Fuji Electric

Innovating Energy Technology

SELECTION GUIDE

FRENIC-HVAC
FRENIC-AQUA

FRENIC-VG

FRENIC-Ace-H

FREQUENCY INVERTERS

Fuji Electric Europe

FRENIC-Mini

FRENIC-MEGA

FVR-Micro

FRENIC-Lift

FRENIC-Ace

SelectionGuide_EN_06.2018

Fuji Electric

Fuji Electric, a renowned manufacturer of power electronics, drive engineering and automation technology

Founded in 1987, Fuji Electric Europe has long been a trusted partner, supplying frequency inverters and power electronics to customers in Europe, Russia, Africa and the Middle East. Our outstanding reputation is based on reliable quality, excellent product performance and innovating technology.

In recent years, more and more new applications such as wind and solar power and electrically powered cars have evolved in the renewable energies sector.

The precision control of Fuji Electric inverters allows AC drives to operate at an optimal speed throughout your application, reducing overall power and energy consumption to minimize operating costs.

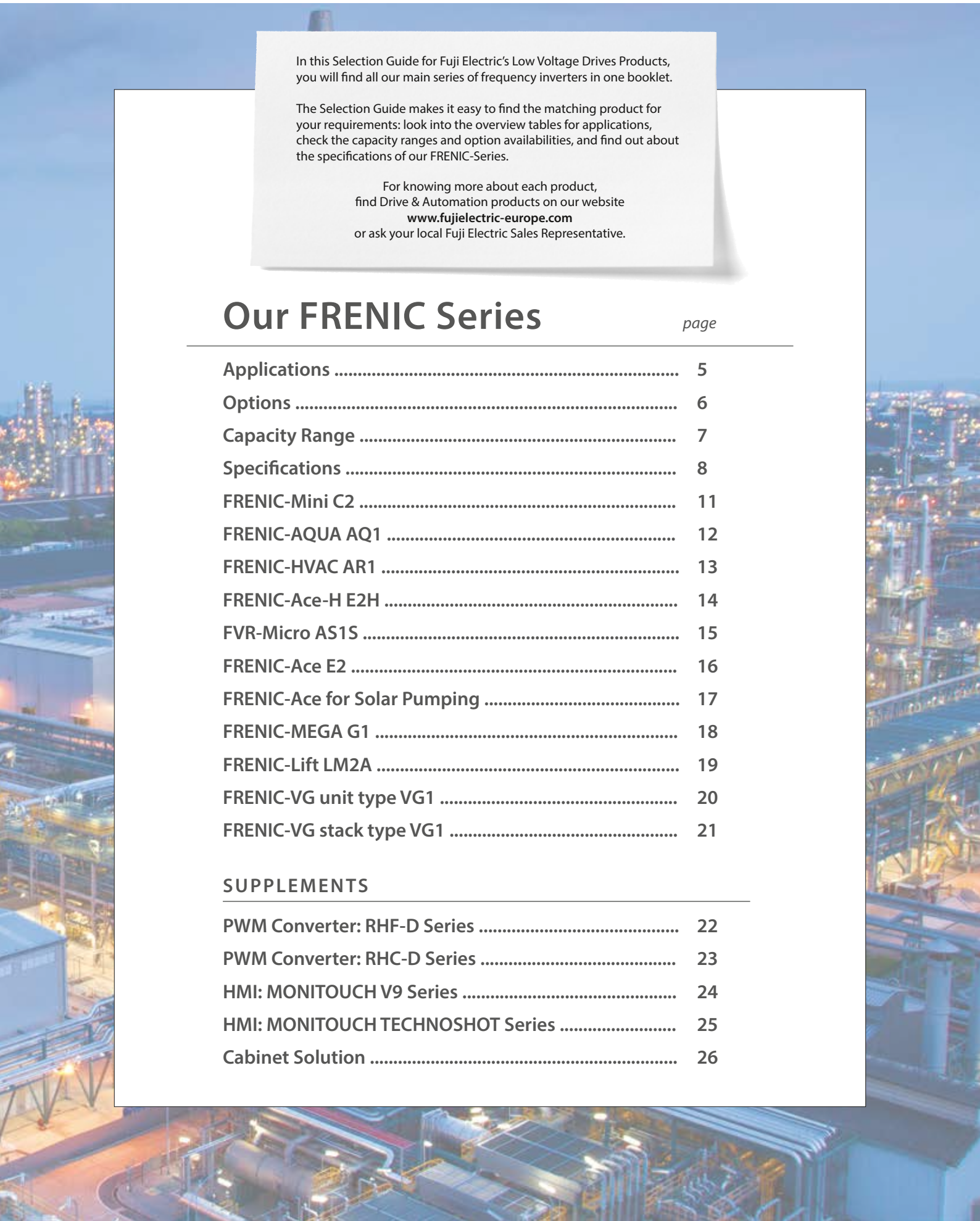
Fuji Electric meets these new challenges with economically viable custom solutions, combining newest technology and know-how with high efficiency, reliabilty and long life.

Our wide product range is supported by an excellent global logistic network and has a solution for every problem.

Visit us on **www.fujielectric-europe.com**

Applications for our drives and inverters include conveyor systems, water, HVAC and lift applications, and others. The FRENIC-Series is equipped with functions and performance to meet all types of requirements, providing easy maintenance, energy and cost saving and environmental friendliness.

In this Selection Guide, you will find Fuji Electric Europe's Low Voltage Inverters and their supplements.



In this Selection Guide for Fuji Electric's Low Voltage Drives Products, you will find all our main series of frequency inverters in one booklet.

The Selection Guide makes it easy to find the matching product for your requirements: look into the overview tables for applications, check the capacity ranges and option availabilities, and find out about the specifications of our FRENIC-Series.

For knowing more about each product,
find Drive & Automation products on our website
www.fujielectric-europe.com
or ask your local Fuji Electric Sales Representative.

Our FRENIC Series

SUPPLEMENTS

Fuji Electric

Extended Warranty Periods

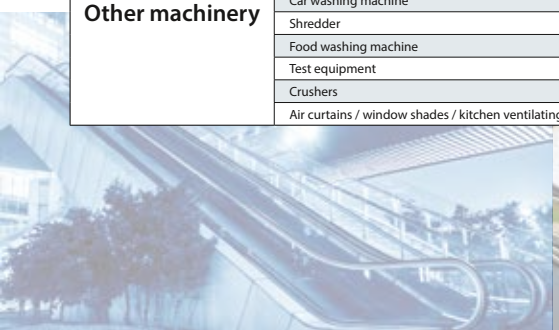
Relax.
You have a Fuji.

3 to 5 years warranty on all drive products from Fuji Electric.
Now applied.

Visit us on **www.fujielectric-europe.com**

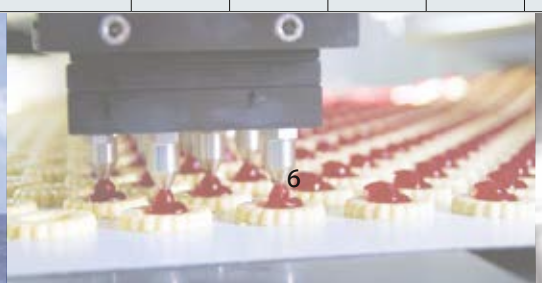
APPLICATIONS

Applications		FRENIC-AQUA	FRENIC-HVAC	FRENIC-Ace-H	FRENIC-MEGA	FRENIC-Lift	FVR-Micro	FRENIC-Ace	FRENIC-Mini C2	FRENIC-VG1
Fans	Exhaust fan		●	●						
	AHU (air handling unit)		●	●						
	Compressor		●	●	●			●	●	●
	Air-conditioning system		●	●	●		●	●	●	
	Dryer		●	●	●		●	●	●	
	Boiler fan		●	●	●			●	●	
	Fans for controlling furnace temperature		●	●	●			●	●	
	Roof fans controlled as a group		●	●	●		●	●	●	
	Refrigerator		●	●	●			●	●	●
	Built-in blower in film-manufacturing machines	●	●	●	●			●	●	
	Cooling-tower fan		●	●	●			●		
	Ventilating fan		●	●	●		●	●	●	
	Separator fan		●	●	●			●	●	
Machine Tools	Grinding machine									●
	Polishing machine									●
	Milling machine									●
	Lathe									●
	Boring machine							●	●	●
	Turntable				●			●	●	●
	Work positioning unit				●			●	●	●
	PCB drilling machine				●			●	●	●
	Winding machine				●			●	●	●
	Press				●			●		●
Electric Pumps	Chillers	●	●	●	●				●	
	Drinking water supply	●	●	●					●	
	Tankless water-supply system	●		●				●	●	
	Submersible pump	●		●	●			●	●	
	Vacuum pump	●		●	●			●	●	●
	Fountain pump	●		●	●			●	●	
	Cooling water pump	●		●	●			●	●	
	Circulating hot water pump	●		●	●			●	●	
	Well pump	●		●	●			●	●	●
	Irrigation	●		●	●			●	●	●
	Water treatment system	●		●	●			●	●	
	Constant-flow pump	●		●	●			●		●
	Sludge pump	●			●			●	●	
	Solar pumping				●			●		
Conveyance machinery	Cranes (travelling, traversing, hoisting)	●	●		●			●		●
	Automated warehouse				●			●	●	●
	Conveyor (belt, chain, screw, roller)				●		●	●	●	●
	Lift				●	●		●		●
	Car parking system				●			●		●
	Elevator, escalator				●	●		●		●
	Automatic door				●			●	●	●
	Shutter				●			●	●	●
Chemical machinery / wood working machines	Fluids mixing machine				●			●	●	●
	Extruder				●			●		●
	Vibrator				●			●	●	●
	Centrifugal separator				●		●	●	●	●
	Coating machine				●			●	●	●
	Take-up roller				●			●	●	●
	Router machine				●			●	●	●
	Planing machine				●			●	●	●
Packaging machinery	Individual packing / inner packing				●		●	●	●	●
	Packing machine				●		●	●	●	●
	Outer packing machine				●			●	●	●
Food processing machinery	Food mixer				●			●	●	●
	Food slicer				●			●	●	
	Grain processing machine				●		●	●	●	●
	Tea manufacturing machine				●			●	●	●
	Rice milling machine				●			●	●	●
	Rice sorters				●		●	●	●	●
Paper making / textile machinery	Spinning machine				●			●	●	●
	Knitting machine				●			●	●	●
	Textile printing machine				●			●	●	●
	Industrial sewing machine				●			●	●	●
	Synthetic fiber manufacturing plant									●
	Slitters				●			●	●	
Other machinery	Automated food / 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 fans						●		●	



OPTIONS

Options		FRENIC-AQUA	FRENIC-HVAC	FVR-Micro	FRENIC-Mini	FRENIC-MEGA	FRENIC-ACE	FRENIC-Ace-H	FRENIC-Lift	FRENIC-VG1
Fieldbus Options	CC-Link communication card	●	●			●	●	●		●
	DeviceNet communication card	●	●			●	●	●		●
	PROFIBUS DP communication card	●	●			●	●	●		●
	CANopen communication card	●	●			●	●	●		
	LonWorks communication card	●	●							
	Ethernet communication card	●	●			●	●	●		
	T-Link communication card					●				●
	SX bus communication card					●				●
	E-SX bus communication card									●
	PROFINET-RT communication card					●	●	●		
	PROFINET-IRT communication card									●
	High-Speed serial communication card (for UPAC)									●
	Terminal block for high speed communication									●
Other Options	Battery	●	●							●
	Relay output interface card	●	●			●		●		
	Analog input interface card	●	●							
	Analog current output interface card	●	●							
	Pt100 temperature sensor input card	●	●					●		
	Additional analog input/output card					●	●	●		●
	Additional digital input/output card						●	●		●
	Additional digital input card					●				●
	Additional digital output card					●				
	Analog output (x 2ch)					●				
	PG (encoder) interface 12-15V HTL					●	●		●	
	PG (encoder) interface 5V TTL line driver					●			●	●
	PG (encoder) interface 5V TTL (not line driver)						●			
	PG (encoder) interface 5V TTL (not line driver) for synchronous operation									
	Gray Code / switching signals 5V TTL line driver encoder interface								●	
	RS-485 option with 2RJ45 connectors for branch connection						●			
	RS-485 communication interface									
	RS-485 option cage clamp terminal									
	Pulse output divider card								●	
	SinCos, SinCos encoder interface								●	
	SinCos, EnDat 2.1 encoder interface								●	
	Hiperface encoder interface								●	
	SSI encoder interface								●	
	Biss encoder interface								●	
	Synchronized interface									●
	F/V converter									●
	User programming card									●
	Functional safety card									●
	PG interface card / Open collector									●
	PG interface card / ABS encoder with 17-bit high resolution									●
	PG card for synchronous motor drive / Open collector									●
	PG card for synchronous motor drive / Line driver									●

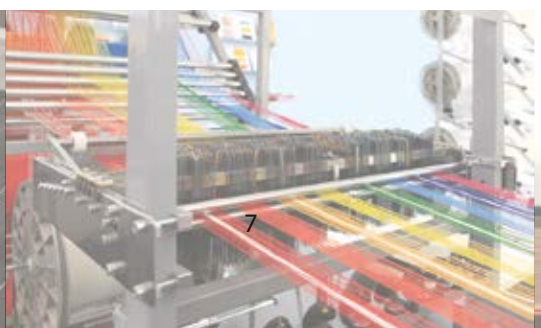




CAPACITY RANGE

Applicable standard motor (kW)	FRENIC-AQUA 3-phase 400 VAC	FRENIC-HVAC 3-phase 400 VAC	FRENIC-MEGA 3-phase 400 VAC	FRENIC-MEGA 3-phase 200 VAC	FRENIC-Lift 3-phase 400 VAC	FRENIC-Lift 1-phase 200 VAC	FRENIC-Ace / FRENIC-Ace-H 3-phase 400 VAC	FRENIC-Ace / FRENIC-Ace-H 1-phase 200 VAC	FRENIC-Mini 3-phase 400 VAC	FRENIC-Mini 1-phase 200 VAC	FRENIC-VG (unit) 3-phase 400 VAC	FRENIC-VG (unit) 3-phase 200 VAC	FRENIC-VG (stack) 3-phase 400 VAC	FRENIC-VG (stack) 3-phase 690 VAC	FVR-Micro 3-phase 400 VAC	FVR-Micro 1-phase 200 VAC
0.1								0.1		0.1						
0.2																
0.4			0.4	0.4			0.4		0.4							0.4
0.75	0.75	0.75										0.75			0.75	
1.5																
2.2					2.2	2.2		2.2		2.2						2.2
4.0						4.0					4.0				4.0	
5.5							*		*							
7.5																
11																
15									15							
18.5																
22																
30													30			
37																
45					45											
55																
75																
90				90								90		90		
110																
132																
160																
200																
220							220									
250																
280																
315																
355																
400														*		
450														450		
500																
560																
630			630								630					
710	710	710											*			
800													800			

* More capacities up to 3 MW available in dual rating and multi drive system.

* 3-phase 400 VAC, 5.5 to 15 kW, w/o EMC-filter built-in

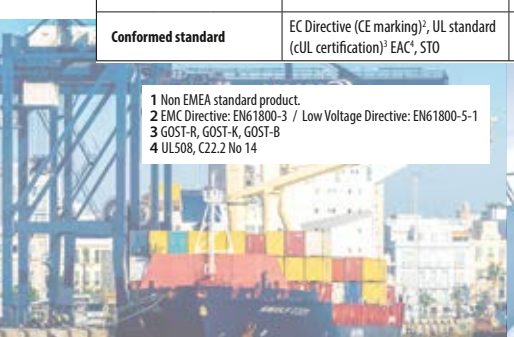
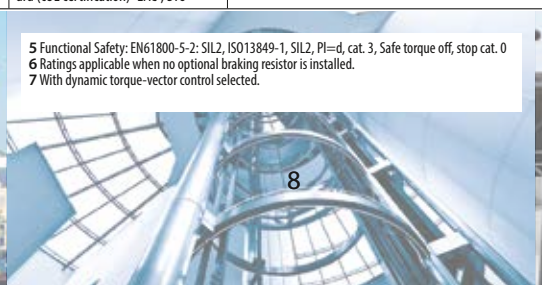


SPECIFICATIONS

			FRENIC-AQUA *(AQ1)*	FRENIC-HVAC *(AR1)*	FRENIC-Ace-H *(E2H)*	FRENIC-Mini *(C2)*
Input ratings	Phase, Voltage, Frequency	3-phase 400 VAC	380 to 440 VAC, 50 Hz / 390 to 480 VAC, 60 Hz	380 to 440 VAC, 50 Hz / 390 to 480 VAC, 60 Hz	380 to 480 VAC, 50/60 Hz	380 to 480 VAC, 50/60 Hz
		3-phase 200 VAC	---	---	200 to 240 VAC, 50/60 Hz	---
		1-phase	---	---	200 to 240 V, 50/ 60 Hz	200 to 240 VAC, 50/60 Hz
	Variations		Voltage: +10 to -15% (voltage unbalance: 2% or less), frequency: +5 to -5%	Voltage: +10 to -15% (voltage unbalance: 2% or less), frequency: +5 to -5%	Voltage: +10 to -15%, voltage unbalance: 2% or less / frequency: +5 to -5%	Voltage: +10 to -15%, voltage unbalance: 2% or less (3-phase, 400 VAC) / +10 to -10% (1-phase, 200 VAC), frequency: +5 to -5%
Output overload capability			110% -1 min (Overload tolerated interval: compliant with IEC 61800-2)	110% -1 min (Overload tolerated interval: compliant with IEC 61800-2)	150% of rated current for 1 min (HHD) (HD), 120% of rated current for 1 min (ND) (HND), 200% of rated current for 3 seconds (HHD)	150% of rated current for 1 min or 200% of rated current for 0.5 s
Output frequ. setting	Maximum frequency		25 to 120 Hz	25 to 120 Hz	HHD/HND/HD mode: 25 to 500 Hz variable under V/control, Magnetic pole position sensorless vector control // up to 200 Hz under vector control with speed sensor // ND mode: 25 to 120 Hz (under any drive control)	25 to 400 Hz
	Base frequency		25 to 120 Hz	25 to 120 Hz	25 to 500 Hz variable (in conjunction with max. frequency)	25 to 400 Hz
	Starting frequency		0.1 to 60.0 Hz	0.1 to 60.0 Hz	0.1 to 60.0 Hz variable	0.1 to 60.0 Hz
	Carrier frequency		0.75 to 16 kHz	0.75 to 16 kHz	3-phase 200 VAC: FRN0030/0040/0056/0069E☐-2☐: 0.75 to 16 kHz variable (HHD/HND mode) // 3-phase 400 VAC: FRN0022/0029/0037/0044/00592☐S-4☐: 0.75 to 16 kHz variable (HHD/HND/HD mode), 0.75 to 10 kHz variable (ND mode) // FRN0072/0085/0105/0139/0168E2☐-4☐: 0.75 to 16 kHz variable (HHD mode), 0.75 to 10 kHz variable (HND/HD mode), 0.75 to 6 kHz variable (ND mode) // FRN0203E2☐-4☐ or above: 0.75 to 10 kHz variable (HHD mode), 0.75 to 6 kHz variable (HND/HD/ND mode)	0.75 to 16 kHz Note: the unit is equipped with an automatic reduction/stop functionthat may automatically drop the carrier frequency to protect the inverter when it is running at frequencies above 6 kHz, depending on ambienttemperature, output current, and other conditions.[1] Under modulated carrier conditions, the system scatters carrier frequency to reduce noise.
Starting torque			100% or higher, reference frequency 1.0 Hz, base frequency 50 Hz, with slip compensation and torque boost active	100% or higher, reference frequency 1.0 Hz, base frequency 50 Hz, with slip compensation and torque boost active	3-phase 200 VAC series: 200% or above, reference frequency 0.5 Hz (HHD FRN0069E2☐-2☐or below), 150% or above, ref. frequency 0.5 Hz (HND FRN0069E2☐-2☐ or below), 3-phase 400 VAC series: 200% or above, ref. frequency 0.5 Hz (HHD FRN0072E2☐-4☐or below), 150% or above, ref. frequency 0.5 Hz (HHD FRN0085E2☐-4☐ or above), 120% or above, ref. frequency 0.5 Hz (HND/ND), 150% or above, ref. frequency 0.5 Hz (HD), Base frequency 50 Hz, with slip compensation and auto torque boost active	150% or more / frequency set to 3 Hz Slip compensation / automatic torque boost active
Brake	Standard torque (%)[6]		20 (0.75 to 22 kW), 10 to 15 (30 to 710 kW)	20 (0.75 to 22 kW), 10 to 15 (30 to 710 kW)	For details, please refer to the user's manual of FRENIC-Ace-H.	For details, please refer to the user's manual of FRENIC-Mini.
	DC injection braking	Starting frequency	0.0 to 60.0 Hz	0.0 to 60.0 Hz	0.0 to 60.0 Hz	0.0 to 60.0 Hz
		Braking time	0.0 to 30.0 s	0.0 to 30.0 s	0.0 to 30.0 s	0.0 to 30.0 s
		Braking level	0 to 60%	0 to 60%	0 to 100%	0 to 100%
Control method			V/f control with slip compensation, dynamic torque vector control, PMSM	V/f control with slip compensation, dynamic torque vector control, PMSM	Induction motor drive: V/f control · Vector control without speed sensor (Dynamic torque vector) · V/f control, with slip compensation · / Synchronous motors: Vector control without magnetic pole position sensor	Induction motor drive: V/f control, slip compensation, automatic torque boost, dynamic torque vector control // Synchronous motor drive: sensorless magnetic positioning (speed control range: 10% of base frequency and up)
Acceleration/deceleration time			0.00 to 3600 s	0.00 to 3600 s	0.00 to 3600 s	0.00 to 3600 s
Multistep frequency			Selectable from 16 steps (step 0 to 15)	Selectable from 16 steps (step 0 to 15)	16 steps	Selectable from 16 steps (step 0 to 15)
Frequency setting control (analog input)			0 to +10 V DC / 0 to 100% (terminal 12) 4 to +20 mA DC / 0 to 100%, 0 to +20 mA DC / 0 to 100% (terminal C1)	0 to +10 V DC / 0 to 100% (terminal 12) 4 to +20 mA DC / 0 to 100%, 0 to +20 mA DC / 0 to 100% (terminal C1)	Term [12]: 0 to ±10 VDC (±5 VDC)/ 0 to ±100%, 0 to +10 VDC (+5 VDC)/ 0 to +100% // Term [C1] C1 function: 4 to 20 mA DC/ 0 to +100% / 0 to ±100%, 0 to 20 mA DC/ 0 to +100% / 0 to ±100% // Term [C1] V2 function: 0 to +10 VDC (+5 VDC)/ 0 to +100%/ 0 to ±100%, inverse function available (20 to 4; 20 to 0)	0 to +10 V DC / 0 to 100% (terminal 12) 4 to +20 mA DC / 0 to 100%, 0 to +20 mA DC / 0 to 100% (terminal C1)
Standard functions			· Fire mode (forced operation) · Customized logic · Multi pump control · Real time clock	· 4 PID control · Motor pick up function · Customized logic · Filter clogging prevention · Real time clock	Customizable logic, 2 PID Control , Fire mode (forced operation), multi pump control, Auto-tuning, Online tuning, 1st and 2nd motor settings, Cooling fan ON/OFF control, Speed control, Pre-excitation, DC Braking, Droop control	PID control function, sensorless synchronous motor control, RS 485 communication port, braking signal function, motor switching function, motor auto-tuning, high starting torque, at 150% or more , braking resistor connectable to the inverter, tripless deceleration by automatic deceleration control, automatic energy-saving function, frequency setting potentiometer
Protection			· Short-circuit · Ground fault · Overvoltage · Undervoltage · Motor overload (PTC)	· Short-circuit · Ground fault · Overvoltage · Undervoltage · Motor overload (PTC)	Overcurrent (short-circuit, ground fault), Overvoltage, Incoming surge, Undervoltage, Input phase loss, Overheating, Motor overload (Electronic thermal overlaod trip), Stall prevention, External alarm input, Memory error, Communication error, (KEYPAD, Option, RS-485), CPU error, Option error, Output phase loss error	Overcurrent, short-circuit, ground fault, overvoltage, undervoltage, input phase loss, output phase loss, inverter overheat, braking resistor overheat, overload, motor electronic thermal overload relay, PTC thermistor, motor overload early warning, stall prevention, step-out detection, external alarm input, memory error , remote keypad (option), communications error, CPU error, operation error,tuning error, RS-485 communications error, data save error during undervoltage, surge protection, protection against momentary power failure , overload prevention control, mock alarm, PID feedback wire break detection
Enclosure (IEC/EN60529)			IP21/IP55 (0.75 to 90 kW), IP00 (110 to 710 kW)	IP21/IP55 (0.75 to 90 kW), IP00 (110 to 710 kW)	IP20 closed type, UL open type (22 kW or smaller), IP00 open type, UL open type (30 kW or larger)	IP20 (IEC 60529:1989) / UL open type (UL50)
Cooling method			Natural cooling (0.75 to 2.2 kW), Fan cooling (4.0 to 710 kW)	Natural cooling (0.75 to 2.2 kW), Fan cooling (4.0 to 710 kW)	Fan cooling	3-phase 400 VAC: natural cooling (0.4/0.75 kW), fan cooling (1.5 to 15 kW); 1-phase 200 VAC: natural cooling (0.1 to 0.75 kW), fan cooling (1.5/2.2 kW)
Conformed standard			EC Directive (CE marking)[2], UL standard (cUL certification)[3] EAC[4], STO	EC Directive (CE marking)[2], UL standard (cUL certification)[3] EAC[4], STO	EC Directive (CE marking)[2], UL standard (cUL certification)[3], EAC[4], STO[5]	EC Directive (CE marking)[2], UL standard (cUL certification)[3], EAC[4]

1 Non EMEA standard product.
2 EMC Directive: EN61800-3 / Low Voltage Directive: EN61800-5-1
3 GOST-R, GOST-K, GOST-B
4 UL508, C22.2 No 14

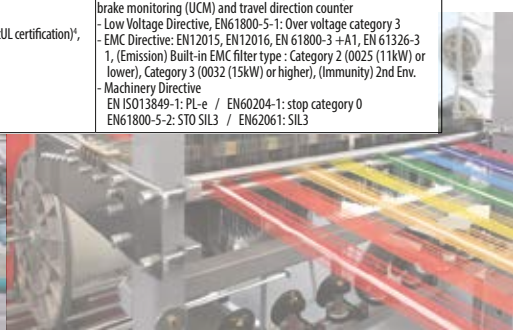
5 Functional Safety: EN61800-5-2: SIL2, ISO13849-1, SIL2, PI=d, cat. 3, Safe torque off, stop cat. 0
6 Ratings applicable when no optional braking resistor is installed.
7 With dynamic torque-vector control selected.


SPECIFICATIONS

			FVR-Micro *(AS1S)*	FRENIC-Ace *(E2)*	FRENIC-MEGA *(G1)*	FRENIC-Lift *(LM2A)*
Input ratings	Phase, Voltage, Frequency	3-phase 400 VAC	280 to 480 VAC, 50/60 Hz	380 to 480 VAC, 50/60 Hz	380 to 480 VAC, 50/60 Hz (up to 55 kW) 380 to 440 VAC, 50 Hz 380 to 480 VAC, 60 Hz (75 kW or above)	380 to 480 VAC, 50/60 Hz
		3-phase 200 VAC	--	200 to 240 VAC, 50/60 Hz	200 to 240 VAC, 50/60 Hz (up to 22 kW) 200 to 220 VAC, 50 Hz, 200 to 230 VAC, 60 Hz (30 kW & above)	---
		1-phase	200 to 240 VAC, 50/60 Hz	200 to 240 V, 50/ 60 Hz	--	200 to 240 VAC, 50/60 Hz
	Variations		400 V series Voltage: -15% to +10% Frequency: 47 to 63 Hz	Voltage: +10 to -15%, voltage unbalance: 2% or less / Frequency: +5 to -5%	Voltage: +10 to -15%, voltage unbalance: 2% or less / Frequency: +5 to -5%	Voltage: +10 to -15%, Frequency: -5 to +5% Voltage unbalance for 3-phase: 2% or less according to IEC61800-3
Output overload capability			150% of rated current during 1 minute	150% of rated current for 1 min (HHD) (HD) 120% of rated current for 1 min (ND) (HND) 200% of rated current for 3 seconds (HHD)	150% of rated current for 1 min (HD) (MD) 120% of rated current for 1 min (LD) 200% of rated current for 3 seconds (HD)	200% for 3 sec
Output frequency setting	Maximum frequency		25.0 to 400 Hz	HHD/HND/HD mode: 25 to 500 Hz variable under V/f control, Magnetic pole position sensorless vector control) (Up to 200 Hz under vector control with speed sensor) ND mode: 25 to 120 Hz (under any drive control)	25 to 500 Hz (120 Hz for inverters in MD/LD mode)	1 to 200 Hz (1.20 to 12000 rpm)
	Base frequency		25.0 to 400 Hz	25 to 500 Hz variable (in conjunction with max. freq.)	25 to 500 Hz variable (in conjunction with max freq.)	1 to 200 Hz (1.20 to 12000 rpm)
	Starting frequency		0.0 to 60.0 Hz	0.1 to 60.0 Hz variable (0.0 Hz under vector control with speed sensor)	0.1 to 60 Hz variable setting	Dynamic torque vector control: 0.1 Hz Vector control with PG: 0.0 Hz
	Carrier frequency		0.75 to 16 kHz	3-phase 200 VAC: FRN0030/0040/0056/0069E☐-2☐: 0.75 to 16 kHz variable (HHD/HND mode) // 3-phase 400 VAC: FRN0022/0029/0037/0044/00592☐S-4☐: 0.75 to 16 kHz variable (HHD/HND/HDmode), 0.75 to 10 kHz variable (ND mode) // FRN0072/0085/0105/0139/0168E2☐-4☐: 0.75 to 16 kHz variable (HHD mode), 0.75 to 10kHz variable (HND/HD mode), 0.75 to 6 kHz variable (ND mode) // FRN0203E2☐-4☐ or above: 0.75 to 10 kHz variable (HHD mode), 0.75 to 6 kHz variable (HND/HD/ND mode)	0.1 to 60 Hz variable setting - 0.75 to 16 kHz (HD mode: 0.4 to 55 kW, LD mode: 5.5 to 18.5 kW) 0.75 to 10 kHz (HD mode: 75 to 400 kW, LD mode: 22 to 55 kW) 0.75 to 6 kHz (HD mode: 500 and 630 kW, LD mode: 75 to 500 kW) 0.75 to 4 kHz (LD mode: 630 kW) 0.75 to 2 kHz (MD mode: 90 to 400 kW)	5 to 16 kHz
Starting torque			For details, please refer to the user's manual of FVR-Micro.	3-phase 200 VAC series: 200% or above, reference frequency 0.5 Hz (HHD FRN0069E2☐-2☐ or below), 150% or above, ref. frequency 0.5 Hz (HND FRN0069E2☐-2☐ or below), 3-phase 400 VAC series: 200% or above, ref. frequency 0.5 Hz (HHD FRN0072E2☐-4☐ or below), 150% or above, ref. frequency 0.5 Hz (HHD FRN0085E2☐-4☐or above), 120% or above, ref. frequency 0.5 Hz (HND/ND), 150% or above, ref. frequency 0.5 Hz (HD), Base frequency 50 Hz, with slip compensation and auto torque boost active	200% (22 kW or smaller)[7] 180% (30 kW or larger)[7]	200%
Brake	Standard torque (%)[6]		For details, please refer to the user's manual of FVR-Micro.	For details, please refer to the user's manual of FRENIC-Ace.	For details, please refer to the user's manual of FRENIC-MEGA.	80% (Average torque for 60 s braking with 50%ED)
	DC injection braking	Starting frequency	0.0 to 60.0 Hz	0.0 to 60.0 Hz	0.1 to 60.0 Hz	0.00 to 5.00 Hz (0.00 to 300.00 rpm)
		Braking time	0.0 to 30 s	0.0 to 30.0 s	0.0 to 30.0 s	0.00 to 30.00 s
		Braking level	0 to 100%	0 to 100%	0 to 100%	0 to 100%
Control method			0: V/f control with slip compensation inactive 1: Dynamic torque vector control 2: V/f control with slip compensation active	Induction motor drive: V/f control, vector control without speed sensor (Dynamic torque vector), V/f control, with slip compensation, V/f control, with slip sensor (PG option), V/f Control with speed sensor (+Auto Torque Boost) (PG option), vector control with speed sensor (PG option) // Synchronous motors: Vector control without magnetic pole position sensor	V/f control, dynamic torque-vector control, V/f control, the slip compensation is available, V/f control w/ speed sensor (PG optional), dynamic torque vector control speed sensor (PG optional), speed sensorless vector control, vector control w/ speed sensor (PG optional)	Vector control with PG (Asynchronous Motor) Vector control with PG (Synchronous Motor) Dynamic torque vector control without PG (Asynchronous Motor) Vector control with Peripheral PG (Synchronous Motor) Sensor-less vector control for rescue operation (Synchronous Motor) (coming soon)
Acceleration/deceleration time			0.00 to 3600 s	0.00 to 6000 s	0.01 to 6000 s	0.00 to 99.9 s
Multistep frequency			16 steps	16 steps	16 steps	16 steps
Frequency setting control (analog input)			Term [C1] C1 function: 4 to 20 mA DC/ 0 to +100% / 0 to ±100%, 0 to 20 mA DC/ 0 to +100% / 0 to ±100% // Term [12]: 0 to +10 (VDC)/0 to 100 (%) (Normal operation) ,+10 to 0 (VDC)/0 to 100 (%) (Inverse operation)	Term [12]: 0 to ±10 VDC (±5 VDC)/ 0 to ±100%, 0 to +10 VDC (+5 VDC)/ 0 to +100% // Term [C1] C1 function: 4 to 20 mA DC/ 0 to +100% / 0 to ±100%, 0 to 20 mA DC/ 0 to +100% / 0 to ±100% // Term [C1] V2 function: 0 to +10 VDC (+5 VDC)/ 0 to +100% / 0 to ±100%, Inverse function available (20 to 4; 20 to 0)	0 to +10 V DC (inverse mode available) , 0 to +10 V DC (inverse mode available), 4 to +20 mA (inverse mode available)	0 to ±10 VDC (2 inputs) 4 to 20 mADC
Standard functions			Setting max/min output frequency; momentary power off restarting; fault, restarting; acceleration/deceleration time; auto-voltage stabilizing output modulation; digital frequency output signal; fault records; parameters locking; reset to factory setting; over voltage stalling prevention, electronic thermal relay, traverse function, PID control, non-linear V/f pattern	Customizable logic, Droop control, Torque control, PID Control (with Dancer control), Torque limiter, Auto-tuning, Online tuning, 1st and 2nd motor settings, Zero speed control, Cooling fan ON/OFF control, Speed control, Positioning control with pulse counter, Master-follower operation, Pre-excitation, DC Braking, Mechanical brake control	Bias frequency, Gain for frequency setting, High and low frequency limiter, Jump frequency control, Slip compensation, Auto-restart after momentary power failure, Automatic deceleration, Torque limiting, Energy saving operation, Automatic torque boost, PID control, Link operation, Fan stop operation, Droop operation, Torque control	Forward rotation, reverse rotation and stop command, coast-to-stop command, alarm reset, forced stop, Multistep speed, analog signal for speed reference, multi-function keypad, communication, individual settings of each point of start, acceleration completion, deceleration beginning, and stop, ASR feedforward compensation, ASR parameter change, Digital torque bias, Analog torque bias, Motor parameters tuning, Pole position tuning, Unbalanced load compensation, Creepless operation, Battery operation, digital output for short circuit for motor phases at stopping (PM motors), hidden parameters depending on control mode, Distance estimation for acceleration/deceleration, Rescue operation by motor brakes control,function for EN81-1 A3 UCM, Trip counter for EN81-1 A3, safety gear function, Output phase rotation,customizable logic interface, etc.
Protection			Overcurrent protection, short-circuit protection, ground fault protection, overvoltage protection, under voltage protection, input phase loss protection, output phase loss protection, overheat protection for inverter, overheat protection for braking resistor, overload protection, electronic thermal overload relay, PTC thermistor, overload early warning, stall prevention, external alarm input, alarm relay output (for any fault), memory error, CPU error, operation error, tuning error, RS-485 communication error, data save error during under voltage, retry function, surge protection, protection against momentary power failure, overload prevention control, mock alarm, PID feedback wire break detection	Overcurrent (short-circuit, ground fault), Overvoltage, Incoming surge, Undervoltage, Input phase loss, Overheating, Motor overload (Electronic thermal overlaod trip), Stall prevention, External alarm input, Memory error, Communication error, (KEYPAD, Option, RS-485), CPU error, Option error, Output phase loss error	Overcurrent (short-circuit, ground fault), Overvoltage, Incoming surge, Undervoltage, Input phase loss, Overheating, Motor overload (Electronic thermal overlaod trip), Stall prevention, External alarm input, Memory error, Communication error, (KEYPAD, Option, RS-485), CPU error, Option error, Output phase loss error	Overcurrent, short circuit, grounding fault, overvoltage, undervoltage, input phase loss, output phase loss, overheating, overload, external alarm, motor protection (electronic thermal and PTC), memory error, keypad communication error, CPU error, option communication error, option error, operation error, tuning error, RS485 communication error, data save error upon undervoltage, option hardware error, EN terminal circuit error, PG wiring broken, CAN bus communication error, overspeed prevention, speed mismatching, charging circuit fault, over torque current, etc.
Enclosure (IEC/EN60529)			IP20 (IEC 60529), UL open type (UL50)	IP20 closed type, UL open type (22 kW or smaller), IP00 open type, UL open type (30 kW or larger)	IP20 (IEC60529) closed type, UL open type (UL50) (22 kW or smaller), IP00 open type, UL open type (30 kW or larger)	IP20 + IP54 Heat sink (From 2.2 to 15 kW) IP20 (from 18,5 to 22 kW), IP00 (from 30 to 45 kW)
Cooling method			Single-phase 200 V 0.4 to 2.2 kW fan cooling Three-phase 400 V 0.4 to 0.75 kW natural cooling Three-phase 400 V 1.5 to 3.7 kW fan cooling	Fan cooling	Natural cooling (1.5 kW or smaller) Fan cooling (2.2 kW or larger)	Fan cooling
Conformed standard			UL61800-5-1, IEC 61800-5-1	EC Directive (CE marking)[2], UL standard (cUL certification)[4], EAC[3], STO[5]	EC Directive (CE marking)[2], UL standard (cUL certification)[4], EAC[3], STO[5]	- EC Directive (CE marking)[1] - EAC[2] - Canada Safety Standard: CSA B44.1-11/ASME A17.5-2011 - Lift Directive (in extracts): EN 81-1 +A3 According to contactors less, brake monitoring (UCM) and travel direction counter - Low Voltage Directive, EN61800-5-1: Over voltage category 3 - EMC Directive: EN12015, EN12016, EN 61800-3 +A1, EN 61326-3 1, (Emission) Built-in EMC filter type : Category 2 (0025 (11kW) or lower), Category 3 (0032 (15kW) or higher), (Immunity) 2nd Env. - Machinery Directive EN ISO13849-1: PL-e / EN60204-1: stop category 0 EN61800-5-2: STO SIL3 / EN62061: SIL3





SPECIFICATIONS

			FRENIC-VG *(VG1 unit)*	FRENIC-VG *(VG1 stack / 400 V)*	FRENIC-VG *(VG1 stack / 690 V)*
Input ratings	**Phase, Voltage, Frequency**	**3-phase 400 VAC**	380 to 480 VAC, 50/60 Hz (3.7~55 kW) 380 to 440 VAC, 50 Hz (55~630 kW) 380 to 480 VAC, 60 Hz (55~630 kW)	380 to 440 VAC, 50 Hz 380 to 460 VAC, 60 Hz (For additional information refer to RHC-D and RHD-D specifications)	660 to 690 VAC, 50/60 Hz 575 to 600 VAC, 50/60 Hz (For additional information refer to RHC-D and RHD-D specifications)
		3-phase 200 VAC	200 to 230 VAC, 50/60 Hz (0.75~22 kW) 200 to 220 VAC, 50 Hz (30~90 kW) 200 to 230 VAC, 60 Hz (30~90 kW)	---	---
		1-phase	---	---	---
	Variations		Voltage: +10 to -15%, Frequency: -5 to +5% Voltage unbalance for 3-phase: 2% or less according to IEC61800-3	Voltage: +10 to -15%, Frequency: -5 to +5% Voltage unbalance for 3-phase: 2% or less according to IEC61800-3 (For additional information refer to RHC-D and RHD-D specifications)	Voltage: +10 to -15%, Frequency: -5 to +5% Voltage unbalance for 3-phase: 2% or less according to IEC61800-3 (For additional information refer to RHC-D and RHD-D specifications)
Output overload capability			150% of rated current for 1 min (HD) (MD) 120% of rated current for 1 min (LD) 200% of rated current for 3 seconds (HD)	150% of rated current for 1 min (MD) 110% of rated current for 1 min (LD)	150% of rated current for 1 min (MD) 110% of rated current for 1 min (LD)
Output frequency setting	**Maximum frequency**		500 Hz	150 Hz (Vector control with PG for IM, PMSM & V/f) 120 Hz (Vector control without PG for IM)	150 Hz (Vector control with PG for IM, PMSM & V/f) 120 Hz (Vector control without PG for IM)
	Base frequency		500 Hz	150 Hz (Vector control with PG for IM, PMSM & V/f) 120 Hz (Vector control without PG for IM)	150 Hz (Vector control with PG for IM, PMSM & V/f) 120 Hz (Vector control without PG for IM)
	Starting frequency		Vector control with PG (IM/PMSM): 0 Hz, Vector control without PG (IM): 1:250, V/f (IM): 0,2 Hz	Vector control with PG (IM/PMSM): 0 Hz Vector control without PG (IM): 1:250 V/f (IM): 0.2 Hz	Vector control with PG (IM/PMSM): 0 Hz Vector control without PG (IM): 1:250 V/f (IM): 0.2 Hz
	Carrier frequency		2 to 15 kHz (0.75~55 kW in HD) 2 to 10 kHz (75~400 kW in HD) 2 to 5 kHz (500~630 kW in HD) 2 to 4 kHz (90~400 kW in MD) 2 to 10 kHz (30~55 kW in LD) 2 to 5 kHz (75~500 kW in LD) 2 kHz (630 kW in LD)	2 kHz	2 kHz
Starting torque			200% (HD) 150% (MD), 120% (LD)	150% (MD) 110% (LD)	150% (MD) 110% (LD)
Brake	**Standard torque (%)**		150%	Braking only available when RHC-D is used	Braking only available when RHC-D or BUC-D is used
	DC injection braking	**Starting frequency**	0.00 to 3600.00 rpm	0.00 to 3600.00 rpm	0.00 to 3600.00 rpm
		Braking time	0.00 to 30.00 s	0.00 to 30.00 s	0.00 to 30.00 s
		Braking level	0 to 100 %	0 to 100 %	0 to 100 %
Control method			· Vector control with PG (IM) · Vector control without PG (IM) · V/f (IM) · Vector control with PG (PMSM)	· Vector control with PG (IM) · Vector control without PG (IM) · V/f (IM) · Vector control with PG (PMSM)	· Vector control with PG (IM) · Vector control without PG (IM) · V/f (IM) · Vector control with PG (PMSM)
Acceleration/deceleration time			0.00 to 99.9 s	0.00 to 99.9 s	0.00 to 99.9 s
Multistep frequency			16 steps	16 steps	16 steps
Frequency setting control (analog input)			0 to ±10 VDC 4 to 20 mADC	0 to ±10 VDC 4 to 20 mADC	0 to ±10 VDC 4 to 20 mADC
Standard functions			Start/stop operation, speed setting, speed detection, speed control, running status signals, acceleration/deceleration times, speed setting gains, jump speed, auto search for idling motor speed, auto-restart after momentary power failure, slip compensation, droop control, torque limit, torque control, PID control, cooling fan ON/OFF control, toggle monitor control, torque bias, motor selection, temperature detection, self-diagnostic function for PG detection circuit, load adaptive control, multiplex system (multiple winding motor drive and direct parallel connection), UP/DOWN control, stop function, PG pulse output, observer, offline tuning, online tuning, position control, pulse train, synchronous operation, STO, SS1, SBC, etc.	Start/stop operation, speed setting, speed detection, speed control, running status signals, acceleration/deceleration times, speed setting gains, jump speed, auto search for idling motor speed, auto-restart after momentary power failure, slip compensation, droop control, torque limit, torque control, PID control, cooling fan ON/OFF control, toggle monitor control, torque bias, motor selection, temperature detection, self-diagnostic function for PG detection circuit, load adaptive control, multiplex system (multiple winding motor drive and direct parallel connection), UP/DOWN control, stop function, PG pulse output, observer, offline tuning, online tuning, position control, pulse train, synchronous operation, STO, SS1, SBC, etc.	Start/stop operation, speed setting, speed detection, speed control, running status signals, acceleration/deceleration times, speed setting gains, jump speed, auto search for idling motor speed, auto-restart after momentary power failure, slip compensation, droop control, torque limit, torque control, PID control, cooling fan ON/OFF control, toggle monitor control, torque bias, motor selection, temperature detection, self-diagnostic function for PG detection circuit, load adaptive control, multiplex system (multiple winding motor drive and direct parallel connection), UP/DOWN control, stop function, PG pulse output, observer, offline tuning, online tuning, position control, pulse train, synchronous operation, STO, SS1, SBC, etc.
Protection			Braking transistor broken, braking resistor overheated, DC fuse blown, excessive positioning deviation, PG communication error, safety circuit error, grounding fault, memory error, keypad communication error, CPU error, network error, RS485 communication error, operation error, output wiring fault, A/D converter error, speed not agreed, UPAC error, inter-inverter communications link error, hardware error, mock alarm, PG failure, input phase loss, start delay, undervoltage, NTC wire brake error, overcurrent, heat sink overheat, external alarm, inverter internal overheat, motor overheat, motor 1 overload, motor 2 overload, motor 3 overload, inverter overload, output phase loss, overspeed, overvoltage, PG wire brake, charger circuit fault, DC fan locked, E-SX bus tact synchronization error, toggle abnormality error, functional safety card error, light alarm (warning), surge protection, main power shut down	Braking transistor broken, braking resistor overheated, DC fuse blown, excessive positioning deviation, PG communication error, safety circuit error, grounding fault, memory error, keypad communication error, CPU error, network error, RS485 communication error, operation error, output wiring fault, A/D converter error, speed not agreed, UPAC error, inter-inverter communications link error, hardware error, mock alarm, PG failure, input phase loss, start delay, undervoltage, NTC wire brake error, overcurrent, heat sink overheat, external alarm, inverter internal overheat, motor overheat, motor 1 overload, motor 2 overload, motor 3 overload, inverter overload, output phase loss, overspeed, overvoltage, PG wire brake, charger circuit fault, DC fan locked, E-SX bus tact synchronization error, toggle abnormality error, functional safety card error, light alarm (warning), surge protection, main power shut down, etc.	Braking transistor broken, braking resistor overheated, DC fuse blown, excessive positioning deviation, PG communication error, safety circuit error, grounding fault, memory error, keypad communication error, CPU error, network error, RS485 communication error, operation error, output wiring fault, A/D converter error, speed not agreed, UPAC error, inter-inverter communications link error, hardware error, mock alarm, PG failure, input phase loss, start delay, undervoltage, NTC wire brake error, overcurrent, heat sink overheat, external alarm, inverter internal overheat, motor overheat, motor 1 overload, motor 2 overload, motor 3 overload, inverter overload, output phase loss, overspeed, overvoltage, PG wire brake, charger circuit fault, DC fan locked, E-SX bus tact synchronization error, toggle abnormality error, functional safety card error, light alarm (warning), surge protection, main power shut down, etc.
Enclosure (IEC/EN60529)			IP20 (from 0.75 to 22 kW), IP00 (from 30 to 630 kW, IP20 available as an option)	IP00	IP00
Cooling method			Fan cooling	Fan cooling	Fan cooling
Conformed standard			EC Directive (CE marking)[2] UL standard (cUL certification)[4] EAC[3] Machinery Directive: IEC/EN ISO13849-1: PL-d, IEC/EN60204-1: Stop category 0 IEC/EN61800-5-2: SIL2, IEC/EN62061: SIL2	EC Directive (CE marking)[2] UL standard (cUL certification)[4] EAC[3] Machinery Directive: IEC/EN ISO13849-1: PL-d, IEC/EN60204-1: Stop category 0 IEC/EN61800-5-2: SIL2, IEC/EN62061: SIL2	Us and Canada Safety Standard* UL, cUL (UL508C, C22.2 No. 14) Machinery Directive* IEC/EN ISO13849-1: PL-d IEC/EN60204-1: Stop category 0 IEC/EN61800-5-2: SIL2 IEC/EN62061: SIL2 Low Voltage Directive* EN61800-5-1: Over voltage category 3 EMC Directive (with external EMC filter installed)* EN61800-3 **pending*



1 Non EMEA standard product.
2 EMC Directive: EN61800-3 / Low Voltage Directive: EN61800-5-1
3 GOST-R, GOST-K, GOST-B
4 UL508, C22.2 No 14

5 Functional Safety: EN61800-5-2: SIL2, ISO13849-1, SIL2, PI=d, cat. 3, Safe torque off, stop cat. 0
6 Ratings applicable when no optional braking resistor is installed.
7 With dynamic torque-vector control selected.

FRENIC-Mini C2

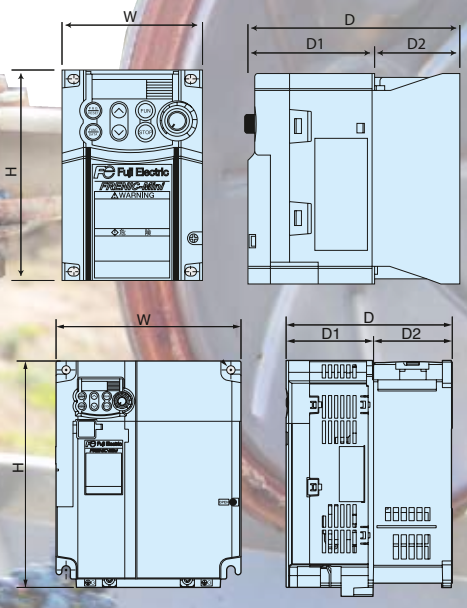
With its rich functionality, compact design, simple operation, and global compatibility, the new FRENIC-Mini elevates the performance of a wide range of devices and equipment.

Including conveyors, fans, pumps, centrifugal separators, and food processing machines - we provide you the system integration, energy efficiency, reduced labour, and lower overall costs you're looking for.

- High performance and multipurpose
- Induction Motor control (V/f and Dynamic torque vector control), PMS Motor control (open loop)
- Slip compensation controller shortens setting time
- Fastest CPU processor in its class
- Optional USB keypad available
- Even easier to use and fully compatible with existing products: External dimensions of C1 model equal C2 model
- Energy use optimizer
- PID control function
- Cooling fan ON/OFF control function
- Network capabilities standard: RS-485 communications port
- Easier maintenance

Power supply voltage	Applicable standard motor (kW)	Inverter model	Outside dimensions (mm)				
			W	H	D	D1	D2
3-phase 400 VAC w/ EMC filter built-in	0.4	FRN0002C2E-4☐	110	130	158	118	40
	0.75	FRN0004C2E-4☐			182		64
	1.5	FRN0005C2E-4☐	140	180			
	2.2	FRN0007C2E-4☐					
	4.0	FRN0011C2E-4☐					
3-phase 400 VAC w/o EMC filter built-in	5.5	FRN0013C2S-4☐	180	230	158	70.3	87.7
	7.5	FRN0018C2S-4☐					
	11	FRN0024C2S-4☐	220	270	190	100	90
	15	FRN0030C2S-4☐					
1-phase 200 VAC w/ EMC filter built-in	0.1	FRN0001C2E-7☐	80	120	100	90	10
	0.2	FRN0002C2E-7☐					
	0.4	FRN0004C2E-7☐			115		25
	0.75	FRN0006C2E-7☐	110	130	139	99	40
	1.5	FRN0010C2E-7☐	140	180	182	118	64
	2.2	FRN0012C2E-7☐					

Dimensions



TYPE CODE

FRN 0011 C2 E - 4 E

- FRN: Series name: FRENIC
- 0011: Applicable rated current (this value shows an amperage rating)
- C2: Applied for: Mini, C2 series (successor of C1)
- E: Model: E: EMC filter built-in / S: Without EMC filter
- 4: Input power supply: 4: 3-phase 400 VAC / 7: 1-phase 200 VAC
- E: Destination: E (Europe)

FRENIC-AQUA AQ1

5 Year Warranty

FRENIC-AQUA is Fuji Electric's first slim type inverter. It is dedicated to a variety of applications of water supply and wastewater treatment systems.

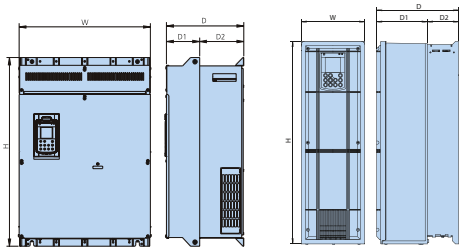
This new series follows European trends with keeping high Japanese reliability. Specific functions to prevent damage on the systems and new energy saving functions are installed as standard and positioning FRENIC-AQUA as a high performance inverter on the pumping application market.

- Wide capacity range from 0.75 kW to 710 kW
- IP21 & IP55 with same dimension
- DCR and EMC filter built-in up to 90 kW, built-in EMC filter for all capacities
- Overload capability 110%
- Torque Vector Control
- Battery (OPK-BP)
- Modbus RTU, BACnet MS/TP, Metasys N2; integrated as standard
- Large LCD display, 19 languages + user customizable language
- Specific macros for common pump applications
- Customizable Logic (mini PLC), 14 steps, possibility to manage digital and analog signals
- Real Time Clock (RTC)
- 4 PID Sets
- Unit conversion function (kPa, bar, l/min, etc.)
- Fire mode (forced operation)
- Password function
- New energy saving functions (sleep mode)
- Multipump control (up to 9 pumps with one inverter)
- Anti jam function
- Pipe fill mode
- Extension cable for remote operation (CB-…S)
- SIL2, Pl d
- Sensorless PMSM control mode up to 90 kW (coming soon)

Protective structure: M: IP21, L: IP55. Type of frame: up to 37 kW plastic enclosure, 45 kW and above metal enclosure.

Power supply voltage	Applicable standard motor (kW)	Inverter model	Outside dimensions (mm)				
			W	H	D	D1	D2
3-phase 400 VAC	0.75	FRN0.75AQ1□-4E	150	465	262	162	100
	1.5	FRN1.5AQ1□-4E					
	2.2	FRN2.2AQ1□-4E					
	4.0	FRN4.0AQ1□-4E					
	5.5	FRN5.5AQ1□-4E					
	7.5	FRN7.5AQ1□-4E					
	11	FRN11AQ1□-4E	203	585			
	15	FRN15AQ1□-4E					
	18.5	FRN18.5AQ1□-4E					
	22	FRN22AQ1□-4E					
	30	FRN30AQ1□-4E	203	645			
	37	FRN37AQ1 □-4E					
	45	FRN45AQ1 □-4E	265	736	284	184	
	55	FRN55AQ1 □-4E					
	75	FRN75AQ1 □-4E	300	885	368	241	127
	90	FRN90AQ1 □-4E					
	110	FRN110AQ1S-4E	530	740	315	135	180
	132	FRN132AQ1S-4E					
	160	FRN160AQ1S-4E		1000	360	180	
	200	FRN200AQ1S-4E					
	220	FRN220AQ1S-4E	680				
	280	FRN280AQ1S-4E					
	315	FRN315AQ1S-4E		1400	440	260	
	355	FRN355AQ1S-4E					
	400	FRN400AQ1S-4E					
	500	FRN500AQ1S-4E	880				
	630	FRN630AQ1S-4E	1000	1550	500	313	187
	710	FRN710AQ1S-4E					

Dimensions



Available as cabinet solution.

For more information, please see page 26.

TYPE CODE

FRN 0.75 AQ1 M - 4 E

- FRN: Series name: FRENIC
- 0.75: Standard applicable motor capacity (kW)
- AQ1: Applied for: AQUA
- M: Protection Structure: S: IP00 M: IP21 L: IP55
- 4: Input power supply: 4: 3-phase 400 VAC
- E: Destination: E (Europe)

CE cULus LISTED EAC

FRENIC-HVAC AR1

FRENIC-HVAC is Fuji Electric's first slim type inverter. It is dedicated to a variety of HVAC applications. This new series follows European trends with keeping high Japanese reliability.

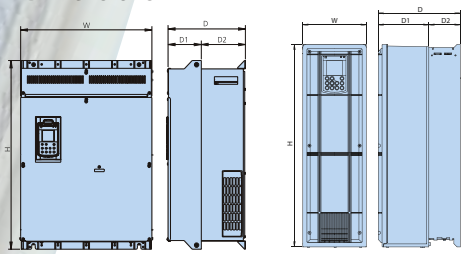
Specific functions to manage fan and compressor applications and new energy saving functions are installed as standard and positioning FRENIC-HVAC as a high performance inverter on the HVAC and compressor market.

- Wide capacity range from 0.75 kW to 710 kW
- IP21 & IP55 with same dimension
- DCR and EMC filter built-in up to 90 kW, built-in EMC filter for all capacities
- Overload capability 110%
- Torque Vector Control
- Modbus RTU, BACnet MS/TP, Metasys N2; integrated as standard
- Large LCD display, 19 languages + user customizable language
- Specific macros for common fan and compressor applications
- Customizable Logic (mini PLC), 14 steps, possibility to manage digital and analog signals Real Time Clock (RTC)
- 4PID sets
- Unit conversion function (kPa, bar, l/min, etc.)
- Fire mode (forced operation) Catch spinning motor
- Password function
- Extension cable for remote operation (CB-…S)
- Battery (OPK-BP)
- SIL2, Pl d
- Sensorless PMSM control mode up to 90 kW (coming soon)

Power supply voltage	Applicable standard motor (kW)	Inverter model	Outside dimensions (mm)				
			W	H	D	D1	D2
3-phase 400V	0.75	FRN0.75AR1□-4E	150	465	262	162	100
	1.5	FRN1.5AR1□-4E					
	2.2	FRN2.2AR1□-4E					
	4.0	FRN4.0AR1□-4E					
	5.5	FRN5.5AR1□-4E					
	7.5	FRN7.5AR1□-4E					
	11	FRN11AR1□-4E	203	585			
	15	FRN15AR1□-4E					
	18.5	FRN18.5AR1□-4E					
	22	FRN22AR1□-4E					
	30	FRN30AR1□-4E	203	645			
	37	FRN37AR1□-4E					
	45	FRN45AR1□-4E	265	736	284	184	
	55	FRN55AR1□-4E					
	75	FRN75AR1□-4E	300	885	368	241	127
	90	FRN90AR1□-4E					
	110	FRN110AR1S-4E	530	740	315	135	180
	132	FRN132AR1S-4E					
	160	FRN160AR1S-4E		1000	360	180	
	200	FRN200AR1S-4E					
	220	FRN220AR1S-4E	680				
	280	FRN280AR1S-4E					
	315	FRN315AR1S-4E		1400	440	260	
	355	FRN355AR1S-4E					
	400	FRN400AR1S-4E					
	500	FRN500AR1S-4E	880				
	630	FRN630AR1S-4E	1000	1550	500	313	187
	710	FRN710AR1S-4E					

□Protective structure: M: IP21, L: IP55. Type of frame: up to 37 kW plastic enclosure, 45 kW and above metal enclosure.

Dimensions



Available as cabinet solution.

For more information, please see page 26.

TYPE CODE

FRN 0.75 AR1 M - 4 E

- FRN: Series name: FRENIC
- 0.75: Standard applicable motor capacity (kW)
- AR1: Applied for: HVAC
- M: Protection Structure: S: IP00 M: IP21 L: IP55
- 4: Input power supply: 4: 3-phase 400 VAC
- E: Destination: E (Europe)

Fuji Electric

FRENIC-Ace-H E2H

NEW

Fuji Electric 3 Year Warranty

FRENIC-Ace-H offers optimum capability in terms of energy saving for HVAC and water pumping applications. Its user friendliness, network compatibility, and long-term reliability are beneficial for long-run performance of systems.

Furthermore, with using customized logic, FRENIC-Ace-H enables to tailor its functionalities for specific requirements at each application.

- Quadruple Rating
- System Protection Functions
  - Slow flow rate
  - Check valve protection
  - Initial acceleration time
  - Over pressure
  - PID alarms
  - Wire break detection
- Water supply and drainage system function
  - Dynamic torque vector control
  - Cascade control (up to 4)
  - PID control (2 PID)
  - Mutual operation (up to 4)
  - Floating method
  - Fire mode
  - Starting mode (Auto search)
  - Auto energy saving
  - Customizable logic, Mini PLC (200 steps)
  - Automatic deceleration
  - Password function
- STO functional safety function as standard: STO SIL 3, Cat 3, PL e
- Built-in EMC filter: Built-in category C2/C3 EMC filter (All types are "E", except for 200 V >30 A: "S" type)
- PM synchronous motor drive: PM motor drive now possible with PM sensorless vector control
- Keypad built-in
- Multi-function keypad (option): Support for 19 languages + 1 customizable language

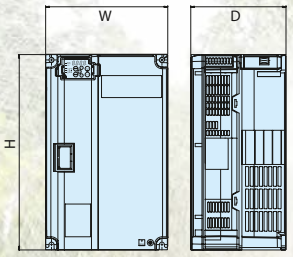
Power supply voltage	Applicable standard motor (kW) HHD*	HND*	HD*	ND*	Inverter model	Outside dimensions (mm) W	H	D
1-phase 200 VAC	0.1	-	-	-	FRN0001E2□-7□H	68	127	85
	0.2	-	-	-	FRN0002E2□-7□H			
	0.4	-	-	-	FRN0003E2□-7□H			107
	0.75	-	-	-	FRN0005E2□-7□H			152
	1.5	-	-	-	FRN0008E2□-7□H	110	130	153
	2.2	-	-	-	FRN0011E2□-7□H	140		
3-phase 400 VAC	0.4	0.75	0.75	0.75	FRN0002E2□-4□H	110	140	162
	0.75	1.1	1.1	1.5	FRN0004E2□-4□H			186
	1.5	2.2	2.2	2.2	FRN0006E2□-4□H	140		199
	2.2	3.0	3.0	3.0	FRN0007E2□-4□H			
	3.7	5.5	5.5	5.5	FRN0012E2□-4□H			
	5.5	7.5	7.5	11	FRN0022E2□-4□H	180	230	158
	7.5	11	11	15	FRN0029E2□-4□H			
	11	15	15	18.5	FRN0037E2□-4□H	220	270	190
	15	18.5	18.5	22	FRN0044E2□-4□H			
	18.5	22	22	30	FRN0059E2□-4□H	250	400	195
	22	30	30	37	FRN0072E2□-4□H			
	30	37	37	45	FRN0085E2□-4□H	326.2	550	261
	37	45	45	55	FRN0105E2□-4□H			
	45	55	55	75	FRN0139E2□-4□H	361.2	615	276
	55	75	75	90	FRN0168E2□-4□H		675	
	75	90	90	110	FRN0203E2□-4□H		740	
	90	110	110	132	FRN0240E2□-4□H	536.4	740	321
	110	132	132	160	FRN0290E2□-4□H			
	132	160	160	200	FRN0361E2□-4□H		1000	366
	160	200	200	220	FRN0415E2□-4□H			
	200	220	220	280	FRN0520E2□-4□H	686.4		
	220	280	250	315	FRN0590E2□-4□H			

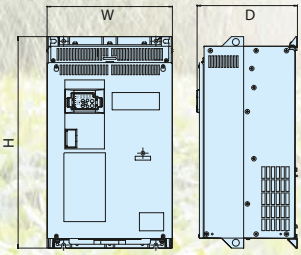
* HHD: 150% 1 min, 200% 0.5 s / HND, ND: 120% 1 min / HD: 150% 1 min

Additional conditions:
- Temperature: at 40°C for HD and ND, at 50°C for HHD and HND
- Carrier frequency: at 4 kHz for HD, ND (from 72 till 168), at 6 kHz for HND (from 72 till 168), at 10 kHz for HHD (from 72 till 168), at 4 kHz for ND, HD, HND (from 203 till 590), at 6 kHz for HHD (from 203 till 590)

□ See type code explanations below.

Dimensions





Available as cabinet solution.
For more information, please see page 26.

TYPE CODE

FRN 0012 E2 E - 4 GA H

- FRN: Series name: FRENIC
- 0012: Applicable rated current at Normal Duty (A)
- E2: Applied for: Ace
- E: Model: E: EMC filter built-in / S: Without EMC filter
- 4: Input power supply: 4: 3-phase 400 VAC / 2: 3-phase 200 VAC / 7: 1-phase 200 VAC (coming soon)
- GA: Destination: E: Europe / GA: Global, with terminal block / GB: Global, without terminal block
- H: Software: Ace-H function

CE cULus LISTED EAC

FVR-Micro **AS1S** NEW

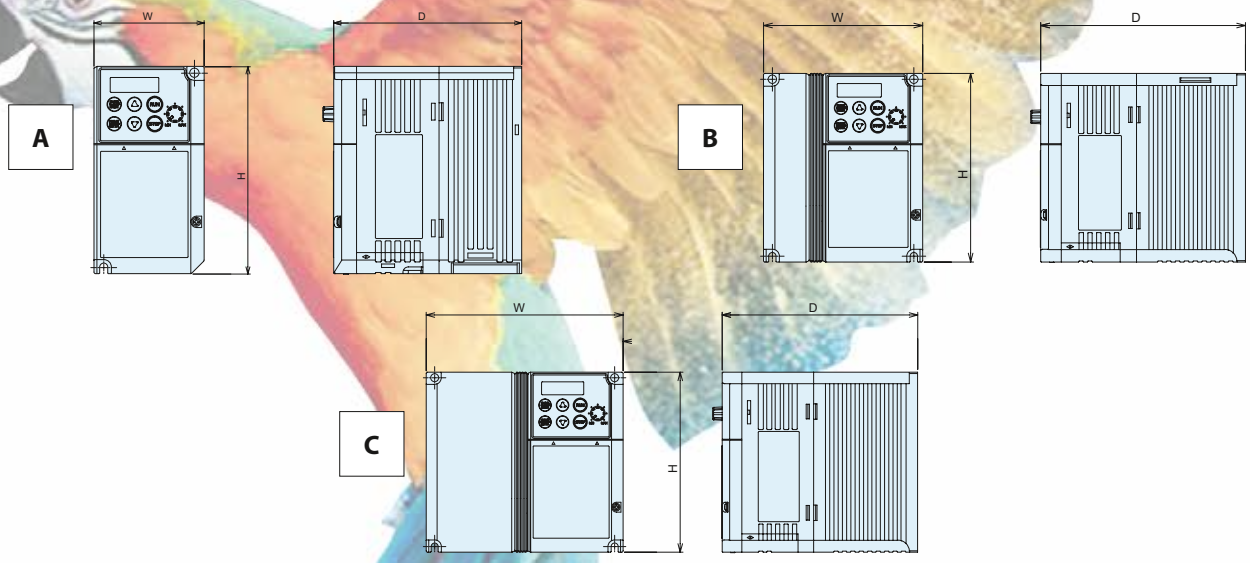
3 Year Warranty

The new version of FVR-Micro (AS1S) combines two major characteristics: it's small and strong. The design is held especially simple, so the user benefits from an easy installation and smooth operations. Its conceptual design ensures saving space and energy, as well as costs. FRENIC-Micro AS1S is a highly economic inverter for general purpose applications. It matches perfectly any application with limited space and where small capacities are needed, such as e.g. conveyor transports, mixer machines, or small wood-working machineries with basic functions.

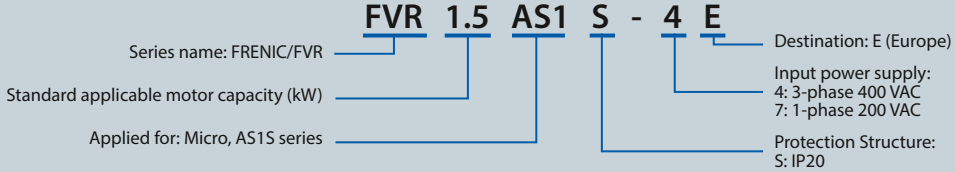
- Capacity range from 0.4 to 3.7 kW
- 3-phase 400 V (0.4 to 3.7 kW)
- Single-phase 200 V (0.4 to 2.2 kW)
- Adoption of control system to minimize motor loss
- Equipped with RS-485 as standard
- PID control function
- Analog input / analog output / multi-stage frequency / jog operation / remote/local
- CE mark and UL/cUL approved standards

Power supply voltage	Applicable standard motor (kW)	Inverter model	Drawing	Outside dimensions (mm)		
				W	H	D
3-phase 400 VAC	0.4	FVR0.4AS1S-4E	B	108	128	139
	0.75	FVR0.75AS1S-4E				
	1.5	FVR1.5AS1S-4E				
	2.2	FVR2.2AS1S-4E				
	3.7	FVR3.7AS1S-4E	C	140		
1-phase 200 VAC	0.4	FVR0.4AS1S-7E	A	68		116
	0.75	FVR0.75AS1S-7E				
	1.5	FVR1.5AS1S-7E	B	108		139
	2.2	FVR2.2AS1S-7E				

Dimensions



TYPE CODE



CE
c UL LISTED
EAC

FRENIC-Ace E2

FRENIC-ACE is the inverter that produces excellent cost-performance with maintaining its high performance through optimal design. With 200 steps of customized logic as a standard feature, it enables users to customize their inverters from simple logistics function to full-scaled programming.

As a standard inverter for the next generation which can be applied to various machines and devices, FRENIC-Ace can be used in almost any type of application from fans and pumps up to specialized machines.

- Customizable logic (mini PLC, 200 steps), superior flexibility
- Quadruple rating
- CAN Open communications built-in as standard
- Wide variety of functions as a standard feature
- Safety enable input STO (compliant to EN/ISO13849-1, SIL3, PI=e, cat. 3)
- 10 years lifetime design
- Optional multifunctional keypad
- Closed loop for IM and Sensorless PMSM control modes

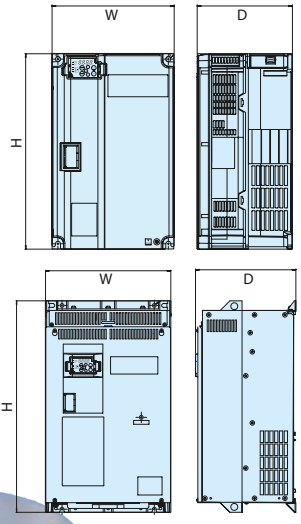
External dimensions with built-in filter except for 5.5 to 15 kW

Power supply voltage	Applicable standard motor (kW) HHD*	HND*	HD*	ND*	Inverter model	Outside dimensions (mm) W	H	D
1-phase 200 VAC	0.1	-	-	-	FRN0001E2☐-7☐	68	127	85
	0.2	-	-	-	FRN0002E2☐-7☐			
	0.4	-	-	-	FRN0003E2☐-7☐			107
	0.75	-	-	-	FRN0005E2☐-7☐			152
	1.5	-	-	-	FRN0008E2☐-7☐	110	130	153
	2.2	-	-	-	FRN0011E2☐-7☐	140		
3-phase 400 VAC	0.4	0.75	0.75	0.75	FRN0002E2☐-4☐	110	140	162
	0.75	1.1	1.1	1.5	FRN0004E2☐-4☐			186
	1.5	2.2	2.2	2.2	FRN0006E2☐-4☐	140		199
	2.2	3.0	3.0	3.0	FRN0007E2☐-4☐			
	3.7	5.5	5.5	5.5	FRN0012E2☐-4☐			
	5.5	7.5	7.5	11	FRN0022E2☐-4☐	180	230	158
	7.5	11	11	15	FRN0029E2☐-4☐			
	11	15	15	18.5	FRN0037E2☐-4☐	220	270	190
	15	18.5	18.5	22	FRN0044E2☐-4☐			
	18.5	22	22	30	FRN0059E2☐-4☐	250	400	195
	22	30	30	37	FRN0072E2☐-4☐			
	30	37	37	45	FRN0085E2☐-4☐	326.2	550	261
	37	45	45	55	FRN0105E2☐-4☐			
	45	55	55	75	FRN0139E2☐-4☐	361.2	615	276
	55	75	75	90	FRN0168E2☐-4☐		675	
	75	90	90	110	FRN0203E2☐-4☐		740	
	90	110	110	132	FRN0240E2☐-4☐	536.4	740	321
	110	132	132	160	FRN0290E2☐-4☐			
	132	160	160	200	FRN0361E2☐-4☐		1000	366
	160	200	200	220	FRN0415E2☐-4☐			
	200	220	220	280	FRN0520E2☐-4☐	686.4		
	220	280	250	315	FRN0590E2☐-4☐			

Note: 3-phase 200 VAC available in a different type code.

* HHD: 150% 1 min, 200% 0.5 s / HND, ND: 120% 1 min / HD: 150% 1 min
Additional conditions:
· Temperature: at 40°C for HD and ND, at 50°C for HHD and HND
· Carrier frequency: at 4 kHz for HD, ND (from 72 till 168), at 6 kHz for HND (from 72 till 168), at 10 kHz for HHD (from 72 till 168), at 4 kHz for ND, HD, HND (from 203 till 590), at 6 kHz for HHD (from 203 till 590)
☐ See type code explanations below.

Dimensions



Available as cabinet solution.
For more information, please see page 26.

TYPE CODE

FRN 0059 E2 S - 4 E

- FRN: Series name: FRENIC
- 0059: Applicable rated current at Normal Duty
- E2: Applied for: Ace
- S: Model: E: EMC filter built-in / S: Without EMC filter
- 4: Input power supply: 4: 3-phase 400 VAC / 2: 3-phase 200 VAC / 7: 1-phase 200 VAC (coming soon)
- E: Destination: E: Europe / GA: Global, with terminal block / GB: Global, without terminal block

FRENIC-Ace for Solar Pumping

NEW

3 Year Warranty

With FRENIC-Ace for Solar Pumping, we offer our contribution for renewable energy control. Water pumping via solar photovoltaic systems uses energy from photovoltaic (PV) panels to power an electrical water pump. FRENIC-Ace controls and handels easily all system relevant functions and acts as the interface between the PV panel and the motor pump.

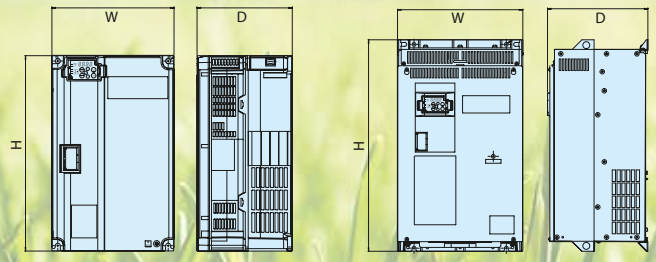
Submersible pumps are mainly used for ground water extraction in the field of irrigation, potable water extraction or livestock watering, which are the target applications. Our optional intelligent monitoring system (IoT) helps to monitor and control the water consumption.

- True and outstanding MPPT function (Maximum Power Point Tracking)
- Start criteria by system conditions and time
- Stop criteria selectable by frequency or power
- Dry pump detection function
- Low power function
- Water tank level control
- It allows to control asynchronous motors and permanent magnets synchronous motors
- Detection of sudden changes of conditions (especially irradiance)
- Two sets of PID gains, for a fast and smooth operation
- Grid connection selectable for maintenance and backup system

Motor (kW)	Motor Voltage [3ph 400 VAC] *AC Power Supply [3ph 400 VAC]*3 DC Voltage Supply [400 to 800 VDC]*		Motor Voltage [3ph 200 VAC] *AC Power Supply [3ph 200 VAC]*3 DC Voltage Supply [180 to 360 VDC]*		Motor Voltage [3ph 200 VAC] *AC Power Supply [1ph 200 VAC]*3 DC Voltage Supply [180 to 360 VDC]*		Dimensions (mm)		
HND*1	Model	[A]*2	Model	[A]*2	Model	[A]*2	W	H	D
0.1					FRN0001E2E-7GA-CLI-SOL	0.8	68	127	112
0.2			FRN0001E2E-2GA-CLI-SOL	1.3	FRN0002E2E-7GA-CLI-SOL	1.6	68	127	112
0.4			FRN0002E2E-2GA-CLI-SOL	2	FRN0003E2E-7GA-CLI-SOL	3.0	68	127	112/127
0.75	FRN0002E2E-4GA-CLI-SOL	1.8	FRN0004E2E-2GA-CLI-SOL	3.5	FRN0005E2E-7GA-CLI-SOL	5	110/68/110	130/127/130	162/127/129
1.1	FRN0004E2E-4GA-CLI-SOL	3.4	FRN0006E2E-2GA-CLI-SOL	6	FRN0008E2E-7GA-CLI-SOL	8	110/68/140	130/127/130	186/152/199
1.5	FRN0006E2E-4GA-CLI-SOL	5	FRN0010E2E-2GA-CLI-SOL	9.6	FRN0008E2E-7GA-CLI-SOL	8	140	130	199
2.2	FRN0006E2E-4GA-CLI-SOL	5	FRN0010E2E-2GA-CLI-SOL	9.6	FRN0011E2E-7GA-CLI-SOL	11	140	130	199
3.0	FRN0007E2E-4GA-CLI-SOL	6.3	FRN0012E2E-2GA-CLI-SOL	12			140	130	199
4	FRN0012E2E-4GA-CLI-SOL	11.1	FRN0020E2E-2GA-CLI-SOL	19.6			140	130	199
5.5	FRN0012E2E-4GA-CLI-SOL	11.1	FRN0020E2E-2GA-CLI-SOL	19.6			140	130	199
7.5	FRN0022E2E-4E-CLI-SOL	17.5	FRN0030E2S-2GB-CLI-SOL	30			181.5/180	285/220	208/158
11	FRN0029E2E-4E-CLI-SOL	23	FRN0040E2S-2GB-CLI-SOL	40			181.5/180	285/220	208/158
15	FRN0037E2E-4E-CLI-SOL	31	FRN0056E2S-2GB-CLI-SOL	56			220/220	332/260	245/190
18.5	FRN0044E2E-4E-CLI-SOL	38	FRN0069E2S-2GB-CLI-SOL	69			220/220	332/260	245/190
22	FRN0059E2E-4E-CLI-SOL	45	FRN0088E2S-2GB-CLI-SOL	88			250	400	195
30	FRN0072E2E-4E-CLI-SOL	60	FRN0115E2S-2GB-CLI-SOL	115			250/250	400/400	195/195
37	FRN0085E2E-4E-CLI-SOL	75					326.2	550	261
45	FRN0105E2E-4E-CLI-SOL	91					326.2	550	261
55	FRN0139E2E-4E-CLI-SOL	112					361.2	615	276
75	FRN0168E2E-4E-CLI-SOL	150					361.2	675	276
90	FRN0203E2E-4E-CLI-SOL	176					361.2	740	276
110	FRN0240E2E-4E-CLI-SOL	210					536.4	740	321
132	FRN0290E2E-4E-CLI-SOL	253					536.4	740	321
160	FRN0361E2E-4E-CLI-SOL	304					536.4	1000	366
200	FRN0415E2E-4E-CLI-SOL	377					536.4	1000	366
220	FRN0520E2E-4E-CLI-SOL	415					686.4	1000	366
280	FRN0590E2E-4E-CLI-SOL	520					686.4	1000	366

1: HND Overload capability: 120% for 1 min at 50°C
2: [A] = Current
3: Grid connection selectable for maintenance and backup system

Dimensions



Available as cabinet solution.
For more information, please see page 26.

TYPE CODE

FRN 0059 E2 E - 4 E - CLI - SOL

- FRN: Series name: FRENIC
- 0059: Applicable rated current at Normal Duty
- E2: Applied for: Ace
- E: Model: E: EMC filter built-in / S: Without EMC filter
- 4: Input power supply (AC connection): 4: 3-phase 400 VAC; 2: 3-phase 200 VAC; 7: 1-phase 200 VAC
- E: Destination: E: Europe / GA: Global, with terminal block; GB: Global, without terminal block
- CLI - SOL: Especially equipped for solar pumping applications

CE
c UL LISTED
EAC

FRENIC-MEGA G1

FRENIC-MEGA, which is the successor of former G11S series and named as a "**M**aximum **E**ngineering for **G**lobal **A**dvantage", is a high performance, multifunctional inverter, gathering the best of Fuji Electric's technologies.

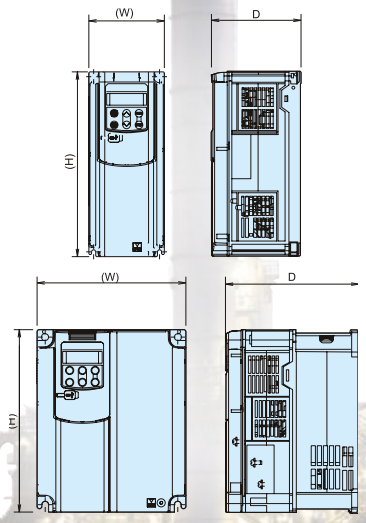
With the flexibility and functionality to support a wide range of applications on all types of mechanical equipment, FRENIC-MEGA combines core capability, responsiveness, environmental awareness, and easy maintenance.

- Safety enable input (compliant to EN/ISO13849- PL=d, cat. 3)
- Built-in EMC filter for all capacities (compliant to EN 61800-3, category C3)
- Sensorless vector control mode (100% torque at 0 Hz)
- Advanced PID functions (dancer control)
- Brake control function
- Logic gates for logic combination of input and output functions and delay timer (10 steps)
- 3 slots for 3 different options at the same time (encoder, fieldbus, I/O expansion)
- Removable control terminals (cage clamp type)
- External EMC filter (footprint up to 22 kW) for higher EMC compliance (EN 61800-3, category C2)
- Basic LED keypad with built-in USB port and copy function (1 complete function set, operation, maintenance and alarms information)
- Advanced LCD/LED keypad with clear text description and copy function (3 complete function sets)
- Positioning function (when encoder option is used)

Power supply voltage	Applicable standard motor (kW)		Inverter model	Outside dimensions (mm)		
	HD*	LD*		W	H	D
3-phase 400 VAC	0.4	-	FRN0.4G1□-4E	110	260	130
	0.75	-	FRN0.75G1□-4E			145
	1.5	-	FRN1.5G1□-4E	150		
	2.2	-	FRN2.2G1□-4E			
	4.0	-	FRN4.0G1□-4E			
	5.5	7.5	FRN5.5G1□-4E	220		195
	7.5	11	FRN7.5G1□-4E			
	11	15	FRN11G1□-4E			
	15	18.5	FRN15G1□-4E	250	400	
	18.5	22	FRN18.5G1□-4E			
	22	30	FRN22G1□-4E			
	30	37	FRN30G1□-4E	326.2	550	261.3
	37	45	FRN37G1□-4E			
	45	55	FRN45G1□-4E	361.2	615	276.3
	55	75	FRN55G1□-4E		675	
	75	90	FRN75G1□-4E			
	90	110	FRN90G1□-4E	535.8	740	321.3
	110	132	FRN110G1□-4E			
	132	160	FRN132G1□-4E	536.4	1000	366.3
	160	200	FRN160G1□-4E			
	200	220	FRN200G1□-4E	686.4		
	220	280	FRN220G1□-4E			
	280	315	FRN280G1□-4E		1400	445.5
	315	355	FRN315G1□-4E			
	355	400	FRN355G1□-4E	886.4		446.3
	400	500	FRN400G1□-4E			
	500	630	FRN500G1□-4E	1006	1550	505.9
	630	710	FRN630G1□-4E			

Protection Structure: E: EMC Filter built-in / S: Standard basic type
*HD: 150% for 1 min, 200% for 3.0 s / LD: 120% for 1 min

Dimensions



Available as cabinet solution.
For more information, please see page 26.

TYPE CODE

FRN 0.75 G1 E - 4 E

- FRN: Series name: FRENIC
- 0.75: Standard applicable motor capacity (kW)
- G1: Applied for: MEGA
- E: Model: E: EMC filter built-in / S: Without EMC filter
- 4: Input power supply: 4: 3-phase 400 VAC / 2: 3-phase 200 VAC
- E: Destination: E (Europe)

FRENIC-Lift LM2A

3 Year Warranty

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 application in the market.

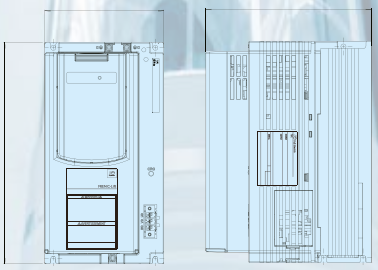
By using the experiences in market, we have now developed the upgraded version of FRENIC-Lift, the LM2A: smaller but smarter.

- Book type frame up to 15 kW Dual Mounting (book type)
- Feed through mounting with IP54 heat sink (book type)
- Removable input and output power terminals (book type)
- Contactorless solution compliant to EN81-20
- Different energy saving levels according to Draft ISO 25745 & VDI 4707
- Easier rescue operation with 24 VDC power supply for control board
- Built-in EMC filter
- Built-in advanced fieldbuses dedicated to lift applications (CANopen CiA DSP 402 & 417, DCP 3 & 4)
- Faster speed and current control loop for easier and faster comfort adjustment
- Removable control terminals
- Two new motor control modes: Vector control with peripheral PG and sensorless vector control for rescue operation (PMSM)
- Several certified functions for safety operation
- New software functions for an easier setup
- Customizable logic capability (PLC function)

Power Supply Voltage	Type	Applied motor current	*Applied motor capacity*	Outside Dimensions (mm)		
				W	H	D
3-phase 400 VAC	FRN0006LM2A-4E	6.1 A	*2.2 kW*	140	260	195
	FRN0010LM2A-4E	10 A	*4.0 kW*			
	FRN0015LM2A-4E	15 A	*5.5 kW*			
	FRN0019LM2A-4E	18.5 A	*7.5 kW*			
	FRN0025LM2A-4E	24.5 A	*11 kW*	160	360	195
	FRN0032LM2A-4E	32 A	*15 kW*			
	FRN0039LM2A-4E	39 A	*18.5 kW*	250	400	195
	FRN0045LM2A-4E	45 A	*22 kW*			
	FRN0060LM2A-4E	60 A	*30 kW*	326.2	550	261.3
	FRN0075LM2A-4E	75 A	*37 kW*			
	FRN0091LM2A-4E	91 A	*45 kW*	361.2	615	276.3
1-phase 200 VAC	FRN0011LM2A-7E	11 A	*2.2 kW*	140	260	195
	FRN0018LM2A-7E	18 A	*4.0 kW*			

Available as wall mounted version.
For more information, please contact your sales representative.

Dimensions



TYPE CODE

FRN 0025 LM2A - 4 E

- FRN: Series name: FRENIC
- 0025: Applicable rated current
- LM2A: Applied for: Lift
- 4: Input power supply: 4: 3-phase 400 VAC
- E: Destination: E: Europe

FRENIC-VG VG1 unit type

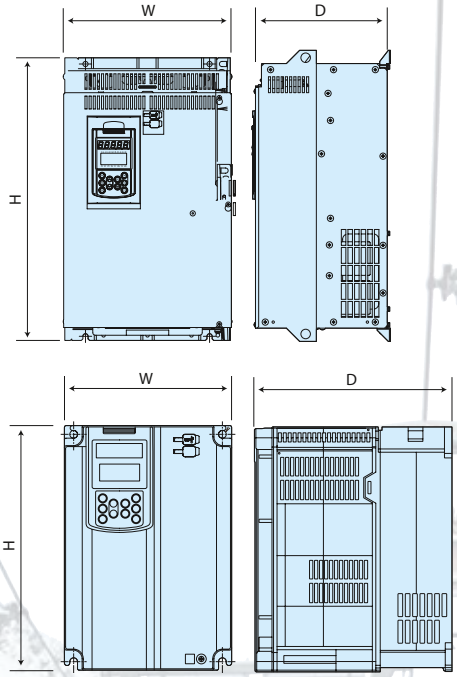
With FRENIC-VG, Fuji Electric has concentrated its technologies to deliver the best-performing inverter on the market. In addition to its basic performance, this model features the following great improvements: support for previously difficult applications due to technical and capability limitations, easier and more user-friendly maintenance, as well as environmental friendliness and safety. With using its vector control, FRENIC-VG unit type will cover various applications which require powerful but also accurate performance.

- Powerful: from 0.75 kW to 630 kW in triple rating HD, LD and MD
- Strong: even in hard environments such as sulfurizing gas, salty environments, dust, humidity, etc.
- Flexible: IM (open and closed loop) and PMSM (open* and closed loop) control
  * *coming soon*
- Torque accuracy: +/- 3%
- Current loop bandwidth: 2000 Hz
- Speed control accuracy: +/- 0,005%
- Speed loop bandwidth: 600Hz
- Connected to the world: USB on board, typical field buses and Ethernet based field bus
- Making safety easier: STO, SS1, SLS, SBC
- All applications solved: Cranes, rubber, paper, winding, test benches, press, shipboard winch, flying shear, positioning, etc are included
- Adaptable and versatile: 5 slots for adjusting to the requirements, real time built in, FULL PLC on board optional, etc.

Power supply voltage	Applicable standard motor (kW)			Inverter model	Outside dimensions (mm)		
	HD*	MD*	LD*		W	H	D
3-phase 400 VAC	3.7	-	-	FRN3.7VG1S-4E	205	300	245
	5.5	-	-	FRN5.5VG1S-4E			
	7.5	-	-	FRN7.5VG1S-4E			
	11	-	-	FRN11VG1S-4E	250	400	
	15	-	-	FRN15VG1S-4E			
	18.5	-	-	FRN18.5VG1S-4E			
	22	-	-	FRN22VG1S-4E			
	30	-	37	FRN30VG1S-4E	326.2	550	261.3
	37	-	45	FRN37VG1S-4E			
	45	-	55	FRN45VG1S-4E	361.2	615	276.3
	55	-	75	FRN55VG1S-4E		675	
	75	-	90	FRN75VG1S-4E		740	321.3
	90	110	110	FRN90VG1S-4E	536.4		
	110	132	132	FRN110VG1S-4E			
	132	160	160	FRN132VG1S-4E		1000	366.3
	160	200	200	FRN160VG1S-4E			
	200	220	220	FRN200VG1S-4E	686.4		
	220	-	280	FRN220VG1S-4E			
	280	315	355	FRN280VG1S-4E		1400	445.5
	315	355	400	FRN315VG1S-4E			
	355	400	450	FRN355VG1S-4E	886.4		446.3
	400	450	500	FRN400VG1S-4E			
	500	-	630	FRN500VG1S-4E	1006	1550	505.9
	630	-	710	FRN630VG1S-4E			

*200 VAC series: HD: 150% 1 min, 200% 3 s / LD: 120% 1 min
400 VAC series: HD: 150% 1 min, 200% 3 s / MD: 150% 1 min / LD: 120% 1 min

Dimensions



TYPE CODE

FRN 30 VG1 S - 4 E

- FRN: Series name: FRENIC
- 30: Nominal applied motor capacity (kW)
- VG1: Applied for: VG, series "1"
- S: Standard type
- 4: Input power supply: 4: 3-phase 400 VAC, 2: 3-phase 200 VAC
- E: Destination: E: Europe

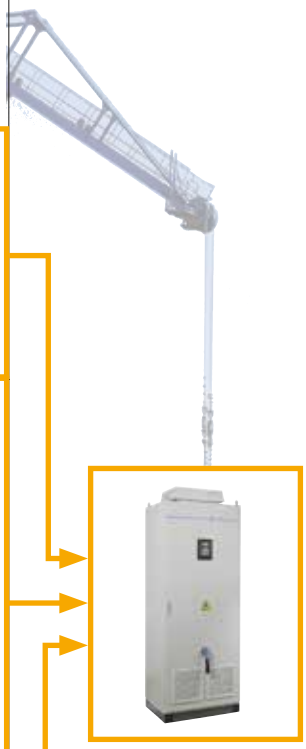
FRENIC-VG VG1 stack type

With FRENIC-VG, Fuji Electric has concentrated its technologies to deliver the best performing inverter on the market.
In addition to its basic performance, this model features the following great improvements: support for previously difficult applications due to technical and capability limitations, easier and more user-friendly maintenance, as well as environmental friendliness and safety. With using its parallel installation, FRENIC-VG stack type will cover various applications which require forceful performance.

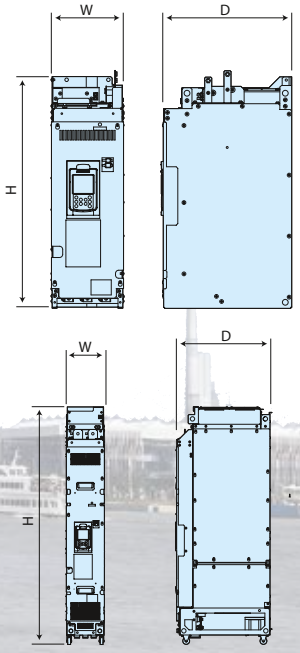
- Powerful: 30 kW to 3 MW in dual rating (MD/LD)
- Regenerative (converter) and non-regenerative (rectifier) headers from 132 kW to 3 MW
- Flexible: IM (open and closed loop) and PMSM (closed loop) control
- Easy to install
- Harmonic distortion mitigation: Sinusoidal-wave Regenerative Header, 12 pulses layout, etc.
- DC bus link sharing: multiple possibilities of power layout
- Redundancy: possible to work at half power in case of maintenance or stack failure
- Non-stop function and other possibilities
- Making safety easier: STO, SS1, SLS, SBC
- 690 VAC series available
- Marine approval DNV-GL

Power supply voltage	No. of units	Applicable standard motor (kW) MD*	LD*	Inverter model	Outside dimensions (mm) W	H	D
3-phase 400 VAC	1	30	37	FRN30SVG1S-4E	226.2	740	406.3
		37	45	FRN37SVG1S-4E			
		45	55	FRN45SVG1S-4E			
		55	75	FRN55SVG1S-4E		880	
		75	90	FRN75SVG1S-4E			
		90	110	FRN90SVG1S-4E			
		110	132	FRN110SVG1S-4E			
	1	132	160	FRN132SVG1S-4E	226.2	1100	567.3
		160	200	FRN160SVG1S-4E			
		200	220	FRN200SVG1S-4E		1400	
		220	250	FRN220SVG1S-4E			
		250	280	FRN250SVG1S-4E			
		280	315	FRN280SVG1S-4E			
		315	355	FRN315SVG1S-4E			
		630	710	FRN630BVG1S-4E **	698.6		
		710	800	FRN710BVG1S-4E **			
		800	1000	FRN800BVG1S-4E **			
	2	355	400	FRN200SVG1S-4E	462.4	1100	567.3
		400	-	FRN220SVG1S-4E		1400	
		-	500	FRN250SVG1S-4E			
		500	630	FRN280SVG1S-4E			
		1000	1200	FRN630BVG1S-4E **	1367.2		
		1200	1200	FRN630BVG1S-4E **			
		-	1500	FRN710BVG1S-4E **			
		1500	1800	FRN800BVG1S-4E **			
	3	630	-	FRN220SVG1S-4E	698.6		
		-	710	FRN250SVG1S-4E			
		-	800	FRN250SVG1S-4E			
		710	-	FRN280SVG1S-4E			
		800	-	FRN280SVG1S-4E			
		-	1000	FRN315SVG1S-4E			
		1800	2000	FRN630BVG1S-4E **	2055.8		
		2000	2400	FRN710BVG1S-4E **			
		2400	1800	FRN800BVG1S-4E **			
NEW 3-phase 690 VAC	1	90	110	FRN90SVG1S-69E	226.2	880	406.3
		110	132	FRN110SVG1S-69E			
		132	160	FRN132SVG1S-69E		1100	567.3
		160	200	FRN160SVG1S-69E			
		200	220	FRN200SVG1S-69E			
		250	280	FRN250SVG1S-69E		1400	
		280	315	FRN280SVG1S-69E			
		315	355	FRN315SVG1S-69E			
		355	400	FRN355SVG1S-69E***			
		400	450	FRN400SVG1S-69E***			
		450	-	FRN450SVG1S-69E***			

* MD: 150% 1 min / LD: 110% 1 min
** One set of the inverter consists of three stacks. The touch panel is connected to the V phase only.
*** Equipped with SiC hybrid module



Available as cabinet solution.
For more information, please see page 26.



TYPE CODE

FRN 30 S VG1 S - 4 E

- FRN: Series name: FRENIC
- 30: Nominal applied motor capacity (kW)
- S: Form: S: Standard stack / B: Stack phase / None: Unit type
- VG1: Applied for: VG, series "1"
- S: S: Standard type
- 4: Input power supply: 4: 3-phase 400 VAC, 69: 3-phase 690 VAC
- E: Destination: E: Europe

Fuji Electric

PWM Converter

RHF-D SERIES

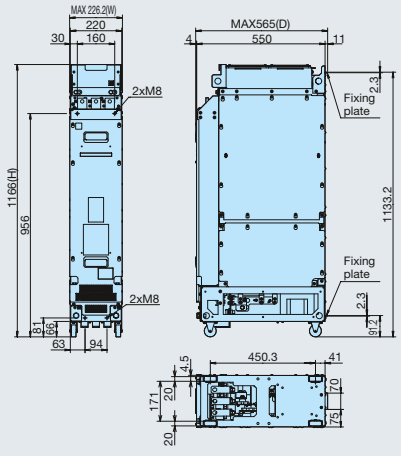
RHF series is the compact solution and dedicated filter for the PWM converter (RHC-D) in the shape of stack type.
Charging circuit, harmonic filter and boosting reaction all in one.

RHF-D table

Series	Filter stack type	Fig.	External dimensions [mm]		
			W	H	D
400 V Series	RHF160S-4D☐	A	226.2	1166	565
	RHF220S-4D☐	A			
	RHF280S-4D☐	B	226.2	1400	565
	RHF355S-4D☐	B			
690 V Series	RHF160S-69D☐	A	226.2	1166	565
	RHF220S-69D☐	B	226.2	1400	565
	RHF280S-69D☐	B			
	RHF355S-69D☐	B			
	RHF450S-69D☐	C	336.2	1400	565

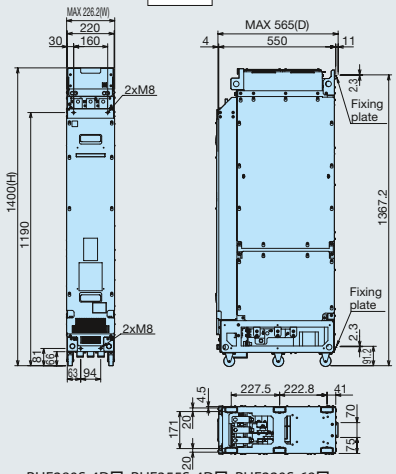
- The RHF-D series is a dedicated filter stack for the high power factor PWM converter with power regenerative function (RHC-D Series).
- This device is used in combination with the RHC-D Series, and peripheral devices (filtering circuit, boosting circuit, charging circuit) required by the PWM converter have been combined into a single unit.
- Peripheral device wire reduction and attachment space saving is possible.
- A stack type with same shape as the inverter (stack type) and PWM converter (RHC-D) has been adopted. This has been effective in making panels more compact.
- 690 VAC Marine Approval:
DNV-GL type approval certificate available for -69 series

A



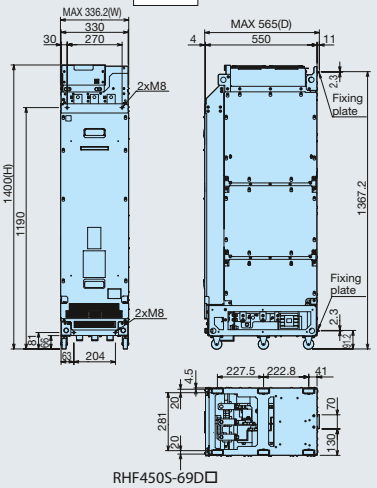
RHF160S-4D☐, RHF220S-4D☐, RHF160S-69D☐

B



RHF280S-4D☐, RHF355S-4D☐, RHF220S-69☐, RHF280S-69D☐, RHF355S-69D☐

C



RHF450S-69D☐

TYPE CODE

RHF 355 S - 4 D E

- RHF: Series name: RHC: PWM CONVERTER / RHD: Diode Rectifier / RHF: Filter for PWM Converter
- 355: Nominal applied motor capacity (kW)
- S: Form: None: Unit type / S: Standard stack / B: Stack by phase
- 4: Input power supply: 4: 3-phase 400 VAC / 69: 3-phase 690 VAC
- D: Developed inverter series: C: C Series / D: D Series
- E: Destination (only with the D series): E: Europe

PWM Converter

RHC-D SERIES

RHC-D series is the active front-end of Fuji Electric in stack type configuration.

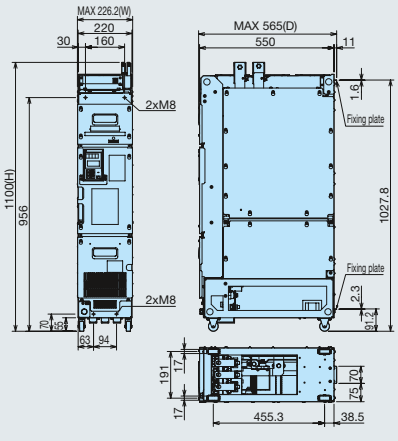
RHC-D table

Series	PWM converter Type	Fig.	Dimensions [mm]		
			W	H	D
400 V series	RHC132S-4D☐	A	226.2	1100	565
	RHC160S-4D☐	A			
	RHC200S-4D☐	A			
	RHC220S-4D☐	B	226.2	1400	565
	RHC280S-4D☐	B			
	RHC315S-4D☐	B			
	RHC630B-4D☐*	C	226.2	1400	567.3
	RHC710B-4D☐*	C			
	RHC800B-4D☐*	C			
690 V series	RHC132S-69D☐	A	226.2	1100	565
	RHC160S-69D☐	A			
	RHC200S-69D☐	A			
	RHC250S-69D☐	B	226.2	1400	565
	RHC280S-69D☐	B			
	RHC315S-69D☐	B			
	RHC355S-69D☐	B			
	RHC400S-69D☐	B			
	RHC450S-69D☐	B			

- Rating available in MD and LD
- Capacity range from 132 kW to 6 MW
- Two configurations available:
  - Standard stack
  - Phase stack
- Able to work with isolated and non-isolated transformers
- Input voltage: 400 VAC or 690 VAC
- Each RHC-D type has its associated RHF
- RHF dimensions are equivalent to RHC-D dimensions
- 690 VAC Marine Approval:
  DNV-GL type approval certificate available for -69 series

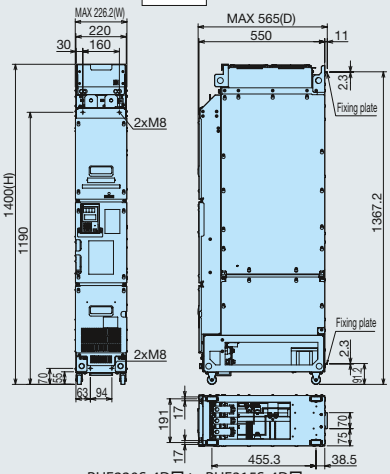
* Each stack corresponds to one phase, and one set of the inverter consists of three stacks. The keypad is only attached to the S phase.

A



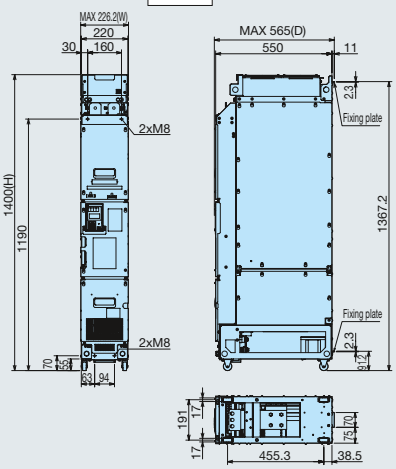
RHF132S-4D☐ to RHF200S-4D☐,
RHF132S-69D☐ to RHF200S-69D☐

B



RHF220S-4D☐ to RHF315S-4D☐,
RHF250S-69D☐ to RHF450S-69D☐

C



RHF630B-4D☐ to RHF800B-4D☐

TYPE CODE

RHC 315 S - 4 D E

- RHC: Series name: PWM CONVERTER / RHD: Diode Rectifier / RHF: Filter for PWM Converter
- 315: Nominal applied motor capacity (kW)
- S: Form: None: Unit type / S: Standard stack / B: Stack by phase
- 4: Input power supply: 4: 3-phase 400 VAC / 69: 3-phase 690 VAC
- D: Developed inverter series: C: C Series / D: D Series
- E: Destination (only with the D series): E: Europe

HMI (Human Machine Interface)

MONITOUCH V9

The biggest revolution on the Graphical User Interfaces

A new concept, a new philosophy, by which every system integrator can heavily access to the latest **VPN and IIoT technologies** offered by the global networking without any specific knowledge.

V9, known as the **Web Machine Interface**, is the new generation of MONITOUCH series which offers compatibility with mobile equipment, advanced use of information through networking, high-speed free-style drawing and optimum operability.

	Model	Display Size	Resolution	Specifications							Sound Output
				Touch Switch	Ethernet (LAN) Ports	Wireless LAN	Serial Ports	SD Card	USB type A & Mini B	VPN	
ADVANCED	V9101iWRLD	10.1"Wide	1024 x 600	Capacitive	2	Yes	3	Yes	Yes	Yes[1]	Yes
	V9100iWRLD			Resistive	2	Yes	3	Yes	Yes	Yes[1]	Yes
	V9101iWLD			Capacitive	2	-	3	Yes	Yes	Yes[1]	Yes
	V9100iWLD			Restistive	2	-	3	Yes	Yes	Yes[1]	Yes
	V9071iWRLD	7"Wide	800 x 480	Capacitive	2	Yes	3[2]	Yes	Yes	Yes[1]	-
	V9070iWRLD			Restistive	2	Yes	3[2]	Yes	Yes	Yes[1]	-
	V9071iWLD			Capacitive	2	-	3[2]	Yes	Yes	Yes[1]	-
	V9070iWLD			Restistive	2	-	3[2]	Yes	Yes	Yes[1]	-
STANDARD	V9150iXD	15"	1024 x 768	Restistive	1	-	3	Yes	Yes	Yes[1]	Yes
	V9150iXLD				2	-	3	Yes	Yes	Yes[1]	Yes
	V9120iSD	12.1"	800 x 600	Restistive	1	-	3	Yes	Yes	Yes[1]	Yes
	V9120iSBD				1	-	3	Yes	Yes	Yes[1]	Yes
	V9120iSLD				2	-	3	Yes	Yes	Yes[1]	Yes
	V9120iSLBD				2	-	3	Yes	Yes	Yes[1]	Yes
	V9100iSD	10.4"	800 x 600	Restistive	1	-	3	Yes	Yes	Yes[1]	Yes
	V9100iSBD				1	-	3	Yes	Yes	Yes[1]	Yes
	V9100iSLD				2	-	3	Yes	Yes	Yes	Yes
	V9100iSLBD				2	-	3	Yes	Yes	Yes[1]	Yes
	V9080iSD	8.4"	800 x 600	Restistive	1	-	3	Yes	Yes	Yes[1]	Yes
	V9080iSBD				1	-	3	Yes	Yes	Yes[1]	Yes
	V9080iSLD				2	-	3	Yes	Yes	Yes[1]	Yes
	V9080iSLBD				2	-	3	Yes	Yes	Yes[1]	Yes
LITE	V9100iCD	10.4"	640 x 480	Restistive	1	-	3	Yes	Yes	Yes[1]	-
	V9100iCBD				1	-	3	Yes	Yes	Yes[1]	-
	V9080iCD	8.4"	640 x 480	Restistive	1	-	3	Yes	Yes	Yes[1]	-
	V9080iCBD				1	-	3	Yes	Yes	Yes[1]	-
	V9060iTD	5.7"	640 x 480	Restistive	1	-	3[2]	Yes	Yes	Yes[1]	-
	V9060iTBD				1	-	3[2]	Yes	Yes	Yes[1]	-

1: VPN (built-in router, licence needed)
2: When optional unit DUR-00 is installed

TYPE CODE V9□□□i□□□□□

Power supply
D: 24V DC

Front case color
B: Black
N/A: Light grey

Extended wired LAN I/F
L: With extended wired LAN I/F
N/A: Without extended wired LAN I/F

Wireless LAN I/F
R: With wireless LAN I/F
N/A: Without wireless LAN I/F

Display device
W: TFT color LCD (10.1" wide type=WSVGA/7.0" wide type = WVGA)
X: TFT color LCD (XGA)
S: TFT color LCD (SVGA)
C: TFT color LCD (VGA)
T: TFT color LCD (VGA)

Interface
i: With a built-in LAN port

Touch switch
0: Resistive
1: Capacitive

Display size
15: 15.0"
12: 12.1"
10: 10.4" (Standard)/ 10.1" widescreen (Advanced)
08: 8.4"
07: 7.0" widescreen (Advanced)
06: 5.7"

HMI (Human Machine Interface)

MONITOUCH TECHNOSHOT

Powerful connectivity on bright TFT colour liquid crystal wide screens

With its sophisticated communication technology, the TECHNOSHOT series accelerates development in all industries. The programmable operation displays in the TECHNOSHOT series are user-friendly and have bright TFT colour liquid crystal wide screens.

Thanks to its powerful connectivity and endless features the TECHNOSHOT panels make the automation life easier.

TS1000

Model	Display Size	Resolution	Specifications							Sound Output
			Touch Switch	Ethernet (LAN) Ports	Wireless LAN	Serial Ports	SD Card	USB type A & Mini B	VPN	
TS1100i	10.2"Wide	800 x 480	Resistive	1	-	3	-	Yes	-	-
TS1070	7"Wide	800 x 480	Resistive	-	-	3	-	Yes	-	-
TS1070i	7"Wide	800 x 480	Resistive	1	-	3	-	Yes	-	-

TS2000

Model	Display Size	Resolution	Specifications							Sound Output
			Touch Switch	Ethernet (LAN) Ports	Wireless LAN	Serial Ports	SD Card	USB type A & Mini B	VPN	
TS2060	5,7"	320 x 240	Resistive	-	-	2	-	Only Mini B	-	-
TS2060i	5.7"	320 x 240	Resistive	1	-	3*	Yes	Yes	-	-

* When optional unit DUR-00 is installed.

TYPE CODE TS1000

TS1□□0□

Display size
07: 7" wide
10: 10.2" wide

Interface
i: with built-in LAN port

TYPE CODE TS2000

TS2060□

i
optional unit DUR-00 and CUR-XX can be attached
SD/SDHC slot: 1 CH
Ethernet: 1 CH
USB type A: 1 port

Cabinet Solution

NEW

3 Year Warranty

For HVAC/AQUA/MEGA/VG/Ace

Building on its technology and experience, Fuji Electric Europe has now developed its customized cabinet solution. Each Fuji Electric Cabinet Solution is designed based on the customer's needs. The customer selects the application, the inverter type, size and options, depending on their requirements and space. The cabinet solution is currently available for the series FRENIC-HVAC, FRENIC-AQUA, FRENIC-MEGA, FRENIC-VG stack, FRENIC-Ace.

- Compact IP54 for cost-efficient installation (IP44 optional on request)
- Up to 710 kW solutions
- EMC filter built-in
- DC Reactor always included
- 4 different cabinet topologies:
  - ❶ inverter alone
  - ❷ inverter + fuses
  - ❸ inverter + main switch
  - ❹ inverter + fuses + main switch
- Height selectable for some power sizes
- Keypad on door
- Up to 3 option cards (several fieldbuses, real time clock backup battery, D I/O, A I/O, Pt 100/1000 options)
- STO SIL2 / SIL3 depending on the series
- Rectifier or Active Front End selectable in case of SVG1S

TYPE CODE

Inverter Selection — *Cabinet Selection*

FRN	450	C	SVG1S	-69	E	OPT-	□	1	□	R	1	D	54	K	22	MD

FRENIC Series

Power (kW)
90
110
132
160
200
220
280
315
355
400
450

Current (A)
240
290
361
415
520
590

Cabinet
C
DC
ADC
SMS

Inverter
SVG1
AR1S
AQ1S
G1E

Inverter
E2E

Voltage
-69
-4

Software Version

Cabinet Options

Output
A
B
C
D
E
F
G

AC Input Configuration
1
2
3
4

DC Input Configuration
1
2
3
4

Door
R
L

Base Height (dm)
0
1
2

Keypad
D
I

IP
54
44

Closing Way
K
L

Cabinet height (dm) (Base or ventilation not included)
10
14
18
20
22

Duty
MD
LD
HHD
HND
HD
ND

NOTES

CONTACT

European Headquarters (Germany)
Fuji Electric Europe GmbH
Goethering 58
63067 Offenbach/Main
Germany
Tel.: +49 69 669029 0
Fax: +49 69 669029 58
info.inverter@fujielectric-europe.com
www.fujielectric-europe.com

Spain
Fuji Electric Europe GmbH
Sucursal en España
C/ Paletes 8, Edifici B, Planta 1, Oficina B
Parc Tecnològic del Vallès
08290 Cerdanyola del Vallès (Barcelona)
Tel.: +34 93 5824333
Fax: +34 93 5824344
info.spain@fujielectric-europe.com
www.fujielectric-europe.com

United Kingdom
Fuji Electric Europe GmbH
Tel.: +44 7 989 090 783
info.uk@fujielectric-europe.com
www.fujielectric-europe.com

Italy
Fuji Electric Europe GmbH
Via Rizzotto 46
41126 Modena (MO)
Tel.: +39 059 4734266
Fax: +39 059 4734294
info.italy@fujielectric-europe.com
www.fujielectric-europe.com

Switzerland
Fuji Electric Europe GmbH
Park Altenrhein
9423 Altenrhein
Tel.: +41 71 85829 49
Fax: +41 71 85829 40
info.swiss@fujielectric-europe.com
www.fujielectric-europe.com

France
Fuji Electric Europe GmbH
265 Rue Denis Papin
38090 Villefontaine
Tel.: +33 4 74 90 91 24
Fax: +33 4 74 90 91 75
info.france@fujielectric-europe.com
www.fujielectric-europe.com

Global Headquarters (Japan)
Fuji Electric Co., Ltd.
Gate City Ohsaki East Tower
11-2 Osaki 1-chome, Shinagawa-ku,
Tokio 141-0032
Japan
Tel.: +81 3 5435 7058
Fax: +81 3 5435 7420
www.fujielectric.com

Fuji Electric