Automation for a Changing World

Delta IP55 Fan and Pump Drive CFP2000 Series

DELTA

Smarter. Greener. Together.

CFP2000

Delta's CFP2000 series is an AC motor drive specially designed for HVAC, fans & pumps, a IP55 enclosure to provide effective protection from dust and other particles and to offer a many outstanding features and built-in functions that reduce setup and tuning time in ope

The CFP2000 is equipped with a built-in EMC filter and a DC choke. This design replaces t space for other devices, while providing the benefits of harmonic suppression and better are also included, which allow you to simply select the needed application in the paramete safety standard is required, an optional main switch function is also available upon select IM/PM motors, real time clock, built-in 10k steps PLC capacity and various optional extens needs into one drive, it is your friendliest and smartest choice available in the industry.

and water treatment applications. It is designed with an good level of protection to water. In addition, it includes eration and provide higher efficiency.

he need for an electrical distribution cabinet and saves power quality to the system. Various parameter groups er group setting and the system setup is ready. If a higher ion. Other outstanding features include support for both sion cards. The CFP2000 series integrates all of your

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Highlights

Standard Models

Power range: AC 380 to 480V/3 phase

kW	0.75	1.5	2.2	3.7	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
HP	1	2	3	5	5	7.5	10	15	20	25	30	40	50	60	75	100	125
Frame Size	A							B				C		D0		D	

Application


HVAC


Fans


Chiller


Water treatment

Features

▸ Motor controls

IM motor

PM motor

▸ Overload ability

Light duty:
120% for 60sec

Normal duty:
120% for 60sec
160% for 3sec

▸ I/O terminals

- 10 MI
- 3 AI
- Optional I/O extension cards
- 2 AO
- 3 relay

▸ Built-in STO SIL2

▸ Mains Switch (Optional)

- Available for all IP55 models 0.75kW to 90kW
- Allows users to turn off the power easily during daily maintenance and does not require an additional breaker box

▸ LCD Keypad

- Quick setting for frequent use modes and facilitates the installation process
- Multi-row display, Intuitive operation, user friendly operation interface
- Parameter management and copy
- Real time clock
- Multi-language: English, Spanish, Portuguese, French, Russian, Turkish, Polish
- TP Editor for users to define the display on the screen of the keypad

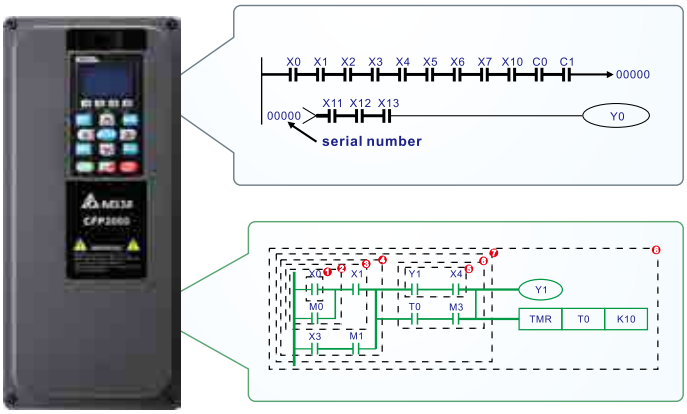
Create homepage logo

Editable message display

Features

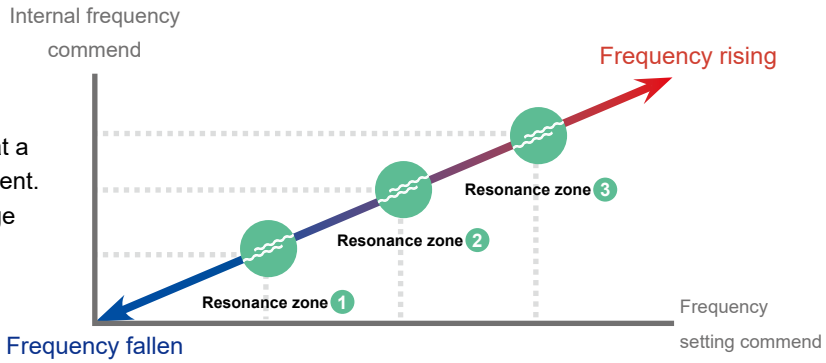
Built-in PLC Function

- Built-in 10k steps PLC function supports independent and distributed control when connecting to a network system for high operation flexibility.
- Real Time Clock (RTC) function facilitates the PLC program writing process for ON/OFF chronology, daylight savings operation and many other settings.



Skip Frequency

- Skip Frequency function avoids motor vibration at a specific frequency band and protects the equipment. User can restrict up to 3 zones of frequency range

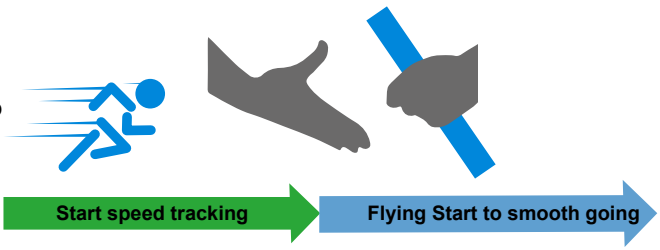


Fire Mode

- Application: ventilation of buildings, tunnels, subways and more
- The drive will bypass the alarm warning in fire mode. When a fire occurs, it forces the drive to continue to operate to extract smoke or supplies water until the drive fails or runs out of emergency power
  - » Preset speed mode: set the drive to continue to operate under a preset speed
  - » BYPASS mode: the AC Mains Bypass breaker will bypass the drive and connect to the emergency power
  - » Fire mode with PID control: it balances the pressure between the stairwell and fire location to ensure the fire door can be easily opened

▶ Flying Start

- Ensures the drive runs smoothly under high inertial load without triggering the alarm, does not require the motor to stop
- When the drive restarts after momentary power loss (within 5s on LV), the speed searching allows the drive to activate flying start immediately and ensure a stable operation of the system without requiring the motor to fully stop in order to save time

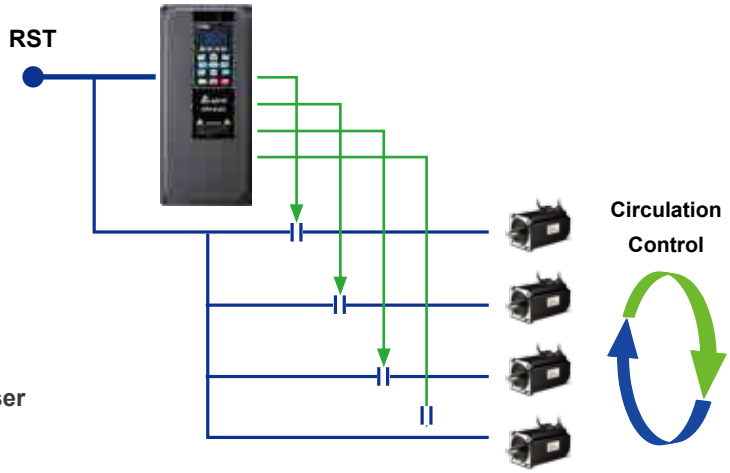


▶ Multi-pumps control

Built-in various modes for multi-pump control

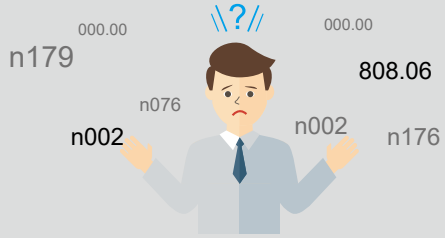
- Fixed time circulation (by time)
- Fixed amount circulation (by PID)
- Fixed amount control (by PID)
- Fixed time circulation + fixed amount circulation
- Fixed time circulation + fixed amount control

Built-in 10k steps PLC function and RTC for user to program a time sequence control



▶ Parameter groups

Without parameter group…..



CFP2000 parameter group function simplifies the drive setting procedures. Various applications are provided:

01: User Defined

02: AHU

03: Fan

04: Pump

05: Compressor

▶ Advanced network functions

- Built-in RS-485 (MODBUS)
- Built-in BACnet MS/TP
- Various communication card options

EtherNet/IP, DeviceNet, MODBUS TCP, CANopen (DS402)

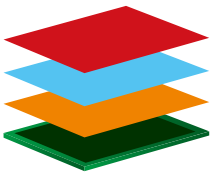
Operating Environment

Enhanced PCB coating

Standard:

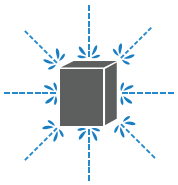
IEC 60721-3-3 class 3C3

Protects PCB from gases such as salt, SO2, O3, H2S, and others to extend the product life when used in a water treatment application

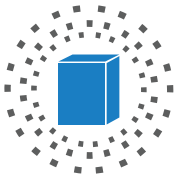


Protection class

IP55 NEMA12, IP41 NEMA1



Water Resistant

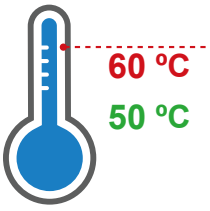


Dust Resistant

Operation temperature

Up to **50 °C** without derating

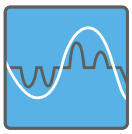
Up to **60 °C** with derating



Built-in DC choke

Suppress harmonics

THDi < 48%



EN61000-3-12

Built EMC filter

EN61800-3 C2 & C1*

***A zero phase reactor is required to fulfill EMC category C1**

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 salts in the air must be less than 0.01 mg/cm^2 every year.			
Ambient Conditions	**Installation Location**	IEC60364-1/IEC60664-1 Pollution degree 2, indoor use only	
	Surrounding Temperature	Storage/Transportation	-25°C~+70°C
		Only allowed at non-condensation, non-frost, non-conductive environment.	
	Rated Humidity	Operation	Max. 95%
		Storage/Transportation	Max. 95%
		Only allowed at non-condensation, non-frost, non-conductive environment.	
	Air Pressure	Operation/Storage	86 to 106 kPa
		Transportation	70 to 106 kPa
	Environment	IEC60721-3-3	
		Operation	Class 3C3; Class 3S2
		Storage	Class 1C2; Class 1S2
		Transportation	Class 2C2; Class 2S2
		Only allowed at non-condensation, non-frost, non-conductive environment.	
	Altitude	Operation	If the AC motor drive is installed at an altitude 0~1,000 m, follow normal operation restrictions. For every 100 m increase in altitude, the AC motor drive needs to either lower rated current by 1% or by 0.5°C of temperature for operation.If the drive is installed at an altitude above 2,000 m, please refer to the voltage derating graph in the user manual for more instructions. Note: Voltage derating is not needed for a Center Ground System, and maximum installation altitude is 4,000m.
Package Drop		Storage/Transportation	IEC60068-2-64
Vibration		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	Protection Level	OperationTemperature
VFDxxxFPxxx-52	Frame A ~ D: 0.75~90 kW	IP55/NEMA12	-10 °C ~ 50 °C
VFDxxxFPxxx-41	Frame A ~ D: 0.75~90 kW	IP41/NEMA1	-10 °C ~ 50 °C

Specifications

Frame Size			A							B				C		D0		D	
Models VFD-____FP4E-__			007	015	022	037	040	055	075	110	150	185	220	300	370	450	550	750	900
OUTPUT RATING	LIGHT DUTY	Rated Output Capacity (kVA)	2.4	3.3	4.4	6.8	8.4	10.4	14.3	19	25	30	36	48	58	73	88	120	143
		Rated Output Current (A)	3	4.2	5.5	8.5	10.5	13	18	24	32	38	45	60	73	91	110	150	180
		Applicable Motor Output (kW)	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
		Applicable Motor Output (HP)	1	2	3	5	5	7.5	10	15	20	25	30	40	50	60	75	100	125
		Overload Tolerance	120% for 60 seconds in every 5 minutes																
	NORMAL DUTY	Rated Output Capacity (kVA)	1.4	2.4	3.2	4.8	7.2	8.4	10	14	19	25	30	36	48	58	73	88	120
		Rated Output Current (A)	1.7	3.0	4.0	6.0	9.0	10.5	12	18	24	32	38	45	60	73	91	110	150
		Applicable Motor Output (kW)	0.4	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75
		Applicable Motor Output (HP)	0.5	1	2	3	5	5	7.5	10	15	20	25	30	40	53	60	75	100
		Overload Tolerance	120% for 60 seconds in every 5 minutes 160% for 3 seconds in every 25 seconds																
INPUT RATING	Max. Output Frequency (Hz)		599.00 Hz																
	Carrier Frequency (kHz)		2 ~ 15 kHz (default setting 6 kHz)										2 ~ 10 kHz (default setting 6 kHz)*1						
	Input Current (A) Light Duty		3.0	4.2	5.5	8.5	10.5	13	18	24	32	38	45	60	73	91	110	150	180
	Input Current (A) Normal Duty		1.7	3.0	4.0	6.0	9.0	10.5	12	18	24	32	38	45	60	73	91	110	150
	Rated Voltage/Frequency		3-phase AC 380 V ~ 480 V (-15% ~ +10%), 50/60 Hz																
	Operating Voltage Range		323 ~ 528 V_{AC}																
	Frequency Tolerance		47 ~ 63 Hz																
Drive Weight			6.8 kg							14.5 kg				26.5 kg		42 kg		59.5 kg	
Cooling Method			Natural cooling		Fan cooling														
Braking Chopper			Frame A, B, C, Built-in																
DC Choke			Built-in DC choke meets EN6100-3-12																
EMC Filter			Built-in EMC filter meets EN61800-3 C2 & C1*																

*1 The carrier frequency range of VFD900FP4EA-xx is 2 ~ 9 kHz, default setting 6 kHz

*2 A zero phase reactor is required to fulfill EMC category C1

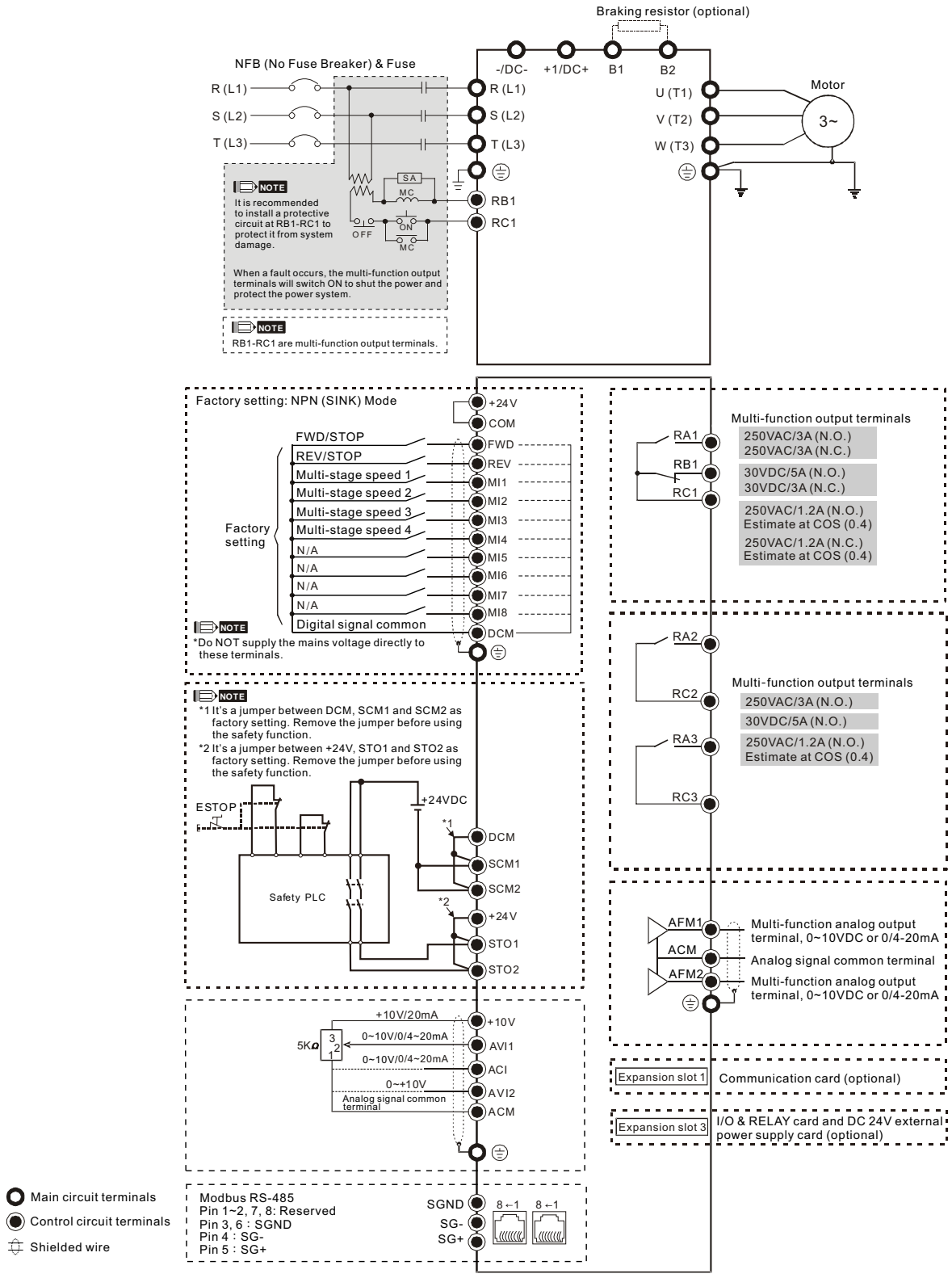
General Specifications

CONTROL CHARACTERISTICS	**Control Method**	Pulse Width Modulated (PWM)				
	Control Mode	1: V/F (V/F control), 2: SVC (Sensorless Vector Control), 3: PMSVC				
	Starting Torque	V/F and SVC: starting torque 150% at 0.5Hz PMSVC: starting torque 100% at rated frequency* 1/20				
	V/F Curve	4 point adjustable V/F curve and square curve				
	Speed Response Ability	5 Hz				
	Torque Limit	Light Duty: Max. 130% torque current; Normal Duty: Max. 160% torque current				
	Torque Accuracy	±5%				
	Max. Output Frequency (Hz)	599.00 Hz				
	Frequency Output Accuracy	Digital command: ±0.01%, Analog command: ±0.1%				
	Output Frequency Resolution	Digital command: 0.01 Hz; Analog command: Max. output frequency x 0.03/60 Hz (±11-bit)				
	Overload Tolerance	Light duty: 120% of rated current for 1 minute Normal duty: 120% of rated current for 1 minute; 160% of rated current for 3 seconds				
	Frequency Setting Signal	0~+10 V, 4~20 mA, 0~20 mA, pulse input				
	Accel./decel. Time	0.00 ~ 600.00/0.0 ~ 6000.0 seconds				
	Main Control Function	Fault restart	Torque limit	Smart stall	Dwell	3-wire sequence
		Speed search	Parameter copy	JOG frequency	Slip compensation	Torque compensation
		S-curve accel/decel	Energy saving control	Accel/Decel. Time switch	Frequency/lower limit settings	Momentary power loss ride thru
		PID control (with sleep function)	Auto-Tuning (rotational, stationary)	DC injection braking at start/stop	BACnet communication	16-step speed (max.)
		Over-torque detection		MODBUS communication (RS-485 RJ45, Max. 115.2 kbps)		
	Fan Control	VFD300FP4E and above are PWM control VFD220FP4E and below are on/off switch control				
PROTECTION CHARACTERISTICS	**Motor Protection**	Electronic thermal relay protection				
	Over-Current Protection	Light duty: Over-current protection for 200% rated current, Normal duty: Over-current protection for 240% rated current, Current clamp (Light duty: 130~135%) (Normal duty: 170~175%)				
	Over-Voltage Protection	Drive will stop when DC-BUS voltage exceeds 820 V				
	Over-Temperature Protection	Built-in temperature sensor				
	Stall Prevention	Stall prevention during acceleration, deceleration and running independently				
	Restart After Instantaneous Power Failure	Parameter setting up to 20 seconds				
	Grounding Leakage Current Protection	Leakage current is higher than 50% of rated current of the AC motor drive				
International Certifications		CE cULus				

Wiring

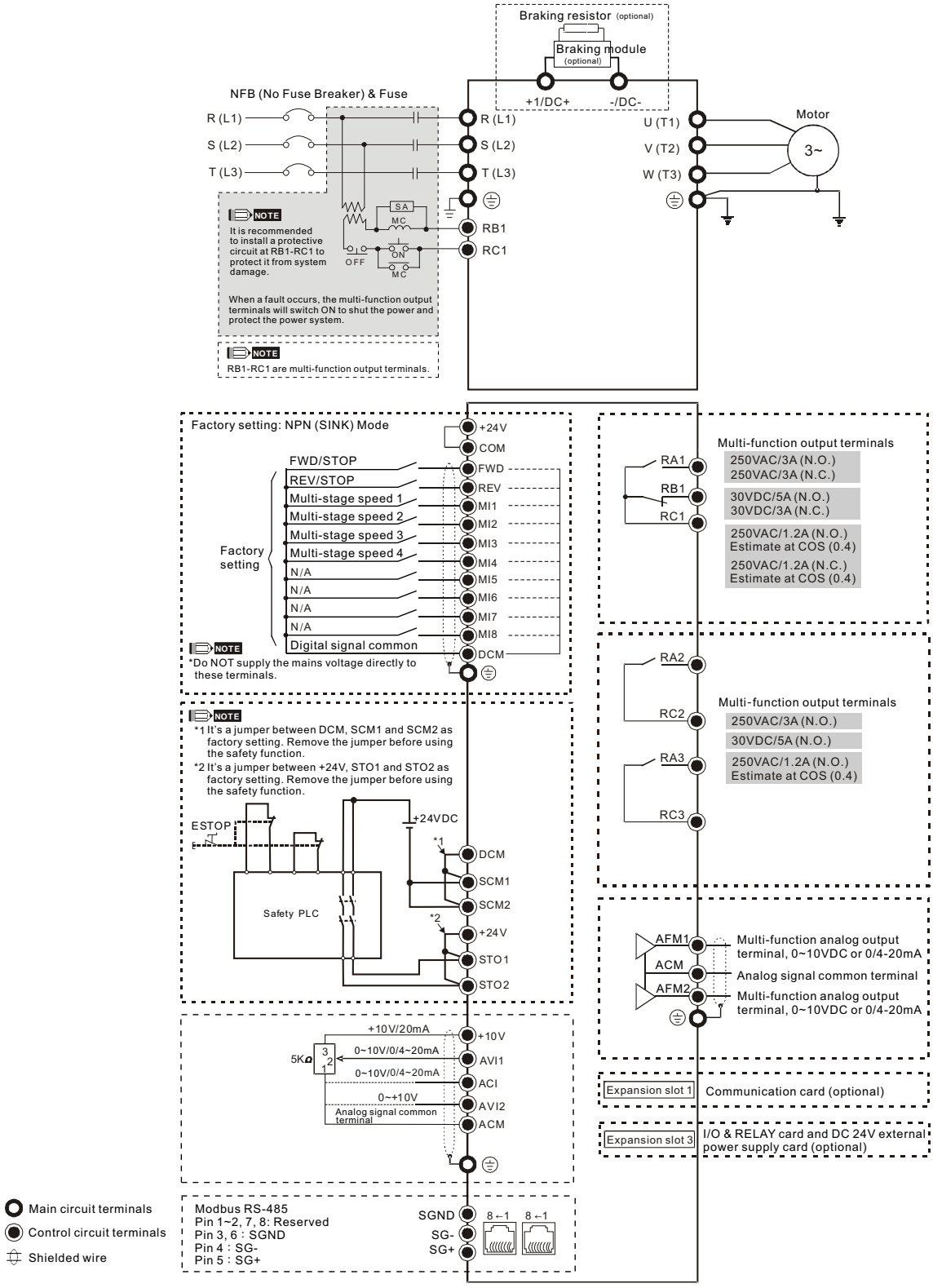
Wiring Diagram for Frame A ~ C

*Input: 3-phase power



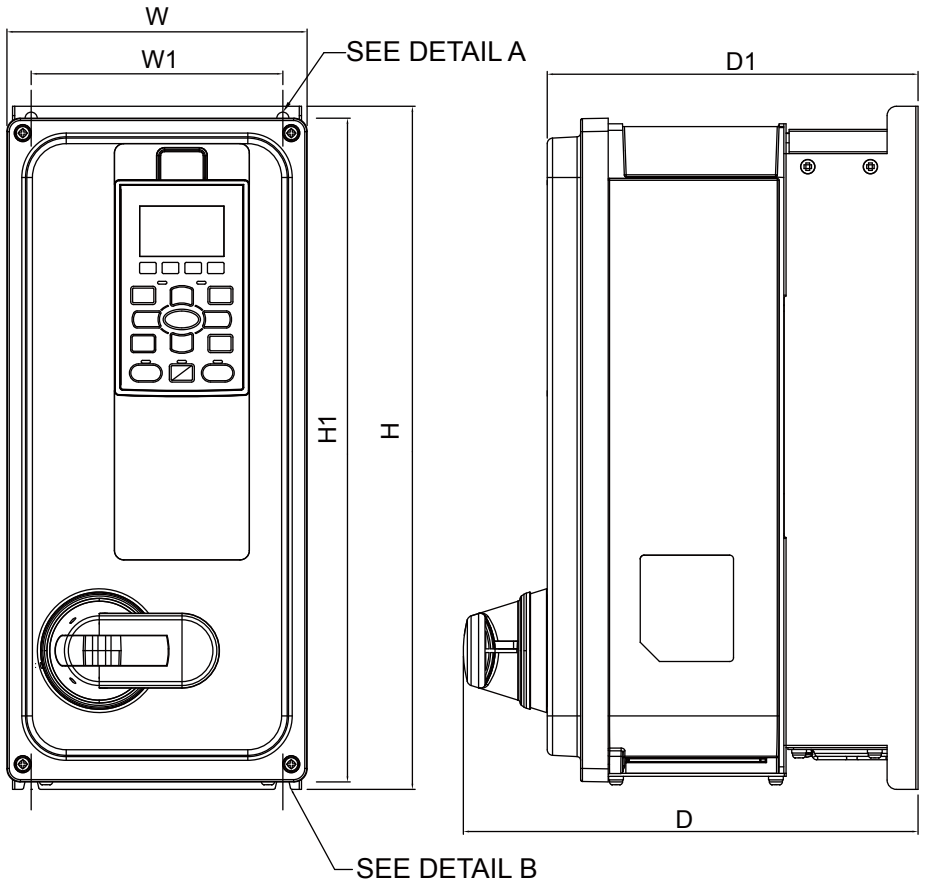
Wiring Diagram for Frame D0 ~ D

*Input: 3-phase power



Dimensions

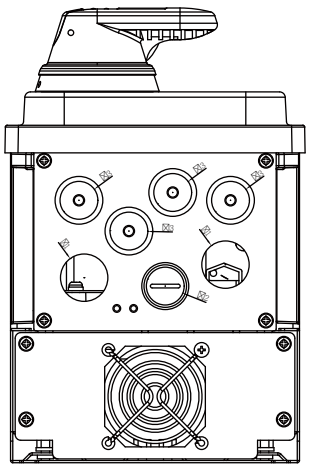
FRAME A (IP55)

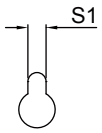


MODEL
FRAME_A

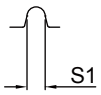
FRAME_A-1
VFD007FP4EA-52
VFD015FP4EA-52
VFD022FP4EA-52
VFD037FP4EA-52
VFD040FP4EA-52
VFD055FP4EA-52
VFD075FP4EA-52

FRAME_A-2
VFD007FP4EA-52S
VFD015FP4EA-52S
VFD022FP4EA-52S
VFD037FP4EA-52S
VFD040FP4EA-52S
VFD055FP4EA-52S
VFD075FP4EA-52S





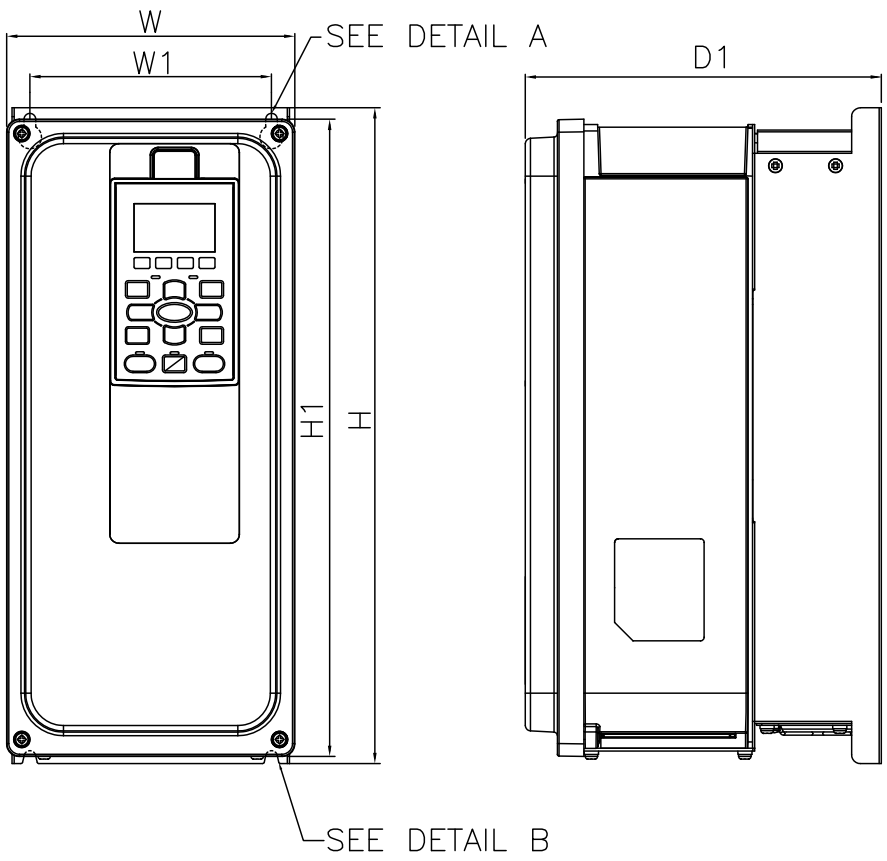
DETAIL A
(MOUNTING HOLE)

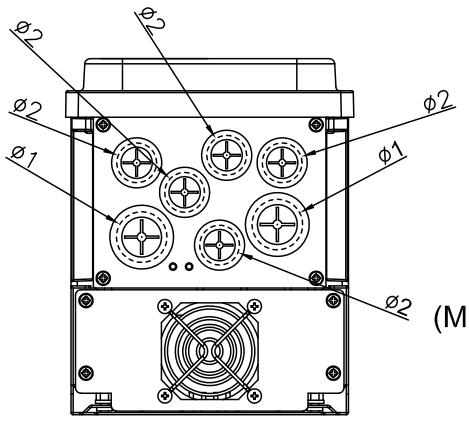


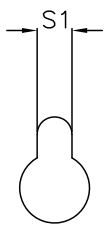
DETAIL B
(MOUNTING HOLE)

FRAME		W	H	D	W1	H1	D1	S1	Ø1	Ø2	Ø3
A-1	mm	161.0	336.4	-	135.0	356.0	199.0	6.5	25.4	20.3	20.3
	inch	6.34	14.43	-	5.31	14.02	7.83	0.26	1.00	0.80	0.80
A-2	mm	161.0	336.4	244.0	135.0	356.0	199.0	6.5	25.4	20.3	20.3
	inch	6.34	14.43	9.61	5.31	14.02	7.83	0.26	1.00	0.80	0.80

FRAME A (IP41)







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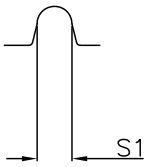
(MOUNTING HOLE)



DETAIL B
(MOUNTING HOLE)

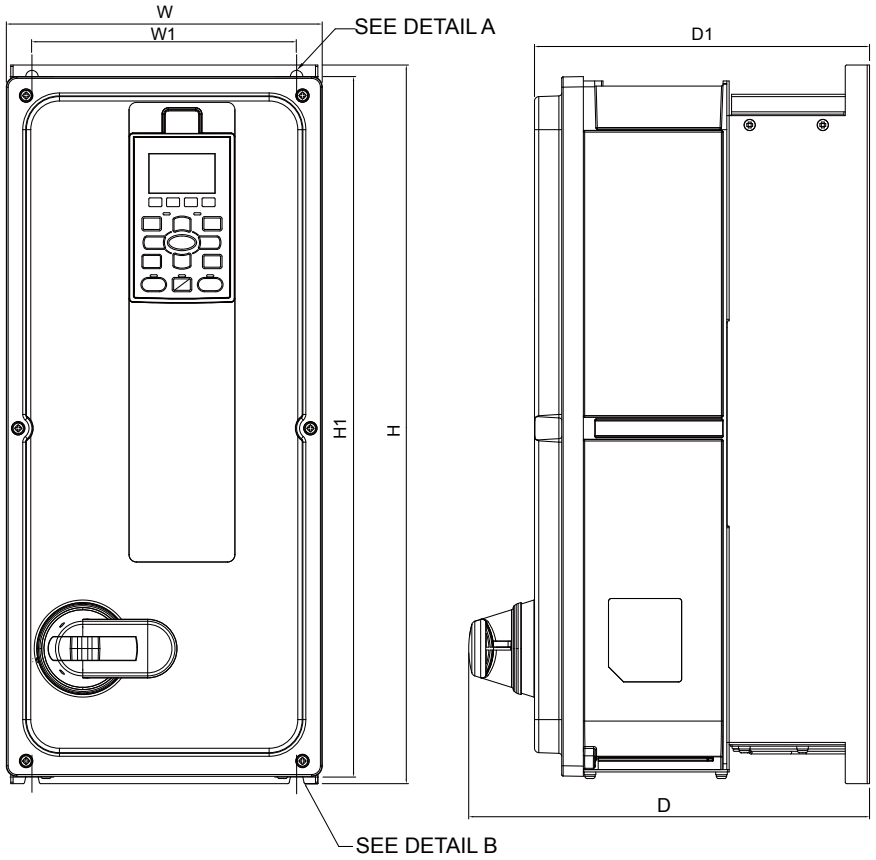
MODEL
FRAME_A

FRAME_A-3
VFD007FP4EA-41
VFD015FP4EA-41
VFD022FP4EA-41
VFD037FP4EA-41
VFD040FP4EA-41
VFD055FP4EA-41
VFD075FP4EA-41

FRAME		W	H	D	W1	H1	D1	S1	Ø1	Ø2
A-3	mm	161.0	336.4	-	135.0	356.0	199.0	6.5	28.0	22.0
	inch	6.34	14.43	-	5.31	14.02	7.83	0.26	1.10	0.87

Dimensions

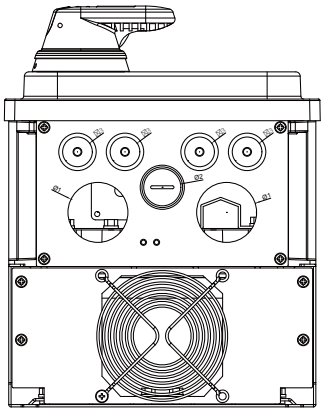
FRAME B (IP55)

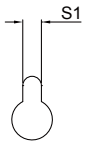


MODEL
FRAME_B

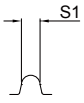
FRAME_B-1
VFD110FP4EA-52
VFD150FP4EA-52
VFD185FP4EA-52
VFD220FP4EA-52

FRAME_B-2
VFD110FP4EA-52S
VFD150FP4EA-52S
VFD185FP4EA-52S
VFD220FP4EA-52S





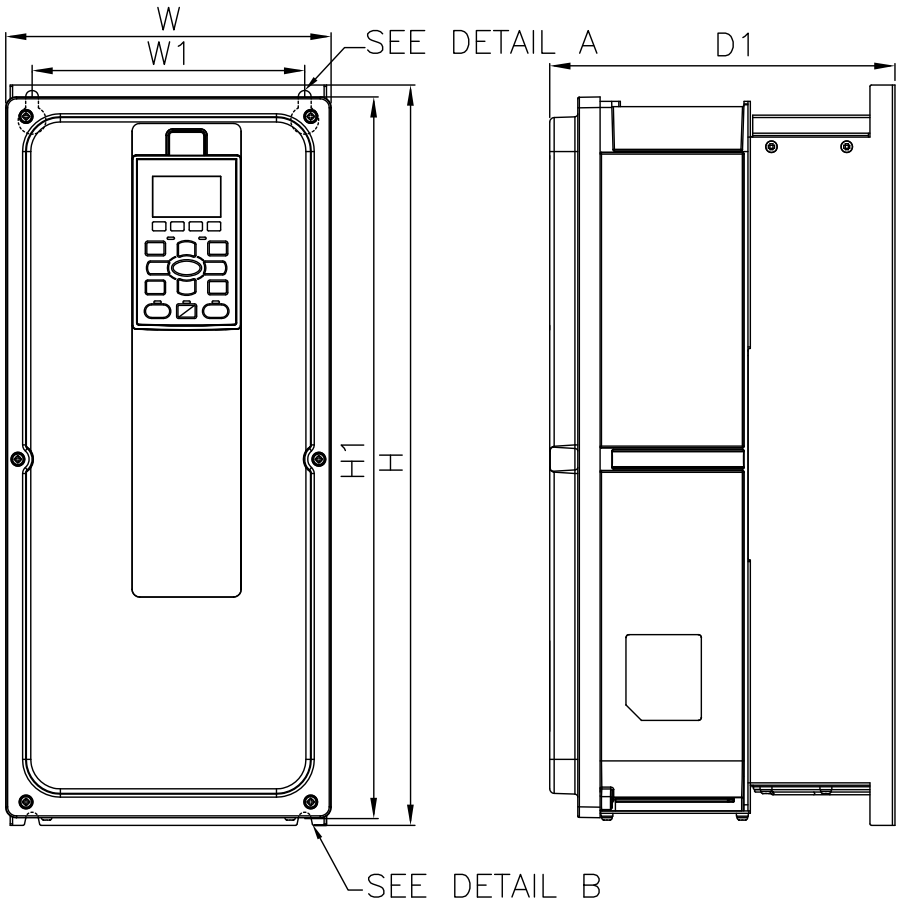
DETAIL A
(MOUNTING HOLE)

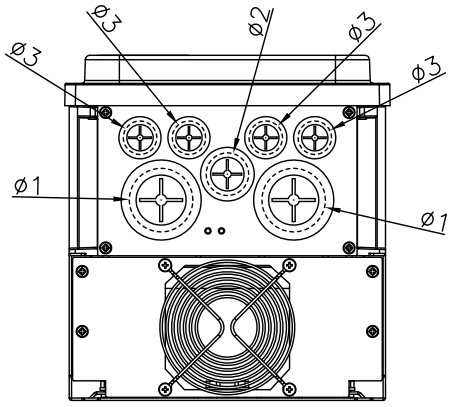


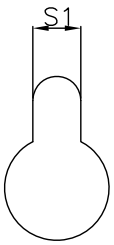
DETAIL B
(MOUNTING HOLE)

FRAME		W	H	D	W1	H1	D1	S1	Ø1	Ø2	Ø3
B-1	mm	216.0	491.4	-	181.0	479.0	229.0	8.5	41.0	25.4	20.3
	inch	8.50	19.35	-	7.13	18.86	9.02	0.33	1.61	1.00	0.80
B-2	mm	216.0	491.4	274.0	181.0	479.0	229.0	8.5	41.0	25.4	20.3
	inch	8.50	19.35	10.79	7.13	18.86	9.02	0.33	1.61	1.00	0.80

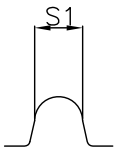
FRAME B (IP41)







DETAIL A
(MOUNTING HOLE)



DETAIL B
(MOUNTING HOLE)

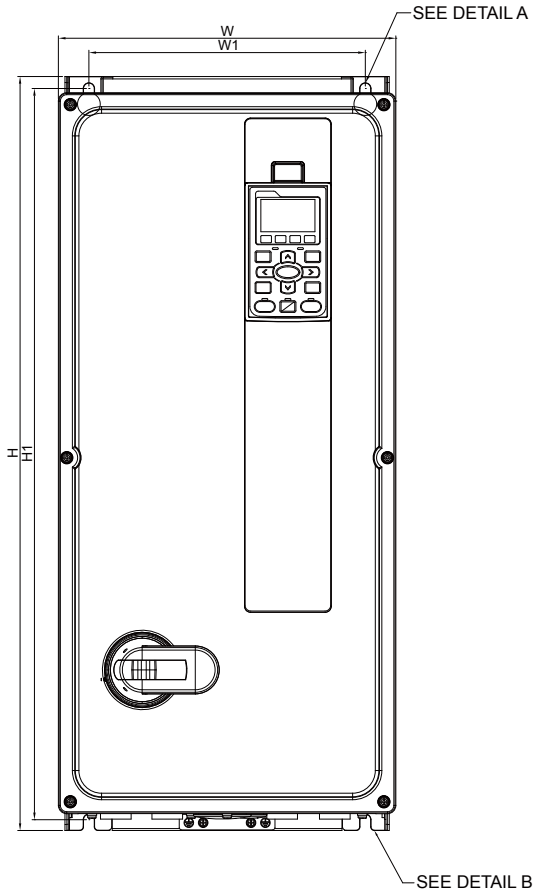
MODEL
FRAME_B

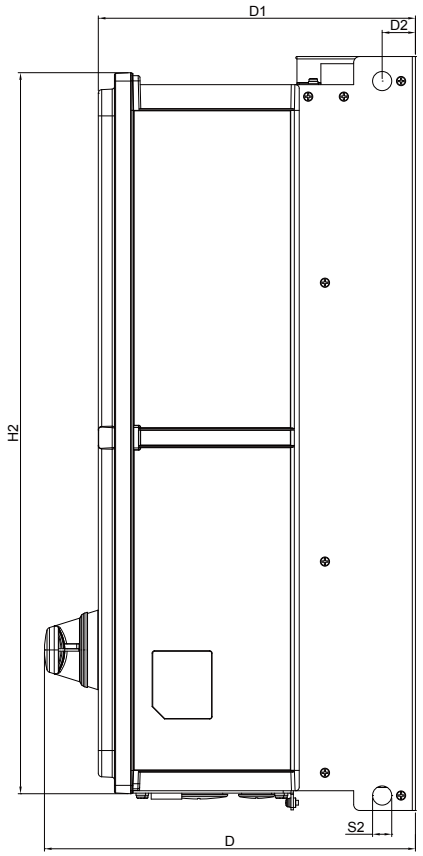
FRAME_B-3
VFD110FP4EA-41
VFD150FP4EA-41
VFD185FP4EA-41
VFD220FP4EA-41

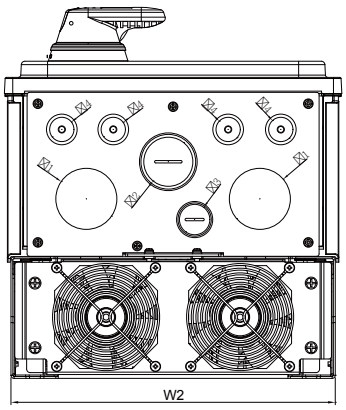
FRAME		W	H	D	W1	H1	D1	S1	Ø1	Ø2	Ø3
B-3	mm	216.0	491.4	-	181.0	479.0	229.0	8.5	41.0	25.4	20.3
	inch	8.50	19.35	-	7.13	18.86	9.02	0.33	1.61	1.00	0.80

Dimensions

FRAME C (IP55)







DETAIL A
(MOUNTING HOLE)

DETAIL B
(MOUNTING HOLE)

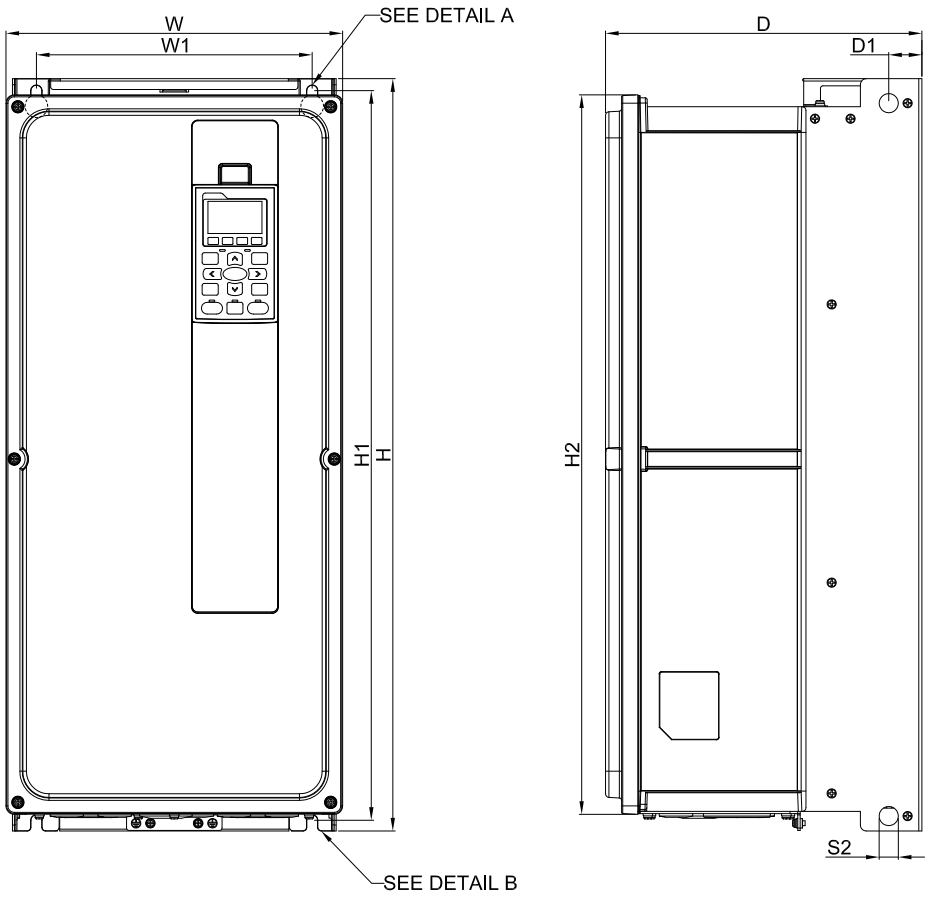
MODEL
FRAME_C

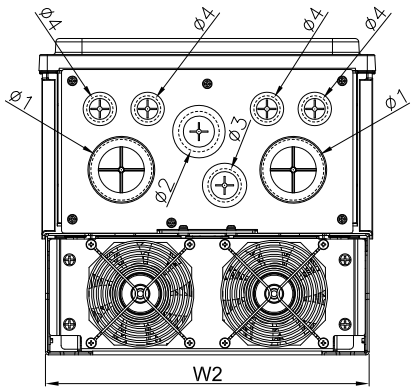
FRAME_C-1
VFD300FP4EA-52
VFD370FP4EA-52

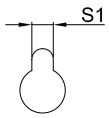
FRAME_C-2
VFD300FP4EA-52S
VFD370FP4EA-52S

FRAME		W	H	D	W1	H1	D1	S1	W2	H2	D2	S2	Ø1	Ø2	Ø3	Ø4
C-1	mm	282.0	630.0	-	231.0	611.0	265.0	9.0	271.0	602.5	27.8	16.0	51.0	41.0	25.4	20.3
	inch	11.10	24.80	-	9.09	24.06	10.43	0.35	10.67	23.72	1.09	0.63	2.01	1.61	1.00	0.80
C-2	mm	282.0	630.0	310.0	231.0	611.0	265.0	9.0	271.0	602.5	27.8	16.0	51.0	41.0	25.4	20.3
	inch	11.10	24.80	12.20	9.09	24.06	10.43	0.35	10.67	23.72	1.09	0.63	2.01	1.61	1.00	0.80

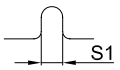
FRAME C (IP41)







DETAIL A
(MOUNTING HOLE)



DETAIL B
(MOUNTING HOLE)

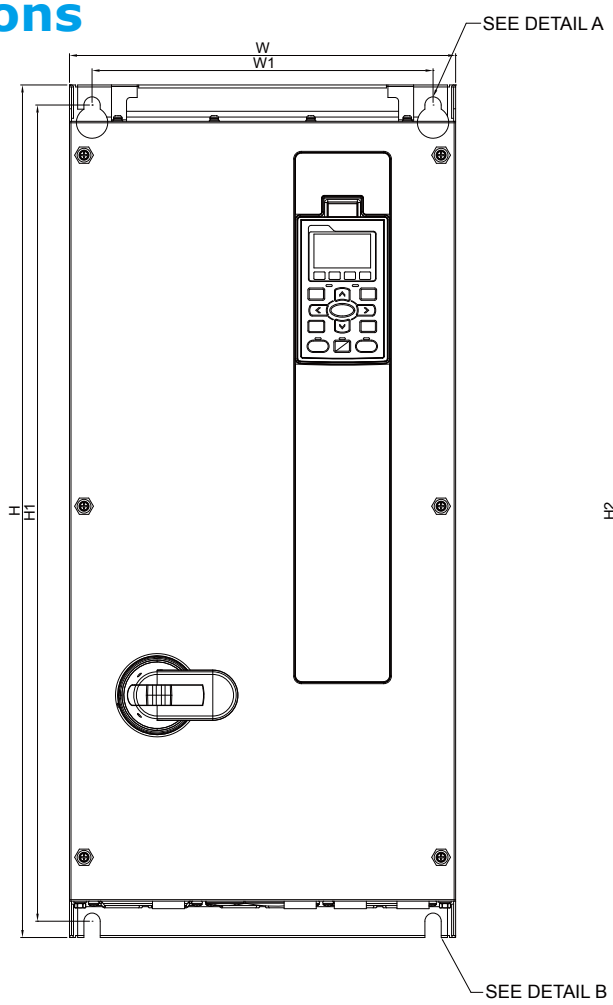
MODEL
FRAME_C

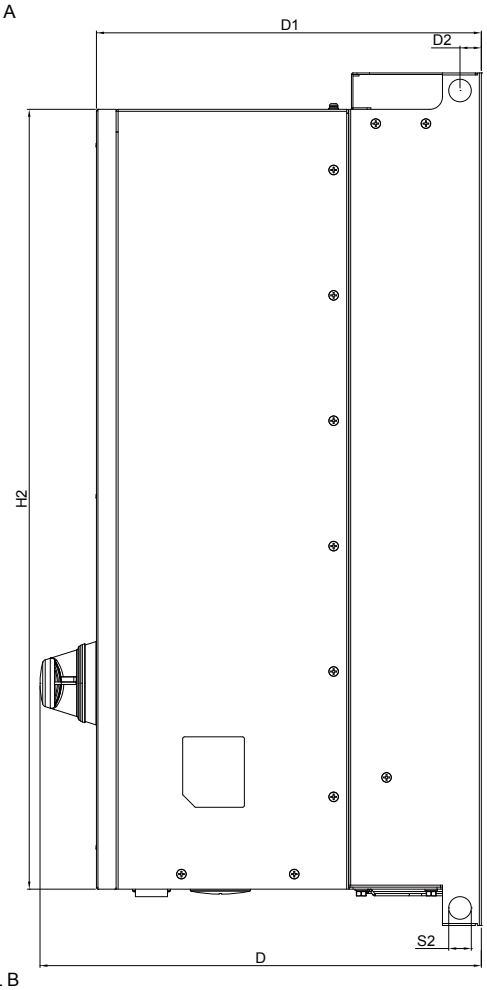
FRAME_C-3
VFD300FP4EA-41
VFD370FP4EA-41

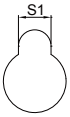
FRAME		W	H	D	W1	H1	D1	S1	W2	H2	D2	S2	Ø1	Ø2	Ø3	Ø4
C-3	mm	282.0	630.0	265.0	231.0	611.0	27.8	9.0	271.0	602.5	27.8	16.0	51.0	34.0	28.0	22.0
	inch	11.10	24.80	10.43	9.09	24.06	1.09	0.35	10.67	23.72	1.09	0.63	2.01	1.34	1.10	0.87

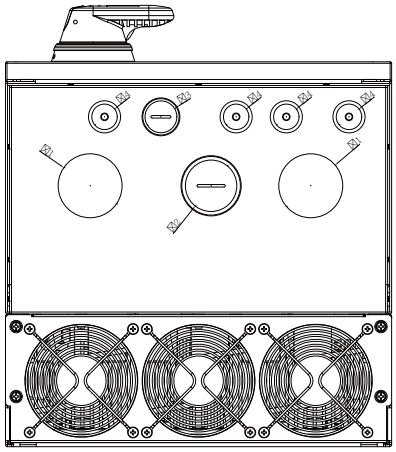
Dimensions

FRAME D0 (IP55)









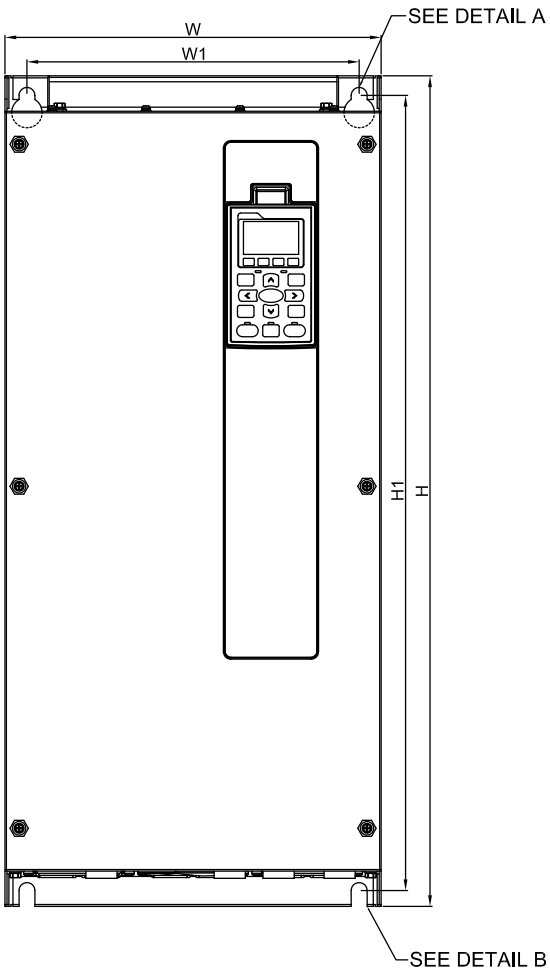
MODEL
FRAME_D0

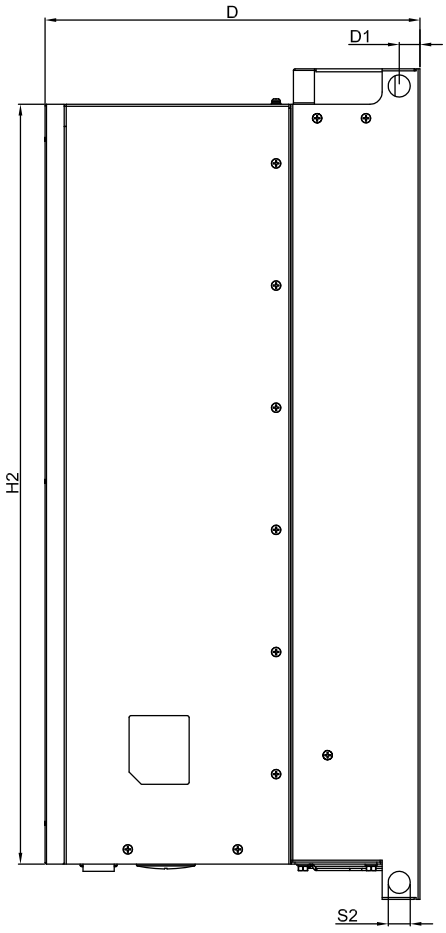
FRAME_D0-1
VFD450FP4EA-52
VFD550FP4EA-52

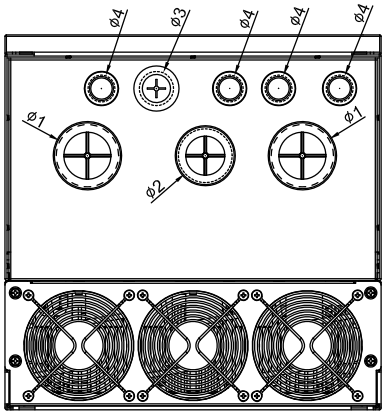
FRAME_D0-2
VFD450FP4EA-52S
VFD550FP4EA-52S

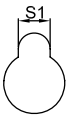
FRAME		W	H	D	W1	H1	D1	S1	H2	D2	S2	Ø1	Ø2	Ø3	Ø4
D0-1	mm	308.0	680.0	-	272.0	651.0	307.0	13.0	622.0	17.0	18.0	51.0	41.0	25.4	20.3
	inch	12.13	26.77	-	10.71	25.63	12.09	0.51	24.49	0.67	0.71	2.01	1.61	1.00	0.80
D0-2	mm	308.0	680.0	352.0	272.0	651.0	307.0	13.0	622.0	17.0	18.0	51.0	41.0	25.4	20.3
	inch	12.13	26.77	13.86	10.71	25.63	12.09	0.51	24.49	0.67	0.71	2.01	1.61	1.00	0.80

FRAME D0 (IP41)









DETAIL A
(MOUNTING HOLE)

DETAIL B
(MOUNTING HOLE)

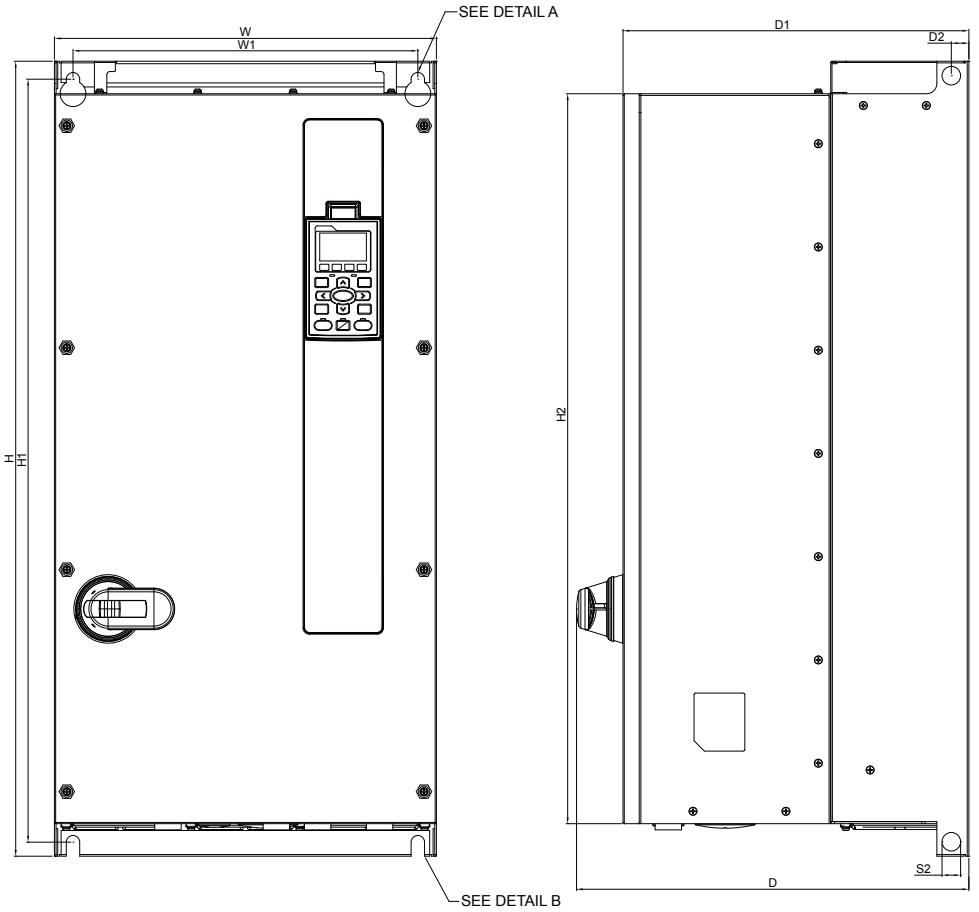
MODEL
FRAME_D0

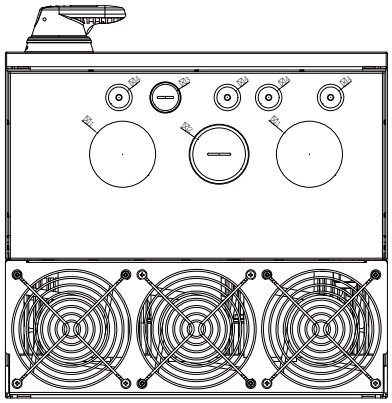
FRAME_D0-3
VFD750FP4EA-41
VFD900FP4EA-41

FRAME		W	H	D	W1	H1	D1	S1	H2	D2	S2	Ø1	Ø2	Ø3	Ø4
D0-3	mm	308.0	680.0	307.0	272.0	651.0	17.0	13.0	622.0	17.0	18.0	51.0	44.0	28.0	22.0
	inch	12.13	26.77	12.09	10.71	25.63	0.67	0.51	24.49	0.67	0.71	2.01	1.73	1.10	0.87

Dimensions

FRAME D (IP55)





DETAIL A
(MOUNTING HOLE)

DETAIL B
(MOUNTING HOLE)

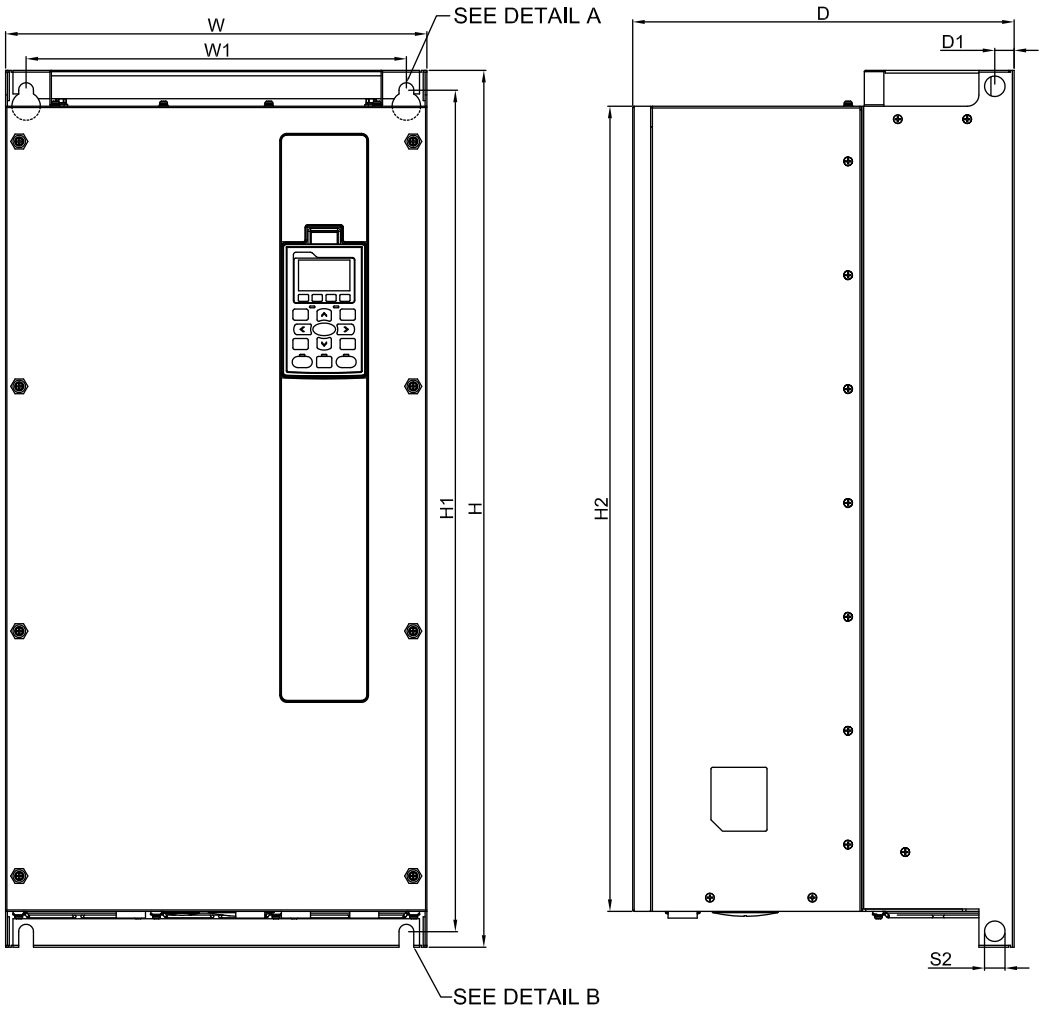
MODEL
FRAME_D

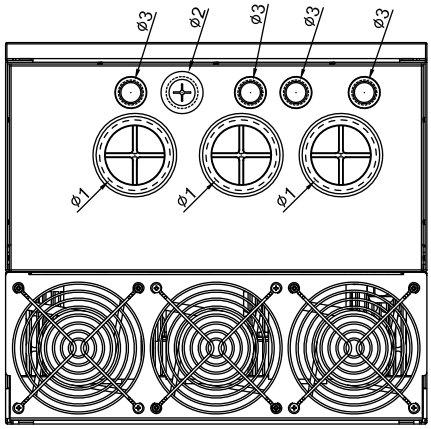
FRAME_D-1
VFD750FP4EA-52
VFD900FP4EA-52

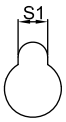
FRAME_D-2
VFD750FP4EA-52S
VFD900FP4EA-52S

FRAME		W	H	D	W1	H1	D1	S1	H2	D2	S2	Ø1	Ø2	Ø3	Ø4
D-1	mm	370.0	770.0	-	334.0	739.0	335.0	13.0	707.0	17.0	18.0	64.0	51.0	25.4	20.3
	inch	14.57	30.31	-	13.15	29.09	13.19	0.51	27.83	0.67	0.71	2.52	2.01	1.00	0.80
D-2	mm	370.0	770.0	380.0	334.0	739.0	335.0	13.0	707.0	17.0	18.0	64.0	51.0	25.4	20.3
	inch	14.57	30.31	14.96	13.15	29.09	13.19	0.51	27.83	0.67	0.71	2.52	2.01	1.00	0.80

FRAME D (IP41)







DETAIL A
(MOUNTING HOLE)

DETAIL B
(MOUNTING HOLE)

MODEL
FRAME_D

FRAME_D-3
VFD450FP4EA-41
VFD550FP4EA-41

FRAME		W	H	D	W1	H1	D1	S1	H2	S2	Ø1	Ø2	Ø3
D-3	mm	370.0	770.0	335.0	334.0	739.0	17.0	13.0	707.0	18.0	62.0	28.0	22.0
	inch	14.57	30.31	13.19	13.15	29.09	0.67	0.51	27.83	0.71	2.44	1.10	0.87

Accessories

▪ 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: +24 V_{DC} ± 5% 200 mA, 5 W External power +24 V_{DC}: max. voltage 30 V_{DC}, min. voltage 19 V_{DC}, 30 W ON: the activation current is 6.5 mA; OFF: leakage current tolerance is 10 μA
MO10 ~ MO11	Multi-function output terminals (photocoupler) Duty-cycle: 50%; Max. output frequency: 100 Hz Max. current: 50 mA; Max. voltage: 48 V_{DC}
MXM	Common for multi-function output terminals MO10, MO11 (photocoupler) Max 48 V_{DC} 50 mA

▪ 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 ~ 130 V_{AC}; Input frequency: 57 ~ 63 Hz Input impedance: 27 KΩ Terminal response time: ON: 10 ms; OFF: 20 ms

▪ EMC-R6AA

Relay
Extension Card

Terminals	Descriptions
RA10 ~ RA15 RC10 ~ RC15	Refer to Pr. 02.36 ~ Pr. 02.41 for multi-function input selection Resistive load: 3A (N.O.) / 250 V_{AC} 5A (N.O.) / 30 V_{DC} Inductive load (COS 0.4) 2.0A (N.O.) / 250 V_{AC} 2.0A (N.O.) / 30 V_{DC} It is used to output each monitor signal, such as for drive in operation, frequency attained or overload indication.

▪ EMC-BPS01

24V Power
Shift Card

Terminals	Descriptions
24V GND	When the AC motor drive power is off, the external power supply card provides external power to the network system, PLC function, and other functions to allow continued operations. Input power: 24 V_{DC} ± 5% Maximum input current: 0.5A Note: Do not connect the control terminal +24 V (Digital control signal common: SOURCE) directly to the EMC-BPS01 input terminal 24 V. Do not connect control terminal GND directly to the EMC-BPS01 input terminal GND.

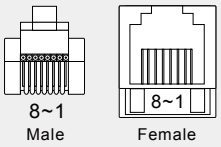
Screw Specifications for Option Card Terminals

EMC-D42A / EMC-D611A EMC-BPS01	Wire gauge	24 ~ 12AWG (0.205 ~ 3.31 mm^2)
	Torque	4 Kg-cm [3.47 lb-in]
EMC-R6AA	Wire gauge	24 ~ 16AWG (0.205 ~ 1.31 mm^2)
	Torque	6 Kg-cm [5.21 lb-in]

Accessories

▪ 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 / 0 V / V-
6	CAN_GND	Ground / 0 V / V-

▪ CMC-MOD01

Network Interface

Features

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

Network Interface

Interface	RJ-45 with Auto MDI / MDIX	**Transmission speed**	10 / 100 Mbps Auto-Detect
Number of ports	1 Port	**Network rotocol**	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 100 M		

▪ CMC-EIP01

Network Interface

Features

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

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 100 M		

▪ 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. 12 Mbps

PROFIBUS DP Connector

Interface	DB9 connector
Transmission method	High-speed RS-485
Transmission cable	Shielded twisted pair cable
Electrical isolation	500 V_{DC}

Communication

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

▪ CMC-DN01

Features

- Based on the high-speed communication interface of Delta HSSP protocol, able to conduct immediate control of an 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: 125 kbps, 250 kbps, 500 kbps 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 5.08mm Pluggable Connector
Transmission method	CAN
Transmission cable	Shielded twisted pair cable (with 2 power cables)
Transmission speed	125 kbps, 250 kbps, 500 kbps and extendable serial transmission speed mode
Network protocol	DeviceNet protocol

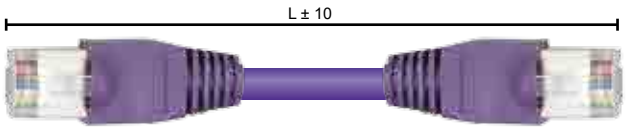
DeviceNet Connector

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

Accessories

▪ Delta Standard Fieldbus Cables

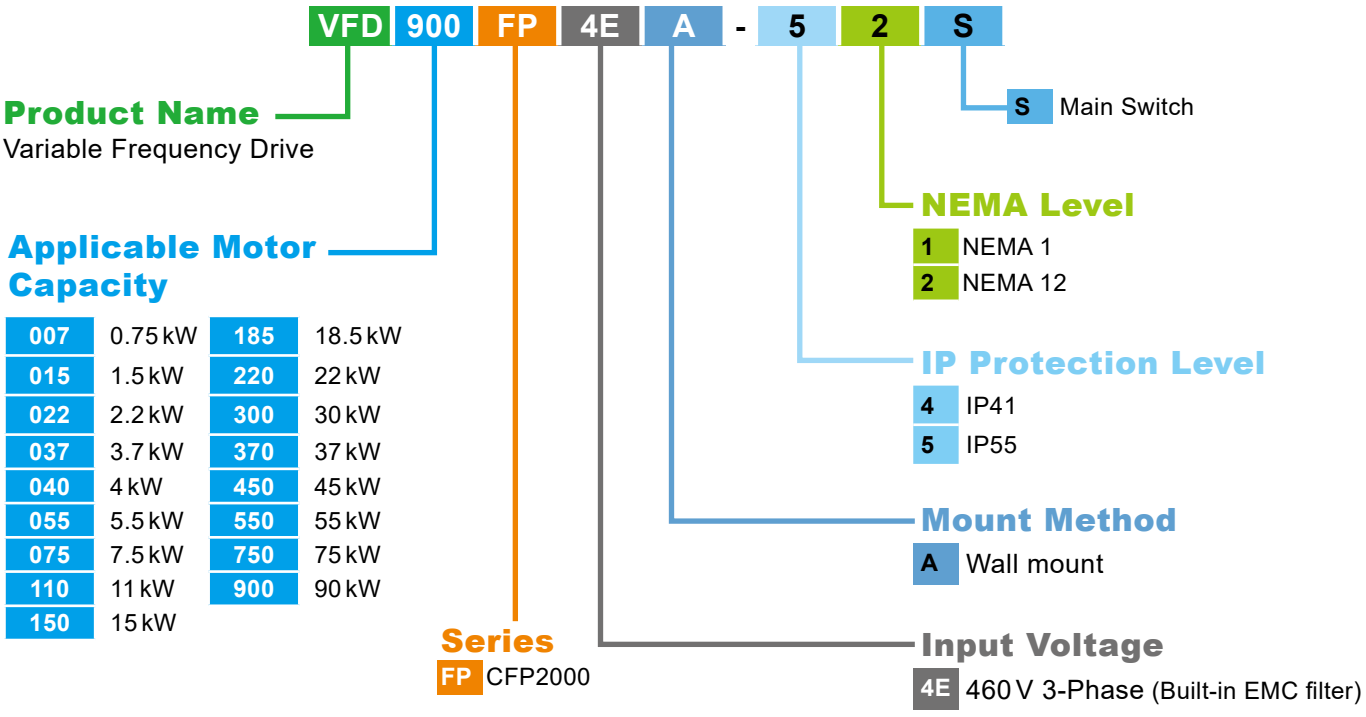
Delta Cables	Part Number	Description	Length
CANopen Cable	UC-CMC003-01A	CANopen cable, RJ45 connector	0.3m
	UC-CMC005-01A	CANopen cable, RJ45 connector	0.5m
	UC-CMC010-01A	CANopen cable, RJ45 connector	1m
	UC-CMC015-01A	CANopen cable, RJ45 connector	1.5m
	UC-CMC020-01A	CANopen cable, RJ45 connector	2m
	UC-CMC030-01A	CANopen cable, RJ45 connector	3m
	UC-CMC050-01A	CANopen cable, RJ45 connector	5m
	UC-CMC100-01A	CANopen cable, RJ45 connector	10m
	UC-CMC200-01A	CANopen cable, RJ45 connector	20m
DeviceNet Cable	UC-DN01Z-01A	DeviceNet cable	305m
	UC-DN01Z-02A	DeviceNet cable	305m
Ethernet Cable	UC-EMC003-02A	Ethernet/EtherCAT cable, Shielding	0.3m
	UC-EMC005-02A	Ethernet/EtherCAT cable, Shielding	0.5m
	UC-EMC010-02A	Ethernet/EtherCAT cable, Shielding	1m
	UC-EMC020-02A	Ethernet/EtherCAT cable, Shielding	2m
	UC-EMC050-02A	Ethernet/EtherCAT cable, Shielding	5m
	UC-EMC100-02A	Ethernet/EtherCAT cable, Shielding	10m
	UC-EMC200-02A	Ethernet/EtherCAT cable, Shielding	20m
CANopen/DeviceNet TAP	TAP-CN01	1 in 2 out, built-in 121Ω terminal resistor	1 in 2 out
	TAP-CN02	1 in 4 out, built-in 121Ω terminal resistor	1 in 4 out
	TAP-CN03	1 in 4 out, RJ45 connector, built-in 121Ω terminal resistor	1 in 4 out
PROFIBUS Cable	UC-PF01Z-01A	PROFIBUS DP cable	305m



Ordering Information

FRAME	Power Range	IP55 NEMA12 W/O Main Switch	IP55 NEMA12 with Main Switch	IP41 NEMA1
A	0.75	VFD007FP4EA-52	VFD007FP4EA-52S	VFD007FP4EA-41
	1.5	VFD015FP4EA-52	VFD015FP4EA-52S	VFD015FP4EA-41
	2.2	VFD022FP4EA-52	VFD022FP4EA-52S	VFD022FP4EA-41
	3.7	VFD037FP4EA-52	VFD037FP4EA-52S	VFD037FP4EA-41
	4	VFD040FP4EA-52	VFD040FP4EA-52S	VFD040FP4EA-41
	5.5	VFD055FP4EA-52	VFD055FP4EA-52S	VFD055FP4EA-41
	7.5	VFD075FP4EA-52	VFD075FP4EA-52S	VFD075FP4EA-41
B	11	VFD110FP4EA-52	VFD110FP4EA-52S	VFD110FP4EA-41
	15	VFD150FP4EA-52	VFD150FP4EA-52S	VFD150FP4EA-41
	18.5	VFD185FP4EA-52	VFD185FP4EA-52S	VFD185FP4EA-41
	22	VFD220FP4EA-52	VFD220FP4EA-52S	VFD220FP4EA-41
C	30	VFD300FP4EA-52	VFD300FP4EA-52S	VFD300FP4EA-41
	37	VFD370FP4EA-52	VFD370FP4EA-52S	VFD370FP4EA-41
D0	45	VFD450FP4EA-52	VFD450FP4EA-52S	VFD450FP4EA-41
	55	VFD550FP4EA-52	VFD550FP4EA-52S	VFD550FP4EA-41
D	75	VFD750FP4EA-52	VFD750FP4EA-52S	VFD750FP4EA-41
	90	VFD900FP4EA-52	VFD900FP4EA-52S	VFD900FP4EA-41

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 for control. 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℃.
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.

Smarter. Greener. Together.

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