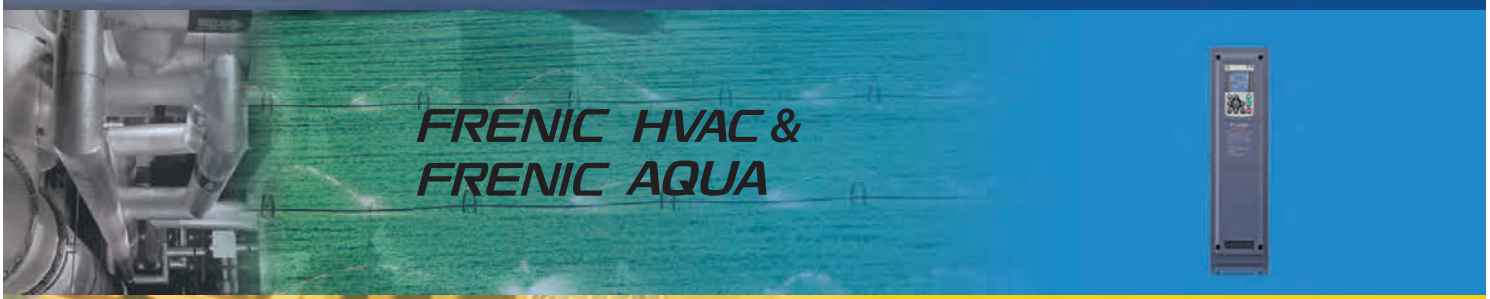
Fuji Electric

Innovating Energy Technology

Fuji Electric Low Voltage AC Drive Selection Guide



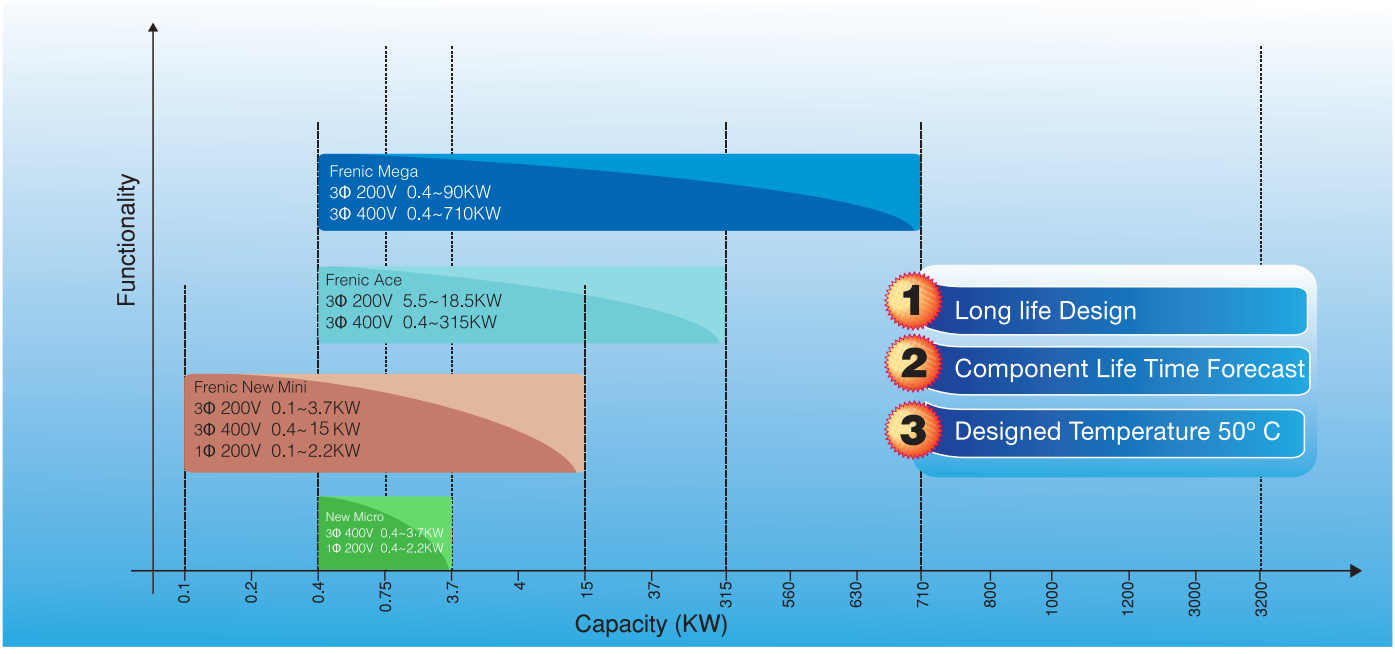
FEI/DP/001/R5

Frenic General Purpose Low Voltage AC Drive Selection Table

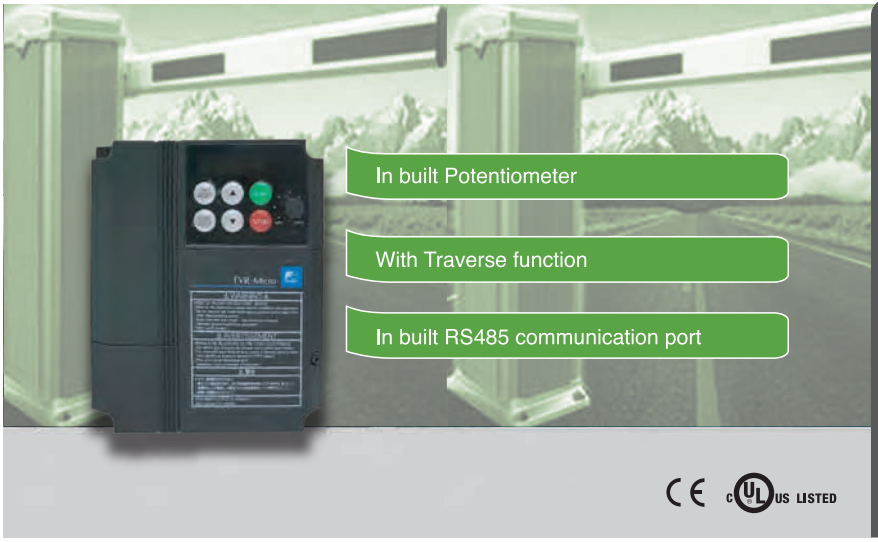
Applications		FRENIC SERIES				
		NEW MICRO	NEW MINI	HVAC/AQUA	ACE	MEGA
Fan	Air handling unit	●	●	●	●	●
	Dryer	●	●	●	●	●
	Boiler Fan	●		●	●	●
	Compressor			●	●	●
	Cooling-tower fans		●	●	●	●
	Ventilating fans	●	●	●	●	●
Machine Tools	Grinding Machine				●	●
	Milling Machine				●	●
	Boring machine				●	●
	Turntable				●	●
	Winding Machine				●	●
	Press				●	●
Conveyance Machinery	Crane (Travelling, Traversing, Hoisting)	●	●		●	●
	Conveyor (Belt, Chain, Screw, Roller)	●	●		●	●
	Lift				●	●
	Car Parking System		●		●	●
	Elevator, Escalator		●		●	●
Chemical Machinery/Wood working machines	Fluids mixing machine		●		●	●
	Extruder		●		●	●
	Vibrator	●	●		●	●
	Centrifugal separator		●		●	●
	Coating Machine				●	●
	Sanding machine			●	●	●
Electric Pumps	Submersible pump	●		●	●	●
	Cooling water pump	●	●	●	●	●
	Sludge pump	●			●	●
Packaging Machinery	Individual packing/inner packing	●	●		●	●
	Packing machine	●	●		●	●
Paper making/Textile machinery	Spinning machine				●	●
	Knitting machine		●		●	●
	Textile printing machine	●	●		●	●
	Industrial sewing machine		●		●	●
	Synthetic fiber manufacturing plant		●		●	●
	Slitters		●		●	●
Other machinery	Automated fbod/medicine blending machine		●		●	●
	Commercial-use washing machine	●	●		●	●
	Offset printing press				●	●
	Bookbinding machine	●	●		●	●
	Car washing machine	●	●		●	●
	Shredder		●		●	●
	Food washing machine	●	●		●	●
	Test Equipment		●	●	●	●
	Crushers				●	●
	Air Curtains/window shades/kitchen ventilating fens		●	●	●	●

*NOTE: This is only a general guideline. Please contact us for exact details of applications.

Frenic General Purpose Product lineup

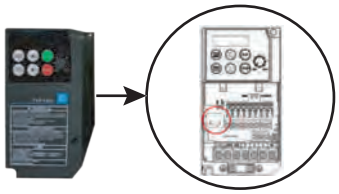


New Micro



Features

- Starting Torque : 200% for 0.5s, 150%for 60s
- PID Process Control Function
- Non Linear V/f pattern
- Digital Inputs: 5
- Digital Outputs: 1
- Relay Outputs : 1
- Analog Inputs: 2
- Analog Outputs: 1
- With In-Built Braking Transistor



■ **Built-in RS-485 communications port (RJ-45) as standard**
RS-485 Communications are available as standard specification

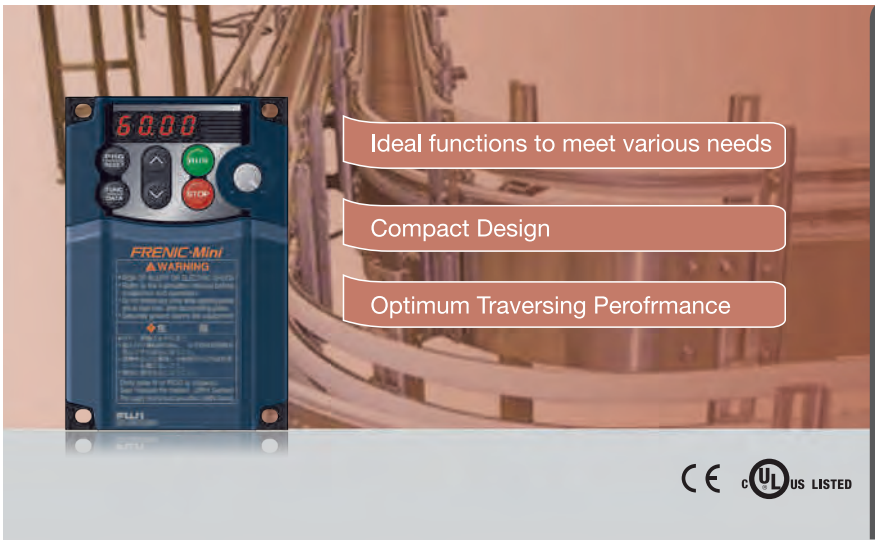
Ordering information

FVR 0.4 AS 1 S - 7 C

- FVR: Series name — FVR-New Micro series
- 0.4: Nominal applied motor capacity 0.4-3.7 kW
- AS: Applicable scope — Advanced simple type
- 1: Developed series
- S: Enclosure — S: Standard-type (IP20)
- 7: Power supply voltage — 4: Three-phase 400V, 7: Single-phase 200V
- C: Version/instruction — C: Chinese, E: English

FRENIC-NEW Mini

Integrated Design and Advance Technology



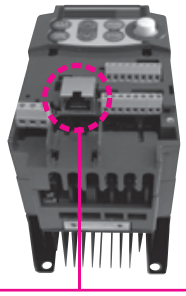
Features

- Starting Torque: 200% for 0.5 sec
  150% for 1 min
- Stable Operation at low speed
- PID Control Function
- Non Linear V/F Pattern
- Digital inputs : 5
- Digital outputs : 1
- Relay outputs : 1
- Analog inputs : 2
- Analog outputs : 1
- In-Built RS485 port

Network capabilities standard

RS-485 communications port

Communications can be controlled through the standard RS-485 communications port using the Modbus-RTU or Fuji inverter protocol



- Dynamic Torque Vector Control System
- Slip Compensation Shortens setting time
- Fastest CPU Processor in its Class
- PID Control Function
- Cooling Fan ON/OFF Control Function
- Synchronous Motor Control - Use of sensorless synchronous motor control together with the motor can reduce energy consumption

Ordering information

FRN 0002 C 2 S - 4 A / SL

- FRN: FRENIC series
- 0002: Applicable Motor Current Rating 0002 - 0012
- C: Applied range — C:Compact
- 2: Development drive series
- S: S:standard (IP20)
- 4: Input power source — 2:3-phase 200V, 4:3-phase 400V, 7:1-phase 200V
- A: Asia
- SL: Solar

FRENIC-Ace New

High Performance Inverter

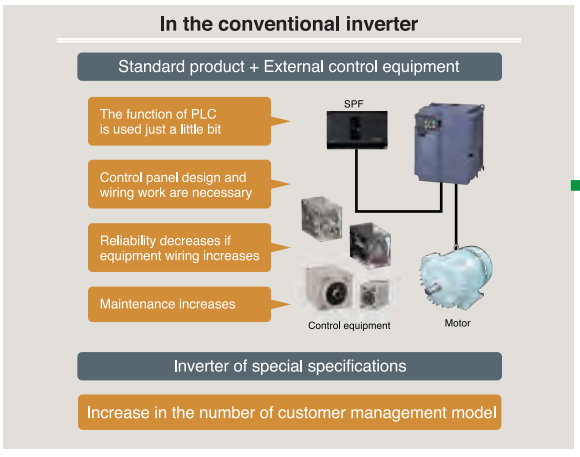
Features

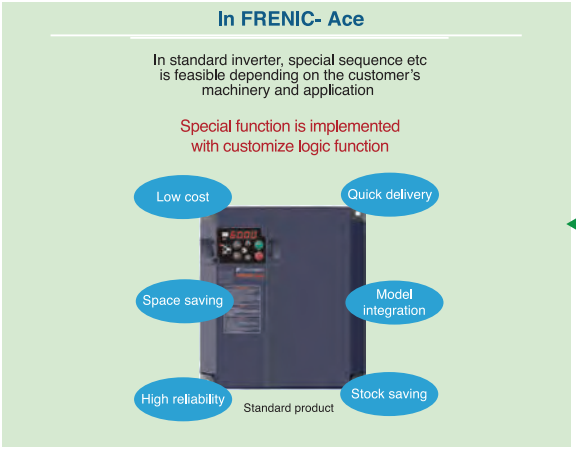
- Starting torque: 200% for 0.5 sec
  150% for 1 min
- Synchronous motor with sensorless vector control
- 1-channel on-board RS485 communications port
- Removable keypad
- Removable control terminal block board
- Digital Inputs : 7
- Digital Outputs : 2
- Relay outputs : 1
- Analog Inputs : 2
- Analog Outputs / FMP : 2

Customizable Logic

- User uniquely can customize the functions for inverter

An external circuit configured of a simple PLC or an external relay timer etc, is not required, and the control functions necessary for customer's machinery and applications can be achieved by combination of various operation function in the inverter





Example: Hoist crane application

FRENIC-ACE with hoist control logic

(1) Set speed program
(2) Reset the alarm by using the push-button switch
(3) Mechanical limit switch function
(4) Detect load
(5) Automatic speed drive when no load is detected
(6) Overload stop function

Dedicated/specialized functions for hoist applicationimplemented by using customizable logic

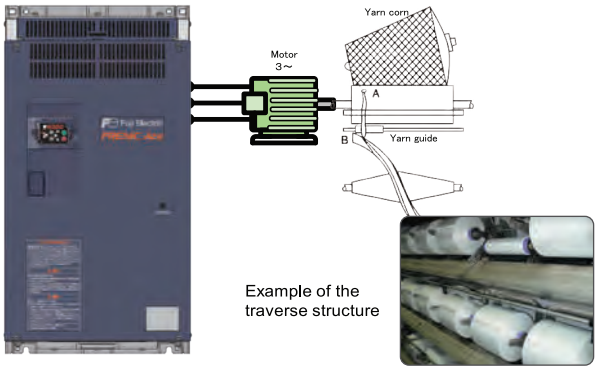
- Operation Environment: OS :Windows7, Converter:USB-485I RJ45-T4P or TP-E1U

Traverse

Implemented functions

- Enable/disable Traverse operation (by external terminal [X1])
- Traverse operation (Amplitude, Jump quantity and Rising/Falling time can be set)
- Center frequency shift function (Shift frequency can be set and the shift direction can be switched by external terminals [X2], [X3]

System architecture



Example of the traverse structure

Ordering information

FRN 0002 E 2 S -4GB

- FRN: FRENIC Series
- 0002: Three phase 400V class: Rating current level of ND specification [Model: 0002 to 0590] Three phase 200V class: Rating current level of HND specification [Model: 0030 to 0069]
- E: Enclosure: S: standard (basic type) E: EMC filter built-in type
- 2: Input power supply: 4: 400V, 2: 200V
- S: Global
- -4GB: CONTROL 7 Digital Input, 2 Digital Output, 1 Relay Output, 2 Analog Input, 1 Analog Output, Integrated Can Open & Mod **'4A'** 7 Digital Input, 2 Digital Output, 1 Relay Output, 2 Analog Input, 2 Analog Output, Integrated Modbus: **'-4GB'**

FRENIC-MEGA

Best Vector Control Performance

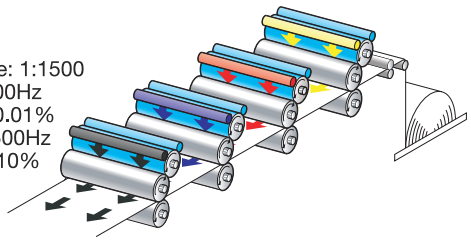
Features

- Starting Torque: 200% for 3 sec, 150% for 1 Min
- Ideal for highly accurate control
- Fuji's Original Dynamic torque vector control
- Quick reaction to the Impact load
- Servo lock function
- Digital Inputs : 9
- Digital Outputs : 4
- Relay outputs : 2
- Analog inputs : 3
- Analog Outputs : 2

Ideal for highly accurate control such as positioning

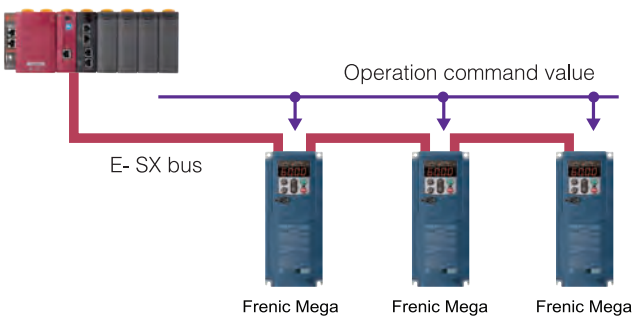
PG vector control.

- Speed control range: 1:1500
- Speed response: 100Hz
- Speed accuracy: ±0.01%
- Current response: 500Hz
- Torque accuracy: ±10%



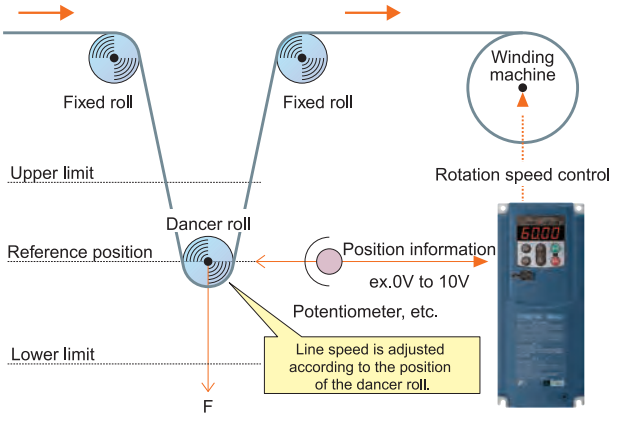
SX Bus

High-speed process and distributed arrangement of the E-SX bus and the SX bus allow seamless connections with control indicators and inverter servos. Supporting various open network systems such from a small-scale application built in a machine to hierarchical distributed system of large-scale line and facility devices can be constructed.



Dancer control function for winding control

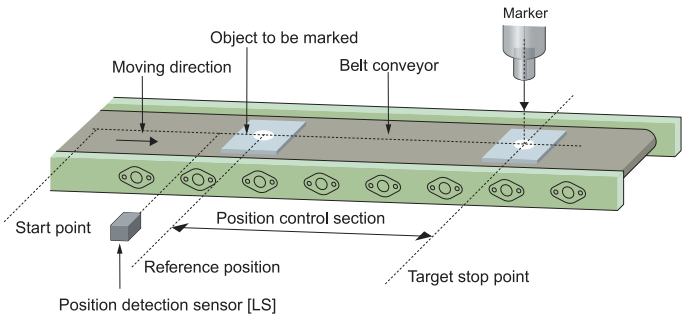
Quick response through inbuilt PID control



MEGA World keeps Expanding

PG option for positioning control

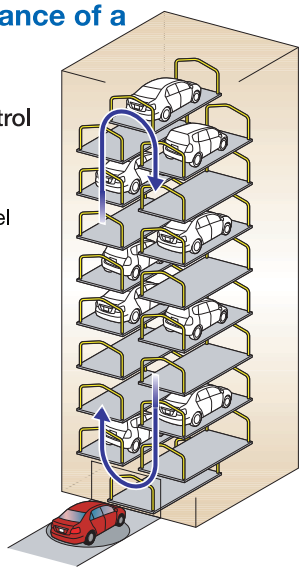
This control function is best suited for the application that requires highly accurate positioning such as that of the conveyance machine.



Maximizing the performance of a general-purpose motor

Speed sensor-less vector control

Useful for the application that required a high starting torque, such as the gondola type multi-level car parking tower



Ordering Information

FRN 0.75 G 1 S - 4 A

- FRN: FRENIC series
- 0.75: Applicable motor rating 0.4kW - 630kW
- G: Applicable range G: High perfomance, multifunctional type
- 1: Development Drive Series
- S: Enclosure S: Standard
- 4: Input power source 4: 3-phase 400V 2: 3-phase 200V
- A: A: Asia

FRENIC-HVAC & FRENIC-AQUA

Energy Saving and Environment Friendly Drive

Features

- EMC filter
- Built in DC Choke
- Slim Body
- 4-PID Control functions
- Customize logic functions
- Separate IP55 enclosure series
- Real time clock
- Torque Vector control
- 2 Level Password function
- Standard Communications: BAC net, Modbus RTU, Metasys N2
- Digital inputs : 9
- Digital outputs : 4
- Relay outputs : 2
- Analog inputs : 3
- Analog outputs : 2

Functions suitable for HVAC

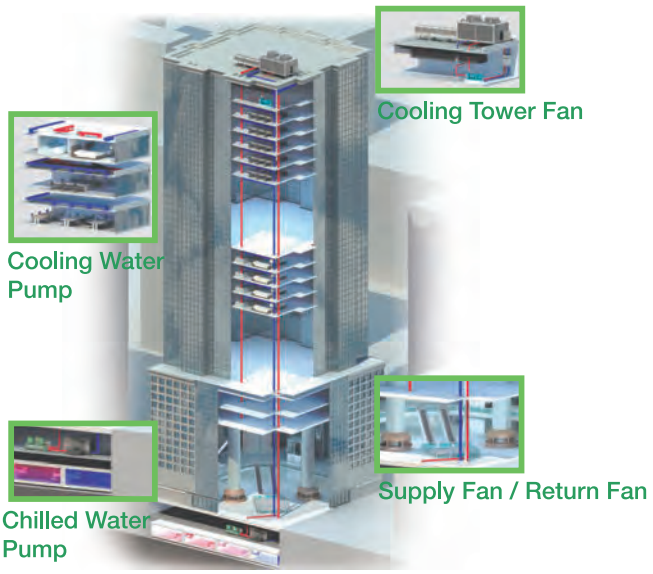
- Optimum Control
- Linearization function
- Wet-bulb temperature presumption control
- Filter Clogging prevention function
- Fire mode

1st time in the world

Functions suitable for AQUA

- Cascade control
- Mutual operation
- Dry pump detection
- Slow flowrate function
- Anti-jam function
- Boost function

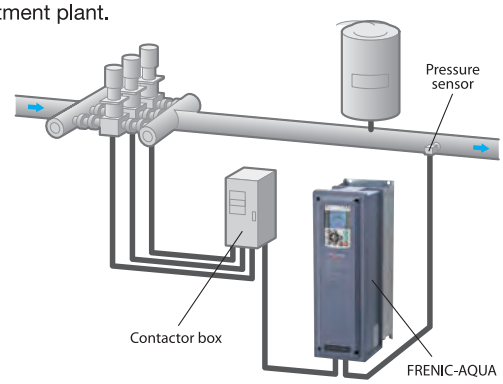
Optimum Control for HVAC facilities



Optimal Function for Usage in Water Treatment

Cascade control

The cascade control is the function that controls the multiple pumps by one drive. The pumps are controlled with combination of inverter drive and commercial drive. This can be applied in a large-scale water treatment plant.



Drive motor floating method (FLOATING)

Max. 4 units + 1 unit (Auxiliary motor)

Drive motor fixed method (FIXED)

Max. 1 unit (Driven by inverter) + 8 units (Commercially driven) + 1 unit (Auxiliary motor)

User friendly, easy to see keypad

1. Present value (PV)
2. Setting value (SV)
3. Manipulating value (MV)
4. Frequency
5. Output current
6. Output voltage
7. Torque
8. Rotation speed
9. Power consumption
10. Cumulative energy

Ordering information

FRN 0.75 AR1 M - 4 A

- FRN: FRENIC series
- 0.75: Applicable range 0.75kW-710kW
- AR1: Applied for: AR:HVAC AQ:AQUA
- M: Protection structure M: IP21 L: IP55 (upto 90 kW)
- 4: Input power supply 4: 3-phase 400V
- A: Asia

FRENIC-Lift

Exclusive Drive for Comfort Elevator

Features

- Overload Capacity: 200% for 10sec
- High performance vector control
- Built in PG feedback circuit
- Reduction of torque ripple realizes low vibration
- Regenerative Direction selection for ARD.
- Short floor & creepless functions
- Also available in single phase 200V for home elevator
- IM/PMSM common drive
- A braking circuit is built in the inverter of all capacities.

One invertor for all types of Elevators using

- Induction Motors open loop/closed loop
- Permanent Magnet synchronous Motors with Magnetic Pole position offset tuning, Static tuning (Deroping not required)

- Rescue operation with ups or batteries

Ordering information

FRN □□□ LM 1 S - 4 A A

- FRN: FRENIC series
- □□□: Applicable motor rating 4.0kW - 45kW
- LM; Elevating Machinery
- 1: Development drive series
- S: standard (IP20/IP00)
- 4: Input power source 2:3-phase 200V 4:3-phase 400V
- A: A : Asia
- A: Blank: with Canport A : without Canport

FRENIC-ACE-GALM3X

Compact Drive for Elevator

Features

- Applicable for Geared (Induction) motor open loop & close loop application.
- Brake Control Function.
- Output contactor function with BX signal.
- Equipped with functional safety (STO), hence you can avoid MC contactor.
- Simple rescue operation with UPS.
- Multistep speed command with six independent settable S-curve during acceleration/ deceleration.
- Soft start operation with DC braking at start up.

- Torque boost gain & compensation response times can be adjustable independently in both normal & UPS operation.
- Automatic control of Cooling fan.
- Auto-reset operation.
- Driving Prohibition function.
- FWD/ REV command check function.
- Overload protection.
- CAN BUS port Built-in
- Deliverance operation during UPS operation
- Overload Capacity : 200% for 0.5 Sec. & 150% for 60 Sec. @ ambient of 50 degree Celsius.

Ordering information

FRN □□□□ E 2 S - 4 GA LM3 X

- FRN: FRENIC Series
- □□□□: Three phase 400V class: Rating current level of HHD specification [Model: 0012 to 0044]
- E: Enclosure: S: standard (basic type) E: EMC filter built-in type
- 2: Input power supply: 4: 400V, 2: 200V
- GA: GA: Global product with CANport
- LM3: LM3: Lift
- X: With double Conformal Coating

Fuji Electric

Innovating Energy Technology

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