



# Geared and Gearless Elevator Drive L1000E



iQRISE<sup>®</sup>

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### Experience & Innovation

**For more than 90 years YASKAWA has been manufacturing and supplying mechatronic products for machine building and industrial automation. Its standard products as well as tailor-made solutions are famous and have a high reputation for outstanding quality and durability.**

YASKAWA has proven success of manufacturing and supplying drives to the elevator industry: an installed base of over 1,000,000 elevator drives installed and operational.

The L1000E Drive Series is a dedicated drive for elevator applications suitable for both modernization projects and new installations.

The L1000E provides high-performance characteristics offering a set of attractive features:

- ▶ Single drive for either IM or PM motor control
- ▶ Peak current ratings of 200% or more based on NEC amps
- ▶ Auto-tuning routines optimally match L1000E to IM/PM motors (coupled or uncoupled)
- ▶ YASKAWA Quality – designed for more than 70,000 hours of maintenance-free operation
- ▶ Designed for extreme quiet motor operation
- ▶ Enhanced features for highest passenger comfort (i.e., torque ripple suppression)
- ▶ Additional functions to reduce floor-to-floor times
- ▶ Powerful keypad and I/O interface to simplify elevator controller integration
- ▶ Easy serviceability and maintainability with lifetime monitors and removable terminals with parameter backup
- ▶ Elevator terminology for ease of operation
- ▶ Rescue operation control flexibility
- ▶ Advanced high speed elevator control



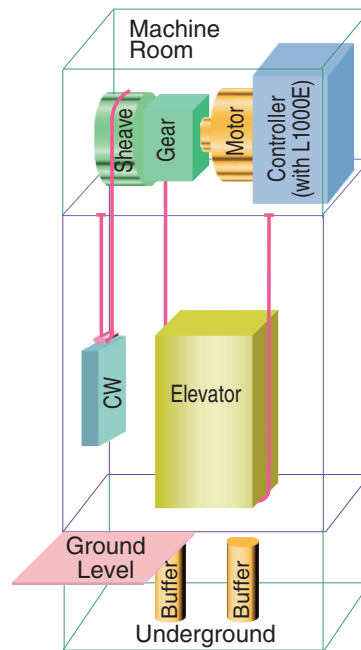
## Advanced Motor / Drive Technology

High-performance current vector control technology for induction and PM motor operation

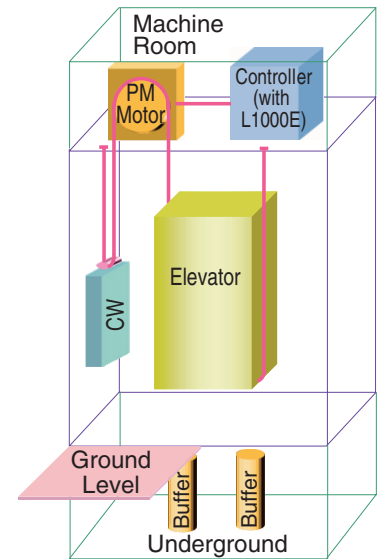
- ▶ Single software parameter to switch between the various motor types
- ▶ Perfect for a wide range of elevator applications

### Control Modes

- ▶ PM motors (SPM/IPM motors): Closed Loop Vector for PM
- ▶ Induction motors (IM): V/f control, Open-Loop Vector, Closed-Loop Vector Control



With IM Motor



With PM Motor

## Powerful Torque Characteristics

Control Mode	Starting Torque	Speed Range	Motor Encoders and Option Cards
Closed-loop vector control for IM motors: For geared and gearless induction motors	200% at 0 rpm	1:1500	Incremental encoders: - Line driver - Complementary
Closed-loop vector control for PM motors: For geared and gearless permanent magnet motors	200% at 0 rpm	1:1500	Incremental encoders: - Line driver - Complementary Absolute encoders: - EnDat 2.1/01, 2.2/01, 2.2/22 - HEIDENHAIN ERN1387/487 - Hiperface SRS 50/60
Open-loop vector control for IM motors: For modernization and new installations	200% at 1 Hz	1:120	Not required
V/f control for IM motors: For modernization applications, when auto-tuning is not possible (e.g., motor current is not known)	150% at 3 Hz	1:40	Not required

## Auto-Tuning Methods

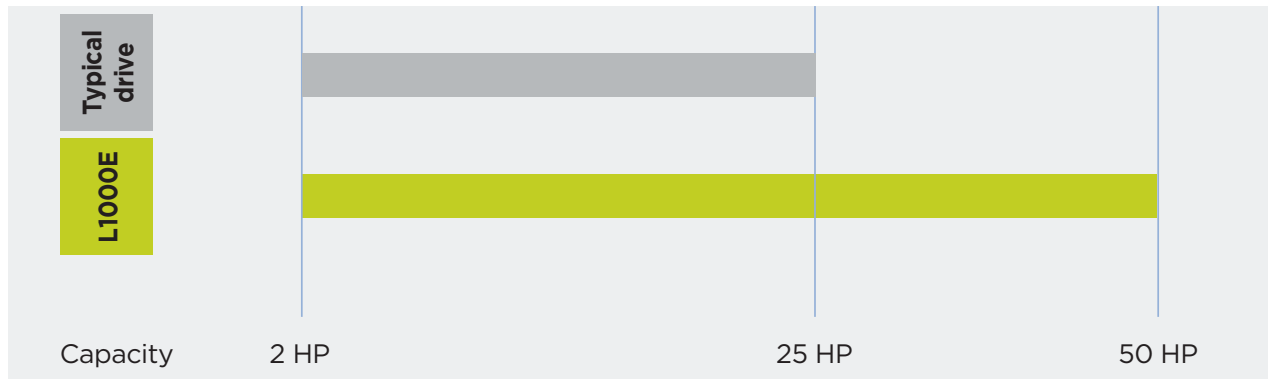
Auto-Tuning methods optimize motor handling performance. Rotational Auto-Tuning and Stationary Auto-Tuning are available for both induction motors and PM motors.

Auto-Tuning for Induction Motors	
Rotational Auto-Tuning	Rotational Auto-Tuning gives the most accurate results and is highly recommended (ropes have to be removed).
Stationary Auto-Tuning 1	Automatically calculates motor parameters needed for vector control (choose this tuning if ropes cannot be removed).
Stationary Auto-Tuning for Line-to-Line Resistance	Used for V/f control or vector control modes when the drive was previously set up properly and the motor cable has changed.
Stationary Auto-Tuning 2	Used when the motor test report is available. The no-load current and the rated slip must be entered from the test report. All other motor-related parameters are calculated automatically (use if ropes cannot be removed).

Auto-Tuning for PM Motors	
Motor Parameter Settings	Use when the motor test report is available.
Stationary Auto-Tuning	Use when the motor nameplate data is only available. The drive automatically calculates the other motor-related parameters.
Stationary Auto-Tuning for Stator Resistance	Automatically calculates stator resistance only. Should be performed if the motor cable has changed.
Pole Position Auto-Tuning	Pre-tuning for selecting an encoder offset tuning function. Checks the PM motor to determine if the stationary encoder offset auto-tuning is possible. After the initial motor auto-tuning, the Pole Position Auto-Tuning attempts to detect the rotor position without motor rotation and auto-tunes the other motor-related parameters.
Rotating Encoder Offset Auto-Tuning	Auto-tunes the encoder offset of an absolute encoder while rotating the motor. Should be performed with no load (ropes have to be removed or car must be balanced).
Stationary Encoder Offset Auto-Tuning	Auto-tunes the encoder offset of an absolute encoder without rotating the motor. Can only be used with an IPM motor. If offset cannot be tuned properly by this method, perform the Rotating Encoder Offset Auto-Tuning.

## Extended Drive Range with Built-In Braking Transistor

- ▶ L1000E provides built-in braking transistor for all drive models up to 50 HP



## LCD Operator for Simple Parameter Programming (optional)

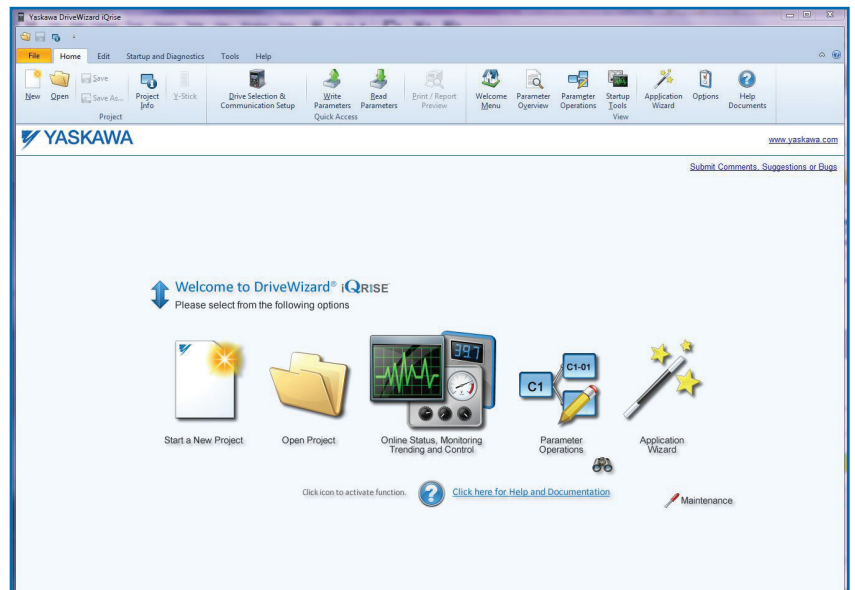


The L1000E can be equipped with an LCD operator including:

- ▶ Elevator language and units: for speed, accel/decel, and jerk rates
- ▶ Copy function: to upload and download parameter settings instantly
- ▶ Setup Mode: prepares the initial parameters to start the drive running immediately
- ▶ Verify function: checks parameters that have been changed from default values
- ▶ Multiple languages: 13 different languages (English, Japanese, German, French, Italian, Spanish, Portuguese, Chinese, Russian, Czech, Turkish, Polish, Greek)

## Support Tool: DriveWizard iQrise

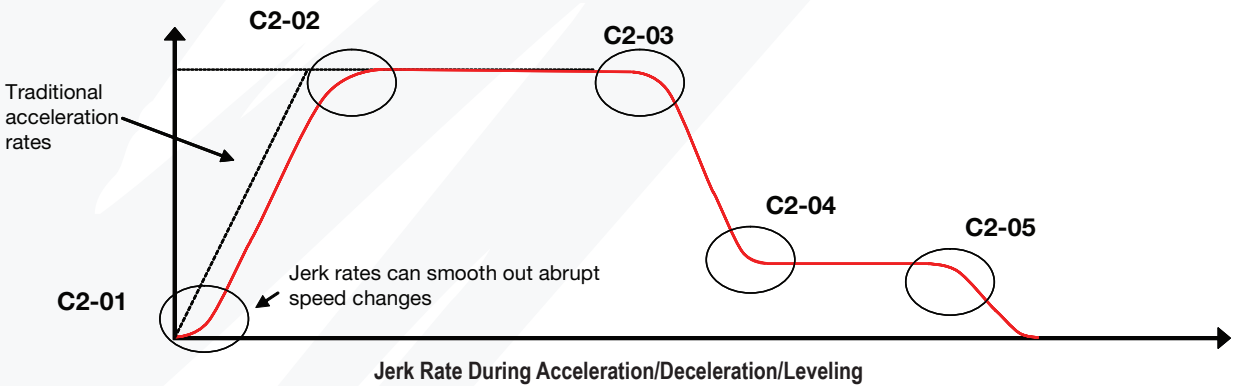
- ▶ The drive is equipped with a USB port for connecting to a PC with DriveWizard iQrise installed
- ▶ To adjust and edit parameters, access all monitors, create customized operation sequences, and observe drive performance with the oscilloscope function
- ▶ Parameter file storage
- ▶ Parameter upload/download function



**Note:** To obtain a copy of DriveWizard iQrise, contact a YASKAWA representative.

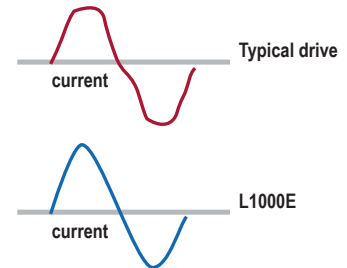
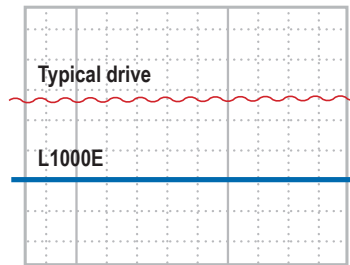
## Independent Jerk Rates

- ▶ Smooth ride performance during transitions from acceleration to nominal speed and deceleration to leveling speed
- ▶ The jerk rates are used to smooth out any speed changes due to sudden changes in the motor speed
- ▶ Selectable units: seconds,  $\text{ft/s}^3$ , or  $\text{m/s}^3$



## Improved Torque Ripple Suppression

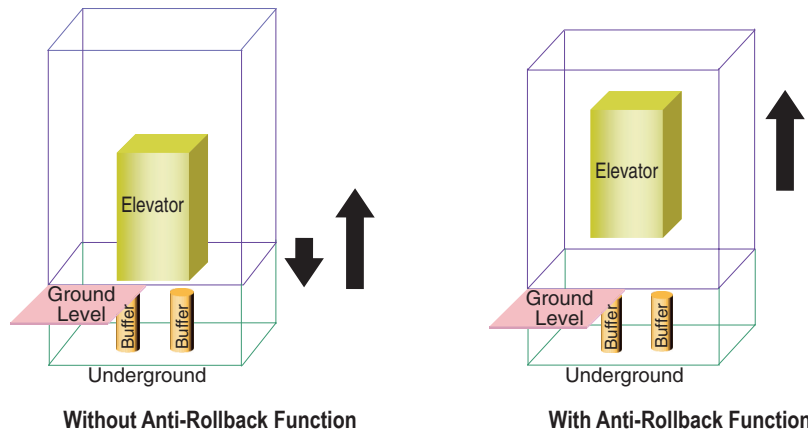
- ▶ Smooth start/stop due to optimized torque ripple suppression
- ▶ Precise motor torque performance for comfortable acceleration and deceleration characteristics



Torque Ripple Comparison  
(Closed-loop Vector at 0 Speed)

## Torque Compensation at Start (Anti-Rollback) without Load Sensor

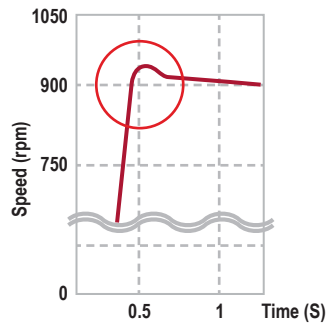
- ▶ New sensorless torque compensation function includes the YASKAWA advanced anti-rollback function, preventing shock at start to ensure a smooth start
- ▶ The anti-rollback function provides the right amount of torque compensation to suppress shock and prevent speed variations when the brake is released



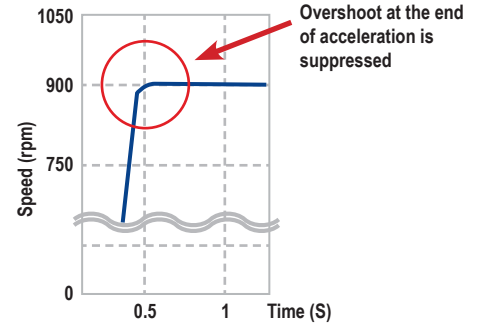


## System Inertia Compensation

- ▶ Inertia compensation provides ideal speed response
- ▶ Acceleration and deceleration compensation prevents vibration and overshoot
- ▶ Adjustment of jerk settings for acceleration and deceleration to ensure a perfectly smooth ride



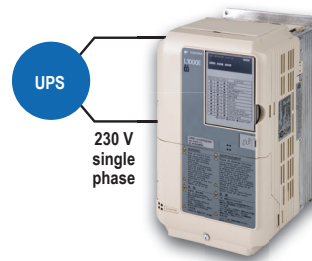
Typical Speed Control



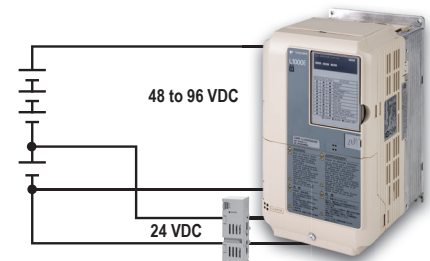
w/Inertia Compensation

## UPS and Light-Load Direction Search Function for Rescue Operation

- ▶ A single-phase 230 V UPS or 48 to 96 VDC battery (24 V control power supply) provides the drive with the necessary power for evacuation
- ▶ In case of power failure, the L1000E can bring the elevator car to the next floor for evacuation using the UPS
- ▶ A “light-load direction search” function triggered by the controller detects the light-load direction of the elevator



UPS Wiring and Operation



Back-up Battery Wiring and Operation

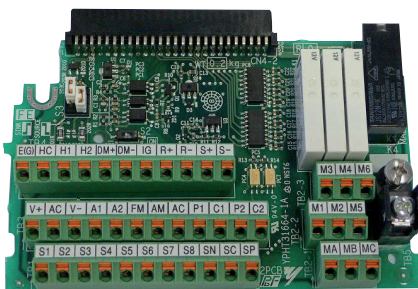
For clarity, the illustrations have been simplified, omitting several switches and control signals.

## Removable Terminal Board with Parameter Backup Function

In the event of a failure requiring a drive replacement, the removable terminal board offers benefits to reduce downtime:

- ▶ Removable terminal board allows quick drive replacement without removing the control wiring
- ▶ Saves parameter data for fast re-initialization of previous parameter settings

L1000E Terminal Board



Parameter		
Name	Number	Setting
Digital Operator Display Unit Selection	o1-03	6
Control Method Selection	A1-02	0
Speed Reference Selection	b1-01	1
Up/Down Command Selection	b1-02	1

## Long Performance Life

### ► Ten Years of Durable Performance

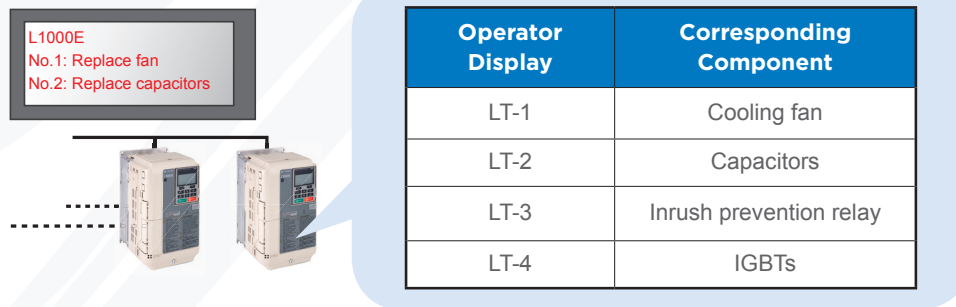
Cooling fan, capacitors, relays, and IGBTs have been carefully selected and designed for a life expectancy of up to 10 years\*.

\* Assumes the drive is running continuously for 24 hours a day at 80% load with an ambient temperature of 40°C

### ► Performance Life Monitors

YASKAWA's L1000E drive is equipped with performance life monitors that notify the user of part fatigue and maintenance periods to prevent problems before they occur.

- Drive outputs a signal to the control device indicating components may need to be replaced



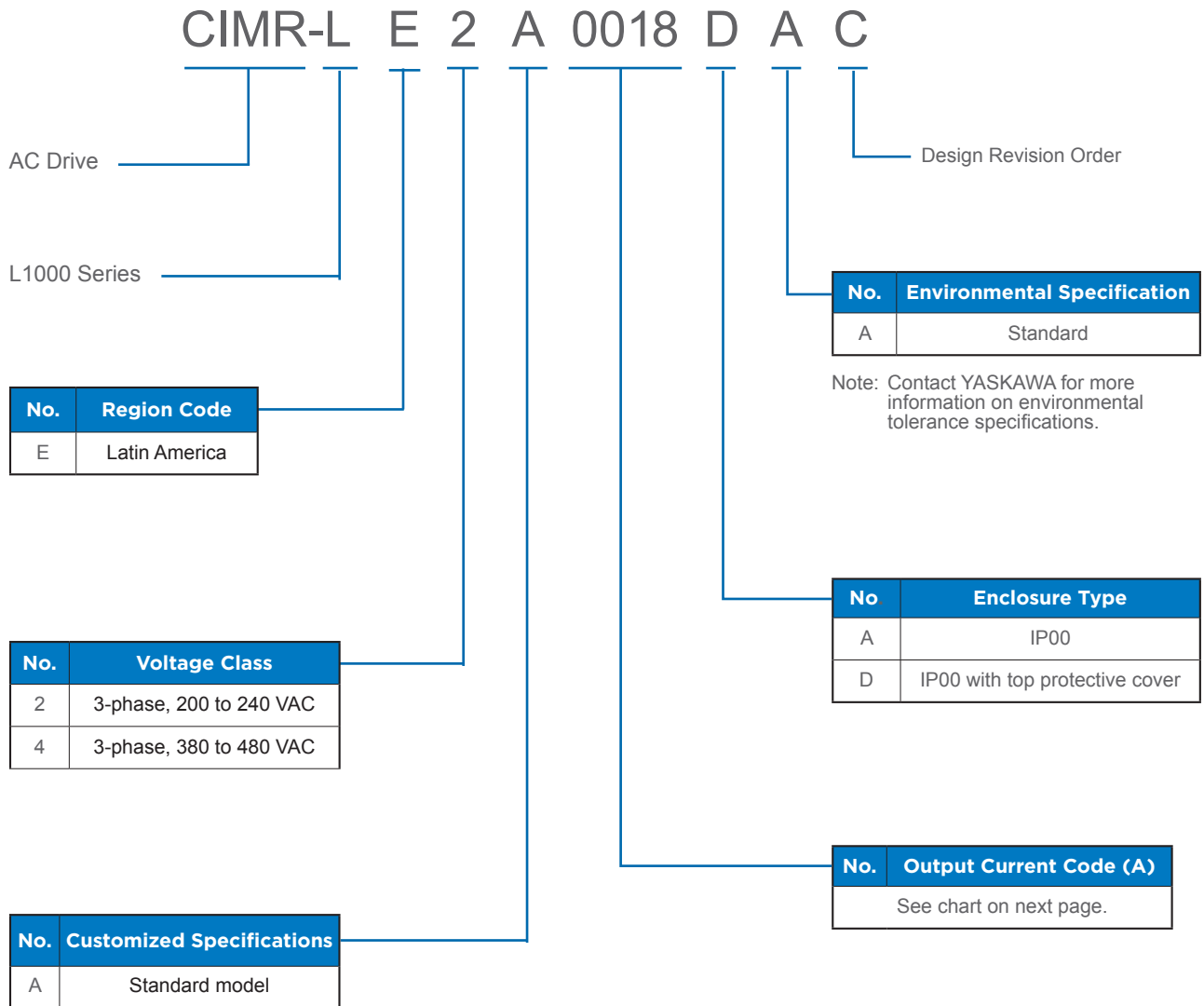
\*Optional LCD Operator required.

## Certifications





## Model Number Key



## Product Lineup

HP	Three-Phase 200 to 240 VAC		Three-Phase 380 to 480 VAC	
	Model CIMR-	Rated Output	Model CIMR-	Rated Output
5	LE2A0018	17.5 A	LE4A0009	9.0 A
7.5	LE2A0022	21.9 A	LE4A0012	11.5 A
10	LE2A0031	31.3 A	LE4A0019	18.5 A
15	LE2A0041	41.3 A	LE4A0023	22.5 A
20	LE2A0059	58.8 A	LE4A0030	30 A
25	LE2A0075	75 A	LE4A0039	38.8 A
30	LE2A0094	93.8 A	LE4A0049	48.8 A
40	LE2A0106	106.3 A	LE4A0056	56.3 A
50	LE2A0144	143.8 A	LE4A0075	75 A
60	LE2A0181	181.3 A	LE4A0094	93.8 A
75	LE2A0225	225 A	LE4A0114	113.8 A
100	LE2A0269	268.8 A	LE4A0140	140 A
125	LE2A0354	353.8 A	LE4A0188	187.5 A
150	LE2A0432	432.5 A	LE4A0225	225 A

## Standard Specifications

### 200 to 240 VAC (Three-Phase)

Model CIMR-LE2A □□□□		0018	0022	0031	0041	0059	0075	0094	0106	0144	0181	0225	0269	0354	0432	
Max. Applicable Motor Capacity	HP	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	
	Rated Output Current (3 min., 50% ED) A	17.5 <sup>&lt;1&gt;</sup>	21.9 <sup>&lt;1&gt;</sup>	31.3 <sup>&lt;1&gt;</sup>	41.3 <sup>&lt;1&gt;</sup>	58.8 <sup>&lt;1&gt;</sup>	75 <sup>&lt;1&gt;</sup>	93.8 <sup>&lt;1&gt;</sup>	106.3 <sup>&lt;1&gt;</sup>	143.8 <sup>&lt;1&gt;</sup>	181.3 <sup>&lt;1&gt;</sup>	225 <sup>&lt;2&gt;</sup>	268.8 <sup>&lt;2&gt;</sup>	353.8 <sup>&lt;2&gt;</sup>	432.5 <sup>&lt;3&gt;</sup>	
	Overload Tolerance	150% of rated output current for 30 s														
	Carrier Frequency (User Adjustable)	2 to 15 kHz (parameter setting)										2 to 10kHz (parameter setting)				
	Max. Output Voltage	Three-phase: 200 to 240 VAC (Proportional to input voltage)														
	Max. Output Frequency	Up to 200 Hz (parameter setting)														
Power	Rated Voltage/Rated Frequency	Three-phase: 200 to 240 VAC, 50/60 Hz														
	Allowable Voltage Fluctuation	-15% to +10%														
	Allowable Frequency Fluctuation	±5%														
	Reactor for Harmonic Wave Prevention	DC Choke Optional							Built-in DC Choke Standard							
	Braking Transistor	Built-in (30% ED, 30 s)										Optional				

### 380 to 480 VAC (Three-Phase)

Model CIMR-LE4A □□□□		0009	0012	0019	0023	0030	0039	0049	0056	0075	0094	0114	0140	0188	0225	
Max. Applicable Motor Capacity	HP	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	
	Rated Output Current (3 min., 50% ED) A	9.0 <sup>&lt;1&gt;</sup>	11.5 <sup>&lt;1&gt;</sup>	18.5 <sup>&lt;1&gt;</sup>	22.5 <sup>&lt;1&gt;</sup>	30 <sup>&lt;1&gt;</sup>	38.8 <sup>&lt;1&gt;</sup>	48.8 <sup>&lt;1&gt;</sup>	56.3 <sup>&lt;1&gt;</sup>	75 <sup>&lt;1&gt;</sup>	93.8 <sup>&lt;1&gt;</sup>	113.8 <sup>&lt;1&gt;</sup>	140 <sup>&lt;2&gt;</sup>	187.5 <sup>&lt;2&gt;</sup>	225 <sup>&lt;2&gt;</sup>	
	Overload Tolerance	150% of rated output current for 30 s														
	Carrier Frequency (User Adjustable)	2 to 15 kHz (parameter setting)											2 to 10 kHz (parameter setting)			
	Max. Output Voltage	Three-phase: 380 to 480 VAC (Proportional to input voltage)														
	Max. Output Frequency	Up to 200 Hz (parameter setting)														
Power	Rated Voltage/Rated Frequency	Three-phase: 380 to 480 VAC, 50/60 Hz														
	Allowable Voltage Fluctuation	-15% to +10%														
	Allowable Frequency Fluctuation	±5%														
	Reactor for Harmonic Wave Prevention	DC Choke Optional							Built-in DC Choke Standard							
	Braking Transistor	Built-in (30% ED, 30 s)										Optional				

<sup><1></sup>: Carrier frequency default is 8 kHz for models 2A0144, 4A0114 and below. Higher carrier frequencies require derating.

<sup><2></sup>: Carrier frequency default is 5 kHz for models 2A0181 to 2A0354, 4A0140 to 4A0225. Higher carrier frequencies require derating.

<sup><3></sup>: Carrier frequency default is 2 kHz for model 2A0432.

## Common Specification

	Item	Specifications
Control Characteristics	Control Method	Sinewave PWM (Flux Vector Control, Open Loop Vector Control, V/f Control, PM Flux Vector control)
	Frequency Control Range	0.01 to 200 Hz
	Frequency Accuracy (Temperature Fluctuation)	Digital reference: $\pm 0.01\%$ , $-10$ to $+40^{\circ}\text{C}$ Analog reference: $\pm 0.1\%$ , $25 \pm 10^{\circ}\text{C}$
	Frequency Setting Resolution	Digital reference: 0.01 Hz Analog reference: 0.03/60 Hz (11 bit)
	Output Speed Resolution	0.001 Hz
	Frequency Setting Signal	$-10$ to $+10\text{V}$ , $0$ to $+10\text{V}$
	Starting Torque <sup>&lt;1&gt;</sup>	200% at 0.3 Hz (Open Loop Vector Control), 200% at 0 rpm (Flux Vector Control, PM Flux Vector Control)
	Speed Control Range <sup>&lt;1&gt;</sup>	1:40 (V/f Control), 1:200 (Open Loop Vector Control), 1:1500 (Flux Vector Control, PM Flux Vector Control)
	Speed Control Accuracy <sup>&lt;1&gt;</sup>	$\pm 3\%$ (V/f Control), $\pm 0.2\%$ (Open Loop Vector Control at $25 \pm 10^{\circ}\text{C}$ ), $\pm 0.02\%$ (Flux Vector Control, PM Flux Vector Control at $25 \pm 10^{\circ}\text{C}$ )
	Speed Response <sup>&lt;1&gt;</sup>	10 Hz (Open Loop Vector Control), 50 Hz (Flux Vector Control, PM Flux Vector Control)
	Torque Limit	Vector control allows separate settings in four quadrants
	Accel/Decel Ramp	0.01 to 6000.0 s (4 selectable combinations of independent acceleration and deceleration settings)
	Braking Torque	Approx. 20% (approx. 125% with dynamic braking resistor option), Models up to CIMR-LE2A0144, 4A0075 have a built-in transistor
	Torque Accuracy	$\pm 5\%$
	V/f Characteristics	Freely programmable
	Overload Accuracy	150% of rated output current for 30 s
Jerk (S-Curve) Rates	Starting, acceleration end, deceleration start, leveling, stop setting independently	
Main Control Functions	Inertia Compensation, Position Lock at Start and Stop (Anti-Rollback) Function, Overtorque/Undertorque Detection, Torque Limit, Speed Reference, Accel/Decel Switchover, 5-Zone Jerk Settings, Auto-tuning (Stationary and Rotational Motor/Encoder Offset Tuning), Dwell, Cooling Fan On/Off or Temperature Controlled, Slip Compensation, Torque Compensation, DC Injection Braking at Start and Stop, MEMOBUS/Modbus Comm. (RS-422/485 max. 115.2 kbps), Fault Restart, Removable Terminal Block with Parameter Backup Function, High Frequency Injection, Short Floor, Rescue Operation (Light Load Direction Search Function), Inspection Run, Brake Sequence, Motor Temperature PTC Input, Speed Related Parameters with Elevator Units Display, Anti-vibration, etc.	
Protection Function	Motor Protection	Motor overheat protection based on output current
	Momentary Overcurrent Protection	Drive stops when output current exceeds 200%
	Overload Protection	Drive stops after 30 s at 150% of rated output current <sup>&lt;2&gt;</sup>
	Overvoltage Protection	200 V class: Stops when DC bus exceeds approx. 410 V; 400 V class: Stops when DC bus exceeds approx. 820 V
	Undervoltage Protection	Stops when DC bus voltage falls below the following levels: Three-phase 200 V class: approx. 190 V; Single-phase 200 V class: approx. 160 V; Three-phase 400 V class: approx. 380 V; Three-phase 380 V class: approx. 350 V
	Heatsink Overheat Protection	Protection by thermistor
	Braking Resistance Overheat Protection	Overheat sensor for braking resistor
	Stall Prevention	Separate settings allowed during acceleration and during run. Enable/disable only during deceleration.
	Ground Fault Protection	Protection by electronic circuit <sup>&lt;3&gt;</sup>
	Charge LED	Charge LED remains lit until DC bus has fallen below approx. 50 V
Environment	Area of Use	Indoors
	Ambient Temperature	$-10$ to $40^{\circ}\text{C}$ (IP00 enclosure with top protective cover); $-10$ to $50^{\circ}\text{C}$ (IP00 enclosure)
	Humidity	95% RH or less (non-condensing)
	Storage Temperature	$-20$ to $60^{\circ}\text{C}$ (short-term temperature during transportation)
	Altitude	Up to 1000 meters without derating, up to 3000 meters with output current and voltage derating
	Vibration/Shock	10 to 20 Hz: $9.8 \text{ m/s}^2$ ; 20 to 55 Hz: $5.9 \text{ m/s}^2$ (2A0018 to 2A225; 4A0009 to 4A0188) or $2.0 \text{ m/s}^2$ (2A0269 to 2A0432, 4A0225)
Safety Standard	UL, cUL, RoHS	
Network Communications	Modbus communications. (RS-422/485 max. 115.2 kbps) standard. Options: CANopen, others	
Feedback Devices	Incremental, EnDat, SIN/COS, Hiperface, IEC/EN 61508, EN 61800-5-1 <sup>&lt;4&gt;</sup>	
Protection Design	IP00 with top protective cover, IP00	

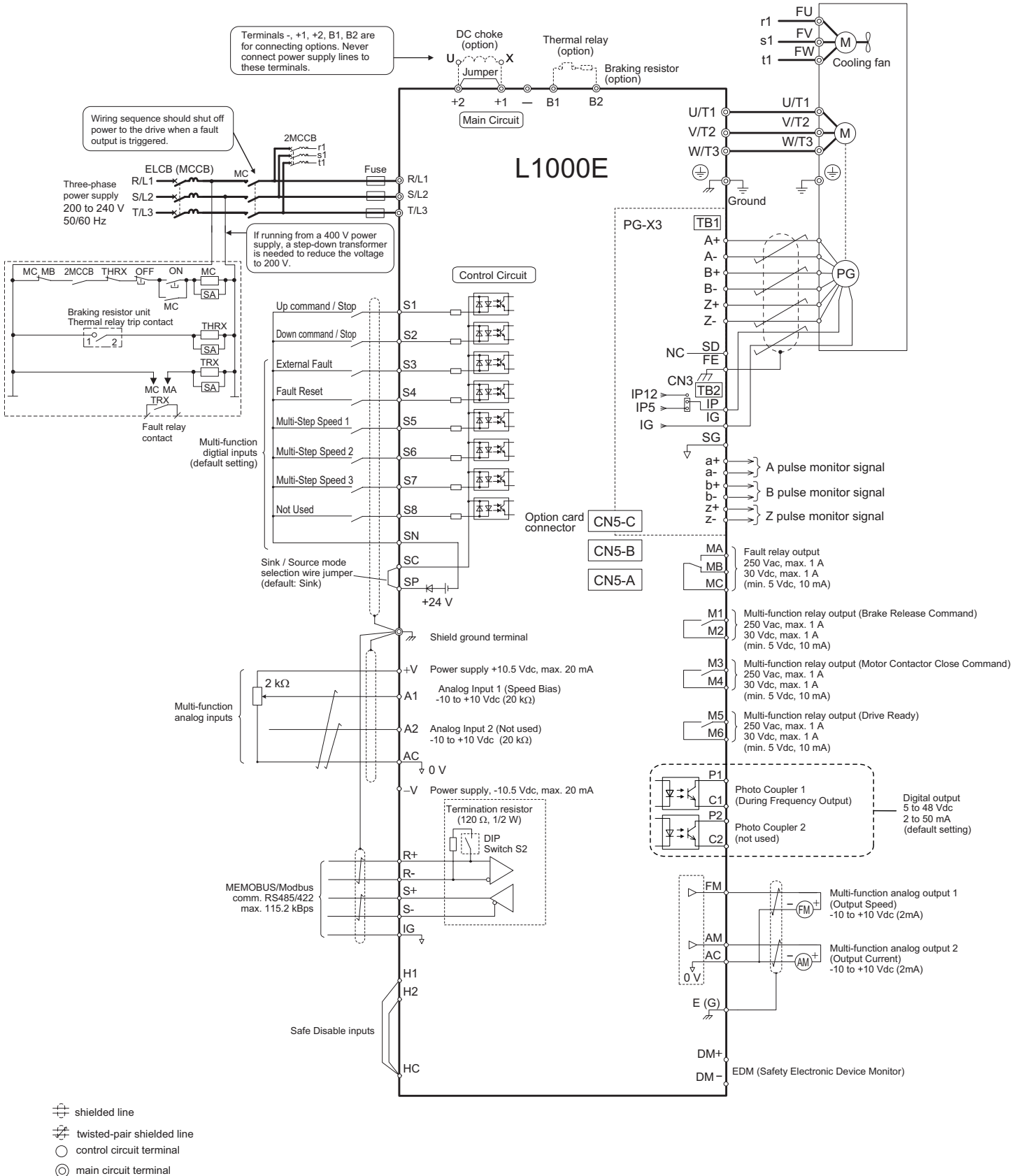
<sup><1></sup>: The accuracy of these values depends on motor characteristics, ambient conditions, and drive settings. Specifications may vary with different motors and with changing motor temperature. Contact YASKAWA for consultation.

<sup><2></sup>: Overload protection may be triggered when operating with 150% of the rated output current if the output speed is less than 6 Hz.

<sup><3></sup>: Ground protection cannot be provided when the impedance of the ground fault path is too low, or when the drive is powered up while a ground fault is present at the output.

# Connection Diagram

Example: CIMR-LE2A0041



## IP00 Enclosure with Top Protective Cover Dimensions

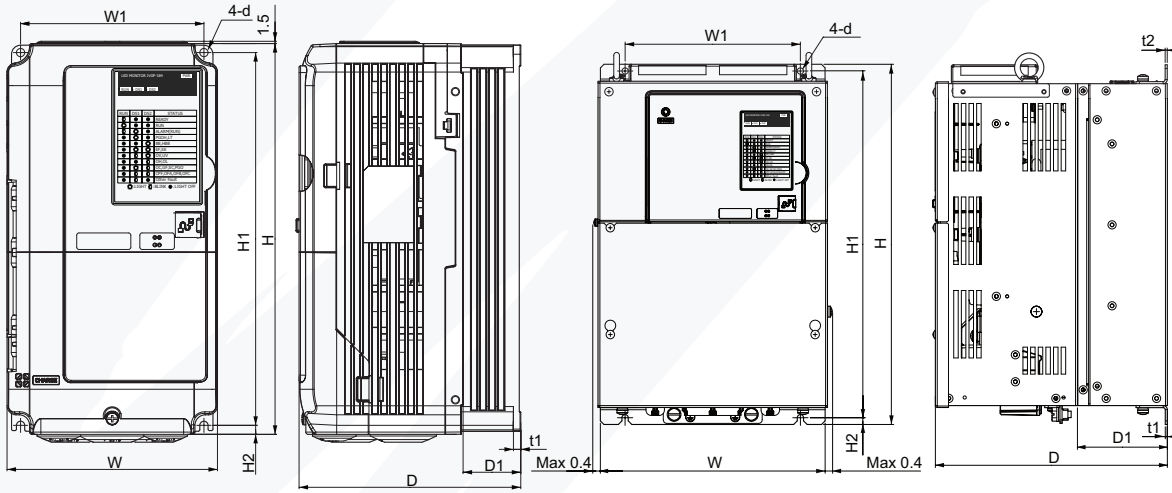


Figure 1

Figure 2

### 200 to 240 VAC Models

Model CIMR-LE□	Dimensions (in.)											Weight (lb)
	Figure	H	W	D	H1	H2	W1	D1	t1	t2	d	
2A0018	1	10.2	5.5	6.5	9.8	0.2	4.8	2.2	0.2	–	M5	7.7
2A0022		10.2	5.5	6.5	9.8	0.2	4.8	2.2	0.2	–	M5	7.7
2A0031		10.2	5.5	6.6	9.8	0.2	4.8	2.2	0.2	–	M5	8.8
2A0041		10.2	5.5	6.6	9.8	0.2	4.8	2.2	0.2	–	M5	8.8
2A0059		11.8	7.1	7.4	11.2	0.3	6.3	3.0	0.2	–	M5	12.3
2A0075		13.8	8.7	7.8	13.2	0.3	7.6	3.1	0.2	–	M6	19.2
2A0094		13.8	8.7	7.8	13.2	0.3	7.6	3.1	0.2	–	M6	21.4
2A0106	2	15.7	9.8	10.2	15.2	0.3	7.7	3.9	0.1	0.1	M6	46.3
2A0144		17.7	10.8	10.2	17.1	0.3	8.7	3.9	0.1	0.1	M6	55.1
2A0181		21.7	12.8	11.1	21.1	0.3	10.2	4.3	0.1	0.1	M6	81.6
2A0225		21.7	12.8	11.1	21.1	0.3	10.2	4.3	0.1	0.1	M6	83.8

### 380 to 480 VAC Models

Model CIMR-LE□	Dimensions (in.)											Weight (lb)
	Figure	H	W	D	H1	H2	W1	D1	t1	t2	d	
4A0009	1	10.2	5.5	6.5	9.8	0.2	4.8	2.2	0.2	–	M5	7.7
4A0012		10.2	5.5	6.5	9.8	0.2	4.8	2.2	0.2	–	M5	7.7
4A0019		10.2	5.5	6.6	9.8	0.2	4.8	2.2	0.2	–	M5	8.6
4A0023		10.2	5.5	6.6	9.8	0.2	4.8	2.2	0.2	–	M5	8.9
4A0030		11.8	7.1	6.6	11.2	0.3	6.3	2.2	0.2	–	M5	11.9
4A0039		11.8	7.1	7.4	11.2	0.3	6.3	3.0	0.2	–	M5	11.9
4A0049		13.8	8.7	7.8	13.2	0.3	7.6	3.1	0.2	–	M6	18.3
4A0056	2	15.7	9.8	10.2	15.2	0.3	7.7	3.9	0.1	0.1	M6	46.3
4A0075		17.7	10.8	10.2	17.1	0.3	8.7	3.9	0.1	0.1	M6	55.1
4A0094		20.1	12.8	10.2	19.5	0.3	10.2	4.1	0.1	0.1	M6	79.4
4A0114		20.1	12.8	10.2	19.5	0.3	10.2	4.1	0.1	0.1	M6	79.4
4A0140		21.7	12.8	11.1	21.1	0.3	10.2	4.3	0.1	0.1	M6	90.4
4A0188		21.7	12.8	11.1	21.1	0.3	10.2	4.3	0.1	0.1	M6	92.6



## IP00 Enclosure Dimensions

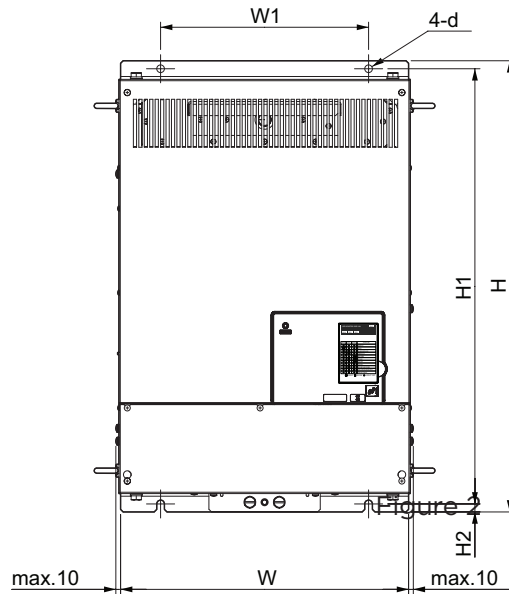


Figure 1

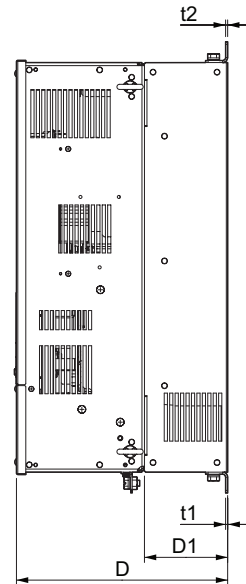


Figure 3

### 200 to 240 VAC Models

Model CIMR-LE□	Dimensions (in.)											Weight (lb)
	Figure	H	W	D	H1	H2	W1	D1	t1	t2	d	
2A0269	1	27.8	17.7	13.0	26.8	0.5	12.8	5.1	0.1	0.1	M10	167.6
2A0354		27.8	17.7	13.0	26.8	0.5	12.8	5.1	0.1	0.1	M10	176.4
2A0432		31.5	19.7	13.8	30.4	0.5	14.6	5.1	0.2	0.2	M12	216.1

### 380 to 480 VAC Models

Model CIMR-LE□	Dimensions (in.)											Weight (lb)
	Figure	H	W	D	H1	H2	W1	D1	t1	t2	d	
4A0225	1	27.8	17.7	13.0	26.8	0.5	12.8	5.1	0.1	0.1	M10	174.2

## Drive Watt Data Loss

### 200 to 240 VAC Models

Model CIMR-LE□	Carrier Frequency: 8 kHz			
	Rated Amps (A)	Heatsink Loss (W)	Interior Unit Loss (W)	Total Loss (W)
2A0018	17.5	97	63	160
2A0022	21.9	127	71	198
2A0031	31.3	244	100	344
2A0041	41.3	269	113	382
2A0059	58.8	352	141	493
2A0075	75	496	178	674
2A0094	93.8	578	239	817
2A0106	106.3	642	231	872
2A0144	143.8 <sup>*1</sup>	833	276	1108
2A0181	181.3 <sup>*1</sup>	1026	338	1363
2A0225	225.0 <sup>*1</sup>	1227	416	1643
2A0269	268.8 <sup>*1</sup>	1903	524	2428
2A0354	353.8 <sup>*1</sup>	2434	662	3096
2A0432	432.5 <sup>*2</sup>	3223	882	4105

### 380 to 480 VAC Models

Model CIMR-LE□	Carrier Frequency: 8 kHz			
	Rated Amps (A)	Heatsink Loss (W)	Interior Unit Loss (W)	Total Loss (W)
4A0009	9.0	67	57	124
4A0012	11.5	86	64	150
4A0019	18.5	170	91	261
4A0023	22.5	188	103	291
4A0030	30	261	123	385
4A0039	38.8	330	151	481
4A0049	48.8	415	192	607
4A0056	56.3	438	183	621
4A0075	75	609	236	844
4A0094	93.8	708	276	984
4A0114	113.0 <sup>*1</sup>	908	327	1235
4A0140	140.0 <sup>*1</sup>	1142	451	1593
4A0188	187.5 <sup>*1</sup>	1685	632	2317
4A0225	225	2227	609	2836

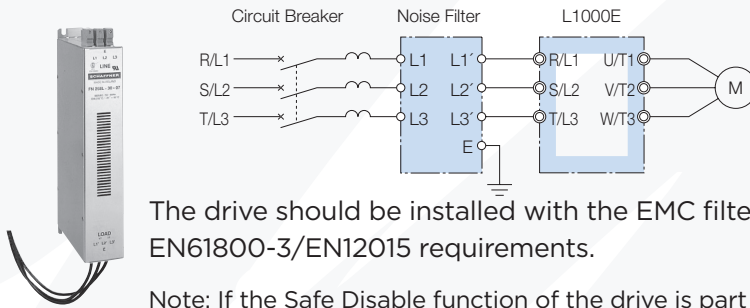
\*1: Value assumes the carrier frequency is set to 5 kHz.

\*2: Value assumes the carrier frequency is set to 2 kHz.

## Options

Name	Purpose	Model
AC Reactors or DC Link Chokes	Harmonic Mitigation	For detailed information contact YASKAWA.
Analog Input	Provides 14-bit high-precision and high-resolution analog speed reference setting. <ul style="list-style-type: none"> <li>Input signal level: -10 to +10 Vdc (20 k<math>\Omega</math>), 4 to 20 mA (500 <math>\Omega</math>)</li> <li>Input channels: 3 channels, DIP switch for input voltage/input current selection</li> <li>Input resolution: Input voltage 13-bit signed (1/8192), Input current 1/6554</li> </ul>	AI-A3
Digital Input	Provides 16-bit digital speed reference setting. <ul style="list-style-type: none"> <li>Input signal: 16-bit binary, 2 digit BCD + sign signal + set signal</li> <li>Input voltage: +24 V (isolated)</li> <li>Input current: 8 mA</li> </ul> Selectable Parameter: 8-bit, 12-bit, 16-bit	DI-A3
CANopen Communications Interface	Used for running or stopping the drive, setting or referencing parameters and monitoring output speed, output current, or similar items through CANopen communication with the host controller.	SI-S3
Analog Monitor	Provides 12-bit outputs analog signal for monitoring drive output state (output speed, output current etc.). <ul style="list-style-type: none"> <li>Output resolution: 11-bit signed (1/2048)</li> <li>Output voltage: -10 to +10 Vdc (non-isolated)</li> <li>Output channels: 2 channels</li> </ul>	AO-A3
Digital Output	Provides isolated digital output signals for monitoring drive run state (alarm signal, zero speed detection, etc.). Output channel: Photocoupler, 6 channels (48 V, 50 mA or less), Relay contact output, 2 channels, 250 Vac, 1 A or less 30 Vdc, 1 A or less	DO-A3
Open Collector PG Interface	For control modes requiring a PG encoder for motor feedback: <ul style="list-style-type: none"> <li>Phase A, B, and Z pulse (3-phase) inputs (complementary type)</li> <li>PG frequency range: Approx. 50 kHz max.</li> <li>Power supply output for PG: +24 V, max. current 30 mA</li> <li>Pulse monitor output: Open collector, +24 V, max. current 30 mA</li> <li>Power supply output for PG: +12 V, max. current 200 mA</li> </ul>	PG-B3
Line Driver PG Interface	For control modes requiring a PG encoder for motor feedback: <ul style="list-style-type: none"> <li>Phase A, B, and Z pulse (differential pulse) inputs (RS-422)</li> <li>PG frequency range: up to 300 kHz (approx.)</li> <li>Pulse monitor output: RS-422</li> <li>Power supply output for PG: +5 V or +12 V, max. current 200 mA</li> </ul>	PG-X3
Absolute Encoder	EnDat Encoder Feedback STEGMANN HIPERFACE Encoder Feedback	PG-F3 (EnDat 2.1/01, 2.2/01, 2.2/22, SRS 50/60)
Absolute Encoder	HEIDENHAIN Encoder Feedback	PG-E3 (HEIDENHAIN ERN1387/487)
LED Operator	Easy long distance viewing	JVOP-182
Braking Resistor	Used to shorten the deceleration time by dissipating regenerative energy	For detailed information contact YASKAWA.
Braking Resistor Unit	Shortened deceleration time results when the L1000E is used with a Braking Resistor Unit. For units above 50 HP.	CDBR series
24 V Power Supply	Provides a separate power supply for the control circuit and option boards. Note: Parameter settings cannot be changed when the drive is operating solely from this power supply.	PS-A10HB PS-A10LB
USB Copy Unit (RJ-45/USB compatible port)	<ul style="list-style-type: none"> <li>Adapter for connecting the drive to the USB port of a PC</li> <li>Can copy parameter settings easily and quickly to be later transferred to another drive</li> </ul>	JVOP-181
LCD Operator Extension Cable	Extension cable for connecting the LCD operator.	UWR0051: 3.3 ft. (1 m) UWR0052: 10 ft. (3 m)
LCD Operator	User friendly display for easy set-up, monitor, and multiple language programming support	JVOP-180

## Noise Filter (EMC Filter) Option



Note: Do not connect the input noise filter to the drive output terminals (U/T1, V/T2, W/T3). Connect in parallel when using two filters. Only a single noise filter is required if the filter is made by Schaffner EMC.

The drive should be installed with the EMC filters listed below in order to comply with the EN61800-3/EN12015 requirements.

Note: If the Safe Disable function of the drive is part of the safety concept of an elevator machine or installation and used for a safe stop according to EN60204-1, stop category 0. This also applies when using the safe disable function in one motor contactor installations. EMC filters must be used when IEC/EN61508 (functional safety) conformance is required.

### 200 to 240 VAC Models

Model CIMR-LE□	Filter Data (Manufacturer: Schaffner)									
	Model Number	Rated Current (A)	Weight (lb)	Figure (next page)	Dimensions (in.)					
					H	W	D	X	Y	
2A0018	FS5972-18-07	18	3.7	2	13.0	5.6	1.8	12.3	4.5	
2A0022	FS5972-35-07	35	4.6		14.0	8.1	2.0	13.2	6.9	
2A0031					16.1	9.3	2.6	15.4	8.1	
2A0041	FS5972-60-07	60	8.8		13.0	3.5	5.9	10.0	2.6	
2A0059					17.8	4.7	6.7	14.4	4.0	
2A0075	FS5972-100-35	100	7.5		24.0	5.1	9.4	19.6	3.5	
2A0094					15.2	10.2	4.5	4.7	9.3	
2A0106	FS5972-170-40	170	13.2		3	15.2	10.2	4.5	4.7	9.3
2A0144						15.2	10.2	5.3	4.7	9.3
2A0181	FS5972-250-37	250	25.8			15.2	10.2	4.5	4.7	9.3
2A0225				15.2		10.2	5.3	4.7	9.3	
2A0269	FS5972-410-99	410	23.1	15.2		10.2	4.5	4.7	9.3	
2A0354				15.2		10.2	5.3	4.7	9.3	
2A0432	FS5972-600-99	600	24.3	15.2		10.2	5.3	4.7	9.3	

## Noise Filter (EMC Filter) Option

### 380 to 480 VAC Models

Model CIMR-LE□	Filter Data (Manufacturer: Schaffner)										
	Model Number	Rated Current (A)	Weight (lb)	Figure (next page)	Dimensions (in.)						
					H	W	D	X	Y		
4A0009	FS5972-10-07	10	2.6	1	13.0	5.6	1.8	12.3	4.5		
4A0012	FS5972-18-07	18	3.7		13.0	5.6	1.8	12.3	4.5		
4A0019	FS5972-35-07	35	4.6		14.0	8.1	2.0	13.2	6.9		
4A0023											
4A0030											
4A0039	FS5972-60-07	60	8.8		16.1	9.3	2.6	15.4	8.1		
4A0049											
4A0056											
4A0075	FS5972-100-35	100	7.5	2	13.0	3.5	5.9	10.0	2.6		
4A0094											
4A0114											
4A0140	FS5972-170-40	170	13.2		17.8	4.7	6.7	14.4	4.0		
4A0188											
4A0225											
	FS5972-250-37	250	25.8			24.0	5.1	9.4	19.6	3.5	

# Noise Filter (EMC Filter) Dimsions

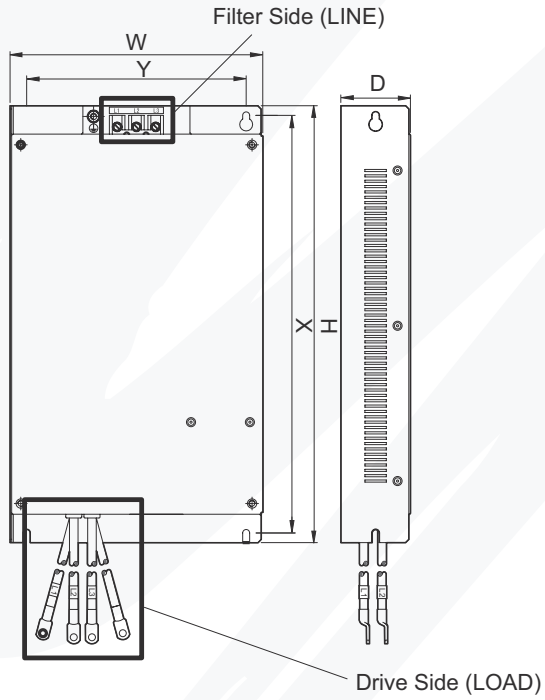


Figure 1

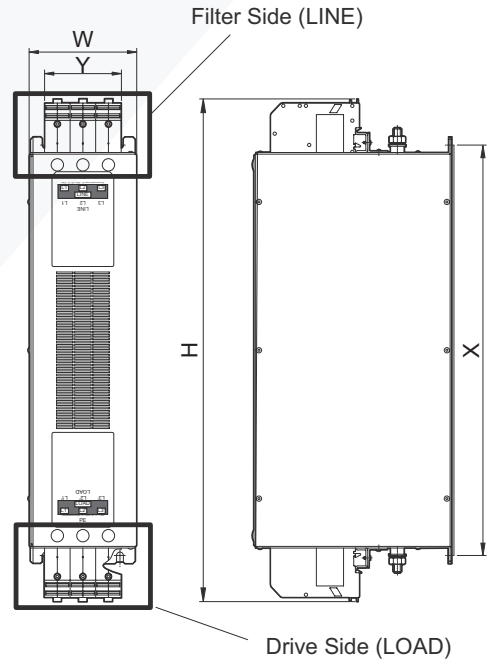


Figure 2

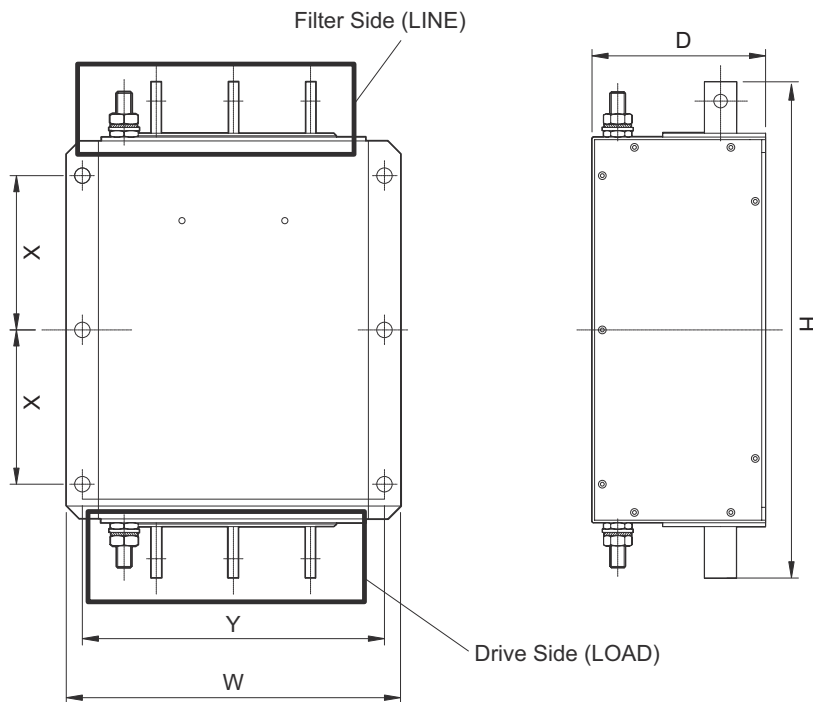


Figure 3



## CDBR Braking Unit Option



The L1000E includes a built-in braking transistor up to 50 HP (200-240 VAC and 380-480 VAC). For L1000E drives above 50 HP with braking torque requirements, a CDBR Braking Unit is available as an option. Please contact a YASKAWA representative for further information on braking resistors. The table below indicates the recommended CDBR Braking Unit and the resistor specification.

### 200 to 240 VAC Models

Max. Applicable Motor (HP)	L1000E	Braking Unit		Braking Resistor Unit			Min.* Connection Resistance ( $\Omega$ )		
	Model CIMR-LE□	Model CDBR-□	Qty.	Resistor Specifications (per unit)	Qty.	Braking Torque (%) (10% ED)			
5	2A0018			1100 W 38 $\Omega$	1	150	16		
7.5	2A0022			1700 W 26 $\Omega$	1	125	16		
10	2A0031			2200 W 19 $\Omega$	1	115	16		
15	2A0041			3400 W 12.6 $\Omega$	1	125	9.6		
20	2A0059			4500 W 9.6 $\Omega$	1	125	9.6		
25	2A0075			5600 W 7.5 $\Omega$	1	125	9.6		
30	2A0094			6700 W 6.3 $\Omega$	1	100	9.6		
40	2A0106			9000 W 4.9 $\Omega$	1	125	6.4		
50	2A0144			20370D	2	5600 W 7.5 $\Omega$	2	100	5.0
60	2A0181			20370D	2	6700 W 6.3 $\Omega$	2	100	5.0
75	2A0225	2110B	1	16800 W 2.7 $\Omega$	2	120	1.6		
100	2A0269	2110B	1	22400 W 1.9 $\Omega$	2	100	1.6		
125	2A0354	2110B	2	16800 W 2.7 $\Omega$	3	110	1.6		
150	2A0432	2110B	2	16800 W 2.7 $\Omega$	4	120	1.6		

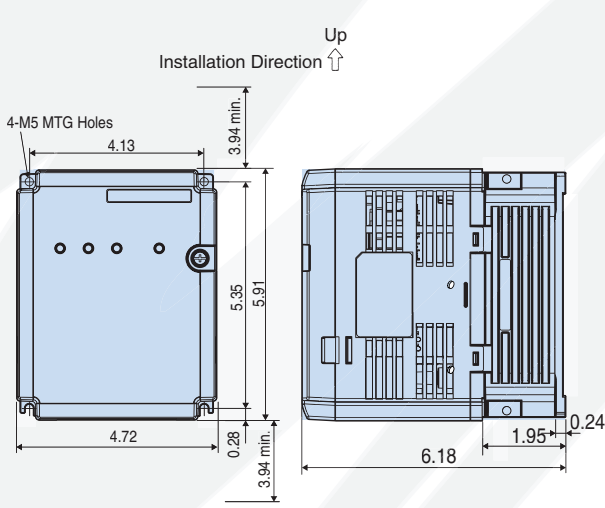
### 380 to 480 VAC Models

Max. Applicable Motor (HP)	L1000E	Braking Unit		Braking Resistor Unit			Min.* Connection Resistance ( $\Omega$ )
	Model CIMR-LE□	Model CDBR-□	Qty.	Resistor Specifications (per unit)	Qty.	Braking Torque (%) (10% ED)	
5	4A0009	Built-in		1100 W 150 $\Omega$	1	150	32
7.5	4A0012			1700 W 100 $\Omega$	1	135	32
10	4A0019			2200 W 75 $\Omega$	1	135	32
15	4A0023			3400 W 50 $\Omega$	1	130	32
20	4A0030			4500 W 38 $\Omega$	1	135	20
25	4A0039			5600 W 30 $\Omega$	1	125	20
30	4A0049			6700 W 25 $\Omega$	1	125	19.2
40	4A0056			9000 W 19 $\Omega$	1	125	19.2
50	4A0075			11200 W 15 $\Omega$	1	125	19.2
60	4A0094			40450D	2	9000 W 19 $\Omega$	2
75	4A0114	40450D	2	9000 W 19 $\Omega$	2	125	12.8
100	4A0140	4220B	1	22400 W 7.5 $\Omega$	1	135	3.2
125	4A0188	4220B	1	33600 W 5 $\Omega$	1	145	3.2
150	4A0225	4220B	1	33600 W 5 $\Omega$	1	120	3.2

\* The value shown for the minimum connection resistance is that for a single braking unit. Select a resistance value higher than the connectable resistance value and enough to generate the required braking torque.

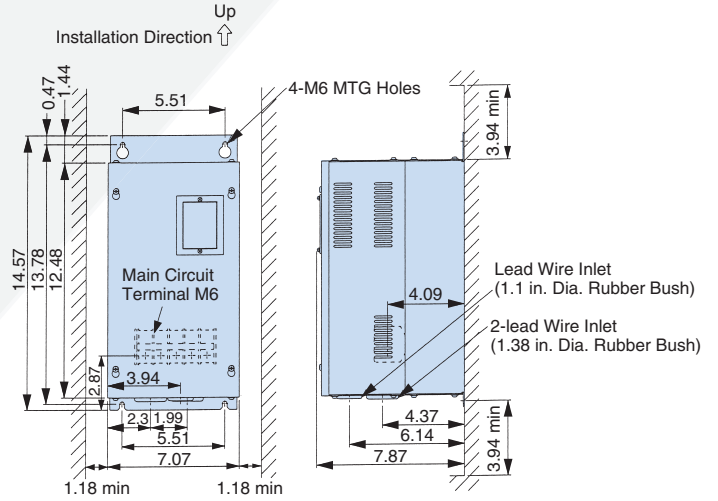
# CDBR Braking Unit Dimensions (in.)

## Model: CDBR-20220D, -20370D, -40300D, -40450D



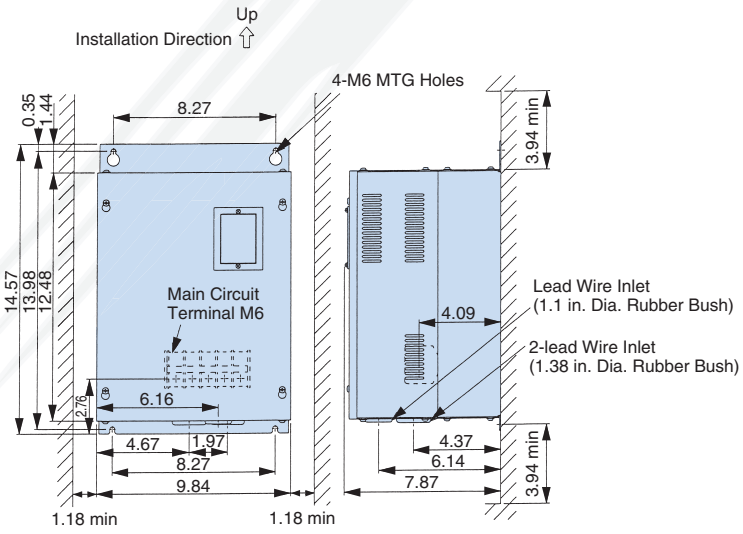
Weight: 4 lb

## Model: CDBR-2110B



Weight: 18.7 lb

## Model: CDBR-4220B



Model CDBR- <input type="text"/>	Heat Loss (W)
20220D	27
20370D	38
2110B	64
40300D	24
40450D	36
4220B	71

## 24-Volt Power Supply Option

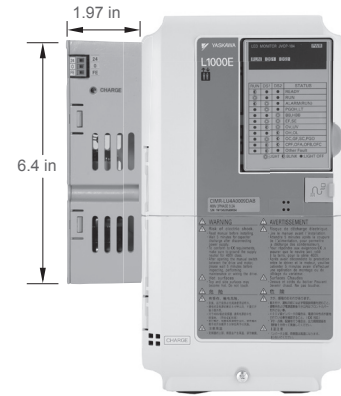
The 24 V Power Supply Option maintains drive control circuit power in the event of a main power outage. The control circuit keeps network communications and I/O data operational in the event of a power outage. It supplies external power to the control circuit only.

Note: Parameter settings cannot be changed when the drive is operating solely from this power supply.

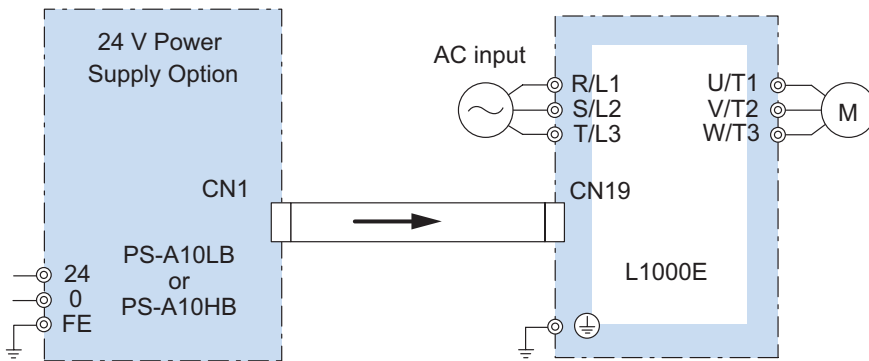
Model	Code No.
200 to 240 VAC	PS-A10LB
380 to 480 VAC	PS-A10HB



The installed option adds 1.97 in. to the total width of the drive.

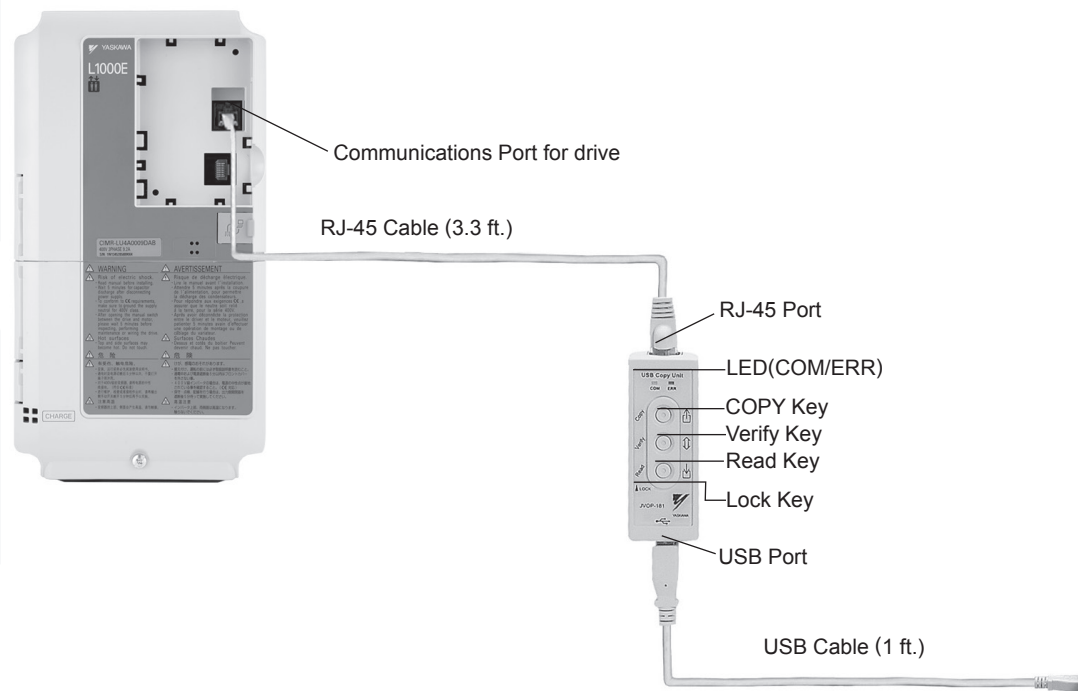


## Connection Diagram



# USB Copy Unit (Model JVOP-181) Option

## Connection



Model	Description
JVOP-181	USB Copy Unit with RJ-45 Cable and USB Cable

## Specifications

Item	Specifications
Port	LAN (RJ-45) USB (Ver.2.0 compatible)
Power Supply	Supplied from a PC or the drive
Operating System	Windows XP SP2, Windows 2000 SP4
Memory	Memorizes the parameters for one drive.
Dimensions	3.5 (H) × 1.2 (W) × 0.8 (D) in.
Accessories	RJ-45 Cable (3.3 ft.), USB Cable (1 ft.)

- Note: 1. Drives must have identical software versions to copy parameter settings.  
 2. Requires a USB driver.  
 3. Parameter copy function is disabled when connected to a PC.

## RC5 Converter (Line Regeneration Unit) Option



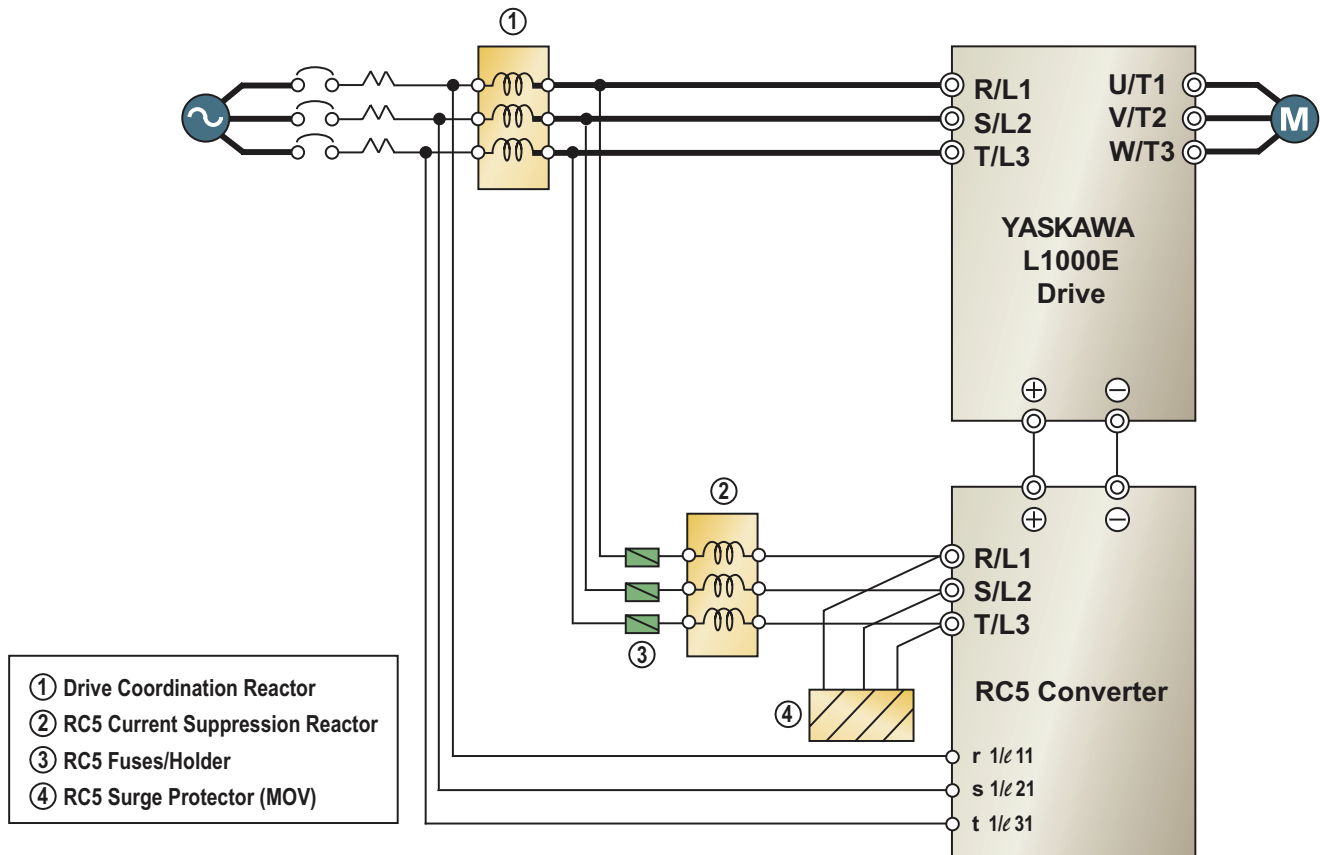
**RC5 Converter**  
Line Regeneration Unit

The RC5 Converter is a high-performance line regeneration unit ideal for elevator applications that require a high-demand braking cycle. The RC5 is an excellent, competitive solution that takes excess regenerative energy from the driven motor and supplies it to the incoming AC power source.

In elevator applications, the RC5 is a cost-competitive alternative to DB resistors, especially when energy savings is considered. DB resistors simply dissipate the regenerated energy as heat. The RC5 returns the regenerated energy back to the power grid, reducing the total energy consumption. Payback for high duty cycle applications is typically less than one year with the RC5.

The RC5 is wired in parallel with the L1000E drive and can be independently sized to suit the projected regenerative load. The RC5 includes display monitors (i.e., power, operating time, and others). It mounts inside the panel with the drive, unlike braking resistors which must be mounted externally because of heavy heat generation and large footprints. The RC5 is also applicable to all other YASKAWA drive series including the F, G, V, and L series drives. Additional configurations are available. Consult the factory.

### RC5 Connection Diagram



## RC5 Converter Specifications & Dimensions

### 200 to 240 VAC Models

Max. Applicable Motor (HP)	L1000E	RC5 Data			Physical Dimensions			Weight (lb)	Standard Enclosure	Heat Loss (W)		
	Model CIMR-LE□	Model CIMR-R5U□	RC5 Kit Number RC5-	RC5 Line Current (A)	H	W	D			Heatsink	Internal	Total
5	2A0018	23P71A	230-5HP-SD	10	11.02	5.51	7.09	9.9	NEMA 1	70	60	130
5	2A0022	23P71A	230-5HP-SD	10	11.02	5.51	7.09	9.9	NEMA 1	70	60	130
7.5	2A0031	25P51A	230-7.5HP-SD	15	11.02	5.51	7.09	9.9	NEMA 1	70	60	130
10	2A0041	27P51A	230-10HP-SD	20	11.02	5.51	7.09	9.9	NEMA 1	90	80	170
15	2A0059	20111A	230-15HP-SD	30	11.81	7.87	8.07	12.1	NEMA 1	160	110	270
20	2A0075	20151A	230-20HP-SD	40	11.81	7.87	8.07	13.2	NEMA 1	200	130	330
25	2A0094	20181A	230-25HP-SD	50	14.96	9.84	8.86	22.0	NEMA 1	250	150	400
30	2A0106	20221A	230-30HP-SD	30	14.96	9.84	8.86	22.0	NEMA 1	320	180	500
40	2A0144	20301A	230-40HP-SD	80	15.75	9.84	8.86	24.3	NEMA 1	410	220	630
50	2A0181	20371A	230-50HP-SD	100	17.72	12.80	11.22	50.7	Open Chassis	540	290	830

### 380 to 480 VAC Models

Max. Applicable Motor (HP)	L1000E	RC5 Data			Physical Dimensions			Weight (lb)	Standard Enclosure	Heat Loss (W)		
	Model CIMR-LE□	Model CIMR-R5U□	RC5 Kit Number RC5-	RC5 Line Current (A)	H	W	D			Heatsink	Internal	Total
5	4A0009	43P71A	460-5HP-SD	5	11.02	5.51	7.09	7.7	NEMA 1	30	50	80
5	4A0012	43P71A	460-5HP-SD	5	11.02	5.51	7.09	7.7	NEMA 1	30	50	80
7.5	4A0019	45P51A	460-7.5HP-SD	7.5	11.02	5.51	7.09	8.8	NEMA 1	40	60	100
10	4A0023	47P51A	460-10HP-SD	10	11.02	5.51	7.09	8.8	NEMA 1	60	60	120
15	4A0030	40111A	460-15HP-SD	15	11.81	7.87	8.07	13.2	NEMA 1	80	70	150
20	4A0039	40151A	460-20HP-SD	20	11.81	7.87	8.07	13.2	NEMA 1	110	90	200
25	4A0049	40181A	460-25HP-SD	25	14.96	9.84	8.86	23.1	NEMA 1	120	100	220
30	4A0056	40221A	460-30HP-SD	30	14.96	9.84	8.86	23.1	NEMA 1	140	110	350
40	4A0075	40301A	460-40HP-SD	40	14.96	9.84	8.86	23.1	NEMA 1	210	140	350
50	4A0094	40370A	460-50HP-SD	50	17.72	12.80	11.22	55.1	Open Chassis	290	160	450
60	4A00114	40450A	460-60HP-SD	60	17.72	12.80	11.22	58.4	Open Chassis	360	190	550
75	4A0140	40550A	460-75HP-SD	75	24.61	12.80	11.22	75.0	Open Chassis	470	260	730
100	4A0188	40750A	460-100HP-SD	100	24.61	12.80	11.22	79.4	Open Chassis	550	310	860

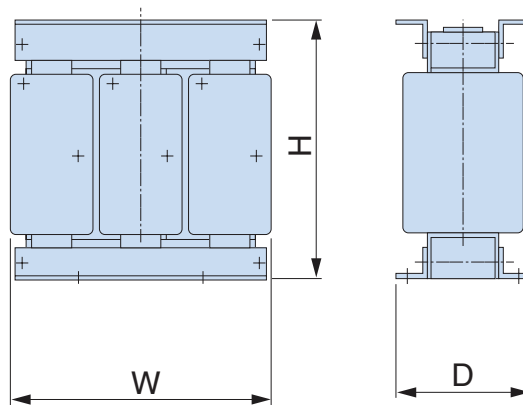
Note: This data represents only the RC5 unit.



## RC5 Dimensions & Weights Reactors

Rated Input Voltage	Basic Drive Model Number CIMR-R5U	Physical Dimensions (in.) L1000E Reactor			Weight (lb) <sup>(1)</sup>	Physical Dimensions (in.) RC5 Reactor			Weight (lb) <sup>(1)</sup>
		H	W	D		H	W	D	
230V	23P71	5.3	6.0	3.2	9	5	6.0	3.3	9
	25P51	5.8	7.2	3.5	11	5.8	7.2	3.5	11
	27P51	5.8	7.2	4	14	5.8	7.2	3.5	11
	20111	7.4	9.0	4.7	23	5.8	7.2	4	14
	20151	7.3	9.0	5.3	24	7.3	9.0	5.3	24
	20181	7.2	9.0	6.3	25	7.2	9.0	6.3	25
	20221	7.2	9.0	6.3	25	7.2	9.0	6.3	25
	20300	7.2	9.0	6.5	29	7.3	9.0	6.5	29
	20370	7	9.0	4.7	29	7	9.0	4.7	29
460V	43P71	4.8	6.0	3	8	4.8	6.0	3.4	11
	45P51	5	6.0	3.3	10	4.8	6.0	3	8
	47P51	5.3	6.0	3.5	12	5	6.0	3.3	10
	40111	5.8	7.2	3.5	14	5.3	6.0	3.5	12
	40151	5.8	7.2	4	16	5.8	7.2	3.5	11
	40181	5.8	7.2	4	16	5.8	7.2	4	14
	40221	7.4	9.0	4.7	28	7.4	9.0	4.7	23
	40301	7	9.0	5.3	27	7	9.0	5.3	27
	40371	7.2	9.0	6.5	33	7.2	9.0	6.5	33
	40451	7.2	9.0	6.5	33	7.2	9.0	6.3	25
	40550	7.3	9.0	6.8	37	7.3	9.0	6.5	29
	40750	7.2	9.0	6.8	43	7	9.0	4.7	29

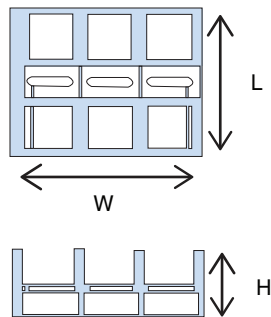
<sup>(1)</sup> The data represents the component unit weight only, not shipping weight.



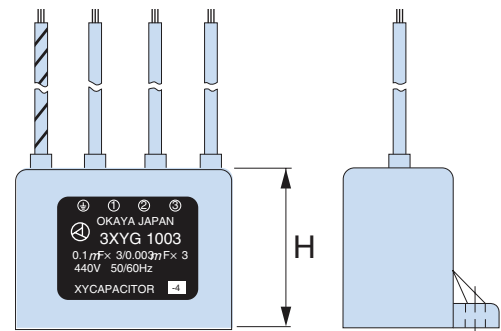
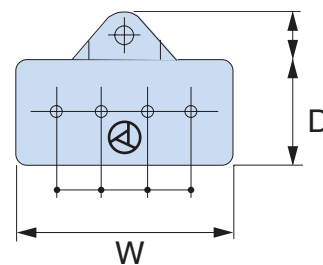
## RC5 Dimensions & Weights Reactors

Rated Input Voltage	Basic Drive Model Number CIMR-R5U	Physical Dimensions (in.) <sup>(1)</sup> Fuse Holder			Physical Dimensions (in.) MOV		
		H	L	W	H	W	D
230V	23P71	1.38	3	3	1.14	1.65	1.63
	25P51	1.38	3	3			
	27P51	1.38	3	3			
	20111	2.79	4.4	4.5			
	20151	2.5	4.5	4.5			
	20181	2.5	4.5	4.5			
	20221	2.5	4.5	4.5			
	20300	2.5	4.5	4.5			
	20370	2.5	4.5	4.5			
460V	43P71	1.31	3.04	2.35	1.14	1.65	1.63
	45P51	1.31	3.04	2.35			
	47P51	1.31	3.04	2.35			
	40111	1.31	3.04	2.35			
	40151	1.31	3.04	2.35			
	40181	2.79	4.4	4.5			
	40221	2.79	4.4	4.5			
	40301	2.79	4.4	4.5			
	40371	2.79	4.4	4.5			
	40451	2.79	4.4	4.5			
	40550	2.79	4.4	4.5			
	40750	2.79	4.4	4.5			

<sup>(1)</sup> The (W) data represents the fuse holder width for three fuses.



Fuse Holder Diagram



MOV Diagram

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**Yaskawa America, Inc.**  
Drives & Motion Division

2121 Norman Drive South  
Waukegan, IL 60085

1-800-YASKAWA (927-5292) • Local: 847-887-7000 • Fax: 1-847-887-7310

[DrivesHelpDesk@yaskawa.com](mailto:DrivesHelpDesk@yaskawa.com) • [www.yaskawa.com](http://www.yaskawa.com)

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