MITSUBISHI

General Purpose Inverter

FREDROL-U_{120S-EC}

European version

Instruction Manual

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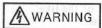
Thank you for choosing the Mitsubishi Inverter.

This instruction manual gives handling information and precautions for use of this equipment. Incorrect handling might cause an unexpected fault. Before using the inverter, please read this manual carefully.

Please forward this manual to the end user

This section is specifically about safety matters

Do not attempt to install, operate, maintain or inspect the inverter until you have read through this instruction manual and appended documents carefully and can use the equipment correctly. Do not use the inverter until you have a full knowledge of the equipment, safety information and instructions. In this instruction manual, the safety instruction levels are classified into "WARNING" and "CAUTION".



Assumes that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



Assumes that incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only.

Note that the CAUTION level may lead to serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

SAFETY INSTRUCTIONS

1. Electric shock prevention

A WARNING

Mhile power is on or when the inverter is running, do not open the front cover. You may get an electric shock.

A Do not run the inverter with the front cover removed. Otherwise, you may access the exposed highvoltage terminals and charging part and get an electric shock.

If power is off, do not remove the front cover except for wiring or periodic inspection. You may access the charged inverter circuits and get an electric shock.

Before starting wiring or inspection, switch power off, wait for more that 10 minutes, and check for no residual voltage with a tester or the like.

Use a class 3 or higher earthing method to earth the inverter.

Any person who is involved in the wiring or inspection of this equipment should be fully competent to do the work.

Always install the inverter before wiring. Otherwise, you may get an electric shock or be injured.

A Operate the switches with dry hands to prevent an electric shock.

Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Otherwise, you may get an electric shock.

2. Fire Prevention

A CAUTION

Mount the inverter on an incombustible surface. Installing the inverter directly on or near a combustible surface could lead to a fire.

If the inverter has become faulty, switch power off on the inverter's power supply side. A continuous flow of a large current could cause a fire.

3. Injury Prevention

⚠ CAUTION

Apply only the voltage specified in the instruction manual to each terminal to prevent, damage, etc.

A Ensure that the cables are connected to the correct terminals. Otherwise damage, etc. may occur.

Always make sure that polarity is correct to prevent damage, etc.

⚠ Please be careful, the key pad and plastic enclosure are hot when operating over 40°C ambient temperature.

Mhile power is on or for some time after power-off, do not touch the inverter as it is hot and you may get burnt.

4. Additional instructions

To prevent injury, damage, or product failure, please note the following points.

(1) Transportation and mounting

Mount the inverter on an inc NOTTON ... Installing the inverter

⚠ Take care when carrying products, use correct lifting gear.

⚠ Do not stack the inverter boxes higher than the number recommended.

Ensure the installation position and material can with stand the weight of the inverter. Install according to the information in the Instruction Manual.

⚠ Do not operate if the inverter is damaged or has parts missing.

⚠ Do not life the inverter with the front cover attached, it may fall off.

⚠ Do not stand or rest heavy objects on the inverter.

Check the inverter mounting orientation is correct.

Trevent any dust, wire fragments or other foreign bodies from dropping into the inverter during wiring up and commissioning.

⚠ Do not drop the inverter, or subject it to impacts.

⚠ Use the imverter under the following environmental conditions:

A CAUTION

Environment	Conditions		
Ambient temperature	-10°C to +50°C (non-freezing) He bits a standard Ha KladU Z		
Ambient humidity	90%RH or less (non-condensing)		
Storage temperature	-20 to +65°C *		
Ambience	Indoors, free from corrosive gas, flammable gas, oil mist, dust and dirt.		
Altitude, vibration	Max, 1000m above sea level, 5.9m/S ² (0.6G) or less (conforming to JIS C 0911)		

* Temperatures applicable for a short time, e.g. in transit.

(2) Wiring

A CAUTION

Do not fit capacitive equipment such as power factor correction capacitor, noise filter or surge supressor to the output of the inverter.

The connection orientation of the output cables U, V, W to the motor will effect the direction of rotation of the motor.

(3) Trial run

A CAUTION

A Check all parameters, and ensure that the machine will not be damaged by sudden start-up.

(4) Operation

A CAUTION

Mhile the retry function is selected, keep away from the equipment because it will start suddenly after an alarm stop.

A The stop key valid only when function setting has been made. Prepare an

emergency stop swich separately.

A Switch off the start signal when resetting the inverter. Fallure to do so may start the motor immediately after reset. The motor immediately after reset.

⚠ Do not use for loads other than a 3-phase induction motor. If another electrical device is connected to the inverter output the device could be damaged.

Do not modify the equipment.

⚠ CAUTION

The electronic motor thermal protection does not guarantee to prevent motor burn out.

⚠ Do not use a contactor on the inverter input for frequent starting/stopping of the inverter, use control signals.

To reduce the effect of mains conducted electromagnetic interference use a RFI noise filter. Take care to ensure electromagnetic radiation from the inverter does not damage or effect the operation of nearby electrical equipment.

When parameter clear or all parameter clear is performed, each parameter returns to the factory settimg. Re-set the required parameters before starting operation.

The inverter can be easily set for high-speed operation. Before changing its setting, fully examine the performances of the motor and machine.

A The inverter does not have a holding stop facility. For emergency stop another circuit must be used.

(5) Emergency stop

A CAUTION

A Provide a safety backup such as emergency brake which will prevent the machine and equipment from hazardous conditions if the inverter fails.

(6) Maintenance, inspection amd parts replacement

⚠ CAUTION

⚠ Do not carry out a megger (insulation resistance) test on the control circuit of the inverter.

(7) Disposing of the inverter.

A CAUTION

Treat as industrial waste.

(8) General

Many of the diagrams and drawings in the instruction manual show the inverter without a cover, or partially open. Never run the inverter like this. Always replace the cover and follow this instruction manual when operating the inverter.

INSTRUCTIONS FOR COMPLIANCE WITH THE EUROPEAN DIRECTIVES

1. EMC DIRECTIVE of Transpolance retem bodines as a prestaeval and distant a

- (1) Our view of inverters and the EMC Directive

 An inverter does not function independently. It is a component designed for installation in a control box and for use with other eqipment to control a machine or equipment. Therefore, we do not think that the EMC Directive applies directly to inverters. For this reason, we do not place the CE mark on the inverters themselves. The European power drive manufacturers' organization (CEMEP) also holds this point of view.
- (2) Compliance
 We do not think that the inverters themselves are covered directly by the EMC
 Directive. However, the EMC Directive applies to machines and equipment
 into which inverters have been incorporated, and these machines and equipment must carry the CE mark. Hence, we have prepared a technical document
 "EMC Installation Guidelines" (manual number BCN-A21041-202) so that
 machines and equipment incorporating inverters may conform to the EMC
 Directive more easily.
- (3) Outline of installation method as a set to seed most mentall base bate to see the recommended to install an inverter in the following method:
 - * Use the inverter with an European Standard-compliant noise filter.
 - * For wiring between the inverter and motor, use shielded cables or run

- cables in metal conduit and ground the cables or conduit at the inverterand motor ends. Use the shortest possible cable length.
- * Install the inverter in an earthed metal enclosure. The enclosure should prevent radiated noise leakage.
- * Insert a line noise filter and ferrite core into the power and control lines as required.

Full information including the European Standard-compliant noise filter specifications are published in the "EMC Installation Guidelines" (number BCN-A21041-202). Please contact your sales representative.

2. Low Voltage Directive

- (1) Our view of inverters for the Low Voltage Directive
 - (2) Compliance
 The European verification institution has approved that our inverters conform to DIN VDE0160. Therefore, the CE mark is placed on inverters.
- (3) Instructions
 To conform to DIN VDE0160, the following specifications and instructions listed are different from those of the standard models.
 - * Use inverter under condition of Over Voltage Category II, Pollution Degree 2 or better.

- * Do not use residual current device as the only protection against indirect contact. Protective earth connection is essential.
- * Wire the earth terminal independently. (Do not connect two or more cables.)

 Connect motor earth to the earth of panel.
- * Only use EN or IEC compliant no-fuse breakers and magnetic contactors.
- * In the input of the inverter, insert an EN or IEC Standard-compliant isolation transformer or surge suppressor. (Not required when the operating place falls within the overvoltage category II set forth in IEC664.)
- * For the input and output of the inverter, only use cables of the type and size set forth in EN60204 Appendix C.
- * Inverter is considered as built-in component. EMC regulations should be considered for whole machinery system.
- * Maximum transportation altitude is 10,000m.

- Do not use residual current device as the only protection against indirect contact. Protective earth connection is essential.
- Wire the sarth terminal independently. (Do not connect two or more cables.)
 - Only use EM or IEC compliant no-fuse breakers and magnetic confectors.
- In the input of the inverter, insert an EN or IEC Standard-compliant isolation transformer or surce suppressor. (Not required when the operation
- isolation transformer or surge suppressor. (Not required when the operating place falls within the overvoltage category if set forth in IEC864.)
- or the input end output of the inverter, only use cables of the type and size of forth in EN80204 Appendix C.
 - Inverter is considered as built-in compenent. EMC regulations should be considered for whole machinery system.
 - Maximum transportation altitude is 10,000m.

Thank you for purchasing the Mitsubishi general purpose inverter FREQROL-U100. For safe operation. please read this manual thoroughly before using this device.

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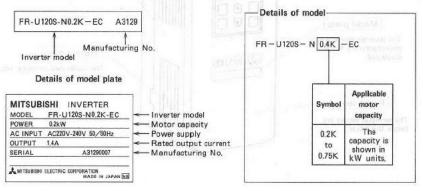
Moreter and parameter settings

1. INSPECTION AT DELIVERY UP GMA SEMAM S

Confirm the following points when unpacking the device.

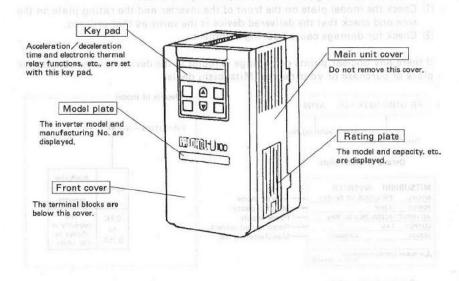
- (1) Check the model plate on the front of the inverter and the rating plate on the side and check that the delivered device is the same as that ordered.
- (2) Check for damage caused during shipment.

If there any unclear points or damage is found in the device, please contact the place of purchase or your nearest Mitsubishi dealer.

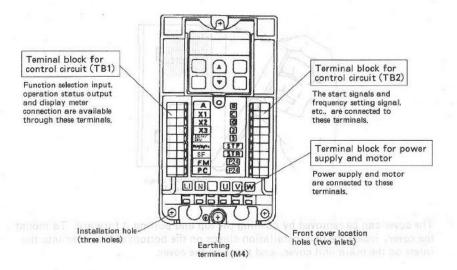


Details of rating plate

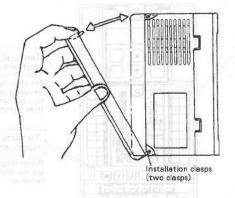
2. NAMES AND FUNCTIONS OF EACH PART



State with front cover removed was about the cover section of wall



How to remove/mount front cover women have a front allow share

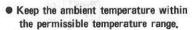


The cover can be removed by pushing the top and pulling it forward. To mount the cover, insert the two installation clasps on the bottom of the cover into the inlets on the main unit cover, and press on the cover.

3. INSTALLATION

Install the inverter vertically.

Non-vertical installation methods will cause the inverter's heat dissipating effect to decrease, and may cause unforeseen problems and breakdowns.



If the inverter's ambient temperature rises due to installation near a heat generating object or installation in a panel will cause the inverter life to decrease remarkably.

Take cooling methods and panel dimensions into consideration when installing the inverter in a panel.

- Tolerable ambient temperature: −10 to 50°C
- · Points for measuring ambient temperature

Note: The inverter was designed for use in separately earthed enclosure.

Precautions must therefore be taken at point of installation to minimise risk of hazard to users.



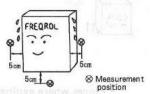




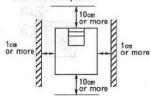
Wrong Horizontal installation



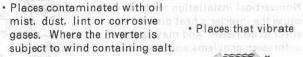
Sideways installation

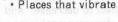


· Ambient space



- Avoid installation in the following places
- · Where the inverter is subject to direct sunlight
- · Humid places





. Install the invertor vertically,





Dell'o philaraneu tean a ve Avoid dollies still represent edt eausa Hiw lange and press machines, etc.

· Places where explosive gases exist.



• Installation on flammable material such as wood.



4. WIRING

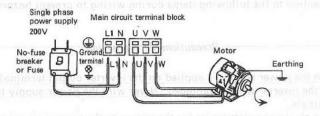
Precautions for wiring

Pay attention to the following items during wiring to prevent hazard to users.

Precautions during wiring

- (1) When the power supply is applied on the inverter output terminals (U, V and W), the inverter will be damaged. Never wire the power supply to these terminals.
- (2) Use a shield or twisted wire for the wiring to the control circuit terminals, and separate the wires from the main circuit or power distribution circuit (200V relay sequence circuit, etc.).
- (3) Cover the slits on the inverter so that the wire waste does not enter the inverter during wiring.
- (4) Confirm that the display lamp on the key pad has gone out before changing the wiring after operation, and wait at least two minutes before starting the wiring. (It takes more than one minutes for discharge of the internal capacitors after disconnecting power supply.)

Connecting power supply and motor



Always connect the power supply wires to L1 and N.

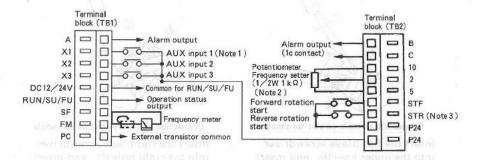
Never connect to U, V and W as the inverter will be damaged.

(The phases do not need to be matched.)

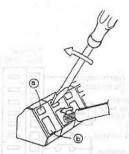
Connect the motor to U, V and W.

The motor rotation direction will be counterclockwise (direction of the arrow, shown above) looking from the load shaft when the wires are connected as shown above and the forward rotation switch (signal) is turned on.

Connecting control signals



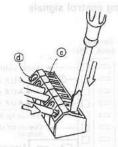
- (Note 1) The function of the AUX input terminals (X1, X2, X3) is selected with the input terminal function selector 60 or allocation input terminals 61.
- (Note 2) $2W1k\Omega$ is recommended if the frequency setting is to be changed frequently.
- (Note 3) The function of the STR terminal can be changed with the STR terminal function [62].



Connection of main circuit terminals

Insert the flat-blade screwdriver into the upper hole ③, and insert the power supply wire into ⑤ while pressing the screwdriver in the direction of the arrow.

Remove the screwdriver when the wire has been inserted.



Connection of control circuit terminals

Insert the flat-blade screwdriver into the right hole ©, and insert the wire into @ while pressing the screwdriver in the direction of the arrow. Remove screwdriver when the wire has been inserted.

(Note) Use a small flat-blade screwdriver (blade width 2.5 to 3mm).

Wire size and peeling length was at besteed ad at allead

Applicable wire size for terminal block

orwation when the nowe	Main circuit (Note 1)	Control circuit		
Wire size	Solid wire : 2 mm² Strand : 2 mm²	Solid wire: \$\phi 0.4 to \$\phi 1.0 mm Strand: 0.3 to 0.75 mm		
Wire sheath peeling length	5 to 6 mm	8 to 10 mm		

All wires are inserted into the terminal block excluding the grounding terminal.

Connected with rod terminals' or with only the wire instead of using crimp terminals.

(When using strands, make sure that the strands do not loosen to avoid a short circuit.)

Use a crimp terminal for only the grounding terminal.

Details to be checked in wiring planning

 If a power failure occurs and the start signal (start switch) is retained, the inverter will automatically resume operation when the power is restored.

If the machine must be prevented from restarting with power restoration, install a magnetic contactor MC on the primary side of the inverter, and design a sequence to prevent the start signal from turning ON.

(2) Use two contacts in parallel or a twin contact to prevent an imperfect contact for the input signal of the control circuit.

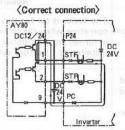
(3) Do not input a voltage on the contact input terminal (STF, etc.) of the control circuit.

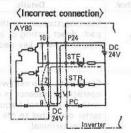
(4) Do not apply the voltage directly onto the alarm output signal terminal (B, C). Pass the voltage through a relay coil or ramp.

(5) When directly connecting the open collector output from a sequence controller to the inverter input terminal, make sure that a backflow current does not occur.

Use of PC terminal

When the external power common for transistor output is connected to this terminal, malfunctions caused by a backflow currents can be prevented.





(Note) A DC24V power supply is required for the AY80 type unit.

Use the following countermeasures to prevent a backflow current when not using the PC terminal.

- (1) Insert a diode to prevent the backflow current.
- (2) Use an all-point isolated type output unit.
- (3) The external power supply voltage must be higher than the inverter's control power supply.
- (4) Use a PC terminal (external transistor common).

⚠[CAUTION] REMOVAL OF COVER WHEN UNIT IS POWERED GIVES ACCESS TO HIGH VOLTAGES.
PLEASE ISOLATE INVERTER FROM POWER BEFORE PERFORMING ANY ADJUSTMENTS TO WIRING, ETC. WAIT AT LEAST 5 MINUTES AFTER ISOLATION BEFORE REMOVING FRONT COVER.

5. OPERATION

Operation methods

The following operation methods can be used. Select the method according to the application and operation specifications.

Operation method	Details	Remarks		
Operation with key pad	Starting/stopping with key pad, direct setting of operation frequency with key pad.	The device is set for this operation when the power is turned on after initial installation. (Factory setting)		
Operation with external input signal	Start with external switch and operation frequency is adjusted with the external frequency setter connected to the inverter control terminal.	Start switch STF P24 DC 0-10V 2 6		
Combined use of Operation with external input	Start with external switch and setting of operation frequency with key pad.	The external frequency setter and key pad RUN key are not accepted. Stop key is only accepted when Pr.75 is set to 14.		
signals and key pad. (Refer to Pr.79)	Setting of operation frequency with external frequency setter, starting/stopping with key pad.	The external start switch does not function.		

Operation with key pad

The key pad operation (parameter No. 79 "1") is selected as the factory setting.

MODE Frequency setting mode is entered.

Set frequency is changed.

SET Set frequency is fixed.

RUN Motor starts (forward rotation) (Note).

STOP Motor stops.

(Note)

To drive the motor in the reverse direction with the RUN key, short-circuit between STR and P24 on the terminal block, or set parameter No.78 to "2".

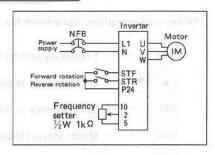
Operation with external input signal

• Set external operation mode (parameter No. 79 "2").

(Refer to the following explanation for the setting method.)

The start signals and frequency are input with external switches and frequency setting potentiometer.

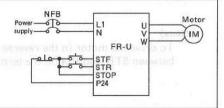
The motor will operate when a signal is input into STF (forward rotation) or STR (reverse rotation) and the frequency setter is operated.



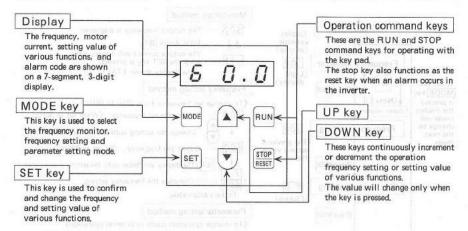
(Note 1)

The start signal self-holding function can be slected (for details see Pr.61) (Note 2)

When potentiometer is used for the frequency setting input signal, set Pr.73 to 0.



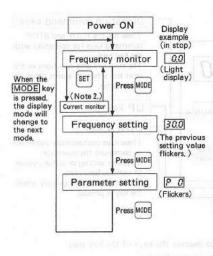
How to use the key pad



↑ CAUTION: Never use any sharp or pointed object to depress the keys of the key pad.

This has been designed only for use with human fingers.

■ Monitor and parameter settings



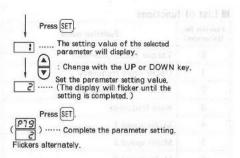
Monitoring method 500 ---- The output frequency is displayed. Hold down SET The output current will display only while the SET key is pressed. (The display shows 1.7A) Frequency setting method (To change set frequency from 30Hz to 60Hz) 300 Display the set frequency. (When set to 30Hz) : Change the setting with the UP or DOWN key. 800 Adjust the frequency. (To set to 60Hz) SET (The display will flicker until the setting is completed.) \$80) Complete the frequency setting. Flickers alternately. Parameter setting method (To change operation mode to external operation) Display the parameter setting mode with the MODE key. P 0 ····· Parameter number : Change with the UP or DOWN key. (Note 1.) 279 Set the parameter number. (To set to operation mode)

(Note)

 The parameter numbers will display in order with each press of the UP or DOWN keys.

(PO will display if the UP key is pressed when CLr is displayed.)

The current monitor displays only when the SET key is pressed in the frequency monitor mode.



 When alarm (Er 1 to 3) is displayed (The alarm can be canceled by pressing the mode key, The error will not be canceled when RESET is pressed.)

Alarm display	Туре	Details from the anomabel Writing was attempted during the pr.77 "1" state (write prohibit)		
Er 1	Write prohibit alarm			
5+3	Write alarm during operation	Pr.79 was rewritten or all clear was executed during operation.		
8,3	Calibration error	The calibration value for C-2 and C-3 was too close. *		

^{*} The calibration error will occur if the difference of the input voltage for the C-2 to C-3 calibration value is approximately 0.5V or less.

6. FUNCTIONS

List of functions

Function No. (parameter)	Function name	Setting range	Setting unit	Factory setting	User setting
0	Torque boost (manual)	0 to 15%	1 %	6 %	NOC
1 - (0)	Upper limit frequency	0 to 120 Hz	0.1 Hz	120 Hz	TH.
2	Lower limit frequency	0 to 60 Hz	0.1 Hz	0 Hz	ant la
3	Base frequency	50 to 120 Hz	0.1 Hz	50 Hz	et airti
4	Multi-speed 1	0 to 120 Hz	0.1 Hz	50 Hz	Inoni
5	Multi-speed 2	0 to 120 Hz	0.1 Hz	30 Hz	
6	Multi-speed 3	0 to 120 Hz	0.1 Hz	10 Hz	191
7	Acceleration time	0, 0.1 to 999 sec.	0.1 sec.	5.0 sec	LAKT!
8	Deceleration time	0, 0.1 to 999 sec.	0.1 sec.	5.0 sec	oras
9	Electronic thermal relay	0 to 15A	0.1 A	Rated current	Marini Inplay-
10	PWM mode 11 Work and graces begge	0 to 15,	origin di	Julese e In	14 151
11,000	DC dynamic braking operation time	0 to 10 sec.	0.1 sec.	0.5 sec.	1.54
12	DC dynamic braking voltage	0 to 15%	1 %	8 %	
14	Applied motor selection	0 , 10	1	0	e was t
15	JOG frequency	0 to 120 Hz	0.1 Hz	5 Hz	5-0-0

Function No. (parameter)	Function name	Setting range	Setting unit	Factory setting	User setting
16	JOG acceleration/deceleration time	0, 0.1 to 999 sec.	0.1 sec	0.5 sec	52
17	External thermal relay input selection	0, 1	r no la rei	0	47
19	Base frequency voltage	0 to 500V,	1 V	not Lot	8).
20	Acceleration/deceleration reference frequency	1 to 120 Hz	0.1 Hz	50 Hz	84
21	Frequency setting voltage bias	0 to 60 Hz	0.1 Hz	0 Hz	00
22	Frequency setting voltage gain	0 to 120 Hz	0.1 Hz	50 Hz	18
23	Stall prevention operation level	0 to 10	1	5	68
24	Multi-speed 4	0 to 120Hz,	0.1 Hz	er ToTlövi	Ed
25	Multi-speed 5	0 to 120Hz,	0.1 Hz	OHER THE	88
26	Multi-speed 6	0 to 120Hz,	0.1 Hz	11	96
27	Multi-speed 7	0 to 120Hz	0.1 Hz	2 0100020	69
37	Speed display	0, 0.1 to 999	0.1	0	0.0
42	Up-to-frequency sensitivity	1 to 100%	1 %	10%	Ia
43	Output frequency detection	1 to 120 Hz	0.1 Hz	6 Hz	53
44	Output frequency detection during reverse rotation	1 to 120Hz,	0.1 Hz	etro M3 elsa kio l	15

Function No. (parameter)	Violated of Function name	Setting range	Setting unit	Factory setting	User
46	No.2 acceleration/deceleration time	0, 0.1 to 999 sec.,	0.1 sec.	26 7 7 7 7	86
47	No.2 deceleration time	0, 0.1 to 999 sec.,	0.1 sec.	uratia -	2.5
48	No.2 torque boost	0 to 15%,	1 %	11.3020	
49	No.2 V/F (Base frequency)	50 to 120 Hz,	0.1 Hz	Autoria	
50	Retry selection 0 SH W SJ 0	0, 1, 2, 3	imiz i r ya	0	48
51	No. of retries at alarm	0, 1 to 10, 101 to 110	Milita An	0	-53
52	Retry execution wait time	0 to 360 sec.	0.1sec.	1 sec.	
53	No. of retry execution time display clear	0	0	0	, AQ
55	Frequency monitor reference	0 to 120 Hz	0.1 Hz	50 Hz	
56	Current monitor reference	0 to 200%	1 %	150%	B5
59	Remote setting function selection	0, 1	1	0	-83
60	Input terminal function selection	0 to 8	1	0	To.
61	Input terminal allocation	111 to 999	yan leper	E7.7G	SA
62	STR terminal function	0 to 10,	ranelpert	160760	
70	FM output terminal function selection	0, 1	on lour	0	4 410
71	Tone selection	0, 1	no fato:	0	

Function No. (parameter)	Function name	Setting range	Setting unit	Factory setting	User setting
72	PWM carrier frequency	2.3 to 14.5 kHz	0.1 kHz	7.0 kHz	9.2
73	Terminal 2 0-5V or 0-10V selection	0, 1	mu 1 your	mba.4g	ER
75	Stop key function	0, 14	tuned kep	14	PE
76	Output signal selection	0, 1, 2	mongon	0	dli
77	Write prohibit selection	0, 1	mu 1 yan	0	199
78	Reverse rotation prevention selection	0, 1, 2	DH 17820	0	103
79	Operation mode selection	1, 2, 3, 4	Sent 1 Vani	upe 1	THEF
80	Multi speed 8	0 to 120Hz,	0.1Hz	11720121	2-13
81	Multi speed 9	0 to 120Hz,	0.1Hz	WD015	5 1
82	Multi speed 10	0 to 120Hz,	0.1Hz		
83	Multi speed 11	0 to 120Hz,	0.1Hz		Telon
84	Multi speed 12	0 to 120Hz	0.1Hz		and a
85	Multi speed 13	0 to 120Hz,	0.1Hz	Mariners Mariners	inter E
86	Multi speed 14	0 to 120Hz,	0.1Hz	V = = -j.00	mW
87	Multi speed 15	0 to 120Hz	0.1Hz	er ad dec	U. Re.Z
90	Ground fault detection	0, 1	1	1	
91	Frequency jump 1A	0 to 120Hz	0.1Hz		

Function No. (parameter)	Setting Function name mittel	Setting range out	Setting unit	Factory setting	User setting
92	Frequency jump 1B	0 to 120Hz,	0.1Hz	Walter	17
93	Frequency jump 2A	0 to 120Hz,	0.1Hz	W555	
94	Frequency jump 2B	0 to 120Hz,	0.1Hz	V 17575	81
95	Frequency jump 3A	0 to 120Hz,	0.1Hz	00700	
96	Frequency jump 3B	0 to 120Hz	0.1Hz	note W	
CLr	Parameter clear	0. 1. 2	in 1 or a	0	_BY
C-1	Frequency meter scale calibration	no treise	day in the	(None and	. 101
C-2	Frequency setting bias calibration	0 to 60 Hz	0.1 Hz	0 Hz	UR
C-3	Frequency setting gain calibration	0 to 120 Hz	0.1 Hz	50 Hz	

(Note)

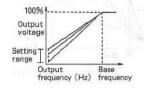
- 1. The factory setting for Pr.79 operation mode selection is "1" (key pad mode).
- 2. The reset key on the key pad is accepted only during an alarm stop.
- 3. All parameters, excluding Pr.79, Pr.60 and Pr.CLr parameter clear, can be written during operation. (When Pr.77 = 0)
 - Writing is invalid when Pr.77=1, except for Pr.77.
- 4. The setting value "---" indicates "no function operation".
- Pr.72 can be read and written when "---" is set in Pr.10.

Explanation of functions and applied you would take a

● Torque boost (manual) 0 ● No.2 torque boost (manual) 48

Low frequency motor torque can be adjusted to the load.

(Note)



If the setting value is too large, the overcurrent protective function may activate. The setting value can be adjusted while confirming the motor current with the monitor function. The No.2 torque boost is valid when terminals RT-P24³⁾ close if the No.2 acceleration/deceleration time Pr.46 is set. [Factory setting]

Torque boost (manual) 6 %

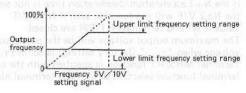
No.2 torque boost (manual) - - -

Upper limit frequency 1
 Lower limit frequency 2
 The upper and lower limit clamps of the output frequency can be set.

[Factory setting]
• Upper limit

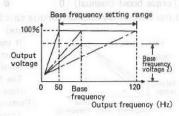
frequency ····· 120Hz

 Lower limit frequency ---- 0 Hz



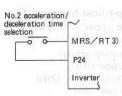
- V/F (base frequency) 3
- Base frequency voltage 19 molland to not soulcast it.
- No.2 V/F (base frequency) 49

The base frequency (reference frequency at motor rated power) can be set between 50 and 120Hz according to the motor rating. The No.2 V/F is valid when terminals RT-P24® close if the No.2 acceleration/deceleration time Pr.46 is set. ®



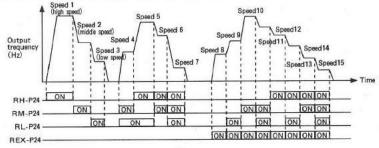
(Note)

- If the No.2 acceleration/deceleration time is not set, the No.2 V/F will not function even if No.2 V/F value is set and terminals RT-P24 are closed.
- The maximum output voltage will be the power supply voltage when "---" (factory setting) is set in Pr.19.
- 3) Terminal MRS/RT function is specified with the input terminal function selection 60 or input terminal allocation 61.



Multi-speed 1	4	● Multi-speed 8	80
Multi-speed 2	5	Multi-speed 9	81
 Multi-speed 3 	6	wolled paire bee Multi-speed10	82
 Multi-speed 4 	24	Multi-speed11	
 Multi-speed 5 		Multi-speed12	84
Multi-speed 6	26	Multi-speed13	85
Multi-speed 7	27	Multi-speed14	86
	-3100	Multi-speed15	87

Each speed can be selected (between terminals RH-P24, RM-P24, RL-P24 and REX-P24) by changing the contact signal from an external switch. Each speed (frequency) can be set within 0 to 120Hz during the inverter (motor) operation.



(Note)

- 1. The 4th to 15th speed cannot be selected if "---" is set (factory setting).
- If two or three speeds are selected for the 3-speed setting, the low speed side frequency will be selected.
 - (Example) If high speed (RH) 40Hz and low speed (RL) 50Hz are set, when RH-P24 and RL-P24 turn ON simultaneously. 50Hz will be output.
- 3. If the multi-speed signal and external frequency signal are input, the multi-speed signal has priority.
- 4. The terminals RH (high), RM (medium) and RL (low) are selected with the input terminal function selection 60 or input terminal allocation 61.
- The terminal REX is selected with the STR input terminal selection 62.
 Reverse operation is not possible from external signal.

● Acceleration time 7

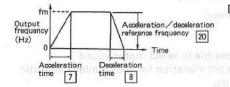
- Deceleration time 8

Pr.7 and 8 can be set between 0.1 and 999 seconds.

Acceleration time is the time taken for acceleration to the frequency

(fm) set in acc./dec. reference frequency Pr.20.

If the acceleration / deceleration time is set to 0, the time will be 0.04 seconds.



Factory setting]	
Acceleration time	· 5.0 sec
Deceleration time	· 5.0 sec
Acceleration / deceleration	
reference frequency	50Hz

● Acceleration time 7

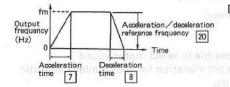
- Deceleration time 8

Pr.7 and 8 can be set between 0.1 and 999 seconds.

Acceleration time is the time taken for acceleration to the frequency

(fm) set in acc./dec. reference frequency Pr.20.

If the acceleration / deceleration time is set to 0, the time will be 0.04 seconds.



Factory setting]	
Acceleration time	· 5.0 sec
Deceleration time	· 5.0 sec
Acceleration / deceleration	
reference frequency	50Hz

• Electronic thermal relay 9

The setting value can be set as a current value (A) for the motor's overheating A protection. Optimum protection characteristics, including a drop in the motor cooling performance at low speed operation, can be obtained. The motor protection function will not operate when set to 0 (A). (The output transistor protection function will operate.)

Set the motor rating current at 50Hz for the setting value. Set to 0 (A) when using the external thermal relay.

[Factory setting] (Inverter rated output current)

PWM mode 10

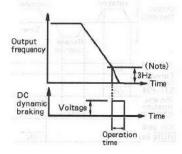
By changing PWM mode setting, it is possible to select motor sound appropriate for load and to reduce resonant vibration for the standard acoustic noise model. Available in sixteen settings.

Setting value	Carrier frequency	Setting value	Carrier frequency	Setting value	Carrier frequency
0	0.7 kHz	6	1.3 kHz	12	1.9 kHz
1	0.8 kHz	7	1.4 kHz	13	2.0 kHz
2	0.9 kHz	8	1.5 kHz	14	2.1 kHz
3	1.0 kHz	9	1.6 kHz	15	2.2 kHz
4	1.1 kHz	10	1.7 kHz	(Note) 2.	D 70 1
5	1.2 kHz	11	1.8 kHz		Parameter 72 valu

[Factory setting] ---

(Note)

- The motor tone will increase in pitch when the setting value is increased.
- The setting cannot be changed from "---" to "0 to 15" during operation. Always stop
 before making changes. Note that during operation the setting can be changed from
 "0 to 15".
- DC dynamic braking operation time 11
 DC dynamic braking voltage 12
 By setting the DC dynamic braking torque (voltage) and the operation time, accuracy in stop position can be adjusted matching the load.



(Note)

The DC dynamic braking operation frequency is fixed to 3Hz.

Set the operation time to "0" when the DC dynamic braking is not required.

[Factory setting]

DC dynamic braking operation time ··· 0.5 sec. DC dynamic braking voltage ·········· 8 %

will be for the external thermal relay input

Applied motor selection 14
 When a Mitsubishi constant torque motor is

When a Mitsubishi constant torque motor is used, set "10" for Pr.71. The thermal characteristics of the electronic thermal relay are set for constant torque motors with independent cooling.

Set Value	Characteristics of Electronic Themal Relay
0	For general-purpose motors
10	For Mitsubishi constant torque motors

● JOG frequency 15 ● JOG acceleration / deceleration time 16

Jogging operation will start and stop when the JOG mode is selected (short circuit between terminals JOG-P24), and the start signal (terminal STF or STR) is input.

Forward rotation rotation

(Note)

1. JOG operation via key pad is also available.

When using the terminal JOG/OH for "JOG", set the external thermal relay input selection 17 to "0". If set to "1", the setting will be for the external thermal relay input selection.

[Factory setting]	
JOG frequency	
JOG acceleration/deceleration time	0.5 sec.
4	

Output frequency	Forwar		Forward rotation
		Reverse rotation	Time
JOG-P24	ON	\rightarrow	1
Forward rotation	71		1
STF-P24	ON		1
Reverse rotation STR-P24		ON	dynamic protections
Key pad RUN key	OCH MOD		ON

(Note)

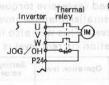
 Terminal JOG OH is selected with the input terminal selection function 60 or input terminal allocation 61. • External thermal relay input selection 17

Set 1 in this parameter and set 0 in Pr.9 when external motor overload protector is used. Trip of an overload relay installed or motor thermostat, which opens on an overtemperature condition, stops drive operation.

(The alarm signal will also be output.)
Restarting will not be possible unless resetting is performed even if the thermal relay contact is restored. Therefore, this can be used as an emergency stop signal input from an external source. The inverter will stop when terminals JOG/OH-P24 open.

- Frequency setting voltage bias 21
- Frequency setting voltage gain 22 The output frequency (ratio) for the frequency setting signal (DC 0 to 10V) can be set.

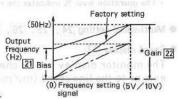
★When setting the bias and gain, the frequency setting signal need not be input.



(Note)
When using terminal
JOG/OH
as an "external thermal relay input", set
Pr.17 to "1".

(Note)

 Select terminal JOG / OH with input terminal function selection 60



• Stall prevention operation level 23

An overload (excessive torque) can be prevented when driving a motor with a capacity smaller than the inverter by changing the stall prevention operation current level. This will also function during acceleration/deceleration.

The operation current level is set with the following setting values (codes).

External thermal relay input selection 17

Setting value	Operation level	Setting value	Operation level	Setting value	Operation level
1	110%	5	150%	en en en	190%
2	120%	6	160%	10	200%
3	130%	crist 7	170%	may to	Stall prevention is not activated
4	140%	8	180%	0	

[Factory setting] 5 (150%)

- . The operation level % indicates the ratio to the inverter rated output current
- Multi-speed setting 24. 25, 26, 27 → Refer to Multi-speed setting 4
- Speed display 37

The monitor display can be changed from frequency (Hz) to the speed of the load axis or to the line speed (m/min)

Example

(Line speed display)

• For 55m/min at 60Hz

Setting value → 5 5

* Input a speed of 60Hz.

The display may not match the actual speed due to the effect of motor slippage. When the load speed display has been selected, any function to be set in frequency (Hz) must still be set in frequency.

Up-to-frequency sensitivity 42

An output signal is available whenever the output frequency reaches a value selectable between ±100% of the operating frequency. (Setting from ±1% is possible)

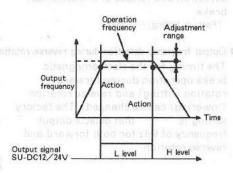
[Factory setting] ····· 10%

Setting value 0	Output frequency (Hz) display	
Setting value 0.1 to 999	Display of load speed*	

[Factory setting] ····· 0

12 / 24 V will become the Lievel an (eto/)

Always set the speed at 60Hz. An input out of the range 0.1 to 999 is not possible.

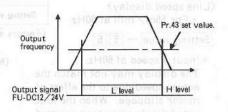


Output frequency detection 43

The frequency to be detected can be set between 1 to 120 Hz.

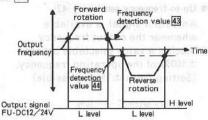
When the output frequency exceeds this frequency, the terminals FU-DC 12/24V will become the L level, and when lower, will become the H level. This can be used as a signal for actuation and release of a mechanical brake.

[Factory setting] ····· 6Hz

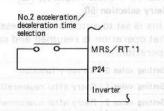


Output frequency detection during reverse rotation 44

The timing for the electromagnetic brake operation during forward rotation (lifting) and reverse rotation (lowering) can be changed. The factory setting is "---" that detects output frequency of 6Hz for both forward and reverse rotation.



The No.2 acceleration / deceleration time can be selected with an external contact signal. To do so, set Pr.46 and close deceleration time terminals RT and P24 *1 190 When using the terminal MRS/RT for the "No.2 function", set the No.2 acceleration/deceleration time 46 within the range of "0 to 999". MRS (output stop function) will be applied if the setting is "---".



· To set deceleration time different from acceleration time, set parameter 46 as the acceleration time and 47 as the deceleration time.

(Note)

- *1 Terminal MRS/RT is selected with the input terminal function selection 60 or input terminal allocation 61.
- . *2 If function No. 47 is set to "---" (factory setting), the acceleration/deceleration time will be the same as that set in 46 .

[Factory setting]

No.2 acceleration/deceleration time "---" (terminal MRS/RT has output stop function)

- No.2 torque boost 48 moltaneles → refer to Torque boost 1 manaleses not reselected 2.014
- No.2 V/F (Base frequency)
 49 → refer to V/F (Base frequency)
 3
- Retry selection 50

This is set to automatically reset the inverter when an inverter alarm occurs so that operation is resumed and continued. "OPT" will display during the retry operation.

Setting value 0	No retry function -81919008 X 6W 6M 792
Setting value 1	Retry after regenerative overvoltage trip (QVT) only
Setting value 2	Retry after overcurrent trip (OCT) only
Setting value 3	Retry after regenerative overvoltage trip (OVT) and overcurrent trip (OCT),

[Factory setting] ····· 0

No. of retries at alarm 51

Set the number of retries and select the alarm signal output or not at alarm occurrence.

Setting value	Alarm signal output during alarm	No. of retries		
0		No retry		
1 to 10	Not available .	1 to 10		
101 to 110	Available	1 to 10		

[Factory setting] 0

● Retry execution wait time 52

The time before restarting after an inverter alarm occurs can be set.

[Factory setting] ····· 1 sec. The second se

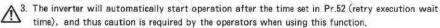
■ No. of retry execution time display clear 53

The cumulative number of restart times made by retry can be read through reading this parameter and it can be cleared by setting $\mathbf{0}$.

[Factory setting] ····· 0

(Note)

- The monitor display after retrying will be the operation frequency.
- If an alarm other than that set in Pr.50 (retry selection) occurs during retry waiting, an alarm will display and the retry will stop.

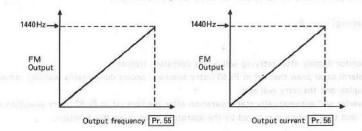


• Frequency monitor reference 55

• Current monitor reference 56

Terminal FM provides the frequency or current monitor function. Set the frequency or current value which is referenced for monitor in Pr.55 or Pr.56.

(The frequency or current can be selected with Pr.70 (FM output terminal function selection).)



• Remote setting function selection 59 its rago to elemend

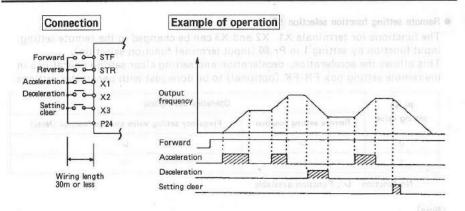
The functions for terminals X1, X2 and X3 can be changed to the remote setting input function by setting 1 in Pr.60 (input terminal function selection). This allows the acceleration, deceleration and setting clear setting operations in the remote setting box FR-FK (optional) to be done just with parameter settings.

Pr. 59 setting value	Operation description						
	Remote setting function	Frequency setting value storage function (Note					
0	ν	L boliwing L					
1	· ·	Date Supple					

ー: No function レ: Function available

(Note)

If the terminals of acceleration-P24 and deceleration-P24 are left open for approximately one minute or longer or STF/STR-P24 is switched off or STOP key is pressed, the operation frequency setting value of that point will be registered in the memory. Operation will restart with that setting value even if the power supply is turned off and on once.



(Note)

The frequency setting value up/down times with the acc./dec. operation are set in per.46 (No.2 acceleration/deceleration time) and Pr.47 (No.2 deceleration time), but the output frequency acc./dec. times in Pr.7 and Pr.8.

Therefore, the actual acc./dec. times become the longer setting values respectively.

Input terminal function selection 60

The functions of terminals (X1, X2, X3) can be group selected from the following nine types, for individual terminal function selection refer to [61].

Terminal		Setting value											
	0	1	2	3	4	10.5	10 6 A	0 7 ms	8				
X1	RH	Acceleration	RES	RH	RH	RH	RH	RHoo	RH				
X2	RM	Deceleration	MRS/RT	RM	RM	RM	MRS/RT	JOG/OH	MRS/RT				
Х3	RL	CLR	JOG/OH	JOG/OH	MRS/RT	RES	RES	RES	JOG/OH				
E7-19	Multi	Remote setting	Junal Va	NV8.or	8 8	30	80 P	0					

[Factory setting] ····· 0

(Note)

This parameter cannot be written during operation (writing is possible only when stopped).

Refer to the following page for the functions selected with the X1, X2 and X3 input terminals.

List of function selections

Pr. 60	Mode	X1	X2	Х3	Function	Related parameters
		OFF	OFF	OFF	Frequency reference 0 to 5V/10V	Pr.73
		ON	OFF	OFF	Multi-speed 1	Pr. 4
		OFF	ON	OFF	Multi-speed 2	Pr. 5
0	Multi-	OFF	OFF	ON	Multi-speed 3	Pr. 6
U	speed -	OFF	ON	ON	Multi-speed 4	Pr.24
	mode	ON	OFF	ON	Multi-speed 5	Pr.25
	M HEN	ON	ON	OFF	Multi-speed 6	Pr.26
	Ca 83	ON	ON	ON	Multi-speed 7	Pr.27
		OFF	OFF	OFF	0 to 5V/10V input setting	Pr.73
		ON	OFF	OFF	Frequency rise	E-99/22
		OFF	ON	OFF	Frequency lower	Facety settle
1	Remote	OFF	OFF	ON	Frequency setting clear	1 122
10	setting -	OFF	ON	ON	Frequency setting clear	(Note:
	renw yi	ON	OFF	ON	Frequency setting clear	79/16/12/C <u>—</u> 17 ⁴ T
		ON	ON	OFF	No operation	.100220018
	gm SX	ON	ON	ON	Frequency setting clear	ett ot zetsH
	RES	OFF	OFF	OFF	0 to 5V/10V input setting	rater <u>ar</u> nara
2	MRS/RT	ON	OFF	OFF	RES	
	JOG/OH mode	OFF	ON	OFF	MRS/RT	Pr.46

Pr. 60	Mode	X1	X2	Х3	Function	Related parameters
RES		OFF	OFF	ON	JOG/OH	Pr.17
	RES	OFF	ON	ON	MRS/RT, JOG/OH	Pr.17, Pr.46
2	MRS/RT	ON	OFF	ON	RES 330	46
	JOG/OH	ON	ON	OFF	RES MO A	90 -
	mode	ON	ON	ON	RES THO	30 J
		OFF	OFF	OFF	0 to 5V/10V input setting	Pr.73
		ON	N OFF OFF Multi-speed 3		Multi-speed 3	10 at Pr. 4
	JOG/OH Multi- speed mode	OFF	ON	OFF	Multi-speed 2	Pr. 5
3		OFF	OFF	ON	JOG/OH	Pr.17
		OFF	ON	ON	Va of B JOG/OH 140	Pr.17
		ON	OFF	ON	JOG/OH	10 Pr.17
	17.19	ON	ON	OFF	Multi-speed 6	Pr.26
		ON	ON	ON	JOG/OH 10	Pr.17
	-	OFF	OFF	OFF	0 to 5V/10V input setting	Pr.73
		ON	OFF	OFF	Multi-speed 3	40 bePr. 4
	MRS/RT	OFF	ON	OFF	Multi-speed 2	Pr. 5
		OFF	OFF	ON	MRS/RT	Pr.46
4	Multi-	OFF	ON	ON	MRS or middle speed, RT	Pr. 5, Pr.46
	mode	ON	OFF	ON	MRS or high speed, RT	Pr. 4 , Pr.46
		ON	ON	OFF	Multi-speed 6	Pr.26
		ON	ON	ON	MRS or 6th speed, RT	Pr.26, Pr.46

Pr. 60	Mode	X1	X2	X3	Function	Related parameter
OFF O		OFF	OFF	0 to 5V/10V input setting	Pr.73	
		ON	OFF	OFF	Multi-speed 3	Pr. 4
	RES	OFF	ON	OFF	Multi-speed 2	Pr. 5
	NA. dec	OFF	OFF	ON	RES NO M	C DUDOIL
5	Multi- speed	OFF	ON	ON	Ve of 0 RES RES	-
	mode	ON	OFF	ON	RES 930 W	d -
2 49		ON	ON	OFF	Multi-speed 6	Pr.26
11-19	Tari	ON	ON	ON	RES 440 41	
	7.49	OFF	OFF	OFF	0 to 5V/10V input setting	Pr.73
	MRS/RT	ON	OFF	OFF	Multi-speed 3	Pr. 4
	10 -11	OFF	ON	OFF	MRS/RT	Pr.46
0	RES	OFF	OFF	ON	RES NO N	
6	Multi-	OFF	ON	ON	RES AND RES	
	speed	ON	OFF	ON	RES 340 M	
	mode	ON	ON	OFF	MRS or high speed, RT	Pr. 4 , Pr.46
	18 19	ON	ON	ON	RES THE	

Pr. 60	Mode	X1	X2	X3	X slam Function; jugar sdf	Related parameters
		OFF	OFF	FF OFF 0 to 5V/10V input setting		Pr.73
	JOG/OH	ON	OFF	OFF	Multi-speed 3	Pr. 4
	•	OFF	ON	OFF	JOG/OH	Pr.17
	RES	OFF	OFF	ON	RES	
7	Multi-	OFF	ON	ON	RES DOM	100 70
st	speed	ON	OFF	ON	RES	_
	mode	ON	ON	OFF	JOG/OH	Pr.17
		ON	ON	ON	RES	_
		OFF	OFF	OFF	0 to 5V/10V input setting	Pr.73
	MRS/RT	ON	OFF	OFF	Multi-speed 3	Pr. 4
	•	OFF	ON	OFF	MRS/RT	Pr.46
8	JOG/OH	OFF	OFF	ON	JOG/OH	Pr.17
0	Multi-	OFF	ON	ON	MRS/RT, JOG/OH	Pr.46, Pr.17
	speed	ON	OFF	ON	JOG/OH	Pr.17
	mode	ON	ON	OFF	MRS or high speed, RT	Pr. 4 . Pr. 46
		ON	ON	ON	MRS/RT, JOG/OH	Pr.46, Pr.17

(Note) ON : Short with terminal P24. The last redemun Holb & and abard as gooding

OFF: Open

(When function OH has been selected (1 in Pr.17), ON indicates open.)

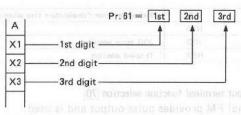
Allocation input terminals 61

The function of the input to terminals X 1, X 2, X 3 can be allocated from the 8 functions in the table below.

Pr. No	Setting range	Setting Unit	Factory Setting	OFF CN	Funct	tion	298
61	111 to 999	1 396		: The		is are as	Pr.60
15-10		40%	DOL	1 : RH	140		
		res	1	2 : RM			
15.19	98	The Jugar V	01 N.VB on 0	3 : RL			
10 40		E basqa	diaM ·	4 : OH			
Pr.46		TANG	BMB	5 : STOP			
57.19		-	0.01	6 : MRS			
Tight da	19	40 7800	TH/SHM	7 : RT			
77 -9	-	H0'X	JOL	9 : JOG			
13 14 .4	9	A speeds of	WHS or 19	- 400			
					1 5 41 4 3		

Setting is made by a 3 digit number set in Pr61, each digit represents the function to be allocated to individual terminals. (note1)

contorol terminals



- Note 1) When two or more digits of Pr.61 are set to the same number, the function is actived by turning on one of them.
- Note 2) When a value "0 to 999" is set in Pr.61, the set values of Pr.60 is ignored.

STR terminal function 62

The function of the input to terminal STR can be allocated from the 8 functions in the table below.

Setting value	Function code	Function	Related Pr.	Remarks	
	STR	Reverse rotation start		Factory setting	
1.00.7%	THE PHODE	Multi-speed 3	nied ze Pr. 4 eupi); 1 DUE (000 V)	
2	RM	Multi-speed 2	Pr. 5	INDER THE CALL	
3	RL	Multi-speed 1	Pr. 6		
4	ОН	External thermal relay input			
5	STOP	Start signal self-holding selection			
6	MRS	Output stop			

7	RT	2nd acceleration / deceleration time selection	Pr. 46 to 49	
8	RES	4 A		
9	Jog	JOG mode selection	Pr. 15, 16	
10	REX	15 speed selection	Pr. 80 to 87	

• FM output terminal function selection 70

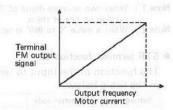
Terminal FM provides pulse output and is used to connect an indicator that monitors frequency or current. The frequency or current can be selected through this parameter.

Setting value 0	Output frequency
Setting value 1	Motor current (output current)

[Factory setting] 0

(Note)

When the frequency has been selected, terminal FM output can be adjusted with Pr.55, when the current has been selected, it can be adjusted with Pr.56.



● Tone modulation selection 71

(This parameter is a function number for the low-acoustic noise series)

The tone control that changes the motor tone can be selected with the key pad.

Setting value	Tone selection
0	No tone control
1	Tone control

- The tone control changes the motor noise from a metallic tone to a composite sound that is easy to listen to.
- When the tone control is selected, the motor tone will be easy to listen to even with the same carrier frequency.
 The tone control is effective when the carrier frequency

is low.

[Factory setting] ····· 0

PWM carrier frequency 72

(This parameter is a function number for the low-acoustic noise series)

The PWM carrier frequency is 7.0 kHz but this frequency can be changed with Pr. 72 if necessary in relation to the load or motor resonance frequency. (Note) If the PWM carrier frequency is lowered, the motor noise will increased, but the noise generated from the inverter and the leakage current will decrease. (Refer to the precautions on page 62 when setting the PWM carrier frequency to a higher value.)

(Note)

This parameter can be read and written when the PWM mode Pr.10 setting is "---".

[Factory setting] ····· 7.0 kHz

• Terminal 2 0-5V or 0-10V selection 73

It is possible to change the input specification (terminal 2) according to the frequency reference voltage signal.

Setting value	and a last brace star Input voltage at terminal 2
14 80 0 TOTOE	For 0 to 5 VDC input
major I parviso	For 0 to 10 VDC input

[Factory setting] 1

- Note 1) To change the output frequency corresponding to the input of the maximum frequency command voltage, a value should be set for C-3 frequency setting gain calibration.

 It is not necessary to input a command voltage. Refer to page 59 for alternative calibration procedure.
 - The acceleration / deceleration time is not influenced by a change in Pr.73 setting since it defines the gradient up to the acceleration / deceleration reference frequency set in Pr.20,
 - 2) Set "0" for Pr.73 when the inverter is operated with a potentiometer. (1 or 2W $2k\Omega$)

Stop key function 75

When "stop key" is pressed in external operation mode, motor is decelerated to a stop.

Setting value	Stop key function
0	The stop key only functions in PU op or counbinel mode
14	When stop key is pressed in any operation mode, motor stops.

[Factory setting] ····· 14

Note 1) To restart after "stop key stopping" in ext mode.

- 1 Turn off the start signal (STF/STR) after the motor has stopped.
- 2 Press the "SET" key.
- 3 Turn on the start signal (STF/STR).

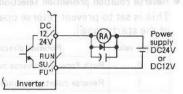
Note 2) When motor is stoped by using the stop key in external operation mode, "E 0" is displyed.

Output signal selection 76

The inveter running, up-to-frequency or frequency detection signal can be selected for the open collector output signal (terminal RUN/SU/FU).

Setting value 0	Inverter running (RUN)
Setting value 1	Up-to-frequency (SU)
Setting value 2	Frequency detection signal (FU)

[Factory setting] ····· 0



(Note) The inverter will be damaged if the voltage application direction is mistaken.

Also, take care to prevent mis-wiring such as of the diode connection direction.

*)

• Parameter write prohibit selection 77

Writing-in of every function with the key pad can be prohibited.

Setting value	Write prohibition function
0	Parameter writing permitted (during operation and stop)
1	Parameter write prohibited (Note)

[Factory setting] 0

(Note)

Parameter No. [77] can be written in. Er1 will display when writing of other parameters is attempted. (Release the error display with the MODE key.)

Reverse rotation prevention selection 78

This is set to prevent reverse operation from trouble caused by mistaken input of the start signal.

Setting value	Rotation direction
0	Both forward/reverse rotation
1	Reverse rotation prohibited
2	Forward rotation prohibited (Note)

(Note) so langua nolitoateb voneupari

The inverter will drive the motor in reverse with the RUN key when set to "2".

[Factory setting] ····· 0

Both key pad operation and external opeation are valid.

Operation mode selection 79

The inverter operation modes include operation with external signals and operation with key pad. Operation can be limited to one mode or can be carried out with both modes.

Setting value 1	Operation only with key pad
Setting value 2	Operation only with external signals
Setting value 3	Operation frequency ··· Set with key pad (direct setting or AV keys) Start signal ··· External signal input (STF, STR terminals)
Setting value 4	Operation frequency ··· External signal input (DC0 to 5V/10V between terminals2-5) Start signal ··· Input with key pad (RUN key) (Note) 4.

[Factory setting] ····· 1

(Note)

- 1. This parameter cannot be rewritten during operation. Er2 will display if writing is attempted.
- Setting values 3 and 4 are set to use the external signals and key pad operation for the operation frequency setting and start signals.
- 3. When set to 3, the operating frequency is set via key pad and analog signal input is ignored.
- When set to 4, the operating frequency is set via analog signal input, multi-speed setting or JOG frequency setting.
- Multi-speed setting 80 to 87 → Refer to Multi-speed setting 4

Ground fault detection 90

It is possible to detect an output side earthing/grounding fault when the inverter starts operation. The inverter shuts off the output, displays E. GF and outputs the

Setting value	northing Details in entit	
onsod.	No ground fault protection	
189001	Ground fault protection on	

alarm signal when a earthing/grounding faultis detected.
[Factory setting] 1

Frequency jump 1A 91

Frequency jump 2B 94

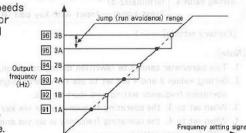
Frequency jump 1B 92
Frequency jump 2A 93

• Frequency jump 3A 95

● Frequency jump 3B 96

Resonance can occur at certain speeds in some applications when a motor is driven by an inverter. To avoid this resonance upto three jump positions can be set. by diffining the upper and lower frequency limits in 91 to 96.

The 1A, 2A or 3A setting value becomes the jumping point, the inverter will run at that frequency while in the frequency jump range.



Note)1: Frequency jump will not function if 9999 (defalut value) is set.

2: During acceleration and deceleration, the frequency in the setting range will be passed through.

Parameter clear/calibration CLr

The parameter-all-clear or frequency setting signal calibration mode can be selected. The parameter-clear cannot be executed during operation, and Er2 will display.

Setting value	Details o agains and Toy
0	Not executed.
1	Parameters are all cleared (initialized). *
2	Frequency setting signal calibration mode is selected.

* Parameter No. 77, 21, 22 cannot be cleared.

© Frequency meter scale calibration | C-1

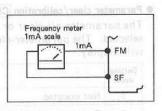
- The following adjustment can be performed by selecting the calibration mode (setting value 2).

 (Refer to page 61 for details.)
 - C-1 Display: Frequency meter scale calibration
 - C-2 Display: Frequency setting bias calibration (Pr.21 will be rewritten simultaneously.)
 - C-3 Display: Frequency setting gain calibration (Pr.22 will be rewritten simultaneously.)

If the difference of the input voltages for the bias and gain calibration is less than 0.5V, the calibration error will occur (Er3 will display).

• Frequency meter scale calibration C-1

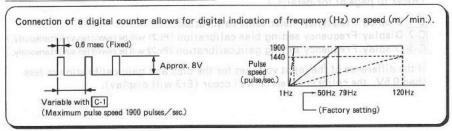
Allows a meter connected to FM to be calibrated through this parameter, without a calibration potentiometer. Using Pr. C-1, press ▲ or ▼ key to vary pulse train frequency. Then average of output voltage changes, and the meter is calibrated.



(Note)

- 1. Terminal FM output is a 1440Hz at output frequency of 60Hz as the factory setting.
- If terminal FM-SF is measured with a tester, approx. 5V (average value) will be indicated at the max. Output frequency. (When indicator is not connected.)

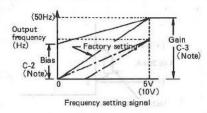
FM terminal pulse output specifications



- Frequency setting bias calibration C-2
- Frequency setting gain calibration C-3
 Allows the output frequency to be set in relation to the frequency setting signal (DC 0 to 5V or 0 to 10V).

(Bias)

The output frequency for the setting signal input between terminals 2-5 will be set.



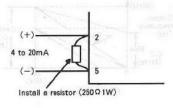
(Gain)

The output frequency for the setting signal input between terminals 2-5 will be set. If the input signal is 0V, it is judged to be 5V (10V) input.

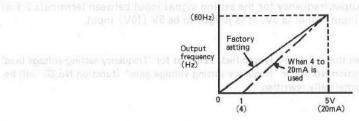
(Note)

 When this C-2 or C-3 is specified, value set for "frequency setting voltage bias" (function No. 21) or "frequency setting voltage gain" (function No.22) will be automatically rewritten.

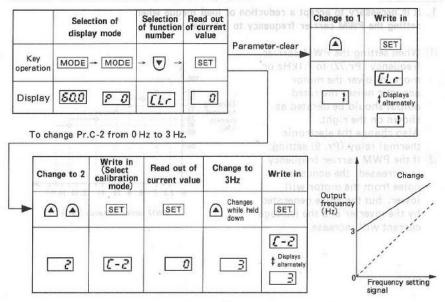
Remarks To set frequency with current input (4 to 20mA) as and publish younger?



- Place a resistor between 2-5, and convert the current into a voltage. (4 to 20ma → 1 to 5V) Pr.73 set to "0".
- Adjust C-2 (bias) as below.
 (Pr.21 will be rewritten simultaneously.)



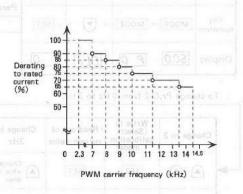
O Example of parameter-all-clear/calibration operation



Precautions

- It is necessary to accept a reduction of load torque when setting the PWM carrier frequency to a higher value.
- (1) When setting the PWM carrier frequency (Pr.72) to 7.1kHz or more to lower the motor acoustic noise, the rated output should be derated as shown on the right.

 Also change the electronic thermal relay (Pr. 9) setting.
- (2) If the PWM carrier frequency is increased, the acoustic noise from the motor will lower, but the noise generated by the inverter and the leakage current will increase.



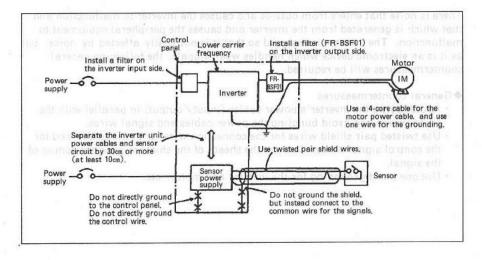
2. Noise

There is noise that enters from outside and causes the inverter to malfunction and that which is generated from the inverter and causes the peripheral equipment to malfunction. The inverter is designed so that it is not easily affected by noise, but as it is an electronic device which handles weak signals, the following general countermeasures will be required.

General countermeasures

- Avoid laying the inverter's power cables (input/output) in parallel with the signal wires and avoid bundling the power cables and signal wires.
- Use twisted pair shield wires for the connection wires with the sensor and for the control signal wires. Connect the sheath of the shield wire to the comon of the signal.
- · Use one-point grounding for the inverter and motor, etc.

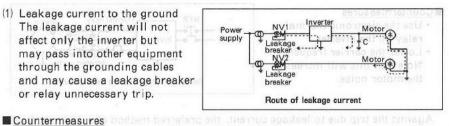
Example of noise countermeasures



3. Leakage current

Leakage current will flow through stray capacity which exists between the ground and a cable, motor, etc. The value of the leakage current depends on the cable length, wiring method and inverter carrier frequency, and will increase when using a low-acoustic noise inverter, so use the following countermeasures.

(1) Leakage current to the ground The leakage current will not affect only the inverter but may pass into other equipment through the grounding cables and may cause a leakage breaker or relay unnecessary trip.



- . Lower the inverter's carrier frequency (Pr. 72). Total rotal manufacture and hollowing Note that this will increase the motor acoustic noise. (3) we made to 1980 to
- Use a leakage breaker that corresponds to high harmonics and surges (Mitsubishi New Super NV Series, etc.) for the inverter or other lines when using the low-acoustic noise model (with high carrier frequency).

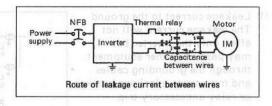
(2) Leakage current across the line

The harmonics of leakage current which flows through stray capacity across the inverter output lines may cause an external thermal overload protector trip.

When the cable length is long (50m or more), the ratio of leakage current to the motor's rated current becomes large, and trip is liable to occur.

■ Countermeasures

- Use the electronic thermal relay on the inverter.
- Lower the carrier frequency.
 Note that this will increase the motor noise.



Against the trip due to leakage current, the preferred method of motor overload protection is a thermistor protection with temperature detectors in the motor or motor protection switch with bi-metal release, etc.

7. SPECIFICATIONS

Standard specifications

Model F	R-U120S-NEC	0.2K	0.4K	0.75K	
Applica	ble motor capacity (kW) *1	0.2 0.4 0.75			
	Rated capacity (kVA) * 2	0.6	1.0	Vaccent 1.7	
110	Rated output current (A)	1.4	2,4	4.1	
Output	Overload current rating *3	150% 60 sec. 20	0% 0.5 sec. (reverse	time characteristic)	
	Rated output voltage *4	3-phase 220 to 240V			
	Rated input AC voltage	Single-phase 220 to 240V 50/60Hz			
Power	Tolerable AC voltage fluctuation	198 to 264V 50/60Hz d suproT			
supply	Tolerable frequency fluctuation	8886 at 1 0° 0	± 5 %	Acceleration	
	Power supply capacity (kVA) * 5	0.9	1.5	2.5	
Protect	ve structure manage man nortan	Semi-closed type (IP10)			
Cooling	method and facilities of DET level to	Self-cooling			
Weight	(kg)	0.7	0.9	1.7	

(Note)

- * 1. The maximum applicable capacity is for a Mitsubishi standard 4P motor. 6P motors drawn hight current, so check the current rating carefully.
- * 2. The rated capacity is shown for an output voltage of 240V.
- * 3. The overload current value % shows the ratio to the inverter's rated output current.
- * 4. The output voltage cannot exceed the power supply voltage.
- * 5. The power capacity will differ according to the impedance on the power supply side (including reactor and power wires on input side). Prepare a power supply capacity higher than the noted value.

m Standard specifications

■ Common specifications

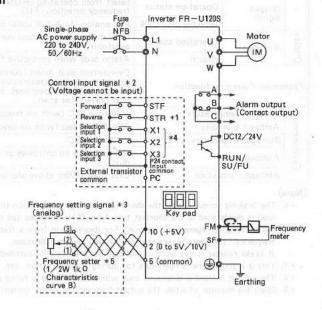
	Control method		Sinusoidal wave PWM control	
	Output frequency range		0.5 to 120Hz (starting frequency fixed at 0.5Hz)	
	Frequency	Digital input	0.1Hz (less than 100Hz), 1Hz (100Hz and more) with key pad operations	
ions	setting resolution	Analog input	1/500 (0-10V) or 1/250 (0-5V) of maximum setting frequency	
Control specifications	Frequency	Digital input	Within $\pm 0.5\%$ of set output frequency (-10 to $+50$ °C) with key pad operations	
bec	stability	Analog input	Within ±1% of maximum output frequency (25°C±10°C)	
S IC	Voltage/free	quency characteristics	Base frequency between 50 and 120Hz selectable	
ıtı	Torque boos	#8 to 284V 50 / 8#1	Manual torque boost 0 to 15% selectable	
S	Acceleration / deceleration characteristics		0. 0.1 to 999 sec. selectable (acceleration/deceleration set separately)	
	Braking	Regenerative *6	0.2K…150% or more, 0.4K, 0.75K…100% or more,	
	torque	DC injection	3Hz or less Operation time, operation voltage adjustable	
	Stall prevention operation level		Operation current level (110 to 200%) selectable	
	Frequency se	etting signal	DC 0 to 5V or 0 to 10V	
13		Starting signal	Forward/reverse rotation commanded separately	
Operation specifications	Input signal	Input signal selection (X1, X2, X3)	Select RH. RM. RL, JOG/OH. MRS/RT, RES, accelerations, deceleration and CLR from the combinations shown on page 43 or individually shown on page 48.	
Oper		STR terminal to take function	Select STR, RH, RM, RL, OH, STOP, MRS, RT, RES, JOG and REX shown on page 49.	
	Output signal	Alarm	1c contact output. Electric rating is shown on page 74.	

	Output	Operation status	Select from operating (RUN), frequency reached (SU) and frequency detection (FU)
	signal	Monitor * 9	For analog (1mA full scale) or digital (1440Hz/60Hz) meter
Display	Key pad	Operation status	Output frequency, output current *8, operation speed selectable
Öis	Key pau	Alarm	Alarm code when protective function has been activated.
Prot	tection/war	ning function	Overcurrent shut down (during acceleration/deceleration/constant speed), regenerative overvoltage shut off, electronic thermal overload, stall prevention, earth fault over current (at start)
20.2	Ambient te	mperature	-10 to +50°C (with no freezing)
ent	Ambient hu	umidity	90% RH or less (with no dew condensation)
E	Storage temperature *7		-20 to +65°C
Environment	Atmosphere		Indoors with no corrosive or flammable gases, oil mist or dust
ш	Altitude/vibration		Less than 1000m above sea level, 5.9m/S2 (0.6G) or less

(Note)

- *6. The braking torque shows the short time average deceleration torque when the motor without load is decelerated in the shortest time from 60Hz (changes due to motor's loss), and is not the continuous regenerative torque. For deceleration from a frequency that exceeds the base frequency, the average deceleration torque value will decrease.
 - A brake resister is not built-in and cannot be externally installed.
- *7. This is a short time temperature for during transportation, etc.
- *8. The output current is displayed only while the SET key is being pressed.
- * 9. Select the monitor of either the output frequency or motor current via the key pad (function No.70).

■ Terminal wiring diagram



main circuit
OInput terminal for control circuit
Output terminal for control circuit

@Terminal for

- *1. Short-circuit between terminals STR-P24 to perform reverse rotation with key pad operation. When Pr.78 is set to "2" (forward rotation prohibited), the motor will rotate in the reverse direction with the key pad operation even if STR-P24 are not short circuited. (When Pr.79 is 1 or 4)
 STR terminal function can be changed with Pr.62.
- * 2. Valid when parameter No.79 is set to "2" or "3" via key pad.
- *3. Valid when parameter No.79 is set to "2" or "4" via key pad.
- * 4. Input terminals X1, X2 and X3 are selection input terminals, specified with Pr.60, and Pr. 61 (Refer to page 43, 48.)
- * 5. 2W1k \O is recommended if the frequency setting is to be changed frequently.
- * 6. If the potentiometer is used for the frequency setting input signal, set Pr. 73 to 0. Frequency setting voltage gain must be adjust by Pr.22. See Section 6 (page 59 to 61)

■ Explanation of terminal specifications of MSP STZ alemmes neewed fluoris-mont? It *

Termina	al symbol	Terminal name	operation. When aliable set to "2" (forward rotat
Jon	L1, N	AC power input terminal	Connect to a commercial power supply.
Main circuit	U, V, W	Inverter output terminal	Connect a 3-phase motor.
		Earthing terminal	Earth for inverter body. Earth this, 80 000 bills V
Control	STF	Forward rotation starting terminal	Contact input terminal for the forward run command. The motor will forward rotate when STF-P24 are short circuited, and will stop when released.
	STR	Reverse rotation starting terminal	Contact input terminal for the reverse run command. The motor will reverse rotate when STR-P24 are short circuited, and will stop when released. The STR terminal function can be changed by changing the parameter Na62 setting. (Refer to page49 for the selection).
(Input signal)	P24	Contact input common terminal	Common terminal for the contact input signal.
	10	Power supply teminal for frequency setting	DC5V, Tolerable load current 10mA.
	2	Frequency setting terminal (Voltage signal)	Output frequency will be the maximum at DC 5V or 10V, and the input output will be in proportion. Input resistance : 10k Ω Max, tolerable input voltage: 10V

Termin	al symbol	Terminal name	Details IIII Todaya Isaama T
	o nortens o P.3 tol possible	Frequency setting input common terminal	Common terminal for the frequency setting signal. This is not insulated from the display meter connection terminal common SF.
Control	X1, X2, X3	AUX input terminal	The terminal specifications will change according to the parameter No.60 and No.61 setting. (Refer to page43, 48 for the selection). (The specification will be RH, RM, RL, JOG /OH, MRS/RT, RES, acceleration, deceleration or CLR.)
	PC	External transistor common terminal	When connecting to the transistor output (open collector output) of a sequencer, etc., if the external power common for transistor output is connected to this terminal, malfunctions caused by backflow currents can be prevented. (Refer to page 13.)
(Input signal)	RH, RM, RL REX (Note1)		A maximum of 15 speeds selectable with the combination of RH-P24, RM-P24, RL-P24 and REX-P24 short circuiting.
nair z v	JOG/OH (Note 1)	JOG mode selection or external thermal relay	JOG operation is selected when terminals JOG-P24 turn ON, and jog operation starts with the start signal (STF or STR). The thermal relay contact input terminal can be selected for stopping the inverter by operating the externally connected thermal relay.
	MRS/RT (Note 1)	Output stop or No.2 acceleration/ deceleration time selection	The inverter output will stop when MRS-P24 are short-circuited. This teminal is set with Pr.46 for the No.2 acceleration/deceleration time selection (RT). The No.2 acceleration/deceleration time can be selected by short-circuiting between RT-P24.

Termina	al symbol	Terminal name	Terminal symbol Termi aliane
RES (Note		Reset terminal	This is used to reset the hold state during operation of the protection circuit. Short-circuit between RES-P24 for 0.1sec. or longer, and then open. (Resetting is also possible with the RESET key on the key pad.)
Control circuit (Input signal)	Acceler- ation, deceler- ation, CLR (Note 1)	Remote setting terminal	These can provide remote operator control for the following functions. When terminals acceleration-P24 are short-circuited, the frequency will increase, and will decrease when terminals of deceleration-P24 are short-circuited. When CLR-P24 are short-circuited, the speed will return to the reference speed (frequency set with frequency setting signal or input from key pad.) The frequency increment/decrement speed is set with Pr.46 (acceleration) and Pr.47 (deceleration).
Control circuit (Output signal)	A, B, C	Alarm output terminal	1c contact output that indicates that the inverter protection circuit has functioned and output has stopped. B-C opened, A-C closed during alarm B-C closed, A-C opened during normal operation Contact capacity DC30V 0.3A
	FM	Display meter connection terminal	The output is set to be approximately 5V at 50Hz without display meter, and will be proportional to the output frequency. The output voltage has a pulse waveform, so a digital display meter can be connected. Pulse specifications: 8V (peak), 1440Hz 50Hz. (Refer to page 55, 56, 57)
	SF	Display meter connection common terminal	Common to FM. This is not isolated from frequency setting input common 5.

Termina	l symbol	Terminal name	Details DOUGHUL BALLDERON'S R
Control circuit (Output signal)	RUN SU FU	Operation state output terminal	One of the inverter operating (RUN), frequency reached (SU) or frequency detection (FU) output selectable. • Inverter operating (RUN) is at L level when above the starting frequency, and is at H level when stopped or during DC braking. • Frequency reached (SU) is at L level when the output frequency reaches the set frequency, and is at H level when stopped or during acceleration/deceleration. • The frequency detection (FU) is at L level when the output frequency exceeds the set detection frequency, and is at H level when lower than the set frequency. Open collector output tolerable load: DC24V 0.1A
17.70)	DC12/ 24V	Output common terminal	Common terminal for RUN, SU, FU

(Note)

*1 This terminal is selected with the Pr.60, Pr.61 or Pr.62 setting. (Refer to page 43 to 50.)
(The X1, X2, X3 selection input terminal and STR terminal will change to the selected function.)

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thing time

The terminals are screwless type, so prepare a small flat-bladed screwdriver (tip width $2.5\ to\ 3mm$) before wiring.

Protective function

The following protection functions are built in to protect the inverter. If the protective circuit functions, the inverter output will stop, alarm will display, and alarm signal will be output. The motor will coast to a stop. The inverter must be reset to resume operations.

Function	name	I netw level I se still 20 bed Details Operate - stress			pad)
Judgine Intl. medical		The protective circuit functions during acceleration acceleration, deceleration or constant		001	(001)
Overcurre shut dow	10000	speed when the motor output current exceeded approximately 200% of the	During constant speed	002	(OC2)
rated current, and the inverter output stops. During deceleration		During deceleration	063	(OC3)	
Regenera overvolta shut dow	ge	circuit of the inverter exceeds the trip po	rotective circuit functions when the DC voltage in the main tof the inverter exceeds the trip point with the regenerative y during braking, and the inverter output stops.		(OVT)
Overload shut down (Electronic thermal relay) (*1)	Motor	or more pole motor or when groups of motors are connected to		et audī X adīj E KR (

Function name		Details		Display (Key pad)		
Overload shut down (Electronic thermal relay) (*1)	In- verter	The electronic thermal relay functions with the inverse time characteristic to protect the output transistor when 150% or more of the inverter rated output current flows but the overcurrent shut down is not activated (under 200%).		characteristic to protect the output transistor when 150% or more of the inverter rated output current flows but the		(THT)
External t mai relay		System can be designed to prevent drive operation when external motor overload protector or thermoswitch in the motor opens on an overtemperature condition. Even if the relay contact is automatically restored, the inverter will not restart unless reset.	1000000	(онт)		
EEPROM breakage		The output will stop when the EEPROM which stores the parameter set values breaks.	PE	(PE)		
Stall prev	ention	When 150% (*2) or more of the inverter rated current flows to the motor during acceleration (or constant speed operation), this function stops increasing of frequency (or reduces frequency) until the load current decreases, to prevent the inverter from overcurrent tripping. When the load current has decreased below 150%, this function allows the inverter to return to and continue the previous operation. During deceleration, in contrast, if DC voltage in the inverter exceeds the rated value, this function stops reducing frequency to prevent the regenerative overvoltage shut off from being activated. When the regenerative energy becomes low, this function continues deceleration again.	When due to function	n from a		

Function name	· Details	Display (Key pad)	
Insufficient voltage warning (*4)	voltage drops, and will also cause an insufficient motor torque and increased heat generation. The inverter output will stop when the power voltage drops below approx. AC 115V. Operation will		
Earth fault over current (*5)	The protective circuit functions when a earth fault current has flowed due to a earth fault occurring in the output (load) side of the inverter. Activate only at a start of the operation. A earth fault occurring at low earth resistance may activate the overcurrent protection.	GF (GF)	
In retry	Retry is executed when the retry function is selected, and that inverter alarm occurs. This indicates that the retry is functioning. (The display will show the time set in Pr.52 retry execution wait time.)	OPF (OPT)	
Inverter stop by STOP key on key pad	When parameter No.75 is set to 14 and motor is stoped by using the stop key in external operation mode. "E. O" is displayed. An alarm signal will not be output. (Refer to page).	ε <i>ឰ</i> (EO)	

(Note)

- * 1. The heat cumulative data in the electronic thermal relay will be cleared when the inverter is reset.
- * 2. The stall prevent operation current can be set. The default setting is 150%.
- * 3. This functions only when the function "external thermal relay input selection" is set.
- *4. An alarm signal will not be output when this protective function activates. If the voltage is insufficient (main circuit DC voltage is 230V or less) when the power is turned on, " \$\overline{G}\$. \$\overline{G}\$ is will display for approximately 10 seconds and then the insufficient voltage display " \$\overline{G}\$. \$\overline{G}\$ is will appear. (No key pad operation will be accepted during the display of " \$\overline{G}\$. \$\overline{G}\$ is higher than standard tolerance when the power is turned on, the display " \$F_rU\$ is will appear, and if the voltage does not lower within 10 seconds, the display " \$\overline{G}\$. \$\overline{G}\$ is (overvoltage shut down) will appear.

The inverter autout stop state will be retained if the protective function operated.

Retention of alarm output signal

If the no-fuse breaker on the inverter's power supply side is turned OFF when the protective function activates, the inverter control power supply will be lost, and the alarm output will not be held. If the output must be held, create a sequence that will hold the alarm output signal with an external equipment.

Alarm display

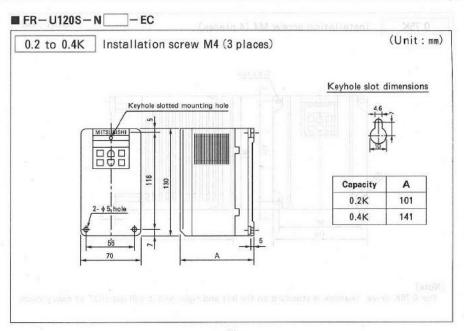
The display on the key pad will automatically change when the protective function operates. (Only during monitoring.)

Resetting methods

The inverter output stop state will be retained if the protective function operates, and the inverter will not restart unless it is reset. Turn the power off and on once or press the RESET key on the key pad. If the RES terminal is set with Pr.60, Pr.61 or Pr.62 (input terminal function selection), resetting will be possible by opening reset terminal RES-P24 after short-circuiting for approximately 0.1 second or more.

If the short circuited state between terminal RES-P24 is continued. "FrU" will display (light) and indicate that the reset state has been entered.

8. DIMENSIONAL OUTLINE DRAWING



(Unit: mm) 0.75K Installation screw M4 (4 places) 2- \$5 hole 110 147 (Note) For 0.75K drive, heatsink is standard on the left and right and it will get HOT at heavy loads.

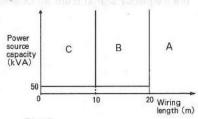
9. SELECTION OF PERIPHERAL DEVICES

Selection of peripheral devices

Motor output (kW)	Applicable inverter model	No-fuse breaker (NFB)	Magnetic contactor (MC)			Wiring (m²) (Note) 4		EMC FILTER REF.	
		Leakage breaker (NV)	A area	B area	C area	R, S, T	U, V, W	m01-gniniw	
0.2	FR-U120S-N0.2K-EC	NF30 model, NV30 model 10A	S-K18	S-K21	S-K21	2	2	SF1320	
0.4	FR-U120S-N0.4K-EC	NF30 model, NV30 model 10A	S-K21	S-K25	S-K50	2	2	SF1320	
0.75	FR-U120S-N0.75K-EC	NF30 model, NV30 model 15A	S-K21	S-K25	S-K50	2	2	SF1321	

(Note)

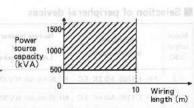
- Select the NFB model according to the power supply capacity.
- 2. The wiring sizes are shown for a 20m length.
- When installing an MC on the inverter power supply, select the applicable range A, B, or C shown on the right according to the power source capacity and wiring length.
- Use a φ 0.4 to φ 1.0 solid wire or 0.3 to 0.75mm² stranded wire for the control line.

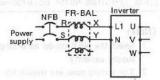


(Note)

Use the wire sizes recommended above.

- An excessive peak current will flow to the power supply input circuit when the inverter is directly connected to a large capacity power supply transformer (500k V A or more, wiring 10m or less), and the inverter may be damaged. Always install the optional power factor improvement reactor FR-BAL in this case. (Use the one rank large size.)
- The wiring length between the inverter and motor must be less than 100m. The control line must be 30m or less and must be separated from the main power line. Use a twisted pair wire when inputting the frequency signal from an external source.





10. OPTION

Name (Model)	Specifications and construction										
	tunity is cone			Dimensions			Weight	Loss	Leakage	Rated	
VERDO	Filter type	Inverter	W	W1	D	Installation screw	(kg)	(W)	Current (mA)	Current (A)	
dalnw	SF1320	FR-U120S-N0.2K/N0.4K	70	56	30.5	M4	0.32	2.7	10	6	
peruppo	SF1321	FR-U120S-N0,75K	110	96	36.5	M4	0.52	3.8	10	10	
	Screwless terminals				thui statu	nem nu la pendi antinona antinona anti- memdur si	priori lebo pequo rio carli il qua ri priori do carli il qua ri priori do carli il qua ri priori di carli di c	10			
ad billione and specific to					Rated Voltage: AC250\ Rated frequency: 50/60						

"WARRANTY"

1. Exceptions to the warranty, such as opportunity losses

We do not warrant to reimburse you or your customers for opportunity losses, damage to produce other than ours, or any other business which results from the failure of our product, whether such a failure has occured within the free warranty period or not.

2. Repair after production stop

If we stop producing any of our models (products), we will continue to repair such a model for seven years after the month of the year when its production is stopped.

3. Delivery condition

It is understood that a standard product which does not include setting and or adjustment in applications is delivered when it arrives on your premises, and we are not obliged to adjust or test run such product on the spot.

▲ Application of this product

- This product is not designed or manufactured for use with any equipment or system which will be operated under conditions hazardous to life.
- If you are planning to use this product in any specific application such as passenger medical, aerospace, atomic, power or submarine equipment or system, please refer to our business department.
- This product is manufactured under rigorous quality control. However, safety devices should be installed if this product is applied to any facility that may result in a serious accident or loss due to a failure of this product.
- This product should only be used with a three-phase induction motor load.

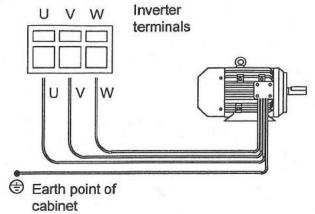
Addendum to FR-U120S-EC manual IB(NA) 66719-A (9609)

Additional Information

Motor Earth

Connect the motor earth to the panel (cabinet) earth point of the inverter.

The minimum wire size for earthing is 2mm2



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Revision

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★MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE:MITSUBISHI DENKI BLDG. MARUNOUCHI TOKYO 100 TELEX;J24532 CABLE MELCO TOKYO

TYPE	FR-U120S-EC EIBUN TORISETU
CODE	1A2H09

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Specifications are subject to change without notice.