HITACHI

ADJUSTABLE FREQUENCY CONTROL

L100 series

Actual Size
(L100-004NFE, 004NFU)

New Compact Range with Enhanced Functions, And Easier to Use

Innovative Design Full of Smart Functions

The 16-step multispeed operation and enhanced PID control functions enable accurate control of automated machinery.

FEATURE 1

Simple Operation By Touch and Control

Start Operation by RUN key only. Speed change by PID control only. Grouped functions for quick, easy settings.

FEATURE 2

Compact Size Saves Space

Installation space is reduced 56% from standard model J100 Series and over 11% from our compact inverter L50 Series, contributing to a downsizing of the system installation.

FEATURE 3

Network-Compatible World Standard Machine Expands Global Business

The L100 Series of world standard machines provide global performance.

- Europe low-voltage directive compliant EMC directive compliant (with dedicated noise filter)
- UL,C-UL standards
- C-tick (Australian EMC requirment, with dedicated noise filter)

The lineup includes machines compatible with networking to DeviceNet, PROFIBUS, etc.

<CE> <UL> <C-UL(CSA)> <C-Tick>

FEATURE 4

Advanced Functions Condensed in One Unit

- PID control provided as standard
- 16-stage multispeed operation
- Instantaneous power failure retry (frequency stabilization)
- Intelligent terminal system allows you to select only the necessary functions from the full lineup of enhanced functions.

CONTENTS

FEATURE 5

Available for Diverse Applications

The L100 Series features intelligent, advanced functions to meet diverse applications

- Fan
- Pump
- Air-conditioning equipment
- Automatic door
- Conveyor
- For machine standardization in 50/60 Hz area
- Amusement machine
- Jet bath
- Automated dishwasher
- And many more

■ Model Code

L100-004 N F E

- Series name
- Applicable motor rating: 002: 0.2 kW to 075: 7.5 kW
- Input power specification: L: Three-phase 200 V class; N: Single-/three-phase 200 V class; H: Three-phase 400 V class
- F: Operator panel equipped; R: Japanese version (with operator)
- E: European version for Europe, Australia, Singapore, etc.; U: UL version for North America

■ Model Type List

Applicable motor rating (kW)			0.2	0.4	0.55	0.75	1.1	1.5	2.2	3.0	3.7	4.0	5.5	7.5
European Version (xxE type) UL Version (xxU type)	Single-/three-phase 200 V	NFE type	●	●	●	●	●	●	●					
		NFU type	●	●		●		●	●					
	Three-phase 200 V	LFU type									●		●	●
	Three-phase 400 V	HFE type		●		●		●	●	●		●	●	●
		HFU type		●		●		●	●			●	●	●
Japanese Version	Three-phase 200 V	LFR type	●	●		●		●	●		●		●	●
	Three-phase 400 V	HFR type		●		●		●	●		●		●	●

Standard Specifications

xxE.xxU Type

Item			200 V Class										400 V Class							
Model (L100-)			002NFE 002NFU	004NFE 004NFU	005NFE -	007NFE 007NFU	011NFE -	015NFE 015NFU	022NFE 022NFU	- 037LFU	- 055LFU	- 075LFU	004HFE 004HFU	007HFE 007HFU	015HFE 015HFU	022HFE 022HFU	030HFE -	040HFE 040HFU	055HFE 055HFU	075HFE 075HFU
Protective structure:			IP20																	
Applicable motor(kW)			0.2	0.4	0.55	0.75	1.1	1.5	2.2	3.7	5.5	7.5	0.4	0.75	1.5	2.2	3.0	4.0	5.5	7.5
Rated capacity (240*10/460V) (kVA)			0.5	1.0	1.2	1.6	2.0	2.9	4.1	6.3	9.6	12.7	1.1	1.9	3.0	4.3	6.2	6.8	10.4	12.7
Rated input voltage			1-phase:200~240V+10%/-10%, 50/60Hz +/-5% 3-phase:200~230V+10%/-10%,50/60Hz+/-5% (037LFU~:3-phase only)										3-phase 380~460V +/-10%,50/60Hz+/-5%							
Rated output voltage			3-phase 200~240V (corresponding to input voltage)										3-phase 380~460V (corresponding to input voltage)							
Rated output current (A)			1.4	2.6	3.0	4.0	5.0	7.1	10.0	15.9	24	32	1.5	2.5	3.8	5.5	7.8	8.6	13	16
Control method			Sine-wave pulse width modulation (PWM) control																	
Output frequency range (*4)			0.5 ~ 360 Hz																	
Frequency accuracy			Digital command: ±0.01% of the Max. frequency Analog command: ±0.2% (25 ±10) of the Max. frequency																	
Frequency setting resolution			Digital: 0.1 Hz, Analog: Max. frequency/1000																	
Volt./Freq. characteristic			Setting available for constant torque, reduced torque																	
Overload current rating			150%, 60 seconds																	
Acceleration/deceleration time			0.1~3000 sec. (linear acceleration/deceleration), second acceleration/deceleration setting available																	
Braking		Dynamic braking (short time) *5	Approx. 100%				Approx.70%		Approx.20%				Approx. 100%			Approx.70%		Approx.20%		
			Capacitive feedback type; Dynamic braking unit and braking resistor are optional, individually installed.																	
		DC braking	Operating frequency, time, and braking force variable																	
Input signal	Frequency setting	Digital operator panel	Up ( ) and down ( ) keys/Value setting keys																	
		Potentiometer	Analog setting																	
		External signal *6	0~10 VDC (input impedance 10kΩ) 4~20mA (input impedance 250Ω), Potentiometer: 1kΩ to 2kΩ (2W) Variable resister																	
	Forward /Reverse run	Digital operator panel	Run/Stop (Forward/Reverse run change by command)																	
		External signal	Forward run/stop (1a contact) Reverse operation command available at terminal assignment (1a/1b selectable)																	
	Intelligent input terminal		FW (Forward run comand),RV (reverse run command), CF1~CF4 (multi-stage speed setting), JG (jogging command), 2CH (2-stage acceleration/deceleration command), FRS (free run stop command), EXT (external trip), USP (USP function), SFT (soft lock), AT (analog current input select signal), RS (Reset), PTC (Thermal protection)																	
Output signal	Intelligent output terminal		RUN (running signal), FA1,2 (frequency arrival signal), OL (overload advance notice signal), OD (deviation signal at PID control), AL (alarm signal)																	
	Frequency monitor		PWM output; Select analog output frequency monitor, analog output current monitor or digital output frequency monitor																	
Alarm output contact			ON for the inverter alarm (1C contact output) (possible to change to OFF for the alarm)																	
Other functions			AVR function, upper/lower limiter, PID control, carrier frequency change, frequency jump, electronic thermal level adjustment, gain/bias setting function, retry function																	
Protective function			Overcurrent, overvoltage, undervoltage, overload, extreme high/low temperature, CPU error, memory error, ground fault detection at startup, internal communication error																	
Operating environment		Ambient/storage temperature/humidity	−10~50°C (*7)/−10~70°C (*8)/20~90% (no condensation)																	
		Vibration (*9)	5.9 m/S^2 (0.6G), 10~55 Hz																	
		Location	Altitude 1,000 m or less, indoors (no corrosive gases or dust)																	
Coating color			Blue																	
Option			Remote operator unit, copy unit, cables for the units, Dynamic braking unit, braking resistor, AC reactor, DC reactor, noise filter																	
Weight (kg)			0.8	0.8	1.3	1.3	2.3	2.3	2.8	2.8	5.5	5.7	1.3	1.7	1.7	2.8	2.8	2.8	5.5	5.7

*1: Protective structure is based upon EN60529.
*2: The applicable motor refers to Hitachi standard 3-phase motor (4-pole). To use other motors, care must be taken to prevent the rated motor current (50 Hz) from exceeding the rated output current of the inverter.
*3: The output voltage decreases as the main power supply voltage decreases. (Except for use of the AVR function)
*4: To operate the motor beyond 50/60 Hz, consult the motor manufacturer about the maximum allowable rotation speed.
*5: The braking torque at capacitive feedback is the average deceleration torque at the shortest deceleration (stoppage from 50/60 Hz) of the motor itself. It is not the continuous regenerative braking torque. And the average deceleration torque varies with motor loss. This value decreases when operating beyond 50/60 Hz. If a large regeneration torque is required, the optional Dynamic braking unit should be used.
*6: The frequency command is the maximum frequency at 9.8 V for input voltage 0 ~ 10 VDC, or at 19.6 mA for input current 4 ~ 20 mA. If this characteristic is not convenient, contact your Hitachi sales representative.
*7: To use the inverter at 40°C or higher, reduce carrier frequency 2kHz and derate output current 80%, and remove the top cover.
*8: The storage temperature refers to the short-term temperature during transport.
*9: Conforms to the test method specified in JIS C0911 (1984). For the model types excluded in the standard specifications, contact your Hitachi sales representative.
*10: Input voltage of xxLFU is 230V

LFR.HFR Type

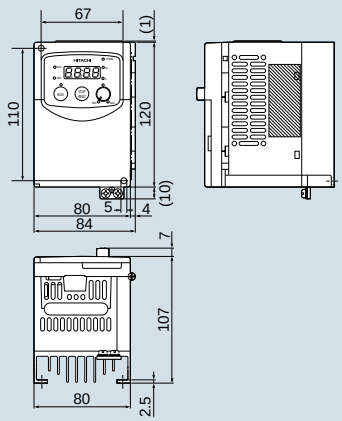
Item			200 V Class								400 V Class						
Model (L100-)			002LFR	004LFR	007LFR	015LFR	022LFR	037LFR	055LFR	075LFR	004HFR	007HFR	015HFR	022HFR	037HFR	055HFR	075HFR
Protective structure:			IP20														
Applicable motor(kW)			0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	0.4	0.75	1.5	2.2	3.7	5.5	7.5
Rated capacity (220/460V) (kVA)			0.5	1.0	1.5	2.7	3.8	6.1	9.1	12.2	1.1	1.9	2.9	4.2	6.6	10.4	12.7
Rated input voltage			3-phase:200~230V+10%/-10%,50/60Hz+/-5%								3-phase 380~460V +/-10%,50/60Hz+/-5%						
Rated output voltage			3-phase 200~230V (corresponding to input voltage)								3-phase 380~460V (corresponding to input voltage)						
Rated output current (A)			1.4	2.6	4.0	7.1	10.0	15.9	24	32	1.5	2.5	3.8	5.5	8.6	13	16
Control method			Sine-wave pulse width modulation (PWM) control														
Output frequency range (*4)			0.5 ~ 360 Hz														
Frequency accuracy			Digital command: ±0.01% of the Max. frequency Analog command: ±0.2% (25 ±10) of the Max. frequency														
Frequency setting resolution			Digital: 0.1 Hz, Analog: Max. frequency/1000														
Volt./Freq. characteristic			Setting available for constant torque, reduced torque														
Overload current rating			150%, 60 seconds														
Acceleration/deceleration time			0.1~3000 sec. (linear acceleration/deceleration), second acceleration/deceleration setting available														
Braking		Dynamic braking (short time) *5	Approx. 100% (50Hz) Approx. 50% (60Hz)			Approx.20~40%		Approx. 20%			Approx. 100% (50Hz) Approx. 50% (60Hz)			Approx.20~40%		Approx. 20%	
			Capacitive feedback type; Dynamic braking unit and braking resistor are optional, individually installed.														
		DC braking	Operating frequency, time, and braking force variable														
Input signal	Frequency setting	Digital operator panel	Up ( ) and down ( ) keys/Value setting keys														
		Potentiometer	Analog setting														
		External signal *6	0~10 VDC (input impedance 10kΩ) 4~20mA (input impedance 250Ω), Potentiometer: 1kΩ to 2kΩ (2W) Variable resister														
	Forward /Reverse run	Digital operator panel	Run/Stop (Forward/Reverse run change by command)														
		External signal	Forward run/stop (1a contact) Reverse operation command available at terminal assignment (1a/1b selectable)														
	Intelligent input terminal		FW (Forward run comand),RV (reverse run command), CF1~CF4 (multi-stage speed setting), JG (jogging command), 2CH (2-stage acceleration/deceleration command), FRS (free run stop command), EXT (external trip), USP (USP function), SFT (soft lock), AT (analog current input select signal), RS (Reset)														
Output signal	Intelligent output terminal		RUN (running signal), FA1,2 (frequency arrival signal), OL (overload advance notice signal), OD (deviation signal at PID control), AL (alarm signal)														
	Frequency monitor		PWM output; Select analog output frequency monitor, analog output current monitor or digital output frequency monitor														
Alarm output contact			ON for the inverter alarm (1C contact output) (possible to change to OFF for the alarm)														
Other functions			AVR function, upper/lower limiter, PID control, carrier frequency change, frequency jump, electronic thermal level adjustment, start frequency adjustment gain/bias setting function, retry function. Automatic to rque boost, trip history														
Protective function			Overcurrent, overvoltage, undervoltage, overload, extreme high/low temperature, CPU error, memory error, ground fault detection at startup, internal communication error														
Operating environment		Ambient/storage temperature/humidity	−10~50°C (*7)/−10~60°C (*8)/20~90% (no condensation)														
		Vibration (*9)	5.9 m/S^2 (0.6G), 10~55 Hz														
		Location	Altitude 1,000 m or less, indoors (no corrosive gases or dust)														
Coating color			Blue														
Option			Remote operator unit, copy unit, cables for the units, Dynamic braking unit, braking resistor, AC reactor, DC reactor, noise filter														
Weight (kg)			0.8	0.85	0.9	1.7	1.8	2.8	5.5	5.7	1.3	1.65	1.7	1.8	2.8	5.5	5.7

*1: The protection method conforms to JEM1030.
*2: The applicable motor refers to Hitachi standard 3-phase motor (4-pole). To use other motors, care must be taken to prevent the rated motor current (50 Hz) from exceeding the rated output current of the inverter.
*3: The output voltage decreases as the main power supply voltage decreases. (Except for use of the AVR function)
*4: To operate the motor beyond 50/60 Hz, consult the motor manufacturer about the maximum allowable rotation speed.
*5: The braking torque at capacitive feedback is the average deceleration torque at the shortest deceleration (stoppage from 50/60 Hz) of the motor itself. It is not the continuous regenerative braking torque. And the average deceleration torque varies with motor loss. This value decreases when operating beyond 50/60 Hz. If a large regeneration torque is required, the optional Dynamic braking unit should be used.
*6: The frequency command is the maximum frequency at 9.8 V for input voltage 0 ~ 10 VDC, or at 19.6 mA for input current 4 ~ 20 mA. If this characteristic is not convenient, contact your Hitachi sales representative.
*7: To use the inverter at 40°C or higher, reduce carrier frequency 2kHz and clerate output current 80%.
*8: The storage temperature refers to the short-term temperature during transport.
*9: Conforms to the test method specified in JIS C0911 (1984). For the model types excluded in the standard specifications, contact your Hitachi sales representative.

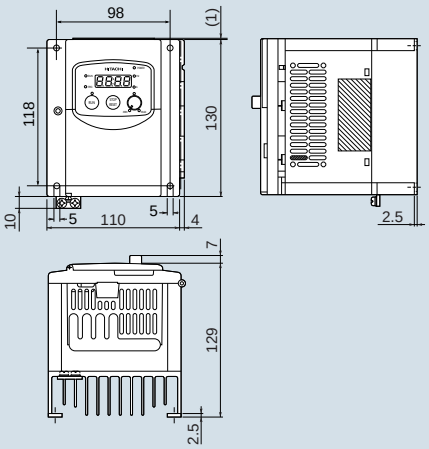
Dimensional Drawings

xxE.xxU Type

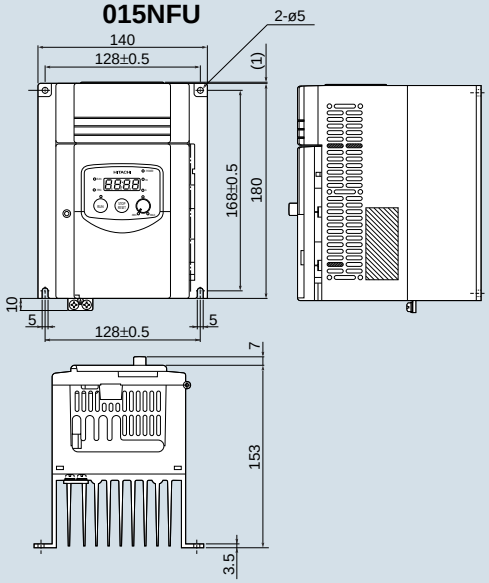
L100-002NFE, 004NFE 002NFU, 004NFU



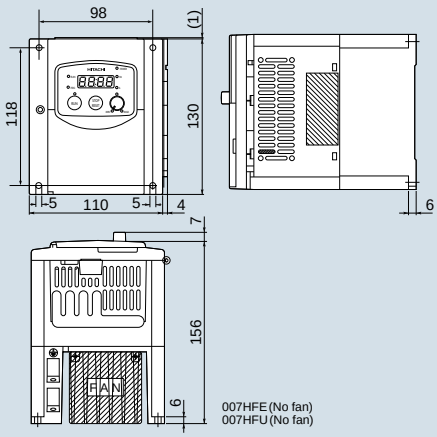
L100-005NFE, 007NFE, 004HFE 007NFU, 004HFU



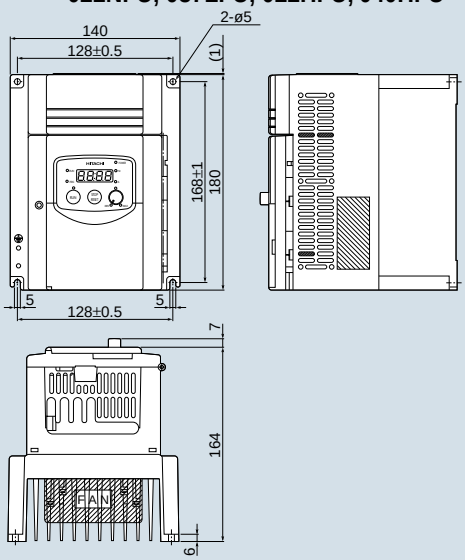
L100-011NFE, 015NFE 015NFU



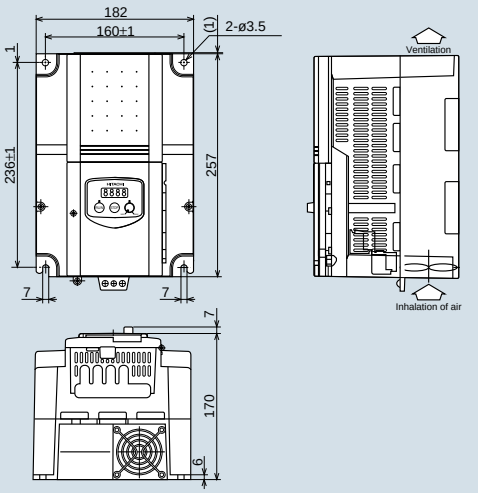
L100-007HFE, 015HFE 007HFU, 015HFU



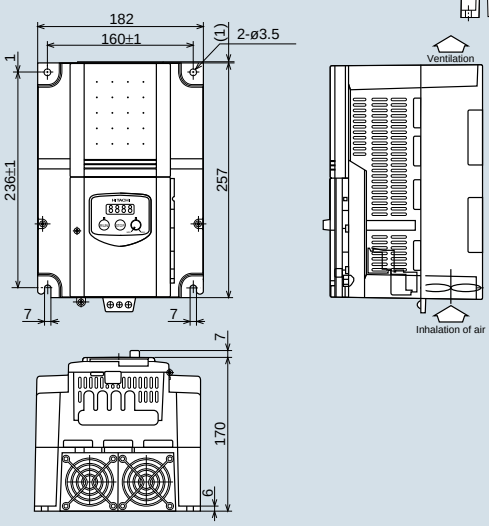
L100-022NFE, 022HFE, 030HFE, 040HFE 022NFU, 037LFU, 022HFU, 040HFU



L100-055LFU, 055HFE,055HFU, 075HFE, 075HFU

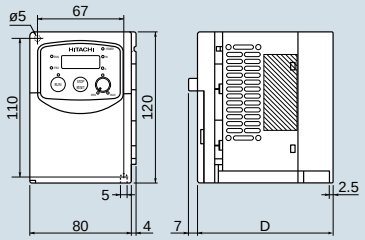


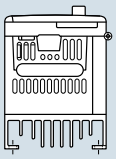
L100-075LFU



LFR.HFR Type

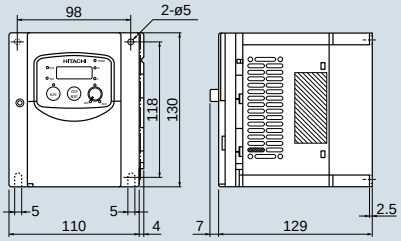
L100-002LFR~007LFR

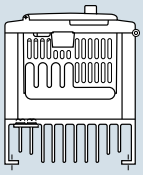




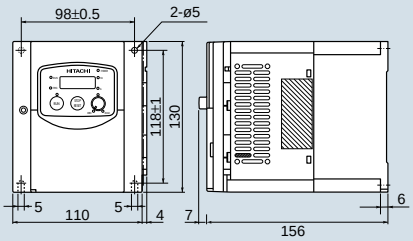
Model	D
L100-002LFR L100-004LFR	107
L100-007LFR	130

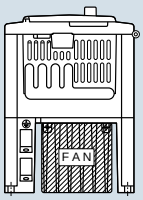
L100-004HFR





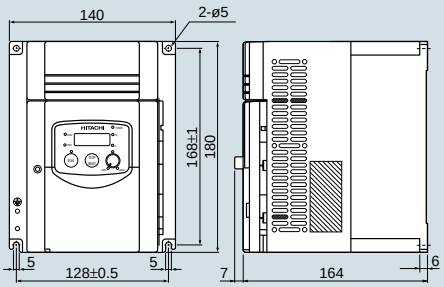
L100-015LFR, 022LFR, 007HFR, 015HFR, 022HFR

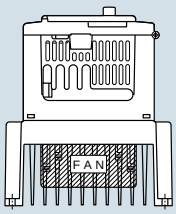




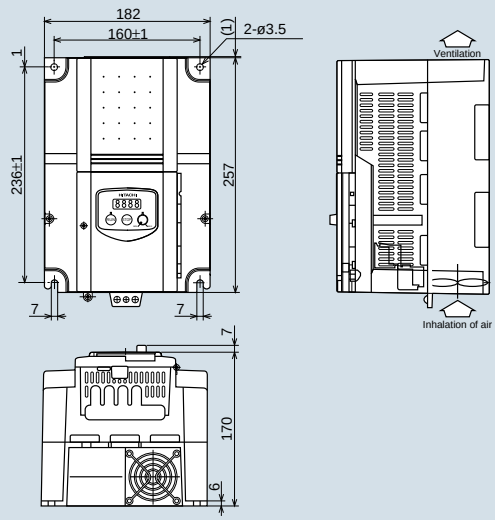
(007HFR:No fan)

L100-037LFR, 037HFR

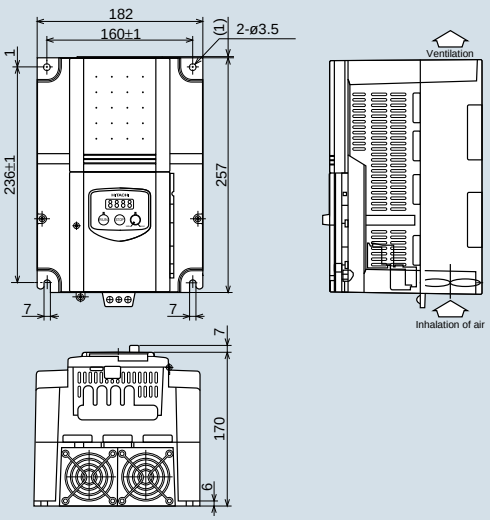




L100-055LFR, 055HFR, 075HFR

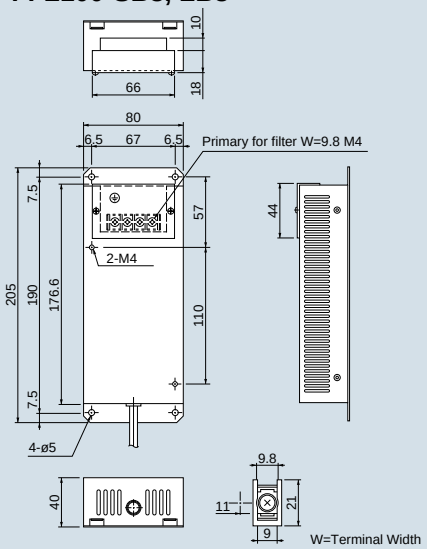


L100-075LFR

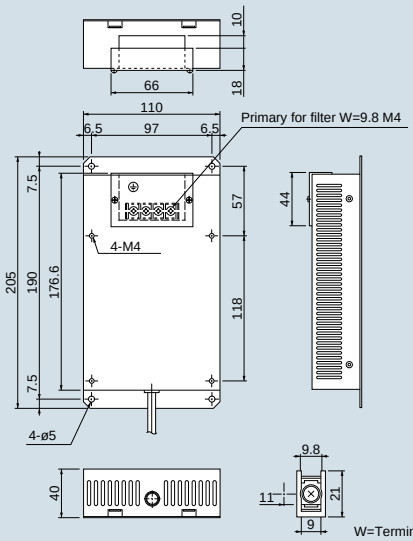


Noise filter

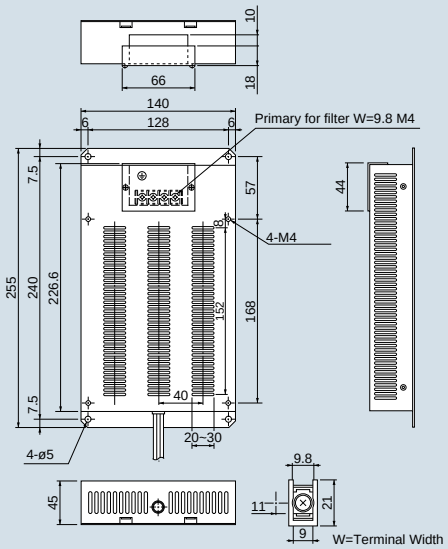
FFL100-SB3, LB3



FFL100-SB5, HB6



FFL100-SB11, HB11, HB17



Applicable Filter

Inverter model	Input Power Source	Noise filter model
L100-002NFE/U 004NFE/U 002LFR 004LFR	1-phase 200 V class	FFL100-SB3
	3-phase 200 V class	FFL100-LB3
L100-005NFE 007NFE/U 007LFR	1-phase 200 V class	FFL100-SB5
	3-phase 200 V class	FFL100-HB6
L100-011NFE 015NFE/U 022NFE/U 015LFR 022LFR	1-phase 200 V class	FFL100-SB11
	3-phase 200 V class	FFL100-HB11
L100-037LFU 037LFR	3-phase 200 V class	FFL100-HB17
L100-055LFU 075LFU 055LFR 075LFR	3-phase 200 V class	FFL100-HB23
L100-004HFE/U 007HFE/U 015HFE/U 004HFR 007HFR 015HFR	3-phase 400 V class	FFL100-HB6
L100-022HFE/U 030HFE 040HFE/U 022HFR 037HFR	3-phase 400 V class	FFL100-HB11
L100-055HFE/U 075HFE/U 055HFR 075HFR	3-phase 200 V class	FFL100-HB23

*please inquire us about dimensional drawing of FFL100-HB23.

Operation

The L100 Series can be easily operated with the digital operator panel equipped as standard in the main unit.
For remote operation, the remote operator unit is available as an option.

Monitor section (LED)
Displays the monitored frequency, motor current, motor rpm, or alarm condition.

Monitor lamp
Indicates the monitor item.

Run key
Press to start the motor.

Stop/Reset key
Press to stop the motor or to cancel the alarm.

Function key

Power lamp
Indicates ON/OFF of the control circuit power supply.

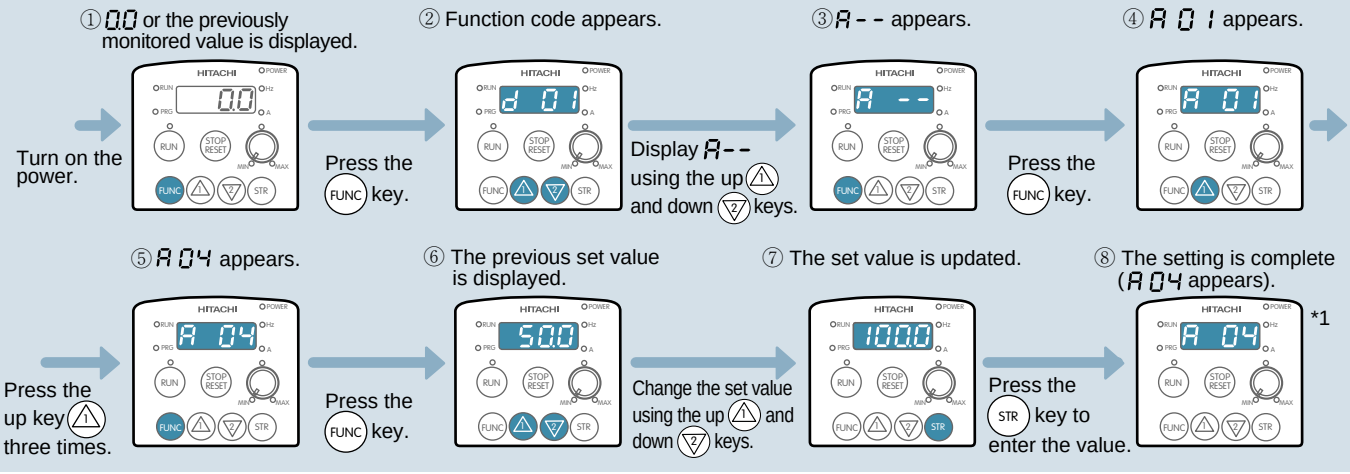
Monitor lamp
Indicates the monitor item.

Frequency setting Potentiometer

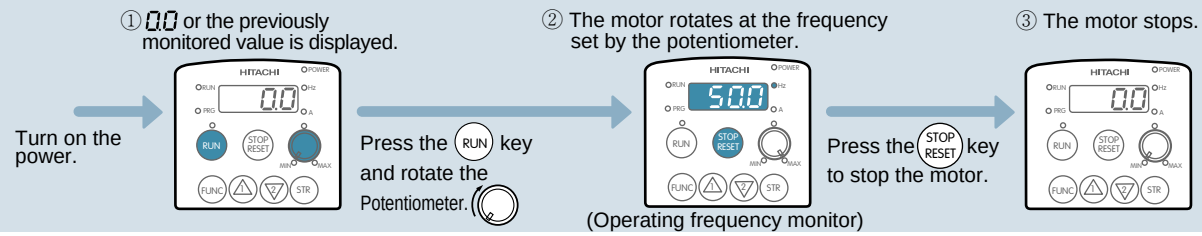
Store key
Use to store the set data.

Up/down keys
Scroll the function code No. or change the setting.

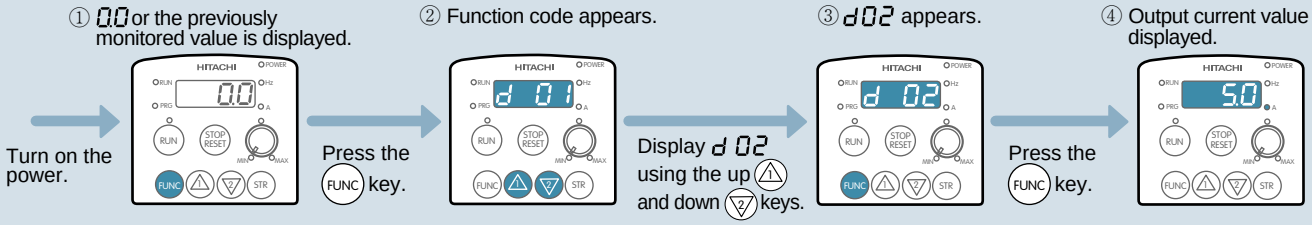
(1) Setting the maximum frequency



(2) Running the motor (using the Potentiometer)



(3) Monitoring the output current value



*1 when running the motor, return to Monitor Mode or Basic Setting Mode.

Function List

"xxE type" and "xxU type" in the tables below refer to the model types for Europe and North America, respectively.
"LFR type" and "HFR type" in the tables below refer to the model types for Japan.

Monitor Mode/Basic Setting Mode

Code		Function	Monitor/Setting Range	Initial Setting	
				xxE type xxU type	LFR type HFR type
Monitor	d01	Output frequency monitor	0.0 ~ 360.0 Hz	–	
	d02	Output current monitor	0.00 ~ 999.9 A	–	
	d03	Running direction monitor	F (forward run) r (reverse run) □ (stop)	–	
	d04	PID feedback value monitor	0 ~ 9999	–	
	d05	Input terminal status monitor	Display the Status of terminal (Input, Output)	–	
	d06	Output terminal status monitor		–	
	d07	Operating frequency converted value monitor	(Output frequency (Hz)) x (frequency converted value b86)	–	
	d08	Trip monitor	–	–	
	d09	Trip history monitor	–	–	
Setting	F01	Output frequency setting	0.5 ~ 360 Hz	–	
	F02	Acceleration time 1 setting	0.1 ~ 3000 s	10.0s	
	F03	Deceleration time 1 setting	0.1 ~ 3000 s	10.0 s	
	F04	Running direction setting	00:Forward/01:Reverse	00:Forward	
Expanded Function	A--	Extented function of A group setting	A01 ~ A98	–	
	B--	Extented function of B group setting	b01 ~ b89	–	
	C--	Extented function of C group setting	C01 ~ C44	–	

Expanded Function A (Frequently Used Functions)

Code		Function	Setting Range	Initial Setting	
				xxE type xxU type	LFR type HFR type
Basic Setting	A01	Frequency Commanding	•Potentiometer (Front Case) •Control terminal •Digital panel	Control terminal	Potentionmeter
	A02	Run Commanding	•Control terminal •Digital panel	Control terminal	Digital panel
	A03	Base frequency setting	50 ~ 360 Hz	xxE type:50Hz xxU type:60Hz	60Hz
	A04	Maximum frequency setting	50 ~ 360 Hz	xxE type:50Hz xxU type:60Hz	60Hz
Analog Input Setting	A11	External frequency setting start	0.0 ~ 360 Hz	0.0 Hz	
	A12	External frequency setting end	0.0 ~ 360 Hz	0.0 Hz	
	A13	External frequency start rate setting	0 ~ 100%	0%	
	A14	External frequency end rate setting	0 ~ 100%	100%	
	A15	External frequency start pattern setting	Set frequency of A11 / 0 Hz	0 Hz	
	A16	External frequency sampling count setting	1 ~ 8 times	8 times	
Multispeed Freq. Setting	A20 ~ A35	Multispeed frequency setting (Speed 0 ~ Speed 15)	0 ~ 360 Hz	0 Hz	0~60 Hz
	A38	Jogging frequency setting	0.00 ~ 9.99 Hz	1.0 Hz	
	A39	Jogging stop operation selection	•Free run stop •Decelerate stop •Regenerative braking	Free run stop	
V/F Character-istics	A41	Torque boost mode selection	Manual/Auto	Manual	
	A42	Manual torque boost setting	0 ~ 99	11	
	A43	Boost frequency setting	0.0 ~ 50.0%	10%	
	A44	Torque characteristics	Constant torque /Reduced torque	Constant torque	
	A45	Output voltage gain setting	50 ~ 100%	100%	
DC Braking	A51	DC braking function selection	ON/OFF	OFF	
	A52	DC braking frequency setting	0.5 ~ 10Hz	0.5Hz	
	A53	DC braking output delay time setting	0.0 ~ 5 s	0.0 s	
	A54	DC braking power setting	0 ~ 100%	0%	
	A55	DC braking time setting	0.0 ~ 60 s	0.0 s	

Expanded Function A (Frequently Used Functions)

Code		Function	Setting Range	Initial Setting	
				xxE type xxU type	LFR type HFR type
Upper/Lower Limiter,Jump Frequency	A61	Frequency upper limiter setting	0.0 ~ 360 Hz	0.0 Hz	
	A62	Frequency lower limiter setting	0.0 ~ 360 Hz	0.0 Hz	
	A63	Jump frequency setting 1	0.0 ~ 360 Hz	0.0 Hz	
	A64	Jump frequency width setting 1	0 ~ 10 Hz	0.5 Hz	
	A65	Jump frequency setting 2	0 ~ 360 Hz	0 Hz	
	A66	Jump frequency width setting 2	0 ~ 10 Hz	0.5 Hz	
	A67	Jump frequency setting 3	0 ~ 360 Hz	0 Hz	
	A68	Jump frequency width setting 3	0 ~ 10 Hz	0.5 Hz	
PID Control	A71	Selection of PID function	ON/OFF	OFF	
	A72	P gain setting	0.2 ~ 5 times	1.0	
	A73	I gain setting	0.0 ~ 150 s	1.0 s	
	A74	D gain setting	0.0 ~ 100 s	0.0 s	
	A75	PID scale rate setting	0.01 ~ 99.99	1.00	
	A76	Feedback input method setting	Current/Voltage	Current	
AVR	A81	AVR function selection	ON/OFF/OFF at deceleration	OFF at deceleration	
	A82	Motor input voltage setting	200/220/230/240 380/400/415/440/460	xxE type:230/400 xxU type:230/460	200/400
2nd Acceleration/ Deceleration Function	A92	Second acceleration time setting	0.1 ~ 3000 s	15.0 s	
	A93	Second deceleration time setting	0.1 ~ 3000 s	15.0 s	
	A94	Second acceleration/deceleration switching method	Terminal /switching frequency	Terminal	
	A95	Acceleration switching frequency	0 ~ 360 Hz	0 Hz	
	A96	Deceleration switching frequency	0 ~ 360 Hz	0 Hz	
	A97	Acceleration pattern selection	Linear/S-curve	Linear	
	A98	Deceleration pattern selection	Linear/S-curve	Linear	

Expanded Function B (Fine Tuning Function)

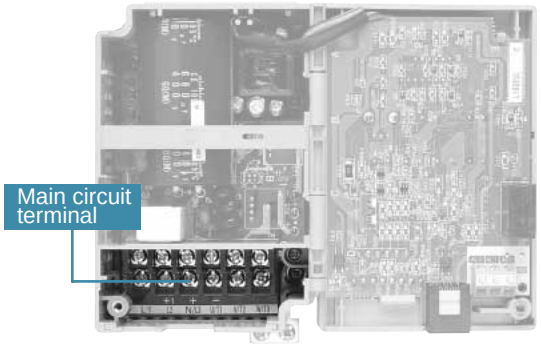
Code		Function	Setting Range	Initial Setting	
				xxE type xxU type	LFR type HFR type
Instantaneous Stop Restart	b01	Selection of restart mode	Trip/0Hz start /interrupt start /interrupt stop	Trip	
	b02	Allowable instantaneous power failure time setting	0.3 ~ 25 s	1.0 s	
	b03	Reclosing stand by after instaneous power failure recovered	0.3 ~ 100 s	1.0 s	
Electronic Thermal	b12	Electronic thermal level setting	50 ~120% of the rated inverter current value / Differs depending on model type	Rated inverter current value	
	b13	Electronic thermal characteristic selection	Reduced torque /constant torque	Reduced torque characteristic	
Overload Limit	b21	Overload limit mode selection	00 ~ 02 (code)	OI:ON only at acceleration and constant speed	
	b22	Overload limit level setting	50 ~150% of the rated inverter current value / Differs depending on model type	Rated inverter current value	
	b23	Overload limit constant setting	0.3 ~ 30.0	1.0	
Lock	b31	Software lock selection	00 ~ 03 (code)	01	
Current monitor	b32 (only xxE,xxU type)	Reactive current setting	0.00~rated current of each inverter	58% of rated current	–
Others	b81	Analog meter adjustment	0 ~ 255	80	
	b82	Start frequency adjustment	0.5 ~ 9.9 Hz	0.5 Hz	
	b83	Carrier frequency setting	0.5 ~ 16 kHz	5 kHz	12 kHz
	b84	Initialization mode selection	History only /setting only	History only	
	b85	Initial value selection	00, 01, 02	xxE type: 01 xxU type: 02	00
	b86	Frequency conversion value setting	0.1 ~ 99.9	1.0	
	b87	Stop key validity selection during terminal operation	Enabled/disabled	Enabled	
	b88	Restarting after FRS signal selection	0Hz start/frequency matching start	0Hz start	
	b89	Monitoring selection	01 ~ 07 (code)	01	

Expanded Function C (Terminal setting functions)

<table>
<tr><th colspan="2" rowspan="2">Code</th><th rowspan="2">Function</th><th rowspan="2">Setting Range</th><th colspan="2">Initial Setting</th></tr>
<tr><th>xxE type
xxU type</th><th>LFR type
HFR type</th></tr>
<tr><td rowspan="5">Intelligent Input Terminal Setting</td><td>C01</td><td>Intelligent input terminal 1 setting</td><td rowspan="5"><table><tr><th>Code</th><th>Function</th></tr><tr><td>00</td><td>FW (Forward run command)</td></tr><tr><td>01</td><td>RV (Reverse run command)</td></tr><tr><td>02</td><td>CF1 (1st multispeed command)</td></tr><tr><td>03</td><td>CF 2 (2nd multispeed command)</td></tr><tr><td>04</td><td>CF3 (3rd multispeed command)</td></tr><tr><td>05</td><td>CF4 (4th multispeed command)</td></tr><tr><td>06</td><td>JG (Jogging operation command)</td></tr><tr><td>09</td><td>2CH (Second acceleration/deceleration command)</td></tr><tr><td>11</td><td>FRS (Free run stop command)</td></tr><tr><td>12</td><td>EXT (External trip)</td></tr><tr><td>13</td><td>USP (USP function)</td></tr><tr><td>15</td><td>SFT (Software lock)</td></tr><tr><td>16</td><td>AT (Analog current input selection signal)</td></tr><tr><td>18</td><td>RS (Reset)</td></tr><tr><td>* 19</td><td>PTC (Thermistor trip)
[Assignable to C05 only]</td></tr></table>*xxE, xxU type only</td><td colspan="2">FW</td></tr>
<tr><td>C02</td><td>Intelligent input terminal 2 setting</td><td colspan="2">RV</td></tr>
<tr><td>C03</td><td>Intelligent input terminal 3 setting</td><td>xxE type:CF1
xxU type:AT</td><td>CF1</td></tr>
<tr><td>C04</td><td>Intelligent input terminal 4 setting</td><td>xxE type:CF2
xxU type:USP</td><td>CF2</td></tr>
<tr><td>C05</td><td>Intelligent input terminal 5 setting</td><td colspan="2">RS</td></tr>
<tr><td rowspan="4">Intelligent Input Terminal Contact</td><td>C11</td><td>Intelligent input terminal 1 contact</td><td rowspan="4">Input terminal setting
NO: ON (operated) at short
NC: ON (operated) at open
●Input ON State
NO> 1~5 L <NC> 1~5 L</td><td colspan="2">NO</td></tr>
<tr><td>C12</td><td>Intelligent input terminal 2 contact</td><td colspan="2">NO</td></tr>
<tr><td>C13</td><td>Intelligent input terminal 3 contact</td><td colspan="2">NO</td></tr>
<tr><td>C14</td><td>Intelligent input terminal 4 contact</td><td>xxE type:NO
xxU type:NC</td><td>NO</td></tr>
<tr><td>C15</td><td>Intelligent input terminal 5 contact</td><td colspan="2">NO</td></tr>
<tr><td rowspan="3">Intelligent Output Terminal Setting</td><td>C21</td><td>Intelligent output terminal 1 setting</td><td rowspan="2"><table><tr><th>Code</th><th>Function</th></tr><tr><td>00</td><td>RUN (Running signal)</td></tr><tr><td>01</td><td>FA1 (Frequency arrival signal:command arrival)</td></tr><tr><td>02</td><td>FA2 (Frequency arrival signal:setting or more)</td></tr><tr><td>03</td><td>OL (Overload advance notice signal)</td></tr><tr><td>04</td><td>OD (Deviation limit signal)</td></tr><tr><td>05</td><td>AL (Alarm signal)</td></tr></table></td><td colspan="2">FA1</td></tr>
<tr><td>C22</td><td>Intelligent output terminal 2 setting</td><td colspan="2">RUN</td></tr>
<tr><td>C23</td><td>Monitor signal selection</td><td>A-F (Analog output frequency monitor)
A (Analog output current monitor)
D-F (Digital output frequency monitor)</td><td colspan="2">A-F</td></tr>
<tr><td rowspan="3">Intelligent Output Terminal Contact</td><td>C31</td><td>Intelligent output terminal 11 contact</td><td rowspan="2">Output terminal setting
NO: Closed at operation (L Level at ON)
NC: Open at operation (H Level at ON)</td><td colspan="2">NO</td></tr>
<tr><td>C32</td><td>Intelligent output terminal 12 contact</td><td colspan="2">NO</td></tr>
<tr><td>C33</td><td>Alarm output NO/NC contact setting</td><td>NO: AL0-AL2 closed at alarm
NC: AL0-AL2 open at alarm</td><td colspan="2">NC</td></tr>
<tr><td rowspan="4">Function Relation with Output Terminal</td><td>C41</td><td>Overload advance notice signal</td><td>0 ~ 200% of the rated inverter current value</td><td>Differs depending on model</td><td colspan="2">Rated inverter current value</td></tr>
<tr><td>C42</td><td>Acceleration arrival signal frequency setting</td><td colspan="2">0.0 ~ 360.0 Hz</td><td colspan="2">0 Hz</td></tr>
<tr><td>C43</td><td>Deceleration arrival signal frequency setting</td><td colspan="2">0.0 ~ 360.0 Hz</td><td colspan="2">0 Hz</td></tr>
<tr><td>C44</td><td>PID deviation limit signal level setting</td><td colspan="2">0.0 ~ 100.0%</td><td colspan="2">3.0%</td></tr>
</table>

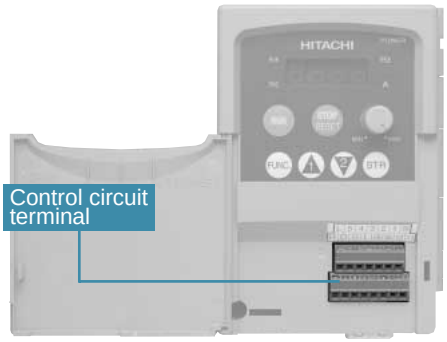
Terminal Functions

[Main Circuit Terminal]



Front case (right open)

[Control Circuit Terminal]



Terminal section cover (left open)

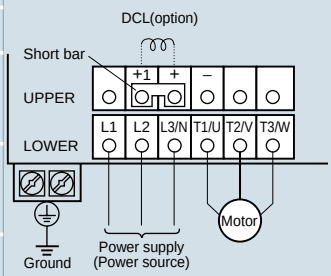
Terminal Screw Diameter

Model (L100 -) / Terminal Screw Diameter	002~004NFE 002~004NFU 002~007LFR	005~022NEF 007~022NFU 037LFU 004~040HFE 004~040HFU 015~037LFR 004~037HFR	055~075LFU 055~075HFE 055~075HFU 055~075LFR 055~075HFR
Main circuit terminal	M3.5	M4	M5
Terminal width (mm)	7.1	9	13
Control circuit terminal	M2 (press-tight type)		
Alarm terminal	M3 (press-tight type)		
Grounding	M4		M5

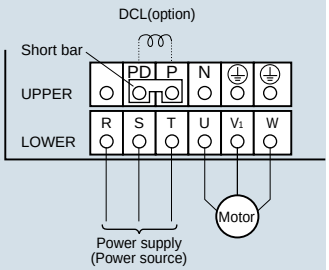
Main Circuit Terminals

Symbol (xxE type / xxU type)	Symbol (LFR type / HFR type)	Terminal Name	Function
L1,L2,L3	R.S.T	Main power supply input terminals	Connect the input power supply.
T1,T2,T3	U.V.W	Inverter output terminals	Connect the motor.
+, +1	P.PD	DC reactor connection terminals	Connect the DC reactor for harmonic suppression, power factor improvement.
+, –	P.N	Regenerative braking unit connection terminals	Connect the optional regenerative braking unit when braking torque required
G ⏚		Ground connection terminal	Ground to prevent electric shock and reduce noise

• xxE type
xxU type

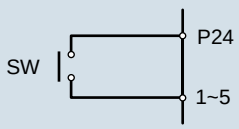
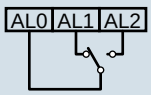


• LFR type
HFR type



*Open Short bar when connect DCL

Control Circuit Terminals

Symbol	Signal	Terminal Name	Remarks
FM	Input/Monitor signal	Monitor terminal (frequency, current, etc.)	PWM output
L		Common terminal for monitor and frequency command	–
P24 (xxE,xxU type only)		Common terminal for the intelligent input terminal	24 VDC
PCS (LFR,HFR type only)		Other external power supply terminal (24V DC,max • 30mA)	–
5		Intelligent input terminals: Select from the forward run command (FW), reverse run command (RV), multispeed commands 1~4 (CF1~CF4), second acceleration/deceleration command (2CH), free run stop (FRS), external trip (EXT), Power rdclosing restort prevention (USP) jogging (JG), analog input selection (AT), soft lock (SFT), reset (RS), and thermistor Trip (PTC) (xxE,xxU type only).	Contact input  Operated by SW (closed)
4			
3			
2			
1			
H	Frequency command	Power supply (10VDC) for frequency command	–
O		Frequency command input (voltage command) (0 ~ 10VDC)	Input impedance 10 kΩ
OI		Frequency command input (current command) (4 ~ 20mADC)	Input impedance 250Ω
L		Common terminal for frequency command	–
12	Output signal	Intelligent output terminal: Select from the run (RUN), overload advance notice (OL), alarm (AL), frequency arrival (FA1), and set frequency arrival (FA2).	Open collector output L level at operation (ON)
11			
CM2			
AL2	Alarm output	Alarm output terminal: 1C contact (relay) output  <Initial Setting> Normal : AL0-AL1 Closed Abnomal.1,Power OFF:AL0-AL2 closed	Contact rating • AC250V 2.5A(resistor load) 0.2A(cosφ • DC30V 3.0A(resistor load) 0.7A(cosφ
AL1			
AL0			

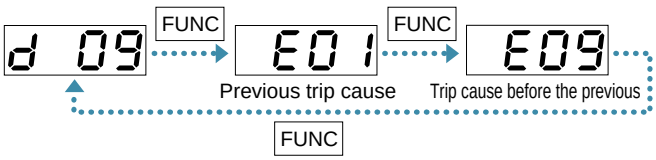
Protective Functions

Name	Description		Digital operator	Remote operator /copy unit ERR1 ****
Overcurrent protection	When the motor is restrained or suddenly reduced in speed, a large current is charged to the inverter, causing a fault. When the inverter detects 205% peak current for the rated current of the inverter,Over current is occurred.	Constant speed	E01	OC.Drive
		Deceleration	E02	OC.Decel
		Acceleration	E03	OC.Accel
		Others	E04	Over.c
Overload protection (*1)	When the inverter output current causes the motor to overload, the electronic thermal trip in the inverter cuts off the inverter output.		E05	Over.L
Overvoltage protection	If regenerative energy from the motor or the main power supply voltage is high, the protective circuit activates to cut off the inverter output when the voltage of the converter section exceeds the specification.		E07	Over.V
EEPROM error(*2)	The inverter output is cut off when EEPROM in the inverter has an error due to external noise, excessive temperature rise, or other factor.		E08	EEPROM
Undervoltage protection	When the input voltage received by the inverter decreases, the control circuit does not function normally. When the input voltage is below the specification, the inverter output is cut off.		E09	Under.V
CPU error	The inverter output is cut off when the inverter CPU has a malfunction or an error.		E11 E22	CPU CPU2
External trip	When the external equipment or unit has an error, the inverter receives the corresponding signal and cuts off the output.		E12	EXTERNAL
USP error	The USP error is indicated when the power is turned on with the inverter in RUN state. (Enabled when the USP function is selected.)		E13	USP
Ground fault protection	Ground fault is detected between the inverter output section and the motor when the power is turned on, to protect the inverter.		E14	GND.Flt
Input overvoltage protection	When the input voltage is higher than the specified value, it is detected 100 seconds after power is turned on and the output is cut off.		E15	OV.SRC
Temperature error	When the temperature in the main circuit increases due to cooling fan stop, the inverter output is cut off. (Only for the model type with cooling fan)		E21	OH FIN
PTC error (xxE,xxU type only)	When the resistance value of the external thermistor is too large, the equipment detects the abnormal condition of the thermistor and then cut off the output (when PTC function is selected)		E35	PTC
Waiting on account of undervoltage	Waiting with the output turned off, because the inverter receiving Voltage has dropped.		_ _U	UV.WAIT

Notes
1.Press the reset key 10 seconds after the alarm has occurred.
2.If an EEPROM error occurs,be sure to comfirm the seting value again.

Trip Monitoring Method

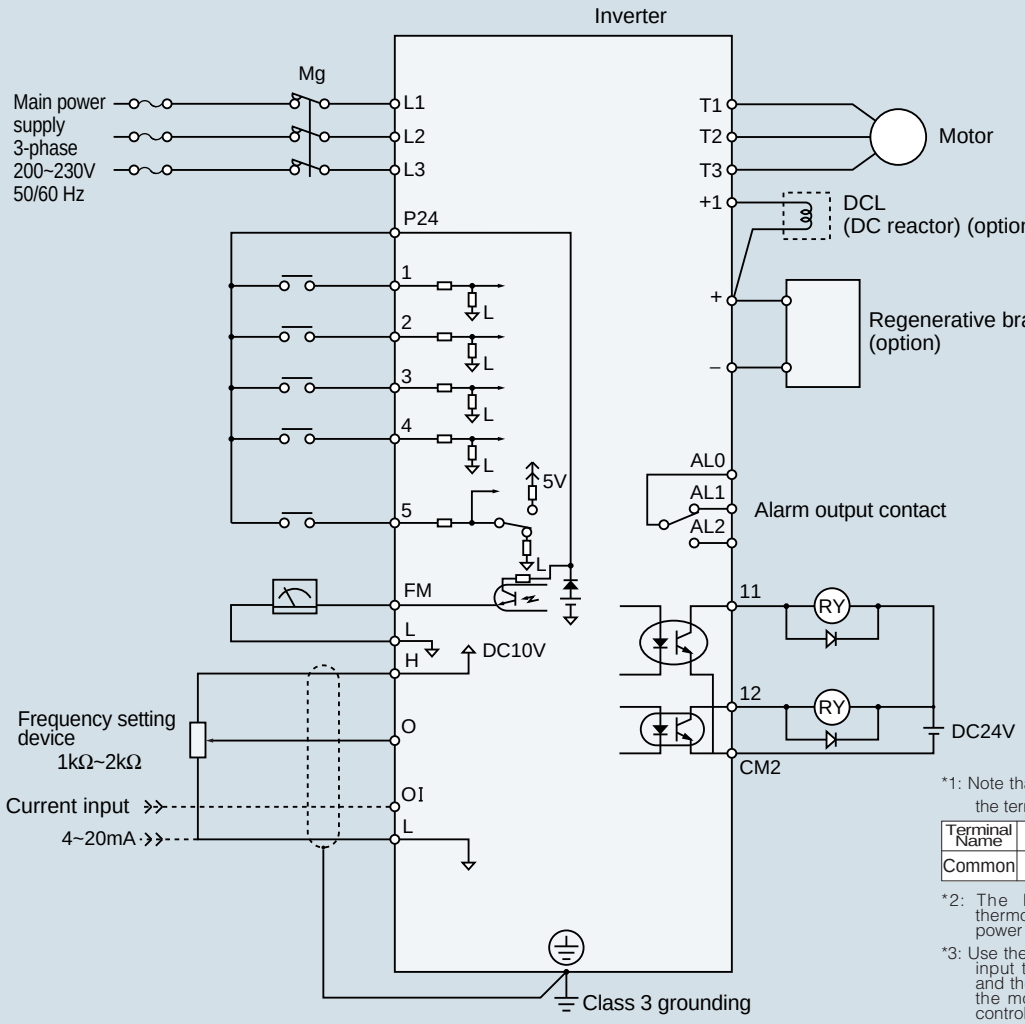
Trip History Monitoring Method



Note
1: [- - -] is indicated when there is no trip.

Connection Diagram

● xxE,xxU Type



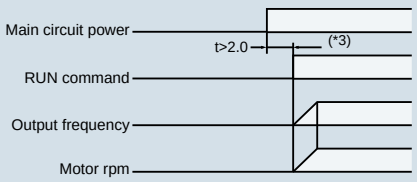
*1: Note that the common terminal differs depending on the terminal name.

Terminal Name	1, 2, 3, 4, 5	FM H, O, OI	11, 12
Common	L	L	CM2

*2: The braking resistor is equipped with a thermosensor. If it is activated, turn off the main power or extend the deceleration time.

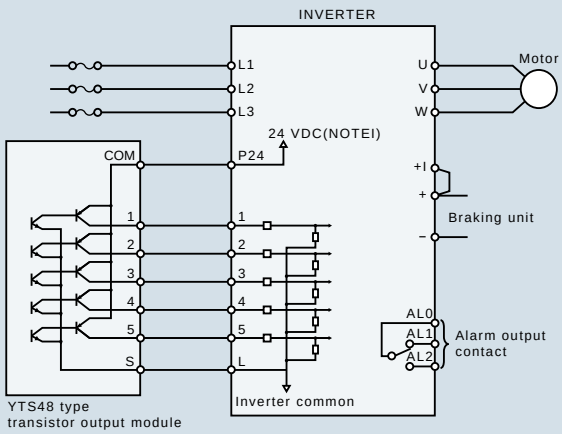
*3: Use the above timing to turn on the main power and input the RUN command. If the main power ON and the RUN command input occur simultaneously, the motor starts to run 2 sec. later because the control power supply boot is delayed.

Turn on the main power at the timing shown below.



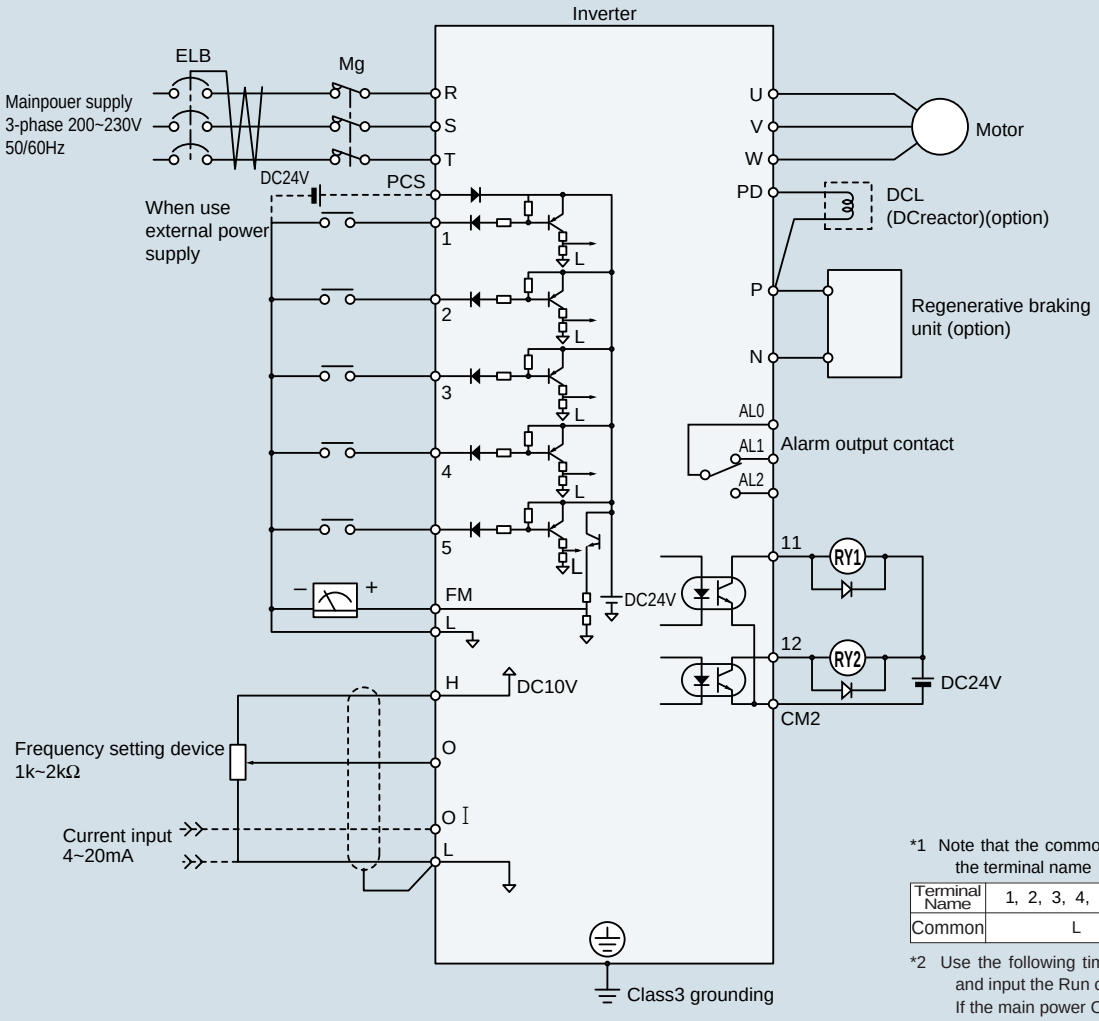
<Connection to the Programmable Controller>

When the internal interface power source is used



Note : 1
Do not short circuit the terminals P24 and L by mistake.
The control power supply may cause a failure

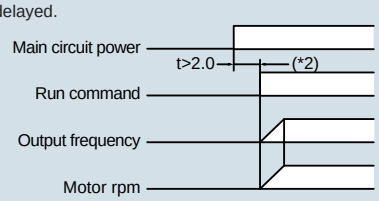
● LFR,HFR Type



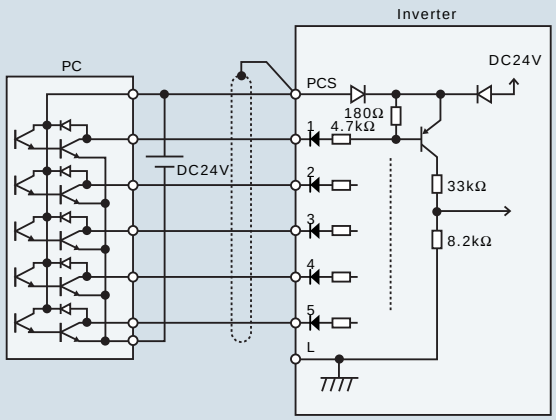
*1 Note that the common terminal differs depending on the terminal name

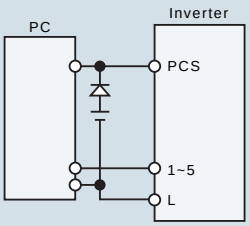
Terminal Name	1, 2, 3, 4, 5, FM	H, O, OI	11, 12
Common	L	L	CM2

*2 Use the following timing to turn on the main power and input the Run command.
If the main power ON and the Starts to run 2 Sec. later because the control power Supply boot is delayed.



<Connection to the Programmable Controller>

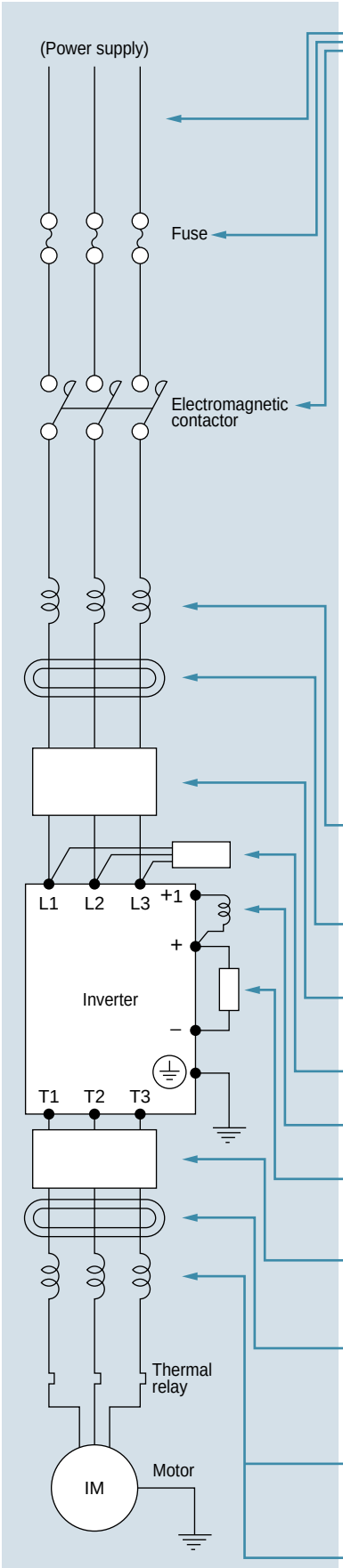




Note :
When the programmable controller is used with an analog input circuit(O,OI)and the inverter L terminal,be sure to equip an external power supply with a circuit for preventing reverse flow.
(See the detailed instruction manual.)

Note :
When terminal L is used,be sure to install the diode D to prevent reverse flow.

Applicable Wiring Apparatus and Options



Standard Apparatus

Motor Output (kW)	Inverter model L100-□□□		Wiring		Applicable equipment
	xxE,xxU Type	LFR,HFR Type	Power lines	Signal lines	Fuse(class J) rated 600V
0.2	002NFE/NFU	002LFR	AWG16/1.3mm²	(*) 0.14 to 0.75 mm² Shielded wire	10A
0.4	004NFE/NFU	004LFR			
0.55	005NFE	–			
0.75	007NFE/NFU	075LFR	AWG14/2.1mm²		15A
1.1	011NFE	–			
1.5	015NFE/NFU	015LFR	AWG12/3.3mm²		20A(single ph.) 15A(three ph.)
2.2	022NFE/NFU	022LFR	AWG10/5.3mm²		30A(single ph.) 20A(three ph.)
3.7	037LFU	037LFR	AWG12/3.3mm²		30A
5.5	055LFU	055LFR	AWG10/5.3mm²		40A
7.5	075LFU	075LFR	AWG 8 /8.4mm²		50A
0.4	004HFE/HFU	004HFR	AWG16/1.3mm²	(*) 0.14 to 0.75 mm² Shielded wire	3A
0.75	007HFE/HFU	007HFR			6A
1.5	015HFE/HFU	015HFR			10A
2.2	022HFE/HFU	022HFR			
3.0	030HFE	–	AWG14/2.1mm²		15A
4.0(3.7)	040HFE/HFU	(037HFR)			
5.5	055HFE/HFU	055HFR	AWG12/3.3mm²		20A
7.5	075HFE/HFU	075HFR			25A

NOTE1: Field wiring connection must be made by a UL Listed and CSA Certified closed-loop terminal connector sized for the wire gauge involeved. Connector must be fixed using the crimp tool specified by the connector manufacturer.
NOTE2: Be sure to consider the capacity of the circuit breaker to be used.
NOTE3: Be sure to use bigger wires for power lines if the distance exceeds 20 m.
(*) Use 0.75 mm² wire for the alarm signal wire.

Options

Name	Function
Input-side AC reactor for harmonicsuppression/power coordination/powerfactor improvement (ALI-□□□)	This is useful when harmonic suppression measures must be taken, when the main power voltage unbalance rate exceeds 3% and the main power capacity exceeds 500kVA, or when a sudden power voltage variation occurs.It also helps to improve the power factor.
Radio noise filter <zerophase reactor> (ZCL-□)	Noise may occur in a nearby radio, etc., via the mainpower supply side wiring when using the inverter. This filter helps to reduce the noise; radiated noise reduction.
EMI filter for Inverter (FFL100-□□)	Reduces the conductive noise on the main power wires generated from the main power supply. Connect to the inverter primary side (input side).
Input-side radio noise filter (capacitive filter) (CFI-□)	Reduces noise radiated from the main power wiring on the input side.
DC reactor	Suppresses harmonics generated by the inverter.
Dynamic braking unit	This is useful for increasing the control torque of the inverter, for frequently repeating ON-OFF of the inverter, or for decelerating the load with a large inertial moment (GD^2).
Output-side noise filter (ACF-C□)	This is installed between the inverter and the motor to reduce noise radiated from the control power wiring. It is useful for reducing radio-wave disturbance in a radio or TV set and for preventing malfunction of measuring instruments or sensors
Radio noise filter <zero-phase reactor> (ZCL-□□□)	Useful for reducing noise produced in the inverter output side. (It is usable on either the input or output side.)
AC reactor for vibration reduction/thermal relay malfunction prevention (ACL-L-□□□) (ACL-H-□□□)	Vibration may increase when driving a general-purpose motor with an inverter as compared with operation on commercial power. Connecting this reactor between the inverter and the motor allows reduction of motor pulsation. When the wiring between the inverter and the motor is 10 m or more, inserting the reactor prevents thermal relay malfunction caused by harmonics resulting from inverter switching. A current sensor can be used instead of the thermal relay.
LCR filter	Output-side sine wave generating filter

NOTE1: FFL 100 series filter is required for EMC directive(Europe),C-TICK(Australian EMC requirment) but others are not this purpose. Reactor and others of the above table except EMI filter for general use for noise reduction.

For Correct Operation

Application to Motors

(Application to general-purpose motors)

Operating frequency	The overspeed endurance of a general-purpose motor is 120% of the rated speed for 2 minutes (JIS C4004). For operation at higher than 60 Hz, it is required to examine the allowable torque of the motor, useful life of bearings, noise, vibration, etc. In this case, be sure to consult the motor manufacturer as the maximum allowable rpm differs depending on the motor capacity, etc.
Torque characteristics	The torque characteristics of driving a general-purpose motor with an inverter differ from those of driving it with commercial power (starting torque decreases in particular). Carefully check the load torque characteristic of a connected machine and the driving torque characteristic of the motor.
Motor loss and temperature increase	An inverter-driven general-purpose motor heats up swiftly at lower speeds. Consequently, the torque level permitting continuous use decreases with lower motor speeds. Carefully check the torque characteristics.
Noise	When run by an inverter, a general-purpose motor generates noise slightly greater than with commercial power.
Vibration	When run by an inverter at variable speeds, the motor may generate vibration, especially because of (a) unbalance of the rotor including a connected machine, or (b) resonance caused by the natural vibration frequency of a mechanical system. Particularly, be careful of (b) when operating at variable speeds a machine previously fitted with a constant speed motor. Vibration can be minimized by (1) avoiding resonance points using the frequency jump function of the inverter, (2) using a tire-shaped coupling, or (3) placing a rubber shock absorber beneath the motor base.
Power transmission mechanism	Under continued, low-speed operation, oil lubrication can deteriorate in a power transmission mechanism with an oil-type gear box (gear motor) or reducer. Check with the motor manufacturer for the permissible range of continuous speed. To operate at more than 60 Hz, confirm the machine's ability to withstand the centrifugal force generated.

(Application to special motors)

Gear motor	The allowable rotation range of continuous drive varies depending on the lubrication method or motor manufacturer. (Particularly in case of oil lubrication, pay attention to the low frequency range.) The Hitachi GA/GX/CX gear motors are of a grease lubrication type. Their grease lubrication capability remains unchanged even if the motor rotating speed decreases.
Brake-equipped motor	For use of a brake-equipped motor, be sure to connect the braking power supply from the primary side of the inverter.
Pole-change motor	There are different kinds of pole-change motors, constant output characteristic type, constant torque characteristic type, etc., and with different rated current values. In motor selection, check the maximum allowable current for each motor of a different pole count. At the time of pole changing, be sure to stop the motor.
Submersible motor	The rated current of a submersible motor is significantly larger than that of the general-purpose motor. In inverter selection, be sure to check the rated current of the motor.
Explosion-proof motor	Inverter drive is not suitable for a safety-enhanced explosion-proof type of motor. The inverter should be used in combination with a pressure-proof explosion-proof type of motor. * Explosion-proof verification is not available for L100 Series. For explosion-proof operation, use other series of motors.
Synchronous (MS) motor High-speed (HFM) motor	In most cases, the synchronous (MS) motor and the high-speed (HFM) motor are designed and manufactured to meet the specifications suitable for a connected machine. As to inverter selection, consult the manufacturer.
Single-phase motor	A single-phase motor is not suitable for variable-speed operation by inverter drive. Therefore, use a three-phase motor.

(Application to the 400V-class motor)

A system applying a voltage-type PWM inverter with IGBT may have surge voltage at the motor terminals resulting from the cable constants including the cable length and the cable laying method. Depending on the surge current magnification, the motor coil insulation may be degraded. In particular, when a 400V-class motor is used, a longer cable is used, and critical loss can occur, take the following countermeasures:
(1) install the LCR filter between the inverter and the motor,
(2) install the AC reactor between the inverter and the motor, or
(3) enhance the insulation of the motor coil.

Notes on Use

(Drive)

Run/Stop	Run or stop of the inverter must be done with the keys on the operator panel or through a control circuit terminal. Do not operate by installing a electromagnetic contactor (Mg) in the main circuit.
Emergency motor stop	When the protective function is operating or the power supply stops, the motor enters the free run stop state. When an emergency stop is required or when the motor should be kept stopped, use the mechanical brake.
High-frequency run	A max. 360 Hz can be selected on the L100 Series. However, a two-pole motor can attain up to approx. 21,600 rpm, which is extremely dangerous. Therefore, carefully make selection and settings by checking the mechanical strength of the motor and connected machines. Consult the motor manufacturer when it is necessary to drive a standard (general-purpose) motor at over 60 Hz. A full line of high-speed motors is available from Hitachi.

(Installation location and operating environment)

Avoid installation in areas of high temperature, excessive humidity, or where moisture can easily collect, as well as areas that are dusty, subject to corrosive gasses, mist of liquid for grinding, or salt. Install the inverter away from direct sunlight in a well-ventilated room that is free of vibration. The inverter can be operated in the ambient temperature range from -10 to 50 .(carrier frequency and output current must be reduced in the range of 40 to 50)

(Main power supply)

Installation of an AC reactor on the input side	In the cases below involving a general-purpose inverter, a large peak current flows on the main power supply side, and is able to destroy the converter module. Where such situations are foreseen or the connected equipment must be highly reliable, install an AC reactor between the power supply and the inverter. Also, where influence of indirect lightning strike is possible, install a lightning conductor. (A) The unbalance factor of the power supply is 3% or higher. (Note) (B) The power supply capacity is at least 10 times greater than the inverter capacity (the power supply capacity is 500 kVA or more). (C) Abrupt power supply changes are expected. Examples: (1) Several inverters are interconnected with a short bus. (2) A thyristor converter and an inverter are interconnected with a short bus. (3) An installed phase advance capacitor opens and closes. In cases (A), (B) and (C), it is recommended to install an AC reactor on the main power supply side. Note: Example calculation with V_{RS} = 200V, V_{ST} = 203V, V_{TR} = 197V V_{RS} : R-S line voltage, V_{ST} : S-T line voltage, V_{TR} : T-R line voltage Unbalance factor of voltage $= \frac{\text{Max. line voltage (min.)} - \text{Mean line voltage}}{\text{Mean line voltage}} \times 100$ $= \frac{V_{RS} - (V_{RS} + V_{ST} + V_{TR})/3}{(V_{RS} + V_{ST} + V_{TR})/3} \times 100 = \frac{205 - 202}{202} \times 100 = 1.5\ (\%)$
Using a private power generator	An inverter run by a private power generator may overheat the generator or suffer from a deformed output voltage waveform of the generator. Generally, the generator capacity should be five times that of the inverter (kVA) in a PWM control system, or six times greater in a PAM control system.

Notes on Peripheral Equipment Selection

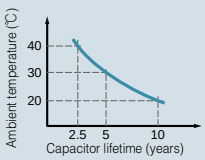
Wiring connections		(1) Be sure to connect main power wires with R, S, and T (input) terminals and motor wires to U, V, and W terminals (output). (Incorrect connection will cause a breakdown.) (2) Be sure to provide a grounding connection with the ground terminal (⏚).
Wiring between inverter and motor	Electro-magnetic contactor	When an electromagnetic contactor is installed between the inverter and the motor, do not perform on-off switching during running operation.
	Thermal relay	When used with standard applicable output motors (Hitachi standard three-phase squirrel-cage four-pole motors), the L100 Series do not need a thermal relay for motor protection due to the internal electronic protective circuit. A thermal relay, however, should be used: • during continuous running at a range beyond 30 to 60 Hz. • for motors exceeding the range of electronic thermal adjustment (rated current). • when several motors are driven by the same inverter; install a thermal relay for each motor. • The RC value of the thermal relay should be more than 1.1 times the rated current of the motor. Where the wiring length is 10 m or more, the thermal relay tends to turn off readily. In this case, provide an AC reactor on the output side or use a current sensor. See the item for the thermal relay malfunction preventive AC reactor on page 16.
Installing a circuit breaker		Install a circuit breaker on the main power input side to protect inverter wiring and ensure personal safety. Choose an inverter-compatible circuit breaker. The conventional type may malfunction due to harmonics from the inverter. For more information, consult the circuit breaker manufacturer.
Wiring distance		The wiring distance between the inverter and the remote operator panel should be 20 meters or less. When this distance is exceeded, use CVD-E (current-voltage converter) or RCD-E (remote control device). Shielded cable should be used on the wiring. Beware of voltage drops on main circuit wires. (A large voltage drop reduces torque.)
Earth leakage relay		If the earth leakage relay (or earth leakage breaker) is used, it should have a sensitivity level of 15 mA or more (per inverter). The leakage current differs depending on the cable length; see page xx.
Phase advance capacitor		Do not use a capacitor for power factor improvement between the inverter and the motor because the high-frequency components of the inverter output may overheat or damage the capacitor

High-frequency Noise and Leakage Current

(1) High-frequency components are included in the input/output of the inverter main circuit, and they may cause interference in a transmitter, radio, or sensor if used near the inverter. The interference can be minimized by attaching noise filters (option) in the inverter circuitry.
(2) The switching action of an inverter causes an increase in leakage current. Be sure to ground the inverter and the motor.

Lifetime of Primary Parts

Because a smoothing capacitor deteriorates as it undergoes internal chemical reaction, it should normally be replaced every five years. Be aware, however, that its life expectancy is considerably shorter when the inverter is subjected to such adverse factors as high temperatures or heavy loads exceeding the rated current of the inverter.
The approximate lifetime of the capacitor is as shown in the figure at the right when it is used 12 hours daily (according to the "Instructions for Periodic Inspection of General-Purpose Inverter" (JEMA).)
Also, such consumable parts as a cooling fan should be replaced. (Maintenance inspection and parts replacement must be performed by only specified trained personnel.)



Precaution for Correct Usage

- Before use, be sure to read through the Instruction Manual to insure proper use of the inverter.
- Note that the inverter requires electrical wiring; a specialist should carry out the wiring.
- The inverter in this catalog is designed for general industrial applications. For special applications in fields such as aircraft, outer space, nuclear power, electrical power, transport vehicles, clinics, and submarine relay equipment, please consult with us in advance.
- For application in a facility where human life is involved or serious losses may occur, make sure to provide safety devices to avoid a serious accident.
- The inverter is intended for use with a three-phase AC motor. For use with a load other than this, please consult with us.

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