

Integrated Smart Lift Drive

FRENIC-Lift Series

ALL in ONE



FRENIC-Lift

[OUTPUT : 4.0 - 18.5kW]

ALL in ONE

Great performance through dedicated designs
Welcome to the new generation of lift inverter



One unit does it all

Compact all-in-one unit with all necessary lift control panel equipment. It eliminates the machine room, simplifying lift installation in difficult-to-install locations.

It also features the industry's first shockless stop function, ensuring safety during sudden power outages.

All-in-one

The controller, main power circuit, ARD, and other necessary equipment are integrated into the inverter. A single unit is all it takes to begin lift operations.

Safety and security

It features the industry's first shockless stop function that safely stops the lift at the nearest floor in the event of a power outage. It reduces the risk of injury to passengers, even in areas with frequent power outages.

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Integrated Smart Lift Drive

FRENIC-Lift | LM3U

Series

ALL in ONE



All-in-one

The controller, main power circuit, ARD, and other necessary equipment are integrated into the inverter.
A single unit is all it takes to begin lift operations.

01 Compact design for installation in confined spaces

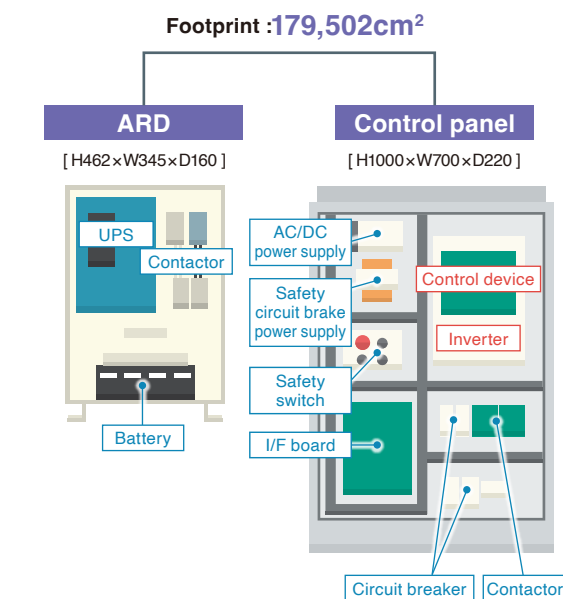
Unit type that integrates necessary parts for ARD(Auto Rescue Device) operation.
Two cabinet types (control panels) are also available, each equipped with a breaker and battery.
They both contribute to space savings, being compact with a much smaller footprint than conventional separately-mounted ARDs.

Industry's smallest class

Footprint
Reduced approx.
74%

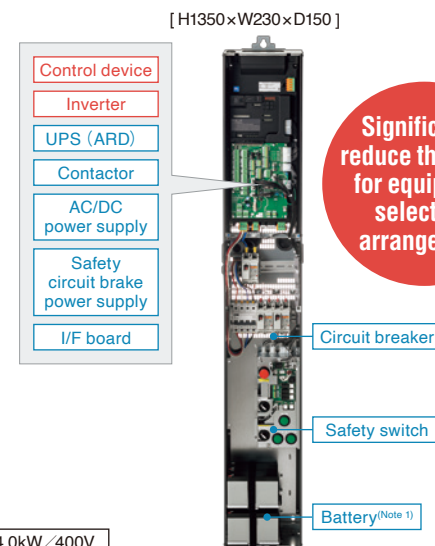
Depth
Reduced approx.
32%

Separately-mounted ARD General configuration



LM3U Series

Footprint : **46,575cm²**
Layout example inside a control panel



Note 1 : Battery must be arranged for by the customer.

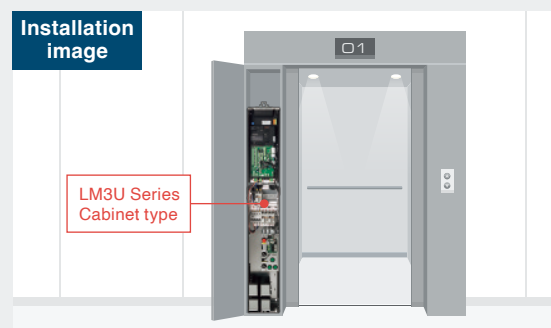
POINT

Eliminates machine room and contributes to lobby design



All-in-one design eliminates the machine room, and its industry-leading thinness allows installation without affecting lobby design or surrounding appearance.

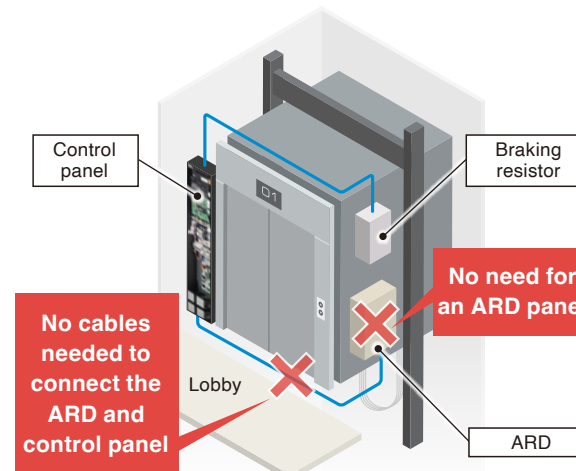
Installation image



02 Built-in ARD reduces installation costs and simplifies maintenance

Reduces installation costs

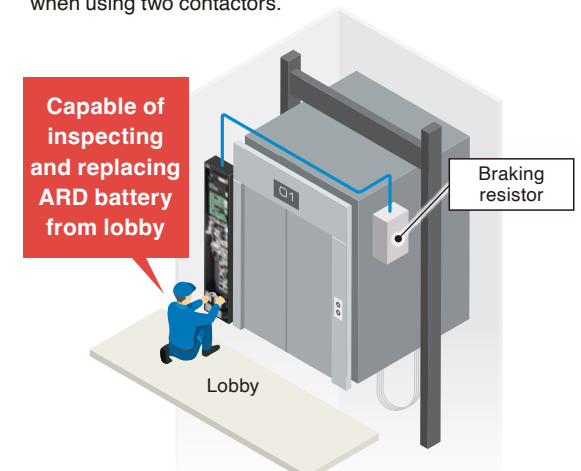
The built-in ARD eliminates the need for ARD/UPS installation panels and inverter connection cables, thereby reducing installation costs. It requires no complicated wiring work, thus shortening work time from delivery to installation.



Simplifies maintenance

It enables the ARD battery to be inspected and replaced from the lobby, thus eliminating the need to work inside the shaft. It also comes with a contactorless solution compliant with EN81-20 that decreases maintenance work and reduces contactor-induced noise similar to a safety circuit when using two contactors.

Both



POINT

Simplifies control panel installation

The control panel can be installed easily and quickly without additional components because the main unit contains all the necessary equipment.

03 Combined LOP/COP available

It offers a total solution that includes not only the inverter but also the LOP/COP.

Note : Contact our sales department for details.

LOP:Landing Operation Panel
COP:Car Operation Panel



Safety and security

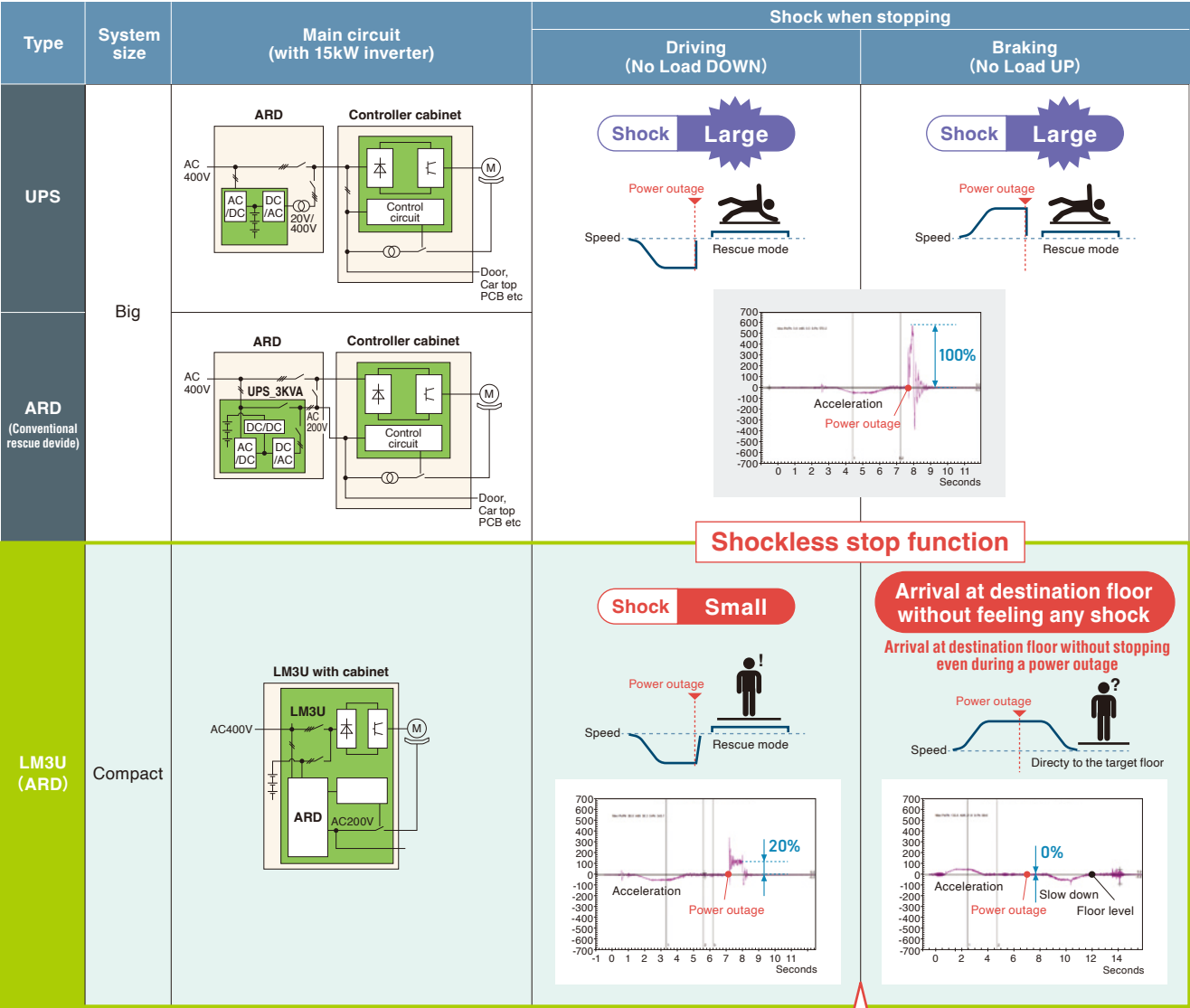
It features the industry's first shockless stop function that safely stops the lift at the nearest floor in the event of a power outage.
It reduces the risk of injury to passengers, even in areas with frequent power outages.

01 Reduces risk of passenger injury

Industry first

Features Shockless stop function

Its shockless stop function protects passengers from the risk of injury caused by sudden braking during power outages. The function ensures a high level of safety by allowing the lift to arrive at its destination floor without feeling any shaking even when braking.



Reduces shock when stopping by 80%

Moves safely to nearest floor

The inverter drive reduces shock during power outages by 80% compared to conventional ARD systems. Inverter braking also allows the lift to move to the nearest floor with hardly any shaking.

Type description

FRN 0010 C LM 3 U - 4 G

Code	Series name
FRN	FRENIC series

Three-phase400V series

Code	Applicable motor rating [kW]
0010	4.0
0015	5.5
0018	7.5
0027	11
0033	15
0039	18.5

Code	Type
C	Cabinet type (Under development)

Code	Destination
G	Global

Code	Power supply
4	Three-phase 400V

Code	Enclosure
U	Integrated Lift control all-in-one package series

Code	Development code
3	3

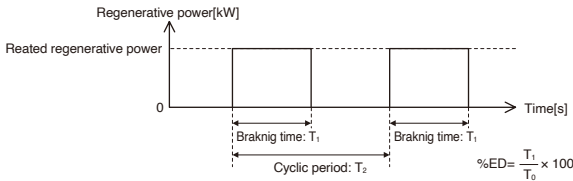
Code	Applicable area
LM	For Lift

Standard specifications

Three-phase 400V series

Item			Specifications						
Type (FRN□□□□LM3U-4G)			0010	0015	0018	0027	0033	0039	
Nominal applied motor [kW] ^(Note 1)			4.0	5.5	7.5	11.0	15.0	18.5	
Motor drive inverter	Output ratings	Rated capacity ^(Note 2) [kVA]	7.6	11	14	20	25	30	
		Rated voltage ^(Note 3) [V]	Three-phase 380 to 480V (With AVR)						
		Rated current ^(Note 4) [A]	10	14.8	18	27	33	39	
		Overload capability[A] (Permissible overload time)	20 3s	29.6 3s	36 3s	45.9 3s	66 3s	70.2 3s	
		Ambient temperature	-10 to +50°C (current derating necessary in +45 to +50°C range) [Cabinet type -10 to +45°C]						
	Input ratings	Main power supply	Three-phase 380 to 440V, 50/60Hz						
		Voltage / frequency variations		Voltage: +10 to -15% (Voltage unbalance:2% or less ^(Note 7) , Frequency: +5 to -5%)					
		Rated current ^(Note 5) [A]	With DCR	7.7	10.6	14.4	21.1	28.8	35.5
			Without DCR	14.2	17.3	23.2	—	43.8	—
		Required power supply(with DCR) ^(Note 6) [kVA]	5.4	7.3	10	15	20	25	
	Braking	Braking time ^(Note 8) [s]	60						
		Braking duty ratio ^(Note 8) (%ED) [%]	50						
		Rated regenerative power ^(Note 8) [kW]	3.2	4.4	6.0	7.7	12.0	14.8	
		Minimum connectable Resistance ^(Note 9) [Ω]	96	64	48	24		16	
DC reactor (DCR)			Option ^(Note 13)						
Power supply unit	Input ratings	Main power supply	Single-phase 219 to 254V, 50/60Hz						
		Voltage/frequency variations	Voltage: +10 to -15%/ Frequency: +5 to -5%						
		Rated current [A]	6.0	7.3					
	Output ratings	AC Output	Single-phase 220V(inverter output) 50/60Hz Rated:1.0kVA/400W ^(Note 17)	Single-phase 220V (inverter output) 50/60Hz Rated:1.0kVA/400W, Overload 1.5kVA/760W (1s) ^{(Note 10) (Note 12)(Note 17)}					
		DC Output for control circuit	DC 24V±5% Rated:100W/3.7A	DC 24V±5% Rated:100W/4.2A					
		DC Output for safety circuit	DC 48V±10% Rated: 7.2W/150mA						
		DC Output for brake coil	2 outputs (individually controllable) Output voltage range: DC40V to DC200V (phase control) Output voltage range: DC100V to DC200V (cycle control) ^(Note 15) Maximum current per output : 2A (75%ED) ^(Note 16)						
	Input ratings	Operating time [s]	180s or less ^(Note 14)						
		Battery power supply	Nominal voltage 72V (Recommended) ^(Note 14)						
		Recommended batteries	Small valve regulated lead battery						
		Charging method/voltage/current/time	Constant voltage constant current method/ Nominal voltage×1.137/1A max/8 hours (80%), 24 hours (100%)						
	Output ratings	AC Output	Single-phase 220V(inverter output) 50/60Hz Rated:1.0kVA/400W	Single-phase 220V (inverter output) 50/60Hz Rated:1.0kVA/400W, Overload 1.5kVA/760W(1s) ^{(Note 11) (Note 12)}					
		DC Output for control circuit	DC 24V±5% Rated:100W/3.7A	DC 24V±5% Rated:100W/4.2A					
		DC Output for safety circuit	DC 48V -5% to +10% Rated: 7.2W/150mA						
		DC Output for brake coil	Number of output: 2 outputs Setting voltage range: DC40V to DC200V (Phase control), or DC100V to DC200V (Cycle control) ^(Note 15) Rated current: 2.25Arms-1s (pull in) with 1.3Arms (hold), or 2Arms (75%ED) ^(Note 16)						
Enclosure (IEC60529)			IP20						
Cooling method			Fan cooling						
Weight / Mass (kg)			5.3	5.9	6.1	6.1	7.7	7.7	

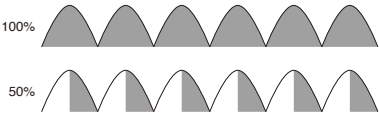
Note 1: Standard applicable motors are for Fuji Electric's 4-pole standard motors.
Note 2: The rated capacity is for 400V series: 440V rating.
Note 3: A voltage higher than the power supply voltage cannot be output.
Note 4: Setting the carrier frequency (Function code: F26) to the following value or above requires current derating.
FRN0010 to 0018LM3U-4G, FRN0033LM3U-4G: 10 kHz(2 phase modulation)
FRN0027LM3U-4G and FRN0039LM3U-4G: 8 kHz
Select the unit's capacity so that the mean square current in operation is the following percentage or less of the unit's rated current.
The current derating (subtraction) is required in +45 to +50°C range
FRN0010LM3U-4G to FRN0018LM3U-4G, FRN0027LM3U-4G: 1.5% / °C
FRN0033LM3U-4G, FRN0039LM3U-4G: 1.0% / °C
Note 5: This is the estimated value when the power supply capacity is 500 kVA and connected to the power supply of %X=5%.
Note 6: Indicates the type with a DC reactor (DCR).
Note 7: Phase-to-phase imbalance ratio [%] = (Refer to max. voltage [V]-min. voltage [V])/3-phase averaging voltage [V] × 67(IEC/EN 61800-3)
Use an AC reactor (ACR: optional) when using with an unbalance ratio of 2 to 3%.
Note 8: Braking time and braking duty ratio (%ED) are defined by cycling operation at the rated regenerative power shown in the diagram below.



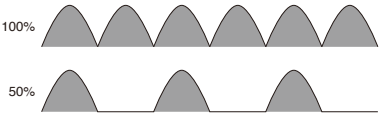
Note 9: The allowable error of the minimum connectable resistance value is ±5%.
Note 10: Interval between overloads must be at least 1 second.

Note 15: Phase control and cycle control have the following differences:

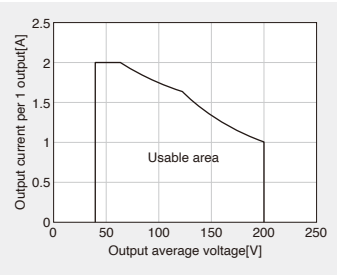
Phase control:
This method controls the voltage applied to the load from 0 to 100% by controlling the firing phase α every half cycle of the power supply frequency.



Cycle control:
This is a method of controlling the voltage applied to the load from 0 to 100% by controlling the ratio of on and off periods in one power supply voltage cycle within a fixed period

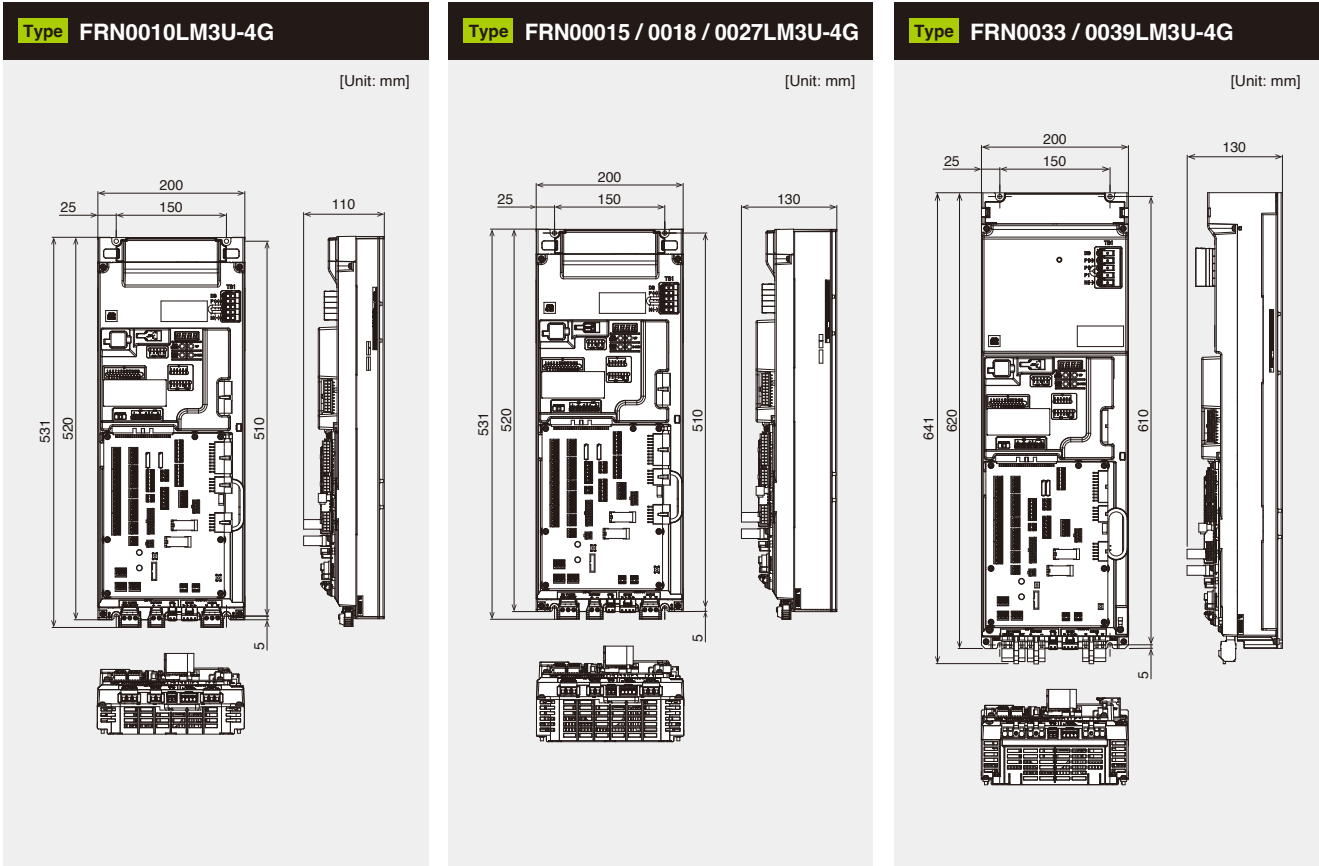


Note 16: Derating of output current relative to output voltage is as follows.
LM3U has 2 brake outputs. When the output is used in parallel, the current can be twice as large as the above.Consult us if overloading is required at the moment of excitation.



Note 17: If a voltage lower than the rated voltage is input, the output voltage may decrease to the equivalent of the input voltage

External dimensions



Note 11: Interval between overloads must be at least 9 second.
Note 12: The sum of power supply for car top board and brake power output must be less than or equal to the UPS power output capacity.
Note 13: If using Type 0027 or 0039, be sure to use a DC reactor (option).
Note 14: Applicable battery voltage range: 48V to 96V (nominal)
Please select a battery voltage equal to or higher than the value calculated by the following formula.
If used below that voltage, the deceleration torque and static torque may be insufficient.

$$V_{\text{bat}} \geq 2 \times (\sqrt{3} \times R \times I_q + \omega r e \% \times E) \times k$$

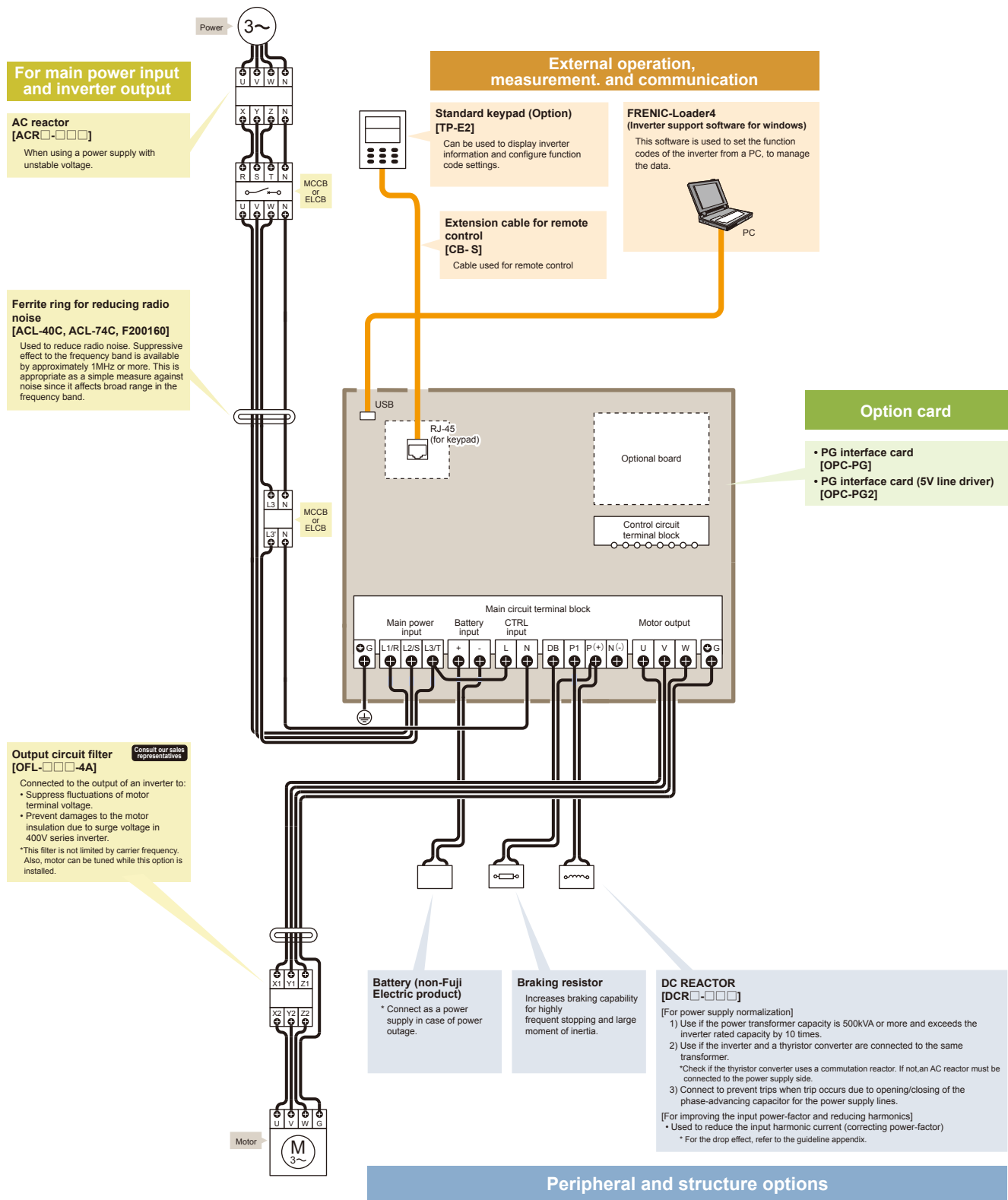
V _{bat}	Battery Voltage [Voc]	Required battery voltage [Voc]
I _q	Current [A]	Set the required torque in terms of current. Motor rated current [A] × torque [%] Or motor rated current [A] × overload [%]
ωre%	Motor Speed [%]	Set the rotation speed ratio [%] to the motor rated speed. (Motor actual rotation speed [r/min]/motor rated speed [r/min])
R	Motor Winding + Wiring Cable Resistance (per phase) [Ω]	Combined resistance of motor winding and wiring cable per phase [Ω] Measure the line-to-line resistance of the motor including wiring and halve it
E	Motor rated back EMF (Line-to-line effective value) [Vrms]	Set the back EMF[Vrms]at the rated motor speed. Set by calculating from the value on the rating plate, etc.
K	Safety factor [%]	100 to 120[%](1.0~1.2) Please set it with enough margin to ensure sufficient torque.

If used below that voltage, the deceleration torque and static torque may be insufficient.
Also, if used at less than 72V, the continuous operating time may decrease.

Options

Configuring the FRENIC-Lift (LM3U)

This section lists the names and features of peripheral equipment and options for the FRENIC-Lift (LM3U) as well as a configuration example.



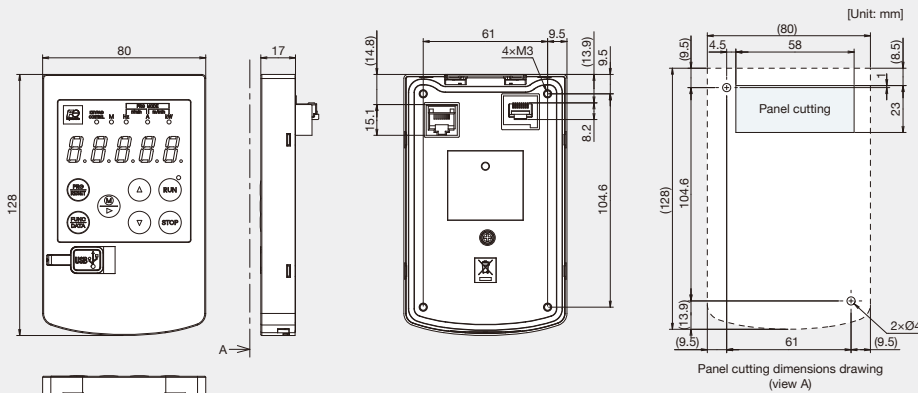
Remote operation keypad with USB
[TP-E2]

When used in combination with the FRENIC-Loader 4, the data items from the unit can be saved into the keypad memory, making it possible to perform check operations anywhere.



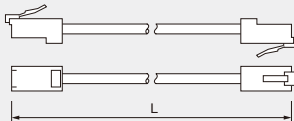
Specifications

Item	Specifications	Remarks
USB interface	Type: Mini-B	FRENIC Loader support with Windows® 11 or later OS
Applicable inverter	RENIC-MEGA (G2) series FRENIC-Ace (E3) series FRENIC-Lift (LM3U) series	
Connection cable	Conforming to ANSI/TIA/EIA568A Category 5 or higher (for 10BASE-T/100BASE-TX straight connection)	Option type: CB-5S, CB-3S, CB-1S
Cable length	20 m (787 ft) or less	
Connector	RJ-45	
Protective construction	Panel side: IP20, reverse side: IP20	
Weight	107 g (3.8 oz)	



Extension cable for remote control
[CB-□S]

This straight cable is used to connect the RJ-45 connector of the inverter body to the keypad, USB-RS485 converter, etc.
Available in three lengths (1, 3, 5m).



Type	CB-5S	CB-3S	CB-1S
Length [m]	5	3	1

Peripheral and structure options

Options

Built-in Option Card Types and Ports in Which They Can be Installed

The FRENIC-Lift (LM3U) option card connection ports in which each built-in option card can be installed are shown in the following fig.



OPC-PG
(Incremental type)

The PG interface card is equipped with a 2 system pulse (ABZ-phase) input circuit and PG (pulse generator) power supply output circuit, and speed control function with PG feedback signal can be realized by installing it in FRENIC-Lift (LM3U).

PG interface specifications

Item	Specifications
Encoder pulse count	20 to 3000 P/R (A-phase, B-phase, Z-phase incremental type)
Pulse input mode	Open collector method (wire length: 20 m or less) Complementary method (wire length: 100 m or less)
Pulse input voltage	High level ≥ 8 V, Low level ≤ 3 V (when using 12 V power supply specification) High level ≥ 10 V, Low level ≤ 3 V (when using 15 V power supply specification)
Pulse input current	8 mA or less
PG power supply ¹⁾	+12 VDC ±10%/120 mA or less, or +15 VDC ±10%/120 mA or less

Note: If the PG power supply current exceeds 120 mA, use an external power supply.

Pulse train input interface specifications

Item	Specifications
Input pulse frequency	Up to 30 kHz (open collector method) Up to 100 kHz (complementary method)
Pulse input mode	Open collector method (wire length: 20 m or less) Complementary method (wire length: 100 m or less)
Pulse input voltage	High level ≥ 8 V, w level ≤ 3 V (when using 12 V power supply specification) High level ≥ 10 V, w level ≤ 3 V (when using 15 V power supply specification)
Pulse input current	8 mA or less

Note: Refer to the user's manual for details.

OPC-PG2
(5V Line Driver type)

The PG interface (5 V line driver) card is equipped with a 5 V line driver output type PG (pulse generator) 1 system pulse (A-, B-, Z-phase) input circuit, a wire break detection circuit (Z-phase can be canceled), and a PG power supply output circuit.

The following functions can be realized by installing this interface card in FRENIC-Lift (LM3U).

- (1)Speed control with PG feedback signal (vector control with speed sensor)
(2)Pulse train input as frequency command

PG interface specifications

Item		Specifications
PG used	Output pulse count	20 to 3000 P/R
	Max. response frequency	100 kHz
	Pulse output method	Line driver method (26C31, 26LS31 or equivalent) SOURCE current + 20 mA (max.) SINK current -20 mA (max.)
	Max. wire length ^(Note 1)	100 m (when using cable coil diameter AWG 16)
PG power supply ^(Note 2)		+5 VDC ±10%/200 mA or less

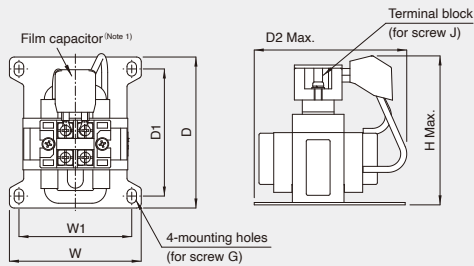
Note 1: The relationship between wire length and minimum connectable coil diameter is shown in Table 11.8.8.
Note 2: If the PG power supply current exceeds 200 mA, use an external power supply.

Relationship between wire length and minimum connectable coil diameter

PG power supply specification	Specifications				
	Up to 20	Up to 30	Up to 50	Up to 75	Up to 100
5 V ±10%, 200 mA	AWG24 (0.25 mm ²)	AWG22 (0.34 mm ²)	AWG20 (0.50 mm ²)	AWG18 (0.75 mm ²)	AWG16 (1.25 mm ²)

Note: Refer to the user's manual for details.

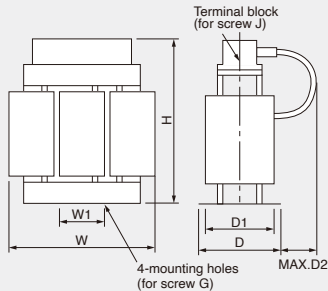
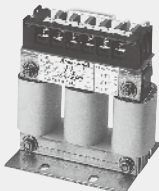
DC Reactor
[DCR□-□□□]



Note 1: Provided only with DCR4-3.7D

Power supply voltage	Standard applicable motor (kW)	DC reactor type	Rated current (A)	Inductance (mH)	Generated loss (W)	Dimensions [mm]								Mass kg (lb)
						W	W1	D	D1	D2	H	Mounting hole (G)	Terminal hole (J)	
Three-phase 400 V	4.0	DCR4-3.7D	9.0	7.0	17	83	71	95	80	105	99	M5 (6×9)	M4	1.2 (2.6)
	5.5	DCR4-5.5D	13	4.0	17	83	71	95	80	101	105	M5 (6×9)	M4	1.3 (2.9)
	7.5	DCR4-7.5D	18	3.5	22	110	95	98	80	120	115	M6 (7×11)	M5	2.0 (4.4)
	11	DCR4-11D	25	2.2	24	110	95	98	80	125	120	M6 (7×11)	M5	2.3 (5.1)
	15	DCR4-15D	34	1.8	35	138	124	114	96	131	130	M6 (7×11)	M5	3.1 (6.8)
	18.5	DCR4-18.5D	41	1.4	32	138	124	114	96	142	138	M6 (7×11)	M6	3.9 (8.6)

AC Reactor
[ACR□-□□□]

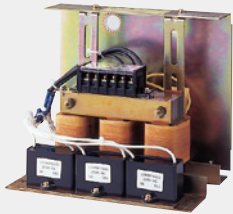


Power supply voltage	Standard applicable motor (kW)	Reactor type	Reactance(mΩ/phase)			Generated loss (W)	Dimensions [mm]								Approx Weight (kg)
			Rated current (A)	50Hz	60Hz		W	W1	D	D1	D2	G	H	Terminal hole (J)	
Three-phase 400 V	4.0	ACR4-3.7 A	9	512	615	17	125	40	100	75	106	M5 (6×10)	95	M4	2.4
	5.5	ACR4-5.5 A	13	349	418	22	125	40	115	90	106	M5 (6×10)	95	M5	3.1
	7.5	ACR4-7.5 A	18	256	307	27	125	40	115	90	106	M5 (6×10)	95	M5	3.7
	11	ACR4-11A	24	183	219	40	180	60	110	85	106	M6 (7×11)	115	M6	4.3
	15	ACR4-15A	30	139	167	46	180	60	110	85	106	M6 (7×11)	137	M6	5.4
	18.5	ACR4-18.5A	39	114	137	57	180	60	110	85	106	M6 (7×11)	137	M6	5.7

Note: Perform fan cooling (3 m/s or more).

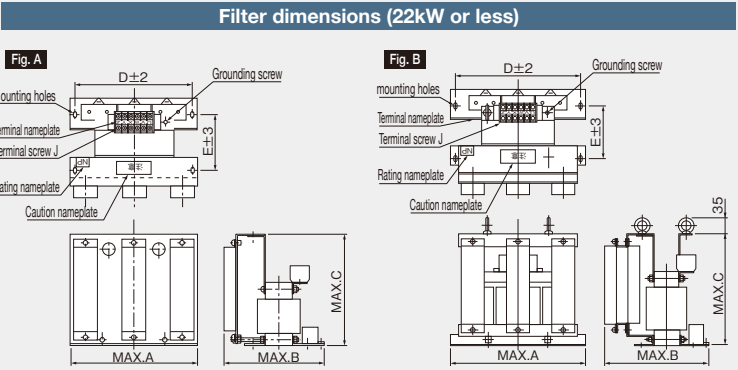
Options

Output circuit filter
[OFL-□□□-4A]



Connect an OFL to the unit power output side to:

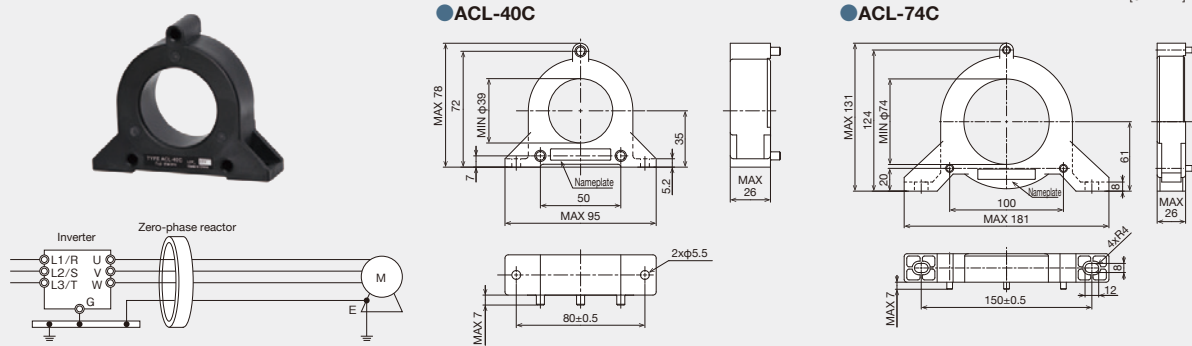
- Suppress the surge voltage at motor terminals
This protects the motor from insulation damage caused by the application of high voltage surge currents from the unit.
- Suppress leakage current from output lines
This reduces leakage current from long power feed lines. (The maximum wire length must be 400 m.)
- Minimize radiation and induction noise from output lines
An OFL effectively suppresses noise from long lines such as wiring at plants.



Power system	Standard applicable motor (kW)	Filter Type	Rated current (A)	Overload capability	Input power supply voltage of the unit	Permissible carrier frequency range (kHz)	Max. output frequency (Hz)	Generated loss (W)	Figure	Dimensions [mm]							Weight [kg]	
										A	B	C	D	E	Grounding screw	Terminal screw		Mounting screw (mounting hole)
Three-phase 400 V	4.0	OFL-3.7-4A	9	150% for 1 min 200% for 3 s	Three-phase 380 to 480 V 50/60 Hz	0.75 to 16 kHz	400 Hz	210	A	220	225	220	200	115	M4	M4	M5	14
	5.5	OFL-7.5-4A	18					190		290	290	230	260	160	M5	M5	M6	22
	7.5	OFL-15-4A	30					320	B	330	275	310	300	145	M6	M6	M8	35
	11																	
	15																	
	18.5																	OFL-22-4A

Note: Carrier frequency is not restricted on the OFL-***-4A.M4

Zero-phase reactor for reducing radiated noise
[ACL-40C, ACL-74C]



Zero-phase reactors for suppressing radio noise (ACL)

No. of turns	Output wire size of the unit		Applicable zero-phase reactor
	75 °C, 90 °C wire ^(Note 1)	75 °C wire (AWG) ^(Note 2)	
1	38 mm ² or less 5.5 mm ² × 2P to 22 mm ² × 2P	1AWG or less AWG 10 × 2P to AWG 4 × 2P	ACL-40C
	250 mm ² or less 38 mm ² × 2P to 100 mm ² × 2P	500 kcmil or less AWG 2 × 2P to AWG 4/0 × 2P	ACL-74C
2	14 mm ² or less	AWG 6 or less	ACL-40C
	60 mm ² or less 5.5 mm ² × 2P to 22 mm ² × 2P	AWG 1/ or less AWG 10 × 2P to AWG 4 × 2P	ACL-74C
4	5.5 mm ² or less	AWG 10 or less	ACL-40C
	14 mm ² or less	AWG 6 or less	ACL-74C

Note 1: HIV (heat-resistant polyvinyl chloride insulated wire) and crosslinked polyethylene are anticipated.
Note 2: THW (heat-resistant IV cable) is anticipated.

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 place, 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 tie 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.