Automation for a Changing World

Delta Vector Control
AC Motor Drive

www.deltaww.com
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.
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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

DCI Communication Integrator
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-PG01O
- EMC-PG01U
- EMC-PG01L
- EMC-PG01R

I/O cards
- EMC-R6AA
- EMC-D42A
- EMC-D61A
- EMC-BPS01

Communication cards
- CMC-P001
- CMC-DN01

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.
### 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.

![Graph showing torque output at various frequencies](image)

### Auto Energy-Saving

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

![Graph showing frequency command, output voltage, and current](image)

### 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:**
  VFD 007 C 43 A
  Series Name: Variable Frequency Drive
  Applicable Motor Capacity
  007: 1 HP (0.75kW) ~ 4500: 600 HP (450kW)
  * Refer to product specification for detailed information

- **600 V / 690 V:**
  VFD 007 C 43 A
  Series Name: Variable Frequency Drive
  Applicable Motor Capacity
  015: 2 HP (1.5 kW) ~ 6300: 675 HP (630 kW)
  * Refer to product specification for detailed information

- **Version**
  A Wall-Mounted
  S Same Power, Small Size
  U Same Power, Small Size with Junction Box
  E Built-in EMC Filter

- **Input Voltage**
  A 230 V 3-Phase
  A 460 V 3-Phase

- **NEMA Protection Level**
  0 UL Open Type
  1 NEMA 1

- **IP Protection Level**
  0 IP00
  2 IP20

- **Product Series**
  C C2000
**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:

![Communication Protocols](image)

► 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)
CH2000 Series

Features

- Fast response to impact loads
- Super Heavy Duty (SHD) setting for high overload
- Large starting torque: above 200% at 0.5 Hz, and 200% at 0 Hz 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 10 K 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

- Checking time
- Original speed
- Light load status checking
- Current checking level
- Output Frequency
- Output Current
**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**

- **Product Series**
  - CH CH2000

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

- **NEMA Protection Level**
  - 0 UL Open Type
  - 1 NEMA 1

- **IP Protection Level**
  - 0 IP00
  - 2 IP20

- **Installation Types**
  - A.S Wall Mount
  - C Floor Mount

- **EMI Input Voltage/Phase**
  - 23 230 V 3-phase
  - 43 460 V 3-phase
  - 4E 460 V 3-phase (EMC filter built-in)
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

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

**Model Name**

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<th>CB</th>
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**Product Series**

- C200

**Applicable Motor Capacity**

- 004: 0.5 HP (0.375 kW)
- 075: 10 HP (7.5 kW)

Refer to the Specifications in the user manual for more details

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

**External Parts**

- **VFD-E Series**
  - Switch to ON for 50Hz
  - Switch to ON for free run to stop
  - Switch to ON for setting frequency source to AC1 (Pr. 02.00=2)
  - Keypad mounting port
  - Mounting port for extension card
  - AC1 terminal AC1/AVI2 switch
  - NPN/PNP
  - RS-485 port (RJ45)

- **VFD-EL Series**
  - Digital keypad
  - NPN/PNP
  - CANopen
  - External terminals
  - RS-485 port (RJ45)

**Standard Models**

- **Power Range**
  - **VFD-E Series**: 1-phase 115V series: 0.2~0.75 kW (0.25~1 hp)  
  1-phase 230V series: 0.2~2.2 kW (0.25~3 hp)  
  3-phase 230V series: 0.2~7.5 kW (0.25~20 hp)  
  3-phase 460V series: 0.4~22 kW (0.50~30 hp)
  - **VFD-EL Series**: 1-phase 115V series: 0.2~0.75 kW (0.25~1 hp)  
  1-phase 230V series: 0.2~2.2 kW (0.25~3 hp)  
  3-phase 230V series: 0.2~3.7 kW (0.25~5 hp)  
  3-phase 460V series: 0.4~3.7 kW (0.50~5 hp)

**Model Name**

- **VFD** 007 E 23 A
  - **Product Series**: VFD-E
  - **Applicable Motor Capacity**: 002: 0.25 HP (0.2 kW) ~ 220: 30 HP (22 kW)
  - **Series Name**: Variable Frequency Drive

- **VFD** 007 E 23 A
  - **Product Series**: VFD-EL
  - **Applicable Motor Capacity**: 002: 0.25 HP (0.2 kW) ~ 037: 5 HP (3.7 kW)
  - **Series Name**: Variable Frequency Drive

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[Delta logo]

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