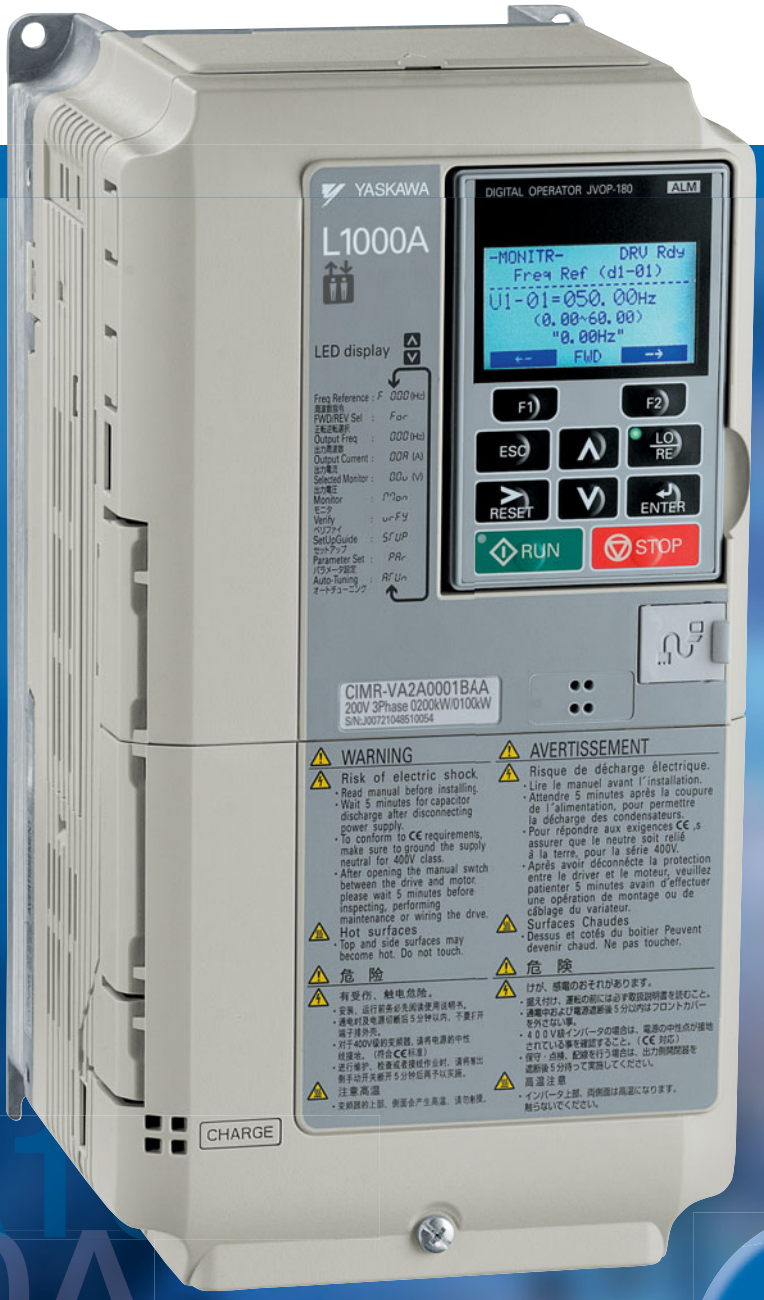
YASKAWA

LIFT INVERTER SERIES
L1000A



EN
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For Modernization and New Installation

YASKAWA L1000A

FOR HIGH PERFORMANCE LIFT APPLICATION

Contents

Experience & Innovation

Since 1915 YASKAWA has manufactured and supplied products for machine building and industrial automation. Our standard products as well as tailor-made solutions are well known and have a high reputation for outstanding quality and reliability.

YASKAWA has a track record also of manufacturing and supplying inverters to drive the lift industry: more than 60.000 sold lift inverter units every year.
The L1000A Inverter Series is a dedicated inverter drive for lift applications suitable for both modernisation projects and new installations.

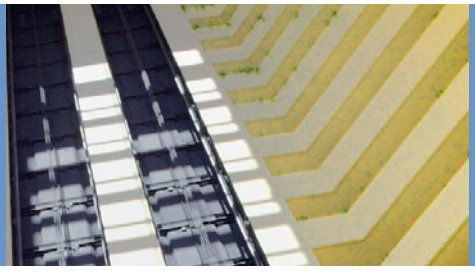
Based on many years of experience and application oriented innovation the L1000A provides high-performance characteristics offering a set of attractive features:

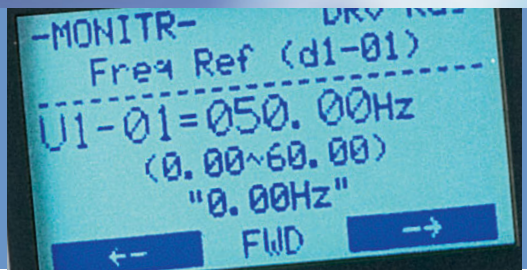
- Energy and Life-Cycle-Cost efficiency
- Simple and stress-free handling
- Safe and comfortable rides

The YASKAWA L1000A uses special hardware designed for 3 million starts and more than 70.000 hrs of maintenance free operation. It provides advanced control functions to run induction and PM motor applications in geared or gearless elevator systems.
With its motor capacities ranging from 1.5 to 110 kW the L1000A is capable of driving almost any elevator. In addition, the L1000A is quickly installed and can be integrated into most control systems.

L1000A benefits

- ✓ Energy & cost efficiency
- ✓ Simple & stress-free handling
- ✓ Safe & comfortable rides





YASKAWA L1000 lift drives are the solution to technical requirements of today's elevators. This inverter controls induction and permanent magnet motors. It is the first choice for new installation, machine room less lifts, but also for modernization. Experience the proven YASKAWA reliability combined with a new level of ride comfort.

Advantages

- Cost saving - L1000A can control PM motors with robust and relatively low cost incremental encoders
- State of the art motor control algorithms provide a smooth ride and an accurate landing
- Compact shape for installation in narrow panels
- EN81-1 compliant solution with one motor contactor saves costs while increasing reliability
- Auto-Tuning function saves installation time by allowing drive setup without removing ropes
- Integrated brake control according to EN 81-1+A3
- DCP3-Interface for easy serial connection with lift control
- Standard LCD operator now in 11 European languages:
  German, Englisch, French, Italian, Spanish, Portugese, Greek, Turkish, polish, Czech and Russian.

Features

- Incremental, EnDat and SinCos encoder support, Hiperface coming soon
- Brake monitoring according to EN 81-1+A3
- DCP3-Interface
- Smooth start of gearless motors without load sensor
- Flexible I/Os and lift firmware allow connection to almost any lift controller
- Parameter display in lift language and lift units (m/s, m/s ² ...)
- Emergency operation with standard UPS or battery, light load direction search built in
- Proven YASKAWA quality and reliability

Available soon:

- L1000A with SIL3 STO for operation without motor contactor

Energy & Cost Efficiency

Advanced Motor/Drive technology

High performance current vector control technology for induction and synchronous motor operation

- Single software parameter to switch between motor types
- Perfect for a wide range of lift applications

Control Modes

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

USB Copy Unit

- The USB copy unit as a fast and convenient way to back up settings and instantly program the drive.

LCD Operator for Simple Parameter Handling

All standard versions are equipped with an LCD operator including:

- 11 European operating languages, clear text
- Copy function: to upload and download parameter settings instantly
- Verify function: checks parameters which have been changed from default values

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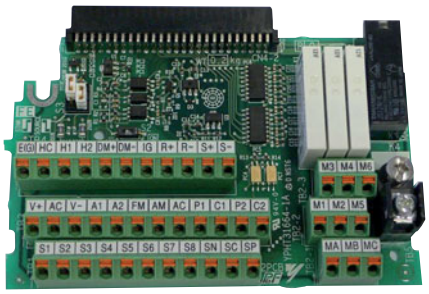
Simple Handling

Multifunction Terminal Board

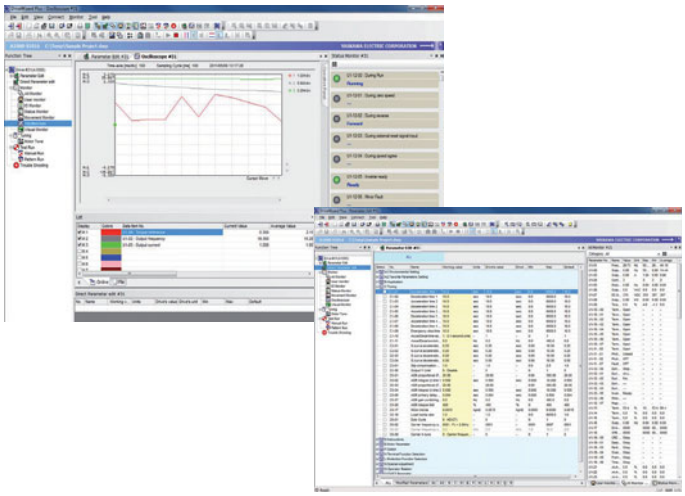
- Terminal board with a Parameter Backup Function
  The terminal board's ability to save parameter setting data makes it easy to get the application back online in the event of a failure requiring drive replacement.

L1000A Terminal Board



Parameter		
Name	**Number**	**Setting**
ND/HD	C6-01	1
Control Mode	A1-02	0
Frequency Reference Selection	b1-01	1
Run Command Selection	b1-02	1

DriveWizard Plus



Manage the unique settings for all your drives right on your PC. An indispensable tool for drive setup and maintenance Edit parameters, access all monitors, create customized operation sequences, and observe drive performance with the oscilloscope function.

- Convenient PC-based drive-setup, monitoring and diagnostic functions
- Built-in scope function
- Automatic parameter conversion from older series drives
- Online and offline parameter editing

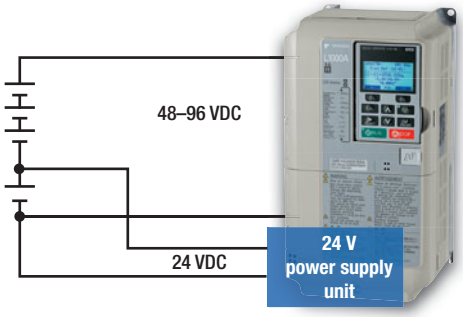
Note: To obtain a copy of DriveWizard Plus, contact a YASKAWA representative.

Safe & Comfortable Rides

UPS and Light-Load Direction Search Function for Rescue Operation

- A single-phase 230 V UPS or 48 – 96 VDC battery (24 V control power supply) provides the inverter drive with the necessary power for evacuation.
- In case of power failure the L1000A can bring the cabin to the next floor for evacuation using the UPS.
- A “light-load direction search” function triggered by the controller detects the light direction of the lift.

UPS wiring and operation



Back-up battery wiring and operation

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

Long Lifetime Design

- Designed for 10 years of maintenance-free operation

  IGBTs are designed for 3 million full load starts.

  Cooling fan and capacitors have been carefully selected for a lift life of at least 70.000 hrs of maintenance free operation.

- Performance life monitor

  The L1000A is equipped with performance life monitors that notify the user of part wear and maintenance periods to prevent problems before they occur.

Operator Display	Corresponding Component
LT-1	Cooling fan
LT-2	Capacitors
LT-3	Inrush prevention relay
LT-4	IGBTs

Alarm signals can be transmitted to a PLC or control device.

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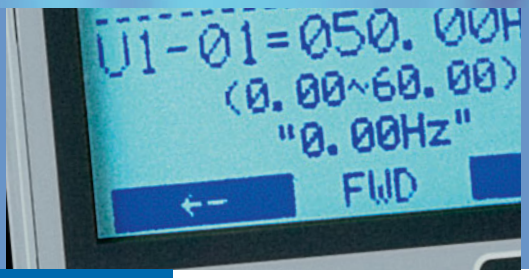
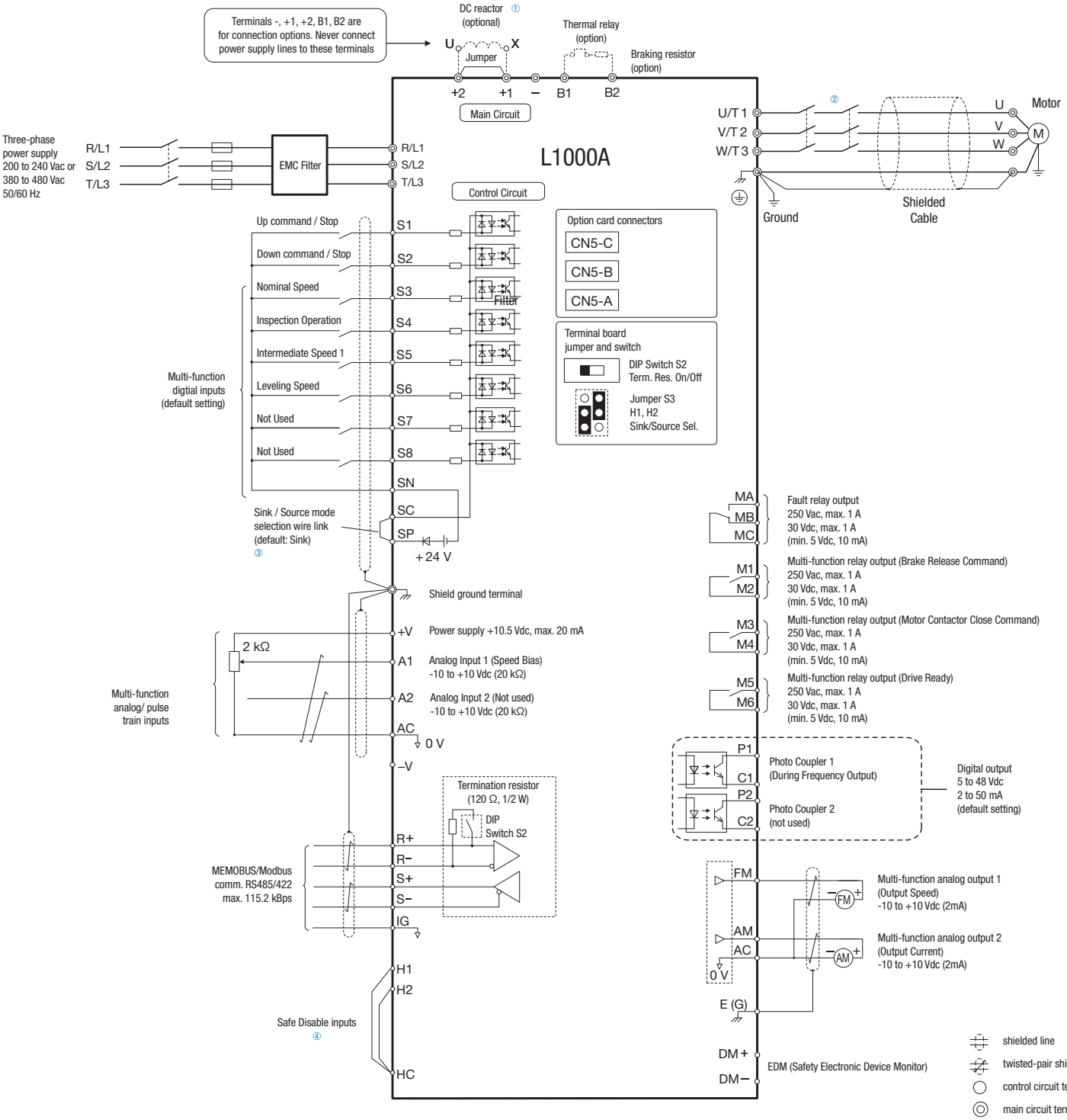
Standard Specifications

Item		Specifications
Control Characteristics	Control Method	V/f Control, Open Loop Vector Control, Closed Loop Vector Control, Closed Loop Vector for PM
	Frequency Control Range	0.01 to 120 Hz
	Frequency Accuracy (Temperature Fluctuation)	Digital reference: within ±0.01% of the max. output frequency (–10 to +40°C) Analog reference: within ±0.1% of the max. output frequency (25°C ±10°C)
	Frequency Setting Resolution	Digital reference: 0.01 Hz Analog reference: 0.03 Hz / 60 Hz (11 bit)
	Output Frequency Resolution	0.001 Hz
	Frequency Setting Signal	-10 to +10 V, 0 to +10 V
	Starting Torque	150%/3 Hz (V/f Control), 200%/0.3 Hz*1 (Open Loop Vector Control), 200%/0 r/min*1 (Closed Loop Vector Control, Closed Loop Vector Control for PM
	Speed Control Range	1:1500 (Closed Loop Vector Control and Closed Loop Vector for PM) 1:200 (Open Loop Vector Control) 1:40 (V/f Control
	Speed Control Accuracy	±0.2% in Open Loop Vector Control (25°C ±10°C) *2, ± 0.02% in Closed Loop Vector Control (25°C±10°C)
	Speed Response	10 Hz in Open Loop Vector (25°C ±10°C), 50 Hz in Closed Loop Vector Control (25°C±10°C) (excludes temperature fluctuation when performing Rotational Auto-Tuning)
	Torque Limit	All Vector Control allows separate settings in four quadrants (available in OLV, CLV, CLV/PM)
	Accel/Decel Time	0.00 to 600.00 s (4 selectable combinations of independent acceleration and deceleration settings)
	Braking Torque	Drives of 200/400 V 30 kW or less have a built-in braking transistor.
	V/f Characteristics	Freely programmable
	Main Control Functions	Inertia Compensation, Position Lock at Start and Stop/Anti-Rollback Function, Overtorque/Undertorque Detection, Torque Limit, Speed Reference, Accel/decel Switch, 5 Zone Jerk Settings, Auto-tuning (Stationary and Rotational Motor/Encoder Offset Tuning), Dwell, Cooling Fan on/off Switch, 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, Online Tuning, High Frequency Injection, Short Floor, Rescue Operation(Light Load Direction Search Function), Inspection Run, Brake Sequence, Speed related parameters with elevator units display, 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 60 s at 150% (acceleration current 175%) of rated output current*3
	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	200 V class: Stops when DC bus exceeds approx. 190 V, 400 V class: Stops when DC bus exceeds approx. 380 V
	Heatsink Overheat Protection	Thermistor
	Stall Prevention	Stall prevention during acceleration/deceleration and constant speed operation
	Ground Fault Protection	Protection by electronic circuit*4
	Charge LED	Charge LED remains lit until DC bus has fallen below approx. 50 V
Operating Environment	Area of Use	Indoors
	Ambient Temperature	–10 to +50°C (open chassis), –10 to +40°C (NEMA Type 1)
	Humidity	95% RH or less (no condensation)
	Storage Temperature	–20 to +60°C (short-term temperature during transportation)
	Altitude	Up to 1000 meters (output derating of 1% per 100 m above 1000 m, max. 3000 m)
	Shock	10 Hz to 20 Hz, 9.8 m/s² max. 20 Hz to 55 Hz, 5.9 m/s² (200 V: 45 kW or more, 400 V: 55 kW or more) or 2.0 m/s² max. (200 V: 55 kW or less, 400 V: 75 kW or less)
Safety Standard		EN954-1 safe category 3 stop category 0; EN ISO 13849-1; IEC EN 61508 SiL2
Protection Design		IP20

*1: Requires a drive with recommended capacity.
*2: Speed control accuracy may vary slightly depending on installation conditions or motor used. Contact Yaskawa for details.
*3: Overload protection may be triggered when operating with 150% of the rated output current if the output frequency is less than 6 Hz.
*4: Protection may not be provided under the following conditions as the motor windings are grounded internally during run:
• Low resistance to ground from the motor cable or terminal block. • Drive already has a short-circuit when the power is turned on.



Connection Diagram



① Remove the jumper when installing a DC reactor. Models CIMR-LC2A0085 through 0115 and 4A0045 through 0150 come with a built-in DC reactor.

② The drive provides a stop function in compliance with Stop Category 0 (EN60204-1) and "Safe Torque Off" (IEC61800-5-2). It has been designed to meet the requirements of the EN954-1/ISO13849-1, Category 3 and IEC61508, SIL2. Using this function the number of motor contactors can be reduced to one.

③ Never short terminals SP and SN, as doing so will damage the drive.

④ Disconnect the wire jumper between H1 - HC and H2 - HC when utilizing the Safe Disable inputs.

Note: 1. The drive should be implemented in the system in a way so that a drive fault causes the safety chain to open. Always use terminal MA-MB-MC for this purpose.
2. Even though no fault is present conditions where the drive can not start can occur, e.g. when the Digital Operator is left in the Programming Mode. Use the "Drive Ready" output (default set to terminals M5-M6) to interlock operation in such situations.

Dimensions

Enclosures

Enclosures of standard products vary depending on the model. Refer to the table below.

Voltage class	200 V																400 V															
Model	CIMR-LC2A																CIMR-LC4A															
	0008	0011	0018	0025	0033	0047	0060	0075	0085	0115	0145	0180	0215	0283	0364	0415	0005	0006	0009	0015	0018	0024	0031	0039	0045	0060	0075	0091	0112	0150	0180	0216
Max. Applicable Motor Capacity [kW]	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
IP20	Standard												Note*				Standard on request												Note*			

Note*: with reduced bending space

IP20 (with reduced bending space)

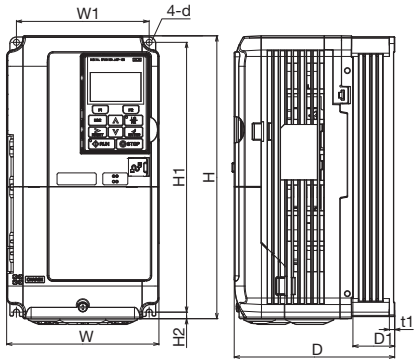


Fig. 1

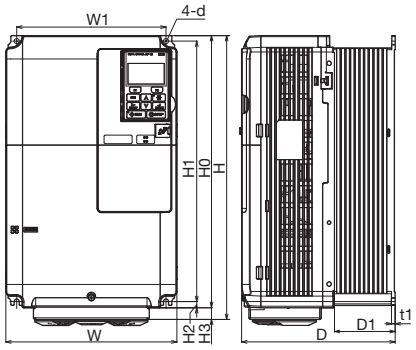


Fig. 2

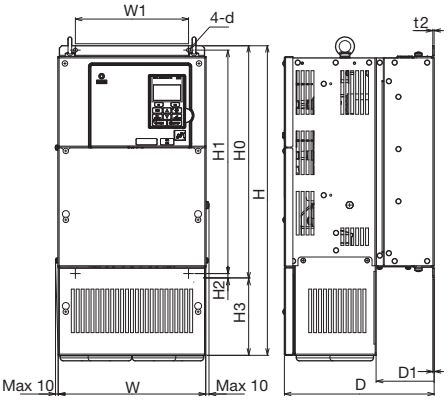


Fig. 3

200 V Class

Model CIMR-LC2A □□□□	Max. applicable motor capacity [kW]	Figure	Dimensions in mm												Weight (kg)
			W	H	D	W1	H0	H1	H2	H3	D1	t1	t2	d	
0008	1.5	Fig. 1	140	260	147	122	-	248	6	-	38	5	-	M5	3.2
0011	2.2														
0018	4.0				164						55				3.5
0025	5.5				167										4.0
0033	7.5														
0047	11		180	300	187	160		284	8		75				5.6
0060	15		220	350	197	192		335			78			M6	8.7
0075	18.5	Fig. 2		365			350			15					9.7
0085	22	Fig. 3	254	534	258	195	400	385	7.5	134	100	2.3	2.3		23
0115	30		279	614		220	450	435		164					28
0145	37		329	630	283	260	550	535		80	110				40
0180	45														
0215	55		450	705	330	325	705	680	12.5	163	130	3.2	3.2	M10	81
0283	75														86
0346	90		500	800	350	370	800	773	13	238		4.5	4.5	M12	105
0415	110														

400 V Class

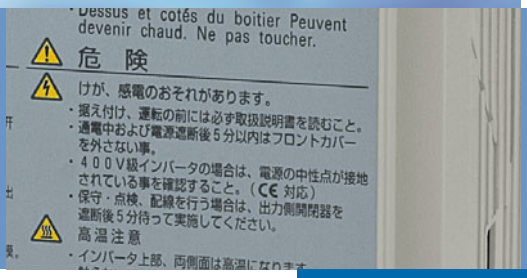
Model CIMR-LC4A □□□□	Max. applicable motor capacity [kW]	Figure	Dimensions in mm												Weight (kg)
			W	H	D	W1	H0	H1	H2	H3	D1	t1	t2	d	
0005	1.5	Fig. 1	140	260	147	122	-	248	6	-	38	5	-	M5	3.2
0006	2.2				164						55				3.4
0009	4.0														3.5
0015	5.5				167										3.9
0018	7.5														
0024	11		180	300		160		284	8						5.4
0031	15				187						75				5.7
0039	18.5		220	350	197	192		335			78			M6	8.3
0045	22	Fig. 3	254	465	258	195	400	385	7.5	65	100	2.3			23
0060	30		279	515	258	220	450	435							27
0075	37		329	630	258	260	510	495		120	105				39
0091	45														
0112	55			730	283		550	535		180	110				43
0150	75														45
0180	90		450	705	330	325	705	680	12.5	163	130	3.2		M10	85
0216	110		500	800	350	370	800	773	13	236		4.5		M12	103

Options

Name	Purpose	Model
Analog Input	Enables high-precision and high-resolution analog speed reference setting. • Input signal level: –10 to +10 Vdc (20 kΩ) 4 to 20 mA (500 Ω) • Input channels: 3 channels, DIP switch for input voltage/input current selection • Input resolution: Input voltage 13 bit signed (1/8192) Input current 1/6554	AI-A3
Digital Input	Enables 16-bit digital speed reference setting. • Input signal: 16 bit binary, 2 digit BCD + sign signal + set signal • Input voltage: +24 V (isolated) • Input current: 8 mA 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 frequency, output current, or similar items through CANopen communication with the host controller.	SI-S3
Analog Monitor	Outputs analog signal for monitoring drive output state (output freq., output current etc.) • Output resolution: 11 bit signed (1/2048) • Output voltage: –10 to +10 Vdc (non-isolated) • Output channels: 2 channels	AO-A3
Digital Output	Outputs isolated type digital signal for monitoring drive run state (alarm signal, zero speed detection, etc.). Output channel: Photo coupler 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. • Phase A, B, and Z pulse (3-phase) inputs (complementary type) • PG frequency range: Approx. 50 kHz max. • Power supply output for PG: +24 V, max. current 30 mA • Pulse monitor output: Open collector, +24 V, max. current 30 mA • Power supply output for PG: +12 V, max. current 200 mA	PG-B3
Line Driver PG Interface	For control modes requiring a PG encoder for motor feedback. • Phase A, B, and Z pulse (differential pulse) inputs (RS-422) • PG frequency range: up to 300 kHz (approx.) • Pulse monitor output: RS-422 • Power supply output for PG: +5 V or +12 V, max. current 200 mA	PG-X3
Absolute Encoder	Endat Motor Feedback	PG-F3 (Endat. 2.2/22, HIPERFACE)
Absolute Encoder	Heidenhain Motor Feedback	PG-E3 (Heidenhain ERN1387)
Absolute Encoder	Resolver Motor Feedback	PG-R3 (Resolver)*
LED Operator	Easy long distance reading	JVOP-182
Braking Resistor	Used to shorten the deceleration time by dissipating regenerative energy	For detailed information contact YASKAWA.
Braking Chopper Unit	Shortened deceleration time results when used with a Braking Resistor Unit. For units above 30 kW	CDBR series
24 V Power Supply	Provides 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.	200 V Class: PS-A10LB 400 V Class: PS-A10HB
USB Copy Unit (RJ-45/USB compatible plug)	• Adapter for connecting the drive to the USB port of a PC • Can copy parameter settings easily and quickly to be later transferred to another drive.	JVOP-181
LCD Operator Extension Cable	Cable for connecting the LCD operator.	WV001: 1 m WV003: 3 m

*coming soon

Note: contact the manufacturer in question for availability and specifications of non-YASKAWA products.



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Options

Name	Purpose	Model		
		Three-phase 400 V	**Filter:**	**Footmounted:**
Standard EMC Filter	Filter for power supply side for electromagnetic interference suppression of single and multiple drives.	CIMR-LC4A0005☐AA CIMR-LC4A0006☐AA CIMR-LC4A0009☐AA CIMR-LC4A0015☐AA CIMR-LC4A0018☐AA CIMR-LC4A0024☐AA CIMR-LC4A0031☐AA	FB-40008A FB-40008A FB-40014A FB-40025A FB-40025A FB-40044A FB-40044A	yes
		CIMR-LC4A0039☐AA CIMR-LC4A0045☐AA CIMR-LC4A0060☐AA CIMR-LC4A0075☐AA CIMR-LC4A0091☐AA CIMR-LC4A0112☐AA CIMR-LC4A0150☐AA CIMR-LC4A0180☐AA CIMR-LC4A0216☐AA	FB-40060A FB-40060A FB-40072A FB-40105A FB-40105A FB-40170A FB-40170A FB-40250A FB-40250A	no
		Three-phase 400 V	**AC Reactor IP00**	**AC Reactor IP20**
AC Input Reactors	These reactors are used at the output of drives in order to improve the power factor and to comply with requirements to harmonic distortion units resulting from EN12015.	CIMR-LC4A0005☐AA CIMR-LC4A0006☐AA CIMR-LC4A0009☐AA CIMR-LC4A0015☐AA CIMR-LC4A0018☐AA CIMR-LC4A0024☐AA CIMR-LC4A0031☐AA CIMR-LC4A0039☐AA CIMR-LC4A0045☐AA CIMR-LC4A0060☐AA CIMR-LC4A0075☐AA CIMR-LC4A0091☐AA CIMR-LC4A0112☐AA	B0903084 B0903084 B0903084 B0903085 B0903085 B0903086 B0903087 B0910009 B0910009 B0910011 B0910011 B0910013 B0910013	B0903088 B0903088 B0903088 B0903089 B0903089 B0903090 B0903091 B0910014 B0910014 B0910016 B0910016 B0910018 B0910018
		CIMR-LC4A0150☐AA CIMR-LC4A0180☐AA CIMR-LC4A0216☐AA	under developement	under developement

Ratings & Type Descriptions

Model Number Key

CIMR- L C 4 A 0015 B A A — — — — —

CIMR-: AC Drive; L: L1000A Series

Region Code

C	Europe

Voltage Class

2	3-phase, 200-240 Vac
4	3-phase, 380-480 Vac

Customized Specifications

A	Standard model

Enclosure Type

B	IP20
C	IP20 with reduced bending space

Environmental Specification

A	Standard

Design Revision Order

Special Model

Blank	Standard
9101	With A3 Brake Monitoring

200 V		
	Rated output current [A]	Max. applicable motor*3 [kW]
0008	8*1	1.5
0011	11*1	2.2
0018	18*1	4.0
0025	25*1	5.5
0033	33*1	7.5
0047	47*1	11
0060	60*1	15
0075	75*1	18.5
0085	85*1	22
0115	115*1	30
0145	145*2	37
0180	180*2	45
0215	215*2	55
0283	283*2	75
0346	346*2	90
0415	415*2	110

400 V		
	Rated output current [A]	Max. applicable motor*3 [kW]
0005	4.8*1	1.5
0006	5.5*1	2.2
0009	9.2*1	4.0
0015	14.8*1	5.5
0018	18*1	7.5
0024	24*1	11
0031	31*1	15
0039	39*1	18.5
0045	45*1	22
0060	60*1	30
0075	75*5	37
0091	91*1	45
0112	112*2	55
0150	150*2	75
0180	180*2	90
0216	216*2	110

*1: This value assumes a maximum carrier frequency of 8 kHz. Increasing the carrier frequency requires a reduction in current.
*2: This value assumes a maximum carrier frequency of 5 kHz. Increasing the carrier frequency requires a reduction in current.
*3: The motor capacity (kW) refers to a Yaskawa 4-pole, 60 Hz, 200 V motor or 400 V motor. The rated output current of the drive output amps should be equal to or greater than the motor rated current.

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