MESI
ELEVATOR

Fuji Electric
Innovating Energy Technology

FRENIC-Lift

Finest drives specialized in lift applications

Fuji Electric
3 Year Warranty

CEN-LM2EN21.03

Fuji Electric

The new Lift inverter

Smaller, smarter.

In 2005, Fuji Electric designed the first FRENIC-Lift inverter to fulfill the requirements of lift applications. FRENIC-Lift is nowadays the most preferred inverter for lift applications. By using the experiences in the market, we have now developed the upgraded version of FRENIC-Lift: smaller but smarter.

Save energy to support Green Building.
Your input to sustainability with Fuji Electric's FRENIC-Lift.

Benefits

The upgraded FRENIC-Lift offers you several new benefits which are much attractive and efficient for Lift applications: smaller but smarter.

Book type shape up to 15 kW (32 A) with new advantages

- Side mounting:
  Install the inverter in the most convenient way depending on space limitations (e.g. door frames).
- Removable power terminals:
  Easier and faster installation by pre-wiring thanks to removable power terminals.
- IP 54 heatsink:
  Stronger IP level allows feed through mounting for heatsink, making cabinet design smaller and cheaper for shaft installation.

Certified functional safety functions according to EN81-20 for an easier installation

- Contactorless: Needless of the two motor contactors between inverter and motor (Pollution Degree 3)
- Brake monitoring function for UCM
- Travel direction change safety counter for belt/coated ropes lifts

Different energy saving modes

Following the standards and directives for saving energy (ISO 25745), different saving energy modes are available. Put the inverter to sleep mode by activating a digital input. Charging circuits are highly robust and allow high number of power ups per hour.

Customizable logic capability

Customize your own functions with the built-in PLC function. Easily program your PLC via loader software. Create up to 200 steps program (macro steps / function blocks).

Connected to the world

CANopen (402 & 417), DCP (3 & 4) and Modbus RTU are available thanks to the 3 built-in communication ports.

Built-in EMC filter

Built-in EMC filter compliant to EN12015 and EN12016.
Saves space inside the cabinet and makes wiring easier.

Easy rescue operation

Rescue operation available by means of UPS or batteries. Thanks to the new 24 VDC input, rescue can be performed from 48 VDC only. Software functions help as well to optimize UPS or batteries sizing by choosing the most favourable rescue direction.

Able to control any motor

With its additional new motor control modes, FRENIC-Lift is able to control any motor in the market. Even able to control a motor with peripheral encoder.

Stronger coating

New coating makes PCB stronger against humidity and dust.
Robustness for lift shaft environments.

TYPE CODE

FRN 0022 LM2 A - 4 E

- FRN: Series name: FRENIC
- 0022: Applicable rated current
- LM2: Applied for: Lift
- A: Destination: E (Europe)
- 4: Input power supply: 4 (3-ph 400 VAC, 3-ph 230 VAC)
- E: Input power supply: 7 (1-phase 200 VAC)

Dimensions

External Dimensions

Type	W (mm)	H (mm)	D (mm)
FRN0006LM2A-4E	140	260	195
FRN0010LM2A-4E			
FRN0015LM2A-4E			
FRN0019LM2A-4E			
FRN0025LM2A-4E	160	360	195
FRN0032LM2A-4E			
FRN0039LM2A-4E	250	400	195
FRN0045LM2A-4E			
FRN0060LM2A-4E	326.2	550	261.3
FRN0075LM2A-4E			
FRN0091LM2A-4E	361.2	615	276.3
FRN0011LM2A-7E	140	260	195
FRN0018LM2A-7E			

Conformity Standards

Lift Directive

Replacement of two motor contactors: interrupting the current to the motor (to stop the machine), as required by EN 81-20 (Pollution Degree 3)

Brake monitoring for EN 81-20

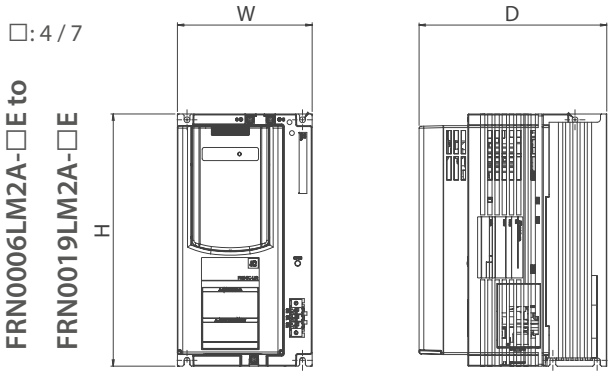
Travel direction change counter for lifts with belt or coated ropes

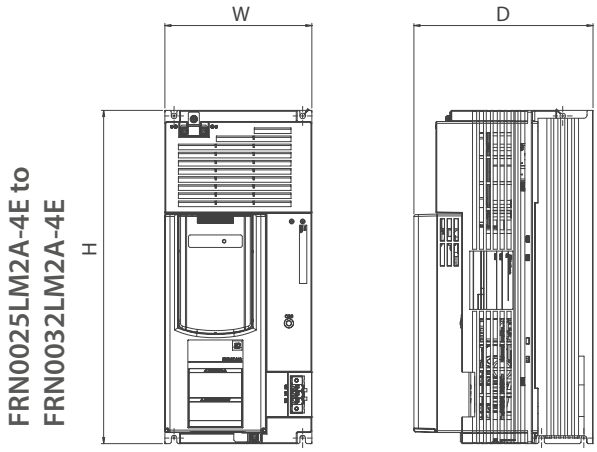
Machinery Directive
- EN ISO13849-1: PL-e
- EN60204-1: Stop category 0
- EN61800-5-2: STO SIL3
- EN62061: SIL3

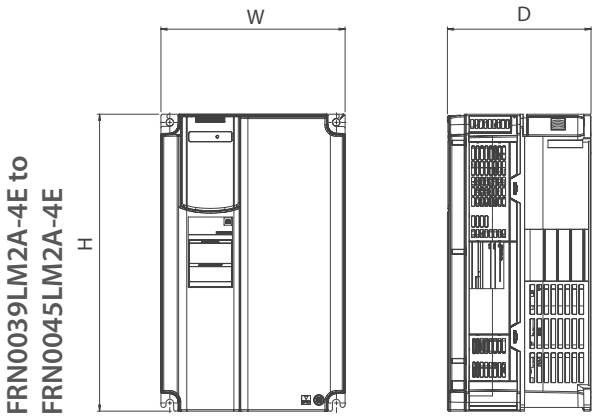
Low Voltage Directive
- EN61800-5-1: Over voltage category 3

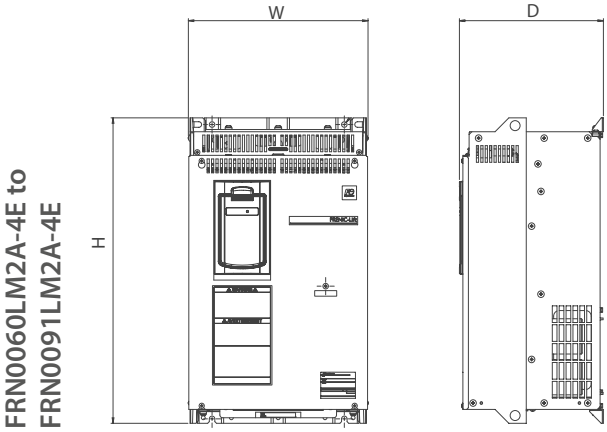
EMC Directive
- EN12015, EN12016, EN 61800-3, EN 61326-3-1
  (Emission) Category 2 (0025 (11kW) or lower)
  Category 3 (0032 (15kW) or higher)
  (Immunity) 2nd environment

Canadian and U.S. standards
- CSA C22.2 No.274-13: Adjustable speed drives
- UL 508 C (3rd Edition): Power Conversion Equipment
- According to CSA B44.1-11/ASME A17.5-2014: Elevator and escalator electrical equipment







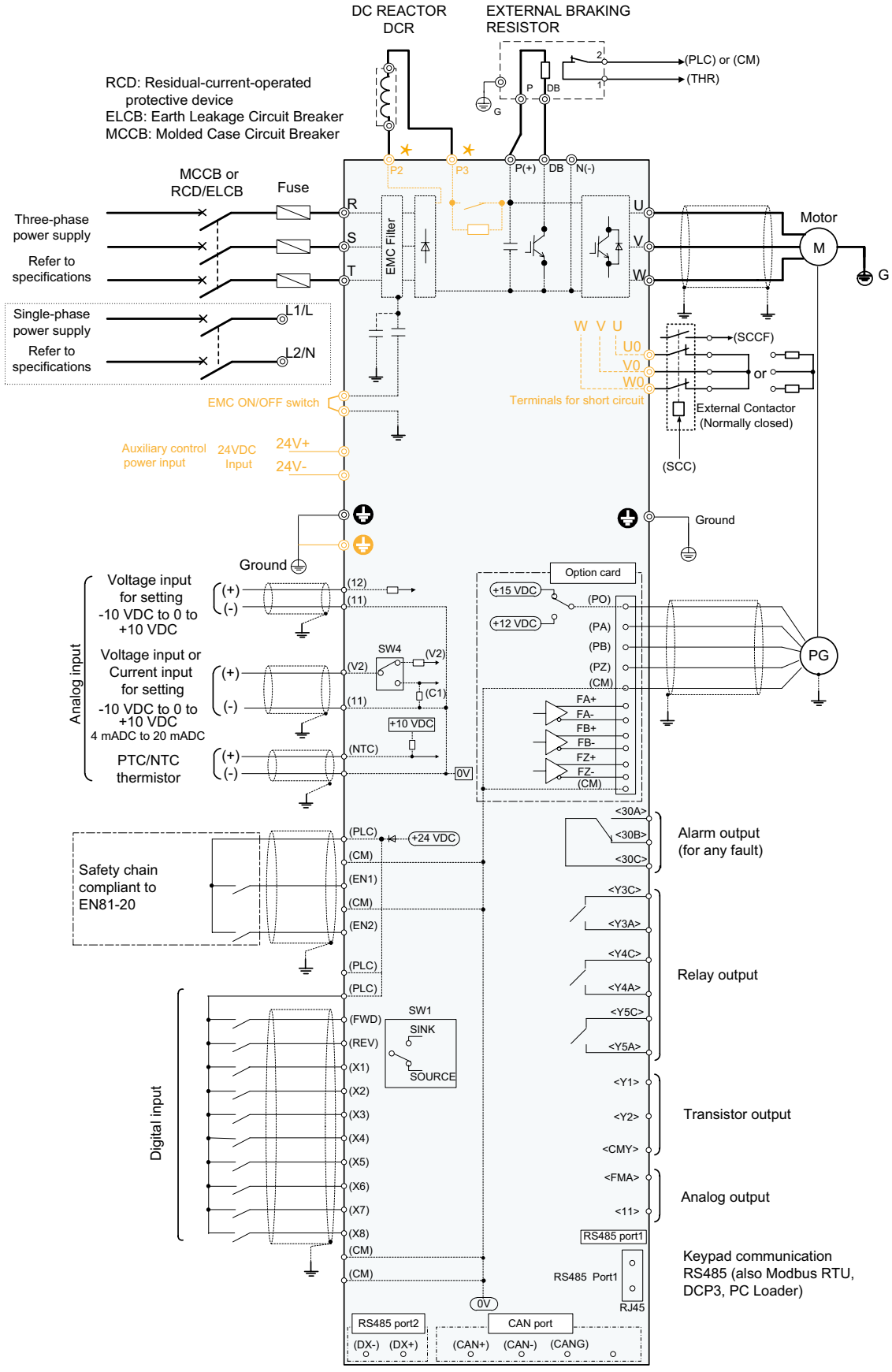


Specifications

Item				3-phase 400 V										3-phase 230 V (NEW)						1-phase 200 V	
Type FRN__LM2A-☐E ☐: 4 / 7				0006	0010	0015	0019	0025	0032	0039	0045	0060	0075	0091	0019	0025	0032	0039	0045	0060	0011	0018
Nominal applied motor [kW]				2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	4.0	5.5	7.5	9.0	11	15	2.2	4.0
Output ratings	Rated capacity[1] [kVA]			4.6	7.6	11	14	18	24	29	34	45	57	69	7.4	9.8	12.7	15.5	17.9	23.9	4.1	6.8
	Rated voltage[2] [V]			3-phase 380 to 480 VAC											3-phase 230 VAC						3-ph 200 to 240 VAC	
	Rated current[3] [A]			6.1	10.0	15.0	18.5	24.5	32.0	39.0	45.0	60.0	75	91	18.5	24.5	32.0	39.0	45.0	60.0	11.0	18.0
	Overload capacity [A] (Permissible overload time)			11 (3s)	18.0 (3s)	27.0 (3s)	37.0 (3s)	49.0 (3s)	64.0 (3s)	78.0 (3s)	90.0 (3s)	120 (3s)	150 (3s)	182 (3s)	37.0 (3s)	49.0 (3s)	64.0 (3s)	78.0 (3s)	90.0 (3s)	120 (3s)	22.0 (3s)	36.0 (3s)
	Frequency [Hz]			0 to 200 Hz																		
Input ratings	Main power supply – Normal operation – Phases, Voltage, Frequency			3-phase 380 to 480 VAC, 50/60 Hz											3-phase, 230 VAC, 50/60 Hz						1-ph 200 to 240 VAC, 50/60 Hz	
				Variations: Voltage: +10 to -15% (Voltage unbalance: 2% or less[4]), Frequency: +5 to -5%											Variations: Voltage: +10 to -10% (Voltage unbalance: 2% or less[4]), Frequency: +5 to -5%						Variations: Voltage: +10 to -15% (Voltage unbalance: 2% or less[4]), Frequency: +5 to -5%	
		Rated current[5] [A]	with DCR	4.5	7.5	10.6	14.4	21.1	28.8	35.5	42.2	57.0	68.5	83.2	14.4	21.1	28.8	34.5	42.2	57.6	17.5	33
			without DCR	8.2	13	17.3	23.2	33.0	43.8	52.3	60.6	77.9	94.3	114	23.2	31.5	42.7	49.5	60.6	- [9]	24	41
		Required power supply capacity (with DCR) [kVA]		3.2	5.2	7.4	10	15	20	25	30	40	48	58	5.7	8.4	11.5	13.7	16.8	22.9	3.5	6.1
	UPS operation	Input power for driving Phases, Voltage, Frequency		1-phase 220 to 480 VAC, 50/60 Hz											1-phase, 220 to 240 VAC, 50/60 Hz						1-ph 200 to 240 VAC, 50/60 Hz	
				Variations: Voltage: +10 to -10%, Frequency: +5 to -5%																		
		Operation time [s]		180																		
	Battery operation	Input power for driving Voltage		48 VDC or more in the direct current voltage conversion																	36 VDC	
		Operation time [s]		180																		
		Aux. control power Voltage		24 VDC (22 to 32 VDC), max. 40 W						1-phase 220 to 480 VAC, 50/60 Hz[8]					DC 24 V (22 V to 32 V), max. 40 W [10]			1-phase 230 VAC, 50/60 Hz [8]			24 VDC (22 to 32 VDC), Maximum 40 W	
Braking	Braking time[7] [s]			60																		
	Braking duty-cycle (%ED)[7] [%]			50																		
	Rated regenerative power[7] [kW]			1.8	3.2	4.4	6.0	8.8	12	14.8	17.6	24	29.6	36	3.2	4.4	6.0	7.2	8.8	12	1.8	3.2
	Minimum resistance [Ω][6]			160	96	47	47	24	24	16	16	10	8.5	8	24	16	12	8	8	6	33	20
Enclosure (IEC60529)				IP20						IP20		IP00			IP20			IP20		IP00	IP20	
Enclosure (IEC60529) Heat sink				IP54						IP20		IP00			IP54			IP20		IP00	IP54	
Cooling method				Fan cooling																		
Average power losses in standstill [W][11]				23				26				33			23		26			33	23	
Average power losses in standby [W][12]				16								18			-			16		18	16	
Weight/Mass [kg]				4.4		4.7		6.1	6.3	10.5	11.2	27	28	32	4.7	6.1	6.3	10.5	11.2	27	4.1	4.5

*1) In case of 3ph 400 V: Rated capacity is calculated by regarding the output rated voltage as 440 VAC.
In case of 3ph 220 V: Rated capacity is calculated by regarding the output rated voltage as 230 VAC.
In case of 1ph 200 V: Rated capacity is calculated by regarding the output rated voltage as 220 VAC.
*2) Output voltage cannot exceed the power supply voltage.
*3) These values correspond to the following conditions: carrier frequency is 10 kHz (2 phase modulation) and ambient temperature is 45°C. Select the inverter capacity such that the square average current during operation is not higher than the 80% of the rated current of the inverter.
*4) Voltage unbalance [%] = (Max.voltage [V] - Min.voltage [V])/ Three-phase average voltage [V] x 67 (IEC61800-3). This is for 3ph 400 VAC and 3ph 200 VAC.
*5) The power supply capacity is 500kVA (ten times the inverter capacity when the inverter capacity exceeds 50kVA), and the value of the power supply impedance is %X=5%.
*6) The admissible error of minimum resistance is ±5%.
*7) Braking time and duty cycle (%ED) are defined by cycle operation at the rated regenerative power.
*8) Variations (Voltage: +10 to -10%, Frequency: +5 to -5%)
*9) DCR is required for 230V mode of FRN0060LM2A-4E.
*10) Only for rescue operation. Do not use during normal operation.
*11) Standstill means STBY function is not activated, cooling fan is stopped and inverter is supplied by means of normal power supply (L1/L2/L3).
*12) Standby means STBY function is activated, cooling fan is stopped and inverter is supplied by a means of auxiliary power supply (15kW or less:+24VDC, 18.5kW or more: 400 VAC.).

Basic Wiring Diagrams



The orange marked parts represent the model "book type" lift inverter (FRN0032LM2A-4E or lower).

*In case of FRN0039LM2A-4E and above, the DC Reactor is connected between P1 and P(+).

Options

Option Cards

OPC-PR

Option card for encoders with SinCos incremental signals and SinCos absolute signals. Specific for PMS motors. Includes pulse repetition signals for controller (Line Driver with frequency divider function).

OPC-PS

Option card for encoders with SinCos incremental signals and serial communication. Protocols implemented are EnDat 2.1, Biss and SSI. Specific for PMS motors. Includes pulse repetition signals for controller (Line Driver with frequency divider function).

OPC-PSH

Same features as OPC-PS plus Hiperface protocol.

OPC-PG3

Option card for incremental encoders with open collector / complementary signals. For induction and PMS motors. Includes pulse repetition signals for controller (Line Driver with frequency divider function).

OPC-PG3ID

Option card for incremental encoders with open collector / complementary signals. For induction and PMS motors. Includes pulse repetition signals for controller (Open collector with frequency divider function).

Extra Options

Extra options are available to fulfill your specific requirements such as user friendly LCD keypad, varieties of encoder, and dual mounting attachment to save your cabinet space.

TP-A1-LM2

Advanced LCD keypad. Intuitive and user friendly menu. Monitoring and maintenance information. Up to 3 inverter settings can be recorded in internal memory. Different speed units selectable (rpm, Hz, mm/s). Available in different languages: English, Japanese, German, French, Spanish, Italian, Chinese, Russian, Greek, Turkish, Polish, Czech, Swedish, Portuguese, Dutch and user customized language.

DC Reactor

Compliant to EN12015 harmonic levels. More compact. Reduces input current.

TP-E1U

Basic keypad with 7-segment display. Mini-USB connector included for a direct communication between FRENIC-Lift and PC loader software.

OPC-PMPG

Option card for incremental encoders with line driver signals and 3 channels (U, V, W) for absolute position detection. For induction and PMS motors. Includes pulse repetition signals for controller (Line Driver with frequency divider function).

PC Loader Software

Free software for monitoring and programing FRENIC-Lift. Oscilloscope function available. Includes an application to program built-in PLC. Download for free from our web page: http://www.fujielectric-europe.com/

DA-LM2

Keypad adapter for side mounting installation. Includes cable. Depending on the attachment, width and height will change.

Braking Resistor

Burns regenerated energy when the lift is in braking mode. Different braking resistors available according to lift speed and traffic.

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