



Digitized Automation for a Changing World

Delta Elevator Drive EB3000 Series



www.deltaww.com



During the past 25 years, Delta has acquired extensive experience in elevator drive development. As the types of buildings have become diverse, the requirements for elevator drives have changed accordingly. To enhance flexibility and usability, Delta listened to customer feedback and upgraded these products for easier installation, maintenance, and troubleshooting. After years of effort, Delta is ready to tackle broader applications and introduces the new EB3000 Series, its third generation elevator drive.

The EB3000 Series is compliant and safe. With a more compact design, it is easy to install in machine-room (MR) and machine-roomless (MRL) lifts for a wide range of uses. To deliver better performance and more comfortable rides, the EB3000 Series applies the latest control techniques and supports different encoders with multiple built-in communications. This makes the EB3000 compatible with a variety of motors and controllers. Moreover, Delta offers the Delta Drive Tool which enables easy and remote operation as it runs auto-tuning and quick troubleshooting.





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INTRODUCTION

An elevator drive that supports multiple types of buildings

- Fits in multiple types of buildings from low-rise to high-rise
- Supports high speed up to 4 m / sec
- Suits new installation and retrofit cases
- Applicable for machine-room (MR) and machine-roomless (MRL) lifts



Commercial
Building



Residential
Building



Hospital



Public
Transportation



Industrial
Building



FEATURES



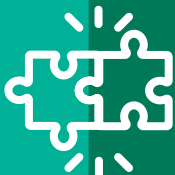
COMPACT

Designed for flexible installation



EFFICIENT

Features tools for easy installation and maintenance



COMPATIBLE

Supports different systems



COMFORTABLE

Integrates multiple technologies easily



SAFE

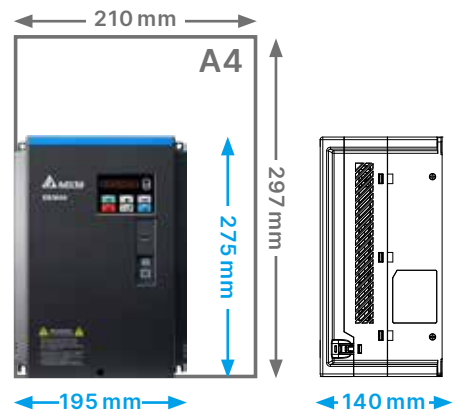
Rates as the top priority



COMPACT

Powerful features in a smaller size

- Smaller than A4 paper (Frame A)
- Easy to fit in MRL lifts



EFFICIENT

Easy when it comes to maintenance and trouble-shooting and saves on working hours

Zero Contactor

- Saves two contactors in control panel

EMC Filter

- Integrated EMC models save wiring and configuration costs

Data-logger

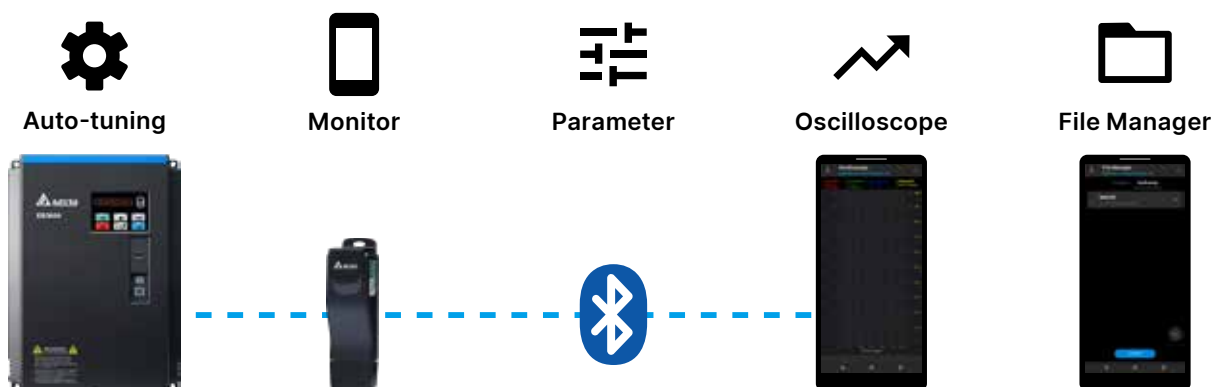
- 4 channels, 6 trigger modes, 3 sampling time
- 1 Built-in memory slot: Saves up to 30,000* files with a micro SD card

Note: The number is calculated with a 32GB micro SD card

Wireless Control

- Connects to smart applications via Bluetooth on smartphones

Application Features



COMPATIBLE

Suitable for multiple circumstances without additional cost

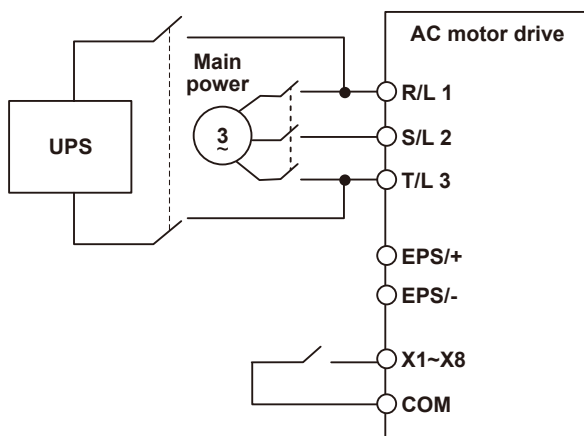
Built-in Major Communications

- CANlift CiA 417
Standardizes communication across all elevator parts to suit multiple types of elevator systems
- Modbus (DCP 3/4)
Open protocol for the serial link between a lift controller and drive.

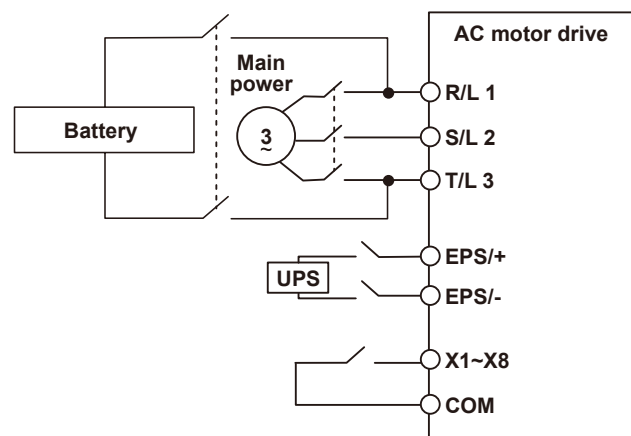
Supports Various Encoders

- Incremental encoders
 - ABZ
 - ABZ + Hall
 - SIN/COS
 - SIN/COS + Sinusoidal
- Incremental with absolute position
 - Endat 2.1
 - Endat 2.2
Supports a high speed elevator up to 4 m/s with precise control of encoder feedback
 - SSI
 - BSS-C
Open protocol platform for economic and operational benefits
 - Sick Hiperface

Flexible UPS Configuration Options



Three Phase: Big UPS capacity



Single Phase with Batteries: Budget friendly

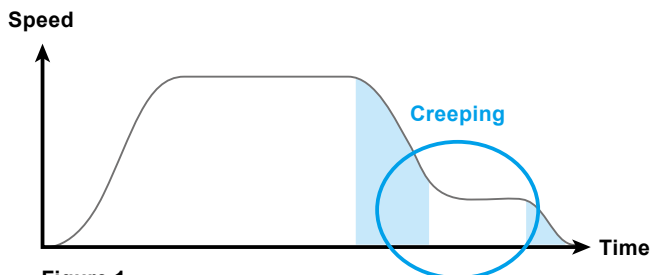
1 kVA 1ph 220 V UPS Battery: 24 V for 200 V series,
48 V for 400 V series

COMFORTABLE

Makes every elevator ride a relaxing and comfortable experience

Direct Landing

- Reduces creep time for a smooth ride
- Reduces each travel time



Traditional

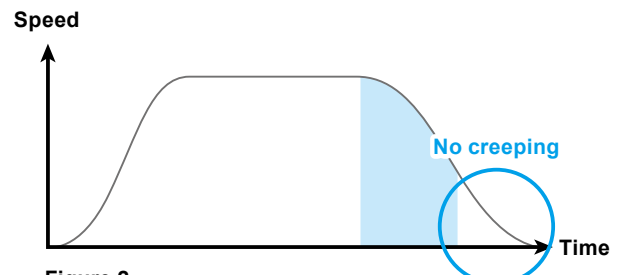


Figure 2

Direct Landing

Smooth Start without Load Sensor

- Precise torque control offsets rollback

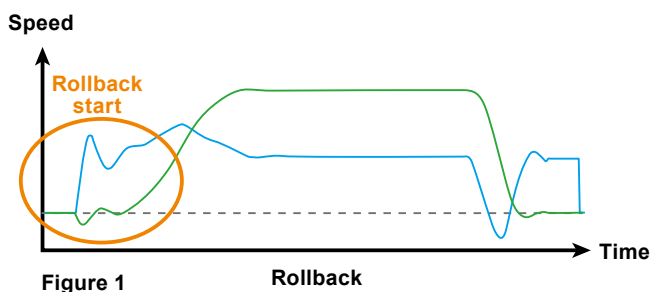


Figure 1

Rollback

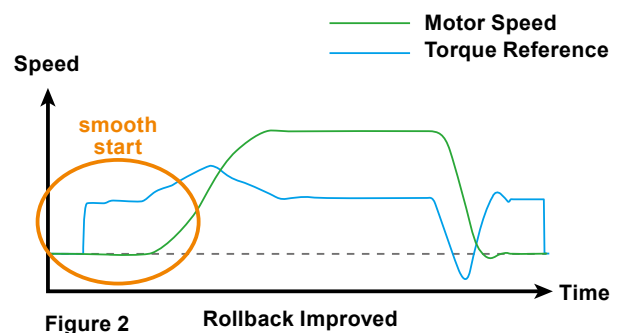


Figure 2

Rollback Improved

Low Noise

- Zero contactor reduces engaged and unengaged noise
- 8 kHz carrier frequency lowers motor noise
- Fans do not turn on until the overtemperature limit is exceeded;
Users can choose the setting mode regarding the range of operating temperature

SAFE

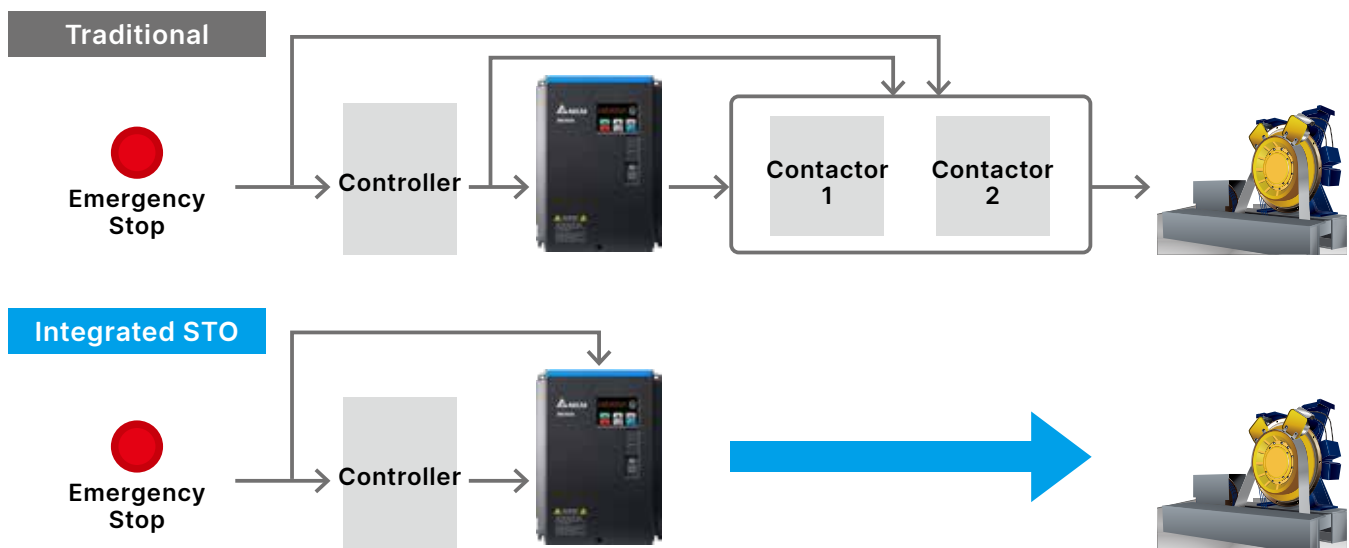
Complies with safety standards and hardware protection to ensure safe elevator rides

Complies to EN Standards

- Lift : EN 81-20 / EN 81-50
- EMC: EN 12015 / EN 12016

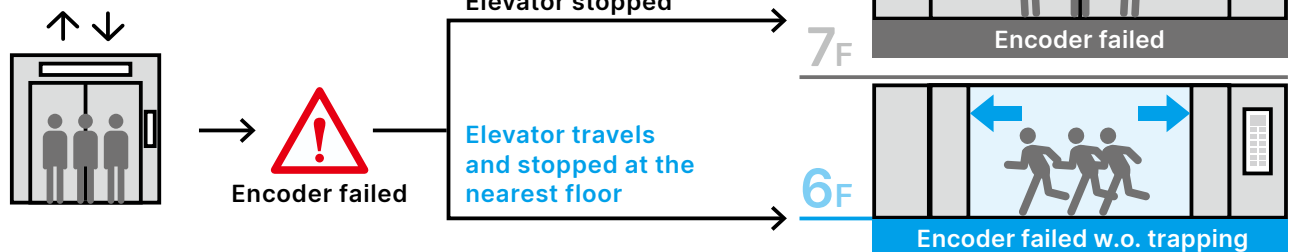
Functional Safety

- Safe torque off: SIL3

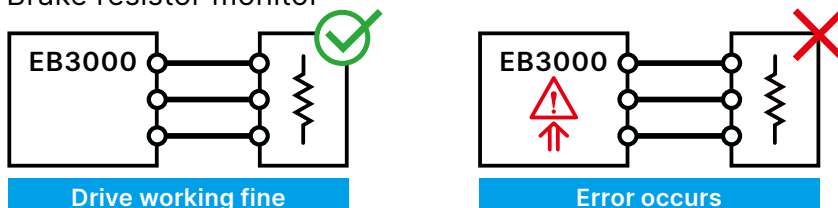


Saves repair and maintenance time

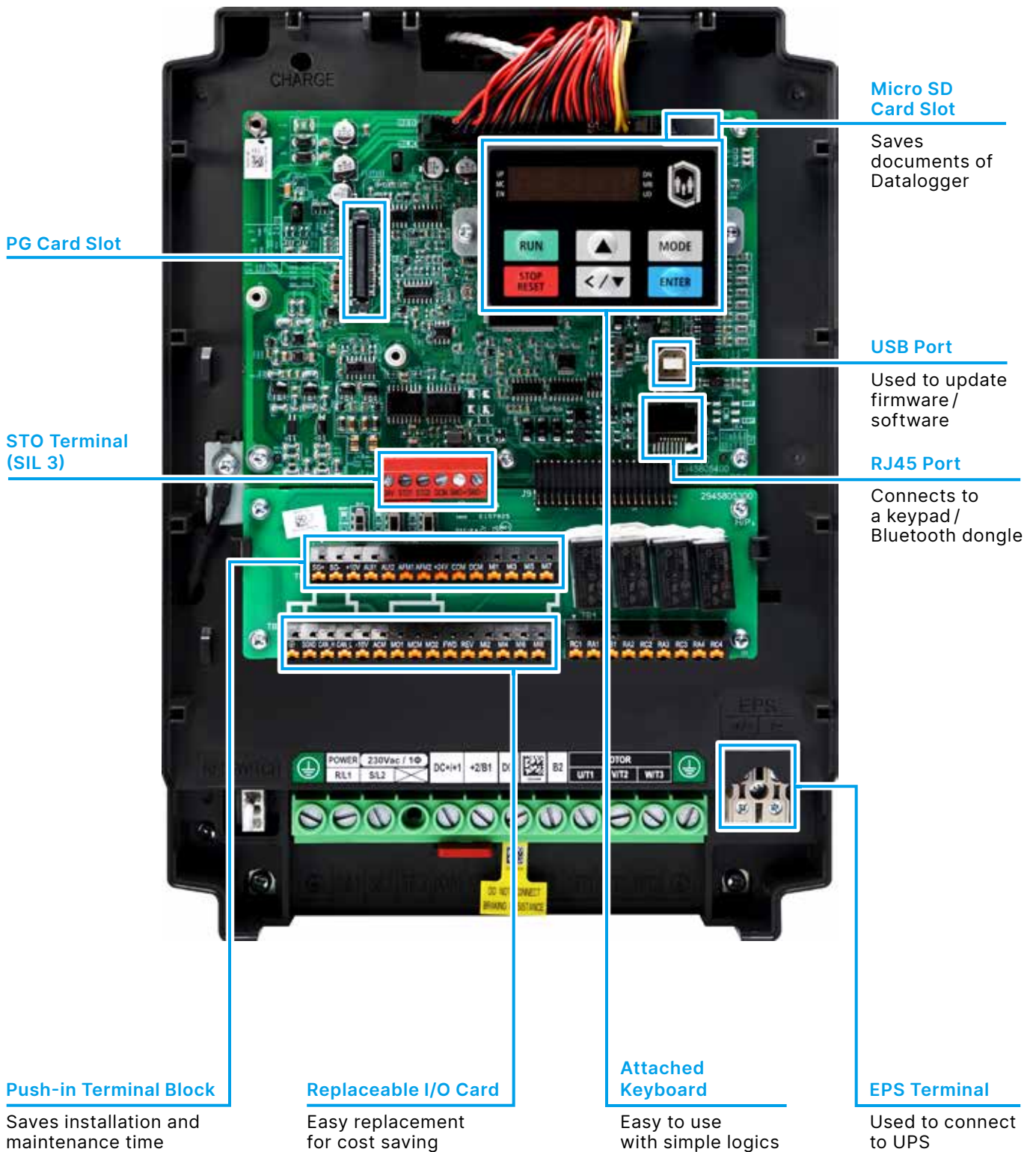
- Trapping prevention



- Brake resistor monitor



Product Structure





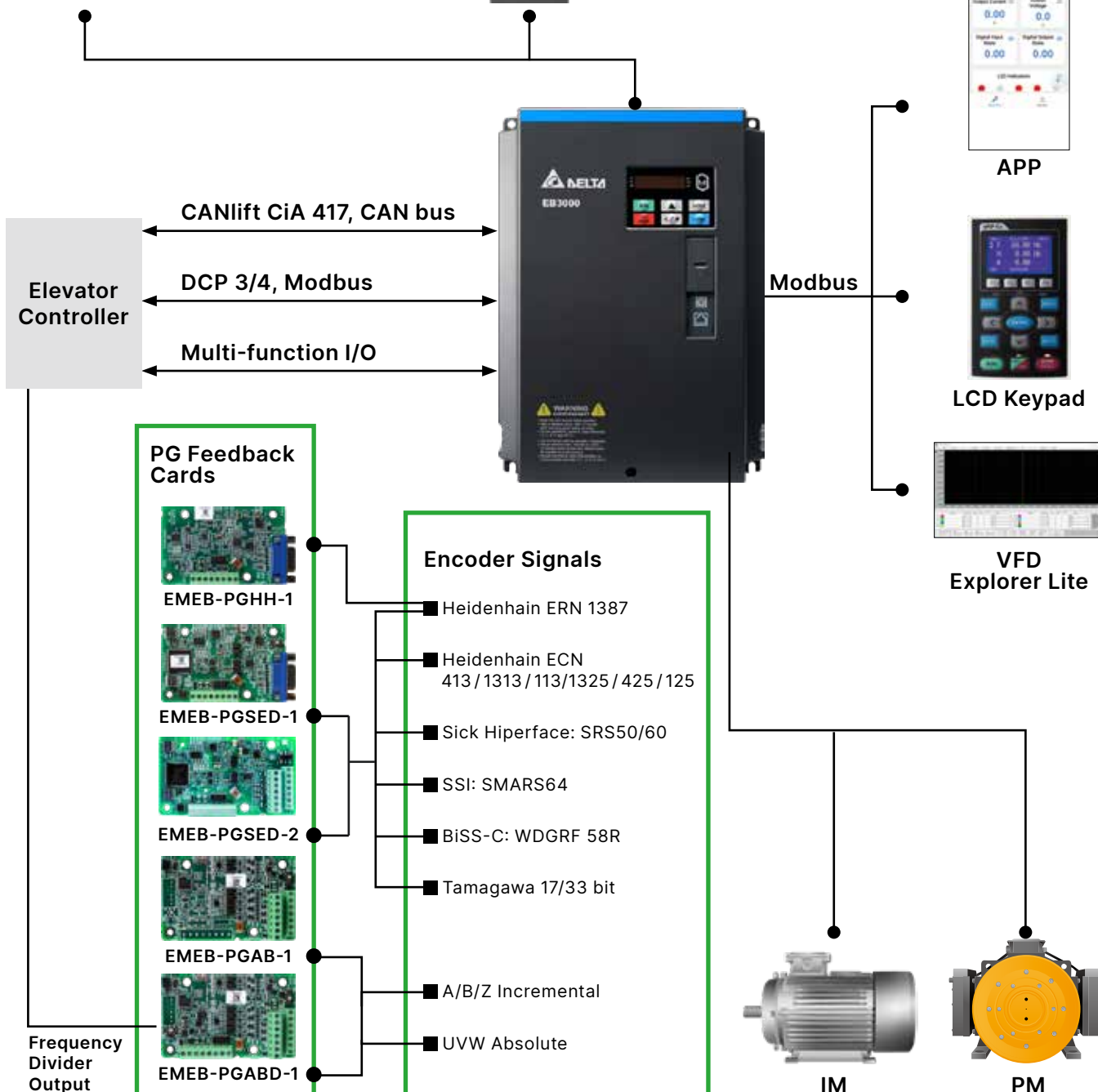
Active Front End AFE2000

- Regenerates Power
- Improves Power Factor
- Suppresses Harmonics



Power Regenerative Unit REG2000

- Regenerates Power



Product Specifications

230 V Series

Frame Size		A			
Model VFD----ED21--		022	022	037	037
		B	BE	B	BE
Applicable Motor Output (kW)		2.2		3.7	
Applicable Motor Output (HP)		3		5	
Output Rating	Rated Output Capacity (kVA)	4.2		6.9	
	Rated Output Current (A)	11		18	
	Maximum Output Voltage (V)	Proportional to input voltage			
	Output Frequency Range (Hz)	0.00 ~ 400			
	Carrier Frequency Range (kHz)	2 ~ 15			
	Rated Output Maximum Carrier Frequency (kHz)	10			
Input Rating	Input Current (A)	24.2		39.6	
	Rated Voltage / Frequency	single-phase			
		200~240 V 50 /60 Hz			
	Voltage Tolerance	-15 % ~ +10 % (170 ~ 264 V)			
Frequency Tolerance	± 5 % (47 ~ 63 Hz)				
Cooling Method		Fan Cooling			
EMC Filter (●=Build-in, X=Optional)		X	●	X	●
Weight (kg)		3.45	3.85	3.55	3.95

*BE has a built-in EMC Filter.

460 V Series

Frame Size		A						B			
Model VFD----ED43--		040	055	075	110	150	185				
		B	BE	B	BE	B	BE	B	BE	B	B
Applicable Motor Output (kW)		4	5.5	7.5	11	15	18.5				
Applicable Motor Output (HP)		5	7.5	10	15	20	25				
Output Rating	Rated Output Capacity (kVA)	7.6	11.4	14.1	20.6	25.1	29.7				
	Rated Output Current (A)	10	15	18.5	27	33	39				
	Maximum Output Voltage (V)	Proportional to input voltage									
	Output Frequency Range (Hz)	0.00 ~ 400									
	Carrier Frequency Range (kHz)	2 ~ 15									
	Rated Output Maximum Carrier Frequency (kHz)	10	8								
Input Rating	Input Current (A)	11	16.5	20.4	29.7	36.3	42.9				
	Rated Voltage / Frequency	Three-phase 380 ~ 480 V, 50/60Hz									
	Voltage Tolerance	-15 ~ +10 % (323 ~ 528 V)									
	Frequency Tolerance	± 5 % (47~63 Hz)									
Cooling Method		Fan cooling									
EMC Filter (●=Build-in, X=Optional)		X	●	X	●	X	●	X	●	X	●
Weight (kg)		3.45	3.9	3.65	4.1	3.75	4.15	5.65	6.2	5.7	6.3

*BE has a built-in EMC Filter.

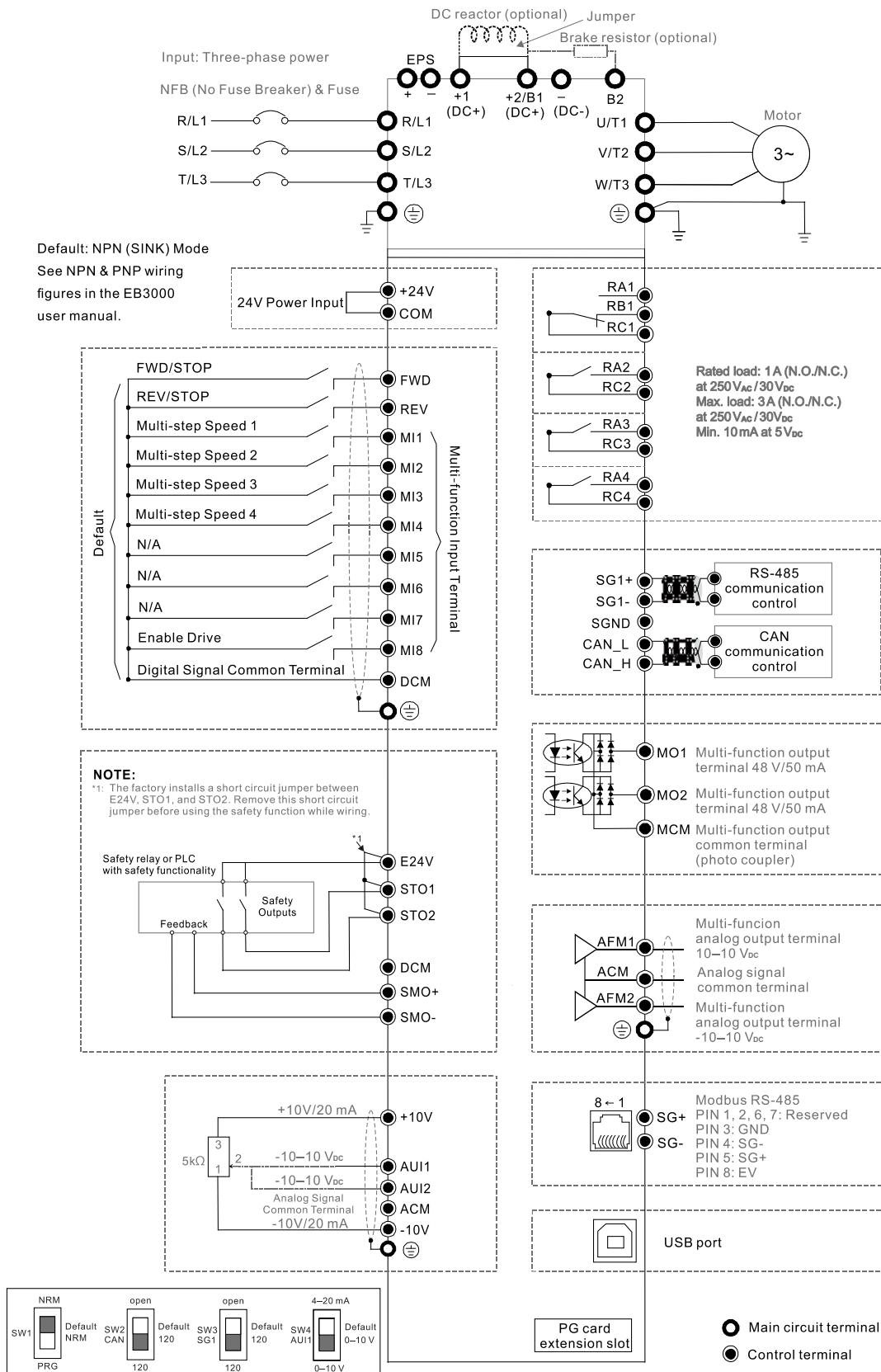
General Specifications

Control Characteristics	Control Method	V/F, SVC, FOC+PG, FOC+PM	
	Starting Torque	Reach up to 150 % or above at 0.5 Hz Under FOC+PG or FOC+PM mode, starting torque can reach 150 % at 0 Hz.	
	Speed Control Range	1:50 (up to 1:1000 when using PG card)	
	Speed Control Resolution	±0.5 % (up to ±0.02 % when using PG card)	
	Speed Response Capacity	5 Hz (Up to 30 Hz for Vector control)	
	Max. Output Frequency	0.00 to 400 Hz	
	Output Frequency Accuracy	Digital Command 0.005 %, Analog Command 0.5 %	
	Frequency Setting Resolution	Digital Command 0.01 Hz, Analog Command: 1/4096 (12 bit) of the maximum output frequency.	
	Torque Limit	Maximum is 200 % torque current	
	Accel./Decel. Time	0.00~600.00 seconds	
	V/F Curve	Adjustable V/F curve using 4 independent points and square curve.	
	Frequency Setting Signal	±10 V	
	Brake Torque	About 125 % while ED is 30 % (use optional brake resistor) Note: ED is "Executive Duty"	
Protection Characteristics	Motor Protection	Electronic thermal relay protection	
	Over-current Protection	The current is limited by 220 % of the drive's I_{rated} and the limit for over-current protection is 300 % of the drive's I_{rated} .	
	Ground Leakage Current Protection	More than 50 % of the drive's rated current	
	Overload Capacity	150 % 60 s, 200 % 3 s	
	Voltage Protection	Over-voltage level: [230 V model] $V_{DC} > 410 V$ [460 V model] $V_{DC} > 820 V$	Low-voltage level: [230 V model] $V_{DC} < 180 V$ [460 V model] $V_{DC} < 360 V$
	Over-voltage Protection for the Input Power	Varistor (MOV)	
	Over-temperature Protection	Built-in temperature sensor	
Certifications		CE, UL, TUV (STO SIL3), EN81-20, RoHS, EAC	

Control Terminals

Name	Quantity	Terminal
Digital input terminal (MI)	FWD × 1 REV × 1 MI × 8	1. FWD: Forward Run/Stop 2. REV: Reverse Run/Stop 3. MI1 ~ MI8 user-defined functions
Analog input terminal (AUI)	2 units	1. User-defined functions 2. Impedance: 20 kΩ 3. Range: -10 ~ 10 V _{DC} 4. AUI switch: AUI Switch (SW4), default setting is 0-10 V
Relay output terminal	4 units (Normally Open/ Normally Close)	Rated load: 1 A (N.O./N.C.) at 250V _{AC} /30 V _{DC} Max. load: 3 A (N.O./N.C.) at 250V _{AC} /30 V _{DC} Min. 10 mA at 5 V _{DC}
Digital Output terminal (MO)	2 units	1. User-defined function 2. Maximum 48 V _{DC} 50 mA
Analog output terminal (AFM)	2 units	1. User-defined functions 2. Max.load: 5 kΩ ; Output current: Max. 2 mA 3. Resolution: 0 ~ 10 V _{DC} , corresponds to the maximum operating frequency 4. Range: 0 ~ 10 V _{DC} , -10 ~ 10 V _{DC}
Safety Torque Off (STO) terminal	2 units	1. Power cutoff safety function for EN954-1 and IEC/EN61508 2. Default is short-circuited (E24 V/STO1/STO2) 3. When STO1-E24 V and STO2-E24 V are ON, the activation current is 3.3 mA ≥ 15 V _{DC}
Serial communication ports	1 unit	SG1 Switch (SW3): terminator 120 Ω (default) / open
CAN communication ports	1 unit	CAN Switch (SW2): terminator 120 Ω (default) / open
USB port	1 unit	Programming / host computer controlling
RJ45 port	1 unit	Connect to Keypad or Bluetooth Dongle
SD card slot	1 unit	Micro SD: memory capacity < = 2 TB

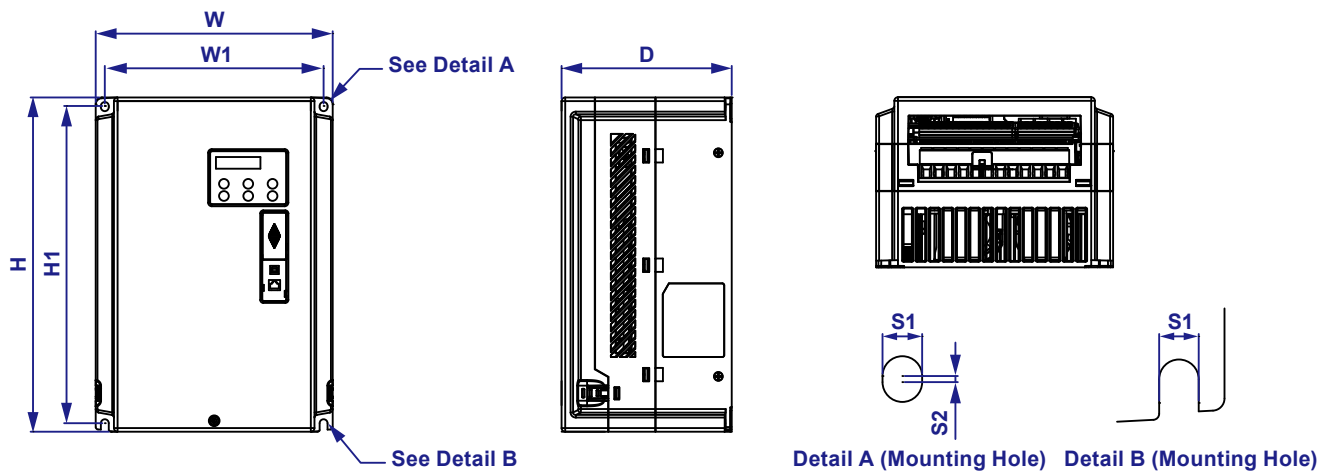
Wiring



Dimensions

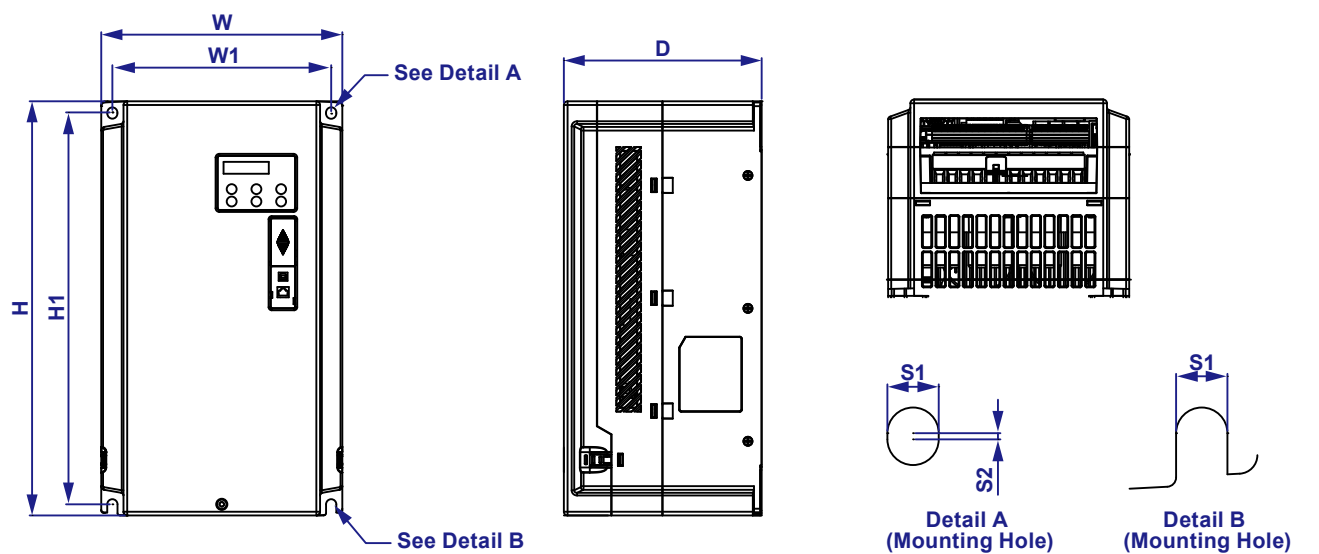
Frame A

VFD022ED21B, VFD040ED43B, VFD075ED43B,
VFD022ED21BE, VFD040ED43BE, VFD075ED43BE
VFD037ED21B, VFD055ED43B,
VFD037ED21BE, VFD055ED43BE,



Frame B

VFD110ED43B, VFD150ED43B, VFD185ED43B
VFD110ED43BE, VFD150ED43BE,



Accessories

EMEB-PGAB-1	Terminals	Descriptions
	T B 1	VP Power output of encoder * ¹ Voltage: +5 V ± 0.5 V or +12 V ± 1 V Current: Max. 200 mA
		0V Common power terminal of encoder
		A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$ Incremental encoder signal input (line driver, voltage, push-pull, open collector) * ² Maximum input frequency: 150 kHz
		U, $\bar{U}$, V, $\bar{V}$, W, $\bar{W}$ Absolute encoder signal input (line driver, voltage, push-pull, open collector) * ² Maximum input frequency: 150 kHz
		SW1 Switch between encoder power 5 V/12 V
		SW2 Switch between OPEN-C/LINE-D

Note 1: Use SW1 to set up output Voltage

Note 2: Different input signal needs a different wiring method. See user manual for wiring diagrams

EMEB-PGABD-1	Terminals	Descriptions
	T B 1	Vin Port for voltage input, to adjust the amplitude of output voltage at terminal A/O and B/O. It is converted into 5 V voltage for linear drive output signal Vin range: 8 ~ 24 V Max: 24 V
		A/O, B/O Output signal of the push-pull frequency divider Factory setting: Output amplitude is about +24 V. Use SW2 to cut off the internal default power Input required power (i.e. output voltage amplitude) Max. output frequency: 100 kHz Frequency dividing range: 1 ~ 255
		GND Common ground terminal connecting to the host controller and the motor drive
		AO, /AO, BO, /BO Line driver pulse output signal RS-422 Maximum output frequency: 150 kHz Frequency dividing range: 1 ~ 255
		SW3 Internal/External power switch for frequency divided output
		VP Power output of encoder * ¹ Voltage: +5 V ± 0.5 V or +12 V ± 1 V Current: Max. 200 mA
	T B 2	0V Common power terminal of encoder
		A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$ Incremental encoder signal input (line driver, voltage, push-pull, open collector) * ² Maximum input frequency: 150 kHz
		U, $\bar{U}$, V, $\bar{V}$, W, $\bar{W}$ Absolute encoder signal input (line driver, voltage, push-pull, open collector)* ² Maximum input frequency: 150 kHz
		SW1 Switch between encoder power 5 V/12 V
		SW2 Switch between OPEN-C/LINE-D

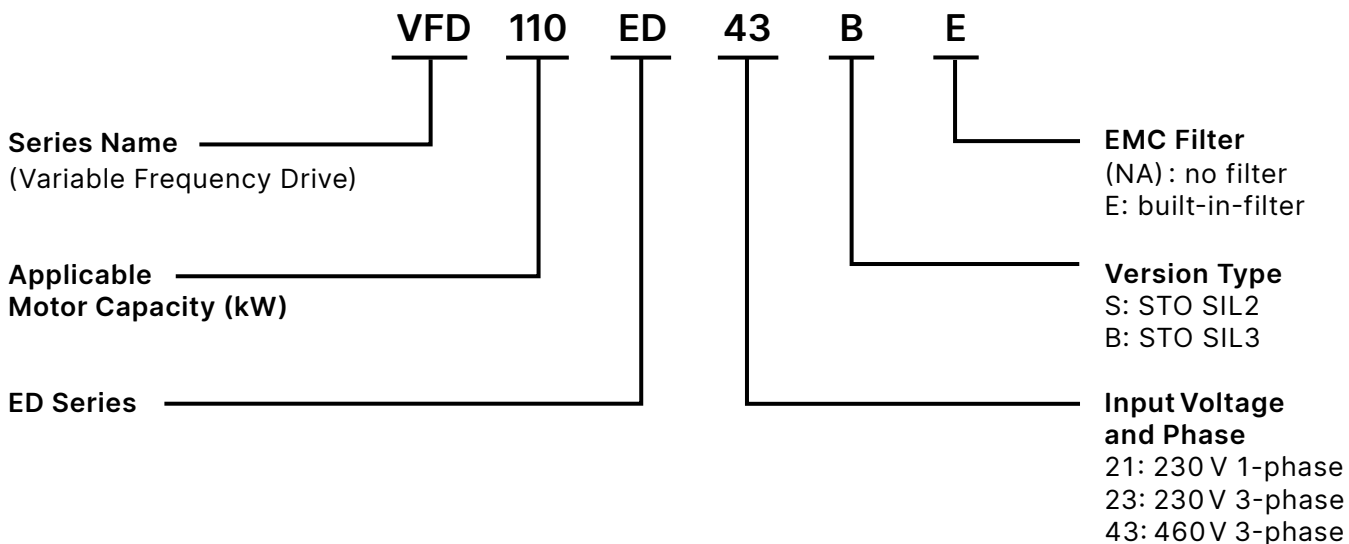
Note 1: Use SW1 to set up output voltage

Note 2: Different input signal needs a different wiring method. See user manual for wiring diagrams

EMEB-PGHH-1	Terminals	Descriptions
	Vin	No function
	A/O, B/O	Open Collector Pulse Output Signal Max. output frequency: 100kHz
	GND	Power source common for encoder
	AO, /AO, BO, /BO	Output signal for the Line Driver Signal RS422 Max. output frequency: 100kHz
	D-SUB Connector (J2)	Support encoder signal: SinCos: Heidenhain ERN1387

EMEB-PGSED-□	Terminals	Descriptions
 	Vin	No function
	A/O, B/O	Open Collector Pulse Output Signal Max. output frequency: 100kHz Frequency Resolution: $1 \sim 2^{11}$
	GND	Common ground terminal connecting to the host controller and the motor drive
	AO, /AO, BO, /BO	Output signal for the line driver frequency division. Line Driver RS422 Maximum output frequency: 100kHz Frequency Resolution: $1 \sim 2^{11}$
	D-SUB Connector (J2)	Support encoder type: - SinCos: Heidenhain ERN1387 - EnDat2.1/2.2: Heidenhain ECN1313/ECN413/ECN113/ ECN1325/ECN425/ECN125 - SICK HIPERFACE: SRS50/60 - BiSS-C - SSI
	SW1	Switch between encoder power $5V_{DC}/8V_{DC}$

Model Name



Ordering Information

EB3000 Models		Description	Frame
230 V	VFD022ED21B	One-phase 230 V / 2.2 kW	A
	VFD022ED21BE	One-phase 230 V / 2.2kW / built-in EMC filter	
	VFD037ED21B	One-phase 230 V / 3.7 kW	
	VFD037ED21BE	One-phase 230 V / 3.7 kW built-in EMC filter	
460 V	VFD040ED43B	Three-phase 460 V / 4.0 kW	
	VFD040ED43BE	Three-phase 460 V / 4.0kW / built-in EMC filter	
	VFD055ED43B	Three-phase 460 V / 5.5 kW	
	VFD055ED43BE	Three-phase 460 V / 5.5kW / built-in EMC filter	
	VFD075ED43B	Three-phase 460 V / 7.5 kW	
	VFD075ED43BE	Three-phase 460 V / 7.5kW / built-in EMC filter	
	VFD110ED43B	Three-phase 460 V / 11.0 kW	B
	VFD110ED43BE	Three-phase 460 V / 11.0 kW / built-in EMC filter	
	VFD150ED43B	Three-phase 460 V / 15.0 kW	
	VFD150ED43BE	Three-phase 460 V / 15.0 kW / built-in EMC filter	
	VFD185ED43B	Three-phase 460 V / 18.5 kW	

Accessories	Description
EMEB-PGHH-1	PG Card, supports SinCos Encoder (Heidenhain ERN1387)
EMEB-PGAB-1	PG Card, supports A/B/A and U/V/W absolute encoder
EMEB-PGABD-1	PG Card, supports A/B/A and U/V/W absolute encoder with frequency divider
EMEB-PGSED-1 (D-sub) EMEB-PGSED-2 (Terminal)	PG Card, supports SIN/COS (Heidenhain ERN1387), EnDat2.1/01/21(Heidenhain ECN413, ECN1313), SICK HIPERFACE (SRS50, SRS60), EnDat2.2/01/21/02/22 (ECN113, ECN1325, ECN425, ECN125). SSI (SMRS64), BiSS-C (WDGF 58R)
KPC-CC01	Digital control keypad with High illuminated LCD display. Support RS-485, Languages: English/Traditional Chinese
VFD-BT01	Bluetooth Dongle, supports RS-485



Smarter. Greener. Together.

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