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20060124AMD-EE



VFD-e

DELTA VFD-e Series
**High Performance/Flexible Extension/
Micro Type AC Motor Drives**



www.delta.com.tw/industrialautomation

Variable Speed AC Motor Drive

VFD-e Series

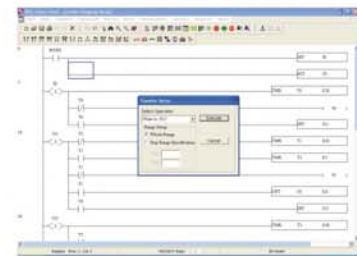


Features

Features

High Performance
Flexible Extension
Micro Type AC Motor Drives

- **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 (0.25~10hp)
3 phase 460V series: 0.4~11kW (0.50~15hp)
- **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

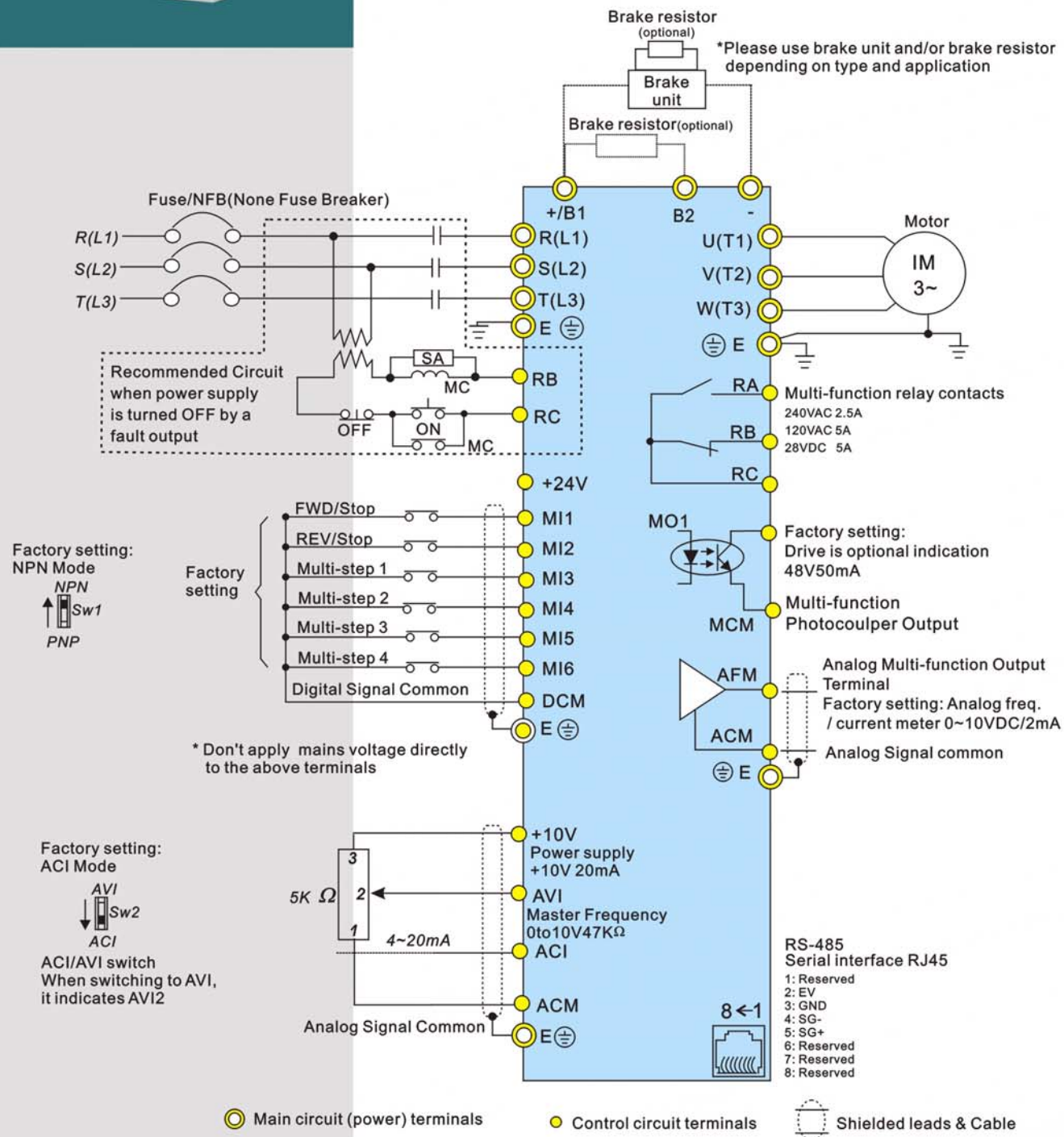


- **Modular Design**
Modular structure and extension with optional cards
- **Standard MODBUS Protocol**
Standard MODBUS Protocol via RS-485
- **Built-in EMI Filter (230V 1 phase and 460V 3 phase)**
To reduce electromagnetic interference efficiently
- **Compact Design**
Space saving and easy DIN rail mounting with optional DIN rail adapter
- **Optional Fieldbus Modules**
Provide connection to a variety of networks, including Profibus, DeviceNet, LonWorks and CANopen (under development)
- **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 for use on 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.
- **Comply with RoHS**
New lead-free manufacturing process
- **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

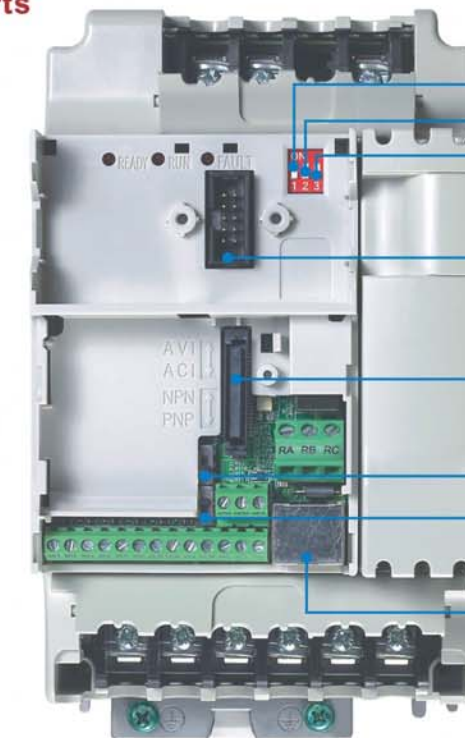


Variable Speed AC Motor Drive

Basic Wiring Diagram



External Parts

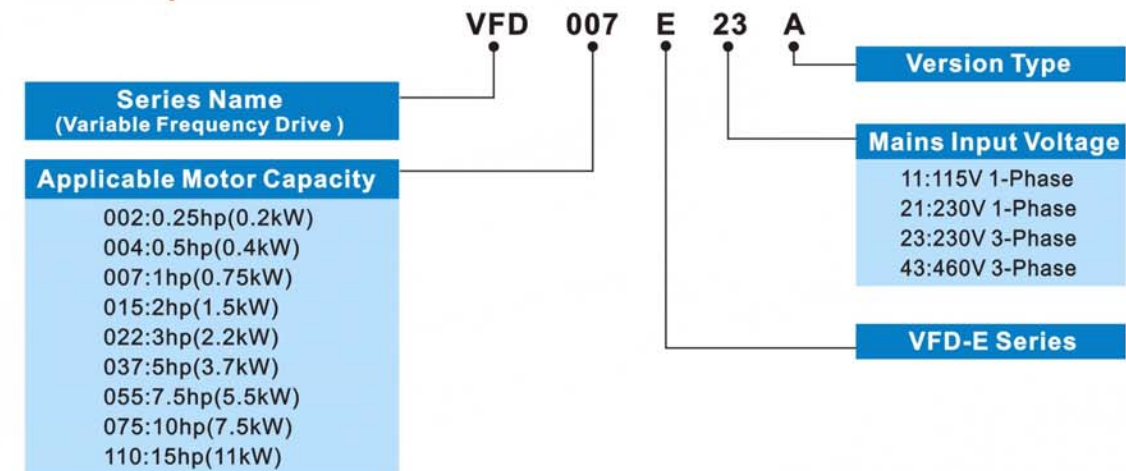


- Switch to ON for 50Hz
- Switch to ON for free run to stop
- Switch to ON for setting frequency source to ACI(P 02.00=2)
- Keypad mounting port
- Mounting port for extension card
- ACI terminal ACI/AVI2 switch
- NPN/PNP
- RS-485 port(RJ-45)

Control Terminals



Model Explanation





Variable Speed AC Motor Drive



VFD-e Applications

Conveyor and Transportation Machinery

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

Food Processing

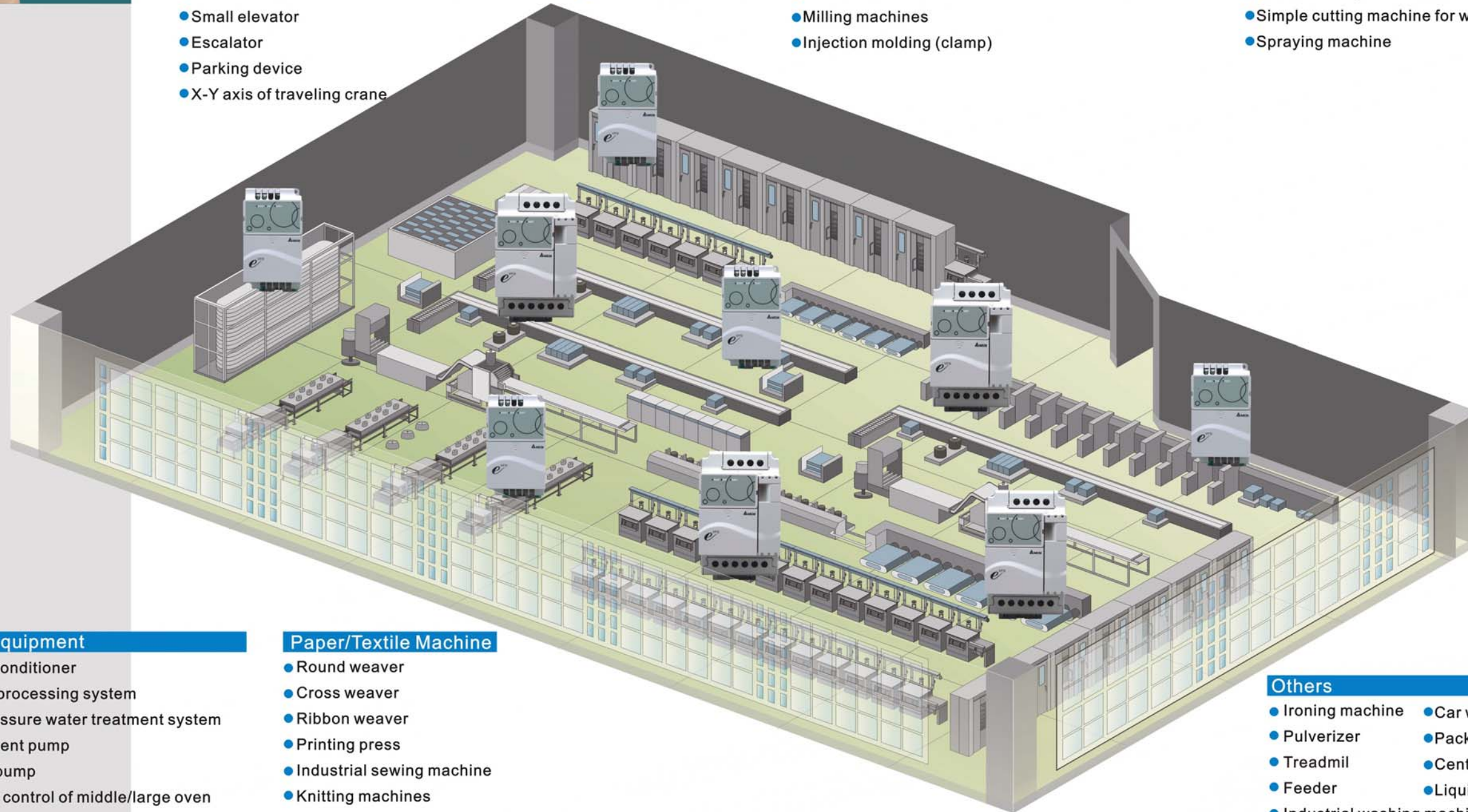
- Dumpling maker
- Food stirrer
- Noodle maker

Machine Tool/Metal Processing Machinery

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

Wood Working Machinery

- 4 side planer
- Woodcarver
- 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
- Treadmil
- Centrifuge
- Feeder
- Liquid mixer
- Industrial washing machine



Variable Speed AC Motor Drive



Specifications

Voltage Class		115V Class		
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
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)	0.1~400Hz		
	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
Max. Applicable Motor Output (kW)		0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5
Max. Applicable Motor Output (hp)		0.25	0.5	1.0	2.0	3.0	5.0	7.5	10.0
Output Rating	Rated Output Capacity (kVA)	0.6	1.0	1.6	2.9	4.2	6.5	9.5	12.5
	Rated Output Current (A)	1.6	2.5	4.2	7.5	11.0	17.0	25.0	33.0
	Maximum Output Voltage (V)	3-phase proportional to input voltage							
	Output Frequency (Hz)	0.1~400Hz							
	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
	Rated Voltage/Frequency	Single/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)	1.1	1.1	1.1	1.9	1.9	1.9	3.5	3.5	

Voltage Class		460V							
Model Number VFD-___ E		004	007	015	022	037	055	075	110
Max. Applicable Motor Output (kW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11.0
Max. Applicable Motor Output (hp)		0.5	1.0	2.0	3.0	5.0	7.5	10.0	15.0
Output Rating	Rated Output Capacity (kVA)	1.2	2.0	3.3	4.4	6.8	9.9	13.7	18.3
	Rated Output Current (A)	1.5	2.5	4.2	5.5	8.2	13.0	18.0	24.0
	Maximum Output Voltage (V)	3-phase proportional to input voltage							
	Output Frequency (Hz)	0.1~400Hz							
	Carrier Frequency (kHz)	1-15							
Input Rating	Rated Input Current (A)	3-phase							
		1.9	3.2	4.31	7.1	11.2	14	19	26
	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	

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 5.0Hz	
	Overload Endurance	150% of rated current for 1 minute	
	Skip Frequency	Three zones, setting range 0.1~400Hz	
	Accel/Decel Time	0.1to 600 seconds (2 Independent setting of Accel/Decel time)	
	Stall Prevention Level	Setting 20to 250% of rated current	
	DC Braking	Operation frequency 0.1~400.0Hz, 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 have brake chopper built-in)	
Operating Characteristics	V/f Pattern	Keypad	Adjustable V/f pattern 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)
	Frequency Setting	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
	Operation Setting Signal	Keypad	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
		External Signal	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)
	Multi-Function Input Signal	Output frequency/current/voltage/frequency command/speed/factor	
	Multi-Function Output Indication	Contact will be On when drive malfunctions (1 Form C/change-over contact or 1 open collector output)	
	Analog Output Signal	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, fan & pump control, external counter, MODBUS communication, abnormal reset, abnormal re-start, power-saving, sleep/wake function, digital frequency output, fan control, sleep/wake frequency, master/auxiliary frequency, 1st/2nd frequency source selections, 1st/2nd frequency source combination, NPN/PNP selection	
	Alarm Output Contact	Over voltage, over current, under voltage, under current, external fault, overload, ground fault, overheating, electronic thermal, IGBT short circuit, PTC	
Operation Functions	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, JOG, PLC		
Protection Functions			
Display Keypad			
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	9.80665m/s ² (1G) less than 20Hz, 5.88m/s ² (0.6G) at 20 to 50Hz		
Approvals	  		

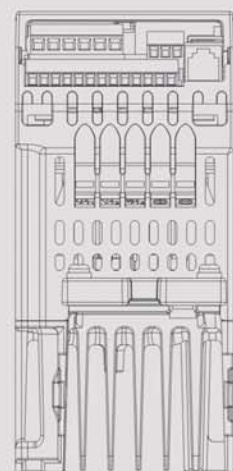
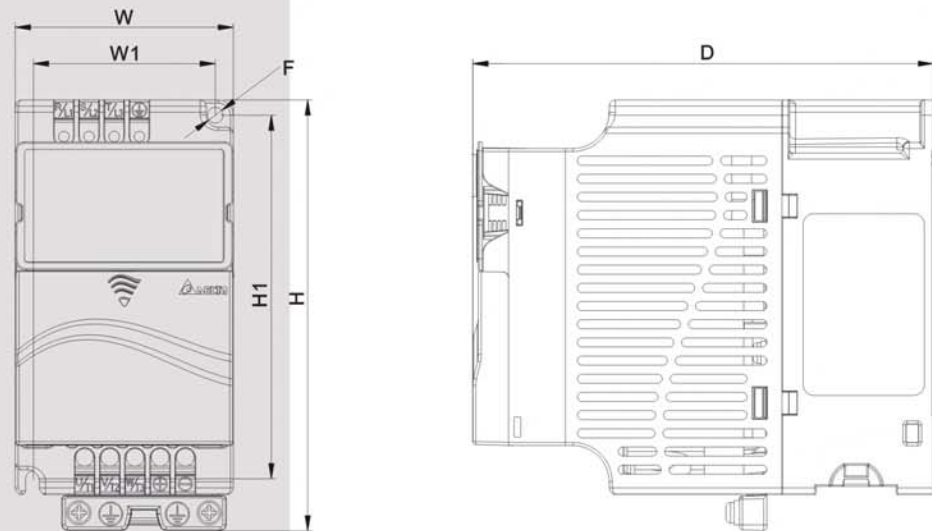


Variable Speed AC Motor Drive



Dimensions & Options

Dimensions



Unit: mm(inch)

Model	W	W1	H	H1	D	F
VFD002E11A VFD002E21A VFD002E23A VFD004E11A VFD004E21A VFD004E23A VFD004E43A VFD007E21A VFD007E23A VFD007E43A VFD015E23A VFD015E43A	72.0 (2.83)	60.0 (2.36)	142.0 (5.59)	120.0 (4.72)	152.0 (5.98)	5.2 (0.20)
VFD007E11A VFD015E21A VFD022E21A VFD022E23A VFD022E43A VFD037E23A VFD037E43A	100.0 (3.94)	89.0 (3.51)	174.0 (6.86)	162.0 (6.38)	152.0 (5.99)	5.5 (0.22)
VFD055E23A VFD055E43A VFD075E23A VFD075E43A VFD110E43A	130.0 (5.12)	116.0 (4.57)	260.0 (10.24)	246.5 (9.71)	169.2 (6.67)	5.5 (0.22)

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**
A/D, D/A card (12 bits)
(under development)



■ **EME-PG01**
PG card
(under development)

■ **CME-USB01**
Second communication card
(USB1.1) (under development)

Fieldbus Modules

- DeviceNet
- Profibus
- LonWorks
- CANopen (under development)

Others

- Zero phase reactor
- AC reactor
- DIN rail adapter
- Brake unit (under development)
- Grounding plate
- Keypad for communication (PU-06)
- DC Fan



■ **Digital keypad (KPE-LE01)**



■ **Keypad cable**



■ **EMI Input Filter**
(under development)



■ **Brake resistor**