Automation for a Changing World

Delta Vector Control Drive C2000 Series

reddot design award
winner 2010

www.deltaww.com

DELTA

Smarter. Greener. Together.

Powerful Features. High Efficienc

The C2000 series AC motor drive provides the most efficient and cost-effective solution for all types of drive applications. It features precise speed, torque and position control functions that are suitable for both sensor and sensorless types of synchronous and asynchronous motors. The C2000 series is also equipped with built-in PLC functions and supports the CANopen Master/Slave extension for the ultimate in system flexibility and fast data exchange.

Table of Contents

Standard Models (IP20/NEMA1)

Power range: 230V 0.75~90kW, 460V 0.75~450kW

230V (kW)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
230V (HP)	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125
Frame Size	A				B			C			D		E			F
Braking Chopper	Built-in										Optional					
DC Reactor	Optional										Built-in					
EMI Filter	Optional															
Protection Level	IP20										IP00 / IP20					

460V (kW)	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
460V (HP)	1	2	3	5	5	7.5	10	15	20	25	30	40	50	60	75	100	125
Frame Size	A						B			C			D0		D		E
Braking Chopper	Built-in																
DC Reactor	Optional																
EMI Filter	Built-in (VFD_ _ _C43E)																
Protection Level	IP20																

*Available in China and Taiwan only.

Advanced Drive Controls

■ Door Width Auto-tuning

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

■ Environmental Adaptability

1. 50℃ operating temperature
2. Built-in DC reactor
3. Coated circuit boards
4. Built-in EMI filter
5. Global safety standards
   (CE/UL/cUL)

*Note: Please refer to the Product Specification

110	132	160	185	220	280	315	355	450*
150	175	215	250	300	375	425	475	600
	F		G		H			
Optional								
Built-in								
Optional								
IP00 / IP20								

■ Versatile Drive Controls

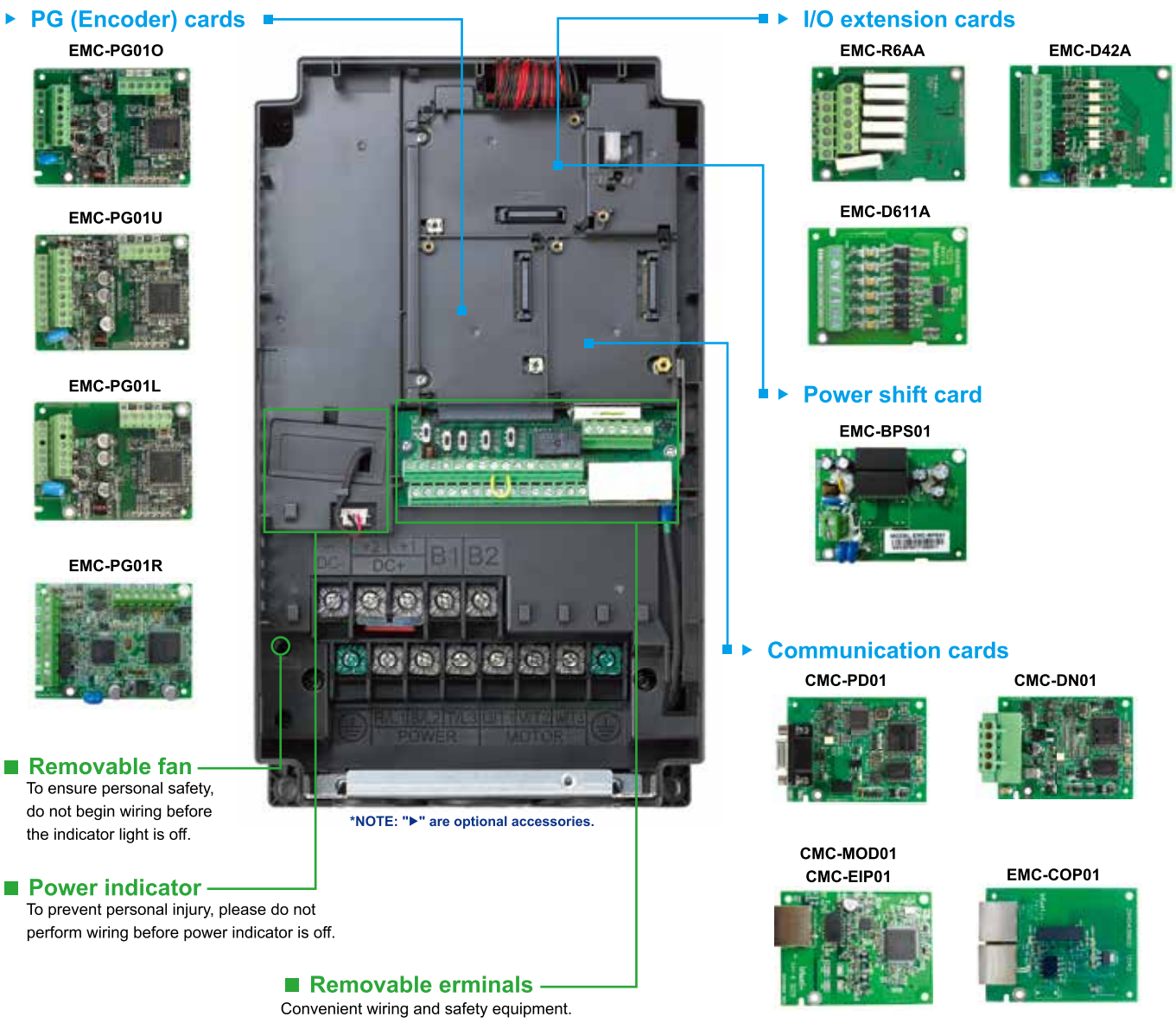
1. Built-in safe stop function
2. Built-in PLC function
3. Built-in brake unit
4. Supports various network protocols
5. Synchronous point-to-point control

■ Modular Design

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

Modular Design

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



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

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

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

■ RFI Switch

■ Remove the safety screws and press on two sides to remove the cover for wiring

■ Modular fan design is easy to clean and replace providing longer service life.

Excellent Environment Adaptability

■ Built-in DC choke to surpress harmonics*
■ Built-in EMI filter to filter noise*
■ Conformal coating (Class 3C2 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.

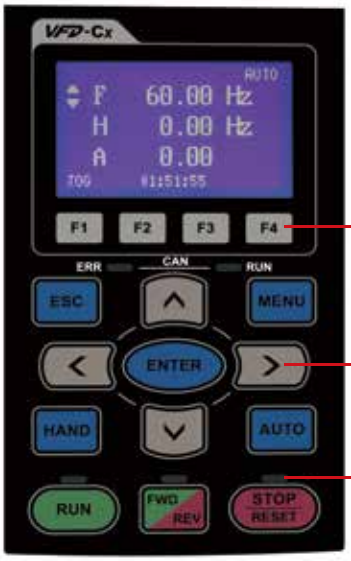
*Note: Please refer to the Product Specification

Certifications

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

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 and calendar function
- Language selection for display
- Copy function saves parameters and PLC programs to the keypad memory for later transfer to another drive
- IP66 protection level



F1 to F4: User-defined function keys

Selection keys

LED displays the current drive status

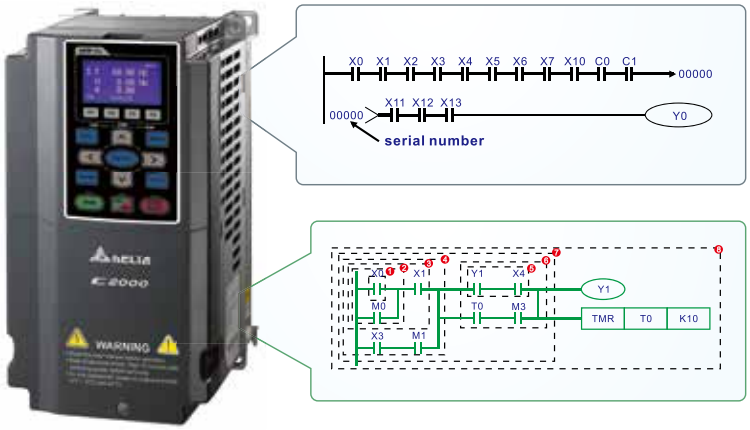
Create homepage logo

Editable message display

Editable chart display

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.

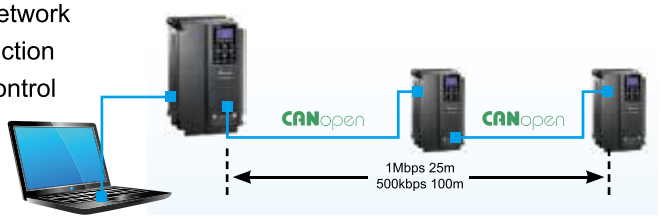


High-speed Network

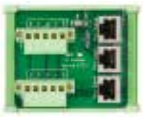
- Provides optional MODBUS RTU and various fieldbus cards for flexible communication applications
- Advanced network functions
- Built-in MODBUS communication interface
- PROFIBUS
- CANopen (DS402)

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

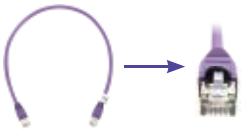
- Supports all Delta industrial automation products (all EDS files of Delta industrial automation products are built-in)
- I/O data layout of each piece of equipment on the CANopen Network
- Planning function for motion control
- WPL Soft



- TAP-CN03 distribution box for long distances



- RJ45 cable



- DeviceNet

Delta DeviceNet Builder software is specially designed for DeviceNet communication. With this software, it is easy to plan DeviceNet equipment and remote I/O via parameters to build a standard DeviceNet monitoring structure.

- Supports all Delta industrial automation products (all EDS files of Delta industrial automation products are built-in)
- I/O data layout of each piece of equipment in the DeviceNet network
- DeviceNet layout software

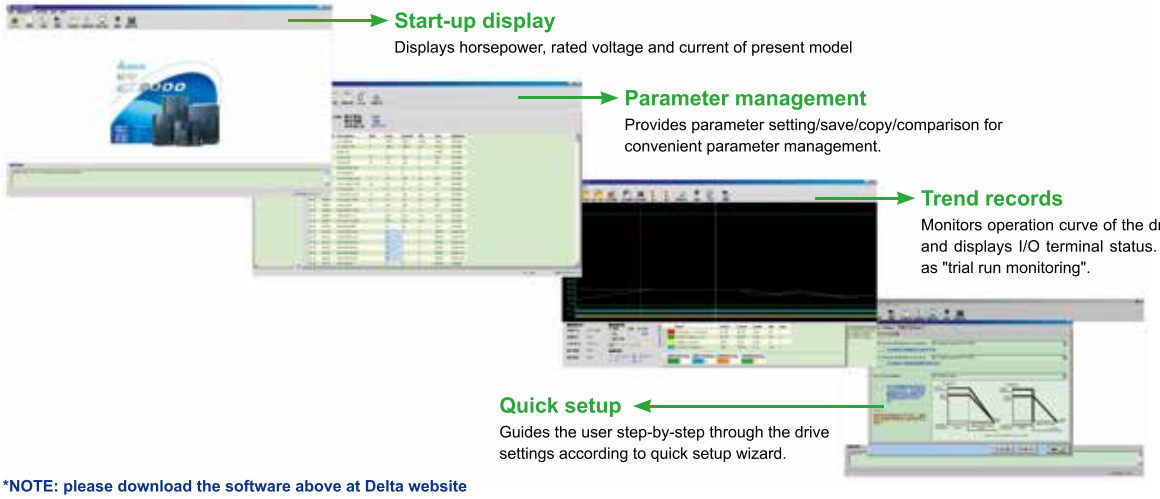
- EtherNet/IP
- **MODBUS TCP**

Delta's communication integrator software not only provides graphic module setting and a human interface design but also supports settings and online monitoring for all Ethernet products.

- Delta software for Ethernet/MODBUS TCP products
- Graphic module setting and human interface design
- Auto search function
- Setting interface for virtual COM port

Convenient Operation Platform for Drive System Management

- 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 present model

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

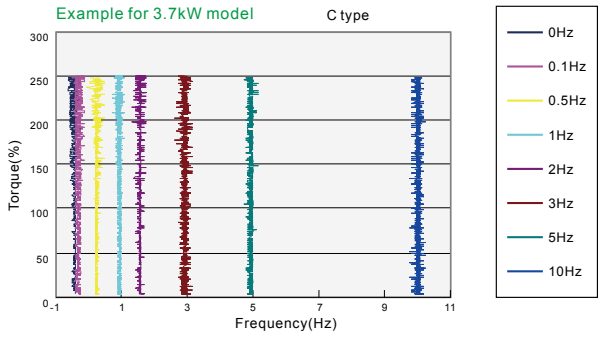
Trend records
Monitors operation curve of the drive by communication and displays I/O terminal status. Useful for tasks such as "trial run monitoring".

Quick setup
Guides the user step-by-step through the drive settings according to quick setup wizard.

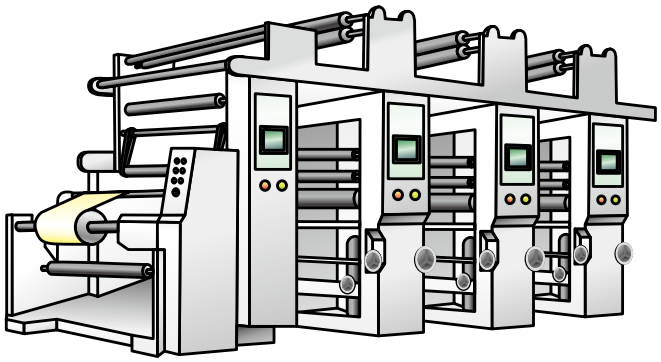
*NOTE: please download the software above at Delta website

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.

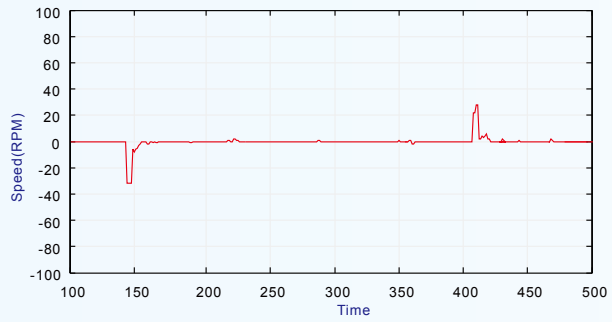


- Precise position and speed control ideal for printing machine applications.



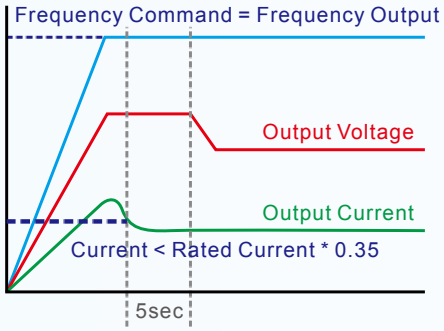
Fast Response to Impact Load

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



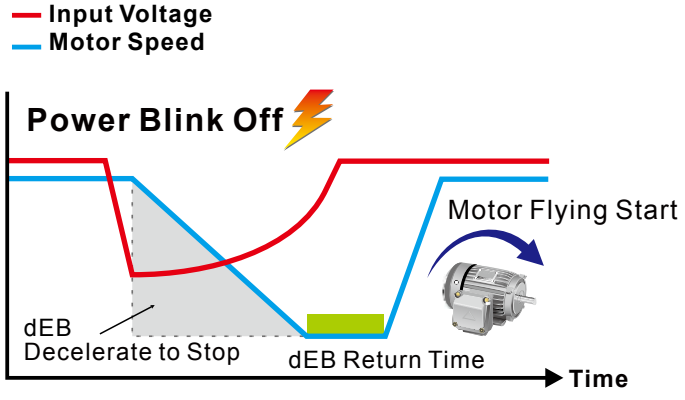
Auto Energy-Saving Operation

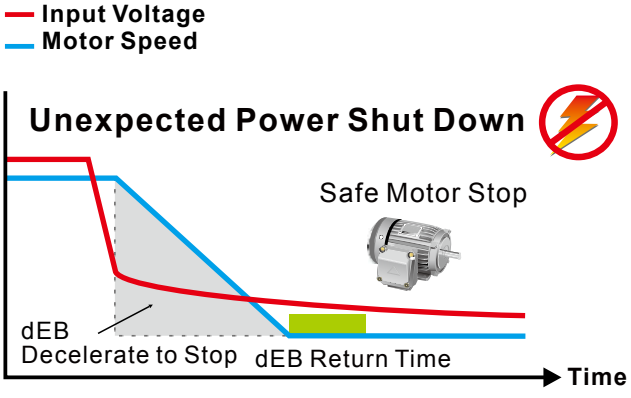
During constant speed operation, this function auto-calculates the best voltage value by the load power for the load.



Deceleration Energy Backup (dEB)

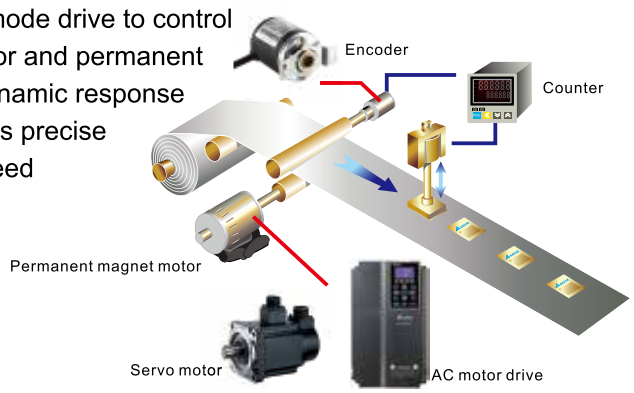
This function controls the motor deceleration for stopping when an unexpected power shut down occurs to prevent mechanical damage. When power resumes, the motor will return to its previous speed.





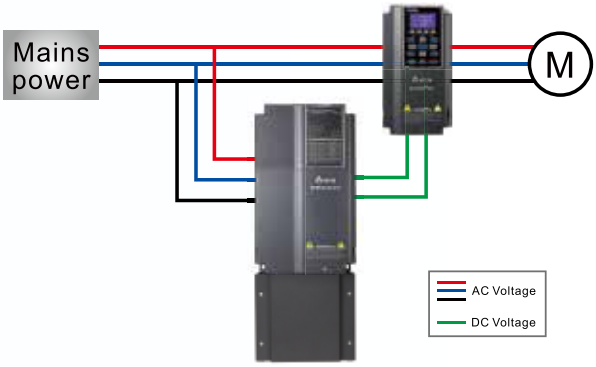
A Drive for Permanent Magnet (PM) Motors

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.



Delta REG2000 Series for Power Regeneration

Using the REG2000 with the C2000 in a crane and hoist application provides the user with a four-quadrant operation and energy saving results.



Delta AFE2000 Series for Power Regeneration and Power Quality Improvement

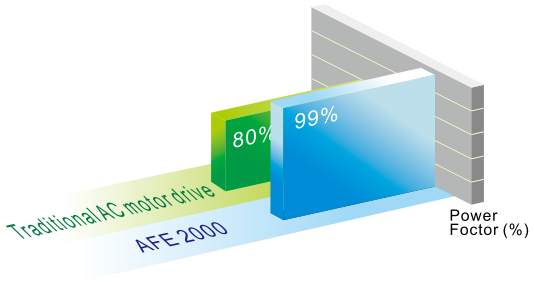
The Active Front End Unit (AFE2000) helps to reduce torque ripple and harmonics with a higher power factor to provide excellent production quality and outstanding energy saving results.

Delta Active Front End AFE2000 Series

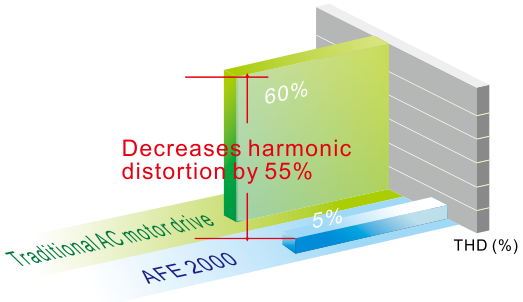
Features

- Replaces traditional brake resistor to reduce heat generation.
- Clear energy savings: more than 95% of the regenerative energy is converted into electricity and supplied back to the mains.
- Full-load operation: input-side current THD lower than 5% and improves power factor up to 99%.
- AC motor drives with AFE2000: supports 4-quadrant operation with variable frequencies and adjustable system.
- Constant DC bus voltage: unaffected by mains voltage fluctuations.

Improves power factor and decreases harmonic distortion.
THD<=5%, power factor > 99%

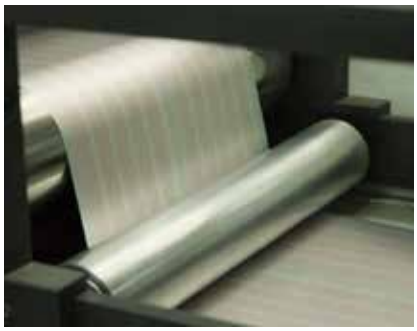


Improves power factor by 20%



Applications

- Large-inertia loads, such as centrifuge equipment, dewatering machines and roving machines
- 4-quadrant loads including elevators, cranes and pumpjacks (oil extraction machines)
- Quick braking, such as machine tools, bag making machines, auto storage and retrieval systems, and lathes
- Long-term energy feedback, such as wind power, water power, steel printing and paper making machinery (winding equipment)
- Improves power quality for industries such as semiconductor and panel industries



Operating Environment

DO NOT expose the AC motor drive to harsh environments, such as dust, direct sunlight, corrosive/ inflammable gasses, humidity, liquid or vibrations. The salt in the air must be less than 0.01mg/cm ^{2} per year.			
Installation location	IEC60364-1/IEC60664-1 Pollution degree 2,Indoor use only		
Surrounding Temperature	Storage/ Transportation	-25℃ ~ +70℃	
	No condensation, no frost		
Rated Humidity	Operation	Max. 95%	
	Storage/ Transportation	Max. 95%	
	No condensation, no frost		
Air Pressure	Operation/ Storage	86 to 106 kPa	
	Transportation	70 to 106 kPa	
Pollution Level	IEC60721-3-3		
	Operation	Class 3C2；Class 3S2	
	Storage	Class 2C2；Class 2S2	
	Transportation	Class 1C2；Class 1S2	
	No condensation, no frost		
Altitude	Operation	If AC motor drive is installed at altitude 0~1000m, follow normal operation restriction. If it is install at altitude 1000~3000m, decrease 2% of rated current or lower 0.5℃ of temeperature for every 100m increase in altitude. Maximum altitude for Corner Grounded is 2000m.	
Package Drop	Storage/ Transportation	ISTA procedure 1A(according to weight) IEC60068-2-31	
Vibration	1.0mm, peak to peak value range from 2Hz to 13.2 Hz; 0.7G~1.0G range from 13.2Hz to 55Hz; 1.0G range from 55Hz 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)		

Specification for Operation Temperature and Protection Level

Model	Frame	Top Cover	Conduit Box	Protection Level	Operation Temperature
VFDxxxCxxA VFDxxxCxxS	Frame A~C 230V: 0.75~22kW 460V: 0.75~30kW	Remove top cover	Standard conduit plate	IP20/UL Open Type	-10℃ ~50℃
		Standard with top cover		IP20/UL Type1/NEMA1	-10℃ ~40℃
	Frame D~H 230V: >22kW 460V: >30kW	N/A	No conduit box	IP00 IP20/UL Open Type  IP00: for the circled area IP20: for all other area	-10℃ ~50℃
VFDxxxCxxE VFDxxxCxxU	Frame A~C 460V: 0.75~30kW	Remove top cover	Standard conduit plate	IP20/UL Open Type	-10℃ ~50℃
		Standard with top cover		IP20/UL Type1/NEMA1	-10℃ ~40℃
	Frame D~H 230V: >22kW 460V: >30kW	N/A	Standard conduit box	IP20/UL Type1/NEMA1	-10℃ ~40℃

Specifications

230V

Frame Size		A				B			C			D		E			F	
Model VFD___C__		007	015	022	037	055	075	110	150	185	220	300	370	450	550	750	900	
Applicable Motor Output (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	
Applicable Motor Output (HP)		1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	
Output Rating	NORMAL DUTY	Rated Output Capacity (kVA)	2.0	3.2	4.4	6.8	10	13	20	26	30	36	48	58	72	86	102	138	
		Rated Output Current (A)	5	8	11	17	25	33	49	65	75	90	120	146	180	215	255	346	
		Overload Capacity	Rated output current: 120% for 1 minute, 160% for 3 seconds.															
		Max. Output Frequency (Hz)	0.00~600.00Hz															
		Carrier Frequency (kHz)	2~15kHz (8kHz)							2~10kHz (6kHz)				2~9kHz (4kHz)				
	HEAVY DUTY	Rated Output Capacity (kVA)	1.9	2.8	4.0	6.4	9.6	12	19	25	28	34	45	55	68	81	96	131	
		Rated Output Current (A)	4.8	7.1	10	16	24	31	47	62	71	86	114	139	171	204	242	329	
		Overload Capacity	Rated output current: 150% for 1 minute, 180% for 3 seconds.															
		Max. Output Frequency (Hz)	0.00~300.00Hz															
		Carrier Frequency (kHz)	2~6kHz (2kHz)															
Input Rating	Input Current (A) Normal Duty		6.4	12	16	20	28	36	52	72	83	99	124	143	171	206	245	331	
	Input Current (A) Heavy Duty		6.1	11	15	18.5	26	34	50	68	78	95	118	136	162	196	233	315	
	Rated Voltage/Frequency		3-phase AC 200V~240V (-15%~+10%), 50/60Hz															
	Operating Voltage Range		170~265Vac															
	Frequency Tolerance		47~63Hz															
Drive Weight			2.6± 0.3Kg				5.4± 1Kg			9.8± 1.5Kg			38.5± 1.5Kg	64.8± 1.5Kg			86.5± 1.5Kg	
Efficiency (%)			96	96	96	96	96.5	96.5	96.5	96.5	96.5	96.5	97	97	97	97	97	97	
Cooling Method			Natural cooling	Fan cooling														
Braking Chopper			Frame A, B, C: built-in										Frame D and above: optional					
DC Choke			Frame A, B, C: optional										Frame D and above: built-in					
EMI Filter			Optional external EMI filter is available upon purchase															
EMC-COP01			VFDXXXC23A: optional; VFDXXC23E: built-in															

460V

Frame Size		A						B			C		
Model VFD___C__		007	015	022	037	040	055	075	110	150	185	220	300
Applicable Motor Output (kW)		0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22	30
Applicable Motor Output (HP)		1	2	3	5	5	7.5	10	15	20	25	30	40
Output Rating	NORMAL DUTY	Rated Output Capacity (kVA)	2.4	3.2	4.8	7.2	8.4	10	14	19	25	30	36	48
		Rated Output Current (A)	3.0	4.0	6.0	9.0	10.5	12	18	24	32	38	45	60
		Overload Capacity	Rated output current: 120% for 1 minute, 160% for 3 seconds.											
		Max. Output Frequency (Hz)	0.00~600.00Hz											
		Carrier Frequency (kHz)	2~15kHz (8kHz)									2~10kHz (6kHz)		
	HEAVY DUTY	Rated Output Capacity (kVA)	2.3	3.0	4.5	6.5	7.6	9.6	14	18	24	29	34	45
		Rated Output Current (A)	2.9	3.8	5.7	8.1	9.5	11	17	23	30	36	43	57
		Overload Capacity	Rated output current: 150% for 1 minute, 180% for 3 seconds.											
		Max. Output Frequency (Hz)	0.00~300.00Hz											
		Carrier Frequency (kHz)	2~6kHz (2kHz)											
Input Rating	Input Current (A) Normal Duty		4.3	5.9	8.7	14	15.5	17	20	26	35	40	47	63
	Input Current (A) Heavy Duty		4.1	5.6	8.3	13	14.5	16	19	25	33	38	45	60
	Rated Voltage/Frequency		3-phase AC 380V~480V (-15%~+10%), 50/60Hz											
	Operating Voltage Range		323~528Vac											
	Frequency Tolerance		47~63Hz											
Drive Weight			2.6± 0.3Kg						5.4± 1Kg			9.8± 1.5Kg		
Efficiency (%)			96	96	96	96	96	96	96	96	96.5	96.5	96.5	96.5
Cooling Method			Natural cooling	Fan cooling										
Braking Chopper			Frame A, B, C: built-in ; Frame D and above: optional											
DC Choke			Frame A, B, C: optional ; Frame D and above: built-in											
EMI Filter			Frame A,B,C VFDXXXC43E: built-in EMI filter Frame A,B,C VFD___C43A: no EMI filter (Optional external EMI filter is available upon purchase) , VFDXXX C43E: built-in.											

NOTES:

·The carrier frequency is default. Increasing the carrier frequency requires a reduction in current, please refer to Pr. 06-55 Derating Protection drawing.

·The motor drive should operate in derating current when its control method is set to FOC Sensorless,TQC+PG, TQC Sensorless, PM+PG and PM Sensorless modes.

·When the application is performing impact load, select the motor drive with one grade larger capacity.

·For FRAME A, B and C, Model VFD___C43A is under IP20/NEMA1/UL TYPE1 protection level.

·For FRAME D and above, if the last character of the model is A then it is under IP20 protection level but the wiring terminal is under IP00 protection level;
if the last character of the model is E, it is under IP20/NEMA1/UL TYPE1 protection level.

460V

Frame Size		D0	D			E		F		G		H			
Model VFD___C__		370	450	550	750	900	1100	1320	1600	1850	2200	2800	3150	3550	4500*
Applicable Motor Output (kW)		37	45	55	75	90	110	132	160	185	220	280	315	355	450
Applicable Motor Output (HP)		50	60	75	100	125	150	175	215	250	300	375	425	475	600
Output Rating	NORMAL DUTY														
	Rated Output Capacity (kVA)	58	73	88	120	143	175	207	247	295	367	438	491	544	720
	Rated Output Current (A)	73	91	110	150	180	220	260	310	370	460	550	616	683	866
	Overload Capacity	Rated output current: 120% for 1 minute, 160% for 3 seconds.													
	Max. Output Frequency (Hz)	0.00~600.00Hz													
	Carrier Frequency (kHz)	2~10kHz (6kHz)				2~9kHz (4kHz)									
	HEAVY DUTY														
	Rated Output Capacity (kVA)	55	69	84	114	136	167	197	235	280	348	417	466	517	677
	Rated Output Current (A)	69	86	105	143	171	209	247	295	352	437	523	585	649	816
	Overload Capacity	Rated output current: 150% for 1 minute, 180% for 3 seconds.													
	Max. Output Frequency (Hz)	0.00~300.00Hz													
	Carrier Frequency (kHz)	2~6kHz (2kHz)													
Input Rating	Input Current (A) Normal Duty	74	101	114	157	167	207	240	300	380	400	494	555	625	866
	Input Current (A) Heavy Duty	70	96	108	149	159	197	228	285	361	380	469	527	594	816
	Rated Voltage/Frequency	3-phase AC 380V~480V (-15%~+10%), 50/60Hz													
	Operating Voltage Range	323~528Vac													
	Frequency Tolerance	47~63Hz													
Drive Weight		38.5± 1.5Kg				64.8±1.5Kg		86.5±1.5Kg		134±4Kg		228			
Efficiency (%)		97	97	97	97	97	97	97	97	97.5	97.5	97.5	97.5	97.5	97.5
Cooling Method		Fan cooling													
Braking Chopper		Frame A, B, C: built-in ; Frame D and above: optional													
DC Choke		Frame A, B, C: optional ; Frame D and above: built-in													
EMI Filter		Optional external EMI filter is available upon purchase													
EMC-COP01		VFDXXXC43A: optional; VFDXXC43E: built-in													

* Available in China and Taiwan only.

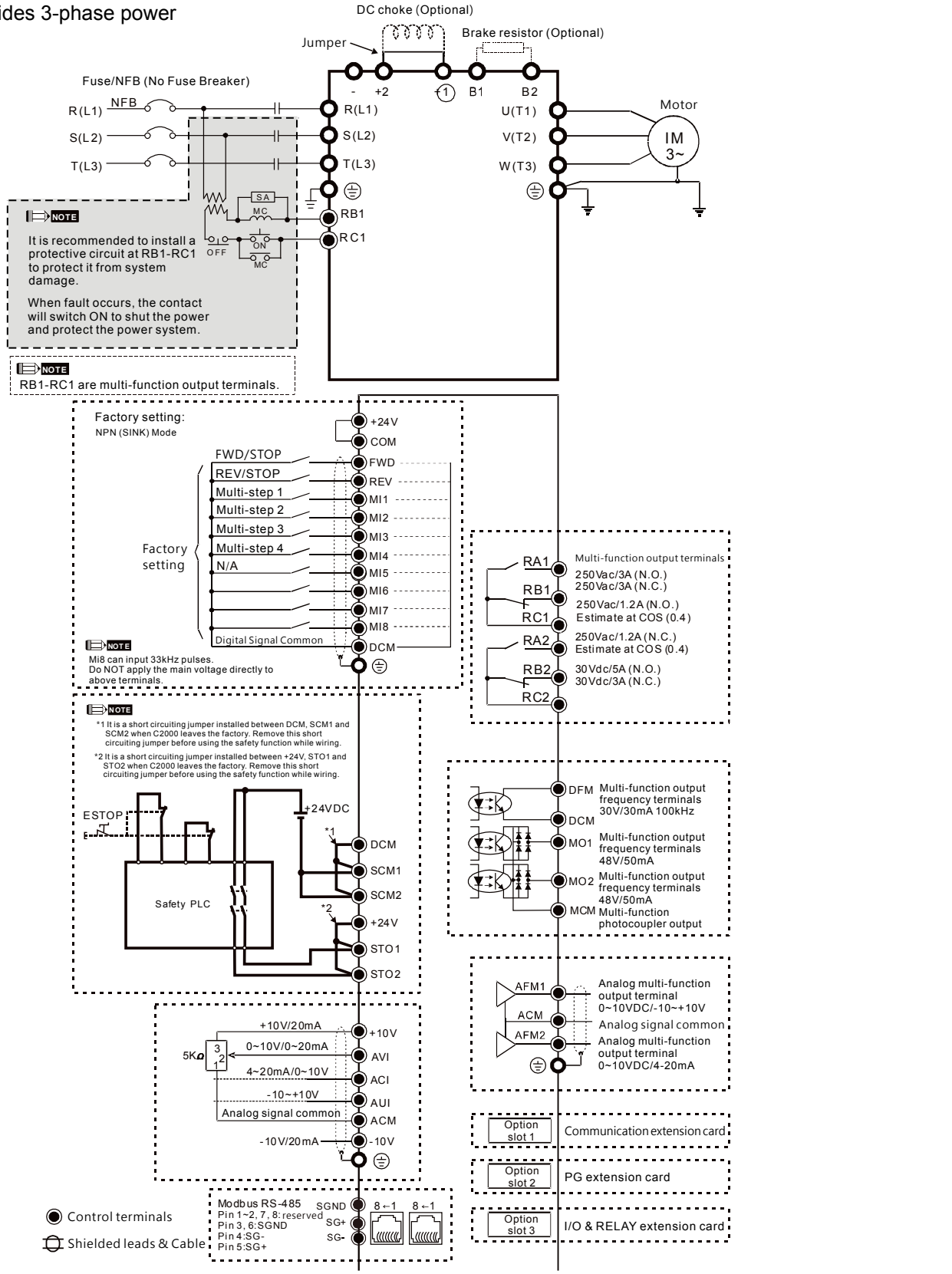
General Specifications

Control Characteristics	Control Method	Pulse Width Modulated (PWM)
	Control Mode	1: V/F, 2: SVC, 3: VF+PG, 4: FOC+PG, 5: TQC+PG, 6: PM+PG, 7: FOC sensorless, 8: TQC sensorless, 9: PM sensorless
	Starting Torque	Reach up to 150% or above at 0.5Hz. Under FOC+PG mode, starting torque can reach 150% at 0Hz.
	V/f Curve	4-point adjustable V/f curve and square curve
	Speed Response Ability	5Hz (vector control can reach up to 40Hz)
	Torque Limit	Normal duty 160%, heavy duty 180% of torque current
	Torque Accuracy	±5%
	Max. Output Frequency (Hz)	Normal duty:0.00~600.00Hz; Heavy duty: 0.00 ~ 300.00 Hz
	Frequency Output Accuracy	Digital command:±0.01%, -10℃ ~+40℃, Analog command:±0.1%, 25±10℃
	Output Frequency Resolution	Digital command:0.01Hz , Analog command: 0.03 X max. output frequency/60 Hz (±11 bit)
	Overload Capacity	Normal duty: rated output current is 120% for 60seconds, 160% for 3 seconds. Heavy duty: rated output current is 150% for 60seconds, 180% for 3 seconds.
	Frequency Setting Signal	+10V~-10,0~+10V,4~20mA,0~20mA,Pulse input
	Accel./decel. Time	0.00~600.00/0.0~6000.0 Seconds
	Main Control Function	Torque control, Droop control, Speed/torque control switching, Feed forward control, Zero-servo control, Momentary power loss ride thru, Speed search, Over-torque detection, Torque limit, 17-step speed (max), Accel/decel time switch, S-curve accel/decel, 3-wire sequence, Auto-Tuning (rotational, stationary), Dwell, Cooling fan on/off switch, Slip compensation, Torque compensation, JOG frequency, Frequency upper/lower limit settings, DC injection braking at start/stop, High slip braking, PID control (with sleep function), Energy saving control, MODOBUS communication (RS-485 RJ45, max. 115.2 kbps), Fault restart, Parameter copy
	Fan Control	230V model : VFD150C23A(include) and series above: PMW control; VFD110 C23A and series below: on/off switch control 460V model : VFD185 C43A(include) and series above: PMW control; VFD150C43A and series below: on/off switch control
Protection Characteristics	Motor Protection	Electronic thermal relay protection
	Over-current Protection	Over-current protection for 240% rated current current clamp『Normal duty: around 170~175%』 ; 『Heavy duty: around180~185%』
	Over-voltage Protection	230: drive will stop when DC-BUS voltage exceeds 410V 460: drive will stop when DC-BUS voltage exceeds 820V
	Over-temperature Protection	Built-in temperature sensor
	Stall Prevention	Stall prevention during acceleration, deceleration and running independently.
	Restart after Instantaneous Power Failure	Parameter setting up to 20 seconds
	Grounding Leakage Current Protection	Leakage current is higher than 50% of the AC motor drive's rated current
Ceritifications		CE cULus EAC

Wiring

Wiring Diagram for Frame A~C

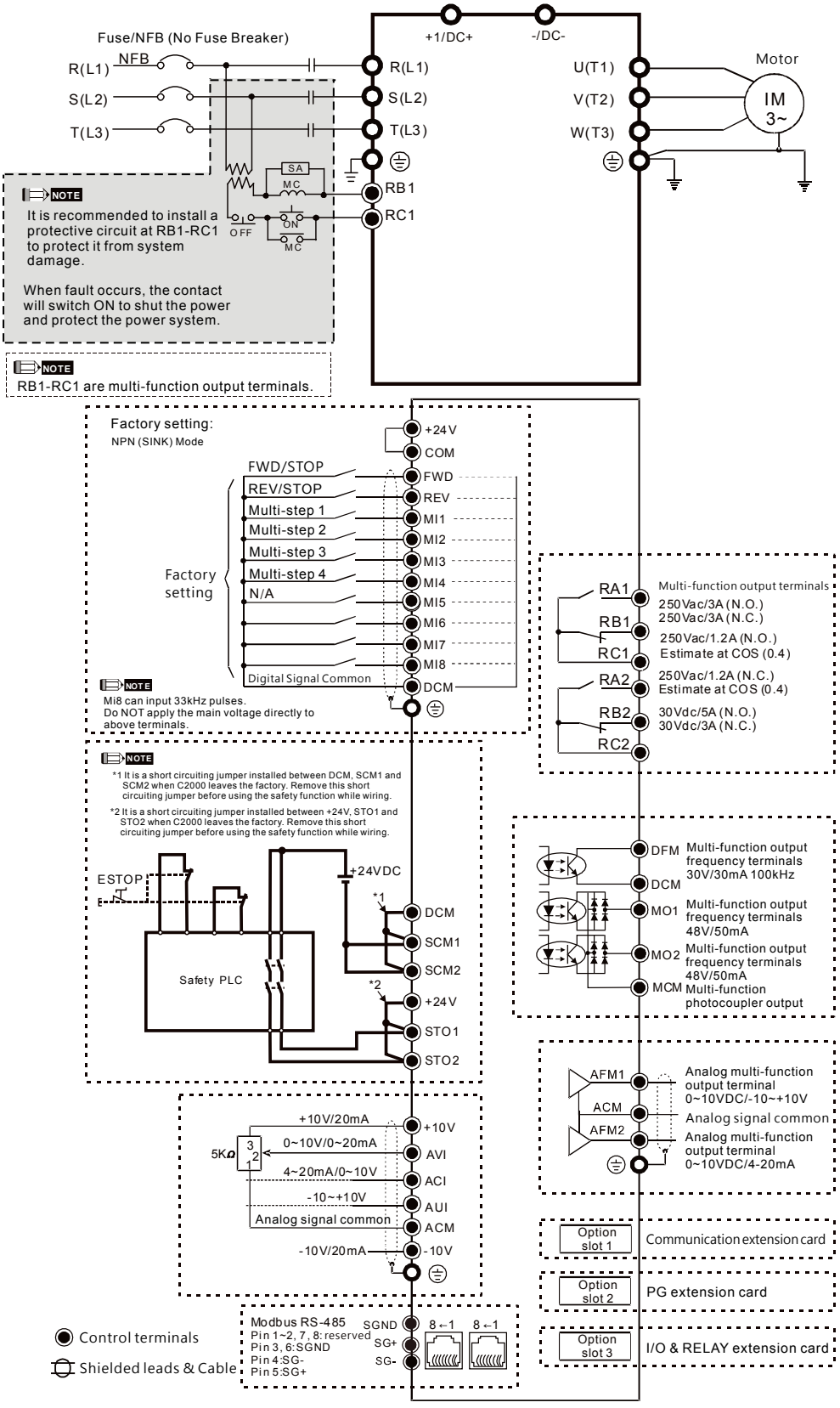
*It provides 3-phase power



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.

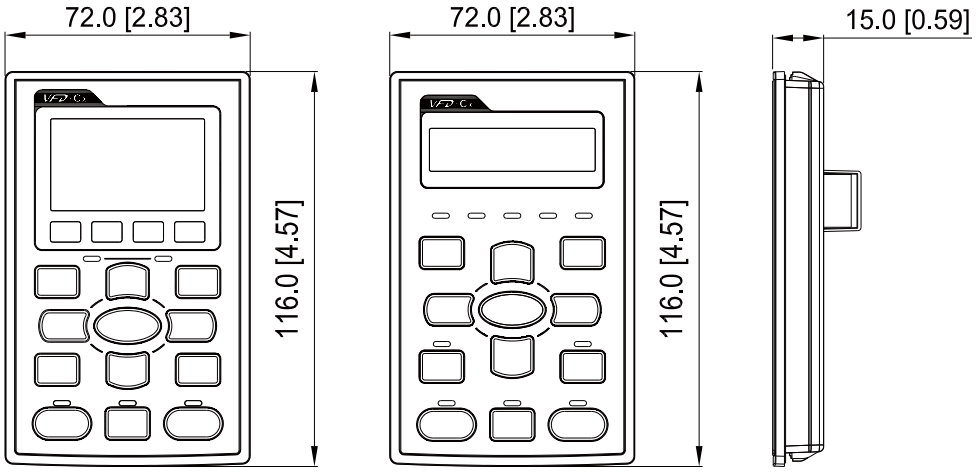
Wiring Diagram for Frame D and Frames Above

*It provides 3-phase power



Dimensions

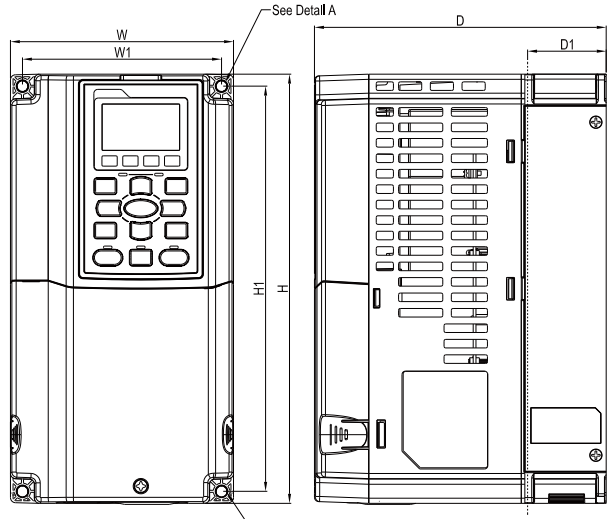
Digital Keypad

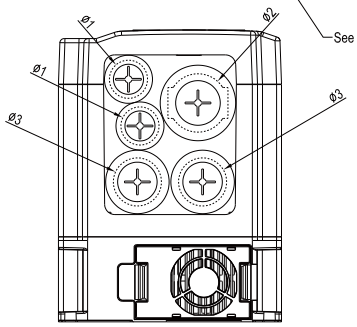


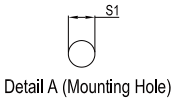
KPC-CC01
Standard LCD Keypad

KPC-CE01
Optional: LCD Keypad

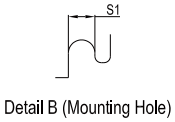
Frame A







Detail A (Mounting Hole)



Detail B (Mounting Hole)

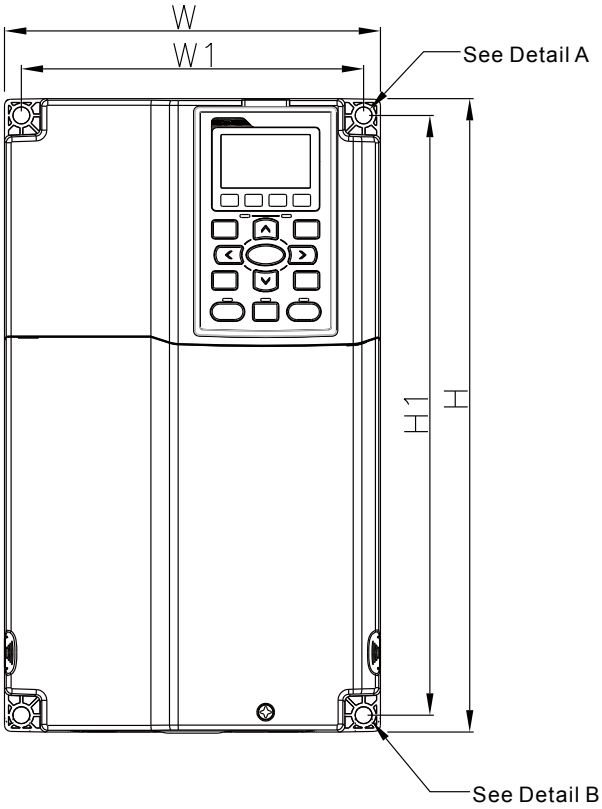
MODEL
VFD007C23A
VFD015C23A
VFD022C23A
VFD037C23A
VFD007C43A/43E
VFD015C43A/43E
VFD022C43A/43E
VFD037C43A/43E
VFD040C43A/43E
VFD055C43A/43E

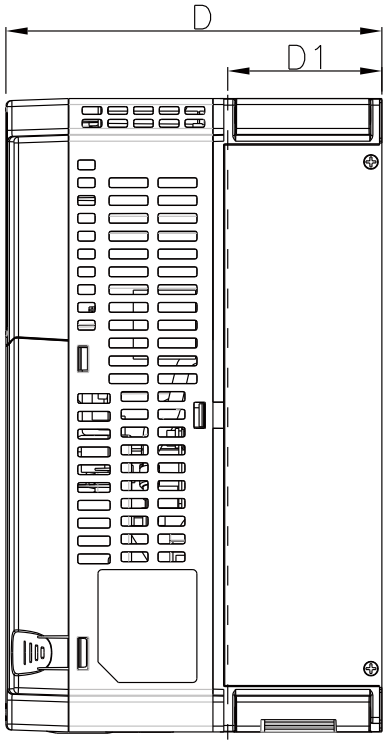
Unit : mm[inch]

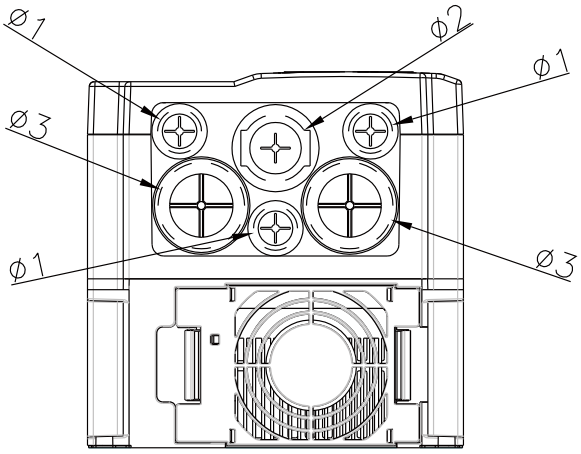
Frame		W	H	D	W1	H1	D1*	Ø	Ø1	Ø2	Ø3
A1	mm	130.0	250.0	170.0	116.0	236.0	45.8	6.2	22.2	34.0	28.0
	inch	5.12	9.84	6.69	4.57	9.29	1.80	0.24	0.87	1.34	1.10

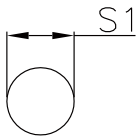
D1*: Flange mounting

Frame B

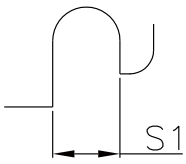








Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

VFD055C23A
VFD075C23A
VFD110C23A
VFD075C43A/43E
VFD110C43A/43E
VFD150C43A/43E

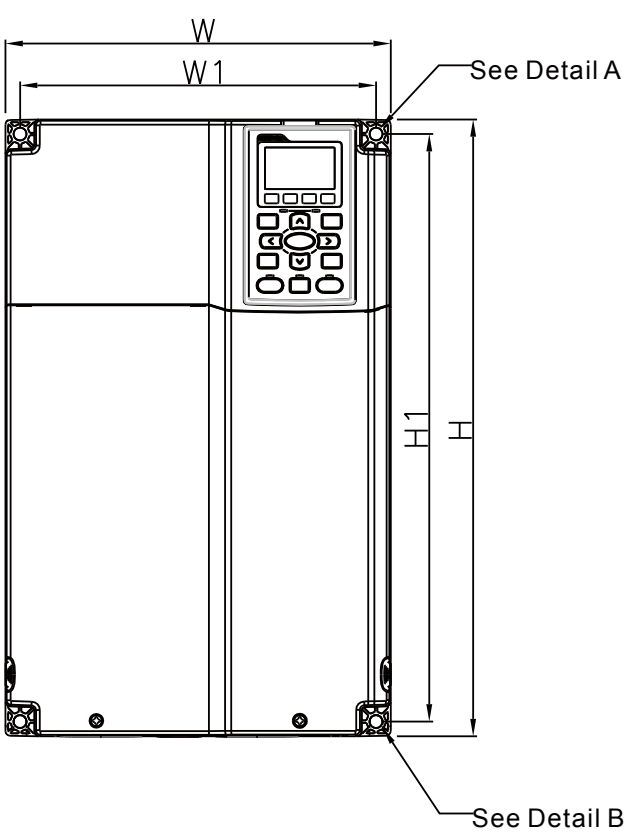
Unit：mm[inch]

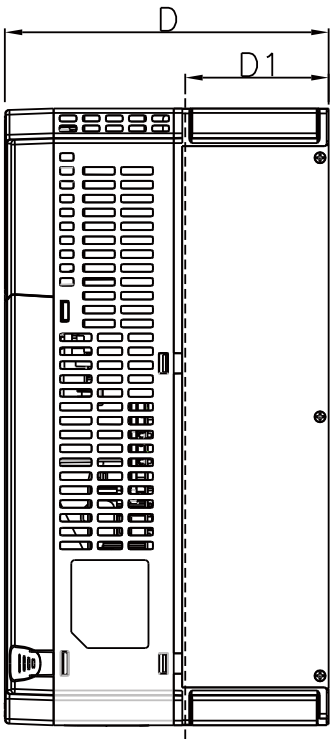
Frame		W	H	D	W1	H1	D1*	S1	Ø1	Ø2	Ø3
B1	mm	190.0	320.0	190.0	173.0	303.0	77.9	8.5	22.2	34.0	28.0
	inch	7.48	12.60	7.48	6.81	11.93	3.07	0.33	0.87	1.34	1.10

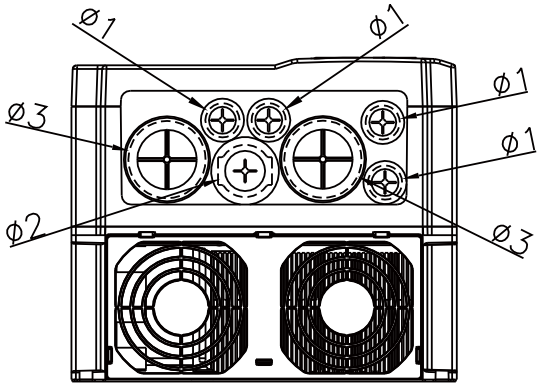
D1*: Flange mounting

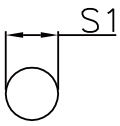
Dimensions

Frame C

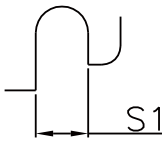








Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

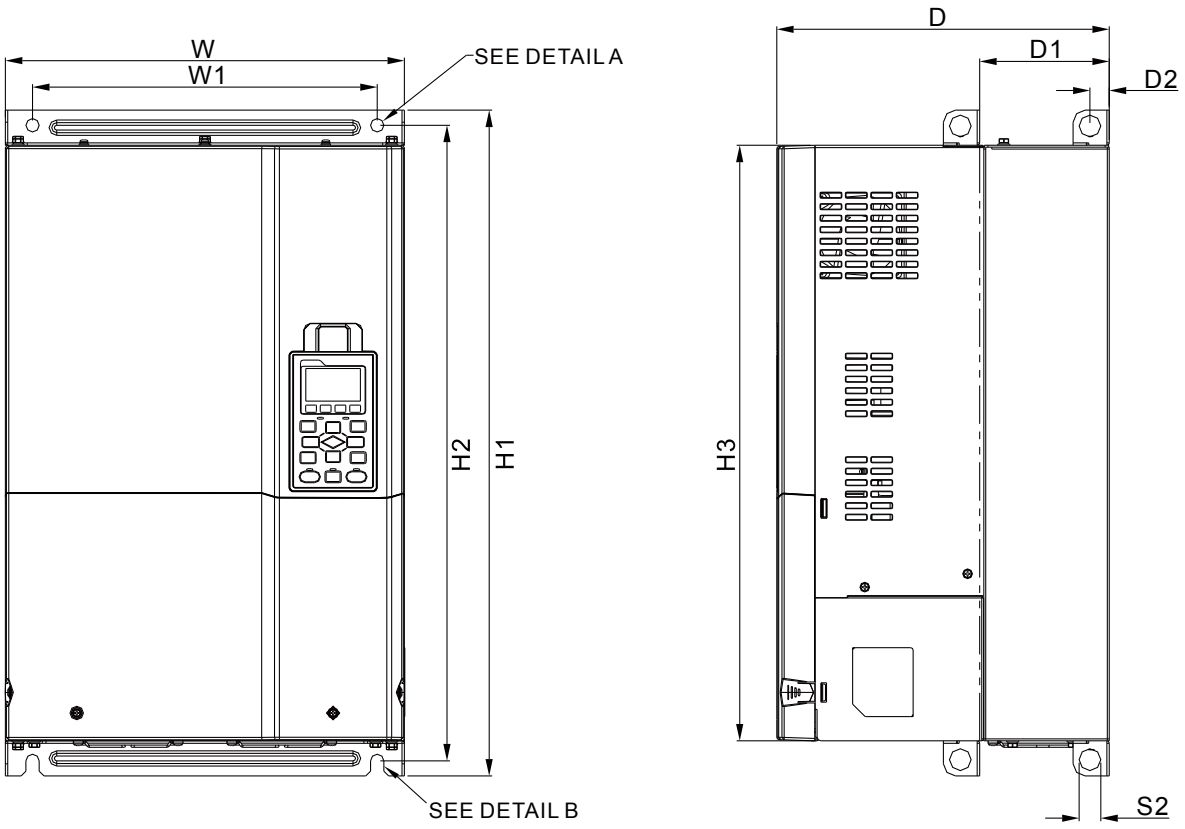
VFD150C23A
VFD185C23A
VFD220C23A
VFD185C43A/43E
VFD220C43A/43E
VFD300C43A/43E

Unit : mm[inch]

Frame		W	H	D	W1	H1	D1*	S1	Ø1	Ø2	Ø3
C1	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 mounting

Frame D



MODEL

FRAME_D1
VFD300C23A
VFD370C23A
VFD550C43A
VFD750C43A

FRAME_D0-1
VFD370C43S
VFD450C43S

Unit : mm[inch]

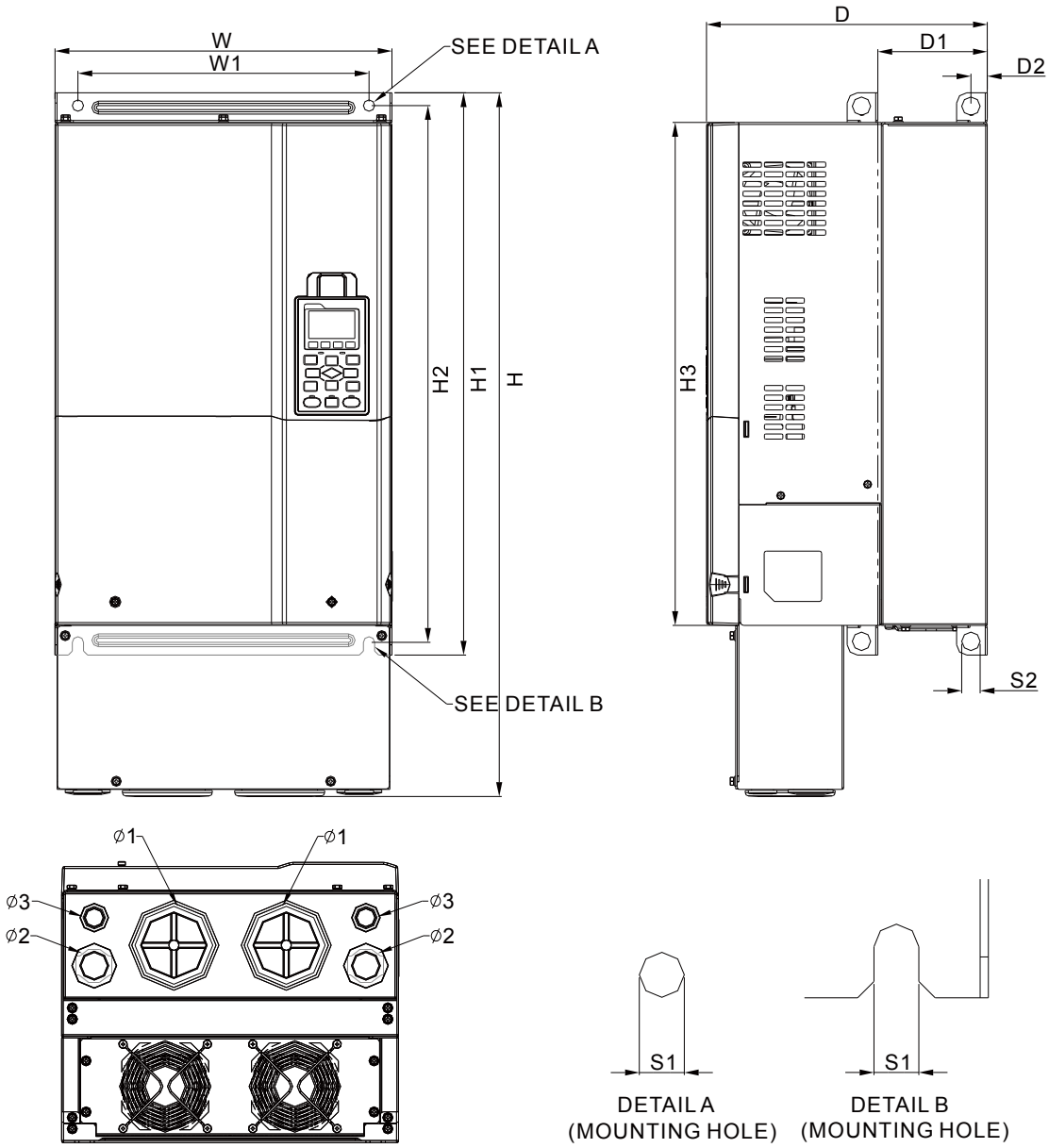
Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	Ø1	Ø2	Ø3
D1	mm	330.0	-	275.0	285.0	550.0	525.0	492.0	107.2	16.0	11.0	18.0	-	-	-
	inch	12.99	-	10.83	11.22	21.65	20.67	19.37	4.22	0.63	0.43	0.71	-	-	-

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 mounting

Dimensions

Frame D



MODEL

FRAME_D2	FRAME_D0-2
VFD300C23E	VFD370C43U
VFD370C23E	VFD450C43U
VFD550C43E	
VFD750C43E	

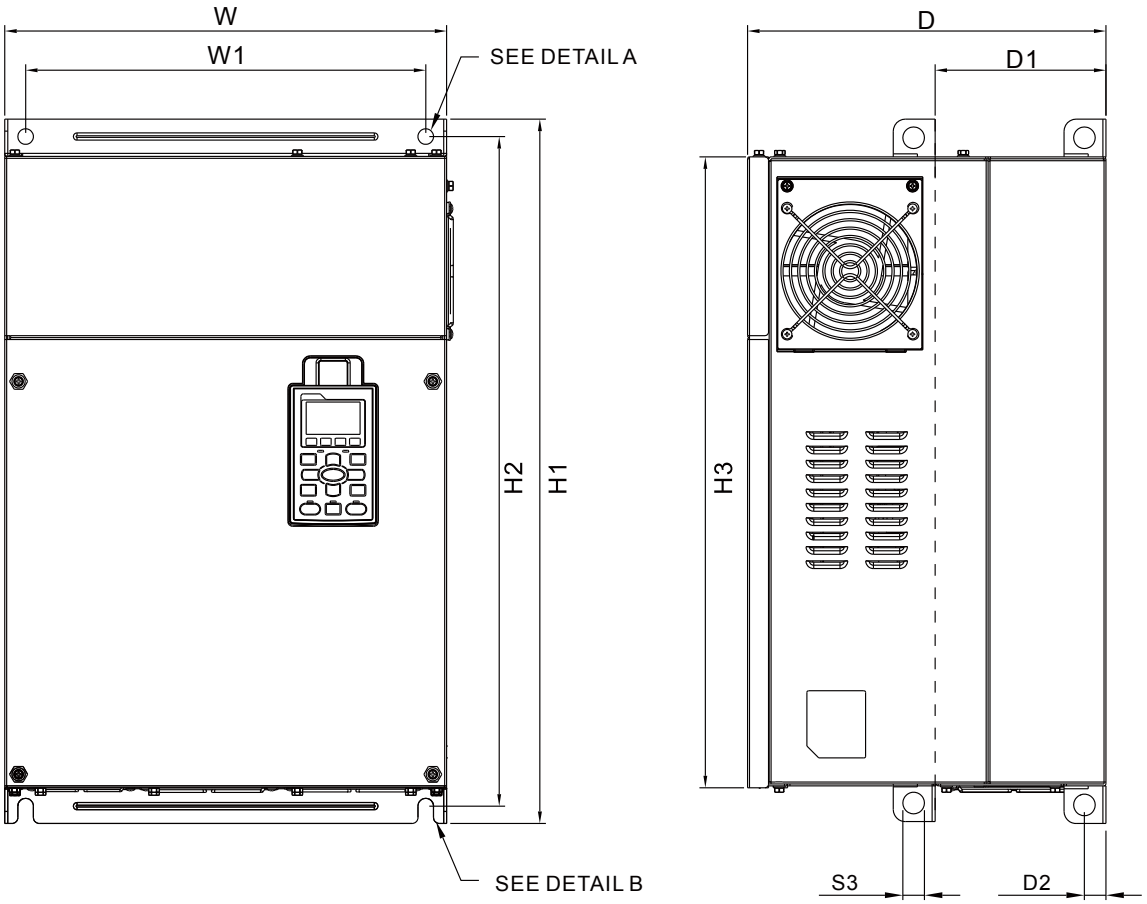
Unit：mm[inch]

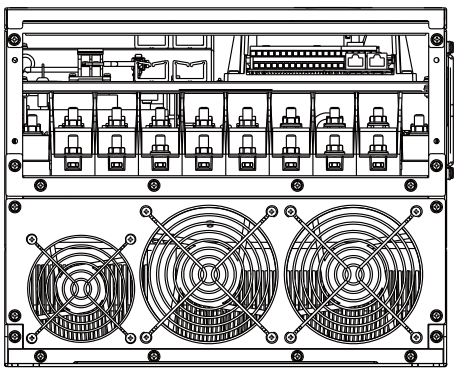
Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	Ø1	Ø2	Ø3
D2	mm	330.0	688.3	275.0	285.0	550.0	525.0	492.0	107.2	16.0	11.0	18.0	76.2	34.0	22.0
	inch	12.99	27.10	10.83	11.22	21.65	20.67	19.37	4.22	0.63	0.43	0.71	3.00	1.34	0.87

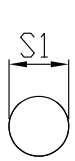
Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	Ø1	Ø2	Ø3
D0-2	mm	280.0	614.4	255.0	235.0	500.0	475.0	442.0	94.2	16.0	11.0	18.0	62.7	34.0	22.0
	inch	11.02	21.19	10.04	9.25	19.69	18.70	17.40	3.71	0.63	0.43	0.71	2.47	1.34	0.87

D1*: Flange mounting

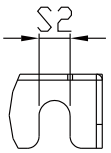
Frame E







Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

FRAME_E1

VFD450C23A
VFD550C23A
VFD750C23A
VFD900C43A
VFD1100C43A

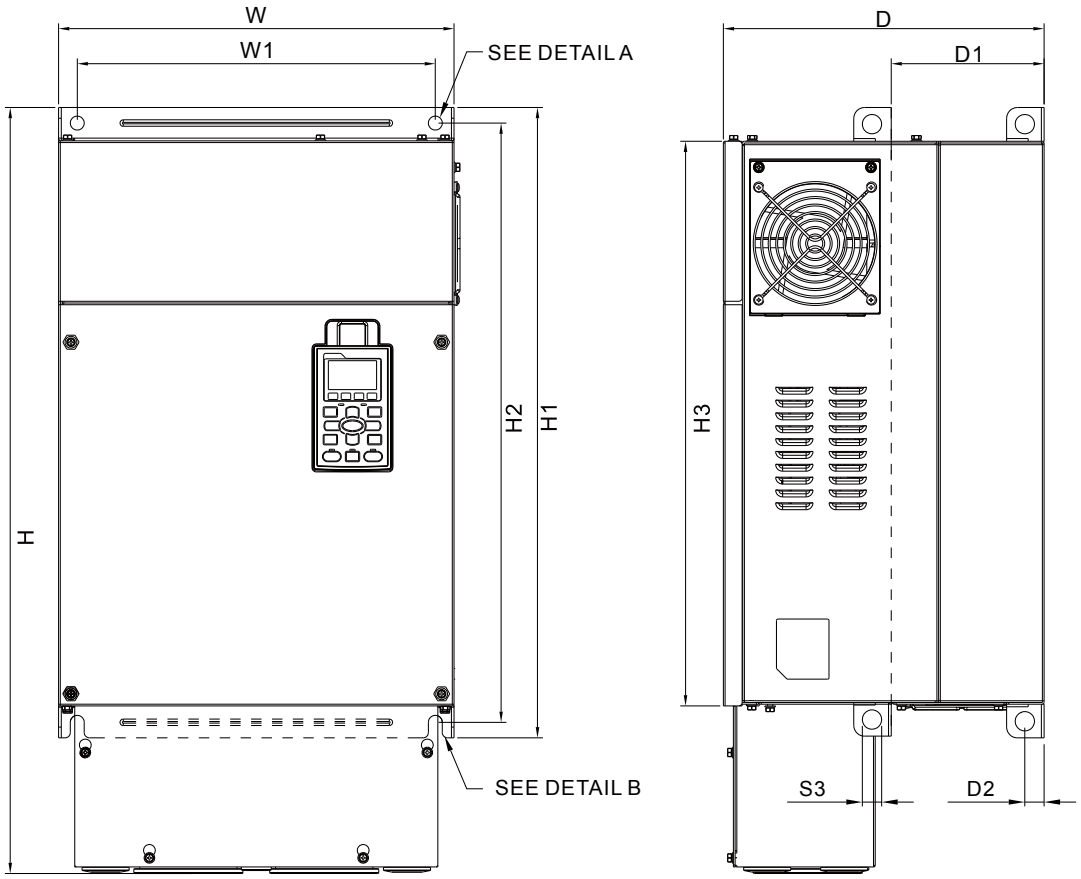
Unit : mm[inch]

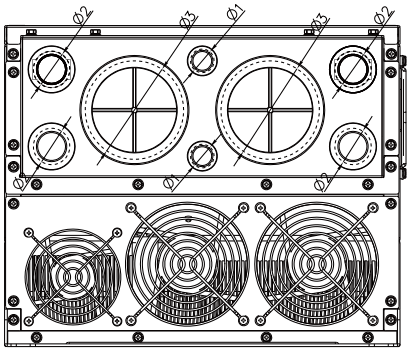
Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
E1	mm	370.0	-	300.0	335.0	589	560.0	528.0	143.0	18.0	13.0	13.0	18.0	-	-	-
	inch	14.57	-	11.81	13.19	23.19	22.05	20.80	5.63	0.71	0.51	0.51	0.71	-	-	-

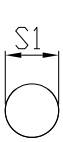
D1*: Flange mounting

Dimensions

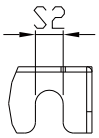
Frame E







Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

FRAME_E2

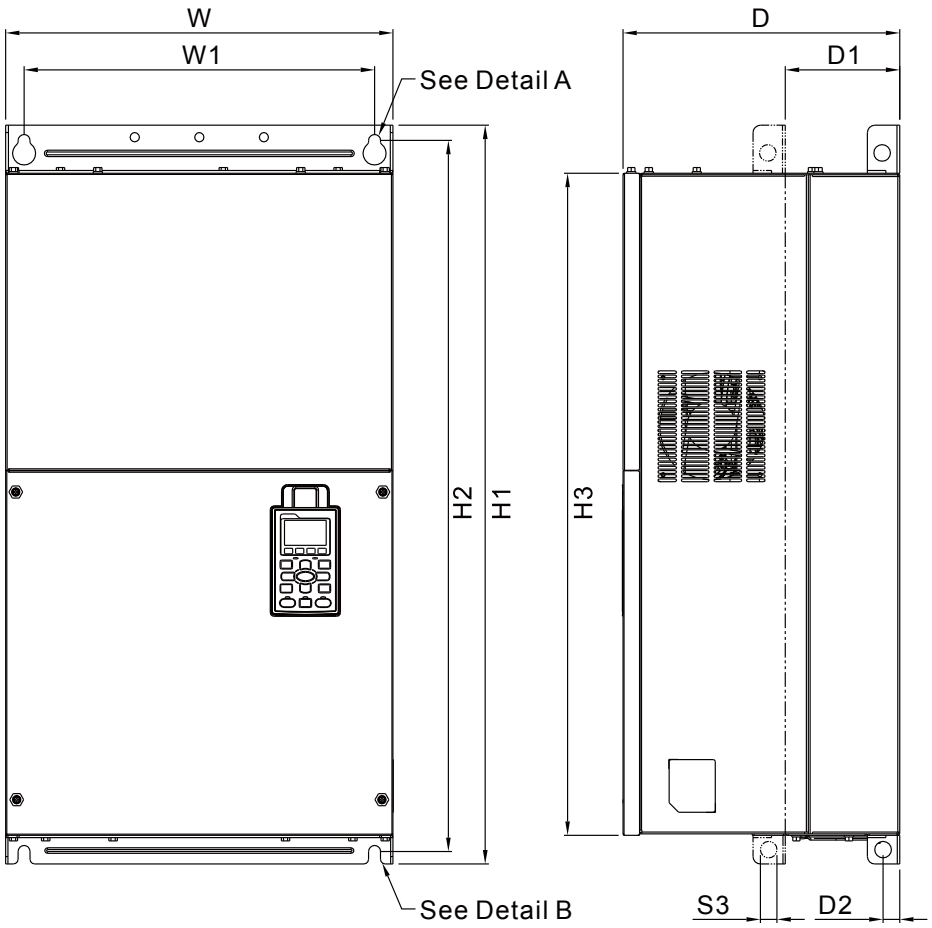
VFD450C23E
VFD550C23E
VFD750C23E
VFD900C43E
VFD1100C43E

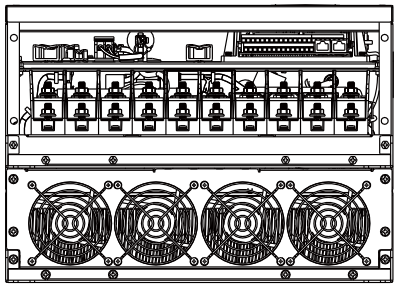
Unit : mm[inch]

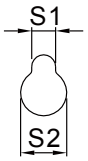
Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
E2	mm	370.0	715.8	300.0	335.0	589	560.0	528.0	143.0	18.0	13.0	13.0	18.0	22.0	34.0	92.0
	inch	14.57	28.18	11.81	13.19	23.19	22.05	20.80	5.63	0.71	0.51	0.51	0.71	0.87	1.34	3.62

D1*: Flange mounting

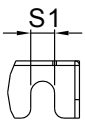
Frame F







Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

FRAME_F1

VFD900C23A
VFD1320C43A
VFD1600C43A

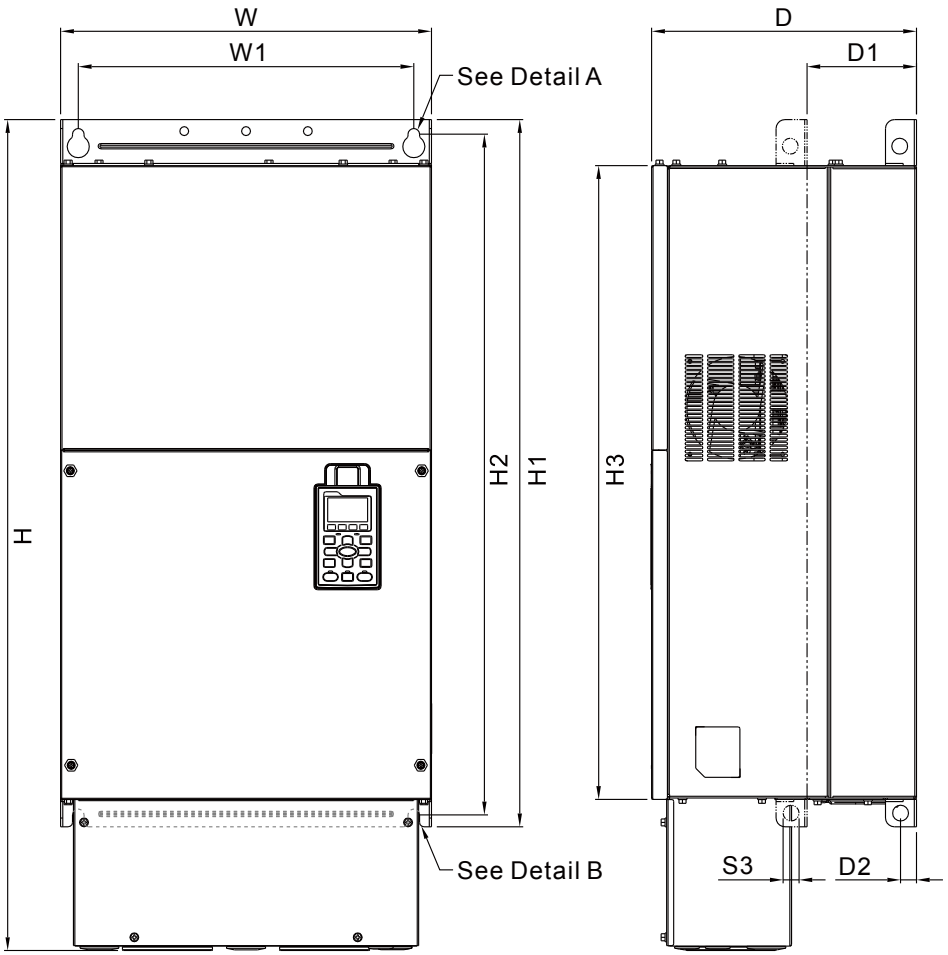
Unit：mm[inch]

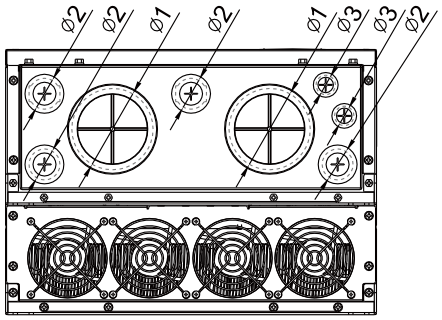
Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
F1	mm	420.0	-	300.0	380.0	800.0	770.0	717.0	124.0	18.0	13.0	25.0	18.0	92.0	35.0	22.0
	inch	16.54	-	11.81	14.96	31.50	30.32	28.23	4.88	0.71	0.51	0.98	0.71	3.62	1.38	0.87

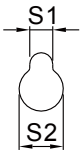
D1*: Flange mounting

Dimensions

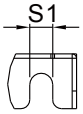
Frame F







Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

FRAME_F2

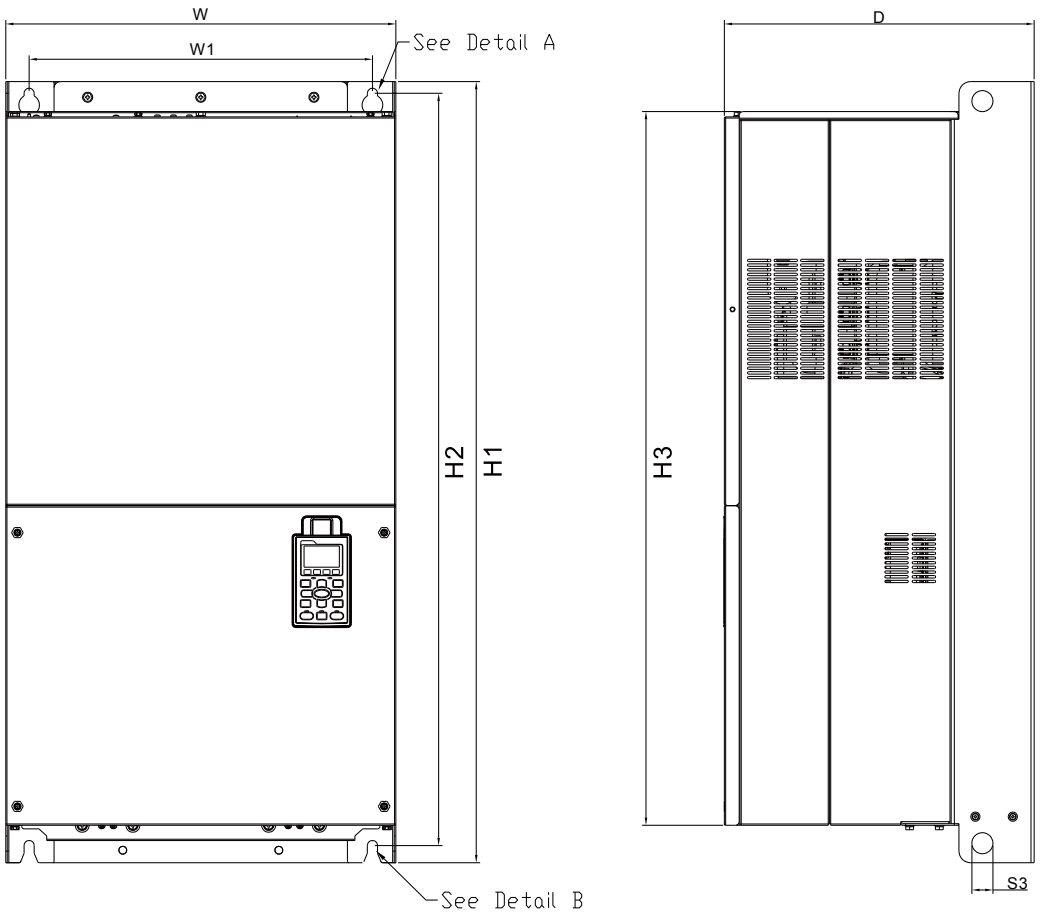
VFD900C23E
VFD1320C43E
VFD1600C43E

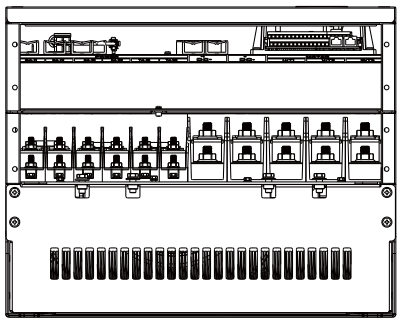
Unit : mm[inch]

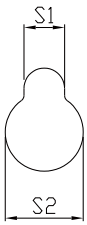
Frame		W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
F2	mm	420.0	940.0	300.0	380.0	800.0	770.0	717.0	124.0	18.0	13.0	25.0	18.0	92.0	35.0	22.0
	inch	16.54	37.00	11.81	14.96	31.50	30.32	28.23	4.88	0.71	0.51	0.98	0.71	3.62	1.38	0.87

D1*: Flange mounting

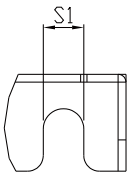
Frame G







Detail A (Mounting Hole)



Detail B (Mounting Hole)

MODEL

FRAME_G1

VFD1850C43A

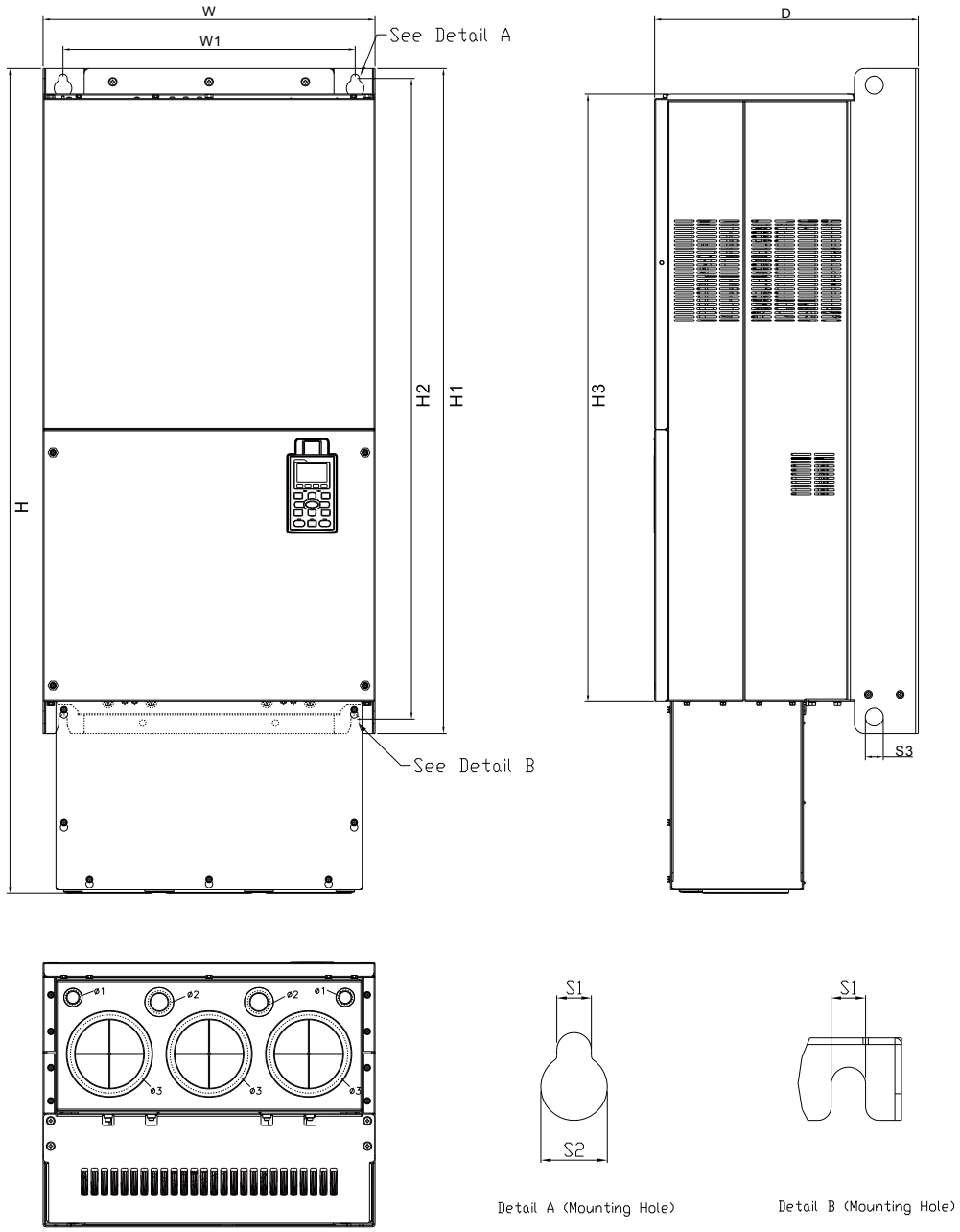
VFD2200C43A

Unit : mm[inch]

Frame		W	H	D	W1	H1	H2	H3	S1	S2	S3	Ø1	Ø2	Ø3
G1	mm	500.0	-	397.0	440.0	1000.0	963.0	913.6	13.0	26.5	27.0	-	-	-
	inch	19.69	-	15.63	217.32	39.37	37.91	35.97	0.51	1.04	1.06	-	-	-

Dimensions

Frame G



MODEL

FRAME_G2

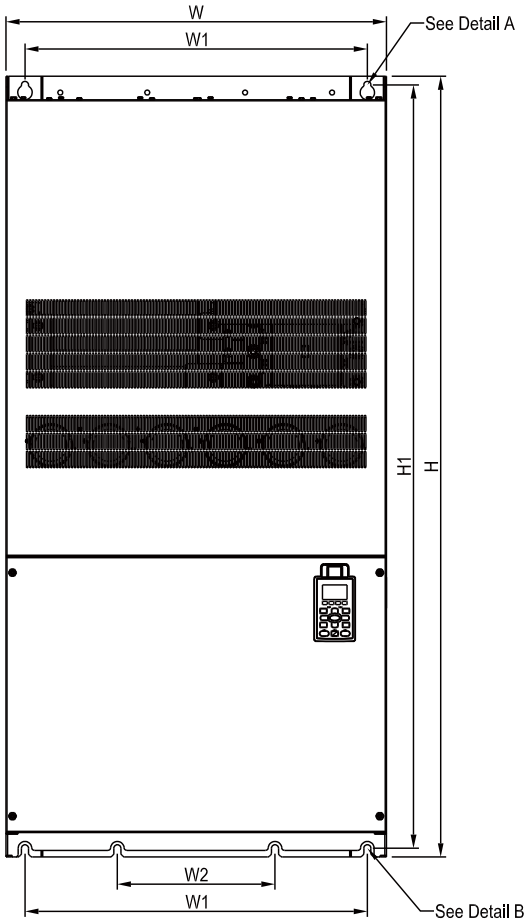
VFD1850C43E

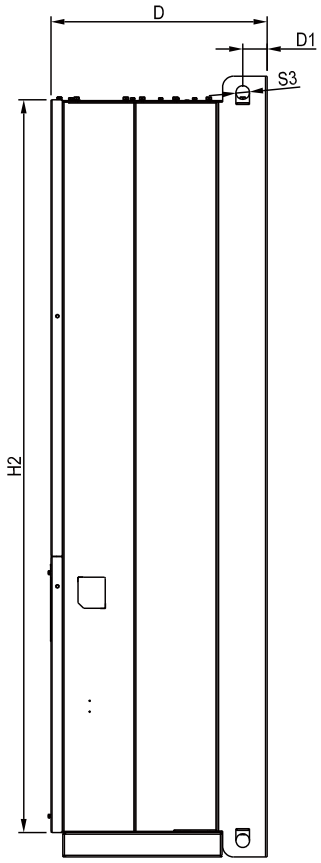
VFD2200C43E

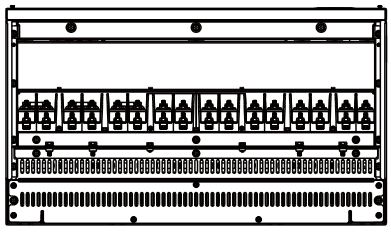
Unit : mm[inch]

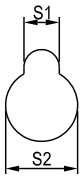
Frame		W	H	D	W1	H1	H2	H3	S1	S2	S3	Ø1	Ø2	Ø3
G2	mm	500.0	1240.2	397.0	440.0	1000.0	963.0	913.6	13.0	26.5	27.0	22.0	34.0	117.5
	inch	19.69	48.83	15.63	217.32	39.37	37.91	35.97	0.51	1.04	1.06	0.87	1.34	4.63

Frame H

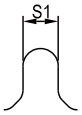








See Detail A(Mounting Hole)



See Detail B(Mounting Hole)

MODEL

FRAME_H1

VFD2800C43A
VFD3150C43A
VFD3550C43A
VFD4500C43A*

Unit：mm[inch]

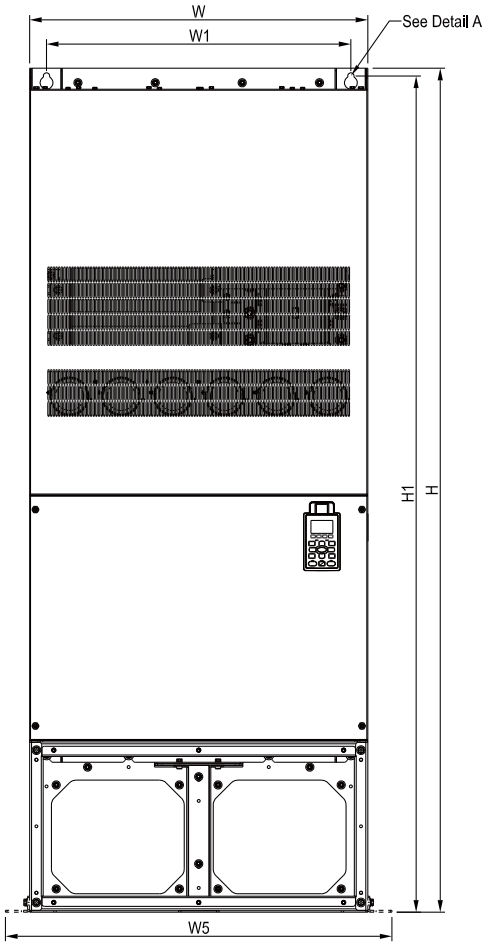
Frame		W	H	D	W1	W2	W3	W4	W5	W6	H1	H2	H3	H4
H1	mm	700.0	1435.0	398.0	630.0	290.0	-	-	-	-	1403.0	1346.6	-	-
	inch	27.56	56.50	15.67	24.80	11.42	-	-	-	-	55.24	53.02	-	-

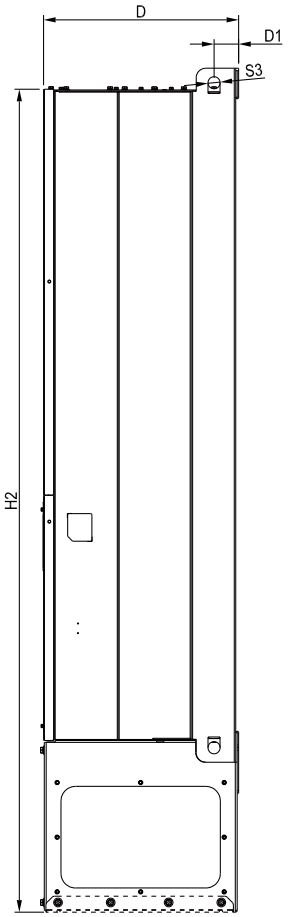
Frame		H5	D1	D2	D3	D4	D5	D6	S1	S2	S3	Ø1	Ø2	Ø3
H1	mm	-	45.0	-	-	-	-	-	13.0	26.5	25.0	-	-	-
	inch	-	1.77	-	-	-	-	-	0.51	1.04	0.98	-	-	-

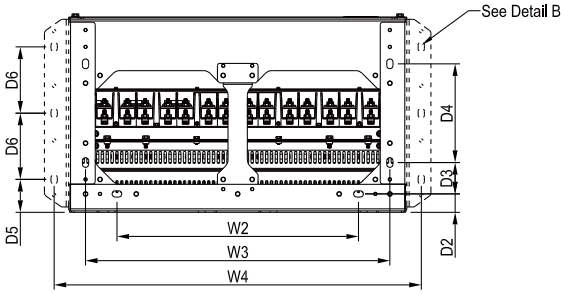
* Available in China and Taiwan only.

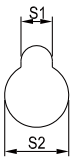
Dimensions

Frame H









See Detail A(Mounting Hole)

See Detail B(Mounting Hole)

MODEL

FRAME_H2

VFD2800C43E-1
VFD3150C43E-1
VFD3550C43E-1
VFD4500C43E-1*

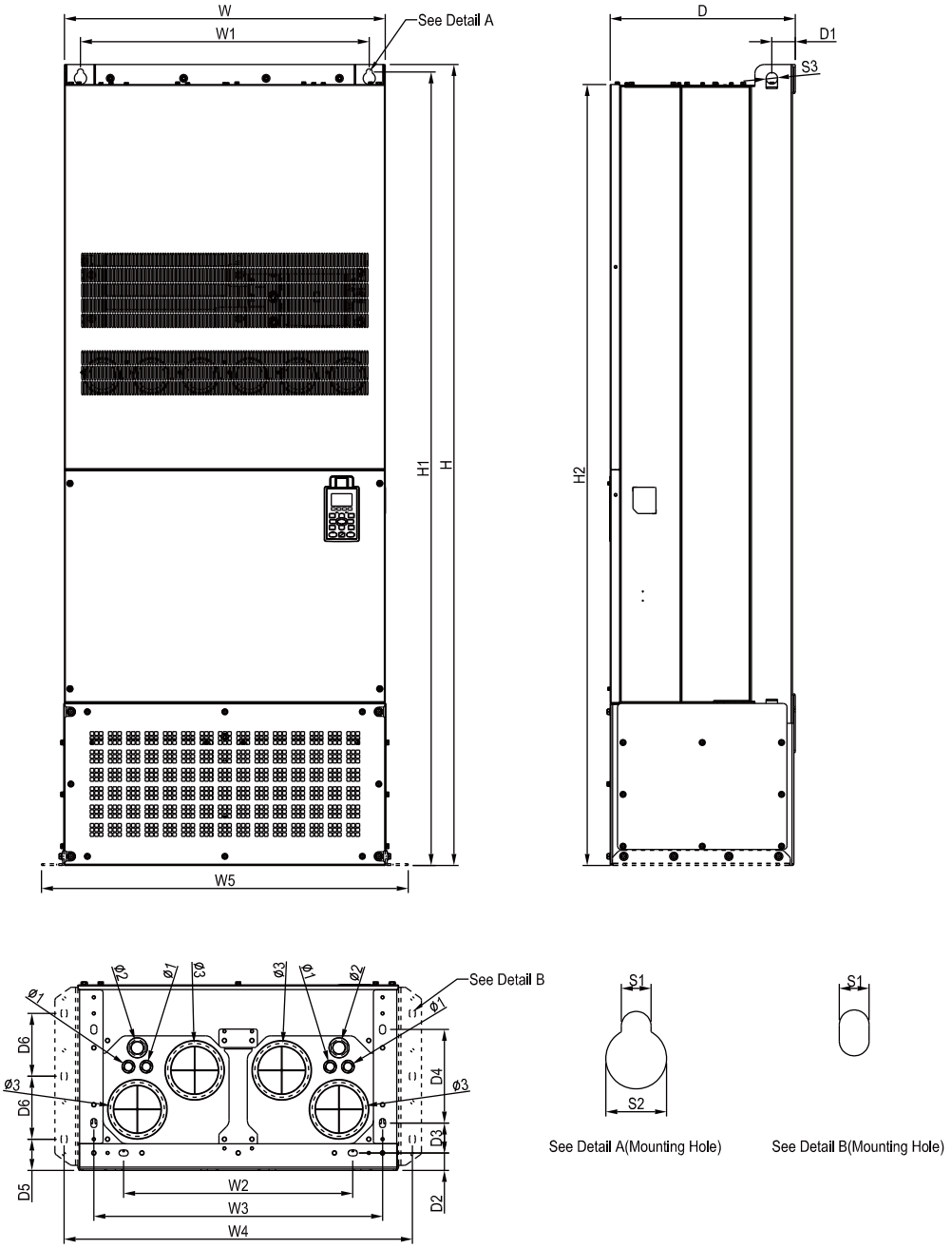
Unit : mm[inch]

Frame		W	H	D	W1	W2	W3	W4	W5	W6	H1	H2	H3	H4
H2	mm	700.0	1745.0	404.0	630.0	500.0	630.0	760.0	800.0	-	1729.0	1701.6	-	-
	inch	27.56	68.70	15.91	24.80	19.69	24.80	29.92	31.50	-	68.07	66.99	-	-

Frame		H5	D1	D2	D3	D4	D5	D6	S1	S2	S3	Ø1	Ø2	Ø3
H2	mm	-	51.0	38.0	65.0	204.0	68.0	137.0	13.0	26.5	25.0	-	-	-
	inch	-	2.01	1.50	2.56	8.03	2.68	5.39	0.51	1.04	0.98	-	-	-

* Available in China and Taiwan only.

Frame H



MODEL

FRAME_H3

VFD2800C43E
VFD3150C43E
VFD3550C43E
VFD4500C43E*

Unit : mm[inch]

Frame		W	H	D	W1	W2	W3	W4	W5	W6	H1	H2	H3	H4
H3	mm	700.0	1745.0	404.0	630.0	500.0	630.0	760.0	800.0	-	1729.0	1701.6	-	-
	inch	27.56	68.70	15.91	24.80	19.69	24.80	29.92	31.50	-	68.07	66.99	-	-

Frame		H5	D1	D2	D3	D4	D5	D6	S1	S2	S3	Ø1	Ø2	Ø3
H3	mm	-	51.0	38.0	65.0	204.0	68.0	137.0	13.0	26.5	25.0	22.0	34.0	117.5
	inch	-	2.01	1.50	2.56	8.03	2.68	5.39	0.51	1.04	0.98	0.87	1.34	4.63

* Available in China and Taiwan only.

Option Cards

EMC-PG01L

Set by
Pr.10-00~10-02

Terminals		Descriptions
PG1	VP	Output voltage for power: +5V/+12V±5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA
	DCM	Common for power and signal
	A1, /A1 ,B1, /B1, Z1, /Z1	Encoder input signal (Line Driver) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec
PG2	A2, /A2, B2, / B2	Pulse input signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec.
PG OUT	AO, /AO, BO, /BO, ZO, /ZO , SG	PG card output signals. It has division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA; Max. output frequency: 300kP/sec SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained.

EMC-PG01O

Set by
Pr.10-00~10-02

Terminals		Descriptions
PG1	VP	Output voltage for power: +5V/+12V±5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA
	DCM	Common for power and signal
	A1, /A1 ,B1, /B1, Z1, /Z1	Encoder input signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec
PG2	A2, /A2, B2, / B2	Pulse input signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec.
PG OUT	V+ ,/V-	Needs external power source for PG OUT circuit. Input voltage of power:+12V ~ +24V
	V-	Negative power supply input
	A/O, B/O, ZO,	PG card output signals. It has 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 (1.8kΩ/1W)] Max. Output current: 20mA; Max output frequency: 300KP/Sec

EMC-PG01R

Set by
Pr.10-00~10-02

Terminals		Descriptions
PG1	R1- R2	Resolver output power 7Vrms, 10kHz
	S1,S2, S3, S4,	Resolver input signal 3.5±0.175Vrms, 10kHz
PG2	A2, /A2, B2, / B2	Pulse input signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec.
PG OUT	AO, /AO, BO, /BO, ZO, /ZO , SG	PG card output signals. It has division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA Max. output frequency: 300kP/sec SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained.

EMC-PG01U

■ FJMP1[S]: Standard UVW Output Encoder; [D]: Delta Encoder

Set by Pr.10-00~10-02

Terminals		Descriptions
PG1	VP	Output voltage for power: +5V/+12V±5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA
	DCM	Common for power and signal
	A1, /A1 ,B1, /B1, Z1, /Z1	Encoder input signal (Line Driver) 1-phase or 2-phase input. Max. input frequency: 300kP/sec
	U1, /U1, V1, /V1, W1, /W1	Encoder input signal
PG2	A2, /A2, B2, / B2	Pulse input signal Open collector input: +5V/+12V (Note1) 1-phase or 2-phase input; Max. input frequency: 300kP/sec.
PG OUT	AO, /AO, BO, /BO, ZO, /ZO, SG	PG card output signals. Division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA Max. output frequency: 300kP/sec 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 5~15mA and install a pull-up resistor

【5V】 Recommend pull-up resistor: 100~220Ω，1/2W and above

【12V】Recommend pull-up resistor: 510~1.35kΩ，1/2W and above

【24V】Recommend pull-up resistor: 1.8k~3.3kΩ，1/2W and above

Screw Specifications for Option Card Terminals

EMC-D42A / EMC-D611A EMC-BPS01	Wire gauge	24~12AWG (0.205~3.31mm^2)
	Torque	4Kg-cm [3.47lb-in]
EMC-R6AA	Wire gauge	24~16AWG (0.205~1.31mm^2)
	Torque	6Kg-cm [5.21lb-in]
EMC-PG01L / EMC-PG01O EMC-PG01R / EMC-PG01U	Wire gauge	30~16AWG (0.0509~1.31mm^2)
	Torque	2Kg-cm [1.74lb-in]

Option Cards

EMC-D42A

I/O Extension Card

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

EMC-D611A

I/O Extension Card

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: 100~130VAC; Input frequency: 57~63Hz Input impedance: 27Kohm Terminal response time: ON: 10ms; OFF: 20ms

EMC-R6AA

Relay
Extension Card

Terminals	Descriptions
RA10~RA15 RC10~RC15	Refer to Pr. 02.36~ Pr. 02.41 for multi-function input selection Resistive load: 3A(N.O.)/250VAC 5A(N.O.)/30Vdc Inductive load (COS 0.4) 2.0A(N.O.)/250VAC 2.0A(N.O.)/30Vdc It is used to output each monitor signal, such as for drive in operation, frequency attained or overload indication.

EMC-BPS01

Power Shift Card

Terminals	Descriptions
24V GND	When the AC motor drive power is off, the external power supply card provides external power to the network system, PLC function, and other functions to allow continued operations. Input power: 24V±5% Maximum input current: 0.5A Note: (1) Do not connect the control terminal +24V (Digital control signal common: SOURCE) directly to the EMC-BPS01 input terminal 24V. (2) Do not connect control terminal GND directly to the EMC-BPS01 input terminal GND.

CMC-MOD01

Features

- MDI/MDI-X auto-detect
- E-mail alarm
- Virtual serial port.
- Baud rate: 10/100Mbps auto-detect
- Supports MODBUS TCP protocol
- AC motor drive keypad/Ethernet configuration

Network Interface

Interface	RJ-45 with Auto MDI/MDIX
Number of ports	1 Port
Transmission method	IEEE 802.3, IEEE 802.3u
Transmission cable	Category 5e shielding 100M

Transmission speed	10/100 Mbps Auto-Detect
Network protocol	ICMP, IP, TCP, UDP, DHCP, SMTP, MODBUS OVER TCP/IP, Delta Configuration

CMC-EIP01

Features

- MDI/MDI-X auto-detect
- Virtual serial port
- Supports MODBUS TCP and Ethernet/IP protocol
- Baud rate: 10/100Mbps auto-detect
- AC motor drive keypad/Ethernet configuration

Network Interface

Interface	RJ-45 with Auto MDI/MDIX
Number of ports	1 Port
Transmission method	IEEE 802.3, IEEE 802.3u
Transmission cable	Category 5e shielding 100M

Transmission speed	10/100 Mbps Auto-Detect
Network protocol	ICMP, IP, TCP, UDP, DHCP, SMTP, MODBUS OVER TCP/IP, Delta Configuration

CMC-PD01

Features

- Supports PZD control data exchange
- Supports PKW polling AC motor drive parameters
- Supports user diagnosis function
- Auto-detects baud rates; supports Max. 12Mbps

PROFIBUS DP Connector

Interface	DB9 connector
Transmission method	High-speed RS-485
Transmission cable	Shielded twisted pair cable
Electrical isolation	500VDC

Communication

Message type	Cyclic data exchange
Module name	CMC-PD01
GSD document	DELA08DB.GSD
Company ID	08DB (HEX)
Serial transmission speed supported (auto-detection)	9.6kbps; 19.2kbps; 93.75kbps; 187.5kbps; 125kbps; 250kbps; 500kbps; 1.5Mbps; 3Mbps; 6Mbps; 12Mbps (bits per second)

CMC-DN01

Features

- Based on the high-speed communication interface of Delta HSSP protocol, able to conduct immediate control of AC motor drive.
- Supports Group 2 only connection and polling I/O data exchange.
- For I/O mapping, supports Max. 32 words of input and 32 words of output.
- Supports EDS file configuration in DeviceNet configuration software.
- Supports all baud rates on DeviceNet bus: 125kbps, 250kbps, 500kbps and extendable serial transmission speed mode.
- 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 open removable connector. Of 5.08mm PIN interval
Transmission method	CAN
Transmission cable	Shielded twisted pair cable (with 2 power cables)
Transmission speed	125kbps, 250kbps, 500kbps and extendable serial transmission speed mode
Network protocol	DeviceNet protocol

AC Motor Drive Connection Port

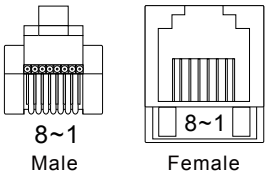
Interface	50 PIN communication terminal
Transmission method	SPI communication
Terminal function	1. Communicating with AC motor drive 2. Transmitting power supply from AC motor drive
Communication protocol	Delta HSSP protocol

Option Cards

EMC-COP01

Built-in EMC-COP01 card are available for VFD_ _ _C23E and VFD_ _ _C43E.

RJ-45 Pin definition



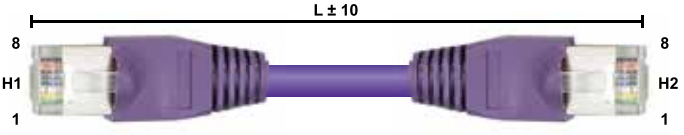
Pin	Pin name	Definition
1	CAN_H	CAN_H bus line (dominant high)
2	CAN_L	CAN_L bus line (dominant low)
3	CAN_GND	Ground/0V/V-
6	CAN_GND	Ground/0V/V-

Network Interface

Interface	RJ-45
Number of ports	1 Port
Transmission method	CAN
Transmission cable	CAN standard cable
Transmission speed	1M 500k 250k 125k 100k 50k
Communication protocol	CANopen

CANopen Communication Cable

Model: TAP-CB05, TAP-CB10



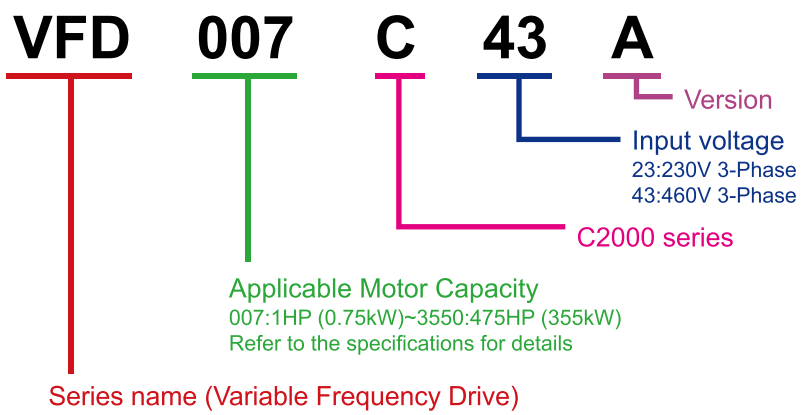
Title	Part No.	L	
		mm	inch
1	TAP-CB05	500±10	19±0.4
2	TAP-CB10	1000±10	39±0.4

Digital Keypad Accessories: RJ45 Extension Leads and CMC-EIP01 Cables

Applicable Models: CBC-K3FT、CBC-K5FT、CBC-K7FT、CBC-K10F、CBC-K16FT

Title	Part No.	Explanation
1	CBC-K3FT	RJ45 extension lead, 3 feet (approximately 0.9m)
2	CBC-K5FT	RJ45 extension lead, 5 feet (approximately 1.5m)
3	CBC-K7FT	RJ45 extension lead, 7 feet (approximately 2.1m)
4	CBC-K10FT	RJ45 extension lead, 10 feet (approximately 3m)
5	CBC-K16FT	RJ45 extension lead, 16 feet (approximately 4.9m)

Model Name



Ordering information

Frame Size	Power Range	Models			
Frame A 	**230V:** ND: 0.75~3.7kW HD: 0.4~2.2kW **460V:** ND: 0.75~5.5kW HD: 0.4~4.0kW	VFD007C23A VFD015C23A VFD022C23A VFD037C23A	VFD007C43A VFD015C43A VFD022C43A VFD037C43A VFD040C43A VFD055C43A	VFD007C43E VFD015C43E VFD022C43E VFD037C43E VFD040C43E VFD055C43E	
Frame B 	**230V:** ND: 5.5~11kW HD: 3.7~7.5kW **460V:** ND: 7.5~15kW HD: 5.5~11kW	VFD055C23A VFD075C23A VFD110C23A	VFD015C43A VFD110C43A VFD110C43A	VFD075C43E VFD110C43E VFD150C43E	
Frame C 	**230V:** ND: 15~22kW HD: 11~18.5kW **460V:** ND: 18.5~30kW HD: 15~22kW	VFD150C23A VFD185C23A VFD220C23A	VFD185C43A VFD220C43A VFD300C43A	VFD185C43E VFD220C43E VFD300C43E	
Frame D 	**230V:** ND: 30~37kW HD: 20~30kW **460V:** ND: 37~75kW HD: 30~45kW	**Frame_D1** VFD300C23A VFD370C23A VFD550C43A VFD750C43A	**Frame_D0-1** VFD370C43S VFD450C43S	**Frame_D2** VFD300C23E VFD370C23E VFD550C43E VFD750C43E	**Frame_D0-2** VFD370C43U VFD450C43U
Frame E 	**230V:** ND: 45~75kW HD: 37~55kW **460V:** ND: 90~110kW HD: 55~90kW	**Frame_E1** VFD450C23A VFD550C23A VFD750C23A VFD900C43A VFD1100C43A	**Frame_E2** VFD450C23E VFD550C23E VFD750C23E VFD900C43E VFD1100C43E		
Frame F 	**230V:** ND: 90kW HD: 75kW **460V:** ND: 132~160kW HD: 110~132kW	**Frame_F1** VFD900C23A VFD1320C43A VFD1600C43A	**Frame_F2** VFD900C23E VFD1320C43E VFD1600C43E		
Frame G 	**460V:** ND: 185~220kW HD: 160~185kW	**Frame_G1** VFD1850C43A VFD2200C43A	**Frame_G2** VFD1850C43E VFD2200C43E		
Frame H 	**460V:** ND: 280~450kW HD: 220~355kW	**Frame_H1** VFD2800C43A VFD3150C43A VFD3550C43A VFD4500C43A*	**Frame_H2** VFD2800C43E-1 VFD3150C43E-1 VFD3550C43E-1 VFD4500C43E-1*	**Frame_H3** VFD2800C43E VFD3150C43E VFD3550C43E VFD4500C43E*	

* Available in China and Taiwan only.

Attention

Standard Motors

Used with 400V Standard Motors
It is recommended to add an AC output reactor when using with a 400V standard motor to prevent damage to motor insulation.

Torque Characteristics and Temperature Rise
When a standard motor is drive controlled, the motor temperature will be higher than with DOL operation.
Please reduce the motor output torque when operating at low speeds to compensate for less cooling efficiency.
For continuous constant torque at low speeds, external forced motor cooling is recommended.

Vibration
When the motor drives the machine, resonances may occur, including machine resonances.
Abnormal vibration may occur when operating a 2-pole motor at 60Hz or higher.

Noise
When a standard motor is drive controlled, the motor noise will be higher than with DOL operation.
To lower the noise, please increase the carrier frequency of the drive. The motor fan can be very noisy when the motor speed exceeds 60Hz.

Special Motors

High-speed Motor
To ensure safety, please try the frequency setting with another motor before operating the high-speed motor at 120Hz or higher.

Explosion-proof Motor
Please use a motor and drive that comply with explosion-proof requirements.

Submersible Motor & Pump
The rated current is higher than that of a standard motor.
Please check before operation and select the capacity of the AC motor drive carefully.
The motor temperature characteristics differ from a standard motor, please set the motor thermal time constant to a lower value.

Brake Motor
When the motor is equipped with a mechanical brake, the brake should be powered by the mains supply.
Damage may occur when the brake is powered by the drive output. Please DO NOT drive the motor with the brake engaged.

Gear Motor
In gearboxes or reduction gears, lubrication may be reduced if the motor is continuously operated at low speeds.
Please DO NOT operate in this way.

Synchronous Motor
These motors need suitable software for control. Please contact Delta for more information.

Single-phase Motor
Single-phase motors are not suitable for being operated by an AC Motor Drive. Please use a 3-phase motor instead when necessary.

Environmental Conditions

Installation Position
1. The drive is suitable for installation in a place with ambient temperature from -10 to 50℃.
2. The surface temperature of the drive and brake resistor will rise under specific operation conditions. Therefore, please install the drive on materials that are noncombustible.
3. Ensure that the installation site complies with the ambient conditions as stated in the manual.

Wiring

Limit of Wiring Distance
For the remote operation, please use twist-shielding cable and the distance between the drive and control box should be less than 20m.

Maximum Motor Cable Length
Motor cables that are too long may cause overheating of the drive or current peaks due to stray capacitance.
Please ensure that the motor cable is less than 30m.
If the cable length can't be reduced, please lower the carrier frequency or use an AC reactor.

Choose the Right Cable
Please refer to current value to choose the right cable section with enough capacity or use recommended cables.

Grounding
Please ground the drive completely by using the grounding terminal.

How to Choose the Drive Capacity

Standard Motor
Please select the drive according to applicable motor rated current listed in the drive specification.
Please select the next higher power AC drive in case higher starting torque or quick acceleration/deceleration is needed.

Special Motor
Please select the drive according to: Rated current of the drive > rated current of the motor

Transportation and Storage
Please transport and store the drive in a place that meets environment specifications.

Peripheral Equipment

Molded-Case Circuit Breakers (MCCB)
Please install the recommended MCCB or ELCB in the main circuit of the drive and make sure that the capacity of the breaker is equal to or lower than the recommended one.

Add a Magnetic Contactor(MC) in the Output Circuit
When a MC is installed in the output circuit of the drive to switch the motor to commercial power or other purposes, please make sure that the drive and motor are completely stopped and remove the surge absorbers from the MC before switching it.

Add a Magnetic Contactor (MC) in the Input Circuit
Please only switch the MC ONCE per hour or it may damage the drive. Please use RUN/STOP signal to switch many times during motor operation.

Motor Protection
The thermal protection function of the drive can be used to protect the motor by setting the operation level and motor type (standard motor or variable motor).
When using a high-speed motor or a water-cooled motor the thermal time constant should be set to a lower value.

When using a longer cable to connect the motor thermal relay to a motor, high-frequency currents may enter via the stray capacitance.
It may result in malfunctioning of the relay as the real current is lower than the setting of thermal relay. Under this condition, please lower the carrier frequency or add an AC reactor to solve this.

DO NOT Use Capacitors to Improve the Power Factor
Use a DC reactor to improve the power factor of the drive. Please DO NOT install power factor correction capacitors on the main circuit of the drive to prevent motor faults due to over current.

Do NOT Use Surge Absorber
Please DO NOT install surge absorbers on the output circuit of the drive.

Lower the Noise
To ensure compliance with EMC regulations, usually a filter and shielded wiring is used to lower the noise.

Method Used to Reduce the Surge Current
Surge currents may occur in the phase-lead capacitor of the power system, causing an overvoltage when the drive is stopped or at low loads.

It is recommended to add a DC reactor to the drive.

Smarter. Greener. Together.

Industrial Automation Headquarters

Delta Electronics, Inc.
Taoyuan Technology Center
18 Xinglong Road, Taoyuan District,
Taoyuan City 33068, Taiwan (R.O.C.)
TEL: 886-3-362-6301 / FAX: 886-3-371-6301

Asia

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

Delta Greentech (China) Co., Ltd.
238 Min-Xia Road, Pudong District,
ShangHai, P.R.C. 201209
TEL: 86-21-58635678 / FAX: 86-21-58630003

Delta Electronics (Japan), Inc.
Tokyo Office
2-1-14 Minato-ku Shibadaimon,
Tokyo 105-0012, Japan
TEL: 81-3-5733-1111 / FAX: 81-3-5733-1211

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

Delta Electronics Int'l (S) Pte Ltd.
4 Kaki Bukit Ave 1, #05-05, Singapore 417939
TEL: 65-6747-5155 / FAX: 65-6744-9228

Delta Electronics (India) Pvt. Ltd.
Plot No 43 Sector 35, 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 - 3° andar Edificio Itapeva One-Bela Vista
01332-000-São Paulo-SP-Brazil
TEL: 55 11 3568-3855 / FAX: 55 11 3568-3865

Europe

Deltronics (The Netherlands) B.V.
Eindhoven Office
De Witbogt 20, 5652 AG Eindhoven, The Netherlands
TEL: 31-40-2592850 / FAX: 31-40-2592851