

## Environment for Operation, Storage and Transportation

### ATTENTION!

Enclosure should avoid direct contact with chemicals and solvents, and exposure to direct sunlight at high temperature

Operating Environment	Installation Location	IEC 60364-1/ IEC 60664-1 Pollution degree 2 for PCB design Dust-tight enclosure (IP6x) for indoor use only		
	Ambient Temperature	Operation	IP66 NEMA 4X UL Type 4X	-20 ~ +40°C -20 ~ +50°C with derating
		Storage	-40 ~ +85°C	
		Transportation	-20 ~ +70°C	
	No condensation, non-frozen			
	Rated Humidity	Operation	0 ~ 100%	
		Storage / Transportation	Max. 95%	
		No condense water		
	Air Pressure	Operation	86 ~ 106 kPa	
		Storage / Transportation	70 ~ 106 kPa	
Pollution Level (IEC60721-3)	Operation	Class 3C2; Class 3S2		
	Storage	Class 2C2; Class 2S2		
	Transportation	Class 1C2; Class 1S2		
	Concentrate prohibited			
Altitude	<1000m (>1000m with derating)			
Package Drop	Storage	ISTA procedure 1A (according to weight); compliant to IEC 60068-2-31		
	Transportation			
Vibration	Operating	EC60068-2-6: 2Hz ~ 13.2Hz: 1mm, peak-peak 13.2Hz ~ 55Hz: 0.7G ~ 2.0G 55Hz ~ 512Hz: 2.0G		
	Non-operating	2.5G peak 5Hz~2kHz: 2.5G, max. amplitude 0.015"		
Impact	Operating	IEC/EN60068-2-27: 15G, 11ms		
	Non-operating	30G		

## Applications

Food, beverage, pumps manufacturing and other humid and dusty operating environments

### • Beverage Manufacturing



### • Food Manufacturing



### • Pumps Manufacturing



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DELTA\_IA-MDS\_MS300-IP66\_Flyer\_EN\_20180326



Automation for a Changing World

## Delta IP66 Compact Drive MS300 IP66/NEMA 4X



### Compact Design with IP66/NEMA 4X Enclosure Protection

Reliable and durable performance in harsh environments

### Easy Installation

No need for electrical cabinet, saving cost and space

### High Safety and Stability

Built-in STO (Safe Torque Off) SIL2 safety function and mains switch (optional)

### Built-in PLC Function

Built-in PLC capacity (2K steps): distributed control and independent operation via network connection

### Outstanding Drive Performance

Supports IM and PM motors, open-loop control

### Various Communication Protocols



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# Product Specifications

1-phase  
230 V

230V 1-phase (without built-in filter)					
Model Name VFD_____MNSAA		2A8MS21	4A8MS21	7A5MS21	11AMS21
Dimensions	W x H (mm)	160 x 230	160 x 230	160 x 230	175 x 280
	D (mm)	132	144	160	183
Cooling Method		Natural air cooling			Fan cooling
230V 1-phase (with built-in filter)					
Model Name VFD_____MFSAA		2A8MS21	4A8MS21	7A5MS21	11AMS21
Dimensions	W x H (mm)	160 x 230	160 x 230	175 x 280	175 x 280
	D (mm)	132	144	183	183
Cooling Method		Natural air cooling			Fan cooling
Applicable Motor Output (kW)		0.4	0.75	1.5	2.2
Applicable Motor Output (hp)		0.5	1	2	3
Output	Heavy Duty Rated Output Current (A)	2.8	4.8	7.5	11
	Normal Duty Rated Output Current (A)	3.2	5	8.5	12.5
Carrier Frequency (kHz)		2 ~ 15			
DC Reactor		Optional (external)			
Disconnect Switch		Optional (external)			
Breaking Chopper		Built-in			
Keypad		Built-in			
Degree of Protection		IP66/NEMA 4X			

3-phase  
230 V

230V 3-phase (without built-in filter)							
Model Name VFD_____MNSAA		2A8MS23	4A8MS23	7A5MS23	11AMS23	17AMS23	25AMS23
Dimensions	W x H (mm)	160 x 230	160 x 230	160 x 230	175 x 280	175 x 280	195 x 300
	D (mm)	132	144	160	183	183	183
Cooling Method		Natural air cooling			Fan cooling		
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
Output	Heavy Duty Rated Output Current (A)	2.8	4.8	7.5	11	17	25
	Normal Duty Rated Output Current (A)	3.2	5	8	12.5	19.5	27
Carrier Frequency (kHz)		2 ~ 15					
DC Reactor		Optional (external)					
Disconnect Switch		Optional (external)					
Breaking Chopper		Built-in					
Keypad		Built-in					
Degree of Protection		IP66/NEMA 4X					

3-phase  
460 V

460V 3-phase (without built-in filter)								
Model Name VFD_____MNSAA		1A5MS43	2A7MS43	4A2MS43	5A5MS43	9A0MS43	13AMS43	17AMS43
Dimensions	W x H (mm)	160 x 230	160 x 230	160 x 230	160 x 230	175 x 280	195 x 300	195 x 300
	D (mm)	132	144	160	183	183	183	183
Cooling Method		Natural air cooling				Fan cooling		
460V 3-phase (with built-in filter)								
Model Name VFD_____MFSAA		1A5MS43	2A7MS43	4A2MS43	5A5MS43	9A0MS43	13AMS43	17AMS43
Dimensions	W x H (mm)	160 x 230	160 x 230	160 x 230	175 x 280	175 x 280	195 x 300	195 x 300
	D (mm)	132	144	160	183	183	183	183
Cooling Method		Natural air cooling				Fan cooling		
Applicable Motor Output (kW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5
Applicable Motor Output (hp)		0.5	1	2	3	5	7.5	10
Output	Heavy Duty Rated Output Current (A)	1.5	2.7	4.2	5.5	9	13	17
	Normal Duty Rated Output Current (A)	1.8	3	4.6	6.5	10.5	15.7	20.5
Carrier Frequency (kHz)		2 ~ 15						
DC Reactor		Optional (external)						
Disconnect Switch		Optional (external)						
Breaking Chopper		Built-in						
Keypad		Built-in						
Degree of Protection		IP66/NEMA 4X						

General  
Spec.

General Specifications	
Control Methods	V/F, VFPG <sup>Note1</sup> , SVC, FOC sensorless
Applied Motors	IM (Induction Motor), PM (IPM and SPM) motor control
Max. Output Frequency	0.00 ~ 599.00 Hz
Starting Torque <sup>Note2</sup>	150% / 3 Hz (V/f, SVC control for IM, heavy duty) 100% / (1/20 of motor rated frequency) (SVC control for PM, heavy duty)
Speed Response Ability <sup>Note2</sup>	1:50 (V/f, SVC control for IM, heavy duty), 1:20 (SVC control 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, 4~20 mA / 0~+10V 1 channel pulse input (33kHz), 1 channel pulse output (33 KHz)
Main Control Functions	Multi-motor switches (up to 4 independent motor parameters), fast run, DEB function, wobble frequency function, rapid deceleration function, main and auxiliary frequency function, momentary power loss ride thru, speed search, over-torque detection, 16-step speed (including main speed), accel/decel time switch, s-curve accel/decal, 3-wire sequence, JOG frequency, frequency upper/lower limit settings, DC injection braking at start/stop, PID control, Built-in PLC (2000 steps) and simple positioning function
Application	Built-in application parameter groups (selected by industry) and user-defined application parameter groups
Protection Functions	Motor Protection: Over-current, over-voltage, over-temperature and phase loss protection Stall Prevention: Stall prevention during acceleration, deceleration and running (independent settings)
Accessories	Communication Cards: DeviceNet, Ethernet/IP, Profibus DP, Modbus TCP, CANopen External DC Power Supply: EMM-BPS01 (DC 24V power supply card)
Certifications	UL, CE, RCM, TÜV, RoHS, REACH, NSF

Note1. Pulse input (terminal MI7) as speed feedback

Note2. Control accuracy may vary due to different environments, application conditions, and motors. Please contact Delta or your local distributor for details.