

FUJI INVERTERS
FRENIC Series

INVERTER LINE-UP

Extensive lineup ranges from simplified performance to high performance models. Fuji Electric inverter family plays an active part worldwide.



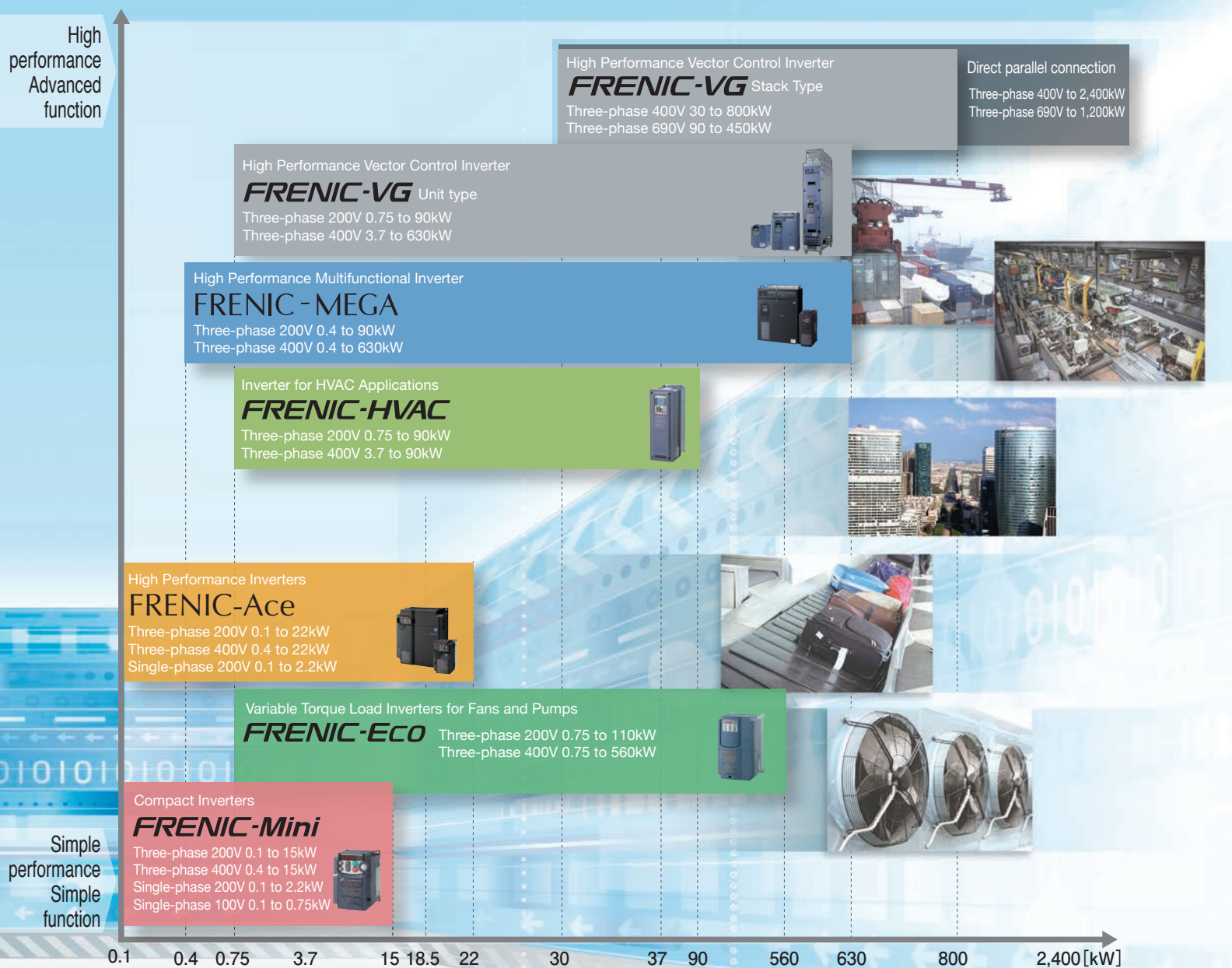
Fuji Inverter Family Consisting of a Diverse Lineup

Major features of Fuji inverters

- Environmentally-friendly long-life design (10 years) and compliance with RoHS directive *1
- A wide variety from simple performance models to high performance models
- Specialized models lined up that can maximize the performance for each application such as fan and pump application and crane application

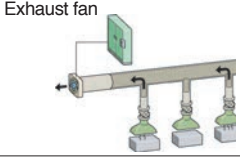
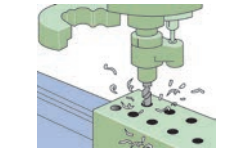

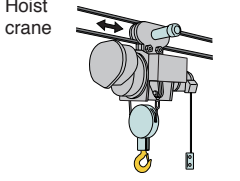
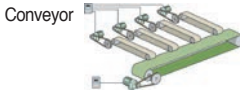
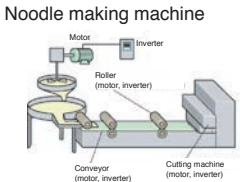
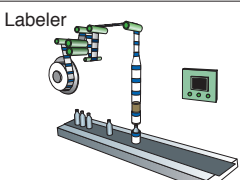
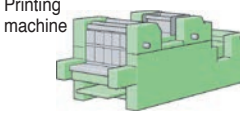

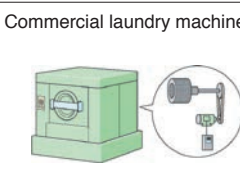
*1 Except for some models.

Fuji inverter series



Diversifying Fuji inverter applications

◎ : Best suitable ○ : Suitable

Classification	Representative instrument image	Application example	FRENIC-Mini	FRENIC-Ace	FRENIC-MEGA	FRENIC-ECO	FRENIC-HVAC	FRENIC-VG	
Fluid machine		Fan	○	○	◎	◎	◎		
		Pump	○	○	◎	◎	◎		
		Blower	○	○	◎	◎	◎		
		Compressor	○	○	◎	◎	◎		
		Gear pump			○	◎			
Machine tool		Drilling machine		○	◎				
		Turning machine		○	◎				
		Grinding machine		○	◎				
		Tool changer	○	◎					
		Milling machine				○			◎
		Machining centre				○			◎
Metal processing machine		Pressing machine			○			◎	
		Winder			○			◎	
		Wire drawing machine		○				◎	
		Shearing machine		○				◎	
		Dicer							◎
Conveyor machine (vertical)		Elevator		○	○			◎	
		Escalator		○	○			◎	
		Multi-level storage		○	○			◎	
		Multi-level parking lot		○	○			◎	
		Crane				○			◎
		Hoist crane			◎	○			◎
Conveyor machine (horizontal)		Conveyor transport	○	◎	◎				
		Chain transport	○	◎	◎				
		Ball screw	○	◎	◎				
Food processing machine		Noodle making machine	○	◎	◎				
		Confectionery machine	○	◎	◎				
		Tea making machine	○	◎	◎				
		Bread making machine	○	◎	◎				
		Mixer	○	◎	◎				
		Slicer	○	◎	◎				◎
Packing and bookbinding machine		Labeler	○	○	◎			◎	
		Inner packing machine	○	○	◎			◎	
		Outer packing machine	○	○	◎			◎	
		Bookbinding machine	○	○	◎			◎	
		Wrapping machine	○	○	◎			◎	
		Paper machine	○	○	◎			◎	
Printing machine		Winder		○	○			◎	
		Slitter			○			◎	
		Offset printing machine			○			◎	
		Rotary printing machine			○			◎	
Health, medical, welfare care instruments		Stair lift	○	◎					
		Treadmill	○	◎					
		Care bed	○	◎					
		Bubble bath	○	◎	○	○	○		
Others		Commercial laundry machine	○	○	◎				
		Car washing machine	◎	○					
		Food waste disposer	◎	○					
		Conveyor-belt sushi	◎	○					
		Stage installation		○					◎
		Pachinko ball feeder	◎	○	◎				

* Options may be required for application.

Major specifications of series

Series name	Input voltage class	Capacity range (application motor capacity) [kW]	Overload capability	Digital input X terminal including FWD/ REV terminal	Digital input Y terminal	*1 Analog input	*1 Analog output	Output frequency range	
<i>FRENIC-Mini</i>	Three-phase 200V	0.1 to 15 kW	150% -1min. 200% -0.5sec.	5	1	2	1	0.1 to 400Hz	
	Three-phase 400V	0.4 to 15 kW							
	Single-phase 200V	0.1 to 2.2 kW							
	Single-phase 100V	0.1 to 0.75 kW							
FRENIC-Ace	Three-phase 200V (ND)	0.1 to 22 kW	150% -1min. 200% -0.5sec.	7	2	2	1	0.1 to 500Hz	
	Three-phase 400V (HND)	0.4 to 22 kW							
	Single-phase 200V (HHD)	0.1 to 2.2 kW							
	Three-phase 200V (HND)	0.2 to 30 kW	120% -1min.						
	Three-phase 400V (HND)	0.75 to 30 kW							
FRENIC-MEGA	Three-phase 200V (HHD)	0.4 to 90 kW	150% -1min. 200% -3sec.	11	4	3	2	0.1 to 599Hz ³	
	Three-phase 400V (HHD)	0.4 to 630 kW							
	Three-phase 200V(HND)	7.5 to 110 kW	120% -1min.						
	Three-phase 400V(HND)	7.5 to 710 kW							
<i>FRENIC-Eco</i>	Three-phase 200V	0.75 to 110 kW	120% -1min.	7	3	3	1	0.1 to 120Hz	
	Three-phase 400V	0.75 to 560 kW							
<i>FRENIC-HVAC</i>	Three-phase 200V	0.75 to 90 kW	120% -1min.	9	4	3	2	0.1 to 120Hz	
	Three-phase 400V	3.7 to 90 kW							
<i>FRENIC-VG</i>	Unit Type	Three-phase 200V (HD)	0.75 to 90 kW	11	4	3	3	0.1 to 500Hz	
		Three-phase 400V (HD)	3.7 to 630 kW						150% -1min. 200% -3sec.
		Three-phase 400V (MD)	110 to 450 kW						150% -1min.
		Three-phase 200V(LD)	37 to 110 kW						120% -1min.
	Three-phase 400V(LD)	37 to 710 kW							
	Stack Type	Three-phase 400V (MD)	30 to 800 kW	150% -1min.	11	4	3	3	0.1 to 500Hz
		Three-phase 690V (MD)	90 to 450 kW						
		Three-phase 400V(LD)	37 to 1000 kW	110% -1min.					
Three-phase 690V (LD)		110 to 450 kW							

		Control function																		
	Auto-restart after momentary power failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Slip compensation control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	PID control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Automatic energy saving operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Regeneration prevention control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Overload prevention control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Torque limiter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Preventing condensation in motor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Number of motor switching options	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Pick-up operation, draw operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Commercial power supply switching operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Customizable logic function	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Hit-and-stop control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Dancer roll control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Velocity zero control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Servo lock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Synchronous motor driving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Calendar function	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Traceback function	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Online tuning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Functional safety (STO)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Pattern operation, timer operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Pump control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

: Equipped : Not equipped

*1 The behavior of analog input and output can be switched by settings. Refer to the catalogue of each series.

*2 Consult our sales representatives.

*3 If the output frequency exceeds 599 Hz, the inverter will stop with overspeed protection.

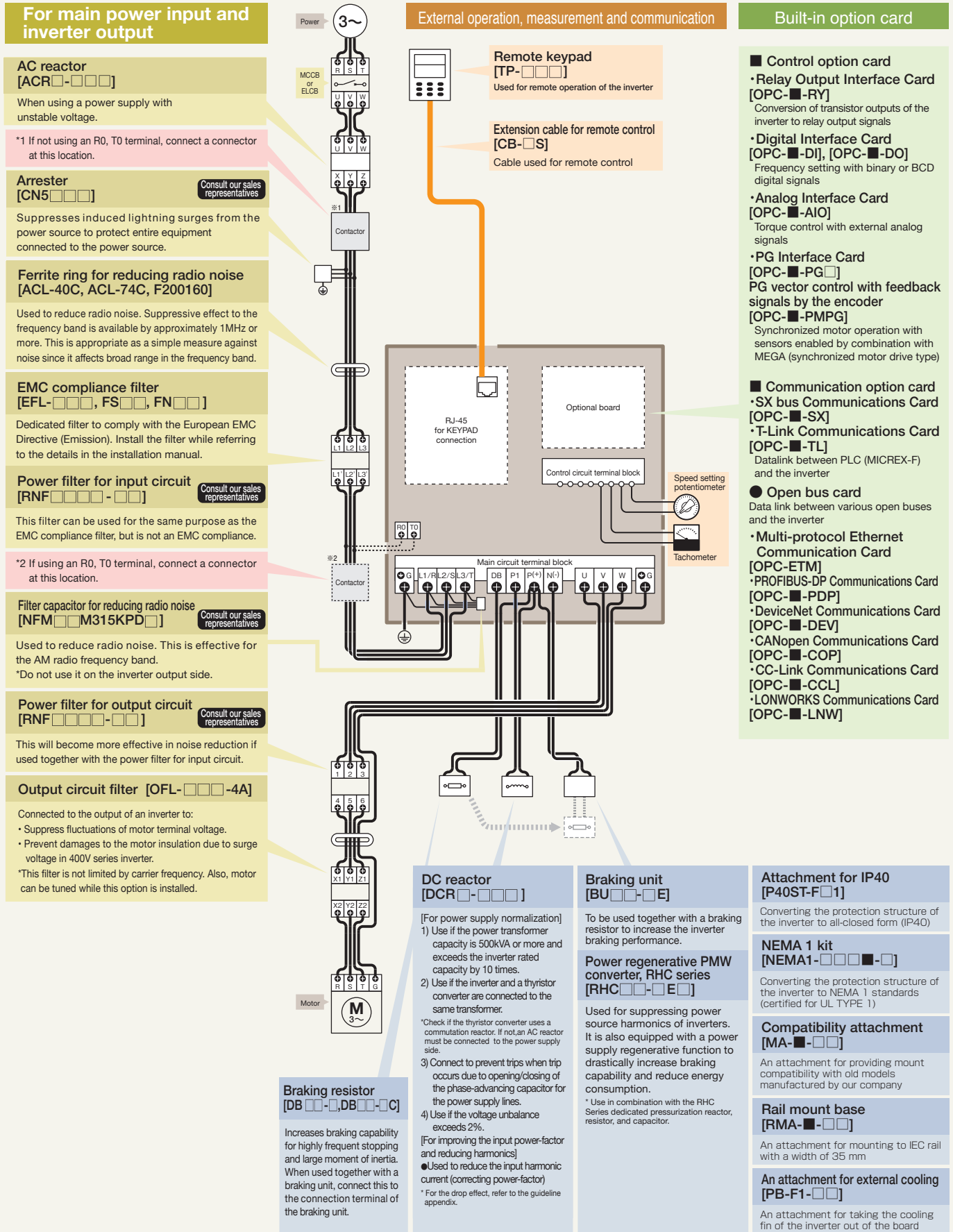
Special option

Applicable inverter		FRENIC-Mini	FRENIC-Ace	FRENIC-MEGA	FRENIC-ECO	FRENIC-HVAC	FRENIC-VG	
Item	Control option card	Relay Output Interface Card			○	○	○	
		Digital Interface Card		○	○			○
		Analog Interface Card		○	○		○	○
		PG Interface Card		○	○			○
		PG interface card for synchronous motor drive			○			
		Analog Current Output Interface Card			○		○	
		Synchronize Interface Card						○
	Communication option card	RS-485 Communications Card	Built-in	Built-in*	Built-in	○	Built-in	Built-in
		T-Link Communications Card			○			○
		SX-bus Communications Card			○			○
		E-SX-bus Communications Card						○
		Multi-protocol Ethernet communication card			○			
		PROFIBUS-DP Communications Card		○	○	○	○	○
		DeviceNet Communications Card		○	○	○	○	○
		CANopen Communications Card		○	○		○	
		CC-Link Communications Card		○	○	○	○	○
		LonWorks Communications Card				○	○	
		Resistance Temperature Detector Input Card				○	○	
		ProfiNet-IRT Communications Card						○
		User Programming Card (UPAC)						○
Functional Safety Card						○		
Software	Inverter support loader software	○	○	○		○	○	
Operation option	Remote touch panel	○	Standard	—	Standard	—	—	
	Remote touch panel with USB	○	○	Standard	—	—	—	
	Multifunctional touch panel		○	○	○	Standard	Standard	

○ : Supported □ : Not supported — : None

* The number of connectors of the RS-485 port can be changed from 1 to 2 by mounting an option card.

Wiring diagram of peripheral equipment of inverter



Fuji Inverter Family Contributing with a Diverse Lineup



Standard product



Semi-standard product

Compact Inverters

FRENIC-Mini



- Series of compact inverters equipped with functions ideal for diverse small capacity needs
- Frequency setting volume control provided as standard equipment, allowing easy operation
- Dynamic torque-vector control, PDI control function, cooling fan ON/OFF control function and synchronous motor control provided

● Model variations



Standard type



Built-in EMC filter

● Major functions



Side-by-side installation



Frequency setting volume control



Synchronous motor driving

● International standards



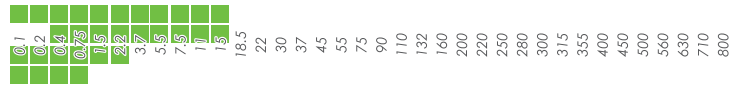
EC Directive (CE marking)



UL Standards (cUL Standards)

● Input voltage class/capacity range

Three-phase 200V/0.1 to 15kW
 Three-phase 400V/0.4 to 15kW
 Single-phase 200V/0.1 to 2.2kW
 Single-phase 100V/0.1 to 0.75kW



High Performance Inverters

FRENIC-Ace



- Series of inverters applicable to diverse applications ranging from simple variable-speed applications to business sector-specific machines requiring high performance and multiple functions
- Capable of four load ratings according to applied load, optimizing total cost and offering space-saving performance^{*1}
- Customizable logic function provided as standard feature to allow up to 200 steps of programming

● Model variations



Standard type



Built-in EMC filter

● Major functions



Side-by-side installation



Synchronous motor driving



Detachable keypad



Pulse train input



Customizable logic



Double rating



Functional safety STO

● International standards



EC Directive (CE marking)



UL Standards (cUL Standards)

● Input voltage class/capacity range

Three-phase 200V/0.1 to 22kW (HHD)
 Three-phase 400V/0.4 to 22kW (HHD)
 Single-phase 200V/0.1 to 2.2kW (HHD)



*1 Three-phase 400V only *2 FRN□□□E2S-○G●, FRN□□□E2S-○K and FRN□□□E2S-○J only

High Performance Multifunctional Inverters

FRENIC - MEGA



- General-purpose inverter with best-in-class vector control. Capable of vector control of induction and synchronous motors at up to 599 Hz.
- Achieves high environmental resistance by using PCB coating, compliant with IEC60721 3-3 Class 3C2 as standard, and IP55 protection for the inverter back.
- Enhancement of maintenance, traceback, and PC and mobile loader facilitates maintenance.

● Model variations



Standard type



Built-in EMC filter



Integrated DC reactor

● Major functions



Synchronous motor driving



Optimized minimum power control



Position control



Detachable keypad



Built-in USB terminal



Pulse train input



Ratio operation



Customizable logic



Traceback



Double rating



Functional safety STO

● International standards



EC Directive (CE marking)



UL Standards (cUL Standards)

● Input voltage class/capacity range

Three-phase 200V/0.4 to 90kW (HHD)
 Three-phase 400V/0.4 to 630kW (HHD)



Standard Standard product **Semi-standard** Semi-standard product

Variable Torque Load Inverters for Fans and Pumps

FRENIC-ECO

RoHS * Supports up to 15 kW.



- Series of inverters developed exclusively for square reduction loads such as fans and pumps
- Equipped with various functions including new system of automatic energy saving, PID control, life expectancy prediction and commercial power supply operation switching sequence
- Ideal for air-conditioning systems, fans and pumps, for which conventional general-purpose inverters could not be used due to cost and function issues

● Model variations

STD Standard type **DCR** Integrated DC reactor **Plus** Eco-Plus

● Major functions

Side-by-side installation **Optimized minimum power control** **Detachable keypad**

● International standards

CE EC Directive (CE marking) **UL LISTED** UL Standards (cUL Standards)

● Input voltage class/capacity range



Inverter for HVAC Applications

FRENIC-HVAC

RoHS



- Series of inverters equipped with energy-saving and special functions required for air conditioning market and designed exclusively for specific market
- EMC filter and DC reactor (DCR) provided as standard equipment^{*1}
- Compliance with the protective structure IP55^{*2}
- Equipped with functions suited for air conditioning applications including 4PID control, real time clock, torque-vector control, filter clogging prevention and linearization function

● Model variations

STD Standard type **PD** Commercial power selector switch integrated type

● Major functions

SMTW Calendar function **Linearization** Linearization function **Customizable** Customizable logic **Optimized minimum power control**

● International standards

CE EC Directive (CE marking) **UL LISTED** UL Standards (cUL Standards)

● Input voltage class/capacity range



*1 DC reactors of three-phase 200 V: 0.75 to 45 kW and three-phase 400 V: 0.75 to 90 kW are built in *2 Compatible with three-phase 200 V: 0.75 to 45kW and three-phase 400 V: 0.75 to 90 kW.

High Performance Vector Control Inverter

FRENIC-VG

RoHS



- Fuji's highest-performance series of inverters bringing vector inverter technologies together
- Provided with vector control with and without speed sensor and V/f control
- Full-fledged maintenance functions enabled by calendar function and traceback
- Safety function (STO) compliant with functional safety standard EN61800-5-2 provided as standard feature
- Stack type three-phase 690 V 355 to 450 kW provided with new device (SiC hybrid module) capable of realizing significant reduction of generated loss as compared with conventional Si module
- A Marine standard compatible product lineup has been added as semi-standard products. (Certifying body: DNV GL classification societies)*1

● Model variations

STD Standard type

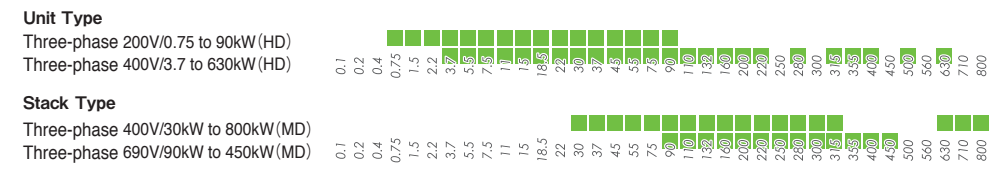
● Major functions

Detachable keypad **UPAC** UPAC **Synchronous motor driving** **Functional safety STO** **Position control** **Load compensating control**

● International standards

CE EC Directive (CE marking) **UL LISTED** UL Standards (cUL Standards)

● Input voltage class/capacity range



*1 Three-phase 690V stack type only. Consult our sales representatives.

How To Read The Model Number

FRENIC-
Mini

FRN 0010 C 2 S - 2 A

Code	Series name
FRN	FRENIC Series

Code	Nominal applied motor capacity
0001	0.1kW
}	}
0060	15kW

Code	Application range
C	Compact

Code	Developed inverter series
2	2series

Code	Destination / Instruction Manual
A	Asia/English
E	Europe/English
U	USA/English
C	China/Chinese
J	Japan/Japanese

Code	Input power source
2	Three-phase 200V
4	Three-phase 400V
6	Single-phase 100V
7	Single-phase 200V

Code	Structure
S	Standard (IP20)
E	Built-in EMC filter (IP20)

FRENIC-
Ace

FRN 0004 E 2 S - 2 GB

Code	Series name
FRN	FRENIC Series

Code	Nominal applied motor capacity
0001	0.1kW
}	}
0590	315kW

Code	Application range
E	High performance type

Code	Developed inverter series
2	2series

Code	Destination / Instruction Manual
GA, GB ^{*1}	Global/English
E	Europe/English
C	China/Chinese
K	Korea/Korean
J	Japan/Japanese

^{*1} Control terminals differ between GA model and GB model. For details, please refer to the FRENIC-Ace catalog.

Code	Input power source
2	Three-phase 200V
4	Three-phase 400V
7	Single-phase 200V

Code	Structure
S	Standard
E	Built-in EMC filter

FRENIC-
MEGA

FRN 0003 G 2 S - 4 G

Code	Series name
FRN	FRENIC Series

Code (kW/HP)	Nominal applied motor capacity
0002	0.4kW
}	}
1386	600kW(900HP), 710kW(1000HP)

Code	Application range
G	High performance multifunctional type

Code	Developed inverter series
2	2series

Code	Destination / Instruction Manual
G	Grobal / English
C	China/Chinese
J	Japan/Japanese

Code	Input power source
2	Three-phase 200V
4	Three-phase 400V

Code	Structure
S	Standard
E	Built-in EMC filter
H	Integrated DC reactor

FRENIC-ECO

FRN 5.5 F 1 S - 2 A

Code	Series name
FRN	FRENIC Series
Code (kW)[HP]	Nominal applied motor capacity
0.75 [001]	0.75kW
}	}
560 [900]	560kW
Code	Application range
F	Fan and pump (for square reduction torque loads)
Code	Developed inverter series
1	1series

Code	Destination / Instruction Manual
A	Asia/English
E	Europe/English
U	USA/English
J	Japan/Japanese

Code	Input power source
2	Three-phase 200V
4	Three-phase 400V

Code	Structure
S	Standard (IP20/IP00)

FRENIC-HVAC

FRN 3.7 AR 1 L - 4 A

Code	Series name
FRN	FRENIC Series
Code (kW)[HP]	Nominal applied motor capacity
0.75 [001]	0.75kW
}	}
710 [1000]	710kW
Code	Application range
AR	HVAC
Code	Developed inverter series
1	1series

Code	Destination / Instruction Manual
A	Asia/English
E	Europe/English
U	USA/English
J	Japan/Japanese

Code	Input power source
2	Three-phase 200V
4	Three-phase 400V
5	Three-phase 575V

Code	Protective structure
L	IP55
M	IP21
S	IP00

FRENIC-VG

FRN 30 S VG 1 S - 4 E

Code	Series name
FRN	FRENIC Series
Code	Nominal applied motor capacity
0.75	0.75kW
}	}
800	800kW
Code	Form
None	Unit type
S	Standard stack
B	Stack by phase

Code	Destination / Instruction Manual
E	English
C	Chinese
J	Japanese

Code	Input power source
2	Three-phase 200V
4	Three-phase 400V
69	Three-phase 690V

Code	Structure
S	Standard

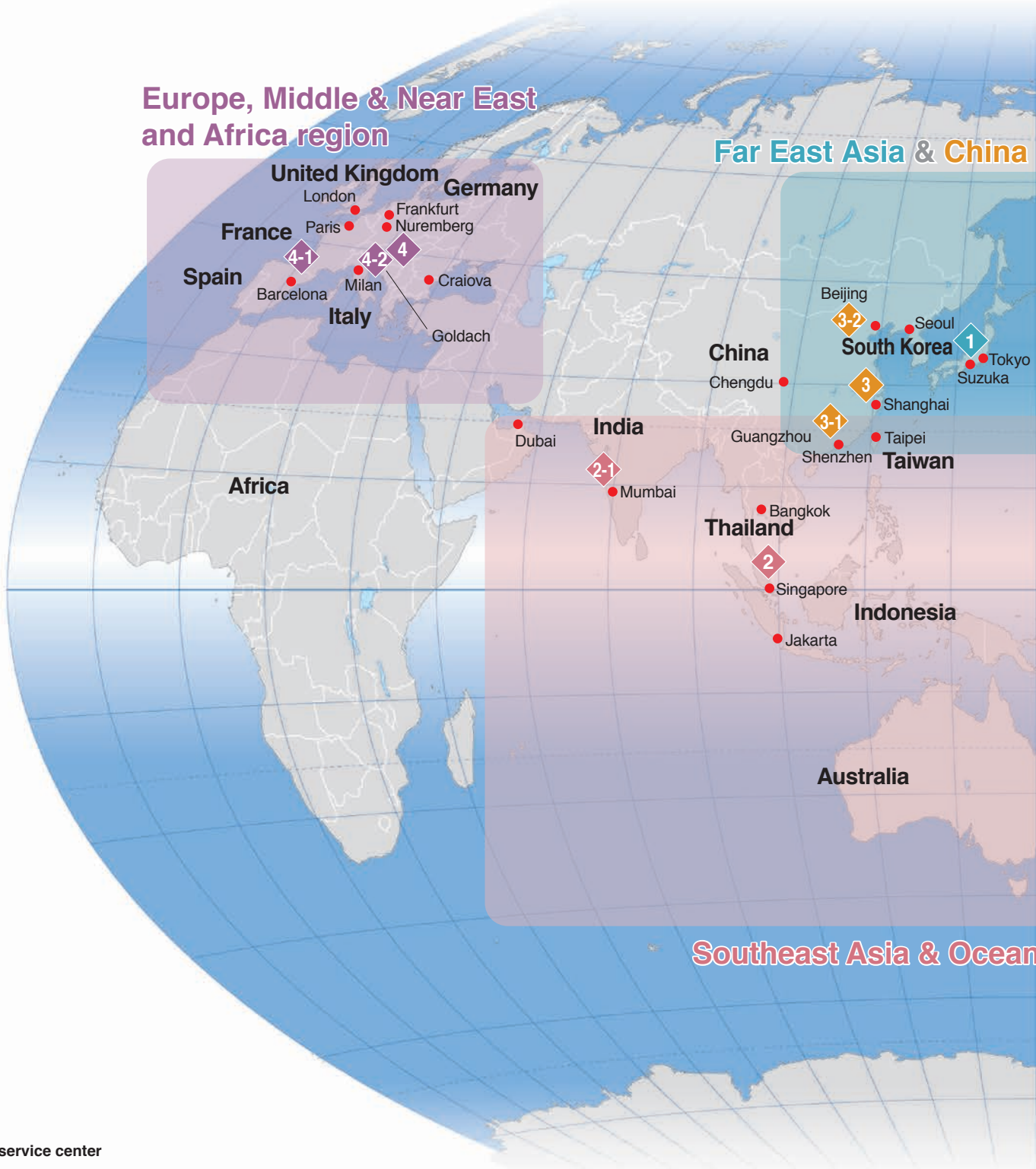
Code	Developed inverter series
1	1series

Code	Application range
VG	High performance vector control

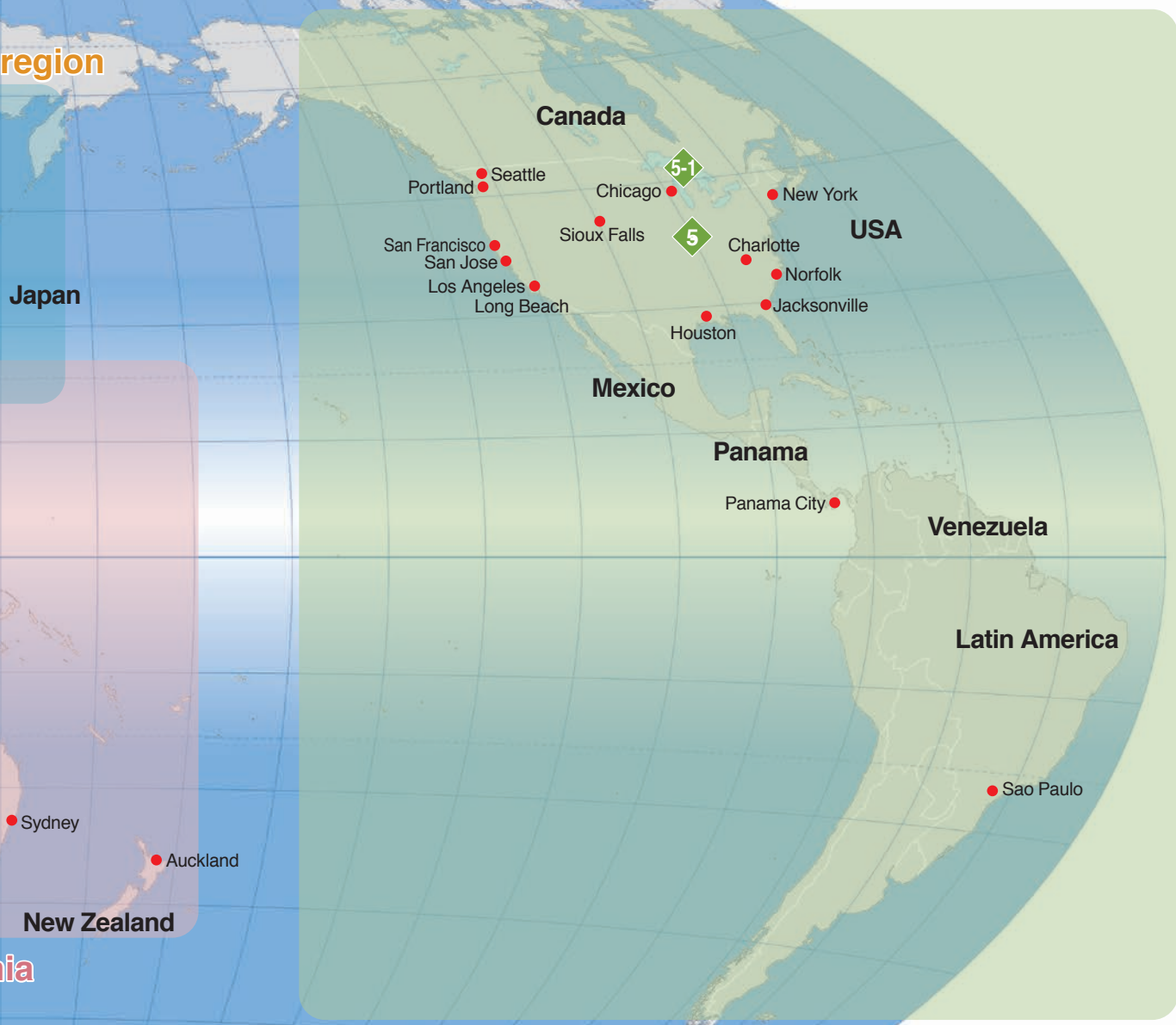
Overseas service network

Service net expanding globally!!

For inquiries about services, be sure to consult your local Fuji service centers.



*Note: See the pages listed for detailed company and contact information.



USA, Canada, Central & South America Area

Far East Asia & China Area



- ◆ Fuji FA Service Centers
- Contracted Service Companies
- Sub-contracted Companies
- ▲ Commission Service Companies

INV ≤ 22kW General Purpose Inverter, below 22kW		INV ≥ 30kW General Purpose Inverter, above 30kW		Medium Voltage Medium Voltage Inverter	
Vector Inv	Vector Inverter	Machine Tool Inv	Machine Tool Inverter	PLC PLC	POD POD
α Servo α	β Servo β	W Servo W	ALPHA5 ALPHA5	ALPHA5 Smart ALPHA5 Smart	Motor Motor

Far East Asia

Mark	Name	Address, Phone etc.	Business Hours	English	Applicable Products					
					Minor trouble			Major trouble		
1	Overseas Service Center	5520, Minamitamagaki-cho, Suzuka-City, Mie 513-8633, Japan • Phone : +81-59-383-8326 • Fax : +81-59-383-8874	08:30 ~ 17:15 (GMT +9hours)	Yes	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC
1a	CANA ELECTRIC CO., LTD.	Cana Bldg,62,Nambusunhwan-ro 356-gil, Seocho-Gu, Seoul, 137-887 Korea • Phone : +82-2-3462-0670 • Fax : +82-2-3462-0678	08:30 ~ 17:30 (GMT +9hours)	Yes	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC
1b	ELTA ELECTRICAL CO., LTD.	No.256, Shannong St. Sanchong Dist., New Taipei City, 241018, Taiwan • Phone : +886-2-2597-6458 • Fax : +886-2-2595-4571	08:30 ~ 17:30 (GMT +8hours)	Yes	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC
1c	Ching Tong Trading Co., Ltd.	16 Alley 4, Lane 78, Chang-An W. Rd., Taipei 10351, Taiwan • Phone : +886-2-2555-2121 • Fax : +886-2-2559-8666 • E-mail : service@ctkingdom.com	08:30 ~ 18:30 (GTM +8hours)	Yes	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC
1d	FULL KEY SYSTEM CO., LTD.	12F, No. 111-8, Xingde Rd., Sanchong Dist., New Taipei City, Taiwan • Phone : +886-2-2995-2008 • Fax : +886-2-2995-2028	09:00 ~ 18:00 (GTM +8hours)	Yes	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC	INV ≤ 22kW Vector Inv	INV ≥ 30kW Machine Tool Inv	Medium Voltage PLC

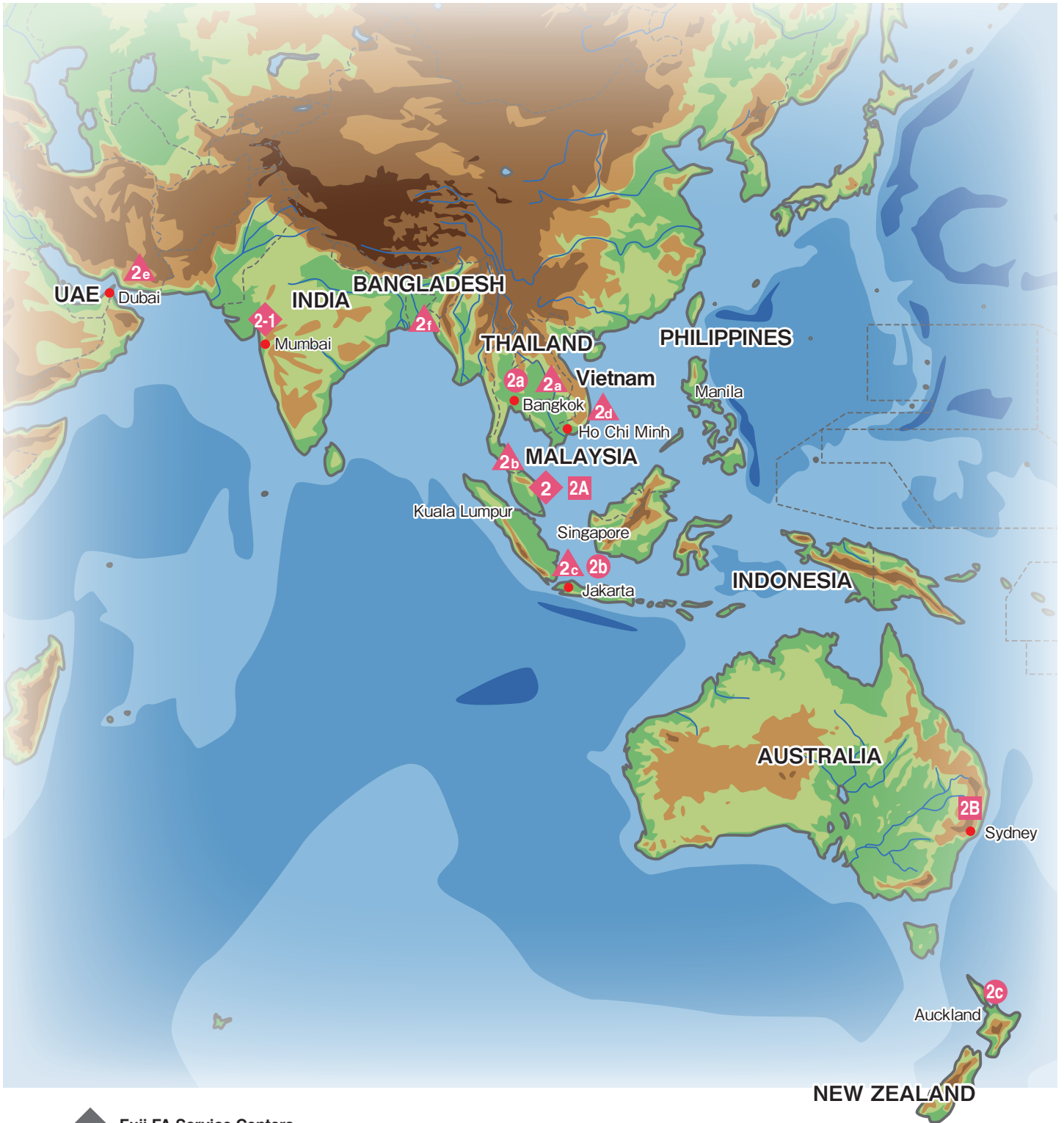
China

INV ≤ 22kW General Purpose Inverter, below 22kW		INV ≥ 30kW General Purpose Inverter, above 30kW		Medium Voltage Medium Voltage Inverter	
Vector Inv	Vector Inverter	Machine Tool Inv	Machine Tool Inverter	PLC PLC	POD POD
Servo Amp.	Servo Amp.	Servo Motor	Servo Motor	Motor	Motor

Mark	Name	Address, Phone etc.	Business Hours	English	Applicable Products					
					Minor trouble			Major trouble		
3	FUJI ELECTRIC (CHINA) CO., LTD.	26F, Global Harbor Tower B, 1188 North Kaixuan Road, Putuo District, Shanghai 200062, R.P.CHINA • Phone : +86-21-5496-1177 • Fax : +86-21-5496-0189	09:00 ~ 17:35 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3-1	Shenzhen Office	Room 2602, Han Tang Buliding, Oversea Chinese Town, Nanshan District, Shenzhen, CHINA (P.C.518052) • Phone : +86-755-8363-2248 • Fax : +86-755-8362-9785	09:00 ~ 17:35 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3-2	Beijing Office	Unit 2007, Tower A Phoenix Place, 5A Shuguang Xili, Chaoyang District, Beijing, China (P.C.100028) • Phone : +86-10-5939-2250 • Fax : +86-10-5939-2251	09:00 ~ 17:35 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3a	Beijing Blue Stone Technology Development Co., Ltd.	Floor 22, Kemao Canter Building, No.18, Xhongguanchun Street, Haidian District, Beijing, China (P.C.100190) • Phone : +86-10-6256-1166, 8125 • Fax : +86-10-6264-1552	09:00 ~ 17:30 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3b	Star Automation Equipment(Shenzhen) Co., Ltd.	Room916, Yin Long Zhan Ye Building, Shen Nan Rd, Che Gong Miao, FuTian District, Shenzhen City, Guangdong Province, P.R.China (P.C.518040) • Phone : +86-755-8347-9580 • Fax : +86-755-8347-9509	08:30 ~ 17:30 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3c	Rujiang Engineering Equipment Co.,Ltd.	No.401, Royal Villa Mingdi International Hotel, Jianhe Road No.668, Shanghai City, P.R.C. • Phone : +86-21-6321-7500 • Fax : +86-21-6321-8655	08:30 ~ 17:00 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3d	Polytrade (Shanghai) Co., Ltd.	Rm.806, Enterprise Plaza, No.228 Mei Yuan Road, Shanghai, China (P.C. : 200070) • Phone : +86-21-6381-6236 • Fax : +86-21-6381-6760	09:00 ~ 18:00 (GMT +8hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3e	Shanghai Stone Trading Co.,Ltd.	Room 505, No.1, 600 Nong, Tianshan Road, Changning District, Shanghai, China • Phone : +86-21-6113-6333 • Fax : +86-21-6113-6555	09:00 ~ 16:30 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3f	Wuxi Xinqiyuan Technology Co.,Ltd.	No.400, Wuxi (National) Industrial Design Parck, Hongqiao Road, Liyuan Economic Developing Zoon, Wuxi, Jiangsu, China • Phone : +86-510-8513-5390 • Fax : +86-510-8513-5391	08:30 ~ 17:00 (GMT +8hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3g	Shanghai Hui Chuang Industrial Co.,Ltd.	No.102, Guilin Science Park No.5 Buliding, Guiping Road No.333, Xuhui District, Shanghai City, P.R.C. • Phone : +86-21-6495-9251 • Fax : +86-21-2301-0459	08:30 ~ 12:00 13:00 ~ 17:30 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3h	Hangzhou Sun Electric Co.,Ltd.	No.B406, Science Buliding, East Software Park, Wensan Road No.90, Hangzhou City, Zhejiang Province, P.R.C. • Phone: +86-571-8195-1299 • Fax : +86-571-8195-1211	08:30 ~ 17:30 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3i	SHANGHAI LONGSTANDING ELECTROMECHANICAL CONTROL EQUIPMENT CO.,LTD.	4F, Buliding 11, Suide Road No.2 Nong, Shanghai City, P.R.C. • Phone : +86-21-5108-8777 • Fax : +86-21-5108-7802	08:30 ~ 12:00 13:00 ~ 17:30 (GMT +8hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3j	Zibo HuiKe Mechanical & Electrical Equipment Co.,Ltd.	No.3-06, The Area in Mechanical and Electrical Hardware City, Zhangdian District, Zibo City, Shandong Province, P.R.C. • Phone : +86-533-285-7971 (Hot Line : +86-400-600-3499) • Fax : +86-533-285-7972	08:40 ~ 11:30 13:30 ~ 17:30 (GMT +8hours)	No	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
3-1	Shanghai Angdian Industry Co., Ltd. Motor Reparative Factory	Make69, No.2031, Jiangchuan Road, Minhang District, Shanghai, China (P.C.201111) • Web : www.sh-angdian.com • Phone : +86-21-6430-1105 • Fax : +86-21-5475-8621	08:00 ~ 16:30 (GMT +8hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor

Contact your local Fuji Electric sales affiliate to request after-sales service (including spare parts for power distribution/control equipment). Please contact each service company for applicable products in detail.

Southeast Asia & Oceania



- ◆ Fuji FA Service Centers
- Contracted Service Companies
- Sub-contracted Companies
- ▲ Commission Service Companies

INV ≤ 22kW General Purpose Inverter, below 22kW		INV ≥ 30kW General Purpose Inverter, above 30kW		Medium Voltage Medium Voltage Inverter	
Vector Inv	Vector Inverter	Machine Tool Inv	Machine Tool Inverter	PLC PLC	POD POD
Servo Amp.	Servo Amp.	Servo Motor	Servo Motor	Motor	Motor

Mark	Name	Address, Phone etc.	Business Hours	English	Applicable Products					
					Minor trouble			Major trouble		
2	South East & Oceania Service Centre Fuji Electric Asia Pacific Pte. Ltd.	151 Lorong Chuan, #03-01/01A New Tech Park lobby A, Singapore 556741 • Phone : +65-6533-0010 • Fax : +65-6533-0021	08:45 ~ 17:30 (GTM +8hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2-1	Fuji Electric India Private Limited	503, A-wing, Dynasty Business Park, Andheri-Kurla Road And-heri (East), Mumbai-400 059, India • Web : www.fujielectric.co.in • Phone : +91-22-4010-4870	08:45 ~ 17:30 (GTM +5.5hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2A	Fuji Technical Centre (S'pore) Pte Ltd.	48 Toh Guan Road East #09-110, Enterprise Hub Singapore 608586 • Phone : +65-6515-5970, 5971 • Fax : +65-6515-5155	08:30 ~ 18:00 (GTM +8hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2a	Fuji Technical Centre (Thailand) Co., Ltd.	8 Soi Lasalle 77, Kwaeng Bangna, Khet Bangna, Bangkok 10260, Thailand • Phone : +66-2393-8904 ~ 6 • Fax : +66-2393-8909	08:30 ~ 17:30 (GTM +7hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2b	PT. Unitama Sentosa Gemilang	Jl. R. E. Martadinata Kompleks Permata Ancol Blok N -32 Jakarta Utara Indonesia • Web : www.unitama.co.id • Phone : +62-21-6451132 / 34 / 35 • Fax : +62-21-6451130	08:30 ~ 17:30 (GTM +7hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2B	CSE-UNISERVE PTY. LIMITED	10 Columbia Way Baulkham Hills NSW 2153 Australia • Web : www.cse-uniserve.com.au • Phone : +61-2-8853-4200 • Fax : +61-2-8853-4281	08:30 ~ 17:00 (GTM +10hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2c	CSE-Uniserve NZ Limited	Unit F, 55 Druces Road Manukau Clity, New Zealand • Web : www.cse-waf.co.nz • Phone : +64-9-271-3810 • Fax : +64-9-262-3292	08:30 ~ 17:00 (GTM +12hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2a	S.T. Control Co., Ltd.	84/1,Soi Ramkhamhaeng 9 (Thararom), Ramkhamhaeng Road, Wangthonglang, Bangkok 10310. • Web : www.stcontrol.com • Phone : +66-2-319-2559 • Fax : +66-2-319-1800	08:00 ~ 17:00 (GTM +7hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2b	EITA Electric Sdn. Bhd.	Lot 4, Block A, Jalan SS13/7,Subang Jaya Industrial Estate, 47500 Subang Jaya,Selangor Darul Ehsan, Malaysia. • Web : www.eita.com.my • Phone : +60-3-5637 8088 • Fax : +60-3-5635 4719	08:30 ~ 18:00 (GTM +8hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2c	PT. DUTA FUJI ELECTRIC	JL. HAYAM WURUK 4F-H, JAKARTA 10120 • Web : www.dutafuji.com • Phone : +62-21-384-0834 • Fax : +62-21-352-1208,352-1207	08:00 ~ 17:00 (GTM +7hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2d	Hao Phuong Co.,Ltd.	7/31 Song Than Business Center, Di An Ward,Binh Duong Province, Vietnam • Web : www.haophuomg.com • Phone : +84-650-3737619 • Fax : +84-650-3737620	08:00 ~ 12:00 13:30 ~ 17:00 (Sat.:08:00~12:00) (GMT +7hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2e	M.A.H.Y Khoory & Co. L.L.C	Abu Hail, Dubai, United Arab Emirates P.O BOX - 41 • Web : https://mahykhoory.com/ • Phone : +971 4 6067300	SAT~THU 08:00~17:00 (GMT +4hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
2f	Automation Engineering & Controls Ltd.	AKH Tower(3rd Floor), Plot#10, Lane#05, Road #01, Block#L, Agrabad Access Road, Barapole, Halishahar Housing Estate, Chittagong-4216. • Phone : +88-031-725750, 724259, 754259 • Fax : +88-031-714128	SAT~THU 09:00~18:00 (GMT +6hours)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor

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Please contact each service company for applicable products in detail.

Europe, Middle East & Africa Area



INV ≤ 22kW General Purpose Inverter, below 22kW		INV ≥ 30kW General Purpose Inverter, above 30kW		Medium Voltage Medium Voltage Inverter	
Vector Inv	Vector Inverter	Machine Tool Inv	Machine Tool Inverter	PLC PLC	POD POD
Servo Amp.	Servo Amp.	Servo Motor	Servo Motor	Motor	Motor

Mark	Name	Address, Phone etc.	Business Hours	English	Applicable Products					
					Minor trouble			Major trouble		
4	EU Service Center Fuji Electric Europe GmbH	Goethering 58, 63067 Offenbach/Main Germany • Web : www.fujielectric-europe.com • Phone : +49-69-66-90-29-0 • Fax : +49-69-66-90-29-58	09:00 ~ 18:00 (GMT +1hour)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4-1	Fuji Electric Europe GmbH, Spain Branch	C/dels Paletes 8, Edifici B, Primera Planta B, Parc Tecnològic del Vallès, 08290 Cerdanyola del Vallès (Barcelona), Spain • Web : www.fujielectric-europe.com • Phone : +34-93-5824-333 • Fax : +34-93-5824-344	09:00 ~ 18:00 (GMT +1hour)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4-2	Fuji Electric Europe GmbH, Switzerland Branch	Rietlistrasse 5, 9403 Goldach, Switzerland • Web : www.fujielectric-europe.com • Phone : +41-71-858-2949 • Fax : +41-71-858-2940	08:00 ~ 17:00 (GMT +1hour)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4A	KEMPSTON CONTROLS	Shirley Road Rushden, Northamptonshire NN10 6BZ, U.K. • Web : www.kempstoncontrols.co.uk • Phone : +44-1933-411411 • Fax : +44-1933-410211	09:00 ~ 18:00 (GMT+1hour)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4B	C.N.C. SERVICES	37, rue de Villeparisis-BP33 (République)-77290 Mirty-Mory, France • Web : www.cncservices.fr • Phone : +33-1-64-67-93-72 • Fax : +33-1-64-27-66-54	09:00 ~ 18:00 (GMT +1hour)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4C	S.A.T. ENGINEERING S.R.L.	Via Palermo, 22 20090 Assago(MI), Italy • Web : www.satengineering.com • Phone : +39-2-4571-3516 • Fax : +39-2-4571-4435	09:00 ~ 18:00 (GMT +1hour)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4D	GTS Gesellschaft für Technischen Service mbH	Arnold-Sommerfeld-Ring 10, 52499 Baesweiler, Germany • Web : www.GTSmbH.com • Phone : +49-2401-60-353-0 • Fax : +49-2401-60-353-13	24hours	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4a	SERVICIO INDUSTRIAL DE ELECTRONICA S.A.	Poligon Industrial Monguít C/Centelles S/N - Nave A y B 08480 L'Ametlla del Vallès (Barcelona) • Web : www.side.es • Phone : +34-902-88-45-61 • Fax : +34-902-88-45-59	—	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4b	Kontek Otomasyon A.S.	Efnan Sok. No:9, Merkez Mah. Çekmeköy, 34782 Istanbul, Turkey • Web : kontekenerji.com.tr • Phone : +90-216-446-4700 • Fax : +90-216-466-2120	08:00 ~ 17:00 (GMT +2hour)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4c	INDUSTRIAL ELECTRIC SYSTEMS	Leninskij prospect 121/1, korp 2, 119571 Moscow, Russia • Web : www.indels.ru • Phone : +7-495-781-0098	08:00 ~ 17:00 (GMT +4hour)	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4d	R.e B. Impianti s.r.l	Contrada Molino, 17/N, 46042 Castel Goffredo (MN), Italy • Phone : +39-376-171-5753	—	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4-1	BEN Buchele Elektromotorenwerke GmbH	Poppenreuther Straße 49a, D-90419 Nürnberg, Germany • Web : www.benbuechle.de • Phone : +49-911-37-48-0 • Fax : +49-911-37-48-138	—	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
4-2	MOTOARE ELECTRICE SRL	Craiova-200633, Popoveni 7, Romania • Phone/Fax : +40-251-425-343	—	Yes	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage	INV ≤ 22kW	INV ≥ 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC POD	Vector Inv	Machine Tool Inv	PLC POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor

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USA, Canada, Central & South America Area



Mark	Name	Address, Phone etc.	Business Hours	English	Applicable Products					
					Minor trouble			Major trouble		
5	USA SERVICE CENTER Fuji Electric Corp of America	105 14th St NW, Roanoke, VA 24017, USA • Phone : +1-540-491-9625	09:00 ~ 17:00 (GMT -5hours)	Yes	INV \leq 22kW	INV \geq 30kW	Medium Voltage	INV \leq 22kW	INV \geq 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC/POD	Vector Inv	Machine Tool Inv	PLC/POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
5-1	CHICAGO SERVICE STATION	210 Dowdle Ct. Unit 2, Algonquin, IL 60102, USA • Phone : +1-847-397-8040	09:00 ~ 17:00 (GMT -6hours)	Yes	INV \leq 22kW	INV \geq 30kW	Medium Voltage	INV \leq 22kW	INV \geq 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC/POD	Vector Inv	Machine Tool Inv	PLC/POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
5A	MAHO SERVICE INC.	5550 Cerritos Ave. Suite H, Cypress, CA 90630, USA • Phone : +1-714-220-1878 • Fax : +1-714-220-1870	08:00 ~ 17:00 (GMT -8hours)	Yes	INV \leq 22kW	INV \geq 30kW	Medium Voltage	INV \leq 22kW	INV \geq 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC/POD	Vector Inv	Machine Tool Inv	PLC/POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor
5C	INDUSTRIAL ELECTRONIC SOLUTIONS	1901 Lendew St, Ste#9., Greensboro, NC 27408, USA • Web : www.iesgso.com • Phone : +1-336-275-3426 • Fax : +1-336-378-1183	24hours	Yes	INV \leq 22kW	INV \geq 30kW	Medium Voltage	INV \leq 22kW	INV \geq 30kW	Medium Voltage
					Vector Inv	Machine Tool Inv	PLC/POD	Vector Inv	Machine Tool Inv	PLC/POD
					Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor

General Purpose Inverter, below 22kW		General Purpose Inverter, above 30kW		Medium Voltage Inverter		Vector Inv Vector Inverter		Machine Tool Inv Machine Tool Inverter		PLC	POD	Servo Amp. Servo Amp.		Servo Motor Servo Motor		Motor Motor	
Mark	Name	Address, Phone etc.		Business Hours	English	Applicable Products											
						Minor trouble						Major trouble					
5a	MALLOY ELECTRIC	809 West Russell St., Sioux Falls, SD 57104, USA • Phone : +1-605-336-3693 • Fax : +1-605-336-1545		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5b	KELLER ELECTRICAL INDUSTRIES, INC.	1881 East University Drive, Phoenix, AZ 85034 • Web : www.kellerelectrical.com • Phone : +1-602-437-3015 • Fax : +1-602-437-8163		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5c	CONTROL CONCEPTS, INC.	6635 Theall Rd, Houston, TX 77066, USA • Web : www.controlconceptstexas.com • Phone : +1-713-352-3210 • Fax : +1-602-437-8163		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5d	SPECIALIZED ELECTRONIC SERVICES, INC.	10890 Alder Circle, Dallas, TX 75238, USA • Web : www.specializedelectronics.com • Phone : +1-972-680-9210 • Fax : +1-972-690-9200		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5e	MSA CONTROL INDUSTRIA ELECTRICA LTDA.	Rua Iapo 334, - Casa Verde - Sao Paulo - SP - Brasil - CEP 02512-020 • Web : www.msaccontrol.com.br • Phone : +55-11-3961-1171 • Fax : +55-11-3961-1171		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5f	DYKMAN ELECTRICAL, INC.	2323 Federal Way, Boise, ID 83705, USA • Web : www.dykman.com • Phone : +1-208-336-3988 • Fax : +1-208-336-1506		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5g	ELECTRONIC DRIVES AND CONTROLS INC.	17 Eastmans Road, Parsippany NJ, USA 07054 • Web : www.electronicdrives.com • Phone : +1-973-428-0500 • Fax : +1-973-428-0135		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5h	LUCAPEL COMERCIAL LTDA.	Rua Issaco Coppini, 43 - Bairro Oswaldo Cruz - Sao Caetano do Sul - SP - Brasil - CEP : 09571-110 • Web : www.lucapel.com.br • Phone : +55-11-4232-3422 • Fax : +55-11-4232-3424		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5-1	REED ELECTRIC & FILED SERVICE	5503 S. Boyle Avenue, Los Angeles, CA 90058, USA • Web : www.reed-electric.com • Tel : +1-323-587-2284 • Fax : +1-323-587-2142		08:00 ~ 16:00 (GMT -8hours)	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5-2	CASCADE MACHINERY & ELECTRIC, INC.	4600 E.Marginal Way South, Seattle WA 98134, USA • Web : www.cascade-machinery.com • Phone : +1-206-762-0500 • Fax : +1-206-767-5122		08:00 ~ 16:30 (GMT -8hours)	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5-3	ELECTRIC MOTOR AND CONTRACTING CO., INC.	3703 Cook Blvd. Chesapeake, VA 23323, USA • Web : www.emc-co.com • Phone : +1-757-487-2121 • Fax : +1-757-487-5983		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5-4	WESTSIDE ELECTRIC INC.	4031 Faye Rd. Jacksonville, FL 32226, USA • Web : www.westside-electric.com • Phone : +1-904-757-1126 • Fax : +1-904-757-6068		08:00 ~ 16:30 (GMT -5hours)	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5-5	Talleres Industriales, C.A.	Av. Central Cl. 16, Colon, Panama • Phone : +1-507-433-9500		08:00 ~ 17:00 (GMT -5hours)	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5-6	CRANE REPAIR SERVICE	1002 Valley Avenue NW, Puyallup, WA 98371, USA • Web : www.lancecrane.com • Phone: +1-253-848-9473 • Fax : +1-253-848-1790		24hours	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						
5-7	SANMA EQUIPOS INDUSTRIALES, SA De C.V.	Del Rastro 141, Villa de San Antonio, 67110 Guadalupe, N.L., Mexico • Web : www.sanmaeq.com • Phone : +52-81-8299-8345		-	Yes	INV≤22kW	INV≥30kW	Medium Voltage	INV≤22kW	INV≥30kW	Medium Voltage	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD
						Vector Inv	Machine Tool Inv	PLC	POD	Vector Inv	Machine Tool Inv	PLC	POD				
						Servo Amp.	Servo Motor	Motor	Servo Amp.	Servo Motor	Motor						

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Guideline for Suppressing Harmonics

Application to "Guideline for Suppressing Harmonics by the Users Who Receive High Voltage or Special High Voltage"

These products fall under the scope of the "Guideline for Suppressing Harmonics by Customers Receiving High Voltage or Special High Voltage." When entering into a new contract with an electric power company, or updating your existing contract, you will be requested to submit an accounting statement form by the electric power company.

(1) Scope of regulation

- In principle, the guideline applies to the customers that meet the following two conditions:
 - The customer receives high voltage or special high voltage.
 - The "equivalent capacity" of the converter load exceeds the standard value for the receiving voltage (50kVA at a receiving voltage of 6.6kV).

(2) Regulation method

The level (calculated value) of the harmonic current that flows from the customer's receiving point out to the system is subjected to the regulation. The regulation value is proportional to the contract demand. The regulation values specified in the guideline are shown in Table 1.

Table 1 Upper limits of harmonic outflow current per kW of contract demand [mA/kW]

Receiving voltage	5th	7th	11th	13th	17th	19th	23th	Over 25th
6.6kV	3.5	2.5	1.6	1.3	1.0	0.90	0.76	0.70
22kV	1.8	1.3	0.82	0.69	0.53	0.47	0.39	0.36

1. Calculation of Equivalent Capacity (Pi)

Although the equivalent capacity (Pi) is calculated using the equation of (input rated capacity) x (conversion factor), catalog of conventional inverters do not contain input rated capacities. A description of the input rated capacity is shown below:

(1) "Inverter rated capacity" corresponding to "Pi"

- Calculate the input fundamental current I1 from the kW rating and efficiency of the load motor, as well as the efficiency of the inverter. Then, calculate the input rated capacity as shown below:

$$\text{Input rated capacity} = \sqrt{3} \times (\text{power supply voltage}) \times I_1 \times 1.0228/1000[\text{kVA}]$$
 Where 1.0228 is the 6-pulse converter's value obtained by (effective current) / (fundamental current).
- When a general-purpose motor or inverter motor is used, the appropriate value shown in Table 2 can be used. Select a value based on the kW rating of the motor used, irrespective of the inverter type.

Table 2 "Input rated capacities" of general-purpose inverters determined by the nominal applied motors

Nominal applied motor [kW]	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	
Pi [kVA]	200V	0.57	0.97	1.95	2.81	4.61	6.77	9.07	13.1	17.6	21.8	25.9
	400V	0.57	0.97	1.95	2.81	4.61	6.77	9.07	13.1	17.6	21.8	25.9
Nominal applied motor [kW]	30	37	45	55	75	90	110	132	160	200	220	
Pi [kVA]	200V	34.7	42.8	52.1	63.7	87.2	104	127				
	400V	34.7	42.8	52.1	63.7	87.2	104	127	153	183	229	252
Nominal applied motor [kW]	250	280	315	355	400	450	500	530	560	630		
Pi [kVA]	200V											
	400V	286	319	359	405	456	512	570	604	638	718	

(2) Values of "Ki (conversion factor)"

- Depending on whether an optional ACR (AC REACTOR) or DCR (DC REACTOR) is used, apply the appropriate conversion factor specified in the appendix to the guideline. The values of the converter factor are shown in Table 3.

Table 3 "Conversion factors Ki" for general-purpose inverters determined by reactors

Circuit category	Circuit Type	Conversion factor Ki	
3	3-phase rectifier (smoothing capacitor)	Without a reactor	K31=3.4
		With a reactor (ACR)	K32=1.8
		With a reactor (DCR)	K33=1.8
		With reactors (ACR and DCR)	K34=1.4
4	Single-phase bridge (capacitor smoothing, voltage doubler rectification system)	Without a reactor	K41=2.3
		With a reactor (ACR)	K42=0.35
	Single-phase bridge (capacitor smoothing, full-wave rectification system)	Without a reactor	K43=2.9
		With a reactor (ACR)	K44=1.3
5	Self-excited three-phase bridge	High-efficiency power supply regeneration When using PWM converter	K5=0

2. Calculation of Harmonic Current

(1) Value of "input fundamental current"

- Apply the appropriate value shown in Table 4 based on the kW rating of the motor, irrespective of the inverter type or whether a reactor is used.
- * If the input voltage is different, calculate the input fundamental current in inverse proportion to the voltage.

Table 4 "Input fundamental currents" of general-purpose inverters determined by the nominal applied motors, 3-phase rectifier (smoothing capacitor)

Nominal applied motor [kW]	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	
Input fundamental current [A]	200V	1.61	2.74	5.50	7.93	13.0	19.1	25.6	36.9	49.8	61.4
	400V	0.81	1.37	2.75	3.96	6.50	9.55	12.8	18.5	24.9	30.7
6.6 kV converted value [mA]	49	83	167	240	394	579	776	1121	1509	1860	
Nominal applied motor [kW]	30	37	45	55	75	90	110	132	160	200	
Input fundamental current [A]	200V	98.0	121	147	180	245	293	357			
	400V	49.0	60.4	73.5	89.9	123	147	179	216	258	323
6.6 kV converted value [mA]	2970	3660	4450	5450	7450	8910	10850	13090	15640	19580	
Nominal applied motor [kW]	250	280	315	355	400	450	500	530	560	630	
Input fundamental current [A]	200V										
	400V	403	450	506	571	643	723	804	852	900	1013
6.6 kV converted value [mA]	24400	27300	30700	34600	39000	43800	48700	51600	54500	61400	

(2) Calculation of harmonic current

Table 5 Generated harmonic current [%], 3-phase rectifier (smoothing capacitor)

Degree	5th	7th	11th	13th	17th	19th	23th	25th
Without a reactor	65	41	8.5	7.7	4.3	3.1	2.6	1.8
With a reactor (ACR)	38	14.5	7.4	3.4	3.2	1.9	1.7	1.3
With a reactor (DCR)	30	13	8.4	5.0	4.7	3.2	3.0	2.2
With reactors (ACR and DCR)	28	9.1	7.2	4.1	3.2	2.4	1.6	1.4

- ACR: 3%
- DCR: Accumulated energy equal to 0.08 to 0.15ms (100% load conversion)
- Smoothing capacitor: Accumulated energy equal to 15 to 30ms (100% load conversion)
- Load: 100%

$$\text{nth harmonic current [A]} = \text{Fundamental current [A]} \times \frac{\text{Generated nth harmonic current [\%]}}{100}$$

Calculate the harmonic current of each order (harmonic number) using the following equation:

(3) Maximum availability factor

- For a load like elevators, which provides intermittent operation, or a load with a over-dimensioned motor rating, reduce the current by multiplying the equation by the "maximum availability factor" of the load.
- The "maximum availability factor of an appliance" means the ratio of the capacity of the harmonic generator in operation at which the availability reaches the maximum, to its total capacity, and the capacity of the generator in operation is an average for 30 minutes.
- In general, the maximum availability factor is calculated according to this definition, but the standard values shown in Table 6 are recommended for inverters for building equipment.

Table 6 Maximum availability factor of inverters, etc. for building equipment (based on equipment type)

Equipment	Inverter capacity category	Single inverter availability factor
Air conditioning system	200kW or less	0.55
	Over 200kW	0.60
Sanitary pump	—	0.30
Elevator	—	0.25
Rising elevator	—	0.65
Falling elevator	—	0.25
Refrigerator, freezer	50kW or less	0.60

[Correction coefficient according to contract demand level]

- Since the total availability factor decreases with increase in the building scale, calculating reduced harmonics with the correction coefficient β defined in Table 7 below is permitted.

Table 7 Correction coefficient according to the building scale

Contract demand [kW]	Correction coefficient β
300	1.00
500	0.90
1000	0.85
2000	0.80

*If the contract demand is between two specified values shown in Table 7, calculate the value by interpolation.

(4) Harmonic order to be calculated

Calculate only the "5th and 7th" harmonic currents

Product Warranty

To all our customers who purchase Fuji Electric products included in this catalog:

Please take the following items into consideration when placing your order.

When requesting an estimate and placing your orders for the products included in these materials, please be aware that any items such as specifications which are not specifically mentioned in the contract, catalog, specifications or other materials will be as mentioned below.
In addition, the products included in these materials are limited in the use they are put to and the place where they can be used, etc., and may require periodic inspection. Please confirm these points with your sales representative or directly with this company.
Furthermore, regarding purchased products and delivered products, we request that you take adequate consideration of the necessity of rapid receiving inspections and of product management and maintenance even before receiving your products.

1. Free of Charge Warranty Period and Warranty Range

1-1 Free of charge warranty period

- (1) The product warranty period is "1 year from the date of purchase" or 24 months from the manufacturing date imprinted on the name plate, whichever date is earlier.
- (2) However, in cases where the operating environment, conditions of use, use frequency and times used, etc., have an effect on product life, this warranty period may not apply.
- (3) Furthermore, the warranty period for parts restored by Fuji Electric's Service Department is "6 months from the date that repairs are completed."

1-2 Warranty range

- (1) In the event that breakdown occurs during the product's warranty period which is the responsibility of Fuji Electric, Fuji Electric will replace or repair the part of the product that has broken down free of charge at the place where the product was purchased or where it was delivered. However, if the following cases are applicable, the terms of this warranty may not apply.
 - 1) The breakdown was caused by inappropriate conditions, environment, handling or use methods, etc. which are not specified in the catalog, operation manual, specifications or other relevant documents.
 - 2) The breakdown was caused by the product other than the purchased or delivered Fuji's product.
 - 3) The breakdown was caused by the product other than Fuji's product, such as the customer's equipment or software design, etc.
 - 4) Concerning the Fuji's programmable products, the breakdown was caused by a program other than a program supplied by this company, or the results from using such a program.
 - 5) The breakdown was caused by modifications or repairs affected by a party other than Fuji Electric.
 - 6) The breakdown was caused by improper maintenance or replacement using consumables, etc. specified in the operation manual or catalog, etc.
 - 7) The breakdown was caused by a chemical or technical problem that was not foreseen when making practical application of the product at the time it was purchased or delivered.
 - 8) The product was not used in the manner the product was originally intended to be used.
 - 9) The breakdown was caused by a reason which is not this company's responsibility, such as lightning or other disaster.
- (2) Furthermore, the warranty specified herein shall be limited to the purchased or delivered product alone.
- (3) The upper limit for the warranty range shall be as specified in item (1) above and any damages (damage to or loss of machinery or equipment, or lost profits from the same, etc.) consequent to or resulting from breakdown of the purchased or delivered product shall be excluded from coverage by this warranty.

1-3. Trouble diagnosis

As a rule, the customer is requested to carry out a preliminary trouble diagnosis. However, at the customer's request, this company or its service network can perform the trouble diagnosis on a chargeable basis. In this case, the customer is asked to assume the burden for charges levied in accordance with this company's fee schedule.

2. Exclusion of Liability for Loss of Opportunity, etc.

Regardless of whether a breakdown occurs during or after the free of charge warranty period, this company shall not be liable for any loss of opportunity, loss of profits, or damages arising from special circumstances, secondary damages, accident compensation to another company, or damages to products other than this company's products, whether foreseen or not by this company, which this company is not responsible for causing.

3. Repair Period after Production Stop, Spare Parts Supply Period (Holding Period)

Concerning models (products) which have gone out of production, this company will perform repairs for a period of 7 years after production stop, counting from the month and year when the production stop occurs. In addition, we will continue to supply the spare parts required for repairs for a period of 7 years, counting from the month and year when the production stop occurs. However, it is estimated that the life cycle of certain electronic and other parts is short and it will be difficult to procure or produce those parts, so there may be cases where it is difficult to provide repairs or supply spare parts even within this 7-year period. For details, please confirm at our company's business office or our service office.

4. Transfer Rights

In the case of standard products which do not include settings or adjustments in an application program, the products shall be transported to and transferred to the customer and this company shall not be responsible for local adjustments or trial operation.

5. Service Contents

The cost of purchased and delivered products does not include the cost of dispatching engineers or service costs. Depending on the request, these can be discussed separately.

6. Applicable Scope of Service

Above contents shall be assumed to apply to transactions and use of the country where you purchased the products. Consult the local supplier or Fuji for the detail separately.



NOTES

When running general-purpose motors

- **Driving a 400V general-purpose motor**
When driving a 400V general-purpose motor with an inverter using extremely long cables, damage to the insulation of the motor may occur. Use an output circuit filter (OFL) if necessary after checking with the motor manufacturer. Fuji's motors do not require the use of output circuit filters because of their reinforced insulation.
- **Torque characteristics and temperature rise**
When the inverter is used to run a general-purpose motor, the temperature of the motor becomes higher than when it is operated using a commercial power supply. In the low-speed range, the cooling effect will be weakened, so decrease the output torque of the motor. If constant torque is required in the low-speed range, use a Fuji inverter motor or a motor equipped with an externally powered ventilating fan.
- **Vibration**
When the motor is mounted to a machine, resonance may be caused by the natural frequencies, including that of the machine. Operation of a 2-pole motor at 60Hz or more may cause abnormal vibration.
* Study use of tier coupling or dampening rubber.
* It is also recommended to use the inverter jump frequency control to avoid resonance points.
- **Noise**
When an inverter is used with a general-purpose motor, the motor noise level is higher than that with a commercial power supply. To reduce noise, raise carrier frequency of the inverter. High-speed operation at 60Hz or more can also result in more noise.

When running special motors

- **High-speed motors**
When driving a high-speed motor while setting the frequency higher than 120Hz, test the combination with another motor to confirm the safety of high-speed motors.
- **Explosion-proof motors**
When driving an explosion-proof motor with an inverter, use a combination of a motor and an inverter that has been approved in advance.
- **Submersible motors and pumps**
These motors have a larger rated current than general-purpose motors. Select an inverter whose rated output current is greater than that of the motor.
These motors differ from general-purpose motors in thermal characteristics. Set a low value in the thermal time constant of the motor when setting the electronic thermal function.
- **Brake motors**
For motors equipped with parallel-connected brakes, their braking power must be supplied from the primary circuit (commercial power supply). If the brake power is connected to the inverter power output circuit (secondary circuit) by mistake, problems may occur.
Do not use inverters for driving motors equipped with series-connected brakes.
- **Geared motors**
If the power transmission mechanism uses an

oil-lubricated gearbox or speed changer/reducer, then continuous motor operation at low speed may cause poor lubrication. Avoid such operation.

- **Synchronous motors**
It is necessary to use software suitable for this motor type. Contact Fuji for details.
- **Single-phase motors**
Single-phase motors are not suitable for inverter-driven variable speed operation. Use three-phase motors.
* Even if a single-phase power supply is available, use a three-phase motor as the inverter provides three-phase output.

Environmental conditions

- **Installation location**
Use the inverter in a location with an ambient temperature range of -10 to 50°C.
The inverter and braking resistor surfaces become hot under certain operating conditions. Install the inverter on nonflammable material such as metal. Ensure that the installation location meets the environmental conditions specified in "Environment" in inverter specifications.

Combination with peripheral devices

- **Installing a molded case circuit breaker (MCCB)**
Install a recommended molded case circuit breaker (MCCB) or an earth leakage circuit breaker (ELCB) in the primary circuit of each inverter to protect the wiring. Ensure that the circuit breaker capacity is equivalent to or lower than the recommended capacity.
- **Installing a magnetic contactor (MC) in the output (secondary) circuit**
If a magnetic contactor (MC) is mounted in the inverter's secondary circuit for switching the motor to commercial power or for any other purpose, ensure that both the inverter and the motor are fully stopped before you turn the MC on or off. Remove the surge killer integrated with the MC.
- **Installing a magnetic contactor (MC) in the input (primary) circuit**
Do not turn the magnetic contactor (MC) in the primary circuit on or off more than once an hour as an inverter fault may result. If frequent starts or stops are required during motor operation, use FWD/REV signals.
- **Protecting the motor**
The electronic thermal function of the inverter can protect the motor. The operation level and the motor type (general-purpose motor, inverter motor) should be set. For high-speed motors or water-cooled motors, set a small value for the thermal time constant to protect the motor.
If you connect the motor thermal relay to the motor with a long cable, a high-frequency current may flow into the wiring stray capacitance. This may cause the relay to trip at a current lower than the set value for the thermal relay. If this happens, lower the carrier frequency or use the output circuit filter (OFL).
- **Regarding power-factor correcting capacitor**
Do not mount power factor correcting capacitors in the inverter (primary) circuit. Use the DC REACTOR to improve the inverter power factor. Do

not use power factor correcting capacitors in the inverter output circuit (secondary). An overcurrent trip will occur, disabling motor operation.

- **Discontinuance of surge killer**
Do not mount surge killers in the inverter output (secondary) circuit.
- **Reducing noise**
Use of a filter and shielded wires are typical measures against noise to ensure that EMC Directives are met.
- **Measures against surge currents**
If an overvoltage trip occurs while the inverter is stopped or operated under a light load, it is assumed that the surge current is generated by open/close of the phase-advancing capacitor in the power system.
We recommend connecting a DC REACTOR to the inverter.
- **Megger test**
When checking the insulation resistance of the inverter, use a 500V megger and follow the instructions contained in the Instruction Manual.

Wiring

- **Wiring distance of control circuit**
When performing remote operation, use twisted shield wire and limit the distance between the inverter and the control box to 20m.
 - **Wiring length between inverter and motor**
If long wiring is used between the inverter and the motor, the inverter will overheat or trip as a result of overcurrent (high-frequency current flowing into the stray capacitance) in the wires connected to the phases. Ensure that the wiring is shorter than 50m. If this length must be exceeded, lower the carrier frequency or mount an output circuit filter (OFL).
 - **Wiring size**
Select cables with a sufficient capacity by referring to the current value or recommended wire size.
 - **Wiring type**
Do not use multicore cables that are normally used for connecting several inverters and motors.
 - **Grounding**
Securely ground the inverter using the grounding terminal.
- ### Selecting inverter capacity
- **Driving general-purpose motor**
Select an inverter according to the applicable motor ratings listed in the standard specifications table for the inverter. When high starting torque is required or quick acceleration or deceleration is required, select an inverter with a capacity one size greater than the standard.
 - **Driving special motors**
Select an inverter that meets the following condition:
Inverter rated current > Motor rated current.

Transportation and storage

When transporting or storing inverters, follow the procedures and select locations that meet the environmental conditions that agree with the inverter specifications.