Type number key

VFD 4A8 MS 43 A N S A A

Version	Version letter
Installation type	A=Standard H=Hi-speed
STO	N=No S=Built-in
EMC/PFC	F=Built-in filter N=No function P=PFC
Protection	A=IP20 E=IP40
Mains input voltage	11=110V 1-phase 21=230V 1-phase 23=230V 3-phase 43=460V 3-phase
Series	MS300
Rated current	1A6=1.6Amp 4A2=4.2Amp 11A=11Amp 38A=38Amp
VFD	**V**ariable **F**requency **D**rive



230V 1phase 0.2 ~ 2.2kW with built-in filter

Type number VFD□□□MS21AFSAA		1A6	2A8	4A8	7A5	11A
Rated power	kW	0.2	0.4	0.75	1.5	2.2
Rated output current (HD/ND)	A RMS	1.6/1.8	2.8/3.2	4.8/5	7.5/8.5	11/12.5
Overload (HD/ND)	%	150% 60s 200% 3s / 120% 60s 150% 3s				
Rated output capacity (HD/ND)	kVA	0.6/0.7	1.1/1.2	1.8/1.9	2.9/3.2	4.2/4.8
Rated input current (HD/ND)	A RMS	3.4/3.8	5.9/6.7	10.1/10.5	15.8/17.9	23.1/26.3
Mains fuse (for UL: Bussmann)		JJS-10	JJS-15	JJS20	JJS-35	JJS-50
Non-fuse current breaker	A	15	20	30	45	70
Dimensions HxWxD	mm	142x72x159			157x87x179	
Frame *		B3			C2	
Weight	kg	1.32			1.8	
Protection **		IP20				
Power cable entry (with conduit box)	∅mm	2x 22.5			2x 27.8	
Signal cable entry (with conduit box)	∅mm	2x 22.5				
Section of power cables, stranded (with ring)	mm^2	2.1~3.3			5.3~8.4	8.4
Cooling		Convection	Fan			
Cooling air flow rate	m^3/hr	n.a.	16.99		27.2	
Carrier frequency (HD/ND)	kHz	2~15				
EMC-Filter		Built-in: C3 30m, C2 20m				
DC-Choke		Connection for option				
DC-Bus connection		Yes				
Brake chopper		Built-in				
Recommended brake resistor	Ω/W	750/80	200/80	200/80	91/200	70/300
Minimum brake resistor value	Ω	190	95	63.3	47.5	38

230V 1phase 0.2 ~ 2.2kW no filter

Type number VFD□□□MS21ANSAA VFD□□□MS21ENSAA		1A6	2A8	4A8	7A5	11A
Rated power	kW	0.2	0.4	0.75	1.5	2.2
Rated output current (HD/ND)	A RMS	1.6/1.8	2.8/3.2	4.8/5	7.5/8.5	11/12.5
Overload (HD/ND)	%	150% 60s 200% 3s / 120% 60s 150% 3s				
Rated output capacity (HD/ND)	kVA	0.6/0.7	1.1/1.2	1.8/1.9	2.9/3.2	4.2/4.8
Rated input current (HD/ND)	A RMS	3.4/3.8	5.9/6.7	10.1/10.5	15.8/17.9	23.1/26.3
Mains fuse (for UL: Bussmann)		JJS-10	JJS-15	JJS20	JJS-35	JJS-50
Non-fuse current breaker	A	15	20	30	45	70
Dimensions HxWxD	mm	128x68x96	128x68x125	142x72x143	157x87x152	
Frame *		A1	A3	B2	C1	
Weight	kg	0.65	0.76	0.95	1.24	
Protection		A: IP20 E: IP40				
Power cable entry (with conduit box)	∅mm	2x 22.5			2x 27.8	
Signal cable entry (with conduit box)	∅mm	2x 22.5			2x 22.5	
Section of power cables, stranded (with ring)	mm^2	2.1		2.1~3.3	5.3~8.4	8.4
Cooling		Convection			Fan	
Cooling air flow rate	m^3/hr	n.a.			27.2	
Carrier frequency (HD/ND)	kHz	2~15				
EMC-Filter		External option				
DC-Choke		Connection for option				
DC-Bus connection		Yes				
Brake chopper		Built-in				
Recommended brake resistor ***	Ω/W	750/80	200/80	200/80	91/200	70/300
Minimum brake resistor value ***	Ω	190	95	63.3	47.5	38

* See dimensional drawing on Page 5~6.

** See User Manual

400V 0.4 ~ 3.7kW with built-in filter

Type number VFD□□□MH43AFSAA		1A5	2A7	4A2	5A5	9A0
Rated power	kW	0.4	0.75	1.5	2.2	3.7
Rated output current (HD/ND)	A RMS	1.5/1.8	2.7/3	4.2/4.6	5.5/6.5	9/10.5
Overload (HD/ND)	%	150% 60s 200% 3s / 120% 60s 150% 3s				
Rated output capacity (HD/ND)	kVA	1.1/1.4	2.1/2.3	3.2/3.5	4.2/5	6.9/8
Rated input current (HD/ND)	A RMS	2.1/2.5	3.7/4.2	5.8/6.4	6.1/7.2	9.9/11.6
Mains fuse (for UL: Bussmann)		JJS-10	JJS-15	JJS20	JJS-25	JJS-45
Non-fuse current breaker	A	15			20	30
Dimensions HxWxD	mm	142x72x159			157x87x179	
Frame *		B3			C2	
Weight	kg	1.32			1.8	
Protection **		IP20				
Power cable entry (with conduit box)	∅mm	2x 22.5			2x 27.8	
Signal cable entry (with conduit box)	∅mm	2x 22.5				
Section of power cables, stranded (with ring)	mm^2	2.1~3.3			2.1~8.4	
Cooling		Fan				
Cooling air flow rate	m^3/hr	16.99			27.2	
Carrier frequency (HD/ND)	kHz	2~15				
EMC-Filter		Built-in: C3 30m, C2 20m				
DC-Choke		Connection for option				
DC-Bus connection		Yes				
Brake chopper		Built-in				
Recommended brake resistor	Ω/W	750/80		360/200	250/300	150/400
Minimum brake resistor value	Ω	380	190	126.7	108.6	84.4

400V 0.4 ~ 3.7kW no filter

Type number VFD□□□MH43ANSAA VFD□□□MH43ENSAA		1A5	2A7	4A2	5A5	9A0
Rated power	kW	0.4	0.75	1.5	2.2	3.7
Rated output current (HD/ND)	A RMS	1.5/1.8	2.7/3	4.2/4.6	5.5/6.5	9/10.5
Overload (HD/ND)	%	150% 60s 200% 3s / 120% 60s 150% 3s				
Rated output capacity (HD/ND)	kVA	1.1/1.4	2.1/2.3	3.2/3.5	4.2/5	6.9/8
Rated input current (HD/ND)	A RMS	2.1/2.5	3.7/4.2	5.8/6.4	6.1/7.2	9.9/11.6
Mains fuse (for UL: Bussmann)		JJS-10	JJS-15	JJS20	JJS-25	JJS-45
Non-fuse current breaker	A	15			20	30
Dimensions HxWxD	mm	128x68x129	128x68x143	142x72x143	157x87x152	
Frame *		A4	A5	B1	C1	
Weight	kg	0.76	0.81	1.05	1.24	
Protection **		A: IP20 E: IP40				
Power cable entry (with conduit box)	∅mm	2x 22.5			2x 27.8	
Signal cable entry (with conduit box)	∅mm	2x 22.5				
Section of power cables, stranded (with ring)	mm^2	2.1		2.1~3.3	2.1~8.4	
Cooling		Convection		Fan		
Cooling air flow rate	m^3/hr	n.a.		16.99	27.2	
Carrier frequency (HD/ND)	kHz	2~15				
EMC-Filter		External option				
DC-Choke		Connection for option				
DC-Bus connection		Yes				
Brake chopper		Built-in				
Recommended brake resistor	Ω/W	750/80		360/200	250/300	150/400
Minimum brake resistor value	Ω	380	190	126.7	108.6	84.4

* See dimensional drawing on Page 5~6.

** See User Manual

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400V 5.5 ~ 22kW with built-in filter

Type number VFD□□□MS43AFSAA		13A	17A	25A	32A	38A	45A
Rated power	kW	5.5	7.5	11	15	18.5	22
Rated output current (HD/ND)	A RMS	13/15.7	17/20.5	25/28	32/36	38/41.5	45/49
Overload (HD/ND)	%	150% 60s 200% 3s / 120% 60s 150% 3s					
Rated output capacity (HD/ND)	kVA	9.9/12	13/15.6	19.1/21.3	24.4/27.4	29/31.6	34.3/37.3
Rated input current (HD/ND)	A RMS	14.3/17.3	18.7/22.6	27.5/30.8	35.2/39.6	41.8/45.7	49.5/53.9
Mains fuse (for UL: Bussmann)		JJS-35	JJS-45	JJS-60	JJS-80	JJS-90	JJS-110
Non-fuse current breaker	A	32	45	60	80	90	100
Dimensions HxWxD	mm	207x109x187		250x130x219		300x175x244	
Frame *		D2		E2		F2	
Weight	kg	2.91		5.15		8.5	
Protection **		IP20					
Power cable entry (with conduit box)	∅mm	2x 34.5		2x 43.7		2x 50.1	
Signal cable entry (with conduit box)	∅mm	2x 22.5					
Section of power cables (stranded)	mm^2	5.3~8.4		8.4~21.2		13.3~33.6	
Cooling		Fan					
Cooling air flow rate	m^3/hr	39.7		91.2		115.2	
Carrier frequency (HD/ND)	kHz	2~15					
EMC-Filter		Built-in: C3 30m, C2 20m					
DC-Choke		Connection for option					
DC-Bus connection		Yes					
Brake chopper		Built-in					
Recommended brake resistor	Ω/W	75/1000		43/1500	32/2000		26/3000
Minimum brake resistor value	Ω	50.7	40	33	26.2		23

400V 5.5 ~ 22kW no filter

Type number VFD□□□MS43ANSAA VFD□□□MS43ENSAA		13A	17A	25A	32A	38A	45A
Rated power	kW	5.5	7.5	11	15	18.5	22
Rated output current (HD/ND)	A RMS	13/15.7	17/20.5	25/28	32/36	38/41.5	45/49
Overload (HD/ND)	%	150% 60s 200% 3s / 120% 60s 150% 3s					
Rated output capacity (HD/ND)	kVA	9.9/12	13/15.6	19.1/21.3	24.4/27.4	29/31.6	34.3/37.3
Rated input current (HD/ND)	A RMS	14.3/17.3	18.7/22.6	27.5/30.8	35.2/39.6	41.8/45.7	49.5/53.9
Mains fuse (for UL: Bussmann)		JJS-35	JJS-45	JJS-60	JJS-80	JJS-90	JJS-110
Non-fuse current breaker	A	32	45	60	80	90	100
Dimensions HxWxD	mm	207x109x154		250x130x185		300x175x192	
Frame *		D1		E1		F1	
Weight	kg	2.07		3.97		6.25	
Protection **		A: IP20 E: IP40					
Power cable entry (with conduit box)	∅mm	2x 34.5		2x 43.7		2x 50.1	
Signal cable entry (with conduit box)	∅mm	2x 22.5					
Section of power cables (stranded)	mm^2	5.3~8.4		8.4~21.2		13.3~33.6	
Cooling		Fan					
Cooling air flow rate	m^3/hr	39.7		91.2		115.2	
Carrier frequency (HD/ND)	kHz	2~15					
EMC-Filter		External option					
DC-Choke		Connection for option					
DC-Bus connection		Yes					
Brake chopper		Built-in					
Recommended brake resistor	Ω/W	75/1000		43/1500	32/2000		26/3000
Minimum brake resistor value	Ω	50.7	40	33	26.2		23

* See dimensional drawing on Page 5~6.

** See User Manual

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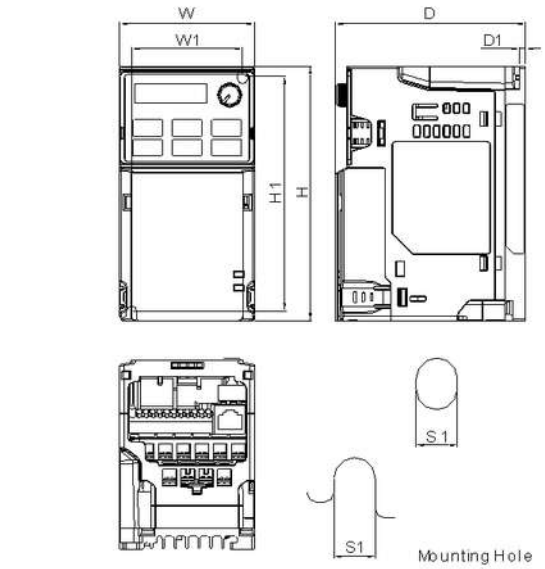
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Frame sizes and dimensions in mm [inches]

Frame A

Unit : mm [inch]

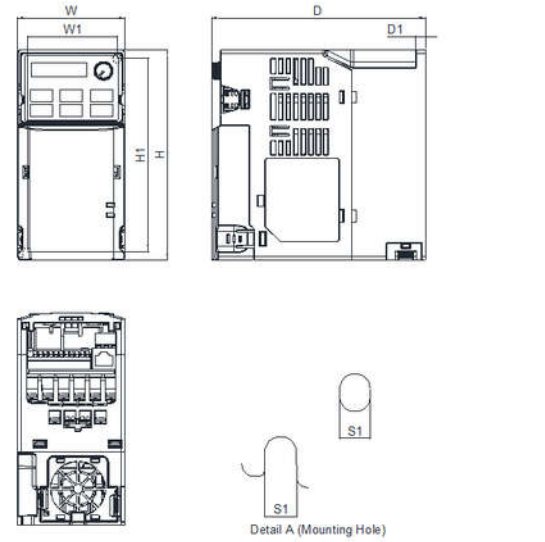
Frame	W	H	D	W1	H1	D1	S1
A1	68.0 [2.68]	128.0 [5.04]	96.0 [3.78]	56.0 [2.20]	118.0 [4.65]	3.0 [0.12]	5.2 [0.20]
A2	68.0 [2.68]	128.0 [5.04]	110.0 [4.33]	56.0 [2.20]	118.0 [4.65]	3.0 [0.12]	5.2 [0.20]
A3	68.0 [2.68]	128.0 [5.04]	125.0 [4.92]	56.0 [2.20]	118.0 [4.65]	3.0 [0.12]	5.2 [0.20]
A4	68.0 [2.68]	128.0 [5.04]	129.0 [5.08]	56.0 [2.20]	118.0 [4.65]	3.0 [0.12]	5.2 [0.20]
A5	68.0 [2.68]	128.0 [5.04]	143.0 [5.63]	56.0 [2.20]	118.0 [4.65]	3.0 [0.12]	5.2 [0.20]



Frame B

Unit : mm [inch]

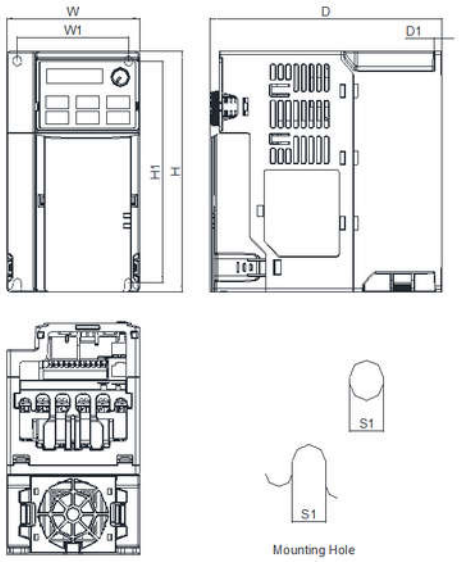
Frame	W	H	D	W1	H1	D1	S1
B1	72.0 [2.83]	142.0 [5.59]	143.0 [5.63]	60.0 [2.36]	130.0 [5.63]	6.4 [0.25]	5.2 [0.20]
B2	72.0 [2.83]	142.0 [5.59]	143.0 [5.63]	60.0 [2.36]	130.0 [5.63]	3.0 [0.12]	5.2 [0.20]
B3	72.0 [2.83]	142.0 [5.59]	159.0 [6.26]	60.0 [2.36]	130.0 [5.63]	4.3 [0.17]	5.2 [0.20]



Frame C

Unit : mm [inch]

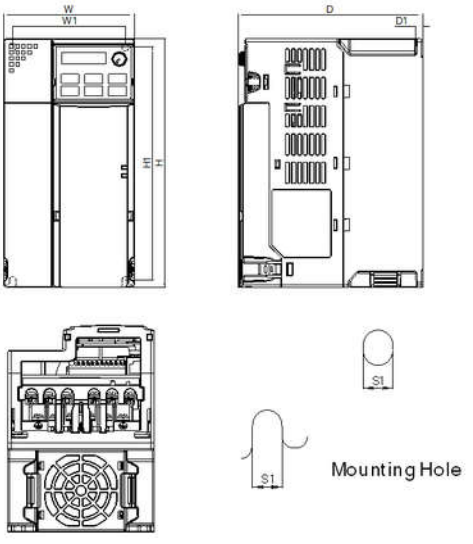
Frame	W	H	D	W1	H1	D1	S1
C1	87.0 [3.43]	157.0 [6.18]	152.0 [5.98]	73.0 [2.87]	144.5 [5.69]	5.0 [0.20]	5.5 [0.22]
C2	87.0 [3.43]	157.0 [6.18]	179.0 [7.05]	73.0 [2.87]	144.5 [5.69]	5.0 [0.20]	5.5 [0.22]



Frame D

Unit : mm[inch]

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

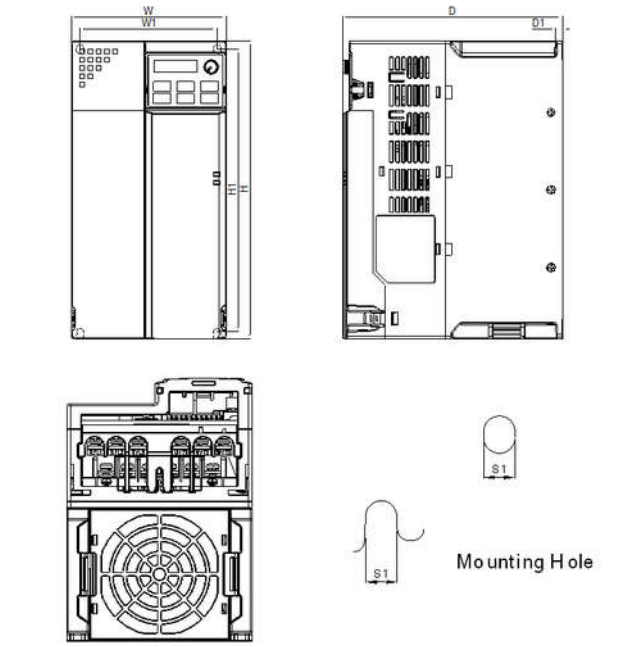


Frame sizes and dimensions in mm [inches] (cont'd)

Frame E

Unit : mm [inch]

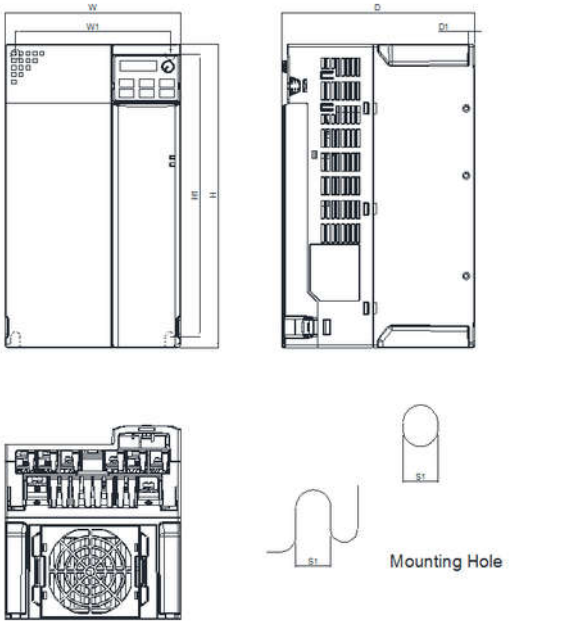
Frame	W	H	D	W1	H1	D1	S1
E1	130.0 [5.12]	250.0 [9.84]	185.0 [7.83]	115.0 [4.53]	236.8 [9.32]	6.0 [0.24]	5.5 [0.22]
E2	130.0 [5.12]	250.0 [9.84]	219.0 [8.62]	115.0 [4.53]	236.8 [9.32]	6.0 [0.24]	5.5 [0.22]



Frame F

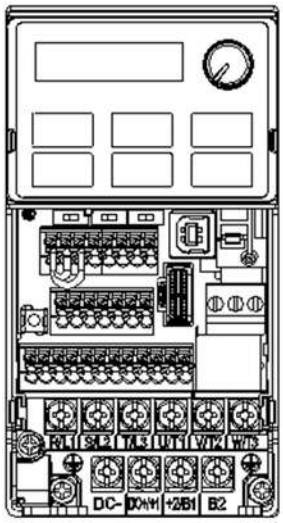
Unit : mm [inch]

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

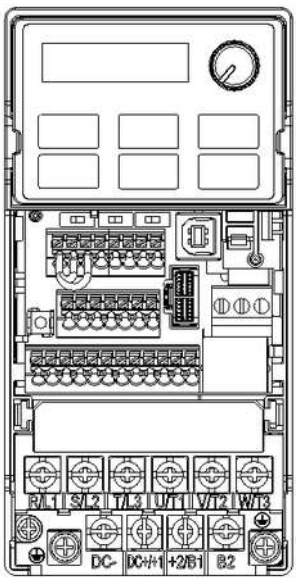


Main circuit wiring

Main circuit wiring Frame A

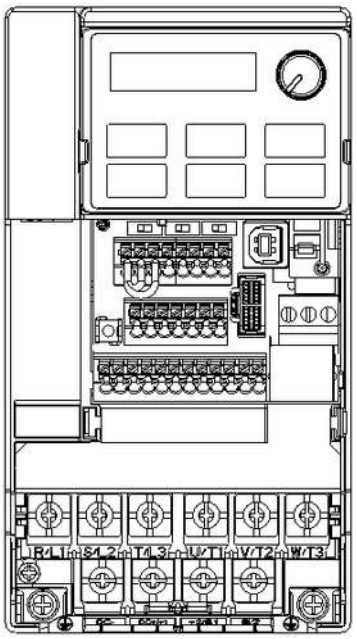


Main circuit wiring Frame B

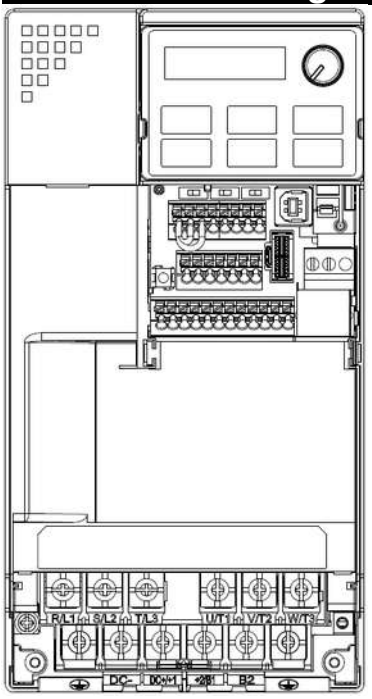


Main circuit wiring (cont'd)

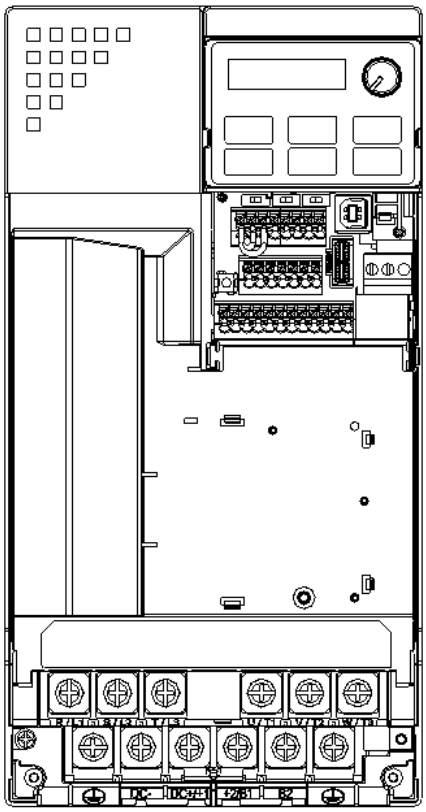
Main circuit wiring Frame C



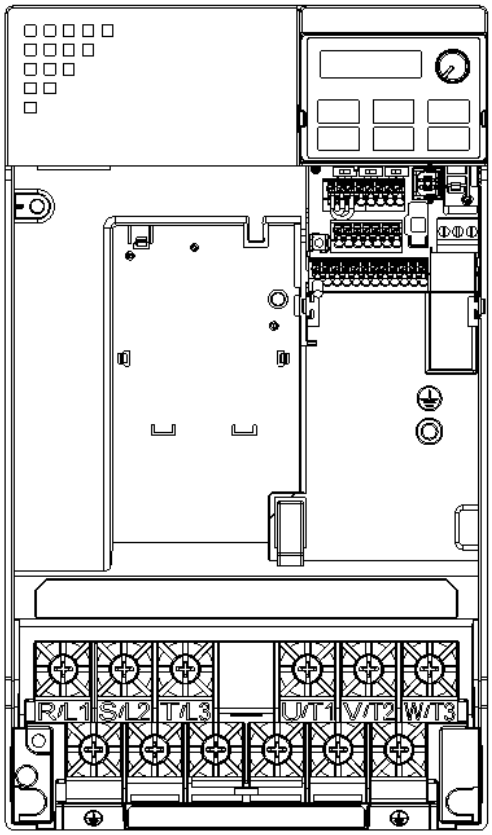
Main circuit wiring Frame D



Main circuit wiring Frame E



Main circuit wiring Frame F



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Common data MS300

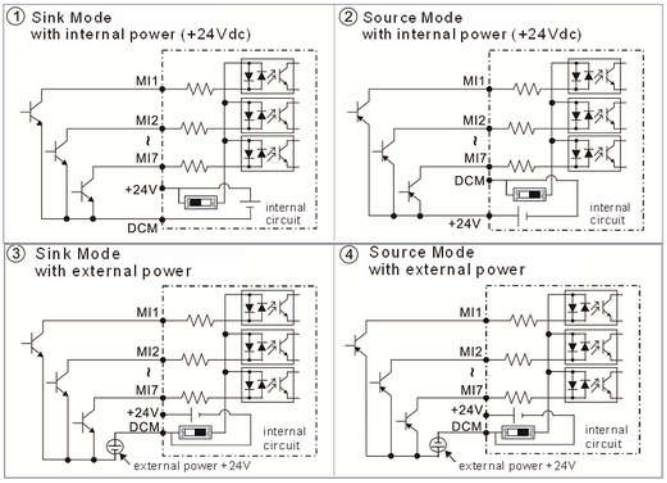
Mains voltage range		VAC	230VAC: 170 ~ 265 400VAC: 323 ~ 528
Mains frequency		Hz	47 ~ 63
Output frequency range		Hz	0 ~ 599
Output voltage range		V	0 ~ Mains
Operating			
	Temperature	°C	IP20: -20 ~ +50 (+60 with derating) IP40/zero stacking: -20 ~ +40 (+50 with derating)
	Atmospheric pressure	kPa	86 ~ 106
	Relative humidity	%	≤90 (non condensing, non frozen)
	Installation location		IEC60364-1/60664-1: Pollution degree 2, Indoor use only
	PCB conformal coating & Pollution level		IEC721-3-3: 3C2, 3S2
Storage			
	Temperature	°C	-40 ~ +85
	Atmospheric pressure	kPa	70 ~ 106
	Relative humidity	%	≤95 (non condensing, non frozen)
	Pollution level		IEC721-3-3: 2C2, 2S2
Transportation			
	Temperature	°C	-20 ~ +70
	Atmospheric pressure	kPa	70 ~ 106
	Relative humidity	%	≤95 (non condensing, non frozen)
	Pollution level		IEC721-3-3: 1C2, 1S2
Vibration	Operating		IEC60068-2-6: 2~13.2Hz 1mm 13.2~55Hz 0.7~2.0G 55-512Hz 2G
	Non operating		IEC60068-2-6: 2~2000Hz 0.381mm max 2.5G peak
Shock			IEC60068-2-27: 15G 11ms operating 30G 11ms non-operating
Package drop			IEC60068-2-31 ISTA 1A (acc. to weight)
Degree of protection			IP20 IP40 with option conduit box
Altitude		m	≤1000 derate 1% rated current or 0.5°C per 100m up to 2000m
Keypad			Detachable
Signal cable section		mm^2	0.5 (Relay 0.2~3.3)
Digital inputs		7x MIx	SINK or SOURCE: Via switch Range: 24VDC Scan time: 0~30s Pull-up (internal): ca. 4kΩ Current (ON): 3.3mA MI7: 33kHz max.
STO inputs		S1-DCM S2-DCM	Range: 24VDC (30VDCmax) Current (ON): 6.67mA (11VDC switching)
Analogue inputs			Resolution: 12 bits Delay: 0~20s
		1x AVI	Range: 0~10VDC / -10 ~ +10VDC Impedance: 20kΩ
		1x ACI	Range: 0/4~20mA / 0~10VDC Impedance: 250Ω / 20kΩ
Digital outputs		2x MOx	Optocoupler OC (common + or -) 48VDC/50mA
Frequency output		1x DFM	Optocoupler OC: 30VDC/30mA Duty-cycle: 50% Range: 1~55x Output frequency (33kHz max)
Analogue output		AFM	Resolution: 10 bits Range: 0~10VDC / 0/4~20mA (switch) Max load: 2mA / 500Ω

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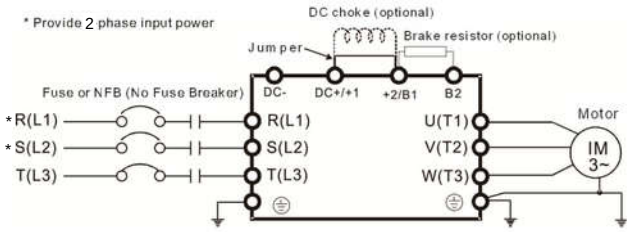
Relays	1x	Change-over NO: R_A~R_C NC: R_B~R_C	Resistive 3A/250VAC - 5A/30VDC Inductive 1.2A/250VAC - 2A/30VDC Resistive 3A/250VAC - 3A/30VDC Inductive 1.2A/250VAC - 1.2A/30VDC
Signal supply	1x	+24VDC±10%/100mA	
Potentiometer supply	1x	+10.5±0.5VDC/20mA	
Trip memory		Last 6 errors	
Acc/Dec Times	s	0.0 ~ 6000	
Serial communication	RJ45 SG+/SG-	Modbus RS485 COM1 Baudrate Address Mode ASCII Modbus RTU	4800 ~ 115200bps 1 ~ 254 7,N,2 / 7,E,1 / 7,O,1 / 7,E,2 / 7,O,2 / 8,N,1 / 8,N,2 / 8,E,1 / 8,O,1 / 8,E,2 / 8,O,2 8,N,1 / 8,N,2 / 8,E,1 / 8,O,1 / 8,E,2 / 8,O,2
	USB		Automatic

NPN/PNP wiring for MIx

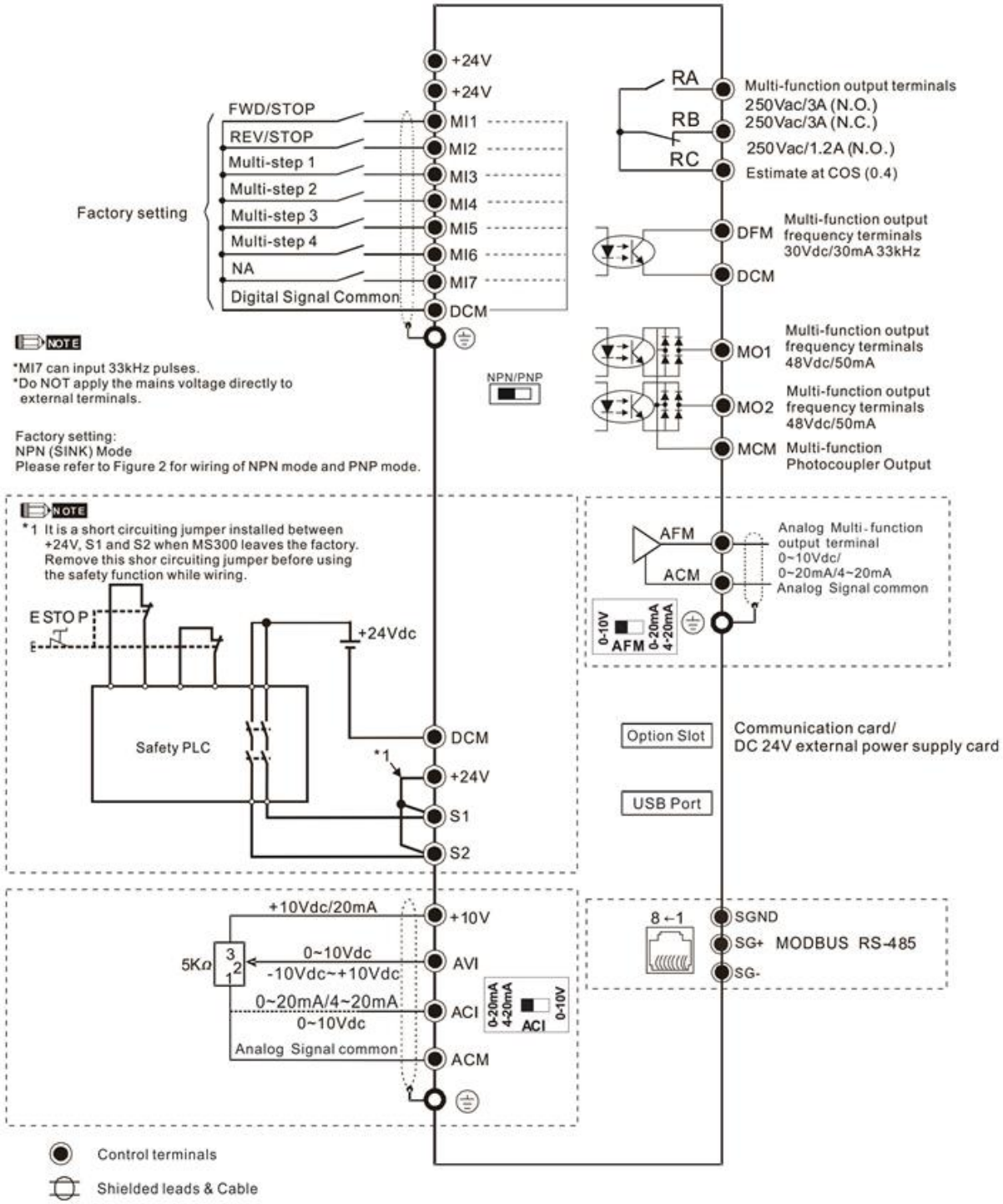


Power terminals (general)

Terminal symbol	Terminal function
R/L1, S/L2, T/L3	Mains input
U/T1, V/T2, W/T3	Motor output
+1/DC+ ~ +2/B1	Connection DC-choke (external option)
+2/B1 ~ B2	Brake resistor (external option)
+1/DC+ ~ DC-	DC-bus connection
⏚	Ground



Basic wiring diagram



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Options

Filters	Built-in filter: C3, motor cable ≤30m, carrier frequency 2~15kHz C2, motor cable ≤20m, carrier frequency 2~15kHz Option EMC filters Capacitive filter
Braking	Brake resistors.
Keypad&Cables	The standard keypad KPMS-LE01 can be connected to the drive via EGx010C cable. The option keypad KPC-CC01 can be connected to the RS485 port.
Reactors	AC input reactors AC output reactors DC-chokes Zero-phase reactors
Mechanical options	Earth plates Conduit boxes Fan kits DIN-rail adapters (up to Frame C) Mounting adapters (feed-through installation)
Communication	IFD6500/IFD6530 USB-RS485 converter, Splitters, Cables.
Fieldbus	CMM-DN01 Devicenet CMM-PD01 Profibus CMM-COP01 CANopen CMM-MOD01 Modbus over TCP/IP CMM-EIP01 Ethernet
Option cards	EMM-BPS01 To connect external 24VDC supply
Software	To read, save, copy, change parameters. Download VFDSoft 1.50 or higher from www.delta-emea.com.

Programming

Group 00-xx **Drive Parameters**
Drive ID, Software version, Password, Parameter reset, Control Mode, Duty HD/ND selection, User-defined display, Carrier frequency, Source of frequency/operation, Stop method, Motor direction inhibit, etc.

Group 01-xx **Basic Parameters**
V/f-curve (2), Max/Min Voltage and frequency, Acc/Dec times, Jogging, S-curve, 3 Skip frequencies, etc.

Group 02-xx **Digital Input/Output Parameters**
2-3 Wire operation, Function and setting of digital inputs, outputs and relay, Count values, Debounce time, Brake delay, etc.

Group 03-xx **Analogue Input/Output Parameters**
Function, Gain, Bias, Filtering of analogue inputs and outputs, 3-Point setting of analogue inputs.

Group 04-xx **Multi-step Speed and Position**
15 Speed steps and positions.

Group 05-xx **Motor Parameters**
Setting of motor parameters (4 motors), Auto-tuning, Slip compensation, Torque boost, Y-Δ switch-over, Motor operation time, IM/PM selection, etc.

Group 06-xx **Protection Parameters**
Protection settings, Fault memory and conditions, PTC, Derating, etc.

Group 07-xx **Special Parameters**
Brake level, DC-Braking, Power loss override, DEB, Speed search, Auto reset, Fan control, Emergency stop, Auto Energy Saving, AVR, Slip compensation, Autorestart, Dwell time, etc.

Group 08-xx **PID Control Parameters**
PID settings, Sleep/Wake-up function, etc.

Group 09-xx **Communication Parameters**
Protocol, Address, Transmission speed, Block Transfer, CANopen, Fieldbus option card settings, etc.

Group 10-xx **PG (Encoder) Parameters**
Settings for encoder feedback operation, Auto Speed Regulation, Mechanical gear ratio, Electrical gear ratio, PM Speed estimator, etc.

Group 11-xx **Advanced Parameters**
ASR, PWM Mode, Several advanced bit settings, etc.

Group 13-xx **Macro**
Application Macro settings

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