

FRENIC4000VM6/FM6



Compatible with VM5R and FM5R. Improved performance and reliability.

Enhanced safety by supporting IEC and new JIS standards*

Conforming to IEC standards enables these inverters to be utilized in a wide range of overseas plants. In addition, these products also comply with the JIS standards revised in July 2019 following the enforcement of the Industrial Standardization Law. Plant protective functions have been enhanced.

Supports ultra high-speed E-SX bus network loop with various communication connectability (option)

Adapts to Fuji Electric's original ultra high-speed E-SX bus. When used in combination with the XCS-3000 Type E specialized controller, a network loop can be constructed for improved reliability. The communication options of the former FRENIC4000VM series models is also supported.

Expanded trace functions. Improved usability

The sampling range before and after a fault occurs is expanded by a low-speed trace function. In addition, a variety of functions such as Excel chart output and 1 ms real-time chart display on the loader have been added. Support tools such as analog output for charts, a personal computer loader, and a high-speed data acquisition system have also been enhanced.

Compatible with VM5R dimensions and interface (option)

Selecting the optional FRENIC4000VM5R compatible VM6 series, it makes possible to renew partially to install the existing VM5R panel without modification.

Note: - VM6 or FM6 specialized loader (FLOAD V8) is required.

- This product is equivalent to the former standard.



* IEC standards (support available soon): IEC 60204-1:2016, IEC 61800-3:2017, IEC 61800-5-1:2007+A1:2016
New JIS standards: JIS B 9960-1:2019, JIS C 61800-5-1:2016, JIS C 4421:2008



Inherits the outstanding maintainability of the VM5R series

All the inverter devices can be maintained from the front of the panels. Also, the individual cooling fans in the inverter and converter units have been eliminated, and only fans in the panels (panel top fans) are used for cooling. This arrangement of fans reduces the amount of maintenance work required.

Enables highly efficient plant operations

Utilizes a DC power distribution system that can transfer powering energy and regenerative energy via a common DC bus for greater plant operation efficiency.

Space-saving, multi-stage unit structure adopted

Utilizes a multi-stage unit structure for mounting inverters of up to 300 kVA capacity.

Up to 12 inverters can be mounted per panel, enabling significant space savings. In addition, units of different sizes, and vector (VM6) and V/f controls (FM6) can be combined*.

* The vector control (VM6) and V/f control (FM6) units are the same size.

Equipped with a touch panel with liquid crystal display

Setting, running, monitoring, and maintenance operations can be performed using the touch panel on the front of the unit.

Extensive plant control functions

Equipped with various useful plant control functions that are based on our experience in plant installations to date.

Specifications

VM6/FM6

Common specifications

(*): Option

Type			Common to FRENIC4000VM6/FM6
Main circuit system			Voltage-type IGBT sine wave PWM inverter
Output voltage			3-phase, 400 V AC
Overload capability			150% for 1 min
Control function	Start/stop	Key operation	Touch panel (*), Loader (*)
		External signal	Contact input, Analog input (±10 V)
		Communication link operation	E-SX bus (*), SX bus (*), T-link (*), PROFIBUS-DP (*)
	Contact input		15 built-in points (14 points selectable)
	Speed setting		Various communication links, External signals, Touch panel, Loader (*) key operation
	Operation status signal		· 7 points with built-in relay output (6 points selectable) · Analog output (3 built-in points + 4 externally mounted points*)
	Rotating motor pickup		The rotating motor is picked up in inverter operation (SY0).
	Restart after momentary power failure		Inverter is restarted without stopping the motor.
	Touch panel		Each constant setting, Startup conditions, Control data digital display, Fault cause display, Fault point data display
	Loader (*)		Setting item, Startup conditions, Control data digital display, Fault cause display, Fault trace data display (*1), Real-time chart fault guidance
	Analog output		Analog output of arbitrary control data
	Charge lamp		Comes on when residual voltage (25 V DC or larger) is in the main circuit.
	Protection	Protection level	
Overvoltage		Actuated when the DC main circuit voltage exceeds 790 V DC	
Undervoltage		On detecting undervoltage of DC intermediate voltage, inverter stops.	
Overheat		Protects the inverter by detecting the temperature of the heat sink inside the inverter.	
Short-circuit		Detected by "overcurrent."	
Overcurrent		Actuated when the output current peak value exceeds the overcurrent level (fixed).	
Ground fault		By the operation of the converter side ground fault detection relay, inverter stops.	
Motor (*2)		Protected by electronic thermal function and temperature detection. "Overload", "Motor overheat", "Startup congestion", "Overspeed"	
EN terminal (STO)		Safety features: Safety torque off Releases torque from the motor immediately (output differential)	
Environment	Installation location		Indoors, Free from corrosive gas, inflammable gas, dust, or explosive gas
	Ambient temp.		0 to +40°C
	Ambient humidity		20 to 90% RH (no condensation)
	Cooling method		Forced air-cooled system
	Altitude		Up to 1000 m
	Vibration		4.9 m/s ² or lower (at 10 to 50 Hz)
	Storage (ambient temp.)		-5 to +40°C
Panel structure			Maintainable from the front, IP20
Applicable standard			IEC Standards, JIS Standards (Japanese Industrial Standards) Note: When a PWM converter is being used.

(*1): Saves and displays control data of 225 points for the past four 1 ms samplings.
Saves 100 fault traces.

(*2): Only VM6 has the function of "motor overheat" and "overspeed" protection.

Individual specifications

(*): Option

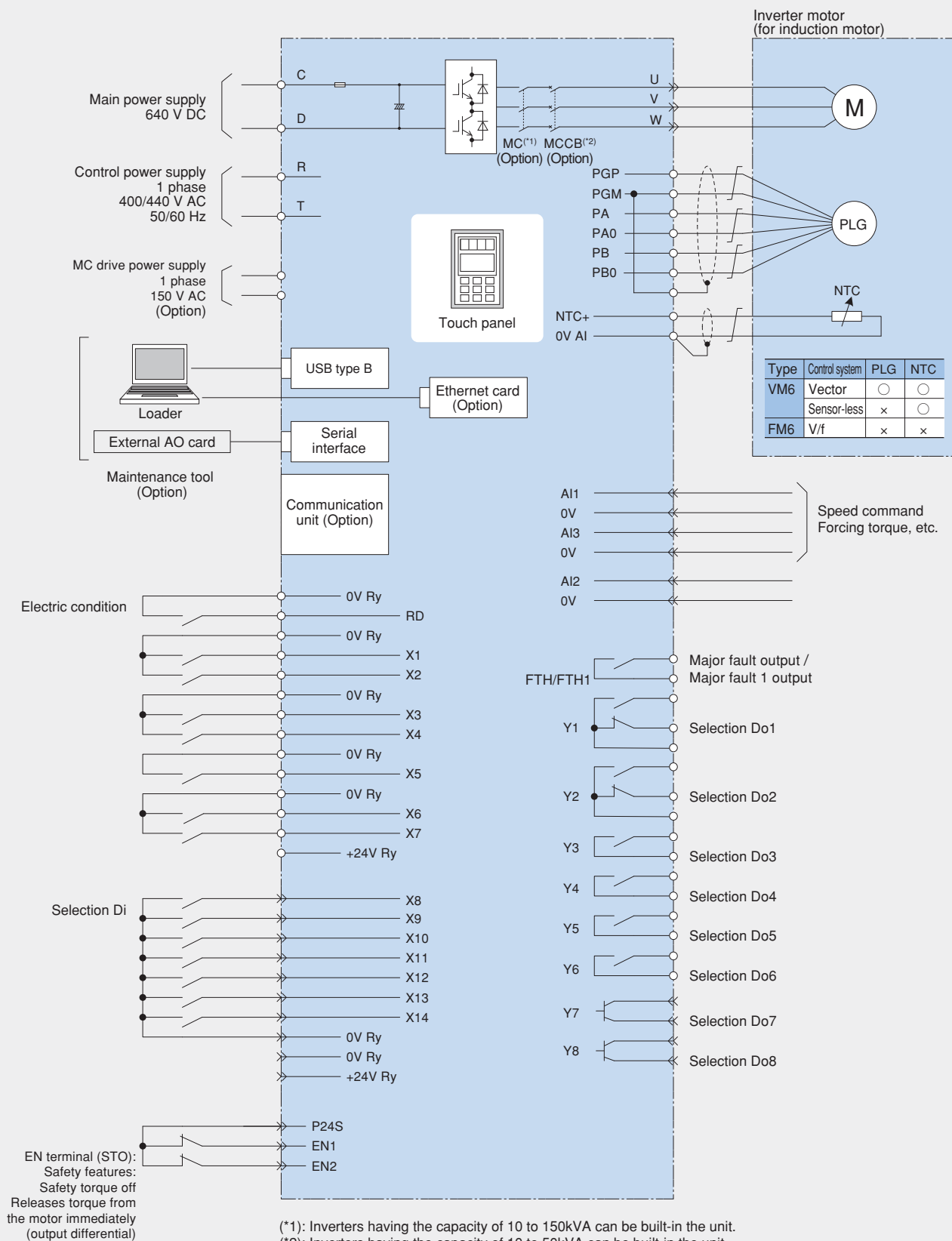
Type		FRENIC4000VM6		
Motor control system		•Vector control •Sensor-less vector control		
Function	Speed control	ASR fixed cycle 1 ms		
	Vector control	Maximum speed	200 Hz on inverter output frequency basis	
		Control range	1:1000	
		Control response	40 Hz (mechanical systems not included)	
		Speed control accuracy	±0.005% of the maximum speed	
		PG frequency	100 kHz or lower	
		Torque accuracy	±5% of the rated torque, ±3% (*)	
	Sensor-less vector control	Maximum speed	200 Hz on inverter output frequency basis	
		Control range	1: 100 (0.5 Hz or larger)	
		Control response	4 Hz (mechanical systems not included)	
		Speed control accuracy	±0.5% of the maximum speed	
		Torque accuracy	±5% of the rated torque	
	Setting resolution	±0.005% of the max. speed (20000d/100%)		
	Acceleration/ deceleration time	0 to 550.00 s Linear (break point) acceleration/deceleration Acceleration/deceleration settable by communication 2 types of deceleration for emergency stop		
	Control function	Multiplex winding motor driving	Up to 18 windings (6 multiplexing) without the output reactor	
		Start/stop operation selection	The timing for releasing the brake or starting ASR can be controlled by 3 different signals (SY1, 2 and 3 by communication)	
		Droop control	Torque drooping characteristics according to the speed. A fixed drooping type or speed command proportional type.	
		Torque control	Torque limit (2 types of communication) Torque compensation (Communication 2 types + analog input 1 point) Mechanical loss torque is compensated by polygonal approximation with set value (forward/reverse: 14 points)	
		Torque bias	Analog torque setting, Communication torque setting (2 lines), Mechanical loss pattern, etc.	
		Observer	Load disturbance observer Vibration suppression observer	
		Acceleration/ deceleration forcing	Upon calculating the acceleration/deceleration torque based on the moment of inertia J and acceleration	
		Backlash compensation	Compensates backlash during mechanical drive by several motors	
		Higher setting	Sets the speed higher than normal to cope with load impact	
		ω2 lock	Applies an electromagnetic brake during excitation to prevent the motor from needless rotation	
		di/dt limitation	Limits the gradient of the torque current command	

Type		FRENIC4000FM6
Motor control system		V/f controlled AVR
Function	Output frequency	2.5 to 200 Hz
	Frequency control range	1:80
	Frequency control accuracy	±0.01% of the maximum frequency
	Field control range	1:4
	Restart after momentary power failure	Inverter is restarted without stopping the motor.

Communication options

Card name	Use
E-SX bus card	Connects the inverter with the host PLC via E-SX bus
SX bus card	Connects the inverter with the host PLC via SX bus
T-link card	Connects the inverter with the host PLC via T-link
PSB card	Connects the inverter with the host PLC via PROFIBUS-DP

Standard interface VM6/FM6

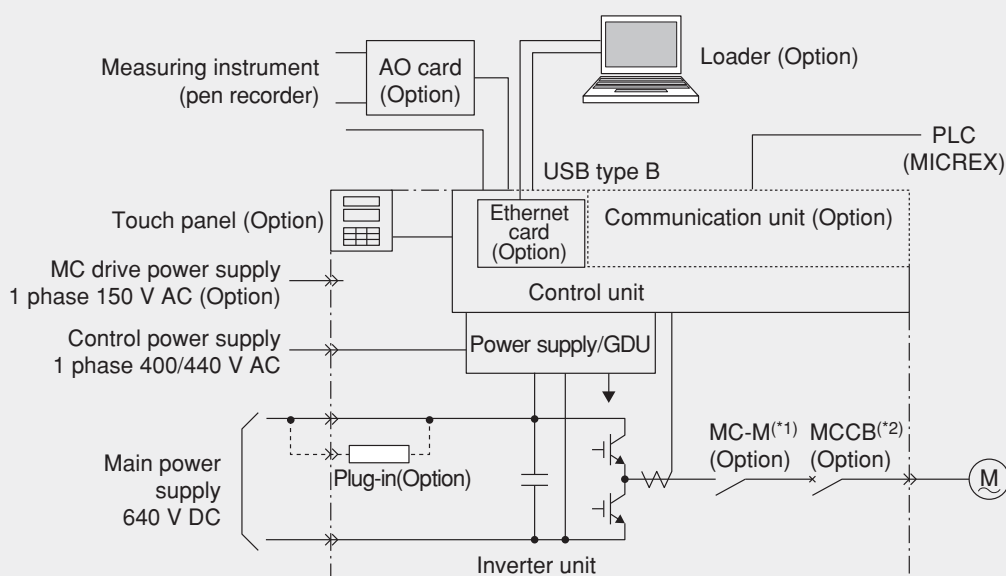


System configuration of inverter unit VM6/FM6

System configuration of the FRENIC4000 series

■ Unit type (10 to 300 kVA)

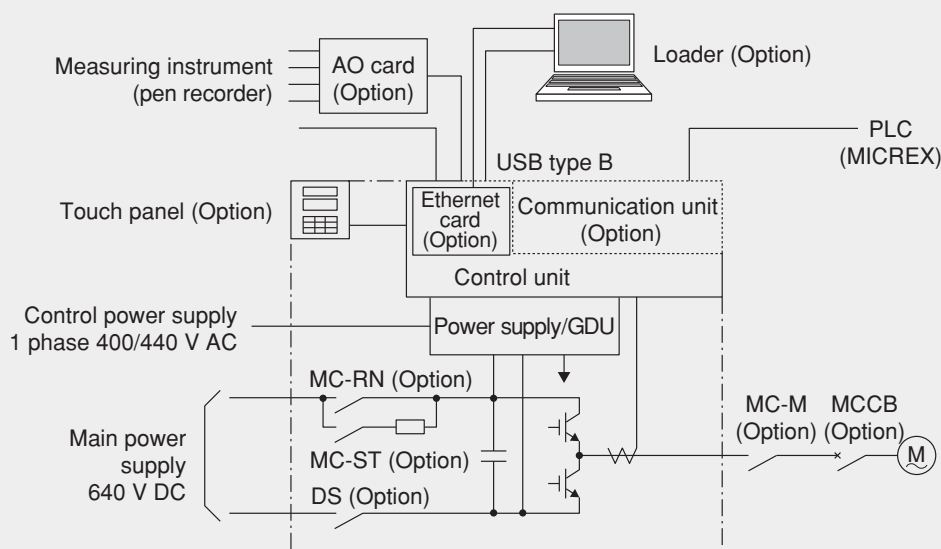
(Plug-in structure is optional.)



(*1): Inverters having the capacity of 10 to 150kVA can be built-in the unit.

(*2): Inverters having the capacity of 10 to 50kVA can be built-in the unit.

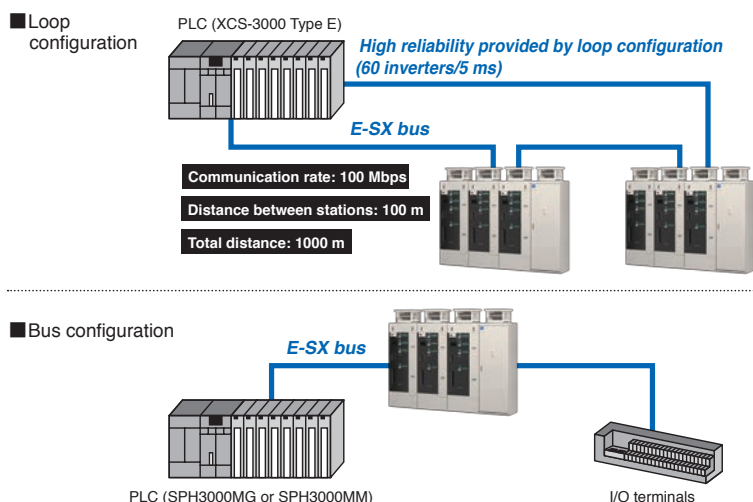
■ Large capacity type (450, 600, 900 kVA)



System bus and solution proposal VM6/FM6

Ultra high-speed E-SX bus

FRENIC4000 VM6/FM6 can be connected to the PLC (XCS-3000 Type E, SPH3000MG, SPH3000MM controllers) via the ultra high-speed E-SX bus. This bus makes it possible to support devices that require higher speeds and precision motion control. In addition, when used in combination with the XCS-3000 Type E controller, a network loop can be constructed, and if a disconnection should occur in one place, operation can continue.



E-SX bus specifications

Item	Specification	
	Bus mode specification	Loop mode specification
Bus communication rate	100 Mbps	
Bus distance (between stations/total distance)	100 m / 1 km	
Optical line	Yes	
Continuous system operation when one disconnection occurs	Yes Station dropout	Yes No station dropout
I/O capacity	4096 words	
Refresh performance	512 words / 1 ms	
Tact fluctuation	±1 μsec	
Synchronization between stations	±1 μsec Between a maximum of 32 axes on the same bus	
Tact cycle setting range	0.25 to 10 ms	0.5 to 10 ms

FRENIC 4000VM5R-compatible VM6

The FRENIC 4000VM5R-compatible VM6 maintains the same dimensions as conventional FRENIC 4000VM5R Series products. This means that you can upgrade to the VM6 while minimizing the amount of modifications made to existing panels.

	VM5R	VM5R compatible VM6	VM6
Unit type	Plug-in system (supports DC hot plugging) (Note 1)		Fixed type (New JIS compatible)
Panel type	Main circuit stack + control stack (Note 2)		Main circuit stack + control stack
Dimension compatibility with VM5R	—	✓	×
Electrical equipment	SX bus, T link/D line, PROFIBUS-DP		E-SX bus, SX bus, T link, PROFIBUS-DP
PC loader	FLOAD V7		FLOAD V8 (Note 3)
MultiLoader *When equipped with an Ethernet communications card (option)	×		✓

(Note 1) Upgradeable per unit.

(Note 2) Main circuit stack: 3-phase batch upgrade

Control stack: Upgrade per stack (master/slave batch upgrade when multiplexing)

(Note 3) FLOAD V7 is not supported, so a new installation is required when upgrading.

For details, please contact our company sales office.

Inverter dimensions

VM6/FM6

Inverter unit types, rated currents, dimensions and masses

Unit type

Inverter capacity [kVA]	Type	Rated output current [A]	Approx. capacity of usable motor (*1) [kW]	Max. unit dimensions WxDxH [mm]	Outline	Approx. mass [kg]	Control power supply capacity [VA] (when steady)	Max. No. of units/panel
5	RKPB050□-4VM6□ RKPB050□-4FM6□	7.2	2.2	656×510×140	①	20	60	12
10	RKPB100□-4VM6□ RKPB100□-4FM6□	14.4	5.5	656×510×140	①	20	60	12
15	RKPB150□-4VM6□ RKPB150□-4FM6□	21.7	7.5	656×510×140	①	20	60	12
25	RKPB250□-4VM6□ RKPB250□-4FM6□	36.1	15	656×510×140	①	20	60	12
38	RKPB380□-4VM6□ RKPB380□-4FM6□	54.8	22	656×510×210	①	30	65	8
50	RKPB500□-4VM6□ RKPB500□-4FM6□	72.2	30	656×510×210	①	35	65	8
75	RKPB750□-4VM6□ RKPB750□-4FM6□	108	45	656×510×210	①	40	65	8
100	RKPB101□-4VM6□ RKPB101□-4FM6□	144	55	656×510×420	①	60	80	4
150	RKPB151□-4VM6□ RKPB151□-4FM6□	217	90	656×510×420	①	70	80	4
225	RKPB221□-4VM6□ RKPB221□-4FM6□	325	132	656×510×840	①	110	80	2
300	RKPB301□-4VM6□ RKPB301□-4FM6□	433	160	656×510×840	①	120	80	2
Panel frame for above	—	—	—	900×650×2725 (800)	②	350	50 Hz : 750 60 Hz : 850	—

Panel type

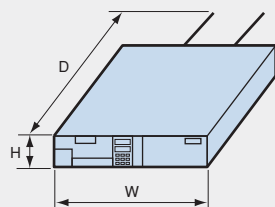
Inverter capacity [kVA]	Type	Rated output current [A]	Approx. capacity of usable motor (*1) [kW]	Max. unit dimensions WxDxH [mm]	Outline	Approx. mass [kg]	Control power supply capacity [VA] (when steady)	Remarks
450	RKPB451□-4VM6□ RKPB451□-4FM6□	650	270	800×650×2725	②	700	50 Hz : 880 60 Hz : 980	—
600	RKPB601□-4VM6□ RKPB601□-4FM6□	866	360	800×650×2725	②	700	50 Hz : 880 60 Hz : 980	—
900	RKPB901□-4VM6□ RKPB901□-4FM6□	1299	540	800×650×2725	②	750	50 Hz : 1270 60 Hz : 1410	—
1200	RKPB122□-4VM6□	2×866	720	1600×650×2725	②×2	1400	50 Hz : 1760 60 Hz : 1960	Output reactor unnecessary
1800	RKPB182□-4VM6□	2×1299	1080	1600×650×2725	②×2	1500	50 Hz : 2540 60 Hz : 2820	Output reactor unnecessary
2700	RKPB272□-4VM6□	3×1299	1440	2400×650×2725	②×3	2250	50 Hz : 3810 60 Hz : 4230	Output reactor unnecessary
3600	RKPB362□-4VM6□	4×1299	1800	3200×650×2725	②×4	3000	50 Hz : 5080 60 Hz : 5640	Output reactor unnecessary
4500	RKPB452□-4VM6□	5×1299	2160	4000×650×2725	②×5	3750	50 Hz : 6350 60 Hz : 7050	Output reactor unnecessary
5400	RKPB542□-4VM6□	6×1299	3240	4800×650×2725	②×6	4500	50 Hz : 7620 60 Hz : 8460	Output reactor unnecessary

Note: The dimensions, masses and control power supply capacities shown are for standard specifications.

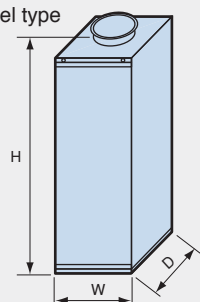
(*1): At rated current

Inverter unit

① Unit type

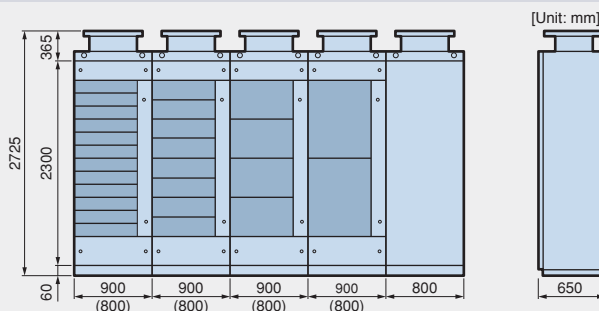


② Panel type



Note: Dimension "D" is larger by approx. 60 mm when a MCCB is built-in.

Inverter panel



Note: Panel width 800 mm also available
Panel top fans can be shipped separately.

Common converter dimensions CM6

- When regeneration function is generally unnecessary: Diode converter
- When the regenerative side capacity is smaller than that on the drive side: Combination of diode converter and PWM regenerative converter
- When regenerative capacity equivalent to that on the drive side is necessary: PWM converter (thyristor converter also available)

Specifications

Diode converter

Rated output current [A]	Rated capacity [kW] (at a rated value of 635 V DC / 621 V DC)	Without an initial charging circuit			With an initial charging circuit			Control power supply capacity [VA] (when steady)
		Panel dimensions WxDxH [mm]	Approx. mass [kg]	Fig.	Panel dimensions WxDxH [mm]	Approx. mass [kg]	Fig.	
225	143/140	800x650x2635	550	1	800x650x2635	600	1	2260
600	381/373	800x650x2635	650	1	800x650x2635	700	1	2260
1200	762/745	1100x650x2635	800	1	1700x650x2635	1100	2	2260
1800	1143/1118	1100x650x2635	850	1	1700x650x2635	1150	2	3390
2750	1746/1708	1100x1300x2635	1100	1	1100x1300x2635	1150	1	3520
4950	3143/3074	1900x1300x2635	1600	2	1900x1300x2635	1600	2	4650

Note: The dimensions, mass and control power supply capacity are based on standard specifications.

Thyristor converter

Rated output current [A]	Rated capacity [kW] (at 600 V AC input / 620 V DC output)	Panel dimensions WxDxH [mm]	Approx. mass [kg]	Fig.
2400	1440	1400x650x2620	1100	2

PWM converter

Rated capacity [kW] at 400 V AC input	Rated capacity [kW] at 440 V AC input	Panel dimensions WxDxH [mm]	Approx. mass [kg]	Control power supply capacity [VA] (when steady)		Fig.
30	35	800x650x2725	430	50 Hz : 865	60 Hz : 965	1
40	45	800x650x2725	430	50 Hz : 865	60 Hz : 965	1
60	65	800x650x2725	430	50 Hz : 865	60 Hz : 965	1
80	90	800x650x2725	430	50 Hz : 880	60 Hz : 980	1
125	135	800x650x2725	430	50 Hz : 880	60 Hz : 980	1
190	205	800x650x2725	450	50 Hz : 880	60 Hz : 980	1
250	275	800x650x2725	500	50 Hz : 880	60 Hz : 980	1
380	415	1600x650x2725	850	50 Hz : 880	60 Hz : 980	2
505	555	1600x650x2725	900	50 Hz : 880	60 Hz : 980	2
760	835	1600x650x2725	950	50 Hz : 1270	60 Hz : 1410	2
1010 (2 multiplex)	1110 (2 multiplex)	2400x650x2725	1400	50 Hz : 1760	60 Hz : 1960	3
1520 (2 multiplex)	1670 (2 multiplex)	2400x650x2725	1500	50 Hz : 2540	60 Hz : 2820	3

Note: The dimensions, mass and control power supply capacity are based on standard specifications.

PWM regenerative converter

Peak regenerative amount [kW]	Panel dimensions WxDxH [mm]	Approx. mass [kg]	Control power supply capacity [VA] (when steady)		Fig.
110	800x650x2725	430	50 Hz : 880	60 Hz : 980	1
165	800x650x2725	430	50 Hz : 880	60 Hz : 980	1
250	800x650x2725	450	50 Hz : 880	60 Hz : 980	1
330	800x650x2725	500	50 Hz : 880	60 Hz : 980	1
500	1600x650x2725	850	50 Hz : 880	60 Hz : 980	2
660	1600x650x2725	900	50 Hz : 880	60 Hz : 980	2
1320 (2 multiplex)	1600x650x2725	950	50 Hz : 1270	60 Hz : 1410	2
1980 (3 multiplex)	2400x650x2725	1400	50 Hz : 1760	60 Hz : 1960	3

Note: The dimensions, mass and control power supply capacity are based on standard specifications.

Dimensions

Fig. 1



Fig. 2

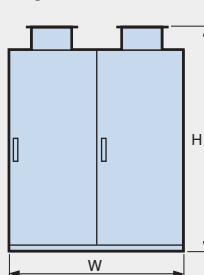
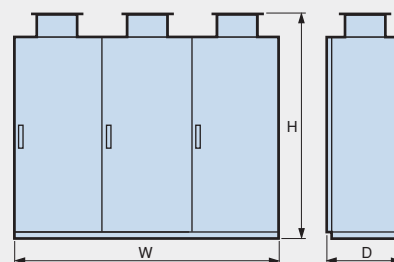


Fig. 3



Note: For dimensions for 3 multiplex or over, please contact us.

Common specifications

Environment	Installation location	Indoors, Free from corrosive gas, inflammable gas, dust, or explosive gas
	Ambient temp.	0 to +40°C
	Ambient humidity	20 to 90% RH (no condensation)
	Cooling method	Forced air-cooled system
	Altitude	Up to 1000 m
	Vibration	4.9 m/s ² or lower (at 10 to 50 Hz)
	Storage (ambient temp.)	-5 to +40°C
Applicable standard		JEC-2410 (ambient temp.)

DC/AC reactors and regenerative transformer Dimensions CM6

Specifications

Diode converter

Rated output current [A]	Separate DC reactor			
	Standard type (*1)	Dimensions W×D×H [mm]	Approx. mass [kg]	Fig.
600	RKJP1DLK-0094A	Contact us	Contact us	1
1200	RKJP1DLK-0094B			
1800	RKJP1DLK-0094C	615×850×1015	270	1
2750	RKJP1DLK-2408CP	840×1050×120	490	1
4950	RKJP1DLK-2408EP	1230×1050×1120	820	1

(*1): The DCL type is for reference. The selected type depends on particular specifications.

PWM converter

Rated capacity [kW] at 400 V AC input	Separate AC reactor			
	Standard type (*2)	Approx. dimensions W×D×H [mm]	Approx. mass [kg]	Fig.
30	RKJP1ALK-0083R or S	Contact us	Contact us	2
40	RKJP1ALK-0083T or U			
60	RKJP1ALK-0083V or W			
80	RKJP1ALK-0083A or H			
125	RKJP1ALK-0083B or J			
190	RKJP1ALK-0083C or K	665×665×1065	340	2
256	RKJP1ALK-0083D or L	665×665×1065	370	2
380	RKJP1ALK-0083F or N	910×950×980	540	2
500	RKJP1ALK2516G or P	1010×1050×1210	610	2
760	RKJP1ALK2516F or N	1010×1050×1210	930	2
1000 (2 multiplex)	RKJP1ALK2516G or P ×2	1010×1050×1210×2	610×2	2
1520 (2 multiplex)	RKJP1ALK2516F or N ×2	1010×1050×1210×2	930×2	2

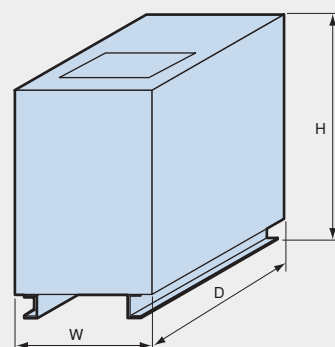
(*2): Type depends on the particular source frequency and whether the leads are present or not (/F).

PWM regenerative converter

Peak regenerative amount [kW]	Separate regenerative transformer			
	Standard type	Approx. dimensions W×D×H [mm]	Approx. mass [kg]	Fig.
110	RKJP1TRK-0065GP	Contact us	Contact us	3
165	RKJP1TRK-0065HP			
250	RKJP1TRK-0065IP	800×800×1165	450	3
330	RKJP1TRK-0065JP	800×800×1165	525	3
500	RKJP1TRK-0065KP	900×900×1375	685	3
660	RKJP1TRK-0065LP	900×900×1375	830	3
1320 (2 multiplex)	RKJP1TRK-0065LP×2	900×900×1375×2	830×2	3
1980 (3 multiplex)	RKJP1TRK-0065LP×3	900×900×1375×3	830×3	3

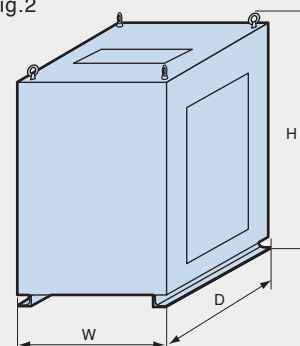
Separate DC reactor

Fig. 1



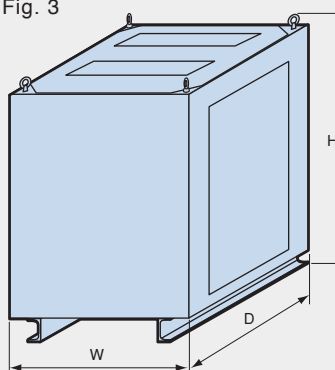
Separate AC reactor

Fig. 2



Separate regenerative transformer

Fig. 3



Recommended cable for inverter and converter

VM6/FM6/CM6

Inverter

(*): furnished

Inverter capacity [KVA]	Rated current [A]	Overload current [A] (1min)	Position	Main circuit (inverter ⇔ motor)				Control
				Connectable cable			Terminal	Inverter relay unit
				No./each phase	Phase	Size [mm ²]		
5	7.2	10.8	⑤	1	Three	3.5 to 8	M5 (*)	M3.5 (*)
10	14.4	21.7						
15	21.7	32.5						
25	36.1	54.1						
38	54.8	82.3						
50	72.2	108.3						
75	109	163						
100	144	217						
150	217	325						
225	325	487						
300	433	650						
450	650	974						
600	866	1299	2	Three	80 to 325	M16 (*)		
900	1299	1949	4	Three				

PWM converter

(*): furnished

Converter capacity [kW]		Rated current [A] (AC side)	Rated current [A] (AC side)	Position	Main circuit (incoming ⇔ converter)				Control		
					Connectable cable			Terminal	Relay unit		
									Screw size		
AC 400V input	AC 440V input				No./each phase	Phase	Size [mm ²]	Screw size	Screw size		
30	35	54	81	④	1	Three	3.5 to 38	M8 (*)	M3.5 (*)		
40	45	72	108				3.5 to100	M10 (*)			
60	65	108	162								
80	90	144	217								
125	135	217	325								
190	205	325	488								
250	275	433	650								
380	415	650	974								
505	555	866	1299				2	Three		80 to 325	M16 (*)
760	835	1299	1949				4	Three			

Diode converter

(*): furnished

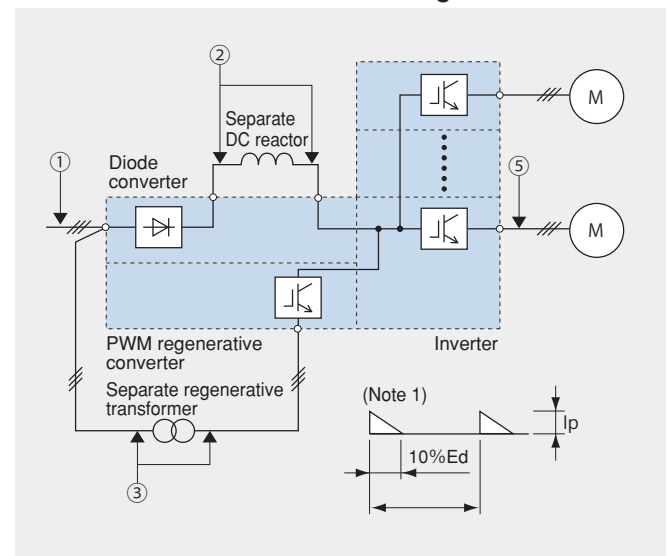
Converter rated output current [A]	Rated current [A]	Overload current [A] (1min)	Position	Main circuit (incoming ⇔ converter)				
				Connectable cable			Terminal	
				No./each phase	Phase	Size [mm ²]	Shape	Screw size
225	183	275	①	1	Three	80 to 325	Copper bar	M16 (*)
	225	337	②	2	Single			
600	490	735	①	2	Three			
	600	900	②	2	Single			
1200	980	1470	①	3	Three			
	1200	1800	②	4	Single			
1800	1471	2207	①	5	Three			
	1800	2700	②	6	Single			
2750	2247	3371	①	8	Three			
	2750	4125	②	10	Single			
4950	4044	6066	①	16	Three			
	4950	7425	②	20	Single			

PWM regenerative converter

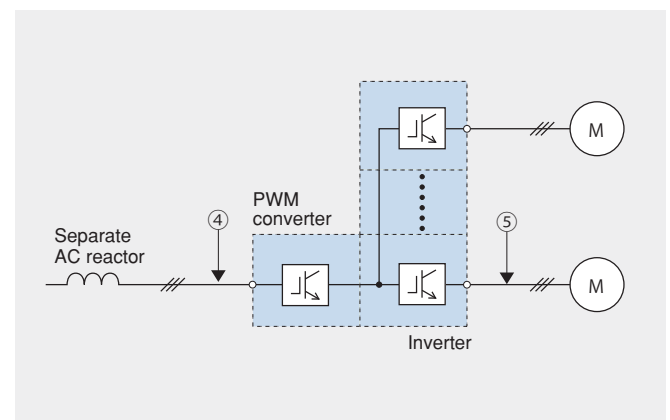
(*): furnished

Converter capacity [kW]	Max. current I _p (Note 1) [A]	Position	Main circuit				Control
			Connectable cable			Terminal	Terminal block
			No./each phase	Phase	Size [mm ²]	Screw size	Screw size
110	217	③	1	Three	3.5 to 100	M10 (*)	M3 (*)
165	325						
250	487						
330	650		2	Three	80 to 325	M16 (*)	M3 (*) except on terminal block for panel inside sequence circuit
500	974						
660	1299						
n×660	n×1299		n×2	Three			

Diode converter + inverter + PWM regenerative converter



PWM converter + inverter



Data setting and monitoring (touch panel) VM6/FM6/CM6

Touch panel equipped with liquid crystal display (LCD)

The touch panel equipped with an LCD provides various necessary information, and enables data setting, running, and monitoring to be performed easily. The display language can be switched between Japanese and English. Key operation guidance is also displayed on the bottom line of the LCD, so most operations can be performed without needing to refer to the instruction manual.

LED (sign + 4 digits)

Displays the number of revolutions (changeable).
Any of the eight different data indicated on the LCD on the monitor screen (initial screen) can be selected.
At tripping:
"Err" blinks automatically, alerting you to the trip.

Program key

Reverts to the monitor screen (default) from any screen.

Shift key (digit shift)

Used to move the cursor from one digit to another in order to change data.

Reset key

When normal:
Assigned to "return" and "cancel" functions. Returns to the previous layer.
At tripping:
Releases the stop status due to tripping.



LCD monitor

Displays various information, including operational, set and fault data over a maximum of 5 lines × 13 characters.
On tripping, the trip data automatically appears.

Up and down keys

Used for changing the Data Indication Nos. and the data setting values.

Normal, reverse and stop keys

The operation can be started or stopped on the touch panel.

Help key

During normal operation:
Moves to a key operation guidance screen that displays the key operations that can be used on the current screen.
From the key operation guidance screen:
Returns to the previous screen.

Function/data selection key

Assigned to "enter" and "OK" functions.

Example of actual screen display

The monitor screen (default screen after turning on power) continually displays all of the current running statuses: speed command, detection, and output current, output voltage.

Use of touch panel

Menu	Description
Initial	Monitor screen: Current, voltage and frequency display
M01	Parameter setting reference and change
M02	Di/Do bit on/off status reference
M03	Ai/Ao voltage reference
M04	Inverter internal data display
M05	Communication, sent/received data reference
M06	Inverter start, stop operation
M07	Inverter startup condition on/off reference
M08	Latest fault code (simultaneous occurrence) reference
M09	Error history reference
M10	Inverter inside data reference on trip
M1	Present time setting, operating time reference, parameter setting control, liquid crystal concentration adjustment, etc.

Introduction of some functions

• M09 Error history

Displays a chronological record of the past 100 faults with the causes and the time and date of occurrence, thereby allowing you to trace back errors.

• M10: Trip data display

Displays internal data sampling values and bit data on/off, allowing you to know the fault circumstances.

• M11: Save of parameter settings, load, and comparison

Inverter parameter settings can be saved in batch form into nonvolatile memory using the touch panel.
They are retained when the power is turned off. The saved data can also be loaded to the inverter.
Current inverter settings and values saved on the touch panel can be compared with each other.

Option VM6/FM6/CM6

Maintenance tool: PC loader (FLOADV8 for Windows)

An optional PC loader is available for offline checking of maintenance data and managing control parameters.

Main functions of FLOADV8 for Windows

• Trace-back data

Upon fault occurrence, the cause as well as the waveform data and bit on/off statuses of the speed, current and other major items are registered. You can proceed to analysis of error circumstances, quick action and recovery.

Details of up to 4 of the latest error occurrences can be retained.

High-speed trace (sampling 1 ms) and low-speed trace (sampling 200 ms) are acquired at the same time.

• Control parameter setting, change, display and storage

Control parameter settings can be saved with arbitrary filenames and comments and changed on a PC. Thus, the inverter control parameters can be controlled on a PC.

You can also compare the parameters of the inverter and PC.

• Running status display

Current inverter running statuses can be viewed at a glance thanks to the block diagram, actual value and internal data indications.

• Fault cause display

Up to 4 faults with up to 30 causes each are indicated together with the time and date of occurrence.

• Fault history display

The fault history and occurrence history of the past 100 faults are displayed together with the dates and times of the occurrences.

• Fault guidance

The fault cause and the recovery procedure can be checked from the fault factor read in from the controller.

• Test run operation

The loader facilitates easy start and stop of the inverter while its statuses are displayed on the "running status indication screen".

• Multi-window display

Several window indications can be displayed on a single screen, thereby allowing you to simultaneously monitor multiple information sources.

• Printing

Printing in form format is possible using Microsoft Excel. Also, data saved as an Excel file can be referred to even in computer environments where the PC loader is not installed.

• Chart display

Two types of charts can be displayed. Both charts are capable of high-speed sampling with a maximum speed of 1 ms.

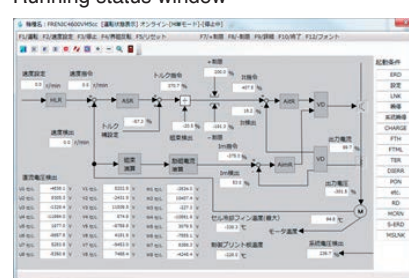
Real-time chart: Data is stored on the personal computer. The waveform is displayed in real time.

Historical chart: Data is stored on the controller. Monitoring data synchronized with control software can also be stored. Data can be stored regardless of whether a loader is connected.

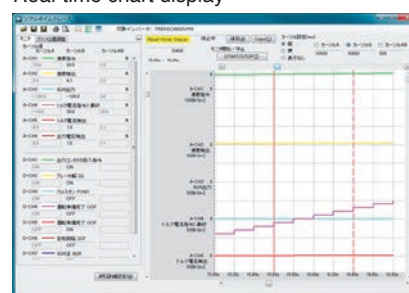
Control parameter display

項目名	設定値	読み取り値	書き込み可能	コメント
0.00	0.00	0.00	○	
0.01	0.01	0.01	○	
0.02	0.02	0.02	○	
0.03	0.03	0.03	○	
0.04	0.04	0.04	○	
0.05	0.05	0.05	○	
0.06	0.06	0.06	○	
0.07	0.07	0.07	○	
0.08	0.08	0.08	○	
0.09	0.09	0.09	○	
0.10	0.10	0.10	○	
0.11	0.11	0.11	○	
0.12	0.12	0.12	○	
0.13	0.13	0.13	○	
0.14	0.14	0.14	○	
0.15	0.15	0.15	○	
0.16	0.16	0.16	○	
0.17	0.17	0.17	○	
0.18	0.18	0.18	○	
0.19	0.19	0.19	○	
0.20	0.20	0.20	○	
0.21	0.21	0.21	○	
0.22	0.22	0.22	○	
0.23	0.23	0.23	○	
0.24	0.24	0.24	○	
0.25	0.25	0.25	○	
0.26	0.26	0.26	○	
0.27	0.27	0.27	○	
0.28	0.28	0.28	○	
0.29	0.29	0.29	○	
0.30	0.30	0.30	○	
0.31	0.31	0.31	○	
0.32	0.32	0.32	○	
0.33	0.33	0.33	○	
0.34	0.34	0.34	○	
0.35	0.35	0.35	○	
0.36	0.36	0.36	○	
0.37	0.37	0.37	○	
0.38	0.38	0.38	○	
0.39	0.39	0.39	○	
0.40	0.40	0.40	○	
0.41	0.41	0.41	○	
0.42	0.42	0.42	○	
0.43	0.43	0.43	○	
0.44	0.44	0.44	○	
0.45	0.45	0.45	○	
0.46	0.46	0.46	○	
0.47	0.47	0.47	○	
0.48	0.48	0.48	○	
0.49	0.49	0.49	○	
0.50	0.50	0.50	○	
0.51	0.51	0.51	○	
0.52	0.52	0.52	○	
0.53	0.53	0.53	○	
0.54	0.54	0.54	○	
0.55	0.55	0.55	○	
0.56	0.56	0.56	○	
0.57	0.57	0.57	○	
0.58	0.58	0.58	○	
0.59	0.59	0.59	○	
0.60	0.60	0.60	○	
0.61	0.61	0.61	○	
0.62	0.62	0.62	○	
0.63	0.63	0.63	○	
0.64	0.64	0.64	○	
0.65	0.65	0.65	○	
0.66	0.66	0.66	○	
0.67	0.67	0.67	○	
0.68	0.68	0.68	○	
0.69	0.69	0.69	○	
0.70	0.70	0.70	○	
0.71	0.71	0.71	○	
0.72	0.72	0.72	○	
0.73	0.73	0.73	○	
0.74	0.74	0.74	○	
0.75	0.75	0.75	○	
0.76	0.76	0.76	○	
0.77	0.77	0.77	○	
0.78	0.78	0.78	○	
0.79	0.79	0.79	○	
0.80	0.80	0.80	○	
0.81	0.81	0.81	○	
0.82	0.82	0.82	○	
0.83	0.83	0.83	○	
0.84	0.84	0.84	○	
0.85	0.85	0.85	○	
0.86	0.86	0.86	○	
0.87	0.87	0.87	○	
0.88	0.88	0.88	○	
0.89	0.89	0.89	○	
0.90	0.90	0.90	○	
0.91	0.91	0.91	○	
0.92	0.92	0.92	○	
0.93	0.93	0.93	○	
0.94	0.94	0.94	○	
0.95	0.95	0.95	○	
0.96	0.96	0.96	○	
0.97	0.97	0.97	○	
0.98	0.98	0.98	○	
0.99	0.99	0.99	○	
1.00	1.00	1.00	○	

Running status window



Real-time chart display



Maintenance tools: MultiLoader/MultiChart

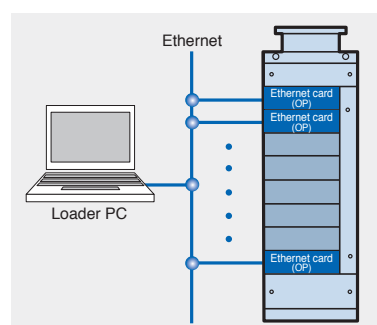
The optional Ethernet communication card allows up to 255 inverters and converters to be accessed by a single PC loader. Furthermore, it streamlines and facilitates maintenance.

• Major features of the MultiLoader

- Parameter settings for connection points (change/save)
- Status display, fault history, traceback, and data management

• Major features of the MultiChart

- Chart display of multiple inverters



Option VM6/FM6/CM6

External AO card (type: RGGW1AAU0070F)

Inverter internal data (signal selection out of about 120 data) can be outputted by 4 channels in ± 10 V of analog voltage. They are isolated from the inverter.

Special lifter

The inverter can be replaced by a small number of persons.

f(s)NISDAS (*)

The inverter monitoring can be centralized at high speed.

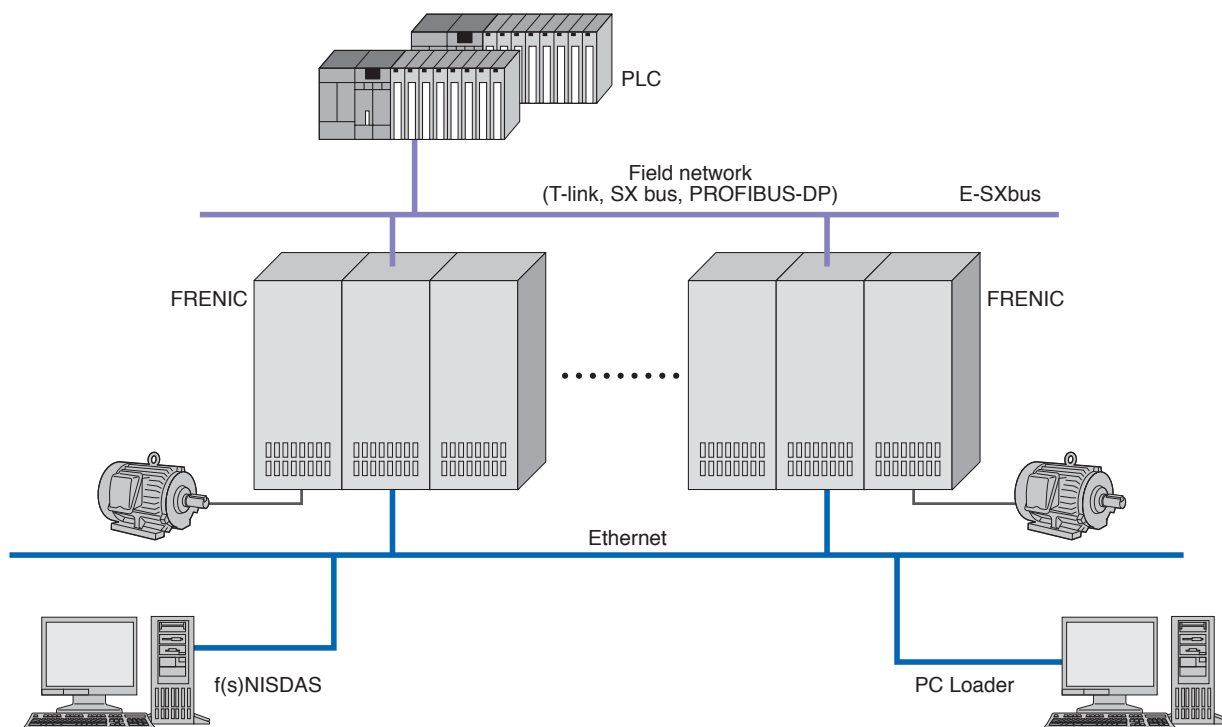
Main features

- **Real time monitoring**
Inverter data can be sampled every 10ms (for up to 32 inverters simultaneously).
- **Trace-back data acquisition**
Trace-back data stored in the inverter can be acquired.
- **PLC internal data acquisition**
Fuji general-purpose PLC (MICREX-SX) internal data can be acquired.

(*): f(s)NISDAS: Using open-Network & I.T., based on SX, Diagnosis and Analysis System



Example of system configuration



Adjustable speed drives of Fuji Electric group

VM6/FM6

Adjustable speed drives of Fuji Electric

Application	Series	Features	Output voltage [V]	Capacity range [kVA]			
				10	100	1000	10000
For plant	FRENIC 4000VM6	Vector controlled inverter for plants •High-performance vector control system for quick response,high-accuracy and wide range speed control. •The DC-link system allows highly efficient plant operation.	400			5400	
	FRENIC 4000FM6	V/f controlled inverter for plants •Frequency of fan, pump and group-driven motors can be controlled accurately. •The DC-link system allows highly efficient plant operation.	400			900	
	FRENIC 4400VM6	Large-capacity vector controlled inverter •The capacity of FRENIC4000 series units has been increased due to 3-level control.	850			8400	
	FRENIC 4800VM6	Medium-voltage, water-cooling, large-capacity and vector controlled inverter •The capacity of FRENIC4000 series units has been increased due to 3-level control. •Downsizing achieved by adopting a water-cooling system	3300				26000
	LEONIC-M700	Thyristor converter for plants •Large-capacity thyristor converter for various types of control	DC220 DC440 DC750			• • •	
	LEONIC-M Compact	Unit-type DC motor controller •Compact thyristor controller equipment intended for update from analog controller also	DC220 DC440		75kW 150kW		
For general industry (medium-voltage)	FRENIC 4600FM6e	Medium-voltage direct-output inverter (for fans and pumps) •Compact •Variable speed operation of medium-voltage motors saves energy. •Circuit configuration and control are well designed for power supplies and motors.	3300 6600 11000			5200 5720 18300	
For general industry (low-voltage)	FRENIC-VG FRENIC-VGM	High-performance vector controlled inverter	200 400 690		90kW 2400kW		
	FRENIC-MEGA	High-performance multifunctional inverter (Vector control and V/f control)	200 400		90kW 630kW		
	FRENIC-ECO	V/f controlled inverter for fans and pumps	200 400		110kW 560kW		

Ordering information

When placing an order or making an inquiry, please state the following.

Application of inverter		Remarks:	
Load machine specifications			
Name:			
Load torque characteristics: ☐ Square-law speed ☐ Constant torque ☐ Constant output			
Moment of load inertia after conversion into motor shaft (J): kg·m ²			
Overload: %			
Input specifications			
Rated voltage: V ± %		Rated frequency: Hz ± %	
Control power source: -phase, -wire, V, Hz			
Driven motor			
Motor specifications: ☐ Squirrel-cage rotor ☐ () , ☐ Existing ☐ New installation			
Rating	Output: kW	No. of poles:	Voltage: kV
	Frequency: Hz	Speed: r/min	Current: A
Speed control			
Control range: r/min to r/min			
Rotational/frequency setting method			
Ambient conditions			
Installation location: Indoor		Humidity: %RH	Temperature: °C
Provision of air conditioning:		Altitude: m	
Limit on carrying-in:			



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