



# ***FRENIC-Lift***



The dedicated inverter  
for Lift applications

An exclusive design to achieve the best  
performance for the elevator.  
The ideal combination of strength, quality,  
reliability and comfort.



Fuji Electric FA has designed FRENIC Lift inverter to fulfill the requirements of lift applications. It includes the most advanced technology to offer a product easy to set up, powerful and competitive. FRENIC Lift is the name of the technology and quality dedicated to elevator applications.

## Excellent Comfort

FRENIC Lift has an excellent shaft performance: current loop bandwidth is 500 Hz, 5 times faster than its predecessor (UD series); and the accuracy of the speed control is  $\pm 0.01\%$ , obtaining very low vibration and excellent rollback avoidance.

## Powerful

Very high overload torque: can deliver 200% of rated current for 10 s. The inverter is rated for 10 kHz switching frequency, at 45°C for a duty cycle of 80% ED.

## Universal Solution for elevators

FRENIC Lift is able to control asynchronous (induction) motor (with and without encoder) and permanent magnet synchronous motors.

FRENIC Lift is able to control permanent magnet synchronous motor with incremental encoder without using additional options (HTL 12-15 VDC supply voltage encoder). Other encoder types can be used by adding optional cards: Heidenhain EnDat 2.1 encoder (OPC-LM1-PS1), SinCos encoder (OPC-LM1-PR) or incremental encoder 5 VDC Line driver (OPC-LM1-IL).

Braking transistor is included in all capacities.

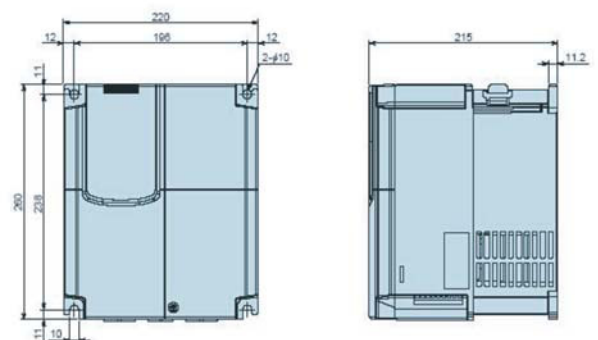
## Static auto-tuning and pole tuning

FRENIC Lift is able to perform Static Auto-tuning for Asynchronous motor and Static Pole tuning for Permanent Magnet Synchronous motors; during both procedures the mechanical brake remains applied, avoiding the time-consuming task of removing the load from the motor.

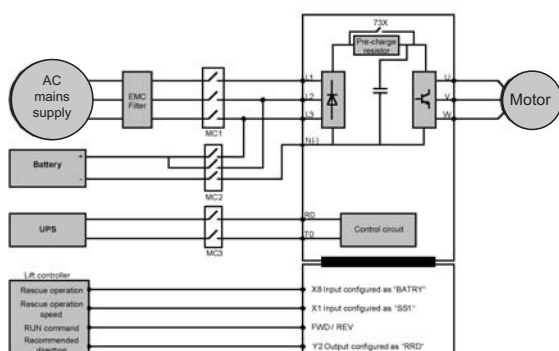
## Advanced functions dedicated to Lift applications

- Excellent rollback avoidance.
- Short floor operation.
- Direct to floor operation.
- Brake control function.
- Main contactors control.
- Anticipated door opening function.
- Easy rescue operation. Can be supplied using batteries and/or UPS. Signal for indication of the recommended direction.
- 10 different linear accelerations/deceleration ramps.
- 14 different S ramps.
- Automatic control of the cooling fan: silent operation and energy saving.
- Ground fault protection.
- Input phase lost protection.
- Overheat early warning indication signal.

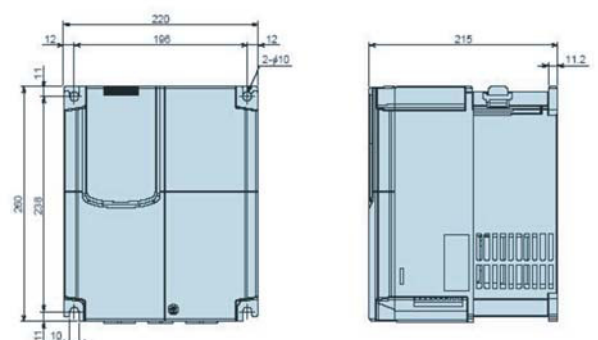
## External dimensions (mm) 4.0 kW



## Battery operation



## External dimensions (mm) 5.5 to 11 kW



- Advanced Maintenance functions:
  - Cumulative running time indication (fan and inverter).
  - DC Bus capacitors measurement.
  - End of life warning signal.
  - Alarm history with detailed information of the last 4 alarms.

## A robust inverter

- Life time of DC bus capacitors: > 61320 hours.
- Life time of electrolytic capacitors in printed circuit boards: > 61320 hours.
- Life time of cooling fans: > 43800 hours.
- Automatic reduction of the switching frequency by temperature.

## Built-in communication interfaces

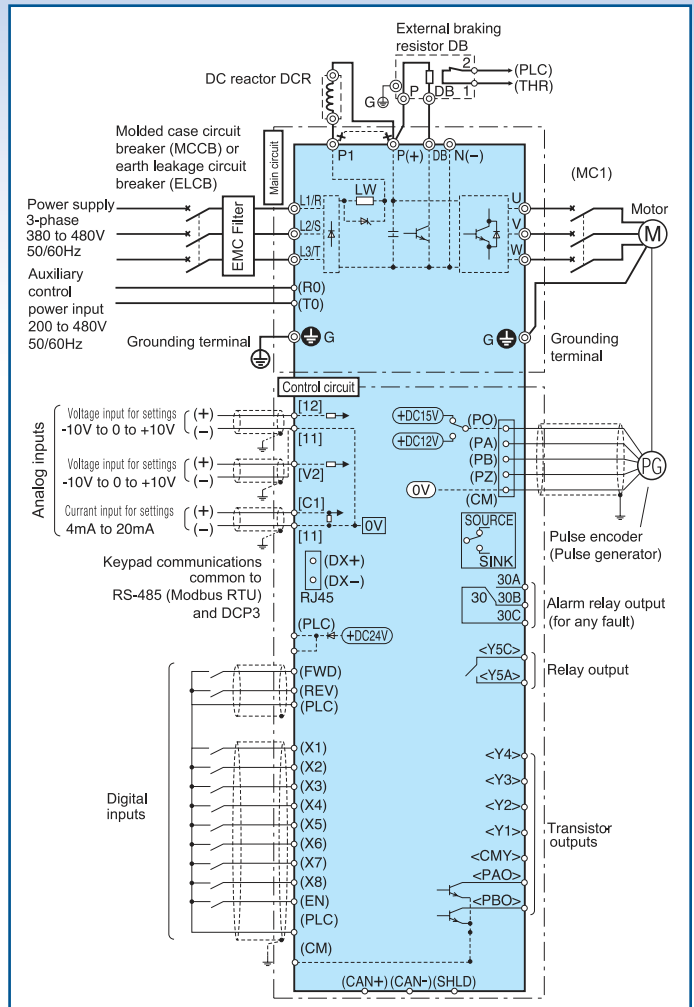
As standard includes the following communication interfaces to ease the system integration:

- RS 485 port with ModBus RTU protocol.
- CANopen port (E version).
- DCP 3 protocol (EA version).

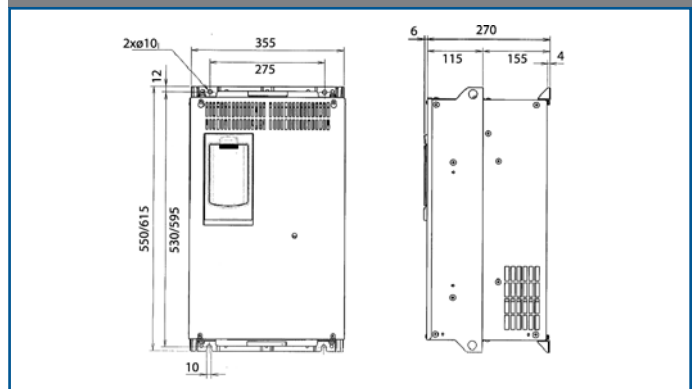
## Options

- Multifunction LCD keypad (TP-G1-ELS):
  - Able to save 3 complete parameter sets.
  - Menu 0 can be defined by the user.
  - 6 different languages can be selected: Japanese, English, German, French, Spanish and Italian.
- Feedback options:
  - OPC-LM1-PS1 option card for Heidenhain EnDat 2.1 encoder.
  - OPC-LM1-PR option card for SinCos encoder.
  - OPC-LM1-IL option card for 5 VDC line driver encoder.
- EMC filter to fulfill EN 61800-3:2004 and EN 12015:2004.

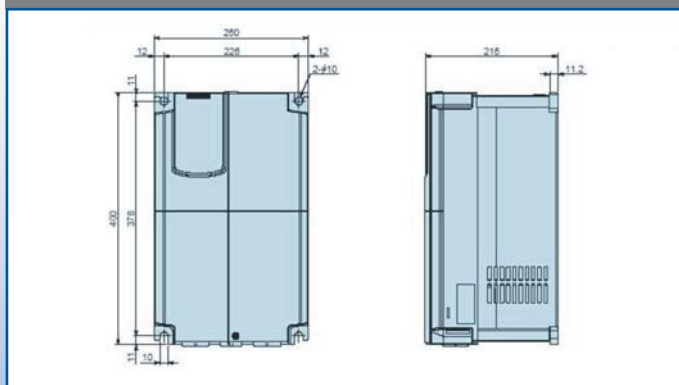
## Basic Connection Diagram



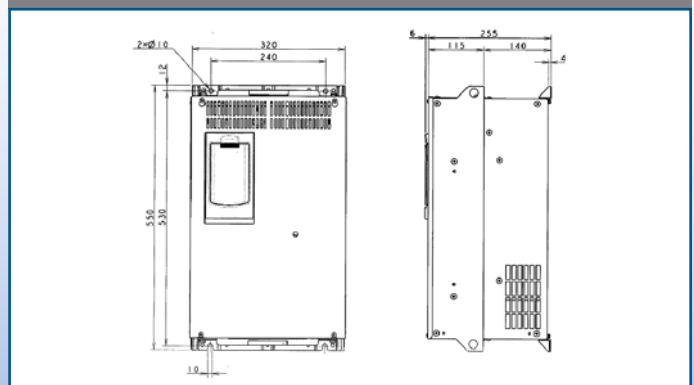
## External dimensions (mm) 37 and 45 kW



## External dimensions (mm) 15 to 22 kW



## External dimensions (mm) 30 kW



## Standard Specifications for 3-phase 400V AC

Item				Specifications										
Model (FRN___ LM1S-4E / EA )				4.0	5.5	7.5	11	15	18.5	22	30	37	45	
Output rating	Rated capacity [kVA] (*1)			6.8	10.2	14	18	24	29	34	45	57	69	
	Voltage [V] (*2)			3-phase 380 to 480 V, 50/60 Hz							3-ph. 380-460V 50/60 Hz			
	Rated current [A] (*3)			9.0	13.5	18.5	24.5	32.0	39.0	45.0	60.0	75.0	91.0	
	Overload current rating [A] (10 s)			18 (3s)	27.0	37.0	49.0	64.0	78.0	90.0	108 (5s)	135 (5s)	163 (5s)	
	Rated frequency [Hz]			50, 60Hz										
Input power supply	Nominal operation	Main power: phases, voltage, frequency			3-phase, 380 to 480V, 50/60Hz									
		Aux. control power input: Phases, voltage, frequency			Single-phase, 200 to 480V, 50/ 60Hz									
		Permissible voltage and frequency fluctuation (*7)			Voltage: +10 to -15% (Voltage imbalance within 2% *4), frequency: +5% to -5%									
		Rated input current [A] (*5)	With DCR		7.5	10.6	14.4	21.1	28.8	35.5	42.2	57.0	68.5	83.2
			Without DCR		13.0	17.3	23.2	33.0	43.8	52.3	60.6	77.9	94.3	114
	Required power capacity [kVA] (*6)			5.2	7.4	10	15	20	25	30	40	48	58	
	Battery operation	Main power			48VDC or higher									
		Auxiliary control power input	Phases, voltage, frequency		Single-phase, 200 to 480V, 50/ 60Hz									
			Perm. Voltage + Frequ. Fluctuations		Voltage: + 10 to -15%, Frequency: + 5 to -5%									
Braking	Braking time [s]			30										
	Duty cycle (%ED) [%]			50										
	Minimum connectable resistance value [Ω]			96	64	48	24	24	16	16	10	10	8	
DC REACTOR (DCR)				Option										
Applicable Safety Standard				EN50178:1997. EN954-1 Cat. 3 (*8)										
Protective enclosure (IEC60529)				IP20							IP00			
Cooling system				Fan cooling										
Weight [kg]				2.8	5.6	5.7	7.5	11.1	11.2	11.7	24	33	34	

(\*1) The rated capacity shows the case where the output voltage is 440V.

(\*2) Voltages exceeding the power supply voltage cannot be output.

(\*3) The rated current shows the case where the carrier frequency is 10kHz, ambient temperature is 45C or under, and the root mean squared current in cycle operation is 80% of the inverter's rated current.

(\*4) Voltage imbalance [%] = (Max. voltage [V] – Min. voltage [V]) / 3-phase average voltage [V] x 67 (See IEC61800-3). When using the inverter at an imbalance rate of 2 to 3%, use an optional AC reactor (ACR).

(\*5) Calculations were made based on a power supply capacity of 500 kVA (if the inverter capacity exceeds 50 kVA, the power supply capacity is 10 times the inverter capacity) and a connected power supply %X = 5%.

(\*6) The inverter is equipped with a DC reactor (DCR).

(\*7) These permissible fluctuations are for the main power and the auxiliary control power input.

(\*8) Pending



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