

## **Catalog CA.VJ.01** **J1000 and V1000 MicroDrives**

**Date: 09/15/09**

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# **YASKAWA**



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Other Documents and Manuals are available to support special use or installation of this product. These documents may be provided with the product or upon request. Contact Yaskawa Electric America, Inc. or visit [www.yaskawa.com](http://www.yaskawa.com), as required. Documents may include the following:

### **J1000**

TOEPC71060626.... J1000 Quick Start Guide  
SIEPC71060631 ..... J1000 Technical Manual  
TM.J1000.01 ..... J1000 Cheat Sheet  
TOBPC73060032.... RS-232C Interface Technical Manual (SI-232/J and SI-232/JC)  
TOBPC73060033.... RS-485 MEMOBUS/Modbus Interface Technical Manual (SI-485/J)  
TOBPC73060034.... Potentiometer Technical Manual (AI-V3/J)  
TOBPC73060035.... LED Operator Installation Manual (JVOP-182)  
TOEPC73060020.... DriveWizard Plus Instruction Manual  
TOBPC73060025.... USB Copy Unit (V-Stick) Technical Manual (JVOP-181)

### **V1000**

TOEPC71060614.... V1000 Quick Start Guide  
SIEPC71060618 ..... V1000 Technical Manual  
TM.V1000.01 ..... V1000 Cheat Sheet  
TOBPC73060023.... Profibus-DP Installation Manual (SI-P3/V)  
SIEPC73060023 ..... Profibus-DP Technical Manual (SI-P3/V)  
TOBPC73060025.... USB Copy Unit (Y-Stick) Technical Manual (JVOP-181)  
TOEPC73060028.... DeviceNet Installation Manual (SI-N3/V)  
SIEPC73060028 ..... DeviceNet Technical Manual (SI-N3/V)  
TOEPC73060020.... DriveWizard Plus Instruction Manual  
TOBPC73060029.... LCD Operator Installation Manual (JVOP-180)  
TOBPC73060035.... LED Operator Installation Manual (JVOP-182)  
TOEPYEACOM01... Ethernet/IP Installation Manual (SI-EN3/V)  
SIEPYEACOM01 .... Ethernet/IP Technical Manual (SI-EN3/V)  
TOEPYEACOM02... Modbus TCP/IP Installation Manual (SI-EM3/V)  
SIEPYEACOM02 .... Modbus TCP/IP Technical Manual (SI-EM3/V)  
TOBPC73060049.... MECHATROLINK-II Installation Manual (SI-T3/V)  
SIEPC73060049 ..... MECHATROLINK-II Technical Manual (SI-T3/V)  
TOBPC73060027.... V1000 24V Control Power Unit  
TOBPC71060621 .... V1000 Finless Type Installation Guide  
TOEPYEAOPT02.... 1000 Series Operator Mounting Kit NEMA Type 4X/IP66 Installation Manual  
TOEPYEAOPT03.... V1000 120VAC Interface (D1-100)

# Description

## 1/8-7.5HP

J1000



In our pursuit to create drives optimized for variable speed needs in compact applications, the J1000 is the solution. This micro-drive is simple and reliable with Yaskawa quality. Demand continues to increase for compact drives with hassle-free maintenance. Yaskawa drives have earned a reputation for high performance, high functionality, and high quality.

Great Things Come in Small Packages!

### Performance Features

- Ratings:
  - 1/8 to 3 HP at 200-240 VAC 1-Ph.
  - 1/8 to 5 HP at 200-240 VAC 3-Ph.
  - 1/2 to 7.5 HP (ND) at 380-480 VAC 3-Ph.
- Overload Capacity:
  - 150% for 60 sec. (Heavy Duty)
  - 120% for 60 sec. (Normal Duty)
- Control Methods: V/f Control
- DC injection braking, ramp to stop
- Electronic reversing
- Adjustable accel/decel: 0.0 to 6000.0 seconds
- Controlled speed range: 40:1
- Speed Regulation:
  - ± 0.5 to 1% with slip compensation
- Displacement power factor: 0.98
- Output frequency: 0 to 400 Hz
- Frequency resolution:
  - 0.01 Hz with digital reference
  - 0.06 / 60 Hz with analog reference
- Frequency accuracy:
  - 0.01% with digital command
  - 0.5% with analog command
- Volts / hertz ratio: infinitely adjustable pattern
- DC Injection braking: adjustable amplitude, duration, current limited
- Torque boost: full range, auto
- Power loss ride-thru: 0.5 sec.
- Speed search
- Auto restart
- 2 Critical frequency rejection settings
- Slip Compensation

### Design Features

- 16-bit microprocessor logic
- Digital keypad operator, 5 digits
- LED status display
- Remote Mount Keypad Capability
- 5 multifunction digital inputs
- 1 multifunction digital output
- Programmable form C output contact for customer use: 1A at 250 VAC or 30 VDC
- 24 VDC control logic compatible with sourcing or sinking outputs (PNP or NPN)
- Carrier frequency: 15 kHz max; swing PWM
- 8 multi-speed settings plus jog speed
- 1 Remote speed reference:
  - 0-10 VDC (20 kohms) or isolated
  - 4-20 mA (250 ohms)
- Signal follower: bias and gain
- Analog monitor output:
  - 0-10 VDC proportional to output frequency or output current
- Approximately 140 parameters and monitors
- Cooling fan controlled by drive run/stop
- UL recognized electronic overload
- MTBF: 28 years
- Built-in Dynamic Braking Transistor
- Protected Chassis
- Side-by-Side mounting
- Maintenance monitors

### Protective Features

- Current limit, stall prevention during accel, decel, and run
- Motor and drive overload
- Over voltage prevention function
- Instantaneous over current
- Short circuit
- Under voltage
- Heatsink overheat
- Ground fault protection
- Over/under torque
- Short circuit current rating: 30kA rms sym.

### Service Conditions

- Ambient service temperature:
  - 10° to 50°C (+14° to 122°F)
- Ambient storage temperature:
  - 20° to 60°C (-4° to 140°F)
- Humidity: to 95% non-condensing
- Altitude: to 3300 ft; higher by derating
- Service factor: 1.0
- Input voltage: -15% to +10%
  - 200 to 240 VAC, 380 to 480 VAC
- Input frequency: +/-5%; 50/60 Hz
- Input phase sequence insensitive

### Options

- Dynamic Braking resistor (external)
- Remote LED Operator w/ copy function
- Modbus 232/422/485 Communications
- Analog Potentiometer Card
- DriveWizard Plus
- DIN rail mounting kit
- USB Copy Unit (Y-Stick)
- Reactors, 3% and 5%
- EMC filters, C1 and C3

### Standards

- UL 508C (Power Conversion)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- UL, cUL listed; CE marked
- RoHS compliant
- EN 50178 (LVD)
- EN 50081-2, EN 50082-2 (EMC)
- EN 61800-3
- IEC 529, 146
- FCC CFR 47 Part 15 Subpart B (w/ External Filter)

Rated Input Voltage	Drive Model Number CIMR-JU	Normal Duty <sup>(1)</sup>		Heavy Duty <sup>(1)</sup>	
		Rated Output Current (Amps)	Nominal HP <sup>(2)</sup>	Rated Output Current (Amps)	Nominal HP <sup>(2)</sup>
200-240V 1-Phase	BA0001BAA	1.2	1/8 & 1/4	0.8	1/8
	BA0002BAA	1.9	1/4	1.6	1/4
	BA0003BAA	3.3	1/2 & 3/4	3.0	1/2
	BA0006BAA	6.0	1	5.0	3/4 & 1
	BA0010BAA	9.6	2 & 3	8.0	2
200-240V 3-Phase	2A0001BAA	1.2	1/8 & 1/4	0.8	1/8
	2A0002BAA	1.9	1/4	1.6	1/4
	2A0004BAA	3.3	1/2 & 3/4	3.0	1/2
	2A0006BAA	6.0	1	5.0	3/4 & 1
	2A0010BAA	9.6	2 & 3	8.0	2
	2A0012BAA	12.0	3	11.0	3
	2A0020BAA	19.6	5	17.5	5
380-480V 3-Phase	4A0001BAA	1.2	1/2	1.2	1/2
	4A0002BAA	2.1	3/4 & 1	1.8	3/4
	4A0004BAA	4.1	2	3.4	1 & 2
	4A0005BAA	5.4	3	4.8	3
	4A0007BAA	6.9	4	5.5	3
	4A0009BAA	8.8	5	7.2	4
	4A0011BAA	11.1	7.5	9.2	5

(1) Normal Duty overload current rating is 120% of rated output current for 60 seconds; Heavy Duty overload current rating is 150% of rated output current for 60 seconds

(2) Horsepower rating is based on 230-volt and 460-volt induction-type squirrel-cage NEMA B 4-pole motors as represented in NEC table 430.250 Full-Load Current, Three-Phase Alternating Current Motors

# Dimensions and Data

## J1000

Rated Input Voltage	Drive Model Number CIMR-JU	Normal Duty		Heavy Duty		Physical Dimensions (in.)			Mounting Dimensions (in.)		Weight (lbs.) <sup>(1)</sup>
		Rated Output Current (Amps)	Nominal HP	Rated Output Current (Amps)	Nominal HP	H	W	D	H1	W1	
200-240V 1-Phase	BA0001BAA	1.2	1/8 & 1/4	0.8	1/8	5.00	2.68	2.99	4.60	2.20	1.3
	BA0002BAA	1.9	1/4	1.6	1/4	5.00	2.68	2.99	4.60	2.20	1.3
	BA0003BAA	3.3	1/2 & 3/4	3.0	1/2	5.00	2.68	4.65	4.60	2.20	2.2
	BA0006BAA	6.0	1 & 1.5	5.0	3/4 & 1	5.00	4.25	5.41	4.60	3.78	3.5
	BA0010BAA	9.6	2 & 3	8.0	2	5.00	4.25	6.06	4.60	3.78	4.0
200-240V 3-Phase	2A0001BAA	1.2	1/8 & 1/4	0.8	1/8	5.00	2.68	2.99	4.60	2.20	1.3
	2A0002BAA	1.9	1/4	1.6	1/4	5.00	2.68	2.99	4.60	2.20	1.3
	2A0004BAA	3.5	1/2 & 3/4	3.0	1/2	5.00	2.68	4.25	4.60	2.20	2.0
	2A0006BAA	6.0	1 & 1.5	5.0	3/4 & 1	5.00	2.68	5.04	4.60	2.20	2.4
	2A0010BAA	9.6	2 & 3	8.0	2	5.00	4.25	5.08	4.60	3.78	3.8
	2A0012BAA	12.0	3	11.0	3	5.00	4.25	5.41	4.60	3.78	3.8
	2A0020BAA	19.6	5	17.5	5	5.00	5.51	5.63	4.60	5.04	5.3
380-480V 3-Phase	4A0001BAA	1.2	1/2	1.2	1/2	5.00	4.25	3.19	4.60	3.78	2.2
	4A0002BAA	2.1	3/4 & 1	1.8	3/4	5.00	4.25	3.90	4.60	3.78	2.7
	4A0004BAA	4.1	2	3.4	1 & 2	5.00	4.25	5.41	4.60	3.78	3.8
	4A0005BAA	5.4	3	4.8	3	5.00	4.25	6.06	4.60	3.78	3.8
	4A0007BAA	6.9	4	5.5	3	5.00	4.25	6.06	4.60	3.78	3.8
	4A0009BAA	8.8	5	7.2	4	5.00	4.25	6.06	4.60	3.78	3.8
	4A0011BAA	11.1	7.5	9.2	5	5.00	5.51	5.63	4.60	5.04	5.3

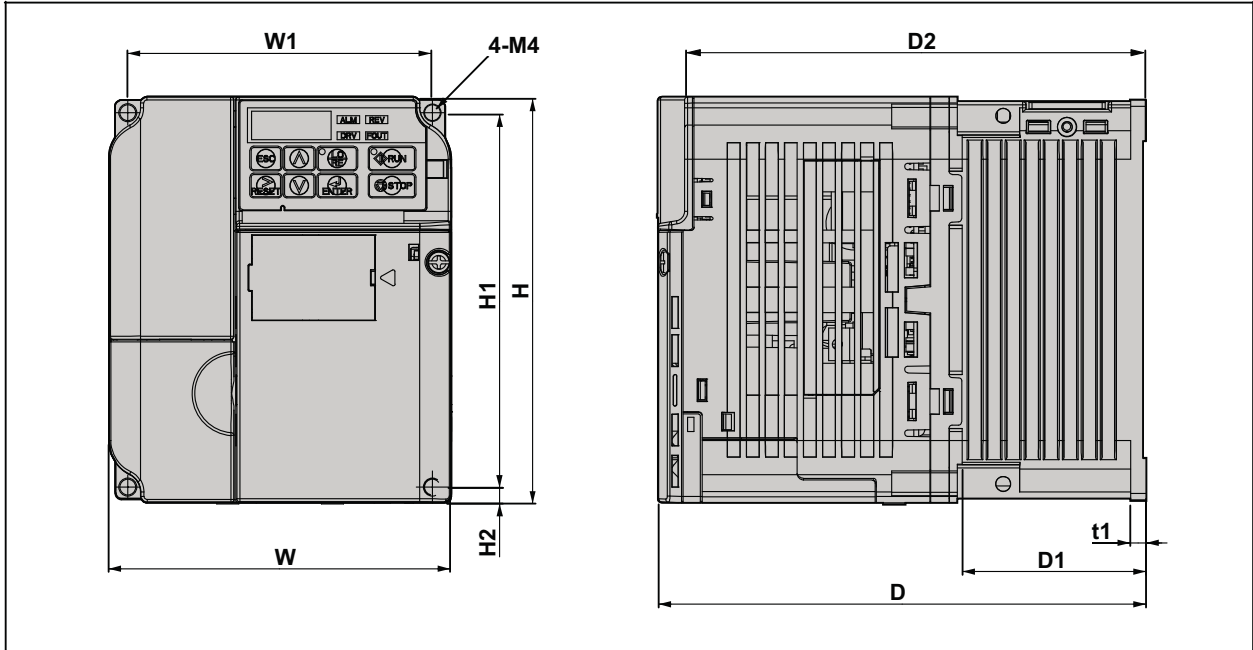
(1) This data represents the drive weight only, not shipping weight.





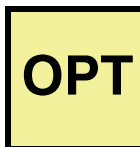
**Dimension Drawing**  
**DD.J1000.02**  
**Protected Chassis**

**J1000**



Voltage Class	Drive Model CIMR-J□	Dimensions (in)									Weight (lb.)
		W	H	D	W1	H1	H2	D1	D2	t1	
Single-Phase 200 V Class	BA0006B	4.3	5.0	5.4	3.8	4.6	0.2	2.3	5.1	0.2	3.8
	BA0010B	4.3	5.0	6.1	3.8	4.6	0.2	2.3	5.7	0.2	4.0
Three-Phase 200 V Class	2A0010B	4.3	5.0	5.1	3.8	4.6	0.2	2.3	4.7	0.2	3.8
	2A0012B	4.3	5.0	5.4	3.8	4.6	0.2	2.3	5.1	0.2	3.8
	2A0020B	5.5	5.0	5.6	5.0	4.6	0.2	2.6	5.3	0.2	5.3
Three-Phase 400 V Class	4A0001B	4.3	5.0	3.2	3.8	4.6	0.2	0.4	2.9	0.2	2.2
	4A0002B	4.3	5.0	3.9	3.8	4.6	0.2	1.1	3.6	0.2	2.7
	4A0004B	4.3	5.0	5.4	3.8	4.6	0.2	2.3	5.1	0.2	3.8
	4A0005B	4.3	5.0	6.1	3.8	4.6	0.2	2.3	5.7	0.2	3.8
	4A0007B	4.3	5.0	6.1	3.8	4.6	0.2	2.3	5.7	0.2	3.8
	4A0009B	4.3	5.0	6.1	3.8	4.6	0.2	2.3	5.7	0.2	3.8
	4A0011B	5.5	5.0	5.6	5.0	4.6	0.2	2.6	5.3	0.2	5.3

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**Reactor, 3% and 5% Impedance** - may be used on either the input or output of a drive to reduce the effect of load or line side transients on the drive. The three-phase reactors are available loose in a separate NEMA 1 enclosure.

Rated Input Voltage	Drive Model Number CIMR-JU	Rated Output Current (Amps)	Nominal HP	3% Enclosed Reactor			5% Enclosed Reactor				
				Part Number 05P00620-	Dimensions (in.)			Part Number 05P00620-	Dimensions (in.)		
					H	L	W		H	L	W
200-240V 1-Phase	BA0001BAA	1.2	1/8 & 1/4	0020	8.0	8.0	6.0	0015	8.0	8.0	6.0
	BA0002BAA	1.9	1/4		0021	8.0	8.0	6.0	0021	8.0	8.0
	BA0003BAA	3.3	1/2 & 3/4	0027	8.0	8.0	6.0	0028	8.0	8.0	6.0
	BA0006BAA	6.0	1	0027	8.0	8.0	6.0	0028	8.0	8.0	6.0
200-240V 3-Phase	2A0001BAA	1.2	1/8 & 1/4	0020	8.0	8.0	6.0	0015	8.0	8.0	6.0
	2A0002BAA	1.9	1/4		0021	8.0	8.0	6.0	0021	8.0	8.0
	2A0004BAA	3.5	1/2 & 3/4	0027	8.0	8.0	6.0	0028	8.0	8.0	6.0
	2A0006BAA	6.0	1	0027	8.0	8.0	6.0	0028	8.0	8.0	6.0
	2A0010BAA	9.6	2 & 3	0032	8.0	8.0	6.0	0033	8.0	8.0	6.0
	2A0012BAA	12.0	3	0036	8.0	8.0	6.0	0037	8.0	8.0	6.0
380-480V 3-Phase	4A0001BAA	1.2	1/2	0015	8.0	8.0	6.0	0016	8.0	8.0	6.0
	4A0002BAA	2.1	3/4 & 1		0021	8.0	8.0	6.0	0023	8.0	8.0
	4A0004BAA	4.1	2	0028	8.0	8.0	6.0	0029	8.0	8.0	6.0
	4A0005BAA	5.4	3	0033	8.0	8.0	6.0	0034	8.0	8.0	6.0
	4A0007BAA	6.9	4	0037	8.0	8.0	6.0	0038	13.0	13.0	13.0
	4A0009BAA	8.8	5	0042	13.0	13.0	13.0	0043	13.0	13.0	13.0
4A0011BAA	11.1	7.5									



**Options**  
**J1000 Drive**

**EMC C1 Filters** - may be used on the input of the drive to attenuate possible drive-generated noise. Filters should always be mounted as close to the drive as possible; these are designed such that the drive can be mounted to it, pancake-style. The drive should be installed with the EMC filters listed below in order to comply with the EN 61800-3, category C1 requirements. These C1 filters meet the requirements for CE.

Rated Input Voltage	Drive Model Number CIMR-JU	Rated Output Current (Amps)	Nominal HP	C1 Filter					
				Part Number	Rated Current (A)	Dimensions (in.)			Weight (lbs)
						H	W	D	
200-240V 1-Phase	BA0001BAA	1.2	1/8 & 1/4	FS23638-10-07	10	6.65	2.80	1.77	0.97
	BA0002BAA	1.9	1/4						
	BA0003BAA	3.3	1/2 & 3/4						
	BA0006BAA	6.0	1	FS23638-20-07	20	6.65	4.37	1.97	1.76
BA0010BAA	9.6	2 & 3							
200-240V 3-Phase	2A0001BAA	1.2	1/8 & 1/4	FS23637-8-07	8	6.65	2.80	1.57	0.88
	2A0002BAA	1.9	1/4						
	2A0004BAA	3.5	1/2 & 3/4						
	2A0006BAA	6.0	1	FS23637-14-07	14	6.65	4.37	1.77	1.28
	2A0010BAA	9.6	2 & 3						
	2A0012BAA	12.0	3						
2A0020BAA	19.6	5	FS23637-24-07	24	6.85	5.67	1.97	1.98	
380-480V 3-Phase	4A0001BAA	1.2	1/2	FS23639-5-07	5	6.65	4.37	1.77	1.10
	4A0002BAA	2.1	3/4 & 1						
	4A0004BAA	4.1	2						
	4A0005BAA	5.4	3	FS23639-10-07	10	6.65	4.37	1.77	1.54
	4A0007BAA	6.9	4						
	4A0009BAA	8.8	5						
	4A0011BAA	11.1	7.5						



**EMC C3 Filters (Conducted Interference Voltage Limits)** - may be used on the input of a drive to attenuate possible drive-generated noise. An input filter with proper shielding, routing and grounding between itself and the drive is designed to reduce line-conducted noise levels within the limits of EN61800-3 Category C3,  $I \leq 100A$  (second environment for industrial low-voltage supply network), when the drive's output conductors are properly routed and shielded in grounded steel conduit all the way to the motor. Filters should always be mounted as close to the drive as possible. The filters in combination with the drive meet UL and CE.

Rated Input Voltage	Drive Model Number CIMR-JU	Rated Output Current (Amps)	Nominal HP	C3 Filter Kit	
				Part Number	Rated Current (A)
200-240V 1-Phase	BA0001BAA	1.2	1/8 & 1/4	FS22800-5-A	5
	BA0002BAA	1.9	1/4		
	BA0003BAA	3.3	1/2 & 3/4	FS22800-9-A	9
	BA0006BAA	6.0	1	FS22800-16-A	16
	BA0010BAA	9.6	2 & 3	FS22800-26-A	26
200-240V 3-Phase	2A0001BAA	1.2	1/8 & 1/4	Consult Factory	Consult Factory
	2A0002BAA	1.9	1/4		
	2A0004BAA	3.5	1/2 & 3/4		
	2A0006BAA	6.0	1		
	2A0010BAA	9.6	2 & 3		
	2A0012BAA	12.0	3		
	2A0020BAA	19.6	5		
380-480V 3-Phase	4A0001BAA	1.2	1/2	FS22801-3-A	3
	4A0002BAA	2.1	3/4 & 1		
	4A0004BAA	4.1	2	FS22801-6-A	6
	4A0005BAA	5.4	3	FS22801-12-A	12
	4A0007BAA	6.9	4	FS22801-12-A	12
	4A0009BAA	8.8	5		
4A0011BAA	11.1	7.5	FS22801-16-A	16	

**Note:** Kit contains filter, cover, and mounting hardware.



## Options J1000 Drive

**Dynamic Braking Resistor, 3% Duty Cycle** - are rated for 3% duty cycle over a 100-second interval. Approximate braking torque for each rating is listed. These resistors are designed in NEMA 1 enclosures for separate panel mounting.

Rated Input Voltage	Drive Model Number CIMR-JU	Normal Duty		Heavy Duty		3% DB Resistor					Dimensions (in.)		
		Rated Output Current (Amps)	Nominal HP	Rated Output Current (Amps)	Nominal HP	Part Number	Qty Reqd	Resistance (Ohms) (Each)	Power (Watts) (Each)	Approx. Braking Torque (%)	H	W	D
200-240V 1-Phase	BA0001BAA	1.2	1/8 & 1/4	0.8	1/8	R7507	1	400	150	125	7.16	1.73	0.51
	BA0002BAA	1.9	1/4	1.6	1/4	R7507	1	400	150	125	7.16	1.73	0.51
	BA0003BAA	3.5	1/2 & 3/4	3.0	1/2	R7505	1	200	150	230	7.16	1.73	0.51
	BA0006BAA	6.0	1	5.0	3/4 & 1	R7505	1	200	150	230	7.16	1.73	0.51
	BA0010BAA	9.6	2 & 3	8.0	2	R7504	1	100	150	125	7.16	1.73	0.51
200-240V 3-Phase	2A0001BAA	1.2	1/8 & 1/4	0.8	1/8	R7507	1	400	150	125	7.16	1.73	0.51
	2A0002BAA	1.9	1/4	1.6	1/4	R7507	1	400	150	125	7.16	1.73	0.51
	2A0004BAA	3.5	1/2 & 3/4	3.0	1/2	R7505	1	200	150	230	7.16	1.73	0.51
	2A0006BAA	6.0	1	5.0	3/4 & 1	R7505	1	200	150	230	7.16	1.73	0.51
	2A0010BAA	9.6	2 & 3	8.0	2	R7504	1	100	150	125	7.16	1.73	0.51
	2A0012BAA	12.0	3	11.0	3	R7503	1	70	150	120	7.16	1.73	0.51
	2A0020BAA	19.6	5	17.5	5	R7510	1	62	150	100	7.16	1.73	0.51
380-480V 3-Phase	4A0001BAA	1.2	1/2	1.2	1/2	R7508	1	750	150	230	7.16	1.73	0.51
	4A0002BAA	2.1	3/4 & 1	1.8	3/4	R7508	1	750	150	230	7.16	1.73	0.51
	4A0004BAA	4.1	2	3.4	1 & 2	R7508	1	750	150	130	7.16	1.73	0.51
	4A0005BAA	5.4	3	4.8	3	R7507	1	400	150	125	7.16	1.73	0.51
	4A0007BAA	6.9	4	5.5	3	R7507	2	400	150	125	7.16	1.73	0.51
	4A0009BAA	8.8	5	7.2	4	R7507	2	400	150	120	7.16	1.73	0.51
4A0011BAA	11.1	7.5	9.2	5	R7507	2	400	150	120	7.16	1.73	0.51	



**Dynamic Braking Resistor, 10% Duty Cycle** - are rated for 10% duty cycle over a 100-second interval. Approximate braking torque for each rating is listed. These resistors are designed in vented NEMA 1 enclosures for separate panel mounting. The built-in braking module supports the 3% and 10% duty cycle resistors listed here and on the previous page.

Rated Input Voltage	Drive Model Number CIMR-JU	Normal Duty		Heavy Duty		10% DB Resistor								
		Rated Output Current (Amps)	Nominal HP	Rated Output Current (Amps)	Nominal HP	New Part No. USR000	Qty Reqd	Resistance (Ohms) (Each)	Power (Watts) (Each)	Approx. Braking Torque (%)		Dimensions (in.)		
										ND	HD	L	W	H
200-240V 1-Phase	BA0001BAA	1.2	1/8 & 1/4	0.8	1/8	032	1	750	600	120	150	12	7	5
	BA0002BAA	1.9	1/4	1.6	1/4	033	1	400	350	120	150	12	7	5
	BA0003BAA	3.5	1/2 & 3/4	3.0	1/2	022	1	200	250	120	150	12	5	5
	BA0006BAA	6.0	1	5.0	3/4 & 1	035	1	150	350	102	150	12	7	5
	BA0010BAA	9.6	2 & 3	8.0	2	024	1	70	250	107	150	12	7	5
200-240V 3-Phase	2A0001BAA	1.2	1/8 & 1/4	0.8	1/8	032	1	750	600	120	150	12	7	5
	2A0002BAA	1.9	1/4	1.6	1/4	033	1	400	350	120	150	12	7	5
	2A0004BAA	3.5	1/2 & 3/4	3.0	1/2	022	1	200	250	120	150	12	5	5
	2A0006BAA	6.0	1	5.0	3/4 & 1	035	1	150	350	102	150	12	7	5
	2A0010BAA	9.6	2 & 3	8.0	2	024	1	70	250	107	150	12	7	5
	2A0012BAA	12.0	3	11.0	3					107	107	12	7	5
	2A0020BAA	19.6	5	17.5	5	025	1	40	846	111	111	12	7	5
380-480V 3-Phase	4A0001BAA	1.2	1/2	1.2	1/2	032	1	750	600	120	150	12	7	5
	4A0002BAA	2.1	3/4 & 1	1.8	3/4					120	150	12	7	5
	4A0004BAA	4.1	2	3.4	1 & 2	032	1	750	600	61	61	12	7	5
	4A0005BAA	5.4	3	4.8	3	034	1	250	350	119	119	12	7	5
	4A0007BAA	6.9	4	5.5	3	034	1	250	350	119	119	12	7	5
	4A0009BAA	8.8	5	7.2	4	035	1	150	350	118	150	12	7	5
	4A0011BAA	11.1	7.5	9.2	5	035	1	150	350	118	150	12	7	5



**Options**  
**J1000 Drive**

**DIN Rail Mounting Kits** - The DIN rail attachment kit allows the drive to be mounted on a 35 mm DIN rail. The DIN rail itself is not included in the kit. Option kit for customer mounting.

Rated Input Voltage	Drive Model Number CIMR-JU	Rated Output Current (Amps)	Nominal HP	DIN Rail Kit
				Part Number 72606-EZZ08122
200-240V 1-Phase	BA0001BAA	1.2	1/8 & 1/4	A
	BA0002BAA	1.9	1/4	
	BA0003BAA	3.3	1/2 & 3/4	
	BA0006BAA	6.0	1	B
	BA0010BAA	9.6	2 & 3	
200-240V 3-Phase	2A0001BAA	1.2	1/8 & 1/4	A
	2A0002BAA	1.9	1/4	
	2A0004BAA	3.5	1/2 & 3/4	
	2A0006BAA	6.0	1	B
	2A0010BAA	9.6	2 & 3	
	2A0012BAA	12.0	3	
380-480V 3-Phase	2A0020BAA	19.6	5	C
	4A0001BAA	1.2	1/2	B
	4A0002BAA	2.1	3/4 & 1	
	4A0004BAA	4.1	2	
	4A0005BAA	5.4	3	
	4A0007BAA	6.9	4	
	4A0009BAA	8.8	5	C
4A0011BAA	11.1	7.5		





**NEMA 1 Enclosure Kits** - These kits provide a bottom metal box to protect fingers from hazardous voltages, and a top plastic cover to protect the drive from falling debris. Option kit for customer mounting.

Rated Input Voltage	Drive Model Number CIMR-JU	Rated Output Current (Amps)	Nominal HP	NEMA 1 Enclosure Kit
				Part Number EZZ020564__
200-240V 1-Phase	BA0001FAA	1.2	1/8 & 1/4	A
	BA0002FAA	1.9	1/4	
	BA0003FAA	3.3	1/2 & 3/4	B
	BA0006FAA	6.0	1	C
	BA0010FAA	9.6	2 & 3	D
200-240V 3-Phase	2A0001FAA	1.2	1/8 & 1/4	A
	2A0002FAA	1.9	1/4	
	2A0004FAA	3.5	1/2 & 3/4	
	2A0006FAA	6.0	1	
	2A0010FAA	9.6	2 & 3	G
	2A0012FAA	12.0	3	C
	2A0020FAA	19.6	5	H
380-480V 3-Phase	4A0001FAA	1.2	1/2	G
	4A0002FAA	2.1	3/4 & 1	C
	4A0004FAA	4.1	2	
	4A0005FAA	5.4	3	L
	4A0007FAA	6.9	4	
	4A0009FAA	8.8	5	
	4A0011FAA	11.1	7.5	H



## Options J1000 Drive

**Remote Interface, RS232C.** This option allows for RS232 communication to a Remote LED Digital Operator (JVOP-182).  
**Model No. SI-232/J**

**Remote Interface, RS232C.** This option allows for RS232 communication to PC software such as DriveWizard Plus or USB Copy Unit (Y-Stick, JVOP-181).  
**Model No. SI-232/JC**

**Remote Interface, RS485/422.** This option allows the drive to realize RS485/422 network communication with Modbus protocol.  
**Model No. SI-485/J**

**Analog Potentiometer Card.** This option provides an analog potentiometer for frequency control, mounted to the front of the J1000 drive.  
**Model No. AI-V3/J**

**USB Copy Unit (Y-Stick).** This option allows the drive to connect to the USB port on a PC. It can read, copy and verify drive parameter settings from one drive to another like drive. The unit plugs into the RS232C Remote Interface (SI-232/JC) option.  
**Model No. JVOP-181**

**CopyUnitManager Software for USB Copy Unit (Y-Stick).** This option allows the user to transfer and save parameter files from the Copy Unit (JVOP-181) to a PC and vice versa.  
**No Model No.**

**UL Rated Remote Operator Kits.** This option is used to extend the existing Digital Operator to the wall of a separately priced, oversized UL Type 1, 3R, 4, 4X, or 12 enclosure (IPX6 environment). Price includes a faceplate bezel with digital operator brackets and membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, and a 1:1 template for cutting the necessary cutouts in the enclosure. Keypad can be removed after kit installation. Designed for use with the LED Operator (JVOP-182) sold separately.  
Connects to RJ45 port and mounts to enclosure wall.  
**Model No. UUX000526 (Blank Membrane)**  
**Model No. UUX000527 (Yaskawa Logo Membrane)**

**Operator, LED Digital Remote.** This option allows the drive to be operated from a remote location. It requires the RS232C Remote Interface (SI-232/J), sold separately. This option also requires Installation Set A (EZZ020642A) for panel or door mounting and Remote Operator Cable (UWR0051 or UWR0052), each sold separately.

**Model No. JVOP-182**

**Operator Cable, Remote.** These cables are used to connect the Remote LED Digital Operator (JVOP-182). They are available in one (1) or three (3) meter lengths.

**Model No. UWR0051 (1 meter)**

**Model No. UWR0052 (3 meter)**

**LED Keypad Installation Set A (Remote Operator Mounting Bracket Kit).** This is a bracket to which the LED Digital Remote Operator (JVOP-182) attaches, and has (4) threaded holes and screws to attach to the cover of an enclosure. The kit contains (2) screws to mount the Operator to the bracket and (4) screws to attach the bracket to the enclosure.

**Model No. EZZ020642A**

**LED Keypad Installation Set B (Remote Operator Mounting Bracket Kit).** Contains a similar bracket that the keypad attaches to and has non-threaded holes for mounting to an enclosure that has the screws attached to the enclosure already. The kit contains (2) screws to mount the keypad to the bracket and (4) nuts to attach the bracket to the customer supplied screws attached to the enclosure.

**Model No. EZZ020642B**

**DriveWizard Plus Software.** This optional software package allows upload and download of parameters via PC for data storage and for programming multiple drives. The software also includes graphing and monitoring tools. It is a Windows-based program designed to make startup, commissioning, and troubleshooting of the J1000 as simple as possible. Refer to our website at [www.yaskawa.com](http://www.yaskawa.com) to download the software, and for more information, including minimum system requirements and cable information to interface a PC to V1000 or J1000 drives.

**No Model No.**

**PC Interface Cable.** This 6-foot cable interconnects the drive keypad port to the 9-pin communication port on a PC. This cable is used in conjunction with DriveWizard Plus software.

**Model No. UWR00468-2**

# Description

## 1/8-25HP

V1000



The V1000 is a world-class compact current vector drive that defines a new world standard. Demands for efficient production and better maintainability are on the rise, spurred by global competition. Yaskawa drives have earned a reputation for high performance, high functionality, and high quality.

### Performance Features

- Ratings:  
1/8 to 5 HP at 200-240 VAC 1-Ph.  
1/8 to 25 HP (ND) at 200-240 VAC 3-Ph.  
1/2 to 25 HP (ND) at 380-480 VAC 3-Ph.
- Overload Capacity:  
150% for 60 sec. (Heavy Duty)  
120% for 60 sec. (Normal Duty)
- Control Methods: V/f Control,  
Open Loop Current Vector Control,  
PM Open Loop Current Vector Control  
Simple closed loop speed control
- DC injection braking, ramp to stop
- Electronic reversing
- Adjustable accel/decel: 0.01 to 6000 seconds
- Controlled speed range:  
40:1<sup>(1)</sup> 100:1<sup>(2)</sup>
- Speed Regulation:  
± 0.5 to 1% with slip compensation<sup>(1)</sup>  
± 0.2%<sup>(2)</sup>
- Displacement power factor: 0.98
- Output frequency: 0 to 400 Hz
- Frequency resolution:  
0.01 Hz with digital reference  
0.06 / 60 Hz with analog reference
- Frequency accuracy:  
0.01% with digital command  
0.5% with analog command
- Volts / hertz ratio: infinitely adjustable pattern
- DC Injection braking: adjustable amplitude, duration, current limited
- Torque boost: full range, auto
- Power loss ride-thru: 0.5 sec.
- Speed search
- Auto restart
- 3 Critical frequency rejection settings
- Slip Compensation
- Energy Savings Function
- Enhanced PID with loss of feedback function

<sup>(1)</sup> V/f Mode

<sup>(2)</sup> Open Loop Current Vector Mode

### Design Features

- Dual microprocessor logic
- Digital keypad operator, 5 digits
- LED status display
- Remote Mount Keypad Capability
- RJ-45 Style Digital Operator Connector
- 7 multifunction digital inputs
- 3 multifunction digital outputs
- Hardwire baseblock (EN954-1 Cat. 3)
- Programmable form C output contact for customer use: 1A at 250 VAC or 30 VDC
- 24 VDC control logic compatible with sourcing or sinking outputs (PNP or NPN)
- Carrier frequency: 15 kHz max; swing PWM
- 16 multi-speed settings plus jog speed
- 2 Remote speed references:  
0-10 VDC (20 kohms) or isolated 4-20 mA (250 ohms)
- Signal follower: bias and gain
- 2 programmable open collector outputs
- Analog monitor output:  
0-10 VDC proportional to output frequency or output current
- Approx. 400 parameters and monitors
- Digital pulse train input (33 kHz max.)
- Cooling fan controlled by drive run/stop
- RS-422/485 Modbus 115 kbps
- UL recognized electronic overload
- MTBF: 28 years
- Built-in Dynamic Braking Transistor
- NEMA 1 enclosure
- Side-by-Side mounting
- Application presets
- Maintenance monitors

### Protective Features

- Current limit, stall prevention during accel, decel, and run
- Motor and drive overload
- Over voltage prevention function
- Instantaneous over current
- Short circuit
- Under voltage
- Heatsink overheat
- Ground fault protection
- Over/under torque
- Short circuit current rating: 30kA rms sym.

### Service Conditions

- Ambient service temperature:  
-10° to 40°C (+14° to 104°F) NEMA 1  
-10° to 50°C (+14° to 122°F) Open Chassis
- Ambient storage temperature:  
-20° to 60°C (-4° to 140°F)
- Humidity: to 95% non-condensing
- Altitude: to 3300 ft; higher by derating
- Service factor: 1.0
- Input voltage: -15% to +10%  
200 to 240 VAC, 380 to 480 VAC
- Input frequency: +/-5%; 50/60 Hz
- Input phase sequence insensitive

### Options

- Dynamic Braking resistor (external)
- Multi-lingual, full-text remote LCD w/ copy
- Profibus-DP, DeviceNet Communications
- Modbus TCP/IP, EtherNet/IP Communications
- MECHATROLINK-II communications
- DriveWizard Plus
- CASE software
- DIN rail mounting kit
- USB Copy Unit (Y-Stick)
- Reactors, 3% and 5%
- EMC filters, C1 and C3
- Adapter plates
- External heatsink kits
- 24V control power unit
- Remote LED operator
- Remote LCD operator
- 120V interface

### Standards

- UL 508C (Power Conversion)
- CSA 22.2 No. 14-95 (Industrial Control Equipment)
- UL, cUL listed; CE marked
- RoHS compliant
- EN 50178 (LVD)
- EN 50081-2, EN 50082-2 (EMC)
- EN 954-1, Category 3 Safety Standard
- EN 61800-3
- IEC 529, 146
- FCC CFR 47 Part 15 Subpart B (w/ External Filter)
- TUV

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# Standard Drives



Rated Input Voltage	Drive Model Number CIMR-VU <sup>(3)</sup>	Normal Duty <sup>(1)</sup>		Heavy Duty <sup>(1)</sup>	
		Rated Output Current (Amps)	Nominal HP <sup>(2)</sup>	Rated Output Current (Amps)	Nominal HP <sup>(2)</sup>
200-240V 1-Phase	BA0001FAA	1.2	1/8 & 1/4	0.8	1/8
	BA0002FAA	1.9	1/4	1.6	1/4
	BA0003FAA	3.3	1/2 & 3/4	3.0	1/2
	BA0006FAA	6.0	1	5.0	3/4 & 1
	BA0010FAA	9.6	2 & 3	8.0	2
	BA0012FAA	12.0	3	11.0	3
	BA0018FAA	17.5	5	17.5	5
200-240V 3-Phase	2A0001FAA	1.2	1/8 & 1/4	0.8	1/8
	2A0002FAA	1.9	1/4	1.6	1/4
	2A0004FAA	3.5	1/2 & 3/4	3.0	1/2
	2A0006FAA	6.0	1	5.0	3/4 & 1
	2A0010FAA	9.6	2 & 3	8.0	2
	2A0012FAA	12.0	3	11	3
	2A0020FAA	19.6	5	17.5	5
	2A0030FAA	30.0	7.5 & 10	25.0	7.5
	2A0040FAA	40.0	10	33.0	10
	2A0056FAA	56.0	20	47.0	15
	2A0069FAA	69.0	25	57.5	20
380-480V 3-Phase	4A0001FAA	1.2	1/2	1.2	1/2
	4A0002FAA	2.1	3/4 & 1	1.8	3/4
	4A0004FAA	4.1	2	3.4	1 & 2
	4A0005FAA	5.4	3	4.8	3
	4A0007FAA	6.9	4	5.5	3
	4A0009FAA	8.8	5	7.2	4
	4A0011FAA	11.1	7.5	9.2	5
	4A0018FAA	18.0	10	15.0	7.5 & 10
	4A0023FAA	24.0	15	19.2	10
	4A0031FAA	31.0	20	25.8	15
	4A0038FAA	38.0	25	31.7	20

- (1) Normal Duty overload current rating is 120% of rated output current for 60 seconds; Heavy Duty overload current rating is 150% of rated output current for 60 seconds
- (2) Horsepower rating is based on 230-volt and 460-volt induction-type squirrel-cage NEMA B 4-pole motors as represented in NEC table 430.250 Full-Load Current, Three-Phase Alternating Current Motors
- (3) All standard V1000 ratings are typically in stock.

# V1000

## V1000 Drive Variants

**V1000 Finless** - Finless (flat heatsink) drives are intended to be installed in a customer's enclosure with an external heatsink. Replace standard "FAA" at end of drive model number with "JAA" (or "LAA").

**V1000 Open Chassis** - Open chassis drives are intended to be installed in a customer's enclosure and meet IP20 ("BAA") or IP00 ("AAA"). Replace standard "FAA" at end of drive model number with "BAA" (or "AAA").

**V1000 w/ C3 Filter** - These drives include a built-in C3 filter; see "EMC C3 Filters" on page 29. Replace standard "FAA" at end of drive model number with "EAA."

Rated Input Voltage	Normal Duty <sup>(1)</sup>		Heavy Duty <sup>(1)</sup>		Finless <sup>(3)</sup>	Open <sup>(3)</sup>	w/ C3 Filter <sup>(3)</sup>
	Rated Output Current (Amps)	Nominal HP <sup>(2)</sup>	Rated Output Current (Amps)	Nominal HP <sup>(2)</sup>	Drive Model Number CIMR-VU	Drive Model Number CIMR-VU	Drive Model Number CIMR-VU
200V, 1-Phase	1.2	1/8 & 1/4	0.8	1/8	BA0001JAA	BA0001BAA	BA0001EAA
	1.9	1/4	1.6	1/4	BA0002JAA	BA0002BAA	BA0002EAA
	3.3	1/2 & 3/4	3.0	1/2	BA0003JAA	BA0003BAA	BA0003EAA
	6.0	1	5.0	3/4 & 1	BA0006JAA	BA0006BAA	BA0006EAA
	9.6	2 & 3	8.0	2	BA0010JAA	BA0010BAA	BA0010EAA
	12.0	3	11.0	3	BA0012JAA	BA0012BAA	BA0012EAA
	17.5	5	17.5	5	Consult Factory	BA0018BAA	Consult Factory
200V, 3-Phase	1.2	1/8 & 1/4	0.8	1/8	2A0001JAA	2A0001BAA	Consult Factory
	1.9	1/4	1.6	1/4	2A0002JAA	2A0002BAA	
	3.5	1/2 & 3/4	3.0	1/2	2A0004JAA	2A0004BAA	
	6.0	1	5.0	3/4 & 1	2A0006JAA	2A0006BAA	
	9.6	2 & 3	8.0	2	2A0010JAA	2A0010BAA	
	12.0	3	11.0	3	2A0012JAA	2A0012BAA	
	19.6	5	17.5	5	2A0020JAA	2A0020BAA	
	30.0	7.5 & 10	25.0	7.5	2A0030JAA	2A0030AAA	
	40.0	10	33.0	10	2A0040JAA	2A0040AAA	
	56.0	20	47.0	15	2A0056JAA	2A0056AAA	
69.0	25	60.0	20	2A0069JAA	2A0069AAA		
400V, 3-Phase	1.2	1/2	1.2	1/2	4A0001JAA	4A0001BAA	4A0001EAA
	2.1	3/4 & 1	1.8	3/4	4A0002JAA	4A0002BAA	4A0002EAA
	4.1	2	3.4	1 & 2	4A0004JAA	4A0004BAA	4A0004EAA
	5.4	3	4.8	3	4A0005JAA	4A0005BAA	4A0005EAA
	6.9	4	5.5	3	4A0007JAA	4A0007BAA	4A0007EAA
	8.8	5	7.2	4	4A0009JAA	4A0009BAA	4A0009EAA
	11.1	7.5	9.2	5	4A0011JAA	4A0011BAA	4A0011EAA
	18.0	10	15.0	7.5 & 10	4A0018JAA	4A0018AAA	Consult Factory
	24.0	15	19.2	10	4A0023JAA	4A0023AAA	
	31.0	20	25.8	15	4A0031JAA	4A0031AAA	
38.0	25	31.7	20	4A0038JAA	4A0038AAA		

(1) Normal Duty overload current rating is 120% of rated output current for 60 seconds; Heavy Duty overload current rating is 150% of rated output current for 60 seconds

(2) Horsepower rating is based on standard NEMA B 4-pole motor design and NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors

(3) All variant drives have a 16-week lead time unless a forecast is provided

# V1000 Drive Variants



**V1000 Conformal Coat** - These drives include circuit boards that have been conformally coated with Humiseal™ for humidity and dust resistance. Note that this variant is only available in open chassis at this time. Replace standard “FAA” at end of drive model number with “BMA” (or “AMA”).

**V1000 Shakeproof** - These drives include components that have been strengthened for increased vibration resistance. Note that this variant is only available in finless version at this time. Replace standard “FAA” at end of drive model number with “JSA.”

**V1000 w/ 1667 Hz Software** - These drives include custom software that allows output frequencies up to 1667 Hz. Delete “CIMR-” prefix and add “-134” at end of drive model number.

Rated Input Voltage	Normal Duty <sup>(1)</sup>		Heavy Duty <sup>(1)</sup>		Conformal Coat <sup>(3)</sup>	Shakeproof <sup>(3)</sup>	1667 Hz <sup>(3)</sup>
	Rated Output Current (Amps)	Nominal HP <sup>(2)</sup>	Rated Output Current (Amps)	Nominal HP <sup>(2)</sup>	Drive Model Number CIMR-VU	Drive Model Number CIMR-VU	Drive Model Number VU
200V, 1-Phase	1.2	1/8 & 1/4	0.8	1/8	Consult Factory	Consult Factory	BA0001FAA-134
	1.9	1/4	1.6	1/4			BA0002FAA-134
	3.3	1/2 & 3/4	3.0	1/2			BA0003FAA-134
	6.0	1	5.0	3/4 & 1			BA0006FAA-134
	9.6	2 & 3	8.0	2			BA0010FAA-134
	12.0	3	11.0	3			BA0012FAA-134
	17.5	5	17.5	5			BA0018FAA-134
200V, 3-Phase	1.2	1/8 & 1/4	0.8	1/8	Consult Factory	Consult Factory	2A0001FAA-134
	1.9	1/4	1.6	1/4			2A0002FAA-134
	3.5	1/2 & 3/4	3.0	1/2			2A0004FAA-134
	6.0	1	5.0	3/4 & 1	2A0006BMA	2A0006JSA	2A0006FAA-134
	9.6	2 & 3	8.0	2	2A0010BMA	2A0010JSA	2A0010FAA-134
	12.0	3	11.0	3	2A0012BMA	2A0012JSA	2A0012FAA-134
	19.6	5	17.5	5	2A0020BMA	2A0020JSA	2A0020FAA-134
	30.0	7.5 & 10	25.0	7.5	2A0030BMA	2A0030JSA	2A0030FAA-134
	40.0	10	33.0	10	Consult Factory	Consult Factory	2A0040FAA-134
	56.0	20	47.0	15			2A0056FAA-134
69.0	25	60.0	20	2A0069FAA-134			
400V, 3-Phase	1.2	1/2	1.2	1/2	Consult Factory	Consult Factory	4A0001FAA-134
	2.1	3/4 & 1	1.8	3/4			4A0002FAA-134
	4.1	2	3.4	1 & 2	4A0004BMA	4A0004JSA	4A0004FAA-134
	5.4	3	4.8	3	4A0005BMA	4A0005JSA	4A0005FAA-134
	6.9	4	5.5	3	4A0007BMA	4A0007JSA	4A0007FAA-134
	8.8	5	7.2	4	4A0009BMA	4A0009JSA	4A0009FAA-134
	11.1	7.5	9.2	5	4A0011BMA	4A0011JSA	4A0011FAA-134
	18.0	10	15.0	7.5 & 10	4A0018AMA	Consult Factory	4A0018FAA-134
	24.0	15	19.2	10	Consult Factory		4A0023FAA-134
	31.0	20	25.8	15			4A0031FAA-134
	38.0	25	31.7	20			4A0038FAA-134

- (1) Normal Duty overload current rating is 120% of rated output current for 60 seconds; Heavy Duty overload current rating is 150% of rated output current for 60 seconds
- (2) Horsepower rating is based on standard NEMA B 4-pole motor design and NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors
- (3) All variant drives have a 16-week lead time unless a forecast is provided

**Dimensions and Data**

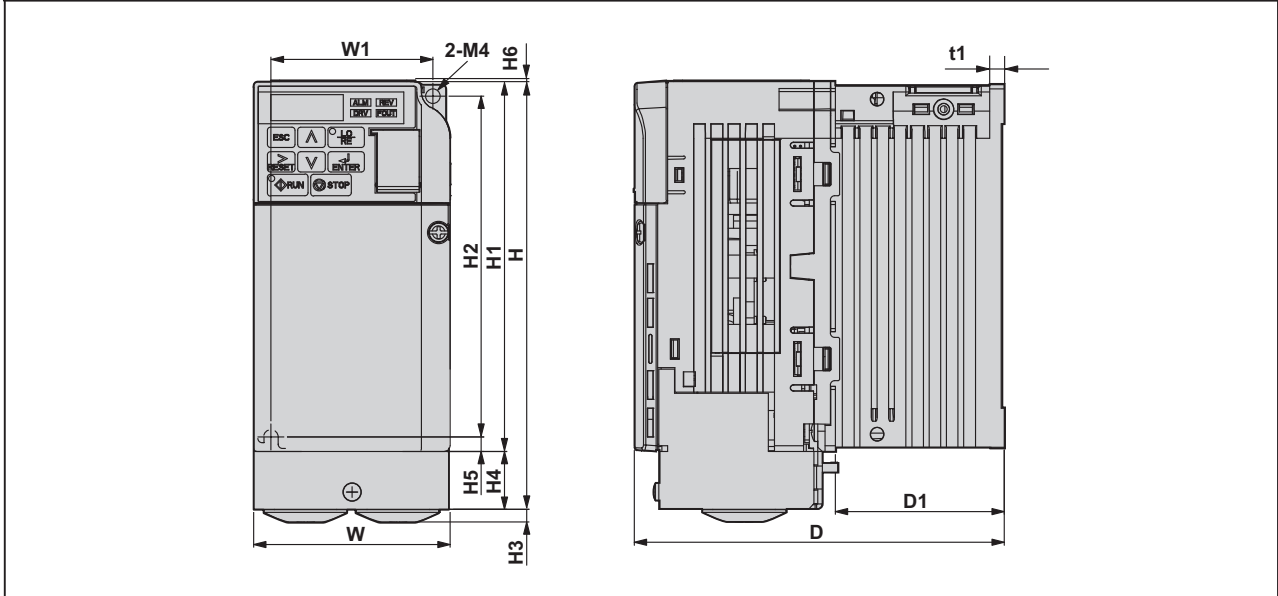
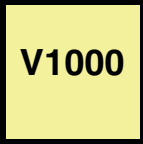
Rated Input Voltage	Drive Model Number CIMR-VU	Normal Duty		Heavy Duty		Physical Dimensions (in.)			Mounting Dimensions		Weight (lbs.) <sup>(1)</sup>	Drawing Number DD.V1K.FR_
		Rated Output Current (Amps)	Nominal HP	Rated Output Current (Amps)	Nominal HP	H	W	D	H1	W1		
200-240V 1-Phase	B_0001_AA	1.2	1/8 & 1/4	0.8	1/8	5.89	2.68	2.99	5.10	2.20	1.8	1
	B_0002_AA	1.9	1/4	1.6	1/4	5.89	2.68	2.99	5.10	2.20	1.8	1
	B_0003_AA	3.3	1/2 & 3/4	3.0	1/2	5.89	2.68	4.65	5.10	2.20	2.6	3
	B_0006_AA	6.0	1	5.0	3/4 & 1	5.89	4.25	5.41	5.10	3.78	4.2	8
	B_0010_AA	9.6	2 & 3	8.0	2	5.89	4.25	6.06	5.10	3.78	4.4	10
	B_0012_AA	12.0	3	11.0	3	6.02	5.51	6.42	5.24	5.04	5.7	12
	B_0018_AA	17.5	5	17.5	5	6.02	6.69	7.09	5.24	6.22	6.6	13
200-240V 3-Phase	2_0001_AA	1.2	1/8 & 1/4	0.8	1/8	5.89	2.68	2.99	5.10	2.20	1.8	1
	2_0002_AA	1.9	1/4	1.6	1/4	5.89	2.68	2.99	5.10	2.20	1.8	1
	2_0004_AA	3.5	1/2 & 3/4	3	1/2	5.89	2.68	4.25	5.10	2.20	2.4	2
	2_0006_AA	6.0	1	5	3/4 & 1	5.89	2.68	5.04	5.10	2.20	2.9	4
	2_0010_AA	9.6	2 & 3	8	2	5.89	4.25	5.08	5.10	3.78	4.2	7
	2_0012_AA	12.0	3	11	3	5.89	4.25	5.41	5.10	3.78	4.2	8
	2_0020_AA	19.6	5	17.5	5	6.02	5.51	5.63	5.24	5.04	5.7	11
	2_0030_AA	30.0	7.5 & 10	25.0	7.5	10.00	5.51	5.51	9.76	4.80	8.4	14
2_0040_AA	40.0	10	33.0	10	10.00	5.51	5.51	9.76	4.80	8.4	14	
	2_0056_AA	56.0	20	47.0	15	11.42	7.09	6.42	11.18	6.30	12.1	16
	2_0069_AA	69.0	25	57.5	20	14.09	8.66	7.36	13.23	7.56	20.2	17
380-480V 3-Phase	4_0001_AA	1.2	1/2	1.2	1/2	5.89	4.25	3.19	5.10	3.78	2.6	5
	4_0002_AA	2.1	3/4 & 1	1.8	3/4	5.89	4.25	3.90	5.10	3.78	3.1	6
	4_0004_AA	4.1	2	3.4	1 & 2	5.89	4.25	5.41	5.10	3.78	3.5	8
	4_0005_AA	5.4	3	4.8	3	5.89	4.25	6.06	5.10	3.78	4.2	9
	4_0007_AA	6.9	4	5.5	3	5.89	4.25	6.06	5.10	3.78	4.2	9
	4_0009_AA	8.8	5	7.2	4	5.89	4.25	6.06	5.10	3.78	4.2	9
	4_0011_AA	11.1	7.5	9.2	5	6.02	5.51	5.63	5.24	5.04	5.7	11
	4_0018_AA	18.0	10	15.0	7.5 & 10	10.00	5.51	5.51	9.21	4.80	8.4	14
4_0023_AA	24.0	15	19.2	10	10.00	5.51	5.51	9.21	4.80	8.4	14	
	4_0031_AA	31.0	20	25.8	15	11.42	7.09	5.63	10.63	6.30	11.4	15
	4_0038_AA	38.0	25	31.7	20	11.42	7.09	6.42	10.63	6.30	12.1	16

(1) This data represents the drive weight only, not shipping weight.



# Dimension Drawing

DD.V1000.01  
V1000 NEMA 1

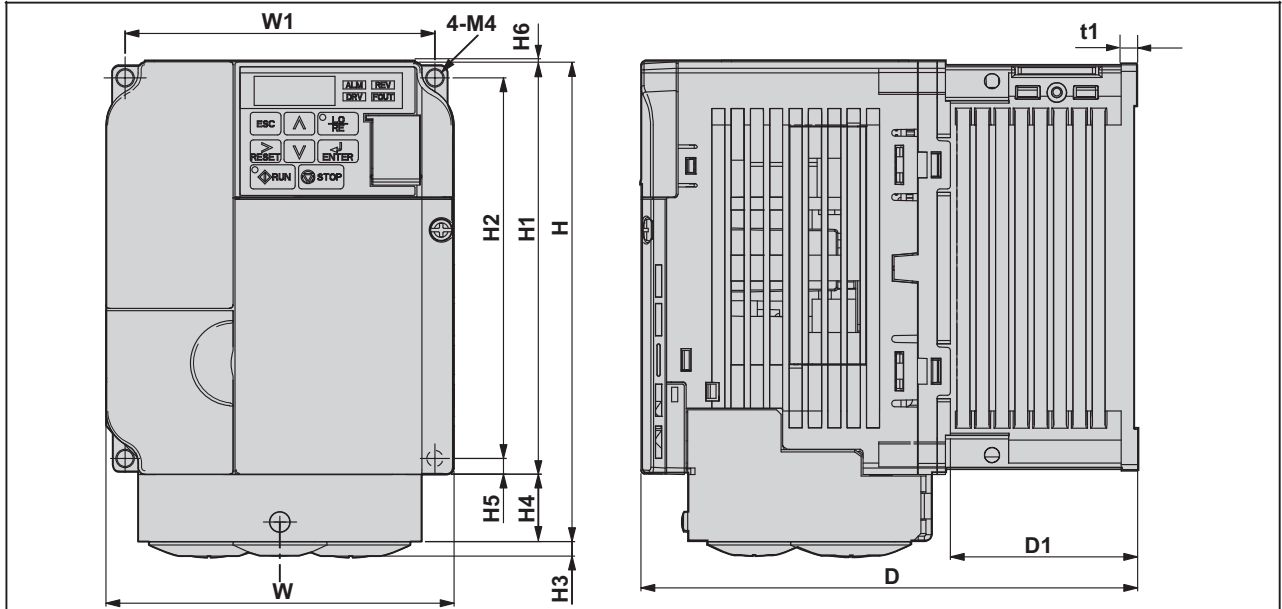


Voltage Class	Drive Model CIMR-V□	Dimensions (in)												Weight (lb.)
		W1	H2	W	H1	D	t1	H5	D1	H	H4	H3	H6	
Single-Phase 200 V Class	B□0001F	2.20	4.65	2.68	5.03	2.99	0.12	0.20	0.26	5.89	0.79	0.16	0.06	1.8
	B□0002F	2.20	4.65	2.68	5.03	2.99	0.12	0.20	0.26	5.89	0.79	0.16	0.06	1.8
	B□0003F	2.20	4.65	2.68	5.03	4.65	0.20	0.20	1.54	5.89	0.79	0.16	0.06	2.6
Three-Phase 200 V Class	2□0001F	2.20	4.65	2.68	5.03	2.99	0.12	0.20	0.26	5.89	0.79	0.16	0.06	1.8
	2□0002F	2.20	4.65	2.68	5.03	2.99	0.12	0.20	0.26	5.89	0.79	0.16	0.06	1.8
	2□0004F	2.20	4.65	2.68	5.03	4.25	0.20	0.20	1.54	5.89	0.79	0.16	0.06	2.4
	2□0006F	2.20	4.65	2.68	5.03	5.04	0.20	0.20	2.32	5.89	0.79	0.16	0.06	2.9

**V1000**

# Dimension Drawing

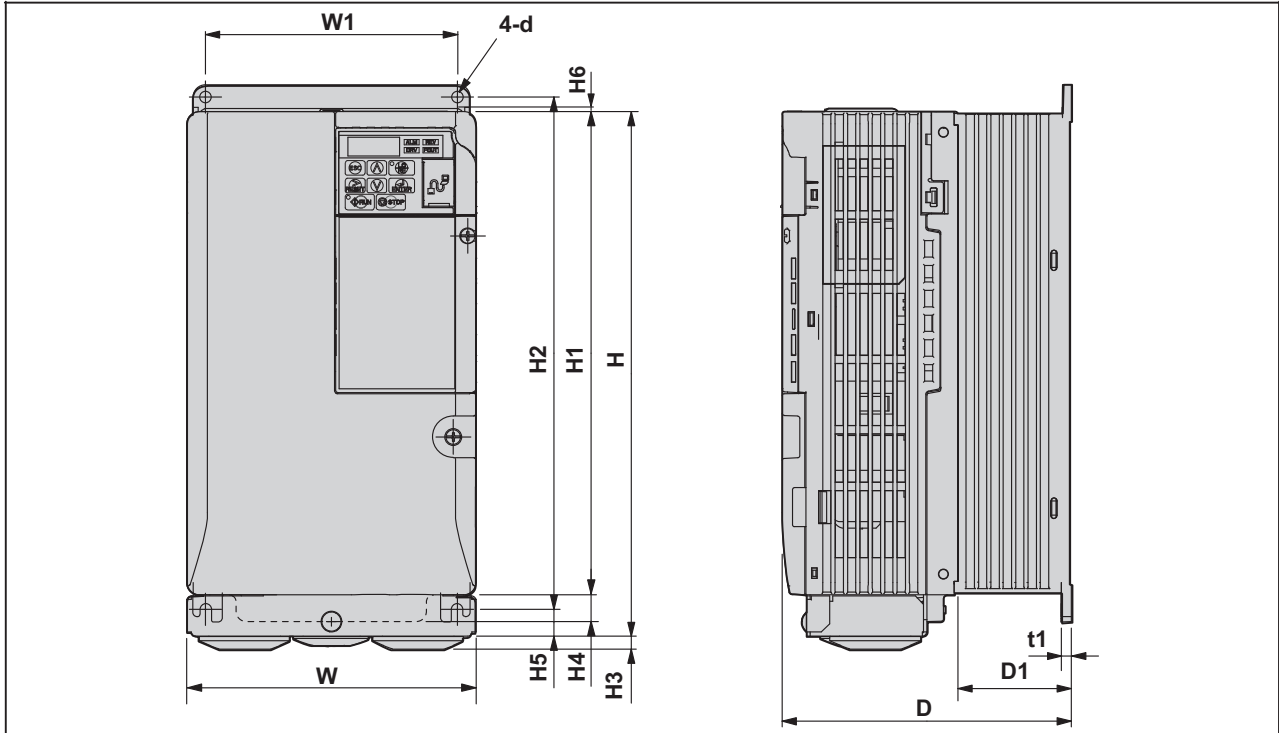
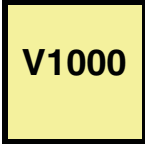
DD.V1000.02  
V1000 NEMA 1



Voltage Class	Drive Model CIMR-V□	Dimensions (in)												Weight (lb.)
		W1	H2	W	H1	D	t1	H5	D1	H	H4	H3	H6	
Single-Phase 200 V Class	B□0006F	3.78	4.65	4.25	5.03	5.41	0.20	0.20	2.28	5.89	0.79	0.16	0.06	4.2
	B□0010F	3.78	4.65	4.25	5.03	6.06	0.20	0.20	2.28	5.89	0.79	0.16	0.06	4.4
	B□0012F	5.04	4.65	5.51	5.03	6.42	0.20	0.20	2.56	6.02	0.79	0.19	0.20	5.7
	B□0018F	6.22	4.64	6.69	5.23	7.08	0.20	0.20	2.56	6.73	1.50	0.19	0.20	7.3
Three-Phase 200 V Class	2□0010F	3.78	4.65	4.25	5.03	5.08	0.20	0.20	2.28	5.89	0.79	0.16	0.06	4.2
	2□0012F	3.78	4.65	4.25	5.03	5.41	0.20	0.20	2.28	5.89	0.79	0.16	0.06	4.2
	2□0020F	5.04	4.65	5.51	5.03	5.63	0.20	0.20	2.56	6.02	0.79	0.19	0.20	5.7
Three-Phase 400 V Class	4□0001F	3.78	4.65	4.25	5.03	3.19	0.20	0.20	0.39	5.89	0.79	0.16	0.06	2.6
	4□0002F	3.78	4.65	4.25	5.03	3.90	0.20	0.20	1.10	5.89	0.79	0.16	0.06	3.1
	4□0004F	3.78	4.65	4.25	5.03	5.41	0.20	0.20	2.28	5.89	0.79	0.16	0.06	4.2
	4□0005F	3.78	4.65	4.25	5.03	6.06	0.20	0.20	2.28	5.89	0.79	0.16	0.06	4.2
	4□0007F	3.78	4.65	4.25	5.03	6.06	0.20	0.20	2.28	5.89	0.79	0.16	0.06	4.2
	4□0009F	3.78	4.65	4.25	5.03	6.06	0.20	0.20	2.28	5.89	0.79	0.16	0.06	4.2
	4□0011F	5.04	4.65	5.51	5.03	5.63	0.20	0.20	2.56	6.02	0.79	0.19	0.20	5.7

# Dimension Drawing

DD.V1000.03  
V1000 NEMA 1



Voltage Class	Drive Model CIMR-V□	Dimensions (in)													Weight (lb.)
		W1	H2	W	H1	D	t1	H5	D1	H	H4	H3	H6	d	
Three-Phase 200 V Class	2□0030F	4.80	9.76	5.51	9.21	5.51	0.20	0.51	2.17	10.00	0.51	0.24	0.06	M5	8.4
	2□0040F	4.80	9.76	5.51	9.21	5.51	0.20	0.51	2.17	10.00	0.51	0.24	0.06	M5	8.4
	2□0056F	6.30	11.18	7.09	10.63	6.42	0.20	0.51	2.95	11.42	0.59	0.24	0.06	M5	12.1
	2□0069F	7.56	13.23	8.66	12.60	7.36	0.20	0.87	3.07	13.78	0.59	0.28	0.06	M5	20.3
Three-Phase 400 V Class	4□0018F	4.80	9.76	5.51	9.21	5.51	0.20	0.51	2.17	10.00	0.51	0.24	0.06	M5	8.4
	4□0023F	4.80	9.76	5.51	9.21	5.51	0.20	0.51	2.17	10.00	0.51	0.24	0.06	M5	8.4
	4□0031F	6.30	11.18	7.09	10.63	5.63	0.20	0.51	2.17	11.42	0.59	0.24	0.06	M5	11.5
	4□0038F	6.30	11.18	7.09	10.63	6.42	0.20	0.51	2.95	11.42	0.51	0.24	0.06	M5	12.1

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**Reactor, 3% and 5% Impedance** - may be used on either the input or output of a drive to reduce the effect of load or line side transients on the drive. The three-phase reactors are available loose in a separate NEMA 1 enclosure.

Rated Input Voltage	Drive Model Number CIMR-VU	Rated Output Current (Amps)	Nominal HP	3% Enclosed Reactor			5% Enclosed Reactor				
				Part Number 05P00620-	Dimensions (in.)			Part Number 05P00620-	Dimensions (in.)		
					H	L	W		H	L	W
200-240V 1-Phase	BA0001_AA	1.2	1/8 & 1/4	0020	8.0	8.0	6.0	0015	8.0	8.0	6.0
	BA0002_AA	1.9	1/4					0021			
	BA0003_AA	3.3	1/2 & 3/4	0020	8.0	8.0	6.0	0021	8.0	8.0	6.0
	BA0006_AA	6.0	1	0027							
	BA0010_AA	9.6	2 & 3	0027	8.0	8.0	6.0	0028	8.0	8.0	6.0
BA0012_AA	12.0	3	0032								
200-240V 3-Phase	BA0018_AA	17.5	5	0036	8.0	8.0	6.0	0037	8.0	8.0	6.0
	2A0001_AA	1.2	1/8 & 1/4	0020	8.0	8.0	6.0	0015	8.0	8.0	6.0
	2A0002_AA	1.9	1/4					0021			
	2A0004_AA	3.5	1/2 & 3/4	0020	8.0	8.0	6.0	0021	8.0	8.0	6.0
	2A0006_AA	6.0	1	0027							
	2A0010_AA	9.6	2 & 3	0027	8.0	8.0	6.0	0028	8.0	8.0	6.0
	2A0012_AA	12.0	3	0032							
	2A0020_AA	19.6	5	0036	8.0	8.0	6.0	0037	8.0	8.0	6.0
	2A0030_AA	30.0	7.5 & 10	0041	13.0	13.0	13.0	0042	13.0	13.0	13.0
	2A0040_AA	40.0	10	0046							
2A0056_AA	56.0	20	0054	13.0	13.0	13.0	0055	13.0	13.0	13.0	
2A0069_AA	69.0	25	0058								
380-480V 3-Phase	4A0001_AA	1.2	1/2	0015	8.0	8.0	6.0	0016	8.0	8.0	6.0
	4A0002_AA	2.1	3/4 & 1					0016			
	4A0004_AA	4.1	2	0021	8.0	8.0	6.0	0023	8.0	8.0	6.0
	4A0005_AA	5.4	3	0028							
	4A0007_AA	6.9	4	0033	8.0	8.0	6.0	0034	8.0	8.0	6.0
	4A0009_AA	8.8	5	0037							
	4A0011_AA	11.1	7.5	0042	13.0	13.0	13.0	0043	13.0	13.0	13.0
	4A0018_AA	17.5	10	0042							
4A0023_AA	24.0	15	0047	13.0	13.0	13.0	0048	13.0	13.0	13.0	
4A0031_AA	31.0	20	0047								
4A0038_AA	38.0	25	0051								



## Options V1000 Drive

**EMC C1 Filters** - may be used on the input of the drive to attenuate possible drive-generated noise. Filters should always be mounted as close to the drive as possible; these are designed such that the drive can be mounted to it, pancake-style. The drive should be installed with the EMC filters listed below in order to comply with the EN 61800-3, category C1 requirements. These C1 filters meet the requirements for CE. Note: EMC filters for models CIMR-VU2A0030 through 0069 are in compliance with EN 61800-3, Category 2. All other models comply with Category 1.

Rated Input Voltage	Drive Model Number CIMR-VU	Rated Output Current (Amps)	Nominal HP	C1 Filter					
				Part Number	Rated Current (A)	Dimensions (in.)			Weight (lbs)
						H	W	D	
200-240V 1-Phase	BA0001_AA	1.2	1/8 & 1/4	FS23638-10-07	10	6.65	2.80	1.77	0.97
	BA0002_AA	1.9	1/4						
	BA0003_AA	3.3	1/2 & 3/4						
	BA0006_AA	6.0	1	FS23638-20-07	20	6.65	4.37	1.97	1.76
	BA0010_AA	9.6	2 & 3						
	BA0012_AA	12.0	3	FS23638-30-07	30	6.85	5.67	1.97	2.64
	BA0018_AA	17.5	5	FS23638-40-07	40	6.85	6.85	1.97	3.52
200-240V 3-Phase	2A0001_AA	1.2	1/8 & 1/4	FS23637-8-07	8	6.65	2.80	1.57	0.88
	2A0002_AA	1.9	1/4						
	2A0004_AA	3.5	1/2 & 3/4						
	2A0006_AA	6.0	1						
	2A0010_AA	9.6	2 & 3	FS23637-14-07	14	6.65	4.37	1.77	1.28
	2A0012_AA	12.0	3						
	2A0020_AA	19.6	5	FS23637-24-07	24	6.85	5.67	1.97	1.98
	2A0030_AA	30.0	7.5 & 10	FS23637-52-07	52	11.97	5.39	2.20	4.41
2A0040_AA	40.0	10							
2A0056_AA	56.0	20	FS23637-68-07	68	13.39	6.89	2.56	5.73	
2A0069_AA	69.0	25	FS23637-80-07	80	15.47	8.35	2.56	6.83	
380-480V 3-Phase	4A0001_AA	1.2	1/2	FS23639-5-07	5	6.65	4.37	1.77	1.10
	4A0002_AA	2.1	3/4 & 1						
	4A0004_AA	4.1	2						
	4A0005_AA	5.4	3	FS23639-10-07	10	6.65	4.37	1.77	1.54
	4A0007_AA	6.9	4						
	4A0009_AA	8.8	5	FS23639-15-07	15	6.85	5.67	1.97	1.98
	4A0011_AA	11.1	7.5						
	4A0018_AA	17.5	10	FS23639-30-07	30	11.97	5.39	2.20	3.97
4A0023_AA	24.0	15							
4A0031_AA	31.0	20	FS23639-50-07	50	13.39	6.89	2.56	5.95	
4A0038_AA	38.0	25							



**EMC C3 Filters (Conducted Interference Voltage Limits)** - may be used on the input of a drive to attenuate possible drive-generated noise. An input filter with proper shielding, routing and grounding between itself and the drive is designed to reduce line-conducted noise levels within the limits of EN61800-3 Category C3,  $I \leq 100A$  (second environment for industrial low-voltage supply network), when the drive's output conductors are properly routed and shielded in grounded steel conduit all the way to the motor. Filters should always be mounted as close to the drive as possible. The filters in combination with the drive meet UL and CE.

Rated Input Voltage	Drive Model Number CIMR-VU	Rated Output Current (Amps)	Nominal HP	C3 Filter Kit	
				Part Number	Rated Current (A)
200-240V 1-Phase	BA0001_AA	1.2	1/8 & 1/4	FS22800-5-A	5
	BA0002_AA	1.9	1/4		
	BA0003_AA	3.3	1/2 & 3/4	FS22800-9-A	9
	BA0006_AA	6.0	1	FS22800-16-A	16
	BA0010_AA	9.6	2 & 3	FS22800-26-A	26
	BA0012_AA	12.0	3	FS22800-33-A	33
	BA0018_AA	17.5	5	Consult Factory	Consult Factory
200-240V 3-Phase	2A0001_AA	1.2	1/8 & 1/4	Consult Factory	Consult Factory
	2A0002_AA	1.9	1/4		
	2A0004_AA	3.5	1/2 & 3/4		
	2A0006_AA	6.0	1		
	2A0010_AA	9.6	2 & 3		
	2A0012_AA	12.0	3		
	2A0020_AA	19.6	5		
	2A0030_AA	30.0	7.5 & 10		
	2A0040_AA	40.0	10		
	2A0056_AA	56.0	20		
2A0069_AA	69.0	25			
380-480V 3-Phase	4A0001_AA	1.2	1/2	FS22801-3-A	3
	4A0002_AA	2.1	3/4 & 1		
	4A0004_AA	4.1	2	FS22801-6-A	6
	4A0005_AA	5.4	3	FS22801-12-A	12
	4A0007_AA	6.9	4	FS22801-12-A	12
	4A0009_AA	8.8	5	FS22801-16-A	16
	4A0011_AA	11.1	7.5		
	4A0018_AA	17.5	10	Consult Factory	Consult Factory
4A0023_AA	24.0	15			
4A0031_AA	31.0	20			
4A0038_AA	38.0	25			

**Note:** Kit contains filter, cover, and mounting hardware.



**Options**  
**V1000 Drive**

**Dynamic Braking Resistor, 3% Duty Cycle** - are rated for 3% duty cycle over a 100-second interval. Approximate braking torque for each rating is listed. These resistors are designed in NEMA 1 enclosures for separate panel mounting.

Rated Input Voltage	Drive Model Number CIMR-VU	Normal Duty		Heavy Duty		3% DB Resistor					Dimensions (in.)		
		Rated Output Current (Amps)	Nominal HP	Rated Output Current (Amps)	Nominal HP	Part Number	Qty Req'd	Resistance (Ohms) (Each)	Power (Watts) (Each)	Approx. Braking Torque (%)	H	W	D
200-240V 1-Phase	BA0001_AA	1.2	1/8 & 1/4	0.8	1/8	R7507	1	400	150	125	7.16	1.73	0.51
	BA0002_AA	1.9	1/4	1.6	1/4								
	BA0003_AA	3.5	1/2 & 3/4	3.0	1/2	R7505	1	200	150	230	7.16	1.73	0.51
	BA0006_AA	6.0	1	5.0	3/4 & 1								
	BA0010_AA	9.6	2 & 3	8.0	2	R7504	1	100	150	125	7.16	1.73	0.51
	BA0012_AA	12.0	3	11.0	3	R7503	1	70	150	120			
	BA0018_AA	17.5	5	17.5	5	R7510	1	62	150	100	7.16	1.73	0.51
200-240V 3-Phase	2A0001_AA	1.2	1/8 & 1/4	0.8	1/8	R7507	1	400	150	125	7.16	1.73	0.51
	2A0002_AA	1.9	1/4	1.6	1/4								
	2A0004_AA	3.5	1/2 & 3/4	3.0	1/2	R7505	1	200	150	230	7.16	1.73	0.51
	2A0006_AA	6.0	1	5.0	3/4 & 1								
	2A0010_AA	9.6	2 & 3	8.0	2	R7504	1	100	150	125	7.16	1.73	0.51
	2A0012_AA	12.0	3	11.0	3	R7503	1	70	150	120			
	2A0020_AA	19.6	5	17.5	5	R7510	1	62	150	100	7.16	1.73	0.51
	2A0030_AA	30	7.5 & 10	25.0	7.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2A0040_AA	40	10	33.0	10								
	2A0056_AA	56	20	47.0	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2A0069_AA	69	25	60.0	20								
380-480V 3-Phase	4A0001_AA	1.2	1/2	1.2	1/2	R7508	1	750	150	230	7.16	1.73	0.51
	4A0002_AA	2.1	3/4 & 1	1.8	3/4								
	4A0004_AA	4.1	2	3.4	1 & 2	R7508	1	750	150	130	7.16	1.73	0.51
	4A0005_AA	5.4	3	4.8	3	R7507	1	400	150	125			
	4A0007_AA	6.9	4	5.5	3	R7507	2	400	150	125	7.16	1.73	0.51
	4A0009_AA	8.8	5	7.2	4								
	4A0011_AA	11.1	7.5	9.2	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4A0018_AA	17.5	10	14.8	7.5 & 10								
	4A0023_AA	24	15	18.0	10								
	4A0031_AA	31	20	24.0	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4A0038_AA	38	25	31.0	20								





**Dynamic Braking Resistor, 10% Duty Cycle** - are rated for 10% duty cycle over a 100-second interval. Approximate braking torque for each rating is listed. These resistors are designed in vented NEMA 1 enclosures for separate panel mounting. The built-in braking module supports the 3% and 10% duty cycle resistors listed here and on the previous page. Resistors for applications requiring 50% and 100% duty cycle can be supported; please consult Yaskawa for duty cycles above 10%.

Rated Input Voltage	Drive Model Number CIMR-VU	Normal Duty		Heavy Duty		10% DB Resistor							Minimum Resistance (Ohms)		
		Rated Output Current (Amps)	Nominal HP	Rated Output Current (Amps)	Nominal HP	Part No.	Qty Reqd	Resistance (Ohms) (Each)	Power (Watts) (Each)	Approx. Braking Torque (%)		Dimensions (in.)			
										ND	HD	L		W	H
200-240V 1-Phase	BA0001_AA	1.2	1/8 & 1/4	0.8	1/8	USR000032	1	750	600	120	150	12	7	5	300
	BA0002_AA	1.9	1/4	1.6	1/4	USR000033	1	400	500	120	150	12	7	5	300
	BA0003_AA	3.5	1/2 & 3/4	3.0	1/2	USR000022	1	200	250	120	150	12	5	5	200
	BA0006_AA	6.0	1	5.0	3/4 & 1	USR000035	1	150	500	102	150	12	7	5	120
	BA0010_AA	9.6	2 & 3	8.0	2	USR000024	1	70	250	107	150	12	7	5	60
	BA0012_AA	12.0	3	11.0	3					107	107	12	7	5	60
	BA0018_AA	17.5	5	17.5	5	USR000025	1	40	846	111	111	12	7	5	32
200-240V 3-Phase	2A0001_AA	1.2	1/8 & 1/4	0.8	1/8	USR000032	1	750	600	120	150	12	7	5	300
	2A0002_AA	1.9	1/4	1.6	1/4	USR000033	1	400	500	120	150	12	7	5	300
	2A0004_AA	3.5	1/2 & 3/4	3.0	1/2	USR000022	1	200	250	120	150	12	5	5	200
	2A0006_AA	6.0	1	5.0	3/4 & 1	USR000035	1	150	500	102	150	12	7	5	120
	2A0010_AA	9.6	2 & 3	8.0	2	USR000024	1	70	250	107	150	12	7	5	60
	2A0012_AA	12.0	3	11.0	3					107	107	12	7	5	60
	2A0020_AA	19.6	5	17.5	5	USR000025	1	40	846	111	111	12	7	5	32
	2A0030_AA	30	7.5 & 10	25.0	7.5	URS000148	1	18	1301	120	150	12	10	5	16
	2A0040_AA	40	10	33.0	10	URS000140	1	13.6	1646	120	150	12	13	5	9.6
	2A0056_AA	56	20	47.0	15	URS000136	1	10.5	3402	101	135	27	10	5	9.6
2A0069_AA	69	25	60.0	20					80	101					
380-480V 3-Phase	4A0001_AA	1.2	1/2	1.2	1/2	USR000032	1	750	600	120	150	12	7	5	750
	4A0002_AA	2.1	3/4 & 1	1.8	3/4					120	150	12	7	5	750
	4A0004_AA	4.1	2	3.4	1 & 2	USR000032	1	750	600	61	61	12	7	5	510
	4A0005_AA	5.4	3	4.8	3	USR000034	1	250	500	119	119	12	7	5	240
	4A0007_AA	6.9	4	5.5	3	USR000034	1	250	500	119	119	12	7	5	200
	4A0009_AA	8.8	5	7.2	4	USR000035	1	150	500	118	150	12	7	5	100
	4A0011_AA	11.1	7.5	9.2	5	USR000036	1	100	975	117	150	12	10	5	100
	4A0018_AA	17.5	10	14.8	7.5 & 10	USR000038	1	50	1600	120	150	12	13	5	32
	4A0023_AA	24	15	18.0	10	USR000038	1	50	1600	113	150	12	13	5	32
	4A0031_AA	31	20	24.0	15	USR000039	1	40	2050	106	142	12	16	5	20
4A0038_AA	38	25	31.0	20	URS000154	1	27.2	2720	120	150	19	13	5	20	



**Options**  
V1000 Drive

**DIN Rail Mounting Kits** - The DIN rail attachment kit allows the drive to be mounted on a 35 mm DIN rail. The DIN rail itself is not included in the kit. Option kit for customer mounting.

Rated Input Voltage	Drive Model Number CIMR-VU	Rated Output Current (Amps)	Nominal HP	DIN Rail Kit
				Part Number 72606-EZZ08122
200-240V 1-Phase	BA0001_AA	1.2	1/8 & 1/4	A
	BA0002_AA	1.9	1/4	
	BA0003_AA	3.3	1/2 & 3/4	
	BA0006_AA	6.0	1	B
	BA0010_AA	9.6	2 & 3	C
	BA0012_AA	12.0	3	
200-240V 3-Phase	BA0018_AA	17.5	5	D
	2A0001_AA	1.2	1/8 & 1/4	A
	2A0002_AA	1.9	1/4	
	2A0004_AA	3.5	1/2 & 3/4	
	2A0006_AA	6.0	1	
	2A0010_AA	9.6	2 & 3	B
	2A0012_AA	12.0	3	C
	2A0020_AA	19.6	5	
	2A0030_AA	30.0	7.5 & 10	
	2A0040_AA	40.0	10	Consult Factory
2A0056_AA	56.0	20		
2A0069_AA	69.0	25		
380-480V 3-Phase	4A0001_AA	1.2	1/2	B
	4A0002_AA	2.1	3/4 & 1	
	4A0004_AA	4.1	2	
	4A0005_AA	5.4	3	
	4A0007_AA	6.9	4	
	4A0009_AA	8.8	5	
	4A0011_AA	11.1	7.5	C
	4A0018_AA	18.0	10	Consult Factory
	4A0023_AA	24.0	15	
	4A0031_AA	31.0	20	
4A0038_AA	38.0	25		



**Adapter Plate** - Conversion kit used to mount a V1000 on the same footprint as a V7 drive. Not available for J1000 drives.

**External Heatsink Kit** - Allow for V1000 drives to be mounted with the drive's heatsink external to the enclosure. Not available for J1000 drives. Option kit for customer mounting.

Rated Input Voltage	Drive Model Number CIMR-VU	HD Rated Output Current (Amps)	Nominal HP	External Heatsink Kit	Adapter Kit
				Part Number EZZ020568_	Part Number EZZ020572_
230V, 1-Phase	BA0001_AA	0.8	1/8	A	Not Required
	BA0002_AA	1.6	1/4		
	BA0003_AA	3.0	1/2		
	BA0006_AA	5.0	3/4 & 1		
	BA0010_AA	8.0	2		
	BA0012_AA	11.0	3		
	BA0018_AA	17.5	5		
230V, 3-Phase	2A0001_AA	0.8	1/8	A	Not Required
	2A0002_AA	1.6	1/4		
	2A0004_AA	3.0	1/2		
	2A0006_AA	5.0	3/4 & 1	G	Not Required
	2A0010_AA	8.0	2		
	2A0012_AA	11.0	3	D	Not Required
	2A0020_AA	17.5	5		
	2A0030_AA	25.0	7.5	H	B
	2A0040_AA	33.0	10		
	2A0056_AA	47.0	15	J	Not Required
2A0069_AA	57.5	20			
460V	4A0001_AA	1.2	1/2	L	Not Required
	4A0002_AA	1.8	3/4		
	4A0004_AA	3.4	1 & 2	C	Not Required
	4A0005_AA	4.8	3		
	4A0007_AA	5.5	3	D	A
	4A0009_AA	7.2	4		
	4A0011_AA	9.2	5	E	Not Required
	4A0018_AA	15.0	7.5 & 10		
	4A0023_AA	19.2	10	H	B
	4A0031_AA	14.8	15		
4A0038_AA	18.8	20	J	Not Required	



## Options V1000 Drive

**24VDC Control Power Unit** - This option provides board-level component voltages for the V1000 drive when provided with 24VDC from an external, customer-supplied source. It is used to maintain both drive control power and network communications (when utilized). Both a Control Power Unit and a Bracket Kit are required for proper operation and certification. Option kit for customer mounting.

Rated Input Voltage	Drive Model Number CIMR-VU	Rated Output Current (Amps)	Nominal HP <sup>(1)</sup>	Control Power Unit	Bracket Kit
				Part Number	Part Number EZZ020639_
200-240V 1-Phase	BA0001_AA	1.2	1/8 & 1/4	PS-V10S	A
	BA0002_AA	1.9	1/4		
	BA0003_AA	3.3	1/2 & 3/4		
	BA0006_AA	6.0	1	PS-V10S	B
	BA0010_AA	9.6	2 & 3		
	BA0012_AA	12.0	3		
	BA0018_AA	17.5	5		
200-240V 3-Phase	2A0001_AA	1.2	1/8 & 1/4	PS-V10S	A
	2A0002_AA	1.9	1/4		
	2A0004_AA	3.5	1/2 & 3/4		
	2A0006_AA	6.0	1		
	2A0010_AA	9.6	2 & 3	PS-V10S	B
	2A0012_AA	12.0	3		
	2A0020_AA	19.6	5	PV-V10M	B
	2A0030_AA	30.0	7.5 & 10		
	2A0040_AA	40.0	10	PS-V10M	C
	2A0056_AA	56.0	20		
2A0069_AA	69.0	25			
380-480V 3-Phase	4A0001_AA	1.2	1/2	PS-V10S	A
	4A0002_AA	2.1	3/4 & 1		
	4A0004_AA	4.1	2	PS-V10S	B
	4A0005_AA	5.4	3		
	4A0007_AA	6.9	4		
	4A0009_AA	8.8	5		
	4A0011_AA	11.1	7.5	PS-V10M	B
	4A0018_AA	18.0	10		
	4A0023_AA	24.0	15		
4A0031_AA	31.0	20	PS-V10M	C	
4A0038_AA	38.0	25			



**Operator, LCD Digital Remote, NEMA Type 1.** This option allows the drive to be operated from a remote location, and provides a 16-character, 5-line alpha-numeric LCD. This option requires Installation Set A (EZZ020642A) for panel or door mounting and Remote Operator Cable (UWR0051 or UWR0052), each sold separately.

**Note:** This option requires the V1000 drive to contain 1012 software or later; please consult your Yaskawa representative to ensure proper operation.

**Model No. JVOP-180**

**Operator, LED Digital Remote, NEMA Type 1.** This option allows the drive to be operated from a remote location. This kit requires the Remote Operator Cable (UWR0051 or UWR0052, sold separately).

**Note:** This option requires the V1000 drive to contain 1016 software or later; please consult your Yaskawa representative to ensure proper operation.

**Model No. JVOP-182**

**LCD/LED Keypad Installation Set A (Remote Operator Mounting Bracket Kit).** This is a bracket to which the LCD Digital Remote Operator (JVOP-180) attaches, and has (4) threaded holes and screws to attach to the cover of an enclosure. The kit contains (2) screws to mount the Operator to the bracket and (4) screws to attach the bracket to the enclosure.

**Model No. EZZ020642A**

**LCD/LED Keypad Installation Set B (Remote Operator Mounting Bracket Kit).** Contains a similar bracket that the keypad attaches to and has non-threaded holes for mounting to an enclosure that has the screws attached to the enclosure already. The kit contains (2) screws to mount the keypad to the bracket and (4) nuts to attach the bracket to the customer supplied screws attached to the enclosure.

**Model No. EZZ020642B**

**Operator Cable, Remote.** These cables are used to connect the Remote LCD Digital Operator (JVOP-180) or Remote LED Operator (JVOP-182). They are available in one (1) or three (3) meter lengths.

**Model No. UWR0051 (1 meter)**

**Model No. UWR0052 (3 meter)**

**Operator Kits, NEMA Type 3R/4X.** This option is used to extend the existing Digital Operator to the wall of a separately priced, oversized UL Type 3R, 4, 4X, or 12 enclosure (IPX6 environment). Price includes a faceplate bezel with digital operator brackets and membrane to cover the operator cutout in the enclosure door, a 3-foot cable, a 10-foot cable, and a 1:1 template for cutting the necessary cutouts in the enclosure. Keypad can be removed after kit installation. Designed for use with the LCD Operator JVOP-180 or the LED Operator JVOP-182 sold separately. Connects to RJ45 port and mounts to enclosure wall.

**Model No. UUX000526 (Blank Membrane)**

**Model No. UUX000527 (Yaskawa Logo Membrane)**

**DriveWizard Plus Software.** This optional software package allows upload and download of parameters via PC for data storage and for programming multiple drives. The software also includes graphing and monitoring tools. It is a Windows-based program designed to make startup, commissioning, and troubleshooting of the J1000 as simple as possible. Refer to our website at [www.yaskawa.com](http://www.yaskawa.com) to download the software, and for more information, including minimum system requirements and cable information to interface a PC to V1000 or J1000 drives.

**No Model No.**

**PC Interface Cable.** This 6-foot cable interconnects the drive keypad port to the 9-pin communication port on a PC. This cable is used in conjunction with DriveWizard Plus software.

**Model No. UWR00468-2**

**USB Copy Unit (Y-Stick).** This option allows the drive to connect to the USB port on a PC. It can read, copy and verify drive parameter settings from one drive to another like drive. The unit plugs into the RJ-45 port on the front of the digital operator. Refer to our website at [www.yaskawa.com](http://www.yaskawa.com) to download the software.

**Model No. JVOP-181**

**CopyUnitManager Software for USB Copy Unit (Y-Stick).** This option allows the user to transfer and save parameter files from the Copy Unit (JVOP-181) to a PC and vice versa. Refer to our website at [www.yaskawa.com](http://www.yaskawa.com) to download the software.

**No Model No.**

**DriveWorksEZ (DWEZ) Standard and Pro.** A software system that provides the means to create custom drive functionality in the V1000 using function block programming to distribute control away from a PLC. Must attend one of the two classes below to obtain software CD.

**DriveWorksEZ (DWEZ) Standard Certification.** A 3-day V1000 Application Programming training class (TRM010-V1000) must be attended to become certified. Provides 20 connections and 119 basic functions.

**Model No. CD.DWEZ.02**

*To enroll in class, call Technical Training Services at 847-887-7228.*

**DriveWorksEZ (DWEZ) Pro Certification.** A 2-day DWEZ-specific training class (TRM020-DriveWorksEZ) must be attended to become certified. This class is intended for those well-versed in V1000 programming. DWEZ Pro provides increased functionality, with 50 connections and 225 function blocks compared to the Standard version.

**Model No. CD.DWEZ.03**

**120 VAC Interface.** This option mounts directly to the control terminal block on the drive and allows the use of 120 VAC control logic circuits to produce multi-function control input signals for the drive.

**Model No. DI-100**

*Note: This option will become available November 2009.*



## Options V1000 Drive

**DeviceNet™ With ADR.** This option complies with all pertinent aspects of the ODVA (Open DeviceNet Vendor Association) specification and AC drive profile. All parameters, diagnostics and operational commands are accessible via DeviceNet. Automatic Device Replacement (ADR) is supported in this DeviceNet option, including the functions of Auto Baud Rate sensing and Faulted Node Recovery (using Group 4 messaging). Each DeviceNet network supports up to 63 drives. Controllers are available from many PLC and/or PC suppliers. The board mounts integrally in the drive and provides a DeviceNet standard open tap connector. The option is configured using parameters within the drive, which allows for easy configuration eliminating the use of hardware switches. Status LEDs are viewable through the front cover and a monitor has been added to allow for improved diagnostics. Option is backwards compatible with the previous generation option cards.

**Note:** It is recommended that the V1000 drive contain 1012 software or later; please consult your Yaskawa representative to ensure proper operation.

**Model No. SI-N3/V**

**EtherNet/IP.** This option complies with the EtherNet/IP protocol specification, and allows for communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user specified IP address, from a DHCP host, or from a BootP host. The IP address can be set from the drive keypad or from the network. All parameters, diagnostics and operational commands are accessible via EtherNet/IP. The web interface allows management of diagnostic information through a standard web browser. The embedded web pages include the main page, drive status page, network monitor page, and documentation page.

**Note:** It is recommended that the V1000 drive contain 1012 software or later; please consult your Yaskawa representative to ensure proper operation.

**Model No. SI-EN3/V**

**Profibus DP.** This option complies with the Profibus DP protocol specification. All parameters, diagnostics and operational commands are accessible via Profibus. The option board provides a 9-pin (F) type D-Sub connector for easily connecting to a standard Profibus style, shielded twisted-pair cable. Each Profibus network supports up to 99 drives. This option supports all of the Profibus data rates from 9.6 Kbps to 12 Mbps. Up to 32 bytes of input data and 32 bytes of output data are provided per message transaction. Sync and Freeze modes are supported for groups. Profibus DP-V1 support (cyclic and acyclic data exchange). Configurable PPO read and write parameters. The option is configured using parameters within the drive, which allows for easy configuration eliminating the use of hardware switches. Status LEDs are viewable through the front cover, and a monitor has been added to allow for improved diagnostics. Option is backwards compatible with the previous generation option cards.

**Note:** It is recommended that the V1000 drive contain 1010 software or later; please consult your Yaskawa representative to ensure proper operation.

**Model No. SI-P3/V**

**Modbus TCP/IP.** This option complies with the Modbus TCP/IP protocol specification. This allows for Modbus communication over 10/100 Mbps Ethernet networks. This option has the ability to configure the IP Address from a user-specified IP address, from a DHCP host, or from a BootP host. All parameters, diagnostics and operational commands are accessible via Modbus TCP/IP. This option supports up to 10 simultaneous PLC/PC connections.

**Note:** It is recommended that the V1000 drive contain 1015 software or later; please consult your Yaskawa representative to ensure proper operation.

**Mounts at option connector CN5.**

**Model No. SI-EM3/V**

**MECHATROLINK-II.** This option is designed for connecting a drive to a field network using the MECHATROLINK protocol. The MECHATROLINK-II option allows the user to operate the drive, monitor the status, and change parameters from a MECHATROLINK master device at a communication speed up to 10 Mbps.

**Note:** This option requires the V1000 drive to contain 1016 software or later; please consult your Yaskawa representative to ensure proper operation.

**Model No. SI-T3/V**

## Technical Training

In today's world of global competition, it is impossible for a company to survive without "state-of-the-art" technically trained associates and customers. Yaskawa Electric America Technical Training Service's mission is to provide inverter drives training classes to our customers that are "right on target" with knowledge they need to perform their jobs.

Yaskawa Electric America has three training facilities in the United States. The primary training facility is in Yaskawa Electric America's North American Headquarters in Waukegan, Illinois (45 miles north of Chicago, 50 miles south of Milwaukee). This facility has four training rooms: two lecture halls and two training labs. Two additional facilities are located in Cypress, California, and Plain City, Ohio.

Besides the possibility of attending training classes in Waukegan, Yaskawa Electric America can also bring training to the customer. On-site classes are available in two varieties. The first is to duplicate the official training classes at the customer's location. Full functioning demo units, data projector, computer and documentation can be shipped to recreate the official class on-site. The second variety is road show training. Road show training is a one-day training class that is specifically tailored to the students' needs and questions. Only basic demos are used and the topics covered in class are generated by the students in attendance.

The Yaskawa Virtual Training Room is another training option. All you need is an Internet connection and a telephone. This is a live, interactive training class, which gives you the ability to talk to the instructor as well as other students. The Internet connection allows us to show slides and demonstrate software packages. The telephone is for the audio portion of the training class. Web classes can be found on the Yaskawa formal training schedule and can also be done on-demand, per the time and preference of the customer.

Finally, the eLearning Module (eLM™) is a complement to our adjustable frequency drive training seminars. They are modular in nature, pinpoint specific topics, can be completed on or offline, and each one only takes about 30 minutes to complete.

The eLM is a perfect fit for an experienced engineer who needs to understand a specific topic. The eLM does not allow for some typical training practices such as hands-on exercises or student discussions. Students with limited prior experience, and who require a broader and long-term understanding of our products, are advised to take a traditional factory training class.

This list contains available classes at Yaskawa for the J1000 and V1000. If your training need cannot be met by the current training class schedule, please send an email to the Yaskawa Training Coordinator.

Product	eLearning Modules	Factory Classes
J1000	eLM.J1000.01	Not Available
V1000	eLM.V1000.01	V1000 Installation and Startup Class Number: TRM015-V1000
		V1000 Application Programming Class Number: TRM010-V1000

To enroll, contact Technical Training Services.

Phone: 1-800-Yaskawa (1-800-927-5292) and (then dial 2 for "Drives" and 4 for "Training")

Fax: 847-785-2724

E-mail: [training@yaskawa.com](mailto:training@yaskawa.com)

Check out the latest class schedule and cut sheets at [www.yaskawa.com](http://www.yaskawa.com)

# Terms and Conditions

## YASKAWA ELECTRIC AMERICA, INC. - STANDARD TERMS AND CONDITIONS OF SALE

### 1. GENERAL:

- (a) Any sale of products or services by Yaskawa Electric America, Inc. ("YEA") is governed exclusively by these Standard Terms and Conditions of Sale ("Standard Terms") and shall supersede any inconsistent or additional terms on Buyer's purchase order or any other document. These Standard Terms constitute the final, complete and exclusive agreement between YEA and the Buyer as to the subject matter hereof. YEA hereby objects to any inconsistent or additional terms. This Agreement may be amended only in writing signed by an authorized representative of YEA.
- (b) Any order placed with YEA must be in the form of a written purchase order or letter from Buyer ("Order") and shall set forth all information necessary for YEA to fill the Order, if accepted. All proposals, quotations or similar communications from YEA will be considered invitations to Buyer to submit an Order. A binding sales contract will result only when YEA accepts Buyer's Order, at YEA's office in Waukegan, Illinois or such other place as designated by YEA. YEA reserves the right to bill any Order at a minimum of \$100, plus any additional charges provided for herein.
- (c) All products shall be packaged for domestic shipment in accordance with YEA's standard specifications. If special packaging is required, it must be clearly requested on Buyer's Order. The price for any special packaging shall be billed to Buyer.

### 2. WARRANTY:

- (a) YEA warrants that each new and unused product sold by YEA shall be free of defects in material workmanship for a period of one (1) year from the date the product is first used by Buyer, or 18 months from the date of shipment, whichever occurs first. YEA warrants that its services shall be free of defects in workmanship for a period of ninety (90) days from the date they are first provided. Within the applicable warranty period, YEA will, at its sole discretion, either repair, replace or return the purchase price paid to YEA for any product, part or service found by YEA to be defective; provided that the subject product is used under normal conditions for which it was designed and installed, operated and maintained in accordance with YEA's instructions and (subject always to such instructions) in accordance with generally accepted industrial practices.
- (b) YEA's warranty obligation shall be conditioned upon receipt by YEA of written notice of any alleged defects within sixty (60) days after discovery. YEA will not be responsible or accept invoices for unauthorized repairs to any products, even if defective. YEA shall not be responsible for any products which have been altered, abused, misused, or improperly installed or repaired, or for any loss, damage, defect, claim or non-performance resulting from or attributable to Buyer's specifications.
- (c) Where Buyer requests that YEA supply non-stock products or component parts manufactured by a third-party, YEA will, to the extent permitted, pass through to Buyer any warranty of the manufacturer. As to such items, Buyer's sole remedy for breach of warranty shall be the remedy offered by and available from the manufacturer. YEA shall have no liability, whether in contract, tort or otherwise, for such products.
- (d) YEA does not guarantee production rates or the quality of goods made using YEA's products or services, nor shall any longer warranty periods apply, except as agreed in writing signed by an authorized YEA representative.
- (e) YEA'S WARRANTY HEREIN IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES OF YEA AND ALL PARENT OR AFFILIATED COMPANIES OF YEA. ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE OR USE, ARE HEREBY EXCLUDED.
- (f) UNDER NO CIRCUMSTANCES SHALL YEA, OR ANY PARENT OR AFFILIATED COMPANY OF YEA, BE LIABLE TO

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All drawings, tables, graphs and the like submitted by YEA or contained in YEA's publications shall be regarded as approximations only. Weights, measurements, capacities and all other particulars of products or services offered by YEA are approximations only. YEA is not responsible for such approximations, including, in particular, based on data supplied by Buyer.

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### 5. SHIPMENT, FORCE MAJEURE, PRICES AND ERROR:

- (a) Shipment/delivery dates are approximations only. YEA shall not be liable to pay any penalty or damages, including consequential damages, for any delay in shipment.
- (b) In no event shall YEA be liable for any damages, including consequential damages, caused by delays or non-performance resulting from or related to force majeure or other causes beyond YEA's reasonable control, including, but not limited to, war, blockade, civil disturbances, strikes and lockouts, labor shortages, fire and other casualties, acts of nature, accidents and governmental acts (including regulations concerning export and import licensing and currency exchange). In case of non-delivery, YEA's obligation shall be limited to the refund of any advance payment received from Buyer.
- (c) All claims for loss of or damage to products, whether concealed or obvious, must be made, in writing, to the carrier and to YEA by Buyer as soon as possible after receipt of shipment, and in no case beyond 30 days of shipment, or such claims shall be deemed waived. YEA will render reasonable assistance in providing information necessary for Buyer to process such damage claims with the carrier or any insurance company.



# Terms and Conditions

(d) YEA's quoted prices are firm for thirty (30) days from the date of YEA's written proposal. Thereafter, the applicable prices are those in effect at the time Buyer's Order is placed with YEA. YEA will notify Buyer of any price changes for incorporation into a revised Order prior to acceptance by YEA. Pricing based on volume discounts is subject to adjustment by YEA if actual shipping volumes do not meet minimum volume requirements of agreement. Clerical errors in any element of a proposal, purchase order, invoice or contract are subject to correction by YEA.

(e) (1) Buyer agrees to accept delivery within fifteen (15) days following the anticipated date of delivery. If Buyer refuses to take delivery within the fifteen (15) day period, YEA reserves the right to charge Buyer for storage charges plus interest.

(f) (2) All shipments are F.O.B. YEA's (or its suppliers') manufacturing plant or warehouse. YEA will, at Buyer's expense, arrange for the transportation of the products from the manufacturing plant or warehouse designated by YEA. Buyer is responsible to timely procure all necessary export and import licenses and all permits required for the consummation of the transaction.

## 6. TERMS OF PAYMENT:

(a) All payments are due within thirty (30) days of YEA's invoice. YEA reserves the right to require payment in advance, or satisfactory security, for any shipment or sale. YEA may cancel any shipment or Order for any Buyer which has failed to make payment or comply with any other provision of these Standard Terms. YEA reserves the right to seek any other remedy available at law or equity. Payment shall be made at the agreed time, to the place specified, and in the currency indicated on YEA's invoice. Buyer's failure to pay at the agreed time and place constitutes a waiver of Buyer's right to demand YEA's performance under the contract.

(b) When an account becomes past due according to its payment terms, Buyer shall pay interest on the balance due, at the greater of 1.50% per month (18% per annum) or the maximum permitted by law, until paid in full.

(c) If delivery and/or payment in installments are accepted by YEA, Buyer's failure to pay any installment when due shall give YEA the right to suspend work or delivery until such payment is made. In the event that any such default by Buyer continues for more than fifteen (15) days, YEA may then cancel the contract by written notice to Buyer. Upon cancellation of an installment contract, all items already delivered to and paid for in full by Buyer will be transferred to Buyer "AS IS, WHERE IS," without any warranty.

(d) All duties, tariffs, fees, costs and other charges connected with shipment, insurance, exportation and importation of the products are the responsibility of Buyer, and, if paid by YEA, such expenses may be recovered by YEA from Buyer, and Buyer shall indemnify YEA against claims for the same. Buyer is responsible for all taxes applicable or related to this transaction, including all sales, use and excise taxes.

## 7. RISK OF LOSS:

Risk of loss and/or damage to the products shall pass to Buyer upon delivery thereof to Buyer or its representative, or to a carrier for shipment to Buyer or its designated customer, as the case may be, at the manufacturing plant or warehouse of YEA or its supplier. Buyer is responsible to obtain insurance coverage on all shipments of products supplied by YEA.

## 8. RETURNS/CANCELLATION CHARGES:

Buyer shall not return any product to YEA without the written consent of, and upon terms agreed to, by YEA. If Buyer refuses to accept delivery, or improperly revokes acceptance of product, Buyer shall be responsible for YEA's cancellation charges and expenses.

Before returning products, a Return Merchandise Authorization ("R.M.A.") number must be obtained from YEA. Products returned without an R.M.A. number clearly marked on the outside of the shipping carton will be refused. Except for approved warranty returns, YEA will only accept for return and credit new, unused, current stock items, in the original packaging and undamaged. Buyer shall be responsible for all freight charges, import/export charges, duties, tariffs, taxes, insurance and risk of loss/damage regarding return shipment to YEA.

## 9. SECURITY INTEREST:

To secure any indebtedness due and owing from Buyer from time to time, Buyer hereby grants to YEA, and YEA hereby reserves, a continuing purchase money security interest in all Yaskawa-brand and other products heretofore or hereafter sold and delivered to Buyer by YEA, and all related parts, components and accessories therefor, and all proceeds arising from the sale or other disposition of the foregoing, including, but not limited to, cash, accounts, contract rights, accounts receivable, instruments and chattel paper. Buyer shall at no time grant any security interest that conflicts with that granted to YEA herein. Buyer shall cooperate with YEA, and hereby appoints YEA as its attorney-in-fact, to execute and file, on Buyer's behalf, any documents necessary to evidence and perfect YEA's security interest.

## 10. GOVERNING LAW, FORUM AND JURY WAIVER:

These Standard Terms and the relationship of the parties hereto shall be governed by the internal laws of the State of Illinois, U.S.A., without regard to its choice of law rules. For all claims or disputes arising out of or relating to the sale of products or services by YEA and/or the relationship of Buyer and YEA, Buyer shall file any and all lawsuits or claims exclusively in the state or federal courts located in Cook County, Illinois. Buyer hereby submits to the personal jurisdiction of said courts and waives any claim of improper or inconvenient venue. To the fullest extent permitted by law, Buyer hereby agrees to waive the right to trial by jury for all claims or disputes arising out of or relating to the sale of products or services by YEA and/or the relationship of Buyer and YEA. The parties agree that U.N. Convention of Contracts for the International Sale of Goods shall not apply to their relationship or the sale of products by YEA.

## 11. MISCELLANEOUS:

(a) Failure on the part of YEA to enforce any of its rights derived from this contract shall never be construed as a waiver of any of YEA's rights.

(b) The invalidity of one or more of the clauses herein shall not affect the validity of the other clauses, which for this purpose are considered severable.

(c) Any use by Buyer of any YEA trademark must be approved by YEA in writing.

(d) Buyer may not delegate its performance or assign its rights under this Agreement except upon the express written consent of YEA. In any case, these Standard Terms shall be binding upon the successors and legal representatives of Buyer.

(e) Buyer shall comply with all applicable laws and regulations regarding the use, import and export of the products sold hereunder. The products and services to be sold hereunder are not intended for use in any nuclear, chemical or weapons production or environmental damage. If Buyer uses the products or services for such or other impermissible purposes, it shall indemnify, hold harmless and defend YEA, all parent and affiliated companies of YEA, from and against all related claims and damages.

(f) All rights and remedies available to YEA under the Uniform Commercial Code and other applicable law are reserved to YEA as remedies in the event of Buyer's default.



