



Datasheet

# Delta Basic Compact Drive MH300 Series



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 **DELTA**  
Smarter. Greener. Together.

# Specifications



Single-phase  
115V

			Models w/o Built-in EMC Filter		
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	5
	Normal Duty	Rated Output Current (A)	1.8	2.7	5.5
Input	Rated Voltage/Frequency		1-Phase AC 100V~120V (-15%~+10%), 50/60Hz		
	Mains Input Voltage Range		85~132V		
	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)			68×128		87×157
Size: D (mm)			130	144	167

Single-phase  
230V

			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	5	7.5	11
	Normal Duty	Rated Output Current (A)	1.8	3.2	5.2	8.5	12.5
Input	Rated Voltage/Frequency		1-Phase AC 200V~240V (-15%~+10%), 50/60Hz				
	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)			72x142			87x157	
Size: D (mm)			174			194	
			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)			130	144	162	167	

# Product Specifications

3-phase  
230V

Models w/o Built-in EMC Filter													
Frame			A		B	C		D	E		F		
Applicable Motor Output (kW)			0.2	0.4	0.75	0.75	1.5	2.2	3.7/4	5.5	7.5	11	15
Applicable Motor Output (HP)			1/4	1/2	1	1	2	3	5	7.5	10	15	20
Inverter Output	Heavy Duty	Rated Output Current (A)	1.6	2.8	5	5	7.5	11	17	25	33	49	65
	Normal Duty	Rated Output Current (A)	1.8	3.2	5.2	5.2	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		47~63Hz										
Carrier Frequency (kHz)			2~15kHz (default 4kHz)										
Brake Chopper			Built-in										
DC Reactor			Optional										
AC Reactor			Optional										
Cooling Method			Natural air cooling				Fan cooling						
Size: W×H (mm)			68x128				72x142	87x157	109x207	130x250	175x300		
Size: D (mm)			144	144	162	150	158	167	169	200	207		

Models w/o an EMC Filter													
Frame			G				I						
Applicable Motor Output (kW)			18.5				22		30		37 (45) <sup>(Note)</sup>		
Applicable Motor Output (HP)			25				30		40		50 (60) <sup>(Note)</sup>		
Inverter Output	Heavy Duty	Rated Output Current (A)	75				90		120		146		
	Normal Duty	Rated Output Current (A)	81				102		134		160		
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		47~63Hz										
Carrier Frequency (kHz)			2~15kHz (default 4kHz)										
Brake Chopper			Built-in				Optional						
DC Reactor			Optional				Built-in						
AC Reactor			Optional										
Cooling Method			Fan cooling										
Size: W×H (mm)			250x400				330x550						
Size: D (mm)			225				300						

Note: Values in the brackets are the applicable motor output under normal duty

3-phase  
460 V

Models with Built-in EMC Filter														
Frame			B				C		D		E		F	
Applicable Motor Output (kW)			0.4	0.75	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	1	2	3	5	7.5	10	15	20	25	30
Inverter Output	Heavy Duty	Rated Output Current (A)	1.5	3	3	4.2	5.7	9	13	17.5	25	32	38	45
	Normal Duty	Rated Output Current (A)	1.8	3.3	3.3	4.6	6.5	10.5	14.5	19.8	28	36	41.5	49
Input	Rated Voltage/Frequency		3-Phase AC 380V~480V (-15%~+10%), 50/60Hz											
	Mains Input Voltage Range		323~528V											
	Mains Frequency Range		47~63Hz											
Carrier Frequency (kHz)			2~15kHz (default 4kHz)											
Brake Chopper			Built-in											
DC Reactor			Optional											
AC Reactor			Optional											
Cooling Method			Fan cooling											
Size: W×H (mm)			72x142				87x157		109x207		130x250		175x300	
Size: D (mm)			174				194		202		234		259	

Models w/o an EMC Filter															
Frame			A			B		C		D		E		F	
Cooling Method			Natural air cooling			Fan cooling									
Size: W×H (mm)			68x128			72x142		87x157		109x207		130x250		175x300	
Size: D (mm)			144	162	150	158	167		169		200		207		

3-phase  
460 V

Models with Built-in EMC Filter																	
Frame			G				H				I						
Applicable Motor Output (kW)			30				37				45			55		75	
Applicable Motor Output (HP)			40				50				60			75		100	
Inverter Output	Heavy Duty	Rated Output Current (A)	60				75				91			112		150	
	Normal Duty	Rated Output Current (A)	69				85				108			128		180	
Input	Rated Voltage/Frequency		3-Phase AC 380V~480V (-15%~+10%), 50/60Hz														
	Mains Input Voltage Range		323~528V														
	Mains Frequency Range		47~63Hz														
Carrier Frequency (kHz)			2~15kHz (default 4kHz)														
Brake Chopper			Built-in				Optional										
DC Reactor			Optional				Built-in										
AC Reactor			Optional														
Cooling Method			Fan cooling														
Size: W×H (mm)			250x400				280x500				330x550						
Size: D (mm)			225				280				300						

Models w/o an EMC Filter															
Frame			G				H				I				
Cooling Method			Fan cooling												
Size: W×H (mm)			250x400				280x500				330x550				
Size: D (mm)			225				280				300				

# General Specifications and Accessories

<b>Control Functions</b>	Control Methods	V/F, SVC, FOC, V/F+PG, FOC+PG, TQC+PG		
	Applicant Motors	Induction motors (IM), Interior Permanent Magnet (IPM) motors, and Surface Permanent Magnet (SPM) motors		
	Max. Output Frequency	599Hz		
	Starting Torque*	150%/3 Hz 200%/0.5 Hz 200%/0 Hz 100%/(1/20 of motor rated frequency) 150%/0 Hz 200%/0 Hz	(V/f, SVC, V/F+PG control for IM, Heavy duty) (FOC control for IM, Heavy duty) (FOC+PG control for IM, Heavy duty) (SVC control for PM, Heavy duty) (FOC control for PM, Heavy duty) (Closed-loop vector control w/PG for PM, Heavy duty)	
	Speed Control Range*	1 : 50 (V/f, SVC, V/F+PG control for IM, Heavy duty) 1 : 100 (FOC control for IM, Heavy duty) 1 : 1000 (FOC+PG control for IM, Heavy duty)	1 : 20 (SVC control for PM, Heavy duty) 1 : 100 (FOC control for PM, Heavy duty) 1 : 1000 (Closed-loop vector control w/PG for PM, Heavy duty)	
	Overload Tolerance	Normal Duty (ND): 120% of rated output current for 60 seconds; 150% of rated output current for 3 seconds 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, 4~20mA/0~+10V, 2 Pulse input (33kHz), 1 Pulse output (33kHz)		
	Main Control Functions	multi-motor control motor switches (max. 8 independent motor parameter settings), fast startup, 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, torque limit, 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, PID control, built-in PLC (5K steps), positioning function, tension control, Modbus and CANopen integrated as standard		
<b>Protection Functions</b>	Motor Protection	overcurrent protection, overvoltage protection, over-temperature protection, phase failure protection, overload protection, output grounding protection		
	Stall Prevention	stall prevention during acceleration, deceleration and running independently		
<b>Accessories</b>	Communication Cards	PROFIBUS DP, DeviceNet, Modbus TCP, EtherNet/IP, EtherCAT		
	PG Cards	EMM-PG01L (ABZ, line driver) EMM-PG01O (ABZ, open collector)	EMM-PG01R (resolver)	
	I/O Expansion Cards	EMM-D33A (digital card - 3 in/3 out) EMM-A22A (analog card - 2 in/2 out)	EMM-R2CA (relay card (output: A *3)) EMM-R3AA (relay card (output: A *3))	
	External DC Power Supply	EMM-BPS02 (DC 24V power supply card)		
<b>Digital Controller</b>	A removable keypad as standard			
<b>Certifications</b>	CE, RCM, REACH, RoHS, TUV, UL			

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

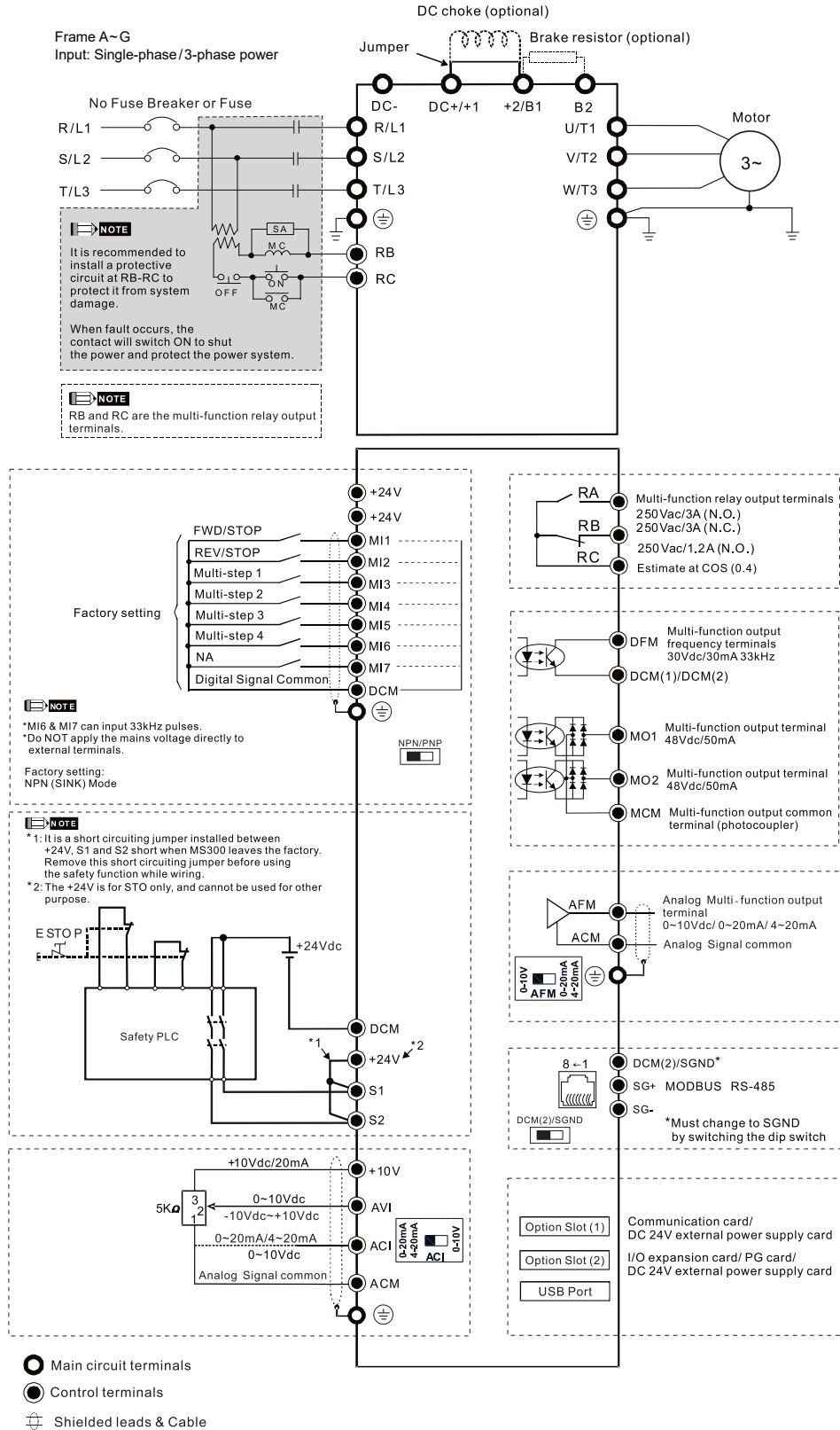
## Operating Environment

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

Please refer to MH300 user manual for more details.

# Wiring

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

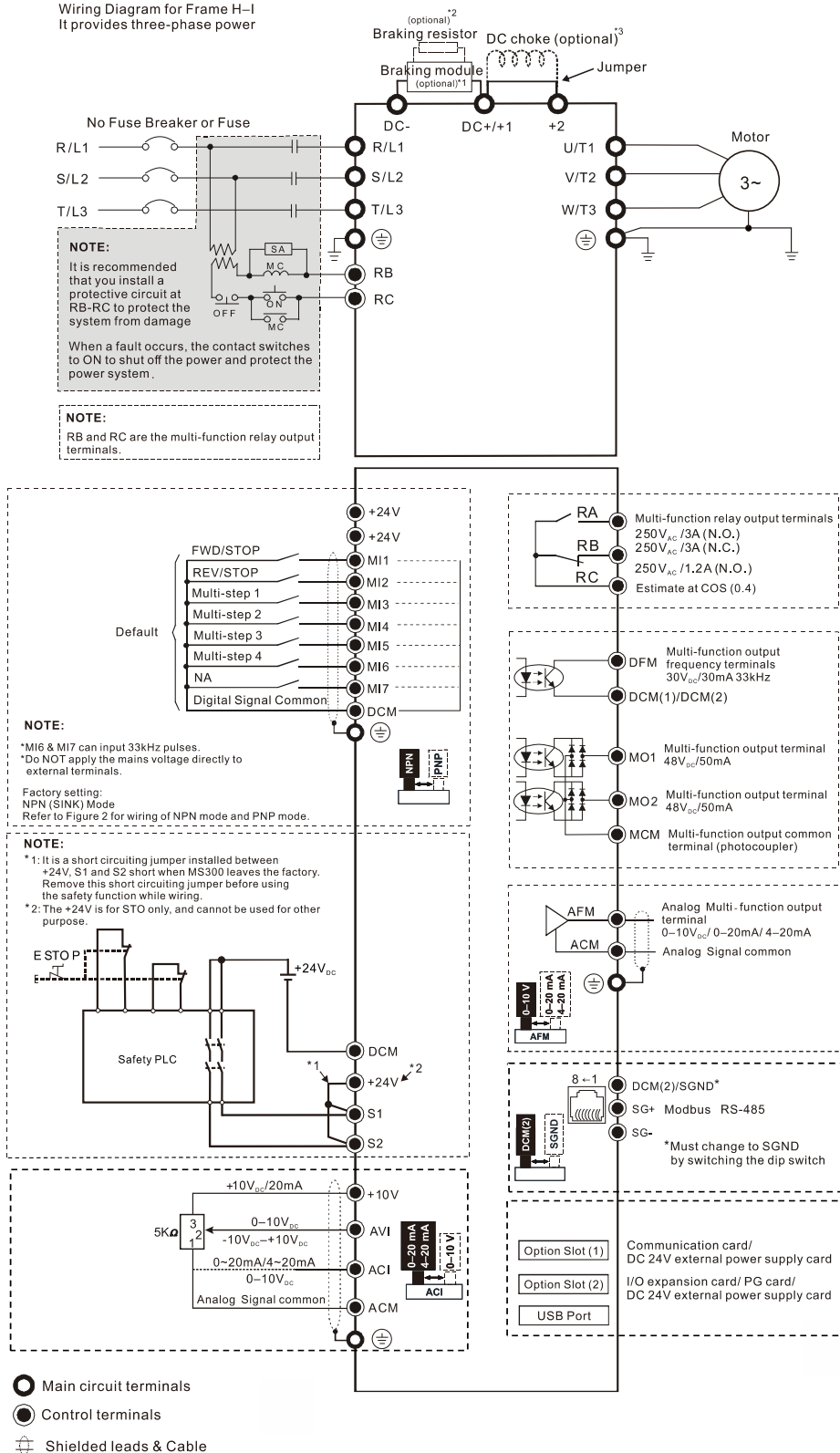


Note 1: please refer to MH300 user manual (chapter 7-4) for more details of DC choke  
 Note 2: please refer to MH300 user manual (chapter 7-1) for more details of brake resistor

# Wiring

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

Wiring Diagram for Frame H-I  
It provides three-phase power

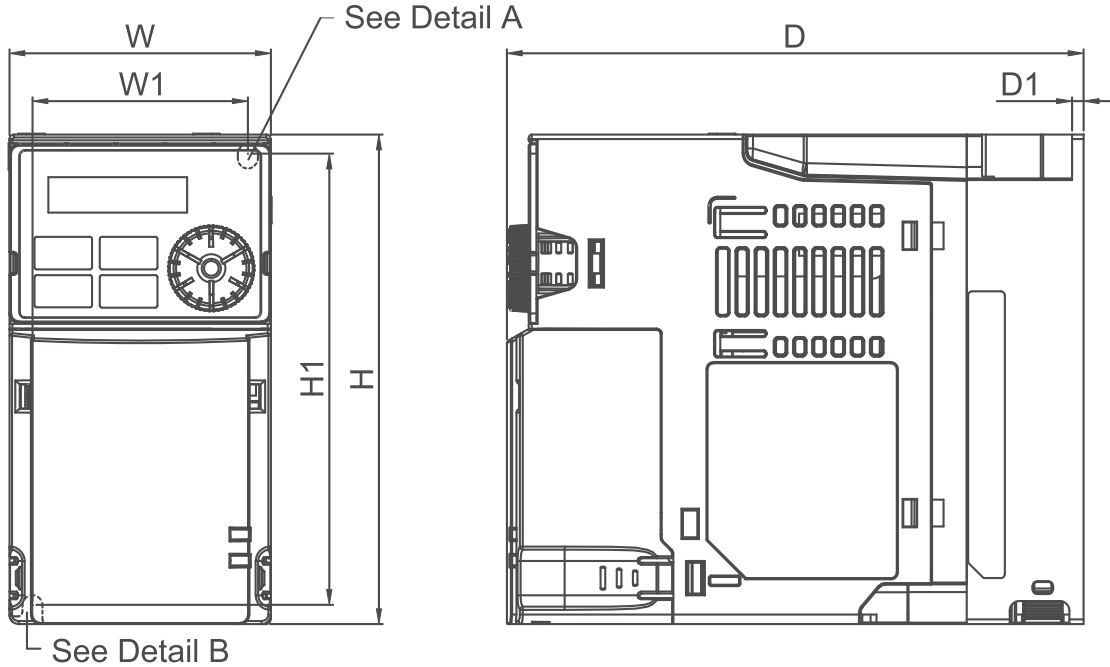


\*1 & \*2 Refer to Section 7-1 in the user manual for brake units and resistor selection.

\*3 Refer to Section 7-4 in the user manual for DC reactor selection.

# Dimensions

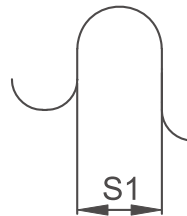
## Frame A



Detail A (Mounting Hole)



Detail B (Mounting Hole)



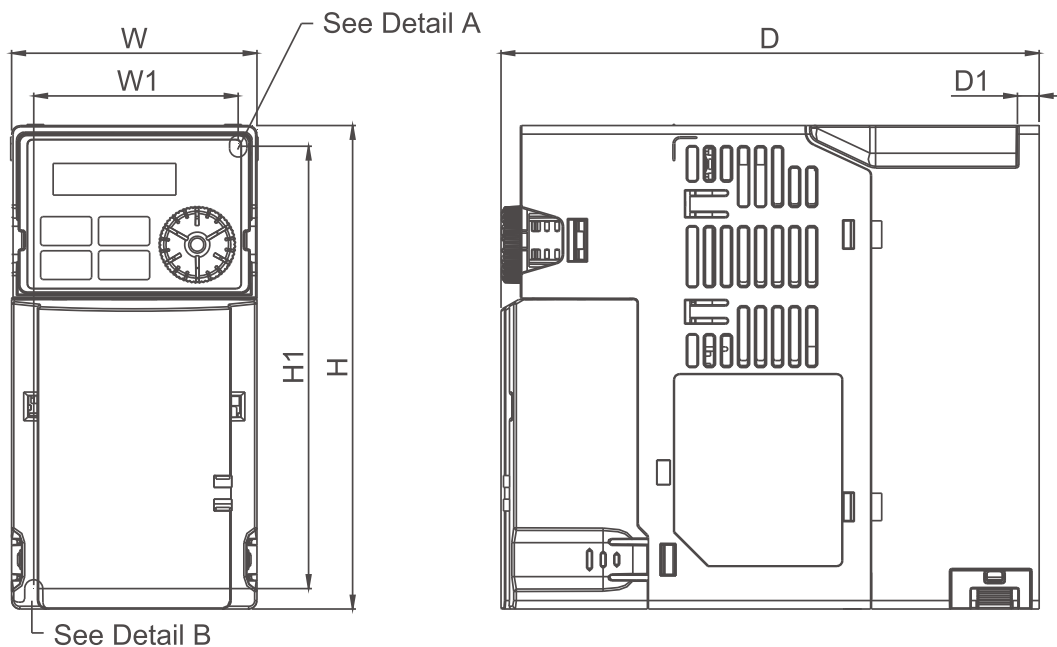
MODEL	FRAME A1	FRAME A2	FRAME A3	FRAME A4
VFD1A6MH11ANSAA	VFD2A5MH11ANSAA	VFD2A5MH11ENSAA	VFD5A0MH23ANSAA	VFD5A0MH23ANSNA
VFD1A6MH11ENSAA	VFD2A8MH21ANSAA	VFD2A8MH21ENSAA	VFD5A0MH23ENSAA	VFD5A0MH23ENSNA
VFD1A6MH21ANSAA	VFD1A6MH23ANSAA	VFD1A6MH23ENSAA	VFD3A0MH43ANSAA	VFD3A0MH43ANSNA
VFD1A6MH21ENSAA	VFD2A8MH23ANSAA	VFD2A8MH23ENSAA	VFD3A0MH43ENSAA	VFD3A0MH43ENSNA
	VFD1A5MH43ANSAA	VFD1A5MH43ENSAA		

Frame	W	H	D	W1	H1	D1	S1	
A1	mm	68.0	128.0	130.0	56.0	118.0	3.0	5.2
	inch	2.68	5.04	5.12	2.20	4.65	0.12	0.20
A2	mm	68.0	128.0	144.0	56.0	118.0	3.0	5.2
	inch	2.68	5.04	5.67	2.20	4.65	0.12	0.20

Frame	W	H	D	W1	H1	D1	S1	
A3	mm	68.0	128.0	150.0	56.0	118.0	3.0	5.2
	inch	2.68	5.04	5.91	2.20	4.65	0.12	0.20
A4	mm	68.0	128.0	162.0	56.0	118.0	3.0	5.2
	inch	2.68	5.04	6.38	2.20	4.65	0.12	0.20

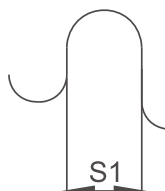
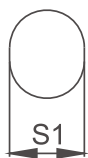


## Frame B



Detail A (Mounting Hole)

Detail B (Mounting Hole)



### MODEL

#### FRAME B1

VFD7A5MH23ANSAA  
 VFD7A5MH23ENSAA  
 VFD4A2MH43ANSAA  
 VFD4A2MH43ENSAA

#### FRAME B2

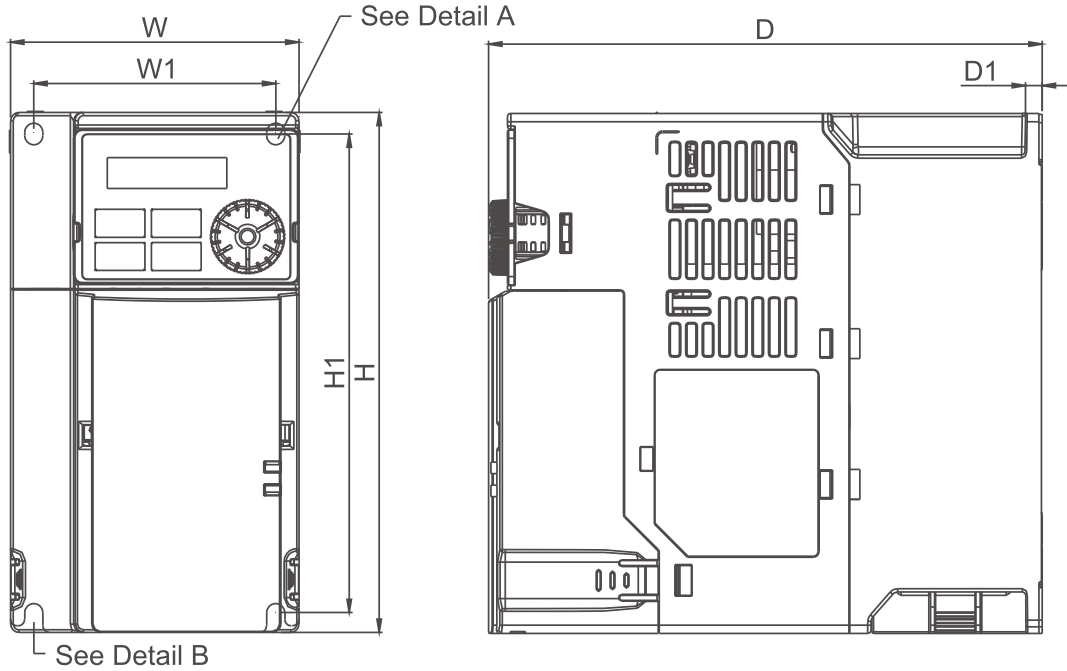
Standard Models:  
 VFD5A0MH21ANSAA  
 VFD5A0MH21ENSAA

#### FRAME B3

VFD1A6MH21AFSAA  
 VFD2A8MH21AFSAA  
 VFD5A0MH21AFSAA  
 VFD3A0MH43AFSAA  
 VFD4A2MH43AFSAA

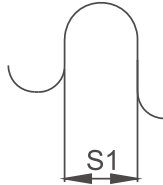
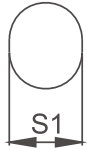
Frame		W	H	D	W1	H1	D1	S1
B1	mm	72.0	142.0	158.0	60.0	130.0	6.4	5.2
	inch	2.83	5.59	6.22	2.36	5.12	0.25	0.20
Frame		W	H	D	W1	H1	D1	S1
B2	mm	72.0	<b>142.0</b>	162.0	60.0	130.0	3.0	5.2
	inch	2.83	5.59	6.38	2.36	5.12	0.12	0.20
Frame		W	H	D	W1	H1	D1	S1
B3	mm	72.0	142.0	174.0	60.0	130.0	4.3	5.2
	inch	2.83	5.59	6.85	2.36	5.12	0.17	0.20

**Frame C**



Detail A (Mounting Hole)

Detail B (Mounting Hole)



**MODEL  
FRAME C1**

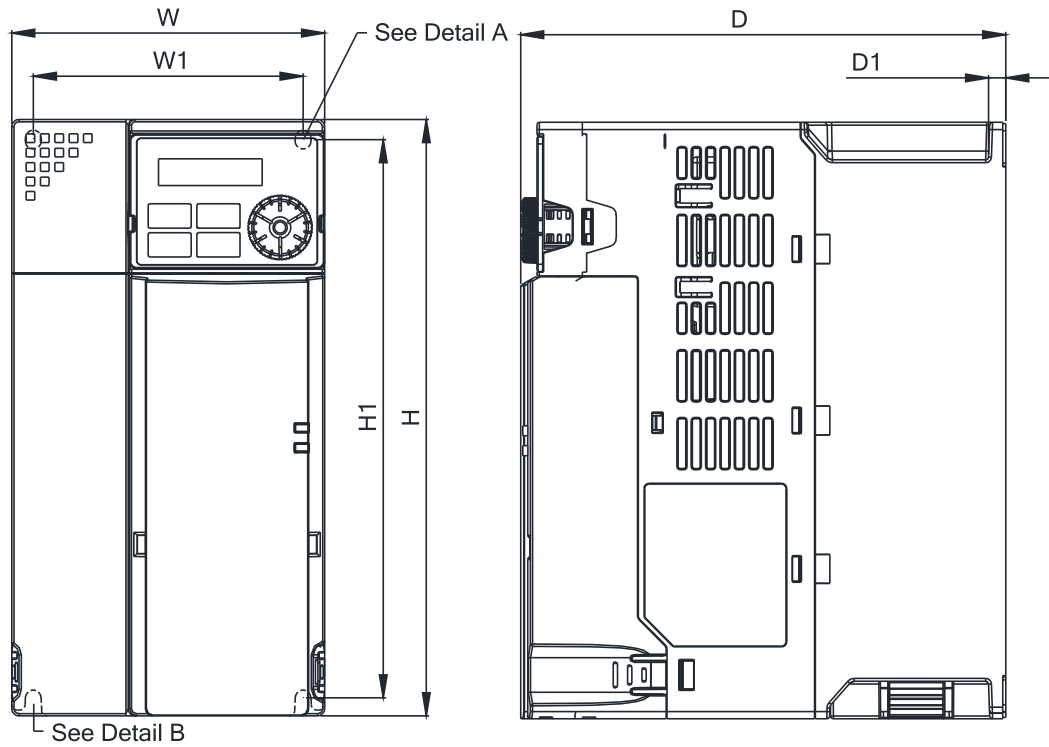
VFD5A0MH11ANSAA  
 VFD7A5MH21ANSAA  
 VFD11AMH21ANSAA  
 VFD11AMH23ANSAA  
 VFD17AMH23ANSAA  
 VFD5A7MH43ANSAA  
 VFD9A0MH43ANSAA

**FRAME C2**

VFD7A5MH21AFSAA  
 VFD11AMH21AFSAA  
 VFD5A7MH43AFSAA  
 VFD9A0MH43AFSAA

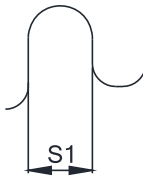
Frame		W	H	D	W1	H1	D1	S1
C1	mm	87.0	157.0	167.0	73.0	144.5	5.0	5.5
	inch	3.43	6.18	6.57	2.87	5.69	0.20	0.22
Frame		W	H	D	W1	H1	D1	S1
C2	mm	87.0	157.0	194.0	73.0	144.5	5.0	5.5
	inch	3.43	6.18	7.64	2.87	5.69	0.20	0.22

## Frame D



Detail A (Mounting Hole)

Detail B (Mounting Hole)



### MODEL FRAME D1

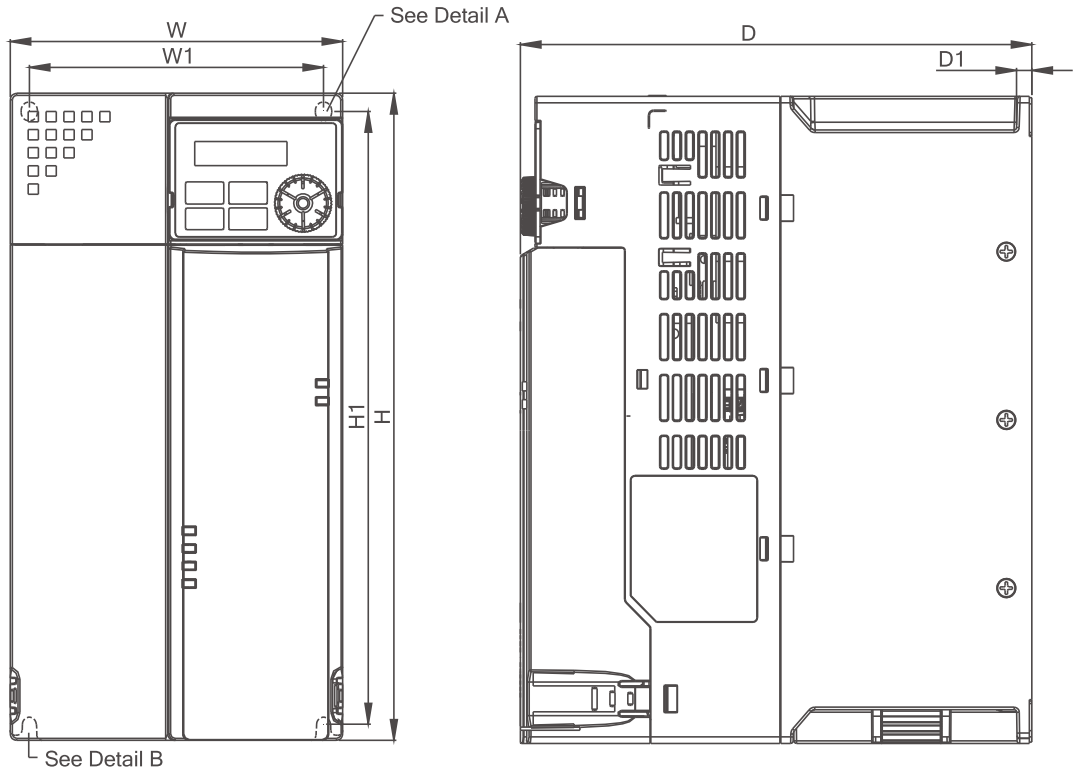
### FRAME D2

VFD25AMH23ANSAA  
VFD25AMH23ENSAA  
VFD13AMH43ANSAA  
VFD13AMH43ENSAA  
VFD17AMH43ANSAA  
VFD17AMH43ENSAA

VFD13AMH43AFSAA  
VFD17AMH43AFSAA

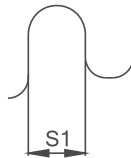
Frame		W	H	D	W1	H1	D1	S1
D1	mm	109.0	207.0	169.0	94.0	193.8	6.0	5.5
	inch	4.29	8.15	6.65	3.70	7.63	0.24	0.22
Frame		W	H	D	W1	H1	D1	S1
D2	mm	109.0	207.0	202.0	94.0	193.8	6.0	5.5
	inch	4.29	8.15	7.95	3.70	7.63	0.24	0.22

## Frame E



Detail A (Mounting Hole)

Detail B (Mounting Hole)



### MODEL

#### FRAME E1

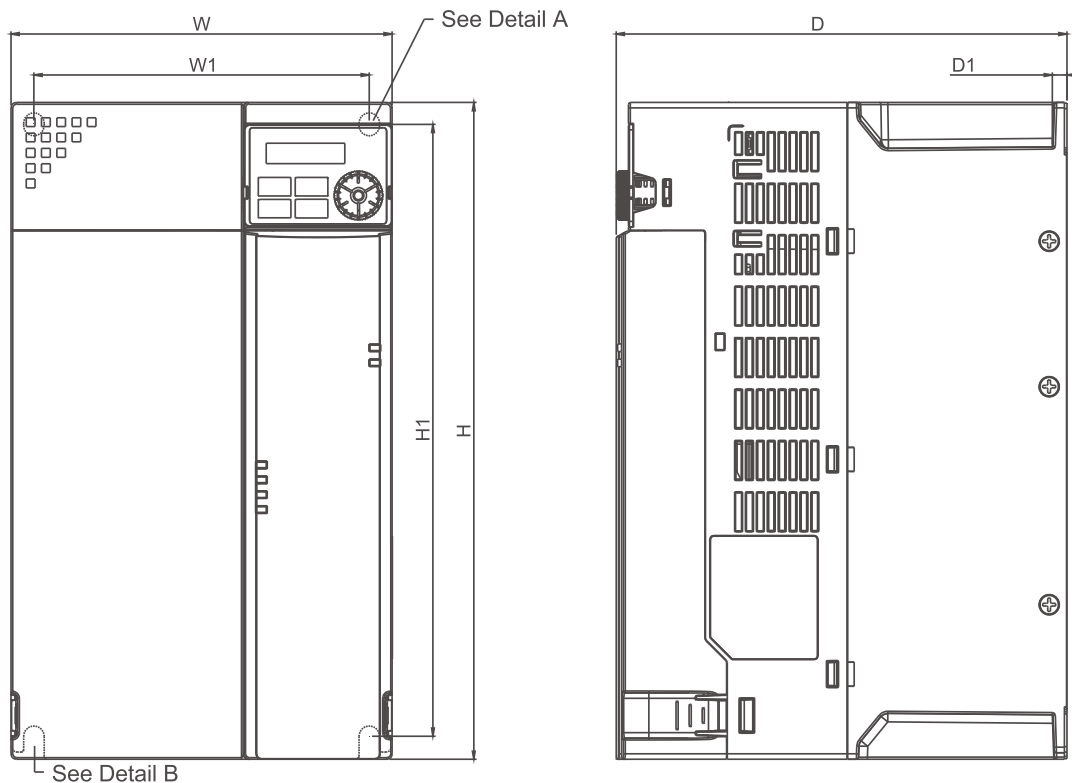
#### FRAME E2

VFD33AMH23ANSAA  
 VFD33AMH23ENSAA  
 VFD49AMH23ANSAA  
 VFD49AMH23ENSAA  
 VFD25AMH43ANSAA  
 VFD25AMH43ENSAA  
 VFD32AMH43ANSAA  
 VFD32AMH43ENSAA

VFD25AMH43AFSAA  
 VFD32AMH43AFSAA

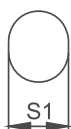
Frame		W	H	D	W1	H1	D1	S1
E1	mm	130.0	250.0	200.0	115.0	236.8	6.0	5.5
	inch	5.12	9.84	7.87	4.53	9.32	0.24	0.22
Frame		W	H	D	W1	H1	D1	S1
E2	mm	130.0	250.0	234.0	115.0	236.8	6.0	5.5
	inch	5.12	9.84	9.21	4.53	9.32	0.24	0.22

## Frame F



Detail A (Mounting Hole)

Detail B (Mounting Hole)



### MODEL FRAME F1

Standard Models:  
 VFD65AMH23ANSAA  
 VFD65AMH23ENSAA  
 VFD38AMH43ANSAA  
 VFD38AMH43ENSAA  
 VFD45AMH43ANSAA  
 VFD45AMH43ENSAA

High Speed Models:  
 VFD65AMH23ANSHA  
 VFD65AMH23ENSHA  
 VFD38AMH43ANSHA  
 VFD38AMH43ENSHA  
 VFD45AMH43ANSHA  
 VFD45AMH43ENSHA

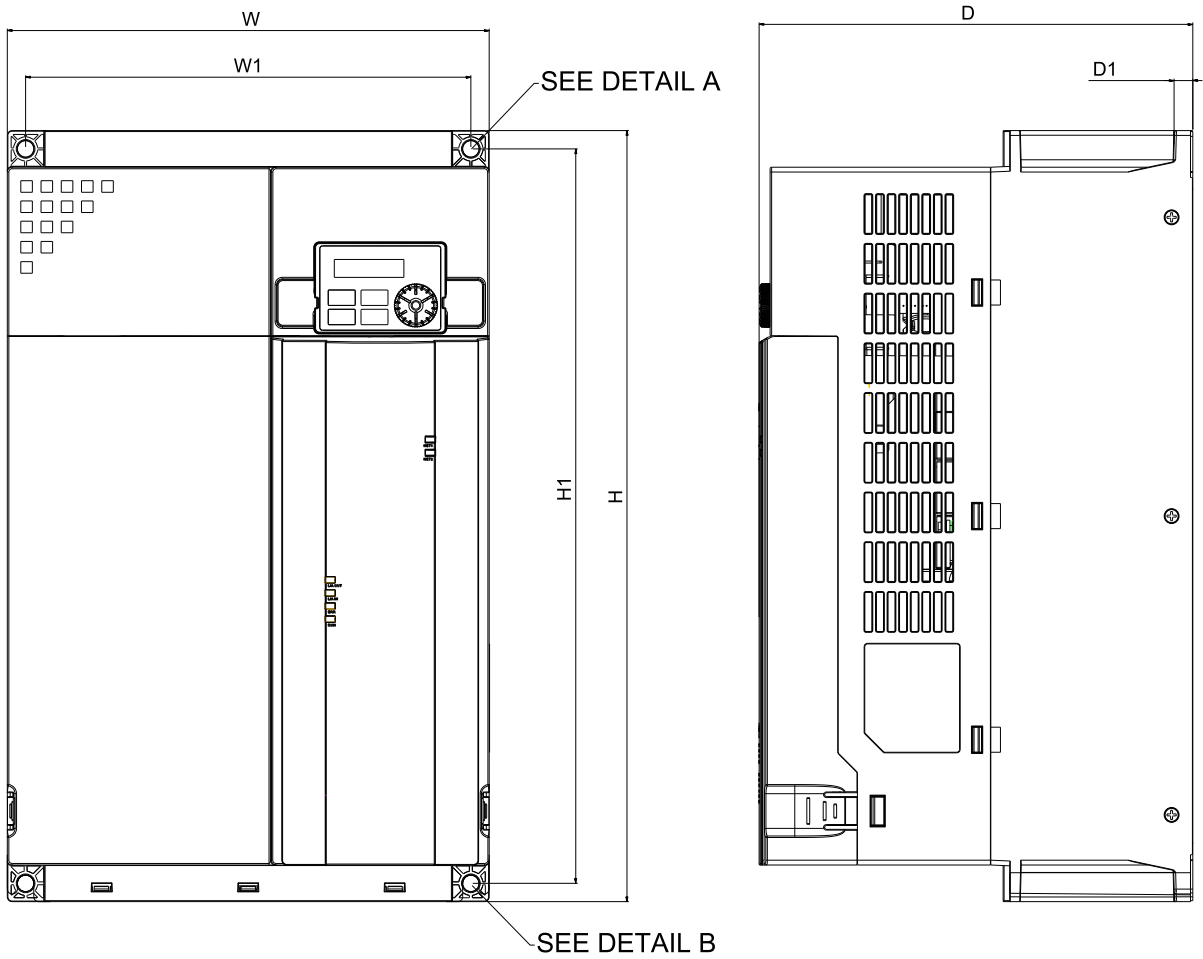
### FRAME F2

Standard Models:  
 VFD38AMH43AFSAA  
 VFD45AMH43AFSAA

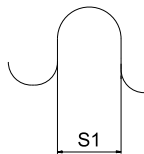
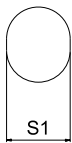
High Speed Models:  
 VFD38AMH43AFSHA  
 VFD45AMH43AFSHA

Frame		W	H	D	W1	H1	D1	S1
F1	mm	175.0	300.0	207.0	154.0	279.5	6.5	8.4
	inch	6.89	11.81	8.15	6.06	11.00	0.26	0.33
Frame		W	H	D	W1	H1	D1	S1
F2	mm	175.0	300.0	259.0	154.0	279.5	6.5	8.4
	inch	6.89	11.81	10.20	6.06	11.00	0.26	0.33

## Frame G



Detail A (Mounting Hole)      Detail B (Mounting Hole)

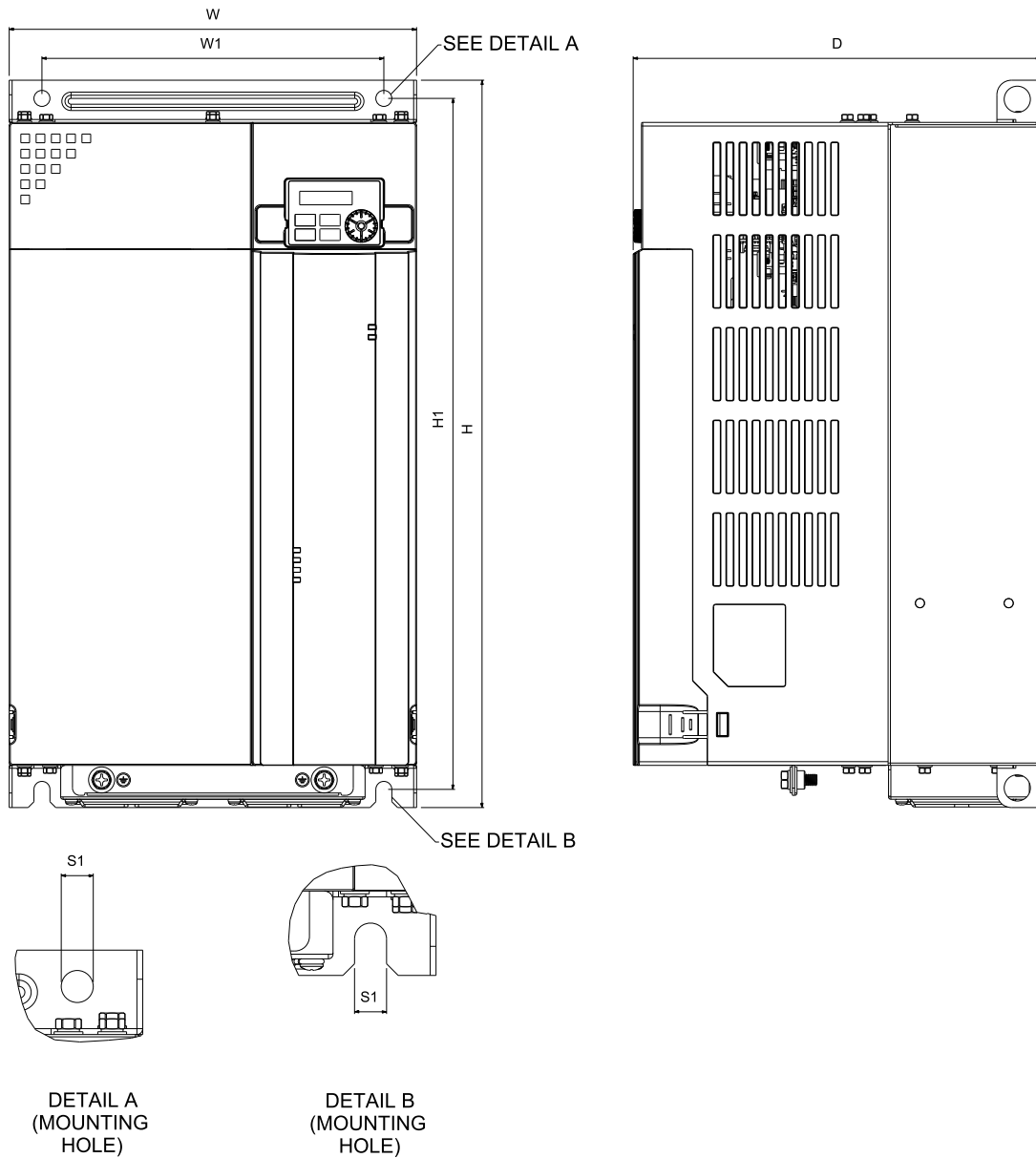


### MODEL FRAME G

VFD60AMH43AFSAA  
VFD60AMH43ANSAA  
VFD75AMH23ANSAA  
VFD90AMH23ANSAA

Frame		W	H	D	W1	H1	D1	S1
G	mm	250.0	400.0	225.0	231.0	381.0	10.0	8.5
	inch	9.84	15.75	8.86	9.09	15.00	0.39	0.33

## Frame H

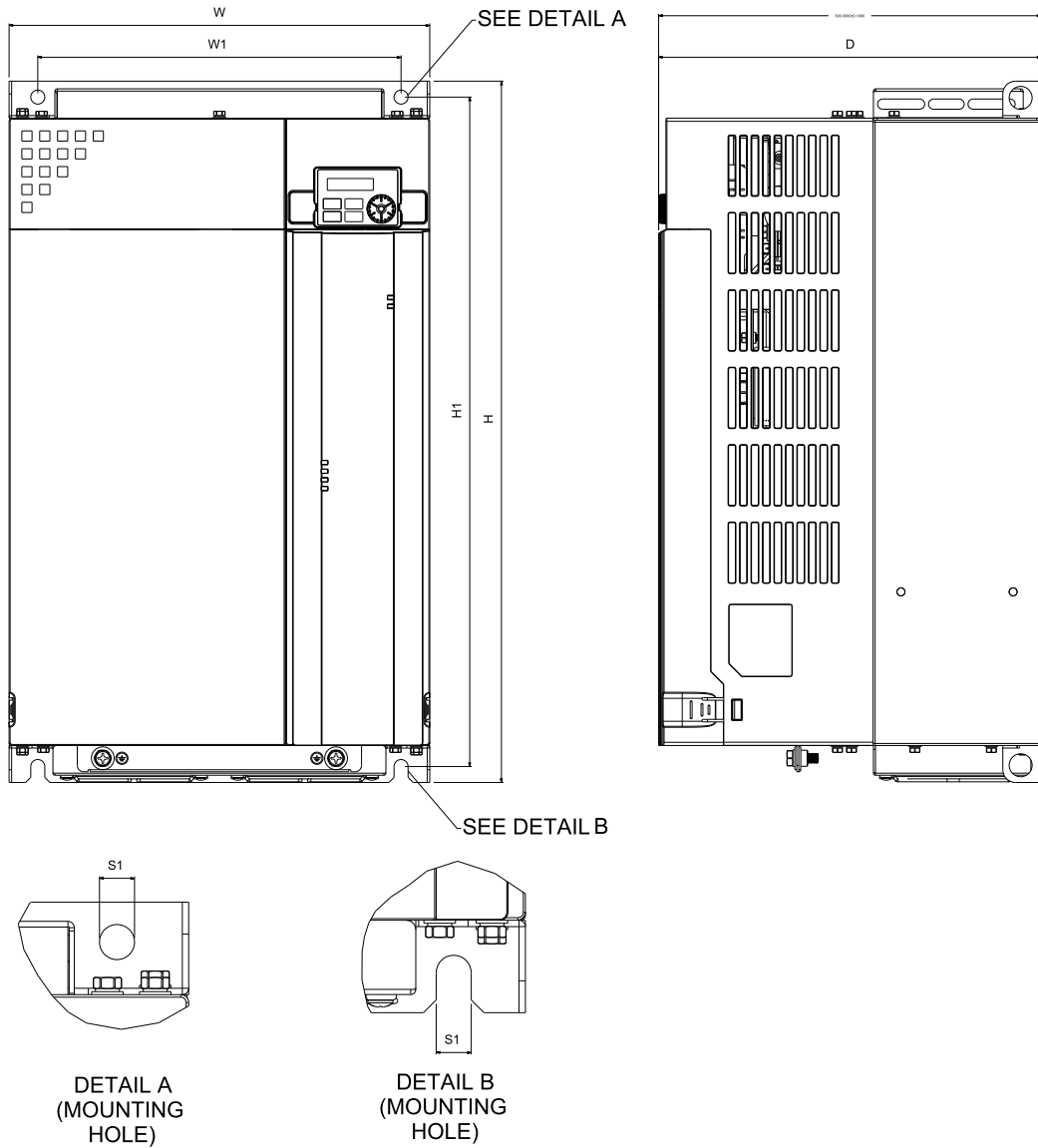


### MODEL FRAME H

VFD75AMH43AFSAA  
 VFD75AMH43ANSAA  
 VFD91AMH43AFSAA  
 VFD91AMH43ANSAA

Frame		W	H	D	W1	H1	D1	S1
H	mm	280.0	500.0	280.0	235.0	475.0	11.0	8.4
	inch	11.02	19.69	11.02	9.25	18.70	0.43	0.33

## Frame I



### MODEL FRAME I


VFD112MH43AFSAA  
 VFD112MH43ANSAA  
 VFD120MH23ANSAA  
 VFD146MH23ANSAA  
 VFD150MH43AFSAA  
 VFD150MH43ANSAA

Frame		W	H	D	W1	H1	S1
I	mm	330.0	550.0	300.0	285.0	525.0	11.0
	inch	12.99	21.65	11.81	11.22	20.67	0.43




# Accessories


## PG Cards: EMM-PG01L

		Terminals	Description
 <p>Set by Pr.10-00~10-02</p>	PG1	VP	Output voltage for power: +5V/+12V ± 5% (use FSW3 to switch +5V/+12 V, default +5V) Max. output current: 200 mA
		DCM	Common for power and signal
		A1, /A1 B1, /B1 Z1, /Z1	Encoder input signal (Line Driver or Open Collector) Open collector input: + 5 V ~ 24 V (Note 1) 1-phase or 2-phase input / Max. input frequency: 300 kHz
	PG2	A2, /A2 B2, /B2	Pulse input signal (line driver or open collector) Open collector input: +5V/+12V (Note1) 1-phase or 2-phase input/Max. input frequency: 300 kHz
	PG OUT	AO, /AO BO, /BO ZO, /ZO SG	PG card output signals / Division frequency function: 1 ~ 255 times Max. output voltage for line driver: 5V <sub>DC</sub> Max. output current: 15 mA/Max. output frequency: 300 kHz SG: The GND of PG card is the same as the host controller or PLC, and a common output signal is attained
Ground	PE	Earthing terminal to reduce noise; this terminal should also be grounded	


## PG Cards: EMM-PG01O

		Terminals	Description
 <p>Set by Pr.10-00~10-02</p>	PG1	VP	Output voltage for power: +5V/+12V ± 5% (use SSW320 to switch +5V / +12V, the default is +5V) Max. output current: 200 mA
		DCM	Common for power and signal
		A1, /A1 B1, /B1 Z1, /Z1	Encoder input signal (line driver or open collector) Open collector input: +5V~+12V (Note1) 1-phase or 2-phase input/Max. input frequency: 300 kHz
	PG2	A2, /A2 B2, /B2	Pulse input signal (line driver or open collector) Open collector input: +5V~+12V (Note1) 1-phase or 2-phase input/Max. input frequency: 300 kHz
	PG OUT	V+ V- /AO, /BO, /ZO SG	Needs external power source for PG OUT circuit. Input voltage of power: +7V~+24V Negative power supply input PG card output signals / Division frequency function: 1 ~ 255 times Add a pull-up resistor (1.8KΩ/1W) to the open collector output signals to avoid signal interferences Max. Output current: 20 mA/Max output frequency: 300 kHz SG: The GND of PG card is the same as the host controller or PLC, and a common output signal is attained
Ground	PE	Earthing terminal to reduce noise; this terminal should also be grounded	

## PG Cards: EMM-PG01R

		Terminals	Description
 <p>Resolver Set by Pr.10-00~10-02</p>	PG1	R1- R2	Resolver output power 7V <sub>rms</sub> , 10 kHz
		S1, S2, S3, S4	Resolver input signal 3.5 ± 0.175 V <sub>rms</sub> , 10 kHz
	PG2	A2, /A2 B2, /B2	Pulse input signal (line driver or open collector) Open collector input : +5V~+12V (Note1) 1-phase or 2-phase input/Max. input frequency: 300kHz
	PG OUT	AO, /AO BO, /BO ZO, /ZO SG	PG card output signals / Division frequency function: 1 ~ 255 times Max. output voltage for line driver: 5V <sub>DC</sub> Max. output current: 50 mA/Max. output frequency: 300 kHz SG: The GND of PG card is the same as the host controller or PLC, and a common output signal is attained
	Ground	PE	Earthing terminal to reduce noise; this terminal should also be grounded


## External Power Supply Card (DC 24V): EMM-BPS02

		Terminals	Description
	PE GND 24V		When the AC motor drive power is off, the external power supply card provides external power to the network system, PLC function, and other functions to allow continued operations Input power: 24 V ± 5% Maximum input current: 0.5A Note: 1) Do not connect the control terminal +24V (Digital control signal common: SOURCE) directly to the EMC-BPS02 input terminal 24V 2) Do not connect control terminal GND directly to the EMC-BPS02 input terminal GND in order to achieve good isolation


Note 1: For the open collector, set input voltage to 5 ~ 15 mA 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

# Accessories

## ▪ Digital I/O Card: EMM-D33A


	Terminals	Description
	24V, DCM	Output power: +24 V <sub>DC</sub> ± 5% 200 mA, 5W
	MI10~MI12	Refer to Pr. 02-26~Pr. 02-28 to program the multi-function Choose SINK (NPN)/SOURCE (PNP) from SWW1 Internal power is supplied by terminal 24V: +24 V <sub>DC</sub> ± 5% 200 mA, 5W If external power is +24 V <sub>DC</sub> , the max. voltage is 30 V <sub>DC</sub> and the min. voltage is 19 V <sub>DC</sub> ON: the activation current is 6.5 mA OFF: leakage current tolerance is 10 μA
	MO10~MO12	Refer to Pr. 02-36~Pr. 02-38 to program the multi-function The motor drive releases various monitor signals, such as drive in operation, frequency attained and overload indication, via transistor (open collector) MO output signal: each MO terminal needs a pull-up resistor, the max. external power voltage is 48 V <sub>DC</sub> /50 mA
	MCM	Common for multi-function output terminals MO10~MO12 (photocoupler)
	PE	Earthing terminal to reduce noise; this terminal should also be grounded

## ▪ Analog I/O Card: EMM-A22A


	Terminals	Description
	ACM	Common output signal and input signal terminals
	AI10, AI11	Refer to Pr. 14-00~Pr. 14-01 to program the multi-function Two AI ports: switch between J9, J19 for AVI or ACI AVI10~AVI11: input 0~10.00 V ± 0.05 V ACI10~ACI11: input 0~20.00 mA ± 0.05 mA
	AO10, AO11	Refer to Pr. 14-12~Pr. 14-13 to program the multi-function Two AO ports: switch between J2, J22 for AVO or ACO AVO10~AVO11: output 0~10.00 V ± 0.05 V ACO10~ACO11: output 0~20.00 mA ± 0.05 mA
	PE	Earthing terminal to reduce noise; this terminal should also be grounded

## ▪ Relay Cards:

### EMM-R2CA

	Terminals	Description
	RA10~RA11 RB10~RB11 RC10~RC11	Refer to Pr. 02-36~Pr. 02-37 to program the multi-function Resistive load: 5 A (N.O.)/240 V <sub>AC</sub> Function: To output each monitor signal, such as drive is in operation, frequency attained or overload indication

### EMM-R3AA

	Terminals	Description
	RA10~RA12 RC10~RC12	Refer to Pr. 02-36~Pr. 02-38 to program the multi-function Resistive load: 6 A (N.O.)/250 V <sub>AC</sub> Function: To output each monitor signal, such as drive is in operation, frequency attained or overload indication

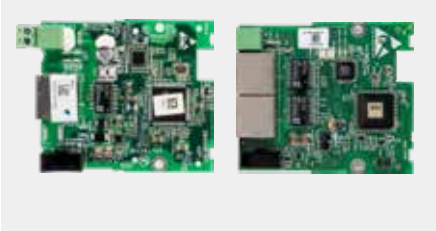
## ▪ Screw Specification of Option Card Terminals

Screw Specification of Option Card Terminals	Wire Gauge	Torque	Screw Specification of Option Card Terminals	Wire Gauge	Torque
EMM-PG01L	30~16 AWG (0.0509~1.31 mm <sup>2</sup> )	2 Kg-cm [1.74 lb-in]	EMM-BPS02	30~16AWG (0.0509~1.31 mm <sup>2</sup> )	8 Kg-cm [6.94 lb-in]
EMM-PG01O			EMM-R2CA	24~12 AWG	5 Kg-cm
EMM-PG01R			EMM-R3AA	(0.205~3.31 mm <sup>2</sup> )	[4.34 lb-in]
EMM-A22A					
EMM-D33A					
CMM-EIP02					
CMM-EIP03					
CMM-EC02					
CMM-PD02					
CMM-DN02					

Option cards require working with the cables models of CBM-CLxxA / CBM-CCxxA. For more details, please refer to the MH300 user manual.

▪ **EtherNet/IP, Modbus TCP Option Card**

CMM-EIP02 / CMM-EIP03



**Features**

- ▶ Supports max. 32 words input and 32 words output of I/O connection
- ▶ User-defined parameter mapping
- ▶ IP Filter, basic firewall function
- ▶ Supports DLR ring node \* applied to CMM-EIP03

**Network Interface**

Network Protocol	DHCP、BOOTP、EtherNet/IP、Modbus TCP	Interface	RJ-45
Transmission Speed	10/100Mbps	Number of Ports	1 (CMM-EIP02) / 2 (CMM-EIP03)
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**

- ▶ Supports 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 Ports	1
Transmission Method	Explicit message/Implicit message	Transmission Cable	Delta standard
Transmission Distance	25m / 1Mbps		

▪ **PROFIBUS DP 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 Ports	1
Transmission Method	Cyclic/non-cyclic data exchange	Transmission Cable	Delta standard
Transmission Distance	100m / 12Mbps		

# Accessories

## ▪ EtherCAT Option Card

CMM-EC02



### Features

- ▶ Supports Ethernet CAT 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

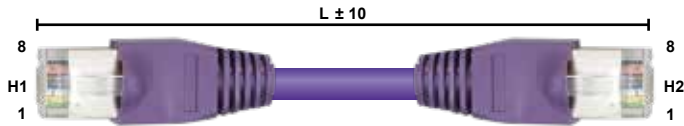
Interface	RJ-45	Transmission Cable	Category 5e shielding 100M
Number of Ports	2	Transmission Speed	100Mbps
Transmission Method	IEEE 802.3, IEEE 802.3u	Network Protocol	EtherCAT

## ▪ Standard Fieldbus Cables

Delta Cables	Part Number	Description	Length
CANopen Cable	UC-CmC003-01A	CANopen cable, RJ45 connector	0.3m
	UC-CmC005-01A		0.5m
	UC-CmC010-01A		1m
	UC-CmC015-01A		1.5m
	UC-CmC020-01A		2m
	UC-CmC030-01A		3m
	UC-CmC050-01A		5m
	UC-CmC100-01A		10m
	UC-CmC200-01A		20m
DeviceNet Cable	UC-DN01Z-01A	DeviceNet cable	305m
	UC-DN01Z-02A		305m
EtherNet/EtherCAT Cable	UC-EmC003-02A	EtherNet/EtherCAT cable, Shielding	0.3m
	UC-EmC005-02A		0.5m
	UC-EmC010-02A		1m
	UC-EmC020-02A		2m
	UC-EmC050-02A		5m
	UC-EmC100-02A		10m
	UC-EmC200-02A		20m
CANopen/DeviceNet TAP	TAP-CN01	1 in 2 out, built-in 121Ω terminal resistor	1 in 2 out
	TAP-CN02		1 in 2 out, RJ45
	TAP-CN03	1 in 4 out, RJ45 connector, built-in 121Ω terminal resistor	1 in 4 out
PROFIBUS Cable	UC-PF01Z-01A	PROFIBUS DP cable	305 m

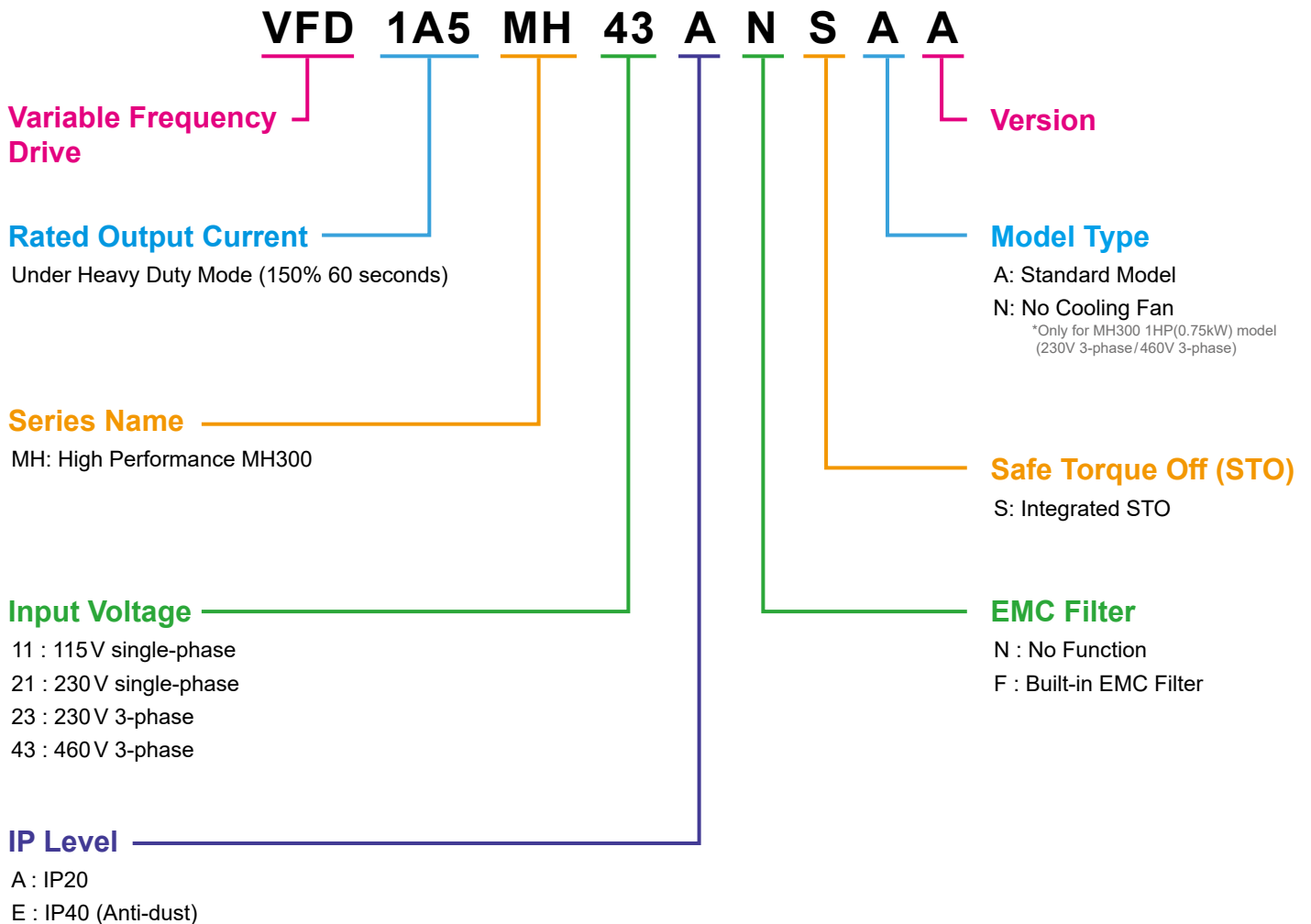
# Extension Cable for Digital Keypad

- RJ45 Extension Cable/CANopen Communication Cable



Part No.	L	
	mm	inch
UC-CMC003-01A	300	11.8
UC-CMC005-01A	500	19.6
UC-CMC010-01A	1,000	39
UC-CMC015-01A	1,500	59
UC-CMC020-01A	2,000	78.7
UC-CMC030-01A	3,000	118.1
UC-CMC050-01A	5,000	196.8
UC-CMC100-01A	10,000	393.7
UC-CMC200-01A	20,000	787.4

## Model Name Explanation



# Ordering Information

Power Range			Frame Size	Model Name	Standard Models (0 ~ 599 Hz)		
Max. Applicable Motor Capacity		Drive Rated Output Current			Built-in EMC Filter	IP40 Models	F: Forced air cooling N: Natural air cooling
[HP]	[kW]	[A]					
115V/single-phase							
0.25	0.2	1.6	A	VFD1A6MH11ANSAA	-	-	N
				VFD1A6MH11ENSAA	-	V	N
0.5	0.4	2.5	A	VFD2A5MH11ANSAA	-	-	N
				VFD2A5MH11ENSAA	-	V	N
1	0.75	5.0	C	VFD5A0MH11ANSAA	-	-	F
				VFD5A0MH11ENSAA	-	V	F
230V/single-phase							
0.25	0.2	1.6	A	VFD1A6MH21ANSAA	-	-	N
			A	VFD1A6MH21ENSAA	-	V	N
			B	VFD1A6MH21AFSAA	V	-	N
0.5	0.4	2.8	A	VFD2A8MH21ANSAA	-	-	N
			A	VFD2A8MH21ENSAA	-	V	N
			B	VFD2A8MH21AFSAA	V	-	F
1	0.75	5.0	B	VFD5A0MH21ANSAA	-	-	N
				VFD5A0MH21AFSAA	V	-	F
				VFD5A0MH21ENSAA	-	V	N
2	1.5	7.5	C	VFD7A5MH21ANSAA	-	-	F
				VFD7A5MH21AFSAA	V	-	F
				VFD7A5MH21ENSAA	-	V	F
3	2.2	11.0	C	VFD11AMH21ANSAA	-	-	F
				VFD11AMH21AFSAA	V	-	F
				VFD11AMH21ENSAA	-	V	F
230V/3-phase							
0.25	0.2	1.6	A	VFD1A6MH23ANSAA	-	-	N
				VFD1A6MH23ENSAA	-	V	N
0.5	0.4	2.8	A	VFD2A8MH23ANSAA	-	-	N
				VFD2A8MH23ENSAA	-	V	N
1	0.75	5.0	A	VFD5A0MH23ANSAA	-	-	F
				VFD5A0MH23ENSAA	-	V	F
				VFD5A0MH23ANSNA	-	-	N
				VFD5A0MH23ENSNA	-	V	N
2	1.5	7.5	B	VFD7A5MH23ANSAA	-	-	F
				VFD7A5MH23ENSAA	-	V	F
3	2.2	11.0	C	VFD11AMH23ANSAA	-	-	F
				VFD11AMH23ENSAA	-	V	F
5	3.7/4	17.0	C	VFD17AMH23ANSAA	-	-	F
				VFD17AMH23ENSAA	-	V	F
7.5	5.5	25.0	D	VFD25AMH23ANSAA	-	-	F
				VFD25AMH23ENSAA	-	V	F
10	7.5	33.0	E	VFD33AMH23ANSAA	-	-	F
				VFD33AMH23ENSAA	-	V	F
15	11	49.0	E	VFD49AMH23ANSAA	-	-	F
				VFD49AMH23ENSAA	-	V	F
20	15	65.0	F	VFD65AMH23ANSAA	-	-	F
				VFD65AMH23ENSAA	-	V	F
25	18.5	75	G	VFD75AMH23ANSAA	-	-	F
30	22	90		VFD90AMH23ANSAA	-	-	F
40	30	120	I	VFD120MH23ANSAA	-	-	F
50	37	146		VFD146MH23ANSAA	-	-	F

Power Range			Frame Size	Model Name	Standard Models (0~599 Hz)		
Max. Applicable Motor Capacity		Drive Rated Output Current			Built-in EMC Filter	IP40 Models	F: Forced air cooling N: Natural air cooling
[HP]	[kW]	[A]					
460V/3-phase							
0.5	0.4	1.5	A	VFD1A5MH43ANSAA	-	-	N
			A	VFD1A5MH43ENSAA	-	V	N
			B	VFD1A5MH43AFSAA	V	-	F
1	0.75	3.0	A	VFD3A0MH43ANSAA	-	-	F
			A	VFD3A0MH43ENSAA	-	V	F
			B	VFD3A0MH43AFSAA	V	-	F
			A	VFD3A0MH43ANSNA			N
2	1.5	4.2	B	VFD4A2MH43ANSAA	-	-	F
				VFD4A2MH43ENSAA	-	V	F
				VFD4A2MH43AFSAA	V	-	F
				A	VFD3A0MH43ANSNA		
3	2.2	5.7	C	VFD5A7MH43ANSAA	-	-	F
				VFD5A7MH43ENSAA	-	V	F
				VFD5A7MH43AFSAA	V	-	F
				A	VFD3A0MH43ENSNA		V
5	3.7/4	9.0	C	VFD9A0MH43ANSAA	-	-	F
				VFD9A0MH43ENSAA	-	V	F
				VFD9A0MH43AFSAA	V	-	F
7.5	5.5	13.0	D	VFD13AMH43ANSAA	-	-	F
				VFD13AMH43ENSAA	-	V	F
				VFD13AMH43AFSAA	V	-	F
10	7.5	17.5	D	VFD17AMH43ANSAA	-	-	F
				VFD17AMH43ENSAA	-	V	F
				VFD17AMH43AFSAA	V	-	F
15	11	25.0	E	VFD25AMH43ANSAA	-	-	F
				VFD25AMH43ENSAA	-	V	F
				VFD25AMH43AFSAA	V	-	F
20	15	32.0	E	VFD32AMH43ANSAA	-	-	F
				VFD32AMH43ENSAA	-	V	F
				VFD32AMH43AFSAA	V	-	F
25	18.5	38.0	F	VFD38AMH43ANSAA	-	-	F
				VFD38AMH43ENSAA	-	V	F
				VFD38AMH43AFSAA	V	-	F
30	22	45.0	F	VFD45AMH43ANSAA	-	-	F
				VFD45AMH43ENSAA	-	V	F
				VFD45AMH43AFSAA	V	-	F
40	30	60	G	VFD60AMH43AFSAA	V	-	F
				VFD60AMH43ANSAA	-	-	F
50	37	75	H	VFD75AMH43AFSAA	V	-	F
				VFD75AMH43ANSAA	-	-	F
60	45	91	H	VFD91AMH43AFSAA	V	-	F
				VFD91AMH43ANSAA	-	-	F
75	55	112	I	VFD112MH43AFSAA	V	-	F
				VFD112MH43ANSAA	-	-	F
100	75	150	I	VFD150MH43AFSAA	V	-	F
				VFD150MH43ANSAA	-	-	F