MITSUBISHI ELECTRIC

MELSOFT

MELSOFT
FR Configurator
INSTRUCTION MANUAL

VFD SETUP SOFTWARE

FR-SW2-SETUP-WE

-Windows® (English) Version-

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® XP Professional (English version) is the operating system.
  - 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.
- The screens, parameter names, set values and so on given in this manual are written on the basis of the FR-A700 series. When using the inverter of any other series, refer to the instruction manual of the used inverter.

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  1)The formal name of Windows® 98 is Microsoft® Windows® 98 operating system.

  2)The formal name of Windows® 2000 is Microsoft® Windows® 2000 operating system.

  3)The formal name of Windows® Me is Microsoft® Windows® Me operating system.

  4)The formal name of Windows® XP is Microsoft® Windows® XP operating system.

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⚠ For Maximum Safety

- This product is not designed or manufactured to be used in equipment or systems in situations that can affect or endanger human life.
- When considering this product for operation in special applications such as machinery or systems used in passenger transportation, medical, aerospace, atomic power, electric power, or submarine repeating applications, please contact your nearest Mitsubishi sales representative.
- Although this product was manufactured under conditions of strict quality control, you are strongly advised to install safety devices to prevent serious accidents when it is used in facilities where breakdowns of the product are likely to cause a serious accident.

<Abbreviations>	
PU	Operation panel (FR-DU07) and parameter unit (FR-PU04/ FR-PU07)
Inverter	Mitsubishi inverter FR-A/F700 series
Pr.	Parameter Number
PU operation	Operation using the PU (FR-DU07/FR-PU04/FR-PU07).
External operation	Operation using the control circuit signals

CONTENTS

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 9999 in *Pr. 123 PU communication waiting time setting* and *Pr. 337 RS-485 communication waiting time setting*. When using the PU connector, set a value other than 0 in *Pr. 122 PU communication check time interval* on the inverter's operation panel. When using the RS-485 terminal, set a value other than 0 in *Pr. 336 communication check time interval*. When using the USB connector to make communication (available for FR-A700 series only), set a value other than 0 in *Pr. 548 USB communication check time interval*. (Refer to the inverter instruction manual for the setting method.)

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 personal computer.

- System setting function
- Parameter editing function
- Monitoring function
- Diagnosis function
- Test running function
- File management function
- Advanced function
- Help function

1.1.1 Packing Confirmation

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

Item	Quantity
CD-ROM	1 disk
Install manual	1 book

1.2 Preparations for Startup

1.2.1 System configuration

Components	Description*1	
Personal computer*2	IBM PC/AT compatible machine with CD-ROM drive (for installation), USB port *3 or RS-232C port	
	OS	Windows® XP Professional, Windows® XP Home Edition, Windows® 2000 Professional, Windows® Me, Windows® 98 (English)
	Processor	Pentium® 133MHz or more (Windows® 98, Windows® 2000 Professional) Pentium® 150MHz or more (Windows® Me) Pentium® 300MHz or more (Windows® XP Professional, Windows® XP Home Edition)
	Memory	24MB or more (Windows® 98) 32MB or more (Windows® Me, Windows® 2000 Professional) 128MB or more (Windows® XP Professional, Windows® XP Home Edition)
	Hard disk	Free area of 50MB or more
Software	Internet Explorer 4.0 or more	
Display	Applicable to display at resolution of 800 × 600 or more, and High Color (16 bits). Connectable to the above PC.	
Keyboard	Connectable to the above PC	
Mouse	Connectable to the above PC	
Printer	Connectable to the above PC	

*1 Windows is a registered trademark of Microsoft Corporation in the United States and other countries.
Pentium is a registered trademark of Intel Corporation

*2 FR Configurator may not normally operate according to PC used.

*3 The setup using the USB port is available for FR-A700 series only.

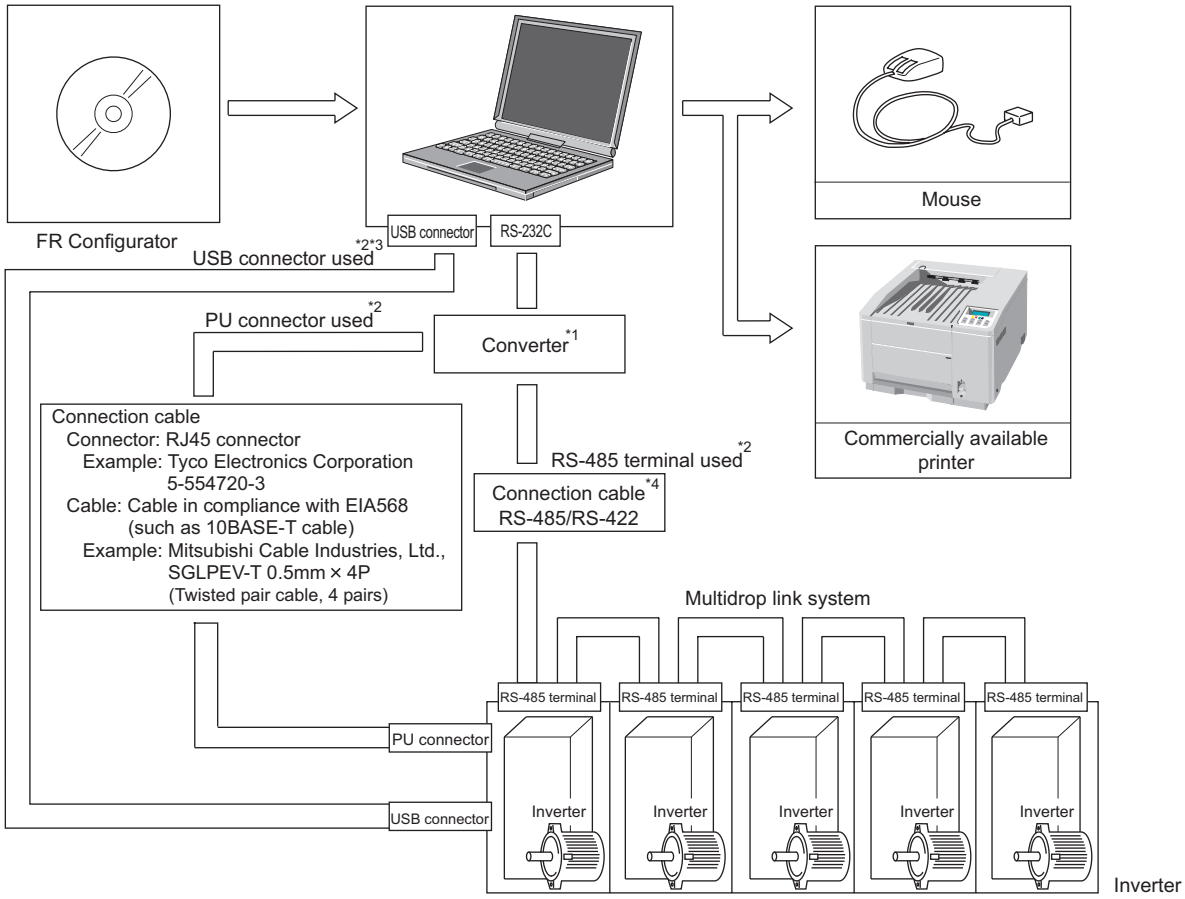
1.2.2 Compatible inverters

FR Configurator is compatible with the following inverters.

- FR-A700 series
- FR-F700 series

1.2.3 System configuration

The following devices are required to use the FR Configurator. 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>
1) Model: FA-T-RS40□Converter (Model with connectors and cable is also available)
Mitsubishi Electric Engineering Co., Ltd.
2)Model: DINV-CABV (with connectors and cable)
Diatrend Corp.

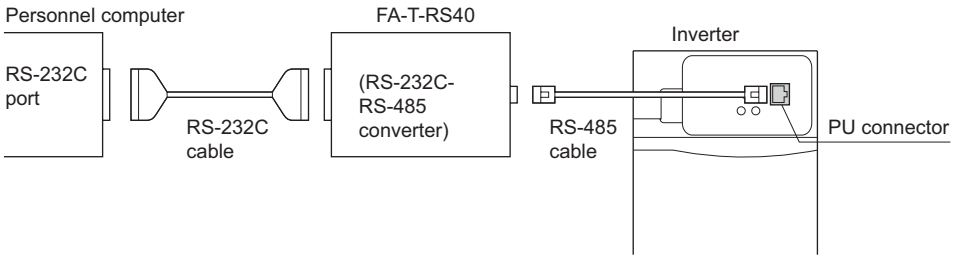
The converter cable cannot connect two or more inverters (the computer and inverter are connected on a 1:1 basis). Since the product above is packed with the RS-232C cable and RS-485 cable (10BASE-T + RJ-45 connector), the cable and connector need not be prepared separately. Contact a maker for details of the product.

*2: The PU connector, RS-485 terminal or USB connector (FR-A700 series only) can be used to make communication.
(Refer to the corresponding instruction manual for details.)

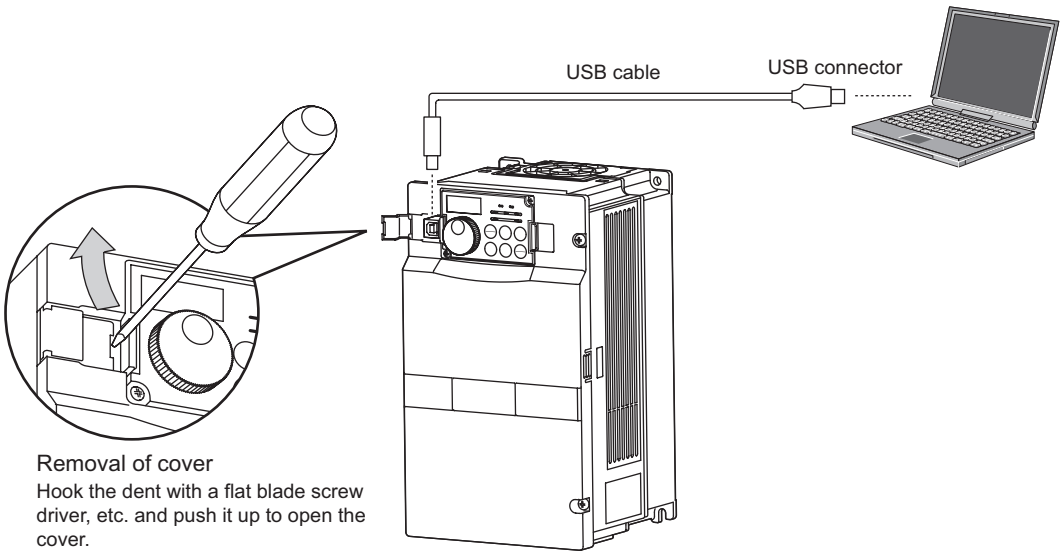
*3: The communication using USB connector (available for FR-A700 series only) cannot connect two or more inverters. (the personal computer and inverter are connected on a 1:1 basis) Also, the communication using USB HUB can not be made.

*4: Overall length of connection cable: 500m

[Connection example between converter and inverter (PU connector)]



[Connection of USB cable and USB connector]



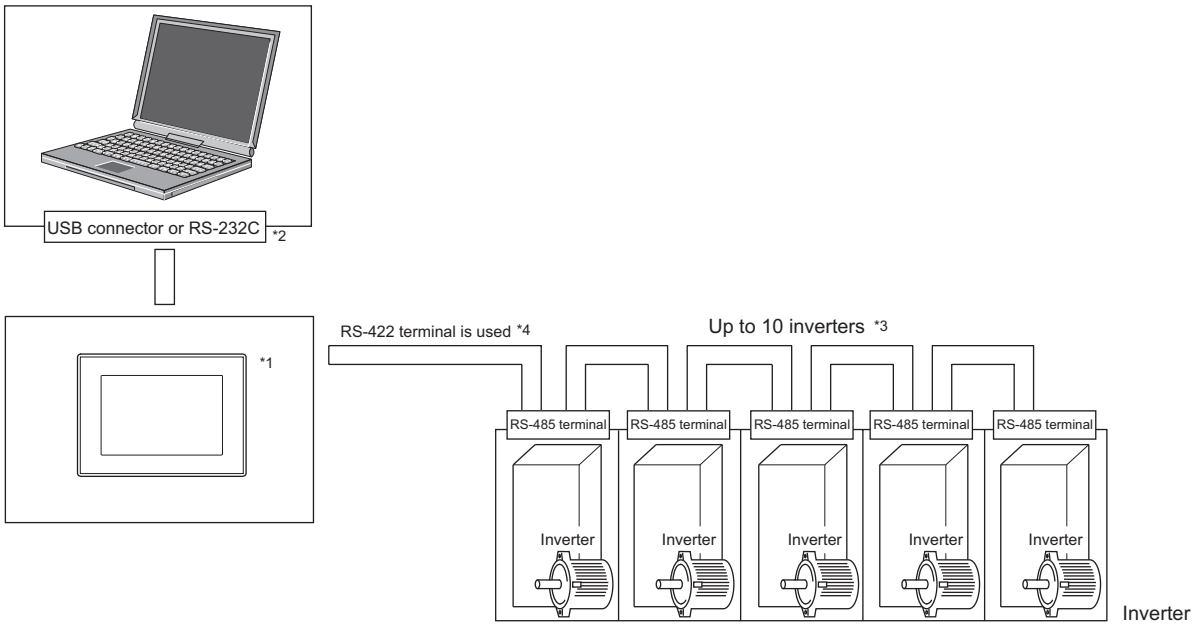
Interface	Conforming to USB 1.1
Transfer speed	12Mbps
Wiring length	Maximum 5m
Connector	USB connector (B receptacle)
Power supply	Supplied by self-power

[Connection via GOT (FA transparent function)]

The FA transparent function allows the sequence programs of the Mitsubishi PLC to be read, written and monitored from a PC connected via a GOT.

Using FA transparent function of GOT1000 series, communication with inverter via GOT is enabled.

- RS-232C or USB connection is used between FR Configurator and GOT
- RS-422 is used between GOT and inverter



*1: GOT RS-422 communication unit (GT15-RS4-9S) is required.

*2: USB or RS-232C(one from Port 1 to Port 9) can be used for communication port, and setting must be made in Communication settings screen of the FR Configurator (Can not use multiple Ports simultaneously).
The personal computer and GOT is connected on a 1:1 basis. Also the communication using USB HUB can not be made.

*3: Up to 10 inverters can be connected with RS-422 connection. Inverter station number can be set from 0 to 31.

*4: Refer to GOT1000 Series Connection Manual for the compatible version of the GOT and details of RS-422 connection.

CAUTION

Do not perform the following operation during FA transparent function is valid and FR Configurator is ONLINE.

1. Online operation (project download, etc.) from GT Designer/GT Designer2 to GOT
2. Online operation to the PLC CPU by using FA transparent function of GX Developer

1.2.4 Installation of FR Configurator

To use the FR Configurator (FR-SW2-SETUP-WE), the files included in the setup disks must be installed onto the personal computer.

REMARKS

FR configurator is installed in a different folder from that of the old version inverter setup software. The old version inverter setup software can be also used continuously.
However, when installing the old version inverter setup software after the installation of FR Configurator, FR Configurator will not operate. In this case, uninstall FR Configurator *(refer to page 10)* and then install it again.
If the older version of the FR Configurator is installed (version information can be checked in "About VFD Setup S/W" screen, *refer to page 67*), uninstall the older version, and then install the new version of the FR Configurator.

To install the old version of the FR configurator, use the setup program (SETUP.EXE) on the Setup Disk . The setup program creates a directory on the specified hard disk and copies the required files.

CAUTION

- Since the files in the Setup Disk are compressed, the FR-Configurator will not operate by merely copying the files. Always use the setup program to install the software.
- Install the software in accordance with the Windows installation procedure.
- For uninstallation method, *refer to page 10*.

Installation procedure

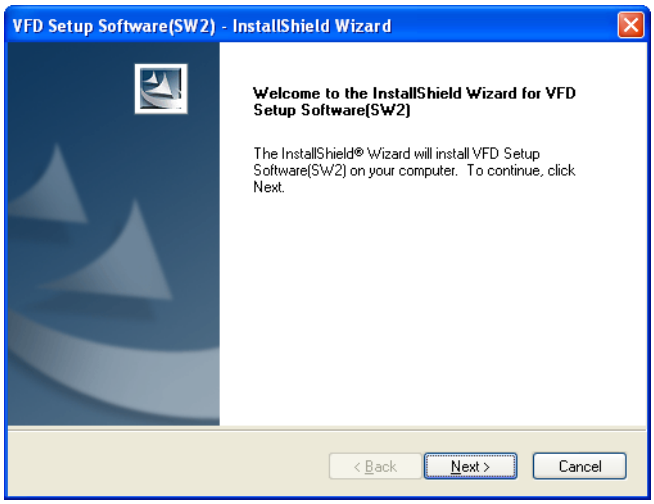
The following describes the procedures for installing the FR Configurator to a personal computer.

CAUTION

- Close any other applications that have already been started.
- When installing to Windows 2000/XP (Professional/Hope Edition) OS, login as a user name with administrator authority (Administrator authorization) and install it.
- If an inverter is connected by the USB cable, disconnect the USB cable.
- If the following verification screen is displayed during the installation, click [Continue(C)] to continue the installation.

(1) Insert the CD-ROM to the drive of which CD-ROM can be read. When the screen shown on the right is displayed, click [OK] to continue the installation of the FR Configurator.

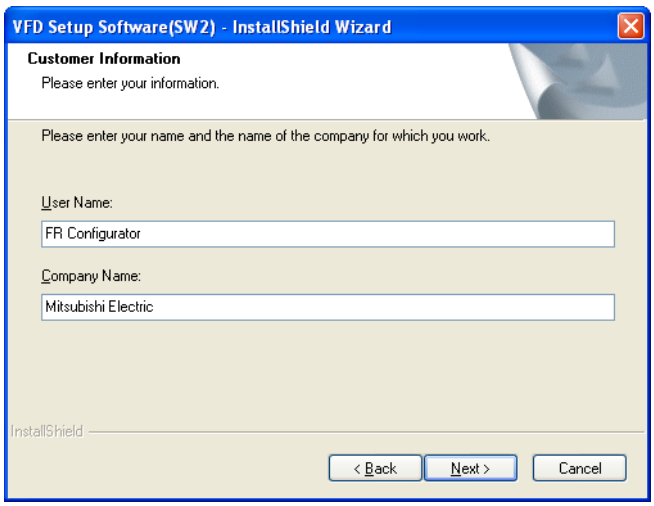
(2) The screen shown right is displayed.
Click the "Next" button.



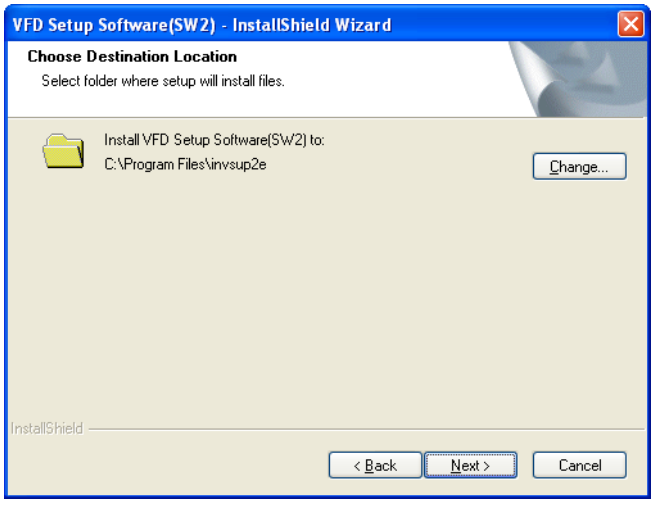
REMARKS

The above screen can be displayed with double-clicking the icon of CD-ROM drive or the following procedure.
(1) Choose the [Execute it by specifying a file name (R)] command from [Start] menu.
(2) The display of [Execute it by specifying a file name (R)] appears.
(3) Input "D:\SETUP" (with one-byte characters) to "Name (O)" and click the "OK" button. (When CD-ROM drive is D drive)

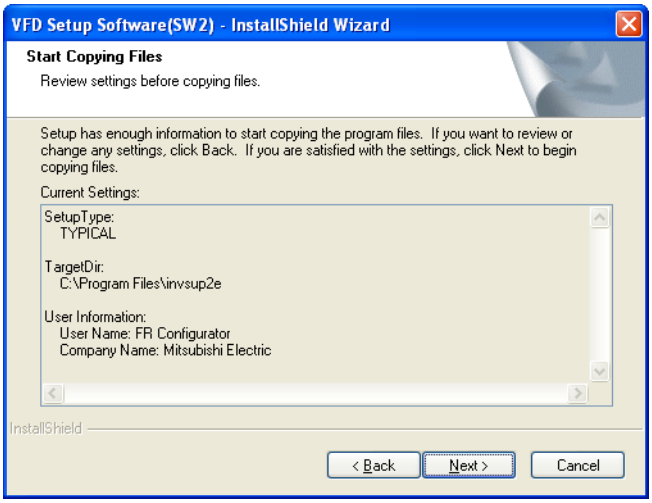
(3) Enter a user name and company name in one byte characters.
After entering, click the "Next" button.



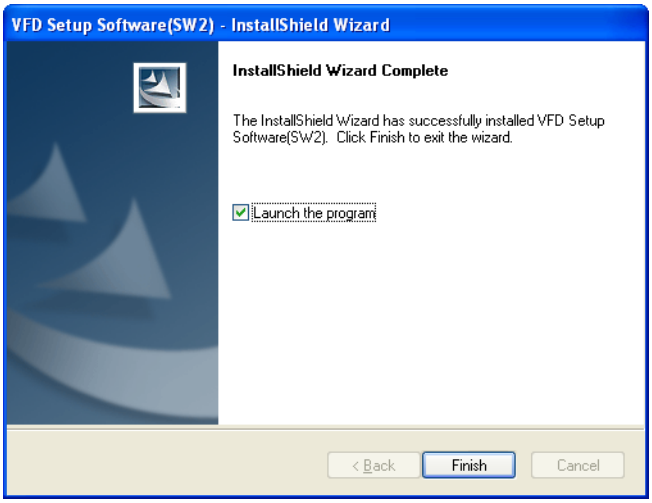
(4) Check the installation destination folder and click "Next" button.
When changing the installation destination, click "Change..." and change it.



(5) Check the settings, and click "Next" if there is no problem.
When changing the settings, click "<Back" and correct them.



(6) The installation is completed.
Click the "Finish" button to finish.
By checking "Launch the program", the program will start right after the "Install Shield Wizard" is finished.



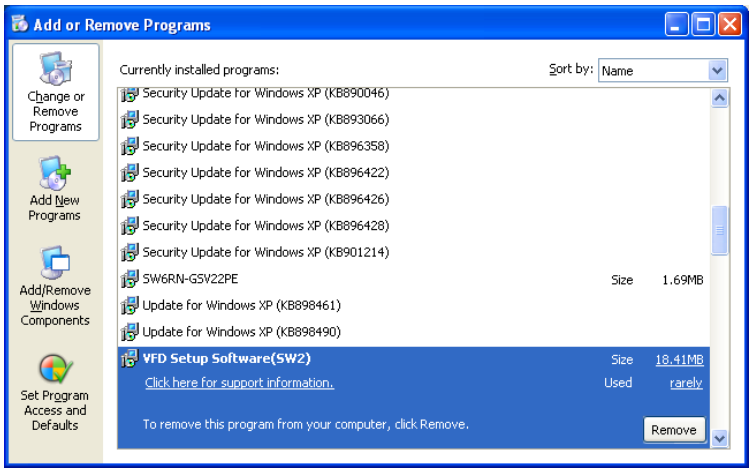
(7) When the installation is finished, a shortcut is created in the [Start] menu.

REMARKS

If the user does not have the administrator authority (Administrator authorization) with Windows XP/2000 OS, the installation cannot be made.
Login as a user with administrator authority and start the installation again.

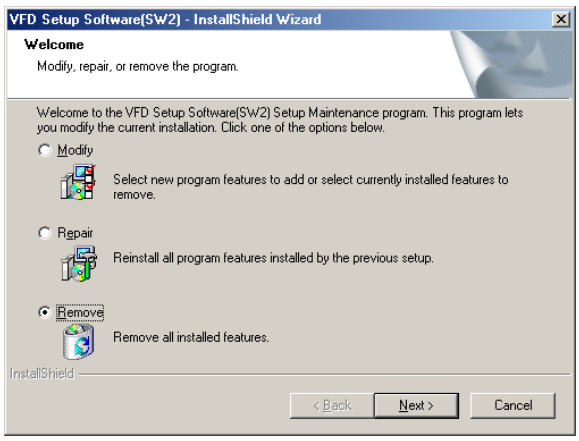
1.2.5 Uninstallation of FR Configurator

Select "Add or Remove Programs" from [Start] - [Setting] - [Control panel] and display the following screen.
Select "VFD Setup Software(SW2)" and click the "Remove" button to execute the uninstallation.



CAUTION

If the operation system is Windows 98SE or Windows Me, the following screen appears during the uninstallation.



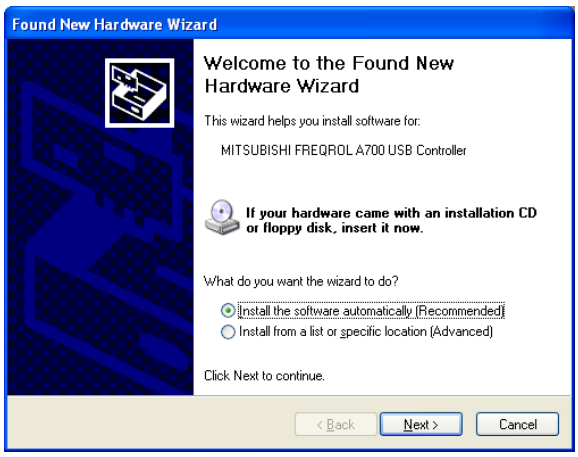
Select [Remove] and click [Next>] to proceed the uninstallation.

1.2.6 When connecting USB for the first time (FR-A700 series)

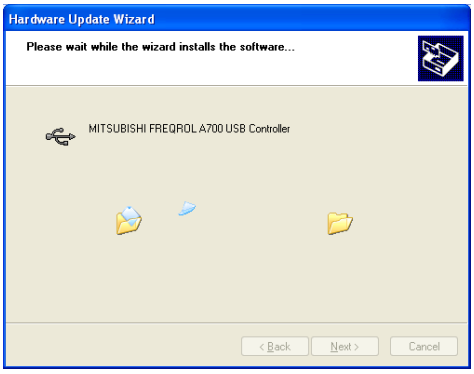
If a personal computer and inverter are connected via USB for the first time with the inverter power on, Found New Hardware Wizard is displayed.
The following additional wizard is displayed for Windows 98SE/Me/XP only.
For Windows 2000, it is automatically detected.

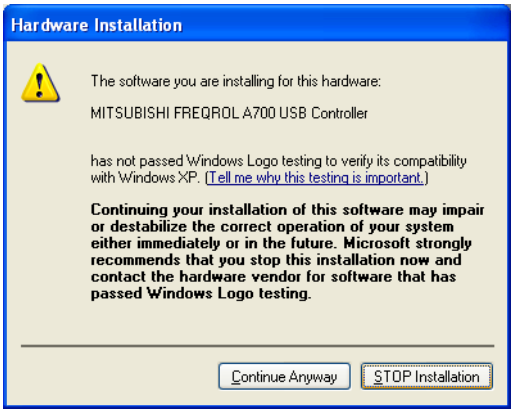
(1) Check the radio button "Yes, this time only" and click the "Next" button.

(2) Check "Install the software automatically (Recommended)" and click the "Next" button.

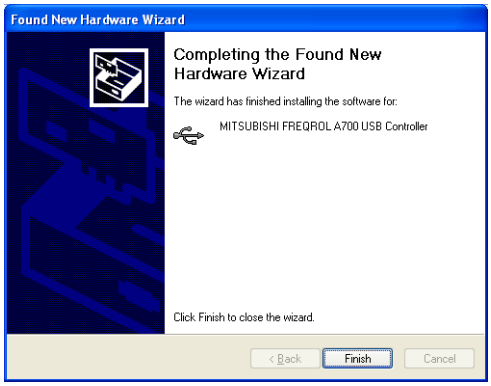


(3) If the screen shown on the right is displayed when using Windows XP, click [Continue Anyway] to start the installation.





(4) The installation of driver is completed. Click "Finish" to complete.



CAUTION

When the dialogue box shown on right appeared while using Windows 98SE and Windows Me, check the "Specify a location" and specify "C:\EZSocket\EZSocketInv", and then click "Next>" button.
If the FRA700.inf file is not in the folder above, search the FRA700.inf file and specify that folder.

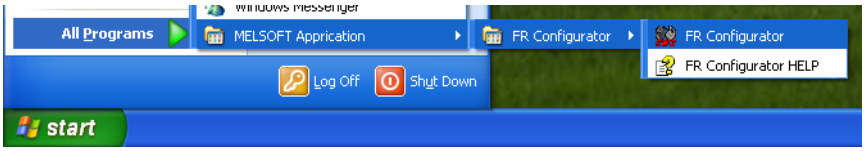
MEMO

2 FUNCTIONS

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

2.1 Starting FR Configurator

Click [Start] , point to [All Programs] , point to [MELSOFT application] , point to [FR Configurator] and then click [FR Configurator] to start FR Configurator.



2.2 Menu list

This software has the following functions:

Menu	Pull-Down Menu	Function/Operation	Refer to page
File	Open (Ctrl+O)	Opens a file.	17
	Close	Closes the screen.	-
	Save As (Ctrl+A)	Saves data.	16
	Print (Ctrl+P)	Selects printing.	17
	Exit	Exit FR Configurator.	-
View	System list	Displays a system list.	19
Settings	System Settings	Sets the model, capacity and option type. (Stations 00 to 31)	23
	Communication Settings	Sets communication information.	25
	Environmental Settings	Set the place for saving data (directory) and the operation at the start-up.	26
Parameter	All List Format	Shows the parameter list, and parameter setting can be made.	28
	Functional List Format	Shows and sets the related parameters function-by-function.	33
	Individual List Format	A total of 32 parameters out of all parameters can be registered to two different user groups to be managed.	34
	Basic Settings	The parameters required for starting up the inverter can be set without being aware of parameter numbers.	35
	I/O terminals Allocations	Assigns functions to the inverter I/O terminals.	36
	Convert Function	Converts the parameter settings automatically at replacement from the conventional mode	38
Monitor	Data Display	Shows four pieces of data (up to 4 signals) in terms of meter deflections.	43
	I/O terminal monitor	Monitors the status of the inverter I/O terminals.	44
	Oscilloscopes	3 analog signals and 4 digital signals (up to 7 signals) can be output in waveform.	45
	Status Monitor	Lists the operation status, operation mode and error existence of all inverter stations.	53
Diagnosis	VFD Status	Shows various data of all stations connected in real time in terms of values.	54
	Alarm History	Displays the alarm history of all inverters connected.	55
	Life Check (D)	Displays inverter part replacement indication.	56
	Trouble Shoot	Estimates the cause of faults from the situation.	57
Test Running	Test Running	Gives the operation command from the personal computer to actually test run the inverter.	58
	Auto Tuning	Performs auto tuning.	59
Advanced (Z)	Machine Analyzer	Measures the response frequency characteristic of speed relative to the motor torque of the machine.	61
Window	Cascade Display	Overlapping Windows.	-
	Tile Display	Windows are side-by-side.	-
Help	Help	Explains the use of FR Configurator and the description of parameters, etc.	66
	About VFD Setup S/W	Version information (copyright, version information, user and company names, etc.)	67

2.3 Saving, Reading and Printing the Files

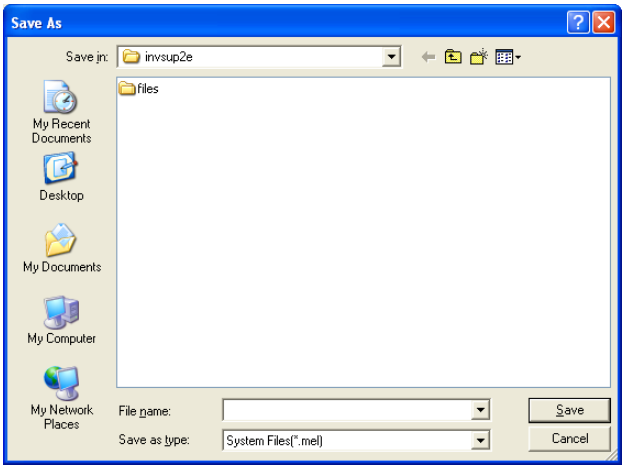
2.3.1 File types

Extension	Description	Target screen	Refer to page
*.MEL	Manages the system setting and parameter lists of all stations as a single file.	System Setting, All List Format	23, 28
*.MMT	Manages the Data Display in monitoring. (one screen)	Data Display	43
*.GPI	Manages the oscilloscope data in monitoring. (one screen)	Oscilloscopes	45
*.JPEG	Saves the oscilloscope data as images.	Oscilloscopes	45
*.TXT	Saves the parameter list (one station) in a text file format.	All list Format, Functional List Format, Individual List Format, Basic Setting Format 2	27
*.CSV	Saves the parameter list (one station) in a text file format. Saves the oscilloscope data in a text file format.	All List Format, Functional List Format, Individual List Format, Basic Setting Format 2, Oscilloscopes	27, 45
*.PRM	Saves the parameter list (one station) in a text format. Used to copy the parameter settings to other inverters (other stations).	All List Format, Functional List Format, Individual List Format, Basic Setting Format 2	27
*.XLS	Saves the parameter list (one station) in a Microsoft Excel file format. (Editable with Microsoft Excel 97 or later)	All List Format, Functional List Format, Individual List Format, Basic Setting Format 2	27
*.HDT	Saves the frequency characteristic measurement data of Machine Analyzer	Machine Analyzer	61

2.3.2 Saving method

(1) *.MEL file

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



(2) *.MMT, *.GPI, *.JPEG,*.HDT, *.TXT, *.CSV, *.PRM, *.XLS files

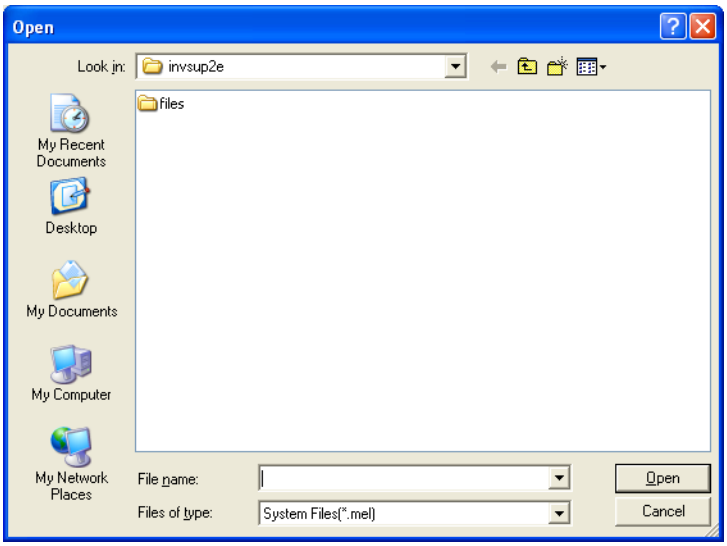
Choose the [Save] command from the [File] menu on the corresponding display screen. The "Save As" panel appears. Select the file type from "Save as type", and save the file with the name in "File name" field.

CAUTION

When saving *.TXT, *.CSV, *.PRM and *.XLS files from the Functional List Format, Individual List Format or Basic Settings format 2, only the parameters displayed are saved.
When saving all the parameter setting values, save in all list format.

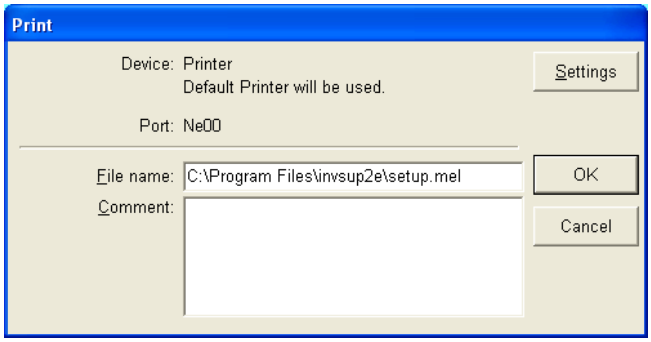
2.3.3 Reading the file

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



2.3.4 Printing

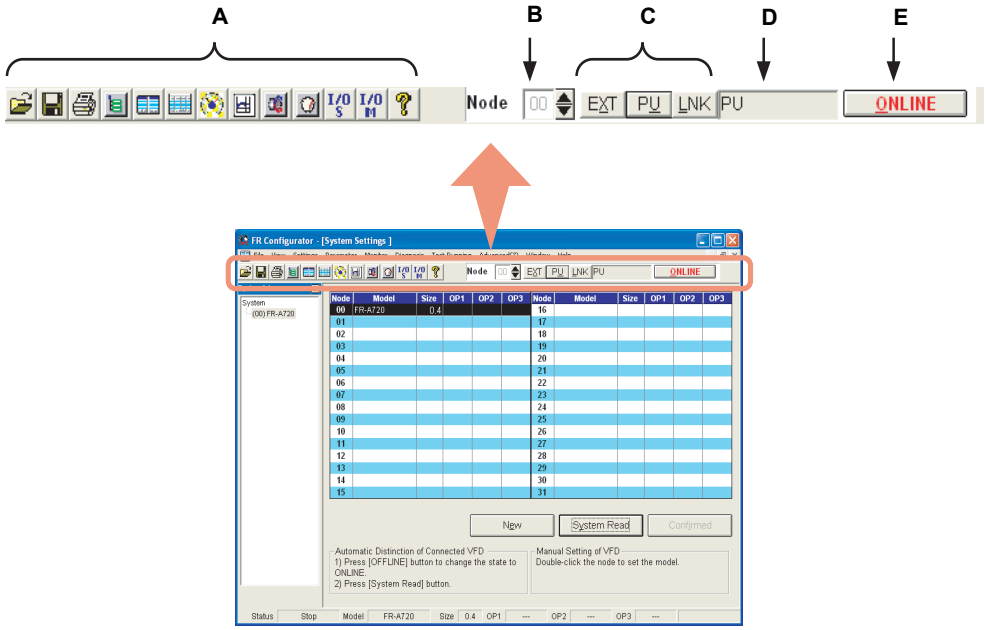
Display the screen to be printed and choosing the [Print] command in the [File] menu displays the "Print" panel. Make printer and other settings and click the [OK] button to start printing.
When entering a comment in the comment area, the comment can be printed with it.



2.4 Explanation of Screen

2.4.1 Tool bar

Tool bar is comprised of tool buttons which have functions commonly used in the menu, and the menu can be executed quickly by clicking the icons.
In addition, selection of station number and operation mode, online/offline settings are also available.

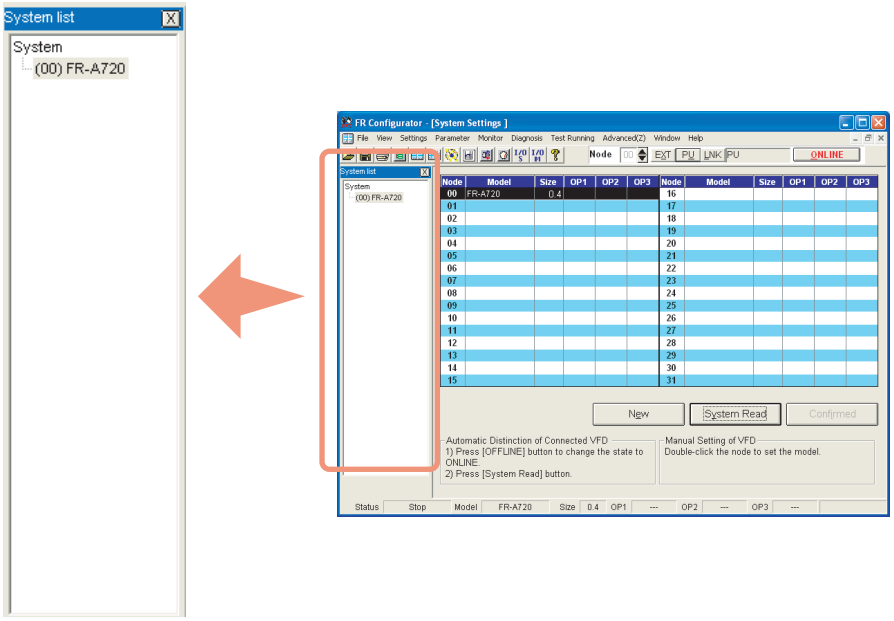


No.	Name	Function and description
A	Function tool button	.....Opens a file. (*Refer to page 17*) .....Saves the data. (*Refer to page 16*) .....Prints. (*Refer to page 17*) .....Displays a system list. (*Refer to page 19*) .....Makes settings of model, capacity and plug-in option. (*Refer to page 23*) .....Displays a parameter list and makes a parameter setting. (*Refer to page 28*) .....Displays four data with analog meter and numerical value. (*Refer to page 43*) .....Displays data of three analog signals and four digital signals as waveform. (*Refer to page 45*) .....Gives an operation command from a personal computer and executes a test operation on the inverter. (*Refer to page 58*) .....Executes an auto tuning. (*Refer to page 59*) .....Assigns functions to the inverter I/O terminals. (*Refer to page 36*) .....Monitors the status of the inverter I/O terminals. (*Refer to page 44*) .....Explains the use of FR Configurator and the description of parameters, etc. (*Refer to page 66*)

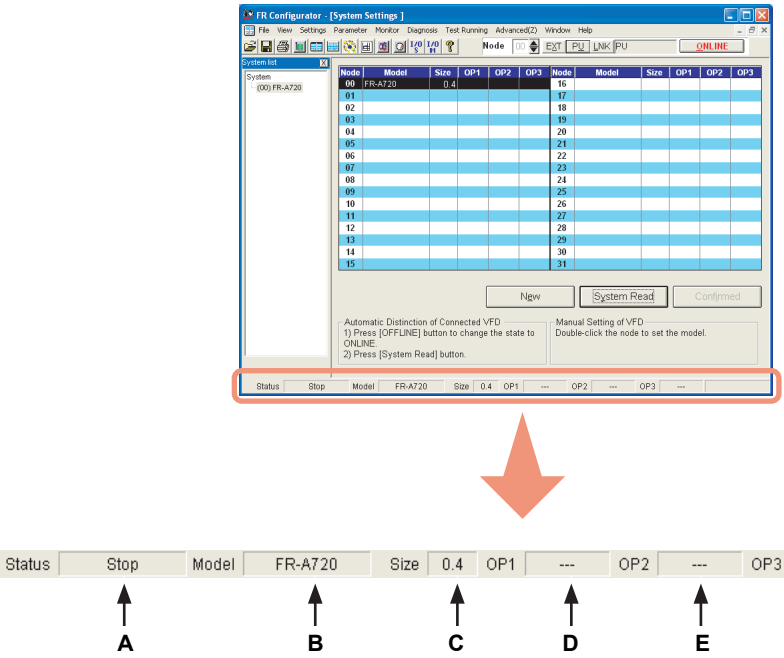
No.	Name	Function and description
B	Station number selection	Selects a station number to be displayed on the screen using the ▼/▲ button. (Only station number set with the system setting is displayed in the displaying column. Direct enter of displaying column is also available.
C	Operation mode button	Sets the operation mode by clicking each button. The set operation mode is displayed in the displaying column of operation mode. Valid only when the online button is in the [ONLINE] status. • [EXT] (Alt+X): External operation mode • [PU] (Alt+U): PU operation mode • [LNK] (Alt+L): Network operation mode
D	Operation mode indication	• EXT: External operation mode • PU: PU operation mode • LNK: Network operation mode • EXT JOG: External JOG operation mode • PU JOG: PU JOG operation mode • PU+EXT: External/PU combined operation mode • No Node: when the time-out occurs in the ONLINE mode **REMARKS** • The operation mode + alarm (warning) descriptions are displayed at the alarm occurrence or during the warning indication. Displayed in red letters at the alarm occurrence. Example: When the overcurrent shut-off during acceleration occurs during PU operation ... PU (OC1) When PU stop occurs during EXT operation ... EXT (PS) • At the occurrence of communication error such as NAK or the occurrence of inverter error such as out of parameter range, error codes are displayed. *(page 70)*
E	Online button	Switches Offline and Online by clicking. Pressing [Alt] key and [o] key can also switch Offline and Online. [ONLINE] ...Online [OFFLINE] ...Offline

2.4.2 System list

The system list is displayed with the system setting screen when starting FR Configurator.
The model name and station number set with the system setting are displayed on the list.
The inverter (station number) selected on the system list becomes active on thez parameter setting screen or alarm display screen.
When the system list window is closed, select [System list] of the [Display] menu to display again.



2.4.3 Status bar



No.	Name	Function and description
A	Status	Displays the inverter operation status (Running/Stop/Off Line/Error) of selected station.
B	Model	Displays the inverter model name of selected station.
C	Size	Displays the inverter size of selected station.
D	OP1	Displays the name of plug-in option mounted on the inverter of selected station. (The number of plug-in options which can be mounted on an inverter differs according to the inverter.)
E	OP2	
F	OP3	
G	PLC Function status (FR-A700-NA/EC series only)	Displays the state of PLC Function. PLC Function: Stop Status Stop Model FR-A720-NA Size 00030 OP1 --- OP2 --- OP3 --- P.RUN ; Stop PLC Function: Running Status Running Model FR-A720-NA Size 00030 OP1 --- OP2 --- OP3 --- P.RUN ; Running PLC Function: Disabled Status Stop Model FR-A720-NA Size 00030 OP1 --- OP2 --- OP3 --- PLC Function: Error Status Stop Model FR-A720-NA Size 00030 OP1 --- OP2 --- OP3 --- P.RUN ; Error

2.5 Operation Mode Setting of the Inverter

2.5.1 Operation mode setting

For operating the inverter using FR Configurator (parameter change, auto tuning and test operation, etc.), the operation mode of inverter must be set. Refer to the table, and select an operation mode, which matches to each connecting method. The selection of operation mode can be made using the tool bar. *(Refer to page 18)*

Connecting method		Operation mode*	Parameter setting	
Direct connection with FR Configurator and the Inverter	PU connector (RS-485 connector)	PU	*Pr. 122 PU communication check time interval* ≠ 0 (Factory setting = 9999) *Pr. 123 PU communication waiting time setting* = 9999 (Factory setting)	
	RS-485 terminal	PU	*Pr. 551 PU mode control source selection* = 2 (Factory setting)	*Pr. 336 RS-485 communication check time interval* ≠ 0 *Pr. 337 RS-485 communication waiting time setting* = 9999 (Factory setting)
		LINK	*Pr. 551 PU mode control source selection* = 1	
	USB connector (FR-A700 series only)	PU	*Pr. 548 USB communication check time interval* ≠ 0 (Factory setting = 9999) *Pr. 551 PU mode control source selection* = 3	
Connection via GOT	PU connector (RS-485 connector)	PU	*Pr. 123 PU communication waiting time setting* = 0 *Pr. 551 PU mode control source selection* = 2 (Factory setting)	
	RS-485 terminal	PU	*Pr. 551 PU mode control source selection* = 2 (Factory setting)	*Pr. 336 RS-485 communication check time interval* ≠ 0 *Pr. 337 RS-485 communication waiting time setting* = 0
		LINK	*Pr. 551 PU mode control source selection* = 1	

* When connecting a USB connector, set "3" in *Pr.551 PU mode control source selection*. The change for the setting value of *Pr.551* becomes valid when turning on the power next time or resetting the inverter.

Controllability through communcation

Operation Location	Condition (*Pr. 551* Setting)	Operation Mode / Item	PU Operation	External Operation	External/PU Combined Operation Mode 1 (*Pr. 79* = 3)	External/PU Combined Operation Mode 2 (*Pr. 79* = 4)	NET Operation (when RS-485 terminals are used) *6	NET Operation (when communication option is used) *7
Control by RS-485 communication from PU connector	2 (PU connector)	Run command (start)	○	×	×	○	×	
		Run command (stop)	○	★ *3	★ *3	○	★ *3	
		Running frequency setting	○	×	○	×	×	
		Monitor	○	○	○	○	○	
		Parameter write	○ *4	× *5	○ *4	○ *4	× *5	
		Parameter read	○	○	○	○	○	
		Inverter reset	○	○	○	○	○	
	Except for 2	Run command (start)	×	×	×	×	×	
		Run command (stop)	★ *3	★ *3	★ *3	★ *3	★ *3	
		Running frequency setting	×	×	×	×	×	
		Monitor	○	○	○	○	○	
		Parameter write	× *5	× *5	× *5	× *5	× *5	
		Parameter read	○	○	○	○	○	
		Inverter reset	○	○	○	○	○	

Operation Location	Condition (*Pr. 551* Setting)	Operation Mode / Item	PU Operation	External Operation	External/PU Combined Operation Mode 1 (*Pr. 79* = 3)	External/PU Combined Operation Mode 2 (*Pr. 79* = 4)	NET Operation (when RS-485 terminals are used) *6	NET Operation (when communication option is used) *7
Control by communication from RS-485 terminals	1 (RS-485 terminals)	Run command(start, stop)	○	×	×	○	×	
		Running frequency setting	○	×	○	×	×	
		Monitor	○	○	○	○	○	
		Parameter write	○ *4	× *5	○ *4	○ *4	× *5	
		Parameter read	○	○	○	○	○	
		Inverter reset	○	○	○	○	○	
	Except for 1	Run command (start, stop)	×	×	×	×	○ *1	×
		Running frequency setting	×	×	×	×	○ *1	×
		Monitor	○	○	○	○	○	○
		Parameter write	× *5	× *5	× *5	× *5	○ *4	× *5
		Parameter read	○	○	○	○	○	○
		Inverter reset	×	×	×	×	○ *2	×
Operation from the USB connector*8	3 (USB connector)	Run command (start, stop)	○	×	×	○	×	
		Running frequency setting	○	×	○	×	×	
		Monitor	○	○	○	○	○	
		Parameter write	○ *4	× *5	× *5	× *5	× *5	
		Parameter read	○	○	○	○	○	
		Inverter reset	○	○	○	○	○	
	Except for 3	Run command (start, stop)	×	×	×	×	×	
		Running frequency setting	×	×	×	×	×	
		Monitor	○	○	○	○	○	
		Parameter write	× *5	× *5	× *5	× *5	× *5	
		Parameter read	○	○	○	○	○	
		Inverter reset	○	○	○	○	○	

○: Enabled, ×: Disabled, ★ : Some are enabled

*1 As set in *Pr. 338 Communication operation command source* and *Pr. 339 Communication speed command source*. *(Refer to the inverter Instruction Manual (applied))*

*2 At occurrence of RS-485 communication error, the inverter cannot be reset from the computer.

*3 Enabled only when stopped by the PU. At a PU stop, PS is displayed on the operation panel. As set in *Pr. 75 Reset selection/disconnected PU detection/PU stop selection*. *(Refer to the inverter Instruction Manual (applied))*

*4 Some parameters may be write-disabled according to the *Pr. 77 Parameter write selection* setting and operating status. *(Refer to the inverter Instruction Manual (applied))*

*5 Some parameters are write-enabled independently of the operation mode and command source presence/absence. When *Pr. 77* = 2, write is enabled. *(Refer to the inverter Instruction Manual (applied))* Parameter clear is disabled.

*6 When *Pr. 550 NET mode operation command source selection* = 1 (RS-485 terminals valid) or *Pr. 550 NET mode operation command source selection* = 9999 and the communication option is not fitted.

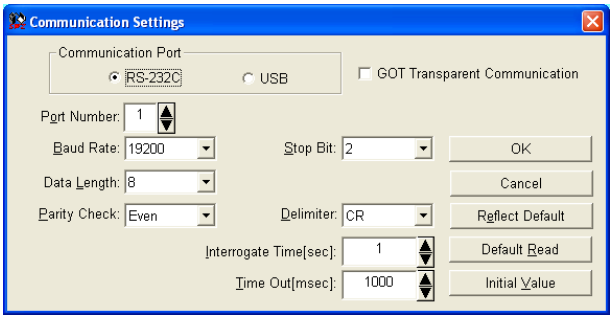
*7 When *Pr. 550 NET mode operation command source selection* = 0 (communication option valid) or *Pr. 550 NET mode operation command source selection* = 9999 and the communication option is fitted.

*8 FR-A700 series only.

2.5.2 Communication device setting of personal computer

Make a setting for the communicating method of personal computer and inverter. Select [Communication setting] in the [Setting] menu of the FR Configurator menu bar, and then select either "RS-232C" or "USB" from the connecting methods on the communication setting screen.

For details, refer to page 25.



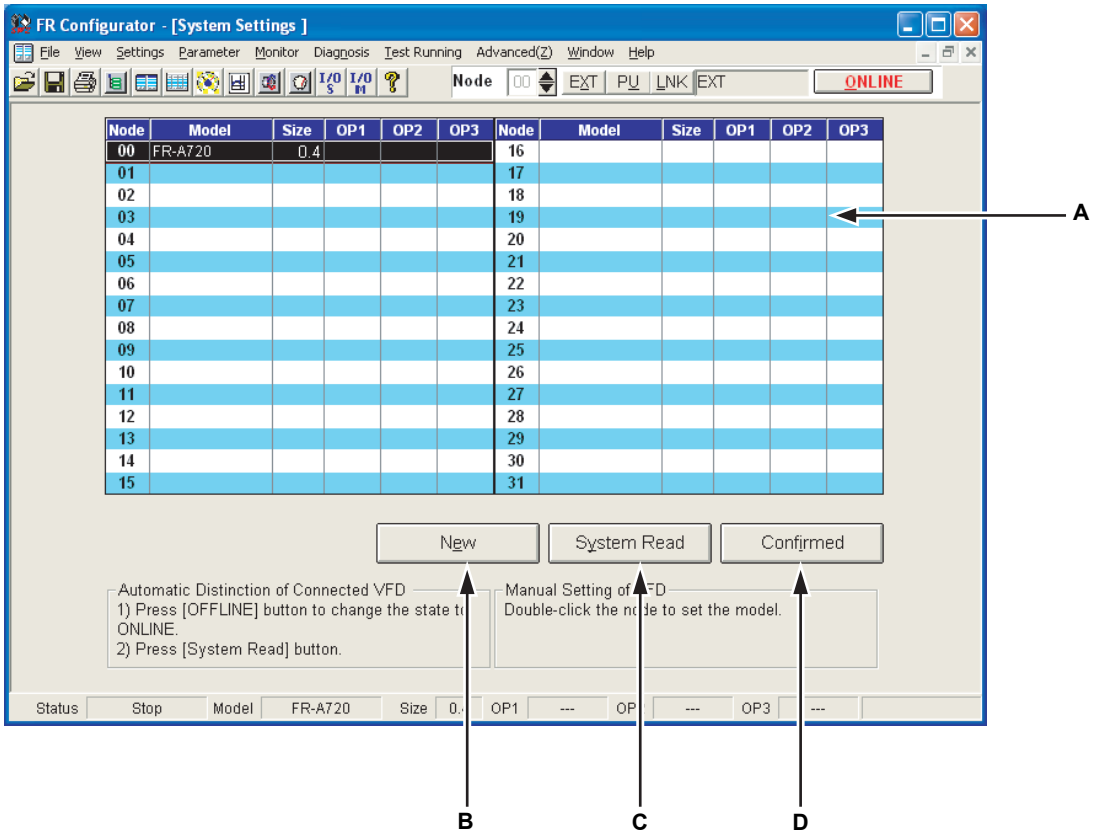
2.6 FR Configurator Setting [Setting]

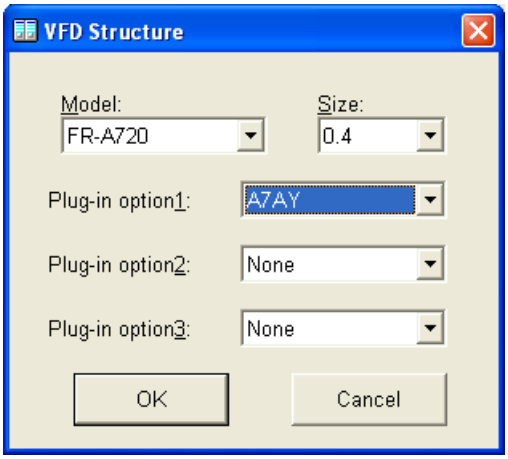
2.6.1 System setting

The system setting is displayed when starting FR Configurator.
This section describes the setting for the station number, model, capacity and plug-in option of inverter to be connected. The inverter can be set from 0 to 31 stations.
The connected inverter system can be also read all at once.

POINT

After adding or changing the inverter model or capacity, make sure to press the Confirmed button.



No.	Name	Function and description
A	System setting	Sets the environment of inverter from 00 to 31 stations. Select a model and capacity of inverter. Set a type of plug-in option when using a plug-in option. By double-clicking on the line of station number to be set, the "VFD Structure" panel is displayed. Set model, capacity and option, and press the [OK] button to complete the setting. With the same procedures, set all the inverter stations to be connected. 
B	[New] button	By clicking the [New] button, the edited system setting and communication setting are initialized (cleared), and a new system is set.
C	[System Read] button	Before pressing the [System Read] button, change the system to the [online] mode by pressing the [ONLINE] button. In the online mode, the system is in the status communicating with the inverter. By clicking the [System Read] button, the models, capacities and options of all stations (0 to 31 stations) are read, and connected (communicable) stations are displayed. Automatically confirmed after the read. When the system setting has been already registered, the verification is performed. When the verification result is different from the read data, displays the result of checking, and select to change the settings or not.
D	[Confirmed] button	The data set the system setting can be confirmed. When the setting of the system configuration is changed manually, make sure to confirm using the [Confirmed] button.

CAUTION

- When clicking the [Cancel] button during [System Read], the verification is performed with the system setting up to the point.
- 75K or more of FR-F740-CH is displayed as "FR-F740-CHT" in the [Model] field.

REMARKS

Shortcut key on the [System setting] screen

Menu name	Shortcut key*
Open	Ctrl + O
Save As	Ctrl + A
Print	Ctrl + P

Button name	Shortcut key*
EXT	Alt + X
PU	Alt + U
LINK	Alt + L
ONLINE/OFFLINE	Alt + O

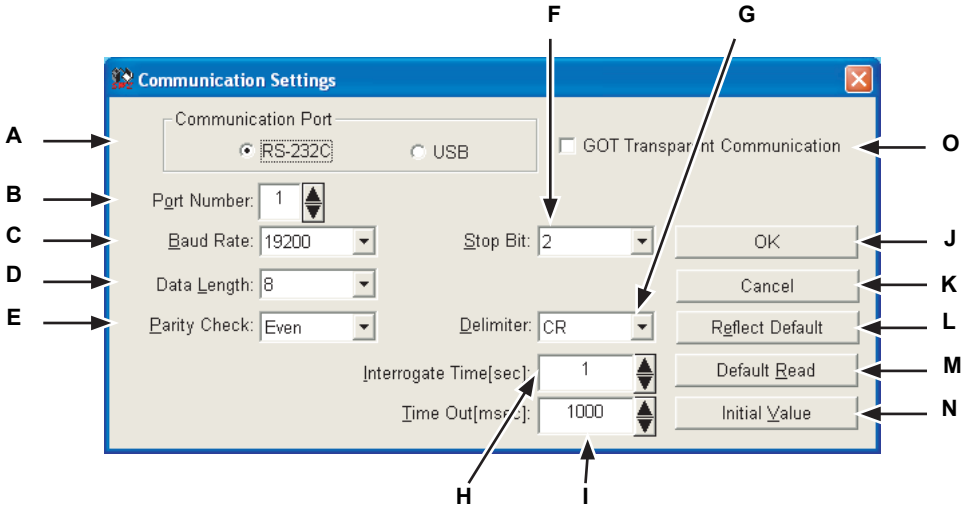
* "+" indicates that keys should be pressed at the same time.

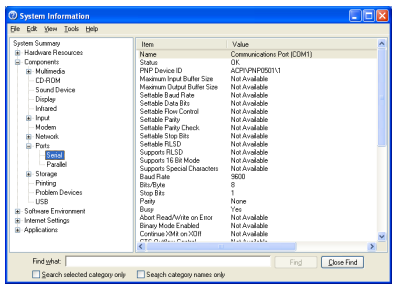
2.6.2 Communication settings

FR Configurator can control the inverter by communication using RS-232C port or USB port of personal computer. Communication setting must be set same as the inverter.
When you start this software first, the initial screen appears, then displays the system setting screen. Choose the [Communication settings] command on the [Settings] menu. The screen then shows the following dialog box, where various communication settings can be made.
Communication settings will be described below.

POINT

The communication setting is set to the initial value of inverter.
Confirm the communication ports (1 to 9) and communication device (RS-232C/USB) of personal computer.



No.	Name	Initial value	Function and description
A	Communication port type	RS-232C	Selects a communication device from either RS-232C or USB. (USB communication is available for FR-A700 series only.)
B	Communication port number	1	Selects a communication port of personal computer. The communication port can be checked by the following procedure. (1) Click [Start], point to [All Programs]*, point to [Accessories], point to [System Tools], and then click [System Information]. * [Programs] for other than Windows XP (2) Select [Serial]* in [Port] folder of [Component] in the left pane. * [Serial] is not displayed for other than Windows 2000 and XP. (3) Check the [COM] number of "Communication port" displayed in the right pane. Example: "1" for "Communication port (COM1)" (4) Set the confirmed value to the communication port of B. 
C	Baud Rate	19200	Set the communication speed.
D	Data Length	8	Set the data bit length.
E	Parity Check	Even	Specify the parity bit.
F	Stop Bit	2	Set the stop bit length.
G	Delimiter	CR	Specify the delimiter at the data trailer.

No.	Name	Initial value	Function and description
H	Interrogate Time	1	Sets an interval for sending data (display and error check of the operation mode) to the inverter. The value must be set 2s shorter than the communication check time interval (*Pr.122*, *Pr.336* or *Pr.548*). If it is set longer than the setting value of communication check time interval (*Pr.122*, *Pr. 366* or *Pr. 548*), the inverter will come to an alarm stop. **CAUTION** If the value of Interrogate Time is set shorter, the menu or buttons of each window may be slow to respond depending on operating model and communication speed.
I	Time Out*	1000	Sets the time for a personal computer to receive a response from an inverter after sending a data to the inverter from the personal computer. If there is no response after the set time is passed, "Time out" error will be displayed.
J	[OK] button		Recognizes the setting value on the communication screen and returns to the system setting screen.
K	[Cancel] button		Cancels the communication settings and returns to the system setting screen.
L	[Reflect Default] button		Used to omit the setting of the values specified in communication settings from the next time onward.
M	[Default Read] button		Used to read the default values. The value is as set with the [Reflect Default] button.
N	[Initial Value] button		Used to return the communication setting to the initial value.
O	GOT Transparent communication		Check when using FA transparent function.

* When connecting with FA transparent function, set the time-out value in 500ms increments (Example: 500 / 1000 / 1500 /... / 30000).

CAUTION

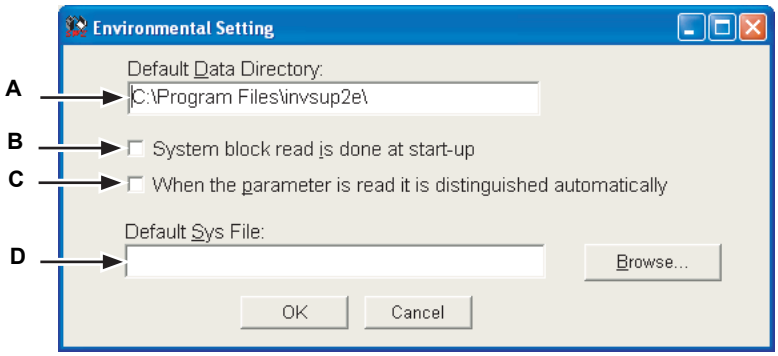
When using FA transparent communication, communication error (Time Out) may occur when FR Configurator starts communication during Time Out occurrence in GOT (when GOT is monitoring the inverter which is not connected).
In that case, set the Time Out value more than the following.

Time Out value of GOT[s] x (Retry count of GOT + 1) x 3 x1000[ms] (500ms increments)

If the value above is more than 30[s], make adjustment to "Time Out value" and "Retry count" of GOT so that the value above is less than 30[s].

2.6.3 Environmental Setting

You can specify the place for saving data (directory) and default system.



No.	Name	Function and description
A	Default Data Directory	Set the folder (directory) displayed first in a data saving screen, "Save with file name", or a opening file screen,"Open file". Once the data is saved in a different folder, the same folder where the data is saved and opened will be displayed when saving the data again.
B	System block read is done at start-up	Turn on the check box to execute automatically [System Read] when starting of FR Configurator. If the default system file is registered, system block read is not performed automatically at the startup.
C	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 29)*
D	Default Sys File	Registers the system file (*.MEL) which is automatically opened when starting FR Configurator. If the default system file is registered, system block read is not performed automatically at the startup. There is no default system file registered at the installation.

2.7 Parameter Setting [Parameter]

When system settings are completed, parameter menu can be selected.
Select the [All List Format], [Functional List Format], [Individual List Format], or [Basic Settings] command in the [Parameter] menu to select the corresponding format, and set parameters. Any parameter setting is changed by first entering new data in the Updated Val column and then pressing the [Write] or [Blk Write] button. The new data is then displayed in the Present Setting column. The Present setting column shows the current setting value of the inverter.
Using [I/O terminals Allocation] allows to change or assign the functions of the inverter I/O terminals by selecting from the list.
Using [Convert Function], the parameters of the conventional model inverter can be automatically converted to those of FR-A700/F700 series.

The communication settings of the inverter must be set before setting parameters. *(Refer to page 21)*

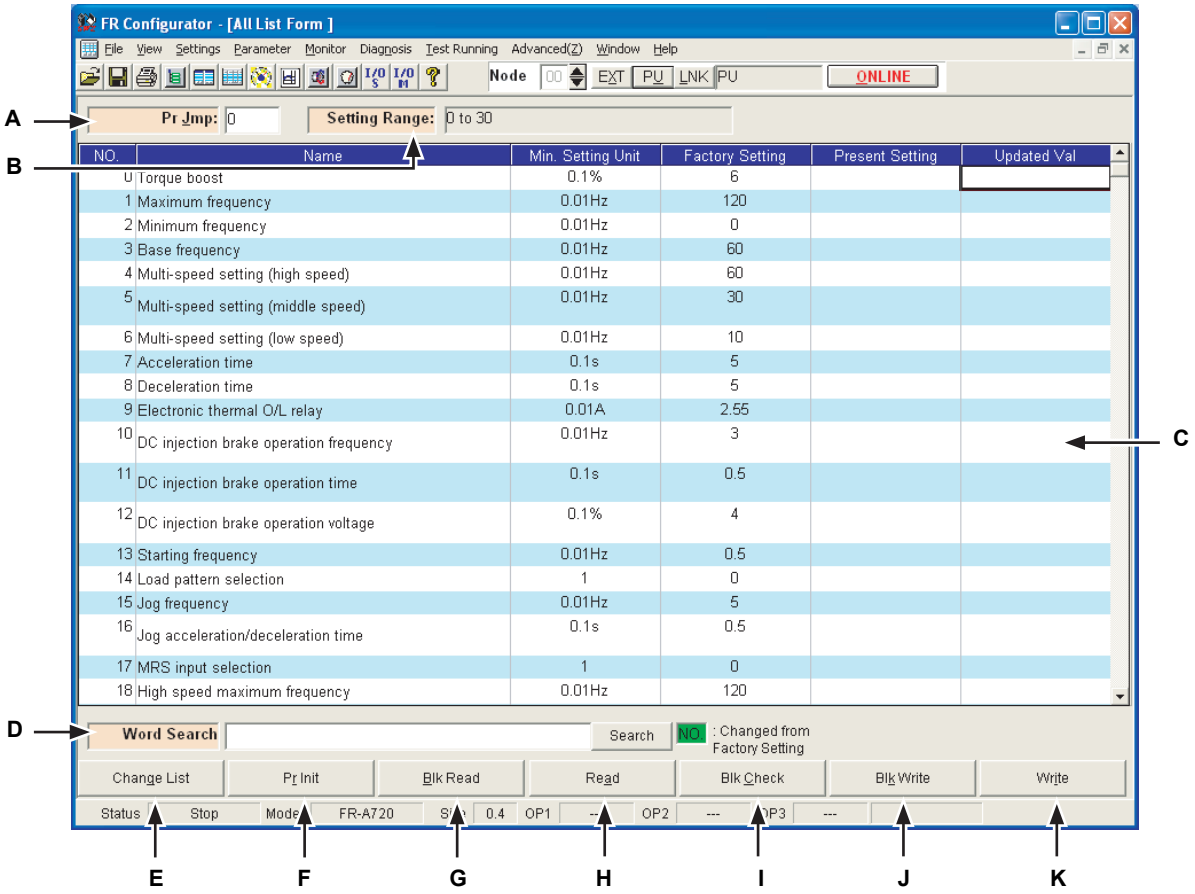
● Saving a file

By selecting [Save] in the [File] menu, a list can be saved.

- MEL file (.mel).....A file saved in MEL format can be opened with FR Configurator afterward.
- PRM file (.prm).....A file saved in PRM format can be opened with FR Configurator afterward.
- TXT/CSV file (.txt/.csv).....When saved in TXT/CSV format, the file is saved in a text format.
- XLS file (.xls).....When saved in XLS format, the file is saved in Microsoft Excel format. The file can be opened with Microsoft Excel.

2.7.1 Displaying all parameters [All List Format]

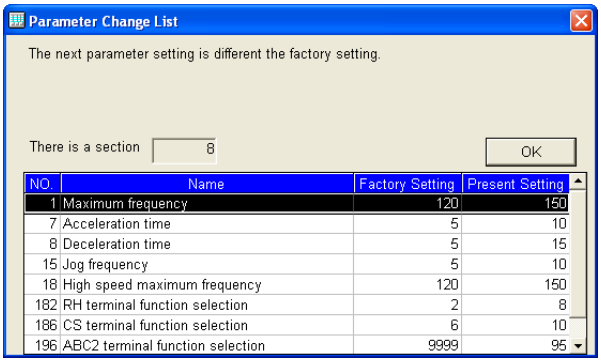
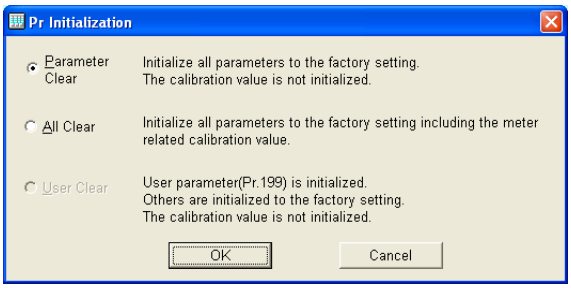
By selecting the [All List Format] command in the [Parameter] menu or clicking of the tool button, all parameters of the inverter are displayed as a list. When changing any parameter setting, enter a new value in the parameter column to be changed, and press the key to set it.



REMARKS

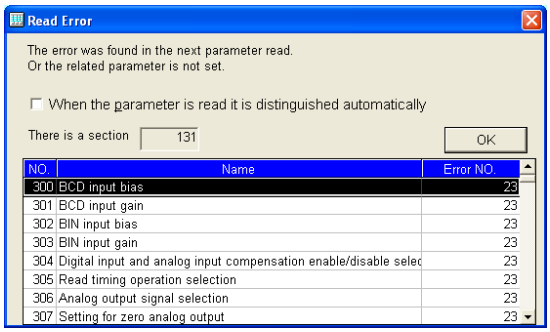
By pressing the [F1] key (function key), the explanation (HELP) of selected parameter can be displayed.

No.	Name	Function and description
A	Pr Jmp	Displays a selected parameter number. Input the parameter number and press key to jump to the designated parameter column.
B	Setting Range	Displays the setting range for a selected parameter.
C	Parameter display area	Displays a parameter list. After entering data in the Updated Val Column, the parameter setting value can be changed by pressing the [Write] or [Blk Write] button. After the parameter writing, the new data is displayed in the Present Setting column. If the parameter setting value has been changed from the initial value, the NO. column is displayed in green.
D	Word Search	Letters inputted in Word Search field is searched among the parameter name. (The sensitivity of one byte character set or 2 byte character set is ignored.)

No.	Name	Function and description
E	Change List	Displays parameters of which Present Setting value has changed from the Factory Setting as a list. 
F	Pr Init	Clears (initializes) the parameters of the inverter. (The communication parameters are not initialized.) Choose the clearing method from "Parameter Clear" or "All Clear" on the following panel and click the [OK] button to execute clear. 
G	Blk Read	Reads all parameters of the selected inverter station number.
H	Read	Reads the data of the parameter numbers selected on the screen.
I	Blk Check	Batch-checks the parameters of the inverter against those of the personal computer.
J	Blk Write	Writes new parameter values to the inverter. (When there are no values in the Updated Val field, the screen for selecting whether the present settings will be written or not appears. Perform operation following the screen.)
K	Write	Writes the data of the parameter numbers selected on the screen.

CAUTION

- 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.



  [When the parameter is read it is distinguished automatically]
  Turning on this check box automatically judges the read-disabled parameters and hides them from the Read Error panel from the next read.
- Changing the *Pr. 21* setting automatically switches the minimum setting increments of the acceleration/deceleration time-related parameters (*Pr. 7*, *Pr. 8*, *Pr. 16*, *Pr. 44*, *Pr. 45*, *Pr. 110*, *Pr. 111*, *Pr. 264*, *Pr. 265*).
  (Increments are 0.1s when *Pr. 21*=0, 0.01s when *Pr. 21*=1).
  The acceleration deceleration time-related parameters differ according to the inverter. *Refer to the inverter Instruction Manual (applied) for details.*
- When the setting of *Pr. 37*, *Pr. 71*, *Pr. 81*, *Pr. 144*, *Pr. 450*, *Pr. 505* or *Pr. 811* has been changed, the setting value (setting increments) of related parameters may be changed.
  If the setting value is changed, perform [Blk Read] to reflect the setting value of the inverter in parameter display area.
  Refer to the inverter Instruction Manual (applied) for details of the parameters.

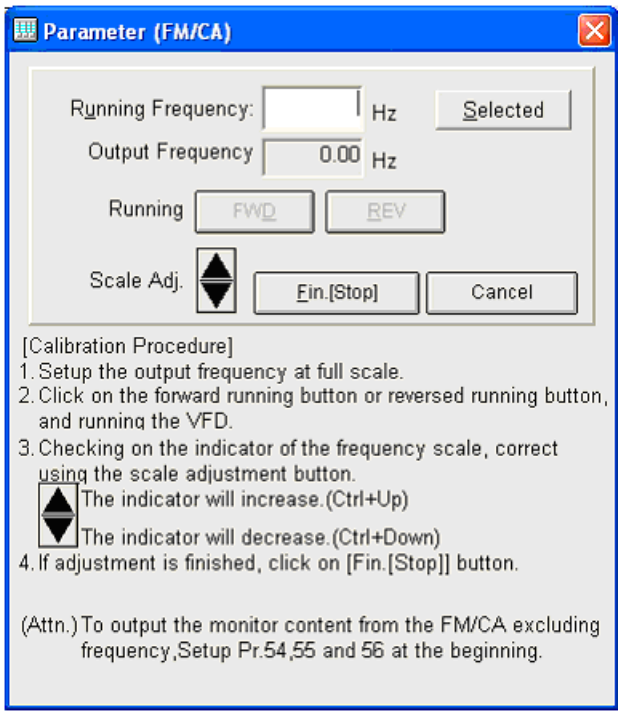
(1) FM/CA/AM calibration

The full scale of terminal FM/CA, terminal AM can be calibrated.

The dedicated adjustment screen is used for terminal FM/CA/AM calibration *(Pr. 900, Pr. 901)*.

Press the [Click] button in the parameter list to show the FM/CA/AM terminal adjustment panel.

FM/CA/AM calibration is enabled during the ONLINE mode only.



<Calibration method>

1) Set to the ONLINE mode.

2) Set the monitor with using *Pr. 54 FM/CA terminal function selection* (*Pr. 158 AM terminal function selection*).

3) Press the [Click] button in Pr. 900/Pr. 901 row to show the FM/CA/AM terminal adjustment panel.

4) Input the running frequency in the full-scale state, and press [Selected].

5) Press [FWD]/[REV] to start the inverter.

6) Calibrate the scale of the meter in the full-scale state with the ▲/▼ button.

7) Press [Fin.[Stop]] button after adjustment to write the calibration value to the inverter.
To cancel the calibration, press the [Cancel] button.

(2) Calibration of frequency (torque) setting voltage (current)

The dedicated adjustment screen is used for the calibration of frequency setting voltage (current) bias/gain (*Pr. 902 to Pr. 905, Pr. 917 to Pr. 920, Pr. 932, Pr. 933*).

Press the [Click] button in the parameter list to show the frequency setting voltage (current) bias/gain setting panel.

The frequency setting voltage (current) bias/gain setting is enabled during the ONLINE mode only.

<Setting method>

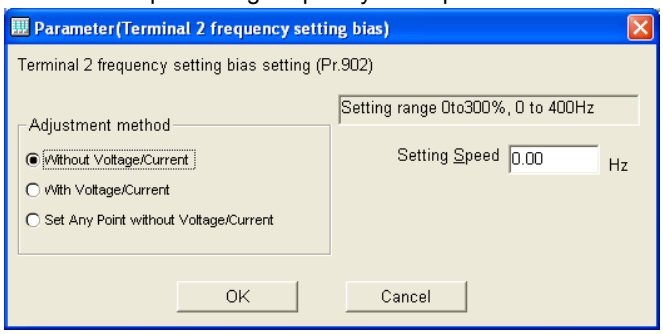
1) Set to the ONLINE mode.

2) Press the [Click] button in *Pr. 902 to Pr. 905, Pr. 917 to Pr. 920, Pr. 932, Pr. 933* row to show the Parameter (Terminal 2(4) frequency setting bias/gain (speed/torque/flux)) setting panel.

3) Choose the Adjustment method from 3 Adjustment method check button.

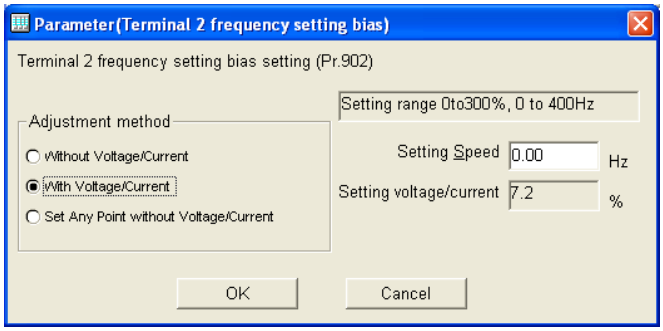
(a) Without Voltage/Current

Check "Without Voltage/Current" and input setting frequency or torque command value.



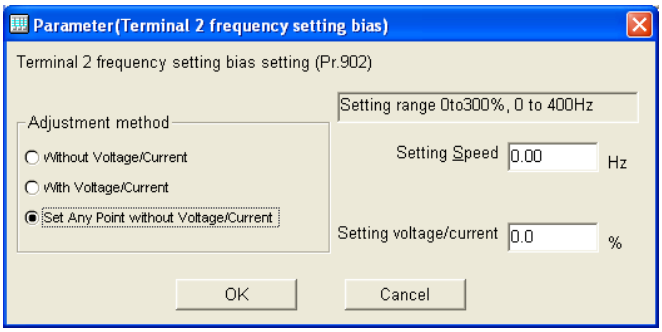
(b) With Voltage/Current

Check "With Voltage/Current", input setting frequency or torque command value, and then adjust the external potentiometer.



(c) Set Any Point without Voltage/Current

Check "Set Any Point without Voltage/Current" and input the setting frequency or the torque command, and the setting voltage (current).



4) Press [OK] button to write the calibration value to the inverter. To cancel the calibration, press the [Cancel] button.

(3) CA terminal calibration (FR-A700-EC/CH, FR-F700-EC/NA/CH)

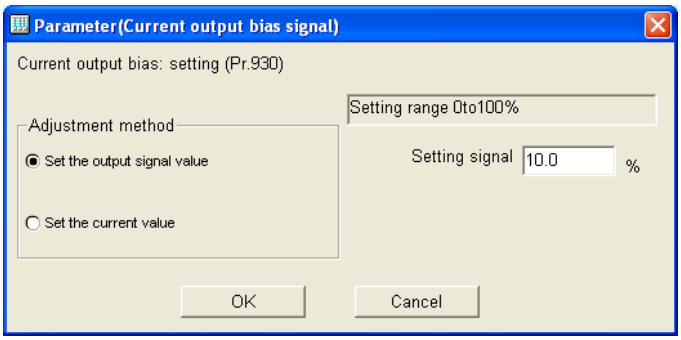
The dedicated adjustment screen is used for the calibration of the Current output bias/gain signal/current (*Pr. 930, Pr. 931*).
Press the [Click] button in the parameter list to show the Current output bias/gain signal/current setting panel.
The Current output bias/gain signal/current setting is enabled during the ONLINE mode only.

<Setting method>

1) Set to the ONLINE mode.
2) Press the [Click] button in *Pr. 930, Pr. 931* Current output bias/gain signal/current panel.
3) Choose the Adjustment method from 2 Adjustment method check button.

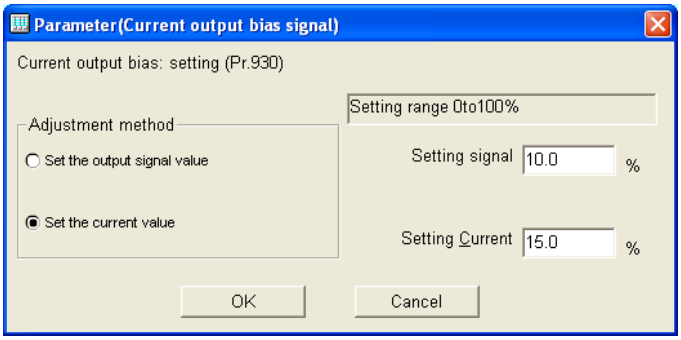
(a) Set the output signal value

Check "Set the output signal value" and input setting signal value.



(b) Set the current value

Check "Set the current value", input Setting signal value and Setting current value.



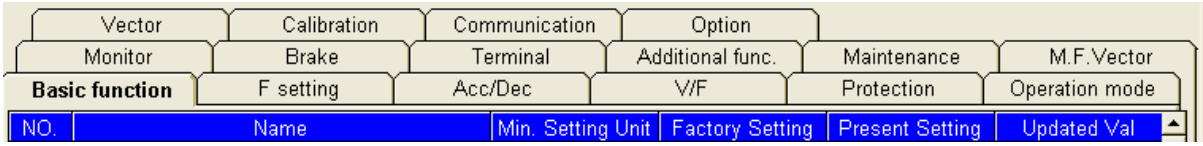
4) Press [OK] button to write the calibration value to the inverter. To cancel the calibration, press the [Cancel] button.

2.7.2 Displaying the parameters function-by-function [Functional List Format]

By selecting the [Functional List Format] command in the [Parameter] menu, the parameters are displayed as a functional list.
Click the function name tab to display the parameter related to the function name.
For parameter setting and changing, values may only be written in the online mode.

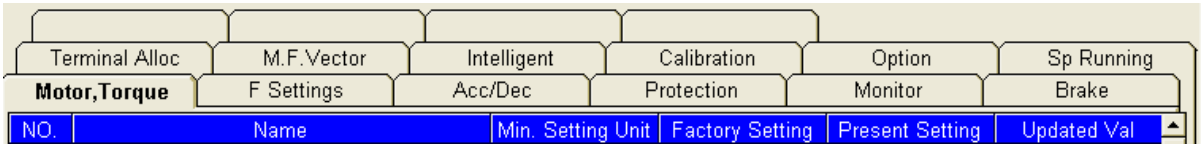
When changing any parameter setting, enter a new value in the Updated Val column and press the ↵ key to register it.
The function list differs according to the inverter.

(1) FR-A700 series



Function	Description
Basic function	Displays the parameters related to the basic function.
F setting	Displays the parameters related to frequency.
Acc/Dec	Displays the parameters related to acceleration/deceleration.
V/F	Displays the parameters related to V/F characteristic.
Protection	Displays the parameters related to the protective function.
Operation mode	Displays the parameters related to the operation mode.
Monitor	Displays the parameters related to the monitoring function.
Brake	Displays the parameters related to frequency, time and others at braking.
Terminal	Displays the parameters related to the control circuit terminals.
Additional func.	Displays the parameters related to the additional function.
Maintenance	Displays the parameters related to the maintenance of the inverter.
M.F. vector	Displays the parameters related to the advanced magnetic flux vector control.
Vector	Displays the parameters related to the vector control.
Calibration	Displays the parameters for the calibration of the FM and AM terminals, and the bias/gain setting of the frequency (torque) setting voltage and the frequency (torque) setting current.
Communication	Displays the parameters related to the communication operation.
Option	Displays the parameters related to the options.

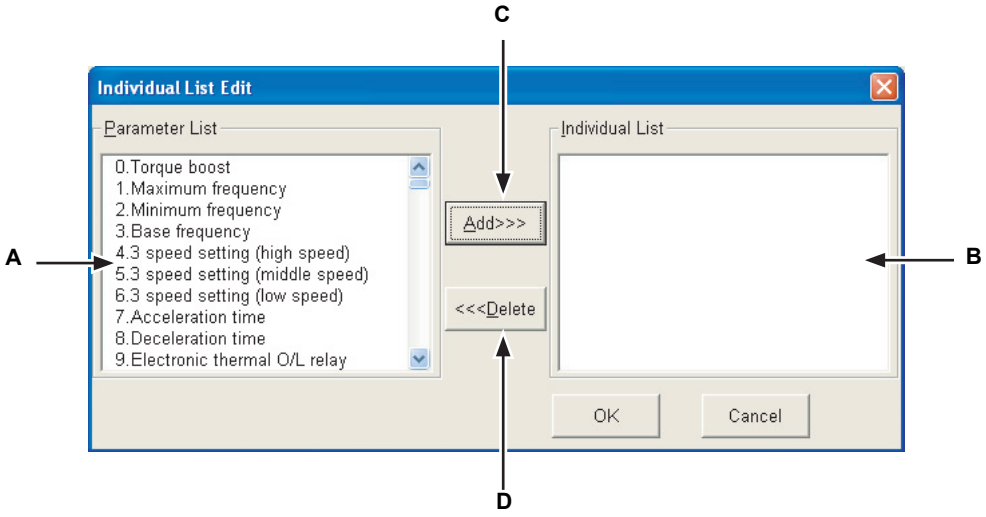
(2) FR-F700 series



Function	Description
Motor,Torque	Displays the parameters related to motor and torque.
F Settings	Displays the parameters related to frequency.
Acc/Dec	Displays the parameters related to acceleration/deceleration.
Protection	Displays the parameters related to the protective function.
Monitor	Displays the parameters related to the monitoring function.
Brake	Displays the parameters related to frequency, time and others at braking.
Terminal Alloc	Displays the parameters related to the control circuit terminals.
M.F.Vector	Displays the parameters related to the simple Magnetic flux vector control (M.F.Vector).
Intelligent	Displays the parameters related to the intelligent mode in which the inverter performs operation after setting appropriate parameters automatically.
Calibration	Displays the parameters for the calibration of the FM and AM terminals, and the bias/gain setting of the frequency setting voltage and the frequency setting current.
Option	Displays the parameters related to the options.
Sp Running	Displays the parameters related to the special running used after selecting the communication related settings, etc. in advance.

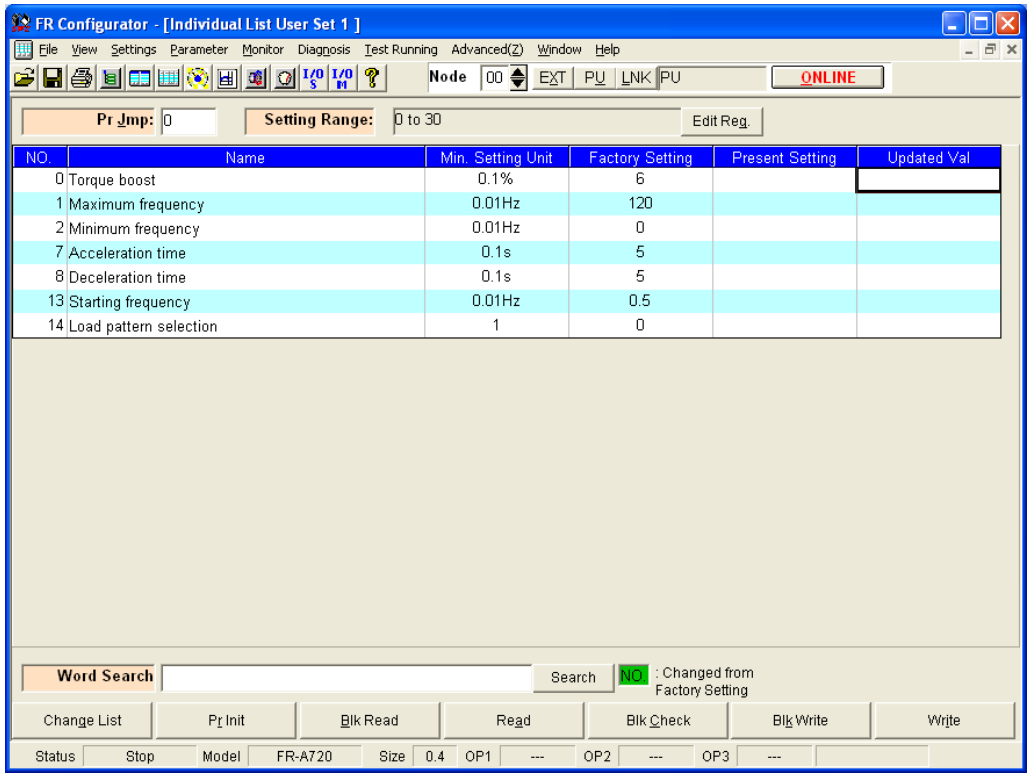
2.7.3 Registering a parameter to the user group [Individual List Format]

By using the [Individual List Format] command on the [Parameter] menu, two different user groups ("User Group 1", "User Group 2") can be selected. For these user groups, a total of 32 parameters from among all parameters can be registered. Click the [Edit Reg.] button. The following panel appears.



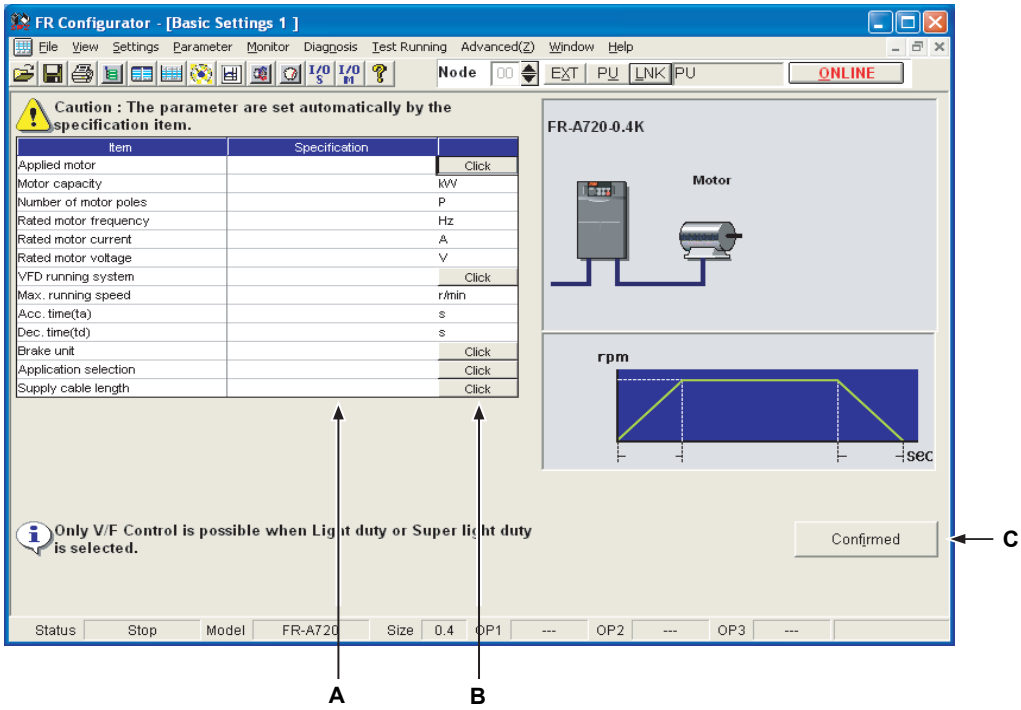
No.	Name	Function and description
A	Parameter List	Displays a parameter list.
B	Individual List	Displays parameters to be registered to the user groups.
C	Add	Select the items to be registered in the "Parameter List (P)" and press the [Add>>>] button to register them to the "Individual List (K)".
D	Delete	Select the items to be deleted in the "Individual List (K)" and press the [<<<Delete] button to delete them.

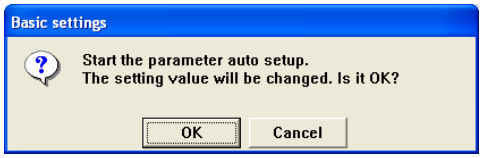
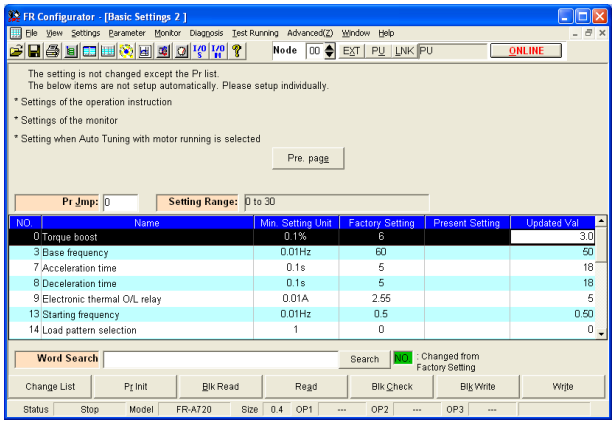
After selecting the parameters, pressing the [OK] button completes the user setting and displays the individually selected list in the following panel. To save the individual list, select the [Save] command from the [File] menu and save it to the system file.



2.7.4 Parameter automatic settings [Basic Settings]

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



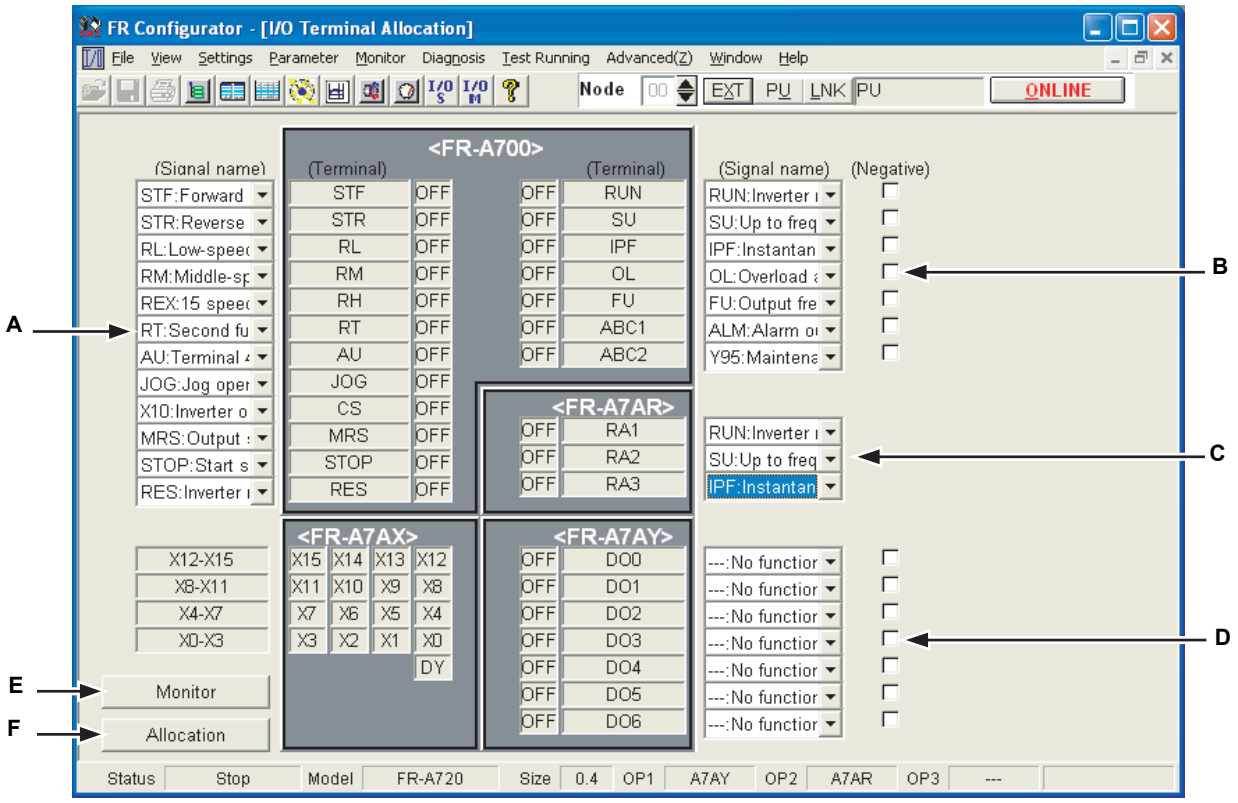
No.	Name	Function and description
A	Area for entering the specifications	Enter the specification of each item. 60Hz is the maximum setting for operation speed. The illustration shown right on the screen changes according to the specifications entered.
B	[Click] button	Clicking this button displays a window to choose each specifications. Make a selection and click the [OK] button.
C	Confirmed	After entering the specifications of all items, press the [Confirmed] button to register them. Pressing the [Confirmed] button displays the panel on the right.  By pressing the [OK] button, the parameters are set automatically and the new values of the parameters that may be set automatically are displayed and the following panel appears. To write the new parameter values to the inverter, press the [Blk Write] button. 

CAUTION

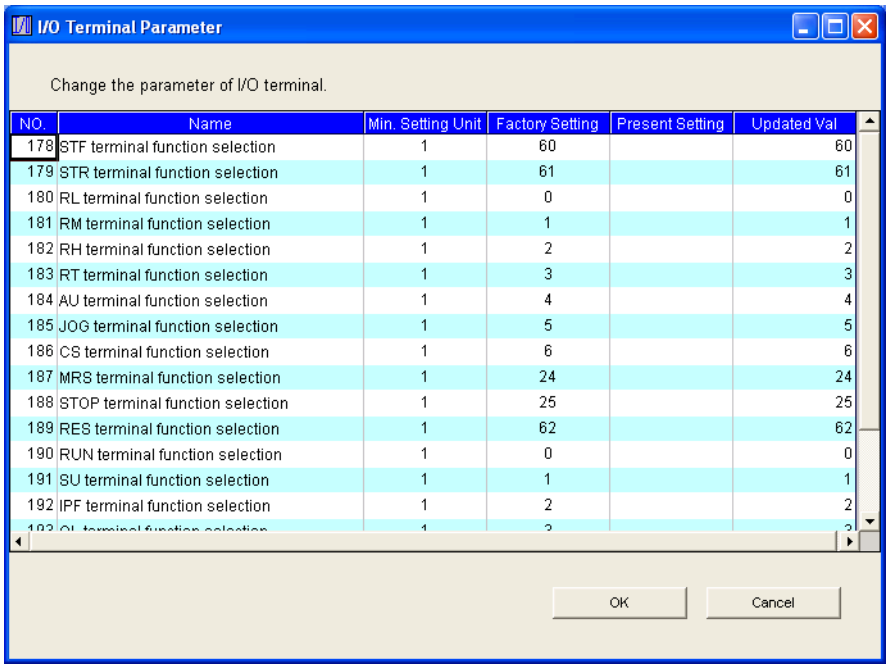
Only V/F Control can be selected in [VFD running system] field when LD or SLD is selected.

2.7.5 Allocating functions to I/O terminals of the inverter [I/O Terminal Allocation]

Selecting the [I/O Terminals Allocation] command on the [Parameter] menu or the tool button selects the I/O terminals from the list and allows to change or assign the functions of the inverter I/O terminals to them.



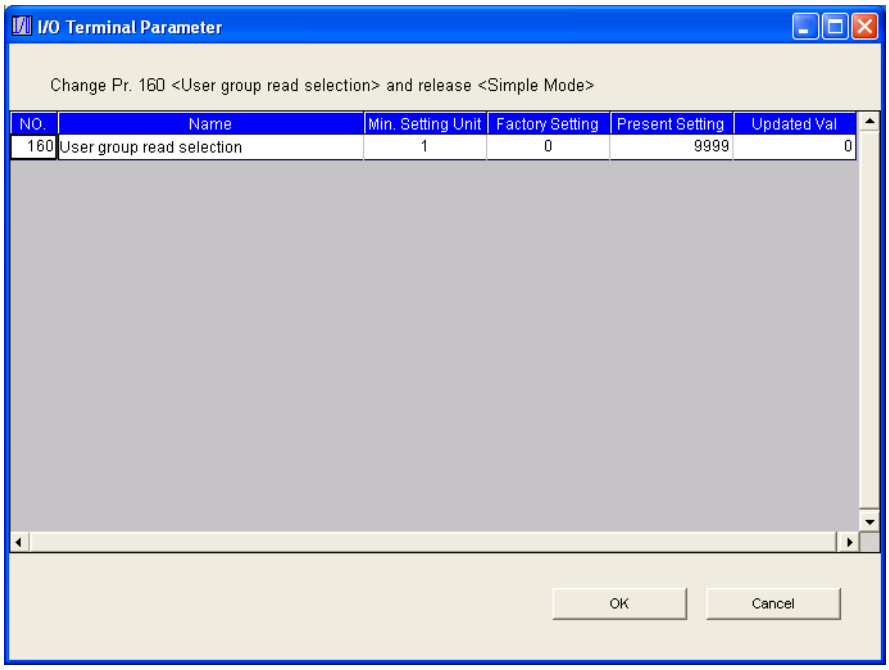
No.	Name	Function and description
A	Inverter input terminal function selection	Selects the signal name from the list and assigns the function to the corresponding input terminal.
B	Inverter output terminal function selection	Selects the signal name from the list and assigns the function to the corresponding output terminal. Checking the check box sets to negative logic.
C	FR-A7AR terminal function selection	Selects the signal name from the list and assigns the function to the output terminal of the corresponding plug-in option (FR-A7AR). (When the plug-in option settings have not yet been made by system settings, the setting cannot be changed.)
D	FR-A7AY terminal function selection	Selects the signal name from the list and assigns the function to the output terminal of the corresponding plug-in option (FR-A7AY). Checking the check box sets to negative logic. (When the plug-in option settings have not yet been made by system settings, the setting cannot be changed.)
E	Monitor/Allocation	When monitoring the signal, click [Monitor] to change to "I/O Terminal Monitor" screen. Refer to *page 44* for "I/O Terminal Monitor". Click [Allocation] to return to "I/O Terminal Allocation" screen and the signal monitoring can not be made.

No.	Name	Function and description
F	Allocation/Monitor start	Clicking [Allocation] lists the parameters, and clicking OK writes the parameter setting values to the inverter. When the terminal monitor screen appears by clicking [Monitor], the button becomes [Monitor start]. Clicking the button starts monitoring. 

REMARKS

After displaying and checking the parameter list allocated by clicking the "Allocation" button, write the parameters to the inverter.

- Since the parameter cannot be read when *Pr.160* ≠ 0, display the *Pr.160* setting change check screen, and click OK to display the parameter list.



For details of I/O terminals functions, refer to the inverter manual.

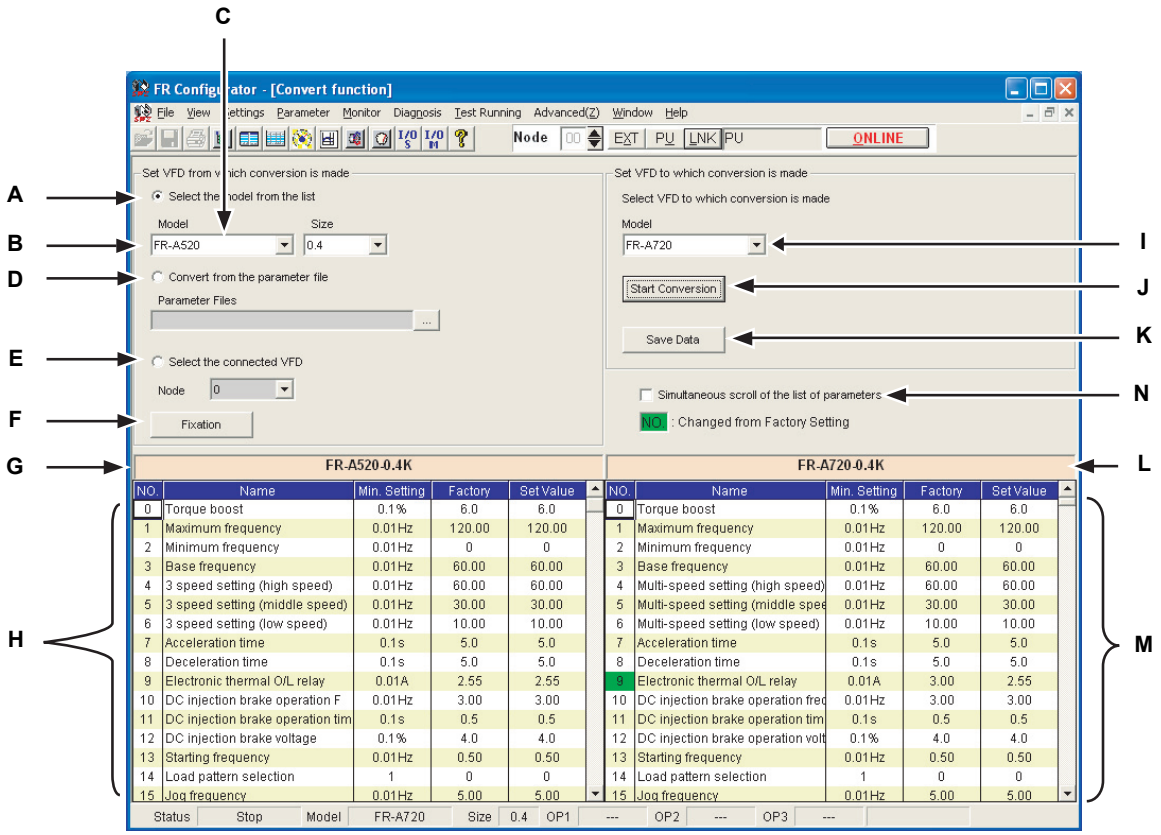
2.7.6 Converting parameters automatically at the replacement of the conventional model [Convert Function]

By selecting the [Convert Function] command in the [Parameter] menu, the parameters of the conventional model inverter can be automatically converted to those of FR-A700/F700 series of the same model type.

Source inverter	Target inverter
FR-A520, FR-A520L, FR-V520, FR-V520L	FR-A720
FR-A540, FR-A540L, FR-A540L-G, FR-V540, FR-V540L	FR-A740
FR-F520, FR-F520L	FR-F720
FR-F540, FR-F540L, FR-F540L-G, FR-F540L-S	FR-F740

CAUTION

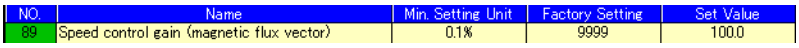
If the model type of the source inverter and the target inverter is different (Example: converting NA to EC, etc.), convert can not be made.



[Source inverter setting section]

No.	Name	Function and description
A	Source model selection setting	Turning on the checkbox to select the model and the capacity from the list.
B	Source model selection	Selects the model of source inverter from the list in the combo box.
C	Source capacity selection	Selects the capacity of source inverter from the list in the combo box.
D	Parameter file conversion setting	Turning on the checkbox makes the parameter file input field valid. Input the storage place for the parameter file (PRM file).
E	Connected inverter selection	Turning on the check box makes the station number selection available. Specify the station number of source inverter.
F	[Fixation] button	Clicking Fixation after making the source inverter setting, and then the target inverter setting can be made.
G	Source model/capacity display	Displays the model and capacity of the read parameter.
H	Source parameter data list	Lists the data of the read parameter. The setting value can be changed.

[Target inverter setting section]

No.	Name	Function and description
I	Target model selection	Selects the model of target inverter from the list in the combo box.
J	[Start Conversion] button	Clicking here starts the conversion.
K	[Save Data] button	Clicking the [Save Data] button displays the [Save as] dialogue, and the parameter data is saved with specifying a file. The format of the file is Parameter file (PRM file) only.
L	Target model/capacity display	Displays the inverter model and capacity of the converted parameter.
M	Target parameter data list	Displays the converted parameter list. The setting value can be changed. The number of parameters of which setting has been made are displayed in green. 

[Common section]

No.	Name	Function and description
N	Simultaneous scroll of the list of parameters	Checked: When either of the source or target parameter lists is scrolled, the other list is also scrolled. Not checked: When either of the source or target parameter lists is scrolled, the other list does not scroll.

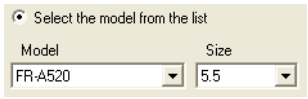
CAUTION

Do not change the setting of the following parameters in the Source parameter data list. Increments or setting value may not be converted correctly.
(If the parameter setting is already changed when reading into the Source parameter data list, converting can be made correctly.)

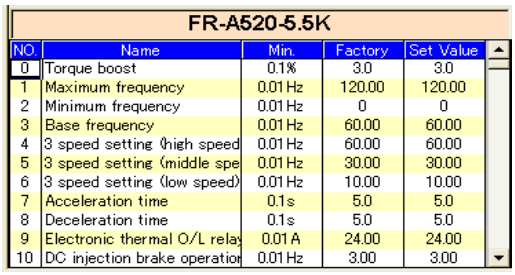
Pr. 21, Pr. 37, Pr. 71, Pr. 81, Pr. 144, Pr. 450, Pr. 505, Pr. 811
(Refer to the inverter instruction manual for details of the parameters.)

● Conversion procedure by selecting a model from a list

(1) Check "Select the model from the list" in "Set VFD from which conversion is made" section and select the model and capacity of the source inverter.



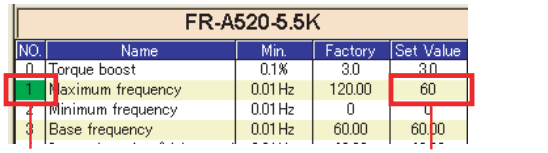
(2) Click Fixation.
When it is fixed, the parameters of selected model and capacity are displayed as a list.



FR-A520-5.5K

NO.	Name	Min.	Factory	Set Value
0	Torque boost	0.1%	3.0	3.0
1	Maximum frequency	0.01 Hz	120.00	120.00
2	Minimum frequency	0.01 Hz	0	0
3	Base frequency	0.01 Hz	60.00	60.00
4	3 speed setting (high speed	0.01 Hz	60.00	60.00
5	3 speed setting (middle spe	0.01 Hz	30.00	30.00
6	3 speed setting (low speed)	0.01 Hz	10.00	10.00
7	Acceleration time	0.1 s	5.0	5.0
8	Deceleration time	0.1 s	5.0	5.0
9	Electronic thermal O/L relay	0.01 A	24.00	24.00
10	DC injection brake operation	0.01 Hz	3.00	3.00

(3) When the parameter setting of the utilized source inverter has been changed, input the changed value in the Set Value column.



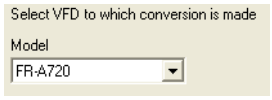
FR-A520-5.5K

NO.	Name	Min.	Factory	Set Value
0	Torque boost	0.1%	3.0	3.0
1	Maximum frequency	0.01 Hz	120.00	60
2	Minimum frequency	0.01 Hz	0	0
3	Base frequency	0.01 Hz	60.00	60.00

Displayed in green when the setting value is changed.

When changing the *Pr.1* setting value to "60Hz "

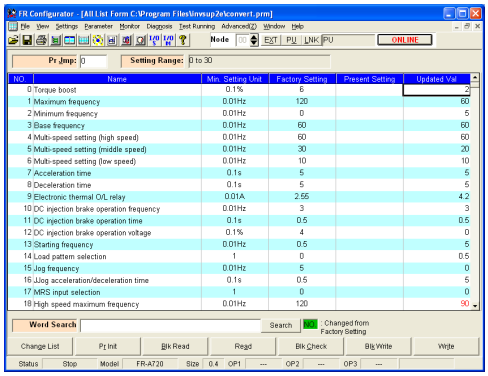
(4) Select the model of target inverter.
(Only models convertible with FR Configurator are selectable)



(5) Click Start Conversion to display the parameter conversion result as a list.
Input a new value in the Set Value column to change the parameter setting value.

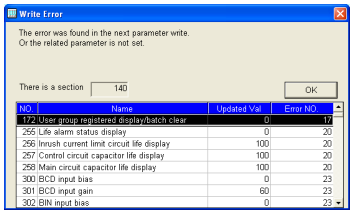
(6) Click Save Data to save the conversion result in the parameter file (PRM).

(7) Display the All List Format or the Functional List Format, and select the target inverter.



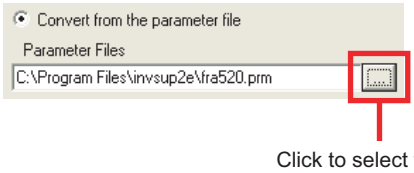
(8) Open the saved parameter file (PRM). Press the [ONLINE] button to display ONLINE and click Blk Write.
The parameter setting value is written in the inverter and conversion is completed.

(9) For parameters completed in error, set them manually again if required.



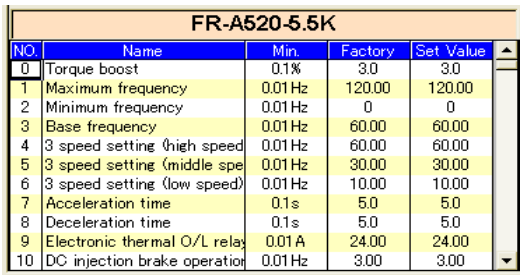
● Conversion procedure from parameter file

(1) Check "Convert from the parameter file" in "Set VFD from which conversion is made" section and select the parameter file (PRM) of source inverter saved with inverter setup software (FR-SW0-SETUP/FR-SE1-SETUP).



Click to select the file.

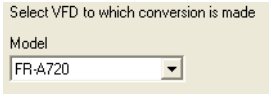
(2) Click Fixation.
When it is fixed, the parameters of selected parameter file are displayed as a list.
Input a new value in the Set Value column to change the parameter setting value.



FR-A520-5.5K

NO.	Name	Min.	Factory	Set Value
0	Torque boost	0.1%	3.0	3.0
1	Maximum frequency	0.01 Hz	120.00	120.00
2	Minimum frequency	0.01 Hz	0	0
3	Base frequency	0.01 Hz	60.00	60.00
4	3 speed setting (high speed	0.01 Hz	60.00	60.00
5	3 speed setting (middle spe	0.01 Hz	30.00	30.00
6	3 speed setting (low speed)	0.01 Hz	10.00	10.00
7	Acceleration time	0.1s	5.0	5.0
8	Deceleration time	0.1s	5.0	5.0
9	Electronic thermal O/L relay	0.01 A	24.00	24.00
10	DC injection brake operation	0.01 Hz	3.00	3.00

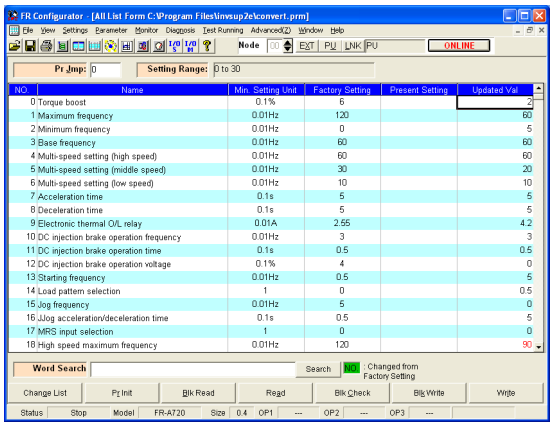
(3) Select the model of target inverter.
(Only models convertible with FR Configurator are selectable)



(4) Click Start Conversion to display the parameter conversion result as a list.
Input a new value in the Set Value column to change the parameter setting value.

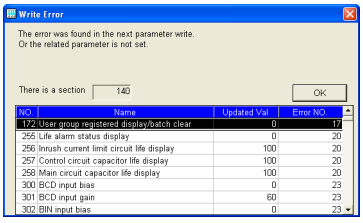
(5) Click Save Data to save the conversion result in the parameter file (PRM).

(6) Display the All List Format or the Functional List Format, and select the target inverter.



(7) Open the saved parameter file (PRM). Press the [ONLINE] button to display ONLINE and click Blk Write.
The parameter setting value is written in the inverter and conversion is completed.

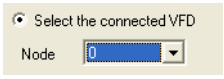
(8) For parameters completed in error, set them manually again if required.



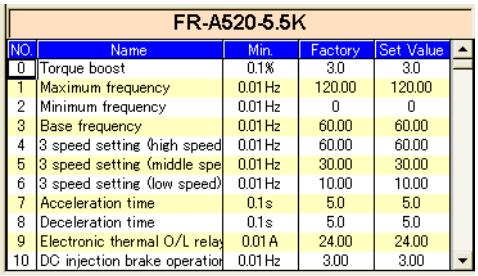
● Conversion procedure by selecting an inverter connected.

(1) Press the [ONLINE] button to display ONLINE.

(2) Check "Select the connected VFD" and select the station number from a list.



(3) Clicking Fixation reads the parameters of inverter connected and displays the parameters as a list.
Input a new value in the Set Value column to change the parameter setting value.



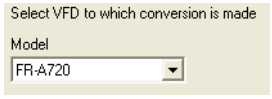
FR-A520-5.5K

NO.	Name	Min.	Factory	Set Value
0	Torque boost	0.1%	3.0	3.0
1	Maximum frequency	0.01 Hz	120.00	120.00
2	Minimum frequency	0.01 Hz	0	0
3	Base frequency	0.01 Hz	60.00	60.00
4	3 speed setting (high speed	0.01 Hz	60.00	60.00
5	3 speed setting (middle spe	0.01 Hz	30.00	30.00
6	3 speed setting (low speed)	0.01 Hz	10.00	10.00
7	Acceleration time	0.1 s	5.0	5.0
8	Deceleration time	0.1 s	5.0	5.0
9	Electronic thermal O/L relay	0.01 A	24.00	24.00
10	DC injection brake operation	0.01 Hz	3.00	3.00

REMARKS

When OFFLINE is selected, change it to ONLINE.

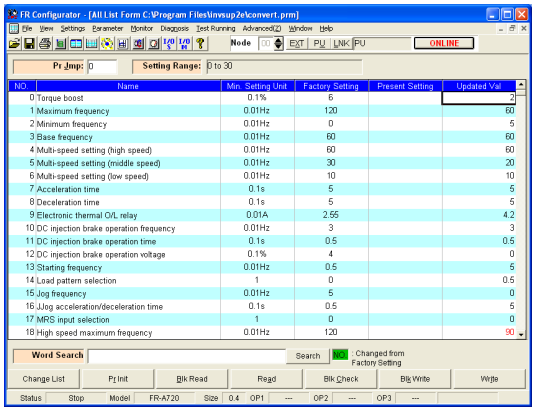
(4) Select the model of target inverter setting.
(Only models convertible with FR Configurator are selectable)



(5) Click Start Conversion to display the parameter conversion result as a list.
Input a new value in the Set Value column to change the parameter setting value.

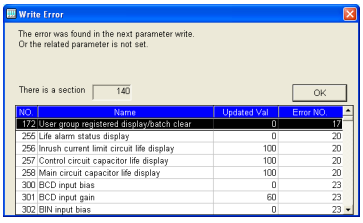
(6) Click Save Data to save the conversion result in the parameter file (PRM).

(7) Display the All List Format or the Functional List Format, and select the target inverter.



(8) Open the saved parameter file (PRM). Press the [ONLINE] button to display ONLINE and click Blk Write.
The parameter setting value is written in the inverter and conversion is completed.

(9) For parameters completed in error, set them manually again if required.



2.8 Monitoring Inverter Status [Monitor]

Selecting the [Data Display], [I/O Terminal Monitor], [Oscilloscopes], or [Status Monitor] command in the [Monitor] menu allows you to select the corresponding monitor item.

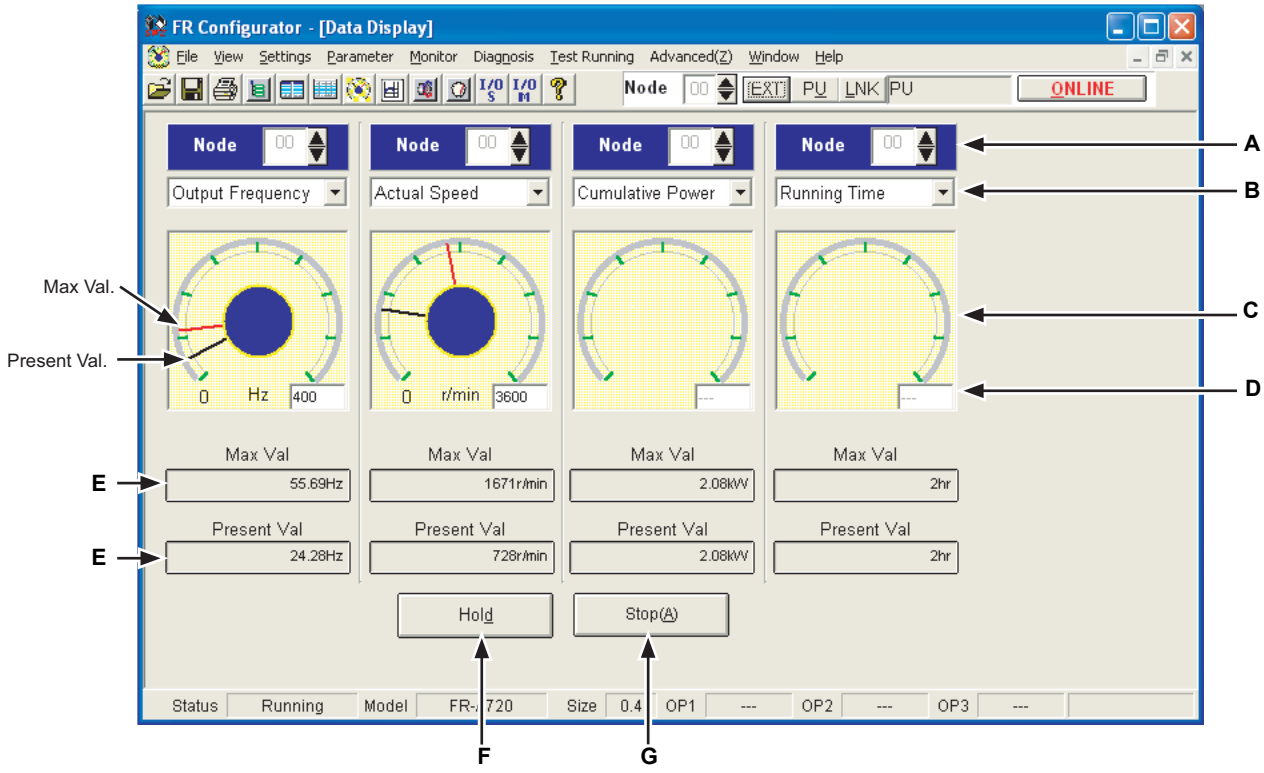
CAUTION

Using Monitor/Oscilloscopes function with FA transparent function may not exhibit the best performance, and may reduce the response level.
When quick response is required, directly connect the inverter with FR Configurator and not connect via GOT.

2.8.1 Displaying monitor data on analog meter [Data Display]

Data Display shows up to four different signals as meters in real time. The meter displays handle only data which can be indicated by meter deflections.

Selecting the [Data Display] command in the [Monitor] menu or selecting the tool button shows the following screen:

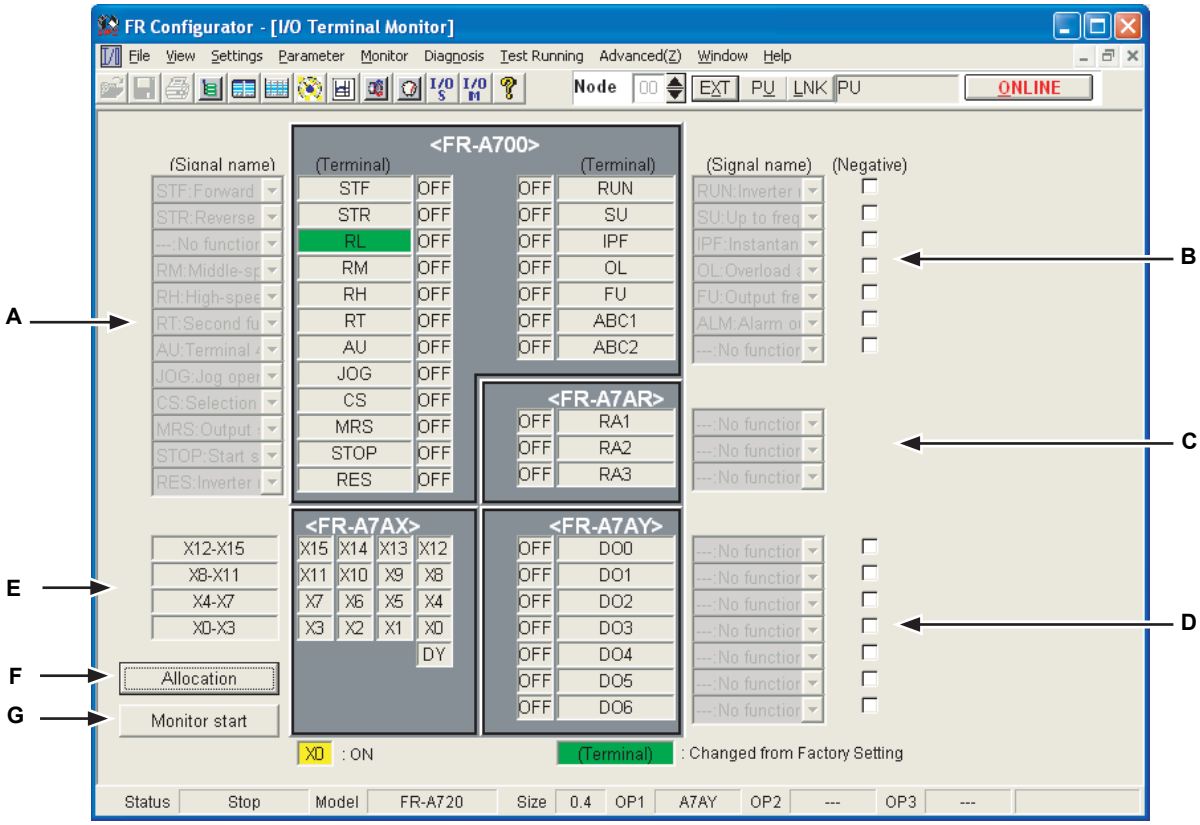


The meter scales are automatically adjusted. After the parameters are batch-read, they are set to the optimum values.

No.	Name	Function and description
A	Node	Station number of the inverter which to be monitored can be selected.
B	Monitor item	Monitor items can be selected.
C	Meter display	Shows monitor values on the analog meters. The present value is indicated by the black pointer and the maximum value by the red pointer.
D	Meter full-scale	Shows the full-scale value of the meter display. It can be changed by entering a new value.
E	Max Val/Present Val	Maximum value and present value can be checked in numerical value.
F	Hold	Clicking the [Hold] button holds the data being monitored. The data can be also saved in this state. Click this button during the hold to cancel the hold.
G	Start/Stop	After switching to ONLINE, click the [Start] button to start monitoring. Click this button during the monitoring to stop monitoring.

2.8.2 Monitoring the status of I/O terminal [I/O Terminal Monitor]

Selecting the [I/O Terminal Monitor] command in the [Monitor] menu and selecting from the list allows you to monitor the status of the inverter I/O terminal. Also, terminal functions can be assigned.

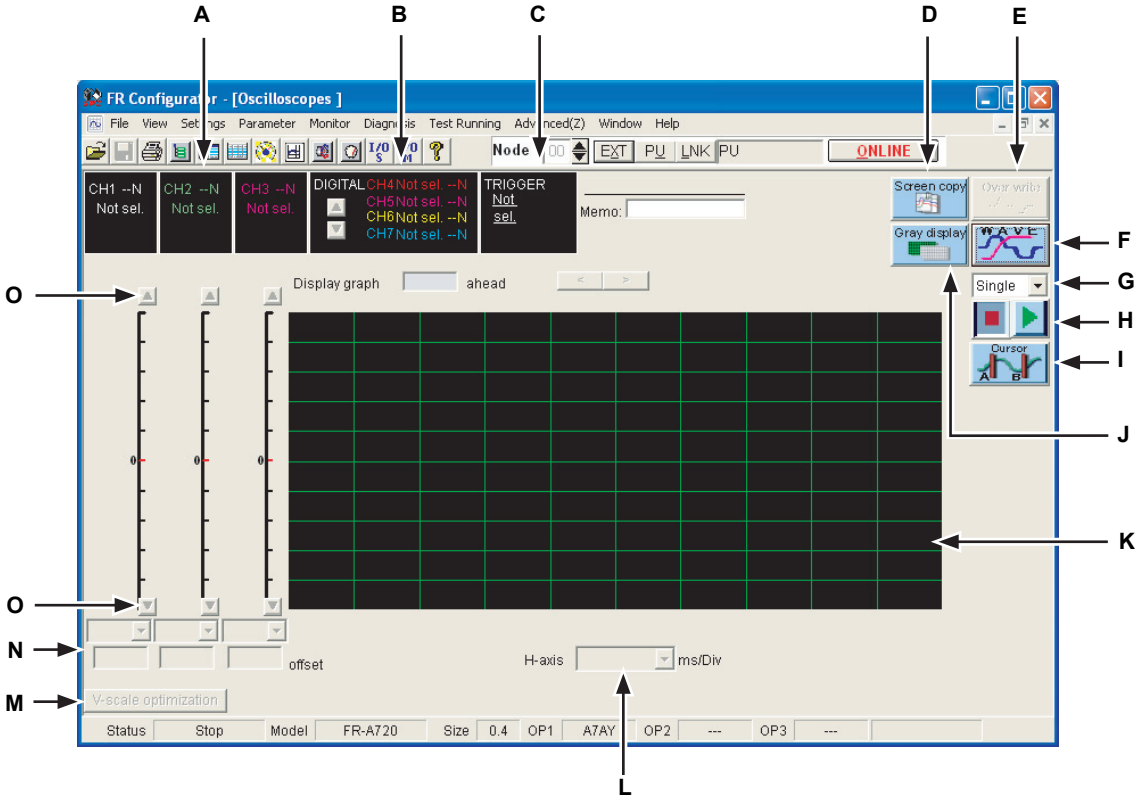


No.	Name	Function and description
A	Inverter input terminal monitor	Monitors the input terminal status. The status is displayed as ON/OFF beside the terminal name. Click [Allocation] to assign the function to the corresponding input terminal after selecting the signal name from the list. The terminal whose signal has been changed from the initial value is displayed in green.
B	Inverter output terminal monitor	Monitors the output terminal status. The status is displayed as ON/OFF beside the terminal name. Click [Allocation] to assign the function to the corresponding output terminal after selecting the signal name from the list. Checking the check box sets to negative logic. The terminal whose signal has been changed from the initial value is displayed in green.
C	FR-A7AR terminal monitor	Monitors the FR-A7AR terminal status. The status is displayed as ON/OFF beside the terminal name. Click [Allocation] to assign the function to the output terminal of the corresponding plug-in option (FR-A7AR) after selecting the signal name from the list. (When the plug-in option settings have not yet been made by system settings, the setting cannot be changed.) The terminal whose signal has been changed from the initial value is displayed in green.
D	FR-A7AY terminal monitor	Monitors the FR-A7AY terminal status. The status is displayed as ON/OFF beside the terminal name. Click [Allocation] to assign the function to the output terminal of the corresponding plug-in option (FR-A7AY) after selecting the signal name from the list. Checking the check box sets to negative logic. (When the plug-in option settings have not yet been made by system settings, the setting cannot be changed.) The terminal whose signal has been changed from the initial value is displayed in green.
E	FR-A7AX terminal monitor	Monitor the FR-A7AX termianl status. The terminal is displayed in yellow when the signal is ON.
F	Allocation / Monitor	When changing the signal, click [Allocation] to change to "I/O Terminal Allocation" screen. Refer to *page 36* for "I/O Terminal Allocation". Click [Monitor] to return to "I/O Terminal Monitor" screen and the signal monitoring can not be made.
G	Monitor start / Monitor stop	Click [Monitor start] to start monitoring. The status of signal is displayed as ON/OFF beside the terminal name. During the monitoring, the button becomes [Monitor stop], and clicking this stops monitoring.

2.8.3 Monitoring by waveform [Oscilloscopes]

Various signals such as output frequency or output current can be monitored by waveform like an oscilloscope.

Selecting the [Oscilloscopes] command in the [Monitor] menu or selecting the tool button shows the following screen.



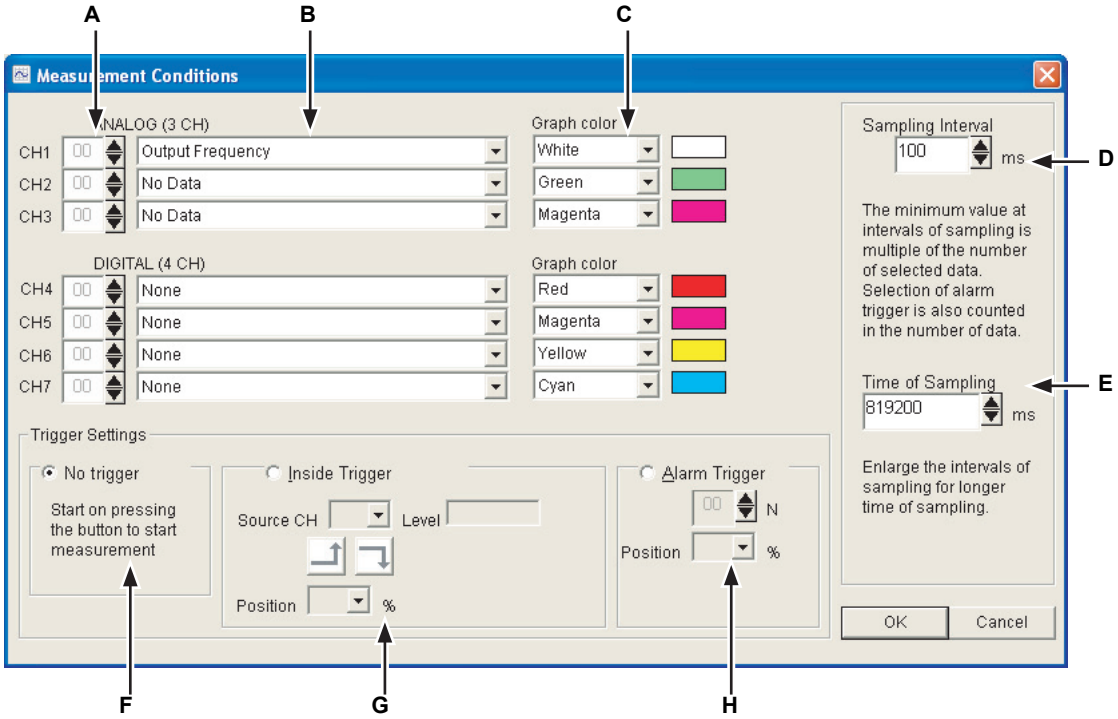
No.	Name	Function and description
A	Analog data display	Displays the station number set on the measurement conditions screen and the name of analog data. Up to three signals from CH1 to CH3 can be displayed. Can be read from the saved data (gpi files).
B	Digital data display	Displays the station number set on the measurement conditions screen and the name of digital data. Up to 4 signals from CH4 to CH7 can be displayed. Move button (▲ / ▼) moves the graph display position. The saved data (gpi files) can also be read.
C	Trigger data display	• Trigger source display: Displays CH set on the measurement conditions screen when inside trigger is selected. Displays “Alarm” when the alarm trigger is selected. The initial status displays “Not sel.” since “No trigger” is selected. • Display of trigger level: When the analog data (CH1 to CH3) are selected by the inside trigger on the measurement condition screen, the set startup/shutdown level is displayed. • Display of trigger condition startup ( ) /shutdown ( ): When the inside trigger is selected on the measurement condition screen, the set trigger condition (startup/shutdown) is displayed.
D	Screen copy	Copies the graph picture on the clipboard to paste to other applications.
E	Overwriting	Overwriting can be performed during sampling stop. When the past history display switching is executed, the waveform data of the selected history turns into the selected color and the already displayed waveform data the gray line. Overwriting can be performed 8 times including waveform data.
F	WAVE	Sets the measurement conditions. (Refer to measurement condition setting, *page 47*.)

No.	Name	Function and description
G	Trigger mode	Selects the trigger mode. Single ..... Displays one waveform by one shot. Repeat..... Repeats single shots to display up to eight waveforms. (Since up to eight histories are displayed, the oldest data is deleted when the ninth data is obtained.)
H	Collection of waveform data	Clicking  starts sampling data and displaying graphs. Clicking  stops sampling.
I	Cursor	Displays the cursor to check the numerical value on the cursor or to check the maximum and minimum values of the graph between cursors. (Refer to Cursor function, *page 49*.)
J	Gray display	Displays the background as white and the graph lines as black.
K	Waveform data display	Displays waveform data as graphs.
L	Setting of horizontal axis scale	Sets the horizontal axis scale values.
M	Y-axis scale optimization	Used to change the scale automatically so that the waveform of each channel is contained within the screen. Analog data is displayed at about 80% of the graph display.
N	Setting of vertical axis scale	Sets the vertical axis scale values. CH1 to CH3 can be set individually. The setting is performed by selecting from the list or directly inputting into the input column. The list displays five analog data, 1/10, 1/20, 1/100, 1/200, and 1/500 of the maximum value. Offset can be also set.
O	Position move of vertical axis 0	The position of 0 in the vertical axis scale can be moved.

Measurement condition setting

Sets the condition of measurement start.

Click  to display the measurement condition setting screen.



No.	Name	Function and description
A	Station number selection	Selects the inverter station number to be measured. Up to 3CH for analog and up to 4CH for digital can be selected.
B	Data item selection	Selects the data item displayed as a graph.
C	Graph color	Selects the color of waveform displayed as a graph.
D	Sampling Interval	Sets the interval of data measurement.
E	Time of Sampling	Sets the time of data measurement.
F	No trigger	Selecting "No trigger" and clicking  starts data sampling and displaying graphs. Clicking  stops sampling.
G	Inside trigger	Selecting the inside trigger starts measuring the data when the setting condition is met. • Source CH setting Selects the CH to be measured. • Level value setting Set the level value of trigger. Selecting the analog data from CH1 to CH3 makes the level setting column valid. • Condition setting Digital data:  ...Measurement starts when the signal starts up.  ...Measurement starts when the signal shuts down. Analog data:  ...Measurement starts when the level value is exceeded.  ...Measurement starts when the level value is underrun. • Position setting Select what % before the trigger position to start data sampling. The set trigger position is displayed with a character of 'T' above the graph.
H	Alarm trigger	When the inverter outputs the alarm signal after clicking  , the measurement is started. Select the station number and the position.

REMARKS

Setting range and setting increments of "Sampling Interval" and "Time of Sampling"

"Sampling Interval" and "Time of Sampling" depend on Communication Port and Baud rate. Refer to the following table for lower limit of "Sampling Interval".

Communication Port	Baud rate [bps]	Lower limit of "Sampling Interval" [ms]
RS-232C	300	2500
	600	1300
	1200	700
	2400	350
	4800	250
	9600	150
	19200	100
	38400	100
USB	-	50

Refer to the following table for maximum value, minimum value, and the Setting Increments of "Sampling Interval" and "Time of Sampling" when the measurement conditions are actually set.

	Maximum value	Minimum value	Setting Increments
Sampling Interval	60000	"Lower limit of Sampling Interval" (the table above) × "the number of the measuring items"*	50
Time of Sampling	Sampling Interval × 8192	Sampling Interval × 2	Sampling Interval

[Unit: ms]

*If the alarm trigger is set, the alarm trigger is also added to the measuring items.

Example: When connecting with RS-232 port, Baud rate is 19200bps, and monitoring "Output Frequency", "Output Current", and "Output Voltage".

The lower limit of "Sampling Interval" = 100[ms]

The maximum value of "Sampling Interval" = 60000[ms]
The minimum value of "Sampling Interval" = 100 × 3 = 300[ms]
The setting increments of "Sampling Interval" = 50[ms]

The maximum value of "Time of Sampling" = 300 × 8192 = 2457600[ms]
The minimum value of "Time of Sampling" = 300 × 2 = 600[ms]
The setting increments of "Time of Sampling" = 100[ms]

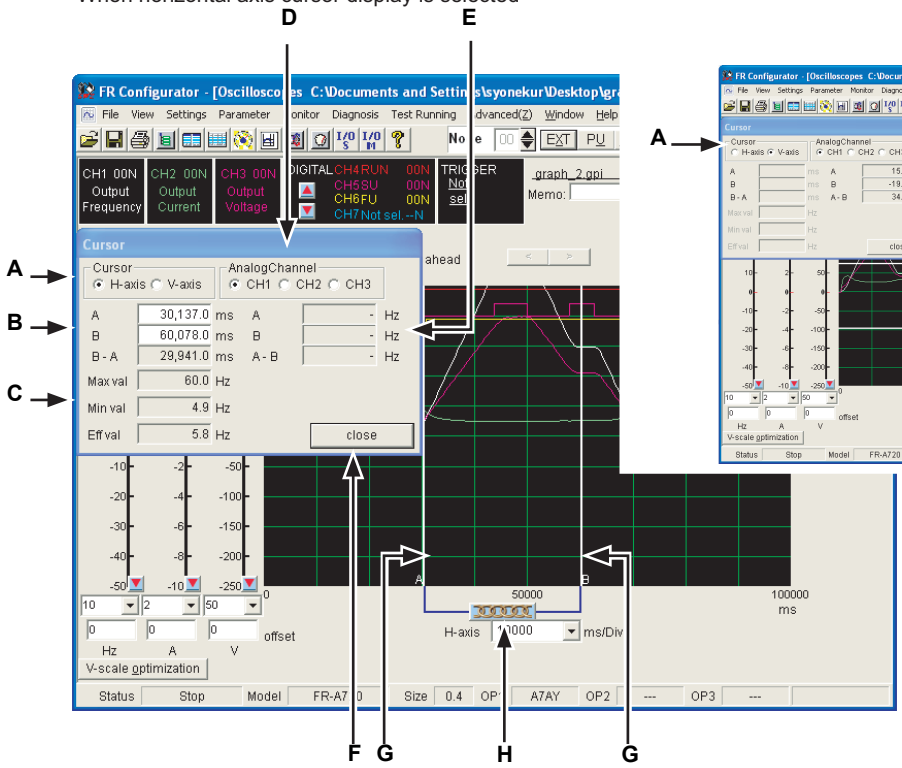
Cursor function

Numerical values of waveform on the cursor, the effctive value, the maximum value, and the minimum value between two points can be displayed.

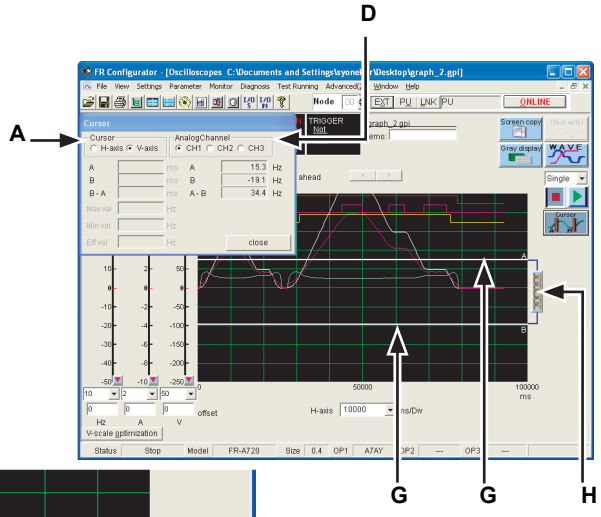
Click 

to display the measurement condition setting screen.

When horizontal axis cursor display is selected



When vertical axis cursor display is selected



No.	Name	Function and description
A	Cursor selection	Selects whether the cursor is entered in the vertical axis or the horizontal axis.
B	Cursor position	Displays the position (time) of cursor A and B in horizontal axis. Displays, also, the difference (time) between B and A.
C	Effective value, maximum value, minimum value display	Displays the maximum value, the minimum value and the effective value of the waveform between A and B.
D	Analog channel selection	Selects the channel (station) performed by cursor measurement.
E	Measurement value display	Displays the measurement value of the waveform on cursor A and B, or the difference between A and B.
F	Close	Close cursor display.
G	Cursor A, B	Cursor. Dragging or inputting numerical values into the cursor position can move the cursor.
H	Cursor synchronization selection	When  is displayed, cursor A and B move synchronously. When  is displayed, cursor A and B move individually .

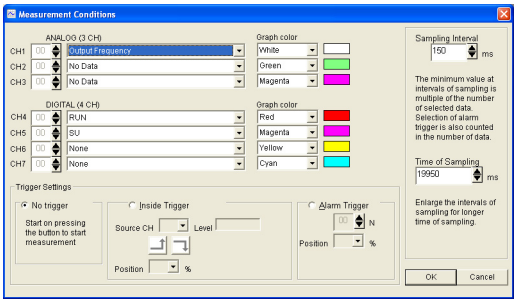
Oscilloscope measurement procedure example (monitoring output frequency, RUN signal and SU signal)

●When measuring without trigger

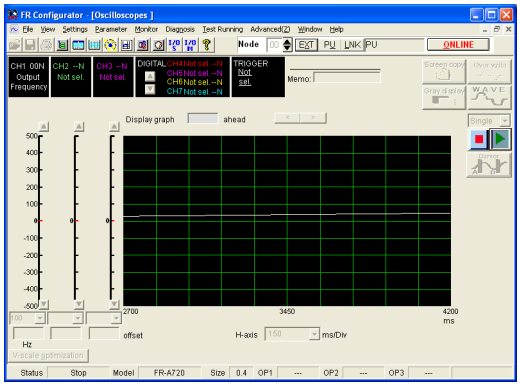
(1) Clicking 

to display the Measurement Conditions setting screen.

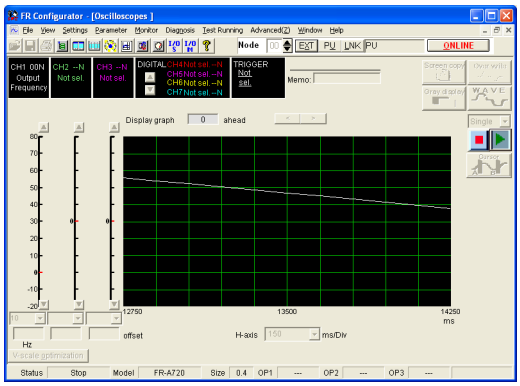
(2) Select "Output Frequency" from the CH1 list,
"RUN" from CH4, and "SU" from CH5.
Set the sampling interval and the sampling time.
Check "No trigger" for the trigger setting.
After setting, click [OK] and return to the oscilloscope screen.



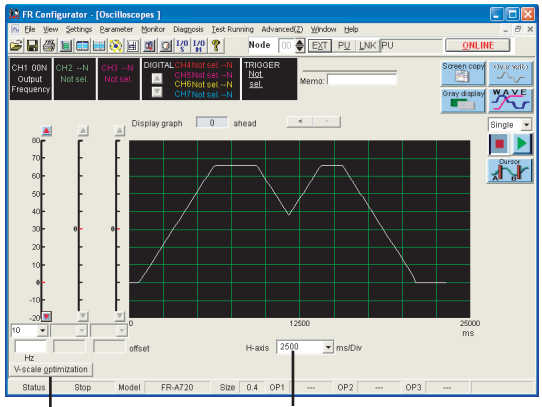
(3) Clicking  starts measuring.



(4) Measuring stops by clicking  or after the set sampling time.



(5) The graph is adjustable for the better view.



Adjusts the horizontal scale.
Input by selecting from the list or input directly.

Optimizes the vertical axis scale.
The adjustment to about 80%
of the oscilloscope screen can be made.

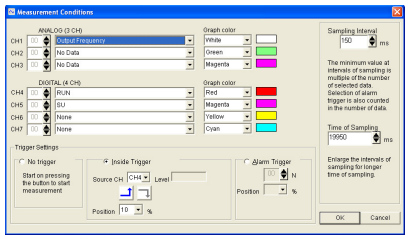
(6) Data can be saved as a GPI file.

Oscilloscope measurement procedure example (monitoring output frequency, RUN signal and SU signal)

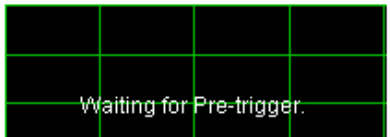
●When measuring by inside trigger setting (Example: RUN signal startup)

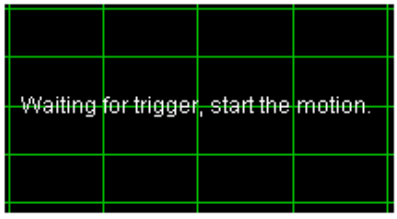
(1) Clicking  to display the Measurement Conditions setting screen.

(2) Select "Output Frequency" from the CH1 list, "RUN" from CH4, and "SU" from CH5.
Set the sampling interval and the sampling time.
Set the trigger setting.
Check the Inside Trigger, select "4" for the source CH, click  , and then set "10%" for the position.
After setting, click [OK] and return to the oscilloscope screen.

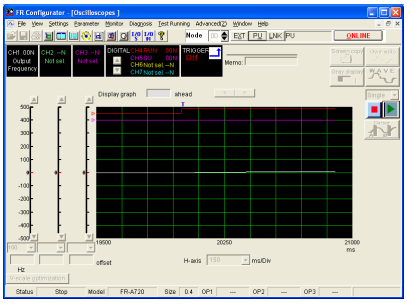


(3) When  is clicked, the screen displays "Waiting for Pre-trigger." and retrieve the data before trigger occurrence. After the retrieval of the data, the screen displays " Waiting for trigger, start the motion." and becomes the trigger waiting condition.





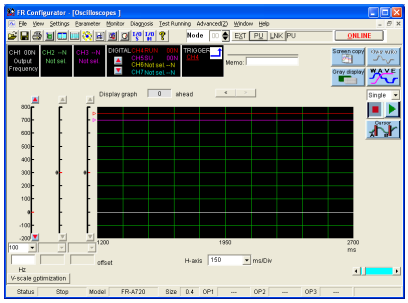
(4) When the trigger condition is met (RUN signal startup), the measurement is automatically started.



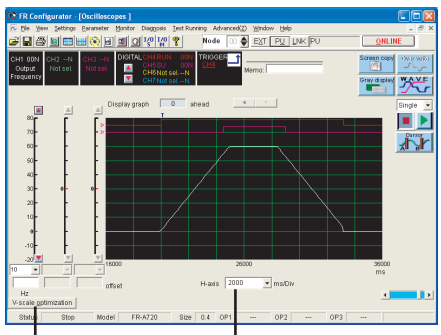
REMARKS

For this example, the sampling time is set to "20000ms" and the position "10%", and therefore the startup of the RUN signal within 2000ms after clicking  is ignored, and the measurement is not started.

(5) Measuring stops by clicking  or after the set sampling time.
The data of 2000ms before the RUN signal startup and of 18000ms after the startup are displayed.



(6) The graph is adjustable for the better view.



Adjusts the horizontal scale.
Input by selecting from the list or input directly.

Optimizes the vertical axis scale.
The adjustment to about 80%
of the oscilloscope screen can be made.

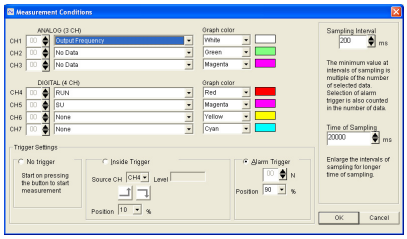
(7) Data can be saved as a GPI file.

Oscilloscope measurement procedure example (monitoring output frequency, RUN signal and SU signal)

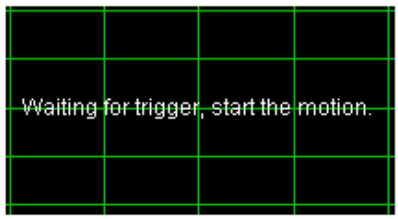
●When measuring by the alarm trigger setting

(1) Clicking WAVE to display the Measurement conditions setting screen.

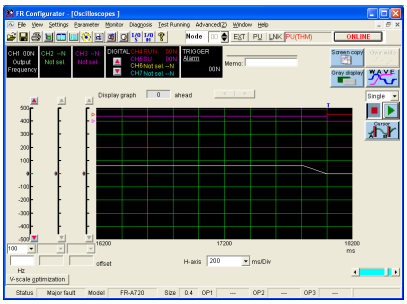
(2) Select "Output Frequency" from the CH1 list, "RUN" from CH4, and "SU" from CH5.
Set the sampling interval and the sampling time.
Set the trigger setting.
Check the Alarm Trigger, click [OK] after setting "90%" for the position, and then return to the oscilloscope screen.



(3) When is clicked, the screen displays "Waiting for Pre-trigger." and retrieve the data before trigger occurrence. After the retrieval of the data, the screen displays " Waiting for trigger, start the motion." and becomes the trigger waiting condition.



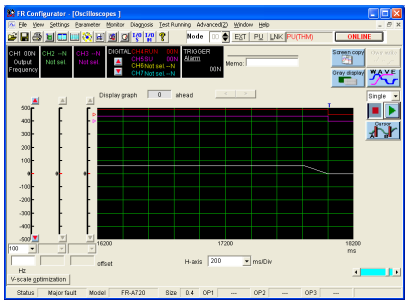
(4) When the inverter alarm occurs, the measurement is automatically started.



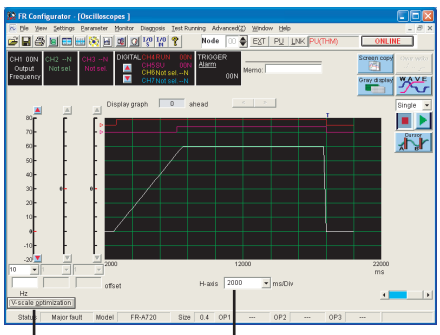
REMARKS

For this example, the sampling time is set to "20000ms" and the position "90%", and therefore the measurement is not started when the alarm occurs within 18000ms after clicking .

(5) Measuring stops by clicking or after the set sampling time.
The data of 18000ms before the alarm occurrence and of 2000ms after the occurrence are displayed.



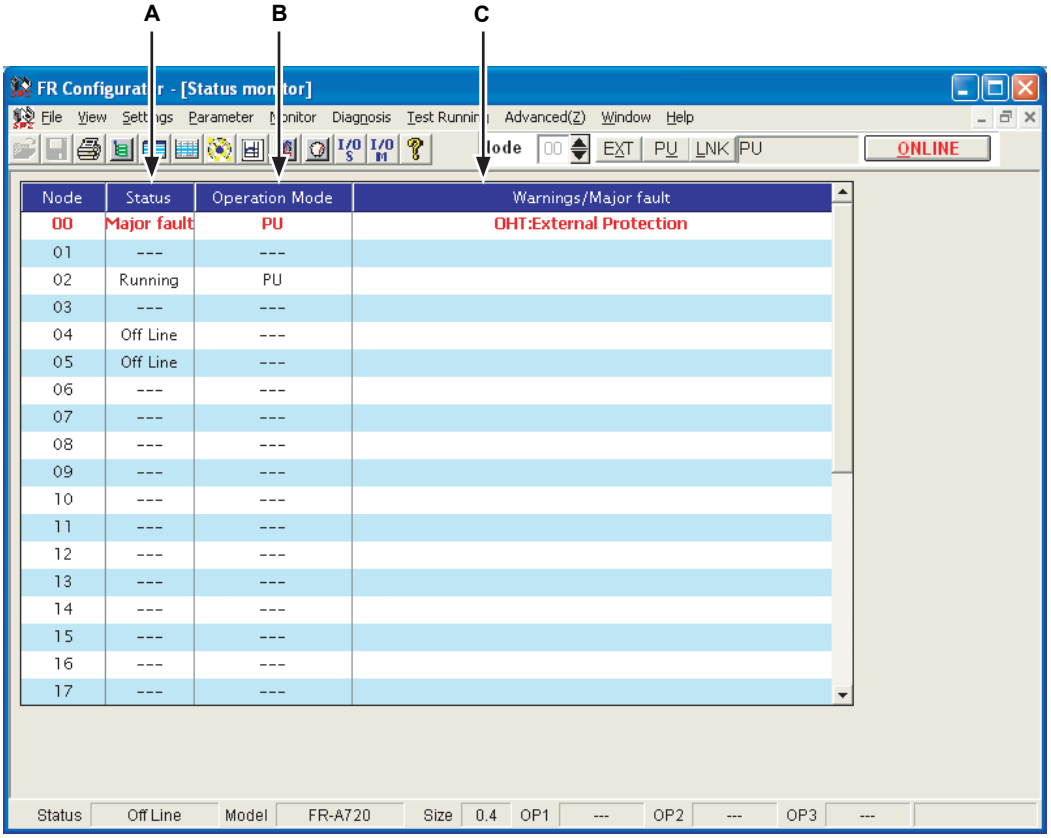
(6) The graph is adjustable for the better view.



(7) Data can be saved as a GPI file.

2.8.4 Listing the inverter status of all stations [Status Monitor]

By selecting the [Status Monitor] command in the [Monitor] menu, the status of all stations added in the system setting (*page 20*) can be listed.
The operation status, operation mode and warning/error of each station can be checked using the list display.



No.	Name	Function and description
A	Operating status	Operation..... ..During inverter operation Stop.....During inverter stop Off Line.....Inverter unconnected
B	Operation Mode	[EXT]: During external operation [PU]: During PU operation [LNK]: During network operation [EXT JOG]: During external JOG [PU JOG]: During PU JOG [PU+EXT]: During PU/external combined operation
C	Warning/Major fault	Displays when a warning or alarm occurs. Displayed in red when the inverter stopped at the alarm occurrence. Displayed in orange in the case of a warning. 00 Major fault PU OHT:External Protection

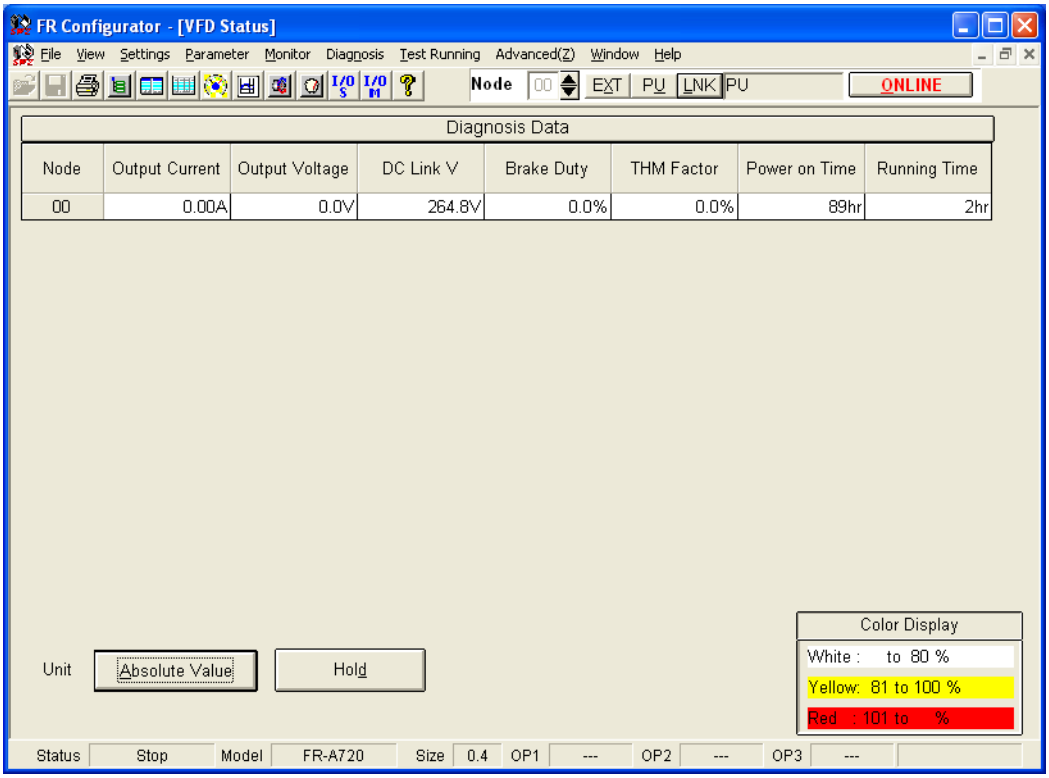
2.9 Inverter Failure Check [Diagnosis]

2.9.1 Checking main circuit status [VFD Status]

Selecting the [VFD Status] command in the [Diagnosis] menu displays the following screen.
Displays the output current, output voltage, DC bus voltage, Regenerative brake duty, Electronic thermal relay function load 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. The values displayed can be switched between absolute value indication and % indication.

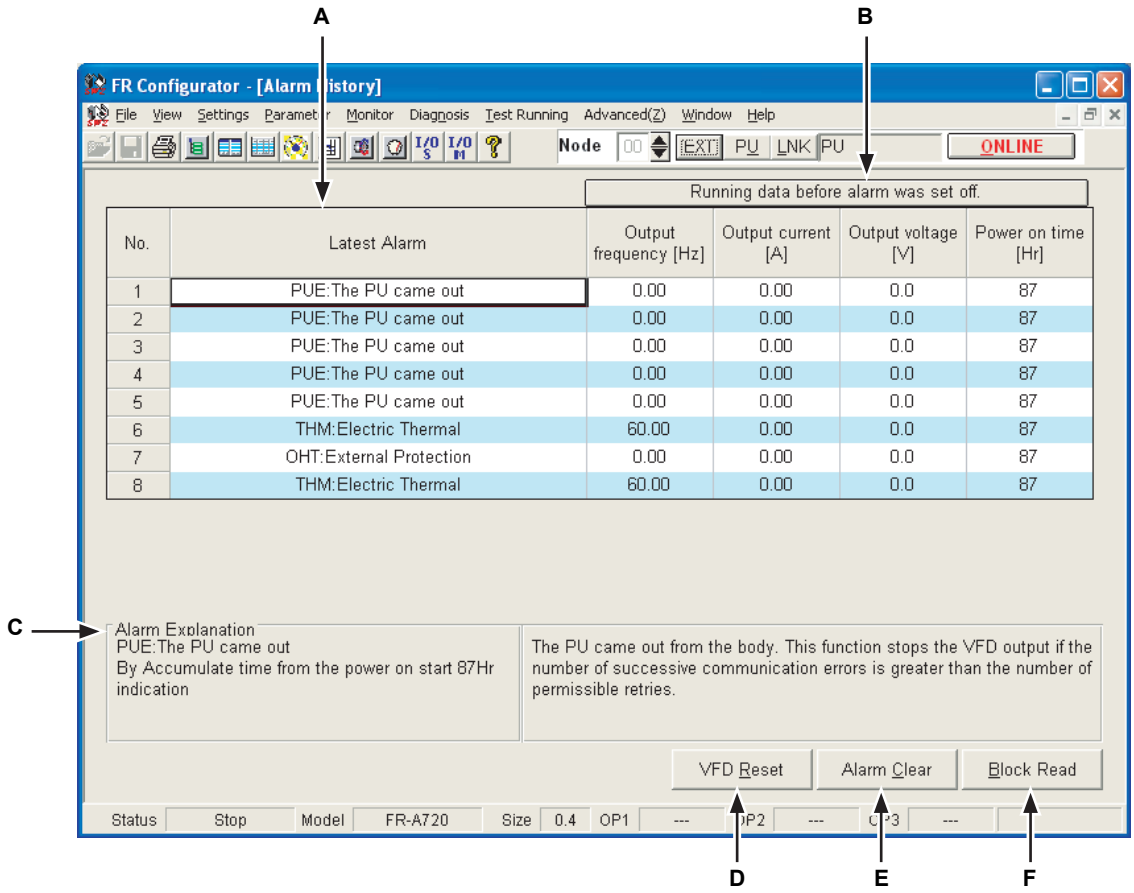
CAUTION

This command can be chosen in the online mode only.



2.9.2 Listing the occurred alarm [Alarm History]

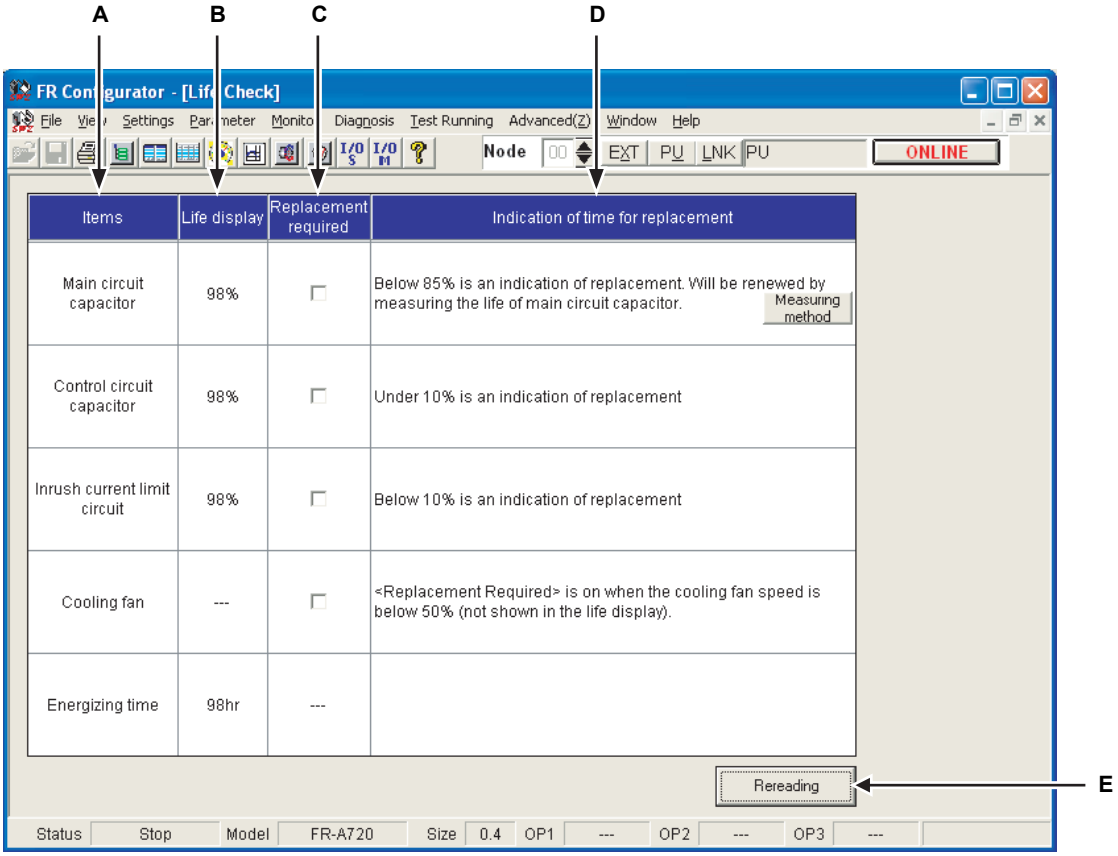
Alarm History displays the history of eight past alarms of the inverter station connected and selected.
Selecting the [Alarm History] command in the [Diagnosis] menu displays the following screen.



No.	Name	Function and description
A	Latest Alarm	Lists the history of eight past alarms of the selected inverter.
B	Running data before alarm was set off.	Displays the operation data just before alarm occurrence.The four data, output frequency, output current, output voltage and energization time, are displayed.
C	Alarm Explanation	Clicking the alarm column in the Latest Alarm list shows the explanation of that alarm.
D	VFD Reset	Clicking the [VFD Reset] button resets the chosen station inverter.
E	Alarm Clear	Clicking the [Alarm Clear] button clears the alarm history of the chosen station inverter.
F	Block Read	Press the [ONLINE] button to show ONLINE and then click the [Block Read] button to display the alarm history of the selected inverter specified in the system settings.

2.9.3 Check of inverter part replacement indication [Life check]

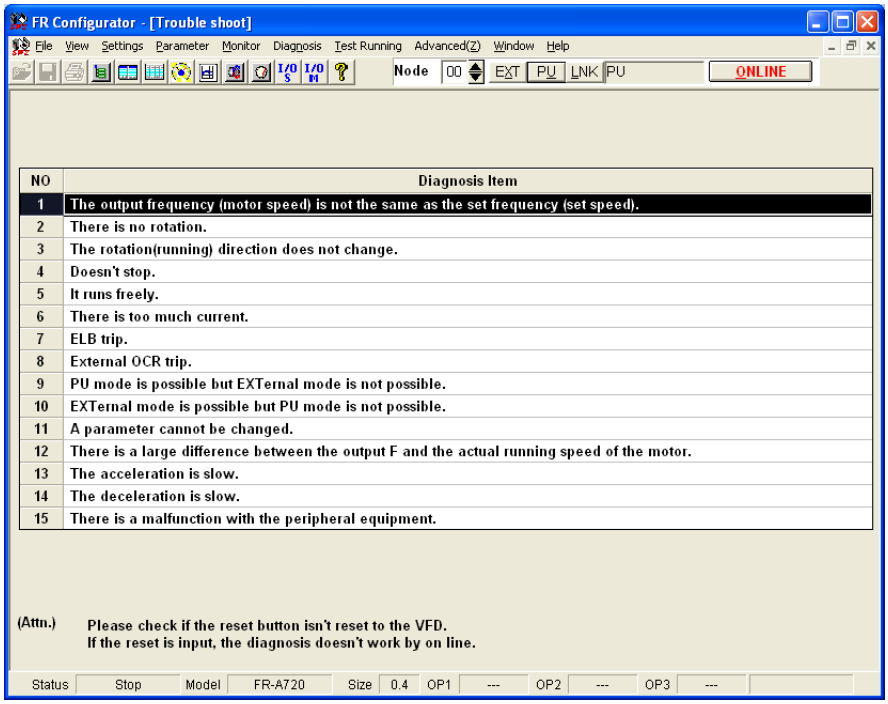
The following screen displays the replacement necessity of each part with deterioration degree of Main circuit capacitor, Control circuit capacitor, Inrush current limit circuit and Cooling fan.
Select the [Life check] command in the [Diagnosis] menu to display the following screen.



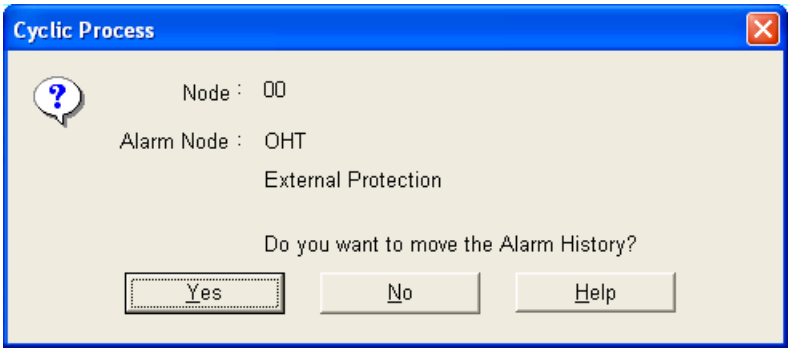
No.	Name	Function and description	
A	Items	Displays items to be diagnosed.	
		Main circuit capacitor	Measured the main circuit capacitor capacitance at factory shipment as 100 %. When the capacitance reduces below 85 %, the replacement indication is displayed. Click the [Measuring method] button to display the help of *Pr.259*.
		Control circuit capacitor	In the operating status, the control circuit capacitor life is calculated from the energization time and temperature, and deterioration degree is displayed in %. When capacitance reduces below 10 %, the replacement indication is displayed.
		Inrush current limit circuit	The number of contact (relay, contactor, thyristor) ON times is counted, and it is counted down from 100% (1 million times) every 1%(10,000 times). When 10 % (900,000 times) is reached, the replacement indication is displayed.
		Cooling fan	Detects the cooling fan speed. When the cooling fan speed reduces below 50%, the replacement indication is displayed.
		Energization time	Displays inverter cumulative energization time after factory shipment.
B	Life display	Displays the life of each item in %.	
C	Replacement required	Displays replacement necessity of each part. If items exceed the indication of replacement, the check box is checked, and the item line is displayed in red.	
D	Indication of time for replacement	Explains the indication of replacement timing.	
E	Rereading	Reads the updated status from inverter to update the display.	

2.9.4 Estimating the cause of faults [Trouble shoot]

The diagnosis items appear. When you choose the corresponding item, the panel appears. Enter data in accordance with the display. The estimated cause, etc. is shown as a result.
For diagnosing the running status, the online mode must be selected.
Select the [Trouble shoot] command in the [Diagnosis] menu to display the following screen.



[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 alarm history. (*Refer to page 55*)
Clicking the [Help] button shows the alarm help detail.

CAUTION

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.

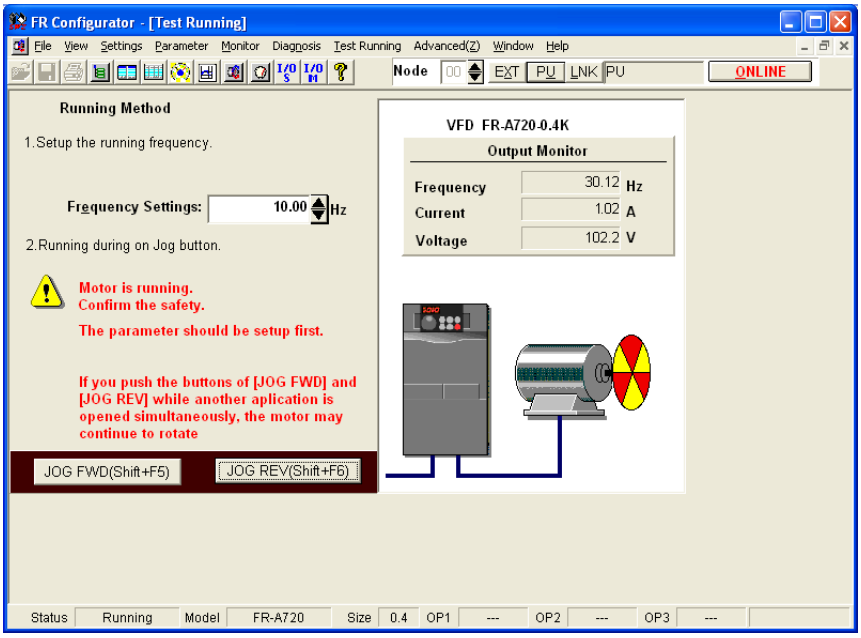
2.10 Test Running

2.10.1 Test Running

Selecting the [Test Running] command from the [Test Running] menu or the tool button displays the following screen.

CAUTION

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).
Set the PU or LNK (Link) operation by the connection method of the inverter and personal computer. *(Refer to page 21)*

(2) Enter the running frequency and press the key to set.

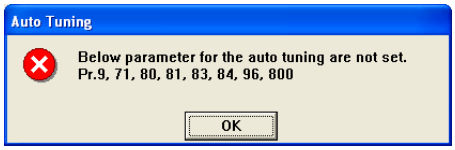
(3) Click the [JOG FWD] (Shift+F5) or [JOG REV] (Shift+F6) button. The motor rotates while the button is being pressed.
The output frequency, output voltage and output current are monitored on the screen.

2.10.2 Maximize the motor performance [Auto Tuning]

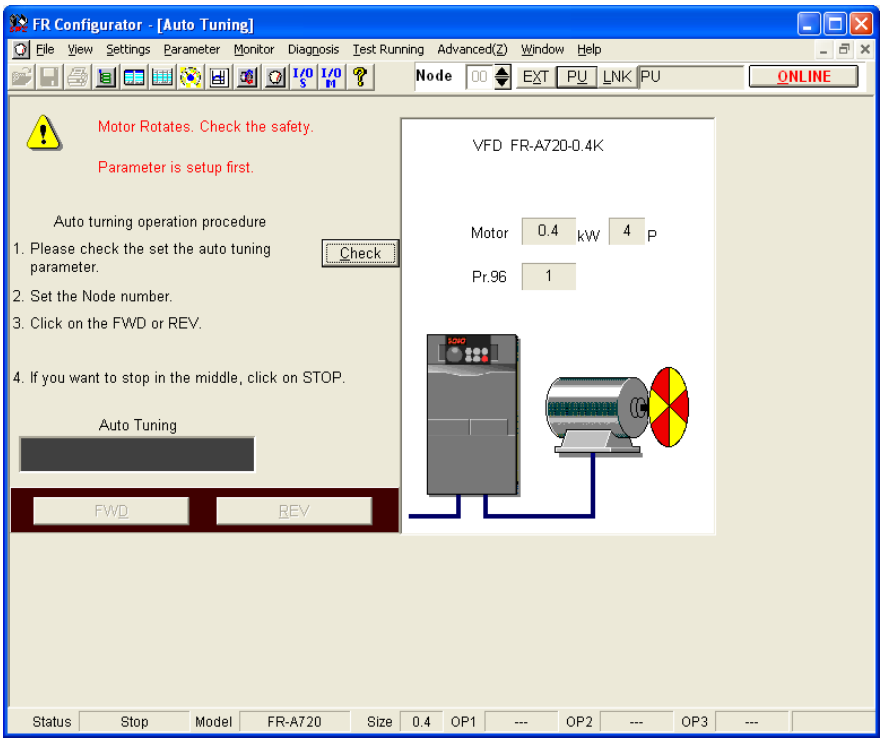
● Offline Auto Tuning

When operating with the advanced magnetic flux vector control or the real sensorless vector control, measure the motor constants automatically (Offline auto tuning) to operate with the optimum operating characteristics even in the case of the constants of each motor is different, using other manufacturer's motor, the long wiring, etc.

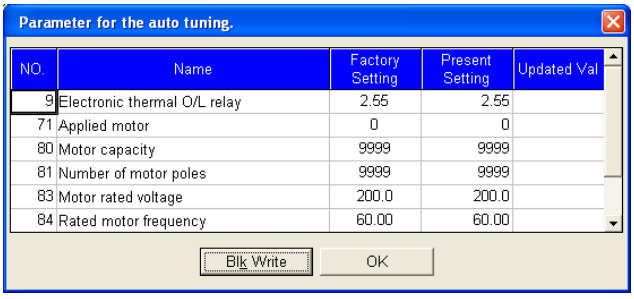
Selecting the [Auto Tuning] command from the [Test Running] menu or the tool button enables auto tuning.
The auto tuning parameters must be set in advance. If they have not been set, the following screen appears:



(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 displays the auto tuning parameters on the screen in a dialog box.



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

(3) Click the [FWD] or [REV] button

The progress display and monitor screen display indicate 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.

CAUTION

1. In the offline mode, test running and auto tuning cannot be performed.
2. Before starting test running, check and 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-F700 series. (Can be displayed on the screen.)
5. When PLC function is valid, Auto Tuning cannot be executed.
   (Auto Tuning cannot be executed, when Auto Tuning display is activated during PLC function. Disable the PLC function, and then close and open again the Auto Tuning display or activate the other display once to perform the Auto Tuning.)

2.11 Advanced Function

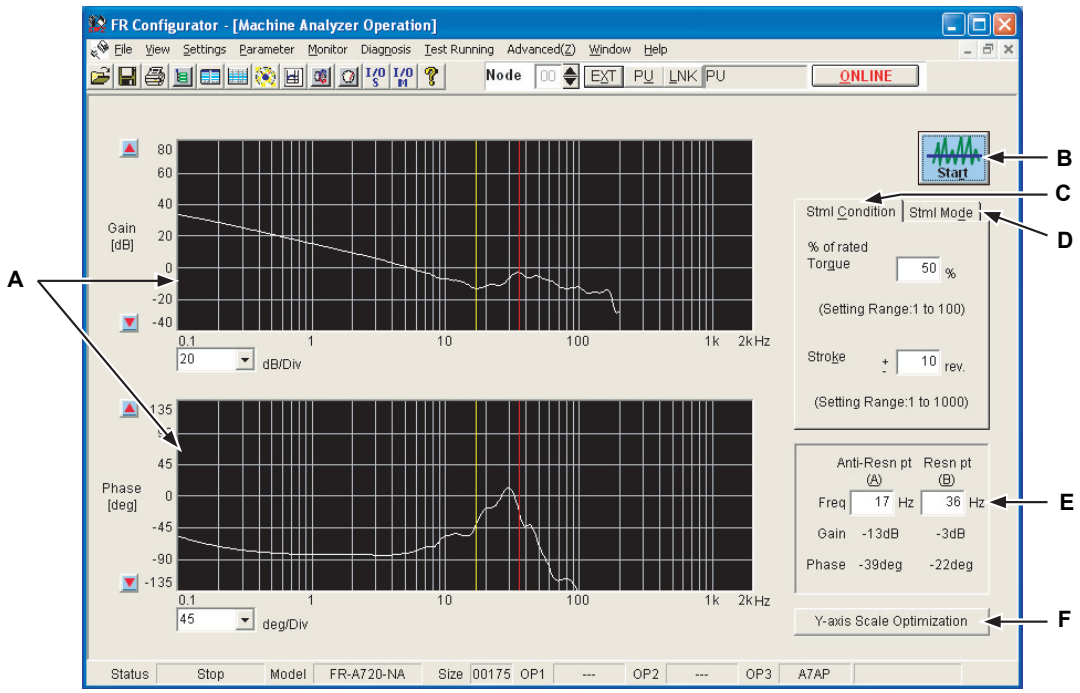
2.11.1 Machine Analyzer (Vector Control only)

Machine Analyzer reads and analyzes the torque and speed data when the inverter oscillates the motor at random torque for about 0.5 to 4s.
This allows measurement of the response frequency characteristic of speed relative to the motor torque of the machine so that you can grasp the frequency at which the mechanical system has the resonance point.

CAUTION

1. The Machine Analyzer function is available only for the system that can perform PLG vector control (FR-A7AP required).
2. Machine Analyzer will not work in the following cases.
   - Inverter running
   - When the second motor is selected (*Pr. 450* ≠ *"9999"*)
   - When the control mode is other than the vector control mode (*Pr. 800* ≠ *"0 to 5"*)
   - When Modbus-RTU communication is selected (*Pr. 549* = *"1"*)
   - When PLC function is valid (*Pr. 414* = *"1"*) (NA/EC only)
     (Machine Analyzer cannot be executed, when Machine Analyzer display is activated during PLC function. Disable the PLC function, and then close and open again the Machine Analyzer display or activate the other display once to perform the Machine Analyzer.)

Choosing the [Machine analyzer] command in the [Advanced (Z)] menu displays the following screen.
Before starting Machine Analyzer operation, set the oscillation conditions and oscillation mode.



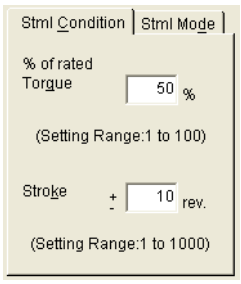
Machine analyzer screen

●Various buttons, status indications

No.	Name	Function and description
A	Waveform data	Frequency characteristic measurement results are displayed in the Bode diagram (gain, phase).
B	Start	Start the Machine Analyzer.
C	Stml Condition	Set the oscillation conditions for Machine Analyzer.
D	Stml Mode	Set the oscillation mode for Machine Analyzer.
E	Resonance point, Anti-Resonance point	Used to directly enter and specify the resonance point and Anti-Resonance point when they cannot be detected automatically.
F	Y-axis Scale Optimization	Used to change the scale automatically so that the waveform is contained within the screen.

Starting Machine Analyzer operation

(1)Set Stml condition.

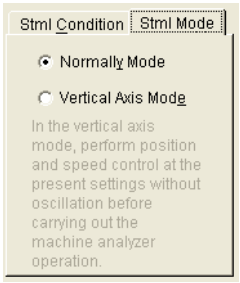


- " % of rated Torque".....Set the maximum oscillation torque for oscillating the motor under a random torque command. (Setting range: 1 to 100%)
- "Stroke".....Set the rotation range permitted for oscillation, beginning at the motor position when Machine Analyzer is started. If this range is exceeded, Machine Analyzer is stopped immediately, and the motor is coasted in the vertical shaft mode or is coasted after deceleration in the normal mode.(Setting range: ±1 to ±1000)

REMARKS

- If a measurement result varies, accurate measurement may not have been made.
- Accurate measurement may not be made in a mechanical system whose oscillation torque is too small or whose friction is large. In such a case, increase the oscillation torque and restart Machine Analyzer.
- If the oscillation torque is too large relative to the load inertia moment, an overcurrent or similar alarm may occur. At that time, reduce the oscillation torque and restart Machine Analyzer.
- Starting oscillation automatically switches to the torque control mode and shifts the position. Before starting operation after oscillation, therefore, always make a home position return.

(2)Select the Stml mode



- "Normal mode".....The inverter operates in the torque control mode and oscillates the motor randomly.
- "Vertical Axis Mode".....A servo lock is placed in the speed control mode, preventing a fall. Gain setting must have been made to ensure that stable servo lock operation will be performed.

REMARKS

In "Vertical Axis Mode"

- The accuracy of 100Hz or less on the low frequency side may become poor.
- The measurement accuracy becomes poor if the position loop gain *(Pr. 422)* is set too high.

CAUTION

When the machine is a vertical axis, always perform this function in the "Vertical Axis Mode" since a fall may occur.

(3)Press the 

button to display the message to confirm that the operation is at a stop.

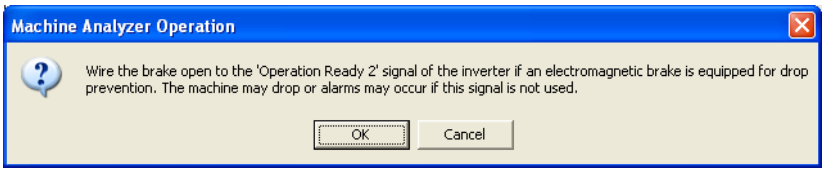
Check that the operation status is at a stop, and click [OK].

REMARKS

● " Stml Condition ".....The following screen appears if either or both "% of rated Torque" and "Stroke" are set outside the setting ranges.

Click the [OK] button to return to the Machine Analyzer setting screen.

The following screen appears when the "Vertical Axis Mode" is selected.

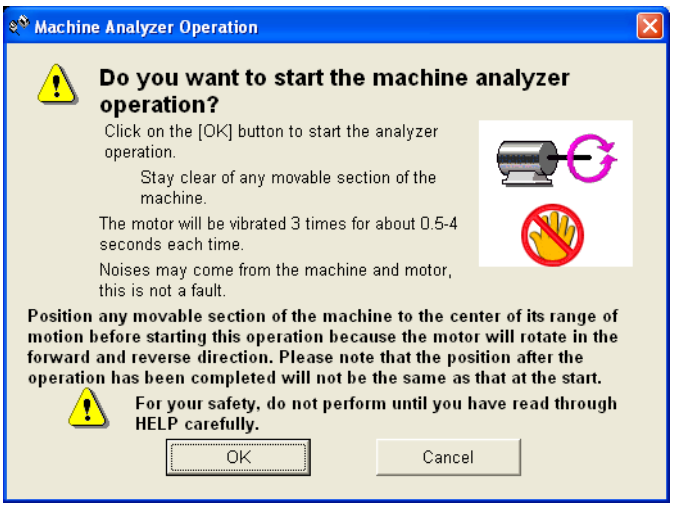


Click the [Cancel] button to return to the Machine Analyzer setting screen.
Click the [OK] button to display the Machine Analyzer Operation start screen.

CAUTION

1. When Machine Analyzer is executed in the vertical shaft mode, a servo lock is first placed, the "Operation ready 2" signal is output, and then the motor is started in 0.5 seconds.
2. When an electromagnetic brake is used, assign the "Operation ready 2" signal to any of the output terminals and modify the circuit to open the electromagnetic brake using this signal.
   If this is not done, a machine drop or an overcurrent or similar alarm may occur.
   (For details of *Pr. 190 to Pr. 196 "output terminal function selection", refer to the Instruction Manual (applied)* of the inverter.)

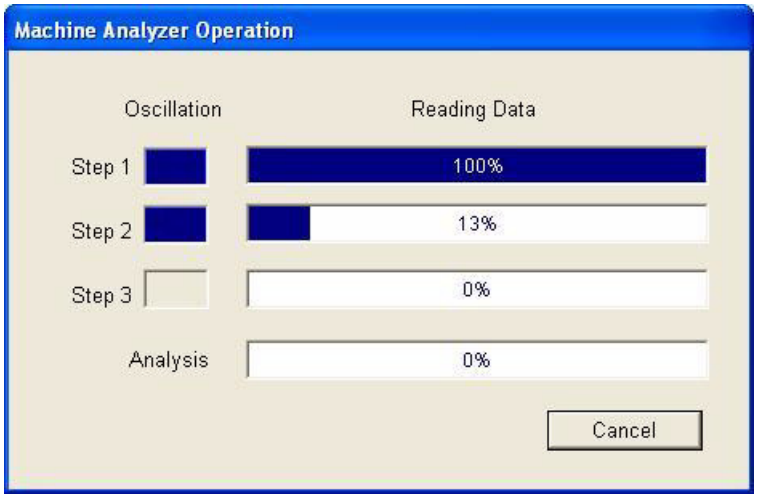
(4)Click the [OK] button in the Machine Analyzer Operation screen to start the operation.



Machine Analyzer Operation screen

Click the [Cancel] button to return to the Machine Analyzer screen.

(5)When Machine Analyzer is started, the following screen appears so that you can check the Machine Analyzer progress conditions.



● Guideline of oscillation time

Step	Oscillation Time
Step1	About 0.5s
Step2	About 1s
Step3	About 5s
Analysis	About 15s

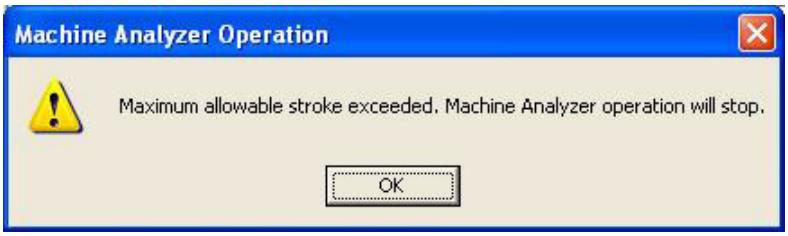
Click the [Cancel] button to stop the Machine Analyzer Operation, and return to the Machine Analyzer screen.

REMARKS

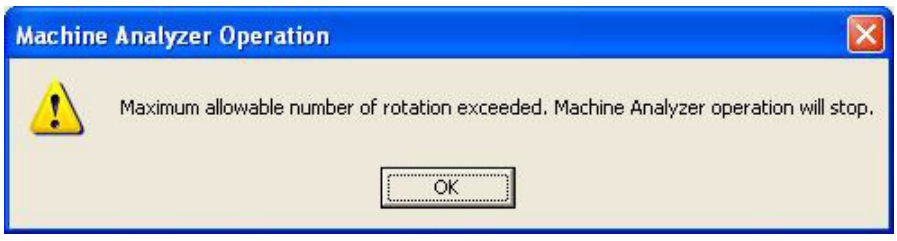
During oscillation, oscillation can be stopped with the [Cancel] button, MRS signal (output stop signal) or the parameter unit [STOP] key.

The following screen appears if the motor rotation stroke exceeds the permissible range or the motor speed exceeds 3000r/min during oscillation.
Click the [OK] button to return to the Machine Analyzer setting screen.

• If the motor rotation stroke exceeds the permissible range

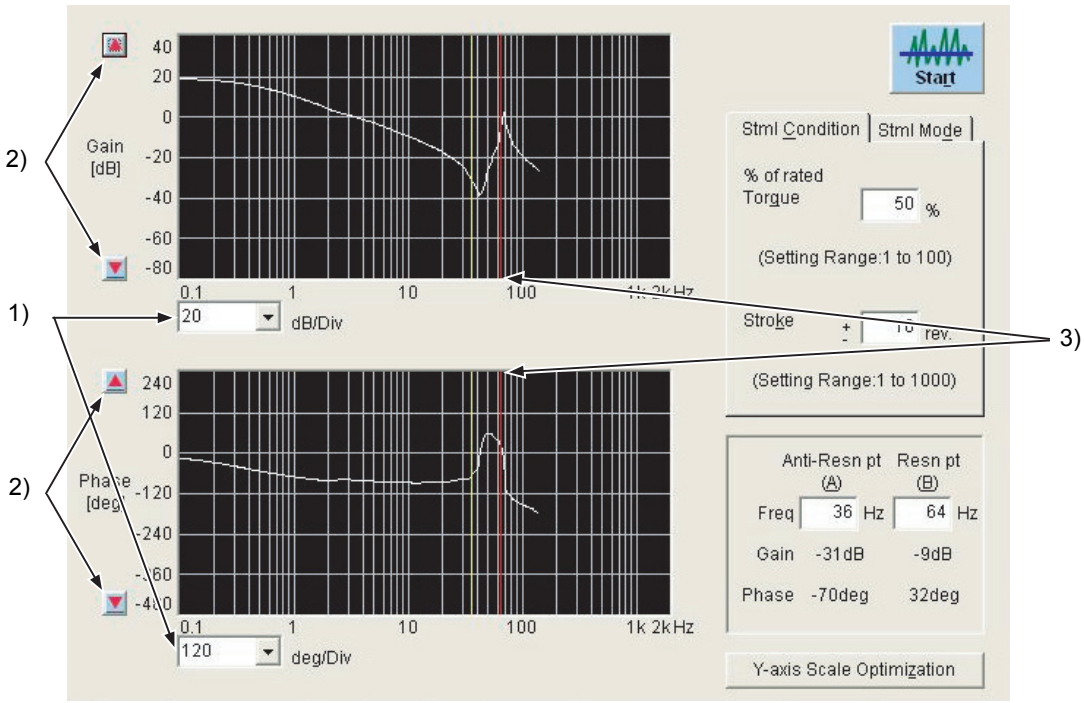


• If the motor speed exceeds 3000r/min



(6)On completion of Machine Analyzer, the frequency characteristics are displayed on the Machine analyzer screen.

(7) The frequency characteristics measured by Machine analyzer are displayed in Bode diagram.
For the waveform data, you can change the vertical axis scale and/or move the resonance point and anti-resonance point cursors.



1) Setting of the vertical axis scale
Click the [▼] to display the drop-down list.
The unit of the vertical axis scale can be selected from the list.
Click the " Y-axis scale optimization" button to automatically change the scale to put the waveform within the screen.

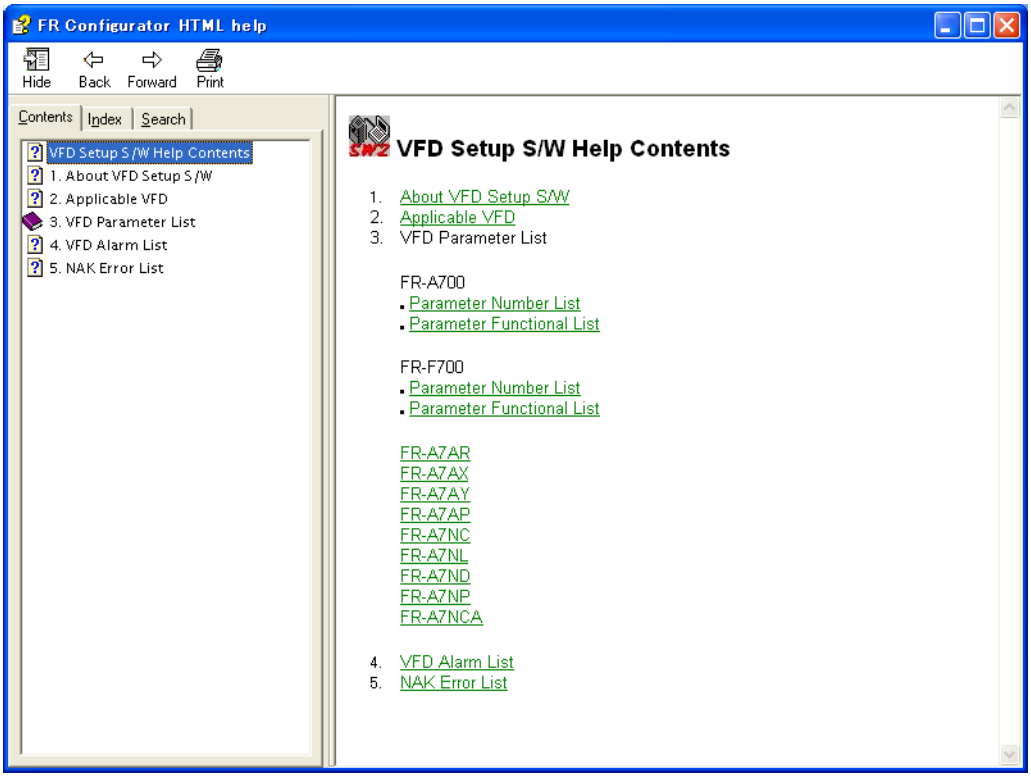
2) Moving the position of zero in the vertical axis
Click the [▲]/[▼] button to move the position of zero.

3) Resonance point, anti-resonance point cursors
The resonance point (red cursor) and anti-resonance point (yellow cursor) are normally detected automatically , but depending on the characteristic, they may not be detected automatically.
In such a case, move the cursors to the normal positions by directly writing the resonance point and anti-resonance point frequency.

2.12 Help

2.12.1 Help contents

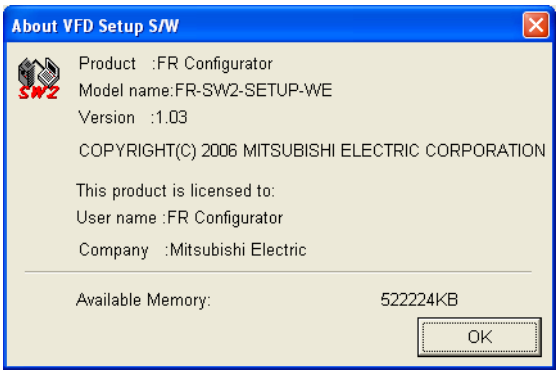
Selecting the [Help] command in the [Help] menu or the tool button displays the help of FR Configurator.
Pressing F1 key can display the help of the currently selected function of the FR Configurator.
Pressing F1 key when the parameter is selected in All List Format, Functional List Format, or Individual List Format displays the help of the selected parameter.



1. About VFD Setup S/W
   Explains the functions and use of VFD setup software.
2. Applicable VFD
   Displays a list of the inverters with which the inverter setup software is compatible
3. VFD Parameter List
   Explains the functions for each parameter of inverter.
4. VFD Alarm List
   Explains inverter alarms.
5. NAK Error List
   Explains the errors displayed in the setup software, e.g. NAK error.

2.12.2 Product information

Selecting the [Product Information] command in the [Help] menu displays the copyright, the product name, the model name, the version information and the license set for installation and other data on the following screen:



MEMO

3 TROUBLE INDICATIONS

This chapter explains the "trouble indications".
Always read the instructions before using this software.

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 D of the screen on *page18*).

(1) 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 differs from the initial setting.
5(05H)	Overrun error	New data has been sent by the computer before the inverter completes receiving the present data.
7(07H)	Character error	The character received is invalid (other than 0 to 9, A to F, control code).

(2) Inverter error

Error Code (HEX)	Error Name	Definition
17(11H)	Outside parameter range	Data outside the setting range was specified for the running frequency (running speed), parameter write or like.
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 of analog value settings between *Pr. 902 and Pr. 903, Pr. 904 and Pr. 905, Pr. 917 and Pr. 918, Pr. 919 and Pr. 920, and Pr. 932 and Pr. 933*.
26(1AH)	Instruction code error	A non-existing instruction code was sent to the inverter.
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.
258(102H)	Other communication errors	The malformed data is included in the data received on the inverter.

(3) Communication error (personal computer side)

Error Code (HEX)	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	Receive data error	Data from the inverter is invalid.
2005	NAK receive	NAK data has been received.
2006	Line offline	The present line is offline.
2007	Unconnected	This station number is not yet connected.
2008	Station number duplicated error	There are multiple inverters with the same station number (*Pr.547*) by USB communication.

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 storage area (directory) is different.
Data directory is invalid. After starting, make environmental setting.	The data storage area (directory) setting is invalid.
The following file is not found. The program is terminated.	The user file is not in the specified storage area (directory).
Time-out occurred. Check the wiring and communication settings.	Communication stopped for some reason in the online mode. After the time-out occurred at USB connection, remove and insert the USB cable or reset the inverter before restarting a communication.

4 APPENDICES

This chapter explains the use of the supplementary software.
Always read the instructions before using this software.

4.1 Supplementary Software

4.1.1 Introduction

The parameter file edit software (hereafter "PrEdit") is specifically designed to make changes/additions of the models supported by the FR Configurator and additions/deletions/changes of the display parameters. Please acknowledge that the PrEdit is not supported.
The PrEdit is installed in the "invsup2e" folder.

4.1.2 Parameter files (ine)

(1) What are parameter files (ine)?

Parameter files are text files which consist of information on the models compatible with the FR Configurator and the parameter information of those models. Installing the FR Configurator into the personal computer also installs the following files into the "files" folder at where the FR Configurator is installed.

	Parameter File Name			
	JPN	NA	CH / CHT	EC
FR-A720	fra720.ine (55K or less)	fra72na.ine (02150 or less)		
	fra720l.ine (75K or more)	fra72lna.ine (02880 or more)		
FR-A740	fra740.ine (55K or less)	fra74na.ine (01100 or less)	fra74cht.ine (55K or less)	fra74ec.ine (01800 or less)
	fra740l.ine (75K or more)	fra74lna.ine (01440 or more)	fra74lcht.ine (75K or more)	fra74lec.ine (02160 or more)
FR-F720	frf720.ine (55K or less)	frf72na.ine (02330 or less)		
	frf720l.ine (75K or more)	frf72lna.ine (03160 or more)		
FR-F740	frf740.ine (55K or less)	frf74na.ine (01160 or less)	frf74ch.ine frf74cht1.ine (55K or less)	frf74ec.ine (01160 or less)
	frf740l.ine (75K or more)	frf74lna.ine (01800 or more)	frf74lcht.ine (S75K or more)	frf74lec.ine (01800 or more)

(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-A720)
- Model type code (NA, EC, CH...)
- Power supply capacity (100V class: 1, 200V class: 2, 400V class: 4)
- Model code

Model	Model code
FR-A700 series	&HA7
FR-F700 series	&HF7

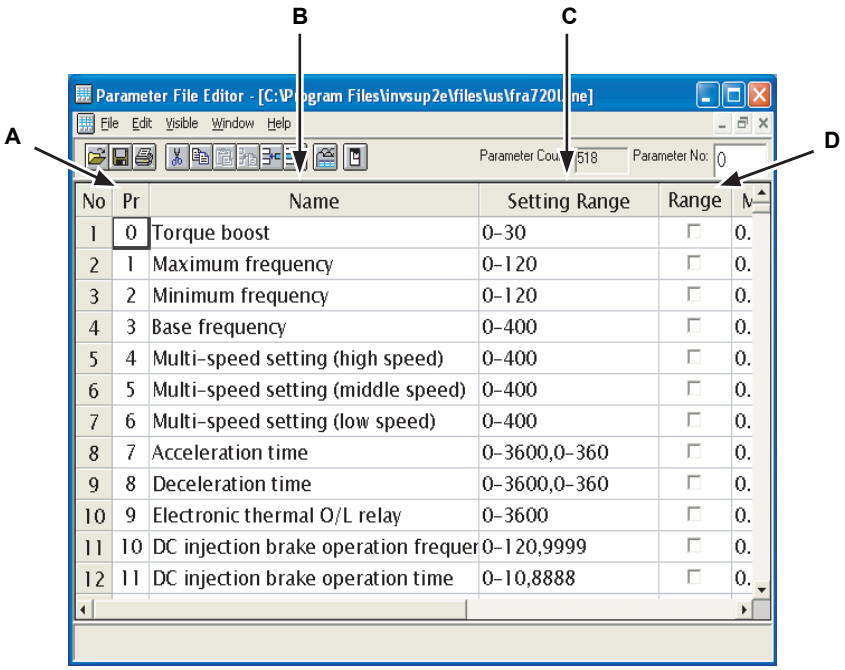
- Allowable capacity (0.1K, 0.2K, 0.4K...)
- Rated current value (0.8A, 1.5A, 3A...)
- Connectable option (A7AX, A7AY...)
- Number of parameters

[Parameter information part]

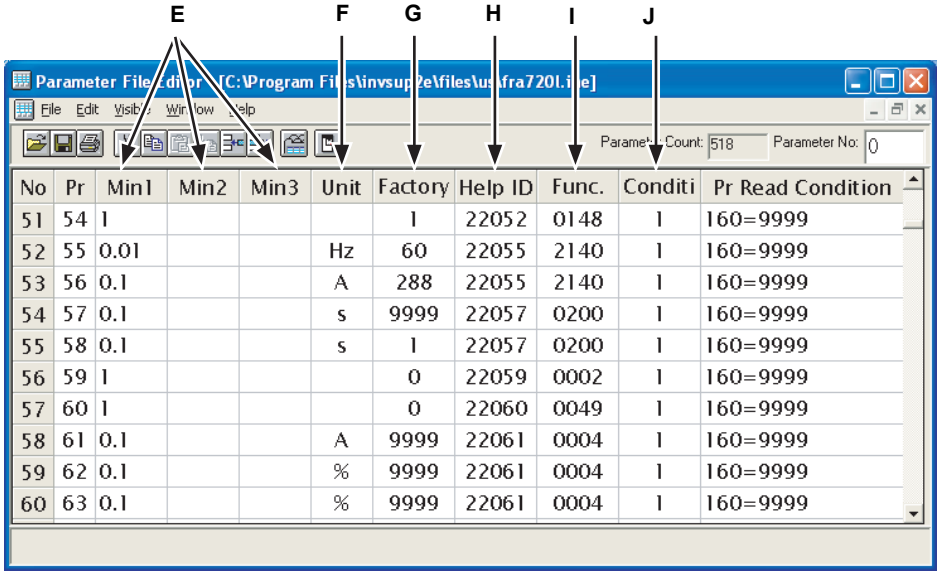
- Help context ID (number for help display)
- Parameter number
- Name
- Unit (Hz, r/min, V, A...)
- Step (1, 0.1, 0.01, 0.001)
- Factory setting
- Function-based list code (parameter displayed on the Functional List Format screen)
- Setting range check flag (0: checked, 1: not checked)
- Setting range

4.1.3 Use of PrEdit (Parameter file edit software)

This software is a edit software only for FR Configurator parameter file. This software cannot be used for other applications. By editing and saving the file, it can be displayed on the parameter screen (All list Format, Functional List Format, etc.) as a FR Configurator parameter file. You can make an updated inverter version, a special or another inverters compatible with FR Configurator.



No.	Name	Function and description
A	Pr	Write the parameter number. Set the parameter numbers in the ascending order and do not write the same parameter number.
B	Name	Write the parameter name.
C	Setting range	Enter the parameter setting range and use "," and "-" for separation. Example: 0 to 6, 9999 → 0-6, 9999
D	Range check	Choose whether the FR Configurator range check is valid or not. By checking this column, a range check is not made in the FR Configurator.



No.	Name	Function and description
E	Minimum	Choose the minimum setting increment from among "1", "0.1", "0.01" and "0.001" in the combo box.
F	Unit	Write the parameter unit. This column may be left blank for parameters which do not have units.
G	Factory setting	Write the value set at the factory.
H	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".
I	Function list	Enter the hexadecimal code as the function class for display on the Functional List Format screen. Selecting "Functional List Code" in the [Edit] menu shows the functional list code edit panel.
J	Condition count	Shows the number of conditions set in parameter read condition editing.

REMARKS

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

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)

•Add & Paste

Inserts the data cut or copied on a line basis. (Tool button available)

•Add

Inserts a blank line to above the currently chosen line. (Tool button available)

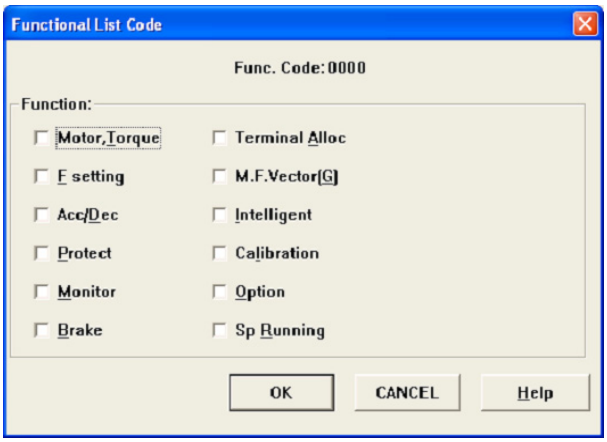
•Delete

Deletes the currently chosen line. (Tool button available)

•Functional list code

Shows the functional code list of the currently chosen parameter.

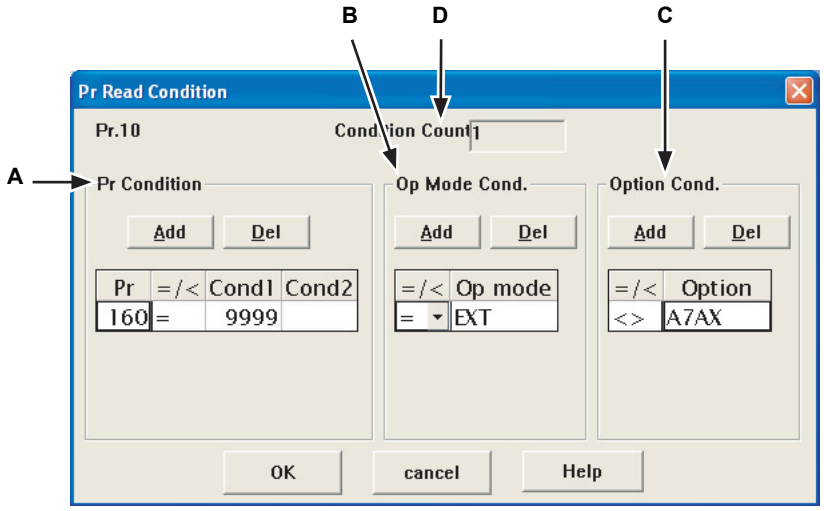
Clicking the item to be displayed in the Functional List Format and pressing the [OK] button automatically shows the functional list code.

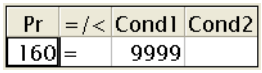
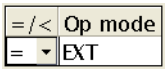
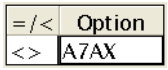


Functional List Code Edit Panel

•Parameter Read Condition

When performing Block Read or Block Check by FR Configurator, no error indication will be displayed by setting the parameter reading conditions, even if the parameter setting of inverter and FR Configurator do not match.
(Refer to *page 28* for Block Read and Block Check of the parameters.)



No.	Name	Function and description
A	Parameter Condition	Set the read disable conditions by other parameters. When adding a condition, press the [Add] button and add one row. Enter the parameter number that will be the read disable condition into the Pr. item, = (equal) or <> (not equal) as the condition, and the parameter setting into the Cond1 item. When the setting has a range, enter the range into Cond1 and Cond2. To delete the condition, choose the item to be deleted and press the [Delete] button. Example) When *Pr. 160*=9999 is in the read-disabled condition 
B	Operation Mode Condition	Set the read disable conditions for the operation mode. When adding a condition, press the [Add] button and add one row. Choose = (equal) or <> (not equal) as the condition, and select the mode disabled for read from Op mode. To delete the condition, choose the item to be deleted and press the [Delete] button. Example) When the reading is diabled in the external mode 
C	Option Condition	Set the read disable conditions for option fitting. When adding a condition, press the [Add] button and add one row. Choose = (equal) or <> (not equal) as the condition, and enter the option name into the Option item. The option name to be entered is the one set in the model information panel of the FR Configurator. To delete the condition, choose the item to be deleted and press the [Delete] button. Example) When the reading is disabled without FR-A7AX 
D	Condition Count	Display the number of conditons set already. Pressing the [OK] button automatically set the number of the read disabled conditons.

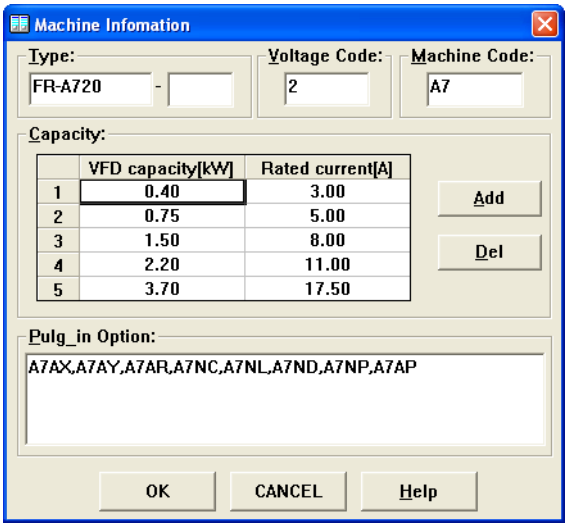
REMARKS

Refer to the inverter instruction manual for the parameter reading conditions of the inverter.

•Machine Information

Shows the edit panel for model information of parameter file. (Tool button available)

You can edit the Inverter Type, Voltage Code, Machine Code, VFD capacity, Rated current and compatible Pulg in options.



Machine Information Edit Panel

(3) Display

•Display column setting

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

•Tool bar

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

Displays the displayed windows one over another.

•Tile display

Displays the displayed windows side by side.

(5) Help

•Contents

Shows the contents of help.

•About PrEdit

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 the PrEdit with the parameter file, you can open the PrEdit from the parameter file.

CAUTION

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

Revision

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

Print Date	*Manual Number	Revision
May, 2006	IB(NA)-0600242ENG-A	First edition