ▶ Modular design for flexible extension and easy maintenance
- ▶ High-speed communications include BACnet and MODBUS. Optional communication cards are available upon purchase:



- ▶ Extended life cycle
- ▶ Enhanced conformal coating on PCBs for superior durability in critical environments
- ▶ Fire mode and bypass functions: continuous pressure to extract smoke when emergencies occur
- ▶ Various modes for fans/pumps applications including PID control, sleep/wake up functions, flying start and skip frequency
- ▶ Multi-pumps synchronous control of up to 8 motors at one time and provides fixed amount and fixed time circulation control
- ▶ Built-in 10K steps PLC programming capacity and Real Time Clock (RTC)





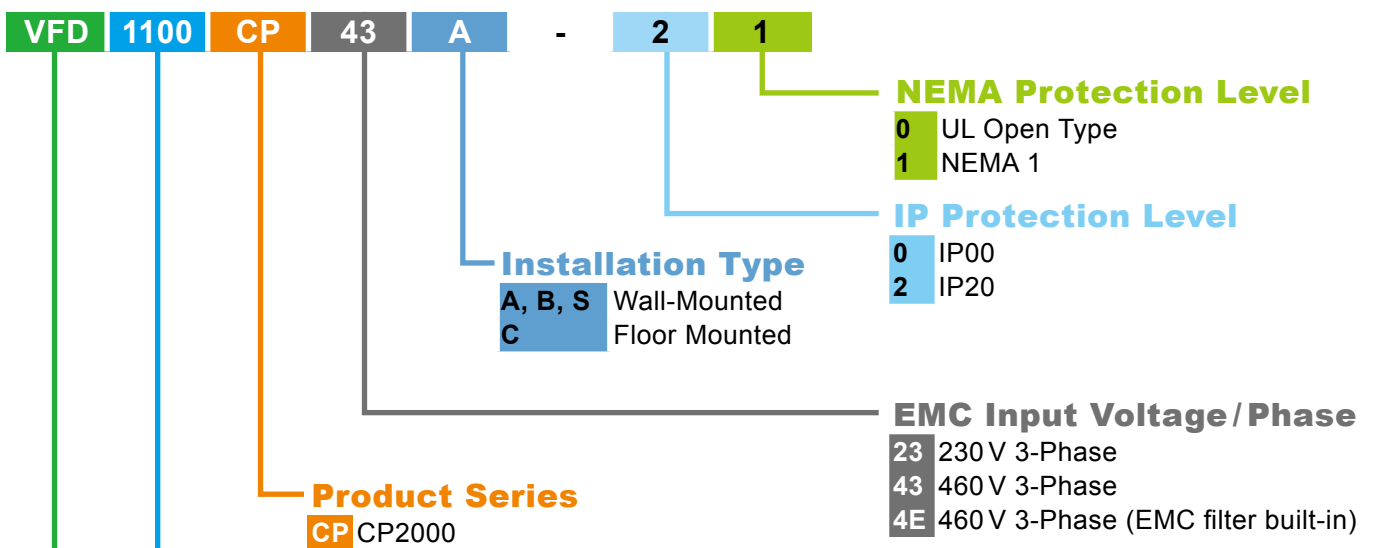
# Improves Motor Performance

- ▶ Sensorless Vector Control (SVC) and auto-tuning functions to improve motor performance for variable torque load applications
- ▶ Deceleration Energy Backup (DEB) function decelerates motor to a stop when sudden power failure occurs to protect the equipment from damage
- ▶ Auto adjusting acceleration/deceleration speed, reduces mechanical vibration when activating and stopping the equipment and provides smooth operation
- ▶ Energy saving control functions include PID control, sleep/wakeup mode and auto-energy saving mode

## Standard Models

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

## Model Name



### Applicable Motor Capacity

<b>007</b>	0.75 kW	<b>075</b>	7.5 kW	<b>300</b>	30 kW	<b>900</b>	90 kW	<b>2200</b>	220 kW
<b>015</b>	1.5 kW	<b>110</b>	11 kW	<b>370</b>	37 kW	<b>1100</b>	110 kW	<b>2800</b>	280 kW
<b>022</b>	2.2 kW	<b>150</b>	15 kW	<b>450</b>	45 kW	<b>1320</b>	132 kW	<b>3150</b>	315 kW
<b>037</b>	3.7 kW	<b>185</b>	18.5 kW	<b>550</b>	55 kW	<b>1600</b>	160 kW	<b>3550</b>	350 kW
<b>055</b>	5.5 kW	<b>220</b>	22 kW	<b>750</b>	75 kW	<b>1850</b>	180 kW	<b>4000</b>	400 kW
								<b>5000</b>	500 kW

### Product

Variable Frequency Drive

# CH2000 Series

## Features

- ▶ Fast response to impact loads
- ▶ Super Heavy Duty (SHD) setting for high overload
- ▶ Large starting torque: above 200% at 0.5Hz, and 200% at 0Hz in FOC+PG mode
- ▶ Supports both asynchronous and synchronous motors
- ▶ Various crane functions for high operation performance
- ▶ Modular design facilitates installation process and is easy to maintain
- ▶ Built-in 10K steps PLC programming capacity
- ▶ Built-in MODBUS communication
- ▶ Optional communication cards:



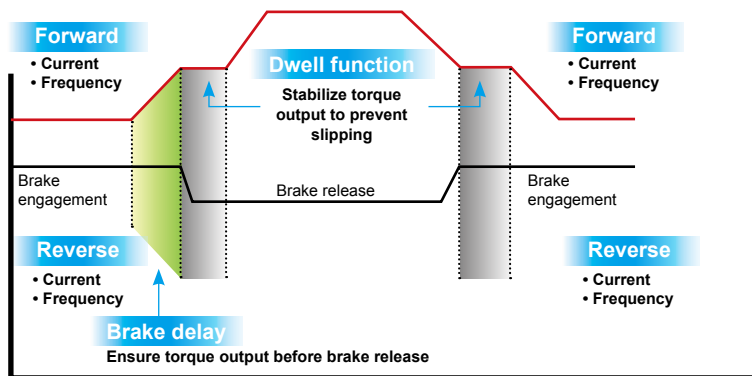
CANopen

DeviceNet

EtherNet/IP

MODBUS TCP

## Advanced Crane Function

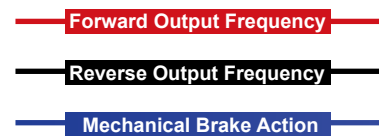


### ▲ Mechanical brake control

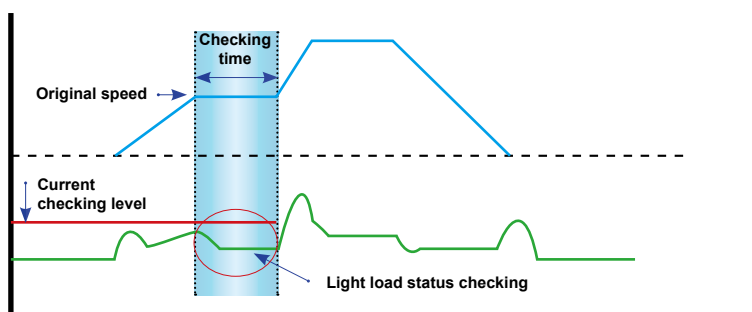
8 independent brake control setting to different criteria. High flexibility to meet complex application needs and ensure operation safety.

### ▲ Advanced crane time sequence

Brake delay and dwell function ensure smooth operation.

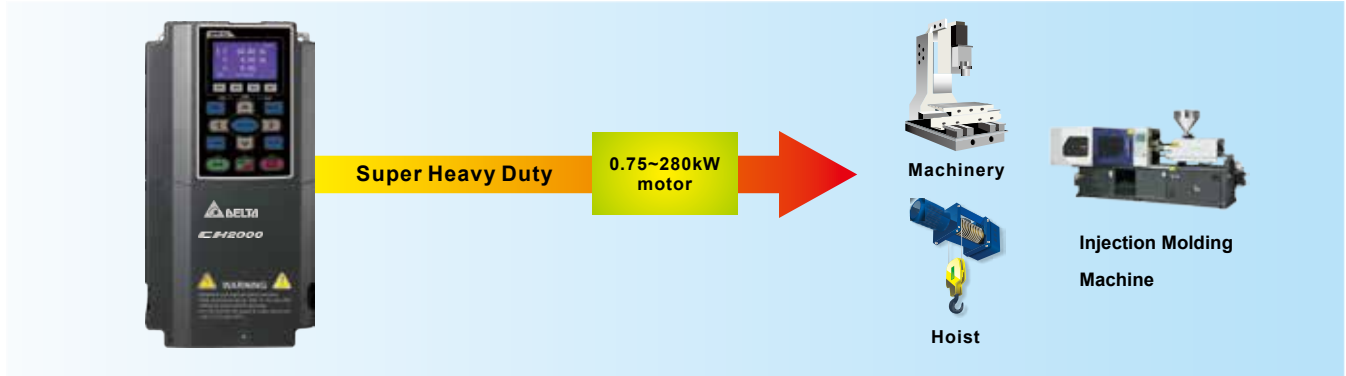


## Auto-acceleration of Light Load



# Excellent Overload Capability

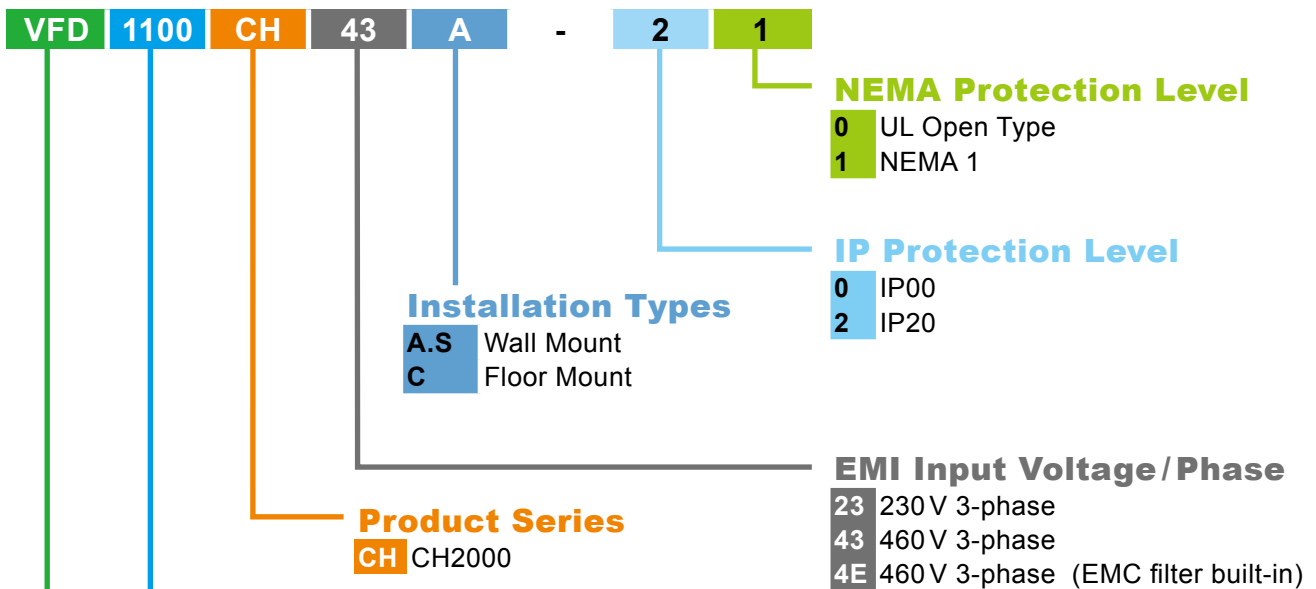
The super heavy duty setting is suitable for harsh environment applications with a current overload capability of 150% for 60 seconds and 200% for 3 seconds.



## Standard Models

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

## Model Name



### Applicable Motor Capacity

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

**Product**  
Variable Frequency Drive



# C200

## Series



### Features

- ▶ Flexible and user-friendly interface supporting multi-point inputs, analog inputs, CANopen and RS-485 with MODBUS communication application flexibility
- ▶ Simple and fast installation, parameter setting and tuning
- ▶ Built-in 5K steps PLC programming capability
- ▶ Supports wall mount installation (Frame A)
- ▶ Enhanced conformal coating on PCB and thermal design suitable for harsh environment applications
- ▶ Instant response to sudden load impact and prevents inrush current from interrupting system operation

### Built-in High-speed Fieldbus

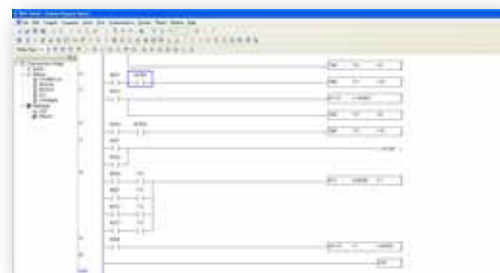
- ▶ Built-in RS-485 with MODBUS communication
- ▶ CANopen (DS402)
  - Delta provides CANopen Builder software to facilitate the planning process
  - I/O data configuration for all products that support CANopen communication protocol



MKCB-HUB01

### Built-in PLC Functions

- ▶ 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.

## Field Applications

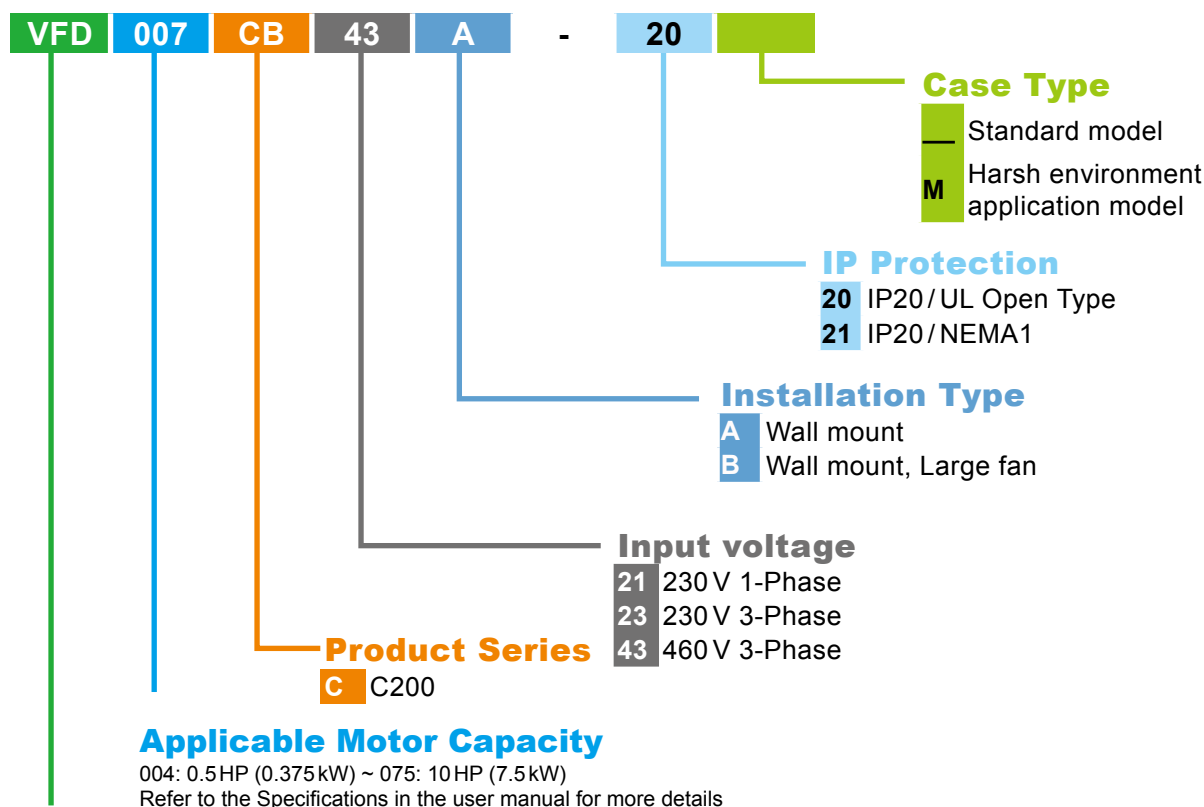
Easy to use with high safety standard and versatile control functions for applications that require speed.

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

## Standard Models

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

## Model Name



### Product

Variable Frequency Drive

# 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 EMC 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

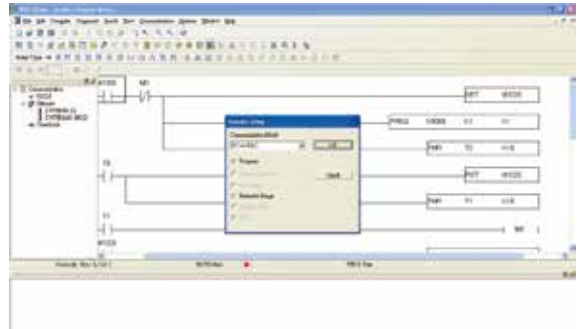


### ▶ Standard MODBUS Protocol

Standard MODBUS Protocol via RS-485

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

PLC programming and editing capability without the need of a 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)



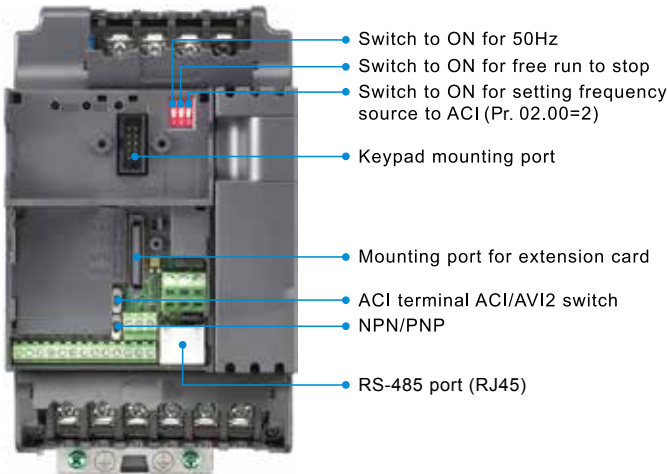
■ **EME-PG01**  
PG card

- **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)

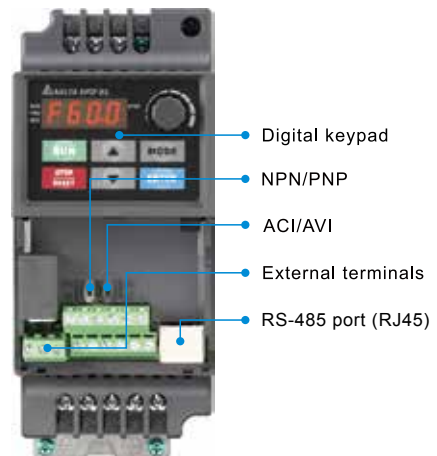
- **EME-A22A**  
Analog I/O Card (12 bits)
- **CME-USB01**  
Second communication card (USB1.1)

# External Parts

## VFD-E Series



## VFD-EL Series



# Standard Models

## Power Range

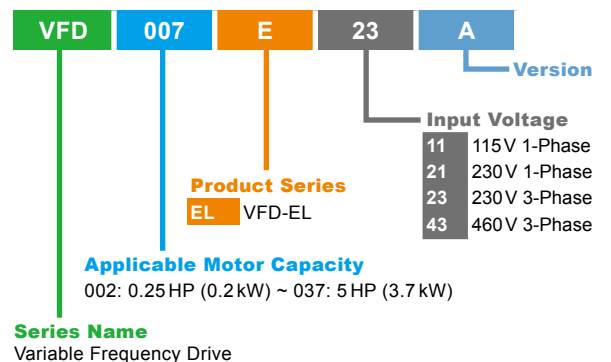
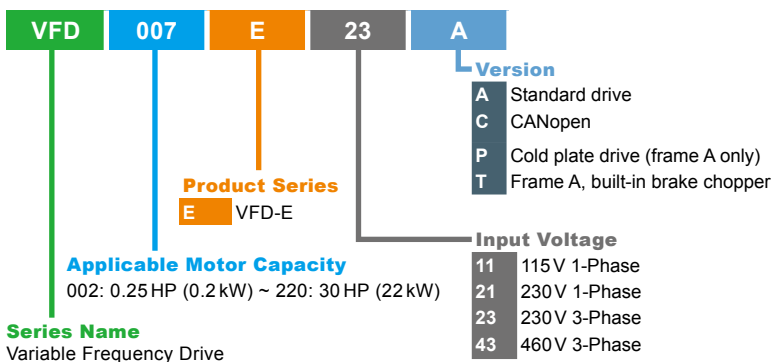
### VFD-E Series:

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

### VFD-EL Series:

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

# Model Name





Smarter. Greener. Together.

## 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,  
People's Republic of China (Post code: 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.  
Post code : 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, HSIIDC  
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

### Delta Electronics (Netherlands) B.V.

Eindhoven Office  
De Witbogt 20, 5652 AG Eindhoven, The Netherlands  
TEL: +31 (0)40-8003800 / FAX: +31 (0)40-8003898

\*We reserve the right to change the information in this catalogue without prior notice.