HITACHI INVERTER

J100 E5 SERIES

INSTRUCTION MANUAL

Single phase input 200V class Three phase input 400V class



Wolweverstraat 22 Postbus 4070 2984 CD Ridderkerk 2980 GB Ridderkerk Tel.: 0180 - 46 60 04 Fax: 0180 - 44 23 55

After reading this manual, keep it at hand for future reference.

Hitachi, Ltd.

Tokyo Japan

NB526X

SAFETY

For the Best Results with J100 Series inverter, read this manual and all of the warning sign attached to the inverter carefully before installing and operating it, and follow the instructions exactly. Keep this manual handy for your quick reference.

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 symbol means hazardous high voltage. It used to call your attention to items or operations that could be dangerous to your and other persons operating this equipment.

Read these message and follow these instructions carefully.



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

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage of product.

The matters described under [\(\triangle \) CAUTION may, if not avoided, lead to serious results depending on the situation. Important matters are described in CAUTION (as well as WARNING), so be sure to observe them.

NOTE

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

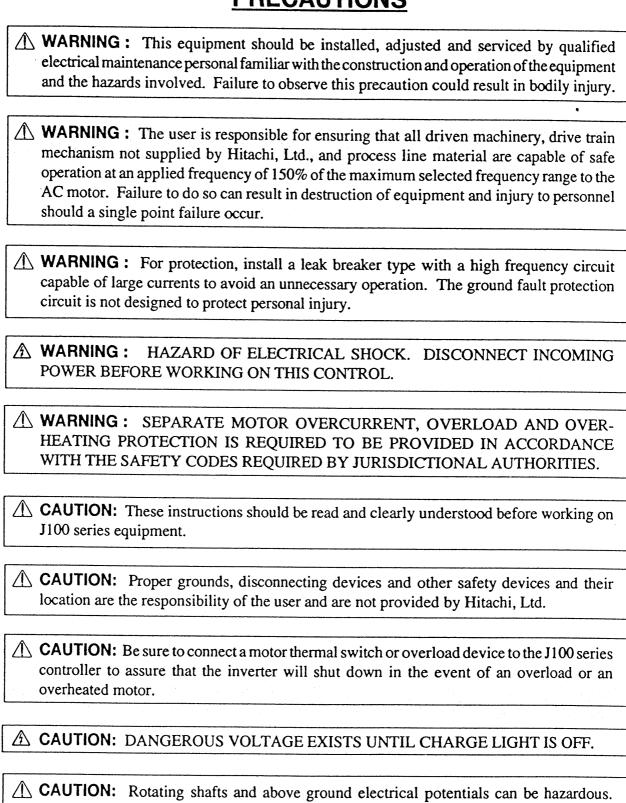


HAZARDOUS HIGH VOLTAGE

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 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



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

performed only by qualified personnel.

Therefore, it is strongly recommended that all electrical work conform to the National Electrical Codes and local regulations. Installation, alignment and maintenance should be

⚠ WARNING

This equipment has high leakage current and must be perminally hard wired to earth via two independent cable.

⚠ MOTORS

- a) Class I motor must be connected to protective earth via low resistive path ($< 0.1\Omega$)
- b) Any motor used must be of suitable rating.
- c) Motors may have hazardous moving parts, in this event suitable protection must be provided.

⚠ CAUTION

Alarm connection may contain hazardous live voltage even when inverter is disconnected. In case of removing flont cover for maintenance or inspection, confirm that incoming power for alarm connection is surely disconnected.

A CAUTION

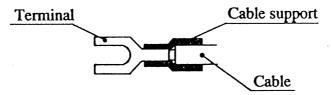
Hazardous (main) terminals for any interconnection (motor, contact breaker, filter etc) must be inaccesible in end installation.

⚠ CAUTION

This equipment should be installed in an enclosure meeting reguirements of IP4X(see EN60529). The end application must be in accordance with BS EN60204-1(with reference to manual page4-1 and 4-2, the diagram measurements to be suitably amended).

⚠ CAUTION

Cnnection to field wiring terminals must be reliably fixed having two independent means of support. Using terminal with cable support (figure below), or cable gland, cable clamp etc.



⚠ CAUTION

A double pole disconnection device must be fitted to the incoming mains supply close to theinverter. Additionally, a protection device meeting IEC947-1/IEC947-3 must be fitted at this point(protection device data shown in page 5-8)

The above instructions together with any other requirements highlighted in this manual must be complied with for continued LVD compliance.

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 ± 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) Install the filter and inverter into locked cabinet meeting requirements of IP4X.

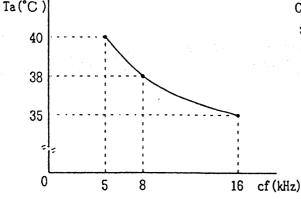
3. Wiring

- 1) Sielded wire(screened cable) is required for motor wiring, and length is less than 50m.
- 2) Length is 20m to 50m, carrier frequency must be setting 5kHz.
- 3)Separate the main circuit wiring from signal/process circuit wiring.

4. Environment condition

When using a filter, keep the following condition.

① Ambient temperature and carrier frequency



Carrier frequency can be changed by function A10, see page 8-18

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

Revision History Table

No.	Revision Contents	The Date of Issue	Operation Manual No.

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1. SAFETY PRECAUTIONS

1. Installation

⚠ CAUTION		
Be sure to install the unit on flame resistant material such as metal. Otherwise, there is a danger of fire.		p. 4-1
 Be sure not to place anything inflammable in the vicinity. Otherwise, there is a danger of fire. 		p. 4-1
 Be sure not to let the foreign matter enter such as cut wire refuse, spatter from welding, iron refuse, wire, dust, etc. Otherwise, there is a danger of fire. 	•••••	
 Be sure to install it in a place which can bear the weight according to the specifications in the text (4. Installation). Otherwise, it may fall and there is a danger of injury. 	•••••	p. 4-1
 Be sure to install the unit on a perpendicular wall which is not subject to vibration. Otherwise, it may fall and there is a danger of injury. 	•••••	p. 4-1
 Be sure not to install and operate an inverter which is damaged or parts of which are missing. Otherwise, there is a danger of injury. 		p. 4-1
 Be sure to install it in a room which is not exposed to direct sunlight and is well ventilated. Avoid environments which tend to be high in temperature, high in humidity or to have dew condensation, as well as places with dust, corrosive gas, explosive gas, inflammable gas, grinding-fluid mist, salt damage, etc. Otherwise, there is a danger of fire. 		
Be sure that the wall surface is a nonflammable material, such as steel plate.	•••••	p. 4-2

2. Wiring

⚠ WARNING	
Be sure to ground the unit. Otherwise, there is a danger of electric shock and/or fire.	p. 5-1
 Wiring work shall be carried out by electrical experts. Otherwise, there is a danger of electric shock and/or fire. 	p. 5-1
 Implement wiring after checking that the power supply is off. It might incur electric shock and/or fire. 	p. 5-1
 After installing the main body, carry out wiring. Otherwise, there is a danger of electric shock and/or injury. 	p. 5-1

A CAUTION

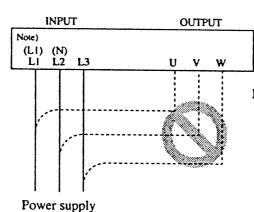
 Make sure that the input voltage is: Single phase 220 to 240 V 50/60 Hz Three phase 380 to 415 V/50 Hz, 400 to 460 V/60 Hz

 Be sure not to input a single phase to a 3 phase type. Otherwise, there is a danger of fire.

- p. 5-2
- Be sure not to connect AC power supply to the output terminals (U, V, W).
- p. 5-2

..... p. 5-2

Otherwise, there is a danger of injury and/or fire.



Note: L1, N: Single phase 220 to 240V 50/60 Hz L1, L2, L3: Three phase 380 to 415V/50 Hz

400 to 460V/60 Hz

- Fasten the screws with the specified fastening torque. Check so that p. 5-2 there is no loosening of screws.

..... p. 5-2

- Otherwise, there is a danger of fire.
- Remarks for using earth leakage circuit breakers in the mains supply:

Frequency inverters with CE-filters (RFI-filter) and screened motor cables have a higher leakage current against earth. Especially in the moment of switching on this can cause unintentional triggerings of earth leakage circuit breakers. Because of the rectifier on the input side of the inverter there is the possibility to stall the switch-off function through amounts of DC-current. The following should be observed:

Only short time-invariant and pulse current-sensitive earth leakage circuit breakers with higher trigger current should be used.

Other components should be secured with separate earth leakage circuit breakers.

Earth leakage circuit breakers in front of an inverter are not an absolute protection against direct touching.

- Be sure to set the fuse(s) (the same phase as the main power supply) p. 5-2 in the operation circuit. Otherwise, there is a danger of fire.
- As for motor leads, earth leakage breakers and electromagnetic contactors, be sure to use the equivalent ones with the specified capacity (rated).

Otherwise, there is a danger of fire.

3. Control and operation

⚠ WARNING	
 Be sure to turn on the input power supply after mounting the surface cover. While being energized, be sure not to remove the cover. Otherwise, there is a danger of electric shock. 	p. 6-1
• Be sure not to operate the switches with wet hands Otherwise, there is a danger of electric shock.	p. 6-1
 While the inverter is energized, be sure not to touch the inverter terminals even during stoppage. Otherwise, there is a danger of electric shock. 	p. 6-1
	p. 8-24
 Even if the power supply is cut for a short period of time, it may restart operation after the power supply is recovered if the operation command is given. If it may incur danger to personnel, be sure to make a circuit so that it will not restart after power recovery. Otherwise, there is a danger of injury. 	p. 6-1
• The Stop Key is effective only when the function is set. Be sure to prepare the Key separately from the emergency stop. Otherwise, there is a danger of injury.	p. 6-1
 After the operation command is given, if the alarm reset is conducted, it will restart suddenly. Be sure to set the alarm reset after checking the operation command is off. Otherwise, there is a danger of injury. 	p. 6-1 p. 7-13
 Be sure not to touch the inside of the energized inverter or to put a bar into it. Otherwise, there is a danger of electric shock and/or fire. 	p. 6-1
• 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.	p. 7-4
 When the Stop key function is ineffective, pressing the Stop key does not cancel the stop and trip. Be sure to provide an emergency stop switch separately. When the operation command destination is a digital operator, this selection es ineffective. 	p. 8-27

⚠ CAUTION		
 Radiating fin and discharging resistor will have high temperature. Be sure not to touch them. Otherwise, there is a danger of getting burned. 	•••••	p. 6-2
 Low to high speed operation of the inverter can be easily set. Be sure to operate it after checking the tolerance of the motor and machine. Otherwise, there is a danger of injury. 		p. 6-2
 If a motor is operated at a frequency higher than 60Hz, be sure to check the speeds of the motor and the machine with each manufacturer, and after getting their consent, operate them. Otherwise, there is a danger of machine breakage. 	. • • • • • • • • • • • • • • • • • • •	p. 6-2
 Check the following before and during the test run. Otherwise, there is a danger of machine breakage. Was the short-cut bar between +1 and + removed? Was the direction of the motor correct? 	•••••	p. 6-4
 Was the inverter tripped during acceleration or deceleration? Were the rpm and frequency meter correct? Were there any abnormal motor vibrations or noise? 		

4. Maintenance, inspection and part replacement

	⚠ WARNING	
•	After a lapse of more than 5 minutes after turning off the input power p. 11 supply, perform the maintenance and inspection. Otherwise, there is a danger of electric shock.	-1
	Before starting maintenance and inspection, be sure to check the charge lamp beside the control terminal is off.	
•	Make sure that only qualified persons will perform maintenance, inspection and part replacement. (Before starting the work, remove metallic objects from your person (wristwatch, bracelet, etc.)	-1
	(Be sure to use tools protected with insulation.) Otherwise, there is a danger of electric shock and/or injury.	

MARNING

When removing connectors, never pull the wires. (Wires for cooling p. 11-1 fan and thermal relay)
 Otherwise, there is a danger of fire due to wire breakage and/or injury.

5. Others

/ WARNING

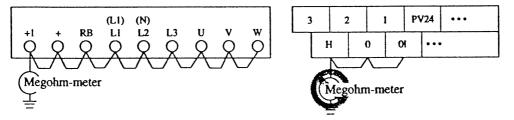
Never modify the unit.

Otherwise, there is a danger of electric shock and/or injury.

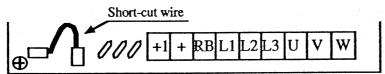
CAUTION

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.

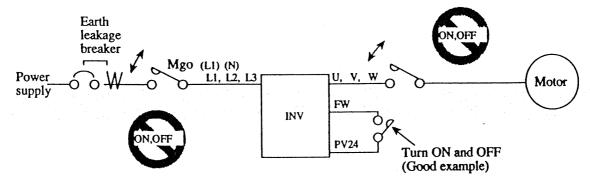
When conducting megger tests as a part of daily inspection, be sure that these tests are only executed between the main circuit and the ground. Do not execute megger tests on the control circuit.



Remove short wiring on the power PCB before conducting the test. And be sure to attach short wiring after the test. (for 400V class only)



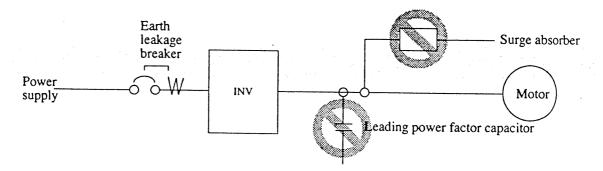
- Do not attach or remove wiring or connectors when power is applied. Also, do not check signals during operation.
- Do not stop operation by switching off the electromagnetic contactors on the primary or secondary sides of the inverter.



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.



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



- Be sure to ground the grounding terminal, (4).
- When inspecting the unit, after turning the power supply off be sure to wait unitl 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.)

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.

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.

/ CAUTION EMI filter Inverter Noise Power Motor Motor LI(LI) U RI R2 source L2(N) SI S2 Power TI T2 L3 source Inverter **EMI** Terminal Remote operator filter Ground the grounding frame. Piping Noise (to be grounded) or shielded wire Completely ground the shield made of metal screen, enclosed panel, etc. with as short a wire as possible.

• 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.

- When occurring an EEPROM error ([]]), be sure to confirm the setting value again.
- When setting b contact to the reverse command ([REV] terminal), the inverter state automatically. Do not set to b contact.

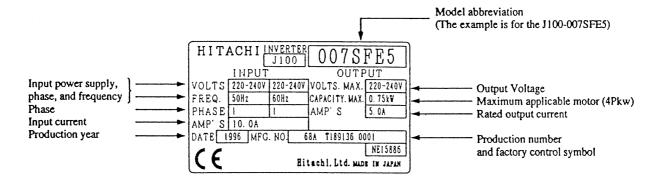
GENERAL CAUTION

In all the illustrations in this manual, covers and safety devices are occasionally removed to describe the details. When the product is operated, make sure that the covers and safety devices are placed as they were specified originally and operate it according to the instruction manual.

2 INSPECTION UPON UNPACKING

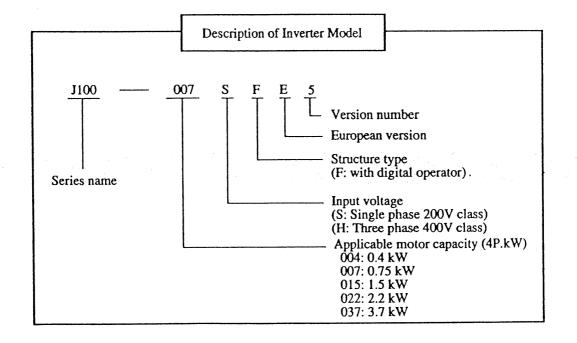
Before installation and wiring, be sure to check the following:

- 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

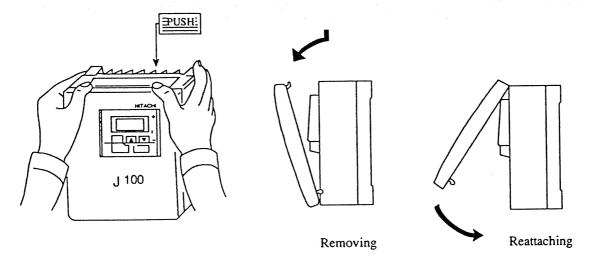
If you discover any problems, contact your sales agent immediately.



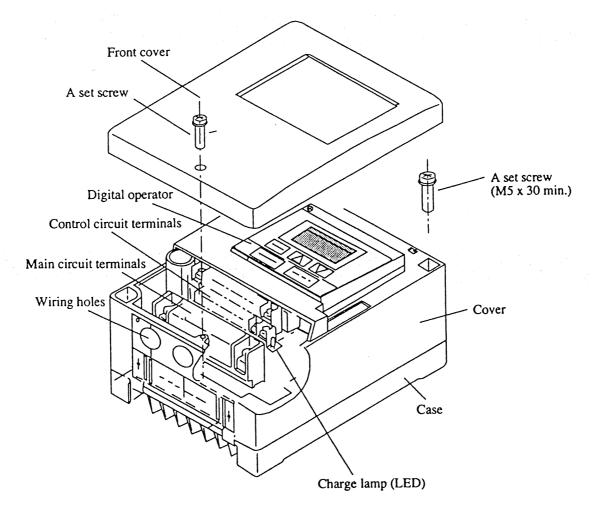
3. APPEARANCE AND NAMES OF PARTS

3.1 Removing and reattaching the front cover

After removing the screws for attaching the front cover, the cover can be removed as shown below:



3.2 Names of parts



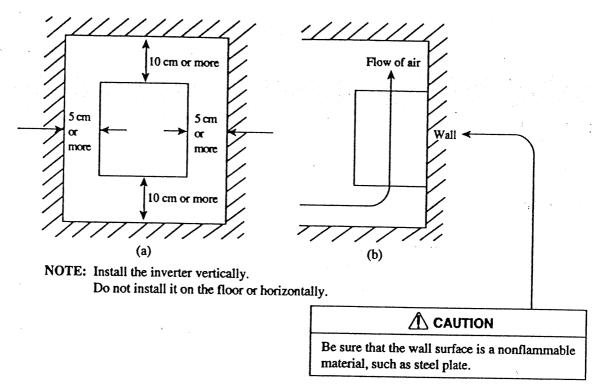
4. INSTALLATION

CAUTION

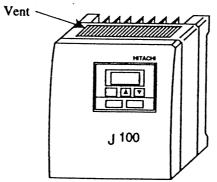
- Be sure to install the unit on flame resistant material such as metal. Otherwise, there is a danger of fire.
- Be sure not to place anything inflammable in the vicinity. Otherwise, there is a danger of fire.
- Be sure not to let the foreign matter enter such as cut wire refuse, spatter from welding, iron refuse, wire, dust, etc.
 Otherwise, there is a danger of fire.
- Be sure to install it in a place which can bear the weight according to the specifications in the text (4. Installation).

 Otherwise, it may fall and there is a danger of injury.
- Be sure to install the unit on a perpendicular wall which is not subject to vibration. Otherwise, it may fall and there is a danger of injury.
- Be sure not to install and operate an inverter which is damaged or parts of which are missing.
 Otherwise, there is a danger of injury.
- Be sure to install it in a room which is not exposed to direct sunlight and is well ventilated. Avoid environments which tend to be high in temperature, high in humidity or to have dew condensation, as well as places with dust, corrosive gas, explosive gas, inflammable gas, grinding-fluid mist, salt damage, etc.
 Otherwise, there is a danger of fire.

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.



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.



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

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 a locked enclosure meeting the requirements of IP4X (see EN60529).

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

NOTE 2: The end application must be in accordance with BS EN60204-1.

5. WIRING

WARNING

- Be sure to ground the unit.
 Otherwise, there is a danger of electric shock and/or fire.
- Wiring work shall be carried out by electrical experts.

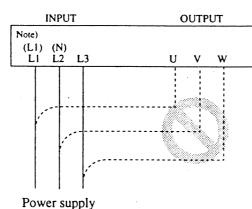
 Otherwise, there is a danger of electric shock and/or fire.
- Implement wiring after checking that the power supply is off. It might incur electric shock and/or fire.
- After installing the main body, carry out wiring.

 Otherwise, there is a danger of electric shock and/or injury.

A CAUTION

- 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 not to input a single phase to a 3 phase type. Otherwise, there is a danger of fire.
- Be sure not to connect AC power supply to the output terminals (U, V, W).

Otherwise, there is a danger of injury and/or fire.



Note: L1, N: Single phase 220 to 240V 50/60 Hz L1, L2, L3: Three phase 380 to 415V/50 Hz 400 to 460V/60 Hz

• Fasten the screws with the specified fastening torque. Check so that there is no loosening of screws.

Otherwise, there is a danger of fire.

• Remarks for using earth leakage circuit breakers in the mains supply:

Frequency inverters with CE-filters (RFI-filter) and screened motor cables have a higher leakage current against earth. Especially in the moment of switching on this can cause unintentional triggerings of earth leakage circuit breakers. Because of the rectifier on the input side of the inverter there is the possibility to stall the switch-off function through amounts of DC-current. The following should be observed:

Only short time-invariant and pulse current-sensitive earth leakage circuit breakers with higher trigger current should be used.

Other components should be secured with separate earth leakage circuit breakers.

Earth leakage circuit breakers in front of an inverter are not an absolute protection against direct touching.

• Be sure to set the fuse(s) (the same phase as the main power supply) in the operation circuit.

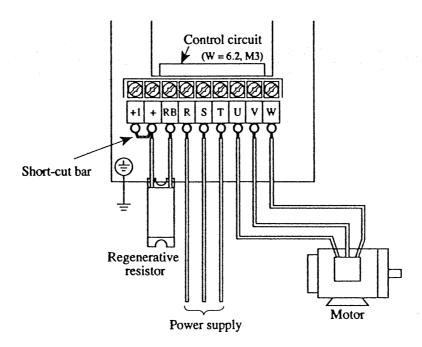
Otherwise, there is a danger of fire.

- As for motor leads, earth leakage breakers and electromagnetic contactors, be sure to use the equivalent ones with the specified capacity (rated).

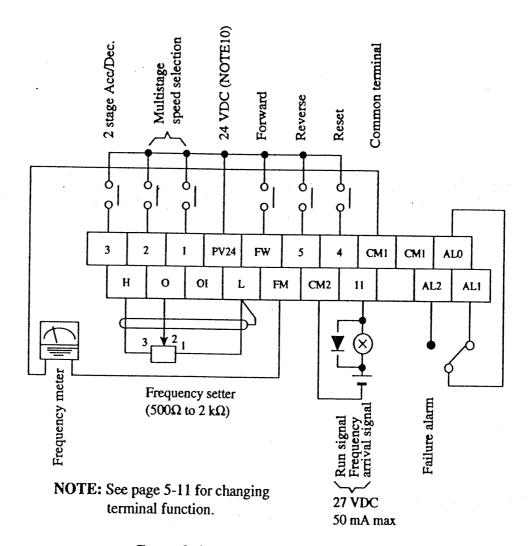
 Otherwise, there is a danger of fire.
- Double pole disconnection device must be fitted to the incoming mains supply close to the inverter. And protection device meeting IEC947-1/IEC947-3 must be fitted at this point.
- Connection to wiring terminal must be reliabily fixed with two means of support.

5.1 Wiring the power supply and motor

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

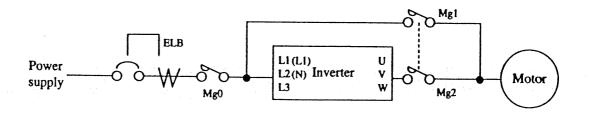


- The inverter will be damaged if the power supply is connected to the motor terminals U, V and W, so be sure not to make any mistakes.
- If multiple motors are to be connected, be sure to attach a thermal relay to each motor.
- See the page 5-8 on the terminal dimensions.
- Make sure that the wiring 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.
- Make sure that the short-cut bar which has been attached in advance between terminals +1 and + is not removed except when the DC Reactor is being mounted.



Control circuit terminal diagram

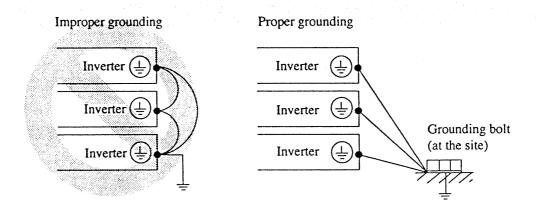
NOTE 1: When changing the power supply of the motor between the inverter and commercial power, be sure to install mechanically interlocked switches Mg1 and Mg2.



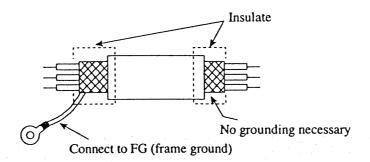
NOTE 2: Install an earth leakage breaker at the input of the inverter. (Select an earth leakage breaker whose sensitive current level is raised in high frequency range.) When the cable between the inverter and motor is more than 10 m long, the thermal relay may malfunction due to high-frequency waves. 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 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.



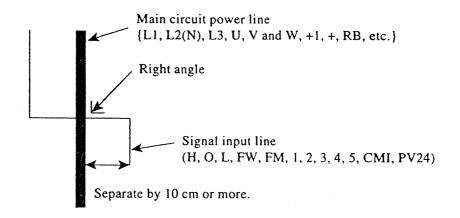
- NOTE 4: When a frequency arrival signal is used, be sure to install a surge absorbing diode in parallel with the relay. Otherwise, the surge voltage created when the relay goes ON or OFF may damage the AR output circuit.
- NOTE 5: Use a twisted and shielded wire for the signal line, and cut the shielded 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 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.

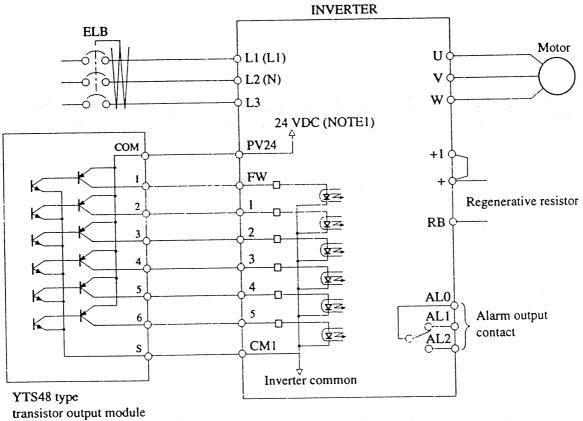
NOTE10: Do not short circuit the terminals PV24 and CM1 by mistake. The control power supply may cause a failure.

NOTE11: Do not short-circuit the terminals H and L.

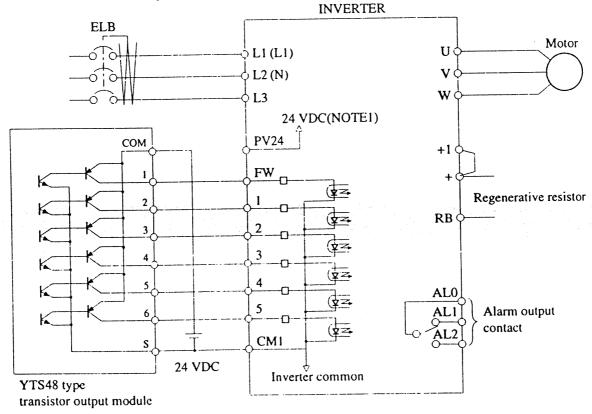
The control power supply may cause a failure.

Connection to the Programmable Controller

(1) When the internal interface power source is used



(2) When the external interface power source is used



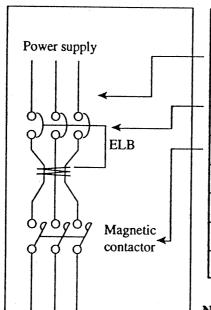
NOTE 1: Do not short circuit the terminals PV24 and CM1 by mistake. The control power supply may cause a failure.

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.



·					<u> </u>		
Motor	Inverter	Wiri	ng	Applicable equipment			
output (kW)	model	Power lines	Signal lines	Earth leakage breaker (ELB)	Electromagnetic contactor		
0.4	J100-004SFE5	1.25 mm ²	(*) 0.75 mm ²	EX30(10A)	H20		
0.75	J100-007SFE5	2 mm ²	Shielded	EX30(15A)	H20		
1.5	J100-015SFE5	2 mm ²	wire	EX30(20A)	H20		
2.2	J100-022SFE5	2 mm ²		EX30(30A)	H20		
1.5	J100-015HFE5	2 mm ²		EX30(10A)	H10C		
2.2	J100-022HFE5	2 mm ²		EX30(15A)	H20		
3.7	J100-037HFE5	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 meeting requirements of IEC947-1/IEC94 at the input.

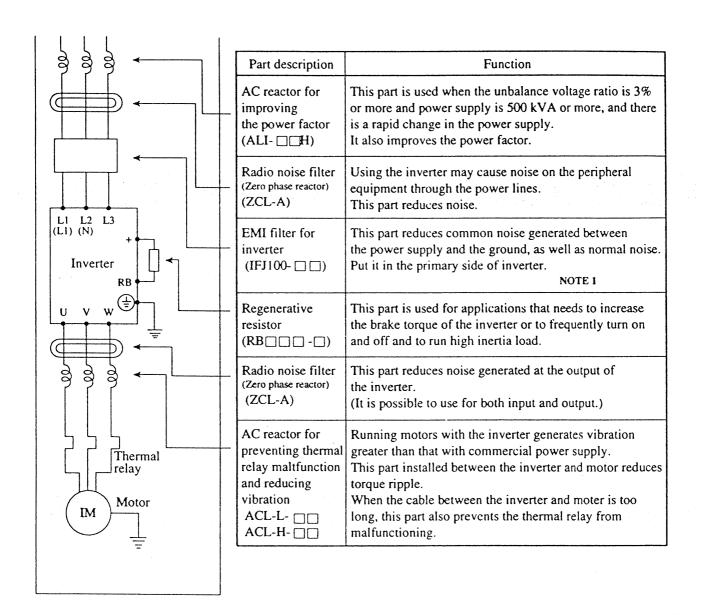
(*) Use 1.25 mm² wire for the alarm signal wire.

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

1	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 meta tube, the leakage current becomes eight times because IV wires have a high dielectric constant.



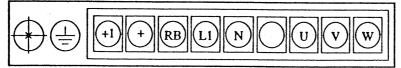
NOTE 1: IFJ100 series filter is required for EMC directive, but others are not for this purpose.

Reactor and others of the above table except EMI filter are for general use for noise reduction.

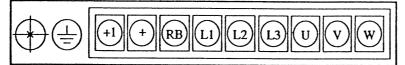
5.3 **Terminal**

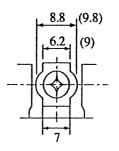
Main circuit terminal

Single phase 220 to 240 V 50/60 Hz



Three phase 380 to 415 V 50 Hz/400 to 460 V 60 Hz





Main circuit terminal

Note: Value inside () for 015 and 022SFE5, 015 to 037HFE5

~	• • • • • • • • • • • • • • • • • • • •	
Control	circuit te	rmınal

3	2	2	1		PV24	FW		5	4	ļ	CN	11	Ci	M 1	AJ	۵	
F	I	C)	0	l I	. F	M	CN	1 2	1	1			A	L2	Al	_1

	Screw diameter	Width (mm)
Main circuit	M4	8.8 (9.8)
Control circuit	M3	6.2 (9)
Grounding	M4	

Dimension

nesistor

Main circuit

+,RB

(£)

Terminal symbol	Terminal description	Function		
L1 L2 L3 (L1), (N)	Main power	Connect the power supply		
U,V,W	Inverter output	Connect the motor	cut bar is attached +1 and +. When to be connected,	
 +1	External DC Reactor	Usually the short-cut bar is attached between terminals +1 and +. When the DC Reactor is to be connected, be sure to remove the short-cut bar.		

(option)

electric shock)

Short-cut bar Connect a regenerative resistor Ground (connect grounding to avoid

Regenera

Motor

Make sure that the short-cut bar attached between +1 and + is not removed except when the DC Reactor is to be mounted.

Power supply

Tightening torque

Screw	Tightening torque	
М3	0.5 N·m (max. 0.7 N·m)	
M4	0.5 N·m (max. 0.7 N·m)	

External

resistor

Ground

regenerative

Control circuit

1	Terminal	Terminal description and fun	Remarks		
	symbol		Initial setting		
	FW	Forward operation		Min. ON time: 12 ms or more	
<u> </u>	5	Intelligent input terminals 1 to 5	Reverse running command		
	4 Reverse running Initialization	(Note 1) Reverse running Initialization USP function	Reset input (Note 2)		
	3	Multistage speed 2nd setting Reset	2 stage acc/dec. time		
Input	2	(First stage) function Multistage speed 2 stage acc/dec. Terminal	Multistage speed (Second stage)		
signal	1	(Second stage) time software lock (Note 3) Multistage speed Free run stop (Third stage)	Multistage speed (First stage)		
		External DC External trip Damping one of the above is selected.			
	PV24	Common for input signals		Output current: max. 100 mA	
Monitor signal	FM	Analog frequency monitor/Digital frequency monitor/Analog output current monitor	Analog frequency monitor		
_	CM1	Common for monitor			
Frequency command	Н	Power supply for frequency command		5 VDC	
input	0	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	11	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	AL0	Normal: AL0-AL1 close	Contact rating		
output	AL1	AL0 Abnormal, Power off: AL2 AL1 AL0-AL1 open	250 VAC 2.5 A (Resistor load) Min 100 VAC 0.2 A (cosø=0.4)		
	AL2	(Initial setting)	30 VDC 3.0 A (Resistor load) 5 VDC 0.7 A (cosø=0.4) 100 mA		

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.

N WARNING

- Be sure to turn on the input power supply after mounting the surface cover. While being energized, be sure not to remove the cover.

 Otherwise, there is a danger of electric shock.
- Be sure not to operate the switches with wet hands. Otherwise, there is a danger of electric shock.
- While the inverter is energized, be sure not to touch the inverter terminals even during stoppage.
 - Otherwise, there is a danger of electric shock.
- If the re-try mode is selected, it may suddenly restart during the trip stop. Be sure not to approach the machine. (Be sure to design the machine so that personnel safety will be secured even if it restarts.)

 Otherwise, there is a danger of injury.
- Even if the power supply is cut for a short period of time, it may restart operation after the power supply is recovered if the operation command is given. If it may incur danger to personnel, be sure to make a circuit so that it will not restart after power recovery.
 - Otherwise, there is a danger of injury.
- The Stop Key is effective only when the function is set. Be sure to prepare the Key separately from the emergency stop.

 Otherwise, there is a danger of injury.
- After the operation command is given, if the alarm reset is conducted, it will restart suddenly. Be sure to set the alarm reset after checking the operation command is off. Otherwise, there is a danger of injury.
- Be sure not to touch the inside of the energized inverter or to put a bar into it.
 Otherwise, there is a danger of electric shock and/or fire.

! CAUTION

- Radiating fin and discharging resistor will have high temperature. Be sure not to touch them.
 - Otherwise, there is a danger of getting burned.
- Low to high speed operation of the inverter can be easily set. Be sure to operate it after checking the tolerance of the motor and machine.

 Otherwise, there is a danger of injury.
- If a motor is operated at a frequency higher than 60Hz, be sure to check the speeds of the motor and the machine with each manufacturer, and after getting their consent, operate them.

Otherwise, there is a danger of machine breakage.

Note:

- (1) Make sure that the power lines (input power supply L1(L1), L2(N) and L3, 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 $(\frac{1}{z})$ 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.

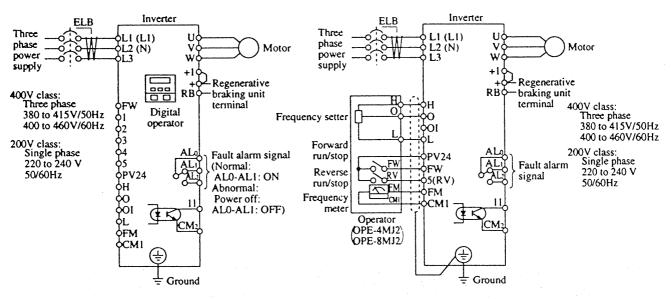
6.2 Test Run

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 $\boxed{F} \boxed{g}$ is changed to \boxed{DD} , or \boxed{DC} .
- (3) Press wice and display F 2.
- (4) Set frequency with . Check the output frequency and direction of revolution.
- (5) Press and start to run.

 (Short circuit FW to PV24 or 5(RV) to PV24 when F g is set to 2.3
- (6) Press (中止/リセット stop/RESET) and decelerate to a stop.

CAUTION

Check the following before and during the test run. Otherwise, there is a danger of machine breakage.

- Was the short-cut bar between +1 and + removed?
- 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 [[]].

То	minal								
symbol		Function		Contents					
	FW	Y Forward run/stop		SWF Contact (close): Forward run (open): Stop					
	5	Reverse runt/stop		SWR Contact (close): Reverse run (open): Stop Terminal 5: REV Both contacts SWF and SWR are close-stop.					
	1	beed	SW1	Frequency (Hz) Fourth speed Third speed Second Second Third Second Secon					
	2	Multistage speed	SW2	Switch SWI ON ON ON ON (VRO)					
(1 to 5)	3		SW3	SW2 ON ON Use SW3 to select the extended multistage speed. SWR ————————————————————————————————————					
ninals	DB	External DC braking		When the terminal [DB] is turned on, the DC braking operation can be performed.					
Intelligent input terminals (1 to 5)	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.					
Intelligen	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 reclos- ing 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.					
P	V24	24 V D power s		Common terminal for running terminal or intelligent terminal					
C	CM1	Common terminal 1		Common terminal for monitor terminal					
Γ	7-1								

Terminal symbol		Function	Contents				
-	Power supply terminal to command a frequency		• Standard setting for external voltage signal is 0 to 4.8 V (5 V nominal 0 to 9.6 V (10 V nominal) can be switched by 48 .	l). Voltage input			
Frequency command	0	Frequency command terminal (voltage command)	H O OI L H O OI L H C → ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕	⊕ ⊖ = 4 to 19.6 mA DC			
Freque	OI	Frequency command terminal (current command)	NOTE: When an inconvernience occurs in the abov characteristics, ad [7] [8] and [7] [8]. The sum of both analog input signa	ds is outputted.			
	L	Frequency command common	When selecting one of analog input current and voltage, make other is not inputted.	sure that the			
Monitor terminal	FM	FM Frequency monitor • Analog frequency monitor/Digital frequency monitor/Analog output					
Monito	СМ1	Input monitor signal common	minals.				
output terminal 11 (Note)	AR	Frequency arrival signal	Frequency Frequency A	Output terminal specification Open collector output 27 V DC max 50 mA max			
Intelligent	RUN	RUN signal	When [RUN] is selected as a terminal, the inverter outputs when the motor is driven.				
Inte	OL						
CM2		Output signal common terminal	Common terminal for intelligent output terminal				
AL0			In the normal state: ALO and AL1 are closed.				
AL1		Alarm terminal	In the abnormal state or when power is turned off: ALO and AL2 are closed. (At the time of initialization)				
AL2			Contact rating 250 V AC 2.5 A (resistance load) 0.2 A (cosø = 0.4) 30 V DC 3.0 A (resistance load) 0.7 A (cosø = 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 [2].

Terminal name: Monitor terminal [FM] (Analog, digital)

Function No. to be set

A 50, A 51, and F 10

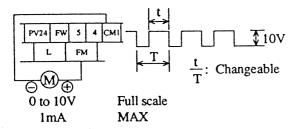
Function contents

Monitor output frequency signal or the current of the inverter is output from the control circuit terminal.

Monitor output current signal is output as an analog signal only.

① Analog Frequency Monitor Signal

The meter outputs duty cycle in proportion to the output frequency with full scale at the maximum frequency.



NOTE: This is a dedicated indicator, so that it cannot be used as a line speed signal.

Indication accuracy after adjustment: About ±5% (The accuracy of some meters may exceed this

② Digital Frequency Monitor Signal
Pulse train of a frequency which is the
same as the output frequency is output.

value.)

The duty is about 50%.

PV24 FW 5 4 CMI \$\frac{1}{Output frequency}\$

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.

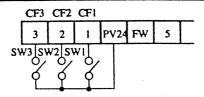
Setting contents

- 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).

Function Contents of Intelligent Input Terminals 7.3

rotation and it is dangerous. Before turning the power on, confirm that the running command is not on. Terminal setting method 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 0 in one of the input terminal 0 in one of the input	Terminal name: Reverse running/stop terminal [REV]	Function No. C 0 to C 4 to be set
via the terminal [REV], the terminal executes the reverse running command or stop command. Terminal setting method 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 [C □ 0 to □ 4]. Terminal name: Multispeed [CF1], [CF2], [CF3] Function content 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 F 2 indicates the output frequency of Multispeed to A 17 and A 71.	Function content	⚠ WARNING
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 □ 0 to □ 4. Terminal name: Multispeed [CF1], [CF2], [CF3] Function content 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 F 2 indicates the output When the running command is input the forward running terminal [FW] at the time, the running command enters a swhich is the same as stop. Note that when the [REV] terminal is "b contact", the running automatically starts. Function No. □ 0 to □ 4, F to be set A 12 to A 17, A When the operations in (1) to (4) are repeated, the frequency of Multispeed not be set. It can be set also by one of A to A 17 and A 171.	via the terminal [REV], the terminal executes the reverse running command or	running command is on, the motor starts rotation and it is dangerous. Before turning the power on, confirm that the
Terminal name: Multispeed [CF1], [CF2], and [CF3] are selected as intelligent input terminals, Multispeed 1 to Multispeed 7 can be set. When the frequency command 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 F 2 indicates the output terminal FW arreverse running terminal [FW] arreverse running terminal [FW] at reverse running terminal [FW] at the time, the running command enters a swhich is the same as stop. Note that when the [REV] terminal is set as the support to contact", the running automatically starts. Function No.	Terminal setting method	Precautions
Function content • 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 F 2 indicates the output frequency. If this occurs, F 2 is cates the output frequency of Multispeed at to Multispeed 7 can be set. It can be set also by one of A to A 17 and A 71.	[REV] terminal setting (This is set in the terminal 5 at the time of initialization.) Set the set value [Reverse running command] in one of the input terminal of the input terminal in the set value [Reverse running command] in one of the input terminal in the set value [Reverse running command]	 Note that when the [REV] terminal is set to "b contact", the running automatically
Function content • 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 F 2 indicates the output frequency. If this occurs, F 2 is cates the output frequency of Multispeed at to Multispeed 7 can be set. It can be set also by one of A to A 17 and A 71.		
 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 F 2 indicates the output (4) Press the Func key once so as to stor set frequency. If this occurs, F 2 is cates the output frequency of Multispect at set the indication is the same as the set frequency.) (5) Press the A and ▼ keys once. (Control terminal) is combined that the indication is the same as the set frequency.) (6) When the operations in (1) to (4) are upper to A 17 and A 17 an		
Set the speed as shown below. ① Turn the running command off. ② Turn each switch on and set it to	 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. Turn the running command off. Turn each switch on and set it to Multispeed n. Display the data section of F2. Set an optional output frequency by 	 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 A 12 to A 17 and A 71. Terminal setting method Digital operator Set the set values 1, 2, and 3 in one of the input terminals

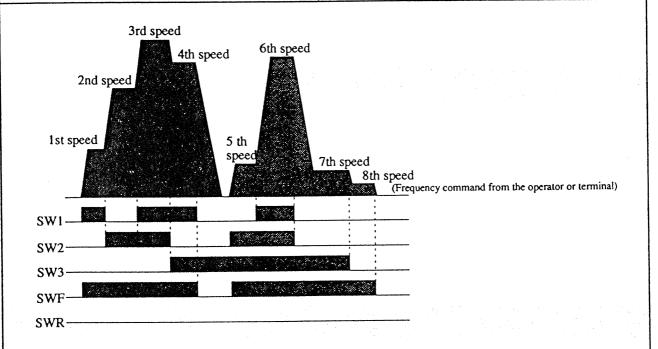
Example of output terminal connection



Setting of multispeed

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

- 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 the key every time and then set the
 next one. Note that when the the 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]

to be set

Function No. C 0 to C 4 A 21, A 22, A 56

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.

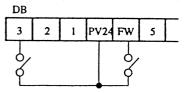
- ① A 56 DC braking type selection
- ② A 21 DC braking force setting
- 3 A 22 DC braking time setting

DC braking execution method

When the operation type is an edge opera-

Turn the switch between [DB] and [PV24] on and output DC braking only for the time of A 22 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 (E 5) is easily generated.

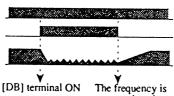
Terminal setting method

Digital operator

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

Level operation 1

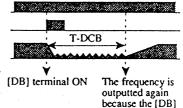
Running command [DB] terminal Inverter output frequency



outputted again to release the DB terminal.

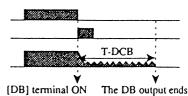
Edge operation 1

Running command [DB] terminal Inverter output frequency



Edge operation 2

Running command [DB] terminal Inverter output frequency

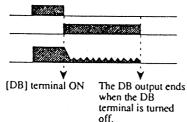


because the [DB] operation time expires.

operation time expires.

Level operation 2

Running command [DB] terminal Inverter output frequency



Termin	al name: Initialization (factory delivery state) [STN]	Function No. to be set	C 0 to C 4
	rning the equipment to the initial state at factorion following procedure.	tory before shipme	ent for some reason,
② Turn the on or per turn the 3 When 6 turn the operation	e [STN] (set value 5) to one of the inplin the extended function mode to set an inteller switch between the [STN] and [PV24] terms of the reset operation as shown in Note a power on again before the charge lamp of the seconds or more pass after the power is turn as switch between the [STN] and [PV24] terms on, or power turning operation is performed initialized.)	ligent terminal.) ninals on and then 1. (After the powe the logic substrate goe the on or the reset tinals off. (When the	turn the power off and er is turned off, do not goes off.) operation is performed, the key operation, reset
	For resetting, turn the switch between the block on and then off.		

Terminal name: 2nd setting function SET

Function No. C 0 to C 4 (A 0 to be set to A 2, A 18, A 19. A 62, A 63, F 2, F 5 to F 8)

Function content

- When the terminal [SET] is turned on, it is possible to set two types of motor constants and execute running by one
- 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

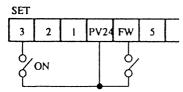
A62: Base frequency setting

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 22. 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 6 in one of the input terminals C 0 to C 4.

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 be set

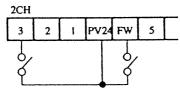
CI 0	to C 4.
A 18	, A 19

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 7 in one of the input terminals C 0 to C 4.

2 stage acceleration and deceleration time setting method

Use A 18 (acceleration time 2) and A 19 (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.)

Running command				
[FW, REV]				
[2CH] -				
terminal				
Output frequency —				

Terminal name: Free run stop [FRS]

Function No. to be set

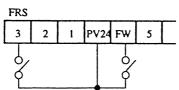
C 0 to C 4

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

C 20.

The contact setting cannot be switched only by selecting FRS by switching $\boxed{C \mid 0}$ to $\boxed{C \mid 4}$.

Terminal setting method

- Digital operator -

Set the set value 8 in one of the input terminals 0 to 0 to 4.

Running command _ [FW, REV]		· * · * *
[FRS] -		
Motor	:	0 frequency start
revolution _		

Function No. C 0 to C 4 Terminal name: External trip [EXT] to be set Function switching method Function content When the switch between the set terminals • When the terminal [EXT] is turned on, the [EXT] and [PV24] is turned on, the equipment inverter enters the trip state by an indicaenters the trip state. tion of E 12 and stops output. Even when the switch is turned off, the trip state will not be canceled. Reset the equip-Terminal setting method ment or turn the power off and on again to cancel the trip state. Digital operator · Set the set value 9 in one of the I PV24 FW input terminals C 0 to C 4. When [EXT] is allocated to the terminal 3 Running command [FW, REV] [EXT] terminal

Free run

Motor revolution speed

[RS] terminal

Alarm output terminal

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

Function No. [C

2.333	100		 week.	V		1000
ì	×	0	o	C		4
				1		

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 (株立/リセット STOP/RESET key. Refer to the time chart indicated below.

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

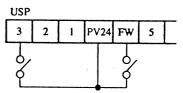
Set content

- Digital operator

Set the set value $\boxed{10}$ in one of the input terminals \boxed{C} $\boxed{0}$ to \boxed{C} $\boxed{4}$.

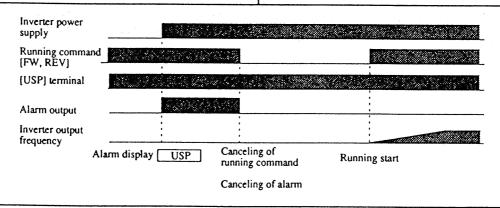
Function switching method

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 (E 13).



When [USP] is allocated to the terminal 3

- 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 (E 9) 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]

to be set

Function No. C 0 to C 4

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 A 57 trip history clear selection.

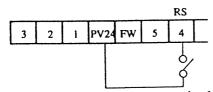
Terminal setting method

Digital operator -

Set the set value 111 in one of the input terminals C 0 to C 4.

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.)

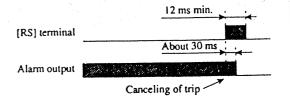


When [RS] is allocated to the terminal 4 (Initialization)

WARNING

• After the operation command is given, if the alarm reset is conducted, it will restart suddenly. Be sure to set the alarm reset after checking that the operation command is off. Otherwise, there is a danger of injury.

- 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 新DP/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.

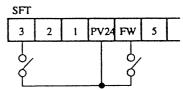
Terminal setting method

Set the set value 12 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

- 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 A 53.
- Software lock by the operator is also possible without the [SFT] terminal being used.
 (A 84)

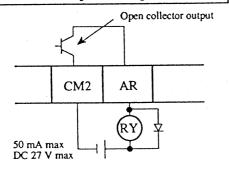
7.4 Function Contents of Intelligent Output Terminals (Initial setting is "b contact ' (NC) state)

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).

Connection example of output terminal

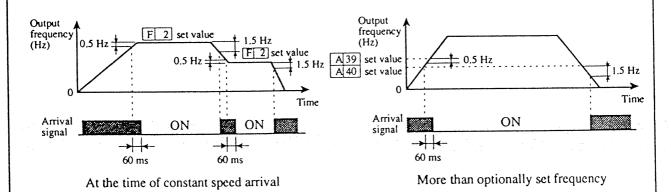


Terminal setting method

Set the set value in the output terminal in the outp

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.



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

C 10 Terminal name: Run signal [RUN] Function No. to be set Function content Terminal setting method When [RUN] is selected as an intelligent - Digital operator output terminal, the inverter outputs a RUN signal when the motor is driven. Set the set value \[\begin{array}{c} \begin{array}{c} \limit{ in the output} \end{array} terminal C 10. Connection example of output terminal Precautions Open collector output A RUN signal is outputted simultaneously when a gate signal of the power module is CM2 RUN outputted. Therefore, when the frequency of the RUN signal is less than the start frequency adjustment value A 4, it will 50 mA max DC 27 V max not be outputted. A RUN signal can be outputted even during DC braking by A 52. FW (REV) A 4 Inverter output frequency ON RUN

Terminal name: Overload advance notice signal [OL]

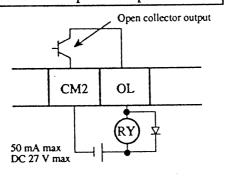
Function No. to be set

C 10

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



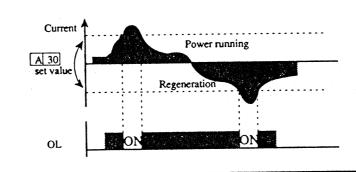
Terminal setting method

Digital operator

Set the set value $\boxed{2}$ in the output terminal $\boxed{0}$.

Precautions

A value of 150% is set by initialization. To change the level, change [A 30] (overload advance notice level).



7.5 Function Contents of Alarm Terminals

Terminal name: Alarm terminal [AL1, AL2-AL0]

Function No. to be set

C 21

Function content

 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.

Terminal setting method

Digital operator

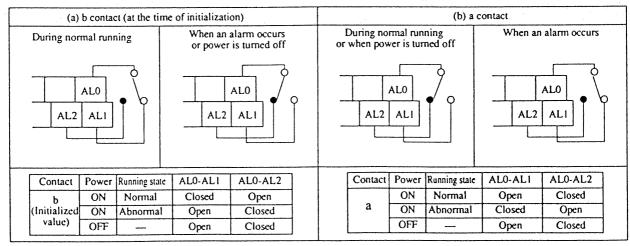
- "a contact" or "b contact" can be selected by C 21.
- The initialization is "b contact".

Precautions

- 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.)

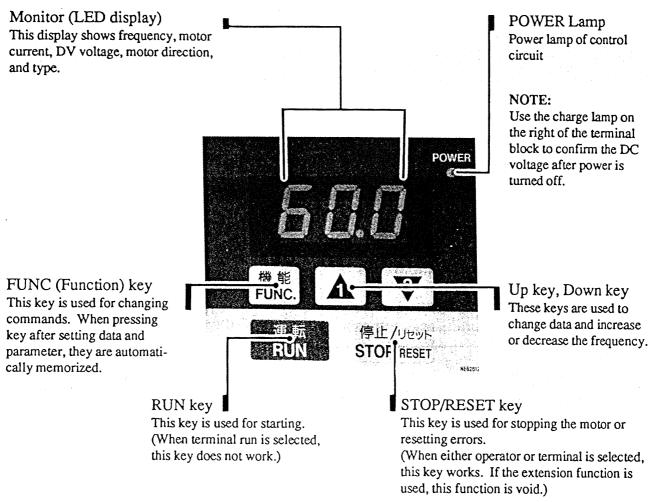
Contact specification

Maximum	Minimum
AC 250V, 2.5A (load R) 0.2A (cosø=0.4)	AC 100 V, 10 mA
DC 30 Vm, 3.0A (load R) 0.7A (cosø=0.4)	DC 5 V, 100 mA

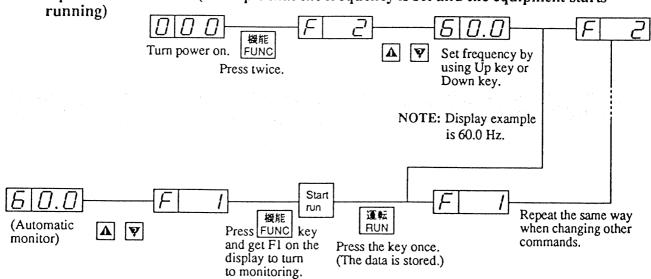


8. OPERATION OF THE DIGITAL OPERATOR

8.1 Name of Keys



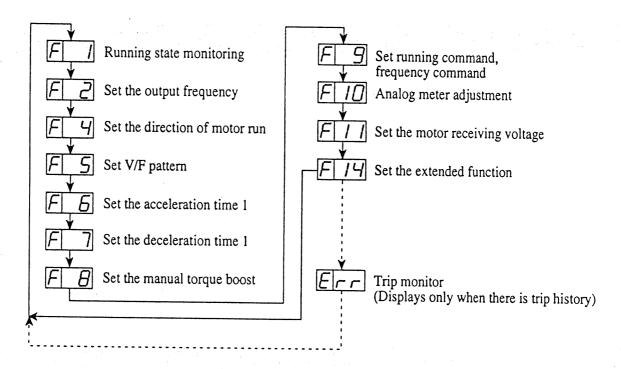
8.2 Operation Procedure (Example that the frequency is set and the equipment starts



8.3 Key Description

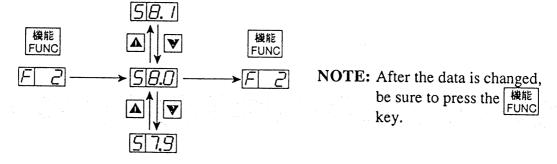
[Function key]... This key allows the selection of commands and memorizes parameters.

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.



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

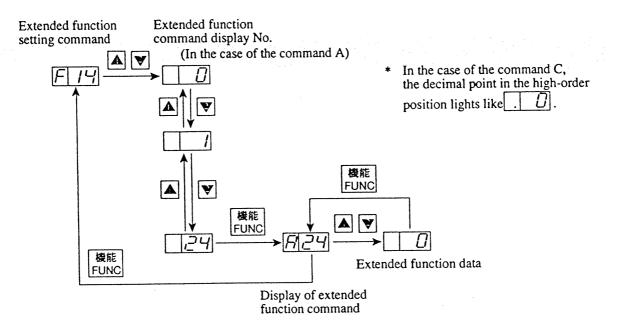
The set value of \boxed{F} \boxed{Y} determines a forward run or a reverse run.

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

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

Screen transfer for extended commands

When an extended command is to be used, select the extended function command No. from $\boxed{F[I\ Y]}$ by using the keys $\boxed{\blacktriangle}$ and $\boxed{\blacktriangledown}$ so as to enter the extended function mode.



Explanation of screen display

- ① When the inverter is turned on, the display which is outputted when the power is turned off before it is turned on appears. However, when the data display section for the commands F4 to F14 is turned off, the command display (F4 to F14) at that time appears.
- ② At the time of second setting, the decimal point in the first position of the data display section is displayed like [22]. However, a display of more than 100 of the set frequency, acceleration and deceleration time, DC braking time adjustment time, or standby time after undervoltage does not mean the second setting.

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 $\boxed{F|I|Y|}$, the extended functions shown on pages 8-5 and 8-6 can be set.

		Screen display			I	Application	
Display order	Function name	Туре	Command display	Settable during running	Range of set values	Initializa- tion	of 2nd setting function
].x -	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 \(\begin{aligned} \in \begin{aligned} F \begin{aligned} \begin{aligned} F \begin{aligned} \begin{aligned} \begin{aligned} F \begin{aligned} \begin{aligned

Display	Turned of Constitution	Screen display		Initial	Settable for	Remarks	Ref.
order	Extended function name	Code display	Setting range		2nd function	Remarks	page
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 thermial characteristic selection	A24	٥/١	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	۷ı	0			8-23
29	Deceleration selection (Linear, S-curve)	A29	0/1	0			8-23
30	Overload previous notice signal settingl	A30	50-150%	150			8-23
31	Overload limit level setting	A31	50-150%	150			8-23
32	Oerload limit content selection	A32	Ø1	0			8-24
33	LAD stop function setting	A33	0/1	0	_		8-24
34	Trip/retry function selection	A34	٥ι	0	<u> </u>		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	220/38	0	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

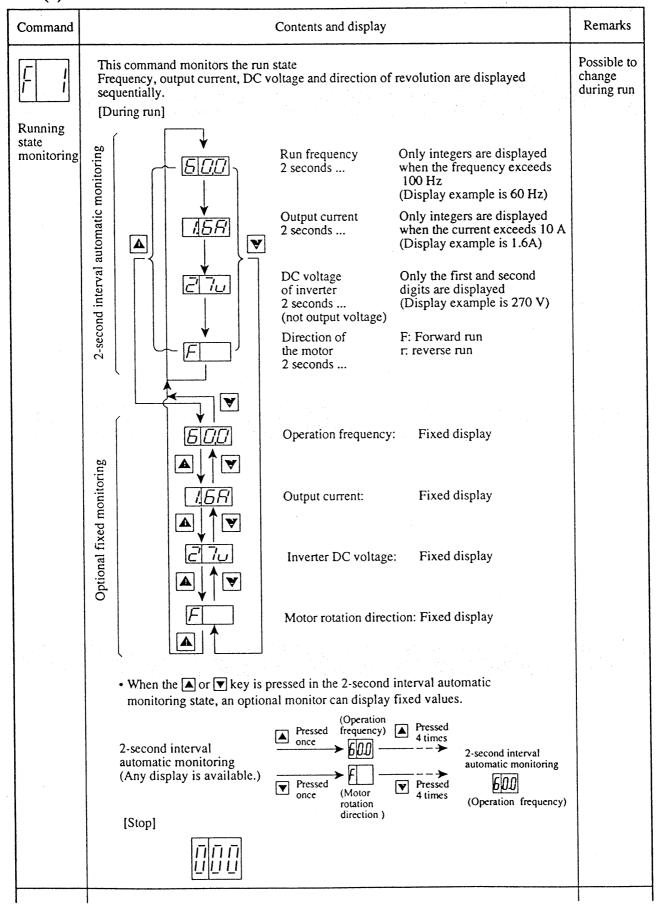
Display			Screen display				T _{D-6}
order	Extended function name	Code display	Setting range	Initial value	Settable for 2nd function	Remarks	Ref.
40	Optional arrival frquency for deceleration	A 40	0-100%	100			8-26
41	Forward rotation	A41	0(oft)/1(on)	1			8-26
42	Reverse rotation	A42	0 (off) / 1 (on)	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		:1	8-19
45	Frequency arival 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	Cl	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



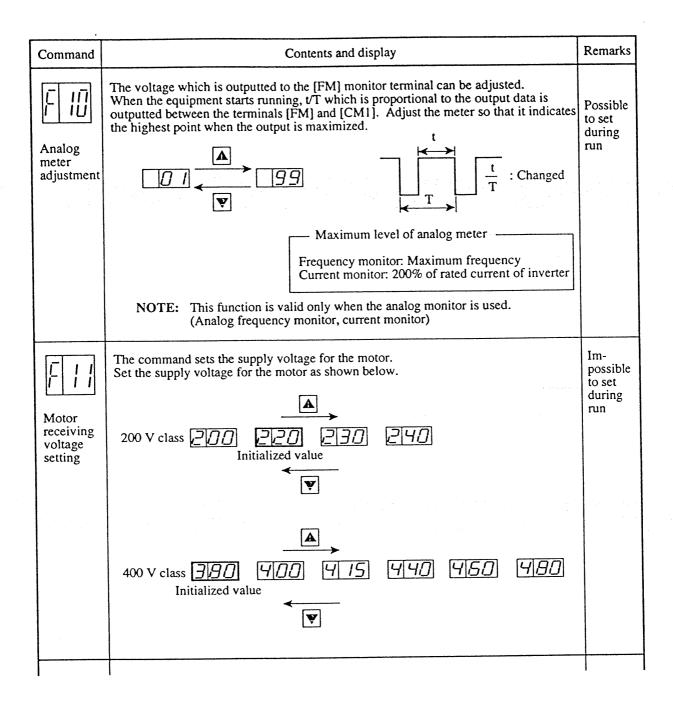
Command	Contents and display	Remarks				
F 2	This command sets the output frequency.					
	Set frequency from 0 to 99.9 Hz by 0.1 Hz	set during run				
Output frequency setting	Set frequency from 100 to 360 Hz by 1 Hz (NOTE 1) SSS SSS SSS SSS SSS SSS SSS SSS SSS S					
- 3-	To push down or vonce changes one digit. Keeping pushing down changes continuously.					
	The output frequency in the multispeed mode can be set as specified below.					
	(1) Connect the multispeed terminal for setting the frequency to PV24. (The relationship between multispeeds 1 to 7 and the control circuit terminals as shown below.)					
	Multispeed Control circuit terminal SW1 SW2 SW3 SW2 SW3 SW1 SW2 SW3 SW2 SW3 SW2 SW3 SW3 SW2 SW3 SW2 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW2 SW3 SW3 SW3 SW3 SW3 SW2 SW3 SW3 SW3 SW3 SW3 SW2 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3 SW3					
	The above example is the case when the intelligent input terminals 1, 2, and 3 are set to the terminals CF1, CF2, and CF3 respectively. (Set using					
	(2) Set an optional output frequency using the A or W key.					
	(3) Press the FUNC key once to store the set output frequency. (NOTE 2) (F こ is displayed.)					
	 (4) Press the key once. (Check whether the output frequency, which is set is displayed.) (5) By repeating (1) to (4), the output frequency in the multispeed mode can be set 					
	NOTE 1: When setting to over 120 Hz, the changing over maximum frequency is					
	necessary. NOTE 2: Whenever any data is changed, be sure to press the FUNC key before starting the next setting. Note that when the FUNC key is not pressed, the data will					
	not be set. (*) The multi-speed output frequency can be set by the above method independently					
	of the setting status of the command $[F]$. (*) The setting frequency blinks during stop, and does not blink during running. This distinguishes two conditions, RUN and STOP.	Brinking during stop				

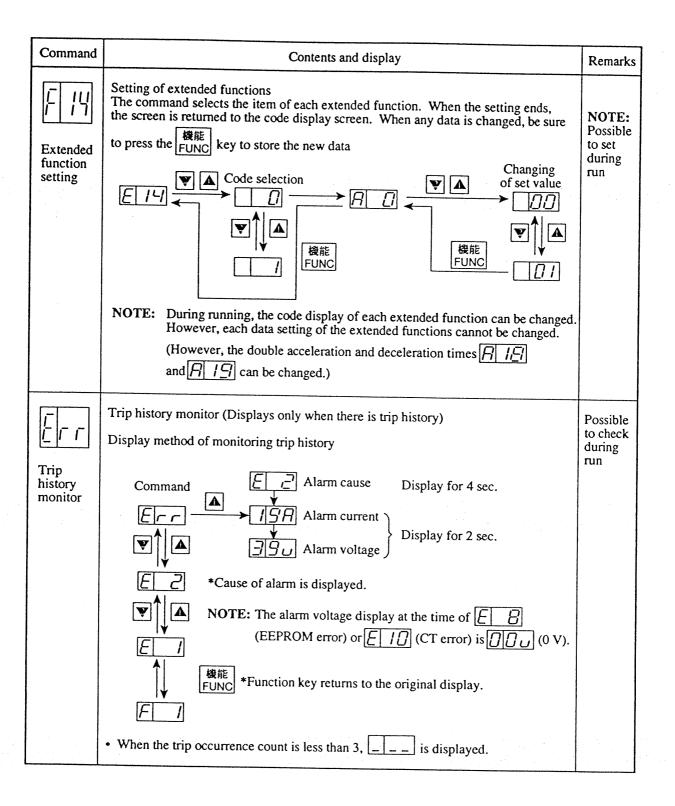
Command	Contents and display	Remarks
Ē 4	Set the motor direction. Set the motor direction when running by pressing 雇权 key.	Im- possible to change during run
Running direction setting	F Forward run Switching can be done by pressing Reverse run	

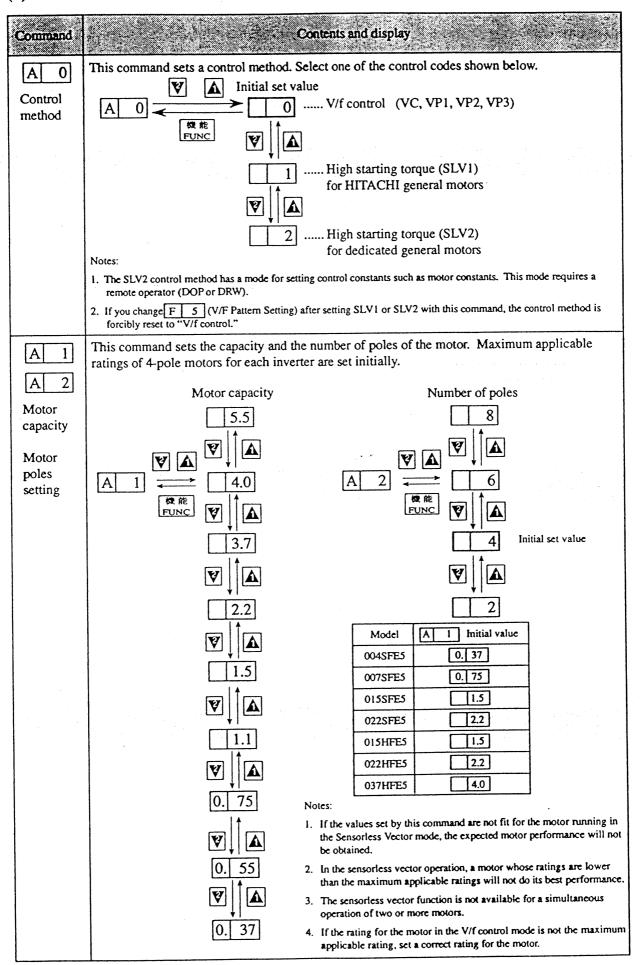
Command	Contents and display							
V/f pattern	This command sets V/F pattern. When combining V/F patterns other than the following using the control method (A0), the basic frequency (A62) and the maximum frequency (A63) of the extention function mode, the display shows							
setting	Output voltage V/F pattern Output voltage V/F pattern 200 220 230 240 380 400 440 460 Output voltage V/F pattern 200 220 230 240 380 400 440 460							
	00 08 16 24 V/F VC Constant torque 04 12 20 28 V/F VP1 Reducing torque 1.5 power 0 50 Hz							
2	01 09 17 25 0 100 Hz 05 13 21 29 0 50 100 Hz							
	02 10 18 26 0 60 Hz 06 14 22 30 0 60 Hz							
	03 11 19 27 0 60 120 Hz 07 15 23 31 00 % 0 60 120 Hz							

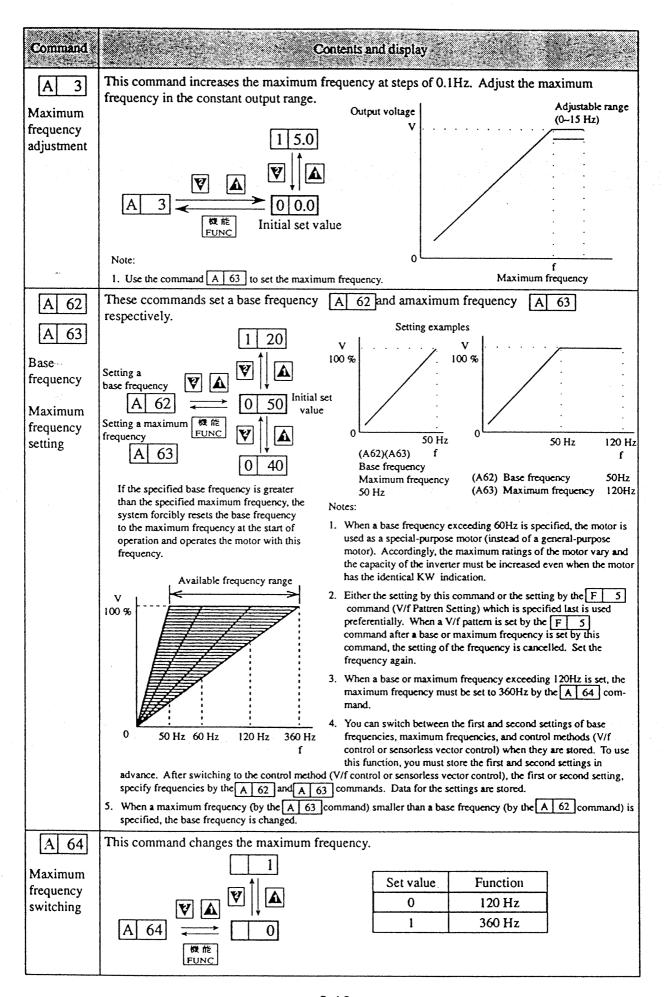
Command	Contents and display						
	Spec	ial V	F pat	tem			
			volta		V/F pattern		
				240	_	Uses for V/F pattern	
	50	51	52	53	VF VC 100 % 100 Hz	Constant torque chracteristics: Conveyor Reduced torque characteristics: Fan, pump	
	54	55	56	57	VF VC 100 % 120 Hz		
	ı	TON	a	nd th	sensorless vector contro is command is changed reful in this regard.	l (SLV1, SLV2) is selected as a control system in design, V/F control is forcibly selected.	

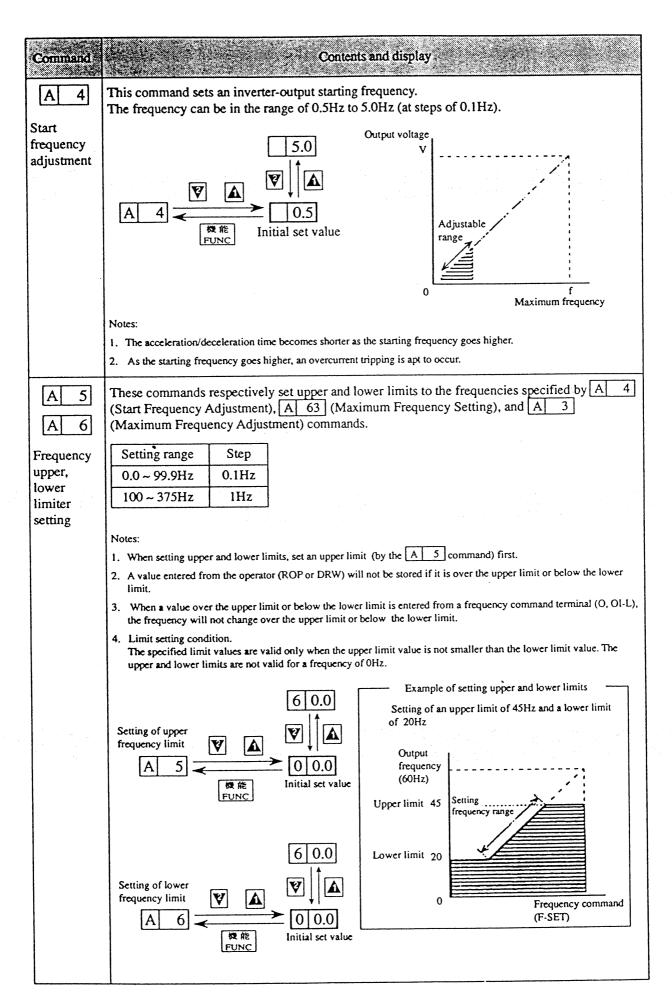
Command	Contents and display							
FE	These commands set and display Acc. time (F 5) and Dec. time (F 7). In the case of adjustment in real time, press the FUNC key after data is changed.							
Accelera-	$\begin{array}{c c} & & & & & & & \\ \hline 4.9 & & & & & \\ \hline \hline \hline \end{array} \begin{array}{c} & & & & \\ \hline \hline \end{array} \begin{array}{c} & & & \\ \end{array} \begin{array}$							
tion time 1	Setting range Period							
	0.1 to 99.9 Every 0.1s							
Decelera- tion	100 to 999 Every 1s							
time 1	• When a time of more than 999 seconds is set by the remote operator, is displayed on the digital operator.							
	Set torque boost	Possible						
Manual	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.							
torque bost	Setting is effective only when V/F control is selected.							
setting	• In the case of adjustment in real time, press the Hunc key after data is changed.							
	Code Output voltage 100%							
	Setting and changing is done with keys. About 21 0 5 25 50 Hz 6 30 60							
	Change setting mode	Im-						
F 9		possible to set						
	Run command to Frequency command to (NOTE I)	during						
Running command	Digital operator Digital operator	run						
Frequency	Digital operator Terminal block							
command setting	Terminal block Digital operator							
	☐ ☐ ☐ ☐ Terminal block Terminal block							
	NOTE 1: The multi-speed output frequency can be set for one of							

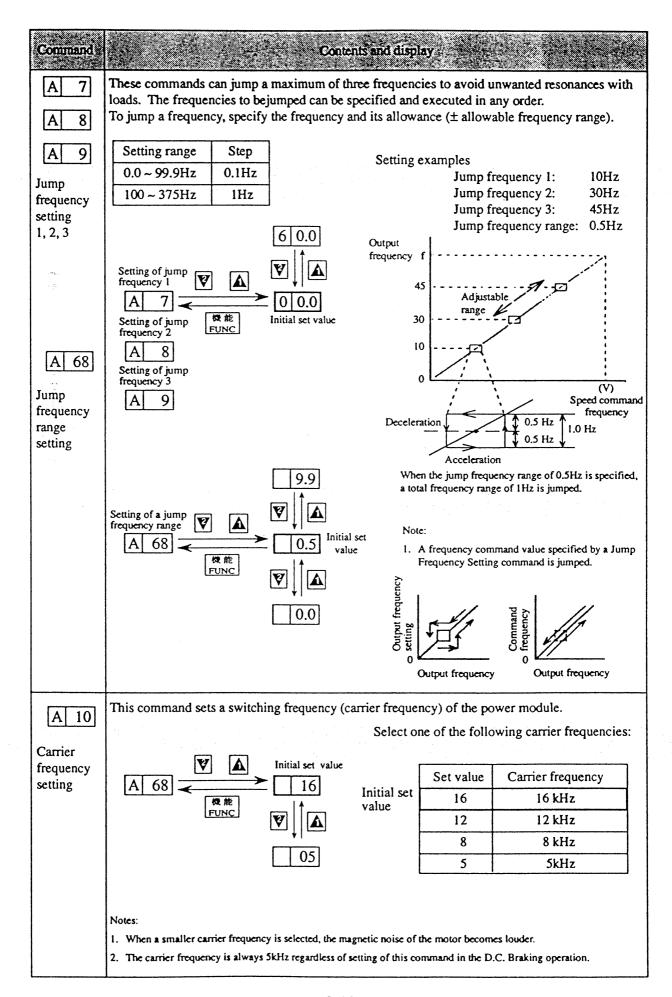


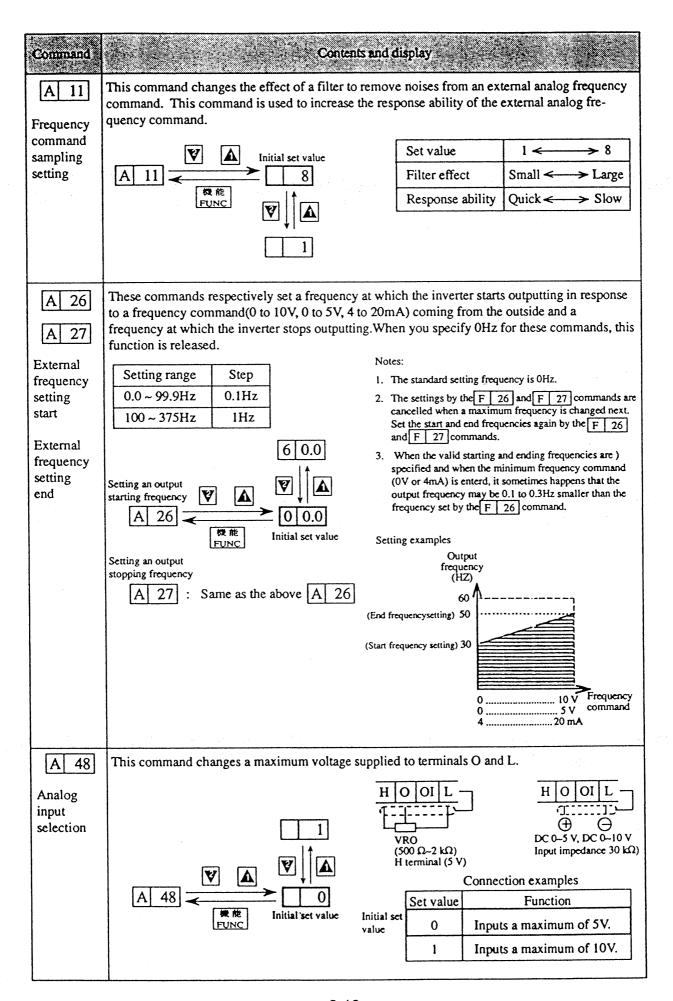


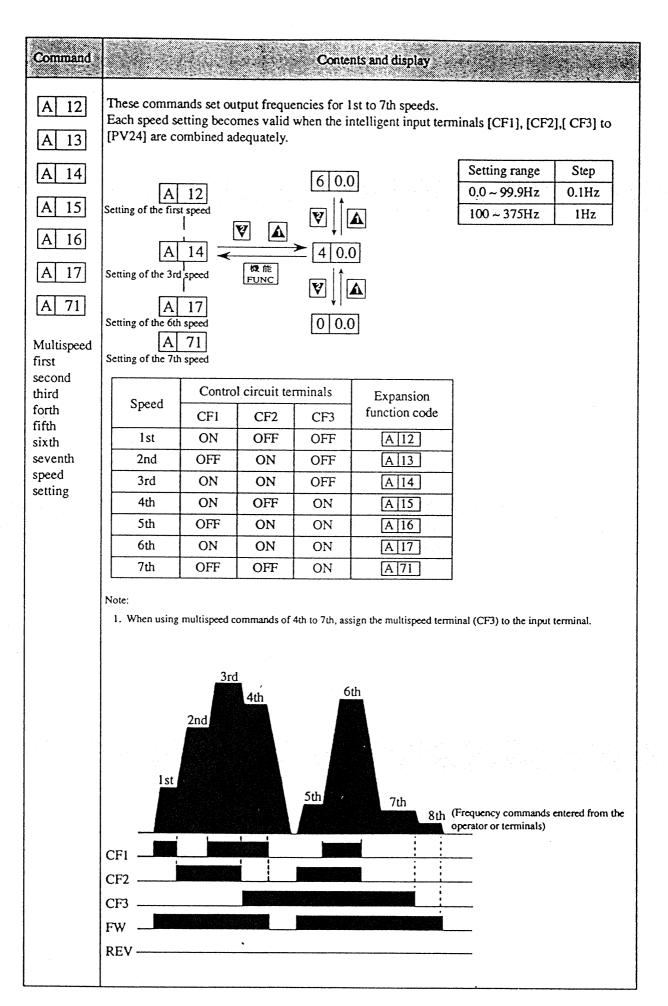


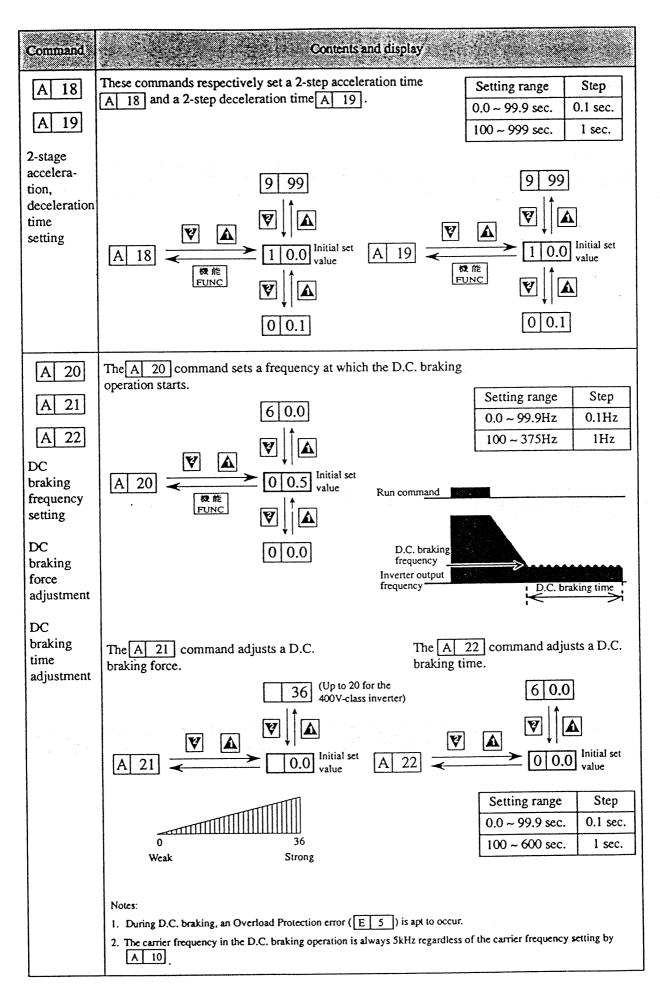


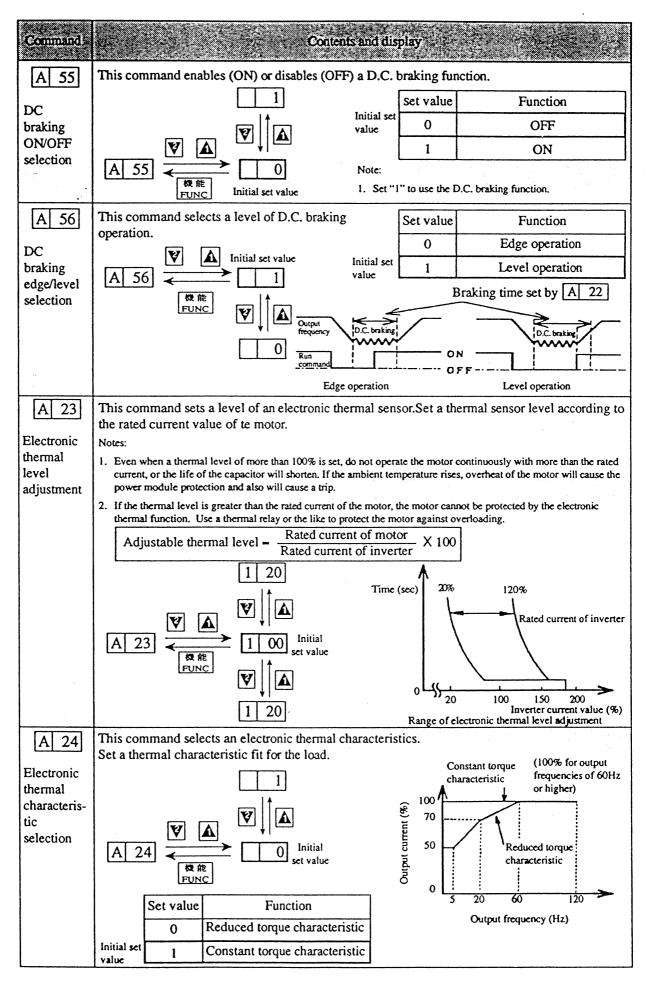


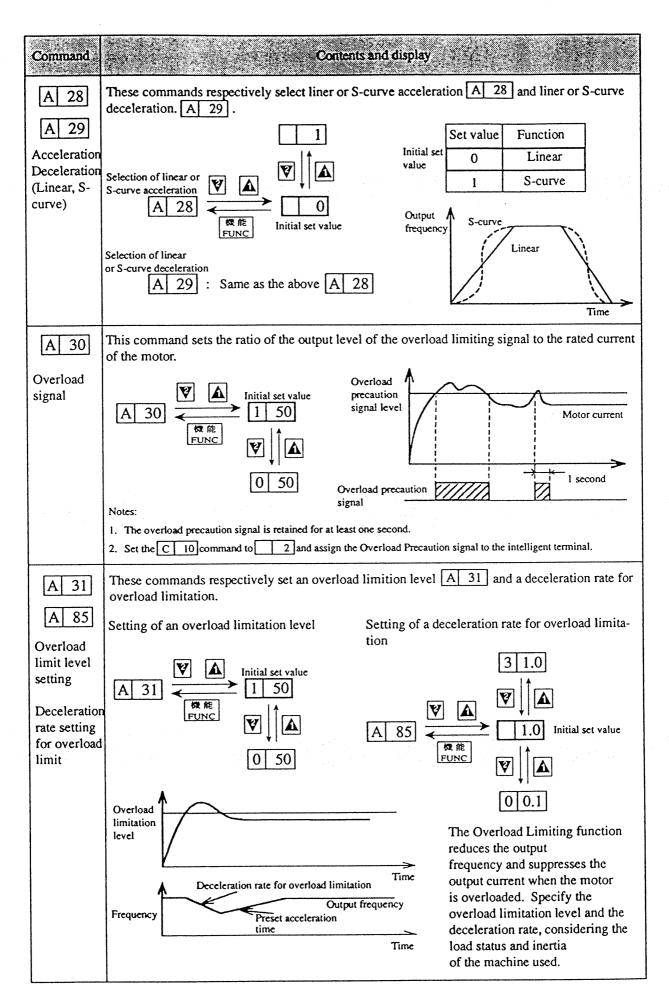


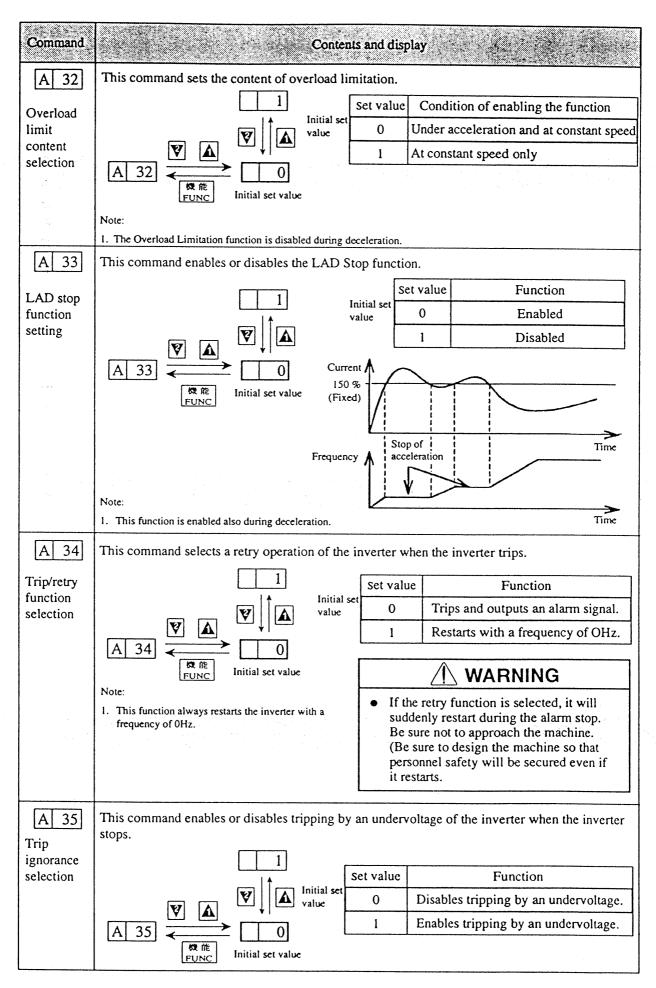


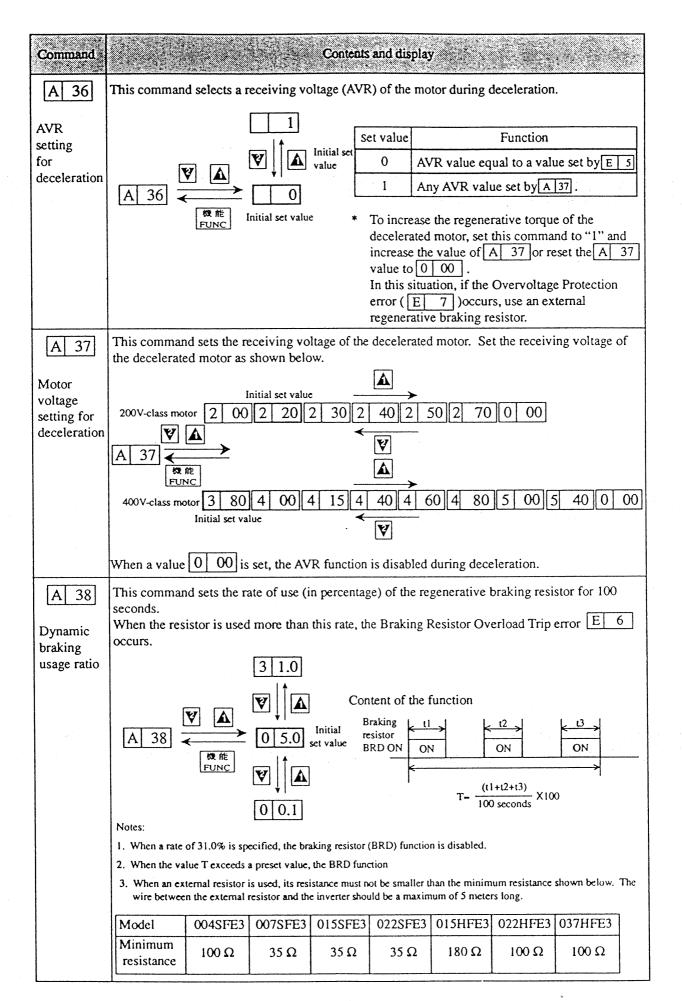


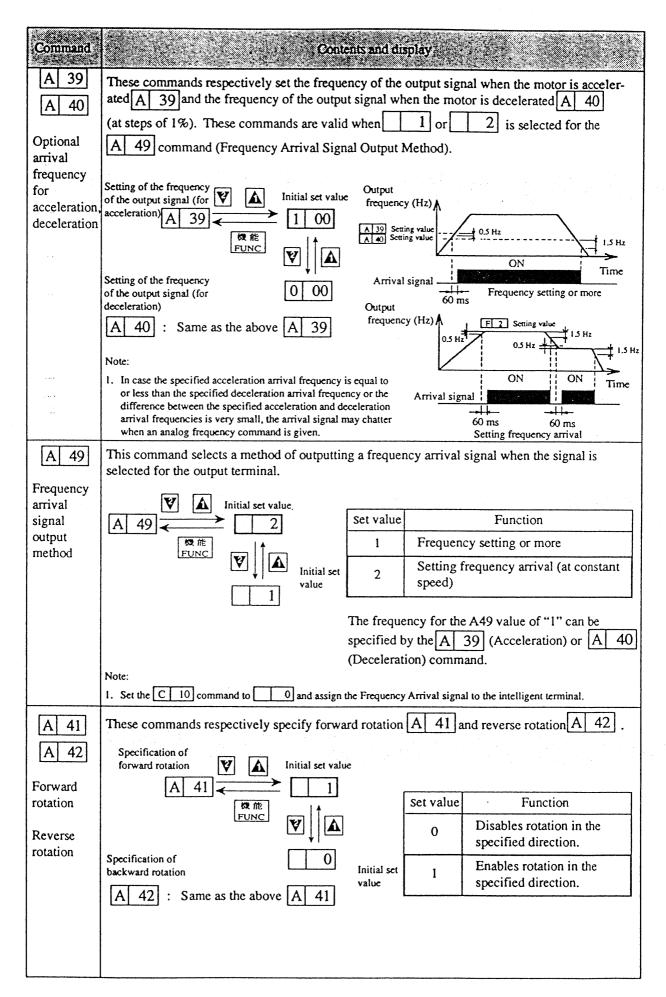


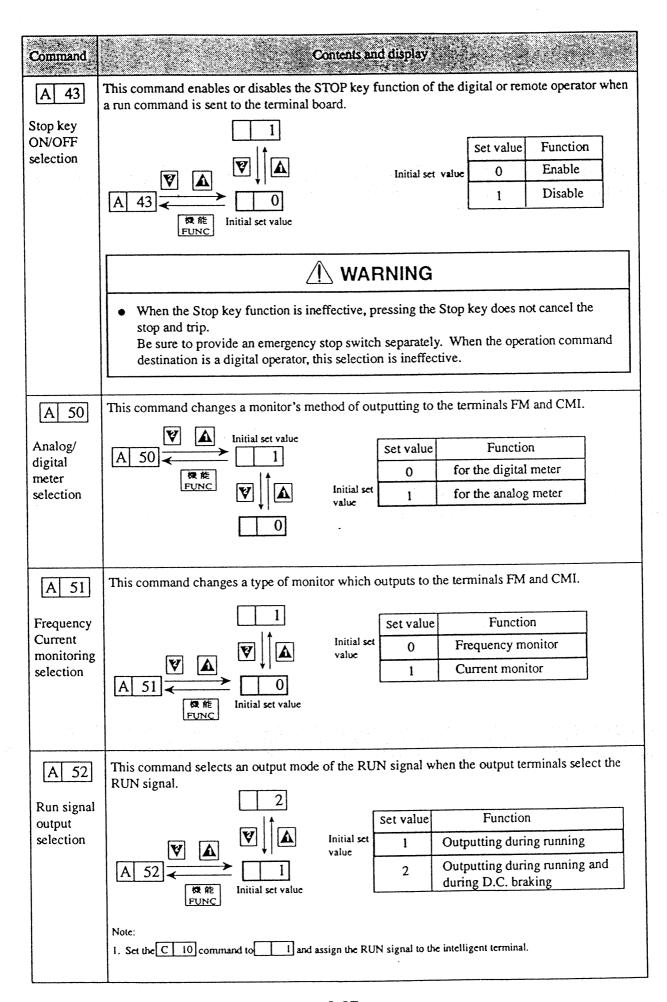


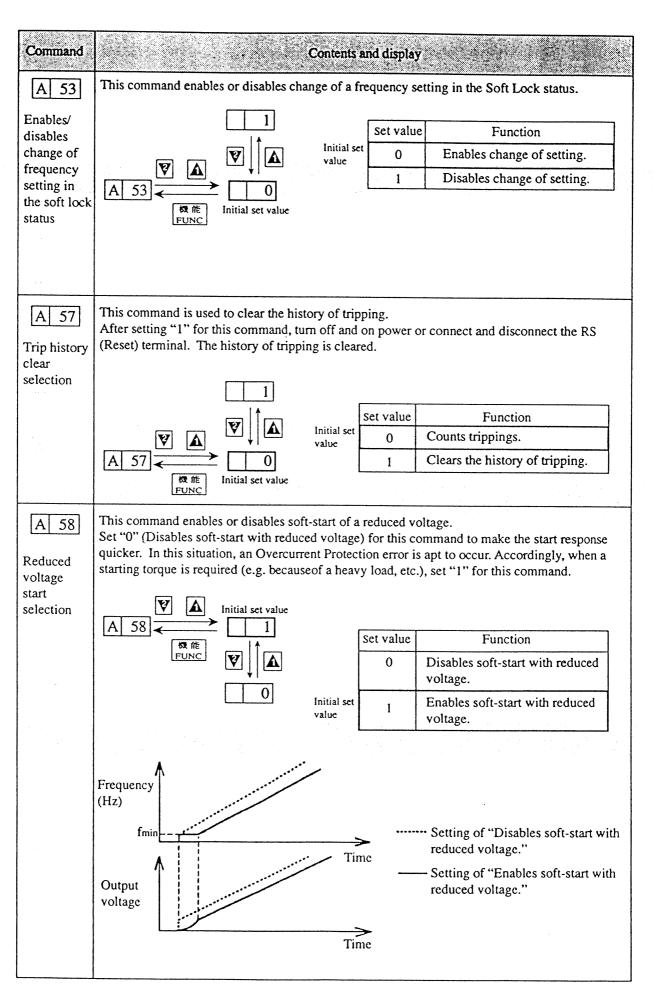




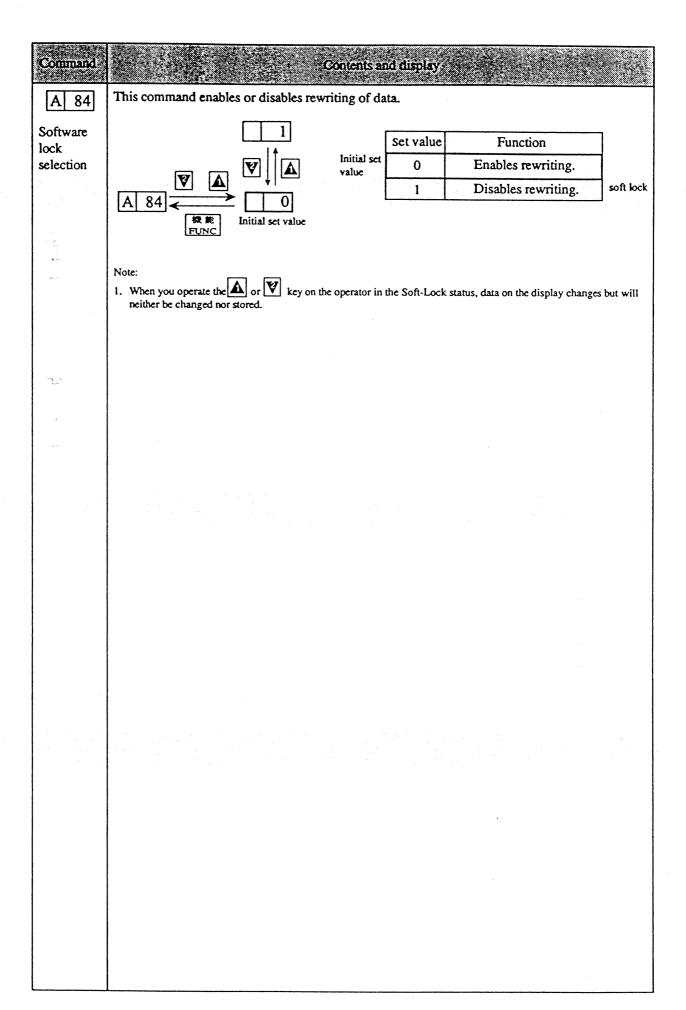








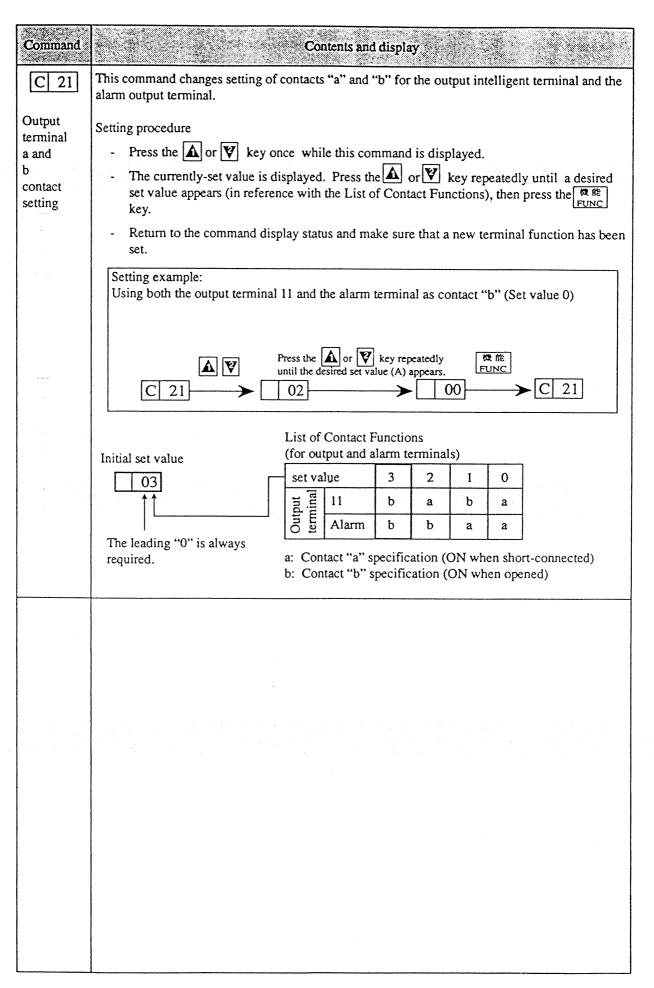
Command	Contents and display
A 80 A 81	These commands adjust the relationship between external frequency commands and inverter output frequencies.
Frequency command	A 80 : Voltage command (O-L)
adjust (voltage,	A 81 : Current command (OI-L) It is not recommended to use this function so often. If this function is used so often, the relation-
current)	ship 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.
	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.
A 82 A 83	These commands respectively set an allowance time of an undervoltage and a reentry wait time after power recovery.
Allowable	
voltage time,	A 82 1.0 Initial set value A 83 1 0.0 Initial set value
Under voltage retry	校能 FUNC V LA
waiting time setting	0.3
	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.)
	Allowable undervoltage time
	Power supply
	Undervoltage
	Running status of the inverter
	Rotations per minute of the motor
	Note: 1. To use the retry function, set the A 34 command to 1 (Restart with 0Hz).



Command			Contents and display						
11.1 () 1		nds respective	ely assign terminal functions to terminals 1 to 5 (a total of five						
,	terminals). When changir	ng the initial fo	unctions assigned to the terminals or changing the order of the						
	terminals, rea	ssign the func	tions respectively to the terminals by these commands.						
C 4		•	o an input intelligent terminal should be 12 msec or more.						
Tamut			ds to intelligent terminals						
Input terminal		ame of function t terminal setting	Terminal symbol Initial value Input intelligent Input inte						
setting 1,2,3			terninais terminais						
4 and 5	<u> </u>	t terminal setting	3 2 1 PV24 FW 5 4 CM1 CM1 ALO						
	L	t terminal setting	H O OI L FM CM2 II AL2 AL1						
	<u> </u>	t terminal setting							
		t terminal setting	5 0						
	Setting proce		key once for a desired terminal setting command.						
	- The pro-	eset value of u Lvalue appears	he terminal is displayed. Press the or key repeatedly until the s on the display (in reference with the List of Functions), then press						
	the 校能 key.								
- Return to the command display status and make sure that a new terminal function h									
		assigned.							
	Setting ex	Setting example: Assigning the SFT (Terminal Soft Lock) function to the RS (Reset) terminal							
	Assigning	me SF1 (1em	į į						
	Enter the value of a desired terminal by pressing the								
		A 🔻							
		_0							
		minal Function							
	Set value		Name of function						
	0		Backward rotation						
	1	<u> </u>	Speed 1						
	2		Speed 2						
	3		Speed 3						
	4		External D.C. braking						
	5		Initial setting						
	6		Secondary setting function						
	7		2-step acceleration/deceleration						
	8	<u> </u>	Free-running stop						
	9	 _ _ _ _ _ _ _ _ 	External tripping						
	10	USP	USP function						
	11	RS	Resetting						
	12	SFT	Terminal Soft Lock						
		rminal setting							
	- Do no	ot enter identic	cal values for $C = 0$ to $C = 4$ commands. minal 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						
ļ	funct	ion to the dest	tination terminal first.)						

Command Contents and display This command assigns a terminal function to the output intelligent terminal 11. Use this com-C 10 mand when changing the terminal function assigned to the terminal. Output Assignment of commands to intelligent terminals terminal setting Command Name of function Terminal symbol Initial value C10 Output terminal setting 11 0 PV24 FW 5 4 CMI CMI ALO OI L FM CM2 11 AL2 AL1 Output intelligent terminal Setting procedure - Press the or key once for a desired terminal setting command. - The preset value of the terminal is displayed. Press the \(\bigsim \) or \(\bigvet \) key repeatedly until the desired value appears on the display (in reference with the List of Functions), then press the 模能 key. Return to the command display status and make sure that a new terminal function has been assigned. Setting example: Changing the RUN (Run signal) function to the AR (Frequency Arrival signal) functiony Enter the value of a desired terminal 機能 FUNC by pressing the Λ or \forall key. **→** C 10 0 List of Output Terminal Functions Set value Symbol Name of function $\overline{0}$ AR Frequency Arrival signal 1 RUN Running signal 2 OL Overload Precaution signal

Command Contents and display This command changes setting of contacts "a" and "b" for input intelligent terminals 1 to 5. C 20 Setting procedure Input - Press the A or W key once while this command is displayed. terminal The currently-set value is displayed. Press the A or W key repeatedly until a desired a and set value appears (in reference with the List of Contact Functions), then press the Func contact setting 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) Press the or key repeatedly 機能 FUNC → C 20 20 Initial set value List of Contact Functions (for input terminals) Initial set value Od oc Оъ OA 09 08 07 06 05 04 04 02 01 00 OF OE 00 Set value b ь а ь а b b ь a а 1 b a а 2 ь а ь b Input terminal b b a а a а a 3 b b b b а а ь b b b а а 4 b b b b а а а a b b b b а а 2 a: Contact "a" specification (ON when short-connected) b: Contact "b" specification (ON when opened) 14 12 10 19 18 17 16 15 14 11 Set value 1F 1E 1d 1A b ь b b a b a b а а b а а ь а а Input terminal 2 b ь а ь b а а b b а а b а а 3 b а b b b b а b b b 4 b b b ь ь b b b а a a а a а a ь b b b b b 5 b b b b ь b b h 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.



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	1.4	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. Constant speed					
(NOTE 1)	When the current flowing through the power module or a temperature abnormality of the main devices comes to certain level, the output	Dec.	E 2			
	is cut off.	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.	ie	E 5			
Braking resistor overload	When regenerative braking resistor exceeds the usage time ratio an over- caused by the stop of the BRD function is detected, and output of the inv is cut off.		E 6			
Overvoltage protection	When the converter voltage exceeds a certain level due to regenerative en the motor, this protection function engages, and the output of inverter is	nergy from cut off.	E 7			
EEPROM error (NOTE 2)	When the memory built in has problems due to noise or excessive temper this protective function engages, and the output of inverter is cut off.	erature rise,	E B			
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).					
СТ епог	When a large noize source is near the inverter or an abnormality occurs on built-in CT, the output of the inverter is cut off.					
CPU error	Malfunction or abnormality on built-in CPU and the output of the inverter is cut off.					
External trip	An abnormality signal from external equipment cuts off the output of the inverter.					
USP error	It indicates an error when power is turned on while the inverter is being run. (When USP function is selected)					
Ground fault protection	The inverter is protected by detection of ground faults between the inverted and the motor upon power on. There may be the possibility of power mother protection is provided for the inverter, not for humans.	ter output odule failure.	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 06 was selected in F3)	
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	
It is displayed when power is shut off.	
It displays the rest time of retry waiting time after the power recovery of undervoltage when selecting the retry mode. (example) - / [] shows restart after 10 seconds.	-V 0

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

10. TROUBLESHOOTING

Sy	mptom	Probable cause	Countermeasure			
The motor will not run.	The inverter outputs U, V and W are not supplying voltage.	• Is power being supplied to terminals L1, L2(N), and L3? If it is, the POWER lamp should be on.	 Check terminals L1, L2(N), and L3, U, V, and W. Turn on the power supply. 			
	mg voltage.	• Is the display E 🛛 ?	• Press 🛕 🕎 and check the content. Then press the reset key.			
		Is the operation instruction RUN ON? Is terminal FW (or RV) connected to terminal PV24? .	Set to ON. Connect terminal PV24 to terminal FW (or RV) on the printed-circuit board. (When the terminal mode is selected.)			
		• Has the frequency setter been turned on by pushing 機能 FUNC key to select F □ and then ▲ ▼ key. • Are the printed-circuit board terminals H, O and L connected to the potentiometer?.	 Push down keys and set. When terminal mode is selected, connect the potentiometer to H, O, and L, and then set. 			
		• Has RS/FRS been left ON?	• Release reset.			
		• Is the mode key F 5 setting correct?	Read the instruction manual again (8-10).			
	Inverter outputs U, V, and W are supplying voltage.	Has the motor seized or is the load too great?	Release seizure or lighten the load. Test the motor independently.			
	The optional remote operator is	Are the operational settings between the remote operator and inverter unit correct? .	Check the operation of the optional remote operator. (copy unit)			
	used. (copy unit)		ON 1 2 3 4 1: OFF 2: ON (Same as J300)			
The direction of the motor is reversed		 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? 	Make the connections according to the phase sequence of the motor. (In general, forward should be in the sequence: U, V, and W.)			
		 Are the terminals on the printed-circuit board correct? Is the mode key F 4 set correctly? 	Terminal FW for forward, and RV for reverse.			

Symptom The rom		Probable cause	Countermeasure			
The rpm of the motor will not		After checking the wiring of the frequency setter, the rpm still does not increase when the setter is turned.	Replace the frequency setter.			
increase.		Are terminals 1 and PV24, terminal 2 and PV24, terminal 3 and PV24 ON?	• 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.)			
:		• Is the load too great?	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.		Is the fluctuation in load too great?Is the power supply voltage fluctuating?Is some peculiar frequency causing the problem?	 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.		 Is the maximum frequency setting correct? Are the number of motor poles, the gear ratio, and pulley ratio correct? 	 Check the V/F pattern against the motor specifications. Check the speed-change ratio. 			
The data is incorrect.	The data has not changed.	• Was the power turned off without pushing the 機能 key after the data was changed with A v keys.	• Input the data and push the REINC key once.			
		• The data is memorized upon power off. Is the time from power OFF to ON less than six seconds?	• Take six seconds or more when turning power OFF and ON after changing the data.			
	Data copied by the copy unit is not input.	• Is the power turned off for six seconds or more after the display changed from REMT to INV.	Copy again and turn the power off six seconds or more after copying.			

Sym	ptom	Probable cause	Countermeasure
The data is not changed.	Frequency setting can not be changed. Run and stop can not be done.	The change of the terminal mode and digital operator mode were correct?	• Confirm the change in F 9 setting mode. (See page 8-12.)
	The data can not be changed.	• Is software lock ON with software lock selection [H] [H] (date: 1) • Is the switch 4 mounted on the back of the remote operater (copy unit) ON? (See page 13-2)	Open SFT terminal and PV24. Change the data of FET 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 STR key to store the data
- ② Operating the 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

WARNING

- After a lapse of more than 5 minutes after turning off the input power supply, perform the maintenance and inspection.
 Otherwise, there is a danger of electric shock.
- Make sure that only qualified persons will perform maintenance, inspection and part replacement. (Before starting the work, remove metallic objects from your person (wristwatch, bracelet, etc.)

(Be sure to use tools protected with insulation.)

Otherwise, there is a danger of electric shock and/or injury.

/ CAUTION

 When removing connectors, never pull the wires. (Wires for cooling fan and thermal relay)

Otherwise, there is a danger of fire due to wire breakage and/or injury.

• General precautions

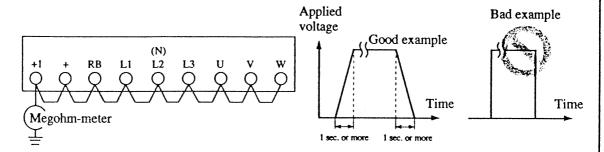
Always keep the unit clean so that dust or other foreign matter does not enter the inverter. Take special care in regard to breaking lines and connection mistakes. Firmly connect terminals and connectors. Keep electronic equipment away from moisture and oil. Dust, steel filings and other foreign matter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

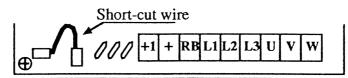
Conduct these tests by short-circuiting the terminals as shown below, and by following the conditions described.

- 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.



Insulation Resistance Tests and Withstand Voltage Tests

• Remove short-cut wire on the power PCB before conducting the test. And be sure to attach short-cut wire after the test. (for 400V class only)



- 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.

Apply 80% of the rated voltage of the capacitor for 1 hour at normal temperature.

- A Increase the voltage to 90% and apply it for 1 hour.
- B 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.

11-2

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

Recommended Spare Parts

Part description	Symbol	Quantity		Damada	
r art description	Symbol	Used	Spare	Remarks	
Main circuit P.C. board assembly	POWER PCB	1	l	Main circuit device, circuit parts, fin assembly	
Cooling fan	FAN	1	1	Used for 015SFE5 and 022SFE5 015HFE5 to 037HFE5	
Smoothing capacitor P.C. board assembly	СВ РСВ	1	1	Used for 015SFE5 to 022SFE5 015HFE5 to 037HFE5 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)

Inctmimants	IIISH UIIIGHUS	Thermometer		Hygrometer	Tester	500 V class Megohm meter
Standard	replacement period	1				
Criterio	CINCIIA	Ambient temperature between -10 to +40°C; no icing.	Ambient humidity 20 to 90%; no dew condensation.		No abnormalities. 220 to 240 V, 50/60 Hz 380 to 415 V, 50 Hz 400 to 460 V, 60 Hz	No abnormalities in (1) and (2). Tightening torque (except for terminal block) • M3 (Diode module): 0.59 - 0.79 N•m • M4 (Power module): 0.98 - 1.47 N•m • M3: 0.79 - 0.98 N•m • M3: 0.79 - 1.18 N•m
Increation method	mspection memod			Visual and aural inspection.	Measure the voltage between inverter terminals R, S, and T.	(1) Tighten. (2) Visual inspection.
Inspection cycle	Periodic					7 7 7
Inspec	Daily	7		7	7	
Increation content	תואליכנוסון בסוונפוונ	Check ambient temperature, humidity, dust, corrosive gases, oil mist, etc.		Check for abnormal vibrations and noise.	Check the input line voltage.	(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.
Increotion item	maheemon neum	Ambient environment		Devices overall	Power supply voltage	Overall
Inspection	location	Overall				Main circuit

Daily Inspection and Periodic Inspection (2/3)

Inspection	Taxos is a citorograft	Tacacation contant	Inspec	Inspection cycle	Inspection method	Criteria	Standard	Instruments
location	inspection term	יוואספרווסון בסווגרווו	Daily	Periodic	mspection meaned		period	- 1
Main	Terminal block	No damage.		7	Visual inspection	No abnormalities.		
CIICUII	Smoothing	(1) Check for leaking	7		Visual inspection of	Visual inspection of No abnormalities in (1) and	5 years	Capacity meter
	capacitor	(2) Check for swelling	7		(1) alla (2).	(~).		
	Relays	(1) Check for stuttering noise when operating		7	(1) Aural inspection.	(1) No abnormalities.		`
	Resistors	(1) Check for large cracks or changes in color		7	(1) Visual inspection	(1) Visual inspection (1) No abnormalities.		Tester
	Cooling fan	(1) Check for abnormal vibrations and noise	7		(1) Rotate manually with power off.	(1) Smooth rotation	2 - 3 years	
					(2) Increase tightening			
		(2) Check for dust	7	-		(2) No abnormality		

Daily Inspection and Periodic Inspection (3/3)

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

NOTE: 1. The life of capacitor will be affected by the amibient temperature. See Appendix 3 Capacitor Life Curve.

2. The inverter must be cleaned periodically. If dust accumulates on the fan and heat sink, it can cause overheating of the inverter.

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.

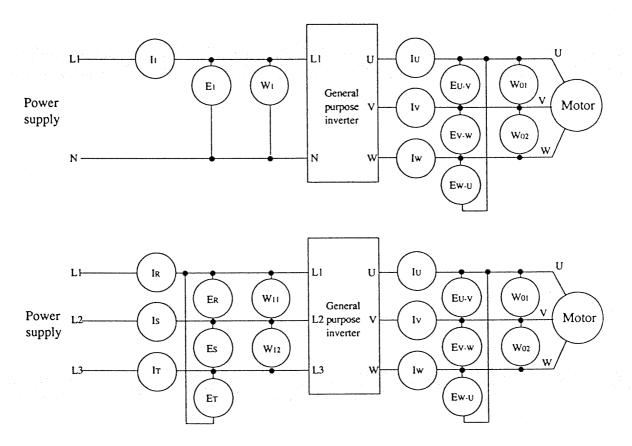


Table 3 Parts to be measured

	T	y			
Measurement item	Parts to be measured	Me	easuring 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
Supply current	L1, L2, L3 (IR)(IS)(IT)	*	Moving-iron type	Total effective	400-460 V 60 Hz
I	(10)(15)(11)	7	ammeter	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 supply current I_1 and supple $Pf_1 = \frac{W_1}{\sqrt{3} \cdot E_1 \cdot I_1} \times 100(\%)$				
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 and output power W. $Pf_0 = \frac{W_0}{\sqrt{3} \cdot E_0 \cdot I_0} \times 100(\%)$		m the output voltage E, c	output current I,	

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 frequencys 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

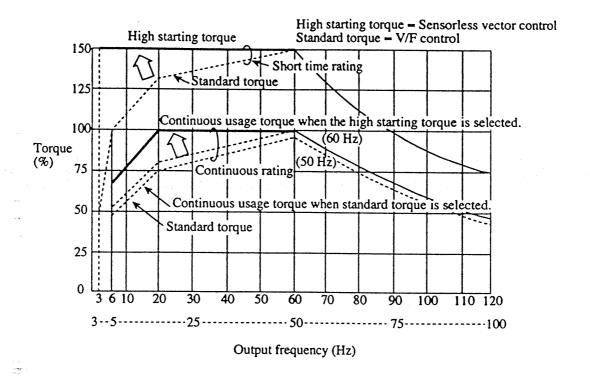
Model designation		J100- 004SFE5	J100- 007SFE5	J100- 015SFE5	J100- 022SFE5	J100- 015HFE5	J100- 022HFE5	J100- 037HFE5		
Protective structure (NOTE 1)		IP20								
Over voltage category										
Maximum motor size (4P, kW)(NOTE 2)		0.4	0.75	1.5	2.2	1.5	2.2	3.7		
Maximu capacity (kVA)		1.1	1.9	2.9	4.0					
	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		
Input supply phase		Single-pl	hase		Three-phase, 3 wire, earthed neutral					
Rated input AC voltage (V)				50/60 Hz 50/60 Hz ±	380 to 415/400 to 460 V ±10%, 50/60 Hz ±5%					
Rated output voltage (V) (NOTE 3)		Three-ph (Corresp	nase 220 to onds to in	240 out voltage.	Three-phase 400 to 460 (Corresponds to input voltage.)					
Rated input current (A)		6	10	15	21	5	7	11		
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		±0.01% of the maximum frequency Analog ±0.2% (25 ±10°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- 007SFE5	J100- 015SFE5	J100- 022SFE5	J100- 015HFE5	J100- 022HFE5	J100- 037HFE5	
Input signals	Frequency setting	Digital operator	Settings with							
		External signals	0 - 5 VDC (nominal), 0 - 10 VDC (nominal) (Input impedance 30 k Ω) 4 - 20 mA (nominal) (Input impedance 250 Ω) Potentiometer: 500 Ω to 2 k Ω (2 W) Variable resistor							
	Forward/ reverse run, stop	Digital operator	RUN/STOP 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 siganl							
Output signals			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							
								,	;	

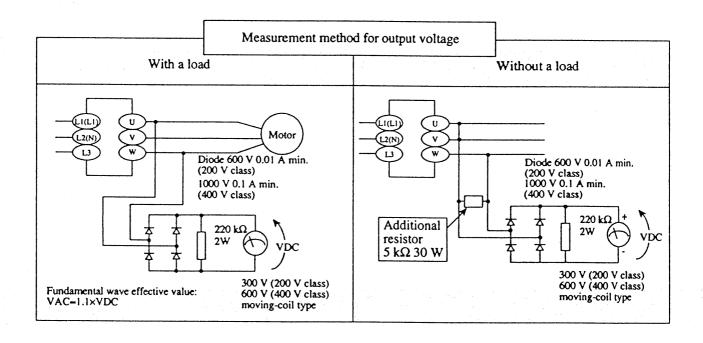
Model designation		J100- 004SFE5	J100- 007SFE5	J100- 015SFE5	J100- 022SFE5	J100- 015HFE5	J100- 022HFE5	J100- 037HFE5		
General specifi- cations	Ambient temperature	-10 to 40°C (-10 to 50°C when cover removed.)				-10 to 40°C -10 to 50°C (with cover) (without cover)				
	Humidity	20 to 90% RH (no dew 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		

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

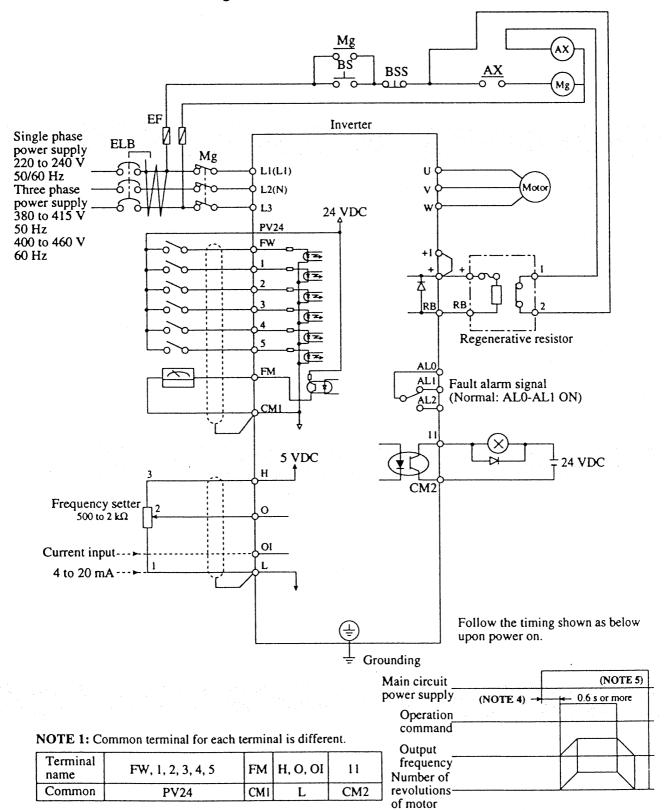
- **NOTE 1:** Protective structure is based upon JEM1030 (1977).
- **NOTE 2:** The applicable motor is a Hitachi standard four-pole motor. When using another motor, make sure that the rated motor current does not exceed the rated inverter current.
- NOTE 3: The output voltage will decrease if input voltage 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



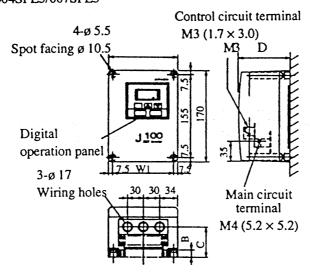
NOTE 2: The regenerative resistor has a temperature sensor.
When it works, turn off power supply to the inverter or set the deceleration time longer.

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.

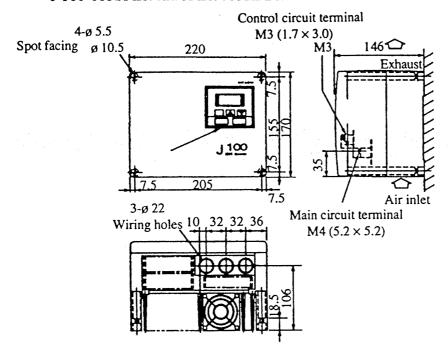
NOTE 5: Do not turn OFF the main circuit power during running.

Dimension Diagram J 100-004SFE5/007SFE5

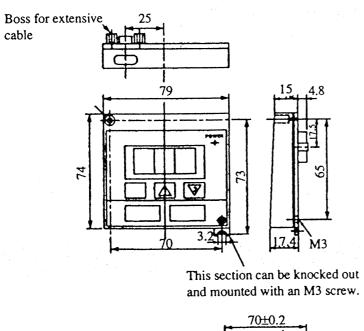


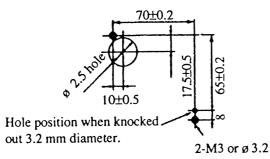
	W	W1	D	С	В
J100-004SFE5	128	113	93	55	14.5
J100-007SFE5	145	130	103	69	18.5

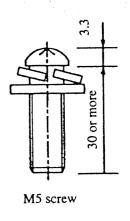
J 100-015SFE5/022SFE5/015HFE5/022HFE5/037HFE5



Digital operator



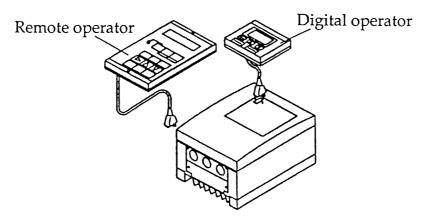




13. FUNCTIONS WHEN USING THE OPTIONAL REMOTE OPERATOR

13.1 Connecting the remote operator

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



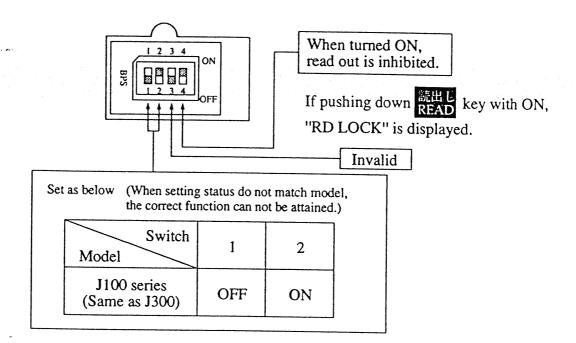
- (1) Insert the connector straight into the remote operator and inverter unit printed-circuit board.
- (2) Turn on the power supply.
- (3) Make sure that the liquid crystal display of the remote operator is lit.

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 dipswitches 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	FS00.0 000.0Hz	0.000	000.0 to 375.0		(1) displays the setting. (2) displays the
		1S005.0 000.0Hz	0.000			output. • [] is displayed
	Multistage-speed setting and out-put frequency	2S020.0 000.0Hz	0.000			when run instruction is ON.
	put frequency	3S040.0 000.0Hz	0.000			F: Forward run R: Reverse run
		4S000.0 000.0 Hz				Displayed during
	Expansion	5S000.0 000.0Hz	000			multistage operation.
	multistage speed	6S000.0 000.0Hz				
		7S000.0 000.0Hz				
2	Acceleration time setting	ACCEL-1 0010.0S	10.0 (15.0)	0.1 to 2999.9	Y	
3	Deceleration time setting	DECEL-1 0010.0S	10.0 (15.0)	0.1 to 2999.9	Y	
4	2-stage acceleration time setting	ACCEL-2 0010.0S	10.0	0.1 to 2999.9	Y	
5	2-stage deceleration time setting	DECEL-2 0010.0S	10.0	0.1 to 2999.9	Y	
6	Frequency setting command	F-SET-M Terminal	Terminal	Remote Terminal	N	REMOTE: Setting from the remote operator
7	Operation command method	F/R-SW Terminal	Terminal	Remote Terminal	N	TERMINAL: Setting from the inverter terminal
8	Revolution speed display	RPM 4P 00000RPM	4	2 to 48	Y	Synchronized speed display
9	Output current display	If A Im000.0%		1.5 to 23	Y	(1) displays the rated current of the inverter (2) displays output current
10	DC voltage display	PN-V 000V	_	-		
11	Manual torque boost adjustment	V-Boost Code<11>	11	00 to 99	Y	
12	Output voltage gain adjustment	V-Gain 100%	100	50 to 100	Y	
13	Analog meter adjustment	M-ADJ 72	72	01 to 99	Y	
14	Failure display	# ? ERROR Over V.	_	-	-	#: Normal operation, Alarm content takes precedence over all other displays.
15	Trip history monitor	? ERR COUNT 000	-	-	-	Displays three alarms of the past (Voltage and current upon alarm)

0.5 N·m (max. 0.7 N·m)

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 se- quence	No.	Function name	Display (Function	content 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	<u>+</u> Fmax.	000.0 Hz	0	0 to 15 (Hz)	Adjustment against the maximum frequency set at F-00
3	F-02	Start frequency adjustment	<u>F</u> min.	000.5 Hz	0.5	0.5 to 5.0 (Hz)	
4	F-03	Maximum frequency limiter setting	<u>H</u> -LIM-F	000.0 Hz	0	0 to 375 (Hz)	Set the maximum and minimum set frequency.
5	F-04	Minimum frequency limiter setting	<u>L</u> -LIM-F	000.0 Hz	0	0 to 375 (Hz)	Both F03 and F04 are 0. : Not valid
6	F-05	Multistage-speed first speed setting	Speed-1	000.0 Hz	0	0 to 375 (Hz)	Setting the multistage speed Control circuit terminal Set
7	F-06	Multistage-speed second speed setting	Speed-2	000.0 Hz	0	0 to 375 (Hz)	1 2 3 frequency ON OFF (1S) F-05 OFF OFF (2S) F-06
8	F-07	Multistage-speed third speed setting	Speed-3	000.0 Hz	0	0 to 375 (Hz)	ON ON (3S) F-07 ON OFF (4S) F-08 OFF ON (5S) F-09
9	F-08	Multi-stage-speed fourth speed setting	Speed-4	000.0 Hz	0	0 to 375 (Hz)	OFF ON ON (6S) F-10 OFF OFF (7S) F-11
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 setting	Speed-7	000.0 Hz	0	0 to 375 (Hz)	
13	F-12	DC braking frequency adjustment	<u>F</u> -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	<u>V</u> -DCB	000	000	000 to 020	Set the DC braking force Maximum is at 020.
				:			

Display se- quence	No.	Function name	Display (Function	content n 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	
			<u>S</u> WITCH1	DCB OFF		DCB ON/OFF	① DC braking Yes/No	
			SWITCH1	FM ANA		FM ANA/DIG	© Frequency monitor: Analog meter/Digital meter	
			<u>S</u> WITCH1	fmax 120		Imax 120/360	③ Switch the maximum frequency 120/360 Hz	
21	F-20	Switch selection 1	SWITCH1	PWER ALM	See the	PWER ALM/ZST	Trip/Retry function (Restart upon undervoltage) (*2)	
			SWITCHI	DIOP FWD	lett	DIOP FWD/REV	Switch the motor revolution direction with the digital operator	
			<u>s</u> witchi	FWD ON		FWD ON/OFF	6 Direction of the motor revolution ON/OFF (Forward)	
		tan di kacamatan	SWITCH1 REV	REV ON		REV ON/OFF	① Direction of the motor revo- lution ON/OFF (Reverse)	
			<u>s</u> witch1	OLMT ON		OLMT ON/OFF	Overload limiter	

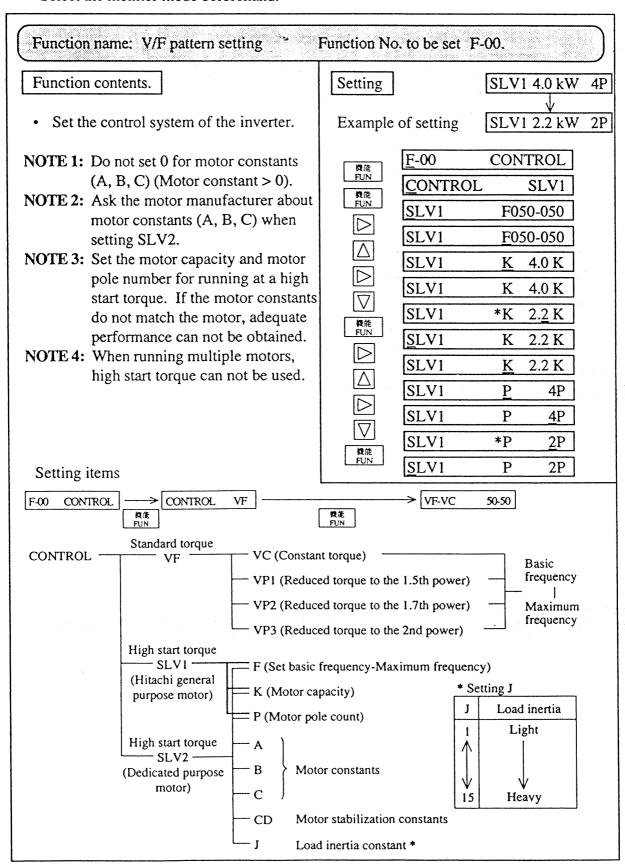
Display se- quence	o. Function name	Display (Function	conten n mode	it 2)	Standard setting	Setting range	Remarks
		SWITCH2 I	DB L	LVL		DB EDG/LVL	DC braking edge/level selection
		SWITCH2	STOP	ON		STOP ON/OFF	2) STOP key is effective when external run is selected.
		SWITCH2	Ethm	100		Ethm 000/100	3 Electronic Thermal relay is selected.
		SWITCH2	SLOK	OFF		SLOK OFF/ON	Setting frequency in software lock (Invalid from the terminal).
22 F-2	21 Switch selection 2	SWITCH2	AIN	5V		AIN 5V/10V	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	See the	AIN TER/PAN	6 Be sure to select TER.
		SWITCH3	SOFTF	REE	left	SOFT LOCK/FREE	Data is changed or not. (* 3)
23 F-2	22 Switch selection 3	SWITCH3	FARV	2		FARV 1/2	2) Selection of frequency arrival (2: Set frequency 1: Any frequency)
		SWITCH3	TRIP C	OFF		TRIP OFF/ON	3 Selection of neglect of undervoltage trip upon stop
-		SWITCH3 DEBG OFF		44	DEBG OFF/ON	4) Must be OFF.	
		SWITCH3	TCNT	CNT		CNT/CLR	5) Trip history clear selection
24 F-2	Switch selection 4	SWITCH4	MON	FM	1	MON FM/CUR	Monitoring selection FM: Frequency monitoring CUR: Current monitoring
		SWITCH5	RUN 1	I		RUN 1/2	RUN signal output selection 1: Output during operation 2: Output during operation and DC braking
25 F-2	24 Switch selection 5	<u>S</u> WITCH5	AVR C	ON		AVR ON/OFF	2) AVR value delection for deceleration ON: The AVR value is the same as the V-SET value. OFF: An optional AVR value can be delected
No.				:			by DEC-V 3) LAD stop function selection
		SWITCH5	LAD C	NC		LAD ON/OFF	ON: LAD stop sunction (*4) OFF: No LAD stop function
		SWITCH5	RVS O	N		RVS ON/OFF	4) Reduced voltage start ON/OFF
							OFF: No LAD stop A Reduced voltage st

Display se- quence	No.	Function name	Display (Function	content mode 2)	Standard setting	Setting range	Remarks
26		Overload limiter constant setting	LM.CONS	150%01.0	150 (%) /1.0		Set the overload limit level and deceleration time
27	F-26	Allowable under- voltage 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	BRD-%ED	05.0%	5.0 (%)	0.1 to 31.0 (%) (* 6)	Set the allowable usage ratio of regenerative resistor to over 100 seconds
30		Frequency arrival setting	SPD-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	CARRIER	16 kHz	16	5, 8, 12, 16 (kHz)	
32	F-31	Input voltage setting	V-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		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	JUMP-F1	000.0Hz	0	0 to 375 (Hz)	Up to 3 locations can be set. 0 means invalid.
35	F-34	Jump frequency 2	JUMP-F2	000.0Hz	0	0 to 375 (Hz)	
36	F-35	Jump frequency 3	JUMP-F3	000.0Hz	0	0 to 375 (Hz)	
37	F-36	Jump frequency width	JMP-WID	0.5Hz	0.5	0 to 9.9 (Hz)	
38	F-37	Overload previous notice level	<u>O</u> Lalarm	150%	150	50 to 150 (%)	ON level of overload previous notice signal
39	F-38	Input terminal 1	IN-TM I	CF I			REV: Reverse running command
	ting	Input terminal 2	<u>I</u> N-TM 2	CF 2		REV/CF1/CF2 CF3/DB/STN	CF1: 1st multispeed switching CF2: 2nd multispeed switching
	al set	Input terminal 3	IN-TM 3	2CH	Same as		CF3: 3rd multispeed switching DB: External DB input
	min	Input terminal 4	JN-TM 4	RS		SFT	STN: Initialization SET: 2nd setting function
	put te	Input terminal 5	IN-TM 5	REV			switching 2CH: 2-stage acceleration and
	ninal in	Input terminal I NO/NC setting	IN-TM C	0/C-1 NO			deceleration switching FRS: Free run input EXT: External trip terminal
	Intelligent terminal input terminal setting	Input terminal 2 NO/NC setting	<u>I</u> N-TM C	0/C-2 NO			USP: USP function RS: Reset input SFT: Software lock input
	ıtellige	Input terminal 3 NO/NC setting	IN-TM ()/C-3 NO	NO	NO/NC	NO: a contact NC: b contact When the corresponding
	1	Input terminal 4 NO/NC setting	<u>I</u> N-TM ()/C-4 NO			terminal is the [RS] terminal, only the NO operation is per-
		Input terminal 5 NO/NC setting	IN-TM (D/C-5 NO			formed. (Even when NC is set, * display remains but the setting is returned to NO.)

Display se- quence	No.	Function name	Display content (Function mode 2)	Standard setting	Setting range	Remarks
40	F-39 Output terminal 1		OUT-TM 1 AR	AR	AR/RUN/OL	AR: Speed arrival signal RUN: During on-line signal OL: Overload previous notice
	Intelligent terminal output terminal sett	Output terminal 11 NO/NC setting	NO/NC setting OUT-TM O/C-T NC NC NO/N	NO/NC	signal NO: a contact	
	Intelliger output te	Alarm output NO/NC setting	OUT-TM O/C-A NC	NC	NO/NC	NC: b contact
41	1-40	External frequency command input sampling count setting	<u>S</u> AMP-F 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.

- Function mode operation when using the remote operator
 - 1. After data is changed, be sure to push down the key.
 - 2. Change data when the inverter is stopped. No data can be changed when the inverter is tripped and stopped.
 - 3. In the function mode, the motor can not be started running. Select the monitor mode beforehand.



Protective function displayed when using the remote operator

Description	Contents		Display
Power module	When output of an inverter is short circuited or the motor is locked, a large current flows through the	Constant speed	PM. Drive
protection	inverter and causes a fault. When the current flowing through the power module or a temperature abnormal-	Dec.	PM. Decel
	ity of the main devices comes to certain level, the output	Acc.	PM. Accel
	is cut off.	Stop	PM. ERR
Over- current	The output current of the inverter is detected. When it exceeds the specified value, the output is turned off.	Constant speed	OC. Drive
protection (NOTE1)		Dec.	OC. Decel
		Acc.	OC. Accel
Overload	7.77	Stop	OC. ERR
protection (NOTE1)	When a motor overload is detected the inverter's built in the detects it and the output of the inverter is cut off.	ermostat	Over. L
Braking resistor overload	When regenerative braking resistor exceeds the usage time overvoltage caused by the stop of the BRD function is deteroutput of the inverter is cut off.	ratio, an cted, and	OL. BRD
Over- voltage protection	When the converter voltage exceeds a certain level due to renergy from the motor, this protection function engages, as of inverter is cut off.	Over. V	
	This is an error display when the voltage supplied to the inceeds the specified value.	OV. SRC	
EEPROM error	When the memory built in has problem by noise and exces ture rise, protective function works and output of inverter	sive tempera- is cut off.	EEPROM
Under- voltage protection	A decrease of the input voltage of an inverter results in implication of the control circuit. It also generates motor heat and torque. Output is cut off when the input voltage goes down to less	causes low	Under. V
	160V (200V class), 300 to 320V (400V class).		
CT error	When a large noize source is near the inverter or an abnorm on built-in CT, the output of the inverter is cut off.	nality occurs	CT
CPU error	Malfunction or abnormality on built in CPU and the outpu inverter is cuts off.	t of the	СРИ
External trip	An abnormality signal from external equipment cuts off the inverter. (When the external trip function is selected)	EXTERNAL	
USP error	It indicates an error when power is turned on while the invrun. (When USP function is selected)	USP	
Ground fault protection	The inverter is protected by detection of ground fault betw inverter output and the motor upon power on. There may be the possibility of power module failure.	GND Flt	

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

Dimension (unit:mm)

Remote operator (DOP-0A) Copy unit (DRW-0A) 155 Panel cut out Panel cut out J100 CABLE Extension cable for connector between Extension cable for connector between the J100 and the remote operator 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

Ор	Operation example (Procedure to transfer the data of inverter A to B,C, and D inverters)								
Se- quence	Operation	Key	Operation result						
1	Set data is read out from the inverter A (It is stored into the memory.	読出し READ	Inverter A Copy unit						
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)	Data copy						
5	Cut off the power supply to inverter B. (* 1)		Inverter B Inverter C Inverter D						
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.		17.00 17.00						

	Operation example (Process to char	ige 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.	E= 牙梗能 記憶 MON FUN STR	Data change Data change D
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	Inverter A Copy unit

*1 When pressing any key or resetting the unit after the COPY 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 exterminal 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 J100-004SFE5 to J100-022SFE5), 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 be 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 [This information is written on the
MFG. No.		}	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	<u></u>	
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 extention function	0	

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

(2) Extention 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 thermial 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	
L			Į.

Command display	Function name	Standard setting	Remarks
A 40	Optional arrival frquency 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 arival 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		This information is written on the
MFG. No.		$ \longrightarrow $	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	
		1S005.0 000.0Hz	
and service	Multistage speed setting and output	2S020.0 000.0Hz	·
	frequency	3S040.0 000.0Hz	
-		4S000.0 000.0Hz	
	Expansion multistage	5S000.0 000.0Hz	
	speed	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	

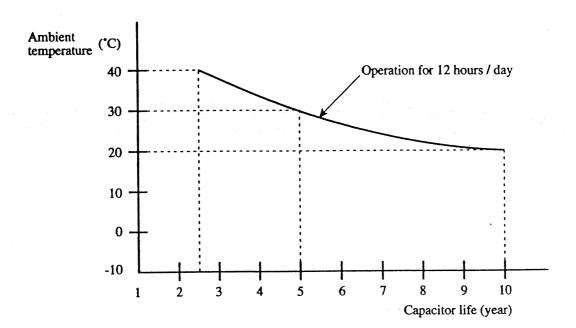
NOTE: The value of 400 V class is 15.0s.

Function mode

Display sequence		Function name	Standard setting	Set value
F-00	V/F patte	rn setting	V/F-VC 050-050	
F-01	Maximun	n frequency adjustment	0	
F-02		uency adjustment	0.5	
F-03	Maximun	n frequency limiter setting	0	
F-04	Minimun	r frequency limiter setting	0	
F-05		e-speed first speed setting	0 (Hz)	
F-06		e-speed second speed setting	0 (Hz)	
F-07		e-speed third speed setting	0 (Hz)	
F-08		e-speed fourth speed setting	0 (Hz)	
F-09		e-speed fifth speed setting	0 (Hz)	
F-10		e-speed sixth speed setting	0 (Hz)	
F-11		e-speed seventh speed setting	0 (Hz)	
		ng frequency adjustment	0.5 (Hz)	
F-13		ng force adjustment	0 (0)	
F-14		ng time adjustment	0 (S)	
F-15		c thermal level adjustment	100 (%)	
F-16	Decelera	tion selection(Linear, Curve) tion selection(Linear, Curve)	Linear Linear	
F-17		frequency setting start	0 (Hz)	
F-18		frequency setting start	0 (Hz)	
F-19	LACITIAL	Set DC braking	DCB OFF	
F-20		Switch of frequency monitor	FM ANA	
		Switch of the maximum frequency	fmax 120	
'	Switch	Switch of trip and retry	PWER ALM	
	selec-	Switch of the motor direction when using the digital	DIOP FWD	
	tion 1	operator		
		Direction of the motor (Forward)	FWD ON	
		Direction of the motor (Reverse)	REV ON	
		Overload limiter	OLMT ON	
F-21		DC braking edge/level selection	DB LVL	
		Stop key is effective when external run is selected	STOP ON	
	Switch	Selection of electronic thermal characteristic	Ethm 100	
	selec- tion 2	Selection of software lock	SLOK OFF	
	Hon 2	Setting voltage for analog input	AIN 5V	
		Selection of analog input	AIN TER	
F-22		Selection of data change	SOFTFREE	
	Switch	Selection of frequency arrival	FARV 2	
	selec- tion 3	Selection of neglect of trip Debug mode display	TRIP OFF DEBG OFF	
		Trip history clear	TCNT CNT	
F-23	Switch	Monitoring selection	MON FM	
F-23	selec-	Wouldering Solection	1,101, 11,11	
	tion 4			
F-24	†	RUN signal output selection	RUN I	
1 - 24	Switch	AVR value selection for deceleration	AVR ON	
	selec- tion 5	LAD stop function selection	LAD ON	
	tion 5	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	c braking usage ratio setting	5.0	
F-29	Frequen	cy arrival setting	ACC, DEC 100%	ACC DEC
F-30	Carrier f	requency setting	16 kHz	
F-31	Input vo	ltage setting	220 V (380V)	
F-32	AVR vo	Itage setting for deceleration	220 V (380V)	

Display sequence		Standard setting	Set value	
F-33	Jump frequency 1	Jump frequency 1		
F-34	Jump frequency 2		0	
F-35	Jump frequency 3		0	
F36	Jump frequency width		0.5	
F-37	Overload previous notice level		150%	
F-38		Input terminal 1	CF1	
		Input terminal 2	CF2	
		Input terminal 3	2CH	
		Input terminal 4	RS	
	Intelligent terminal	Input terminal 5	REV	
	input terminal setting	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 11	AR	
		Output terminal 11 NO/NC setting	NC	
	output terminal setting	Main output NO/NC setting	NC	
F-40	External frequency command input		08	
	sampling count setting			

Appendix 3 Capacitor Life Curve



- * When the inverter is stored in the panel, the ambient temperature is the temperature in the panel.
- * The useful life of the inverter will shorten if proper ventilation is disturbed by the dust and dirt accumulated on the inverter. This is true even when the inverter is running at a normal operating temperature.

