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



VFD-E

High Performance / Flexible Extension /
Micro Type AC Motor Drive



www.delta.com.tw/industrialautomation



Features

• Modular Design

Modular structure and extension with optional cards

• Standard MODBUS Protocol

Standard MODBUS Protocol via RS-485

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

To reduce electromagnetic interference efficiently

• Compact Design

Space saving and easy DIN rail mounting with optional DIN rail adapter

• Optional Fieldbus Modules

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

• Flexible Extension

Via optional cards, such as I/O card, Relay card, PG (Encoder) card and USB card, to meet your application requirements



• RFI-Switch for IT Mains

Removable "Y" capacitor to use with IT mains supplies.



• Easy DC BUS Sharing

Multiple VFD-E can be connected in parallel to share the regenerative braking energy. In this way, over-voltage is prevented and the DC-bus voltage stabilized.

• Complete Protection Function

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

• Removable Keypad

The standard keypad acts as status monitor. More functions, including parameter modification, RUN/STOP, speed change, and status display, via optional keypad

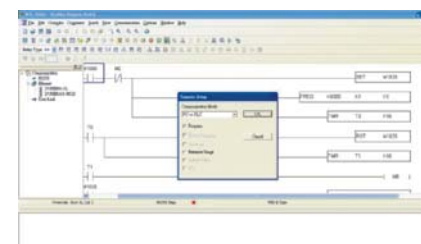


• Power Range

1-phase 115V series: 0.2~0.75kW (0.25~1hp)
1-phase 230V series: 0.2~2.2kW (0.25~3hp)
3-phase 230V series: 0.2~7.5kW (0.25~20hp)
3-phase 460V series: 0.4~22kW (0.50~30hp)

• Built-in PLC Function

Easy to write PLC program without additional PLC



• Side-by-side Installation(40°C)

High-efficiency cooling and flexible space



• Easy Maintenance

Removable cooling fan for easy maintenance



Application Cases

• Vacuum compressor

It reduces the large load of instant vacuum with VFD-E outstanding overload capacity.



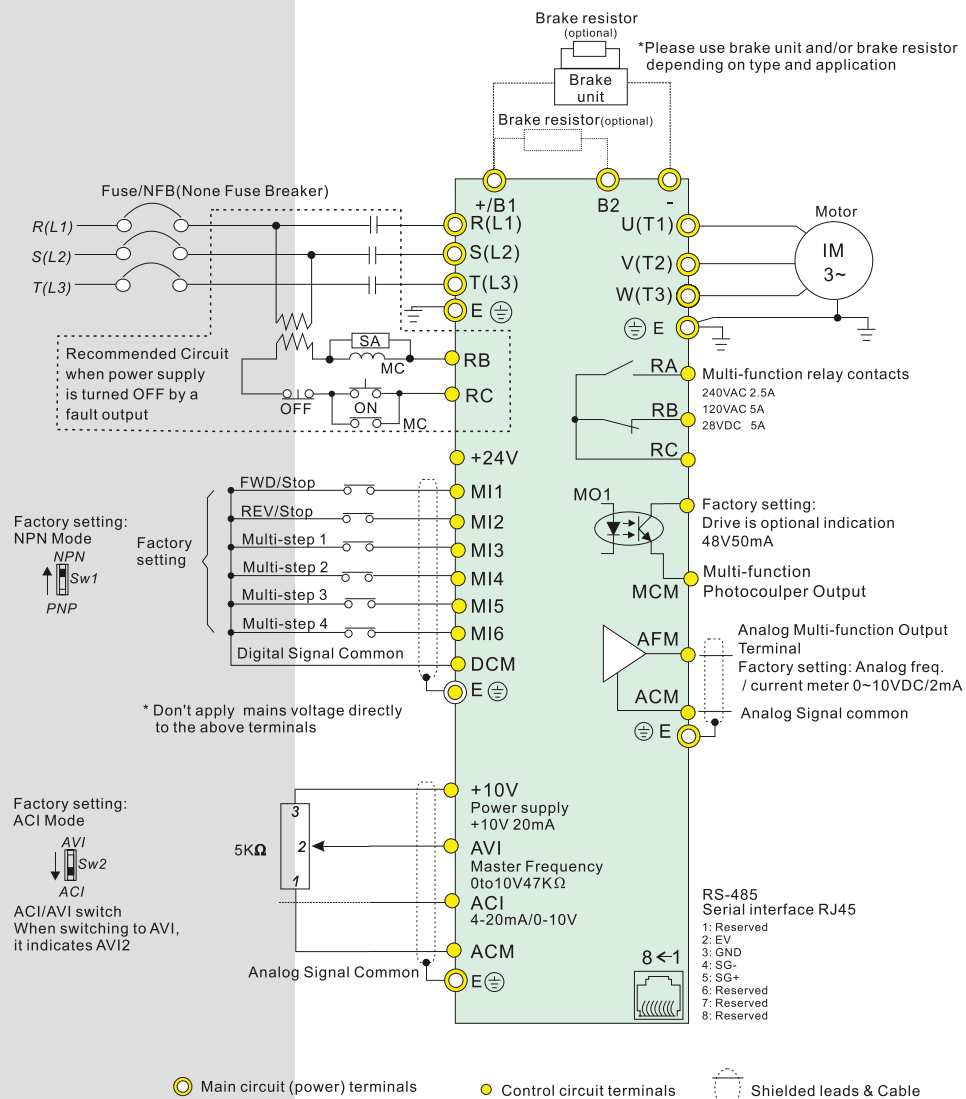
• Escalator

It not only saves energy with built-in PLC function and multi-step speed but also eliminates cost of external controller.

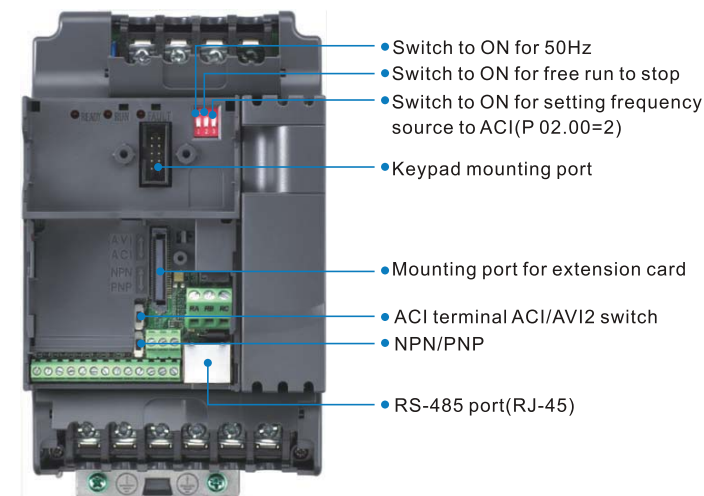




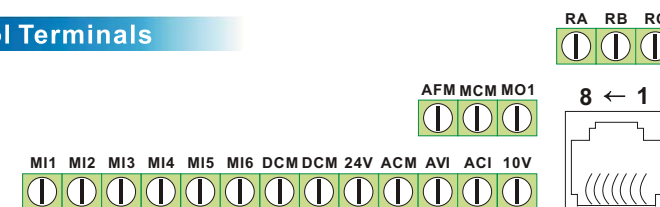
Standard Wiring Diagram



External Parts



Control Terminals



Model Explanation

VFD	007	E	23	A
Version Type				
A: Standard drive P: Cold plate drive (frame A only)				
C: CANopen T: Frame A, built-in brake chopper				
Mains Input Voltage				
11: 115V 1-Phase 23: 230V 3-Phase				
21: 230V 1-Phase 43: 460V 3-Phase				
E Series				
Applicable motor capacity				
002: 0.25HP(0.2kW) 015: 2HP(1.5kW) 055: 7.5HP(5.5kW) 150: 20HP(15kW)				
004: 0.5HP(0.4kW) 022: 3HP(2.2kW) 075: 10HP(7.5kW) 185: 25HP(18.5kW)				
007: 1HP(0.75kW) 037: 5HP(3.7kW) 110: 15HP(11kW) 220: 30HP(22kW)				

Application Fields

Conveyor and Transportation Machinery

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

Food Processing

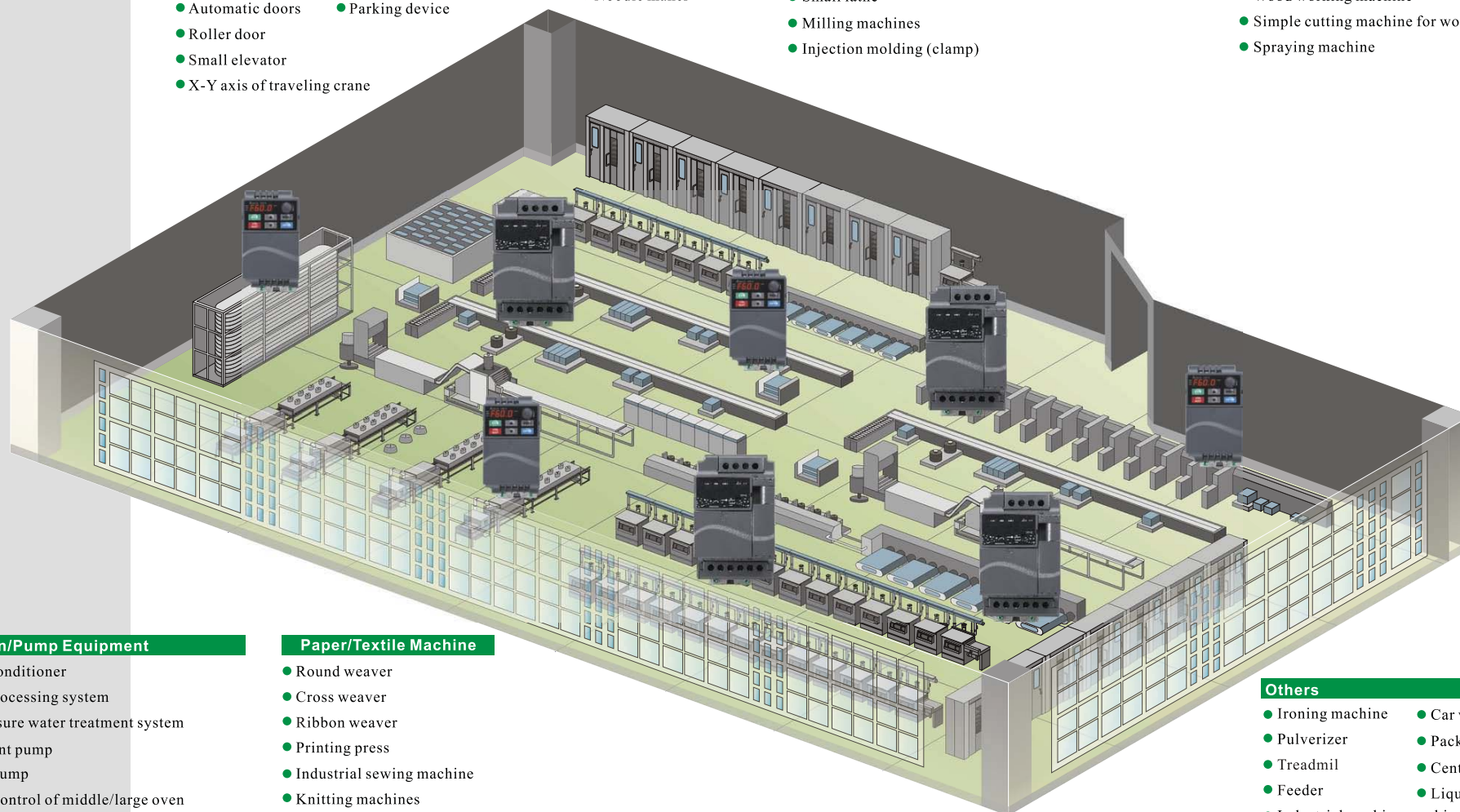
- Dumpling maker
- Food stirrer
- Noodle maker

Machine Tool/Metal Processing Machinery

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

Wood Working Machinery

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



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 fans
- Building water dispenser system
- Dryer's windmill

Paper/Textile Machine

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

Others

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



Specifications

Voltage Class		115V		
Model Number	VFD-___E	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
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)		0.1~600Hz		
Carrier Frequency (kHz)		1-15		
Input Rating	Rated Input Current (A)	Single-phase		
		6	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)		1.2	1.2	1.2

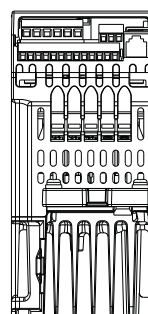
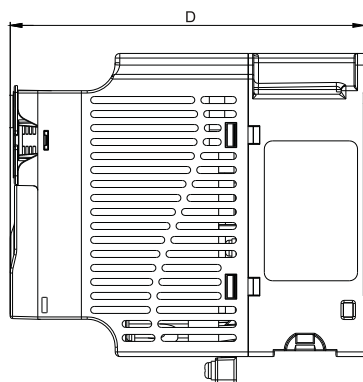
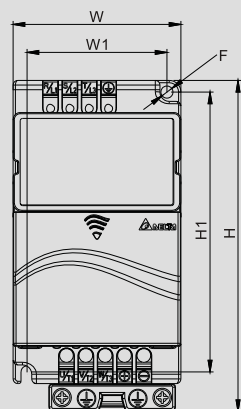
Voltage Class		230V									
Model Number	VFD-___E	002	004	007	015	022	037	055	075	110	150
Max. Applicable Motor Output (kW)		0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
Max. Applicable Motor Output (hp)		0.25	0.5	1.0	2.0	3.0	5.0	7.5	10.0	15	20
Rated Output Capacity (kVA)		0.6	1.0	1.6	2.9	4.2	6.5	9.5	12.5	17.1	25
Rated Output Current (A)		1.6	2.5	4.2	7.5	11.0	17	25	33	45	65
Maximum Output Voltage (V)		3-phase proportional to input voltage									
Output Frequency (Hz)		0.1~600Hz									
Carrier Frequency (kHz)		1-15									
Input Rating	Rated Input Current (A)	Single/3-phase					3-phase				
		4.9/1.9	6.5/2.7	9.7/5.1	15.7/9	24/15	20.6	26	34	48	70
	Rated Voltage/Frequency	Single/3-phase, 200-240V, 50/60Hz									
	Voltage Tolerance	± 10%(180-264V)									
	Frequency Tolerance	± 5%(47-63Hz)									
Cooling Method		Natural Cooling					Fan Cooling				
Weight (kg)		1.1	1.1	1.1	1.9	1.9	1.9	3.5	3.5	3.57	6.6

Voltage Class		460V										
Model Number	VFD-___E	004	007	015	022	037	055	075	110	150	185	220
Max. Applicable Motor Output (kW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15	18.5	22
Max. Applicable Motor Output (hp)		0.5	1.0	2.0	3.0	5.0	7.5	10.0	15.0	20	25	30
Rated Output Capacity (kVA)		1.2	2.0	3.3	4.4	6.8	9.9	13.7	18.3	24	29	34
Rated Output Current (A)		1.5	2.5	4.2	5.5	8.5	13.0	18.0	24.0	32	38	45
Maximum Output Voltage (V)		3-phase proportional to input voltage										
Output Frequency (Hz)		0.1~600Hz										
Carrier Frequency (kHz)		1-15										
Input Rating	Rated Input Current (A)	3-phase										
		1.9	3.2	4.3	7.1	11.2	14	19	26	35	41	49
	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	1.9	1.9	4.2	4.2	4.2	7.47	7.47	7.47

Control Characteristics	Control System		SPWM (Sinusoidal Pulse Width Modulation) Control (V/f or sensorless vector control)
	Frequency Setting Resolution		0.01Hz
	Output Frequency Resolution		0.01Hz
	Torque Characteristics		Including the auto-torque/auto-slip compensation; starting torque can be 150% at 3.0Hz
	Overload Endurance		150% of rated current for 1 minute
	Skip Frequency		Three zones, setting range 0.1~600Hz
	Accel/Decel Time		0.1 to 600 seconds (2 Independent setting of Accel/Decel time)
	Stall Prevention Level		Setting 20 to 250% of rated current
	DC Braking		Operation frequency 0.1~600.0Hz, 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 models (built-in brake chopper))
Operating Characteristics	V/f Pattern		Adjustable V/f pattern
	Frequency Setting	Keypad	Setting by ▲▼
		External Signal	Potentiometer-5kΩ/0.5W, 0 to +10VDC, 4 to 20mA, RS-485 interface; Multi-function Inputs 3 to 9 (15 steps, Jog, up/down)
	Operation Setting Signal	Keypad	Set by RUN and STOP
		External Signal	2 wires/3 wires (FWD, REV, EF), JOG operation, RS-485 serial interface (MODBUS), programmable logic controller
	Multi-function Input Signal		Multi-step selection 0 to 15, Jog, accel/decel inhibit, 2 accel/decel switches, counter, external Base Block (NC, NO), auxiliary motor control is invalid, ACI/AVI/AUI selections, driver reset, UP/DOWN key settings, sink/source (=NPN/PNP) selection
	Multi-function Output Indication		AC drive operating, frequency attained, non-zero frequency, Base Block, fault indication, local/remote indication, auxiliary motor output, drive is ready, overheat alarm, emergency stop and status selections of input terminals (NC/NO)
	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		Built-in PLC, AVR, accel/decel S-Curve, over-voltage/over-current stall prevention, 5 fault records, reverse inhibition, momentary power loss restart, DC braking, auto torque/slip compensation, auto tuning, adjustable carrier frequency, output frequency limits, parameter lock/reset, vector control, PID control, external counter, MODBUS communication, abnormal reset, abnormal re-start, power-saving, sleep/wake function, fan control, 1st/2nd frequency source selections, 1st/2nd frequency source combination, NPN/PNP selection
Environmental Conditions	Protection Functions		Over voltage, over current, under voltage, under current, external fault, overload, ground fault, overheating, electronic thermal, IGBT short circuit, PTC
	Display Keypad		6-key, 7-segment LED with 4-digit, 5 status LED, master frequency, output frequency, output current, custom units, parameter values for setup and lock, faults, RUN, STOP, RESET, FWD/REV
	Built-in EMI Filter		For 230V 1-phase and 460V 3-phase models
	Enclosure Rating		IP20
	Pollution Degree		2
	Installation Location		Altitude 1,000m 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		9.80665m/s ² (1G) less than 20Hz, 5.88m/s ² (0.6G) at 20 to 50Hz
Approvals			



Dimensions



Unit: mm(inch)

Model		W	W1	H	H1	D	F
VFD002E11A/11/11C	VFD007E21A/21T/21C						
VFD002E21A/21T/21C	VFD007E23A/23T/23C						
VFD002E23A/23T/23C	VFD007E43A/43T/43C	72.0 (2.83)	60.0 (2.36)	142.0 (5.59)	120.0 (4.72)	152.0 (5.98)	5.2 (0.20)
VFD004E11A/11T/11C	VFD015E23A/23T/23C						
VFD004E21A/21T/21C	VFD015E43A/43T/43C						
VFD004E23A/23T/23C							
VFD004E43A/43T/43C							
VFD007E11A/11C	VFD037E23A/23C						
VFD015E21A/21C	VFD037E43A/43C	100.0 (3.94)	89.0 (3.51)	174.0 (6.86)	162.0 (6.38)	152.0 (5.98)	5.5 (0.22)
VFD022E21A/21C							
VFD022E23A/23C							
VFD022E43A/43C							
VFD055E23A/23C	VFD075E43A/43C	130.0 (5.12)	116.0 (4.57)	260.0 (10.24)	246.5 (9.71)	169.2 (6.67)	5.5 (0.22)
VFD055E43A/43C	VFD110E43A/43C						
VFD075E23A/23C							
VFD150E23A/23C	VFD185E43A/43C	200.0 (7.87)	180.0 (7.09)	310.0 (12.20)	290.0 (11.42)	190.0 (7.48)	10.0 (0.39)
VFD150E43A/43C	VFD220E43A/43C						
VFD002E11P	VFD007E21P						
VFD002E21P	VFD007E23P						
VFD002E23P	VFD007E43P	72.0 (2.83)	56.0 (2.20)	155.0 (6.10)	143.0 (5.63)	111.5 (4.39)	5.3 (0.21)
VFD004E11P	VFD015E23P						
VFD004E21P							
VFD004E23P							
VFD004E43P							

New Models

VFD-E-T : Built-in brake chopper for frame A
VFD-E-P : Plate drive
VFD-E-C : Built-in CANopen communication

Accessories

Optional Cards



EME-R3AA
Relay card (3 form A/
NO contacts)



EME-R2CA
Relay card (2 form C/
Change-over contacts)



EME-33A
I/O card
(photocoupler 3in+3out)



EME-A22A
Analog I/O Card (12 bits)



EME-PG01
PG card



CME-USB01
Second communication card
(USB1.1)

Fieldbus Modules



DeviceNet



Profibus



LonWorks



CANopen

Others



Digital keypad



Brake resistor

- Keypad for communication (VFD-PU06)
- Zero phase reactor
- Keypad cable
- DIN rail(Width35mm)
- EMI input filter
- Grounding plate
- Brake unit
- DC fan
- AC reactor