

# C2000 Series Installation Instruction

## Classical Field Oriented Control AC Motor Drive

- Please read this instruction sheet thoroughly before installation and keep this instruction sheet and CD shipped with the product at hand and distribute to all users for reference.
- To ensure the safety of operators and equipment, only qualified personnel familiar with AC motor drive are allowed to do installation, trial run and parameters settings. Always read this instruction thoroughly before using the AC Motor Drive, especially the WARNING, DANGER and CAUTION notes. If you have any question, please contact your dealer.

### PLEASE READ PRIOR TO INSTALLATION FOR SAFETY.

	<input checked="" type="checkbox"/>	The ground terminal ⊕ of the AC motor drive must be grounded correctly. The grounding method must comply with the laws of the country where the AC motor drive is to be installed.
	<input checked="" type="checkbox"/>	After the power has been turned off, the AC motor drive may still contain the high voltage capacitors before POWER indicator of the AC motor drive is OFF. To prevent personal injury, please DO NOT touch the internal circuit and components until the voltage between +1 and - is less than 25VDC. Please wait at least 5 minutes for ≤22kW models to discharge to safe voltage level. (10 minutes for ≥30kW models).
	<input checked="" type="checkbox"/>	The CMOS IC on the internal circuit board of the AC motor drive is sensitive to static electricity. Please DO NOT touch the circuit board by your bare hands before taking anti-static measures. Never reassemble the internal components or circuit.

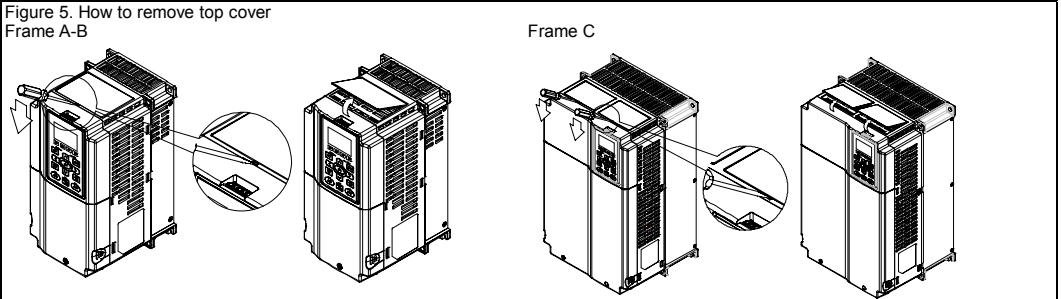
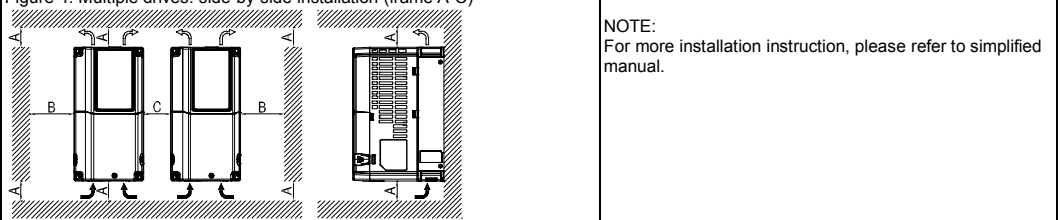
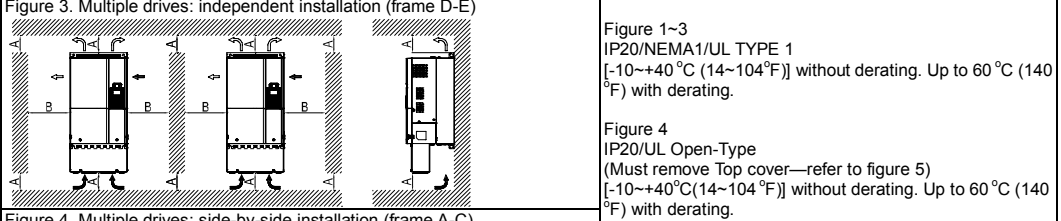
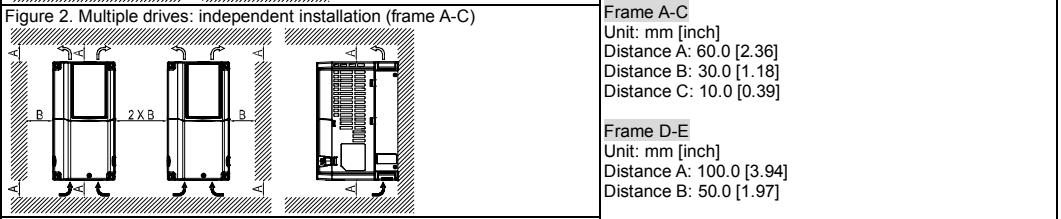
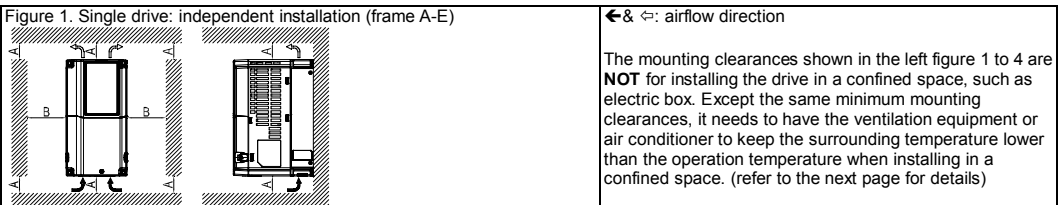
	<input checked="" type="checkbox"/>	If it needs to change wiring, please turn off the power of the AC motor drive before wiring. The capacitors of the internal DC needs time to discharge, if wiring before the voltage is discharged to the safe level, it may cause short circuit and fire. To ensure the personal safety, please wire with the safety voltage level.
	<input checked="" type="checkbox"/>	DO NOT install the AC motor drive in a place subjected to high temperature, direct sunlight and inflammables.

	<input checked="" type="checkbox"/>	Never apply the power into the output terminals U/T1, V/T2, W/T3 of the AC motor drive. Please stop operation immediately when fault occurs during operation of the AC motor drive and motor and refer to fault code for resetting the drive.
	<input checked="" type="checkbox"/>	DO NOT use Hi-pot test for internal components. The semi-conductor used in the AC motor drive is easily damaged by high-pressure.
	<input checked="" type="checkbox"/>	When the motor cable between the AC motor drive and motor is too long, the layer insulation of the motor may be damaged. Please use a frequency inverter duty motor or add a reactor to prevent motor damage.

	<input checked="" type="checkbox"/>	The rated voltage for the AC motor drive must be ≤ 240V (≤ 480V for 460V models) and the mains supply current capacity must be ≤ 5000A RMS (≤ 10000A RMS for the ≥ 40hp (30kW) models).
	<input checked="" type="checkbox"/>	The AC motor drive must be placed in a clean, good ventilation and dry location free from corrosive gases or liquids.
	<input checked="" type="checkbox"/>	The AC motor drive must be stored within an ambient temperature range of -25°C ~ +75°C and relative humidity range of 0% to 90% without condensation.
	<input checked="" type="checkbox"/>	DO NOT place on the ground directly. It should be stored properly. Moreover, if the surrounding environment is humid, you should put desiccator in the package. To prevent condensation and frost, please DO NOT store in an area with rapid changes in temperature. DO NOT install the AC motor drive in a place subjected to direct sunlight or vibration.

5. Please turn on the power after the front cover is installed. DO NOT operate with the humid hands. Make sure that the AC motor drive is unloaded. After the fault occurs, please wait 5 seconds after a fault has been cleared before pressing RESET key.
- NOTE**
- To prevent personal injury, please make sure that the case and wiring are installed by this instruction. The figures in this instruction are only for reference, it may be slightly different from that one you have but it won't affect your customers' right.
  - The content of this instruction sheet may be revised without prior notice. Please consult our distributors or download the most updated version at http://www.delta.com.tw/industrialautomation
- Installation Procedures**
- Make sure that the part number printed on the nameplate of the AC motor drive corresponds with the part number you ordered.
  - Please inspect the unit to assure it was not damaged during shipment after unpacking.
  - Make sure that the wire gauge is within the voltage range as indicated on the nameplate.
  - Please install the AC motor drive according to this instruction.
  - Please install accessories as requirement.
  - Connect to the motor and make sure that the connection and voltage are correct.
  - Please make sure that the power is OFF before wiring.
  - Setting parameters (refer to parameters manual for details).

### Minimum Mounting Clearances (Appearances in the following figures are only for reference)



In the following table, it shows the required air volume and heat dissipation for installing single drive in a confined space. When installing the multiple drives, the required air volume should be the required air volume for single drive X the number of the drives.  
External: the required air volume for heat sink, Internal: the required air volume for internal drive

Models	Flow Rate (CFM)		
	External	Internal	Total
007C23A	-	-	-
015C23A	13.6	-	13.6
022C23A	13.6	-	13.6
037C23A	10.2	-	10.2
055C23A	40.0	14.5	54.5
075C23A	65.8	14.5	80.3
110C23A	58.2	14.5	72.6
150C23A	166.3	12.2	178.5
185C23A	166.3	12.2	178.5
220C23A	145.6	12.2	157.8
300C23A	179.2	29.8	209.0
370C23A	179.2	29.8	209.0
450C23A	228.2	73.1	301.3
550C23A	228.2	73.1	301.3
750C23A	245.7	73.1	318.8
007C43A/E	-	-	-

Models	Flow Rate (CFM)		
	External	Internal	Total
022C43A/E	13.6	-	13.6
037C43A/E	10.2	-	10.2
040C43A/E	10.2	-	10.2
055C43A/E	40.0	-	54.5
075C43A/E	65.8	14.5	80.3
110C43A/E	58.2	14.5	72.6
150C43A/E	99.0	14.5	113.5
185C43A/E	99.0	20.8	119.8
220C43A/E	126.2	20.8	147.0
300C43A/E	179.2	20.8	200.0
370C43A	179.2	29.8	209.0
450C43A	179.2	29.8	209.0
550C43A	186.3	29.8	216.1
750C43A	256.9	29.8	300.0
900C43A/E	223.1	73.1	296.2
1100C43A/E	13.6	73.1	13.6

### Specifications for Wiring Terminals (refer to wiring diagram)

control terminals		Wire gauge: 26-16AWG(0.1281-1.318mm <sup>2</sup> ) Torque(±10%): 5kgf-cm[4.31 lbf-in.] (0.4905Nm)		
main circuit terminals				
Models	VFD- Max. Wire Gauge	Min. Wire Gauge	Torque (±10%)	Note
007C23A/E	8 AWG (8.4mm <sup>2</sup> )	14 AWG (2.1mm <sup>2</sup> )	M4 20kg-cm (17.4 lbf-in.) (1.962Nm)	
015C23A/E		12 AWG (3.3mm <sup>2</sup> )		
022C23A/E		10 AWG (5.3mm <sup>2</sup> )		
037C23A		8 AWG (8.4mm <sup>2</sup> )		
037C23E		10 AWG (5.3mm <sup>2</sup> )		
007C43A/E		14 AWG (2.1mm <sup>2</sup> )		
015C43A/E		14 AWG (2.1mm <sup>2</sup> )		
022C43A/E		14 AWG (2.1mm <sup>2</sup> )		
037C43A		10 AWG (5.3mm <sup>2</sup> )		
037C43E		12 AWG (3.3mm <sup>2</sup> )		
040C43A/E	4 AWG (21.2mm <sup>2</sup> )	10 AWG (5.3mm <sup>2</sup> )	M5 35kg-cm (30.4 lbf-in.) (3.4335Nm)	Terminal D+ [+2 & +1]: Torque 45 Kg-cm [39.0 lbf-in.] (4.4145Nm) (±10%)
055C43A/E		8 AWG (8.4mm <sup>2</sup> )		
055C23A/E		6 AWG (13.3mm <sup>2</sup> )		
075C23A/E		4 AWG (21.2mm <sup>2</sup> )		
※110C23A/E		8 AWG (8.4mm <sup>2</sup> )		
075C43A		10 AWG (5.3mm <sup>2</sup> )		
075C43E		8 AWG (8.4mm <sup>2</sup> )		
110C43A/E		8 AWG (8.4mm <sup>2</sup> )		
150C43A		6 AWG (13.3mm <sup>2</sup> )		
150C43E		8 AWG (8.4mm <sup>2</sup> )		
150C23A	1/0 AWG (53.5mm <sup>2</sup> )	1 AWG (42.4mm <sup>2</sup> )	M8 80kg-cm (69.4 lbf-in.) (7.848Nm)	Terminal D+ [+2 & +1]: Torque 90 Kg-cm [78.2 lbf-in.] (8.829Nm) (±10%)
150C23E		2 AWG (33.6mm <sup>2</sup> )		
185C23A		1/0 AWG (53.5mm <sup>2</sup> )		
185C23E		1 AWG (42.4mm <sup>2</sup> )		
※220C23A/E		1/0 AWG (53.5mm <sup>2</sup> )		
185C43A		4 AWG (21.2mm <sup>2</sup> )		
185C43E		6 AWG (13.3mm <sup>2</sup> )		
220C43A/E		4 AWG (21.2mm <sup>2</sup> )		
300C43A		2 AWG (33.6mm <sup>2</sup> )		
300C43E		3 AWG (26.7mm <sup>2</sup> )		
300C23A	300MCM (152mm <sup>2</sup> )	4/0 AWG (107mm <sup>2</sup> )	M8 200kg-cm (173 lbf-in.) (19.62Nm)	Please use the specifications of insulated heat shrink tubing that comply with UL (600C, YDPU2).
370C23A		250MCM (126mm <sup>2</sup> )		
370C43A		1/0 AWG (53.5mm <sup>2</sup> )		
450C43A		2/0 AWG (67.4mm <sup>2</sup> )		
550C43A		3/0 AWG (85mm <sup>2</sup> )		
750C43A		300MCM (152mm <sup>2</sup> )		
300C23E		4/0 AWG (107mm <sup>2</sup> )		
370C23E		4/0 AWG (107mm <sup>2</sup> )		
370C43E		1/0 AWG (53.5mm <sup>2</sup> )		
450C43E		2/0 AWG (67.4mm <sup>2</sup> )		
550C43E	3/0 AWG (85mm <sup>2</sup> )			
750C43E	4/0 AWG (107mm <sup>2</sup> )			
450C23A	300MCM*2 (152mm <sup>2</sup> *2)	1/0AWG*2 (53.5mm <sup>2</sup> *2)	M8 200kg-cm (173 lbf-in.) (19.62Nm)	When using the ring terminal, please comply with the following specification. 
550C23A		3/0AWG*2 (85mm <sup>2</sup> *2)		
750C23A		4/0 AWG *2 (107mm <sup>2</sup> *2)		
900C43A	4/0 AWG*2 (107mm <sup>2</sup> *2)	1/0AWG*2 (53.5mm <sup>2</sup> *2)	M8 200kg-cm (173 lbf-in.) (19.62Nm)	When using the ring terminal, please comply with the following specification. 
1100C43A		3/0AWG*2 (85mm <sup>2</sup> *2)		
370C43A		1/0AWG*2 (53.5mm <sup>2</sup> *2)		
550C23E		3/0AWG*2 (85mm <sup>2</sup> *2)		
750C23E		1/0AWG*2 (53.5mm <sup>2</sup> *2)		
900C43E	300MCM*2 (152mm <sup>2</sup> *2)	2/0AWG*2 (67.4mm <sup>2</sup> *2)	M8 200kg-cm (173 lbf-in.) (19.62Nm)	When using the ring terminal, please comply with the following specification. 
※900C23A		300MCM*2 (152mm <sup>2</sup> *2)		
1320C43A		4/0 AWG*2 (107mm <sup>2</sup> *2)		
1600C43A		300MCM*2 (152mm <sup>2</sup> *2)		
900C23E		4/0 AWG*2 (107mm <sup>2</sup> *2)		
1320C43E	300MCM*4 (152mm <sup>2</sup> *4)	3/0AWG*2 (85mm <sup>2</sup> *2)	M8 200kg-cm (173 lbf-in.) (19.62Nm)	When using the ring terminal, please comply with the following specification. 
1600C43E		4/0 AWG*2 (107mm <sup>2</sup> *2)		
2800C43A		4/0 AWG*4 (107mm <sup>2</sup> *4)		
3150C43A		300MCM*4 (152mm <sup>2</sup> *4)		
3550C43A		300MCM*4 (152mm <sup>2</sup> *4)		
2800C43E	300MCM*4 (152mm <sup>2</sup> *4)	3/0AWG*4 (85mm <sup>2</sup> *4)	M8 200kg-cm (173 lbf-in.) (19.62Nm)	When using the ring terminal, please comply with the following specification. 
3150C43E		4/0 AWG*4 (107mm <sup>2</sup> *4)		
3550C43E	250MCM*4 (127mm <sup>2</sup> *4)			

Main circuit terminals: R/L11, R/L12, S/L21, S/L22, T/L31, T/L32

1850C43A	300MCM*4 (152mm <sup>2</sup> *4)	2/0AWG*4 (67.4mm <sup>2</sup> *4)	M8 200kg-cm (173 lbf-in.) (19.62Nm)	When using the ring terminal, please comply with the following specification. 
2200C43A		3/0AWG*4 (85mm <sup>2</sup> *4)		
1850C43E		1/0AWG*4 (53.5mm <sup>2</sup> *4)		
2200C43E	400MCM*2 (203mm <sup>2</sup> *2)			

Main circuit terminals: U/T1, V/T2, W/T3, +1/DC+, -/DC-

1850C43A	500MCM*2 (253mm <sup>2</sup> *2)	400MCM*2 (203mm <sup>2</sup> *2)	M10 408kg-cm (354 lbf-in.) (40Nm)	When using the ring terminal, please comply with the following specification. 
2200C43A		500MCM*2 (253mm <sup>2</sup> *2)		
1850C43E		300MCM*2 (152mm <sup>2</sup> *2)		
2200C43E		400MCM*2 (203mm <sup>2</sup> *2)		

NOTE: UL installations must use 600V, 75°C or 90°C. Use copper wire only.  
NOTE: VFD110C23A, VFD220C43A must use 90°C wire, if ambient temperature > 45°C.  
NOTE: VFD220C23A, VFD900C23A/E must use 90°C wire, if ambient temperature > 40°C.

### Environment for Operation, Storage and Transportation

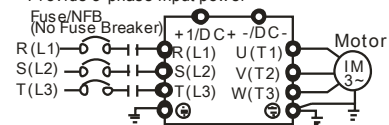
DO NOT expose the AC motor drive in the bad environment, such as dust, direct sunlight, corrosive/inflammable gasses, humidity, liquid and vibration environment. The salt in the air must be less than 0.01mg/cm<sup>2</sup> each year.

Environment	Installation location	IEC60364-1/IEC60664-1 Pollution degree 2, Indoor use only	
	Surrounding Temperature	Operation	UL type1/IP20 -10~+40°C without derating. Up to 60°C with derating*
		Storage/Transportation	UL OPEN-TYPE/IP20 -10~+50°C without derating (-10~+40°C for side by side removed top cover). Up to 60°C with derating*
		Non-condensation, non-frozen -25°C ~ +70°C	
Rated Humidity	Operation	Max. 90%	
	Storage /Transportation	Max. 95%	
	No condense water		
Air Pressure	Operation	86 to 106 kPa	
	Storage	86 to 106 kPa	
	Transportation	70 to 106 kPa	
Pollution Level	IEC721-3-3		
	Operation	Class 3C2, Class 3S2	
	Storage	Class 2C2, Class 2S2	
	Transportation	Class 1C2, Class 1S2	
No concentrate			
Package Drop	Altitude	Operation	Airflow range is 0-1000m. It will reduce 1% for each increasing 100m during the altitude 1000-3000m. The airflow limit is 2000m at the network area "Corner Grounded".
	Storage /Transportation	ISTA procedure 1A(according to weight) IEC60068-2-31	
Vibration	IEC 60068-2-6		
	Impact IEC/EN 60068-2-27		
Operation Position	Max. allowed offset angle ±10° (for normal installation position)		

# Wiring Diagram

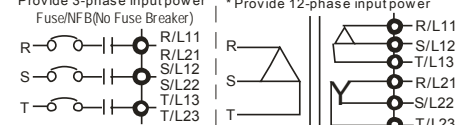
For frame D and above

\* Provide 3-phase input power



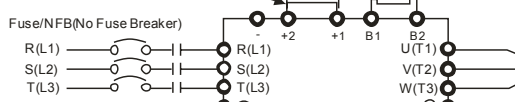
For frame G and frame H

\* Provide 3-phase input power  
\* Provide 12-phase input power

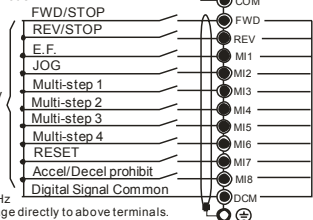


Frame A-C

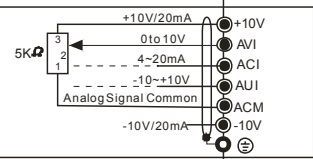
\* It provide 3-phase power



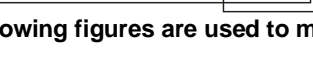
Factory setting: NPN (SINK) Mode  
Please refer to following figure for wiring of NPN mode and PNP mode



power removal safety function for EN954-1 and IEC/EN61508

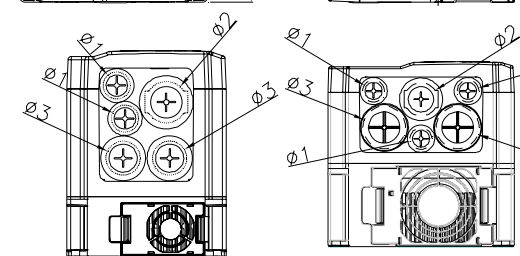
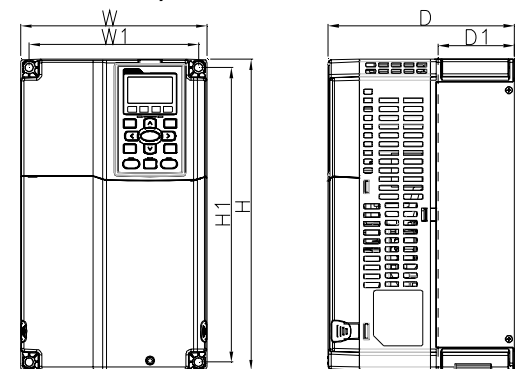


Modbus RS-485 Pin 1-2, 6, 8: reserved  
Pin 3, 7: GND  
Pin 4: SG-  
Pin 5: SG+



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

## Dimensions (Following figures are used to mark the dimensions and the appearance is only for reference)



Frame A  
VFD007C23A/E; VFD007C43A/E; VFD015C23A/E; VFD015C43A/E; VFD022C23A/E; VFD022C43A/E; VFD037C23A/E;  
VFD037C43A/E; VFD040C43A/E; VFD055C43A/E;

	W	H	D	W1	H1	D1	S1,S2	φ1	φ2	φ3
mm	130.0	250.0	170.0	116.0	236.0	45.8	6.2	22.2	34.0	28.0
inch	5.12	9.84	6.69	4.57	9.29	1.80	0.24	0.87	1.34	1.10

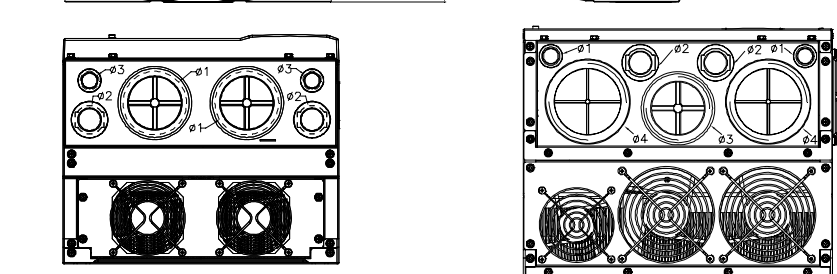
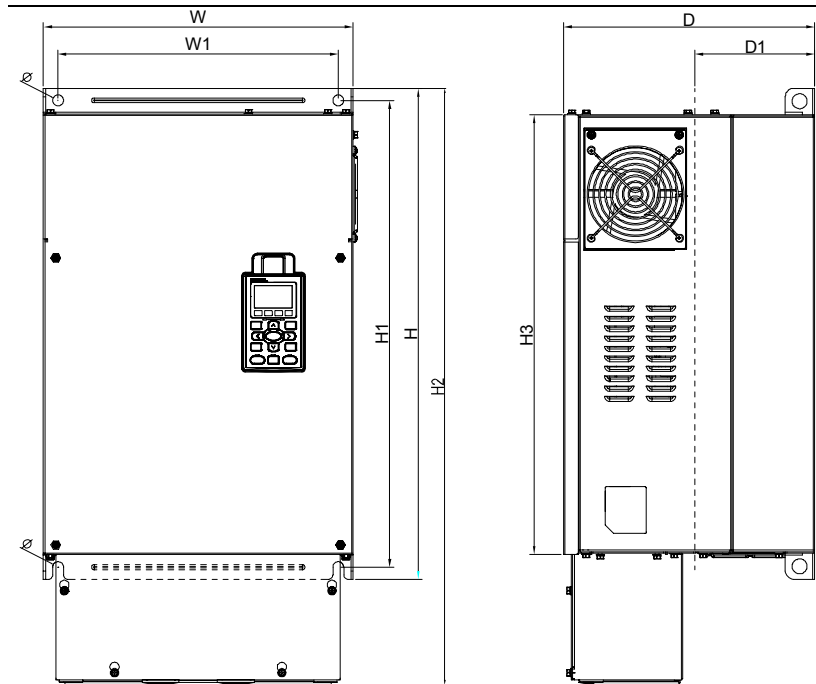
Frame B  
VFD055C23A/E; VFD75C23A/E; VFD075C43A/E; VFD110C23A/E; VFD11C43A/E; VFD150C43A/E;

	W	H	D	W1	H1	D1	S1,S2	φ1	φ2	φ3
Mm	190.0	320.0	190.0	173.0	303.0	77.9	8.5	22.2	34.0	43.8
Inch	7.48	12.60	7.48	6.81	11.93	3.07	0.33	0.87	1.34	1.72

Frame C  
VFD150C23A/E; VFD185C23A/E; VFD185C43A/E; VFD220C23A/E; VFD220C43A/E; VFD300C43A/E;

	W	H	D	W1	H1	D1	S1,S2	φ1	φ2	φ3
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 mm[inch]



Frame D  
D1 : VFD300C23A; VFD370C23A; VFD370C43A; VFD450C43A; VFD550C43A; VFD750C43A;  
D2 : VFD300C23E; VFD370C23E; VFD370C43E; VFD450C43E; VFD550C43E; VFD750C43E;

Frame	W	H	D	W1	H1	H2	H3	D1	φ	φ1	φ2	φ3
D	330.0 [12.99]	550.0 [20.65]	275.0 [10.83]	285.0 [11.22]	525.0 [20.67]		492.0 [19.37]	107.0 [4.22]	11.0 [0.43]	34.0 [1.34]	22.0 [0.87]	11.0 [0.43]
D1	330.0 [12.99]	550.0 [20.65]	275.0 [10.83]	285.0 [11.22]	525.0 [20.67]	688.3 [27.10]	492.0 [19.37]	107.0 [4.22]	11.0 [0.43]	34.0 [1.34]	22.0 [0.87]	11.0 [0.43]

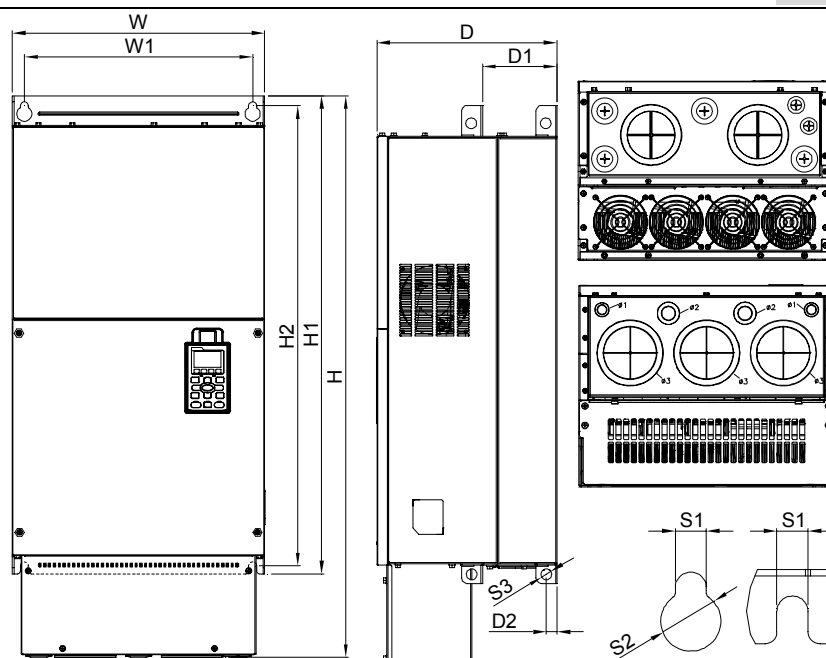
Frame E

E1 : VFD450C23A; VFD550C23A; VFD750C23A; VFD900C43A; VFD110C43A;

E2 : VFD450C23E; VFD550C23E; VFD750C23E; VFD900C43E; VFD110C43E;

Frame	W	H	D	W1	H1	H2	H3	D1	φ	φ1	φ2	φ3	φ4
E	370.0 [14.57]	589 [23.19]	300.0 [11.81]	335.0 [13.19]	560.0 [22.05]		528.0 [20.80]	143.0 [5.63]	13.0 [0.51]	22.0 [0.87]	34.0 [1.34]	76.0 [2.99]	92.0 [3.62]
E1	370.0 [14.57]	589 [23.19]	300.0 [11.81]	335.0 [13.19]	560.0 [22.05]	715.8 [28.18]	528.0 [20.80]	143.0 [5.63]	13.0 [0.51]	22.0 [0.87]	34.0 [1.34]	76.0 [2.99]	92.0 [3.62]

D1 : Flange mounting mm[inch]



Frame F

F1 : VFD900C23A; VFD1320C43A; VFD1600C43A;

F2 : VFD900C23E; VFD1320C43E; VFD1600C43E;

Frame	W	H	D	W1	H1	H2	H3	D1	D2	S1	S2	S3
F1	420.0 [16.54]		300.0 [11.81]	380.0 [14.96]	800.0 [31.50]	770.0 [30.32]	492.0 [19.37]	124.0 [4.88]	18.0 [0.71]	13.0 [0.51]	25.0 [0.98]	18.0 [0.71]
F2	420.0 [16.54]	940.0 [37.00]	300.0 [11.81]	380.0 [14.96]	800.0 [31.50]	770.0 [30.32]	492.0 [19.37]	124.0 [4.88]	18.0 [0.71]	13.0 [0.51]	25.0 [0.98]	18.0 [0.71]

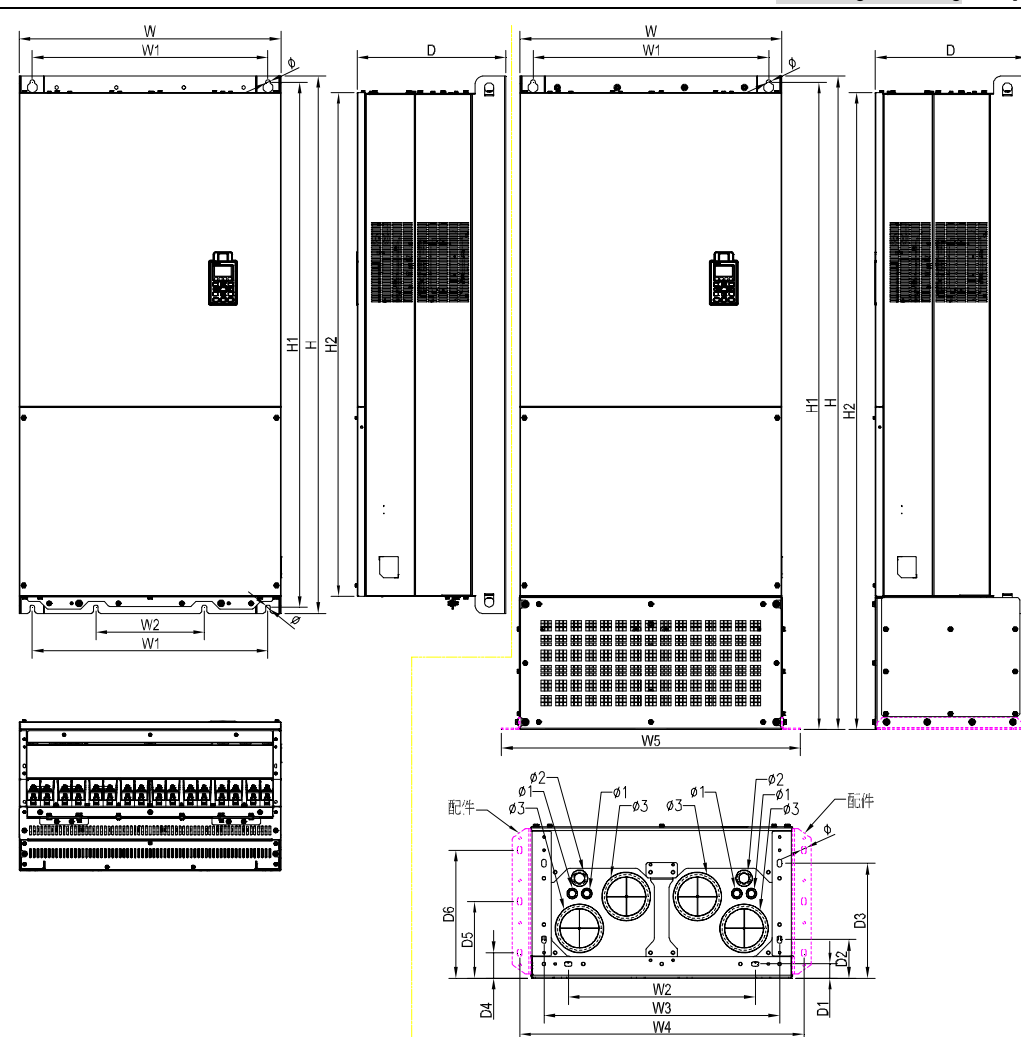
Frame G

G1 : VFD1850C43A; VFD2200C43A;

G2 : VFD1850C43E; VFD2200C43E;

Frame	W	H	D	W1	H1	H2	H3	φ	φ1	φ2	φ3
G1	500.0 [19.69]		397.0 [15.63]	440.0 [217.32]	1000.0 [39.37]	963.0 [37.91]	913.6 [35.97]	13.0 [0.51]			
G2	500.0 [19.69]	1240.2 [48.83]	397.0 [15.63]	440.0 [217.32]	1000.0 [39.37]	963.0 [37.91]	913.6 [35.97]	13.0 [0.51]	22.0 [0.87]	34.0 [1.34]	117.5 [4.63]

D1 : Flange mounting mm[inch]



Frame H

H1 : VFD1850C43A; VFD2200C43A;

H2 : VFD1850C43E; VFD2200C43E;

Frame	W	H	D	W1	W2	W3	W4	W5	H1	H2	D1	D2
H1	700.0 [27.56]	1435.0 [56.5]	398.0 [15.67]	630.0 [24.8]	290.0 [11.42]	1358.0 [53.46]		1347.0 [53.03]	1403.0 [55.24]	1347.0 [53.03]		
H2	700.0 [27.56]	1745.0 [68.7]	404.0 [15.9]	630.0 [24.8]	500.0 [19.69]	1358.0 [53.46]	1577.0 [62.08]	1347.0 [53.03]	1729.0 [68.07]	1702.0 [67.0]	38.0 [1.5]	103.0 [4.06]

Frame	D3	D4	D5	D6	φ	φ1	φ2	φ3
H1					13.0 [0.51]			
H2	307.0 [12.09]	68.0 [2.68]	206.0 [8.07]	342.0 [13.46]	13.0 [0.51]	22.0 [0.87]	34.0 [1.34]	117.5 [4.63]

Frame D  
D1 : VFD300C23A; VFD370C23A; VFD370C43A; VFD450C43A; VFD550C43A; VFD750C43A;  
D2 : VFD300C23E; VFD370C23E; VFD370C43E; VFD450C43E; VFD550C43E; VFD750C43E;