DELTA ELECTRONICS, INC.

VFD C2000

Classical Field Oriented Control AC Motor Drive

DELTA ELECTRONICS, INC.
www.delta.com.tw/industrialautomation

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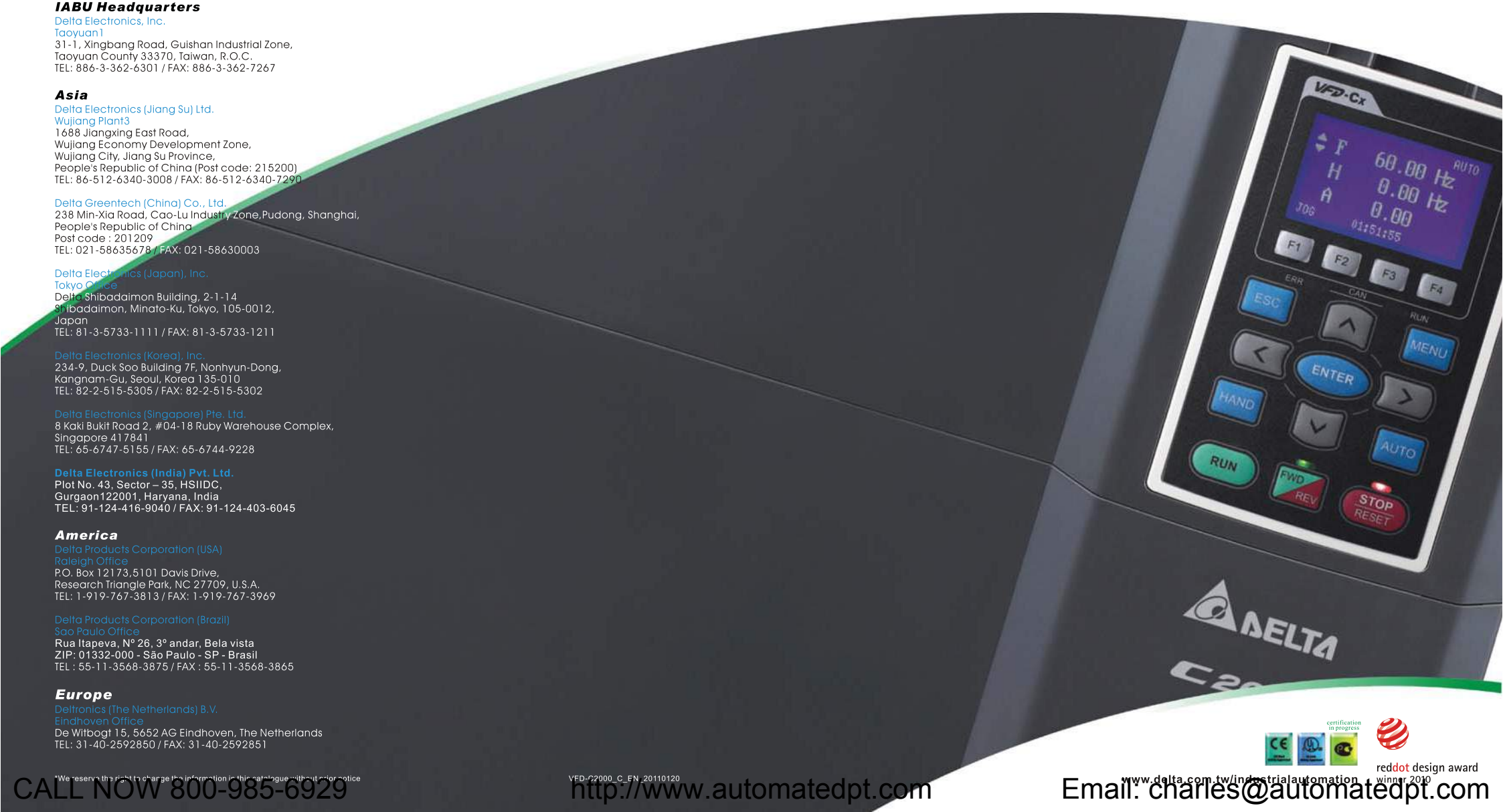

certification in progress

reddot design award winner 2010

VFD-C2000_C_EN_20110120

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C2000

Leading the Future of Drive Technology

Delta Electronics, a leading brand in drive technology, has officially launched its most cost-effective classical field oriented control in AC motor drive VFD-C2000 series. This series offers four competitive values"high efficiency, high performance, lost cost of maintenance and long product life" to customers to enhance their competitive advantage while spending less cost.

Main Functions and Features

- Field oriented control with built-in PLC function
- Wide variety of applications
- Modular design for easy maintenance and many extensions
- Built-in MODBUS communication
- Long-life design and self diagnosis
- Enhanced protections and adaptation to ambient conditions
- Complies with global safety standards, including CE, UL and cUL
- Wide range of models to meet requirements
- High-speed communication interface (optional cards for PROFIBUS-DP, DeviceNet, MODBUS TCP and EtherNet/IP)
- Fully CANopen master and slave functions prepared, only option converter card CMC-COP01 needed.

Standard Models (IP20/NEMA1)

Power range: 230V 0.75~90kW, 460V 0.75~355kW

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									
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	110	132	160	185	220	280	315	355
460V (HP)	1	2	3	5	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	175	215	250	300	375	425	475
Frame Size	A						B	C			D						E		F		G		H		

High-performance Variable-frequency Technology

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. A drive for induction motor and synchronous motor

Versatile Driving Controls

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

Environmental Adaptability

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

Modular Design

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

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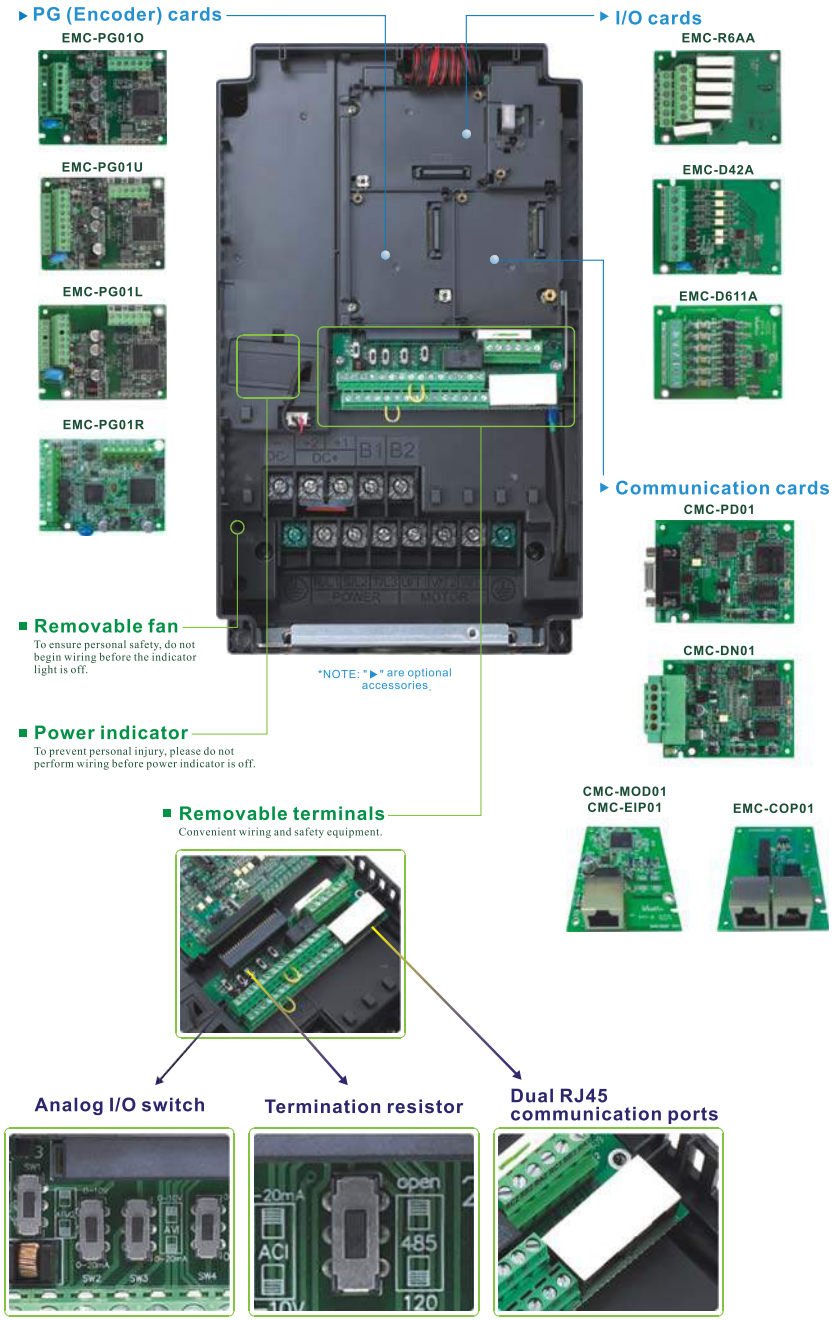
Modular Design

- Various accessories options, such as I/O extension cards, encoder feedback cards, communication cards, hot-plugging LCM keypad, removable terminals and removable fan.



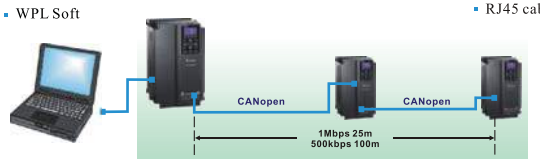
- The modular design fufills the needs of system applications and equipment maintenance.

Environmental Adaptability Design

- The built-in DC reactor and RFI filter controls harmonics and noise interference effectively.
- Strong coating to ensure safe operation in harsh environments
- Heatsink and electronics components are completely isolated from each other. With the following two heatsink designs, the best cooling according to requirements is achieved:
  (1) Flange mounting: Heat from the drive can be dissipated out of the cabinet
  (2) Forced fan cooling: Blow cool air into aluminum heatsink.

High-speed Network Building

- Provides various communication network cards and fieldbus cards
- Built-in RS-485 modbus protocol
- CANopen (DS402)
  - Supports all Delta industrial automation products (all EDS files of Delta industrial automation products are built-in)
  - I/O data layout of each pieces of equipments on the CANopen Network
  - Planning function for motion control
  - WPL Soft
- Advanced network functions
- PROFIBUS
  - TAP-CN03 distribution box for long distances
  - RJ45 cable

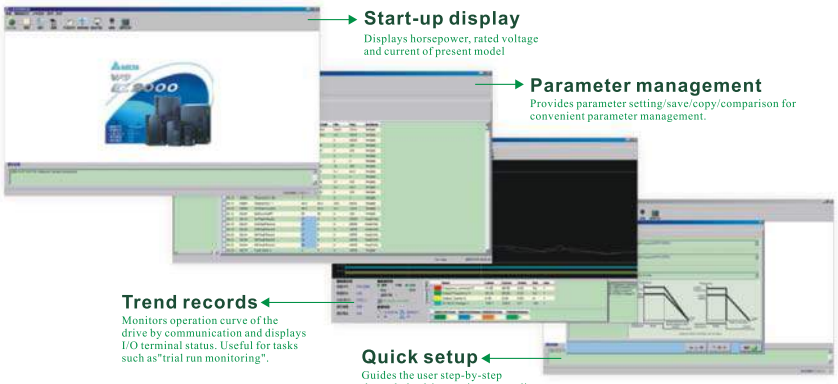


- DeviceNet
  - Delta DeviceNet Builder software is specially designed for DeviceNet communication. With this software, it is easy to plan DeviceNet equipment and remote I/O via parameters to build a standard DeviceNet monitoring structure.
  - Supports all Delta industrial automation products (all EDS 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 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".

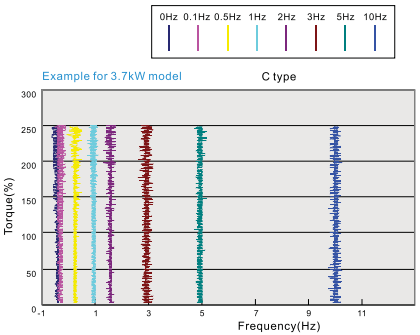
Quick setup
Guides the user step-by-step through the drive settings according to quick setup wizard.

Enhanced Motor Efficiency in General Applications

Improved sensorless vector control (SVC) response and torque control in, for example, crane applications.

High-performance Field Oriented Control

In FOC+PG mode, C2000 is capable of creating a start-up torque up to 200% at extremely low speed to result a much stable speed control.



Safe Stop Function

VFD-C2000 series is built according to category safe stop standard: EN954-1, EN60204-1 and IEC6158 to prevent personal injury at accidental start-up.

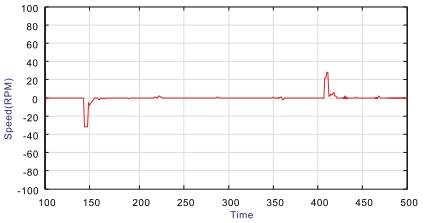
Emergency stop switch

Safety module

Improved Load Impact

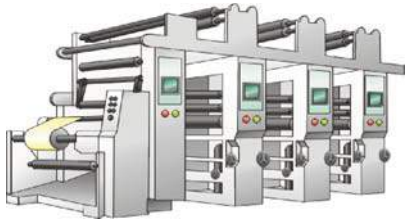
When load changes, VFD-C2000 will provide a best torque response by FOC to minimize the vibration of load impact.

Press machine



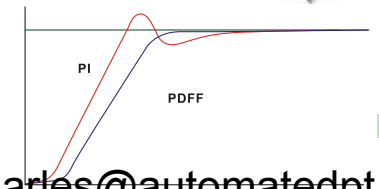
High-performance Field Oriented Control

A best choice for precise position and speed control, applicable to e.g. control printing machine.



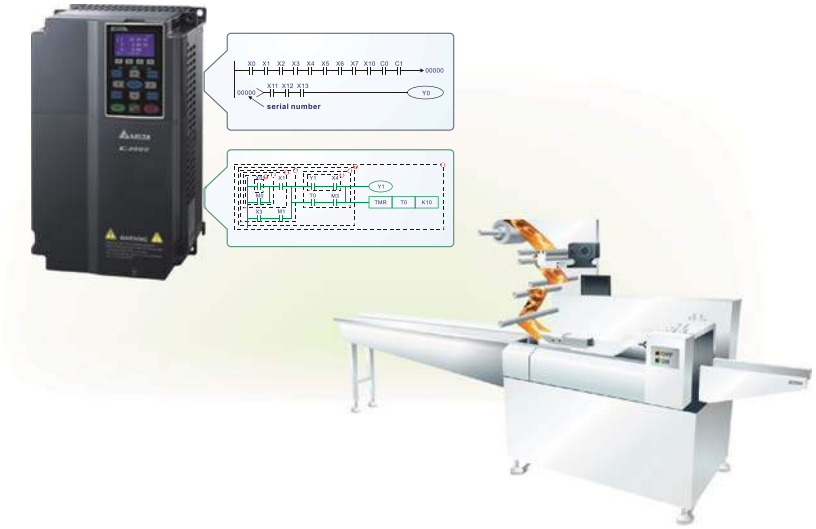
Innovative PID Technology

Apart from traditional PI control, VFD-C2000 also provides PDFF control in speed regulation to eliminate overshoot and increase response time.



Intelligent Programmable Logic Controller

■ In network systems, distributed control and independent operation can easily be achieved with the built-in Delta PLC.



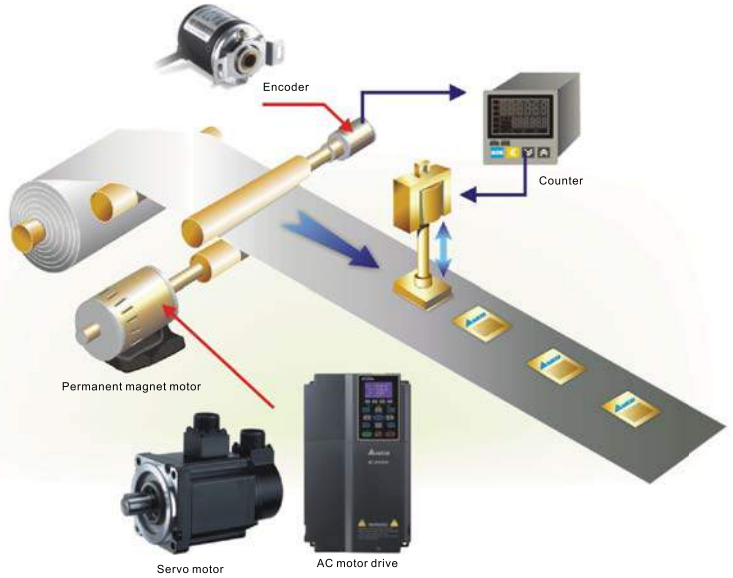
Environment for Operation, Storage and Transportation

DO NOT expose the AC motor drive in the bad environment, such as dust, direct sunlight, corrosive/ inflammable gasses, humidity, liquid and vibration environment. The salt in the air must be less than 0.01mg/cm² every year.

Environment	Installation location		IEC60364-1/IEC60664-1 Pollution degree 2,Indoor use only
	Surrounding Temperature	Storage/ Transportation	-25℃ ~ +70℃
		No-condensation, non-frozen	
	Rated Humidity	Operation	Max. 90%
		Storage/ Transportation	Max. 95%
		No condense water	
	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 concentrate	
	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)	

A Drive for Permanent Magnet (PM) Motors

■ VFD-C2000 is a dual mode drive for induction motors and permanent magnet motors. The dynamic response of a PM motor provides precise control of position, speed and torque.



Specification for Operation Temperature and Protection Level

Model	Frame	Top cover	Conduit Box	Protection Level	Operation Temperature
VFDxxxCxxA	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 	-10℃ ~50℃
VFDxxxCxxE	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	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
		Carrier Frequency (kHz)	2~6kHz															
	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
		Carrier Frequency (kHz)	2~15kHz							2~10kHz					2~9kHz			
Input Rating		Input Current (A) Heavy Duty	6.1	11	15	18.5	26	34	50	68	78	95	118	136	162	196	233	315
		Input Current (A) Normal Duty	6.4	12	16	20	28	36	52	72	83	99	124	143	171	206	245	331
		Rated Voltage/ Frequency	3-phase AC 200V~240V (-15%~+10%), 50/60Hz															
		Operating Voltage Range	170~265Vac															
		Frequency Tolerance	47~63Hz															
		Cooling Method	Natural cooling	Fan cooling														
		Braking Chopper	Built-in										Option					
		DC Reactor	Option										Built-in					
		EMI Filter	Option															

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	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
		Carrier Frequency (kHz)	2~6kHz											
	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
		Carrier Frequency (kHz)	2~15kHz									2~10kHz		
Input Rating		Input Current (A) Heavy Duty	4.1	5.6	8.3	13	14.5	16	19	25	33	38	45	60
		Input Current (A) Normal Duty	4.3	5.9	8.7	14	15.5	17	20	26	35	40	47	63
		Rated Voltage/Frequency	3-phase AC 380V~480V (-15%~+10%), 50/60Hz											
		Operating Voltage Range	323~528Vac											
		Frequency Tolerance	47~63Hz											
		Cooling Method	Natural cooling	Fan cooling										
		Braking Chopper	Built-in											
		DC Reactor	Option											
		EMI Filter	VFDXXXC43A: without EMI filter VFDXXXC43E: built-in EMI filter											

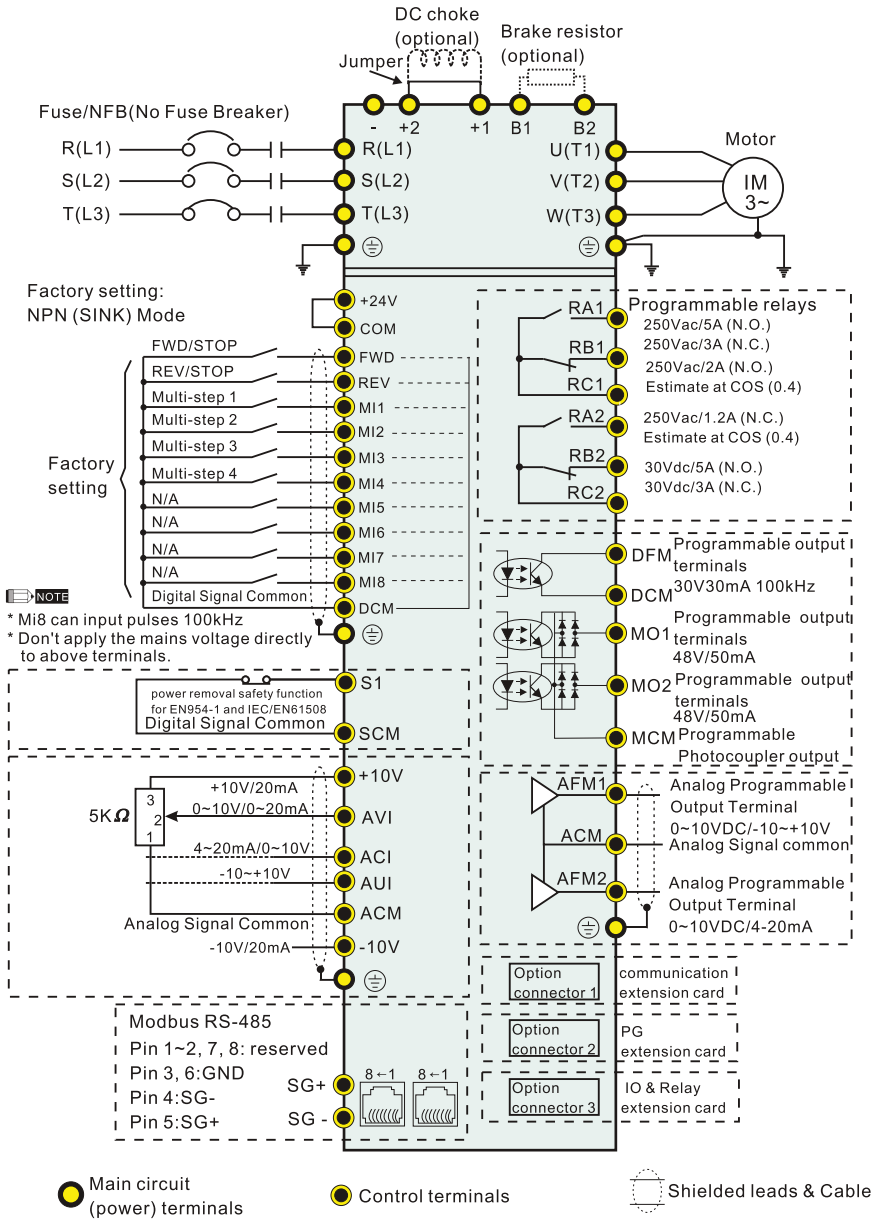
NOTE:
- *Frame F~H is under development.
- For FRAME A, B and C, Model VFDXXXC43A is under IP20/NEMA1/UL TYPE1 protection level.
- For FRAME D and above, if the last character of the model is A then it is under IP20 protection level but the wiring terminal is under IP00 protection level; if the last character of the model is E, it is under IP20/NEMA1/UL TYPE1 protection level.

460V		Frame Size	D				E		*F		*G		*H		
		Model VFD-__C__	370	450	550	750	900	1100	1320	1600	1850	2200	2800	3150	3550
		Applicable Motor Output (kW)	37	45	55	75	90	110	132	160	185	220	280	315	355
		Applicable Motor Output (hp)	50	60	75	100	125	150	175	215	250	300	375	425	475
Output Rating	HEAVY DUTY	Rated Output Capacity (kVA)	55	69	84	114	136	167	197	235	280	348	417	466	517
		Rated Output Current (A)	69	86	105	143	171	209	247	295	352	437	523	585	649
		Carrier Frequency (kHz)	2~6kHz												
	NORMAL DUTY	Rated Output Capacity (kVA)	58	73	88	120	143	175	207	247	295	367	438	491	544
		Rated Output Current (A)	73	91	110	150	180	220	260	310	370	460	550	616	683
		Carrier Frequency (kHz)	2~10kHz				2~9kHz								
Input Rating		Input Current (A) Heavy Duty	70	96	108	149	159	197	228	285	361	380	469	527	594
		Input Current (A) Normal Duty	74	101	114	157	167	207	240	300	380	400	494	555	625
		Rated Voltage/Frequency	3-phase AC 380V~480V (-15%~+10%), 50/60Hz												
		Operating Voltage Range	323~528Vac												
		Frequency Tolerance	47~63Hz												
		Cooling Method	Fan cooling												
		Braking Chopper	Option												
		DC Reactor	Built-in												
		EMI Filter	VFDXXXC43A: without EMI filter VFDXXXC43E: built-in EMI filter												

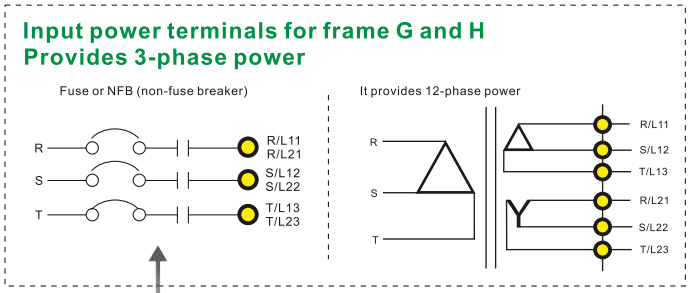
General Specifications

Control Characteristics	Control Method	1: V/F, 2: SVC, 3: VF+PG, 4: FOC+PG, 5: TQC+PG,
	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	Max. 200% torque current
	Torque Accuracy	±5%
	Max. Output Frequency (Hz)	Normal duty:0.01~600.00Hz; 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 Tolerance	Normal duty: rated output current is 120% for 60seconds Heavy duty: rated output current is 150% for 60seconds
	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; VFD150C23A and series below: on/off switch control 460V model : VFD150C23A(include) and series above: PMW control; VFD150C23A and series below: on/off switch control
Protection Characteristics	Motor Protection	Electronic thermal relay protection
	Over-current Protection	Over-current protection for 220% 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 rated current of the AC motor drive

Frame A~C
Offers 3-phase power supply

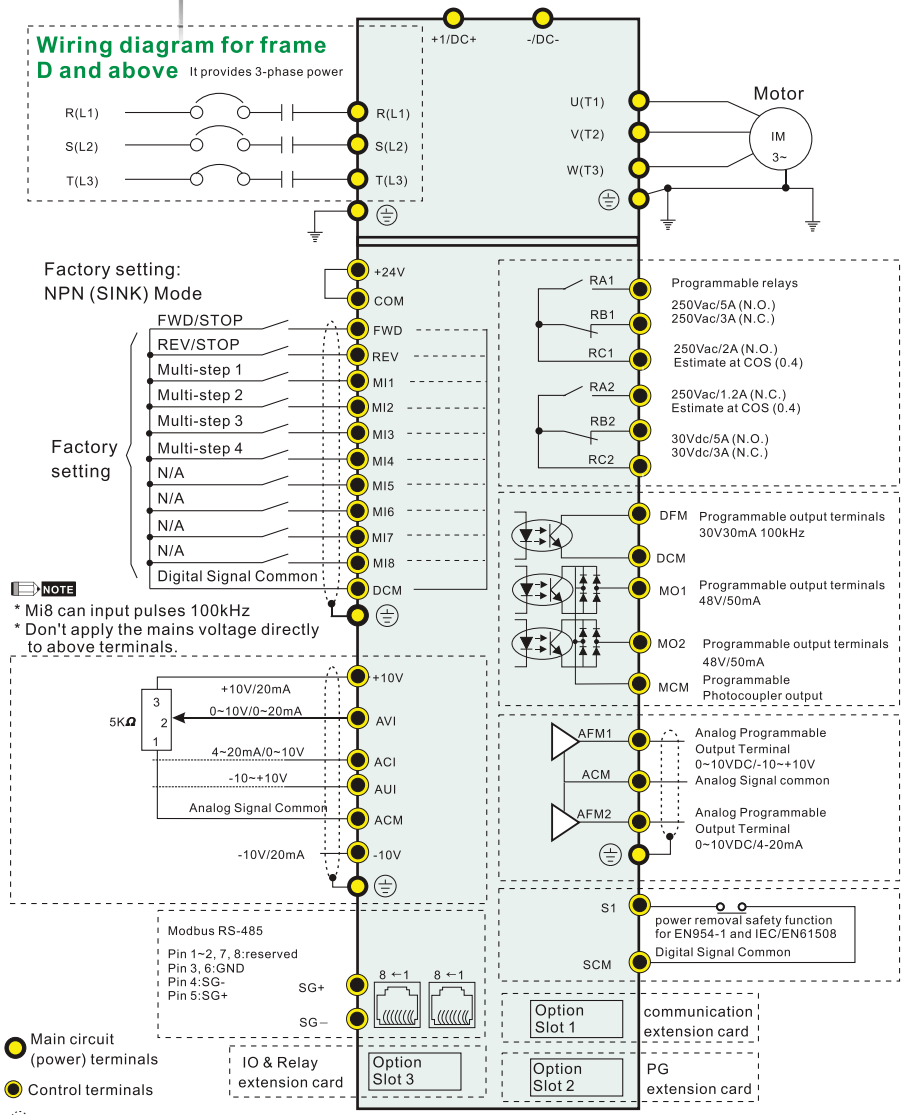


Input power terminals for frame G and H
Provides 3-phase power



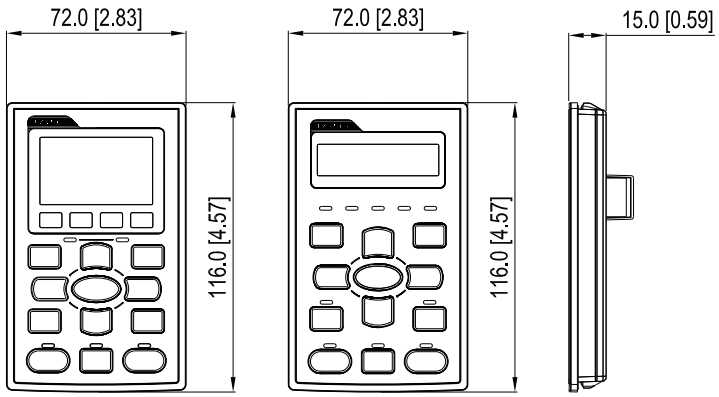
Wiring diagram for frame D and above

It provides 3-phase power



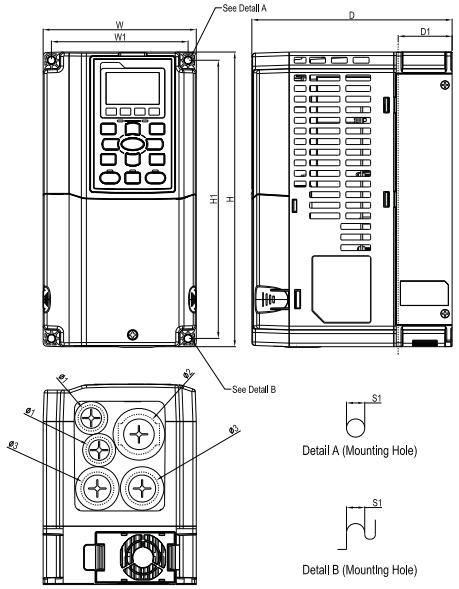
Dimensions

Digital Keypad



KPC-CC01 KPC-CE01

Frame A



MODEL

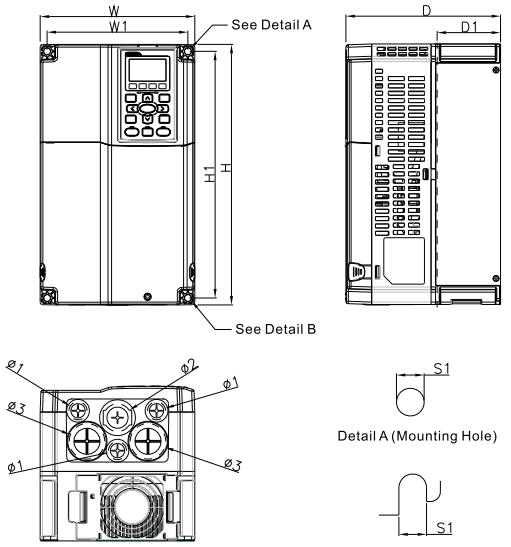
VFD007C23A
VFD007C43A/43E
VFD015C23A
VFD015C43A/43E
VFD022C23A
VFD022C43A/43E
VFD037C23A
VFD037C43A/43E
VFD040C43A/43E
VFD055C43A/43E

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

NOTE: Model VFD007C43E; VFD015C43E; VFD022C43E; VFD037C43E; VFD040C43E; VFD055C43E will be available for ordering soon. Please contact your local distributor or Delta representative for detailed launch schedule.

Frame B



MODEL

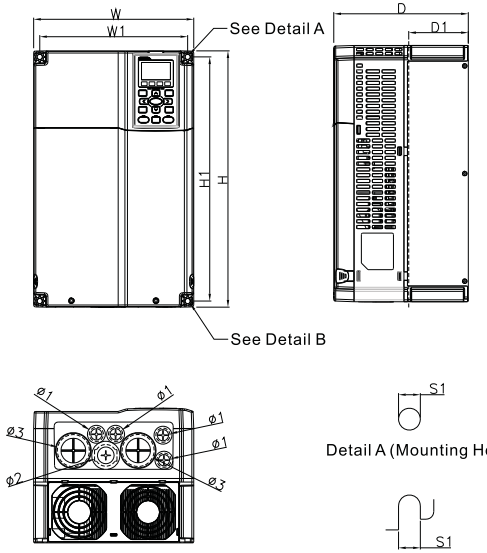
VFD055C23A
VFD075C23A
VFD075C43A/43E
VFD110C23A
VFD110C43A/43E
VFD150C43A/43E

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

NOTE: Model VFD075C43E; VFD110C43E; VFD150C43E will be available for ordering soon. Please contact your local distributor or Delta representative for detailed launch schedule.

Frame C



MODEL

VFD150C23A
VFD185C23A
VFD185C43A/43E
VFD220C23A
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

NOTE: Mode VFD185C43E; VFD220C43E; VFD300C43E will be available for ordering soon. Please contact your local distributor or Delta representative for detailed launch schedule.

D1* : Flange mounting

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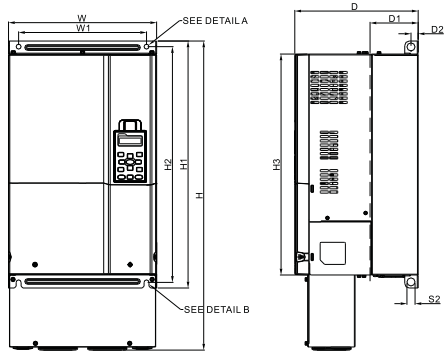
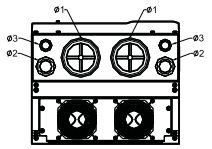
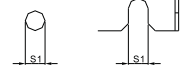
Dimensions

Frame D







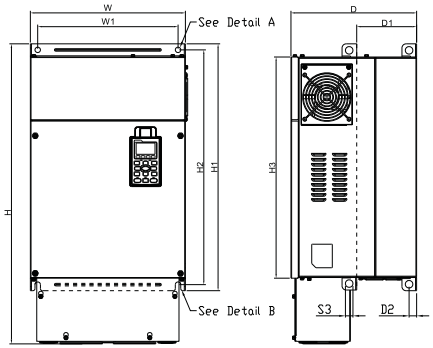
MODEL

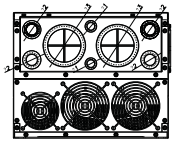
FRAME_D1	FRAME_D2
VFD300C23A	VFD300C23E
VFD370C23A	VFD370C23E
VFD370C43A	VFD370C43E
VFD450C43A	VFD450C43E
VFD550C43A	VFD550C43E
VFD750C43A	VFD750C43E

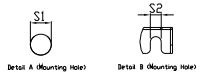
Unit：mm[inch]

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

Frame E







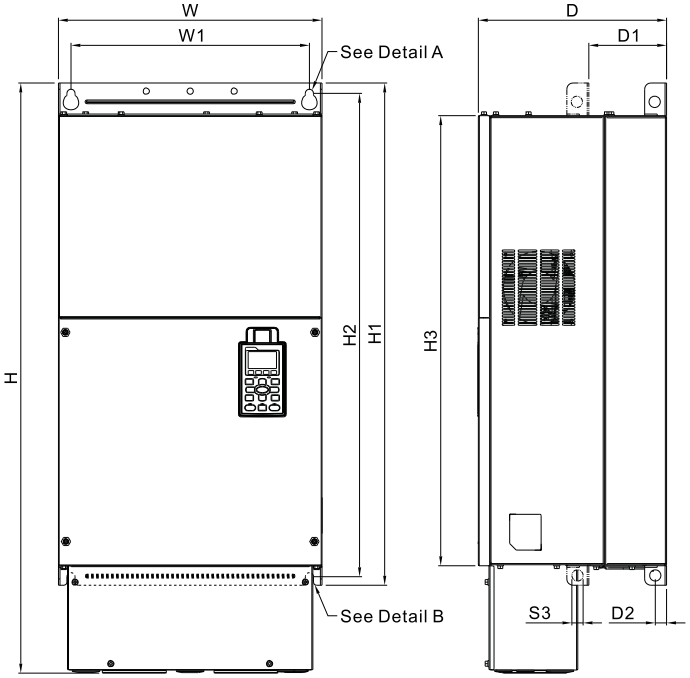
MODEL

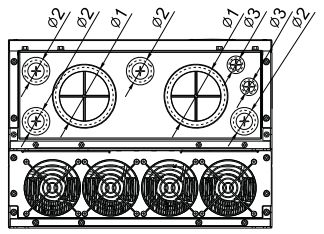
FRAME_E1	FRAME_E2
VFD450C23A	VFD450C23E
VFD550C23A	VFD550C23E
VFD750C23A	VFD750C23E
VFD900C43A	VFD900C43E
VFD1100C43A	VFD1100C43E

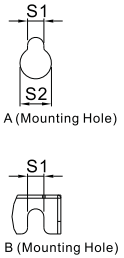
Unit：mm[inch]

Frame	W	H	D	W1	H1	H2	H3	D1*	D2	S1,S2	S3	Ø1	Ø2	Ø3
E1	370.0 [14.57]	-	300.0 [11.81]	335.0 [13.19]	589 [23.19]	560.0 [22.05]	528.0 [20.80]	143.0 [5.63]	18.0 [0.71]	13.0 [0.51]	18.0 [0.71]	-	-	-
E2	370.0 [14.57]	715.8 [28.18]	300.0 [11.81]	335.0 [13.19]	589 [23.19]	560.0 [22.05]	528.0 [20.80]	143.0 [5.63]	18.0 [0.71]	13.0 [0.51]	18.0 [0.71]	22.0 [0.87]	34.0 [1.34]	92.0 [3.62]

Frame F







MODEL

FRAME_F1	FRAME_F2
VFD900C23A	VFD900C23E
VFD1320C23A	VFD1320C43E
VFD1600C23A	VFD1600C43E

Frame	W	H	D	W1
F1	420.0 [16.54]	-	300.0 [11.81]	380.0 [14.96]
F2	420.0 [16.54]	940.0 [37.00]	300.0 [11.81]	380.0 [14.96]

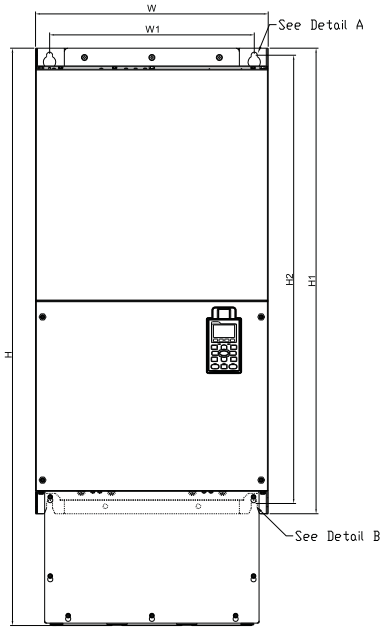
Unit：mm[inch]

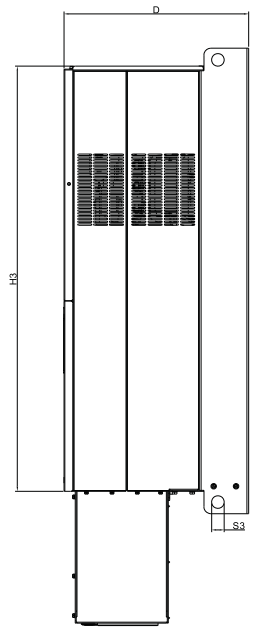
Frame	H1	H2	H3	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
F1	800.0 [31.50]	770.0 [30.32]	717.0 [28.23]	124.0 [4.88]	18.0 [0.71]	13.0 [0.51]	25.0 [0.98]	18.0 [0.71]	92.0 [3.62]	35.0 [1.38]	22.0 [0.87]
F2	800.0 [31.50]	770.0 [30.32]	717.0 [28.23]	124.0 [4.88]	18.0 [0.71]	13.0 [0.51]	25.0 [0.98]	18.0 [0.71]	92.0 [3.62]	35.0 [1.38]	22.0 [0.87]

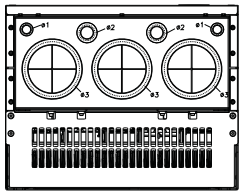
D1* : Flange mounting

Dimensions

Frame G







MODEL

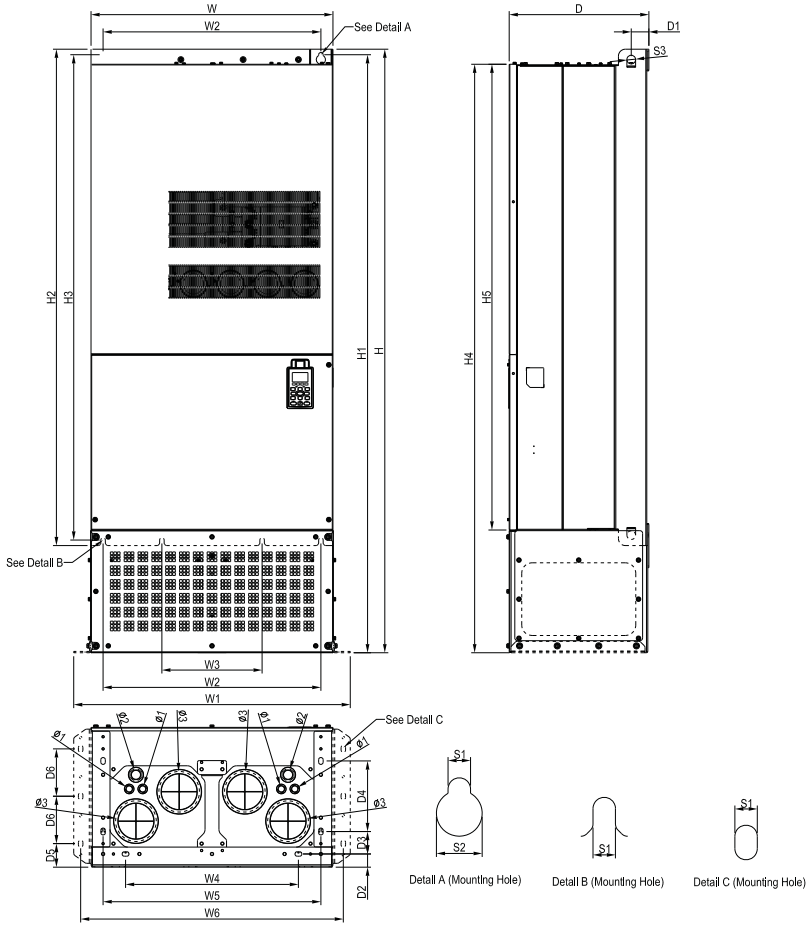
FRAME_G1	FRAME_G2
VFD1850C43A	VFD1850C43E
VFD2200C43A	VFD2200C43E

Frame	W	H	D
G1	500.0 [19.69]	-	397.0 [15.63]
G2	500.0 [19.69]	1240.2 [48.83]	397.0 [15.63]

Unit : mm[inch]

Frame	W1	H1	H2	H3	S1	S2	S3	Ø1	Ø2	Ø3
G1	440.0 [217.32]	1000.0 [39.37]	963.0 [37.91]	913.6 [35.97]	13.0 [0.51]	26.5 [1.04]	27.0 [1.06]	-	-	-
G2	440.0 [217.32]	1000.0 [39.37]	963.0 [37.91]	913.6 [35.97]	13.0 [0.51]	26.5 [1.04]	27.0 [1.06]	22.0 [0.87]	34.0 [1.34]	117.5 [4.63]

Frame H



MODEL

FRAME_H1	FRAME_H2	FRAME_H3
VFD2800C43A	VFD2800C43E-1	VFD2800C43E
VFD3150C43A	VFD3150C43E-1	VFD3150C43E
VFD3550C43A	VFD3550C43E-1	VFD3550C43E

Unit : mm[inch]

Frame	W	H	D	W1	W2	W3	W4	W5	W6	H1	H2	H3	H4
H1	700.0 [27.56]	-	398.0 [15.67]	-	630.0 [24.80]	290.0 [11.42]	-	-	-	-	1435.0 [56.50]	1403.0 [55.24]	-
H2	700.0 [27.56]	1745.0 [68.70]	404.0 [15.91]	800.0 [31.50]	-	-	500.0 [19.69]	630.0 [24.80]	760.0 [29.92]	1729.0 [68.07]	-	-	1701.6 [66.99]
H3	700.0 [27.56]	1745.0 [68.70]	404.0 [15.91]	800.0 [31.50]	-	-	500.0 [19.69]	630.0 [24.80]	760.0 [29.92]	1729.0 [68.07]	-	-	1701.6 [66.99]

Frame	H5	D1	D2	D3	D4	D5	D6	S1	S2	S3	Ø1	Ø2	Ø3
H1	1346.6 [53.02]	45.0 [1.77]	-	-	-	-	-	13.0 [0.51]	26.5 [1.04]	25.0 [0.98]	-	-	-
H2	1346.6 [53.02]	51.0 [2.01]	38.0 [1.50]	65.0 [2.56]	204.0 [8.03]	68.0 [2.68]	137.0 [5.39]	13.0 [0.51]	26.5 [1.04]	25.0 [0.98]	-	-	-
H3	1346.6 [53.02]	51.0 [2.01]	38.0 [1.50]	65.0 [2.56]	204.0 [8.03]	68.0 [2.68]	137.0 [5.39]	13.0 [0.51]	26.5 [1.04]	25.0 [0.98]	22.0 [0.87]	34.0 [1.34]	117.5 [4.63]

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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
R10A~R15A R10C~R15C	Refer to Pr. 02.36~ Pr. 02.41 for multi-function input selection Resistive load: 5A(N.O.)/3A(N.C.) 250VAC 5A(N.O.)/3A(N.C.) 30Vdc Inductive load (COS 0.4) 2.0A(N.O.)/1.2A(N.C.) 250VAC 2.0A(N.O.)/1.2A(N.C.) 30Vdc It is used to output each monitor signal, such as for drive in operation, frequency attained or overload indication.

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 It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec
PG2	A2, /A2 B2, /B2	Pulse Input signal It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec.
PG OUT	AO, /AO BO, /BO ZO, /ZO	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

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 It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec
PG2	A2, /A2 B2, /B2	Pulse Input Signal It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec.
PG OUT	V+	Needs external power source for PG OUT circuit. Input voltage of power:+12V ~ +24V
	V-	
	A/O, B/O, //O	PG Card Output signals. It has division frequency function: 1~255 times Input signal of open collector. Please add a pull-high resistor on the external power V+~V-(e.g. power of PLC) to prevent the interference of the receiving signal. 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 It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec.
PG OUT	AO, /AO, BO /BO, ZO, /ZO	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

Screw Specifications for Option card Terminals:

EMC-D42A	Wire gauge	24~12AWG（0.205~3.31mm²）
	Torque	4Kg-cm [3.47lb-in]
EMC-R6AA	Wire gauge	24~16AWG（0.205~1.31mm²）
	Torque	6Kg-cm [5.21lb-in]
EMC-PG01L EMC-PG01O EMC-PG01R EMC-PG01U	Wire gauge Torque	30~16AWG（0.0509~1.31mm²） 2Kg-cm [1.74lb-in]

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EMC-PG01U

- FJMP1 Ⓢ : Standard UVW Output Encoder; Ⓓ : Delta Encoder
- Set by Pr.10-00~10-02

Terminals		Descriptions
PG1	VP	Output voltage for power: +5V/+12V5% (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 1-phase or 2-phase input. Max. output frequency: 300kP/sec
	U1, /U1, V1, V1, W1, /W1	Encoder input signal
PG2	A2, /A2 B2, /B2	Pulse Input signal 1-phase or 2-phase input. Max. output frequency: 300kP/sec.
PG OUT	AO, /AO, BO, /BO, ZO, /ZO	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

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, HTTP, SMTP, MODBUS OVER TCP/IP, EtherNet/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

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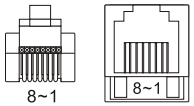
Option Cards

EMC-COP01

RJ-45 Pin definition



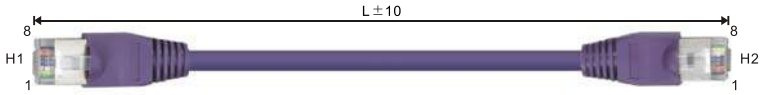
Pin	Pin name	Definition
1	CAN_H	CAN_H bus line (dominant high)
2	CAN_L	CAN_L bus line (dominant low)
3	CAN_GND	Ground/0V/V-
7	CAN_GND	Ground/0V/V-

Specification

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-CB03, TAP-CB04



Title	Part No.	L	
		mm	inch
1	TAP-CB03	500±10	19±0.4
2	TAP-CB04	1000±10	39±0.4

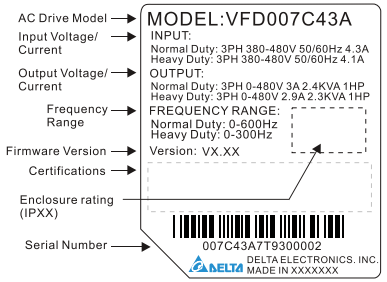
CANopen Dimensions

Model: TAP-CN03

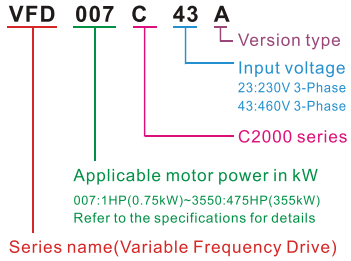
Ordering information

Frame A 	**230V:** 0.75~3.7kW (1~5HP) **460V:** 0.75~5.5kW (1~7.5HP)	VFD007C23A VFD037C23A VFD007C43A/E VFD015C43A/E VFD037C43A/E VFD040C43A/E VFD055C43A/E VFD015C23A/E VFD022C23A/E VFD022C43A/E
Frame B 	**230V:** 5.5~11kW (7.5~15HP) **460V:** 7.5~15 kW (10~20HP)	VFD055C23A VFD075C23A VFD110C23A/E VFD075C43A/E VFD110C43A/E VFD150C43A/E
Frame C 	**230V:** 15~22 kW (20~30HP) **460V:** 18.5~30 kW (25~40HP)	VFD150C23A VFD185C23A VFD220C23A VFD185C43A/E VFD220C43A/E VFD300C43A/E
Frame D 	**230V:** 30~37 kW (40~50HP) **460V:** 37~75 kW (50~100HP)	VFD300C23A VFD370C23A VFD370C43A VFD450C43A VFD550C43A VFD750C43A VFD300C23E VFD370C23E VFD370C43E VFD450C43E VFD550C43E VFD750C43E
Frame E 	**230V:** 45~55 kW (60~75HP) **460V:** 90~110 kW (125~150HP)	VFD450C23A/E VFD550C23A/E VFD900C43A/E VFD1100C43A/E VFD750C23A/E
Frame F 	**230V:** 75~90 kW (100~125HP) **460V:** 132~160 kW (175~215HP)	VFD900C23A/E VFD1320C43A/E VFD1600C43A/E
Frame G 	**460V:** 185~220 kW (250~300HP)	VFD1850C43A/E VFD2200C43A/E
Frame H 	**460V:** 280~355 kW (375~475HP)	VFD2800C43A/E VFD3150C43A/E VFD3550C43A/E

Nameplate



Model name



Optional Accessories

- Digital Keypad KPC-CE01
- Option Cards
- Fuse
- Non-fuse Circuit Breaker
- All Brake Resistors and Brake Units Used in AC Motor Drives
- AC Reactor
- Zero Phase Reactor
- DC Reactor
- EMI Filter
- Panel Mounting
- Conduit Box Kit
- Fan Kit
- Flange Mounting Kit

NOTE: Model VFD007C43E~VFD300C43E will be available for ordering soon.

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 of motors need suitable software to control them. 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.

CALL NOW 800-985-6929 http://www.automatedpt.com Email: charles@automatedpt.com