Automation for a Changing World

High Frequency Motor Drive C2000-HS Series

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Smarter. Greener. Together.

High Frequency Motor Drive C2000-HS Series

Prime product for High-speed Fluid Applications

High-speed centrifugation is widely applied to fluid-mechanical devices to increase efficiency and save both time and equipment cost. During operation, a fluid-mechanical device rotates at high speed to gain a faster flow rate, and the frequency increases as the motor rotation speed increases.

With years of experience in motor drive and control, Delta introduces the High Frequency Motor Drive C2000-HS Series with outstanding performance (output frequency up to 1,500 Hz) and energy-efficient features to fulfill the demand for high speed motor control. The C2000-HS Series is the best choice for your fluid mechanical devices.

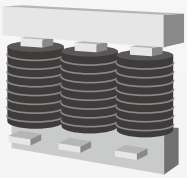
Applications

- HVAC Systems - Chiller Units

- Sewage Treatment Plants - Centrifugal Turbo Blowers

- Power Plants - Micro Gas Turbine Generators

Features



Output Reactor

Supports all kinds of motors:

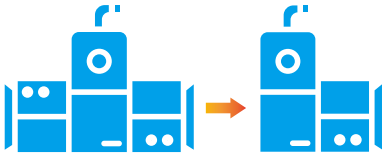
SPM (surface permanent magnet motor)

IPM (Interior permanent magnet motor)

IM (induction motor)

High-speed Operation

- Enhanced performance and control: max. operating frequency up to 1,500 Hz
- Direct drive mechanism: reduced system size, higher efficiency and lower cost



Conventional system design

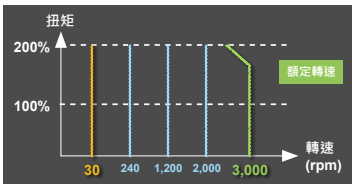
High-speed direct drive mechanism (no gear box)

Compact Design

- No need to adopt a drive of higher power range when matching with a high-capacity motor
- Reduces the installation space

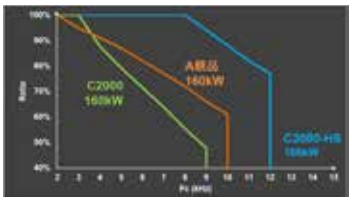
Sensorless Motor Control Technology

- Built-in motor ID parameters for sensorless control with steadier output speed and optimized dynamic response
- With FOC sensorless control, the speed control precision reaches 1:100



New IGBT Technology

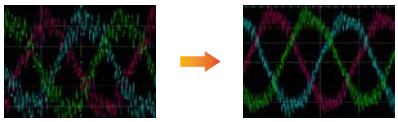
- Maintains high motor drive efficiency of up to 98 % while running at a high carrier frequency
- Substantially reduces the derating limit of the output current.



* Refer to Delta's official documentation for the actual test results.

Output Reactor

- Suppresses current ripples on the high-speed motor
- Reduces the chance of motor temperature rise



Without output reactor

With output reactor

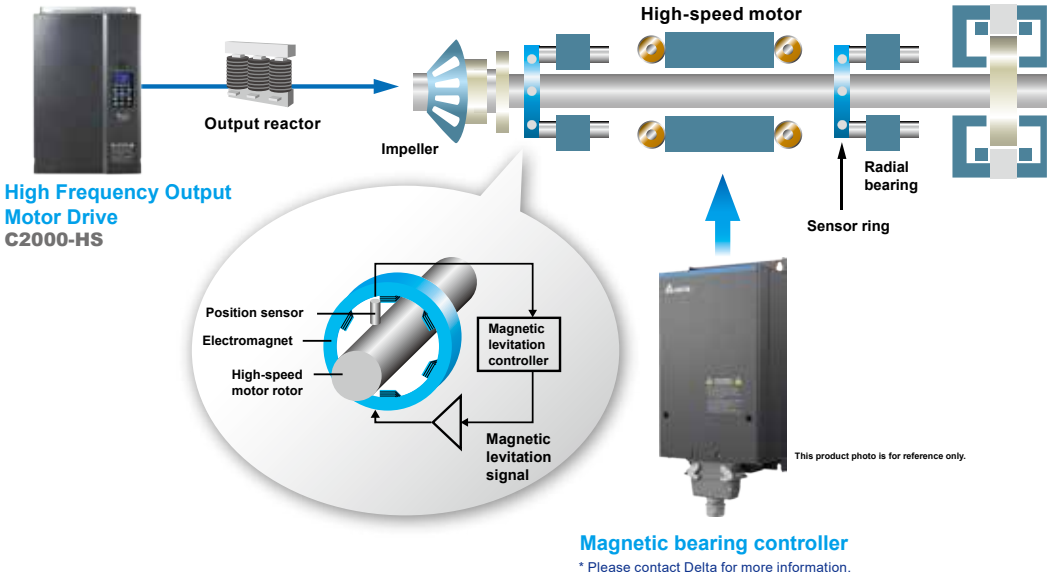
* Contact Delta for model selection and installation.

Built-in DC Reactor

- Suppresses high harmonics
- Compliant with EN61000-3-12

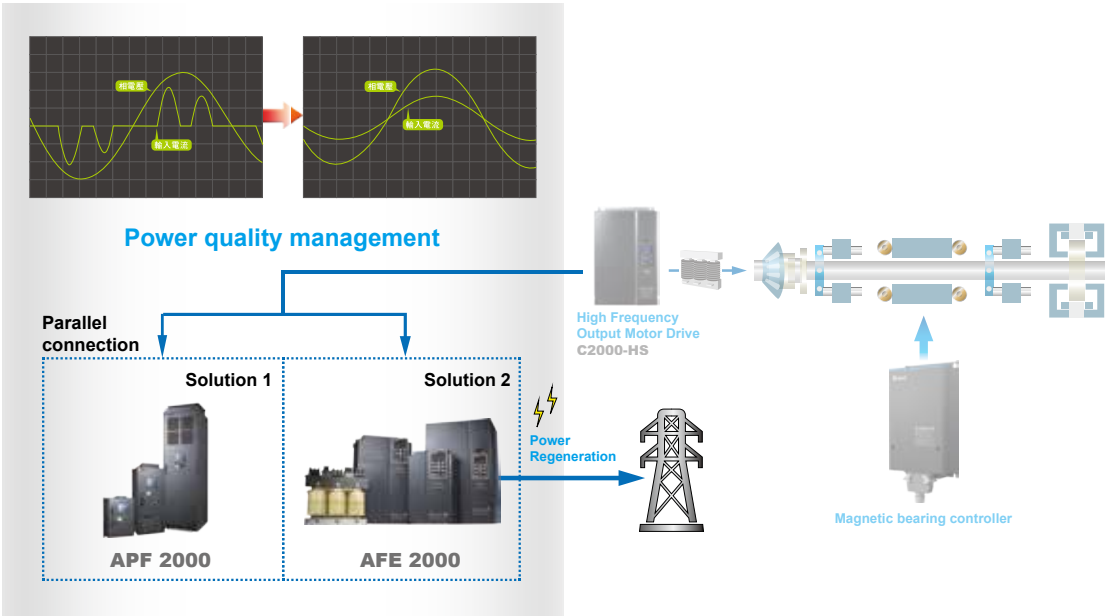
Best Solution for a Electronically Controlled High-speed Motor

- Magnetic bearing controller: The high-speed motor uses non-contact bearing instead of a conventional one to reduce damage during operation. This saves maintenance cost by eliminating the need of cleaning the copper pipes of the fluid machinery, the effort for cooling oil circuit maintenance, and the oil quality verification process
- Output reactor: Suppresses the current ripples on the high-speed motor and the increasing heat of the motor rotor



Total Power Quality Management Solution

- Works with Delta's power quality management products for power regeneration during motor operation, and the generated power is transmitted to the mains via a parallel connection
- Reduces the harmonic distortion at the power input side by raising the power factor to 0.95~0.99
- Compliant with IEEE 519 standard to decrease electricity cost



Model Name

VFD 750 C 43 A - HS

High Speed Models

Installation Method

A: Wall mounting

S: Same capacity but smaller size

Input Voltage / Phase

43: 460 V, 3-phase

C2000 Series

Maximum Applicable Motor Capacity

300 : 40 HP (30 kW)
370 : 50 HP (37 kW)
750 : 100 HP (75 kW)
1100 : 150 HP (110 kW)
1600 : 215 HP (160 kW)
2200 : 300 HP (220 kW)
3550 : 475 HP (355 kW)

Motor Drive

Product Specifications

Frame				D0		D			E		F	G	H
Model VFD-_ _ _ C43x-HS				300	370	450	550	750	900	1,100	1,600	2,200	3,550
Output Rating	Normal Load	Rated Output Capacity (kVA)		48	58	73	88	120	143	175	247	367	544
		Rated Output Current (A)		60	73	91	110	150	180	220	310	460	683
		Applicable Motor Output (kW)		30	37	45	55	75	90	110	160	220	355
		Applicable Motor Output (HP)		40	50	60	75	100	125	150	215	300	475
		Max. Output Frequency	IM	1,500 Hz							1,200 Hz	1,000 Hz	900 Hz
			PM	1,000 Hz									900 Hz
		Carrier Frequency (kHz)		2~15 (Default 10)					2~15 (Default 8)		2~12 (Default 8)	2~10 (Default 6)	2~9 (Default 6)
Input Rating		Input Current (A)		63	74	101	114	157	167	207	300	400	625
		Rated Voltage / Frequency		3-phase AC 380 V~480 V (-15%~+10%), 50/60 Hz									
		Operating Voltage Range		323~528 VAC									
		Frequency Tolerance		47~63 Hz									
Efficiency (%)				>98	>98	97	97	>98	97	>98	>98	>98	>98
Power Factor				> 0.98									
Net Weight				38 kg		40 kg			66 kg		88 kg	138 kg	228 kg
Cooling Method				Fan Cooling									
Braking Chopper				Optional									
DC Reactor				Built-in, EN61000-3-12 compliant									

Control Features

VFD- _ _ _ C43x-HS				
Control Method	PM/IM open loop control			
Starting Torque	IM: Reach up to 150 % at 1/50 rated rotor speed PM: Reach up to 150 % at 1/100 rated rotor speed			
V/F Curve	4-point adjustable V/F curve and square curve			
Speed Response Ability	Open loop: 5 Hz Closed loop: Max. 40 Hz for IM; max. 100 Hz for PM			
Torque Limit	Normal duty: a maximum of 160 % torque current			
Torque Accuracy	±5 %			
Frequency Output Accuracy	Digital command: ±0.01 %, -10 ºC ~ +40 ºC; Analog command: ±0.1 %, 25 ± 10 ºC			
Output Frequency Resolution	Digital command: 0.1 Hz, Anaglog command: 0.05% max. output frequency (Parameter 01-00), 11bit			
Overload Tolerence	120% of rated current: 1 minute for every 5 minutes 160 of rated current: 3 seconds for every 30 seconds			
Frequency Setting Signal	-10 ~ +10 V, 0 ~ +10 V, 4 ~ 20 mA, 0 ~ 20 mA, Pulse input			
Acceleration/ Deceleration Time	0.00 ~ 600.00/0.0 ~ 6,000.0 seconds			
Main Control Functions	Feed forward control	Restart after instantaneous power failure	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	Frequency upper/ lower limit settings	DC injection braking at start/stop
	High slip braking	PID control (with sleep function)	Energy saving control	Parameter duplication
	Modbus communication (RS-485 RJ45, max. 115.2 Kbps)		Fault restart	
Fan Control	PWM Control			

Protection Features

VFD- _ _ _ C43x-HS	
Motor Protection	Electronic thermal relay protection
Over-current Protection	Over-current protection for 240 % rated current Current clamp: 170 ~ 175 %
Over-voltage Protection	Drive stops running when DC-BUS voltage exceeds 820 V
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 50% higher than the rated current of the AC motor drive
Short-circuit Current Rating (SCCR)	Per UL 508C, the drive is suitable for use on a circuit capable of delivering no more than 100 kA symmetrical amperes (rms) when protected by fuses given in the fuse table
Certifications	GB/T12668-2 UL508c CE

Specifications for Operating Temperature and Protection Level

Model	Frame	Top Cover	Conduit Box	Protection Level	Operating Temperature
VFD-_ _ _ C43 x-HS	D0 ~ H	N/A	No	IP00 	-10 ~ 50 °C
Conduit Box Installed	D0 ~ H	N/A	Standard	IP20/NEMA1	-10 ~ 40 °C

Protection Level	Operating Environment
UL Open Type / IP20 (Without conduit box)	Ambient temperature -10 °C ~ +50 °C: Running at the rated current Ambient temperature exceeds +50 °C: Decrease 2 % of the rated current for every 1 °C increase Max. operating temperature: 60 °C
UL Type1 / NEMA1 (Conduit box installed)	Ambient temperature -10 °C ~ +40 °C: Running at the rated current Ambient temperature exceeds +40 °C: Decrease 2 % of the rated current for every 1 °C increase Max. operating temperature: 60 °C
High Altitude	Altitude 0 ~ 1,000 m: Follow normal operation restriction Altitude 1,000 ~ 2,000 m: Decrease 1 % of rated current, or lower 0.5 °C of temperature for every 100 m increase in altitude Altitude over 2,000 m: Contact Delta for more information * Corner-grounded systems should be used below 2,000 m

Ordering Information

Power Range (kW)	Frame	IP00 (Without Conduit Box)	Dimensions (H x W x D, mm)
30	D0	VFD300C43S-HS	500 x 280 x 255
37		VFD370C43S-HS	500 x 280 x 255
45	D	VFD450C43A-HS	550 x 330 x 275
55		VFD550C43A-HS	550 x 330 x 275
75		VFD750C43A-HS	550 x 330 x 275
90	E	VFD900C43A-HS	589 x 370 x 300
110		VFD1100C43A-HS	589 x 370 x 300
160	F	VFD1600C43A-HS	800 x 420 x 300
220	G	VFD2200C43A-HS	1,000 x 500 x 397
355	H	VFD3550C43A-HS	1,435 x 700 x 398

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*We reserve the right to change the information in this catalogue without prior notice.

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