

HITACHI INVERTER

J100 E4 SERIES

INSTRUCTION MANUAL

Single phase input 200V class

Three phase input 400V class

NB524XA

Definitions and Symbols

A safety instruction (message) is given with a hazard alert symbol and a signal word; **WARNING** or **CAUTION**. Each signal word has the following meaning throughout this manual.



This is the “Safety Alert Symbol.” This symbol is used to call your attention to items or operations that could be dangerous to your or other persons operating this equipment. Read these messages and follow these instructions carefully.



WARNING **WARNING:** personal danger

Warning notes indicate any condition or practice, which if not strictly observed, could result in personal injury or possible death.



CAUTION **CAUTION:** Possible damage to equipment

Caution notes indicate any condition or practice, which if not strictly observed or corrected, could result in damage or destruction of the equipment.

NOTE

NOTE: Notes indicate an area or subject of special merit, emphasizing either the product’s capabilities or common errors in operation or maintenance.

DANGER HIGH VOLTAGE



Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there might be exposed components with cases or protrusions at or above line potential. Extreme care should be taken to protect against shock. Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case an emergency occurs. Disconnect power whenever possible before checking controllers or performing maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on an electronic controllers or rotating electrical equipment.

PRECAUTIONS

WARNING : This equipment should be installed, adjusted and serviced by qualified electrical maintenance personal familiar with the construction and operation of the equipment and the hazards involved. Failure to observe this precaution could result in bodily injury.

WARNING : The user is responsible for ensuring that all driven machinery, drive train mechanism not supplied by Hitachi, Ltd., and process line material are capable of safe operation at an applied frequency of 150% of the maximum selected frequency range to the AC motor. Failure to do so can result in destruction of equipment and injury to personnel should a single point failure occur.

WARNING : For protection, install a leak breaker type with a high frequency circuit capable of large currents to avoid an unnecessary operation. The ground fault protection circuit is not designed to protect personal injury.

WARNING : HAZARD OF ELECTRICAL SHOCK. DISCONNECT INCOMING POWER BEFORE WORKING ON THIS CONTROL.

WARNING : SEPARATE MOTOR OVERCURRENT, OVERLOAD AND OVERHEATING PROTECTION IS REQUIRED TO BE PROVIDED IN ACCORDANCE WITH THE SAFETY CODES REQUIRED BY JURISDICTIONAL AUTHORITIES.

CAUTION: These instructions should be read and clearly understood before working on J100 series equipment.

CAUTION: Proper grounds, disconnecting devices and other safety devices and their location are the responsibility of the user and are not provided by Hitachi, Ltd.

CAUTION: Be sure to connect a motor thermal switch or overload device to the J100 series controller to assure that the inverter will shut down in the event of an overload or an overheated motor.

CAUTION: DANGEROUS VOLTAGE EXISTS UNTIL CHARGE LIGHT IS OFF.

CAUTION: Rotating shafts and above ground electrical potentials can be hazardous. Therefore, it is strongly recommended that all electrical work conform to the National Electrical Codes and local regulations. Installation, alignment and maintenance should be performed only by qualified personnel.

Factory recommended test procedures, included in the instruction manual, should be followed. Always disconnect electrical power before working on the unit.

PRECAUTIONS FOR EMC (Electro Magnetic Compatibility)

It is required to satisfy the EMC directive (89/336/EEC) when using J100 inverter in EU country. To satisfy EMC directive and to comply with standard, the followings should be kept.

WARNING:

This equipment should be installed, adjusted and serviced by qualified personal familiar with construction and operation of the equipment and the hazards involved. Failure to observe this precaution could result in bodily injury.

1. Power supply to J100 inverter

- 1) Voltage fluctuation $\pm 10\%$ or less
- 2) Voltage unbalance $\pm 3\%$ or less
- 3) Frequency variation $\pm 4\%$ or less
- 4) Voltage distortion THD=10% or less

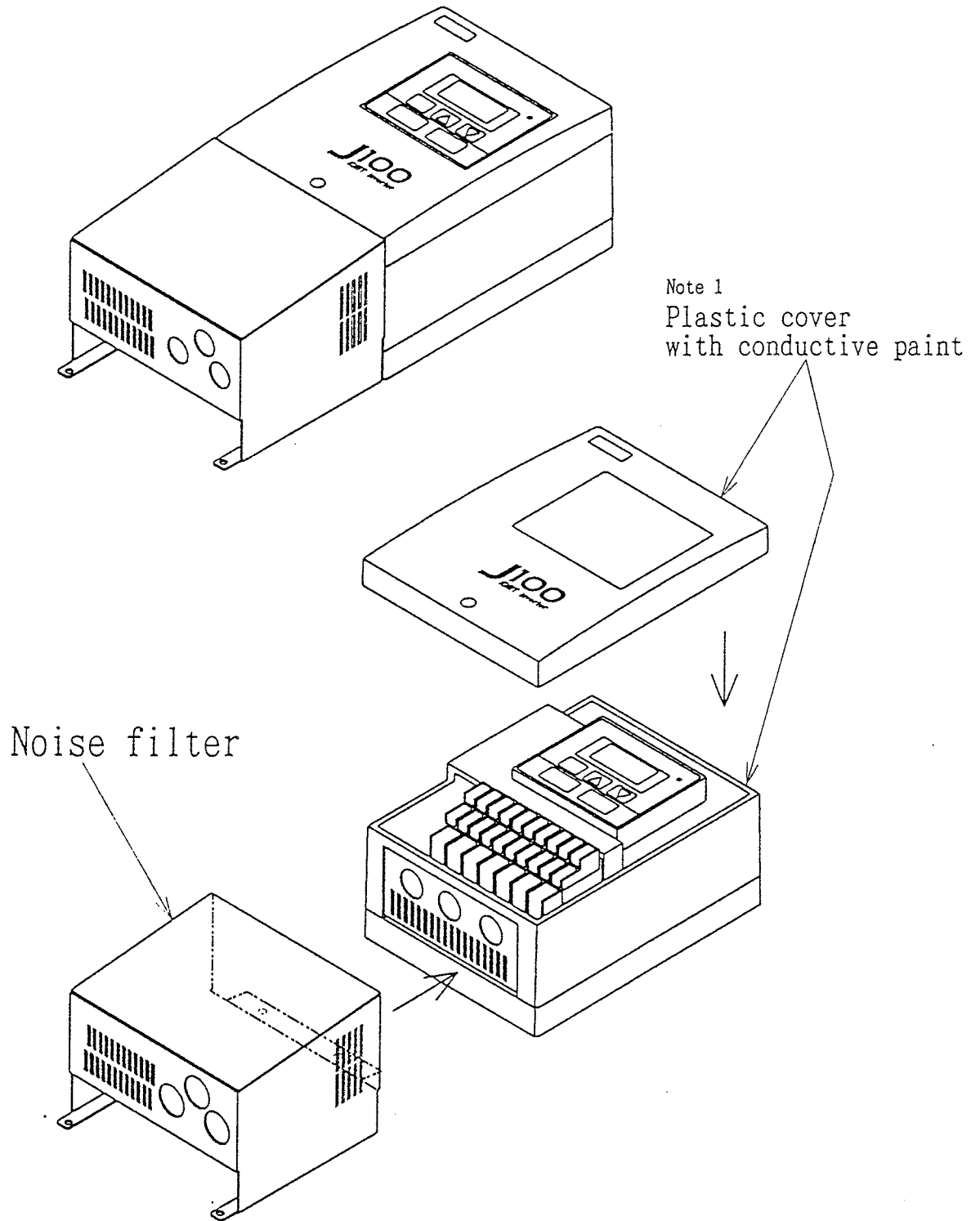
2. Installation

- 1) Use filter designed for J100 inverter
- 2) Fix the filter and inverter to metal panel

3. Wiring

- 1) Shielded wire (screened cable) is required for motor wiring, and length is less than 20m.
- 2) Separate the main circuit wiring from signal/process circuit wiring.

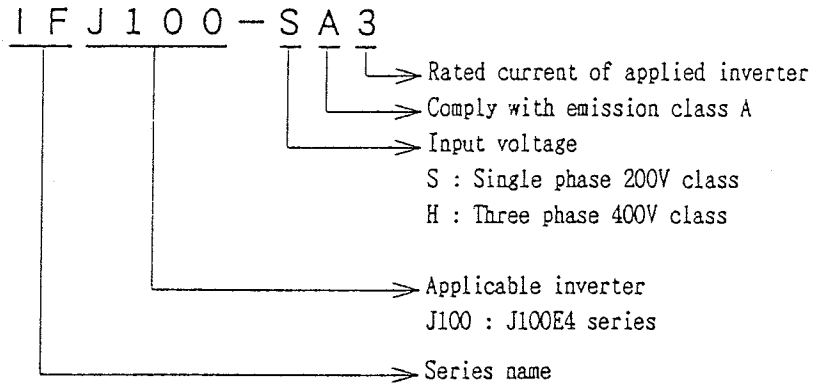
1. Appearance and names of parts (J100-004SFE4)



Note 1: Do not operate an inverter with no cover. Inverter operation with no cover makes high radiation noise, and less noise immunity.

2. Model name and specifications

1) Description of filter model name.



2) Specification and applicable inverter

·Single phase 200V class (250V max)

Model name	Input current	Performance	Motor (kW)			
			0.4	0.75	1.5	2.2
IFJ100-SA3	6.0 A	EN55011 class A	J100-004 SFE4			
IFJ100-SA5	10.0 A	EN55011 class A		J100-007 SFE4		
IFJ100-SA10	21.0 A	EN55011 class A			J100-015 SFE4	J100-022 SFE4

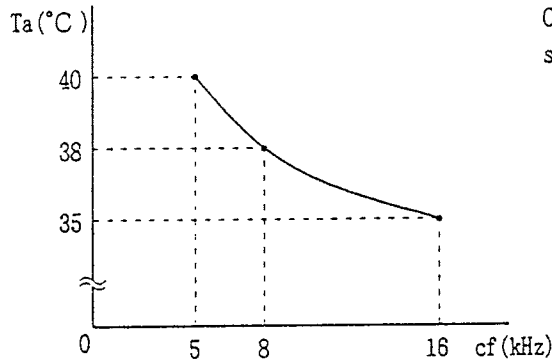
·Three phase 400V class (506V max)

Model name	Input current	Performance	Motor (kW)		
			1.5	2.2	3.7
IFJ100-HA8	17.2 A	EN55011 class A	J100-015 HFE4	J100-022 HFE4	J100-037 HFE4

3) Environment condition

When using a filter (IFJ100 series), keep the following condition.

- ① Ambient temperature and carrier frequency



Carrier frequency can be changed by function A10, see page 8-18 of inverter instruction manual.

- ② Humidity : 20 to 90% RH (no dew condensation)
- ③ Vibrations : 5.9 m/s^2 (0.6G) 10-55Hz
- ④ Location : 1000 meter or less altitude, indoor (no corrosive gas or dust)

3. Installation and wiring

WARNING:

Failure to observe this precaution could result in bodily injury.
Disconnect power before servicing and wait for 5minute.

Be sure **CHARGE** lamp located on the side of control terminal is off, and inside come cool down.

1) Installing the filter

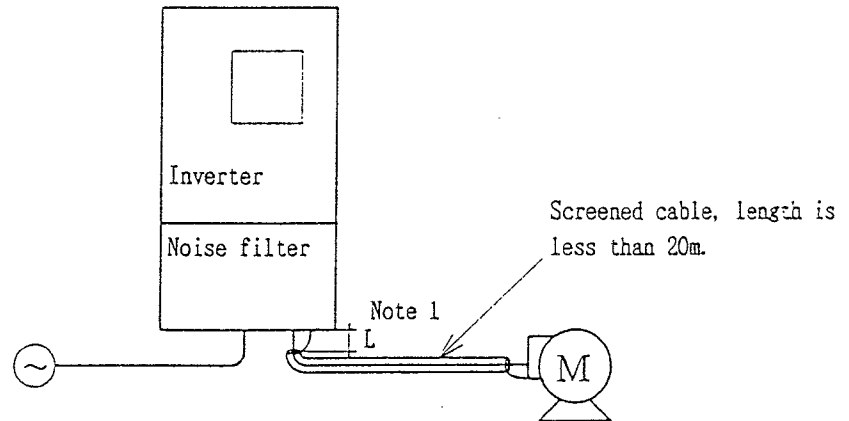
The filter, IFJ100 series, are exclusively designed for J100E4 inverters, and follow the installation instruction.

Remove the cover of filter and inverter, and fix the filter to the inverter. Fix the filter and inverter to a metal panel or cabinet wall, and make the wiring to the inverter and filter as shown Fig 1.2 or 3.

2) Wiring

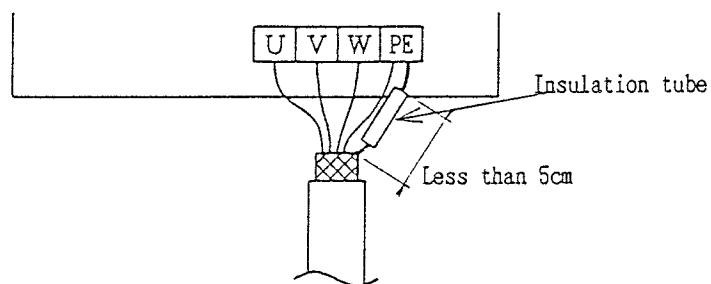
Wiring method is relevant for emission noise and noise immunity keep the following.

① Power supply and motor wiring.

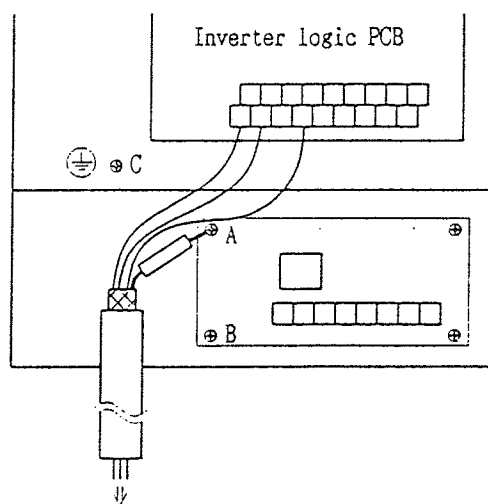


Note 1

"L" is less than 5cm, and put an insulation tube to screened wire.

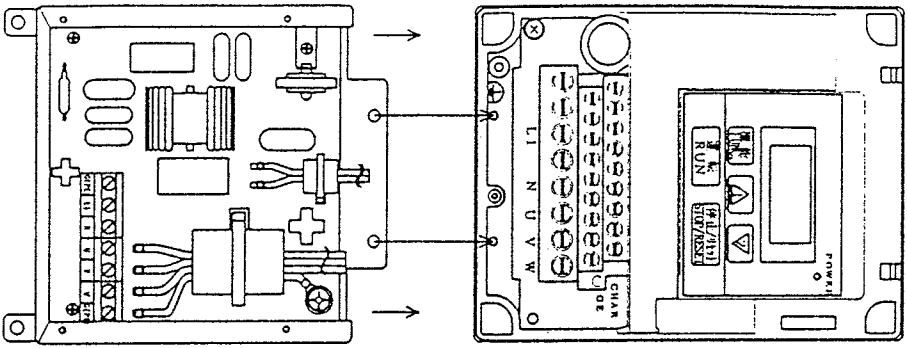


② Signal wiring

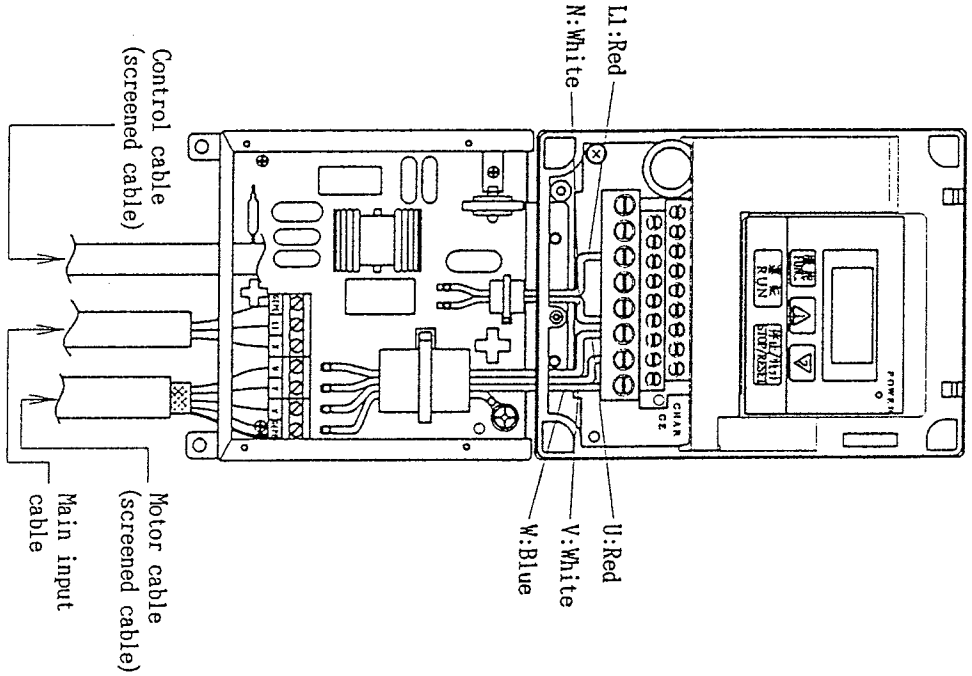


Connect a screened wire to scree A, B or C with insulation tube.

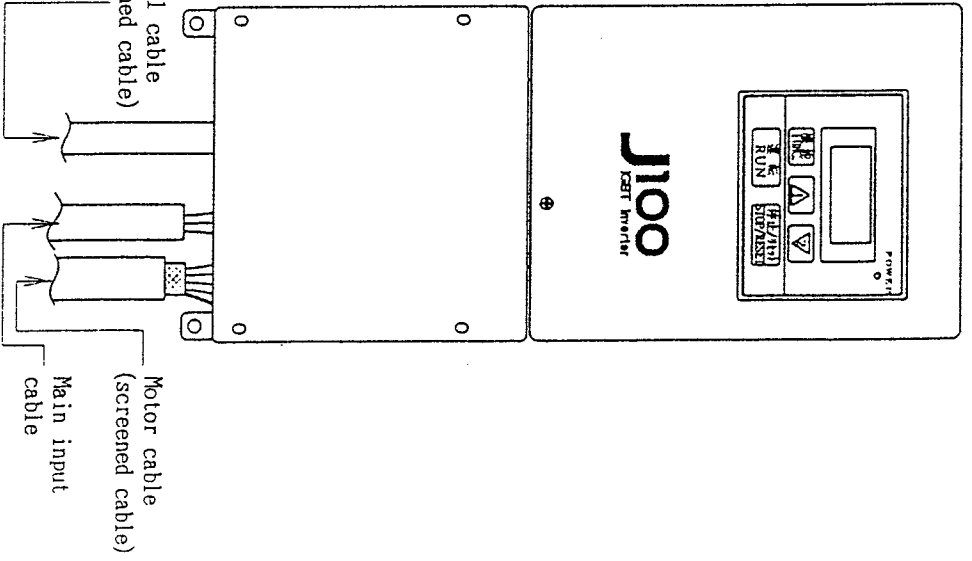
No connection of screened wire on signal source side is required.



(a) Fixing a filter to inverter

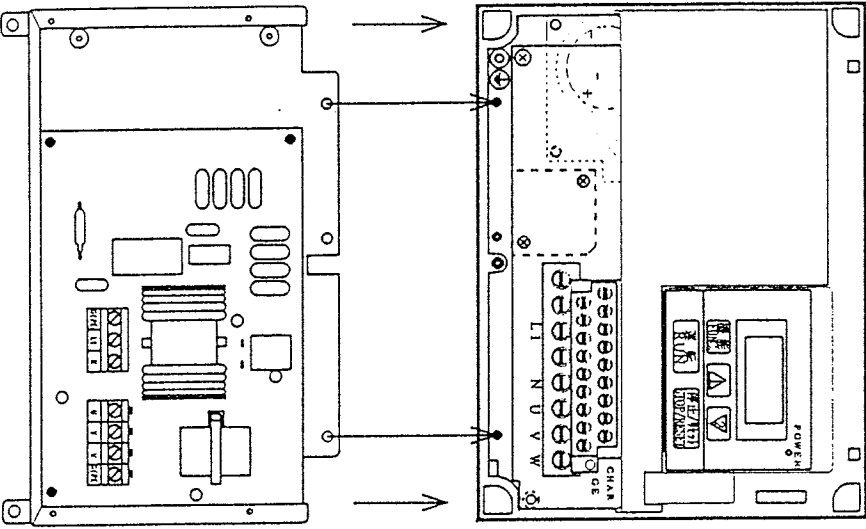


(b) Wiring to an inverter

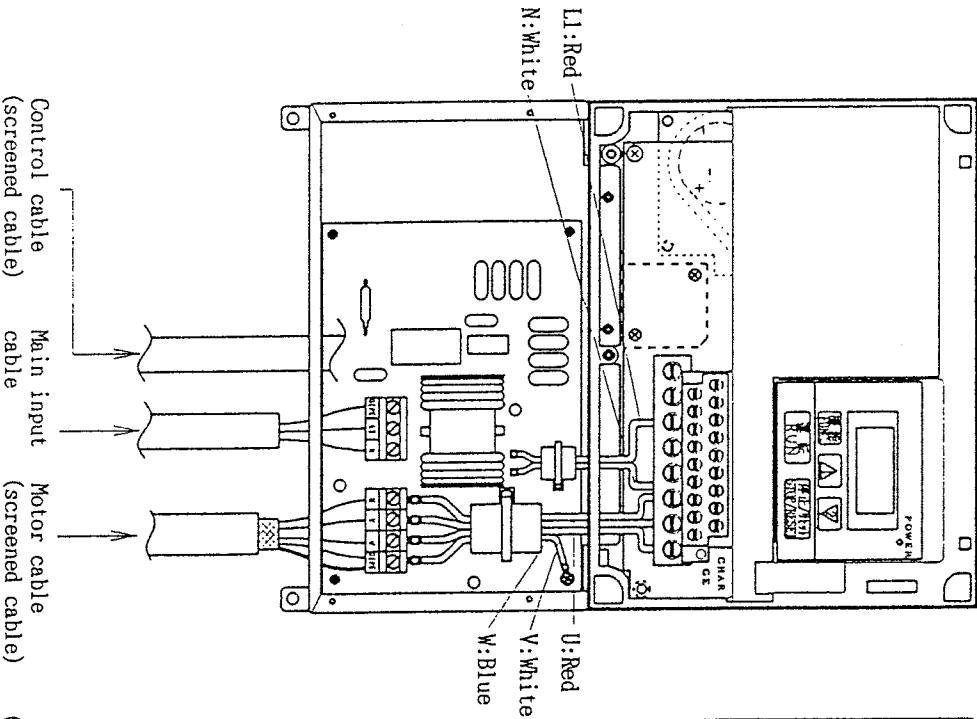


(c)

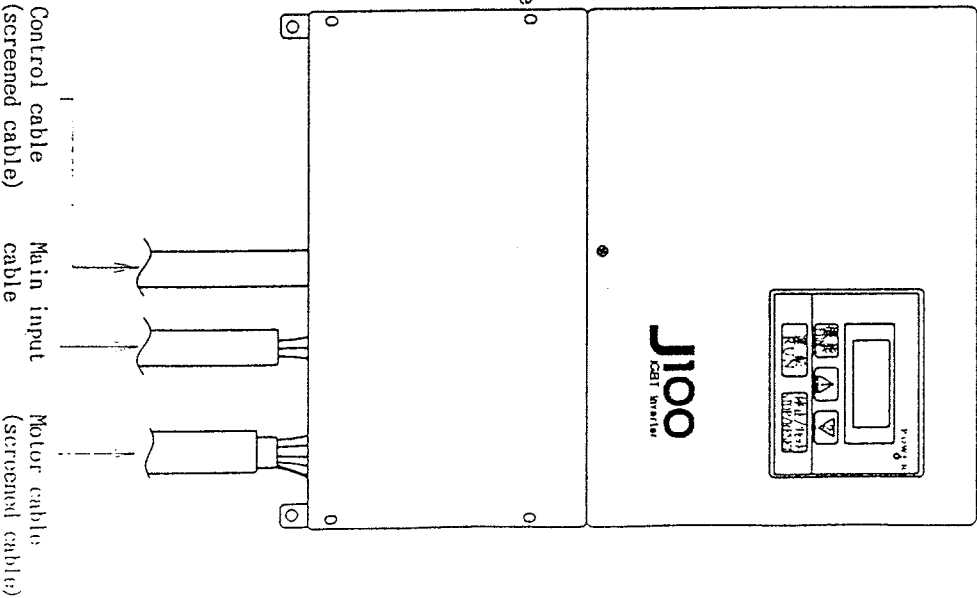
Fig 1 Installation and wiring for J100-004~007SFE4



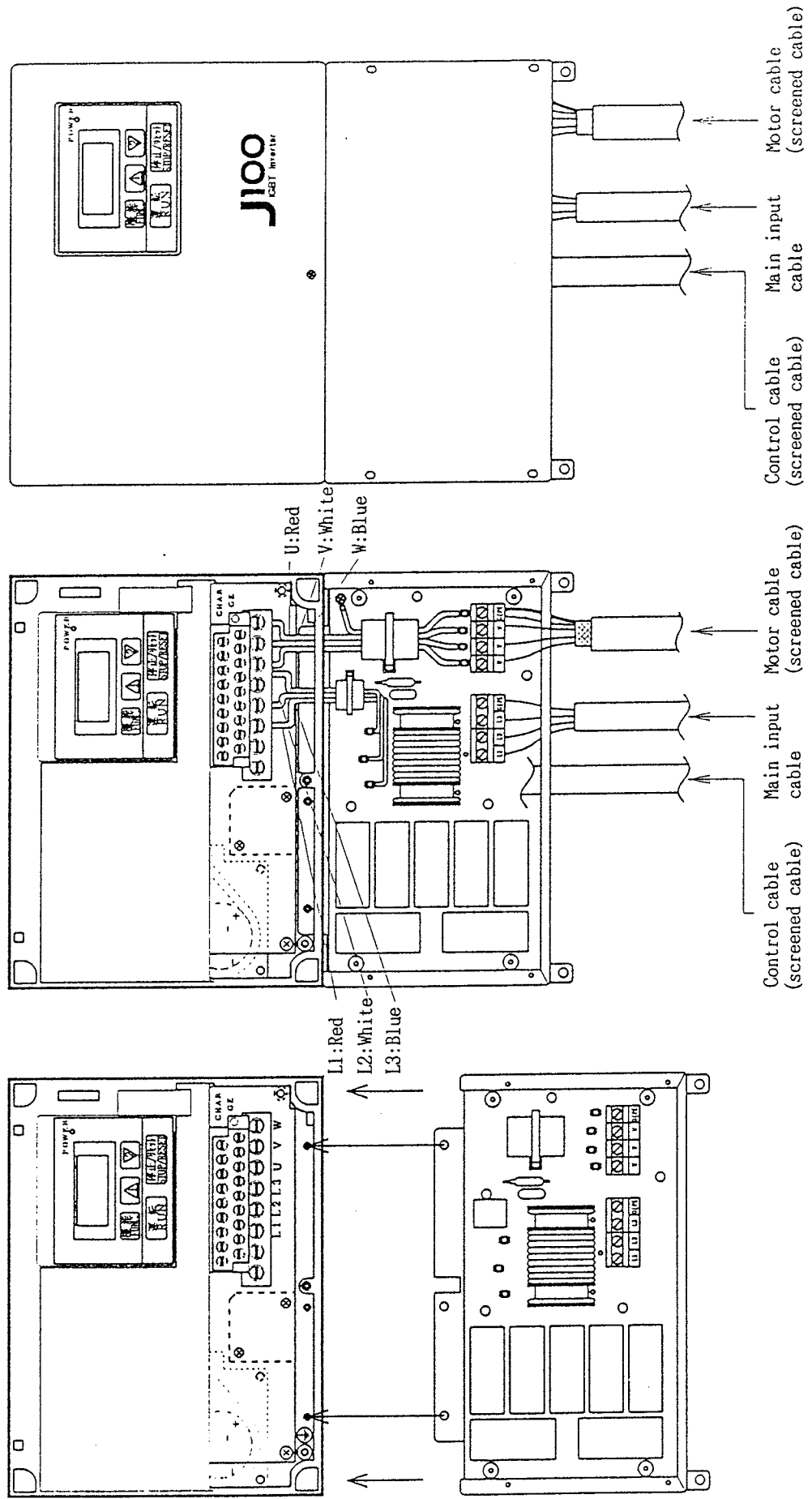
(a) Fixing a filter to inverter



(b) Wiring to an inverter



(c)



(a) Fixing a filter to inverter

(b) Wiring to an inverter

(c)

Fig 3 Installation and wiring for J100-015~037HFE4

Revision History Table

No.	Revision Contents	The Date of Issue	Operation Manual No.
1	Addition of precaution for EMC	August,1995	NB524XA

TABLE OF CONTENTS

	Page
1. SAFETY PRECAUTIONS	1-1
2. INSPECTION UPON UNPACKING	2-1
3. APPEARANCE AND NAMES OF PARTS	3-1
4. INSTALLATION.....	4-1
5. WIRING	5-1
6. OPERATION	6-1
7. FUNCTION OF CONTROL CIRCUIT TERMINAL.....	7-1
8. OPERATION OF THE DIGITAL OPERATOR	8-1
9. PROTECTIVE FUNCTIONS	9-1
10. TROUBLESHOOTING.....	10-1
11. MAINTENANCE AND INSPECTION.....	11-1
12. STANDARD SPECIFICATIONS	12-1
13. FUNCTIONS WHEN USING THE OPTIONAL REMOTE OPERATOR.....	13-1
14. SERVICE.....	14-1
APPENDIX 1 J100 SERIES DATA SETTING VALUES (FOR THE DIGITAL OPERATOR)	A-1
APPENDIX 2 J100 SERIES DATA SETTING VALUES (FOR THE REMOTE OPERATOR)	A-2
APPENDIX 3 CAPACITOR LIFE CURVE.....	A-5

1. SAFETY PRECAUTIONS

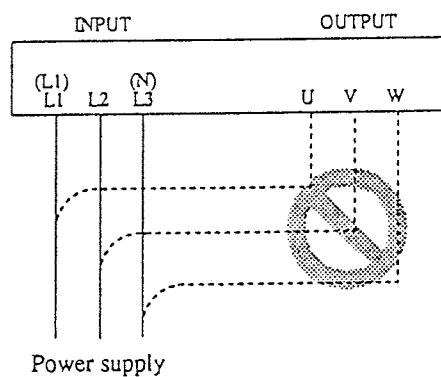
1.1 Input voltage

- Make sure that the input voltage is:
Single phase 220 to 240 V 50/60 Hz
Three phase 380 to 415 V/50 Hz, 400 to 460 V/60 Hz
- Be sure to install an earth leakage breaker.
The ground fault protection is designed to detect current flowing to the ground upon power on. This function is to protect the inverter, not people. Install the earth leakage breaker to protect against the ground fault on wires between the inverter and the motor. (Use a breaker whose sensitive current level is raised in the high frequency area so as not to cause malfunction.)

1.2 Installation locations and surfaces

- Avoid installing this unit in locations which are subjected to high temperatures, high humidity, or dew condensation. Also avoid locations exposed to dust and dirt, corrosive gases, coolant mist. The installation location should be a well-ventilated room which is not exposed to direct sunlight.
- Be sure to install the unit on a perpendicular wall which is not subjected to vibrations.
- The installation wall should be made of steel sheeting or other nonflammable material.

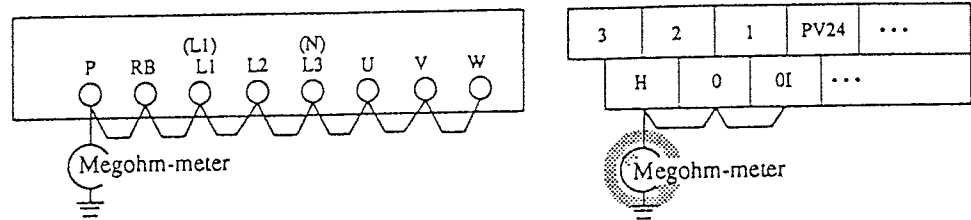
1.3 Do not connect the power supply to the output, this will damage the inverter.



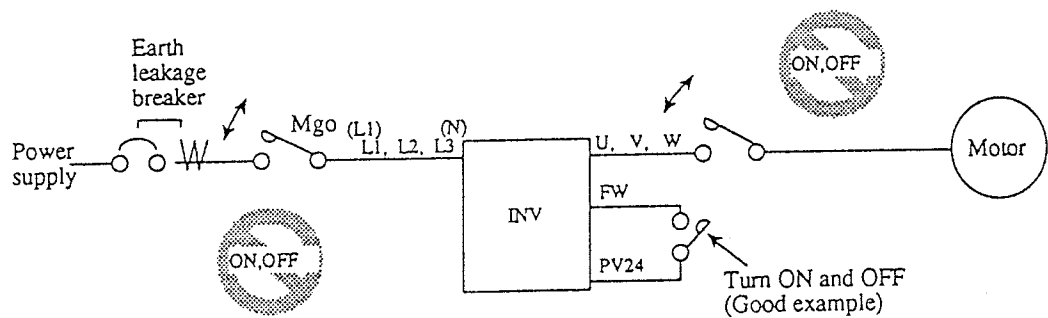
- 1.4 Do not touch the interior of the inverter or put rods or other objects inside it when power is applied. Such action can lead to electrocution and can cause malfunctions.
- 1.5 When operating a general-purpose motor at a high frequency exceeding 60 Hz, be sure to verify with the manufacturers the maximum rpm of the motor and machine.

- 1.6 Withstand voltage tests and insulation resistance tests (megger tests) are executed before the units are shipped, so that there is no need to conduct these tests before operation.

When conducting megger tests as a part of daily inspection, be sure that these tests are only executed between the main circuit and the ground. Do not execute megger tests on the control circuit.

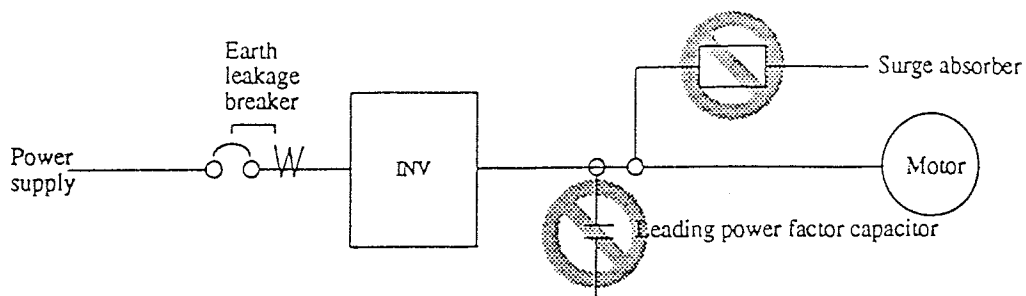


- 1.7 Do not attach or remove wiring or connectors when power is applied. Also, do not check signals during operation.
- 1.8 Do not stop operation by switching off the electromagnetic contactors on the primary or secondary sides of the inverter.



When there has been an instantaneous power failure, and if an operation instruction has been given, then the unit may restart operation after the power failure has ended. If there is a possibility that such an occurrence may harm humans, then install an electromagnetic contactor (Mgo) on the power supply side, so that the circuit does not allow automatic restarting after the power supply recovers. If the optional remote operator is used and the retry function has been selected, this will also cause automatic restarting when an operation instruction has been input, so please be careful.

- 1.9 Do not insert leading power factor capacitors or surge absorbers between the output terminals of the inverter and the motor.



- 1.10 Be sure to ground the grounding terminal, \oplus .
- 1.11 When inspecting the unit, after turning the power supply off be sure to wait until the CHARGE lamp beside the control terminal is off before opening the cover.

(If the lamp is lit or still flickering, then the internal capacitor's residual voltage is still dangerous.)

1.12 MOTOR TERMINAL SURGE VOLTAGE SUPPRESSION FILTER (FOR THE 400 V CLASS)

In a system using an inverter of the voltage control PWM system, a surge voltage caused by the cable constants such as the cable length (especially when the distance between the motor and inverter is 10 m or more) and cabling method may occur at the motor terminal.

A dedicated filter of the 400 V class for suppressing this surge voltage is available, Please order one.

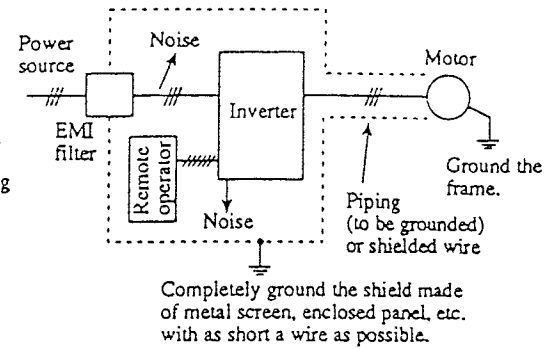
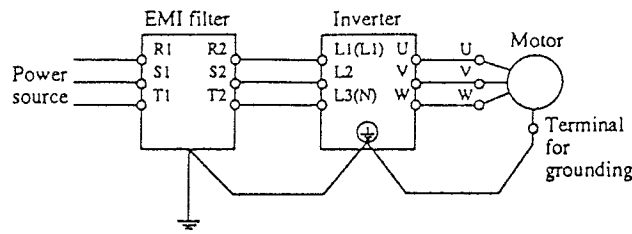
1.13 PROTECTION AGAINST NOISE INTERFERENCE FROM INVERTER

The inverter uses many semiconductor switching elements such as transistors and IGBTs. Thus, a radio set or measuring instrument located near the inverter is susceptible to noise interference.

To protect the instruments from erroneous operation due to noise interference, they should be installed well apart from the inverter. It is also effective to shield the whole inverter structure.

Addition of an EMI filter on the input side of the inverter also reduces the effect of noise from commercial power line on external devices.

Note that external dispersion of noise from the power line can be minimized by connecting an EMI filter on the primary side of inverter.



1.14 EFFECTS OF DISTRIBUTOR LINES ON INVERTERS

In the cases below involving a general-purpose inverter, a large peak current flows on the power supply side, sometimes destroying the converter module. Where such situations are foreseen, or the paired equipment must be highly reliable, install an AC reactor between the power supply and the inverter.

- (A) The unbalance factor of the power supply is 3% or higher.
- (B) The power supply capacity is at least 10 times greater than the inverter capacity (and the power supply capacity, 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) or (C), we recommend installing an AC reactor of 3% (in a voltage drop at rated current) with respect to the supply voltage on the power supply side.

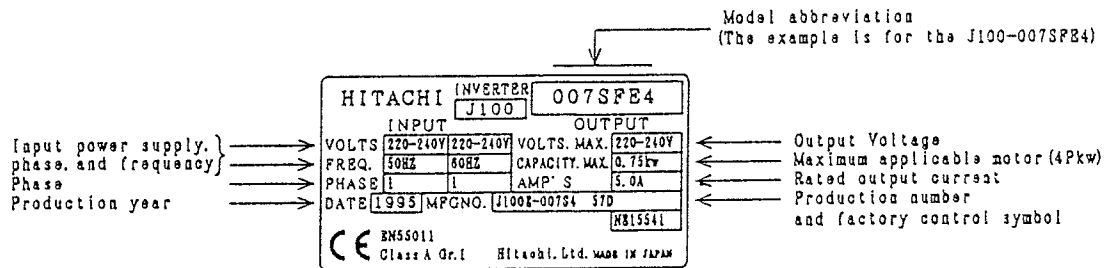
1.15 When occurring an EEPROM error ($\boxed{E} \boxed{A}$), be sure to confirm the setting value again.

1.16 When setting b contact to the reverse command ([REV] terminal), the inverter state automatically. Do not set to b contact.

2. INSPECTION UPON UNPACKING

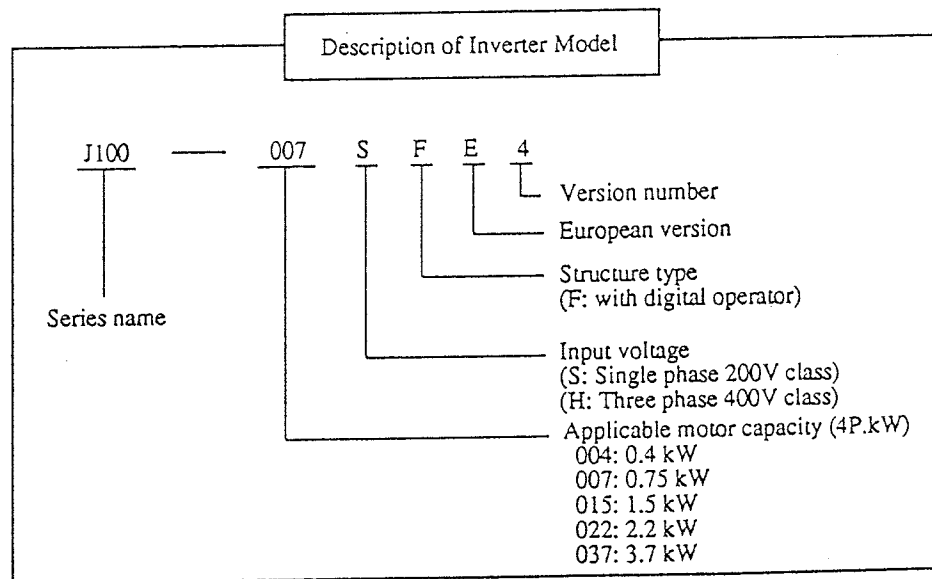
Before installation and wiring, be sure to check the following:

- Make sure that there was no damage during transportation the unit.
- After unpacking the unit, make sure that the package contains one inverter and one operation manual
- Make sure that the product is the one you ordered by checking the specifications label on the front of the cover.



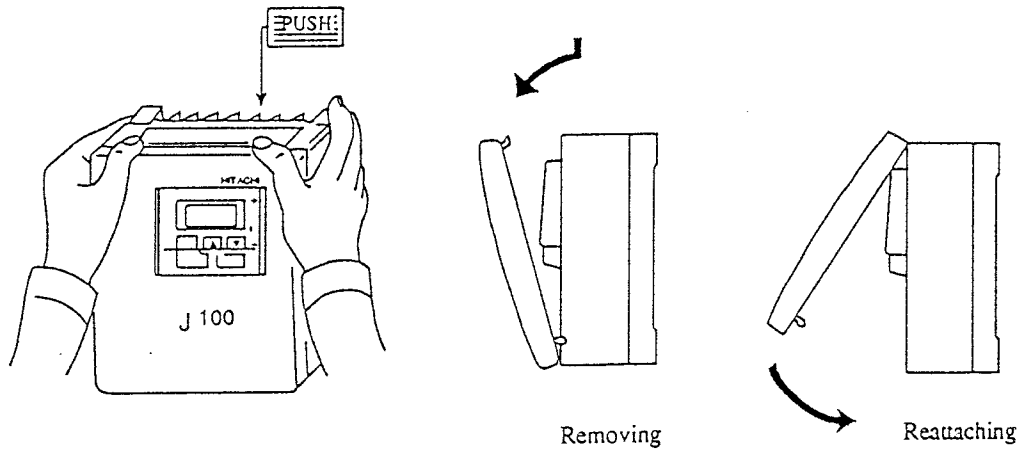
Contents of Specifications Label

If you discover any problems, contact your sales agent immediately.

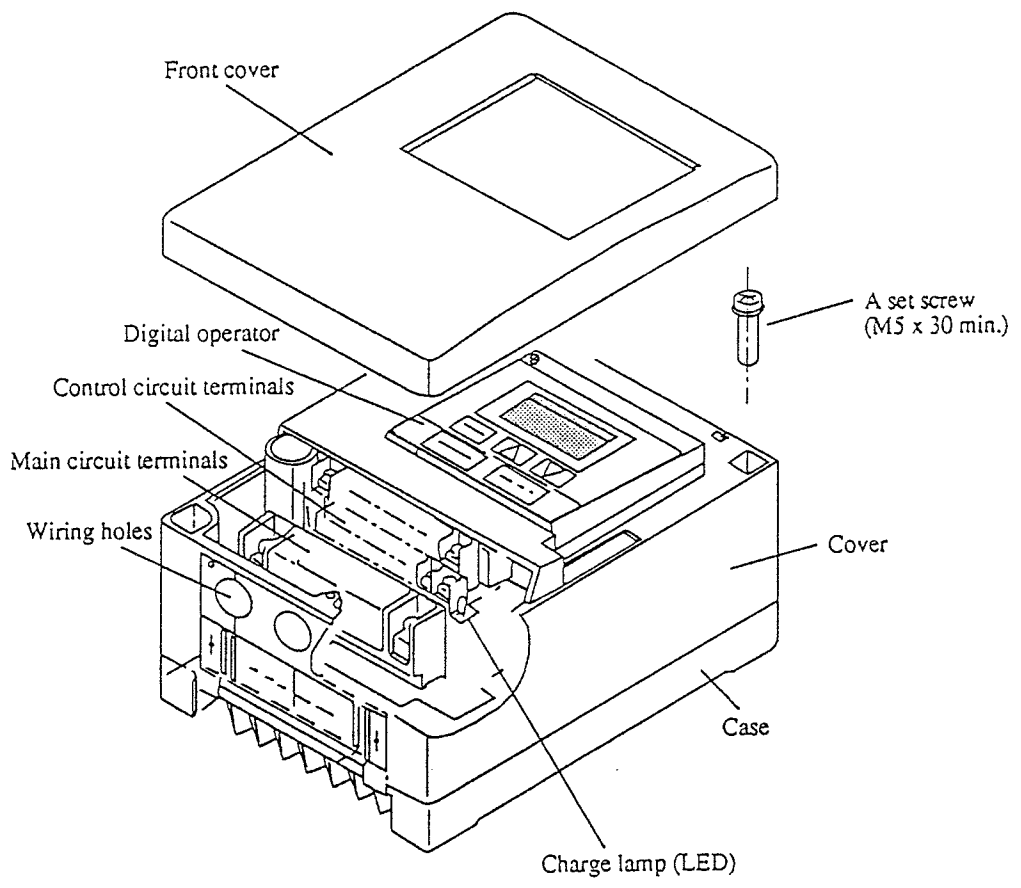


3. APPEARANCE AND NAMES OF PARTS

3.1 Removing and reattaching the front cover

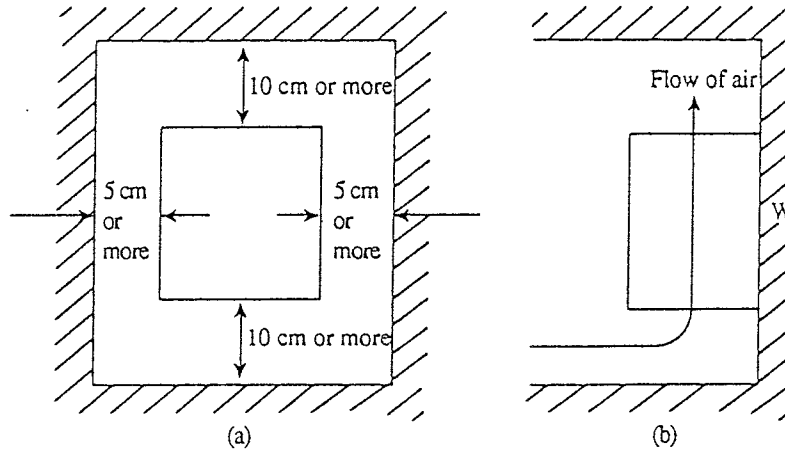


3.2 Names of parts



4. INSTALLATION

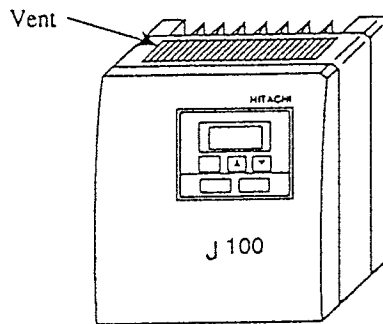
For cooling purposes, be sure that the inverter is installed vertically. In addition, be sure that it is separated from other components and walls. If foreign matter is introduced into the interior of the inverter, this may cause malfunctions, so make sure that no foreign matter can enter it.



NOTE: Install the inverter vertically.
Do not install it on the floor or horizontally.

Be sure that the wall surface is a nonflammable material, such as steel plate.

During wiring or other work, do not allow any wire scraps, welding fragments, iron scraps, dust, etc. to enter into the inverter, therefore be sure to cover the top of the inverter before working.



Be sure to check the ambient temperature (-10 to 40°C).

(Up to 50°C with the front cover removed.) NOTE 1

The higher the ambient temperature inside the inverter, the shorter its life will be. If a heat generating unit is used near the inverter, try to keep it as far away as possible. Also, when installing the inverter in a box, be sure to carefully consider ventilation and the dimensions.

See the mounting dimension diagram for details (PAGE 12-6).

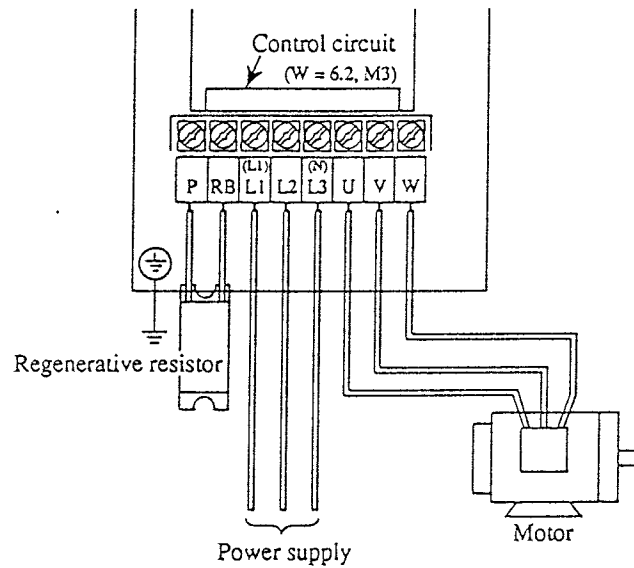
Be sure to install the inverter in the box for use.

NOTE 1: For EMC directive, do not remove the front cover.

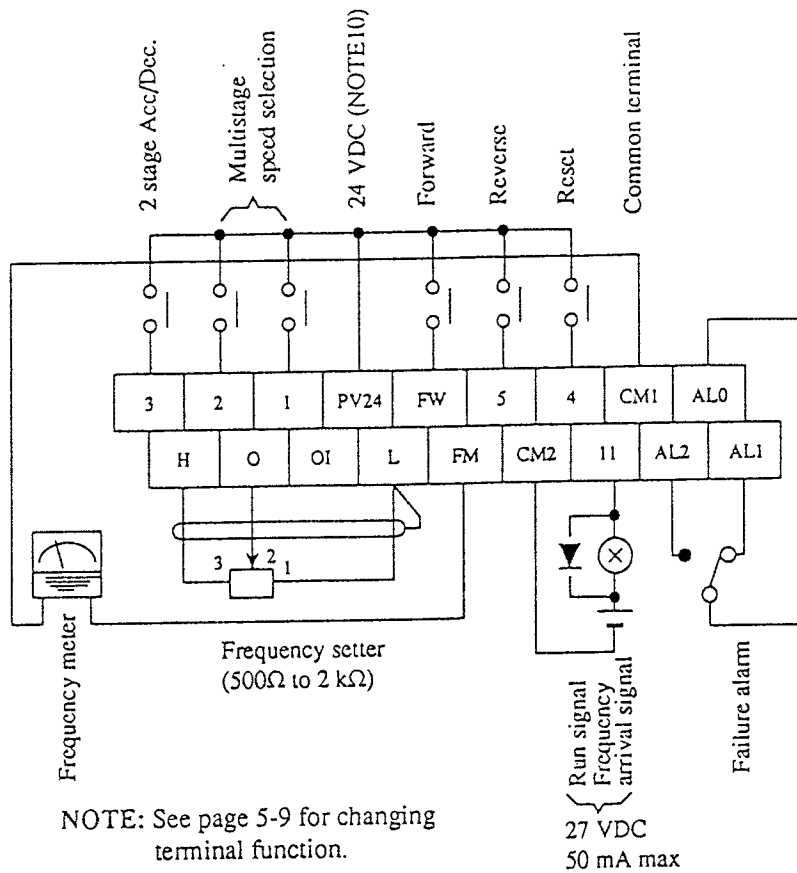
5. WIRING

The terminal board will be exposed when the front cover is removed. Wire the inverter in this state.

5.1 Wiring the power supply and motor

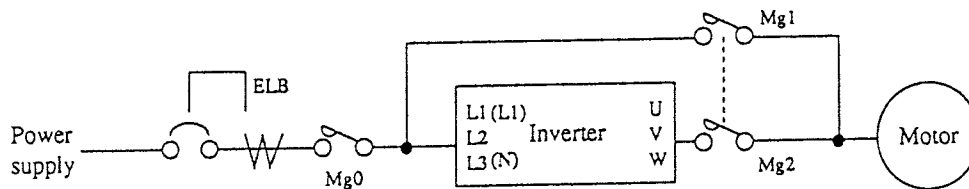


- The inverter will be damaged if the power supply is connected to the motor terminals U, V and W, so be sure not to make any mistakes.
- If multiple motors are to be connected, be sure to attach a thermal relay to each motor.
- See the page 5-8 on the terminal dimensions.
- Make sure that the wiring is:
Single phase 220 to 240 V/50 Hz, 60 Hz(L1), (N) terminals.
Three phase 380 to 415 V/50Hz, 400 to 460 V/60 HzL1, L2, L3.

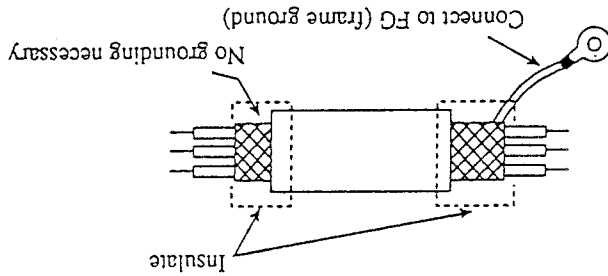


Control circuit terminal diagram

NOTE 1: When changing the power supply of the motor between the inverter and commercial power, be sure to install mechanically interlocked switches Mg1 and Mg2.

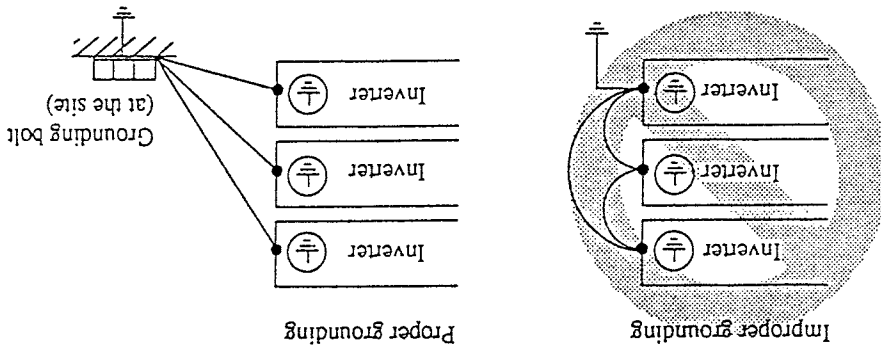


NOTE 2: Install an earth leakage breaker at the input of the inverter. (Select an earth leakage breaker whose sensitive current level is raised in high frequency range.) When the cable between the inverter and motor is more than 10 m long, the thermal relay may malfunction due to high-frequency waves. To prevent this, install an AC reactor on the output side of the inverter or use a current sensor rather than a thermal relay.



NOTE 5: Use a twisted and shielded wire for the signal line, and cut the shielded covering as shown in the diagram below. Make sure that the length of the signal line is 20 meters or less. If the line must be longer than 20 meters, please use a VX application control device RCD-A (remote control device) or CVD-E (insulated signal converter).

NOTE 4: When a frequency arrival signal is used, be sure to install a surge absorbing diode in parallel with the relay. Otherwise, the surge voltage created when the relay goes ON or OFF may damage the AR output circuit.

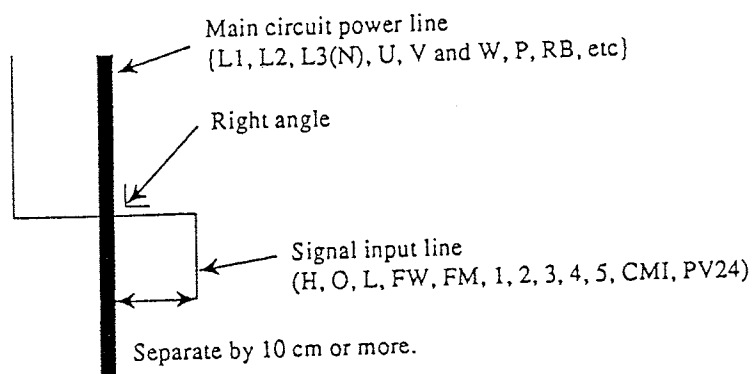


NOTE 3: Be sure that the specified grounding is carried out. Be sure to separate the unit's grounding pole from those of other heavy electric machinery, and avoid using common grounding poles. If multiple inverters are used, make sure that the grounding connections do not create a loop.

NOTE 6: When the frequency setting signal is turned on and off with a contact, use a relay which will not cause contact malfunctions, even with the extremely weak currents and voltages, such as crossbar twin contacts, etc.

NOTE 7: Use relays which do not have contact defects at 24 V DC, 3 mA for the other terminals.

NOTE 8: Separate the main circuit wiring from the relay control circuit wiring. If they must cross, be sure that they cross at a right angle.



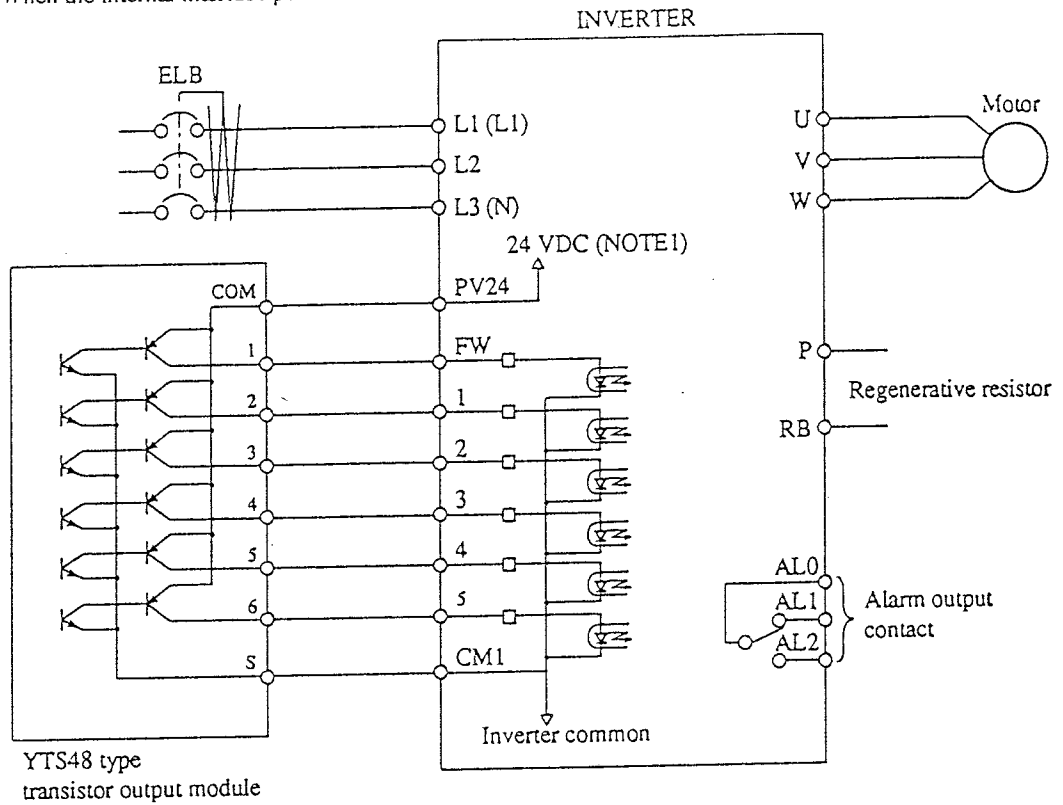
NOTE 9: Insulate frequency analog command input terminal L from the common terminal for peripheral devices such as the programmable controller.

NOTE10: Do not short circuit the terminals PV24 and CM1 by mistake.
The control power supply may cause a failure.

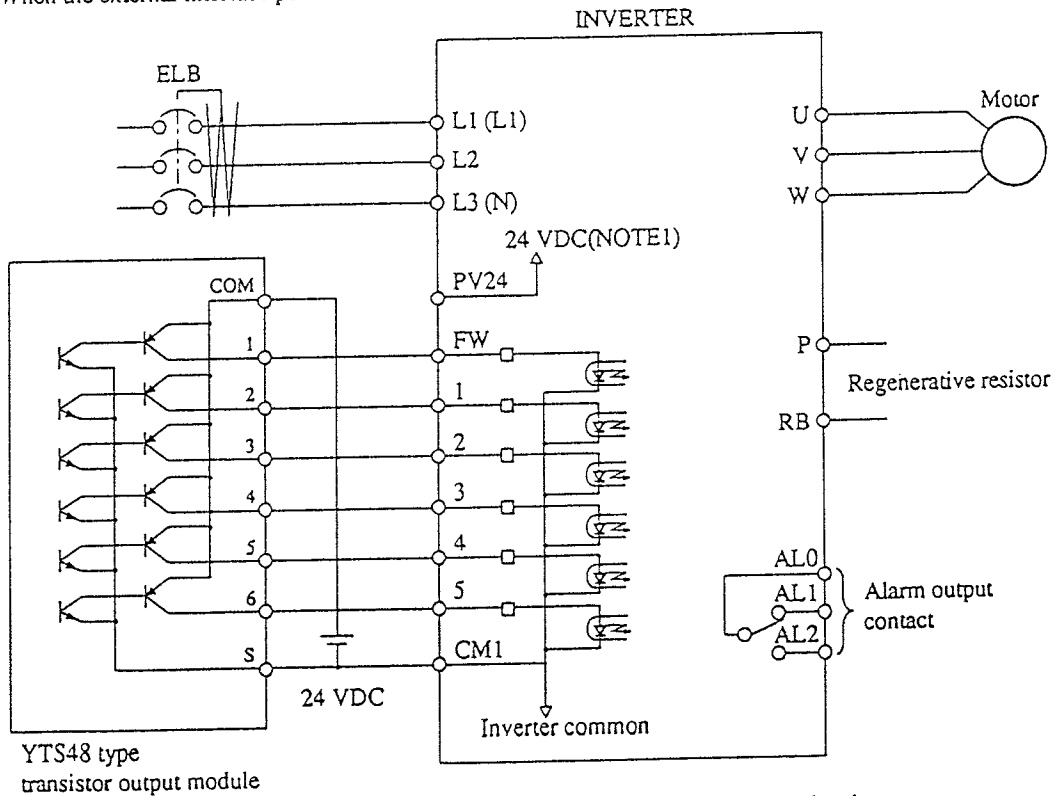
NOTE11: Do not short-circuit the terminals H and L.
The control power supply may cause a failure.

Connection to the Programmable Controller

(1) When the internal interface power source is used



(2) When the external interface power source is used



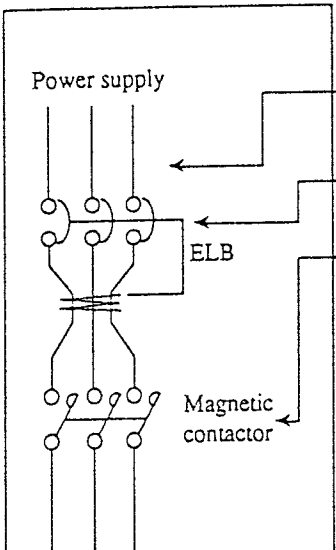
NOTE 1: Do not short circuit the terminals PV24 and CM1 by mistake.
The control power supply may cause a failure.

5.2 Wiring Equipment, Options

CAUTION: Provide the wiring equipment in accordance with the safety codes required by jurisdictional authorities.

The table below is an example selected out of the Hitachi's standard distribution equipment.

If specified in the standard or laws and regulations, follow their instructions.



Motor output (kW)	Inverter model	Wiring		Applicable equipment	
		Power lines	Signal lines	Earth leakage breaker (ELB)	Electromagnetic contactor
0.4	J100-004SFE4	1.25 mm ²	(*) 0.75 mm ² Shielded wire	EX30(10A)	H20
0.75	J100-007SFE4	2 mm ²		EX30(15A)	H20
1.5	J100-015SFE4	2 mm ²		EX30(20A)	H20
2.2	J100-022SFE4	2 mm ²		EX30(30A)	H20
1.5	J100-015HFE4	2 mm ²		EX30(10A)	H10C
2.2	J100-022HFE4	2 mm ²		EX30(15A)	H20
3.7	J100-037HFE4	2 mm ²		EX30(15A)	H20

NOTE 1: The applicable equipment is for a Hitachi standard four pole squirrel-cage motor.

NOTE 2: Be sure to consider the capacity of the circuit breaker to be used.

NOTE 3: Be sure to use bigger wires for power lines if the distance exceeds 20 m.

NOTE 4: Install an earth leakage breaker at the input.

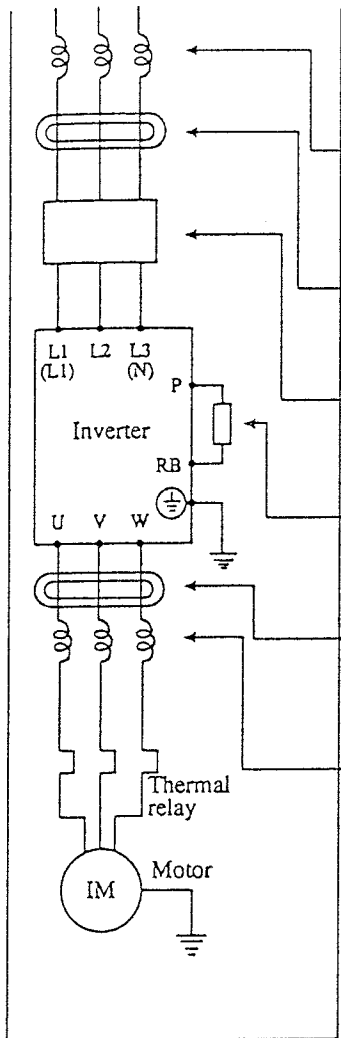
(*) Use 1.25 mm² wire for the alarm signal wire.

Classify the detective current of the earth leakage breaker depending on the total distance between the inverter and the motor.

ℓ	Detective current (mA)
100 m and less	30
300 m and less	100
600 m and less	200

NOTE 1: When using CV wire and metal tube, the leakage current is around 30 mA/km.

NOTE 2: When using CV wire and metal tube, the leakage current becomes eight times because IV wires have a high dielectric constant.



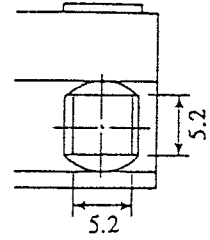
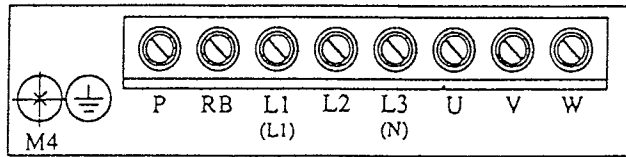
Part description	Function
AC reactor for improving the power factor (ALI-□□H)	This part is used when the unbalance voltage ratio is 3% or more and power supply is 500 kVA or more, and there is a rapid change in the power supply. It also improves the power factor.
Radio noise filter (Zero phase reactor) (ZCL-A)	Using the inverter may cause noise on the peripheral equipment through the power lines. This part reduces noise.
EMI filter for inverter (IFJ100-□□)	This part reduces common noise generated between the power supply and the ground, as well as normal noise. Put it in the primary side of inverter.
Regenerative resistor (RB□□□-□)	This part is used for applications that needs to increase the brake torque of the inverter or to frequently turn on and off and to run high inertia load.
Radio noise filter (Zero phase reactor) (ZCL-A)	This part reduces noise generated at the output of the inverter. (It is possible to use for both input and output.)
AC reactor for preventing thermal relay malfunction and reducing vibration (ACL-L-□□) (ACL-H-□□)	Running motors with the inverter generates vibration greater than that with commercial power supply. This part installed between the inverter and motor reduces torque ripple. When the cable between the inverter and moter is too long, this part also prevents the thermal relay from malfunctioning.

NOTE 1

NOTE 1: IFJ100 series filter is required for EMC directive, but others are not for this purpose.
 Reactor and others of the above table except EMI filter are for general use for noise reduction.

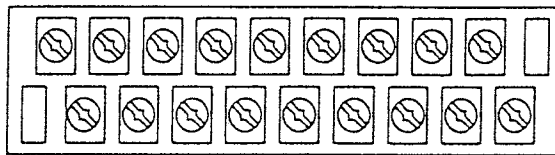
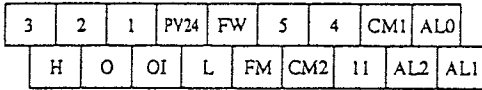
5.3 Terminal

Main circuit terminal



Main circuit terminal

Control circuit terminal



	Screw diameter	Width (mm)
Main circuit	M4	5.2 x 5.2
Control circuit	M3	1.7 x 3.0
Grounding	M4	—

Dimension

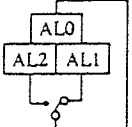
Main circuit

Terminal symbol	Terminal description	Function	
L1 L2 L3 (L1), (N)	Main power	Connect the power supply	
U, V, W	Inverter output	Connect the motor	
P, RB	External regenerative resistor	Connect a regenerative resistor (option)	
⊥	Ground	Ground (connect grounding to avoid electric shock)	

Tightening torque

Screw	Tightening torque
M3	0.5 N·m (max. 0.7 N·m)
M4	1.2 N·m (max. 1.5 N·m)

Control circuit

	Terminal symbol	Terminal description and function		Initial setting	Remarks	
Input signal	FW	Forward operation			Dry contact Close: ON (run) Open: OFF (stop) Min. ON time: 12 ms or more	
	5	Intelligent input terminals 1 to 5		Reverse running command		
	4	Reverse running command	Initialization (Note 1) USP function	Reset input (Note 2)		
	3	Multistage speed (First stage)	2nd setting function	Reset		2 stage acc./dec. time
	2	Multistage speed (Second stage)	2 stage acc./dec. time	Terminal software lock (Note 3)		Multistage speed (Second stage)
	1	Multistage speed (Third stage)	Free run stop			Multistage speed (First stage)
			External DC Damping one of the above is selected.	External trip		
	PV24	Common for input signals				
Monitor signal	FM	Analog frequency monitor/Digital frequency monitor/Analog output current monitor		Analog frequency monitor		
	CM1	Common for monitor				
Frequency command input	H	Power supply for frequency command			5 VDC	
	O	Voltage frequency command			0-5 VDC (nominal) 0-10 VDC (nominal) (Input impedance 30 kΩ)	
	OI	Current frequency command			DC 4-20 mA (nominal) Input impedance 250Ω	
	L	Common for frequency command				
Output signal	I1	Intelligent output terminal One of frequency arrival signal, RUN signal, and Overload advance notice signal is selected.		Frequency arrival signal	27 VDC 50 mA max	
	CM2	Common for output				
Fault alarm output	AL0		Normal: AL0-AL1 close	Contact rating 250 VAC 2.5 A (Resistor load) (Min 100 VAC) 0.2 A (cosφ=0.4) 10 mA 30 VDC 3.0 A (Resistor load) 5 VDC 0.7 A (cosφ=0.4) 100 mA		
	AL1		Abnormal, Power off: AL0-AL1 open			
	AL2		(Initial setting)			

NOTE 1: USP: Prevention function of restart upon power on.

NOTE 2: The reset terminal cannot be changed from "a contact" (NO) to "b contact" (NC).

NOTE 3: When the software is to be locked by the terminal 3 in the same way as with the J100E2 series, it is necessary to switch the terminal. (See page 7.14.)

6. OPERATION

6.1 Before Starting Operation

Prior to the test run, check the following.

- (1) Make sure that the power lines (input power supply L1(L1), L2 and L3(N), and output terminals, U, V and W are connected correctly.
- (2) Make sure that there are no mistakes in the signal line connections.
- (3) Make sure that the inverter case (\oplus) is grounded.
- (4) Make sure that terminals other than those specified are not grounded.
- (5) Make sure that the inverter is installed vertically on a wall, and a nonflammable material such as a steel plate is used as a mounting surface.
- (6) Make sure that there are no short-circuits caused by stray pieces of wire, solderless terminals or other objects left from wiring work. Also, make sure that no tools have been left behind.
- (7) Make sure that the output wires are not short-circuited or grounded.
- (8) Make sure that there are no loose screws or terminals.
- (9) Make sure that the maximum frequency setting matches the machine specifications.
- (10) With the digital operator removed, do not operate the inverter. Make sure that the digital operator or remote operator is connected before operating the inverter.

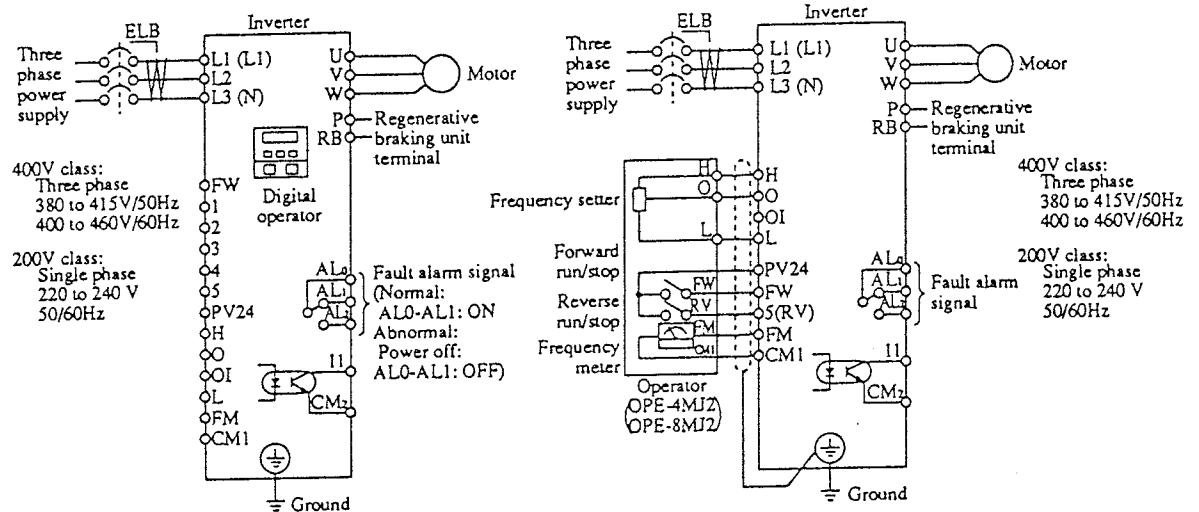
Be sure to refer to page 11-2 when conducting insulation resistance and withstand voltage tests. Never test terminals other than those which are indicated.

6.2 Test Run

An example of a general connection diagram is shown below.

Operating with digital operator:
When setting frequency, run and stop with digital operator.
(The same way as remote operator (DOP) or copy with (DRW).)

Running from external command:
When setting frequency, run and stop from external command (FW,RV Terminal).
The following shows run from the operation box (OPE-4MJ2,OPE-8MJ2)



Procedure(Operating with digital operator)

- (1) Turn on ELB to supply power to the inverter. Make sure that the **POWER** LED on the digital operator goes ON.
- (2) Make sure that **F 9** is changed to **00**, or **02**.
- (3) Press **機能 FUNC** twice and display **F 2**.
- (4) Set frequency with **▲**. Check the output frequency and direction of revolution.
- (5) Press **運転 RUN** and start to run.
(Short circuit FW to PV24 or 5(RV) to PV24 when **F 9** is set to **02**.)
- (6) Press **停止/リセット STOP/RESET** and decelerate to a stop.

Check the following after the test run is complete.

- Was the direction of the motor correct?
- Was the inverter tripped during acceleration or deceleration?
- Were the rpm and frequency meter correct?
- Were there any abnormal motor vibrations or noise?


When overcurrent tripping or overvoltage tripping occurs during the test run, increase the acceleration time or deceleration time.

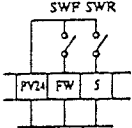
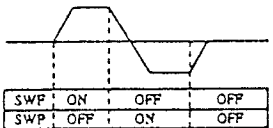
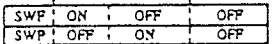
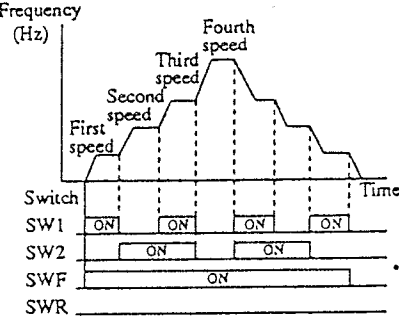
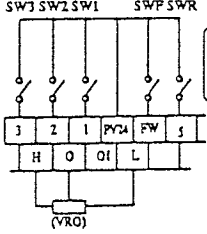
Factory settings

Maximum frequency: 50 Hz
Forward operation

7. FUNCTION OF CONTROL CIRCUIT TERMINAL

7.1 List of Control Circuit Terminals

The initialization of the intelligent input terminals is "a contact" (they turn on when short-circuited). When they are to be used in the b contact state, it is necessary to switch the setting by .

Terminal symbol	Function	Contents
FW	Forward run/stop	SWF Contact (close): Forward run (open): Stop <div style="display: flex; justify-content: space-around; align-items: center;">   </div>
S	Reverse run/stop	SWR Contact (close): Reverse run (open): Stop <div style="display: flex; justify-content: space-around; align-items: center;"> Terminal 5:)  </div> <p style="text-align: center;">REV) Both contacts SWF and SWR are close-stop.</p>
1	Multistage speed	SW1
2		SW2
3		SW3
1 to 5	Intelligent input terminals (1 to 5)	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  </div> <div style="width: 45%;">  <p style="font-size: small;">Condition Terminal 1: CF1 Terminal 2: CF2 Terminal 3: CF3 Terminal 5: REV</p> <p style="font-size: small;">• Use SW3 to select the extended multistage speed</p> </div> </div>
DB	External DC braking	When the terminal [DB] is turned on, the DC braking operation can be performed.
STN	Initialization	This function is used for initialization (state which is set at factory before shipment). When the terminal [STN] is turned on and the equipment is reset or the power is turned on again, the equipment will be initialized.
SET	2nd setting function	When the terminal [SET] is turned on, the set frequency, torque boost, acceleration and deceleration time, second acceleration and deceleration time, and control system can be changed in a batch.
2CH	2 stage acceleration and deceleration	When the terminal [2CH] is turned on, the acceleration and deceleration can be executed by the 2 stage acceleration and deceleration time.
FRS	Free run stop	When the terminal [FRS] is turned on, the inverter stops output and the motor enters the free run state.
EXT	External trip	When the terminal [EXT] is turned on, the inverter enters the trip state, stops output, and displays E12.
USP	Power reclosing restart prevention	When the terminal [USP] is turned on, the restart when the power is turned on with the running command kept on can be prevented.
RS	Reset	When the terminal [RS] is turned on, the trip state can be canceled. During running, the output is stopped. NOTE: The function cannot be used in the b contact state.
SFT	Software lock	When the terminal [SFT] is turned on, the data of each function is locked. However, the running monitor and frequency setting are valid.
PV24	24 V DC power source	Common terminal for running terminal or intelligent terminal
CM1	Common terminal 1	Common terminal for monitor terminal

Terminal symbol	Function	Contents
Frequency command	H	Power supply terminal to command a frequency
	O	Frequency command terminal (voltage command)
	OI	Frequency command terminal (current command)
	L	Frequency command common
<p>• Standard setting for external voltage signal is 0 to 4.8 V (5 V nominal). Voltage input 0 to 9.6 V (10 V nominal) can be switched by A148.</p> <p>NOTE: When an inconvenience occurs in the above characteristics, adjust it using A180 and A191. The sum of both analog input signals is outputted. When selecting one of analog input current and voltage, make sure that the other is not inputted.</p>		
Monitor terminal	FM	Frequency monitor
	CM1	Input monitor signal common
Intelligent output terminal 11 (Note)	AR	Frequency arrival signal
	RUN	RUN signal
	OL	Overload previous notice signal
CM2	Output signal common terminal	• Common terminal for intelligent output terminal
AL0	Alarm terminal	In the normal state: AL0 and AL1 are closed.
AL1		In the abnormal state or when power is turned off: AL0 and AL2 are closed. (At the time of initialization)
AL2		Contact rating 250 V AC 2.5 A (resistance load) 0.2 A (cosφ = 0.4) 30 V DC 3.0 A (resistance load) 0.7 A (cosφ = 0.4) [Minimum 100 V AC 10 mA 5 V DC 100 mA]

NOTE: "b contact" is set by initialization for terminal 11. When "a contact" is to be used, switch the contact setting by **C21**.

7.2 Function Contents of Monitor Terminal

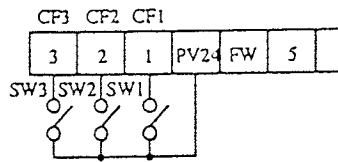
Terminal name: Monitor terminal [FM] (Analog, digital)	Function No. to be set A 50, A 51, and F 10
<div data-bbox="354 340 576 382" style="border: 1px solid black; padding: 2px;">Function contents</div> <p>Monitor output frequency signal or the current of the inverter is output from the control circuit terminal.</p> <p>Monitor output current signal is output as an analog signal only.</p> <p>① Analog Frequency Monitor Signal The meter outputs duty cycle in proportion to the output frequency with full scale at the maximum frequency.</p> <div data-bbox="357 798 852 1018"> <p style="text-align: center;">0 to 10V Full scale 1mA MAX</p> </div> <p>NOTE: This is a dedicated indicator, so that it cannot be used as a line speed signal. Indication accuracy after adjustment: About $\pm 5\%$ (The accuracy of some meters may exceed this value.)</p> <p>② Digital Frequency Monitor Signal Pulse train of a frequency which is the same as the output frequency is output. The duty is about 50%.</p> <div data-bbox="365 1470 885 1627"> </div> <p>③ Analog Current Monitor Signal The duty cycle in proportion to the output current with full scale at 200% of the rated current of the inverter. Specification of analog meter follows the analog frequency monitor specifications.</p>	<div data-bbox="933 340 1144 382" style="border: 1px solid black; padding: 2px;">Setting contents</div> <ol style="list-style-type: none"> 1. Select Frequency Monitor or Current Monitor by A 51. 2. When Frequency Monitor is selected, select Analog Meter or Digital Meter by A 50. (When Current Monitor is selected, analog data is outputted even if Digital Meter is selected.) 3. When the analog meter is used, adjust the meter so that the needle of the meter indicates the maximum value at the time of maximum frequency by F 10 (analog meter adjustment).

7.3 Function Contents of Intelligent Input Terminals

Terminal name: Reverse running/stop terminal [REV]		Function No. C 0 to C 4 to be set	
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Function content</div> <ul style="list-style-type: none"> • When the running command is inputted via the terminal [REV], the terminal executes the reverse running command or stop command. <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Terminal setting method</div> <div style="border: 1px solid black; padding: 5px;"> Digital operator [REV] terminal setting (This is set in the terminal 5 at the time of initialization.) Set the set value [Reverse running command] 0 in one of the input terminals C0 to C4. </div>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Precautions</div> <ul style="list-style-type: none"> • When the running command is inputted via the forward running terminal [FW] and reverse running terminal [REV] at the same time, the running command enters a state which is the same as stop. • When the power is turned on when the running command is on, the motor starts rotation and it is dangerous. Before turning the power on, confirm that the running command is not on. • Note that when the [REV] terminal is set to "b contact", the running automatically starts. 		

Terminal name: Multispeed [CF1], [CF2], [CF3]		Function No. C 0 to C 4 , F 2 to be set A 12 to A 17 , A 71	
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Function content</div> <ul style="list-style-type: none"> • When [CF1], [CF2], and [CF3] are selected as intelligent input terminals, Multispeed 1 to Multispeed 7 can be set. When the frequency command from the normal operator (or terminal) is combined with them, up to 8 stages of running are available. • When the control terminal is set at each speed by the switch, the numerical value displayed at F2 indicates the output frequency at the time of each multispeed. Set the speed as shown below. <ol style="list-style-type: none"> ① Turn the running command off. ② Turn each switch on and set it to Multispeed n. Display the data section of F2. ③ Set an optional output frequency by pressing the ▲ and ▼ keys. 	<ol style="list-style-type: none"> ④ Press the 機能 FUNC key once so as to store the set frequency. If this occurs, F2 indicates the output frequency of Multispeed n. ⑤ Press the ▲ and ▼ keys once. (Confirm that the indication is the same as the set frequency.) ⑥ When the operations in (1) to (4) are repeated, the frequency of Multispeed n can be set. It can be set also by one of A12 to A17 and A71. <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Terminal setting method</div> <div style="border: 1px solid black; padding: 5px;"> Digital operator Set the set values 1, 2, and 3 in one of the input terminals C0 to C4. </div>		

Example of output terminal connection

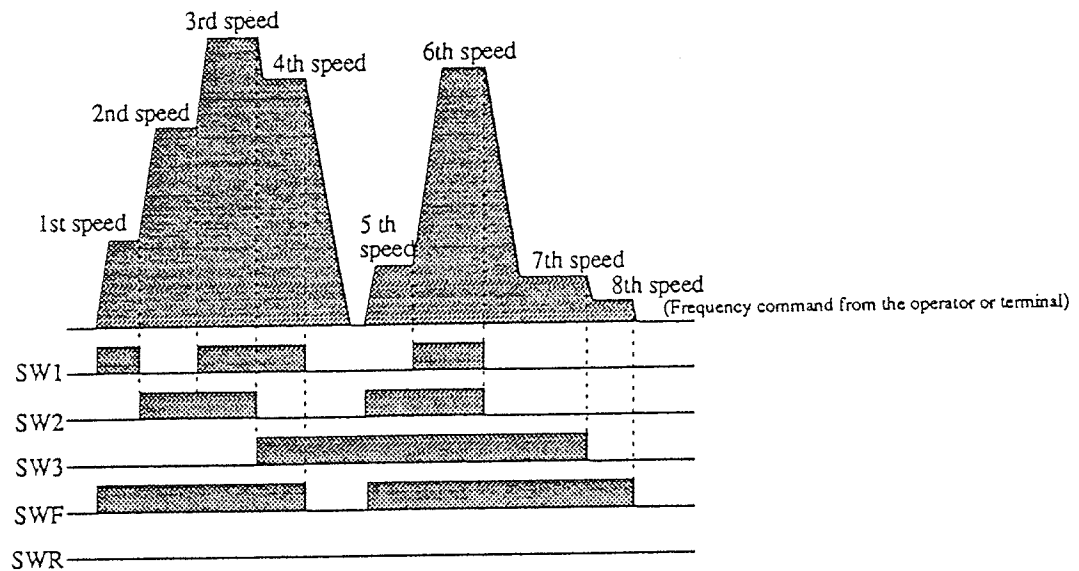


Setting of multispeed

Multispeed	Control circuit terminal		
	SW1	SW2	SW3
Multispeed 1	ON	OFF	OFF
Multispeed 2	OFF	ON	
Multispeed 3	ON	ON	
Multispeed 4	ON	OFF	ON
Multispeed 5	OFF	ON	
Multispeed 6	ON	ON	
Multispeed 7	OFF	OFF	

Precautions

- Up to the third speed of the multispeed can be set by initialization. When CF3 (allocated to the terminal 3 in this case) is set by the extended function mode [C 2], up to the seventh speed can be set.
- After any data is changed, be sure to press the **機能 FUNC** key every time and then set the next one. Note that when the **機能 FUNC** key is not pressed, no data will be set.
- When a frequency more than 120 Hz is to be set, it is necessary to switch the maximum frequency ([A 64]).



Terminal name: External DC damping [DB]

Function No. to
to be set , ,

Function content

- When the terminal [DB] is turned on, the DC braking [DB] operation can be performed.

Necessary setting items when the external DC braking terminal is used

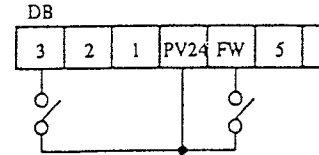
Set the following when the external DC braking terminal is to be used.

- ① DC braking type selection
- ② DC braking force setting
- ③ DC braking time setting

DC braking execution method

- When the operation type is an edge operation
Turn the switch between [DB] and [PV24] on and output DC braking only for the time of DC braking time selection (at the time of stop).

- When the operation type is a level operation
Output DC braking when the switch between [DB] and [PV24] is on. Time setting is not related to it.



When [DB] is allocated to the terminal 3

Precautions

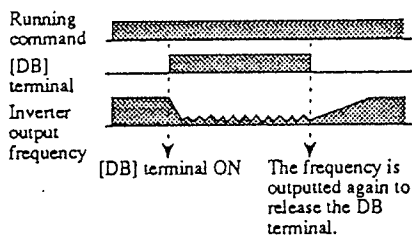
- As the DC braking force and DC braking time are increased, overload protection () is easily generated.

Terminal setting method

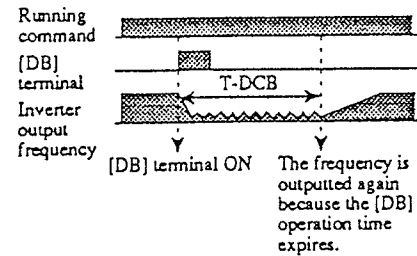
Digital operator

Set the set value in one of the input terminals to .

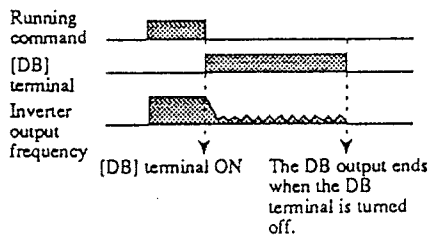
Level operation 1



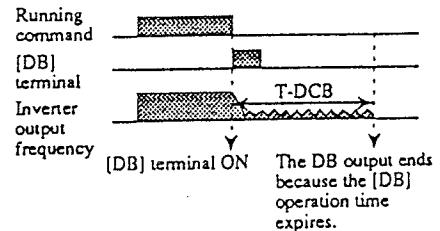
Edge operation 1



Level operation 2



Edge operation 2



Terminal name: Initialization
(factory delivery state) [STN]

Function No. [C][0] to [C][4]
to be set

When returning the equipment to the initial state at factory before shipment for some reason, follow the following procedure.

- ① Allocate [STN] (set value [][5]) to one of the input intelligent terminals. (Use [C][0] to [C][4] in the extended function mode to set an intelligent terminal.)
- ② Turn the switch between the [STN] and [PV24] terminals on and then turn the power off and on or perform the reset operation as shown in Note 1. (After the power is turned off, do not turn the power on again before the charge lamp of the logic substrate goes off.)
- ③ When 6 seconds or more pass after the power is turned on or the reset operation is performed, turn the switch between the [STN] and [PV24] terminals off. (When the key operation, reset operation, or power turning operation is performed before 6 seconds pass, the equipment may not be initialized.)

NOTE 1: For resetting, turn the switch between the [RS] and [PV24] terminals of the terminal block on and then off.

NOTE 2: When the software is locked, the equipment cannot be initialized.

Terminal name: 2nd setting function [SET]

Function No. to be set to (to , , , , , , to)

Function content

- When the terminal [SET] is turned on, it is possible to set two types of motor constants and execute running by one inverter.
- Select the second setting function when the equipment is stopped.

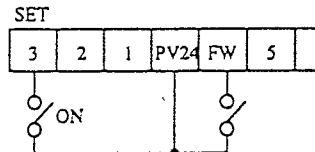
Functions which can be set by the second function

- F2: Output frequency setting
- F5: V/f pattern setting
- F6: Acceleration time 1 setting
- F7: Deceleration time 1 setting
- F8: Manual torque boost setting
- A0: Control method
- A1: Motor capacity setting
- A2: Motor poles setting
- A18: 2-stage acceleration time setting
- A19: 2-stage deceleration time setting
- A62: Base frequency setting
- A63: Maximum frequency setting

Function switching method

While the switch between the set terminals [SET] and [PV24] is on, the equipment is operated by the setting of the second function.

When the terminal is turned off, the setting is returned to the original setting (first function).



When [SET] is allocated to the terminal 3

How to set the monitor and function modes when the second function is executed

- To set the second set data, change the setting in the state that [SET] and [PV24] are turned on.
- Even when the [SET] terminal is switched during data display, the digital operator displays the same value and does not display the switched set data. When the display code is displayed, switch the [SET] terminal.
- In the digital operator, at the time of second setting, a decimal point is displayed in the first digit place of the data display section such as . However, when the acceleration and deceleration time, DC braking time adjustment time, and standby time after undervoltage display more than 100, it does not mean the second function setting. (When the remote operator is used for setting, there is no distinction display of the second setting. Confirm it from the state of ON or OFF of the terminal.)

Terminal setting method

Set the set value in one of the input terminals to .

Precautions

- Connect and turn on the [SET] terminal before the running command terminals (FW and REV terminals). When they are connected and turned on at the same time, the setting may not be switched to the second setting.

Terminal name: Second stage acceleration and deceleration [2CH]

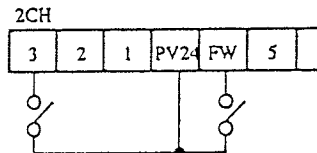
Function No. to
to be set ,

Function content

- When the terminal [2CH] is turned on, the equipment can be accelerated or decelerated (acceleration time 2, deceleration time 2) by the 2 stage acceleration and deceleration time.

Function switching method

- While the switch between the set terminals [2CH] and [PV24] is on, the equipment operates by the 2 stage acceleration and deceleration time (acceleration time 2, deceleration time 2).
- When the terminal is turned off, the equipment is returned to the original acceleration and deceleration time (acceleration time 1, deceleration time 1).



When [2CH] is allocated to the terminal 3

Terminal setting method

Digital operator

Set the set value in one of the input terminals to .

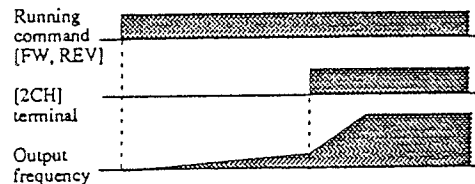
2 stage acceleration and deceleration time setting method

Use (acceleration time 2) and (deceleration time 2) to set the 2 stage acceleration and deceleration time (acceleration time 2, deceleration time 2).

Between terminals [2CH] and [CM1]	Acceleration and deceleration time for operation
OFF state	Acceleration time 1, Deceleration time 1
ON state	Acceleration time 2, Deceleration time 2

Precautions

When a time of more than 1000 seconds is set by the remote operator, the indication of the digital operator becomes . (However, the operation during the set time will be executed.)



Terminal name: Free run stop [FRS]

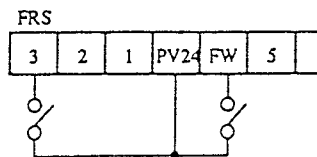
Function No. to to be set

Function content

- When the terminal [FRS] is turned on, the inverter stops output and the motor enters the free run state.

Function switching method

- While the switch between the set terminals [FRS] and [PV24] is on, the equipment operates the FRS operation.



When [FRS] is allocated to the terminal 3

NOTE: "a contact" is set by initialization.

When "b contact" is to be used, switch the contact setting by

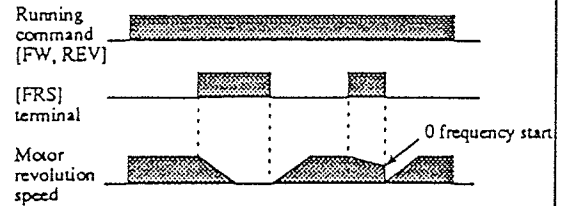
.

The contact setting cannot be switched only by selecting FRS by switching to .

Terminal setting method

Digital operator

Set the set value in one of the input terminals to .



Terminal name: External trip [EXT]

Function No.
to be set

to

Function content

- When the terminal [EXT] is turned on, the inverter enters the trip state by an indication of and stops output.

Terminal setting method

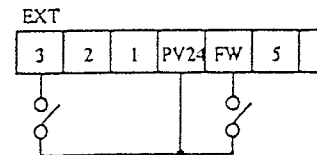
Digital operator

Set the set value in one of the input terminals to .

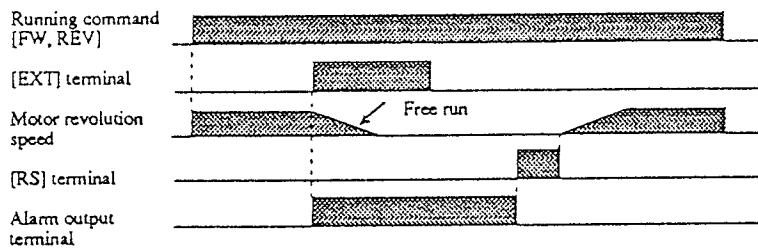
Function switching method

When the switch between the set terminals [EXT] and [PV24] is turned on, the equipment enters the trip state.

Even when the switch is turned off, the trip state will not be canceled. Reset the equipment or turn the power off and on again to cancel the trip state.



When [EXT] is allocated to the terminal 3



Terminal name: Prevention function of restart upon power on [USP]

Function No. to be set

to

Function content

- If the running command is set when power is turned on, the inverter starts running immediately after it is activated. The USP function prevents it so that the inverter will not execute sudden running.
- To reset an alarm and restart running, turn the running command off (Note 1) or perform a reset operation by the terminal [RS] or the key. Refer to the time chart indicated below.

NOTE 1: When the running command is turned off, the indication is switched to but the trip state will not be canceled.

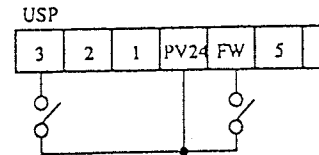
Set content

Digital operator

Set the set value in one of the input terminals to .

Function switching method

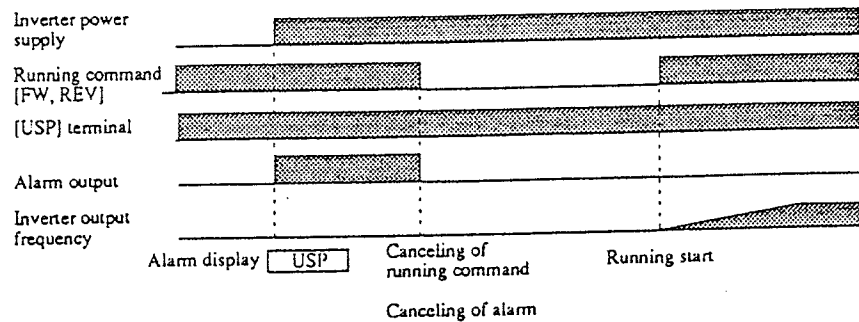
While the switch between the set terminals [USP] and [PV24] is on, the equipment executes the USP operation. If the power is turned on when the running command is inputted, the equipment enters the USP trip state ().



When [USP] is allocated to the terminal 3

Precautions

- Note that when a USP error occurs and it is canceled by resetting in the state that the running command from the terminal is inputted, the inverter restarts running immediately.
- Even when the trip state is canceled by turning the terminal [RS] on and off after an insufficient voltage protection () occurs, this function will be performed.
- When the running command is inputted immediately after the power is turned on, a USP error will be caused. When this function is used, input the running command two (2) seconds after the power is turned on.



Terminal name: Reset [RS]

Function No. to

Function content

- The trip content can be canceled.
- The function is used to return each setting to the initialization (state which is set at factory before shipment). See page 7-7, "Initialization".
- The function is used to erase the trip history data. Set trip history clear selection.

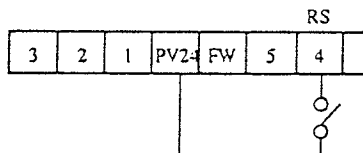
Terminal setting method

Digital operator

Set the set value in one of the input terminals to .

Function switching method

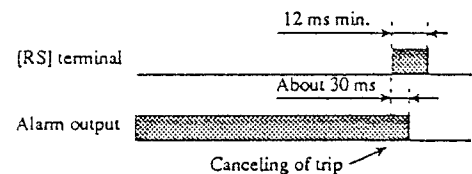
- When the switch between the set terminals [RS] and [PV24] is turned on and off, the equipment executes the reset operation. (Reset [RS] is allocated to the control terminal 4 by initialization.)



When [RS] is allocated to the terminal 4 (Initialization)

Precautions

- When the control terminal [RS] is kept on continuously for more than 4 seconds before using it, the display of the remote operator becomes R-ERROR COMM<2> (the display of the digital operator is). However, the inverter is normal. To return the display to the original one, open the terminal [RS] and press one of the keys of the operator.
- When the [RS] terminal is turned off from on, it becomes valid.
- The STOP/RESET key of the digital operator is valid only when an alarm occurs.
- Only "a contact" (NO) can be set to the [RS] terminal. The terminal cannot be used in the "b contact" (NC) state.
- Even when the power is turned off or on, the function of the terminal is the same as that of the reset terminal.



Terminal name: Terminal software lock [SFT]

Function No.
to be set

C 0 to C 4

Function content

- When the terminal [SFT] is turned on, the data of all the functions except the output frequency is locked by initialization. When the data is locked, no data can be changed.

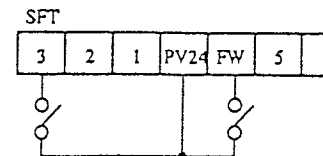
Terminal setting method

Digital operator

Set the set value in one of the input terminals C 0 to C 4.

Function switching method

When the switch between the set terminals [SFT] and [PV24] is turned on, the equipment enters the software lock state.



When [SFT] is allocated to the terminal 3

Precautions

- When the [SFT] terminal is turned on by initialization, only the output frequency can be changed.
- Software lock can be made possible also for the output frequency by .
- Software lock by the operator is also possible without the [SFT] terminal being used. ()

Terminal name: Frequency arrival signal [AR]

Function No.

C 10, A 39,

to be set

A 40, A 49

Function content

- When [AR] is selected as an intelligent output terminal, at the time of constant speed arrival, two types of methods for outputting a frequency more than an optionally set frequency can be executed. Select the output method by A 49. Set an optionally set frequency by A 39 (setting at the time of acceleration) or A 40 (setting at the time of deceleration).

Terminal setting method

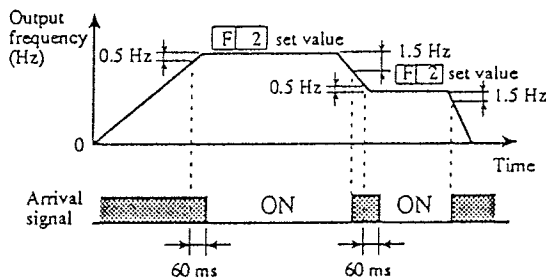
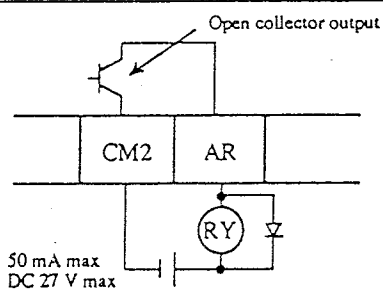
Digital operator

Set the set value 0 in the output terminal C 10.

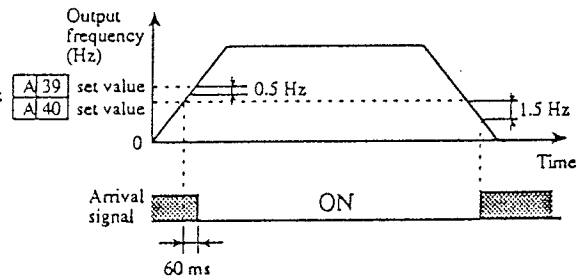
Precautions

- At the time of acceleration, an output signal at a frequency between the set frequency - 0.5 Hz to + 1.5 Hz is turned on.
- At the time of deceleration, an output signal at a frequency between the set frequency + 0.5 Hz to - 1.5 Hz is turned on.

Connection example of output terminal



At the time of constant speed arrival



More than optionally set frequency

NOTE: When an arrival signal is outputted, a delay of about 60 ms occurs.

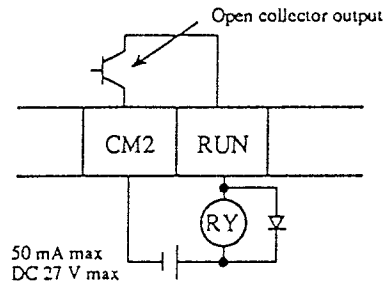
Terminal name: Run signal [RUN]

Function No.
to be set

Function content

- When [RUN] is selected as an intelligent output terminal, the inverter outputs a RUN signal when the motor is driven.

Connection example of output terminal



Terminal setting method

Digital operator

Set the set value in the output terminal .

Precautions

- A RUN signal is outputted simultaneously when a gate signal of the power module is outputted. Therefore, when the frequency of the RUN signal is less than the start frequency adjustment value , it will not be outputted.
- A RUN signal can be outputted even during DC braking by .

FW (REV)

set value

Inverter output frequency

RUN

ON

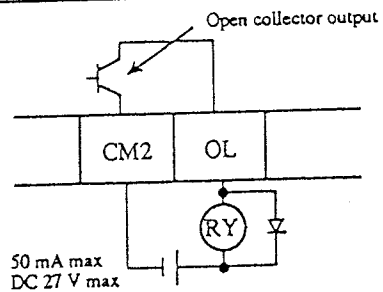
Terminal name: Overload advance notice signal [OL]

Function No.
to be set

Function content

- When an output current more than the set current (rate to the rated current) flows, the terminal outputs a signal.

Connection example of output terminal



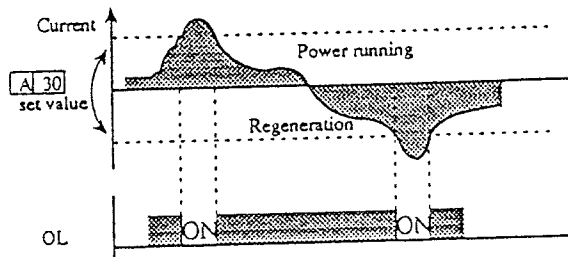
Terminal setting method

Digital operator

Set the set value in the output terminal .

Precautions

A value of 150% is set by initialization. To change the level, change (overload advance notice level).



7.5 Function Contents of Alarm Terminals

Terminal name: Alarm terminal [AL1, AL2-AL0]		Function No. C 21 to be set																																					
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Function content</div> <ul style="list-style-type: none"> When an alarm occurs, the function outputs an alarm signal from the terminals [AL0], [AL1], and [AL2] via the c contact. If this occurs, the operator displays the alarm content. <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Terminal setting method</div> <div style="border: 1px solid black; padding: 5px;">Digital operator <ul style="list-style-type: none"> "a contact" or "b contact" can be selected by C 21. The initialization is "b contact". </div>		<div style="border: 1px solid black; padding: 5px;">Precautions</div> <ul style="list-style-type: none"> Holding of an alarm signal When an alarm signal is outputted, the alarm content will be stored even if the input power is turned off. Therefore, by turning the power on again, the content can be confirmed. However, when the input power is turned off, the alarm output will be reset (canceled) when the power is turned on again next. Therefore, to hold the alarm output, hold the alarm once by the external sequence and then turn the power switch of the inverter off. When the alarm contact output is set ON during normal running (b contact), a time delay occurs until the contact is closed when the power is turned on. Therefore, when the alarm contact output is to be used, set a delay of about 2 seconds when the power is turned on. (In the case of b contact, the contact may chatter when the power is turned on or off. If a fault may be caused by this, provide an interlock in the external circuit.) 																																					
Contact specification																																							
Maximum		Minimum																																					
AC 250V, 2.5A (load R) 0.2A (cos ϕ =0.4)		AC 100 V, 10 mA																																					
DC 30 Vm, 3.0A (load R) 0.7A (cos ϕ =0.4)		DC 5 V, 100 mA																																					
<p>The alarm output terminals are connected as shown in Fig. (a) at the time of initialization. They can be changed as shown in Fig. (b) by setting C 21.</p>																																							
(a) b contact (at the time of initialization)		(b) a contact																																					
During normal running	When an alarm occurs or power is turned off	During normal running or when power is turned off	When an alarm occurs																																				
<table border="1" style="font-size: small;"> <thead> <tr> <th>Contact</th> <th>Power</th> <th>Running state</th> <th>AL0-AL1</th> <th>AL0-AL2</th> </tr> </thead> <tbody> <tr> <td rowspan="3">b (Initialized value)</td> <td>ON</td> <td>Normal</td> <td>Closed</td> <td>Open</td> </tr> <tr> <td>ON</td> <td>Abnormal</td> <td>Open</td> <td>Closed</td> </tr> <tr> <td>OFF</td> <td>—</td> <td>Open</td> <td>Closed</td> </tr> </tbody> </table>	Contact	Power	Running state	AL0-AL1	AL0-AL2	b (Initialized value)	ON	Normal	Closed	Open	ON	Abnormal	Open	Closed	OFF	—	Open	Closed	<table border="1" style="font-size: small;"> <thead> <tr> <th>Contact</th> <th>Power</th> <th>Running state</th> <th>AL0-AL1</th> <th>AL0-AL2</th> </tr> </thead> <tbody> <tr> <td rowspan="3">a</td> <td>ON</td> <td>Normal</td> <td>Open</td> <td>Closed</td> </tr> <tr> <td>ON</td> <td>Abnormal</td> <td>Closed</td> <td>Open</td> </tr> <tr> <td>OFF</td> <td>—</td> <td>Open</td> <td>Closed</td> </tr> </tbody> </table>			Contact	Power	Running state	AL0-AL1	AL0-AL2	a	ON	Normal	Open	Closed	ON	Abnormal	Closed	Open	OFF	—	Open	Closed
Contact	Power	Running state	AL0-AL1	AL0-AL2																																			
b (Initialized value)	ON	Normal	Closed	Open																																			
	ON	Abnormal	Open	Closed																																			
	OFF	—	Open	Closed																																			
Contact	Power	Running state	AL0-AL1	AL0-AL2																																			
a	ON	Normal	Open	Closed																																			
	ON	Abnormal	Closed	Open																																			
	OFF	—	Open	Closed																																			

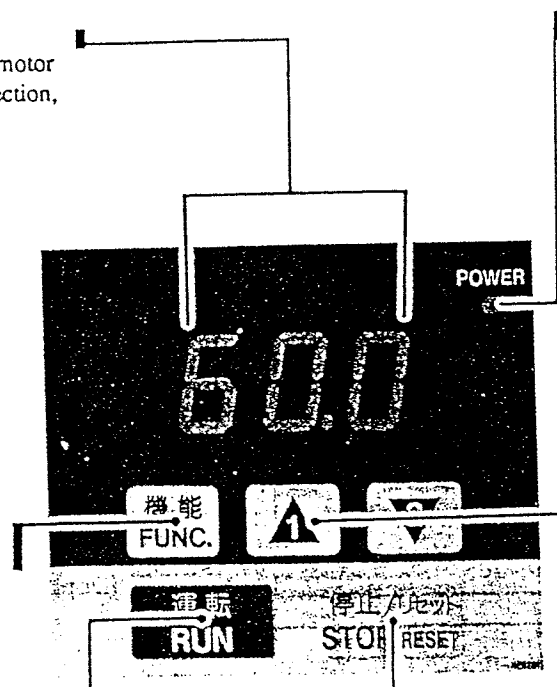
8. OPERATION OF THE DIGITAL OPERATOR

8.1 Name of Keys

Monitor (LED display)
This display shows frequency, motor current, DV voltage, motor direction, and type.

POWER Lamp
Power lamp of control circuit

NOTE:
Use the charge lamp on the right of the terminal block to confirm the DC voltage after power is turned off.



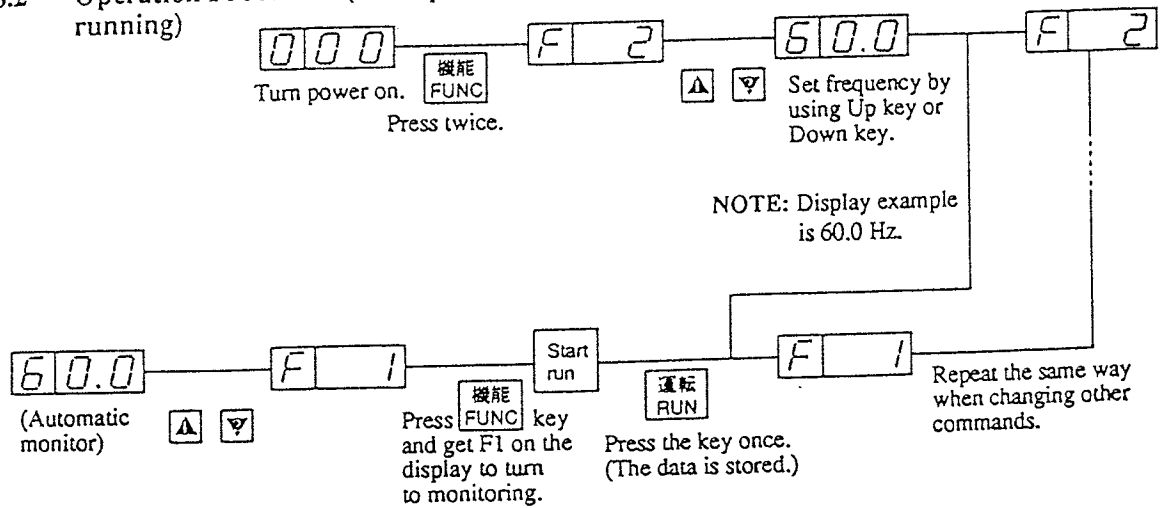
FUNC (Function) key
This key is used for changing commands. When pressing key after setting data and parameter, they are automatically memorized.

Up key, Down key
These keys are used to change data and increase or decrease the frequency.

RUN key
This key is used for starting. (When terminal run is selected, this key does not work.)

STOP/RESET key
This key is used for stopping the motor or resetting errors. (When either operator or terminal is selected, this key works. If the extension function is used, this function is void.)

8.2 Operation Procedure (Example that the frequency is set and the equipment starts running)

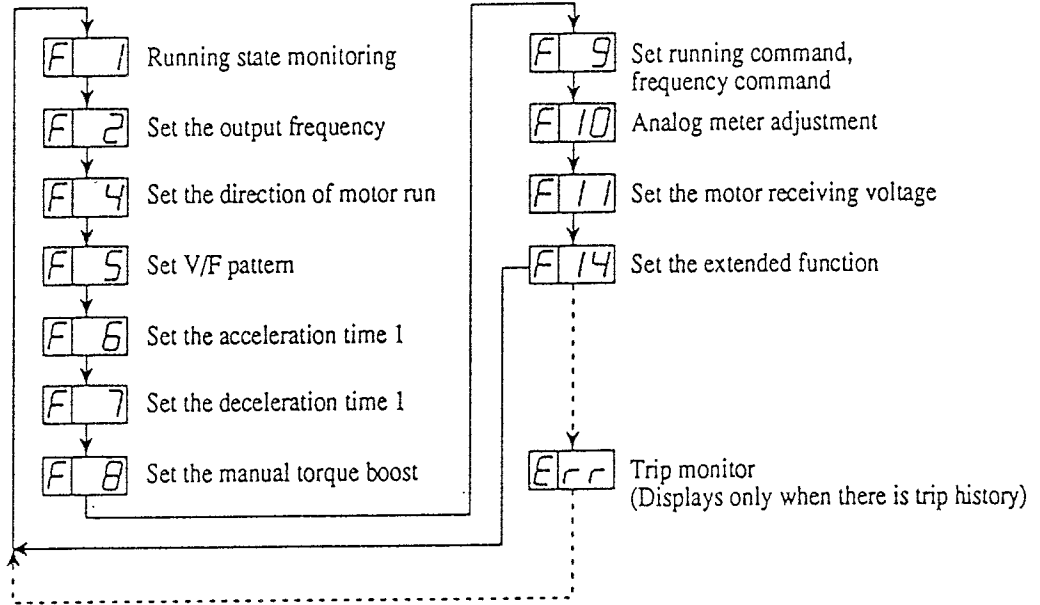


8.3 Key Description



[Function key] . . . This key allows the selection of commands and memorizes parameters.

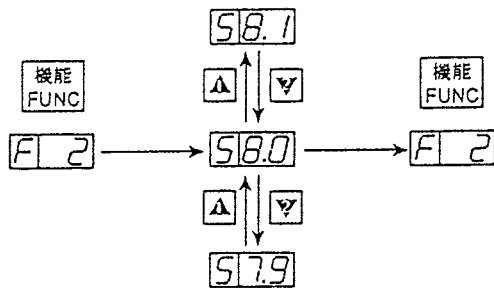
When each time the key is pressed, the display changes as follows.



[Up key, Down key] . . . These keys change the values of data, and parameters.



Pushing down this key once under **F 1** to **F 1 4** condition moves to the data state.

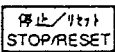


NOTE: After the data is changed, be sure to press the **機能 FUNC** key.



[RUN key] . . . This key starts the run.

The set value of **F 4** determines a forward run or a reverse run.



[STOP/RESET key] . . . This key stops the run.

When a trip occurs, this key becomes the reset key.

8.4 Initialization List of Digital Operator

(1) Monitor mode, function mode

The initialized value and settable range of each mode are displayed.

For extended function setting of **F14**, the extended functions shown on pages 8-5 and 8-6 can be set.

Display order	Function name	Type	Screen display			Initializa- tion	Application of 2nd setting function
			Command display	Settable during running	Range of set values		
1	Running state monitoring	Monitor- ing	F1	—	Frequency, current, DC voltage, rotational direction	—	—
2	Output frequency setting	Setting	F2	√	0.0 to 99.9 Hz/0 to 360 Hz	0.0	√
3	Running direction setting	Setting	F4	—	F/r (Forward/reverse)	F	—
4	V/f pattern setting	Setting	F5	—	0 to 57	NOTE 1	√
5	Acceleration time 1	Setting	F6	√	0.1 to 99.9 seconds, 100 to 999 seconds	NOTE 2	√
6	Deceleration time 1	Setting	F7	√	0.1 to 99.9 seconds, 100 to 999 seconds	NOTE 2	√
7	Manual torque boost setting	Setting	F8	√	0 to 99	11	√
8	Running command, frequency command setting	Setting	F9	—	0 to 3	03	—
9	Analog meter adjustment	Setting	F10	√	1 to 99	72	—
10	Motor receiving voltage setting	Setting	F11	—	200 to 240 V/380 to 460 V NOTE 3	NOTE 4	—
11	Extended function setting	Setting	F14	—	0 to 85/ .0 to .21 NOTE 5	0	—

NOTE 1: 08 for 200 V class, 00 for 400 V class

NOTE 2: 10 seconds for 200 V class, 15 seconds for 400 V class

NOTE 3: For the 200 V class, one of 200, 220, 230, and 240 can be selected. For the 400 V class, one of 380, 400, 415, 440, 460, and 480 can be selected.

NOTE 4: 220 V for 200 V class, 380 V for 400 V class

NOTE 5: No extended function can be set during running. However, the set value of each function can be monitored.

(2) Extension function mode

- Each function name and settable range to the extension function mode are shown below.
- Set the extension function code to be changed by F14.

Display order	Extended function name	Screen display		Initial value	Settable for 2nd function	Remarks	Ref. page
		Code display	Setting range				
1	Control method	A 0	0-2	0	√		8-15
2	Motor capacity setting	A 1	0.2-5.5	NOTE 1	√		8-15
3	Motor poles setting	A 2	2/4/6/8	4	√		8-15
4	Maximum frequency adjustment	A 3	0.0-15 Hz	0.0	—		8-16
5	Start frequency adjustment	A 4	0.5-5.0 Hz	0.5	—		8-17
6	Upper frequency limiter setting	A 5	0-375 Hz	0	—		8-17
7	Lower frequency limiter setting	A 6	0-375 Hz	0	—		8-17
8	Jump frequency setting 1	A 7	0-375 Hz	0	—		8-18
9	Jump frequency setting 2	A 8	0-375 Hz	0	—		8-18
10	Jump frequency setting 3	A 9	0-375 Hz	0	—		8-18
11	Carrier frequency setting	A10	5/8/12/16 Hz	16	—		8-18
12	Frequency command sampling setting	A11	1-8	8	—		8-19
13	Multispeed first speed setting	A12	0-375 Hz	0	—		8-20
14	Multispeed second speed setting	A13	0-375 Hz	0	—		8-20
15	Multispeed third speed setting	A14	0-375 Hz	0	—		8-20
16	Multispeed forth speed setting	A15	0-375 Hz	0	—		8-20
17	Multispeed fifth speed setting	A16	0-375 Hz	0	—		8-20
18	Multispeed sixth speed setting	A17	0-375 Hz	0	—		8-20
19	2-stage acceleration time setting	A18	0.1-999s	10.0	√	Changeable during RUN	8-21
20	2-stage deceleration time setting	A19	0.1-999s	10.0	√	Changeable during RUN	8-21
21	DC braking frequency setting	A20	0.5-375 Hz	0.5	—		8-21
22	DC braking force adjustment	A21	0-36 (400 V:0-20)	0	—		8-21
23	DC braking time adjustment	A22	0-600s	0	—		8-21
24	Electronic thermal level adjustment	A23	20-120%	100	—		8-22
25	Electronic thermal characteristic selection	A24	0/1	1	—		8-22
26	External frequency setting start	A26	0-375 Hz	0	—		8-19
27	External frequency setting end	A27	0-375 Hz	0	—		8-19
28	Acceleration selection (Linear, S-curve)	A28	0/1	0	—		8-23
29	Deceleration selection (Linear, S-curve)	A29	0/1	0	—		8-23
30	Overload previous notice signal setting	A30	50-150%	150	—		8-23
31	Overload limit level setting	A31	50-150%	150	—		8-23
32	Overload limit content selection	A32	0/1	0	—		8-24
33	LAD stop function setting	A33	0/1	0	—		8-24
34	Trip/retry function selection	A34	0/1	0	—		8-24
35	Trip ignorance selection	A35	0(off)/1(on)	0	—		8-24
36	AVR voltage setting for deceleration	A36	0/1	0	—		8-25
37	Motor voltage setting for deceleration	A37	200-270 V/380-540 V/000	220/380	—	000:Invalid during decel.	8-25
38	Dynamic braking usage ratio	A38	0.1-30.0, 31.0	5	—	31.0:BRD invalid	8-25
39	Optional arrival frequency for acceleration	A39	0-100%	100	—		8-26










Display order	Extended function name	Screen display		Initial value	Settable for 2nd function	Remarks	Ref. page
		Code display	Setting range				
40	Optional arrival frequency for deceleration	A 40	0-100%	100	---		8-26
41	Forward rotation	A41	0(off)/1(on)	1	---		8-26
42	Reverse rotation	A42	0 (off) / 1 (on)	1	---		8-26
43	Stop key ON/OFF selection	A43	0/1	0	---		8-27
44	Analog input selection	A48	0(5 V)/1 (10 V)	0	---		8-19
45	Frequency arrival signal output method	A49	1/2	2	---		8-26
46	Analog/digital meter selection	A50	0/1	1	---		8-27
47	Frequency/current monitoring selection	A51	0/1	0	---		8-27
48	RUN signal output selection	A52	1/2	1	---		8-27
49	Enable/disable of frequency setting for software lock	A53	0/1	0	---		8-28
50	DC braking ON/OFF selection	A55	0 (off) / 1 (on)	0	---		8-22
51	DC braking edge/level selection	A56	0/1	1	---		8-22
52	Trip history clear selection	A57	0/1	0	---		8-28
53	Reduced voltage start selection	A58	0/1	1	---		8-28
54	Base frequency setting	A62	50-360 Hz	50	√		8-16
55	Maximum frequency setting	A63	50-360 Hz	50	√		8-16
56	Maximum frequency switching	A64	0 (120 Hz) / 1 (360 Hz)	0	---		8-16
57	Jump frequency range setting	A68	0-9.9 Hz	0.5	---		8-18
58	Multispeed seventh speed setting	A71	0-375 Hz	0	---		8-20
59	Frequency command adjust. (voltage)	A80	0-255	NOTE 2	---		8-29
60	Frequency command adjust.(current)	A81	0-255	NOTE 2	---		8-29
61	Allowable undervoltage time setting	A82	0.3-3.0s	1.0	---		8-29
62	Undervoltage retry waiting time	A83	0.3-100.0s	10.0	---		8-29
63	Software lock selection	A84	0/1	0	---		8-30
64	Deceleration rate setting for overload limit	A85	0.1-31.0s	1.0	---	31.0:Invalid	8-23
65	Input terminal setting 1	C0	0-12	1	---		8-31
66	Input terminal setting 2	C1	0-12	2	---		8-31
67	Input terminal setting 3	C2	0-12	7	---		8-31
68	Input terminal setting 4	C3	0-12	11	---		8-31
69	Input terminal setting 5	C4	0-12	0	---		8-31
70	Output terminal setting	C10	0-2	0	---		8-32
71	Input terminal a and b contact setting	C20	00-1F	00	---		8-33
72	Output terminal a and b contact setting	C21	00-03	03	---		8-34

NOTE 1: The most applicable motor capacity of the inverter is set.

NOTE 2: The initial setting of each inverter is adjusted when shipping from the works.

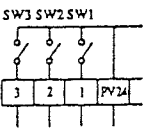
8.5 Explanation of the Mode






(1) Monitor mode and Function mode



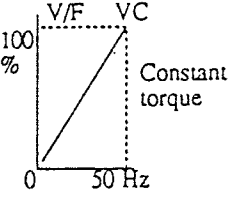
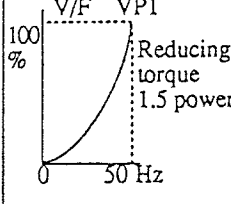
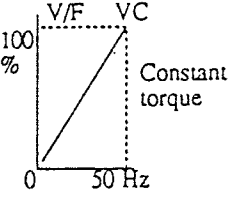
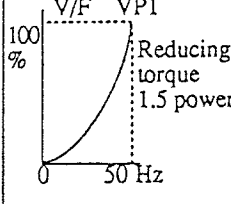
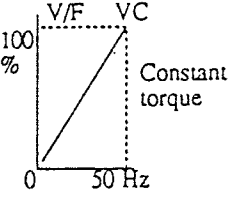
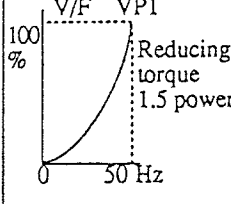
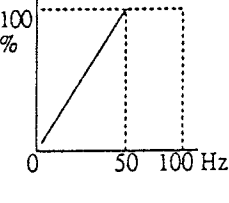
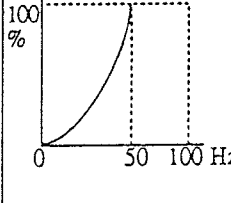
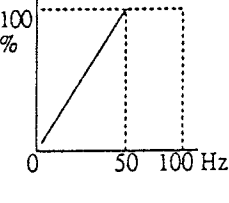
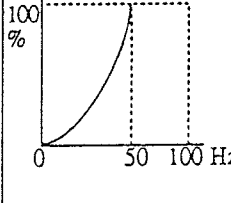
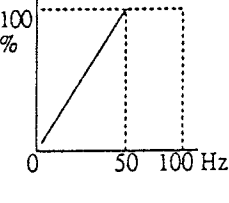
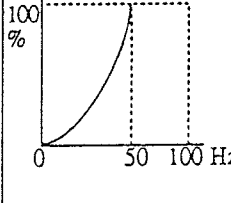
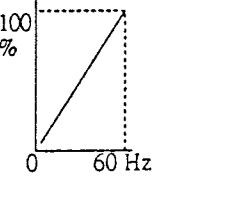
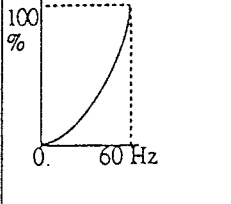
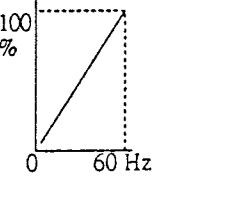
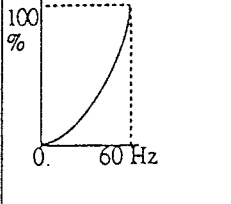
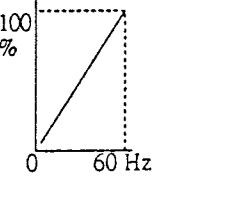
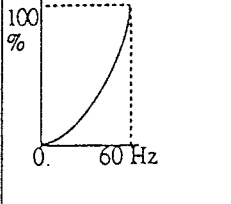
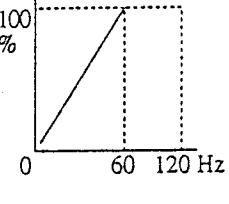
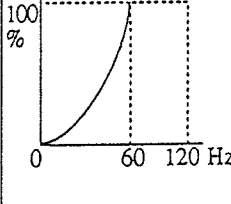
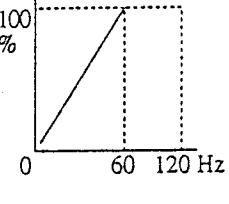
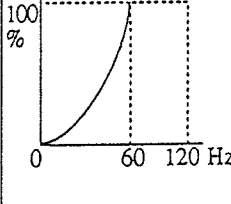
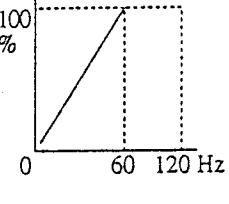
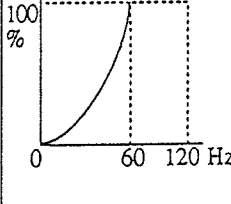
Command	Contents and display	Remarks
 <p>Running state monitoring</p>	<p>This command monitors the run state Frequency, output current, DC voltage and direction of revolution are displayed sequentially. [During run]</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>2-second interval automatic monitoring</p> </div> <div style="width: 45%;"> <p>Run frequency 2 seconds ... Only integers are displayed when the frequency exceeds 100 Hz (Display example is 60 Hz)</p> <p>Output current 2 seconds ... Only integers are displayed when the current exceeds 10 A (Display example is 1.6A)</p> <p>DC voltage of inverter 2 seconds ... (not output voltage) Only the first and second digits are displayed (Display example is 270 V)</p> <p>Direction of the motor 2 seconds ... F: Forward run r: reverse run</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> <p>Optional fixed monitoring</p> </div> <div style="width: 45%;"> <p>Operation frequency: Fixed display</p> <p>Output current: Fixed display</p> <p>Inverter DC voltage: Fixed display</p> <p>Motor rotation direction: Fixed display</p> </div> </div> <p>• When the  or  key is pressed in the 2-second interval automatic monitoring state, an optional monitor can display fixed values.</p> <p>2-second interval automatic monitoring (Any display is available.)</p> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="text-align: center; margin-right: 20px;"> <p> Pressed once</p> <p>→</p> <p> Pressed once</p> </div> <div style="text-align: center; margin-right: 20px;"> <p>(Operation frequency)</p> <p>→</p> <p>(Motor rotation direction)</p> </div> <div style="text-align: center; margin-right: 20px;"> <p> Pressed 4 times</p> <p>→</p> <p> Pressed 4 times</p> </div> <div style="text-align: center;"> <p>2-second interval automatic monitoring</p> <p>→</p> <p> (Operation frequency)</p> </div> </div> <p>[Stop]</p> 	<p>Possible to change during run</p>

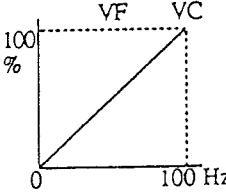
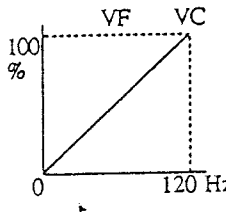
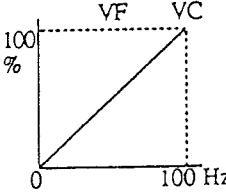
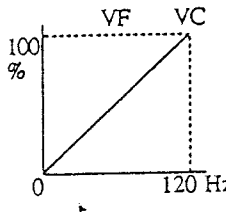
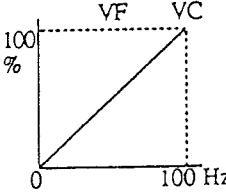
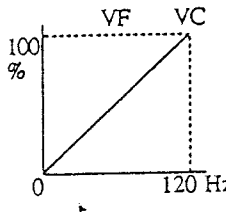
Command	Contents and display	Remarks
<div data-bbox="402 260 496 342" style="border: 1px solid black; padding: 2px; display: inline-block;">F 2</div> Output frequency setting	<p data-bbox="542 254 946 281">This command sets the output frequency.</p> <div data-bbox="574 317 1110 359" style="border: 1px solid black; padding: 2px; display: inline-block;">600</div> Set frequency from 0 to 99.9 Hz by 0.1 Hz	

120

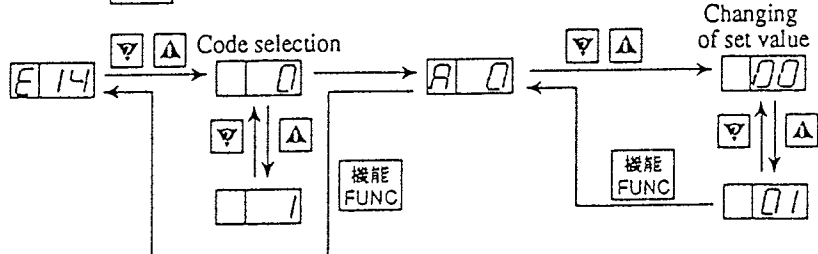
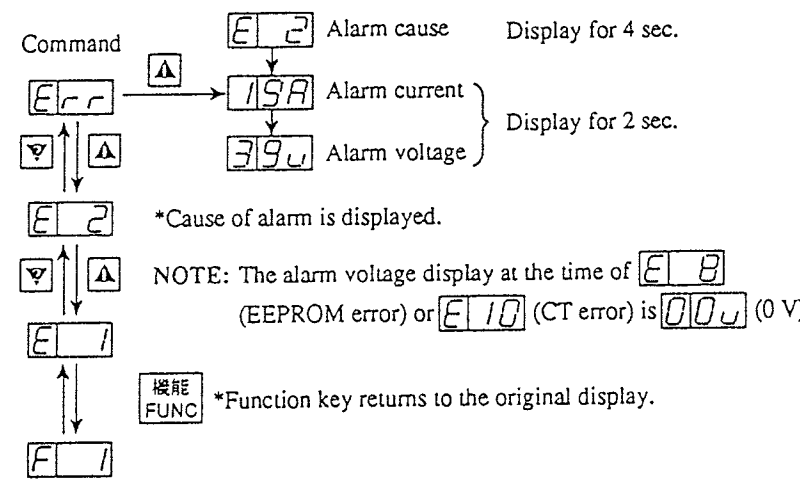
Command	Contents and display	Remarks
<div data-bbox="365 241 462 325" style="border: 1px solid black; padding: 2px; display: inline-block;"> </div> Running direction setting	<p>Set the motor direction.</p> <p>Set the motor direction when running by pressing  key.</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  Forward run  Reverse run </div> <div style="font-size: 3em; margin-right: 10px;">}</div> <div> Switching can be done by pressing  . </div> </div>	Im-possible to change during run

Command	Contents and display		Remarks																												
 V/f pattern setting	<p>This command sets V/F pattern.</p> <p>When combining V/F patterns other than the following using the control method (A0), the basic frequency (A62) and the maximum frequency (A63) of the extension function mode, the display shows .</p>		Im-possible to set during run																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center;">Output voltage</th> <th rowspan="2" style="text-align: center;">V/F pattern</th> <th colspan="4" style="text-align: center;">Output voltage</th> <th rowspan="2" style="text-align: center;">V/F pattern</th> </tr> <tr> <th style="text-align: center;">200</th> <th style="text-align: center;">220</th> <th style="text-align: center;">230</th> <th style="text-align: center;">240</th> <th style="text-align: center;">200</th> <th style="text-align: center;">220</th> <th style="text-align: center;">230</th> <th style="text-align: center;">240</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">380</td> <td style="text-align: center;">400</td> <td style="text-align: center;">440</td> <td style="text-align: center;">460</td> <td></td> <td style="text-align: center;">380</td> <td style="text-align: center;">400</td> <td style="text-align: center;">440</td> <td style="text-align: center;">460</td> <td></td> </tr> </tbody> </table>				Output voltage				V/F pattern	Output voltage				V/F pattern	200	220	230	240	200	220	230	240	380	400	440	460		380	400	440	460	
Output voltage				V/F pattern	Output voltage				V/F pattern																						
200	220	230	240		200	220	230	240																							
380	400	440	460		380	400	440	460																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 12.5%; text-align: center;">00</td> <td style="width: 12.5%; text-align: center;">08</td> <td style="width: 12.5%; text-align: center;">16</td> <td style="width: 12.5%; text-align: center;">24</td> <td style="width: 25%; text-align: center;">  </td> <td style="width: 12.5%; text-align: center;">04</td> <td style="width: 12.5%; text-align: center;">12</td> <td style="width: 12.5%; text-align: center;">20</td> <td style="width: 12.5%; text-align: center;">28</td> <td style="width: 25%; text-align: center;">  </td> </tr> </tbody> </table>				00	08	16	24		04	12	20	28																			
00	08	16	24		04	12	20	28																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 12.5%; text-align: center;">01</td> <td style="width: 12.5%; text-align: center;">09</td> <td style="width: 12.5%; text-align: center;">17</td> <td style="width: 12.5%; text-align: center;">25</td> <td style="width: 25%; text-align: center;">  </td> <td style="width: 12.5%; text-align: center;">05</td> <td style="width: 12.5%; text-align: center;">13</td> <td style="width: 12.5%; text-align: center;">21</td> <td style="width: 12.5%; text-align: center;">29</td> <td style="width: 25%; text-align: center;">  </td> </tr> </tbody> </table>				01	09	17	25		05	13	21	29																			
01	09	17	25		05	13	21	29																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 12.5%; text-align: center;">02</td> <td style="width: 12.5%; text-align: center;">10</td> <td style="width: 12.5%; text-align: center;">18</td> <td style="width: 12.5%; text-align: center;">26</td> <td style="width: 25%; text-align: center;">  </td> <td style="width: 12.5%; text-align: center;">06</td> <td style="width: 12.5%; text-align: center;">14</td> <td style="width: 12.5%; text-align: center;">22</td> <td style="width: 12.5%; text-align: center;">30</td> <td style="width: 25%; text-align: center;">  </td> </tr> </tbody> </table>				02	10	18	26		06	14	22	30																			
02	10	18	26		06	14	22	30																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 12.5%; text-align: center;">03</td> <td style="width: 12.5%; text-align: center;">11</td> <td style="width: 12.5%; text-align: center;">19</td> <td style="width: 12.5%; text-align: center;">27</td> <td style="width: 25%; text-align: center;">  </td> <td style="width: 12.5%; text-align: center;">07</td> <td style="width: 12.5%; text-align: center;">15</td> <td style="width: 12.5%; text-align: center;">23</td> <td style="width: 12.5%; text-align: center;">31</td> <td style="width: 25%; text-align: center;">  </td> </tr> </tbody> </table>				03	11	19	27		07	15	23	31																			
03	11	19	27		07	15	23	31																							

Command	Contents and display	Remarks																							
	<p data-bbox="472 260 643 289">Special V/F pattern</p> <table border="1" data-bbox="467 302 898 884"> <thead> <tr> <th colspan="4" data-bbox="472 310 656 340">Output voltage</th> <th data-bbox="656 310 893 340" rowspan="3">V/F pattern</th> </tr> <tr> <th data-bbox="472 346 516 375">200</th> <th data-bbox="516 346 560 375">220</th> <th data-bbox="560 346 604 375">230</th> <th data-bbox="604 346 656 375">240</th> </tr> <tr> <th data-bbox="472 382 516 411">380</th> <th data-bbox="516 382 560 411">400</th> <th data-bbox="560 382 604 411">440</th> <th data-bbox="604 382 656 411">460</th> </tr> </thead> <tbody> <tr> <td data-bbox="472 420 516 646">50</td> <td data-bbox="516 420 560 646">51</td> <td data-bbox="560 420 604 646">52</td> <td data-bbox="604 420 656 646">53</td> <td data-bbox="656 420 893 646">  </td> </tr> <tr> <td data-bbox="472 653 516 879">54</td> <td data-bbox="516 653 560 879">55</td> <td data-bbox="560 653 604 879">56</td> <td data-bbox="604 653 656 879">57</td> <td data-bbox="656 653 893 879">  </td> </tr> </tbody> </table> <p data-bbox="911 373 1341 457">Uses for V/F pattern Constant torque characteristics : Conveyor Reduced torque characteristics : Fan, pump</p> <p data-bbox="505 909 1341 993">NOTE: When sensorless vector control (SLV1, SLV2) is selected as a control system and this command is changed in design, V/F control is forcibly selected. Be careful in this regard.</p>	Output voltage				V/F pattern	200	220	230	240	380	400	440	460	50	51	52	53		54	55	56	57		
Output voltage				V/F pattern																					
200	220	230	240																						
380	400	440	460																						
50	51	52	53																						
54	55	56	57																						

Command	Contents and display	Remarks															
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">F 6</div> <div style="margin-bottom: 10px;">F 7</div> <div style="margin-bottom: 10px;">Acceleration time 1</div> <div>Deceleration time 1</div> </div>	<p>These commands set and display Acc. time (F 6) and Dec. time (F 7).</p> <p>In the case of adjustment in real time, press the 機能 FUNC key after data is changed.</p> <div style="text-align: center; margin: 10px 0;"> </div> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th>Setting range</th> <th>Period</th> </tr> </thead> <tbody> <tr> <td>0.1 to 99.9</td> <td>Every 0.1s</td> </tr> <tr> <td>100 to 999</td> <td>Every 1s</td> </tr> </tbody> </table> <p>• When a time of more than 999 seconds is set by the remote operator, -- is displayed on the digital operator.</p>	Setting range	Period	0.1 to 99.9	Every 0.1s	100 to 999	Every 1s	Possible to set during run									
Setting range	Period																
0.1 to 99.9	Every 0.1s																
100 to 999	Every 1s																
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">F 8</div> <div>Manual torque boost setting</div> </div>	<p>Set torque boost</p> <ul style="list-style-type: none"> Motor torque can be adjusted to increase the output voltage when the starting torque is not sufficient in V/F control. Pay attention not to cause the motor to burnout and an inverter trip. Setting is effective only when V/F control is selected. In the case of adjustment in real time, press the 機能 FUNC key after data is changed. <div style="margin: 10px 0;"> <p>Code 00 ?</p> <p>99</p> </div> <p>Setting and changing is done with Δ ▽ keys.</p> <div style="margin: 10px 0;"> </div>	Possible to set during run															
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">F 9</div> <div style="margin-bottom: 10px;">Running command</div> <div>Frequency command setting</div> </div>	<p>Change setting mode</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Run command to</th> <th>Frequency command to (NOTE 1)</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>Digital operator</td> <td>Digital operator</td> </tr> <tr> <td>01</td> <td>Digital operator</td> <td>Terminal block</td> </tr> <tr> <td>02</td> <td>Terminal block</td> <td>Digital operator</td> </tr> <tr> <td>03</td> <td>Terminal block</td> <td>Terminal block</td> </tr> </tbody> </table> <p>NOTE 1: The multi-speed output frequency can be set for one of 00 to 03. (See page 8-8.)</p>		Run command to	Frequency command to (NOTE 1)	00	Digital operator	Digital operator	01	Digital operator	Terminal block	02	Terminal block	Digital operator	03	Terminal block	Terminal block	Impossible to set during run
	Run command to	Frequency command to (NOTE 1)															
00	Digital operator	Digital operator															
01	Digital operator	Terminal block															
02	Terminal block	Digital operator															
03	Terminal block	Terminal block															

Command	Contents and display	Remarks
<div data-bbox="391 233 483 317" data-label="Image"> </div> <div data-bbox="386 346 500 426" data-label="Text"> <p>Analog meter adjustment</p> </div>	<p data-bbox="511 212 1360 331">The voltage which is outputted to the [FM] monitor terminal can be adjusted. When the equipment starts running, t/T which is proportional to the output data is outputted between the terminals [FM] and [CM1]. Adjust the meter so that it indicates the highest point when the output is maximized.</p> <div data-bbox="565 346 865 472" data-label="Diagram"> </div> <div data-bbox="998 315 1339 472" data-label="Diagram"> </div> <div data-bbox="841 493 1356 619" data-label="Text" style="border: 1px solid black; padding: 5px;"> <p>Maximum level of analog meter Frequency monitor: Maximum frequency Current monitor: 200% of rated current of inverter</p> </div> <p data-bbox="560 619 1242 682">NOTE: This function is valid only when the analog monitor is used. (Analog frequency monitor, current monitor)</p>	<p>Possible to set during run</p>
<div data-bbox="399 737 492 821" data-label="Image"> </div> <div data-bbox="394 842 492 940" data-label="Text"> <p>Motor receiving voltage setting</p> </div>	<p data-bbox="516 716 1040 779">The command sets the supply voltage for the motor. Set the supply voltage for the motor as shown below.</p> <div data-bbox="527 800 1104 987" data-label="Diagram"> </div> <div data-bbox="527 1039 1339 1228" data-label="Diagram"> </div>	<p>Impossible to set during run</p>

Command	Contents and display	Remarks
<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">E 14</div> Extended function setting	<p>Setting of extended functions The command selects the item of each extended function. When the setting ends, the screen is returned to the code display screen. When any data is changed, be sure to press the 機能 FUNC key to store the new data</p>  <p>NOTE: During running, the code display of each extended function can be changed. However, each data setting of the extended functions cannot be changed. (However, the double acceleration and deceleration times A 19 and A 19 can be changed.)</p>	NOTE: Possible to set during run
<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">E r r</div> Trip history monitor	<p>Trip history monitor (Displays only when there is trip history) Display method of monitoring trip history</p>  <p>• When the trip occurrence count is less than 3, _ _ _ is displayed.</p>	Possible to check during run

(2) Extension Function Mode

Command	Contents and display																								
<p>A 0</p> <p>Control method</p>	<p>This command sets a control method. Select one of the control codes shown below.</p> <p>Initial set value</p> <p>A 0 ← ▽ ▲ → 0 V/f control (VC, VP1, VP2, VP3)</p> <p>FUNC</p> <p>▽ ▲ ↔ 1 High starting torque (SLV1) for HITACHI general motors</p> <p>▽ ▲ ↔ 2 High starting torque (SLV2) for dedicated general motors</p> <p>Notes:</p> <ol style="list-style-type: none"> The SLV2 control method has a mode for setting control constants such as motor constants. This mode requires a remote operator (DOP or DRW). If you change F 5 (V/F Pattern Setting) after setting SLV1 or SLV2 with this command, the control method is forcibly reset to "V/f control." 																								
<p>A 1</p> <p>A 2</p> <p>Motor capacity</p> <p>Motor poles setting</p>	<p>This command sets the capacity and the number of poles of the motor. Maximum applicable ratings of 4-pole motors for each inverter are set initially.</p> <p>Motor capacity</p> <p>A 1 ← ▽ ▲ → 5.5</p> <p>▽ ▲ ↔ 4.0</p> <p>FUNC</p> <p>▽ ▲ ↔ 3.7</p> <p>▽ ▲ ↔ 2.2</p> <p>▽ ▲ ↔ 1.5</p> <p>▽ ▲ ↔ 1.1</p> <p>▽ ▲ ↔ 0.75</p> <p>▽ ▲ ↔ 0.55</p> <p>▽ ▲ ↔ 0.37</p> <p>Number of poles</p> <p>A 2 ← ▽ ▲ → 8</p> <p>▽ ▲ ↔ 6</p> <p>FUNC</p> <p>▽ ▲ ↔ 4 Initial set value</p> <p>▽ ▲ ↔ 2</p> <table border="1" data-bbox="998 1291 1315 1606"> <thead> <tr> <th>Model</th> <th>A 1</th> <th>Initial value</th> </tr> </thead> <tbody> <tr> <td>004SFE4</td> <td>0.37</td> <td></td> </tr> <tr> <td>007SFE4</td> <td>0.75</td> <td></td> </tr> <tr> <td>015SFE4</td> <td>1.5</td> <td></td> </tr> <tr> <td>022SFE4</td> <td>2.2</td> <td></td> </tr> <tr> <td>015HFE4</td> <td>1.5</td> <td></td> </tr> <tr> <td>022HFE4</td> <td>2.2</td> <td></td> </tr> <tr> <td>037HFE4</td> <td>4.0</td> <td></td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> If the values set by this command are not fit for the motor running in the Sensorless Vector mode, the expected motor performance will not be obtained. In the sensorless vector operation, a motor whose ratings are lower than the maximum applicable ratings will not do its best performance. The sensorless vector function is not available for a simultaneous operation of two or more motors. If the rating for the motor in the V/f control mode is not the maximum applicable rating, set a correct rating for the motor. 	Model	A 1	Initial value	004SFE4	0.37		007SFE4	0.75		015SFE4	1.5		022SFE4	2.2		015HFE4	1.5		022HFE4	2.2		037HFE4	4.0	
Model	A 1	Initial value																							
004SFE4	0.37																								
007SFE4	0.75																								
015SFE4	1.5																								
022SFE4	2.2																								
015HFE4	1.5																								
022HFE4	2.2																								
037HFE4	4.0																								

Command	Contents and display						
<p data-bbox="391 247 500 394">Maximum frequency adjustment</p> <p data-bbox="410 247 500 289">A 3</p>	<p data-bbox="526 239 1406 302">This command increases the maximum frequency at steps of 0.1Hz. Adjust the maximum frequency in the constant output range.</p> <div data-bbox="558 331 954 541"> </div> <div data-bbox="967 285 1471 617"> </div> <p data-bbox="537 575 586 596">Note:</p> <p data-bbox="537 600 1029 625">1. Use the command A 63 to set the maximum frequency.</p>						
<p data-bbox="391 646 500 688">Base frequency</p> <p data-bbox="410 699 500 741">A 62</p> <p data-bbox="391 846 500 940">Maximum frequency setting</p> <p data-bbox="410 699 500 741">A 63</p>	<p data-bbox="526 638 1377 701">These commands set a base frequency A 62 and a maximum frequency A 63 respectively.</p> <div data-bbox="526 705 938 978"> </div> <div data-bbox="548 991 889 1138"> <p>If the specified base frequency is greater than the specified maximum frequency, the system forcibly resets the base frequency to the maximum frequency at the start of operation and operates the motor with this frequency.</p> </div> <div data-bbox="526 1159 906 1486"> </div> <div data-bbox="980 684 1487 1012"> <p>Setting examples</p> <div data-bbox="948 718 1149 1012"> <p>(A62)(A63) Base frequency 50 Hz Maximum frequency 50 Hz</p> </div> <div data-bbox="1159 718 1487 1012"> <p>(A62) Base frequency 50 Hz (A63) Maximum frequency 120 Hz</p> </div> </div> <p data-bbox="928 1020 984 1041">Notes:</p> <ol data-bbox="928 1050 1487 1619" style="list-style-type: none"> When a base frequency exceeding 60Hz is specified, the motor is used as a special-purpose motor (instead of a general-purpose motor). Accordingly, the maximum ratings of the motor vary and the capacity of the inverter must be increased even when the motor has the identical KW indication. Either the setting by this command or the setting by the F 5 command (V/f Pattern Setting) which is specified last is used preferentially. When a V/f pattern is set by the F 5 command after a base or maximum frequency is set by this command, the setting of the frequency is cancelled. Set the frequency again. When a base or maximum frequency exceeding 120Hz is set, the maximum frequency must be set to 360Hz by the A 64 command. You can switch between the first and second settings of base frequencies, maximum frequencies, and control methods (V/f control or sensorless vector control) when they are stored. To use this function, you must store the first and second settings in advance. After switching to the control method (V/f control or sensorless vector control), the first or second settings, specify frequencies by the A 62 and A 63 commands. Data for the settings are stored. When a maximum frequency (by the A 63 command) smaller than a base frequency (by the A 62 command) is specified, the base frequency is changed. 						
<p data-bbox="391 1633 500 1791">Maximum frequency switching</p> <p data-bbox="410 1633 500 1675">A 64</p>	<p data-bbox="526 1633 1008 1665">This command changes the maximum frequency.</p> <div data-bbox="548 1671 850 1881"> </div> <table border="1" data-bbox="1008 1692 1325 1808"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>120 Hz</td> </tr> <tr> <td>1</td> <td>360 Hz</td> </tr> </tbody> </table>	Set value	Function	0	120 Hz	1	360 Hz
Set value	Function						
0	120 Hz						
1	360 Hz						

Command	Contents and display						
<p data-bbox="414 283 511 325">A 4</p> <p data-bbox="397 346 511 441">Start frequency adjustment</p>	<p data-bbox="535 273 1242 346">This command sets an inverter-output starting frequency. The frequency can be in the range of 0.5Hz to 5.0Hz (at steps of 0.1Hz).</p> <div data-bbox="552 367 958 577"> </div> <div data-bbox="990 357 1429 693"> </div> <p data-bbox="535 703 592 735">Notes:</p> <ol data-bbox="535 735 1266 808" style="list-style-type: none"> 1. The acceleration/deceleration time becomes shorter as the starting frequency goes higher. 2. As the starting frequency goes higher, an overcurrent tripping is apt to occur. 						
<p data-bbox="414 840 511 882">A 5</p> <p data-bbox="414 892 511 934">A 6</p> <p data-bbox="397 945 511 1102">Frequency upper, lower limiter setting</p>	<p data-bbox="535 829 1477 924">These commands respectively set upper and lower limits to the frequencies specified by A 4 (Start Frequency Adjustment), A 63 (Maximum Frequency Setting), and A 3 (Maximum Frequency Adjustment) commands.</p> <table border="1" data-bbox="544 934 820 1060"> <thead> <tr> <th>Setting range</th> <th>Step</th> </tr> </thead> <tbody> <tr> <td>0.0 ~ 99.9Hz</td> <td>0.1Hz</td> </tr> <tr> <td>100 ~ 375Hz</td> <td>1Hz</td> </tr> </tbody> </table> <p data-bbox="535 1102 592 1134">Notes:</p> <ol data-bbox="535 1134 1485 1365" style="list-style-type: none"> 1. When setting upper and lower limits, set an upper limit (by the A 5 command) first. 2. A value entered from the operator (ROP or DRW) will not be stored if it is over the upper limit or below the lower limit. 3. When a value over the upper limit or below the lower limit is entered from a frequency command terminal (O, OI-L), the frequency will not change over the upper limit or below the lower limit. 4. Limit setting condition. The specified limit values are valid only when the upper limit value is not smaller than the lower limit value. The upper and lower limits are not valid for a frequency of 0Hz. <div data-bbox="544 1386 974 1879"> </div> <div data-bbox="982 1375 1469 1827"> <p data-bbox="1063 1375 1396 1407">Example of setting upper and lower limits</p> <p data-bbox="1031 1407 1437 1459">Setting of an upper limit of 45Hz and a lower limit of 20Hz</p> </div>	Setting range	Step	0.0 ~ 99.9Hz	0.1Hz	100 ~ 375Hz	1Hz
Setting range	Step						
0.0 ~ 99.9Hz	0.1Hz						
100 ~ 375Hz	1Hz						

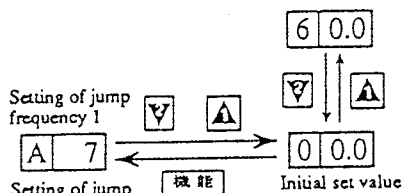
Command	Contents and display
---------	----------------------

A 7
A 8
A 9

These commands can jump a maximum of three frequencies to avoid unwanted resonances with loads. The frequencies to be jumped can be specified and executed in any order. To jump a frequency, specify the frequency and its allowance (\pm allowable frequency range).

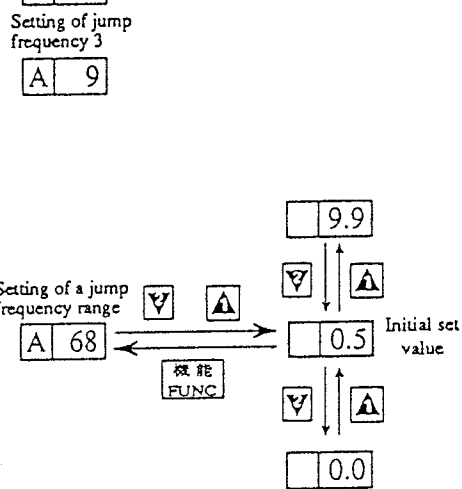
Setting range	Step
0.0 ~ 99.9Hz	0.1Hz
100 ~ 375Hz	1Hz

Jump frequency setting
1, 2, 3



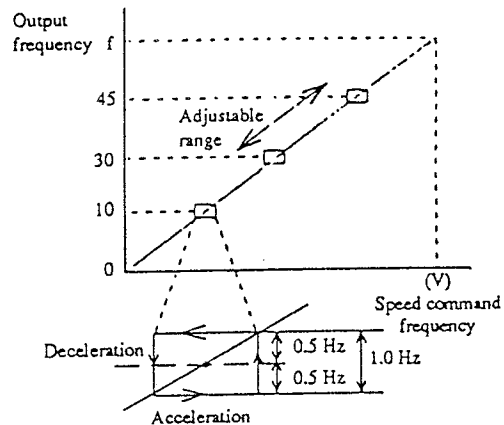
A 68

Jump frequency range setting



Setting examples

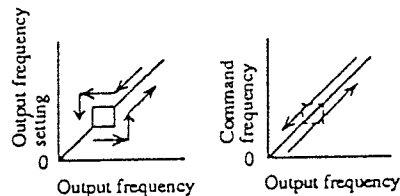
- Jump frequency 1: 10Hz
- Jump frequency 2: 30Hz
- Jump frequency 3: 45Hz
- Jump frequency range: 0.5Hz



When the jump frequency range of 0.5Hz is specified, a total frequency range of 1Hz is jumped.

Note:

1. A frequency command value specified by a Jump Frequency Setting command is jumped.

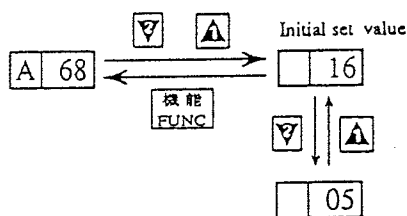


A 10

Carrier frequency setting

This command sets a switching frequency (carrier frequency) of the power module.

Select one of the following carrier frequencies:



Initial set value

Set value	Carrier frequency
16	16 kHz
12	12 kHz
8	8 kHz
5	5kHz

Notes:

1. When a smaller carrier frequency is selected, the magnetic noise of the motor becomes louder.
2. The carrier frequency is always 5kHz regardless of setting of this command in the D.C. Braking operation.

Command	Contents and display
A 11	This command chang

Command	Contents and display																																																	
A 12	<p>These commands set output frequencies for 1st to 7th speeds. Each speed setting becomes valid when the intelligent input terminals [CF1], [CF2],[CF3] to [PV24] are combined adequately.</p> <div data-bbox="1156 373 1437 487" style="float: right; border: 1px solid black; padding: 2px;"> <table border="1"> <tr> <th>Setting range</th> <th>Step</th> </tr> <tr> <td>0.0 ~ 99.9Hz</td> <td>0.1Hz</td> </tr> <tr> <td>100 ~ 375Hz</td> <td>1Hz</td> </tr> </table> </div> <div data-bbox="522 394 993 760" style="text-align: center;"> </div> <table border="1" data-bbox="535 777 1149 1150" style="margin: 10px auto;"> <thead> <tr> <th rowspan="2">Speed</th> <th colspan="3">Control circuit terminals</th> <th rowspan="2">Expansion function code</th> </tr> <tr> <th>CF1</th> <th>CF2</th> <th>CF3</th> </tr> </thead> <tbody> <tr> <td>1st</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>A 12</td> </tr> <tr> <td>2nd</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>A 13</td> </tr> <tr> <td>3rd</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>A 14</td> </tr> <tr> <td>4th</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>A 15</td> </tr> <tr> <td>5th</td> <td>OFF</td> <td>ON</td> <td>ON</td> <td>A 16</td> </tr> <tr> <td>6th</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>A 17</td> </tr> <tr> <td>7th</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>A 71</td> </tr> </tbody> </table>	Setting range	Step	0.0 ~ 99.9Hz	0.1Hz	100 ~ 375Hz	1Hz	Speed	Control circuit terminals			Expansion function code	CF1	CF2	CF3	1st	ON	OFF	OFF	A 12	2nd	OFF	ON	OFF	A 13	3rd	ON	ON	OFF	A 14	4th	ON	OFF	ON	A 15	5th	OFF	ON	ON	A 16	6th	ON	ON	ON	A 17	7th	OFF	OFF	ON	A 71
Setting range		Step																																																
0.0 ~ 99.9Hz		0.1Hz																																																
100 ~ 375Hz		1Hz																																																
Speed		Control circuit terminals			Expansion function code																																													
		CF1	CF2	CF3																																														
1st		ON	OFF	OFF	A 12																																													
2nd	OFF	ON	OFF	A 13																																														
3rd	ON	ON	OFF	A 14																																														
4th	ON	OFF	ON	A 15																																														
5th	OFF	ON	ON	A 16																																														
6th	ON	ON	ON	A 17																																														
7th	OFF	OFF	ON	A 71																																														
A 13																																																		
A 14																																																		
A 15																																																		
A 16																																																		
A 17																																																		
A 71																																																		
<p>Multispeed first second third forth fifth sixth seventh speed setting</p>																																																		
	<p>Note: 1. When using multispeed commands of 4th to 7th, assign the multispeed terminal (CF3) to the input terminal.</p>																																																	

Command

Contents and display

These commands respectively set a 2-step acceleration time **A 18** and a 2-step deceleration time **A 19**.

Setting range	Step
0.0 ~ 99.9 sec.	0.1 sec.
100 ~ 999 sec.	1 sec.

2-stage acceleration, deceleration time setting

A 20
A 21
A 22

The **A 20** command sets a frequency at which the D.C. braking operation starts.

Setting range	Step
0.0 ~ 99.9Hz	0.1Hz
100 ~ 375Hz	1Hz

DC braking frequency setting

DC braking force adjustment

DC braking time adjustment

The **A 21** command adjusts a D.C. braking force.

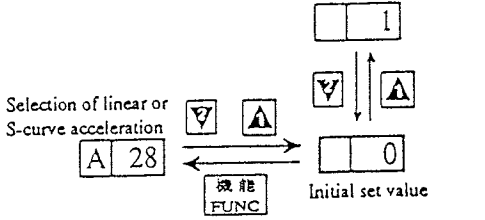
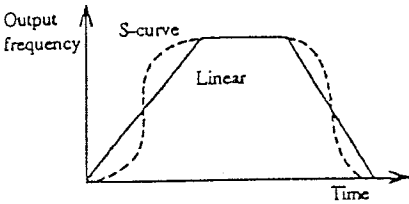
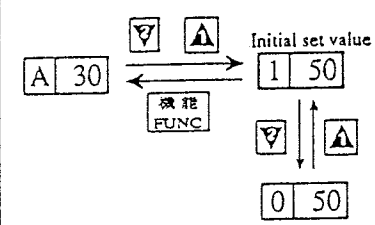
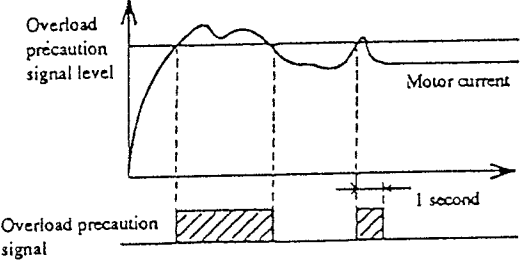
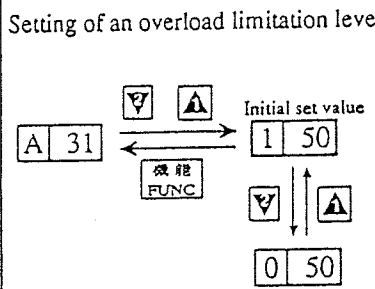
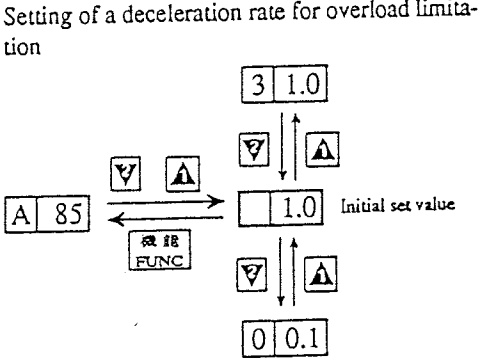
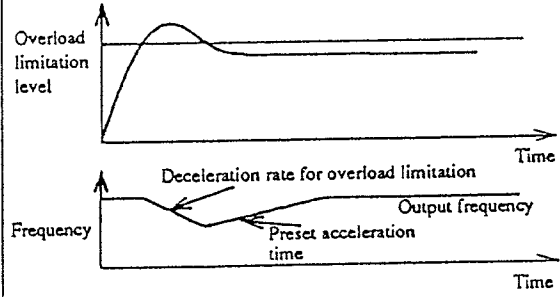
The **A 22** command adjusts a D.C. braking time.

Setting range	Step
0.0 ~ 99.9 sec.	0.1 sec.
100 ~ 600 sec.	1 sec.

Notes:

- During D.C. braking, an Overload Protection error (**E 5**) is apt to occur.
- The carrier frequency in the D.C. braking operation is always 5kHz regardless of the carrier frequency setting by **A 10**.

Command	Contents and display						
<p>A 55</p> <p>DC braking ON/OFF selection</p>	<p>This command enables (ON) or disables (OFF) a D.C. braking function.</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> </div> <div> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>OFF</td> </tr> <tr> <td>1</td> <td>ON</td> </tr> </tbody> </table> </div> </div> <p>Note:</p> <ol style="list-style-type: none"> Set "1" to use the D.C. braking function. 	Set value	Function	0	OFF	1	ON
Set value	Function						
0	OFF						
1	ON						
<p>A 56</p> <p>DC braking edge/level selection</p>	<p>This command selects a level of D.C. braking operation.</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> </div> <div> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Edge operation</td> </tr> <tr> <td>1</td> <td>Level operation</td> </tr> </tbody> </table> </div> </div> <p>Braking time set by A 22</p>	Set value	Function	0	Edge operation	1	Level operation
Set value	Function						
0	Edge operation						
1	Level operation						
<p>A 23</p> <p>Electronic thermal level adjustment</p>	<p>This command sets a level of an electronic thermal sensor. Set a thermal sensor level according to the rated current value of the motor.</p> <p>Notes:</p> <ol style="list-style-type: none"> Even when a thermal level of more than 100% is set, do not operate the motor continuously with more than the rated current, or the life of the capacitor will shorten. If the ambient temperature rises, overheat of the motor will cause the power module protection and also will cause a trip. If the thermal level is greater than the rated current of the motor, the motor cannot be protected by the electronic thermal function. Use a thermal relay or the like to protect the motor against overloading. $\text{Adjustable thermal level} = \frac{\text{Rated current of motor}}{\text{Rated current of inverter}} \times 100$ <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> </div> <div> </div> </div> <p>Range of electronic thermal level adjustment</p>						
<p>A 24</p> <p>Electronic thermal characteristic selection</p>	<p>This command selects an electronic thermal characteristics. Set a thermal characteristic fit for the load.</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> </div> <div> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Reduced torque characteristic</td> </tr> <tr> <td>1</td> <td>Constant torque characteristic</td> </tr> </tbody> </table> </div> </div> <p>Initial set value</p>	Set value	Function	0	Reduced torque characteristic	1	Constant torque characteristic
Set value	Function						
0	Reduced torque characteristic						
1	Constant torque characteristic						

Command	Contents and display						
<p data-bbox="391 239 477 275">A 28</p> <p data-bbox="391 302 477 338">A 29</p> <p data-bbox="375 359 500 478">Acceleration Deceleration (Linear, S- curve)</p>	<p data-bbox="506 233 1442 302">These commands respectively select liner or S-curve acceleration (A 28) and liner or S-curve deceleration. (A 29).</p> <div data-bbox="506 310 987 527"> <p data-bbox="506 401 672 449">Selection of linear or S-curve acceleration</p>  </div> <div data-bbox="506 541 987 625"> <p data-bbox="506 541 688 590">Selection of linear or S-curve deceleration</p> <p data-bbox="581 583 987 625">A 29 : Same as the above A 28</p> </div> <table border="1" data-bbox="1117 302 1365 432"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Linear</td> </tr> <tr> <td>1</td> <td>S-curve</td> </tr> </tbody> </table> 	Set value	Function	0	Linear	1	S-curve
Set value	Function						
0	Linear						
1	S-curve						
<p data-bbox="391 701 477 737">A 30</p> <p data-bbox="375 772 477 835">Overload signal</p>	<p data-bbox="506 695 1458 758">This command sets the ratio of the output level of the overload limiting signal to the rated current of the motor.</p> <div data-bbox="506 772 878 995"> <p data-bbox="506 793 878 842">Initial set value</p>  </div>  <p data-bbox="506 1016 565 1037">Notes:</p> <ol data-bbox="506 1045 1377 1100" style="list-style-type: none"> The overload precaution signal is retained for at least one second. Set the C 10 command to 2 and assign the Overload Precaution signal to the intelligent terminal. 						
<p data-bbox="391 1142 477 1178">A 31</p> <p data-bbox="391 1205 477 1241">A 85</p> <p data-bbox="375 1262 500 1352">Overload limit level setting</p> <p data-bbox="375 1381 500 1499">Deceleration rate setting for overload limit</p>	<p data-bbox="506 1129 1458 1192">These commands respectively set an overload limitation level (A 31) and a deceleration rate for overload limitation.</p> <div data-bbox="506 1213 878 1499"> <p data-bbox="506 1220 878 1255">Setting of an overload limitation level</p>  </div> <div data-bbox="971 1213 1458 1570"> <p data-bbox="971 1213 1458 1276">Setting of a deceleration rate for overload limitation</p>  </div> <div data-bbox="506 1535 1062 1829">  </div> <p data-bbox="1117 1591 1458 1856">The Overload Limiting function reduces the output frequency and suppresses the output current when the motor is overloaded. Specify the overload limitation level and the deceleration rate, considering the load status and inertia of the machine used.</p>						

Command	Contents and display						
<p data-bbox="397 254 482 289">A 32</p> <p data-bbox="381 317 475 436">Overload limit content selection</p>	<p data-bbox="516 247 1047 275">This command sets the content of overload limitation.</p> <div data-bbox="527 283 868 493"> <p data-bbox="876 325 950 367">Initial set value</p> </div> <table border="1" data-bbox="958 289 1461 420"> <thead> <tr> <th>Set value</th> <th>Condition of enabling the function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Under acceleration and at constant speed</td> </tr> <tr> <td>1</td> <td>At constant speed only</td> </tr> </tbody> </table> <p data-bbox="516 514 560 535">Note:</p> <p data-bbox="516 546 1047 567">1. The Overload Limitation function is disabled during deceleration.</p>	Set value	Condition of enabling the function	0	Under acceleration and at constant speed	1	At constant speed only
Set value	Condition of enabling the function						
0	Under acceleration and at constant speed						
1	At constant speed only						
<p data-bbox="397 590 482 625">A 33</p> <p data-bbox="381 653 475 745">LAD stop function setting</p>	<p data-bbox="516 583 1096 611">This command enables or disables the LAD Stop function.</p> <div data-bbox="527 640 868 871"> <p data-bbox="876 661 950 703">Initial set value</p> </div> <table border="1" data-bbox="1039 625 1445 745"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Enabled</td> </tr> <tr> <td>1</td> <td>Disabled</td> </tr> </tbody> </table> <div data-bbox="885 787 1437 1081"> </div> <p data-bbox="516 1039 560 1060">Note:</p> <p data-bbox="516 1071 917 1092">1. This function is enabled also during deceleration.</p>	Set value	Function	0	Enabled	1	Disabled
Set value	Function						
0	Enabled						
1	Disabled						
<p data-bbox="397 1123 482 1159">A 34</p> <p data-bbox="381 1186 475 1270">Trip/retry function selection</p>	<p data-bbox="516 1117 1274 1144">This command selects a retry operation of the inverter when the inverter trips.</p> <div data-bbox="527 1165 868 1375"> <p data-bbox="876 1228 950 1270">Initial set value</p> </div> <table border="1" data-bbox="974 1192 1453 1312"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Trips and outputs an alarm signal.</td> </tr> <tr> <td>1</td> <td>Restarts with a frequency of 0Hz.</td> </tr> </tbody> </table> <p data-bbox="516 1386 560 1407">Note:</p> <p data-bbox="516 1417 1055 1438">1. This function always restarts the inverter with a frequency of 0Hz.</p>	Set value	Function	0	Trips and outputs an alarm signal.	1	Restarts with a frequency of 0Hz.
Set value	Function						
0	Trips and outputs an alarm signal.						
1	Restarts with a frequency of 0Hz.						
<p data-bbox="397 1472 482 1507">A 35</p> <p data-bbox="381 1535 475 1627">Trip ignorance selection</p>	<p data-bbox="516 1465 1453 1522">This command enables or disables tripping by an undervoltage of the inverter when the inverter stops.</p> <div data-bbox="527 1564 868 1795"> <p data-bbox="876 1648 950 1690">Initial set value</p> </div> <table border="1" data-bbox="950 1606 1453 1732"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Disables tripping by an undervoltage.</td> </tr> <tr> <td>1</td> <td>Enables tripping by an undervoltage.</td> </tr> </tbody> </table>	Set value	Function	0	Disables tripping by an undervoltage.	1	Enables tripping by an undervoltage.
Set value	Function						
0	Disables tripping by an undervoltage.						
1	Enables tripping by an undervoltage.						

Command	Contents and display																
<p data-bbox="446 254 532 289">A 36</p> <p data-bbox="428 327 550 443">AVR setting for deceleration</p>	<p data-bbox="565 254 1365 281">This command selects a receiving voltage (AVR) of the motor during deceleration.</p> <div data-bbox="574 306 998 527"> </div> <table border="1" data-bbox="998 331 1503 464"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>AVR value equal to a value set by [E 5]</td> </tr> <tr> <td>1</td> <td>Any AVR value set by [A 37].</td> </tr> </tbody> </table> <p data-bbox="992 489 1503 695">* To increase the regenerative torque of the decelerated motor, set this command to "1" and increase the value of [A 37] or reset the [A 37] value to [0 00]. In this situation, if the Overvoltage Protection error ([E 7]) occurs, use an external regenerative braking resistor.</p>	Set value	Function	0	AVR value equal to a value set by [E 5]	1	Any AVR value set by [A 37].										
Set value	Function																
0	AVR value equal to a value set by [E 5]																
1	Any AVR value set by [A 37].																
<p data-bbox="446 722 532 758">A 37</p> <p data-bbox="428 800 550 915">Motor voltage setting for deceleration</p>	<p data-bbox="565 716 1487 772">This command sets the receiving voltage of the decelerated motor. Set the receiving voltage of the decelerated motor as shown below.</p> <div data-bbox="558 779 1503 1087"> </div> <p data-bbox="553 1115 1325 1150">When a value [0 00] is set, the AVR function is disabled during deceleration.</p>																
<p data-bbox="446 1178 532 1213">A 38</p> <p data-bbox="428 1251 550 1335">Dynamic braking usage ratio</p>	<p data-bbox="565 1171 1463 1228">This command sets the rate of use (in percentage) of the regenerative braking resistor for 100 seconds.</p> <p data-bbox="565 1234 1487 1291">When the resistor is used more than this rate, the Braking Resistor Overload Trip error [E 6] occurs.</p> <div data-bbox="574 1304 1503 1598"> <div data-bbox="976 1367 1503 1577"> <p data-bbox="976 1367 1211 1394">Content of the function</p> $T = \frac{(t1+t2+t3)}{100 \text{ seconds}} \times 100$ </div> </div> <p data-bbox="565 1608 613 1629">Notes:</p> <ol data-bbox="565 1640 1503 1755" style="list-style-type: none"> When a rate of 31.0% is specified, the braking resistor (BRD) function is disabled. When the value T exceeds a preset value, the BRD function When an external resistor is used, its resistance must not be smaller than the minimum resistance shown below. The wire between the external resistor and the inverter should be a maximum of 5 meters long. <table border="1" data-bbox="558 1766 1458 1871"> <thead> <tr> <th>Model</th> <th>004SFE3</th> <th>007SFE3</th> <th>015SFE3</th> <th>022SFE3</th> <th>015HFE3</th> <th>022HFE3</th> <th>037HFE3</th> </tr> </thead> <tbody> <tr> <td>Minimum resistance</td> <td>100 Ω</td> <td>35 Ω</td> <td>35 Ω</td> <td>35 Ω</td> <td>180 Ω</td> <td>100 Ω</td> <td>100 Ω</td> </tr> </tbody> </table>	Model	004SFE3	007SFE3	015SFE3	022SFE3	015HFE3	022HFE3	037HFE3	Minimum resistance	100 Ω	35 Ω	35 Ω	35 Ω	180 Ω	100 Ω	100 Ω
Model	004SFE3	007SFE3	015SFE3	022SFE3	015HFE3	022HFE3	037HFE3										
Minimum resistance	100 Ω	35 Ω	35 Ω	35 Ω	180 Ω	100 Ω	100 Ω										

Command	Contents and display						
<p data-bbox="412 254 500 281">A 39</p> <p data-bbox="412 302 500 329">A 40</p> <p data-bbox="396 369 516 548">Optional arrival frequency for acceleration deceleration</p>	<p data-bbox="529 247 1455 405">These commands respectively set the frequency of the output signal when the motor is accelerated A 39 and the frequency of the output signal when the motor is decelerated A 40 (at steps of 1%). These commands are valid when 1 or 2 is selected for the A 49 command (Frequency Arrival Signal Output Method).</p> <div data-bbox="529 453 967 737"> <p>Setting of the frequency of the output signal (for acceleration) A 39 ← Initial set value 1 00</p> <p>機能 FUNC</p> <p>Setting of the frequency of the output signal (for deceleration) A 40 : Same as the above A 39</p> <p>Initial set value 0 00</p> </div> <div data-bbox="987 453 1481 919"> <p>Output frequency (Hz)</p> <p>Setting value</p> <p>Setting value</p> <p>0.5 Hz</p> <p>1.5 Hz</p> <p>ON</p> <p>Time</p> <p>60 ms</p> <p>Frequency setting or more</p> <p>Arrival signal</p> <p>Output frequency (Hz)</p> <p>Setting value</p> <p>Setting value</p> <p>0.5 Hz</p> <p>1.5 Hz</p> <p>ON</p> <p>ON</p> <p>Time</p> <p>60 ms</p> <p>60 ms</p> <p>Setting frequency arrival</p> <p>Arrival signal</p> </div> <p data-bbox="529 772 1044 919">Note: 1. In case the specified acceleration arrival frequency is equal to or less than the specified deceleration arrival frequency or the difference between the specified acceleration and deceleration arrival frequencies is very small, the arrival signal may chatter when an analog frequency command is given.</p>						
<p data-bbox="412 940 500 968">A 49</p> <p data-bbox="396 1005 516 1150">Frequency arrival signal output method</p>	<p data-bbox="529 934 1422 993">This command selects a method of outputting a frequency arrival signal when the signal is selected for the output terminal.</p> <div data-bbox="529 1020 967 1230"> <p data-bbox="537 1062 625 1089">A 49</p> <p data-bbox="740 1031 862 1058">Initial set value</p> <p data-bbox="756 1062 844 1089">2</p> <p data-bbox="659 1100 730 1140">機能 FUNC</p> <p data-bbox="878 1150 950 1190">Initial set value</p> <p data-bbox="756 1188 844 1215">1</p> </div> <table border="1" data-bbox="967 1041 1471 1203"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Frequency setting or more</td> </tr> <tr> <td>2</td> <td>Setting frequency arrival (at constant speed)</td> </tr> </tbody> </table> <p data-bbox="967 1234 1481 1335">The frequency for the A49 value of "1" can be specified by the A 39 (Acceleration) or A 40 (Deceleration) command.</p> <p data-bbox="529 1350 1390 1402">Note: 1. Set the C 10 command to 0 and assign the F frequency Arrival signal to the intelligent terminal.</p>	Set value	Function	1	Frequency setting or more	2	Setting frequency arrival (at constant speed)
Set value	Function						
1	Frequency setting or more						
2	Setting frequency arrival (at constant speed)						
<p data-bbox="412 1430 500 1457">A 41</p> <p data-bbox="412 1478 500 1505">A 42</p> <p data-bbox="396 1545 516 1606">Forward rotation</p> <p data-bbox="396 1640 516 1701">Reverse rotation</p>	<p data-bbox="529 1423 1455 1463">These commands respectively specify forward rotation A 41 and reverse rotation A 42.</p> <div data-bbox="529 1482 976 1776"> <p>Specification of forward rotation A 41 ← Initial set value 1</p> <p>機能 FUNC</p> <p>Specification of backward rotation A 42 : Same as the above A 41</p> <p>Initial set value 0</p> <p>Initial set value</p> </div> <table border="1" data-bbox="1068 1556 1471 1749"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Disables rotation in the specified direction.</td> </tr> <tr> <td>1</td> <td>Enables rotation in the specified direction.</td> </tr> </tbody> </table>	Set value	Function	0	Disables rotation in the specified direction.	1	Enables rotation in the specified direction.
Set value	Function						
0	Disables rotation in the specified direction.						
1	Enables rotation in the specified direction.						
















Command	Contents and display						
<p data-bbox="397 273 495 325">A 43</p> <p data-bbox="389 336 487 430">Stop key ON/OFF selection</p>	<p data-bbox="519 241 1461 325">This command enables or disables the STOP key function of the digital or remote operator when a run command is sent to the terminal board.</p> <div data-bbox="527 325 868 546"> <p>The diagram shows a numeric display with '1' at the top and '0' at the bottom. A 'FUNC' button is shown below the display. Arrows indicate that pressing the 'FUNC' button cycles the display between '1' and '0'. The text 'Initial set value' is placed below the '0'.</p> </div> <table border="1" data-bbox="1169 336 1412 472"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Enable</td> </tr> <tr> <td>1</td> <td>Disable</td> </tr> </tbody> </table> <p data-bbox="527 598 1469 672">Note: 1. When the STOP key function is disabled, the STOP key is locked. You can neither stop the motor nor release tripping. The "Disable" setting is not valid when the run command is sent to the digital operator.</p>	Set value	Function	0	Enable	1	Disable
Set value	Function						
0	Enable						
1	Disable						
<p data-bbox="397 724 495 777">A 50</p> <p data-bbox="389 787 487 913">Analog/digital meter selection</p>	<p data-bbox="519 682 1461 745">This command changes a monitor's method of outputting to the terminals FM and CMI.</p> <div data-bbox="527 745 868 966"> <p>The diagram shows a numeric display with '1' at the top and '0' at the bottom. A 'FUNC' button is shown below the display. Arrows indicate that pressing the 'FUNC' button cycles the display between '1' and '0'. The text 'Initial set value' is placed below the '0'.</p> </div> <table border="1" data-bbox="1015 756 1388 892"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>for the digital meter</td> </tr> <tr> <td>1</td> <td>for the analog meter</td> </tr> </tbody> </table>	Set value	Function	0	for the digital meter	1	for the analog meter
Set value	Function						
0	for the digital meter						
1	for the analog meter						
<p data-bbox="397 1092 495 1144">A 51</p> <p data-bbox="389 1155 487 1291">Frequency Current monitoring selection</p>	<p data-bbox="519 1060 1461 1123">This command changes a type of monitor which outputs to the terminals FM and CMI.</p> <div data-bbox="527 1123 868 1354"> <p>The diagram shows a numeric display with '1' at the top and '0' at the bottom. A 'FUNC' button is shown below the display. Arrows indicate that pressing the 'FUNC' button cycles the display between '1' and '0'. The text 'Initial set value' is placed below the '0'.</p> </div> <table border="1" data-bbox="1023 1134 1396 1270"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Frequency monitor</td> </tr> <tr> <td>1</td> <td>Current monitor</td> </tr> </tbody> </table>	Set value	Function	0	Frequency monitor	1	Current monitor
Set value	Function						
0	Frequency monitor						
1	Current monitor						
<p data-bbox="397 1501 495 1554">A 52</p> <p data-bbox="389 1564 487 1669">Run signal output selection</p>	<p data-bbox="519 1459 1461 1564">This command selects an output mode of the RUN signal when the output terminals select the RUN signal.</p> <div data-bbox="527 1543 868 1774"> <p>The diagram shows a numeric display with '2' at the top and '1' at the bottom. A 'FUNC' button is shown below the display. Arrows indicate that pressing the 'FUNC' button cycles the display between '2' and '1'. The text 'Initial set value' is placed below the '1'.</p> </div> <table border="1" data-bbox="1023 1564 1461 1732"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Outputting during running</td> </tr> <tr> <td>2</td> <td>Outputting during running and during D.C. braking</td> </tr> </tbody> </table> <p data-bbox="527 1795 1469 1869">Note: 1. Set the C 10 command to 1 and assign the RUN signal to the intelligent terminal.</p>	Set value	Function	1	Outputting during running	2	Outputting during running and during D.C. braking
Set value	Function						
1	Outputting during running						
2	Outputting during running and during D.C. braking						

Command	Contents and display						
<p data-bbox="435 233 521 275">A 53</p> <p data-bbox="418 300 540 506">Enables/ disables change of frequency setting in the soft lock status</p>	<p data-bbox="553 226 1422 258">This command enables or disables change of a frequency setting in the Soft Lock status.</p> <div data-bbox="553 285 894 506"> </div> <table border="1" data-bbox="1036 300 1474 428"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Enables change of setting.</td> </tr> <tr> <td>1</td> <td>Disables change of setting.</td> </tr> </tbody> </table>	Set value	Function	0	Enables change of setting.	1	Disables change of setting.
Set value	Function						
0	Enables change of setting.						
1	Disables change of setting.						
<p data-bbox="435 646 521 688">A 57</p> <p data-bbox="418 714 540 793">Trip history clear selection</p>	<p data-bbox="553 646 1450 730">This command is used to clear the history of tripping. After setting "1" for this command, turn off and on power or connect and disconnect the RS (Reset) terminal. The history of tripping is cleared.</p> <div data-bbox="553 779 894 999"> </div> <table border="1" data-bbox="1019 821 1466 949"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Counts trippings.</td> </tr> <tr> <td>1</td> <td>Clears the history of tripping.</td> </tr> </tbody> </table>	Set value	Function	0	Counts trippings.	1	Clears the history of tripping.
Set value	Function						
0	Counts trippings.						
1	Clears the history of tripping.						
<p data-bbox="435 1024 521 1066">A 58</p> <p data-bbox="418 1104 540 1220">Reduced voltage start selection</p>	<p data-bbox="553 1024 1474 1146">This command enables or disables soft-start of a reduced voltage. Set "0" (Disables soft-start with reduced voltage) for this command to make the start response quicker. In this situation, an Overcurrent Protection error is apt to occur. Accordingly, when a starting torque is required (e.g. because of a heavy load, etc.), set "1" for this command.</p> <div data-bbox="553 1178 894 1377"> </div> <table border="1" data-bbox="1019 1234 1466 1423"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Disables soft-start with reduced voltage.</td> </tr> <tr> <td>1</td> <td>Enables soft-start with reduced voltage.</td> </tr> </tbody> </table> <div data-bbox="548 1482 1490 1829"> <p data-bbox="1084 1591 1490 1724"> Setting of "Disables soft-start with reduced voltage." —— Setting of "Enables soft-start with reduced voltage." </p> </div>	Set value	Function	0	Disables soft-start with reduced voltage.	1	Enables soft-start with reduced voltage.
Set value	Function						
0	Disables soft-start with reduced voltage.						
1	Enables soft-start with reduced voltage.						

Command	Contents and display
<p data-bbox="431 247 513 279">A 80</p> <p data-bbox="431 296 513 327">A 81</p> <p data-bbox="415 363 513 506">Frequency command adjust (voltage, current)</p>	<p data-bbox="545 222 1455 296">These commands adjust the relationship between external frequency commands and inverter output frequencies.</p> <p data-bbox="570 338 943 369">A 80 : Voltage command (O-L)</p> <p data-bbox="570 390 951 422">A 81 : Current command (OI-L)</p> <p data-bbox="545 443 1495 579">It is not recommended to use this function so often. If this function is used so often, the relationship between external frequency commands and inverter output frequencies is broken and the control function is disabled. Use this function only when the external commands are not related to output frequencies adequately.</p> <p data-bbox="578 590 1463 663">In case the output frequency is smaller than the external command, increase the data value. In case the output frequency is greater than the external command, decrease the data value.</p>
<p data-bbox="431 695 513 726">A 82</p> <p data-bbox="431 743 513 774">A 83</p> <p data-bbox="415 810 537 1052">Allowable under voltage time, Under voltage retry waiting time setting</p>	<p data-bbox="545 674 1487 747">These commands respectively set an allowance time of an undervoltage and a reentry wait time after power recovery.</p> <div data-bbox="553 768 1471 1062" style="text-align: center;"> </div> <p data-bbox="545 1083 1000 1325">An undervoltage event occurs when power is shut off or the voltage falls under a preset value while the inverter is in service. When the undervoltage event ends within a preset time period, the inverter can be restarted. (When the under-voltage event lasts over the preset time period, tripping occurs with the Undervoltage Protection error.)</p> <p data-bbox="1049 1073 1495 1136">A preset reentry wait time later after power is recovered, retrying starts.</p> <div data-bbox="553 1335 1365 1776" style="text-align: center;"> </div> <p data-bbox="553 1797 1252 1860">Note: 1. To use the retry function, set the A 34 command to 1 (Restart with 0Hz).</p>

Command	Contents and display						
<p data-bbox="467 254 548 289">A 84</p> <p data-bbox="448 317 540 401">Software lock selection</p>	<p data-bbox="581 247 1101 275">This command enables or disables rewriting of data.</p> <div data-bbox="589 302 927 520"> </div> <table data-bbox="1068 321 1450 447"> <thead> <tr> <th>Set value</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Enables rewriting.</td> </tr> <tr> <td>1</td> <td>Disables rewriting.</td> </tr> </tbody> </table> <p data-bbox="1463 415 1528 436">soft lock</p> <p data-bbox="581 573 630 594">Note:</p> <p data-bbox="581 604 1511 653">1. When you operate the ▲ or ▽ key on the operator in the Soft-Lock status, data on the display changes but will neither be changed nor stored.</p>	Set value	Function	0	Enables rewriting.	1	Disables rewriting.
Set value	Function						
0	Enables rewriting.						
1	Disables rewriting.						

Command	Contents and display																																										
C 0 ? C 4	<p>These commands respectively assign terminal functions to terminals 1 to 5 (a total of five terminals).</p> <p>When changing the initial functions assigned to the terminals or changing the order of the terminals, reassign the functions respectively to the terminals by these commands.</p> <p>The time to input a signal to an input intelligent terminal should be 12 msec or more.</p> <p>Assignment of commands to intelligent terminals</p>																																										
Input terminal setting 1,2,3 4 and 5	<table border="1" data-bbox="560 430 1096 651"> <thead> <tr> <th>Command</th> <th>Name of function</th> <th>Terminal symbol</th> <th>Initial value</th> </tr> </thead> <tbody> <tr> <td>C 0</td> <td>Input terminal setting 1</td> <td>1</td> <td>1 /</td> </tr> <tr> <td>C 1</td> <td>Input terminal setting 2</td> <td>2</td> <td>2</td> </tr> <tr> <td>C 2</td> <td>Input terminal setting 3</td> <td>3</td> <td>7</td> </tr> <tr> <td>C 3</td> <td>Input terminal setting 4</td> <td>4</td> <td>11</td> </tr> <tr> <td>C 4</td> <td>Input terminal setting 5</td> <td>5</td> <td>0</td> </tr> </tbody> </table> <div data-bbox="1112 441 1502 588" style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>Input intelligent terminals</p> <table border="1"> <tr><td>3</td><td>2</td><td>1</td></tr> <tr><td>H</td><td>O</td><td>OI</td></tr> </table> </div> <div style="text-align: center;"> <p>Input intelligent terminals</p> <table border="1"> <tr><td>PV24</td><td>FW</td><td>5</td><td>4</td><td>CM1</td><td>ALC</td></tr> <tr><td>L</td><td>FM</td><td>CM2</td><td>11</td><td>AL2</td><td>AL1</td></tr> </table> </div> </div>	Command	Name of function	Terminal symbol	Initial value	C 0	Input terminal setting 1	1	1 /	C 1	Input terminal setting 2	2	2	C 2	Input terminal setting 3	3	7	C 3	Input terminal setting 4	4	11	C 4	Input terminal setting 5	5	0	3	2	1	H	O	OI	PV24	FW	5	4	CM1	ALC	L	FM	CM2	11	AL2	AL1
Command	Name of function	Terminal symbol	Initial value																																								
C 0	Input terminal setting 1	1	1 /																																								
C 1	Input terminal setting 2	2	2																																								
C 2	Input terminal setting 3	3	7																																								
C 3	Input terminal setting 4	4	11																																								
C 4	Input terminal setting 5	5	0																																								
3	2	1																																									
H	O	OI																																									
PV24	FW	5	4	CM1	ALC																																						
L	FM	CM2	11	AL2	AL1																																						
	<p>Setting procedure</p> <ul style="list-style-type: none"> - Press the or key once for a desired terminal setting command. - The preset value of the terminal is displayed. Press the or key repeatedly until the desired value appears on the display (in reference with the List of Functions), then press the key. - Return to the command display status and make sure that a new terminal function has been assigned. 																																										
	<p>Setting example: Assigning the SFT (Terminal Soft Lock) function to the RS (Reset) terminal</p> <div style="text-align: center; margin-top: 10px;"> <p>Enter the value of a desired terminal by pressing the or key.</p> </div>																																										
	<p>List of Terminal Functions</p> <table border="1" data-bbox="576 1144 1153 1690"> <thead> <tr> <th>Set value</th> <th>Symbol</th> <th>Name of function</th> </tr> </thead> <tbody> <tr><td>0</td><td>REV</td><td>Backward rotation</td></tr> <tr><td>1</td><td>CF 1</td><td>Speed 1</td></tr> <tr><td>2</td><td>CF 2</td><td>Speed 2</td></tr> <tr><td>3</td><td>CF 3</td><td>Speed 3</td></tr> <tr><td>4</td><td>DB</td><td>External D.C. braking</td></tr> <tr><td>5</td><td>STN</td><td>Initial setting</td></tr> <tr><td>6</td><td>SET</td><td>Secondary setting function</td></tr> <tr><td>7</td><td>2CH</td><td>2-step acceleration/deceleration</td></tr> <tr><td>8</td><td>FRS</td><td>Free-running stop</td></tr> <tr><td>9</td><td>EXT</td><td>External tripping</td></tr> <tr><td>10</td><td>USP</td><td>USP function</td></tr> <tr><td>11</td><td>RS</td><td>Resetting</td></tr> <tr><td>12</td><td>SFT</td><td>Terminal Soft Lock</td></tr> </tbody> </table>	Set value	Symbol	Name of function	0	REV	Backward rotation	1	CF 1	Speed 1	2	CF 2	Speed 2	3	CF 3	Speed 3	4	DB	External D.C. braking	5	STN	Initial setting	6	SET	Secondary setting function	7	2CH	2-step acceleration/deceleration	8	FRS	Free-running stop	9	EXT	External tripping	10	USP	USP function	11	RS	Resetting	12	SFT	Terminal Soft Lock
Set value	Symbol	Name of function																																									
0	REV	Backward rotation																																									
1	CF 1	Speed 1																																									
2	CF 2	Speed 2																																									
3	CF 3	Speed 3																																									
4	DB	External D.C. braking																																									
5	STN	Initial setting																																									
6	SET	Secondary setting function																																									
7	2CH	2-step acceleration/deceleration																																									
8	FRS	Free-running stop																																									
9	EXT	External tripping																																									
10	USP	USP function																																									
11	RS	Resetting																																									
12	SFT	Terminal Soft Lock																																									
	<p>Notes on terminal setting</p> <ul style="list-style-type: none"> - Do not enter identical values for C 0 to C 4 commands. When moving a terminal function from a terminal to another terminal, first assign a set value of a terminal function to a terminal from which its function is moved, then assign the value of a function to be moved to the destination terminal. (Do not enter a value of the function to the destination terminal first.) 																																										

Command	Contents and display																																						
C 10 Output terminal setting	<p data-bbox="555 243 1513 310">This command assigns a terminal function to the output intelligent terminal 11. Use this command when changing the terminal function assigned to the terminal.</p> <p data-bbox="555 344 1042 373">Assignment of commands to intelligent terminals</p> <table border="1" data-bbox="561 394 1198 491"> <thead> <tr> <th>Command</th> <th>Name of function</th> <th>Terminal symbol</th> <th>Initial value</th> </tr> </thead> <tbody> <tr> <td>C10</td> <td>Output terminal setting</td> <td>11</td> <td>0</td> </tr> </tbody> </table> <div data-bbox="863 541 1250 680" style="text-align: center;"> <table border="1"> <tr> <td>3</td><td>2</td><td>1</td><td>PV24</td><td>FW</td><td>5</td><td>4</td><td>CM1</td><td>ALC</td> </tr> <tr> <td>H</td><td>O</td><td>OI</td><td>L</td><td>FM</td><td>CM2</td><td>11</td><td>AL2</td><td>AL1</td> </tr> </table> <p style="text-align: right; margin-right: 50px;">↑ Output intelligent terminal</p> </div> <p data-bbox="555 739 734 768">Setting procedure</p> <ul data-bbox="587 777 1513 987" style="list-style-type: none"> - Press the  or  key once for a desired terminal setting command. - The preset value of the terminal is displayed. Press the  or  key repeatedly until the desired value appears on the display (in reference with the List of Functions), then press the  key. - Return to the command display status and make sure that a new terminal function has been assigned. <div data-bbox="581 1037 1484 1234" style="border: 1px solid black; padding: 5px;"> <p data-bbox="581 1037 750 1066">Setting example:</p> <p data-bbox="581 1066 1448 1096">Changing the RUN (Run signal) function to the AR (Frequency Arrival signal) function</p> <p data-bbox="906 1108 1188 1138" style="text-align: center;">Enter the value of a desired terminal</p> <p data-bbox="906 1150 1166 1180" style="text-align: center;">by pressing the  or  key.</p> <div style="text-align: center;">  </div> <p data-bbox="636 1192 1432 1234">        </p> </div> <p data-bbox="555 1302 896 1331">List of Output Terminal Functions</p> <table border="1" data-bbox="561 1339 1101 1499"> <thead> <tr> <th>Set value</th> <th>Symbol</th> <th>Name of function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>AR</td> <td>Frequency Arrival signal</td> </tr> <tr> <td>1</td> <td>RUN</td> <td>Running signal</td> </tr> <tr> <td>2</td> <td>OL</td> <td>Overload Precaution signal</td> </tr> </tbody> </table>	Command	Name of function	Terminal symbol	Initial value	C10	Output terminal setting	11	0	3	2	1	PV24	FW	5	4	CM1	ALC	H	O	OI	L	FM	CM2	11	AL2	AL1	Set value	Symbol	Name of function	0	AR	Frequency Arrival signal	1	RUN	Running signal	2	OL	Overload Precaution signal
Command	Name of function	Terminal symbol	Initial value																																				
C10	Output terminal setting	11	0																																				
3	2	1	PV24	FW	5	4	CM1	ALC																															
H	O	OI	L	FM	CM2	11	AL2	AL1																															
Set value	Symbol	Name of function																																					
0	AR	Frequency Arrival signal																																					
1	RUN	Running signal																																					
2	OL	Overload Precaution signal																																					

Command

Contents and display

C 20

This command changes setting of contacts "a" and "b" for input intelligent terminals 1 to 5.

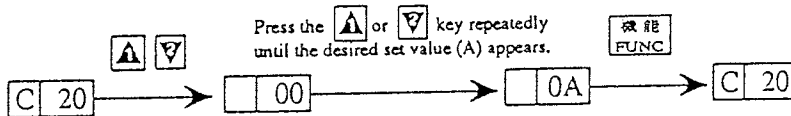
Input terminal a and b contact setting

Setting procedure

- Press the or key once while this command is displayed.
- The currently-set value is displayed. Press the or key repeatedly until a desired set value appears (in reference with the List of Contact Functions), then press the key.
- Return to the command display status and make sure that a new terminal function has been set.

Setting example:

Using input terminals 1, 3, and 5 as contact "a" and input terminals 2 and 4 as contact "b" (Set value A)



Initial set value

List of Contact Functions (for input terminals)

Set value	OF	OE	Od	OC	Ob	OA	O9	O8	O7	O6	O5	O4	O4	O2	O1	00
1	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a
2	b	b	a	a	b	b	a	a	b	b	a	a	b	b	a	a
3	b	b	b	b	a	a	a	a	b	b	b	b	a	a	a	a
4	b	b	b	b	b	b	b	b	a	a	a	a	a	a	a	a
5	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a

- a: Contact "a" specification (ON when short-connected)
 b: Contact "b" specification (ON when opened)

Set value	1F	1E	1d	1C	1b	1A	19	18	17	16	15	14	14	12	11	10
1	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a
2	b	b	a	a	b	b	a	a	b	b	a	a	b	b	a	a
3	b	b	b	b	a	a	a	a	b	b	b	b	a	a	a	a
4	b	b	b	b	b	b	b	b	a	a	a	a	a	a	a	a
5	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b

Note:

1. An input terminal to which the RS function is assigned can be contact "a" only. Even when contact "b" is assigned to the terminal, contact "a" is automatically set to the terminal.

Command	Contents and display
---------	----------------------

<p>C 21</p> <p>Output terminal a and b contact setting</p>	<p>This command changes setting of contacts "a" and "b" for the output intelligent terminal and the alarm output terminal.</p> <p>Setting procedure</p> <ul style="list-style-type: none"> - Press the or key once while this command is displayed. - The currently-set value is displayed. Press the or key repeatedly until a desired set value appears (in reference with the List of Contact Functions), then press the key. - Return to the command display status and make sure that a new terminal function has been set. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Setting example: Using both the output terminal 11 and the alarm terminal as contact "b" (Set value 0)</p> </div> <p>Initial set value</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 10px;">03</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;"> </div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">0</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">3</div> </div> <p>The leading "0" is always required.</p> <p>List of Contact Functions (for output and alarm terminals)</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>set value</th> <th>3</th> <th>2</th> <th>1</th> <th>0</th> </tr> </thead> <tbody> <tr> <td>Output terminal</td> <td>11</td> <td>b</td> <td>a</td> <td>b</td> </tr> <tr> <td>Alarm</td> <td>b</td> <td>b</td> <td>a</td> <td>a</td> </tr> </tbody> </table> <p>a: Contact "a" specification (ON when short-connected) b: Contact "b" specification (ON when opened)</p>	set value	3	2	1	0	Output terminal	11	b	a	b	Alarm	b	b	a	a
set value	3	2	1	0												
Output terminal	11	b	a	b												
Alarm	b	b	a	a												

9. PROTECTIVE FUNCTIONS

The J100 series inverters are equipped with protective functions against overcurrent, overvoltage, and undervoltage which protect the inverter. If the protective functions are engaged, the output is shut down, motor runs free and holds that condition until it is reset.

Description	Contents	Display	
Power module protection (NOTE 1)	When output of an inverter is short circuited or the motor is locked, a large current flows through the inverter and causes a fault. When the current flowing through the power module or a temperature abnormality of the main devices comes to certain level, the output is cut off.	Constant speed	E 1
		Dec.	E 2
		Acc.	E 3
		Stop	E 4
Overload protection (NOTE 1)	When a motor overload is detected by the electronic thermal function, the output of the inverter is cut off.	E 5	
Braking resistor overload	When regenerative braking resistor exceeds the usage time ratio an overvoltage caused by the stop of the BRD function is detected, and output of the inverter is cut off.	E 6	
Overvoltage protection	When the converter voltage exceeds a certain level due to regenerative energy from the motor, this protection function engages, and the output of inverter is cut off.	E 7	
EEPROM error (NOTE 2)	When the memory built in has problems due to noise or excessive temperature rise, this protective function engages, and the output of inverter is cut off.	E 8	
Undervoltage protection	A decrease of the input voltage of an inverter results in improper function of the control circuit. It also generates motor heat and causes low torque. Output is cut off when the input voltage goes down to less than 150 V to 160 V (200 V class), 300 V to 320 V (400 V class).	E 9	
CT error	When a large noise source is near the inverter or an abnormality occurs on built-in CT, the output of the inverter is cut off.	E 10	
CPU error	Malfunction or abnormality on built-in CPU and the output of the inverter is cut off.	E 11	
External trip	An abnormality signal from external equipment cuts off the output of the inverter.	E 12	
USP error	It indicates an error when power is turned on while the inverter is being run. (When USP function is selected)	E 13	
Ground fault protection	The inverter is protected by detection of ground faults between the inverter output and the motor upon power on. There may be the possibility of power module failure. This protection is provided for the inverter, not for humans.	E 14	

NOTE 1: If a trip occurs, press the reset key after an elapse of 10 seconds to restore the inverter.

NOTE 2: If an EEPROM error occurs, be sure to confirm the setting value again.





Other display

Contents	Display
It is displayed when the registered data in F3 is different from the respective data. (For example, it is displayed when confirming V/F data in F5 after <input type="text" value="05"/> was selected in F3)	<input type="text" value="- -"/>
It is displayed when the fault happens between digital operator and the inverter, or short circuit RS-PV24 for four seconds or more. Pushing down any one of the <input type="text" value="▲"/> <input type="text" value="▼"/> and <input type="text" value="機能"/> keys recovers. If not, turn off and on power again.	<input type="text" value="- - -"/>
It is displayed when power is shut off.	<input type="text" value="- - -"/>
It displays the rest time of retry waiting time after the power recovery of undervoltage when selecting the retry mode. (example) <input type="text" value="- / 0"/> shows restart after 10 seconds.	<input type="text" value="- / 0"/>

For display contents when the remote operator or copy unit is used, see page 13-1 and the subsequent pages.

10. TROUBLESHOOTING

Symptom		Probable cause	Countermeasure
The motor will not run.	The inverter outputs U, V and W are not supplying voltage.	<ul style="list-style-type: none"> Is power being supplied to terminals L1, L2, and L3(N)? If it is, the POWER lamp should be on. 	<ul style="list-style-type: none"> Check terminals L1, L2, and L3(N), U, V, and W. Turn on the power supply.
		<ul style="list-style-type: none"> Is the display E <input type="text"/> <input type="text"/> ? 	<ul style="list-style-type: none"> Press <input type="button" value="▲"/> <input type="button" value="▼"/> and check the content. Then press the reset key.
		<ul style="list-style-type: none"> Is the operation instruction RUN ON? Is terminal FW (or RV) connected to terminal PV24? . 	<ul style="list-style-type: none"> Set to ON. Connect terminal PV24 to terminal FW (or RV) on the printed-circuit board. (When the terminal mode is selected.)
		<ul style="list-style-type: none"> Has the frequency setter been turned on by pushing <input type="button" value="機能"/> <input type="button" value="FUNC"/> key to select <input type="button" value="F"/> <input type="button" value="2"/> and then <input type="button" value="▲"/> <input type="button" value="▼"/> key. Are the printed-circuit board terminals H, O and L connected to the potentiometer? . 	<ul style="list-style-type: none"> Push down keys and set. When terminal mode is selected, connect the potentiometer to H, O, and L, and then set.
		<ul style="list-style-type: none"> Has RS/FRS been left ON? 	<ul style="list-style-type: none"> Release reset.
		<ul style="list-style-type: none"> Is the mode key <input type="button" value="F"/> <input type="button" value="S"/> setting correct? 	<ul style="list-style-type: none"> Read the instruction manual again (8-10).
Inverter outputs U, V, and W are supplying voltage.	<ul style="list-style-type: none"> Has the motor seized or is the load too great? 	<ul style="list-style-type: none"> Release seizure or lighten the load. Test the motor independently. 	
The optional remote operator is used. (copy unit)	<ul style="list-style-type: none"> Are the operational settings between the remote operator and inverter unit correct? . 	<ul style="list-style-type: none"> Check the operation of the optional remote operator. (copy unit) <div style="display: flex; align-items: center; gap: 10px;"> <div style="display: flex; flex-direction: column; gap: 5px;"> <div>ON</div> <div>OFF</div> </div> <div style="display: flex; align-items: center;"> <div style="display: flex; gap: 5px;"> <div style="border: 1px solid black; width: 15px; height: 15px; margin-right: 2px;"></div> <div style="border: 1px solid black; width: 15px; height: 15px; margin-right: 2px;"></div> <div style="border: 1px solid black; width: 15px; height: 15px; margin-right: 2px;"></div> <div style="border: 1px solid black; width: 15px; height: 15px;"></div> </div> <div style="margin-left: 5px;"> <p>1: OFF</p> <p>2: ON (Same as J300)</p> </div> </div> </div>	
The direction of the motor is reversed.	<ul style="list-style-type: none"> Are the connections of output terminals U, V, and W correct? Is the phase sequence of the motor forward or reverse in respect to U, V, and W? 	<ul style="list-style-type: none"> Make the connections according to the phase sequence of the motor. (In general, forward should be in the sequence: U, V, and W.) 	
	<ul style="list-style-type: none"> Are the terminals on the printed-circuit board correct? . Is the mode key <input type="button" value="F"/> <input type="button" value="4"/> set correctly? . 	<ul style="list-style-type: none"> Terminal FW for forward, and RV for reverse. 	

Symptom		Probable cause	Countermeasure
The rpm of the motor will not increase.		<ul style="list-style-type: none"> • After checking the wiring of the frequency setter, the rpm still does not increase when the setter is turned. 	<ul style="list-style-type: none"> • Replace the frequency setter.
		<ul style="list-style-type: none"> • Are terminals 1 and PV24, terminal 2 and PV24, terminal 3 and PV24 ON? 	<ul style="list-style-type: none"> • Turn off terminal 1, 2, and 3. (When the frequency and multistage speed are fixed at a given frequency, the speed potentiometer will be invalid.)
		<ul style="list-style-type: none"> • Is the load too great? 	<ul style="list-style-type: none"> • Decrease the load. • When the load is too great, the limiting function will be activated, so that the rotational speed will be lower than the setting.
Rotation is unstable.		<ul style="list-style-type: none"> • Is the fluctuation in load too great? • Is the power supply voltage fluctuating? • Is some peculiar frequency causing the problem? 	<ul style="list-style-type: none"> • Increase the capacity. (Both of the motor and inverter.) • Decrease the fluctuation. • Change the output frequency slightly.
The rpm of the motor does not match the inverter.		<ul style="list-style-type: none"> • Is the maximum frequency setting correct? • Are the number of motor poles, the gear ratio, and pulley ratio correct? 	<ul style="list-style-type: none"> • Check the V/F pattern against the motor specifications. • Check the speed-change ratio.
The data is incorrect.	The data has not changed.	<ul style="list-style-type: none"> • Was the power turned off without pushing the  key after the data was changed with   keys. 	<ul style="list-style-type: none"> • Input the data and push the  key once.
		<ul style="list-style-type: none"> • The data is memorized upon power off. Is the time from power OFF to ON less than six seconds? 	<ul style="list-style-type: none"> • Take six seconds or more when turning power OFF and ON after changing the data.
	Data copied by the copy unit is not input.	<ul style="list-style-type: none"> • Is the power turned off for six seconds or more after the display changed from REMT to INV. 	<ul style="list-style-type: none"> • Copy again and turn the power off six seconds or more after copying.

Symptom		Probable cause	Countermeasure
The data is not changed.	Frequency setting can not be changed. Run and stop can not be done.	<ul style="list-style-type: none"> The change of the terminal mode and digital operator mode were correct? 	<ul style="list-style-type: none"> Confirm the change in [F 9] setting mode. (See page 8-12.)
	The data can not be changed.	<ul style="list-style-type: none"> Is software lock ON? Is software lock ON with software lock selection [A 4] (date: 1) Is the switch 4 mounted on the back of the remote operator (copy unit) ON? (See page 13-2) 	<ul style="list-style-type: none"> Open SFT terminal and PV24. Change the data of [A 4] to 1 to 0. Turn the switch OFF.
		Note: If software lock is ON because of use with an explosion proof motor, do not release the software locks.	

Precautions for data setting

When changing any set data by one of the following methods (① to ③), keep the equipment unoperated for 6 seconds or more after the selected method is executed. When any key is pressed, or the reset operation is performed, or the power is turned off within 6 seconds, correct data may not be set.

- ① Changing the data and pressing the **[記憶 STR]** key to store the data
- ② Operating the **[コピー COPY]** key when copying another inverter data using the copy unit (DRW) (See page 13-12.)
- ③ Returning to the initialization (the factory settings) (See page 7-7.)

11. MAINTENANCE AND INSPECTION

11.1 Maintenance and Inspection Precautions

- Be sure to turn off the power supply during maintenance and inspection.
- After the power supply has been turned off, start maintenance and inspection after the CHARGE lamp on the printed-circuit board has gone out. (Immediately after the lamp has gone out, there will be a residual voltage of about 50 V DC in the DC bus intermediate circuit.) Perform the work after the CHARGE lamp has stopped flickering.
- When removing connectors, never pull the wires. (Wires for cooling fan)

- General precautions

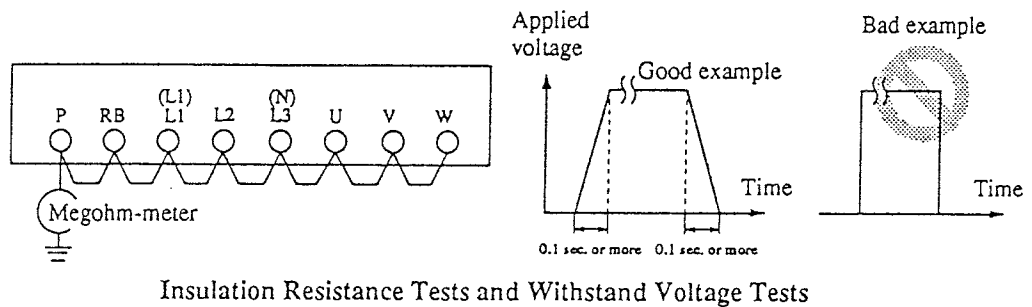
Always keep the unit clean so that dust or other foreign matter does not enter the inverter. Take special care in regard to breaking lines and connection mistakes. Firmly connect terminals and connectors. Keep electronic equipment away from moisture and oil. Dust, steel filings and other foreign matter can damage insulation, causing unexpected accidents, so take special care.

11.2 Inspection Items

- (1) Daily inspection
- (2) Periodic inspection (Approximately once a year)
- (3) Insulation resistance tests, withstand voltage tests

Conduct these tests by short-circuiting the terminals as shown below, and by following the conditions described.

- In regard to insulation resistance tests, measure the terminals below and the grounding at 500 VDC, and make sure that 5 M-ohms or greater is indicated.
- Do not perform the withstand voltage test. When it should be done, in regard to withstand voltage tests, supply the terminals below and the grounding with 1500 VAC (200 V class), 2000 VAC (400 V class) for one minute, and make sure that there are no abnormalities.
- Do not conduct insulation resistance tests and withstand voltage tests for terminals other than those indicated below. Increase or decrease the applied voltage for the withstand voltage test slowly and turn the equipment 0 V again.



NOTE 1: If the inverter is used under high temperature and heavy load conditions, its operating life will be significantly reduced.

NOTE 2: If the inverter has been stored for three years or more, apply the following conditions.

- ① Apply 80% of the rated voltage of the capacitor for 1 hour at normal temperature.
- ② Increase the voltage to 90% and apply it for 1 hour.
- ③ Apply the rated voltage for 5 hours.

NOTE 3: Precautions in handling printed-circuit boards.

When maintenance and inspection of printed-circuit boards is necessary, be sure to follow the precautions below.

- Prevent damage caused by static electricity. The MCUs and ICs on a printed-circuit board can be destroyed by static electricity, so be sure to ground work benches, soldering irons, and yourself before working on a printed-circuit board.

We recommend that the following parts be stocked to reduce down time.

Recommended Spare Parts

Part description	Symbol	Quantity		Remarks
		Used	Spare	
Main circuit P.C. board assembly	POWER PCB	1	1	Main circuit device, circuit parts, fan assembly
Cooling fan	FAN	1	1	Used for 015SFE4 and 022SFE4 015HFE4 to 037HFE4
Smoothing capacitor P.C. board assembly	CB PCB	1	1	Used for 015SFE4 to 022SFE4 015HFE4 to 037HFE4 Store this part at a temperature ranging from -20°C to 30°C
Digital operator	D. OPE	1	1	Applicable for all models
Logic P.C. board	LOGIC PCB	1	1	Same as above (Input kw data)

Daily Inspection and Periodic Inspection (1/3)

Inspection location	Inspection item	Inspection content	Inspection cycle		Inspection method	Criteria	Standard replacement period	Instruments
			Daily	Periodic				
Overall	Ambient environment	Check ambient temperature, humidity, dust, corrosive gases, oil mist, etc.	✓			Ambient temperature between -10 to +40°C; no icing. Ambient humidity 20 to 90%; no dew condensation.	—	Thermometer
	Devices overall	Check for abnormal vibrations and noise.	✓		Visual and aural inspection.			Hygrometer
	Power supply voltage	Check the input line voltage.	✓		Measure the voltage between inverter terminals R, S, and T.	No abnormalities. 220 to 240 V, 50/60 Hz 380 to 415 V, 50 Hz 400 to 460 V, 60 Hz		Tester
Main circuit	Overall	(1) Insulation resistance test (between main circuit terminals and grounding terminal) (2) Check installation for looseness. (3) Check for evidence of overheating in the various components. (4) Clean.	✓	✓		No abnormalities in (1) and (2).	—	500 V class Megohm meter
				✓	(1) Tighten.	Tightening torque (except for terminal block) • M3 (Diode module): 0.59 - 0.79 N·m • M4 (Power module): 0.98 - 1.47 N·m		
				✓	(2) Visual inspection.	• M3: 0.79 - 0.98 N·m • M4: 0.98 - 1.18 N·m.		
				✓				

Daily Inspection and Periodic Inspection (2/3)

Inspection location	Inspection item	Inspection content	Inspection cycle		Inspection method	Criteria	Standard replacement period	Instruments
			Daily	Periodic				
Main circuit	Terminal block	No damage.		✓	Visual inspection	No abnormalities.		
	Smoothing capacitor	(1) Check for leaking	✓		Visual inspection of (1) and (2).	No abnormalities in (1) and (2).	5 years (NOTE)	Capacity meter
		(2) Check for swelling	✓					
	Relays	(1) Check for stuttering noise when operating		✓	(1) Aural inspection.	(1) No abnormalities.	—	
	Resistors	(1) Check for large cracks or changes in color		✓	(1) Visual inspection	(1) No abnormalities.		Tester
	Cooling fan	(1) Check for abnormal vibrations and noise	✓		(1) Rotate manually with power off.	(1) Smooth rotation	2 - 3 years	—
(2) Check for dust			✓	(2) Increase tightening	(2) No abnormality			

Daily Inspection and Periodic Inspection (3/3)

Inspection location	Inspection item	Inspection content	Inspection cycle		Inspection method	Criteria	Standard replacement period	Instruments
			Daily	Periodic				
Control circuit	Operation check	(1) Check the balance of the output voltage of individual phases when operating the inverter independently.		✓	(1) Measure the voltage between the phases of inverter output terminals U, V, and W.	(1) Within 2% voltage difference between phases.	—	—
		(2) Conduct a sequence protection operation test, and make sure that there are no errors in the protection and display circuits.		✓	(2) Simulate operation of the inverter protection circuit.	(2) Operate without any abnormalities.	—	—
	Component check, including printed-circuit boards	Overall	(1) No abnormal odor or changes in color. (2) No significant corrosion.		✓	Visual inspection	No abnormalities	—
Display	Digital operation panel	Capacitor		✓	Visual inspection		5 years (NOTE)	—
		(1) No illegible display (2) No lack of character (3) No blown out LEDs		✓	Visual inspection	Normal operation Display can be read out.	7 years	—
				✓	Visual inspection			

NOTE: The life of capacitor will be affected by the ambient temperature. See Appendix 3 Capacitor Life Curve.

11.3 Measurement Method for I/O Voltage, Current, and Power

General measuring instruments for I/O voltage, current, and power are indicated below. The voltage to be measured is the fundamental wave effective voltage and the power to be measured is the total effective value.

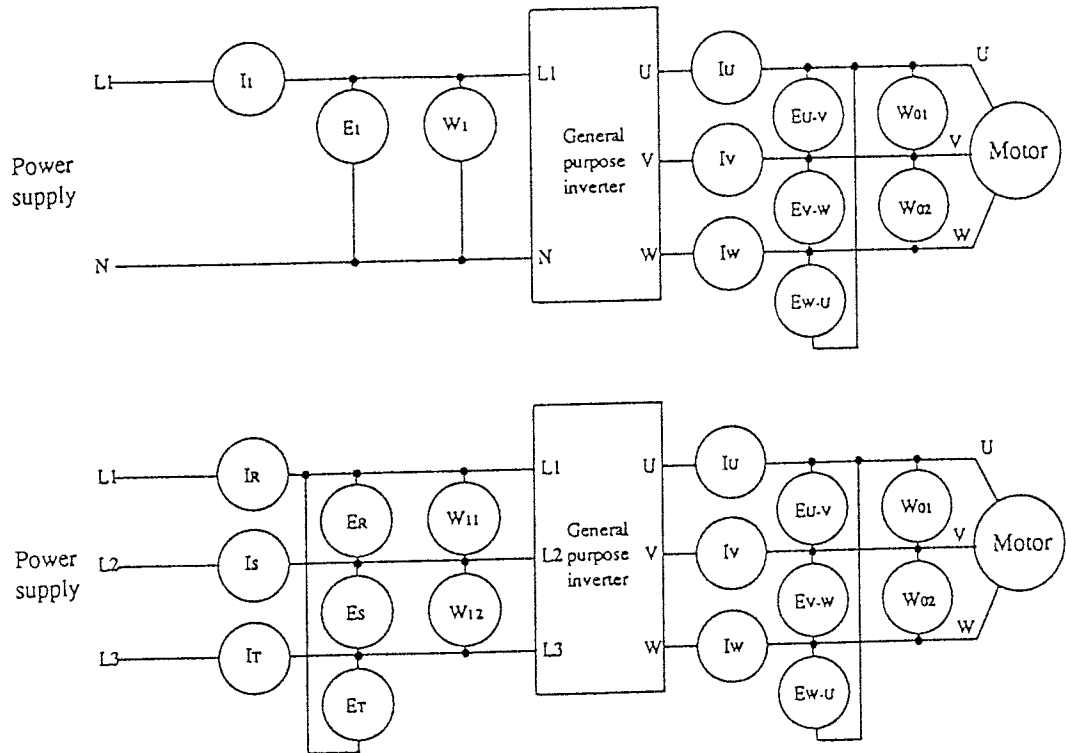








Table 3 Parts to be measured

Measurement item	Parts to be measured	Measuring instrument	Remarks	Reference value
Supply voltage E_1	Between L1 and L2, L2 and L3, L3 and L1 (ER) (ES) (ET)	 Moving-iron type voltmeter or rectifier type voltmeter	Fundamental wave effective value	Commercial supply voltage 1ø 200 V class 220-240 V, 50/60 Hz 3ø 400 V class 380-415 V 50 Hz 400-460 V 60 Hz
Supply current I_1	L1, L2, L3 (IR)(IS)(IT)	 Moving-iron type ammeter	Total effective value	
Supply power W_1	Between L1 and L2, L2 and L3 (W11)(W12)	 Electrodynamic type wattmeter	Total effective value	
Supply power factor Pf_1	Calculate the supply power factor from the measured supply voltage, E_1 , supply current I_1 and supply power W_1 . $Pf_1 = \frac{W_1}{\sqrt{3} \cdot E_1 \cdot I_1} \times 100(\%)$			
Output voltage E_0	Between U and V, V and W, W and U (EU)(EV)(EW)	 Rectifier type voltmeter	Total effective value	
Output current I_0	U, V, W (IU)(IV)(IW)	 Moving-iron type ammeter	Total effective value	
Output power W_0	Between U and V, V and W (W01)(W02)	 Electronic type wattmeter	Total effective value	
Output power factor Pf_0	Calculate the output power factor from the output voltage E, output current I, and output power W. $Pf_0 = \frac{W_0}{\sqrt{3} \cdot E_0 \cdot I_0} \times 100(\%)$			





NOTE 1: Use a meter indicating a fundamental wave effective value for voltage, and meters indicating total effective values for current and power.

NOTE 2: The inverter output waveform is a distorted wave, and low frequencies may cause errors. However, the measuring instruments and methods indicated above provide comparatively accurate values.

NOTE 3: A tester (general purpose) may not be suited often to measurement of a distorted wave.

12. STANDARD SPECIFICATIONS

Model designation		J100-004SFE4	J100-007SFE4	J100-015SFE4	J100-022SFE4	J100-015HFE4	J100-022HFE4	J100-037HFE4
Protective structure (NOTE 1)		IP20						
Maximum motor size (4P, kW)(NOTE 2)		0.4	0.75	1.5	2.2	1.5	2.2	3.7
Maximum capacity (kVA)	200 V	1.1	1.9	2.9	4.0			
	240 V	1.2	2.1	3.1	4.4			
	400 V					2.6	3.7	6.0
	460 V					2.9	4.0	6.5
Rated input AC voltage (V)		Single-phase 220 to 240 V $\pm 10\%$, 50/60 Hz $\pm 5\%$				Three-phase 380 to 415/400 to 460 V $\pm 10\%$, 50/60 Hz $\pm 5\%$		
Rated output voltage (V) (NOTE 3)		Three-phase 220 to 240 (Corresponds to input voltage.)				Three-phase 400 to 460 (Corresponds to input voltage.)		
Rated output current (A)		3	5	7.5	10.5	3.8	5.3	8.6
Output frequency range (NOTE 4)		0.5 to 360 Hz						
Frequency accuracy		$\pm 0.01\%$ of the maximum frequency Analog $\pm 0.2\%$ (25 $\pm 10^\circ\text{C}$)						
Frequency setting resolution		0.01 Hz						
Voltage/frequency characteristics		V/F any type possible, High starting torque, standard starting torque (constant torque, reduced torque)						
Overload current capacity		150%, 60 seconds						
Acceleration/deceleration time		0.1 to 999 seconds, individually set (independent settings from 0.1 to 2999.9 seconds are possible when the remote operator is used.)						
Starting torque (NOTE 5)		150% or more (3 Hz)						
Braking torque	Dynamic braking (NOTE 6) Feedback to capacitor	Approx. 20%						
	Dynamic braking using external regenerative resistor	150%			100%			
	DC injection braking	Braking is ON at the min. frequency or less. Braking can be selected by the remote operator. (Min. frequency, operative frequency, brake time and brake force can be set.)						

Model designation			J100-004SFE4	J100-007SFE4	J100-015SFE4	J100-022SFE4	J100-015HFE4	J100-022HFE4	J100-037HFE4
Input signals	Frequency setting	Digital operator	Settings with  						
		External signals	0 - 5 VDC (nominal), 0 - 10 VDC (nominal) (Input impedance 30 kΩ) 4 - 20 mA (nominal) (Input impedance 250Ω) Potentiometer: 500Ω to 2 kΩ (2 W) Variable resistor						
	Forward/reverse run, stop	Digital operator	  switch (The forward run (FW) when shipped from the factory)						
		FW command	FW/STOP						
	Intelligent input terminal	REV: Reverse run command CF1: Change of multi-stage first speed CF2: Change of multi-stage second speed CF3: Change of multi-stage third speed DB: External DB input STN: Initial setting SET: Change of second setting function 2CH: Change of 2 accel/decel speed FRS: Free run input EXT: External trip terminal USP: USP function RS: Reset SFT: Software lock input							
Intelligent output terminal	AR: Frequency arrival signal RUN: RUN signal OL: Overload previous notice signal								
Output signals	Frequency monitoring	Analog meter (0 - 10 VDC 1 mA full-scale) Selection of the digital frequency signal or analog output current monitor.							
Fault alarm contact		ON when the inverter is abnormal (1c contact)							
Other characteristics		Change of V/F patter, curve accel/decel, upper/lower limiter, output current signal, DC voltage monitoring, output frequency display, trip history monitoring (memorable up to 3 times), etc.							
Protection functions		Overcurrent, overvoltage, undervoltage, electronic thermal, temperature abnormality, ground fault overcurrent upon starting, overload limit							

Model designation		J100-004SFE4	J100-007SFE4	J100-015SFE4	J100-022SFE4	J100-015HFE4	J100-022HFE4	J100-037HFE4	
General specifications	Ambient temperature	-10 to 40°C (-10 to 50°C when cover removed.)				-10 to 40°C (with cover)		-10 to 50°C (without cover)	
	Humidity	20 to 90% RH (no dew condensation)							
	Vibrations	5.9 m/S ² (0.6G) 10 - 55 Hz							
	Operation location	1,000 meter or less altitude, indoors (no corrosive gas or dust)							
	Paint color	Gray							
Options	Remote operator, copy unit, cable for digital operator, regenerative resistor, reactor for improving power factor, noise filter for inverters, L type fitting for connection of electric tube								
Estimated mass (kg)	1.3	1.6	3.3	3.4	3.3	3.4	3.4	3.4	

* With use of a remote operator or a digital operator, the functions can be expanded. See Chapter 13.

NOTE 1: Protective structure is based upon JEM1030 (1977).

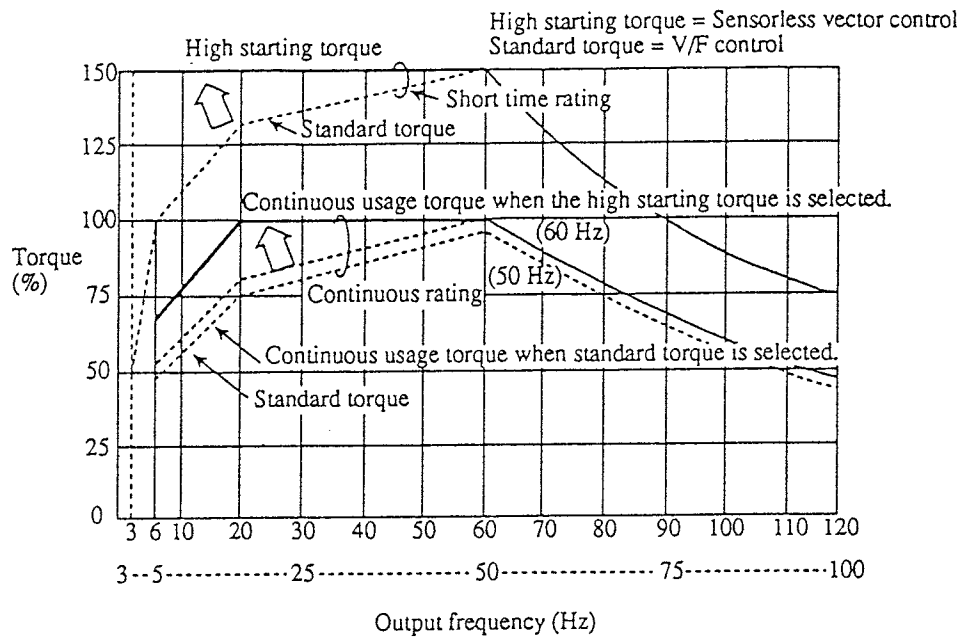
NOTE 2: The applicable motor is a Hitachi standard four-pole motor. When using another motor, make sure that the rated motor current does not exceed the rated inverter current.

NOTE 3: The output voltage will decrease if input voltage decreases.

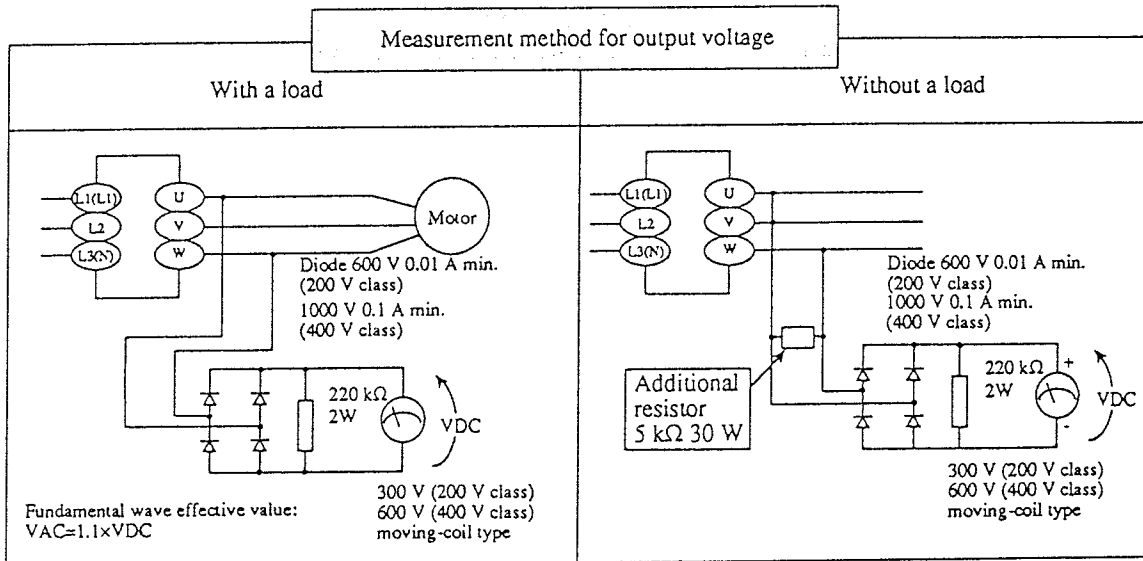
NOTE 4: Confirm with the motor manufacturer the motors maximum rpm when using a motor running at frequency higher than 50/60 Hz.

NOTE 5: When using the Hitachi standard four-pole motor running at frequency higher than 50/60 Hz.

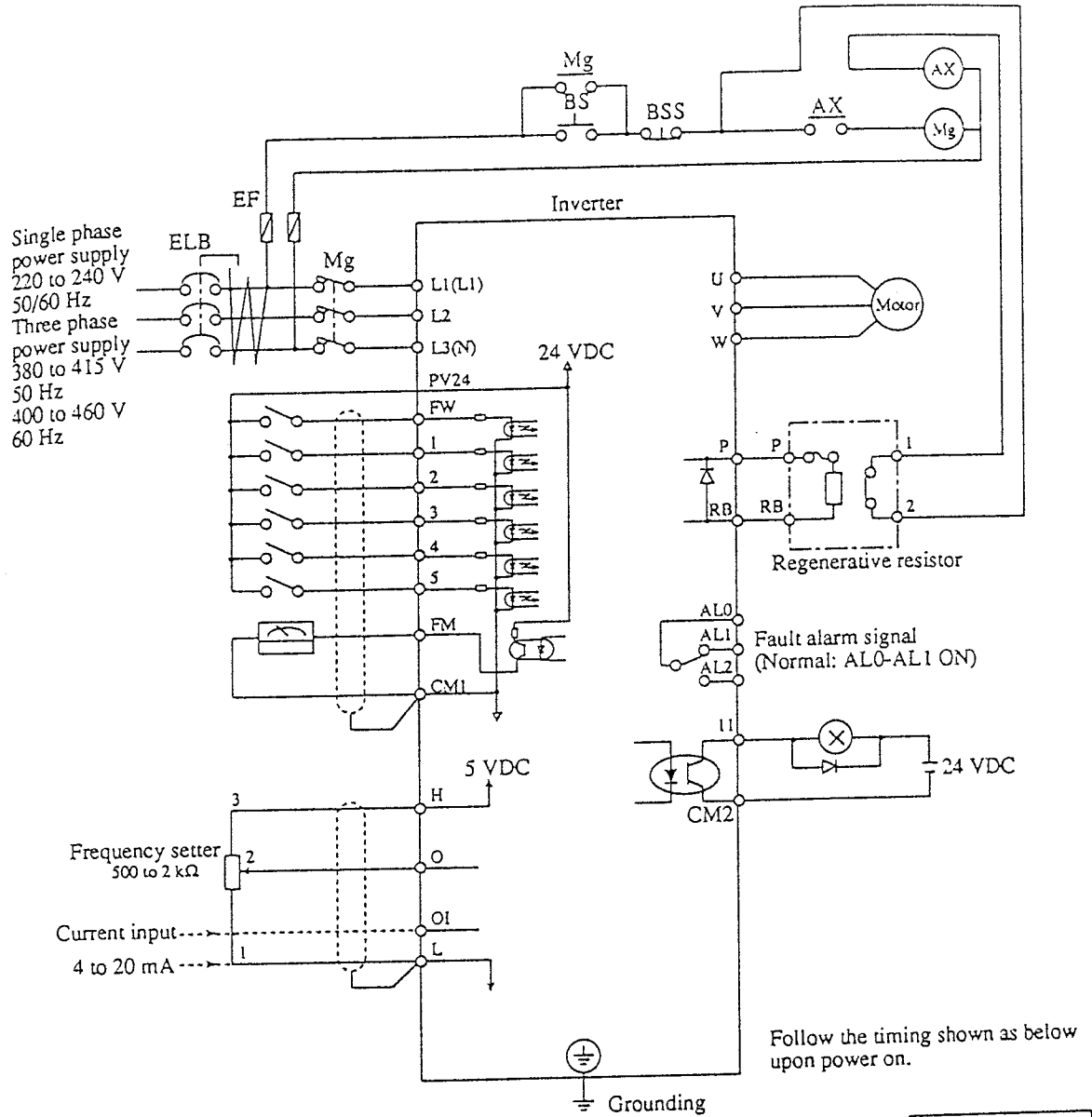
NOTE 6: Torque will be reduced when the base frequency exceeds 50/60 Hz.



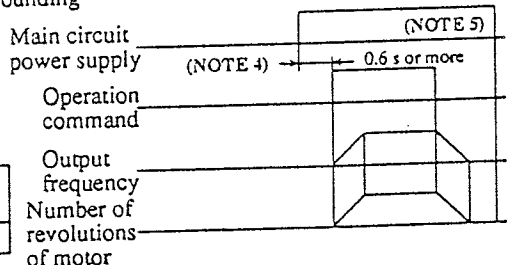
NOTE: Using the Hitachi standard four-pole motor



Terminal Connection Diagram



Follow the timing shown as below upon power on.



NOTE 1: Common terminal for each terminal is different.

Terminal name	FW, 1, 2, 3, 4, 5	FM	H, O, OI	11
Common	PV24	CM1	L	CM2

NOTE 2: The regenerative resistor has a temperature sensor. When it works, turn off power supply to the inverter or set the deceleration time longer.

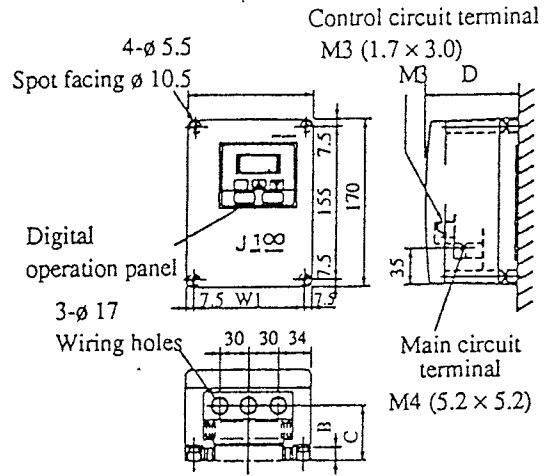
NOTE 3: When the operation command is input first and the main circuit power is turned ON, a direct start results and a trip occurs.

NOTE 4: Do not input the operation command simultaneously when the main circuit is turned on.

NOTE 5: Do not turn OFF the main circuit power during running.

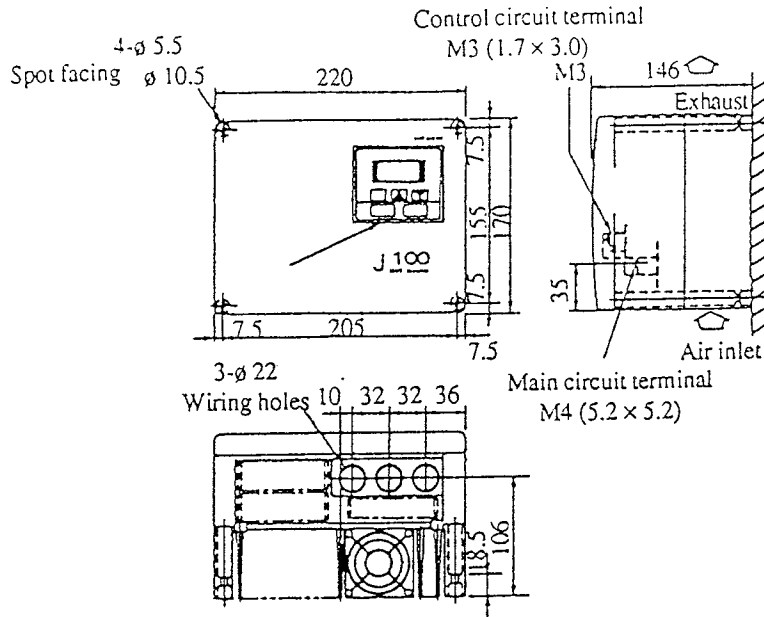
Dimension Diagram

J100-004SFE4/007SFE4

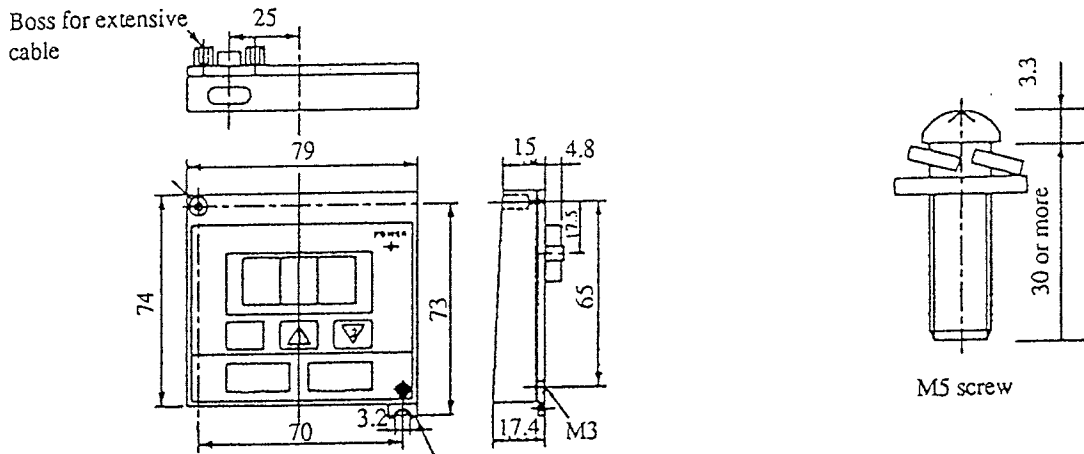


	W	W1	D	C	B
J100-004SFE4	128	113	93	55	14.5
J100-007SFE4	145	130	103	69	18.5

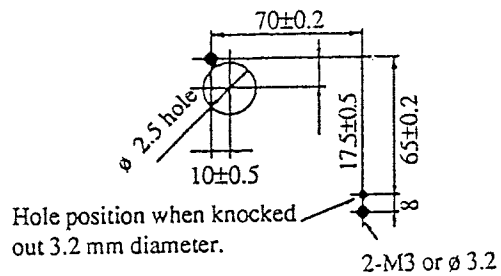
J 100-015SFE4/022SFE4/015HFE4/022HFE4/037HFE4



Digital operator



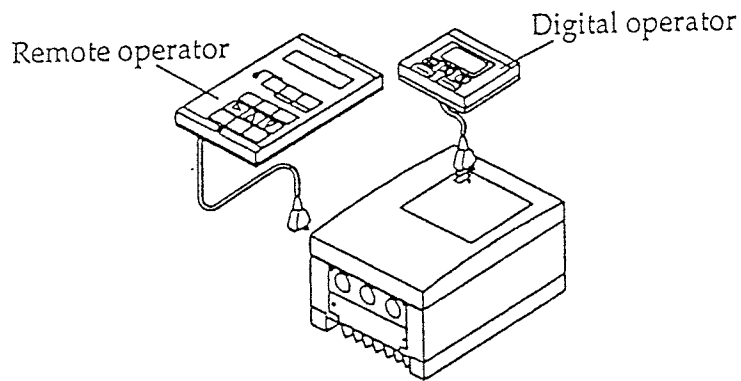
This section can be knocked out and mounted with an M3 screw.



13. FUNCTIONS WHEN USING THE OPTIONAL REMOTE OPERATOR

13.1 Connecting the remote operator

Be sure to turn the power supply off when connecting the connector.

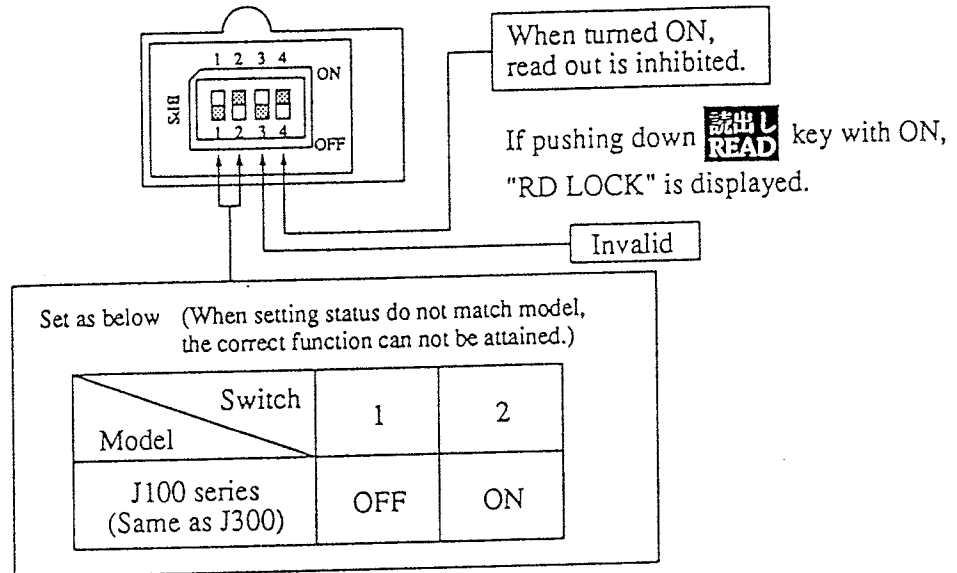


- (1) Insert the connector straight into the remote operator and inverter unit printed-circuit board.
- (2) Turn on the power supply.
- (3) Make sure that the liquid crystal display of the remote operator is lit.

When the power supply of the inverter is turned on, FS000.0..... of the monitoring mode will be displayed. If, however, any of the following is displayed when the inverter is turned off, they will be displayed when power is turned on again.

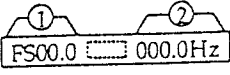


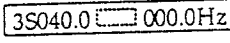
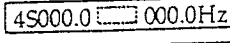
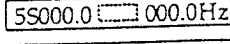
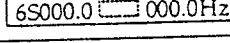
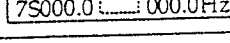
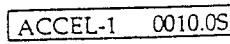
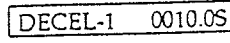
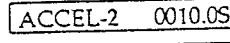
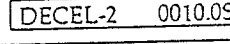
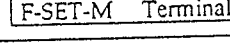
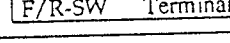
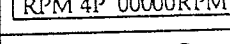
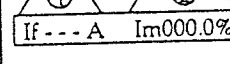

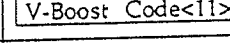
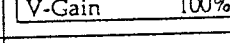
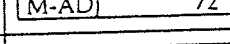
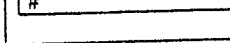
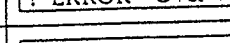

- Frequency setting, multi-speed setting or other frequency displays, motor rotational speed display, frequency conversion display, or output current display.


NOTE: See the operation manual of the remote operator for instructions.
 In addition, see the following pages for details on its various functions. Set the dip-switches mounted on the backside of the remote operator and copy unit as below.



Y : Setting can be changed during operation
 N : Setting can not be changed during operation
 - : Display only

Monitoring mode displays
 (when the remote operator is used)

Display sequence	Monitor name	Display content	Standard setting	Setting range	Setting and change are possible?	Remarks
1	Frequency setting and output frequency		000.0	000.0 to 375.0	Y	(1) displays the setting. (2) displays the output. • [] is displayed when run instruction is ON. F: Forward run R: Reverse run Displayed during multistage operation.
	Multistage-speed setting and output frequency		000.0			
			000.0			
			000.0			
	Expansion multistage speed		000			
						
						
						
2	Acceleration time setting		10.0 (15.0)	0.1 to 2999.9	Y	
3	Deceleration time setting		10.0 (15.0)	0.1 to 2999.9	Y	
4	2-stage acceleration time setting		10.0	0.1 to 2999.9	Y	
5	2-stage deceleration time setting		10.0	0.1 to 2999.9	Y	
6	Frequency setting command		Terminal	Remote Terminal	N	REMOTE: Setting from the remote operator TERMINAL: Setting from the inverter terminal
7	Operation command method		Terminal	Remote Terminal	N	
8	Revolution speed display		4	2 to 48	Y	Synchronized speed display
9	Output current display		-	1.5 to 23	Y	(1) displays the rated current of the inverter (2) displays output current
10	DC voltage display		-	-	-	
11	Manual torque boost adjustment		11	00 to 99	Y	
12	Output voltage gain adjustment		100	50 to 100	Y	
13	Analog meter adjustment		72	01 to 99	Y	
14	Failure display		-	-	-	#: Normal operation, Alarm content takes precedence over all other displays.
						
15	Trip history monitor		-	-	-	Displays three alarms of the past (Voltage and current upon alarm)

NOTE: When data is changed, be sure to press the  key. (Otherwise, the changed data may not be stored.)

The following functions can be obtained with connection of J-100-series to the remote operator (DOP) or the copy unit (DRW). However, selection is limited within the terminal functions.

Function mode

Display sequence	No.	Function name	Display content (Function mode 2)	Standard setting	Setting range	Remarks																																		
1	F-00	V/F pattern setting	CONTROL VF	VF	SLV1, SLV2 or VF	High starting torque (SLV1, SLV2) standard starting torque (VF)																																		
2	F-01	Maximum frequency adjustment	\pm Fmax. 000.0 Hz	0	0 to 15 (Hz)	Adjustment against the maximum frequency set at F-00																																		
3	F-02	Start frequency adjustment	Fmin. 000.5 Hz	0.5	0.5 to 5.0 (Hz)																																			
4	F-03	Maximum frequency limiter setting	H-LIM-F 000.0 Hz	0	0 to 375 (Hz)	Set the maximum and minimum set frequency. Both F03 and F04 are 0. : Not valid																																		
5	F-04	Minimum frequency limiter setting	L-LIM-F 000.0 Hz	0	0 to 375 (Hz)																																			
6	F-05	Multistage-speed first speed setting	Speed-1 000.0 Hz	0	0 to 375 (Hz)	Setting the multistage speed <table border="1" style="display: inline-table; vertical-align: top;"> <thead> <tr> <th colspan="3">Control circuit terminal</th> <th>Set frequency</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th></th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>OFF</td> <td></td> <td>(1S) F-05</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>(2S) F-06</td> </tr> <tr> <td>ON</td> <td>ON</td> <td></td> <td>(3S) F-07</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td rowspan="3">ON</td> <td>(4S) F-08</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>(5S) F-09</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>(6S) F-10</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td></td> <td>(7S) F-11</td> </tr> </tbody> </table>	Control circuit terminal			Set frequency	1	2	3		ON	OFF		(1S) F-05	OFF	ON	OFF	(2S) F-06	ON	ON		(3S) F-07	ON	OFF	ON	(4S) F-08	OFF	ON	(5S) F-09	ON	ON	(6S) F-10	OFF	OFF		(7S) F-11
Control circuit terminal			Set frequency																																					
1	2	3																																						
ON	OFF		(1S) F-05																																					
OFF	ON	OFF	(2S) F-06																																					
ON	ON		(3S) F-07																																					
ON	OFF	ON	(4S) F-08																																					
OFF	ON		(5S) F-09																																					
ON	ON		(6S) F-10																																					
OFF	OFF		(7S) F-11																																					
7	F-06	Multistage-speed second speed setting	Speed-2 000.0 Hz	0	0 to 375 (Hz)																																			
8	F-07	Multistage-speed third speed setting	Speed-3 000.0 Hz	0	0 to 375 (Hz)																																			
9	F-08	Multi-stage-speed fourth speed setting	Speed-4 000.0 Hz	0	0 to 375 (Hz)																																			
10	F-09	Multistage-speed fifth speed setting	Speed-5 000.0 Hz	0	0 to 375 (Hz)																																			
11	F-10	Multistage-speed sixth speed setting	Speed-6 000.0 Hz	0	0 to 375 (Hz)																																			
12	F-11	Multistage-speed seventh speed setting	Speed-7 000.0 Hz	0	0 to 375 (Hz)																																			
13	F-12	DC braking frequency adjustment	E-DCB 000.5 Hz	0.5	0.5 to 375 (Hz)	Set the starting frequency to perform DC braking.																																		
14	F-13	DC braking force adjustment	V-DCB 000	000	000 to 020	Set the DC braking force Maximum is at 020.																																		

Display sequence	No.	Function name	Display content (Function mode 2)	Standard setting	Setting range	Remarks
15	F-14	DC braking time adjustment	T-DCB 000.0 S	0 (s)	00 to 600 (S)	Set the DC braking time. If 0 is set, no DC braking.
16	F-15	Electronic thermal level adjustment	E-therm 100%	100 (%)	120 to 20 (%)	
17	F-16	Acceleration selection (Linear, S-curve)	ACCline Linear	Linear	Linear	
18	F-17	Deceleration selection (Linear, S-curve)	DECLine Linear	Linear	S-curve	
19	F-18	External frequency setting start	E-START 000.0 Hz	0 (Hz)	0 to 375 (Hz)	Set the relationship of the output frequency against the frequency setting from the terminal.
20	F-19	External frequency setting end	E-END 000.0 Hz	0 (Hz)	0 to 375 (Hz)	F-START: Minimum set frequency F-END: Maximum set frequency
21	F-20	Switch selection 1	SWITCH1 DCB OFF	See the left	DCB ON/OFF	① DC braking Yes/No
			SWITCH1 FM ANA		FM ANA/DIG	② Frequency monitor: Analog meter/Digital meter
			SWITCH1 fmax 120		Imax 120/360	③ Switch the maximum frequency 120/360 Hz
			SWITCH1 PWER ALM		PWER ALM/ZST	④ Trip/Retry function (Restart upon undervoltage) (*2)
			SWITCH1 DIOP FWD		DIOP FWD/REV	⑤ Switch the motor revolution direction with the digital operator
			SWITCH1 FWD ON		FWD ON/OFF	⑥ Direction of the motor revolution ON/OFF (Forward)
			SWITCH1 REV ON		REV ON/OFF	⑦ Direction of the motor revolution ON/OFF (Reverse)
			SWITCH1 OLMT ON		OLMT ON/OFF	⑧ Overload limiter

Display se-quence	No.	Function name	Display content (Function mode 2)	Standard setting	Setting range	Remarks
22	F-21	Switch selection 2	SWITCH2 DB LVL	See the left	DB EDG/LVL	① DC braking edge/level selection
			SWITCH2 STOP ON		STOP ON/OFF	② STOP key is effective when external run is selected.
			SWITCH2 Ethm 100		Ethm 000/100	③ Electronic Thermal relay is selected.
			SWITCH2 SLOK OFF		SLOK OFF/ON	④ Setting frequency in software lock (Invalid from the terminal)
			SWITCH2 AIN 5V		AIN 5V/10V	⑤ Setting voltage for analog input. NOTE: Even if either VOL or CUR is selected, the total output frequency of both analog input signals is displayed.
			SWITCH2 AIN TER		AIN TER/PAN	⑥ Be sure to select TER.
23	F-22	Switch selection 3	SWITCH3 SOFTFREE	See the left	SOFT LOCK/FREE	① Data is changed or not. (* 3)
			SWITCH3 FARV 2		FARV 1/2	② Selection of frequency arrival (2: Set frequency 1: Any frequency)
			SWITCH3 TRIP OFF		TRIP OFF/ON	③ Selection of neglect of undervoltage trip upon stop
			SWITCH3 DEBG OFF		DEBG OFF/ON	④ Must be OFF.
			SWITCH3 TCNT CNT		CNT/CLR	⑤ Trip history clear selection
24	F-23	Switch selection 4	SWITCH4 MON FM		MON FM/CUR	Monitoring selection FM: Frequency monitoring CUR: Current monitoring
25	F-24	Switch selection 5	SWITCH5 RUN 1	See the left	RUN 1/2	① RUN signal output selection 1: Output during operation 2: Output during operation and DC braking
			SWITCH5 AVR ON		AVR ON/OFF	② AVR value detection for deceleration ON: The AVR value is the same as the V-SET value. OFF: An optional AVR value can be detected by DEC-V
			SWITCH5 LAD ON		LAD ON/OFF	③ LAD stop function selection ON: LAD stop function (*4) OFF: No LAD stop function
			SWITCH5 RVS ON		RVS ON/OFF	④ Reduced voltage start ON/OFF

Display sequence	No.	Function name	Display content (Function mode 2)	Standard setting	Setting range	Remarks
26	F-25	Overload limiter constant setting	<u>L</u> M.CONS 150%01.0	150 (%) /1.0	50 to 150 (%) /0.3 to 31.0 (* 5)	Set the overload limit level and deceleration time
27	F-26	Allowable undervoltage time setting	<u>I</u> PS-T 001.0 S	1.0 (S)	0.3 to 3.0 (S)	
28	F-27	Standby time after undervoltage setting	<u>I</u> PS-R-T 0010.0 S	10.0 (S)	0.3 to 100.0 (S)	
29	F-28	Dynamic braking usage ratio setting	<u>BRD</u> -%ED 05.0%	5.0 (%)	0.1 to 31.0 (%) (* 6)	Set the allowable usage ratio of regenerative resistor to over 100 seconds
30	F-29	Frequency arrival setting	<u>SPD</u> -ARV ACC100%	ACC 100%	ACC or DEC 0 to 100 %	Rate to the maximum frequency which is set in Item F-00 or F-01
31	F-30	Carrier frequency setting	<u>CARRIER</u> 16 kHz	16	5, 8, 12, 16 (kHz)	
32	F-31	Input voltage setting	<u>V</u> -SET 220V	220 (380)	200, 220, 230, 240 V [380, 400, 415, 440, 460, 480]	Set the motor voltage (* 7)
33	F-32	AVR voltage selection for deceleration	<u>DEC</u> -V 220V	220 (380)	200, 220, 230, 240, 250, 270, 000 V [380, 400, 415, 440, 460, 480, 500, 540, 000]	This is effective when AVR OFF is selected in Item of Switch selection 5. *When AVR OFF is selected, the cursor will not move. (* 7)
34	F-33	Jump frequency 1	<u>JUMP</u> -F1 000.0Hz	0	0 to 375 (Hz)	Up to 3 locations can be set. 0 means invalid.
35	F-34	Jump frequency 2	<u>JUMP</u> -F2 000.0Hz	0	0 to 375 (Hz)	
36	F-35	Jump frequency 3	<u>JUMP</u> -F3 000.0Hz	0	0 to 375 (Hz)	
37	F-36	Jump frequency width	<u>JMP</u> -WID 0.5Hz	0.5	0 to 9.9 (Hz)	
38	F-37	Overload previous notice level	<u>QL</u> alarm 150%	150	50 to 150 (%)	ON level of overload previous notice signal
39	F-38	Input terminal 1	<u>I</u> N-TM 1 CF 1	Same as left	REV/CF1/CF2 CF3/DB/STN SET/2CH/FRS EXT/USP/RS SFT	REV: Reverse running command CF1: 1st multispeed switching CF2: 2nd multispeed switching CF3: 3rd multispeed switching DB: External DB input STN: Initialization SET: 2nd setting function switching 2CH: 2-stage acceleration and deceleration switching
		Input terminal 2	<u>I</u> N-TM 2 CF 2			
		Input terminal 3	<u>I</u> N-TM 3 2CH			
		Input terminal 4	<u>I</u> N-TM 4 RS			
		Input terminal 5	<u>I</u> N-TM 5 REV			
		Input terminal 1 NO/NC setting	<u>I</u> N-TM O/C-1 NO	NO	NO/NC	FRS: Free run input EXT: External trip terminal USP: USP function RS: Reset input SFT: Software lock input NO: a contact NC: b contact When the corresponding terminal is the [RS] terminal, only the NO operation is performed. (Even when NC is set, * display remains but the setting is returned to NO.)
		Input terminal 2 NO/NC setting	<u>I</u> N-TM O/C-2 NO			
		Input terminal 3 NO/NC setting	<u>I</u> N-TM O/C-3 NO			
		Input terminal 4 NO/NC setting	<u>I</u> N-TM O/C-4 NO			
		Input terminal 5 NO/NC setting	<u>I</u> N-TM O/C-5 NO			

Display sequence	No.	Function name	Display content (Function mode 2)	Standard setting	Setting range	Remarks
40	F-39 Intelligent terminal output terminal setting	Output terminal 11	<u>OUT-TM</u> 1 AR	AR	AR/RUN/OL	AR: Speed arrival signal RUN: During on-line signal OL: Overload previous notice signal NO: a contact NC: b contact
		Output terminal 11 NO/NC setting	<u>OUT-TM</u> O/C-1 NC	NC	NO/NC	
		Alarm output NO/NC setting	<u>OUT-TM</u> O/C-A NC	NC		
41	F-40	External frequency command input sampling count setting	<u>SAMP-F</u> 08	08	1 to 8 (times)	When the frequency is low, the external frequency command may malfunction due to noise.

- (*1) In the case of standard setting, up to 135 Hz (120 Hz + 15 Hz) can be set. When (3) the maximum frequency to be switched by Switch Selection 1 in the standard mode F-20 is set to 360 Hz, up to 375 Hz (360 Hz + 15 Hz) can be set.
When a high frequency is to be selected, please sufficiently examine the mechanical strength of the motor and load. Particularly the general purpose motor is designed at 50 or 60 Hz. Therefore, when the running frequency is more than it, contact the manufacturer of motor beforehand.
- (*2) In the case of retry, the starting frequency is 0.
- (*3) Even in the enabled state, when the software lock terminal [SFT] is on, the equipment is in the disabled state.
- (*4) When the current becomes more than 150% of the rating of load current, the acceleration and deceleration will be halted.
- (*5) When the deceleration time is set to 31.0 by F-25 LM CONS, this function will not be performed.
- (*6) When F-28 BRD-%ED is set to 31%, the damping circuit will not be operated.
- (*7) When F-24 switch 5 AVR is ON, the value of F-32 DEC-V is forcibly set to the value of F-31 V-SET.

Protective function displayed when using the remote operator

Description	Contents	Display	
Power module protection	When output of an inverter is short circuited or the motor is locked, a large current flows through the inverter and causes a fault. When the current flowing through the power module or a temperature abnormality of the main devices comes to certain level, the output is cut off.	Constant speed	PM. Drive
		Dec.	PM. Decel
		Acc.	PM. Accel
		Stop	PM. ERR
Over-current protection (NOTE1)	The output current of the inverter is detected. When it exceeds the specified value, the output is turned off.	Constant speed	OC. Drive
		Dec.	OC. Decel
		Acc.	OC. Accel
		Stop	OC. ERR
Overload protection (NOTE1)	When a motor overload is detected the inverter's built in thermostat detects it and the output of the inverter is cut off.	Over. L	
Braking resistor overload	When regenerative braking resistor exceeds the usage time ratio, an overvoltage caused by the stop of the BRD function is detected, and output of the inverter is cut off.	OL. BRD	
Over-voltage protection	When the converter voltage exceeds a certain level due to regenerative energy from the motor, this protection function engages, and the output of inverter is cut off.	Over. V	
	This is an error display when the voltage supplied to the inverter exceeds the specified value.	OV. SRC	
EEPROM error	When the memory built in has problem by noise and excessive temperature rise, protective function works and output of inverter is cut off.	EEPROM	
Under-voltage protection	A decrease of the input voltage of an inverter results in improper function of the control circuit. It also generates motor heat and causes low torque. Output is cut off when the input voltage goes down to less than a 150 to 160V (200V class), 300 to 320V (400V class).	Under. V	
CT error	When a large noise source is near the inverter or an abnormality occurs on built-in CT, the output of the inverter is cut off.	CT	
CPU error	Malfunction or abnormality on built in CPU and the output of the inverter is cuts off.	CPU	
External trip	An abnormality signal from external equipment cuts off the output of the inverter. (When the external trip function is selected)	EXTERNAL	
USP error	It indicates an error when power is turned on while the inverter is being run. (When USP function is selected)	USP	
Ground fault protection	The inverter is protected by detection of ground fault between the inverter output and the motor upon power on. There may be the possibility of power module failure.	GND Flt	

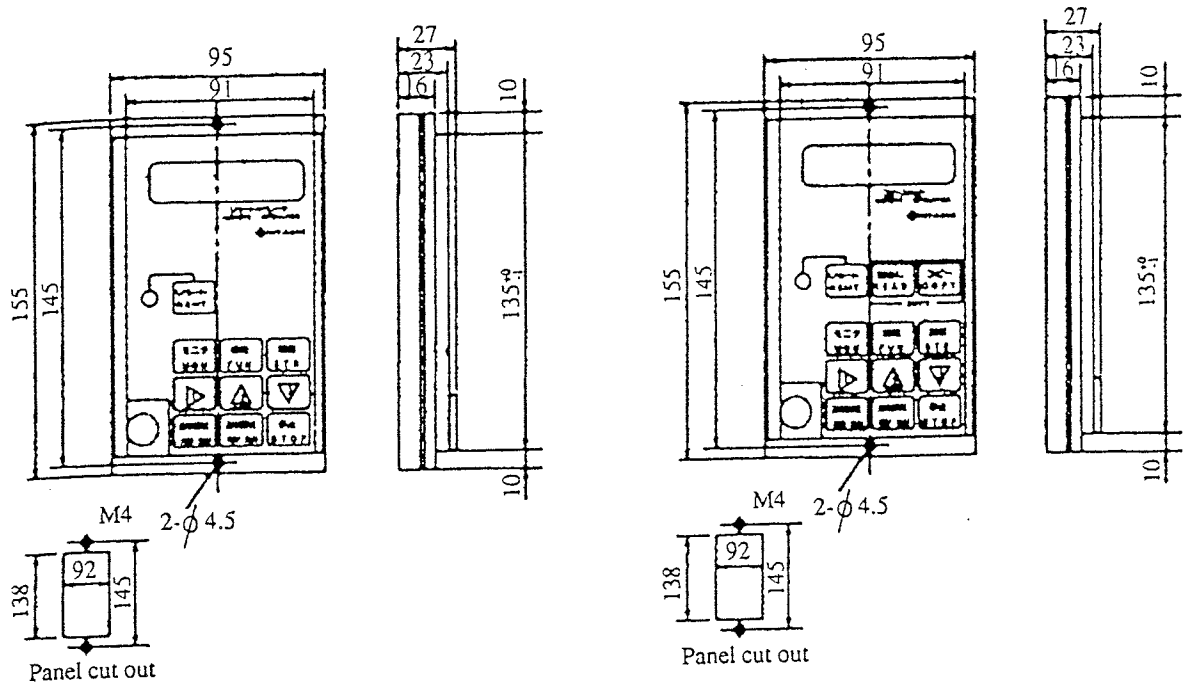
NOTE1: If a trip occurs, press the reset key after an elapse of 10 seconds to restore the inverter.

Remote operator/Copy unit

Dimension (unit:mm)

Remote operator (DOP-0A)

Copy unit (DRW-0A)



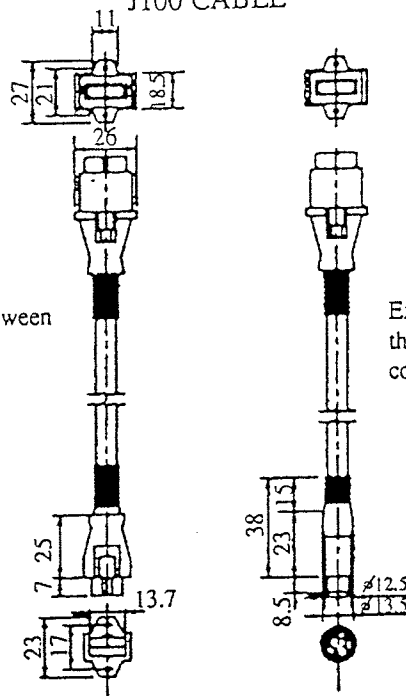
J100 CABLE

Extension cable for connector between the J100 and the remote operator

Extension cable for connector between the J100 and the remote operator or the copy unit

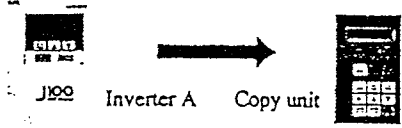
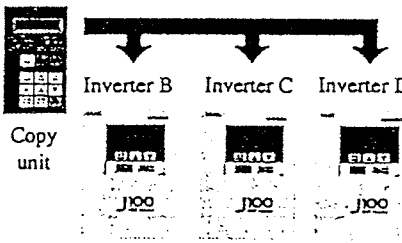
(ICJ-1, ICJ-3)


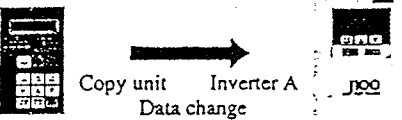
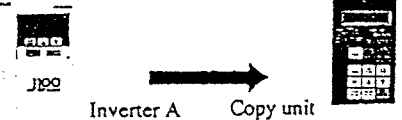
(ICA-1J, ICA-3J)




NOTE 1: Shape of the cable for the J100 series is different from that of the VWS3A and VWA. Only the cable can be provided when changing the cable.

Copy unit function

Operation example (Procedure to transfer the data of inverter A to B, C, and D inverters)			
Sequence	Operation	Key	Operation result
1	Set data is read out from the inverter A (It is stored into the memory).	読出し READ	
2	Turn off the power supply to inverter A and remove the cable.	—	—
3	Connect the cable to inverter B and turn on the power.	—	—
4	Copy data stored in the copy unit is written to inverter B.	コピー COPY (*1)	
5	Cut off the power supply to inverter B. (*1)	—	
6	Perform the above processes from 3 to 5 sequentially for inverters C and D. That is, the same process as at for inverter B.	—	

Operation example (Process to change and transfer to inverters B, C and D)			
1	Connect the cable and press the remote key. Change the data of the inverter with copy unit.	モニタ MON 機能 FUN 記憶 STR 	
2 to 6	Read out the data from inverter A (It is stored into the memory area of the copy unit). The following procedures are the same those of the operation 1. Change the data setting first.	読出し READ	

- *1 When pressing any key or resetting the unit after the  key is pressed, be sure to wait for at least six seconds. (When any key is pressed, the unit is reset, or the power is turned off within six seconds, the data may not be copied.)

NOTE 1: The following settings cannot be copied by the copy function. Note that the current set data is saved as it is.

- Monitor mode
 - Analog meter adjustment
 - Trip history monitor
(Counts of latest three alarms)

- Function mode
 - F-23 Switch selection 4
 - F-24 Switch selection 5
 - F-32 AVR voltage selection for deceleration
 - F-33 Jump frequency 1
 - F-34 Jump frequency 2
 - F-35 Jump frequency 3
 - F-36 Jump frequency width
 - F-37 Overload previous notice level
 - F-38 Intelligent input terminal setting
 - F-39 Intelligent output terminal setting
 - F-40 Setting of external frequency command sampling times

NOTE 2: Do not copy the setting from the 200 V class to the 400 V class or from the 400 V class to the 200 V class. (When the setting is copied to a different voltage class by mistake, reset F-31 V-SET (motor voltage setting).)

NOTE 3: Do not copy the setting from the Japanese version to the European or American version or from the European or American version to the Japanese version.

NOTE 4: When the V/f control setting data is copied from a different capacity (for example, copied from J100-004SFE3 to J100-022SFE3), change the kW setting of F-00 CONTROL to the kW value of the applied motor.

14. SERVICE

When inquiring about inverter trouble, please be ready to inform the shop where you purchased your unit or the nearest service station the following.

- (1) Type
- (2) Purchased date
- (3) Manufacturing No. (MFG. No.)
- (4) Malfunction symptoms

If the contents are unclear due to an old nameplate, give only the clear items. To reduce the non-operation time, it is recommended to stock a spare inverter.

Warranty

The warranty period under normal installation and handling conditions shall be one (1) year after the date of delivery. The warranty shall cover the repair of only the inverter to be delivered.

1. Service in the following cases, even within the warranty period, shall be charged to the purchaser.
 - (a) Malfunction or damage caused by misoperation or remodelling or improper repair
 - (b) Malfunction or damage caused by a drop after purchase and transportation
 - (c) Malfunction or damage caused by fire, earthquake, flood, thunderbolt, or other natural calamities, pollution or abnormal voltage.
2. When service is required for the product at your worksite, all expenses associated with field repair shall be charged to the purchaser.
3. Always keep it handy. Please do not loose it. We are sorry but this manual can not re-issued.

Appendix 1 J100 series data setting values

J100 series inverters provide many functions and their parameters can be set by the user. It is recommended to record the parameters that have been set by the user, in order to speed the investigation and repair in the event of a failure.

Inverter model

J100

MFG. No.

This information is written on the nameplate located on the side cover of the inverter.

For the digital operator

Display sequence	Function name	Standard setting	Set value
F1	Setting frequency and output frequency	—	
F2	Setting output frequency	0.0	
F4	Direction of the motor revolution	F	
F5	Setting V/F pattern	08 (00)	
F6	Setting acceleration time	10.0 (15.0)	
F7	Setting deceleration time	10.0 (15.0)	
F8	Setting torque boost	11	
F9	Switch over of the digital operator and terminal mode	03	
F10	Analog meter adjustment	72	
F11	Setting input voltage	220 (380)	
F14	Setting extension function	0	

NOTE: The value in the parentheses is for 400 V.

(2) Extension Function Mode

Command display	Function name	Standard setting	Remarks
A 0	Control method	0	
A 1	Motor capacity setting	NOTE 1	
A 2	Motor poles setting	4	
A 3	Maximum frequency adjustment	0.0	
A 4	Start frequency adjustment	0.5	
A 5	Upper frequency limiter setting	0	
A 6	Lower frequency limiter setting	0	
A 7	Jump frequency setting 1	0	
A 8	Jump frequency setting 2	0	
A 9	Jump frequency setting 3	0	
A10	Carrier frequency setting	16	
A11	Frequency command sampling setting	8	
A12	Multispeed first speed setting	0	
A13	Multispeed second speed setting	0	
A14	Multispeed third speed setting	0	
A15	Multispeed forth speed setting	0	
A16	Multispeed fifth speed setting	0	
A17	Multispeed sixth speed setting	0	
A18	2-stage acceleration time setting	10.0	
A19	2-stage deceleration time setting	10.0	
A20	DC braking frequency setting	0.5	
A21	DC braking force adjustment	0	
A22	DC braking time adjustment	0	
A23	Electronic thermal level adjustment	100	
A24	Electronic thermal characteristic selection	1	
A26	External frequency setting start	0	
A27	External frequency setting end	0	
A28	Acceleration selection (Linear, S-curve)	0	
A29	Deceleration selection (Linear, S-curve)	0	
A30	Overload previous notice signal setting	150	
A31	Overload limit level setting	150	
A32	Overload limit content selection	0	
A33	LAD stop function setting	0	
A34	Trip/retry function selection	0	
A35	Trip ignorance selection	0	
A36	AVR voltage setting for deceleration	0	
A37	Motor voltage setting for deceleration	220 (380)	
A38	Dynamic braking usage ratio	5	
A39	Optional arrival frequency for acceleration	100	

Command display	Function name	Standard setting	Remarks
A 40	Optional arrival frequency for deceleration	100	
A41	Forward rotation	1	
A42	Reverse rotation	1	
A43	Stop key ON/OFF selection	0	
A48	Analog input selection	0	
A49	Frequency arrival signal output method	2	
A50	Analog/digital meter selection	1	
A51	Frequency/current monitoring selection	0	
A52	RUN signal output selection	1	
A53	Enable/disable of frequency setting for software lock	0	
A55	DC braking ON/OFF selection	0	
A56	DC braking edge/level selection	1	
A57	Trip history clear selection	0	
A58	Reduced voltage start selection	1	
A62	Base frequency setting	50	
A63	Maximum frequency setting	50	
A64	Maximum frequency switching	0	
A68	Jump frequency range setting	0.5	
A71	Multispeed seventh speed setting	0	
A80	Frequency command adjust. (voltage)	NOTE 2	
A81	Frequency command adjust.(current)	NOTE 2	
A82	Allowable undervoltage time setting	1.0	
A83	Undervoltage retry waiting time	10.0	
A84	Software lock selection	0	
A85	Deceleration rate setting for overload limit	1.0	
C0	Input terminal setting 1	1	
C1	Input terminal setting 2	2	
C2	Input terminal setting 3	7	
C3	Input terminal setting 4	11	
C4	Input terminal setting 5	0	
C10	Output terminal setting	0	
C20	Input terminal a and b contact setting	00	
C21	Output terminal a and b contact setting	03	

NOTE 1: The most applicable motor capacity of the inverter is set.

NOTE 2: The initial setting of each inverter is adjusted when shipped from the factory.

NOTE 3: The value in the parentheses is for 400 V standard setting.

Appendix 2 J100 series data setting values (For the remote operator)

J100 series inverters provide many functions and their parameters can be set by the user. It is recommended to record the parameters that have been set by the user, in order to speed the investigation and repair in the event of a failure.

Inverter model J100

MFG. No.

} This information is written on the nameplate located on the side cover of the inverter.

Monitor mode

NO.	Monitor name	Display content	Set value
1	Frequency setting and output frequency	FS000.0 000.0Hz	
	Multistage speed setting and output frequency	1S005.0 000.0Hz	
		2S020.0 000.0Hz	
		3S040.0 000.0Hz	
		4S000.0 000.0Hz	
	Expansion multistage speed	5S000.0 000.0Hz	
		6S000.0 000.0Hz	
		7S000.0 000.0Hz	
2	Acceleration time setting	ACCEL-1 010.0S	
3	Deceleration time setting	DECEL-1 010.0S	
4	2-stage acceleration time setting	ACCEL-2 010.0S	
5	2-stage deceleration time setting	DECEL-2 010.0S	
6	Frequency setting command	F-SET-M Terminal	
7	Operation command method	F/R-SW Terminal	
8	Revolution speed display	RPM 4P 00000RPM	———
9	Output current display	If - - - A Im000.0%	———
10	DC current display	PN-V 000V	———
11	Output voltage gain adjustment	V-Boost Code <11>	
12	Output voltage gain adjustment	V-Gain 100%	
13	Analog meter adjustment	M-ADJ 72	
14	Trip display	#	———
		?ERROR Over V.	In case of over voltage tripping
15	Trip history	?ERR COUNT 000	———

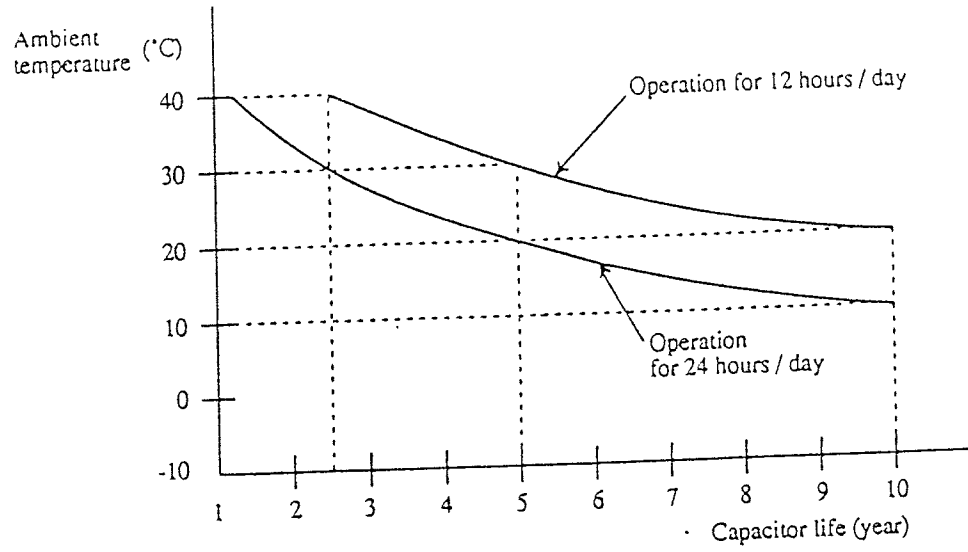
NOTE: The value of 400 V class is 15.0s.

Function mode

Display sequence	Function name	Standard setting	Set value
F-00	V/F pattern setting	V/F-VC 050-050	
E-01	Maximum frequency adjustment	0	
E-02	Start frequency adjustment	0.5	
E-03	Maximum frequency limiter setting	0	
E-04	Minimum frequency limiter setting	0	
E-05	Multistage-speed first speed setting	0 (Hz)	
E-06	Multistage-speed second speed setting	0 (Hz)	
E-07	Multistage-speed third speed setting	0 (Hz)	
E-08	Multistage-speed fourth speed setting	0 (Hz)	
E-09	Multistage-speed fifth speed setting	0 (Hz)	
E-10	Multistage-speed sixth speed setting	0 (Hz)	
E-11	Multistage-speed seventh speed setting	0 (Hz)	
E-12	DC braking frequency adjustment	0.5 (Hz)	
E-13	DC braking force adjustment	0	
E-14	DC braking time adjustment	0 (S)	
E-15	Electronic thermal level adjustment	100 (%)	
E-16	Acceleration selection(Linear, Curve)	Linear	
E-17	Deceleration selection(Linear, Curve)	Linear	
F-18	External frequency setting start	0 (Hz)	
F-19	External frequency setting end	0 (Hz)	
F-20	Switch selection 1	Set DC braking	DCB OFF
		Switch of frequency monitor	FM ANA
		Switch of the maximum frequency	fmax 120
		Switch of trip and retry	PWER ALM
		Switch of the motor direction when using the digital operator	DIOP FWD
		Direction of the motor (Forward)	FWD ON
		Direction of the motor (Reverse)	REV ON
F-21	Switch selection 2	Overload limiter	OLMT ON
		DC braking edge/level selection	DB LVL
		[Stop]key is effective when external run is selected	STOP ON
		Selection of electronic thermal characteristic	Ethm 100
		Selection of software lock	SLOK OFF
		Setting voltage for analog input	AIN 5V
F-22	Switch selection 3	Selection of analog input	AIN TER
		Selection of data change	SOFTFREE
		Selection of frequency arrival	FARV 2
		Selection of neglect of trip	TRIP OFF
		Debug mode display	DEBG OFF
F-23	Switch selection 4	Trip history clear	TCNT CNT
		Monitoring selection	MON FM
F-24	Switch selection 5	RUN signal output selection	RUN 1
		AVR value selection for deceleration	AVR ON
		LAD stop function selection	LAD ON
		Selection of reduced voltage start	RVS ON
F-25	Overload limiter constant	150% 1.0	
F-26	Allowable undervoltage time	001.0S	
F-27	Stand by time after undervoltage setting	0010.0S	
F-28	Dynamic braking usage ratio setting	5.0	
F-29	Frequency arrival setting	ACC, DEC 100%	ACC DEC
F-30	Carrier frequency setting	16 kHz	
F-31	Input voltage setting	220 V (380V)	
F-32	AVR voltage setting for deceleration	220 V (380V)	

Display sequence	Function name	Standard setting	Set value
E-33	Jump frequency 1	0	
E-34	Jump frequency 2	0	
E-35	Jump frequency 3	0	
E-36	Jump frequency width	0.5	
E-37	Overload previous notice level	150%	
F-38	Intelligent terminal input terminal setting	Input terminal 1	CF1
		Input terminal 2	CF2
		Input terminal 3	2CH
		Input terminal 4	RS
		Input terminal 5	REV
		Input terminal 1 NO/NC setting	NO
		Input terminal 2 NO/NC setting	NO
		Input terminal 3 NO/NC setting	NO
		Input terminal 4 NO/NC setting	NO
		Input terminal 5 NO/NC setting	NO
F-39	Intelligent terminal output terminal setting	Output terminal 11	AR
		Output terminal 11 NO/NC setting	NC
		Alarm output NO/NC setting	NC
F-40	External frequency command input sampling count setting	08	

Appendix 3 Capacitor Life Curve



* When the inverter is stored in the panel, the ambient temperature is the temperature in the panel.



