

Smile to the Environment

FRENIC-AQUA

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

Product Outline and Characteristics of FRENIC-AQUA Series

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



The water business market including water purification plants and wastewater plants has continued to grow in recent years. Using a large volume of water, cost reduction is required and it largely depends on how efficiently water can be managed. It is of course achieved by reducing the amount of water to be used, however, the reduction in power consumption in water transfer and supply also allows significant cost reduction. And the key to that is the dedicated inverter which controls pumps and motors. The FRENIC-AQUA series, a Fuji's new product, helps energy-saving of pumps, eliminating ineffectual operations by adjusting the amount of water properly to produce a significant effect both on electricity conservation and on cost reduction.

User-friendly keypad

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

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



*Possible to show understandable indications through the unit conversion function.

*Multi-language function: 19 languages + user customized language supported

Wide range of capacity

0.75 kW - 710 kW / 400 V

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

Optimum control by dedicated functions for water treatment usage

- The following functions are installed as standard: cascade operation, rotary operation, customized logic, drought protection, high-frequency operation detection, etc.

Comfort control by energy-saving functions

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

User-friendly, useful functions

- The following user-friendly, useful functions are featured as standard: real time clock, fire mode (forced operation), 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 90 kW) / C3 supported (110 kW to 710 kW)
 - Immunity 2nd Environment supported (0.75 kW to 710 kW)

Innovative functions

Rotary operation

Inverters are connected via communications; by which the system is configured without using a controller.

Customized logic

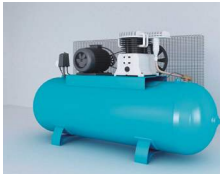
The customized logic interface function is adopted in the inverter body. This allows the logic circuit and arithmetic circuit to be built with the digital and analog input/output signals, which processes the signals as necessary to generate the simple relay sequence.

Optimum for Various Applications in Water Business

Fan pump



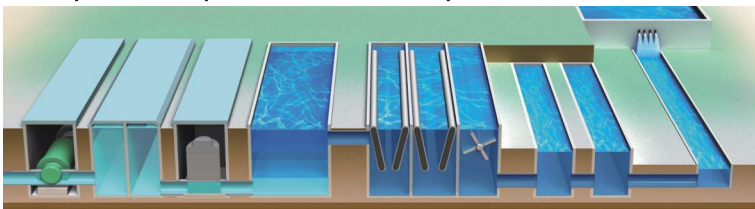
Compressor



Oil pump system



Water purification plant and wastewater plant



Standard specifications

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

Item		Specifications															
Model	FRN□□□AQ1 # -4E : AQUA	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, frequency)	3-phase, 380 to 480 V, 50/60 Hz															
	Control power supply auxiliary-input (No. of phase, voltage, frequency)	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: 1st 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

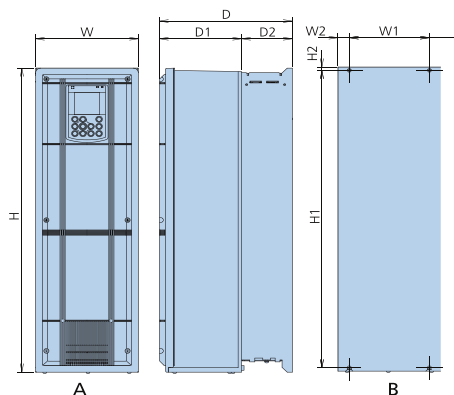
Item		Specifications															
Model	FRN□□□AQ1 # -4E : AQUA	75	90	110	132	160	200	220	280	315	355	400	500	630	710		
Applicable standard motor (rated output) [kW] **1		75	90	110	132	160	200	220	280	315	355	400	500	630	710		
Output ratings	Rated capacity [kVA] **2	114	134	160	192	231	287	316	396	445	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, frequency)	3-phase, 380 to 480V, 50/60Hz															
	Control power supply auxiliary-input (No. of phase, voltage, frequency)	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: 1st 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. *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).
 *2) The rated capacity indicates the case of 440 V ratings. *5) A average braking torque obtained by use of a motor. (Varies with the efficiency of the motor)
 *3) Output voltage cannot exceed the power supply voltage.

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	FRN0.75~7.5AQ1 □-4E	A	150	465	262	162	100	B	115	17.5	451	7
	11 ~ 22	FRN11~22AQ1 □-4E		203	585	262	162	100		158	22.5	571	7
	30 ~ 37	FRN30~37AQ1 □-4E		203	645	262	162	100		158	22.5	631	7
	45 ~ 55	FRN45~55AQ1 □-4E		265	736	284	184	100		180	42.5	716	12
	75 ~ 90	FRN75~90AQ1 □-4E		300	885	368	241	127		215	42.5	855	15
	110 ~ 132	FRN110~132AQ1 □-4E		530	740	315	135	180		430	50	710	15
	160 ~ 200	FRN160~200AQ1 □-4E		530	1000	360	180	180		430	50	970	15
	220 ~ 280	FRN220~280AQ1 □-4E		680	1000	360	180	180		580	50	970	15
	315 ~ 355	FRN315~355AQ1 □-4E		680	1400	440	260	180		580	50	1370	15
	400 ~ 500	FRN400~500AQ1 □-4E		880	1400	440	260	180		720	50	1370	15
	630 ~ 710	FRN630~710AQ1 □-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.