

Variadores multifunción de alto rendimiento

Series **FRENIC-MEGA**



FRENIC-MEGA

FRENIC-MEGA continues to provide the level of quality, robust design, easy to use interface, and competitive price for general-purpose industrial drives for which Fuji Electric is recognized for. However the FRENIC-MEGA series offers more high performance features and functions that are typically only found on “high-end” drives allowing one product family to cover a broader range of applications.

Offered in a capacity range that covers 1/2Hp through 1,000Hp that includes a common interface, common programming and industrial network connectivity the FRENIC-MEGA is exceptionally suited for industrial applications where standardizing on one product across a facility can lead to increased productivity.



HEAVY DUTY: (HD) PAR CONSTANTE

Transportadores, Agitadores, Elevadores, Extrusoras, Molinos, Trituradoras, Troqueladoras, Grúas (Puente, Carro, Gancho), Enrolladora, Cortadora, Trefiladora, etc.

LIGHT DUTY: (LD) PAR VARIABLE

HVAC, Bombas y Ventiladores Centrífugos, Chillers, Sopladores, Aire acondicionado

FRENIC-MEGA

FRENIC-MEGA Model Numbering System Diagram

The diagram illustrates the structure of a FRENIC-MEGA model number, breaking it down into seven components represented by colored boxes and connected to a sample model number by lines.

- Product Code** (Red box): FRENIC Series
- Applicable Horsepower Rating** (Grey box): F50 = 0.5Hp, 007 = 7.5Hp, 040 = 40Hp, 100 = 100Hp, 900 = 900Hp (Model Number Hp Rating Reflects Low Duty Rating)
- Application Range** (Yellow box): G = FRENIC-MEGA High Performance Multifunction
- Development Series** (Green box): 1 = 1st Generation
- Enclosure** (Green box): S = Basic type (IP20/IP00 - UL Open Type)
- Input Power Source** (Blue box): 2 = 230VAC - 3-Phase, 4 = 460VAC - 3-phase, See FRENIC-MEGA Instruction Manual for 1-Phase Input Applications
- Destination/Manual** (Blue box): U = USA/English

The sample model number is: **F**R**N** ### **G** 1 **S** - # U

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Especificaciones

Capacidad (HP)	230 V: 0.5 - 150 HP (LD) 0.5 - 125 HP (HD) 460 V: 0.5 - 1,000 HP (LD) 150 - 700 HP (MD) 0.5 - 900 HP (HD)
Capacidad de sobrecarga	Baja resistencia (LD): 120 % 1 min Resistencia media (MD): 150 % 1 min Resistencia alta (HD): 150 % 1 min, 200 % 3 s
Potencia de entrada	Serie 230 V: Mono/trifásica 200 a 240 V, 50/60 Hz Serie 460 V: Mono/trifásica 380 a 480 V, 50/60 Hz Voltaje: +10 % a -15 % (Desbalance de 2 % o menos) Frecuencia: +5 % a -5 %
Control	Control V/F Control vectorial de par dinámico Control vectorial sin sensor Control vectorial de lazo cerrado
Voltaje de salida	Serie 230 V: Trifásico 200 a 240 V (con función de regulador automático de tensión, AVR) Serie 460 V: Trifásico 380 a 480 V (con función AVR)
Frecuencia de salida	V/F, control vectorial de par dinámico: 500 Hz máximo (HD), 120 Hz (MD, LD) Control vectorial sin sensor: 120 Hz máximo Control vectorial de lazo cerrado: 200 Hz máximo
Estabilidad de salida	Configuración analógica: ± 0.2 % de frecuencia máxima Configuración digital: ± 0.01 % de frecuencia máxima (por teclado)
Par de arranque (lazo abierto)	≤ 30 HP (HD): 200 % a 0.3 Hz ≥ 40 HP (HD): 180 % a 0.3 Hz
Transistor de frenado	≤ 30 HP (HD), 40 HP (LD): Incorporado
Resistor de frenado	≤ 10 HP (HD), 15 HP (LD): Incorporado
Reactor de CC	≥ 75 HP (LD), 100 HP (HD): Viene con variador (externo)
Temperatura ambiente	-10 a 50 °C (14 a 122 °F) para funcionamiento; -25 a 65 °C (-13 a 149 °F) para almacenamiento
Humedad relativa	5 a 95 % HR (sin condensación)
Ubicación de instalación	Grado 2 de polución según el estándar de IEC 60664-1 (Libre de gases corrosivos, gases inflamables, vapor de aceite, polvo y luz solar directa) Solo para uso en interiores
Altitud	$\leq 3,300$ ft (1,000 m), 3,300 ft (1,000 m) a 9,900 ft (3,000 m) con disminución
Carcasa	Tipo abierto según UL, tipo 1 por kit de opciones según NEMA/UL
Seguridad	Categoría 3 según EN ISO13849-1, EN954-1
Estándar	UL, cUL: UL508C, C22.2 N.º 14, EN61800-5:2007 CE: EN61800-5-1 RoHS: 2002/96/EC

Series FRENIC-MEGA

Variadores multifunción de alto rendimiento

Rendimiento

Los variadores FRENIC-MEGA de Fuji Electric son variadores multifunción de alto rendimiento que proporcionan el mayor rendimiento de la industria para aplicaciones de motores trifásicos. Brindan niveles de potencia expandida y configuraciones flexibles que soportan de 1/2 HP hasta 1000 HP. Están diseñados para un funcionamiento continuo con protección de motor integrada y funciones de mantenimiento fundamentales.

Cumplen con los requisitos de varias aplicaciones, logran el menor grado de mantenimiento y una protección mejorada frente a las condiciones ambientales. También poseen la flexibilidad para satisfacer las exigencias de aplicaciones industriales simples y complejas.

Rendimiento del control mejorado con métodos de control disponibles: generador de impulsos, control vectorial de par dinámico; control de lazo cerrado de generador de impulsos y control V/F. También tienen un buen rendimiento en respuesta de corriente, respuesta de velocidad y en la configuración de sobrecarga seleccionable doble o triple.

Aplicaciones y funcionalidad versátiles; poseen niveles de potencia expandidos y cumplen con las normas de seguridad de las directivas RoHS. Tienen un teclado multifunción con un puerto USB opcional y una salida de señal de advertencia para mantenimiento.

Series
FRENIC-MEGA



Características

■ Control de entradas/salidas

- 9 entradas digitales
- 2 entradas de seguridad (especiales)
- 3 entradas analógicas
- 6 salidas digitales; 2 relés (1 forma C y 1 forma A) y 4 transistores; 56 funciones seleccionables
- 2 salidas analógicas; tipo seleccionable; 0 a 10 VCC o 4 a 20 mA configurable para proporcionar señal de salida proporcional a 15 funciones diferentes
- 2 conectores RS-485
- Conectores RJ45 para bloque de terminal de control y puerto de teclado
- Terminal de salida de 24 VCC, 100 mA nominal
- LED de alto rendimiento y teclado LCD con clasificación aprobada tipo 4 según NEMA/UL

■ Diseño resistente

- Barras colectoras enchapadas en estaño (Sn) y níquel (Ni)
- PCB con revestimiento de protección
- Recubrimiento de panel del ventilador de refrigeración y protección antióxido
- Ventilador de refrigeración con vida útil de 10 años y capacitor con señal de alarma de mantenimiento

■ Flexibilidad

- Bloque de terminal de control extraíble
- Software de programación y localización y de solución de problemas de PC
- Lógica personalizable
- 3 puertos de tarjetas opcionales incorporados
- Disipador térmico para montar en la parte trasera de un diseño cerrado

■ Control de motor

- Niveles de potencia múltiples
 - Baja resistencia (LD): 120 % por 1 min
 - Resistencia media (MD): 150 % por 1 min
 - Resistencia alta (HD): 200 % por 3 s/150 % por 1 min
- Control vectorial de lazo cerrado de alto rendimiento con tarjeta opcional
- Control vectorial sin sensor de alto rendimiento
- Transistor de frenado incorporado hasta 40 HP (LD)/30 HP (HD)
- Transistor de frenado incorporado hasta 15 HP (LD)/10 HP (HD)
- Entrada monofásica para todos los modelos

■ Seguridad y estándares

- Entrada de seguridad compatible con EN ISO13849-1, EN954-1, categoría 3
- UL 508C, CE
- Certificación especial UL
- Tipo 1 por kit de opciones según NEMA/UL
- Cumplimiento de la normativa RoHS

General Specifications

Environmental

Enclosure	UL Open Type (IP20/IP00), Optional UL Type 1
Ambient Temperature	+14 to +122°F (-10 to +50°C) - UL Open Type +14 to +104°F (-10 to +40°C) - UL Type 1
Storage Temperature	-13 to +158°F (-25 to +70°C)
Humidity	5% to 95% With No Condensation
Altitude	0 to 3,300 ft. (1,000 m) Without Derating, Derate Output Current for Higher Altitudes per User's Manual

Codes and Standards

UL508C, C22.2 No.14, EN61800-5-1:2007

Electrical

Input Voltage: Range(Hz) - Phase	200-240VAC(50/60Hz) - 3Ph ($\leq 40\text{Hp[LD]}$) 200-220VAC(50Hz), 200-230VAC(60Hz) - 3Ph ($\geq 50\text{Hp[LD]}$) 380-480VAC(50/60Hz) - 3Ph ($\leq 100\text{Hp[LD]}$) 380-440VAC(50Hz), 380-480VAC(60Hz) - 3Ph ($\geq 125\text{Hp[LD]}$)
Input Voltage: Tolerance, Unbalance	3-Ph Input = +10% to -15%, $\leq 2\%$
Input Frequency: Nominal, Tolerance	50/60Hz, +/-5%
Displacement Power Factor	≥ 0.98 (@ Rated Load)
Output Voltage: Range-Phase	0 to Maximum Input Voltage-3Ph
Maximum Output Frequency	500Hz (120Hz for MD/LD Modes)
Motor Control Method	V/f, Dynamic Torque Vector, V/f with Speed Sensor, Dynamic Torque Vector with Speed Sensor, Sensorless Vector, Vector with Speed Sensor
Overload Capacity	<u>LD [Low Duty Mode]</u> = 120% Rated Current for 1 min. <u>MD [Medium Duty Mode]</u> = 150% Rated Current for 1 min. <u>HD [Heavy Duty Mode]</u> = 150% Rated Current for 1 min. & 200% Rated Current for 3 sec.
Analog Inputs	Qty 2: 0 to $\pm 10\text{VDC}$ Qty 1: 4 to 20mA
Digital Inputs	Qty 9: Programmable Inputs Qty 2: Enable/Safe Torque Off Inputs
Analog Outputs	Qty 2: Configurable for 0 to +10VDC or 4 to 20mA, User Selectable for Proportional Analog Signal Functionality
Digital Outputs	Qty 1: Form C (1N.O. & 1N.C.) Dry Contacts Rated 0.3A @ 230VAC Max, User Selectable Functionality Qty 1: Form A (1N.O.) Dry Contact Rated 0.3A @ 230VAC Max, User Selectable Functionality Qty 4: Transistor Output Rated 50mA @ 27Vdc Max, User Selectable Functionality
Power Supply	Qty 1: 24VDC, 100mA Max

The inverter with the highest performance in the industry.
FRENIC-MEGA is a high performance, multifunctional inverter
Fuji Electric has developed by gathering the best of its technologies.
With our own state-of-the-art technology, the control performance has evolved to a new dimension.
FRENIC-MEGA has been developed with unyielding standards of quality and flexibility to meet the demands of both simple and complex industrial applications.
Meeting the requirements for various applications, achieving lower maintenance, and improved protection to environmental conditions.
FRENIC-MEGA, the inverter with the highest performance in the industry, is about to redefine the common sense of general-purpose inverters.
Now, it is ready to provide a solution to your application needs!

Best in class vector control for general-purpose inverters

Powerful Solutions for versatile applications

Expanded power rating with flexible configuration

Connectivity to many industrial networks

Designed for long life cycle with improved maintenance functions

Environmentally Friendly Designed

Global compatibility



Available Models

Nominal applied motor (HP)	Standard Inverter					Nominal applied motor (HP)	Standard Inverter				
	Three-phase 230 V series		Three-phase 460 V series				Three-phase 230 V series		Three-phase 460 V series		
	LD spec (120%)	HD spec (150%)	LD spec (120%)	MD spec (150%)	HD spec (150%)		LD spec (120%)	HD spec (150%)	LD spec (120%)	MD spec (150%)	HD spec (150%)
0.5	FRNF50G1S-2U	FRNF50G1S-2U	FRNF50G1S-4U		FRNF50G1S-4U	100	FRN100G1S-2U	FRN125G1S-2U	FRN100G1S-4U		FRN125G1S-4U
1	FRN001G1S-2U	FRN001G1S-2U	FRN001G1S-4U		FRN001G1S-4U	125	FRN125G1S-2U	FRN150G1S-2U	FRN125G1S-4U		FRN150G1S-4U
2	FRN002G1S-2U	FRN002G1S-2U	FRN002G1S-4U		FRN002G1S-4U	150	FRN150G1S-2U		FRN150G1S-4U	FRN150G1S-4U	FRN200G1S-4U
3	FRN003G1S-2U	FRN003G1S-2U	FRN003G1S-4U		FRN003G1S-4U	200			FRN200G1S-4U	FRN200G1S-4U	FRN250G1S-4U
5	FRN005G1S-2U	FRN005G1S-2U	FRN005G1S-4U		FRN005G1S-4U	250			FRN250G1S-4U	FRN250G1S-4U	FRN300G1S-4U
7.5	FRN007G1S-2U	FRN007G1S-2U	FRN007G1S-4U		FRN007G1S-4U	300			FRN300G1S-4U	FRN300G1S-4U	FRN350G1S-4U
7.5		FRN010G1S-2U			FRN010G1S-4U	350			FRN350G1S-4U	FRN350G1S-4U	FRN450G1S-4U
10	FRN010G1S-2U	FRN015G1S-2U	FRN010G1S-4U		FRN015G1S-4U	350				FRN450G1S-4U	
15	FRN015G1S-2U	FRN020G1S-2U	FRN015G1S-4U		FRN020G1S-4U	400					FRN500G1S-4U
20	FRN020G1S-2U	FRN025G1S-2U	FRN020G1S-4U		FRN025G1S-4U	450			FRN450G1S-4U	FRN500G1S-4U	FRN600G1S-4U
25	FRN025G1S-2U	FRN030G1S-2U	FRN025G1S-4U		FRN030G1S-4U	500			FRN500G1S-4U	FRN600G1S-4U	FRN700G1S-4U
30	FRN030G1S-2U	FRN040G1S-2U	FRN030G1S-4U		FRN040G1S-4U	600			FRN600G1S-4U	FRN700G1S-4U	FRN800G1S-4U
40	FRN040G1S-2U	FRN050G1S-2U	FRN040G1S-4U		FRN050G1S-4U	700			FRN700G1S-4U	FRN800G1S-4U	
50	FRN050G1S-2U	FRN060G1S-2U	FRN050G1S-4U		FRN060G1S-4U	800			FRN800G1S-4U		FRN900G1S-4U
60	FRN060G1S-2U	FRN075G1S-2U	FRN060G1S-4U		FRN075G1S-4U	900			FRN900G1S-4U		FRN1000G1S-4U
75	FRN075G1S-2U	FRN100G1S-2U	FRN075G1S-4U		FRN100G1S-4U	1000			FRN1000G1S-4U		

Specifications (Standard Unit)

Three-phase 230V series

Rating for LD (Low Duty) mode inverters for light load, (HD(High Duty) and MD (Medium Duty) motor rating are available in sales catalog and manual)

Type(FRN□G1S-2U)		F50	001	002	003	005	007	010	015	020	025	030	040	050	060	075	100	125	150	
Nominal applied motor (HP) (Output rating) *1		0.5	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	
Output ratings	Rated capacity (kVA) *2	1.2	2.0	3.2	4.4	7.2	11	13	18	24	30	35	46	58	72	86	113	138	165	
	Rated voltage (V) *3	Three-phase 200 to 240 V (with AVR function)												Three-phase 200 to 230 V (with AVR function)						
	Rated current (A) *4	3	5	8	11	18	27	31.8 (29)	46.2 (42)	59.4 (55)	74.8 (68)	88 (80)	115 (107)	146	180	215	283	346	415	
	Overload capability	150%~1 min, 200%~3.0 s							120%~1 min											
Input power	Voltage, frequency	200 to 240 V, 50/60 Hz												200 to 220 V, 50 Hz, 200 to 230 V, 60 Hz						
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%																		
	Required capacity (with DCR) (kVA) *6	0.6	1.2	2.2	3.1	5.2	7.4	10.0	15.0	20.0	25.0	30.0	40.0	48.0	58.0	71.0	98.0	116	143	
Braking	Torque (%) *7	150%			100%			70%			15%			7 to 12%						
	Braking transistor	Built-in																		
	Built-in braking resistor													—						
		Braking time (s)	5 s						3.7 s		3.4 s		—							
		Duty cycle (%ED)	5	3	5	3	2	2.2		1.4		—								
DC reactor (DCR)		Option															Standard *8			
Applicable safety standards		UL508C, C22.2 No.14, EN61800-5-1:2007																		
Enclosure (IEC60529)		IP20, UL open type												IP00, UL open type						
Cooling method		Natural cooling				Fan cooling														
Weight / Mass lbs (kg)		3.8 (1.7)	4.4 (2.0)	6.2 (2.8)	6.6 (3.0)	6.6 (3.0)	14 (6.5)	14 (6.5)	14 (6.5)	13 (5.8)	21 (9.5)	21 (9.5)	22 (10)	55 (25)	71 (32)	93 (42)	95 (43)	137 (62)	232 (105)	

Three-phase 460V series

Rating for LD (Low Duty) mode inverters for light load, (HD(High Duty) and MD (Medium Duty) motor rating are available in sales catalog and manual) (0.5 to 100 HP)

Type (FRN□□□G1S-4U)		F50	001	002	003	005	007	010	015	020	025	030	040	050	060	075	100				
Nominal applied motor (HP) (Output rating) *1		0.5	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100				
Output ratings	Rated capacity (kVA) *2	1.2	2.0	3.2	4.4	7.2	11	13.1	18.3	24	29	36	48	60	73	89	120				
	Rated voltage (V) *3	Three-phase 380 to 480 V (with AVR function)																			
	Rated current (A)	1.5	2.5	4	5.5	9	13.5	16.5	23	30.5	37	45	60	75	91	112	150				
Input power	Overload capability	150%-1 min, 200%-3.0 s						120%-1 min													
	Voltage, frequency	380 to 480 V, 50/60 Hz																			
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%																			
	Required capacity (with DCR) (kVA) *6	0.6	1.2	2.2	3.1	5.2	7.4	10	15	20	25	29	40	48	58	71	96				
Braking	Torque (%) *7	150%		100%			70%			15%				7 to 12%							
	Braking transistor	Built-in																			
	Built-in braking resistor	Built-in																			
		Braking time (s)	5 s					3.7 s		3.4 s		—									
	Duty cycle (%ED)	5	3	5	3	2	2.2		1.4		—										
DC reactor (DCR)		Option																Standard *8			
Applicable safety standards		UL508C, C22.2 No.14, EN61800-5-1:2007																			
Enclosure (IEC60529)		IP20, UL open type												IP00, UL open type							
Cooling method		Natural cooling				Fan cooling															
Weight / Mass lbs (kg)		3.8 (1.7)	4.4 (2.0)	5.7 (2.6)	6.0 (2.7)	6.6 (3.0)	14 (6.5)	14 (6.5)	14 (6.5)	13 (5.8)	21 (9.5)	21 (9.5)	22 (10)	55 (25)	57 (26)	68 (31)	73 (33)				

(125 to 1000 HP)

Type (FRN□□□G1S-4U)		125	150	200	250	300	350	450	500	600	700	800	900	1000					
Output ratings	Nominal applied motor (HP) (Output rating) *1	125	150	200	250	300	350	450	500	600	700	800	900	1000					
	Rated capacity (kVA) *2	140	167	202	242	300	331	414	518	590	669	765	932	1092					
	Rated voltage (V) *3	Three-phase 380 to 480 V (with AVR function)																	
	Rated current (A)	176	210	253	304	377	415	520	650	740	840	960	1170	1370					
Input power	Overload capability	120%-1 min																	
	Voltage, frequency	380 to 440 V, 50 Hz 380 to 480 V, 60 Hz																	
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%																	
	Required capacity (with DCR) (kVA) *6	114	140	165	199	248	271	347	436	489	547	611	773	871					
Braking	Torque (%) *7	7 to 12%																	
	Braking transistor	—																	
	Built-in braking resistor	—																	
	Braking time (s)	—																	
DC reactor (DCR)	Duty cycle (%ED)	—																	
	Standard *8																		
	Applicable safety standards	UL508C, C22.2 No.14, EN61800-5-1:2007																	
	Enclosure (IEC60529)	IP00, UL open type																	
Cooling method		Fan cooling																	
Weight / Mass lbs (kg)		93 (42)	137 (62)	141 (64)	207 (94)	216 (98)	284 (129)	309 (140)	540 (245)	540 (245)	728 (330)	728 (330)	1169 (530)	1169 (530)					

*1 US-4P standard induction motor *2 Rated capacity is calculated assuming the rated output voltage as 230 V for 230 V series and 460 V for 460 V series. *3 Output voltage cannot exceed the power supply voltage.

*4 To use the inverter with the carrier frequency of 3 kHz or more at the surrounding temperature of 40°C (104°F) or higher, manage the load so that the current comes to be within the rated ones enclosed in parentheses () in continuous running.

*5 Voltage unbalance(%) = $\frac{\text{Max. voltage (V)} - \text{Min. voltage (V)}}{\text{Three-phase average voltage (V)}} \times 67$ (IEC 61800-3)

*6 Required when a DC reactor (DCR) is used.

*7 Average braking torque for the motor running alone, without external braking resistor. (It varies with the efficiency of the motor.)

*8 The FRN100G1S-2U or higher type comes with a DC reactor (DCR).



**Safety
Precautions**

Before using this inverter, carefully read the instruction manual, specifications, etc. or consult us or the shop of purchase to fully understand the correct usage of the inverter.

Fuji Electric Corp. of America

47520 Westinghouse Drive Fremont, CA 94539, U.S.A

Tel.+1-510-440-1060

Fax.+1-510-440-1063 <http://www.fujielectric.com/fecoa>

MOUNTING AND WIRING THE INVERTER

