Fuji Electric

Innovating Energy Technology

Smile to the Environment

FRENIC-HVAC

~ Energy Saving for the environment and our children's future ~

Product Outline and Characteristics of FRENIC-HVAC Series

Wide range of capacity

0.75kW-710kW / 400V

Inverter capacity	EMC filter	DC reactor	Protective structure
0.75kW to 90kW	Built-in	Built-in	IP21/IP55
110kW to 710kW	Built-in	External	IP00

Optimum control by dedicated functions for HVAC usage and energy-saving

- **The following functions are installed as standard: linearization, temperature difference constant control and pressure difference constant control, wet-bulb temperature presumption control, etc.**

User-friendly keypad

*Displays the regulator with the large-size liquid-crystal display.

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

*Possible to show understandable indications through the unit conversion function.
*Multi-language function: 19 languages + user customized language supported

User-friendly, useful functions

- **The following user-friendly, useful functions are installed as standard: real time clock, fire mode (forced operation), filter clogging prevention, anti-jam, user password, etc.**

Countermeasures against noise and harmonics

- **Generation of harmonics is suppressed substantially by the EMC filter and built-in DCR.**

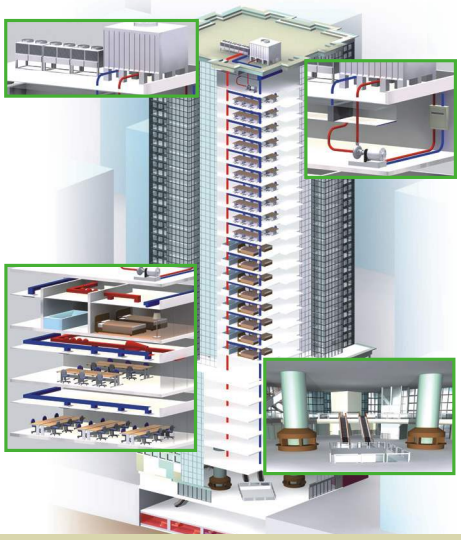
Compliant EMC standard:
- Emission C2 supported (0.75 to 90kW) / C3 supported (110kW to 710kW)
- Immunity 2nd Environment supported (0.75kW to 710kW)

Optimum Control for HVAC Facilities

The first slim-type inverter specialized in energy-saving from Fuji Electric.
Achieves a great effect on energy-saving of pumps!
Contributes drastically to cost reduction by cutting power consumption!

Using an inverter achieves high energy-saving effect. More and more HVAC (heating, ventilation, and air-conditioning) facilities have been introducing the inverter for their fan pump usage promptly and the higher function and performance are demanded for the inverter in the market. The FRENIC-HVAC series, a Fuji's new product, is optimum for energy-saving of the fan pump. It cuts waste by adjusting the flow rate, being fully utilized in saving electricity with energy-saving and in cost reduction.

Application • Cooling pump •Ventilation fan •Freezing machine
• Water supply/distribution pump •Cooling tower •AHU



Significant Energy Saving Realized!!

For an air-conditioning heat source system, the needed quantity of the cooling or heating water fluctuates generally in seasons or days and nights. Therefore, operations continuing in a water conveyance pressure constant control may lead to high operating unnecessary pressures on terminals at low operating state. Thus, the pump consumes an ineffectual electric power for maintaining the high water conveyance pressure.
FRENIC-HVAC can perform an estimated terminal pressure control by linearization function which estimates target pressure from load flow rate.
It is possible to reduce the ineffectual pump power consumption and to achieve a great energy-saving effect together with maintaining comfortable current air conditioning.

Standard specifications

3-phase, 400 V series (0.75 to 710 kW)

Item			Specifications												
Model	FRN□□□AR1□-4E : HVAC		0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
Applicable standard motor (rated output) [kW] *1			0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
Output ratings	Rated capacity [kVA] *2		1.9	3.1	4.1	6.8	10	14	18	24	29	34	45	57	69	85
	Voltage [V] *3		3-phase, 380 to 480 V (with AVR function)													
	Rated current [A]		2.5	4.1	5.5	9.0	13.5	18.5	24.5	32	39	45	60	75	91	112
	Overload current rating		110 % -1 min (Overload tolerated interval: compliant with IEC 61800-2)													
	Rated frequency [Hz]		50, 60 Hz													
Input Power Supply	Main power supply (No. of phase, voltage, freguency)		3-phase, 380 to 480 V, 50/60 Hz													
	Control power supply auxiliary-input (No. of phase, voltage, freguency)		Single phase 380 V ~ 480 V, 50/60 Hz													
	Voltage, frequency variations		Voltage: +10 to -15 % (Unbalance rate between phases is within 2 %) *4 Frequency : +5 to -5 %													
	Rated input current [A]		1.6	3.0	4.3	7.4	10.3	13.9	20.7	27.9	34.5	41.1	55.7	69.4	83.1	102
	Required power supply capacity [kVA]		1.2	2.1	3.0	5.2	7.2	9.7	15	20	24	29	39	49	58	71
Braking	Braking torque [%] *5		20										10 to 15			
	DC braking		Braking starting frequency: 0.0 to 60.0 Hz, Braking time: 0.0 to 30.0s, Braking level: 0 to 60%													
EMC filter (IEC/EN61800-3:2004)			Compliant with EMC standard: Emission: 1st Env. (Category C2) / Immunity: 1 st and 2nd Env.													
DC reactor (DCR)			Built-in (IEC/EN61000-3-2, IEC/EN61000-3-12)													
Compliant with Electrical Safety Standards			UL508C, C22.2No.14, IEC/EN61800-5-1:2007													
"#" Enclosure (IEC/EN60529)			IP21/IP55													
Cooling method			Natural cooling			Fan cooling										
Weight/Mass [kg]		IP21/IP55	10	10	10	10	10	10	18	18	18	18	23	23	50	50

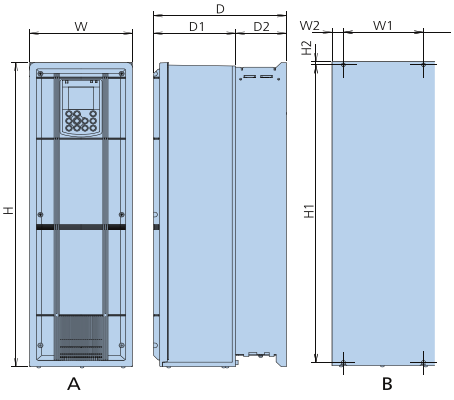
Item			Specifications												
Model	FRN□□□AR1□-4E : HVAC		75	90	110	132	160	200	220	280	315	355	400	500	630	710
Applicable standard motor (rated output) [kW] *1			75	90	110	132	160	200	220	280	315	355	400	500	630	710
Output ratings	Rated capacity [kVA] *2		114	134	160	192	231	287	316	396	445	495	563	731	891	1044
	Voltage [V] *3		3-phase, 380 to 480V (with AVR function)													
	Rated current [A]		150	176	210	253	304	377	415	520	585	650	740	960	1170	1370
	Overload current rating		110% -1min (Overload tolerated interval: compliant with IEC 61800-2)													
	Rated frequency [Hz]		50, 60Hz													
Input Power Supply	Main power supply (No. of phase, voltage, freguency)		3-phase, 380 to 480V, 50/60Hz													
	Control power supply auxiliary-input (No. of phase, voltage, freguency)		Single phase 380 V ~ 480 V, 50/60 Hz													
	Voltage, frequency variations		Voltage: +10 to -15% (Unbalance rate between phases is within 2%) *4 Frequency : +5 to -5%													
	Rated input current [A]		136	162	201	238	286	357	390	500	559	628	705	881	1115	1256
	Required power supply capacity [kVA]		95	113	140	165	199	248	271	347	388	436	489	611	773	871
Braking	Braking torque [%] *5		10 to 15													
	DC braking		Braking starting frequency: 0.0 to 60.0Hz, Braking time: 0.0 to 30.0s, Braking level: 0 to 60%													
EMC filter (IEC/EN61800-3:2004)			same as 0.75 to 55 Kw	Compliant with EMC standard: Emission: 2nd Env. (Category C3) / Immunity: 1 st and 2nd Env.												
DC reactor (DCR)			Built-in	Standard accessory (IEC/EN61000-3-2, IEC/EN61000-3-12)												
Compliant with Electrical Safety Standards			UL508C, C22.2No.14, IEC/EN61800-5-1:2007													
"#" Enclosure(IEC/EN60529)			IP21/IP55	IP00												
Cooling method			Fan cooling													
Weight/Mass [kg]		IP21/IP55	70	70												
		IP00			62	64	94	98	129	140	245	245	245	330	530	530

*1) Applicable standard motors are the case of Fuji Electric's 4-pole standard motors.
*2) The rated capacity indicates the case of 440 V ratings.
*3) Output voltage cannnot exceed the power supply voltage.
*4) Interphase voltage unbalance ratio [%] = (max. voltage [V] - min. voltage [V])/3-phase average voltage [V] × 67 (See IEC61800-3.) When unbalance ratio is between 2 and 3 % please use optional AC reactor (ACR).
*5) Average braking torque obtained by use of a motor.(Varies with the efficiency of the motor)

Outline drawing

Power supply voltage	Applicable standard motor (kW)	Inverter model	Outside dimensions (mm)						Mounting dimensions (mm)				
			Drawing	W	H	D	D1	D2	Drawing	W1	W2	H1	H2
3-phase 400 V	0.75 ~ 7.5	FRN0.75 ~7.5AR1 □ -4E	A	150	465	262	162	100	B	115	17.5	451	7
	11 ~ 22	FRN11~22AR1 □ -4E		203	585	262	162	100		158	22.5	571	7
	30 ~ 37	FRN30~37AR1 □ -4E		203	645	262	162	100		158	22.5	631	7
	45 ~55	FRN45~55AR1 □ -4E		265	736	284	184	100		180	42.5	716	12
	75 ~ 90	FRN75~90AR1 □ -4E		300	885	368	241	127		215	42.5	855	15
	110 ~ 132	FRN110~132AR1 □-4E		530	740	315	135	180		430	50	710	15
	160 ~ 200	FRN160~200AR1 □-4E		530	1000	360	180	180		430	50	970	15
	220 ~ 280	FRN220~280AR1 □-4E		680	1000	360	180	180		580	50	970	15
	315 ~ 355	FRN315~355AR1 □-4E		680	1400	440	260	180		580	50	1370	15
	400 ~ 500	FRN400~500AR1 □-4E		880	1400	440	260	180		720	50	1370	15
	630 ~ 710	FRN630~710AR1 □-4E		1000	1550	500	313	186		900	50	1520	15

□ (Protective structure) : M : IP21, L : IP55



Option

USB port equipped, three types of optional board can be mounted!!

- Relay output card (2 x 1c)/(7 x 1a)
- Analog input/output interface card
- Pt100 temperature sensor input card
- PROFIBUS-DP communication card
- CC -Link communication card
- LONWORKS communication card
- DeviceNet communication card
- CANopen communication card
- Ethernet communication card

*BACnet MS/TP , Modbus RTU, Metasys N2 are equipped as standard.

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