Automation for a Changing World

Delta High Performance Vector Control Drive C2000 Plus Series

reddot design award
winner 2010

www.deltaww.com

DELTA
Smarter. Greener. Together.

Advanced Drive Controls

▪ High Performance

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

▪ 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. Position control

▪ Environmental Adaptability

1. 50˚C operating temperature
2. Built-in DC reactor
3. Coated circuit boards
4. Built-in EMC filter
5. International safety standard (CE/UL/cUL)

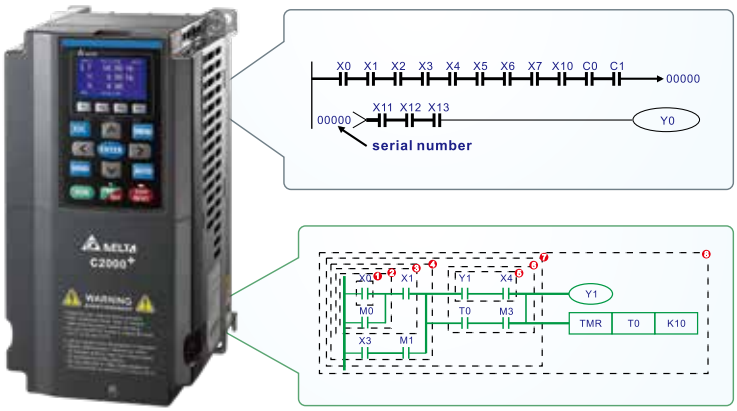
*Note: Please refer to the Product Specification

▪ Modular Design

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

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



Quick and Easy Parameters Setting via the LCD Keypad

- Multi-column display for the drive status
- Simple and intuitive operation
- User-defined parameter groups
- Real-time clock (RTC) function
- Multi-language display
- Copy function saves parameters and PLC programs to the keypad memory for easy backup/transferring to other drive
- IP66 protection level

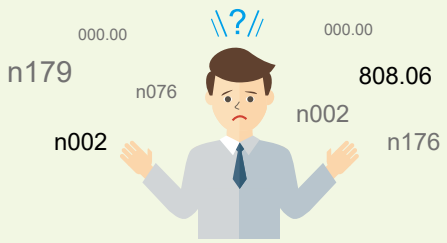
Start Wizard

Multi-Language

- English
- German
- Italian
- French
- Spanish
- Portuguese
- Polish
- Russian
- Turkish
- Chinese

Application Selection

Without parameter group…..



C2000 Plus parameter group function simplifies the drive setting procedures. Various applications are provided:

01: User-defined

02: AHU

03: Fan

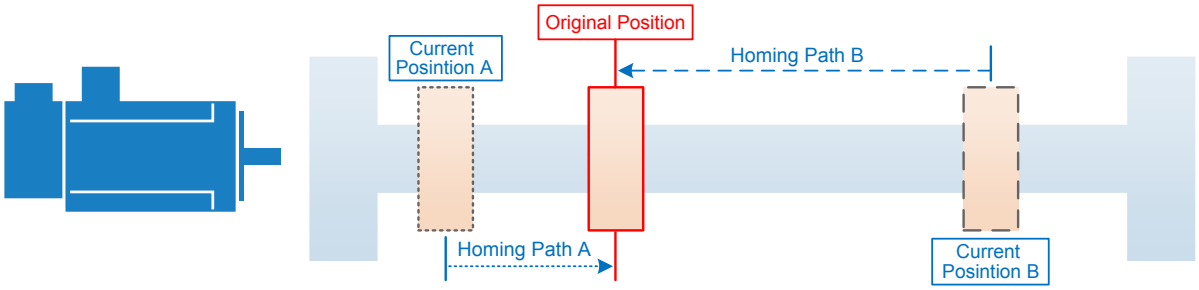
04: Pump

05: Compressor

Positioning Control

Homing

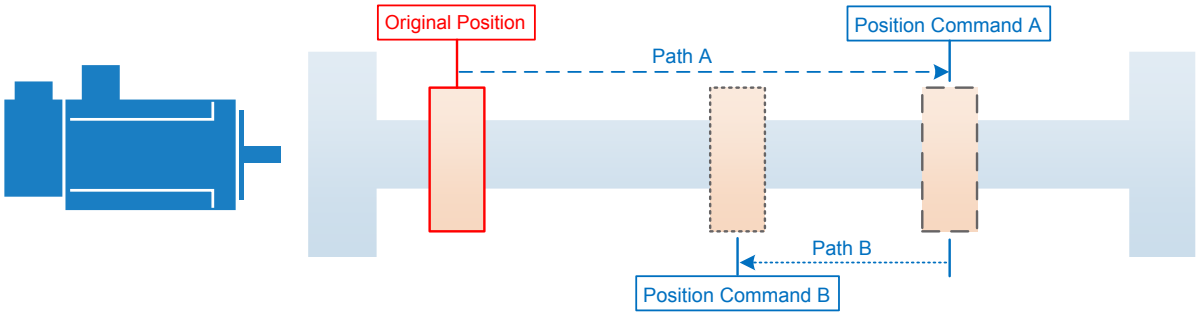
Determines the original position of the motion system, so as to ensure the motor starts from the same coordinates during each machining process



Linear stage

Multi-point Positioning

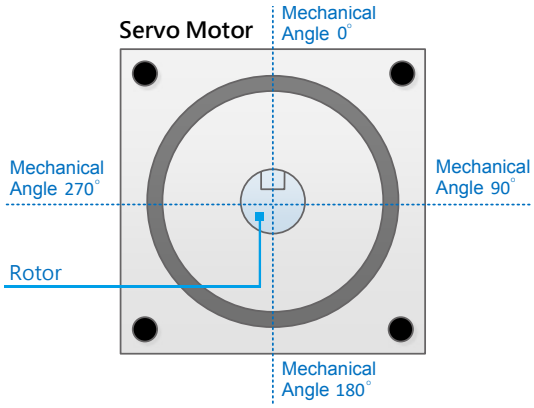
Allows the motor to operate from one position to another, and switches up to 15 positions with 4 multi-function input terminals

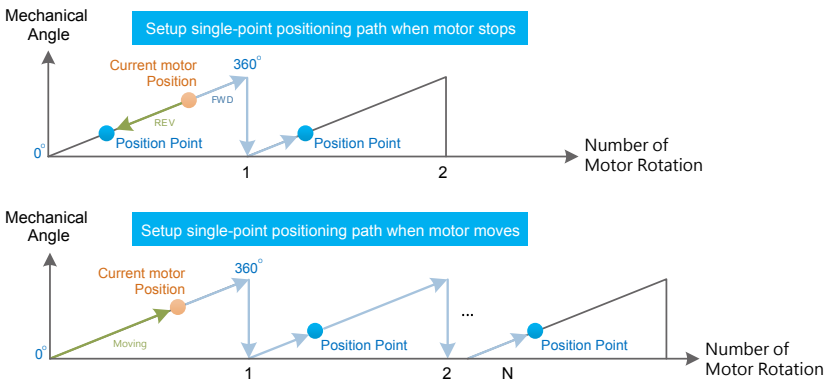


Linear stage

Single-point Positioning

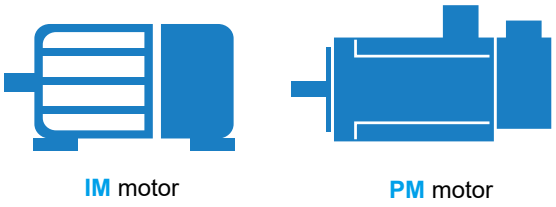
Positions the motor at a specific point (within a single rotation) for precise stop upon request





A Drive for Permanent Magnet (PM) Motors

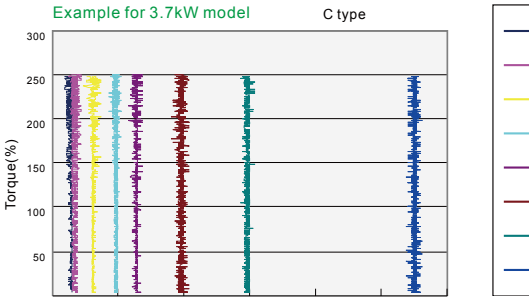
The C2000 is a dual mode drive to control both an induction motor and permanent magnet motor. The dynamic response of a PM motor provides precise control of position, speed and torque



IM motor PM motor

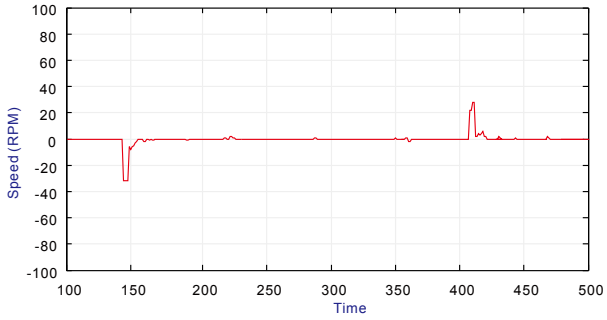
High-Performance Field-oriented Control

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



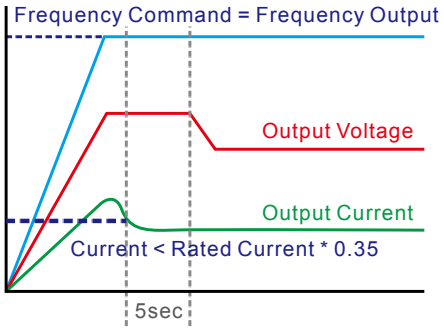
Fast Response to Impact Load

During load changes, the C2000 Series calculates the required torque response and minimizes the vibration caused by load impact using FOC



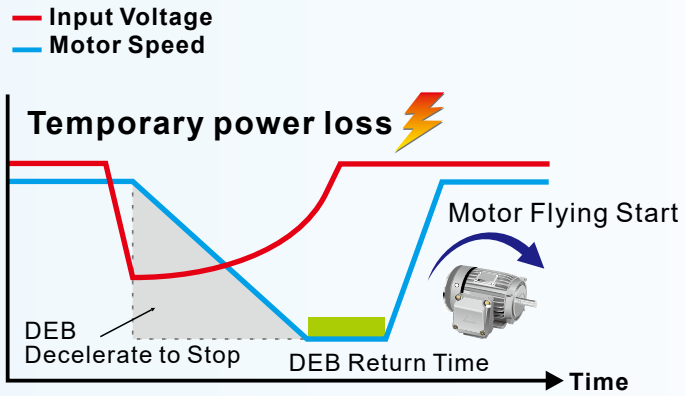
Auto Energy-Saving Operation

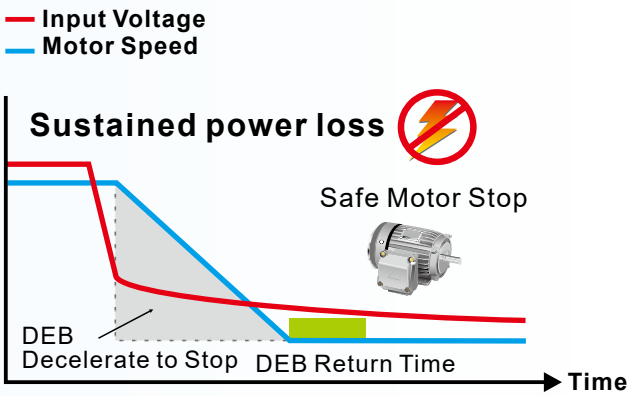
Auto-calculates the optimal voltage for the load output using load power when under constant speed operation



Deceleration Energy Backup (DEB)

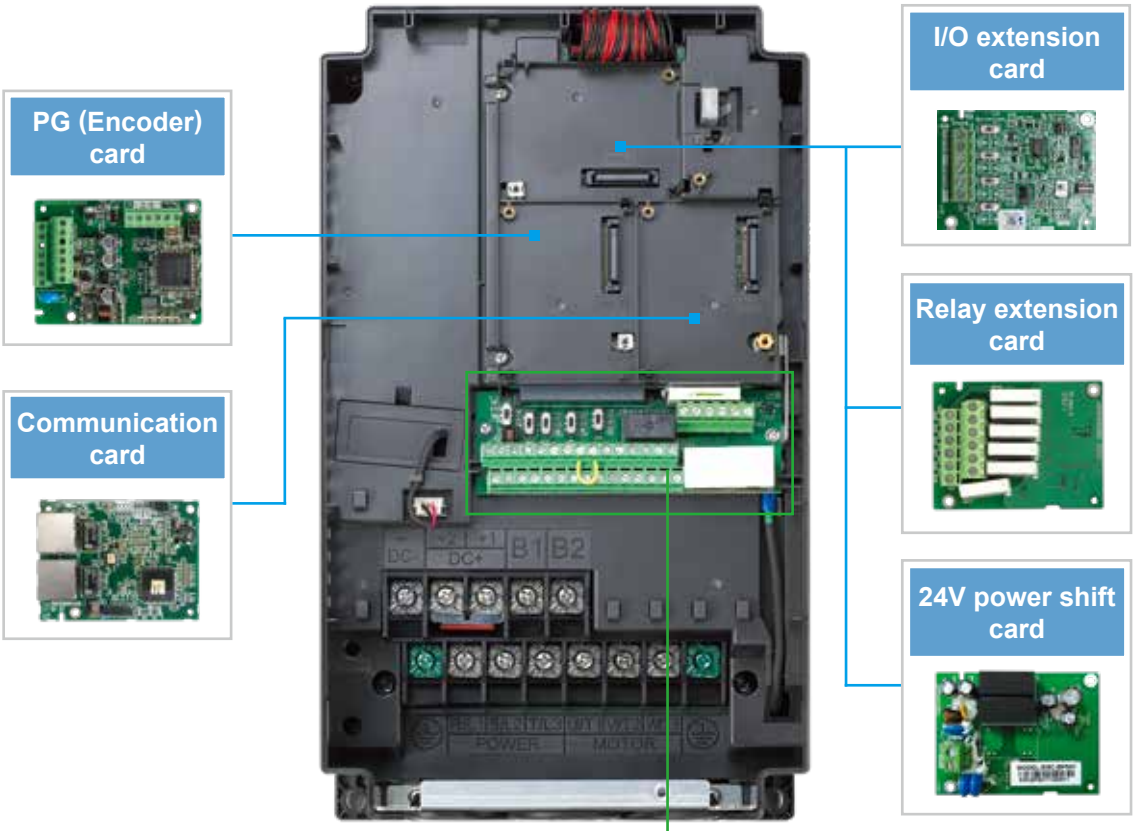
This function controls the motor deceleration to stop when power blinks off to prevent mechanical damage and then accelerates to its original operation speed when power resumes





Modular Design

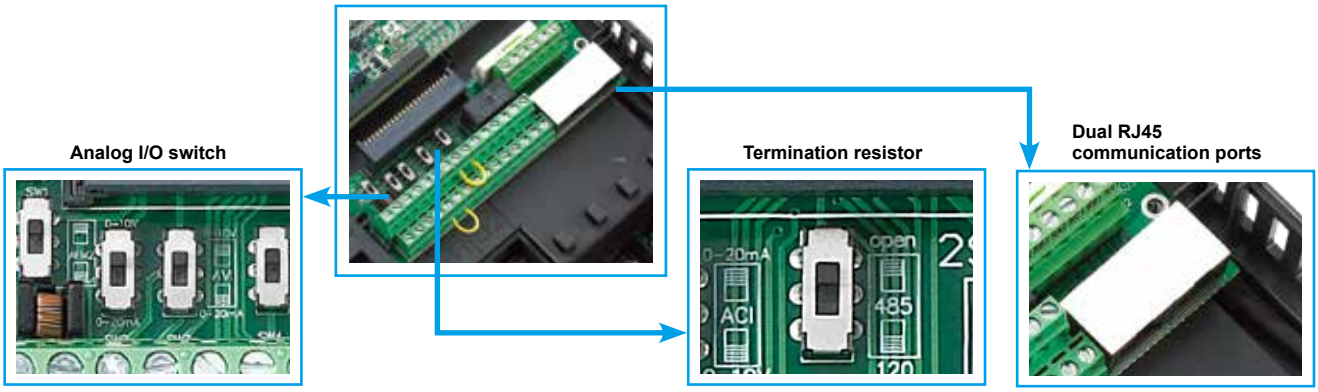
Various accessories options, such as I/O extension cards, encoder feedback cards, communication cards, hot pluggable LCD keypad, removable terminals and removable fans



*NOTE: "▶" are optional accessories.

■ Removable terminals

Convenient wiring and safety equipment.



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

■KPC-CC01 keypad
■Standard RJ45 network cable for remote operation.
■Easy to remove with one press.

■The product nameplate shows the input/output voltage, input/output current, the frequency range, and more.

■Remove the safety screws and press on both side tabs to remove the cover.

■RFI Jumper

■Modular fan design, easy to replace and clean, extending product service life.

Excellent Environment Adaptability

- Built-in DC choke to surpress harmonics*
- Built-in EMC filter to filter noise*
- Conformal coating (Class 3C3 of IEC60721-3-3 standard) ensures drive operation stability and safety in critical environments.
- The electronic components of the drive are isolated from the cooling system to reduce heat interference. Dissipated heat can be discharged by flange-mounting installation, and forced fan cooling can import cold air into the heat sink. The heat dissipation performance is optimized by these two cooling methods.

*Note: Please refer to the Product Specification

Certifications

UL, cUL	**CE** Low Voltage: EN61800-5-1 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
C-Tick	
ROHS	

High-Speed Networking

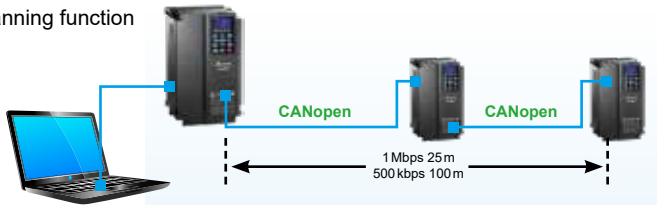
- Provides various fieldbus cards for flexible applications
- Advanced network functions
- Built-in Modbus communication

DP / PROFINET / DeviceNet / Modbus TCP / EtherNet/IP / EtherCAT / CANopen

■ CANopen (DS402)

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

- Supports all Delta industrial automation products (Built-in EDS files for all Delta industrial automation products)
- I/O data configurations for each device on the CANopen network
- Motion control planning function
- WPL Soft



- TAP-CN03 distribution box for long distances

- RJ45 cable

■ DeviceNet

Through the Delta specially designed DeviceNet Builder software, users can easily establish a standard DeviceNet control network by the parameter pre-assignment function for each equipment and remote I/O

- Supports all Delta industrial automation products (Built-in EDS files for all Delta industrial automation products)
- I/O data configurations for each device on the DeviceNet network
- DeviceNet layout software

■ EtherNet/IP

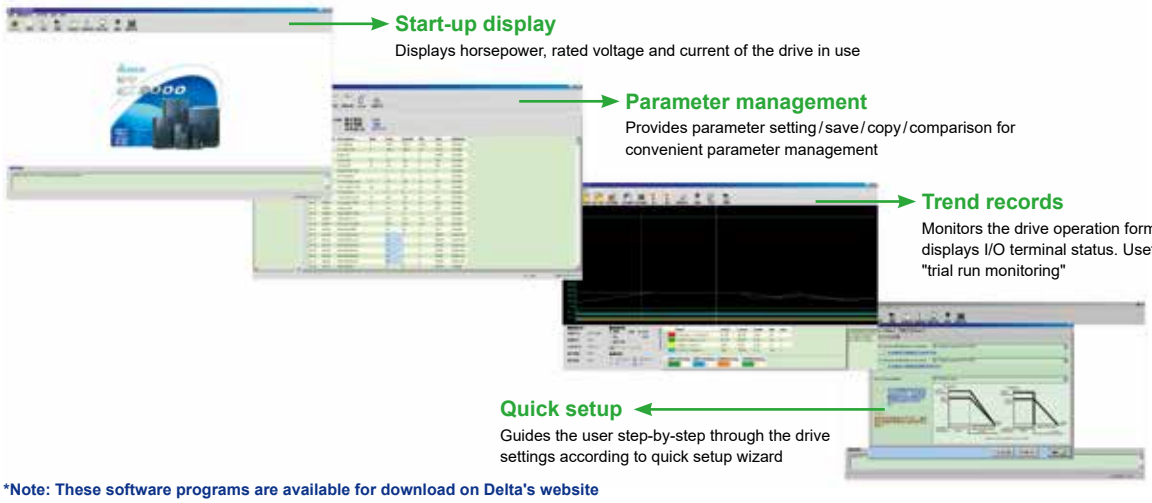
■ Modbus TCP

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

Convenient Drive System Management Platform

■ 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 the drive in use

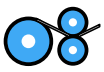
Parameter management
Provides parameter setting/save/copy/comparison for convenient parameter management

Trend records
Monitors the drive operation form via network 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: These software programs are available for download on Delta's website

Examples for Different Loads

Rated Load	Light Duty (LD) / Normal Load (ND)	Heavy Duty (HD)	Super Heavy Duty (SHD)
Parameters	Parameter 00-16 =2 (LD) or 0 (ND)	Parameter 00-16 = 0	Parameter 00-16 = 1
Overload Capacity	120% / 60 secs., 160% / 3 secs.	150% / 60 secs., 180% / 3 secs.	150% / 60 secs., 200% / 3 secs.
Applications	 HVAC;  Fan;  Pump;  Milling Machine;  Bending Machine;  Conveyor System;  Extruding Machine;  Machine Tool		 Crane / Hoist;  Pressing Machine
Carrier Wave Frequency	Parameter 00-17 for adjustment		

Carrier Wave Frequency	Electrical Noise	Noise & Leakage Current	Heat Dissipation	Current Waveform
2 kHz | 15 kHz	Loud | Low	Low | Loud Noise / Large Current	Low | High	

Model Name

VFD | 007 | C | 43 | A - 2 | 1

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

IP Protection Level
- 0 IP00
- 2 IP20

Version
- A B Wall mount
- C Floor mount

Input Voltage
- 23 230 V 3-Phase
- 43 460 V 3-Phase
- 4E 460 V 3-Phase Bult-in EMI
- 53 575 V 3-Phase
- 63 690 V 3-Phase

Product Series
- C C2000

Applicable Motor Capacity
007: 1 HP (0.75 kW) ~ 6300: 850 HP (630 kW)
* Refer to product specification for detailed information

Series Name
Variable Frequency Drive

460V$_{AC}$, 3Ø, Motor Power Range 0.7 ~ 560 kW for Heavy Duty Applications

Frame	Model Name	Output						Input		Power Supply	
		Heavy Duty (HD) *1			Super Heavy Duty (SHD)			Heavy Duty (HD)	Super Heavy Duty (SHD)	Heavy Duty (HD)	Super Heavy Duty (SHD)
	VFD_ _ _C4_ -00 / -21	Motor Power Range (kW)	Motor Power Range (HP)	Rated Output Current (A) *5	Motor Power Range (kW)	Motor Power Range (HP)	Rated Output Current (A) *5	Rated Input Current (A) *2	Rated Input Current (A)	Power Supply Capacity (kVA) *3	Power Supply Capacity (kVA)
A	007	0.75	1	3	0.4	0.5	1.7	4.3	3.5	3.6	2.9
	015	1.5	2	4	0.75	1	3	5.9	4.3	4.9	3.6
	022	2.2	3	6	1.5	2	4	8.7	5.9	7.2	4.9
	037	3.7	5	9	2.2	3	6	14	8.7	11.6	7.2
	040	4.0	5	10.5	3.7	5	9	15.5	14	12.9	11.6
	055	5.5	7.5	12	4.0	5	10.5	17	15.5	14.1	12.9
B	075	7.5	10	18	5.5	7.5	12	20	17	16.6	14.1
	110	11	15	24	7.5	10	18	26	20	21.6	16.6
	150	15	20	32	11	15	24	35	26	29.1	21.6
C	185	18.5	25	38	15	20	32	40	35	33.3	29.1
	220	22	30	45	18.5	25	38	47	40	39.1	33.3
	300	30	40	60	22	30	45	63	47	52.4	39.1
D0	370	37	50	73	30	40	60	74	63	61.5	52.4
	450	45	60	91	37	50	73	101	74	84.0	61.5
D	550	55	75	110	45	60	91	114	101	94.8	84.0
	750	75	100	150	55	75	110	157	114	130.5	94.8
E	900	90	125	180	75	100	150	167	157	138.8	130.5
	1100	110	150	220	90	125	180	207	167	172.1	138.8
F	1320	132	175	260	110	150	220	240	207	199.5	172.1
	1600	160	215	310	132	175	260	300	240	249.4	199.5
G	1850	185	250	370	160	215	310	380	300	315.9	249.4
	2000 *4	200	270	395	160	215	310	395	300	328.4	249.4
	2200	220	300	460	185	250	370	400	380	332.5	315.9
	2500 *4	250	340	481	200	270	395	447	390	371.6	324.2
H	2800	280	375	550	220	300	460	494	400	410.7	332.5
	3150	315	420	616	280	375	550	555	494	461.4	410.7
	3550	355	475	683	315	425	616	625	555	519.6	461.4
	4000 *4	400	530	770	355	475	683	770	590	640.1	490.5
	4500	450	600	866	355	475	683	866	625	720.0	519.6
	5000	500	675	930	450	600	866	930	866	773.2	720.0
	5600	560	750	1094	500	675	930	1094	930	909.5	773.2

Heavy Duty (HD)	At 150% of the rated output current, continuous operation lasts up to 1 min. in every 5 mins. At 180% of the rated output current, continuous operation lasts up to 3 secs. in every 30 secs.
Super Heavy Duty (SHD)	At 150% of the rated output current, continuous operation lasts up to 1 min. in every 5 mins. At 200% of the rated output current, continuous operation lasts up to 3 secs. in every 30 secs.
Rated Input Voltage	3Ø, 380 ~ 480 V$_{AC}$ (-15% ~ +10%)
Rated Input Frequency	50 / 60 Hz
Permissible Power Frequency Variation	±5% (47 ~ 63 Hz)
Displacement Power Factor (cosϕ)	> 0.98
Carrier Wave Frequency *6	Please see Note 6 below
Efficiency	97.8% (Frames A, B, C, D0, D); 98.2% (Frames E, F, G, H)
Cooling Method	Forced air-cooling (The models 007 and 015 are for natural cooling)
Braking Chopper	Built-in for frames A, B, C; optional for frames D0, D, E, F, G, H
DC Reactor	Optional for frames A, B, C; built-in for frames D0, D, E, F, G, H
EMC Filter	Built-in for VFDxxxC4EA-21 frames A, B, C; optional for other frames
EMC-COP01	Built-in for VFDxxxC4EA-21 frames A, B, C and VFDxxxC43A-21 frames D0, D, E, F, G, H; optional for other frames

Notes:
1. Factory rated load (parameter 00-16) is heavy duty by default.
2. Rated input current may vary with the power supply impedance, power adapter, input impedance, DC reactor and the actual loading.
3. Power supply capacity is calculated based on the rated input current and 480 V$_{AC}$ to select an electrical transformer capacity.
4. The model is market ready. Please contact us if you need it. For SHD models, please note the rated output current value.
5. For applications at high altitude, high ambient temperature, or with high carrier wave and advanced motor vector control. Refer to the user manual for corresponding derating curves.
6. Refer to the user manual for the default carrier wave frequency, adjustable range and derating curves.

General Specifications

Item		Specifications
Control Characteristics	Control Mode [*1]	**230 VAC / 460 VAC models:** Available modes below via parameter settings • IMVF (Induction Motor V/F control) • IMVF + PG (Induction Motor, V/F control with encoder) • IM/PM SVC (Inductor Motor / Permanent-magnet Synchronous Motor, space vector control) • IMFOC + PG (Induction Motor, field-oriented control with encoder) • PMFOC + PG (Permanent-magnet Synchronous Motor, field-oriented control with encoder) • IMFOC Sensorless (Induction Motor, sensorless field-oriented control) • PM Sensorless (Permanent-magnet Synchronous Motor, sensorless field-oriented control) • IPM Sensorless (Interior Permanent Synchronous Motor, sensorless vector control) • SynRM Sensorless (Synchronous Reluctance Motor, sensorless field-oriented control) • IM TQCPG (Induction Motor, torque control with encorder) • PM TQCPG (Permanent-magnet Synchronous Motor, torque control with encoder) • IM TQC Sensorless (Induction Motor, sensorless torque control) • SynRM TQC Sensorless (Synchronous Reluctance Motor, sensorless torque control) **575 VAC / 690 VAC models:** Available modes below via parameter settings • IM V/F (Induction Motor, V/F control) • IMVF + PG (Induction Motor, V/F control with encoder) • IM/PM SVC (Induction Motor / Permanent-magnet Synchronous Motor, space vector control)
	Max. Output Frequency [*2]	0 ~ 599 Hz
	Frequency Output Accuracy	Digital command: ±0.01%, -10°C ~ +40°C; Analog command: ±0.1%, 25±10°C
	Output Frequency Resolution (Input Frequency Resolution)	Digital command: 0.01 Hz, Analog command: 0.05 * max. output frequency (Parameter 01-00), 11 bit plus sign
	Speed Control Range (Speed Control Ratio) [*3]	• IMVF, IMVF + PG, IMSVC: 1:50 • IMFOC Sensorless: 1:100 • IMFOC + PG: 1:1000 • PMSVC: 1:20 • PM Sensorless: 1:50 • IPM Sensorless: 1:100 • PMFOC + PG: 1:1000
	Starting Torque	• IMVF, IMVF+PG, IMSVC: 150% / 3 Hz • IMFOC Sensorless: 200% / 0.5 Hz • IMFOC + PG: 200% / 0 Hz • PMSVC: 100% / (motor rated frequency / 20) • PM Sensorless: 100% / (motor rated frequency / 50) • IPM Sensorless: 100% / 0 Hz • PMFOC + PG: 200% / 0 Hz
	Torque Accuracy [*4]	TQC + PG: ±5% ; TQC Sensorless: ±15%
	Torque Limit	**230 VAC / 460 VAC models:** Heavy Duty: up to 180% torque current; Super Heavy Duty: up to 220% torque current **575 VAC / 690 VAC models:** Up to 200% torque current
Protection Characteristics	Out Over-current Protection	**230 VAC / 460 VAC models:** Over-current protection for 240% of rated current (Heavy duty) **575 VAC / 690 VAC models:** Over-current protection for 240% of rated current (Normal duty) When the over-current protection function is triggered, the C2000 Plus will stop and send out error codes.
	Output Current Clamp	**230 VAC / 460 VAC models:** Heavy duty / Super heavy duty: 190 ~ 195% rated current **575 VAC / 690 VAC models: (except 6300 models)** Light duty: 125 ~ 145% rated current; Normal duty: 170 ~ 175% rated current; Heavy duty: 200 ~ 250% rated current **VFD6300C63B-00/21:** Light duty / Normal duty / Heavy duty: 170 ~ 175% rated current The C2000 Plus will recover automatically and the current clamp will be disabled when output current resumes.
	Over-voltage (DC) Protection	**The C2000 Plus will shut down under below conditions:** **230 VAC models:** DC bus over 410 V; **460 VAC models:** DC bus over 820 V; **575 VAC / 690 VAC models:** DC bus over 1189 V
	Grounding Leakage Current Protection [*5]	The leakage current is 60% higher than the rated current
	Output Low / Under Current Fault [*5]	Low current detection in open circuits
	Short-circuit Current Rating (SCCR)	Per UL508C, the C2000 Plus with a fuse is suitable for power systems with less than 100kA short-circuit capacity
	Motor Overheat Protection [*5]	Supports electronic thermal relay protection, PTC, KTY84-130 and PT100
	Drive Overheat Protection	Built-in temperature sensor (IGBT refer to oH1, Heatsink refer to oH2)
	Fan Control	**230 VAC models:** VFD150C2xx-xx: PMW control; VFD110C2xx-xx and below: On / Off switch control **460 VAC models:** VFD185C4xx-xx: PMW control; VFD150C4xx-xx and below: On / Off switch control **575 VAC / 690 VAC models:** PWM control
Certification		**CE** (Low Voltage Directive 2014/35/EU, EN61800-5-1; EMC Directive 2014/35/EU, EN61800-3) **UL**508C, **cUL** CAN / CSA C22.2 No.14-13 · No.274[*6], **Plenum rated** **RCM** · **KC**[*7], **EAC**[*7], **SEMI F47**-0706, **GB12668.3** **WEEE** 2012/19/EU, **RoHS** 2011/95/EU[*8] **ISO 9001** (Quality assurance system) **ISO 14001** (Environmental system)
Safety Standards		Safe Torque Off (STO, EN/IEC61800-5-2) TUV Rheinland Certified IEC62061/IEC61508, SIL CL2 EN ISO13849-1, Cat.3/PL d

Note:
1. 230 VAC / 460 VAC models: Synchronous reluctance control mode is supported for the firmware V3.06 or later.
   575 VAC / 690 VAC models: Magnetic vector control mode is supported for the firmware V2.06 or later.
2. The max. output frequency will vary with carrier waves and control modes. Refer to the parameters 01-00 and 06-55 in the user manual for details.
3. The rated speed control ratio is for heavy duty applications. The speed control varies with the environment, applications, motor types or encoders.
4. In the torque control mode.
5. Adjust protection levels by parameter settings.
6. No UL certification for VFD4500C43x-xx, VFD5000C43x-xx, VFD5600C43x-xx models.
7. For 230 VAC / 460 VAC models only
8. Obtaining the certificate of RoHS 2015/863/EU compliance

Operation Temperature & Protection Level

Model	Frame	Top Cover	Conduit Box	Protection Level	Operation Temperature
VFDxxxCxxx-21	Frame A~C 230V: 0.75~22kW 460V: 0.75~30kW 575V: 1.5~15kW 690V: 18.5~37kW	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
VFDxxxCxxx-21	Frame D0~H 230V: 22kW and above 460V: 37kW and above 690V: 45kW and above	N/A	Standard conduit box	IP20/UL Type1 / NEMA1	-10°C~40°C
VFDxxxCxxx-00	Frame D0~H 230V: 22kW and above 460V: 37kW and above 690V: 45kW and above	N/A	No conduit box	 Degrees of protection: IP20 / IP00 for the circled area	-10°C~50°C

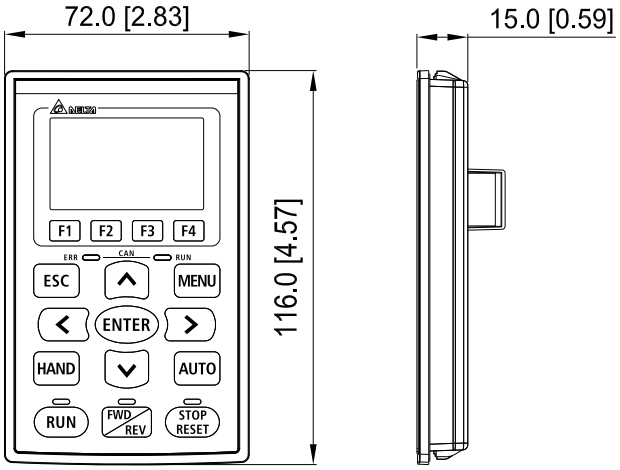
Operating Environment, Storage & Transportation

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

Environment	Installation Location	IEC60364-1/IEC60664-1 Pollution degree 2, indoor use only	
	Surrounding Temperature (°C)	Storage/Transportation	-25 ~ 70
		Only allowed in non-condensation, non-frost, non-conductive environment	
	Rated Humidity	Operation/Storage/Transportation	Max. 95%
		Only allowed in non-condensation, non-frost, non-conductive environment	
	Air Pressure (kPa)	Operation/Storage	86 ~ 106
		Transportation	70 ~ 106
	Pollution Level	IEC60721-3-3	
		Operation	Class 3C3; Class 3S2
		Storage	Class 1C2; Class 1S2
		Transportation	Class 2C2; Class 2S2
		If the AC motor drive is to be used under harsh environment with high level of contamination (e.g. dew, water, dust), make sure it is installed in an environment qualified for IP54 such as in a cabinet	
	Altitude	Operation	If the AC motor drive is installed at an altitude 0 ~ 1000 m, follow normal operation restriction. If it is installed at altitude 1000 ~ 2000 m, decrease 1% of rated current or lower 0.5 °C of temperature for every 100 m increase in altitude. Maximum altitude for Corner Grounded TN system is 2000m, for application over 2000m please contact Delta for more details
Package Drop		Storage/Transportation	ISTA procedure 1A (according to weight) IEC60068-2-31
Vibration		1.0 mm, peak to peak value range from 2 Hz to 13.2 Hz; 0.7 G~1.0 G range from 13.2 Hz to 55 Hz; 1.0 G range from 55 Hz 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)	

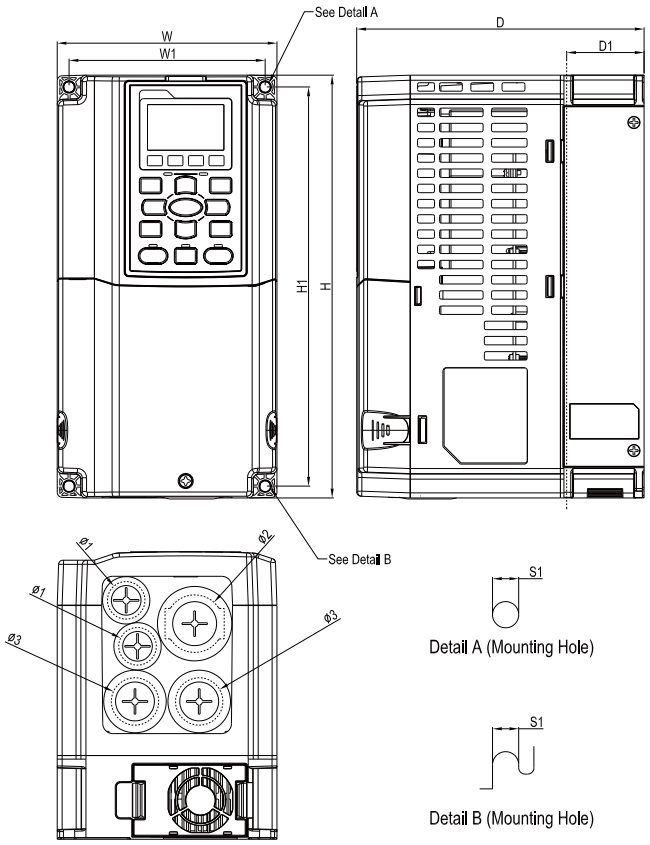
Dimensions

Digital Keypad Unit: mm [inch]



Standard LCD keypad

Frame A



Model	
VFD007C23A-21	VFD007C4EA-21
VFD015C23A-21	VFD015C4EA-21
VFD022C23A-21	VFD022C4EA-21
VFD037C23A-21	VFD037C4EA-21
VFD007C43A-21	VFD040C4EA-21
VFD015C43A-21	VFD055C4EA-21
VFD022C43A-21	VFD015C53A-21
VFD037C43A-21	VFD022C53A-21
VFD040C43A-21	VFD037C53A-21
VFD055C43A-21	

Weight

230 V_{AC} Models: 2.6 ± 0.3 Kg
460 V_{AC} Models: 2.6 ± 0.3 Kg
575 V_{AC} Models: 3 ± 0.3 Kg

Frame		W	H	D	W1	H1	D1*	Ø	Ø1	Ø2	Ø3
A	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

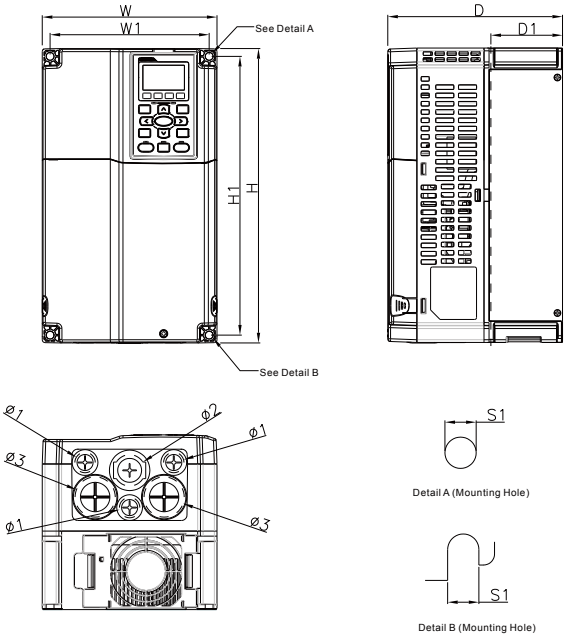
*D1: Flange mount.

Frame B

Model	
VFD055C23A-21	VFD055C53A-21
VFD075C23A-21	VFD075C53A-21
VFD110C23A-21	VFD110C53A-21
VFD075C43A-21	VFD150C53A-21
VFD110C43A-21	
VFD150C43A-21	
VFD075C4EA-21	
VFD110C4EA-21	
VFD150C4EA-21	

Weight

230 V_{AC} Models: 5.4 ± 1 Kg
460 V_{AC} Models: 5.4 ± 1 Kg
575 V_{AC} Models: 4.8 ± 1 Kg



Frame		W	H	D	W1	H1	D1*	S1	Ø1	Ø2	Ø3
B	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

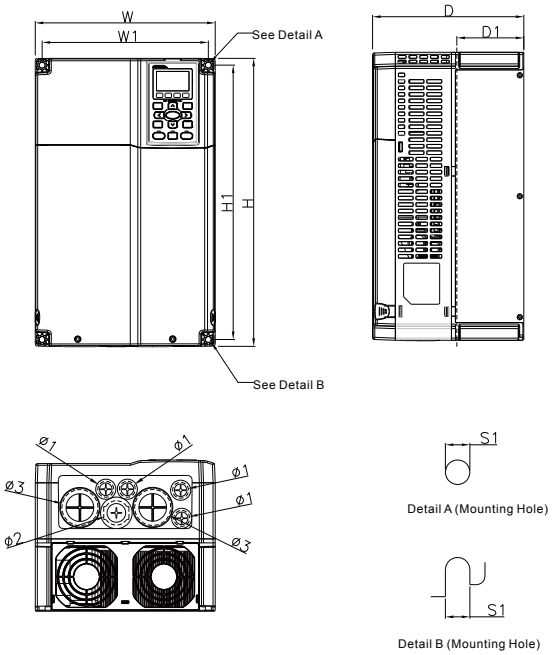
*D1: Flange mount.

Frame C

Model	
VFD150C23A-21	VFD185C63B-21
VFD185C23A-21	VFD220C63B-21
VFD220C23A-21	VFD300C63B-21
VFD185C43A-21	VFD370C63B-21
VFD220C43A-21	
VFD300C43A-21	
VFD185C4EA-21	
VFD220C4EA-21	
VFD300C4EA-21	

Weight

230 V_{AC} Models: 9.8 ± 1.5 Kg
460 V_{AC} Models: 9.8 ± 1.5 Kg
575 V_{AC} Models: 10 ± 1.5 Kg



Frame		W	H	D	W1	H1	D1*	S1	Ø1	Ø2	Ø3
C	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 mount.

Frame D1

Model Frame_D1	Frame_D0-1
VFD300C23A-00	VFD370C43S-00
VFD370C23A-00	VFD450C43S-00
VFD550C43A-00	
VFD750C43A-00	
VFD450C63B-00	
VFD550C63B-00	

Weight

Frame D1

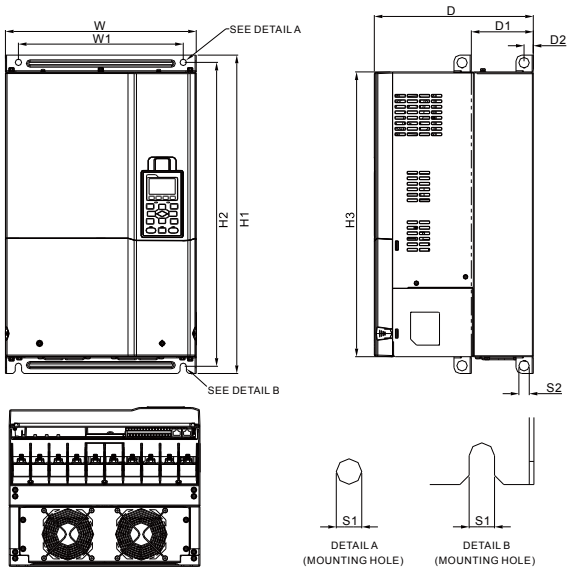
230 V_{AC} Models: 38.5 ± 1.5 Kg

460 V_{AC} Models: 38.5 ± 1.5 Kg

690 V_{AC} Models: 39 ± 1.5 Kg

Frame D0-1

460 V_{AC} Models: 27 ± 1.5 Kg



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	-	-	-

Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2
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 mount.

Frame D2

Model Frame_D2	Frame_D0-2
VFD300C23A-21	VFD370C43S-21
VFD370C23A-21	VFD450C43S-21
VFD550C43A-21	
VFD750C43A-21	
VFD450C63B-21	
VFD550C63B-21	

Weight

Frame D2

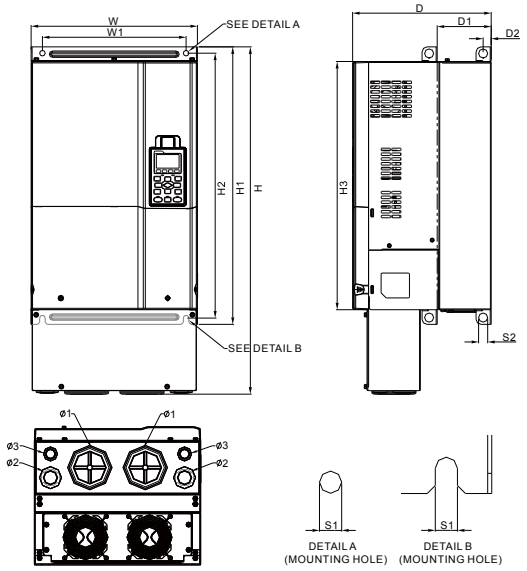
230 V_{AC} Models: 38.5 ± 1.5 Kg

460 V_{AC} Models: 38.5 ± 1.5 Kg

690 V_{AC} Models: 39 ± 1.5 Kg

Frame D0-2

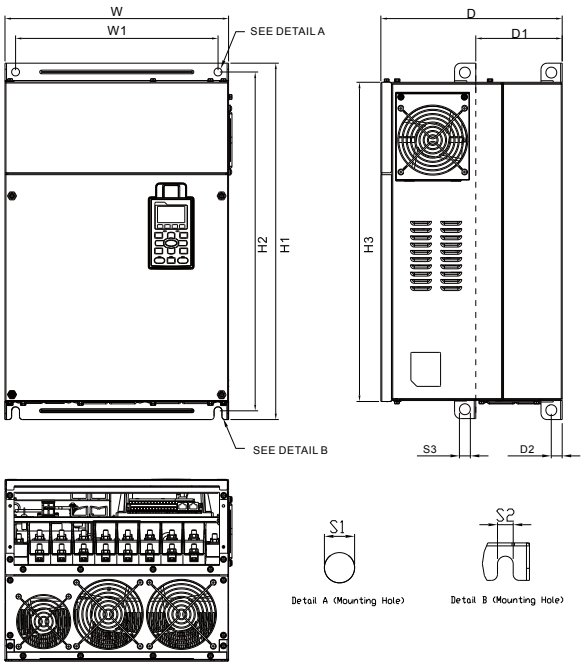
460 V_{AC} Models: 27 ± 1.5 Kg



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
Frame		**W**	**H**	**D**	**W1**	**H1**	**H2**	**H3**	**D1***	**D2**	**S1**	**S2**	**Ø1**	**Ø2**	**Ø3**
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	21.19	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 mount.

Frame E1



Model
Frame_E1

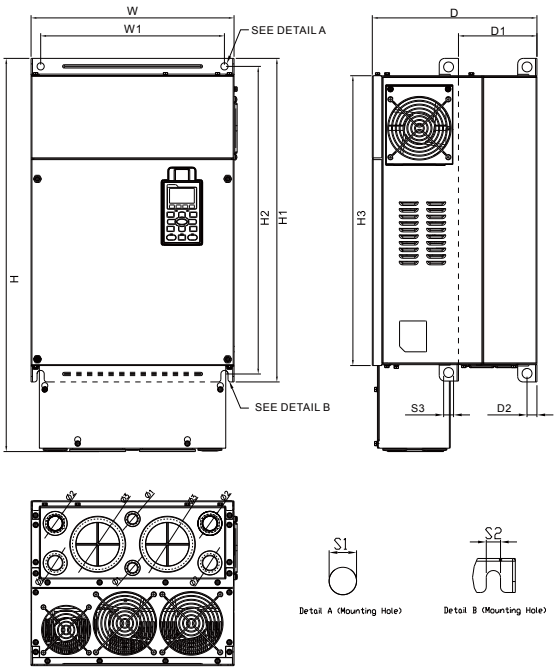
VFD450C23A-00	VFD750C63B-00
VFD550C23A-00	VFD900C63B-00
VFD750C23A-00	VFD1100C63B-00
VFD900C43A-00	VFD1320C63B-00
VFD1100C43A-00	

Weight
230 V_{AC} Models: 64.8 ± 1.5 Kg
460 V_{AC} Models: 64.8 ± 1.5 Kg
690 V_{AC} Models: 61 ± 1.5 Kg

Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
E1	mm	370.0	-	300.0	335.0	589.0	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 mount.

Frame E2



Model
Frame_E2

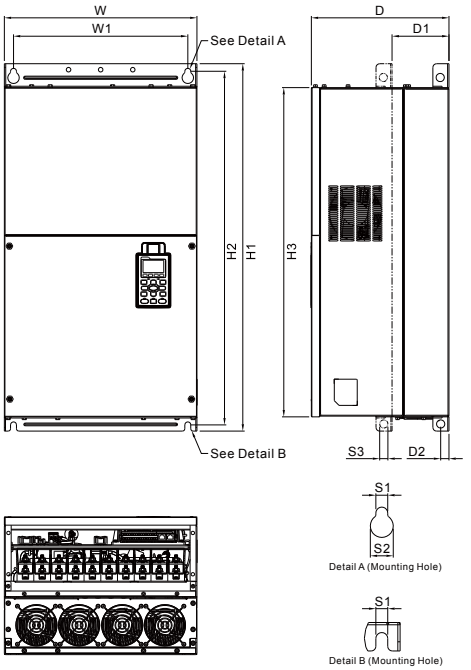
VFD450C23A-21	VFD750C63B-21
VFD550C23A-21	VFD900C63B-21
VFD750C23A-21	VFD1100C63B-21
VFD900C43A-21	VFD1320C63B-21
VFD1100C43A-21	

Weight
230 V_{AC} Models: 64.8 ± 1.5 Kg
460 V_{AC} Models: 64.8 ± 1.5 Kg
690 V_{AC} Models: 61 ± 1.5 Kg

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	589.0	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 mount.

Frame F1



Model
Frame_F1

VFD900C23A-00
VFD1320C43A-00
VFD1600C43A-00
VFD1600C63B-00
VFD2000C63B-00

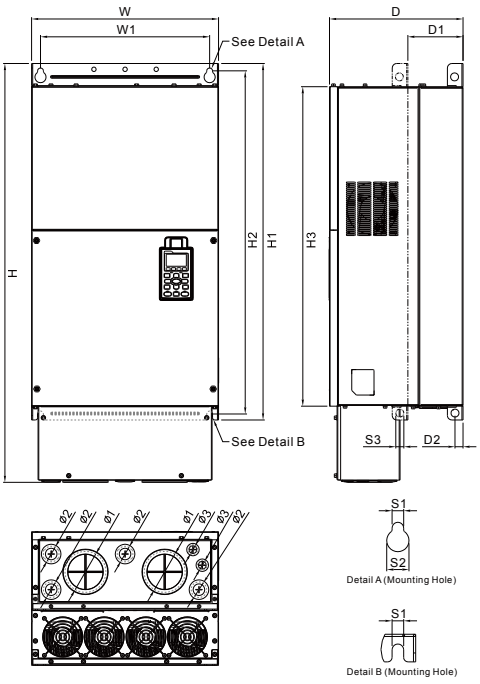
Weight

230 V_{AC} Models: 86.5 ± 1.5 Kg
460 V_{AC} Models: 86.5 ± 1.5 Kg
690 V_{AC} Models: 88 ± 1.5 Kg

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 mount.

Frame F2



Model
Frame_F2

VFD900C23E-21
VFD1320C43E-21
VFD1600C43E-21
VFD1600C63B-21
VFD2000C63B-21

Weight

230 V_{AC} Models: 86.5 ± 1.5 Kg
460 V_{AC} Models: 86.5 ± 1.5 Kg
690 V_{AC} Models: 88 ± 1.5 Kg

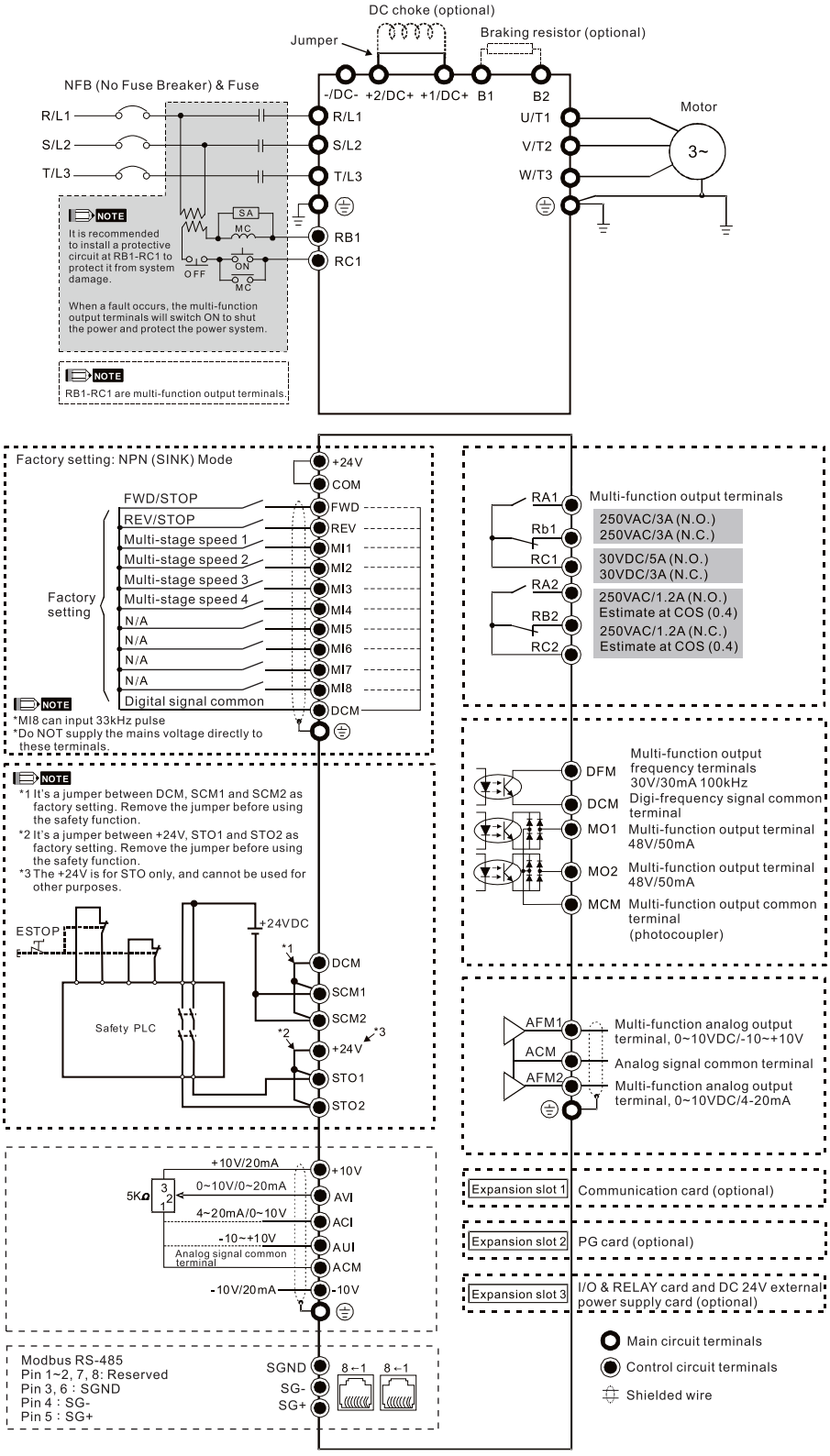
Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
F2	mm	420.0	940.0	300.0	380.0	800.0	770.0	717.0	124.0	18.0	13.0	25.0	18.0	92.0	35.0	22.0
	inch	16.54	37.00	11.81	14.96	31.50	30.32	28.23	4.88	0.71	0.51	0.98	0.71	3.62	1.38	0.87

*D1: Flange mount.

Wiring

Wiring Diagram for Frame A ~ C

*Input: 3-phase power

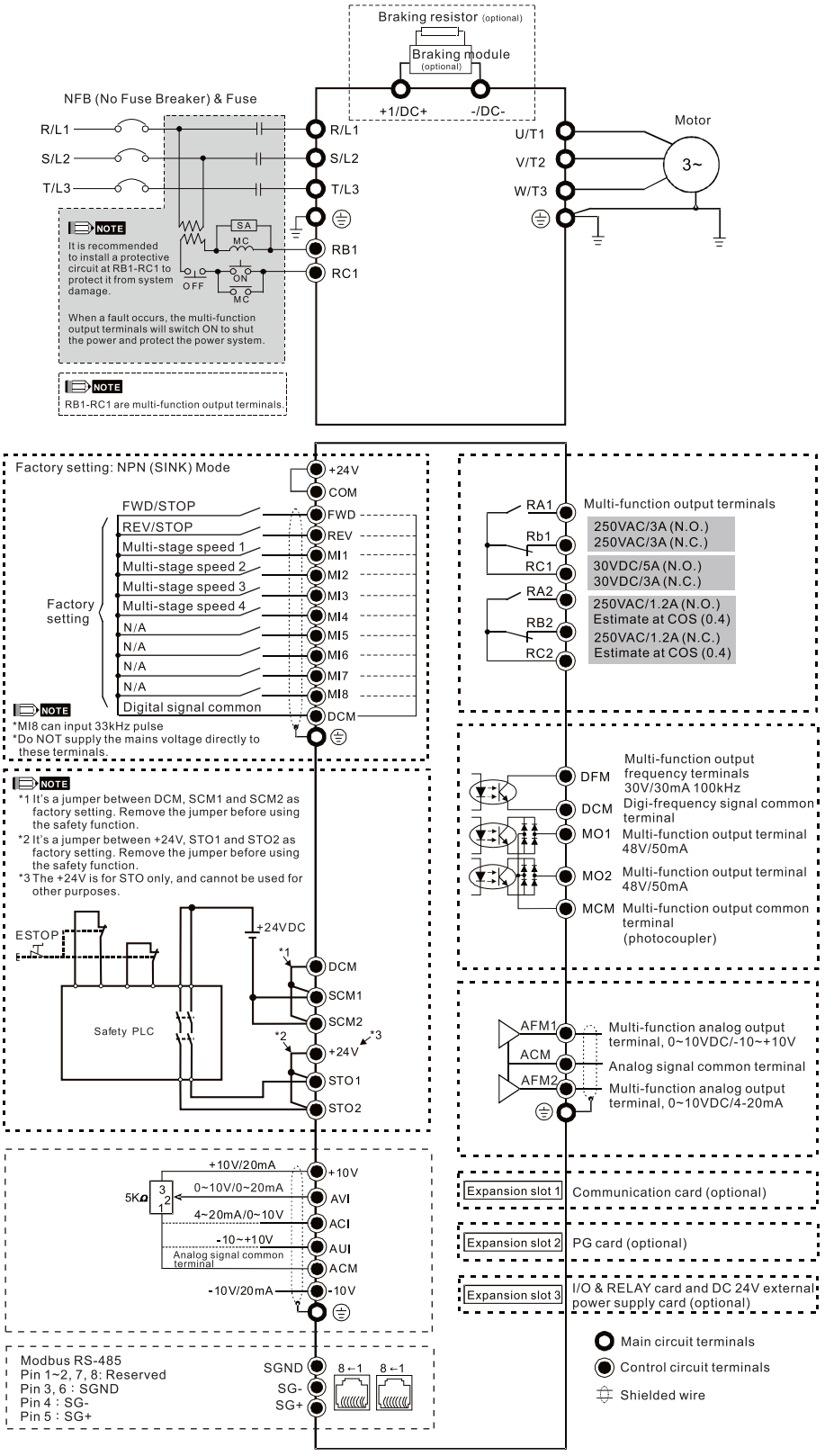


NOTE

It is not recommended to use a power capacitor or automatic power factor regulator (APFR) at the power input side. If the system requires such a device, please make sure a reactor is installed between the drive and the power capacitor or APFR.

Wiring Diagram for Frame D ~ F

*Input: 3-phase power



EMC Filter & Zero-phase Reactor

There are various combinations of installation places and quantity of EMC filters and zero-phase reactors for the C2000 Plus Series to meet electromagnetic compliance regulatory requirements for diverse applications. Please refer to the user manual 7-6 for details.

EMC Regulatory Requirements	Regulatory Classes		
EN 55011 Standard for Industrial, scientific and medical (ISM) equipment	**Class B**	**Class A Group 1**	**Class A Group 2**
EN/IEC61800-3:2004 Standard for power drive systems (PDSs)	**Category C1** 1st environment, unrestricted distribution, such as houses or offices in a residential building	**Category C2** 1st environment, restricted distribution, such as houses or offices in a residential building	**Category C3** 2nd environment, unrestricted distribution, such as industrial areas
C2000 Plus Compliance *1	–	✓	✓

Note 1: The place and the number of the zero-phase reactor installed and the selection of EMC filter may be different according to the Standard EN 61800-3. Please refer to the user manual for details.

Accessories

PG Card

▪EMC-PG01L / EMC-PG02L

Set by
Pr.10-00 ~ 10-02

Terminals		Description
PG1	VP	Output voltage for power: +5 V / +12 V ± 5% (use FSW3 to switch +5 V / +12 V) Max. output current: 200 mA
	DCM	Common for power and signal
	A1, $\overline{A1}$, B1, $\overline{B1}$, Z1, $\overline{Z1}$	Encoder input signal (Line Driver) Open collector input: +5 V / +24 V *Note1 1-phase or 2-phase input Max. input frequency: EMC-PG01L: 300 kHz; EMC-PG02L: 30 kHz
PG2	A2, $\overline{A2}$, B2, $\overline{B2}$	Pulse input signal (Line Driver or Open Collector) Open collector input: +5 V / +24 V *Note1 1-phase or 2-phase input Max. input frequency: EMC-PG01L: 300 kHz; EMC-PG02L: 30 KHz
PG OUT	AO, $\overline{AO}$, BO, $\overline{BO}$, ZO, $\overline{ZO}$, SG	PG card output signals. Division frequency function: 1 ~ 255 times Max. output voltage for Line driver: 5 V_{DC} Max. output current: 15 mA Max. output frequency: EMC-PG01L: 300 kHz; EMC-PG02L: 30 kHz SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained

▪EMC-PG01O / EMC-PG02O

Set by
Pr.10-00 ~ 10-02

Terminals		Description
PG1	VP	Output voltage for power: +5 V / +12 V ± 5% (use FSW3 to switch +5 V / +12 V) Max. output current: 200 mA
	DCM	Common for power and signal
	A1, $\overline{A1}$, B1, $\overline{B1}$, Z1, $\overline{Z1}$	Encoder input signal (Line Driver or Open Collector) Open collector input: +5 V / +24 V *Note1 1-phase or 2-phase input Max. input frequency: EMC-PG01O: 300 kHz; EMC-PG02O: 30 kHz
PG2	A2, $\overline{A2}$, B2, $\overline{B2}$	Pulse input signal (Line Driver or Open Collector) Open collector input: +5 V / +24 V (Note1) 1-phase or 2-phase input Max. input frequency: EMC-PG01O: 300 kHz; EMC-PG02O: 30 kHz
PG OUT	V+, $\overline{V}$-	Needs external power source for PG OUT circuit. Input voltage of power:+12 V ~ +24 V
	V-	Negative power supply input
	A / O, B / O, Z / O	PG card output signals. 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 (1.8 KΩ / 1 W)] Max. Output current: 20 mA Max output frequency: EMC-PG01O: 300 kHz; EMC-PG02O: 30 kHz

▪EMC-PG01R

Set by
Pr.10-00 ~ 10-02

Terminals		Description
PG1	R1- R2	Resolver output power 7 Vrms, 10 kHz
	S1, S2, S3, S4	Resolver input signal 3.5 ± 0.175 Vrms, 10 kHz
PG2	A2, $\overline{A2}$, B2, $\overline{B2}$	Pulse input signal (Line Driver or Open Collector) Open collector input: +5 V / +24 V *Note1 1-phase or 2-phase input; Max. input frequency: 300 kHz
PG OUT	AO, $\overline{AO}$, BO, $\overline{BO}$, ZO, $\overline{ZO}$, SG	PG card output signals. Division frequency function: 1 ~ 255 times Max. output voltage for Line driver: 5 V_{DC} Max. output current: 15 mA Max. output frequency: 300 kHz SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained

▪EMC-PG01U / EMC-PG02U

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

Set by
Pr.10-00 ~ 10-02

Terminals		Description
PG1	VP	Output voltage for power: +5 V / +12 V ± 5% (use FSW3 to switch +5 V / +12 V) Max. output current: 200 mA
	DCM	Common for power and signal
	A1, $\overline{\text{A1}}$, B1, $\overline{\text{B1}}$, Z1, $\overline{\text{Z1}}$	Encoder input signal (Line Driver) 1-phase or 2-phase input. Max. input frequency: 300 kHz
	U1, $\overline{\text{U1}}$, V1, $\overline{\text{V1}}$, W1, $\overline{\text{W1}}$	Encoder input signal
PG2	A2, $\overline{\text{A2}}$, B2, $\overline{\text{B2}}$	Pulse input signal Open collector input: +5 V / +24 V *Note1 1-phase or 2-phase input; Max. input frequency: 300 kHz
PG OUT	AO, $\overline{\text{AO}}$, BO, $\overline{\text{BO}}$, ZO, $\overline{\text{ZO}}$, SG	PG card output signals. Division frequency function: 1 ~ 255 times Max. output voltage for Line driver: 5 V_{DC} Max. output current: 15 mA Max. output frequency: 300 kHz SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained

▪EMC-PG01H NEW

Set by
Pr.10-00 ~ 10-02

Terminals		Description
PG1	VP	Output voltage for power: +5 V / +8 V ± 5% (use FSW1 to switch +5 V / +8 V) Max. output current: 200 mA
	DCM	Common for power and signal
	A+, A-, B+, B-, R+, R-	Encoder Incremental differential signal input terminals Max. input frequency : 600 kHz
	C+, C-, D+, D-	Encoder Absolute differential signal input terminals
PG2	A2, $\overline{\text{A2}}$, B2, $\overline{\text{B2}}$	Pulse-train signal input terminals (Line Driver or Open Collector) Open collector input: +5V ~ +24V(Note1) 1-phase or 2-phase input; Max. input frequency: 300 kHz
PG OUT	AO, $\overline{\text{AO}}$, BO, $\overline{\text{BO}}$, ZO, $\overline{\text{ZO}}$, SG	PG card output signals terminals Division frequency function: 1 ~ 255 times Max. output voltage for Line driver: 5 V_{DC} Max. output current: 15 mA Max. output frequency: 600 kHz ± 5% 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 ~ 15 mA and install a pull-up resistor
[5 V] Recommend pull-up resistor: 100 ~ 220 Ω, 1/2 W and above
[12 V] Recommend pull-up resistor: 510 ~ 1.35 KΩ, 1/2 W and above
[24 V] Recommend pull-up resistor: 1.8K ~ 3.3 KΩ, 1/2 W and above

Relay Extension Card

▪ EMC-R6AA

Terminals	Descriptions
RA10~RA15 **RC10~RC15**	Refer to Pr. 02-36~Pr. 02-41 for multi-function output selection Resistive load: 3A (N.O.)/250 V_{AC} 5A (N.O.)/30 V_{DC} Inductive load (COS 0.4) 1.2A (N.O.)/250 V_{AC} 2.0A (N.O.)/30 V_{DC} It is used to output each monitor signal, such as for drive in operation, frequency attained or overload indication.

Analog I/O Extension Card

▪ EMC-A22A

Terminals	Description
AVI10 **AVI11**	Refer to Pr. 14-00~Pr. 14-01 for function selection (input), and Pr. 14-18~Pr. 14-19 for mode selection Two sets of AVI port for AVI or ACI switch: SSW3 (AVI10) and SSW4 (AVI11) AVI: Input 0~10 V ACI: Input 0~20 mA/4~20 mA
AFM10 **AFM11**	Refer to Pr. 14-12~Pr. 14-13 for function selection (output), and Pr. 14-36~Pr. 14-37 for mode selection Two sets of AFM port for AVO or ACO switch: SSW1 (AFM10) and SSW2 (AFM11) AVO: Output 0~10 V ACO: Output 0~20.0 mA/4.0~20.0 mA
ACM	Analog signal common terminal

I/O Extension Card

▪ EMC-D611A

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: 100~130 V_{AC}; Input frequency: 57~63 Hz Input impedance: 27 KΩ Terminal response time: ON: 10 ms; OFF: 20 ms

▪ EMC-D42A

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

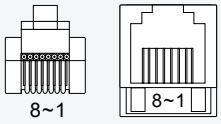
24V Power Shift Card

▪ EMC-BPS01

Terminals	Descriptions
24 V GND	Allows operation of network system, PLC function and partial functions when the AC motor drive is power off Input power: 24 V_{DC} ± 5% Maximum input current: 0.5 A Note: 1. Do not connect the control terminal +24 V (Digital control signal common: SOURCE) directly to the EMC-BPS01 input terminal 24 V. 2. Do not connect control terminal GND directly to the EMC-BPS01 input terminal GND

Communication Card

▪ EMC-COP01 (CANopen)



RJ-45 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 / 0 V / V-
6	CAN_GND	Ground / 0 V / V-

▪ CMC-EC01 (EtherCAT)

Features

- Supports Ethernet CAT protocol
- Supports standard CiA402 speed mode
- Supports SDO (Service Data Objects) function:
  - To write motor drive parameters
  - To read motor drive information
- Auto shutdown function for interruptions during data transmission

Network Interface

Interface	RJ-45	**Transmission cable**	Category 5e shielded cable, 100M
Number of ports	2 Ports	**Transmission speed**	100 Mbps
Transmission method	IEEE 802.3, IEEE 802.3u	**Network protocol**	EtherCAT

Communication Card

▪ CMC-PN01 (PROFINET) NEW

Features

- Supports PROFINET IO device
- Supports synchronous data transmission and synchronous parameter access
- Provides GSDML file for PROFINET communication

Network Interface

Interface	RJ-45	**Transmission Cable**	Category 5e shielded cable, 100M
Number of Ports	2 Ports	**Transmission Speed**	10/100 Mbps auto-detection
Transmission Method	IEEE 802.3	**Network Protocol**	PROFINET

▪ CMC-PD01 (PROFIBUS DP)

Features

- Supports PZD control data exchange
- Supports PKW polling AC motor drive parameters
- Supports user diagnosis function
- Supports remote I/O function
- Baud (auto-detection): max. 12 Mbps

PROFIBUS DP Connector

Interface	DB9 connector
Transmission Method	High-speed RS-485
Transmission Cable	Shielded twisted pair cable
Electrical Isolation	500 V_{DC}

Communication

Message Type	Cyclic data exchange
Module Name	CMC-PD01
GSD Document	DELA08DB.GSD
Company ID	08DB (HEX)
Serial Transmission Speed Supported (auto-detection)	9.6 Kbps; 19.2 Kbps; 93.75 Kbps; 187.5 Kbps; 500 Kbps; 1.5 Mbps; 3 Mbps; 6 Mbps; 12 Mbps (bits per second)

▪ CMC-DN01

Features

- Performs immediate control of an AC motor drive via Delta's HSSP high-speed communication protocol
- Supports Group 2 Only Slave device connection and polling I/O data exchange
- Supports max. 32 words input / 32 words output and remote I/O function for I/O mapping
- 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 5.08 mm Pluggable Connector
Transmission Method	CAN
Transmission Cable	Shielded twisted pair cable (with 2 power cables)
Transmission Speed	125 Kbps, 250 Kbps, 500 Kbps and extendable serial transmission speed mode
Network Protocol	DeviceNet protocol

DeviceNet Connector

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

▪ CMC-EIP01 (EtherNet/IP, Modbus TCP)

Features

- Supports EtherNet/IP and Modbus TCP protocols
- User-defined parameter mapping
- IP Filter, basic firewall function

Network Interface

Interface	RJ-45 with Auto-MDI/MDIX	**Transmission Cable**	Category 5e shielded cable, 100 M
Number of Ports	1 Port	**Transmission Speed**	10/100 Mbps auto-detection
Transmission Method	IEEE 802.3, IEEE 802.3u	**Network Protocol**	ICMP, IP, TCP, UDP, DHCP, BOOTP, SMTP, EtherNet/IP, Modbus TCP

▪ CMC-EIP02 (EtherNet/IP、Modbus TCP dual port) NEW

Features

- Supports Daisy Chain Topology
- MDI/MDI-X auto-detection
- Supports Ethernet configuration profiles for AC motor drives
- Supports virtual serial ports

Network Interface

Interface	RJ-45 with Auto-MDI/MDIX	**Transmission Cable**	Category 5e shielded cable, 100 M
Number of Ports	2 (Switch)	**Transmission Speed**	10/100 Mbps auto-detection
Transmission Method	IEEE 802.3、IEEE 802.3u	**Network Protocol**	ICMP, IP, TCP, UDP, DHCP, BOOTP, EtherNet/IP, Modbus TCP

Ordering Information & Series Overview

Frame Size		Power Range	Models			
Frame A		230 V: 0.75 ~ 3.7 kW 460 V: 0.75 ~ 5.5 kW 575 V: 1.5 ~ 3.7 kW	VFD007C23A-21 VFD015C23A-21 VFD022C23A-21 VFD037C23A-21	VFD007C43A-21 VFD015C43A-21 VFD022C43A-21 VFD037C43A-21 VFD040C43A-21 VFD055C43A-21	VFD007C4EA-21 VFD015C4EA-21 VFD022C4EA-21 VFD037C4EA-21 VFD040C4EA-21 VFD055C4EA-21 * Built-in an EMC filter & EMC-COP01	VFD015C53A-21 VFD022C53A-21 VFD037C53A-21
Frame B		230 V: 5.5 ~ 11 kW 460 V: 7.5 ~ 15 kW 575 V: 5.5 ~ 15 kW	VFD055C23A-21 VFD075C23A-21 VFD110C23A-21	VFD075C43A-21 VFD110C43A-21 VFD150C43A-21	VFD075C4EA-21 VFD110C4EA-21 VFD150C4EA-21 * Built-in an EMC filter & EMC-COP01	VFD055C53A-21 VFD075C53A-21 VFD110C53A-21 VFD150C53A-21
Frame C		230 V: 15 ~ 22 kW 460 V: 18.5 ~ 30 kW 690 V: 18.5 ~ 37 kW	VFD150C23A-21 VFD185C23A-21 VFD220C23A-21	VFD185C43A-21 VFD220C43A-21 VFD300C43A-21	VFD185C4EA-21 VFD220C4EA-21 VFD300C4EA-21 * Built-in an EMC filter & EMC-COP01	VFD185C63B-21 VFD220C63B-21 VFD300C63B-21 VFD370C63B-21
Frame D		230 V: 30 ~ 37 kW 460 V: 37 ~ 75 kW 690 V: 45 ~ 55 kW	**Frame_D1** VFD300C23A-00 VFD370C23A-00 VFD550C43A-00 VFD750C43A-00 VFD450C63B-00 VFD550C63B-00	**Frame_D0-1** VFD370C43S-00 VFD450C43S-00	**Frame_D2** VFD300C23A-21 VFD370C23A-21 VFD550C43A-21 VFD750C43A-21 VFD450C63B-21 VFD550C63B-21 * Built-in conduit boxes MKC-DN1CB & EMC-COP01 (available for 43A models only)	**Frame_D0-2** VFD370C43S-21 VFD450C43S-21 * Built-in conduit boxes MKC-D0N1CB & EMC-COP01
Frame E		230 V: 45 ~ 75 kW 460 V: 90 ~ 110 kW 690 V: 75 ~ 132 kW	**Frame_E1** VFD450C23A-00 VFD550C23A-00 VFD750C23A-00 VFD900C43A-00 VFD1100C43A-00 VFD750C63B-00 VFD900C63B-00 VFD1100C63B-00 VFD1320C63B-00		**Frame_E2** VFD450C23A-21 VFD550C23A-21 VFD750C23A-21 VFD900C43A-21 VFD1100C43A-21 VFD750C63B-21 VFD900C63B-21 VFD1100C63B-21 VFD1320C63B-21 * Built-in conduit boxes MKC-EN1CB & EMC-COP01 (available for 43A models only)	
Frame F		230 V: 90 kW 460 V: 132 ~ 160 kW 690 V: 160 ~ 200 kW	**Frame_F1** VFD900C23A-00 VFD1320C43A-00 VFD1600C43A-00 VFD1600C63B-00 VFD2000C63B-00		**Frame_F2** VFD900C23A-21 VFD1320C43A-21 VFD1600C43A-21 VFD1600C63B-21 VFD2000C63B-21 * Built-in conduit boxes MKC-FN1CB & EMC-COP01 (available for 43A models only)	