MITSUBISHI

TRANSISTORIZED INVERTER

VFD SETUP SOFTWARE

FR-SW0-SETUP-WE

-Windows® (English) Version-

– INSTRUCTION MANUAL –

INTRODUCTION

Thank you for choosing the Mitsubishi Transistorized VFD Setup Software.

This instruction manual gives handling information and precautions for use of this software.

Incorrect handling might cause an unexpected fault. Before using this product, please read this manual carefully to use it to the optimum.

Please forward this manual to the end user.

When reading this manual, note the following:

This manual is written on the basis that Windows 95 (English version) is the operating system. When using Windows 98 with the software, refer to the corresponding Windows 98 instruction manual.

·The [return] and [enter] keys are represented by the ↵ key.

·Drive D is described as the CD-ROM drive and Drive C as the hard disk drive.

·In keyboard operation, simultaneous pressing of keys is indicated by "+".

Example: Pressing the [Alt] and [G] keys simultaneously is indicated by (Alt+G).

Trademarks

· Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

1) The formal name of Windows 3.1 is Microsoft$^®$ Windows$^®$ operating system Version 3.1.

2) The formal name of Windows 95 is Microsoft$^®$ Windows$^®$ 95 operating system.

3) The formal name of Windows 98 is Microsoft$^®$ Windows$^®$ 98 operating system.

· The DOS/V personal computer is a registered trademark of IBM Corporation.

· The "Mitsubishi Transistorized VFD Setup Software" is a registered trademark of Mitsubishi Electric Corporation.
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CHAPTER 1 OVERVIEW

This chapter provides the fundamental "overview" for use of this product.
Always read the instructions before using this software.

When using this software to make communication with the inverters, set a value other than 0 in Pr. 122 "communication check time interval" on the inverter's operation panel. For the FR-S500 series, set a value other than 0 in the communication parameter n6 (336) "communication check time interval".
(Refer to the inverter instruction manual for the setting method.)

CHAPTER 1	OVERVIEW
CHAPTER 2	FUNCTIONS
CHAPTER 3	ERROR INDICATIONS
CHAPTER 4	APPENDICES

1.1 Before Using This Software

• This software can be used effectively as a support tool for operations from startup to maintenance of the Mitsubishi transistorized inverter. The following functions can be performed efficiently on the Windows screen of a personal computer.
  ・System setting function
  ・Parameter editing function
  ・Monitoring function
  ・Diagnosis function
  ・Test running function
 ・File management function
  ・Help function

1.1.1 Packing list

After unpacking, check that the following items are contained in the package:

Item	Quantity
CD-ROM	1 disk
Instruction manual	1 book

1.2 Preparations for Startup

1.2.1 System configuration

The following devices are required to use the VFD Setup Software. Configure the system in accordance with the instruction manuals of the corresponding devices.
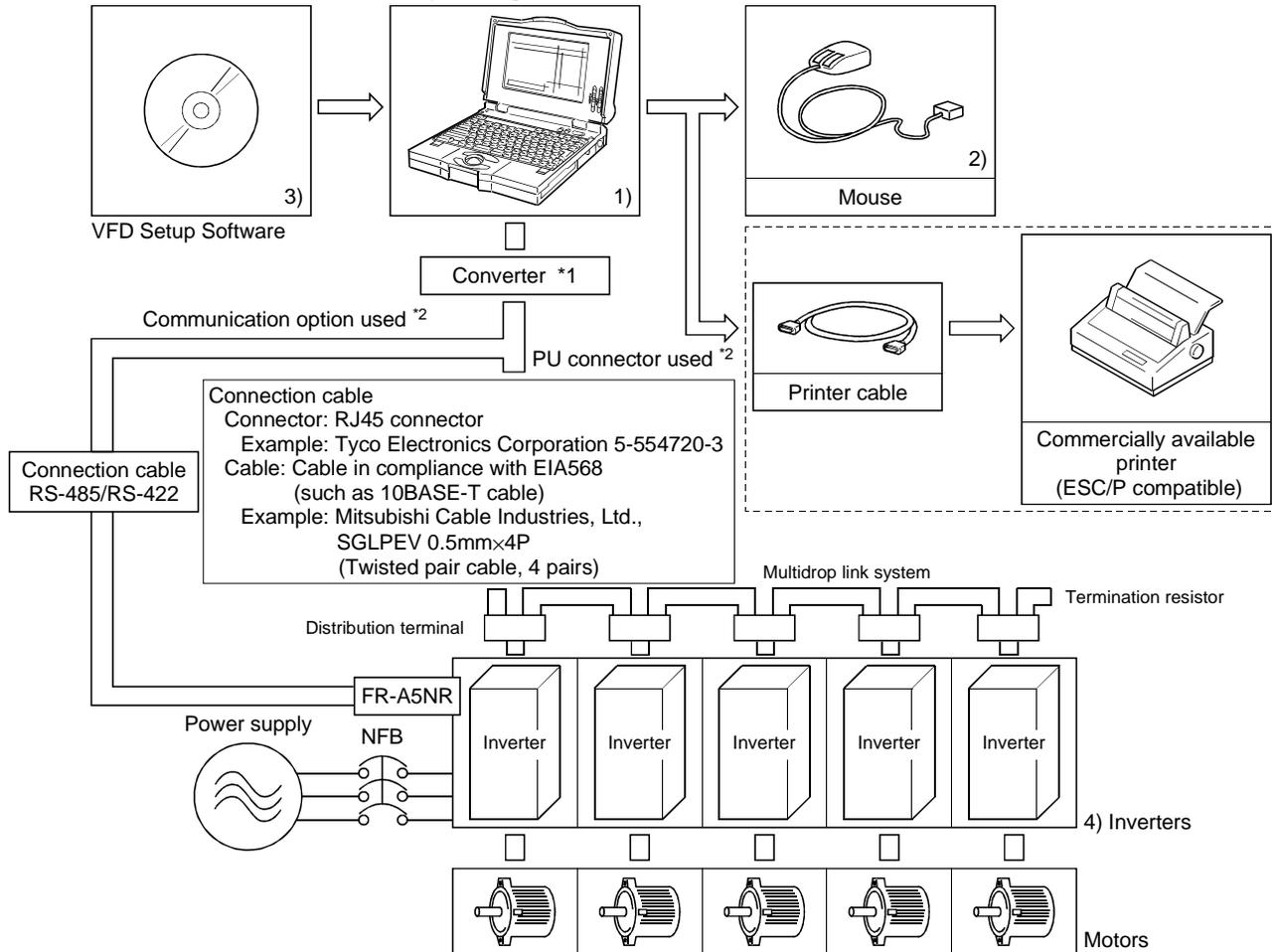
*1: A converter commercially available is required when the personal computer uses the RS-232C port.
　　<Example of a commercially available product>
　　　Model: FA-T-RS40 (Model with connectors and cable is also available)
　　　Converter
　　　Nagoya Sales Office, Mitsubishi Electric Engineering Co., Ltd.
*2: The PU connector or FR-A5NR (FR-A500 series, FR-F500 series) can be used to make communication.
　　(Refer to the corresponding instruction manual for details.)

	Model, Specifications, Etc.
1) Personal computer	One on which Windows 95 or Windows 98 (English version) operates
2) Mouse	Mouse which can be connected to the personal computer
3) Setup software	VFD Setup Software (FR-SW0-SETUP-WE)
4) Inverter	FR-A520 (-NA), FR-A540 (-NA) (-EC) (-CH), FR-A520L-75K, 90K, FR-A540L-75K to 280K (-NA) (-EC), FR-A560-NA, FR-E520-0.1K to 7.5K (C) (-NA), FR-E540-0.4K to 7.5K (-NA) (-EC) (-CH), FR-E520S-0.1K to 0.75K, FR-E520S-0.4K to 2.2K-EC (-CH), FR-E510W-0.1K to 0.75K (-NA), FR-F520-0.75K to 55K, FR-F540-0.75K to 55K (-EC) (-CH), FR-S520-0.1K to 3.7K-R, FR-S520S-0.1K to 1.5K-R, FR-S520S-0.2K to 1.5K-ECR (-CHR)

[Connection example between converter and inverter (PU connection port)]
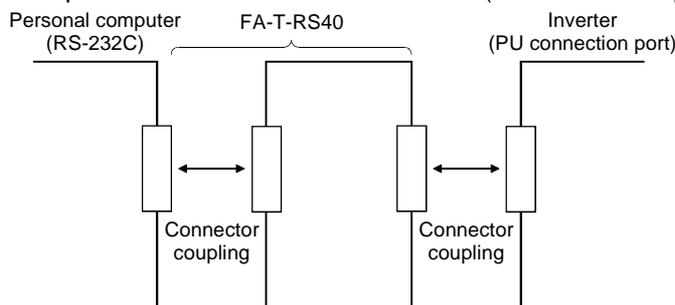
1.2.2 Installing the Setup Software

To use the VFD Setup Software (FR-SW0-SETUP-WE), the files included in the setup disks must be installed onto the personal computer.
If the former version of VFD setup software has been installed, delete it before starting the installation of the latest one.

To install the VFD Setup Software, use the setup program (SETUP.EXE) on the Setup Disk (CD-ROM). The setup program creates a directory on the specified hard disk and copies the required files.

Note: 1. Since the files in the Setup Disk are compressed, the VFD Setup Software will not operate by merely copying the files. Always use the setup program to install the software.
   2. Install the software in accordance with the Windows installation procedure.

• Installation procedure

Use the following procedure to register (install) the VFD Setup Software onto the hard disk drive of the personal computer:

(1) Insert the CD-ROM into the CD-ROM drive.

(2) Press the [Start] button and choose the [Run] command.
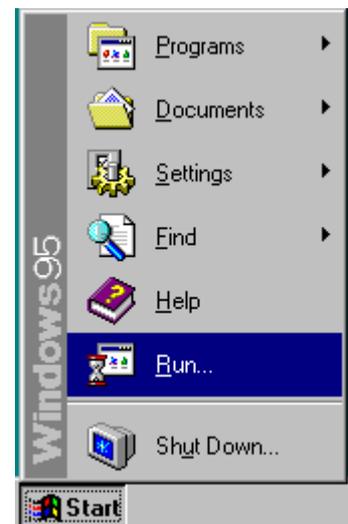
Note: Shut down any other applications that are running.

(3) Running the installation program
 1) The [Run] dialog box appears.
 2) Type "D:\SETUP" (use half-size letters) in [Open] and click the [OK] button or press the ↵ key. (When the CD-ROM drive is drive D)
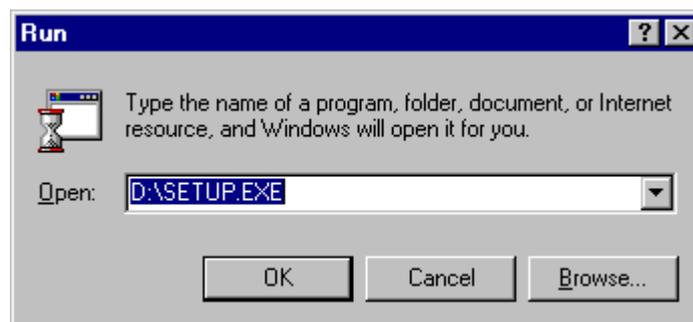
 3) After that, perform operation in accordance with the setup guide (screen).

4) When file copying is over, the following screen appears. Always enter the user and company names and click the [OK] button.
Installation is not completed unless the user and company names are entered.
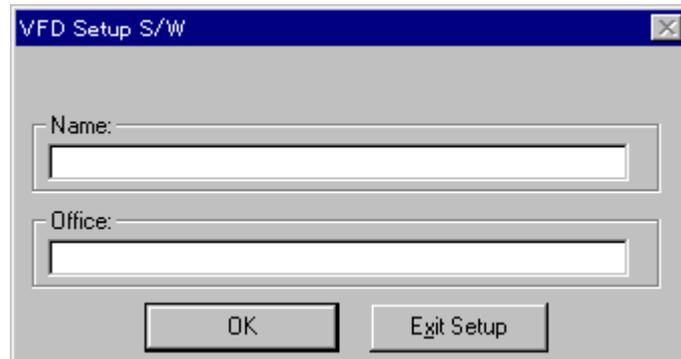
5) When installation is over, the "VFD Setup S/W" and "VFD Setup S/W Help" icons are registered and the following screen appears:
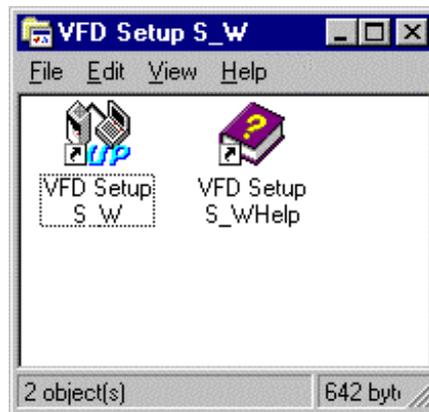
CHAPTER 2 FUNCTIONS

This chapter describes the "functions" for use of this product. Always read the instructions before using this software.

CHAPTER 1	OVERVIEW
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2.1 Starting the VFD Setup Software

Start the VFD Setup Software with "INVSETUP.EXE".

<Primary screen>
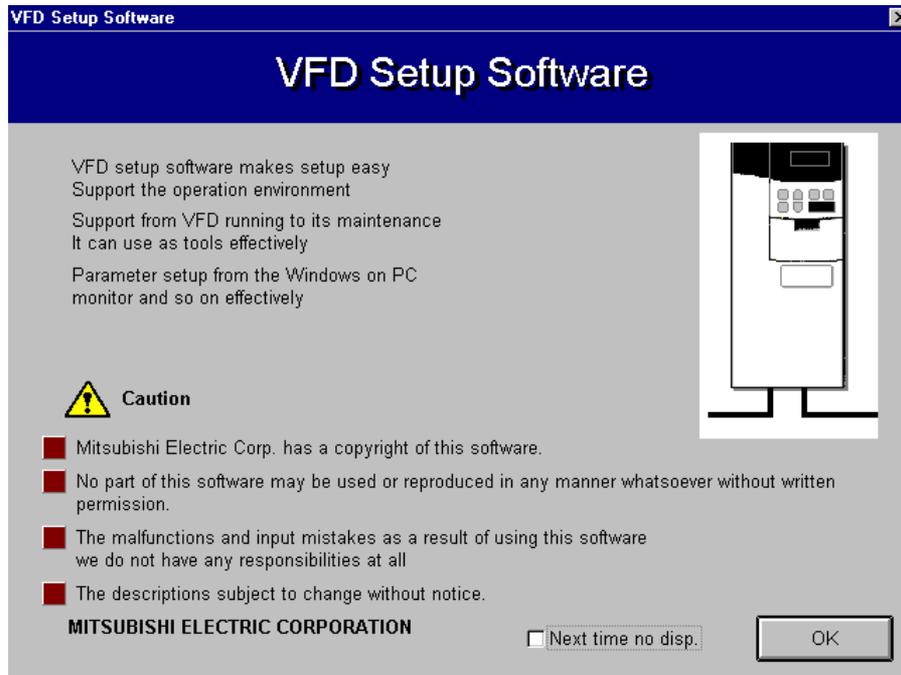
*"☐Next time no disp.": When you check ☐, the above screen will not appear from the next time the software is run.

To display it again, check the check box "Display the initial screen", see section "2.2.3 Environmental Setting" (refer to page 11).

<Initial screen>

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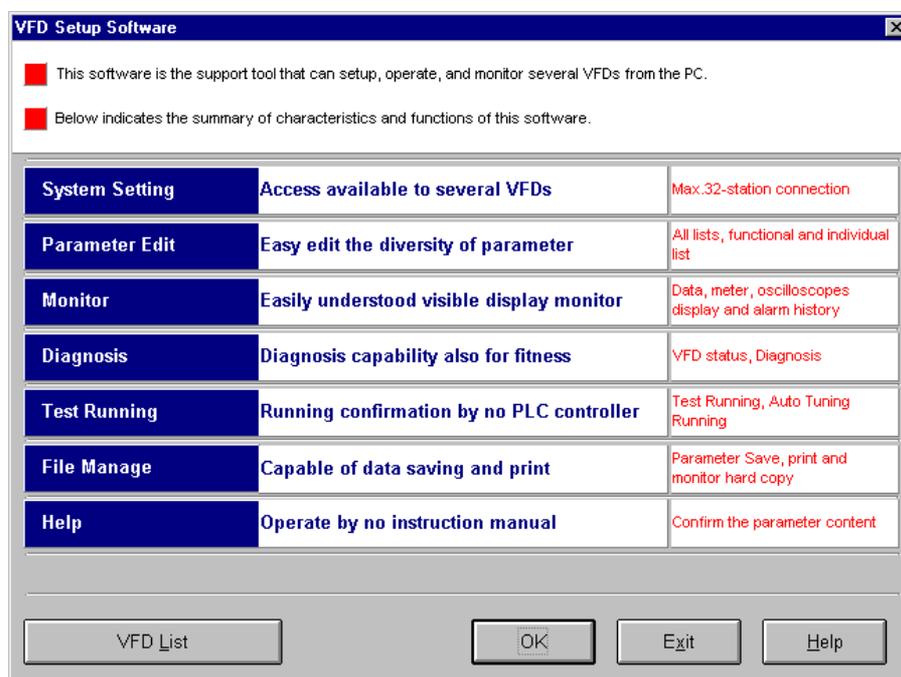
2.2 Settings

When you press the [OK] button on the initial screen, the following screen appears:
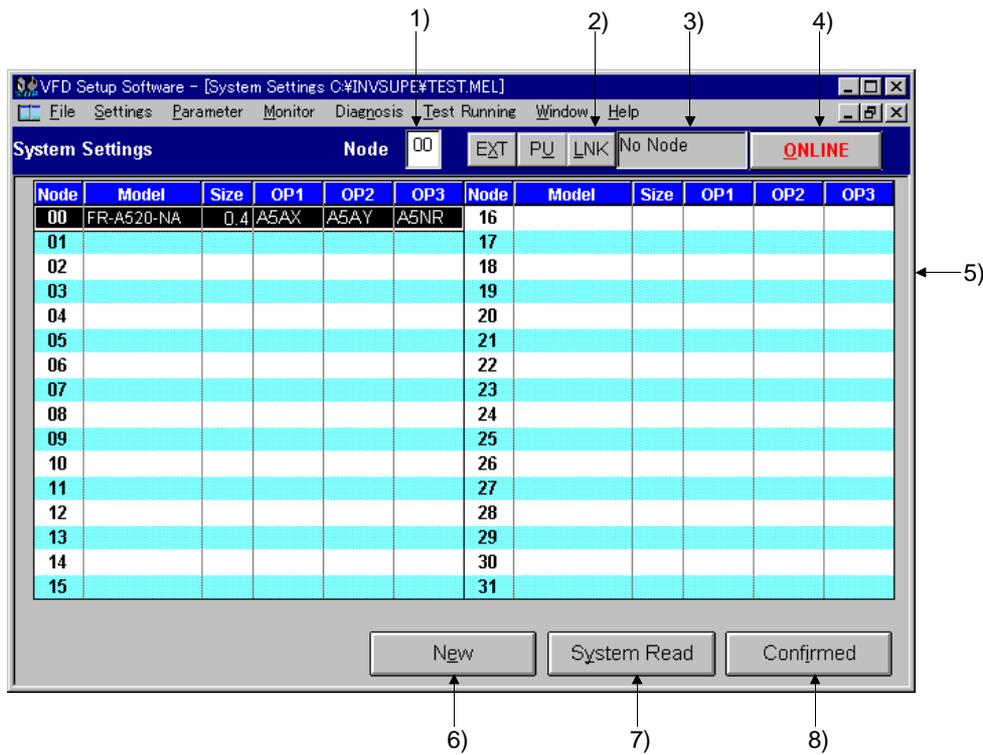
(1) Menu list

This software has the following functions:

| Menu	Pull-Down Menu	Function/Operation
File (Alt+F)	Open — Ctrl+O	Opens a file.
	Close	Closes the screen.
	Save — Ctrl+S	Saves data.
	Save As — Ctrl+A	Save data with a new name.
	Print — Ctrl+P	Selects printing.
	Exit	Performs exiting procedure.
Settings (Alt+S)	System Settings	Sets the model, capacity (size) and option type. (Stations 00 to 31)
	Communication Settings	Sets serial communication information.
	Environmental Settings	Sets the directory where data will be stored and sets re-display of the initial screen.
Parameter (Alt+P)	All list Format	Shows and sets the parameter list.
	Functional List Format	Shows and sets the related parameters function-by-function.
	Individual list Format	You can register or delete a total of 32 parameters out of all parameters to or from two different user groups.
	Basic Settings	You can set the parameters required for starting up the inverter without being aware of parameter numbers.
Monitor (Alt+M)	Data Display	Shows four pieces of data (up to four stations) in terms of values.
	Meter Display	Shows four pieces of data (up to four stations) in terms of meter deflections.
	Oscilloscopes	Shows four pieces of data (up to four stations) in terms of waveforms.
	Alarm History	Shows the alarm history of all inverter stations connected.
Diagnosis (Alt+N)	VFD Status	Shows various data of all stations connected in real time in terms of values.
	Diagnosis	Examine the estimated cause of the alarm in accordance with the alarm display.
Test Running (Alt+T)	Test Running	Gives the operation command from the personal computer to actually test run the inverter.
	Auto Tuning	Performs auto tuning in accordance with the motor connected to the inverter.
Window (Alt+W)	Cascade Display	Overlapping Windows.
	Tile Display	Windows are side-by-side.
Help (Alt+H)	Contents	Various help functions (parameter explanations, function explanations, etc.)
	About VFD Setup S/W	Version information (copyright, version information, user and company names, etc.)

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(2) Description of various buttons and indications

1) Node

   The station number selected is displayed.

2) [EXT] (Alt+X), [PU] (Alt+U) and [LNK] (Alt+L) buttons

   You can choose the inverter operation mode for online operation.

   · [EXT] button: External operation mode

   · [PU] button: PU operation mode

   · [LNK] button: Computer link operation mode

3) The operation mode and error codes appear. (Refer to page 32 for the error codes.)

   Operation mode indications

   · EXT. ....External operation mode

   · PU..PU operation mode

   · EXTJOG ....External jog mode

   · PU JOG ....PU jog mode

   · LNK...Computer link mode

   · PU EXT ....PU-external combined mode

   · TIME...Time scheduled operation

   · SP...Special mode

   · No Node ....Time-out occurred in the online mode

   In any other case, the error number at NAK error occurrence appears.

   · When an alarm occurs, the operation mode and error codes are displayed in red.

   · To display a warning, the operation mode and warning appear.

4) [ONLINE/OFFLINE] (Alt+O) button

   · [ONLINE] (online) button: Online operation mode

   · [OFFLINE] (offline) button: Offline operation mode

   Click the corresponding button to select the online or offline mode.

5) System settings

   You can set the environment of the inverters of stations 00 to 31.

   Set the model, capacity and options for these inverters.

6) [New] button (Alt+E)

   Used to make new system settings.

7) [System Read] button (Alt+Y)

   Used to batch-read all inverters in the system with which the personal computer communicates.

8) [Confirmed] button (Alt+I)

   You can register the data specified in the system settings.

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2.2.1 System Settings

This screen appears when you start this software and press the [OK] button on the initial screen.
On this screen, set the station numbers, models, capacities and plug-in options of the inverters connected.
Inverters can be set to stations 0 to 31.

(1) Station selection (Ctrl+N)

Click the required station number. That line is then chosen.

(2) Selection of model, capacity and options

When you double-click the selected line, the "VFD Structure" panel (as shown on the right) appears. Set the model, capacity and options and press the [OK] button to complete the settings. Using the same procedure, set all inverter stations which connected.
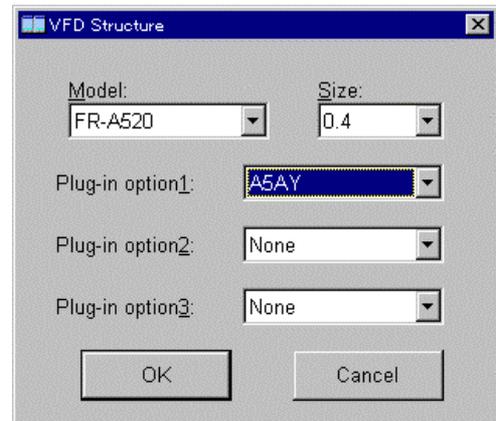
(3) [Confirmed] button (Alt+I)

After setting all stations, pressing the Confirmed button completes the system settings.

(4) [New] button (Alt+E)

Press the New button to initialize (clear) the system settings/communication settings being edited.

(5) [System Read] button (Alt+Y)

Before pressing the [System Read] button, press the [ONLINE/OFFLINE] button to change the mode indication to [ONLINE] and select the online operation mode. In the online operation mode, the personal computer is switched to the inverter communication status and clicking the [System Read] button reads the models, capacities and options of all stations (stations 0 to 31) and displays the stations connected (with which the personal computer can communicate).
After reading, the settings are registered automatically.
When the system settings have not yet been made, the read stations are displayed. When the system settings have already been registered, check is performed. If the check result is different from the read data, select whether different points are displayed and changed or not.


Note: When the [System Read] button is pressed, the 100V or 200V class of the FR-E500 series is displayed as the FR-E520-NA, and the 400V class is displayed as the FR-E540-NA. When the model differs from that, change the model manually.

2.2.2 Communication Settings

The VFD Setup Software uses the serial port of the personal computer to control the inverters through serial communication. Before making communication, serial communication settings must be made.
When you start this software, the initial screen appears. Pressing the [OK] button displays the system setting screen. Choosing the [Settings] → [Communication settings] command on the menu bar. The screen then shows the following dialog box, where various communication settings can be made.
Communication settings will be described below:
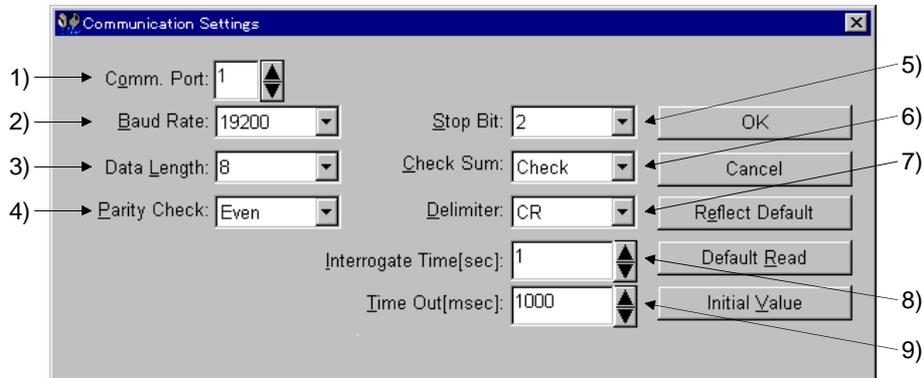
(1) Screen explanations

The values in parentheses are initial values.

1) Communication Port (1)
   Choose the communication port of the personal computer.
2) Baud Rate (19200)
   Set the communication speed.
3) Data Length (8)
   Set the data bit length.
4) Parity Check (Even)
   Specify the parity bit.
5) Stop Bit (2)
   Set the stop bit length.
6) Check Sum (Check)
   Set whether checksum is made or not.
7) Delimiter (CR)
   Specify the delimiter at the data trailer.
8) Interrogate Time [sec] (1)
   Set the interval at which data transmission (operation mode indication and error check) is always made to the inverter.
9) Time Out [msec] (1000)
   Set the time from when data is transferred from the personal computer to the inverter until when the personal computer receives a reply from the inverter. If a reply is not given after the preset time has passed, the "time-out" error is displayed.

(2) Button settings

1) [OK] button

   Recognizes the settings on the communication screen and returns to the system setting screen.

2) [Cancel] button

   Cancels the communication settings and returns to the system setting screen.

3) [Reflect Default] button

   Used to omit the setting of the values specified in communication settings from the next time onward.

4) [Default Read] button

   Used to read the default values.

5) [Initial Value] button

   Used to return to the initial values.

The above set values depend on the inverter connected. Set them after confirming the set values of the communication function parameters of the inverter.

(3) Inverter communication settings

The values set for communication depend on the inverter and connection method.

Inverter	Connection Method	Operation mode	Setting Range	
FR-A520(-NA) FR-A520L FR-A540(-NA) (-EC) (-CH) FR-A540L (-NA) (-EC) FR-F520 FR-F540 (-EC) (-CH)	PU connector (RS-485 connector) or FR-A5NR	• When PU connector (RS-485 connector) is connected PU mode • When FR-A5NR is connected LINK mode	[Node] [Baud rate] [Stop bit] [Data length] [Parity bit] [Delimiter]	Station 0 to 31 4800, 9600, 19200 bps 1 bit, 2 bits 7 bits, 8 bits None, odd, even None, CR, CR+LF
FR-E520 (-NA) FR-E520S (-EC) (-CH) FR-E510W (-NA) FR-E540 (-NA) (-EC) (-CH)	PU connector (RS-485 connector)	PU mode		
FR-S520-R FR-S520S-R FR-S520S-ECR (-CHR)	RS-485 connector	LINK mode		

Note: When making communication with the inverters, set a value other than 0 in Pr. 122 "communication check time interval" on the inverter's operation panel. For the FR-S500 series, set a value other than 0 in the communication parameter n6 (336) "communication check time interval".
(Refer to the inverter instruction manual for the setting method.)

(4) Interrogate time

Set the interval at which data is always sent or received to or from the inverter.

It must be set to at least 2 seconds shorter than the communication check time interval setting of the inverter. If its setting is longer than the communication check time interval setting, the inverter will come to an alarm stop.

Note: The setting of short interrogate time may slow down the response of the menus and buttons on each window depending on the operating model and communication speed.

2.2.3 Environmental Setting

You can specify the data directory (place where data is saved) and default system file.
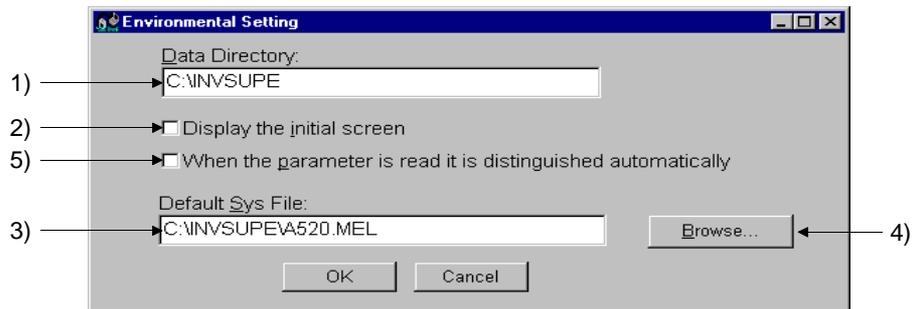
(1) Screen explanations

1) Data Directory.................................You can change the directory where data will be saved.
2) Display the initial screen..................Checking the check box displays the initial screen.
3) Default Sys File ....Shows the system file (*.MEL) which is automatically set when starting
of the software.
There is no default registered.
4) Browse..Default system file browsing button.
Shows the file selection common dialog and displays the chosen file
name in the default system file text box.
5) When the parameter is read it is
distinguished automatically ....Turn on the check box to hide the parameters read-disabled for
parameter batch-read or batch-verify from the error panel. (Refer to
page 15)

2.3 Parameter

When system settings are complete, you can choose menu parameters.
Choose the [Parameter] → [All List Format], [Functional List Format], [Individual List Format] or [Basic Settings] command in the menu to select the corresponding format, and set parameters. Any parameter setting is changed by first entering new data in the Updated column and then pressing the [Write] or [Blk Write] button. The new data is then displayed in the Current setting column, which shows the current settings of the inverter.

2.3.1 All List Format

By choosing the [Parameter] → [All List Format] command in the menu, all parameters of the inverter are displayed as a list. When changing any parameter setting, enter a new value in the required parameter column and press the ↵ key to register it.
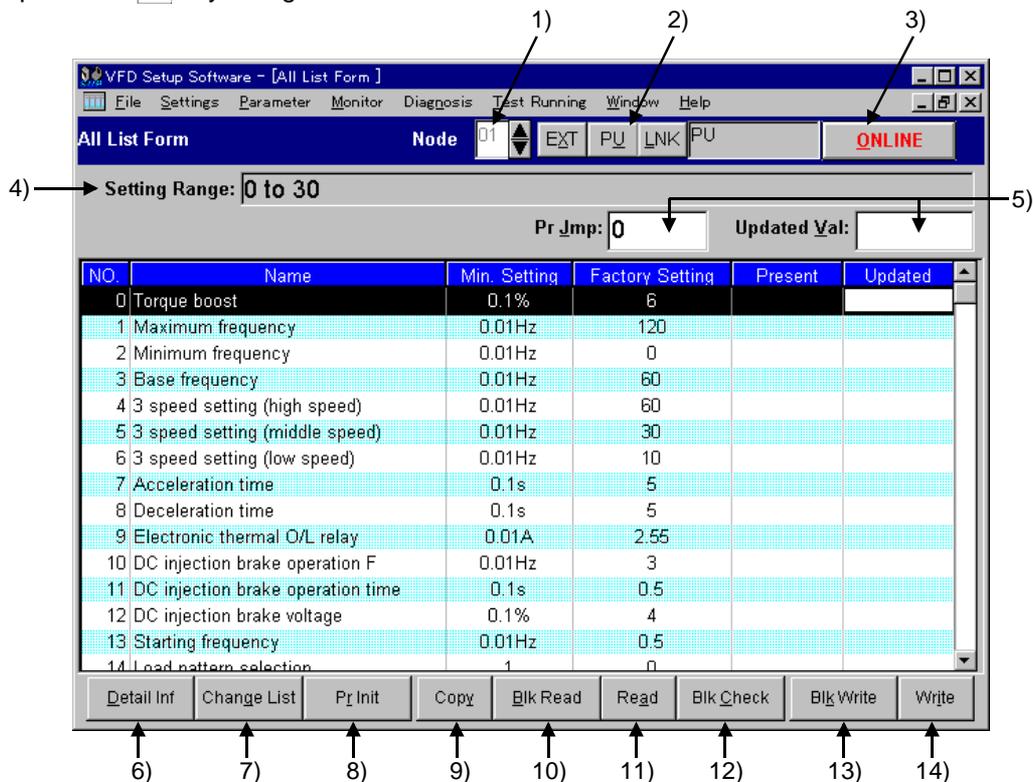

(1) Buttons and indications common to various parameter setting screens

1) Node (Ctrl+N) .... Indicates the inverter station number to be set (only the station numbers registered in the system settings may be selected.)

2) Inverter operation mode .... Used to choose/display the operation mode of the selected inverter station number.

3) Online/offline (Alt+O) .... To read/write the parameter values of the inverter, select the online operation mode.

4) Setting Range.................................. Indicates the setting range of the selected parameter.

5) Pr Jmp (Alt+J),
   updated Val (Alt+V).......................... Shows the number and new value of the selected parameter. Values may be entered directly into these columns.

6) Detail information (Alt+D,F1) .... Shows the function explanation of the selected parameter.

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7) Change List (Alt+G) .... Lists the parameters with the present set values which have been changed from the initial values.
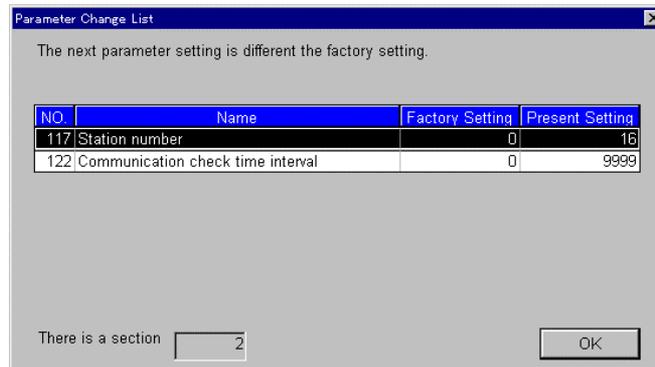

8) Parameter initialization (Alt+R) .... Initializes the parameters of the inverter. (The communication parameters are not initialized.)
Choose the clearing method from among "Parameter Clear", "All Clear" and "User Clear" on the following panel and click the [OK] button to execute clear.
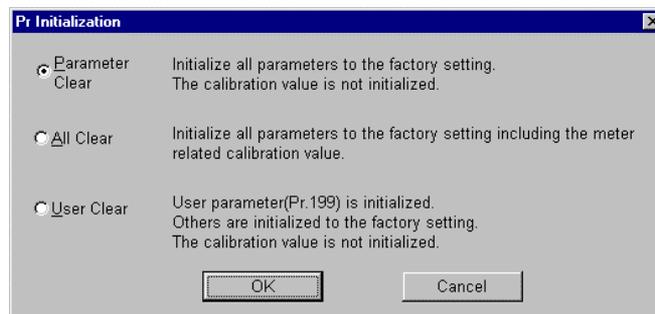
Note: Changing the Pr. 21 setting automatically switches the minimum setting increments of the acceleration/deceleration-related parameters (Pr. 7, Pr. 8, Pr. 16, Pr. 45, Pr. 110, Pr. 111, Pr. 264, Pr.265).
(Increments are 0.1s when Pr. 21=0, 0.01s when Pr. 21=1)

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9) Cop**y** (Alt+Y) .... • System setting file (*.MEL)
Used to copy the parameter list as a file to the inverter. Choose the system setting file (*.MEL) and click the [OK] button to display the panel shown on the right. Making selections at "Copy" and "Node" and clicking the [OK] button reads the parameter settings and sets them to the Updated column. Therefore, by performing block write after that, they are copied to the inverter. (Parameter copy cannot be made between different models.)

• Parameter setting file (*.PRM)
Choosing the parameter setting file (*.PRM) displays the present settings in the Updated value field of the screen. (When only the present settings are saved) When there are both the present settings and updated values, display the parameter copy panel (shown on the right) and select the values to be copied.
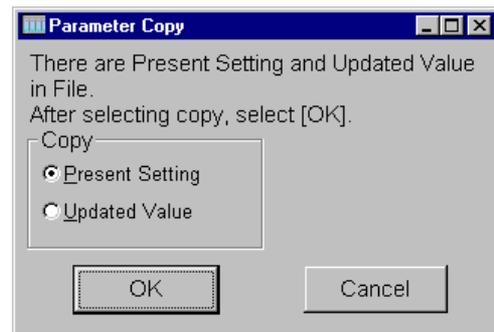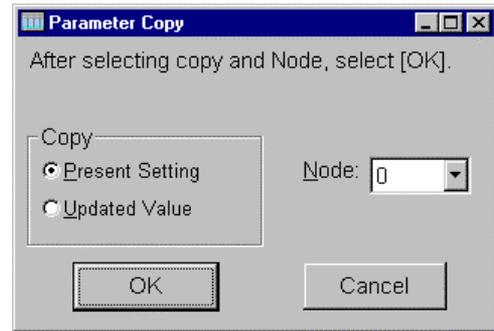
10) **Bl**k Read (Alt+B) ....Reads all parameters of the selected inverter station number.
11) Re**a**d (Alt+A) ....Reads the data of the parameter numbers selected on the screen.
12) Blk **C**heck (Alt+C) ....Batch-checks the parameters of the inverter against those of the personal computer.
13) Bl**k** write (Alt+K) ....Writes new parameter values to the inverter.
(When there are no values in the Updated value field, the screen for selecting whether the present settings will be written or not appears. Perform operation following the screen prompts.)
14) Wr**i**te (Alt+I) ....Writes the data of the parameter numbers selected on the screen.

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Note: If an error occurred during "block read", "block check" or "block write", the parameter list appears on the panel. Double-clicking the error number in the displayed list shows the details of the error definition on the panel.

Read Error ☒

The error was found in the next parameter read.
Or the related parameter is not set.

☐ When the parameter is read it is distinguished automatically

There is a section [139]   [OK]

NO.	Name	Error NO.
61	Reference I for intelligent mode	22
62	Ref. I for intelligent mode accel.	22
63	Ref. I for intelligent mode decel.	22
64	Starting F for elevator mode	22
70	Special regenerative brake duty	22
82	Motor exciting current	22
90	Motor constant (R1)	22
91	Motor constant (R2)	22
92	Motor constant (L1)	22

[When the parameter is read it is distinguished automatically]
Turning on this check box automatically judges the read-disabled parameters and hide them from the read error panel.

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2.3.2 Functional List Format

By choosing the [Parameter] → [Functional List Format] command in the menu, the parameters are displayed as a function list.
For parameter setting and changing, values may only be written in the online operation mode.
When changing any parameter setting, enter a new value in the required parameter column and press the ↵ key to register it.
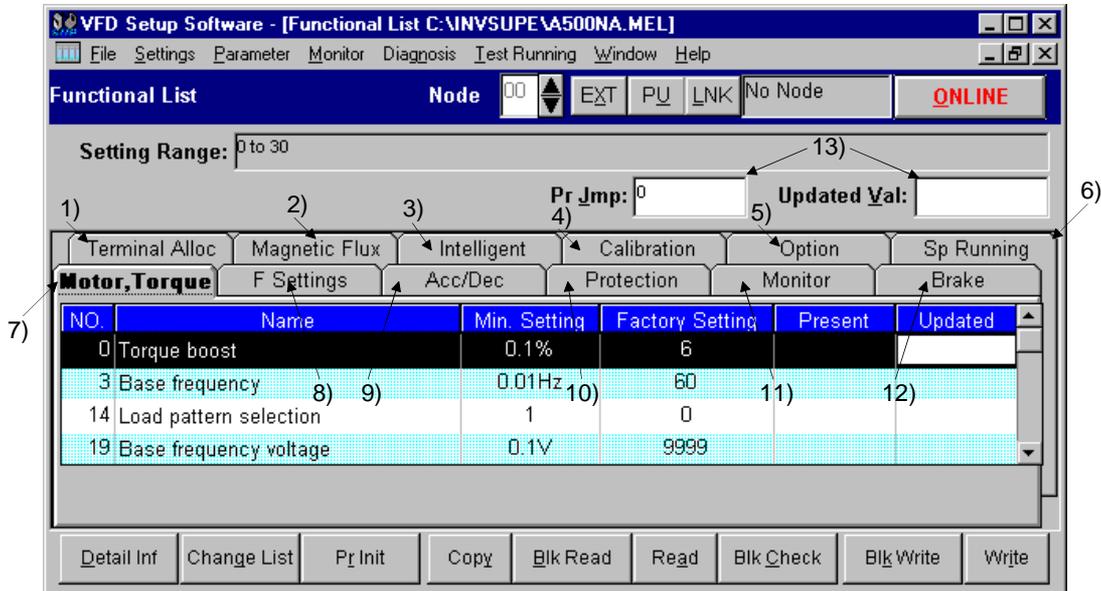
(1) Various panel indications

1) Terminal allocation ....Lists the parameters concerned with the control circuit terminals.

2) Magnetic flux vector.........................Lists only the parameters for magnetic flux vector control.

3) Intelligent ....Shows the parameters related to the intelligent mode in which the inverter performs operation after setting appropriate parameters automatically.

4) Calibration ....Lists the parameters related to the calibration of the FM and AM terminals and the bias/gain adjustments of the frequency setting voltage (current).

5) Option ....Lists the parameters of the values related to the options.

6) Special running................................Lists the parameters such as the functions used by making pre-selection.

7) Motor torque ....Lists the parameters related to motor torque.

8) Frequency setting ....Lists the parameters related to frequency.

9) Acceleration/deceleration ....Lists the parameters related to acceleration/deceleration.

10) Protection ....Lists the parameters related to the protective functions.

11) Monitor..Lists the parameters related to the monitoring function.

12) Brake ....Lists the parameters related to braking.

13) Pr Jmp (Alt+J),
     Updated Val (Alt+V)......................Show the selected parameter number and its new value. Values may be entered directly into these columns.

2.3.3 Individual List Format

By choosing the [Parameter] → [Individual List Format] command in the menu, you can select two different user groups ("User Group 1", "User Group 2").
To these user groups, you can register a total of 32 parameters from among all parameters. Click the [Edit] button (Alt+E). The following panel appears.
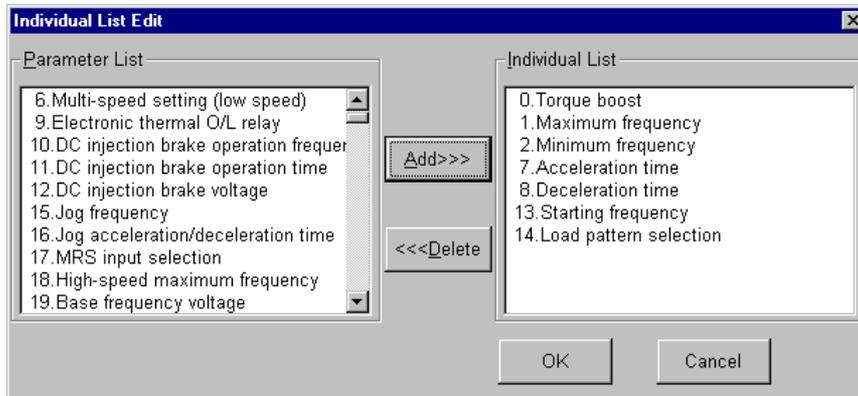
(1) Description of individual list editing operation
1) Registration........... Choose the items to be registered in the "Parameter List" and press the [Add>>>] button to register them to the "Individual List".
2) Deletion................. Choose the items to be deleted in the "Individual List" and press the [<<<Delete] button to delete them.

(2) After choosing the parameters, pressing the [OK] button completes the user setting and displays the individually selected list in the following panel. To save the individual list, choose the [File] → [Save] command from the menu to save it.
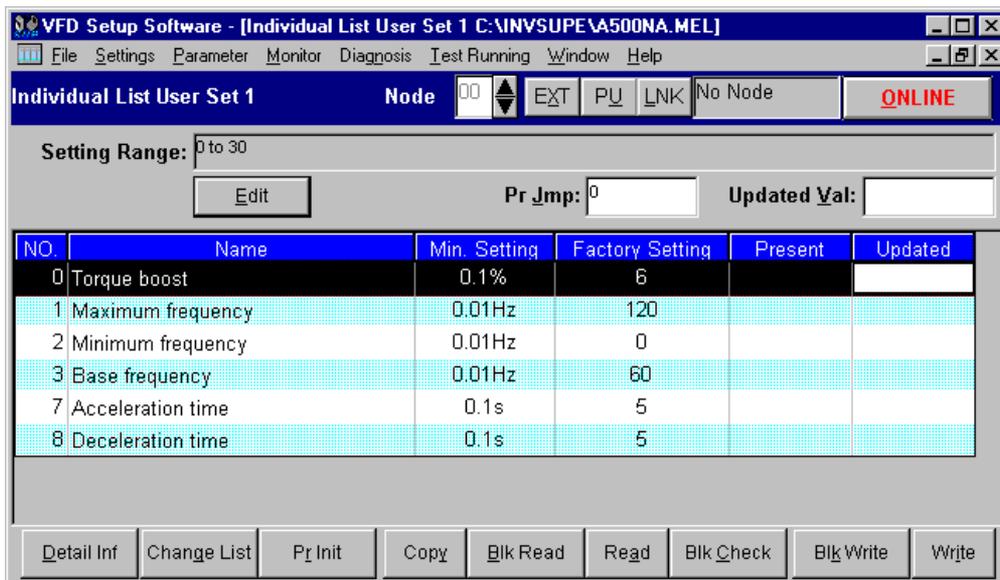
2.3.4 Basic Settings

Choosing the [Parameter] → [Basic Settings] command in the menu displays the following screen.
By entering data into the items shown on the screen, you can set the parameters without being aware of the parameter numbers.
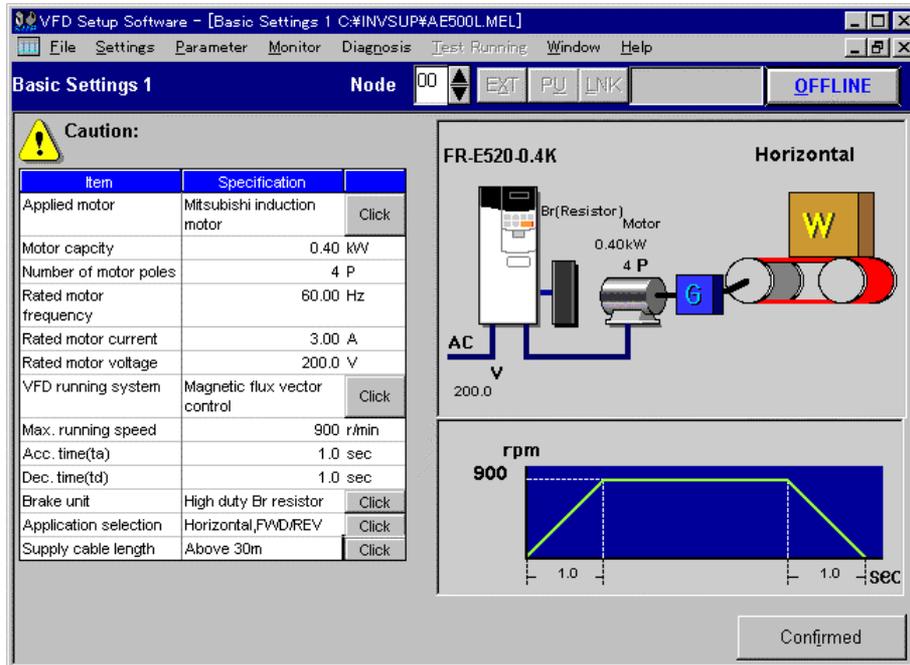

(1) Setting of each specification

Set the specification of each item in the Specification column. When the item has a [Click] button in the Specification column, clicking that button shows choices. Make a choice and click the [OK] button.
60Hz is the maximum setting for operation speed.

(2) Registration of the specifications

After entering the specifications of all items, press the [Confirmed] button to register them. Pressing the [Confirmed] button displays the following panel.
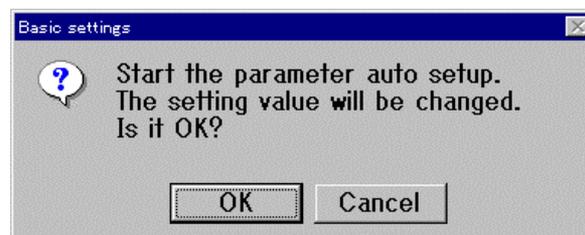
By pressing the [OK] button, the parameters are set automatically and the new values of the parameters that may be set automatically are displayed.

(3) Parameter setting

When the automatic settings of the parameters are registered, the following panel appears.
To write the new parameter values to the inverter, press the [Blk Write] button.

2.4 Monitoring

Choose the [Monitor] → [Data Display], [Meter Display], [Oscilloscopes] or [Alarm History] command from the menu to select the corresponding monitor screen.

2.4.1 Data Display

Data Display shows four different signals such as the output frequency (those of up to four stations) in real time in terms of values. The input and output statuses of the control terminals can also be monitored.
Choosing the [Monitor] → [Data Display] command from the menu displays the following screen:
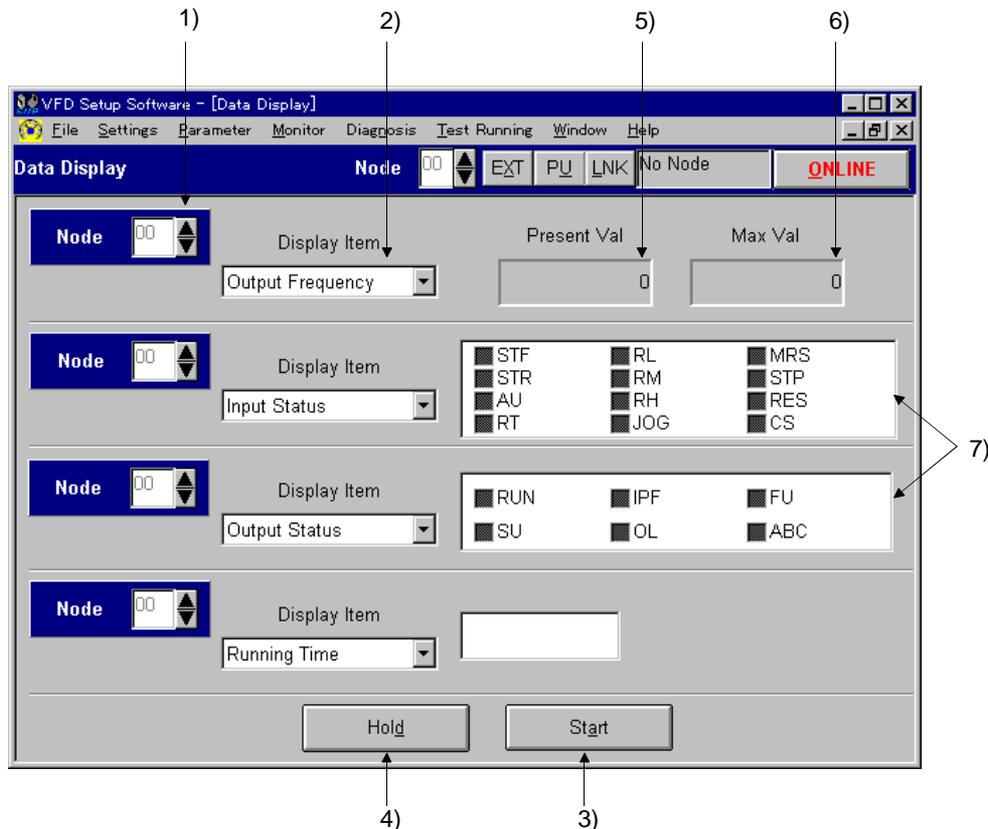
1) Node setting

You can enter the station number specified in "System Settings" or use the [▲ / ▼] button to choose the station number.

2) Display items

Choose the items to be displayed in the menu.

3) Start/Stop (Alt+A)

After pressing the [ONLINE/OFFLINE] button to display [ONLINE], click the [Start] button to start monitoring. (The function of this button toggles depending upon the mode.)
Click this button during monitoring to stop monitoring.

4) Hold (Alt+D)

Clicking the [Hold] button holds the data being monitored. In this state, the data can also be saved.
Click this button during holding to cancel hold.

5) Present value

Shows the real-time monitor value.

6) Maximum value

Shows the maximum value of the monitor value. Once monitoring is stopped, the maximum value is cleared.

7) I/O status

When you have chosen "Input Status" or "Output Status" in "Display Item", the I/O status (ON or OFF) is displayed. (ON: red, OFF: gray)

2.4.2 Meter Display

Meter Display shows four different signals such as the output frequency (those of up to four stations) in real time in terms of meters. Meter Display handles show only data which can be indicated by meter deflections.
Choosing the [Monitor] → [Meter Display] command shows the following screen:
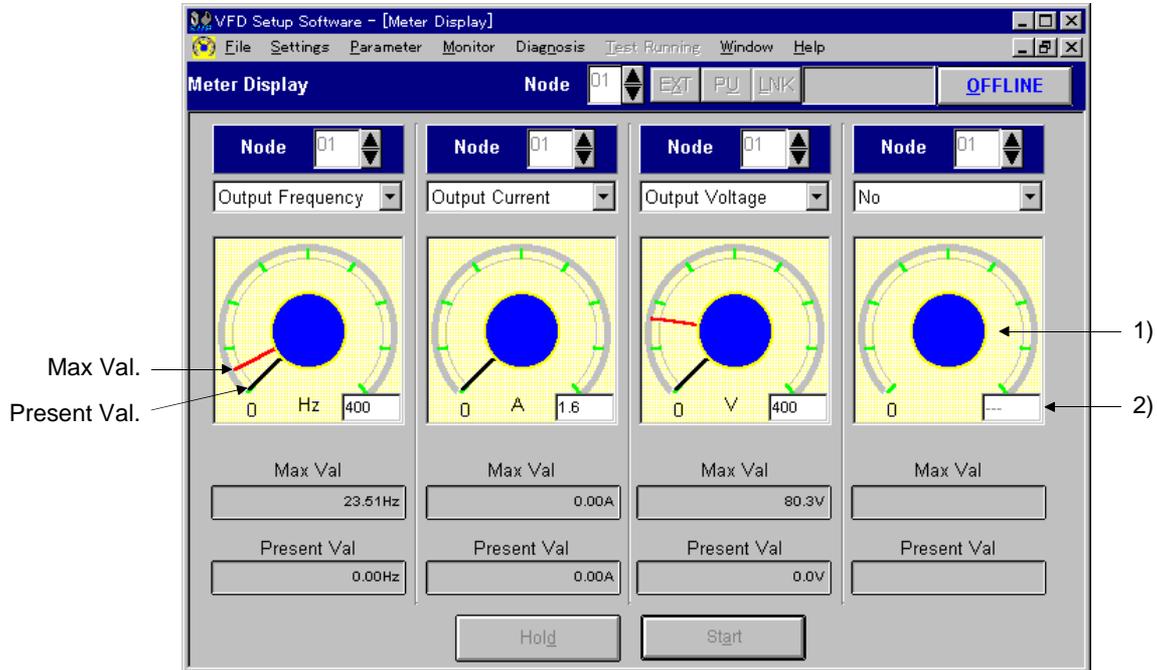
Perform operation as with Data Display.
The meter scales are automatically adjusted. After the parameters are batch-read, they are set to the optimum values.

1) Meter display
   Shows monitor values on the meters.
   The present value is indicated by the black pointer and the maximum value by the red pointer.
2) Meter full-scale
   Shows the full-scale value of the meter display. It can be changed by entering a new value.

2.4.3 Oscilloscopes

Oscilloscopes pre-receives four different signals, such as the output frequency, from the inverters and shows them on the personal computer screen as waveforms.

Choosing the [Monitor] → [Oscilloscopes] command from the menu displays the following screen:
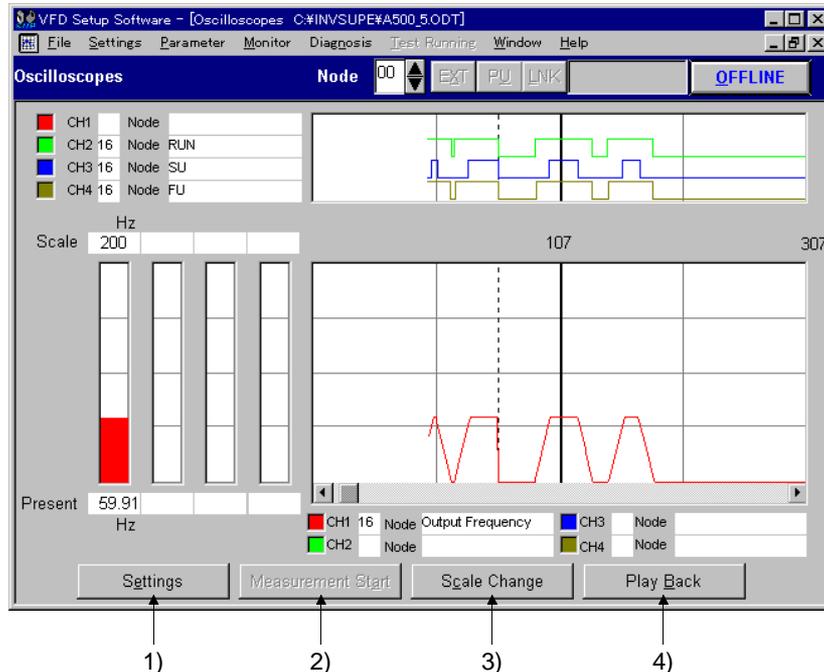

[Operating procedure]

1) Setting (Alt+E)

Pressing the [Settings] button shows the "Measurement Conditions" panel.

a. Choose the station number and measurement item.

b. Trigger signal setting

Choose the outside, inside or alarm trigger. For "Outside Trigger", pressing the [Measurement Start] button starts measurement. For "Inside Trigger", since the signal from the inverter is used as a trigger signal, set the station number measurement signal, timing, trigger terminal and conditions.
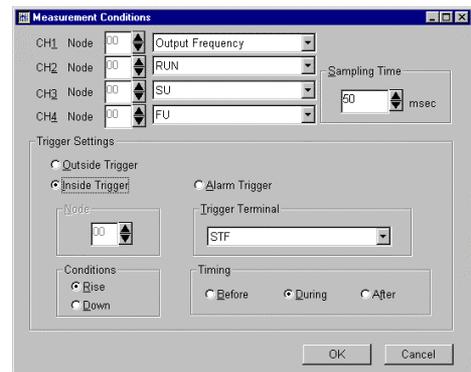
For "Alarm Trigger", the alarm occurrence signal of the inverter is used as a trigger signal. In this case, the trigger settings valid are the station number and timing only.

[Timing]   Choose the displayed data from among "Before", "During" and "After" the trigger signal.

[Sampling Time] Set the interval of importing data. (50 to 60000msec)

[Conditions]   Choose the "Rise" or "Down" timing when the trigger is activated.

c. After setting the measurement conditions, press the [OK] button. The screen returns to Oscilloscopes and the station numbers and measurement items set appear.

2) Measurement start (Alt+A)

Press the [ONLINE] button. For "Inside Trigger", press the [Measurement Start] button to start the importing of data. On a trigger condition match, waveforms are displayed on the screen. For "Outside Trigger", pressing the [Measurement Start] button starts the importing of data endlessly. After completion or (suspension), press the [Play Back] button to display the data.

3) S<u>c</u>ale Change (Alt+C)

To change the vertical and horizontal axis scales of the displayed waveforms, press the [Scale Change] button to display the "Scale Change" panel, on which the scales are to be changed.

The full-scale values on the vertical axes and time axes (horizontal axes) of the displayed waveforms of the four channels (four stations) can be changed.

Specify the sampling count as the unit for the time axis (horizontal axis).

(Reference) Time converting method

: [sampling count] × [sampling interval]
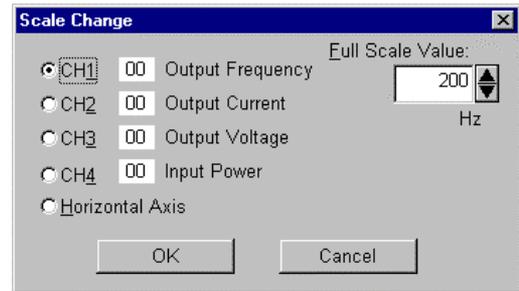
4) Play<u>B</u>ack (Alt+B)

You can play back the measured oscilloscope data.

a. By pressing the [Play Back] button after the end of measurement, the oscilloscope data can be played back. When the waveforms are being displayed, the screen is blanked once and the waveforms are then played back.

b. You can play back saved oscilloscope data. By choosing [File] → [Open] to read the data, the waveforms appear (are loaded).

2.4.4 Alarm History

Alarm History displays the history of eight past alarms of all inverter stations connected.

Choosing the [Monitor] → [Alarm History] command from the menu displays the following screen.
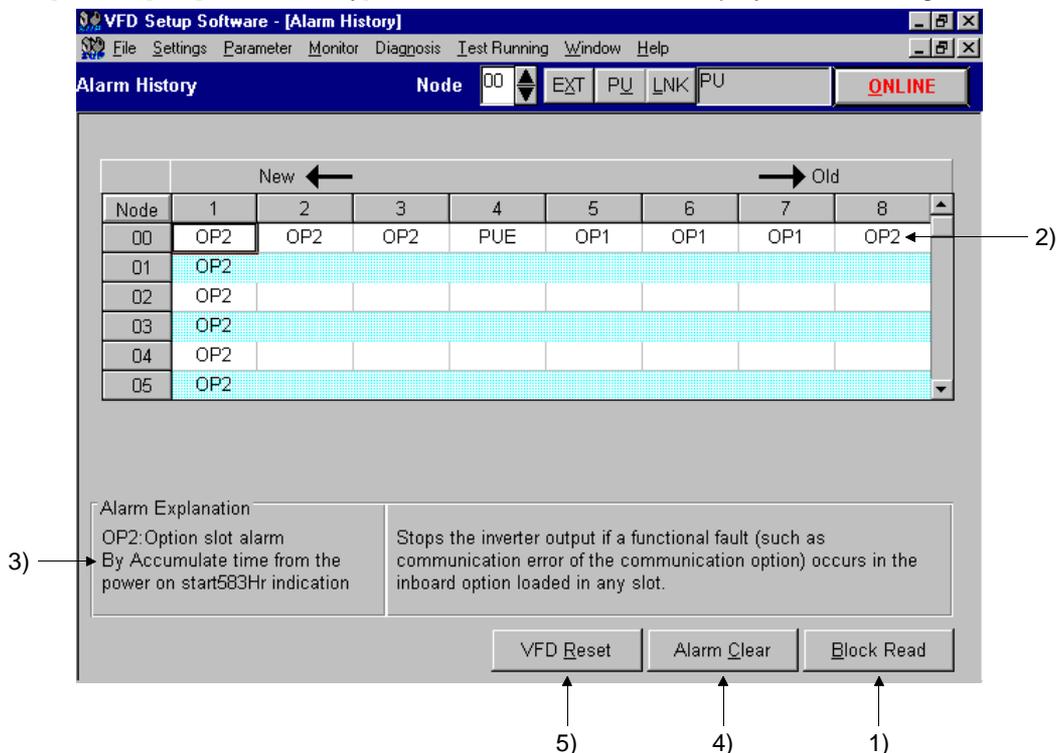
1) <u>B</u>lock Read (Alt+B)

Press the [ONLINE/OFFLINE] button to show [ONLINE] and then click the [<u>B</u>lock Read] button to display the alarm history of all stations specified in the system settings.

2) Alarm History

Lists the station numbers specified in the system settings and their history of eight past alarms.

3) Alarm Explanation

Clicking the alarm display column in the alarm history list shows the explanation of that alarm.

4) Alarm <u>C</u>lear (Alt+C)

Clicking the [Alarm <u>C</u>lear] button clears the alarm history of the chosen station inverter.

5) VFD <u>R</u>eset (Alt+R)

Clicking the [VFD <u>R</u>eset] button resets the chosen station inverter.

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2.5 Diagnosis

2.5.1 VFD Status

Choosing the [Diagnosis] → [VFD Status] command in the menu displays the following screen.
Note: This command can be chosen in the online mode only.
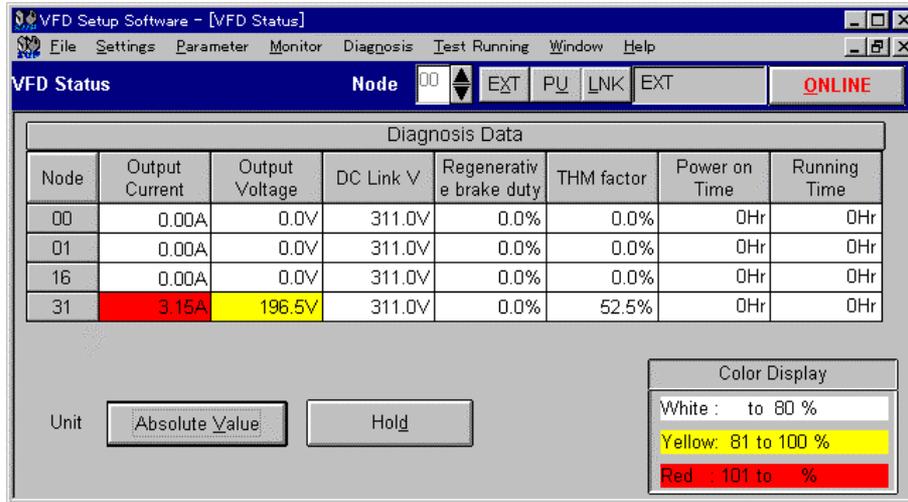
VFD Status: Displays the output current, output voltage, DC link V, Regenerative brake duty, THM factor, Power on Time and Running Time data of all inverter stations specified in the system settings in real time. The data can also be locked by pressing the [Hold] button (Alt+D). The values displayed can be switched between absolute value indication and % indication (Alt+V).

2.5.2 Diagnosis

Choosing the [Diagnosis] → [Diagnosis] command from the menu displays the following screen:

Alarm
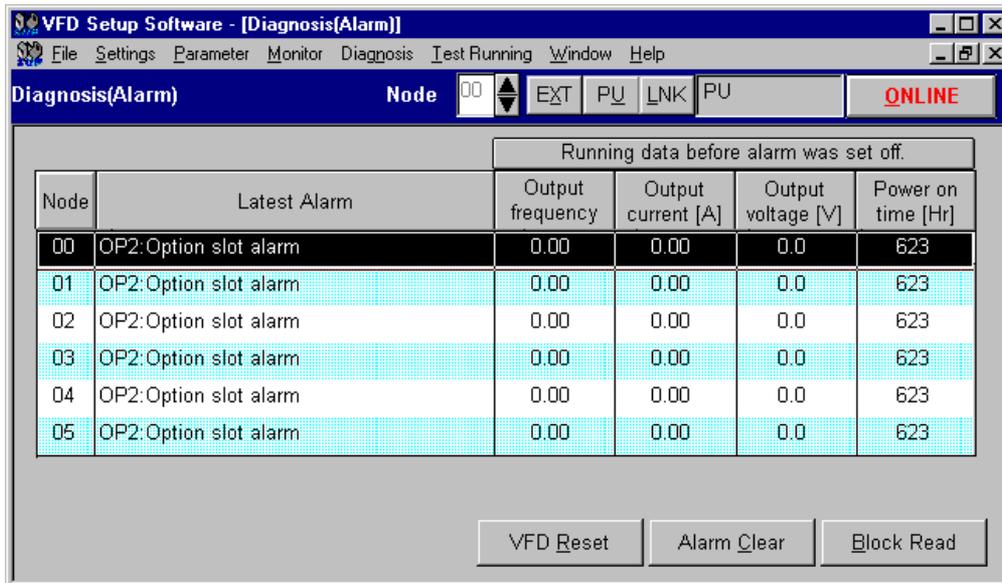
Diagnosis (Alarm): Click the [Block Read] button (Alt+B) to batch-read the information of the inverters where alarms have occurred. By clicking the corresponding item, its comment appears.

Note: This command can be chosen in the online mode only.

·Alarm Clear (Alt+C)

Clicking the [Alarm Clear] button clears the alarm history of the chosen station inverter.

·VFD Reset (Alt+R)

Clicking the [VFD Reset] button resets the chosen station inverter.

No Alarm
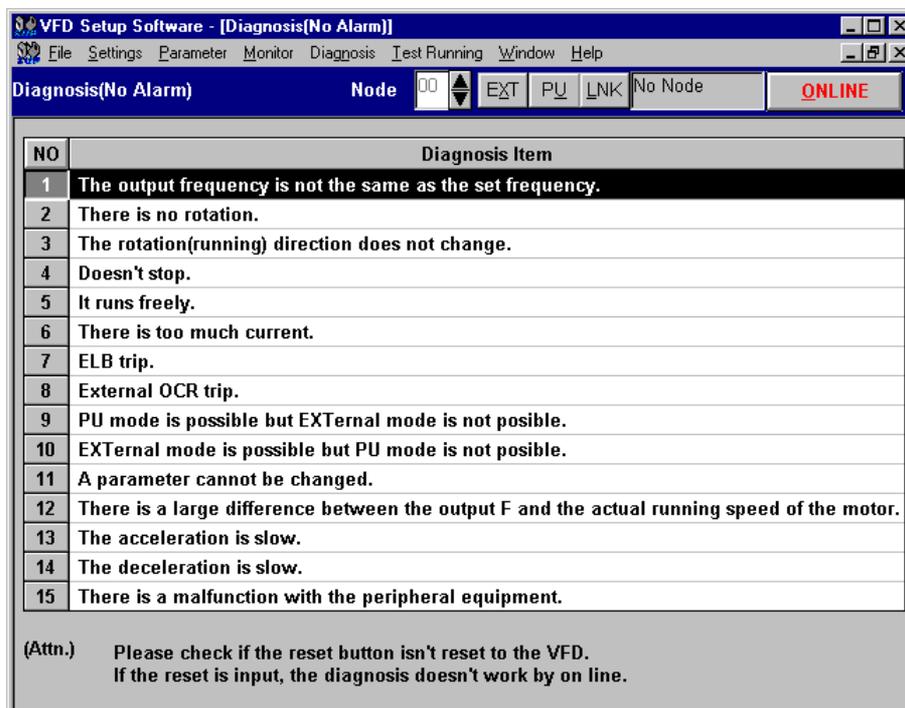
Diagnosis (No Alarm): Shows the diagnosis items. When you choose the corresponding item, the panel appears. Enter data in accordance with the display. As a result, the estimated cause, etc. is shown.

For diagnosing the running status, the online mode must be selected.

[Alarm occurrence in online mode]
If an inverter alarm has occurred in the online mode, the following panel appears:
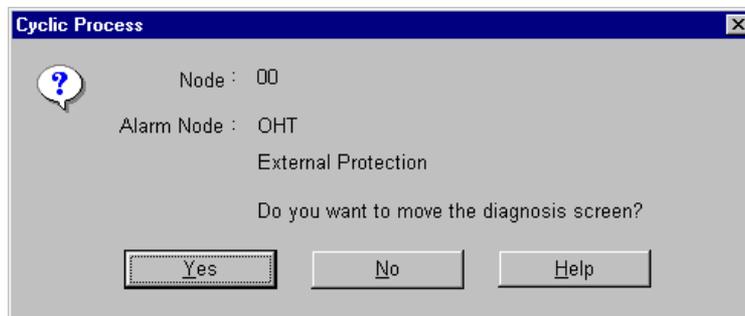
Clicking the [Yes] button shows the Diagnosis (Alarm) screen.
Clicking the [Help] button shows the alarm detail help.

Note: The above alarm panel appears only once in the online mode.
Once you have closed the alarm panel, it will not appear even during alarm occurrence. By changing the online mode to the offline, then to the online again, however, the panel will appear again if an alarm has occurred.

2.6 Test Running

2.6.1 Test Running

Choosing the [Test Running] → [Test Running] command from the menu displays the following screen.
Note: This command can be chosen in the online mode only.
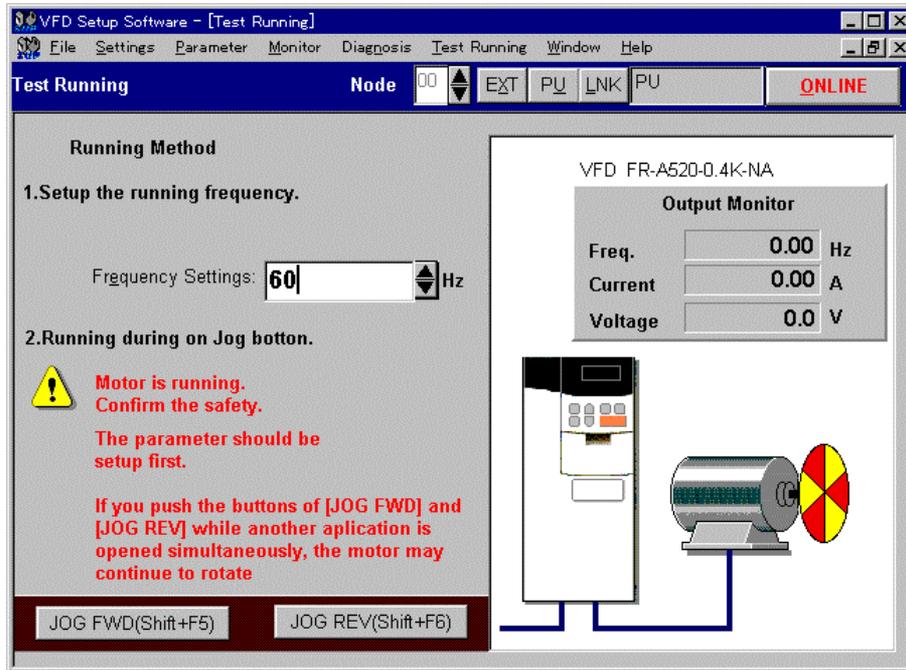
Operation procedure

1) Set the station number of the inverter to be run and the operation mode (PU or LNK (Link) operation).
2) Enter the running frequency and register it with the ↵ key.
3) Click the [Jog FWD] (Shift+F5) or [Jog REV] (Shift+F6) button. The motor rotates while the button is being pressed. The screen shows the output frequency, output voltage and output current being monitored.

| Note: 1. If your inverter is the FR-E500 series, set any value other than "0" in Pr. 146 "frequency setting command selection". |
| 2. When selecting [Jog REV (Shift+F6)] for the FR-S500 series, set "---" in Pr. 63 "STR terminal function selection". Setting other than "---" does not enable [Jog REV (Shift+F6)]. |

2.6.2 Auto Tuning

Choosing the [Test Running] → [Auto Tuning] command from the menu enables auto tuning. You have to set the auto tuning parameters in advance. If they have not been set, the following screen appears:

## <Operation procedure>

1) Set the station number of the inverter to be run and the operation mode (PU or LNK (Link) operation).
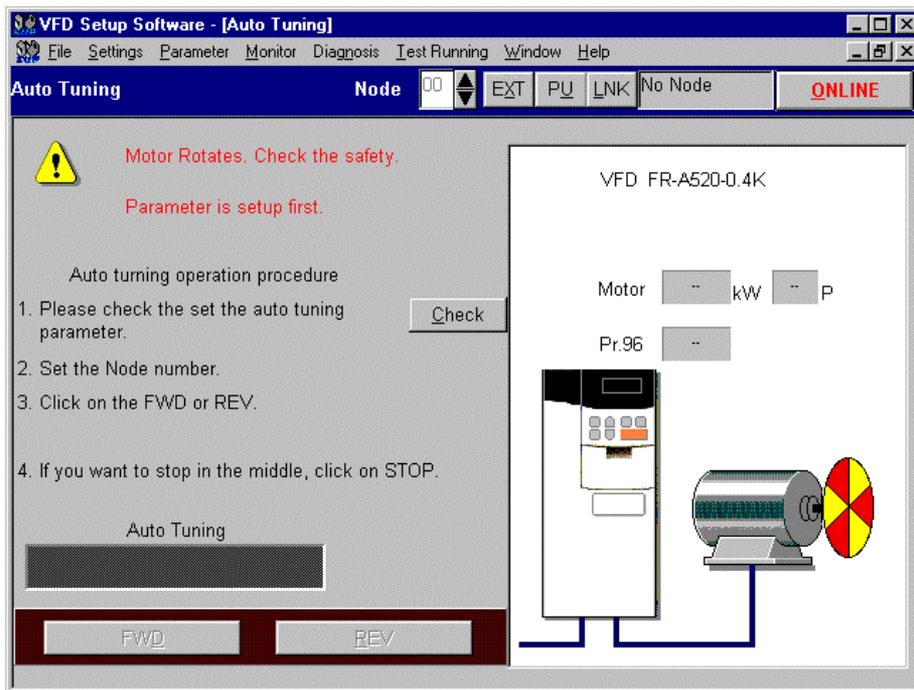
2) Confirmation of the auto tuning parameters

Clicking the [Check] button (Alt+C) shows the parameters on the screen in a dialog box.

After entering the parameter set values, click the [Blk Write] button to write the new parameter values to the inverter.

3) Click the [FWD] (Alt+D) or [REV] (Alt+R) button.

The LED block and monitor screen display the auto tuning status.

When Pr. 96 = "101", the motor is rotated. The motor stops on completion of auto tuning. If the auto tuning has failed, follow the dialog box instructions.

Note: 1. In the offline mode, test running and auto tuning cannot be performed.

2. Before starting test running, check and if necessary adjust the parameters. Not doing so may cause some machines to perform unexpected operation.

3. Provide safety backup devices such as emergency brakes to ensure that the machinery and equipment are not put in hazardous conditions if the inverters become faulty.

4. Auto tuning is not available for the FR-F500 series and FR-S500 series. (Can be displayed on the screen.)

2.7 Saving, Reading and Printing the Files

2.7.1 File types

File Name	Description
*.MEL	Manages the system settings and parameter lists (all stations) as a single file.
*.ADT	Manages the alarm history data. (All stations)
*.MDT	Manages the data indication data in monitoring. (Data on one screen)
*.MMT	Manages the meter indication data in monitoring. (Data on one screen)
*.ODT	Manages the oscilloscope data in monitoring. (Data on one screen)
*.TXT, *.CSV	Manages the parameter list in a text file format.
*.PRM	Displays the parameter setting information.

2.7.2 Saving method

1) *.MEL, *.TXT, *.CSV file

When the system settings and parameter lists to be saved are open, choose the [File] → [Save] command from the menu. The "Save As" panel appears. Choose "Save file as type" to save the file with the "File name".

Choose the [File] → [Save] command in the menu to overwrite the currently open file. If no file is open, the "Save As" panel appears.

The file is saved in the "hard disk - invsupe" folder.
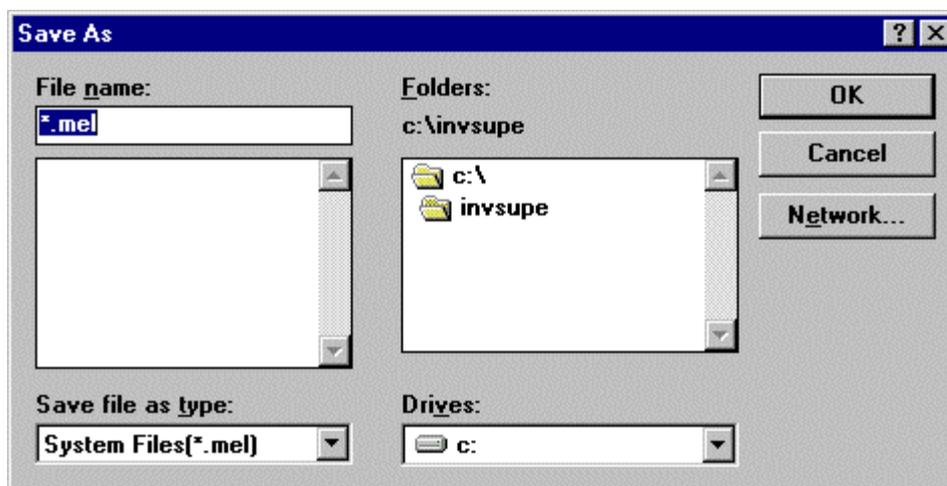
*Instructions for saving

When saving the file, the stations whose data are not opened are judged as "data absence". Therefore, if the file is saved as it is, the previous data will be erased. Always save the file with the data open.

2) *.ADT, *.MDT, *.MMT and *.ODT files

Choose the [File] → [Save] command from the menu on the corresponding display screen. The "Save As" panel appears. Choose "Save as type" to save the file with the "File name".

The file is saved in the "hard disk - INVSETUP" folder.

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2.7.3 Reading the file

To read the saved file, choose the [File] → [Open] command from the menu. The "Open" panel appears. Choose the file to be read and click the [OK] button to read the saved data.

2.7.4 Printing

Calling the screen to be printed and choosing the [File] → [Print] command in the menu displays the "Print" panel. Make printer and other settings and click the [OK] button to start printing.

2.8 Help
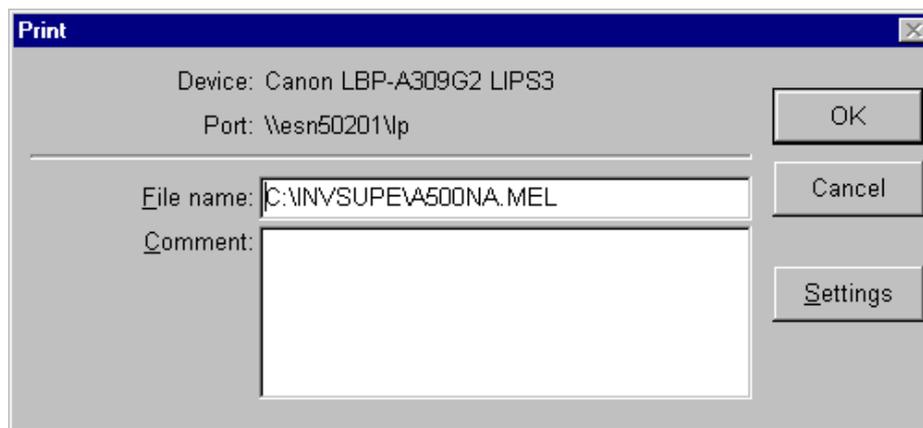
2.8.1 Help contents

Choosing the [Help] → [Contents] command from the menu displays the following screen:
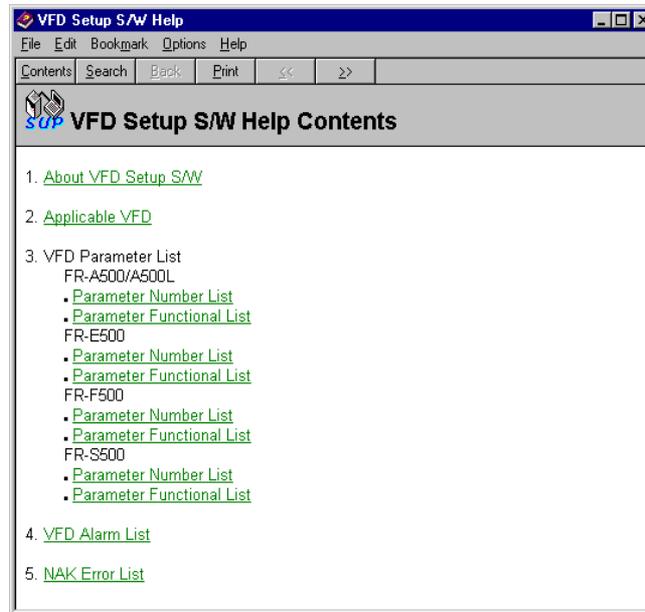
1) About VFD Setup S/W
   Explains how to use the VFD Setup Software.
2) Applicable VFD
   Displays a list of inverters with which the VFD Setup Software is compatible.
3) VFD Parameter List
   Explains each parameter.
4) VFD Alarm List
   Explains inverter alarms.
5) NAK Error List
   Explains the errors displayed in the setup software, e.g. NAK error.

2.8.2 Version information

Choosing the [Help] → [About VFD Setup S/W] command in the menu displays the copyright, the version information, the user and company names set for installation and other data on the following screen:
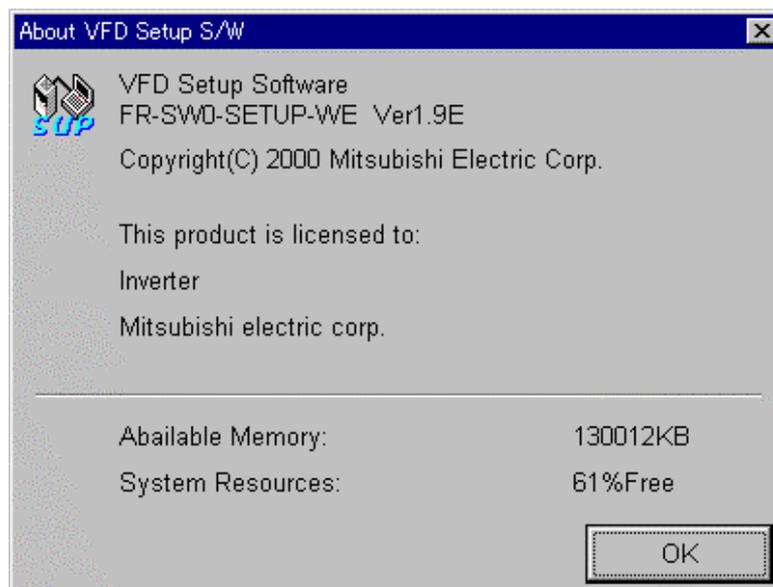
CHAPTER 3
ERROR INDICATIONS

This chapter explains the "error indications" which may be given during use of this product.
Always read the instructions before using this software.

CHAPTER 1	OVERVIEW
CHAPTER 2	FUNCTIONS
CHAPTER 3	ERROR INDICATIONS
CHAPTER 4	APPENDICES

3.1 Error Codes

3.1.1 Error code lists

When any error occurs, the corresponding error code is output to the error code display column (indicated by 3) on the screen on page 6).

(1) Error codes related to a communication error (inverter side)

Error Code (HEX)	Error Name	Definition
0(00H)	Computer NAK error	The number of errors consecutively detected in communication data from the computer is greater than the permissible number of retries.
1(01H)	Parity error	The parity check result does not match the specified parity.
2(02H)	Sumcheck error	The sum check code in the computer does not match that of the data received by the inverter.
3(03H)	Protocol error	Data received by the inverter is in wrong protocol or data receiving is not completed within the predetermined time.
4(04H)	Framing error	The stop bit length is different from the setting.
5(05H)	Overrun error	New data has been sent by the computer before the inverter completes receiving the present data.
6(06H)	Character error	The character received is invalid (other than 0 to 9, A to F, control code).

(2) Error codes related to an inverter error

Error Code (HEX)	Error Name	Definition
17(11H)	Outside parameter range	The data specified for running frequency, parameter write, etc. is outside the setting range.
18(12H)	Operation mode error	The present operation mode is not allowed to perform. Change the operation modes.
19(13H)	Running	The inverter is running.
20(14H)	Parameter write inhibit	Parameter write is inhibited.
22(16H)	No parameters	There are no parameters or related parameters have not been set.
23(17H)	No options	The preset option is not connected to the inverter.
24(18H)	Narrow error	There is no difference between analog value settings of Pr. 902 (Pr. 904) and Pr. 903 (Pr. 905).
25(19H)	Data range error	The data specified for set frequency write, etc. is outside the range.
26(1AH)	Instruction code error	A non-existing instruction code was sent to the inverter.
27(1BH)	Mode error	Mode error
33(21H)	Running in present mode	Mode change etc. cannot be made since the inverter is running in the present operation mode.
34(22H)	With STF	Mode change etc. cannot be made since the forward rotation command is entered.
35(23H)	With STR	Mode change etc. cannot be made since the reverse rotation command is entered.
36(24H)	Operation mode specified	Cannot be executed in the present operation mode.
37(25H)	Pr. 75 specified	Since Pr. 75 is specified, inverter reset cannot be executed.

(3) Error codes related to a communication error (personal computer side)

Error Code	Error Name	Definition
2000	Normal termination	Communication terminated without fault.
2001	Time-out occurrence	Communication with the inverter cannot be made.
2002	Send data error occurrence	Send data error
2003	Checksum error	The sum check code value of the data received by the computer is invalid.
2004	Send data error	Data from the inverter is invalid.
2005	NAK receive data error	Data from the inverter is invalid.
2006	Line offline	The present line is offline.
2007	Unconnected	This station number is not yet connected.

3.1.2 Panel-displayed errors

Display	Definition
Program setting environment is invalid. Redo setup again.	There is no program file read from the EXE file. The program directory is different.
Data directory is invalid. After starting, make environmental setting.	Data directory setting is invalid.
The following file is not found. The program is terminated.	The user file is not in the specified directory.
Time-out occurred. Check the wiring and communication settings.	Communication stopped for some reason in the online mode.

REMARKS

When making communication with the inverters, set a value other than 0 in Pr. 122 "communication check time interval" on the inverter's operation panel. For the FR-S500 series, set a value other than 0 in the communication parameter n6 (336) "communication check time interval".
Refer to the inverter instruction manual for the setting method.

CHAPTER 4
APPENDICES

This chapter provides the "appendices" for use of this product.
Always read the instructions before using this equipment.

CHAPTER 1	OVERVIEW
CHAPTER 2	FUNCTIONS
CHAPTER 3	ERROR INDICATIONS
CHAPTER 4	APPENDICES

4.1 Supplementary Software

4.1.1 Introduction

The parameter file edit software (hereafter "PREDIT") is specifically designed to make changes/additions to the models supported by the VFD setup software (hereafter "setup software") and additions/deletions/changes to the display parameters. Please acknowledge that the PREDIT is not supported.

4.1.2 Parameter files

(1) What are parameter files?

Parameter files are text files which consist of information on the models compatible with the setup software and the parameter information of those models. Installing the setup software into the personal computer also installs the following files into the directory where the setup software is installed.

Applicable Model	Parameter File Name	Description
FR-A500	fra520. ine	FR-A520-0.4K to 55K
	fra540. ine	FR-A540-0.4K to 55K
	fra520na. ine	FR-A520-0.4K to 55K-NA
	fra540na. ine	FR-A540-0.4K to 55K-NA
	fra540ec. ine	FR-A540-0.4K to 55K-EC
	fra540ch. ine	FR-A540-0.4K to 55K-CH
FR-A560	fra560na. ine	FR-A560-0.75K to 55K-NA
FR-E500	fre520. ine	FR-E520-0.1K to 7.5K
	fre520na. ine	FR-E520-0.1K to 7.5K-NA
	fre520w. ine	FR-E510W-0.1K to 0.75K
	fre52wna. ine	FR-E510W-0.1K to 0.75K-NA
	fre520s. ine	FR-E520S-0.1K to 0.75K
	fre52sec. ine	FR-E520S-0.4K to 2.2K-EC
	fre52sch. ine	FR-E520S-0.4K to 2.2K-CH
	fre540. ine	FR-E540-0.4K to 7.5K
	fre540na. ine	FR-E540-0.4K to 7.5K-NA
	fre540ec. ine	FR-E540-0.4K to 7.5K-EC
	fre540ch. ine	FR-E540-0.4K to 7.5K-CH
FR-A500L	fra52l. ine	FR-A520L-75K, 90K
	fra54l. ine	FR-A540L-75K to 280K
	fra54lna. ine	FR-A540L-75K to 280K-NA
	fra54lec. ine	FR-A540L-75K to 280K-EC
FR-F500	frf520. ine	FR-F520-0.75K to 55K
	frf540. ine	FR-F540-0.75K to 55K
	frf540ec. ine	FR-F540-0.75K to 55K-EC
	frf540ch. ine	FR-F540-0.75K to 55K-CH
FR-S500	frs520. ine	FR-S520-0.1K to 3.7K-R
	frs520s. ine	FR-S520S-0.1K to 1.5K-R
	frs52sec. ine	FR-S520S-0.2K to 1.5K-ECR
	frs52sch. ine	FR-S520S-0.2K to 1.5K-CHR

(2) Parameter file structure

The parameter file consists of a machine information part and a parameter information part. The machine information part is used to choose a model on the system setting screen and the parameter information part is used to chiefly display the parameter screen.

[Machine information part]
・Model name (such as FR-A520)
・Model type code (NA, EC, CH...)
・Power supply capacity (100V class: 1, 200V class: 2, 400V class: 4)
・Model code
 (FR-A500 series: &HA5, FR-E500 series: &HBF, FR-F500 series: &HF5, FR-S500 series: &H55)
・Allowable capacity (0.1K, 0.2K, 0.4K...)
・Rated current value (0.8A, 1.5A, 3A...)
・Connectable option (A5AX, A5AY...)
・Number of parameters

[Parameter information part]
・Help context ID (number for help display)
・Parameter number
・Name
・Unit (Hz, V, A...)
・Step (1, 0.1, 0.01, 0.001)
・Factory setting
・Function-based list code (parameter displayed on the functional list screen)
・Setting range check flag (0: checked, 1: not checked)
・Setting range

4.1.3 Parameter file edit software (PREDIT)

This software is specifically designed to edit the parameter file for the setup software, and cannot be used for other applications. By editing and saving the file, it can be displayed on the parameter screen (all list, functional list, etc.) as a setup software parameter file. You can make an updated inverter version or a special or another inverter compatible with the setup software.
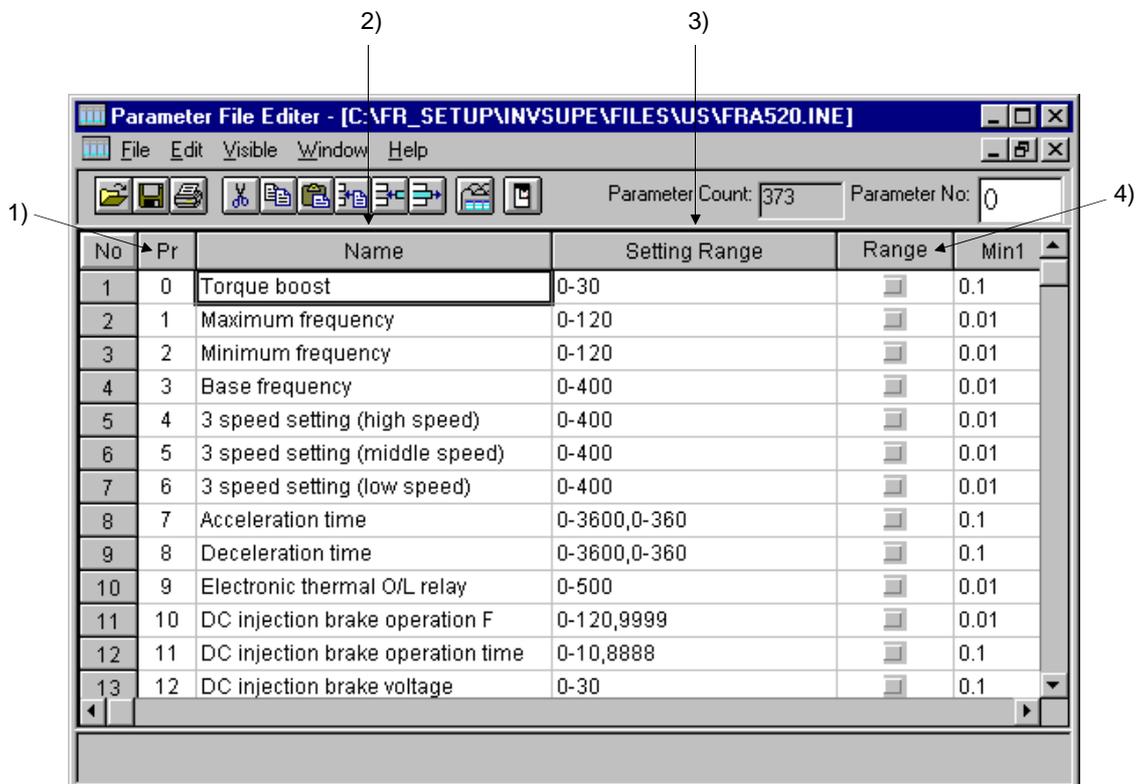
(1) Input items

1) Pr .... Write the parameter number. Set the parameter numbers in the ascending order and do not write the same parameter number.

2) Name .... Write the parameter name.

3) Setting Range .... Enter the parameter setting range and use "," and "-" for separation.
Example: 0 to 6, 9999 → 0-6, 9999

4) Range .... Choose whether the setup software range is checked or not. By checking this column, a range check is not made in the setup software.

5) Minimum .... Choose the minimum setting increment from among "1", "0.1", "0.01" and "0.001" in the combo box.

6) Unit .... Write the parameter unit. This column may be left blank for parameters which do not have units.

7) Factory setting .... Write the value set at the factory.

8) Help ID .... Write the help ID. Used to display help relating to the chosen parameter. When adding a parameter, you cannot add its help and therefore set "0".

9) Function list .... Enter the hexadecimal code as the function class for display on the functional list format screen. Choosing "Edit" → "Functional List Code" shows the functional list code edit panel.

10) Condition count .... Shows the number of conditions set in parameter read condition editing. (Refer to page 38)

Note: The number of parameters and the number of setting ranges need not be entered as they are set automatically.

(2) Functions

1) File
  ・Open
  Opens the parameter file (Tool button available)
  ・Close
  Closes the currently open file.
  ・Save
  Overwrites the currently open file. (Tool button available)
  ・Save As
  Shows the file saving combo box and saves the file with a new name.
  ・Print
  Prints the open file. (Tool button available)
 ・Exit
  Exits from the software.
2) Edit (may also be displayed with the right button of the mouse)
  ・Cut
  Cuts the currently chosen range and pastes it to the clipboard. (Tool button available)
  ・Copy
  Copies the currently chosen range and pastes it to the clipboard. (Tool button available)
  ・Paste
  Pastes the data of the clipboard. (The clipboard data from another application may not be pasted correctly.) (Tool button available)
  ・Insert & Paste
  Inserts the data cut or copied on a line basis. (Tool button available)
  Insert
  Inserts a blank line to above the currently chosen line. (Tool button available)
  ・Delete
  Deletes the currently chosen line. (Tool button available)
  ・Functional list code edit
  Shows the functional code list of the currently chosen parameter.
  Clicking the item to be displayed in the functional list and pressing the [OK] button automatically shows the functional list code.
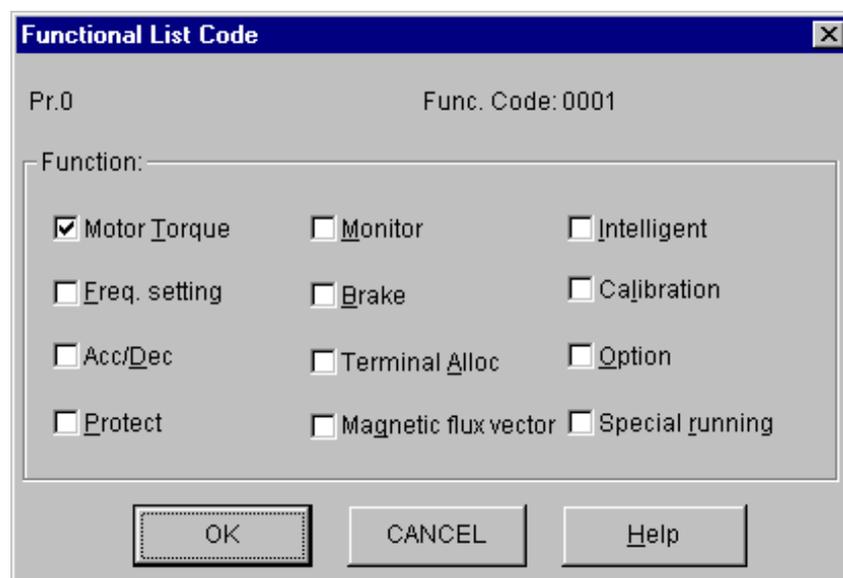
Functional List Code Edit Panel

· Pr read condition edit
When performing Block Read or Block Check by the inverter setup software, no error indication will be displayed by setting the parameter reading conditions, even if the parameters of inverter's parameter setting and setup software do not match. (Refer to page 14 for Block Read and Block Check of the parameters.)

3)

Pr Read Condition   ⊠

Pr.100   4)——► Condition Count 3

                                        2)——►
1)——► **Pr Condition**   **Op Mode Cond.**   **Option Cond.**

| Add | Del | | Add | Del | | Add | Del |

Pr	=/<>	Cond1	Cond2
19	=	9999	
60	=	1	6
71	<>	2	

=/<>	Op mode
= ▼	EXT

=/<>	Option
<>	A5AX

| OK | cancel | Help |
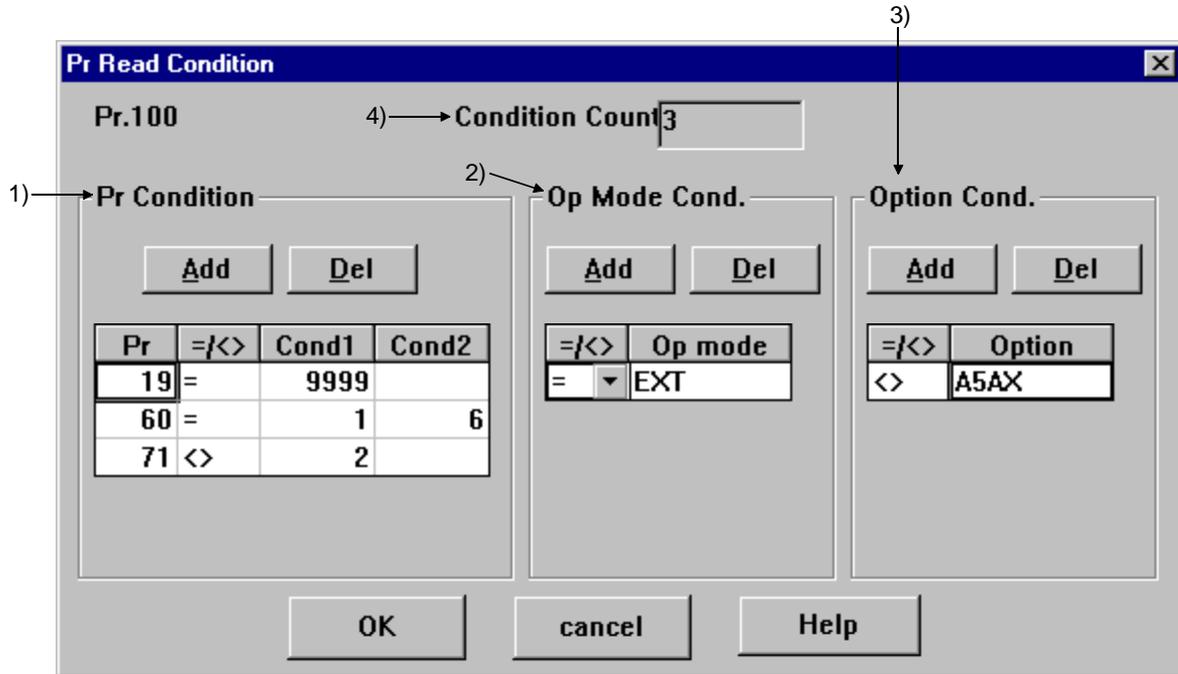
Note: Refer to the inverter instruction manual for the parameter reading conditions of the inverter.

1) Parameter condition
   Pr: Parameter Number
   =/<> : = (equal) or <> (not equal)
   Cond1,Cond2 : Setting data
   ex) When Pr. 19=9999, Pr. 60=1 to 6, Pr. 71<>2

Pr	=/<>	Cond1	Cond2
19	=	9999	
60	=	1	6
71	<>	2	

2) Operation mode condition

=/<> : = (equal) or <> (not equal)

Op mode: Select Operation mode

ex) In the external mode the reading is not correct

=/<>	Op mode
= ▼	EXT

3) Inboard option condition

=/<> : = (equal) or <> (not equal)

As the inboard option name, input the option name which was set using the Machine information panel (refer to page 8) of the setup software.

ex) The parameter can only be read with A5AX fitted

=/<>	Option
<>	A5AX

4) Number of Condition

Display setting condition. Automatic setting "OK" button.

Remarks

ADD/DEL button

ADD: Add disable read condition.

DEL: Delete select condition.

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・Machine information edit

Shows the machine information part edit panel of the parameter file. (Tool button available)

You can edit the inverter type, voltage code, model code, inverter rating, rated current and compatible options.

Machine Information Edit Panel

3) Display

  ・Display column

  Choose whether the display column (refer to the input items) is to be displayed or not.

  ・Toolbar

  Choose whether the toolbar is to be displayed or not.

  ・Status bar

  Choose whether the status bar is to be displayed or not.

  ・Font

  Choose the font of the display list. The set font is also displayed after the next startup.

4) Window

  ・Cascade display

  Shows the displayed windows side by side.

  ・Tile display

  Shows the displayed windows one over another.

5) Help

  ・Contents

  Shows the contents of help.

  ・Version information

  Shows the version information panel.

6) Parameter count

Shows the number of parameters currently being displayed. Line insertion or deletion automatically changes the number of parameters.

7) Parameter No.

Shows the parameter number currently being chosen. After entering the parameter number, pressing the return key displays the entered parameter number at the front of the list.

8) Automatic cell width adjustment

Double-click the item name (Pr., name, range check ...) in the list to adjust the cell width to the maximum width of the column.

9) Mouse right-click

Press the right button of the mouse to show the edit menu.

10) Tool button function display

Placing the mouse on the tool button shows the button function details on the status bar.

11) By relating this software with the parameter file, you can open this software from the parameter file.

Note: Before editing the parameter file, always make a backup copy of the file.

REVISIONS

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

Print	*Manual Number	Revision
Apr., 1998	IB(NA)-66853-A	First edition
Nov., 1998	IB(NA)-66853-B	Additions • Compatibility with the FR-E520-5.5K, 7.5K(-NA), FR-A520L-75K, 90K, FR-A540L-75K to 280K(-NA)(-EC) • APPENDICES Partial additions • Environmental Settings (default system file) • Oscilloscope measurement conditions (Alarm Trigger, Sampling Time setting range • Alarm History (VFD Reset, Alarm Clear) • File saving (Save, file format)
Jun., 1999	IB(NA)-66853-C	Additions • Compatibility with the FR-E540-0.4K to 7.5K (-NA) (-EC) (-CH), FR-E520S-0.4K to 2.2K-EC (-CH), FR-E510W-0.1K to 0.75 (-NA), FR-F540-0.75K to 55K-EC (-CH) • Compatibility with Windows 98
Aug., 2000	IB(NA)-66853-D	Additions • Compatibility with the FR-A560-0.75K to 55K-NA, FR-F520-0.75K to 55K, FR-S520-0.1K to 3.7K-R, FR-S520S-0.1K to 1.5K-R, FR-S520S-0.2K to 1.5K-ECR (-CHR) Partial additions • Software installation disk • System settings Modifications • Windows 3.1 delete
Dec., 2000	IB(NA)-66853-E	Partial addition • Supplementary Software (Pr read condition edit function) Modification • Error code 18 (12H)