

# Variable Speed Drives

# J1 Series

## Simple and Compact inverter

- Simple and Compact Space-saving design
- V/F & Dynamic Vector control
- Overload capability: 150% of rated output current 1 minute.
- 400Hz max Output frequency
- Modbus RS-485 as standard
- Equipped with PID control function.
- Analogue Input and Output (0 to 10 VDC/0 to 20 mA)
- Diverse Functionality: Multi frequency (16 stages), Jog, Remote/local
- PC configuration tool: Sysmac Studio IDE
- CE, UKCA, UL/cUL, EAC and RoHS.

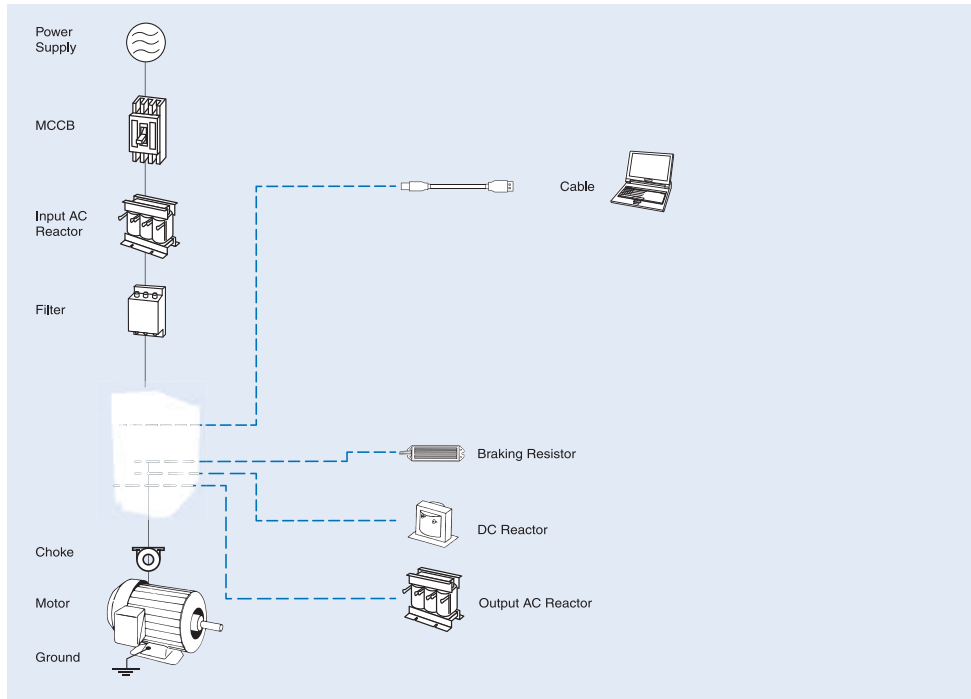
### Ratings:

200 V Class single-phase 0.4 to 2.2 KW

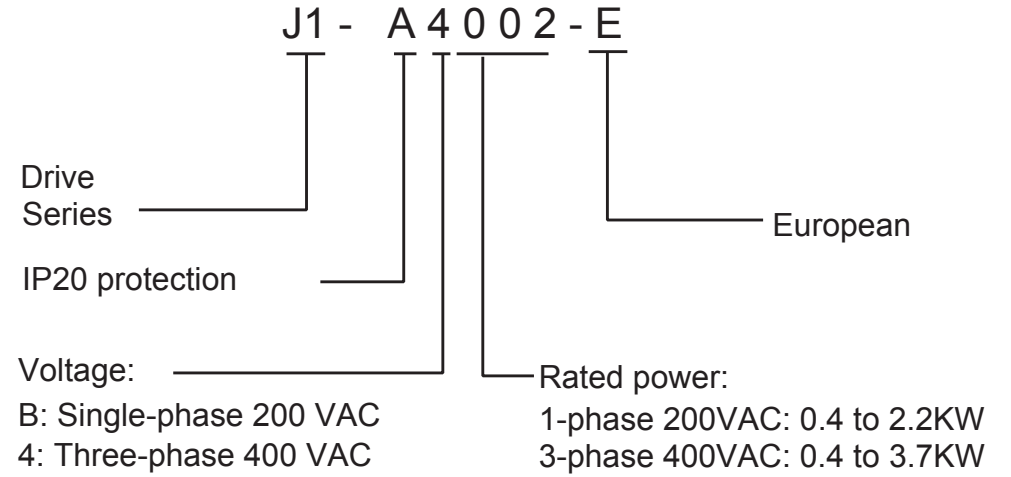
400 V Class three-phase 0.4 to 3.7 KW



## System configuration



## Type designation



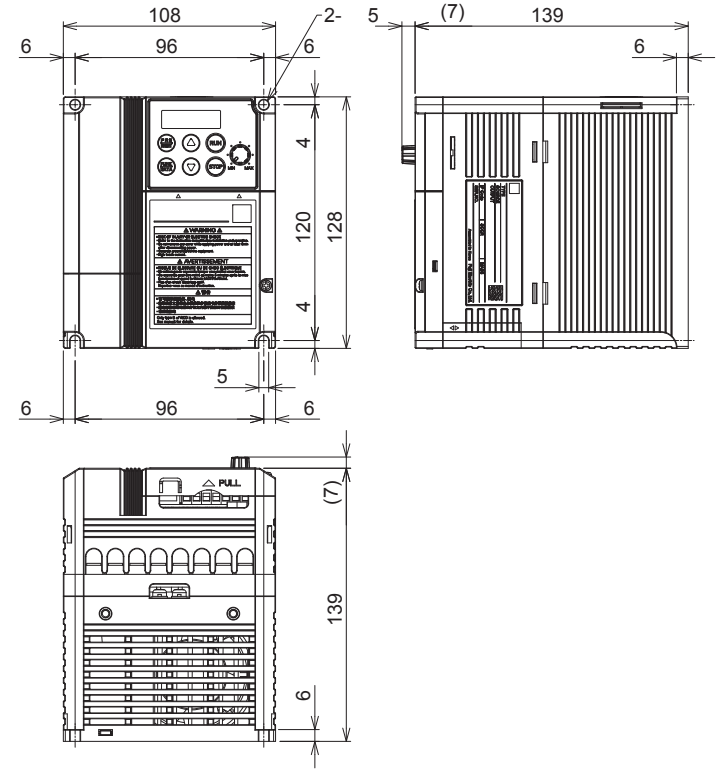
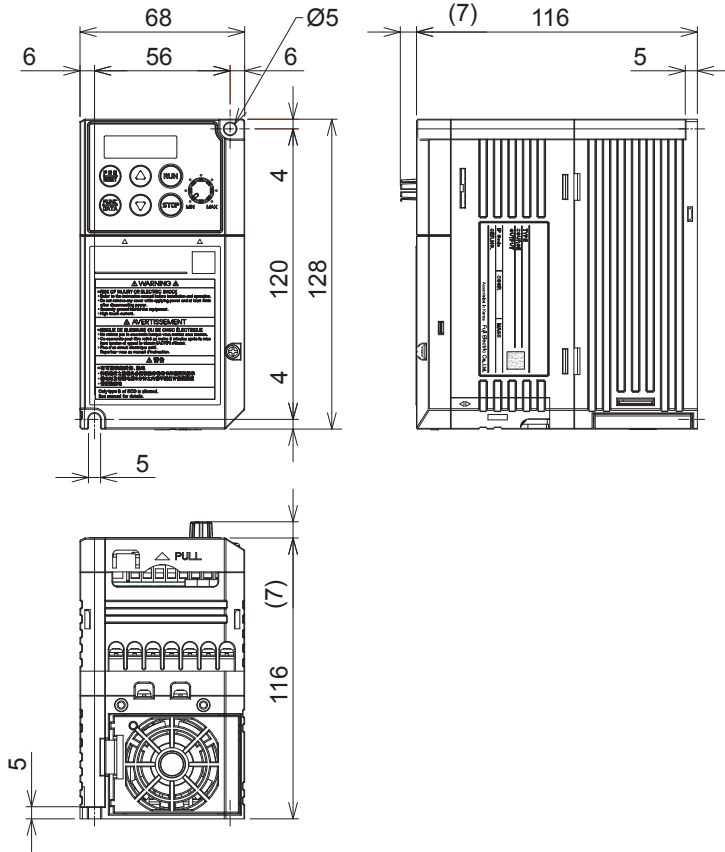
Single-phase 200V: J1-A□		B004	B007	B015	B022
Max. applicable motor output (kW)		0.4	0.75	1.5	2.2
Output characteristics	Drive capacity (kVA) 220V	0.9	1.6	2.8	3.8
	Rated output current (A) at 2KHz	3.5	4.2	9.2	10.0
	Rated output current (A) at 3KHz or above	2.5	4.2	7.5	10.0
	Overload tolerance	150% of the rated output current for 60 seconds			
	Carrier frequency	0.75 to 16 kHz			
	Max. output voltage	Single-phase 200 to 240 V (with AVR)			
	Max. output frequency	400.0 Hz			
Power supply	Rated voltage and frequency	1-phase AC power supply 200-240 V at 50/60 Hz			
	Allowable voltage fluctuation	-10% to +10%			
	Allowable frequency fluctuation	±5%			
	Rated Input current	5.4	9.7	16.4	24.0
	Rated power capacity	0.7	1.3	2.4	3.5
Braking	Braking torque (%)	100		50	30
	Minimum connectable resistor (Ohms)	100		40	
	Maximum duty cycle	100%		50%	
	Maximum braking time	Continuous		50s	
Weight (kg)		0.6	0.6	1.0	1.0

Three-phase 400V: J1-A□		4004-E	4007-E	4015-E	4022-E	4037-E
<b>Max. applicable motor output (kW)</b>		0.4	0.75	1.5	2.2	3.7
<b>Output characteristics</b>	<b>Drive capacity (kVA) 440V</b>	1.1	1.9	3.2	4.1	6.8
	<b>Rated output current (A) (2KHz)</b>	1.8	2.5	4.3	6.3	10.5
	<b>Rated output current (A) (3KHz or higher)</b>	1.5	2.5	4.2	5.5	9.0
	<b>Overload tolerance*4</b>	150% of the rated output current for 60 seconds				
	<b>Carrier frequency*5 (no-derating)</b>	0.75 to 16 kHz				
	<b>Max. output voltage</b>	Three-phase 380 to 480V (with AVR)				
	<b>Max. output frequency</b>	400.0 Hz				
<b>Rated voltage and frequency</b>		3-phase AC power supply 380-480 V at 50/60 Hz				
<b>Power supply</b>	<b>Allowable voltage fluctuation</b>	-15% to +10% (unbalance below 2%)				
	<b>Allowable frequency fluctuation</b>	±5%				
	<b>Rated input current (A)</b>	1.7	3.1	5.9	8.2	13.0
	<b>Rated power capacity (KVA)</b>	0.6	1.1	2.0	2.9	4.9
<b>Braking</b>	<b>Braking torque (%)</b>	100		50	30	
	<b>Minimum connectable resistor (Ohms)</b>	200		160		130
	<b>Maximum duty cycle</b>	100%		50%		
	<b>Maximum braking time</b>	Continuous		50s		
<b>Weight (kg)</b>		0.8	0.8	0.9	1.0	1.3

## Common specifications

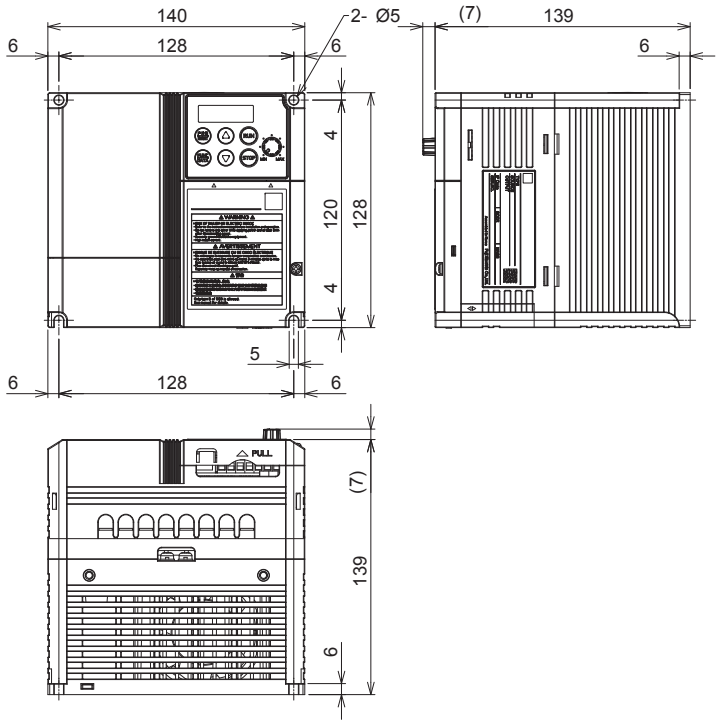
Model number J1-A□		Specifications	
Control functions	Control methods	V/f, Dynamic torque vector, and V/f with slip compensation	
	Motor support	Asynchronous Induction motor	
	Frequency control range	0.00 to 400.0 Hz	
	Frequency tolerance	Digital inputs: $\pm 0.01\%$ of the max. output frequency Analog inputs: $\pm 0.2\%$ of the max. output frequency ( $25 \pm 10$ °C)	
	Frequency setting resolution	Digital inputs: 0.01 Hz Analog inputs: Maximum frequency $\times 5/10,000$	
	Output frequency resolution	0.001 Hz	
	Frequency setting signal	Main speed freq reference: 0 to 10 VDC (22 k $\Omega$ )	
	Starting torque	V/f: 150%/10% of rated speed 200% /0.5Hz Dynamic torque vector	
	Speed control range	1:100 V/f mode 1:200 Dynamic torque vector without feedback / vector without feedback / V/f with feedback	
	Accel/Decel Time	0.01 to 3600.0s (the drive can set two pairs of different acceleration and deceleration times)	
Functionality	Protective functions	Overcurrent, Overvoltage, Undervoltage, Electronic thermal, Temperature error, Ground-fault protection, Overload limit, Input phase loss protection, External alarm trip, Memory and CPU error, Communication error, Anti-regenerative control, current limiter function, Momentary power failure.	
	Main control functions	Torque boost, AVR control, Energy saving, Motor sound, slip compensation, DC braking, current limiter, pre-excitation, overload protection, second motor	
Environment	Operation ambient temperature	-10 to 50°C (40° for side by side mounting)	
	Storage ambient temperature	-10 to 60°C	
	Operating ambient humidity	5 to 95% (with no condensation)	
	Vibration resistance	3 mm (Max. amplitude) 2 to less than 9 Hz 9.8 m/s <sup>2</sup> 9 to less than 20 Hz 2 m/s <sup>2</sup> 20 to less than 55 Hz 1 m/s <sup>2</sup> 55 to less than 200 Hz	
	Location	Maximum altitude up to 1,000m, indoors (without corrosive gases or dust). From 1,000 to 3,000 possible with derating	
Regulations and Standards	CE UKCA	EMC	EN 61800-3: (2004 + A1: 2012)
		Electrical safety	IEC 61800-5-1 (2007)
	UL	US	UL61800-5-1
Protection design		IP20 (IEC 60529), UL open type (UL50)	
Altitude		Output current derating factor	
1000 m or lower		1.00	
1000 to 1500 m		0.97	
1500 to 2000 m		0.95	
2000 to 2500 m		0.91	
2500 to 3000 m		0.88	

Dimensions



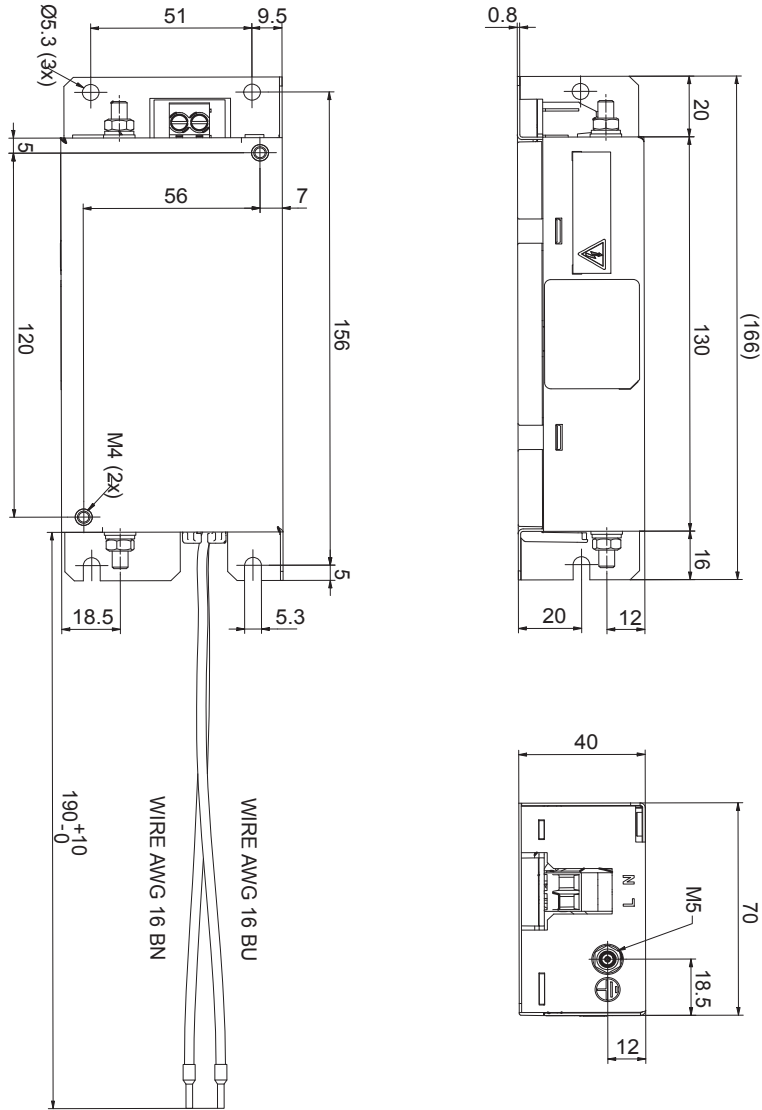
Power Supply	Model
Single-phase 200 V	J1-AB004
	J1-AB007

Power supply	Model
Single-phase 200 V	J1-AB015
	J1-A4004
Three-phase 400 V	J1-A4007
	J1-A4015
	J1-A4022

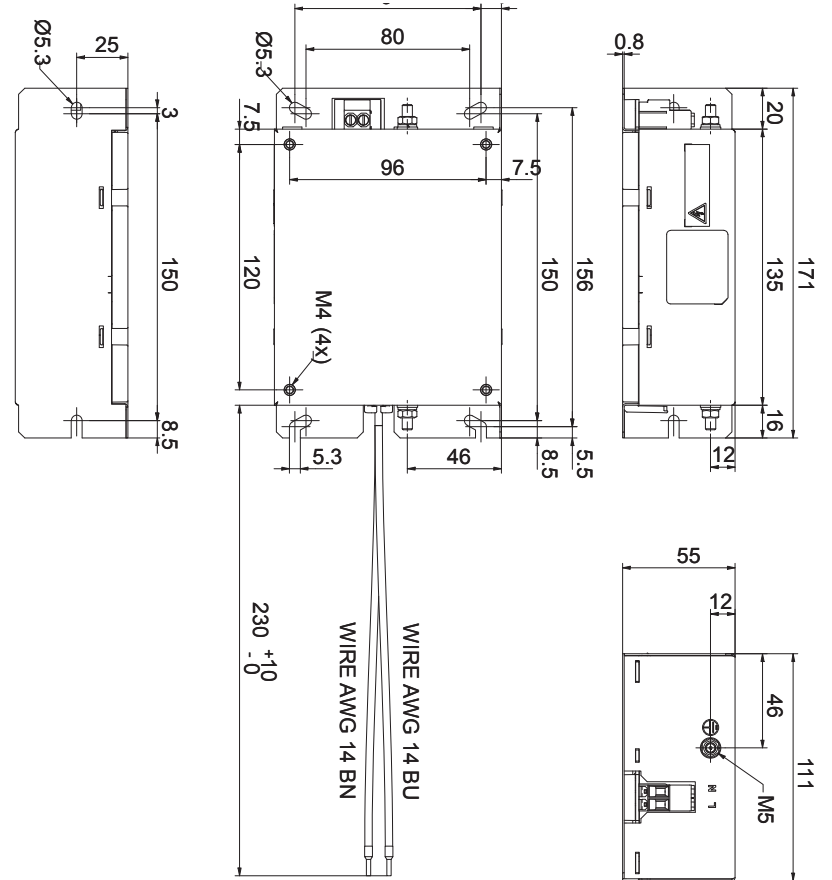


Power supply	Model
Three-phase 400 V	J1-A4037

Line filters  
AX-FIJ1010-SE



AX-FIJ1024-SE





### Input AC Reactor

Voltage	Reference	Fig	A	B	B2	C	C2	D	E	F	G	H	Weight (kg)
Single-phase 200 V	AX-RAI02000070-DE	1	84	113	-	96	-	101	66	5	7.5	2	1.22
	AX-RAI01700140-DE					116							1.95
	AX-RAI01200200-DE					131							2.55
	AX-RAI00630240-DE					116							1.95
Three-phase 400 V	AX-RAI03700040-DE	2	120	113	70	-	120	80	52	5.5	-		1.78
	AX-RAI02800080-DE				70								
	AX-RAI01630090-DE		180		75								195
	AX-RAI01300170-DE												

### Output AC Reactor

Voltage	Reference	Dimensions (mm)						Weight (kg)	
		A	B2	C2	D	E	F		
200 V	AX-RAO07600042-DE	120	70	120	80	52	5.5	1.78	
	AX-RAO03000105-DE		80			62		2.35	
400 V	AX-RAO16300038-DE	180	85	195	140	55	6	2.35	
	AX-RAO07300080-DE							85	5.5
	AX-RAO04600110-DE		210					6	6.5
	AX-RAO03600160-DE		210					6	6.5

Figure 1

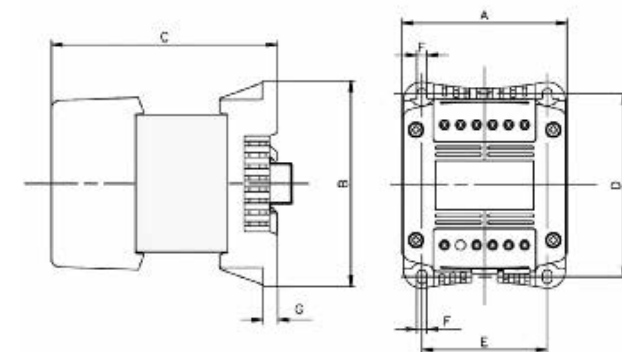
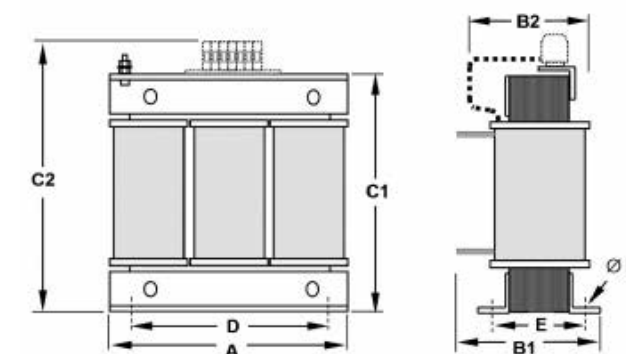
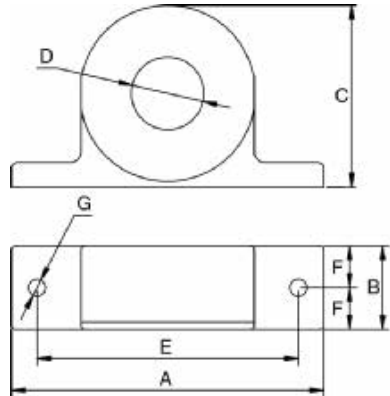


Figure 2



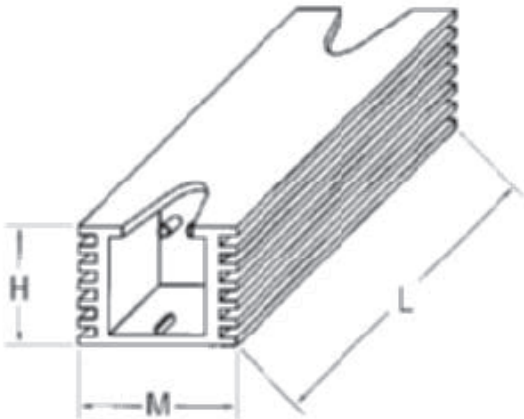
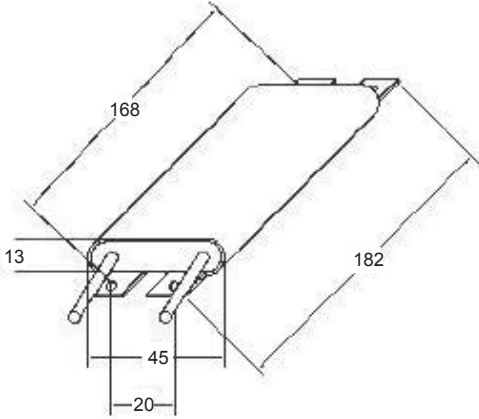
Chokes

Reference	D (diameter)	Motor (kW)	Dimensions (mm)							G (diameter)	Weight (Kg)
			A	B	C	D	E	F			
AX-FER2102-PE	21	< 2.2	86	24	50	21	70	12	4	0.09	
AX-FER2815-PE	28	< 15	106	25	65	28	90	12.5		0.22	



**Braking resistor**

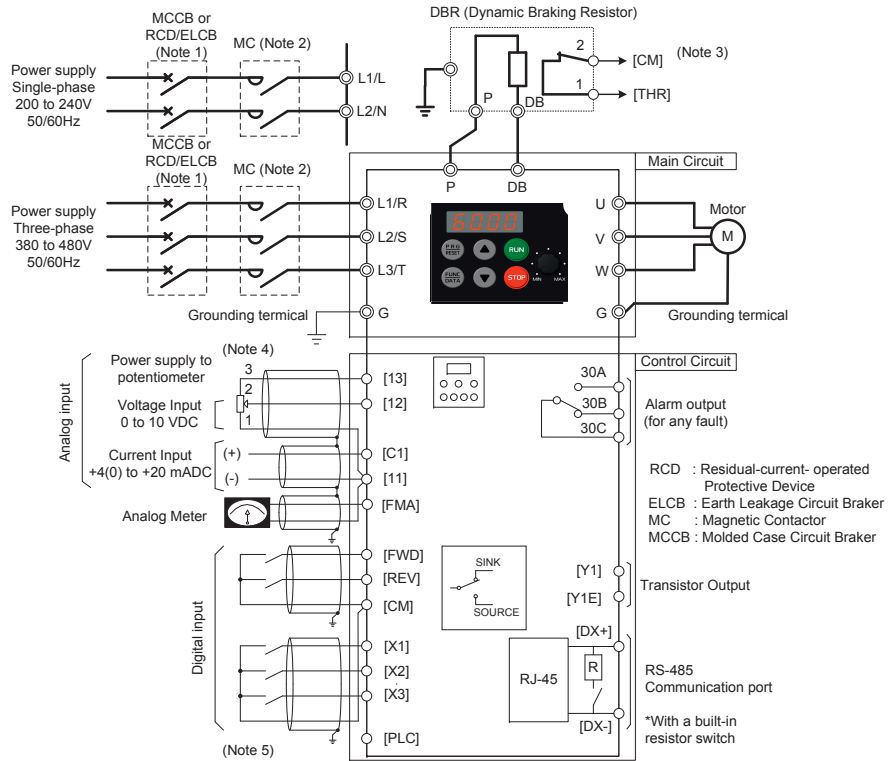
AX-REM00K1200-IE/AX-REM00K1100-IE



Type	Fig	Dimensions (mm)							Weight (kg)
		L	H	M	I	T	G	N	
AX-REM00K2□□□-IE	1	105	27	36	94	-	-	-	0.17
AX-REM00K4□□□-IE		200			189				0.425
AX-REM00K6□□□-IE		320			309				0.73

# Installation

## Standard connections



## Main circuit

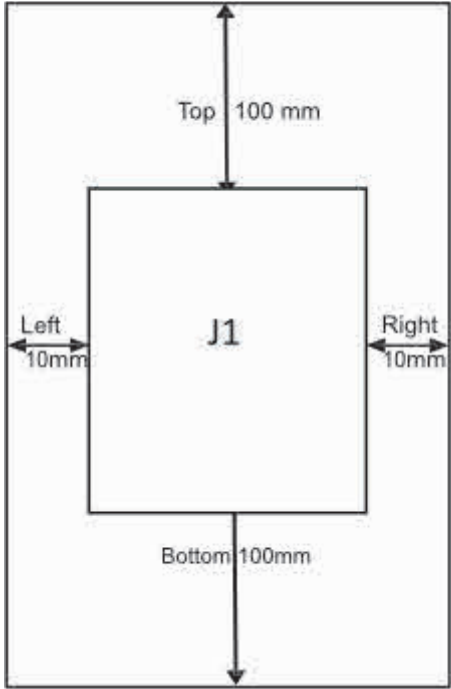
Terminal	Name	Function
L1/R, L2/S, L3/T	Main supply terminals (J1-A4)	Used to connect a power supply
L1/L, L2/N	Main circuit power supply input (J1-AB_)	Used to connect a power supply
U, V, W	Inverter output terminal	Used to connect a motor
DB	Braking resistor connection	To connect a braking resistor
P	DC positive terminal	To connect a braking resistor
G	Ground terminal	Connect the terminal to ground.

### Control circuit

Type	Terminal	Name	Function (Signal level)
Digital input signals	FWD	FWD command	Voltage levels between input and the CM terminal: ON voltage: 22V min OFF voltage 2V max  Maximum 27 VDC
	REV	REV command	
	X1	Multi-Function Digital Input 1 (Multi-speed 1)	
	X2	Multi-Function Digital Input 2 (Free run stop)	Load current: 25 to 5mA
	X3	Multi-Function Digital Input 3 (Reset)	Impedance: 10 kΩ
	CM	Input Signal common	Common terminal digital/analog
	PLC	PLC output signal supply	Rated voltage: 24VDC (range 22 to 29 VDC) Max: 50mA
Analog input signals	13	Power supply for analog input	+10VDC Max 10 mA
	12	Voltage input	0 to 10 VDC, 22kΩ, range 0 to 15 VDC
	C1	Current input	0 or 4 to 20mA, 250Ω, range 0 to 30mA
	11	Input common	

Type	Terminal	Name	Function (Signal level)
Alarm output	30A	Relay output terminal NO	Relay output 250 VAC, 0,3A 48 VDC, 0.5A
	30B	Relay output terminal NC	
	30C	Relay output common	
Multi-function photocoupler outputs	Y1	Transistor output	Max Voltage 35 VDC
	Y1E	Transistor output	
Monitor Outputs	FMA 11	Analog output	0 to +10 VDC Min impedance 5 kΩ
		Common input terminal	
Serial comms	DX+	Modbus terminal (RS-485)	SP RS-485 differential (+) signal
	DX-		SN RS-485 differential (-) signal

Side by side mounting

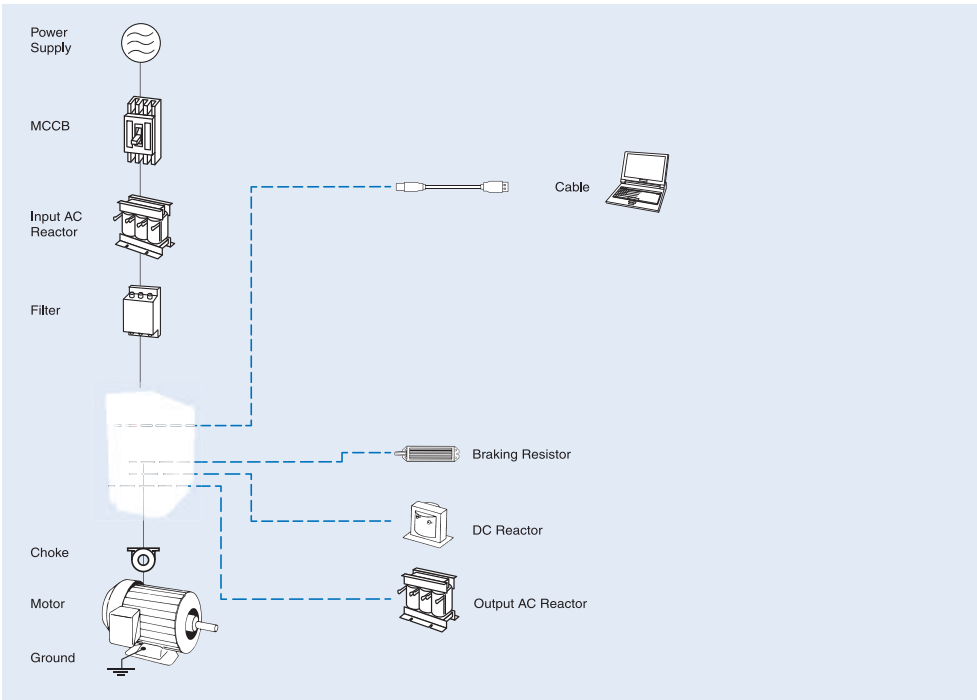


When drive is mounted side by side the ambient temperature should be within -10 to 40°C Drive watt loss

Drive watt loss

Max motor capacity	200V			400V		
	Loss at 0% load [W]	Loss at 100% load of the rated current [W]	Efficiency at 100% load [W]	Loss at 0% load [W]	Loss at 100% load of the rated current [W]	Efficiency at 100% load [W]
0.4	3.91	6.1	99.06	4.4	6.2	99.11
0.75	3.82	11.7	98.83	4.5	15.1	98.55
1.5	5.95	13.1	99.29	6.7	14.6	99.16
2.2	5.23	47.2	98.04	6.3	16.9	99.33
3.7	-	-	-	6.6	37.4	99.24

### Ordering information



### J1 drive

Voltage	Rated current (A)		
	At 2KHz	Above 2KHz	J1-A□□□□-E
Single phase 200V	3.5	2.5	AB004
	4.2	4.2	AB007
	9.2	7.5	AB015
	10.0	10.0	AB022
3 phase 400V	1.8	1.5	A4004
	2.5	2.5	A4007
	4.3	4.2	A4015
	6.3	5.5	A4022
	10.5	9.0	A4037

## Line filters

Drive		Standard line filter		
Voltage	Model J1-A□□□□-E	Reference	Current (A)	Leakage current (mA)
Single-phase 200 V	B004	AX-FIJ1010-SE	9.7	7.9
	B007			
	B015	AX-FIJ1024-SE	24	7.9
	B022			
Three-phase 400 V	4004	AX-FIJ4008-SE	8.2	2.5
	4007			
	4015			
	4022			
	4037	AX-FIJ4013-SE	13	1.7

## Input AC Reactors

200V Single phase					400V Three phases				
J1-A□□□□-E	Reference	mH	A	Losses	J1-A□□□□-E	Reference	mH	A	Losses
B004	AX-RAI02000070-DE	2.0	7.0	14	4004	AX-RAI03700040-DE	3.7	4	18
B007	AX-RAI01700140-DE	1.7	14.0	22	4007				
B015	AX-RAI01200200-DE	1.2	20.0	24	4015	AX-RAI02800080-DE	2.8	8.0	31
B022	AX-RAI00630240-DE	0.63	24.0	26	4022	AX-RAI01630090-DE	1.63	9.0	40
					4037	AX-RAI01300170-DE	1.30	17.0	67

## Output AC Reactors

200 V Single phase				Three-phase 400 V			
J1-A□	Output AC reactor	mH	A	J1-A□	Output AC reactor	mH	A
B004	AX-RAO07600042-DE	7.6	4.2	4004	AX-RAO16300038-DE	16.3	3.8
B007				4007			
B015	AX-RAO03000105-DE	3.0	10.5	4015	AX-RAO07300080-DE	7.3	8.0
B022				4022	AX-RAO04600110-DE	4.6	11.0
				4037	AX-RAO03600160-DE	3.6	16.0

## Chokes

Model	Diameter	Description
AX-FER2102-PE	21	For 2.2 KW motors or below
AX-FER2815-PE	28	For 15 KW motors or below

## Accessories

Description	Model
J1 to PC communication cable RJ45 to USB (RS-485 converter)	3G3A1-PC03

## Software tools

Description	Functions	Number licenses	Media	Model
Sysmac Studio Standard Edition Ver.1.XX	The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including NJ/NX-series CPU Units, NY-series Industrial PC, EtherCAT Slaves, and HMI. Sysmac Studio runs on the following OS *1 Windows 7 (32-bit/64-bit version)/Windows 8.1 (32-bit/64-bit version)/ Windows 10 (32-bit/64-bit version)/Windows 11 (64-bit version) This software provides functions of the Vision Edition. Refer to your local OMRON website for details such as supported models and functions.	(Media only)	Sysmac Studio (32 bit) DVD	SYSMAC-SE200D
		(Media only)	Sysmac Studio (64 bit) DVD	SYSMAC-SE200D-64
		1 license	–	SYSMAC-SE201L
Sysmac Studio Drive Edition Ver.1.XX	Sysmac Studio Drive Edition is a limited license that provides selected functions required for 1S-series Servo, G5-series Servo and M1 Series Inverter System settings. Because this product is a license only, you need the Sysmac Studio Standard Edition DVD media to install it.	1 license	–	SYSMAC-DE001L

## Braking resistor

Voltage	M1-A	Conn. min. resistance	Resistor proposal fast stop (10s not cyclic)			Braking resistor (3% ED, 10 sec)			Braking resistor (10% ED, 10sec)		
			Model	Specifications		Model	Specifications		Model	Specifications	
1 phase 200V	B004	100 Ω	AX-REM00K1100-IE	100W	100 Ω	AX-REM00K1100-IE	100W	100 Ω	AX-REM00K2100-IE	200W	100 Ω
	B007		AX-REM00K1100-IE	100W	100 Ω	AX-REM00K1100-IE	100W	100 Ω	AX-REM00K2100-IE	200W	100 Ω
	B015	40 Ω	AX-REM00K2040-IE	200W	40 Ω	AX-REM00K2050-IE	200W	50 Ω	AX-REM00K4050-IE	400W	50 Ω
	B022		AX-REM00K2040-IE	200W	40 Ω	AX-REM00K2050-IE	200W	50 Ω	AX-REM00K4050-IE	400W	50 Ω
3 phase 400 V	4004	200 Ω	AX-REM00K1200-IE	100W	200 Ω	AX-REM00K1200-IE	100W	200 Ω	AX-REM00K4200-IE	400W	200 Ω
	4007		AX-REM00K1200-IE	200W	200 Ω	AX-REM00K1200-IE	100W	200 Ω	AX-REM00K4200-IE	400W	200 Ω
	4015	160 Ω	AX-REM00K2160-IE	200W	160 Ω	AX-REM00K1200-IE	100W	200 Ω	AX-REM00K4200-IE	400W	200 Ω
	4022		AX-REM00K2160-IE	200W	160 Ω	AX-REM00K1200-IE	100W	200 Ω	AX-REM00K4200-IE	400W	200 Ω
	4037	130 Ω	AX-REM00K4130-IE	400W	130 Ω?	AX-REM00K2150-IE	200W	150 Ω	AX-REM00K6150-IE	600W	150 Ω

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.  
 To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.