SANMOTION

MOTOR SETUP SOFTWARE

SERVO SYSTEMS

Instruction Manual

SANYO DENKI

Publication time	Rev	Chapter or Page	Change details	
FEB.2014	Α		NEW	
		1-1	Servo adjustment assistance/Adaptive notch filter manual setting are added to No.6 Tuning.	
			1-2	Applicable system RS2 amplifier model addition
		Chapter 9.4	Servo adjustment assist function addition	
DEC.2014	в	Chapter 9.5	Adaptive notch filter manual setting function addition	
			Below are mistake corrections.	
		7-5	1) (C) JOG-operation \rightarrow Orientation-operation	
		7-9	(4) orderly completing \rightarrow abnormally completing	
			update a figure Figure 3-11, 3-13, 3-15, 3-16, 6-1, 7-1, 9-1, 11-1, 11-2	
		Chapter 7.2	Add "Maximum velocity is limited to 2m/sec, in the system using linear motor with 1nm resolution." to 2) How to operate, Positioning operation.	
		Chapter 7.3	Add "this function is not allowed if the system is set for linear motor.".	
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1 2013		Chapter 9.1	Add "This function is not allowed if the tandem operation is used.".	
		Chapter 9.2	Add "This function is not allowed if the tandem operation is used.".	
			Chapter 9.4	Add "This function is not allowed if the tandem operation is used.".
		Chapter 10.3	Add "This function is not allowed if the tandem operation is used.".	
		Reference work	Adds the contact info regarding to applicable product update.	
APR.2015	D	Chapter 1.1	Applicable product update.	
AFR.2015		Chapter 1.2	Applicable product update.	
		Chapter 2	Applicable product update for connection with servo amplifier/driver.	
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		Chapter 2.4	Applicable product update for connection with servo amplifier/driver.	
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		Chapter 2.5	Update a wiring diagram and connection axis of PB driver.	
		Chapter 13.3 Chapter 1.1	Add "Connector number of driver side connector". Add "Motor brake control function".	
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WIAN.2017	G	Chapter 3.5	Delete a part of description for parameter level.	
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Publication time	Rev	Chapter or Page	Change details	
		Chapter 1.1	Add "Functional safety module (Safety Module)".	
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		Chapter 2.6	Add connection with "Functional safety module".	
		Chapter 4.1	Add functions of "Parameter editing authority" and "Parameter initialization" to function list.	
		Chapter 4.2	Add menu of functional safety module setting, to "Settings by group".	
		Chapter 4.9	Add notification for "Functional safety module".	
		Chapter 4.10	Add function of "Parameter editing authority".	
		Chapter 4.11	Add function of "Parameter initialization".	
AUG.2017	Н	Chapter 7.1	Add notification for during safety function performing.	
		Chapter 7.2	Add notification for during safety function performing.	
		Chapter 7.3	Add notification for during safety function performing.	
			Chapter 7.4	Add notification for during safety function performing.
			Chapter 9.1	Add notification for during safety function performing.
		Chapter 9.2	Add notification for during safety function performing.	
			Chapter 9.4	Add notification for during safety function performing.
		•	Add notification for the case of functional safety module attached.	
		Chapter 10.3	Add notification for during safety function performing.	
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100,11.2010	5	Chapter 10.1		
		Chapter 10.2	Note for save file (.csv) is added.	
		Chapter 10.3		
		Chapter 10.4		

Preface

Thank you for purchasing our SANMOTION servo system.

This is instruction manual for SANMOTION Motor Setup that is convenient introduction support tool for our servo amplifier.

- ✓ Please refer this at startup and adjustment of the servo system.
- ✓ Also refer a manual of each servo amplifier.

%The screenshot in this manual might differ from actual.

%In this document, RS3 means "SANMOTION R 3E Model", RS2 means "SANMOTION R ADVANCED MODEL",

SSmeans "SANMOTION S", F2 means "SANMOTION F2", F5 means "SANMOTION F5" and PB means "SANMOTION Model No.PB".

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Reference work

Please refer each instruction manual of servo amplifier and driver.
 Download instruction manuals from our webpage. Otherwise contact our sales department.

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1. System summary 1.1

Outline of functions

You can connect this SANMOTION MOTOR SETU

P (hereinafter referred to as Setup S/W) to SANYO DENKI AC-servo amplifiers (hereinafter referred to as servo amplifier(s)) and conduct the following functions: Table 1-1 List of functions and applicable servo amplifier models

No.		Functions	Descriptions	RS3	RS2/ RM2	RF2G pulse	RS2- EtherCAT, RF2J, RF2K	SS1 pulse	SS1 Ether CAT	F2	F5	PB Ether CAT	PB pulse	Safety Module
		Parameter Setting - Each Group	Edits parameters by group. This can edit all the parameters.	0	0	0	0	0	0	0	0	0	0	0
		Parameter Setting - Each Function	Sets parameters by functions. This only can edit representative parameters.	△ ※3	×	×	×	×	×	×	×	×	×	×
		Parameter transmission	Transfer the parameter data between the servo amplifier and a file in the PC.	0	0	0	0	0	0	0	0	0	0	0
1	Parameter	Saving to the Backup Memory/ Restoration from the Backup Memory	Storing parameters into the backup memory built in a servo amplifier. / Restores the backup memory values as the parameters of a servo amplifier.	0	0	0	×	0	×	0	0	×	×	×
		Parameter Verification/ Password Setting	Collates parameters as well as sets passwords to inhibit parameter values from being rewritten.	0	0	0	0	0	0	0	0	0	0	0
		Parameter editing authority	Switches authority for parameter edit/browse.	×	×	×	×	×	×	×	×	×	×	0
		Parameter initialization	Initialize parameters to factory setting.	×	×	×	×	×	х	×	×	×	×	0
2	Monitor	Monitor	Monitors the various data of servo amplifiers.	0	0	0	0	0	0	0	0	0	0	0
3	Diagnosis	Alarm History	Displays current alarm and alarms in the last 15 times indicating estimated route causes and the corrective actions.	0	% 1	※ 1	※ 1	※ 1	※ 1	₩1	0	※ 1	0	0
	Dia	Alarm Reset	Releases the alarm states.	0	0	0	0	0	0	0	0	0	0	×
		Warning info	Displays the information on warning.	0	<u>*</u> 2	<u></u> *2	<u></u> %2	×2	<u>*</u> 2	×	0	<u>*</u> 2	0	×
		JOG Operation * Positioning	Perform velocity JOG-operation. Perform positioning operation.	0	0	0	0	0	0 0	0	0	0	0	×
	tion	Operation * Searching motor	Moves a motor shaft to an original	0	×	×	×	×	×	×	×	×	×	×
4	operation	origins * Magnetic pole	position. Estimates the magnetic pole position of linear	0	0	0	0	×	×	×	×	×	×	×
	Test c	position estimation * Serial Encoder	motors. Clears the amount of multiple turning of a	0	0	0	0	×	Ô	×	×	Ô	×	×
	'	Clear *	serial encoder for motors and alarm status. It permits a control of motor brake power supply.	0		_	-							
		Motor brake control		(400VAC)	×	×	×	×	×	×	×	×	×	×
5	Analog Offset Adjustment	For V-REF/ T-REF Terminal *	Automatically or manually adjust the offset amount of analog velocity command, velocity addition command, or analog torque (force) command.	0	0	×	×	0	×	×	×	×	×	×
	Anald Adju	For T-COMP Terminal *	Automatically or manually adjust the offset amount of torque (force) addition command.	0	0	×	×	0	×	×	×	×	×	×
6	Servo tuning Assist	Auto Tuning	Automatically sets notch filter for torque (force) command by searching resonant frequency of mechanical system, sets FF-vibration suppression frequency by searching resonant/antiresonant frequency of mechanical system.	0	0	0	0	0	0	×	×	×	×	×
	vo tui	Saving Result of Auto Tuning	Stores appropriate gain calculated by auto-tuning function as a parameter.	0	0	0	0	0	0	×	×	×	×	×
	Ser	Servo Tuning Navigation	At the servo tuning, adjusts using navigation.	0	×	×	×	×	×	×	×	×	×	×
		Saving Result of Adaptive Notch Filter	Sets the detected frequency as fixed value.	0	×	×	×	×	×	×	×	×	×	×
		Operation Trace ++	Displays states of servo amplifier operation in waveforms.	0	0	0	0	0	0	0	0	0	0	0
	ment	System Analysis *++	Analyzes characteristics such as mechanical frequency response.	0	0	0	0	0	0	×	×	×	×	×
7	Measurement	Operation Scrolling	Displays states of multiple-axis servo amplifier/drivers at once in waveforms.	0	0	0	0	0	0	0	0	0	0	0
	Me	Drive Recorder ++	Records the last 16 states of a servo amplifier/driver in the past and then displays them in waveform.	0	×	×	×	×	×	×	0	×	0	O (Once)

Available functions are marked with "O", non-supported functions are marked with "×". There are cases where some of functions marked with "Δ" are not available depending on specifications.

%1: Store alarm history occurred in the last 7 times. This does not support diagnosis functions.
 %2: You can check the information on warning by batched monitoring.

- %3: RS3 EtherCAT interface is not available.
- \checkmark The starred functions (*) cannot be used together at the same time.
- \checkmark The functions marked with (++) cannot be used together at the same time.
- ✓ Abbreviated servo amplifier symbol in table indicates servo amplifier and driver below.

RS3	· · · 「SANMOTION R 3E Model」
RS2, RM2, RF2	
SS	•••「SANMOTION S」
F2	•••「SANMOTION F2」
F5	・・・「SANMOTION F5」
PB	· · · 「SANMOTION Model No.PB」
Safety Module	· · · 「SANMOTION R 3E Model functional safety module」

1.2 Applicable system

This Setup S/W supports the servo amplifier and driver below.

- · SANMOTION R 3E Model servo amplifier
- · SANMOTION R ADVANCED Model servo amplifier
- SANMOTION S servo amplifier
- SANMOTION F5 5-phase stepping driver, AC input
- SANMOTION F2 2-phase stepping driver, AC input
- SANMOTION Model No.PB Stepping system, closed loop
- SANMOTION R 3E Model, Functional safety module

There may be cases some functions are not available depending on servo amplifier models or combinations of a servo motor and encoder. Menu and icons of unusable function will be unselectable.

1.3 System environment

Required performance to perform operation greatly varies depending on operation systems and need to be compliant with each system requirement per operating system. It is recommended to add the following requirements to fulfill more patient performance.

PC	IBM PC/AT-compatible
Memory	Space more than 512MB
Hard-disk space	More than 600MB (Including Microsoft .NET Framework 3.5)
Display	More than 1024×768 of resolution/ 32 color-bit
Applicable OS	Windows® 7
	Windows® 8
	Windows® 10
	*There is no limit to the edition of operation software.
Required software	The following components are required to operate this software. If they have not been installed before installing this software, they will be automatically installed. • Microsoft .NET Framework 3.5
	Crystal Reports Basic Runtime for Visual Studio 2008
Others	RS-232C port or USB port with more than 1 channel

Table 1-2 Recommended system requirements to be added

1-2

RS3***A* RS2***A*, RF2G****, RF2J**A*, RF2K**A*, RM2* SS1A15M8** F5PAA***P1**, F5PAB***P1** F2BAW*00M100 PB4D003E***, PB4D003P***

1.4 Installing the program

- Install Setup S/W in the following procedure:
- (1) Stop all the running programs.
- (2) Insert the Installation CD into CD-ROM drive (e.g.: drive E) of your PC.
- (3) Select "Run" command on the Start menu of the Windows taskbar, or double click on installation execution file via the Internet Explorer.
- (4) Select the language you install and then click "OK" button.



Figure 1-1 Dialog to select languages

(5) Start installing Setup S/W. Click "Next".



Figure 1-2 Start-up window for installing Setup S/W

(6) The license agreement is displayed. Confirm the contents and click "Next" if you agree with the contents.



Figure 1-3 The license agreement display window

(7) Designate the folder in which Setup S/W is installed. If you change the folder already displayed, click "Browse...." to designate a new folder to install in. Click "Next".



Figure1-4 Window for designating the folder to install S/W in

(8) Input a keyword to make it conform to customized motors. Click "Next" for cases other than that.

election of products			
Selecting the product you want to instal			6
If you use standard product, do not inp	ut anything and (lick "Nevt"	
Please enter keyword if you want to use			
Keyword			
1			
	< Back	Next >	Cancel

Figure1-5 Keyword-inputting window

- (9) The installer installs the S/W after detecting whether or not any of the following modules exist. Click "Install" button.
 - Microsoft .Net Framework 3.5 SP1
 - Crystal Reports Basic Runtime for Visual Studio 2008



Figure1-6 Window for confirming start of installation

(10) S/W is being installed in this window. Please wait for a while.

Setup - SANMOTION Motor Setup	
Installing	
Please wait while Setup installs SANMOTION Motor Setup on your computer.	6
Extracting files	
C:\Program Files\SANYO DENKI\SANMOTION Motor Setup\freqA\libmmfile.dl	1
	74.4

Figure 1-7 Window showing S/W being installed

(11) Now the installation has been completed. Click "Finish" button. The window instructing to reboot the PC appears depending on installation environments. In this case reboot the PC.



Figure 1-8 Dialog box indicating installation has been completed

1.5 Uninstalling the program

- The following describe how to uninstall the setup Software:
- (1) Stop all running programs.
- (2) Select "Control panel (C)" through "Setting (S)" from the start menu on the Windows taskbar. Doubleclick on "Program and functions" (Windows7) icon to display the window below.



Figure 1-9 Uninstallation window

- (3) Select "SANMOTION Motor Setup", and then click "Remove".
 - ✓ When uninstalling Setup S/W, the following applications will not automatically uninstalled. If there are no impacts on the other applications, these applications below need to be manually uninstalled.
 - Microsoft .Net Framework 3.5 SP1
 - Crystal Reports Basic Runtime for Visual Studio 2008
 - · Windows-driver package for SANYODENKI CO., LTD. (WinUSB) USB Device

2. Connecting to a servo amplifier/driver

2.1 Connecting to a servo amplifier R-3E model

Connecting to a servo amplifier R-3E model should be via USB (FULL-speed).



- ✓ Connect to the connector having USB mark (named "PC").
- The connectors on servo amplifiers are USB-mini B (socket)-type.
- \checkmark When connecting multiple axes, connect them through USB-hub.

2.2 Connecting to a servo amplifier R-Advanced model AC input type (except EtherCAT IF expanded general input type) and SANMOTION S

1) Connecting to single servo amplifier

Use a dedicated cable (optional part: Product model number: AL-00689703-01) to connect a servo amplifier to a PC.

Connecting port on the servo amplifier: For pulse train IF type • • • CN2 connector on the front panel
For EtheCAT IF type • • • PC connector on the front panel
: Serial communication type connector on the PC (9-pin D-sub)



- ✓ Refer to Chapter 13 Appendix for the connector product models and wiring methods.
- ✓ For PC side, connect to COM-port.
- ✓ For servo amplifier side, connect to the connector indicated above. Do not to connect to CN3.

2) Connecting to multiple drivers (amplifiers)

Pulse input type and SANMOTION S can connect multiple, depending on amplifier spec. Follows are explain how to connect multiple connection.

Connect servo amplifiers to a PC using communication cables (2 types), communication converters, and termination connectors (those above are all optional parts). Up to 15 servo amplifiers can be connected together at once.



- ✓ Make sure the connections of CN2 and CN3 are as illustrated above. Connecting those above in a wrong way cannot establish communication.
- ✓ Set SW1 of communication converter by making it conform to 422A-side and set SW2 by making it conform to the communication cable (crossed or straight type) which connects to the host PC.

2.3 Connecting to a servo amplifier R-Advanced model AC input type (with EtherCAT IF expanded general input type)

Use a dedicated cable (optional part: Product model number: AL-00745525-01) to connect a servo amplifier to a PC.

Connecting port on the servo amplifier : CN6 under front cover Connecting port on the PC : Serial communication type connector on the PC (9-pin D-sub)



PC

Dedicated cable: AL-00745525-01

(CN6 under front cover)

Servo amplifier

- ✓ Refer to Chapter 13 Appendix for the connector product models and wiring methods.
- ✓ For PC side, connect to COM-port.
- ✓ Do not to connect to CN2 and CN4.

2.4 Connecting to a servo amplifier R-Advanced model DC input type

1) Connecting to pulse IF type

Use a dedicated cable (optional part: Product model number: AL-00490833-01) to connect a servo amplifier to a PC.

Connecting port on the servo amplifier : For pulse train IF type · · · PC connector on the front panel For EtheCAT IF type · · · CN4 connector on the front panel Connecting port on the PC

: Serial communication type connector on the PC (9-pin D-sub)



Servo amplifier

- Refer to Chapter 13 Appendix for the connector product models and wiring methods.
- For PC side, connect to COM-port.

2) Connecting to EtherCAT IF type

Same as R-Advanced model AC input type (single connection). Refer the section 2.2 and connect it.

Use a dedicated cable (optional part: Product model number: AL-00689703-01) to connect a servo amplifier to a PC.

Connecting port on the servo amplifier : For EtherCAT IF type · · · PC connector on the front panel Serial communication type connector on the PC (9-pin D-sub) Connecting port on the PC



- Refer to Chapter 13 Appendix for the connector product models and wiring methods.
- For PC side, connect to COM-port.
- For servo amplifier side, connect to the PC connector indicated above.

2.5 Connecting to a stepping driver

Use a dedicated connection unit (optional part: PBFM-U6) to connect PC and the stepping driver which is applied SANMOTION MOTOR setup software: SANMOTION Model No.PB, SANMOTION F2 and SANMOTION F5.

Name	Content	Model number	Instruction manual number
USB/RS485 converter	PC/driver connection unit	PBFM-U6	M0010723



- ✔ Refer to *Chapter 13 Appendix* for the connector product models and wiring methods.
- ✓ For detail, refer to another instruction manual (M0010723) for USB/RS485 converter (PBFM-U6).
- ✓ For the connection with F5 or F2, select the #1 as connection axis, and set 57,600bps as communication baud rate.
- ✓ For the connection with PB, select the connection axis in accord with the axis number, and set 57,600bps as communication baud rate.

Connecting to R3E Model Functional safety module

2.6 Connecting to R 3E Mofel Functional safety module

Connecting to a servo amplifier, R-3E Model Functional safety module, should be via USB (FULL-speed).



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3. Basic operation

3.1 Starting up Setup S/W

- You can start up Setup S/W in the two ways below.
- (1) Starting up through Start menu.
- (2) Starting up from the shortcut.
 - The following Start up window appears and then Main menu window is displayed when starting up in either way above.



1) Starting up from the start menu

- (1) Click "Start" on the taskbar.
- (2) Click the following in the following order:
 "All programs"→"SANYODENKI"→"SANMOTION Motor Setup"

2) Starting up from the short cut icon

Double click on the shortcut icon of Setup S/W on the desktop to start up.



Figure 3-2 Displayed icon

3.2 Communication with servo amplifiers

1) Setting for communication

(1) Start up the window for setting communication.

Set the settings necessary for communicating to servo amplifiers via Communication setting window. The communication setting window is displayed after starting up Setup S/W. When not displayed, start up "Communication setting" from "Communication" on the menu bar or click on the communication setting icon on the toolbar.

(2) Select a communication specification.

Select USB-tab or COM (RS-232C) depending on the specifications of servo amplifier/drivers to be connected.

(3) Allocate each axis.

< When selecting USB-communication>

The servo amplifier/drivers currently recognized as being connected are shown in the line marked (B). Select the devices you want to connect and then click "Add axis" button. Click "USB Auto allocate" button to allocate all the devices recognized as being connected. The allocated amplifiers are added to the list of axis allocation.

3)	Servo amplifier connected via USB Axis Amplifier Model 1 RS3A02A2AL2	Motor Model R2AA06040F	Serial number 0268371722
	List of axis allocation	Axis 🛛 🙆 Cancel Axis	s 🔽 🙍 USB Auto allocate
	Axis Connecting port	Amplifier Model	

Figure 3-3 Communication setting window (USB-communication)

<When selecting COM-communication (RS-232C)>

Select COM Port number, Axis number, and Baud Rate, and then click "Add axis" button. Then the axis you want to allocate is added to the list of axis allocation with the setting reflected. Clicking "COM Auto allocate" button automatically changes allocation as well as automatically switches Baud Rate and axis number, and then start searching devices which connect to.

mmunication Se	tting		
🖋 USB 💎 C) —		
Setting for servo a	amplifier to perform serial interf	ace	
COM Port	СОМЗ		
Axis	1		
Baud Rate	38400bps 💌		
List of axis allocati	on 🕞 Add Axis	\ominus Cancel Axis 🗸	Q COM Auto allocate
Axis C	ionnecting port	Amplifier Model	
STATUTE AND INCOME.	OM3 - 38400bps		Connect
Connected	Not connected	or Not-corresponding 	-

Figure 3-4 Communication setting window (COM-communication)

The communication setting conditions registered into project should be the initial value as the PC automatically reads in the previously created project when starting Setup S/W.

2) Establishing communication

Start the communication with servo amplifiers in the following procedure:

- (1) Start through Communication setting window
 - Click on "Connect (C)" button on the right side of each axis to start communication.
 - Click on "Connect all (D)" (in the left corner of the window below) to start communication with the axes applied.

	Communication Setting		
	Servo amplifier connected via USB	1	
	Axis Amplifier Model Motor Model	Senial number	
Green light comes on when normally connected.	List of axis allocation O Add Axis O Cance Axis Connecting port Amplifier Mo 1 USB RS3402424	del	This should be "Connect" button when no communication performed.
(D) ~	Connected Not connected Error Not-connect all	orresponding	

Figure 3-5 Window for establishing communication

- When the communication has been normally started, the light comes on in green and display the model number of the amplifier.
- (2) Establishing communication through Main menu window
 - Click "Establish communication" through "Communication" on the Main menu, or click on the icon for establishing communication on the Toolbar to start communication for all the allocated axes.
 - Double click on the image for each device on the Main menu to start communication only for the applicable axes.

Project(P) Communical	Motor Setup
	tion(C) Function(F) Data File(D) Option(O) Window(W) Help(H)
	🔊 🖄 🚈 🖕 🐂 📥 🚢 🛤 🗛 🔕 🕢 🕐 🕐 🛇 🐼 📼 📼 🚳 🖤 🗣 🎥 👔
Project	1
Communication	Axis1
Parameter	Current Axis 1 Amplifier/Motor Model RS 3A02A2AL2 / R2AA06040F
Q Monitor	X1 -
Q Diagnose	Parameter
Test Operation	- Parameter Setting
👆 Analogue Offset Adjustn	nent Each Group
📎 Servo Tuning Assist	Parameter Transmission
Measurement	Parameter Transmission(To File)
	Backup Memory
Data File	Save to the Backup Memory Restoration from the Backup Memory
Data File	Severate the Backup Memory A Restoration from the Backup

Figure 3-6 Project window when communication being established When communication established properly, the device color changes form gray to

green.

3) Releasing communication

Shut down communication with servo amplifier (s) in the following procedure:

- (1) Shut down through Communication setting window
 - Click on "Disconnect" button on the right side of each axis to shut down the communication with the servo amplifiers you selected.
 - Click "Disconnect all" button in the left corner of the window to end the communication with all the servo amplifiers.
- (2) Shut down through Main menu window
 - Click "Release communication" through "Communication" on the Main menu, or click on the icon for releasing communication on the Toolbar to end communication for all the allocated axes.
 - Double click on the image for each device on the Main menu to release communication only for the applicable axes.
 - Once communication normally shut down, the device color changes from green to gray

3.3 Basic screen operation

The Main window of Setup S/W consists of Side menu, Axis-selector, Functional panel.

1) Main window

You can launch the execution windows for each function through Menu(A) in Main window, Toolbar(B), or each function name displayed in the Project window(C).





Selects and execute various settings and functions.

(A) Menu bar

(B)

(E)

- Tool bar : Selects and execute various functions.
- (C) Side menu : Shows overview of functions. Selecting this displays various functions in Functional panel.
- (D) Axis-selector : Shows the states of being connected of the axes allocated and the axes you are selecting.
 - Info on axis being selected : Shows the information on the selected axis (amplifier and motor model numbers)
- (F) Functional panel : Shows the various functions selected in Side menu.

2) How to start up the window for functions

You can select the following 3 methods to execute various functions.

- (1) Staring up through Menu bar
 - Select various functions from [Function (F)] in the menu bar in Main menu window.
 - Select each function from general categories by function.



Figure 3-8 Start up window through Menu bar

- (2) Starting up form Tool bar
 - Directly select each function from the Toolbar in Main menu.
 - Not all the functions are allocated.



- (3) Starting up through Sub menu window
 - Clicking Sub menu window listed in the left of Main window displays the buttons with which you can access to various functions related to. Click the functional button you want to execute.

🖹 🚔 🚔 🛱 🗱 🔛 2	6 % <u>** ** ** 🔺 </u> 🛙	A A C O O O O) 💊 🖂 🖃 🐼 🌆 N ºF 🏯 ?
Project	1		
Communication	Axis1		
Parameter	Current Axis 1	Amplifier/Motor Mo	del RS3A02A2AL2 / R2AA06040F
Monitor	-		
Q Diagnose	🔭 Param	eter	
Test Operation	- Parameter Setting	1.1.4	
占 Analogue Offset Adjustment	Each Group	· · · · · · · · · · · · · · · · · · ·	Each Function
Servo Tuning Assist	- Parameter Transmission		
2 Measurement	A Parameter Tra	nsmission(To File)	Parameter Transmission(To Amplifier)
	- Backup Memory		
Data File 🕂	📥 Save to the Ba	ckup Memory	Restoration from the Backup Memory
	etc		
	🔏 ي Parameter Ver	ification	Password Setting
	-		

Figure 3-10 Starting up Function window

3.4 Project

You can control and record (store) axes configurations which are connected and various data files as projects.

[New] - SANMOTION Motor	Setup						
Project(P) Communication(C)	Function(E) Data File() Option(O)	Window(<u>W</u>)	Help(<u>H</u>)			
💼 🏫 🚔 🛤 🛤	6 🗚 🕫 🐴 📥 🖆		😳 🕖 🕑	000		⁰N ºF 20 ?	1
Project	1						
P Communication	Axis1						
A Parameter	Current Axis 1		Amplifier/Mo	otor Model	RS3A02A2AL2 /	R2AA06040F	
Q Monitor	– – ·	-					
Q Diagnose	Proje	ect					
🖕 Test Operation	Project Name Creation Date and Time	Project 2/5/2014 18:52:4			New		
🐁 Analogue Offset Adjustment	Author	2/5/2014 16:52:4	•		Copen		
🔏 Servo Tuning Assist							
Measurement	Contents				Save		
📒 Data File 🕂 🕂					💼 Save as		

Figure 3-11 Project window

- ✓ You can newly create, open, save, and save as any name a project from this window.
- Make sure that you need to newly create a project when the type of the servo amplifiers currently connected was changed.

1) Newly creating a project

You need to newly create when initially connecting to servo devices, or connecting the devices other than the ones currently allocated. When you newly create a project, create the project in any of the following procedures.

- (1) Select "New (N)" through "Project (P)" from the menu bar in Main menu window.
- (2) Select from the Toolbar.
- (3) Select "New" through "Project" in Side menu. (Refer to the window above.)

2) Opening an existing project

- When you open an existing project, select the project in any of the following procedures:
- (1) Select "Open(O)" through "Project(P)" in Main menu window, and then select an existing project file.
- (2) Select from the Toolbar.
- (3) Select "Open" through "Project "in the Side menu. (Refer to the window above.)

3) Storing projects

- When you store projects being opened, store them in any of the following procedures:
- (1) Select "Save(S)" through "Project(P)" from the Menu bar in Main menu window to overwrite existing project files. Or select "Save As(A)" to save files with new project names.
- (2) Select from Toolbar.(Overwrite-save only)
- (3) Select "Save as" or "Save" through "Project" from Side menu. (Refer to the window above.)

Ind

4) Settings for a project

- You can input various information on a project other its project name.
- (1) Set the name, creator, and contents of a project.
- (2) You can directly input the name, creator, and contents of a project by selecting "Project" from Side menu.

📋 Proj	ect
Project Name	Project
Creation Date and Time	2/5/2014 18:52:48
Author	SANYODENKI
Contents	Sample

Figure 3-12 **Project information setting window (an excerpt)**

<Axis property>

- (1) Set the name of axis. At the same time you can confirm the software version of applicable servo amplifiers.
- (2) Select the axis you want to display from Axis-selector in Main window, and then right-click to open Property window, and then select

Axis Number/Axis Name 1 Amplifier Model RS3A02A2AL2 Amplifier ID 03000001 Software Version 01.0.06 Module Version 0005-0006-0003-0205-0001-0004-0001-0000 Connect The communication is being established. Disconnect Connecting port USB Baud Rate - - System Information - Motor Structure 00:R0TARY		Axis1[] property	and the second	
System Information Motor Structure 00:R0TARY	i Disconnect Amplifier Information	Axis Number/Axis Name Amplifier Model Amplifier ID Software Version Module Version Communication State Connecting port	RS3A02A2AL2 03000001 01.0.06 0005-0006-0003-0205-0001-0004-0001-0000 The communication is being established. USB	
Main Power Supply Voltage UU:200V		Motor Structure Main Power Supply Voltage	00:R0TARY 00:200V	
Amplifier Capacity Code 0B:20A Control Circuit Type 02:ABS-INC			Province and a second sec	

Figure 3-13 Axis property window

✓ You can check the following information: servo device model numbers, amplifier IDs, software version, module version, and communication state.

5) Adding data files to a project

You can register the data files of operation trace, system analysis, and operation scrolling.

(1) To register data files to a project, select "Add to project" through "files" from the menu bar in various

functional window with the data files you want to register opened.



(2) Registered data files are automatically saved with the name consisting of "date+serial number" and displayed in the data file window per function in Side menu.

1-1-1

displayed in the data me window per function in Side ment

C:\Documents and Setting	gs\sd2\Desktop\Project.prj]	- SANMOTION Motor Setup	X
Project(P) Communication(C)) Function(E) Data File(D)	Option(O) Window(W) Help()	B
🗎 🚔 🚔 🛛 😫 🚽	6 🛪 🚈 🐂 📥 📥 🛙	😐 🗛 🔬 😳 🔍 🕐 🔍 🤇) 🐼 🖂 🕼 🕼 🕬 🗣 🎴 ?
Test Operation	1		
A 1 0% (A 5)			
Analogue Offset Adjustme	Axis1		
Servo Tuning Assist	Current Axis	Amplifier/Motor Mod	del /
A Measurement	DataFile		
	Onera	ation Trace	
📕 Data File 👘			
📒 Parameter of each Gr	Any file		
Parameter of each Fu	🗾 Open any d	data file	
			File name registered
alarm History	Project managed files		/
Operation Trace	Axis Name	Dat	Open selected file
	1 2014020600	01 2/6/2014 6:37 Pi	M
Operation Scrolling			Addition to a project
📒 System Analysis			
Drive Becorder			Remove from project
- Dive necolder			
📒 FFT			

Figure 3-15 Data file registered in a project (e.g.Operation trace)

- ✓ The data files registered in a project are stored in sub-folder under the folder in which project files stored.
- ✓ You can store each data file without registering in a project.
- ✓ You can change data file names later.

6) Reading out data files

Double clicking data file names displayed in Project window reads out (displays) the files you saved.

 Clicking Toolbar icon in Main window saves the information on the project you set and data files you registered.

3.5 Option settings

You can set behaviors of applications via option settings. Select "Option" from the toolbar in the Main menu window.

Display		© COM port auto search (
Interface language	English (United States)	 Select the baud rate of the automatic searching of the amplifier for the COM port.
* This becomes effective	e after reboot of the application.	
Operation Level		38400 bps ✓ 57600 bps
Authority	Authority C	🚽 🖌 19200 bps
Operation Level	Maintenance	2400 bps
3ehavior		0
Enable inactive wind	ow tool bar click.	Auto connection (
Startup process		At the startup
Open the project file	used last time	When a project was opened
USB Amplifier auto a:		L
_		
Open communication	setting	
Database		10
	Befer Clear	<i>[™]</i>
Reference Database File	ricici Cicai	

Figure 3-16 Option setting window

1) Display language

You can select the language you use for your system from drop-down list. This becomes valid by re-starting up the application after setting.

2) Classifying operation

You can set operation permission (authorization) level and operation level.

Setting operation level limits the parameters to be edited. There are two types of operation level, "Basic" and "Advanced".

- \checkmark Basic: This can edit only basic level parameters for servo amplifiers.
- \checkmark Advanced: This can edit all the parameters for servo amplifiers.
- ✓ "Authority B" and "Authority C" are for maintenance by SANYODENKI.

3) Setting behaviors

 Checking "Enable inactive toolbar click", you can click the toolbar in inactive windows with the windows being inactive.

4) Processing at start-up

- ✓ With "Open the project file used last time" checked, the application starts up and opens the project file you previously used.
- With "USB Amplifier auto assign" checked, the application starts up and automatically allocates the servo devices connected to the PC via USB
- ✓ With "Open communication setting" checked, the application starts up and always opens the communication setting window.

5) Database

You can select servo device database file to reference from arbitrary folders. With clear button pressed, or when the destination to reference has not set, it references the database file in the default installation folder. The changes in setting are reflected when the application starts up next time.

6) COM-port auto search

✓ You can select the corresponding baudrate to auto-search servo amplifiers connected to COM-port. Searching is done by switching baudrates checked in the order of the list. To change the order of baudrates to search, click the up and down arrow keys on the right side to change the order of the list.

7) Auto connection

 You can designate the behavior when the application starts up. With "When stating up" checked, the application starts up and tries to auto-connect to the amplifiers being connected. With "When reading in project files" checked, the application tries to auto-connect with the axes allocated as projects when downloading project files.

3.6 Operation manual

Selecting "Operation manual(M)" through "Help(H)" from the Toolbar in Main window, you can open the operating manual for Setup S/W. Refer to this if you have a question or a problem in operating.

✓ The instruction manual for Setup S/W covers the same contents.

3.7 Version information

Selecting "Version Information(V)" through "Help(H)" form the Toolbar in Main window, you can confirm the version, database version, and motor version of Setup S/W.

Software Version	255.120.2
DataBase Version	Test.117
Motor Parameter Version	004.002

Figure 3-17 Window indicating version information

✓ You can confirm the version of Setup S/W here. To confirm the version of the servo device you connect, select "Amplifier Information" property that is displayed by clicking on the axis you connect.

4. Parameters

4.1 Outline of parameter-editing functions

You can edit parameters for amplifiers, forward files, collate, and backup using Setup S/W.

1) List of functions

You can execute the following parameters using Setup S/W.

No	Functions of parameters	Descriptions
1	Setting by group	Edits various parameters for servo amplifiers.
2	Setting by function	Sets parameters by functions. This only can edit representative parameters.
3	Parameter transmission (Amplifier to file)	Stores parameters for servo amplifiers into files.
4	Parameter transmission (File to amplifier)	Forward parameter-file values to servo amplifiers.
5	Storing parameters in backup memory	Back-ups parameters to backup memory built in servo amplifiers. There may be cases that parameters cannot be backuped depending on amplifier driver types you connect.
6	Restoring parameters from backup memory	Restores parameters for servo amplifiers referring to the values in backup memory. There may be cases that parameters cannot be backuped depending on amplifier driver types you connect.
7	Parameter Verification	Collate parameters between servo amplifier and file/ file and file.
8	Password Setting	Sets passwords to protect parameters form being re-written.
9	Parameter editing authority	Switches authority for parameter edit/browse.
10	Parameter initialization	Initialize parameters to factory setting.

2) Parameter types

There are 3 types of parameters as follows. All these parameters can be changed via windows for setting parameters.

(1) General parameters

The parameters set depending on the intended use such as input-output, various servo gains. These are allocated to group 0 to F.

(2) System parameters

Basic system parameters such as ones by input power supply, encoder connected. These are allocated to group "System parameters".

(3) Motor parameters

The parameters of motors to be connected.

4.2 Settings by group

Edit parameters for servo amplifiers by group.

4.2.1 Parameter settings by group

1) How to start up Window for setting parameters by group

You can start Window for setting parameters in any of the following procedures after selecting amplifiers you want to select through axis-selector.

- (1) Select "Parameter Setting of each Group(S)" through "Function(F) Parameter(P)" from the menu bar in the Main window.
- (2) Click the icon for Parameter Setting of each Group 👬 in the Toolbar in Main window.

(3) Click "Each Group" after selecting "Parameter" you want to set through Side menu.

After starting up, the window for setting by group is displayed as follows:



Figure 4-1 Parameters: Window for settings by group

- (A) Menu bar
- : Selects functions to execute
- (B) Toolbar : Selects respective functions to execute
- (C) Amplifier/motor : Shows the servo device and servo motor model numbers being connected
- (D) Group

(F)

- : Shows parameter group numbers and names arameters : Shows parameters of the group you selected
- (E) List of parameters
 - Explanation tab : Shows the explanations of parameters being selected
- (G) Log tab : Shows the history of parameters changed
- (H) Edit button : Button for starting up the window for editing general and system parameters.
- (I) Motor parameters : Start up this function when you want to change the motor parameters already set.

2) How to set general and system parameters

The following shows how to set general and system parameters.

- (1) Click the group to which the parameter you want to change is allocated to select.
- (2) Double click it to open the parameter-editing window.



Figure 4-2 Window indicating list of parameters

(3) Input the set values in the text box for input (or select the set value from the list box), and then click "OK" button or Enterkey to confirm the value.

	t the value you want to nge to.	106040F	×
	Name Auto Present Setting Value 5	Standard Setting Value	Symbol ATRES
Clicking this o value.(not fo amplifiers)	higher the res	machine may oscillate.	<u>×</u>
		DK Cancel	

Figure 4-3 Window for editing parameters

- (4) Repeat the process (1) to (3) above for the parameters you want to change.
- (5) The changed values are shown in Input column of list of parameters. Confirm them and click "Write in amplifier" button to forward them.

File(E) Amplifier(A) L	kility(<u>U</u>) Password	Setting(P) Amplifier Informa	cion(1)						
🔁 🗟 🗋 🌭 🗞 Re	ad from amplifier 🌖	Write in amplifier 🛛 🐴 🐂							E1
hotor Parameter	Amplifier/Motor M	odel RS3A02A2AL2 1	12AA06040F						
📓 System	Group 0 (Auto-	tuning]							
Group 0	ID Symbol	Name	Present Setting	Unit	Input Value	Minimum	Maximum	Standard	-
Group 1	00 TUNMODE	Tuning Mode	00:AutoTun	÷		-	•	00:AutoTun	
[Basic Control]	01 ATCHA	Auto-Tuning Characteristic	00:Positioning1	-87				00:Positioning1	
Group 2 IFF/Notch filter/observer	02 ATRES	Auto ming Response	5	1			40	5	5
Group 3 [Model]	03 ATSAVE	Aut ving Automatic Para.		83 - E		+		<i>c</i> .	
Group 4	04 ATCSEL	Av ing charracteritic c		12		1		onfirm	n the set value
Gan switching/vibration		# Filter Tuning To	50.0			10	B		
Group 5	20 ASUPTC	ration Suppress	25.0						
Dilich cattion		ation Suppress	5.0	%		0.1	0		¥
[High setting]	21 ASUPFC					·	10	00.Adp_Filter	
Group 8 [Control]	34 ADNFE	th filter Functio	00:Adp_Filter Di	1.1					
[High setting] Group 8 [Control] Group 9	34 ADNFE 35 ADNFUE	ch lilter Functio per limit E for	1000			10		1000	
[High setting] Group 8 [Control] Group 9 [Function]	34 ADNFE 35 ADNFUE 36 ADNFLE	ch filter Functio per limit E for er limit E for a	1000			10		100	
[High setting] Group 8 [Control] Group 9	34 ADNFE 35 ADNFUE	ch lilter Functio per limit E for	1000 100 00:Auto Savino	Hz		10			
[High setting] Group 8 [Control] Group 9 [Function]	34 ADNFE 35 ADNFUE 36 ADNFUE 37 ADNSV	th filter Functio per limit E for rr limit E for a filter E Auto	1000 100 00:Auto Savino	Hz	effective after pov	10		100	

Figure 4-4 Window for displaying list of parameters (after changed)

✓ The parameters you changed are displayed as a log.

3) How to set motor parameters

Motor parameters can be automatically set based on the information from a motor encoder, when connecting motors mounting an absolute encoder in them. (This is limited by servo amplifier types.) The following describe how to automatically and manually set motor parameters.

✓ Whether or not motor parameters can be automatically set is depending on the specifications for amplifier and motor. There are cases auto-setting is not available.

(A) When automatically setting motors

(1) Click "Automatic Setup (Recommendation)" button in the window for setting parameters.



Figure 4-5 Window showing list of parameters (to automatically set motors)

(2) You will see confirmation dialog to execute "Motor Automatic Setting" being displayed, then click "OK" button. To stop the execution, click Cancel button.



Figure 4-6 Confirmation dialog to execute Motor Automatic Setting

(3) The following dialog box indicating execution being processed is displayed while executing.

Setting of each group Parameter(Axis1)

Motor Automatic Setting is under execution.

Figure 4-7 Dialog indicating Motor Automatic Setting is being executed

(4) When settings completed, completion window is displayed. Click"OK" button, and then re-turn on the control power supply of the servo amplifier.



Figure 4-8 Window indicating Motor Automatic Setting has been normally completed
(5) When alarms occur or somehow Motor Automatic Setting is not completed, the following window will indicate as preparation un-completing. Eliminate the cause of not normally being completed and re-execute.



Figure 4-9 Dialog indicating motor automatic setting error

Probable causes for not being automatically set

- An alarm occurred in an amplifier. Or the state is servo-on.
- When the motors not supported are connected.
- (When the motors not being shown in the motor selecting window for manual setting are connected.)
- When the motors not corresponding to auto-setting are connected.
- When the combination of amplifiers and motors is not appropriate.
- When encoder clear is being executed.
 - ✓ To enable the motor parameters you changed, re-turn on the control power supply of servo amplifiers.

(B) When manually setting a motor

- (1) Click "Select from the list" button in the parameter setting window to start up motor selecting window.
- (2) Select motors you connect from the list and click "OK" button or press Enterkey.



Figure 4-10 Window for selecting motors

(3) Selected motor model numbers are shown in the column for input motor values in parameter setting window. Select the icon write in amplifier "Write in amplifiers" in the Toolbar to forward the motor parameters you selected to servo amplifiers.

🔗 Read from amplifier 🔅 Writ	e in amplifier		_	Forward the motor parameters you selected to servo amplifiers.
Amplifier/Motor Model	RS3A02A2AL2	R2AA06040F	.8	
Motor Parameter				
Motor Combination Present Setting Value Input Value	R2AA06040F(100B-018 R2AA06020F(100B-018			motor model numbers you selected indicated.

Figure 4-11 Indication of motors connected

- ✓ When writing into servo amplifiers, the history is indicated in "Parameter change history window".
- \checkmark Cycle-power the control power supply to enable the motor parameters you changed.

4.2.2 Parameter settings by group (Functional safety module)

1) How to start up Window for setting parameters by group

You can start Window for setting parameters in any of the following procedures after selecting amplifiers you want to select through axis-selector.

- (1) Select "Parameter Setting of each Group(S)" through "Function(F) Parameter(P)" from the menu bar in the Main window.
- (2) Click the icon for Parameter Setting of each Group in the Toolbar in Main window.
- (3) Click "Each Group" after selecting "Parameter" you want to set through Side menu. After starting up, the window for setting by group is displayed as follows:

	💼 Setting of each g	group F	Parameter(AxisA)[Editing mode]			(B)					- • •	
(A)	(E) Amplifie	r(<u>A</u>)	Utility(U) Pa	ssword Setting(<u>P</u>) Ampl	ifier Information	(<u>I</u>)				(K)		(I)	
(/)	i 🖆 🔛 i 🕰 🍓 i 🖊	🗽 Rea	(C) er	🛬 Write in amplifier 🛛 🐴	• *•							L. L	J
	📔 Group 🛛 "Common	parai	Amplifier/Motor N	Nodel SafetyModule			Checksum	BF4E					
	📔 Group 1 " Paramete	r set 🕻	àroup1 "Parame	ter setting for safety inpu	ut A″						-	(J)	
	Group2 "Paramete		ID Symbol	Name	Present Setting	Unit	Input Value	Minimum	Maximum	Standard	TimeStamp	Setup Version	
(D) .			* 00 SFIAFUNC	Safety input A function sel	01:STO			-		01:STO	26h,28m,1s	001	
. /	Group3 "Paramete	rset	* 01 SFOAFUNC	Safety output A function s	01:INM			-	-	01:INM	26h,28m,1s	001	
	📲 Group4 "Paramete	r set i	* 02 SFOADIAG	Safety output A diagnosis	00:Disable			-	-	00:Disable	26h,28m,1s	001	
			* 03 TVODECA	Deceleration time constant	1000	ms		0	16000	1000	26h,28m,1s	001	
			* 04 SFWTA	Safety function starting w	10	ms 🔨		10	700	10	26h,28m,1s	001	
			* 05 MSTMA	Motor stop detection wait	100	ms	(E)	10	1000	100	26h,28m,2s	001	
	(H)	-	* 06 VMWA	Velocity monitoring width	50	min-1		1	32767	50	26h,28m,2s	001	
			07 SOSMWA	Position monitoring width A	131072	pulse		1	2147483647	181072	26h,28m,2s	001	
	(F)	*	Edit(<u>E</u>)	When the (G)	* mark is changed,	it becon	nes effective after	power supply re	-input.				
		I I	Explanation Log										_
			Selects a safety 1 • Wiring is not red • When "05: SLS/	unction performed by safety in quired if "00: NONE" is set. SSM" is set, it works as the s	nput A (SFIA). afety function sele	ected at i	Group8 ID00 "Safe	ty input C funct	ion selection".				
	<		L										_

Figure4-12 Parameters: Window for settings by group (Editing mode)

(A)	Menu bar	: Selects functions to execute.
(B)	Toolbar	: Selects respective functions to execute.
(C)	Amplifier/motor model No	: Shows the servo device model numbers being connected.
<i>i</i> = 1	_	Servo motor is not shown.
(D)	Group	: Shows parameter group numbers and names.
(E)	List of parameters	: Shows parameters of the group you selected.
(F)	Explanation tab	: Shows the explanations of parameters being selected.
(G)	Log tab	: Shows the history of parameters changed.
(H)	Edit button	: Button for starting up the window for editing general parameters.
(I)	Timestamp	: Shows timestamp of when parameter update.
(J)	Setup Version	: Shows the Setup software version of when parameter update.
(K)	Checksum	: Shows checksum of parameters.

Setting of each group Parameter(AxisA)[Browsing mode]											
File(<u>F)</u> Amplifier(<u>A</u>)		Util	ity(<u>U)</u> Am	plifier Information(<u>I</u>)							
: 🚰 🔛 🛕 🍓 🐅 Re	ad	fro	m amplifier	🗽 Write in amplifier 🛛 🐴	10						i
📔 Group0 "Common parai	ł	Amp	lifier/Motor M	odel SafetyModule		_	Checksum	BF4E			
📔 Group 1 "Parameter set	G	roup	p1"Paramet	er setting for safety inpu	ut A"						
🚊 Group2 "Parameter set		ID	Symbol	Name	Present Setting	Unit	Input Value	Minimum	Maximum	Standard	Ti
	*		SFIAFUNC	Safety input A function sel	01:STO					01:STO	26
当 Group3 "Parameter set	*	01	SFOAFUNC	Safety output A function s	01:INM			-	-	01:INM	26
📔 Group4 "Parameter set	*	02	SFOADIAG	Safety output A diagnosis	00:Disable			-	-	00:Disable	26
	*	03	TVODECA	Deceleration time constant	1000	ms			D 16000	1000	26
	*	04	SFWTA	Safety function starting w	10	ms		1	D 700	10	26
	*	05	MSTMA	Motor stop detection wait	100	ms		1	D 1000	100	26
	*	06	VMWA	Velocity monitoring width	50	min-1			1 32767	50	26
	*	07	SOSMWA	Position monitoring width A	131072	pulse			1 2147483647	131072	26
	•		Edit(E)	When the data of the head :	Ⅲ ∗ mark is changed	. it becon	nes effective afte	r power supply	re-input.		4
				7							
			anation Log		. />						_
Selects a safety function performed by safety input A (SFIA). • Wiring is not required if "00 NONE" is set. • When "05 SLS/SSM" is set, it works as the safety function selected at Group3 ID00 "Safety input C function selection".											

For browsing mode, "Write in amplifier" becomes gray as below and writing is prohibited.

Figure4-13 Parameters: Window for settings by group (Browsing mode)

To perform writing, switch to "editing mode" via the selecting function of parameter editing authority. For detail of the selecting function of parameter editing authority, refer the section "4.10 Parameter editing authority".

2) How to set general parameters

The following shows how to set general parameters.

- (1) Click the group to which the parameter you want to change is allocated to select.
- (2) Double click it to open the parameter-editing window.

STEP1. Click	k an	đ	ram	neter(AxisA)	[Editing mode]								
applicable g	roup		${\sf Utility}(\underline{{\sf U}}) {\sf Password {\sf Setting}}(\underline{{\sf P}}) {\sf Amplifier {\sf Information}}(\underline{{\sf I}})$										
		d	fror	m amplifier	🗽 Write in amplifier 🛛 🐴	a 🐅							Ĺ
📓 Group	non para	,	Ampl	ifier/Motor M	odel SafetyModule		_	Checksum	BF4E				
🛛 🔛 Group 1 *	"Parameter set	Gi	oup	1 "Paramet	er setting for safety inp	ut A"							
📑 Group 2 *	"Parameter set		ID	Symbol	Name	Present Setting	Unit	Input Value	Minimum	Maximum	Standard	TimeStamp	Setup Version
Crown 2 *	"Parameter set	*			Safety input A function sel		-		-	-	01:STO	26h,28m,1s	001
		T_			Safety output A function s					-	01:INM	26h,28m,1s	001
📔 🔐 Group4 *	"Parameter set	_	_		Safety output A diagnosis	00:Disable		STEP2.	Selectio	n and c	louble c	licking	
		_	-	TVODECA	Deceleration time constant	1000							
		_		SFWTA	Safety function starting w		ms		•	want to	o change	e starts th	ie
		_		MSTMA	Motor stop detection wait	100		editing v	window.				
		_		VMWA	Velocity monitoring width		min-1						
		*	07	SOSMWA	Position monitoring width A	181072	pulse		1	2147483647	18107	2 26h,28m,2s	001
		L	_	/ \									
				Edit(<u>E</u>)	When the data of the head	* mark is changed	, it beco	mes effective after	power supply re	-input.			
		E	xpla	nation Log									
		Selects a safety function performed by safety input A (SFIA). • Wring is not required if "00: NONE" is set. • When "05: SLS/SSM" is set, it works as the safety function selected at Group3 ID00 "Safety input C function selection".											
<	•												v

Figure 4-14 Window indicating list of parameters

(3) Input the set values in the text box for input (or select the set value from the list box), and then click "OK" button or Enterkey to confirm the value.

	💼 Parameter Edit(AxisA)	
	Amplifier/Motor Model SafetyModule	
	Group/ID Group 1 "Parameter setting for safety input A"-00 Symbol SFIAFUNC Name Safety input A function selection Present Setting Value 01:STO Standard Setting Value 01:STO	
	Input Value Input Value 01 : STO : Safe Torque Off function Explanation Input the value you want to change to. Selects a safety function performed by safety input A (SFIA). • Wrine is not required if "00: NONE" is set. • Wrine "05: SLS/SSM" is set, it works as the safety function selected at Group3 ID00 "Safety input C function selection".	
Clicking this conf (not forwards to		

Figure 4-15 Window for editing parameters

- (4) Repeat the process (1) to (3) above for the parameters you want to change.
- (5) The changed values are shown in Input column of list of parameters. Confirm them and click "Write in amplifier" button to forward them.

📲 Setting of each group Parameter(AxisA)[Editing mode]											
File(E) Amplifier(A) Utility(U) Password Setting(E) Amplifier Information(I)											
: 😅 🔛 🗋 🍓 🐅 Re	ad fron	n amplifier	🗽 Write in amplifier 🛛 🐴		Confirm	the set	values.		i		
Group! "Common paral			ifier" to	Checksum	_						
and forward t	o ar	nplifie	rs.	Present Setting	Unit	Input Value 🖌	mimum	Maximum	Standard	TimeStamp	Setup Version
		•	ion sel	01:STO		04:SOS	-	-	01:STO	26h,28m,1s	001
Group3 "Parameter set	* 01 5	SFOAFUNC	Safety output A function s	01:INM			-	-	01:INM	26h,28m,1s	001
📓 Group 4 "Parameter set	* 02 5	SFOADIAG	Safety output A diagnosis	00:Disable			-	-	00:Disable	26h,28m,1s	001
	* 03 -	TVODECA	Deceleration time constant	1000	ms		0	16000	1000	26h,28m,1s	001
	* 04 8	SFWTA	Safety function starting w	10	ms		10	700	10	26h,28m,1s	001
	* 05 1	MSTMA	Motor stop detection wait	100	ms		10	1000	100	26h,28m,2s	001
	* 06 \	VMWA	Velocity monitoring width	50	min-1		1	32767	50	26h,28m,2s	001
	* 07 8	SOSMWA	Position monitoring width A	131072	pulse		1	2147483647	131072	26h,28m,2s	001
<	Explar Selec: • Wiri	ng is not req	When the data of the head Inction performed by safety i uired if "00 NONE" is set. SSM" is set, it works as the s	nput A (SFIA).							^

Figure 4-16 Window for displaying list of parameters (after changed)

- ✓ The parameters you changed are displayed as a log.
- (6) Parameter update confirmation window opens so click "OK" button. Parameter will transfer.

Setting of each group Parameter(AxisA)[Editing mode]
Update the parameters ?
OK Cancel

Figure 4-17 Parameter update confirmation window

(7) Parameter update completion window opens after update completion. Click "OK", and perform a control power cycle.



Figure 4-18 Parameter update completion window

✓ After parameter setting, perform a control power cycle, and confirm a changed parameter is correct by starting parameter setting window again. If parameters were set incorrectly, perform parameter setting operation again.

Settings by function Edit parameters by function. 4.3

Functin Parameter Edit(/ File(<u>F)</u> Amplifier(<u>A</u>)		
😅 📓 🙀 Read from ampli	fier 🧊 Write in amplifier	
System Basic External Equipment FullClose Encoder Common1 Common2 Posigioning Velocity Torque(force) S Dutput Elect funcitons.	Amplifier/Motor Model RS3A02A2AL2 R2AA06040F	
	Regenerative Resister Regenerative Resistor Selection(RGKIND) Regenerative resistor is not connected Use internal regenerative resistor Use external regenerative resistor	
	Battery Serial Encoder Function Selection(SERENSEL) C Absolute System C Incremental System	
	Combination motor/encoder	
	Currentsetting	

Figure 4-19 Window for setting parameters by function (Basic)

1) How to operate

Functions can fall into "system" and "operation". Related parameters by function are displayed. Select functions you need from the Function tree view at left side to set parameters.

2) Explanations for window (when connecting external devices)

This section explains actual windows and how to operate/set the windows. The setting window for external device connection and position control is explained here.



Figure 4-20 Window for setting parameters by function (External Equipment)

(A) Parameter names	: shows parameters. Clicking the names displays the explanations for
(B) Function switching tab	them. Select form drop-down list or input values. : when each function has multiple parameters, you can set each parameter by switching functions through tabs. Click tabs to switch.

3) Explanations for window (for position control)

Functin Parameter Edit(Axis1)
File(<u>F</u>) Amplifier(<u>A</u>)	
	ifier 🗽 Write in amplifier (A)
E System	Amplifier/Motor Model RS3A02A2AL2 R2AA06040F
Basic	Setting parameter for position control operation
External Equipment	
□ _ Coperation	Pulse Position Command
Common1	Electronic Gear
- Common2	Electronic Gear 1 numerator(B-GER1) 1 🕂 (1 - 2097152)
Posigioning	Electronic Gear 1 denominator(A-GER1)
Velocity Torque(force)	
State Output	Electronic Gear 2 numerator(B-GER2)
	Electronic Gear 2 denominator(A-GER2) 1 🚔 (1 - 2097152)
	Electronic Gear Switching Function (GE Function is always invalid
	Position Deviation
	Velocity Compensation Function
	Parameter for Velocity adjustment
	Velocity Compensation Function(V-COMPS) Function is always invalid
	Command Function Selection
	Velocity Compensation Command Input Selection(VCOMSEL) Call Offset ajustment function
	C Analog velocity compensation command value is used whe Analogue Command Adjustment
	Preset velocity compensation command is used when veloc
	Analog Velocity(Compensation) Command Scaling(V 500 🛨 [min-1/V] (0 - 4000)
	External Torque Command Filter(EX-TCFIL) 4000 + [Hz] (1 - 4000)
	Analog Velocity, Torque Command Input Dead Band 0.0 + [mV] (0.0 + 6553.5)
	Preset Velocity Compensation Command(V-COMP) 0 + (min-1) (-9999 - 9999)
ļ	

Figure 4-21 Window for setting parameters by function (position control)

(A)	Expand/collapse button	: designates whether only detailed function names are displayed or all
		the parameters are displayed with them all expanded. Button marked with
		"+" expands all the parameters, button marked with "-" displays only
		functional blocks.
(B)	Functional block	: Clicking the parts displayed can select whether or not parameters are displayed per function blocks.
(C)	Function call button	: calls supportive functions displayed.

4.4 Parameter transmission (To file)

You can save the parameters set for servo amplifiers in files. You can confirm parameters for an amplifier and set parameters for the other servo amplifiers without connecting servo amplifiers.

1) How to operate

- (1) Executing parameter-forwarding from servo amplifiers to files performs any of the following three types.
 - Select the axes you execute by Axis-selector before executing.
 - A) Select in the following order of "Function-Parameter-Parameter transmission (To file) (F)" in the menu bar in the Main window.
 - B) Click the icon "Parameter transmission (To file)" A in the Toolbar in Main window.
 - C) Select "Parameter transmission (To file)" through "Parameter" from the Side menu.

mplifier/Motor Model	RS3A02A2A	L2	R2AA06040F	
Tra	insmission	С	ancel	

Figure 4-22 Window for executing Parameter transmission [To file]

(2) Clicking "Forward" button in the Parameter transmission (To file) window shows the dialog window "Save as". Set the file name to save. The extension name is "*.ap1". Click "Save" button after setting.



Figure 4-23 Dialog window for saving with name

(3) Wait for a few seconds until the transmission-window is closed.



Figure 4-24 Window for indicating being transmitted

(4) The file is created in the designated folder.

4.5 Parameter transmission (To amplifier)

You can forward the parameters saved in files to servo amplifiers. Select the type of parameters you want to forward to forward necessary parameters only.

1) How to operate

- (1) Executing parameter-forwarding from servo amplifiers to files performs any of the following three types. Select the axis you execute by Axis-selector before executing.
 - A) Select in the following order of "Function-Parameter- Parameter transmission (To amplifier) (A)" in the menu bar in the Main window.
 - B) Click the icon "Parameter transmission (To amplifier)" / in the Toolbar in Main window.
 - C) Select "Parameter transmission (To amplifier)" through "Parameter" from the Side menu.

mplifier/Motor Model	RS3A02A2AL2	R2AA06040F
The Parameter Kind to	Transmit	-
🔽 General Paramete	r	
System Parameter	·	
Motor Parameter		

Figure 4-25 Parameter transmission window (To amplifier)

- (2) Check the boxes of types of parameters you want to forward in the Parameter transmission window [To amplifier], and click "Transmission" button.
- (3) Select the files you forward from "Open" dialog window, and click "Open" button.

Open	and the second se					? ×
Look in:	🞯 Desktop		-	G Ø	• 📰 🔊	
My Recent Documents	My Document My Computer My Network P					
Desktop						
My Documents						
My Computer						
My Network	File <u>n</u> ame:	test.ap1			•	<u>O</u> pen
Places	Files of type:	Parameter File(*.ap1)			•	Cancel

Figure 4-26 Dialog window for opening files

(4) Wait for a few seconds until the transmission-window is closed.

1	nsmission[To Am		

Figure 4-27 Window for indicating being transmitted

- (5) When the window indicating being forwarded is closed, the parameter-forward is completed. Re-turn on the control power supply of servo amplifiers as needed.
 - There are the parameters requiring initialization. So it is recommended to once turn off the power supplies of servo amplifiers (drivers).

4.6 Save to the Backup memory

You can store current parameter values of servo amplifiers in the area of backup memory inside of servo amplifiers. Storing parameter setting values in the backup area can restore the parameters any time.

- ✓ The factory setting values are set in the backup memory area at delivery. If you once save values in the backup memory, you cannot restore to the factory setting state. It is recommended to store parameters to files before executing. Refer to Section 4.4 Parameter transmission (To file) for the details of how to store in files.
- ✓ Do not shut down the control power supply of servo amplifiers while saving in the backup memory. If you shut down it in mid-course, make sure to save in the backup memory again.

1) How to operate

- (1) You can save in the backup memory in any of the following procedures. Select the applicable axes through Axis-selector before executing.
 - (A) Select in the following order of in "Function-Parameter-Save to the Backup Memory(B)" in Main window.
 - (B) Click the icon "Save to the Backup Memory" in the Toolbar in Main window. When the selecting window is displayed, select the axis numbers you execute.
- (2) Clicking "OK" button in the window for saving to backup memory starts executing backup.

Save to t	the Backup Memory(Axis1)	×
?	Do you want to save all parameters to the backup It takes several seconds for this processing, Do not power off until processing is finished comp	
	OK Cancel	

Figure 4-28 Window confirming storing in backup memory being executed

(3) The following dialog window is shown while executing backup. You can confirm the rest of the number of data.



Figure 4-29 Window indicating being stored in backup memory

(4) When backup orderly completed, the following window is shown. Click "OK" button.



Figure 4-30 Window indicating storing in backup memory orderly completed

4.7 Restoration from the Backup Memory

You can restore servo amplifier parameters using backup memory values.

1) How to operate

- (1) You can store in the backup memory in any of the following procedures. Select target axes through axis-selector before executing.
 - (A) Select in the following orders of "Functions-Parameter-Restoration from the Backup Memory (R)" in the menu bar in the Main window.
 - (B) Click the icon "Restoration from the Backup Memory" in the Toolbar in Main window. After axes selecting window is shown, select the axis numbers you execute.
- (2) Clicking "OK" button in the window for Restoration from the Backup Memory starts restoring process by backup memory values.

Restorat	ion from the Backup Memory(Axis1)
?	Do you want to restore all paremeters from the backup memory? All parameters are changed into the value of a backup memory and the cureent value is lost. It takes several seconds for this processing. Do not power off until processing is finished completely.
	OK Cancel

Figure 4-31 Window confirming to restore from backup memory

(3) The following window is shown while restoring. The rest of the number of data is shown.

Restoration from the Backup Memory(Axis1) Restoration from the Backup Memory is under execution. The Remaining Data Numbers: 510

Figure 4-32 Window indicating Restoration from the Backup Memory being executed

(4) When restoring is orderly completed, the following window is shown. Click "OK" button.



Figure 4-33 Window indicating Restoration from the Backup Memory completed

- ✓ Do not shut down the control power supply of servo amplifiers while restoring. Make sure to restore from backup memory again when shutting down in mid-course.
- There are parameters which become enabled after re-turning on the power supply. So make sure to re-turn on the control power supply of servo amplifiers everytime after executing.

4.8 Parameter Verification

This function shows the list of the parameters having difference after collating parameter values between servo amplifiers and parameter files. This function can also copy the parameters having difference to amplifiers or files.

1) How to operate

- (1) Start up Parameter Verification window in any of the following procedures.
 - (A) Select "Parameter Verification" through "Parameter" in Sub menu in Main window.
 - (B) Click the icon "Parameter Verification" Zain the Toolbar in Main window. Then axes selecting
 - window is shown, so select the axis numbers to collate parameters.
- (2) Window selecting target parameters for comparison is shown. Select the targets to compare. Click "Compare" button after setting.

Farget1			Target2	
Target type	Axis	•	Target type Data File	•
Target	Axis1	•	Target	Reference

Figure 4-34 Window selecting target parameter for comparison

- ✓ Possible target parameters for comparison are ones of servo amplifiers, drivers, and data files (*.ap1) being connected. You can compare between servo amplifiers or between data files.
- You cannot compare if the types of amplifiers or data files to be compared are different (amplifier driver series, input power supply, ad motor configuration)

(3)	The	window	Inc	icating Paramete	venncation	iie	esuit is sr	IOV	vn.			
		👕 Parameter	Veri	fication								×
A)		File(E) Cop	oy(⊆)	Parameter Attribute Setting								
B)		🖰 Na 🔎		🕰 🍓 🗕 🚍 🗕 🚍 🖣	(F)						(D)	,
		Compare targ	et1 -				Compare targe	et2 -				
		Target		Amplifier - Axis 1			Target			DataFile - C:\Docum	ents and Settings\sd2\De	
C)		Amplifier/Moto	or Mo	del RS3A02A2AL2	R2AA06040F		Amplifier/Moto	r Mo	del	RS3A02A2AL2	R2AA06040F	
		Group Name	ID	Name	Setting Value		Group Name	ID		Name	Setting Value	
)		Group 0 [Aut	02	Auto-Tuning Response		1	Group 0 [Aut	02	Auto-T	uning Response	5	
)		Group 1 [Ba	06	Feed Forward Gain		5	Group 1 [Ba	06	Feed F	Forward Gain	0	
		1				_	<u> </u>					

(3) The window indicating Parameter Verification result is shown



(A) Menu:	Executes various functions by selecting them.
(B) Toolbar:	Executes various functions by selecting them.
(C) Information on servo amplifiers:	Shows the model numbers of servo amplifiers and
	servomotors being connected.
(D) Information on files:	Shows the model numbers of servo amplifiers and servo
	motor in the files.
(E) Verification results:	Shows parameters having difference after collating. If there is
	no difference, no information displayed.
(F) Copy button:	Copies parameters having difference.

4.9 Password Setting

You can limit functions of servo amplifiers partly by setting a password to servo amplifiers. The parameters of servo amplifiers to which passwords set cannot be changes as well as not partly used unless passwords are canceled. (Refer to Table 3-1.)

No		Functions	Descriptions
		Parameter Setting	This cannot edit parameters, can only brose.
		Parameter transmission (To amplifier)	Not available
1	Parameter	Parameter Verification	This cannot copy file values to servo amplifiers.
		Save to the backup memory	Not available
		Restoration from backup memory	Not available
2	Alarm	Displaying alarm history	This cannot clear alarm history, can only browse.
3	Test operation	Serial Encoder Clear	Not available
		Auto Notch Filter Tuning	
4	Auto Tuning	Auto FF Vibration Suppression Frequency Tuning	Not available
		Save Result of Auto Tuning	
		Offset Adjustment of V-REF/T-REF Terminal	
5	Adjustment	Offset Adjustment of T-COMP Terminal	Not available

Table 3-1 Functions which cannot be used with password set

1) How to set password

- (1) Open password setting window in the following procedures.
 - 1 Select "Password Setting" in the Toolbar in the window for setting parameters by group.
 - 2 Select "Password Setting" through "Parameter" from Side menu.
- (2) Input new password you set in the text boxes of "New password" and "New password (for a check)", and then click "OK" button. If the both values do not collate, the password cannot be set.
 - ✓ Make sure to set passwords in 4-digit hexadecimal characters ('0' to '9,' 'A' to 'F').
 - ✓ Set "0000" to cancel password function.
 - \checkmark "FFFF" is not available.
 - ✓ Re-turn on the control power supply of servo amplifiers to enable new password.

Password Setting	
New Password	
New Password (for a che	eck)
1 (1 (C (C (C (C (C (C (C (C (C	00] Release a password. FF] It cannot specify.
OK	CANCEL

Figure 4-36 Password setting window

✓ For functional safety module, selection window of parameter editing authority opens if password setting window is open with state of selecting "browsing mode" of parameter editing authority. To change password, switch to "editing mode" via the selecting function of parameter editing authority. For detail of the selecting function of parameter editing authority, refer the section "4.10 Parameter editing authority".

2) How to collate passwords

Starting up the functions shown in Table 3-1 with a password set shows Password-setting window. If the password is not collated, each function cannot be used.

- (1) Input a password into the text box and then click "OK" button.
- (2) If the password set for the servo amplifier is collated by the password you input, the function can be executed.

assword Entering		
Please enter a password.		
	01	Cancel

Figure 4-37 Password input window

4.10 Parameter editing authority

You can select an editing authority of functional safety module parameters from "Editing mode" or "Browsing mode".

- ✓ Functional safety module parameters shall be edit by the person in charge which has training against safety standards. And change to "Browsing mode" after edit.
- ✔ Selection function of parameter editing authority, is dedicated to functional safety module.

1) How to operate

I

(B)

(1) Selection window of parameter editing authority starts up by any of the following ways.

- A) Select in the following order of "Parameter Parameter editing authority" in the sub menu in the Main window.
- B) Click the icon "Parameter editing authority" 🏤 in the Toolbar in Main window.
- (2) Shows a selection window of the parameter editing authority. The window opens with condition of checked a current selection (with indication of [Current items]).

	Parameter editing authority(AxisA)	x
	Amplifier/Motor Model SafetyModule	
	Set the parameter editing authority, against a servo amplifier.	
	Parameter editing authority	
(A) _	editing mode [Current items]	
	This is normal authority which can edit the parameter set values.	
(B)	Browsing mode	
	This is the browsing dedicated mode which is limited of a parameter set value editing. In this mode, the parameter editing function is "read only".	
	OK Cancel	

Figure 4-38 Selection window of parameter editing authority (selecting "Editing mode")

- (A) "Editing mode" selection button : Selects "Editing mode"
 - "Browsing mode" selection button : Selects "Browsing mode"
- (3) To switch to "Browsing mode" from "Editing mode", click "Browsing mode" selection button and then click "OK" button.
- ✓ If parameter editing authority is changed to "Browsing mode" during editing window of each group, below message is shown. Click "OK". (Editing window of each group is quit forcedly.)



Figure 4-39 Quitting message of setting of each group parameter

(4) To switch to "Editing mode" from "Browsing mode", click "Editing mode" selection button and then click "OK" button.



Figure 4-40 Selection window of parameter editing authority (selecting "Browsing mode")

(5) Password input window opens when switching to "Editing mode". Input a password and then click "OK" button.

Password Entering	
Please enter a password.	
() Specify [0000] to cancel the browsing mode which has	s no password.
	OK Cancel
	OK Cancel

Figure 4-41 Password input window

- ✔ Password input window opens even if password is not set. Specify "0000" and then click "OK" button.
- If parameter editing authority is changed to "Editing mode" during editing window of each group, below message is shown. Click "OK" and restart an editing window of each group. (Browsing mode is kept until restart.)



Figure 4-42 Quitting message of setting of each group parameter

4.11 Parameter initialization

This function returns all parameters to factory setting.

- ✓ Functional safety module parameters shall be edit by the person in charge which has training against safety standards. Select "Editing mode" for initialization.
- ✓ Parameter initialization function is dedicated to functional safety module.

2) How to operate

(1) Window of parameter initialization starts up by any of the following ways.

- A) Select in the following order of "Parameter Parameter initialization" in the sub menu in the Main window.
- B) Click the icon "Parameter initialization" 🚣 in the Toolbar in Main window.
- (2) Shows a window of the parameter initialization. Start initialization by clicking "OK".

Paramete	er initialization	23
?	Perform the parameter initialization?	
	This process will take to several ten seconds from a few seconds. Do NOT shut the servo amplifier power until finishing the process.	
	OK Cancel	

Figure 4-43 Parameter initializing window

(3) Wait for a while until the transmission-window is closed. (several tens of seconds)

Reading out a result of parameter initialization.	

- (4) Parameter transmission completes when transmission-window is closed. Perform control power cycle of servo amplifier.
 - ✓ To enable the parameters of functinal safety module, control power cycle of servo amplifier is required.

5. Monitor

5.1 Monitor

You can check various data on servo amplifiers on a real-time basis. Also you can select parameters you monitor from list.

1) How to operate

- (1) Select "Monitor (M)" through "Function (F)" in the menu bar.
- (2) Click on "Monitor ¹⁰ in Toolbar.
- (3) Click on "Monitor"¹⁰ through "Monitor" in Sub menu.



Figure 5-1 Monitor selecting window in Sub menu

(4) Clicking "Start monitor" starts updating monitor data.

File	l <mark>onitor Display</mark> e(E) Monitor(plifier/Motor Mo	M) del RS3A02A2AL2 R:	2AA06040F	Monitor Stop	"Monitor Start" is shown while stopping monitor.
ID	Symbol	Parameter Name	Present Value	Unit 🔺	
01	WARNING1	Warning status 1 monitor	0000-0000	× .	
02	WARNING2	Warning status 2 monitor	0000-0000		
03	WARNING3	Warning status 3 monitor	0000-0000		
04	WARNING4	Warning status 4 monitor	0000-0000	You can sele	ect either decimal or
05	CONT8-1	General Purpose Input CON	0000-0000		I by placing cursor and
06	OUT8-1	General Purpose Output OU	0011-0001	right-clicking	on current value.
07	INC-E MON	Pulse encoder signal monitor	0000-0000		
10	APMON	Actual position monitor (Mot	0	Puls	
12	CPMON	Command position monitor	<u>ب</u> ر	Pulse	
14	PMON	Position deviation monitor	0	Pulse	
15	VMON	Velocity monitor	0	min-1	
16	VCMON	Velocity command monitor	0	min-1	

Figure 5-2 Monitor window

- ✓ The window above is indicating "Monitor Stop".
- ✓ To stop monitor updating, click "Monitor Stop" button.

2) Selecting monitor parameters

(1) Click "Parameter Selection" button while monitor is being stopped. The following parameter selecting window is shown.

	ID	er Selection(Symbol	Parameter Name
		WARNIN	Warning status 1 monitor
		WARNIN	Warning status 2 monitor
		WARNIN	Warning status 3 monitor
		WARNIN	Warning status 4 monitor
rameters		CONT8-1	General Purpose Input CONT8-1 monitor
ecked are	06	OUT8-1	General Purpose Output OUT8-1 monitor
onitored.		INC-E M	Pulse encoder signal monitor
	10	APMON	Actual position monitor (Motor encoder)
	12	CPMON	Command position monitor
	14	PMON	Position deviation monitor
	15	VMON	Velocity monitor
	16	VCMON	Velocity command monitor
	17	TMON	Torque monitor
	18	TCMON	Torque command monitor
	19	ACCMON	Acc. Monitor
	1A	MTLMO	Load Torque monitor (Estimated value)
	30	FMON1	Position Command Pulse Frequency Monitor 1
	31	VC/TC-IN	Analog velocity command/Analog torque comm
		MTCOMP	Analog torque addition command input voltage
	33	ABSPS	Serial encoder PS data monitor (Motor encoder)
	35	MMOENCF	Motor Encoder frequency monitor

Figure 5-3 Parameter selecting window

(2) Check the head of parameters to monitor. Click "OK" button.

6. Diagnosis

You can execute various functions of alarm history, alarm reset, warning information from Diagnosis window in Sub menu.



Figure 6-1 Diagnosis window in Sub menu

6.1 Alarm history

You can display and clear alarm history, and reset alarm. The alarm history occurred in servo amplifiers in the last 7 times. The display shows the types of alarms, the states of servo amplifiers when alarms occur as well as the time alarms occur.

1) How to operate

- (1) Start up alarm history window in any of the following procedures.
 - (A) Select "Alarm history" through "Diagnosis" in Sub menu in Main window.
 - (B) Select in the following order of "Function-Diagnosis-Alarm history" in the menu bar in Main window.
 - (C) Click the icon A "Alarm history" in the Toolbar in Main window.

When axes selecting window is shown, select the axis numbers to show alarm history.

(2) Alarm history is shown.

C Imp			Reset 🛛 🔬 Alarm History Cle	ar			1
mp	/						
Pres	ner/Moti ent Stat		R2AA	\06040F			
		Alarm code	Alarm name	The state at the time of alarm	Alarm		
1	low	00:None	No Alarm	01:P-OFF	0:00:00.00	0 Diagnosis	I / L
8	Flans	ed Time from	Generating		-		
<u>.</u>	202		7				
Dati	a at the t	ime of alarm g	generating				
ID	Symb	ol Pa	rameter Name		Value at the time of the alarm	Unit	1/
00	APMC	IN Acti	ual position monitor (Mot	or encoder)		Pulse	
01	CPMC	N Cor	mmand position monitor			Pulse	
02	ABSP	3 Ser	ial encoder PS data mon	itor (Motor		Pulse	1
03	PMON	V Pos	ition deviation monitor) — I — I	Pulse	
04	FMON	II Pos	ition Command Pulse Fr	equency Monitor		kPulse/s	
05	VMON	l Vel	ocity monitor			min-1	
	Lunua		- A				1
Alar	n History	[1	Transie 1		1
		Alarm	Alarm name	The state at the time of alarm	Alarm	f	
L	ast1	85:AL.85	Motor Encoder Initial	0F:INIT	19:55:39.486	Diagnosis 🐈	
La	ast2	85:AL.85	Motor Encoder Initial	0F:INIT	11:11:53.515	Diagnosis	
L	ast3	85:AL.85	Motor Encoder Initial	0F:INIT	3:33:08.382	Diagnosis	
La	ast4	43:AL.43	Regenerative Error	02:P-ON	0:55:26.133	Diagnosis	
L	ast5	E6:AL.E6	System Parameter E	0F:INIT	0:54:41.884	Diagnosis	
Li	ast6	A1:AL.A1	Serial Encoder Intern	02:P-ON	0:47:10.368	Diagnosis	
La	ast7	85:AL.85	Motor Encoder Initial	0F:INIT	0:46:40.626	Diagnosis	
	ast8	A1:AL.A1	Serial Encoder Intern	02:P-ON	0:44:46.673	Diagnosis	1

Figure 6-2 Alarm history window

A) Alarm reset

: resets alarms currently being occur : clears alarm history stored

- B) Clear alarm history C) Diagnosis
- D) Printout
- : shows alarm diagnosis window
 - : prints alarm occurrence history
- Clicking Diagnosis button displays alarm diagnosis window. (3)

A	arm Dia	gnose [Now] (Axis1)	(A)		
<u>م</u>	Present <u>S</u>	tate 🛛 💝 Prev Alarm 🔿 N	lext Alarm		
1844	plifier/Mot ate of Alai		R2AA06040F		
	arm Ide	Alarm name		The state at the time of alarm	Alarm generating time
85	:AL.85	Motor Encoder Initial proc	cess Error	0F:INIT	20:06:11.144
7	Hide not	relevant causes on selected situ	(B)		
		relevant causes on selected situ I correction measures	uation.		
				pasures	<u> </u>
	factor and Cause For mor - Impro - Conn - Loose - Enco		An investigation and me - Check wiring and re	place if necessary. coder power supply vo	Itage of the motor
A	factor and Cause For mo - Impro - Conn - Loose - Enco - Enco	t correction measures tor encoder wiring: oper wiring. ector is removed. ector is removed. der cable is too long. der cable is too thin. amplifier and motor or are not combined	An investigation and me - Check wiring and re - Confirm that the end above 4.75 V; increas 4.75 V.	place if necessary. coder power supply vo	

Figure 6-3 Alarm diagnosis window

- A) Display alarm history : you can switch the alarm diagnosis windows of current alarm, alarm one alarm before, and after by clicking once.
- B) Hide causes : Checking here hides the causes not applied to the conditions selected when alarms occur.

2) Clearing alarm history

You can clear alarm occurrence history from alarm history window.

(1) Select the icon "Alarm History Clear" ⁴ through "Amplifier" from the Toolbar.

File(E) A	mplifier(<u>A</u>)				
310 8	🛓 🛕 Alarm Resel	et 🛕 Alarm History Cle	ar		
Anna DGan Akda	Inchedal DCOA	ADDADALD Alarm His	tory Clear		
Amplifier/Mo Present Sta		A02A2AL2 Alarm His	tory Clear		
1000	ate	A02A2AL2 Alarm His	tory Clear The state at the time of alarm	Alarm	

Figure 6-4 Alarm history clear window

(2) Window confirming to execute to clear alarm history is shown. Click "OK" button to execute, click Cancel button not to execute.

Alarm Hi	story Clear(Axis1)	×
?	Is Alarm History Clear perform The alarm data generated in t	ied? he past is cleared.
	OK Cance	

Figure 6-5 Window confirming to execute alarm history clear

(3) Window indicating alarm history clear orderly completed is shown. Click "OK" button.



Figure 6-6 Window indicating alarm history clear orderly completed

6.2 Alarm Reset

You can reset alarms in the following conditions:

Alarms occurred in servo amplifier/driver, and then the alarm causes have been eliminated as well as the alarm types are resettable.

1) How to operate

(1) You can reset alarms in any of the following three procedures.

(A) Select in the following order of "Function-Diagnosis-Alarm Reset" in the menu bar.

(B) Click the icon "Alarm reset" Δ_{1} in the Toolbar.

(C) Click "Diagnosis" in Side menu, and then click"Alarm Reset" in Functional panel. After axes selecting window is shown, select the axis numbers you want to reset alarms, and then click "OK" button. To cancel it, click Cancel button.

(2) Window confirming to execute Alarm reset is shown.

Figure 6

Alarm Re	eset(Axis1)	×
?	Is Alarm Reset performed? You have to exectute alarm reset after removing ca	ause and securing safety.
	OK Cancel	

Figure 6-7 Window confirming to execute Alarm reset

- (3) If there are no problems with execution, click "OK" button. To cancel it, click Cancel button.
- (4) Window indicating orderly completion is shown when alarm causes have been eliminated and alarms can be reset, the window indicating abnormal termination is shown if not so.

Alarm Reset(Axis1)	
Alarm Reset has been completed successfully.	
ОК	
-8 Window indicating alarm reset orderly co	mpleted
Alarm Reset(Axis1)	
Alarm Reset was not able to be performed.	

Figure 6-9 Window indicating alarm reset abnormally terminated

0K

6.3 Warning information

You can confirm the state of being warned of servo amplifier/drivers.

The state of being warned means the state of operation being worse not to the extent of system stop, but alarms may occur if the operation is kept.

1) How to start up

You can start up warning information window in any of the following procedures.

- (A) Select "Warning info" through "Diagnosis" in Sub menu in Main window.
- (B) Select in the following order of "Function-Diagnosis-Warning info" in the menu bar in Main window.
- (C) Click the icon **E** "Warning info" in the Toolbar in Main window.

When axes selecting window is shown, select the axis numbers to display alarm history.

2) How to operate

- (1) Detailed description of warning information is shown in the bottom of window.
- (2) The state is updated every 1 second.
- (3) Clicking "Close" button closes the window.

Warning information(Axis1)	
Amplifier/Motor Model RS3A02A2AL2 *A warning lamp detected in a amplifier turns	R24A06040F on.
Over Load Warning	Regenerative Register Over Load Warning
Torque Limit	Velocity Limit Warning
Control Power Voltage Warning	O Delta Pulse Warning
Main power on charge	Main power Warning.
Forward_OT	Reverse_OT
Senser Battery Warning	Full-closed sensor Battery Warning
Sync. error pulse warning	O Dual position FB error pulse warning
Over Load Warning	
Motor Drive is over load Warning.	
[Close

Figure 6-10 Warning information window

✓ It is recommended to deal in the state of being warned as much as possible to prevent servo systems being abnormally terminated in advance.

Life-span estimation 6.4

It can confirm remaining life of the parts used in servo amplifier/driver. Current state is shown as a percentage against total life-span of parts.

1) How to start up

You can start up warning information window in any of the following procedures.

- Select "Life-span estimation" through "Diagnosis" in Sub menu in Main window. (A)
- ÌΒ) Select in the following order of "Function-Diagnosis-Life-span estimation" in the menu bar in Main window.
- (C) "Life-span estimation" in the Toolbar in Main window. Click the icon

When axes selecting window is shown, select the axis numbers of displaying the life-span estimation.

2) How to operate

- Detailed description of life-span estimation is shown in the bottom of window. (1)
- (2)
- The state is updated every 1 second. Clicking "Close" button closes the window. (3)

Life-span estimation	n(Axis1)		- • •
Amplifier/Motor Model	RS3A01A0AB0	R2AA06010F	
Remaining life of relay for	or an inrush current prev Rest of lif About		99.94 %
Remaining life of a holdi	ng brake Rest of lif About	e-span	0.00 %
environme	ntal condition, and so o overhaul as soon as po		varies due to how to use, comes zero.

Figure 6-11 Life-span estimation window

Early overhaul is recommended if remaining life becomes near to zero, to prevent abnormal shutdown V of servo amplifier.

7. Test operation

You can execute the following as functions of Test operation:

JOG-operation, positioning operation, motor origin searching, estimating magnetic pole position, clearing serial encoder



Figure 7-1 Test operation window

✓ There are functions which cannot be used depending on servo amplifier types and parameter settings.

JOG Operation

7.1

Performing JOG Operation, you can set commanded velocity for servo motors to perform test operation of servo motors at constant velocity.

- ✓ Make sure to ensure safety for the environment around your system as servo motors move.
- Motor excitation will be turned off when amplifier alarms occur while executing "JOG-operation". Execute this after surely preparing so that controlling equipment can be used immediately.
- This function is not available when the function of STO/SS1/SS2 is performed from functional safety module.

1) How to start up

- You can start up JOG Operation in any of the following procedures.
 - (A) Select "JOG Operation" through "Test operation" in Sub menu in Main window.
 - (B) Select in the following order of "Function (F)-Test operation (O)-JOG Operation (J) in the menu bar in Main window.
 - (C) Click the icon "JOG Operation" (J) in the Toolbar in Main window.

When axes selecting window is shown, select the axis numbers to perform JOG Operation.

✓ When the situation JOG Operation is not available both when starting up and executing, the following indication is shown to terminate execution. Confirm if the main control power is turn on, or any alarms occur.



Figure 7-2 Window indicating JOG Operation not available

2) How to operate

Opening JOG Operation window shows the following display.

File(E)	(B)
Operating Selections	
Select the operation at completing	Stop Method
At completing, "Alarm of Test Run Close" is selected.	It will stop, if a stop button is pushed.
C At completing, "Alarm of Test Run Close" is not selected.	It will stop, if the execution button [Positive/Negative direction] is detached. (C)
Monitor	
ALM Reserve Reserve T-Limit -OT	+DT S-DN S-RDY
Torque monitor 0.0 [%] Actual p	osition monito 0 [Pulse]
Velocity monitor 0 [min-1]	
Operating Conditions	(E)
PJOG Velocity Command 50 ==	[min-1] (0 · 32767)
JOG Acc./Dec. Time Constant	[msec] (0 - 16000) Decision
JDG Torque(Force) Command	(D) (D) Cancel
(F)	(G)
Operation	
	sitive Negative Btop
Lautions : usage of this function will operate a motor. Please carry out after ensuring surrounding safety.	

Figure 7-3 JOG Operation window

- (A) Select the operation at completing : Selects whether or not a supportive function alarm (ALM_DF) activates when completed
- (B) Selecting stop method : You can select whether the operation continues until clicking stop button or the operation activates only while clicking execute button once execute button (forward/backward) is clicked.
- (C) Monitor : You can confirm current amplifier state, torque monitor, velocity monitor, and present position.
- (D) Operating conditions: Sets behavior conditions such as velocity command, accelerating/decelerating constant, torque (force) command limit value
- (E) Edit : Click "Edit" button to edit. Click "Confirm" button after completing editing. To cancel editing, click "Cancel" button.
- (F) Servo On/Off : Turns on or off motor excitation. You cannot operate servo motors unless the state is servo-on.
- (G) "Positive/Negative Direction" "Stop" : Click the button in the direction which you want to move servo amplifiers. When selecting "Stop when pressing stop-button" as a condition on how to stop, note that you cannot stop motors unless you click stop-button.
- ✓ For the servo amplifier with functional safety module, changes to Safe Torque Off state after resetting supportive function alarm (ALM_DF) if JOG operation starts with servo ON state and the operation at completing selects ALM_DF activation. To start an operation again, transite to servo-ready state by turning OFF servo ON input once.

7.2 **Positioning Operation**

Performing positioning operation, you can set feeding velocity of servo motors and shift pulse to perform Test operation with constant pulse shifted.

- ✓ Make sure to ensure safety for the environment around your system as servo motors move.
- Motor excitation will be turned off when amplifier alarms occur while executing "Positioning operation". Execute after surely preparing so that controlling equipment can be used immediately.
- This function is not available when the function of STO/SS1/SS2 is performed from functional safety module.

1) How to start up

You can start up the positioning operation window in any of the following procedures.

(A) Select "Positioning operation" through "Test operation" in Sub menu in Main window.

(B) Select in the following order of "Function (F)-Test operation (O)-Positioning operation (P)" in the menu bar in Main window.

(C) Click the icon "Positioning operation" (P) in the Toolbar in Main window.

When axes selecting window is shown, select the axis numbers to perform positioning operation.

✓ When the situation positioning operation is not available both when starting up and executing, the following indication is shown to terminate execution. Confirm if the main control power is turn on, or any alarms occur.

Positioni	ng Operation(Axis1)
<u>.</u>	Positioning Operation cannot be performed.(Preparation un-completing)
	OK

Figure 7-4 Window indicating positioning operation error

2) How to operate

Opening positioning operation window shows the following display.



Figure 7-5 Positioning operation window

(A) Select the operation at completing	:	Selects whether or not a supportive terminating alarm (ALM_DF) activates when completed.
(B) Monitor	:	Confirm the following: Present state of amplifier, torque monitor, velocity monitor, present position, the number of operation for continuous repetition operation
(C) Operationg Conditions	:	Set conditions of operation. Clicking Add/delete buttons to set multiple conditions, you can create complicated operating patterns.
(D) Add/Remove/Up/Down	:	Add or remove conditions of operation. You can change the order of operation pattern you set by using Up and Down buttons.
(E) Loop sequence	:	Checking this performs condition for execution repeatedly. If this is not checked, the operation pattern already set is performed only once and stopped.
(F) Start from first item	:	Checking this always returns to the head of the next continuous operation when newly starting operation, in the case the operation stopped in mid-course.
(G) Continuous Count	:	Designate the number of repetition of continuous operation pattern.
(H) Servo On/Off	:	Turn on/off motor excitation.
(I) [STEP][START][STOP]	:	Start and stop operation in the set operation pattern. Clicking [STEP] button performs operation pattern in increments of 1 step.

- \checkmark There is an error of a maximum of 0.5 seconds in stop-setting time.
- Maximum velocity is limited to 2m/sec, in the system using linear motor with 1nm resolution.
 For the servo amplifier with functional safety module, changes to Safe Torque Off state after
- resetting supportive function alarm (ALM_DF) if positioning operation starts with servo ON state and the operation at completing selects ALM_DF activation. To start an operation again, transite to servo-ready state by turning OFF servo ON input once.

7.3 The detection of the origin signal

Using origin-detecting function, you can set feeding speed of servo motor/ accelerating and decelerating constant/searching directions, and then search and move the origins of motor shaft.

<What is motor origin?>

Motor origin here is the position as follows:

- (A) When a serial encoder being connected
 - : the position at which the data of within a 360-degree roll of motor shaft is zero
- (B) When a pulse encoder being connected

: the position in which Z-phase is output

- ✓ Make sure to ensure safety for the environment around your system as servo motors move.
- ✓ Motor excitation will be turned off when amplifier alarms occur while executing "Estimate magnetic pole position". Execute after surely preparing so that controlling equipment can be used immediately.
- ✓ Origin search is available only with the encoder equipped to motor. It is not allowed to the encoder for full-closed system.
 - Also, this function is not allowed with the system using linear motor.
- This function is not available when the function of STO/SS1/SS2 is performed from functional safety module.

1) How to start up

Start up motor origin searching window in any of the following procures.

(A) Select "The detection of the origin signal" through "Test operation" in Sub menu in Main window.

(B) Select in the following order of "Function (F)-Test operation (O)- The detection of the origin signal" in the menu bar in Main window.

(C) Click the icon "Search motor origin" (7) in the Toolbar in Main window.

When axes selecting window is shown, select the axis numbers to perform Orientation-operation.

✓ When the situation The detection of the origin signal is not available both when starting up and executing, the following indication is shown to terminate execution. Confirm if the main control power is turn on, or any alarms occur.



Figure 7-6 Window indicating motor origin detecting error

2) How to operate

Opening motor origin detecting window shows the following display.

Perating Selections (A) elect the operation at completing (A) • At completing, "Alarn of Test Run Close" is selected. (B) At completing, "Alarn of Test Run Close" is not selected. (C) onitor 0.0 [%] Actual position monito -1 [Pulse] Torque monitor 0.0 [%] Actual position monito -1 [Pulse] Velocity monitor 0 [min-1] (C) Edit cceleration/Deceleration Time 0 [misec] (0 - 16000) Decision Torque Command Limit 120.0 [%] (10.0 - 500) Cancel	Drientation(Axi	is1)						_ 🗆 🗙	1
iselect the operation at completing * At completing, "Alarm of Test Run Close" is selected. A t completing, "Alarm of Test Run Close" is not selected. onitor ALM Reserve ALM Reserve Torque monitor 0.0 [%] Actual position monito 1 [Pulse] Velocity monitor 0 [min-1] velocity monitor 0 [min-1] velocity command 50 [min-1] (C) peration Torque Command Limit 120.0 [%] Torque Command Limit 120.0 [%] Servo On Servo Off Prestion Prestive Direction Stup Direction Stup	e(E)								
At completing, "Alarm of Test Run Close" is not selected. (B) onitor ALM Reserve Reserve T-Limit -OT +OT S-DN S-RDY ALM Reserve Reserve T-Limit -OT +OT S-DN S-RDY Torque monitor 0.0 [%] Actual position monito -1 [Pulse] (C) perating Conditions 0 [min-1] (C) Edit Decision velocity Command 50 [min-1] (0 - 32767) Edit Decision cceleration/Deceleration Time 0 [min-1] [0] Insec] (0 - 16000) Decision Torque Command Limit 120.0 [%] (10.0 - 500) Cancel (E) peration Servo On Servo Off Positive Negative Stup Servo On Servo Off Positive Negative Stup Stup Cautions: usage of this function will operate a motor. Editions: Stup Stup Stup			ing	(A)] _[,				
onitor ALM Reserve Reserve T-Limit -OT +OT S-ON S-RDY Torque monitor 0.0 [%] Actual position monito -1 [Pulse] Velocity monitor 0 [min-1] (C) perating Conditions -1 [Pulse] Velocity Command 50 [min-1] (0 - 32767) Edit cceleration/Deceleration Time 0 [msec] (0 - 16000) Decision Torque Command Limit 120.0 [%] (10.0 - 500) Cencel (D) Positive Negative Stup Stup Servo On Servo Off Positive Negative Stup Cautions: usage of this function will operate a motor. Edit Stup Stup	250								
onitor ALM Reserve Reserve T-Limit -OT +OT S-ON S-RDY Torque monitor 0.0 [%] Actual position monito -1 [Pulse] Velocity monitor 0 [min-1] (C)	C At completing	g, ''Alarm of T	est Run Close''	is not selected					(\mathbf{P})
Torque monitor 0.0 [%] Actual position monito -1 [Pulse] Velocity monitor 0 [min-1] (C) Edit perating Conditions 0.1 [min-1] (0 - 32767) Edit Ceceleration/Deceleration Time 0.2 [min-1] (0 - 16000) Decision Torque Command Limit 120.0 [%] (10.0 - 500) Cancel (D) Positive Negative Stup Peration Servo On Servo Off Positive Negative Stup Cautions: usage of this function will operate a motor. Cautions: usage of this function will operate a motor. Edit Edit	Ionitor								
Velocity monitor 0 [min-1] (C) perating Conditions Velocity Command 50 [min-1] (0 - 32767) Edit cceleration/Deceleration Time 0 [msec] (0 - 16000) Decision Torque Command Limit 120.0 [%] (10.0 - 500) Cancel (D) peration Servo 0n Servo Off Positive Negative Direction Stop Cautions: usage of this function will operate a motor.	ALM	Reserve	Reserve	T-Limit				S-RDY	
perating Conditions (C) Velocity Command 50 min-1 (0 - 32767) Edit Decision cceleration/Deceleration Time 0 min (nsec) (0 - 16000) Decision Torque Command Limit 120.0 min (%) (10.0 - 500) Cancel (D) Positive Negative Stup peration Servo On Servo Off Positive Negative Stup Cautions: usage of this function will operate a motor. Cautions: Stup Stup Stup		and the second sec	(and the second second	Actual position mo			-1 [Pulse]	
Velocity Command 50 ··· [min-1] (0 · 32767) Edit ccceleration/Deceleration Time 0 ··· [msec] (0 · 16000) Decision Torque Command Limit 120.0 ··· [%] (10.0 · 500) Cancel (D) (C) Positive Negative Stup Servo On Servo Off Positive Negative Stup Cautions: usage of this function will operate a motor. Cautions: Cautions: Cautions: Cautions:	Velocity m	ionitor		0 [min-1]		(C))		
cceleration/Deceleration Time 0 [msec] (0 - 16000) Torque Command Limit 120.0 [x] (10.0 - 500) (D) [x] (10.0 - 500) peration [D) Servo On Servo Off Positive Direction Direction Stop	perating Conditio	ns ———							
Constant I U = [msec] (U - 16000) Decision Torque Command Limit 120.0 = [%] (10.0 - 500) Cancel (D) (D) Cancel Cancel Servo On Servo Off Positive Negative Stop Cautions: usage of this function will operate a motor. Cautions: usage of this function will operate a motor. Cautions: usage of this function will operate a motor.	Veloo	city Command			50 🚍 [min-1]	(0 - 32767)	Edit	
(D) Peration Servo On Servo Off Positive Negative Stop Direction Servo Off Cautions : usage of this function will operate a motor.	cceleration/Dece				0 📑 [msec]	(0 - 16000)	Decision	
Servo On Servo Off Positive Negative Direction Direction Btop	Torque C	ommand Limi	:		120.0 📑 [%]	(10.0 - 500))	Cancel	
Servo On Servo Off Positive Direction Negative Direction Stop Cautions : usage of this function will operate a motor. Cautions : usage of this function will operate a motor. Cautions : usage of this function will operate a motor. Cautions : usage of this function will operate a motor. Cautions : usage of this function will operate a motor.				(D)	1				(E)
Cautions : usage of this function will operate a motor.	Iperation	~	\sim						
Cautions : usage of this function will operate a motor. Please carry out after ensuring surrounding safety.	Servo Or	<u> </u>	Servo Off			Negativ Directio	n	Stop	
	Cautions : us Please carru	age of this fu	nction will opera uring surroundin	ate a motor. o safetv.					
		2110							

Figure 7-7 Motor origin searching execution window

- (A) Select the operation at completing
 (B) Monitor
 (C) Operating conditions
 (D) Servo On/Off
 (C) Deterting " (Oter " Pacificar" (Oter " Pacificar")
- (E) "Positive/Negative Direction" "Stop" : Positions to origin by moving in a designated direction

The following window is shown when orderly or abnormally completed.

Orientati	on(Axis1)
į)	Orientation has been completed successfully.
	ССК



✓ For the servo amplifier with functional safety module, changes to Safe Torque Off state after resetting supportive function alarm (ALM_DF) if origin-detecting function starts with servo ON state and the operation at completing selects ALM_DF activation. To start an operation again, transite to servo-ready state by turning OFF servo ON input once.

7.4 Magnetic pole position estimation

Executing "Magnetic pole position estimation" can estimate the magnetic pole position with slightly moving motors. "Magnetic pole position estimation" can be executed when using linear motors.

- Make sure to ensure safety for the environment around your system as servo motors move.
- Motor excitation will be turned off when amplifier alarms occur while executing "Estimate magnetic pole position". Execute it after surely preparing so that controlling equipment can be used immediately.
- This function is not available when the function of STO/SS1/SS2 is performed from functional safety module.

1) How to start up

You can start up the window of Magnetic pole position estimation in any of the following procedures.(A) Select "Magnetic pole position estimation" through "Test operation" from Sub menu in Main window.

(B) Select in the following order of "Function (F)- Test operation(O)- Magnetic pole position estimation (M)" in the menu bar in Main window.

(C) Click the icon () "Magnetic pole position estimation" in the Toolbar in Main window.

When axes selecting window is shown, select the axis numbers to estimate magnetic pole position.

✓ When the situation Magnetic pole position estimation is not available both when starting up and executing, the following indication is shown to terminate execution. Confirm if the main control power is turn on, or any alarms occur.

Magnetic	Pole Position Presumption(Axis1)	×
	Magnetic Pole Position Presumption cannot be performed.(Preparation un-completing)
	ОК	

Figure 7-9 Window indicating Magnetic pole position estimation abnormally terminated

2) How to operate

(1) The window confirming to execute is shown. Click "OK" button. Clicking "Cancel" button ends "Magnetic pole position estimation".

2	Is Magnetic Pole Position Presumption performed?
6	Magnetic pole position presumption for linear motor is performed.
-	Cautions: If "OK "is clicked, the motor will be operated.
	(It takes about 5 seconds, it working range depends on kinds of motor, it
	(It takes about 5 seconds. A working range depends on kinds of motor.)
	(It takes about 5 seconds. A working range depends on kinds of motor.) You have to exectute the operation after removing cause and securing safety

Figure 7-10 Window confirming to execute Magnetic pole position estimation

(2) Now "Magnetic pole position estimation" is being executed. Be aware that motors can slightly move. Magnetic Pole Position Presumption(Axis1)



Figure 7-11 Window indicating Magnetic pole position estimation being executed

 \checkmark Motor moves actually when this function use. Get safety of surrounding before use.





Figure 7-12 Window indicating Magnetic pole position estimation orderly completed

(4) When magnetic pole position cannot be estimated orderly, it becomes abnormal termination. Confirm the status.

<Probable causes of abnormal termination>

- Current command value is too small to move motors.
- Motor cannot move as it hits.
- ♦ etc.



Figure 7-13 Window indicating preparation of Magnetic pole position estimation not completed

7.5 Serial Encoder Clear

You can execute zero-clear of multi-turn data in the encoder and clear of encoder status by executing this function when the encoder connected to servo amplifiers is serial communication type.

This function is not allowed if the serial encoder has EnDat format of Heidenhain.

1) How to start up

Start up the window for Serial Encoder Clear in any of the following procedures.

- (A) Select "Serial Encoder Clear" through "Test operation" from Sub menu in Main window.
- (B) Select in the following order of "Function (F)- Test operation (O)- Serial Encoder Clear (E)" from the menu bar in Main window.
- (C) Click the icon "Serial Encoder Clear" 😱 in the Toolbar in Main window. When axes selecting

window is shown, select the axis numbers to execute "Serial Encoder Clear".

2) How to operate

(1) The window confirming to execute is shown. Click "OK" button.

	coder Clear(Axis1)	
2	Is Serial Encoder Clear performed?	
4	The status and the multi-turn data	of the serial encoder is rese
		ncel I

Figure 7-14 Window for confirming to execute serial encoder clear

(2) The window indicating being executed is shown. Click "Cancel" to stop in mid-course.

r is under execution.	
Coursel	
Lancel	
	ar is under execution.



(3) After a few seconds elapsed and orderly completing, the following window is shown. Click "OK" button.



Figure 7-16 Window indicating serial encoder clear orderly completed

(4) After a few seconds elapsed and abnormally completing, the following window is shown. Click "OK" button.



Figure 7-17 Window indicating serial encoder clear not completed

- At the same time, it make the supportive functional alarm (ALM_DF) occur.
 <Probable causes of abnormal termination>
- The motor was driven externally.
- Zero-clear is not available.
- Alarm causes have remained.
- Other cases
 - ✓ There are cases that the only encoder status is cleared but multiple-turn data is not cleared depending on the settings of servo amplifier parameters.
 - ✓ There are cases encoder clear is being executed in spite of that message "Serial encoder clear not executed" is shown after terminating operation through "Terminate" button. Make sure to confirm serial encoder PS data monitor in Monitor window.
7.6 Motor brake control function

In case of connecting the servo amplifier which has motor brake power output, forced ON/OFF of motor brake power is controllable by using this function.

- ✓ It is not available with the servo amplifier which does not have motor brake power output.
- Motor brake is released when turning ON a motor brake power. Pay attention with gravity axis because self-weight fall will happen.

1) How to start up

Start up the motor brake control window by clicking the function of motor brake control in either of Project tree, Tool bar or Menu bar. It cannot start up under the conditions below.

- Servo amplifier does not support the motor brake control function.
- Normal response does not come against preparation request. (State of using other supporting function (Test operation, Adjustment, Tuning or System analysis), State of disabling release of motor brake (during servo ON), etc)

💼 [New] - SANMOTION Mote	or Setup
Project(P) Communicatio	on(C) Function(F) Data File(D) Option(O) Window(W) Help(H)
E 💼 🏫 🚔 🛛 🚔 🍄 🗄	2 3 3 2 · · · · · · · · · · · · · · · ·
Project	1
Communication	Avis 1
🏪 Parameter	Current Axis 1 Amplifier/Motor Model RS3C10A0AL0 / R2CA18350L
Monitor	
Q Diagnose	🖕 Test Operation
Test Operation	JOG Operation
🐁 Analogue Offset Adjustment	
⁰o Servo Tuning	The detection of the origin Magnetic pole position signal
Measurement	
📄 Data File 🛛 🕂	Serial Encoder Clear Bo Motor brake control

Figure 7-18 Test operation window

2) How to operate

- (1) After start up
 - Window confirming to perform is indicated if the motor brake control is selected in Tool bar, Menu bar or sub panel of Test operation.



Figure 7-19 Window confirming to perform motor brake control

Window is closed if "Cancel" or "Exit" is clicked.

After confirmation of no problem for motor brake release, click "OK". Execution window of (2) is indicated.

It cannot perform during in use of other support function, during servo ON or during charge/discharge of main circuit power.



Figure 7-20 Indication window for preparation incompletion of response code of motor brake control

(2)	Execution window	/		
	Start up the execu	ution window.		
		Motor brake control(Axis1)	(A)	Select the way of unlock, from two.
		Amplifier/Motor Model RS3C10A0AL0 R2CA18	(7)	
		Force unlock setting		
		Force unlock is performed during clicking and holding "	'Unlock''.	
		Force unlock is performed till click "Force lock".	(B)	
				Current condition is indicated.
		🔗 Force unlock	Force lock	
		Status indication		
		Force unlock	Force lock	
		Θ ,	•	
			1	
			\rightarrow	
		Exit	(C)	
		Force unlock	Force lock	

Figure 7-21 Execution window for motor brake control

[Indication content of the window and setting] Initial value of buttons and each set values are below.

- (A) Unlock setting for motor brake: Select the way of unlock, from two.
 - Unlock motor brake while "Unlock" button is pressed.
 Unlock motor brake while "Force unlock" button is pressed.
 Window for confirming start is shown when clicking "Force unlock" button.
 Continue pressing "Unlock" button while unlock is desired.

Confirmation for motor brake control starting	×				
Motor brake will be unlocked. Always perform after checking safety around.					
Unlock motor brake?					
🔗 Unlock 🕼 Abort					
%Force unlock is performed during clicking and holding	ıg				

Figure 7-22 Window for final confirmation of motor brake control

- ② Unlock motor brake until "Force lock" button is pressed.
- When "Unlock" button is clicked, motor brake is unlocked and return to execution window of (2). If unlock is not performed, click "Abort" button.



Figure 7-23 Window for final confirmation of motor brake control

- (B) Control button: It controls by two buttons of "Unlock" and "Abort".
- (C) Status indication: Current condition ("Force unlock" or "Force lock") is indicated with lamps.
- (3) Abnormal completion

Abnormal completion window for motor brake control is indicated if error is occurred. Returns to main window after clicking "OK" button.



Figure 7-24 Abnormal completion window for motor brake control

(4) Exiting

Exit confirmation window is indicated if "Exit" button is clicked.



Figure 7-25 Completion confirmation window for motor brake control

No Text on This Page.

8. Adjustment

You can perform the following functions as adjustment functions:

Analog velocity command/ velocity adding command/ torque (force) command offset adjustment/ analog torque (force) adding command offset adjustment.



Figure 8-1 Adjustment menu window

8.1 Offset Adjustment of V-REF/T-REF Terminal

This button automatically performs analog velocity command/ velocity adding command/ torque (force) command off-set adjustment.

1) How to operate

- (1) Select in the following order of "Function", "Adjustment", "Offset Adjustment of V-REF/T-REF Terminal" or click "Offset Adjustment of V-REF/T-REF Terminal" through "Adjustment" in the Side menu.
- (2) "Window confirming to execute" is shown. Click "OK" button.



Figure 8-2 "Offset Adjustment of V-REF/T-REF Terminal" window to confirm the execution

(3) Adjustment execution window is shown.

<Auto-adjustment window>

djustment			
Adjustment Type:	• Auto C Manual		
	Execute Result : -		
lonitor			
Ionitor	Offset value	24 [*	0.424mV]
1onitor	Offset value V-REF Terminal Input voltage		0.424mV] nV]

Figure 8-3 Offset Adjustment of V-REF/T-REF Terminal execution window

✓ Select "Auto" and then click "Execute" button to automatically adjust. This can monitor the adjustment results, the set off-set amount, the input voltage after adjustment. When an extremely-high voltage is input as a commanded input, the automatic off-set cannot normally complete. (when it is 5V or over as a guide)

<manual a<="" th=""><th>adjustment v</th><th>/indow></th></manual>	adjustment v	/indow>
---	--------------	---------

Adjustment Adjustment Type:	C Auto r Manual	forw	vards the off-se	d down arrow key et value you set to time you press.
The set value is transfereed to amplifiers at the time you press "Confirm" button.		ision		
	Offset value	24	[*0.424mV]	
	V-REF Terminal Input voltage	7	[mV]	
	End			

Figure 8-4 Offset Adjustment of V-REF/T-REF Terminal execution window

Set an arbitrary value after selecting "Manual" to manually adjust. This can monitor the set off-set amount, the input voltage after adjustment.

8.2 Offset Adjustment of T-COMP Terminal

This is to adjust off-setting of analog torque (force) adding commend.

Select in the following order of "Function"-->"Adjustment"-->" Offset Adjustment of V-REF/T-REF Terminal", or click " Offset Adjustment of V-REF/T-REF Terminal " through "Adjustment" in the Side menu. Refer to Section 8.1 Offset Adjustment of V-REF/T-REF Terminal for the details of actual operation.

9. Servo-tuning

You can perform auto-tuning notch filter, auto-tuning vibration suppression frequency, storing results of auto-tuning, as auto-tuning functions.



Figure 9-1 Servo-tuning menu window

9.1 Auto Notch Filter Tuning

This function is to automatically detect resonant frequency, set it as Torque (force) command notch filter, and suppress the vibration.

- ✓ This function is not allowed if the tandem operation is used.
- This function is not available when a safety function is performed from functional safety module.

1) How to start up

You can start up Auto-tuning notch filter in any of the following procedures:

- (A) Select "Auto-tuning notch filter" through "Servo Tuning Assist" from the Sub menu in Main window.
- (B) Select in the following order of "Function(F)" -" Servo Tuning Assist (T)" " Auto Notch Filter Tuning(N)" from the menu bar in Main window.
- (C) Click "Auto Notch Filter Tuning" In the Toolbar in Main window. When Axis-selecting window is shown, select the axes you perform Auto-tuning notch filter.

2) How to operate

(1) Window confirming to execute is shown. Click "OK" button.

		g(Axis1)	-
?	Is Auto Notch I	Filter Tuning perf	ormed?
	·····	Cancel 1	

Figure 9-2 Window confirming Auto Notch Filter Tuning execution

(2) Click "Servo-on" button after confirming the operational conditions shown on the window.

Auto Notch Filter T	uning(Axis1)		
File(<u>F</u>)			
Amplifier/Motor Model	RS3A02A2AL2	R2AA06040F	
Operating Selections = Select the operation a	t completing		
	Alarm of Test Run Clos	e" is selected	
	Alarm of Test Run Clos		
December Califica			
Parameter Setting	Torque command	50.0 🕂 [%]	
	i orque command j	(10.0 - 100.0)	
		(10.0 100.0)	
Motor Excitation			
	Servo On	Servo Off	
		30140 011	
Execute			
		1	
		Execute	
	-		
	of this function will ope after ensuring surround		
The holding torqu	e(force) falls during tur	ning execution.	
Do not use this fu	inction in a gravitationa	al axis.	

Figure 9-3 Auto Notch Filter Tuning window

(3) To tune click "Execute" button, to once servo-off click "Servo-off" button.

(4) Executing "tuning" displays Widow indicating tuning being processed. Wait till it is completed.



- (5) When "tuning" is normally completed, Window indicating tuning normally completed is shown. At this time confirm the frequency you set. Note that the servo-off state has continued till you click "OK" button in this window.
- (6) Clicking "OK" button shows the window for tuning in the (3) above.

Auto Notch Filter Tuning(Axis1)		
Auto Notch Filter Tuning has been complete The motor will be Servo-off if O.K. is clicked	ed successfully. I.	
Tuning Result		
Torque Command Notch Filter A	4000	Hz

Figure 9-5 Window indicating results of Auto Notch Filter Tuning

(7) In the window for tuning in the (3) above, clicking "Terminate" button in the upper right shows the Window confirming completed (termination) below. If it is ok to terminate, click "OK" button, if you do not terminate, click "Cancel" button.



Figure 9-6 Window for confirming Auto Notch Filter Tuning completed (terminated)

(8) If you cannot execute Tuning or if any of errors occurs during tuning, the following window is shown and then force-quite the tuning operation.



Figure 9-7 Window indicating preparation of Auto Notch Filter Tuning not completed

9.2 Auto FF Vibration Suppression Frequency Tuning

Executing this function automatically set vibration suppression frequency.

- \checkmark This function is not allowed if the tandem operation is used.
- ✓ This function is not available when a safety function is performed from functional safety module.

1) How to start up

You can start up Window for Auto FF Vibration Suppression Frequency Tuning in any of the following procedures.

- (A) Select "Auto FF Vibration Suppression Frequency Tuning" through "Servo Tuning Assist" from the Sub menu in Main window.
- (B) Select in the following order of "Function (F)" " Servo Tuning Assist (T)" "Auto FF Vibration Suppression Frequency Tuning" in the menu bar in Main window.
- (C) Click on icon "Auto FF Vibration Suppression Frequency Tuning" Fin the Toolbar in Main window.

When Axis-selecting window is shown, select the axes numbers you perform Auto FF Vibration Suppression Frequency Tuning.

2) How to operate

(1) Window confirming to execute is shown. Click "OK" button.



Figure 9-8 Window confirming Auto FF Vibration Suppression Frequency Tuning to execute

(2) Confirm the conditions for operating in the displayed window, and then click "Servo-on" button.

Auto FF Vibration S	uppression Frequer	ncy Tuning(Axis1)	
File(<u>F</u>)			
Amplifier/Motor Model	RS3A02A2AL2	R2AA06040F	
Operating Selections	Constant Providence		
Select the operation a			
and the second	Alarm of Test Run Close		
C At completing, "	Alarm of Test Run Clos	e" is not selected.	
Parameter Setting			
-	Torque command	25.0 🛟	121
	roique ecimiana j	(10.0 - 100.0)	
Friction Torque (Compensation value	5.0 ÷	
		(0 - 50.0)	
Motor Excitation			
	Servo On	Servo	Off
Execute			
ENCOURC		1	
		Execute	
		Television and the second	
Cautions : usage	of this function will one	rate a motor for about 30 seco	nds
Nease carry out	after ensuring surround	ing safety.	146.
	ue(force) falls during tur		
JDo not use this ru	unction in a gravitationa	il axis.	



- (3) To tune click "Execute" button, to once servo-off click "Servo-off" button.
- (4) Executing "tuning" displays Widow indicating tuning being processed. To terminate it click "Cancel "button.

uto EE Vibratia	n Cumpromian E	Frequency Tuning is under execution.
	n pubblession r	requency runing is under execution.
lapsed Time	5 sec	

Figure 9-10 Window indicating Auto FF Vibration Suppression Frequency Tuning being executed

(5) This is Window indicating execution results. Confirm the results you executed tuning, and then click "OK" button.



Figure 9-11 Window indicating Auto FF Vibration Suppression Frequency Tuning results

- ✓ It takes approximately 10 seconds to complete tuning.
- ✓ When the set value is 500.0Hz, vibration suppression frequency is not detected.

9.3 Save Result of Auto Tuning

You can store the parameters adjusted via Auto-tuning. You can store 5 types of parameter combinations.

1) How to start up

Start the window for Save Result of Auto Tuning in any of the following procedures.

- (A) Select "Save Result of Auto Tuning" through "Servo Tuning Assist" from the Sub menu in Main window.
- (B) Select in the following order of "Function(F)" " Servo Tuning Assist (T)" " Save Result of Auto Tuning (S)" in the menu bar in Main window.
- (C) Click on the icon "Storing auto-tuning results" 2 in the Toolbar in Main window.
 - When Axis-selecting window is shown, select the axes numbers you perform Storing auto-tuning results.

2) How to operate

(1) Window confirming to execute is shown, click "OK" button.

Save Re	sult of Auto Tuni	ng(Axis1)	×
?	Is Save Result of	f Auto Tuning per	formed?
	ОК	Cancel	

Figure 9-12 Window confirming Save Result of Auto Tuning to execute

(2) Confirm the conditions for operation shown in the window, select the parameters you store, and then click "Save the Monitor Value" button.

Save Result of Auto Tuning	g(Axis1)					>
File(E)						
Amplifier/Motor Model RS3A	03A2AA0 R2AA08	075F				
Tuning Mode Tuning Mode : Auto-Tuning Characteristic :	Automatic Tuning	dignate the ore.	e combina	tion of j	parameters	s you
Conditions		\sim			((
Saving Parameter Selection :	JRAT, KP, KV P, TVI ,	TCFIL, KMP	<u> </u>	Edit	Decision	
Auto-Tuning Response :			5		Cancel	
Auto Tuning Parameter-Monitor	Value		Parameter Sett	ting Value —		
ATKPP	28 [1/s]		KP1		30	[1/s]
ATKVP	27 [Hz]		KVP1		50	[Hz]
ATTVI	37.3 [ms]	Save the	TVI1		20.0	[ms]
ATTCFIL	993 [Hz]	Monitor Value	TCFIL1		600	[Hz]
ATJLJM	100 [%]		JRAT1		100	[%]
КМ	28 [1/s]		KM1		30	[1/s]
Options for save Change tuning mode to man Detailed The data displayed on an auto tu Manual Tuning :1 is a proper gain	ning parameter-monitor va	lue changes "tunin	g mode" with and	"auto tuning	characteristic".	
Auto Tuning : It is actually a gain i "JRAT,KVP,TVI,TCFIL:Pro "KP: The proper gain by a Auto Tuning (JRAT Manual Settir It is actually a gain in use by	oper Gain by Auto Tuning uto tuning when the tuning ng) a control loop.	g characteristic is ex	cept "the locus c	control 2''		
"JRAT:Parameter JRAT1 "KVP,TVI,TCFIL:The Prop "KP: The proper gain acco Auto Tuning adjust parameters be The parameters below will be sav	er Gain according to Para ording to parameter JRAT1 slow by the characteristics	when the tuning cl automatically.	haracteristic is ex	cept "the loci	us control 2''	-

Figure 9-13 Save Result of Auto Tuning execution window

(3) The parameters you selected are set at the values monitored with Auto-tuning parameter monitor

values.

Save Result of Auto Tuning(Axis1) File(F)			_ 🗆 X
Amplifier/Motor Model BS3402424L2 R24406040F The 5 combinations of paramertes are available. Auto-Tuning Characteristic : http://doi.org/10.00000000000000000000000000000000000	cha Hov savi	auto tuning respons nged on this screer vever, the changed das a parameter. is screen is closed, ne original setting.	n. I value is not
Saving Parameter Selection : JRAT, KP, KVP, TVI, TCFIL, KMP	▼ Edit	Decision	
Auto-Tuning Response : JRAT, KP, KVP, TVI, TCFIL, KMP URAT, KVP, TVI, TCFIL		Cancel	
Auto Tuning Parameter-Monitor V KP, KVP, TVI, TCFIL, KMP KVP, TVI, TCFIL ATKPP 26 [1/s] KP1	Setting Value	3	0 [1/s]

Figure 9-14 Parameter selecting window for Save Result of Auto Tuning

(4) To terminate the operation, click "Terminate" button in upper right of the window. Termination (completion) confirming window is shown, click "OK" button.

Save Res	ult of Auto T	uning(Axis1)	×
?	Is Save Resu	lt of Auto Tuning e	ended?
	ОК	Cancel	

Figure 9-15 Window for confirming Save Result of Auto Tuning completion

9.4 Servo Tuning Navigation

Assists the servo tuning with selecting optimum tuning mode depending on set machine condition.

By treating a complex tuning easier, completion time will be shorter.

It is able to start from machine condition setting, but also able to do servo tuning only, abbreviating machine condition setting.

- ✓ Current setting will be initialized to reset machine characteristics.
- ✓ This function is not allowed if the tandem operation is used.
- ✔ This function is not available when a safety function is performed from functional safety module.

1) How to start

Depending on flow chart below, select the button of starting servo tuning.





2) Start From Condition Setting

Decides optimum tuning mode before servo-tuning by setting of machine condition.

(1) Step1: Parameter initialization

Indicates parameters which are changed at initialization. Click "Next>", if changes have no problem. Click "Exit", if changes are not desired.

	sett	ing(Axis1)				
ep 1 arameter initialization	M	ep 2 achine condition tting	Step 3 Load and machine characteristic settings	Step 4 Step 5 Adjustment Command selection Preparation		
		-	ue below for execu		uning navigat	ion.
For correct servo) tunir	ng, setting value initial	ue, when servo tuning nav lization and servo amplifier alue and reset the servo ar	resetting or otherwise	power-cycle will be	needed.
Amplifier/Motor Mod	tel	RS3A03A2AA0	R2AA08075F]		
Group	ID	Name		Present setting value	Standard value	Unit
Group 0 (Auto-tu	00	Tuning Mode		01:AutoTun_JRA	00:AutoTun	-
Group 0 (Auto-tu	01	Auto-Tuning Charac	teristic	04:Positioning5	00:Positioning1	-
Group 3 [Model f	02	Model velocity feedf	orward gain	40	0	%
7 storing to the						
Showing only the	para	meters to be changed	d a setting values			

Figure 9-17 step1 Initializing parameters display window

• Amplifier will reboot when "Next>" button is clicked. Wait a minute. In case of use of pulse encoder or of amplifier with safety module, please make control power cycle manually.

Tuning condition s	setting(Axis1)			
Step 1 Parameter initialization	Step 2 Machine condition setting	Step 3 Load and machine characteristic settings	Step 4 Adjustment Preparation	Step 5 Command selection
	oot of servo amp	-		
Alarm <u>R</u> eset		<	Back <u>N</u> ext >	Exit

Figure 9-18 step1 Parameter now being initializing

(2) Step2: Machine condition setting

Select item which is nearest the machine in use, from the window. After setting completion, click "Next>" button.

Tuning condition setting(Axis1)			
Step 1 Parameter initialization Step 2 Machine condition setting	Step 3 Load and machine characteristic settings	Step 4 Adjustment Preparation	Step 5 Command selection
Select optimal adjustment mod As note, optimal servo adjustm Please select the control use of machine © Point-to-Point (PTP) control © Continuous path (CP) control Offset load Please select whether an offset load will © Offset load will not given © Offset load will given Rigidity Please select rigidity condition of machine © High rigidity: High rigid machine a © Middle rigidity: Middle rigid machine a © Middle rigidity: Middle rigid machine as Machine accuracy Set the in-position width. In-position width. (1 - 214744	ent will be not give s. be given or not to the moto re. s connecting a coupling dire he as ball screw drive. belt drive. 100 = [Pulse]	n, if incorrect o	
Alarm <u>R</u> eset	<	Back Next	> E <u>x</u> it

Figure 9-19 step2 Machine condition setting window

(3) Step3: Load and machine characteristics setting

Sets the load inertia ratio and the machine characteristics (Resonant frequency and machine stand-anti-resonant/resonant frequency).

(A) Load inertia measurement

Set the load inertia ratio, at first. In case of known inertia ratio, set the value directly, and then click "Next>" button. In case of unknown inertia ratio, load-inertia ratio estimation is available by response of actual motor operation. Click "Load inertia ratio measurement" button.

Tuning condition :	setting(Axis1)				
Step 1 Parameter initialization	Step 2 Machine condition setting	Step 3 Load and machine characteristic settings	Step 4 Adjustment Preparation		ection
Lo	ad characteristics	Mechanical resonal characteristics	nt 🕨	Machine stand vibration characteristics	
Please set the	load inertia ratio.				
Measurement is a	ble by the servo amplifier f	unction if load inertia ratio	is unknown.		
	ertia ratio rement			e of known ine alue directly.	rtia ratio, s
Set the value dire	ctly if load inertia ratio is ki				
Load inertia r	ratio	100 📑 [%			
	1				Exit
Alarm Reset		1	Back 📕	Next>	

Figure 9-20 step3 Load characteristic setting window

When "Load inertia ratio measurement" button is clicked, the window like next is indicated. Set the operation condition, and then estimate load inertia by operating motor actually.

The load characteristic measurement(Axis1)		
Amplifier/Motor Model RS3A01A0AB0	R2AA06010F		Description of condition
Measuring the load inertia rat the command provided intern		y ?	setting for accurate estimation is shown.
Operation condition setting			
PJOG Velocity Command	50 🔶 [min-1]	Edit	
PJOG Acc./Dec. Time Constant	0 🔔 [ms]	Decision	
PJOG Torque Command Limit	120.0 🚔 [%]		
PJOG Position Command	131072 🔶 [pulse]	Cancel	
Command velocity Pos	itive direction	 Indi 	cates graph of estimated
Operated number	1 🜩	loa	d inertia ratio. Click "Keeping
Rest time	1000 🔶 [ms]	as	a setting candidate" button
		wh	en estimated value is
Measurement		sta	bled.
Servo ON Servo OFF	Start	Stop	
Operation executed number	0		
Estimated load inertia ratio	100 [%]		
History list of the estimated load inertia ratio	ss a setting candidate	"	lick "Decision" after confirming The load inertia ratio to be set" fter click, return to Figure 9-20.
	V		
The load inertia ratio to be set	- [%]		
		Decision	
		Decision	

Figure 9-21 step3 Load characteristic measurement window

- ✔ Motor will rotate actually when this function is used. Take care of safety around for operation.
- ✓ Estimation error might be larger when operates with load-less operation condition. Please set operation condition that requires load near to motor rated torque.

(B) Machine resonant characteristic setting

Next, sets the machine resonant characteristic. In case of known resonant frequency of machine, set the value directly as torque command notch filter, and then click "Next>" button. In case of unknown resonant frequency of machine, resonant frequency estimation of machine is available by measurement. Click "Machine resonance measurement" button.

Tuning condition	setting(Axis1)				- • ·)
Step 1 Parameter initialization	Step 2 Machine condition setting	Step 3 Load and machine characteristic settings	Step 4 Adjustment Preparation	Step 5 Command se	election	
Lo	ad characteristics	Mechanical resona characteristics	nt 🕨 📕	Nachine stand vibration characteristics		
frequency.		que command ag rs are able to set.		chine resonant		
Machine measu Set the value dire	resonance urement	ilable and then set the res requency is known. er measurement by the sys		e resonant frequency is	unknown. E	
-	ommand Notch Filter A	or measurement by the sys	atom analysis.		Descri	ption of filter setting
Torque Co	mmand Notch Filter A			4000 🌲 [Hz]		is shown.
TCNFILA,	Low Frequency Phase D	elay Improvement		0 🌩 [-]	6	
Torque Co	ommand Notch Filter B					
Torque Co	mmand Notch Filter B			4000 🚔 [Hz]	0	
TCNFILB,	Depth Selection			0 🌩 [-]	0	
- Torque O	ommand Notch Filter C				-	-
Alarm Reset]	<	Back	Next >	Exit	

Figure 9-22 step3 Machine resonant characteristic setting window

Indicates measurement condition setting window as below. Default torque command value is 50% of motor rated torque. Change the command value depending on the machine condition in use, activate "Servo On" button, and then click "Execute" button.

📅 Data Measure & Analysis(Axis1)	x
File(<u>F</u>)	
Amplifier/Motor Model RS3A03A2AA0 R2AA08075F System Analysis Setting	
Torque command 50.0 🗄 [%]	
(10.0-100.0)	
Freqency Width 10.0 - 2000 V [Hz]	
Motor Excitation	
Servo On Servo Off	
Data Measure Execution	5
Execute	
Cautions : usage of this function will operate a motor. Please carry out after ensuring surrounding safety.	

Figure 9-23 step3 Machine resonant characteristic measurement and Analysis window

V

When measurement completed normally, displays system analysis measurement result window like below and indicates auto measured resonant frequency as setting candidate.



Figure 9-24 step3 Machine resonant characteristic measurement window

- Motor will rotate actually when this function is used. Take care of safety around for operation.
- ✓ 100 Hz or less frequency can not set.

(C) Machine stand vibration characteristic measurement

Sets the machine stand vibration characteristic. In case of known anti-resonant/resonant frequency of machine stand, set the value directly, and then click "Next>" button. In case of unknown anti-resonant/resonant frequency of machine stand, machine stand vibration characteristic is able to measure. Give check mark to "Use the model-following vibration suppression control." and click "Machine stand vibration measurement" button.

Tuning condition	setting(Axis1)					- x	
Step 1 Parameter initialization	Step 2 Machine condition setting	Step 3 Load and machine characteristic settings	Step 4 Adjustment Preparation	Step 5 Command	selection		
Loa	ad characteristics	Mechanical resona		hine stand vibration characteristics	۲.		
is there in a sys		on suppression co the model control					
Measurement by t		ailable and then set the res	uit, if a machine star cription o]
The model-following		ation frequency is known. control is disabled when 8 æ Frequency 1.	D [Hz] is set to Mode	l Control Antireson	ance	Desc	L ription of filter setting
	rol anti-resonant /resona			0.0 🜩 [Hz]		deta	il is shown.
	rol Antiresonance Frequer	· ·		0.0 🛫 [Hz]	0		
Alarm <u>R</u> eset]	<	Back Nex	t>	Egi	t	

Figure 9-25 step3 Machine resonant characteristic setting window

Indicates measurement condition setting window as below. Default torque command value is 50% of motor rated torque. Change the command value depending on the machine condition in use, activate "Servo On" button, and then click "Execute" button.



Figure 9-26 step3 Machine resonant characteristic measurement and Analysis window

When measurement completed normally, displays system analysis measurement result window like below and indicates auto measured resonant frequency as setting candidate. Confirm set value, and correct it if needed, and then close the window.



Figure 9-27 step3 Machine stand vibration characteristic measurement window

Motor will rotate actually when this function is used. Take care of safety around for operation.

The value can not set if measured value is out of setting range, or not satisfied setting condition.

(4) Step4: Adjustment preparation

Confirm machine characteristics setting and optimum real-time auto tuning setting.

Tuning condition s	setting(Axis1)	<u> </u>				
Step 1 Parameter initialization	Machine condition	Step 3 Load and machin characteristic sett			Step 5 Command selection	
Condition, load/ Amplifier/M Recommer	nded real-time auto tuning s Auto tuning Position (Pristics condi A0 R2AA etting g characteristics control selection Tuning mode responsiveness	ition. 08075F Positioning cont Model-following AutoTun_JRAT 5	rol 5 -Fix		-
- Checking th	e conditions which set.			Adjustmer	nt condition save	
Machine condition	on setting					
Machine contro	bl	Point-to-Point (P	PTP) control			
Offset load		Offset load will r	not given			
Rigidity		Low rigidity: Low	w rigid machine a	s belt drive.		-
Alarm <u>R</u> eset			< <u>B</u> ack	<u>N</u> ext >]E	<u>ix</u> it

Figure 9-28 step4 Adjustment preparation display window

Click "Next>", if settings have no problem. Click "<Back" if settings have problem, and set again. Amplifier will reboot with set condition when "Next>" button is clicked. In case of use of pulse encoder or of amplifier with safety module, please make control power cycle manually.

🛅 Tuning condition s	setting(Axis1)			
Step 1 Parameter initialization	Step 2 Machine condition setting	Step 3 Load and machine characteristic settings	Step 4 Adjustment Preparation	Step 5 Command selection
	oot of servo am	plifier. /hen preparation c	ompleted.	
Alarm <u>R</u> eset]	<	Back <u>N</u> ext >	E <u>x</u> it

Figure 9-29 step4 Servo amplifier reboot window

(5) **Step5: Command selection**

Selects the input command at tuning. Click "Operate by the internal command of servo amplifier" when perform tuning with internal positioning operation function of servo amplifier, or click "Operate by the command of upper controller" when input command from upper controller.

Tuning condition s	setting(Axis1)							
Step 1 Parameter initialization	Step 2 Step 3 Step 4 Step ter initialization Machine condition Load and machine Adjustment Com setting characteristic settings Preparation							
Please select the Adjustment is able completed when n Operation com Operate Using w On the Using w	The operation con to done by starting the t epeating tuning with pre- mand selection the internal comman when adjusting with moto tuning function, making the command of upp when adjusting with moto	d of ervo amplifier. Ir operation by internal com commands and changing a	adjustment. om main window because mand of the JOG operatio adjustment parameters.					
Alarm <u>R</u> eset		<	Back <u>N</u> ext >	Exit				

Figure 9-30 step5 Command selection window

3) Start Tuning (JOGCMD)

Perform servo tuning using internal positioning operation function of servo amplifier, without upper controller. Follow the sequence below.

💼 Tuning execu	tion (Internal command)(Axis1)			
Amplifier/Motor N	Nodel RS3A01A0AB0 R2	2AA06010F		
Operation conditi	ion setting			
PJOC	G Velocity Command	50 🔶 [min-1]	Edit	Operation executed number
PJOG Acc./	/Dec. Time Constant	0 🚊 [ms]		0
	gue Command Limit	120.0 🔶 [%]	Decision	Motor excitation
• When set 0 to the	Position Command	131072 🌲 [pulse]	Cancel	
"operated number", operation will				Servo ON Servo OFF
continue till clicking	ommand velocity Positive direct	tion	•	Command
"Stop" button.	Operated number	1 🚔		
	Rest time	1000 (ms]		Start
 "Rest time" has 				
0.5 sec maximum	Manual mode			
of jitter.	parameter	Control gain monitor		20 4 1 4 4 4
	ponse	Position Loop Proportion		28 🛓 [1/s]
	5	Velocity Loop Proportion Velocity Loop Integral		27 🛓 [Hz]
Model velocity fe	edforward gain			57.5 - [ms]
	40	Load Inertia Moment F		100 📩 [%]
		Torque Command Filte		Calls operation trace window.
	Edit Cancel	Model Control Gain mo	onitor	window.
Adjustmen	at parameters for each purpese		ult of parameter adju eration trace function	
Suppress vibratio	on			
FF Vibration Supp	pression Frequency B1		500.0 🐥 [Hz]	Edit
				Cancel
Suppress micro	vibration			
Minor vibration (o	oscillation) suppression function	Function is a	lways invalid	Edit
Minor vibration su	uppression pulse compensation valu	e	1 📩 [Pulse	Cancel
Minor vibration su	uppression pulse compensation freq	uency	1 📩 [times]	1

Figure 9-31 Start Tuning (JOGCMD) window

Motor will rotate actually when this function is used. Take care of safety around for operation.

(1) Tune by Basic adjustment parameter

Tuning by Basic adjustment parameter shown in the window. Tune with checking operation waveform at the operation trace window.

Basic adjustment parameters depend on selection of machine control.

- Selects Point-to-point (PTP) control · · · 1 Auto tuning response 2 Model velocity feedforward gain Selects Continuous path (CP) control
 · 1 Auto tuning response 2 Velocity feedforward gain

 - 3 Position loop proportional gain
- At continuous path (CP) control, please refer the position loop gain which is recommended by auto 1 tuning response setting value, shown in screen.
- (2) Tune by parameter for each purpose

When desired performance is not given by Basic adjustment parameter tune, call "parameters for each purpose" window and perform adjustment for each purpose.

(3) More improvement of performance is needed

When desired performance is not given by "parameters for each purpose", manual servo tuning is needed.

4) Start Tuning (EXTCMD)

Perform servo tuning using upper controller. Follow the sequence below.

Amplifier/Motor Model RS3A01A0AB0 R2AA	A06010F
Automatic mode Manual mode	
Basic adjustment parameter	Control gain monitor
Auto-Tuning Response	Position Loop Proportional Gain monitor 28 📩 [1/s]
5 🔶	Velocity Loop Proportional Gain monitor 27 📩 [Hz]
	Velocity Loop Integral Time Constant m 37.3 - [ms]
Model velocity feedforward gain	Load Inertia Moment Ratio monitor
40 🔶	Torque Command Filter mon Calls operation trace
Edit Cancel	Model Control Gain monitor window.
Adjustment parameters for each popose	Check the result of parameter adjustment through the operation trace function.
Suppress vibration	
FF Vibration Suppression Frequency B1	500.0 📩 [Hz] Edit
	Cancel
Suppress micro vibration	
Minor vibration (oscillation) suppression function	Function is always invalid Edit
	1 [Pulse]

Figure 9-32 Start Tuning (EXTCMD) window

(1) Tune by Basic adjustment parameter

Tuning by Basic adjustment parameter shown in the window. Tune with checking operation waveform at the operation trace window.

Basic adjustment parameters depend on selection of machine control.

- Selects Point-to-point (PTP) control · · ·
- Selects Continuous path (CP) control
 ·
- ① Auto tuning response
- 2 Model velocity feedforward gain
- 1 Auto tuning response
- 2 Velocity feedforward gain
- ③ Position loop proportional gain
- ✓ At continuous path (CP) control, please refer the position loop gain which is recommended by auto tuning response setting value, shown in screen.

(2) Tune by parameter for each purpose

When desired performance is not given by Basic adjustment parameter tune, call "parameters for each purpose" window and perform adjustment for each purpose.

(3) More improvement of performance is needed

When desired performance is not given by "parameters for each purpose", manual servo tuning is needed.

5) Manual tuning mode

If adjustment by auto-tunig mode is not enough, change each parameters individually for servo tuning (Manual tuning mode). Follow the sequence below.

(1) Switch to manual mode

Click manual mode tab in the Tuning execution window.

Tuning execution (External command)(Axis1)]
Amplifier/Motor Model RS3A01A0AB0 R2AA06010F			
Automatic mode Manual mode			
Control gain setting			
Position Loop Proportional Gain 1		28 🚊 [1/s]	
Velocity Loop Proportional Gain 1		27 📩 [Hz]	
Velocity Loop Integral Time Constant 1		37.3 🔶 [ms]	
Load Inertia Moment Ratio 1		100 🌲 [%]	
Torque Command Filter 1		993 🔶 [Hz]	Click edit button and
			change parameters.
			Changed parameters
	[Edit Cancel	will be transferred to
			amplifier when
Adjustment parameters for each purpose	Check the result of parameter adjustment through the operation trace function.	Operation trace	submit button is
	through the operation trace function.		clicked.
Suppress vibration			
FF Vibration Suppression Frequency B1	500.0 🔔 [Hz]	Edit	
		Cancel	
Suppress micro vibration			
Minor vibration (oscillation) suppression function	Function is always invalid	Edit	
Minor vibration suppression pulse compensation value	1 [Pulse]	Cancel	

Figure 9-33 Manual tunig window

Mode change confirmation window is shown. Click OK if there is no problem on changed setting.

Tuning execution (Internal command)(Axis1)	X
Mode will be changed. Is that okay of reflecting settings to an	nplifier?
ОК	Cancel

Figure 9-34 Mode change confirmation window

(2) Tuning in manual mode

Automatic mode values are reflected when switch to manual mode. Start tuning in manual mode from automatic mode values.

Changeable parameters:

- Position loop proportional gain
- 2 Velocity loop proportional gain
- 3 Velocity loop integral time constant
- Load inertia ratio
- 5 Torque command filter
- 6 Model control gain

Below parameters also changeable but there is no automatic mode values reflection when switch to manual mode.

- ① Velocity feedforward gain
- 2 Velocity feedforward filter
- "Parameters for each purpose" are effective in manual mode also. Perform the tuning meets each purpose, for more performance improvement.

9.5 Saving Result of Adaptive Notch Filter

Save the notch filter frequency estimated by Adaptive notch filter as fixed value.

1) How to start up

Adaptive notch filter result saving window is start by either way below.

- (Å) Select "Saving the Adaptive notch filter result" through "Servo tuning" from the Sub menue in Main window.
- (B) Select in the following order of "Function(F)" " Servo Tuning (T)" "Saving the Adaptive notch filter result (A)" in the menu bar in Main window.

2) How to operate

(1) Confirm the monitor value, and click "Save" button.

Saving the	&Adanti	ve notch filter resu	lts(Axis1)			
Amplifier/Moto Setting when fi	r Model king the ac	R\$340342440	R2AA08075F iency which has estimate	d at internal <u>of seven</u>	Saving Adaptive notc as torque command (fixed value).	
Adaptive noto		4000	[Hz] Save	The setting value for Ac TCNFILE	laptive notch filter E 4000 [Hz]	
Options for sa	lf rer filter		and notch filter	"Save", Adaptive no setting will be un-fix		
	Fig	gure 9-35 A	daptive notch	filter results saving	window	

(2) Click close button on the right above of window for exit.

10. Measurement

This function can perform the following:

- Shows graphically operating states. (as Operation Trace)
- Scrolls operation data in real time to check conditions. (as Operation Scrolling)
- Checks mechanical frequency characteristics. (as System Analysis)

Displays the data	in flash ROM from sto	red inside a	amplifiers	s. (as D	rivie Re	corder
C:\Documents and Setting	s\sd2\Desktop\Project.prj] - SANMOTI	ION Motor Setup				
Project(P) Communication(C)	Function(E) Data File(D) Option(O)	Window(<u>W</u>) Hel	lp(H)			
	5 ×6 ×2 💁 🛬 🚣 🛤 🗛 🗛	L 🖸 🛈 🖗 🛈	0 0 0		on of 💁	?
Project	1					
P Communication	Axis1					
Parameter	Current Axis 1	Amplifier/Motor M	1odel RS3A0	2A2AL2 /	R2AA060	40F
Q Monitor						
Q Diagnose	Measuren	nent				
🖕 Test Operation	Select axis measurement	1-				
🐁 Analogue Offset Adjustment	Operation Trace		System	Analysis		
🔊 Servo Tuning Assist	— Multi axis measurement —————	1				
🛄 Measurement	Operation Scrolling					
늘 Data File 🕂	View the recorded data					
	Drive data has no update while o Previously recorded data only is a		analysis functions	are working.		

Figure 10-1 Measurement menu window

10.1 **Operation Trace**

This function shows operational state in waveform display on an oscilloscope. This monitors operational state when adjusting servo.

Saved file shall not save again via Excel etc. Format is different so the file will be disabled to read by this 1 software.

1) How to start up

You can start up the window for operational tracing in any if the following procedures:

- (A)
- Select "Operation Trace" through "Measurement" from Sub menu in Main window. Select in the following order of "Function(F)" "Measurement(S)" "Operation Trace(T)" in the (B) menu bar in Main window.
- Click on the icon "Operation Trace" (C)

When Axis-selecting window is shown, select the axis number you perform Operation Trace.

2) How to operate

(1) The following Operation Trace window is shown. To change various conditions for tracing, click "Trace conditions" tab.



Figure 10-2 Operation Trace window (Trace conditions tab)

(A) (B) (C)	Addition to a project Trace Start Trace Stop	:	Registers and stores measured data to the data files of projects. Starts tracing operation in set conditions. Stops tracing operation.
(D)	Toggle display information area	:	Selects display/non-display of info-display area.
(E)	CH-scale	:	Displays CH-scale selected via Scale CH. Make sure this is just the CH-scale selected via Scale CH, not linked to other CH-scales.
(F)	Time-axis Range	:	Sets time axis.
(G)	Display waveforms overlapped	:	Clicking this displays waveforms overlapped.
(H) (I)	Call cursor window Trigger position	:	Clicking this displays cursor-related setting in a new window. Shows trigger positions in vertical and horizontal directions respectively.
(J)	Display zero-level position	:	Shows zero-level positions for each CH.
(K)	Paste to clipboard	:	Copies tracing conditions and measured waveforms to clipboard.
(L)	FFT	:	Executes FFT-analysis between cursors. Setting analysis period with cursor is needed to enable this button.
(M)	Monitor states	:	Displays present tracing state.

(2) Clicking "Set tracing conditions" shows the follwing window for setting operational tracing conditions. Check each condition in the window to set. After setting, clicking "OK" button can diable the changes in the settings. After changing setings, clicking "Trace Start" button starts sampling.

Coperation Trace(Axis1)	
File(<u>F)</u> Trace(<u>T)</u> Jump(<u>J</u>)	
Conditions CH Information Measure Information	Use this to call existingsettings. 242AL2 R2AA06040F
Decision Cancel Load conditions	Status: Idle
Trace Methods	Scale CH Time-Axis Range CH1 100ms //Div) This sets the interval of sampling. Tracable time is automatically calculated.
Sampling Time : 50 🐳 x 0.112 = 5.600 [ms]	1400-
Traceable time : 1433.600 [ms]	1200 -
Trigger Conditions	800
Trigger: Analog CH1	This sets trigger CH.
Slope :	This is to select the edge of triggers.
Position : 10 😴 (%) (0 - 100)	Trigger in horizontal directionin the display
Level: 20 📩 min-1 (-2147483648 - 2147483647)	Level of trigger
Analogue CH 🛛 🗖	
CH1 VMON:Velocity Monitor [min-1]	
CH2 VCMON:Velocity Command Monitor 🗾 [min-1]	
CH3 TCMON:Torque(Force) Command M ▼ [%]	

Figure 10-3 Window displaying tabs for setting tracie conditions

- ✓ The following data can be selected only with CH1, 3, and 5. When selecting these data, each CH of CH2, 4, and 6 cannot be selected.
 - 1) Monitor positions (for motor)
 - 2) Monitor positions (for external devices)
 - 3) Position command integrated value
 - 4) PS data of motor serial-type encoder
- ✓ Analog 6 channels are selectable when buffering point is 256.
- ✓ Only analog 3 channels are selectable when buffering point is 512.
- ✓ Only analog 1 channel is selectable when buffering point is 1024.

- (B) -OX e(Axis1) File(f Jump(J) 😂 🖬 ټ 🕰 🚵 | 💽 Trace Star i ace Stop Trace Conditions CH pformation M (C) Amplifier/Motor Model RS3A02A2AL2 R2AA06040F (A) ation Analogue CH Status: Idle CH1 VMON:Velocity Monitor [min-1] Scale CH Time-Axis Range 200 - [min-1] 644 NV Range 2002 Auto 1 100ms 👻 [/Div] CH1 -0 🛨 [min-1] Offset VCMON:Velocity Command Monitor [min-1] CH2 1600 200 💌 [min-1] Range 1 Auto 1400 Offset 0 ÷ [min-1] 1200 Г СНЗ TCMON Torque(Force) Command [%] 1000 10 - [%] Range 1 Auto 800 Offset 0.0 📫 [%] 600 CH4 RegR:Regenerative Resistor [%] 0.1 💌 [%] 400 Range Auto 0.00 🛨 [%] Offset 200 СН2 TMON: Torque (Force) Monitor [%] 1 100 💌 [%] Range Auto -200 0.0 🛟 [%] Offset -400 🔽 СН6 PCMD Position Command [kPulse/s 500 T [kPulse/s] -600 -Range Auto 1 0 🕂 [kPulse/s] Offset Digital CH 2 CH1 TLIM:Torque(Force) Limit 3 CH2 INP:In Position 4 CH3 SRDY:Servo Ready CH4 ALM:Alarm -
- (3) This is the case of making "Channel infomation tab" being shown.

Figure 10-4 Operation trace window (CH information tab)

- (A) Select display : Sh
- : Shows graphically the channels checked.
 - Waveform items : Shows the signal names selected each channel. Signal range and off-set are set here.
- (C) Auto

(B)

- . Shows the signal names selected each channel. Signal lange and on-set are set ne
- Auto : Clicking "Auto" button automatically set range and off-set to show them graphically.

(4) This is the case of making "Measure Information tab" being shown.

Poperation Trace(Axis1)				
File(E) Trace(I) Jump(J)				
🗄 🚰 📕 🏗 🔔 🍓 🔯 🗹 Trace Start 📧 Trace Stop 👔				
Trace Conditions CH Information Measure Information	Amplifier/Motor M	odel RS3A02A2AL2	R2AA06040F	
🔶 Waveforms are overlapped	Status: Idle			
Measure Displayed on the Front No.04 🗾	Scale CH	Time-Axis Range		FET
No Measurement Date Comment	СН1 💌	100ms 🗾 [/Div]		
0 3/13/2014 19:33:16	1600		1 1 1 1	^
1 3/13/2014 19:31:34	1400 -			
(A) (B)	1200 -			
(A) (B) /	1000-			
	800-			
	600-			
	400-	h		
	200 -			
	0-1			
	-200			
	-400			
	-600 -			
	1			
	2			
	3			
	4			
Delete		•		Þ

Figure 10-5 Operation trace window (measure information tab)

- (A) Overlapping waveforms
- Display this time measured waveform overlapped on previously measured Waveform.
- (B) Data displayed on top
- Shows selected waveforms in solid line. :
- Clicking "Display cursor window" button displays Cursor window, automatically calculating data on (5) cursor positions, time/data difference between cursors, Max/Min values, and effective value.

Operation	Trace Cursor									J	
t axis cur:	sor 📕 ti ∔	t1 - t2 : 1 / (t1 - t2) :		0.000 m Infinity H		xis cursor	v1 💽	(A)	• (C)	λ.	
Analogue	Name	tt	12	Maximum	Minimum	Average	Effective value	v1	v2	v1-v2	Unit
CH1	VMDN:Velocity Monitor	0	0	0	0	0	0	-10791	-10791	0	min-1
CH2	VCMON:Velocity Command	0	0	0	0	0	0	-10791	-10791	0	min-1
CH3	TCMON: Torque(Force) Com	2.0	2.0	2.0	2.0	2.0	0.0	-539.6	-539.6	0.0	%
CH4	RegR:Regenerative Resisto	0.00	0.00	0.00	0.00	0.00	0.00	(Over)	(Over)	(Over)	%
CH5	TMON:Torque(Force) Monitor	1.9	1.9	1.9	1.9	1.9	0.0	(Over)	(Over)	0.0	%
CH6	PCMDF1:Position Command	0	0	0	0	0	0	-26978	-26978	0	kPul.
Digital	Name	tt	12								
CH1	TLIM:Torque(Force) Limit	0	0								
CH2	INP:In Position	1	1								
CH3	SRDY:Servo Ready	0	0								
CH4	ALM:Alarm	0	0								

Figure 10-6 Operation Trace /Cursor window

- (A) Effective value
- Displays results of calculation for data between cursors in axis t of CH.
- (B) Cursor position data
- : Displays data values designated with cursor t1. : Displays data differential designated with v1-v2 in vertical cursor.
- Cursor differential data (C)

÷

(6) Clicking FFT button executes FFT-analysis.

Note that without setting the period you want to analyze, you cannot enable this button. At first, select the analog channel you execute, and then click "OK" button.

Apply FFT to the cursor selected area for Select CH of data that are applied FFT.	the correct active me	asured data
Analog CH1 : VMON:Velocity Monito	r	
	01	Cancel

Figure 10-7 Operation trace - Window for selecting FFT-analysis channel

FFT-analysis results are shown.

	A BC M d M d d l	RS3A02A2AL2	R2AA06040F	
Cursor Frequency PSD	Amplifier/Motor Model	RS3AUZAZALZ	RZAAU6U4UF	
[Hz] [[min-1]^2/Hz]	50			
f1 17.01 9.46	45			
f2 • • 34.01 2.70	45			
· · · · · · · · · · · · · · · · · · ·	40			
Graph control				
Range 5 [/Div] Auto	Ê 35			
Offset 0 🛨 [(min-1)^2/Hz]	Joni Joni			
Source info	₩ 30 광꿈			
Data name: VMON:Velocity Monitor	25/			
Sampling Time : 5.600 ms	35 30 [2H/C.(L-uuu)] 20 20 20 20 20 20			
, -	물트 20		X	
Data points: 21	Š			
File Information	8 15			
Comment:	10			
	10			
	5			
				-
	0			
	1		10 Francisco (Ma)	
			Frequency (Hz)	
	Window Function : Rec	tangular Window / Fre	quency Resolution : 8.50Hz / Data F	reproces

Figure 10-8 Operation trace / FFT-analysis window

10.2 **Operation scrolling**

This function displays operation states in waveform in real time.

When connecting multiple axes, you can display waveforms of each axis at the same time.

- Sampling time is limited depending on the throughput of PCs you use.
- Saved file shall not save again via Excel etc. Format is different so the file will be disabled to read by this ~ software.

1) How to start up

You can start up Operation Scrolling window in any of the following procedures:

- Select "Operation Scrolling" through "Measurement" from Sub menu in Main window. (A)
- (B) Select in the following order of "Function (F)" - "Measurement (S)" - "Operation Scrolling(S)" in the menu bar in Main window.
- (C) Click on the icon "Operation Scrolling" in the Toolbar in Main window.

The window asking to select whether on-line display (check the states of amplifiers you connected) or off-lone display (check the states already measured) depending on situation, select applicable one.

2) How to operate

(1) The following operation scrolling window is shown. To change conditions for obtaining waveform, click "Scrolling Conditions tab".



Figure 10-9 **Operation scrolling window**

- A) Start scrolling
- : Starts scrolling operation in set conditions.
- B) Stop scrolling
- : Stop scrolling operation.

Operation Scrolling File(E) Scrolling(S)		se to call existing	g settings.	<u>-0×</u>
Decision Cancel Load conditions	саве СН СН1 70-	Time-Axis Range		*
Sampling Time : 10 (ms) 1-15000 Scrolling time : (ms) (ms) Analogue CP (A) (B)	60 - 50 - 40 - 30 -			
CH1 Axis1 VMON:Velocity Monitor (min-1) CH2 Axis1 VCMON:Velocity Command Monitor (min-1)	-10 -	D		
CH3 1 Axis1 TCMON:Torque(Force) Command M [3] Digital CH	-20 - -30 - -40 - -50 -			
CH1 TLIM:Torque(Force) Limit	-60 - -70 -			
CH2 SACT:Motor Excitation	j	2		
		<u></u>		<u>کا</u> :.

(2) The following shows Operation Scrolling conditions window.

Figure 10-10 Operation Scrolling Conditions setting window

- (A) Select axis
- Selects the axis of servo amplifier/drivers you want to show. :
- (B) Select item

- Displays the signal names selected by each channel. The range and off-set of signals are set here. : Sets the cycles of requesting data for to servo amplifiers. Note that when using PCs with low :
- (C) Sampling cycle
- throughput and set the cycles to small value, the behavior is extremely slow. Total number of sampling is 1000. Scrollable time is automatically calculated.
- FFT-analysis is not available. 1
- You can obtain waveforms in axis-wide, however up to 3 channels of both analog and digital are 1 available to obtain at the same time.
- Note that the times to obtain data among channels are not the same timing.
- The number of data is a maximum of 1000. Data which is over 1000 should be overwritten. ~
- The other operation methods follow tracing operation. ~

10.3 System Analysis

System analysis function can easily perform system analysis by operating a servo amplifier and motor several hundreds ms to for several tens of seconds.

- ✓ Make sure to keep the safety around the system you operate as servo motors move.
- When any of amplifier alarm occurs during executing this function, motor excitation is turned off. Make sure to perform this function after ensuring necessary braking equipment is ready to operate.
- This function is not allowed if the tandem operation is used.
- Saved file shall not save again via Excel etc. Format is different so the file will be disabled to read by this software.

1) How to start up

You can start up System analysis window in any of the following procedures:

- (A) Select "System Analysis" through "Measurement" from the Sub menu in Main window.
- (B) Select in the following order of "Function (F)" "Measurement (S)" "System Analysis(A)" in the menu bar in Main window.
- (C) Click on the icon "System Analysis" Imagin the Toolbar in Main window.
 When Axis-selecting window is shown, select the axes numbers you perform System analysis.

2) How to operate

(1) System analysis execution window is shown. Click "Start measuring and analyzing Data" button.



Figure 10-11 System Analysis execution window

(2) The following Window confirming to execute is shown. If it is OK to execute, click "OK" button, to cancel, click "Cancel" button.



Figure 10-12 Window confirming System analysis to execute

(3) Data measure & Analysis window is shown. Set the conditions for measuring.

Data Measure & Ar	nalysis(Axis1)		×	
File(E)				
Amplifier/Motor Model - Operating Selections -	RS3A02A2AL2	R2AA06040F		
	Alarm of Test Run Clo			
C At completing, " System Analysis Settin	Alarm of Test Run Clo	se" is not selected.		
Torque commar		50.0 🛨 [%]	Set torque (force) com	
Freqency Wid Motor Excitation	th 10.0 - 2000	[H₂]	value and the frequen to measure.	cy rang
Servo O	n	Servo Off		
Data Measure Executi	on			
	Execute			
Cautions : usage Please carry out	of this function will op after ensuring surroun	erate a motor. ding safety.		
	-			

Figure 10-13 Data measure & Analysis window

- (4) After setting conditions, make sure that no problem with that motors move, and then click "Servo On" button. After that motor excitation starts and "Execute" button becomes enabled.
- (5) Clicking "Execute" button starts measuring. The execution state is shown in the progress bar.
 - Data Measure & Analysis(Axis1)



(6) The following window is shown at the time measuring and data read-in are completed. After that click "OK" button. Motor excitation continues until "OK" button is clicked.

ata Mea	easure & Analysis(Axis1)	×
?	The measurement have been completed successfully. If "O.K." is clicked, analysis will be started. (Servo-off is performed at the time of the end of data measu	rement.)
	OK Cancel	

Figure 10-15 System analysis data/ waiting for analyzing window

(7) Now the system is analyzing data. Wait for a while.



Figure 10-16 System analysis data/ indicating data being analyzed window
(8) The results are shown graphically when the analysis completed.



Figure 10-17 Window indicating system analysis results

- ✔ Adjust torque (force) command value so that the torque (force) State-of restriction Incidence Rate under Measurement being measure should be 0%.
- (9) Clicking Measuring tab automatically calculates gain margin and phase margin to show them in the window. Gain margin and phase margin are shown by marker.





✓ Move the cursors by manually right- and left-clicking.

(10) This function can set Model vibration suppression anti-resonance frequency and resonance frequency according to the graphical results.

Select "Damping Setting" tab, move cursor t1(green) to the frequency you want to set as Model vibration suppression anti-resonance frequency, move cursor t2(yellow) to the frequency you want to set as Model vibration suppression anti-resonance frequency, and then click "Write to Amplifier" button. Or you can directly set frequency.

System Analysis(Axis1)	
File(E) System Analysis(<u>S</u>)	
🍏 🛃 🏗 🔔 🍓 🚉 💷 Data Measure & Analysis Start	
nalysis Measure Damping Setting Filter Setting	Amplifier/Motor Model RS3A02A2AL2 R2AA06040F
The frequency is set as the antirresonance frequency of a model control system, and resonance frequency.	cursor [Hz] [dB] [deg] f2 [dB] 30 [dB] 30 [dB] 30 [dB] 0 0 0 0 0 0 0 0 10
When a cursor is enabled, this function is available.	licking here after setting starts writing to servo amplifiers.
	-120

Figure 10-19 Model vibration suppression anti-resonance frequency and resonance frequency window ✓ Setting value has limitation. You cannot set the value out of the limitation range.

(11) You can set torque command notch-filter to suppress mechanical resonance frequency. Select "Filter setting" tab, and then directly input resonance frequency by using cursor or frequency. Click "Setting" button. At the same time parameters are forwarded to servo amplifiers.



Figure 10-20 Torque (force) command notch-filter setting window

✔ Number of settable notch-filter varies depending on the specifications of servo amplifier/drivers you use.

10.4 Drive recorder

Drive recorder is a function to do the following items:

Always samples servo amplifier's operational states.

Automatically stores operational data into flash ROM inside amplifiers under set trigger conditions. Makes it possible to check operational data subsequently.

- ✓ No all the servo amplifier/drivers have Drive recorder functions.
- You can store data over the past 16 times. The data before that should be overwritten. For a functional safety module, past 1 time data is shown, only. That data will be cleared when turning power OFF. Moreover, there is no limit to the frequency of storing data.
- ✓ Note that there is a limit to the frequency of storing data in flash ROM.
- ✓ You can store and access the data in files.
- ✓ Saved file shall not save again via Excel etc. Format is different so the file will be disabled to read by this software.

1) How to start up

You can start up Drive recorder window in any of the following procedures:

- (A) Select "Drive recorder" through "Measurement" from Sub menu in Main window.
- (B) Select in the following order of "Function (F)" "Measurement(S)" "Drive recorder(D)" in the menu in Main window.
- (C) Click on the icon "Drive recorder" in the Toolbar in Main window.

When Axis-selecting window is shown, select the axes numbers you check Drive recorder data.

2) How to operate

(1) Drive recorder execution window is shown. Click "OK" button to read-in the data, click "No" to cancel.



Figure 10-21 Drive recorder data read-in window

(2) Clicking "OK" button shows Data read-in window. When the number of data to read-in, it takes up to 30 seconds to read all data.

Read drive record data		
115	Reading data	
	Cancel	

Figure 10-22 Window indicating Drive recorder data now being read-in

(3) Clicking "No" button in the (1) above, or completing data read-in shows Drive recorder list window.

				This clears the data stored inside		
				amplifiers.		
31	🚽 🎼 🔦 📾	Read Records 🔣	Clear Records			This displays the data stor
Amp	lifier/Motor Model	RS3A02A2AL2	R2AA06040F			inside amplifiers in wavefo
No	Record Time	Trigger Data	Trigger Edge	Trigger Level	Comment	in a new window.
1	24:23:04.784	ALM:Alarm	rizing edge		Í I	Show waveform
2	23:24:55.870	ALM:Alarm	rizing edge			Show waveform
3	23:22:41.392	ALM:Alarm	rizing edge			Show waveform
4	23:06:53.370	ALM:Alarm	rizing edge			Show waveform
5	23:06:51.565	ALM:Alarm	rizing edge			Show waveform
6	23:06:41.029	ALM:Alarm	rizing edge			Show waveform
7	21:42:52.892	ALM:Alarm	rizing edge			Show waveform
8	21:23:03.068	ALM:Alarm	rizing edge			Show waveform
9	21:18:02.020	ALM:Alarm	rizing edge			Show waveform

Figure 10-23 Drive recorder list window

(4) Clicking "Waveform display" displays the data selected in waveform in a new window.
Drive record waveform (Axis1) [No.9 initiation time:21:18:02.020]



Figure 10-24 Drive recorder waveform display

(5) Clicking "Clear all records" in Drive recorder list display shows the following window. Click "OK" button to continue.



Figure 10-25 Window asking to continue Clear Records

(6) Clicking "Clear all records" in Drive recorder list display shows the following window to ask to continue clearing data. Click "OK" button to continue.



Figure 10-26 Window indicating Drive recorder data being erased

(7) Once record data have been erased, the following window is shown. Click "OK" button.



Figure 10-27 Window indicating Drive recorder data cleared

No Text on This Page.

11. Data files

Selecting Data File from the Side menu shows the following window.

11.1 Overview

Drag and drop each data file (parameters, operational tracing, operation scrolling, system analysis, and Drive recorder) to confirm their contents. You can also firstly select each data type you call from Sub menu in the Side menu data files, and then control the data as projects.

E:\Documents and Settings	s\sd2\Desktop\Project.prj]- SANMOTION Motor Setup	- IIX
Project(P) Communication(C)	Function(E) Data File(D) Option(Q) Window(W) Help(H)	
i 💼 🏛 🚔 🛤 🕺 🏍	o 🕺 🚈 🛰 🛰 🛰 🔽 📖 🗛 🛕 😳 🕢 🕐 🔿 🛇 🔛 📼 🕺 💆 애 🗣 🏖 💈	0
Project	1	
Communication	Axis1	
Parameter	Current Axis 1 Amplifier/Motor Model RS3A02A2AL2 / R2AA06040	
Q Monitor		1
Q Diagnose	Data File	
🖕 Test Operation		
🌯 Analogue Offset Adjustment	Open a Setup Application data file, Drop here	1
🗞 Servo Tuning Assist		
🖂 Measurement		
🚞 Data File 🛛 🕂		1
1		
		· *

Figure 11-1 Data file window

11.2 How to use

You can open each data file in the following 2 procedures.

- (1) Drag & drop the data files you select. Dragging and dropping data files into the area boxed in red dot of Figure 11-1 Data file window automatically identify the type of data files to show the contents in the window. Provided that, parameter file (*.ap1) always shows parameter setting window. To check alarm history, separately open alarm history checking window or open the file in the procedure specified in (2) below.
- (2) Open files by data file type. Select Sub menu per data file type from Side menu, and then click "Open any data files" to open designated files as shown in Figure 11-2.



Figure 11-2 Window for selecting by data file (parameters by group)

11.3 Adding to projects

You can add to/delete from projects from each window displayed when selecting Sub menu through data file.

- 5) Clicking "Addition to a project" can add data files to projects. Registering to projects can display the registered files as files of project control file list.
- 6) Clicking "Remove from project" can delete selected data files from projects.

Troubleshooting When installing 12.

12.1

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	Lack of disk space		This application needs the environment of Microsoft .NET Framework 3.5 in addition to this system, so 400MB-disk space is required. Re-install after securing sufficient HDD-volume.
2	Cannot be installed		Installation cannot be continued when OS version is old. Re-construct the environment by referring to Section1.3 System environment.
		Not logged on as administrator authority	Installation needs the right of administrator. Re-install after logging on as administrator authority.

12.2 Wiring, Connection and establishing communication with servo amplifiers

	ampimers		
No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	"An error occurred when opening port"	Software cannot use communication port.	Check if the communication port (PC side) to which cables is connected is used by other application. Otherwise, Setup S/W has already started up.
2	The confirmation results of communication state become "errors in received data"	Setting error of communication port	Check if the communication port (PC side) to which cables is connected conforms to COM port.
3	The confirmation results of communication state become "timeout"	Setting error of communication baudrate Note1)	Check if servo amplifier communication baudrate setting corresponds to "communication speed."
		Setting error of axis-selection Note1)	Check if servo amplifier communication axis selection corresponds to the axis selection you selected.
		Connecting error of communication	Check if communication cables are properly connected to PC side (USB or COM) and servo amplifier/driver.
		cables	Check if any damages on communication cables.
		Control power supply error	Check if control power supply is supplied to servo amplifier/driver.
		Malfunction due to noise	Take some actions to noise. Note 2)
4	The confirmation results of communication state become "Overlap" Note3)	Setting error of communication (when connecting multiple axes)	Check if any servo amplifier/driver communication axis numbers overlapped among amplifiers being connected. Note 1)
		Malfunction due to noise	Take some actions to noise. Note 2)
5	The confirmation results of communication state become "Not-corresponding"	Version discrepancy	Setup S/W does not correspond to the software version of the servo amplifiers you use. Install the latest Setup S/W.
		Software discrepancy	R ADVANCED MODEL SETUP Software cannot communicate with RS1, RR1-model servo amplifiers. Use R-SETUP Software to communicate with these servo amplifiers.
			R ADVANCED MODEL-servo amplifier cannot communicate with R-SETUP Software.
6	Performing the following functions becomes "Communication released" • Write-in/forward parameters • Test operation • Auto-tuning • Adjustment • Measurement	Parameter locking function by password is enabled.	Authorize parameter editing. Refer to Section 4.9 Setting Password for the details.

Note 1) You can set communication baudrate for RS2-model servo amplifier (GroupA-20) and communication axis numbers (GroupA-21) by parameters. The initial values are 38400bps and #1, respectively. These settings become valid when re-turning on amplifier control power supply. Provided that, the initial values and setting methods vary depending on the type of amplifiers. Or there may be cases settings cannot be changed. When connecting RS3-model amplifier via USB, there is no setting for communication baudrate.

Note 2) When communication cannot be executed normally due to noise, take the following actions to noise:

7) Grounding servo amplifiers and PC correctly.

8) Keep servo amplifier or PC away from the noise-generating area.

9) Place noise filter.

Note 3) When "Overlap" won't canceled even if taking corrective actions, take any of the following actions: 10) Re-turn servo amplifier control power.

11) Re-connect communication cable (on amplifier side) after disconnecting once.

12.3 Parameter Setting

1) Parameter Verification

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	"Verification cannot be performed as the amplifier and file amplifier main ID is different"		Cannot be collated as the target parameter file type and the amplifier type you are connecting is different.
2	"Amplifier ID** is not supported"	Tried to collate old-version amplifier files.	Update to the latest Setup S/W.

2) Parameter transmission (To amplifier)

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	"Collation cannot be executed as the amplifier and file amplifier main ID is different"	The type of amplifier is not correct.	Cannot be collated as the parameter file type to forward and the amplifier type you are connecting is different.
	"Some parameters could not be forwarded as amplifier software version is incorrect"	due to software version	Check added parameters, manually set them if necessary. In most cases, added parameters do not have to be changed their settings.
		Parameter setting values are invalid.	When the parameter values you forward are out of settable range, they cannot be forwarded.

12.4 Various supportive functions

1) Monitor

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	"Communication error occurred in axis*. Cause: timeout"		Check if the communication cables between servo amplifiers and PC have come off.

2) Alarms

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	"Alarm reset could not be executed"		Reset cannot be executed as the alarm still continues. Eliminate the cause of the alarm. The alarms which cannot be reset are occurring. Re-turn on amplifier driver control power supply after eliminating the alarm causes.

3) Test operation

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	"***cannot be performed.(Preparation un-completing)"	The state has not become SRDY-state. Other supportive functions are now being executed.	Is any alarm-state continuing? Eliminate the conditions of the alarm. Check if the primary power supply has been established. Terminate other supportive functions (velocity-JOG, position-JOG, various Auto-tuning, various adjusting functions, system analysis) if any of them has start up. Error in communication occurs due to any of causes. Re-establish communication. This function cannot be executed when executing any of the following (Test operation, Auto-tuning, Adjustment) from Digital operator. This function cannot be executed during switching control modes.
2	Encoder clear cannot be executed (ALM_DF is output)	The motor is driven externally.	When motors are driven externally at 50min ⁻¹ (mm/s) or over in any of causes, you cannot perform encoder clear.
3	Motor will not move in positioning operation and velocity-JOG operation	_	Check velocity command setting or command pulse number. OT became valid. Eliminate the causes of becoming OT.
4	"Estimate magnetic pole position has abnormally completed" "(ALM_44h)	Could not normally complete due to any of causes.	Check the motor motion range. (approximately ±10mm) Check force command value when estimating magnetic pole position. "Estimate magnetic pole position" cannot be normally completed unless setting the value large enough for static friction. Check the polarity of linear encoder signal or wiring of motor power line. There may be possibility of connecting reversely.

4) Auto-tuning

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	****cannot be performed The state has not	Is any alarm-state continuing? Eliminate the conditions of the alarm.	
	(Preparation un-completing)"	become SRDY-state. Other supportive	Check if the primary power supply has been established.
		functions are now being executed.	Terminate other supportive functions (velocity-JOG, position-JOG, various Auto-tuning, various adjusting functions, system analysis) if any of them has start up.
		Error in communication occurs due to any of causes. Re-establish communication.	
		This function cannot be executed when executing any of the following (Test operation, Auto-tuning, Adjustment) from Digital operator.	
			This function cannot be executed during switching control modes.
			System analysis cannot be executed when Overtravel (OT) is occurring. Eliminate all the cause of OT.
			After servo-on, the measurement is not accurate enough during the time to wait motor brake releasing. Execute this after the time of motor brake operation releasing delay (BOFFDLY) elapsed.

5) Adjusting

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	"***Automatic offset cannot be performed. (Preparation un-completing)"	5.2V or over is input into designated analog inputs.	Check analog input voltage. When the voltage is 5.2V or over at adjustment, you cannot execute automatic offset.
			Error in communication occurs due to any of causes. Re-establish communication.
			This function cannot be executed when executing any of the following (Test operation, Auto-tuning, Adjustment) from Digital operator.
			This function cannot be executed during switching control modes.
2	Executing automatic offset changes manual offset values		Executing automatic offset changes manual off-set amount as both offset amounts are the same data.

6) Measurement

No.	Abnormal operation/message	Primary cause	Check the contents and corrective actions
1	"System analysis cannot be	become	Is any alarm-state continuing? Eliminate the conditions of the alarm.
	performed (Preparation un-completing)"	SRDY-state. Other supportive functions are	Check if the primary power supply has been established.
	un-completing)	now being executed.	Terminate other supportive functions (velocity-JOG, position-JOG, various Auto-tuning, various adjusting functions, system analysis) if any of them has start up.
			Error in communication occurs due to any of causes. Re-establish communication.
			This function cannot be executed when executing any of the following (Test operation, Auto-tuning, Adjustment) from Digital operator.
			This function cannot be executed during switching control modes.
			System analysis cannot be executed when Overtravel (OT) is occurring. Eliminate all the cause of OT.
			After servo-on, the measurement is not accurate enough during the time to wait motor brake releasing. Execute this after the time of motor brake operation releasing delay (BOFFDLY) elapsed.
2		Limit of the throughput of the PC you use	This depends on the throughput of the PC you use as the system communicates with amplifier drivers in real time and displays waveforms in the window. Quit other applications, or set the time to sample of scrolling operation.

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13. Appendix

13.1 Wiring for R 3E MODEL servo amplifiers



- ✓ Connect to connectors with marked with USB.
- ✓ Connect multiple axes via USB-hub.

13.2 Wiring for R ADVANCED servo amplifiers

1) Servo amplifiers connectors



CN2 on servo amplifier side		
MUF-RS8DK-GKXR		
(JST Mfg. Co.	, Ltdmanufactured)	
Pin No.	Signal name	
1	422RXD+	
2	422RXD-	
3 422TXD+		
4	+5V	
5	232RXD	
6	422TXD-	
7 232TXD 8 GND		
		Shell

CN3 on servo amplifier side		
MUF-RS8DK-GKXR		
(JST Mfg. Co.	, Ltdmanufactured)	
Pin No.	Signal name	
1	422RXD+	
2	422RXD-	
3	422TXD+	
4	+5V	
5	NC	
6	422TXD-	
7	NC	
8	GND	
Shell	Shield	

✓ Connect a cable to CN2 to connect to the host computer.

✓ To connect multiple axes, connect the cable from the former amplifier (or upper level PC) to CN2, connect the cable from the latter amplifier to CN3.

2) Connecting cable A

This is a cable to connect between a host computer (terminal of RS-232C) and RS2 series servo amplifier side.







COM on host PC side		
JEZ-9S-3(LF)		
(JST Mfg. Co.	, Ltdmanufactured)	
Pin No.	Signal name	
1	DCD	
2	RD	
3	TD	
4	DTR	
5	SG	
6	DSR	
7 RS		
8 CS		
9	RI	

CN2 on servo amplifier side			
MUF-PK8K-X			
(JST Mfg. Co.,	(JST Mfg. Co., Ltdmanufactured)		
Pin No.	Signal name		
1	NC		
2 NC			
3	NC		
4	NC		
5	RXD		
6 NC			
7 TXD			
8	SG		
Case	Shield		

- ✓ Use shielded wire for cables.
- ✓ Connect the shielded wire of the cables to the connector on amplifier side. Do not connect to the case of connectors on PC (D-Sub9 pin).
- ✓ Do not wire the terminals other than the ones whose destinations to connect are specified in Wiring diagram.

3) Connecting cable B

This is a cable to connect between servo amplifiers to connect multiple RS2-model servo amplifiers. (RS422A-connection)



4) Termination connector

This is a connector to terminate RS422A-communication when connecting multiple RS2-model servo amplifiers.



 $\label{eq:termination} \begin{array}{l} \mbox{Termination conne} \mbox{c} \mbox{tor: AL-00695977-01} \\ \mbox{(Terminal resistor (120 Ω) is inserted between pin1 and pin2.)} \end{array}$



5) Communication converter

This is a module needed to connect multiple RS2-model servo amplifiers, converting RS232C-communication to RS422A-communication.



Communication converter: SAU-024-01

E

CN1			
MUF-RS8DK-GKXR			
	(JST Mfg. Co.,		
Ltdma	Ltdmanufactured)		
Pin No.	Signal name		
1	422TXD+		
2	422TXD-		
3 422RXD+			
4	+5V		
5	232TXD		
6	422RXD-		
7	232RXD		
8	GND		
Shell	Shield		

010			
CN2			
MUF-RS8DK-GKXR			
	(JST Mfg. Co.,		
Ltdma	anufactured)		
Pin No.	Signal name		
1	422TXD+		
2 422TXD- 3 422RXD+ 4 +5V			
		5 -	
		6	422RXD-
7 -			
8 GND			
Shell Shield			

CN3		
DELC-J9PAF-23L9E		
(Japan Aviation Elec	tronics Industry, Limited	
-manu	factured)	
Pin No.	Signal name	
1	DCD	
2	RD	
3	TD	
4	DTR	
5	SG	
6	DSR	
7	RS	
8	CS	
9	RI	
Shell	Shield	

SW-selection		
No,	Options	
SW1	232C	422A
5001	CN1/ RS232C-signal enabled	CN1/ RS422A-signal enabled
SW2	STRAIGHT	Crossed
3002	When using a straight cable between PC and CN3	When using a crossed cable between PC and CN3

6) Servo amplifier connector B (for connection with RF2G servo amplifier)

Connector No.	Content	Model number
PC	Cable for PC connection	AL-00490833-01

Cable for PC connection (AL-00490833-01)



7) Servo amplifier connector C (for EtherCAT IF expanded input)

Optional model number

Connector No.	Content	Model number
PC	Cable for PC connection	AL-00745525-01

Cable for PC connection (AL-00745525-01)



13.3 Wiring for stepping driver

■Optional model number

Name	Content	Model number	Instruction manual
USB/RS485 converter	PC/driver connection unit	PBFM-U6	M0010723

Connector number of driver side connector

Driver model number	Connector number
F5PAA***P1**, F5PAB***P1**	CN5
F2BAW***M1**	CN5
PB4D003E***	CN8
PB4D003P***	CN12

■ Signal name of driver side connector

Pin No.	Signal name	Pin No.	Signal name
1	А	6	VCC
			(Normally, connection is not required)
2	В	7	—
3	N.C. (Connection is not required)	8	_
4	N.C. (Connection is not required)	9	_
5	GND	10	—



Connector model number

PCB side	Post with base	S10B-PADSS-1GW	
Cable side	Housing	PADP-10V-1-S	JST
	Contact	SPH-002T-P0.5L	

Signal name for converter unit side

Connector terminal block		Communication cable
Pin No.	Signal name	Communication cable
1	-	N.C.
2	-	N.C.
3	R+(D+)	Yellow
4	R-(D-)	White
5	GND	Black



✔ Connect with condition of RS-485, half-duplex.

Wiring for SANMOTION R 3E Model Functional safety module 13.4



- Connect to connectors with marked with USB. Connect multiple axes via USB-hub. V
- ~

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Release	
Revision A	May. 2014
Revision B	Dec. 2014
Revision C	Feb. 2015
Revision D	Apr. 2015
Revision E	Jun. 2015
Revision F	Oct. 2015
Revision G	Mar. 2017
Revision H	Aug. 2017
Revision J	May. 2018

– 🕂 Cautions 🗕

- Read the accompanying Instruction Manual carefully prior to using the product.
- If applying to medical devices and other equipment affecting people's lives please contact us beforehand and take appropriate safety measures.
- If applying to equipment that can have significant effects on society and the general public, please contact us beforehand.
- Do not use this product in an environment where vibration is present, such as in a moving vehicle or shipping vessel.
- Do not perform any retrofitting, re-engineering, or modification to this equipment.
- The Products presented in this Instruction Manual are meant to be used for general industrial applications. If using for special applications related to aviation and space, nuclear power, electric power, submarine repeaters, etc., please contact us beforehand.

* For any question or inquiry regarding the above, contact our Sales Department.

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Precautions For Adoption

Failure to follow the precautions on the right may cause moderate injury and property damage, or in some circumstances, could lead to a serious accident.

Always follow all listed precautions.