Automation for a Changing World

Delta Sensorless Vector Control Compact Drive VFD-EL Series

www.deltaww.com

DELTA

Smarter. Greener. Together.

Features

Standard MODBUS Protocol

Standard MODBUS protocol via RS-485

Built-in EMC Filter
(230 V 1-phase and 460 V 3-phase)

The built-in EMC filter reduces electromagnetic interference and complies with the EN61800-3 standard

Compact Design

Space saving and easy DIN rail mounting with optional DIN rail adapter (Built-in for Frame B)

Optional Fieldbus Modules

Provide connection to a variety of networks, including PROFIBUS, DeviceNet and CANopen

RFI Switch for IT Mains

Removable "Y" capacitor to use with IT mains supplies

Easy DC Bus Sharing

Multiple VFD-EL can be connected in parallel to share the regenerative braking energy. This prevents over-voltage and stabilizes DC bus voltage.

*This function is not supported by the 115V model.

Complete Protection Functions

High precision current detection, full overload protection (oL, oL1 and oL2), overvoltage/ overcurrent stall prevention, short-circuit protection, reset after fault, speed search function and motor overheat protection by PTC

Power Range

1-phase 115 V series: 0.2 ~ 0.75 kW (0.25 ~ 1 hp)
1-phase 230 V series: 0.2 ~ 2.2 kW (0.25 ~ 3 hp)
3-phase 230 V series: 0.2 ~ 3.7 kW (0.25 ~ 5 hp)
3-phase 460 V series: 0.4 ~ 3.7 kW (0.50 ~ 5 hp)

Side-by-side Installation (40 °C)

High-efficiency cooling and flexible spacing

Easy Maintenance

Removable cooling fan for easy maintenance

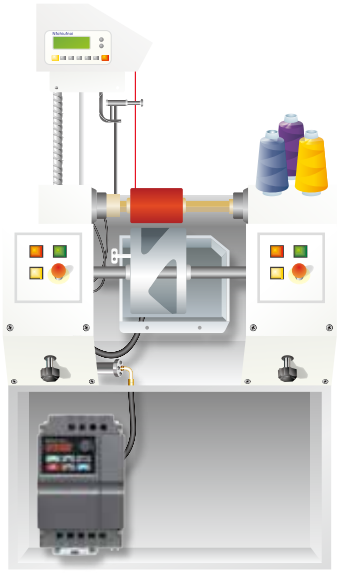
Applications

Conveyor Belts

1. Multi-step speed application: provides multi-step speed settings to meet the needs of a conveyor belt
2. Side-by-side installation to save space
3. DC bus sharing: connects multiple drives in parallel to share the regenerative energy and prevent overvoltage

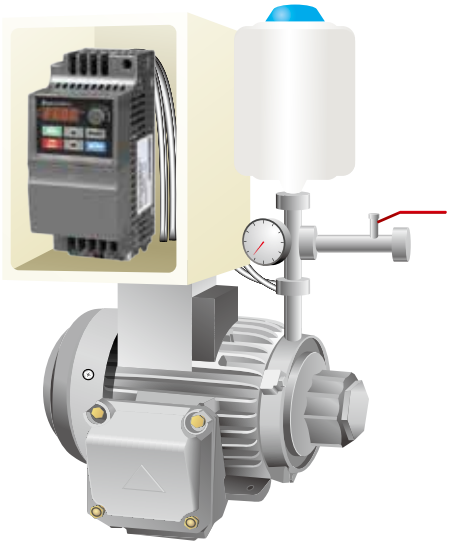
Winders

With auto acceleration/deceleration the rapid start/ stop increases productivity and speed

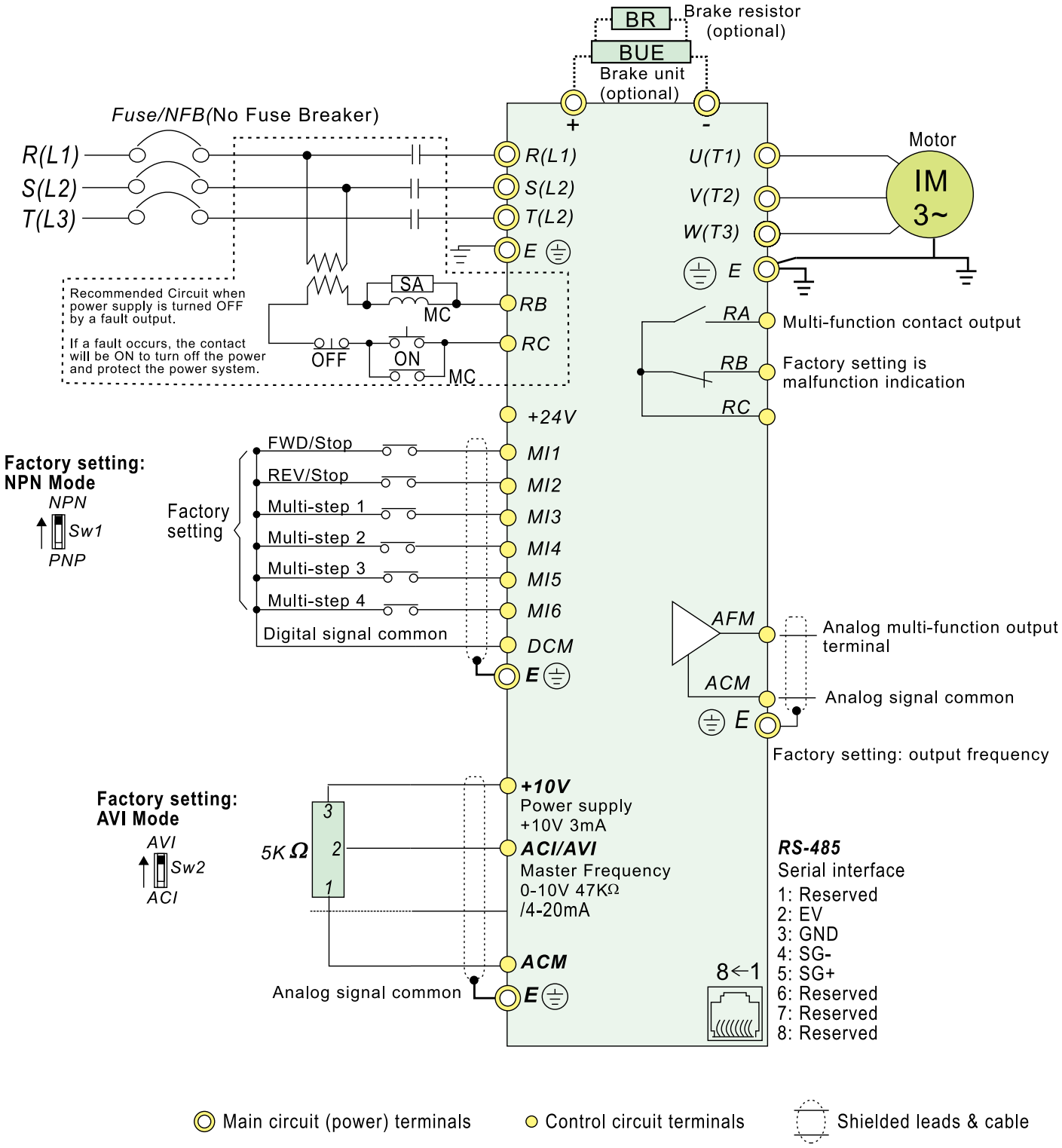


Constant Pressure Control of Water Pumps

1. Built-in smart PID controller saves the cost of a specified external PID meter
2. Built-in auto detection of water suspension and auto power-on saves the cost of external PLC controller and relay
3. A wide range of input voltages are available, including 1-phase 110 V / 230 V and 3-phase 230 V / 460 V, for various pump applications and different countries



Standard Wiring Diagram

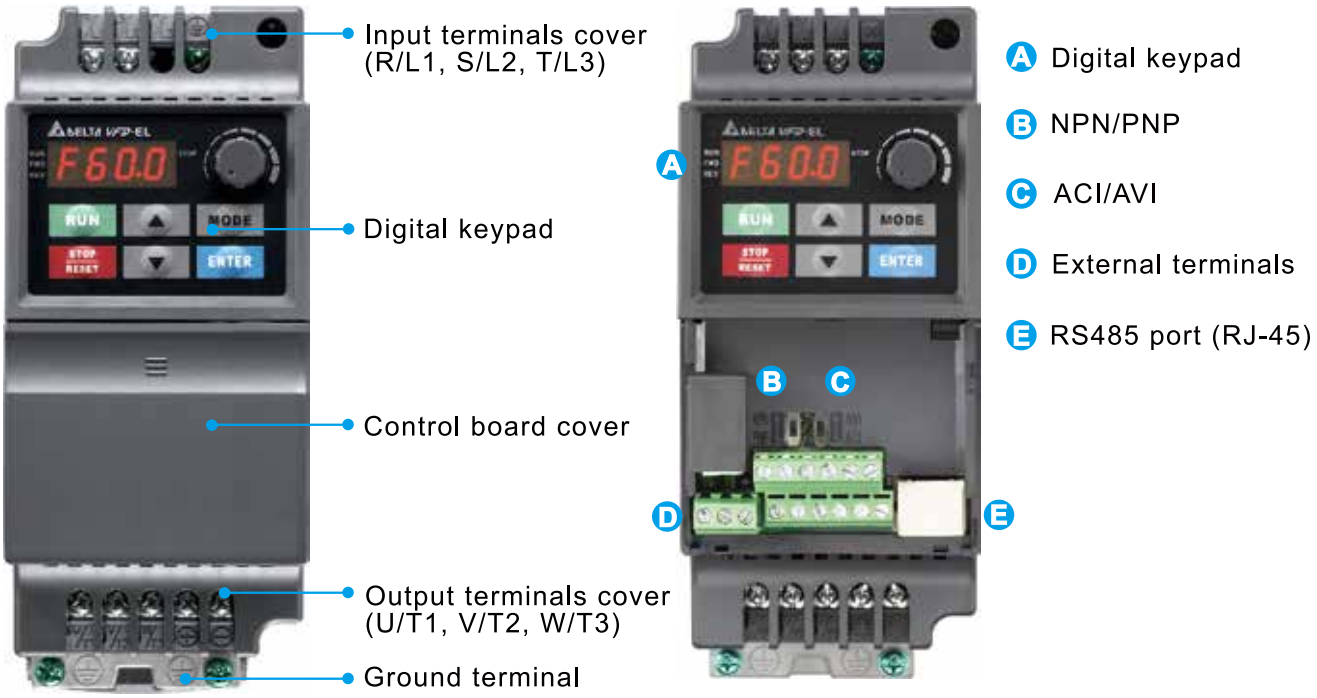


NOTE

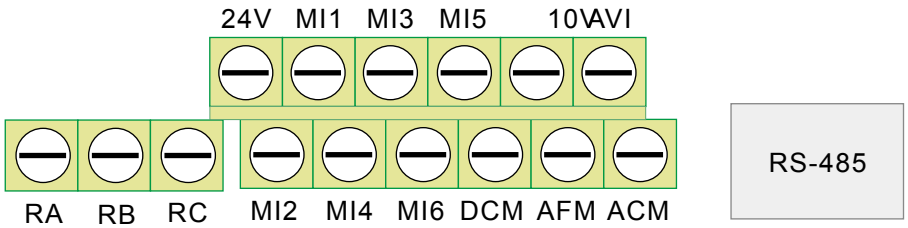
It is recommended to install a circuit breaker at the control terminal to protect the circuit from an operation abnormality or sudden power outage.

The protection circuit uses the multi-function output terminal of the AC motor drive for connection. When an abnormal condition (closed contact) occurs, the external power supply is disconnected to protect the power system of the AC motor drive.

External Parts



Control Terminals



Model Explanation

VFD 007 EL 23 A

Product
(Variable Frequency Drive)

Applicable Motor Capacity
002: 0.25 HP(0.2 kW) 015: 2 HP(1.5 kW)
004: 0.5 HP(0.4 kW) 022: 3 HP(2.2 kW)
007: 1 HP(0.75 kW) 037: 5 HP(3.7 kW)

EL Series

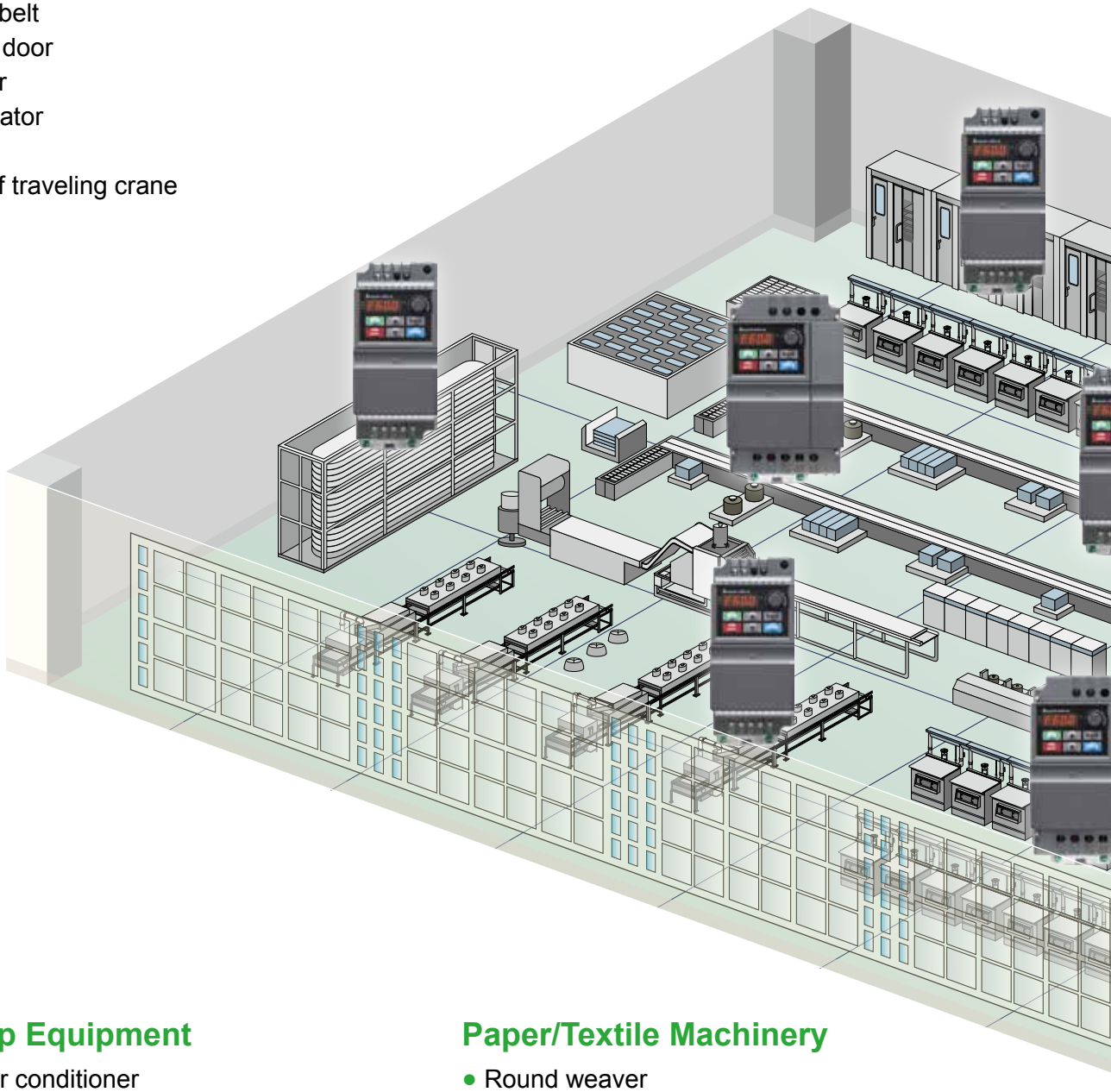
Mains Input Voltage
11: 115 V 1-Phase 23: 230 V 3-Phase
21: 230 V 1-Phase 43: 460 V 3-Phase

Version
A: Standard drive

Application Fields

Conveyor and Transportation Machinery

- Conveyor belt
- Automatic door
- Roller door
- Small elevator
- Escalator
- X-Y axis of traveling crane



Fan/Pump Equipment

- Building air conditioner
- Wastewater processing system
- Constant pressure water treatment system
- Water treatment pump
- Agricultural pump
- Temperature control of middle/large oven
- Air compressor
- Heat exchange fan
- Building water dispenser system
- Dryer's windmill

Paper/Textile Machinery

- Round weaver
- Cross weaver
- Ribbon weaver
- Printing press
- Industrial sewing machine
- Knitting machine

Food Processing

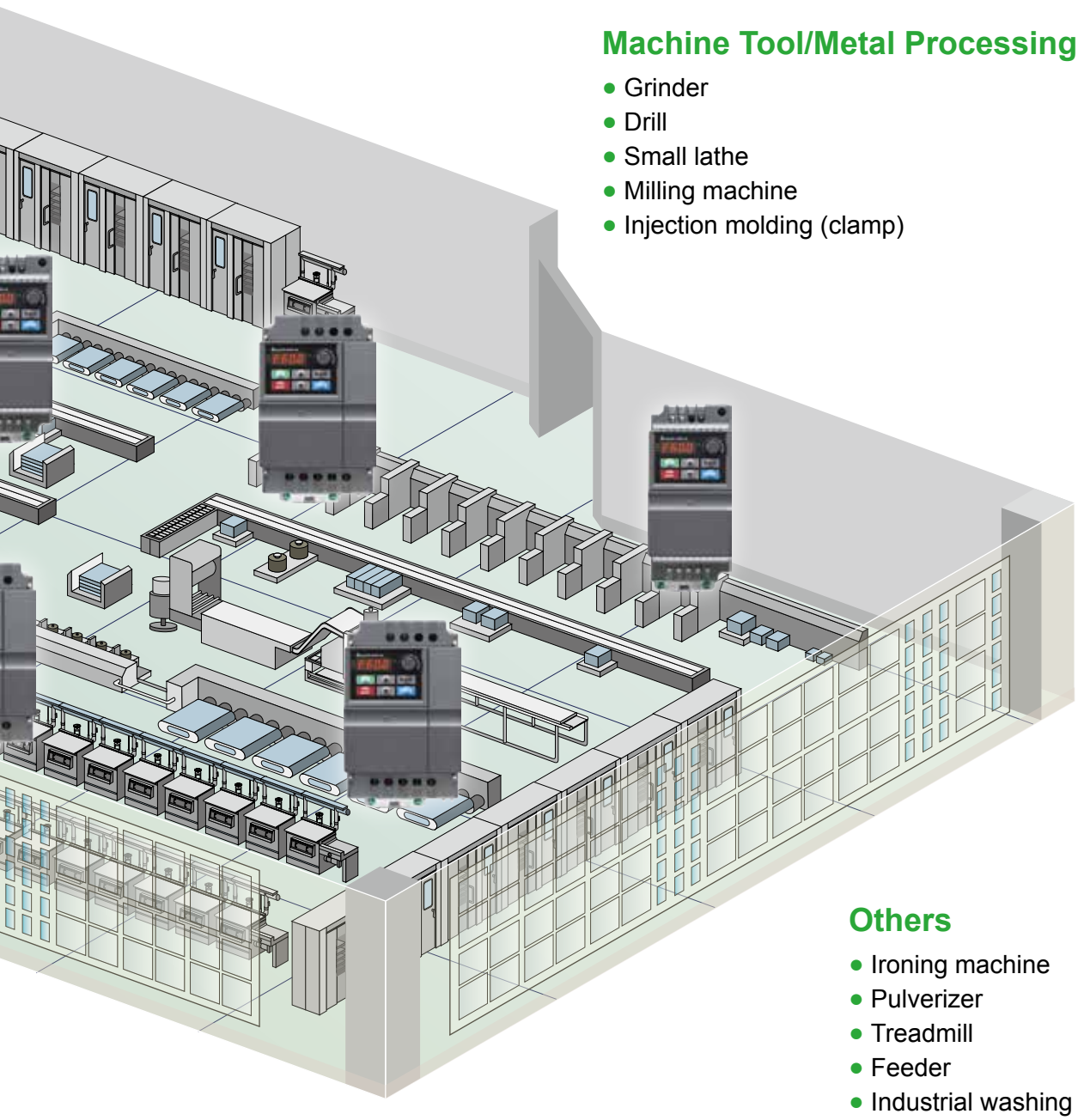
- Dumpling maker
- Food stirrer
- Noodle maker

Wood Working Machinery

- 4 side planer
- Wood carver
- Wood working machine
- Simple cutting machine for wood working
- Spraying machine

Machine Tool/Metal Processing Machinery

- Grinder
- Drill
- Small lathe
- Milling machine
- Injection molding (clamp)



Others

- Ironing machine
- Pulverizer
- Treadmill
- Feeder
- Industrial washing machine
- Car washing machine
- Packing machine
- Centrifuge
- Liquid mixer

Specifications

115V	Voltage Class		115V					
	Model Number VFD-___ EL		002		004		007	
	Max. Applicable Motor Output (kW)		0.2		0.4		0.75	
	Max. Applicable Motor Output (Hp)		0.25		0.5		1.0	
Output Rating	Rated Output Capacity (kVA)		0.6		1.0		1.6	
	Rated Output Current (A)		1.6		2.5		4.2	
	Maximum Output Voltage (V)		3-phase proportional to twice the input voltage					
	Output Frequency (Hz)		0.1~599Hz					
	Carrier Frequency (kHz)		2-12					
Input Rating	Rated Input Current (A)		Single-phase					
			6.4		9		18	
	Rated Voltage/Frequency		Single phase 100-120V, 50/60Hz					
	Voltage Tolerance		±10% (90-132V)					
	Frequency Tolerance		±5% (47-63Hz)					
	Cooling Method		Natural cooling				Fan cooling	
	Weight (kg)		1.1		1.1		1.4	

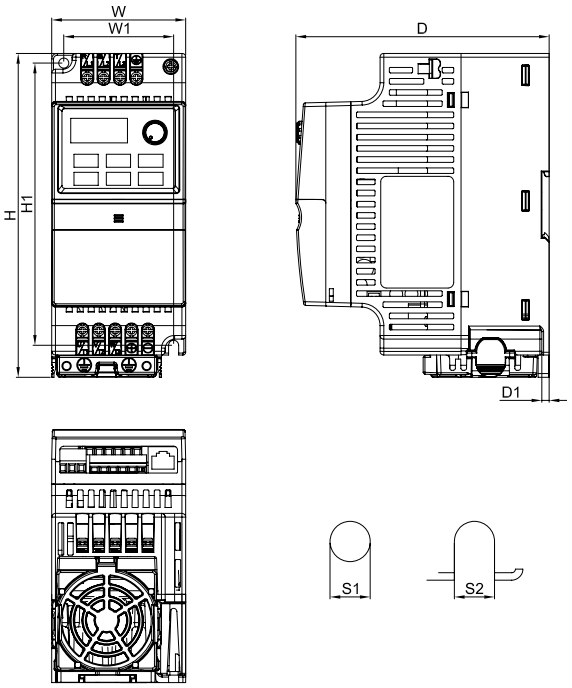
230V	Voltage Class		230V					
	Model Number VFD-___ EL		002	004	007	015	022	037
	Max. Applicable Motor Output (kW)		0.2	0.4	0.75	1.5	2.2	3.7
	Max. Applicable Motor Output (Hp)		0.25	0.5	1.0	2.0	3.0	5.0
Output Rating	Rated Output Capacity (kVA)		0.6	1.0	1.6	2.9	4.2	6.5
	Rated Output Current (A)		1.6	2.5	4.2	7.5	11.0	17.0
	Maximum Output Voltage (V)		3-Phase Proportional to Input Voltage					
	Output Frequency (Hz)		0.1~599Hz					
	Carrier Frequency (kHz)		2-12					
Input Rating	XXXE L21A	Rated Input Current (A)	4.9	6.5	9.5	15.7	24	--
		Rated Voltage/Frequency	1-phase, 200-240V, 50/60Hz					
	XXXE L23A	Rated Input Current (A)	1.9	2.7	4.9	9	15	20.6
		Rated Voltage/Frequency	Single phase/3-phase, 200-240V, 50/60Hz					3-phase, 200-240V, 50/60Hz
	Voltage Tolerance		±10% (180-264V)					
	Frequency Tolerance		±5% (47-63Hz)					
	Cooling Method		Natural cooling		Fan cooling			
	Weight (kg)		1.2	1.2	1.2	1.7	1.7	1.7

460V	Voltage Class		460V				
	Model Number VFD-___ EL		004	007	015	022	037
	Max. Applicable Motor Output (kW)		0.4	0.75	1.5	2.2	3.7
	Max. Applicable Motor Output (hp)		0.5	1.0	2.0	3.0	5.0
Output Rating	Rated Output Capacity (kVA)		1.2	2.0	3.3	4.4	6.8
	Rated Output Current (A)		1.5	2.5	4.2	5.5	8.2
	Maximum Output Voltage (V)		3-phase proportional to input voltage				
	Output Frequency (Hz)		0.1~599 Hz				
	Carrier Frequency (kHz)		2-12				
Input Rating	Rated Input Current (A)		3-phase				
			1.8	3.2	4.3	7.1	9.0
	Rated Voltage/Frequency		3-phase, 380-480V, 50/60Hz				
	Voltage Tolerance		±10% (342~528V)				
	Frequency Tolerance		±5% (47~63Hz)				
	Cooling Method		Natural cooling		Fan cooling		
	Weight (kg)		1.2	1.2	1.2	1.7	1.7

Control Characteristics	Control System		SPWM (Sinusoidal Pulse Width Modulation) control (V/F control)
	Frequency Setting Resolution		0.01 Hz
	Output Frequency Resolution		0.01 Hz
	Torque Characteristics		Including the auto-torque/auto-slip compensation; starting torque can be 150% at 5.0Hz
	Overload Endurance		150% of rated current for 1 minute
	Skip Frequency		Three zones, setting range 0.1 - 599 Hz
	Accel/Decel Time		0.1 to 600 seconds (2 Independent settings for Accel/Decel time)
	Stall Prevention Level		Setting 20 to 250% of rated current
	DC Braking		Operation frequency 0.1 - 599.0 Hz, output 0-100% rated current Start time 0-60 seconds, stop time 0-60 seconds
	Regenerated Braking Torque		Approx. 20% (up to 125% possible with optional brake resistor or externally mounted brake unit, 1-15hp (0.75-11 kW) models have brake chopper built-in)
	V/F Pattem		Adjustable V/F pattern
Operating Characteristics	Frequency Setting	Keypad	Setting by ▲▼
		External Signal	Potentiometer 5 k / 0.5 W, 0 to +10 V_{DC}, 4 to 20 mA, RS-485 interface; Multi-function Inputs 3 to 6 (15 steps, Jog, up/down)
	Operation Setting Signal	Keypad	Set by RUN and STOP
		External Signal	2 wires / 3 wires (MI1, MI2, MI3), JOG operation, RS-485 serial interface (MODBUS)
	Multi-function Input Signal		Multi-step selection 0 to 15, Jog, accel / decel inhibit, 2 accel / decel switches, counter, external Base Block, ACI / AVI selections, driver reset, UP / DOWN key settings, NPN / PNP input selection
	Multi-function Output Indication		AC drive operating, frequency attained, counter attained, zero speed, Base Block, fault indication, overheat alarm, emergency stop and status selections of input terminals
	Analog Output Signal		Output frequency / current
	Alarm Output Contact		Contact will be ON when drive malfunctions (1 Form C / change-over contact or 1 open collector output)
	Operation Functions		AVR, accel / decel S-Curve, overvoltage / overcurrent stall prevention, 5 fault records, reverse inhibition, momentary power loss restart, DC braking, auto torque / slip compensation, adjustable carrier frequency, output frequency limits, parameter lock / reset, PID control, external counter, MODBUS communication, abnormal reset, abnormal re-start, power-saving, fan control, sleep/wake frequency, 1st / 2nd frequency source selections, 1st / 2nd frequency source combination, NPN / PNP selection
	Protection Functions		Over voltage, over current, under voltage, external fault, overload, ground fault, overheating, electronic thermal, IGBT short circuit, PTC
	Display Keypad		6-key, 7-segment LED with 4-digit, 4 status LEDs, master frequency, output frequency, output current, custom units, parameter values for setup and lock, faults, RUN, STOP, RESET, FWD / REV
	Built-in EMC Filter		For 230 V 1-phase and 460 V 3-phase models
Environmental Conditions	Enclosure Rating		IP20
	Pollution Degree		2
	Installation Location		Altitude 1,000 m or lower, keep from corrosive gasses, liquid and dust
	Ambient Temperature		-10 °C to + 50 °C (40 °C for side-by-side mounting) Non-Condensing and not frozen
	Storage/ Transportation Temperature		-20 °C to 60 °C
	Ambient Humidity		Below 90% RH (non-condensing)
	Vibration		9.80665 m/s^2 (1G) less than 20 Hz, 5.88 m/s (0.6 G) at 20 to 50 Hz
	Certifications		

Dimensions

Frame A



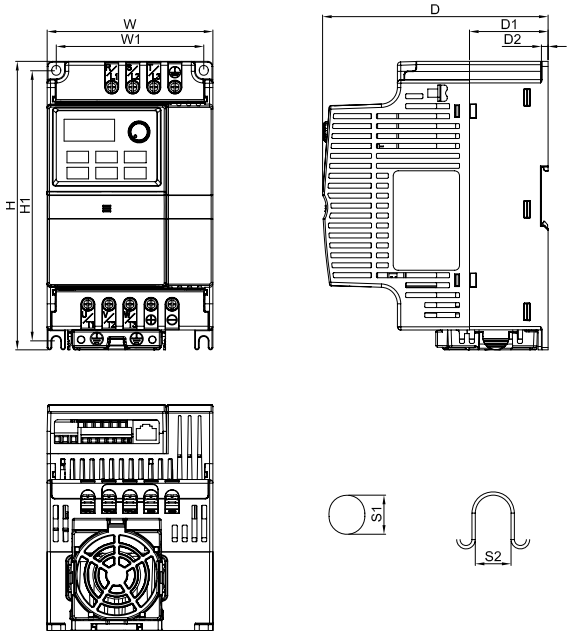
MODEL

VFD002EL11A
VFD002EL21A
VFD002EL23A
VFD004EL11A
VFD004EL21A
VFD004EL23A
VDF004EL43A
VFD007EL21A
VDF007EL23A
VDF007EL43A
VDF015EL23A
VFD015EL43A

Unit: mm[inch]

Frame		W	H	D	W1	H1	D1	S1	S2
A	mm	72.0	174.0	136.0	59.0	151.6	4.0	5.4	5.4
	inch	2.83	6.86	5.36	2.32	5.97	0.16	0.21	0.21

Frame B



MODEL

VFD007EL11A
VFD015EL21A
VFD022EL21A
VDF022EL23A
VFD022EL43A
VDF037EL23A
VFD037EL43A

Unit: mm[inch]

Frame		W	H	D	W1	H1	D1	D2	S1	S2
B	mm	100.0	174.0	136.0	89.0	162.9	47.4	4.0	5.9	5.4
	inch	3.94	6.85	5.36	3.50	6.42	1.87	0.16	0.23	0.21

Accessories

Fieldbus Modules

- **DeviceNet**
  CME-DN01

- **PROFIBUS**
  CME-PD01

- **CANopen**
  CME-COP01

Others

- **Brake unit**
  BUE-20015 BUE-40015
  BUE-20037 BUE-40037

- **Keypad for communication**
  VFD-PU06

- **DIN Rail (Width 35mm)**
  MKEL-DRA (For frame A Optional) MKEL-DRB (For frame B Built-in)

- **Brake resistor**

- **Zero phase reactor**
  RF220X00A

- **Grounding plate**
  MKE-EP

Ordering Information

Frame Size		Power Range	Models
Frame A		115 V: 0.2 kW ~ 0.4 kW 230 V: 0.2 kW ~ 1.5 kW 460 V: 0.4 kW ~ 1.5 kW	VFD002EL 11A / 21A / 23A VFD004EL 11A / 21A / 23A / 43A VFD007EL 21A / 23A / 43A VFD015EL 23A / 43A
Frame B		115 V: 0.75 kW 230 V: 1.5 kW ~ 3.7 kW 460 V: 2.2 kW ~ 3.7 kW	VFD007EL11A VFD015EL 21A VFD022EL 21A / 23A / 43A VFD037EL 23A / 43A

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