



# Delta Standard VFD Panel Package



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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 arrester 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

<b>Option 1</b>	Delta	<b>Option 5-7</b>	HP Rating	<b>Option 10</b>	Input Filtering Options
D	Delta	001	1HP	0	None
<b>Option 2</b>	Pump	to	*7.5 = 007	1	3% Input Reactor
G	General	375	175HP	2	5% Input Reactor
<b>Option 3</b>	VFD Selection	<b>Option 8</b>	Enclosure Style	<b>Option 11</b>	Output Filtering Option
C	C2000	1	NEMA 1	0	None
P	CP2000	2	NEMA 12	1	3% Output Reactor
<b>Option 4</b>	Voltage Rating	3	NEMA 3R	2	5% Output Reactor
2	208/230VAC	4	NEMA 4X	<b>Option 12</b>	Inner Cabinet Temp Ctrl
4	460VAC	<b>Option 9</b>	User Interface Option	0	None
6	600VAC	1	Keypad	1	Heater
		2	HMI	<b>Option 13</b>	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	55x36x16
25	30	C	
30	36	C	
40	45	C	67x36x16
50	54	D	
60	67	D	74x36x30
75	86	E	
100	104	E	
125	125	E	74x68x30
150	150	E	
175	180	F	
200	220	F	74x68x30
250	290	G	
350	350	G	
400	430	H	Consult Factory
450	465	H	
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)	47x24x14
15	24	B	
20	32	B	
25	38	B (C)	55x36x16
30	45	C	
40	60	C	
50	73	C (D)	67x36x16
60	91	D	
75	110	D	74x36x30
100	150	D	
125	180	D (E)	
150	220	E	74x68x30
175	260	E (F)	
215	310	F	
250	370	F (G)	74x68x30
300	460	G	
375	530	G	
(375)	(550)	(H)	Consult Factory
425 (420)	616	H	
475	683	H	
536 (600)	770 (866)	H	

**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)	

**Double Door Type**

74 x 68 x 30



**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

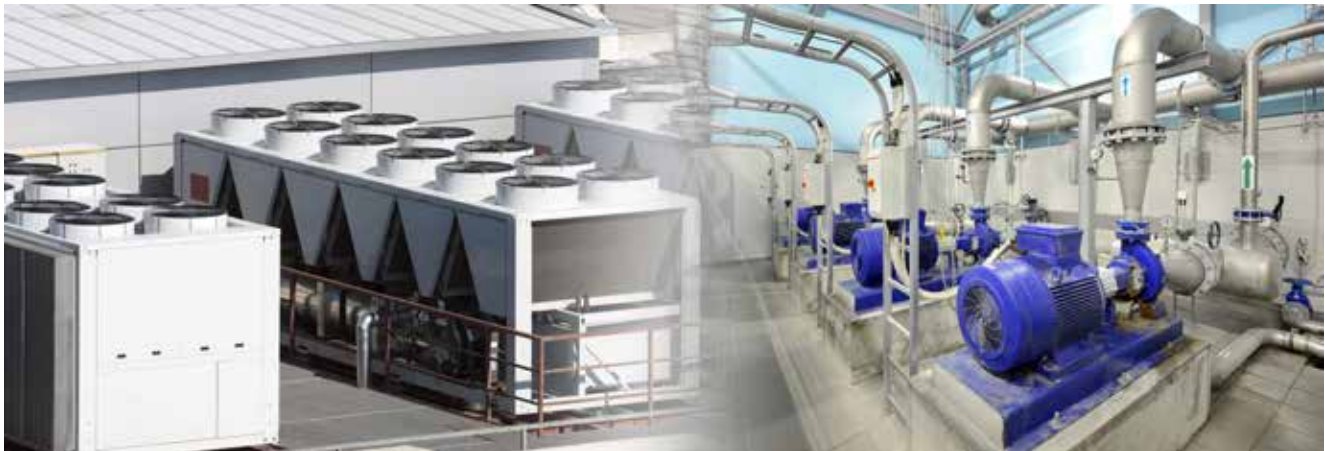
General Specifications						
Control Characteristics	<b>Control Method</b>	<b>Pulse Width Modulated (PWM)</b>				
	<b>Control Mode</b>	230V / 460V model: 1: V/F (V/F control), 2: SVC (Sensorless Vector Control), 3: PM (Permanent Magnet Motor) 575V / 690V model: 1: V/F, 2: SVC				
	<b>Starting Torque</b>	Reach up to 150% or above at 0.5Hz				
	<b>V/F Curve</b>	4 point adjustable V/F curve and square curve				
	<b>Speed Response Ability</b>	5 Hz				
	<b>Torque Limit</b>	Light Duty: Max. 130% torque current; Normal Duty: Max. 160% torque current				
	<b>Max. Output Frequency (Hz)</b>	230V model: 599.00Hz (55kW and above: 400.00Hz) 460V model: 599.00Hz (90kW and above: 400.00Hz) 575V / 690V model: 599.00Hz				
	<b>Frequency Output Accuracy</b>	Digital command: $\pm 0.01\%$ , $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$ , Analog command: $\pm 0.1\%$ , $25 \pm 10^{\circ}\text{C}$				
	<b>Output Frequency Resolution</b>	Digital command: $\pm 0.01\text{Hz}$ ; Analog command: Max. output frequency $\times 0.03/60\text{Hz}$ ( $\pm 11$ bit)				
	<b>Overload Tolerance</b>	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				
	<b>Frequency Setting Signal</b>	0 ~ +10V, 4 ~ 20mA, 0 ~ 20mA, pulse input				
	<b>Accel. / Decel. Time</b>	0.00 ~ 600.00/0.0 ~ 6000.0 seconds				
	<b>Main Control Function</b>	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)			
<b>Fan Control</b>	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	   	




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



# C2000 Series VFD General Specifications

General Specifications		
Control Characteristics	<b>Control Method</b>	<b>Pulse Width Modulated (PWM)</b>
	<b>Control Mode</b>	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
	<b>Starting Torque</b>	Reach up to 150% or above at 0.5Hz. Under FOC+PG mode, starting torque can reach 150% at 0Hz
	<b>V/F Curve</b>	4 point adjustable V/F curve and square curve
	<b>Speed Response Ability</b>	5 Hz (vector control can reach up to 40Hz)
	<b>Torque Limit</b>	230V / 460V model: Normal Duty 160%, Heavy Duty 180% of torque current; 575V / 690V model: Maximum 200% of torque current
	<b>Torque Accuracy at TQC Mode</b>	TQC + PG: $\pm 5\%$ TQC Sensorless: $\pm 15\%$
	<b>Max. Output Frequency (Hz)</b>	Light Duty / Normal Duty: 0.01 ~ 599.00Hz; Heavy Duty: 0.00 ~ 300.00Hz
	<b>Frequency Output Accuracy</b>	Digital command: $\pm 0.01\%$ , $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$ , Analog command: $\pm 0.1\%$ , $25 \pm 10^{\circ}\text{C}$
	<b>Output Frequency Resolution</b>	Digital command: $\pm 0.01\text{Hz}$ ; Analog command: 0.03 max. output frequency/60Hz ( $\pm 11$ bit)
	<b>Overload Capacity</b>	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
	<b>Frequency Setting Signal</b>	+10V ~ -10, 0 ~ +10V, 4 ~ 20mA, 0 ~ 20mA, pulse input
	<b>Accel. / Decel. Time</b>	0.00 ~ 600.00/0.0 ~ 6000.0 seconds
	<b>Main Control Function</b>	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)
	<b>Fan Control</b>	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

# C2000 Series VFD General Specs (cont'd)

Product Characteristics	<b>Motor Protection</b>	Electronic thermal relay protection
	<b>Over-Current Protection</b>	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%)
	<b>Over-Voltage Protection</b>	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
	<b>Over-Temperature Protection</b>	Built-in temperature sensor
	<b>Stall Prevention</b>	Stall prevention during acceleration, deceleration and running independently
	<b>Restart After Instantaneous Power Failure</b>	Parameter setting up to 20 seconds
	<b>Grounding Leakage Current Protection</b>	Leakage current is higher than 50% of rated current of the AC motor drive
<b>International Certifications</b>	  	

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





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