



Digitized Automation for a Changing World

# Delta IP55 Fan and Pump Drive CFP2000 Series



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 **DELTA**  
Smarter. Greener. Together.



# CFP2000

Delta's CFP2000 series is an AC motor drive specially designed for HVAC, fans & pumps, and water treatment applications. It is designed with an IP55 enclosure to provide effective protection against water, dust, and other particles, and features outstanding functions to help users reduce setup / tuning time and enhance operation efficiency in applications. In addition, it includes many outstanding features and built-in functions that reduce setup and tuning time in operation and provide higher efficiency.

The CFP2000 is equipped with a built-in EMC filter and a DC choke. This design replaces the need for an electrical distribution cabinet and saves space for other devices, while providing the benefits of harmonic suppression and better power quality to the system. Various parameter groups are also included, which allow you to simply select the needed application in the parameter group setting and the system setup is ready. If a higher safety standard is required, an optional main switch function is also available upon selection. Other outstanding features include support for both IM/PM motors, real-time clock, built-in 10k steps PLC capacity and various optional extension cards.

The CFP2000 Series integrates all of your needs in one drive, and is your friendliest and smartest choice available in the industry!



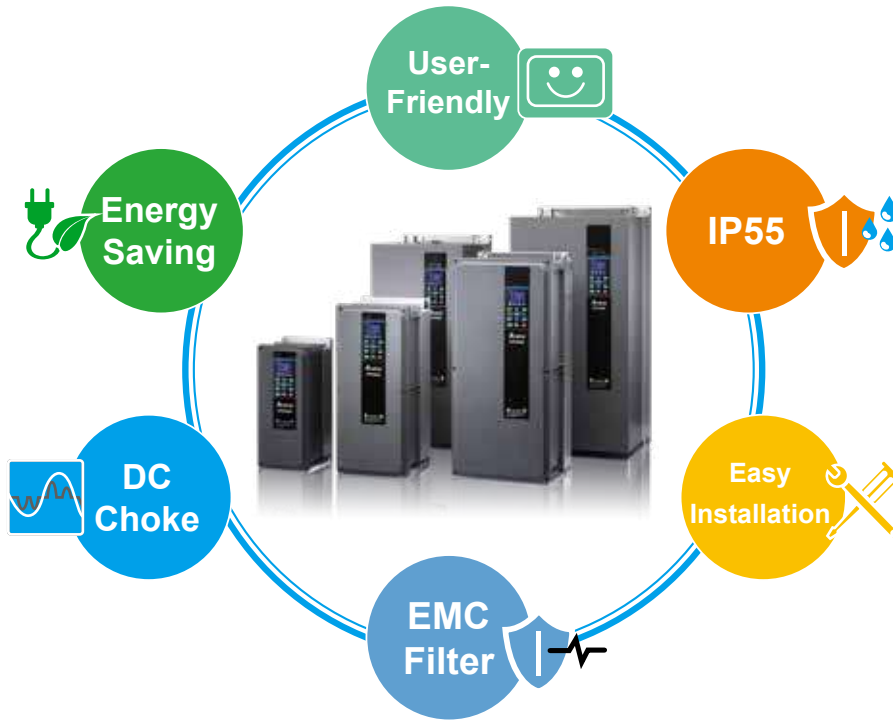


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# Highlights



## Standard Models

### AC 230V/3-Phase

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

### AC 380 to 480 V/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	

### AC 575V/3-Phase

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

## Application



HVAC



Fans



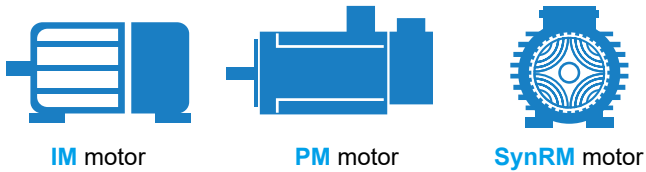
Chiller



Water treatment

# Features

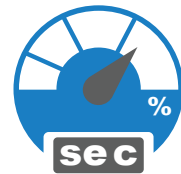
## ▶ Motor Controls



## ▶ 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

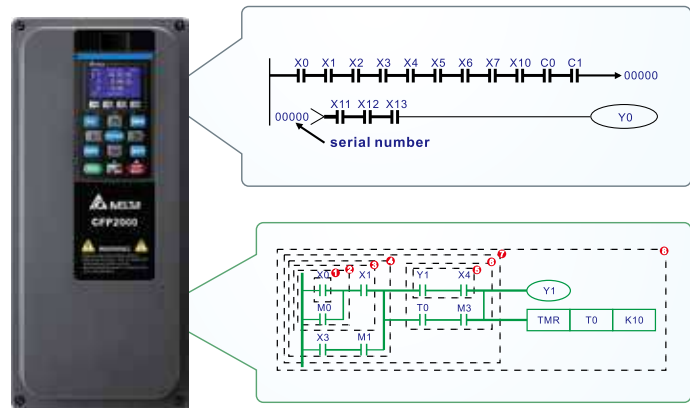


Editable message display



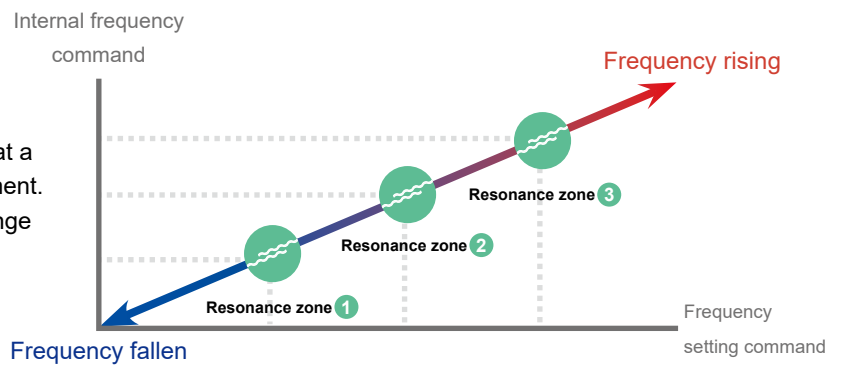
## ► Built-in PLC Function

- 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. Users can restrict up to 3 zones of frequency range



## ► Fire Mode

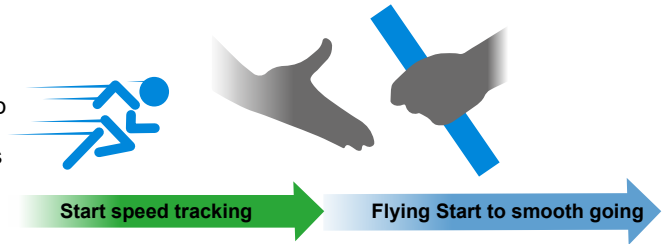
- Application: ventilation of buildings, tunnels, subways and more
- The drive will bypass the alarm warning in fire mode. When a fire occurs, it forces the drive to continue to operate to extract smoke or supplies water until the drive fails or runs out of emergency power
  - » Preset speed mode: set 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

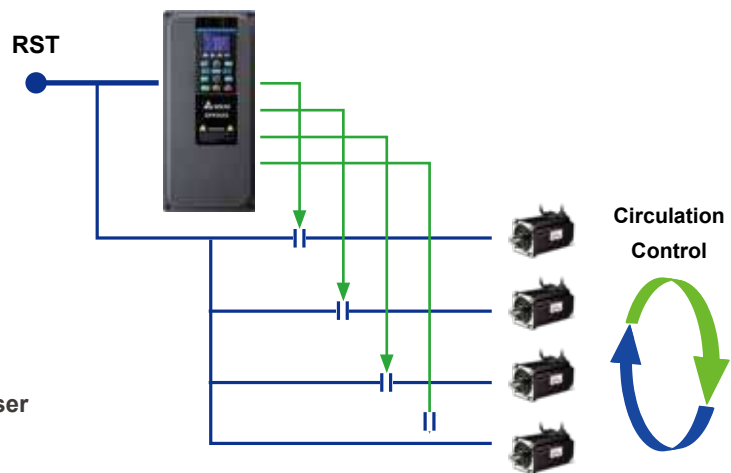


## ► Multi-pump Control

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 Networking

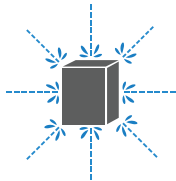
- Built-in RS-485 (Modbus)
- Built-in BACnet MS/TP 
- Various communication card options

PROFINET, , EtherNet/IP, BACnet IP, DeviceNet, Modbus TCP, CANopen (DS402)

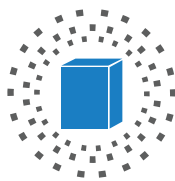
# Operating Environment

## ► Protection Class

IP55 NEMA12, IP41 NEMA1



Water Resistant



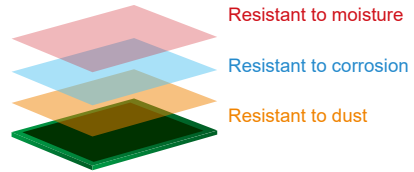
Dust Resistant

## ► Enhanced PCB Coating

Standard:

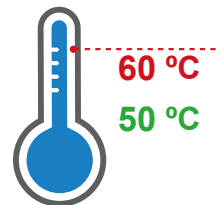
**IEC 60721-3-3 class 3C3**

Protects PCB from gases such as salt, SO<sub>2</sub>, O<sub>3</sub>, H<sub>2</sub>S, and others to extend the product life when used in a water treatment application



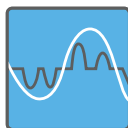
## ► Operation Temperature

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<sup>2</sup> every year.

Ambient Conditions	<b>Installation Location</b>	IEC60364-1/IEC60664-1 Pollution degree 2, indoor use only	
	<b>Surrounding Temperature (°C)</b>	Storage/Transportation	-25 ~ 70
		Only allowed at non-condensation, non-frost, non-conductive environment	
	<b>Rated Humidity</b>	Operation	Max. 95%
		Storage/Transportation	Max. 95%
		No condense water	
	<b>Air Pressure (kPa)</b>	Operation/Storage	86 ~ 106
		Transportation	70 ~ 106
	<b>Environment</b>	IEC60721-3-3	
		Operation	Class 3C3; Class 3S2
Storage		Class 1C2; Class 1S2	
Transportation		Class 2C2; Class 2S2	
<b>Altitude</b>	Operation	If the AC motor drive is installed at altitude 0~1000 m, follow normal operation restrictions. If it is installed at altitude 1000~2000 m, decrease 1% of rated current or lower 0.5°C of temperature for every 100m increase in altitude. Maximum altitude for Corner Grounded is 2000m. Contact Delta for more information if you need to use this motor drive at an altitude of 2000m or higher.	
<b>Vibration Operating</b>	IEC 60068-2-6		
	Frame A: 2Hz ≤ f ≤ 13.2Hz/Amplitude 1mm; 13.2Hz < f ≤ 55Hz/Gravity 0.7G to 2.0G; 55Hz < f ≤ 512Hz/Gravity 2.0G		
	Frame B: 2Hz ≤ f ≤ 13.2Hz/Amplitude 1mm; 13.2Hz < f ≤ 55Hz/Gravity 0.7G to 1.5G; 55Hz < f ≤ 512Hz/Gravity 1.5G		
	Frame C/ D0/ D: 2Hz ≤ f ≤ 13.2Hz/Amplitude 1mm; 13.2Hz < f ≤ 55Hz/Gravity 0.7G to 1.0G; 55Hz < f ≤ 512Hz/Gravity 1.0G		
<b>Shock Operating</b>	IEC 60068-2-27		
	Frame A; B; C; D0: Max. 30G; 11 ms; Frame D: Max. 15G; 11 ms		
In protective shipping package	<b>Vibration</b>	IEC 60068-2-64	
		10Hz ≤ f ≤ 100Hz/ASD: 1.0m2/s3; 100Hz ≤ f ≤ 200Hz/Slope: -3dB/octave	
	<b>Shock</b>	Cardboard box type: Free fall drop in accordance with ISTA 1A Wooden box type: In accordance with ISTA 1E (4 side incline) and ISTA 2B (Bottom side drop)	
<b>Operation Position</b>	Max. allowed offset angle ±10° (under normal installation position)		

## Specifications for Operation Temperature and Protection Level

Model	Frame	Protection Level	Operation Temperature
VFDxxxFPxxx-52x	230V: 0.75~45kW 460V: 0.75~90kW	IP55/NEMA12	-10°C~50°C*
VFDxxxFPxxx-41	575V: 1.5~90kW	IP41/NEMA1	

\*Note: 15°C~50°C, without derating; 51°C~60°C, with derating

# Specifications

230 V															
Frame Size		A					B		C		D0		D		
Models VFD-___FP2EA-___		007	015	022	037	055	110	220	300	370	450	550	750	900	
OUTPUT RATING	LIGHT DUTY	Rated Output Capacity (kVA)	2	3.3	4	6	8.4	12	18	24	30	36	42	58	72
		Rated Output Current (A)	5	7.5	10	15	21	31	46	61	75	90	105	146	180
		Applicable Motor Output (kW)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45
		Applicable Motor Output (HP)	1	2	3	5	7.5	10	15	20	25	30	40	50	60
		Overload Tolerance	120% for 60 seconds in every 5 minutes												
	NORMAL DUTY	Rated Output Capacity (kVA)	1.2	2	3.2	4.4	6.8	10	13	20	26	30	36	48	58
		Rated Output Current (A)	3	5	8	11	17	25	33	49	65	75	90	120	146
		Applicable Motor Output (kW)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	33	30	37
		Applicable Motor Output (HP)	0.5	1	2	3	5	7.5	10	15	20	25	30	40	50
		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													
	Carrier Frequency (kHz)	2~15 (default 6)						2~10 (default 6)				2~9 (default 6)			
	Input Current (A) Light Duty	5	7.5	10	15	21	31	46	61	75	90	105	146	180	
Input Current (A) Normal Duty	3	5	8	11	17	25	33	49	65	75	90	120	146		
Rated Voltage/Frequency	3-Phase AC 380V~480V (-15%~+10%), 50/60Hz														
Operating Voltage Range	170~265V <sub>AC</sub>														
Frequency Tolerance	47~63Hz														
Efficiency (%)	97														
Power factor	> 0.98														
Drive Weight (Kg)	6.8				14.5				26.5		42		59.5		
Cooling Method	Natural cooling		Fan cooling												
Braking Chopper	Optional														
DC Choke	Built-in DC choke meets EN61000-3-12														
EMC Filter	Built-in EMC filter meets EN61800-3 C1 <sup>1</sup> & C2														

\*1 A zero phase reactor is required to fulfill EMC category C1

## NOTE

- The value of the carrier frequency is a factory setting. To increase the carrier frequency, the current needs to be decreased. Please see derating curve diagram of Pr. 06-55 for more information.
- When a load is a surge load, use a higher level model.

460 V																			
Frame Size		A						B				C		D0		D			
Models VFD-___FP4EA-___		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)	3.0	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	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																
		Max. Output Frequency (Hz)	599																
		Carrier Frequency (kHz)	2~15 (default 6)										2~10 (default 6)					2~9 (default 4)	
	NORMAL DUTY	Rated Output Capacity (kVA)	1.4	2.4	3.2	4.8	7.2	8.4	9.6	14.3	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	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	50	60	75	100
		Overload Tolerance	120% for 60 seconds in every 5 minutes 160% for 3 seconds in every 25 seconds																
		Max. Output Frequency (Hz)	599																
		Carrier Frequency (kHz)	2~15 (default 6)										2~10 (default 6)					2~9 (default 4)	
INPUT RATING	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	4	6	9.0	10.5	12	18	24	32	38	45	60	73	91	110	150	
	Rated Voltage/Frequency	3-Phase AC 380V~480V (-15%~+10%), 50/60Hz																	
	Operating Voltage Range	323~528 V <sub>AC</sub>																	
	Frequency Tolerance	47~63Hz																	
Efficiency (%)	97																		
Power factor	> 0.98																		
Drive Weight (Kg)	6.8					14.5				26.5		42		59.5					
Cooling Method	Natural cooling		Fan cooling																
Braking Chopper	Frame A, B, C, Built-in																		
DC Choke	Built-in DC choke meets EN61000-3-12																		
EMC Filter	Built-in EMC filter meets EN61800-3 C1 <sup>*1</sup> & C2																		

\*1 A zero phase reactor is required to fulfill EMC category C1

 **NOTE**

- The value of the carrier frequency is a factory setting. To increase the carrier frequency, the current needs to be decreased. Please see derating curve diagram of Pr. 06-55 for more information.
- When a load is a surge load, use a higher level model.

# Specifications

575 V																	
Frame Size		A					B			C			D0		D		
Models VFD-___FP5EA-___		015	022	037	055	075	110	150	185	220	300	370	450	550	750	900	
OUTPUT RATING	LIGHT DUTY	Rated Output Capacity (kVA)	3	4.3	6.7	9.9	12.1	18.6	24.1	30	36	45	54	67	86	104	125
		Rated Output Current (A)	3	4.3	6.7	9.9	12.1	18.7	24.2	30	36	45	54	67	86	104	125
		Applicable Motor Output (kW)	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
		Applicable Motor Output (HP)	2	3	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)	2.5	3.6	5.5	8.2	10	15.4	19.9	24	30	36	45	54	67	86	104
		Rated Output Current (A)	2.5	3.6	5.5	8.2	10	15.5	20	24	30	36	45	54	67	86	104
		Applicable Motor Output (kW)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
		Applicable Motor Output (HP)	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100
		Overload Tolerance	120% for 60 seconds in every 5 minutes 160% for 3 seconds in every 25 seconds														
Max. Output Frequency (Hz)	599																
Carrier Frequency (kHz)	2~15 (default 6)									2~10 (default 6)				2~9 (default 6)			
INPUT RATING	Input Current (A) Light Duty	3	4.3	6.7	9.9	12.1	18.7	24.2	30	36	45	54	67	86	104	125	
	Input Current (A) Normal Duty	2.5	3.6	5.5	8.2	10	15.5	20	24	30	36	45	54	67	86	104	
	Rated Voltage/Frequency	3-Phase AC 380V~480V (-15%~+10%), 50/60 Hz															
	Operating Voltage Range	446~660V <sub>AC</sub>															
	Frequency Tolerance	47~63Hz															
Efficiency (%)	97																
Power factor	> 0.98																
Drive Weight (Kg)	6.8			14.5				26.5			42		59.5				
Cooling Method	Natural cooling	Fan cooling															
Braking Chopper	Frame A, B, C, Built-in																
DC Choke	Built-in DC choke meets EN61000-3-12																
EMC Filter	Built-in EMC filter meets EN61800-3 C2 <sup>*1</sup> & C3																






\*1 A zero phase reactor is required to fulfill EMC category C2

## NOTE

- The value of the carrier frequency is a factory setting. To increase the carrier frequency, the current needs to be decreased. Please see derating curve diagram of Pr. 06-55 for more information.
- When a load is a surge load, use a higher level model.



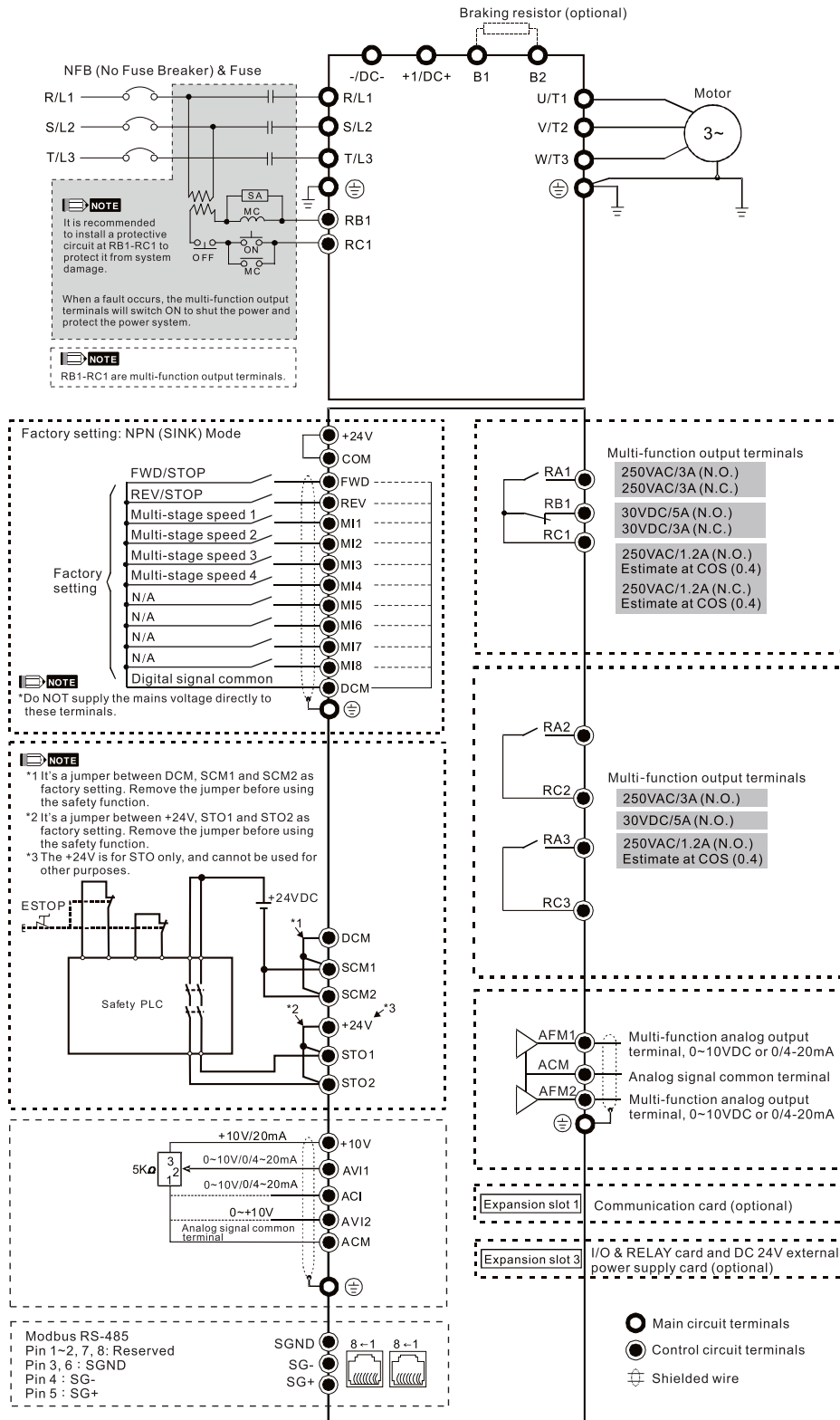
## General Specifications

CONTROL CHARACTERISTICS	<b>Control Method</b>	Pulse Width Modulated (PWM)
	<b>Control Mode</b>	1: V/F (V/F control), 2: SVC (Sensorless Vector Control), 3: PM Sensorless 4: SynRM Sensorless (applied to 230 V / 460 V models)
	<b>Starting Torque</b>	Reach up to 150% or above at 0.5Hz.
	<b>V/F Curve</b>	4 point adjustable V/F curve and square curve
	<b>Speed Response Ability</b>	5 Hz (vector control can reach up to 40 Hz)
	<b>Torque Limit</b>	Light Duty: Max. 130% torque current; Normal Duty: Max. 175% torque current
	<b>Torque Accuracy</b>	±5%
	<b>Max. Output Frequency</b>	599.00 Hz
	<b>Frequency Output Accuracy</b>	Digital command: ±0.01%, -10°C~+40°C; Analog command: ±0.1%, 25°C±10°C
	<b>Output Frequency Resolution</b>	Digital command: 0.01 Hz; Analog command: Max. output frequency x 0.03 / 60 Hz (± 11-bit)
	<b>Overload Tolerance</b>	Light duty: 120% of rated current can endure for 1 minute Normal duty: 120% of rated current can endure for 1 minute; 150% of rated current can endure for 3 seconds
	<b>Frequency Setting Signal</b>	0~+10V, 4~20mA, 0~20mA, pulse input
	<b>Accel./decel. Time</b>	0.00~600.00/0.0~6,000.0 seconds
<b>Main Control Function</b>	Momentary power loss ride thru, Speed search, Over-torque detection, Torque limit, 16-step speed (max), Accel/decel time switch, S-curve accel/decel, 3-wire sequence, Auto-Tuning (rotational, stationary), Dwell, Slip compensation, Torque compensation, JOG frequency, Frequency upper/lower limit settings, DC injection braking at start/stop, High slip braking, Energy saving control, Modbus communication (RS-485 RJ45, max. 5.2 Kbps)	
<b>Fan Control</b>	Frame A~B are ON / OFF switch control. Frame C~D are PWM control	
PROTECTION CHARACTERISTICS	<b>Motor Protection</b>	Electronic thermal relay protection
	<b>Over-Current Protection</b>	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%)
	<b>Over-Voltage Protection</b>	230 V models: Drive stops when DC bus voltage exceeds 410 V 460 V models: Drive stops when DC bus voltage exceeds 820 V 575 V models: Drive stops when DC bus voltage exceeds 1,016 V
	<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>Short-circuit Current Rating (SCCR)</b>	Per UL508C, the drive is suitable for use on a circuit capable of delivering not more than 100kA symmetrical amperes (rms) when protected by fuses given in the fuse table	
<b>International Certifications</b>	     SEMI F47	

# Wiring

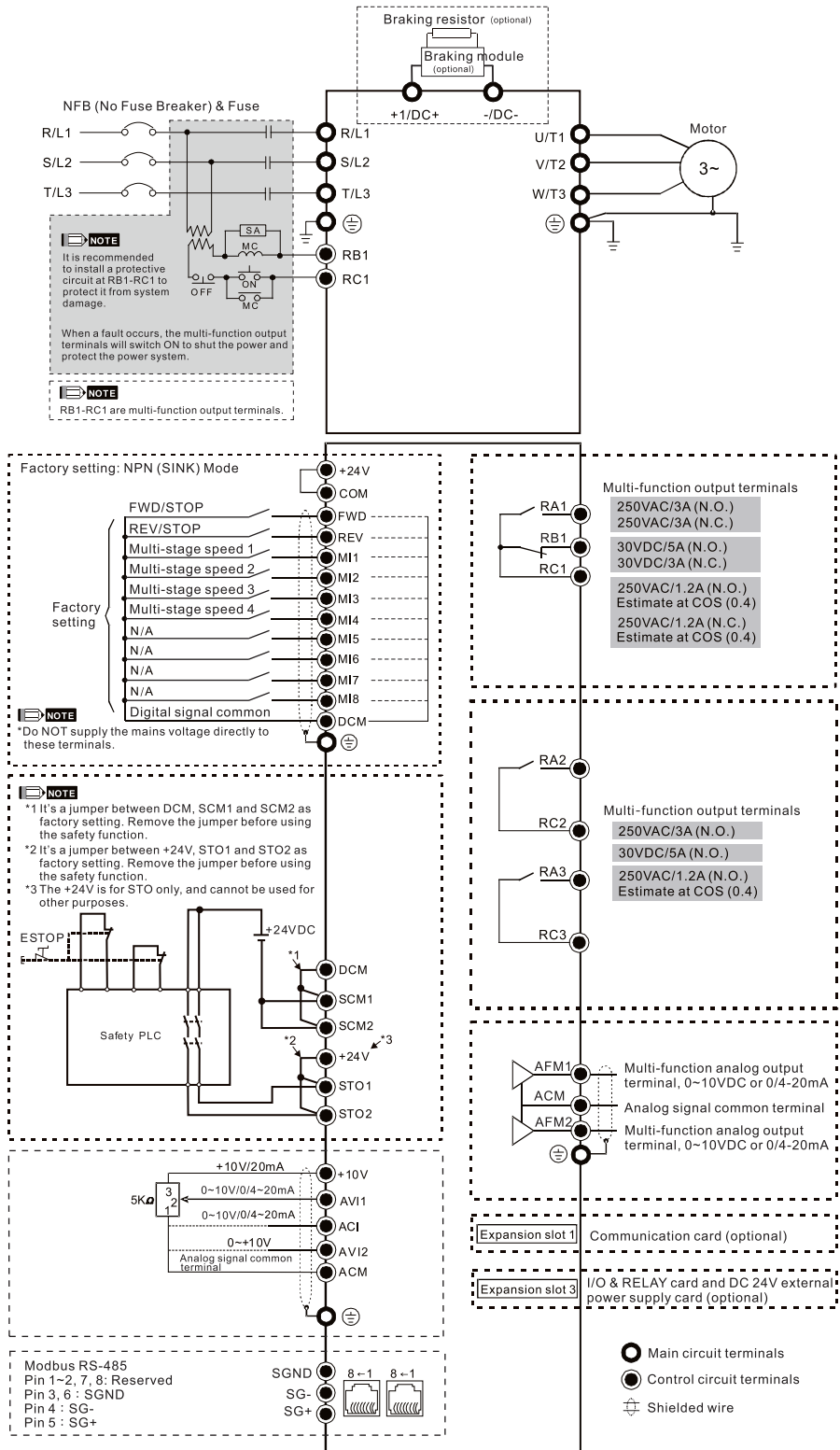
## Wiring Diagram for Frame A~C

\*Input: 3-phase power



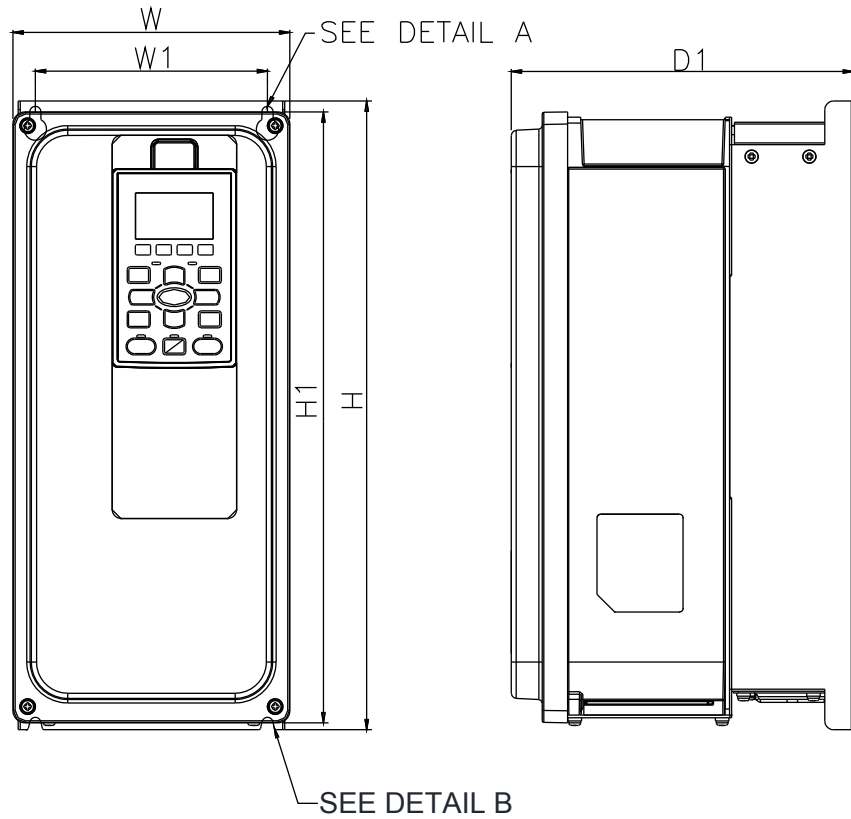
# Wiring Diagram for Frame D0~D

\*Input: 3-phase power



# Dimensions

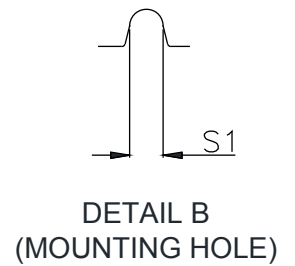
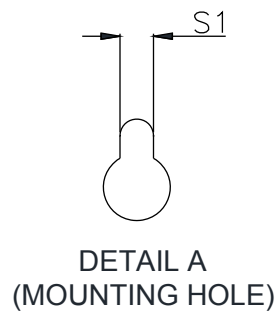
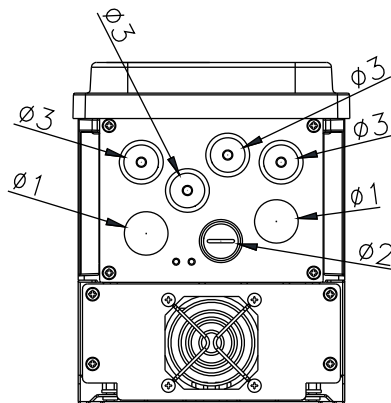
## FRAME A (IP55)



### MODEL

#### FRAME A-1

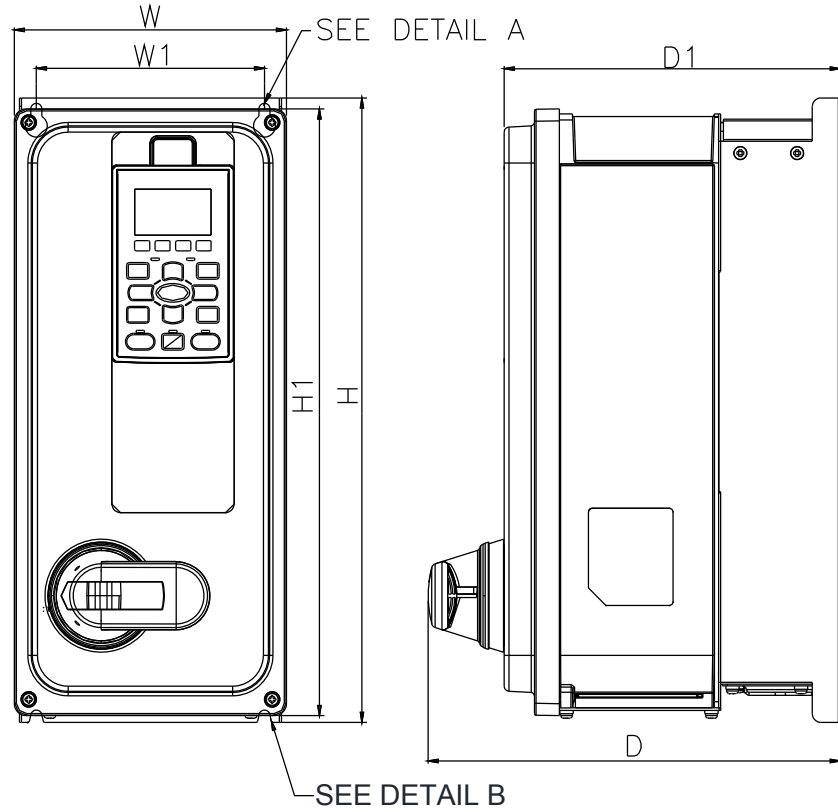
- VFD007FP2EA-52
- VFD015FP2EA-52
- VFD022FP2EA-52
- VFD037FP2EA-52
- VFD055FP2EA-52
- VFD007FP4EA-52
- VFD015FP4EA-52
- VFD022FP4EA-52
- VFD037FP4EA-52
- VFD040FP4EA-52
- VFD055FP4EA-52
- VFD075FP4EA-52
- VFD015FP5EA-52
- VFD022FP5EA-52
- VFD037FP5EA-52
- VFD055FP5EA-52
- VFD075FP5EA-52



FRAME		W	H	D	W1	H1	D1	S1	Ø1	Ø2	Ø3
A-1	mm	161.0	366.4	-	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



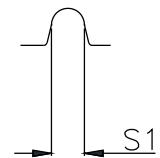
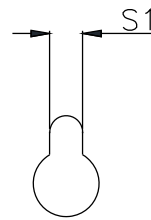
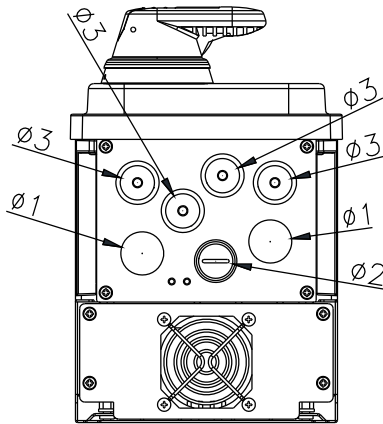
**FRAME A (IP55)**



**MODEL**

**FRAME A-2**

- VFD007FP2EA-52S
- VFD015FP2EA-52S
- VFD022FP2EA-52S
- VFD037FP2EA-52S
- VFD055FP2EA-52S
- VFD007FP4EA-52S
- VFD015FP4EA-52S
- VFD022FP4EA-52S
- VFD037FP4EA-52S
- VFD040FP4EA-52S
- VFD055FP4EA-52S
- VFD075FP4EA-52S
- VFD015FP5EA-52S
- VFD022FP5EA-52S
- VFD037FP5EA-52S
- VFD055FP5EA-52S
- VFD075FP5EA-52S

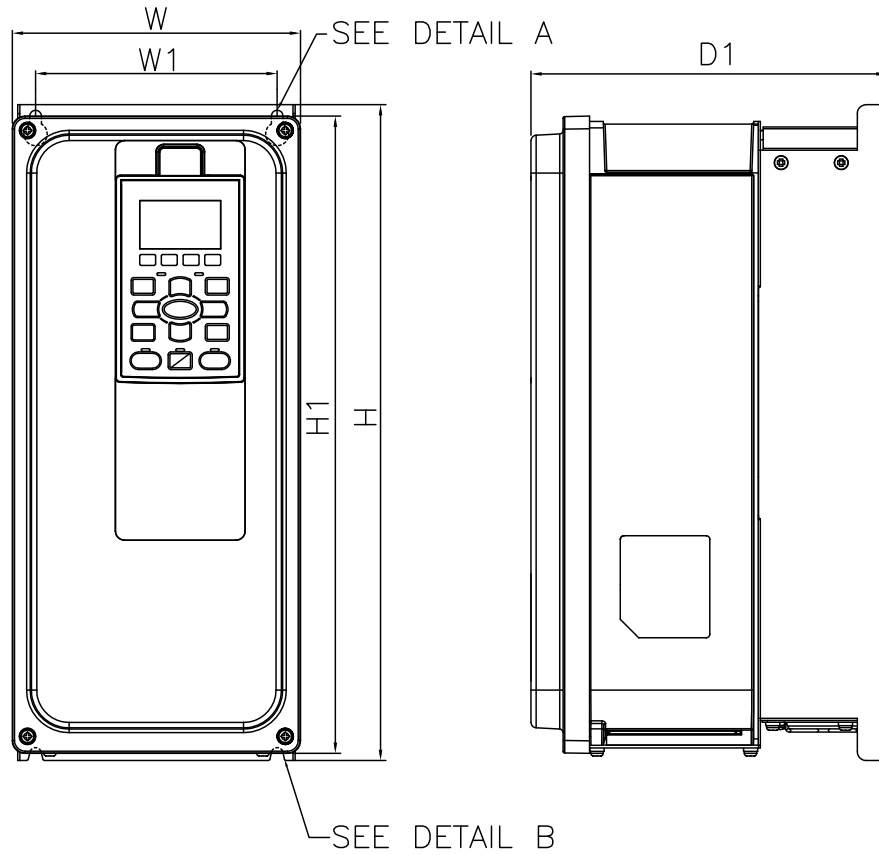


DETAIL A (MOUNTING HOLE)

DETAIL B (MOUNTING HOLE)

FRAME	W	H	D	W1	H1	D1	S1	Ø1	Ø2	Ø3	
A-2	mm	161.0	366.4	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

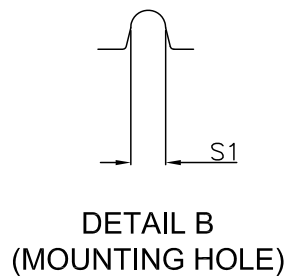
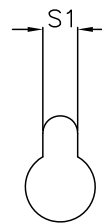
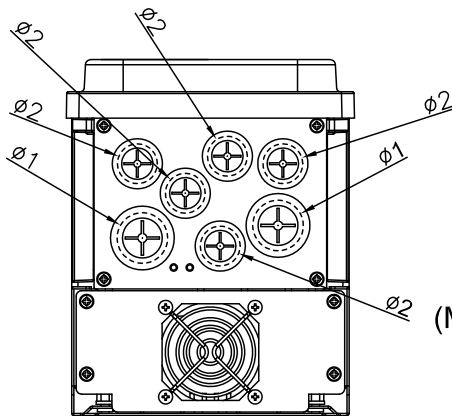
**FRAME A (IP41)**



**MODEL**

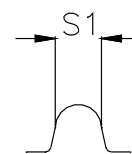
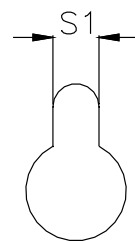
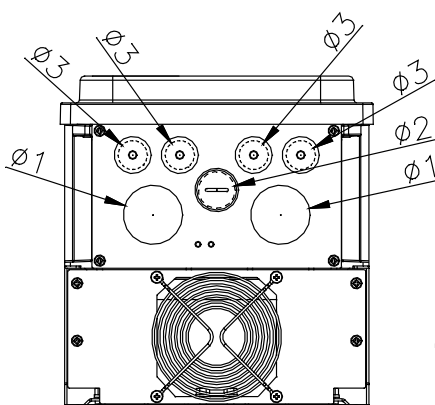
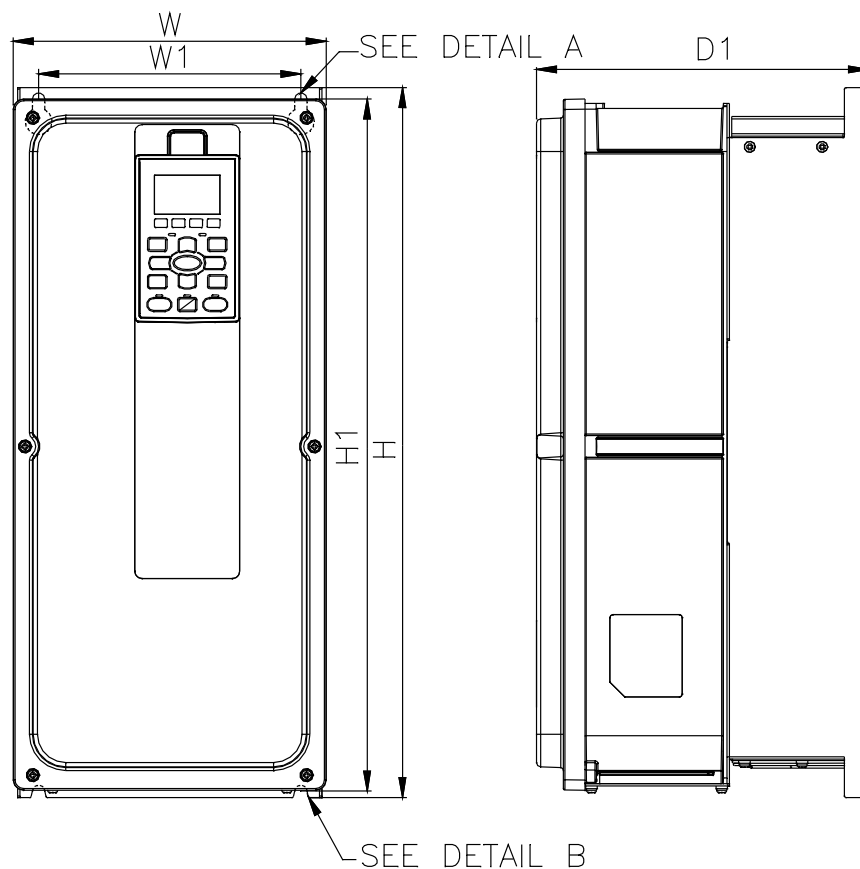
**FRAME A-3**

- VFD007FP2EA-41
- VFD015FP2EA-41
- VFD022FP2EA-41
- VFD037FP2EA-41
- VFD055FP2EA-41
- VFD015FP4EA-41
- VFD022FP4EA-41
- VFD037FP4EA-41
- VFD040FP4EA-41
- VFD055FP4EA-41
- VFD075FP4EA-41
- VFD015FP5EA-41
- VFD022FP5EA-41
- VFD037FP5EA-41
- VFD055FP5EA-41
- VFD075FP5EA-41



FRAME		W	H	D	W1	H1	D1	S1	Ø1	Ø2
A-3	mm	161.0	366.4	-	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

## FRAME B (IP55)



DETAIL A (MOUNTING HOLE)      DETAIL B (MOUNTING HOLE)

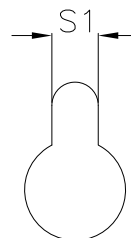
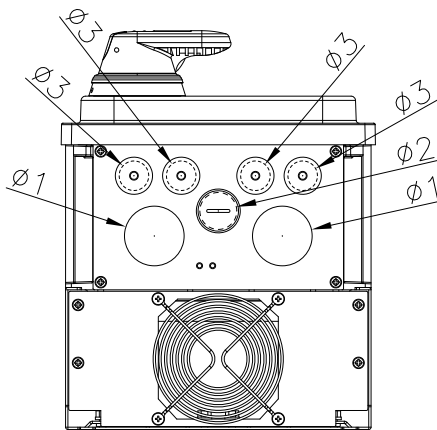
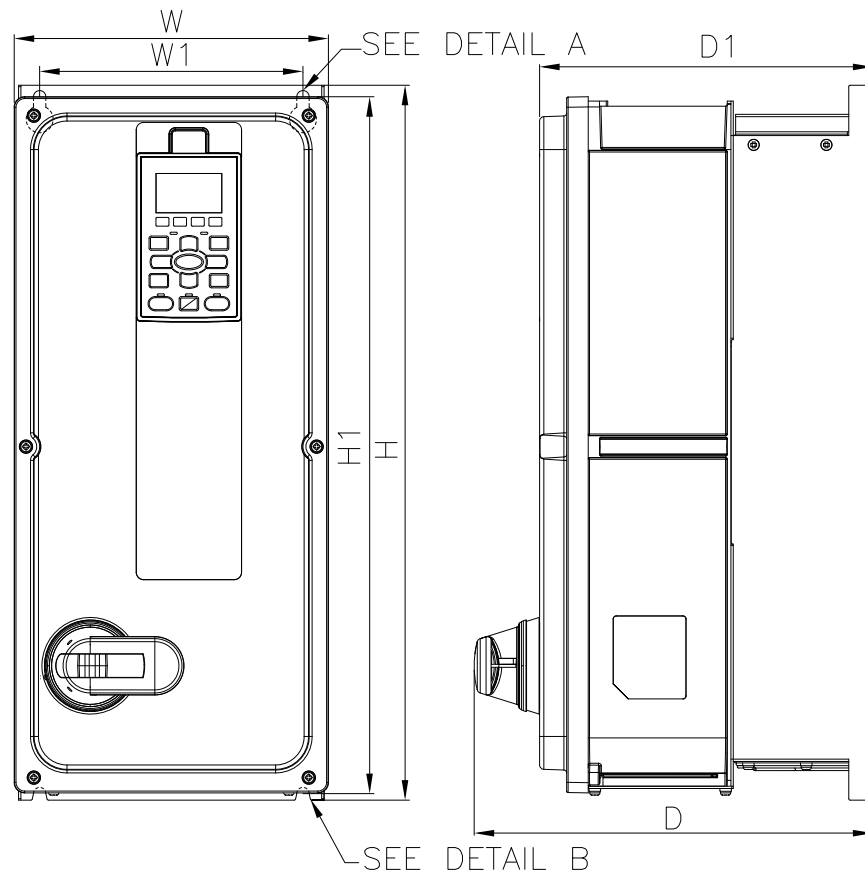
### MODEL

#### FRAME B-1

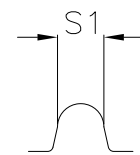
VFD075FP2EA-52  
 VFD110FP2EA-52  
 VFD110FP4EA-52  
 VFD150FP4EA-52  
 VFD185FP4EA-52  
 VFD220FP4EA-52  
 VFD110FP5EA-52  
 VFD150FP5EA-52  
 VFD185FP5EA-52

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

**FRAME B (IP55)**



DETAIL A  
(MOUNTING HOLE)



DETAIL B  
(MOUNTING HOLE)

**MODEL**

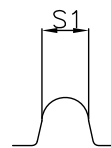
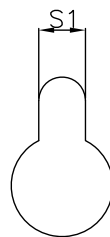
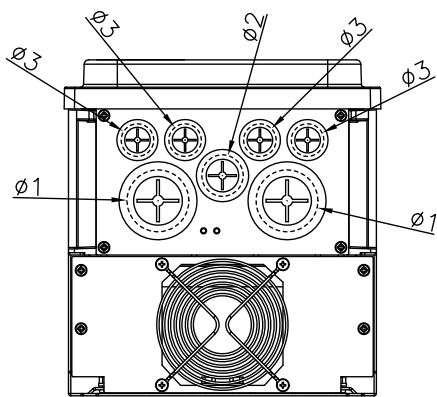
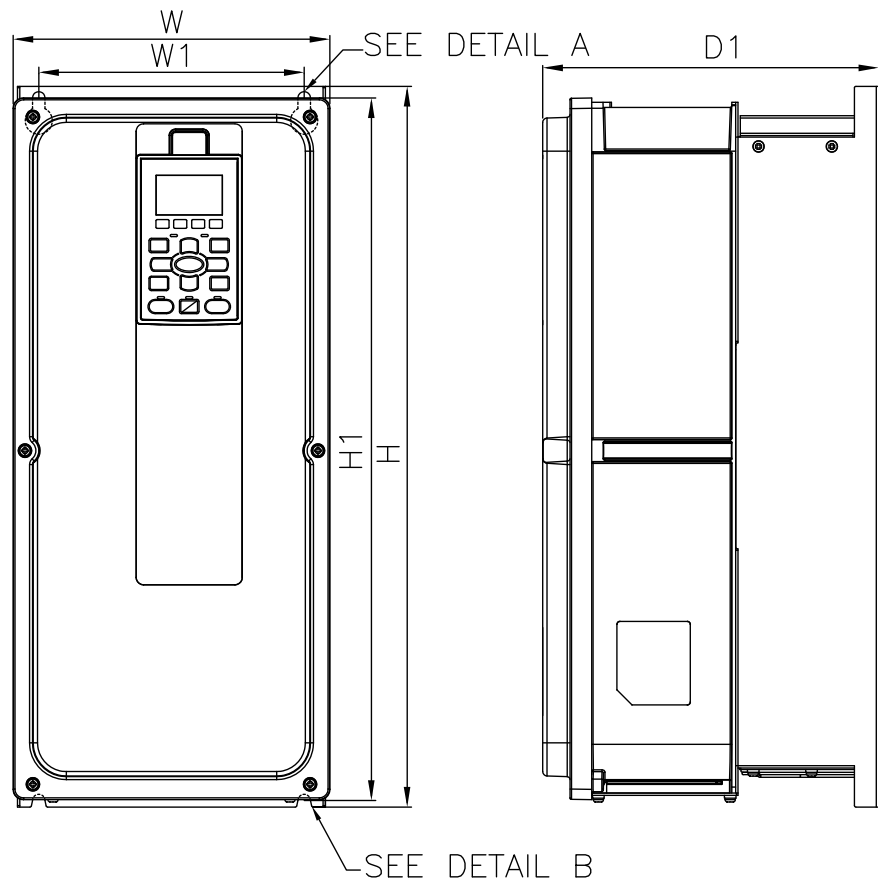
**FRAME B-2**

- VFD075FP2EA-52S
- VFD110FP2EA-52S
- VFD110FP4EA-52S
- VFD150FP4EA-52S
- VFD185FP4EA-52S
- VFD220FP4EA-52S
- VFD110FP5EA-52S
- VFD150FP5EA-52S
- VFD185FP5EA-52S

FRAME		W	H	D	W1	H1	D1	S1	Ø1	Ø2	Ø3
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)

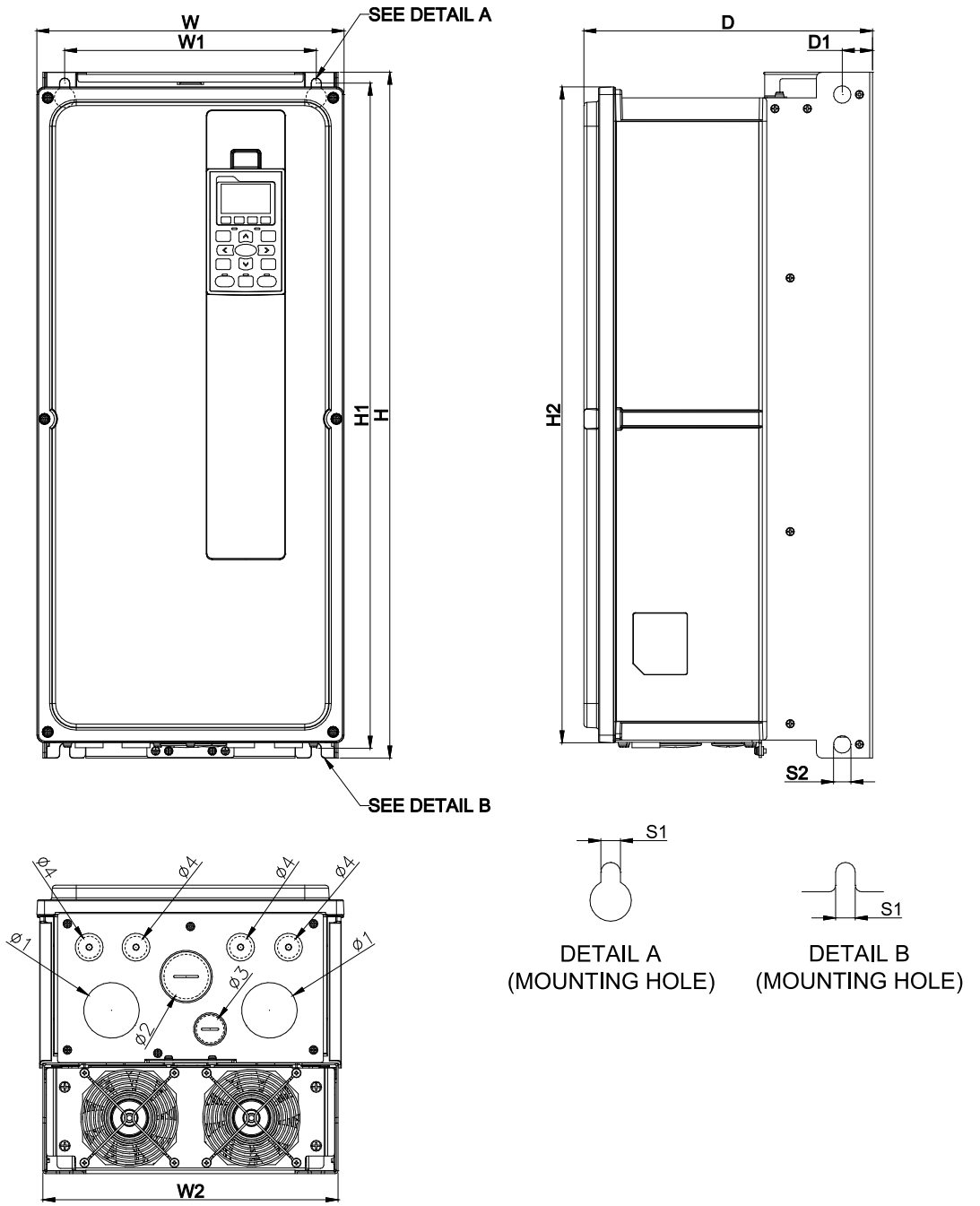
**MODEL**

**FRAME B-3**

- VFD075FP2EA-41
- VFD110FP2EA-41
- VFD110FP4EA-41
- VFD150FP4EA-41
- VFD185FP4EA-41
- VFD220FP4EA-41
- VFD110FP5EA-41
- VFD150FP5EA-41
- VFD185FP5EA-41

FRAME	W	H	D	W1	H1	D1	S1	Ø1	Ø2	Ø3
B-3	mm	216.0	491.4	-	181.0	479.0	8.5	41.8	28.0	22.0
	inch	8.50	19.35	-	7.13	18.86	0.33	1.65	1.10	0.87

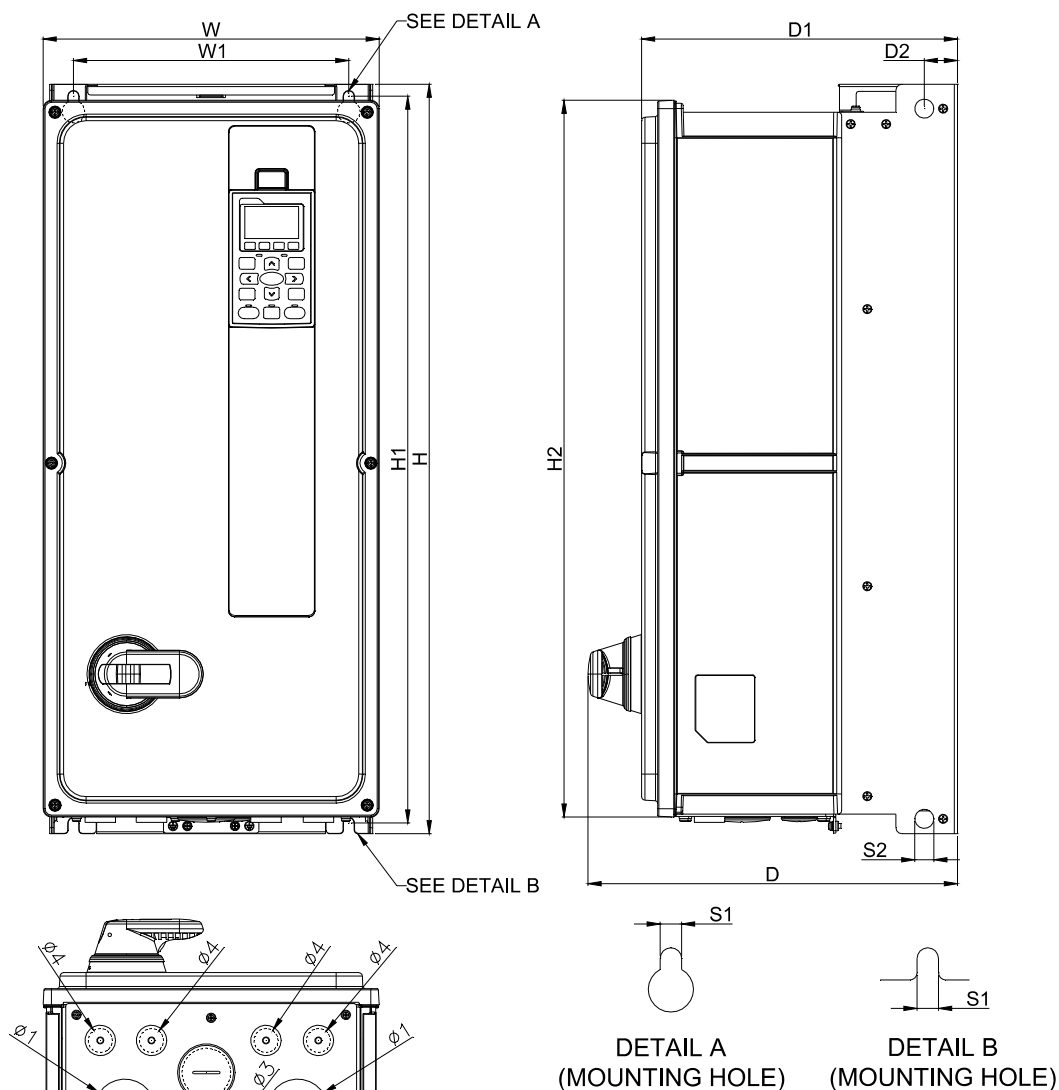
**FRAME C (IP55)**



- MODEL**
- FRAME C-1**  
 VFD150FP2EA-52  
 VFD185FP2EA-52  
 VFD300FP4EA-52  
 VFD370FP4EA-52  
 VFD220FP5EA-52  
 VFD300FP5EA-52  
 VFD370FP5EA-52

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

## FRAME C (IP55)



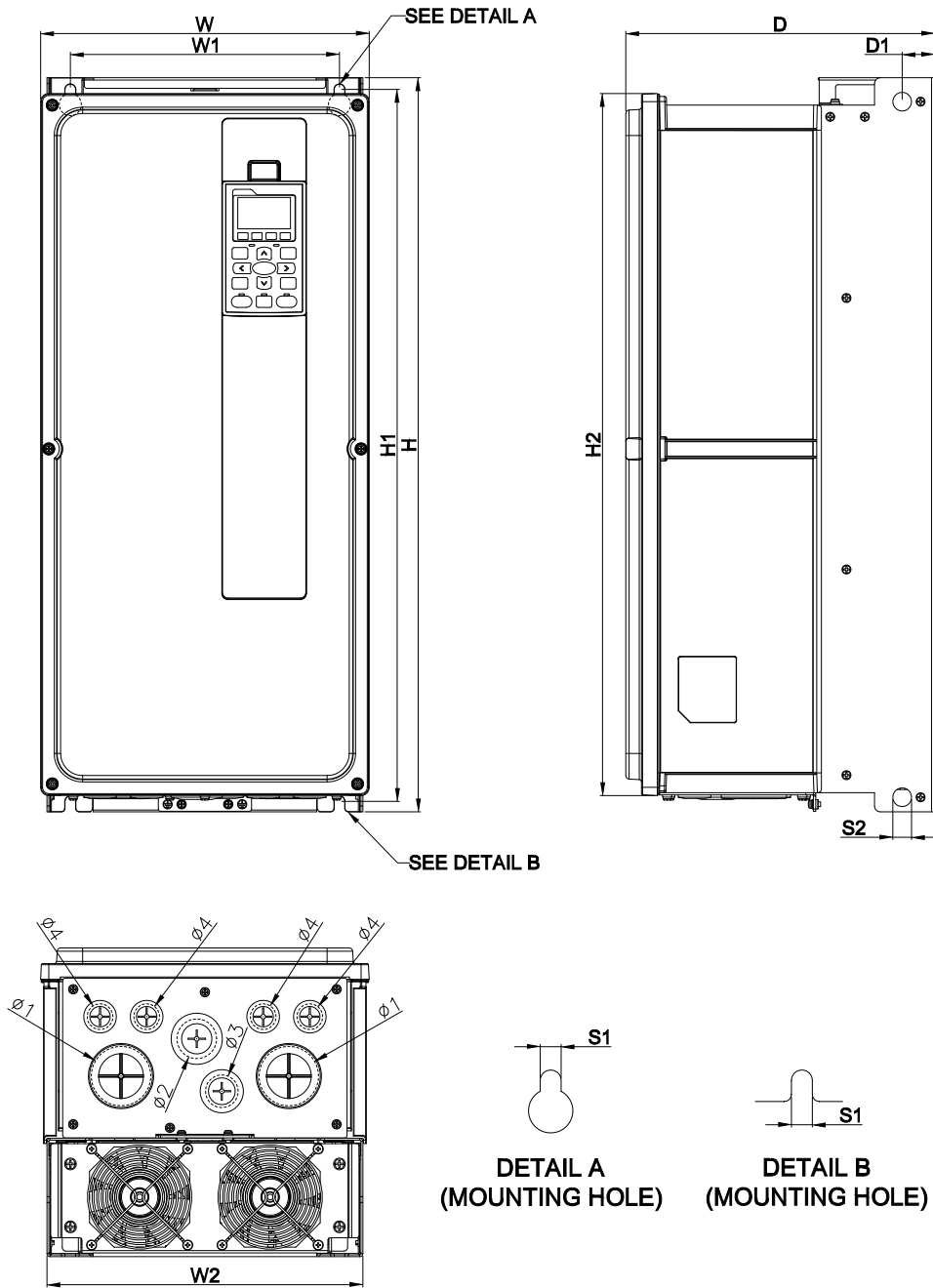
### MODEL

#### FRAME C-2

VFD150FP2EA-52S  
VFD185FP2EA-52S  
VFD300FP4EA-52S  
VFD370FP4EA-52S  
VFD220FP5EA-52S  
VFD300FP5EA-52S  
VFD370FP5EA-52S

FRAME	W	H	D	W1	H1	D1	S1	W2	H2	D2	S2	$\phi 1$	$\phi 2$	$\phi 3$	$\phi 4$
C-2	mm	282.0	630.0	310.0	231.0	611.0	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	0.35	10.67	23.72	1.09	0.63	2.01	1.61	1.00	0.80

**FRAME C (IP41)**



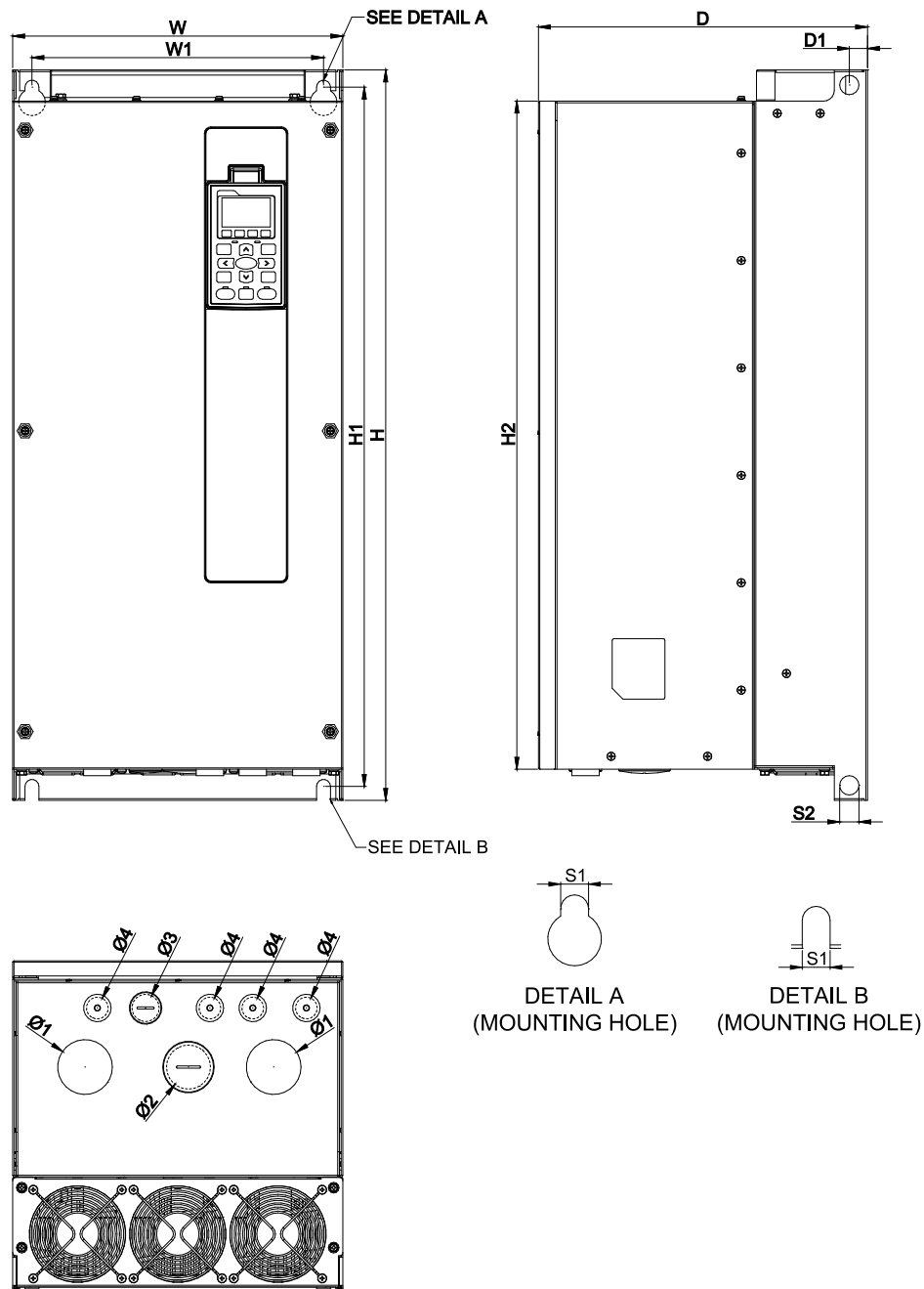
**MODEL**

**FRAME C-3**

- VFD150FP2EA-41
- VFD185FP2EA-41
- VFD300FP4EA-41
- VFD370FP4EA-41
- VFD220FP5EA-41
- VFD300FP5EA-41
- VFD370FP5EA-41

FRAME	W	H	D	W1	H1	D1	S1	W2	H2	S2	$\varnothing 1$	$\varnothing 2$	$\varnothing 3$	$\varnothing 4$	
C-3	mm	282.0	630.0	265.0	231.0	611.0	27.8	9.0	271.0	602.5	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	0.63	2.01	1.34	1.10	0.87

**FRAME D0 (IP55)**

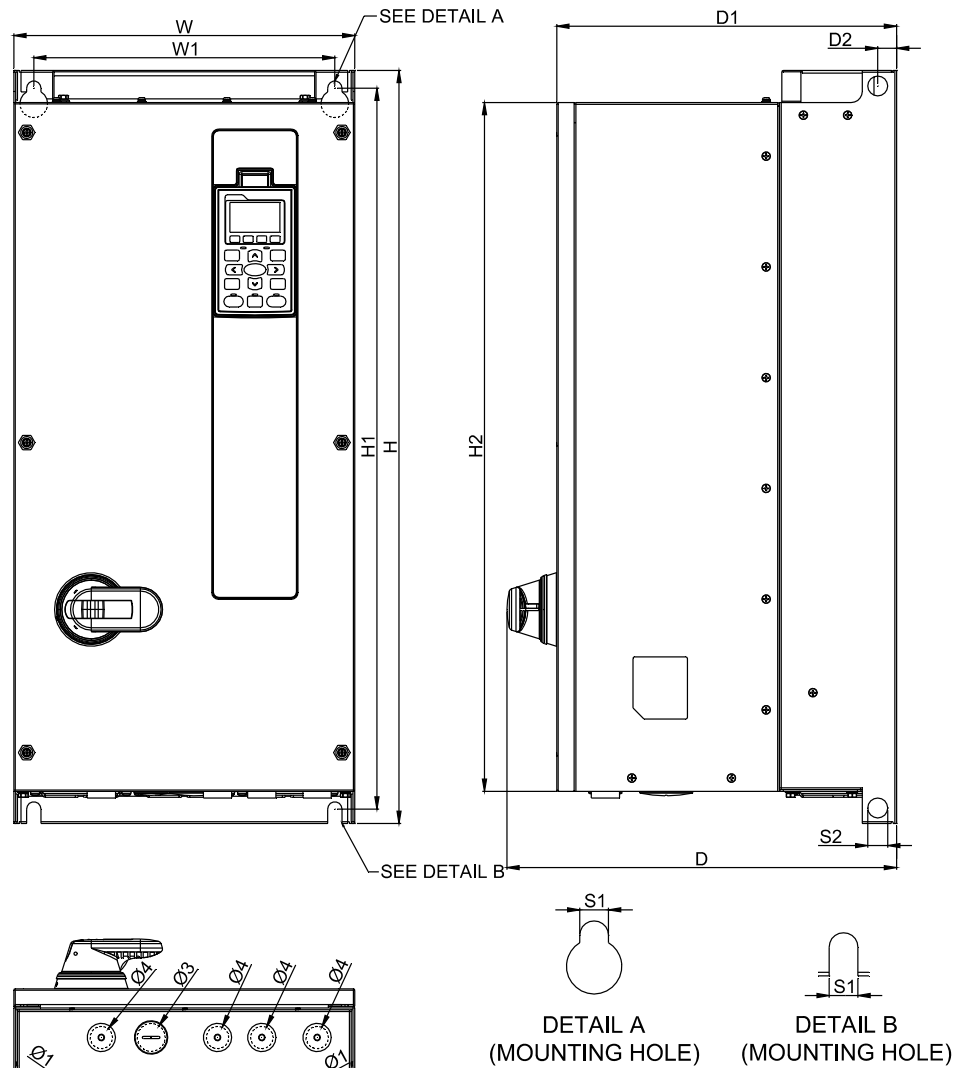


**MODEL**

- FRAME D0-1**  
 VFD220FP2EA-52  
 VFD300FP2EA-52  
 VFD450FP4EA-52  
 VFD550FP4EA-52  
 VFD450FP5EA-52  
 VFD550FP5EA-52

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

**FRAME D0 (IP55)**



**MODEL**

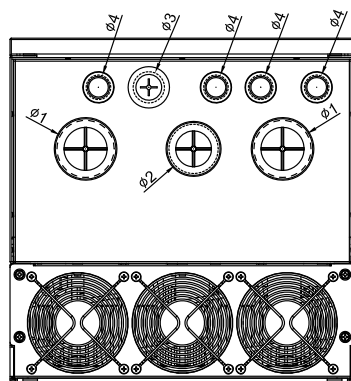
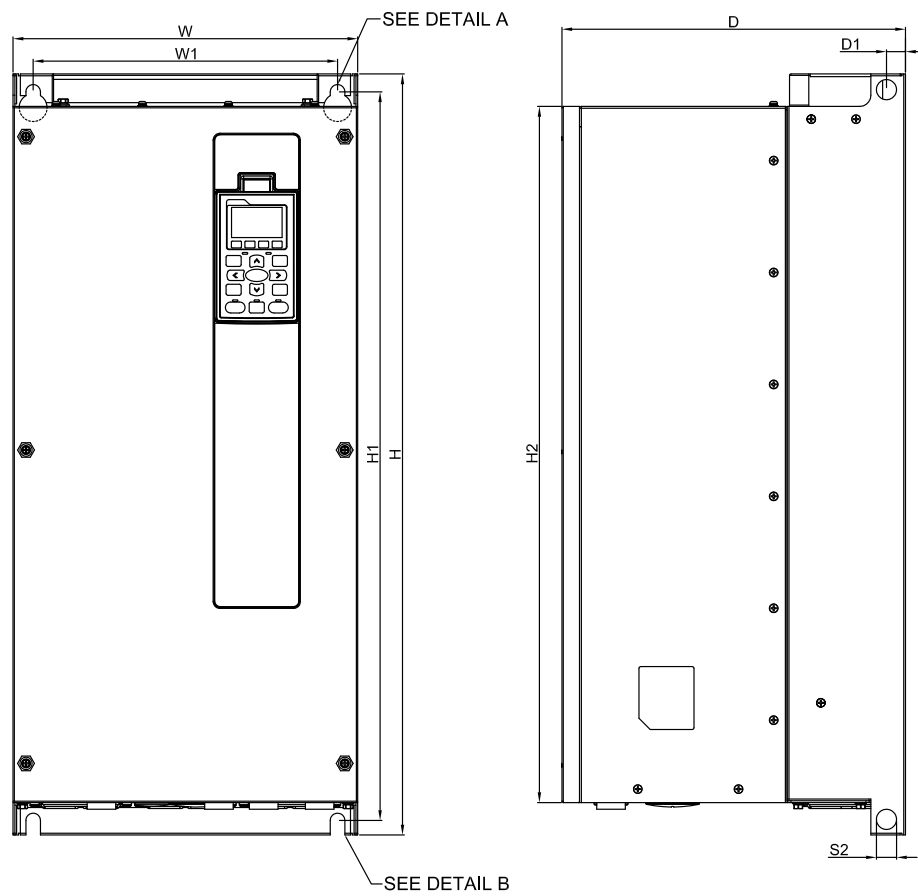
**FRAME D0-2**

- VFD220FP2EA-52S
- VFD300FP2EA-52S
- VFD450FP4EA-52S
- VFD550FP4EA-52S
- VFD450FP5EA-52S
- VFD550FP5EA-52S

FRAME	W	H	D	W1	H1	D1	S1	H2	D2	S2	Ø1	Ø2	Ø3	Ø4
D0-2	mm	308.0	680.0	352.0	272.0	651.0	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	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)

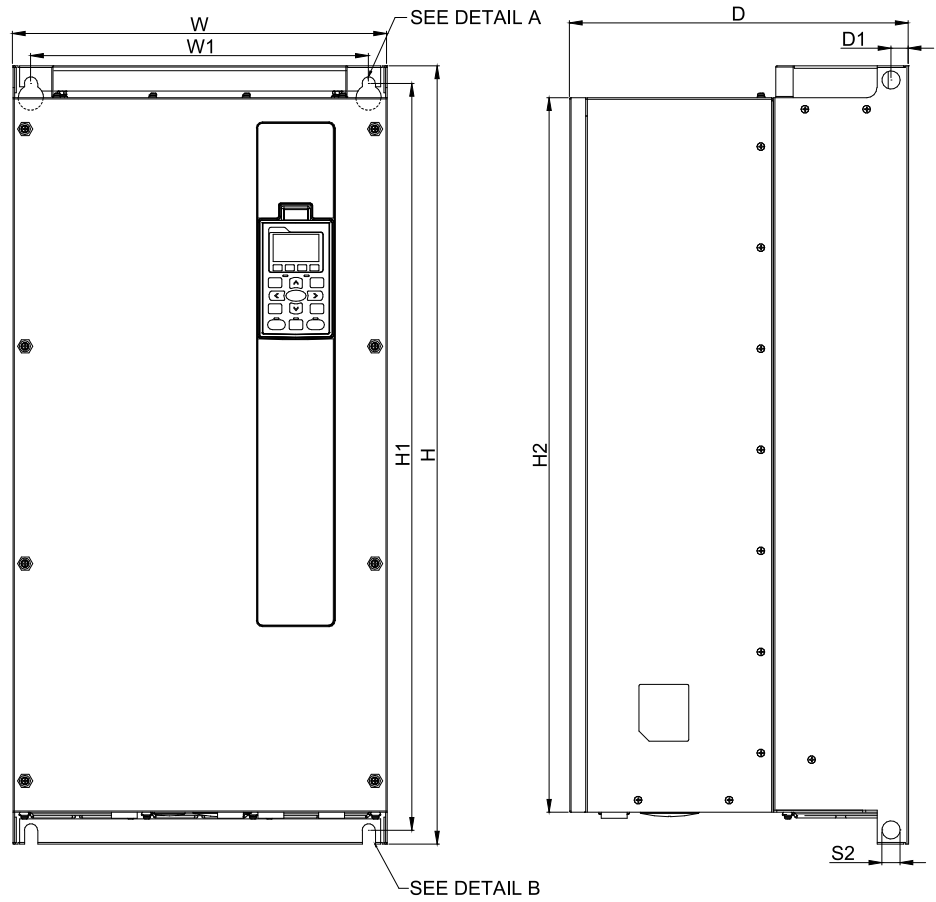
### MODEL

#### FRAME D0-3

VFD220FP2EA-41  
 VFD300FP2EA-41  
 VFD450FP4EA-41  
 VFD550FP4EA-41  
 VFD450FP5EA-41  
 VFD550FP5EA-41

FRAME	W	H	D	W1	H1	D1	S1	H2	S2	$\phi 1$	$\phi 2$	$\phi 3$	$\phi 4$	
D0-3	mm	308.0	680.0	307.0	272.0	651.0	17.0	13.0	622.0	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	0.71	2.01	1.73	1.10	0.87

**FRAME D (IP55)**

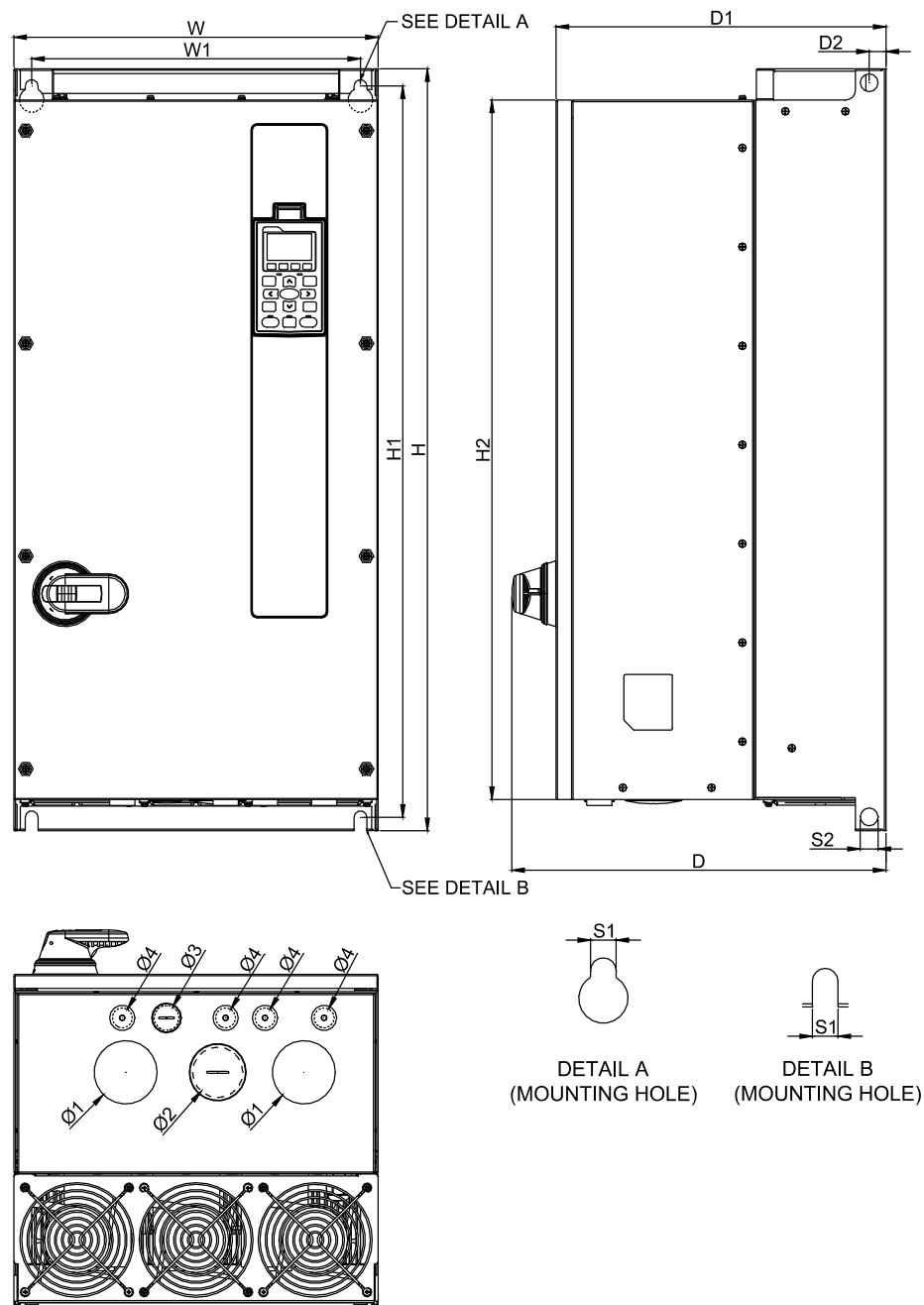


**MODEL**

- FRAME D-1**  
 VFD370FP2EA-52  
 VFD450FP2EA-52  
 VFD750FP4EA-52  
 VFD900FP4EA-52  
 VFD750FP5EA-52  
 VFD900FP5EA-52

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

## FRAME D (IP55)



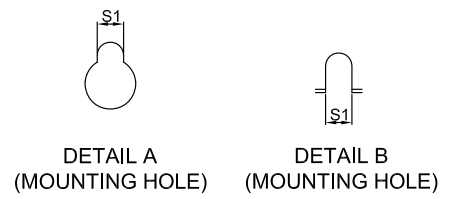
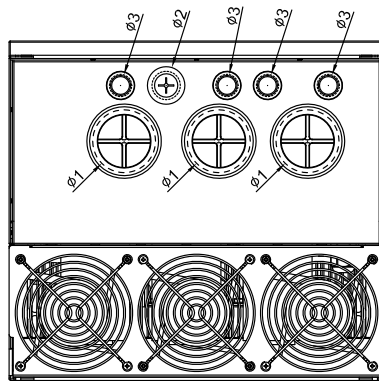
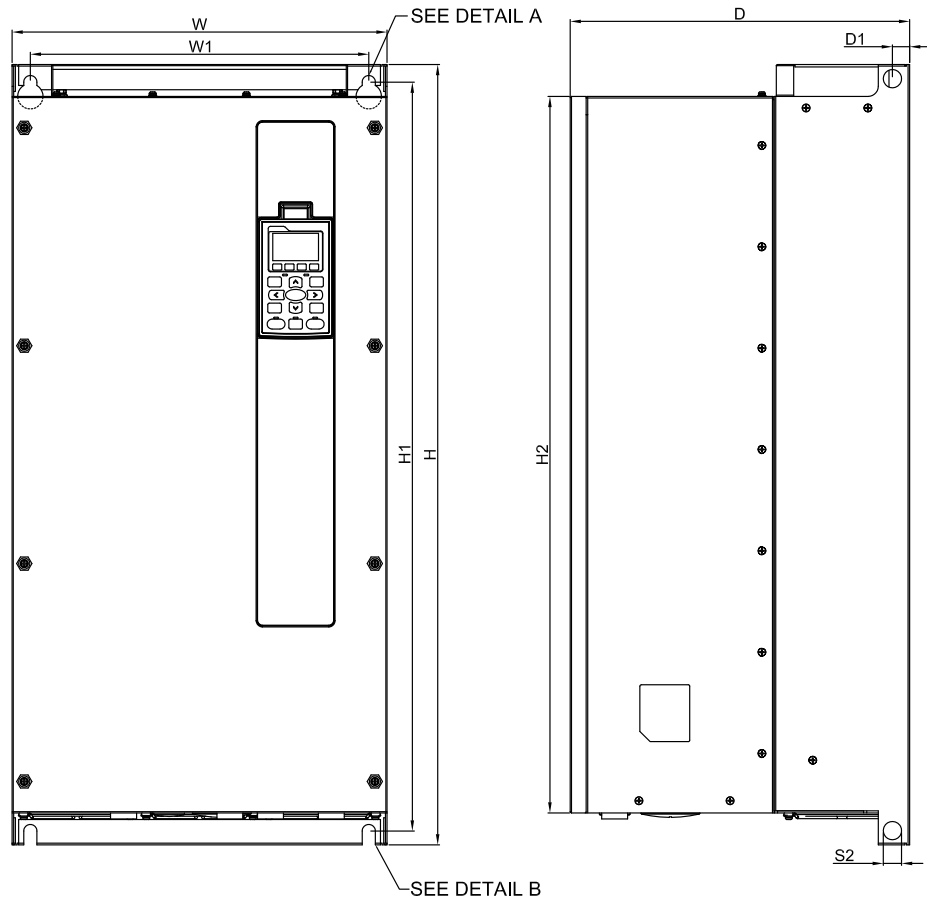
### MODEL

#### FRAME D-2

VFD370FP2EA-52S  
VFD450FP2EA-52S  
VFD750FP4EA-52S  
VFD900FP4EA-52S  
VFD750FP5EA-52S  
VFD900FP5EA-52S

FRAME	W	H	D	W1	H1	D1	S1	H2	D2	S2	$\varnothing1$	$\varnothing2$	$\varnothing3$	$\varnothing4$	
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)**



**MODEL**

**FRAME D-3**


- VFD370FP2EA-41
- VFD450FP2EA-41
- VFD750FP4EA-41
- VFD900FP4EA-41
- VFD750FP5EA-41
- VFD900FP5EA-41

FRAME	W	H	D	W1	H1	D1	S1	H2	S2	$\varnothing 1$	$\varnothing 2$	$\varnothing 3$	
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


## Relay Extension Card

### EMC-R6AA

	Terminals	Descriptions
	RA10~RA15 RC10~RC15	Refer to Pr. 02-36~Pr. 02-41 for multi-function output selection Resistive load: 3A (N.O.)/250 V <sub>AC</sub> 5A (N.O.)/30 V <sub>DC</sub> Inductive load (COS 0.4) 2.0A (N.O.)/250 V <sub>AC</sub> 2.0A (N.O.)/30 V <sub>DC</sub> It is used to output each monitor signal, such as for drive in operation, frequency attained or overload indication.


## Analog I/O Extension Card

### EMC-A22A

	Terminals	Description
	AVI10 AVI11	Refer to Pr. 14-00~Pr. 14-01 for function selection (input), and Pr. 14-18~Pr. 14-19 for mode selection Two sets of AVI port for AVI or ACI switch: SSW3 (AVI10) and SSW4 (AVI11) AVI: Input 0~10V ACI: Input 0~20mA/4~20mA
	AFM10 AFM11	Refer to Pr. 14-12~Pr. 14-13 for function selection (output), and Pr. 14-36~Pr. 14-37 for mode selection Two sets of AFM port for AVO or ACO switch: SSW1 (AFM10) and SSW2 (AFM11) AVO: Output 0~10.00V ACO: Output 0~20.0mA/4.0~20.0mA
	ACM	Analog signal common terminal


## I/O Extension Card

### EMC-D611A

	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 <sub>AC</sub> ; Input frequency: 57~63 Hz Input impedance: 27 K $\Omega$ Terminal response time: ON: 10 ms; OFF: 20 ms

## I/O Extension Card


### EMC-D42A

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

# Accessories

## 24 V Power Shift Card

### EMC-BPS01

Terminals	Descriptions
 24V GND	Allows operation of network system, PLC function and partial functions when the AC motor drive is power off Input power: 24 VDC $\pm$ 5% Maximum input current: 0.5A Note: Do not connect the control terminal +24V (Digital control signal common: SOURCE) directly to the EMC-BPS01 input terminal 24V. Do not connect control terminal GND directly to the EMC-BPS01 input terminal GND.

## CANopen Card

### EMC-COP01

RJ-45 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-

## EtherNet/IP, Modbus TCP Card

### CMC-EIP01



#### Features

- ▶ Support EtherNet/IP and Modbus TCP protocol
- ▶ User-defined parameter mapping
- ▶ IP Filter, basic firewall function

#### Network Interface

Interface	RJ-45 with Auto MDI/MDIX	Transmission Cable	Category 5e shielding 100M
Number of Ports	1 Port	Transmission Speed	10/100 Mbps Auto-Detect
Transmission Method	IEEE 802.3, IEEE 802.3u	Network Protocol	ICMP, IP, TCP, UDP, DHCP, BOOTP, SMTP, EtherNet/IP, Modbus TCP

## BACnet Card

### eZVFD-CC NEW



#### Features

- ▶ Supports native BACnet protocol Rev 12
- ▶ Supports BACnet/IP, BACnet over Ethernet communication protocols
- ▶ Dual port Ethernet supports daisy-chaining multiple VFD devices
- ▶ Maps VFD I/O terminals as BACnet I/O
- ▶ Fully programmable in GCL+
- ▶ Setup and configure using Delta Controls facility management software enteliWEB
- ▶ Real-time clock with supercap power backup

#### eZVFD Connector

Interface	Dual Port RJ45
Transmission Method	Ethernet
Transmission Cable	Shielded CAT 5e/6

#### eZVFD Communication

Transmission Speed	10/100 Base-T
Network Protocol	BACnet/IP, BACnet Ethernet
BACnet Protocol	Rev 12
Device Addressing	Software Addressed



## PROFINET Card

▪ CMC-PN01 **NEW**



### Features

- ▶ Supports PROFINET IO device
- ▶ Supports synchronous data transmission and synchronous parameter access
- ▶ Provides GSDML file for PROFINET communication

### Network Interface

<b>Interface</b>	RJ-45	<b>Transmission Cable</b>	Category 5e shielding 100M
<b>Number of Ports</b>	2 Ports	<b>Transmission Speed</b>	10/100 Mbps auto-negotiate
<b>Transmission Method</b>	IEEE 802.3	<b>Network Protocol</b>	PROFINET

## PROFIBUS DP Card

▪ CMC-PD01



### Features

- ▶ Supports PZD control data exchange
- ▶ Supports PKW polling AC motor drive parameters
- ▶ Supports user diagnosis function
- ▶ Supports remote I/O function
- ▶ Baud (auto-detection): max. 12Mbps

### PROFIBUS DP Connector

<b>Interface</b>	DB9 connector
<b>Transmission Method</b>	High-speed RS-485
<b>Transmission Cable</b>	Shielded twisted pair cable
<b>Electrical Isolation</b>	500 V <sub>DC</sub>

### Communication

<b>Message Type</b>	Cyclic data exchange
<b>Module Name</b>	CMC-PD01
<b>GSD Document</b>	DELA08DB.GSD
<b>Company ID</b>	08DB (HEX)
<b>Serial Transmission Speed Supported (auto-detection)</b>	9.6Kbps; 19.2Kbps; 93.75Kbps; 187.5Kbps; 125Kbps; 250Kbps; 500Kbps; 1.5Mbps; 3Mbps; 6Mbps; 12Mbps (bits per second)

## DeviceNet Card

▪ 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
- ▶ Supports max. 32 words input / 32 words output and remote I/O function for I/O mapping
- ▶ Node address and serial transmission speed can be set up on AC motor drive
- ▶ Power supplied from AC motor drive

### DeviceNet Connector

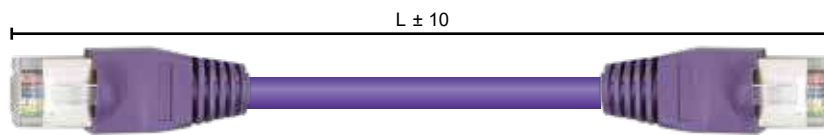
<b>Interface</b>	5-Pin 5.08mm Pluggable Connector
<b>Transmission Method</b>	CAN
<b>Transmission Cable</b>	Shielded twisted pair cable (with 2 power cables)
<b>Transmission Speed</b>	125Kbps, 250Kbps, 500Kbps and extendable serial transmission speed mode
<b>Network Protocol</b>	DeviceNet protocol

### DeviceNet Connector

<b>Interface</b>	50-Pin communication terminal
<b>Transmission Method</b>	SPI communication
<b>Terminal Function</b>	1. Communicating with AC motor drive 2. Transmitting power supply from AC motor drive
<b>Communication Protocol</b>	Delta HSSP protocol

## 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 cable, Shielding	0.3m
	UC-EMC005-02A	EtherNet cable, Shielding	0.5m
	UC-EMC010-02A	EtherNet cable, Shielding	1m
	UC-EMC020-02A	EtherNet cable, Shielding	2m
	UC-EMC050-02A	EtherNet cable, Shielding	5m
	UC-EMC100-02A	EtherNet cable, Shielding	10m
	UC-EMC200-02A	EtherNet cable, Shielding	20m
PROFIBUS Cable	UC-PF01Z-01A	PROFIBUS DP cable	305m



## CANopen / DeviceNet TAP Breakout Boxes

Part Number	Description
TAP-CN01	1 in 2 out, built-in 121Ω terminal resistor
TAP-CN02	1 in 4 out, built-in 121Ω terminal resistor
TAP-CN03	1 in 4 out, RJ45 connector, built-in 121Ω terminal resistor

Unit: mm [inch]



TAP-CN01



TAP-CN02



TAP-CN03

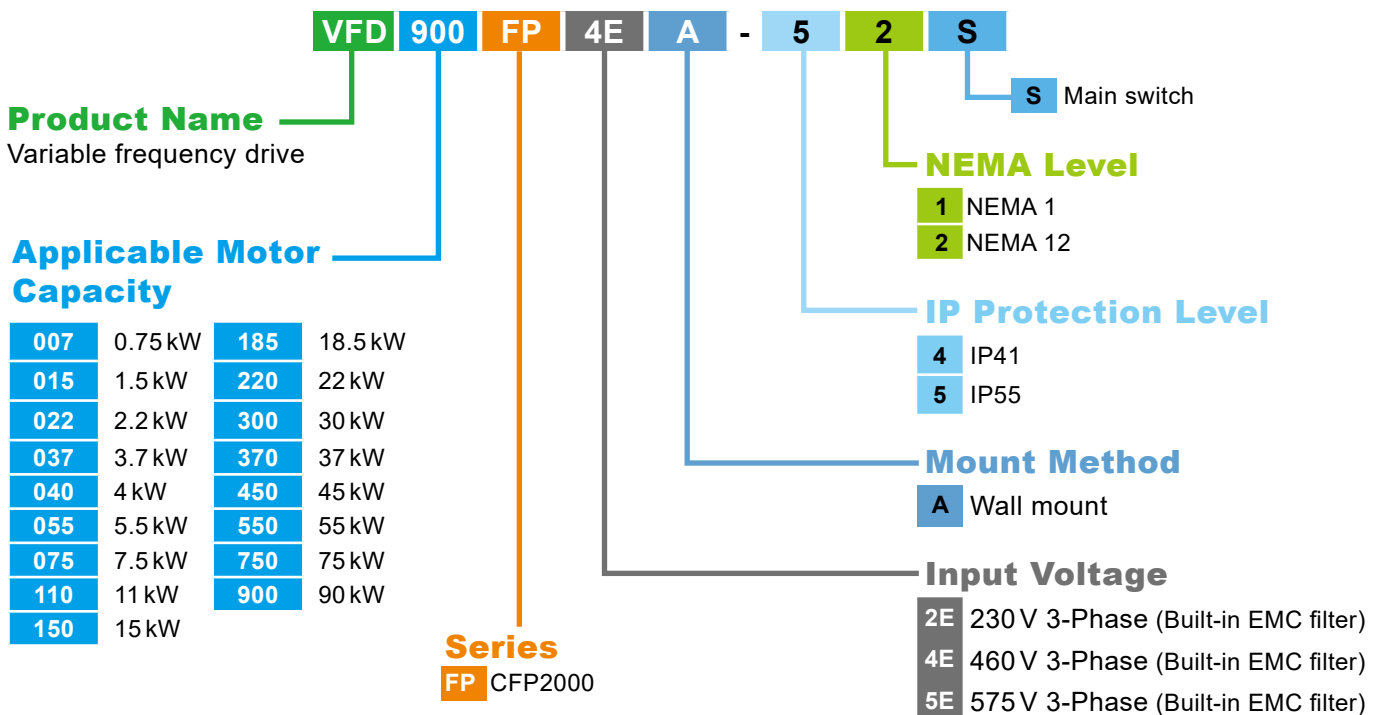
## Ordering Information

Model	Frame	Power Range	IP41 NEMA1	IP55 NEMA12 w/o Mains Switch	IP55 with Mains Switch
230 V	A	0.75kW	VFD007FP2EA-41	VFD007FP2EA-52	VFD007FP2EA-52S
		1.5kW	VFD015FP2EA-41	VFD015FP2EA-52	VFD015FP2EA-52S
		2.2kW	VFD022FP2EA-41	VFD022FP2EA-52	VFD022FP2EA-52S
		3.7kW	VFD037FP2EA-41	VFD037FP2EA-52	VFD037FP2EA-52S
		5.5kW	VFD055FP2EA-41	VFD055FP2EA-52	VFD055FP2EA-52S
	B	7.5kW	VFD075FP2EA-41	VFD075FP2EA-52	VFD075FP2EA-52S
		11kW	VFD110FP2EA-41	VFD110FP2EA-52	VFD110FP2EA-52S
	C	15kW	VFD150FP2EA-41	VFD150FP2EA-52	VFD150FP2EA-52S
		18.5kW	VFD185FP2EA-41	VFD185FP2EA-52	VFD185FP2EA-52S
	D0	22kW	VFD220FP2EA-41	VFD220FP2EA-52	VFD220FP2EA-52S
		30kW	VFD300FP2EA-41	VFD300FP2EA-52	VFD300FP2EA-52S
	D	37kW	VFD370FP2EA-41	VFD370FP2EA-52	VFD370FP2EA-52S
		45kW	VFD450FP2EA-41	VFD450FP2EA-52	VFD450FP2EA-52S
	460 V	A	0.75kW	VFD007FP4EA-41	VFD007FP4EA-52
1.5kW			VFD015FP4EA-41	VFD015FP4EA-52	VFD015FP4EA-52S
2.2kW			VFD022FP4EA-41	VFD022FP4EA-52	VFD022FP4EA-52S
3.7kW			VFD037FP4EA-41	VFD037FP4EA-52	VFD037FP4EA-52S
4kW			VFD040FP4EA-41	VFD040FP4EA-52	VFD040FP4EA-52S
5.5kW			VFD055FP4EA-41	VFD055FP4EA-52	VFD055FP4EA-52S
7.5kW			VFD075FP4EA-41	VFD075FP4EA-52	VFD075FP4EA-52S
B		11kW	VFD110FP4EA-41	VFD110FP4EA-52	VFD110FP4EA-52S
		15kW	VFD150FP4EA-41	VFD150FP4EA-52	VFD150FP4EA-52S
		18.5kW	VFD185FP4EA-41	VFD185FP4EA-52	VFD185FP4EA-52S
		22kW	VFD220FP4EA-41	VFD220FP4EA-52	VFD220FP4EA-52S
C		30kW	VFD300FP4EA-41	VFD300FP4EA-52	VFD300FP4EA-52S
		37kW	VFD370FP4EA-41	VFD370FP4EA-52	VFD370FP4EA-52S
D0		45kW	VFD450FP4EA-41	VFD450FP4EA-52	VFD450FP4EA-52S
		55kW	VFD550FP4EA-41	VFD550FP4EA-52	VFD550FP4EA-52S
D		75kW	VFD750FP4EA-41	VFD750FP4EA-52	VFD750FP4EA-52S
		90kW	VFD900FP4EA-41	VFD900FP4EA-52	VFD900FP4EA-52S

# Ordering Information

Model	Frame	Power Range	IP41 NEMA1	IP55 NEMA12 w/o Mains Switch	IP55 with Mains Switch
575 V	A	1.5kW	VFD015FP5EA-41	VFD015FP5EA-52	VFD015FP5EA-52S
		2.2kW	VFD022FP5EA-41	VFD022FP5EA-52	VFD022FP5EA-52S
		3.7kW	VFD037FP5EA-41	VFD037FP5EA-52	VFD037FP5EA-52S
		5.5kW	VFD055FP5EA-41	VFD055FP5EA-52	VFD055FP5EA-52S
		7.5kW	VFD075FP5EA-41	VFD075FP5EA-52	VFD075FP5EA-52S
	B	11kW	VFD110FP5EA-41	VFD110FP5EA-52	VFD110FP5EA-52S
		15kW	VFD150FP5EA-41	VFD150FP5EA-52	VFD150FP5EA-52S
		18.5kW	VFD185FP5EA-41	VFD185FP5EA-52	VFD185FP5EA-52S
	C	22kW	VFD220FP5EA-41	VFD220FP5EA-52	VFD220FP5EA-52S
		30kW	VFD300FP5EA-41	VFD300FP5EA-52	VFD300FP5EA-52S
		37kW	VFD370FP5EA-41	VFD370FP5EA-52	VFD370FP5EA-52S
	D0	45kW	VFD450FP5EA-41	VFD450FP5EA-52	VFD450FP5EA-52S
		55kW	VFD550FP5EA-41	VFD550FP5EA-52	VFD550FP5EA-52S
	D	75kW	VFD750FP5EA-41	VFD750FP5EA-52	VFD750FP5EA-52S
90kW		VFD900FP5EA-41	VFD900FP5EA-52	VFD900FP5EA-52S	

## Model Name





# Global Operations

## ASIA (Taiwan)



Taoyuan Technology Center (Green Building)



Taoyuan Plant 1



Tainan Plant (Diamond-rated Green Building)

## ASIA (China)



Wujiang Plant 3



Shanghai Office





**ASIA (Japan)**



Tokyo Office

**ASIA (India)**



Rudrapur Plant  
(Green Building)

**EUROPE**



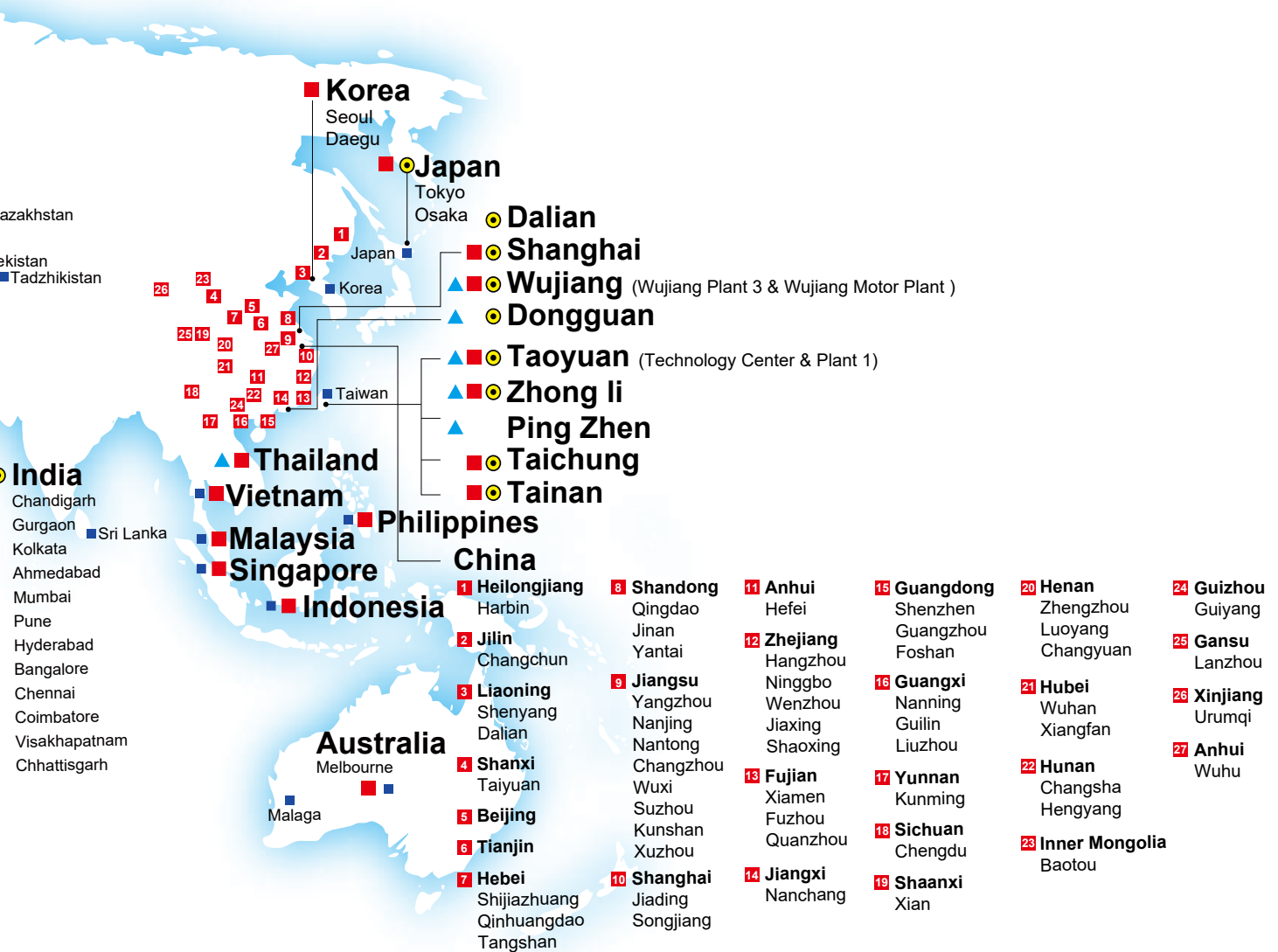
Amsterdam, the Netherlands

**AMERICA**



Research Triangle Park, U.S.A.

▲ 8 Factories   ■ 117 Branch Offices   ● 13 R&D Centers   ■ 915 Distributors





Smarter. Greener. Together.

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