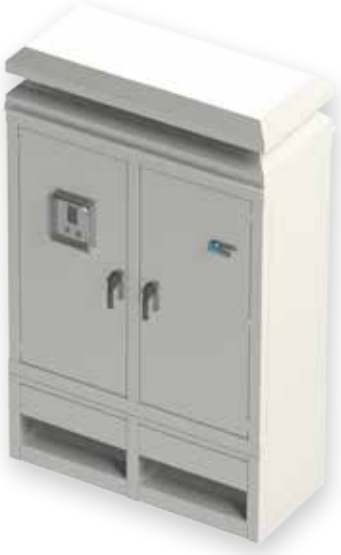
Delta Standard VFD Panel Package



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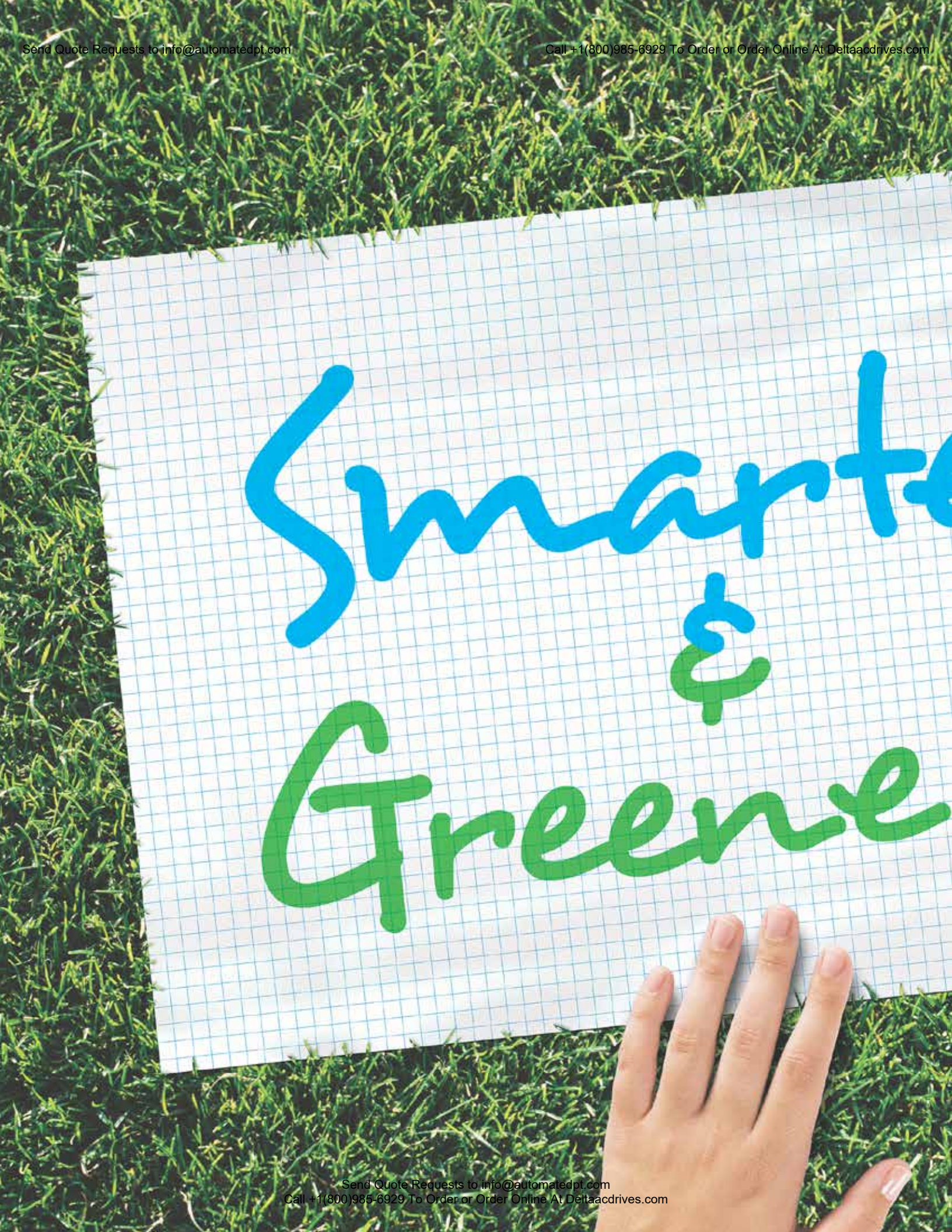

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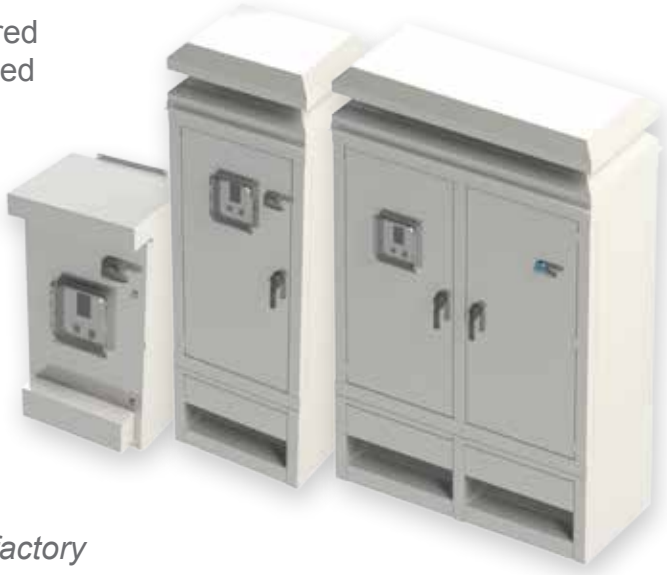
As a leading industrial automation brand, Delta continuously develops innovative, efficient and reliable products & solutions. Among these solutions include the integration of drives, controllers, motion, sensors, communication devices, and software to meet the specific needs of a diverse range of applications. Delta cooperates with machine makers in various markets such as HVAC, textiles, oil and gas, printing and packaging, and consumer electronics to provide energy-saving solutions, drive systems, facility management control systems, power quality solutions, and factory automation.

Delta's Standard Panel Solutions provide a simple and cost effective product package for a wide variety of industrial and pumping applications.

Delta Products VFD Panel Packages

Delta Products Variable Frequency Drive (VFD) Panel Packages are designed for the C2000 and CP2000 VFD Series to support all general purpose variable torque/speed and fan/pump applications.

With a standard NEMA 3R rating, these engineered panels feature Delta's leading technology designed to eliminate the need for any additional cooling such as air conditioners or heat exchangers for up to 104 degrees Fahrenheit ambient temperatures. The package provides simple manual control via the VFD keypad or HMI which contains functions for Hand/Off/Auto. Additionally, the system's integrated Modbus protocols can be leveraged to interface readily with any building management system.



The packages are configurable to allow control to meet all specified project requirements.

Custom designs are available by consulting the factory

STANDARD FEATURES

- CP2000: 1-125 HP (208/230V), 1-600 HP (460V), 1-675 HP (575/690V)
- C2000: 1-120 HP (208/230V), 1-536 HP (460V), 2-675 HP (600V)
- User interface for easy system programming and monitoring
- Door mounted VFD run and fault LED indicators
- RS-485 Modbus
- 65kA circuit breaker
- Standard surge arrestor for protection against external voltage spikes
- Dry contacts for remote indication
- 24VDC PS for external transducers standard in 208V/230V and 460V panels
- Remote control via communication or dry contact with analog input speed control
- UL 508A and cUL approved

OPTIONS

- Enclosures for various environments
- HMI or Keypad user control
- Input filtering to support harmonic mitigation
- Output filter to support lead length, multi-motor applications
- Heater for extreme cold/ startup
- Sun-shielding

Advanced Application Solutions

Delta's Standard VFD Panel Package offers built-in features serving application solutions for Outdoor Pump Systems, Chiller Pumps, Wastewater Pumps, Artificial Lift, Irrigation Water Pumps, Crane & Hoist and more.

Advanced embedded drive control features include:

- PC Pump Backspin Control
- Pump Control Capability
- Cascading Pump Control
- Pendant Control
- Full Regen capability available*

**Consult with factory to include Active Front End*

Part Number Configuration

Each part number has 13 options

Options	1	2	3	4	5	6	7	8	9	10	11	12	13
Part # Example	D	G	P	2	0	1	0	3	1	0	0	0	0

Option 1	Delta
D	Delta
Option 2	Pump
G	General
Option 3	VFD Selection
C	C2000
P	CP2000
Option 4	Voltage Rating
2	208/230VAC
4	460VAC
6	600VAC

Option 5-7	HP Rating
001	1HP
to	*7.5 = 007
375	175HP
Option 8	Enclosure Style
1	NEMA 1
2	NEMA 12
3	NEMA 3R
4	NEMA 4X
Option 9	User Interface Option
1	Keypad
2	HMI

Option 10	Input Filtering Options
0	None
1	3% Input Reactor
2	5% Input Reactor
Option 11	Output Filtering Option
0	None
1	3% Output Reactor
2	5% Output Reactor
Option 12	Inner Cabinet Temp Ctrl
0	None
1	Heater
Option 13	Sun Shielding
0	None
1	Delta Sun Shield

Standard Configurations

Package Specifications

CP2000 and C2000 listed below and designed based on default duty: CP2000 = LD, C2000 = ND. C2000 in "()" where spec differs:

CP2000 (C2000) 600V/690V

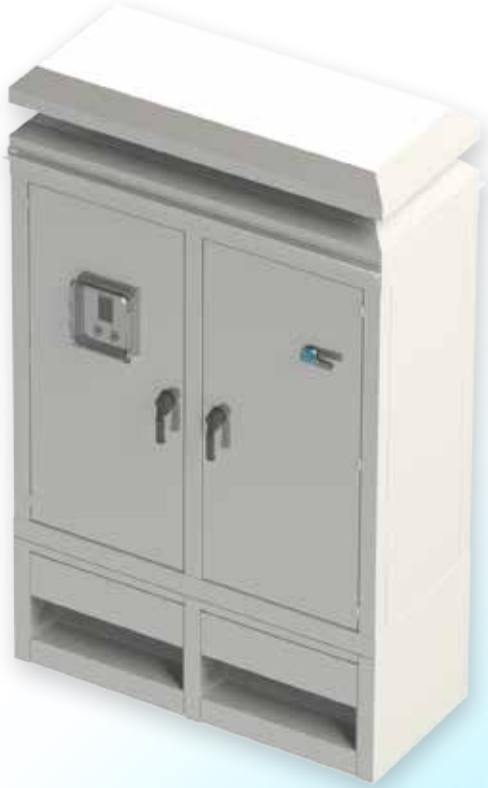
HP	Amps LD (ND)	VFD Frame	Package Dims
1	-	-	-
2	3	A	41x24x12
3	4.3	A	
5	6.7	A	
7.5	9.9	B	47x24x14
10	12.1	B	
15	18.7	B	
20	24.2	B	
25	30	C	55x36x16
30	36	C	
40	45	C	
50	54	D	67x36x16
60	67	D	
75	86	E	74x36x30
100	104	E	
125	125	E	
150	150	E	
175	180	F	
200	220	F	74x68x30
250	290	G	
350	350	G	
400	430	H	
450	465	H	Consult Factory
500	590	H	
675	675	H	

CP2000 (C2000) 460V

HP	Amps LD (ND)	VFD Frame	Package Dims
1	3	A	41x24x12
2	4.2 (4)	A	
3	5.5 (6)	A	
5	8.5 (9)	A	
7.5	13 (12)	A	
10	18	A (B)	
15	24	B	47x24x14
20	32	B	
25	38	B (C)	
30	45	C	55x36x16
40	60	C	
50	73	C (D)	
60	91	D	67x36x16
75	110	D	
100	150	D	74x36x30
125	180	D (E)	
150	220	E	
175	260	E (F)	
215	310	F	74x68x30
250	370	F (G)	
300	460	G	
375	530	G	
(375)	(550)	(H)	Consult Factory
425 (420)	616	H	
475	683	H	
536 (600)	770 (866)	H	

Double Door Type

74 x 68 x 30

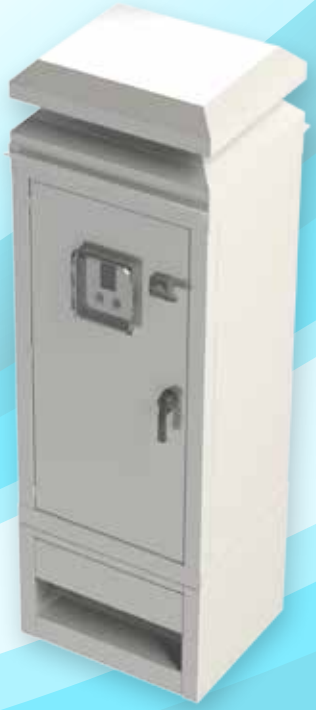


CP2000 (C2000) 208V/230V

HP	Amps LD (ND)	VFD Frame	Package Dims
1	5	A	41x24x12
2	7.5 (8)	A	
3	10 (11)	A	
5	15 (17)	A	
7.5	21 (25)	A (B)	
10	31 (33)	B	47x24x14
15	46 (49)	B	
20	61 (65)	B (C)	
25	75	C	55x36x16
30	90	C	
40	105 (120)	C (D)	67x36x16
50	146	D	
60	180	D (E)	
75	215	E	74x36x30
100	276 (255)	E	
125 (120)	322 (346)	E (F)	

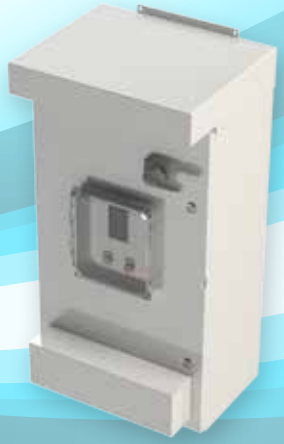
Single Door Type

74 x 36 x 30



Compact Type

41 x 24 x 12
47 x 24 x 14
55 x 36 x 16
67 x 36 x 16



CP2000 Series VFD General Specifications

General Specifications						
Control Characteristics	Control Method	**Pulse Width Modulated (PWM)**				
	Control Mode	230V / 460V model: 1: V/F (V/F control), 2: SVC (Sensorless Vector Control), 3: PM (Permanent Magnet Motor) 575V / 690V model: 1: V/F, 2: SVC				
	Starting Torque	Reach up to 150% or above at 0.5Hz				
	V/F Curve	4 point adjustable V/F curve and square curve				
	Speed Response Ability	5 Hz				
	Torque Limit	Light Duty: Max. 130% torque current; Normal Duty: Max. 160% torque current				
	Max. Output Frequency (Hz)	230V model: 599.00Hz (55kW and above: 400.00Hz) 460V model: 599.00Hz (90kW and above: 400.00Hz) 575V / 690V model: 599.00Hz				
	Frequency Output Accuracy	Digital command: ±0.01%, -10°C ~ +40°C, Analog command: ±0.1%, 25±10°C				
	Output Frequency Resolution	Digital command: ±0.01Hz; Analog command: Max. output frequency x0.03/60Hz (±11 bit)				
	Overload Tolerance	Light Duty: 120% of rated current for 1 minute Normal Duty: 120% of rated current for 1 minute; 160% of rated current for 3 seconds				
	Frequency Setting Signal	0 ~ +10V, 4 ~ 20mA, 0 ~ 20mA, pulse input				
	Accel. / Decel. Time	0.00 ~ 600.00/0.0 ~ 6000.0 seconds				
	Main Control Function	Fault restart	Torque limit	Smart stall	Dwell	3-wire sequence
		Speed search	Parameter copy	JOG frequency	Slip compensation	Torque compensation
		S-curve accel/ decel	Energy saving control	Accel/Decel. Time switch	Frequency/lower limit settings	Momentary power loss ride thru
		PID control (with sleep function)	Auto-Tuning (rotational, stationary)	DC injection braking at start/stop	BACnet Communication	16-step speed (max.)
		Over-torque detection		MODBUS communication (RS-485 RJ45, Max. 115.2kbps)		
	Fan Control	230V model: Model with spec higher than VFD185CP23 (included) are PWM control; Model with spec lower than VFD150CP23 (not included) are on/off switch control. 460V model: Model with spec higher than VFD220CP43 (included) are PWM control; Model with spec lower than VFD185CP43 (not included) are on/off switchcontrol. 575V / 690V model: PWM control				

CP2000 Series VFD General Specs (cont'd)

Product Characteristics	Motor Protection	Electronic thermal relay protection
	Over-Current Protection	230V / 460V model: Light Duty: Over-current protection for 200% rated current, Normal Duty: Over-current protection for 240% rated current, Current clamp (Light Duty: 130 ~ 135%); (Normal Duty: 170 ~ 175%) 575V / 690V model: Over-current protection for 225% rated current Current clamp (Light Duty: around 128 ~ 141%); (Normal Duty: around 170 ~ 175%)
	Over-Voltage Protection	230V model: drive will stop when DC-BUS voltage exceeds 410V 460V model: drive will stop when DC-BUS voltage exceeds 820V 575V / 690V model: drive will stop when DC-BUS voltage exceeds 1189V
	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
International Certifications		CE, UL CERTIFIED SAFETY US-CA E176972 IND. CONT. EQ., GB 12668.3, EAC

Note: EAC Certification is for 230V and 460V models only

C2000 Series VFD General Specifications

General Specifications		
Control Characteristics	**Control Method**	**Pulse Width Modulated (PWM)**
	Control Mode	230V / 460V model: 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 575V / 690V model: 1: V/F, 2: V/F+PG, 3: SVC
	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	5 Hz (vector control can reach up to 40Hz)
	Torque Limit	230V / 460V model: Normal Duty 160%, Heavy Duty 180% of torque current; 575V / 690V model: Maximum 200% of torque current
	Torque Accuracy at TQC Mode	TQC + PG: ±5% TQC Sensorless: ±15%
	Max. Output Frequency (Hz)	Light Duty / Normal Duty: 0.01 ~ 599.00Hz; Heavy Duty: 0.00 ~ 300.00Hz
	Frequency Output Accuracy	Digital command: ±0.01%, -10°C ~ +40°C, Analog command: ±0.1%, 25±10°C
	Output Frequency Resolution	Digital command: ±0.01Hz; Analog command: 0.03 max. output frequency/60Hz (±11 bit)
	Overload Capacity	230V / 460V model: Normal Duty: 120%, 1 minute every 5 minutes; 160%, 3 seconds every 30 seconds Heavy Duty: 150%, 1 minute every 5 minutes; 180%, 3 seconds every 30 seconds 575V / 690V model: Light Duty: rated output current is 120% for 60 seconds Normal Duty: rated output current is 120% for 60 seconds; 150% for 3 seconds Heavy Duty: rated output current is 150% for 60 seconds; 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, Speed/torque control switching, Feed forward control, Zero-servo control, Momentary power loss ride thru, Speed search, Over-torque detection, Torque Limit, 16-step speed (Max.), Accel/decel time switch, S-curve accel/decel, 3-wire sequence, Auto-Tuning (rotational, stationary), Dwell, Slip compensation, Torque compensation, JOG frequency, Fault restart, Frequency upper/lower limit settings, DC injection braking at start/stop, High slip braking, Parameter copy PID control (with sleep function), Energy saving control, MODOBUS communication (RS-485 RJ45, Max. 115.2kbps)
	Fan Control	230V model: Model VFD150C23A (include) and series above: PWM control; VFD110C23A and below: on/off switch control. 460V model: Model VFD185C43A (include) and series above: PWM control; VFD150C43A and below: on/off switch control. 575V / 690V model: PWM control

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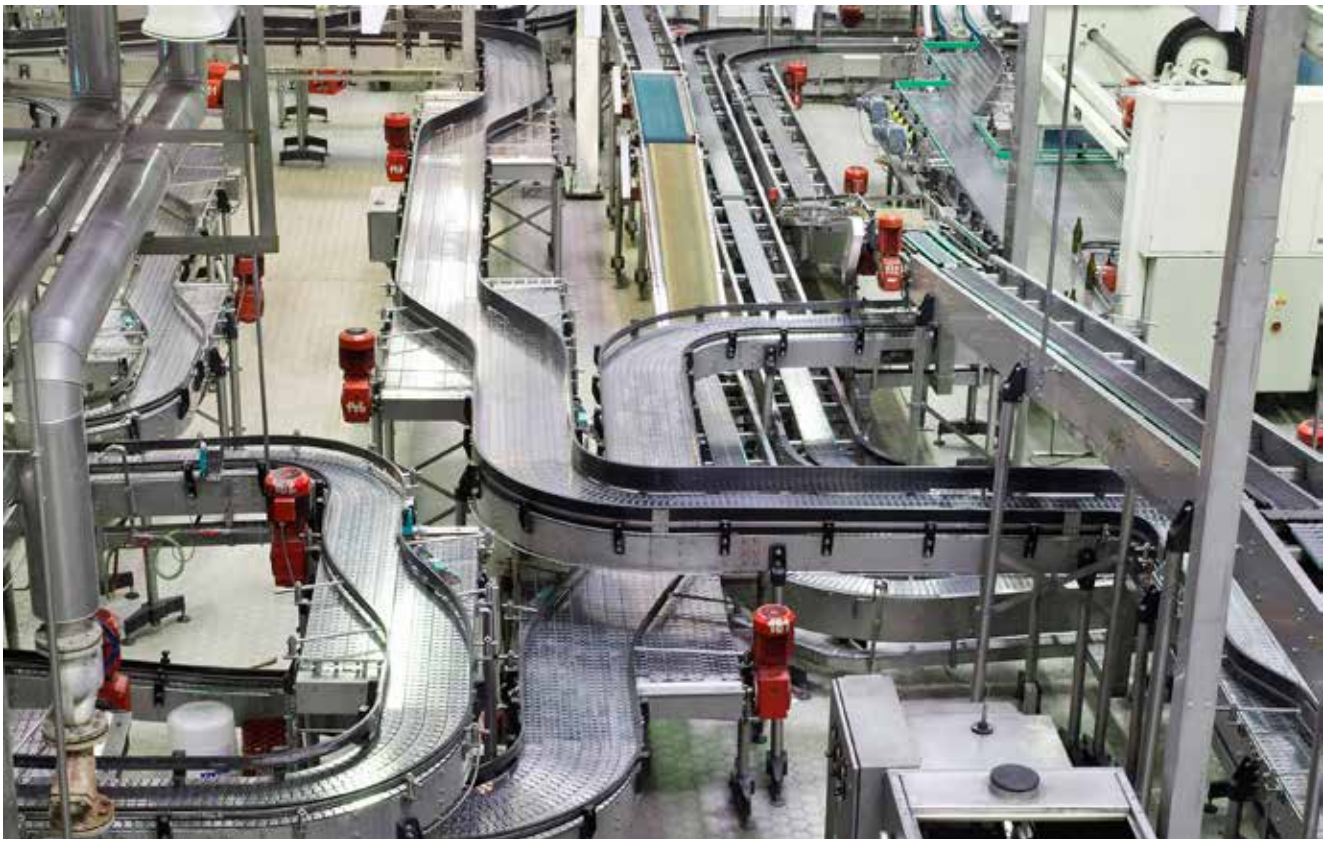
C2000 Series VFD General Specs (cont'd)

Product Characteristics	Motor Protection	Electronic thermal relay protection
	Over-Current Protection	230V / 460V model: Over-current protection for 240% of rated current, Current clamp (Normal Duty: around 170 ~ 175%); (Heavy Duty: 180 ~ 185%) 575V / 690V model: Over-current protection for 225% rated current Current clamp (Light Duty: around 128 ~ 141%); (Normal Duty: around 170 ~ 175%) (Heavy Duty: around 202% ~ 210%)
	Over-Voltage Protection	The C2000 Series will shut down under below conditions: 230V: DC-BUS over 410V; 460V: DC-BUS over 820V; 575V / 690V: DC-BUS over 1189V
	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
International Certifications		CE, UL CERTIFIED IND. CONT. EQ. SAFETY US-CA E176972, EAC

Note: EAC Certification is for 230V and 460V models only



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