



Digitized Automation for a Changing World

# Delta CANopen Communication Compact Drive VFD-EL-C Series



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



# Delta Sensorless Vector Control Compact Drive VFD-EL-C Series

## Flexible interconnection for boundless communications

Compact drives offer power ranges from 0.2 kW to 5.5kW, and feature integrated frequency speed control and remote I/O modules with CANopen communication. These drives provide an optimal solution with the features of interconnection, simplicity, and stability.



Frame A1



Frame A2



Frame B

## Interconnected



Built-in CANopen communication (CiA402)



Built-in Modbus protocol



CANopen remote I/O (6 DI + 4 DO)

## Simple



Dual RJ45 port, no Hub required



Intuitive keypad with DI/DO indicators



4 DO (30 V/500 mA)



Natural cooling (Frame A1): no maintenance required



Fan cooling (Frame A2, Frame B): easy fan removal and replacement

## Stable



150% / 60 secs overload capability



Energy-saving and deceleration energy backup (DEB) functions



Comprehensive protection mechanism



Up to 100 testings, in compliance with CE certification

## Features

### User-friendly Ports for Simple Implementation



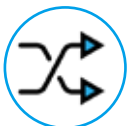
Supports CiA402 Slave, which is coherent with Delta's inverters and CANopen applications. Provides customization services.



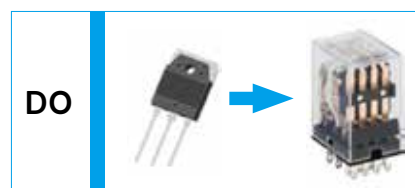
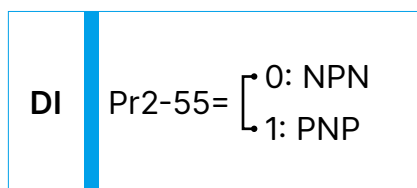
Built-in dual RJ45 ports for connecting CANopen and Modbus networks, no Hub required.



DI/DO supports CANopen PDO feedback and control with the features of remote I/O.



- 6 DI support parameters change through NPN/PNP Mode.
- 4 DO use 30 V/500 mA large capacity transistor with external power supply. Direct drive available.



The intuitive panel displays DI/DO conducting state. Simple on-site commissioning.

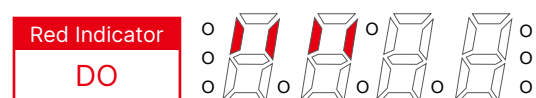
L to R: MI1~MI6

Lights on: MI operation

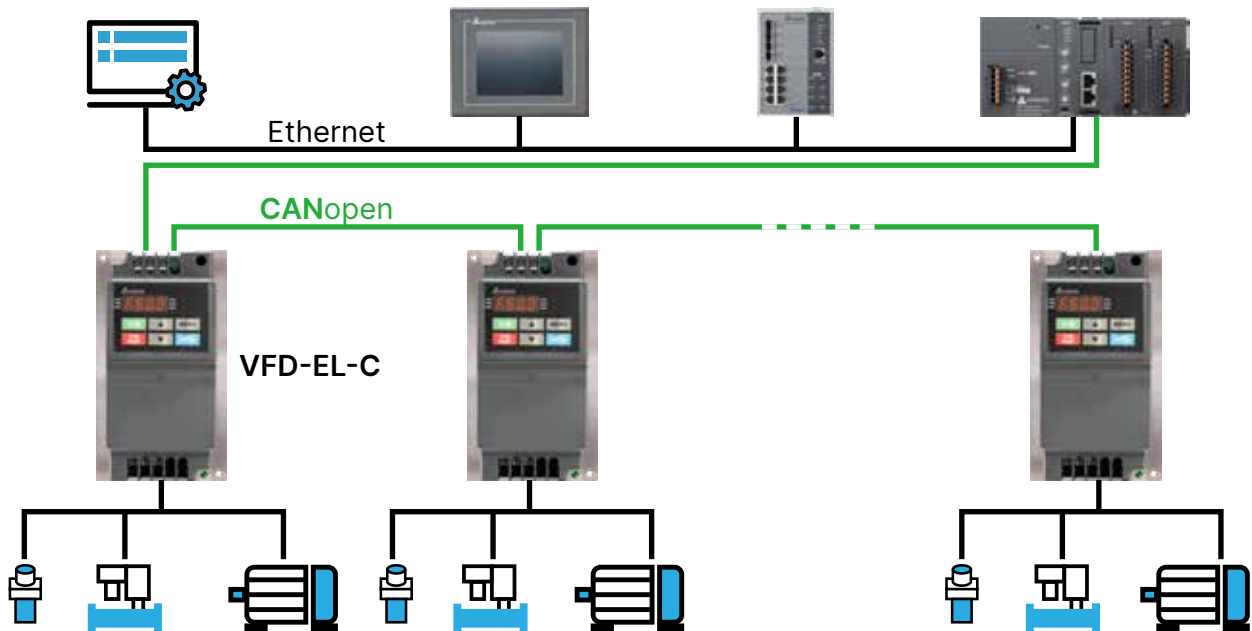


L to R: MO1~MO4

Lights on: MO operation



## Network Diagram



Receives commands from the host controller through CANopen communications and returns the current state of the equipment, forming a closed-loop feedback control.

**Provides on-site fieldbus ports.**



Built-in 6 DI + 4 DO for remote I/O modules distribution. Integrated on-site equipment ports, no additional accessories required. Easy maintenance and compact design.

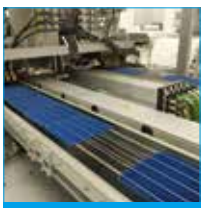
**Integrated design without extra accessory requirements. Easy to maintain and saves space.**



150% / 60secs overload capability and multiple protection mechanism.

**Stable on-site equipment operation.**

## Applications



Photovoltaic  
Production  
Line  
Conveyor



Packaging  
Conveyor



Spray  
Painting  
Conveyor



Food  
Packaging  
Conveyor



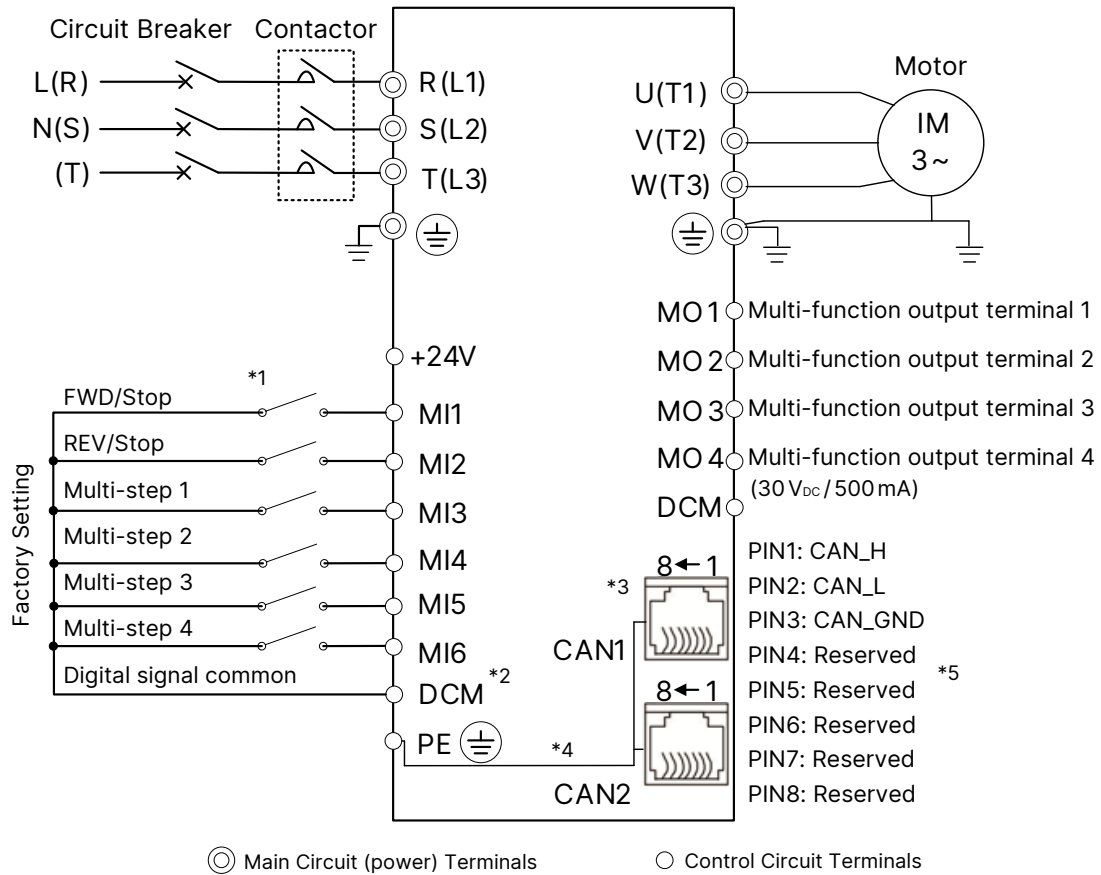
Logistics  
Conveyor



Woodworking  
Machinery

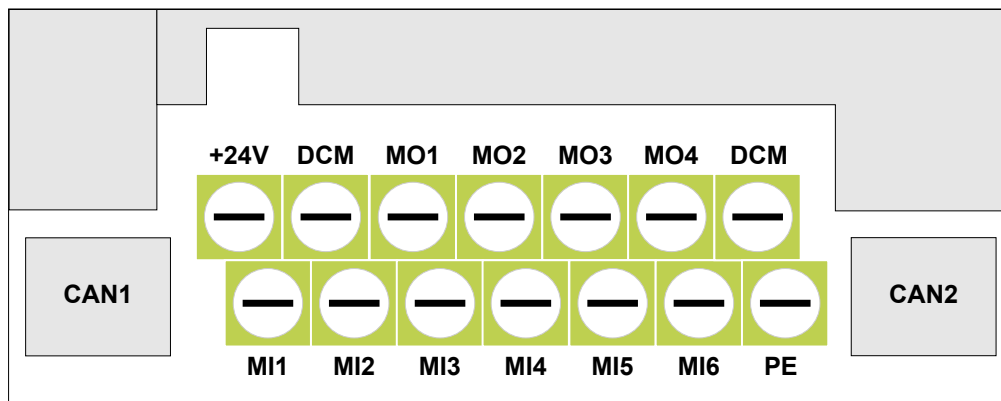
# Wiring

## 230 V / 460 V Models



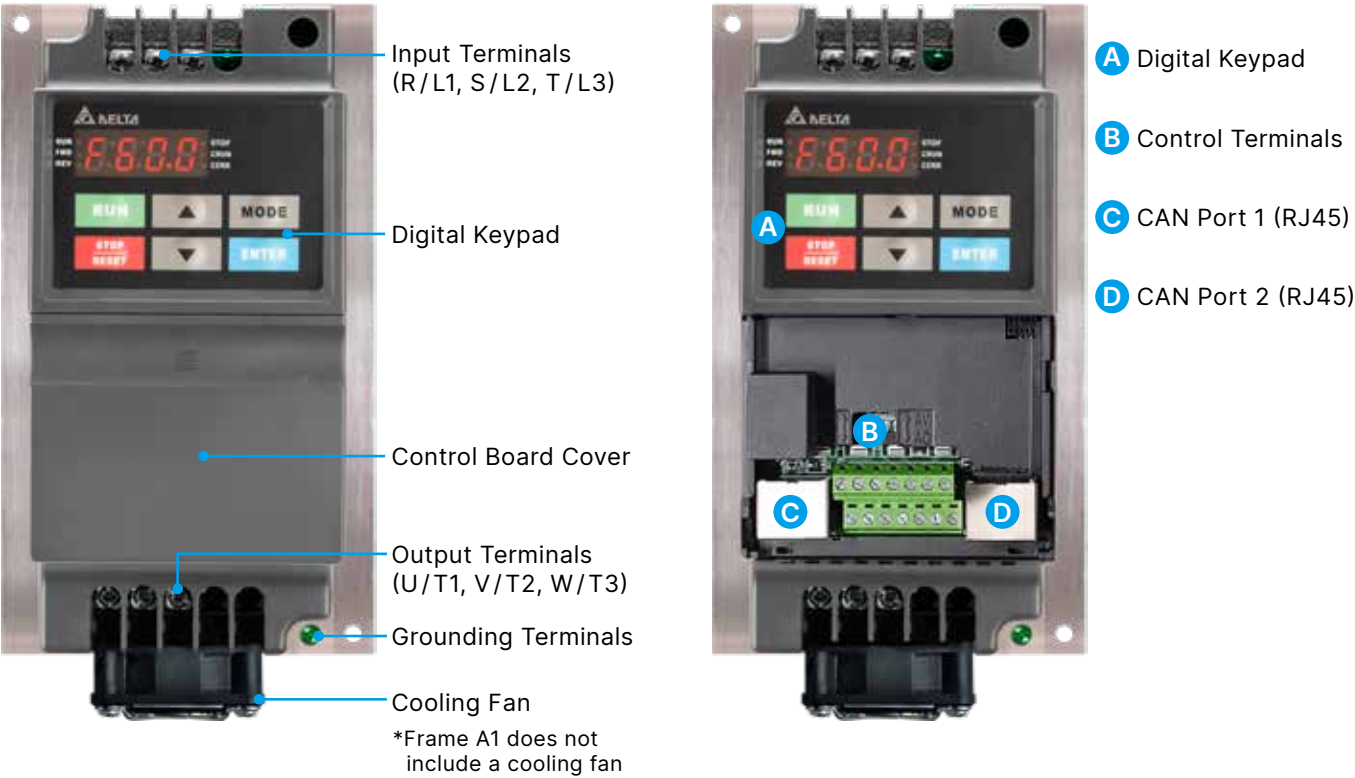
- \*1. MI digital input terminals are compatible with NPN/PNP Mode. Apart from standard wiring, please take parameter 02-55 into account for changeover. Factory setting (02-55 is 0: NPN Mode).
- \*2. MI digital input terminals and MO digital output terminals are common ground and DCM.
- \*3. The internal wiring of CAN1/CAN2 terminals (two RJ45 ports) is in parallel connection. Basically, they are the same.
- \*4. The shielded case of the RJ45 terminal is connected internally to PE terminal.
- \*5. RJ45 terminals PIN4 ~ Pin8 are reserved ports for on-site commissioning. To avoid operation abnormality, do NOT connect any wires.

## Control Terminals

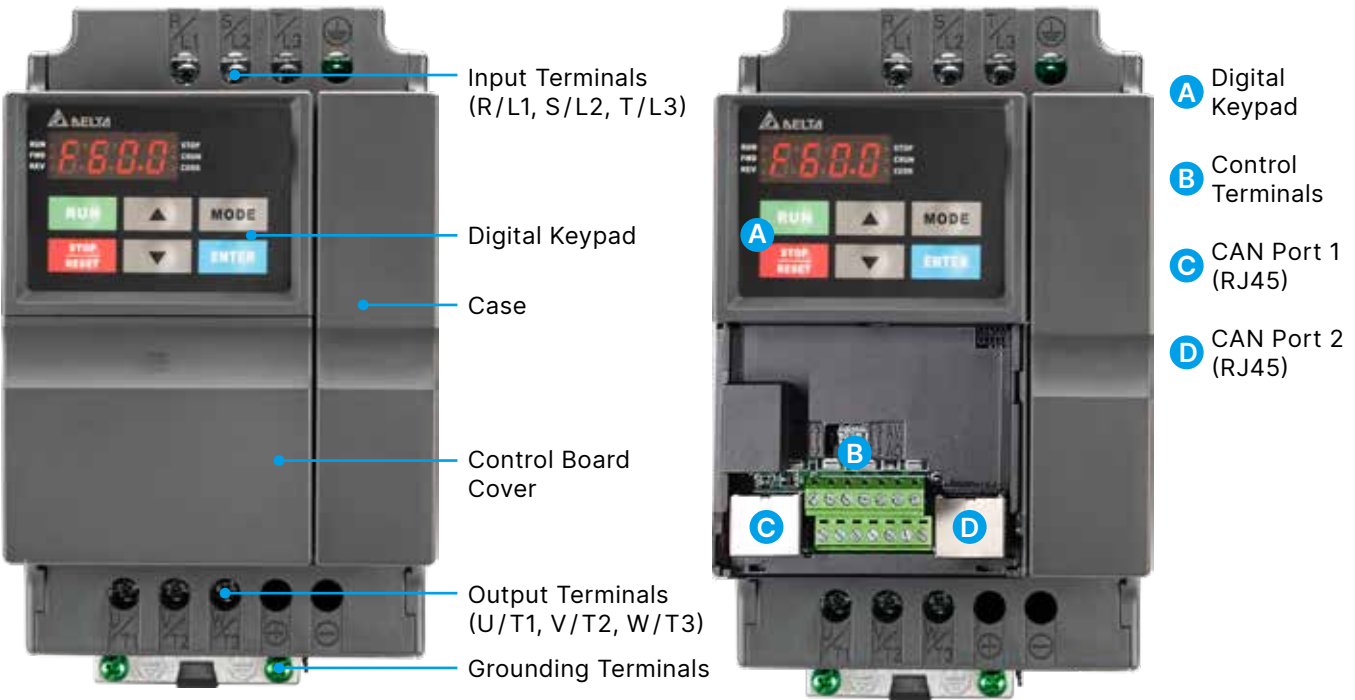


# Frames and Appearances

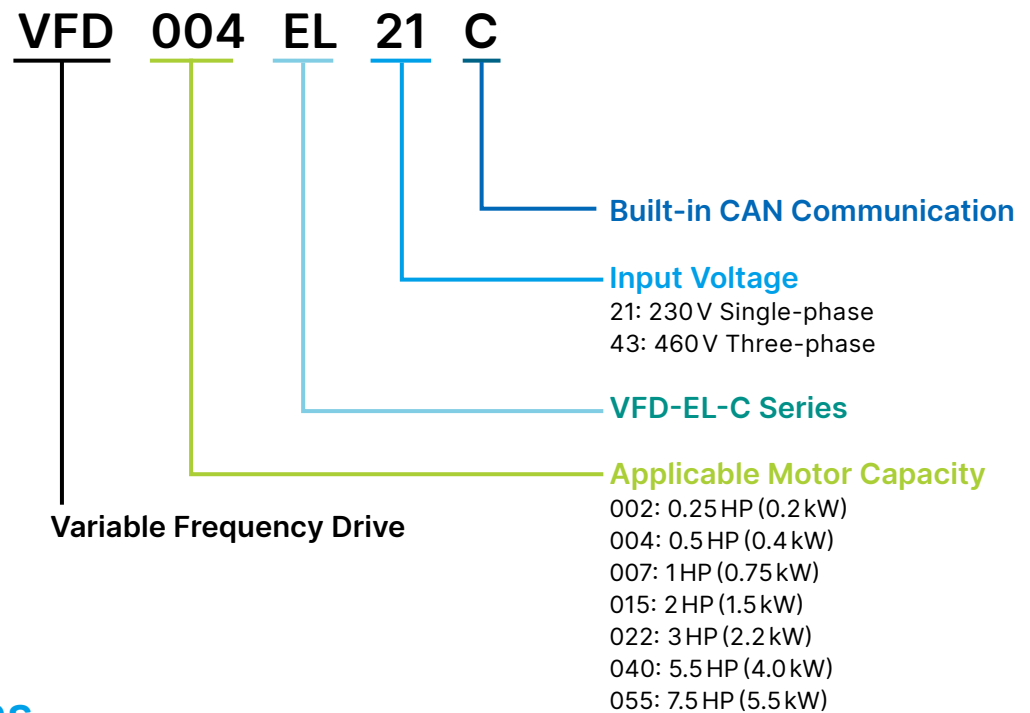
## ■ Frame A1/A2



## ■ Frame B



## Model Explanation



## Specifications

| Voltage                           |                             | 230 V                                                               |     |      |             |      | 460 V                                                              |      |             |     |      |      |
|-----------------------------------|-----------------------------|---------------------------------------------------------------------|-----|------|-------------|------|--------------------------------------------------------------------|------|-------------|-----|------|------|
| Frame                             |                             | A1                                                                  |     |      | B           |      | A1                                                                 |      | A2          | B   |      |      |
| Model                             | VFD-__EL21C<br>VFD-__EL43C  | 002                                                                 | 004 | 007  | 015         | 022  | 004                                                                | 007  | 015         | 022 | 040  | 055  |
| Max. Applicable Motor Output (kW) |                             | 0.2                                                                 | 0.4 | 0.75 | 1.5         | 2.2  | 0.4                                                                | 0.75 | 1.5         | 2.2 | 4.0  | 5.5  |
| Max. Applicable Motor Output (HP) |                             | 0.25                                                                | 0.5 | 1.0  | 2.0         | 3.0  | 0.5                                                                | 1.0  | 2.0         | 3.0 | 5.5  | 7.5  |
| Output Rating                     | Rated Output Capacity (kVA) | 0.6                                                                 | 1.0 | 1.6  | 2.9         | 4.2  | 1.2                                                                | 2.0  | 3.3         | 4.4 | 7.4  | 10.4 |
|                                   | Rated Output Current (A)    | 1.6                                                                 | 2.5 | 4.2  | 7.5         | 11.0 | 1.5                                                                | 2.5  | 4.2         | 5.5 | 9.0  | 13   |
|                                   | Maximum Output Voltage (V)  | Three-phase Proportional to Input Voltage                           |     |      |             |      |                                                                    |      |             |     |      |      |
|                                   | Max. Output Frequency (Hz)  | 0.1~400                                                             |     |      |             |      |                                                                    |      |             |     |      |      |
|                                   | Carrier Frequency (kHz)     | 2~9 (Default 2 kHz)                                                 |     |      |             |      |                                                                    |      |             |     |      |      |
| Input Rating                      | Rated Input Current (A)     | 4.9                                                                 | 6.5 | 9.3  | 15.7        | 24.0 | 1.8                                                                | 3.2  | 4.3         | 7.1 | 10.0 | 17.0 |
|                                   | Rated Voltage / Frequency   | Single-phase 200 V <sub>AC</sub> ~240 V <sub>AC</sub> ,<br>50/60 Hz |     |      |             |      | Three-phase 380 V <sub>AC</sub> ~480 V <sub>AC</sub> ,<br>50/60 Hz |      |             |     |      |      |
|                                   | Voltage Tolerance           | ±10% (180 V~264 V)                                                  |     |      |             |      | ±10% (342 V~528 V)                                                 |      |             |     |      |      |
|                                   | Frequency Tolerance         | ±5 % (47 Hz~63 Hz)                                                  |     |      |             |      |                                                                    |      |             |     |      |      |
| Weight (kg)                       |                             | 1.0                                                                 |     |      | 1.4         |      | 1.0                                                                |      |             | 1.4 |      | 1.5  |
| Cooling Method                    |                             | Natural Cooling                                                     |     |      | Fan Cooling |      | Natural Cooling                                                    |      | Fan Cooling |     |      |      |

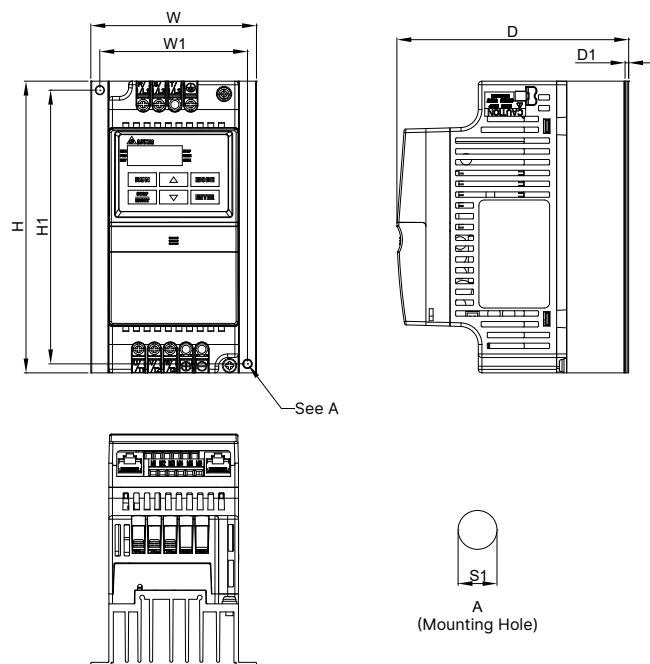
## General Specifications

| Item                     |                                    | Specifications                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control Characteristics  | Control System                     | SPWM (Sinusoidal Pulse Width Modulation) control (V/F Control)                                                                                                                                                                                                                                                                                                         |
|                          | Frequency Setting Resolution       | 0.01Hz                                                                                                                                                                                                                                                                                                                                                                 |
|                          | Output Frequency Resolution        | 0.01Hz                                                                                                                                                                                                                                                                                                                                                                 |
|                          | Torque Characteristics             | Including the torque and slip compensation; starting torque can be 150% at 5 Hz                                                                                                                                                                                                                                                                                        |
|                          | Overload Endurance                 | 150% of rated current for 1 minute                                                                                                                                                                                                                                                                                                                                     |
|                          | Skip Frequency                     | Three zones, setting range 0.1~400Hz                                                                                                                                                                                                                                                                                                                                   |
|                          | Accel./Decel. Time                 | 0.1 to 600secs (2 independent settings for accel./decel. time)                                                                                                                                                                                                                                                                                                         |
|                          | Stall Prevention Level             | Setting 0 to 200% of rated current                                                                                                                                                                                                                                                                                                                                     |
|                          | DC Brake                           | Operating frequency 0.1~400Hz, output 0~100% rated current<br>Start time 0~60secs, stop time 0~60secs                                                                                                                                                                                                                                                                  |
|                          | V/F Pattern                        | Adjustable V/F pattern                                                                                                                                                                                                                                                                                                                                                 |
| Environmental Conditions |                                    | Overvoltage, overcurrent, under voltage, anomalies, motor overload, drive overload, drive overheating                                                                                                                                                                                                                                                                  |
| Operation Functions      |                                    | Built-in voltage regulators, accel./decel. S-curve, over-voltage/over-current stall prevention, anomalous logs, reverse ban, restart for instantaneous power outage, DC brake, torque/slip compensation, carrier frequency setting, output frequency limits, parameter reset, external counter, reset and restart for anomalies, energy-saving, NPN/PNP Mode selection |
| Digital Keypad           |                                    | 6 function keys, 4-digit 7-segment LED, 4 status LEDs, adjustable frequency, output frequency, actual output current display, self-defined units, parameter settings and lock function, anomaly alarms, RUN/STOP/RESET/FWD/REV buttons                                                                                                                                 |
| Environmental Conditions | Enclosure Rating                   | IP20                                                                                                                                                                                                                                                                                                                                                                   |
|                          | Pollution Degree                   | 2                                                                                                                                                                                                                                                                                                                                                                      |
|                          | Installation Location              | Altitude 1,000m or lower, keep away from corrosive gases, liquids and dust                                                                                                                                                                                                                                                                                             |
|                          | Operating Temperature              | -10°C to +50°C (non-condensing and non-icing)*1                                                                                                                                                                                                                                                                                                                        |
|                          | Storage/Transportation Temperature | -20°C to +60°C                                                                                                                                                                                                                                                                                                                                                         |
|                          | Ambient Humidity                   | Below 90% RH (non-condensing)                                                                                                                                                                                                                                                                                                                                          |
| Vibration                |                                    | 1.0mm, peak to peak 2~13.2Hz; 0.7G~1.0G; 13.2~55Hz;<br>1.0G, 55~512Hz; compliant with IEC 60068-2-6                                                                                                                                                                                                                                                                    |
| Certification            |                                    | CE, RoHS, GB 12668.3                                                                                                                                                                                                                                                                                                                                                   |

\*1. VFD007EL21C: to reach 50°C operating temperature, fan accessories are required.  
EL-C Series: abreast mounting, maximum operating temperature is +40°C.

## Dimensions

### ■ Frame A1

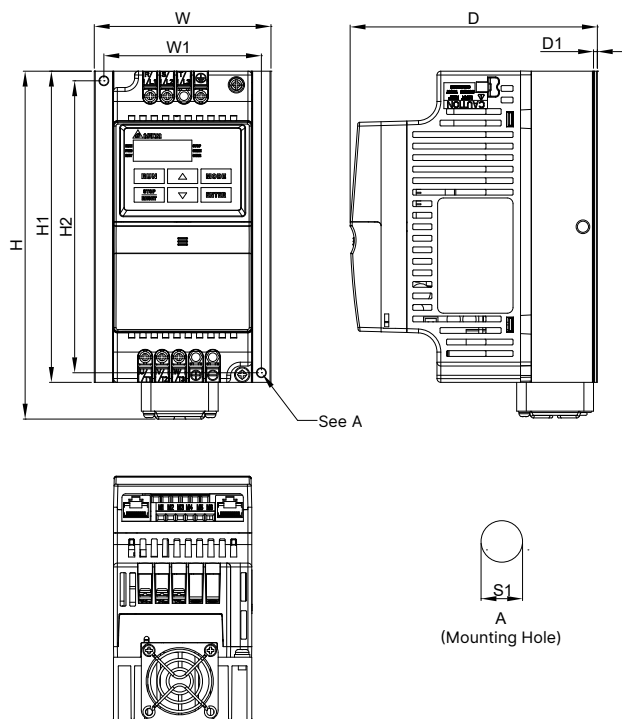


#### Model

VFD002EL21C  
VFD004EL21C  
VFD004EL43C  
VFD007EL21C  
VFD007EL43C

| Frame |      | W    | W1   | H     | H1    | D     | D1   | S1   |
|-------|------|------|------|-------|-------|-------|------|------|
| A1    | mm   | 92.0 | 82.0 | 162.0 | 152.0 | 128.7 | 2.0  | 5.4  |
|       | inch | 3.62 | 3.23 | 6.38  | 5.98  | 5.07  | 0.08 | 0.21 |

### ■ Frame A2

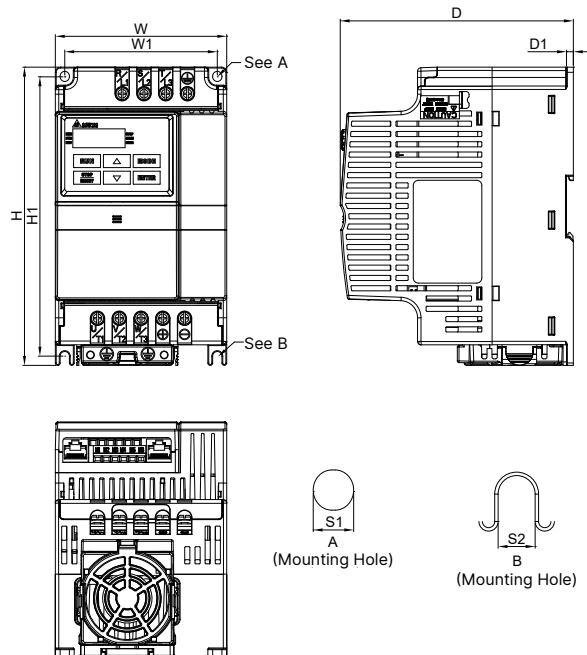


#### Model

VFD015EL43C

| Frame |      | W    | W1   | H     | H1    | H2    | D     | D1   | S1   |
|-------|------|------|------|-------|-------|-------|-------|------|------|
| A2    | mm   | 92.0 | 82.0 | 180.5 | 162.0 | 152.0 | 128.7 | 2.0  | 5.4  |
|       | inch | 3.62 | 3.23 | 7.11  | 6.38  | 5.98  | 5.07  | 0.08 | 0.21 |

## ■ Frame B



### Model

VFD015EL21C  
VFD022EL21C  
VFD022EL43C  
VFD040EL43C  
VFD055EL43C

| Frame |      | W     | W1   | H     | H1    | D     | D1   | S1   | S2   |
|-------|------|-------|------|-------|-------|-------|------|------|------|
| B     | mm   | 100.0 | 89.0 | 174.0 | 162.9 | 136.0 | 4.0  | 5.9  | 5.4  |
|       | inch | 3.94  | 3.50 | 6.85  | 6.42  | 5.35  | 0.16 | 0.23 | 0.21 |

## Ordering Information

| Frame    |                                                                                     | Cooling Method  | Operating Temperature | Power Range                                            | Models                                                                    |
|----------|-------------------------------------------------------------------------------------|-----------------|-----------------------|--------------------------------------------------------|---------------------------------------------------------------------------|
| Frame A1 |  | Natural Cooling | -10 °C ~ 50 °C        | 230 V:<br>0.2 ~ 0.75 kW<br><br>460 V:<br>0.4 ~ 0.75 kW | VFD002EL21C<br>VFD004EL21C<br>VFD004EL43C<br>VFD007EL21C*1<br>VFD007EL43C |
| Frame A2 |  | Fan Cooling     |                       | 460 V: 1.5 kW                                          | VFD015EL43C                                                               |
| Frame B  |  |                 |                       | 230 V:<br>1.5 ~ 2.2 kW<br><br>460V:<br>2.2 ~ 5.5 kW    | VFD015EL21C<br>VFD022EL21C<br>VFD022EL43C<br>VFD040EL43C<br>VFD055EL43C   |

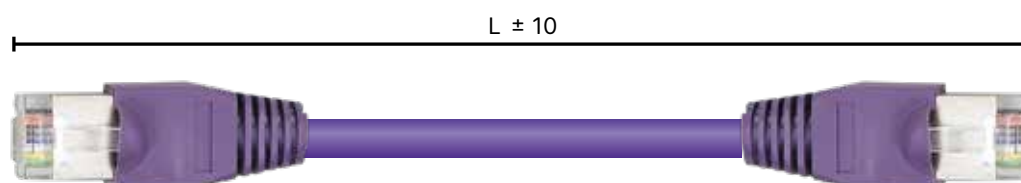
\*1. VFD007EL21C: to reach 50°C operating temperature, a fan kit MKEL-AFKM1 is required (without derating).

VFD007EL21C: to reach 40°C operating temperature, no need for a fan kit (without derating).

## Accessories and Software

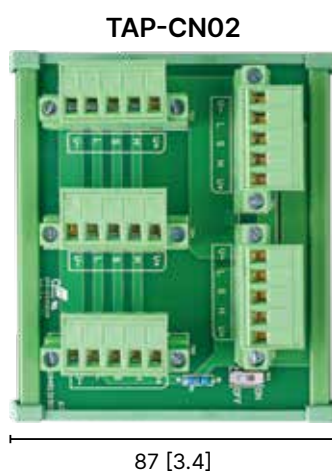
### Delta Standard Fieldbus Cable

| Delta Cables                                              | Model         | Description                   | Length |
|-----------------------------------------------------------|---------------|-------------------------------|--------|
| CANopen Cable /<br>Digital Keypad RJ45<br>Extension Cable | UC-CMC003-01A | CANopen cable, RJ45 connector | 0.3m   |
|                                                           | UC-CMC005-01A | CANopen cable, RJ45 connector | 0.5m   |
|                                                           | UC-CMC010-01A | CANopen cable, RJ45 connector | 1m     |
|                                                           | UC-CMC015-01A | CANopen cable, RJ45 connector | 1.5m   |
|                                                           | UC-CMC020-01A | CANopen cable, RJ45 connector | 2m     |
|                                                           | UC-CMC030-01A | CANopen cable, RJ45 connector | 3m     |
|                                                           | UC-CMC050-01A | CANopen cable, RJ45 connector | 5m     |
|                                                           | UC-CMC100-01A | CANopen cable, RJ45 connector | 10m    |
|                                                           | UC-CMC200-01A | CANopen cable, RJ45 connector | 20m    |



### CANopen Breakout Box

| Model    | Description                                                    |
|----------|----------------------------------------------------------------|
| TAP-CN01 | 1 in 2 out, built-in 121Ω termination resistor                 |
| TAP-CN02 | 1 in 4 out, built-in 121Ω termination resistor                 |
| TAP-CN03 | 1 in 4 out, RJ45 connector, built-in 121Ω termination resistor |



Unit: mm [inch]

## Software

| Software        | Authorization | Description                   |
|-----------------|---------------|-------------------------------|
| ISPSOft         | Free          | PLC program development tool  |
| COMMGR          | Free          | Communication management tool |
| CANopen Builder | Free          | CANopen configuration tool    |

## Fan Kit

Frame A1/Frame A2: MKEL-AFKM1

Frame B: MKEL-BFKM1



## Reactor

RF220X00A





Smarter. Greener. Together.

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