



Automation for a Changing World

## **Standard Compact Drive MS300 Series**



[www.deltaww.com](http://www.deltaww.com)

 **DELTA**  
Smarter. Greener. Together.

# Compact and Intelligent

## The new standard for micro drives

The automation industry today continues to face challenges such as increasing competition and rising costs. In addition to improving productivity and reducing labor, the driving force for automation is the shift to higher efficiency, optimal quality, and most importantly, flexibility and compatibility for a wide range of applications.

Delta's MS300 series are the new generation high performance and standard compact vector control drives that inherit Delta's superior drive technology—all in a compact drive that has been reduced 40% in size.

A variety of essential functions are built-in as standard, including: PLC capacity for simple programming needs, a communication slots for various communication cards, and a USB port to make data uploads and downloads fast and easy. This saves the need for additional hardware, while providing more installation space for the power cabinet. Other key features include: Support for both IM and PM motor control for application flexibility, an STO function to ensure worry-free operation while protecting facilities from damage, and a simplified wiring process with a new screwless wiring design of terminal blocks for quick installation.

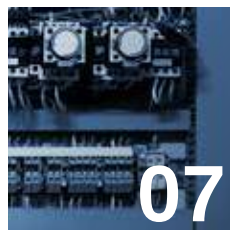
Saving space, reducing setup and wiring time, and providing high efficiency and a highly stable system, the MS300 are your key to improving market competitiveness and ensuring success.





## Models Overview

Standard Models  
High Speed Models  
Exterior Design and Interfaces  
Optional Cards



## Optimized Space Utilization

Compact Design  
Side-by-Side Installation



## Outstanding Drive Performance

Supports IM and PM Motors  
High Starting Torque  
Deceleration Energy Backup (DEB)  
Enhanced Braking Capability



## Strong System Support

Multi-motor Control  
Pulse Control  
Built-in PLC  
High Speed Applications  
24 V<sub>DC</sub> External Power  
High Overload Capability  
Built-in Brake Chopper  
Versatile Communications



## Stable, Safe and Reliable

Safety Standards  
Enhanced Conformal Coating  
IP40 Models  
Built-in EMC Filter



## Easy to Install

Application Groups  
Built-in USB Port  
Screwless Wiring of Control Terminal



## Wide Range of Applications

Machine Tools  
Woodworking Machines  
Automatic Tool Changers (ATC)  
Pumps  
Packaging Machines  
Textile Machines



## Specifications

Product Specifications  
Wiring  
Dimensions  
Accessories  
Model Name Explanation  
Ordering Information

# Models Overview



## Standard Models (IP20/IP40)

### 115V single-phase

|                              |      |     |      |
|------------------------------|------|-----|------|
| Applicable Motor Output (kW) | 0.2  | 0.4 | 0.75 |
| Applicable Motor Output (HP) | 0.25 | 0.5 | 1    |
| Frame Size                   | A    |     | C    |

### 230V single-phase

|                              |      |     |      |     |     |
|------------------------------|------|-----|------|-----|-----|
| Applicable Motor Output (kW) | 0.2  | 0.4 | 0.75 | 1.5 | 2.2 |
| Applicable Motor Output (HP) | 0.25 | 0.5 | 1    | 2   | 3   |
| Frame Size                   | A    |     | B    | C   |     |

### 230V single-phase (Built-in EMC filter)

|                              |      |     |      |     |     |
|------------------------------|------|-----|------|-----|-----|
| Applicable Motor Output (kW) | 0.2  | 0.4 | 0.75 | 1.5 | 2.2 |
| Applicable Motor Output (HP) | 0.25 | 0.5 | 1    | 2   | 3   |
| Frame Size                   | B    |     |      | C   |     |

### 230V 3-phase

|                              |      |     |      |     |     |       |     |     |    |    |
|------------------------------|------|-----|------|-----|-----|-------|-----|-----|----|----|
| Applicable Motor Output (kW) | 0.2  | 0.4 | 0.75 | 1.5 | 2.2 | 3.7/4 | 5.5 | 7.5 | 11 | 15 |
| Applicable Motor Output (HP) | 0.25 | 0.5 | 1    | 2   | 3   | 5     | 7.5 | 10  | 15 | 20 |
| Frame Size                   | A    |     |      | B   | C   |       | D   | E   |    | F  |

### 460V 3-phase

|                              |     |      |     |     |       |     |     |    |    |      |    |
|------------------------------|-----|------|-----|-----|-------|-----|-----|----|----|------|----|
| Applicable Motor Output (kW) | 0.4 | 0.75 | 1.5 | 2.2 | 3.7/4 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 |
| Applicable Motor Output (HP) | 0.5 | 1    | 2   | 3   | 5     | 7.5 | 10  | 15 | 20 | 25   | 30 |
| Frame Size                   | A   |      | B   | C   |       | D   |     | E  |    | F    |    |

### 460V 3-phase (Built-in EMC filter)

|                              |     |      |     |     |       |     |     |    |    |      |    |
|------------------------------|-----|------|-----|-----|-------|-----|-----|----|----|------|----|
| Applicable Motor Output (kW) | 0.4 | 0.75 | 1.5 | 2.2 | 3.7/4 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 |
| Applicable Motor Output (HP) | 0.5 | 1    | 2   | 3   | 5     | 7.5 | 10  | 15 | 20 | 25   | 30 |
| Frame Size                   | B   |      |     | C   |       | D   |     | E  |    | F    |    |

### 575V 3-phase

|                              |      |     |     |     |     |     |
|------------------------------|------|-----|-----|-----|-----|-----|
| Applicable Motor Output (kW) | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 |
| Applicable Motor Output (HP) | 1    | 2   | 3   | 5   | 7.5 | 10  |
| Frame Size                   | A    | B   | C   | C   | D   | D   |

## Standard Models (IP66)

### 230V single-phase

|                              |     |      |     |     |
|------------------------------|-----|------|-----|-----|
| Applicable Motor Output (kW) | 0.4 | 0.75 | 1.5 | 2.2 |
| Applicable Motor Output (HP) | 0.5 | 1    | 2   | 3   |
| Frame Size                   | A   |      |     | B   |

## Standard Models (IP66)

### 230V single-phase (Built-in EMC filter)

|                              |     |      |     |     |
|------------------------------|-----|------|-----|-----|
| Applicable Motor Output (kW) | 0.4 | 0.75 | 1.5 | 2.2 |
| Applicable Motor Output (HP) | 0.5 | 1    | 2   | 3   |
| Frame Size                   | A   |      | B   |     |

### 230V 3-phase

|                              |     |      |     |     |       |     |
|------------------------------|-----|------|-----|-----|-------|-----|
| Applicable Motor Output (kW) | 0.4 | 0.75 | 1.5 | 2.2 | 3.7/4 | 5.5 |
| Applicable Motor Output (HP) | 0.5 | 1    | 2   | 3   | 5     | 7.5 |
| Frame Size                   | A   |      |     | B   |       | C   |

### 460V 3-phase

|                              |     |      |     |     |       |     |     |
|------------------------------|-----|------|-----|-----|-------|-----|-----|
| Applicable Motor Output (kW) | 0.4 | 0.75 | 1.5 | 2.2 | 3.7/4 | 5.5 | 7.5 |
| Applicable Motor Output (HP) | 0.5 | 1    | 2   | 3   | 5     | 7.5 | 10  |
| Frame Size                   | A   |      |     |     | B     | C   |     |

### 460V 3-phase (Built-in EMC filter)

|                              |     |      |     |     |       |     |     |
|------------------------------|-----|------|-----|-----|-------|-----|-----|
| Applicable Motor Output (kW) | 0.4 | 0.75 | 1.5 | 2.2 | 3.7/4 | 5.5 | 7.5 |
| Applicable Motor Output (HP) | 0.5 | 1    | 2   | 3   | 5     | 7.5 | 10  |
| Frame Size                   | A   |      |     |     | B     | C   |     |

## High-speed Models (IP20/IP40)

### 230V single-phase

|                              |     |     |
|------------------------------|-----|-----|
| Applicable Motor Output (kW) | 1.5 | 2.2 |
| Applicable Motor Output (HP) | 2   | 3   |
| Frame Size                   | C   |     |

### 230V single-phase (Built-in EMC filter)

|                              |     |     |
|------------------------------|-----|-----|
| Applicable Motor Output (kW) | 1.5 | 2.2 |
| Applicable Motor Output (HP) | 2   | 3   |
| Frame Size                   | C   |     |

### 230V 3-phase

|                              |     |     |       |     |     |    |    |
|------------------------------|-----|-----|-------|-----|-----|----|----|
| Applicable Motor Output (kW) | 1.5 | 2.2 | 3.7/4 | 5.5 | 7.5 | 11 | 15 |
| Applicable Motor Output (HP) | 2   | 3   | 5     | 7.5 | 10  | 15 | 20 |
| Frame Size                   | B   | C   |       | D   | E   |    | F  |

### 460V 3-phase

|                              |     |     |       |     |     |    |    |      |    |
|------------------------------|-----|-----|-------|-----|-----|----|----|------|----|
| Applicable Motor Output (kW) | 1.5 | 2.2 | 3.7/4 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 |
| Applicable Motor Output (HP) | 2   | 3   | 5     | 7.5 | 10  | 15 | 20 | 25   | 30 |
| Frame Size                   | B   | C   |       | D   |     | E  |    | F    |    |

### 460V 3-phase (Built-in EMC filter)

|                              |     |     |       |     |     |    |    |      |    |
|------------------------------|-----|-----|-------|-----|-----|----|----|------|----|
| Applicable Motor Output (kW) | 1.5 | 2.2 | 3.7/4 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 |
| Applicable Motor Output (HP) | 2   | 3   | 5     | 7.5 | 10  | 15 | 20 | 25   | 30 |
| Frame Size                   | B   | C   |       | D   |     | E  |    | F    |    |

## Hardware Design

Compact design and user-friendly interface

### Removable Keypad

Press to remove; supports remote operation away from drive



### Built-in USB Port

Easy and fast programming setting, update and real-time monitoring and tuning



### Screwless Top Cover Design

Press on both side tabs to remove the cover



### Removable RFI Jumper

Applicable for different application needs



### Removable Fan

Easy to replace and maintain for a longer lifetime



## Option Cards

A wide selection of option cards for highly flexible applications



### External Power Supply Card (DC 24V)

EMM-BPS02



### Communication Cards

PROFIBUS DP

CMM-PD02



DeviceNet

CMM-DN02



EtherNet/IP &  
Modbus TCP

CMM-EIP02



CANopen

CMM-COP02



EtherCAT

CMM-EC02



Built-in 1 Option Slot



# Optimized Space Utilization

## Compact Design

Provides more powerful features in smaller sizes with reduction up to 40% that effectively optimizes the installation space



## Side-by-Side Installation

Supports side-by-side installation with operating temperatures of  $-20^{\circ}\text{C} \sim 40^{\circ}\text{C}$ ; enables highly flexible and highly efficient installation

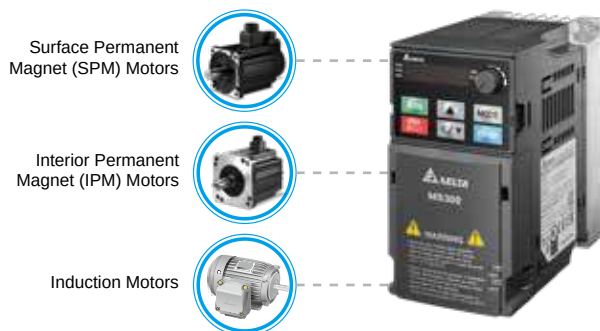
**Substantial savings in space!**



# Outstanding Drive Performance

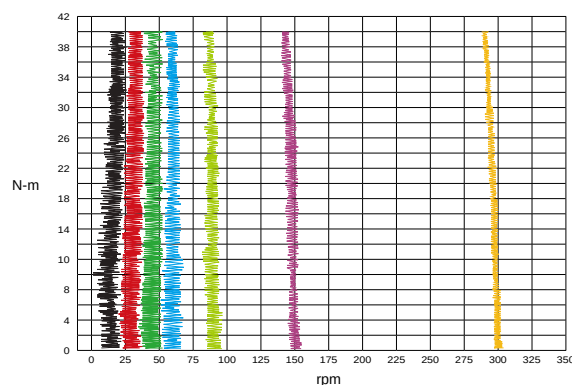
## Supports IM and PM Motors

Supports 4 independent induction motor control parameter sets



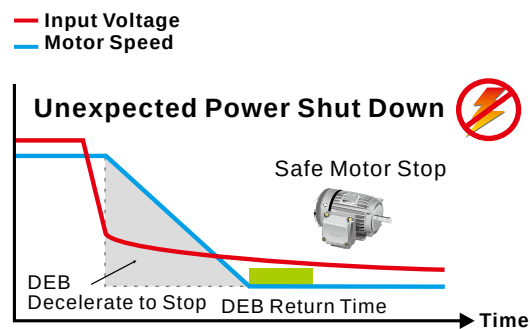
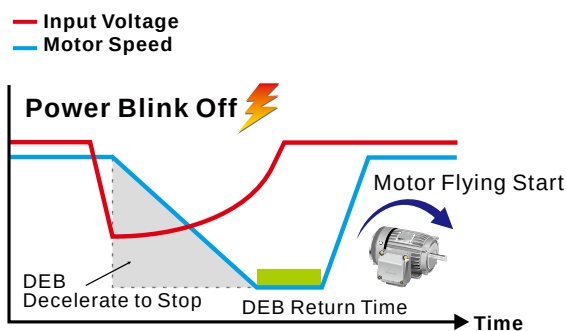
## High Starting Torque

Delivers 200% high starting torque with a low speed control of 0.5 Hz and provides outstanding machine stability; suitable for dynamic loading applications



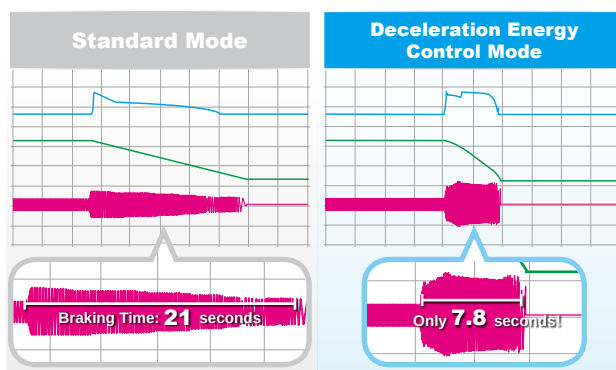
## Deceleration Energy Backup (DEB)

Controls the motor deceleration to a stop when an unexpected power shut-down occurs to prevent mechanical damage. When power resumes, the motor will accelerate to its previous speed



## Enhanced Braking Capability

Provides Deceleration Energy Control Mode to shorten braking time by adjusting the motor speed and current, replacing break resistors

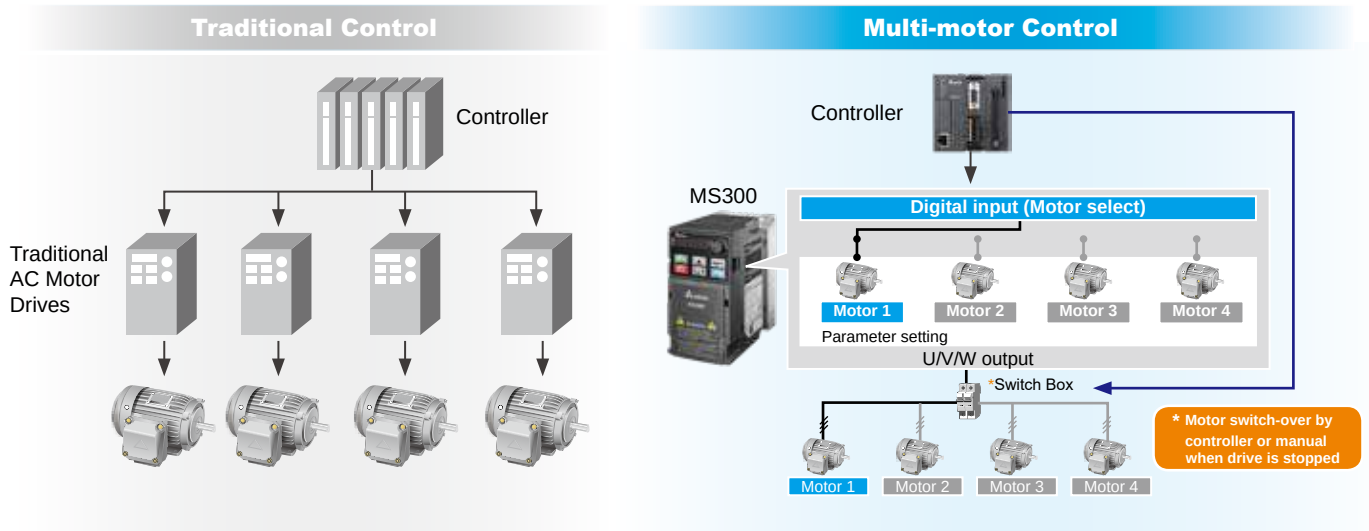


\* Actual deceleration performance varies upon different system loads

# Strong System Support

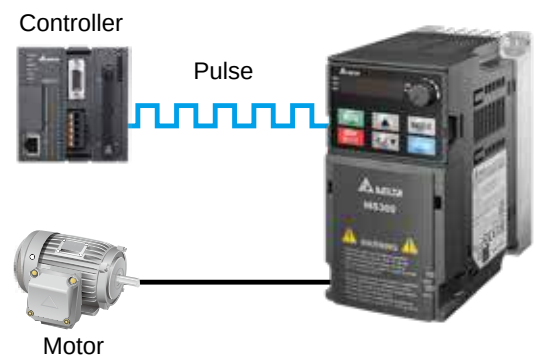
## Multi-motor Control

Supports 4 induction motors switching control



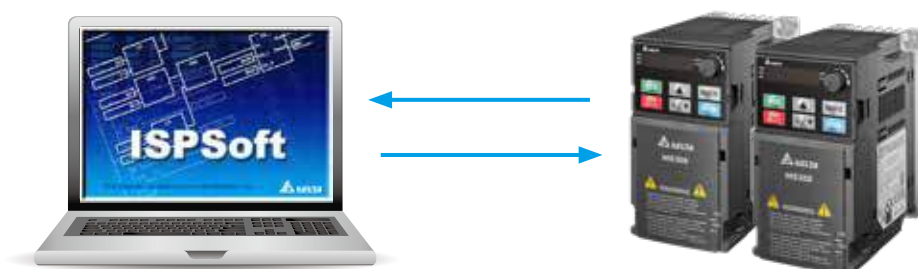
## Pulse Input

Supports single pulse input signal from controller as frequency command



## Built-in PLC

Built-in PLC capacity (2k steps) to provide distributed control and independent operation via network connection



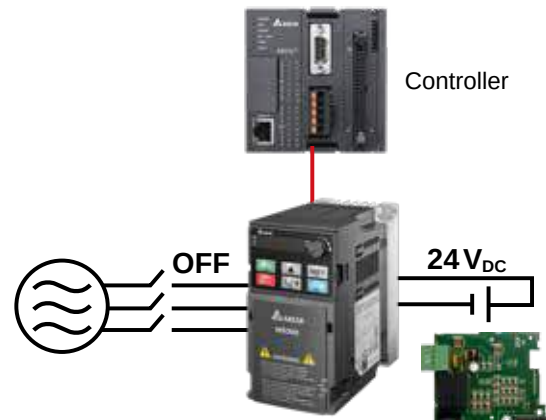
## High-Speed Applications

High-speed models are available to support high-speed processing

| Type       | Model          | Frequency Setting |
|------------|----------------|-------------------|
| Standard   | VFD□□□MS□□□SAA | 0 ~ 599Hz         |
| High-speed | VFD□□□MS□□□SHA | 0 ~ 1500Hz        |

## DC 24V External Power

External power supply card is available for external power connection to protect the system and ensure uninterrupted communication when mains power failure occurs



## High Overload Capability

- Normal duty: rated current 120% for 60 seconds; 150% for 3 seconds
- Heavy duty: rated current 150% for 60 seconds; 200% for 3 seconds

## Built-in Braking Chopper

Larger braking torque capability is provided by using an additional braking resistor

## Versatile Communication Interfaces

Built-in RS-485 (Modbus) and various communication card options

| Communication | MS300    |
|---------------|----------|
| Modbus        | Built-in |
| PROFIBUS DP   | Optional |
| DeviceNet     | Optional |
| Modbus TCP    | Optional |
| EtherNet/IP   | Optional |
| CANopen       | Optional |
| EtherCAT      | Optional |

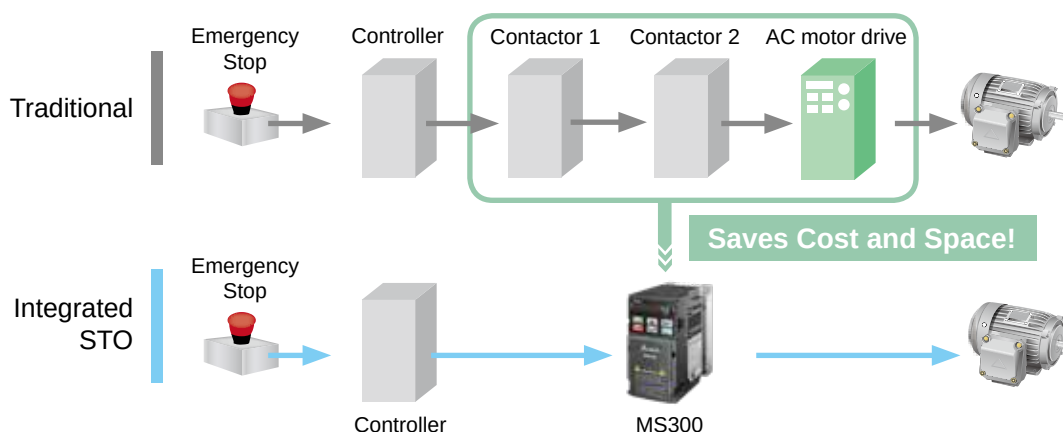
# Stable, Safe and Reliable



## Safety Standard

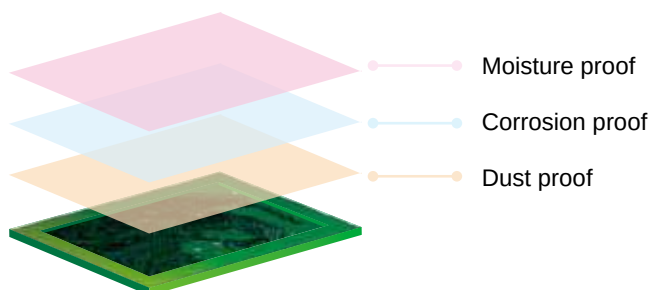
Integrated Safe Torque Off (STO), compliance with:

- ▶ ISO 13849-1:2015 Category 3 PL d
- ▶ EN 60204-1 Category 0
- ▶ EN 61508 SIL2
- ▶ EN 62061 SIL CL 2



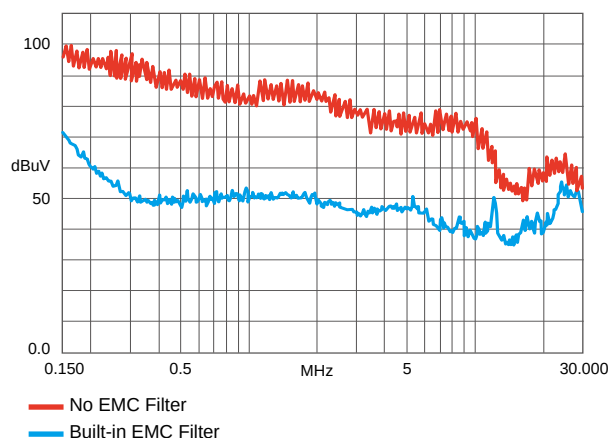
## PCB Coating

100% PCB coating (IEC 60721-3-3 class 3C2 standard) ensures drive operation stability and safety in critical environments



## Built-in EMC Filter

Built-in Class A (C2) standard EMC filter; saves on additional procurement cost and wiring time, and provides more cabinet space for other devices to use



## IP40 Models

Strengthened fan coating and concealed air vent prevent dust and other particles from entering the drive, suitable for critical environment applications



## IP66 Models

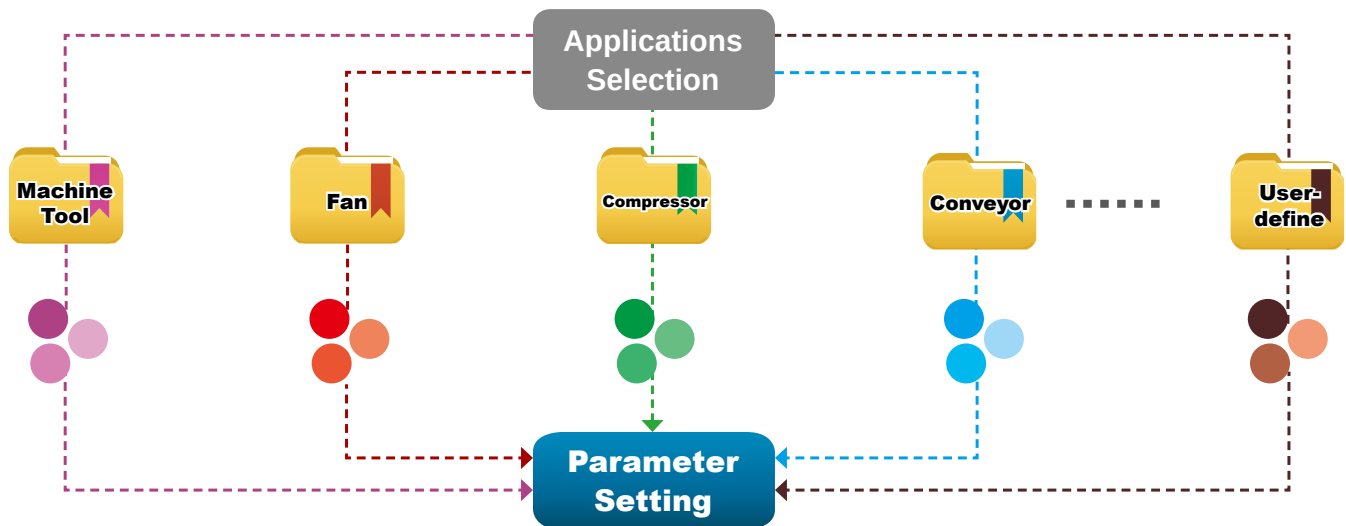
IIP66/NEMA4X water-proof and dust-proof design enables stable operation under harsh environment. Quick installation without control cabinet saves cost



# Easy to Install

## Application Groups (Macro)

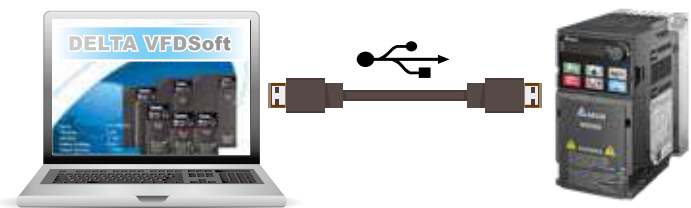
Simplifies the parameter setting process by grouping the parameters for different applications to use



## Built-in USB Port

Built-in USB port facilitates the drive setting, updating, real-time monitoring and system tuning process

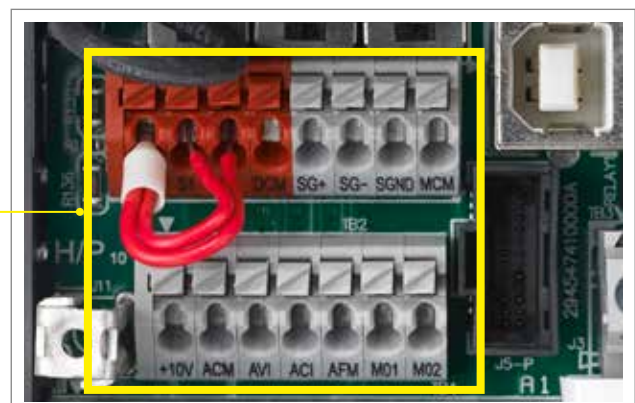
- No need of USB or RS-485 connectors
- Supports offline (drive power off) parameter setting/copying and system update



## Screwless Wiring of Control Terminal

Spring clamp terminal blocks provide fast and easy wiring

No special tools needed, time-saving



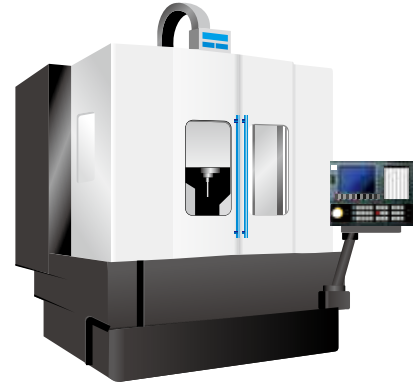
# Wide Range of Applications



## Machine Tools

### Features and Benefits

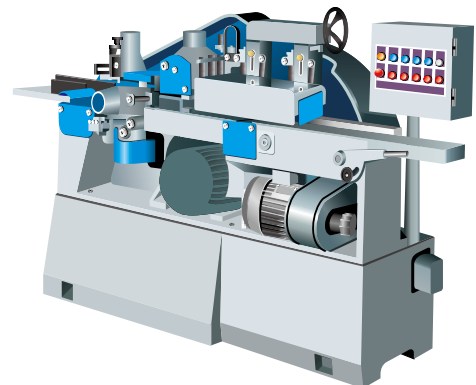
- High-speed models support main spindle 1500Hz frequency output; suitable for complex and high precision processing applications
- Timely acceleration/deceleration control to improve machinery operation efficiency
- Built-in brake chopper to save on purchasing cost
- Built-in PLC capacity for flexible application needs
- Built-in STO function ensures operator safety and effectively reduces accident risk
- Provides deceleration-to-stop function to protect tools from damage and ensure operator safety



## Woodworking Machines

### Features and Benefits

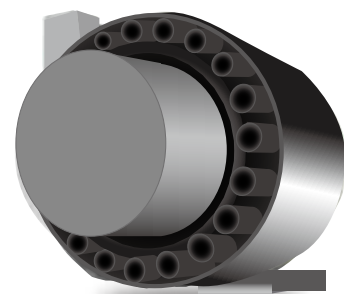
- Timely acceleration/deceleration control improves machinery operation efficiency
- Built-in STO function ensures operator safety and effectively reduces accident risk
- Built-in PLC capacity saves on purchasing cost
- Built-in EMC filter effectively reduces electromagnetic interference
- Compact in size and weight, easy to install and maintain



## Automatic Tool Changers (ATC)

### Features and Benefits

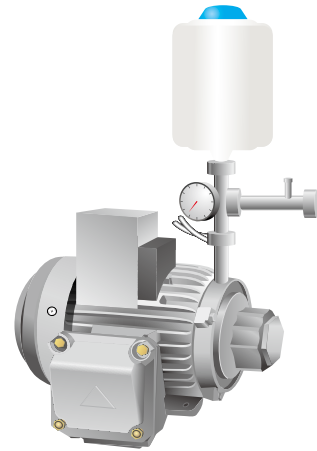
- Compact design of drive provides more cabinet space for other devices to use
- Quick start and timely acceleration/deceleration control function effectively shortens tool changing time and improves system efficiency and productivity
- Simple structure is easy to install and maintain
- Built-in STO function ensures operator safety and effectively reduces accident risk
- Built-in brake choppe saves on purchasing cost



## Pump Applications

### Features and Benefits

- Built-in PID feedback control
- Built-in PLC capacity saves on purchasing cost of PLC and simpler wiring
- Supports a wide range of input voltages, suitable for various types of pumps application and use in different countries
- Deceleration energy control mode shortens deceleration time and reduces cost and installation space for braking resistor



## Packaging Machines

### Features and Benefits

- Compact design to save installation space
- Built-in STO function ensures operator safety and effectively reduces accident rate
- Built-in brake chopper saves on system construction cost
- Built-in RS-485 (Modbus) and various communication cards upon selection (optional)
- High-speed pulse input
- Supports frequency command by pulse input to improve control precision



## Textile Machines

### Features and Benefits

- IP40 models provide excellent protection from a high dust, fiber or moisture environment
- Improved heatsink design prevents fiber clogging the air way; modular design of fan is easy to clean and provides longer lifetime
- Improved braking capability shortens the deceleration-to-stop time and is suitable for sudden stop requirements
- Built-in STO function ensures operator safety and effectively reduces accident rate
- Supports both induction motors and PM motors
- Provides deceleration-to-stop function to protect the equipment from damage when sudden power failure occurs



# Specifications

## IP20/IP40 Models

| Single-phase 115 V (Models w/o Built-in EMC Fielter) |                           |                          |                                              |     |             |
|------------------------------------------------------|---------------------------|--------------------------|----------------------------------------------|-----|-------------|
| Frame                                                |                           |                          | A                                            |     | C           |
| Applicable Motor Output (kW)                         |                           |                          | 0.2                                          | 0.4 | 0.75        |
| Applicable Motor Output (HP)                         |                           |                          | 1/4                                          | 1/2 | 1           |
| Inverter Output                                      | Heavy Duty                | Rated Output Current (A) | 1.6                                          | 2.5 | 4.8         |
|                                                      | Normal Duty               | Rated Output Current (A) | 1.8                                          | 2.7 | 5.5         |
| Input                                                | Rated Voltage/Frequency   |                          | 1-phase AC 100 V~120 V (-15%~+10%), 50/60 Hz |     |             |
|                                                      | Mains Input Voltage Range |                          | 85~132 V                                     |     |             |
|                                                      | Mains Frequency Range     |                          | 47~63 Hz                                     |     |             |
| Carrier Frequency (kHz)                              |                           |                          | 2~15 (default 4)                             |     |             |
| Brake Chopper                                        |                           |                          | Built-in                                     |     |             |
| DC Reactor                                           |                           |                          | Optional                                     |     |             |
| AC Reactor                                           |                           |                          | Optional                                     |     |             |
| Cooling Method                                       |                           |                          | Natural air cooling                          |     | Fan cooling |
| Size: W×H (mm)                                       |                           |                          | 68×128                                       |     | 87×157      |
| Size: D (mm)                                         |                           |                          | 96                                           | 125 | 152         |

| Single-phase 230 V (Models with Built-in EMC Filter) |                           |                          |                                              |             |      |        |      |
|------------------------------------------------------|---------------------------|--------------------------|----------------------------------------------|-------------|------|--------|------|
| Frame                                                |                           |                          | B                                            |             |      | C      |      |
| Applicable Motor Output (kW)                         |                           |                          | 0.2                                          | 0.4         | 0.75 | 1.5    | 2.2  |
| Applicable Motor Output (HP)                         |                           |                          | 1/4                                          | 1/2         | 1    | 2      | 3    |
| Inverter Output                                      | Heavy Duty                | Rated Output Current (A) | 1.6                                          | 2.8         | 4.8  | 7.5    | 11   |
|                                                      | Normal Duty               | Rated Output Current (A) | 1.8                                          | 3.2         | 5    | 8.5    | 12.5 |
| Input                                                | Rated Voltage/Frequency   |                          | 1-phase AC 200 V~240 V (-15%~+10%), 50/60 Hz |             |      |        |      |
|                                                      | Mains Input Voltage Range |                          | 170~265V                                     |             |      |        |      |
|                                                      | Mains Frequency Range     |                          | 47~63Hz                                      |             |      |        |      |
| Carrier Frequency (kHz)                              |                           |                          | 2~15 (default 4)                             |             |      |        |      |
| Brake Chopper                                        |                           |                          | Built-in                                     |             |      |        |      |
| DC Reactor                                           |                           |                          | Optional                                     |             |      |        |      |
| AC Reactor                                           |                           |                          | Optional                                     |             |      |        |      |
| Cooling Method                                       |                           |                          | Natural air cooling                          | Fan cooling |      |        |      |
| Size: W×H (mm)                                       |                           |                          | 72×142                                       |             |      | 87×157 |      |
| Size: D (mm)                                         |                           |                          | 159                                          |             |      | 179    |      |

| Single-phase 230 V (Models w/o an EMC Filter) |                     |        |        |             |
|-----------------------------------------------|---------------------|--------|--------|-------------|
| Frame                                         | A                   |        | B      | C           |
| Cooling Method                                | Natural air cooling |        |        | Fan cooling |
| Size: W×H (mm)                                | 68×128              | 68×128 | 72×142 | 87×157      |
| Size: D (mm)                                  | 96                  | 125    | 143    | 152         |

| 3-phase 230 V (Models w/o Built-in EMC Filter) |                           |                          |                                              |     |      |             |        |       |         |         |    |         |
|------------------------------------------------|---------------------------|--------------------------|----------------------------------------------|-----|------|-------------|--------|-------|---------|---------|----|---------|
| Frame                                          |                           |                          | A                                            |     |      | B           | C      |       | D       | E       |    | F       |
| Applicable Motor Output (kW)                   |                           |                          | 0.2                                          | 0.4 | 0.75 | 1.5         | 2.2    | 3.7/4 | 5.5     | 7.5     | 11 | 15      |
| Applicable Motor Output (HP)                   |                           |                          | 1/4                                          | 1/2 | 1    | 2           | 3      | 5     | 7.5     | 10      | 15 | 20      |
| Inverter Output                                | Heavy Duty                | Rated Output Current (A) | 1.6                                          | 2.8 | 4.8  | 7.5         | 11     | 17    | 25      | 33      | 49 | 65      |
|                                                | Normal Duty               | Rated Output Current (A) | 1.8                                          | 3.2 | 5    | 8           | 12.5   | 19.5  | 27      | 36      | 51 | 69      |
| Input                                          | Rated Voltage/Frequency   |                          | 3-phase AC 200 V~240 V (-15%~+10%), 50/60 Hz |     |      |             |        |       |         |         |    |         |
|                                                | Mains Input Voltage Range |                          | 170~265V                                     |     |      |             |        |       |         |         |    |         |
|                                                | Mains Frequency Range     |                          | 47~63 Hz                                     |     |      |             |        |       |         |         |    |         |
| Carrier Frequency (kHz)                        |                           |                          | 2~15 (default 4)                             |     |      |             |        |       |         |         |    |         |
| Brake Chopper                                  |                           |                          | Built-in                                     |     |      |             |        |       |         |         |    |         |
| DC Reactor                                     |                           |                          | Optional                                     |     |      |             |        |       |         |         |    |         |
| AC Reactor                                     |                           |                          | Optional                                     |     |      |             |        |       |         |         |    |         |
| Cooling Method                                 |                           |                          | Natural air cooling                          |     |      | Fan cooling |        |       |         |         |    |         |
| Size: W×H (mm)                                 |                           |                          | 68×128                                       |     |      | 72×142      | 87×157 |       | 109×207 | 130×250 |    | 175×300 |
| Size: D (mm)                                   |                           |                          | 96                                           | 110 | 143  | 143         | 152    |       | 154     | 185     |    | 192     |

| 3-phase 460 V (Models with Built-in EMC Filter) |                           |                          |                                              |      |     |        |       |         |      |         |    |         |    |
|-------------------------------------------------|---------------------------|--------------------------|----------------------------------------------|------|-----|--------|-------|---------|------|---------|----|---------|----|
| Frame                                           |                           |                          | B                                            |      |     | C      |       | D       |      | E       |    | F       |    |
| Applicable Motor Output (kW)                    |                           |                          | 0.4                                          | 0.75 | 1.5 | 2.2    | 3.7/4 | 5.5     | 7.5  | 11      | 15 | 18.5    | 22 |
| Applicable Motor Output (HP)                    |                           |                          | 1/2                                          | 1    | 2   | 3      | 5     | 7.5     | 10   | 15      | 20 | 25      | 30 |
| Inverter Output                                 | Heavy Duty                | Rated Output Current (A) | 1.5                                          | 2.7  | 4.2 | 5.5    | 9     | 13      | 17   | 25      | 32 | 38      | 45 |
|                                                 | Normal Duty               | Rated Output Current (A) | 1.8                                          | 3    | 4.6 | 6.5    | 10.5  | 15.7    | 20.5 | 28      | 36 | 41.5    | 49 |
| Input                                           | Rated Voltage/Frequency   |                          | 3-phase AC 380 V~480 V (-15%~+10%), 50/60 Hz |      |     |        |       |         |      |         |    |         |    |
|                                                 | Mains Input Voltage Range |                          | 323~528 V                                    |      |     |        |       |         |      |         |    |         |    |
|                                                 | Mains Frequency Range     |                          | 47~63 Hz                                     |      |     |        |       |         |      |         |    |         |    |
| Carrier Frequency (kHz)                         |                           |                          | 2~15 (default 4)                             |      |     |        |       |         |      |         |    |         |    |
| Brake Chopper                                   |                           |                          | Built-in                                     |      |     |        |       |         |      |         |    |         |    |
| DC Reactor                                      |                           |                          | Optional                                     |      |     |        |       |         |      |         |    |         |    |
| AC Reactor                                      |                           |                          | Optional                                     |      |     |        |       |         |      |         |    |         |    |
| Cooling Method                                  |                           |                          | Fan cooling                                  |      |     |        |       |         |      |         |    |         |    |
| Size: W×H (mm)                                  |                           |                          | 72×142                                       |      |     | 87×157 |       | 109×207 |      | 130×250 |    | 175×300 |    |
| Size: D (mm)                                    |                           |                          | 159                                          |      |     | 179    |       | 187     |      | 219     |    | 244     |    |

| 3-phase 460 V (Models w/o an EMC Filter) |  |  |                     |     |             |        |         |         |         |
|------------------------------------------|--|--|---------------------|-----|-------------|--------|---------|---------|---------|
| Frame                                    |  |  | A                   |     | B           | C      | D       | E       | F       |
| Cooling Method                           |  |  | Natural air cooling |     | Fan cooling |        |         |         |         |
| Size: W x H (mm)                         |  |  | 68×128              |     | 72×142      | 87×157 | 109×207 | 130×250 | 175×300 |
| Size: D (mm)                             |  |  | 129                 | 143 | 143         | 152    | 154     | 185     | 192     |

| 3-phase 575 V (Models w/o an EMC Filter) |                           |                          |                                              |             |        |     |         |      |
|------------------------------------------|---------------------------|--------------------------|----------------------------------------------|-------------|--------|-----|---------|------|
| Frame                                    |                           |                          | A                                            | B           | C      |     | D       |      |
| Applicable Motor Output (kW)             |                           |                          | 0.75                                         | 1.5         | 2.2    | 3.7 | 5.5     | 7.5  |
| Applicable Motor Output (HP)             |                           |                          | 1                                            | 2           | 3      | 5   | 7.5     | 10   |
| Inverter Output                          | Heavy Duty                | Rated Output Current (A) | 1.7                                          | 3           | 4.2    | 6.6 | 9.9     | 12.2 |
|                                          | Normal Duty               | Rated Output Current (A) | 2.1                                          | 3.6         | 5      | 8   | 11.5    | 15   |
| Input                                    | Rated Voltage/Frequency   |                          | 3-phase AC 500V~600V (-15%~-+10 %), 50/60 Hz |             |        |     |         |      |
|                                          | Mains Input Voltage Range |                          | 425~660                                      |             |        |     |         |      |
|                                          | Mains Frequency Range     |                          | 47~63                                        |             |        |     |         |      |
| Carrier Frequency (kHz)                  |                           |                          | 2~15 (default 4)                             |             |        |     |         |      |
| Brake Chopper                            |                           |                          | Built-in                                     |             |        |     |         |      |
| DC Reactor                               |                           |                          | Optional                                     |             |        |     |         |      |
| AC Reactor                               |                           |                          | Optional                                     |             |        |     |         |      |
| Cooling Method                           |                           |                          | Natural air cooling                          | Fan cooling |        |     |         |      |
| Size: W×H (mm)                           |                           |                          | 68×128                                       | 72×142      | 87×157 |     | 109×207 |      |
| Size: D (mm)                             |                           |                          | 143                                          | 143         | 152    |     | 154     |      |

# IP66/NEMA 4X Models

| Single-phase 230 V           |                                      |                          |                                |          |           |          |           |             |           |          |
|------------------------------|--------------------------------------|--------------------------|--------------------------------|----------|-----------|----------|-----------|-------------|-----------|----------|
| Frame                        |                                      |                          | A                              |          |           |          |           | B           |           |          |
| VFD_____SAA                  |                                      |                          | 2A8MS21__                      |          | 4A8MS21__ |          | 7A5MS21MN | 7A5MS21MF   | 11AMS21__ |          |
|                              |                                      |                          | M N                            | M F      | M N       | M F      |           |             | M N       | M F      |
| Applicable Motor Output (kW) |                                      |                          | 0.4                            |          | 0.75      |          | 1.5       | 1.5         | 2.2       |          |
| Applicable Motor Output (HP) |                                      |                          | 0.5                            |          | 1         |          | 2         | 2           | 3         |          |
| Inverter Output              | Heavy Duty                           | Rated Output Current (A) | 1.1                            |          | 1.8       |          | 2.9       | 2.9         | 4.2       |          |
|                              |                                      | Rated Output Current (A) | 2.8                            |          | 4.8       |          | 7.5       | 7.2         | 11        |          |
|                              |                                      | Carrier Frequency (kHz)  | 2~15 (default 4)               |          |           |          |           |             |           |          |
|                              | Normal Duty                          | Rated Output Current (A) | 1.2                            |          | 1.9       |          | 3.2       | 3.2         | 4.8       |          |
|                              |                                      | Rated Output Current (A) | 3.2                            |          | 5         |          | 8.5       | 8.5         | 12.5      |          |
|                              |                                      | Carrier Frequency (kHz)  | 2~15 (default 4)               |          |           |          |           |             |           |          |
| Input                        | Heavy Duty                           | Rated Output Current (A) | 7.3                            |          | 10.8      |          | 16.5      | 16.5        | 24.2      |          |
|                              | Normal Duty                          | Rated Output Current (A) | 8.3                            |          | 11.3      |          | 18.5      | 18.5        | 27.5      |          |
|                              | Rated Voltage/Frequency              |                          | 1-phase AC 200 V~240V, 50/60Hz |          |           |          |           |             |           |          |
|                              | Operating Voltage (V <sub>AC</sub> ) |                          | 170~264 (-15%~+10%)            |          |           |          |           |             |           |          |
|                              | Mains Frequency Range (Hz)           |                          | 47~63                          |          |           |          |           |             |           |          |
| Net Weight (kg)              |                                      |                          | 2.25                           | 2.65     | 2.6       | 2.9      | 3.1       | 3.95        | 3.5       | 4.0      |
| Cooling Method               |                                      |                          | Natural air cooling            |          |           |          |           | Fan cooling |           |          |
| EMC Filter                   |                                      |                          | Optional                       | Built-in | Optional  | Built-in | Optional  | Built-in    | Optional  | Built-in |
| Protection Rating            |                                      |                          | IP66 / NEMA 4X                 |          |           |          |           |             |           |          |

| 3-phase 230 V                |                                      |                          |                                |           |           |             |           |           |
|------------------------------|--------------------------------------|--------------------------|--------------------------------|-----------|-----------|-------------|-----------|-----------|
| Frame                        |                                      |                          | A                              |           |           | B           |           | C         |
| VFD_____SAA                  |                                      |                          | 2A8MS23MN                      | 4A8MS23MN | 7A5MS23MN | 11AMS23MN   | 17AMS23NB | 25AMS23MN |
| Applicable Motor Output (kW) |                                      |                          | 0.4                            | 0.75      | 1.5       | 2.2         | 3.7       | 5.5       |
| Applicable Motor Output (HP) |                                      |                          | 0.5                            | 1         | 2         | 3           | 5         | 7.5       |
| Inverter Output              | Heavy Duty                           | Rated Output Current (A) | 1.1                            | 1.8       | 2.9       | 4.2         | 6.5       | 9.5       |
|                              |                                      | Rated Output Current (A) | 2.8                            | 4.8       | 7.5       | 11          | 17        | 25        |
|                              |                                      | Carrier Frequency (kHz)  | 2~15 (default 4)               |           |           |             |           |           |
|                              | Normal Duty                          | Rated Output Current (A) | 1.2                            | 1.9       | 3.0       | 4.8         | 7.4       | 10.3      |
|                              |                                      | Rated Output Current (A) | 3.2                            | 5         | 8         | 12.5        | 19.5      | 27        |
|                              |                                      | Carrier Frequency (kHz)  | 2~15 (default 4)               |           |           |             |           |           |
| Input                        | Heavy Duty                           | Rated Output Current (A) | 3.4                            | 5.8       | 9.0       | 13.2        | 20.4      | 30        |
|                              | Normal Duty                          | Rated Output Current (A) | 3.8                            | 6.0       | 9.6       | 15          | 23.4      | 32.4      |
|                              | Rated Voltage/Frequency              |                          | 3-phase AC 200V~240V · 50/60Hz |           |           |             |           |           |
|                              | Operating Voltage (V <sub>AC</sub> ) |                          | 170~264 (-15%~+10%)            |           |           |             |           |           |
|                              | Mains Frequency Range (Hz)           |                          | 47~63                          |           |           |             |           |           |
| Net Weight (kg)              |                                      |                          | 2.3                            | 2.45      | 2.75      | 3.4         | 3.5       | 4.25      |
| Cooling Method               |                                      |                          | Natural air cooling            |           |           | Fan cooling |           |           |
| EMC Filter                   |                                      |                          | Optional                       |           |           |             |           |           |
| Protection Rating            |                                      |                          | IP66 / NEMA 4X                 |           |           |             |           |           |

| 3-phase 460 V                |                                      |                          |                                   |          |           |          |           |          |           |             |           |          |
|------------------------------|--------------------------------------|--------------------------|-----------------------------------|----------|-----------|----------|-----------|----------|-----------|-------------|-----------|----------|
| Frame                        |                                      |                          | A                                 |          |           |          |           |          |           | B           |           |          |
| VFD_____SAA                  |                                      |                          | 1A5MS43__                         |          | 2A7MS43__ |          | 4A2MS43__ |          | 5A5MS43MN | 5A5MS43MF   | 9A0MS43__ |          |
|                              |                                      |                          | M N                               | M E      | M N       | M E      | M N       | M E      |           |             | M N       | M E      |
| Applicable Motor Output (kW) |                                      |                          | 0.4                               |          | 0.75      |          | 1.5       |          | 2.2       | 2.2         | 3.7       |          |
| Applicable Motor Output (HP) |                                      |                          | 0.5                               |          | 1         |          | 2         |          | 3         | 3           | 5         |          |
| Inverter Output              | Heavy Duty                           | Rated Output Current (A) | 1.1                               |          | 2.1       |          | 3.2       |          | 4.2       | 4.2         | 6.9       |          |
|                              |                                      | Rated Output Current (A) | 1.5                               |          | 2.7       |          | 4.2       |          | 5.5       | 5.5         | 9         |          |
|                              |                                      | Carrier Frequency (kHz)  | 2 ~ 15 (default 4)                |          |           |          |           |          |           |             |           |          |
|                              | Normal Duty                          | Rated Output Current (A) | 1.4                               |          | 2.3       |          | 3.5       |          | 5.0       | 5.0         | 8.0       |          |
|                              |                                      | Rated Output Current (A) | 1.8                               |          | 3         |          | 4.6       |          | 6.5       | 6.5         | 10.5      |          |
|                              |                                      | Carrier Frequency (kHz)  | 2 ~ 15 (default 4)                |          |           |          |           |          |           |             |           |          |
| Input                        | Heavy Duty                           | Rated Output Current (A) | 2.1                               |          | 3.7       |          | 5.8       |          | 6.1       | 6.1         | 9.9       |          |
|                              | Normal Duty                          | Rated Output Current (A) | 2.5                               |          | 4.2       |          | 6.4       |          | 7.2       | 7.2         | 11.6      |          |
|                              | Rated Voltage/Frequency              |                          | 3-phase AC 380 V~480 V · 50/60 Hz |          |           |          |           |          |           |             |           |          |
|                              | Operating Voltage (V <sub>AC</sub> ) |                          | 323 ~ 528 (-15% ~ +10%)           |          |           |          |           |          |           |             |           |          |
|                              | Mains Frequency Range (Hz)           |                          | 47 ~ 63                           |          |           |          |           |          |           |             |           |          |
| Net Weight (kg)              |                                      |                          | 2.35                              | 2.65     | 2.6       | 2.8      | 2.8       | 3.1      | 3.6       | 3.8         | 3.45      | 3.95     |
| Cooling Method               |                                      |                          | Natural air cooling               |          |           |          |           |          |           | Fan cooling |           |          |
| EMC Filter                   |                                      |                          | Optional                          | Built-in | Optional  | Built-in | Optional  | Built-in | Optional  | Built-in    | Optional  | Built-in |
| Protection Rating            |                                      |                          | IP66 / NEMA 4X                    |          |           |          |           |          |           |             |           |          |

| 3-phase 460 V                |                                      |                          |                                |          |           |          |
|------------------------------|--------------------------------------|--------------------------|--------------------------------|----------|-----------|----------|
| Frame                        |                                      |                          | c                              |          |           |          |
| VFD_____SAA                  |                                      |                          | 13AMS43__                      |          | 17AMS43__ |          |
|                              |                                      |                          | M N                            | M E      | M N       | M E      |
| Applicable Motor Output (kW) |                                      |                          | 5.5                            |          | 7.5       |          |
| Applicable Motor Output (HP) |                                      |                          | 7.5                            |          | 10        |          |
| Inverter Output              | Heavy Duty                           | Rated Output Current (A) | 9.9                            |          | 13        |          |
|                              |                                      | Rated Output Current (A) | 13                             |          | 17        |          |
|                              |                                      | Carrier Frequency (kHz)  | 2 ~ 15 (default 4)             |          |           |          |
|                              | Normal Duty                          | Rated Output Current (A) | 12                             |          | 15.6      |          |
|                              |                                      | Rated Output Current (A) | 15.7                           |          | 20.5      |          |
|                              |                                      | Carrier Frequency (kHz)  | 2 ~ 15 (default 4)             |          |           |          |
| Input                        | Heavy Duty                           | Rated Output Current (A) | 14.3                           |          | 18.7      |          |
|                              | Normal Duty                          | Rated Output Current (A) | 17.3                           |          | 22.3      |          |
|                              | Rated Voltage/Frequency              |                          | 3-phase AC 380V~480V · 50/60Hz |          |           |          |
|                              | Operating Voltage (V <sub>AC</sub> ) |                          | 323 ~ 528 (-15% ~ +10%)        |          |           |          |
|                              | Mains Frequency Range (Hz)           |                          | 47 ~ 63                        |          |           |          |
| Net Weight (kg)              |                                      |                          | 4.25                           | 4.95     | 4.25      | 5.05     |
| Cooling Method               |                                      |                          | Fan cooling                    |          |           |          |
| EMC Filter                   |                                      |                          | Optional                       | Built-in | Optional  | Built-in |
| Protection Rating            |                                      |                          | IP66 / NEMA 4X                 |          |           |          |

## General Specifications and Accessories

|                             |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Control Functions</b>    | Control Methods          | V/F, SVC, FOC Sensorless                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                             | Applicant Motors         | Induction motors (IM), interior permanent magnet (IPM) motors, and surface permanent magnet (SPM) motors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                             | Max. Output Frequency    | Standard model: 599.00 Hz/High speed model: 1500.0 Hz (with derating, V/F control only)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                             | Starting Torque*         | 150%/3Hz (V/f, SVC control for IM, heavy duty)<br>100%/(1/20 of motor rated frequency) (SVC control for PM, heavy duty)<br>200%/0.5Hz (FOC Sensorless control for IM, heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                             | Speed Control Range*     | 1:50 (V/f, SVC control for IM, heavy duty)<br>1:20 (SVC control for PM, heavy duty)<br>1:100 (FOC Sensorless control for IM, heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                             | Overload Tolerance       | Normal Duty (ND): 120% of rated output current for 60 seconds; 150% of rated output current for 3 seconds<br>Heavy Duty (HD): 150% of rated output current for 60 seconds; 200% of rated output current for 3 seconds                                                                                                                                                                                                                                                                                                                                                                                       |
|                             | Frequency Setting Signal | 0 ~ +10V/-10V ~ +10V, 4 ~ 20 mA/0 ~ +10V, 1 pulse input (33 kHz), 1 pulse output (33 kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                             | Main Control Functions   | Multiple motor switches (max. 4 independent motor parameter settings), fast run, Deceleration Energy Back (DEB) function, wobble frequency function, fast deceleration function, master and auxiliary frequency source selectable, momentary power loss ride thru, speed search, over-torque detection, 16-step speed (max.), accel/decel time switch, S-curve accel/decel, 3-wire sequence, JOG frequency, upper/lower limits for frequency reference, DC injection braking at start and stop, 2 sets of PID controls, built-in PLC (2k steps), simple positioning function, Modbus integrated as standard |
| <b>Protection Functions</b> | Motor Protection         | Overcurrent protection, overvoltage protection, over-temperature protection, phase failure protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                             | Stall Prevention         | Stall prevention during acceleration, deceleration and running independently                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Accessories</b>          | Communication Cards      | PROFIBUS DP, DeviceNet, Modbus TCP, EtherNet/IP, CANopen, EtherCAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                             | External DC power supply | EMM-BPS01 (DC 24V power supply card)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Digital Controller</b>   |                          | A removable keypad as standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Certifications</b>       |                          | UL, CE, RoHS, RCM, TUV, REACH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

\*Control accuracy may vary depending on the environment, application conditions, different motors or encoder. For details, please contact our company or your local distributor.

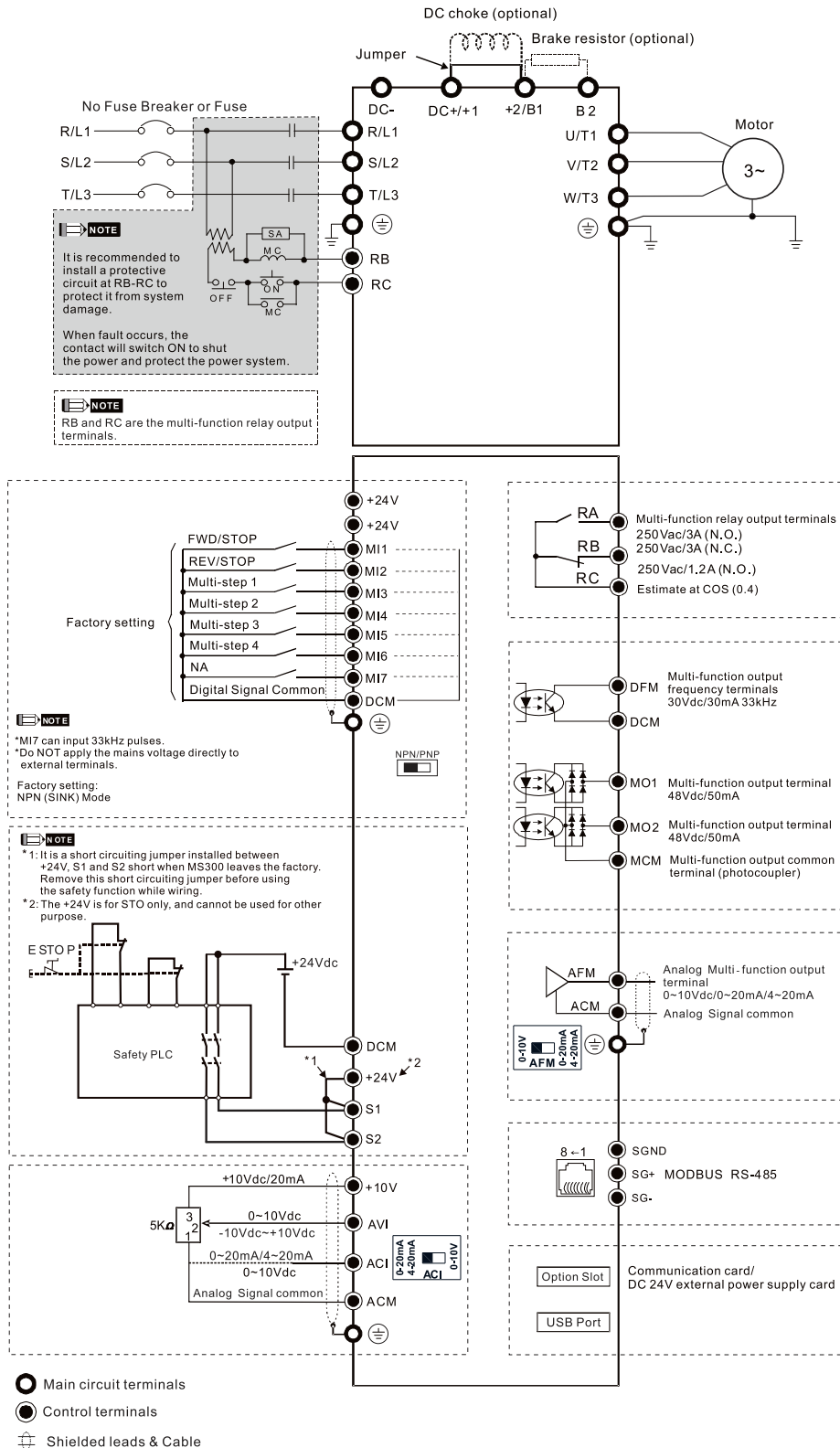
## MS300 Operating Environment

|                              |                          |                                                                                                                      |                                                           |                                         |
|------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------|
| <b>Operating Environment</b> | Installation Location    |                                                                                                                      | IEC60364-1/IEC60664-1 Pollution degree 2, Indoor use only |                                         |
|                              | Ambient Temperature (°C) | Operation                                                                                                            | IP20/UL Open Type                                         | -20 to 50<br>-20 to 60 (needs derating) |
|                              |                          |                                                                                                                      | IP40/NEMA 1/UL Type 1                                     | -20 to 40<br>-20 to 50 (needs derating) |
|                              |                          |                                                                                                                      | IP66/NEMA 4X/UL Type 4X                                   |                                         |
|                              |                          |                                                                                                                      | Zero stacking Installation                                |                                         |
|                              |                          | Storage                                                                                                              |                                                           | -40 to 85                               |
|                              |                          | Transportation                                                                                                       |                                                           | -20 to 70                               |
|                              | Rated Humidity           | Operation                                                                                                            |                                                           | Max. 90%                                |
|                              |                          | Storage/Transportation                                                                                               |                                                           | Max. 95%                                |
|                              | Air Pressure (kPa)       | Operation                                                                                                            |                                                           | 86 ~ 106                                |
|                              |                          | Storage/Transportation                                                                                               |                                                           | 70 ~ 106                                |
|                              | Pollution Level          | Compliance to IEC60721-3-3, 3C2                                                                                      |                                                           |                                         |
|                              | Altitude                 | An altitude of 0 ~ 1000m for normal operation<br>(derating is required for installation at an altitude above 1000 m) |                                                           |                                         |
| <b>Vibration</b>             |                          | Compliance to IEC 60068-2-6                                                                                          |                                                           |                                         |
| <b>Shock</b>                 |                          | Compliance to IEC/EN 60068-2-27                                                                                      |                                                           |                                         |

Please refer to MS300 user manual for more details.

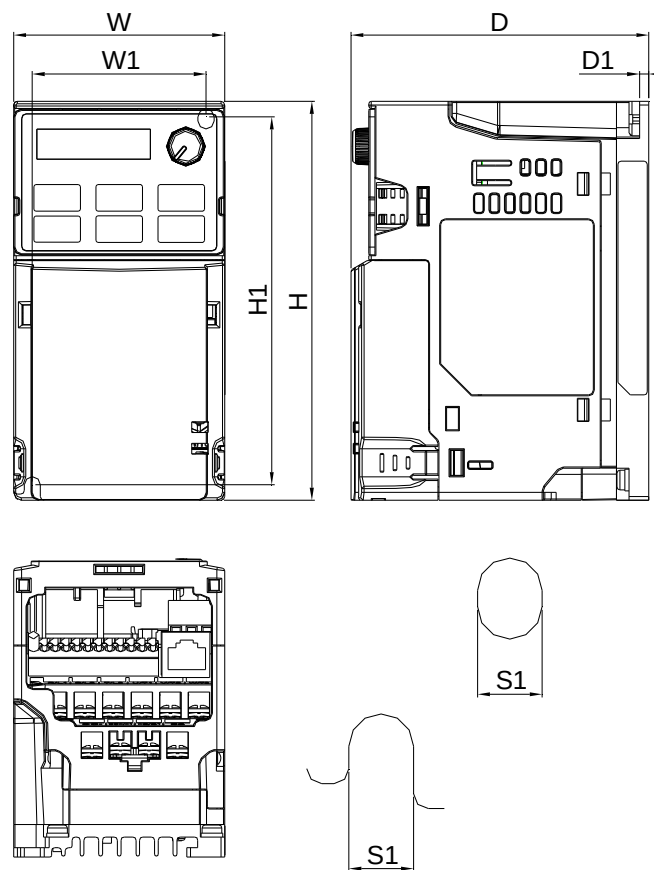
# Wiring

## Input: Single-phase/3-phase power



## Dimensions - IP20 / IP40 Models

### Frame A



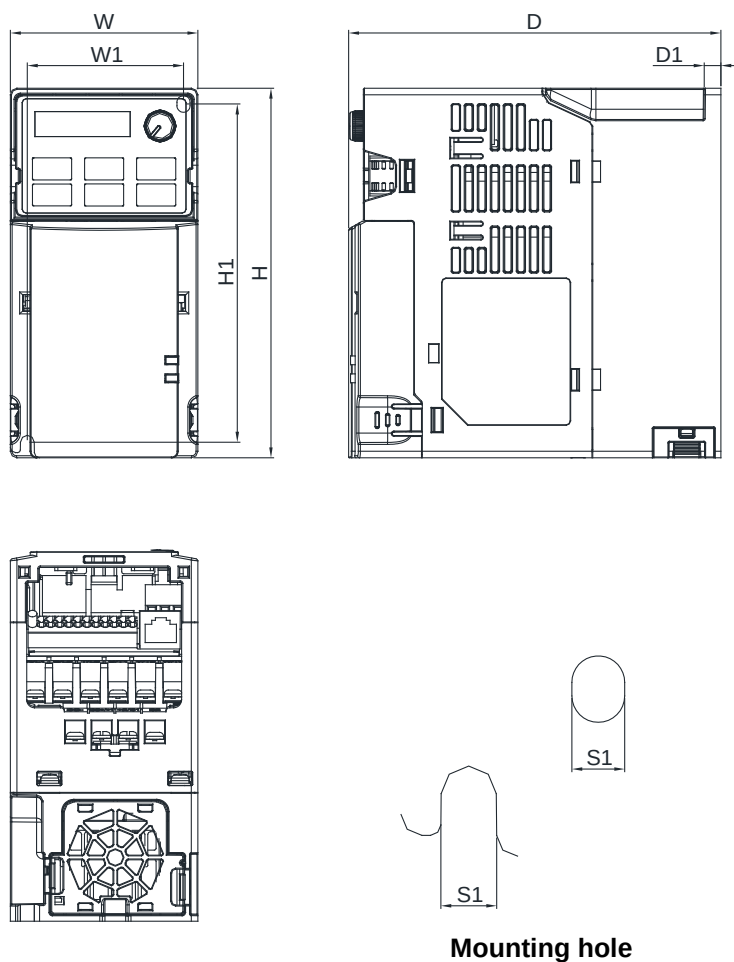
Mounting hole

| MODEL           | FRAME A2        | FRAME A3        | FRAME A4        | FRAME A5        |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>FRAME A1</b> |                 |                 |                 |                 |
| VFD1A6MS11ANSAA | VFD2A8MS23ANSAA | VFD2A5MS11ANSAA | VFD1A5MS43ANSAA | VFD4A8MS23ANSAA |
| VFD1A6MS11ENSAA | VFD2A8MS23ENSAA | VFD2A5MS11ENSAA | VFD1A5MS43ENSAA | VFD4A8MS23ENSAA |
| VFD1A6MS21ANSAA |                 | VFD2A8MS21ANSAA |                 | VFD2A7MS43ANSAA |
| VFD1A6MS21ENSAA |                 | VFD2A8MS21ENSAA |                 | VFD2A7MS43ENSAA |
| VFD1A6MS23ANSAA |                 |                 |                 | VFD1A7MS53ANSAA |
| VFD1A6MS23ENSAA |                 |                 |                 |                 |

| Frame | W    | H    | D     | W1    | H1   | D1    | S1   |
|-------|------|------|-------|-------|------|-------|------|
| A1    | mm   | 68.0 | 128.0 | 96.0  | 56.0 | 118.0 | 5.2  |
|       | inch | 2.68 | 5.04  | 3.78  | 2.20 | 4.65  | 0.20 |
| Frame | W    | H    | D     | W1    | H1   | D1    | S1   |
| A2    | mm   | 68.0 | 128.0 | 110.0 | 56.0 | 118.0 | 5.2  |
|       | inch | 2.68 | 5.04  | 4.33  | 2.20 | 4.65  | 0.20 |
| Frame | W    | H    | D     | W1    | H1   | D1    | S1   |
| A3    | mm   | 68.0 | 128.0 | 125.0 | 56.0 | 118.0 | 5.2  |
|       | inch | 2.68 | 5.04  | 4.92  | 2.20 | 4.65  | 0.20 |

| Frame | W    | H    | D     | W1    | H1   | D1    | S1   |
|-------|------|------|-------|-------|------|-------|------|
| A4    | mm   | 68.0 | 128.0 | 129.0 | 56.0 | 118.0 | 5.2  |
|       | inch | 2.68 | 5.04  | 5.08  | 2.20 | 4.65  | 0.20 |
| Frame | W    | H    | D     | W1    | H1   | D1    | S1   |
| A5    | mm   | 68.0 | 128.0 | 143.0 | 56.0 | 118.0 | 5.2  |
|       | inch | 2.68 | 5.04  | 5.63  | 2.20 | 4.65  | 0.20 |

## Frame B



Mounting hole

### MODEL FRAME B1

Standard Models:  
VFD7A5MS23ANSAA  
VFD7A5MS23ENSAA  
VFD4A2MS43ANSAA  
VFD4A2MS43ENSAA  
VFD3A0MS53ANSAA

High Speed Models:  
VFD7A5MS23ANSHA  
VFD7A5MS23ENSHA  
VFD4A2MS43ANSHA  
VFD4A2MS43ENSHA

### FRAME B2

Standard Models:  
VFD4A8MS21ANSAA  
VFD4A8MS21ENSAA

### FRAME B3

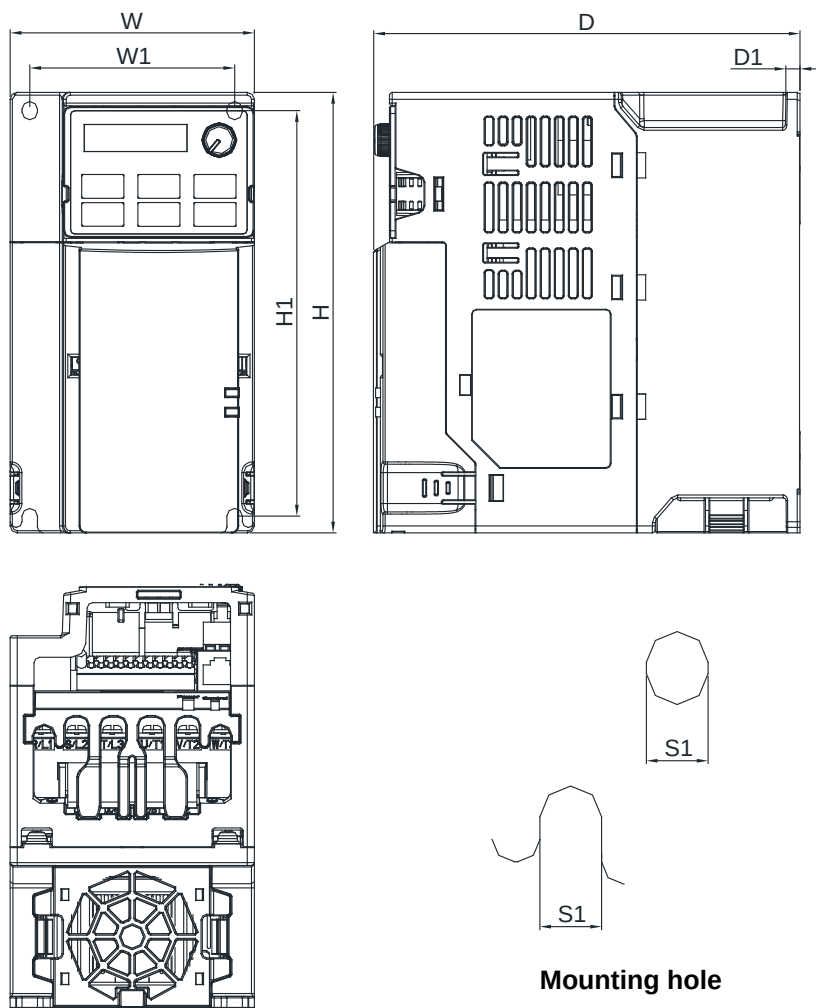
Standard Models:  
VFD1A6MS21AFSAA  
VFD2A8MS21AFSAA  
VFD4A8MS21AFSAA  
VFD1A5MS43AFSAA  
VFD2A7MS43AFSAA  
VFD4A2MS43AFSAA

High Speed Models:  
VFD4A2MS43AFSHA

| Frame |      | W    | H     | D     | W1   | H1    | D1   | S1   |
|-------|------|------|-------|-------|------|-------|------|------|
| B1    | mm   | 72.0 | 142.0 | 143.0 | 60.0 | 130.0 | 6.4  | 5.2  |
|       | inch | 2.83 | 5.59  | 5.63  | 2.36 | 5.12  | 0.25 | 0.20 |
| Frame |      | W    | H     | D     | W1   | H1    | D1   | S1   |
| B2    | mm   | 72.0 | 142.0 | 143.0 | 60.0 | 130.0 | 3.0  | 5.2  |
|       | inch | 2.83 | 5.59  | 5.63  | 2.36 | 5.12  | 0.12 | 0.20 |
| Frame |      | W    | H     | D     | W1   | H1    | D1   | S1   |
| B3    | mm   | 72.0 | 142.0 | 159.0 | 60.0 | 130.0 | 4.3  | 5.2  |
|       | inch | 2.83 | 5.59  | 6.26  | 2.36 | 5.12  | 0.17 | 0.20 |

## Dimensions - IP20 / IP40 Models

### Frame C



#### MODEL FRAME C1

Standard Models:  
VFD4A8MS11ANSAA VFD4A8MS11ENSAA  
VFD7A5MS21ANSAA VFD7A5MS21ENSAA  
VFD11AMS21ANSAA VFD11AMS21ENSAA  
VFD11AMS23ANSAA VFD11AMS23ENSAA  
VFD17AMS23ANSAA VFD17AMS23ENSAA  
VFD5A5MS43ANSAA VFD5A5MS43ENSAA  
VFD9A0MS43ANSAA VFD9A0MS43ENSAA  
VFD4A2MS53ANSAA VFD6A6MS53ANSAA

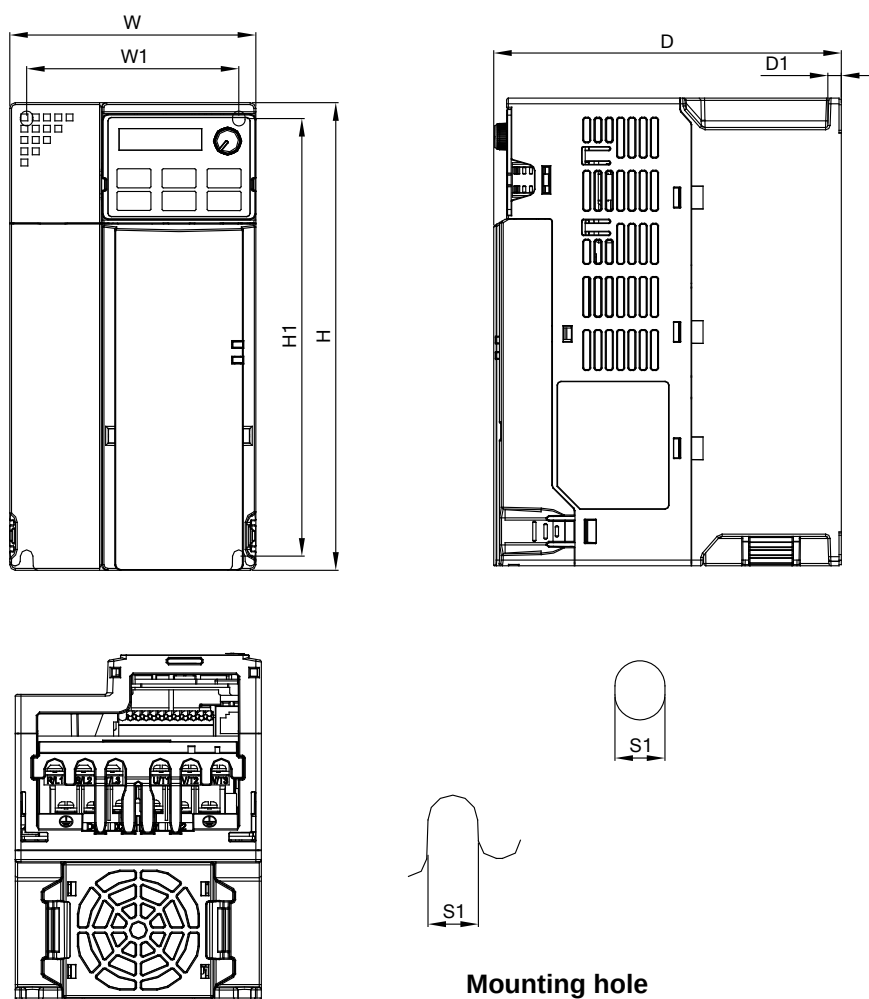
High Speed Models:  
VFD7A5MS21ANSHA VFD7A5MS21ENSHA  
VFD11AMS21ANSHA VFD11AMS21ENSHA  
VFD11AMS23ANSHA VFD11AMS23ENSHA  
VFD17AMS23ANSHA VFD17AMS23ENSHA  
VFD5A5MS43ANSHA VFD5A5MS43ENSHA  
VFD9A0MS43ANSHA VFD9A0MS43ENSHA

#### FRAME C2

Standard Models: High Speed Models:  
VFD7A5MS21AFSAA VFD7A5MS21AFSHA  
VFD11AMS21AFSAA VFD11AMS21AFSHA  
VFD5A5MS43AFSAA VFD5A5MS43AFSHA  
VFD9A0MS43AFSAA VFD9A0MS43AFSHA

| Frame |      | W    | H     | D     | W1   | H1    | D1   | S1   |
|-------|------|------|-------|-------|------|-------|------|------|
| C1    | mm   | 87.0 | 157.0 | 152.0 | 73.0 | 144.5 | 5.0  | 5.5  |
|       | inch | 3.43 | 6.18  | 5.98  | 2.87 | 5.69  | 0.20 | 0.22 |
| Frame |      | W    | H     | D     | W1   | H1    | D1   | S1   |
| C2    | mm   | 87.0 | 157.0 | 179.0 | 73.0 | 144.5 | 5.0  | 5.5  |
|       | inch | 3.43 | 6.18  | 7.05  | 2.87 | 5.69  | 0.20 | 0.22 |

## Frame D



Mounting hole

### MODEL FRAME D1

Standard Models:  
VFD25AMS23ANSAA  
VFD25AMS23ENSAA  
VFD13AMS43ANSAA  
VFD13AMS43ENSAA  
VFD17AMS43ANSAA  
VFD17AMS43ENSAA  
VFD9A9MS53ANSAA

High Speed Models:  
VFD25AMS23ANSHA  
VFD25AMS23ENSHA  
VFD13AMS43ANSHA  
VFD13AMS43ENSHA  
VFD17AMS43ANSHA  
VFD17AMS43ENSHA  
VFD12AMS53ANSAA

### FRAME D2

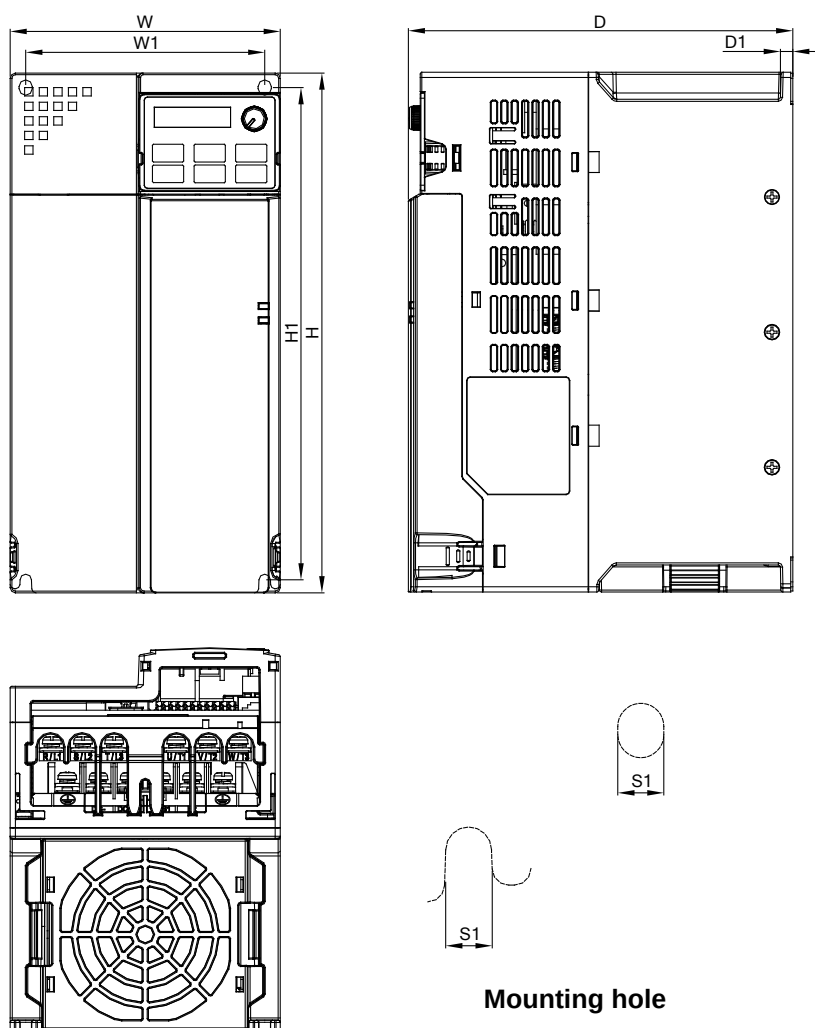
Standard Models:  
VFD13AMS43AFSAA  
VFD17AMS43AFSAA

High Speed Models:  
VFD13AMS43AFSHA  
VFD17AMS43AFSHA

| Frame |      | W     | H     | D     | W1   | H1    | D1   | S1   |
|-------|------|-------|-------|-------|------|-------|------|------|
| D1    | mm   | 109.0 | 207.0 | 154.0 | 94.0 | 193.8 | 6.0  | 5.5  |
|       | inch | 4.29  | 8.15  | 6.06  | 3.70 | 7.63  | 0.24 | 0.22 |
| Frame |      | W     | H     | D     | W1   | H1    | D1   | S1   |
| D2    | mm   | 109.0 | 207.0 | 187.0 | 94.0 | 193.8 | 6.0  | 5.5  |
|       | inch | 4.29  | 8.15  | 7.36  | 3.70 | 7.36  | 0.24 | 0.22 |

## Dimensions - IP20 / IP40 Models

### Frame E



#### MODEL FRAME E1

Standard Models:  
VFD33AMS23ANSAA  
VFD33AMS23ENSAA  
VFD49AMS23ANSAA  
VFD49AMS23ENSAA  
VFD25AMS43ANSAA  
VFD25AMS43ENSAA  
VFD32AMS43ANSAA  
VFD32AMS43ENSAA

High Speed Models:  
VFD33AMS23ANSHA  
VFD33AMS23ENSHA  
VFD49AMS23ANSHA  
VFD49AMS23ENSHA  
VFD25AMS43ANSHA  
VFD25AMS43ENSHA  
VFD32AMS43ANSHA  
VFD32AMS43ENSHA

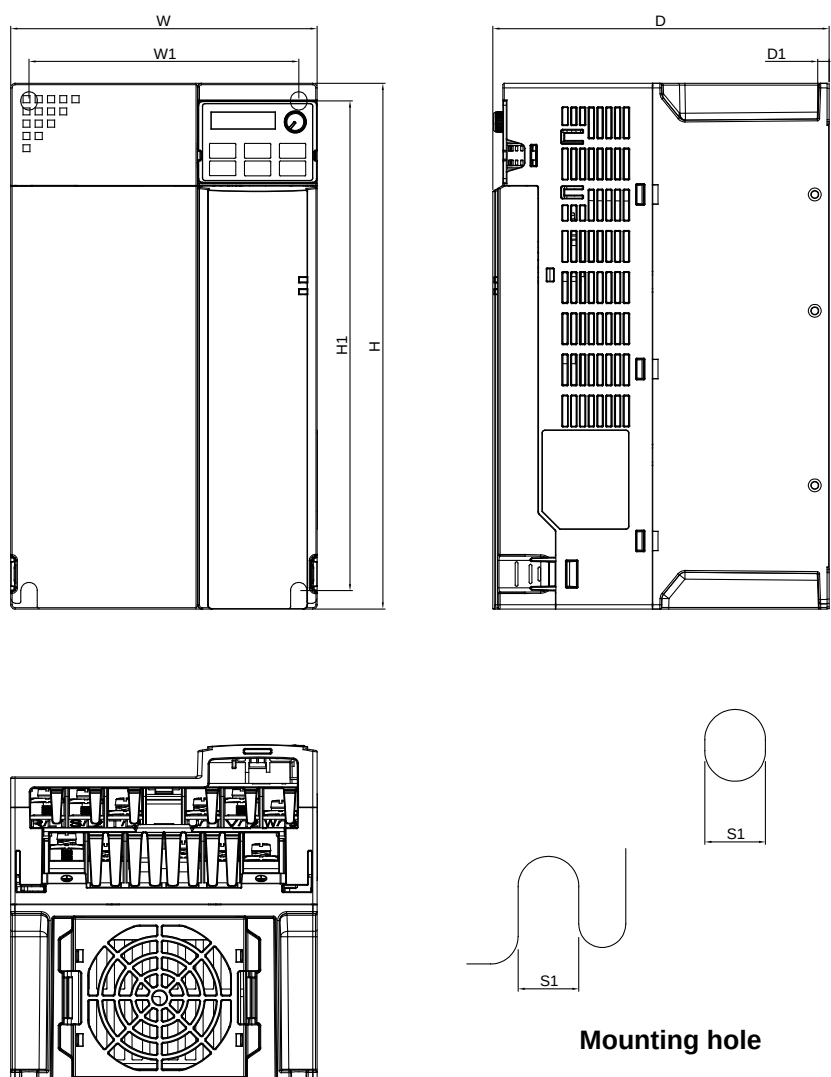
#### FRAME E2

Standard Models:  
VFD25AMS43AFSAA  
VFD32AMS43AFSAA

High Speed Models:  
VFD25AMS43AFSHA  
VFD32AMS43AFSHA

| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
|-------|------|-------|-------|-------|-------|-------|------|------|
| E1    | mm   | 130.0 | 250.0 | 185.0 | 115.0 | 236.8 | 6.0  | 5.5  |
|       | inch | 5.12  | 9.84  | 7.83  | 4.53  | 9.32  | 0.24 | 0.22 |
| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
| E2    | mm   | 130.0 | 250.0 | 219.0 | 115.0 | 236.8 | 6.0  | 5.5  |
|       | inch | 5.12  | 9.84  | 8.62  | 4.53  | 9.32  | 0.24 | 0.22 |

## Frame F



Mounting hole

### MODEL FRAME F1

Standard Models:

VFD65AMS23ANSAA  
VFD65AMS23ENSAA  
VFD38AMS43ANSAA  
VFD38AMS43ENSAA  
VFD45AMS43ANSAA  
VFD45AMS43ENSAA

High Speed Models:

VFD65AMS23ANSHA  
VFD65AMS23ENSHA  
VFD38AMS43ANSHA  
VFD38AMS43ENSHA  
VFD45AMS43ANSHA  
VFD45AMS43ENSHA

### FRAME F2

Standard Models:

VFD38AMS43AFSAA  
VFD45AMS43AFSAA

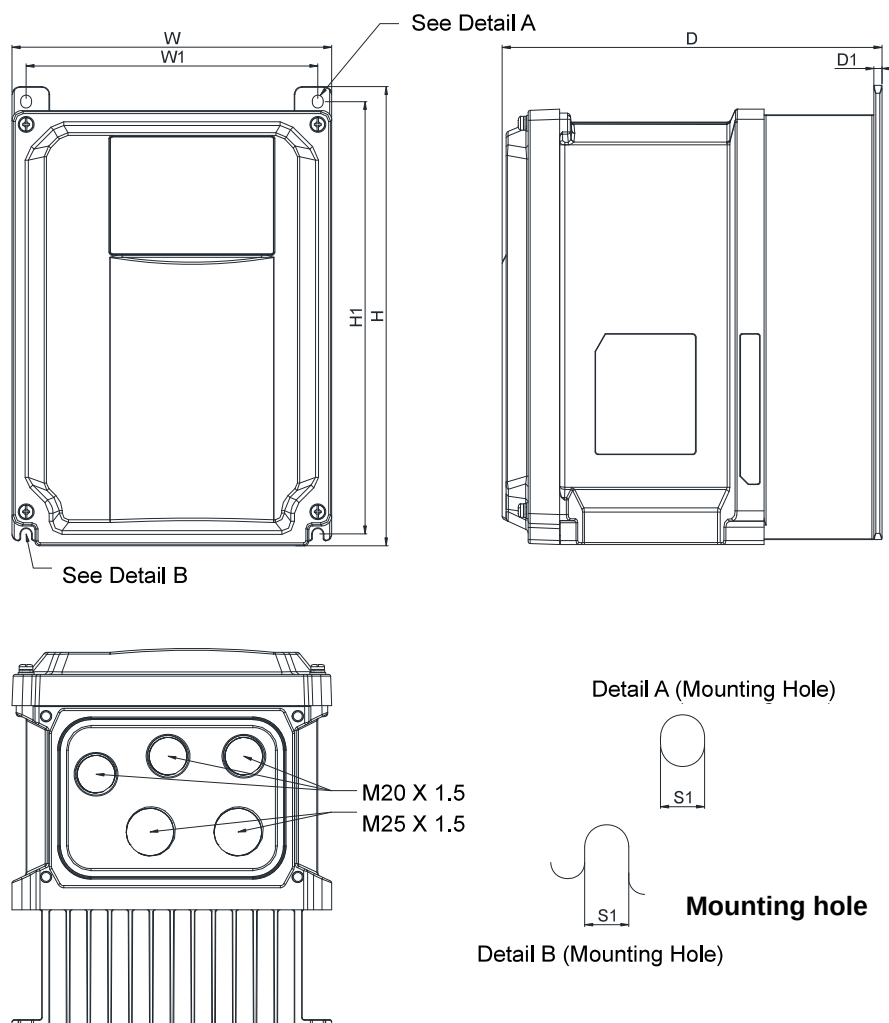
High Speed Models:

VFD38AMS43AFSHA  
VFD45AMS43AFSHA

| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
|-------|------|-------|-------|-------|-------|-------|------|------|
| F1    | mm   | 175.0 | 300.0 | 192.0 | 154.0 | 279.5 | 6.5  | 8.4  |
|       | inch | 6.89  | 11.81 | 7.56  | 6.06  | 11.00 | 0.26 | 0.33 |
| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
| F2    | mm   | 175.0 | 300.0 | 244.0 | 154.0 | 279.5 | 6.5  | 8.4  |
|       | inch | 6.89  | 11.81 | 9.61  | 6.06  | 11.00 | 0.26 | 0.33 |

## Dimensions - IP66 / NEMA 4X Models

Frame A



MODEL  
FRAME A1

VFD2A8MS21MNSAA  
VFD1A5MS43MFSAA  
VFD2A7MS43MNSAA  
VFD2A8MS21MFSAA  
VFD4A8MS21MNSAA  
VFD2A7MS43MFSAA

FRAME A2

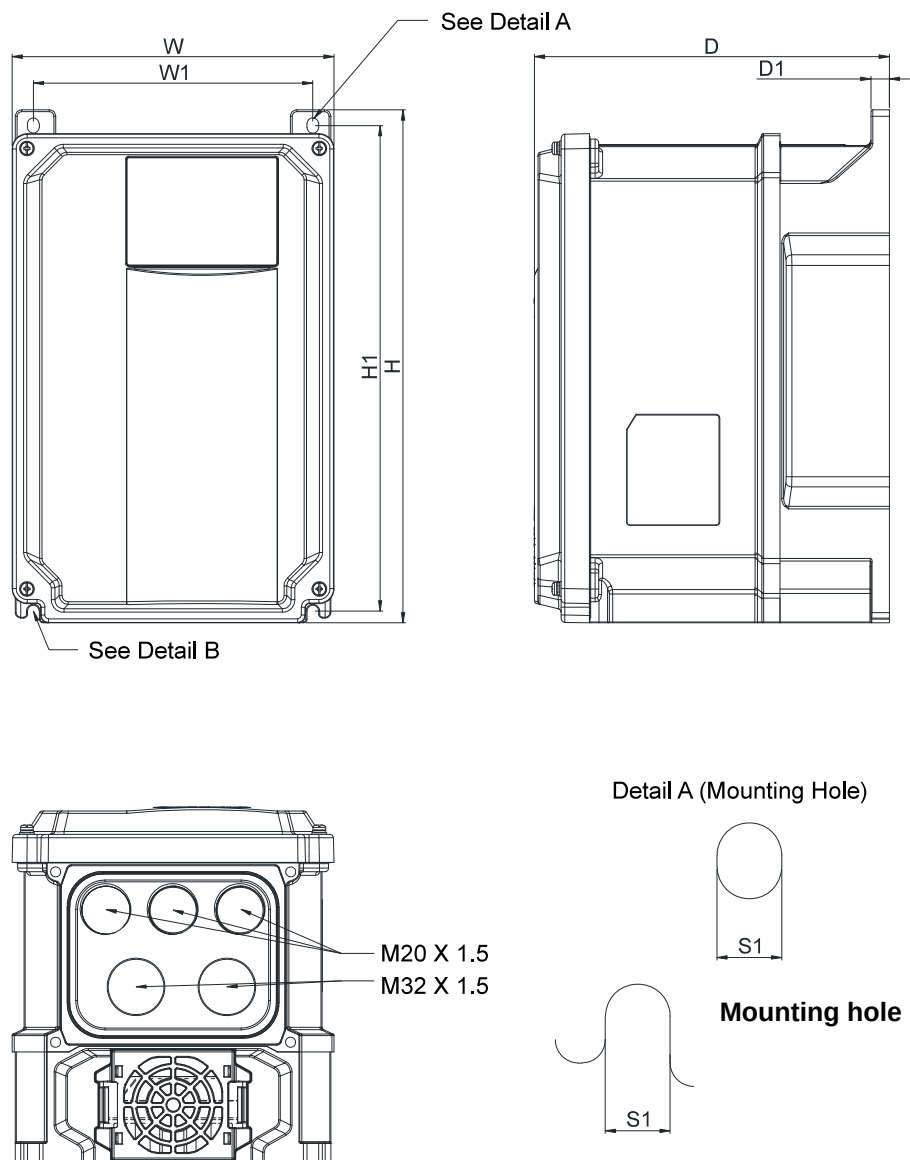
VFD2A8MS23MNSAA  
VFD4A8MS21MFSAA  
VFD1A5MS43MNSAA  
VFD4A8MS23MNSAA

FRAME A3

VFD5A5MS43MNSAA

| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
|-------|------|-------|-------|-------|-------|-------|------|------|
| A1    | mm   | 160.0 | 230.0 | 151.0 | 146.0 | 216.5 | 4.0  | 5.5  |
|       | inch | 6.30  | 9.06  | 6.57  | 5.75  | 8.52  | 0.16 | 0.22 |
| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
| A2    | mm   | 160.0 | 230.0 | 167.0 | 146.0 | 216.5 | 4.0  | 5.5  |
|       | inch | 6.30  | 9.06  | 6.57  | 5.75  | 8.52  | 0.16 | 0.22 |
| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
| A3    | mm   | 160.0 | 230.0 | 190.0 | 146.0 | 216.5 | 4.0  | 5.5  |
|       | inch | 6.30  | 9.06  | 7.48  | 5.75  | 8.52  | 0.16 | 0.22 |

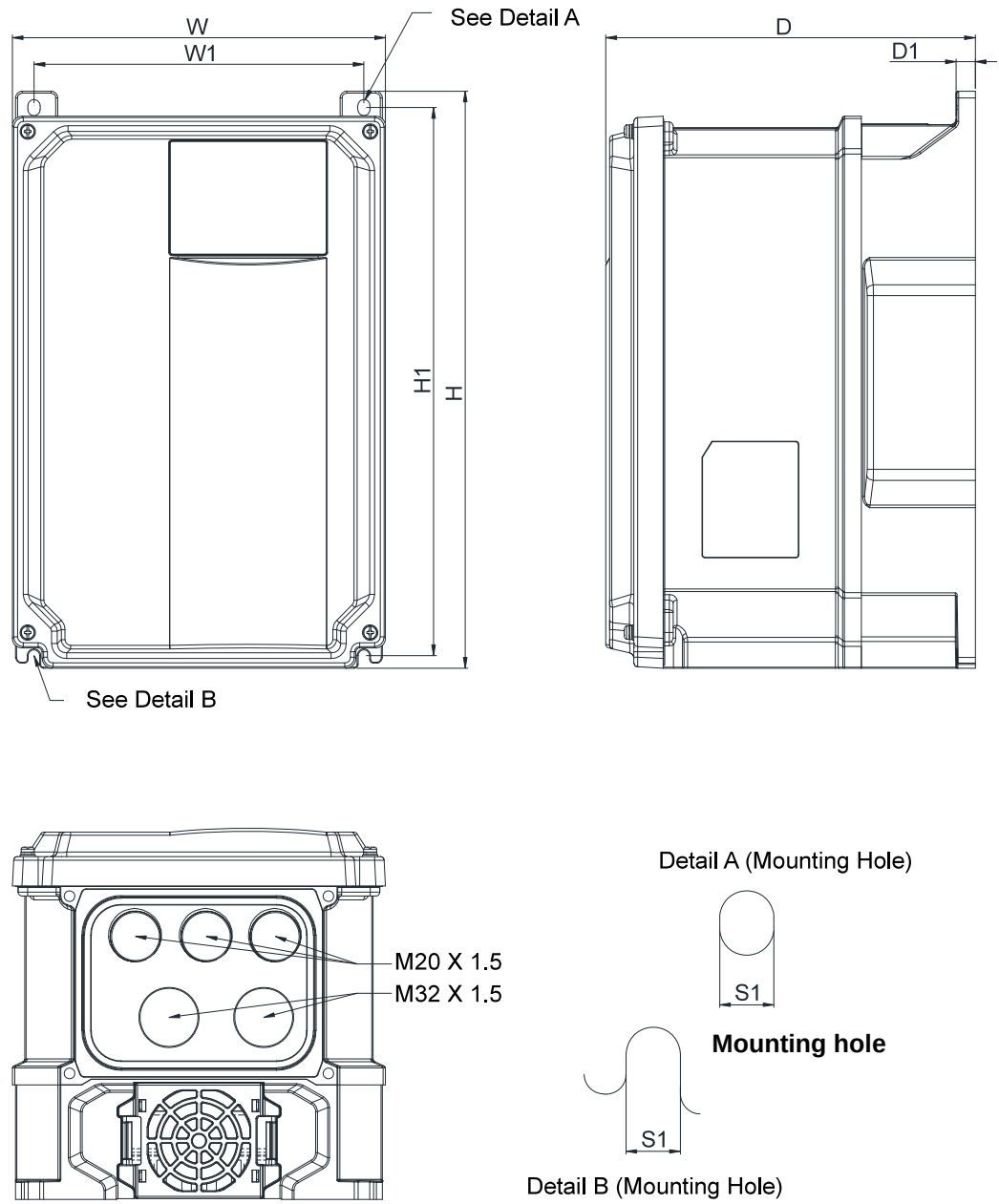
Frame B



| MODEL           |                 |                 |                 |  |
|-----------------|-----------------|-----------------|-----------------|--|
| FRAME B         |                 |                 |                 |  |
| VFD7A5MS21MFSAA | VFD11AMS21MNSAA | VFD11AMS21MFSAA | VFD11AMS23MNSAA |  |
| VFD5A5MS43MFSAA | VFD17AMS23MFSAA | VFD9A0MS43MNSAA | VFD9A0MS43MNSAA |  |

| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
|-------|------|-------|-------|-------|-------|-------|------|------|
| B     | mm   | 175.0 | 280.0 | 193.0 | 152.0 | 266.0 | 10   | 6.4  |
|       | inch | 6.89  | 11.02 | 7.60  | 5.98  | 10.43 | 0.39 | 0.25 |

Frame C



| MODEL           |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|
| FRAME C         |                 |                 |                 |
| VFD13AMS43MNSAA | VFD13AMS43MFSAA | VFD25AMS23MNSAA | VFD17AMS43MNSAA |
| VFD17AMS43MFSAA |                 |                 |                 |

| Frame |      | W     | H     | D     | W1    | H1    | D1   | S1   |
|-------|------|-------|-------|-------|-------|-------|------|------|
| B     | mm   | 195.0 | 300.0 | 193.0 | 172.4 | 285.0 | 10   | 6.4  |
|       | inch | 7.68  | 11.81 | 7.606 | 6.79  | 11.22 | 0.39 | 0.25 |

## Accessories

The matched connection cables (CBM-CLxxA 、CBM-CCxxA) are required for usage.  
Please refer to the user manual for detailed ordering information.

### ■ EtherNet/IP Option Card

CMM-EIP02



#### Features

- ▶ Supports max. 32 words input and 32 words output of I/O connection
- ▶ User-defined parameter mapping
- ▶ IP Filter, basic firewall function
- ▶ Supports remote I/O function

#### Network Interface

|                       |                                       |                    |                       |
|-----------------------|---------------------------------------|--------------------|-----------------------|
| Network protocol      | EtherNet/IP                           | Interface          | RJ-45                 |
| Transmission speed    | 10/100Mbps                            | Number of port     | 1                     |
| Transmission method   | I/O connection/Explicit message       | Transmission cable | Category 5e shielding |
| Transmission distance | 100m, extension is allowed via switch |                    |                       |

### ■ DeviceNet Option Card

CMM-DN02



#### Features

- ▶ Support Group 2 only connection method and cyclic I/O data exchange
- ▶ Provides EDS file to identify DeviceNet equipment information
- ▶ Supports max. 32 words input and 32 words output of parameter mapping and remote I/O function
- ▶ Node address and Baud rate can be set in the AC motor drive

#### Network Interface

|                       |                                                                 |                    |                |
|-----------------------|-----------------------------------------------------------------|--------------------|----------------|
| Network protocol      | DeviceNet                                                       | Interface          | Terminal block |
| Transmission speed    | 500k/250k/125k/100k/50k bps and extendable baud rate mode of 1M | Number of port     | 1              |
| Transmission method   | Explicit message / Implicit message                             | Transmission cable | Delta standard |
| Transmission distance | 25m/1Mbps                                                       |                    |                |

### ■ CANopen Option Card

CMM-COP02



#### Features

- ▶ Complies with CiA 402 standard (default setting)
- ▶ 4 sets of RX/TX PDO
- ▶ Dual communication ports
- ▶ Node address and Baud rate can be set in the AC motor drive
- ▶ Supports Delta protocol, DMCNET
- ▶ Supports remote I/O function

#### Network Interface

|                       |                                              |                    |                |
|-----------------------|----------------------------------------------|--------------------|----------------|
| Network protocol      | CANopen                                      | Interface          | RJ-45          |
| Transmission speed    | 1Mbps/500Kbps/250Kbps/125Kbps/100Kbps/50Kbps | Number of port     | 2              |
| Transmission method   | PDO, SDO                                     | Transmission cable | Delta standard |
| Transmission distance | 25m/1Mbps                                    |                    |                |

## ■ PROFIBUS DP Option Card

CMM-PD02



### Features

- ▶ Supports PZD cyclic data exchange
- ▶ Supports PKW read/write to AC motor drive parameters
- ▶ Supports user diagnosis function
- ▶ Auto-detects baud rates; supports Max.12 Mbps.
- ▶ Supports remote I/O function

### Network Interface

|                       |                                                 |                    |                |
|-----------------------|-------------------------------------------------|--------------------|----------------|
| Network protocol      | PROFIBUS DP                                     | Interface          | DB9            |
| Transmission speed    | 9.6k/19.2k/93.75k/187.5k/500k/1.5M/3M/6M/12Mbps | Number of port     | 1              |
| Transmission method   | Cyclic/non-cyclic data exchange                 | Transmission cable | Delta standard |
| Transmission distance | 100m/12Mbps                                     |                    |                |

## ■ EtherCAT Option Card NEW

CMM-EC02



### Features

- ▶ Supports EthernetCAT protocol
- ▶ Supports standard CiA402 speed mode
- ▶ Supports SDO (Service Data Objects) function: Drive status reading and parameters editing
- ▶ Auto shutdown function for interruptions during data transmission
- ▶ Supports remote I/O function

### Network Interface

|                     |                         |                    |                            |
|---------------------|-------------------------|--------------------|----------------------------|
| Interface           | RJ-45                   | Transmission cable | Category 5e shielding 100M |
| Number of ports     | 2 Ports                 | Transmission speed | 100Mbps                    |
| Transmission method | IEEE 802.3, IEEE 802.3u | Network protocol   | EtherCAT                   |

## ■ 24V Power Shift Card

EMM-BPS02



| Terminals  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PE GND 24V | <p>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.</p> <p>Input power: 24V <math>\pm</math> 5%</p> <p>Maximum input current: 0.5A</p> <p>Note: 1) Do not connect the control terminal +24V (Digital control signal common: SOURCE) directly to the EMC-BPS01 input terminal 24V.</p> <p>2) Do not connect control terminal GND directly to the EMC-BPS01 input terminal GND in order to achieve good isolation.</p> |

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

[5V] Recommend pull-up resistor: 100~220Ω, 1/2W and above

[12V] Recommend pull-up resistor: 510~1.35KΩ, 1/2W and above

[24V] Recommend pull-up resistor: 1.8K~3.3KΩ, 1/2W and above

## ■ Screw Specification of Option Card Terminals

| Screw Specification of Option Card Terminals | Wire Gauge                                 | Torque               |
|----------------------------------------------|--------------------------------------------|----------------------|
| CMM-COP02                                    | 30~16 AWG (0.0509 ~ 1.31 mm <sup>2</sup> ) | 2 Kg-cm [1.74 lb-in] |
| CMM-EIP02                                    |                                            |                      |
| CMM-PD02                                     |                                            |                      |
| CMM-DN02                                     |                                            |                      |
| EMM-BPS02                                    | 30~16 AWG (0.0509 ~ 1.31 mm <sup>2</sup> ) | 8 Kg-cm [6.94 lb-in] |

## Accessories

### Standard Fieldbus Cables

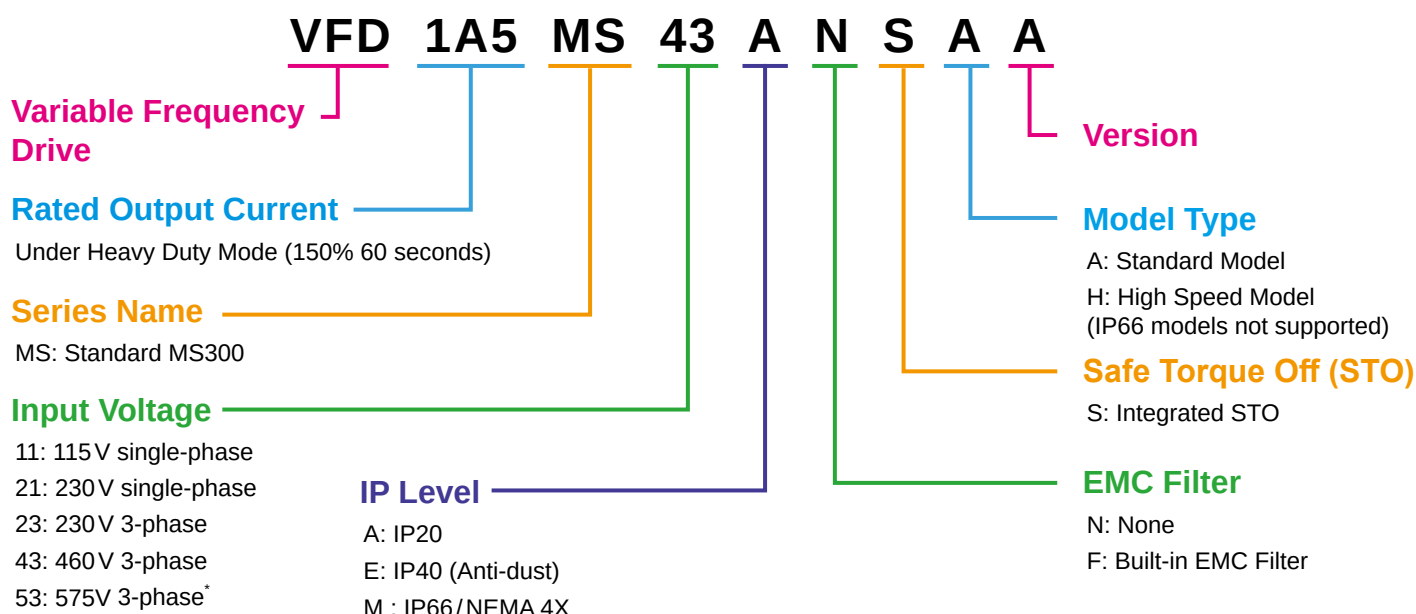
| Delta Cables             | Part Number   | Description                                                 | Length     |
|--------------------------|---------------|-------------------------------------------------------------|------------|
| CANopen Cable            | UC-CMC003-01A | CANopen cable, RJ45 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        |
| DeviceNet Cable          | UC-CMC200-01A | CANopen cable, RJ45 connector                               | 20m        |
|                          | UC-DN01Z-01A  | DeviceNet cable                                             | 305m       |
| EtherNet/ EtherCAT Cable | UC-DN01Z-02A  | DeviceNet cable                                             | 305m       |
|                          | 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        |
| CANopen/ DeviceNet TAP   | UC-EMC200-02A | EtherNet/ EtherCAT cable, Shielding                         | 20m        |
|                          | 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 |
| PROFIBUS Cable           | TAP-CN03      | 1 in 4 out, RJ45 connector, built-in 121Ω terminal resistor | 1 in 4 out |
|                          | UC-PF01Z-01A  | PROFIBUS DP cable                                           | 305m       |

### Extension Cable for Digital Keypad



| Part No. | L    |        |
|----------|------|--------|
|          | mm   | [inch] |
| EG0610C  | 600  | 23.6   |
| EG1010C  | 1000 | 39.4   |
| EG2010C  | 2000 | 78.7   |
| EG3010C  | 3000 | 118.1  |
| EG5010C  | 5000 | 196.8  |

## Model Name Explanation



\*Only for models with ANSAA at the end of model names

# Ordering Information

## IP20/IP40 Standard Models (0 ~ 599 Hz)

| Power Range                    |       |                            | Frame Size | Model Name      | Built-in EMC Filter | IP40 Models |
|--------------------------------|-------|----------------------------|------------|-----------------|---------------------|-------------|
| Max. Applicable Motor Capacity |       | Drive Rated Output Current |            |                 |                     |             |
| [HP]                           | [kW]  | [A]                        |            |                 |                     |             |
| 115 V / single-phase           |       |                            |            |                 |                     |             |
| 0.25                           | 0.2   | 1.6                        | A          | VFD1A6MS11ANSAA | -                   | -           |
|                                |       |                            |            | VFD1A6MS11ENSAA | -                   | V           |
| 0.5                            | 0.4   | 2.5                        | A          | VFD2A5MS11ANSAA | -                   | -           |
|                                |       |                            |            | VFD2A5MS11ENSAA | -                   | V           |
| 1                              | 0.75  | 4.8                        | C          | VFD4A8MS11ANSAA | -                   | -           |
|                                |       |                            |            | VFD4A8MS11ENSAA | -                   | V           |
| 230 V / single-phase           |       |                            |            |                 |                     |             |
| 1/4                            | 0.2   | 1.6                        | A          | VFD1A6MS21ANSAA | -                   | -           |
|                                |       |                            | A          | VFD1A6MS21ENSAA | -                   | V           |
|                                |       |                            | B          | VFD1A6MS21AFSAA | V                   | -           |
| 0.5                            | 0.4   | 2.8                        | A          | VFD2A8MS21ANSAA | -                   | -           |
|                                |       |                            | A          | VFD2A8MS21ENSAA | -                   | V           |
|                                |       |                            | B          | VFD2A8MS21AFSAA | V                   | -           |
| 1                              | 0.75  | 4.8                        | B          | VFD4A8MS21ANSAA | -                   | -           |
|                                |       |                            |            | VFD4A8MS21AFSAA | V                   | -           |
|                                |       |                            |            | VFD4A8MS21ENSAA | -                   | V           |
| 2                              | 1.5   | 7.5                        | C          | VFD7A5MS21ANSAA | -                   | -           |
|                                |       |                            |            | VFD7A5MS21AFSAA | V                   | -           |
|                                |       |                            |            | VFD7A5MS21ENSAA | -                   | V           |
| 3                              | 2.2   | 11.0                       | C          | VFD11AMS21ANSAA | -                   | -           |
|                                |       |                            |            | VFD11AMS21AFSAA | V                   | -           |
|                                |       |                            |            | VFD11AMS21ENSAA | -                   | V           |
| 230 V / 3-phase                |       |                            |            |                 |                     |             |
| 0.25                           | 0.2   | 1.6                        | A          | VFD1A6MS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD1A6MS23ENSAA | -                   | V           |
| 0.5                            | 0.4   | 2.8                        | A          | VFD2A8MS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD2A8MS23ENSAA | -                   | V           |
| 1                              | 0.75  | 4.8                        | A          | VFD4A8MS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD4A8MS23ENSAA | -                   | V           |
| 2                              | 1.5   | 7.5                        | B          | VFD7A5MS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD7A5MS23ENSAA | -                   | V           |
| 3                              | 2.2   | 11.0                       | C          | VFD11AMS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD11AMS23ENSAA | -                   | V           |
| 5                              | 3.7/4 | 17.0                       | C          | VFD17AMS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD17AMS23ENSAA | -                   | V           |
| 7.5                            | 5.5   | 25.0                       | D          | VFD25AMS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD25AMS23ENSAA | -                   | V           |
| 10                             | 7.5   | 33.0                       | E          | VFD33AMS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD33AMS23ENSAA | -                   | V           |
| 15                             | 11    | 49.0                       | E          | VFD49AMS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD49AMS23ENSAA | -                   | V           |
| 20                             | 15    | 65.0                       | F          | VFD65AMS23ANSAA | -                   | -           |
|                                |       |                            |            | VFD65AMS23ENSAA | -                   | V           |

| Power Range                    |       |                            | Frame Size | Model Name      | Built-in EMC Filter | IP40 Models |
|--------------------------------|-------|----------------------------|------------|-----------------|---------------------|-------------|
| Max. Applicable Motor Capacity |       | Drive Rated Output Current |            |                 |                     |             |
| [HP]                           | [kW]  | [A]                        |            |                 |                     |             |
| 460 V/3-phase                  |       |                            |            |                 |                     |             |
| 0.5                            | 0.4   | 1.5                        | A          | VFD1A5MS43ANSAA | -                   | -           |
|                                |       |                            | A          | VFD1A5MS43ENSAA | -                   | V           |
|                                |       |                            | B          | VFD1A5MS43AFSAA | V                   | -           |
| 1                              | 0.75  | 2.7                        | A          | VFD2A7MS43ANSAA | -                   | -           |
|                                |       |                            | A          | VFD2A7MS43ENSAA | -                   | V           |
|                                |       |                            | B          | VFD2A7MS43AFSAA | V                   | -           |
| 2                              | 1.5   | 4.2                        | B          | VFD4A2MS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD4A2MS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD4A2MS43AFSAA | V                   | -           |
| 3                              | 2.2   | 5.5                        | C          | VFD5A5MS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD5A5MS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD5A5MS43AFSAA | V                   | -           |
| 5                              | 3.7/4 | 9.0                        | C          | VFD9A0MS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD9A0MS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD9A0MS43AFSAA | V                   | -           |
| 7.5                            | 5.5   | 13.0                       | D          | VFD13AMS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD13AMS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD13AMS43AFSAA | V                   | -           |
| 10                             | 7.5   | 17.0                       | D          | VFD17AMS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD17AMS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD17AMS43AFSAA | V                   | -           |
| 15                             | 11    | 25.0                       | E          | VFD25AMS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD25AMS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD25AMS43AFSAA | V                   | -           |
| 20                             | 15    | 32.0                       | E          | VFD32AMS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD32AMS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD32AMS43AFSAA | V                   | -           |
| 25                             | 18.5  | 38.0                       | F          | VFD38AMS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD38AMS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD38AMS43AFSAA | V                   | -           |
| 30                             | 22    | 45.0                       | F          | VFD45AMS43ANSAA | -                   | -           |
|                                |       |                            |            | VFD45AMS43ENSAA | -                   | V           |
|                                |       |                            |            | VFD45AMS43AFSAA | V                   | -           |
| 575 V/3-phase                  |       |                            |            |                 |                     |             |
| 1                              | 0.75  | 1.7                        | A          | VFD1A7MS53ANSAA | -                   | -           |
| 2                              | 1.5   | 3.0                        | B          | VFD3A0MS53ANSAA | -                   | -           |
| 3                              | 2.2   | 4.2                        | C          | VFD4A2MS53ANSAA | -                   | -           |
| 5                              | 3.7   | 6.6                        |            | VFD6A6MS53ANSAA | -                   | -           |
| 7.5                            | 5.5   | 9.9                        | D          | VFD9A9MS53ANSAA | -                   | -           |
| 10                             | 7.5   | 12.2                       |            | VFD12AMS53ANSAA | -                   | -           |

## IP66 Standard Models (0 ~ 599 Hz)

| Power Range                    |      |                            | Frame Size | Model Name      | Built-in EMC Filter |
|--------------------------------|------|----------------------------|------------|-----------------|---------------------|
| Max. Applicable Motor Capacity |      | Drive Rated Output Current |            |                 |                     |
| [HP]                           | [kW] | [A]                        |            |                 |                     |
| 230 V/ single-phase            |      |                            |            |                 |                     |
| 1/2                            | 0.4  | 2.8                        | A          | VFD2A8MS21MNSAA | -                   |
|                                |      | 2.8                        |            | VFD2A8MS21MFSAA | V                   |
| 1                              | 0.75 | 4.8                        | A          | VFD4A8MS21MNSAA | -                   |
|                                |      | 4.8                        |            | VFD4A8MS21MFSAA | V                   |
| 2                              | 1.5  | 7.5                        | A          | VFD7A5MS21MNSAA | -                   |
|                                |      | 7.5                        | B          | VFD7A5MS21MFSAA | V                   |
| 3                              | 2.2  | 11                         | B          | VFD11AMS21MNSAA | -                   |
|                                |      | 11                         |            | VFD11AMS21MFSAA | V                   |
| 230 V/3-phase                  |      |                            |            |                 |                     |
| 1/2                            | 0.4  | 2.8                        | A          | VFD2A8MS23MNSAA | -                   |
| 1                              | 0.75 | 4.8                        | A          | VFD4A8MS23MNSAA | -                   |
| 2                              | 1.5  | 7.5                        | A          | VFD7A5MS23MNSAA | -                   |
| 3                              | 2.2  | 11                         | B          | VFD11AMS23MNSAA | -                   |
| 5                              | 3.7  | 17                         | B          | VFD17AMS23MNSAA | -                   |
| 7.5                            | 5.5  | 25                         | C          | VFD25AMS23MNSAA | -                   |
| 460 V/3-phase                  |      |                            |            |                 |                     |
| 1/2                            | 0.4  | 1.5                        | A          | VFD1A5MS43MNSAA | -                   |
|                                |      | 1.5                        |            | VFD1A5MS43MFSAA | V                   |
| 1                              | 0.75 | 2.7                        | A          | VFD2A7MS43MNSAA | -                   |
|                                |      | 2.7                        |            | VFD2A7MS43MFSAA | V                   |
| 2                              | 1.5  | 4.2                        | A          | VFD4A2MS43MNSAA | -                   |
|                                |      | 4.2                        |            | VFD4A2MS43MFSAA | V                   |
| 3                              | 2.2  | 5.5                        | A          | VFD5A5MS43MNSAA | -                   |
|                                |      | 5.5                        | B          | VFD5A5MS43MFSAA | V                   |
| 5                              | 3.7  | 9                          | B          | VFD9A0MS43MNSAA | -                   |
|                                |      | 9                          |            | VFD9A0MS43MFSAA | V                   |
| 7.5                            | 5.5  | 13                         | C          | VFD13AMS43MNSAA | -                   |
|                                |      | 13                         |            | VFD13AMS43MFSAA | V                   |
| 10                             | 7.5  | 17                         | C          | VFD17AMS43MNSAA | -                   |
|                                |      | 17                         |            | VFD17AMS43MFSAA | V                   |

## IP20/IP40 High Speed Models (0 ~ 1500 Hz)

| Power Range                    |       |                            | Frame Size | Model Name      | Built-in EMC Filter | IP40 Models |
|--------------------------------|-------|----------------------------|------------|-----------------|---------------------|-------------|
| Max. Applicable Motor Capacity |       | Drive Rated Output Current |            |                 |                     |             |
| [HP]                           | [kW]  | [A]                        |            |                 |                     |             |
| 230V/single-phase              |       |                            |            |                 |                     |             |
| 2                              | 1.5   | 7.5                        | C          | VFD7A5MS21ANSHA | -                   | -           |
|                                |       |                            |            | VFD7A5MS21ENSHA | -                   | V           |
|                                |       |                            |            | VFD7A5MS21AFSHA | V                   | -           |
| 3                              | 2.2   | 11.0                       | C          | VFD11AMS21ANSHA | -                   | -           |
|                                |       |                            |            | VFD11AMS21ENSHA | -                   | V           |
|                                |       |                            |            | VFD11AMS21AFSHA | V                   | -           |
| 230V/3-phase                   |       |                            |            |                 |                     |             |
| 2                              | 1.5   | 7.5                        | B          | VFD7A5MS23ANSHA | -                   | -           |
|                                |       |                            |            | VFD7A5MS23ENSHA | -                   | V           |
| 3                              | 2.2   | 11.0                       | C          | VFD11AMS23ANSHA | -                   | -           |
|                                |       |                            |            | VFD11AMS23ENSHA | -                   | V           |
| 5                              | 3.7/4 | 17.0                       | C          | VFD17AMS23ANSHA | -                   | -           |
|                                |       |                            |            | VFD17AMS23ENSHA | -                   | V           |
| 7.5                            | 5.5   | 25.0                       | D          | VFD25AMS23ANSHA | -                   | -           |
|                                |       |                            |            | VFD25AMS23ENSHA | -                   | V           |
| 10                             | 7.5   | 33.0                       | E          | VFD33AMS23ANSHA | -                   | -           |
|                                |       |                            |            | VFD33AMS23ENSHA | -                   | V           |
| 15                             | 11    | 49.0                       | E          | VFD49AMS23ANSHA | -                   | -           |
|                                |       |                            |            | VFD49AMS23ENSHA | -                   | V           |
| 20                             | 15    | 65.0                       | F          | VFD65AMS23ANSHA | -                   | -           |
|                                |       |                            |            | VFD65AMS23ENSHA | -                   | V           |
| 460V/3-phase                   |       |                            |            |                 |                     |             |
| 2                              | 1.5   | 4.2                        | B          | VFD4A2MS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD4A2MS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD4A2MS43AFSHA | V                   | -           |
| 3                              | 2.2   | 5.5                        | C          | VFD5A5MS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD5A5MS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD5A5MS43AFSHA | V                   | -           |
| 5                              | 3.7/4 | 9.0                        | C          | VFD9A0MS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD9A0MS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD9A0MS43AFSHA | V                   | -           |
| 7.5                            | 5.5   | 13.0                       | D          | VFD13AMS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD13AMS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD13AMS43AFSHA | V                   | -           |
| 10                             | 7.5   | 17.0                       | D          | VFD17AMS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD17AMS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD17AMS43AFSHA | V                   | -           |
| 15                             | 11    | 25.0                       | E          | VFD25AMS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD25AMS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD25AMS43AFSHA | V                   | -           |
| 20                             | 15    | 32.0                       | E          | VFD32AMS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD32AMS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD32AMS43AFSHA | V                   | -           |
| 25                             | 18.5  | 38.0                       | F          | VFD38AMS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD38AMS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD38AMS43AFSHA | V                   | -           |
| 30                             | 22    | 45.0                       | F          | VFD45AMS43ANSHA | -                   | -           |
|                                |       |                            |            | VFD45AMS43ENSHA | -                   | V           |
|                                |       |                            |            | VFD45AMS43AFSHA | V                   | -           |

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Tainan Plant (Diamond-rated Green Building)



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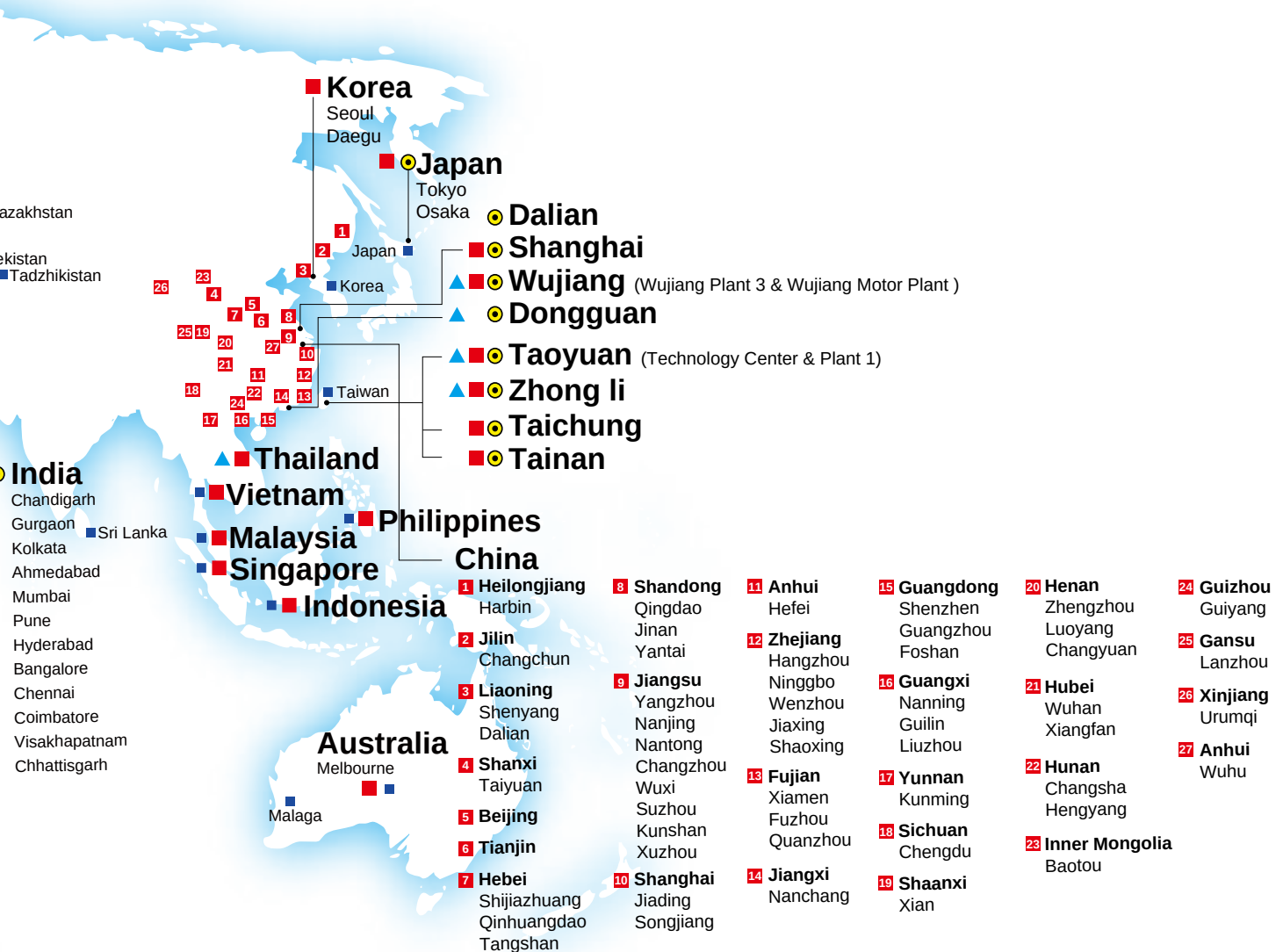
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