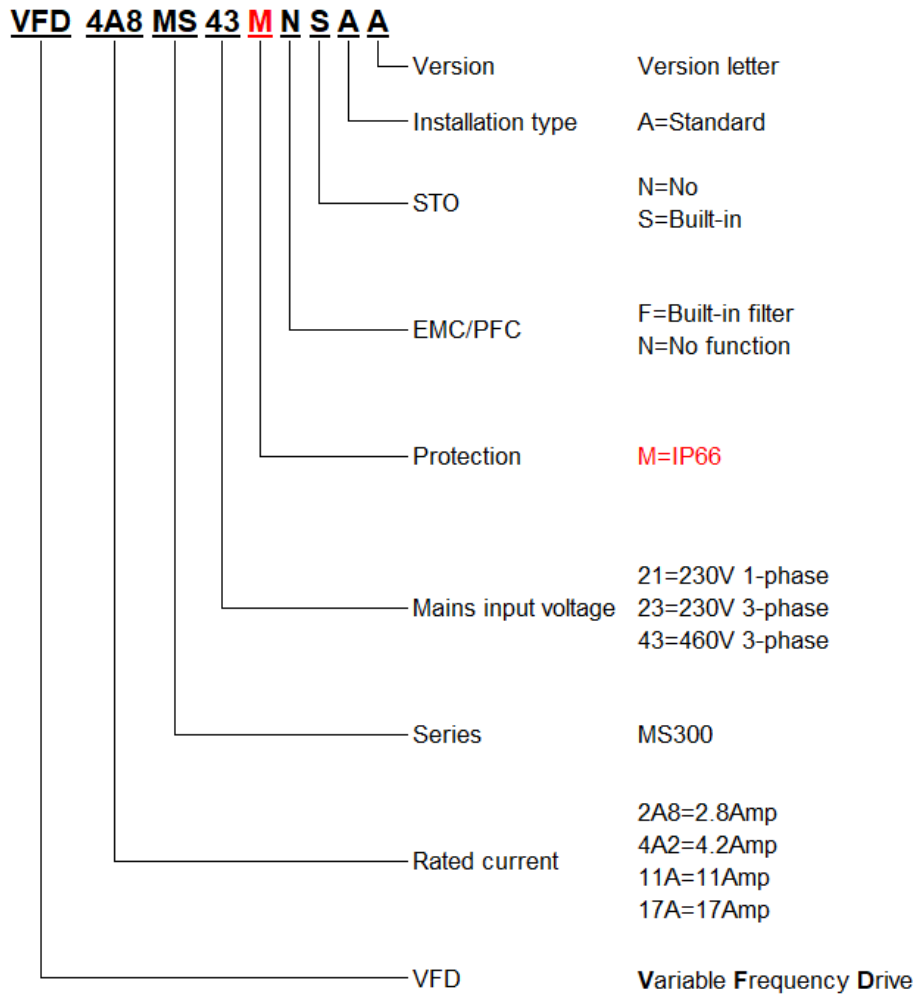


## Type number key



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

Type number	VFD□□□MS21MFSAA	2A8	4A8	7A5	11A
Rated power	kW	0.4	0.75	1.5	2.2
Rated output current (HD/ND)	A RMS	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	1.1/1.2	1.8/1.9	2.9/3.2	4.2/4.8
Rated input current (HD/ND)	A RMS	7.3/8.3	11.3/10.8	18.5/16.5	27.5/24.2
Mains fuse (for UL: Busmann)		JJS-15	JJS20	JJS-35	JJS-50
Non-fuse current breaker	A	16	25	45	63
Dimensions HxWxD	mm	230x160x151		280x175x193	
Frame *		A1		B	
Weight	kg	2.65	2.9	3.95	4
Protection **		IP66			
Power cable entry	Ømm	2x M20x1.5		2x M32x1.5	
Signal cable entry	Ømm	3x M20x1.5			
Section of power cables, stranded (with ring)	mm <sup>2</sup>	2.5~4		6~10	10
Cooling		Convection		Fan	
Cooling air flow rate	m <sup>3</sup> /hr	N/A		46.4	
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	200/80		91/200	70/300
Minimum brake resistor value	Ω	95	63.3	47.5	38

**230V 1phase 0.2 ~ 2.2kW no filter**

Type number	VFD□□□MS21MNSAA	2A8	4A8	7A5	11A
Rated power	kW	0.4	0.75	1.5	2.2
Rated output current (HD/ND)	A RMS	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	1.1/1.2	1.8/1.9	2.9/3.2	4.2/4.8
Rated input current (HD/ND)	A RMS	7.3/8.3	11.3/10.8	18.5/16.5	27.5/24.2
Mains fuse (for UL: Busmann)		JJS-15	JJS20	JJS-35	JJS-50
Non-fuse current breaker	A	16	25	45	63
Dimensions HxWxD	mm	230x160x151		230x160x167	280x175x193
Frame *		A1		A2	B
Weight	kg	2.25	2.6	3.1	3.5
Protection **		IP66			
Power cable entry	Ømm	2x M20x1.5			2x M32x1.5
Signal cable entry	Ømm	3x M20x1.5			
Section of power cables, stranded (with ring)	mm <sup>2</sup>	2.5	4	6	10
Cooling		Convection			Fan
Cooling air flow rate	m <sup>3</sup> /hr	N/A			46.4
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	200/80		91/200	70/300
Minimum brake resistor value	Ω	95	63.3	47.5	38

\* See dimensional drawing on Page 5.

\*\* See User Manual

**400V 0.4 ~ 3.7kW with built-in filter**

Type number	VFD□□□MS43MFSAA	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-35
Non-fuse current breaker	A	6	10	16		30
Dimensions HxWxD	mm	230x160x151		230x160x167	280x175x193	
Frame *		A1		A2	B	
Weight	kg	2.65	2.8	3.1	3.8	3.95
Protection **		IP66				
Power cable entry	Ømm	2x M25x1.5			2x M32x1.5	
Signal cable entry	Ømm	2x M20x1.5				
Section of power cables, stranded (with ring)	mm <sup>2</sup>	0.75~4		1.5~4	2.5~10	4~10
Cooling					Fan	
Cooling air flow rate	m <sup>3</sup> /hr	N/A			46.4	
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□□□MS43MNSAA	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-35
Non-fuse current breaker	A	6	10	16		30
Dimensions HxWxD	mm	230x160x151		230x160x167	230x160x190	280x175x193
Frame *		A1		A2	A3	B
Weight	kg	2.65	2.8	3.1	3.8	3.95
Protection **		IP66				
Power cable entry	Ømm	2x M25x1.5				2x M32x1.5
Signal cable entry	Ømm	2x M20x1.5				
Section of power cables, stranded (with ring)	mm <sup>2</sup>	0.75~2.5		1.5~4	2.5~6	4~10
Cooling		Convection			Fan	
Cooling air flow rate	m <sup>3</sup> /hr	N/A			46.4	
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.

\*\* See User Manual

**400V 5.5 ~ 7.5kW with built-in filter**

Type number	VFD□□□MS43AFSAA	13A	17A
Rated power	kW	5.5	7.5
Rated output current (HD/ND)	A RMS	13/15.7	17/20.5
Overload (HD/ND)	%	150% 60s 200% 3s / 120% 60s 150% 3s	
Rated output capacity (HD/ND)	kVA	9.9/12	13/15.6
Rated input current (HD/ND)	A RMS	14.3/17.3	18.7/22.6
Mains fuse (for UL: Bussmann)		JJS-35	JJS-45
Non-fuse current breaker	A	32	45
Dimensions HxWxD	mm	300x195x193	
Frame *		C	
Weight	kg	4.95	5.05
Protection **		IP66	
Power cable entry	∅mm	2x M32x1.5	
Signal cable entry	∅mm	3x M20x1.5	
Section of power cables (stranded)	mm <sup>2</sup>	6~10	10
Cooling		Fan	
Cooling air flow rate	m <sup>3</sup> /hr	56.6	
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	
Minimum brake resistor value	Ω	50.7	40

**400V 5.5 ~ 7.5kW no filter**

Type number	VFD□□□MS43ANSAA	13A	17A
Rated power	kW	5.5	7.5
Rated output current (HD/ND)	A RMS	13/15.7	17/20.5
Overload (HD/ND)	%	150% 60s 200% 3s / 120% 60s 150% 3s	
Rated output capacity (HD/ND)	kVA	9.9/12	13/15.6
Rated input current (HD/ND)	A RMS	14.3/17.3	18.7/22.6
Mains fuse (for UL: Bussmann)		JJS-35	JJS-45
Non-fuse current breaker	A	32	45
Dimensions HxWxD	mm	300x195x193	
Frame *		C	
Weight	kg	4.95	5.05
Protection **		IP66	
Power cable entry	∅mm	2x M32x1.5	
Signal cable entry	∅mm	3x M20x1.5	
Section of power cables (stranded)	mm <sup>2</sup>	6~10	10
Cooling		Fan	
Cooling air flow rate	m <sup>3</sup> /hr	56.6	
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	
Minimum brake resistor value	Ω	50.7	40

\* See dimensional drawing on Page 5.

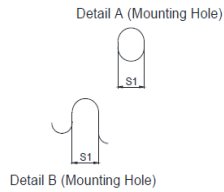
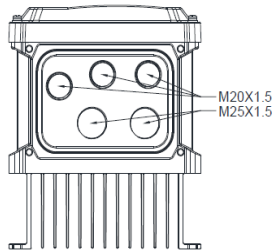
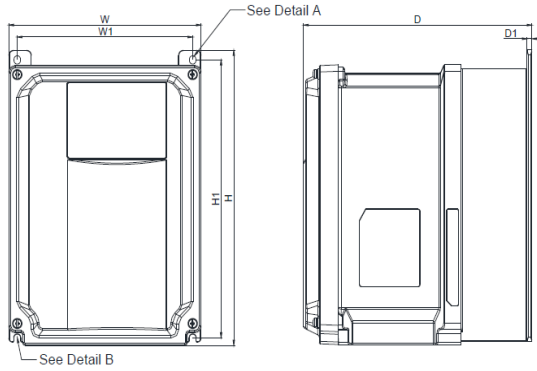
\*\* See User Manual.

## Frame sizes and dimensions in mm [inches]

### Frame A

Frame	W	H	D	W1	H1	D1	S1
A1	160.0 [6.30]	230.0 [9.06]	151.0 [5.94]	146.0 [5.75]	216.5 [8.52]	4.0 [0.16]	5.5 [0.22]
A2	160.0 [6.30]	230.0 [9.06]	167.0 [6.57]	146.0 [5.75]	216.5 [8.52]	4.0 [0.16]	5.5 [0.22]
A3	160.0 [6.30]	230.0 [9.06]	190.0 [7.48]	146.0 [5.75]	216.5 [8.52]	4.0 [0.16]	5.5 [0.22]

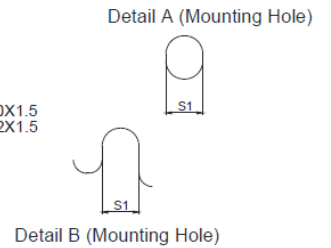
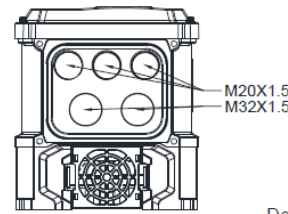
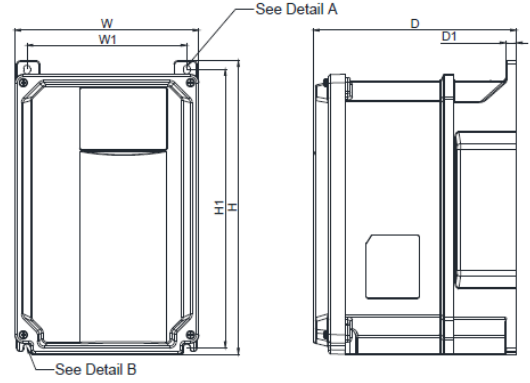
Unit: mm [inch]



### Frame B

Frame	W	H	D	W1	H1	D1	S1
B	175.0 [6.89]	280.0 [11.02]	193.0 [7.60]	152.0 [5.98]	266.0 [10.43]	10 [0.39]	6.4 [0.25]

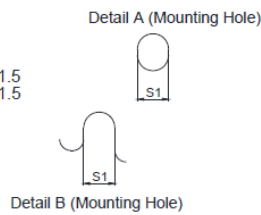
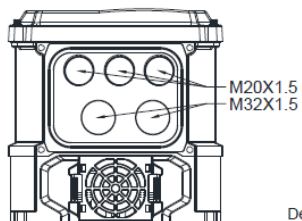
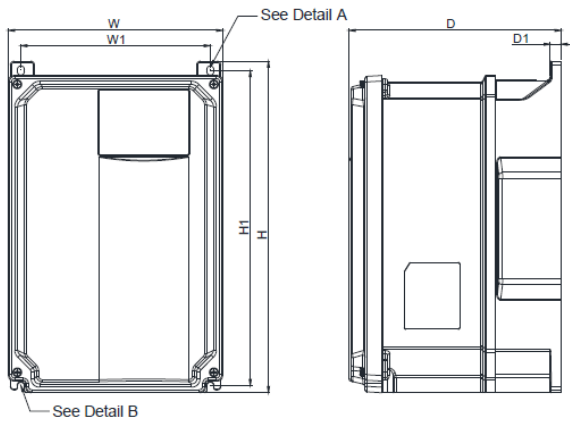
Unit: mm [inch]



### Frame C

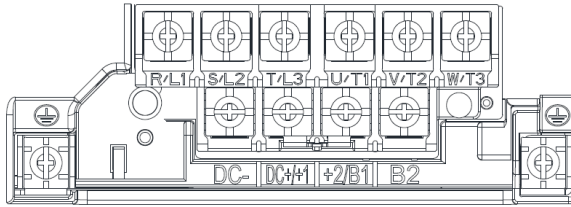
Frame	W	H	D	W1	H1	D1	S1
C	195.0 [7.68]	300.0 [11.81]	193.0 [7.606]	172.4 [6.79]	285.0 [11.22]	10 [0.39]	6.4 [0.25]

Unit: mm [inch]

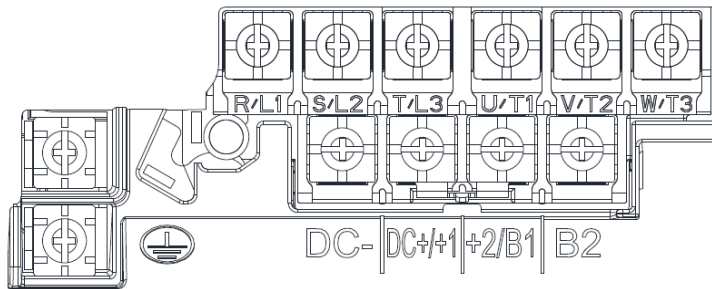


## Main circuit wiring

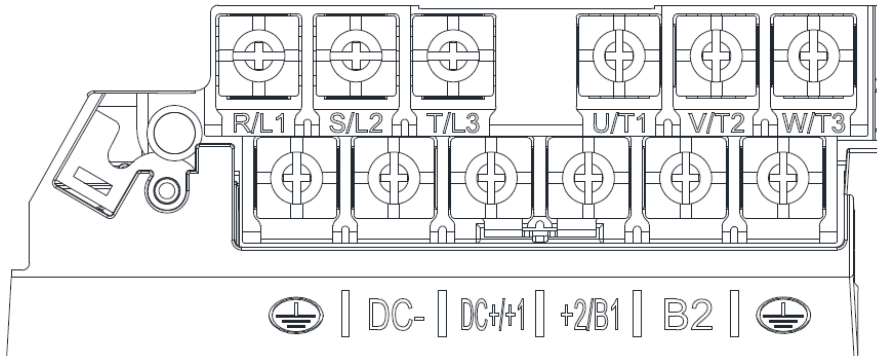
### Main circuit wiring Frame A



### Main circuit wiring Frame B



### Main circuit wiring Frame C

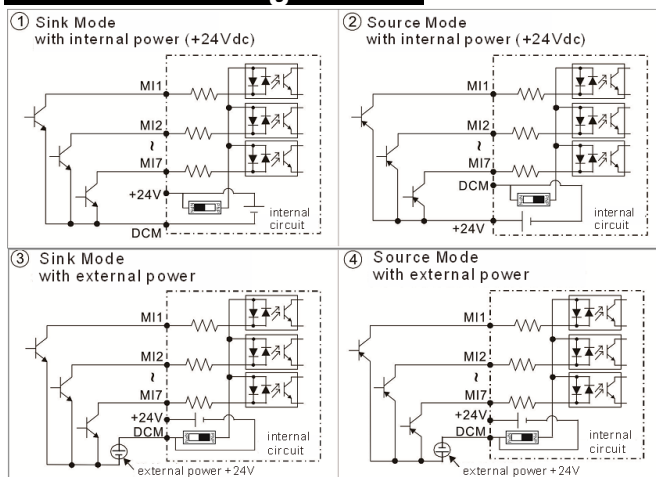


**Common data MS300**

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 Atmospheric pressure kPa Relative humidity % Installation location PCB conformal coating & Pollution level	IP66: -20 ~ +40 (+50 with derating) 86 ~ 106 ≤90 (non condensing, non frozen) IEC60364-1/60664-1: Pollution degree 2, Indoor use only IEC721-3-3: 3C2, 3S2
Storage	Temperature °C Atmospheric pressure kPa Relative humidity % Pollution level	-40 ~ +85 70 ~ 106 ≤95 (non condensing, non frozen) IEC721-3-3: 2C2, 2S2
Transportation	Temperature °C Atmospheric pressure kPa Relative humidity % Pollution level	-20 ~ +70 70 ~ 106 ≤95 (non condensing, non frozen) 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		IP66
Altitude	m	≤1000 derate 1% rated current or 0.5°C per 100m up to 2000m
Keypad		Built-in
Signal cable section	mm <sup>2</sup>	0.25~0.75 (Relay 0.2~1.5)
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 11 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 9 bits
		Range 0~10VDC / 0/4~20mA (switch)
		Max load 2mA / 500Ω

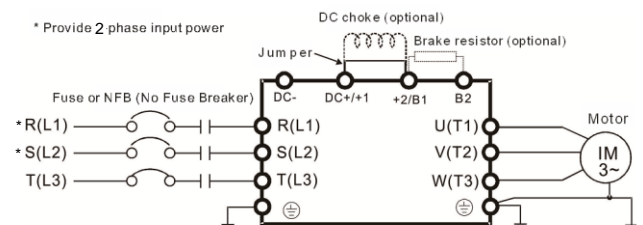
Relays	1x	Change-over NO: R <sub>A</sub> ~R <sub>C</sub> Resistive 3A/250VAC - 5A/30VDC Inductive 1.2A/250VAC - 2A/30VDC NC: R <sub>B</sub> ~R <sub>C</sub> Resistive 3A/250VAC - 3A/30VDC Inductive 1.2A/250VAC - 1.2A/30VDC
Signal supply	1x	+24VDC±10%/100mA
Potentiometer supply	1x	+10.5±0.5VDC/20mA
Trip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

### NPN/PNP wiring for MIx



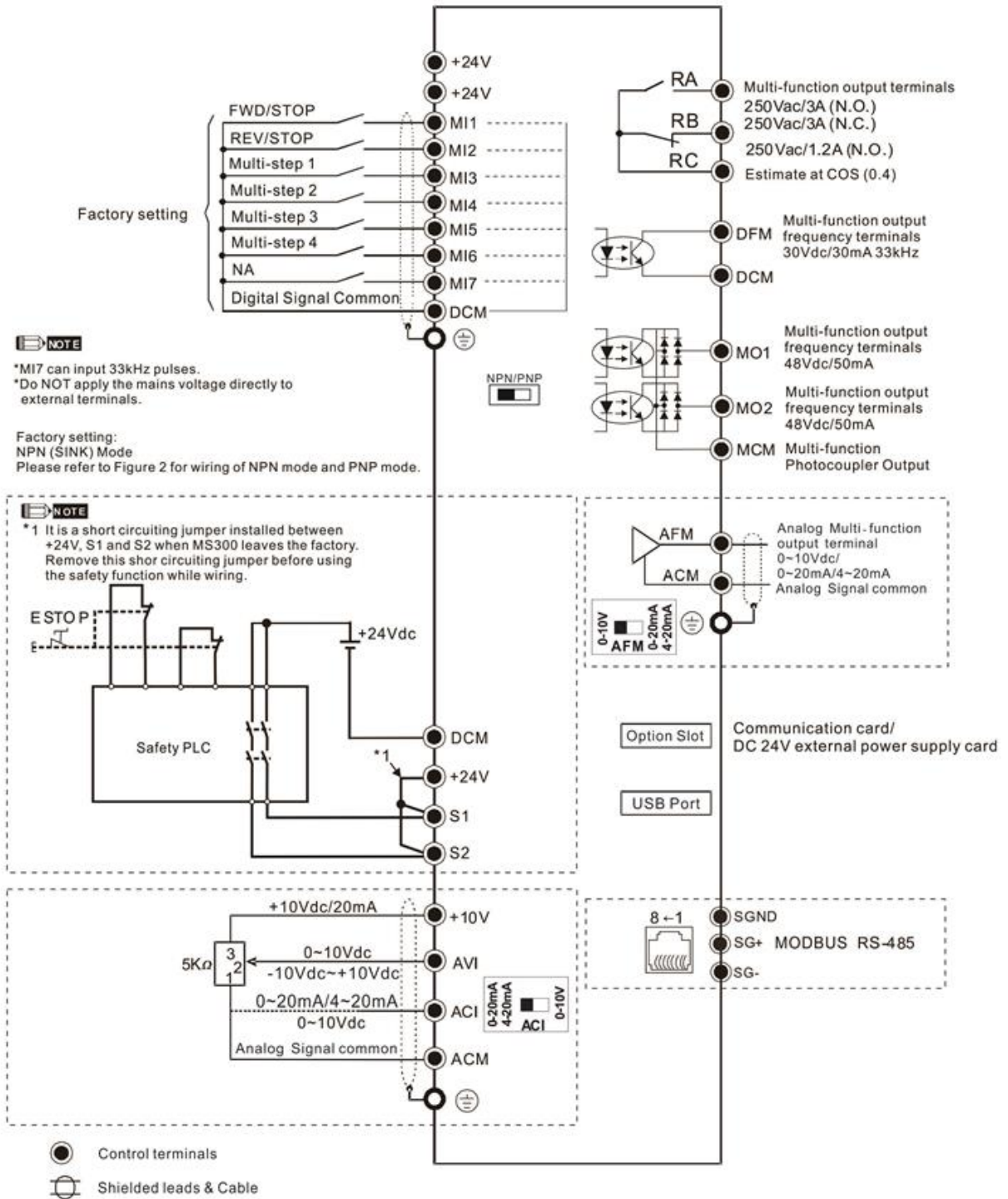
### Power terminals (general)

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



## Options

### Filters

Built-in filter: C3, motor cable  $\leq 30\text{m}$ , carrier frequency 2~15kHz  
 C2, motor cable  $\leq 20\text{m}$ , 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 or KPC-CE01 can be connected to the RS485 port.

### Reactors

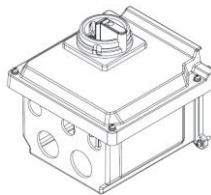
AC input reactors  
 AC output reactors  
 DC-chokes  
 Zero-phase reactors

### Mechanical options

Earth plates (EMC shield plate)  
 Fan kits

### Mains switch

To be mounted on the drive:  
 - Frame A: MKMX-SWA  
 - Frame B: MKMX-SWBA  
 - Frame C: MKMX-SWC



### 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 1.58 or higher from [www.delta-emea.com](http://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, PLC Buffer

15 Speed steps and 20 PLC Buffers.

### Group 05-xx

#### Motor Parameters

Setting of motor parameters (4 motors), Auto-tuning, Slip compensation, Torque boost, Y- $\Delta$  switch-over, Motor operation time, IM/PM selection, etc.

### Group 06-xx

#### Protection Parameters

Protection settings, Fault memory and conditions, PTC, Pt100, Derating, STO-latch, 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

### PLC-mode

#### PLC functionality via Editor on PC: Disable, Run, Edit, Read/Write in MS300

>100 Commands  
10 Input and 4 Output contacts  
32 points  
2000 steps

### Group 14-xx

#### Read-out Values at Fault Condition

Several fault condition read-outs

[www.delta-emea.com](http://www.delta-emea.com)

