



Automation for a Changing World

# **Delta Field Oriented Control AC Motor Drive C2000 690V Series**



 **DELTA**  
Smarter. Greener. Together.



## Leading the Future of Drive Technology

Delta Electronics, a leading brand in drive technology, has officially launched its most cost-effective classical field oriented control AC motor drive: The VFD-C2000 series. This series offers four competitive benefits: high efficiency, high performance, low cost of maintenance and long product life, that will enhance customers' competitive advantage while allowing them to spend less.

## Standard Models (IP20/NEMA1)

Power range: 690V 22~560KW

690V (kW)	22	30	37	45	55	75	90	110	132	160	200
690V (HP)	30	40	50	60	75	100	125	150	175	215	270
Frame Size	C			D			E			F	

### High-performance Variable-frequency Technology

1. High bandwidth control
2. Speed/torque/position control mode
3. For Light duty/Normal duty/ Heavy duty applications
4. 4-quadrant torque control and limit
5. A drive for induction motors and synchronous motors

### Environmental Adaptability

1. 50°C operating temperature\*
2. Built-in DC choke\*
3. Coated circuit boards

\*Note: Please refer to the Product Specifications



# Main Functions and Features

- Field oriented control with built-in PLC function
- Wide variety of applications
- Modular design for easy maintenance and many extensions
- Long-life design
- Enhanced protections and adaptation to ambient conditions
- Wide range of models to meet requirements
- Built-in MODBUS protocol
- High-speed communication interface  
(optional cards for CANopen 、 PROFIBUS-DP 、 DeviceNet 、 MODBUS TCP 、 EtherNet/IP Cards.)

250	315	400	450	560
335	425	530	600	745
G		H		



## Versatile Driving Controls

1. Built-in PLC function
2. Built-in brake unit\*
3. Supports various network protocols
4. Synchronous point-to-point control

\*Note: Please refer to the Product Specifications

## Modular Design

1. Hot plug LCD keypad
2. I/O extension cards
3. Various PG (encoder) feedback cards
4. Network cards for fieldbus modules
5. Removable fan

# Modular Design

■ Various accessories options, such as I/O extension cards, encoder feedback cards, communication cards, hot plug LCD keypad, removable terminals and removable fan.

▶ **PG (Encoder) cards**



▶ **I/O cards**



▶ **Communication cards**



■ **Removable fan**

To ensure personal safety, do not begin wiring before the indicator light is off.

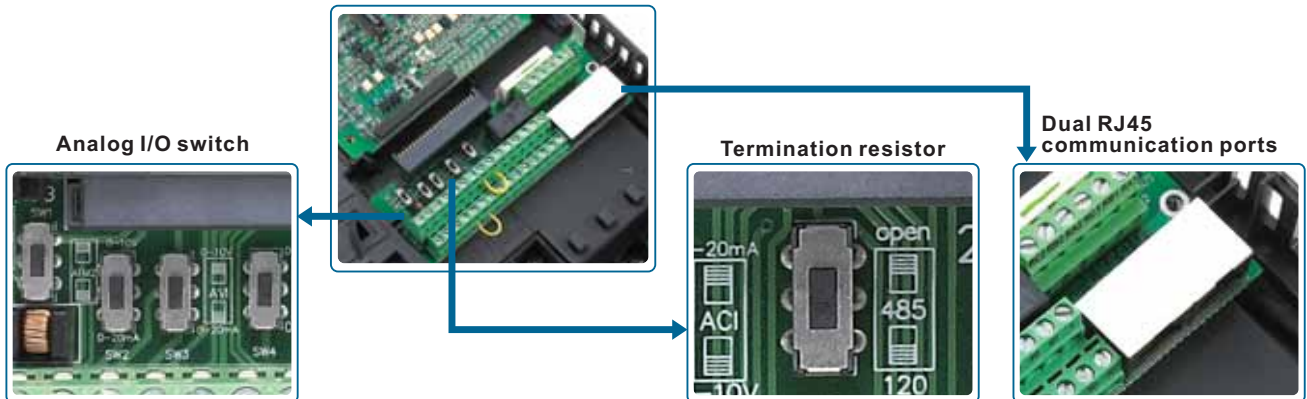
■ **Power indicator**

To prevent personal injury, please do not perform wiring before power indicator is off.

\*NOTE: "▶" are optional accessories.

■ **Removable terminals**

Convenient wiring and safety equipment.



■ The modular design fulfills the needs of system applications and equipment maintenance.



## Designed for Environmental Adaptability

- Built-in DC choke\*
- Enhanced coating on the control board's PCB to ensure reliability of VFD in an adverse environment.
- The electronic components of the drive are isolated from the cooling system to reduce heat interference. Dissipated heat can be discharged by flange-mounting installation, and forced fan cooling can import cold air into the heat sink. The system of heat dissipation can be optimized by these two cooling methods for the best performance.

\*Note: Please refer to the Product Specifications



# High-speed Network Building

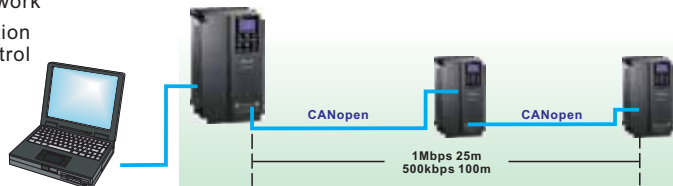
- Provides optional MODBUS RTU and various fieldbus cards for flexible communication applications
- Advanced network functions
- Built-in MODBUS communication protocol



## ■ CANopen (DS402)

Ability to control up to 8 Slave drives via the CANopen Master function

- Supports all Delta industrial automation products (all EDS files of Delta industrial automation products are built-in)
- I/O data layout of each piece of equipment on the CANopen Network
- Planning function for motion control
- WPL Soft



- TAP-CN03 distribution box for long distances



- RJ45 cable



## ■ DeviceNet®

Delta DeviceNet Builder software is specially designed for DeviceNet communication. With this software, it is easy to plan DeviceNet equipment and remote I/O via parameters to build a standard DeviceNet monitoring structure.

- Supports all Delta industrial automation products (all EDS files of Delta industrial automation products are built-in)
- I/O data layout of each piece of equipment in the DeviceNet network
- DeviceNet layout software



## ■ EtherNet/IP®

### ■ MODBUS TCP

Delta's communication integrator software not only provides graphic module setting and human interface design but also supports settings and online monitoring for all Ethernet products

- Delta software for Ethernet/MODBUS TCP products
- Graphic module setting and human interface design
- Auto search function
- Setting interface for virtual COM port



# Convenient Operation Platform for Drive System Management

- Provides a complete operation platform for users' easy control and monitoring via PC, including parameters save/setting, real-time wave monitor, quick setup, for multiple languages and with multi-language operation systems.



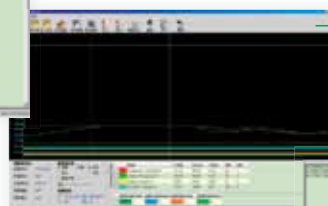
### Start-up display

Displays horsepower, rated voltage and current of present model



### Parameter management

Provides parameter setting/save/copy/comparison for convenient parameter management.

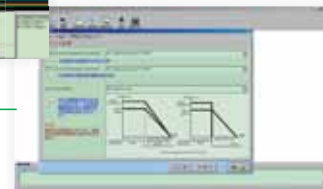


### Trend records

Monitors operation curve of the drive by communication and displays I/O terminal status. Useful for tasks such as "trial run monitoring".

### Quick setup

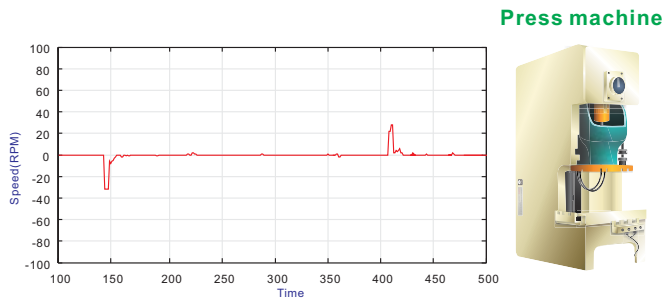
Guides the user step-by-step through the drive settings according to quick setup wizard.



\*NOTE: Please download the software above from the Delta website

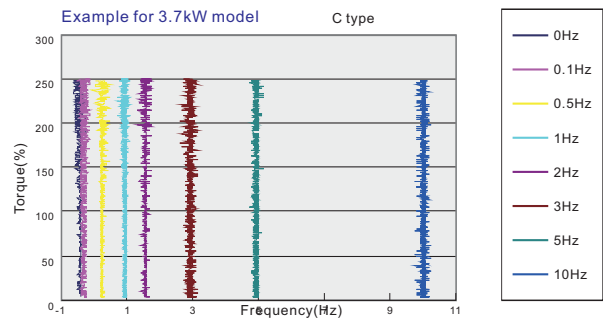
## Improved Load Impact

When load changes, VFD-C2000 will provide a best torque response by FOC to minimize the vibration of load impact.



## High-performance Field Oriented Control

In FOC+PG mode, C2000 is capable of creating a start-up torque up to 200% at extremely low speed for a much more stable speed control.



## Suitable for OIL DRILLING AND MINING INDUSTRIES

- Provides precise control and energy savings.
- The C2000 series is capable of driving both synchronous motors and induction motors for a pumpjack. It reduces power system surges and disturbances when activating the pumpjack or when the pumpjack is in generator status.
- The FOC sensorless mode controls screw pump motion precisely to provide energy saving results for the oil drilling industry.
- Saves energy for fans, conveyors and winches applications.



**Pumpjack**



**Screw pump**



**Fan**



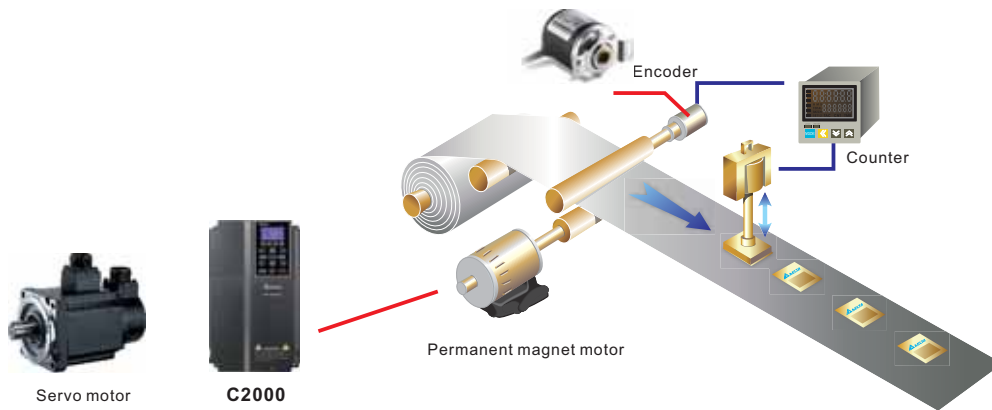
**Winch**



**Conveyor**

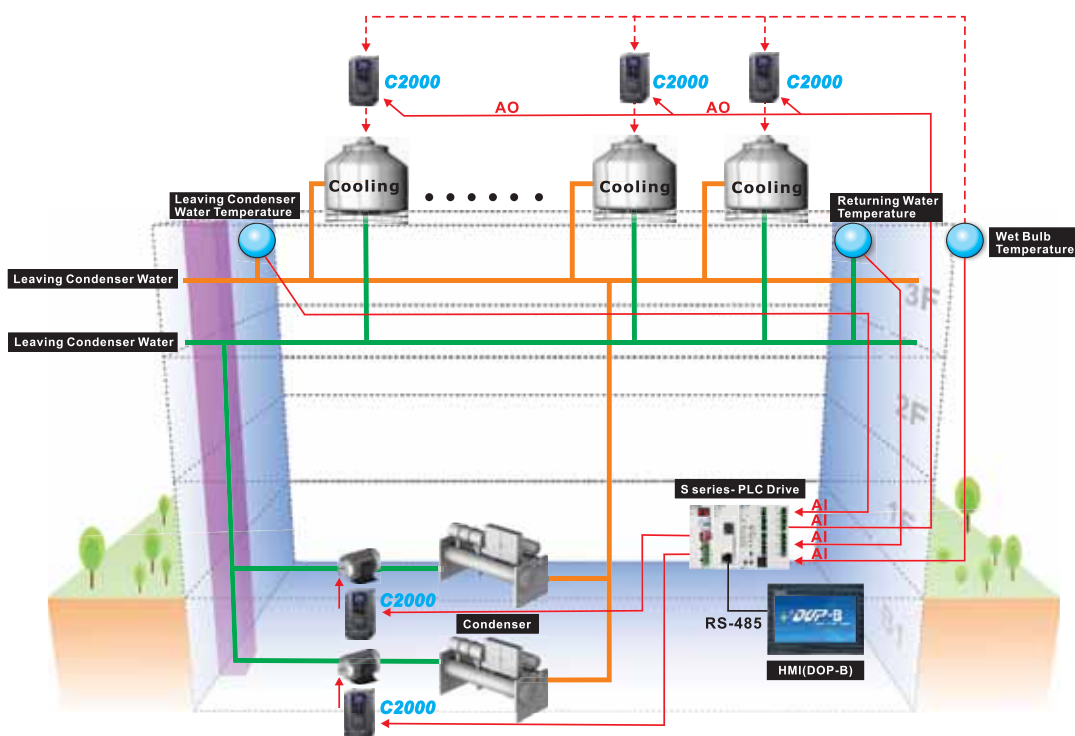
# A Drive for Permanent Magnet (PM) Motors

VFD-C2000 is a dual mode drive for induction motors and permanent magnet motors. The dynamic response of a PM motor provides precise control of position, speed and torque.



## Features for Building Automation Applications

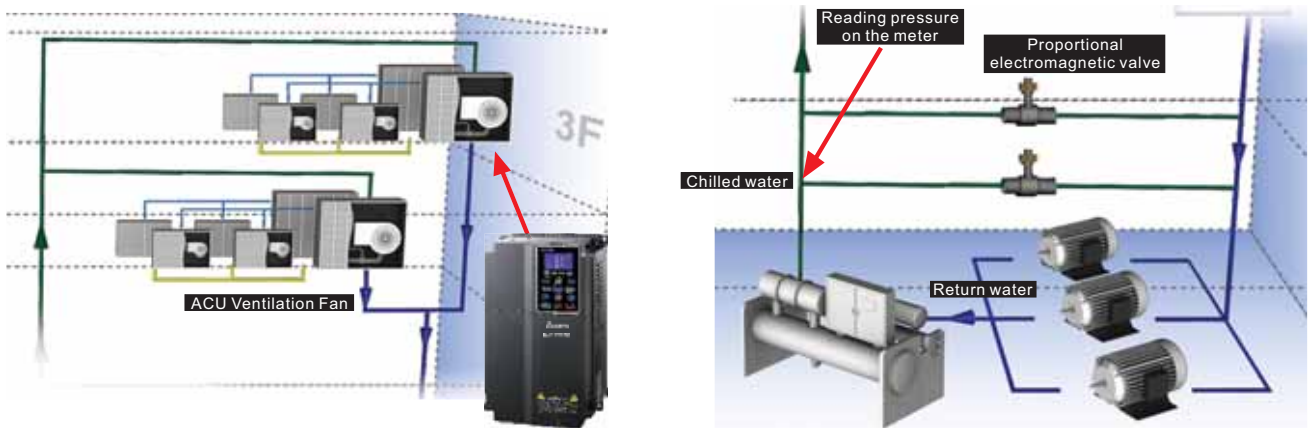
- The four-segment exponential response curve can adjust the input voltage to increase performance for variable torque loads applications, especially for pump and fan applications.
- Flying start and restart functions avoids a momentary power down to provide the best operation for fan applications.
- Skip frequency function avoids motor vibration at a specific frequency band and protects the equipment.
- Low current protection protects the motor from load loss.





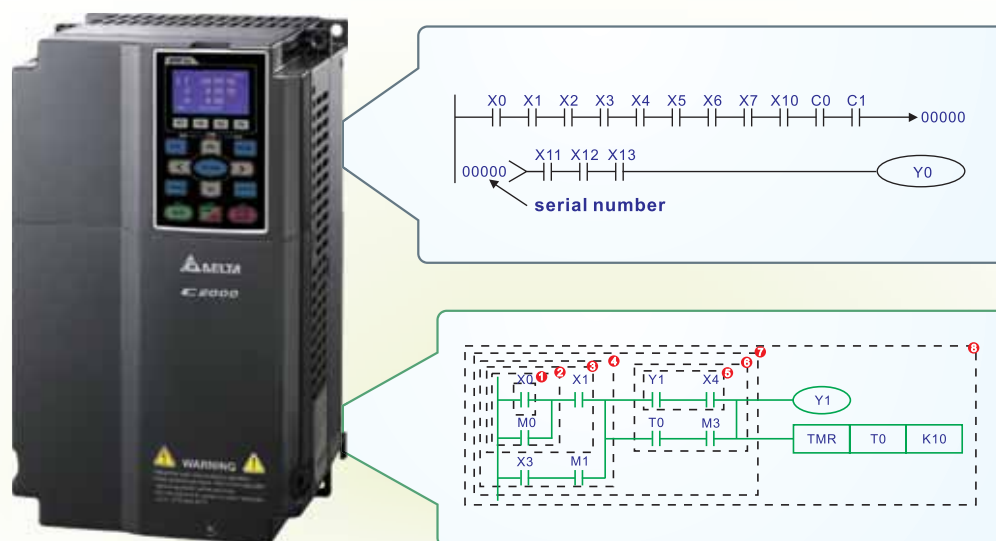
## Increases Motor Performance

- The sensorless vector control (SVC) and AUTO-TUNING functions increase motor performance for variable torque loads applications.
- Deceleration Energy Backup (DEB): when a power loss occurs the drive decelerates and stops the motor to protect the equipment.
- Optimal Acceleration/Deceleration function makes the motor run smoothly and reduces vibration during start and stop.
- Various control functions for saving energy, such as: PID control, sleep/wake up function, and auto energy saving mode.



## Intelligent Programmable Logic Controller

- By connecting the built-in Delta PLC program to a network, you can easily use distributed control mode and independent operation to create an intelligent control space.
- The real time clock function allows you to program the PLC procedure, ON/OFF in chronological order, daylight saving time and more.



# Specifications

690V

Frame Size		C			D			E			F		
Model VFD- ___ C63A-00 / -21		220	300	370	450	550	750	900	1100	1320	1600	2000	
Applicable Motor Output (max hp)		30	40	50	60	75	100	125	150	175	215	270	
Output *	Light Duty	Rated Output Capacity (kVA)	37	43	51	65	80	93	123	147	166	229	258
		Rated Output Current (A)	31	36	43	54	67	78	103	123	139	192	216
		Applicable Motor Output (kW)	22	30	37	45	55	75	90	110	132	160	200
		Max. Output Frequency (Hz)	600										
		Rated Output Capacity (kVA)	31	36	43	54	67	78	103	123	139	191	215
	Normal Duty	Rated Output Current (A)	26	30	36	45	56	65	86	103	116	160	180
		Applicable Motor Output (kW)	18.5	22	30	37	45	55	75	90	110	132	160
		Max. Output Frequency (Hz)	600										
	Heavy Duty	Rated Output Capacity (kVA)	26	30	36	45	56	65	86	103	116	159	179
		Rated Output Current (A)	22	25	30	38	47	54	72	86	97	133	150
		Applicable Motor Output (kW)	15	18.5	22	30	37	45	55	75	90	110	132
	Max. Output Frequency (Hz)		300										
Carrier Frequency (kHz)**		2~9kHz(6kHz)						2~9kHz(4kHz)					
Input	Input Current (A) Light Duty	39	45	54	51	64	74	98	117	132	182	205	
	Input Current (A) Normal Duty	33	38	45	43	53	62	82	98	110	152	171	
	Input Current (A) Heavy Duty	28	31	38	36	45	51	68	82	92	126	143	
	Rated Voltage/Frequency	3-Phase AC 525V~690V (-15%~+10%), 50/60Hz											
	Operating Voltage Range	446~759Vac											
	Frequency Tolerance	47~63Hz											
AC Drive Weight		10±1.5Kg			39±1.5Kg			61±1.5Kg			88±1.5Kg		
Cooling Method		Fan cooling											
Braking Chopper		Frame C (built-in)				Frame D and above (optional)							
DC Choke		Frame C (optional)				Frame D and above (built-in)							

690V

Frame Size		G			H		
Model VFD- ___ C63A-00 / -21 VFD- ___ C63C-21		2500	3150	4000	4500	5600	
Applicable Motor Output (max hp)		335	425	530	600	745	
Output *	Light Duty	Rated Output Capacity (kVA)	316	367	488	559	660
		Rated Output Current (A)	264	307	408	468	552
		Applicable Motor Output (kW)	250	315	400	450	560
		Max. Output Frequency (Hz)	600				
		Rated Output Capacity (kVA)	263	306	406	466	550
	Normal Duty	Rated Output Current (A)	220	256	340	390	460
		Applicable Motor Output (kW)	200	250	315	355	450
		Max. Output Frequency (Hz)	600				
	Heavy Duty	Rated Output Capacity (kVA)	219	255	338	388	458
		Rated Output Current (A)	183	213	283	325	383
		Applicable Motor Output (kW)	160	200	250	315	355
	Max. Output Frequency (Hz)		300				
Carrier Frequency (kHz)**		2~9kHz (3kHz)					
Input	Input Current (A) Light Duty	251	292	388	445	524	
	Input Current (A) Normal Duty	209	243	323	371	437	
	Input Current (A) Heavy Duty	174	202	269	309	364	
	Rated Voltage/Frequency	3-Phase AC 525V~690V (-15%~+10%), 50/60Hz					
	Operating Voltage Range	446~759Vac					
	Frequency Tolerance	47~63Hz					
AC Drive Weight		135±4Kg			243±5Kg		
Cooling Method		Fan cooling					
Braking Chopper		Frame D and above (optional)					
DC Choke		Frame D and above (built-in)					

\*Note : At Pr.00-11, the factory setting is normal duty.

\*\*Note : The drive should operate in derating current when carrier frequency setting increases.

## General Specifications

<b>Control Method</b>		1: V/F 2: SVC 3: VF+PG 4: FOC+PG 5: TQC+PG* 6: PM* 7: FOC Sensorless* 8: TQC Sensorless*
<b>Starting Torque</b>		Reaches up to 150% or above at 0.5Hz. Under FOC+PG mode, starting torque can reach 150% at 0Hz
<b>Control Characteristics</b>	<b>V/F Curve</b>	4-point adjustable V/f curve and square curve
	<b>Speed Response</b>	5Hz (vector control can reach up to 40Hz)
	<b>Torque Limit</b>	Max. 200% torque current
	<b>Torque Accuracy</b>	±5%
	<b>Max. Output Frequency (Hz)</b>	Light duty /Normal duty:0.00~600.00Hz; Heavy duty: 0.00 ~ 300.00 Hz
	<b>Frequency Output Accuracy</b>	Digital command:±0.01%, -10°C ~+40°C, Analog command:±0.1%, 25±10°C
	<b>Output Frequency Resolution</b>	Digital command:0.01Hz, Analog command: 0.03 X max. output frequency/60 Hz (±11 bit)
	<b>Overload Tolerance</b>	Light duty: rated output current is 110% for 60seconds Normal duty: rated output current is 120% for 60seconds ; 160% for 3 seconds Heavy duty: rated output current is 150% for 60seconds ; 180% for 3 seconds
	<b>Frequency Setting Signal</b>	+10V~-10,0~+10V,4~20mA,0~20mA,Pulse input
	<b>Accel./decel. Time</b>	0.00~600.00/0.0~6000.0 Seconds
	<b>Main Control Function</b>	Torque control, Droop control, Speed/torque control switching, Feed forward control, Zero-servo control, Momentary power loss ride thru, Speed search, Over-torque detection, Torque limit, 17-step speed (max), Accel/decel time switch, S-curve accel/decel, 3-wire sequence, Auto-Tuning (rotational, stationary), Dwell, Cooling fan on/off switch, 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, MODBUS communication (RS-485 RJ45, max. 115.2 kbps), Fault restart, Parameter copy
	<b>Fan Control</b>	PWM control
<b>Protection Characteristics</b>	<b>Motor Protection</b>	Electronic thermal relay protection
	<b>Over-current Protection</b>	Over-current protection for 225% rated current current clamp 『Light duty: around 135~140%』 ; 『Normal duty: around 160~165%』 『Heavy duty: around 190~195%』
	<b>Over-voltage Protection</b>	Drive will stop when DC-BUS voltage exceeds 1189V
	<b>Over-temperature Protection</b>	Built-in temperature sensor
	<b>Stall Prevention</b>	Stall prevention during acceleration, deceleration and running independently.
	<b>Restart after Instantaneous Power Failure</b>	Parameter setting up to 20 seconds
	<b>Grounding Leakage Current Protection</b>	Leakage current is higher than 50% of rated current of the AC motor drive
<b>Certifications</b>	 (Certification in progress)  **	

\* Note : The AC motor drive should operate in derating current when its control method is set to TQC+PG, PM,FOC Sensorless or TQC Sensorless mode.

\*\*Note : UL certification following models are in progress :

Frame G1 : VFD2500C63A-00 , VFD3150C63A-00


Frame G2 : VFD2500C63A-21 , VFD3150C63A-21

Frame H1 : VFD4000C63A-00 , VFD4500C63A-00 , VFD5600C63A-00

Frame H2 : VFD4000C63C-21 , VFD4500C63C-21 , VFD5600C63C-21

# Environment for Operation, Storage and Transportation

**DO NOT** expose the AC motor drive to harsh environments, such as dust, direct sunlight, corrosive/ inflammable gasses, humidity, liquid or vibrations. The salt in the air must be less than 0.01mg/cm<sup>2</sup> per year.

Environment	Installation Location	IEC60364-1/IEC60664-1 Pollution degree 2, Indoor use only		
	Surrounding Temperature	Storage/ Transportation	-25°C ~ +70°C	
		Non-condensation, non-frozen		
	Rated Humidity	Operation	Max. 90%	
		Storage/ Transportation	Max. 95%	
		No condense water		
	Air Pressure	Operation/ Storage	86 to 106 kPa	
		Transportation	70 to 106 kPa	
	Pollution Level	IEC60721-3-3		
		Operation	Class 3C2 : Class 3S2	
Storage		Class 2C2 : Class 2S2		
Transportation		Class 1C2 : Class 1S2		
Altitude	No concentrate			
	Operation	If AC motor drive is installed at altitude 0~1000m, follow normal operation restrictions. If it is installed at altitude 1000~3000m, decrease 2% of rated current or lower 0.5°C of temperature for every 100m increase in altitude. Maximum altitude for Corner Grounded is 2000m.		
Package Drop	Storage/ Transportation	ISTA procedure 1A(according to weight) IEC60068-2-31		
Vibration	1.0mm, peak to peak value range from 2Hz to 13.2 Hz; 0.7G~1.0G range from 13.2Hz to 55Hz; 1.0G range from 55Hz to 512 Hz. Comply with IEC 60068-2-6			
Impact	IEC/EN 60068-2-27			
Operation Position	Max. allowed offset angle±10° (under normal installation position)			

# Specifications for Operation Temperature and Protection Level

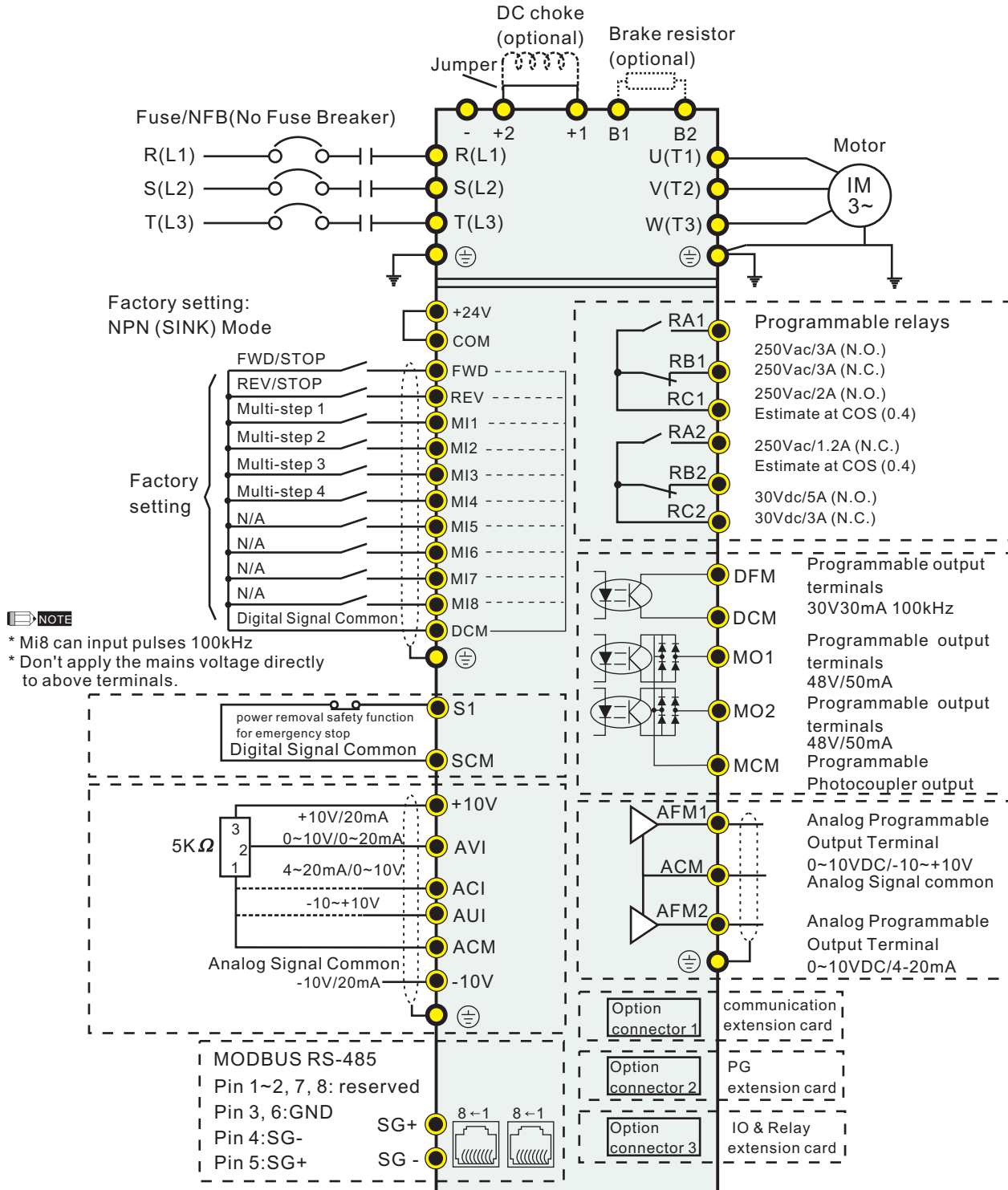
Model	Frame	Top cover	Conduit Box	Protection Level	Operation Temperature
VFDxxxC63A-21	Frame C 22~37kW	Remove top cover	Standard conduit plate	IP20/UL Open Type	-10°C ~50°C
		Standard with top cover		IP20/UL Type1/NEMA1	-10°C ~40°C
VFDxxxC63A-21 VFDxxxC63C-21	Frame D~H >45kW	N/A	Standard conduit box	IP20/UL Type1/NEMA1	-10°C ~40°C
VFDxxxC63A-00	Frame D~H >45kW	N/A	N/A	IP00 IP20/UL Open Type  <small>Only the circled area is IP00, other areas are IP20</small>	HD: -10~50°C ND: -10~50°C LD: -10~40°C

\*Note : HD= Heavy duty ; ND= Normal duty ; LD =Light duty

# Wiring

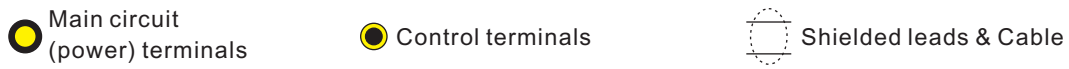
## Frame C

Offers 3-phase power supply

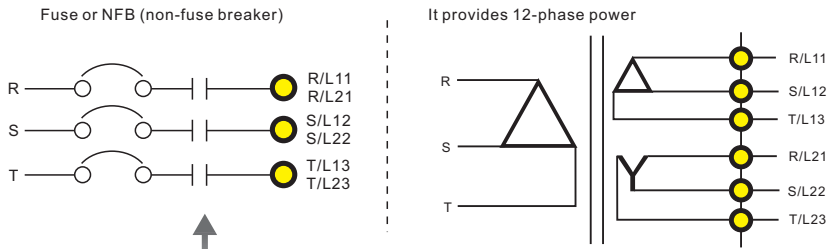


**NOTE**

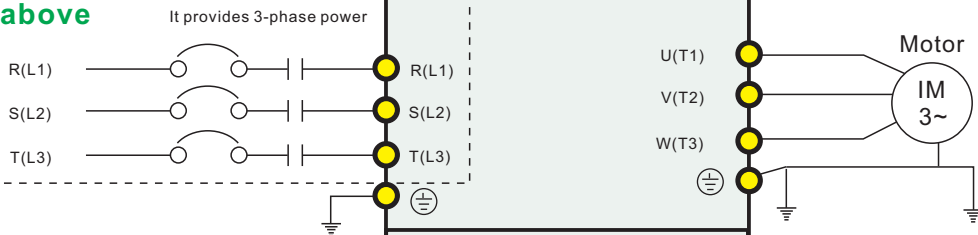
- \* Mi8 can input pulses 100kHz
- \* Don't apply the mains voltage directly to above terminals.



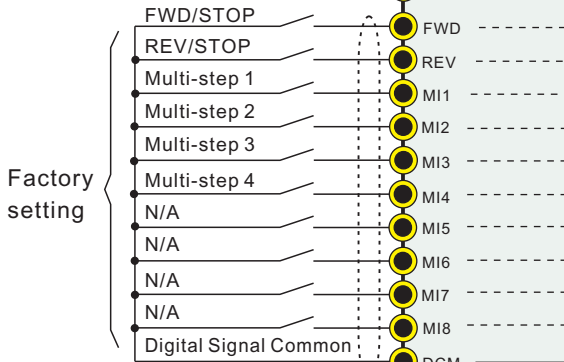
## Input power terminals for frame G and H Provides 3-phase power



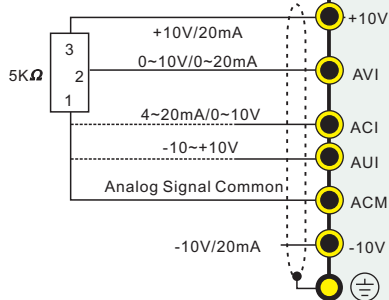
## Wiring diagram for frame D and above



Factory setting:  
NPN (SINK) Mode

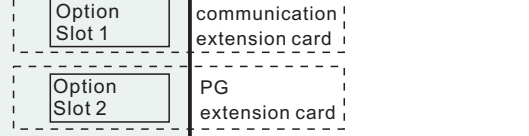
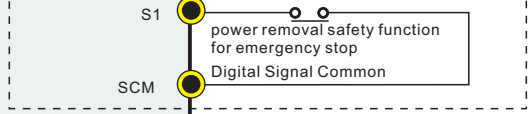
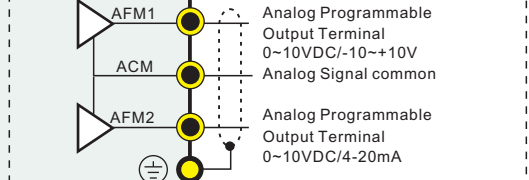
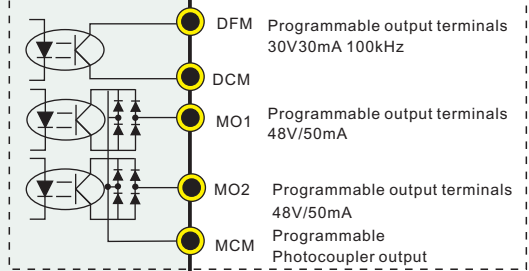
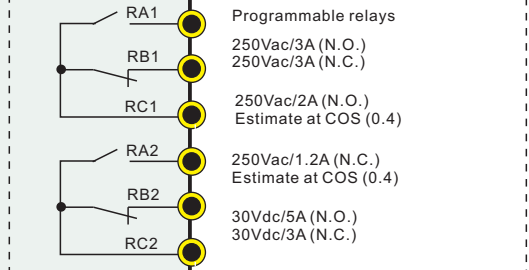
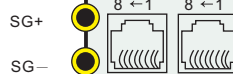


\* Mi8 can input pulses 100kHz  
\* Don't apply the mains voltage directly to above terminals.



MODBUS RS-485

Pin 1~2, 7, 8: reserved  
Pin 3, 6: GND  
Pin 4: SG-  
Pin 5: SG+

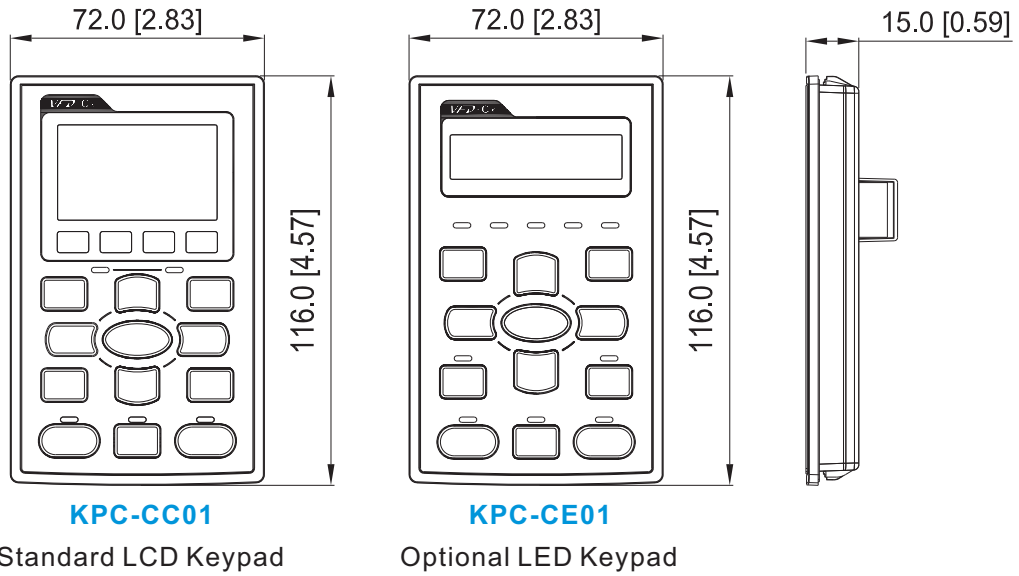


NOTE

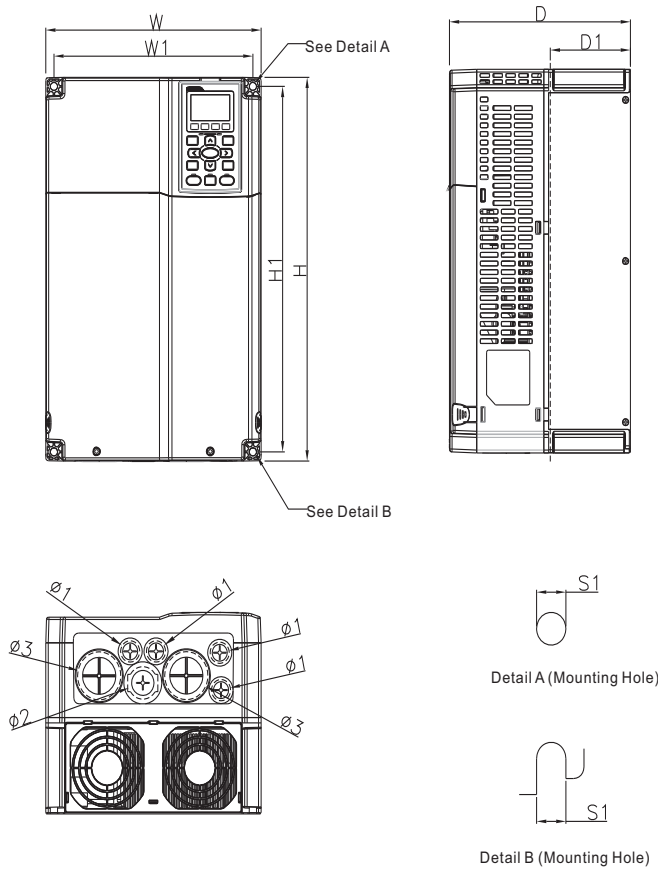
- Main circuit (power) terminals
- Control terminals
- Shielded leads & Cable

# Dimensions

## Digital Keypad



## Frame C



### MODEL

VFD220C63A-21  
VFD300C63A-21  
VFD370C63A-21

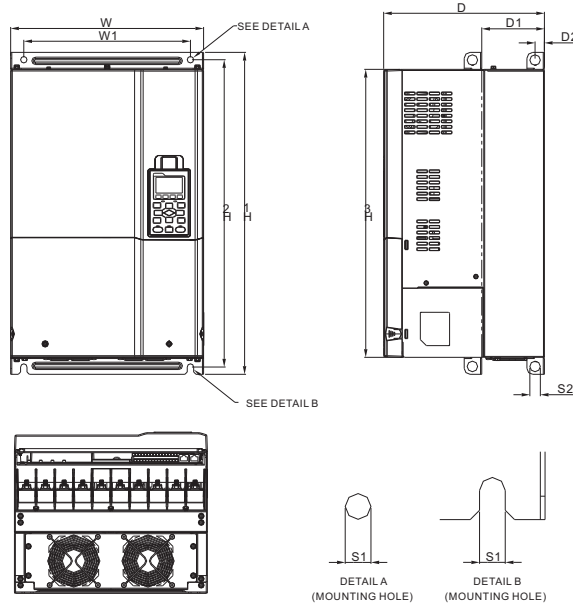
Unit : mm[inch]

FRAME		W	H	D	W1	H1	D1*	S1	Ø1	Ø2	Ø3
C	mm	250.0	400.0	210.0	231.0	381.0	92.9	8.5	22.2	34.0	50.0
	inch	9.84	15.75	8.27	9.09	15.00	3.66	0.33	0.87	1.34	1.97

D1\* : Flange mounting

# Dimensions

## FRAME D1



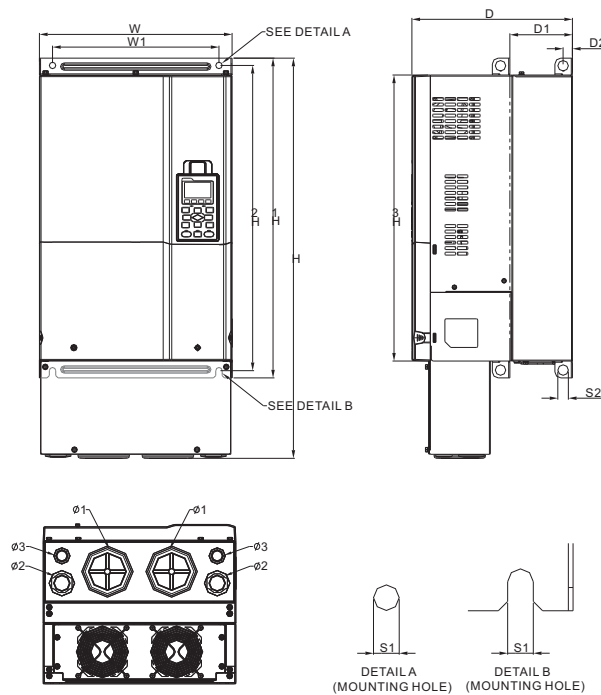
**MODEL**  
**FRAME\_D1**  
 VFD450C63A-00  
 VFD550C63A-00  
 VFD750C63A-00

Unit : mm[inch]

FRAME	W	W1	H	H1	H2	H3	D	D1*	D2	S1	S2	Ø1	Ø2	Ø3	
D1	mm	330.0	285.0	-	550.0	525.0	492.0	275.0	107.2	16.0	11.0	18.0	-	-	-
	inch	12.99	11.22	-	21.65	20.67	19.37	10.83	4.22	0.63	0.43	0.71	-	-	-

D1\* : Flange mounting

## FRAME D2



**MODEL**  
**FRAME\_D2**  
 VFD450C63A-21  
 VFD550C63A-21  
 VFD750C63A-21

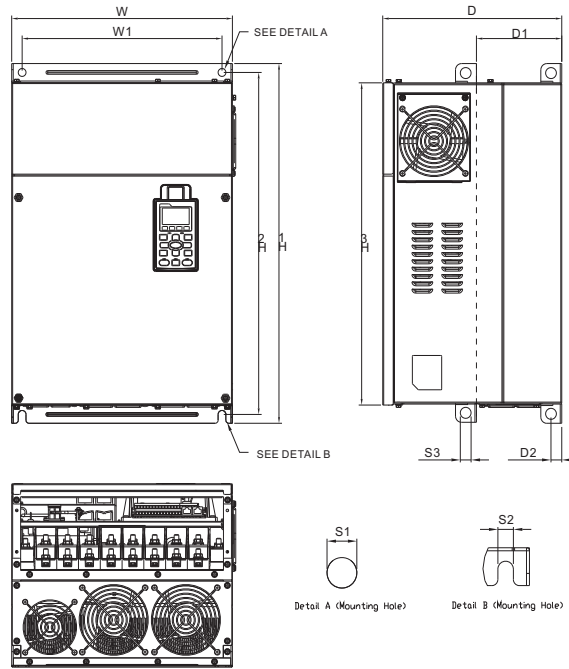
Unit : mm[inch]

FRAME	W	W1	H	H1	H2	H3	D	D1*	D2	S1	S2	Ø1	Ø2	Ø3	
D2	mm	330.0	285.0	688.3	550.0	525.0	492.0	275.0	107.2	16.0	11.0	18.0	76.2	34.0	22.0
	inch	12.99	11.22	27.10	21.65	20.67	19.37	10.83	4.22	0.63	0.43	0.71	3.00	1.34	0.87

D1\* : Flange mounting



## FRAME E1



### MODEL

#### FRAME\_E1

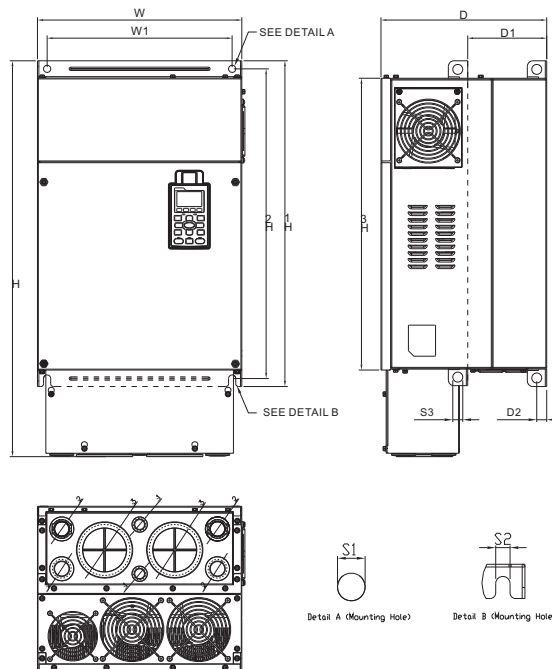
VFD900C63A-00  
VFD1100C63A-00  
VFD1320C63A-00

Unit : mm[inch]

FRAME	W	W1	H	H1	H2	H3	D	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3	
E1	mm	370.0	335.0	-	589	560.0	528.0	300.0	143.0	18.0	13.0	13.0	18.0	-	-	-
	inch	14.57	13.19	-	23.19	22.05	20.80	11.81	5.63	0.71	0.51	0.51	0.71	-	-	-

D1\* : Flange mounting

## FRAME E2



### MODEL

#### FRAME\_E2

VFD900C63A-21  
VFD1100C63A-21  
VFD1320C63A-21

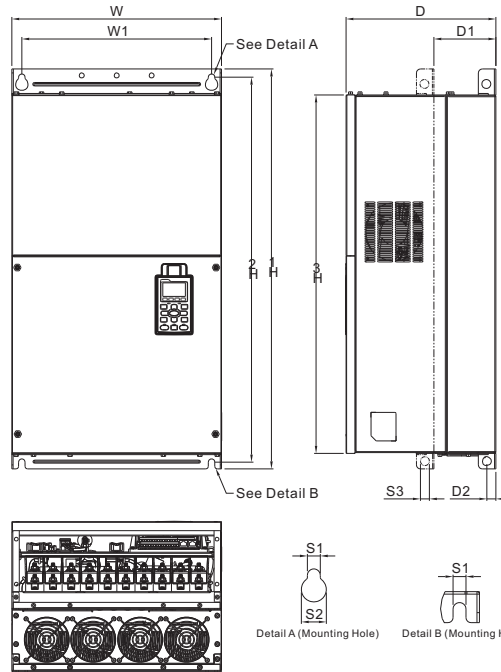
Unit : mm[inch]

FRAME	W	W1	H	H1	H2	H3	D	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3	
E2	mm	370.0	335.0	715.8	589	560.0	528.0	300.0	143.0	18.0	13.0	13.0	18.0	220.0	34.0	92.0
	inch	14.57	13.19	28.18	23.19	22.05	20.80	11.81	5.63	0.71	0.51	0.51	0.71	0.87	1.34	3.62

D1\* : Flange mounting

# Dimensions

## FRAME F1



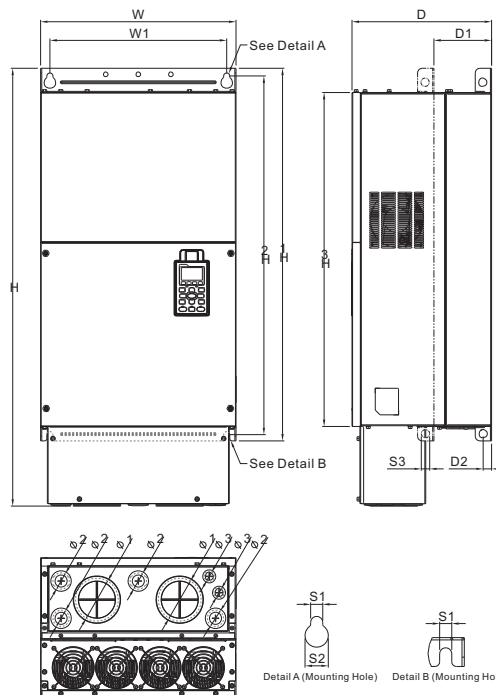
**MODEL**  
**FRAME\_F1**  
 VFD1600C63A-00  
 VFD2000C63A-00

Unit : mm[inch]

FRAME		W	W1	H	H1	H2	H3	D	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
F1	mm	420.0	380.0	-	800	770.0	717.0	300.0	124.0	18.0	13.0	25.0	18.0	-	-	-
	inch	16.54	14.96	-	31.50	30.32	28.23	11.81	4.88	0.71	0.51	0.98	0.71	-	-	-

D1\* : Flange mounting

## FRAME F2



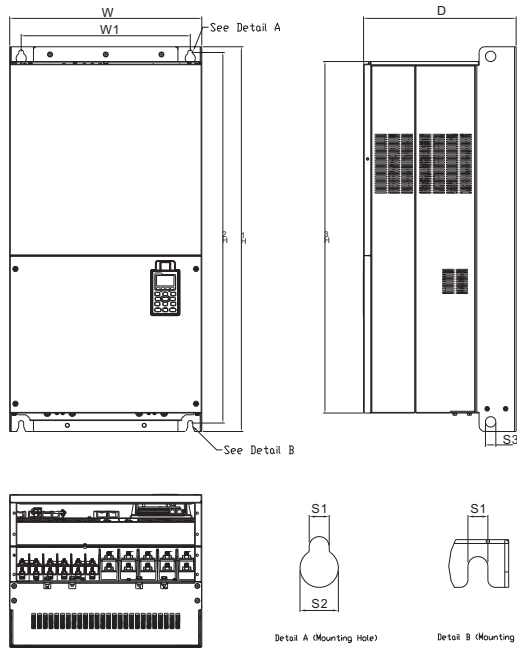
**MODEL**  
**FRAME\_F2**  
 VFD1600C63A-21  
 VFD2000C63A-21

Unit : mm[inch]

FRAME		W	W1	H	H1	H2	H3	D	D1*	D2	S1	S2	S3	Ø1	Ø2	Ø3
F2	mm	420.0	380.0	940.0	800	770.0	717.0	300.0	124.0	18.0	13.0	25.0	18.0	92.0	35.0	22.0
	inch	16.54	14.96	37.0	31.50	30.32	28.23	11.81	4.88	0.71	0.51	0.98	0.71	3.62	1.38	0.87

D1\* : Flange mounting

## FRAME G1

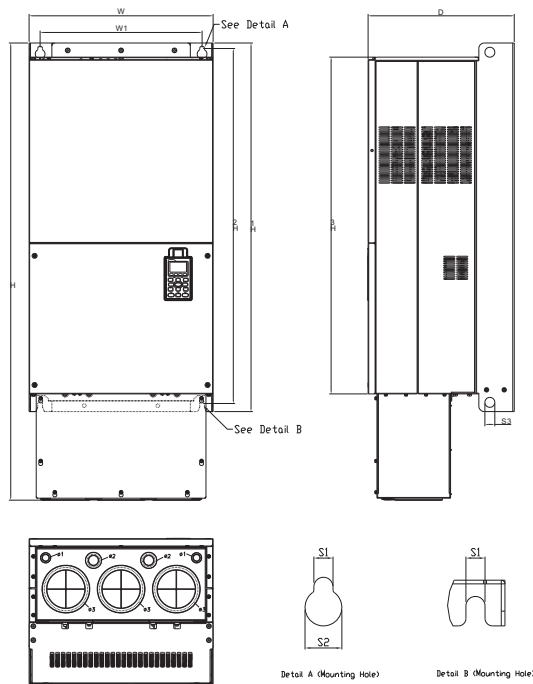


**MODEL**  
**FRAME\_G1**  
 VFD2500C63A-00  
 VFD3150C63A-00

Unit : mm[inch]

FRAME		W	W1	H	H1	H2	H3	D	S1	S2	S3	Ø1	Ø2	Ø3
G1	mm	500.0	440.0	-	1000.0	963.0	913.6	397.0	13.0	26.5	27.0	-	-	-
	inch	19.69	217.32	-	39.37	37.91	35.97	15.63	0.51	1.04	1.06	-	-	-

## FRAME G2



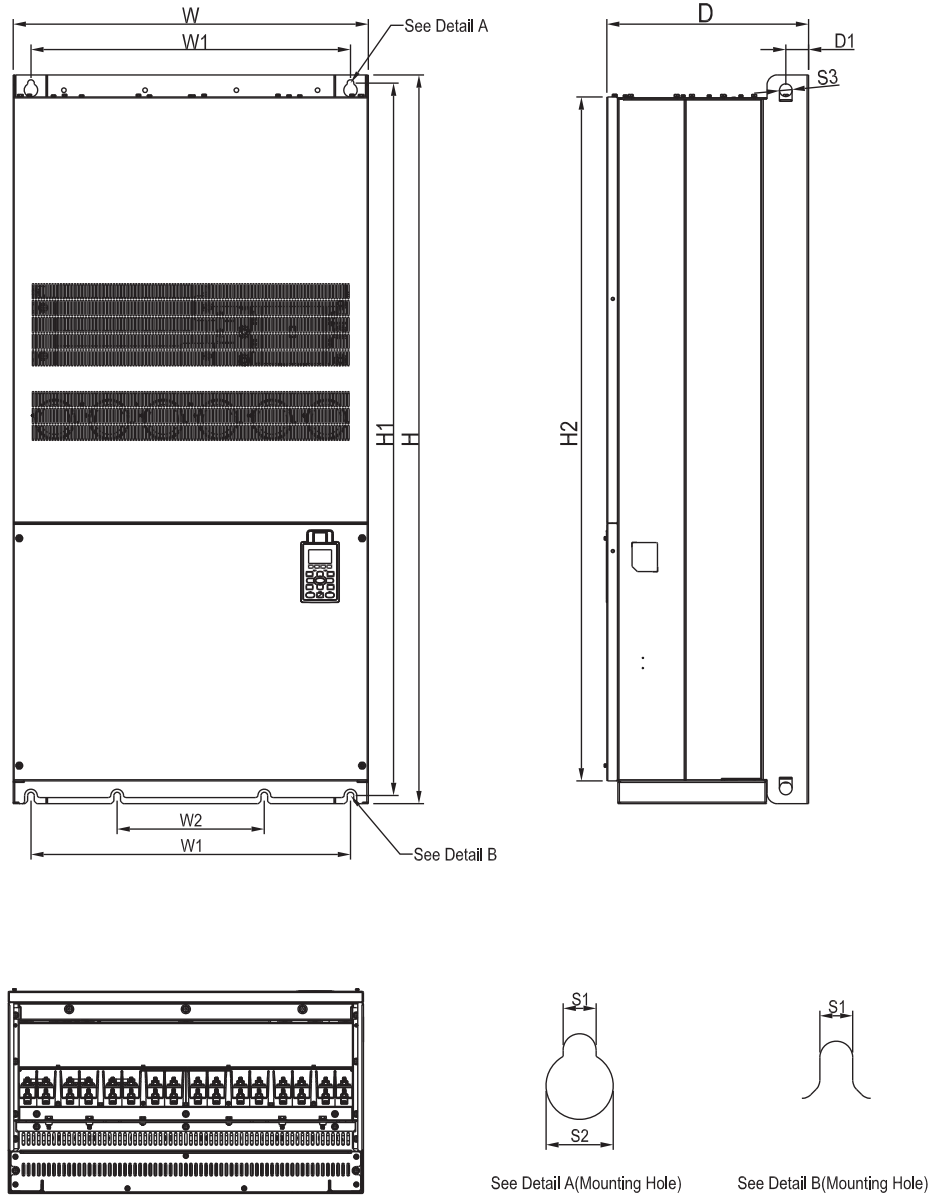
**MODEL**  
**FRAME\_G2**  
 VFD2500C63A-21  
 VFD3150C63A-21

Unit : mm[inch]

FRAME		W	W1	H	H1	H2	H3	D	S1	S2	S3	Ø1	Ø2	Ø3
G2	mm	500.0	440.0	1240.2	1000.0	963.0	913.6	397.0	13.0	26.5	27.0	22.0	34.0	117.5
	inch	19.69	217.32	48.83	39.37	37.91	35.97	15.63	0.51	1.04	1.06	0.87	1.34	4.63

# Dimensions

## FRAME H1



### MODEL

#### FRAME\_H1

VFD4000C63A-00

VFD4500C63A-00

VFD5600C63A-00

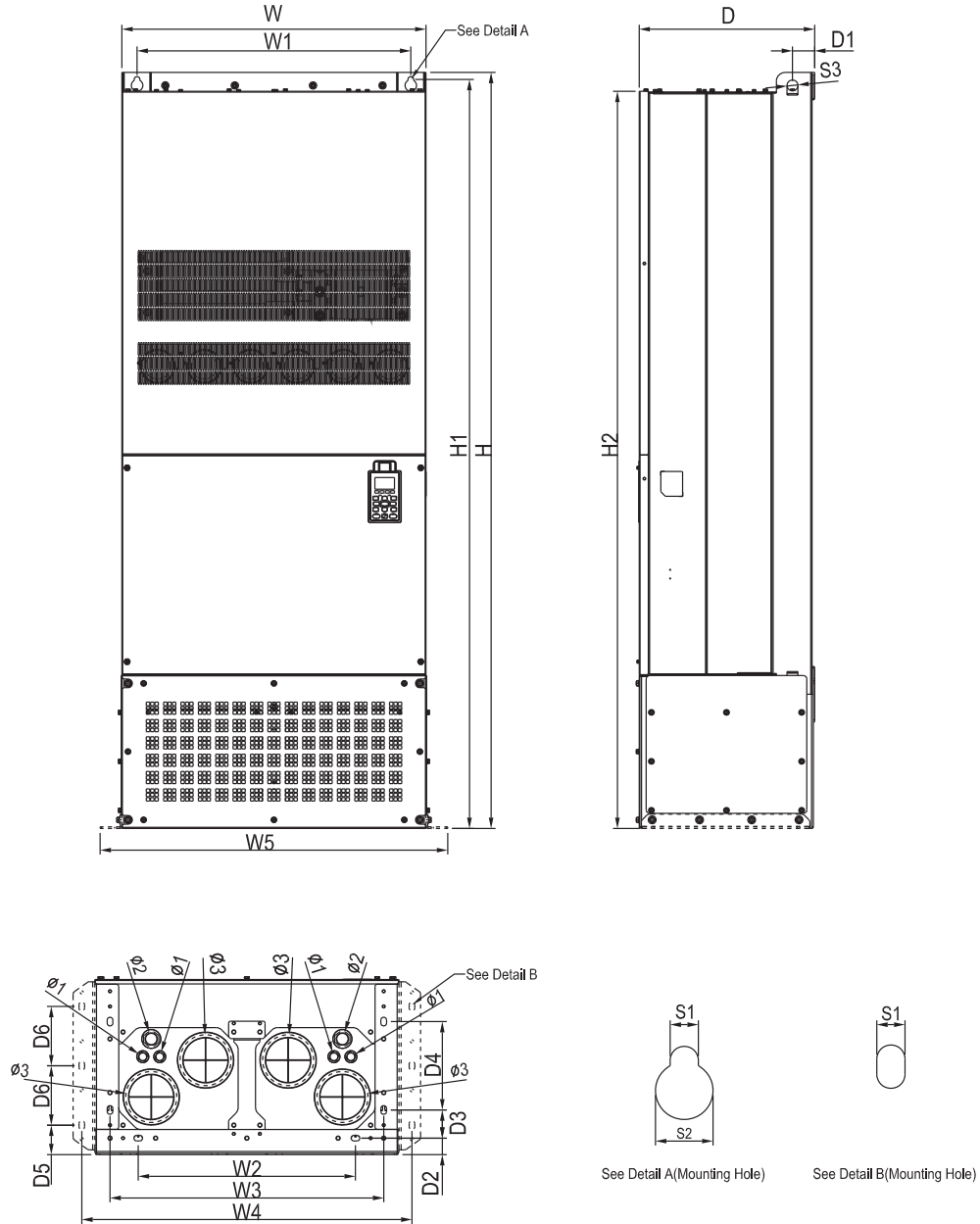
Unit : mm[inch]

FRAME	W	W1	W2	W3	W4	W5	W6	H	H1	H2	H3	H4	H5
H1	mm	700.0	630.0	290.0	-	-	-	1435.0	1403.0	1346.6	-	-	-
	inch	27.56	24.80	11.42	-	-	-	56.5	55.24	53.02	-	-	-

FRAME	D	D1	D2	D3	D4	D5	D6	S1	S2	S3	Ø1	Ø2	Ø3
H1	mm	398.0	45.0	-	-	-	-	13.0	26.5	25.0	-	-	-
	inch	15.67	1.77	-	-	-	-	0.51	1.04	0.98	-	-	-

# FRAME H3



**MODEL**  
**FRAME\_H3**  
 VFD4000C63C-21  
 VFD4500C63C-21  
 VFD5600C63C-21


Unit : mm[inch]

FRAME	W	W1	W2	W3	W4	W5	W6	H	H1	H2	H3	H4	H5
H3	mm	700.0	630.0	500.0	630.0	760.0	800.0	-	1745.0	1729.0	1701.6	-	-
	inch	27.56	24.8	19.69	24.8	29.92	31.50	-	68.70	68.07	66.99	-	-

FRAME	D	D1	D2	D3	D4	D5	D6	S1	S2	S3	ø1	ø2	ø3
H3	mm	404.0	51.0	38.0	65.0	204.0	68.0	137.0	13.0	26.5	25.0	22.0	34.0
	inch	15.91	2.01	1.50	2.56	8.03	2.68	5.39	0.51	1.04	0.98	0.87	1.34

# Option Cards


## EMC-PG01L



Set by Pr.10-00~10-02

Terminals		Descriptions
PG1	VP	Output voltage for power: +5V/+12V±5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA
	DCM	Common for power and signal
	A1, /A1, B1, /B1, Z1, /Z1	Encoder Input (Line Driver) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec
PG2	A2, /A2, B2, /B2	Pulse Input Signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec.
PG OUT	AO, /AO, BO, /BO, ZO, /ZO, SG	PG Card Output signals. It has division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA; Max. output frequency: 300kP/sec SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained.


## EMC-PG01O



Set by Pr.10-00~10-02

Terminals		Descriptions
PG1	VP	Output voltage for power: +5V/+12V±5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA
	DCM	Common for power and signal
	A1, /A1, B1, /B1, Z1, /Z1	Encoder Input Signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec
PG2	A2, /A2, B2, /B2	Pulse Input Signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec.
PG OUT	V+, /V+	Needs external power source for PG OUT circuit. Input voltage of power: +12V ~ +24V
	V-	Negative power supply input
	A/O, B/O, Z/O	PG Card Output Signals. It has division frequency function: 1~255 times Add a pull-up resistor to the open collector output signals to avoid signal interferences. [Three pull-up resistors are included in the package (1.8kΩ/1W)] Max. Output current: 20mA; Max output frequency: 300KP/Sec

## EMC-PG01R




Set by Pr.10-00~10-02

Terminals		Descriptions
PG1	R1- R2	Resolver Output Power 7Vrms, 10kHz
	S1, S2, S3, S4,	Resolver Input Signal 3.5±0.175Vrms, 10kHz
PG2	A2, /A2, B2, /B2	Pulse Input Signal (Line Driver or Open Collector) Open collector input: +5V/+12V (Note1) It can be 1-phase or 2-phase input; Max. input frequency: 300kP/sec.
PG OUT	AO, /AO, BO, /BO, ZO, /ZO, SG	PG Card Output Signals. It has division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA Max. output frequency: 300kP/sec SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained.

## EMC-PG01U

■ FJMP1 **S**: Standard UVW Output Encoder; **D**: Delta Encoder

		Terminals	Descriptions
 <p>Set by Pr.10-00~10-02</p>	PG1	VP	Output voltage for power: +5V/+12V5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA
		DCM	Common for power and signal
		A1, /A1, B1, /B1, Z1, /Z1	Encoder input (Line Driver) 1-phase or 2-phase input. Max. input frequency: 300kP/sec
		U1, /U1, V1, /V1, W1, /W1	Encoder Input Signal
	PG2	A2, /A2 B2, /B2	Pulse Input signal Open collector input: +5V/+12V (Note1) 1-phase or 2-phase input; Max. input frequency: 300kP/sec.
PG OUT	AO, /AO, BO, /BO, ZO, /ZO, SG	PG Card Output Signals. Division frequency function: 1~255 times Max. output voltage for Line driver: 5Vdc Max. output current: 50mA Max. output frequency: 300kP/sec SG: The GND of PG card is the same as the host controller or PLC, so a common output signal is attained.	

Note 1: For the Open Collector, set input voltage to 5~15mA and install a pull-up resistor

**[5V]** Recommended pull-up resistor: 100~220Ω · 1/2W and above

**[12V]** Recommended pull-up resistor: 510~1.35kΩ · 1/2W and above

**[24V]** Recommended pull-up resistor: 1.8k~3.3kΩ · 1/2W and above


## Screw Specifications for Option Card Terminals

EMC-D42A / EMC-D611A EMC-BPS01	Wire gauge	24~12AWG ( 0.205~3.31mm <sup>2</sup> )
	Torque	4Kg-cm [3.47lb-in]
EMC-R6AA	Wire gauge	24~16AWG ( 0.205~1.31mm <sup>2</sup> )
	Torque	6Kg-cm [5.21lb-in]
EMC-PG01L / EMC-PG01O EMC-PG01R / EMC-PG01U	Wire gauge	30~16AWG ( 0.0509~1.31mm <sup>2</sup> )
	Torque	2Kg-cm [1.74lb-in]




# Option Cards


## EMC-D42A

 I/O Extension Card	Terminals	Descriptions
	COM	Common for multi-function input terminals Select SINK (NPN) /SOURCE (PNP) in J1 jumper / external power supply
	MI10~ MI13	Refer to parameters 02-26~02-29 to program the multi-function inputs MI10~MI13. Internal power is applied from terminal E24: +24Vdc±5% 200mA, 5W External power +24Vdc: max. voltage 30Vdc, min. voltage 19Vdc, 30W ON: the activation current is 6.5mA; OFF: leakage current tolerance is 10iA
	MO10~MO11	Multi-function output terminals (photocoupler) Duty-cycle: 50%; Max. output frequency: 100Hz Max. current: 50mA; Max. voltage: 48Vdc
	MXM	Common for multi-function output terminals MO10, MO11(photocoupler) Max 48Vdc 50mA


## EMC-D611A

 I/O Extension Card	Terminals	Descriptions
	AC	AC power common for multi-function input terminal (Neutral)
MI10~ MI15	Refer to Pr. 02.26~ Pr. 02.31 for multi-function input selection Input voltage: 100~130VAC; Input frequency: 57~63Hz Input impedance: 27Kohm Terminal response time: ON: 10ms; OFF: 20ms	

## EMC-R6AA

 Relay Extension Card	Terminals	Descriptions
	RA10~RA15 RC10~RC15	Refer to Pr. 02.36~ Pr. 02.46 for multi-function input selection Resistive load: 3A(N.O.)/ 250VAC 5A(N.O.)/ 30Vdc Inductive load (COS 0.4) 2.0A(N.O.)/ 250VAC 2.0A(N.O.)/ 30Vdc It is used to output each monitor signal, such as for drive in operation, frequency attained or overload indication.

## EMC-BPS01

 External Power Supply Card	Terminals	Descriptions
	24V GND	Input power: 24V±5% Maximum input current:0.5A Note: (1) Do not connect the control terminal +24V (Digital control signal common: SOURCE) directly to the EMC-BPS01 input terminal 24V. (2) Do not connect control terminal GND directly to the EMC-BPS01 input terminal GND.

## CMC-MOD01



### Features

- MDI/MDI-X auto-detect
- Virtual serial port.
- Supports MODBUS TCP protocol
- AC motor drive keypad/Ethernet configuration
- E-mail alarm
- Baud rate: 10/100Mbps auto-detect

### Network Interface

Interface	RJ-45 with Auto MDI/MDIX	Transmission speed	10/100 Mbps Auto-Detect
Number of ports	1 Port	Network protocol	ICMP, IP, TCP, UDP, DHCP, SMTP, MODBUS OVER TCP/IP, Delta Configuration
Transmission method	IEEE 802.3, IEEE 802.3u		
Transmission cable	Category 5e shielding 100M		



## CMC-EIP01



### Features

- MDI/MDI-X auto-detect
- Supports MODBUS TCP and Ethernet/IP protocol
- Baud rate: 10/100Mbps auto-detect
- AC motor drive keypad/Ethernet configuration
- Virtual serial port

### Network Interface

Interface	RJ-45 with Auto MDI/MDIX
Number of ports	1 Port
Transmission method	IEEE 802.3, IEEE 802.3u
Transmission cable	Category 5e shielding 100M

Transmission speed	10/100 Mbps Auto-Detect
Network protocol	ICMP, IP, TCP, UDP, DHCP, SMTP, MODBUS OVER TCP/IP, Delta Configuration

## CMC-PD01



### Features

- Supports PZD control data exchange.
- Supports PKW polling AC motor drive parameters.
- Supports user diagnosis function.
- Auto-detects baud rates; supports Max. 12Mbps.

### PROFIBUS DP Connector

Interface	DB9 connector
Transmission method	High-speed RS-485
Transmission cable	Shielded twisted pair cable
Electrical isolation	500VDC

### Communication

Message type	Cyclic data exchange
Module name	CMC-PD01
GSD document	DELA08DB.GSD
Company ID	08DB (HEX)
Serial transmission speed supported (auto-detection)	9.6kbps; 19.2kbps; 93.75kbps; 187.5kbps; 125kbps; 250kbps; 500kbps; 1.5Mbps; 3Mbps; 6Mbps; 12Mbps (bits per second)

## CMC-DN01



### Features

- Based on the high-speed communication interface of Delta HSSP protocol, able to conduct immediate control of AC motor drive.
- Supports Group 2 only connection and polling I/O data exchange.
- For I/O mapping, supports Max. 32 words of input and 32 words of output.
- Supports EDS file configuration in DeviceNet configuration software.
- Supports all baud rates on DeviceNet bus: 125kbps, 250kbps, 500kbps and extendable serial transmission speed mode.
- Node address and serial transmission speed can be set up on AC motor drive.
- Power supplied from AC motor drive.

### DeviceNet Connector

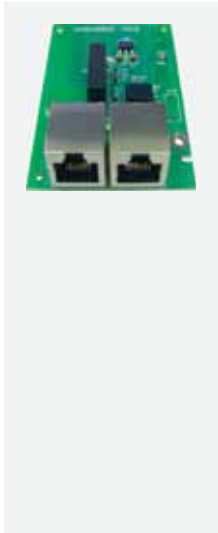
Interface	5-PIN open removable connector. Of 5.08mm PIN interval
Transmission method	CAN
Transmission cable	Shielded twisted pair cable (with 2 power cables)
Transmission speed	125kbps, 250kbps, 500kbps and extendable serial transmission speed mode
Network protocol	DeviceNet protocol

### AC Motor Drive Connection Port

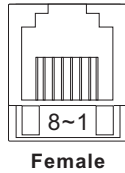
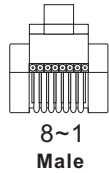
Interface	50 PIN communication terminal
Transmission method	SPI communication
Terminal function	1. Communicating with AC motor drive 2. Transmitting power supply from AC motor drive
Communication protocol	Delta HSSP protocol

# Option Cards

## EMC-COP01



### RJ-45 Pin definition



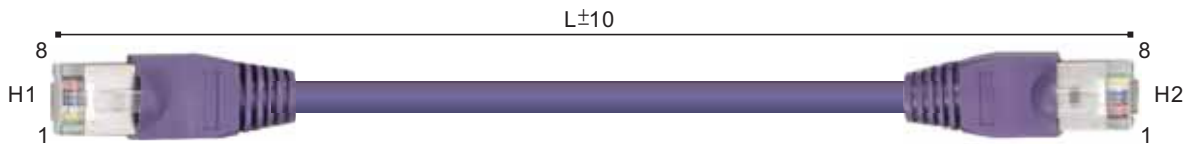
Pin	Pin name	Definition
1	CAN_H	CAN_H bus line (dominant high)
2	CAN_L	CAN_L bus line (dominant low)
3	CAN_GND	Ground/0V/V-
6	CAN_GND	Ground/0V/V-

### Specification

Interface	RJ-45
Number of ports	1 Port
Transmission method	CAN
Transmission cable	CAN standard cable
Transmission speed	1M 500k 250k 125k 100k 50k
Communication protocol	CANopen

## CANopen Communication Cable

Model: TAP-CB03, TAP-CB04



Title	Part No.	L	
		mm	inch
1	TAP-CB03	500±10	19±0.4
2	TAP-CB04	1000±10	39±0.4

## Digital Keypad Accessories: RJ45 Extension Leads and CMC-EIP01 Cables

Model: CBC-K3FT, CBC-K5FT, CBC-K7FT, CBC-K10FT, CBC-K16FT

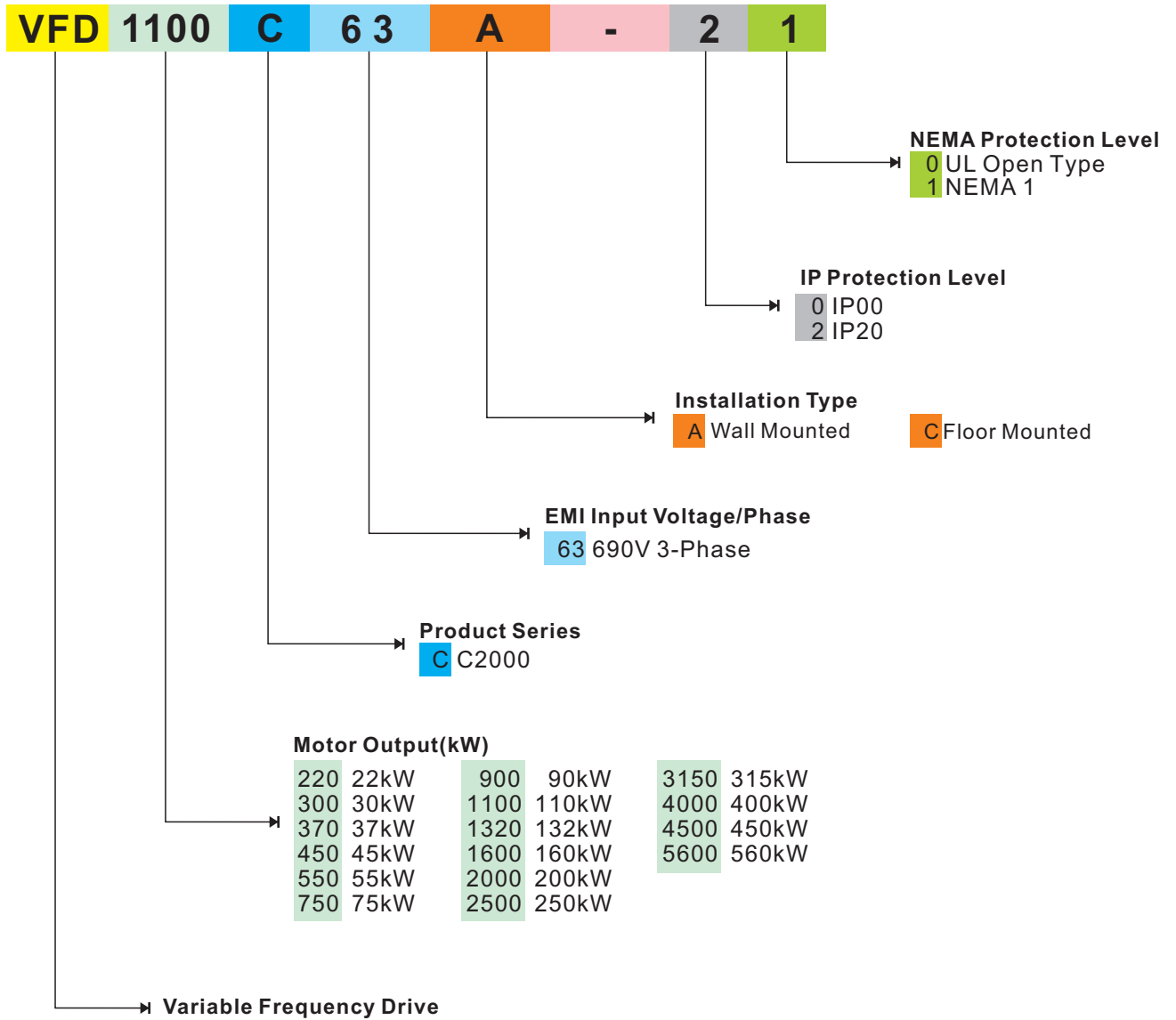
Title	Part No.	Description
1	CBC-K3FT	3 feet RJ45 extension lead (approximately 0.9m)
2	CBC-K5FT	5 feet RJ45 extension lead (approximately 1.5 m)
3	CBC-K7FT	7 feet RJ45 extension lead (approximately 2.1 m)
4	CBC-K10FT	10 feet RJ45 extension lead (approximately 3 m)
5	CBC-K16FT	16 feet RJ45 extension lead (approximately 4.9 m)

# Ordering INFORMATION

<p><i>Frame C</i></p> 	<p><b>690V</b>  <b>LD:</b>22~37KW  <b>ND:</b>18.5~30KW  <b>HD:</b>15~22KW</p>	<p>VFD220C63A-21  VFD300C63A-21  VFD370C63A-21</p>
<p><i>Frame D</i></p> 	<p><b>690V</b>  <b>LD:</b>45~75KW  <b>ND:</b>37~55KW  <b>HD:</b>30~45KW</p>	<p><b>Frame D1</b>      <b>Frame D2</b>  VFD450C63A-00    VFD450C63A-21  VFD550C63A-00    VFD550C63A-21  VFD750C63A-00    VFD750C63A-21</p>
<p><i>Frame E</i></p> 	<p><b>690V</b>  <b>LD:</b>90~ 132KW  <b>ND:</b>75~110KW  <b>HD:</b>55~90KW</p>	<p><b>Frame E1</b>      <b>Frame E2</b>  VFD900C63A-00    VFD900C63A-21  VFD1100C63A-00   VFD1100C63A-21  VFD1320C63A-00   VFD1320C63A-21</p>
<p><i>Frame F</i></p> 	<p><b>690V</b>  <b>LD:</b>160~200KW  <b>ND:</b>132~160KW  <b>HD:</b>110~132KW</p>	<p><b>Frame F1</b>      <b>Frame F2</b>  VFD1600C63A-00   VFD1600C63A-21  VFD2000C63A-00   VFD2000C63A-21</p>
<p><i>Frame G</i></p> 	<p><b>690V</b>  <b>LD:</b>250~315KW  <b>ND:</b>200~250KW  <b>HD:</b>160~200KW</p>	<p><b>Frame G1</b>      <b>Frame G2</b>  VFD2500C63A-00   VFD2500C63A-21  VFD3150C63A-00   VFD3150C63A-21</p>
<p><i>Frame H</i></p> 	<p><b>690V</b>  <b>LD:</b>400~560KW  <b>ND:</b>315~450KW  <b>HD:</b>250~355KW</p>	<p><b>Frame H1</b>      <b>Frame H3</b>  VFD4000C63A-00   VFD4000C63C-21  VFD4500C63A-00   VFD4500C63C-21  VFD5600C63A-00   VFD5600C63C-21</p>



# Model Name





## Attention

### Standard Motors

**Used with 400V Standard Motors**  
It is recommended to add an AC output reactor when using with a 400V standard motor to prevent damage to motor insulation.

#### Torque Characteristics and Temperature Rise

When a standard motor is drive controlled, the motor temperature will be higher than with DOL operation.  
Please reduce the motor output torque when operating at low speeds to compensate for less cooling efficiency.  
For continuous constant torque at low speeds, external forced motor cooling is recommended.

#### Vibration

When the motor drives the machine, resonances may occur, including machine resonances. Abnormal vibration may occur when operating a 2-pole motor at 60Hz or higher.

#### Noise

When a standard motor is drive controlled, the motor noise will be higher than with DOL operation.  
To lower the noise, please increase the carrier frequency of the drive. The motor fan can be very noisy when the motor speed exceeds 60Hz.

### Special Motors

#### High-speed Motor

To ensure safety, please try the frequency setting with another motor before operating the high-speed motor at 120Hz or higher.

#### Explosion-proof Motor

Please use a motor and drive that comply with explosion-proof requirements.

#### Submersible Motor & Pump

The rated current is higher than that of a standard motor.  
Please check before operation and select the capacity of the AC motor drive carefully.  
The motor temperature characteristics differ from a standard motor, please set the motor thermal time constant to a lower value.

#### Brake Motor

When the motor is equipped with a mechanical brake, the brake should be powered by the mains supply.  
Damage may occur when the brake is powered by the drive output. Please DO NOT drive the motor with the brake engaged.

#### Gear Motor

In gearboxes or reduction gears, lubrication may be reduced if the motor is continuously operated at low speeds.  
Please DO NOT operate in this way.

#### Synchronous Motor

These motors need suitable software to control them. Please contact Delta for more information.

#### Single-phase Motor

Single-phase motors are not suitable for being operated by an AC Motor Drive. Please use a 3-phase motor instead when necessary.

### Environmental Conditions

#### Installation Position

1. The drive is suitable for installation in a place with ambient temperature from -10 to 50°C.
2. The surface temperature of the drive and brake resistor will rise under specific operation conditions. Therefore, please install the drive on materials that are noncombustible.
3. Ensure that the installation site complies with the ambient conditions as stated in the manual.

### Wiring

#### Limit of Wiring Distance

For remote operation, please use twist-shielding cable and the distance between the drive and control box should be less than 20m.

#### Maximum Motor Cable Length

Motor cables that are too long may cause overheating of the drive or current peaks due to stray capacitance.

Please ensure that the motor cable is less than 30m.

If the cable length can't be reduced, please lower the carrier frequency or use an AC reactor.

#### Choose the Right Cable

Please refer to current value to choose the right cable section with enough capacity or use recommended cables.

#### Grounding

Please ground the drive completely by using the grounding terminal.

### How to Choose the Drive Capacity

#### Standard Motor

Please select the drive according to applicable motor rated current listed in the drive specification.

Please select the next higher power AC drive in case higher starting torque or quick acceleration/deceleration is needed.

#### Special Motor

Please select the drive according to: Rated current of the drive > rated current of the motor

### Transportation and Storage

Please transport and store the drive in a place that meets environment specifications.

### Peripheral Equipment

#### Molded-Case Circuit Breakers (MCCB)

Please install the recommended MCCB or ELCB in the main circuit of the drive and make sure that the capacity of the breaker is equal to or lower than the recommended one.

#### Add a Magnetic Contactor(MC) in the Output Circuit

When a MC is installed in the output circuit of the drive to switch the motor to commercial power or other purposes, please make sure that the drive and motor are completely stopped and remove the surge absorbers from the MC before switching it.

#### Add a Magnetic Contactor (MC) in the Input Circuit

Please only switch the MC ONCE per hour or it may damage the drive. Please use RUN/STOP signal to switch many times during motor operation.

#### Motor Protection

The thermal protection function of the drive can be used to protect the motor by setting the operation level and motor type (standard motor or variable motor).  
When using a high-speed motor or a water-cooled motor the thermal time constant should be set to a lower value.

When using a longer cable to connect the motor thermal relay to a motor, high-frequency currents may enter via the stray capacitance.

It may result in malfunctioning of the relay as the real current is lower than the setting of thermal relay. Under this condition, please lower the carrier frequency or add an AC reactor to solve this.

#### DO NOT Use Capacitors to Improve the Power Factor

Use a DC reactor to improve the power factor of the drive. Please DO NOT install power factor correction capacitors on the main circuit of the drive to prevent motor faults due to over current.

#### Do NOT Use Surge Absorber

Please DO NOT install surge absorbers on the output circuit of the drive.

#### Lower the Noise

To ensure compliance with EMC regulations, usually a filter and shielded wiring is used to lower the noise.

#### Method Used to Reduce the Surge Current

Surge currents may occur in the phase-lead capacitor of the power system, causing an overvoltage when the drive is stopped or at low loads.

It is recommended to add a DC reactor to the drive.

# Global Operations

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Taoyuan Technology Center (Green Building)



Taoyuan Plant 1



Tainan Plant (Diamond-rated Green Building)

## ASIA (China)



Wujiang Plant 3



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