



INVERTER

Option unit

FR-PU07

INSTRUCTION MANUAL

Parameter unit



PRE-OPERATION INSTRUCTIONS

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Thank you for choosing the Mitsubishi inverter option unit. This instruction manual gives handling information and precautions for use of this equipment. Incorrect handling might cause an unexpected fault. Before using the equipment, please read this manual carefully to use the equipment to its optimum. Please forward this manual to the end user.

This section is specifically about safety matters

Do not attempt to install, operate, maintain or inspect this product until you have read through this instruction manual and appended documents carefully and can use the equipment correctly. Do not use this product 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".



WARNING

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



CAUTION

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 a 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



WARNING

- Do not run the inverter with the front cover removed. Otherwise, you may access exposed high voltage terminals or charging devices and get an electric shock.
- Before starting wiring or inspection, check that the operation panel indicator is off, wait for at least 10 minutes after the power supply has been switched off, and check that there are no residual voltage using a tester or the like. The capacitor is charged with high voltage for some time after power off and it is dangerous.
- 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.
- Operate the keys with dry hands to prevent an electric shock.

2. Additional Instructions

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

(1) Transportation and mounting

CAUTION

- Do not install and operate the parameter unit (FR-PU07) if it is damaged or has parts missing.
- Do not stand or rest heavy objects on this equipment.
- Check the inverter mounting orientation is correct.
- The parameter unit (FR-PU07) is a precision device. Do not drop it or subject it to impact.
- Use the inverter under the following environmental conditions:

Environment	Ambient temperature	-10°C to +50°C (non-freezing)
	Ambient humidity	90%RH or less (non-condensing)
	Storage temperature	-20°C to +65°C*
	Ambience	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)
	Altitude, vibration	Max. 1000m above seal level, 5.9m/s ² or less (conforms to JIS C 60068-2-6)

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

(2) Test operation and adjustment

CAUTION

- Before starting operation, confirm and adjust the parameters. A failure to do so may cause some machines to make unexpected motions.

(3) Usage

WARNING

-  is valid only when the function setting has been made. Provide an emergency stop switch separately.
- Make sure that the start signal is off before resetting the inverter alarm. A failure to do so may restart the motor suddenly.
- Do not modify the equipment.
- Do not perform parts removal which is not instructed in this manual. Doing so may lead to fault or damage of the inverter.

CAUTION

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

(4) Corrective actions for alarm

CAUTION

- Provide safety backup devices, such as an emergency brake, to protect machines and equipment from hazard if the parameter unit (FR-PU07) becomes faulty.

(5) Disposal

CAUTION

- Treat as industrial waste.

(6) General instruction

All illustrations given in this manual may have been drawn with covers or safety guards removed to provide in-depth description. Before starting operation of the product, always return the covers and guards into original positions as specified and operate the equipment in accordance with the manual.

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INTRODUCTION

This product is a unit for setting inverter functions (parameters) and has the following features.

- An operation panel can be removed and a parameter unit can be connected.
- Setting such as direct input method with a numeric keypad, operation status indication, and help function are usable.
- Eight languages can be displayed.
- Parameter setting values of maximum of three inverters can be stored.

Although this product can be connected to the inverter for the FR-PU04(V), the following differences should be noted.

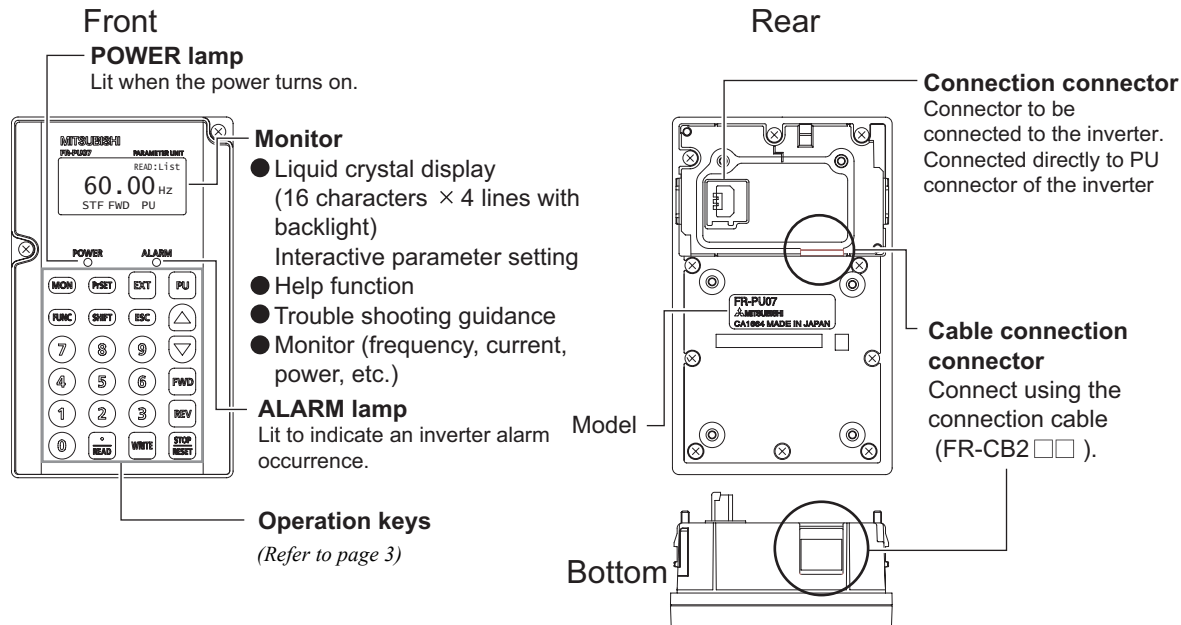
- When parameter is read using the FR-PU07, some parameter names are displayed in different names from actual parameters.
- The FR-PU07 can not be directly connected to the inverter.

The parameter unit screen displays in this instruction manual are examples used with the FR-A700 series.

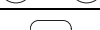
1.1 Overview

1.1.1 Appearance and parts identification

Unpack the parameter unit, check the name plate on the back, and make sure that the product has not been damaged before using the equipment.



1.1.2 Explanation of keys

Key	Description
	Used to select the parameter setting mode. Press to select the parameter setting mode.
	Used to display the first priority screen. Used to display the output frequency when making an initial setting.
	Operation cancel key.
	Used to display the function menu. A variety of functions can be used on the function menu.
	Used to shift to the next item in the setting or monitoring mode.
	Used to enter a frequency, parameter number or set value.
	Used to select the external operation mode.
	Used to select the PU operation mode to display the frequency setting screen.
	- Used to keep on increasing or decreasing the running frequency. Hold down to vary the frequency. - Press either of these keys on the parameter setting mode screen to change the parameter setting value sequentially. - On the selecting screen, these keys are used to move the cursor. - Hold down  and press either of these keys to advance or return the display screen one page.
	Forward rotation command key.

Key	Description
	Reverse rotation command key.
	· Stop command key. · Used to reset the inverter when an alarm occurs.
	· Used to write a set value in the setting mode. · Used as a clear key in the all parameter clear or alarm history clear mode.
	· Used as a decimal point when entering numerical value. · Used as a parameter number read key in the setting mode. · Used as an item select key on the menu screen such as parameter list or monitoring list. · Used as an alarm definition display key in the alarm history display mode. · Used as a command voltage read key in the calibration mode.

CAUTION

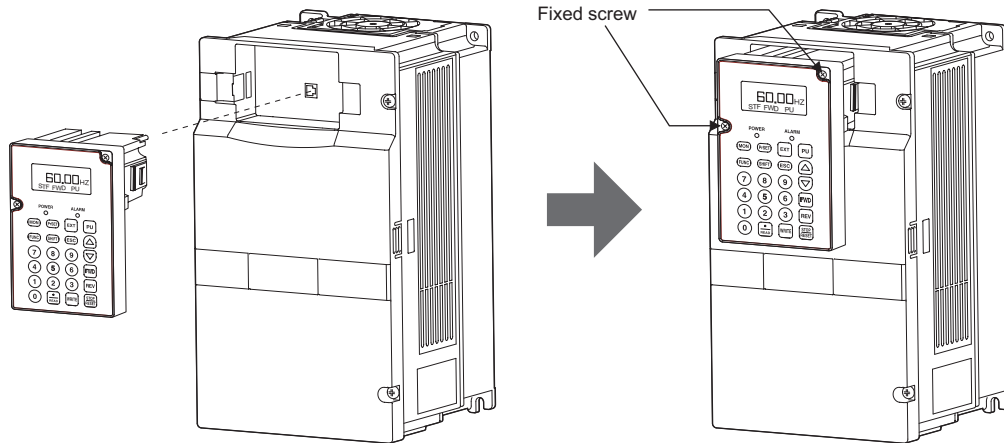
- Do not use a sharp-pointed tool to push the keys.
 - Do not press your fingers against the display.
-

1.2 Installation

To ensure safety, install the FR-PU07 after switching the power of the inverter off.

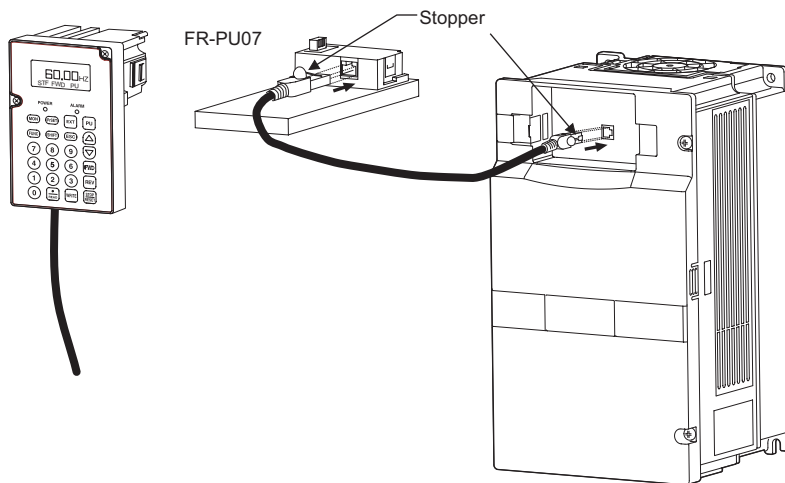
1.2.1 Direct installation to the inverter

- (1) Remove the operation panel (FR-DU07).
- (2) Insert the parameter unit straight and fit it securely.
- (3) Tighten the two screws on the parameter unit to fix the unit to the inverter.



1.2.2 Installation using the connection cable (FR-CB2)

- (1) Remove the operation panel (FR-DU07).
- (2) Securely insert one end of connection cable into the PU connector of the inverter and the other end into the connection connector of FR-PU07 along the guides until the stoppers are fixed.



CAUTION

Install the operation panel only when the front cover is installed.

REMARKS

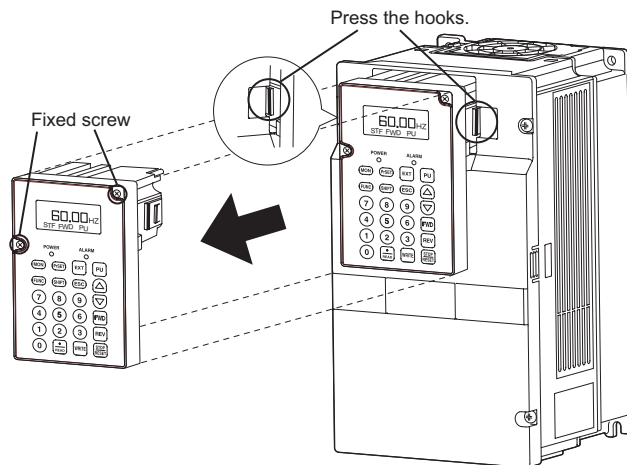
For details of the connection cable (FR-CB2), refer to the connection cable (FR-CB2) instruction manual.

1.3 Removal

To ensure safety, remove the FR-PU07 after switching the power of the inverter off.

1.3.1 Removal from the inverter

Loosen the fixed screws, hold down the right and left hooks of the FR-PU07, and then pull the parameter unit toward you.



1.3.2 Removal when the connection cable (FR-CB2) is used

Hold down the tab (stopper) at the cable end and gently pull the plug.

1.4 Parameters to be Checked First

Change the following parameter settings as required.

For the changing procedures, *refer to page 20*.

1.4.1 PU display language selection (Pr. 145)

By setting the *Pr. 145 PU display language selection* value, you can select the language displayed on the parameter unit.

Pr. 145 Setting	Display Language
0 (initial value)	Japanese
1	English
2	German
3	French
4	Spanish
5	Italian
6	Swedish
7	Finnish

1.4.2 PU buzzer control (Pr. 990)

By setting the *Pr. 990 PU buzzer control* value, you can select to either generate or mute the "beep" which sounds when you press any of the parameter unit keys.

Pr. 990 Setting	Description
0	No buzzer sound
1 (initial value)	Buzzer sound generated

1.4.3 PU contrast adjustment (Pr. 991)

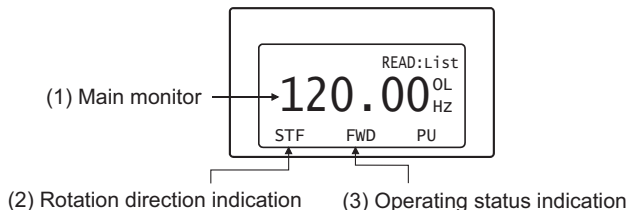
By setting the *Pr. 991 PU contrast adjustment* value, you can adjust the contrast for the display panel of the parameter unit.

Pr. 991 Setting	Description
0 to 63	 [0] [58] [63] Light Initial value Dark

2 FUNCTIONS

2.1 Monitoring Function

2.1.1 Display overview



(1) Main monitor

Shows the output frequency, output current, output voltage, alarm history and other monitor data.

- Using **(SHIFT)** to change to the next screen (*refer to page 12*)
- Using **(FUNC)** to change to the next screen (*refer to page 45*)
- Using the parameter "PU main display data selection" (*refer to page 15*)

(2) Rotation direction indication

Display the direction (forward rotation/reverse rotation) of the start command.

STF : Forward rotation

STR : Reverse rotation

--- : No command or both STF and STR on

(3) Operating status indication

Display the running status of the inverter.

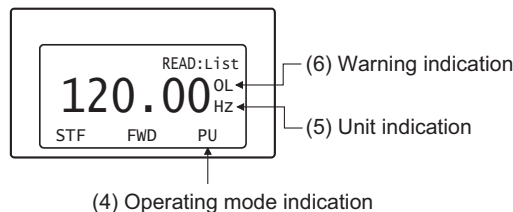
STOP : During stop

FWD : During forward rotation

REV : During reverse rotation

JOGf : During jog forward rotation

JOGr : During jog reverse rotation



(4) Operation mode indication

Displays the status of the operation mode.

- EXT : External operation mode
- PU : PU operation mode
- EXTj : External jog mode
- PUj : PU jog mode
- NET : Network operation mode
- PU+E : External/PU combined operation mode

(5) Unit indication

Shows the unit of the main monitor.

(6) Warning indication

Displays an inverter fault as an alarm.

The warning type varies with the inverter model.
Refer to the inverter instruction manual for details.

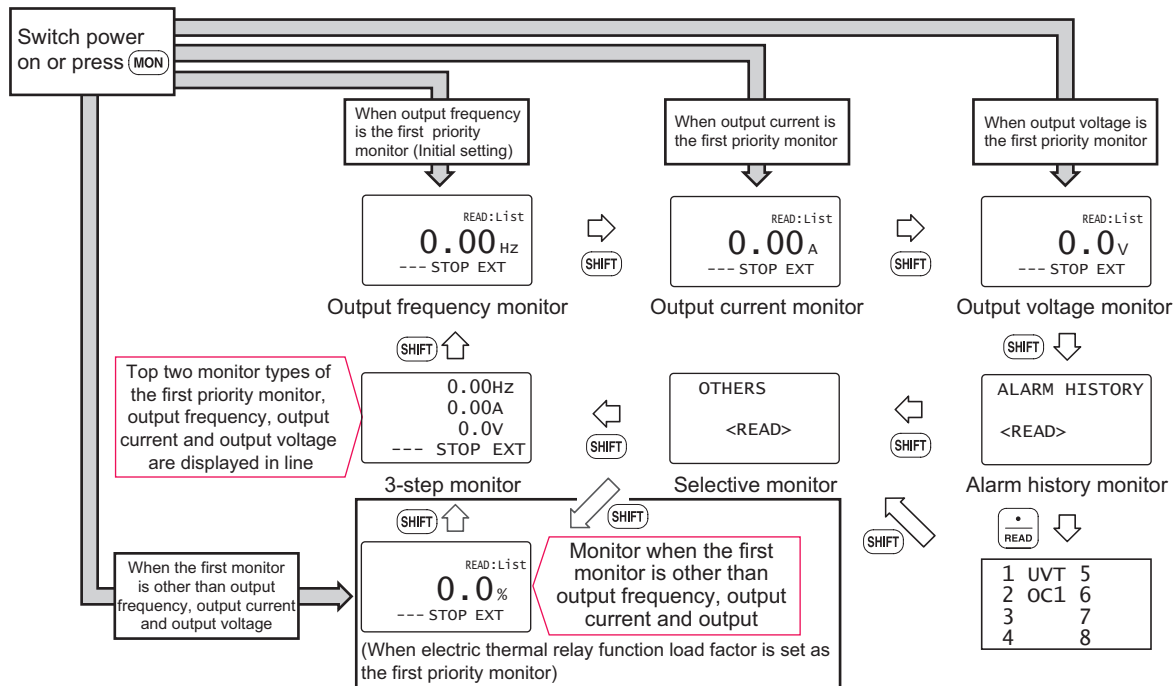
- OL : Overcurrent stall prevention
- oL : Overvoltage stall prevention
- RB : Regenerative brake pre-alarm
- TH : Electronic thermal relay function pre-alarm
- ZC : Zero current detection
- PS : PU stop
- FN : Fan fault
- MT : Maintenance signal output
- SL : Speed limit
- CP : Parameter copy

Nothing is displayed when there is no inverter warning.



2.1.2 Using **SHIFT** to change the main monitor

When "0" (initial value) is set in the *Pr. 52 DU/PU main display data selection*, merely pressing **SHIFT** calls 6 different monitor screens in sequence.



2.1.3 *Setting the power-on monitor (the first priority monitor)*

Set the monitor which appears first when power is switched on or **MON** is pressed.

- When you press **WRITE** with any monitor screen other than ALARM HISTORY, I/P Signal, O/P Signal, multiple simultaneous monitor (3-step monitor) being displayed, that screen is set as the power-on screen and will be displayed first.

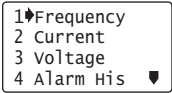
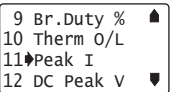
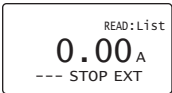


2.1.4 Using to change the main monitor

Press  to display the monitoring list while the main monitor is displayed.

Select a monitor from the monitoring list to change the main monitor.

Example: Select the output current peak value monitor.

1	Press  . The parameter unit is placed in the monitoring mode.	
2	Press  . The monitoring list appears.	
3	Press  /  to move the cursor to "Peak I". Hold down  and press  or  to shift the screen one page.	
4	Press  . *1 The output current peak is displayed.	
5	Press  . *2 The screen in step 4) is set as the first priority screen.	Subsequently press  to call another monitor screen.

*1 The selective monitor screen is not yet the first priority monitor only when  was pressed. Hence, the selected item is erased from memory as soon as the power is switched off or another operation mode is selected. In this case, the item

must be selected again. When you press  to select the first priority screen, the selected item is stored in memory.

*2 When  was pressed, the "output current peak" selected here is first displayed with priority when the other operation mode is switched to the monitoring mode. To give first priority to another monitor screen, press  with that monitor screen being displayed. (Refer to page 13)

REMARKS

- The setting can be also made from the function menu. For details *refer to page 39*.
- When "Current monitor" or "Power monitor" is selected Note that any current or power not more than 5% of the rated inverter current cannot be detected and displayed. Example: When a small motor is used with a large-capacity inverter (a 0.4kW motor is used with a 55kW inverter), power monitor is inoperative.

2.1.5 Using the parameter to change the monitor (Pr. 52)

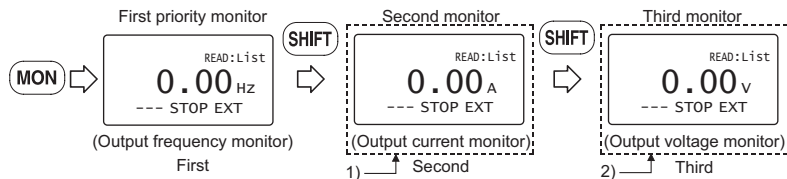
By setting the Pr. 52 DU/PU main display data selection, you can change the "Output current monitor" and "Output voltage monitor" monitor displays from the first priority monitor using **(SHIFT)**.

Inverter	Pr. 52 Setting	
	Setting values displayed in place of output current monitor	Setting values displayed in place of output voltage monitor
FR-A700 series	17 (load meter) 18 (motor excitation current) 24 (motor load factor)	19 (position pulse) 20 (cumulative energization time) 22 (orientation status) 23 (actual operation time) 25 (cumulative power) 32 (torque command) 33 (torque current command) 34 (motor output) 50 (power saving effect) 51 (cumulative saving power) 52 (PID set point) 53 (PID process value) 54 (PID deviation value)
FR-F700 series	17 (load meter) 24 (motor load factor)	20 (cumulative energization time) 23 (actual operation time) 25 (cumulative power) 50 (power saving effect) 51 (cumulative saving power) 52 (PID set point) 53 (PID process value) 54 (PID deviation value)

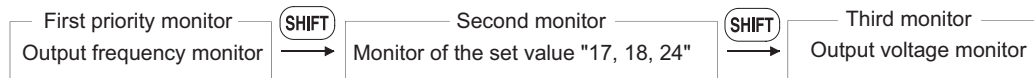


Factory setting

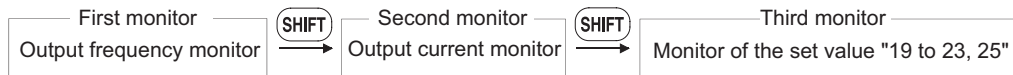
* The monitor displayed at powering on is the first priority monitor. Refer to page 13 for the setting method of the first priority monitor.



1) For the set value of "17, 18, 24", their monitors are displayed at the second monitor instead of output current monitor.



2) For the set value of "19 to 23, 25, 32 to 34, 50 to 54", their monitors are displayed at the third monitor instead of output voltage monitor.



REMARKS

The setting range of *Pr. 52 DU/PU main display data selection* differs according to the inverter. Refer to the inverter instruction manual for details.

2.2 Frequency Setting

The frequency in PU operation mode and external/PU combined operation mode (*Pr. 79* = "3") can be set.

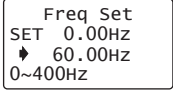
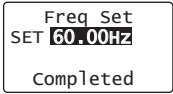
REMARKS

When changing the operation mode from external operation mode to PU operation mode, operation mode can not be changed if the external starting signal (STF or STR) is on.

2.2.1 Direct setting

Directly enter a frequency setting using (0) to (9).

- Operation procedure (Changing from 0Hz setting to 60Hz setting)

1	Press PU . The frequency setting screen appears.	 Freq Set SET 0.00Hz ↓ 0~400Hz
2	Press (6) and (0). Enter 60Hz.*	 Freq Set SET 0.00Hz ↓ 60.00Hz 0~400Hz
3	Press WRITE . The 60Hz setting is complete.	 Freq Set SET 60.00Hz Completed

- * If you entered an incorrect value, press (ESC) to return to the pre-entry state.



2.2.2 Step setting

A frequency is continuously varied using / .

You can vary the frequency only while you press / . Since the frequency varies slowly at first, this setting can be used for fine adjustment.

1	Press . The frequency setting screen appears.	
2	Press / to enter a desired value (60.00Hz). You can set any value between the maximum frequency (Pr: 1) and minimum frequency (Pr: 2).	
3	Press . The 60Hz setting is complete.	

REMARKS

During operation, you can also make the step setting to change the running frequency. Note that if you operate

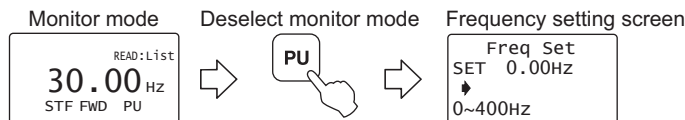
/ in the monitor mode, the inverter does not operate at the frequency when you release the key and the frequency further increases (or decreases). (Since

/ is used to vary the preset frequency, the varied frequency will differ from the output frequency.)

2.2.3 Precautions for frequency setting

- 1) Pr. 79 Operation mode selection must have been set to switch to the PU operation. (Refer to the inverter instruction manual for details of Pr. 79 .)
- 2) In the monitor mode, you cannot make the direct setting (refer to page 17) to set the running frequency.

Perform the step setting (refer to page 18) and press **WRITE**, or press **PU** to display the frequency setting screen before frequency setting.





2.3 Setting and Changing the Parameter Values

Using the FR-PU07 allows you to read the parameter of inverter or change the set value easily. Refer to the inverter instruction manual for details of the parameters.

2.3.1 Specifying the parameter number to change the set value

Example: When changing 5s to 180s as the Pr. 8
Deceleration time setting

1	Press PU . The frequency setting screen appears to switch to PU operation mode. (You need not press PU when the parameter unit is already in the PU operation mode.)	
2	Press PrSET . The parameter unit enters the parameter setting mode.	
3	Press 8 . Enter the desired parameter number.	
4	Press READ . The current setting appears.	

5	(1) Direct setting Press 1 8 0 . * Enter the desired value. Or (2) Step setting Press ▲ ▼ . Display "180" using ▲ ▼ .	
6	Press WRITE . The set value is changed.	
7	Press SHIFT to display the next parameter.	

* If you entered an incorrect value, press **ESC** to return to the pre-entry state.

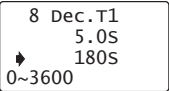
2.3.2 Selecting the parameter from functional list to change the set value

Example: When changing 5s to 180s as the Pr. 8
Deceleration time setting

1	Press PU . The frequency setting screen appears to switch to PU operation mode.	Freq Set SET 0.00Hz ↓ 0~400Hz
2	Press PrSET . The parameter unit enters the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼
3	Select the screen using ▼ and move the cursor to "Appl.Grp".	1▶Appl.Grp ▲ 2 Pr.List 3 User List 4 Param Copy
4	Press READ . The function list appears.	1 Basic Func 2 F Command 3▶Acc.Dec 4 V/F pattern▼
5	Select a function. Point the cursor to "Acc.Dec" using ▼.	1 Basic Func 2 F Command 3▶Acc.Dec 4 V/F pattern▼

6	Press READ . A function list regarding acceleration/deceleration is displayed.	1▶Acc1/Dec1 T 2 Acc1/Dec1 P 3 Brake Seq
7	Select a function. Using ▲▼, point the cursor to "Acc1/Dec1 T".	1▶Acc1/Dec1 T 2 Acc1/Dec1 P 3 Brake Seq
8	Press READ . A parameter list regarding acceleration/deceleration time is displayed.	7▶Acc.T1 8 Dec.T1 16 JOG T 20 Acc/DecF
9	When moving the cursor to "Dec.T1" using ▲▼ and pressing READ , the current setting value is called.	8 Dec.T1 5.0S ↓ 0~3600



10	(1) Direct setting Press 1 8 0 . * Enter the desired value. Or (2) Step setting Press ▲ ▼ . Display "180" using ▲ ▼ .	
11	Press WRITE . The set value is changed.	
12	Press SHIFT to display the next parameter.	

* If you entered an incorrect value, press **ESC** to return to the pre-entry state.

2.3.3 Selecting the parameter from parameter list to change the set value

Example: When changing 5s to 180s as the Pr. 8
Deceleration time setting

1	Press PU . The frequency setting screen appears to switch to PU operation mode.	Freq Set SET 0.00Hz ↓ 0~400Hz
2	Press PrSET . The parameter unit enters the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼
3	Change the screen using ▼.	1▶Appl.Grp ▲ 2 Pr.List 3 User List 4 Param Copy
4	Select a parameter list. Using ▲▼, point the cursor to "Pr.List".	1 Appl.Grp ▲ 2▶Pr.List 3 User List 4 Param Copy
5	Press READ . Select the parameter list. The list of the parameters can be read appears.	0▶Trq.Bst1 1 Max.F1 3 VFbaseF1 ▼

6	Select the parameter. When moving the cursor using ▲▼ and pressing READ at "Dec.T1", the current setting value is called.	8 Dec.T1 5.0S ↓ 0~3600
7	(1) Direct setting Press 1 8 0 . * Enter the desired value. Or (2)Step setting Press ▲▼. Display "180" using ▲▼.	8 Dec.T1 5.0S ↓ 180S 0~3600
8	Press WRITE . The set value is changed.	8 Dec.T1 180.0S Completed
9	Press SHIFT to display the next parameter.	

* If you entered an incorrect value, press **ESC** to return to the pre-entry state.



2.3.4 Selecting the parameter from user-set to change the set value

If a parameter is registered to user-set, the parameter can be read from user-set list and changed. (For registering the user group, refer to page 25.)

Example: When changing 5s to 180s as the Pr. 8
Deceleration time setting

1	Press PU . The frequency setting screen appears to switch to PU operation mode.	Freq Set SET 0.00Hz ↓ 0~400Hz
2	Press PrSET . The parameter unit enters the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ↓
3	Change the screen using ↓.	1 Appl.Grp ↑ 2 Pr.List 3 User List 4 Param Copy
4	Select a User List. Using ▲▼, point the cursor to "User List".	1 Appl.Grp ↑ 2 Pr.List 3 User List 4 Param Copy
5	Press READ . The list of the parameters registered to user-set appears.	8 Dec.T1 ↑ 75 RES Mode

6	Select the parameter. When moving the cursor using ▲▼ and pressing READ at "Dec.T1", the current setting value is called.	8 Dec.T1 5.0s ↓ 0~3600
7	(1) Direct setting Press 1 8 0 . * Enter the desired value. Or (2) Step setting Press ▲▼. Display "180" using ▲▼.	8 Dec.T1 5.0s ↓ 0~3600
8	Press WRITE . The set value is changed.	8 Dec.T1 180.0s Completed
9	Press SHIFT to display the next parameter.	

* If you entered an incorrect value, press **ESC** to return to the pre-entry state.

2.4 User Group Function

- User group function is a function to display only parameters necessary for setting.
- Among all parameters, max. 16 parameters can be registered to the user group. When "1" is set in *Pr. 160*, only parameters registered in the user group can be accessed for reading and writing. (The parameters not registered to the user group cannot be read.)



2.4.1 Registering the parameters to user group

1	Press PrSET . The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼
2	Read the parameters. Enter the parameter number to be registered to the user group with the number keys and press READ to read the parameter setting.	8 Dec.T1 5.0S ◆ 0~3600
3	Set the parameters. When changing the set value, enter a new value with the number keys and press WRITE to write. When not changing the setting value, press WRITE to display the setting completion screen.	8 Dec.T1 5.0S 180S ◆ 0~3600
4	Press WRITE . The selecting screen appears.	Add Pr. User List ◆Yes:Add No :Cancel

5	Register. When moving the cursor to "YES" and pressing WRITE , the registration is executed.
6	The parameter setting screen appears. To continue parameter registration, repeat the operation from step 2. SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼

2.4.2 Deleting the parameters from user group

1	Press PrSET . The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼
2	Select "User List". Using ▲/▼, point the cursor to "3 User List" and press READ .	1 Appl.Grp ▲ 2 Pr.List 3 User List 4 Param Copy
3	Select the parameter to be deleted. Using ▲/▼, point the cursor to the parameter to be deleted and press WRITE .	1 Max.F1 2 Min.F1 3 vFbaseF1 7 Acc.T1 ▼
4	Delete. The screen to be confirmed deleting appears. When pointing the cursor to "Yes" and pressing WRITE , the parameter is deleted.	Delete Pr. User List Yes:Delete No :Cancel
5	To continue deleting parameter, repeat the operation from step 3.	1 Max.F1 2 Min.F1 7 Acc.T1 8 Dec.T1 ▼

2.4.3 Confirming the parameters registered to user group

1	Press PrSET . The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼
2	Select "User List". Using ▲/▼, point the cursor to "3 User List" and press READ .	1 Appl.Grp ▲ 2 Pr.List 3 User List 4 Param Copy
3	Read the parameter. You can confirm the parameters registered to the user group.	1 Max.F1 2 Min.F1 3 vFbaseF1 7 Acc.T1 ▼

REMARKS

If the parameter is not registered to the user group, "User List Setting Err." will be displayed. Press **ESC** to return to the screen of step 1.



2.4.4 Precautions for setting write

- Perform parameter setting change during an inverter stop basically in the PU operation mode or combined operation mode. The parameter setting can not be changed in the external operation mode or during inverter operation. (Read is performed independently of the operation mode.) Note that some parameters can be written even in the external operation mode or during operation. Therefore, refer to the inverter manual used.
- As *Pr. 77 Parameter write selection* = "0" in the initial setting, parameter can be written only during an inverter stop. (Read is allowed even during operation.) Note that some parameters can be written always. Refer to the inverter manual for details of *Pr. 77*.
- In addition to the above case, setting write cannot be performed when:
 - 1) The parameter number selected does not exist in the parameter list; or
 - 2) The value entered is outside the setting range.
- When write cannot be performed and the "Setting Err." appears, press **(ESC)** and make setting once more. (Example: For *Pr. 7 Acceleration time*)

7 Acc.T1
Setting Error
20000S
<ESC>

2.5 Calibration of the Meter (Frequency Meter)

CAUTION

The functions vary with the inverter. (Refer to the inverter instruction manual for details of the parameters.)

2.5.1 Calibration of the FM terminal

Parameter

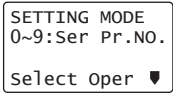
Pr. 900 FM terminal calibration

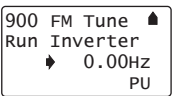
Pr. 54 FM terminal function selection

Pr. 55 Frequency monitoring reference

This section provides the way to calibrate the full-scale of meter connected to terminal FM using the parameter unit.

- Calibrating the meter at the running frequency of 60Hz

1	Press PU . The frequency setting screen appears to switch to PU operation mode.	
2	Press PrSET . The parameter unit is put in the parameter setting mode.	

3	Enter 9 0 0 and press READ . The preset frequency is displayed.	
4	Enter 6 0 and press WRITE . 60Hz is set.	
5	Press FWD . Forward rotation is performed at 60Hz. You need not connect the motor.	



6	Using / , adjust the meter pointer to a predetermined position. The meter pointer moves. (It takes a long time before the pointer moves.)	
7	Press . Calibration is complete.	900 FM Tune Completed <MONITOR>
8	Press to return to the main monitor screen.	READ: List 60.00 Hz STF FWD PU

2.5.2 Calibration of the AM terminal

Parameter

Pr. 901 AM terminal calibration

Pr. 158 AM terminal function selection

Pr. 55 Frequency monitoring reference

Pr. 56 Current monitoring reference

This section provides a way to calibrate the meter connected to terminal AM using the parameter unit.

(1) Calibration procedure 1

(Example: To calibrate the meter at the running frequency of 60Hz)

1	Press . The frequency setting screen appears to switch to PU operation mode.	Freq Set SET 0.00Hz ↓ 0~400Hz
2	Press . The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. select Oper ↓
3	Enter and press . The preset frequency is displayed.	901 AM Tune Run Inverter ↓ 0.00Hz PU

4	Enter 6 0 and press WRITE . 60Hz is set.	901 AM Tune Run Inverter 60Hz PU
5	Press FWD . Forward rotation is performed at 60Hz. You need not connect the motor.	901 AM Tune MntrF 60.00Hz ◆◆◆◆ <WRITE>PU
6	Using ▲ / ▼ , adjust the meter pointer to a predetermined position. The meter pointer moves. (It takes a long time before the pointer moves.)	
7	Press WRITE . Calibration is complete.	901 AM Tune Completed <MONITOR>
8	Press MON to return to the main monitor screen.	READ:List 60.00 Hz STF FWD PU

(2) When calibrating output current

To output the output current or another item which cannot easily achieve a 100% value if operation is performed, adjust the reference voltage output, then select any of the choices displayed.

1	Press PU . The frequency setting screen appears to switch to PU operation mode.	Freq Set SET 0.00Hz ◆ 0~400Hz
2	Press PrSET . The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼
3	Enter 1 5 8 and press READ . The current Pr: 158 setting appears.	158 AM set 1 ◆
4	Enter 2 1 and press WRITE . The setting of reference voltage output is complete.	158 AM set 21 Completed
5	Press PrSET . The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼



6	Enter 9 0 1 and press READ. The current <i>Pr. 901</i> setting appears.	901 AM Tune Run Inverter 0.00Hz PU
7	Enter 6 0 and press WRITE. The setting of maximum running frequency is complete.	901 AM Tune Run Inverter 60Hz PU
8	Press FWD. Forward rotation is performed at 60Hz. You need not connect the motor to make adjustment.	901 AM Tune MntrF 1000 ◆◆◆◆<WRITE>PU
9	Using ▲/▼, adjust the voltage across terminals AM-5 and press WRITE. Setting is complete. The output voltage displayed is the value at 100% output. This voltage is not stored if you do not press WRITE.	901 AM Tune Completed <MONITOR>

10	Press PrSET. The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼
11	Enter 1 5 8 and press READ. The current <i>Pr. 158</i> setting appears.	158 AM set 21 ◆
12	Enter 2 and press WRITE. The setting of output current is complete. The output current for 10VDC is the setting value of <i>Pr. 56</i> <i>Current monitoring reference</i> (initial value: rated inverter output current).	158 AM set 2 Completed

2.6 Adjustment of the Frequency Setting Signals "Bias" and "Gain"

The functions vary with the inverter model. (Refer to the inverter instruction manual for details of the functions.)

2.6.1 Adjustment procedure

There are three ways to adjust the bias and gain of the frequency setting voltage (current).

- (1) Adjust only the bias and gain frequencies and not adjust the voltage (current) (Refer to page 33)
- (2) Adjust any point by applying a voltage across terminals 2-5 (starting a current across terminals 4-5) (Refer to page 35)
- (3) Adjust any point without a voltage being applied across terminals 2-5 (without a current being started across terminals 4-5) (Page 37)

Parameter

Pr. 902 Terminal 2 frequency setting bias frequency

Pr. 903 Terminal 2 frequency setting gain

Pr. 904 Terminal 4 frequency setting bias frequency

Pr. 905 Terminal 4 frequency setting gain

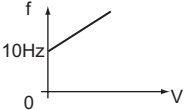
- (1) Adjust only the bias and gain frequencies and not adjust the voltage

• Setting of the frequency setting voltage bias

1	Press PU . The frequency setting screen appears to switch to PU operation mode.	Freq Set SET 0.00Hz ↓ 0~400Hz
----------	---	--

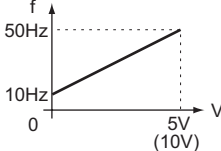
2	Press PrSET . The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼
3	Enter 9 0 2 and press READ . The current Pr. 902 setting appears.	902 Ext2bias ↓ 0.00Hz Set<WRITE> Ext<READ>



4	Enter 1 0. Voltage need not be applied across terminals 2-5.	<pre>902 Ext2bias 10Hz Set<WRITE></pre>
5	Press WRITE. The bias frequency is set at 10Hz.  If the voltage is being applied across terminals 2- 5 at this time, the bias setting is as shown above.	<pre>902 Ext2bias 10.00Hz Completed</pre>

• Setting of the frequency setting voltage gain

6	Press SHIFT. The current setting appears.	<pre>903 Ext2gain 60.00Hz Set<WRITE> Ext<READ></pre>
7	Enter 5 0. Voltage need not be applied across terminals 2-5.	<pre>903 Ext2gain 50Hz Set<WRITE></pre>

8	Press WRITE. The bias frequency is set at 50Hz. At this time, set the gain on the assumption that the 5V (10V) in the inverter is the set voltage. 	<pre>903 Ext2gain 50.00Hz Completed</pre>
---	---	---

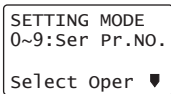
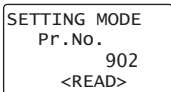
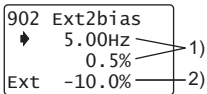
The adjustment of the frequency setting voltage bias and gain is complete.

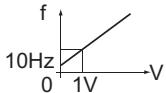
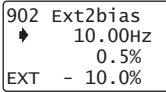
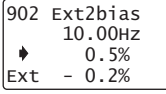
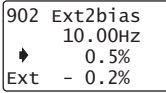
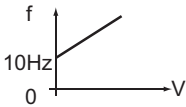
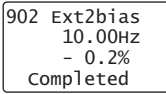
REMARKS

- 1 The current input (*Pr. 904*) can also be adjusted using a similar procedure.
- 2 The *Pr. 903 Terminal 2 frequency setting gain* remains unchanged if the *Pr. 20 Acceleration/deceleration reference frequency* setting is changed.

(2) Adjust any point by application of voltage to across terminals 2-5

• Setting of the frequency setting voltage bias

1	Press PU . The frequency setting screen appears to switch to PU operation mode.	
2	Press PrSET . The parameter unit is put in the parameter setting mode.	
3	Enter 9 0 2 .	
4	Press READ twice. The current <i>Pr. 902</i> setting appears. When the set voltage is changed, the % value also changes. This example assumes that a 1V voltage is applied. The value selected in <i>Pr. 73</i> (5V in this example) is 100%.	 1) The previous setting is displayed. 2) The current set voltage across terminals 2-5 is displayed in %.

5	Enter 1 0 . Set the bias frequency at 10Hz. 	
6	Press WRITE . The cursor (▶) moves to the set voltage.	
7	Apply a 0V voltage. In this example, 0V is applied as 10Hz is set for 0V. (Indicated on the right of changes.)	
8	Press WRITE . The bias frequency is set at 10Hz for 0V input. Setting is completed as shown below: 	 0.0% of analog input value may not be displayed in some cases.



• Setting of the frequency setting voltage gain

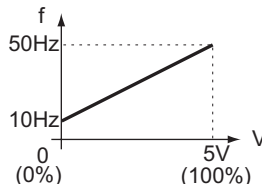
9	Press SHIFT, then READ. The current <i>Pr. 903</i> setting appears. When the set voltage is changed, the % value also changes. The value selected in <i>Pr. 73</i> (5V in this example) is 100%.	903 Ext2gain 60.00Hz 97.1% Ext 80.0% 1) The previous setting is displayed. 2) The current set voltage across terminals 2-5 is displayed in %.
10	Enter 5 0.	903 Ext2gain 50Hz 97.1% Ext 80.0%
11	Press WRITE. The cursor (→) moves to the set voltage. Set the voltage across terminals 2-5 to achieve 100%.	903 Ext2gain 50.00Hz 97.1% Ext 80.0%
12	Apply a 5V voltage. In this example, 5V is applied to set 50Hz for 5V input.	903 Ext2gain 50.00Hz 97.1% Ext 80.0%

13

Press **WRITE**.

The gain frequency is set at 50Hz for 5V input.

Setting is completed as shown below:



903 Ext2gain
 50.00Hz
 99.6%
 Completed

The value displayed may not be just 100.0% in some cases.

The adjustment of the frequency setting voltage bias and gain is complete.

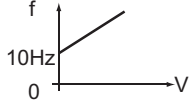
REMARKS

- 1 The current input (*Pr. 904*, *Pr. 905*) can also be adjusted using a similar procedure.
- 2 The *Pr. 903* Terminal 2 frequency setting gain remains unchanged even if the *Pr. 20* Acceleration/ deceleration reference frequency setting is changed.
- 3 A narrow calibration (command) value set using *Pr. 902* and *Pr. 903* (*Pr. 904* and *Pr. 905*) will result in "Incr I/P" and disable write.

(3) Adjust any point without application of voltage to across terminals 2-5

• Setting of the frequency setting voltage bias

1	Press PU . The frequency setting screen appears to switch to PU operation mode.	Freq Set SET 0.00Hz ↓ 0~400Hz
2	Press PrSET . The parameter unit is put in the parameter setting mode.	SETTING MODE 0~9:Ser Pr.No. Select Oper ↓
3	Enter 9 0 2 .	SETTING MODE Pr.No. 902 <READ>
4	Press READ twice. The current <i>Pr. 902</i> setting appears. When the set voltage is changed, the % value also changes. The value selected in <i>Pr. 73</i> (5V in this example) is 100%.	902 Ext2bias ↓ 5.00Hz 0.5% — 1) Ext -0.5% — 2) 1) The previous setting is displayed. 2) The current set voltage across terminals 2-5 is displayed in %.

5	Enter 1 0 . Set the bias frequency at 10Hz.	902 Ext2bias ↓ 10Hz -0.5% Ext -0.5%
6	Press WRITE . The cursor (▶) moves to the set voltage. Voltage need not be applied across terminals 2-5.	902 Ext2bias ↓ 10.00Hz -0.5% Ext -0.5%
7	Enter 0 . Input 0V to set bias.	902 Ext2bias ↓ 10.00Hz - 0% Ext -0.5%
8	Press WRITE . The bias frequency is set at 10Hz. Setting is completed as shown below: 	902 Ext2bias 10.00Hz 0.0% Completed



• Setting of the frequency setting voltage gain

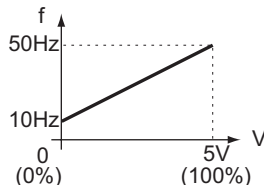
9	Press SHIFT, then READ. The current <i>Pr. 903</i> setting value appears. When the set voltage is changed, the % value also changes. The value selected in <i>Pr. 73</i> (5V in this example) is 100%.	903 Ext2gain 60.00Hz 97.1% Ext 80.0% 1) The previous setting is displayed. 2) The current set voltage across terminals 2-5 is displayed in %.
10	Enter 5 0. Set the gain frequency at 50Hz.	903 Ext2gain 50Hz 97.1% Ext 80.0%
11	Press WRITE. The cursor (→) moves to the set voltage. Voltage need not be applied across terminals 2-5.	903 Ext2gain 50.00Hz 97.1% Ext 80.0%
12	Enter 1 0 0. Input 5V to set gain.	903 Ext2gain 50.00Hz 100.0% Ext 80.0%

13

Press **WRITE**.

The gain frequency is set at 50Hz.

Setting is completed as shown below:



903 Ext2gain
 50.00Hz
 100.0%
 Completed

The adjustment of the frequency setting voltage bias and gain is complete.

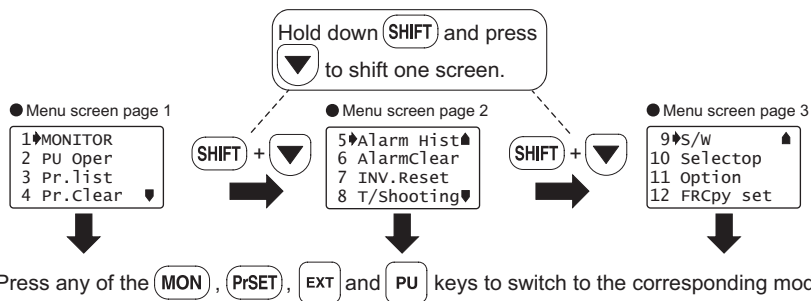
REMARKS

- 1 The current input (*Pr. 904*, *Pr. 905*) can also be adjusted using a similar procedure.
- 2 The *Pr. 903 Terminal 2 frequency setting gain* remains unchanged even if the *Pr. 20 Acceleration/ deceleration reference frequency setting* is changed.
- 3 A narrow calibration (command) value set using *Pr. 902* and *Pr. 903* (*Pr. 904* and *Pr. 905*) will result in "Incr I/P" and disable write.

3 FUNCTION MENU

3.1 Overview of Function Menu

Press **(FUNC)** in any operation mode to call the function menu, on which you can perform various functions.



3.1.1 Function menu

REMARKS

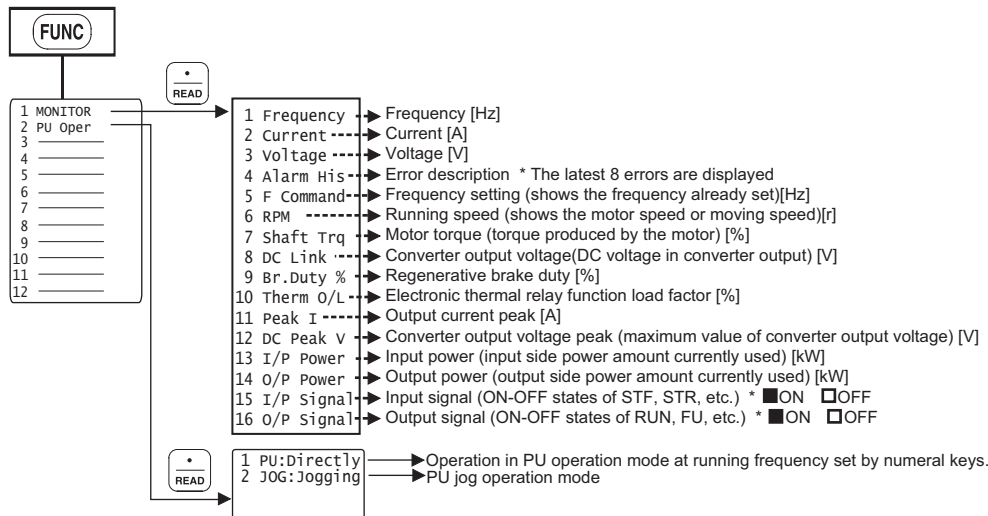
The functions vary with the inverter model and may be invalid for some inverters.

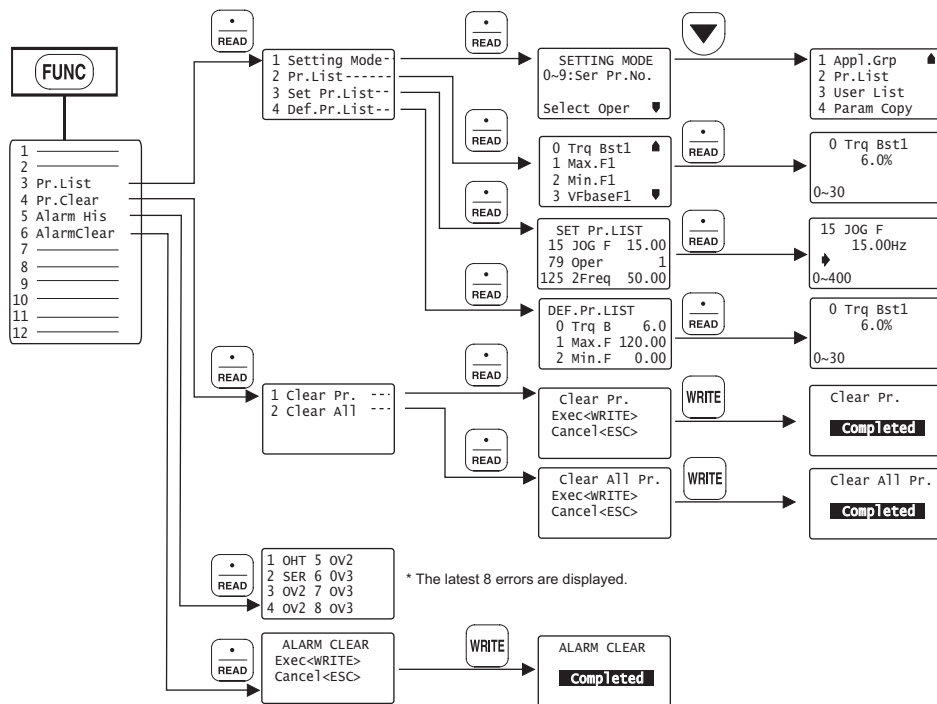
Help Menu	Description	Refer To
1. MONITOR	The monitor list appears, and you can change from one monitor to another and set the first priority screen.	Page 45
2. PU Oper	You can select the PU operation mode via direct input (direct setting with the number keys) or select the jog operation mode from the PU, and displays how to operate the keys.	Page 46
3. Pr.List	The parameter menu appears, and you can perform "parameter setting", "list display", "parameter change list display" and "initial value list display".	Page 48

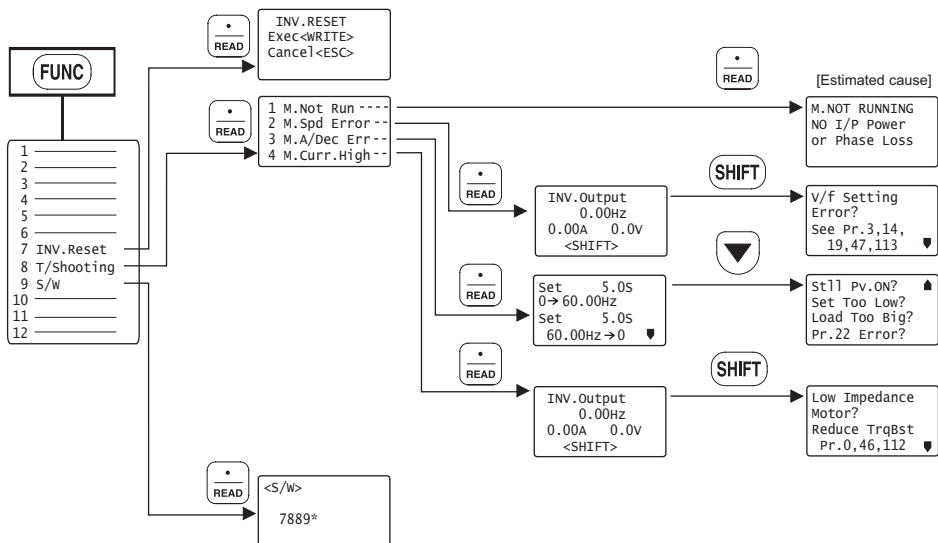


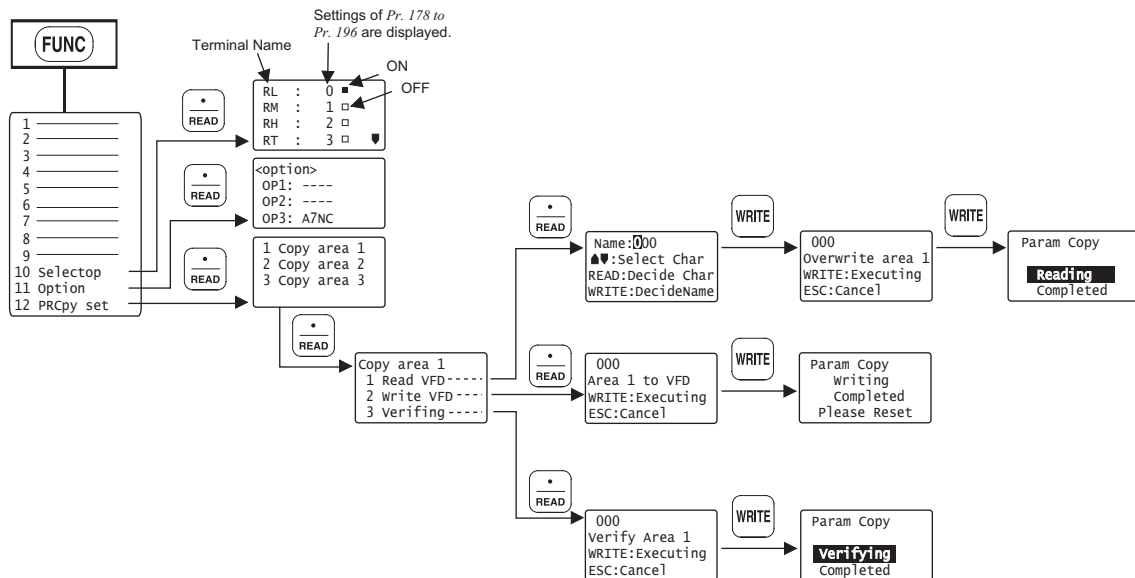
Help Menu	Description	Refer To
4. Pr.Clear	The parameter clear menu appears, and you can perform "parameter clear" and "all clear".	Page 51
5. Alarm Hist	This function displays history of past eight faults (alarms).	Page 53
6. AlarmClear	This function clears all the fault (alarm) history.	Page 54
7. Inv.Reset	This function resets the inverter.	Page 55
8. T/Shooting	The inverter displays the cause of mismatch between inverter operation and control/setting or the cause of an inverter fault.	Page 55
9. S/W	This function displays the software control number of the inverter.	-
10. Selectop	This function displays the signals assigned to the I/O terminals of the control circuit and the ON-OFF states of the signals.	Page 60
11. Option	This function displays the option fitting states of the option connectors 1 to 3.	Page 61
12. FRCpy set	The function can perform the "parameter copy" (read, write verification).	Page 62

3.1.2 Function menu transition





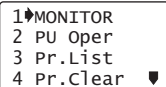
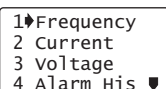
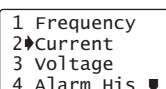


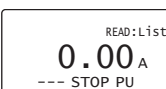


3.2 Operation Procedures for Functions

3.2.1 Monitor function

The monitoring list appears and you can change from one monitor screen to another and set the first priority screen.

1	Press FUNC . The function menu is called.	
2	Make sure that the cursor is located at "1 MONITOR". If not, move the cursor with  /  .	
3	Press  . The monitoring list is called.	
4	Press  or  to move the cursor to the desired item. Hold down SHIFT and press  /  to shift one screen.	

5	Press  . The monitor screen selected by the cursor appears. Press  to give the first priority to this monitor screen.	
---	---	---

REMARKS

- The monitoring list can be called only with pressing  in the monitoring mode. (Refer to page 14)
- "4 Alarm His" can not be set to the first priority monitor.



3.2.2 Selection of PU operation (direct input)

You can select the PU operation mode to set PU operation frequency.

1	Press FUNC . The function menu is called.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear
2	Using ▼ , move the cursor to "2 PU Oper".	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear
3	Press READ . The menu on the right appears.	
4	Make sure that the cursor is located at "1 PU: Directly". If not, move the cursor with ▲ / ▼ .	1 PU:Directly 2 JOG:Jogging
5	Press READ . The PU operation mode is selected and the frequency setting screen appears.	Freq Set SET 0.00Hz ↓ 0~400Hz

6	Enter the set frequency using 0 to 9 and press WRITE . The frequency setting is complete.	Freq Set SET 60.00Hz Completed
7	Press FWD / REV to perform forward or reverse rotation with the set frequency.	READ:List 60.00 Hz STF FWD PU

REMARKS

- Press **▲** to call the frequency setting screen any time.

3.2.3 Selection of the PU jog operation mode

You can select the PU jog operation mode to set PU jog frequency.

1	Press FUNC . The function menu is called.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
2	Using ▼, move the cursor to "2 PU Oper".	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
3	Press READ . The menu on the right appears.	1 PU:Directly 2 JOG:Jogging
4	Using ▼, move the cursor to "2 JOG: Jogging".	1 PU:Directly 2 JOG:Jogging
5	Press READ . The PU jog operation mode is selected, and the frequency setting screen appears.	PU/JOG SET 0.00Hz ▼ 0~400Hz

6	Enter the set frequency using 0 to 9 and press WRITE . The PU jog frequency setting is complete.	PU/JOG SET 5.00Hz Completed
7	Hold down FWD / REV to perform forward or reverse rotation with the PU jog set frequency.	READ:List 5.00 Hz STR JOGr PUj

REMARKS

- Press **SHIFT** to call the PU jog frequency setting screen any time after pressing **PU**.



3.2.4 Parameters

When selecting the parameter on the parameter menu, the parameter menu is displayed, and you can perform the following operations for the parameters.

	Display	Description
1	Setting Mode	Switches to the parameter setting mode to read and write the parameter setting.
2	Pr. List	Displays the parameters list. You can select the parameter from the list to read and write the parameter setting.
3	Set Pr. List	Lists the parameters whose setting is changed from initial value. You can select the parameter from the list to read and write the parameter setting.
4	Def.Pr. List	Displays the parameters and initial value list. You can select the parameter from the list to read and write the parameter setting.

(1) "1 Setting Mode"

1	Press FUNC . The function menu is called.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
2	Using ▼, move the cursor to "3 Pr. List".	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
3	Press READ . The parameter menu appears.	1 Setting Mode 2 Pr.List 3 Set Pr.List 4 Def.Pr.List
4	Press READ . The parameter unit switches to the setting mode. Refer to <i>page 20</i> to set the parameters.	SETTING MODE 0~9:Ser Pr.NO. Select Oper ▼

(2) "2 Pr.List"

1	Call the parameter menu similarly to above steps 1 to 3.	1 Setting Mode 2 Pr.List 3 Set Pr.List 4 Def.Pr.List
---	--	---

2	Using ▼, move the cursor to "2 Pr. List".	1 Setting Mode 2 Pr.List 3 Set Pr.List 4 Def.Pr.List
3	Press READ . The parameter menu appears.	
4	Press ▲/▼ to move the cursor to the desired parameter. Press SHIFT and ▼ together to sift to the next page.	0 Trq Bst1 ▲ 1 Max.F1 2 Min.F1 3 VFbaseF1 ▼
5	Press READ . The parameter indicated by the cursor is read, and the parameter unit is put in the parameter setting mode. Refer to <i>page 20</i> to set the parameters.	0 Trq Bst1 6.0% 0~30

Press **SHIFT** to move to the next parameter.



(3) Display of "3 Set Pr.List"

1	Call the parameter menu similarly to steps 1 to 3 of <i>page 49</i> .	1 Setting Mode 2 Pr.List 3 Set Pr.List 4 Def.Pr.List
2	Using / , move the cursor to "3 Set Pr. List".	1 Setting Mode 2 Pr.List 3 Set Pr.List 4 Def.Pr.List
3	Press . The change list appears. When the parameter has been changed from the initial value, the new value is displayed.	SET Pr.LIST 1 Max.F1 0.00 18 Max.F2 0.00 125 2Freq 50.00
4	Press . The parameter indicated by the cursor is read, and the parameter unit is put in the parameter setting mode. Refer to <i>page 20</i> to set the parameters.	1 Max.F1 0.00Hz 0~120

(4) Display of "4 Def.Pr.List"

The initial values of parameters are displayed.

1	Call the parameter menu similarly to steps 1 to 3 of <i>page 49</i> .	1 Setting Mode 2 Pr.List 3 Set Pr.List 4 Def.Pr.List
2	Using / , move the cursor to "4 Def. Pr. List".	1 Setting Mode 2 Pr.List 3 Set Pr.List 4 Def.Pr.List
3	Press . The initial value list appears.	DEF.Pr.LIST 0 Trq B 6.0 1 Max.F 120.00 2 Min.F 0.00
4	Press . The parameter indicated by the cursor is read, and the parameter unit is put in the parameter setting mode. Refer to <i>page 20</i> to set the parameters.	0 Trq Bst1 6.0% 0~30

3.2.5 Parameter clear

You can perform the "parameter clear" and "all parameter clear".
Switch to the PU operation mode before performing any operation.

- (1) Clear Pr..... Returns (initializes) the parameters to the factory settings with the exception of the some parameters (*Pr. 75* and calibration values in *Pr. 900 to 905*).
- (2) Clear All Initializes all parameters with the exception of *Pr. 75*.

(1) Parameter clear

1	Press FUNC . The function menu is called.	1♦MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
2	Using ▲ / ▼ , move the cursor to "4 Pr. Clear".	1 MONITOR 2 PU Oper 3 Pr.List 4♦Pr.Clear ▼
3	Press READ . The parameter menu appears.	1♦Clear Pr. 2 Clear All
4	Select the "Clear Pr." Using ▲ / ▼ , move the cursor to "1" and press the READ .	1♦Clear Pr. 2 Clear All

5	"Clear Pr." is selected, and the confirmation screen for clearing execution is displayed.	Clear Pr. Exec<WRITE> Cancel<ESC>
6	Press WRITE . The parameters are initialized. When canceling the initialization, press ESC on the confirmation screen.	Clear Pr. Completed



(2) All parameter clear

1	Call the parameter menu similarly to steps 1 to 3 of <i>page 51</i> .	1♦Clear Pr. 2 Clear All
2	Select the "Clear All". Using  /  , move the cursor to "2 Clear All" and press the  .	1 Clear Pr. 2♦Clear All
3	"Clear All" is selected, and the confirmation screen for clearing execution is displayed.	Clear All Pr. Exec<WRITE> Cancel<ESC>
4	Press  . The parameters are initialized. When canceling the initialization, press  on the confirmation screen.	Clear All Pr. Completed

3.2.6 Alarm history

Shows the history of past eight alarms.

1	Press FUNC . The function menu is called.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear
2	Using ▲ / ▼ , move the cursor to "5 Alarm His". Hold down SHIFT and press ▲ / ▼ to shift one screen.	5 Alarm His 6 AlarmClear 7 INV.Reset 8 T/Shooting
3	Press READ . The alarm history appears.	1 OHT 5 OV2 2 SER 6 OV3 3 OV2 7 OV3 4 OV2 8 OV3
4	Press READ . The running frequency at alarm occurrence is displayed.	LATEST ERR OH Fault 0.00Hz

5	Press ▼ . The output current, output voltage and cumulative energization time at alarm occurrence is displayed.	LATEST ERR 0.00A 0.0V 7hr
6	Press READ when displaying the operation mode for alarm occurrence in steps 4 and 5 to display the operation data for the preceding alarm occurrence.	2nd Prev.ERR PU Leave Out 0.00Hz



3.2.7 Alarm clear

Clears all the alarm history.

1	Press FUNC. The function menu is called.	1♦MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
2	Using ▲ / ▼, move the cursor to "6 AlarmClear". Hold down SHIFT and press ▲ / ▼ to shift one screen.	5 Alarm His ▲ 6♦AlarmClear 7 INV.Reset 8 T/Shooting ▼
3	Press READ. The alarm clear is selected, and the confirmation screen for clearing execution is displayed.	ALARM CLEAR Exec<WRITE> Cancel<ESC>
4	Press WRITE. The alarm history is cleared. When canceling the clear, press ESC on the confirmation screen.	ALARM CLEAR Completed

3.2.8 Inverter reset

Resets the inverter.

1	Press FUNC . The function menu is called.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear
2	Using ▲ / ▼ , move the cursor to "7 INV. Reset". Hold down SHIFT and press ▲ / ▼ to shift one screen.	5 Alarm His 6 AlarmClear 7 INV.Reset 8 T/Shooting
3	Press READ . The inv. reset is selected, and the confirmation screen for resetting execution is displayed.	INV.RESET Exec<WRITE> Cancel<ESC>
4	Press WRITE . The inverter is reset, and the parameter unit switches to the monitoring mode. When canceling the inverter reset, press ESC on the confirmation screen.	READ:List 0.00 Hz --- STOP EXT

REMARKS

- If the inverter's protective function is activated to bring the inverter to an alarm stop (output shutoff), execute the inverter reset only by pressing **STOP RESET**.
- A similar reset operation may also be performed by switching power on again or by switching the RES signal on. (Refer to the inverter instruction manual for details.)



3.2.9 Troubleshooting

If the inverter appears to operate improperly, perform the following operation to display the most likely cause of the fault.

This operation may also be performed during inverter operation (PU operation, external operation) or during alarm trip (protection activated).

1	Press FUNC . The function menu is called.	1♦MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
2	Using ▲ / ▼ , move the cursor to "8 T/Shooting". Hold down SHIFT and press ▲ / ▼ to shift one screen.	5 Alarm His ▲ 6 AlarmClear 7 INV.Reset 8♦T/Shooting ▼
3	Press READ . The fault menu appears.	1♦M.Not Run 2 M.Spd Error 3 M.A/Dec Err 4 M.Curr.High
4	Press ▲ or ▼ to move the cursor to the desired item.	1 M.Not Run 2♦M.Spd Error 3 M.A/Dec Err 4 M.Curr.High

5	Press READ . The estimated cause of the fault is displayed. (Refer to page 57)	M.SPEED ERROR SetF>Max.F1/F2 60.00Hz Pr.1/18
---	--	---

Troubleshooting guidance

1) M.NOT RUNNING (Motor does not run)

M.NOT RUNNING
ALARM
Indicated
<SHIFT>

The protective function is activated to bring the inverter to an alarm stop. Press **(SHIFT)** to display the cause of the trip.

M.NOT RUNNING
Max. F1<StartF
Pr. 1 Pr. 13

The inverter cannot start because the inverter starting frequency (*Pr. 13*) is higher than the maximum frequency (*Pr. 1*).

M.NOT RUNNING
NO I/P Power
or Phase Loss

The inverter's main circuit power is lost or there is an open phase in the power supply. Check the power supply.

M.NOT RUNNING
EnableFR Set
See Pr. 78

The inverter cannot start because you attempted to run the motor in the direction in which forward or reverse rotation is inhibited as set in *Pr. 78*.

M.NOT RUNNING
STF, STR
both are OFF
or ON

Both start signals STF and STR are ON or OFF.

M.NOT RUNNING
Current Limit
Activated
<SHIFT>

The inverter cannot start since the current limit function is activated. Press **(SHIFT)** to display the estimated cause that the current limit function was activated.

M.NOT RUNNING
MRS is ON

MRS signal is ON.

M.NOT RUNNING
Under
PID Control

The inverter does not start because the inverter need not start the motor as a result of the arithmetic operation of PID control.

M.NOT RUNNING
SetF<StartF
Pr. 13

The inverter starting frequency (*Pr. 13*) setting is higher than the frequency currently set.

M.NOT RUNNING
CS is OFF
See Pr. 57

The inverter will not restart since the automatic restart after instantaneous power failure select signal CS is OFF. It is estimated that an instantaneous power failure has occurred or the inverter in the commercial power supply switch-over operation mode.

M.NOT RUNNING
AU is OFF

The current input select signal AU remains OFF. (not ON)

M.NOT RUNNING
NO Command
From PU

Neither of **(FWD)** and **(REV)** are pressed in the PU operation mode.



2) M.SPEED ERROR

(Speed does not match the running frequency setting)

M. SPEED ERROR
SetF>MaxF1/F2
60.00 Hz
Pr.1/18

Since the running frequency setting is higher than the maximum frequency (Pr. 1) setting, the running frequency remains at the maximum frequency.

M. SPEED ERROR
SetF<MinF1
60.00Hz
Pr.2

Since the running frequency setting is lower than the minimum frequency (Pr. 2) setting, the running frequency has been increased to the minimum frequency.

M. SPEED ERROR
Fjump Working
See Pr. 31#36
SetF= 60.00Hz

Since the running frequency setting is within the frequency jump setting range (Pr. 31 to 36), the running frequency has jumped.

M. SPEED ERROR
Current Limit
Activated
<SHIFT>

The current limit function was activated and forced the running frequency to reduce. Press (SHIFT) to display the cause that the current limit function was activated.

M. SPEED ERROR
Under
PI#Control

As a result of arithmetic operation of PID control, the running frequency differs from the set value.

3) M.A/Dec Err

(Actual acceleration/deceleration time is longer than the Pr. 7/Pr. 8 setting)

Set 5.0S
0# 60.00Hz
Set 5.0S
60.00Hz# 0

Acceleration time setting (Pr. 7) is displayed.

Frequency reached in the above set time (Pr. 20 Acceleration/deceleration reference frequency) is displayed.

Deceleration time setting (Pr. 8) is displayed.

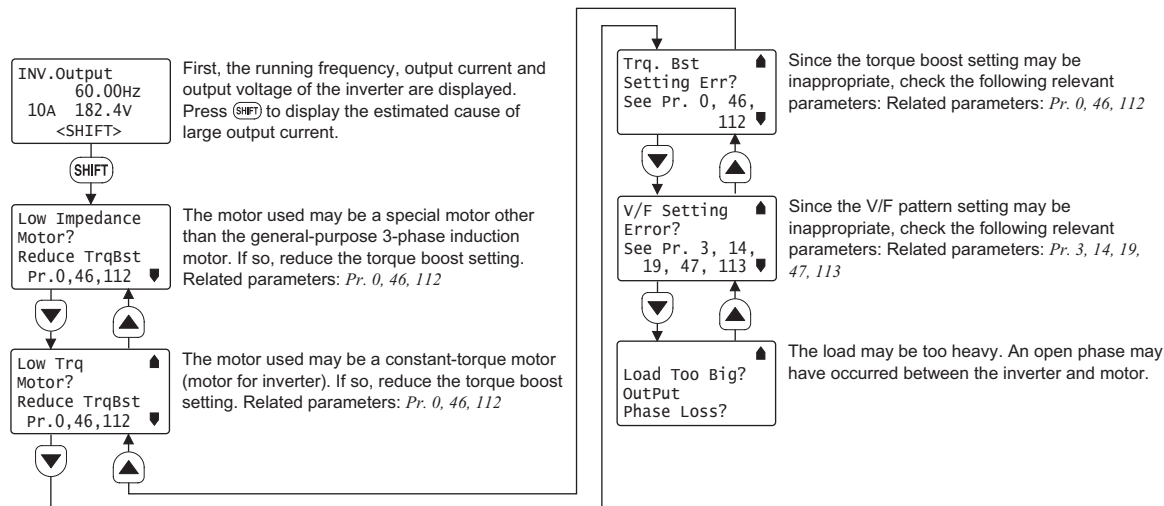
Frequency from which deceleration is made in the above set time (Pr. 20 Acceleration/deceleration reference frequency) is displayed.



St11 Pv. ON?
Set Too Low?
Load Too Big?
Pr. 22 Error?

Estimated cause that actual acceleration/deceleration time is longer than the setting is displayed.

4) M.Curr.High (Inverter output current is larger than normal)



REMARKS

<When the fault could not be identified>

When the cause of the fault is not specified even after performing the operation mentioned above, the current running frequency, output current and output voltage at the point are displayed on the screen.

Press **(SHIFT)** to display the estimated cause related.

INV.Output
60.00Hz
0.00A 182.8V
<SHIFT>

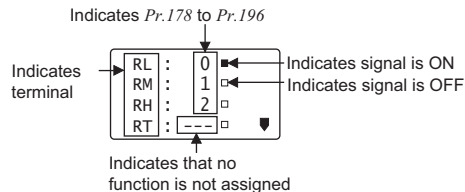


3.2.10 Terminal assignment (Selectop)

The signals assigned to the control circuit terminals and their ON-OFF states are displayed.

If the plug-in options FR-A7AX, FR-A7AY and FR-A7AR are mounted, the terminal state of the plug-in option can be also confirmed.

1	Press FUNC . The function menu is called.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear
2	Using ▲ / ▼ , move the cursor to "10 Selectop". Hold down SHIFT and press ▲ / ▼ to shift one screen.	9 S/w 10 Selectop 11 Option 12 PRcPy set
3	Press READ . The signals assigned to the control circuit terminals and their ON-OFF states are displayed.	RL : 0 □ RM : 1 □ RH : 2 □ RT : 3 □



3.2.11 Option

Displays what options are fitted to the option connectors.

1	Press FUNC. The function menu is called.	1♦MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
2	Using /, move the cursor to "11 Option". Hold down SHIFT and press / to shift one screen.	9 S/W ▲ 10 Selectop 11♦Option 12 PRCpy set
3	Press . Numbers OP1 to OP3 correspond to numbers 1 to 3 of the option slot on the inverter side. For the inverter with only one option slot, what option is mounted is displayed next to OP1. The plug-in option which is mounted on the inverter is displayed.	<option> OP1: ---- OP2: ---- OP3: A7NC



3.2.12 Multiple copies

(1) Copying the parameter settings

You can read the parameter settings of the inverter into the FR-PU07 and store the settings of max. three inverters. You can also copy the stored parameter settings to another inverter of the same series.

Confirm for setting

- Is the PU operation mode selected? → If not, press  to select the PU operation mode.
- Is the inverter stopped? → If it is running, press  to stop it.
- Is the *Pr. 77* setting of the copy destination inverter correct? → Set "0 or 2" in *Pr. 77*.
- Is the inverter of the copy destination the same series as that of the copy source? → Select the inverter of the same series.
Example: ○ FR-A720-0.4K → FR-A720-0.75K Parameters can be copied only to the same series inverters.
 × FR-A720-0.4K → FR-F720-0.75K

- Reading the parameter settings of the inverter to FR-PU07

1	Connect the FR-PU07 to the copy source inverter.	
2	Press FUNC . The function menu appears.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear ▼
3	Select the "multiple copies". Using ▲/▼, move the cursor to "12 PRCpy set" and press READ .	9 S/W ▲ 10 Selectop 11 Option 12 PRCpy set
4	Select the copy area. The copy area selection screen is displayed. Then, move the cursor to any one of 1 to 3 and press READ . (Parameter settings of each inverter (three inverters in total) can be copied to the region 1, 2 or 3.)	1 Copy area 1 2 Copy area 2 3 Copy area 3
5	Select the "READ". Using ▲/▼, move the cursor to "1 Read VFD" and press READ .	Copy area 1 1 Read VFD 2 Write VFD 3 Verifying

6	Give a name. You can name each of copy areas 1 to 3. Select the characters with ▲/▼ and set them with READ . Press WRITE to set the name for the area.	Name: 012 ▲▼: Select Char READ: Decide Char WRITE: DecideName
7	Write to the copy area of FR-PU07. The screen for confirming the overwriting of the data in the FR-PU07 is displayed.	012 Overwrite area 1 WRITE: Executing ESC: Cancel
8	Press WRITE . The parameter settings of the inverter are stored. When canceling, press ESC .	Param Copy Reading Completed



- Writing the parameter setting copied to FR-PU07 to the inverter

1	Connect the FR-PU07 to the copy destination inverter.	
2	Press FUNC . The function menu appears.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear
3	Select the "multiple copies". Using ▲ / ▼ , move the cursor to "12 PRCpy set" and press READ .	9 S/W 10 Selectop 11 Option 12 PRCpy set
4	Select the copy area. Point the cursor to the copy area that stores the parameter settings to be written to the inverter, and press READ .	1 Copy area 1 2 Copy area 2 3 Copy area 3
5	Select the "WRITE". Using ▲ / ▼ , point the cursor to "2 Write VFD" and press READ .	Copy area 1 1 Read VFD 2 Write VFD 3 Verifying

6	Writing the parameter settings is selected, and the confirmation screen for writing execution is displayed.	012 Area 1 to VFD WRITE:Executing ESC:Cancel
7	Press WRITE . The parameter settings stored in the FR-PU07 are copied to the copy destination inverter.	Param Copy Writing Completed Please Reset
8	Reset the inverter. (Refer to page 55)	

CAUTION

- Overwriting the data of the FR-PU07 deletes the previous data.
- Exercise care not to switch power off while parameters are being written.

REMARKS

- The parameter settings of three inverters can be stored in areas 1 to 3.
- Read and write cannot be stopped during execution.
- If power is switched off, parameter data stored in the parameter unit remains unerased.

(2) Verifying the parameters

All the parameter settings stored in the FR-PU07 are verified with those which are stored in the inverter.

<For settings>

Verification cannot be performed between different inverter series.

1	Refer to <i>page 63</i> and copy the parameter settings of the verify source inverter to the FR-PU07.	
2	Connect the FR-PU07 to the inverter to be verified.	
3	Press FUNC . The function menu appears.	1 MONITOR 2 PU Oper 3 Pr.List 4 Pr.Clear
4	Select the "multiple copies". Using ▲ / ▼ , move the cursor to "12 PRCpy set" and press READ .	9 S/W 10 Selectop 11 Option 12 PRCpy set
5	Select the copy area. Point the cursor to the copy area that stores the parameter settings required verification, and press READ .	1 Copy area 1 2 Copy area 2 3 Copy area 3

6	Select the "Verifying". Using ▲ / ▼ , point the cursor to "3 Verifying" to press READ .	Copy area 1 1 Read VFD 2 Write VFD 3 Verifying
7	Verification of the parameter settings is selected, and the confirmation screen for verification execution is displayed.	012 Verify Area 1 WRITE:Executing ESC:Cancel
8	Press WRITE . Start verification of parameter settings stored in the FR-PU07 and parameter settings of the inverter.	Param Copy Verifying Please Wait



9	If an error is detected during verification, the corresponding <i>Pr.</i> is shown. Note that only "Verify Err" will be displayed if an incorrect value has been entered directly (f setting) or set in either <i>Pr. 173</i> or <i>Pr. 174</i>.	Param Copy Verify Err Pr. 2 Min.F1
10	Press 0. When verification is stopped with verification error, press 0 to continue verification.	
11	Verification is complete.	Param Copy Verifying Completed

3.3 Other Precautions

3.3.1 Precautions for parameter unit operation

Note the following items when operating the parameter unit to prevent setting from being disabled or incorrect values from being entered.

- **Precautions for the digit count and decimal point of input value**

The maximum number of input digits is six including a decimal point. If you enter a value in excess of 6 digits, the most significant digit is ignored.

12345.6 → ■2345.6
(Input) ↑ Ignored

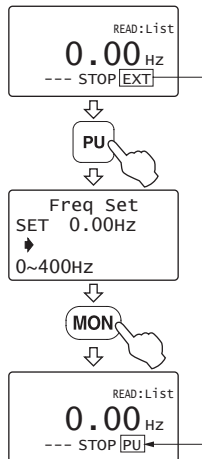
4 OPERATION

4.1 How to Select the Operation Mode

4.1.1 Switching from external operation mode [EXT] to PU operation mode [PU]

Confirmation

Make sure that the external input signal (STF, STR) is OFF.

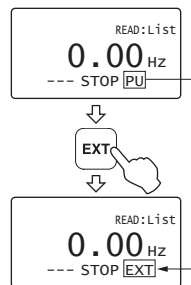


Pressing **[PU]** switches to the PU operation mode and changes the operation mode indication to [PU].

4.1.2 Switching from PU operation mode [PU] to external operation mode [EXT]

Confirmation

Make sure that the external input signal (STF, STR) is OFF and that the operation command indication is "- - -".

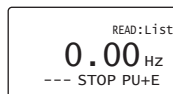


Pressing **[EXT]** switches to the external operation mode and changes the operation mode indication to [EXT].

4.1.3 Switching to the external / PU combined operation mode

Changing the *Pr. 79 Operation mode selection* setting to "3" or "4" switches to the external / PU combined operation mode.

"PU+E" is displayed in the operation mode indication position.



The relationship between the running frequency and the start signal is as indicated in the following table.

Pr. 79 Setting	Description	
	Running frequency setting	Start signal
3	Parameter unit	External signal input · Terminal STF · Terminal STR
	· Direct setting and  /  key setting External signal input · Multi-speed selection (<i>Pr. 4 to Pr. 6, Pr. 24 to Pr. 27</i>) · 4 to 20mADC across terminals 4-5	

Pr. 79 Setting	Description	
	Running frequency setting	Start signal
4	External signal input · 0 to 5/10VDC across terminals 2-5 · 4 to 20mADC across terminals 4-5 · Multi-speed selection (<i>Pr. 4 to Pr. 6, Pr. 24 to Pr. 27</i>) · JOG frequency (<i>Pr. 15</i>)	Parameter unit ·  · 

REMARKS

If the operation mode cannot be switched properly, check the following:

- Make sure that the external input signal is off. If it is on, the operation mode (STF or STR signal) cannot be switched properly.
- Confirm the *Pr. 79 Operation mode selection* setting.
(Refer to *page 68* and *the inverter instruction manual*)



4.2 How to Operate PU Operation

4.2.1 Ordinary operation

You can change speed by repeating the following steps 2 and 3 during motor operation:

Step	Operation Procedure	Image
1	Switch power on. Make sure that the monitor appears.	
2	Set the running frequency. Set the running frequency using direct setting or step setting. (Refer to page 17)	
3	Press FWD or REV . The motor starts running. The parameter unit automatically enters the monitoring mode and shows the output frequency.	

Step	Operation Procedure	Image
4	Press STOP/RESET . The motor is decelerated to a stop.	

REMARKS

When performing PU operation to run the motor, pressing the start key (**FWD** or **REV**) after setting the running frequency switches to monitor mode automatically.

4.2.2 PU jog operation

Hold down **FWD** or **REV** to perform operation, and release it to stop.

Jog operation cannot be performed in the following cases:

- During motor operation
- The *Pr. 15 Jog frequency* is less than the *Pr. 13 Starting frequency*.

Example: To operate at the PU jog running frequency of 8Hz

Step	Operation Procedure	Image
1	Switch to the PU operation mode. If the operation mode indication is not [PU], refer to <i>page 68</i> and switch to the PU operation mode.	
2	The frequency for jog operation can be set with <i>Pr. 15 Jog frequency</i> and the acceleration/deceleration time with <i>Pr. 16 Jog acceleration/deceleration time</i> both in the parameter unit. (Refer to <i>page 20</i> for the parameter setting method.) <Initial value> · <i>Pr. 15</i> 5Hz · <i>Pr. 16</i> 0.5s	

Step	Operation Procedure	Image
3	Press PU , then SHIFT . The PU jog operation mode is selected, and the PU jog frequency setting screen appears on the display. To change the frequency, enter the value and press WRITE .	
4	Press FWD or REV . The display changes to the monitor screen. Hold down the key to perform operation and release it to stop.	
5	Press PU . The inverter exits from the jog operation mode and returns to the ordinary PU operation mode.	

REMARKS

The jog operation mode may also be selected from

FUNC. (Refer to *page 47*)



4.3 Combined Operation (Operation Using External Input Signals and PU)

4.3.1 Entering the start signal from outside and setting the running frequency from the PU (Pr. 79 = 3)

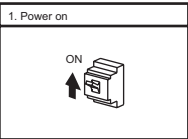
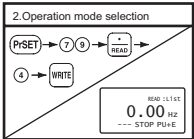
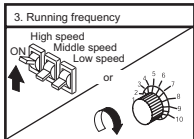
The external frequency setting signals and **FWD** and **REV** of the parameter unit are not accepted.

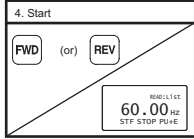
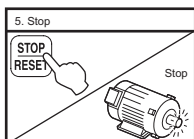
Stop with **STOP RESET** is valid when Pr. 75 Reset selection/disconnected PU detection/PU stop selection = "14 to 17".

Step	Operation Procedure	Image
1	Switch the power on.	
2	Set "3" in Pr. 79 Operation mode selection . The external/PU combined operation mode is selected and the operation mode indication on the display changes to "PU + E".	

Step	Operation Procedure	Image
3	Set the running frequency. Set the running frequency using direct setting or step setting. (Refer to page 17)	
4	Set the start switch (STF or STR) to ON. The operation command indication changes to "STF" or "STR" and the operation status indication changes to the output (FWD or REV) indication. · If the forward and reverse rotation switches are both set to ON, the inverter will not start. Also, if these switches are both set to ON during operation, the motor is decelerated to a stop.	
5	Set the start switch (STF or STR) to OFF. The motor stops running.	

4.3.2 Entering the running frequency from outside and making start and stop from the PU (Pr. 79 = 4)

Step	Operation Procedure	Image
1	Switch the power on.	
2	Set "4" in Pr. 79 Operation mode selection. The external/PU combined operation mode is selected and the operation mode indication on the display changes to "PU + E".	
3	Enter the external frequency command. Select the multi-speed signal or turn the frequency setting potentiometer.	

Step	Operation Procedure	Image
4	Press FWD or REV of the parameter unit. The motor starts running, and the state of the output frequency is shown on the display. ·The starting terminals (STF, STR) of the inverter are invalid. ·The inverter may also be started by pressing the PU FWD or REV and then inputting the frequency command.	
5	Press STOP/RESET of the parameter unit. The motor is decelerated to a stop.	



4.3.3 Entering the start signal and multi-speed signal from outside and setting multiple speeds from the parameter unit

Step	Operation Procedure	Image
1	Switch the power on.	
2	Select the multi-speed signal required for operation. Switch the RH, RM or RL signal on.	
3	Set the start switch (STF or STR signal) to ON. The operation command indication changes to "STF" or "STR", the operation status indication changes to the output (FWD or REV) indication, and the motor starts running. · If the forward and reverse rotation switches are both set to ON, the inverter will not start. Also, if these switches are both set to ON during operation, the motor is decelerated to a stop.	

Step	Operation Procedure	Image
4	Change the multi-speed frequency during running from the parameter unit. When high speed has been selected (RH signal ON), changing the <i>Pr: 4 Multi-speed setting (high speed)</i> value varies the speed. · The other multiple-speed settings not being used may also be changed during operation.	
5	Switch off the multi-speed signal (RH, RM or RL signal) and set the start switch (STF or STR signal) to OFF. The motor stops running.	

5 SPECIFICATIONS

5.1 Standard Specifications

Item	Specifications
Ambient temperature	-10°C to +50°C (non-freezing) (*1)
Ambient humidity	90%RH or less (non-condensing)
Storage temperature	-20°C to +65°C (*2)
Ambience	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)
Altitude, vibration	Maximum 1000m above sea level for standard operation. 5.9m/s ² or less (conforming to JIS C 60068-2-6)
Power supply	Power is supplied from the inverter.
Connection	Fitted to the inverter or connected to the inverter by the cable.
Display	LCD (liquid crystal display, 16 characters 4 lines)
Data retention	Onboard EEPROM
Number of write times	Maximum 100,000 times

*1 At the low temperatures of less than about 0, the liquid crystal display (LCD) may be slower in operation. At high temperatures, the LCD life may become shorter.

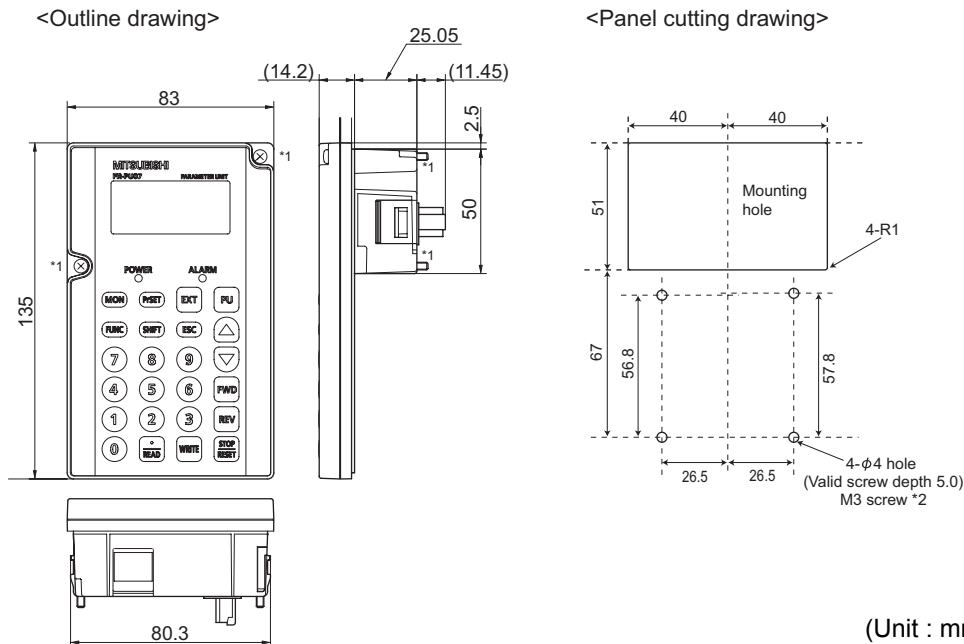
*2 Temperatures applicable for a short time, e.g. in transit.

CAUTION

1. Do not expose the liquid crystal screen to direct sunlight.
2. During transportation, use care to avoid loading the liquid crystal display.



5.2 Outline Drawing and Panel Cutting Drawing



- *1 When installing the FR-PU7 on the enclosure, etc., remove screws for fixing the FR-PU07 to the inverter or fix the screws to the FR-PU07 with M3 nuts.
- *2 Select the installation screws whose length will not exceed the effective depth of the installation screws threads.

REVISIONS

*The manual number is given on the bottom left of the back cover.

Print Date	*Manual Number	Revision
Aug., 2005	IB(NA)-0600240ENG-A	First edition