Panasonic

For Servo System MINAS

Set-up Support Software (PANATERM ver.7)

Operating Manual

For Windows 10, Windows 11

- Thank you for purchasing a Panasonic product.
- Please use it correctly and safely after reading this document and Operating Instructions (Overall), Operating Instructions (Tuning), Technical Reference Functional Specification, and Technical Reference Communication Specification carefully.
- Be sure to read the Safety Precautions before use.
- Carefully store this Operating Manual.
- This product is for industrial use. It cannot be used for any other purpose (e.g., household use).

Rev.0.3

IMG15
Z1024-3045

Table of Contents

1 Introduction

1.1 Safety Precautions

■ Must Be Adhered To

This section explains precautions that must be taken to prevent harm to people and damage to property.

■ The following symbols represent the extent of the harm or damage that may occur through improper use.

⚠ Caution	This indicates “a risk of minor injury or damage to property”.

■ The following symbols indicate how to comply with safety precautions.

	Must not be done.
	Must be done.

⚠ CAUTION		
	Do not disconnect the communication cable when the motor is being run by Set-up Support Software (PANATERM ver.7) , such as in a trial run, Z-phase search and frequency characteristics measurement. Do not put the computer in sleep, hibernation, or screen saver mode.	Doing so may cause injury, malfunction, or damage.
	Do not use the ESC key or the servo-off button in Set-up Support Software (PANATERM ver.7) for the purpose of emergency stop.	Doing so may cause injury, malfunction, or damage.
	When performing operations that change driver parameters, carefully read the driver operating instructions and technical reference, and exercise due care.	Doing so may cause injury, malfunction, or damage.
	As they involve motor operation, execute the trial run function, Z-phase search, and frequency response measurement only after ensuring the safety of the surrounding area.	Doing so may cause injury, malfunction, or damage.
	Run this software in an environment where power can be shut off immediately in case of unexpected operation of the motor or other hazards.	Doing so may cause injury, malfunction, or damage.

1.2 Overview of Set-up Support Software (PANATERM ver.7)

Set-up Support Software (PANATERM ver.7) sets parameters and monitors the control status of the driver connected to the computer.

For supported drivers, see *"2.3 Confirming the Applicable Driver"* .

This software runs on Windows and facilitates communication between the computer and MINAS Servo System driver.

MINAS Servo System drivers are able to communicate with a commercial computer via a USB cable.

MINAS Servo System drivers compatible with Ethernet over EtherCAT (EoE) communication*1 are able to perform EoE communication via an Ethernet cable.

Please read the operating instructions and technical reference listed in *"1.3 Related Documents"* before use.

*1 The EoE communication function is currently under development.

1.3 Related Documents

The following types of operating manuals related to Set-up Support Software (PANATERM ver.7) are available. Refer to the manual that fits your purpose.

The manuals can also be downloaded from our website (*https://industry.panasonic.com/global/en/*).

Common operating instructions for the series

Document name	Document No.	Description
For MINAS Set-up Support Software (PANATERM ver.7) Operating Manual	IMG15	This document describes how to use PANATERM ver. 7, the setup support software for the MINAS Servo System.

A7 family

Document name	Document No.	Description
A7B Series Operating Instructions		
MINAS A7B Series Operating Instructions (Overall) EtherCAT Rotary Motor	IMG07	This manual describes the selection, connection, usage, and error handling of servo drivers and servo motors to ensure correct and safe use of this product.
MINAS A7B Series Operating Instructions (Tuning) EtherCAT Rotary Motor	IMG20	This document describes the tuning function of the servo driver.
A7N Series Operating Instructions		
MINAS A7N Series Operating Instructions (Overall) RTEX Rotary Motor	IMG11	This manual describes the selection, connection, usage, and error handling of servo drivers and servo motors to ensure correct and safe use of this product.
MINAS A7N Series Operating Instructions (Tuning) RTEX Rotary Motor	IMG23	This document describes the tuning function of the servo driver.

A6 family

Document name	Document No.	Description
A6B Series Technical Reference		
MINAS A6B Series Technical Reference Functional Specification EtherCAT Rotary Motor	SX-DSV03241	This document describes the basic functions, application functions, and tuning function of the servo driver.
MINAS A6B Series Technical Reference Communicationl Specification EtherCAT Rotary Motor	SX-DSV03242	This document describes the communication function of the servo driver.
A6N Series Technical Reference		
MINAS A6N Series Technical Reference Functional Specification RTEX Rotary Motor	SX-DSV03077	This document describes the basic functions, application functions, and tuning function of the servo driver.
MINAS A6N Series Technical Reference Communicationl Specification RTEX Rotary Motor	SX-DSV03078	This document describes the communication function of the servo driver.

– Precautions –

- Unauthorized reproduction or duplication of the contents of the present text, either in whole or in part, is strictly prohibited.
- This document is subject to change without notice due to improvements.

- While every effort has been made to ensure the accuracy of this document, in the unlikely event that you find something questionable or incorrect, please contact our support office.
- Illustrations and screens in this document may differ from actual illustrations and screens.

1.4 Trademarks

- MINAS, TUNE COMPASS, precAIse TUNING, PANATERM, Realtime Express and RTEX are registered trademarks or trademarks of Panasonic Holdings Corporation in Japan and other countries.
- EtherCAT is a registered trademark and patented technology licensed by Beckhoff Automation GmbH, Germany.
- “Microsoft” and “Windows” are registered trademarks of Microsoft Corporation in the United States and other countries.
- All other company and product names are registered trademarks or trademarks of their respective companies.

1.5 Descriptions of Terms

Term	Description
MINAS A7 family	All drivers in the MINAS A7 family lineup
MINAS A7☐ Series	Series of drivers classified by communication type and motor type Characters in ☐ vary from series to series
MINAS A6 family	All drivers in the MINAS A6 family lineup
MINAS A6☐ Series	Series of drivers classified by communication type and motor type Characters in ☐ vary from series to series
System	Configuration of drivers and servo motors controlled by a single host device
Error	Driver protection function
Warning	Warning function triggered before the driver protection functions operate
Alarm	General term for errors and warnings
Trigger time (error)	Time error triggered (displayed as a timestamp)
Recovery time (error)	Time taken to recover from error (displayed as power ON total time)
PDS (Power Drive Systems)	Driver status in EtherCAT communication
ESM (EtherCAT State Machine)	EtherCAT application layer status
Preset	Measurement conditions registered as a set
EEPROM	Indicates nonvolatile memory
Reset	Restarts the driver and enables the attribute C and attribute R parameters
Config	Enables the attribute C parameter
Physical input/output	Indicates the status of the driver input/output terminals
Logical input/output	Indicates the driver internal signal status
Trial run	Trial run using Set-up Support Software (PANATERM ver.7)
Online	The driver and computer are connected and communication is established
Offline	Communication has never been established the driver and computer
CCW direction	Counterclockwise direction when viewed from the load side
CW direction	Clockwise direction when viewed from the load side
Network type	Refers to RTEX communication and EtherCAT communication drivers
Monitor	Function for simple checking of driver and motor statuses
Logging	Function to obtain expert analysis results (waveform and frequency response) from driver and motor operation records
Measurement data	Indicates the entire file including measurement conditions, measurement results, and parameters at the time of measurement

1.6 Software License Agreement

Panasonic Industry Co., Ltd., acting through its Industrial Device Business Division (hereinafter referred to as “us”, “our(s)” or “we”) grants the Software license on condition that you have accepted this license agreement. Please be sure to read the Software license agreement (hereinafter referred to as this “Agreement”) before using the Software, and do not use the Software without first accepting this Agreement.

On starting to use the Software, you will be deemed to have accepted all the terms of this Agreement. Please do not use the Software unless you accept this Agreement.

The Software may incorporate several open-source software programs in addition to proprietary computer programs in our possession or licensed to us. If open-source software programs are incorporated, please see the license statements included in the Software installation package for those programs. If there is any conflict between the license statements in the open-source software program licenses and those in this Agreement, the wording of the open-source software program licenses will prevail.

Article 1 License

We grant you a non-exclusive license to use the Software for the purpose of using our products identified in the Software manual (hereinafter referred to as the “Products”) in accordance with the terms of this Agreement. You may not use the Software for the purpose of using third-party products that are not ours.

Article 2 Prohibitions

The following acts are prohibited with regard to the Software.

(1) Altering, reverse-engineering, decompiling, or disassembling the Software, or any other act of a similar nature.

(2) Use of the Software other than by the methods prescribed in the manual provided by us or our website, or any other methods designated by us.

(3) Use of the Software for any purposes other than those prescribed in the manual provided by us or our website, or any other purposes designated by us.

(4) Distribution, renting out, leasing, loaning, or the assigning of the Software to any third party.

However, subject to the assignee's agreement to be bound by all the conditions of this Agreement, you may assign the Software license under this Agreement together with the Products. In this case, you will deliver all the copies of the Software and its annexed documentation to the assignee, and you may not retain any copies of the Software, including backup copies.

Article 3 Disclaimer

We do not warrant the Software's merchantability, fitness for any particular purpose, or non-infringement of third-party intellectual property rights, and do not make any other warranties with regard to the Software.

2 We accept no responsibility for damage of any kind (including direct, indirect, incidental, consequential, and special damage) that results from the use of the Software, loss of its use, or any bugs, security holes, malfunctions or other glitches, or otherwise resulting from use of the Software.

Article 4 Effective term

This Agreement comes into effect when you accept it and start to use the Software.

2 If you are in breach of any of the provisions of this Agreement, we may immediately terminate this Agreement.

3 Within four weeks after this Agreement is terminated, you will return to us, or erase or destroy all of the Software and its copies at your expense.

Article 5 Compliance with export law

You must comply with the export control laws, regulations, etc., of all countries that have jurisdiction over the parties hereto (including the Foreign Exchange and Foreign Trade Act of Japan, and export control regulations based on United Nations Security Council resolutions). If qualifications or appropriate approval by governmental agencies are required, it is prohibited to export the Software directly or indirectly to any countries without such approval. It is also prohibited to use or sell the Software directly or indirectly for military purposes.

Article 6 Ownership of copyright, etc.

Except for open-source software programs, all copyrights and other intellectual property rights to the Software are vested in us or our licensors.

Article 7 Upgrading

It is within our discretion whether or not to offer Software upgrades or updates at any point in the future. If an upgrade or update is offered, a fee may be charged.

2 If a Software upgrade or update is offered, whether on a chargeable or non-chargeable basis, this Agreement will apply as part of the Software unless otherwise specified by us when the offer is made.

Article 8 Limitation of liability

In no event will our liability associated with this Agreement or the Software exceed 10,000 yen.

Article 9 Modifications

We may modify this Agreement at any time at our discretion if

(1) the modifications to this Agreement are in conformity with your interest in general; or

(2) the modifications to this Agreement are not incompatible with the purpose of this Agreement, and are rational in light of the need for and reasonableness of the modifications, and other circumstances related to the modifications.

2 If we modify this Agreement pursuant to the preceding paragraph, we will announce our plan to modify this Agreement, the content of the modified version of this Agreement, and the date on which the modifications will come into effect on our website no later than two weeks before the effective date of the modified version of this Agreement. However, we may effect modifications without notice to you if they are of a minor nature or are not detrimental to you. This Agreement will be modified on the date that the modifications come into effect.

Article 10 Governing law and jurisdiction

This Agreement is governed by the laws of Japan.

2 If any dispute arises in connection with this Agreement, the Osaka District Court will have exclusive jurisdiction over such dispute.

[1st Apr. 2024] Version

1.7 Software Version

■ Revision History

Supported version	Overview	Reference
7.0.0.0	First version	—
7.0.1.1	Supported the precAIseTUNINGfunction	*"11.3"*
7.0.2.0	Removed the precAIse TUNING temporary stop function	*"11.3"*
7.0.3.0	Changed UI	—

■ Functions not currently supported

Functions not currently supported	Overview	Reference
EoE connection	Ethernet over EtherCAT (EoE) connection function	*"5.1.2"*
Certain precAIse TUNING settings	Evaluation time settings Command input mode settings from host device	*"11.3.2"*

The functions displayed in the table above are not currently supported by this software version.

Please note that, although the functions above are described in some parts of the text, they are not supported by this software version.

2 System Configuration

2.1 Minimum System Requirements

A device that meets the following conditions is required to use this software. Please refer to the operating instructions for each device when configuring the system. This software may not operate under operating environments that differ from the recommended conditions.

■ Personal Computer (PC)

OS	Windows 10 64-bit version
	Windows 11 64-bit version
CPU	Dual-core, 2.0 GHz or higher
Memory	8 GB or more
Storage	5 GB A minimum of 10 GB of additional free space is required when performing AI tuning.
Monitor	1920×1080 or more
Communication interface	USB Ethernet

* A computer with Windows OS must be used.

― Precautions ―

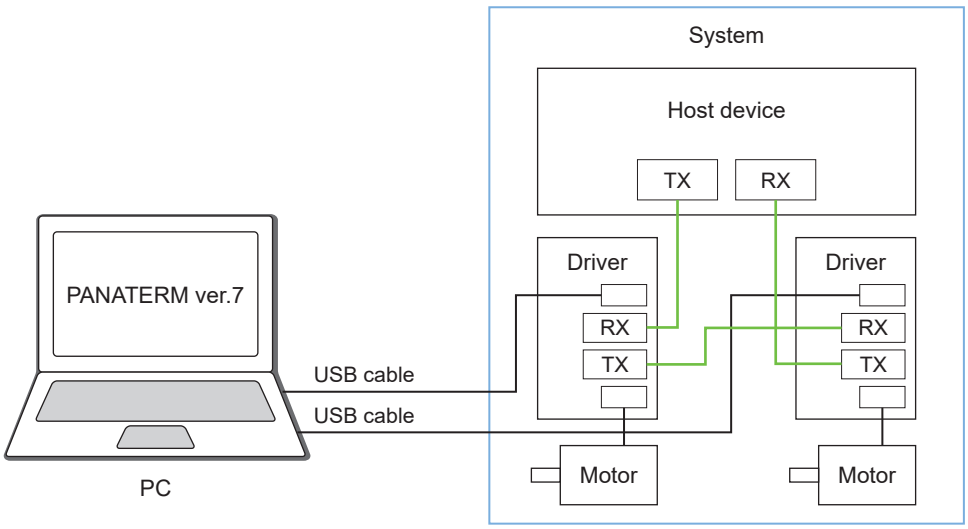
- Operation has been confirmed on Windows 10 and Windows 11. Operation is not guaranteed on other operating systems.

  If the system is to be used in a system environment other than those listed above, the customer must confirm operation.
- If Microsoft discontinues support for a particular OS, Set-up Support Software (PANATERM ver.7) will also no longer operate on that OS.
- Operation is not guaranteed if more than one Set-up Support Software (PANATERM ver.7) is running.
- When used simultaneously with other applications, Set-up Support Software (PANATERM ver.7) operation may become unstable. Only run Set-up Support Software (PANATERM ver.7) by itself.
- Multiple displays are not supported.
- Set-up Support Software (PANATERM ver.7) should be used with the latest updates applied to Windows.
- All users can operate the driver and motor via Set-up Support Software (PANATERM ver.7) . To prevent dangerous operations, do not leave a computer with Set-up Support Software (PANATERM ver.7) installed in a state that allows operation by a third party.
- This software uses “.” (dot) as the decimal point. Some OS language settings may use “,” (comma) as the decimal point. Change the OS language settings.

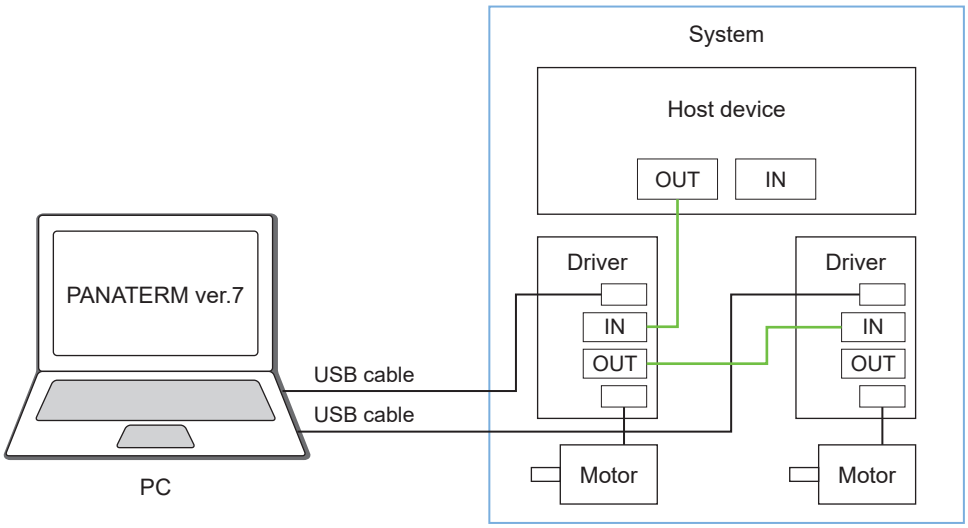
2.2 System Configuration Diagram

Typical examples of system configurations are shown below.

■ RTEX communication-type system configuration example



■ EtherCAT communication-type system configuration example



2.3 Confirming the Applicable Driver

This software is for MINAS Servo System drivers. It cannot be used with other drivers.

The supported driver series and function types are as follows.

○: Supported, ×: Not currently supported, —: Not supported

Series	Communication type	Function type	Analog input	USB	EoE
MINAS A7B Series	EtherCAT	Standard type A7BE	—	○	× (under development)
		Multi-function type A7BF	—	○	× (under development)
		Application specialized type A7BR	○	○	× (under development)

Series	Communication type	Function type	Analog input	USB	EoE
MINAS A7N Series	RTEX	Standard type A7NE	–	○	–
		Multi-function type A7NF	–	○	–
		Application specialized type A7NR	○	○	–
MINAS A6B Series	EtherCAT	Standard type A6BE	–	○	–
		Multi-function type A6BF	–	○	–
MINAS A6N Series	RTEX	Standard type A6NE	–	○	–
		Multi-function type A6NF	–	○	–

■ List of Supported Functions

○: Supported, ×: Not currently supported, —: Not supported

		A7BE, A7BF	A7BR	A7NE, A7NF	A7NR	A6BE, A6BF	A6NE, A6NF
Device tree	Alarm notification	○	○	○	○	○	○
	Battery refresh	○	○	○	○	○	○
	Multi-turn clear	○	○	○	○	○	○
Settings screen	All parameters	○	○	○	○	○	○
	EtherCAT object	○	○	–	–	○	–
	IO settings	○	○	○	○	○	○
	Communication settings	×	×	○	○	×	○
	Alarm	○	○	○	○	○	○
	Analog input	–	○	–	○	–	–
	Config	○	○	○	○	○	○
	Reset	○	○	○	○	–	–
Monitor	Monitor	○	○	○	○	○	○
	RTEX communications monitor	–	–	○	○	–	○
Logging	Waveform measurement	○	○	○	○	○	○
	Frequency characteristics	○	○	○	○	○	○
Tuning	One Minute TUNING	○	○	○	○	–	–
	preclse TUNING	○	○	○	○	–	–
	Manual TUNING	○	○	○	○	○	○
	Load fluctuation suppression tuning	○	○	○	○	–	–
Device Info	Device Info	○	○	○	○	○	○
Trial run/Z-phase search	Trial run	○	○	○	○	○	○
	Z-phase search	○	○	○	○	○	○

		A7BE, A7BF	A7BR	A7NE, A7NF	A7NR	A6BE, A6BF	A6NE, A6NF
Troubleshooting	Troubleshooting	○	○	○	○	○	○

3 Installation

3.1 Installation

3.1.1 Installer Configuration

The Set-up Support Software (PANATERM ver.7) installer contains the following data.

Item name	Folder name after installation
Set-up Support Software (PANATERM ver.7) main unit	Set-up Support Software (PANATERM ver.7)

— Precautions —

- Use the Set-up Support Software (PANATERM ver.7) installer to install the software on the computer's hard disk. The software cannot be installed on a network drive. It cannot be installed using other methods, such as copying.

3.1.2 Installation Method

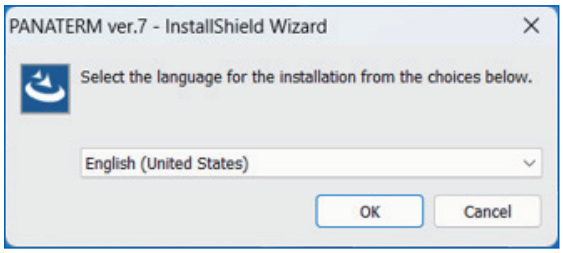
3.1.2.1 Preparation

- Turn on the computer and start Windows.
  (If any software is running, exit it before installation.)
- Copy the Set-up Support Software (PANATERM ver.7) installer (setup.exe) to the folder of your choice.
- If a driver is connected to the computer, remove it.

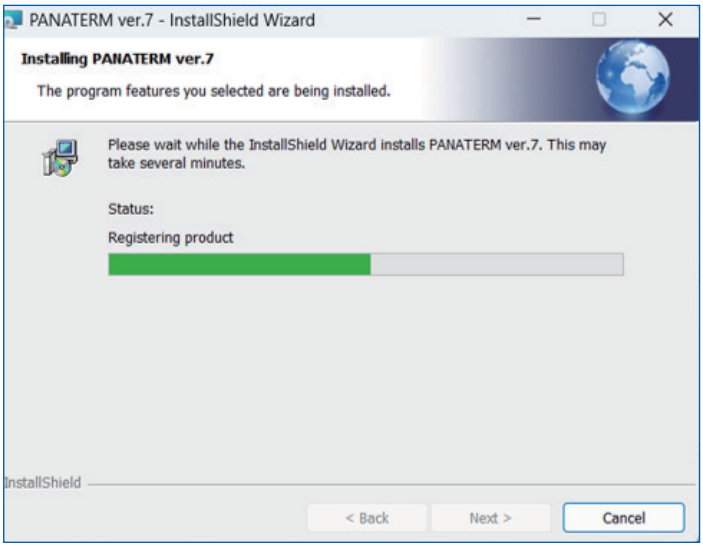
3.1.2.2 Starting Installation

<< Procedure >>

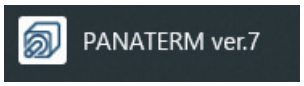
1. Double-click setup.exe to launch the Set-up Support Software (PANATERM ver.7) installer.



2. After selecting the language (Japanese or English) to be used during installation, follow the on-screen instructions.



After installation is complete, the following shortcut icons are created on the desktop and Start menu.



— Precautions —

- If an error occurs during installation, an error message is displayed. Refer to *"14 Troubleshooting"* of *"14.1 Setup Not Possible"* to remove the cause of the error.
- Do not turn off the computer or start any other software until installation is complete.
- If any problems occur after installation, refer to *"3.2 Uninstalling"* and delete the existing Set-up Support Software (PANATERM ver.7) , then reinstall.

3.2 Uninstalling

From the list of Windows apps (**Start**>**Settings**>**Apps**), select Set-up Support Software (PANATERM ver.7) and click [Uninstall].

4 Files

4.1 Files That Can Be Created With Set-up Support Software (PANATERM ver.7)

The following files are created with Set-up Support Software (PANATERM ver.7) .

File name	Extension	Description
Project file	pnt7	This file contains information on multiple drivers. It contains the following information: ● Parameter values ● Alarm information ● Device information ● Set-up Support Software (PANATERM ver.7) version when the file was created
Parameter file	prm7	This file contains parameter values for a single driver. Used in the “All parameters” tab on the settings screen, for frequency response, and in the “Call parameter preset” dialog box for Manual TUNING.
Object file	obj7	This file records the parameter values of EtherCAT objects. Used in the “EtherCAT objects” tab on the settings screen.
Monitor data file	mon7	This file contains data recorded by the monitor. It is played back using the monitor's file playback mode.
Waveform measurement file	wgd7	This file records the measurement conditions, measurement results, and parameters for waveform measurement. Used in waveform measurement.
Frequency response file	fcd7	This file records the measurement conditions, measurement results, and parameters of the frequency response. Used in frequency response.
RTEX communication log file	txt	This file contains RTEX communication log data. Files created not using Set-up Support Software (PANATERM ver.7) cannot be loaded.
Tuning conditions file	json	This file records the tuning conditions during precAIse TUNING. Used in precAIse TUNING.
precAIse TUNING results file	zip	This file records the tuning results following precAIse TUNING. Used in precAIse TUNING.
One Minute TUNING results file	omt7	This file records the tuning results following One Minute TUNING. Used in One Minute TUNING.

― Precautions ―

- Files handled by Set-up Support Software (PANATERM ver.7) are given extensions as shown in the table above to identify their types. Do not change the extension. Doing so would prevent Set-up Support Software (PANATERM ver.7) from being able to read the file.
- Do not tamper with the file. Doing so would prevent Set-up Support Software (PANATERM ver.7) from being able to read the file.

4.2 Loading Files Created With PANATERM ver. 6

Even some files created with PANATERM ver. 6 can be loaded with Set-up Support Software (PANATERM ver.7) .

See the table below.

File name	Extension	File loading	Description
Parameter file	prm5	Possible	This file contains parameter values for a single driver.
Parameter comparison results file	csv	Not possible	This file records the results of parameter comparisons.
Waveform graph file (measurement conditions)	wgc5 wgc6	Possible	This file records the measurement conditions for waveform measurement.
Waveform graph file (measurement conditions, measurement results)	wgd5 wgd6	Possible	This file records the measurement conditions and results of waveform measurement.
Waveform graph file (measurement conditions, measurement results, parameters)	wgp5 wgp6	Possible	This file records the measurement conditions, measurement results, and parameters for waveform measurement.
Frequency response file (measurement conditions)	fcc5	Not possible	This file records the measurement conditions for the frequency response.
Frequency response file (measurement conditions, measurement results)	fcd5	Not possible	This file records the measurement conditions and results for the frequency response.
Frequency response file (measurement conditions, measurement results, parameters)	fcp5	Possible	This file records the measurement conditions, measurement results, and parameters of the frequency response.
Monitor data file	mon5	Possible	This file contains data recorded by the monitor.
Fit gain measurement results file	fit5	Not possible	This file records the fit gain tuning results and parameters.
Object data file	obj5	Possible	This file records parameter values for EtherCAT objects.
Block operation parameters file	obj5	Possible	This file records the parameter values of block operations.

― Precautions ―

- Files created by Set-up Support Software (PANATERM ver. 6) are given extensions as shown in the table above to identify their types. Do not change the extension. Doing so would prevent Set-up Support Software (PANATERM ver.7) from being able to read the file.
- Do not tamper with the file. Doing so would prevent Set-up Support Software (PANATERM ver.7) from being able to read the file.

5 Starting and Exiting Set-up Support Software (PANATERM ver.7)

5.1 Connection Method

This section explains how to connect a computer with the driver.

5.1.1 Connecting Via USB Cable (Commercially Available)

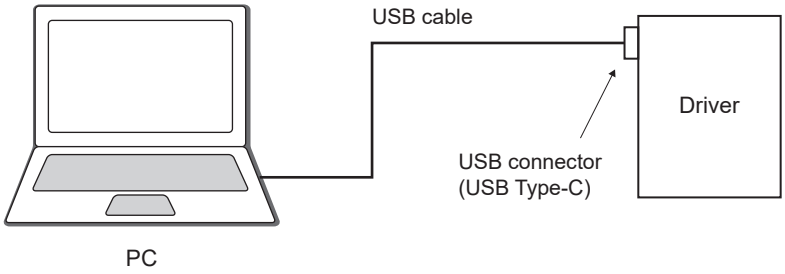
Make sure all driver power supplies are disconnected.

Then, insert the USB cable securely into the computer and driver.

Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for details on USB connections.

- A7: Operating Instructions (Overall)

■ When connecting one driver



— Precautions —

- Communication speed varies greatly as a result of various primary causes, such as connection to USB devices other than the driver, the status of the computer OS, communication errors due to reasons such as noise, and the driver response speed.
- We do not provide USB cables.

  To reduce the effects of noise, we recommend installing ferrite cores at both ends of the USB cable.
- Set-up Support Software (PANATERM ver.7) operation is not guaranteed when drivers with different interfaces are connected in parallel at the same time.
- For the A6 family, use a MINI-B type USB cable.

5.1.2 Ethernet over EtherCAT (EoE) Connection

Make sure all driver power supplies are disconnected.

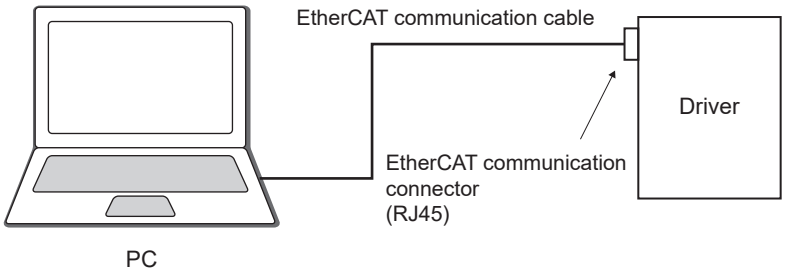
Then, insert the EtherCAT communication cable securely into the computer and driver.

Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for details on EtherCAT connections.

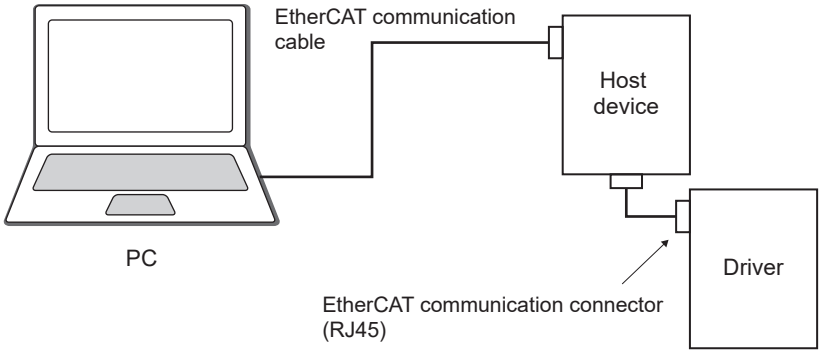
- A7B: Operating Instructions (Overall)
- A6B: Technical Reference Communication Specification

The EoE function is currently under development.

■ When the software PLC is on a computer



■ **When the driver is connected via a host device**



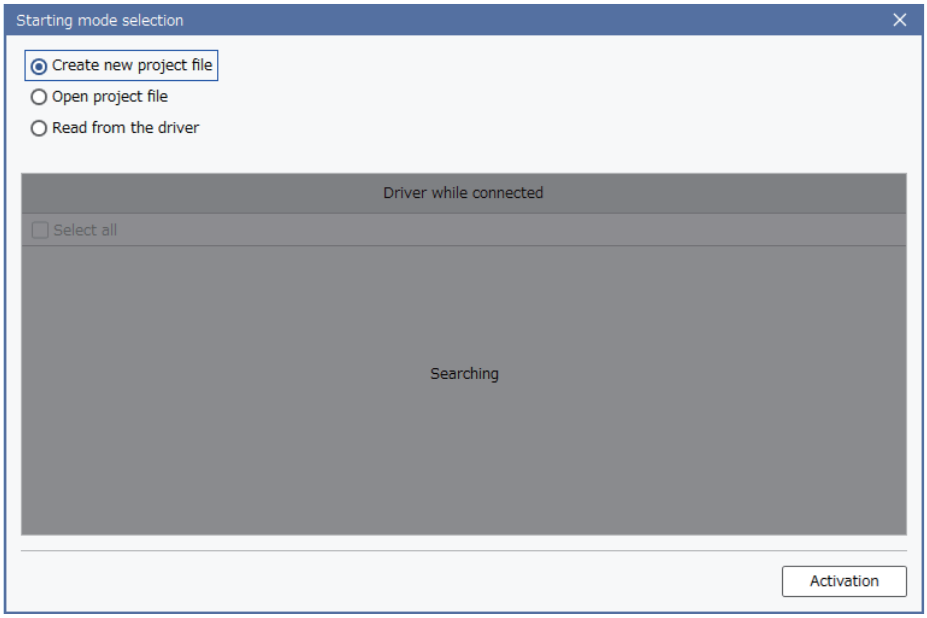
5.2 Starting Set-up Support Software (PANATERM ver.7)

5.2.1 Creating a New Project File to Start the Software

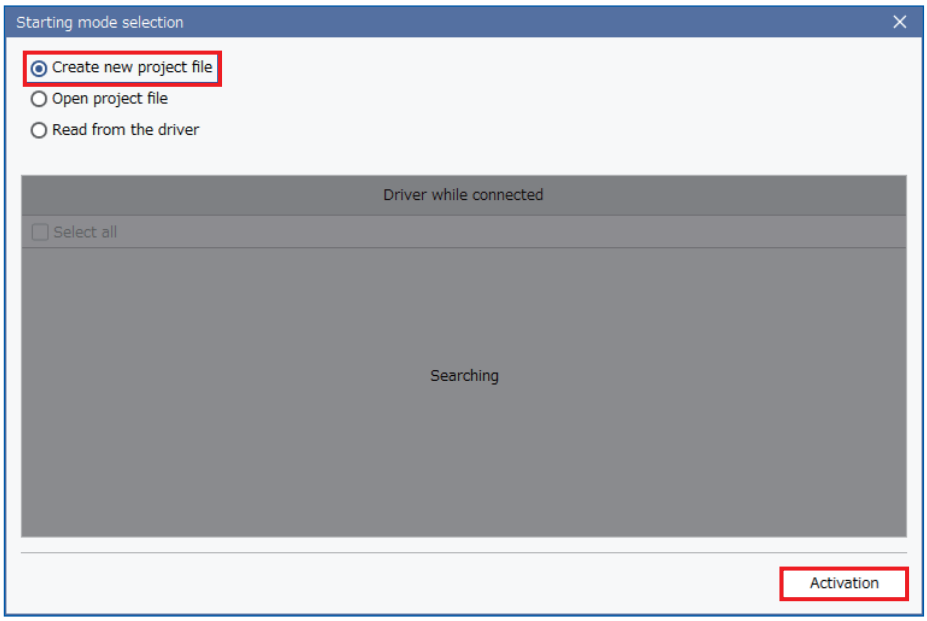
A new project file can be created and parameters can be edited without connecting to the driver.

<< Procedure >>

1. Double-click the Set-up Support Software (PANATERM ver.7) icon on the desktop.
   Set-up Support Software (PANATERM ver.7) starts and the “Starting mode selection” dialog box appears.

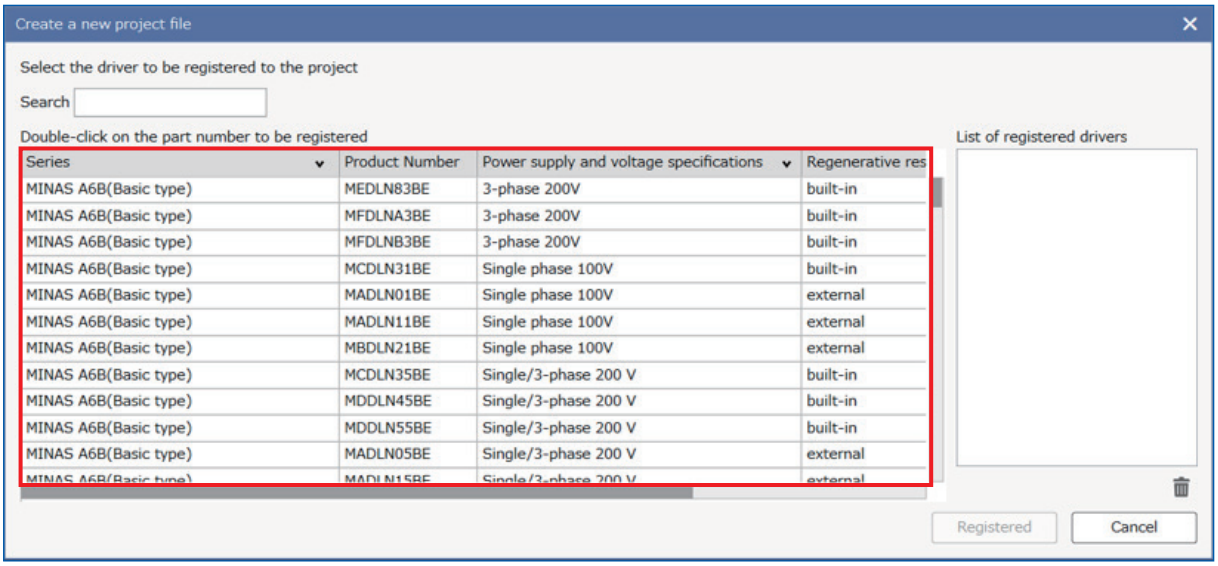


2. From the “Starting mode selection” dialog box, select “Create new project file” and click the [Activation] button.



The “Create a new project file” dialog box appears.

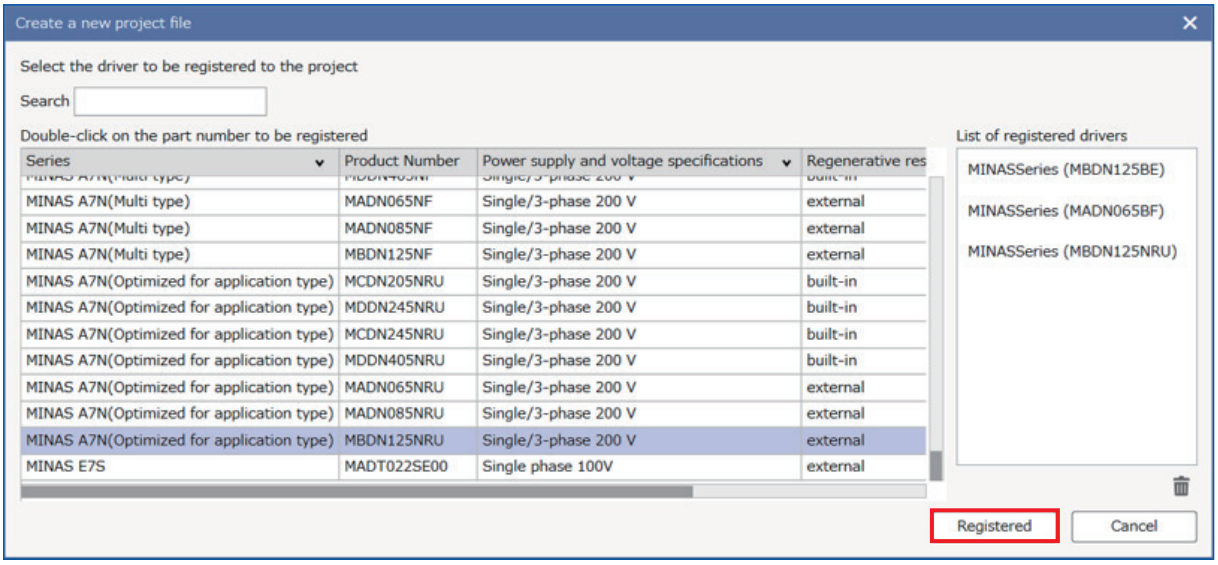
3. Double-click on the driver to be used.



Add the selected driver to the “List of registered drivers”. Up to 32 drivers can be registered.

In the “Create a new project file” dialog box, you can use search, sort, and filter functions to find the driver you want.

4. Click the [Register] button.



This starts reading of the parameters for the driver added to the “List of registered drivers”.

See *“7.4 Connection Method”* when connecting the driver offline.

— Precautions —

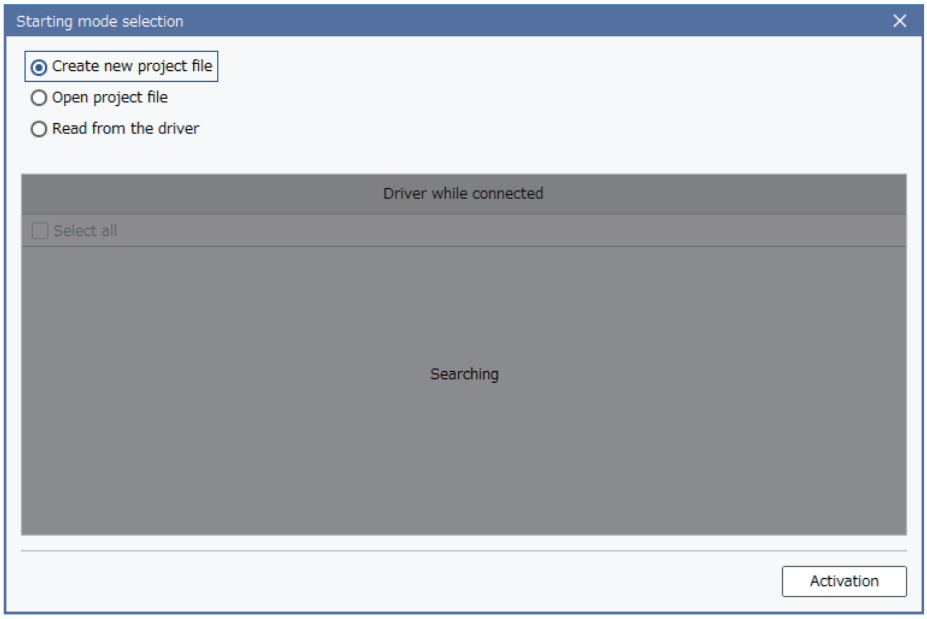
- When starting the software with “Create new project file”, set the initial values for the driver to the parameter values.

5.2.2 Opening a Project File to Start the Software

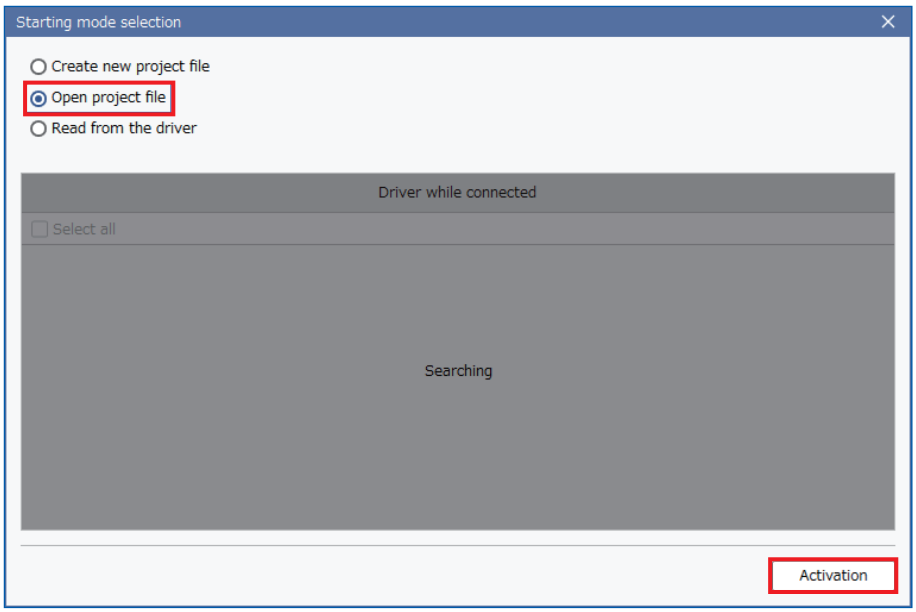
You can read a previously created project file and edit the parameters without connecting to the driver.

<< Procedure >>

1. Double-click the Set-up Support Software (PANATERM ver.7) icon on the desktop.
   Set-up Support Software (PANATERM ver.7) starts and the “Starting mode selection” dialog box appears.

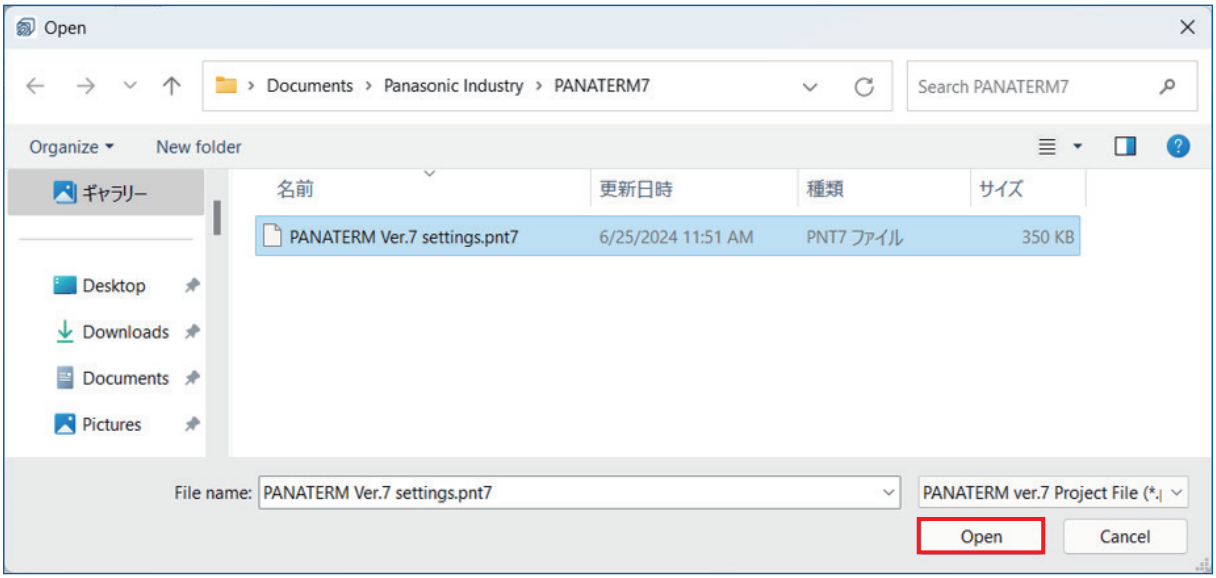


2. From the “Starting mode selection” dialog box, select “Open project file” and click the [Activation] button.



3. Select the project file already created and click the [Open (O)] button.

The selected project file opens.



Load the driver settings saved in the project file.

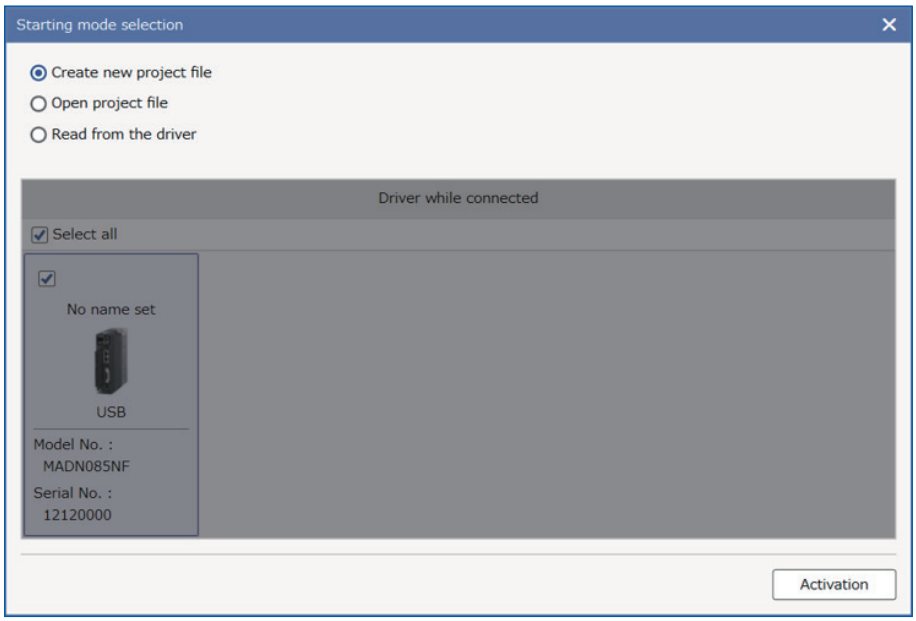
5.2.3 Reading Parameters from the Driver to Start the Software

You can read the settings of the currently connected driver.

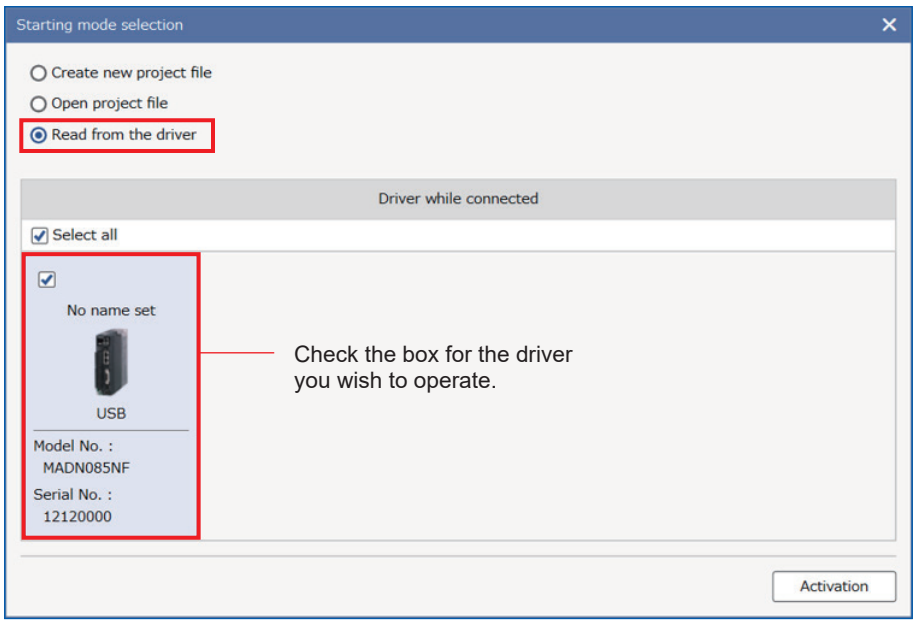
<< Procedure >>

1. Double-click on the Set-up Support Software (PANATERM ver.7) icon on the desktop.

Set-up Support Software (PANATERM ver.7) starts and the “Starting mode selection” dialog box appears.



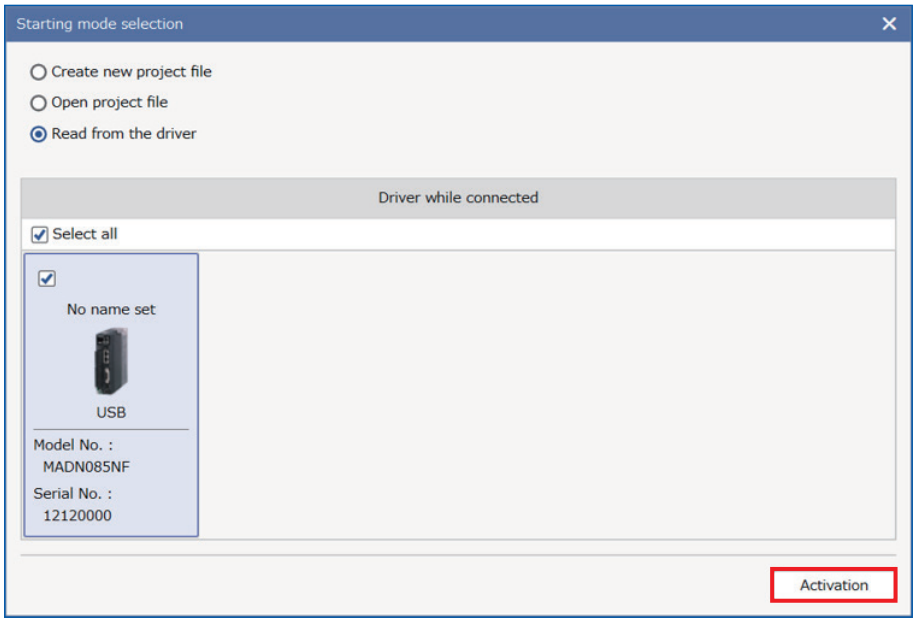
2. Select “Read from the driver”, and check the driver you want to operate with Set-up Support Software (PANATERM ver.7) .



— Precautions —

- If the driver is not recognized, check the following:
  - Is the driver properly connected to the computer?
  - Is the driver turned on?

3. Click the [Activation] button.



This starts the reading of parameters from the driver.

If the “Select undefined driver model” dialog box appears, refer to “Step 5” in *“7.2.2 Adding Drivers Online”* .

5.3 Exiting Set-up Support Software (PANATERM ver.7)

— Precautions —

- When settings have been changed, be sure to write the settings to the driver itself or save the project file before exiting. If you exit the software without saving the settings, your changes will be discarded.
- Monitor data and log data should be saved in a file before exiting. If you exit the software without saving, your data will be discarded.

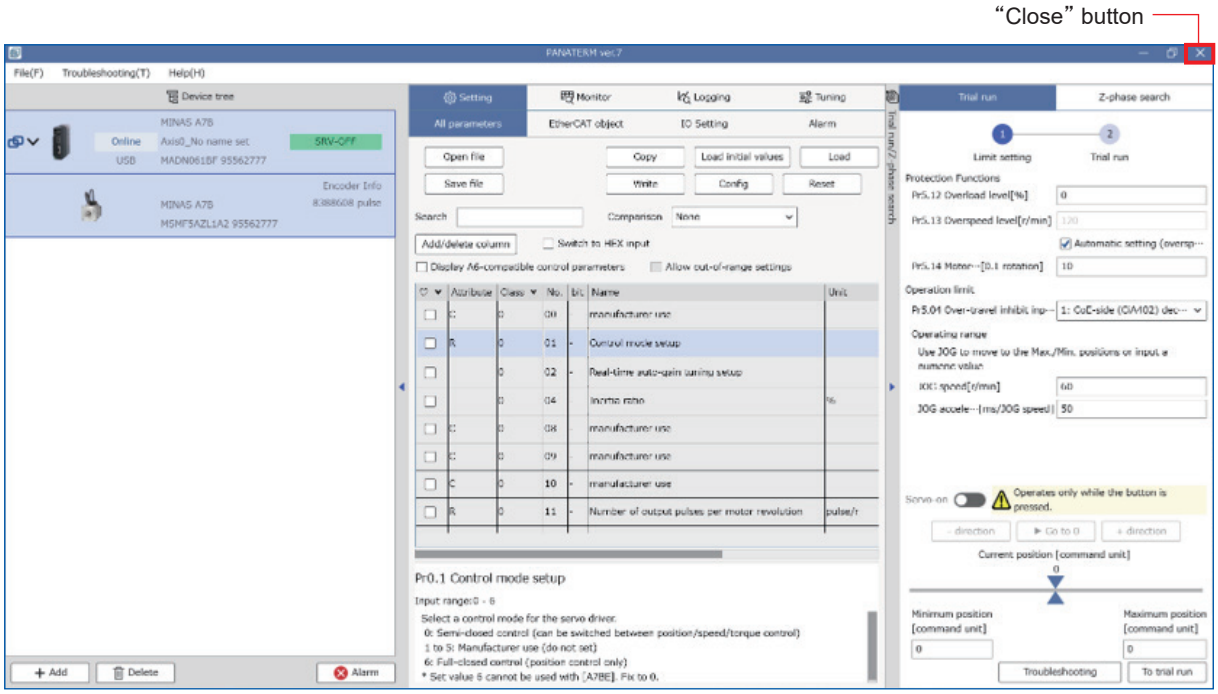
5.3.1 Exiting the Software From the Menu Bar

For details, see *"6.2.1.8 Exit (X)"* .

5.3.2 Exiting the Software With the Close Button

<< Procedure >>

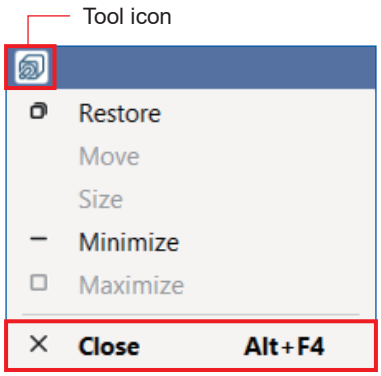
1. Click the [Close] button in the upper-right corner of the software screen.



5.3.3 Exiting the Software From the Tools Icon

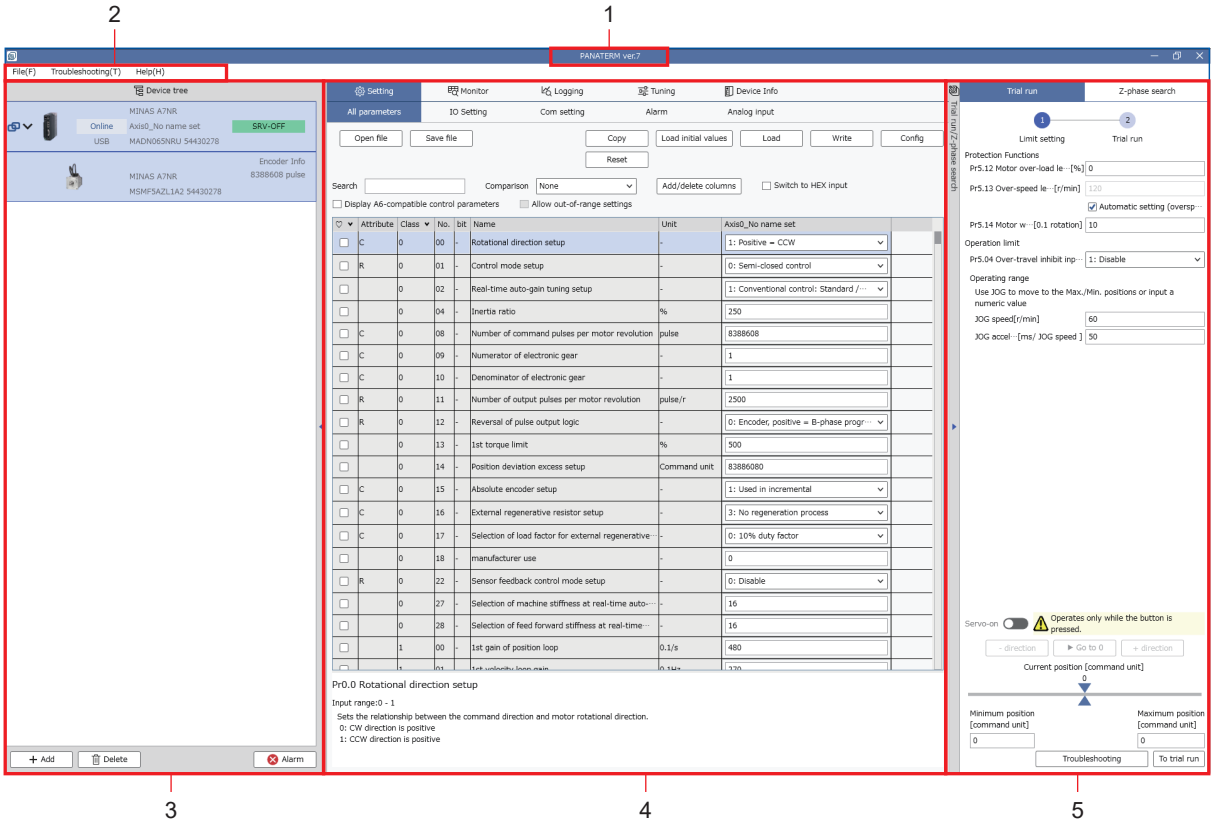
<< Procedure >>

1. Click on the Tools icon in the upper-left corner of the software and select “Close (C)”.



6 Main Screen

6.1 Configuration of the Main Screen



No.	Name	Description	Reference
1	Title bar	Displays the name of the software.	—
2	Menu bar	Displays a menu of each function used in Set-up Support Software (PANATERM ver.7) .	*"6.2"*
3	Device tree	Displays a list of drivers and motors that are connected or being edited.	*"7"*
4	Function display area	This area displays the functions selected in *"8.1.2 Category Display"* .	*"8 Settings Screen"* *"9 Monitor"* *"10 Logging"* *"11 Tuning"* *"12 Device Information"*
5	Trial run	Even without a host device connected, the driver alone can be used to perform motor trial runs from a computer.	*"13"*

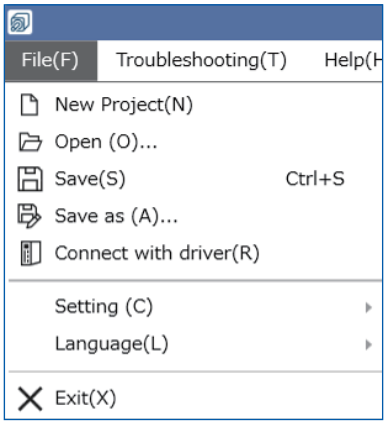
6.2 Menu Bar

This section describes the functions that can be set in the menu bar.

For Troubleshooting (T), see *"7.10 Troubleshooting"* .

6.2.1 File (F)

You can perform operations and set options related to the project file.



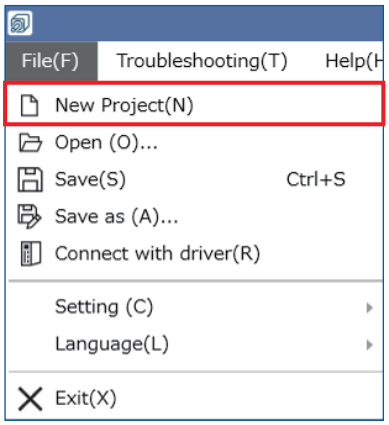
Each of the available selections are described in the following section.

6.2.1.1 New Project (N)

Create a new project file.

<< Procedure >>

1. From the menu bar, select **File (F)>New Project (N)**.



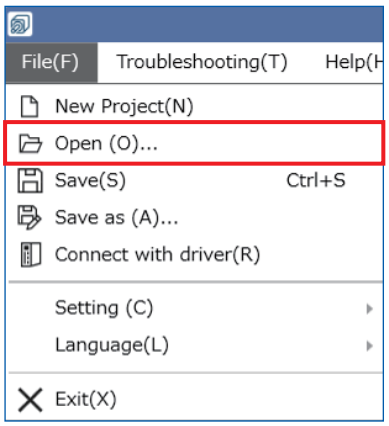
For detailed operation procedures, see *"5.2.1 Creating a New Project File to Start the Software"* "Step 3" onward.

6.2.1.2 Open (O)

Open an existing project file.

<< Procedure >>

1. From the menu bar, select **File (F)**>**Open (O)**.



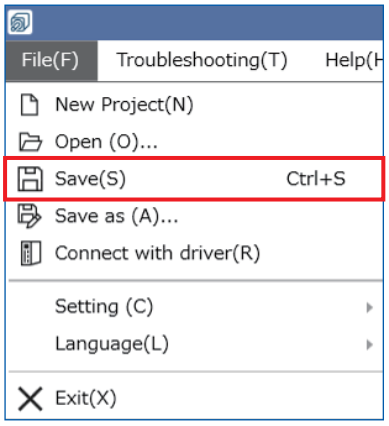
For detailed operation procedures, see *"5.2.2 Opening a Project File to Start the Software"* "Step 3".

6.2.1.3 Save (S)

Overwrite a project file that has already been saved.

<< Procedure >>

1. From the menu bar, select **File (F)**>**Save (S)**. (Shortcut: Ctrl+S)



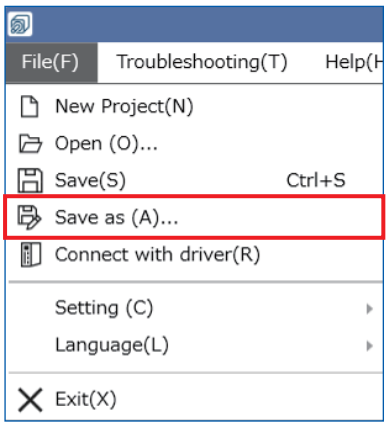
The current project file is overwritten and saved.

6.2.1.4 Save as (A)

Name and save the configured file.

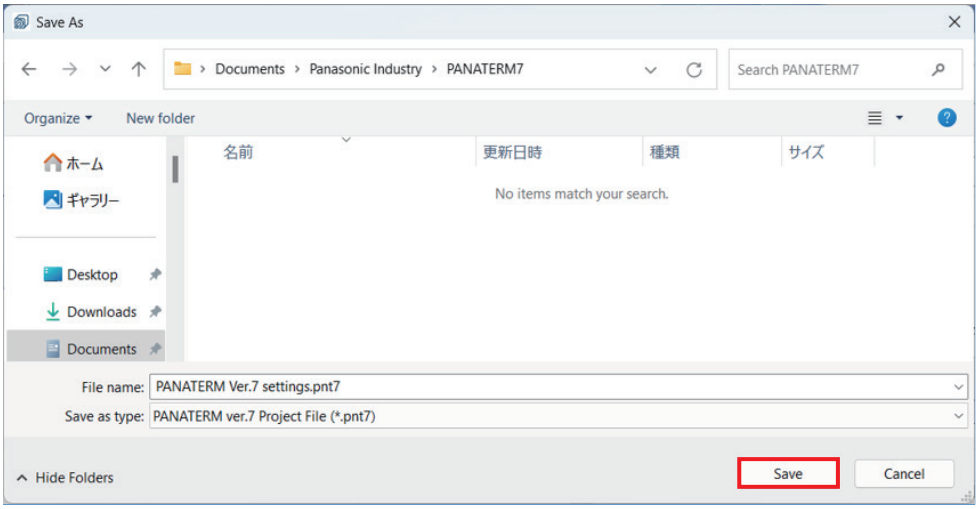
<< Procedure >>

1. From the menu bar, select **File (F)**>**Save as (A)**.



The “Save as” dialog box appears.

2. Specify where to save the file and the file name, and click the [Save] button.

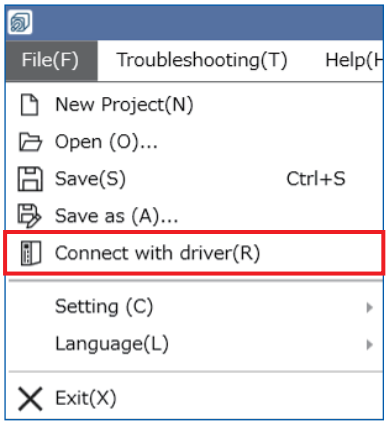


6.2.1.5 Connect with driver (R)

Connect the driver connected to the computer with this software.

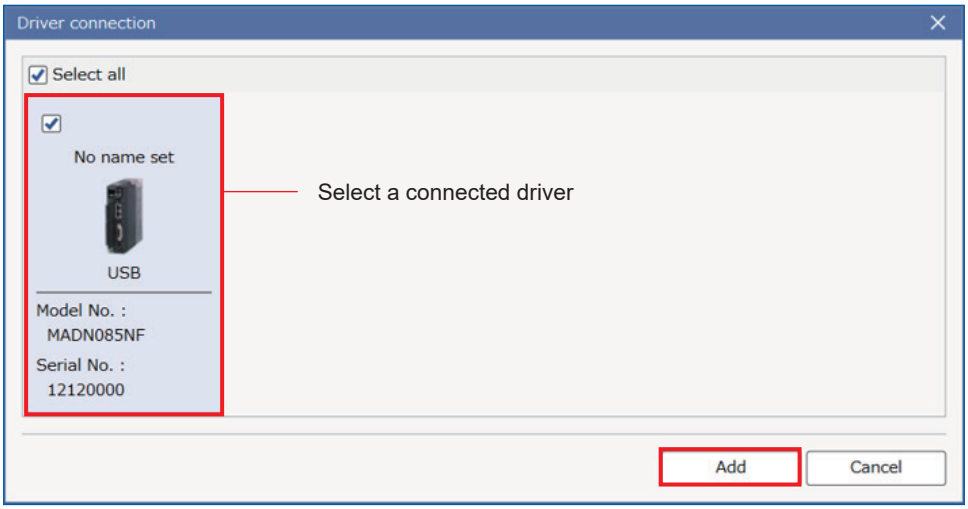
<< Procedure >>

1. From the menu bar, select **File (F)**>**Connect with driver (R)**.



The “Driver connection” dialog box appears.

2. After selecting the connected driver, click the [Add] button.



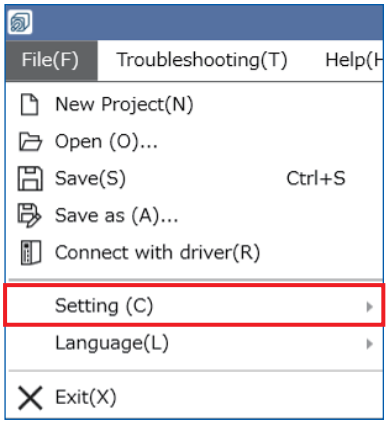
If the “Select undefined driver model” dialog box appears, refer to “Step 5” in *“7.2.2 Adding Drivers Online”* .

6.2.1.6 Settings (C)

Configures settings related to drivers.

<< Procedure >>

1. From the menu bar, select **File (F)**>**Settings (C)**.



For detailed operation procedures, see *“6.2.1.6.1 Model Definition Settings”* onwards.

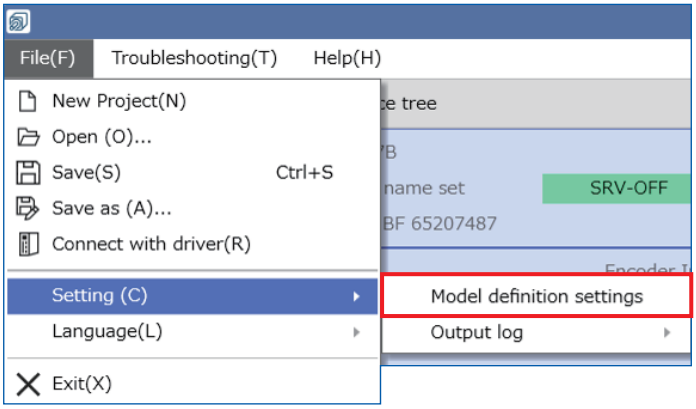
6.2.1.6.1 Model Definition Settings

To add a new model, use the model definition settings to make the new driver available for use.

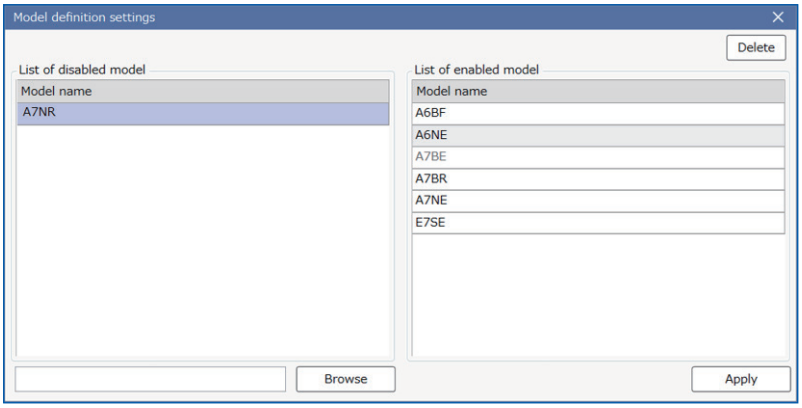
For setup procedures, see *“6.2.1.6.1.1 Configuration of the Model Definition Settings Screen”* onward.

<< Procedure >>

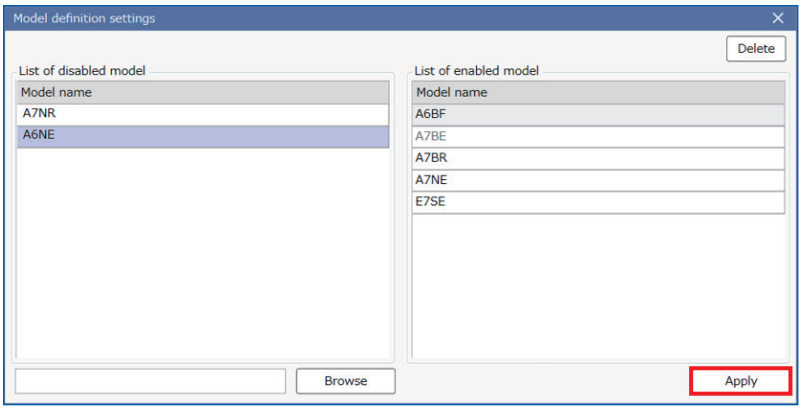
1. From the menu bar, select **File (F)>Settings (C)>Model definition settings**.



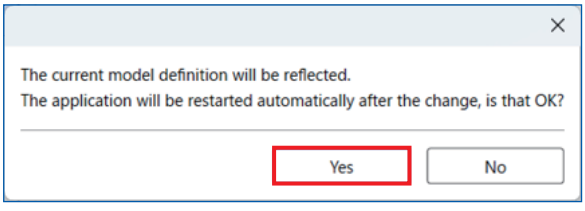
2. Model definition settings are displayed.



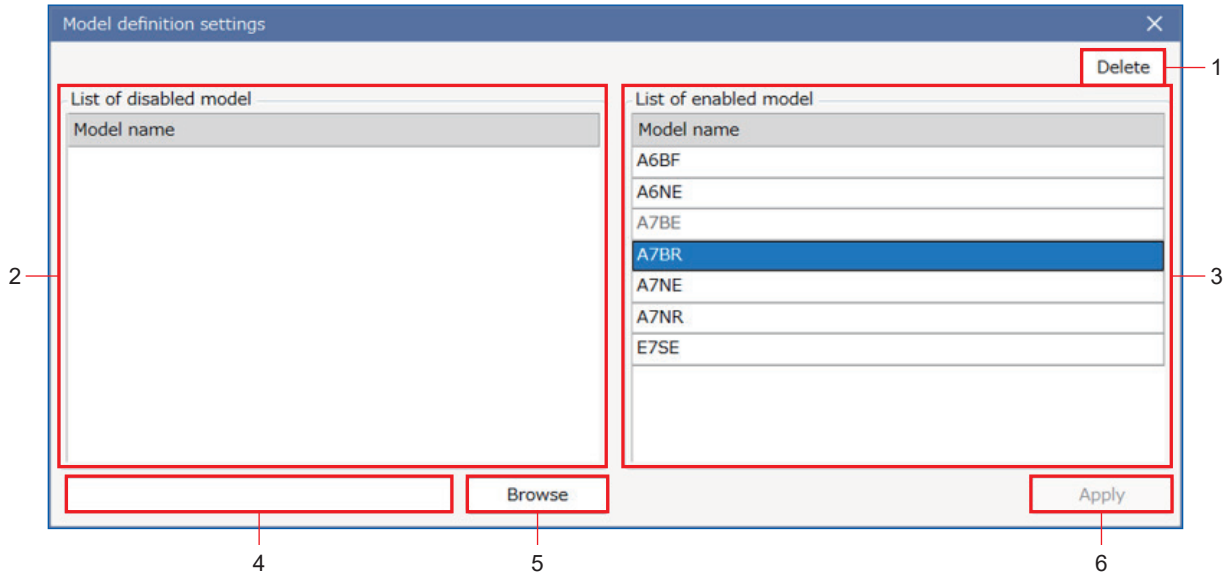
3. Configure the settings then click the [Apply] button.



4. When the following dialog box appears, click the [Yes] button to restart the application and apply the model you set.



6.2.1.6.1.1 Configuration of the Model Definition Settings Screen

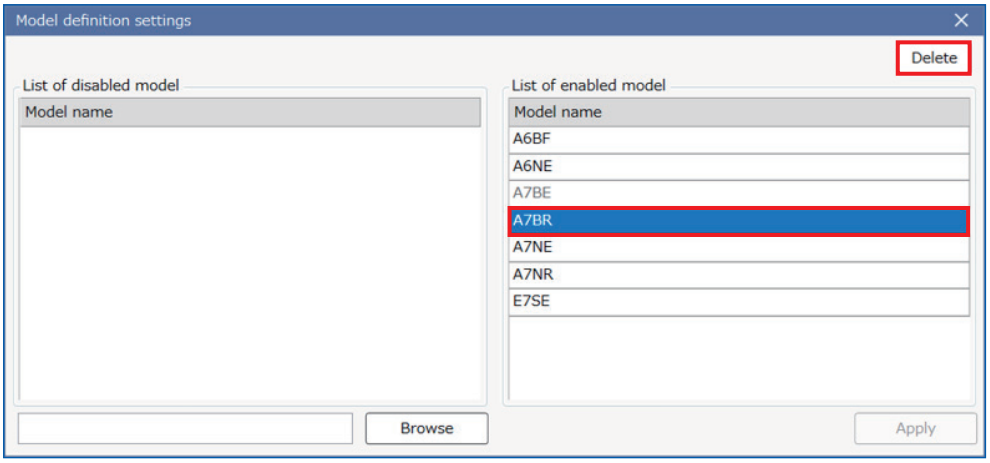


	Name	Description	Reference
1	Delete	Moves the currently selected model in the list of enabled models to the list of disabled models.	*"6.2.1.6.1.2"*
2	List of disabled models	Displays the list of disabled models.	—
3	List of enabled models	Displays the list of enabled models.	—
4	Reference file path display	Displays the path to the referenced applied driver database file.	*"6.2.1.6.1.4"*
5	Reference	Enables new models to be added to the list of enabled models by referencing the model definition file that exists on the computer.	*"6.2.1.6.1.4"*
6	Apply	Enables changes to model definition settings.	—

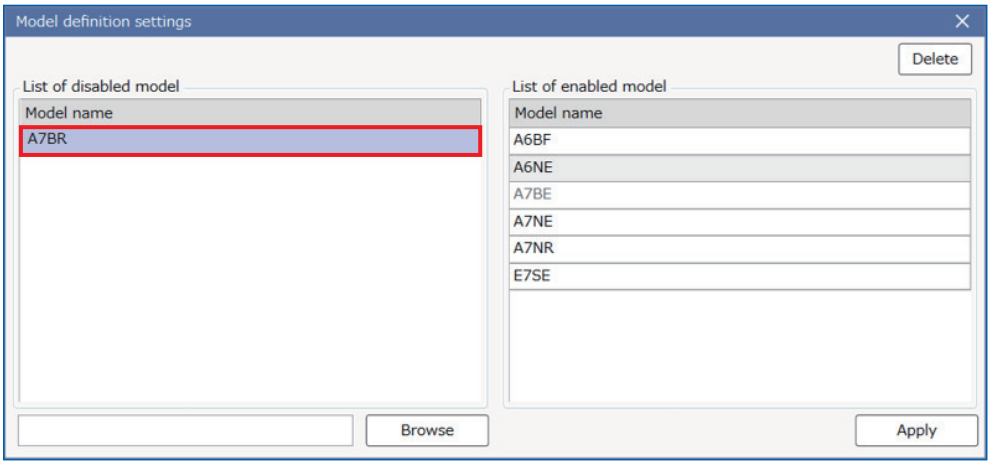
6.2.1.6.1.2 Disabling Enabled Models

<< Procedure >>

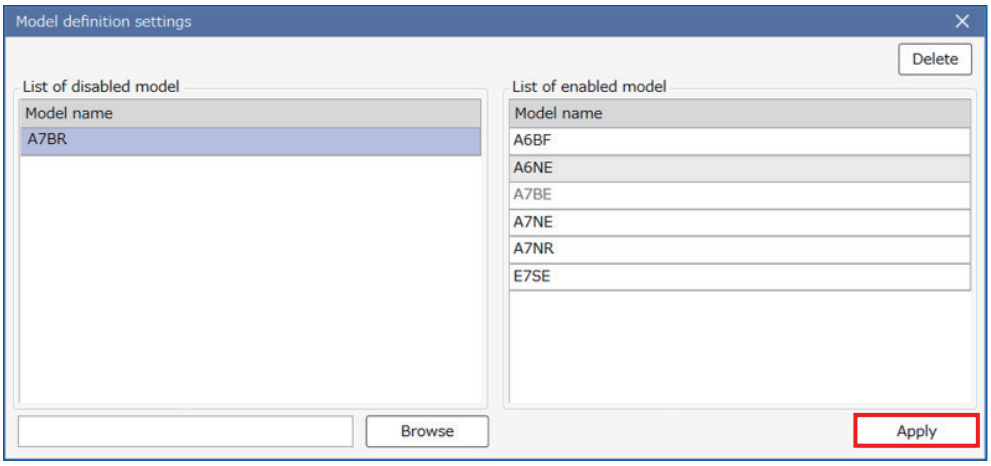
1. Select the model you want to disable in the list of enabled models and double-click on it or click the [Delete] button.



2. The selected enabled model will be registered in the list of disabled models.



3. Click the “Apply” button to apply the settings.



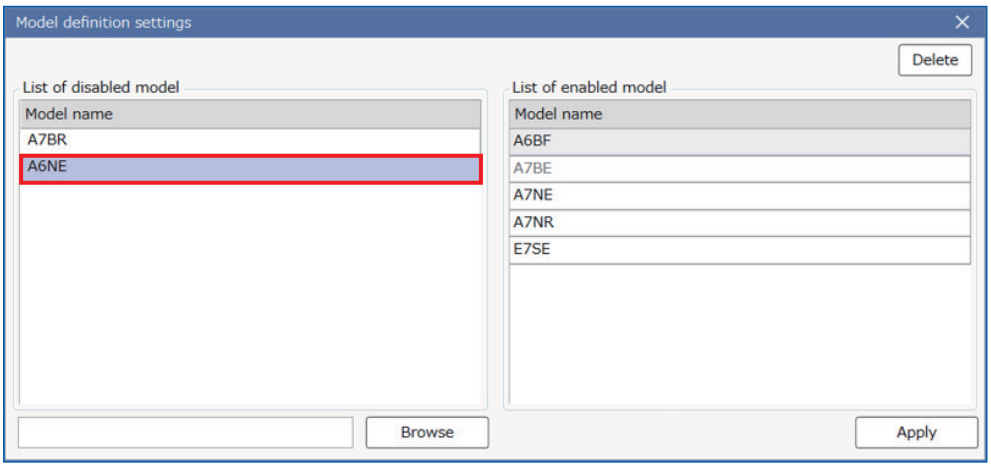
— Precautions —

- Driver models that have already been added to the device tree cannot be disabled.

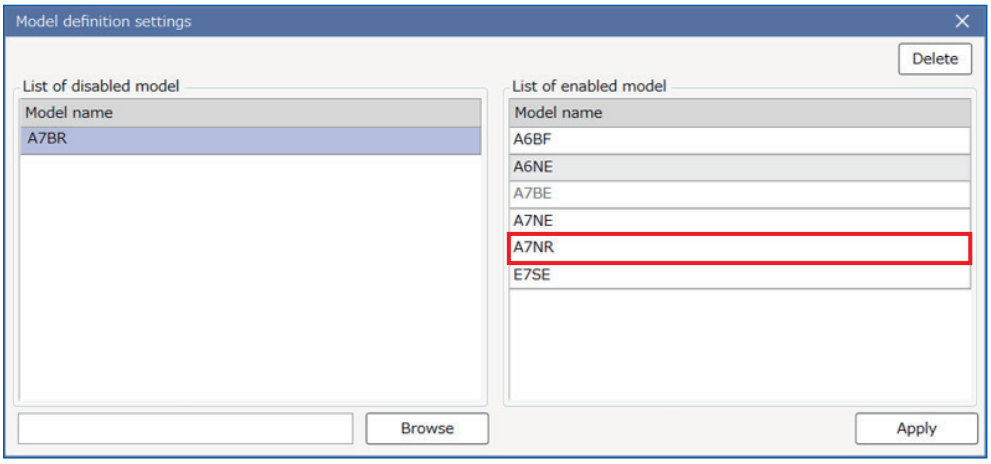
6.2.1.6.1.3 Enabling Disabled Models

<< Procedure >>

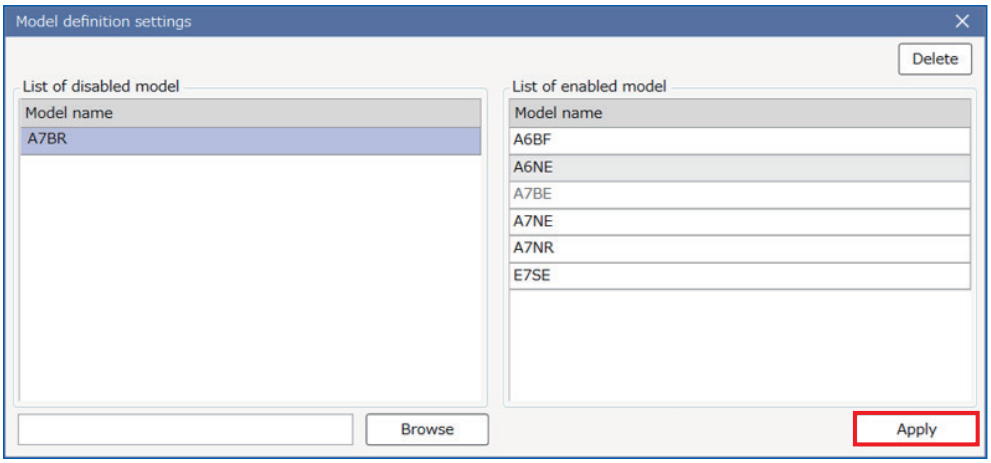
1. Select the model you want to enable in the list of disabled models and double-click on it.



2. The selected disabled model will be registered in the list of enabled models.



3. Click the [Apply] button to apply the settings.

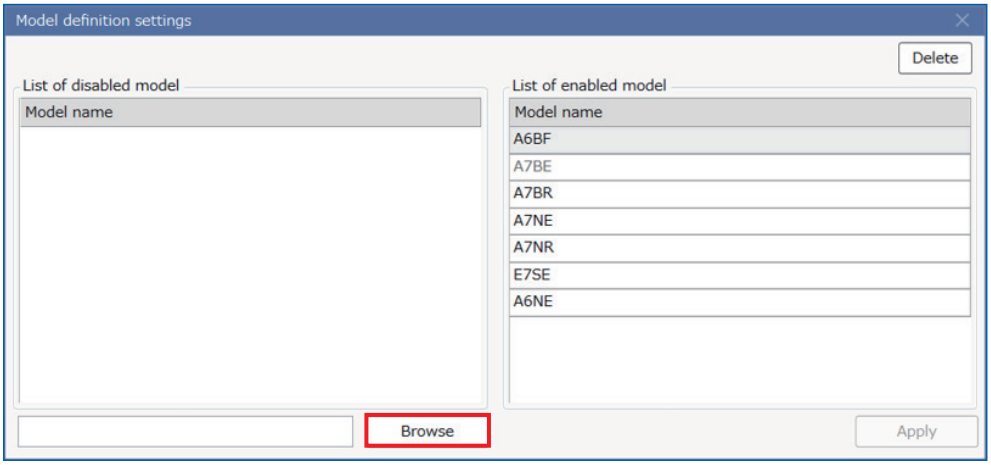


6.2.1.6.1.4 Adding Model Definition Settings

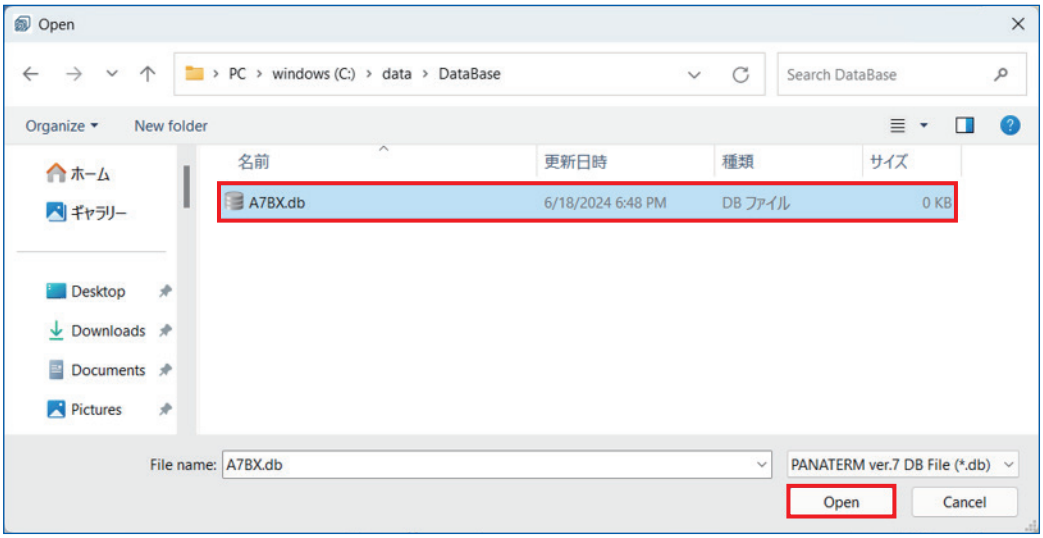
Add a new model by referencing the provided database file (*.db).

<< Procedure >>

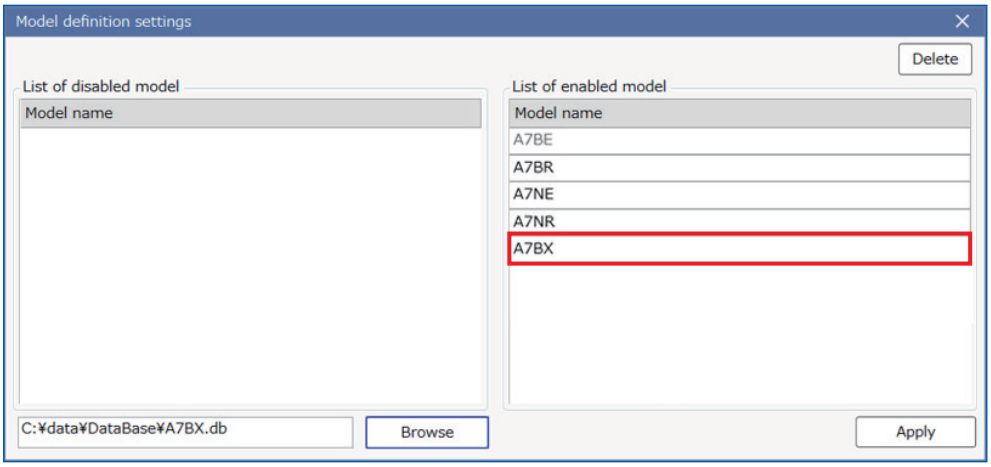
1. Click the [Browse] button.



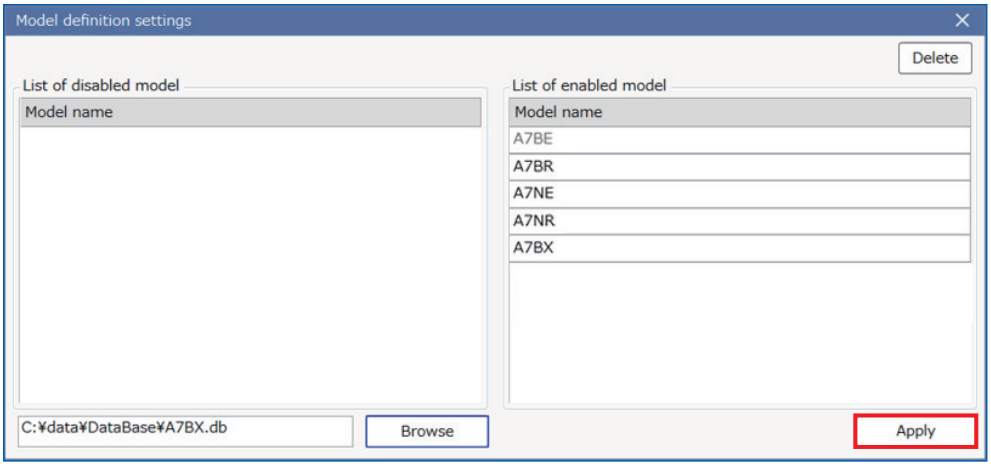
2. Open the folder where the model definition files are saved and select the appropriate definition file.



3. The list of enabled models will be updated and the added models displayed.



4. Click the “Apply” button to apply the settings.

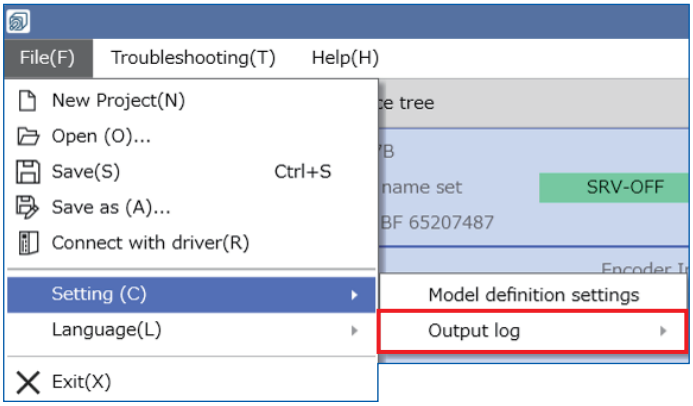


6.2.1.6.2 Log Function

Set-up Support Software (PANATERM ver.7) has a log function for analyzing problems as they occur.
Although initially set to OFF, it should be set to ON when performing the analysis.

<< Procedure >>

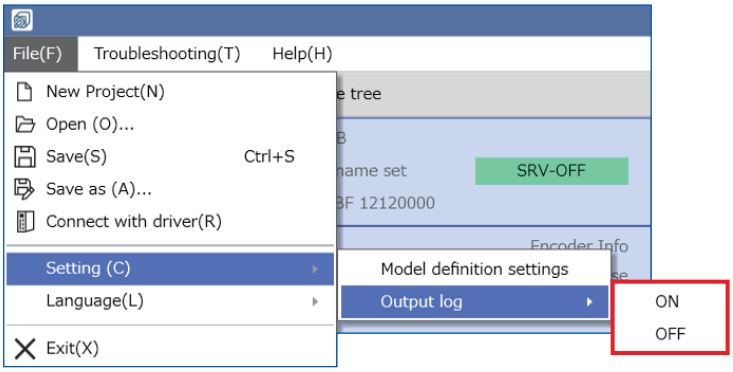
1. From the menu bar, select **File (F)**>**Settings (C)**>**Output log**.



2. Select “Output log” to display ON and OFF.

   ON: Enables the log function.

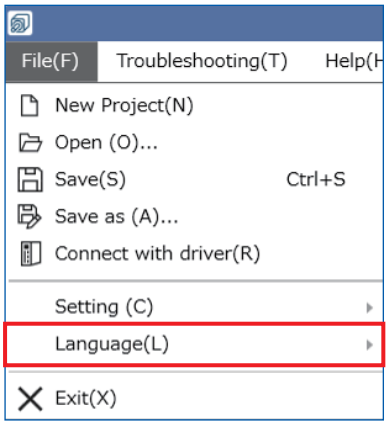
   OFF: Disables the log function.



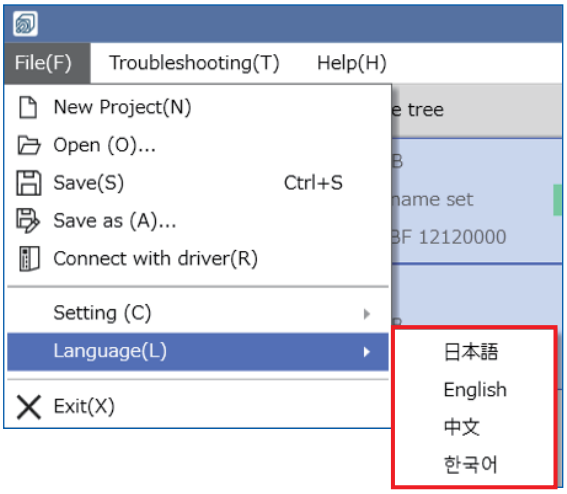
6.2.1.7 Language (L)

<< Procedure >>

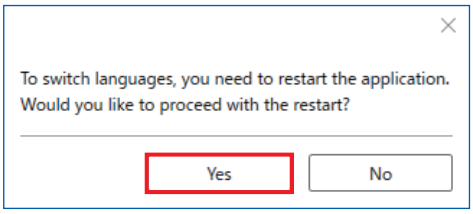
1. From the menu bar, select **File (F)**>**Language (L)**.



2. A list of languages that can be changed appears.



3. A dialog box will appear after a language is selected. To confirm the selection, click the [Yes] button.

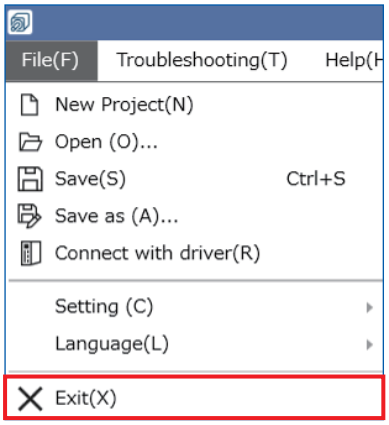


4. After restarting, the change in the display language for Set-up Support Software (PANATERM ver.7) is applied.

6.2.1.8 Exit (X)

<< Procedure >>

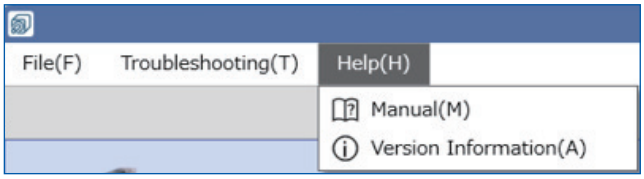
1. From the menu bar, select **File (F)>Exit (X)**.



Set-up Support Software (PANATERM ver.7) exits.

6.2.2 Help (H)

Use this to check Set-up Support Software (PANATERM ver.7) Operating Manual and the software version.

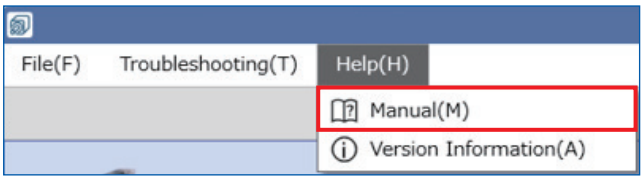


6.2.2.1 Manual (M)

Use this to browse Set-up Support Software (PANATERM ver.7) Operating Manual.

<< Procedure >>

1. From the menu bar, select **Help (H)**>**Manual (M)**.



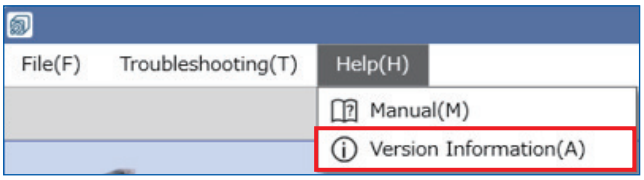
The Operating Manual appears.

6.2.2.2 Version Information (A)

Use this to check version information for Set-up Support Software (PANATERM ver.7) .

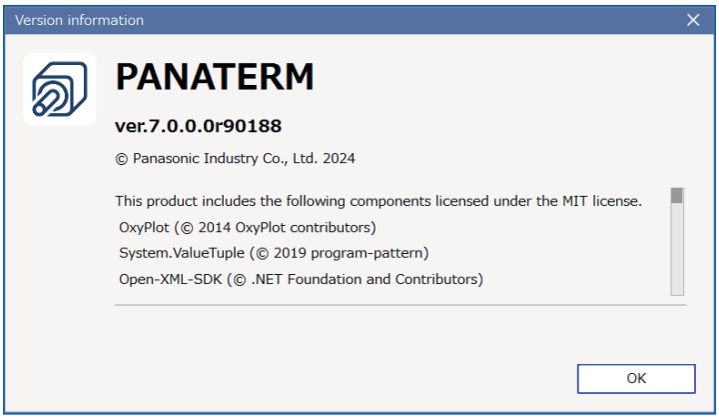
<< Procedure >>

1. From the menu bar, select **Help (H)**>**Version Information (A)**.



Version information for Set-up Support Software (PANATERM ver.7) is displayed.

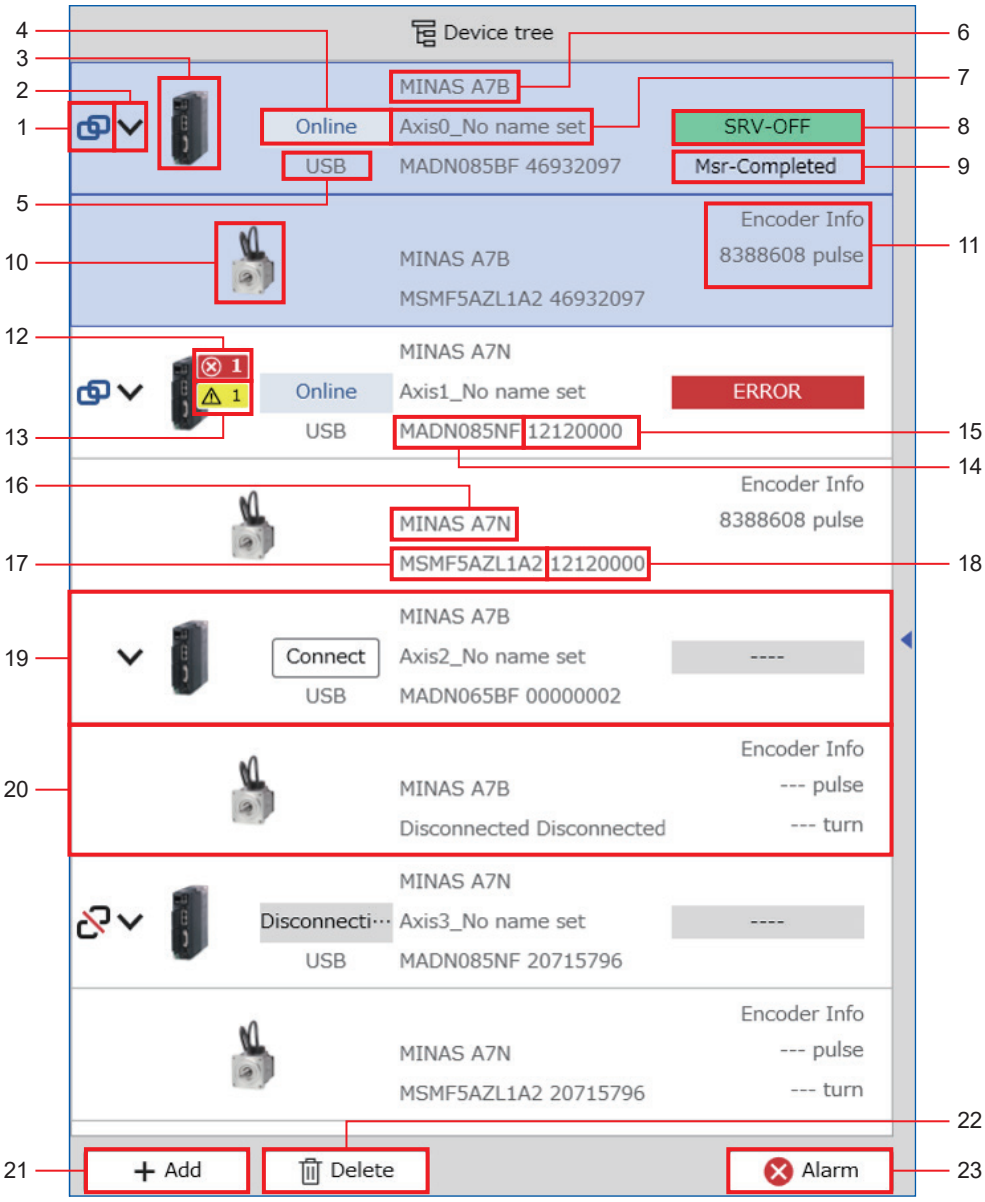
Below is an example of what is displayed.



7 Device tree

7.1 Configuration of the Device Tree Screen

Displays a list of drivers and motors that are connected or being edited.



No.	Name	Description	Reference
1	Connection status	Displays the connection status between the driver and the computer.	*"7.1.1"*
2	Motor information area display button	Click to show or hide the motor information area.	—
3	Driver product image	Displays an image of the driver. Selecting the image displays the alarm notification screen.	*"7.9"*
4	Connection status icon	Displays the connection status between the driver and the computer.	*"7.1.1"*
5	Communication method	Displays the method of communication between the driver and the computer.	—
6	Driver series name	Displays the driver series name.	—
7	Axis No./Nickname	Displays the driver axis No. and the nickname set. If no nickname is set, "Name not set" is displayed.	—
8	Driver status	Displays the driver status.	*"7.1.2"*
9	Waveform measurement status	Displays the status of waveform measurement.	*"7.1.3"*

No.	Name	Description	Reference
10	Motor product image	Displays an image of the motor.	—
11	Encoder information area	Displays the encoder information. Displays the number of pulses per single rotation, as well as multi-turn data. Multi-turn data is not displayed when the encoder setting is incremental.	—
12	Alarm notification icon	Displayed when an alarm signal is output from the driver.	—
13	Warning notification icon	Displayed when a warning signal is output from the driver.	—
14	Driver product number	Displays the driver product number.	—
15	Driver serial number	Displays the driver serial number.	—
16	Motor series name	Displays the motor series name.	—
17	Motor product number	Displays the motor product number.	—
18	Motor serial number	Displays the motor serial number.	—
19	Driver information area	This area displays driver information. Right-click to display the context menu.	*"7.1.4"*
20	Motor information area	This area displays information on motors connected to the driver. Right-click to display the context menu.	*"7.1.4"*
21	Add	Add a new driver.	*"7.2"*
22	Delete	Deletes drivers in the selected device tree.	*"7.3"*
23	Alarm	Opens the alarm screen.	*"7.9"*

7.1.1 Connection Status

The connection status between the driver and the computer is displayed as follows.

Connection status icon	Connection status	Status	Condition
Online		Online	Communication is established with the driver.
Disconnection		Disconnected	The previously connected driver communication connector is disconnected or not properly connected, or the driver power is OFF.
Connect	No	Offline (*1)	The driver was added offline and connection has never been established with the driver.

*1 If you are offline and click on the icon, the "Select driver" dialog box appears and you can attempt a connection. For details, see *"7.4 Connection Method"* .

7.1.2 Driver Status

The status of connected drivers is displayed as follows.

Display	Status	Condition
----	Disconnected or offline	The communication connector is disconnected or not connected properly, or the driver power is OFF. Or, the actual device does not exist, only the settings on the computer.
SRV-OFF	Servo-off	The connected driver is servo-off and there is no alarm.
SRV-ON	Servo-on	The connected driver is servo-on and there is no alarm.

Display	Status	Condition
ERROR	Error	The protection functions of the connected driver are working. Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for information on protection functions. ● A7: Operating Instructions (Overall) ● A6: Technical Reference Functional Specification, Technical Reference Communication Specification
WARNING	Warning	A warning is triggered on the connected driver. When an error and a warning are triggered simultaneously, the error is displayed.

7.1.3 Waveform Measurement Status

The waveform measurement status is displayed as follows.

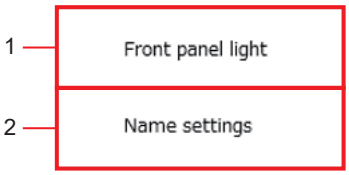
For details on waveform measurement, see *"10.1 Measuring Waveforms"* .

Display	Status	Condition
No display	Unmeasured	Not measured or the [Stop] button was clicked during measurement.
Msr-WaitTrigger	Waiting for trigger	Measurement is in progress and waiting for trigger.
Msr-Sampling	Sampling in progress	Measurement is in progress and sampling is in progress.
Msr-Completed	Measurement completed	Waveform measurement is complete.
Msr-Interrupted	Measurement interrupted	An error occurred during measurement.

7.1.4 Context Menu

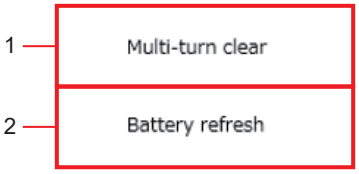
Right-clicking on the driver information area or motor information area in the device tree displays the following context menus respectively.

■ **Driver context menu**



No.	Name	Description	Reference
1	Front panel light	Lights up the front panel.	*"7.6"*
2	Name settings	Sets a nickname.	*"7.5"*

■ **Motor context menu**



No.	Name	Description	Reference
1	Multi-turn clear	Executes multi-turn clear.	*"7.8"*
2	Battery refresh	Executes a battery refresh.	*"7.7"*

7.2 Adding Drivers

Add a driver to the device tree. You can add drivers online and offline.

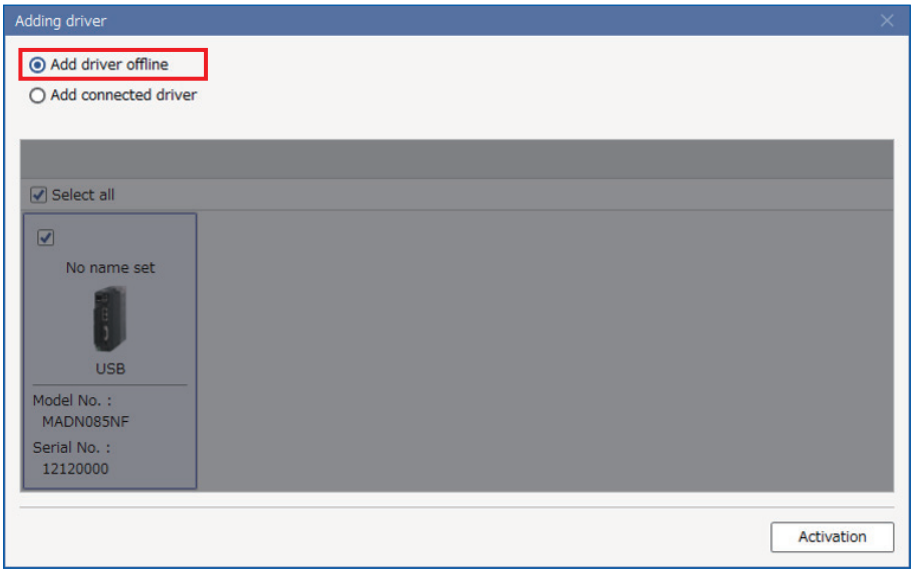
7.2.1 Adding Drivers Offline

<< Procedure >>

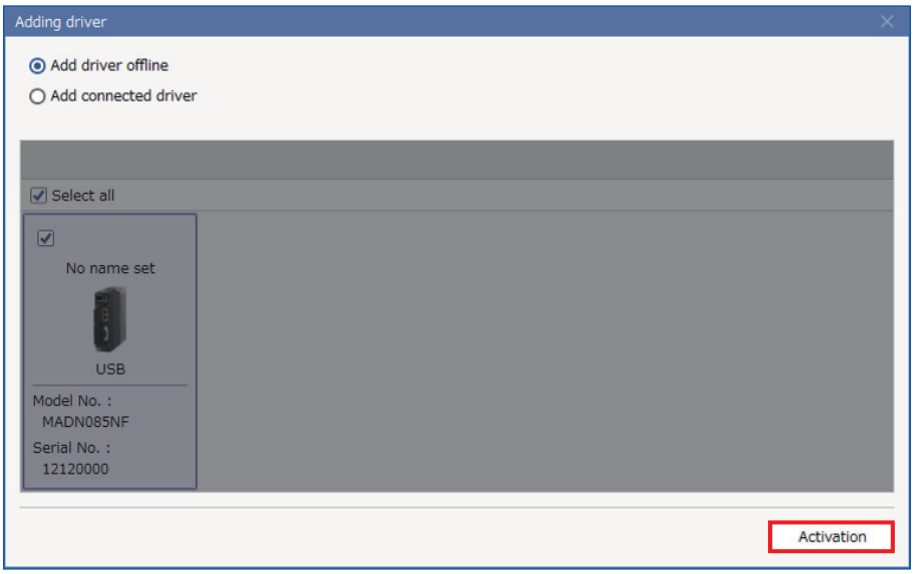
1. Click the [Add] button in the device tree.

The “Adding driver” dialog box appears.

2. Select “Add driver offline”.

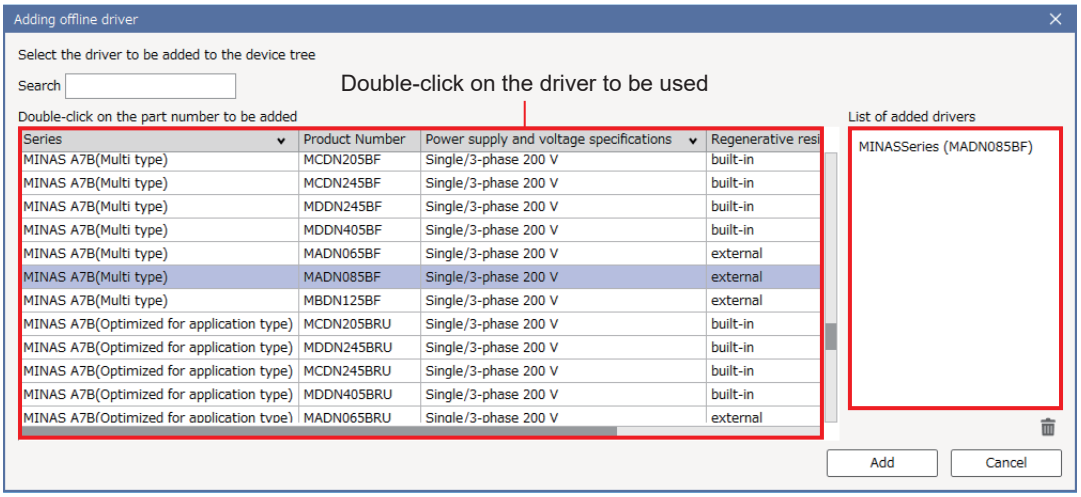


3. Click the [Activation] button.



The “Adding offline driver” dialog box appears

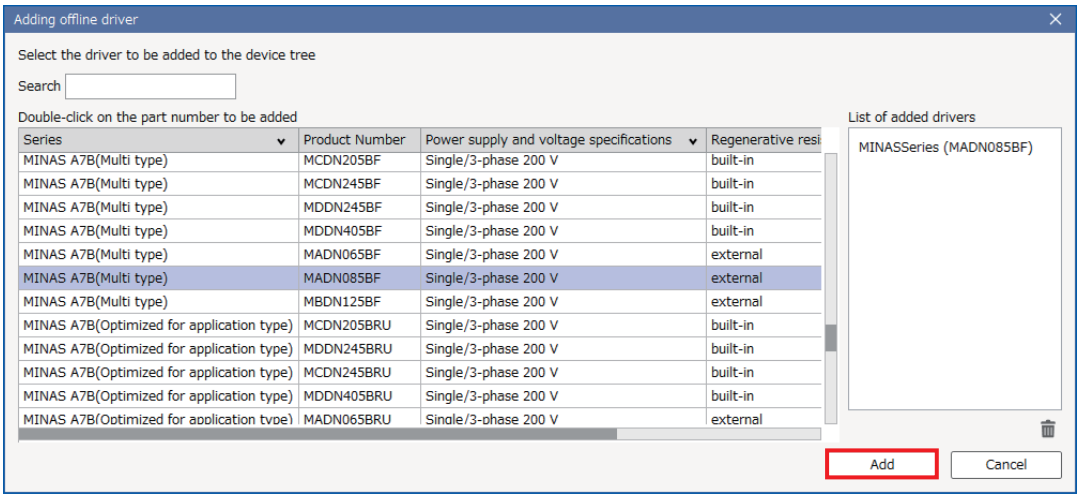
4. Double-click on the driver to be used.



The selected driver is added to the “List of added drivers”. Up to 32 drivers can be registered.

In the “Adding offline driver” dialog box, you can use search, sort, and filter to find the driver you want.

5. Click the [Add] button.



Loading of the parameters for the driver added to the “List of added drivers” starts.

For methods of connecting added drivers, see *“7.4 Connection Method”* .

— Precautions —

- When starting the software with “Add driver offline”, set the initial values for the driver to the parameter values.

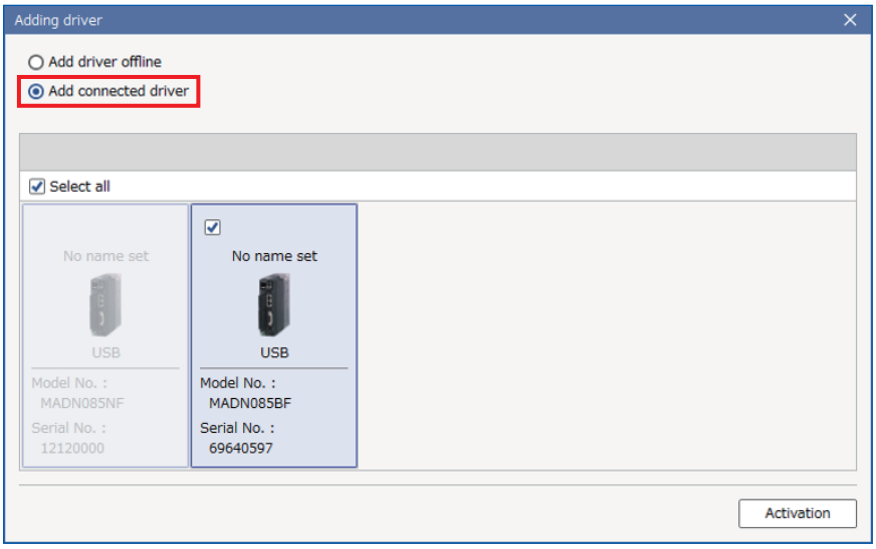
7.2.2 Adding Drivers Online

<< Procedure >>

1. Click the [Add] button in the device tree.

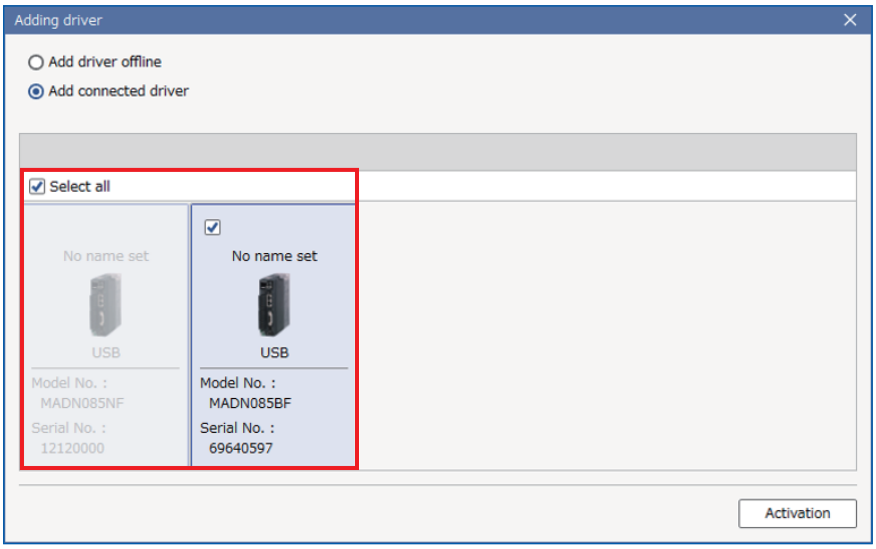
The “Adding driver” dialog box appears.

2. Select “Add connected driver”.

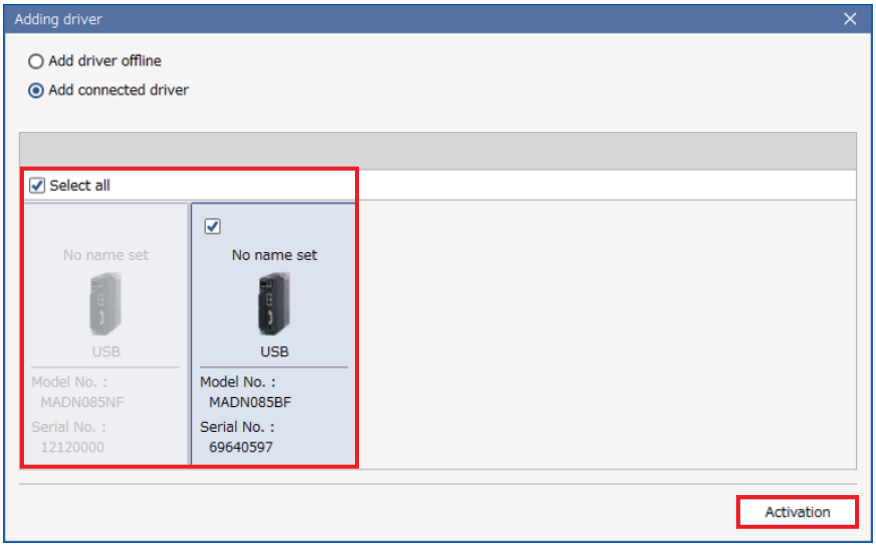


3. Check the box for the driver you wish to add.

Drivers already connected cannot be selected.

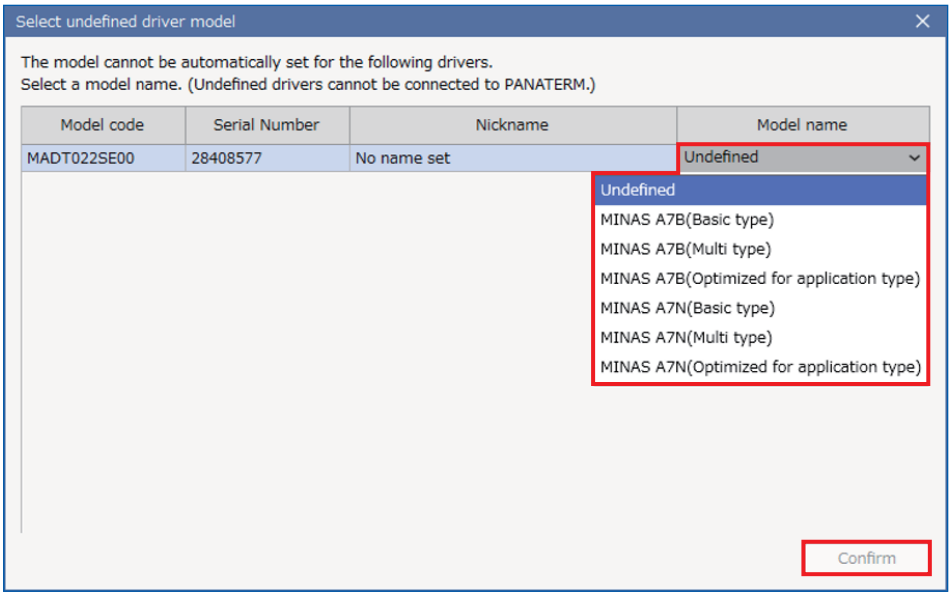


4. Click the [Activation] button.



If the model cannot be determined automatically, the “Select undefined driver model” dialog box appears.

5. If a dialog box appears, select the model name and click the [Confirm] button.



6. A driver is added to the device tree.

7.3 Deleting Drivers

Delete a driver registered in the device tree.

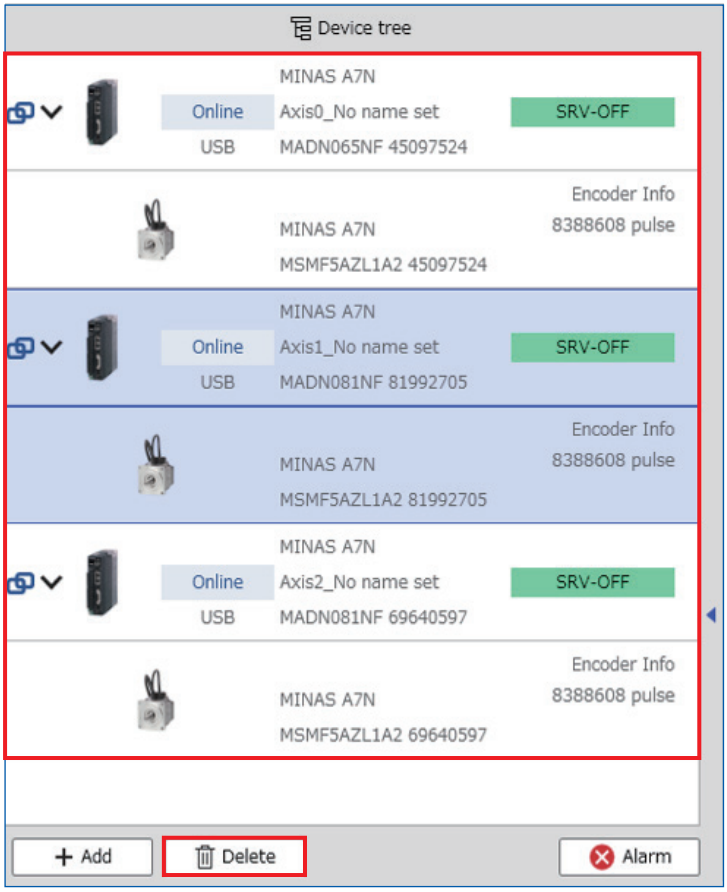
7.3.1 When Multiple Drivers Are Registered

7.3.1.1 Deleting Drivers by Reallocating Axis Nos.

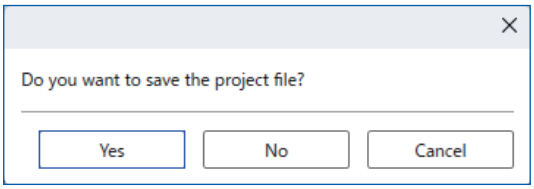
Use to reassign existing axis Nos. with sequential numbers.

<< Procedure >>

1. After selecting the driver to be deleted, click the [Delete] button.

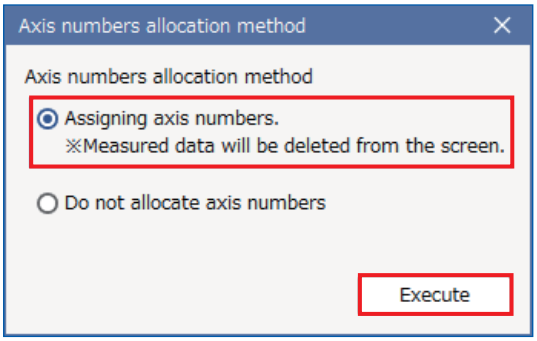


2. A confirmation dialog box for saving the project file appears. Click as indicated.



The “Axis numbers allocation method” dialog box appears.

3. Select “Execute axis No. allocation” and click the [Execute] button.



If the selected driver is deleted from the device tree and the axis Nos. of the drivers displayed in the device tree are reassigned starting from 0, the process is complete.

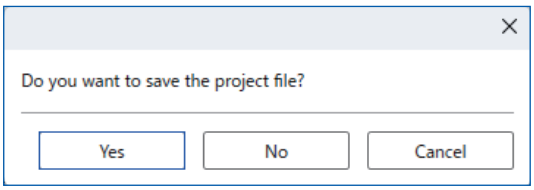
7.3.1.2 Deleting Drivers Without Allocating Axis Nos.

Use this option if you do not want to change the registered axis Nos.

<< Procedure >>

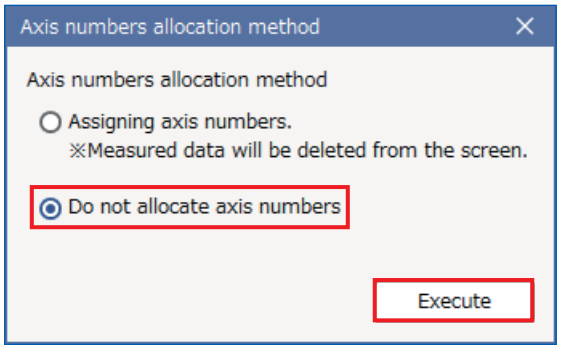
1. After selecting the driver to be deleted, click the [Delete] button.

2. A confirmation dialog box for saving the project file appears. Click as indicated.

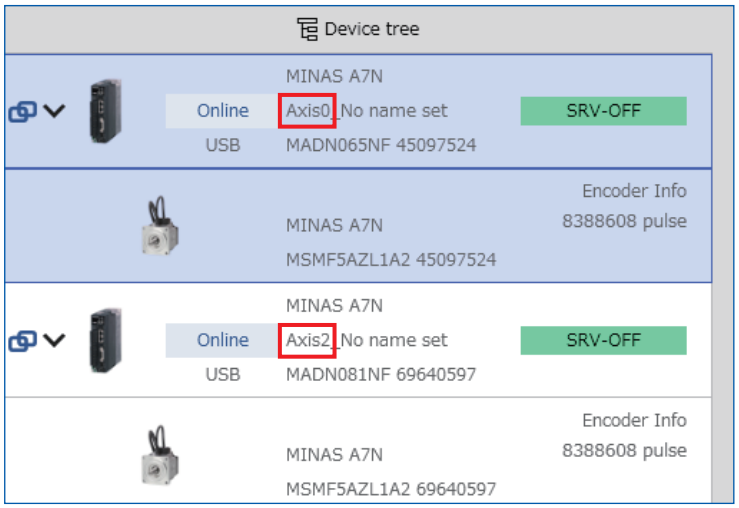


The “Axis numbers allocation method” dialog box appears.

3. Select “Do not allocate axis numbers” and click the [Execute] button.



If the selected driver is deleted from the device tree and the axis Nos. of the drivers displayed in the device tree are the same as before deletion, the process is complete.

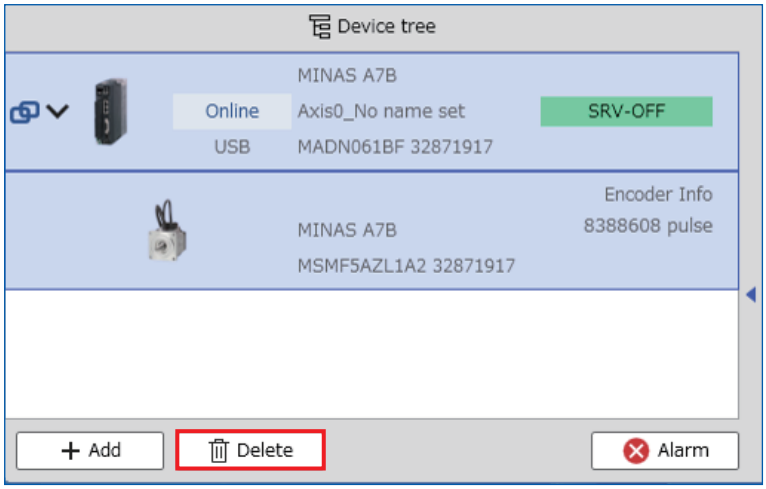


7.3.2 When Only One Driver Is Registered

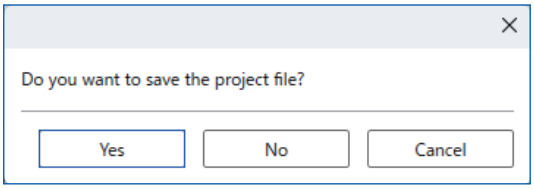
7.3.2.1 Deleting Drivers

<< Procedure >>

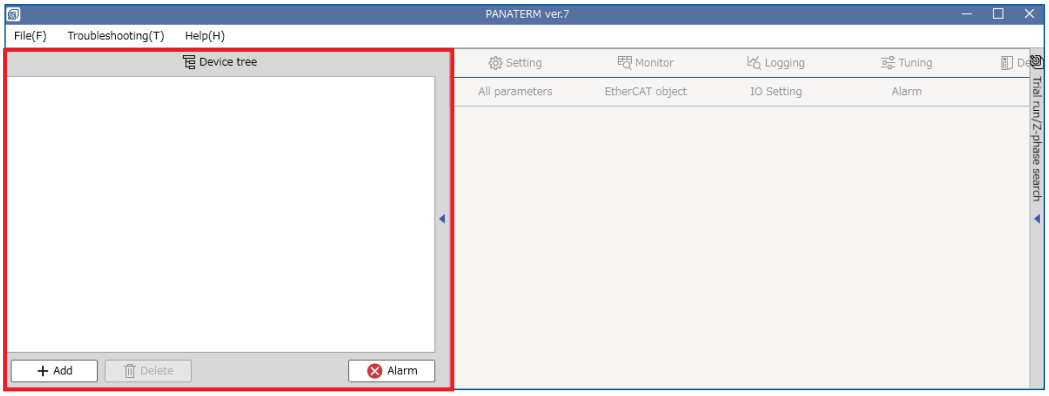
1. After selecting the driver to be deleted, click the [Delete] button.



2. A confirmation dialog box for saving the project file appears. Click as indicated.



3. The driver is deleted and not a single driver is registered in the device tree.



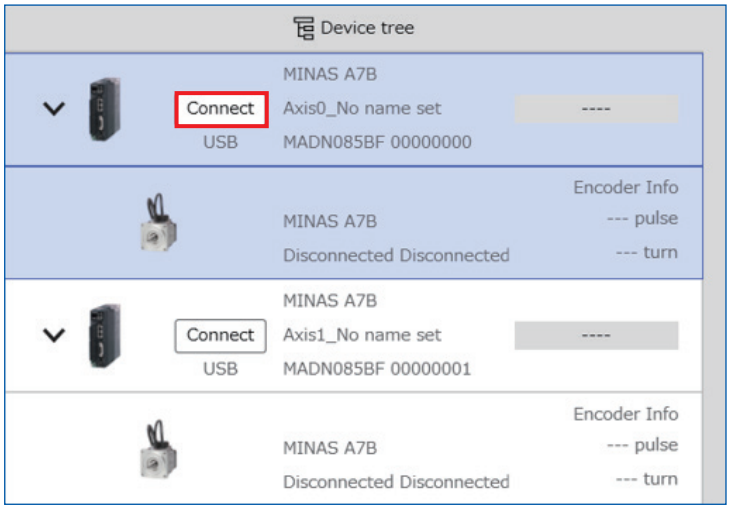
When adding or connecting a new driver, refer to *"6.2.1.5 Connect with driver (R)"* and *"7.2 Adding Drivers"* .

7.4 Connection Method

This section describes how to connect to a computer when the driver is not connected to the computer (offline).

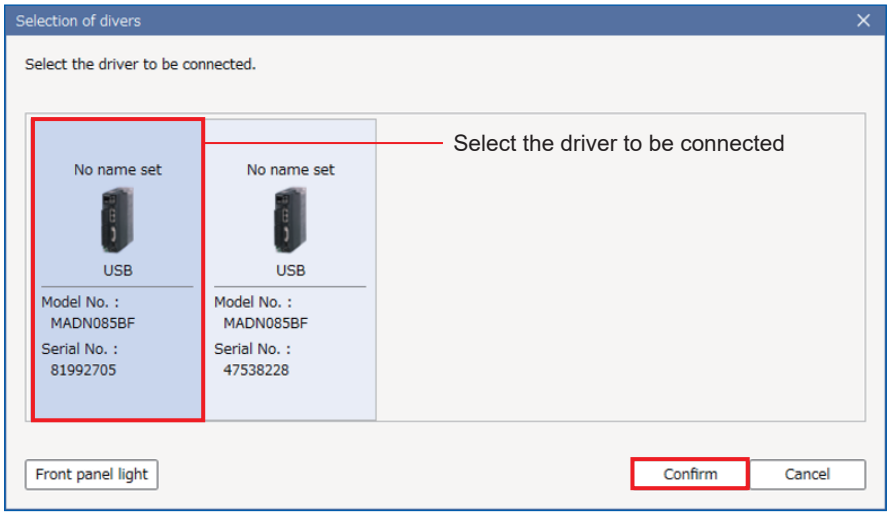
<< Procedure >>

1. Click the [Connect] button in the device tree.



The “Select driver” dialog box appears.

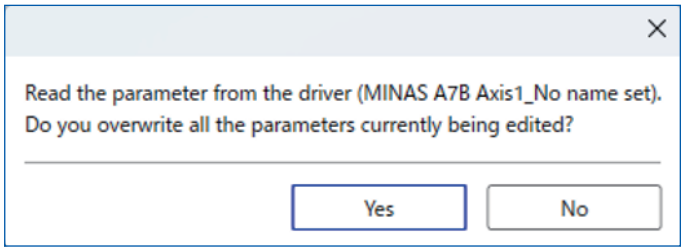
2. After selecting the driver to be connected, click the [Confirm] button.



Notes

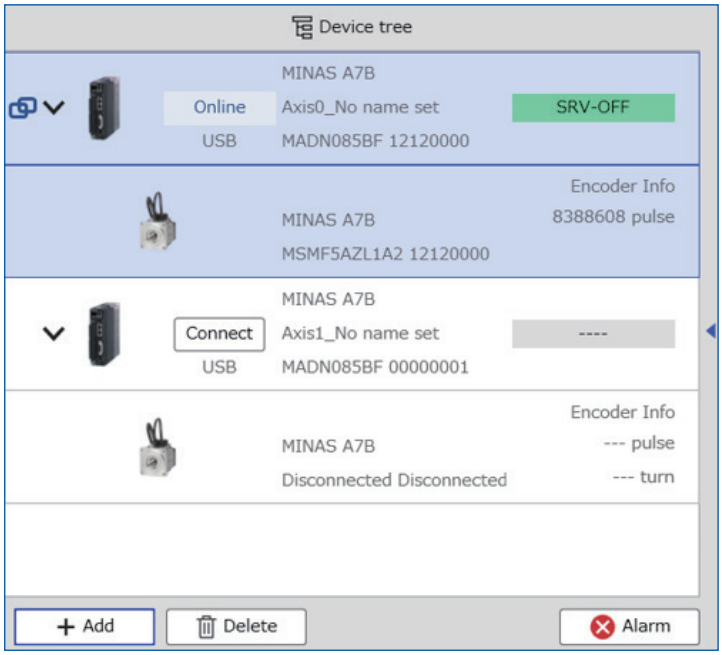
- Of the drivers connected to the computer, only drivers with the same product number as the driver selected in the device tree are displayed.
- If there is no driver available for connection, “Searching” is displayed.

3. Click the button as indicated in the dialog box.



For details, see *"8.11.4 Reading Parameters After Connecting the Driver"* .

4. Once connection is complete, the device tree displays the driver status and information.



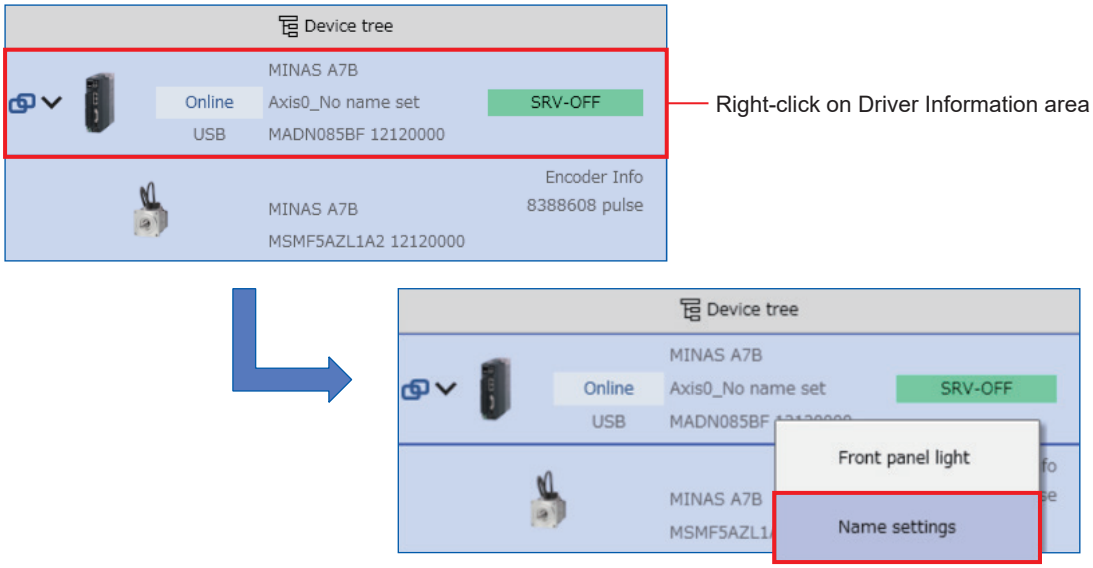
For details of the connected driver/motor information provided, including how to read the connection status icons, see *"7.1 Configuration of the Device Tree Screen"* .

7.5 Setting Nicknames

You can set nicknames for drivers.

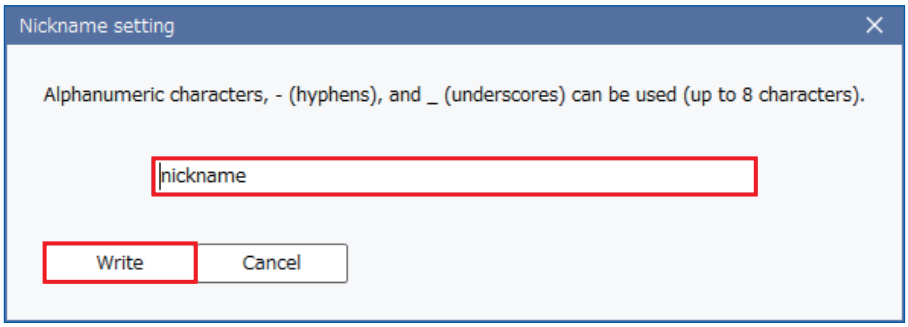
<< Procedure >>

1. Right-click on the driver information area of the device tree and select “Name Settings” from the context menu.



This displays the “Nickname Settings” dialog box.

2. Enter a nickname and click the [Write] button.



- Nicknames can be up to 8 characters in length and can contain alphanumeric characters as well as “-” and “_”.
- If a nickname is unset, the space is blank, but if a nickname has been set, the set nickname is displayed.

3. The nickname set is displayed in the device tree.

– Precautions –

- If the nickname setting is blank, “Name not set” is displayed.
- If the driver is connected to a computer, the nickname is also written to the driver.

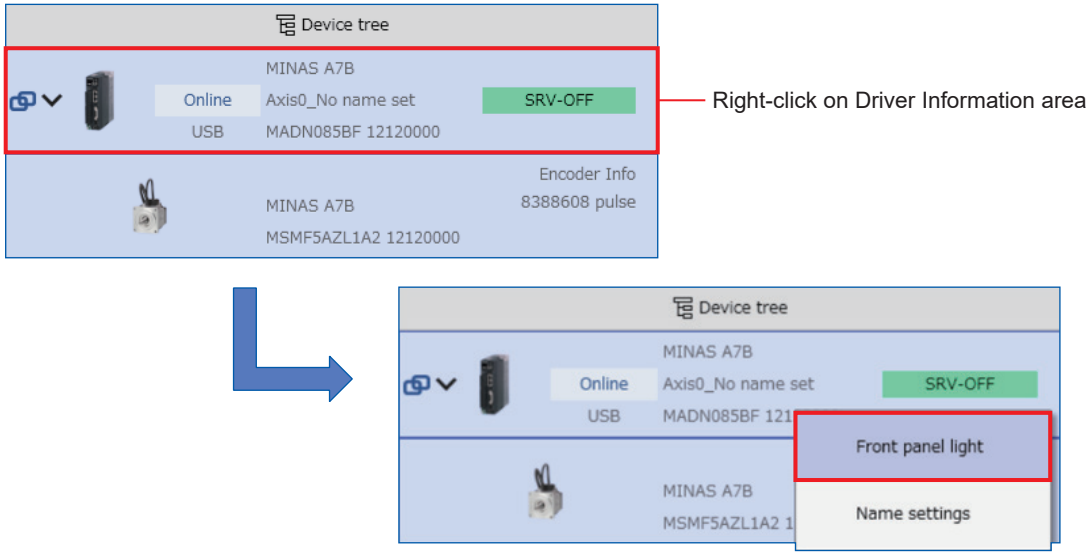
7.6 Lighting Up the Driver Front Panel

The front panel (LED) of the selected driver can be lit from the context menu in the driver information area of the device tree or from the “Select driver” dialog box. The front panel lights up to identify the driver currently selected in Set-up Support Software (PANATERM ver.7) .

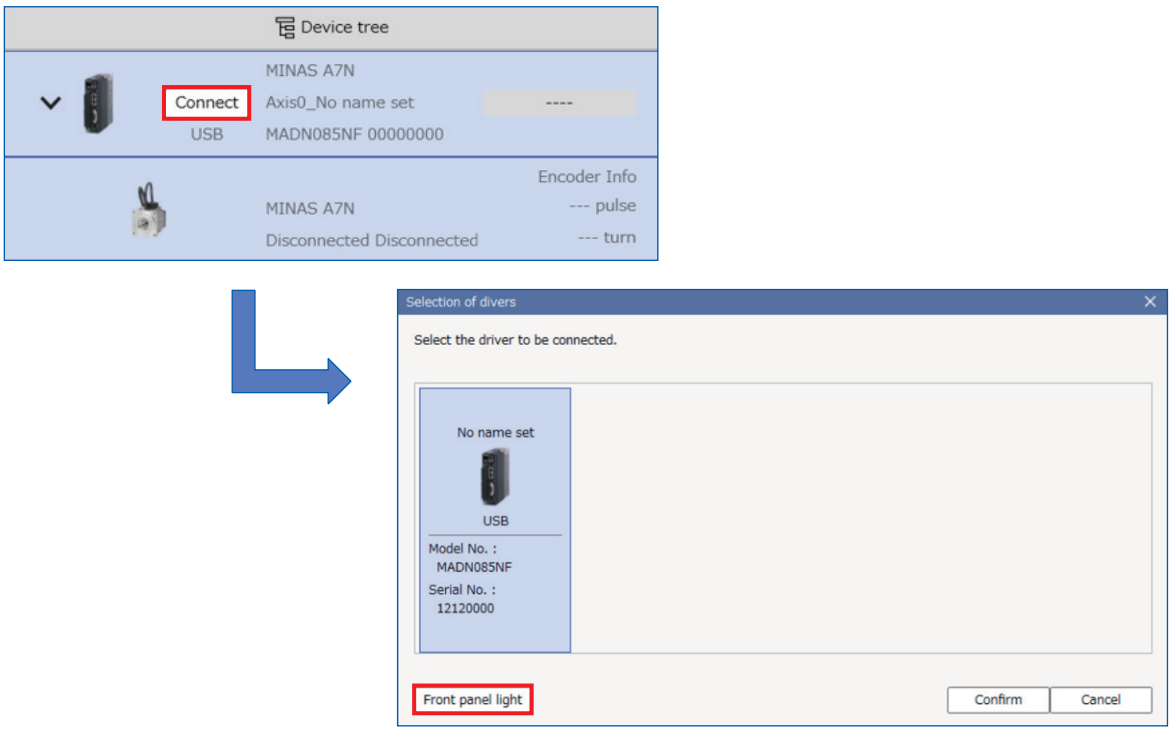
Notes

- The light turns off automatically after about 5 seconds.

■ Lighting up the front panel from the context menu



■ Lighting up the front panel from the “Select driver” dialog box



- “uS” is displayed in the 7-segment LED on the front panel of the driver.

7.7 Battery refresh

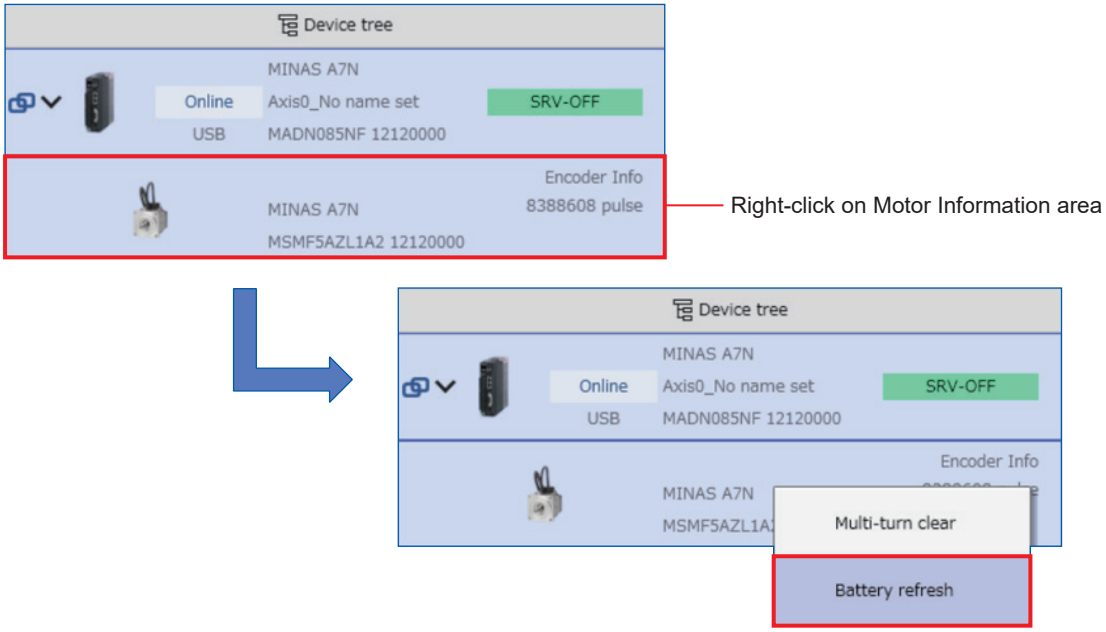
If the battery (battery for absolute encoder) is not discharged continuously, a battery alarm may be triggered. Perform the battery refresh process (forced discharge) to prevent this from happening.

The battery refresh process is required in cases such as the following:

- When replacing with a new battery
- When operating after a period of inactivity

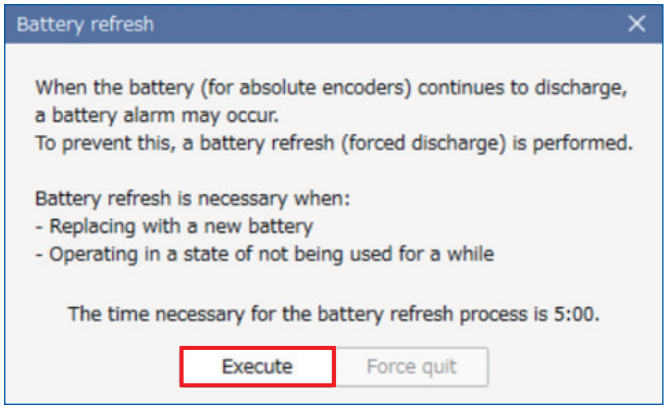
<< Procedure >>

1. Right-click on the motor information area of the device tree and select “Battery Refresh” from the context menu.



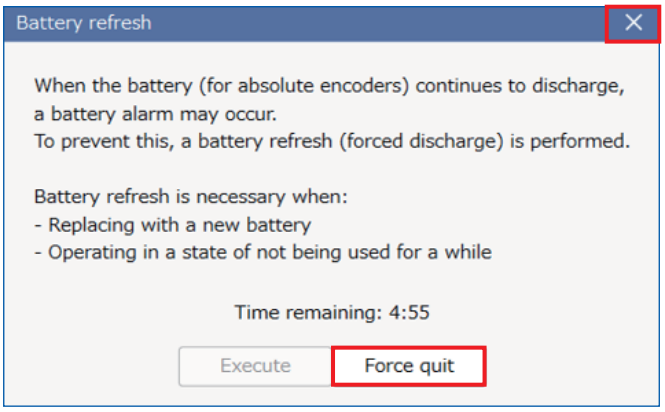
The Battery Refresh dialog box appears.

2. Click the "[Execute]" button.



The remaining time for the battery refresh process will start counting down.

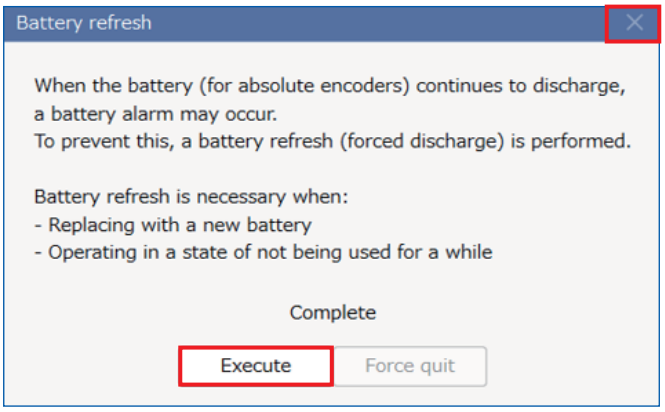
3. The battery refresh process starts.



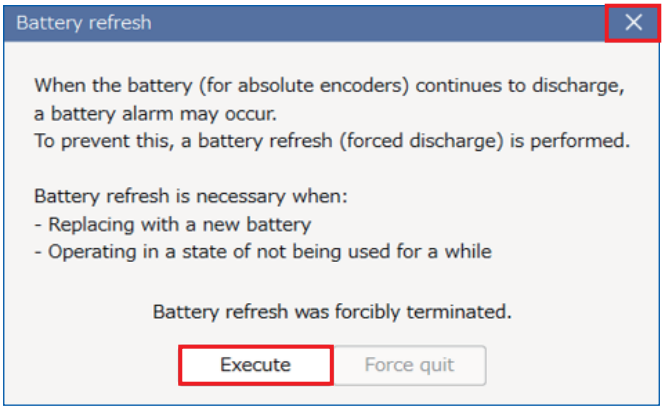
For clicking the [Force Quit] button during the battery refresh process, see"Step 5". For clicking the [×] button, see"Step 6".

4. The following screen will appear once the battery refresh process is complete.

Click the [Execute] button to refresh the battery again, or click the [×] button to exit.



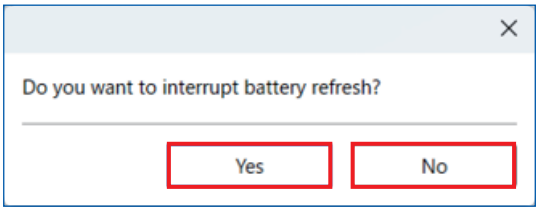
5. Clicking the [Force Quit] button during the battery refresh process forcefully terminates the battery refresh process. Click the [Execute] button to refresh the battery again, or click the [×] button to exit.



6. Clicking the [×] button during battery refresh displays a dialog box.

Clicking the [Yes] button will cancel the battery refresh process and return you to main screen operations.

Clicking the [No] button will return you to main screen operations while the battery refresh process continues.



— Precautions —

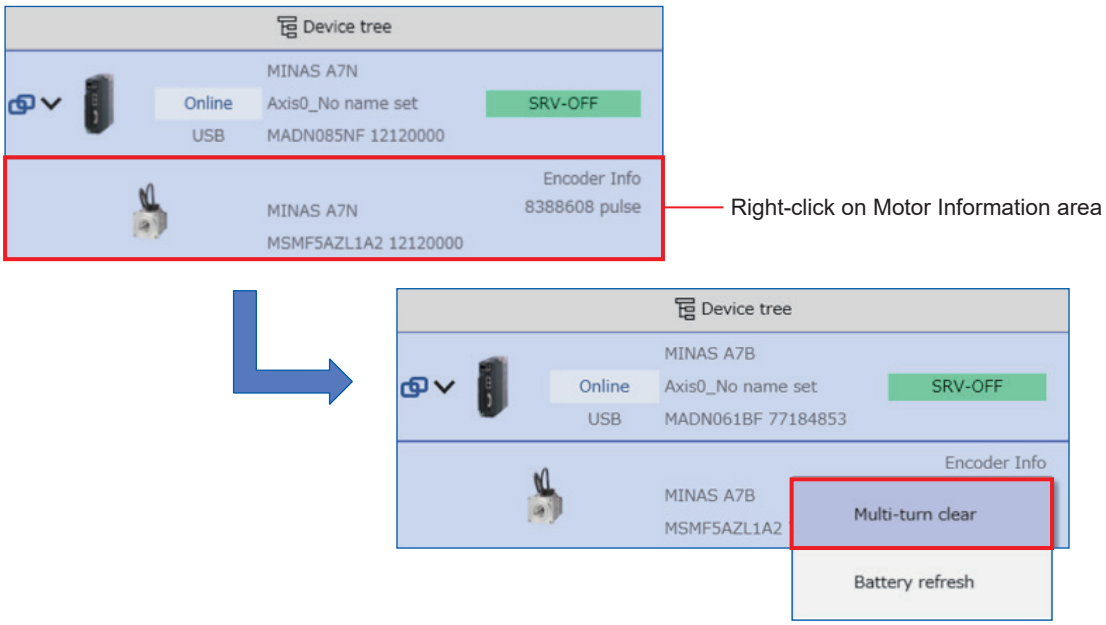
- The battery refresh process is not available for batteryless or incremental encoders.
- The battery refresh process cannot be used in full-closed control mode.
- Be aware that a battery alarm may be triggered. during the battery refresh process.

7.8 Multi-turn Clear

Clear the multi-turn data stored in the encoder to “0” from the context menu of the motor information area in the device tree. This operation clears all encoder errors.

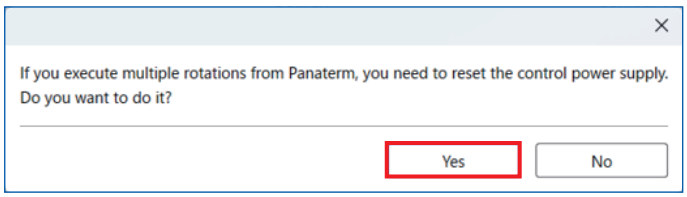
<< Procedure >>

1. Right-click on the driver information area of the device tree and select “Multi-turn clear” from the context menu.



A confirmation dialog box appears.

2. Click the [Yes] button.



Executes multi-turn clear.

— Precautions —

- After executing multi-turn clear, control power must be restarted. Also, it may be necessary to restore power to the driver to clear encoder errors.

7.9 Alarm Notification Screen

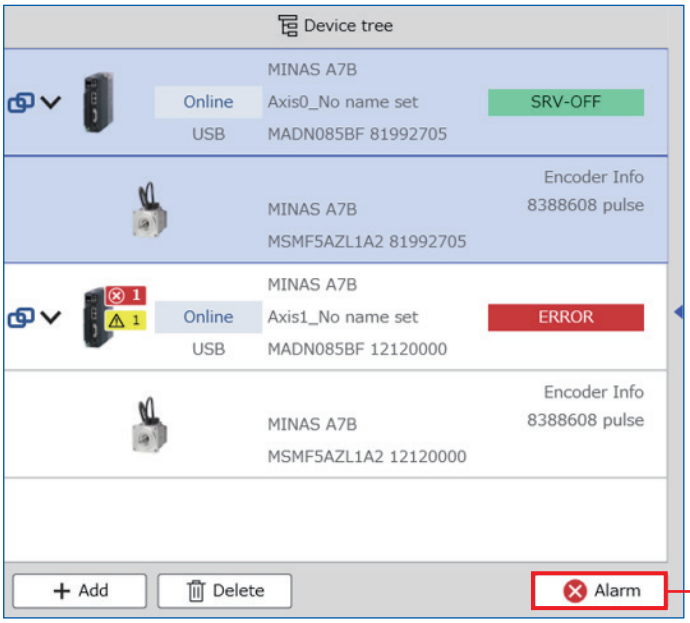
If the LED on the front panel of the driver is blinking, for example, because the motor is not running, you can check the alarm status.

This screen also displays the error log saved in the driver.

<< Procedure >>

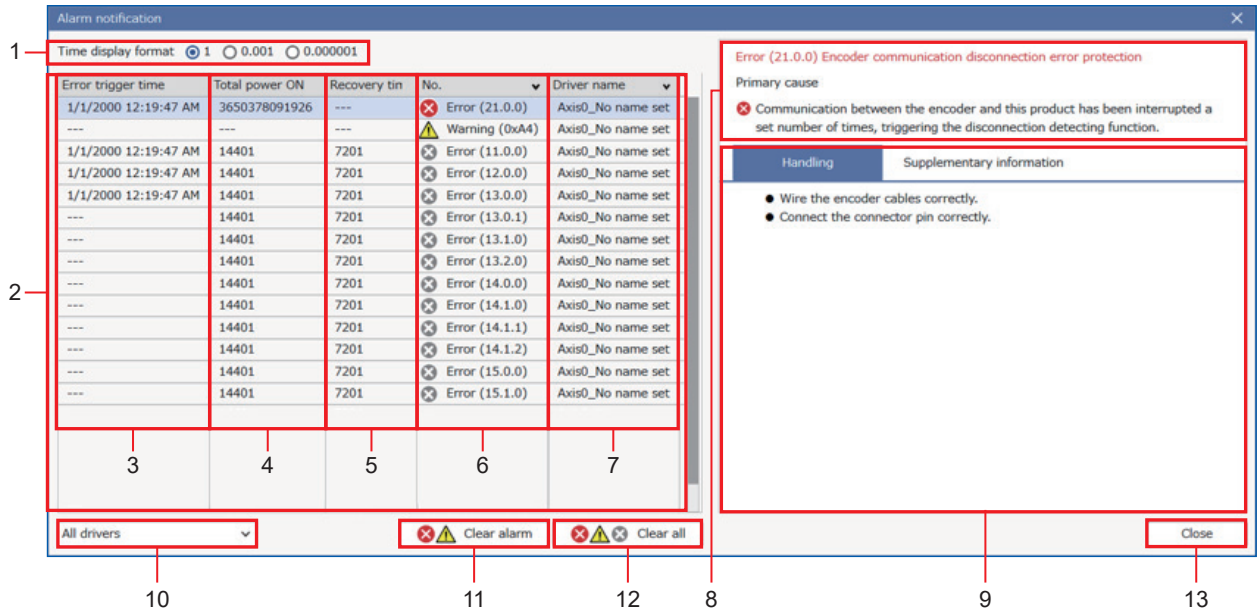
1. Click on the driver image in the device tree.

2. Click the [Alarm] button in the device tree.



The alarm notification screen is displayed.

7.9.1 Configuration of the Alarm Notification Screen



No.	Name	Description	Reference
1	Time display format	Switch between no decimal point, three decimal places, and six decimal places.	—
2	Alarm display area	Displays the time when the alarm was triggered, the total power ON time, the alarm number, and the name of the driver that triggered the alarm.	—
3	Error trigger time	Displays the time when the error was triggered as a timestamp. If the error trigger time cannot be acquired, "---" is displayed. The error trigger time is displayed when all of the following conditions are met. ● Alarm triggered while connected to Set-up Support Software (PANATERM ver.7) or any host device ● Current alarm or three most recent error log incidences	—
4	Total power ON time	Displays the total power ON time (total time in seconds since the driver was first turned on after leaving the factory).	—
5	Recovery time	Displays the time taken to recover from error as power ON total time.	—
6	Alarm number	Displays the error log Nos. for errors and warnings currently triggered.	*"7.9.2"*
7	Driver name	The name of the driver that triggered the alarm is displayed.	—
8	Error primary cause display area	Displays the primary cause of the alarm selected in the alarm display area.	—
9	Handling information and supplementary information display area	Displays handling methods and supplementary information for the selected alarm in the alarm display area. Select a tab to toggle the display of handling methods and supplementary information. Select the "Related Parameters" link in the display of handling methods to close the alarm notification screen and display the relevant parameter section of the All Parameters screen.	—
10	Driver selection box	Select the target drivers for alarm clearing.	—
11	Clear alarm	This button clears currently triggered errors and warnings.	*"7.9.3"*
12	Clear all	This button clears currently triggered errors and warnings as well as the error log.	*"7.9.4"*
13	Close	Closes the alarm notification screen.	—

7.9.2 Alarm Icons

The icons displayed on the alarm notification screen are as follows.

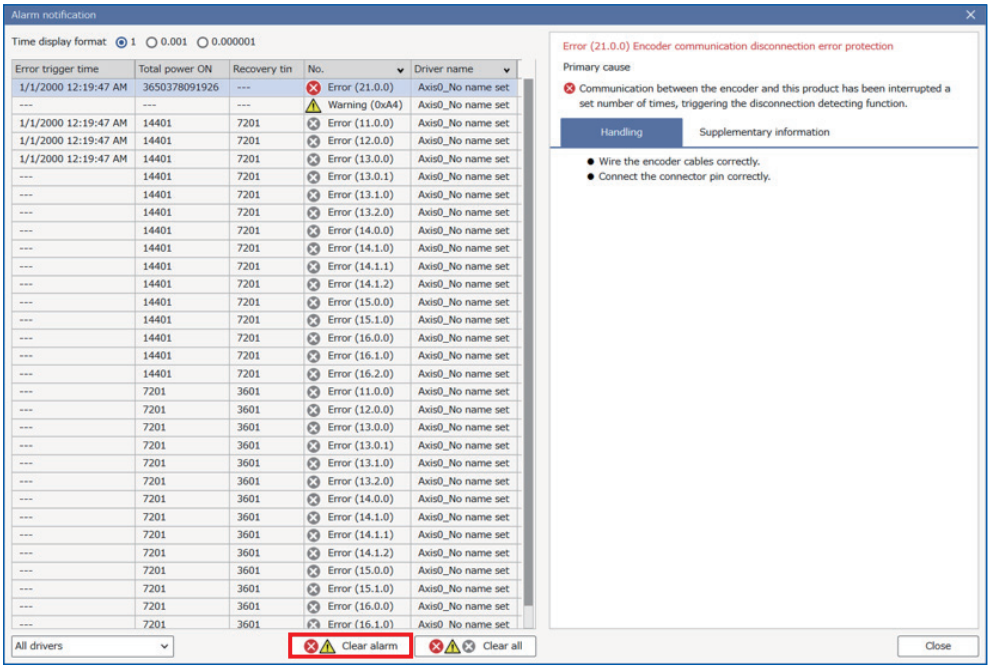
Display	Status	Description
	Error	Driver protection function
	Warning	Warning function triggered before the driver protection functions operate
	Error log	Log of errors triggered in the past. Warnings are not displayed.

7.9.3 Clearing Alarms

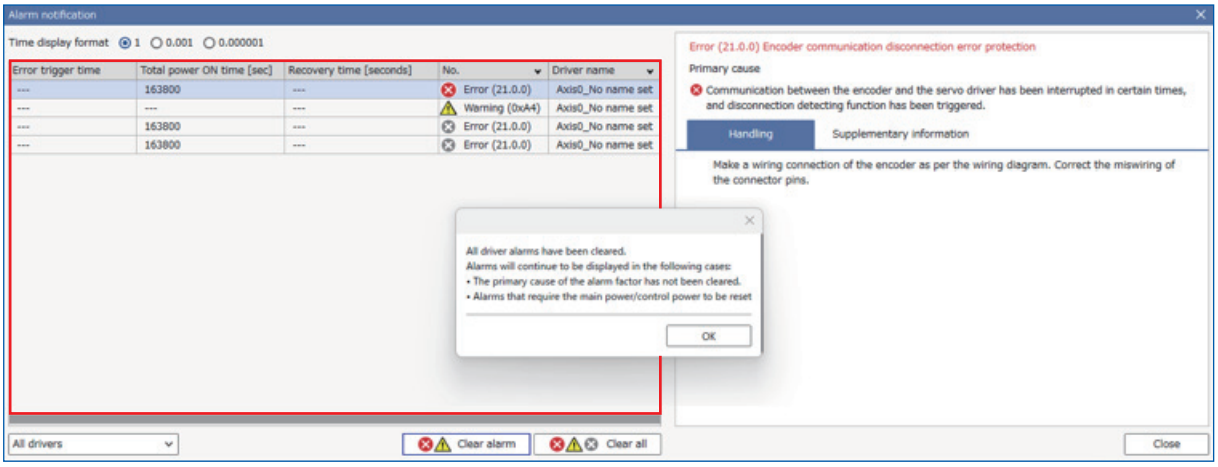
After removing the cause, executing alarm clear deletes current alarms and the status is returned to normal.

<< Procedure >>

1. On the alarm notification screen, click the [Clear alarm] button.



2. This clears any alarms that are triggered.



— Precautions —

- Some alarms cannot be cleared by operation from Set-up Support Software (PANATERM ver.7) .

In this case, turn off the driver, remove the cause, and then turn the driver on again.

- When the driver external alarm clear input signal is on, the alarm cannot be cleared with the [Clear alarm] button on Set-up Support Software (PANATERM ver.7) .

  To clear the alarm from Set-up Support Software (PANATERM ver.7) , turn off the driver external alarm clear input signal beforehand.

  The external alarm clear input signal is a function of models that support EtherCAT communication.

  Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model.

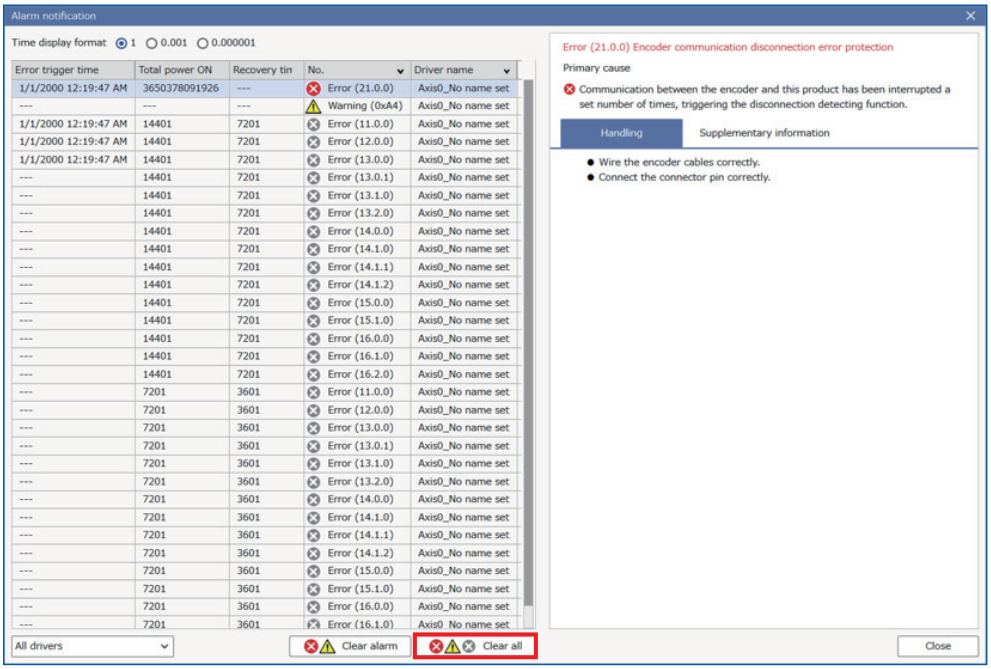
  - A7B: Operating Instructions (Overall)
  - A6B: Technical Reference Functional Specification

7.9.4 Clearing Alarms and the Error Log

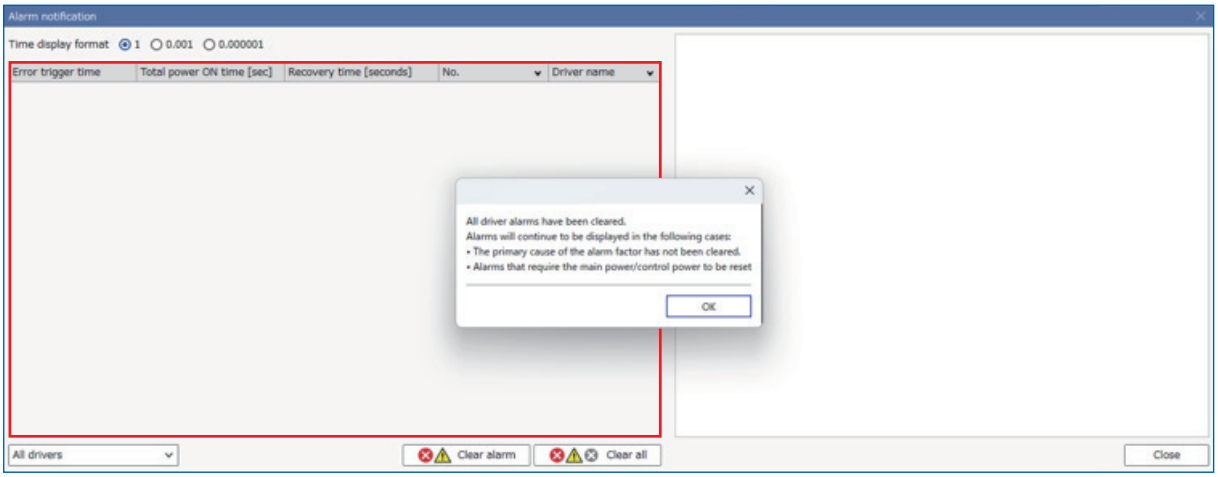
Error logs can be cleared at the same time as alarm clearing.

<< Procedure >>

1. On the alarm notification screen, click the [Clear all] button.



2. This clears any alarms and error logs that are triggered.



— Precautions —

- Some alarms cannot be cleared by operation from Set-up Support Software (PANATERM ver.7) .

  In this case, turn off the driver, remove the cause, and then turn the driver on again.

- When the driver external alarm clear input signal is on, the alarm cannot be cleared with the [Clear alarm] button on Set-up Support Software (PANATERM ver.7) .

  To clear the alarm from Set-up Support Software (PANATERM ver.7) , turn off the driver external alarm clear input signal beforehand.

  The external alarm clear input signal is a function of models that support EtherCAT communication.

  Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model.

  - A7B: Operating Instructions (Overall)
  - A6B: Technical Reference Functional Specification

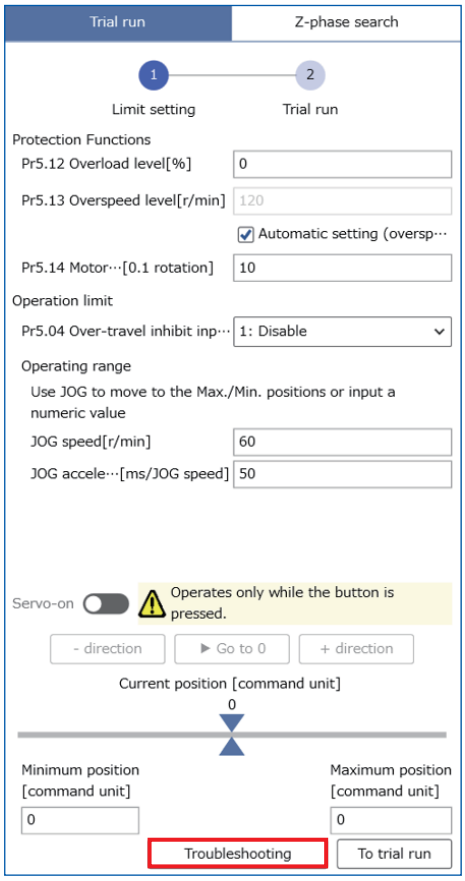
7.10 Troubleshooting

Troubleshooting displays possible causes of errors and how to deal with them.

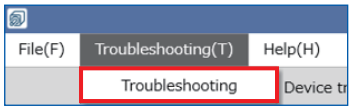
<< Procedure >>

1. Click the [Troubleshooting] button in the “Trial run” tab, or select **Troubleshooting (T)>Troubleshooting** from the menu bar.

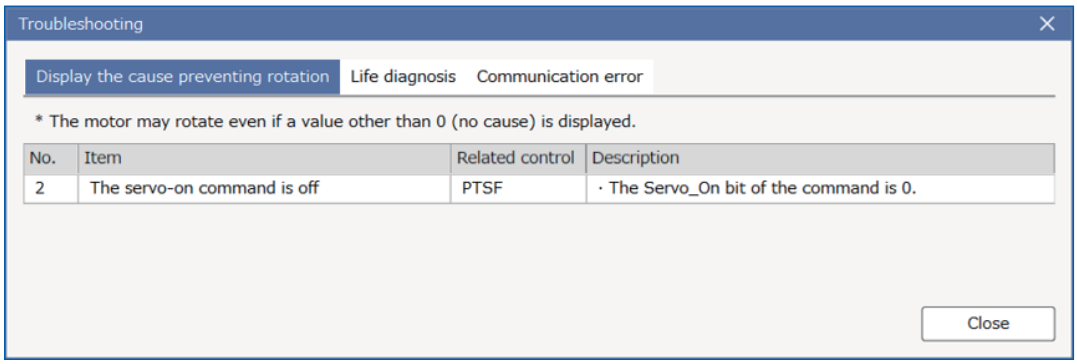
Trial Run tab



Menu bar



2. The “Troubleshooting” screen is displayed.

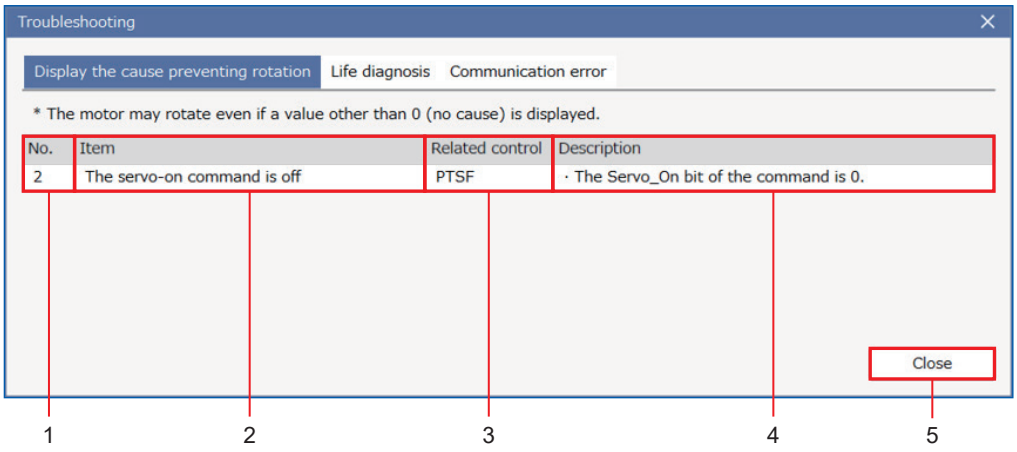


Tab display varies by series.

7.10.1 Configuration of the Troubleshooting Screen

7.10.1.1 Factors That Prevent Rotation

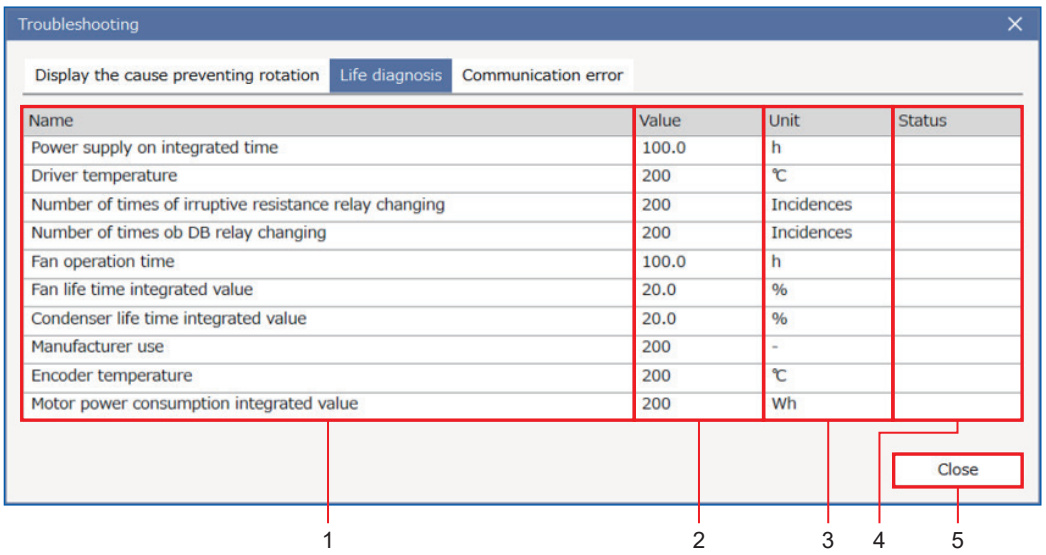
■ **Display the cause preventing rotation tab (only visible when online)**



No.	Name	Description	Reference
1	No.	Displays the item No. for the factor preventing rotation.	—
2	Item	Displays the item name for the factor preventing rotation.	—
3	Related control mode	Displays the related control mode. P: Position Control S: Velocity Control T: Torque Control F: Full-closed Control	—
4	Description	Displays details of the factor preventing rotation.	—
5	Close	Exits Troubleshooting.	—

7.10.1.2 Life Diagnosis

■ **Life diagnosis tab**

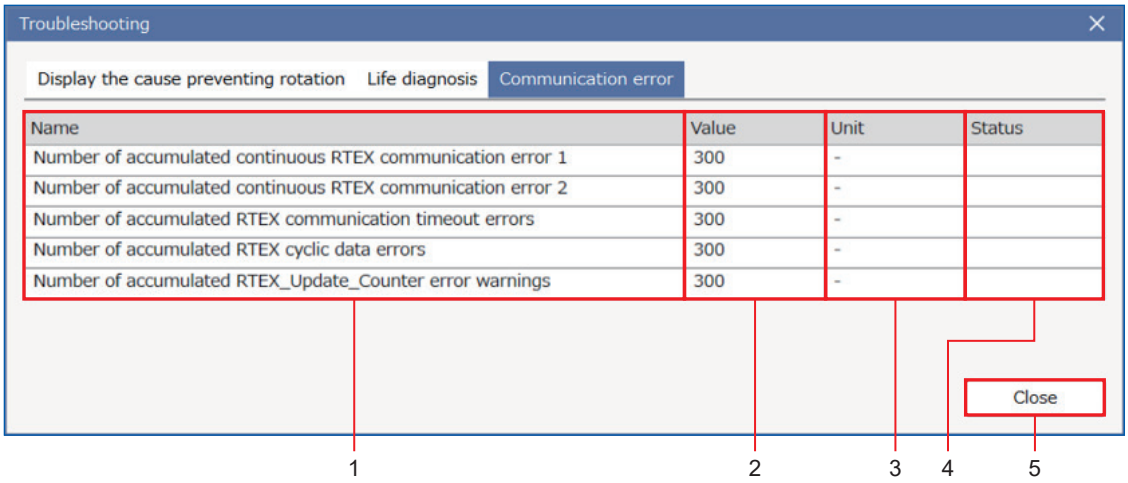


No.	Name	Description	Reference
1	Name	Displays the name of the driver life diagnosis information.	—

No.	Name	Description	Reference
2	Value	Displays the value for the driver life diagnosis information.	—
3	Unit	Displays the unit.	—
4	Status	Depending on the life diagnosis information, the level of the judgment result is indicated with a color in the status column. Driver communication status / Value / Color Online / Exceeds dangerous value / Red Online / Exceeds warning value / Yellow Online / Normal value / Green Offline / — / White	—
5	Close	Exits Troubleshooting.	—

7.10.1.3 Communication Errors

■ **Communication error tab (displayed only when a RTEX communication-type driver is connected (online))**



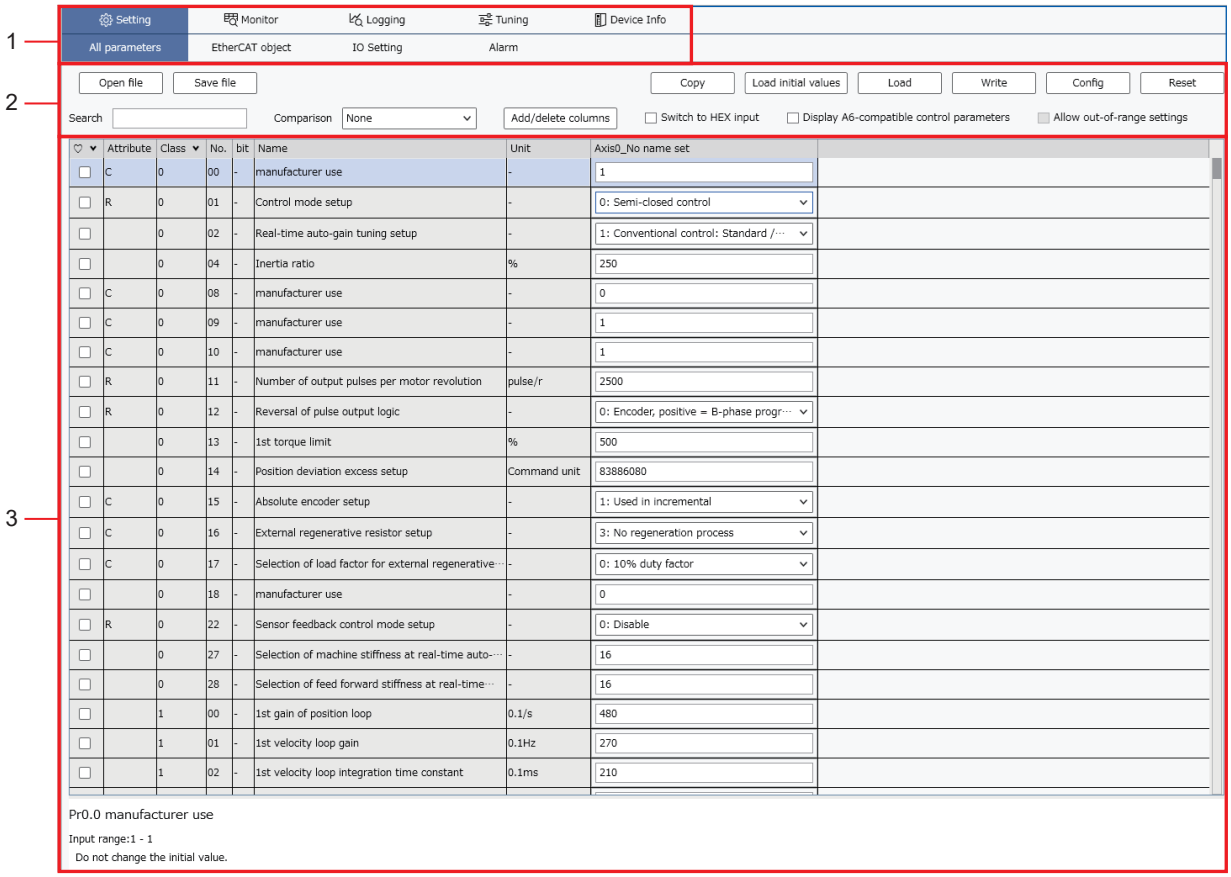
No.	Name	Description	Reference
1	Name	Displays the name of the RTEX communication error.	—
2	Value	Displays the cumulative number of times a communication error has occurred for each item.	—
3	Unit	Displays the unit	—
4	Warning value	Depending on the communication error information, the level of the judgment result is displayed in color in the status column. Driver communication status / Value / Color Online / Exceeds dangerous value / Red Online / Exceeds warning value / Yellow Online / Normal value / Green Offline / — / White	—
5	Close	Exits Troubleshooting.	—

8 Settings Screen

8.1 Configuration of the Settings Screen

You can use the Settings Screen for parameter-related operations, such as editing parameters, sending parameters to drivers, and reading parameters from drivers. Select the tab for the category you wish to configure and set the parameters. The category tabs displayed depends on the type of driver communication.

8.1.1 Settings Screen

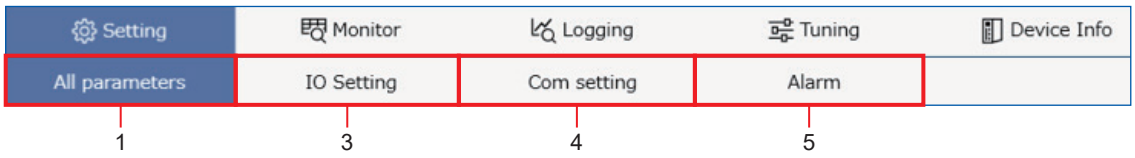


No.	Name	Description	Reference
1	Category selection	Click on a category to display the screen for that category.	*"8.1.2"*
2	Common settings	For operations related to parameters, such as reading and writing parameters.	*"8.1.3"*
3	Tab-related display area	Displays the screen related to the selected tab.	*"8.11 All parameters"* *"8.12 EtherCAT Objects"* *"8.13 IO Settings"* *"8.14 Com setting"* *"8.15 Alarm"* *"8.16 Analog Input"*

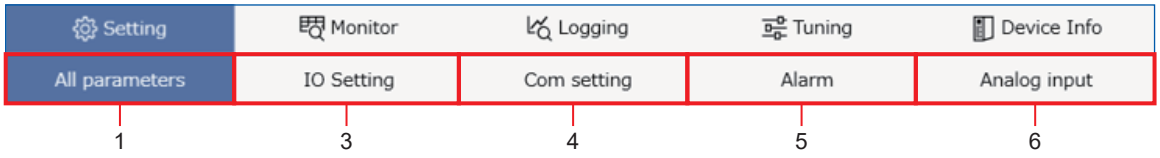
8.1.2 Category Display

The category selection screen displayed depends on the type of driver.

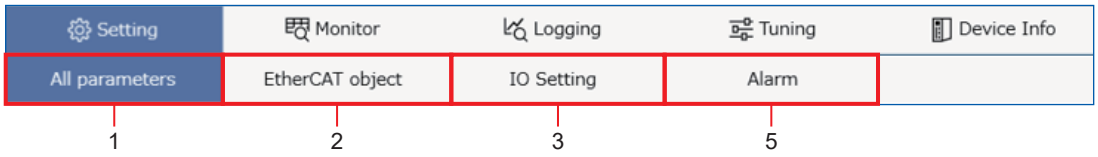
RTEX communication type category selection screen



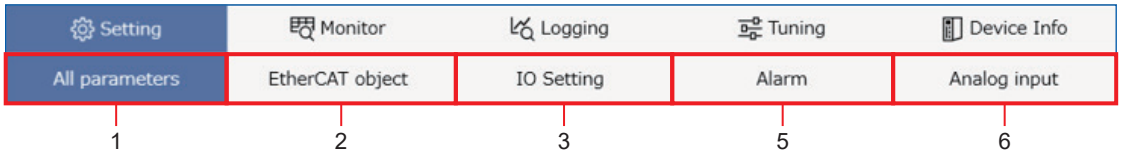
RTEX communication type (analog input compatible) category selection screen



EtherCAT communication type category selection screen



EtherCAT communication type (analog input compatible) category selection screen



Click on a tab in the category display to display the screen for the selected tab.

No.	Name	Description	Reference
1	All parameters	Set the parameters from the list of Class 0 to Class 15 parameters that can be set for the selected driver.	*"8.11"*
2	EtherCAT object	Check and edit parameter settings for EtherCAT objects. This is displayed when a EtherCAT communication-type driver is selected.	*"8.12"*
3	IO Settings	Set input/output pin assignment settings and parameters related to general-purpose input/output.	*"8.13"*
4	Com setting	Set parameters related to driver communication settings. This is displayed if a RTEX communication-type driver is selected.	*"8.14"*
5	Alarm	Set parameters related to alarms.	*"8.15"*
6	Analog input	Set parameters related to analog input. This is displayed when selecting the application specialized type driver for analog input.	*"8.16"*

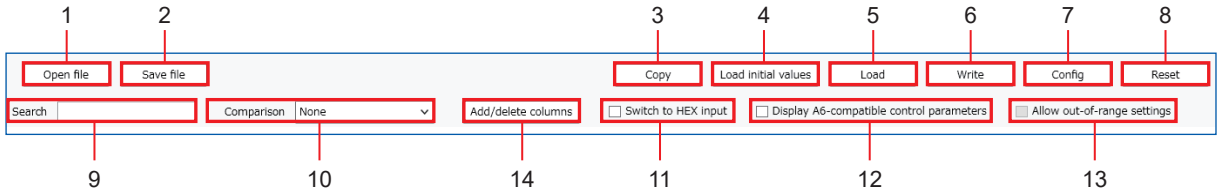
Notes

- Multiple drivers can be edited simultaneously in the "EtherCAT object" tab only when a EtherCAT communication-type driver is selected in the device tree.

8.1.3 Common Settings

Common settings are for operations related to parameters, such as reading and writing parameters.

The buttons displayed for each category are different.



No.	Name	Description	Reference
1	Open file	Open an existing parameter file.	*"8.2"*
2	Save file	Save a parameter file.	*"8.3"*
3	Copy	Overwrites the parameters of the driver or file selected by the user with the on-screen parameters of the specified driver. Parameter changes made by this operation are not written to the driver. Select the [Write] button to write.	*"8.4"*
4	Load initial values	Overwrites the initial parameter values set inside the driver with the parameters on the screen. Parameter changes made by this operation are not written to the driver. Select the [Write] button to write.	*"8.5"*
5	Load	Reads all parameters from the driver. This function is enabled only while the driver is connected.	*"8.6"*
6	Write	Sends parameters to a driver. This function is enabled only while the driver is connected.	*"8.7"*
7	Config	Sends a command to the driver to enable certain parameters. This function is enabled only while the driver is connected.	*"8.8"*
8	Reset	Performs software reset.	*"8.9"*
9	Search	Only parameters that contain the keywords entered in the text box are displayed. Used in the "All parameters" tab or in the "EtherCAT object" tab.	*"8.11.2"* *"8.12.4"*
10	Comparison	Select the method for comparing parameters.	*"8.11.3"* *"8.12.5"*
11	Switch to HEX input	Check the box to switch the parameter value and setting value display from decimal to hexadecimal.	—
12	Display A6-compatible control parameters	Check the box to display control parameters compatible with the A6 family. If the box is not checked, all valid control parameters for the A7 family will be displayed.	—
13	Out-of-range settings	Set whether to allow out-of-range settings for parameter setting values when all drivers are offline. Check the box to select that everything can be entered in numerical values, including combo box selections. This function is mainly used to perform special inspections.	—
14	Add/delete column	Add and delete axes to be displayed in the "Parameter/Object Display Area by Driver".	*"8.10"*

— Precautions —

- The Config command cannot be executed while the servo motor is running.
- Some parameters require execution of the Config command to enable the changed settings. Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for information on those parameters. (Applicable parameters are attribute C parameters.)
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- Some parameters require driver power to be restored to enable the changed settings. Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for information on those parameters. (Applicable parameters are attribute R parameters.)
  - A7: Operating Instructions (Overall)

- A6: Technical Reference Functional Specification

8.2 Open File

This is displayed when All parameters or EtherCAT objects is selected.

Loads parameters from a parameter file or an object file.

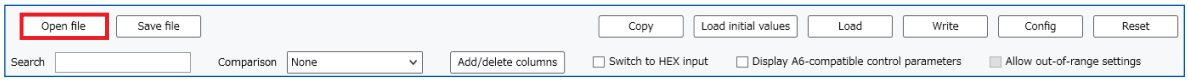
8.2.1 Opening Files

An example of reading parameters from a file is described below.

Objects can be loaded in the same way.

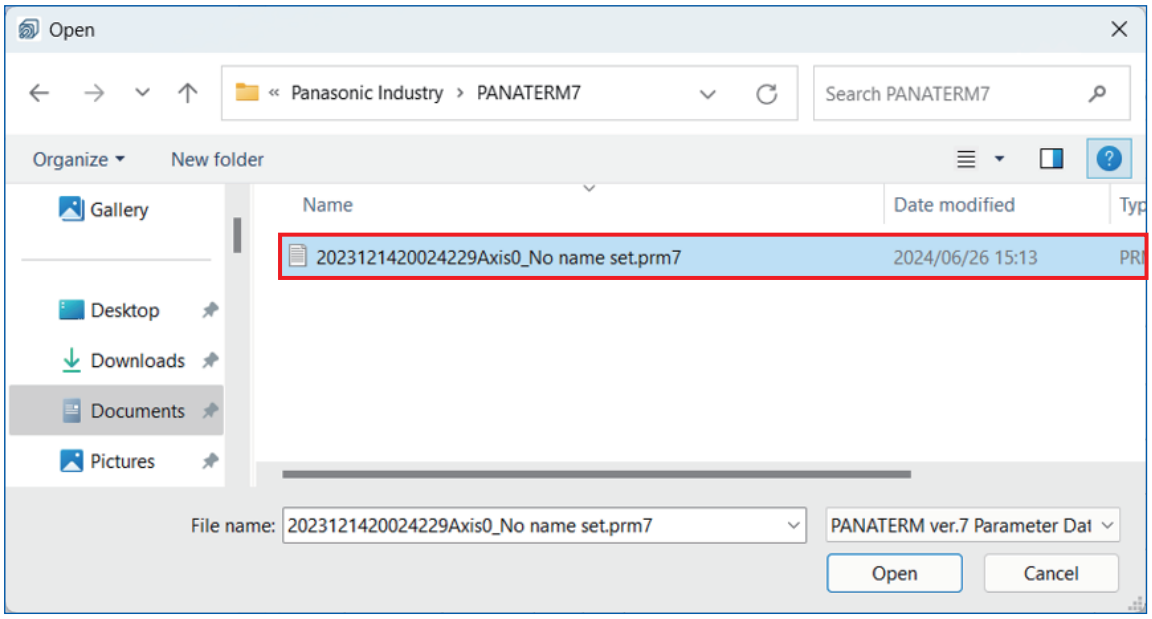
<< Procedure >>

1. Click the [Open file] button.

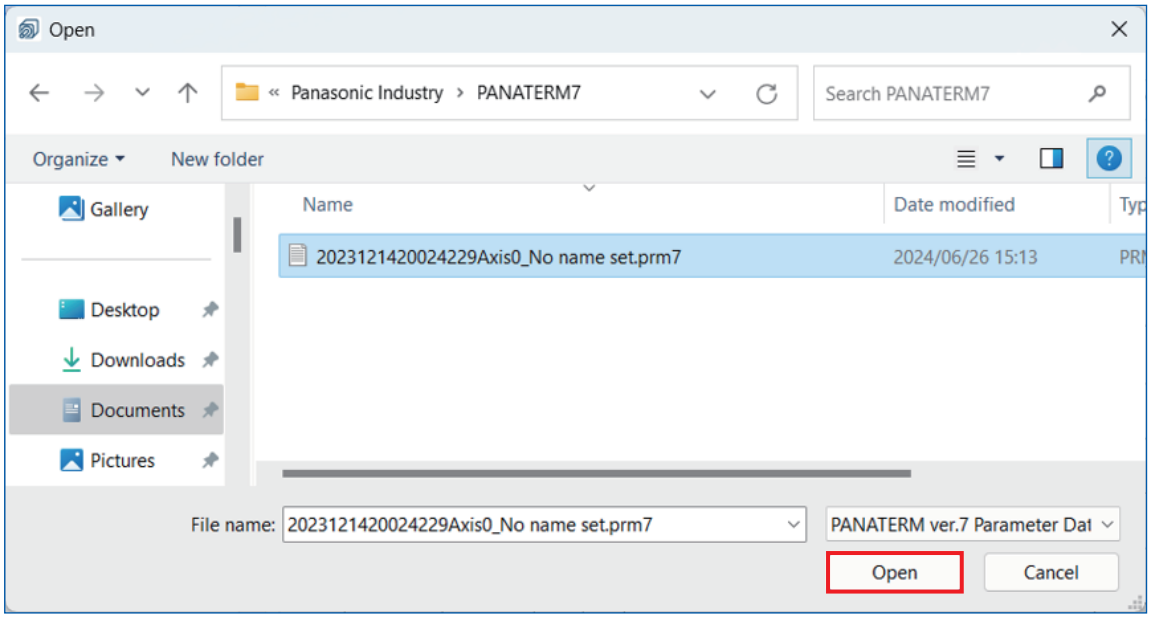


The “Open” dialog box appears.

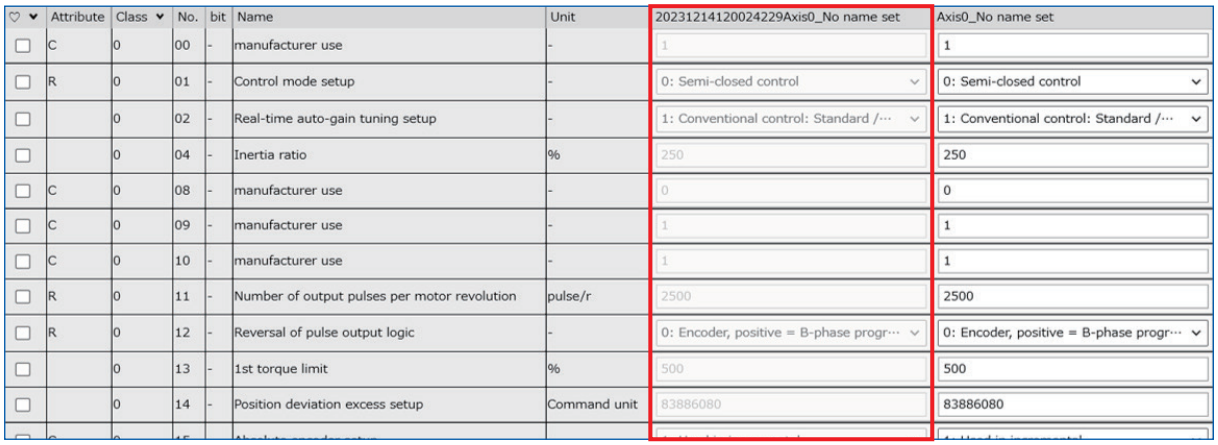
2. Select the parameter file and click the [Open] button.



3. Click the [Open] button.



4. A column is added in the “All parameters” tab as shown below.



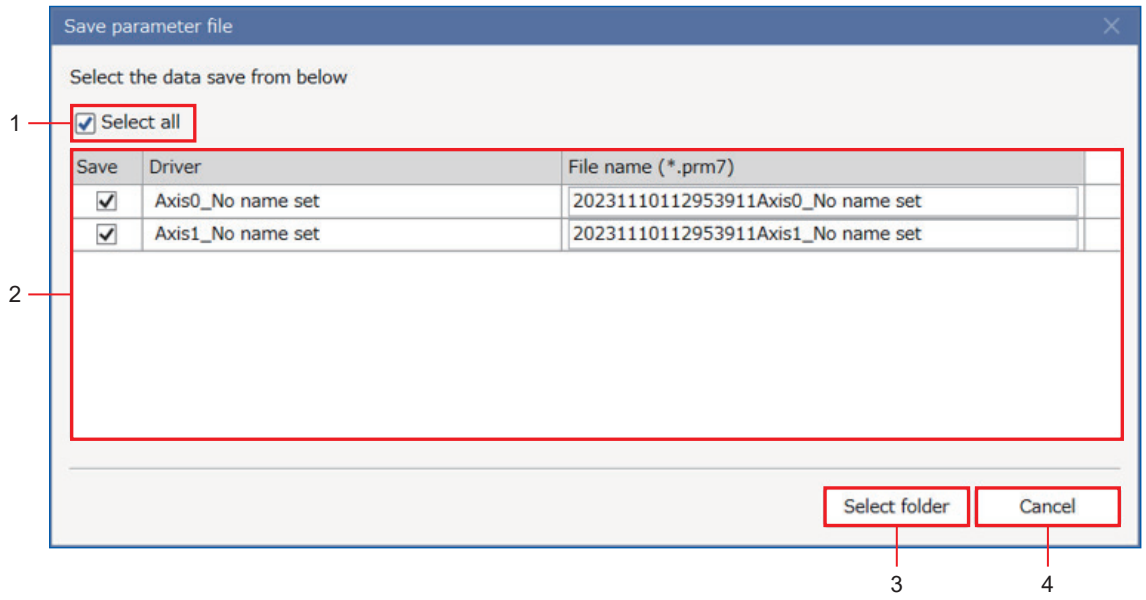
Attribute	Class	No.	bit	Name	Unit	2023121420024229Axis0_No name set	Axis0_No name set
C	0	00	-	manufacturer use	-	1	1
R	0	01	-	Control mode setup	-	0: Semi-closed control	0: Semi-closed control
	0	02	-	Real-time auto-gain tuning setup	-	1: Conventional control: Standard /···	1: Conventional control: Standard /···
	0	04	-	Inertia ratio	%	250	250
C	0	08	-	manufacturer use	-	0	0
C	0	09	-	manufacturer use	-	1	1
C	0	10	-	manufacturer use	-	1	1
R	0	11	-	Number of output pulses per motor revolution	pulse/r	2500	2500
R	0	12	-	Reversal of pulse output logic	-	0: Encoder, positive = B-phase progr···	0: Encoder, positive = B-phase progr···
	0	13	-	1st torque limit	%	500	500
	0	14	-	Position deviation excess setup	Command unit	83886080	83886080

8.3 Saving Files

This is displayed when all parameters or EtherCAT objects is selected.

Saves the selected driver parameters or objects to a file.

8.3.1 Configuration of the Save File Dialog Box



No.	Name	Description	Reference
1	Select all	Check the box to select all target drivers.	—
2	Saved data display area	Display files and drivers to be saved. Or select the data to save.	—
3	Select folder	Select the location to save the file to.	—
4	Cancel	Close the save file dialog box without saving the file.	—

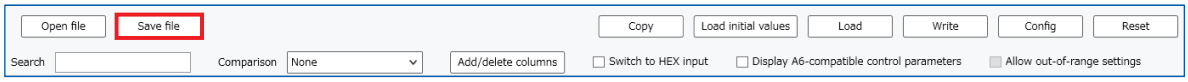
8.3.2 Saving Files

An example of saving parameters to a file is described below.

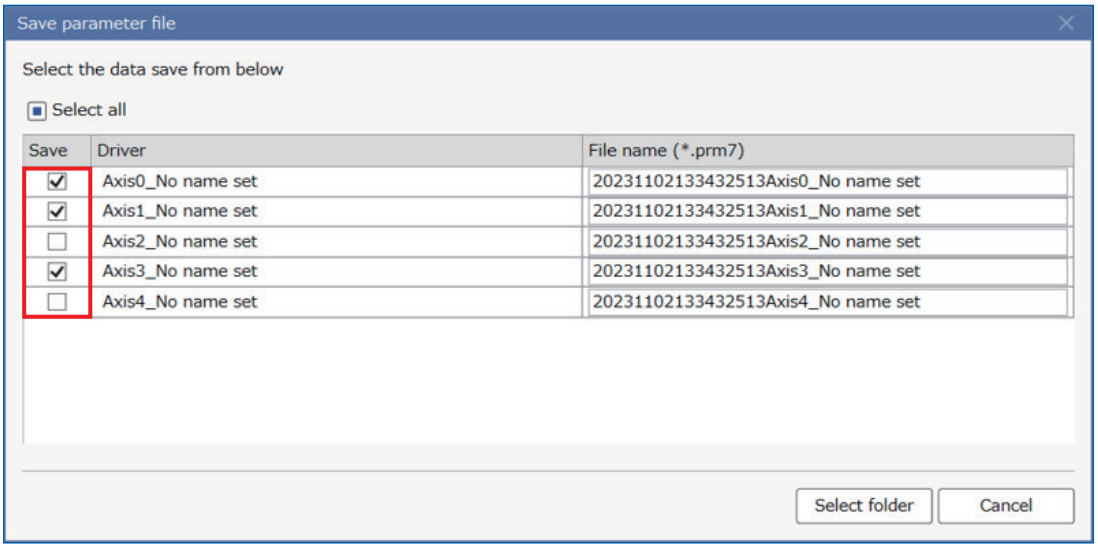
Objects can be saved in the same way.

<< Procedure >>

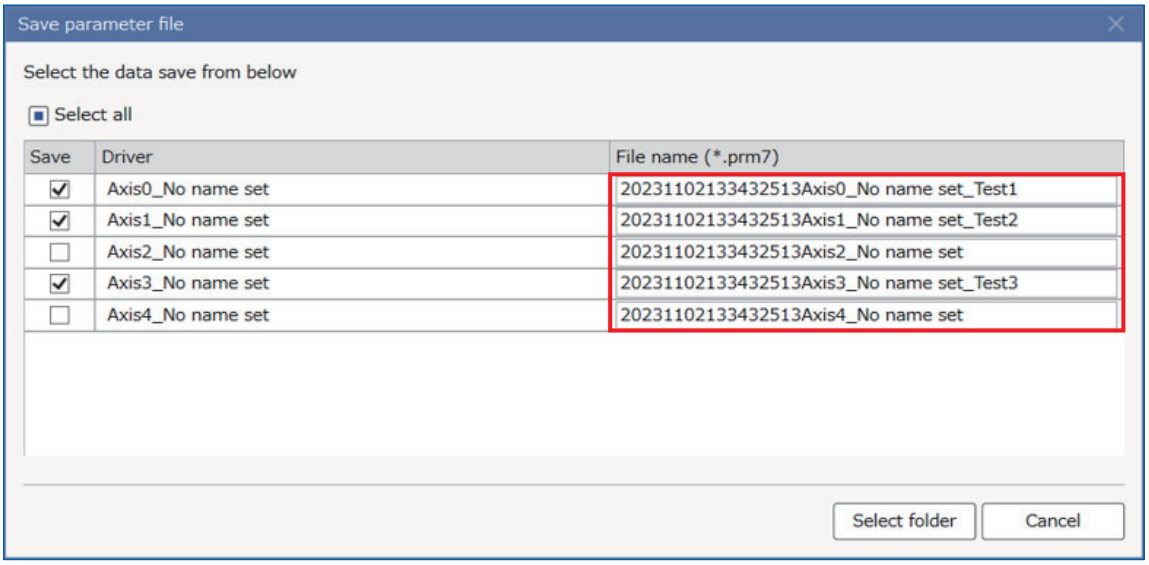
1. Click the [Save file] button.



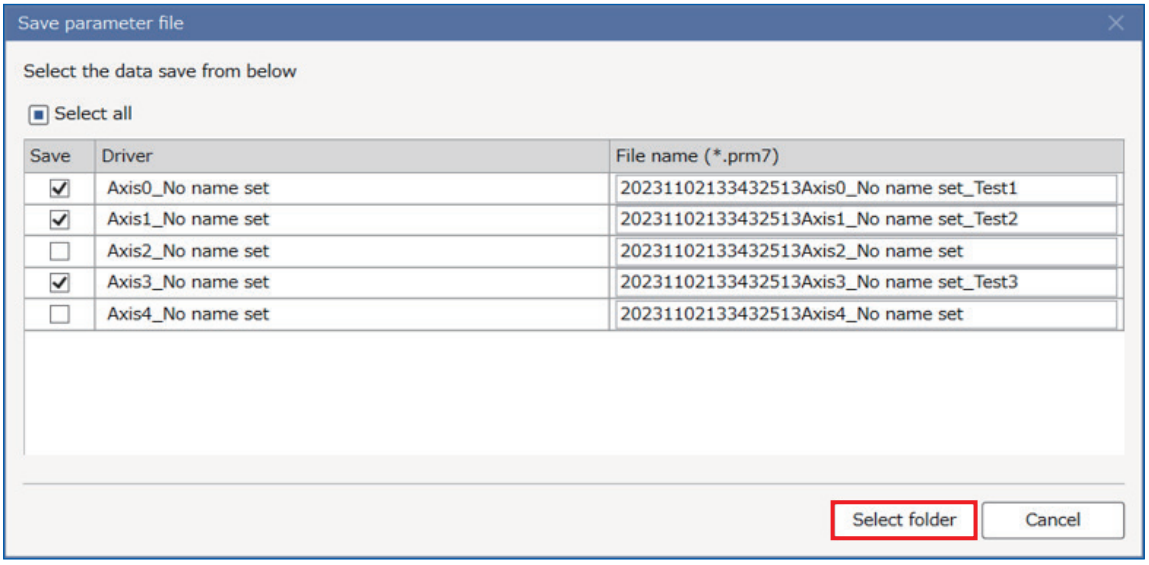
2. Select the target data to be saved from the “Saved data display area”.



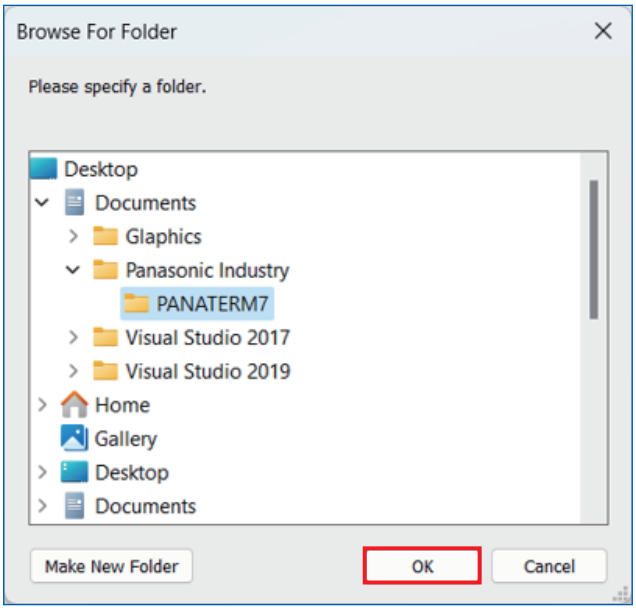
3. If you want to change the file name, change the file name in the file name column of the “Saved data display area” .



4. Click the [Select folder] button.



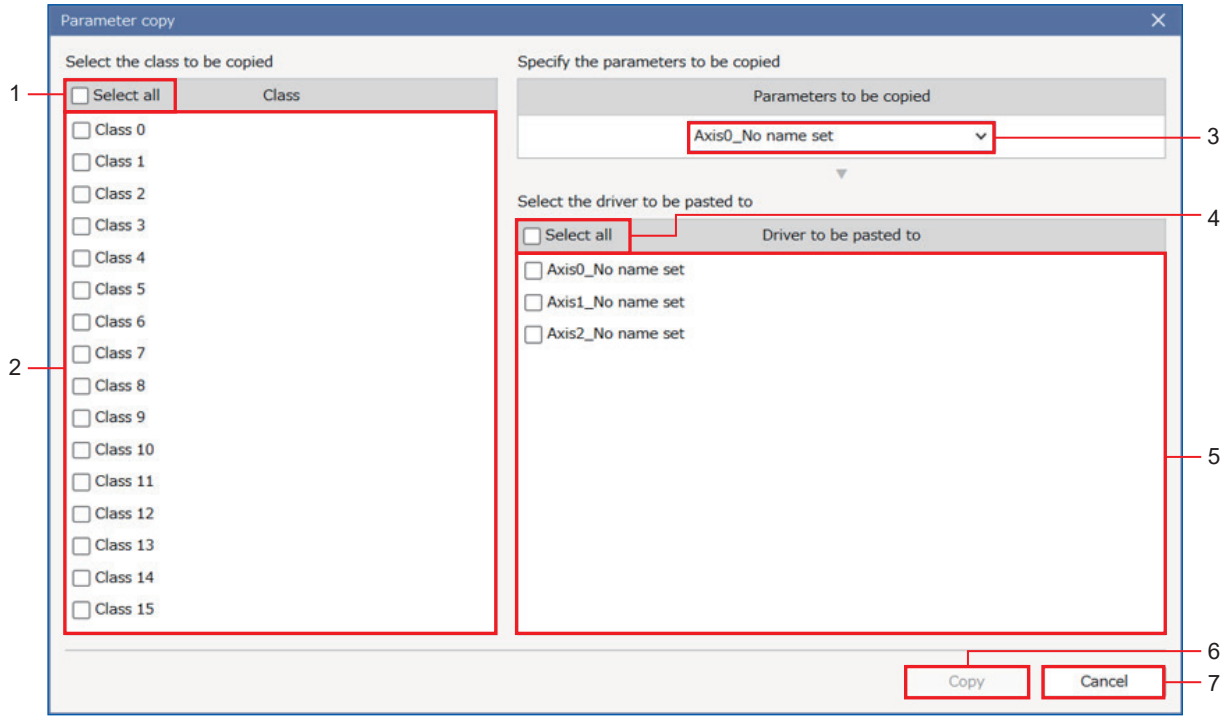
5. Select a folder to save the file to and click the [OK] button to save the file.



8.4 Copying Parameters

Copies parameters from the specified source driver or file to be copied from to the specified destination driver to be pasted to.

8.4.1 Configuration of the Parameter Copy Dialog Box

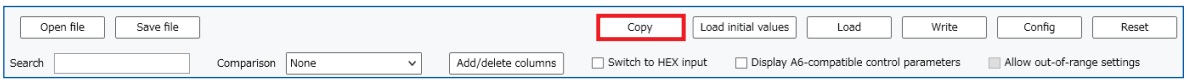


No.	Name		Description
1	Select the class to be copied	Select all	Check the box to select all target classes.
2		Class display area	Display all classes to be copied. Also, select the classes to be read.
3	Specify the parameters to be copied	Parameters to be copied	Select the parameters (file or driver displayed in the device tree) to be copied.
4	Select the driver to be pasted to	Select all	Check the box to select all drivers to be pasted to.
5		Select area for drivers to be pasted to	Display all drivers to be pasted to. Also, select the drivers from which to copy parameters.
6	Copy		Start copying parameters.
7	Cancel		Close the “Parameter copy” dialog box without copying any parameters.

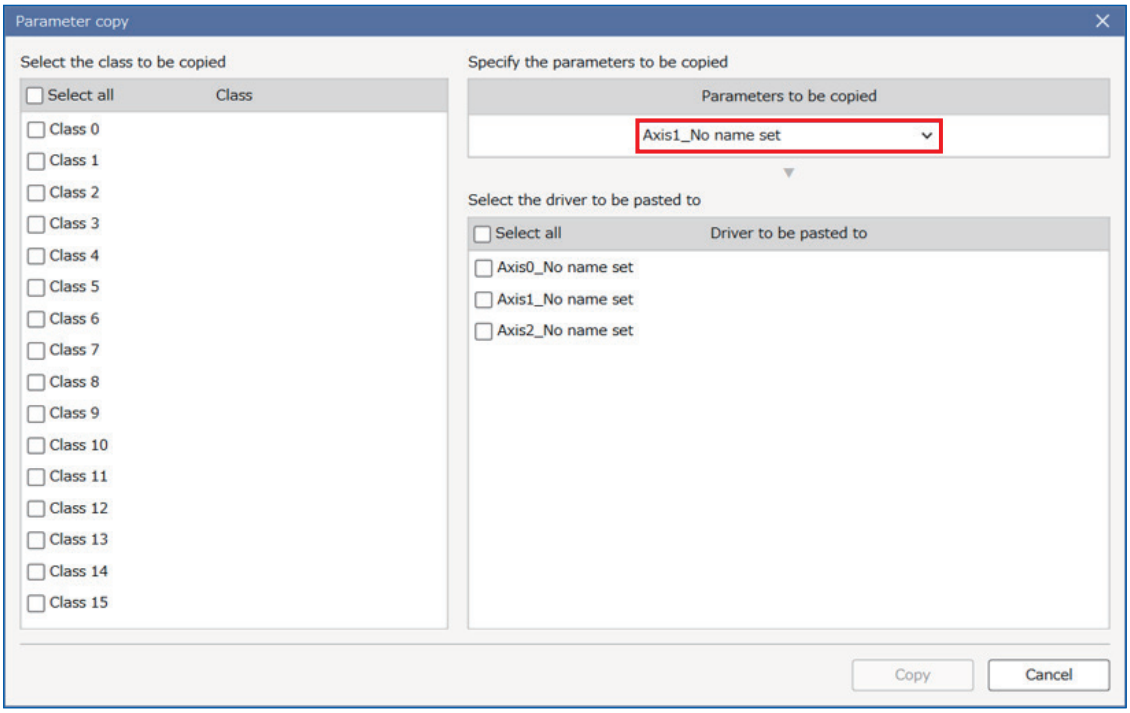
8.4.2 Copying Parameters

<< Procedure >>

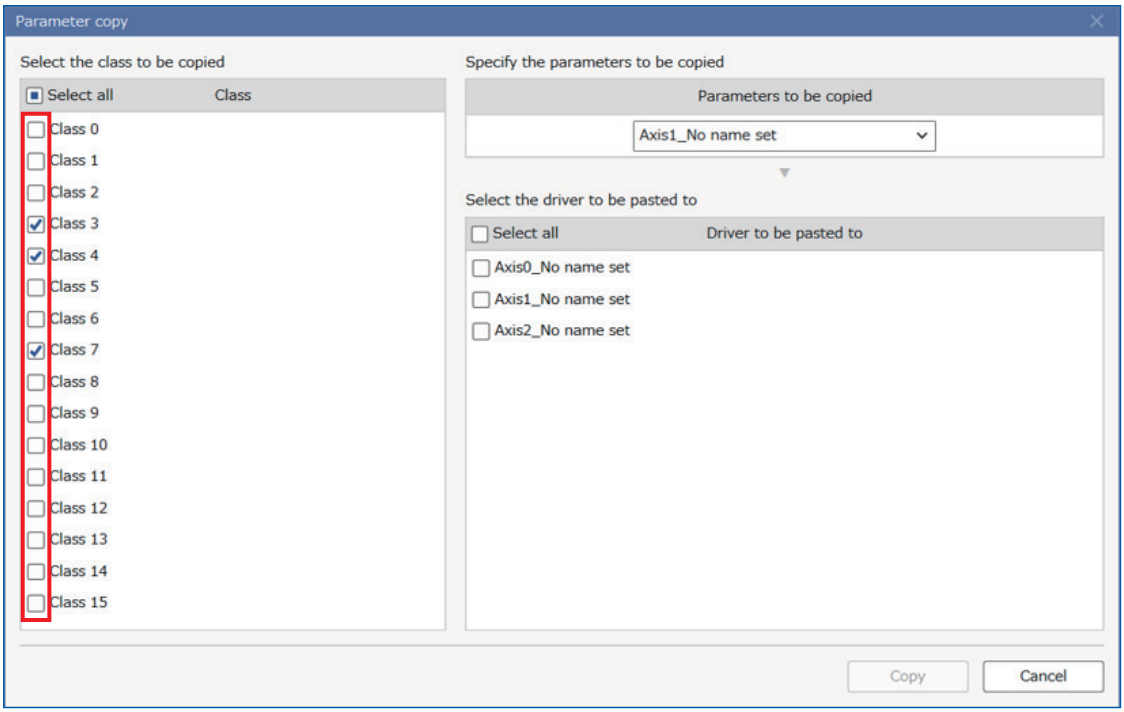
1. Click the [Copy] button.



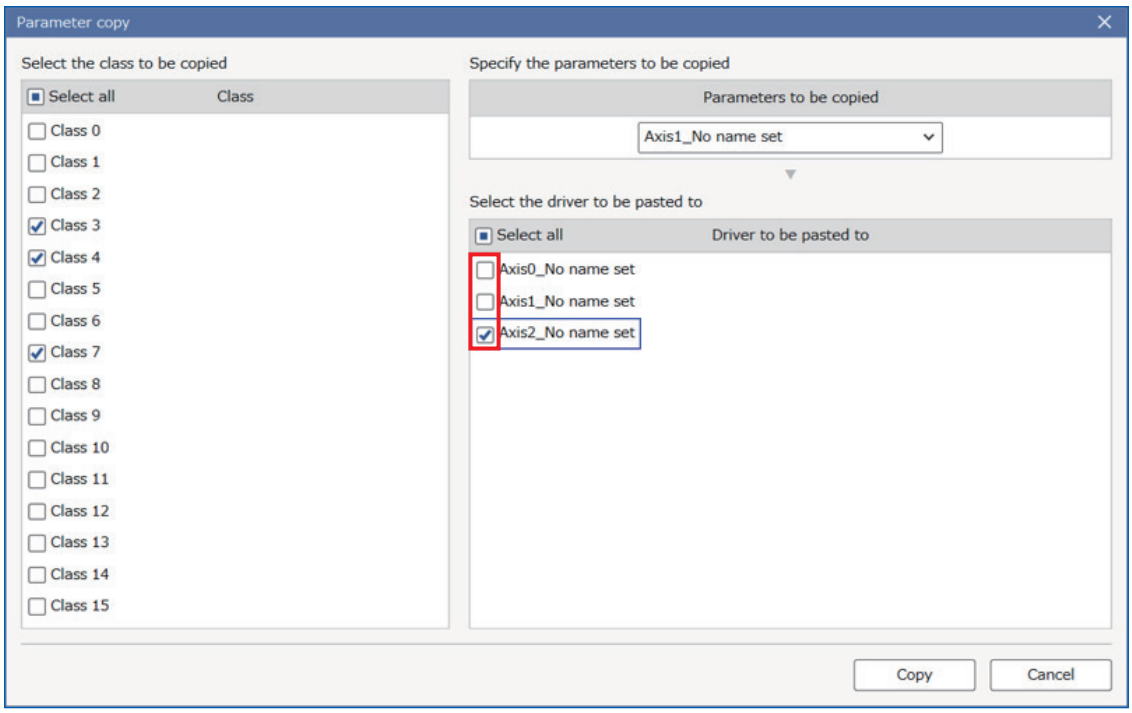
2. Select drivers or files from “Parameters to be copied”.



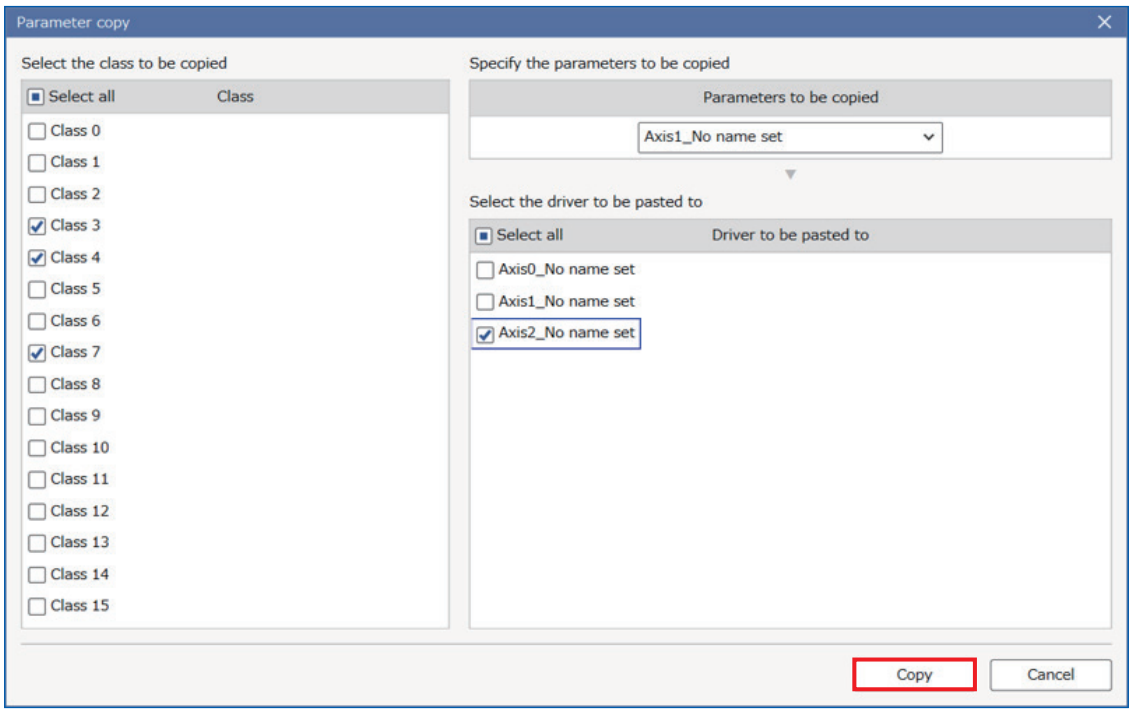
3. Select the classes to be copied from the “Class display area” by checking the check boxes.



4. Select the drivers to be pasted to from the “Selection area for drivers to be pasted to” by checking the check boxes.



5. Click the [Copy] button.

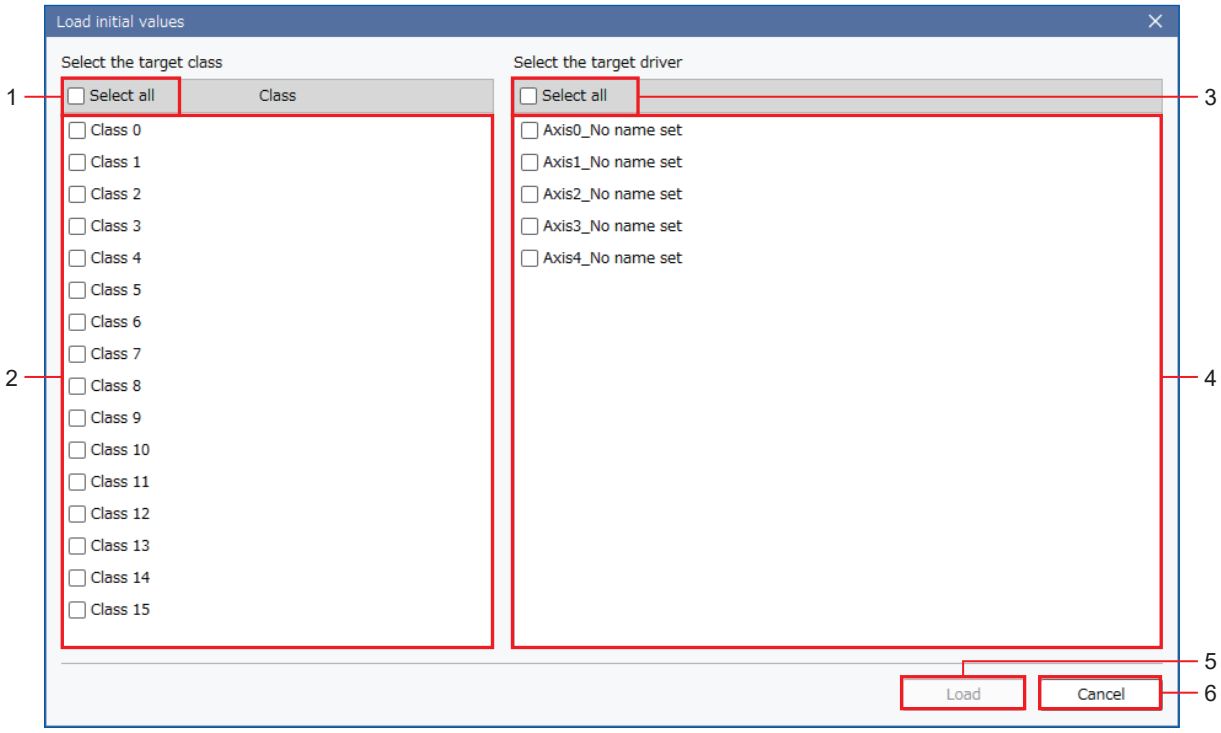


8.5 Loading Parameter Factory Setting Values

Load the parameter factory setting values from the selected drivers.

Parameter changes made by this operation are not written to the driver. To write parameters to a driver, use the [Write] button.

8.5.1 Configuration of the Factory Setting Values Loading Dialog Box



No.	Name		Description
1	Select the target class	Select all	Check the box to select all target classes.
2		Class selection area	Display all classes to be loaded. Also, select the classes to be read.
3	Select the target driver	Select all	Check the box to select all target drivers for loading.
4		Driver selection area	Display all drivers to be loaded. Also, select the target drivers for reading parameters.
5	Load		Start loading factory setting parameter values.
6	Cancel		Close the “Read initial values” dialog box without loading the factory setting parameter values.

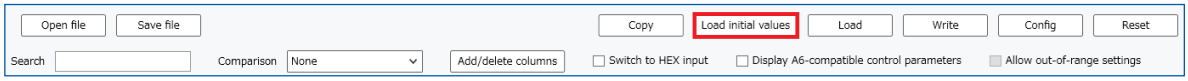
8.5.2 Reading Initial Values

— Precautions —

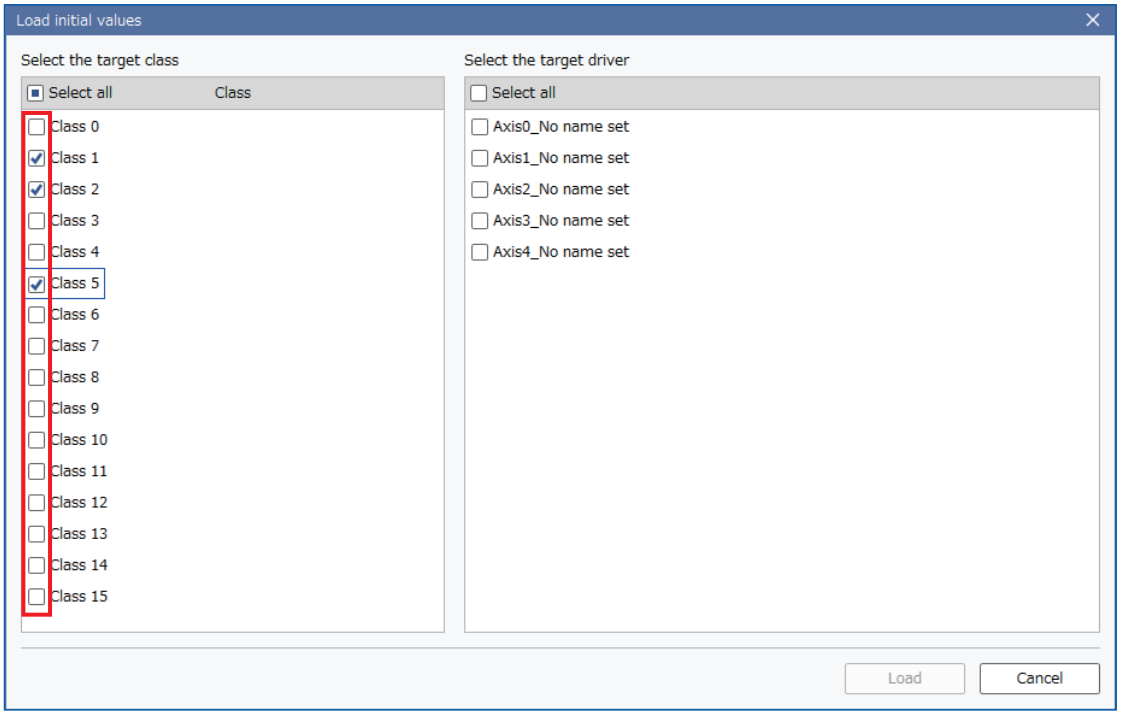
- Before loading factory setting values, make sure that the computer and driver are properly connected and that the driver is powered on. Check this again during reading. Data content cannot be guaranteed if communication or power are interrupted during loading.

<< Procedure >>

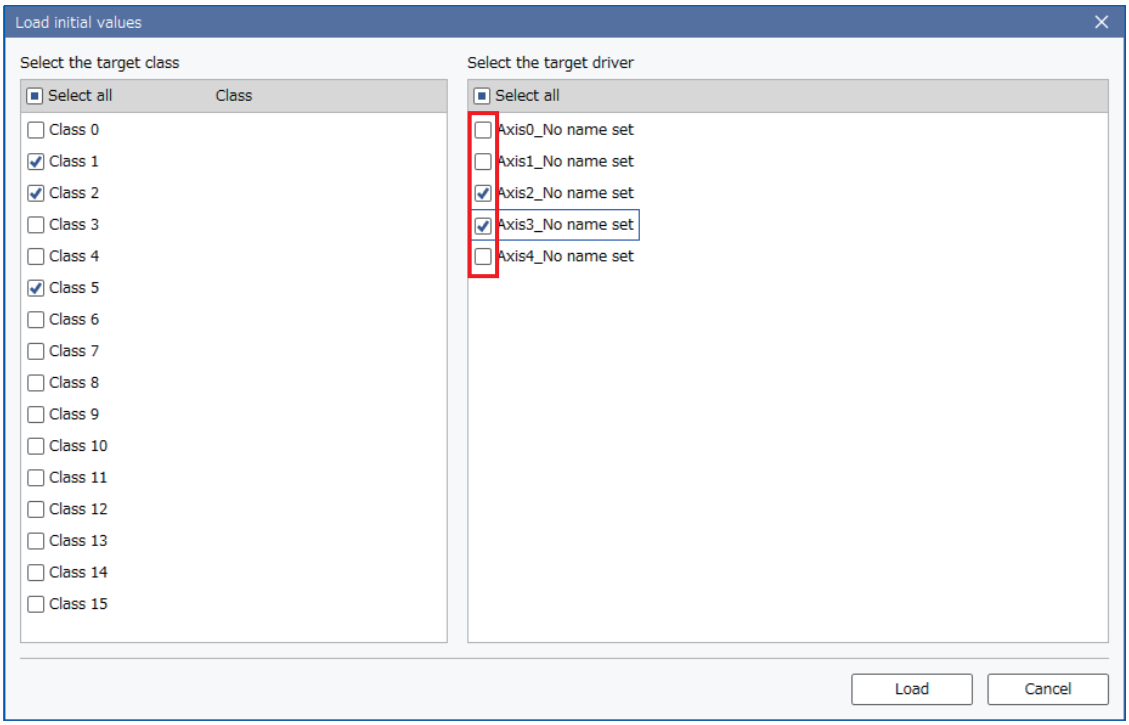
1. Click the [Load initial values] button.



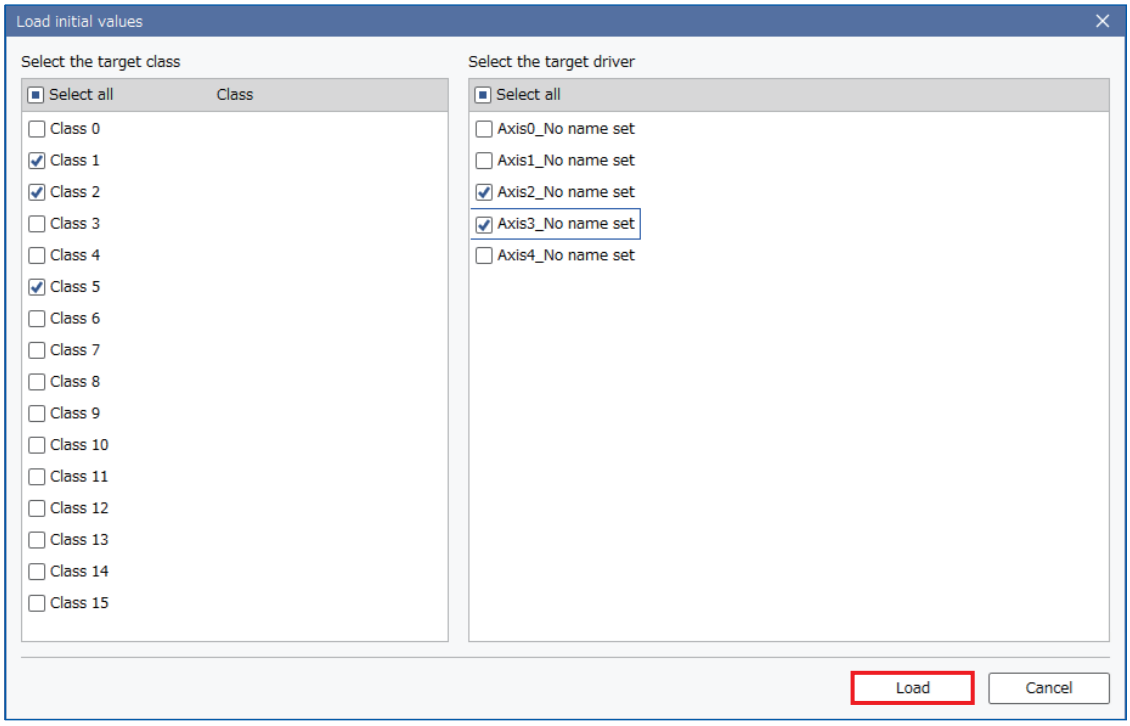
2. Select the classes to be read from the “Class selection area” by checking the check boxes.



3. Select the target drivers for reading from the “Driver selection area” by checking the check boxes.



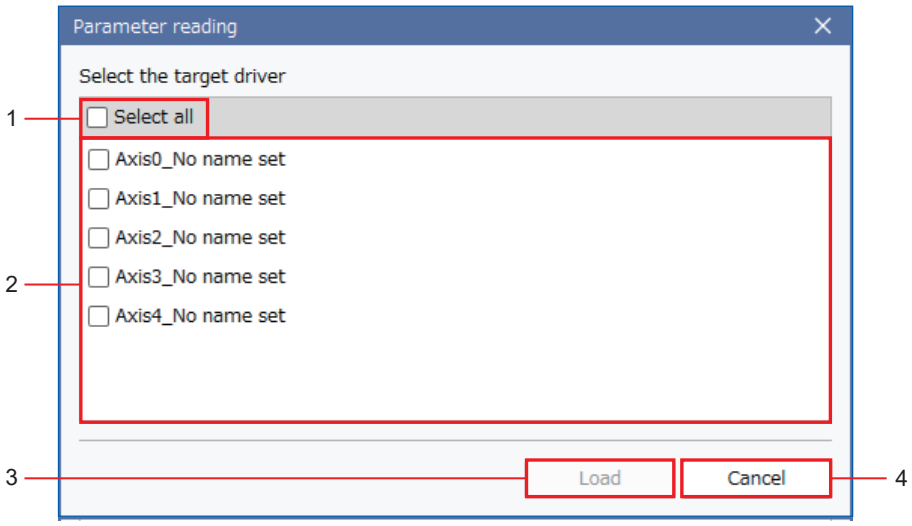
4. Click the [Load] button.



8.6 Reading Parameters

Read all parameters from the selected drivers.

8.6.1 Configuration of the Parameter Reading Dialog Box



No.	Name	Description	Reference
1	Select all	Check the box to select all target drivers for loading.	—
2	Target driver selection area	Display all drivers to be loaded. Also, select the target drivers for reading parameters.	—
3	Load	Start reading parameters.	—
4	Cancel	Close the “Parameter reading” dialog box without reading any parameters.	—

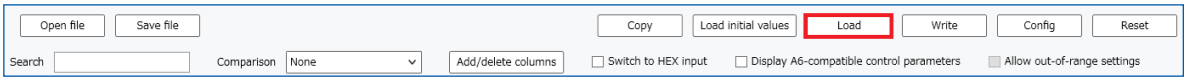
8.6.2 Reading Parameter Values From the Driver

— Precautions —

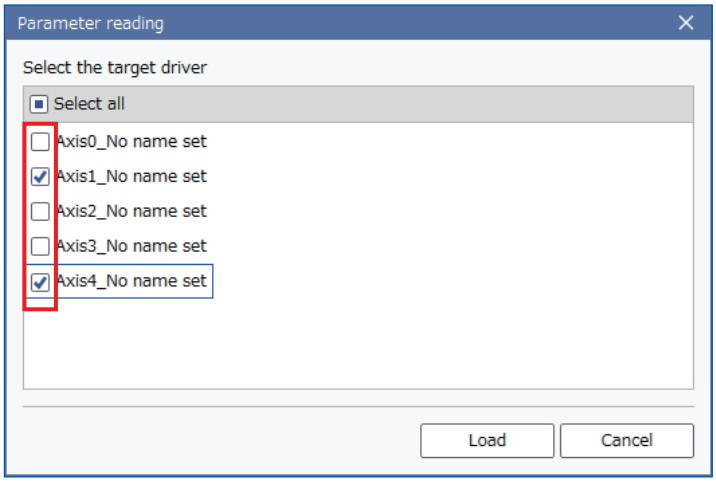
- Before reading parameters, make sure that the computer and driver are properly connected and that the driver is powered on. Check this again during reading. Data content cannot be guaranteed if communication or power are interrupted during loading.

<< Procedure >>

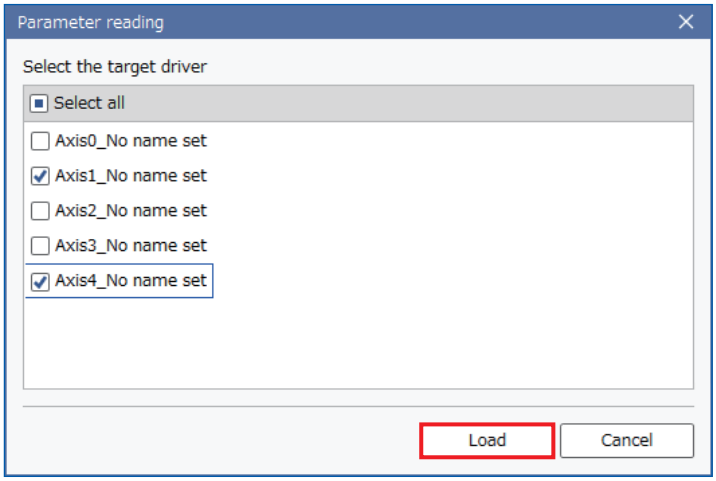
1. Click the [Load] button.



2. Select the target drivers for reading from the “Driver selection area” by checking the check boxes.



3. Click the [Load] button.

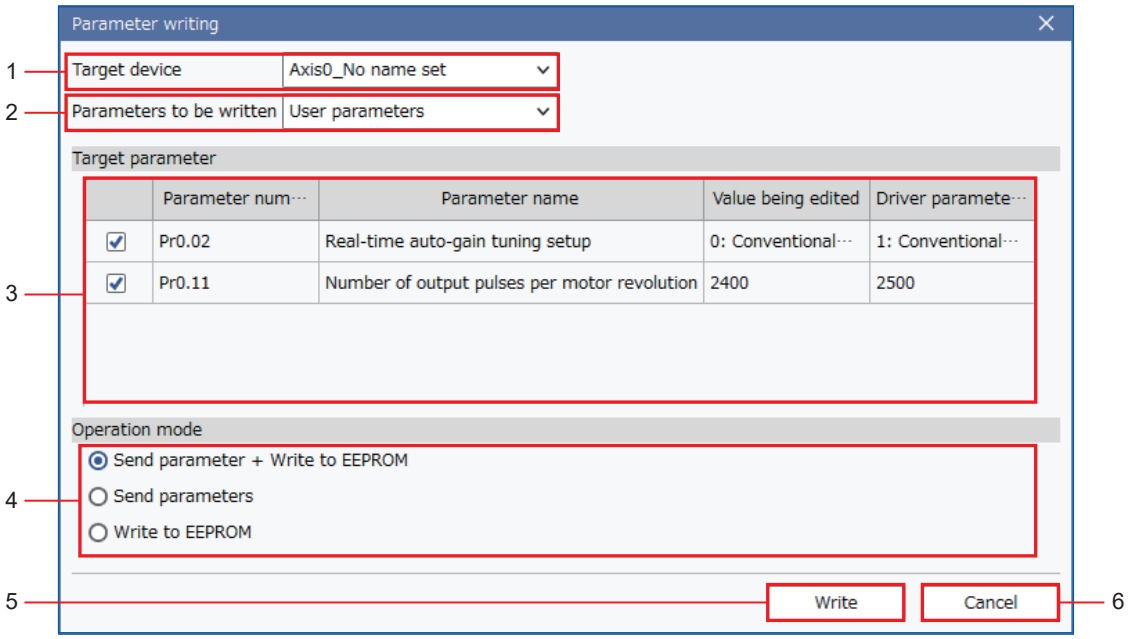


8.7 Writing Parameters

Write the parameters edited on the settings screen to the driver.

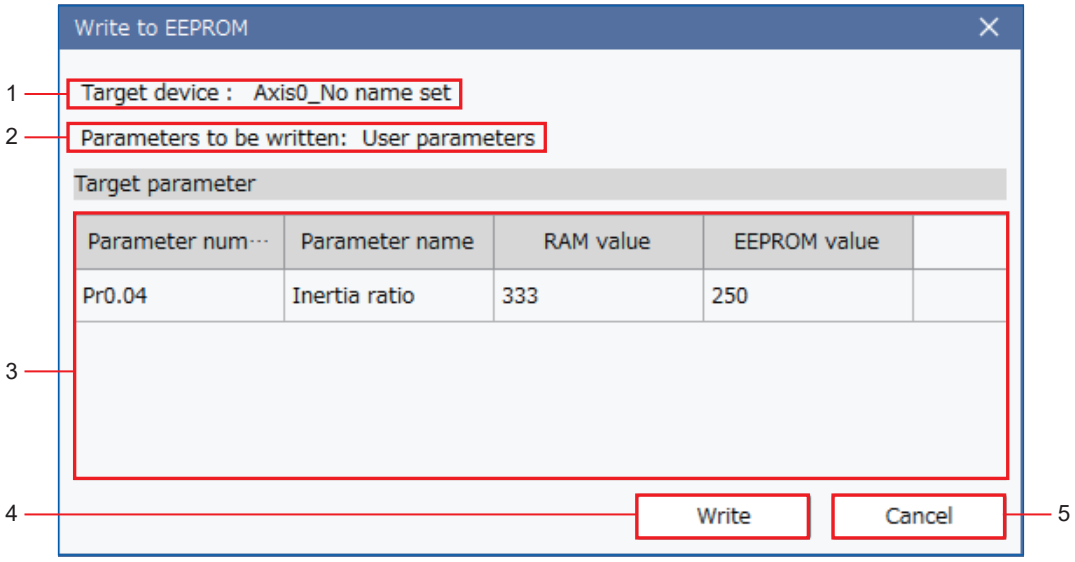
8.7.1 Configuration of the Parameter Writing Dialog Box

■ **Parameter Writing Dialog Box**



No.	Name	Description	Reference
1	Target device	Select the target drivers for writing. By default, the uppermost driver in the device tree is selected.	—
2	Select parameters to be written	Select the parameters to be written. Select either user parameters or EtherCAT objects.	—
3	Target parameters display area	Display parameters where there is a difference between the parameter values edited on the settings screen and the driver parameter values.	—
4	Operation mode	You can choose to send the parameters to the driver, write them to the EEPROM, or do both at once. By default, “Send parameters + Write to EEPROM” is selected.	*“8.7.2”* *“8.7.3”* *“8.7.4”*
5	Write	Start writing parameters.	—
6	Cancel	Close the “Parameter writing” dialog box without writing any parameters.	—

■ **Write to EEPROM Dialog Box**



No.	Name	Description	Reference
1	Target device	Display the target drivers for writing. The drivers selected in the “Parameter writing” dialog box are displayed.	—
2	Select parameters to be written	Display the parameters to be written. The types of parameters selected in the “Parameter writing” dialog box are displayed.	—
3	Target parameters display area	The parameters to be written to EEPROM are displayed. (Parameters sent in the “Parameter writing” dialog box)	—
4	Write	Start “Write to EEPROM” for the parameters.	—
5	Cancel	Close the “Write to EEPROM” dialog box without writing any parameters.	—

8.7.2 Sending Parameters / Writing to EEPROM

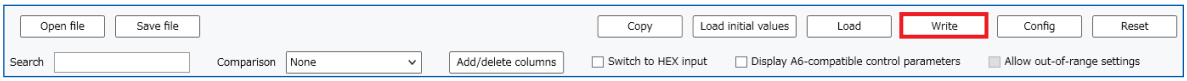
— Precautions —

- Before and during writing parameters, make sure that the computer and driver are properly connected and that the driver is powered on. Data content cannot be guaranteed if communication or power are interrupted during writing.
- Some parameters may significantly affect the operation of drivers and motors. Make sure you understand the contents of the following documentation and take due care when writing parameters.

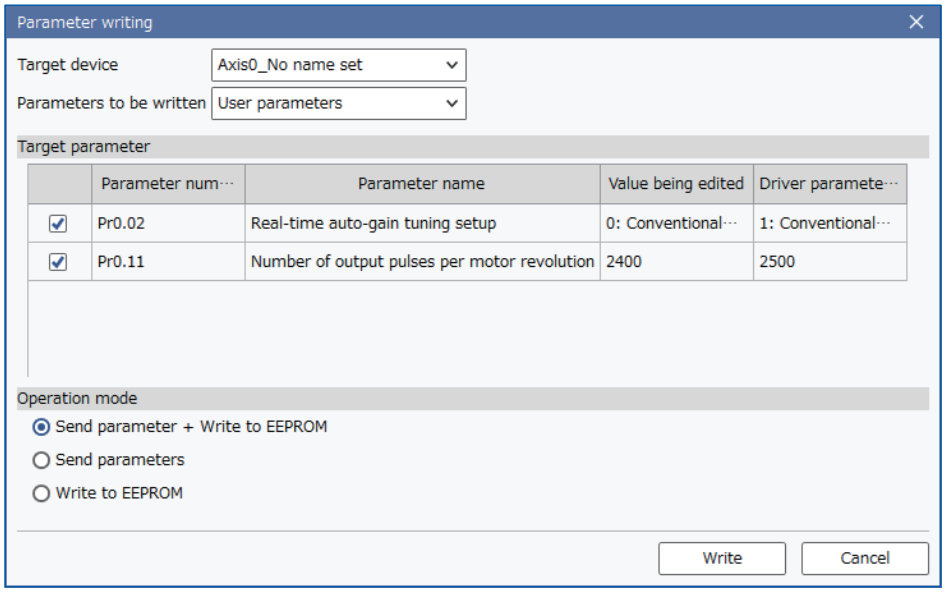
  Relevant documentation (see *“1.3 Related Documents”*) for your model
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- If the “IO Settings” tab or “Alarm” tab is incorrectly set, an error message appears when you click the [Write] button. For details, see *“8.13 IO Settings”* and *“8.15 Alarm”* .
- If you want to return to the values read from the driver after the power is turned on again, execute “Send parameters”. (For details on “Send parameters”, see *“8.7.3 Sending Parameters”* .)

<< Procedure >>

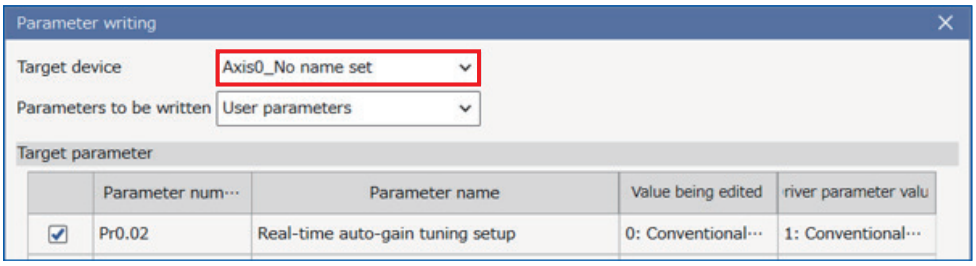
1. Click the [Write] button.



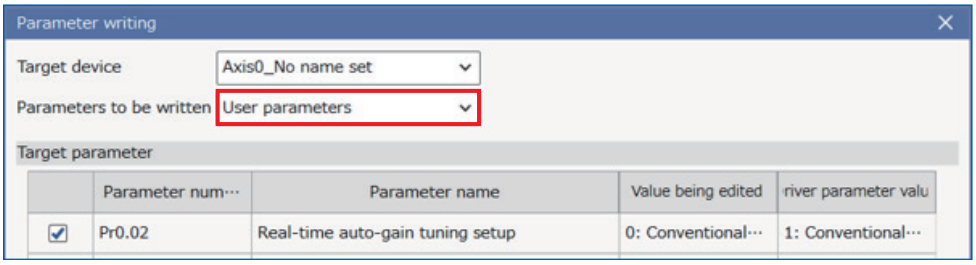
The “Parameter writing” dialog box appears.



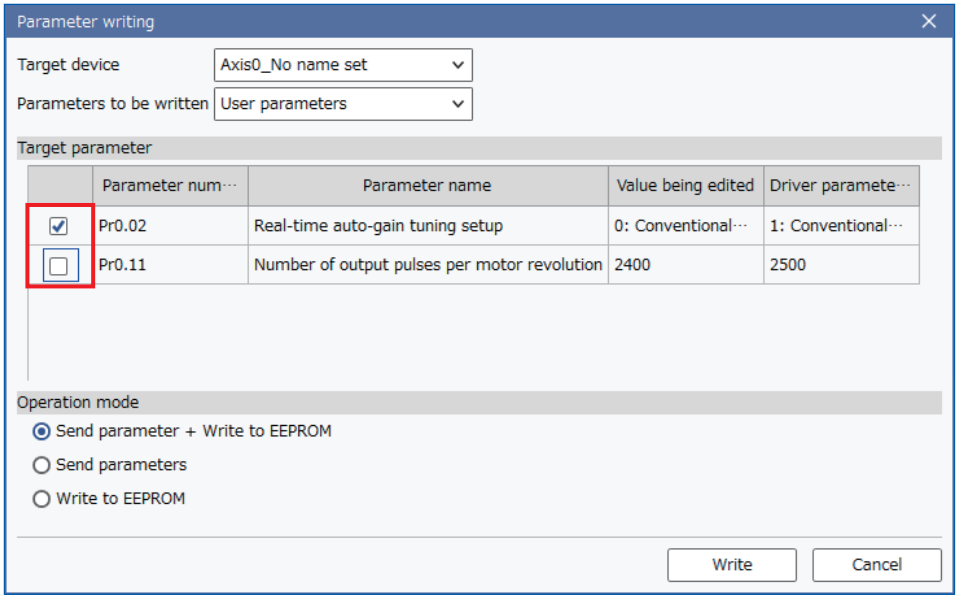
2. Select the target drivers for writing from “Target device”.



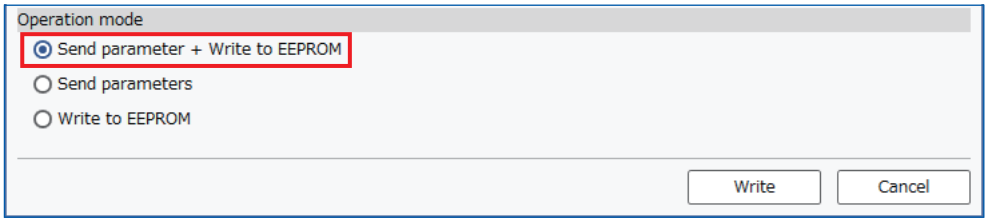
3. Select the parameters to be written from “Select parameters to be written”.



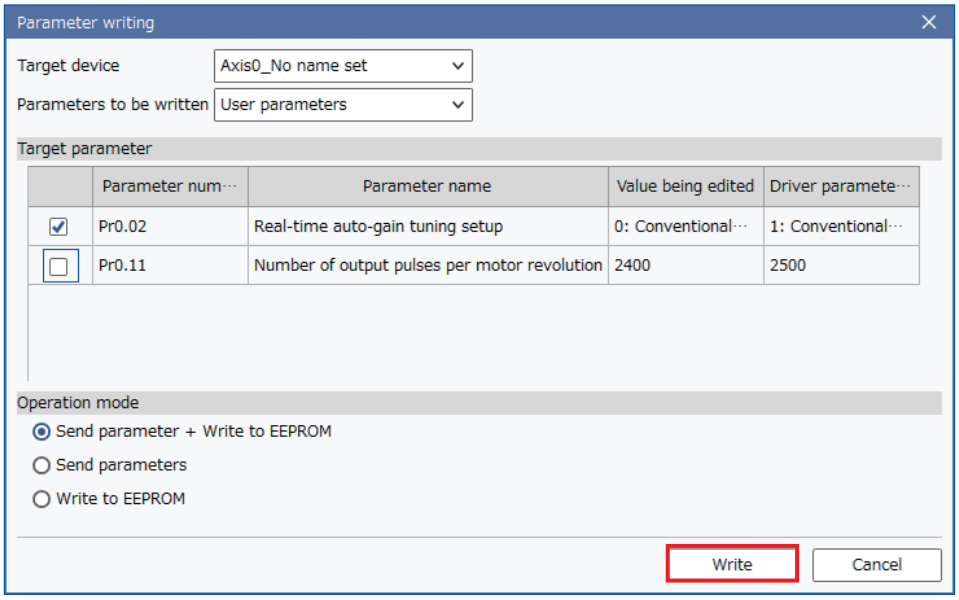
4. From the “Target parameter display area”, check the boxes of the parameters to be written to the driver and uncheck the boxes of parameters that are not to be written.



5. Select “Send parameter + Write to EEPROM”.



6. Click the [Write]button.

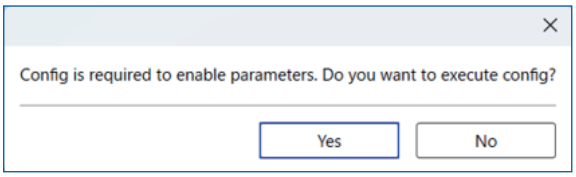


6-1 If writing parameters that do not require execution of the Config command, writing is complete.

6-2 If writing parameters that require execution of the Config command, go to "Step 7".

6-3 If writing parameters that require the power to be turned on again, go to "Step 8".

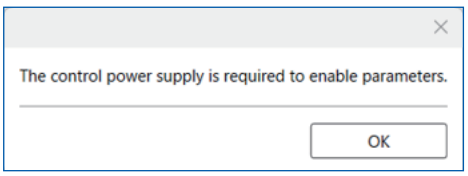
7. A message appears confirming execution of the Config command to enable the parameters.



Click the [Yes] button to execute the Config command for the driver and complete the writing of parameters.

Click the [No]button to complete the writing of parameters without executing the Config command.

8. After the following message dialog box appears to enable the parameters, turn the control power on again.



— Precautions —

- The Config command cannot be executed while the servo motor is running.
- Execution of the Config command is required to enable attribute C parameters. Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for information on those parameters.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- Driver power must be restored to enable attribute R parameters. Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for information on those parameters.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification

8.7.3 Sending Parameters

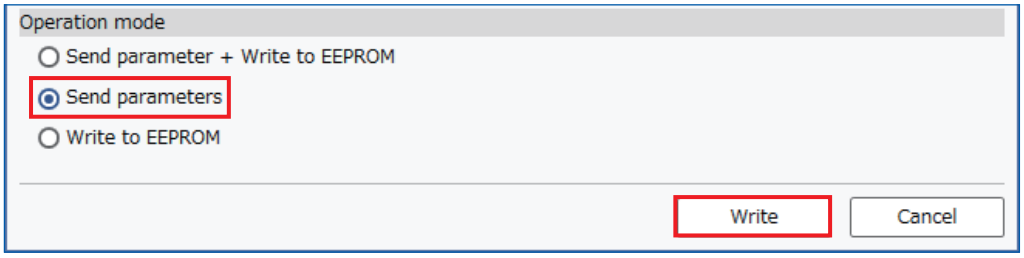
This is the same function as “Send parameters” in section *“8.7.2 Sending Parameters / Writing to EEPROM”* .

— Precautions —

- Before and during sending parameters, make sure that the computer and driver are properly connected and that the driver is powered on. Data content cannot be guaranteed if communication or power are interrupted during sending.
- Some parameters may significantly affect the operation of drivers and motors. Make sure you understand the contents of the following documentation and take due care when sending parameters.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- If you want to use the same settings when power is restored, execute “Write to EEPROM” separately. (For information on “Write to EEPROM”, see *“8.7.4 Writing to EEPROM”* .)

<< Procedure >>

1. In the “Parameter writing” dialog box operation mode, select “Send parameters”, and then click the [Write] button.



Execute send parameters.

— Precautions —

- If the driver is turned off without writing the parameters to the driver EEPROM, the parameters in the driver revert to the values read from the driver.
- The Config command cannot be executed while the servo motor is running.
- Execution of the Config command is required to enable attribute C parameters. Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model for information on those parameters.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- Driver power must be restored to enable attribute R parameters. Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model for information on those parameters.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification

8.7.4 Writing to EEPROM

This is the same function as “Write to EEPROM” in section *“8.7.2 Sending Parameters / Writing to EEPROM”* .

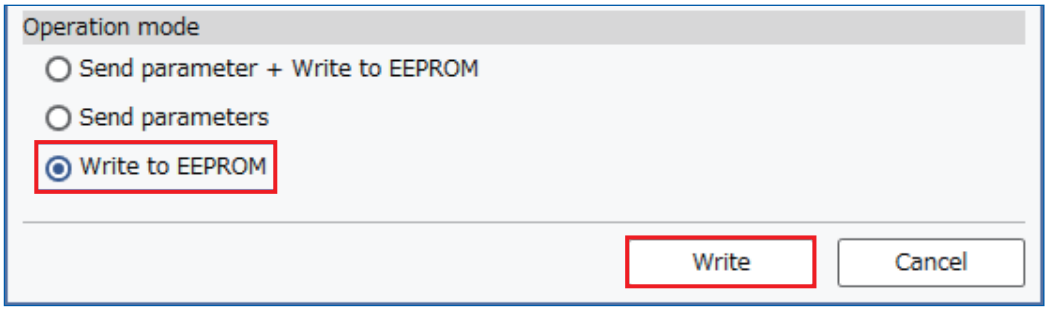
— Precautions —

- Before and during writing parameters, make sure that the computer and driver are properly connected and that the driver is powered on. Data content cannot be guaranteed if communication or power are interrupted during writing.
- Some parameters may significantly affect the operation of drivers and motors. Make sure you understand the contents of the following documentation and take due care when writing parameters.

  Relevant documentation (see *"1.3 Related Documents"*) for your model
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification

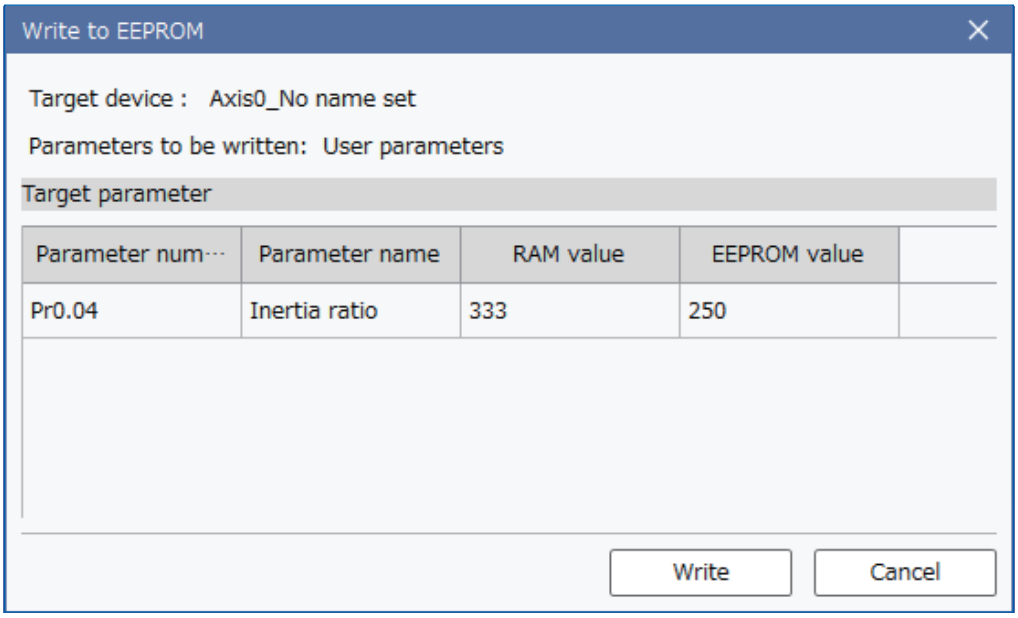
<< Procedure >>

1. In the "Parameter writing" dialog box operation mode, select "Write to EEPROM", and then click the [Write]button.

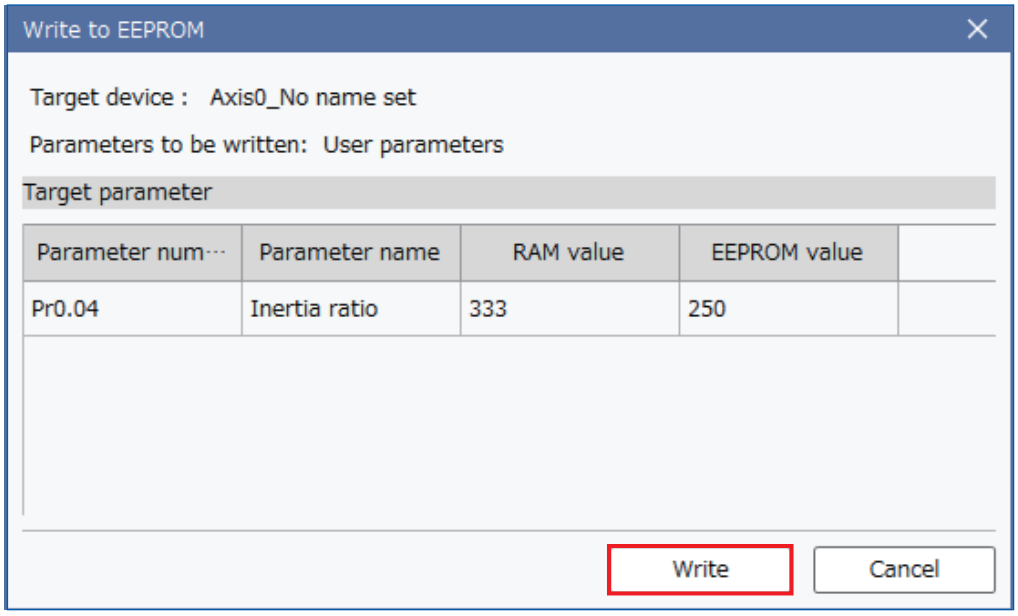


Execute send parameters.

2. The "Write to EEPROM" dialog box appears.



3. Click the [Write] button to complete write to EEPROM.



— Precautions —

- If the Write to EEPROM dialog box does not reflect the edited parameters, the parameters may not have been sent. Send parameters before write to EEPROM.

  (For details on sending parameters, see *"8.7.3 Sending Parameters"* .)

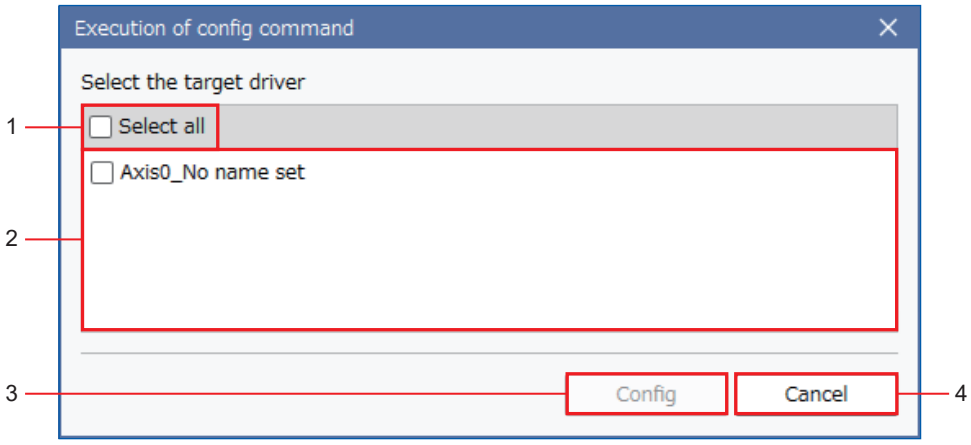
8.8 Config

Execute a Config command on the selected drivers to enable the attribute C parameters.

Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for information on those parameters.

- A7: Operating Instructions (Overall)
- A6: Technical Reference Functional Specification

8.8.1 Configuration of the Execution of Config Command Dialog Box



No.	Name	Description	Reference
1	Select all	Check the box to select all target drivers for Config command execution.	—
2	Target driver selection display area	Display all drivers for which the Config command is to be executed. Also, select the drivers for which the Config command is to be executed.	—
3	Config	Execute the Config command.	—
4	Cancel	Close the "Execution of Config command" dialog box without executing the Config command.	—

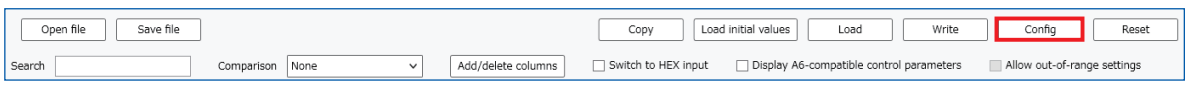
8.8.2 Execution of Config Command

— Precautions —

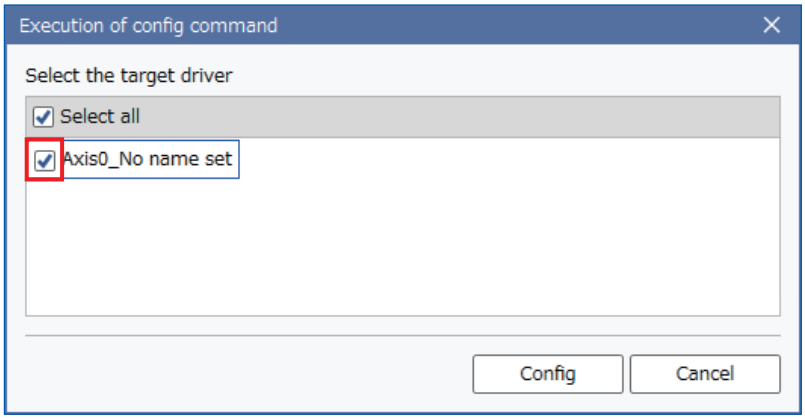
- Before and during execution of the Config command, make sure that the computer and driver are properly connected and that the driver is powered on. Data content cannot be guaranteed if communication or power are interrupted during writing.

<< Procedure >>

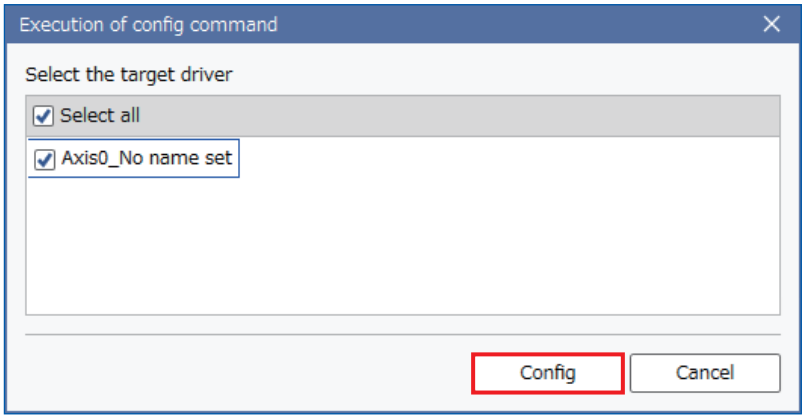
1. Click the [Config] button.



2. Select the target drivers for Config command execution from the “Target driver selection display area”.



3. Click the [Config] button.



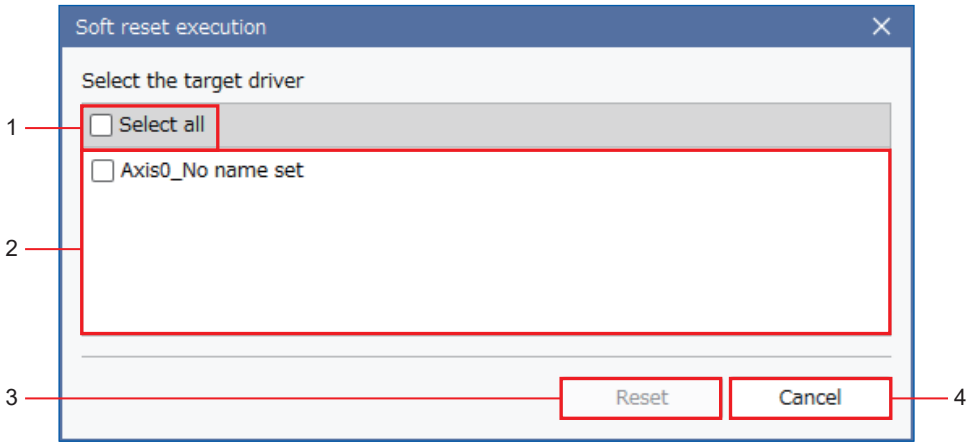
8.9 Reset

Reset the selected drivers to enable the attribute R parameters.

Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for information on those parameters.

- A7: Operating Instructions (Overall)
- A6: Technical Reference Functional Specification

8.9.1 Configuration of the Soft Reset Execution Dialog Box



No.	Name	Description	Reference
1	Select all	Check the box to select all target drivers for software reset.	—
2	Target driver selection area	Display all target drivers for software reset. Also, select the target drivers for software reset.	—
3	Reset	Execute software reset.	—
4	Cancel	Close the "Soft reset execution" dialog box without executing software reset.	—

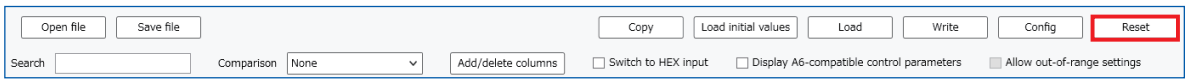
8.9.2 Resetting

— Precautions —

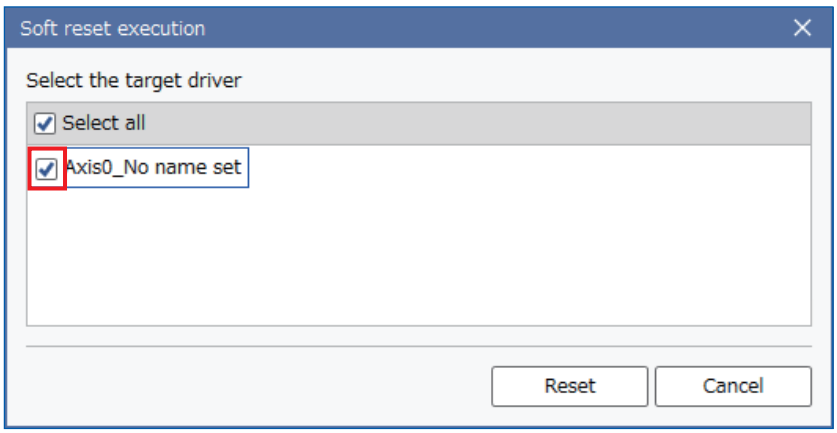
- Before and during reset, make sure that the computer and driver are properly connected and that the driver is powered on. Data content cannot be guaranteed if communication or power are interrupted during writing.
- Reset cannot be executed during servo-on. Execute reset after changing to servo-off.
- Reset cannot be executed when certain alarms (Err31.0.☐ "Safety function error protection 1" , Err31.2.☐ "Safety function error protection 2") are triggered. Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for details on alarms.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification

<< Procedure >>

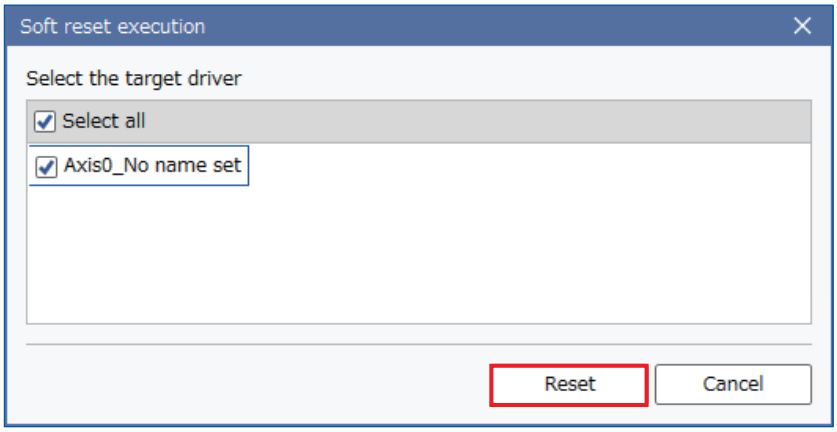
1. Click the [Reset] button.



2. Select drivers for issuing the reset command from the “Target driver selection area”.



3. Click the[Reset] button.



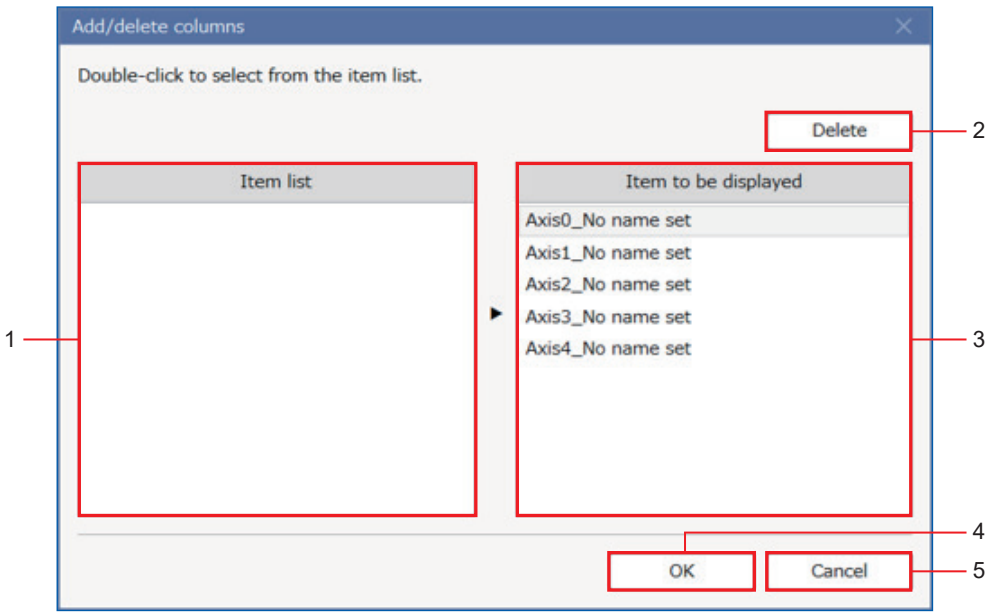
8.10 Adding/Deleting Columns

This is displayed when All parameters or EtherCAT objects is selected.

Add or delete columns in “Parameter display area by driver” in All parameters, or in “Object display area by driver” in EtherCAT objects.

For details of display area locations, see *“8.11.1 Configuration of the All Parameters Tab Screen”* or *“8.12.1 Configuration of the EtherCAT Objects Tab Screen”* .

8.10.1 Configuration of the Add/Delete Column Dialog Box



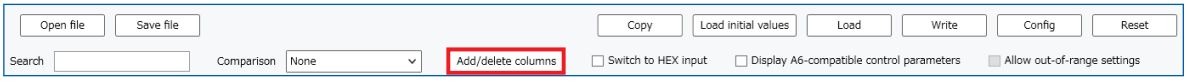
No.	Name	Description	Reference
1	Item list display area	Display a list of hidden items. Items deleted from the “Display item list area” are displayed in this area.	—
2	Delete	Delete (hide) the items displayed in “Parameter/Object Display Area by Driver”.	—
3	Display item list area	Display column items displayed in “Parameter/Object Display Area by Driver”.	—
4	OK	Execute add/delete column.	—
5	Cancel	Close the “Add/delete column” dialog box without adding or deleting the column.	—

8.10.2 Adding/Deleting Columns

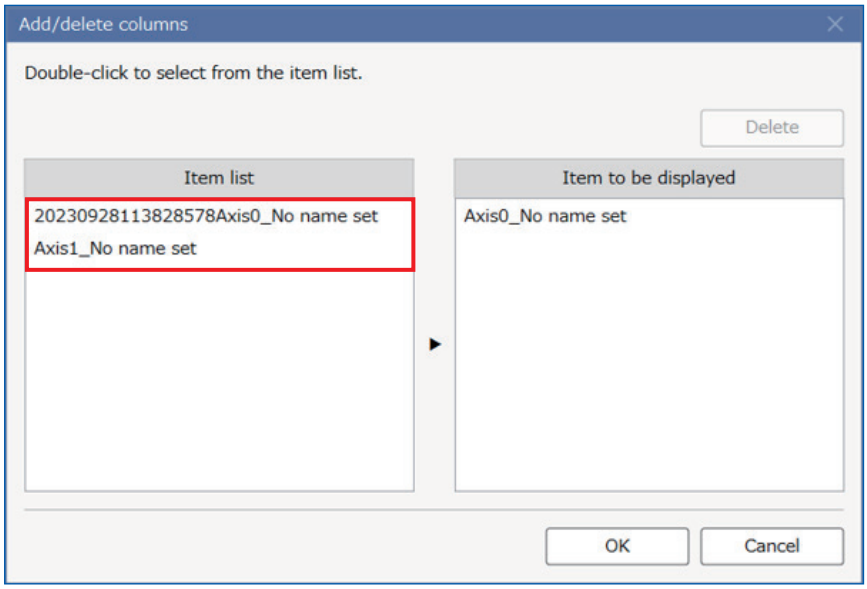
8.10.2.1 Adding Columns

<< Procedure >>

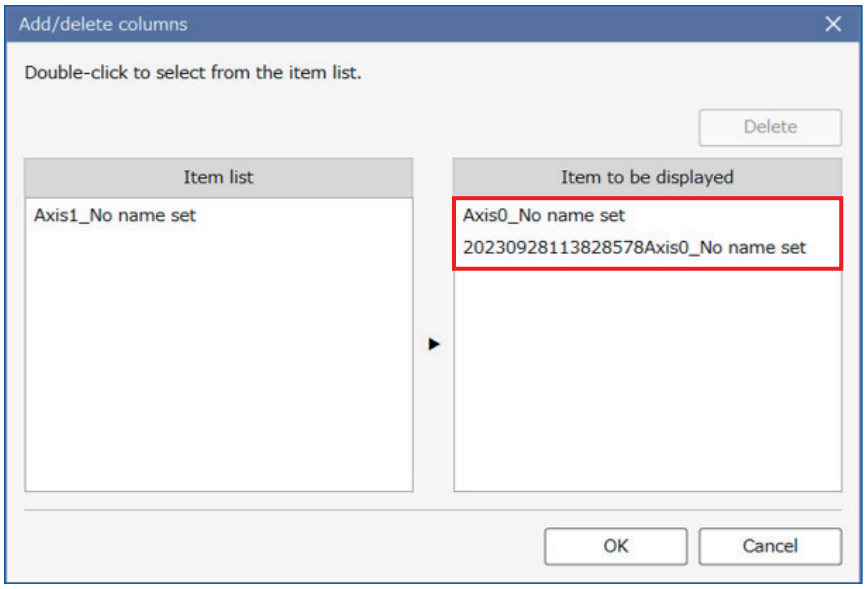
1. Click the [Add/delete column] button.



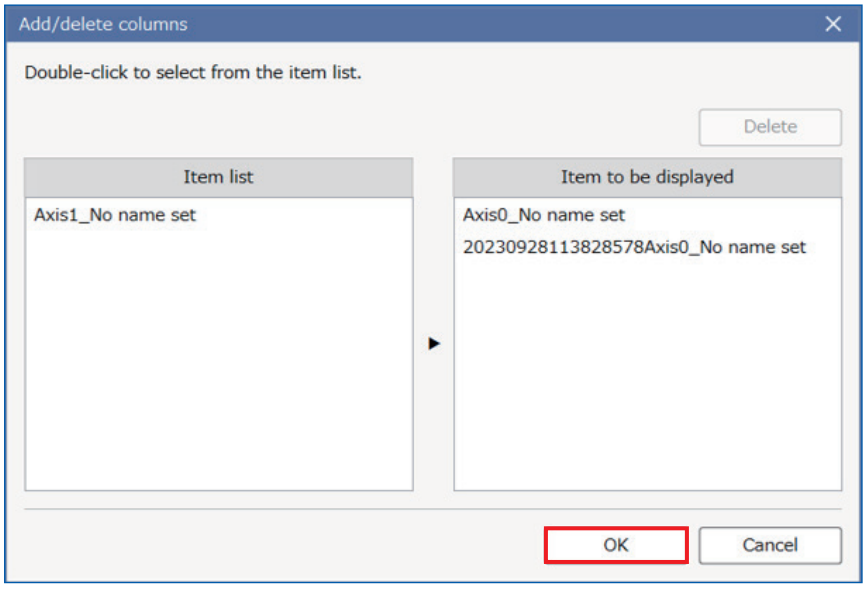
2. Select and double-click the item to be added from the “Item list display area”.



The selected item is added to the “Display item list area”.



3. Click the [OK] button.



A column is added as shown below.

Before column addition

	Attribute	Class	No.	bit	Name	Unit	Axis0_No name set
☐	C	0	00	-	manufacturer use	-	1
☐	R	0	01	-	Control mode setup	-	0: Semi-closed control
☐		0	02	-	Real-time auto-gain tuning setup	-	1: Conventional control: Standard /···
☐		0	04	-	Inertia ratio	%	250
☐	C	0	08	-	manufacturer use	-	0
☐	C	0	09	-	manufacturer use	-	1
☐	C	0	10	-	manufacturer use	-	1
☐	R	0	11	-	Number of output pulses per motor revolution	pulse/r	2500
☐	R	0	12	-	Reversal of pulse output logic	-	0: Encoder, positive = B-phase progr···
☐		0	13	-	1st torque limit	%	500

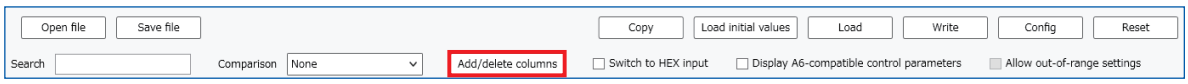
After column addition

	Attribute	Class	No.	bit	Name	Unit	20230928113828578Axis0_No name set	Axis0_No name set
☐	C	0	00	-	manufacturer use	-	1	1
☐	R	0	01	-	Control mode setup	-	0: Semi-closed control	0: Semi-closed control
☐		0	02	-	Real-time auto-gain tuning setup	-	1: Conventional control: Standard /···	1: Conventional control: Standard /···
☐		0	04	-	Inertia ratio	%	250	250
☐	C	0	08	-	manufacturer use	-	0	0
☐	C	0	09	-	manufacturer use	-	1	1
☐	C	0	10	-	manufacturer use	-	1	1
☐	R	0	11	-	Number of output pulses per motor revolution	pulse/r	2500	2500
☐	R	0	12	-	Reversal of pulse output logic	-	0: Encoder, positive = B-phase progr···	0: Encoder, positive = B-phase progr···
☐		0	13	-	1st torque limit	%	500	500

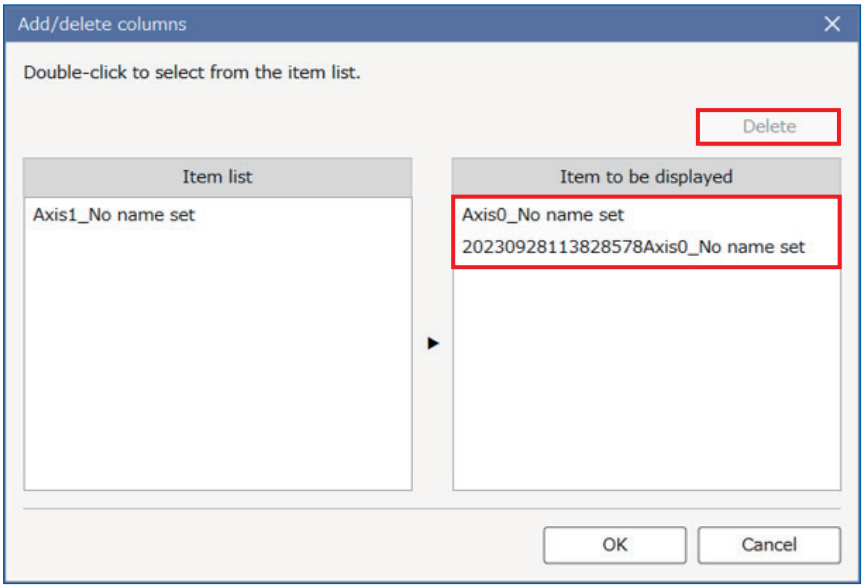
8.10.2.2 Deleting Columns

<< Procedure >>

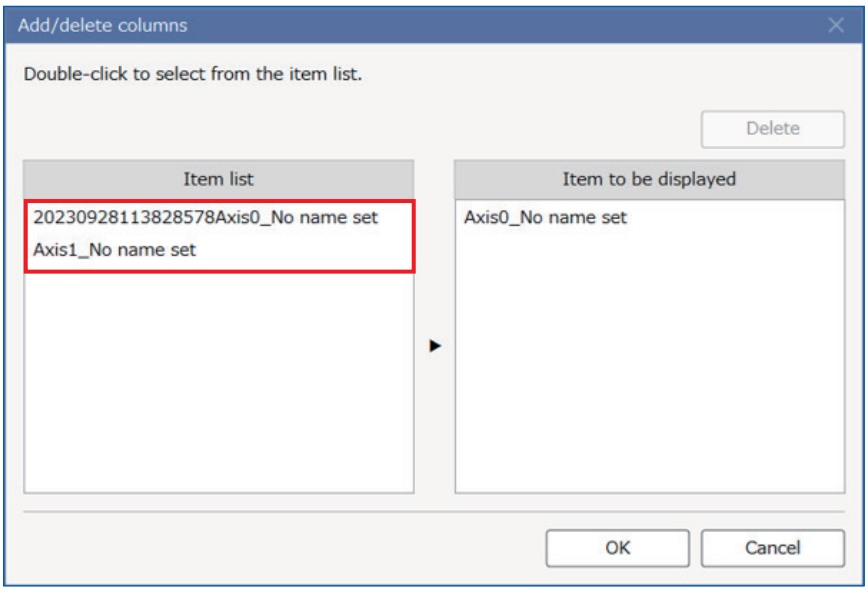
1. Click the [Add/delete column] button.



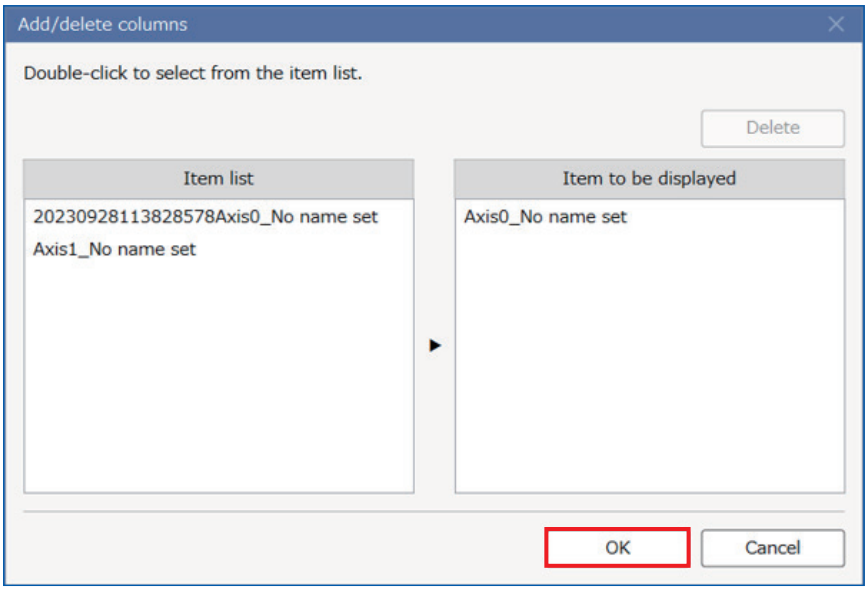
2. Select and double-click the item to be deleted from the “Item list display area”, or click the [Delete] button.



The selected item is moved to the “Item list display area”.



3. Click the [OK] button.



The column is deleted as shown below.

Before column deletion

♡	Attribute	Class	No.	bit	Name	Unit	20230928113828578Axis0_No name set	Axis0_No name set
☐	C	0	00	-	manufacturer use	-	1	1
☐	R	0	01	-	Control mode setup	-	0: Semi-closed control	0: Semi-closed control
☐		0	02	-	Real-time auto-gain tuning setup	-	1: Conventional control: Standard /···	1: Conventional control: Standard /···
☐		0	04	-	Inertia ratio	%	250	250
☐	C	0	08	-	manufacturer use	-	0	0
☐	C	0	09	-	manufacturer use	-	1	1
☐	C	0	10	-	manufacturer use	-	1	1
☐	R	0	11	-	Number of output pulses per motor revolution	pulse/r	2500	2500
☐	R	0	12	-	Reversal of pulse output logic	-	0: Encoder, positive = B-phase progr···	0: Encoder, positive = B-phase progr···
☐		0	13	-	1st torque limit	%	500	500
☐		0	14	-	Position deviation excess setup	Commar	83886080	83886080

Column deletion

♡	Attribute	Class	No.	bit	Name	Unit	Axis0_No name set
☐	C	0	00	-	manufacturer use	-	1
☐	R	0	01	-	Control mode setup	-	0: Semi-closed control
☐		0	02	-	Real-time auto-gain tuning setup	-	1: Conventional control: Standard /···
☐		0	04	-	Inertia ratio	%	250
☐	C	0	08	-	manufacturer use	-	0
☐	C	0	09	-	manufacturer use	-	1
☐	C	0	10	-	manufacturer use	-	1
☐	R	0	11	-	Number of output pulses per motor revolution	pulse/r	2500
☐	R	0	12	-	Reversal of pulse output logic	-	0: Encoder, positive = B-phase progr···
☐		0	13	-	1st torque limit	%	500

8.11 All parameters

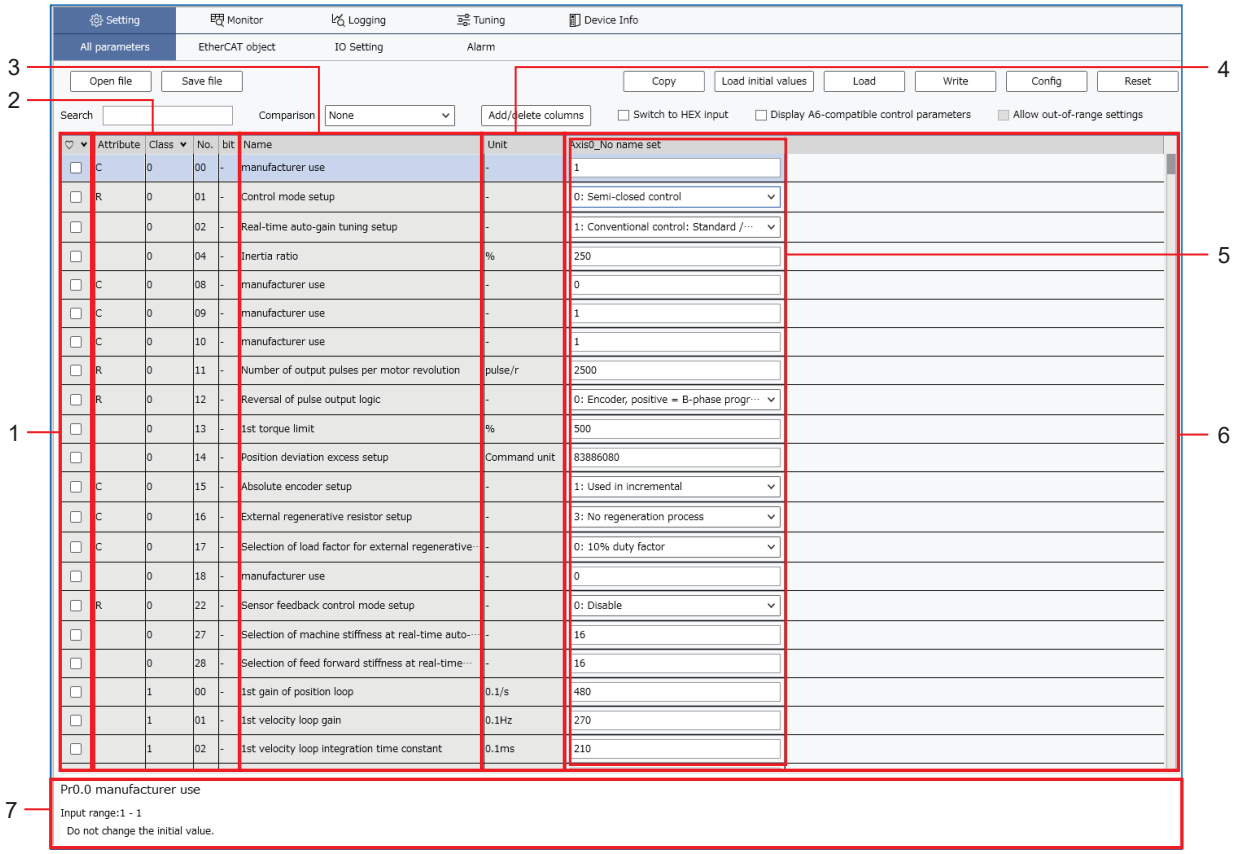
Set the parameters from the list of Class 0 to Class 15 parameters that can be set for the drivers selected in the device tree.

For details of the function and setting range of each parameter, see the relevant documentation (see *"1.3 Related Documents"*) for your model.

- A7: Operating Instructions (Overall)
- A6: Technical Reference Functional Specification

For information on how to write to the driver after setting changes, see *"8.7 Writing Parameters"* .

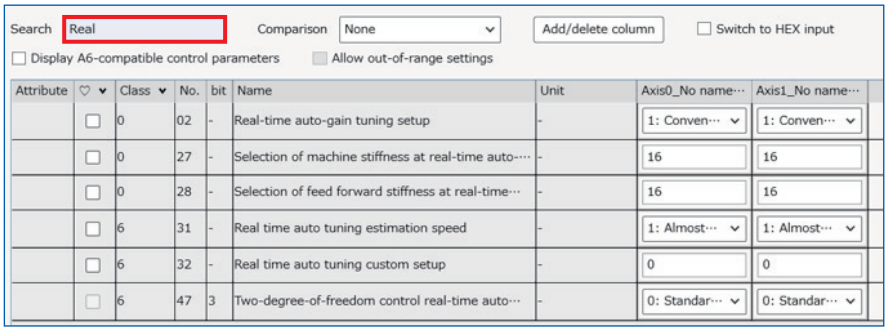
8.11.1 Configuration of the All Parameters Tab Screen



No.	Name	Description	Reference
1	Favorites	You can register your favorites by checking the boxes. It is also possible to display only checked items.	—
2	Parameters	Includes parameter attribute, classification, No., and bit.	—
3	Name	This is the parameter name.	—
4	Unit	This is the unit for the parameter value. Pay attention to the unit when setting parameter values.	—
5	Parameter values	Sets parameter values to be written to the driver. The axis No. of the driver and the nickname or file name are displayed in the header.	—
6	Parameter display area by driver	Display parameters for each driver added to the device tree. This column can be shown or hidden using the [Add/delete column] button.	*"8.10"*
7	Parameter description area	Displays a description of the parameters for the selected tab.	—

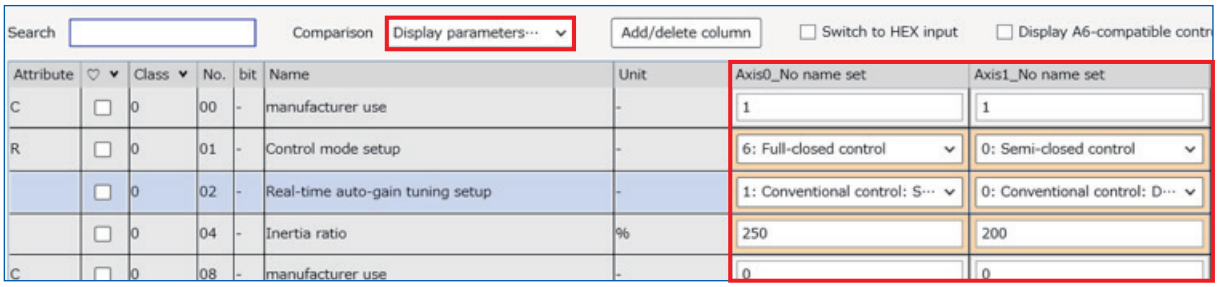
8.11.2 Searching Parameters

Display parameter numbers or parameters that contain the keywords entered in the “Search” box.



8.11.3 Comparing Parameters

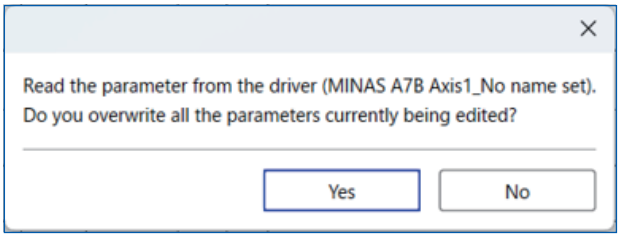
By selecting the “Comparison” combo box, you can compare or narrow down the display of parameters with multiple drivers and initial values. Parameters that differ in the results of the comparison are outlined in yellow.



8.11.4 Reading Parameters After Connecting the Driver

Set-up Support Software (PANATERM ver.7) is reconnected automatically if communication between the computer and driver is interrupted or the driver power is cut off when operating Set-up Support Software (PANATERM ver.7) .

When reconnecting, a message dialog box is shown confirming the overwriting of parameters.



Click the [Yes] button to overwrite the Set-up Support Software (PANATERM ver.7) parameter value or click the [No] button to not overwrite the value and continue editing parameters.

— Precautions —

- Before reading parameters, make sure that the computer and driver are properly connected and that the driver is powered on. Check this again during reading. Data content cannot be guaranteed if communication or power are interrupted during loading. If communication is interrupted or the power is cut off, click the [Load] button on the settings screen to reread the parameters.

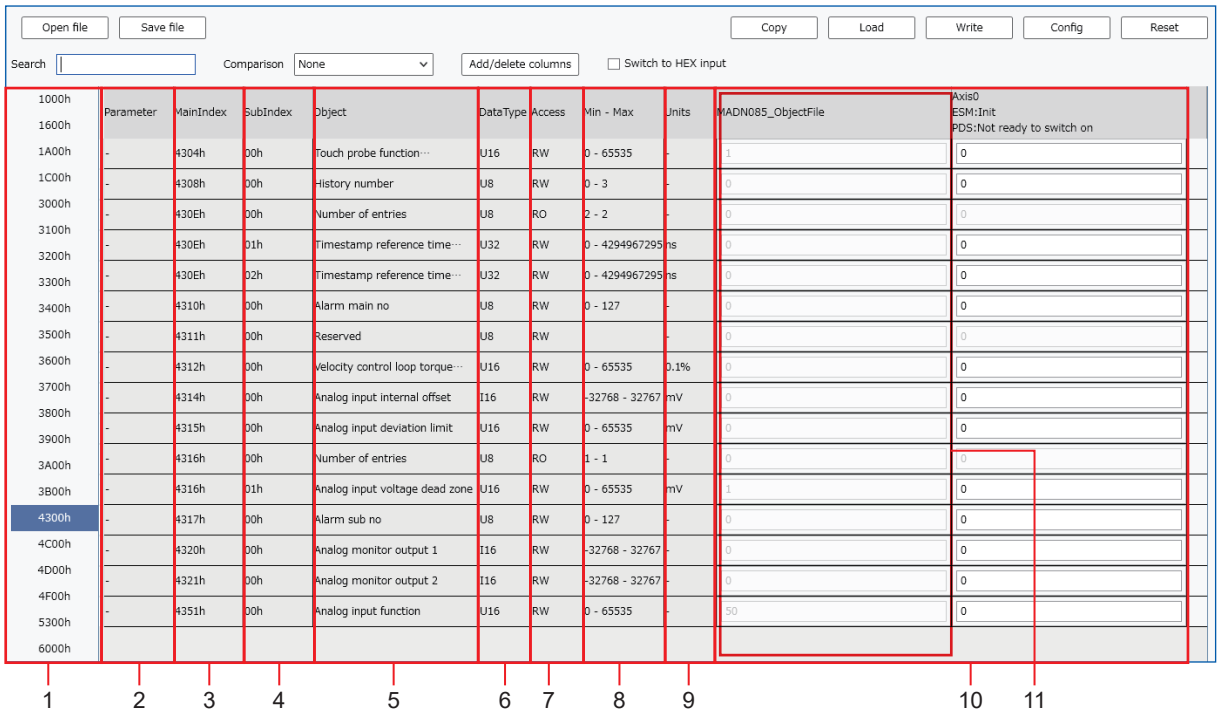
8.12 EtherCAT Objects

The list of objects on the driver side can be displayed and edited without using a host device.

This is only displayed for EtherCAT communication type drivers.

For information on how to write to the driver after setting changes, see *"8.7 Writing Parameters"* .

8.12.1 Configuration of the EtherCAT Objects Tab Screen



No.	Name	Description	Reference
1	Index tab	The objects are classified by index.	—
2	Parameter	Parameter number corresponding to object index (Main-Sub). For objects other than 3000h to 3FFFh, refer to the relevant documentation (see *"1.3 Related Documents"*) for each driver, as some parameter numbers are displayed depending on the model. ● A7B: Operating Instructions (Overall) ● A6B: Technical Reference Communication Specification	—
3	MainIndex	MainIndex of the object.	—
4	SubIndex	SubIndex of the object.	—
5	Object	Name of the object.	—
6	Data type	Data type of the object.	—
7	Access	Displays the attributes of the object. RO: Read-only RW: Read-write	—
8	Min-Max	Setting range of the object. The setting range is not displayed for objects with a data type of OS or VS.	—
9	Units	Unit of the object setting value. Pay attention to the unit when changing the setting value.	—
10	Object display area by driver	Displays objects for each driver added to the device tree. This column can be shown or hidden using the [Add/delete column] button.	*"8.10"*

No.	Name	Description	Reference
11	Setting value	Setting values of the object. The axis No., ESM status, PDS status, and file name of the driver selected in the device tree are displayed in the header. Attribute RO objects are read-only objects and cannot be entered in the text box.	*"8.12.2"* *"8.12.3"*

— Precautions —

- For details of the function and setting range of each object, see the relevant documentation (see *"1.3 Related Documents"*) for your model.
  - A7B: Operating Instructions (Overall)
  - A6B: Technical Reference Communication Specification
- Objects can be edited when the ESM status of the driver is "Init". To edit an object, change the ESM status from to "Init" from the host device.

8.12.2 ESM

You can check the ESM (EtherCAT State Machine) status of the driver selected in the device tree.

Min - Max	Units	Axis0 ESM:Init PDS:Not ready to switch on
8000h - 7FFFh	-	0079

The values displayed for the ESM status of the driver and the ESM status of Set-up Support Software (PANATERM ver.7) are shown below.

Driver ESM status	Values displayed for the ESM status of Set-up Support Software (PANATERM ver.7)
Init	Init
Pre-Operational	Other than Init
Safe-Operational	Other than Init
Operational	Other than Init

8.12.3 PDS

You can check the PDS (Power Drive Systems) status of the driver selected in the device tree.

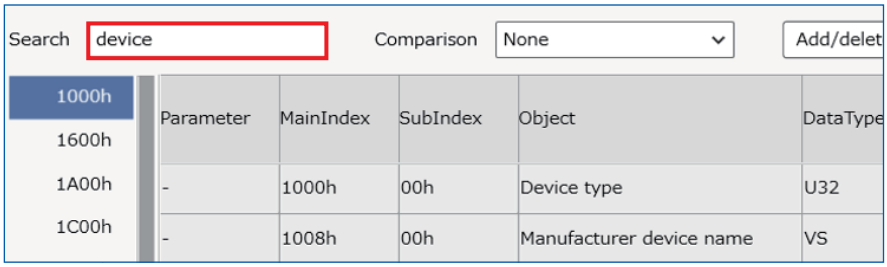
Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for details on PDS status.

- A7B: Operating Instructions (Overall)
- A6B: Technical Reference Communication Specification

Min - Max	Units	Axis0 ESM:Init PDS:Not ready to switch on
8000h - 7FFFh	-	0079

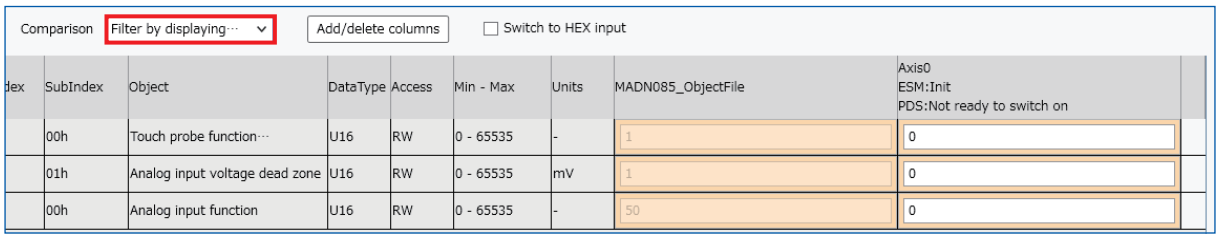
8.12.4 Searching Objects

Display object Nos. or objects that contain the keywords entered in the "Search" box.



8.12.5 Comparing Objects

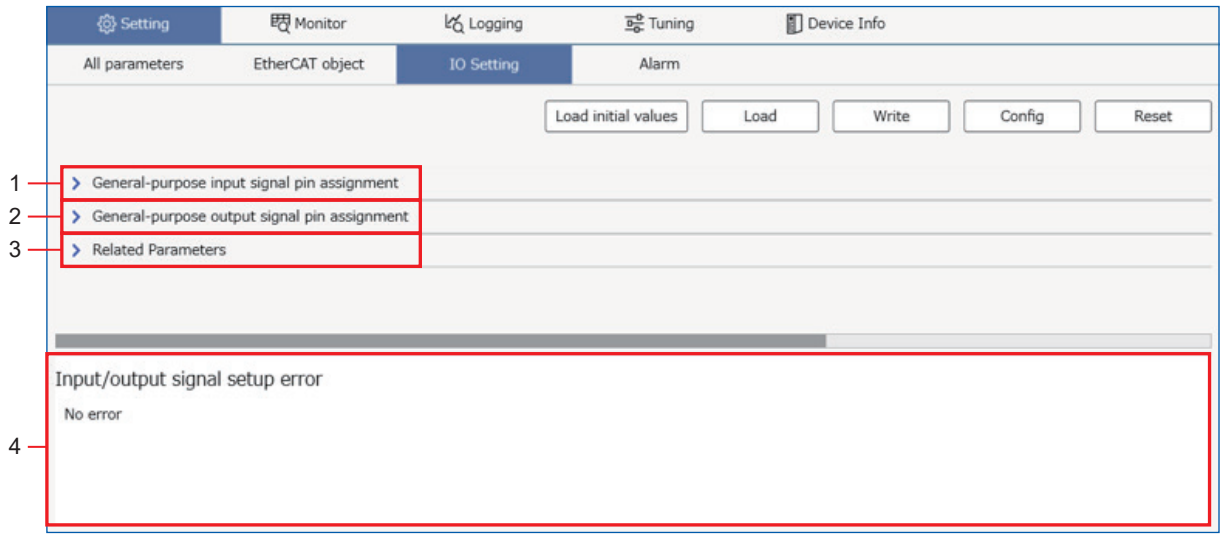
By selecting the “Comparison” combo box, you can compare or narrow down the display of objects with multiple drivers. Objects that differ in the results of the comparison are outlined in yellow.



8.13 IO Settings

You can set general-purpose I/O pin assignments. You can also edit parameters related to general-purpose I/O.

8.13.1 Configuration of the IO Settings Tab Screen



No.	Name	Description	Reference
1	General-purpose input signal pin assignment	Set general-purpose input signal pin assignments.	*"8.13.2"*
2	General-purpose output signal pin assignment	Set general-purpose output signal pin assignments.	*"8.13.3"*
3	Related parameters	Edit parameters related to general-purpose I/O settings.	*"8.13.4"*
4	I/O signal error display area	Depending on the setting, the error description is displayed when an error occurs with the I/O signal.	—

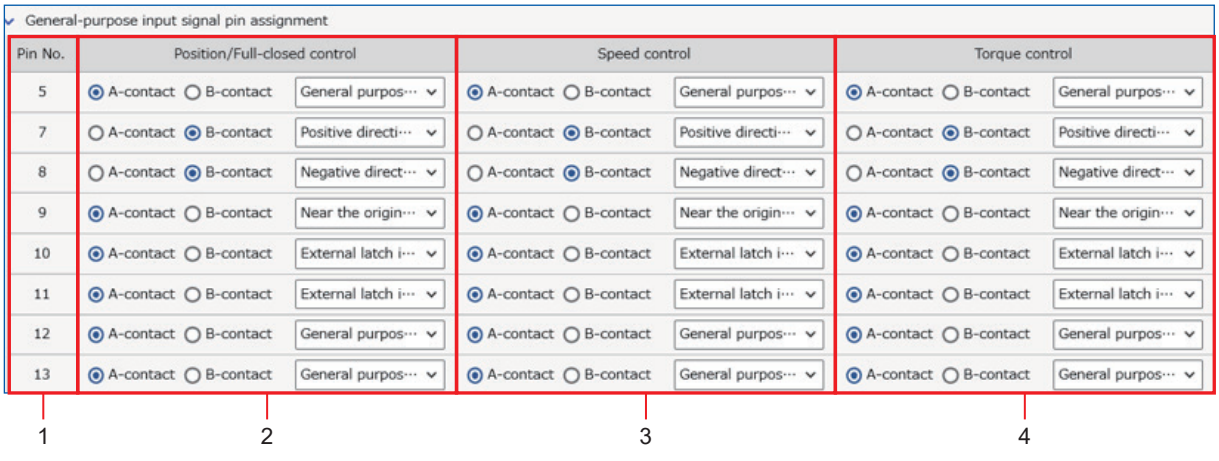
For information on how to write to the driver after setting changes, see *"8.7 Writing Parameters"* .

— Precautions —

- Simultaneous editing of multiple drivers is not possible in the "IO Settings" tab. Edit with one driver selected in the device tree.

8.13.2 General-purpose Input Signal Pin Assignment

You can set the "General-purpose input signal pin assignment". Check the "Pin No." and "Control mode" as you set the assignment.



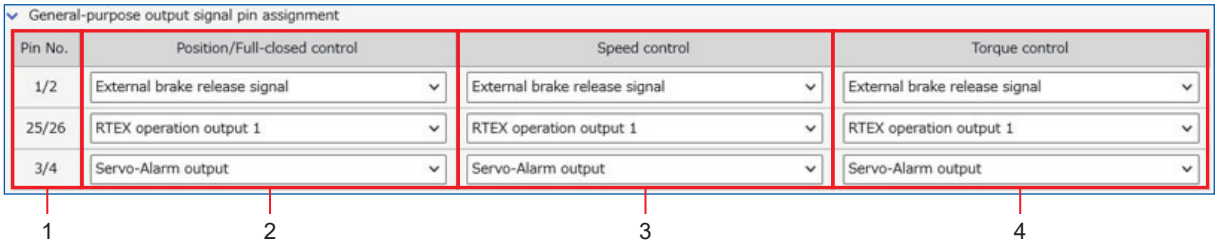
No.	Name	Description
1	Pin No.	Pin No. to be set.
2	Position/Full-closed control	General-purpose input pin assignment setting for “Position/Full-closed control”.
3	Speed control	General-purpose input pin assignment setting for “Velocity control”.
4	Torque control	General-purpose input pin assignment setting for “Torque control”.

— Precautions —

- Which control mode pin assignment setting is enabled for the driver depends on the control mode of the driver.
- For details of the function and setting range of each parameter, see the relevant documentation (see *“1.3 Related Documents”*) for your model.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- When assigning the same signal to multiple control modes, all contact types should be set as either “A Contact” or “B Contact”. If the contact types are set inconsistently, the error description is displayed in the “I/O signal error display area”. Change the settings in accordance with the description.
- The same input signal cannot be set to more than one pin (output signals settings can be duplicated). When assigning the same signal in multiple control modes, assign it to the same pin.
- If a setting that cannot be assigned is made, the error description is displayed in the “I/O signal error display area”. Change the settings in accordance with the description. Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model for details on settings that cannot be assigned.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- If parameters are written to the driver with settings configured that cannot be assigned to general-purpose I/O settings, an alarm may be displayed.

8.13.3 General-purpose output signal pin assignment

You can set the General-purpose output signal pin assignment. Check the “Pin No.” and “Control mode” as you set the assignment.



No.	Name	Description
1	Pin No.	Pin No. to be set.
2	Position/Full-closed control	General-purpose output pin assignment setting for “Position/Full-closed control”.
3	Speed control	General-purpose output pin assignment setting for “Velocity control”.
4	Torque control	General-purpose output pin assignment setting for “Torque control”.

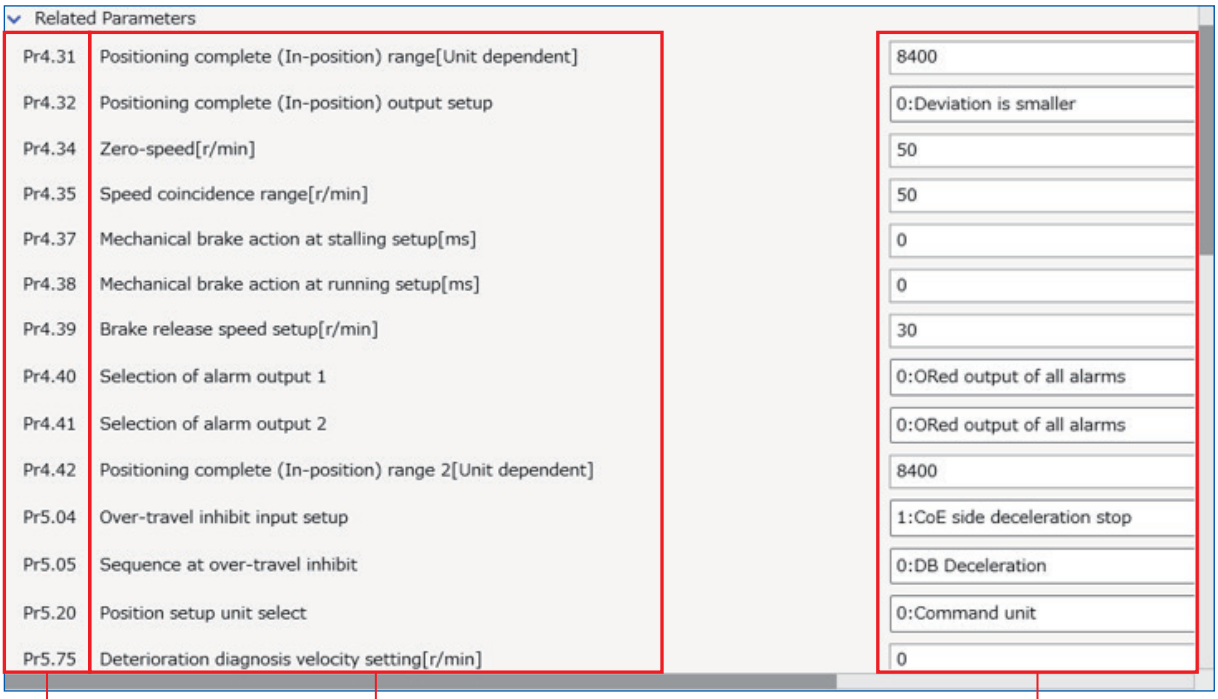
— Precautions —

- Which control mode pin assignment setting is enabled for the driver depends on the control mode of the driver.

- For details of the function and setting range of each parameter, see the relevant documentation (see *"1.3 Related Documents"*) for your model.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- If a setting that cannot be assigned is made, the error description is displayed in the "I/O signal error display area". Change the settings in accordance with the description. Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for details on settings that cannot be assigned.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- If parameters are written to the driver with settings configured that cannot be assigned to general-purpose I/O settings, an alarm may be displayed.

8.13.4 Related parameters

You can edit parameters related to general-purpose I/O.



No.	Name	Description
1	Parameter number	Parameter class and No.
2	Parameter name and unit	Name of the parameter and unit of the parameter value. Pay attention to the unit when editing parameter values.
3	Parameter values	Sets parameter values to be written to the driver.

For details of the function and setting range of each parameter, see the relevant documentation (see *"1.3 Related Documents"*) for your model.

- A7: Operating Instructions (Overall)
- A6: Technical Reference Functional Specification

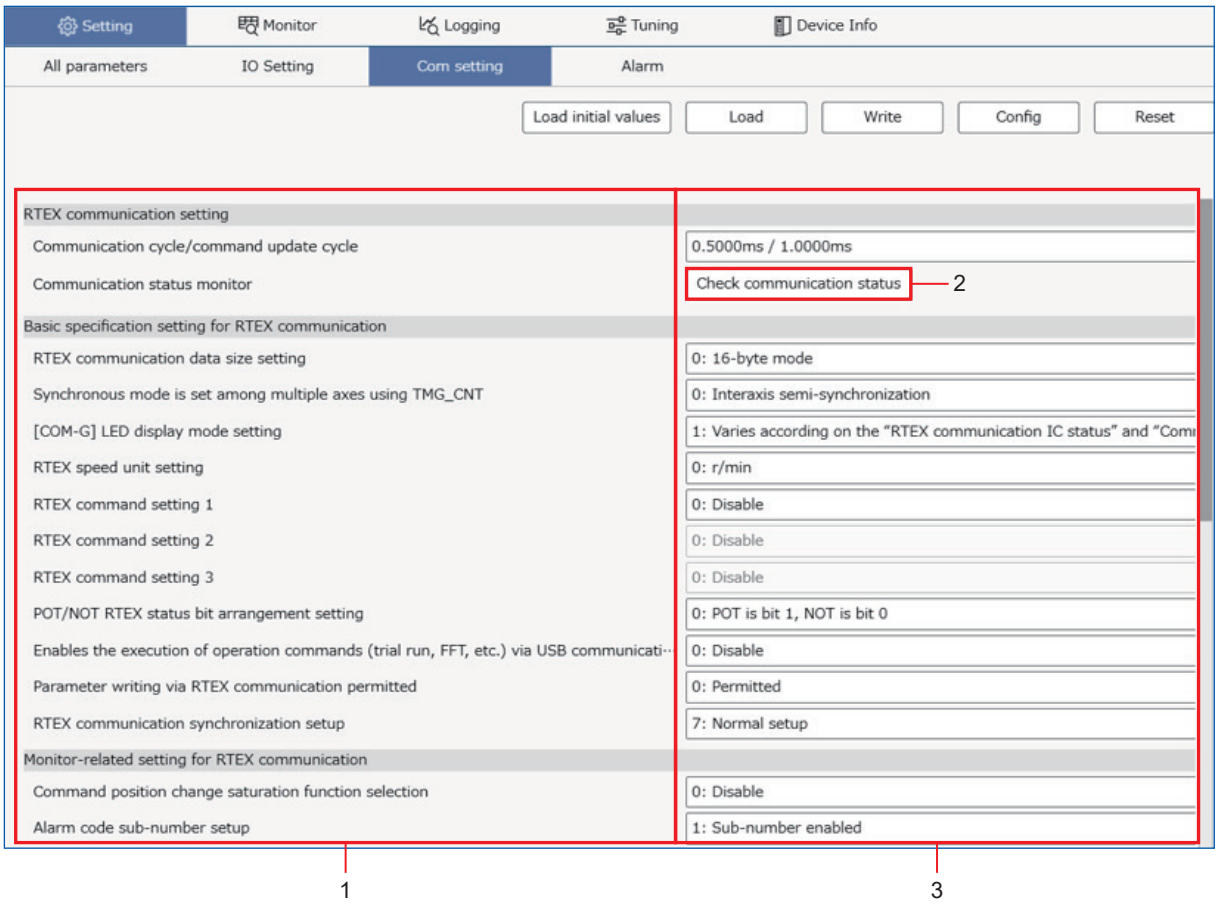
8.14 Com setting

Parameters related to driver communication can be edited.

This is only displayed for RTEX communication type drivers.

The parameters displayed depend on the communication type of the driver selected in the device tree.

8.14.1 Configuration of the Com setting Tab Screen



No.	Name	Description	Reference
1	Parameter name	This is the parameter name.	—
2	Check communication status	Displays the communication status monitor.	*"8.14.2"*
3	Parameter values	Sets parameter values to be written to the driver.	—

For information on how to write to the driver after setting changes, see *"8.7 Writing Parameters"* .

For details of the function and setting range of each parameter, see the relevant documentation (see *"1.3 Related Documents"*) for your model.

- A7: Operating Instructions (Overall)
- A6: Technical Reference Functional Specification

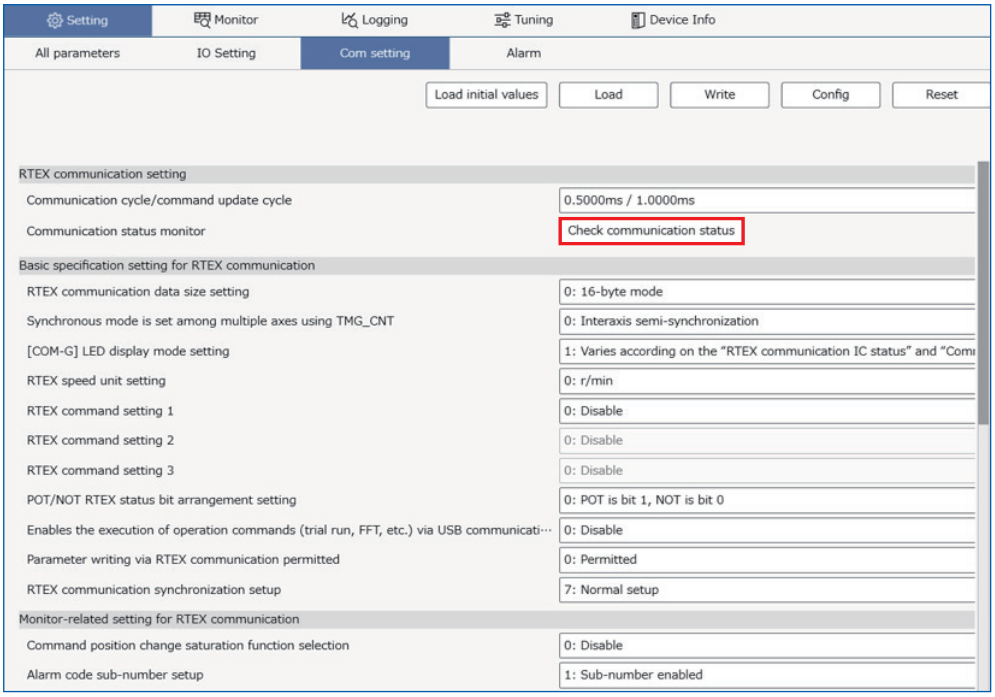
8.14.2 RTEX Communication Status Monitor

8.14.2.1 Opening the RTEX Communication Status Monitor

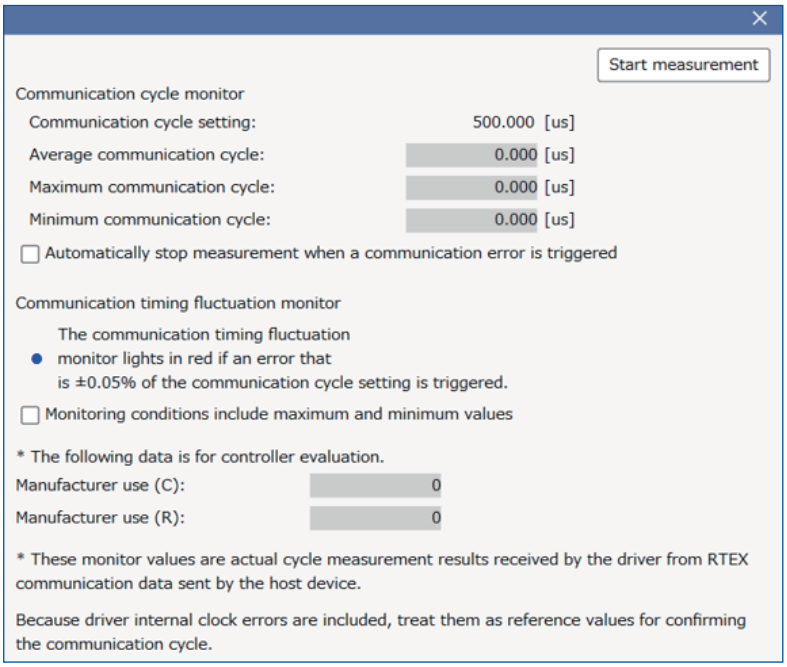
RTEX communication data sent from the host device is displayed as the actual cycle measurement results received by the driver.

<< Procedure >>

1. Select one device in the device tree for which to display the monitor and click the [Check communication Status] button.

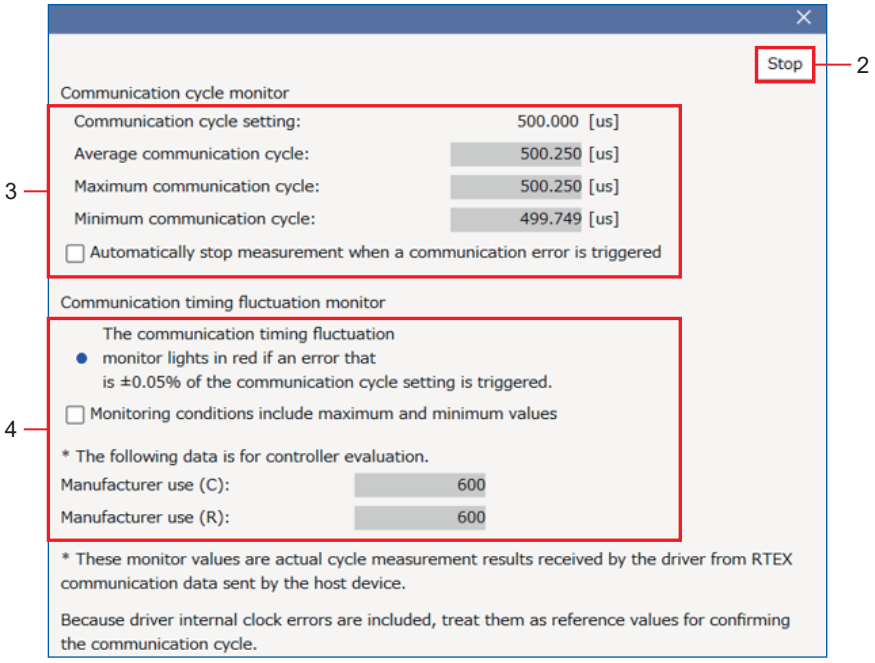


The RTEX communication status monitor opens.

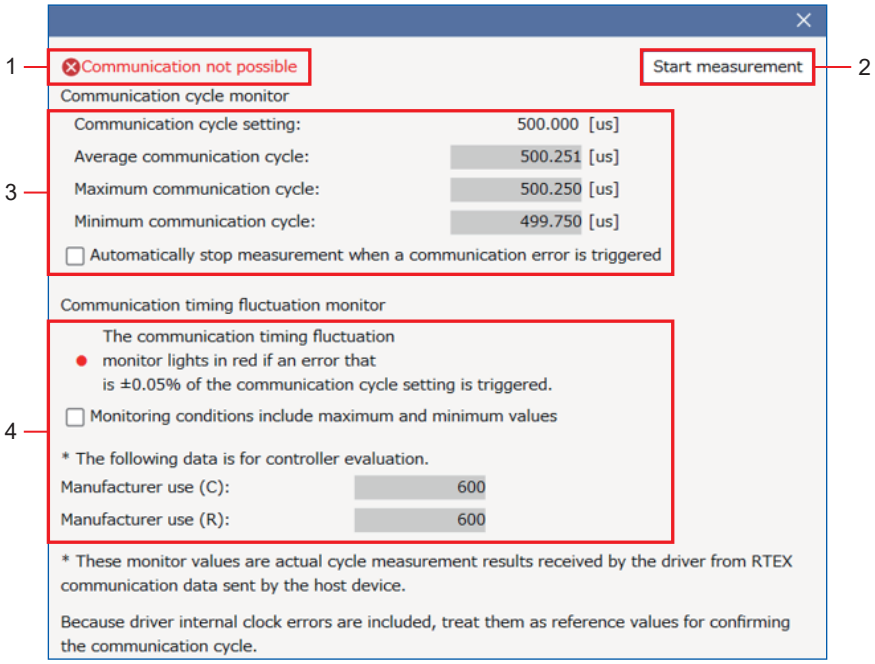


8.14.2.2 Configuration of the RTEX Communication Status Monitor Screen

Connected driver: Online (measurement status)



Connected driver: Offline



No.	Name	Description	Reference
1	Communication cannot be established indication	This message appears when the connected driver is offline or disconnected.	—
2	Measure button	Starts and ends measurement.	—
3	Communication cycle monitor	Communication cycle monitor results are displayed.	—

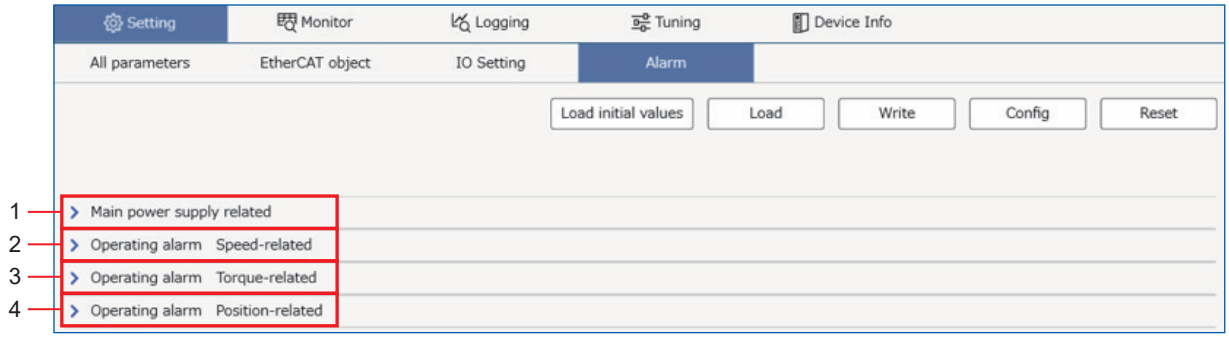
No.	Name	Description	Reference
4	Communication timing fluctuation monitor	When the average communication cycle is within the allowable range, the light turns blue. When communication fluctuation occurs, the light turns red. When the “Monitoring conditions include maximum and minimum values” box is checked, the maximum and minimum communication cycles are also subject to judgment by the communication timing fluctuation monitor.	—

8.15 Alarm

Parameters related to alarms can be edited.

8.15.1 Configuration of the Alarm Tab Screen

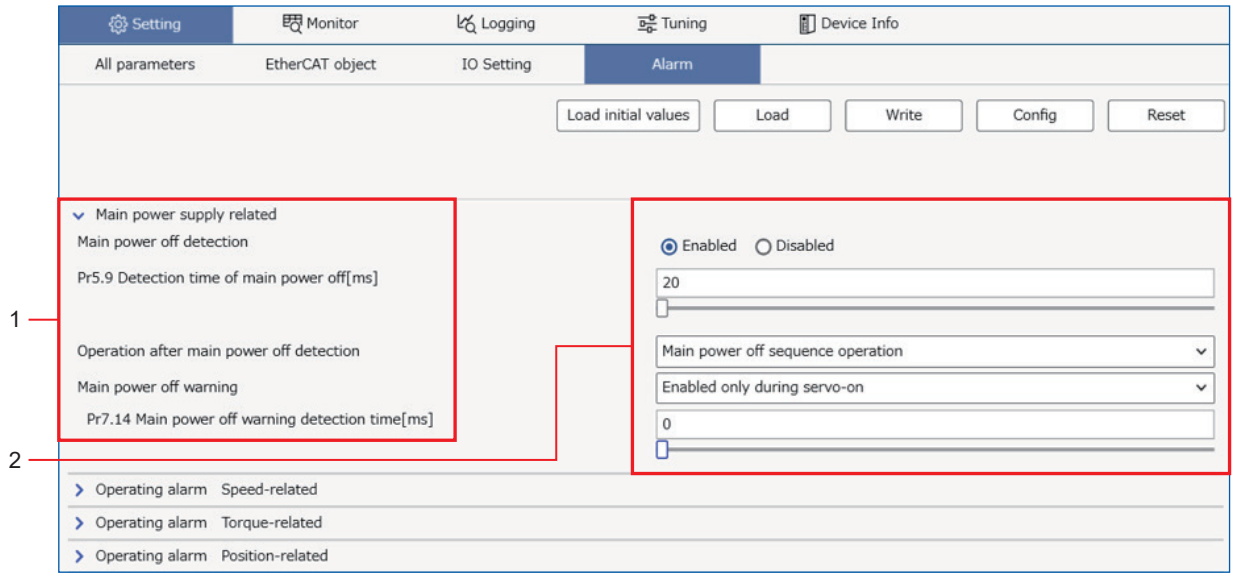
Configuration of the Alarm Tab Screen



No.	Name	Description	Reference
1	Main power supply related	Set the detection time and action when the alarm is triggered for main power supply related alarms.	—
2	Operating alarm - Speed-related	Set the alarm trigger conditions and action when the alarm is triggered for motor speed related alarms.	—
3	Operating alarm - Torque-related	Set the detection conditions and action when the alarm is triggered for motor torque related alarms.	—
4	Operating alarm - Position-related	Set the detection conditions and action when the alarm is triggered for motor position related alarms.	—

The configuration of the Parameter Setup screen is the same for all alarm types.

Configuration of the Parameter Setup Screen



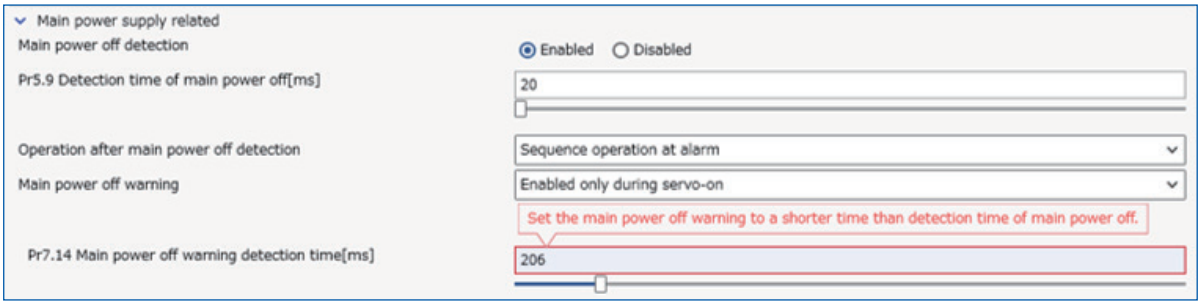
No.	Name	Description	Reference
1	Parameter name and unit	Name of the parameter and unit of the parameter value. Pay attention to the unit when editing parameter values.	—
2	Parameter values	Sets parameter values to be written to the driver.	—

- For information on how to write to the driver after setting changes, see *"8.7 Writing Parameters"* .

- For details of the function and setting range of each parameter, see the relevant documentation (see *"1.3 Related Documents"*) for your model.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification

― Precautions ―

- Incorrect parameter values trigger an alarm and a pop-up appears. Change the settings in accordance with the pop-up contents. If there is an incorrect setting for a parameter value, the parameter cannot be written to the driver.



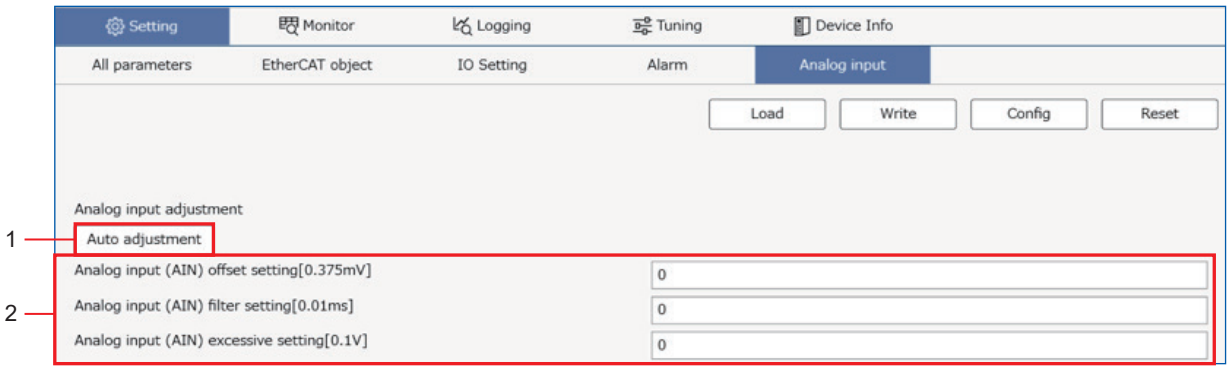
8.16 Analog Input

Set parameters related to analog input.

This is displayed only when a model that supports analog input is connected.

For models that support analog input, see *"2.3 Confirming the Applicable Driver"* .

8.16.1 Configuration of the Analog Input Tab Screen



No.	Name	Description	Reference
1	Auto adjustment	Automatically tunes parameters related to analog input.	—
2	Parameter setup area	Set parameters related to analog input.	—

- For information on how to write to the driver after setting changes, see *"8.7 Writing Parameters"* .
- For details of the function and setting range of each parameter, see the relevant documentation (see *"1.3 Related Documents"*) for your model.
  - A7: Operating Instructions (Overall)

9 Monitor

9.1 Monitor

Displays the operational status of drivers and motors, as well as input and output signals. Monitor data can be recorded over a long period and played back on screen.

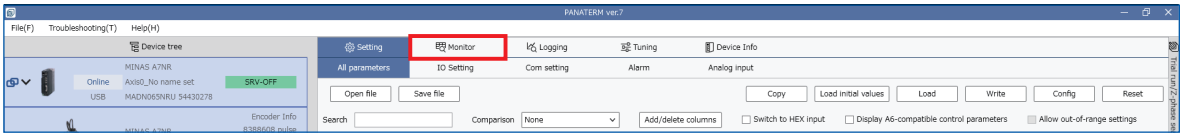
— Precautions —

- The monitor function is not a measurement device. The monitor display should only be used as reference data.
- There is a time lag between the driver and the computer. Therefore. there may be errors or delays between the actual driver values and recording times and the values displayed on the screen and the monitor values and times saved in monitor data files.
- There are slight discrepancies between the multiple types of data recorded on the monitor screen display and in the monitor data file at a given time, even if they were recorded at the same time. To check more accurate information, use *"10.1 Measuring Waveforms"* .

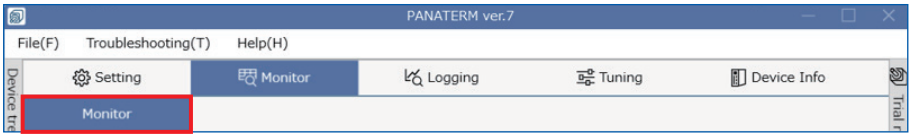
9.1.1 Opening the Monitor Screen

<< Procedure >>

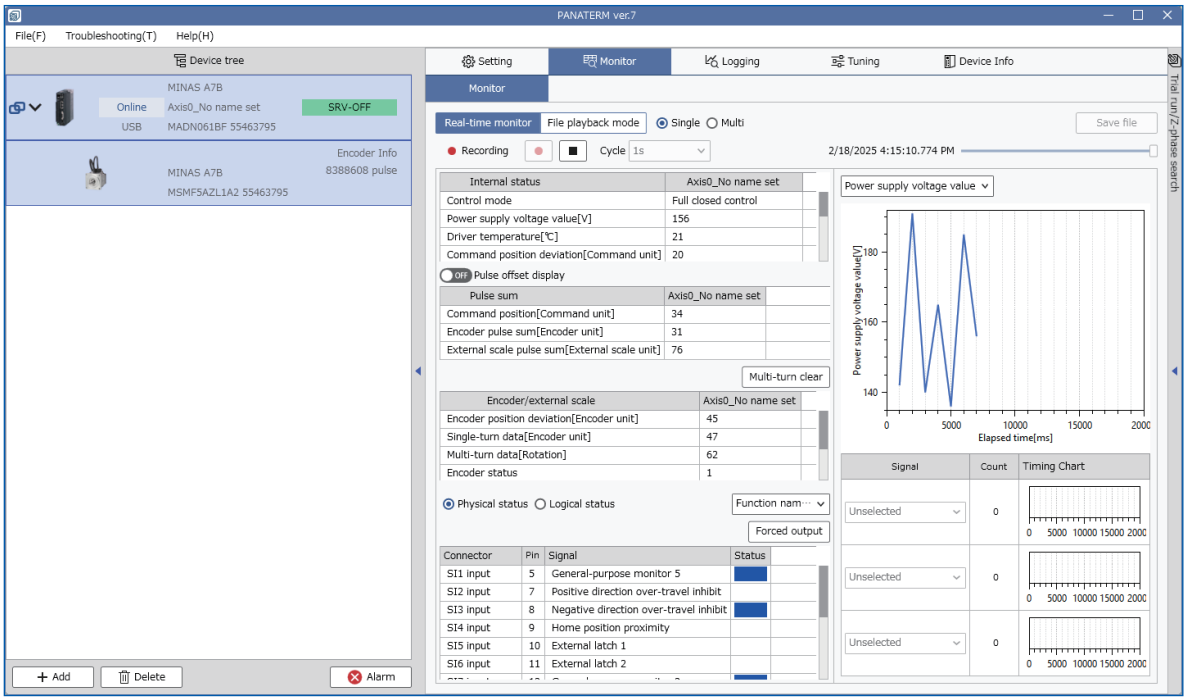
1. Select one device in the device tree for which to display the monitor and click the "Monitor" tab.



2. Click on the "Monitor" tab in the sub tab.



This displays the monitor screen.

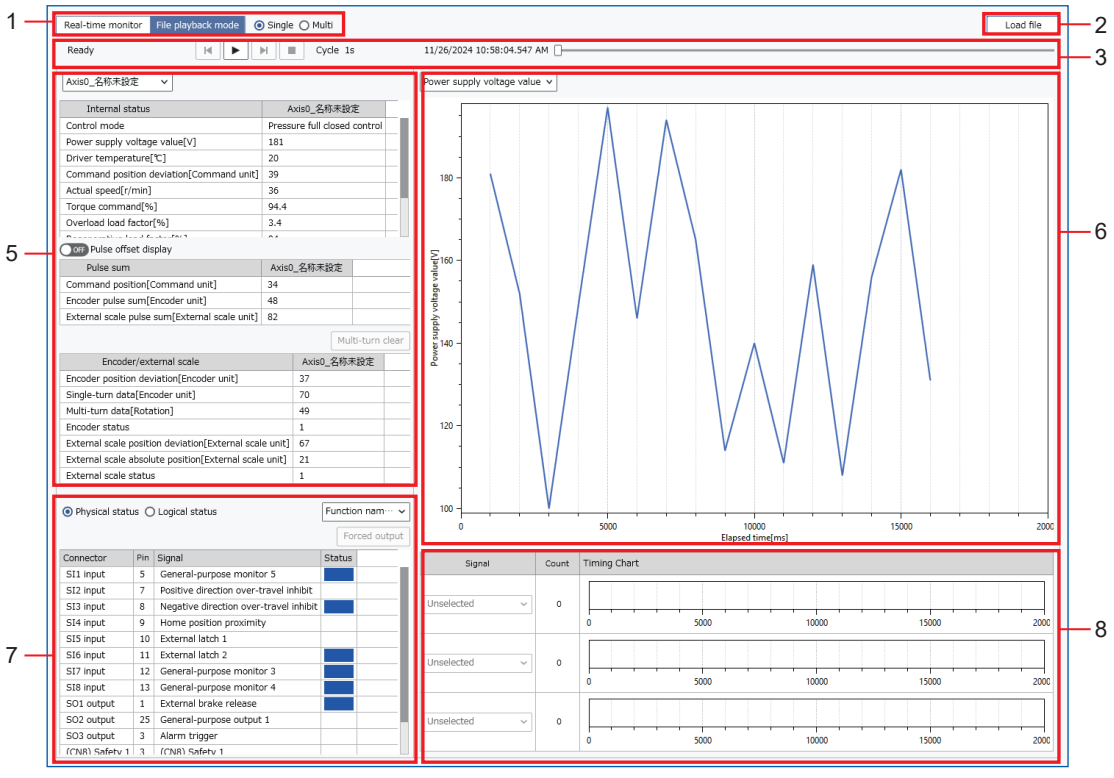


Notes

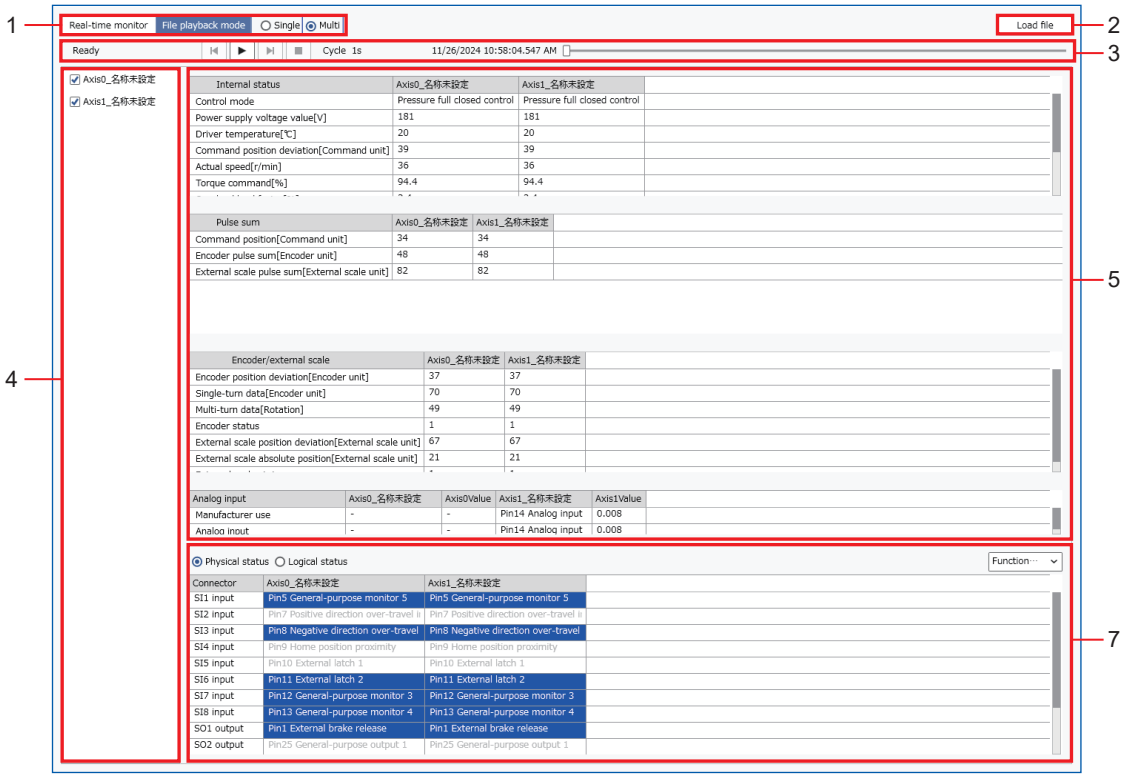
- Select a device from the device tree during graph display switches the display to information about the selected device.

9.1.2 Configuration of the Monitor Screen

■ Single display

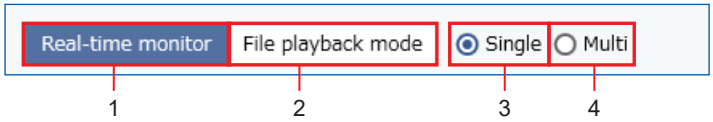


■ Multi display



No.	Name	Description	Reference
1	Mode selection	Select from real-time monitor/file playback mode and from single/multi.	*"9.1.3"*
2	Read file/Save file	The button switches depending on the mode. Function: Real-time monitor — Overview: Save recorded data to a file. Play-back saved data in File playback mode. Function: File playback mode — Overview: Select and load the monitor data file to be played back.	*"9.1.4"* *"9.1.5"*
3	Recording and playback functions	Function: Real-time monitor — Overview: Use the recording function. Function: File playback mode — Overview: Use the playback function.	*"9.1.6"*
4	Driver selection area	Select the drivers to be displayed in the area for monitor details.	—
5	Area for monitor details	Check the internal status of the driver and details of the encoder.	*"9.1.7"*
6	Area for graph details	Set the graph display and the items to be displayed on the graph.	*"9.1.9"*
7	Area for I/O signal details	Monitor I/O signals, and execute name changes and forced output. Display the data being monitored in a graph.	*"9.1.10"*
8	I/O information display area	A timing chart for each I/O pin is displayed. The signal names in the I/O information display area are displayed according to the parameter values set in "IO Settings". Elapsed time is linked to the graph. While recording is stopped, adjust the display position by operating the slider.	—

9.1.3 Mode Selection



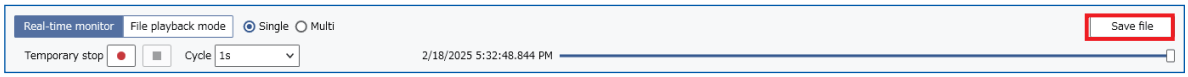
No.	Name	Description	Reference
1	Real-time monitor	Switch to real-time monitoring. Display the operational status of drivers and motors, I/O signals, and the internal status, etc. You can also record monitor data.	—
2	File playback mode	Switch to file playback mode. You can play back monitor data files.	—
3	Single	Monitor one driver. Display the data being monitored in a graph.	—
4	Multi	Monitor multiple drivers. Switches the display of monitor information to list view.	—

9.1.4 Saving Files

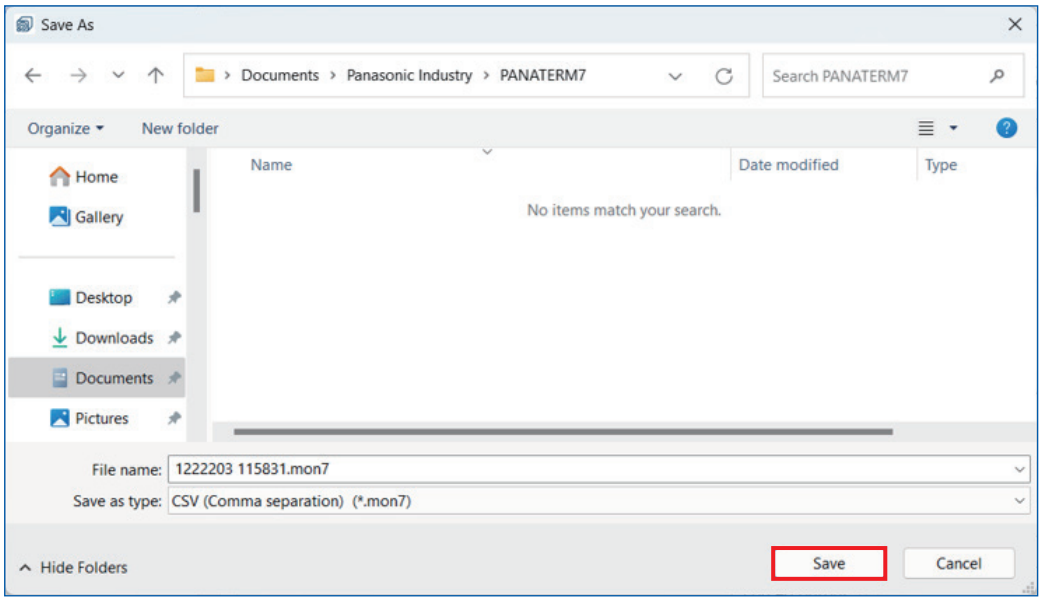
Use “Real-time monitor” to save the monitored data to a file. Playback saved data in “File playback mode”.

<< Procedure >>

1. Click the [Save file] button.



2. Click the [Save] button to save the file.



— Precautions —

- Save the data of all connected drivers together. You cannot select the data to be saved.

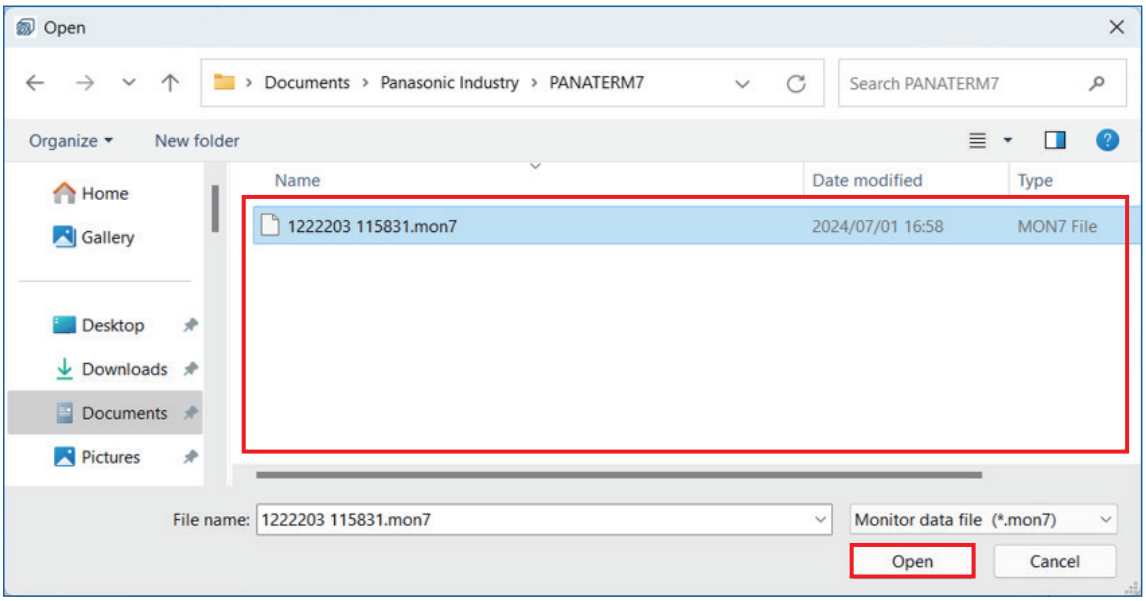
9.1.5 Loading Files

"File playback mode" can be used to load monitor data files saved on a computer.

<< Procedure >>

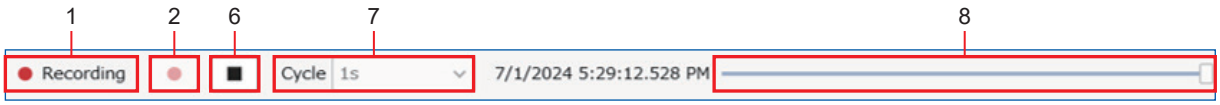
1. Click the [Load file] button.

2. The "Open" dialog box appears. Select a monitor data file and click the [Open] button.

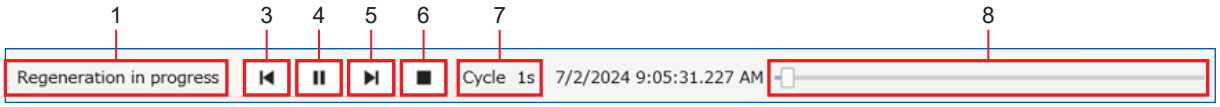


9.1.6 Recording and Playback Functions

Real-time monitor display



File playback mode display

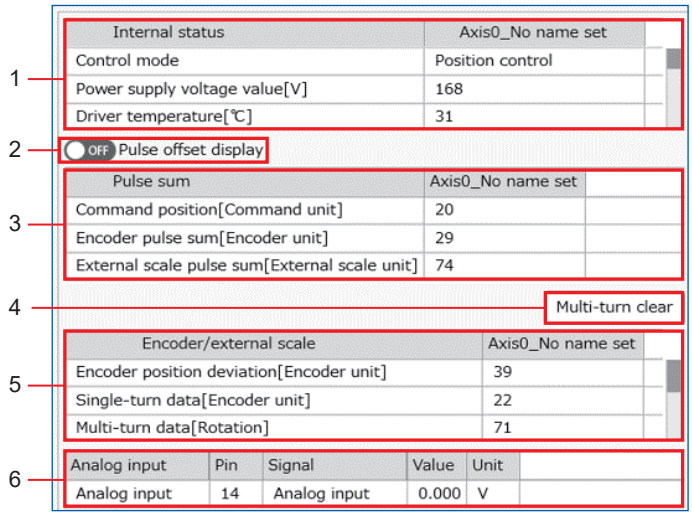


<table>
<tr><th>No.</th><th>Name</th><th>Description</th><th>Reference</th></tr>
<tr><td>1</td><td>Status display</td><td>Display the recording/playback status of the monitor data file.
<table>
<tr><th>Function</th><th>Overview</th></tr>
<tr><td>Real-time monitor</td><td>Displays “Recording” or “Pause”.</td></tr>
<tr><td>File playback mode</td><td>Displays the recording/playback status. The following table shows the status indicators.</td></tr>
</table>
<table>
<tr><th>Status</th><th>Display</th></tr>
<tr><td>When monitor data file is not selected</td><td>File not specified</td></tr>
<tr><td>Playback paused</td><td>Ready</td></tr>
<tr><td>Regeneration in progress</td><td>Regeneration in progress</td></tr>
<tr><td>Playback paused</td><td>Pause</td></tr>
<tr><td>Rewinding at 2× speed</td><td>Rewinding (2×)</td></tr>
<tr><td>Rewinding at 4× speed</td><td>Rewinding (4×)</td></tr>
<tr><td>Rewinding at 8× speed</td><td>Rewinding (8×)</td></tr>
<tr><td>Rewinding at 16× speed</td><td>Rewinding (16×)</td></tr>
<tr><td>Fast-forwarding at 2× speed</td><td>Fast-forwarding (2×)</td></tr>
<tr><td>Fast-forwarding at 4× speed</td><td>Fast-forwarding (4×)</td></tr>
<tr><td>Fast-forwarding at 8× speed</td><td>Fast-forwarding (8×)</td></tr>
<tr><td>Fast-forwarding at 16× speed</td><td>Fast-forwarding (16×)</td></tr>
</table></td><td>—</td></tr>
<tr><td>2</td><td>Record</td><td>Start recording monitor data.
The monitor can record up to 86,400 cycles per measurement. (If the sampling cycle is 1 second, up to 86,400 seconds (24 hours) can be recorded.)
Depending on the available capacity of the computer, the process may end in a lower measurement count.
When recording starts, unsaved monitor data is discarded.</td><td>—</td></tr>
<tr><td>3</td><td>Rewind</td><td>Rewind the monitor data file currently playing.
Select 2×, 4×, 8×, or 16×.</td><td>—</td></tr>
<tr><td>4</td><td>Playback/Pause</td><td>Play/pause a monitor data file.</td><td>—</td></tr>
<tr><td>5</td><td>Fast-forward</td><td>Fast-forward the monitor data file currently playing.
Select 2×, 4×, 8×, or 16×.</td><td>—</td></tr>
<tr><td>6</td><td>Stop</td><td>
<table>
<tr><th>Function</th><th>Overview</th></tr>
<tr><td>Real-time monitor</td><td>Stop recording monitor data.</td></tr>
<tr><td>File playback mode</td><td>Stop playback of the monitor data file.</td></tr>
</table></td><td>—</td></tr>
</table>

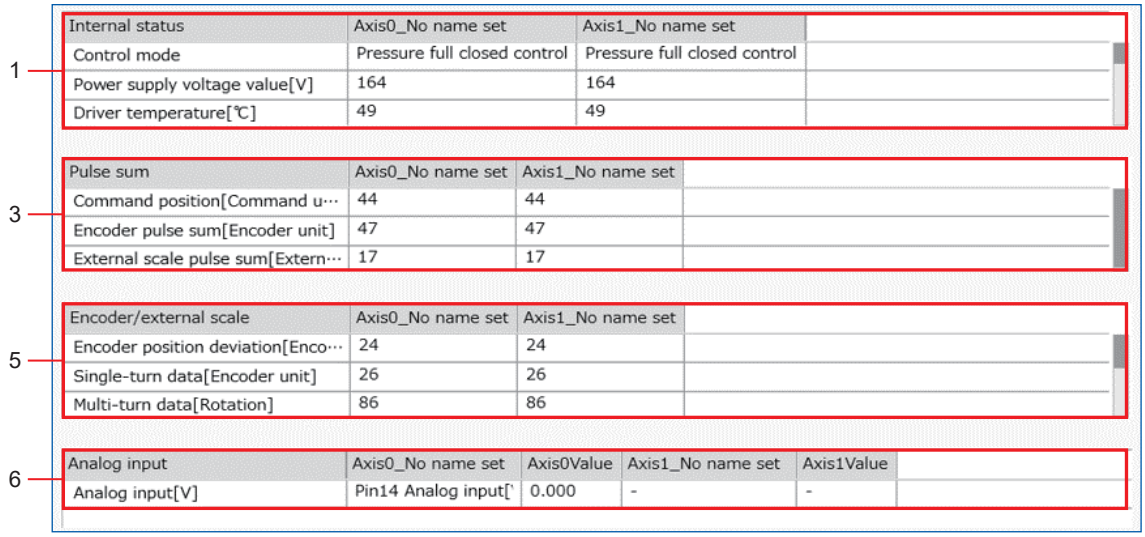
<table>
<tr><th>No.</th><th>Name</th><th>Description</th><th>Reference</th></tr>
<tr><td>7</td><td>Sampling cycle</td><td>
<table>
<tr><th>Function</th><th>Overview</th></tr>
<tr><td>Real-time monitor</td><td>Set the sampling cycle.
Select from 100 ms, 500 ms, 1 s, 5 s, or 10 s.
This operation is not available while recording.
The sampling cycle may be longer than the set time depending on the read conditions of the computer or driver.</td></tr>
<tr><td>File playback mode</td><td>Display the sampling cycle of the monitor data file to be played back.
The fast-forward/rewind operation mode varies depending on the cycle of the monitor data file read.</td></tr>
</table>
<table>
<tr><th>Monitor data file cycle</th><th>Fast-forward/rewind operation mode</th></tr>
<tr><td>100 ms</td><td>Fast-forward/rewind not available</td></tr>
<tr><td>500 ms</td><td>Fast-forward and rewind up to 4× speed</td></tr>
<tr><td>1 s</td><td>Fast-forward and rewind up to 8× speed</td></tr>
<tr><td>5 s</td><td>Fast-forward and rewind up to 16× speed</td></tr>
<tr><td>10 s</td><td>Fast-forward and rewind up to 16× speed</td></tr>
</table>
</td><td>—</td></tr>
<tr><td>8</td><td>Slider</td><td>Indicate from where to play the video.</td><td>—</td></tr>
</table>

9.1.7 Area for Monitor Details

■ Single display



■ **Multi display**



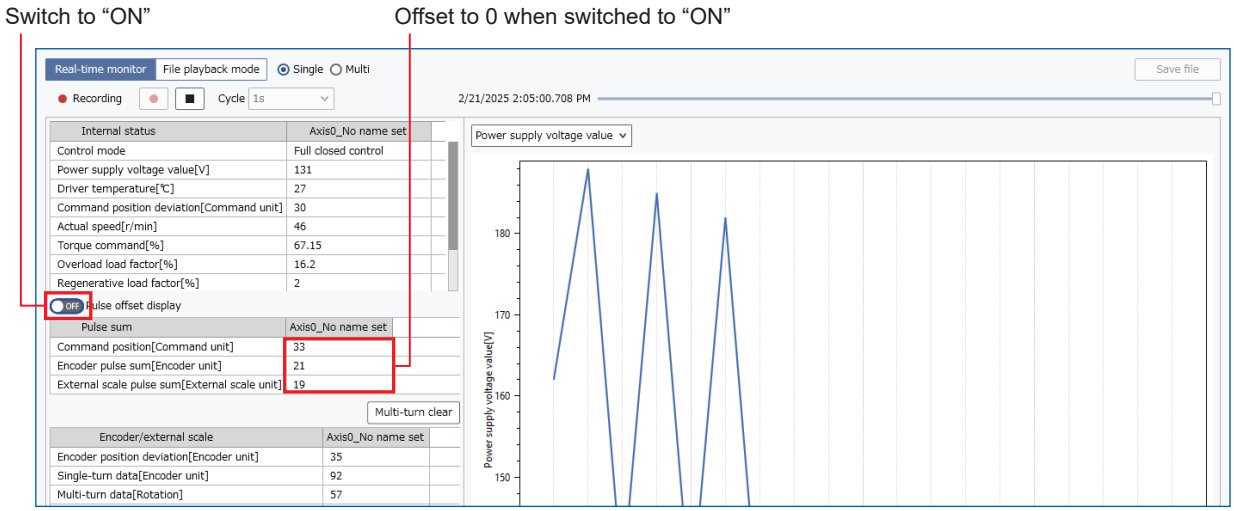
No.	Name	Description	Reference
1	Internal status display area	Display the internal status of the driver.	—
2	Pulse offset display	Turn “Pulse offset display” ON to display the pulse sum at the time of data acquisition as 0. (Displays in single mode only)	*“9.1.8”*
3	Pulse sum display area	Displays the pulse sums for the commands taken in by the driver, for the encoder, and for the external scale.	—
4	Multi-turn clear	Click the [Multi-turn clear] button to clear the multi-turn data stored in the encoder to “0” and to clear all encoder errors. (Only displayed in single mode and is not available in file playback mode.)	—
5	Encoder/external scale display area	Display position information for the encoder/external scale. What is displayed depends on the function type of the driver.	—
6	Analog input monitor	Displays the analog input voltage values. In single display, the analog input monitor is displayed only when a model that supports analog input is connected.	—

For models that support analog input, see *“2.3 Confirming the Applicable Driver”* .

9.1.8 Pulse Offset

Turn “Pulse offset display” ON to display the pulse sum at the time of data acquisition as “0”.

Executing pulse offset

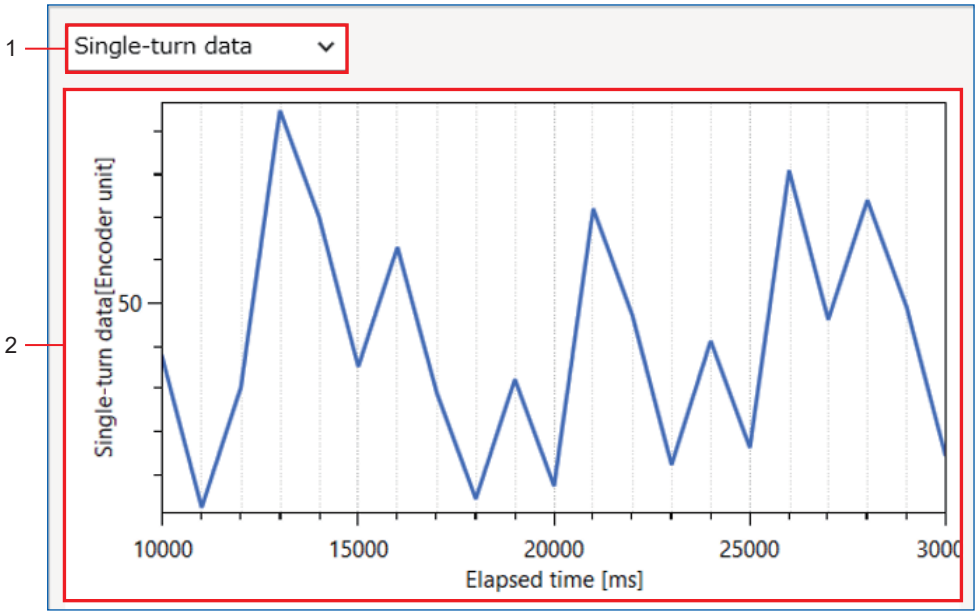


— Precautions —

- The “Pulse offset display” does not set the driver pulse sum to “0”. This function displays “0” only for the contents of the Set-up Support Software (PANATERM ver.7) pulse sum display area.

9.1.9 Area for Graph Details

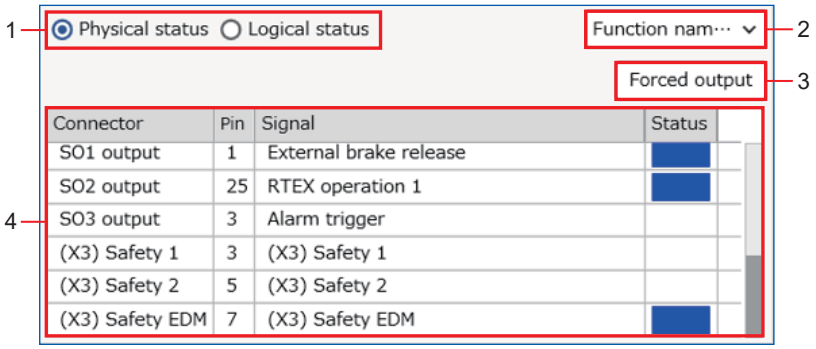
Real-time monitor/File playback mode (Single display)



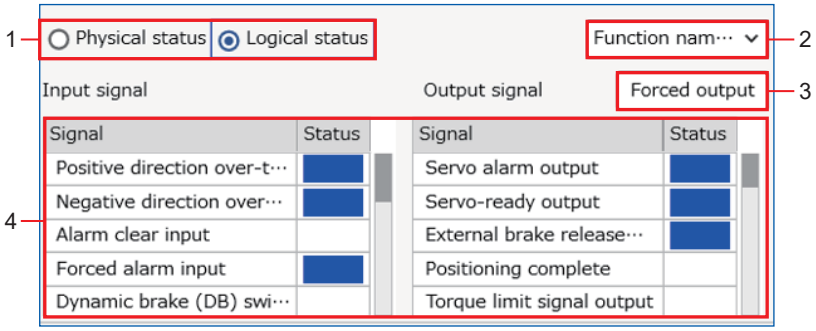
No.	Name	Description	Reference
1	Graph display items	Select the items to be displayed on the graph.	—
2	Graph display area	Display the data being monitored in a graph. Select the graph to be displayed in “Graph display items”.	—

9.1.10 Area for I/O Signal Details

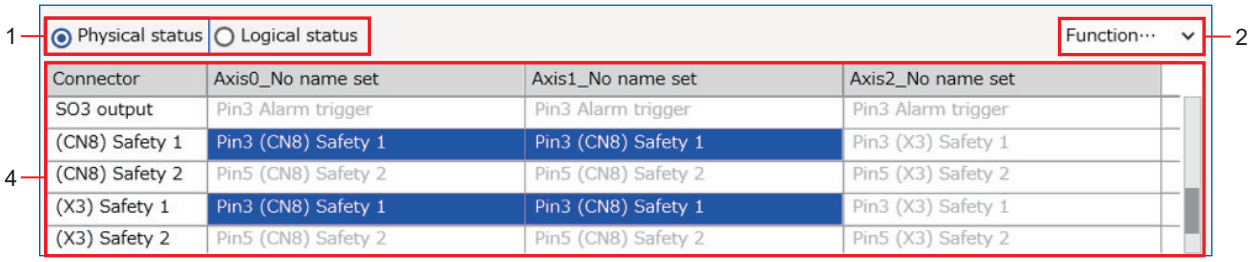
■ Single display - Physical status



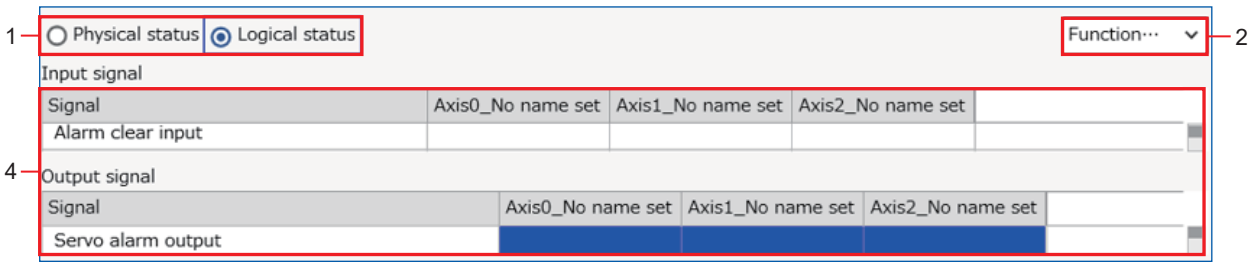
■ Single display - Logical status



■ Multi display - Physical status



■ Multi display - Logical status



No.	Name	Description	Reference
1	Physical and logical status switching settings	Switch to I/O signal status.	—
2	Signal name display switching settings	Switch the I/O signal name to function name or symbol display.	—
3	Forced output	The forced output dialog box appears. (Only displayed in single mode and is not available in file playback mode.)	*"9.1.11"*

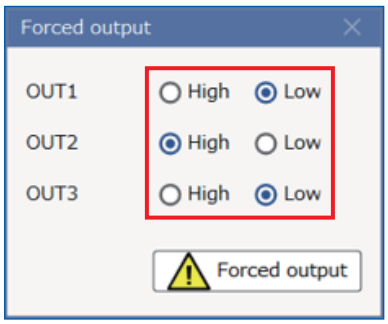
No.	Name	Description	Reference
4	I/O signal status monitor	Displays the status of the input and output signals. Physical input - Indicates the status of the input signal to the driver. Blue: High (connected to COM-) White: Low (open) Physical output - Indicates the status of the output signal from the driver. Blue: High (output transistor ON) White: Low (output transistor OFF) Logical input: Indicates the driver internal signal status. Blue: Active White: Inactive Logical output: Indicates the driver internal signal status. Blue: Active White: Inactive	*"8.13"*

9.1.11 Forced Output

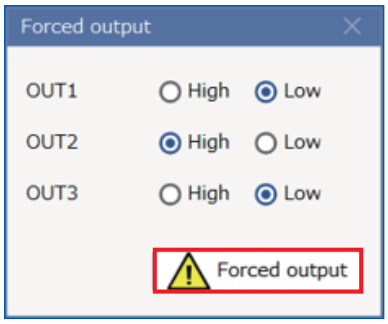
In real-time monitor mode, the driver forcibly outputs the signals set for OUT1 to OUT3.

<< Procedure >>

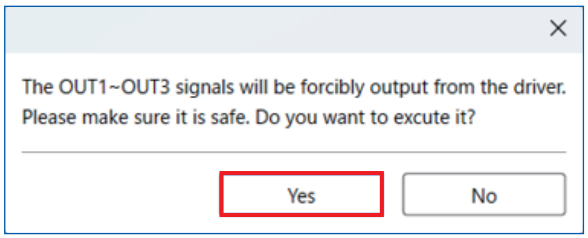
1. Set the signals for OUT1 to OUT3.



2. Click the [Forced output] button.

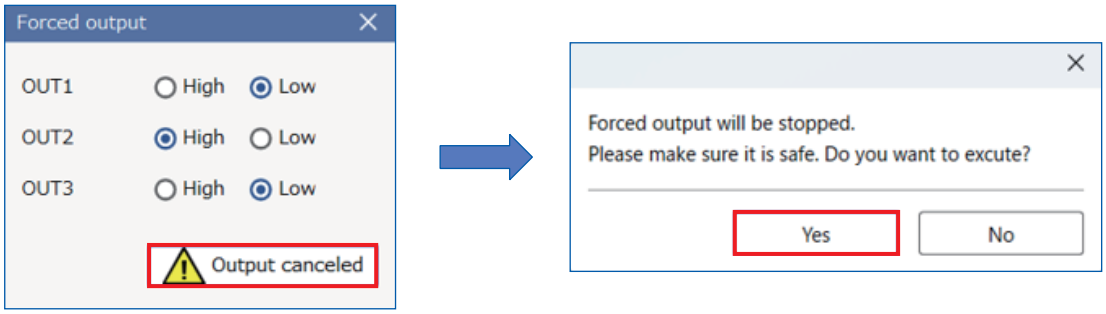


3. Click the [Yes] button.



Forced output starts.

4. To stop forced output, click the [Output canceled] button, and then click the [Yes] button in the dialog box.



Forced output stops.

5. After forced output is stopped, manually turn the driver power back on.

– Precautions –

- Forced output is not possible in the servo-on state. Also, servo-on is disabled during forced output.
- Forced output is not possible in “File playback mode”.

9.2 RTEX Communication Monitor

The RTEX communication data logged to the memory in the driver can be read and the contents confirmed. RTEX communication log data can be recorded and played back on screen. For details on RTEX communication data size settings (16-byte mode, 32-byte mode), see *"8.14 Com setting"* . This function is available only for RTEX communication type drivers.

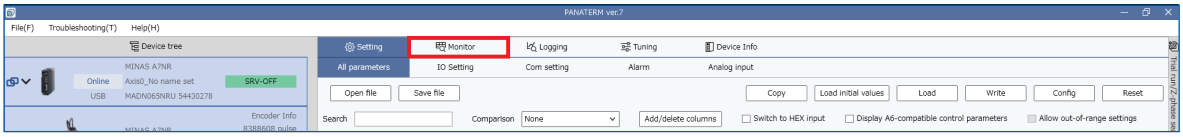
— Precautions —

- Due to the time lag between the driver and the computer, there is a difference between the time saved in the RTEX communication log file and the actual time recorded by the driver.

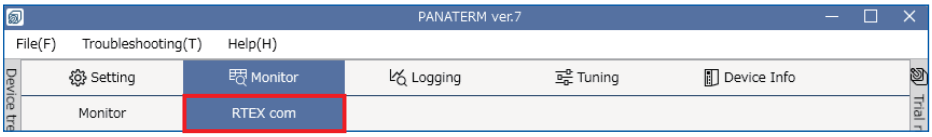
9.2.1 Opening the RTEX Communication Monitor Screen

<< Procedure >>

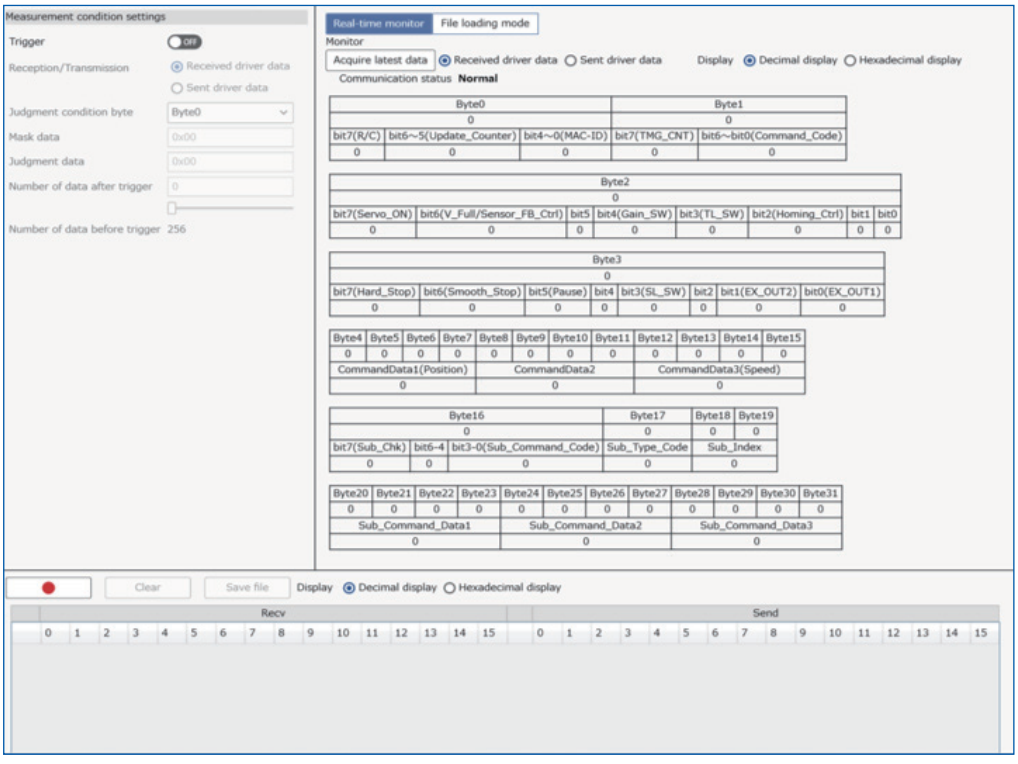
1. Select one device (RTEX communication type) in the device tree on which to display the monitor and click the "Monitor" tab.



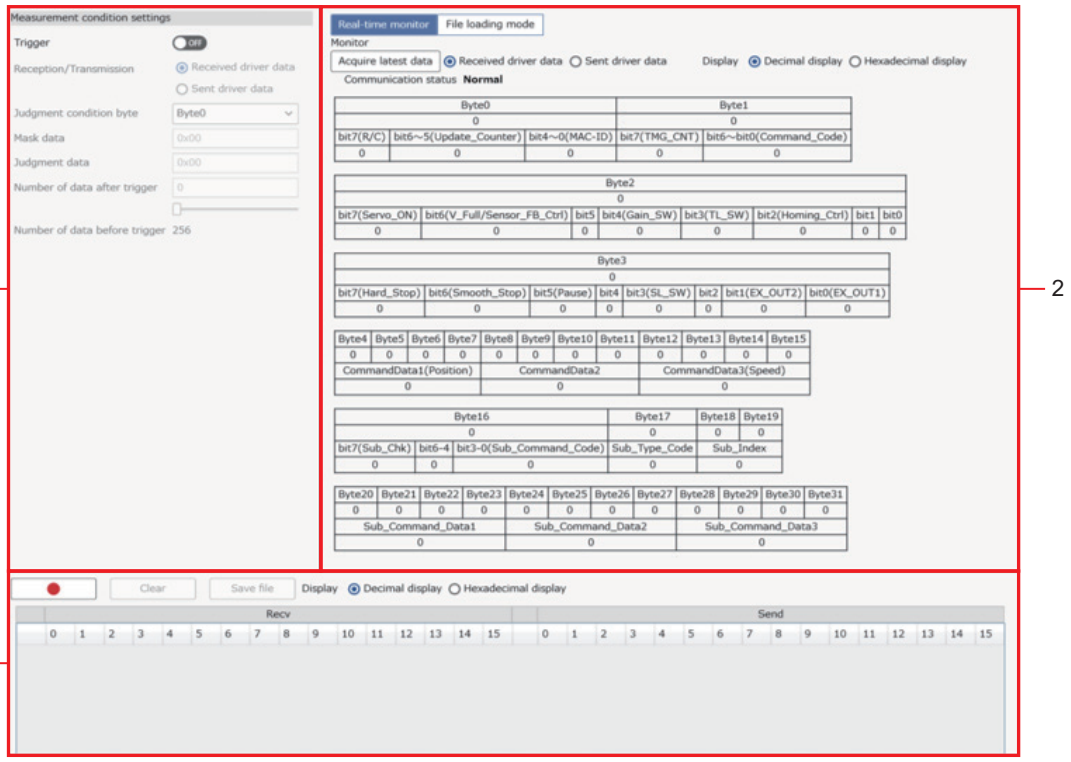
2. Click on the "RTEX com" tab in the sub tab.



3. The RTEX communication monitor screen is displayed.



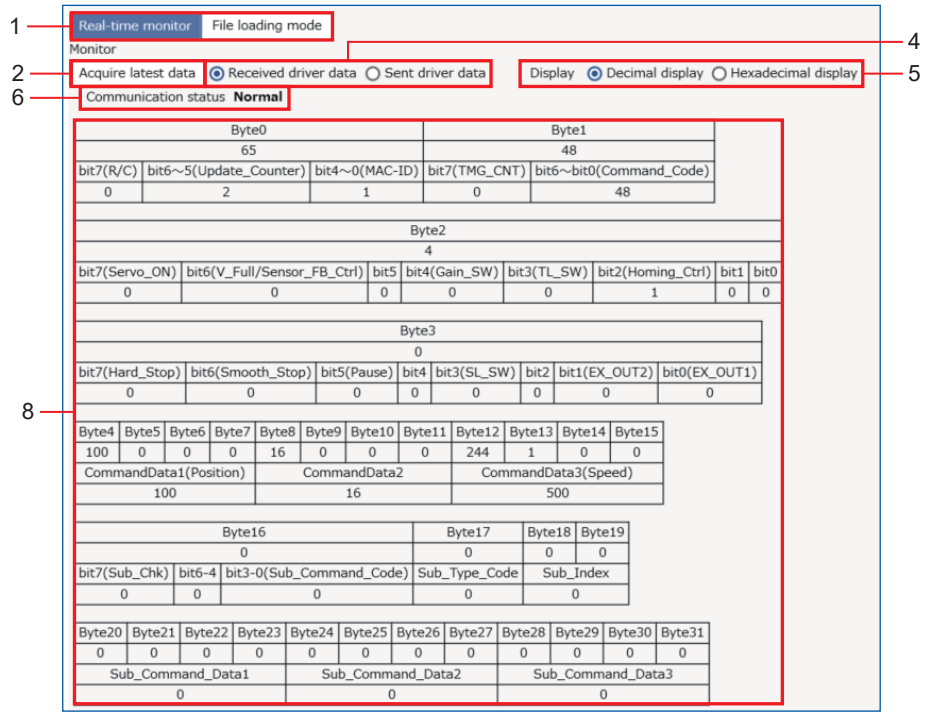
9.2.2 Overall Configuration of the RTEX Communication Monitor Screen



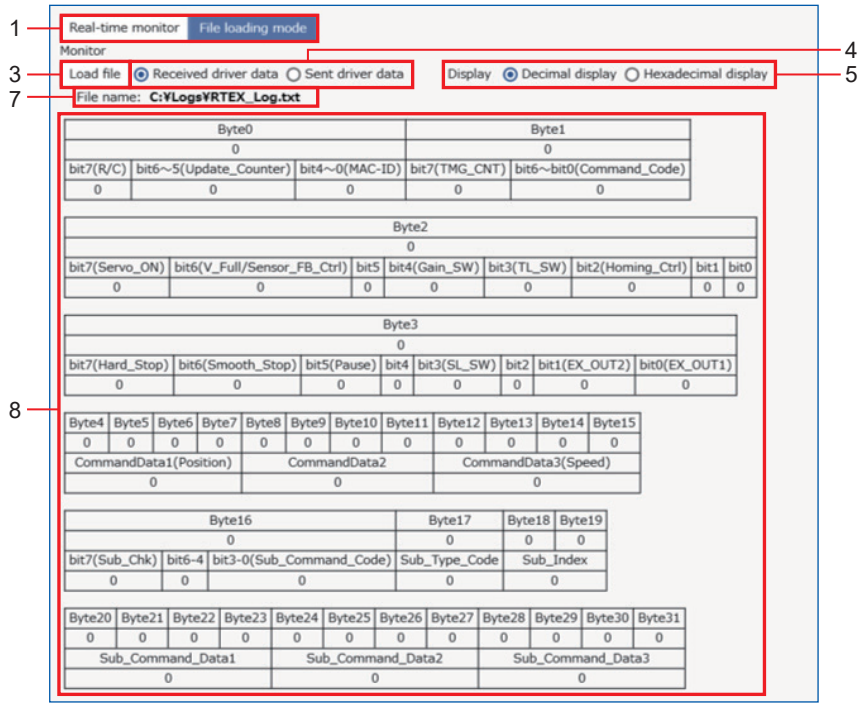
No.	Name	Description	Reference
1	Measurement condition setting area	This area is used to set the trigger and other measurement conditions.	*"9.2.5"*
2	RTEX communication monitor display area	This area displays confirmation of the communication status, details of received and sent data for the driver, and contents of the RTEX communication log file, all in decimal numbers and hexadecimal format.	*"9.2.3"*
3	Log display area	This area displays received and sent data for the driver and the contents of the RTEX communication log file as numerical values.	*"9.2.4"*

9.2.3 Display Area for Log Data Details

■ Real-time monitor



■ File loading mode

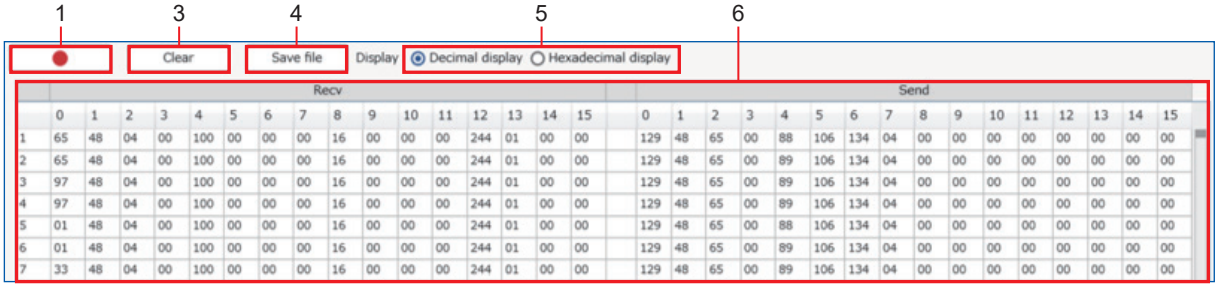


No.	Name	Description	Reference
1	Mode selection	Select either “Real-time monitor” or “File loading mode”.	—
2	Acquire latest data	When online, the latest data is acquired from the driver. Acquired data is displayed in the display area for log data details.	—
3	Load file	Load the RTEX communication log file. This displays the read data in the display area for log data details and the log display area.	*“9.2.8”*

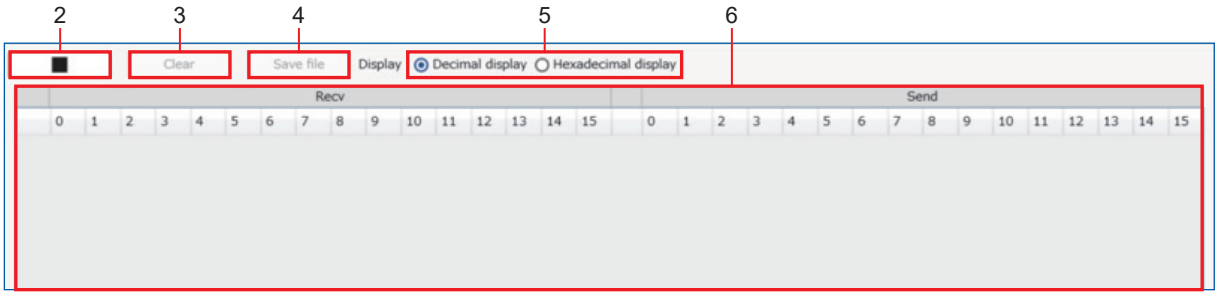
No.	Name	Description	Reference
4	Select receive/transmit driver data	Select whether to display data received by the driver or data sent by the driver.	—
5	Select decimal or hexa-decimal display	Select whether to display data in decimal or hexadecimal format.	—
6	Communication status	Displays the driver communication status when “Real-time monitor” is selected. If the driver is online, “Normal” is displayed, and if the driver is offline or disconnected, it is forced to enter “File loading mode”.	—
7	File name	Displays the name of the RTEX communication log file read when “File loading mode” is selected. If the file has not been read, “---” is displayed.	—
8	Display area for log data details	Displays details of received or sent data for the RTEX communication log file.	—

9.2.4 Log Display Area

■ Before measurement/After measurement

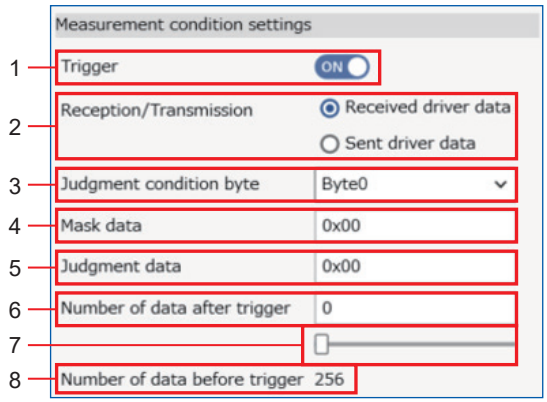


■ During measurement



No.	Name	Description	Reference
1	Start	Click to start measuring RTEX communication.	—
2	Stop	Click this to stop measurement during RTEX communication.	—
3	Clear	Clear the RTEX communication log.	—
4	Save file	Save the measurement results to the RTEX communication log file.	*“9.2.7”*
5	Switch display	Switches between decimal and hexadecimal display of measurement results.	—
6	Log measurement results display area	Displays measurement results separately for received and sent data.	—

9.2.5 Measurement Condition Setting Area

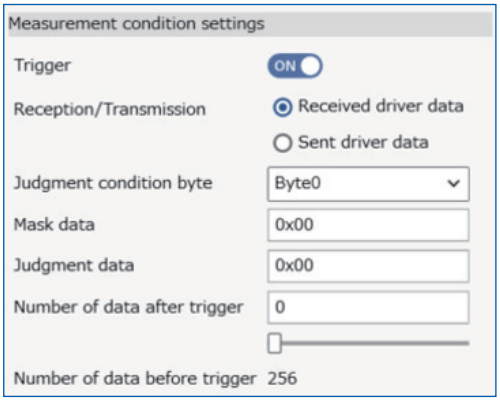


No.	Name	Description	Reference
1	Trigger	Set trigger to ON/OFF.	—
2	Reception/Transmission	Select whether to trigger either received driver data or sent driver data.	—
3	Judgment condition byte	Select the byte (Byte 0 to Byte 15) to be used for the trigger.	—
4	Mask data	Use to extract bits of the judgment condition byte.	—
5	Judgment data	Set the data for performing trigger judgment. The trigger is applied when the judgment data matches the masked judgment condition byte (trigger timing).	—
6	Number of data after trigger	The number of data that can be measured is 0 to 255. Trigger timing data is not included. This is set in conjunction with the number of data before trigger.	—
7	Slide bar to change the number of data after trigger and before trigger	Change the number of data before trigger and the number of data after trigger by moving the slide bar.	—
8	Number of data before trigger	The number of data that can be measured is 1 to 256. Contains trigger timing data. This is set in conjunction with the number of data after trigger.	—

9.2.6 Executing RTEX Communication Measurements

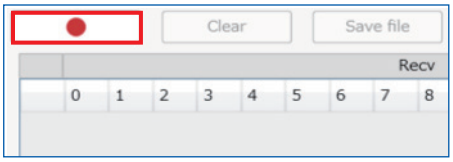
<< Procedure >>

1. Set the trigger conditions.



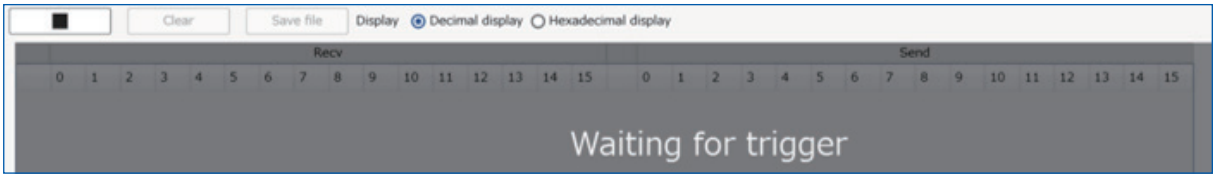
2. Click the [Start] button.

   If the trigger is not set, go to "Step 4".

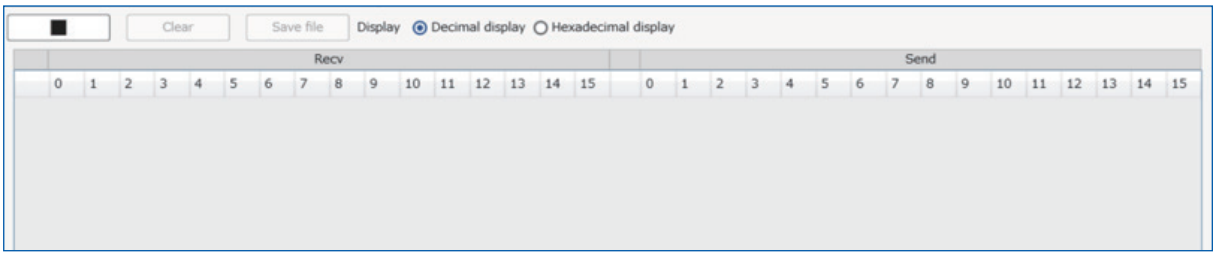


3. Wait until the trigger is applied.

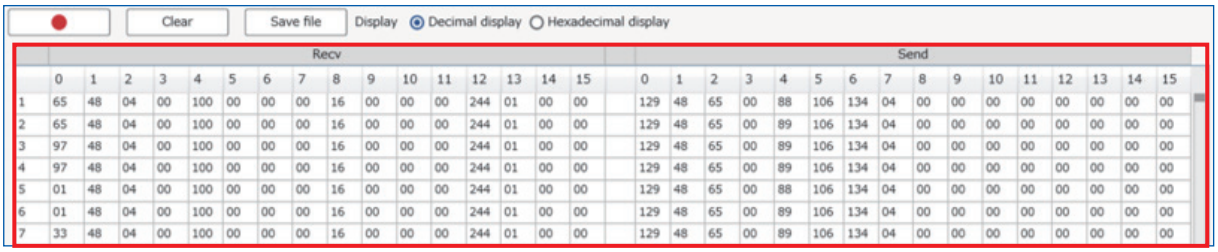
When the trigger is applied and measurement is complete, proceed to "Step 5".



4. If the trigger is not set, measurement is completed by clicking the [Stop] button at any timing.

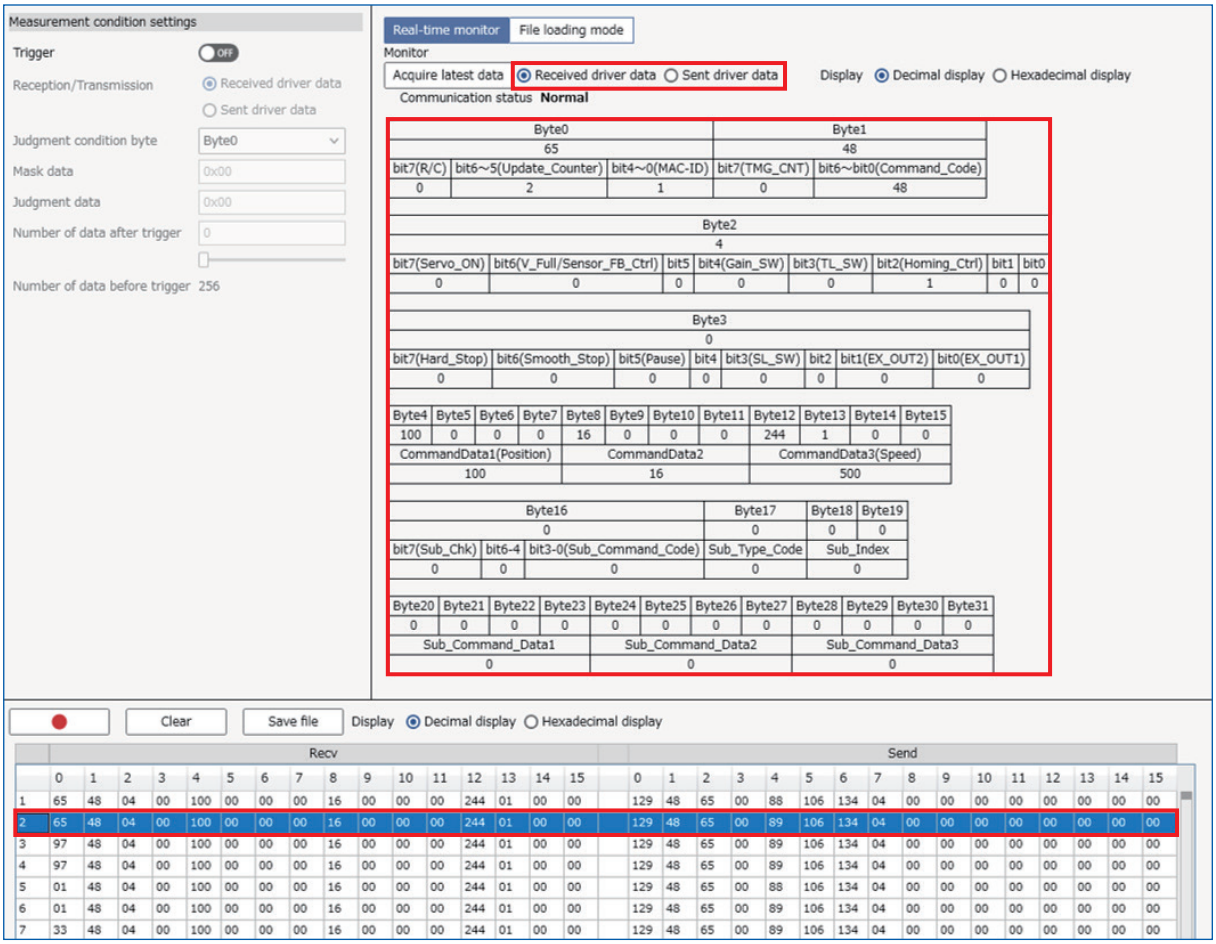


5. When measurement is complete, the measurement results are displayed for confirmation.



	Recv																Send														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	65	48	04	00	100	00	00	00	16	00	00	00	244	01	00	00	129	48	65	00	88	106	134	04	00	00	00	00	00	00	00	00
2	65	48	04	00	100	00	00	00	16	00	00	00	244	01	00	00	129	48	65	00	89	106	134	04	00	00	00	00	00	00	00	00
3	97	48	04	00	100	00	00	00	16	00	00	00	244	01	00	00	129	48	65	00	89	106	134	04	00	00	00	00	00	00	00	00
4	97	48	04	00	100	00	00	00	16	00	00	00	244	01	00	00	129	48	65	00	89	106	134	04	00	00	00	00	00	00	00	00
5	01	48	04	00	100	00	00	00	16	00	00	00	244	01	00	00	129	48	65	00	88	106	134	04	00	00	00	00	00	00	00	00
6	01	48	04	00	100	00	00	00	16	00	00	00	244	01	00	00	129	48	65	00	89	106	134	04	00	00	00	00	00	00	00	00
7	33	48	04	00	100	00	00	00	16	00	00	00	244	01	00	00	129	48	65	00	89	106	134	04	00	00	00	00	00	00	00	00

6. Select the data you want to check and confirm the values of the sent and received driver data in the display area for log data details.



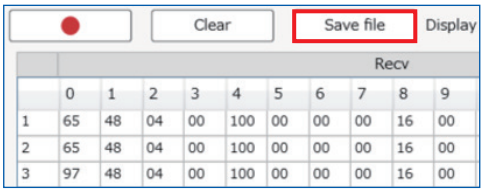
When saving measurement results, see *"9.2.7 Saving Files"* .

9.2.7 Saving Files

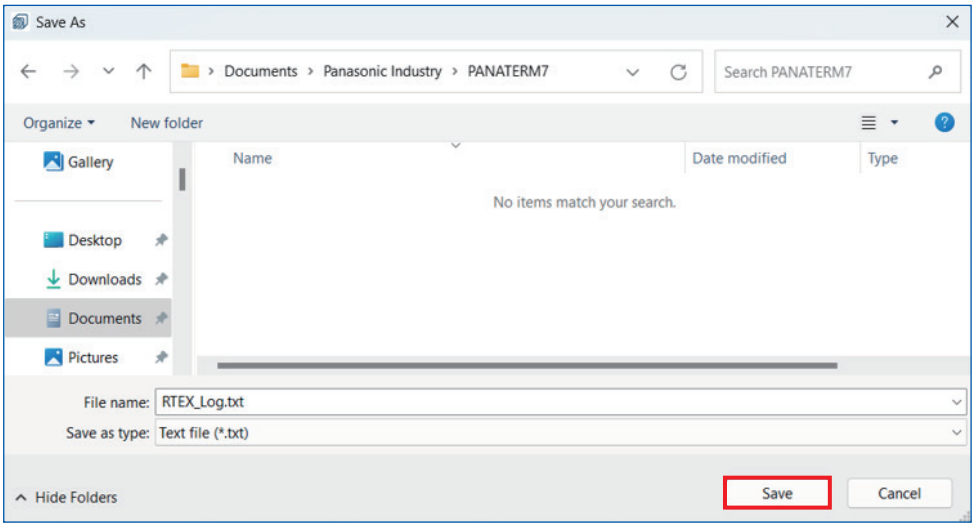
With "Real-time monitor" the measured log data is saved to a file (RTEXcommunication log file). Saved log data is displayed in "File loading mode".

<< Procedure >>

1. Click the [Save file] button.



2. Click the “Save” button when the [Save as] dialog box appears.



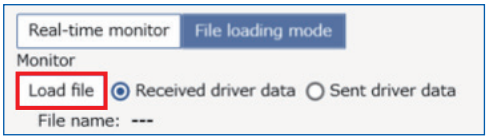
Save the file.

9.2.8 Loading Files

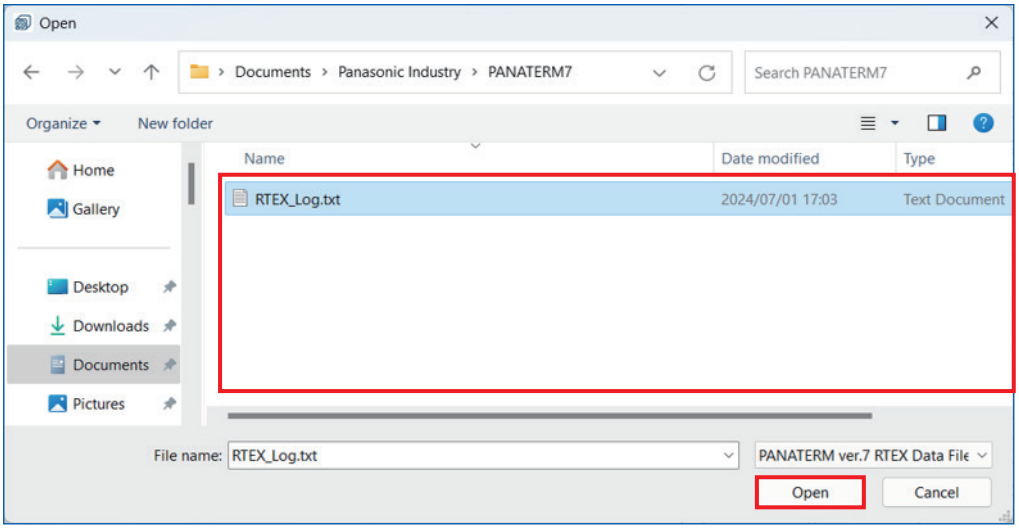
In “File loading mode”, the RTEX communication log file saved on the computer is loaded.

<< Procedure >>

1. Click the [Load file] button.



2. The “Open” dialog box appears, select the RTEX communication log file and click the [Open] button.



10 Logging

10.1 Measuring Waveforms

Measure the internal information of drivers and motors and display the results in a waveform graph. Save these measurement conditions, measurement results, and parameters to a file.

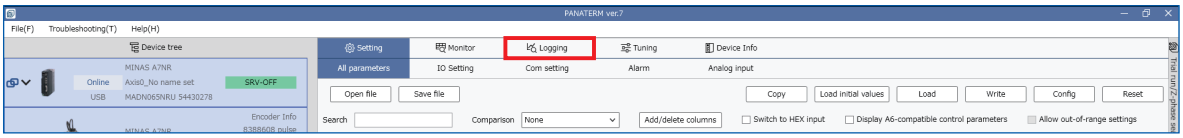
— Precautions —

- For details on measurement data acquired using waveform measurement, refer to the relevant documentation for your model (see *"1.3 Related Documents"*).
  - A7: Operating Instructions (Tuning)
- Waveforms may not be measured accurately depending on the computer load and the driver or motor operating conditions. Measurement results should only be used as guidelines.
- The time of waveform measurement is displayed when the measurement results are transferred from the driver to Set-up Support Software (PANATERM ver.7) . Note that this is not the time at which the trigger condition is met.

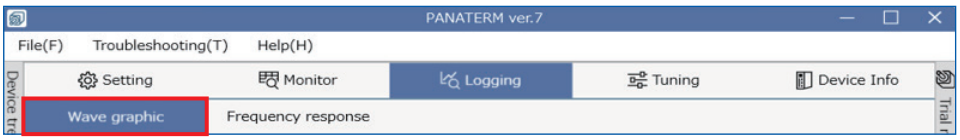
10.1.1 Opening the Waveform Measurement Screen

<< Procedure >>

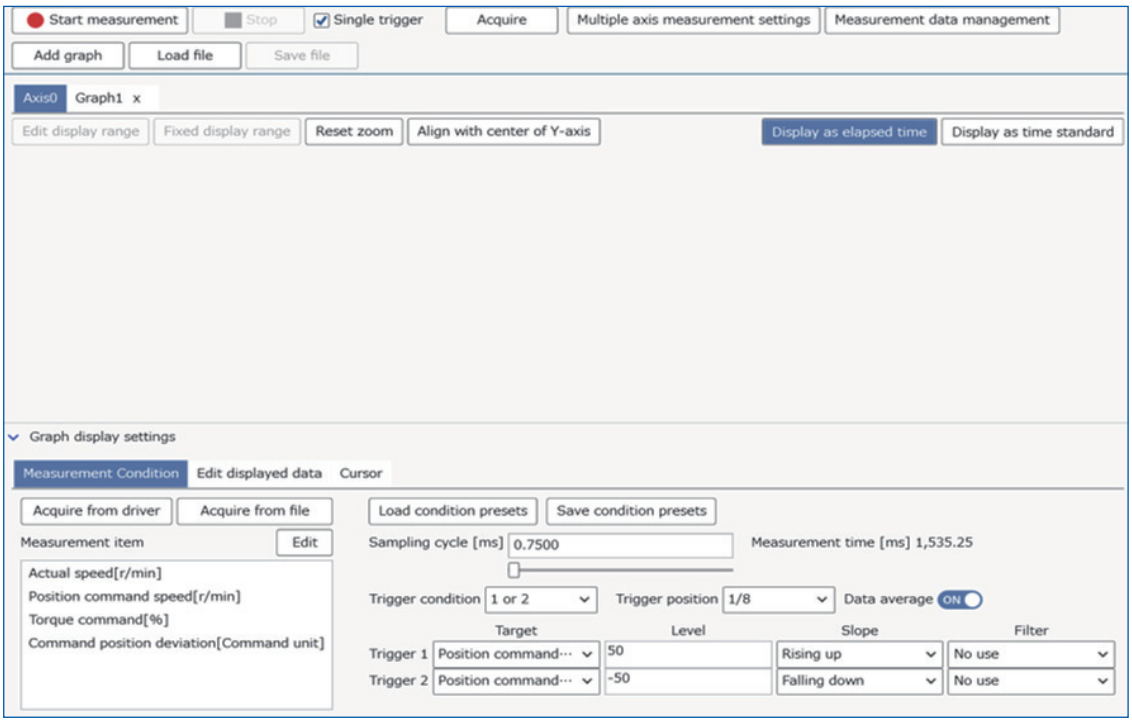
1. Click on the "Logging" tab.



2. Click on the "Wave graphic" tab in the sub tab.

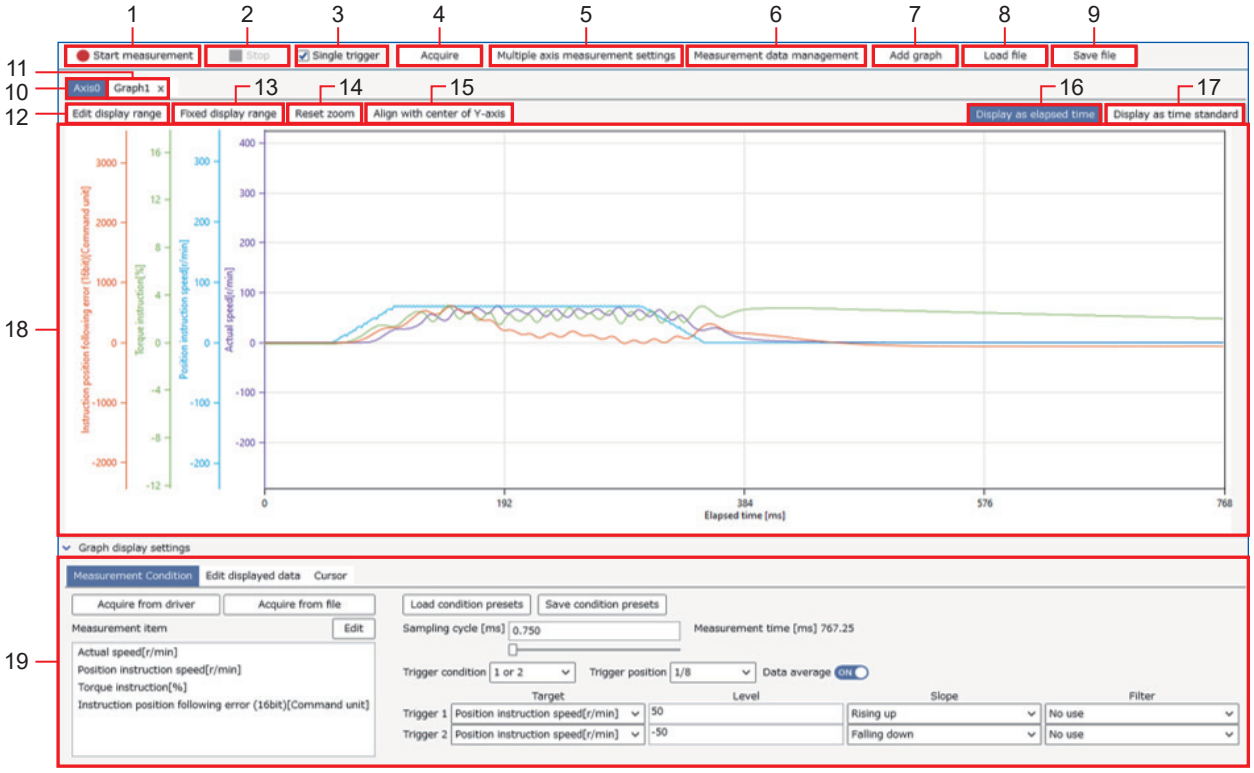


The waveform measurement screen appears.



10.1.2 Configuration of the Waveform Measurement Screen

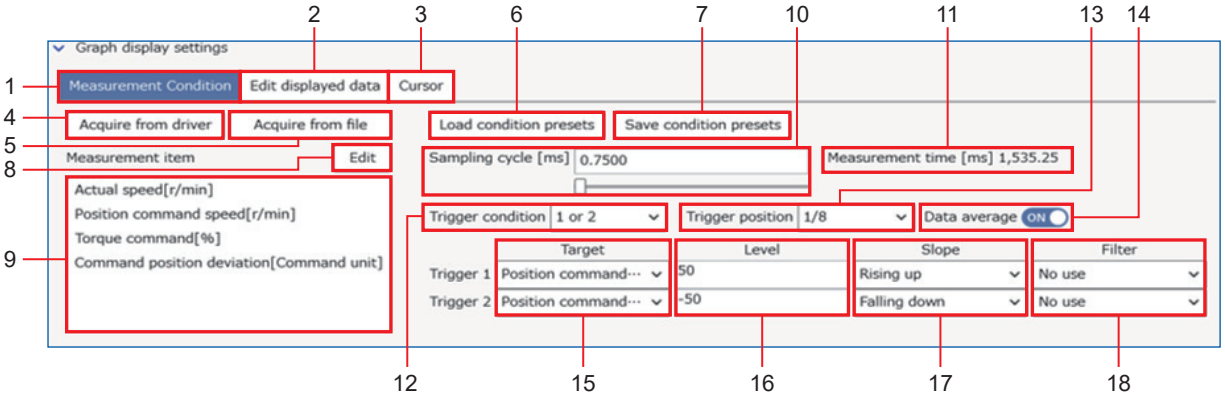
■ Entire waveform measurement screen



No.	Name	Description	Reference
1	Start measurement	Starts waveform measurement.	*"10.1.3"*
2	Stop	Stops waveform measurement.	*"10.1.3"*
3	Single trigger	Turns the single trigger ON/OFF. When ON, measurement is performed only once. When OFF, measurement is performed continuously whenever the trigger conditions are met.	—
4	Acquire	Acquire the latest measurement data saved in the driver.	—
5	Multiple axis measurement settings	Select the drivers to be measured simultaneously.	*"10.1.4"*
6	Measurement data management	Delete/protect measurement data history.	*"10.1.7"*
7	Add graph	Add a "Graph" tab. Up to 33 "Axis" tabs and "Graph" tabs can be added.	—
8	Load file	Read a saved waveform measurement file and display in the "Graph" tab.	*"10.1.9"*
9	Save file	Save measurement data to a waveform measurement file.	*"10.1.8"*
10	Axis	This tab displays measurement data for each online driver and motor. The measurement conditions can also be set for the target device.	—
11	Graph	This tab displays measurement data for online motors and loaded measurement data. Multiple waveform data can be overlaid to facilitate analysis. The [×] buttons allow you to delete tabs.	—
12	Edit display range	Set the range of data to be displayed for each axis of the graph.	*"10.1.6.3"*
13	Fixed display range	Fix the display range to the current plotting range.	*"10.1.6.7"*
14	Reset zoom	Reset the display range and zoom in/out ratio for each measurement item.	*"10.1.6.4"*
15	Align with center of Y-axis	Move the graph to a position at the center of the Y-axis range.	*"10.1.6.6"*
16	Display as elapsed time	Waveforms are displayed in elapsed time without using time stamps.	—

No.	Name	Description	Reference
17	Display as time standard	Waveforms are displayed offset as time standard using timestamps.	*"10.1.15"*
18	Graph display area	Measurement data is displayed as a graph in this area. Analog signal measurement data and digital signal measurement data are displayed on separate graphs.	*"10.1.6"*
19	Graph display settings area	Set "Measurement conditions", "Edit displayed data", and "Cursor" settings in this area. However, "Measurement conditions" can only be set in the axis tab and are not displayed in the graph tab.	—

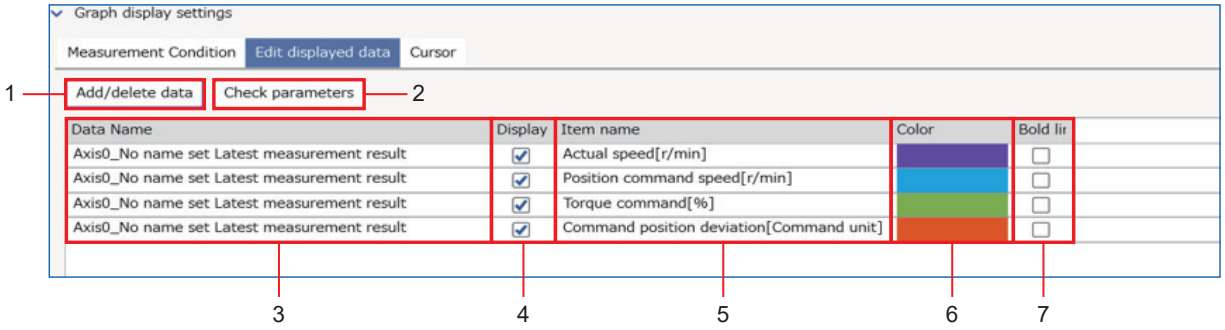
■ Graph display settings area - Measurement conditions screen



No.	Name	Description	Reference
1	Measurement conditions	This displays a screen for setting measurement conditions.	—
2	Edit displayed data	This displays a screen for selecting displayed data and display items, changing line color and line thickness.	—
3	Cursor	This displays a screen for changing whether the cursor is shown or hidden, adjusting the cursor position, and displaying the value of each data at the cursor position.	—
4	Acquire from driver	Acquire measurement conditions from the online driver.	—
5	Acquire from file	Acquire measurement conditions from the waveform measurement file.	—
6	Load condition presets	Select condition presets registered in this software.	*"10.1.10"*
7	Save condition presets	Temporarily register measurement conditions being edited as condition presets in this software. The registered measurement conditions are saved in the project file.	*"10.1.11"*
8	Edit	Select measurement items from analog or digital signals.	*"10.1.5"*
9	List of measurement items	The selected measurement item are displayed in a list.	—
10	Sampling cycle	Set the sampling cycle.	—
11	Measurement time	Displays the measurement time calculated from the sampling cycle.	—
12	Trigger condition	Set the trigger conditions.	—
13	Trigger position	The ratio of data displayed before and after the trigger can be changed.	—
14	Data average	Enabling data averages results in smoother waveform data, while disabling data averages results in rougher waveform data.	—
15	Target	Set the trigger target. The target is one of analog or digital signals.	—
16	Level	Set the trigger level. If the trigger target is an analog signal, set a numerical value. For digital signals, set ON/OFF.	—
17	Slope	Set the slope at which the trigger is applied. Select from "Rising up", "Falling down", "Match", "Mismatch", "or more", or "or less". For digital signals, select either "Match" or "Mismatch".	—

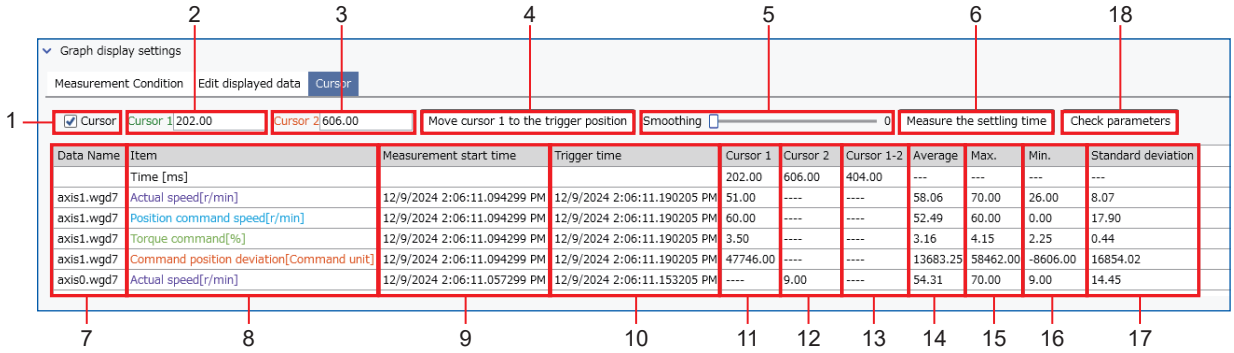
No.	Name	Description	Reference
18	Filter	Set a filter for the trigger target signal, using the average value of the past sampling cycle as the trigger evaluation value.	—

■ Graph display settings area - Edit displayed data screen



No.	Name	Description	Reference
1	Add/delete data	Add/delete data to be displayed on the graph.	*"10.1.12"*
2	Check parameters	Compare parameter values for each measurement data.	*"10.1.13"*
3	Data name	Displays the data name of the measurement data to be displayed in the graph.	—
4	Display	Set whether each measurement data item to be displayed on the graph is displayed or not displayed.	—
5	Item name	Displays the names of the measurement data items to be displayed on the graph.	—
6	Color	Displays the colors of the measurement data lines to be displayed on the graph. Click to change to colors of your choice.	—
7	Bold line	Change a line of measurement data displayed on the graph to a bold line.	—

■ Graph display settings area - Cursor screen



No.	Name	Description	Reference
1	Cursor	Turn whether to display cursors on the graph ON/OFF.	—
2	Cursor 1 position	Specify the position of cursor 1 (elapsed time). Dragging cursor 1 in the graph also updates the numerical value. **Notes** ● If the value entered does not exist in the waveform data, it is overwritten by the value of the nearest measurement point that is larger than the value entered. ● Example: If the sampling cycle is 0.75 ms and 0.5 is entered, this is overwritten with 0.75.	—

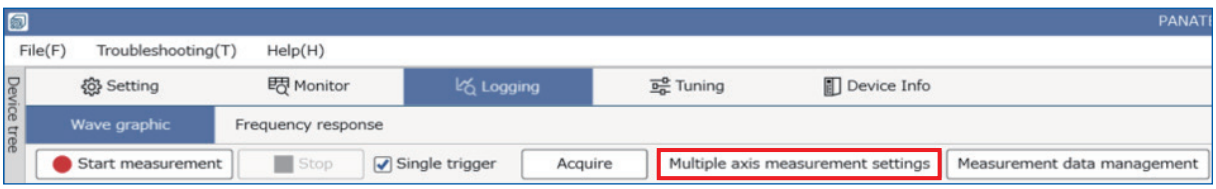
No.	Name	Description	Reference
3	Cursor 2 position	Specify the position of cursor 2 (elapsed time). Dragging cursor 2 in the graph also updates the numerical value. **Notes** ● If the value entered does not exist in the waveform data, it is overwritten by the value of the nearest measurement point that is larger than the value entered. ● Example: If the measurement time [ms] is 1535.25 ms and 1535.75 is entered, this is overwritten with 1535.25 ms.	—
4	Move cursor 1 to the trigger position	Click to move cursor 1 to the trigger position.	—
5	Smoothing	Set the degree of smoothing. Filter noise components and smooth waveforms by thinning data.	—
6	Measure the settling time	Measure the settling time at the cursor position.	*"10.1.14"*
7	Data name	Displays the data name of the measurement data displayed in the graph.	—
8	Item	Displays the name of the data item to be displayed.	—
9	Measurement start time	The measurement start time is displayed with a timestamp. Displayed when "Display as time standard" is selected.	—
10	Trigger time	The trigger time is displayed with a timestamp. Displayed when "Display as time standard" is selected.	—
11	Cursor 1	Displays the value for each data set at the elapsed time for cursor 1.	—
12	Cursor 2	Displays the value for each data set at the elapsed time for cursor 2.	—
13	Between cursor 1 and 2	Displays the difference in the values between cursor 1 and cursor 2 for each data set.	—
14	Average	Displays the average value between cursor 1 and cursor 2 for each data set.	—
15	Max.	Displays the maximum value between cursor 1 and cursor 2 for each data set.	—
16	Min.	Displays the minimum value between cursor 1 and cursor 2 for each data set.	—
17	Standard deviation	Displays the standard deviation between cursor 1 and cursor 2 for each data set.	—
18	Check parameters	Compare parameter values for each measurement data.	*"10.1.13"*

10.1.3 Executing Waveform Measurement

10.1.3.1 Executing Waveform Measurement Online

<< Procedure >>

1. Click the [Multiple axis measurement settings] button and make sure the axes (drivers) you wish to measure are checked.

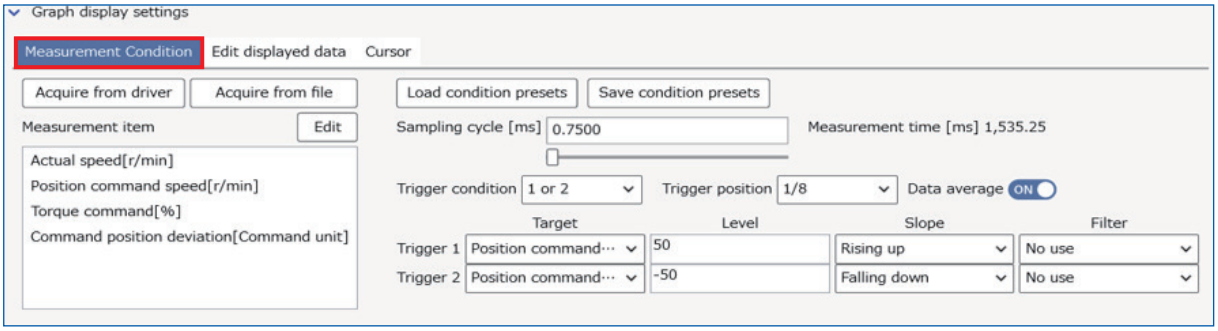


For details on multiple axis measurement settings operations, see *"10.1.4 Selecting Drivers to be Measured"* .

— Precautions —

- By default, all axes are checked.

2. In “Graph display settings”, “Measurement conditions”, set the measurement items and measurement conditions.

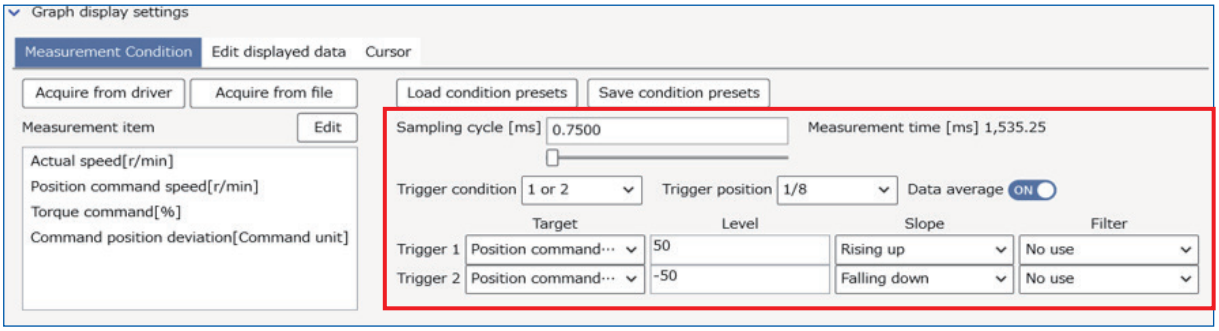


For information on selecting measurement items, see *“10.1.5 Editing Measurement Items”* .

For information on setting measurement conditions in a batch, see *“10.1.10 Setting Measurement Condition Presets”* .

3. Set the sampling cycle and trigger.

At the start of measurement with “Step 4”, data is acquired for the time set in the sampling cycle after the trigger is detected.



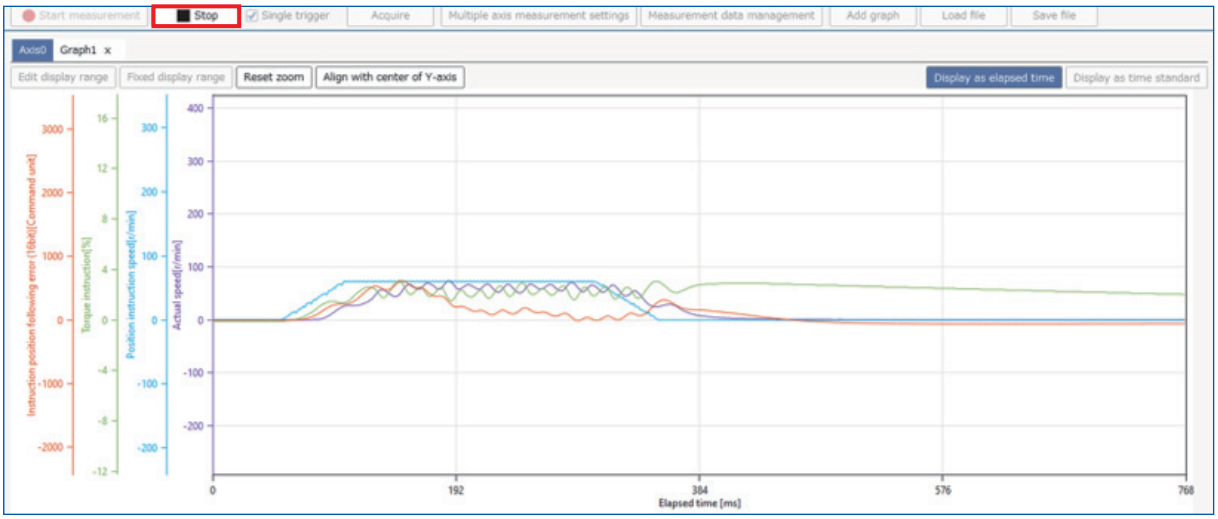
4. Click the [Start measurement] button.

Measurement starts.

— Precautions —

- If “Single trigger” is ON, measurement continues until measurement of all drivers selected with the “Multiple axis measurement settings” button is complete.

5. Wait for the measurement to complete.



— Precautions —

- If “Single trigger” is OFF, all parameters load when the [Stop] button is clicked.

10.1.3.2 Executing Waveform Measurement Offline

<< Procedure >>

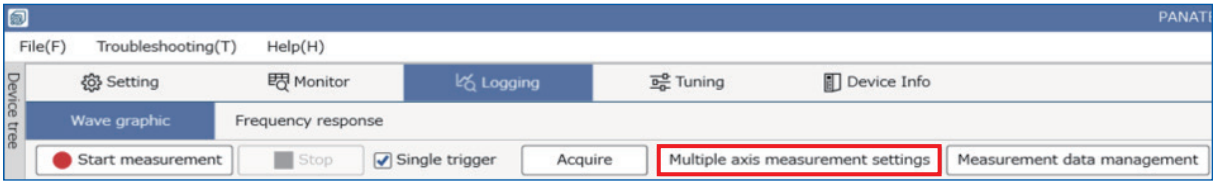
1. Set measurement conditions according to steps 1 to 3 in *“10.1.3.1 Executing Waveform Measurement Online”* .
2. Click the [測定開始] button and disconnect the USB cable from the driver.

3. Wait for the measurement to complete.
4. Insert the USB cable into the driver.
   Wait for the Set-up Support Software (PANATERM ver.7) to reconnect.
5. Click the [Acquire] button.

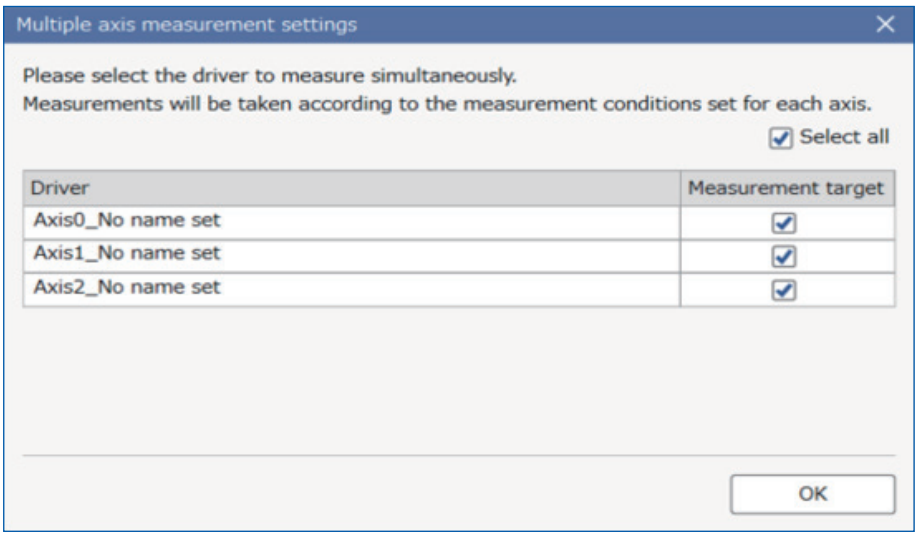
10.1.4 Selecting Drivers to be Measured

<< Procedure >>

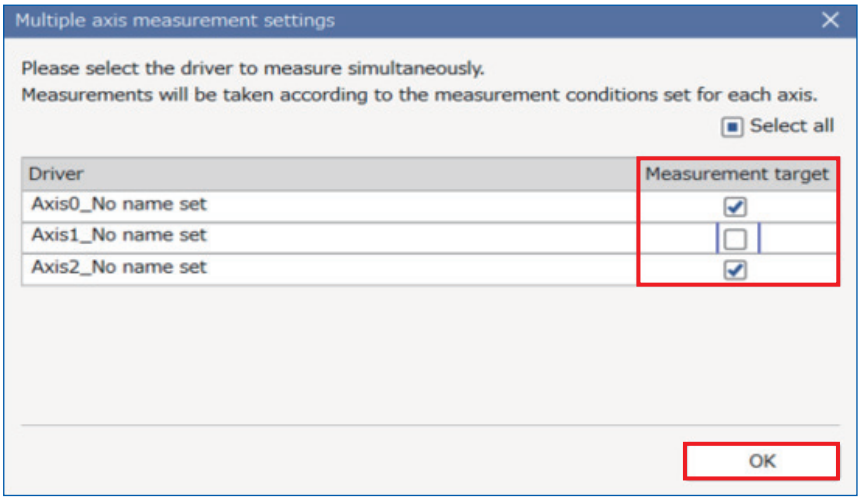
1. Click the [Multiple axis measurement settings] button.



The “Multiple axis measurement settings” dialog box appears.



2. Check the “Measurement target” box for the drivers to be measured and click the [OK] button.



— Precautions —

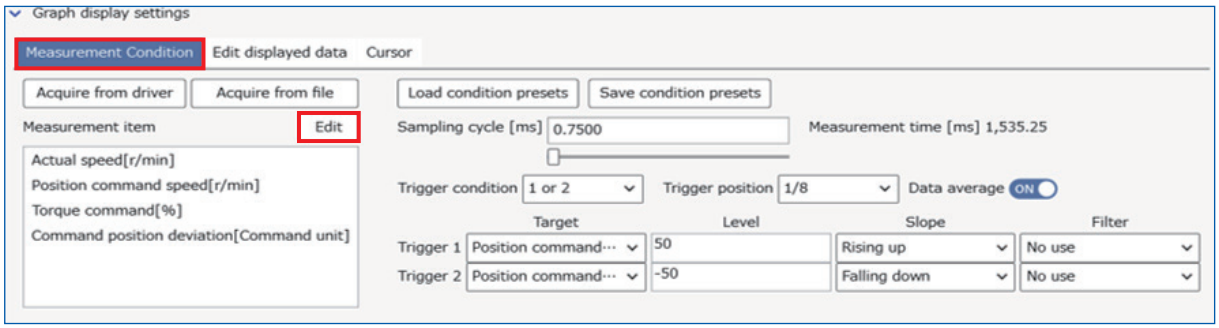
- Only axes that are checked are subject to measurement. No measurement is made when an unchecked driver or motor is operated.
- By default, all axes are checked.

10.1.5 Editing Measurement Items

The signals to be measured can be selected or deleted.

<< Procedure >>

1. Click the [Edit] button in the “Measurement conditions” tab.

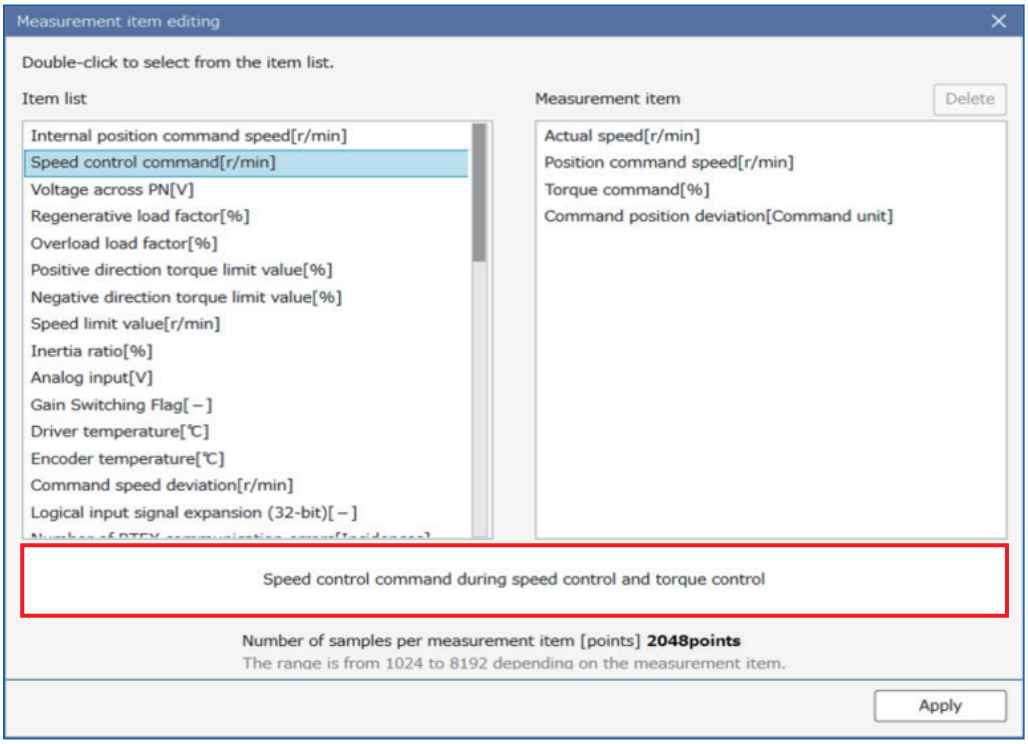


The “Measurement item editing” dialog box appears.

2. Select the target analog signal or digital signal.

2-1 Check the contents of the signal

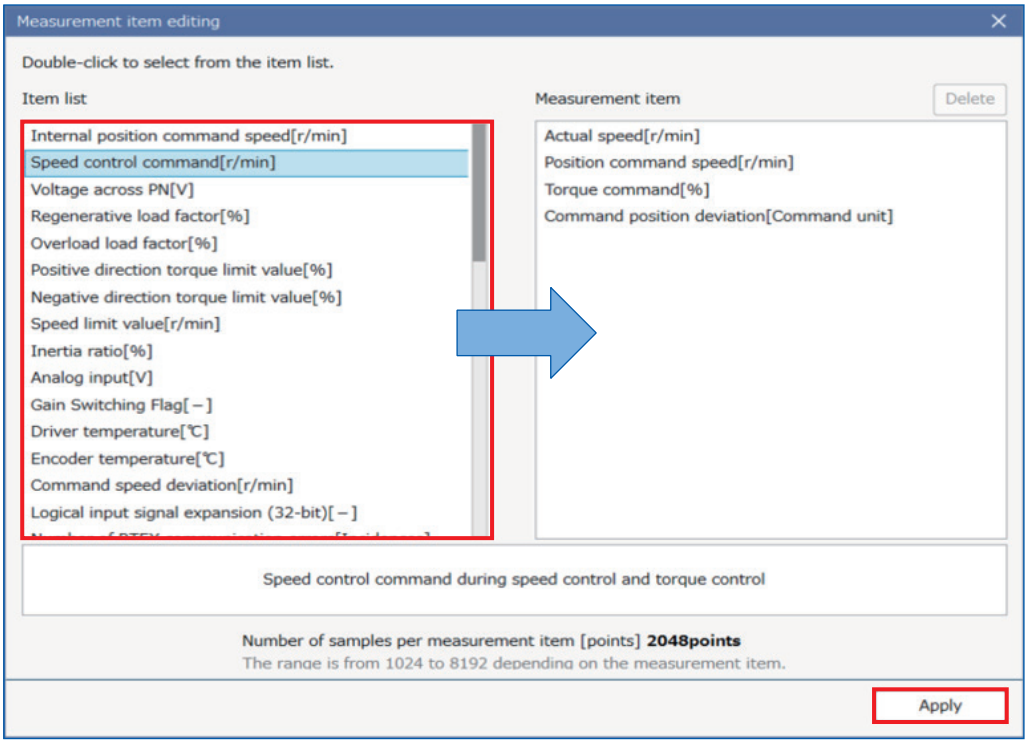
When a signal is selected, check the description of the signal displayed in the red frame.



The types of items that can be displayed on the graph and the number of data units differ between models.See *“10.1.12 Selecting Data to be Displayed On the Graph”* .

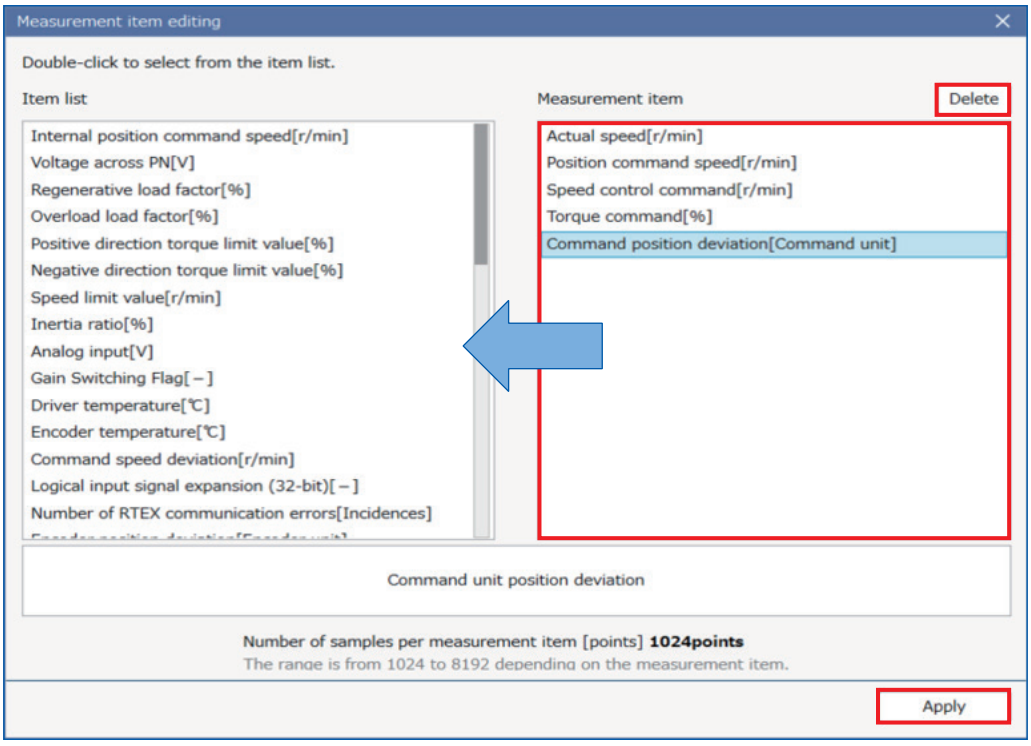
2-2 To add a signal

Double-click the signal you want to measure in the “Item list” to add it to “Measurement Items”, and click the [Apply]button.

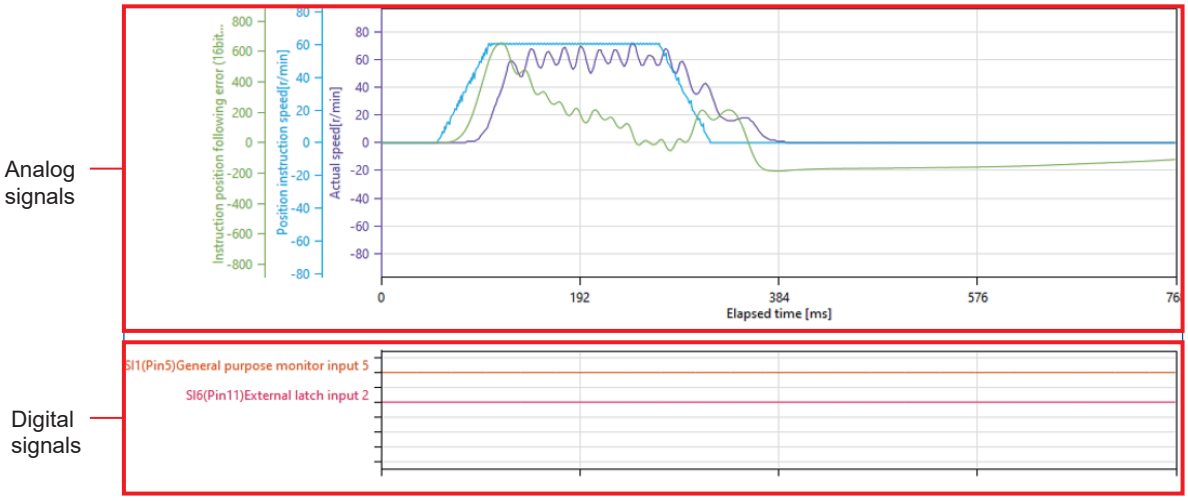


2-3 To exclude a signal from measurement

Select the signal you do not want to measure from “Measurement items”, double-click or click the [Delete] button, then click the [Apply] button.



After measurement, the graph area displays a graph of the selected analog or digital signals.

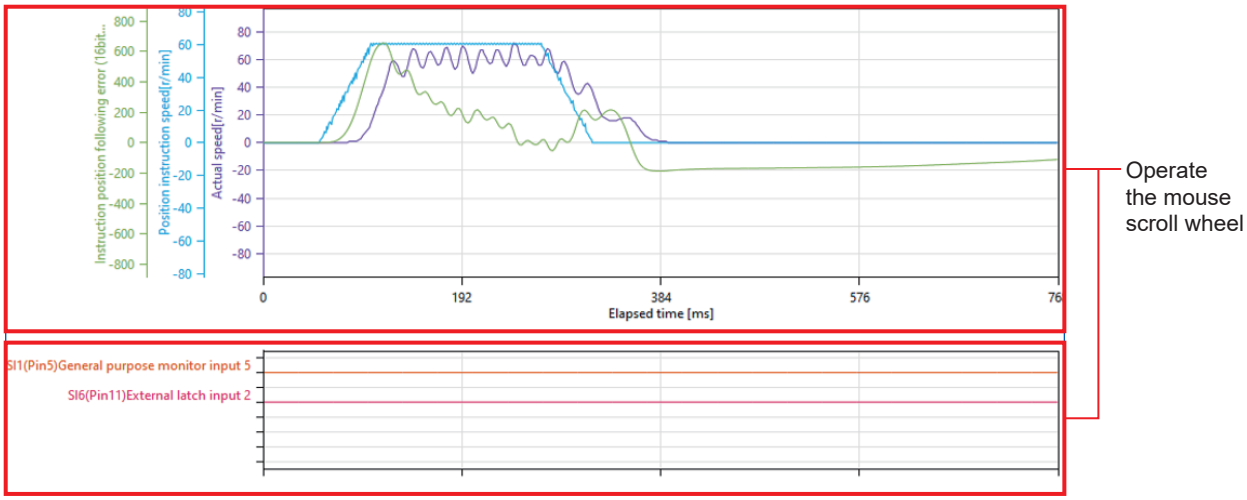


10.1.6 Graph Area Operations

10.1.6.1 Zooming In/Out On the Graphs

In the waveform plotting area, you can zoom in or out on the graph by operating the mouse wheel.

- Operate the mouse wheel in the graph area to zoom in and out on both the X-axis and Y-axis.
- Operate the mouse wheel on the X-axis to zoom in and out on the X-axis only.
- Operate the mouse wheel on the Y-axis to zoom in and out on the measurement item you hover the mouse over only.



10.1.6.2 Dragging and Moving the Graphs

You can drag to move the graph displayed in the waveform plotting area.

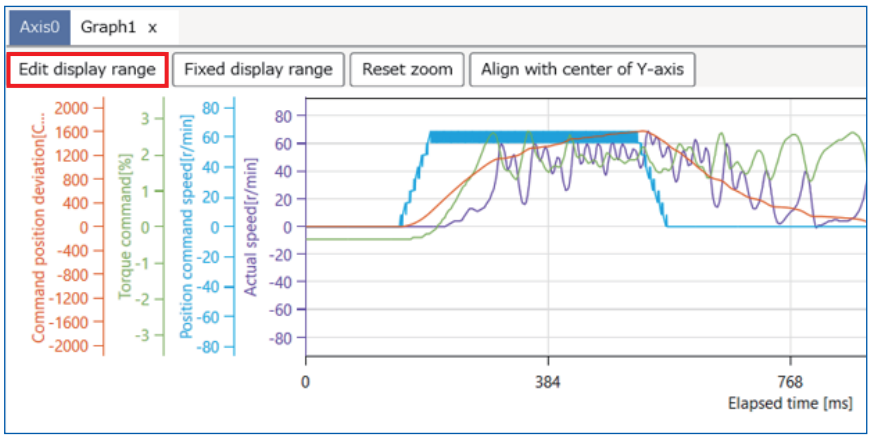
- Dragging and moving the graph in the graph area, moves both the X-axis and Y-axis.
- If you drag and move on the X-axis, only the X-axis is moved.
- If you drag and move on the Y-axis, only the Y-axis is moved.

10.1.6.3 Changing the Display Range for Each Measurement Item

For analog signal measurement items, the display range is specified for each measurement item.

<< Procedure >>

1. Click the [Edit display range] button.

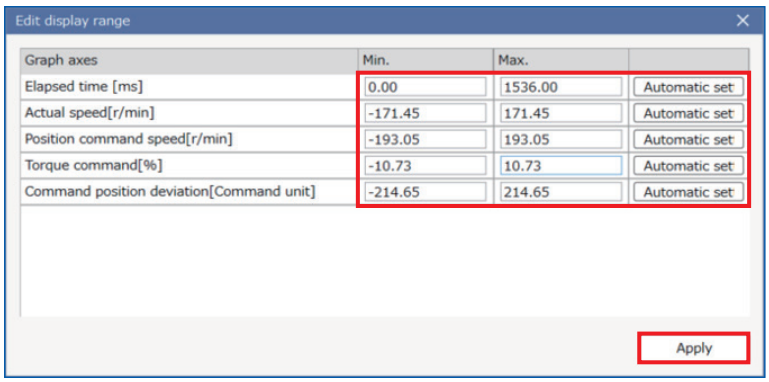


The “Listing range edit” dialog box appears.

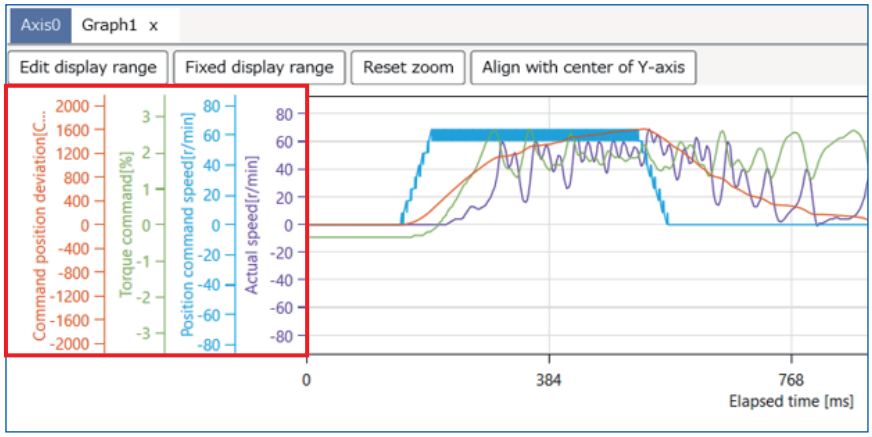
2. Specify the display range of elapsed time or the display range of the vertical axis for each measurement item, and click the [Apply] button to apply the changes.

Notes

- Click the [Automatic setting] button to enter the initial values for the display range.



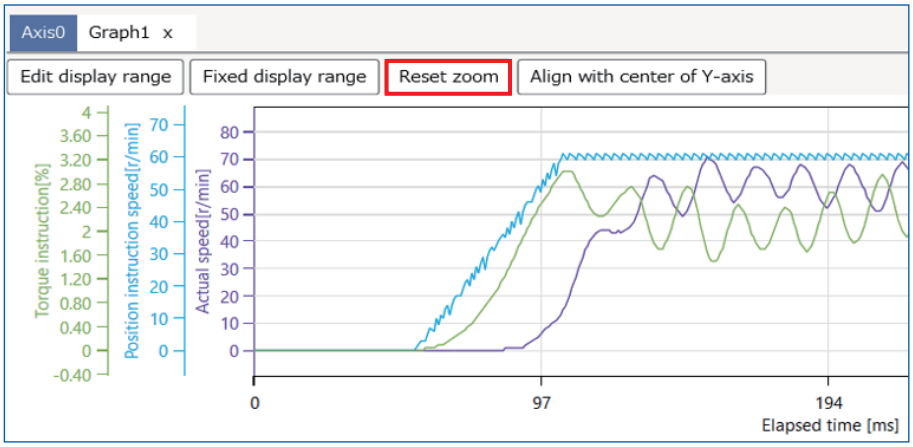
- The display range for each measurement item can also be changed by operating the mouse wheel on the vertical axis in the graph area.



- The entire display range of the graph can be changed by dragging the mouse on the graph.

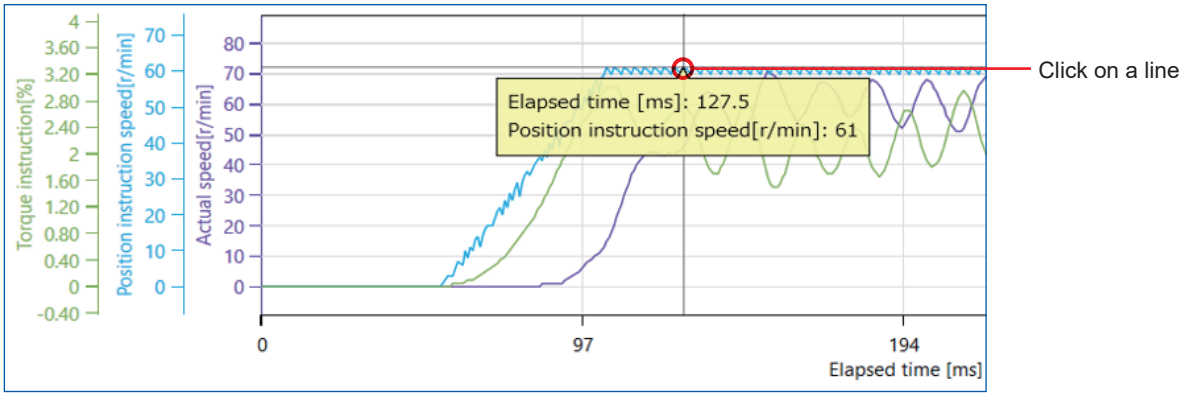
10.1.6.4 Resetting the Display Range and Zoom

Click the [Reset zoom] button to reset the display range set and the zoom all at once.



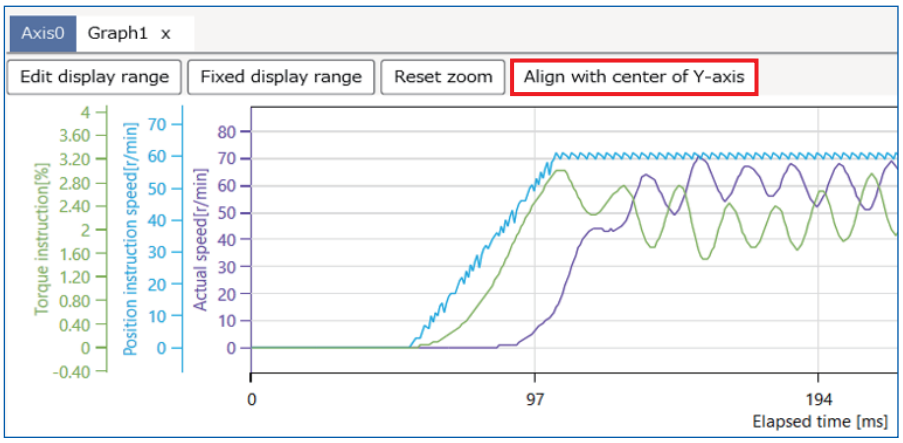
10.1.6.5 Displaying Data at a Specific Position on the Graph

Click on a line in the graph to display the data from the position clicked.



10.1.6.6 Aligning the Graph With the Center of Y-Axis

Click the [Align with center of Y-axis] button to move the graph to a position at the center of the Y-axis range.

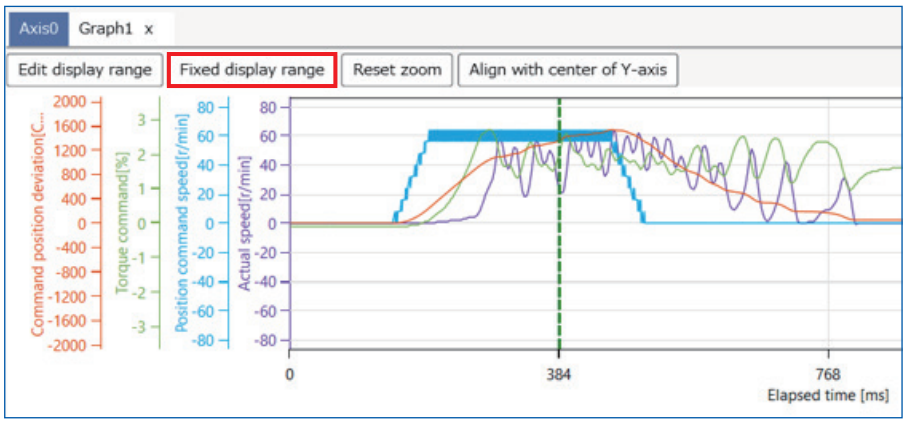


10.1.6.7 Fixing the Display Range

Fix the display range to the current plotting range.

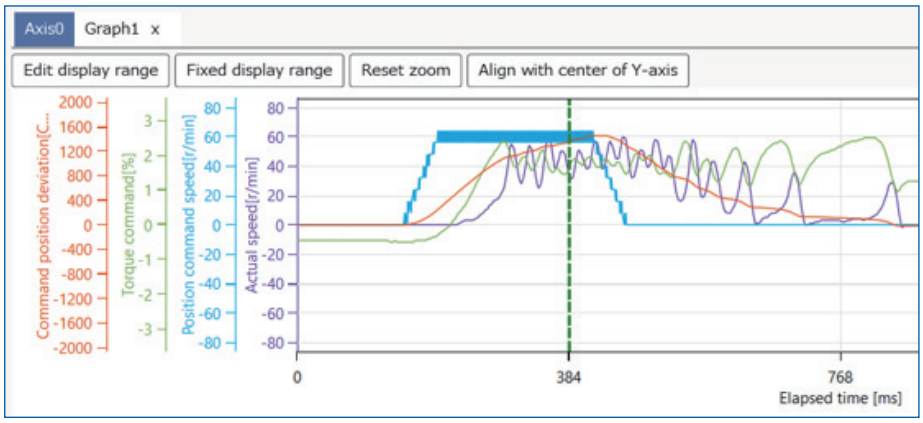
<< Procedure >>

1. Move the graph to a specific position, zoom in or out, and click the [Fixed display range] button.



2. Perform measurement again.

3. When measurement is performed again, the display range for the graph is the range at the point the [Fixed display range] button in "Step 1" was clicked.



Notes

- When the [Reset zoom] button is clicked, the display range for the graph is also the range at the point the [Fixed display range] button in "Step 1" was clicked.

10.1.7 Deleting and Protecting Measurement Data History

Measurement data history can be deleted or protected.

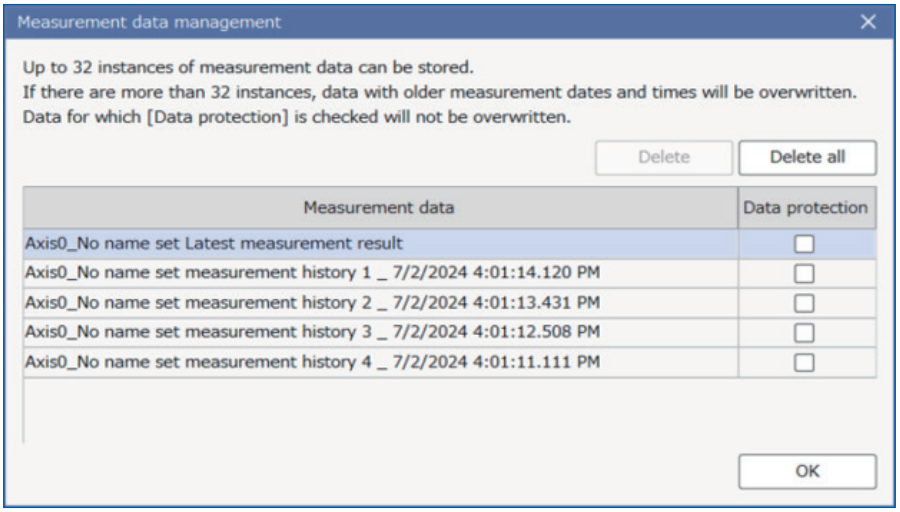
- Up to 32 instances of measurement data can be saved in this software. If there are more than 32 instances, data with older measurement dates and times are overwritten.
- Measurement data, including protected measurement data, is discarded when this software is exited. To save the measurement data, execute "Save file".

  For details on how to save measurement data, see *"10.1.8 Saving Measurement Data to a File"* .

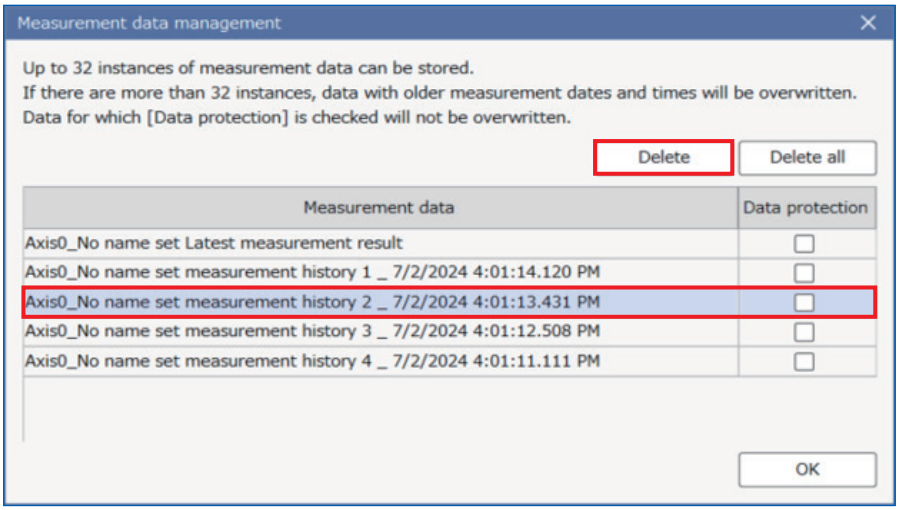
<< Procedure >>

1. Click the [Measurement data management] button.

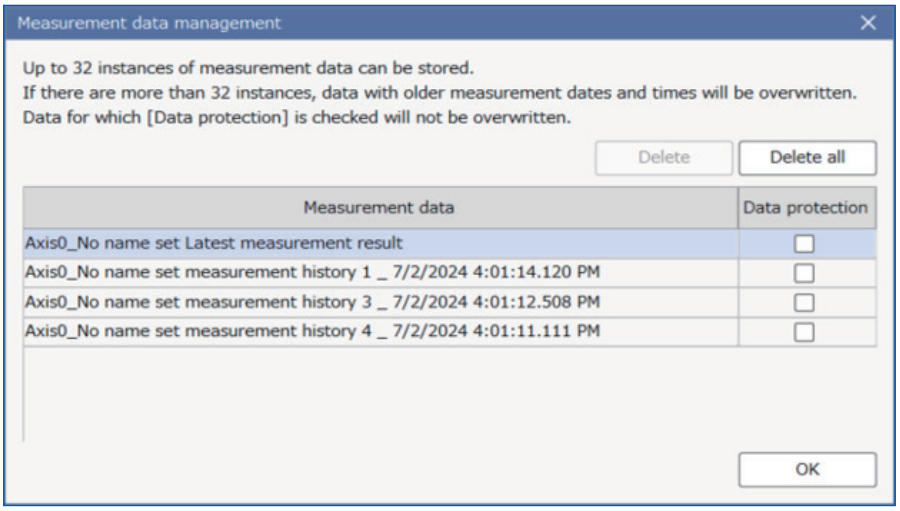
The “Measurement data management” dialog box appears.



2. To delete an item, select the item to be deleted and click the [Delete] button.

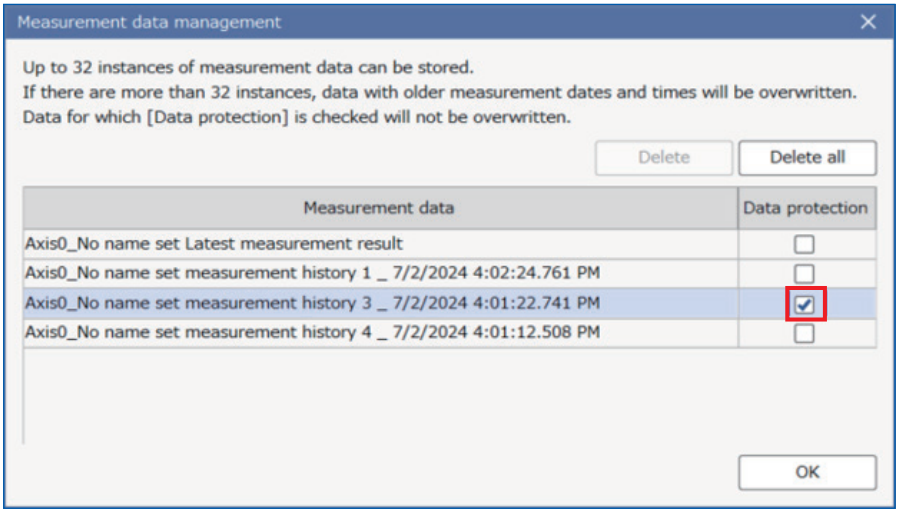


3. The selected item is deleted.

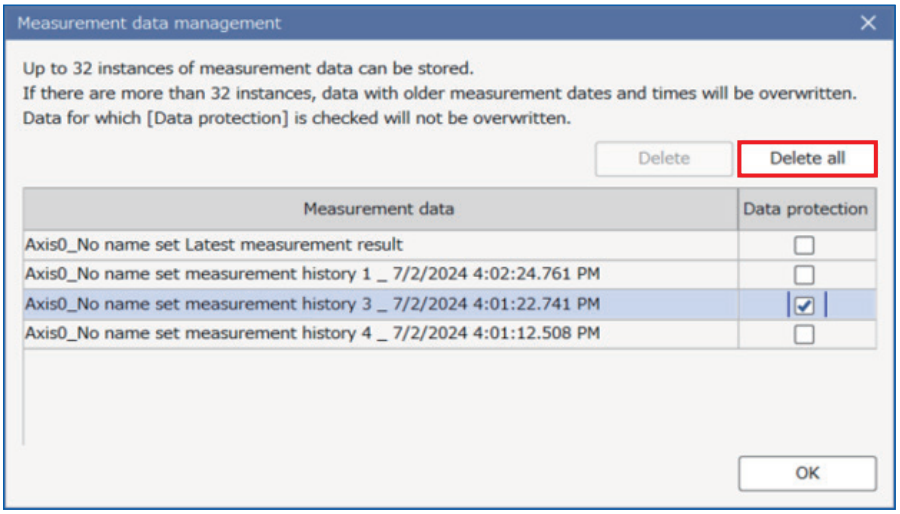


4. To protect data, select the data you want to protect and check the box.

Data that is checked remains without being overwritten.



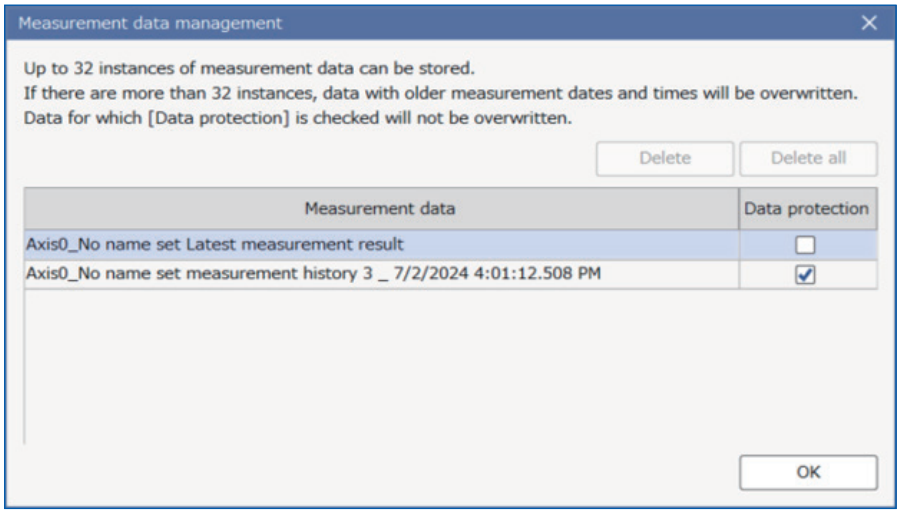
5. To delete all data, click the [Delete all] button.



6. All but the most recent measurement results and protected data are deleted.

Uncheck the box for an item if you wish to delete it.

The latest measurement results cannot be deleted.



10.1.8 Saving Measurement Data to a File

Select any measurement data from multiple measurement data items and save it as a separate file.

- Save measurement conditions, measurement data and parameter settings at the time of measurement all together. You cannot select which information to save.
- The extension of the measurement data file to be saved is *. wgd7.
- If a file with the same name as the measurement data file exists at the time of saving, save the file as a separate file with a sequential number at the end of the file name.

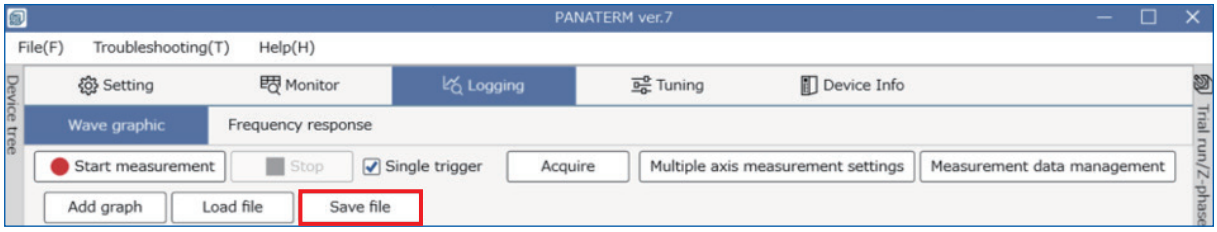
  Example: If the file 2024xxxxaxis0.wgd7 exists, save the file with a file name like the following.

  2024xxxxx axis 0(1).wgd7

  2024xxxxx axis 0(2).wgd7

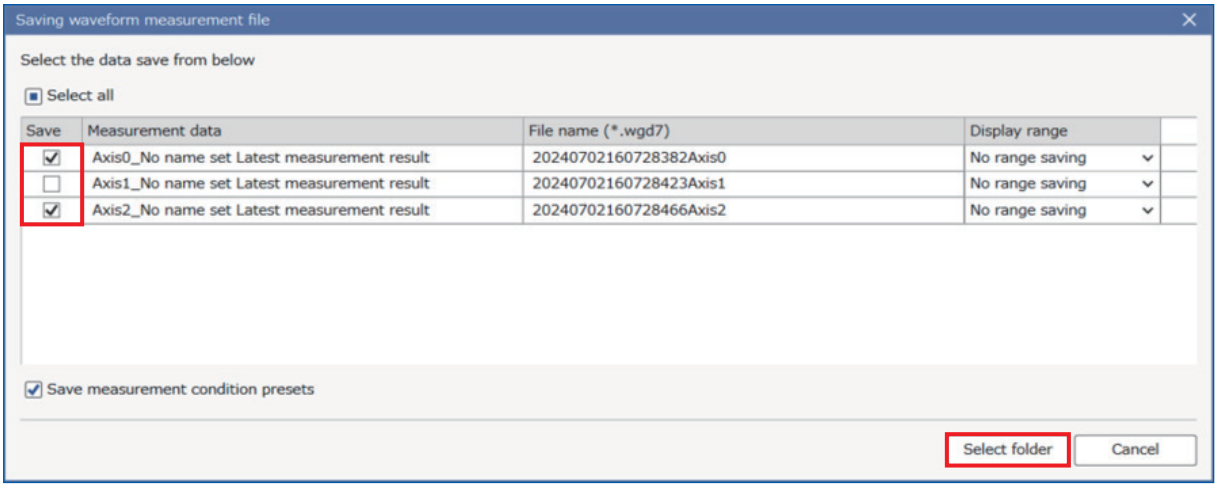
<< Procedure >>

1. Click the [Save file] button.



This displays the “Saving waveform measurement file” dialog box.

2. Check the check boxes for the measurement data to be saved, click the [Select folder] button, and select the folder to save the file to.



10.1.9 Reading Waveform Measurement Files

Measurement data can be read from a waveform measurement file.

The information to be read from the waveform measurement file can be selected from the following three types.

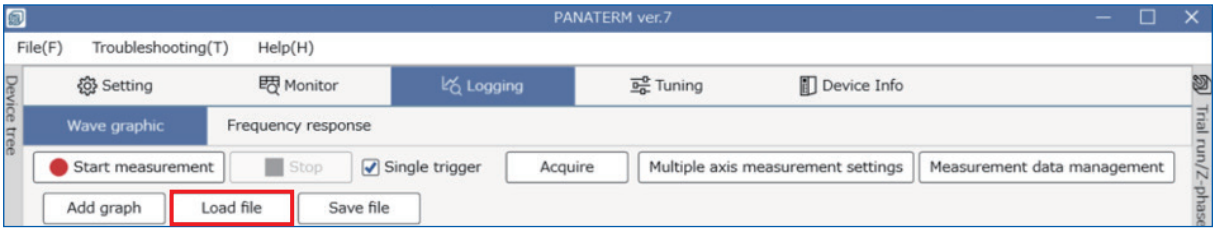
- Measurement conditions
- Measurement results
- Parameters

After loading is complete, the loaded waveform graph data is added.

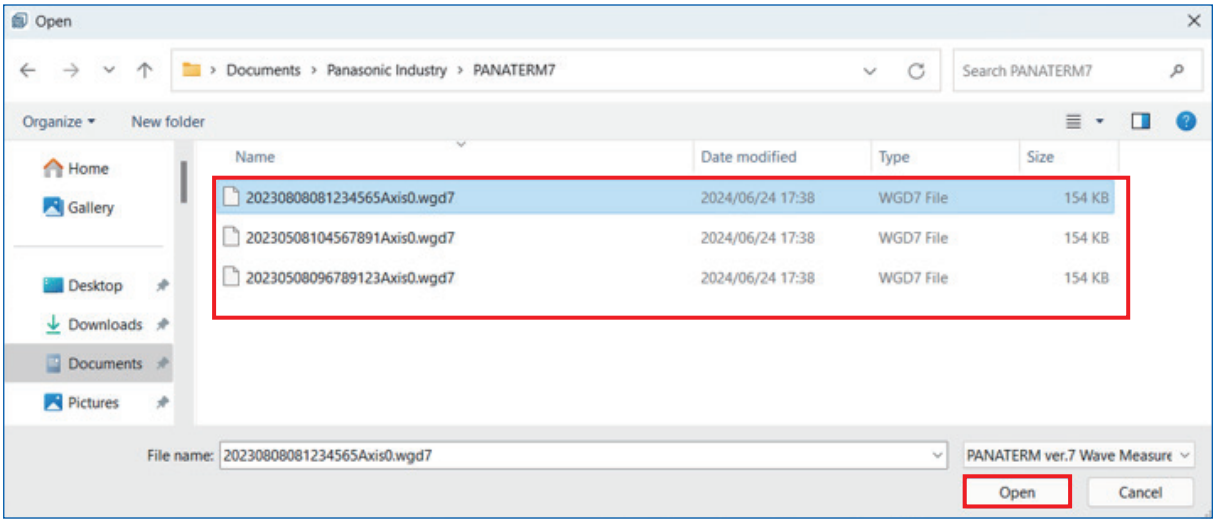
Parameters that can be set for the target driver from among the parameters read can be applied to the online driver.

<< Procedure >>

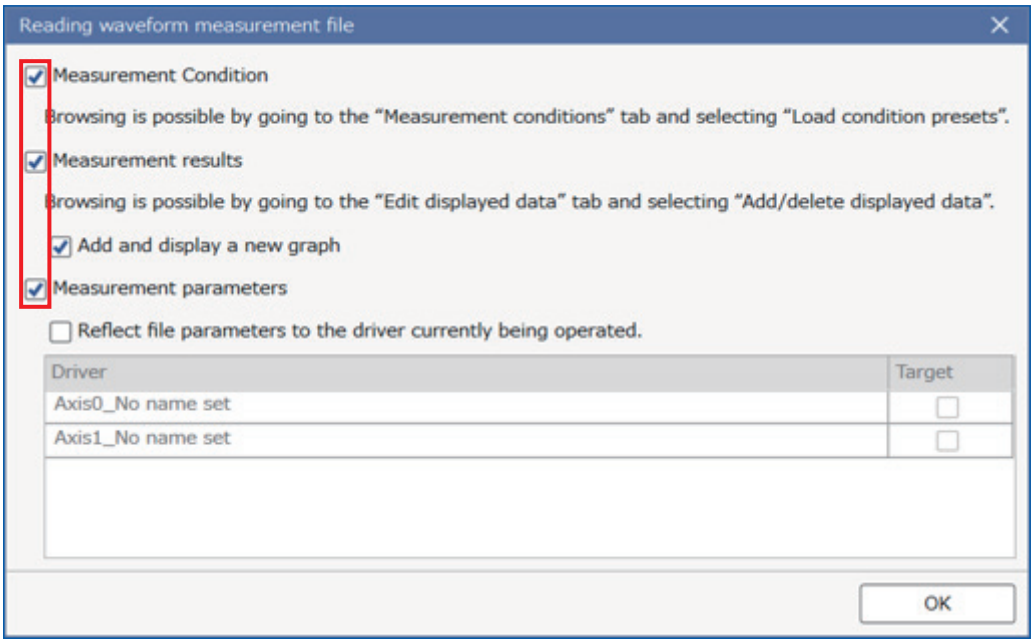
1. Click the [Load file] button.



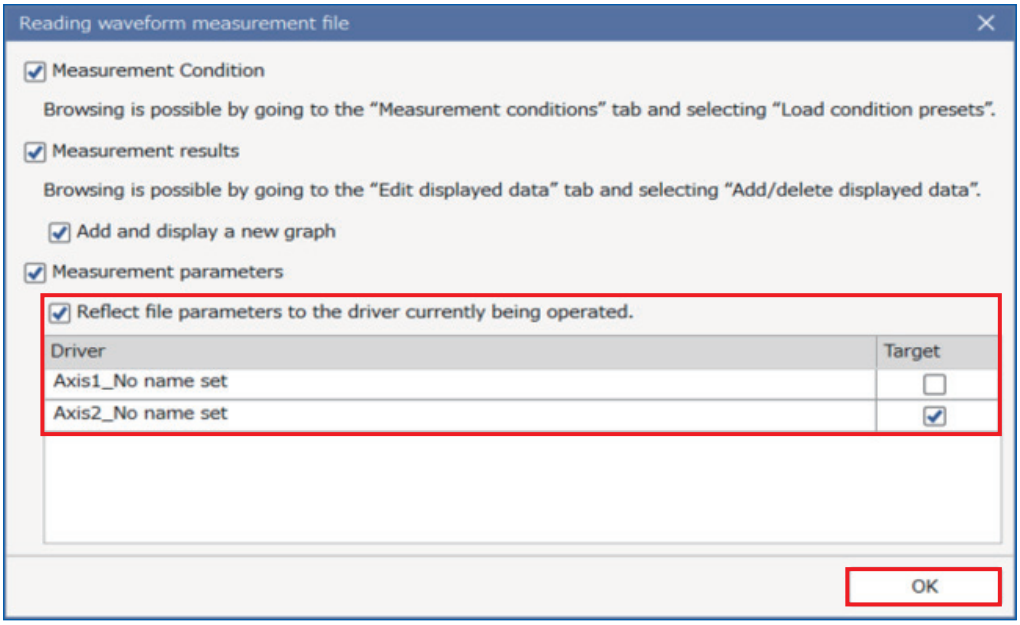
2. The “Open” dialog box appears. Select the waveform measurement file and click the [Open] button.



3. Check the boxes for the data to be read.



4. To apply the parameters of the file to the driver in operation, select the driver and click the [OK] button to read the file.



Notes

- Measurement data can also be read by dragging and dropping waveform measurement files.
- If a waveform measurement file is loaded without checking "Add and display a new graph" in the "Reading waveform measurement file" dialog box, the"Graph" tab is not created.

  Click the "Add/delete data" button in the "Edit displayed data" tab under [Graph display settings] to select a read waveform measurement file and display the graph.

  For details on graph display, see *"10.1.12 Selecting Data to be Displayed On the Graph"* .
- Parameters defined differently for each model from the parameters read cannot be applied to the online driver.

10.1.10 Setting Measurement Condition Presets

Measurement conditions can be set in batch from registered presets.

- Registered condition presets in the "Load condition presets" dialog box can also be deleted.

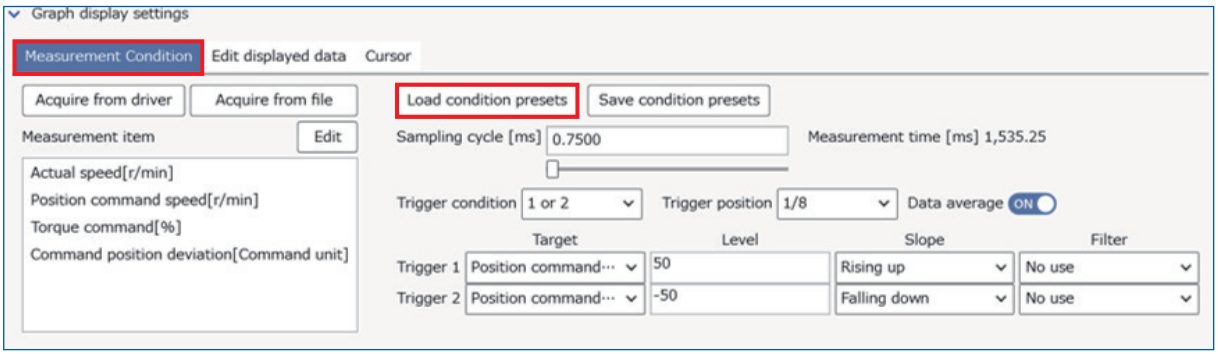
  The condition presets registered in default state "Basic position control measurement", "Basic speed control measurement", "Settling time measurement", "All inputs/outputs", and "Measurement when an alarm is triggered", as well as presets for each axis, cannot be deleted.
- The condition presets registered by default are as follows.

Condition preset name	Description
Basic position control measurement	Measures signals related to position control with the position command speed as the trigger.
Basic speed control measurement	Measures signals related to velocity control with the velocity control command as the trigger.
Settling time measurement	Measures signals related to settling time measurement with position command transfer complete as the trigger.
All inputs/outputs	Measures analog input and physical input/output signals without a trigger.

Condition preset name	Description
Measurement when an alarm is triggered	Measures the waveform when an alarm is triggered with the alarm as the trigger.

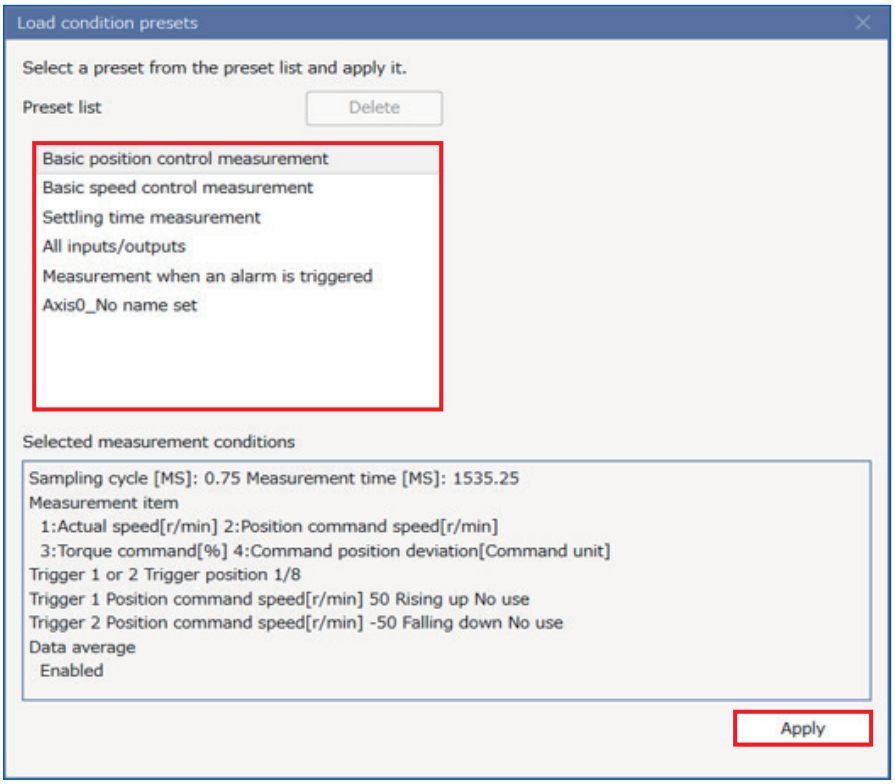
<< Procedure >>

1. Click the [Load condition presets] button in the “Measurement conditions” tab.



The “Load condition presets” dialog box appears.

2. Select the condition preset you wish to apply from the “Preset list” and click the [Apply] button.

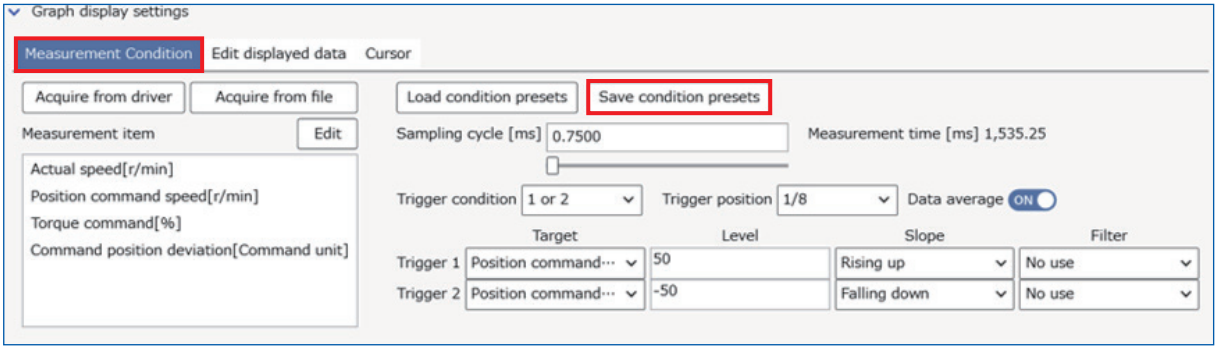


10.1.11 Registering Current Measurement Condition in Presets

Current measurement conditions can be registered in presets. In this case, the preset name can be set to whatever you want.

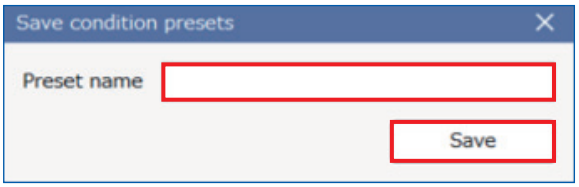
<< Procedure >>

1. Click the [Save condition presets] button in the “Measurement conditions” tab.



The “Save condition presets” dialog box appears.

2. Enter a name in “Preset name” and click the [Save] button.



Notes

- When “Acquire from file” is executed, the acquired measurement condition is also automatically registered in the condition presets.

  In this case, the condition preset name assigned is the file name.

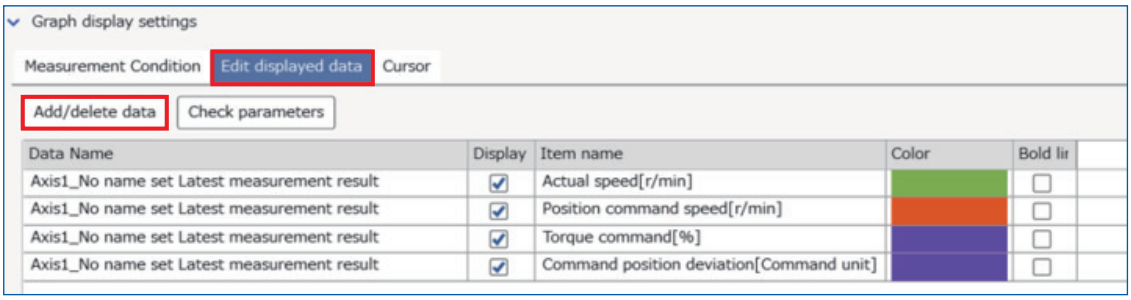
  For details on executing “Acquire from file”, see *“10.1.9 Reading Waveform Measurement Files”* .
- Registered measurement conditions are discarded when this software is exited. To keep the measurement conditions, perform “Save file” after executing waveform measurement. For details on executing “Save file”, see *“10.1.8 Saving Measurement Data to a File”* .

10.1.12 Selecting Data to be Displayed On the Graph

Multiple sets of measurement data can be displayed simultaneously in the graph area.

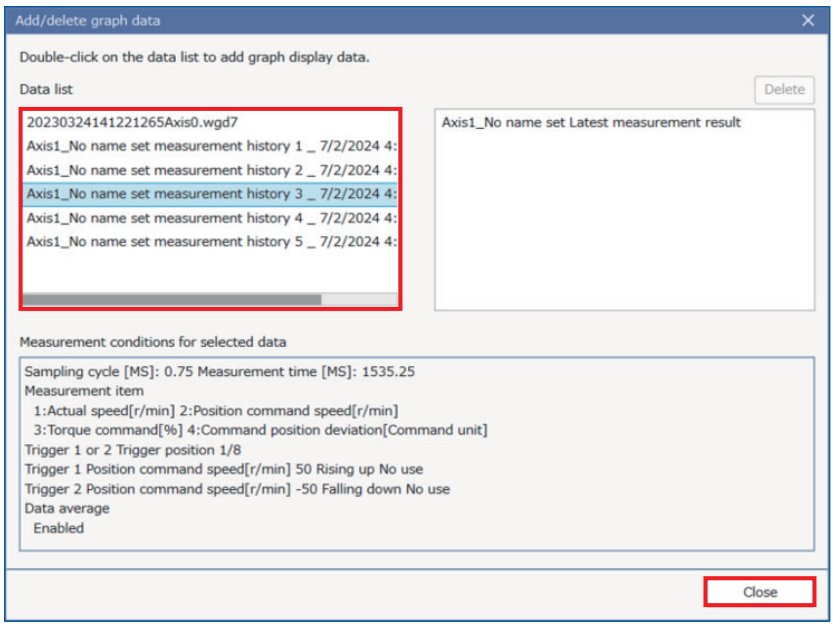
<< Procedure >>

1. Click the [Add/delete data] button in the “Edit displayed data” tab.

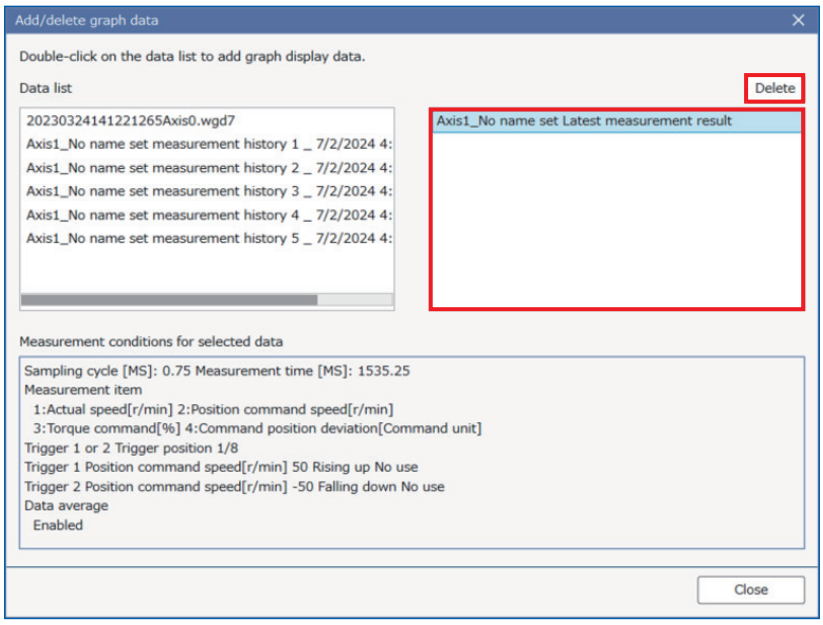


The “Add/delete graph data” dialog box appears.

2. To add data to be displayed, double-click the measurement data you wish to display in the graph from the “Data list” and click the [Close] button.



3. To delete displayed data, select the measurement data you do not want to display, then double-click or click the [Delete] button.



Notes

- Displayed data is added in units of measured data. To change whether to display or not display each item on the graph, go to the “Edit displayed data” tab and check or uncheck the “Display” box for each item.
- The types of items that can be displayed on the graph and the number of data units are as follows.

  Item types: up to 8 analog signal types and 32 digital signal types

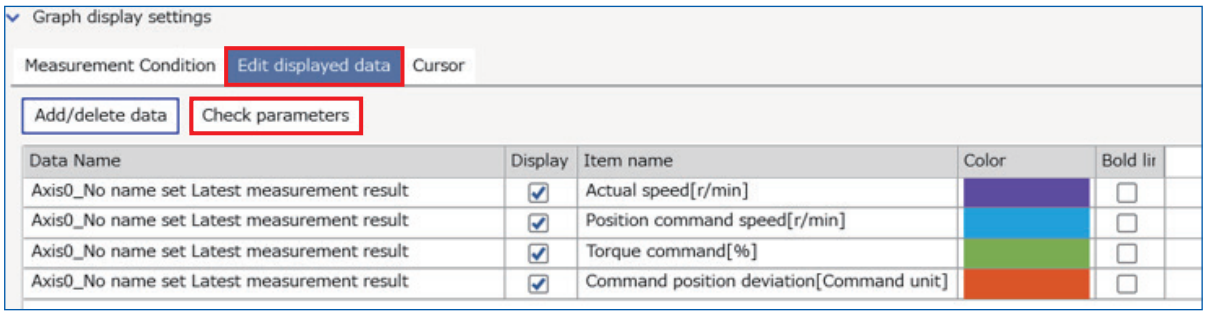
  Number of data: Up to 32 for both analog and digital signals

10.1.13 Comparing Measurement Parameters

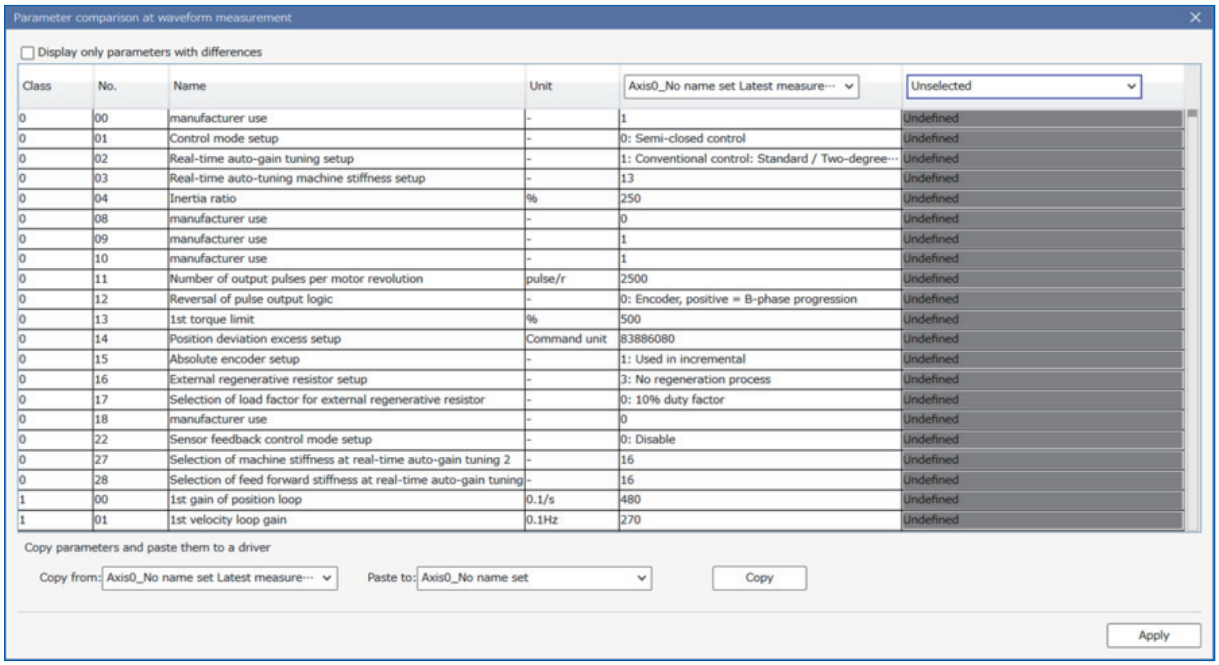
Parameter values can be compared when measuring two sets of measurement data.

<< Procedure >>

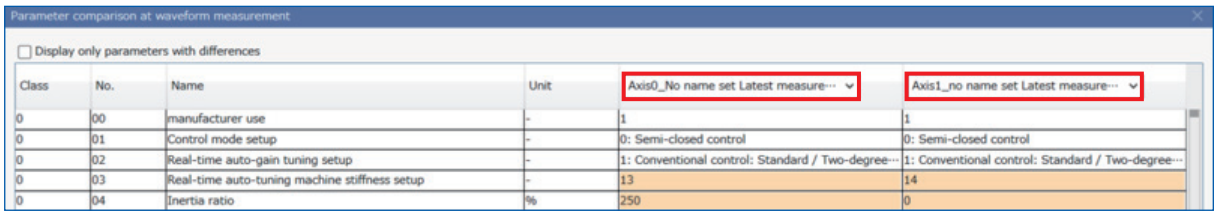
1. Click the [Check parameters] button in the “Edit displayed data” tab.



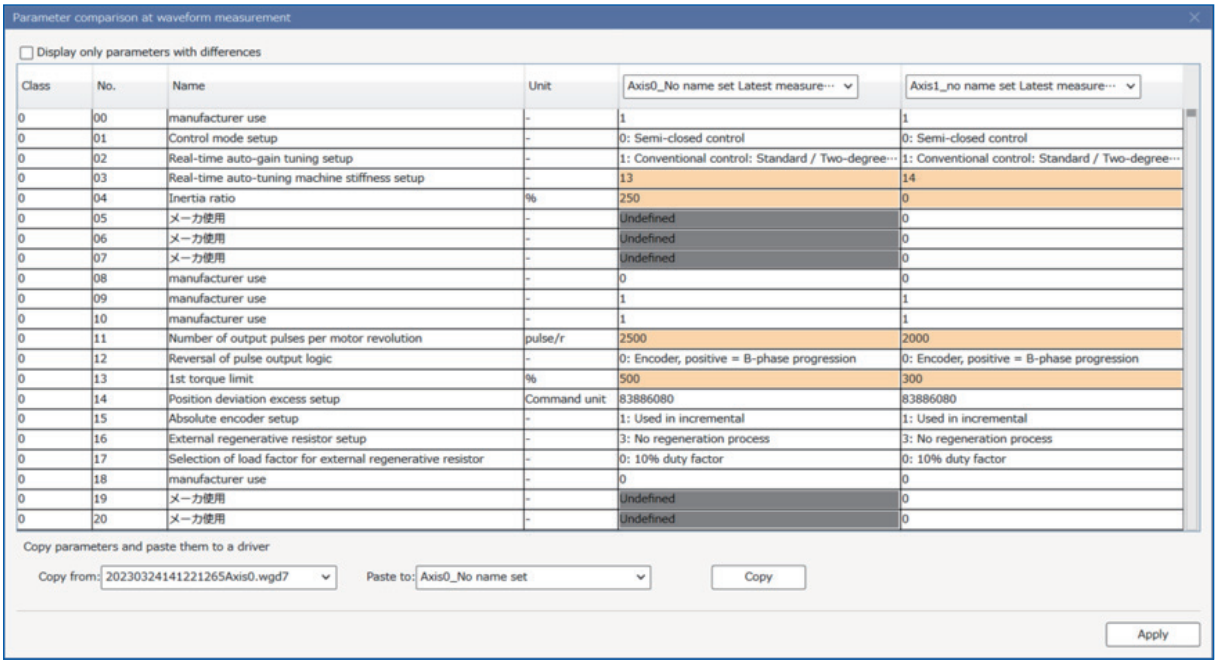
The “Parameter comparison at waveform measurement” dialog box appears.



2. Select the data at the time of the measurement you wish to compare.

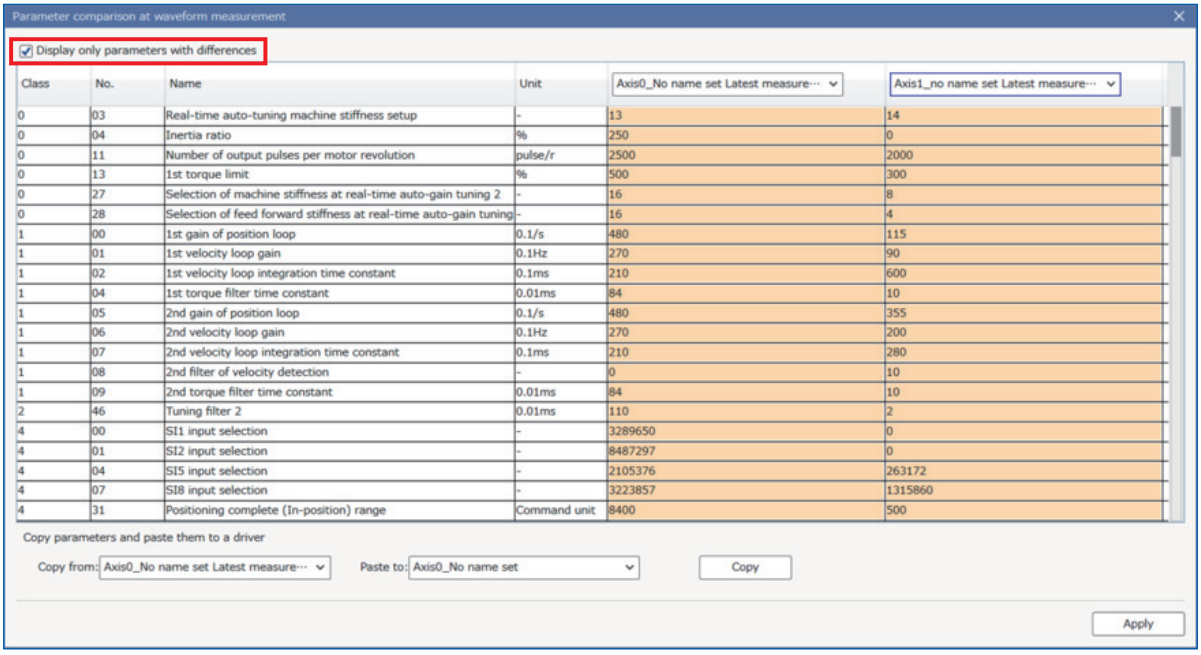


The differences are displayed.



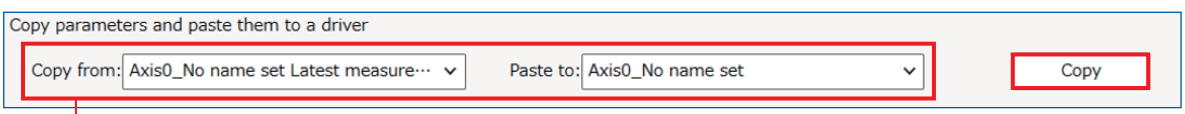
Notes

- Check the “Display only parameters with differences” box to display only the parameters with differences in the parameter list.



- “Check parameters” also allows you to copy the parameter values at the time of measurement of selected measurement data to an online driver.

  Select an option from “Copy from” and “Paste to” in “Copy parameters and paste them to a driver” in the “Parameter comparison at waveform measurement” dialog box, and click the [Copy] button.



Select the location of the measurement data to be copied (copy source) and select the driver (axis) to where it will be pasted (copy destination)

After copying, it is necessary to write the parameters to the driver. For information on how to write to the driver, see *“8.7 Writing Parameters”* .

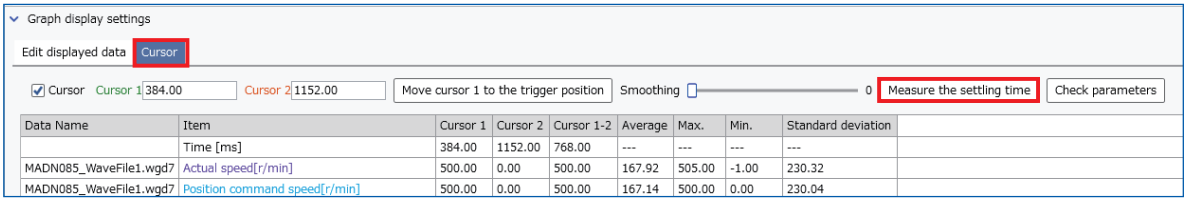
- The measurement conditions read by “Read File” are registered in condition presets. In this case, the condition preset name assigned is the file name. For how to set measurement conditions from condition presets, see *“10.1.10 Setting Measurement Condition Presets”* .
- Parameters defined differently for each model from the parameters to be copied cannot be copied.

10.1.14 Measuring the Settling Time From Measurement Data

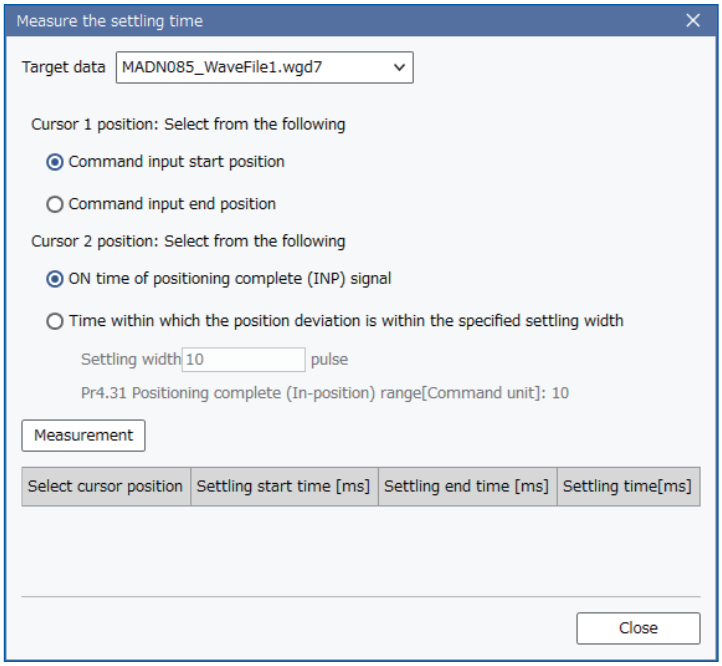
The settling time can be measured for selected measurement data. To calculate the settling time, you can select the method based on the positioning complete signal or the method based on the time within which the position deviation is within the specified settling width.

<< Procedure >>

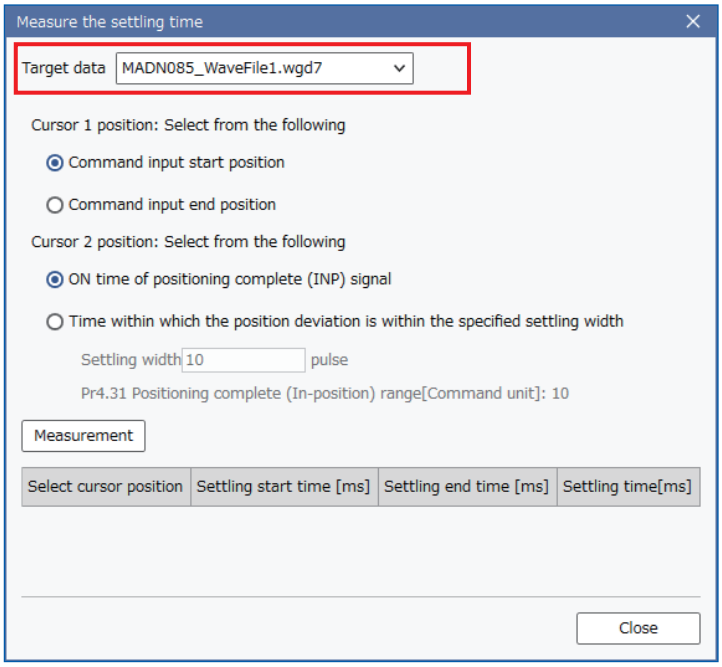
1. Click the [Measure the settling time] button in the “Cursor” tab.



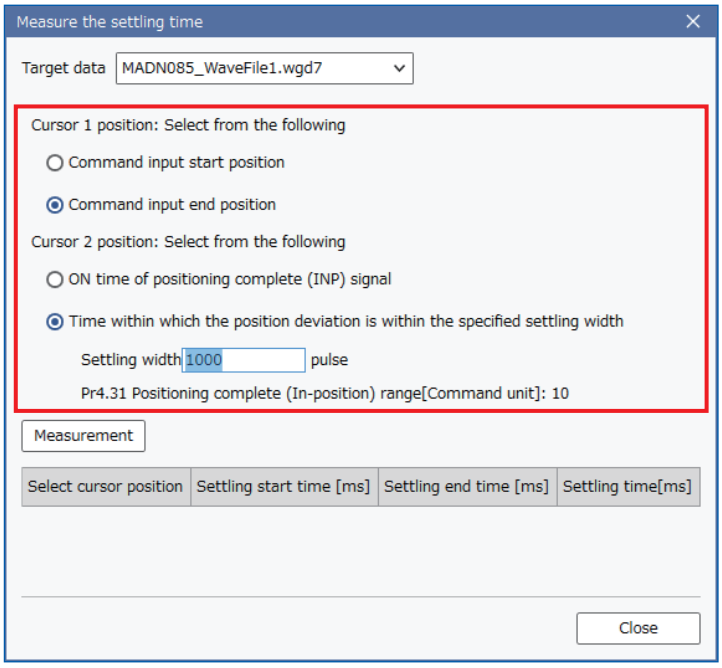
The “Measure the settling times” dialog box appears.



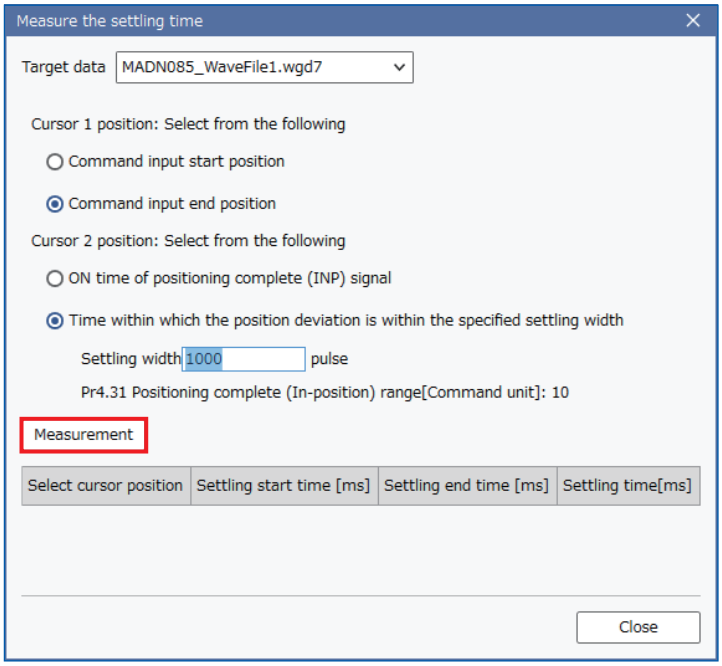
2. Select the “Target data” for which to measure settling time.



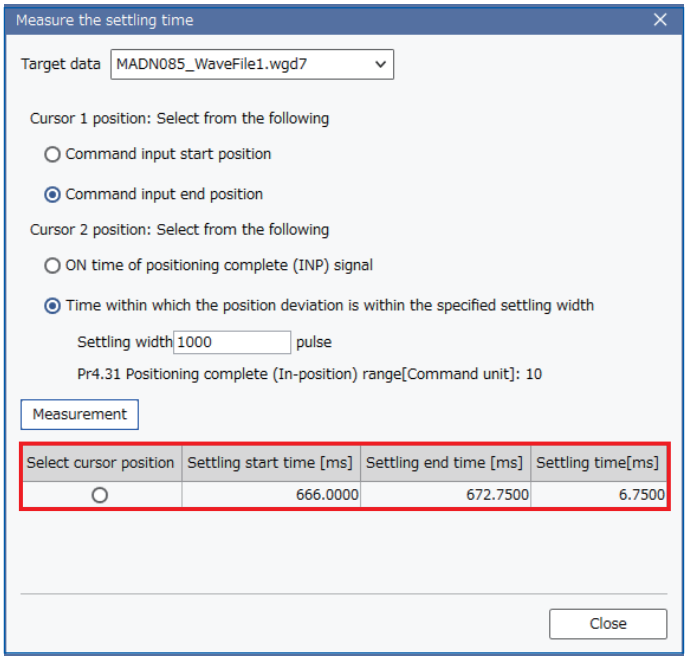
3. Set the cursor 1 and cursor 2 positions respectively.



4. Click the [Measurement] button.



5. This displays the measurement results.



Notes

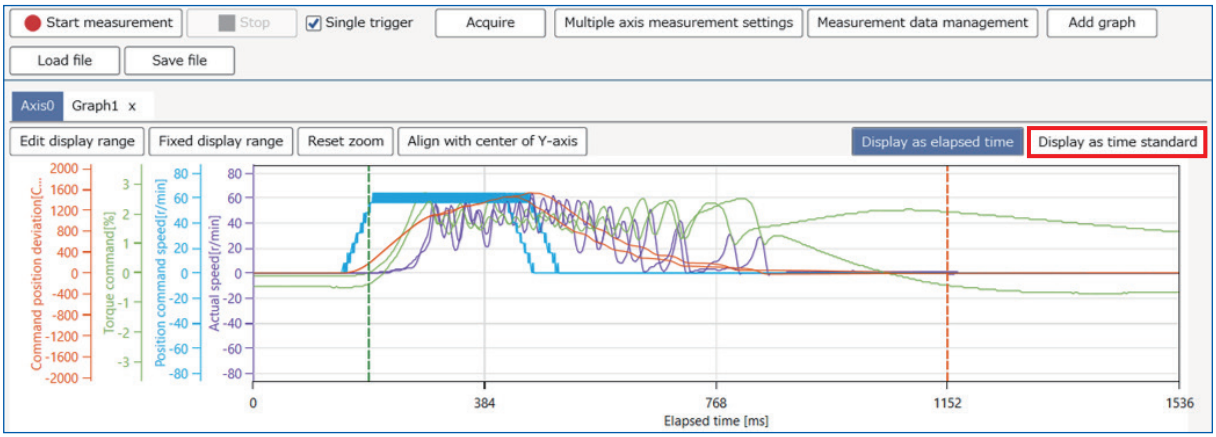
- The measurement data that is to be displayed on the graph as selected in the “Edit displayed data” tab of the Graph display settings is the target of the settling time measurement.
- If there is no INP signal in the measurement data for which the settling time is to be measured, or other necessary signal information is missing in the measurement data, the settling time may not be measured.

10.1.15 Time Stamp Function

This function allows waveforms to be displayed as time standard.

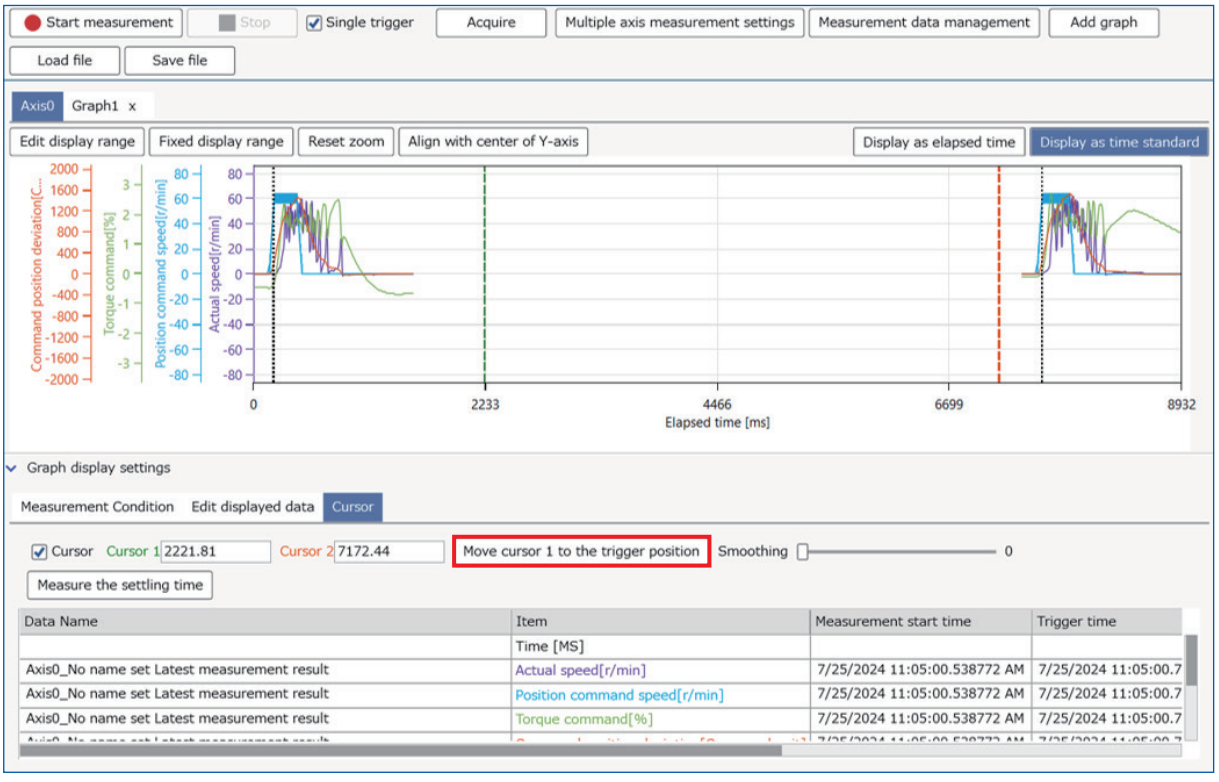
<< Procedure >>

1. Click the [Display as time standard] button.

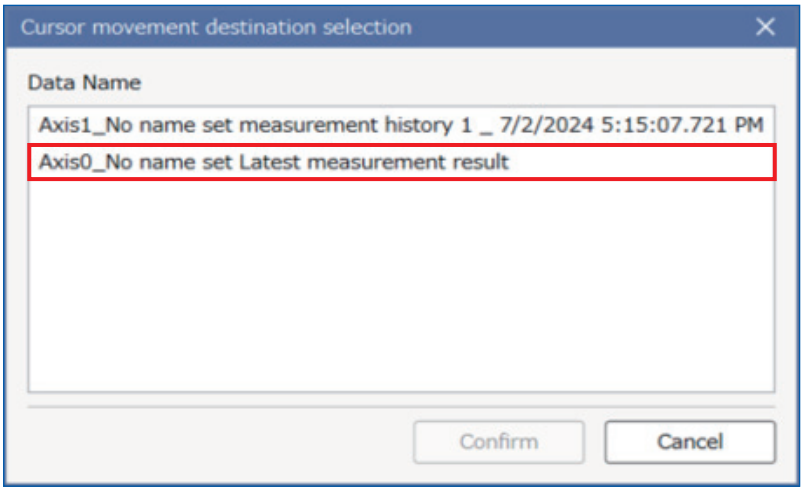


2. Click the [Move cursor 1 to the trigger position] button.

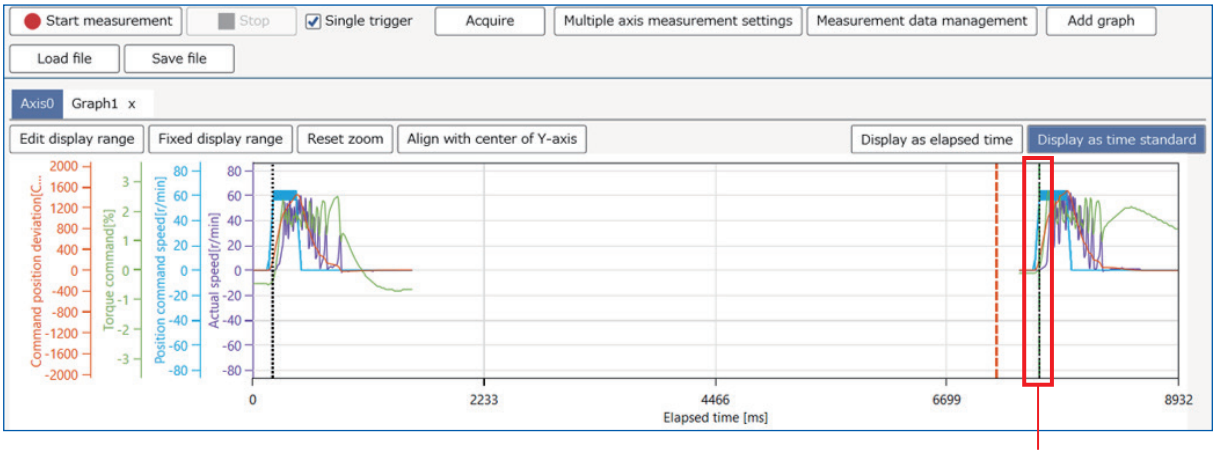
   The “Set trigger time” dialog box appears when there are multiple measurement data items.



3. Select the target trigger time for displaying cursor 1, and click the [Confirm] button.



Cursor 1 is displayed at the selected target trigger time.



Cursor 1 is displayed at the trigger time

10.2 Frequency Characteristics

The resonance point and frequency response of a machine can be measured.

Running the motor measures the frequency response including the load, and a Bode diagram is displayed. The measurement results can also be saved to a file.

Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model for details of the specifications and function of each parameter.

- A7: Operating Instructions (Overall)
- A6: Technical Reference Functional Specification

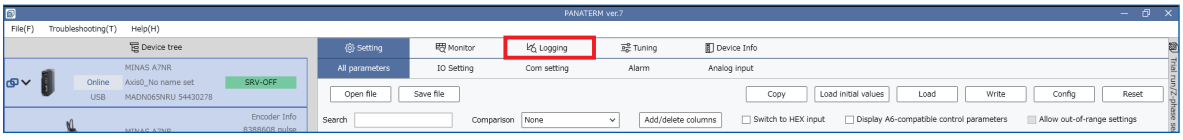
– Precautions –

- The speed of the motor changes radically during measurement. Take necessary safety precautions.
- Execute measurement with the servo ready to be turned off immediately in case of unexpected movement of the motor or other hazards.
- Do not use this function if there is a possibility that the machine may break due to violent movement of the motor.
- Note that setting a large offset may cause movement limits to be exceeded.
- When executing the first measurement, measure with the gain as low as possible.
- Since frequency response measurement results may vary greatly or show incorrect values depending on the characteristics of the device or measurement conditions, use the measurement results of this function as a reference for gain adjustment.
- The gain during measurement is fixed as 1st gain.
- Except for torque speed (normal), measurement results include the effects of various torque filters and various notch filters.
- For safety reasons, some parameters are changed during frequency response measurement and returned to their original settings after measurement is completed.
- If any abnormality occurs during measurement, the parameter values may remain unchanged, so please reset the control power supply..
- Do not rewrite parameters from a host device during measurement.
- The servo may turn off during frequency response measurement when the computer is under heavy load. Instead, execute measurement after the load on the computer has been reduced by closing other running applications.

10.2.1 Opening the Frequency Characteristic Screen

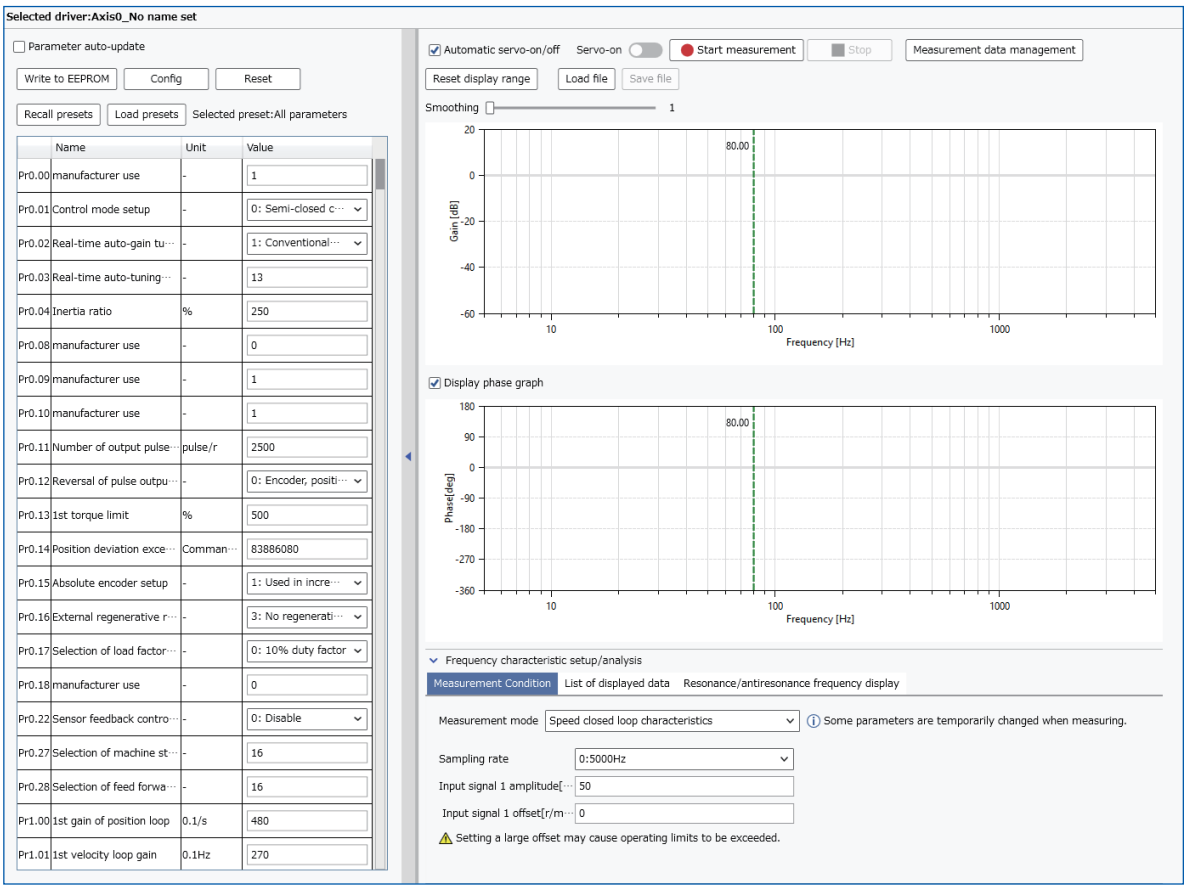
<< Procedure >>

1. Select one device in the device tree for which you want to measure the frequency response and click on the "Logging" tab.



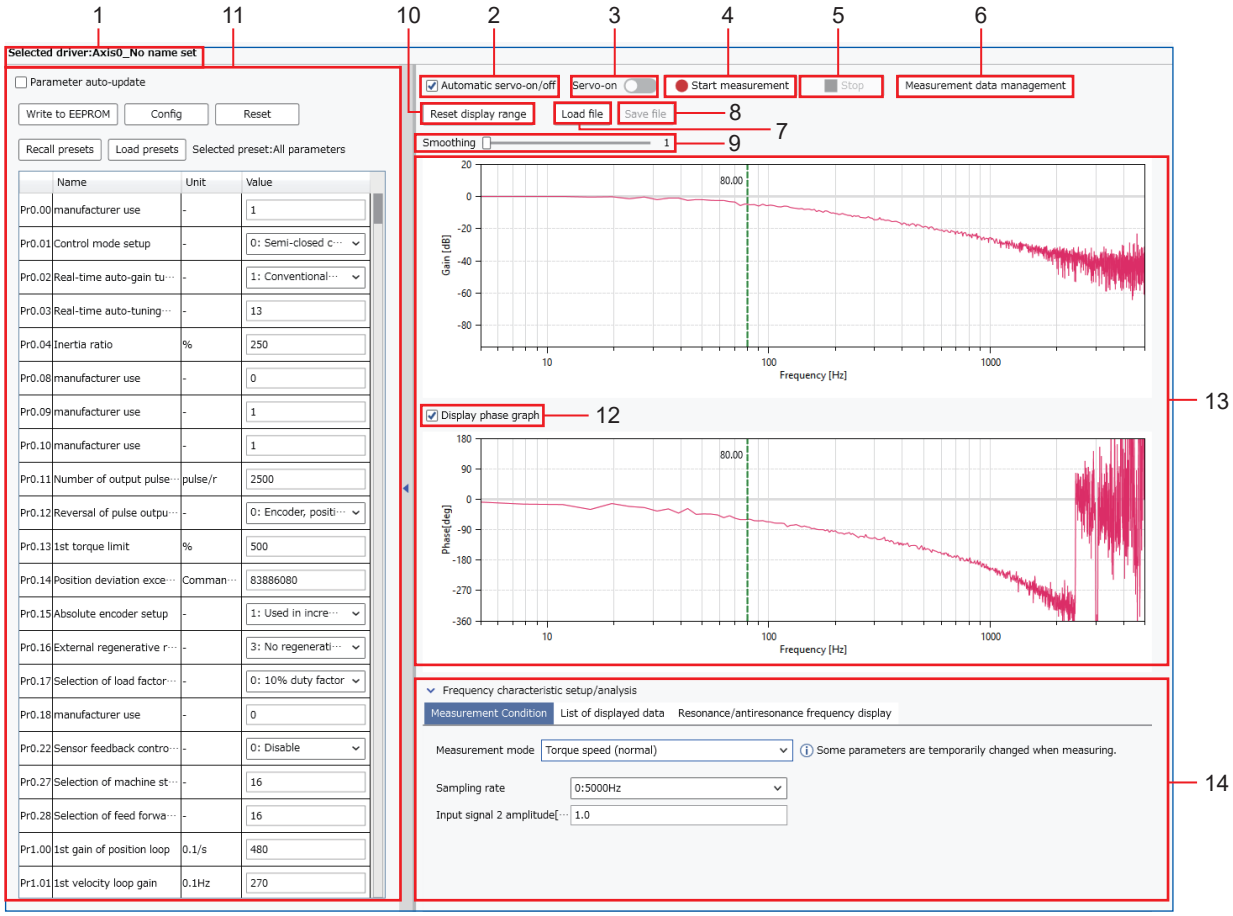
2. Click on the “Frequency response” tab in the sub tab.

3. The frequency characteristic screen is displayed.



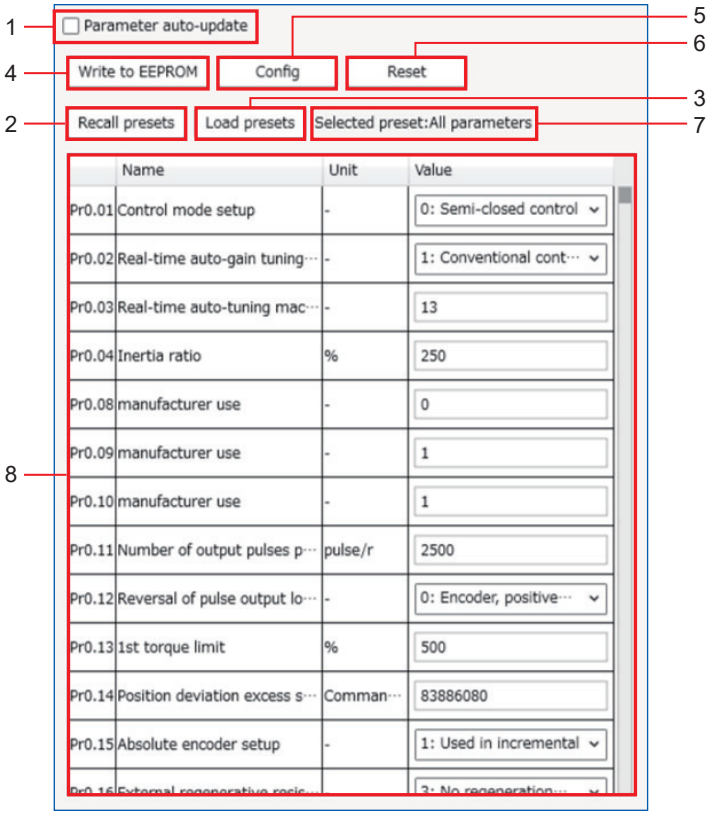
10.2.2 Configuration of the Frequency Characteristic Screen

■ Frequency characteristic screen



No.	Name	Description	Reference
1	Name of selected driver	Displays the name of the selected driver:.	—
2	Automatic servo-on/off	When this is enabled, the servo is automatically turned on at the start of measurement.	—
3	Servo-on	Manually switch servo-on/servo-off.	—
4	Start measurement	Click to start frequency response measurement.	*"10.2.3"*
5	Stop	Click this during measurement to stop measurement.	—
6	Measurement data management	Delete/protect measurement data history.	*"10.2.5"*
7	Load file	Load a saved frequency response file and apply this to the Bode diagram.	*"10.2.7"*
8	Save file	Save the measurement data to a frequency response file.	*"10.2.6"*
9	Smoothing	Set the degree of smoothing. Filter noise components and smooth waveforms by thinning data.	—
10	Reset display range	Reset the display range and zoom in/out ratio for each axis of the graph.	*"10.2.4.3"*
11	Parameter Setup area	This is the area for setting parameters.	—
12	Display phase graph	Check the check box or leave it blank to display or hide the phase graph. The box is checked by default.	—
13	Graph plotting area	Area for plotting the measured frequency response data as a Bode diagram with a Gain-Frequency graph and a Phase-Frequency graph.	—
14	Frequency characteristic / analysis setting area	Area for configuring setting for frequency characteristic / analysis.	—

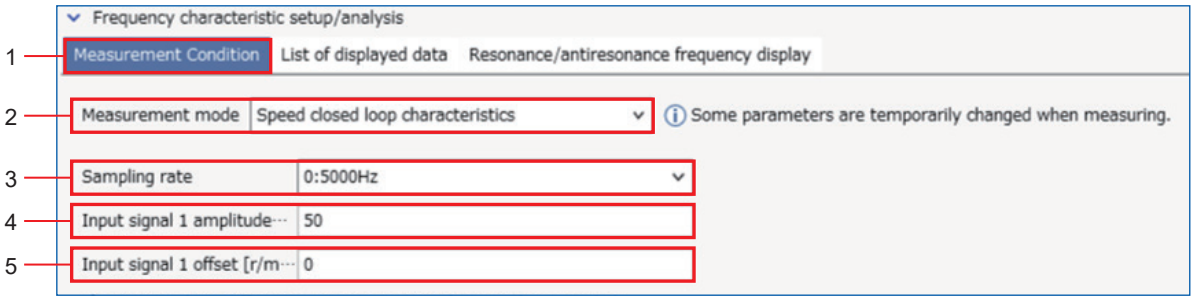
■ Parameter setup area screen



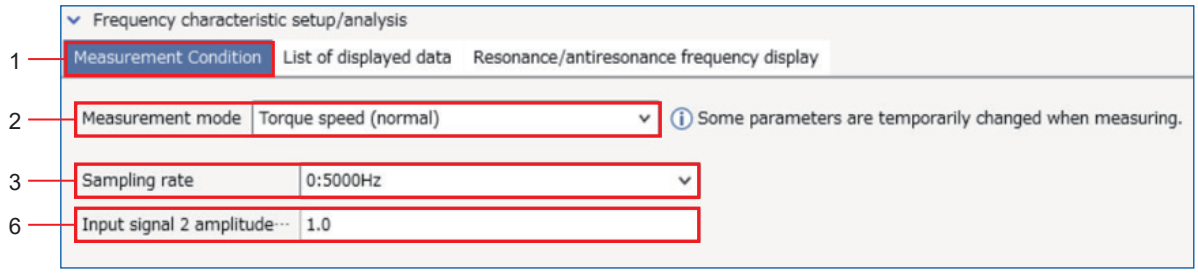
No.	Name	Description	Reference
1	Automatic parameter up-date	When this is checked, the parameters displayed are read from the driver and updated at regular intervals.	—
2	Recall presets	Select condition presets registered in this software.	*"10.2.8"*
3	Load presets	Register presets from a parameter file (.prm7) containing favorite parame-ters.	*"10.2.9"*
4	Write to EEPROM	Write the set parameters to EEPROM.	—
5	Config	Execute the Config command.	—
6	Reset	Execute reset command.	—
7	Selected preset name	Displays the name of the selected preset.	—
8	Parameter display area	Displays the parameters registered in the presets.	—

■ Frequency response settings and analysis - Measurement conditions screen in the settings area

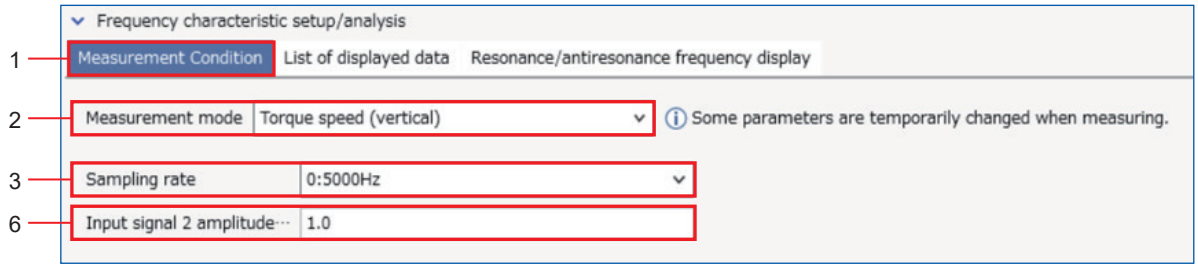
Frequency response settings and analysis - Measurement conditions screen (Measurement mode: Speed closed loop characteristics)



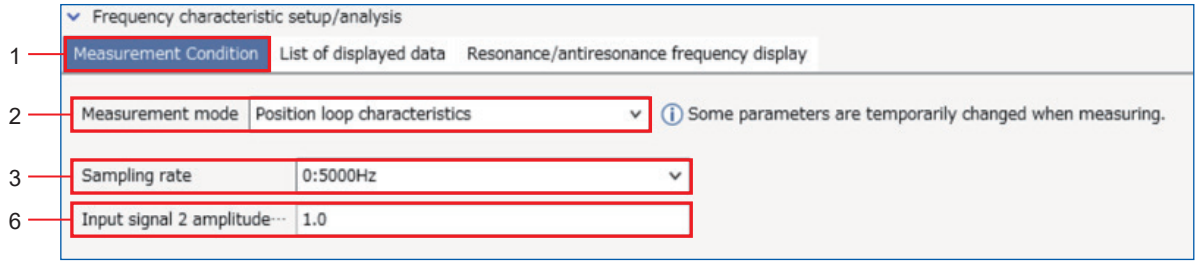
Frequency response settings and analysis - Measurement conditions screen (Measurement mode: Torque speed (Normal))



Frequency response settings and analysis - Measurement conditions screen (Measurement mode: Torque speed (Vertical))



Frequency response settings and analysis - Measurement conditions screen (Measurement mode: Position loop characteristics)

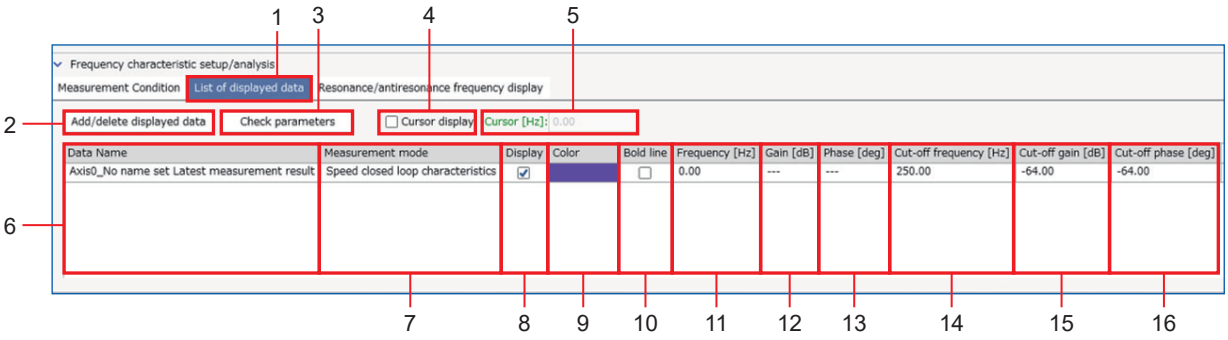


No.	Name	Description	Reference
1	Measurement conditions tab	Displays the measurement conditions.	—
2	Measurement mode	Set the measurement mode.	—
3	Sampling rate	Set the sampling rate setting value. A frequency range that can be set is set for each sampling rate. **Notes** ● Increasing the sampling rate improves measurement accuracy in low frequency bandwidths, but increases measurement time. Conversely, a smaller sampling rate improves measurement accuracy in high frequency bandwidths. Start from 0 and tune as you observe the measurement results. ● When the sampling rate is 1 or higher, overlap may occur due to aliasing.	—
4	Input signal 1 amplitude [r/min]	Set the amplitude of the noise waveform applied to a speed or torque command. **Notes** ● Increasing the amplitude improves measurement accuracy, but if the amplitude is increased too much, torque is saturated and, conversely, accuracy is reduced. Start from a small value and gradually increase it as you observe the measurement results.	—

No.	Name	Description	Reference
5	Input signal 1 offset [r/min]	Set the offset value of the noise waveform applied to the speed or torque command during frequency response measurement. **Notes** ● During measurement, the set offset is used as the average speed command. Polarity is + for positive direction and - for negative direction. Good measurement results are obtained when the offset is greater than the set value of the amplitude so that the motor always rotates in the negative direction. Note, however, that if the movable range is small, movement may exceed the movement limits.	—
6	Input signal 2 amplitude [%]	Set the amplitude of the noise waveform applied to a speed or torque command. **Notes** ● Increasing the amplitude improves measurement accuracy, but if the amplitude is increased too much, torque is saturated and, conversely, accuracy is reduced. Start from a small value and gradually increase it as you observe the measurement results.	—

■ Frequency response setting and analysis area - List of displayed data screen

Frequency response settings and analysis - List of displayed data screen

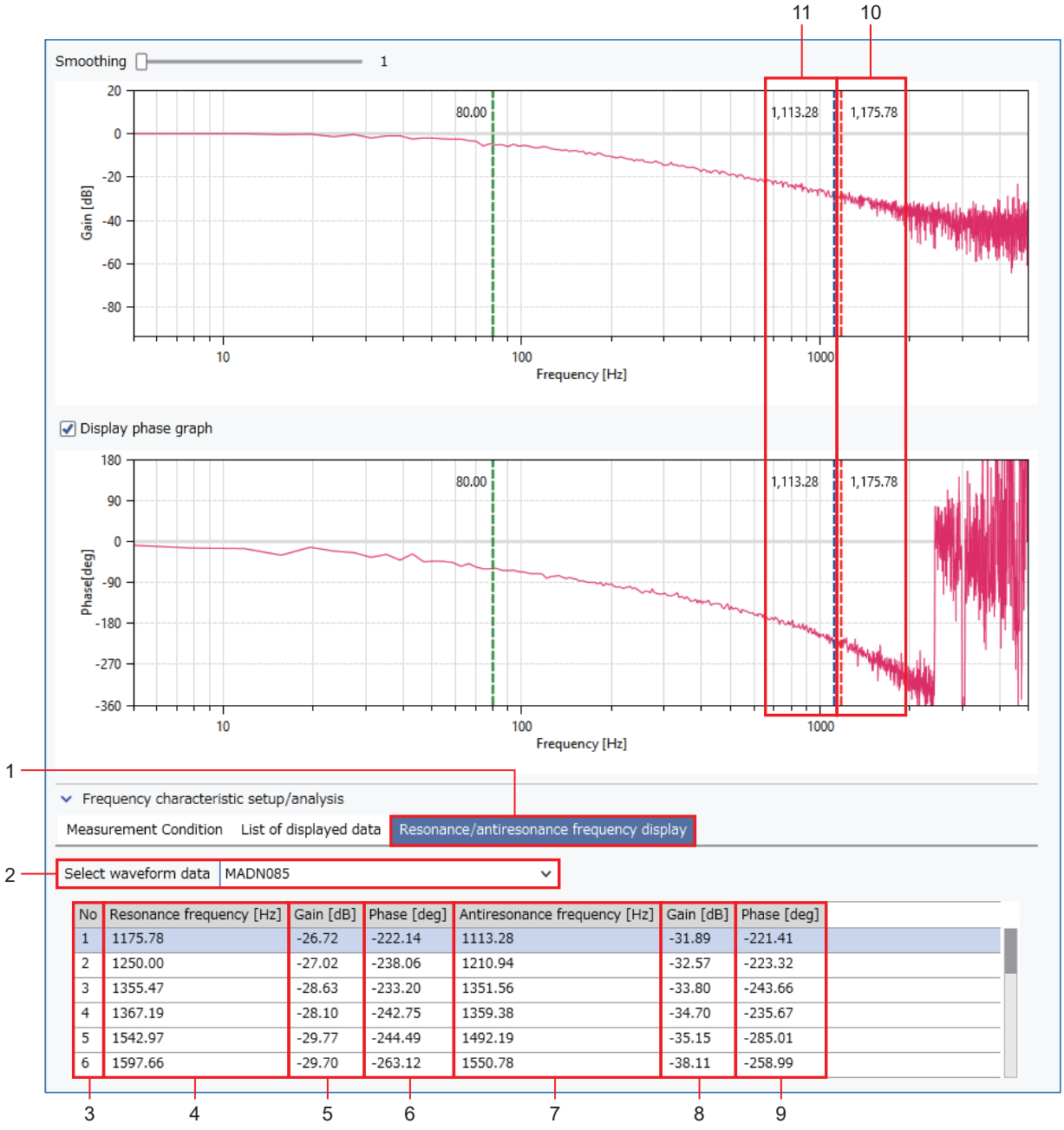


No.	Name	Description	Reference
1	List of displayed data tab	Displays the list of displayed data.	—
2	Add/delete displayed data	Add/delete data to be displayed on the graph.	*"10.2.11"*
3	Check parameters	Compare parameter values for each measurement data.	*"10.2.10"*
4	Cursor display	Set whether to show or hide the cursor displayed on the graph. When the cursor is shown, the values are also plotted at the cursor position on the graph.	—
5	Cursor [Hz]	Displays the frequency at the current cursor position.	—
6	Data name	Displays the data name of the measurement data to be displayed in the graph.	—
7	Measurement mode	Displays the measurement mode at the time of graph measurement.	—
8	Display	Set whether each measurement data item to be displayed on the graph is displayed or not displayed.	—
9	Color	Displays the colors of the measurement data lines to be displayed on the graph. Click to change to colors of your choice.	—
10	Bold line	Change a line of measurement data displayed on the graph to a bold line.	—
11	Frequency [Hz]	Displays the frequency at the cursor position.	—
12	Gain [dB]	Displays the gain at the cursor position.	—
13	Phase [deg]	Displays the phase at the cursor position.	—
14	Cut-off frequency [Hz]	Displays the cut-off frequency.	—

No.	Name	Description	Reference
15	Cut-off gain [dB]	Displays the cut-off gain.	—
16	Cut-off phase [deg]	Displays the cut-off phase.	—

■ Frequency response settings and analysis area - Resonance/antiresonance frequency display screen

Frequency response settings and analysis - Resonance/antiresonance frequency display display screen



No.	Name	Description	Reference
1	Resonance/antiresonance frequency display tab	Displays the resonance/anti-resonance frequencies.	—
2	Select waveform data	Select the waveform data to be displayed on the graph. Displays up to 20 resonance and anti-resonance points existing in the selected waveform data.	—

No.	Name	Description	Reference
3	No	Displays the number for the resonance/anti-resonance frequency. The frequencies are numbered sequentially from 1.	—
4	Resonance frequency [Hz]	Displays the resonance frequency.	—
5	Gain [dB]	Displays the resonance frequency gain.	—
6	Phase [deg]	Displays the resonance frequency phase.	—
7	Antiresonance frequency [Hz]	Displays the anti-resonance frequency.	—
8	Gain [dB]	Displays the anti-resonance frequency gain.	—
9	Phase [deg]	Displays the anti-resonance frequency phase.	—
10	Resonance frequency cursor	A cursor is drawn at the position of the resonance frequency corresponding to the selected waveform data. Numerical values are also drawn at the cursor position on the graph.	—
11	Anti-resonance frequency cursor	A cursor is drawn at the position of the anti-resonance frequency corresponding to the selected waveform data. Numerical values are also drawn at the cursor position on the graph.	—

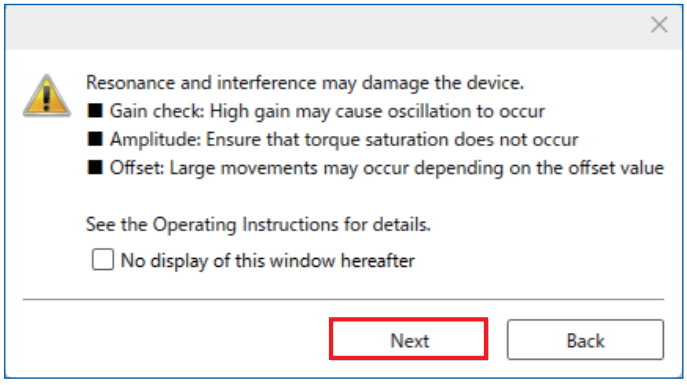
10.2.3 Measuring Frequency Characteristics

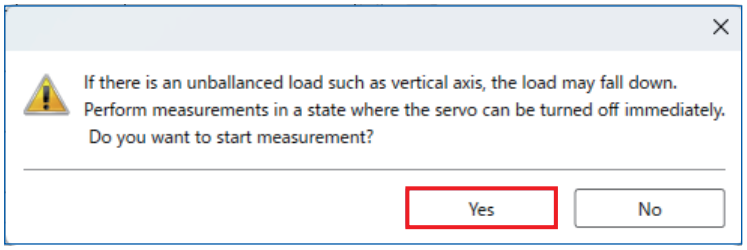
<< Procedure >>

1. Set various parameters and settings for measurement.
2. Check the automatic servo-on/off command box.

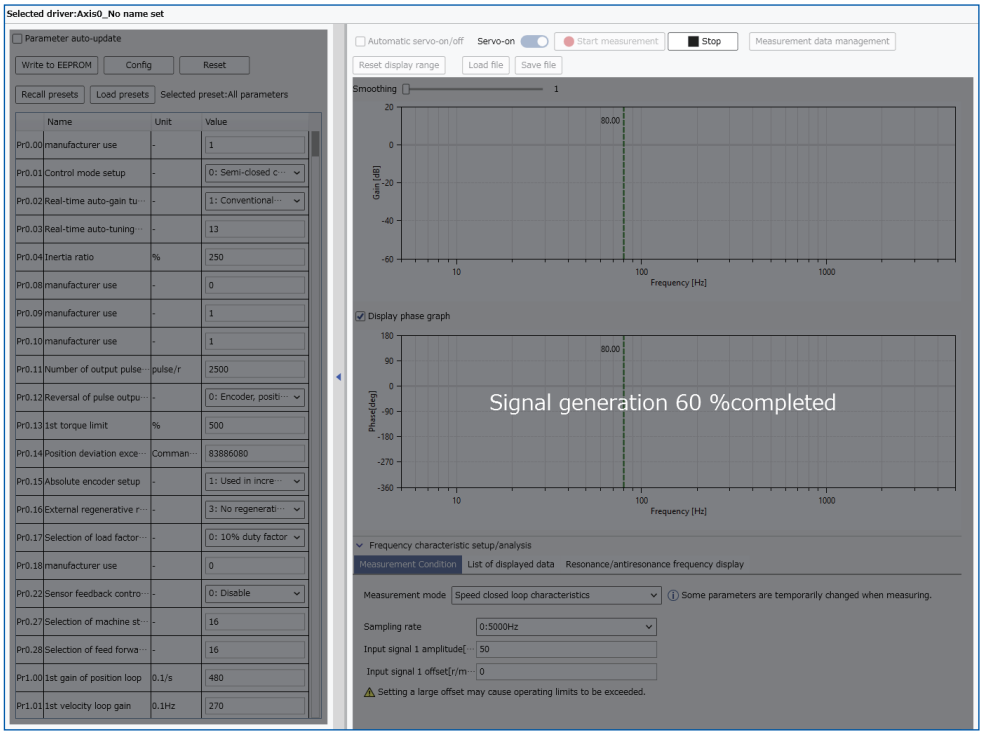
   Uncheck the box if the brake release operation is performed by a host device in the network type. After manually clicking the servo-on button, release the brake from the host device and go to "Step 3".
3. Click the [Start measurement] button.

   When automatic servo-on is not set, manually enable servo-on state and then click the [Start measurement] button.
4. The following message dialog box appears. If there are no problems, click the [Yes] button.

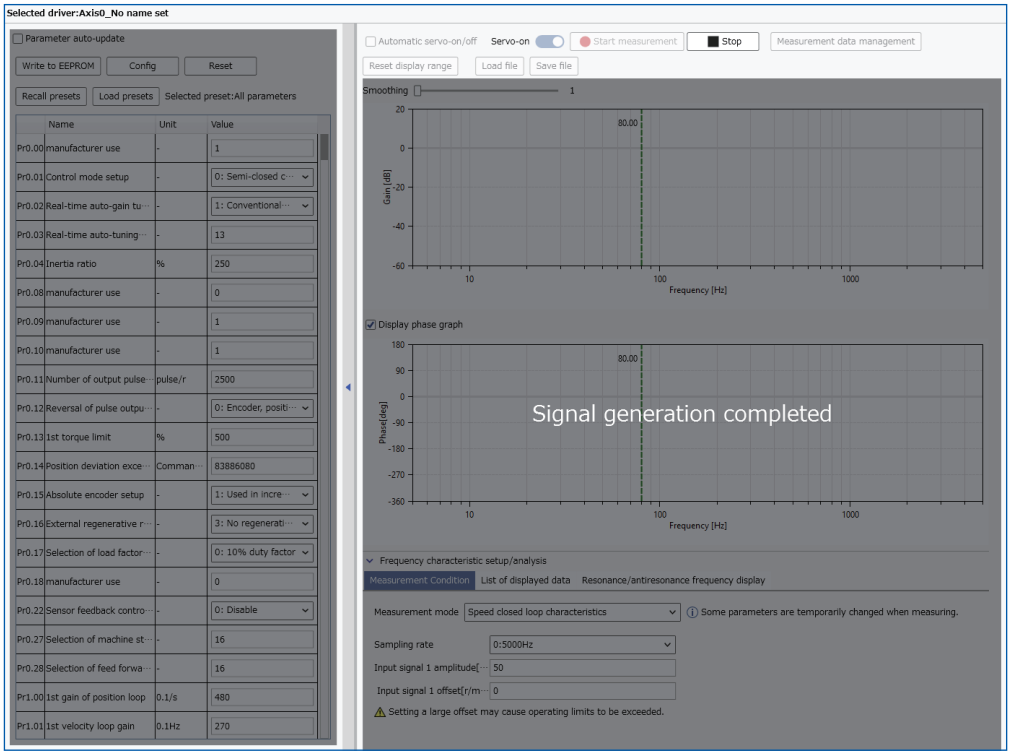




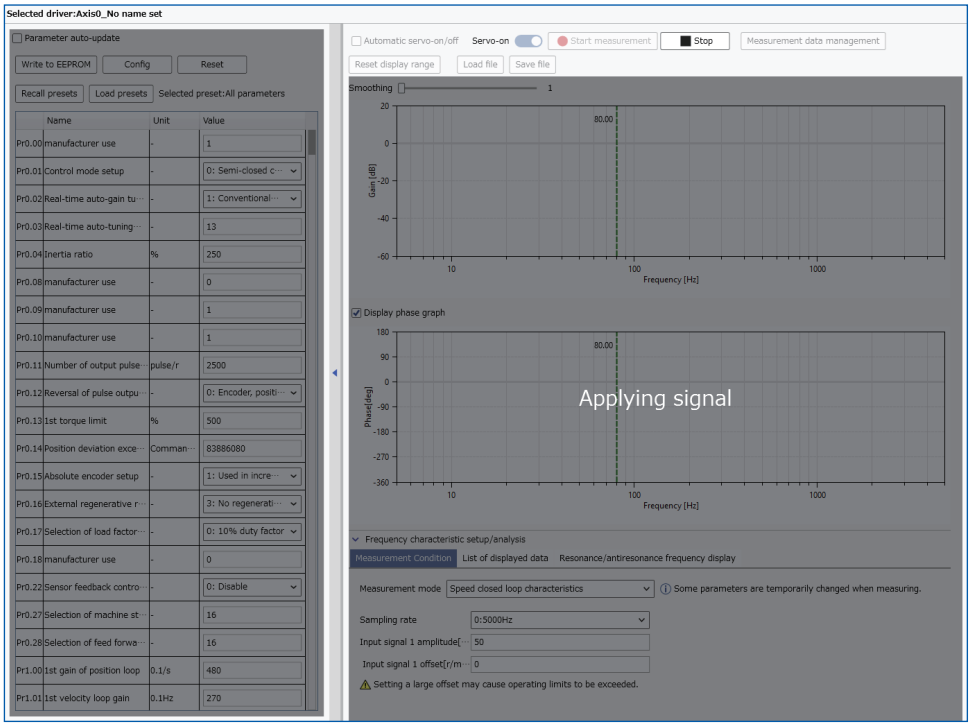
5. Wait until the signal generation rate reaches 100%.



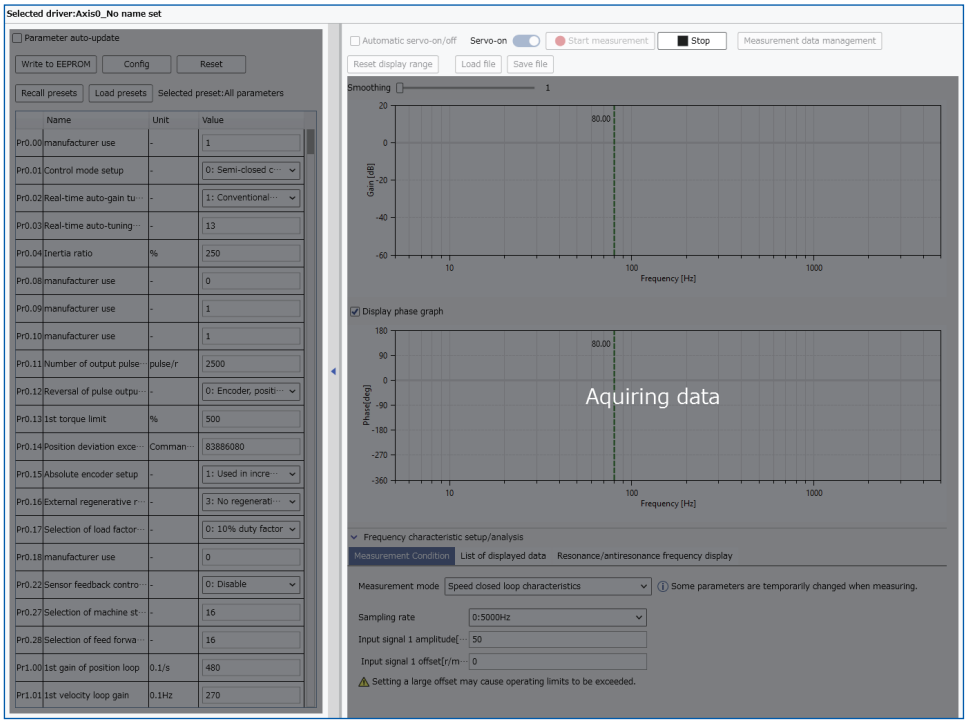
6. When the signal generation rate reaches 100%, the display indicates that signal generation is complete.



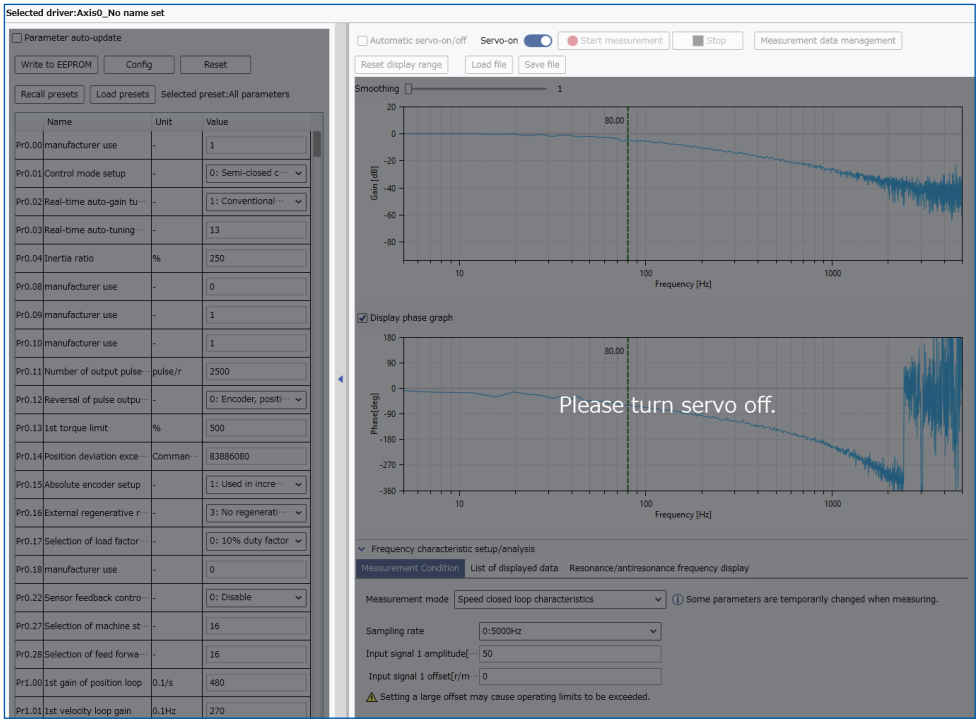
7. Once signal generation is complete, signal application starts.



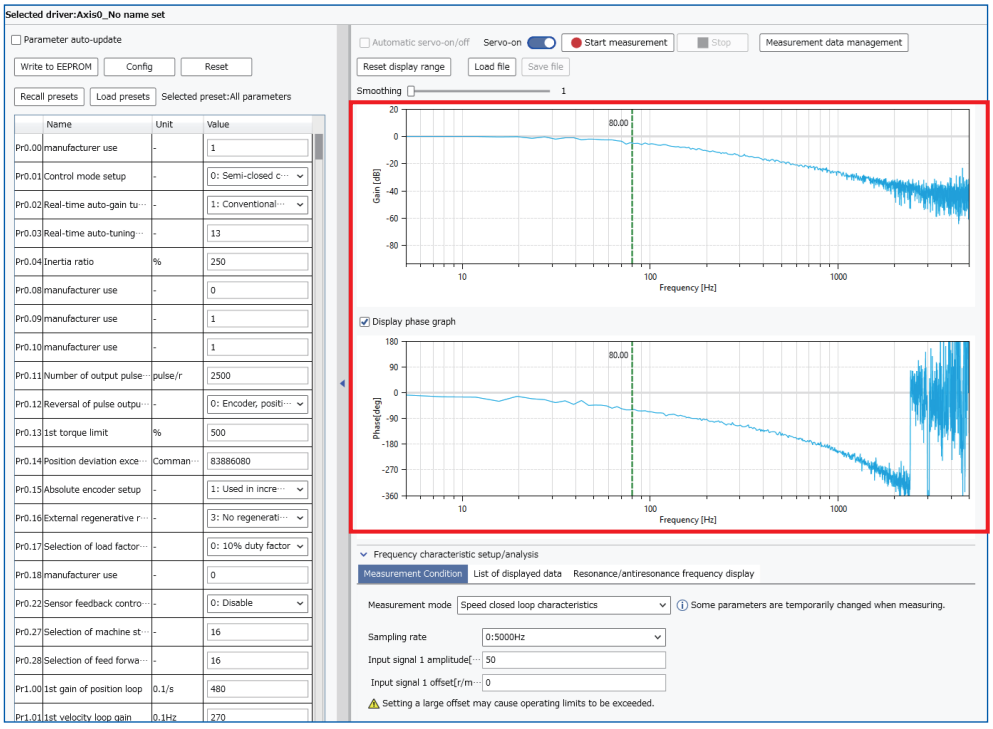
8. When signal application is complete, measurement data is acquired and a measurement results graph is displayed. If automatic servo is off, "Step 9" is displayed.



9. If automatic servo is off, the following screen is displayed after data acquisition. Turn the servo off. The measurement results graph is then displayed.



Measurement Results Graph

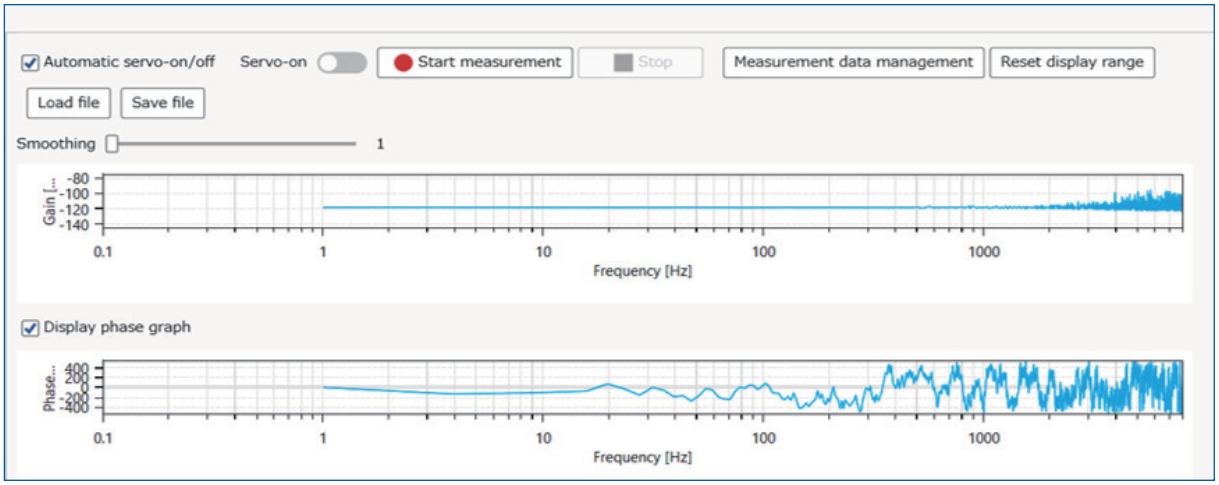


10.2.4 Graph Area Operations

10.2.4.1 Zooming In/Out On the Graphs

In the graph plotting area, you can zoom in or out on the graph plotted by operating the mouse wheel.

- Operate the mouse wheel in the graph area to zoom in and out on both the X-axis and Y-axis.
- Operate the mouse wheel on the X-axis to zoom in and out on the X-axis only.
- Operate the mouse wheel on the Y-axis to zoom in and out on the Y-axis only.



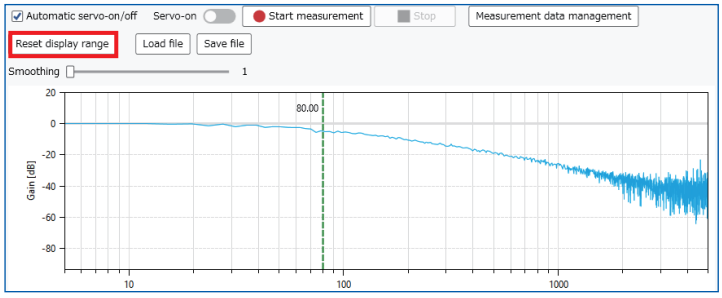
10.2.4.2 Dragging and Moving the Graphs

You can drag to move the graph displayed in the graph plotting area.

- Dragging and moving the graph in the graph area, moves both the X-axis and Y-axis.
- If you drag and move on the X-axis, only the X-axis is moved.
- If you drag and move on the Y-axis, only the Y-axis is moved.

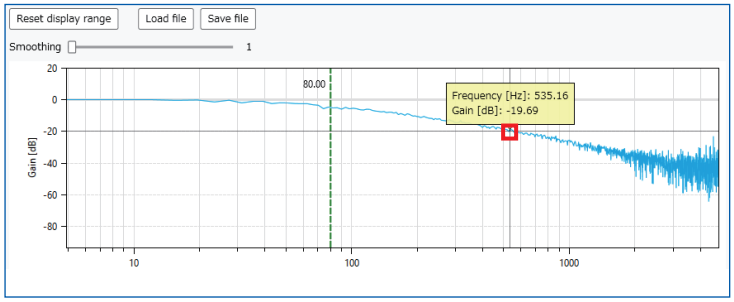
10.2.4.3 Resetting the Display Range and Zoom

Click the [Reset display range] button to reset the display range changed and the zoom all at once.



10.2.4.4 Displaying Data at a Specific Position on the Graph

Click on a line in the graph to display the data from the position clicked.



10.2.5 Deleting and Protecting Measurement Data History

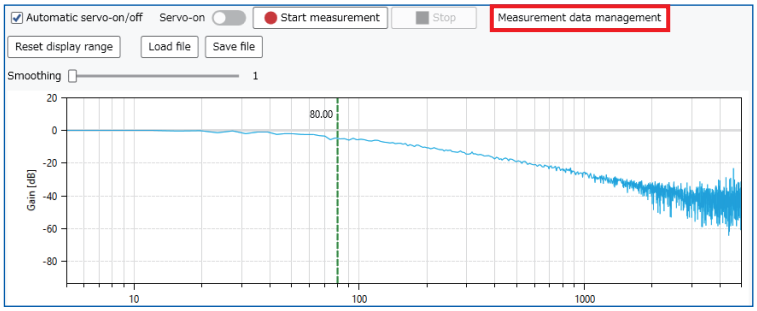
Measurement data history can be deleted or protected.

- Up to 32 instances of measurement data can be saved in this software. If there are more than 32 instances, data with older measurement dates and times will be overwritten.
- Measurement data, including protected measurement data, is discarded when this software is exited. To save the measurement data, execute [Save file].

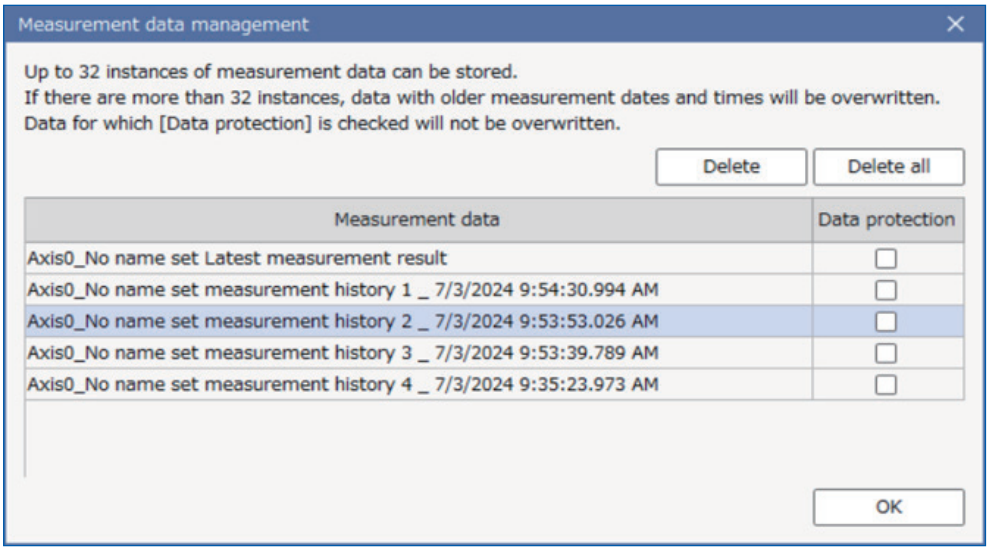
  For details on how to save measurement data, see *"10.2.6 Saving Measurement Data to a File"* .

<< Procedure >>

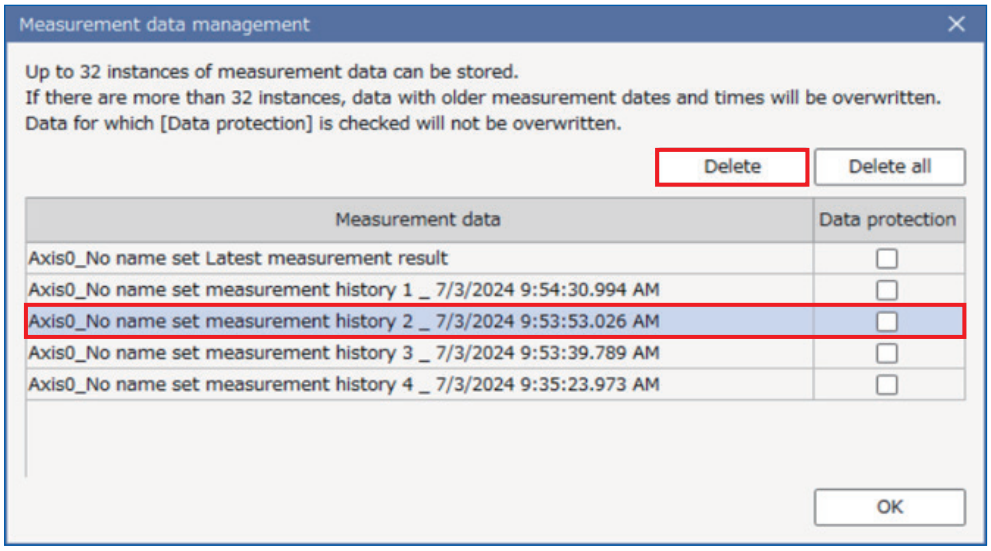
1. Click the [Measurement data management] button.



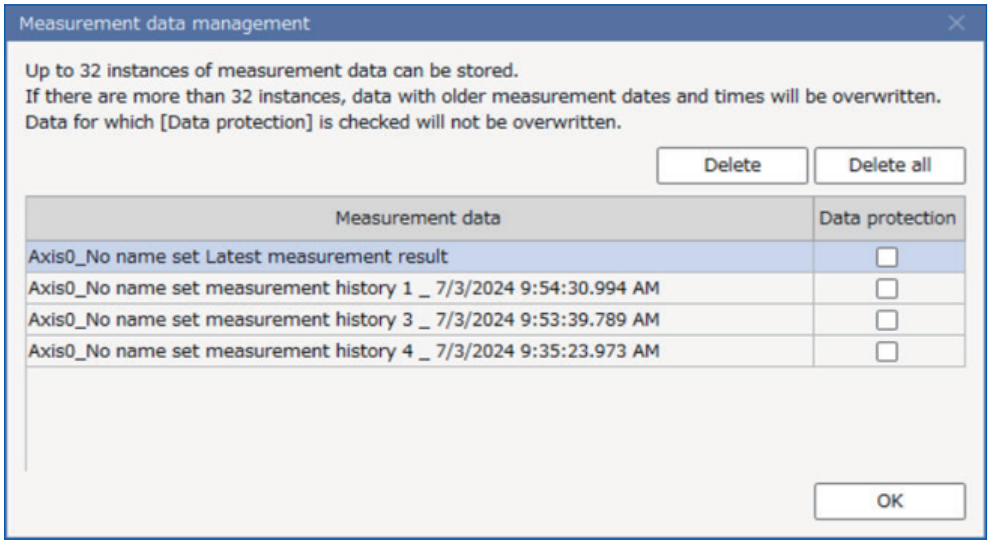
The "Measurement data management" dialog box appears.



2. To delete an item, select the item to be deleted and click the [Delete] button.

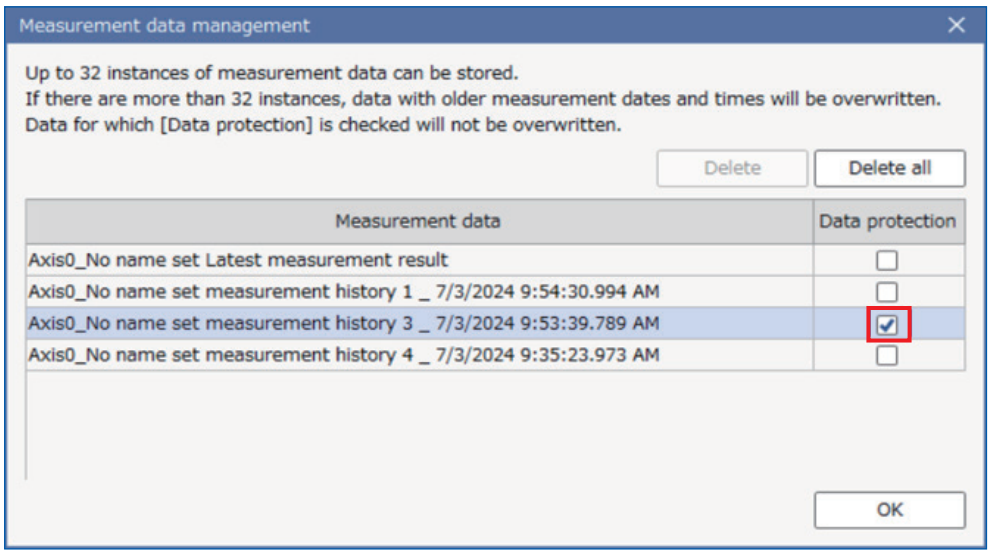


3. The selected item is deleted.

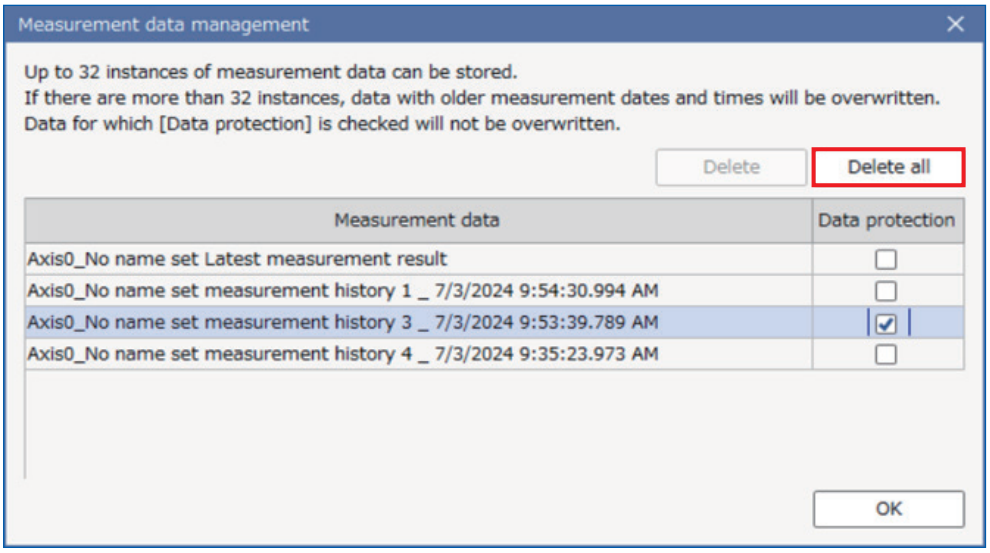


4. To protect data, select the data you want to protect and check the box.

Data that is checked remains without being overwritten.

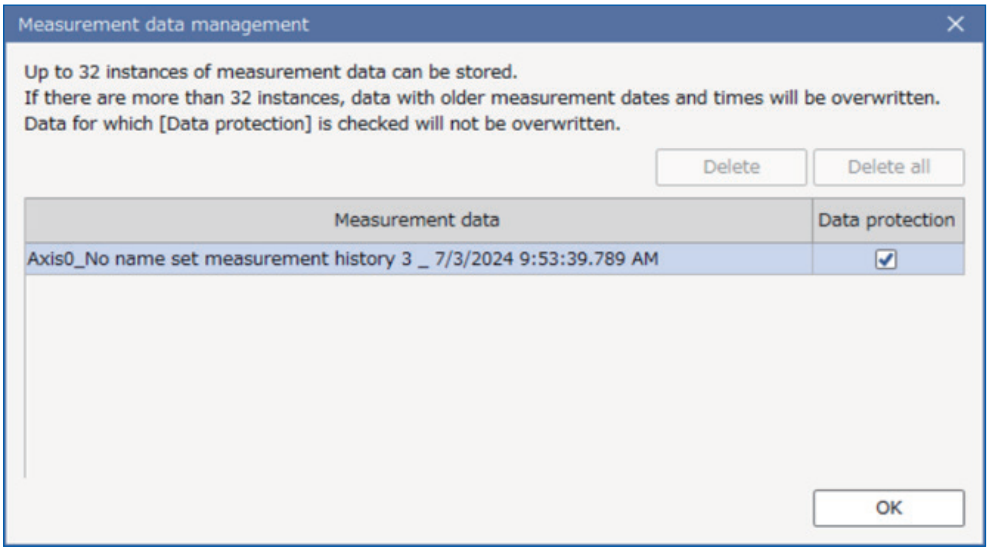


5. To delete all data, click the [Delete all] button.



6. Everything except protected data is deleted.

   Uncheck the box for an item if you wish to delete it.



10.2.6 Saving Measurement Data to a File

Select any measurement data from multiple measurement data items and save it as a separate file.

- Measurement conditions, measurement data and parameter settings at the time of measurement are saved all together. You cannot select which information to save.
- The extension of the measurement data file to be saved is *.fcd7.
- If a file with the same name as the measurement data file exists at the time of saving, save the file as a separate file with a sequential number at the end of the file name.

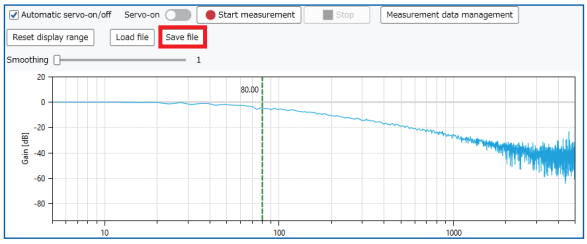
  Example: If the file 2024xxxxaxis0.fcd7 exists, save the file with a file name like the following.

  2024xxxxaxis0(1).fcd 7

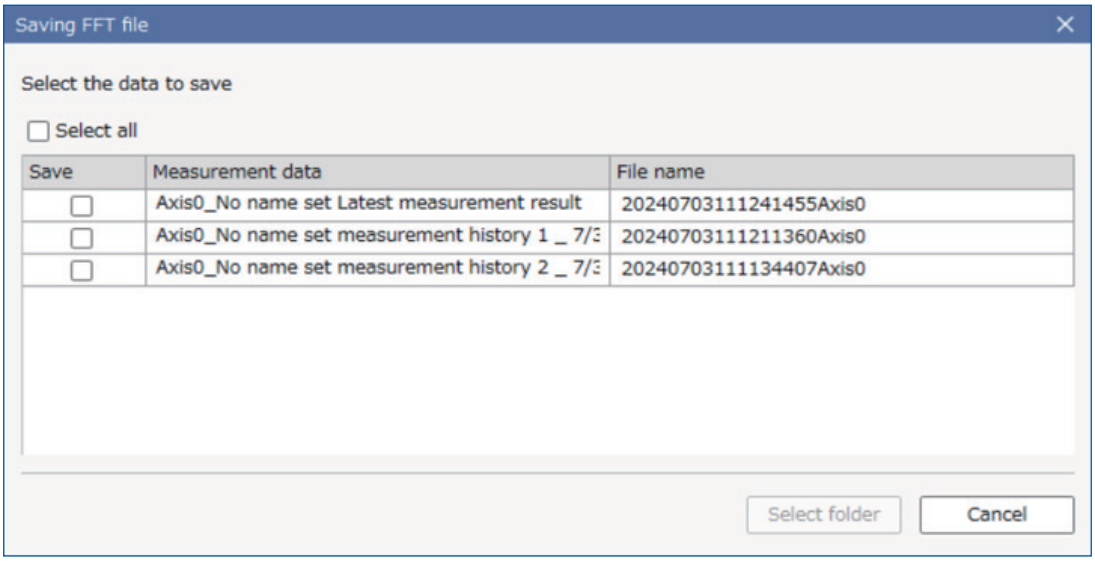
  2024xxxxaxis0(2).fcd 7

<< Procedure >>

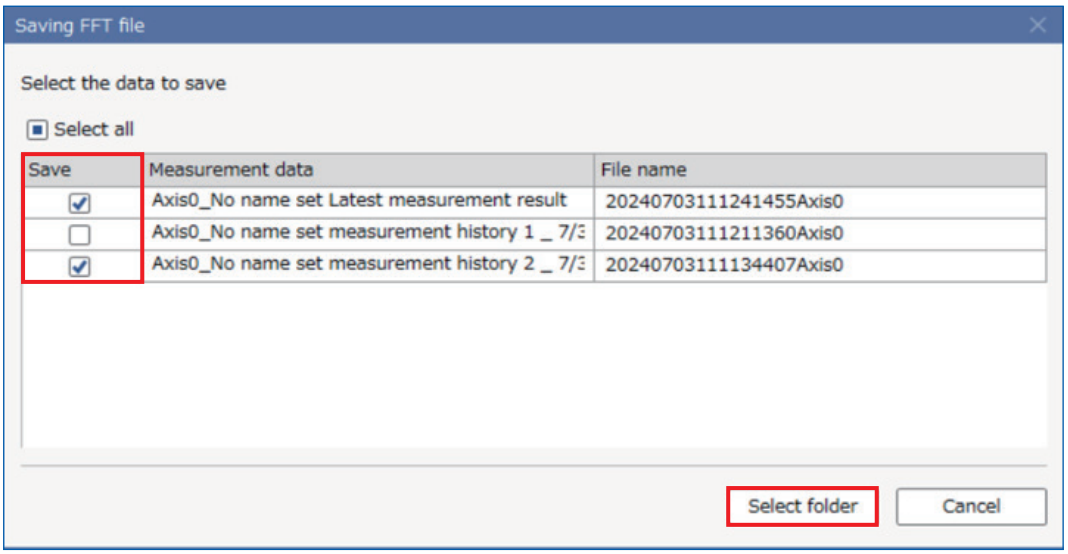
1. Click the [Save file] button.



This displays the “Saving FFT file” dialog box.



2. Check the check boxes for the measurement data to be saved, click the [Select folder] button, and select the folder to save the file to.

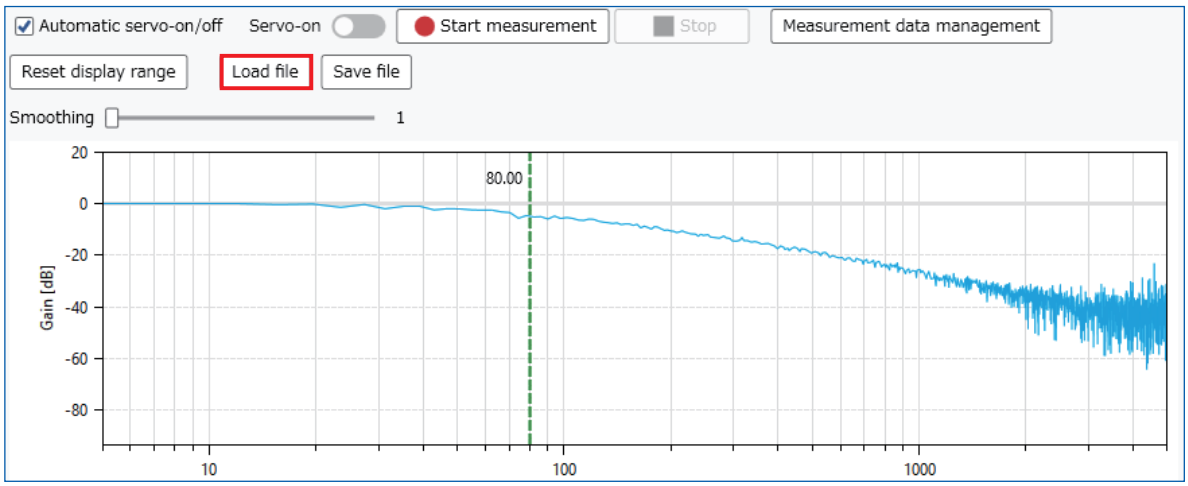


10.2.7 Reading Measurement Data From a File

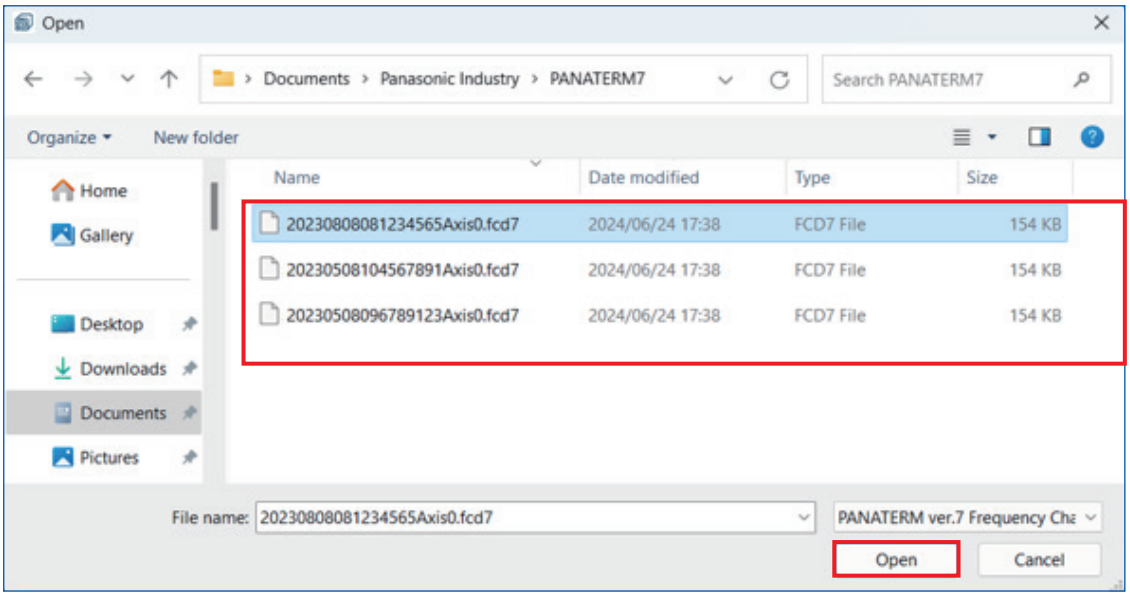
Load a frequency response file.

<< Procedure >>

1. Click the [Load file] button.



2. The “Open” dialog box appears. Select the frequency response file and click the [Open] button to read the file.



10.2.8 Setting Parameters From Presets

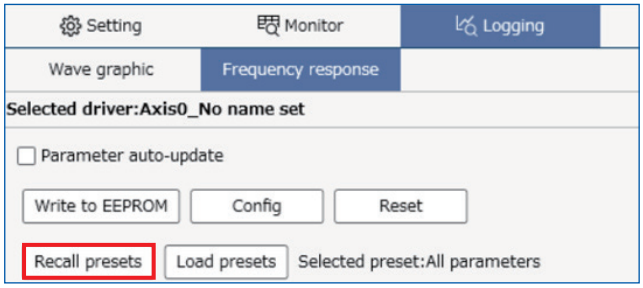
Parameters can be set in batch from presets.

- The only items that can be deleted are those registered with preset loading (*“10.2.9 Registering Presets From a File”*).

  The presets “All parameters” and “Favorites of setting screen” registered by default cannot be deleted.

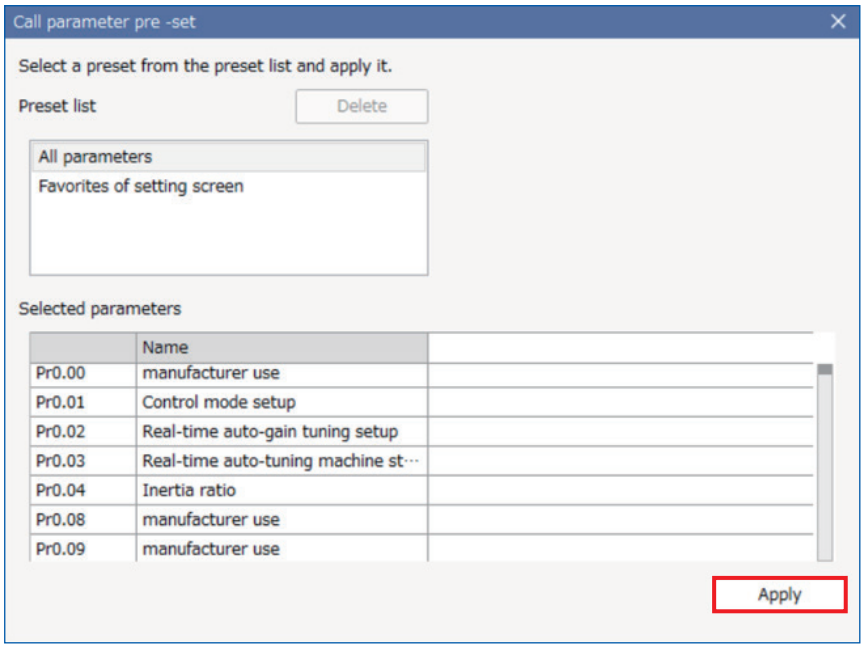
<< Procedure >>

1. Click the [Recall presets] button in the parameter display area.



The “Call parameter preset” dialog box appears.

2. Select the parameter preset you wish to apply from the “Preset list” and click the [Apply] button.

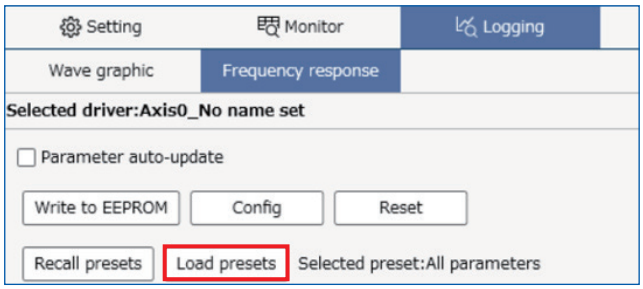


10.2.9 Registering Presets From a File

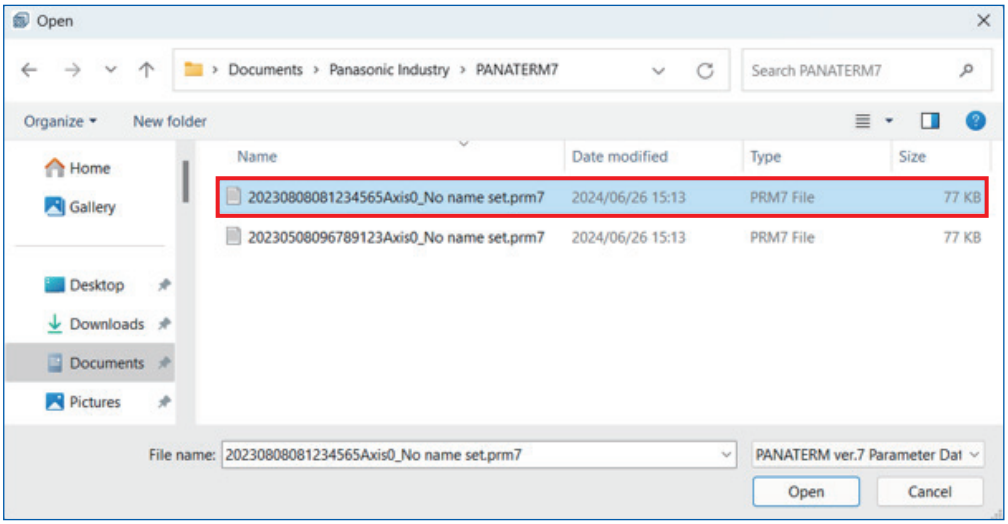
Parameter files with favorite parameters registered can be loaded and registered to presets. Files with parameters not registered as favorites cannot be registered.

<< Procedure >>

1. Click the [Load presets] button in the parameter display area.



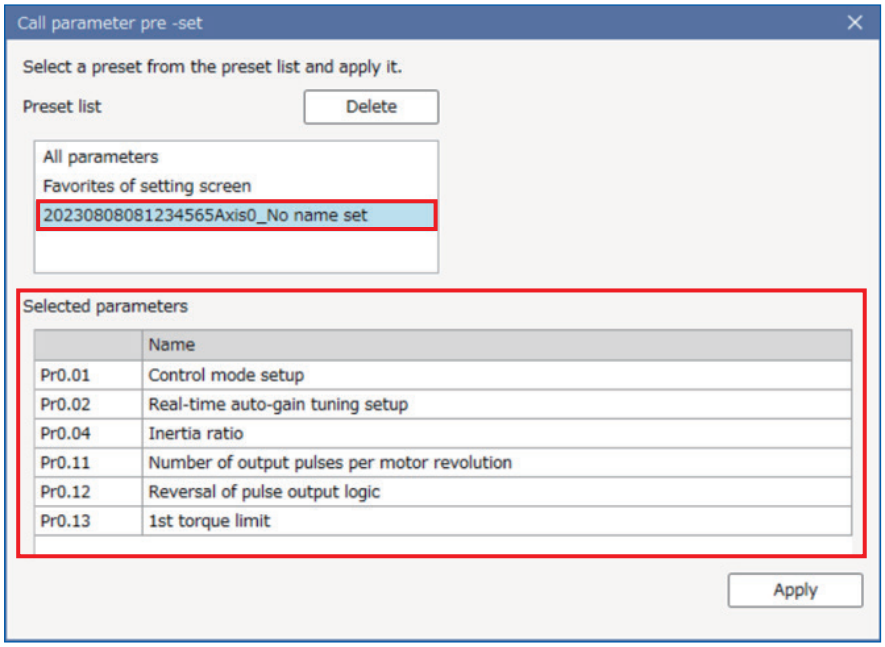
2. Select a parameter file registered as a favorite.



3. Select a parameter file registered as a favorite.

   Only parameters registered as favorites (see [1. Favorites] in *"8.11.1 Configuration of the All Parameters Tab Screen"*) are registered as presets.

   (The registered presets can be viewed in the "Call parameter preset" dialog box. See *"10.2.8 Setting Parameters From Presets"*).

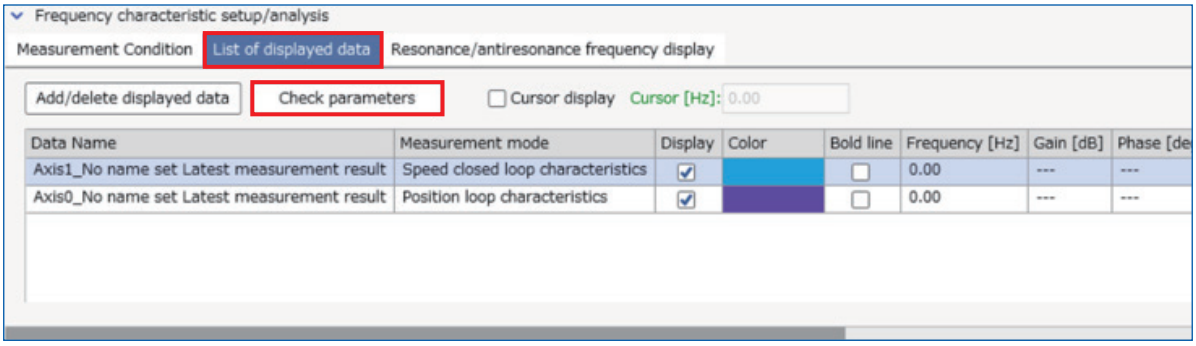


10.2.10 Comparing Measurement Parameters

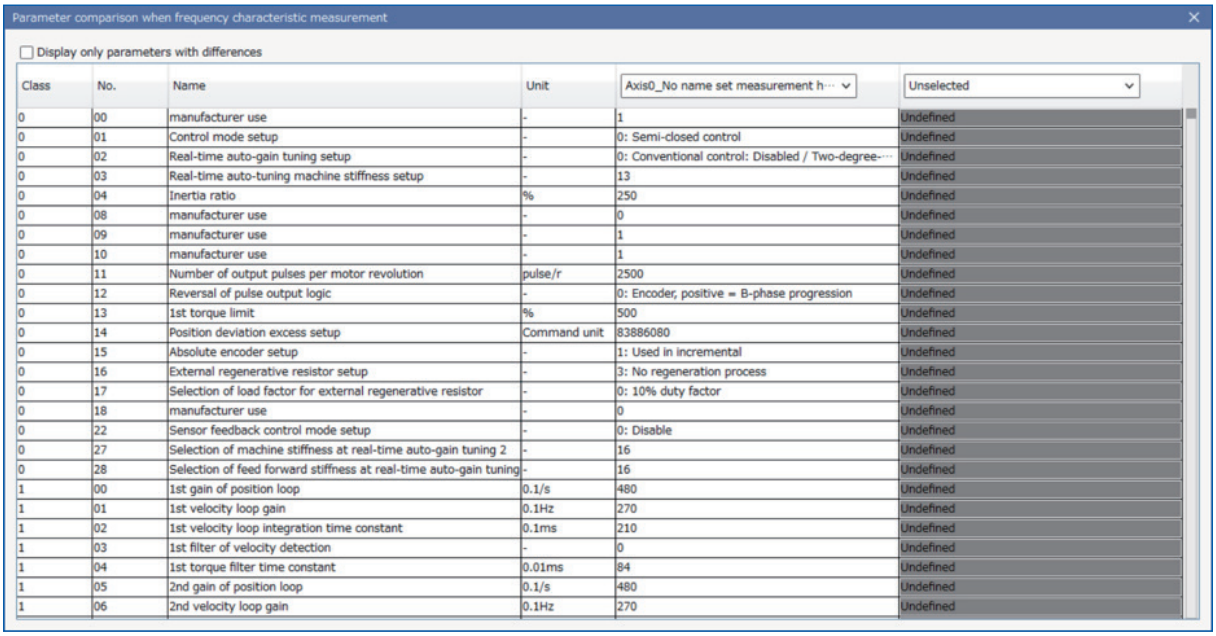
Parameter values can be compared when measuring two sets of measurement data.

<< Procedure >>

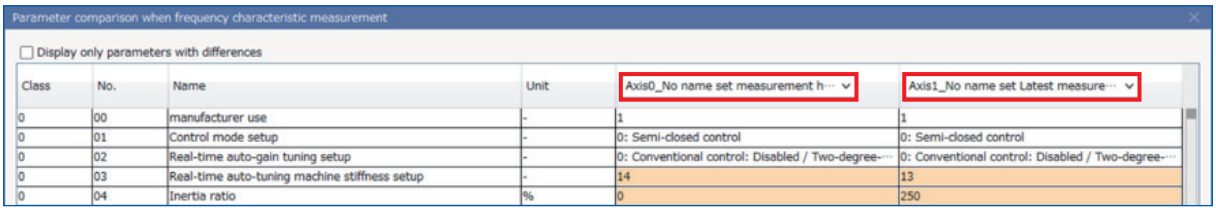
1. Click the [Check parameters] button in the "Edit displayed data" tab.



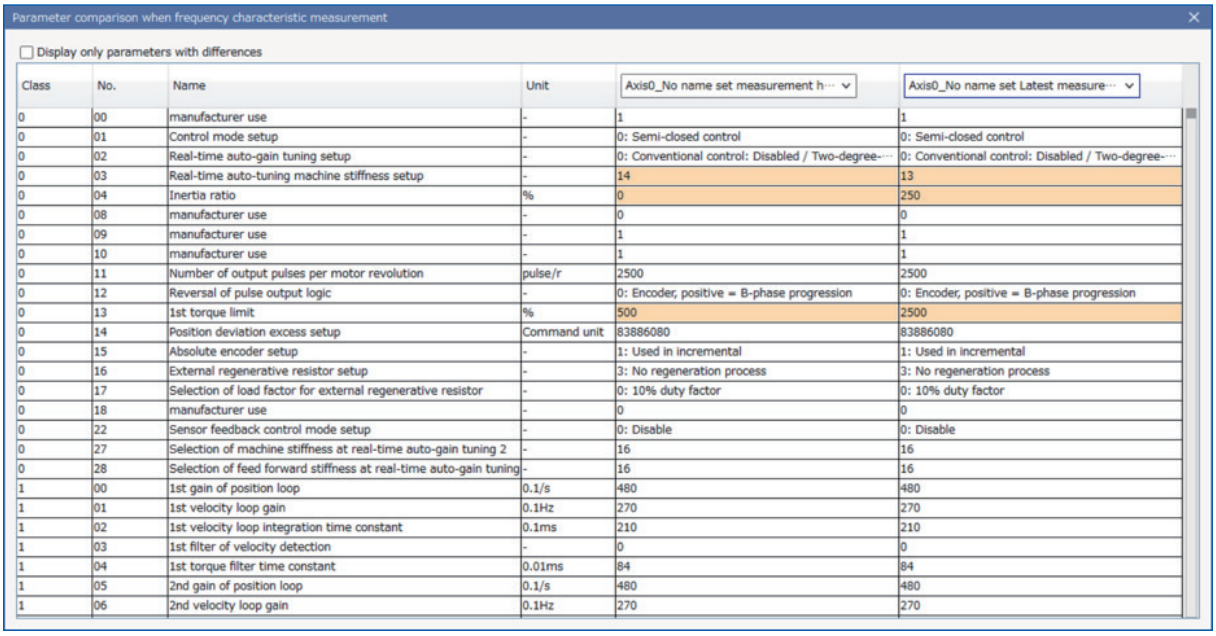
The “Compare parameters when measuring frequency response” dialog box appears.



2. Select the data at the time of the measurement you wish to compare.



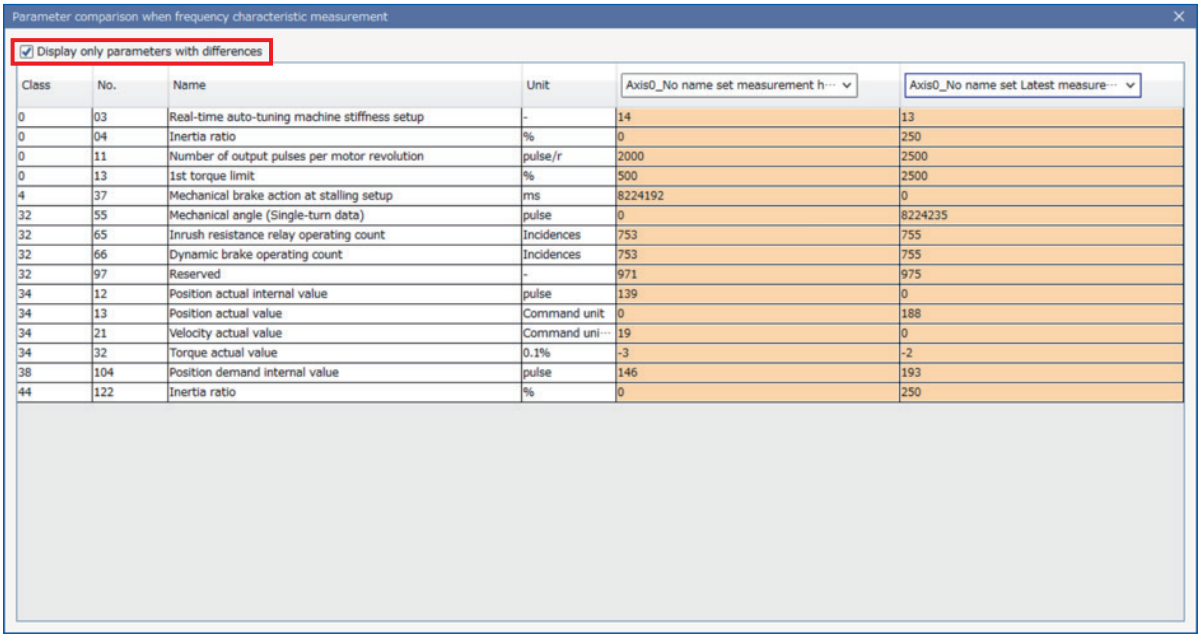
The differences are displayed.



Class	No.	Name	Unit	Axis0_No name set measurement h…	Axis0_No name set Latest measure…
0	00	manufacturer use	-	1	1
0	01	Control mode setup	-	0: Semi-closed control	0: Semi-closed control
0	02	Real-time auto-gain tuning setup	-	0: Conventional control: Disabled / Two-degree-…	0: Conventional control: Disabled / Two-degree-…
0	03	Real-time auto-tuning machine stiffness setup	-	14	13
0	04	Inertia ratio	%	0	250
0	08	manufacturer use	-	0	0
0	09	manufacturer use	-	1	1
0	10	manufacturer use	-	1	1
0	11	Number of output pulses per motor revolution	pulse/r	2500	2500
0	12	Reversal of pulse output logic	-	0: Encoder, positive = B-phase progression	0: Encoder, positive = B-phase progression
0	13	1st torque limit	%	500	2500
0	14	Position deviation excess setup	Command unit	83886080	83886080
0	15	Absolute encoder setup	-	1: Used in incremental	1: Used in incremental
0	16	External regenerative resistor setup	-	3: No regeneration process	3: No regeneration process
0	17	Selection of load factor for external regenerative resistor	-	0: 10% duty factor	0: 10% duty factor
0	18	manufacturer use	-	0	0
0	22	Sensor feedback control mode setup	-	0: Disable	0: Disable
0	27	Selection of machine stiffness at real-time auto-gain tuning 2	-	16	16
0	28	Selection of feed forward stiffness at real-time auto-gain tuning	-	16	16
1	00	1st gain of position loop	0.1/s	480	480
1	01	1st velocity loop gain	0.1Hz	270	270
1	02	1st velocity loop integration time constant	0.1ms	210	210
1	03	1st filter of velocity detection	-	0	0
1	04	1st torque filter time constant	0.01ms	84	84
1	05	2nd gain of position loop	0.1/s	480	480
1	06	2nd velocity loop gain	0.1Hz	270	270

Notes

- Check the “Display only parameters with differences” box to display only the parameters with differences in the parameter list.



Class	No.	Name	Unit	Axis0_No name set measurement h…	Axis0_No name set Latest measure…
0	03	Real-time auto-tuning machine stiffness setup	-	14	13
0	04	Inertia ratio	%	0	250
0	11	Number of output pulses per motor revolution	pulse/r	2000	2500
0	13	1st torque limit	%	500	2500
4	37	Mechanical brake action at stalling setup	ms	8224192	0
32	55	Mechanical angle (Single-turn data)	pulse	0	8224235
32	65	Inrush resistance relay operating count	Incidences	753	755
32	66	Dynamic brake operating count	Incidences	753	755
32	97	Reserved	-	971	975
34	12	Position actual internal value	pulse	139	0
34	13	Position actual value	Command unit	0	188
34	21	Velocity actual value	Command uni…	19	0
34	32	Torque actual value	0.1%	-3	-2
38	104	Position demand internal value	pulse	146	193
44	122	Inertia ratio	%	0	250

- “Check parameters” also allows you to copy the parameter values at the time of measurement of selected measurement data to an online driver.

  Select an option from “Copy from” and “Paste to” in “Copy parameters and paste them to a driver” in the “Parameter comparison when frequency characteristic measurement” dialog box, and click the [Copy] button.

Select the location of the measurement data to be copied (copy source) and select the driver (axis) to where it will be pasted (copy destination)

After copying, it is necessary to write the parameters to the driver. For information on how to write to the driver, see *“8.7 Writing Parameters”* .

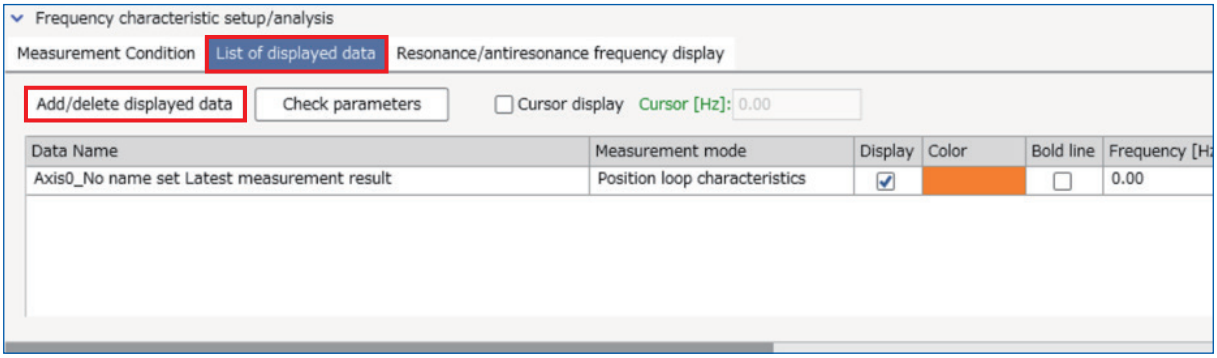
- The measurement conditions loaded by “Read file” are registered in condition presets. In this case, the condition preset name assigned is the file name. For how to set measurement conditions from condition presets, see *“10.2.8 Setting Parameters From Presets”* .
- Parameters defined differently for each model from the parameters to be copied cannot be copied.

10.2.11 Selecting Data to be Displayed On the Graph

Display multiple sets of measurement data simultaneously in the graph area.

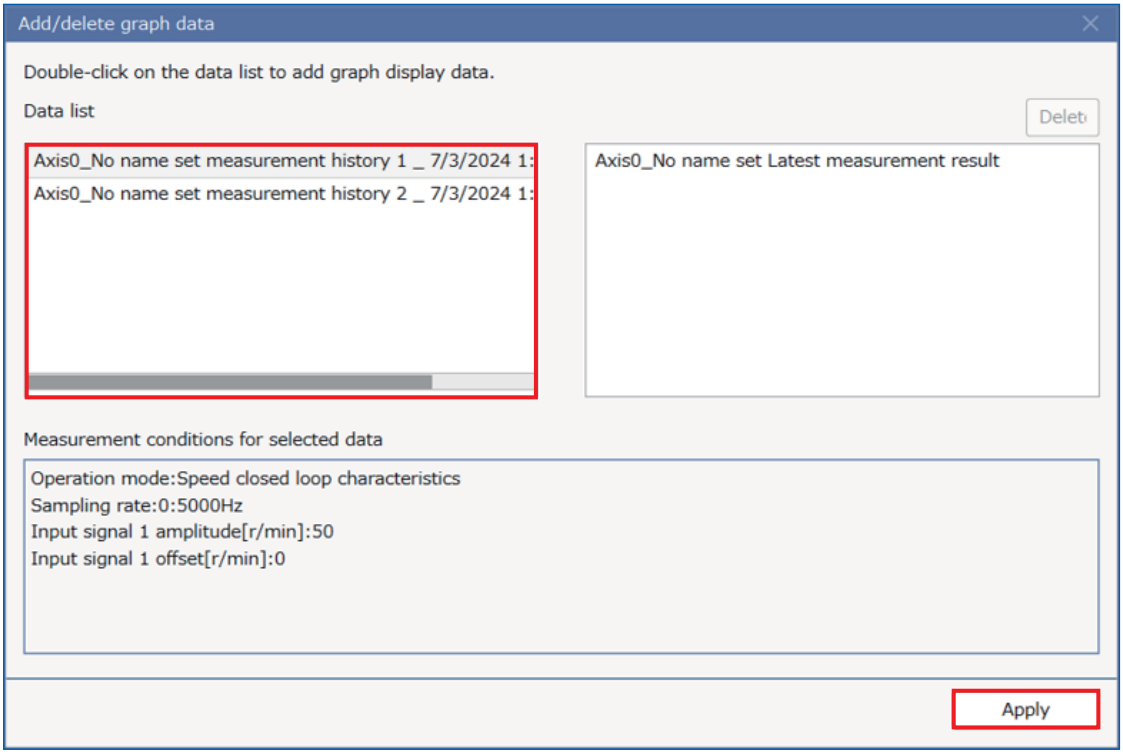
<< Procedure >>

1. Click the [Add/delete data] button in the “List of displayed data” tab.

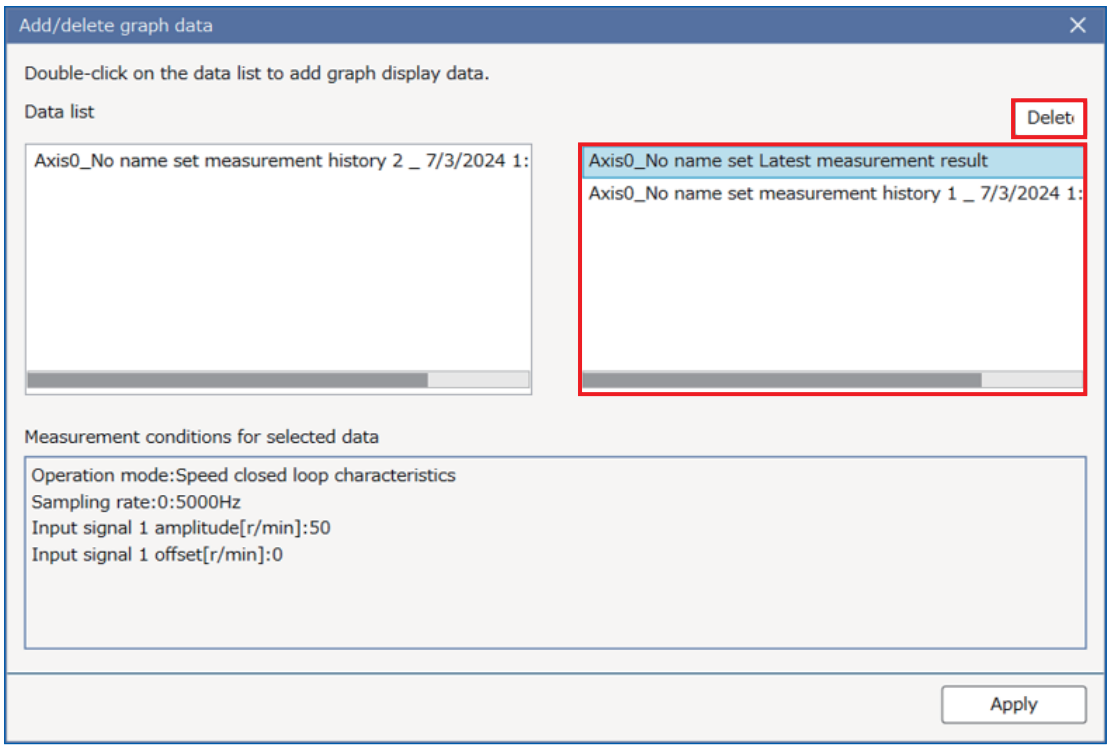


The “Add/delete graph data” dialog box appears.

2. To add data to be displayed, double-click the measurement data you wish to display in the graph from the “Data list” and click the [Apply] button.



3. To delete displayed data, select the measurement data you do not want to display, then double-click or click the [Delete] button.



Notes

- Displayed data is added in units of measured data. To change whether to display or not display each item on the graph, go to the “List of displayed data” tab and check or uncheck the “Display” box for each item.

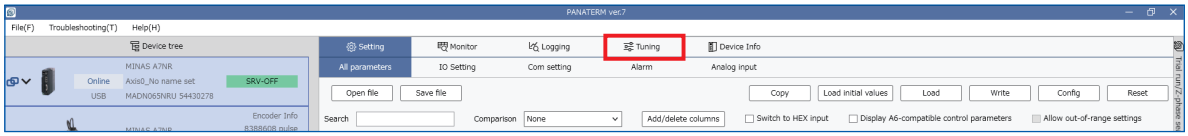
11 Tuning

11.1 Tuning Menu

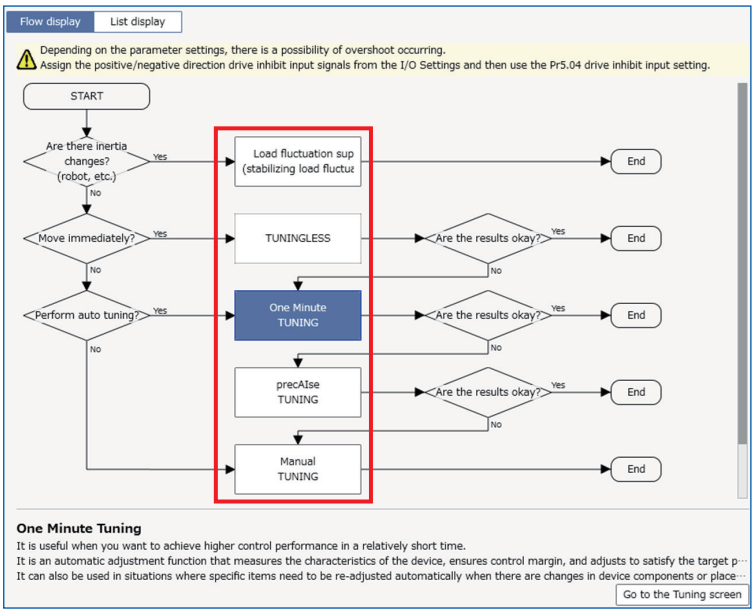
11.1.1 Opening the Tuning Screen

<< Procedure >>

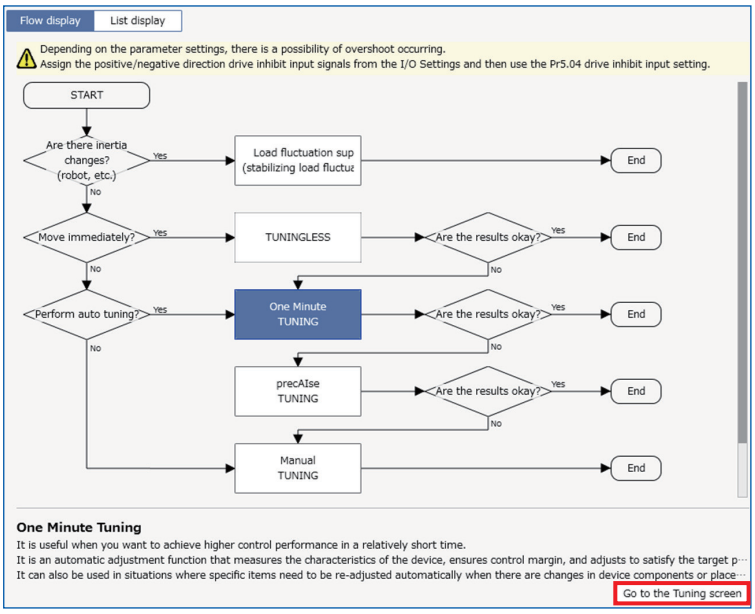
1. Select one device in the device tree to be tuned and click the “Tuning” tab.



2. Select the tuning method.



3. Click the [Go to the Tuning screen] button.

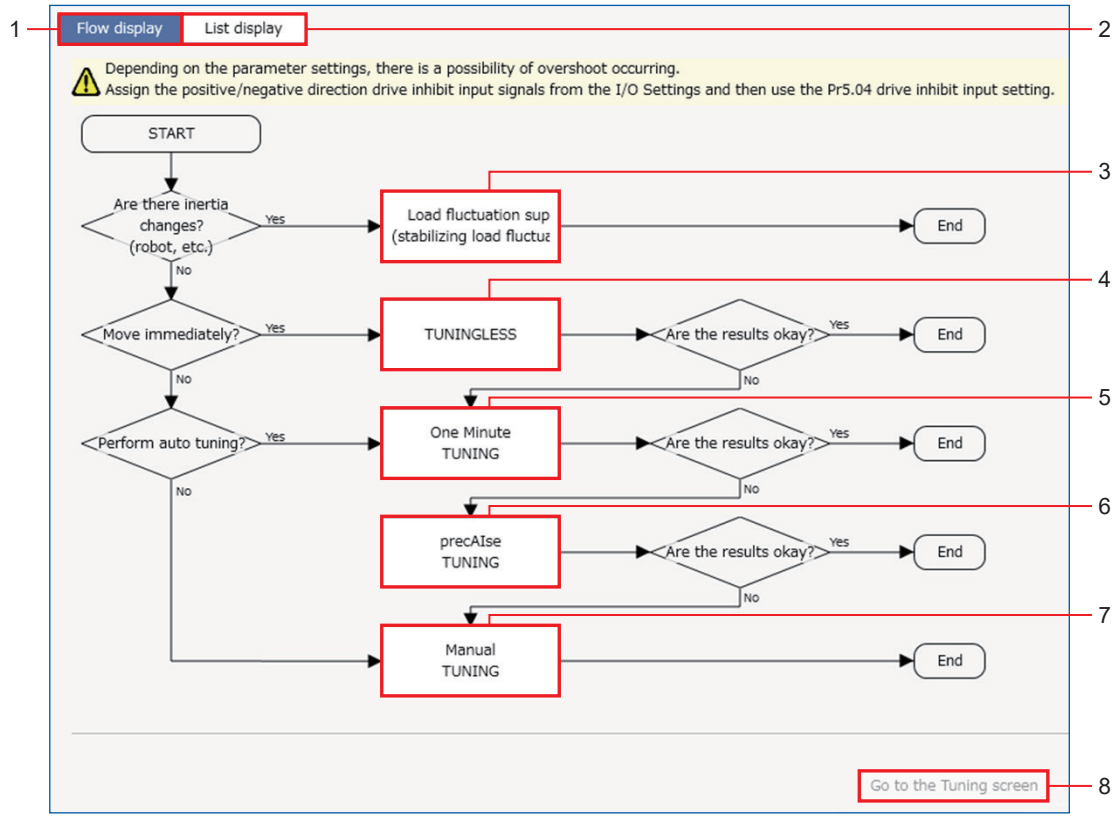


This displays the selected Tuning screen.

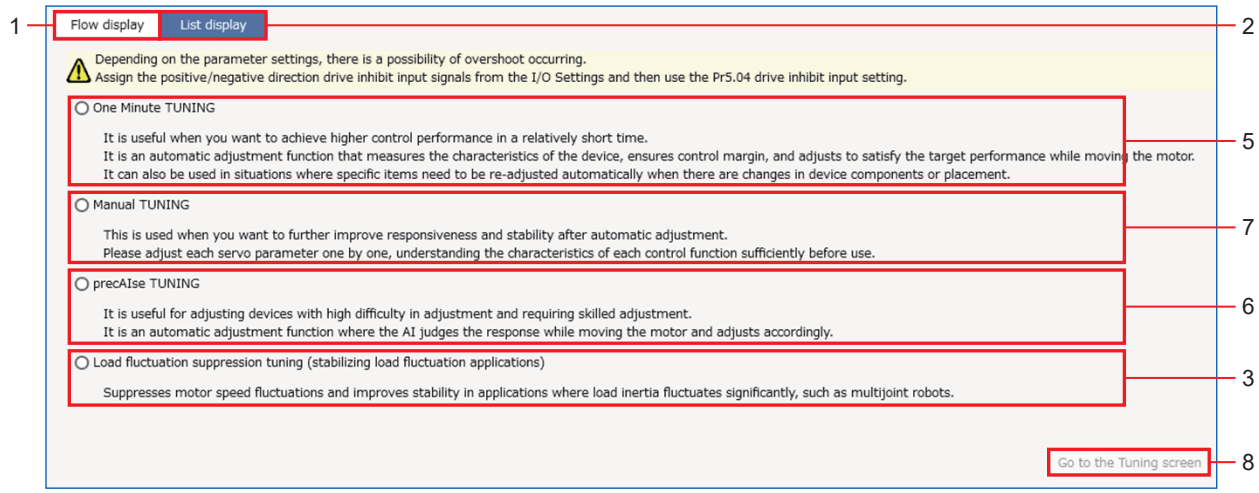
11.1.2 Configuration of the Tuning Menu Screen

Only list display can be used in the Minas A6 Family.

■ Flow display



■ List display



No.	Name	Description	Reference
1	Flow display	Displays the tuning menu in a flowchart.	—
2	List display	Displays the tuning menu in a list.	—
3	Load fluctuation suppression tuning (stabilizing load fluctuation applications)	Select load fluctuation suppression tuning (stabilizing load fluctuation applications).	*"11.5"*
4	TUNINGLESS	With this function tuning is performed automatically by the driver without using Set-up Support Software (PANATERM ver.7) .	(*1)

No.	Name	Description	Reference
5	One Minute TUNING	Select One Minute TUNING.	*"11.2"*
6	precAIse TUNING	Select precAIse TUNING.	*"11.3"*
7	Manual TUNING	Select Manual TUNING.	*"11.4"*
8	Go to the Tuning screen	Transition to the screen for the selected tuning method.	—

*1 Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model.

- A7:Operating Instructions (Tuning)

11.2 One Minute TUNING

Select “One Minute TUNING” from the tuning menu.

Operation commands during tuning are issued from the Set-up Support Software (PANATERM ver.7) trial run function.

Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model for details of the specifications and function of each parameter.

- A7: Operating Instructions (Tuning)

— Precautions —

- Functions other than Set-up Support Software (PANATERM ver.7) trial run cannot be used when tuning is in progress.

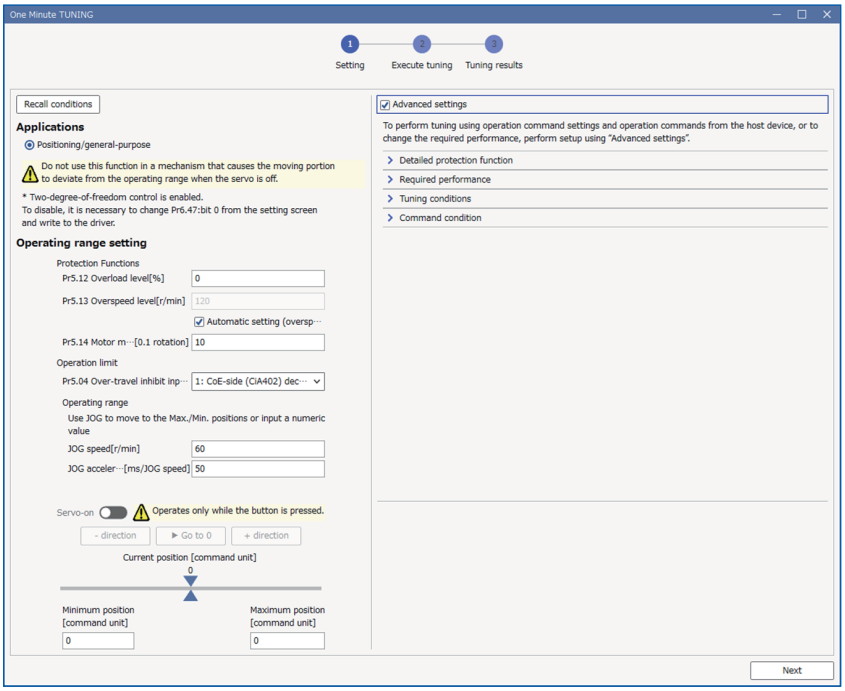
11.2.1 Opening the One Minute TUNING Screen

<< Procedure >>

1. In the function display area of the main screen, select “One Minute TUNING” and click the [Go to the Tuning screen] button.

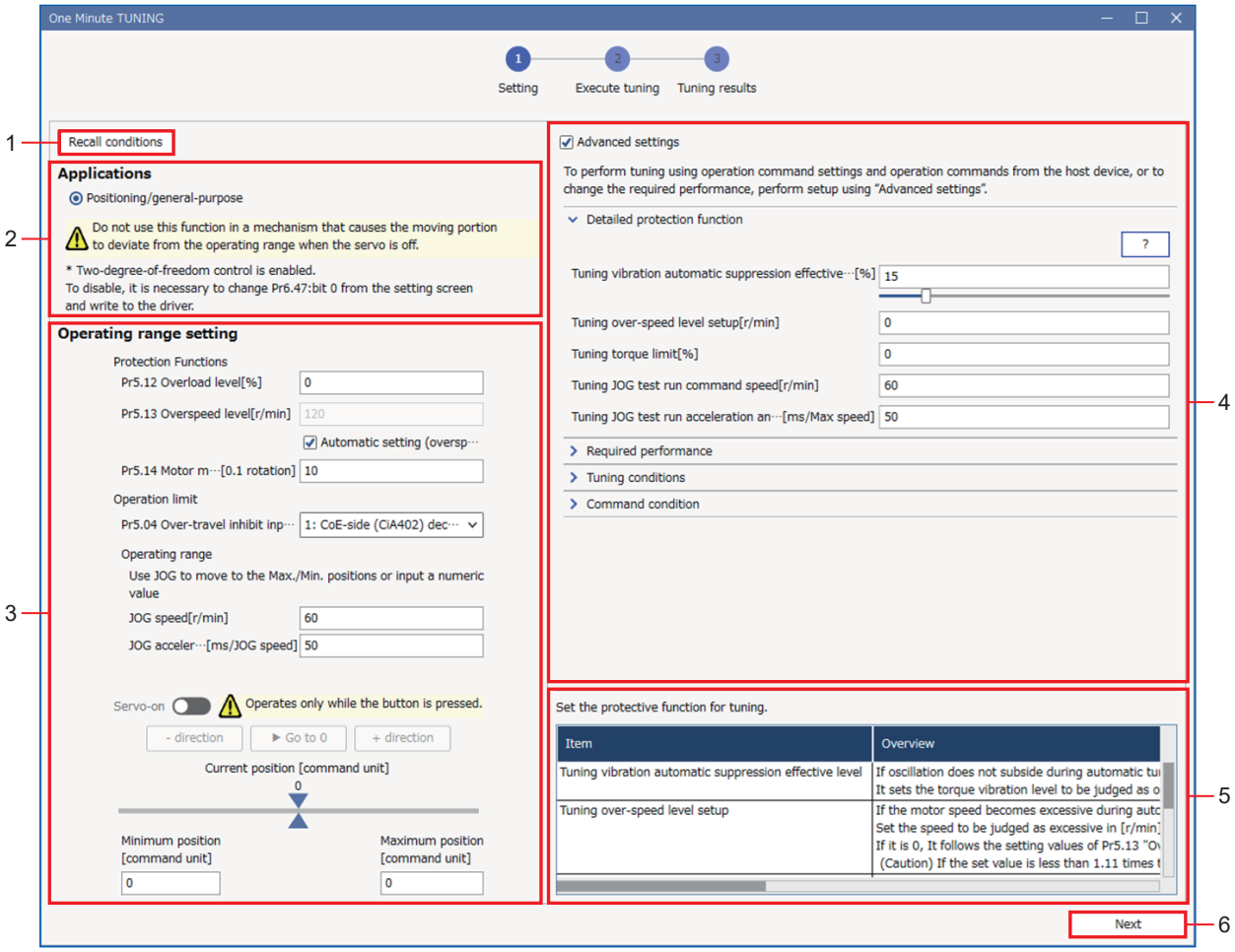
   See *“11.1.1 Opening the Tuning Screen”* .

2. The “One Minute TUNING” screen is displayed.



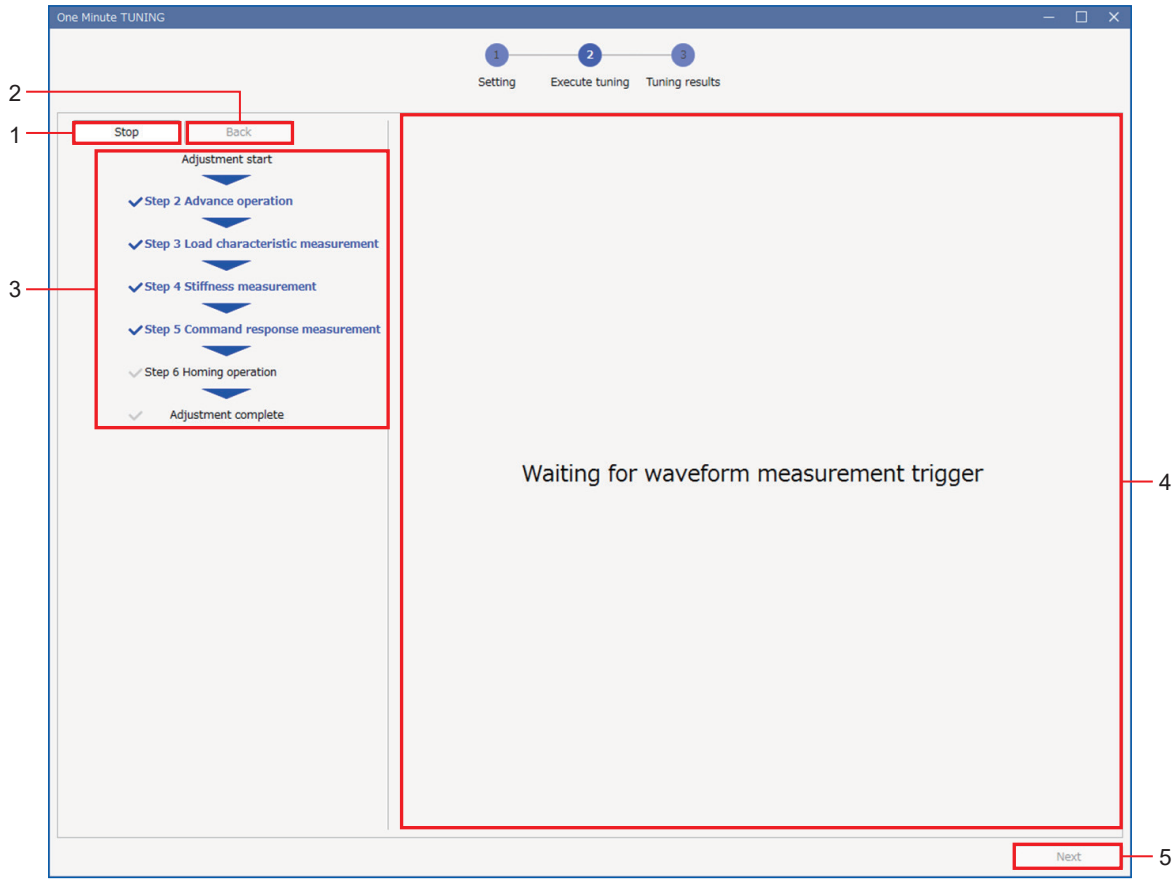
11.2.2 Configuration of the One Minute TUNING Screen

■ Tuning Settings screen



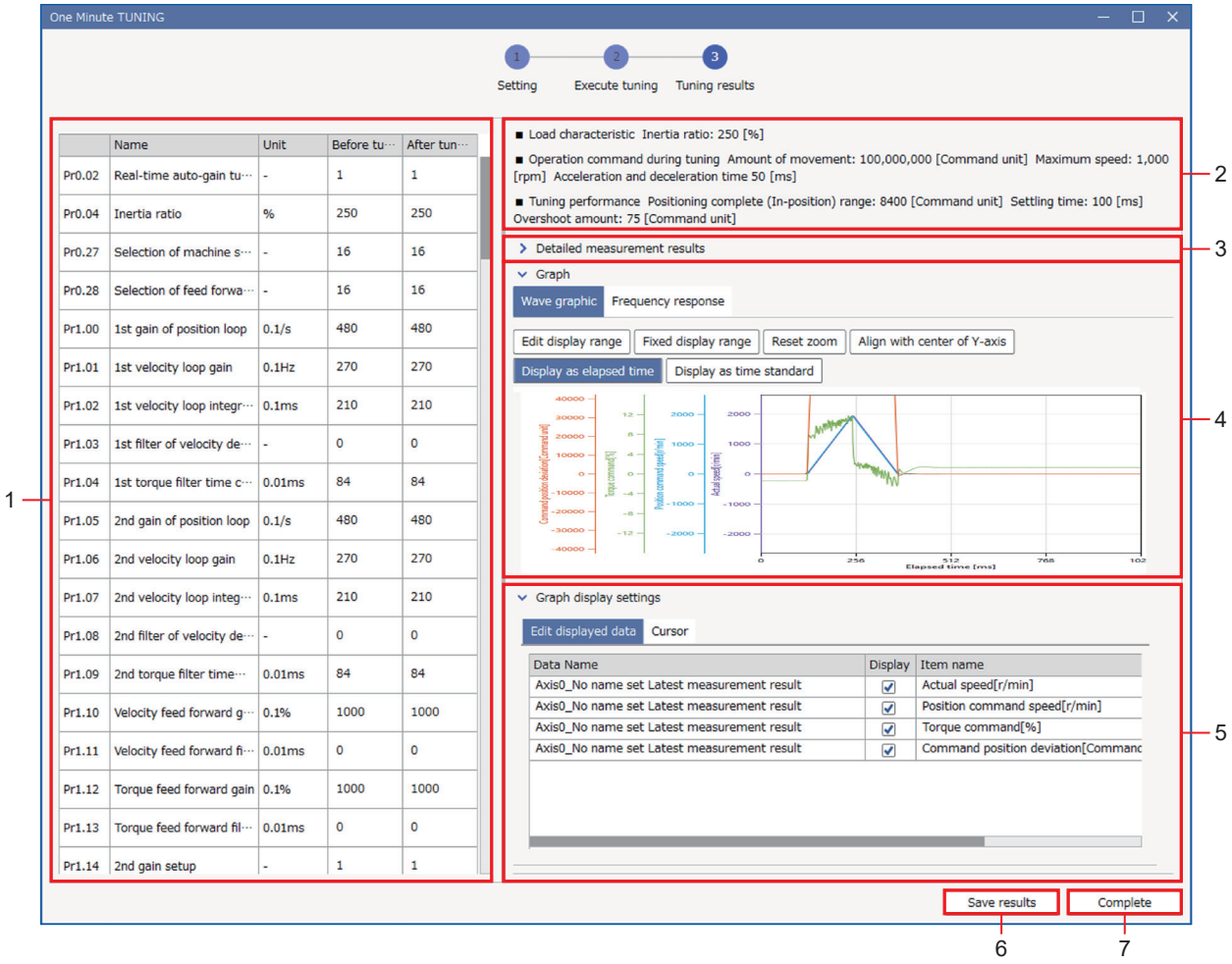
No.	Name	Description	Reference
1	Recall conditions	Load the parameters required for One Minute TUNING from a file.	—
2	Basic settings area	Configure basic settings.	—
3	Operating range settings area	Use JOG to set operation limits.	*"13.2"* *"13.3.1"*
4	Advanced settings area	Set the operation commands.	—
5	Advanced settings Help area	Click the Help button [?] in the advanced settings area to display an over-view of each item.	—
6	Next	Move to the Execute tuning screen.	—

■ Execute Tuning screen



No.	Name	Description	Reference
1	Start/Stop	Click to start or stop adjustment. If stopped, the parameters being tuned will revert to pre-tuned values and tuning will end.	—
2	Back	Go back to the settings screen. You cannot return to the settings screen while tuning is in progress.	—
3	Tuning progress indication	Displays the progress status of tuning. A check mark is added when complete.	—
4	Message display area	Displays a message when waiting for a waveform measurement trigger.	—
5	Next	Move to the Tuning results screen.	—

■ **Tuning Results screen**



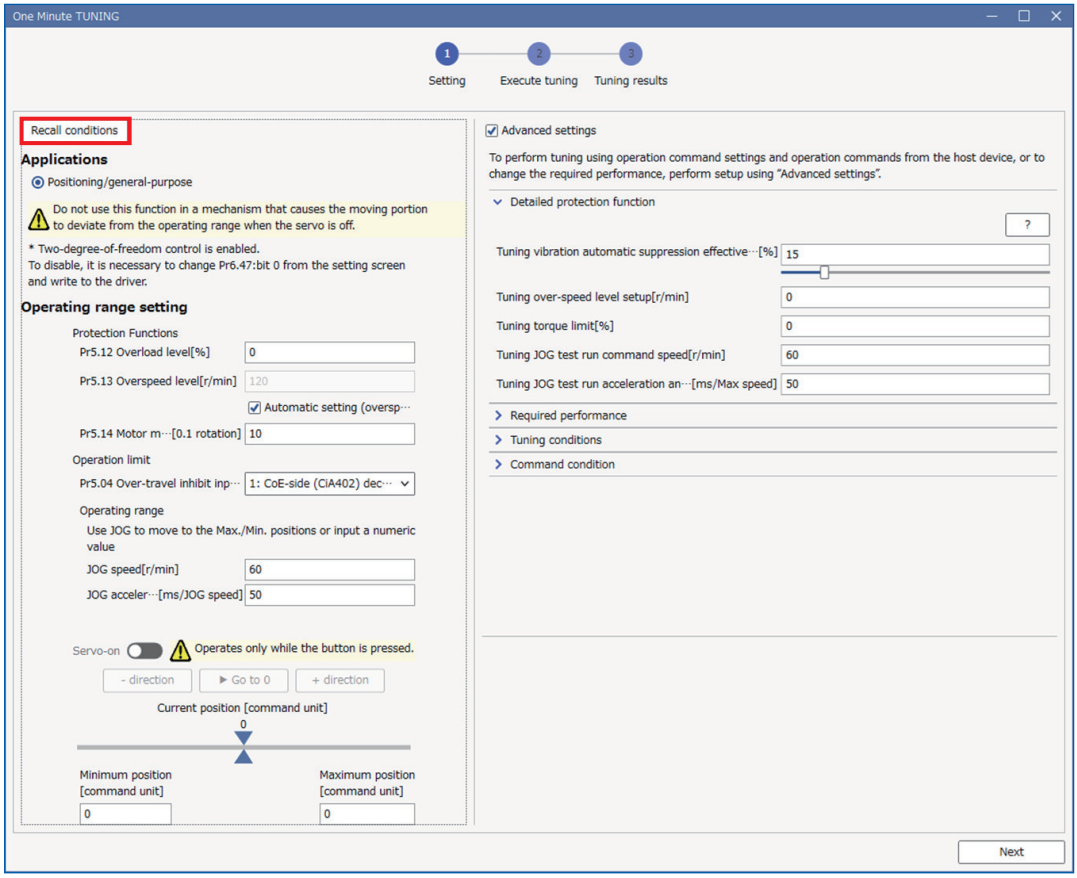
No.	Name	Description	Reference
1	Parameter display area	Displays parameters before and after tuning.	—
2	Simple tuning results display area	Shows a simplified display of results after tuning.	—
3	Detailed measurement results display area	Displays the detailed measurement results.	—
4	Graph display area	Displays the waveform after tuning.	*"10.1"* *"10.2"*
5	Graph display settings area	Sets display data and cursor.	*"10.1"* *"10.2"*
6	Save results	Save the data after tuning to a file.	—
7	Complete	Exit One Minute TUNING. A message dialog box appears. Follow the message to write to EEPROM.	—

11.2.3 Reading Tuning Conditions

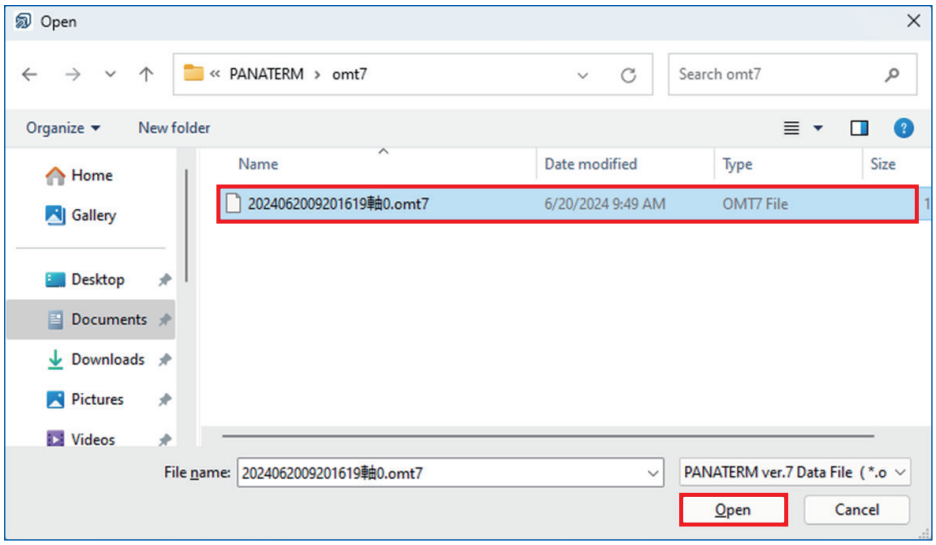
Previously saved tuning conditions can be read.

<< Procedure >>

1. Click the [Recall conditions] button.



2. Select the file you want to load and click the [Open] button.



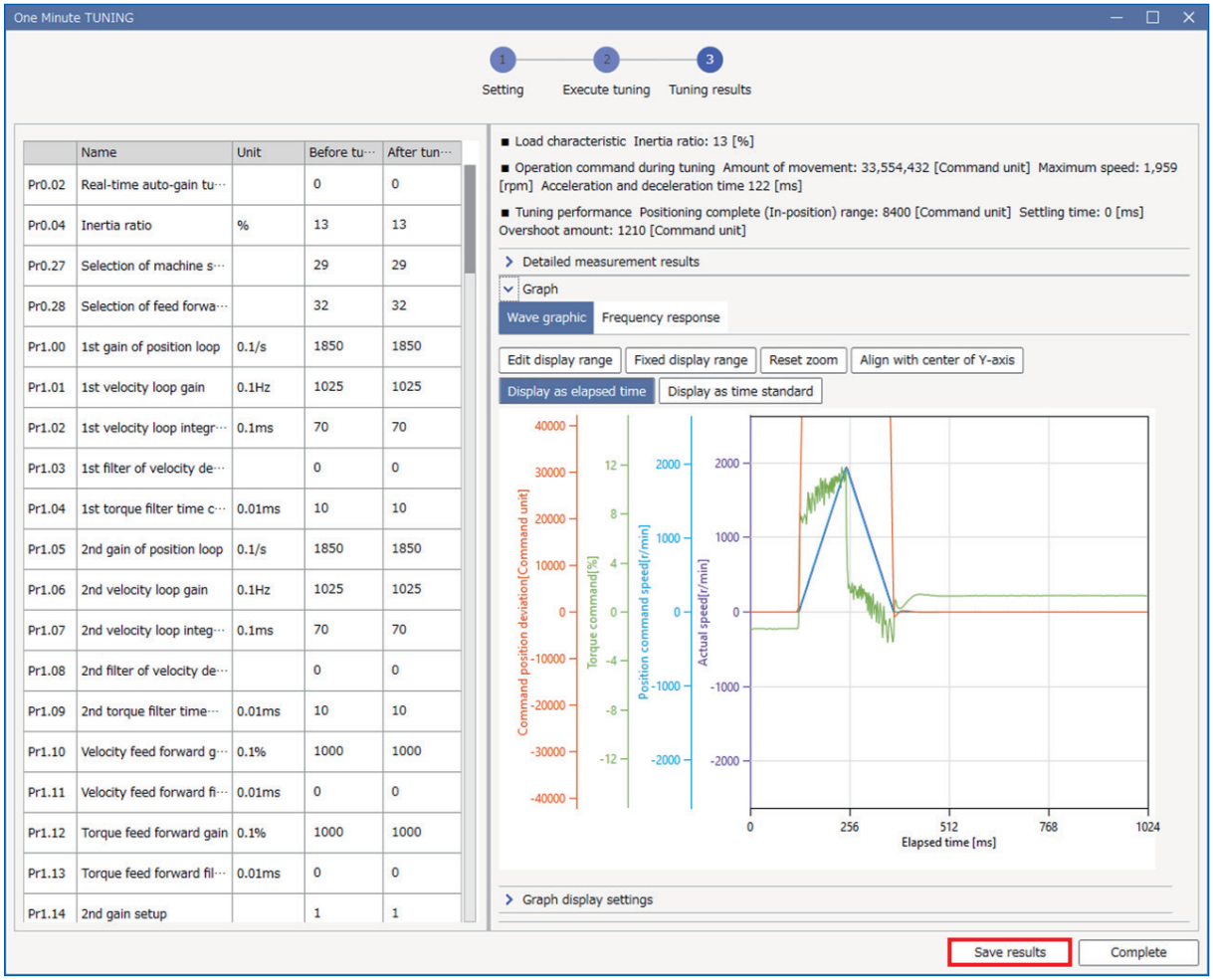
This loads the tuning conditions.

11.2.4 Saving Tuning Results

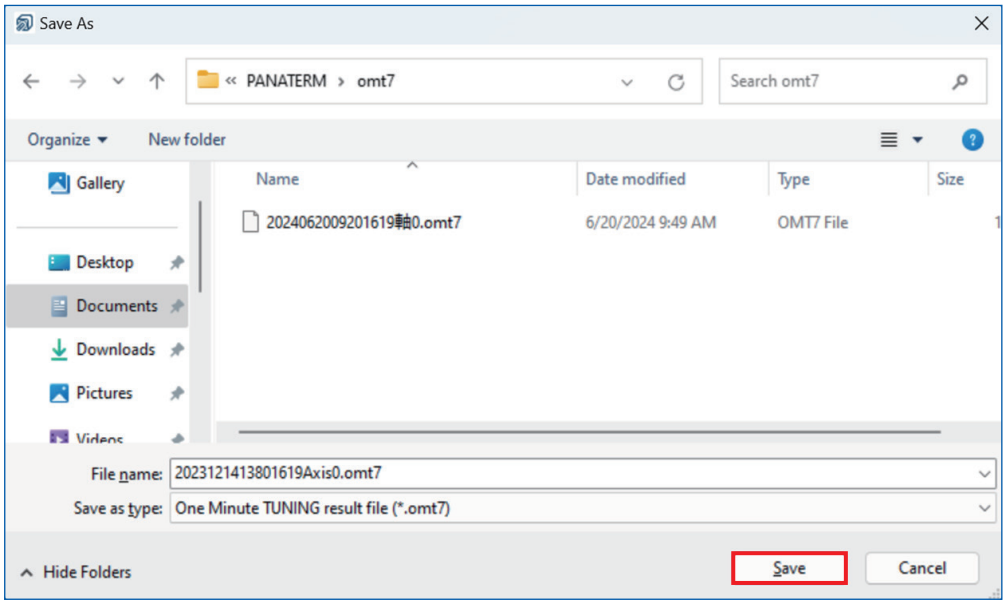
The tuning results can be saved.

<< Procedure >>

1. Click the [Save results] button.



2. Click the [Save] button.



This saves the tuning results.

11.3 precAIse TUNING

Select “precAIse TUNING” from the tuning menu.

Operation commands during tuning are issued from the Set-up Support Software (PANATERM ver.7) trial run function.

Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model for details of the specifications and function of each parameter.

- A7: Operating Instructions (Tuning)

— Precautions —

- Functions other than Set-up Support Software (PANATERM ver.7) trial run cannot be used when tuning is in progress.
- Use precAIse TUNING in position control only. It does not work in other control modes.
- If you are tuning repeatedly under the same conditions, please use PANATERM to align the motor position as much as possible when setting the servo to servo-on status.

  The precAIse TUNING function uses PANATERM and operates with the reference position (zero position) set as the motor position when the servo is set to servo-on status.

  If the reference position (zero position) deviates significantly in comparison to past tunings, an error may occur when tuning is in progress or the expected performance may not be achieved.

11.3.1 Opening the precAIse TUNING Screen

<< Procedure >>

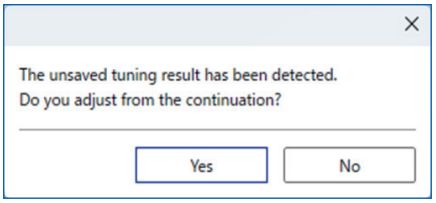
1. In the function display area of the main screen, select “precAIse TUNING” and click the [Go to the Tuning screen] button.

   See *“11.1.1 Opening the Tuning Screen”* .

2. If tuning is aborted and the results are not saved, the following dialog box appears. Select whether to resume tuning from the point at which it was aborted.

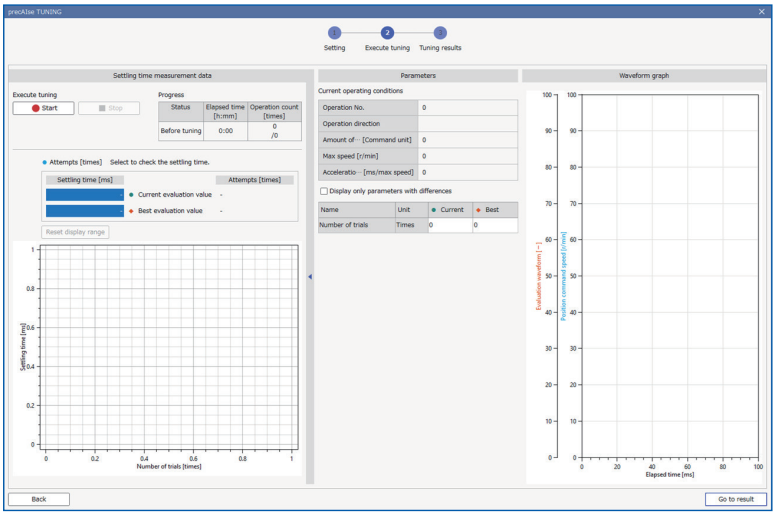
   Click the [Yes] button to go to “Step 3”.

   Click the [No] button and [×] button to go to “Step 4”.

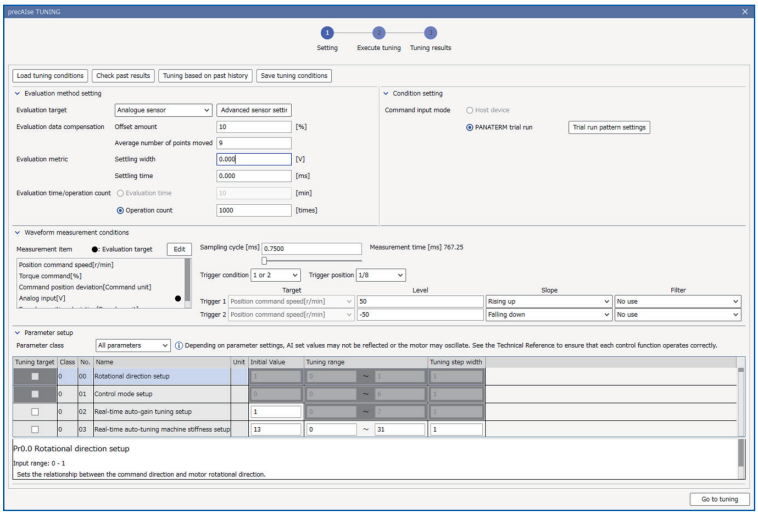


3. The Execute tuning screen is displayed.

If parameter writing is required, the “Write Parameters” dialog box appears.

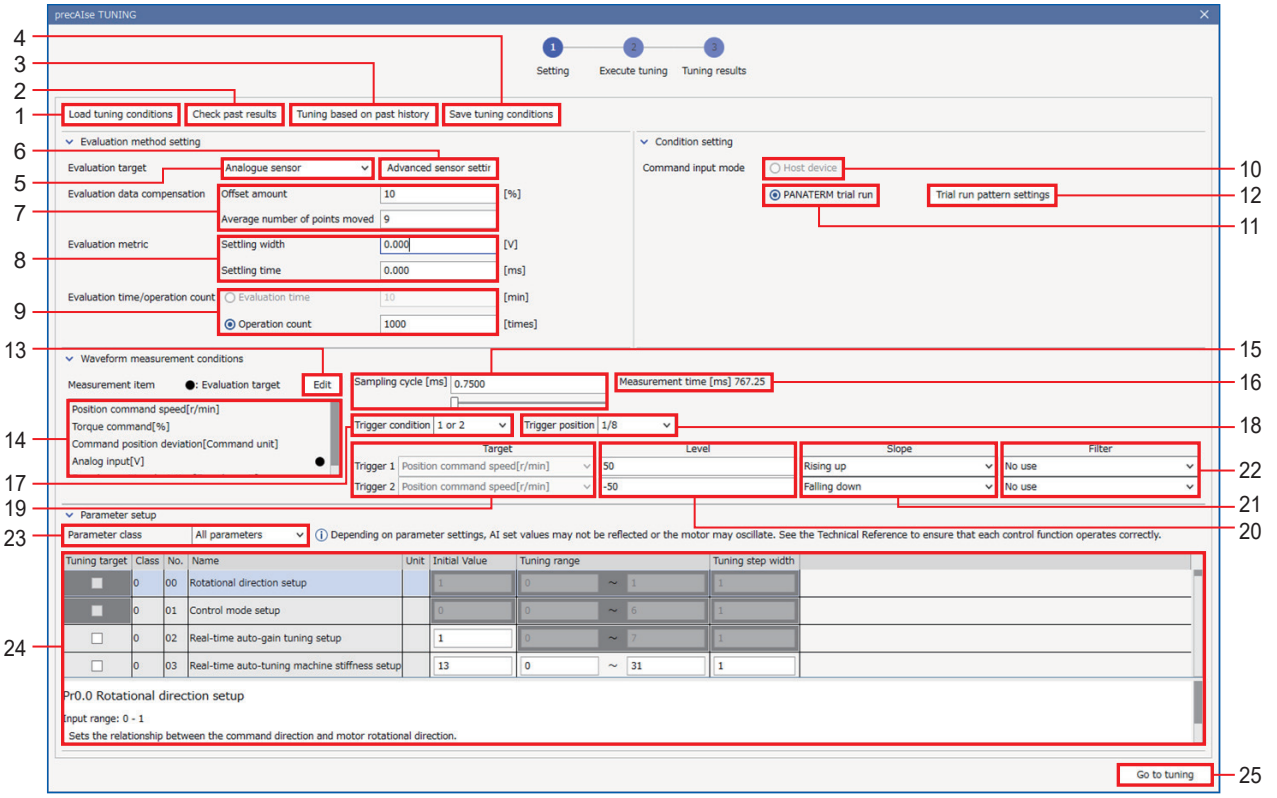


4. The settings screen is displayed



11.3.2 Configuration of the precAIse TUNING Screen

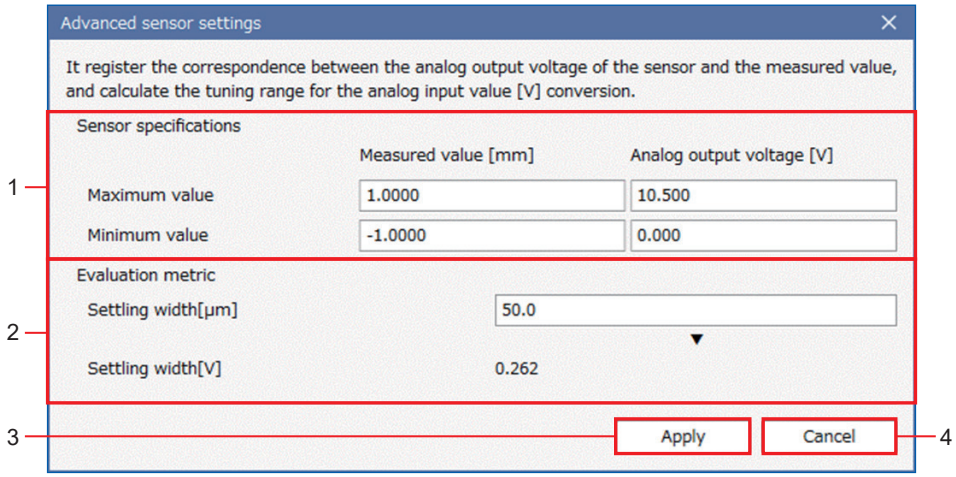
■ Settings Screen



No.	Name	Description	Reference
1	Load tuning conditions	Select a tuning conditions file to apply the condition.	*"11.3.3"*
2	Check past results	Select the precAIse TUNING results file to transition to the "Tuning results" screen and check the results.	*"11.3.4"*
3	Tuning based on past history	Select a tuning conditions file to transition to the "Execute tuning" screen and execute tuning.	*"11.3.5"*
4	Save tuning conditions	Save the tuning conditions file.	*"11.3.6"*
5	Evaluation target	Select the evaluation target. Either servo data or analog sensor can be selected. **Notes** ● For models in which analog input is not currently supported, analog sensor is not displayed as an evaluation target.	—
6	Advanced sensor settings	A dialog box appears. Configure advanced sensor settings.	—
7	Evaluation data compensation	Set compensation values for evaluation data.	—
8	Evaluation metric	Set the settling width and settling time.	—
9	Evaluation time/operation count	Set the evaluation time and operation count. **Notes** ● Evaluation time settings are currently under development.	—
10	Host device	Command input from a host device is currently under development.	—
11	PANATERM trial run	Perform a trial run using Set-up Support Software (PANATERM ver.7) .	
12	Trial run pattern settings	Display the Trial run pattern settings dialog box.	—
13	Edit	Select measurement items from analog or digital signals.	*"10.1.5"*

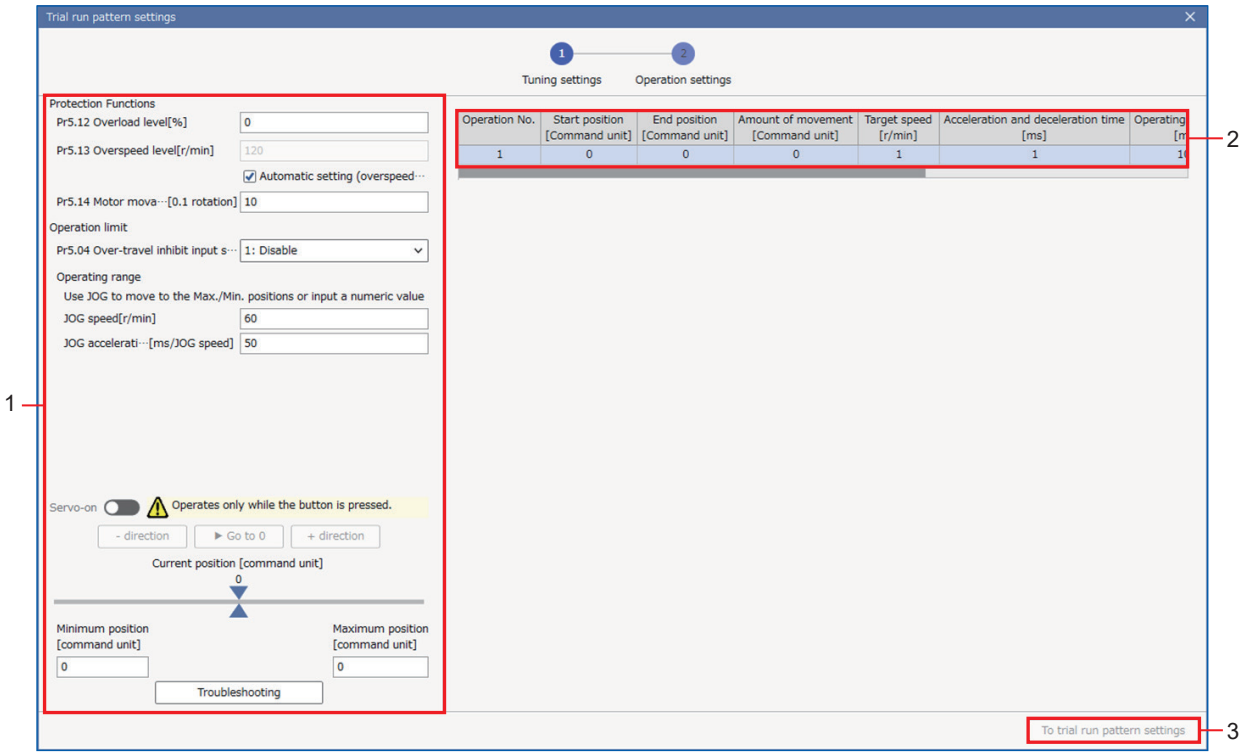
No.	Name	Description	Reference
14	Measurement item display area	This area displays measurement items for waveform measurement conditions.	—
15	Sampling cycle	Set the sampling cycle.	—
16	Measurement time	Displays the measurement time calculated from the sampling cycle.	—
17	Trigger condition	Set the trigger conditions.	—
18	Trigger position	The ratio of data displayed before and after the trigger can be changed.	—
19	Target	Only “position command speed [r/min]” can be set as the trigger target.	—
20	Level	Set the trigger level. If the trigger target is an analog signal, set a numerical value. For digital signals, set ON/OFF.	—
21	Slope	Set the slope at which the trigger is applied. Select from “Rising up”, “Falling down”, “Match”, “Mismatch”, “or more”, or “or less”. For digital signals, use “Match” or “Mismatch”.	—
22	Filter	Set a filter for the trigger target signal, using the average value of the past sampling cycle as the trigger evaluation value.	—
23	Parameter setup	Perform parameter setup.	—
24	Parameter setup area for tuning	Set the parameters for using in tuning.	—
25	Go to tuning	Displays the Execute tuning screen. If any parameter setting values are changed, the Parameter writing dialog box appears.	—

■ Advanced Sensor Settings dialog box



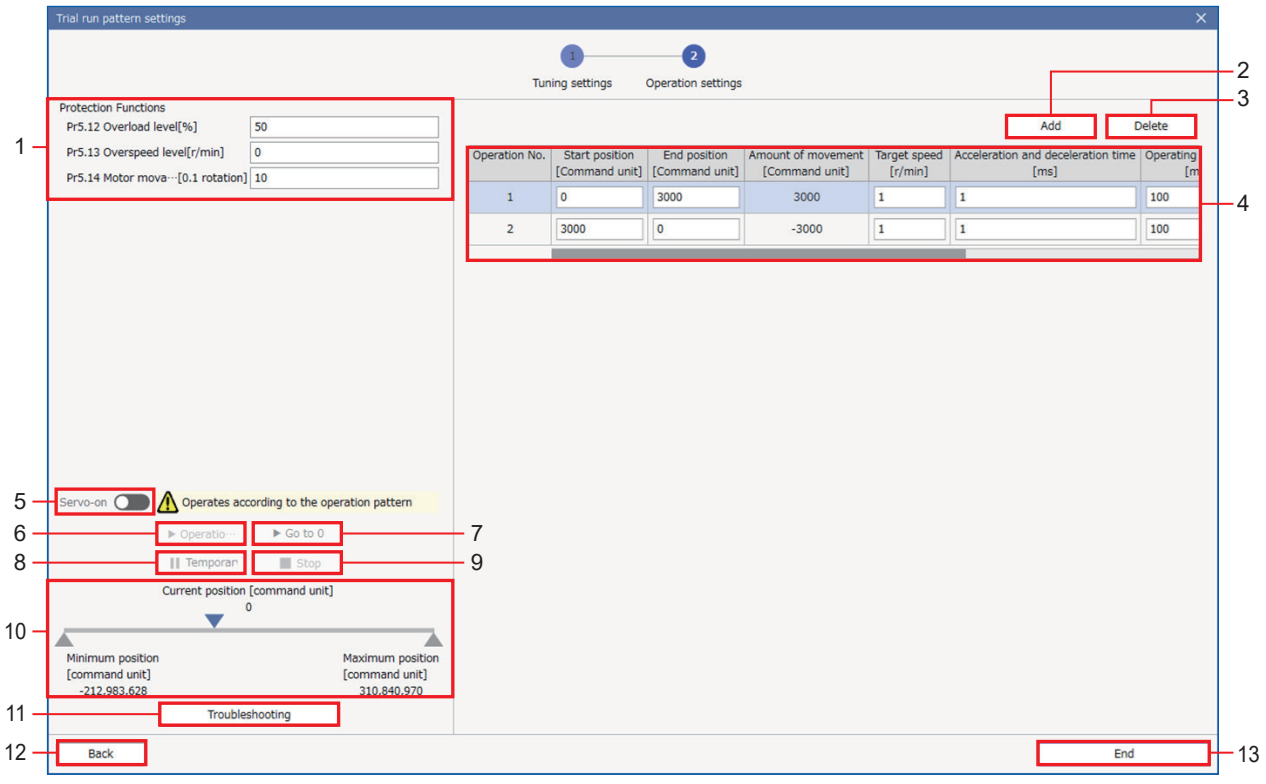
No.	Name	Description	Reference
1	Sensor specifications settings	Set the maximum and minimum values of the sensor analog output voltage and measured value.	—
2	Evaluation metric settings	The analog input value [V] conversion settling width is calculated based on the correspondence between the analog output voltage of the sensor and the measured value.	—
3	Apply	Apply advanced sensor settings.	—
4	Cancel	Exit without applying advanced sensor settings.	—

■ Trial Run Pattern Settings (Tuning Settings) screen



No.	Name	Description	Reference
1	Limit settings	Set the limit settings for the trial run.	*"13.2"*
2	Operation pattern data grid	This area displays the operation pattern.	—
3	To trial run pattern settings	Displays the Trial run pattern settings (operation settings) screen.	—

■ Trial Run Pattern Settings (Operation Settings) screen

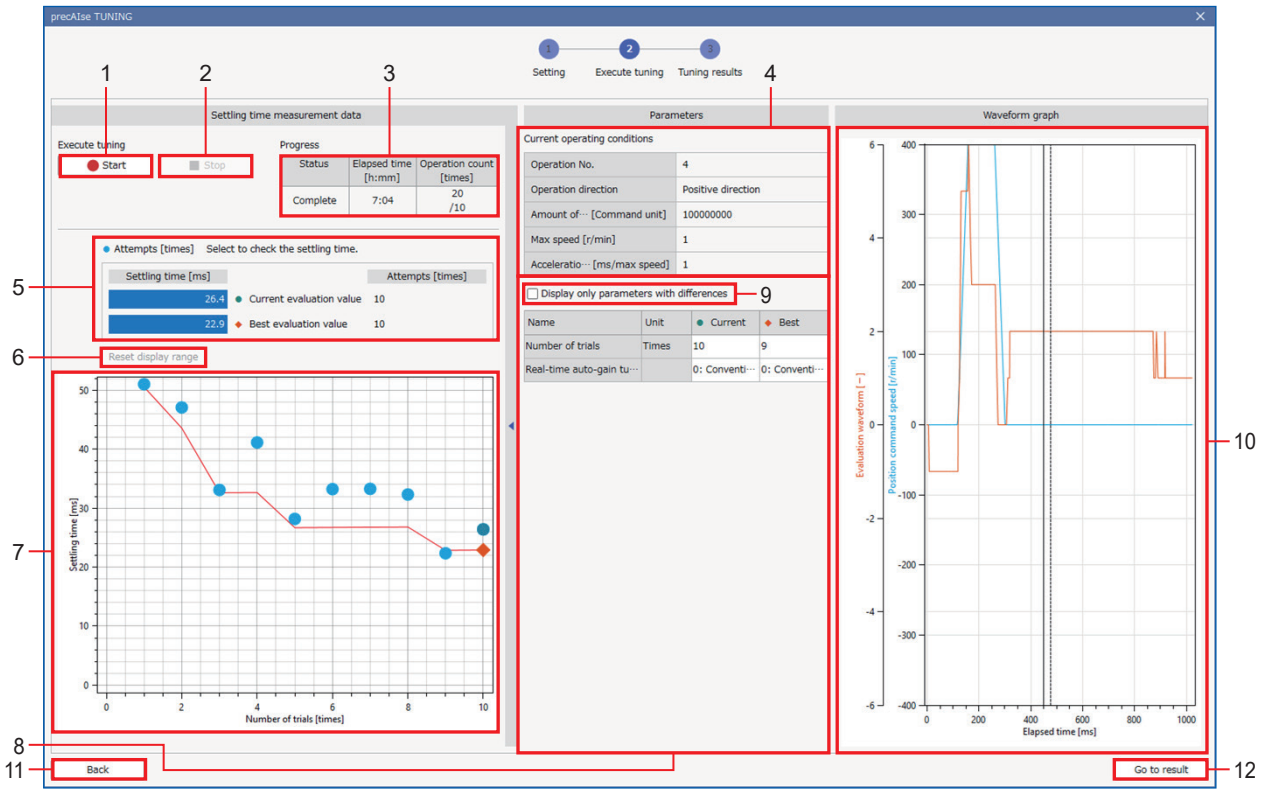


No.	Name	Description	Reference
1	Protection functions	Sets parameters related to protection functions.	(*1)
2	Add	Add an operation pattern.	—
3	Delete	Delete an operation pattern.	—
4	Operation pattern data grid	This area displays the operation pattern.	—
5	Servo-on	Toggle the driver between servo-on/servo-off.	—
6	Operation start	Start the operation according to the operation pattern.	—
7	To position 0	Operation steps are executed to the current position “0”. Enabled only when the servo is on and the motor is not in the 0 position. The current position of the motor is the command unit value set to 0 in the servo-on state.	—
8	Temporary stop/Resume	Click the [Temporary stop] button to decelerate the motor to a stop according to the acceleration and deceleration time and then end the operation. Click the [Resume] button to resume operation from the temporary stop state.	—
9	Operation end	Ends the operation after the motor decelerates and stops according to the acceleration and deceleration time.	—
10	Current position/Minimum position/Maximum position slider	Indicates the current position of the motor and the minimum and maximum positions of the motor operating range. The current position of the motor is the command unit value set to 0 in the servo-on state.	—
11	Troubleshooting	Displays Troubleshooting.	*“7.10”*
12	Back	Go back to the “Trial run pattern settings (Tuning settings) screen”.	—
13	End	Exit the trial run and close the screen.	—

*1 Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model.

- A7: Operating Instructions (Tuning)

■ Execute Tuning screen



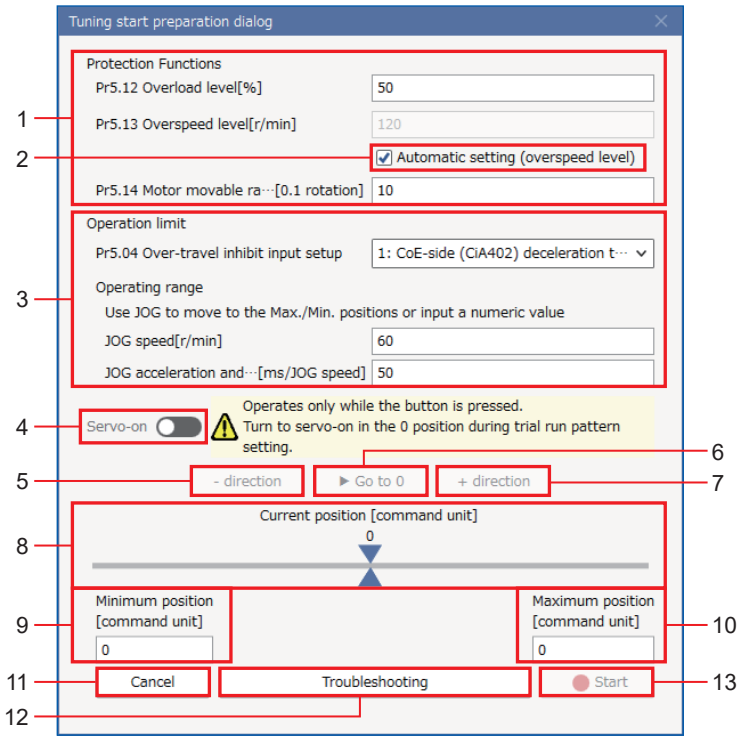
No.	Name	Description	Reference
1	Start	The Tuning start preparation dialog box appears. Configure the start settings and then start adjustment.	—
2	Stop	Stop tuning.	—
3	Progress	Displays the progress of tuning.	—
4	Current operating conditions	Displays the current operating conditions.	—
5	Settling time measurement data display area	Displays the settling time measurement data.	—
6	Reset display range button	Cannot be used on this screen.	—
7	Settling time measurement data graph	Displays the settling time measurement data as a graph. The minimum settling time for each number of trials is indicated by connecting lines. The plot point of the number of trials currently being tuned is shown in green. Clicking on a plot point displays the number of trials and settling time at that point.	—
8	Parameter display area	Lists the parameters (current settings and best evaluation values) selected in the Condition settings dialog box.	—
9	Display only parameters with differences	If this box is checked, only those parameters with differences between the current parameters and the best evaluation value parameters after tuning are displayed.	—
10	Waveform graph display area	Displays the waveform graph.	—
11	Back	Go back to the settings screen.	—
12	Go to result	Displays the Tuning results screen.	—

— Precautions —

- Preliminary operations are performed in advance before the operation count and number of trials are counted.

  Preliminary operations are not counted in the number of trials.
- Depending on the parameter settings on the settings screen, the best evaluation value may be the initial value.

■ Tuning start preparation dialog box



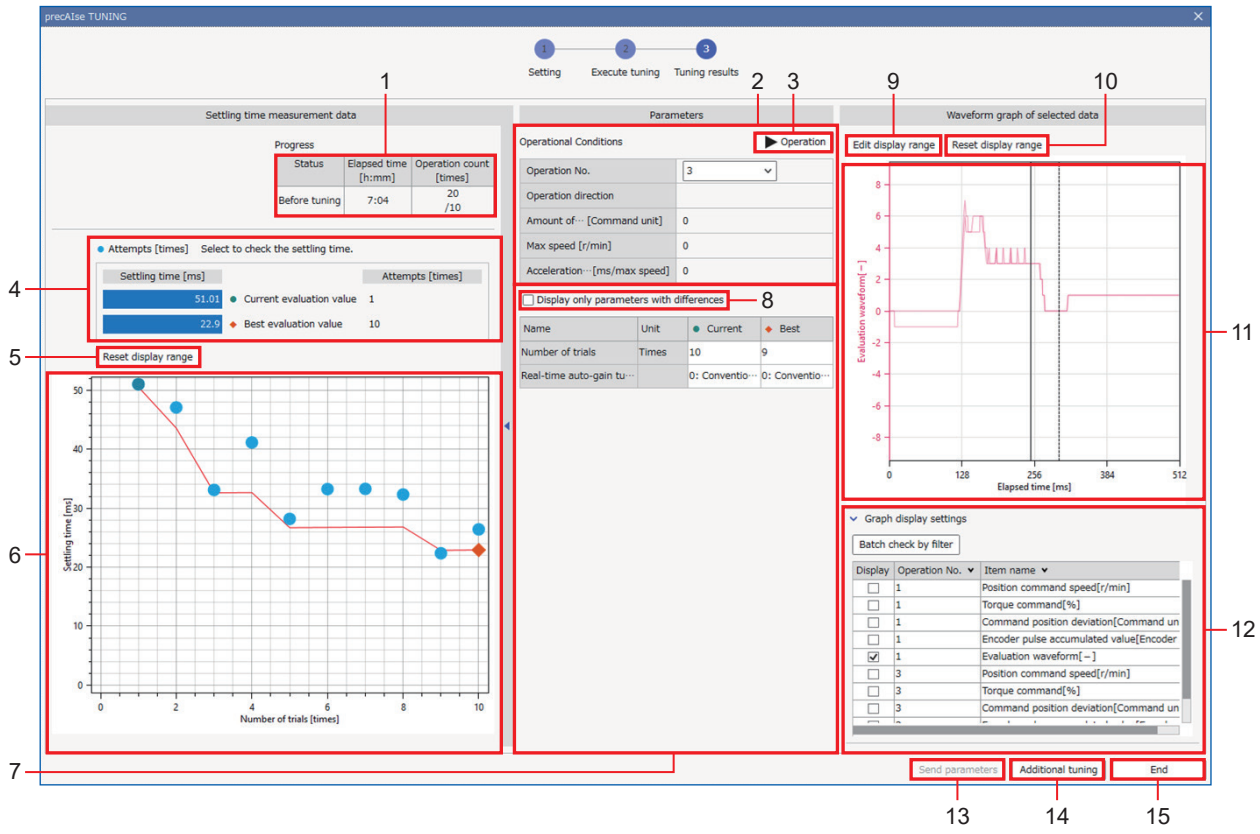
No.	Name	Description	Reference
1	Protection functions	Sets parameters related to protection functions.	(*1)
2	Automatic setting (over-speed level)	Check the box to change the overspeed level to twice the JOG speed.	—
3	Operation limits	Sets parameters related to operation limits. When the over-travel inhibit input setup is changed, it is written to the driver.	(*1)
4	Servo-on	Toggle the driver between servo-on/servo-off.	—
5	Negative direction	Rotates the motor as long as the button is pressed (direction of rotation depends on the parameter “Pr.0.00 Rotational direction setup” and the object “Polarity (607Eh)”). Enabled only during servo-on.	—
6	To position 0	Operation steps are executed to the current position “0”. Enabled only when the servo is on and the motor is not in the 0 position. The current position of the motor is the command unit value set to 0 in the servo-on state.	—
7	Positive direction	Rotates the motor as long as the button is pressed (direction of rotation depends on the parameter “Pr.0.00 Rotational direction setup” and the object “Polarity (607Eh)”). Enabled only during servo-on.	—
8	Current position/Minimum position/Maximum position slider	Indicates the current position of the motor and the minimum and maximum positions of the motor operating range. Move the “Min. position” and “Max. position” sliders (▲) to the left and right to set the minimum and maximum positions. The current position of the motor is the command unit value set to 0 in the servo-on state.	—
9	Minimum position	Displays the minimum position of the motor operating range.	—
10	Maximum position	Displays the maximum position of the motor operating range.	—
11	Cancel	Close the Tuning start preparation dialog box.	—
12	Troubleshooting	Displays Troubleshooting.	*“7.10”*

No.	Name	Description	Reference
13	Start	Start adjustment.	—

*1 Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model.

- A7: Operating Instructions (Tuning)

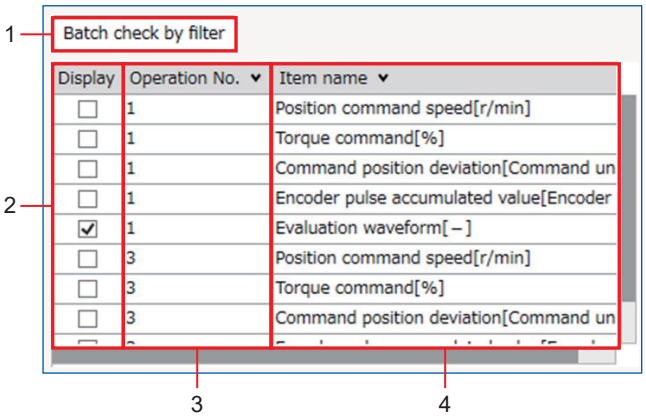
■ Tuning Results screen



No.	Name	Description	Reference
1	Progress	Displays the progress of tuning.	—
2	Current operating conditions	Displays the current operating conditions.	—
3	Operation start/Operation end	Start and end the operation of the target operation No.	—
4	Settling time measurement data display area	Displays the settling time measurement data.	—
5	Reset display range button	Reset the display range.	—
6	Settling time measurement data graph	Displays the settling time measurement data as a graph. The minimum settling time for each number of trials is indicated by connecting lines. Clicking on a plot point displays the number of trials and settling time at that point.	—
7	Parameter display area	Lists the parameters (current settings and best evaluation values) selected in the Condition settings dialog box.	—
8	Display only parameters with differences	If this box is checked, only those parameters with differences are displayed in the parameter display area.	—
9	Edit display range	Edit display range.	*"10.1.6.3"*
10	Reset display range	Reset the display range.	*"10.2.4.3"*

No.	Name	Description	Reference
11	Waveform graph display area	Displays a waveform graph of selected data. Click on a measurement point to display the elapsed time and measurement item.	—
12	Graph display settings area	Configure settings related to graph display.	—
13	Send parameters	Send parameters.	—
14	Additional tuning	Return to the settings screen to perform additional tuning.	*"11.3.7"*
15	End	End tuning. Select whether or not to save the tuning results when exiting.	*"11.3.8"*

■ Graph display settings area

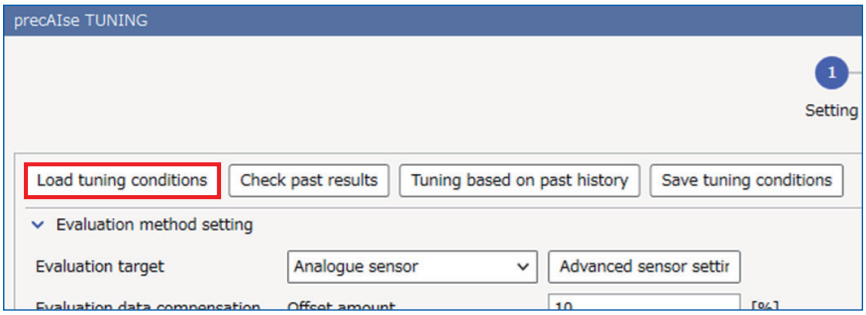


No.	Name	Description	Reference
1	Batch check by filter	Click to check the display items with the same settings as the current filter status.	—
2	Display	Set whether each measurement data item to be displayed on the graph is displayed or not displayed. By default, only evaluation waveforms are displayed.	—
3	Operation No.	Displays the operation No. for the measurement data. Filter this by clicking [v] next to Operation No.	—
4	Item name	Displays the names of the measurement data items to be displayed on the graph. Filter this by clicking [v] next to Item name.	—

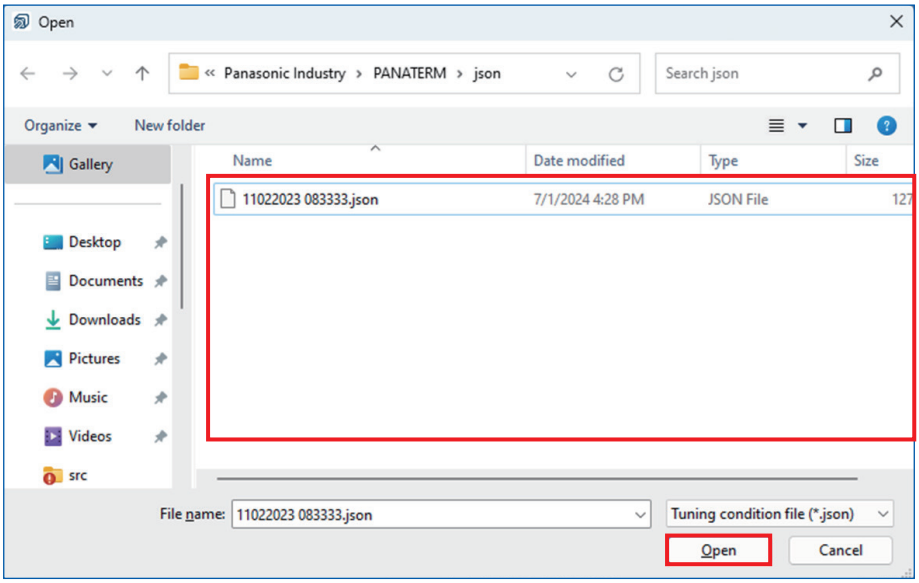
11.3.3 Reading Tuning Conditions

<< Procedure >>

1. Click the [Load tuning conditions] button.



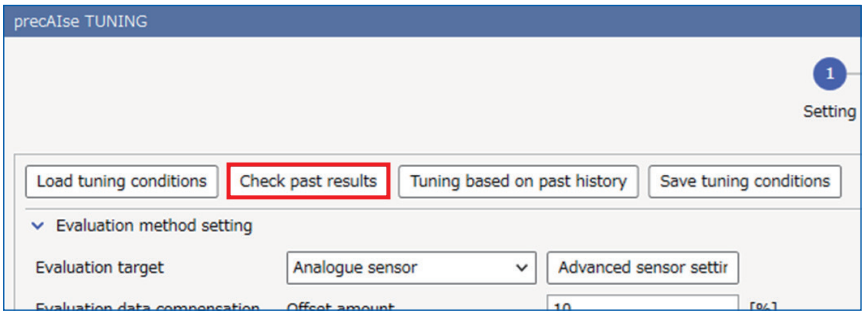
2. Select a file and click the [Open] button to read the tuning conditions.



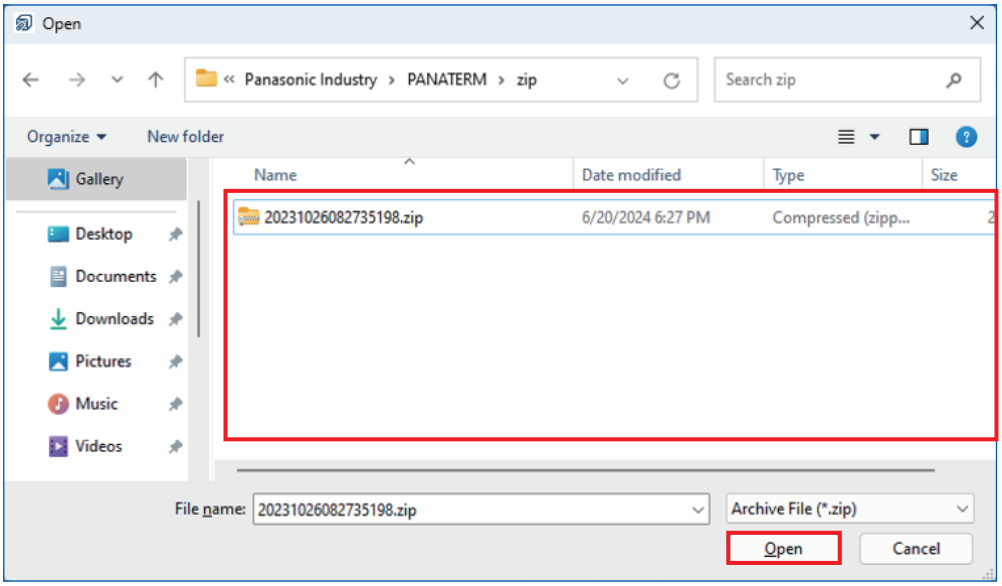
11.3.4 Checking Past Results

<< Procedure >>

1. Click the [Check past results] button.



2. Select the file and click the [Open] button.

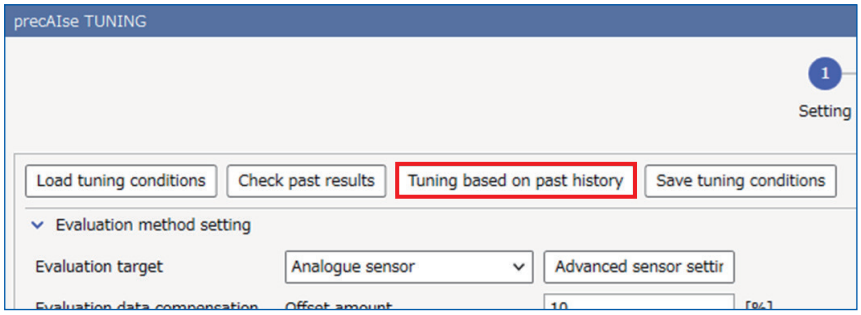


3. Transition to the “Tuning results” screen to display past results.

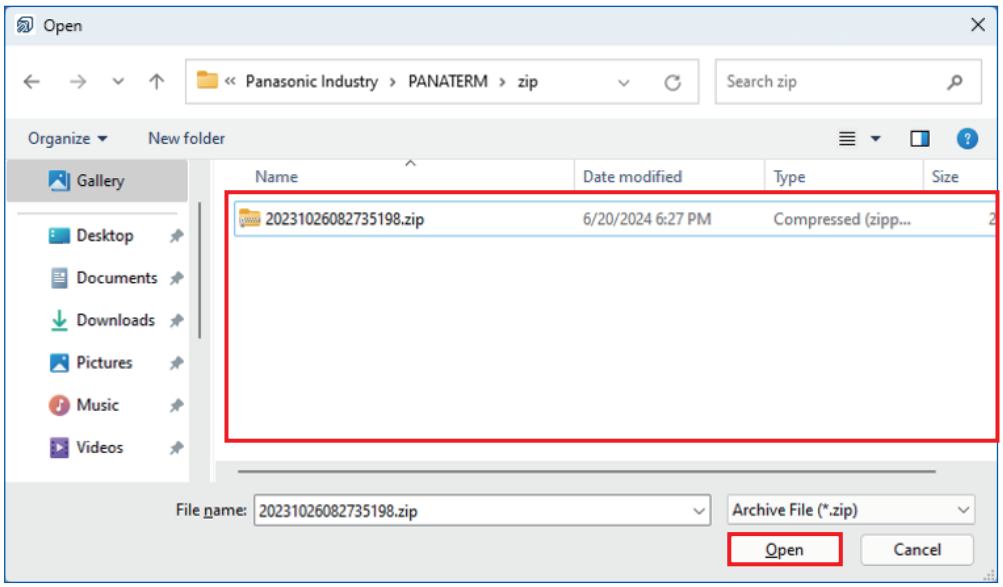
11.3.5 Tuning Based on Past History

<< Procedure >>

1. Click the [Tuning based on past history] button.



2. Select the file and click the [Open] button.

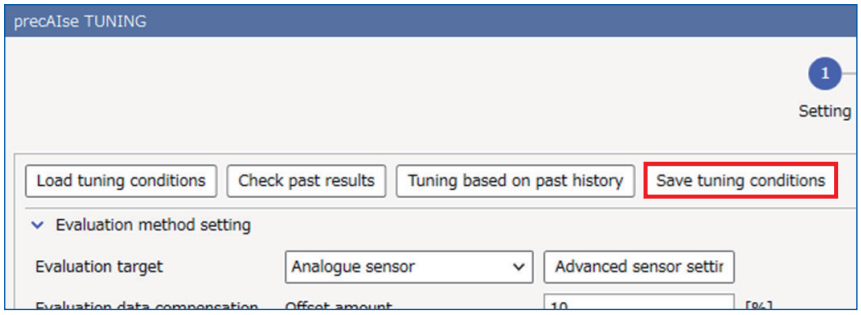


3. Read the historical parameters and then write the historical parameters if there is any difference from the current parameters. Then, transition to the “Execute tuning screen” where tuning can be carried out.

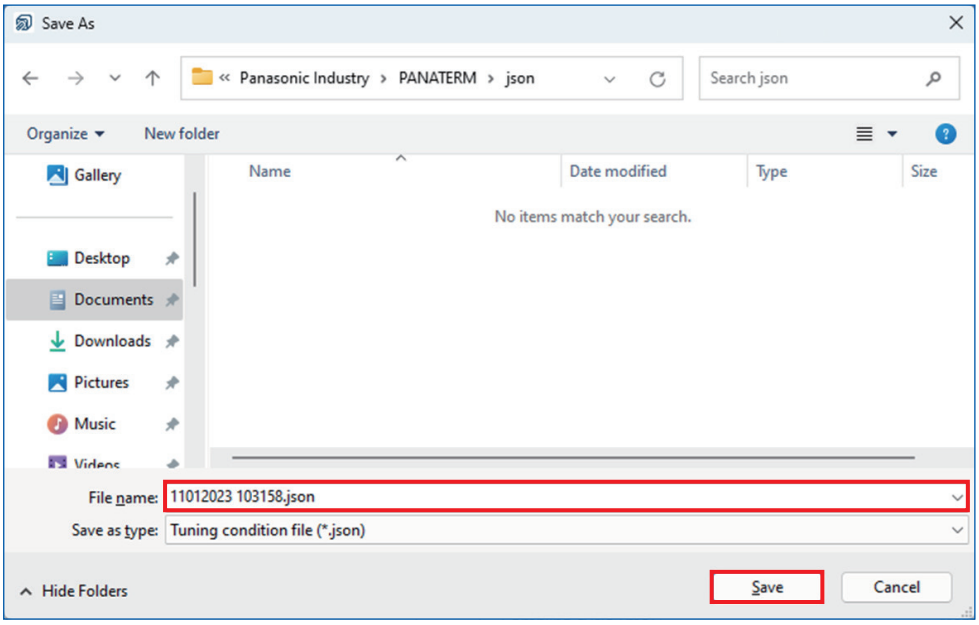
11.3.6 Saving Tuning Conditions

<< Procedure >>

1. Click the [Save tuning conditions] button.



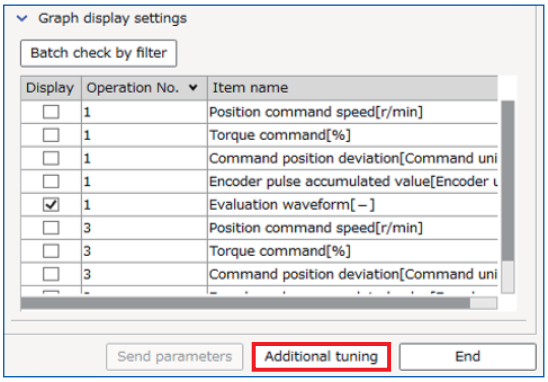
2. Enter an appropriate file name if necessary, and click the [Save] button to save the tuning conditions.



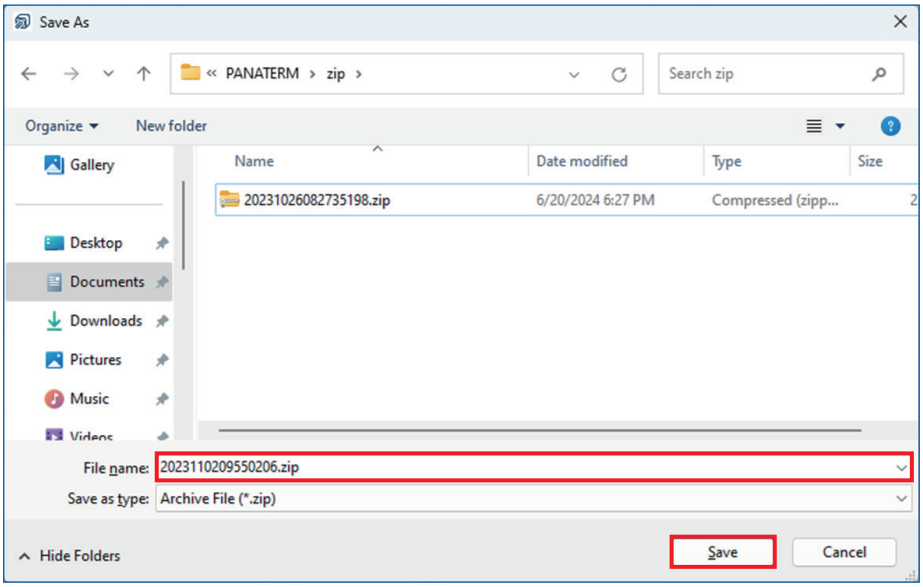
11.3.7 Performing Additional Tuning

<< Procedure >>

1. Click the [Additional tuning] button.



2. Enter an appropriate file name if necessary, and click the [Save] button to save the tuning results.

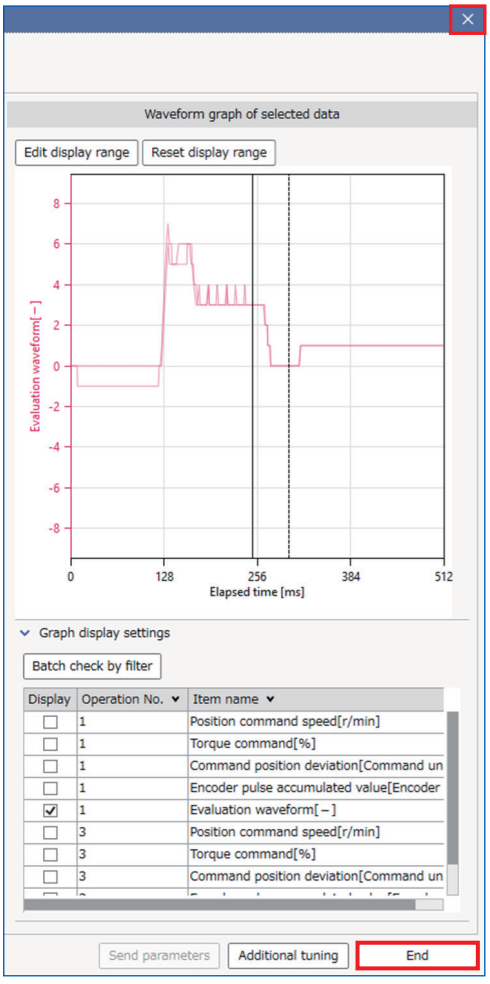


3. Transition to the “Settings” screen where additional tuning can be carried out.

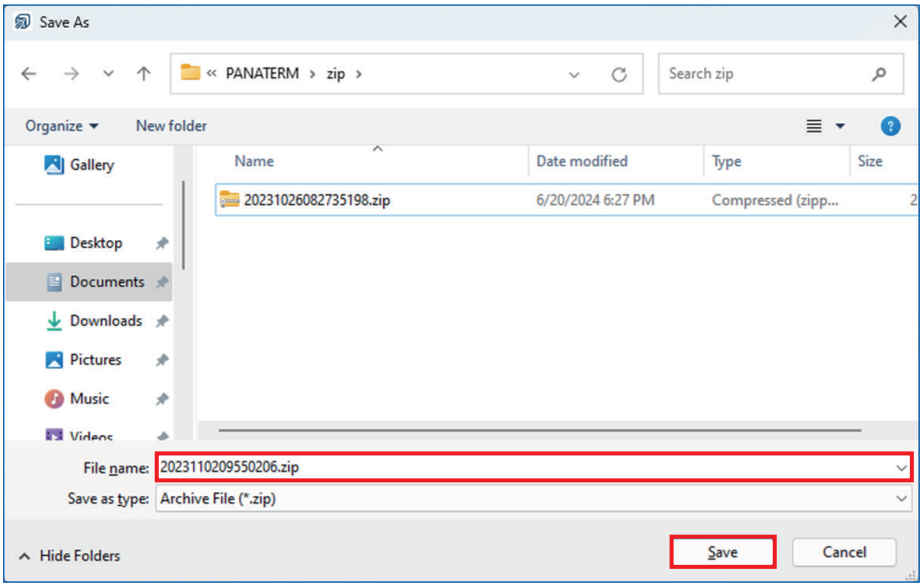
11.3.8 Saving Tuning Results

<< Procedure >>

1. Click the [End] or [×] button.



2. Enter an appropriate file name if necessary, and click the [Save] button to save the tuning results.



11.4 Manual TUNING

Select “Manual TUNING” from the tuning menu.

Operation commands during tuning are issued from the Set-up Support Software (PANATERM ver.7) trial run function or host device.

Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model for details of the specifications and function of each parameter.

- A7: Operating Instructions (Tuning)
- A6: Technical Reference Functional Specification

— Precautions —

- Functions other than Set-up Support Software (PANATERM ver.7) trial run cannot be used when tuning is in progress.

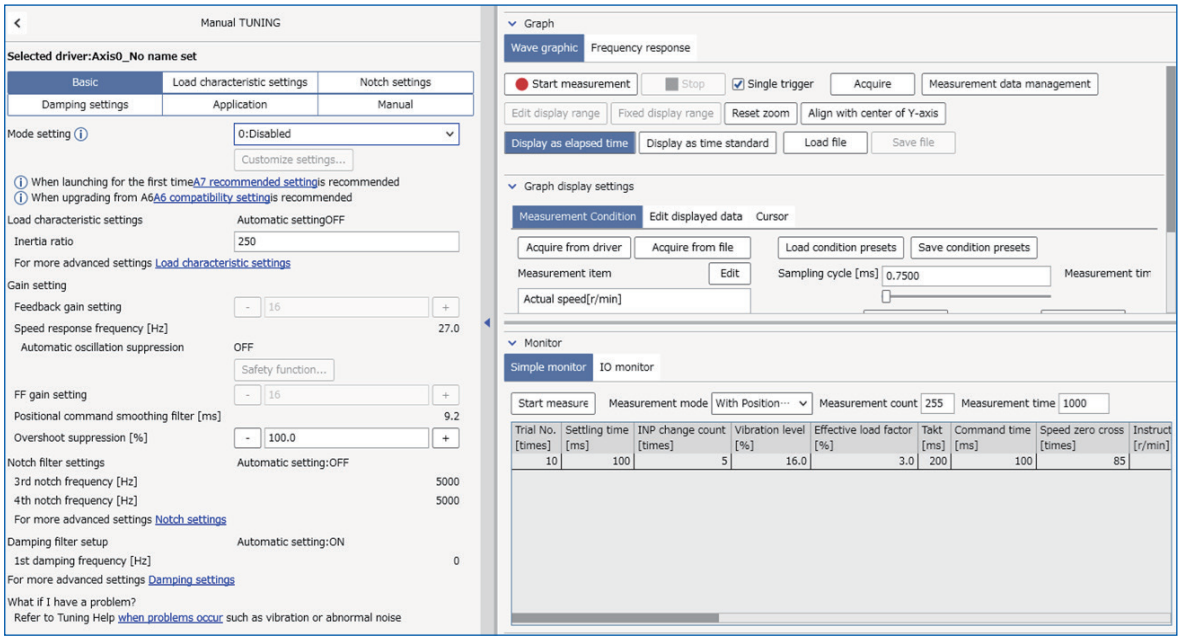
11.4.1 Opening the Manual TUNING Screen

<< Procedure >>

1. In the function display area of the main screen, select “Manual TUNING” and click the [Go to the Tuning screen] button.

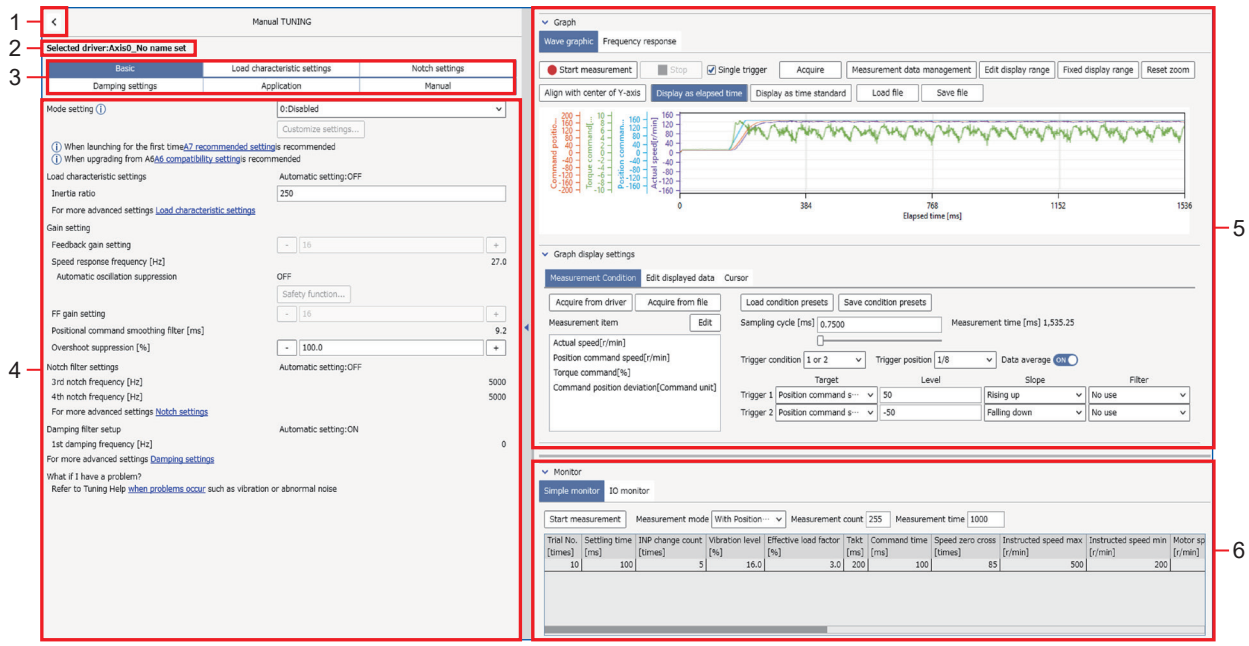
   See *“11.1.1 Opening the Tuning Screen”* .

2. The “Manual TUNING” screen is displayed.



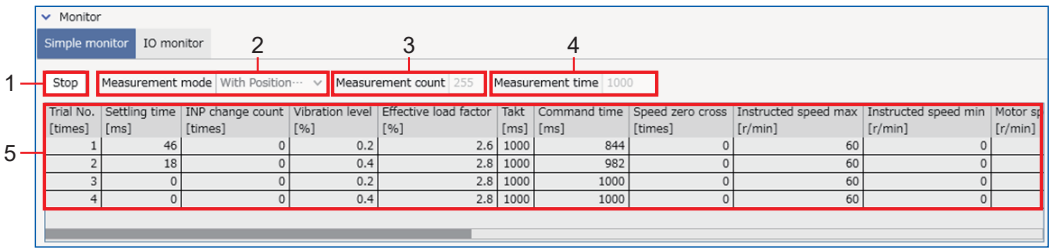
11.4.2 Configuration of the Manual TUNING Screen

■ Manual TUNING Screen (Base)



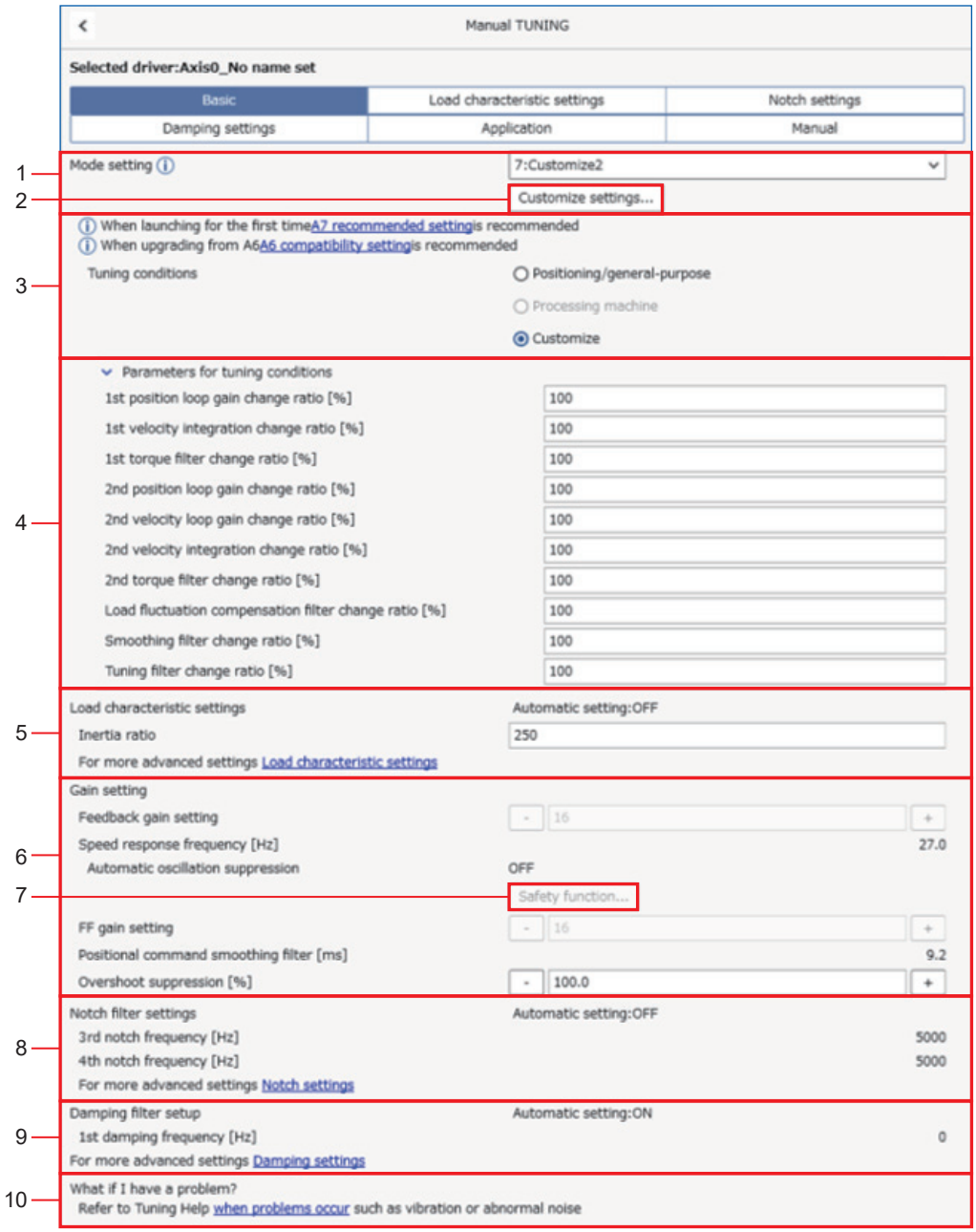
No.	Name	Description	Reference
1	Back	End Manual TUNING to display the tuning selection screen.	—
2	Selected driver	Displays the selected driver.	—
3	Category selection	Select a category.	—
4	Category display area	Displays a description of the selected category.	—
5	Graph display area	Displays waveform measurement and frequency characteristic screens.	*"10.1"* *"10.2"*
6	Monitor display area	Displays simple monitor and IO monitor screens.	*"9.1"*

■ Manual TUNING Screen (Simple Monitor)



No.	Name	Description	Reference
1	Start measurement/Stop measurement	Start or stop measurement.	—
2	Measurement mode	Select a measurement mode.	—
3	Measurement count	Set the measurement count.	—
4	Measurement time	Set the measurement time.	—
5	Monitor results	Displays the monitor results.	—

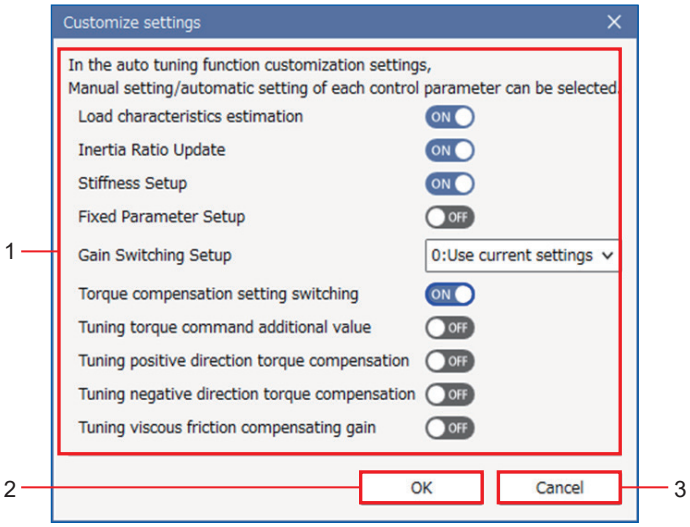
■ Manual TUNING Screen (Category: Basic)



No.	Name	Description	Reference
1	Mode setting	Set the operation mode.	—
2	Customize settings	Open the Customize Settings dialog box to configure settings.	—
3	Tuning conditions	Set the tuning conditions. This is displayed when the mode setting is “6: Disable” or “7: Customize 2”. The processing machine is always grayed out and cannot be selected. Not shown in MINAS A6 family.	—
4	Parameters for tuning conditions	Set the parameters for tuning conditions This is displayed when the mode setting is “7: Customize 2”. Not shown in MINAS A6 family.	—
5	Load characteristic settings	Configure load characteristic settings.	—
6	Gain setting	Configure gain settings.	—
7	Safety function	Open the Safety Function dialog box to configure safety functions.	—

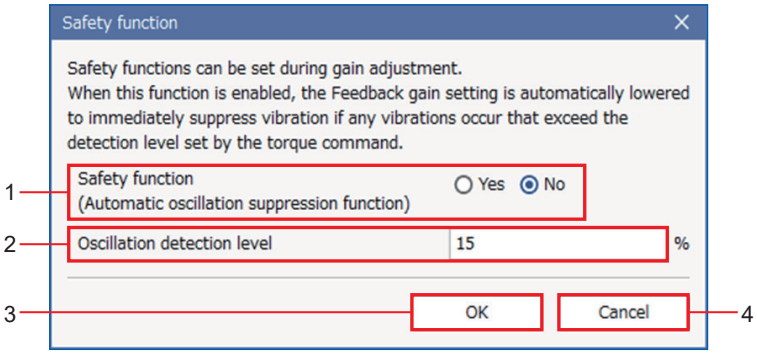
No.	Name	Description	Reference
8	Notch filter settings	Configure notch filter settings.	—
9	Damping filter setup	Configure damping filter setup.	—
10	What if I have a problem?	This section describes how to deal with problems when they occur. Not shown in MINAS A6 family.	—

■ Customize Settings dialog box



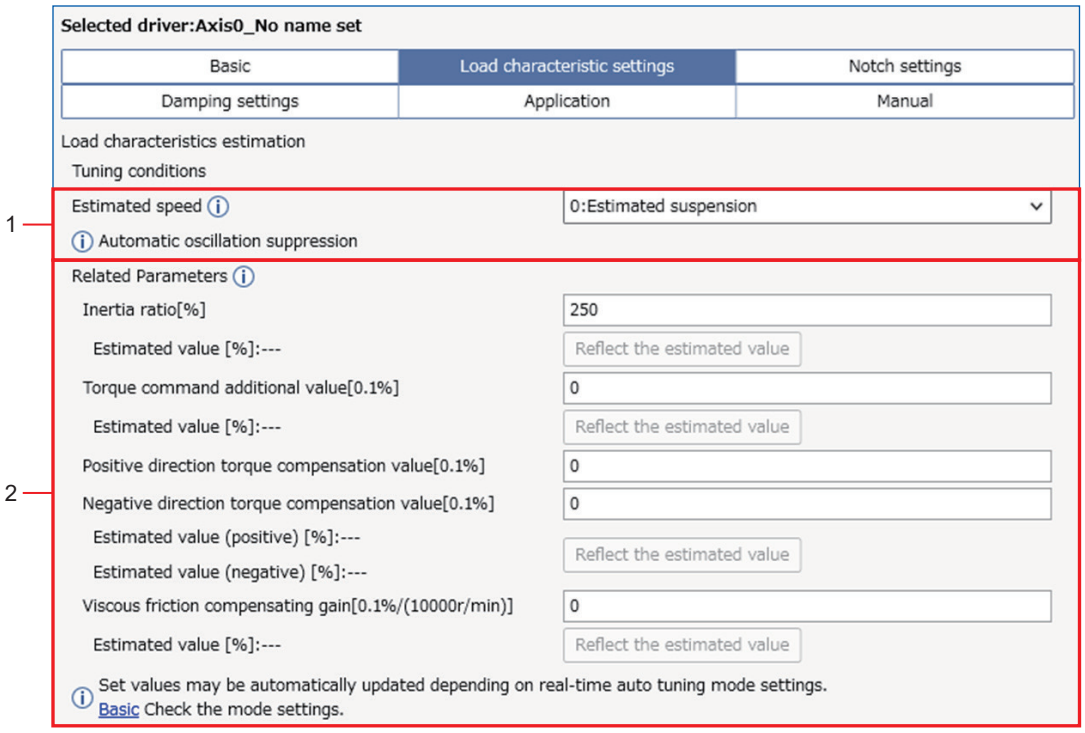
No.	Name	Description	Reference
1	Control parameters setting area	Set the control parameters.	—
2	OK	Apply the settings and close the dialog box.	—
3	Cancel	Close the dialog box without applying the settings.	—

■ Safety Function dialog box



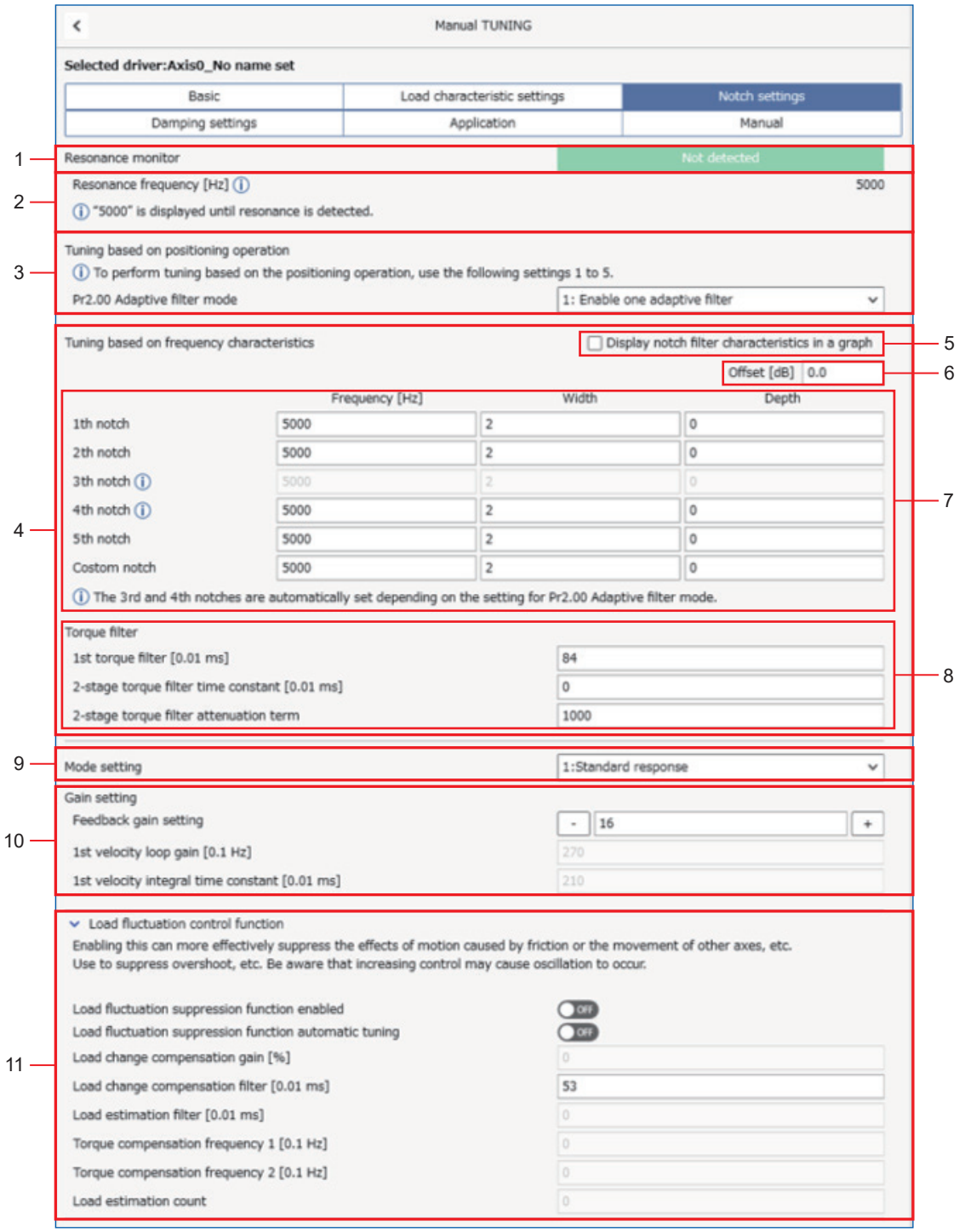
No.	Name	Description	Reference
1	Safety function	Configure the safety function settings.	—
2	Oscillation detection level	Set the oscillation detection level.	—
3	OK	Apply the settings and close the dialog box.	—
4	Cancel	Close the dialog box without applying the settings.	—

■ Manual TUNING Screen (Category: Load Characteristic Settings)



No.	Name	Description	Reference
1	Estimated speed	Set the estimated speed.	—
2	Related parameters	Set parameters related to load characteristics estimation.	—

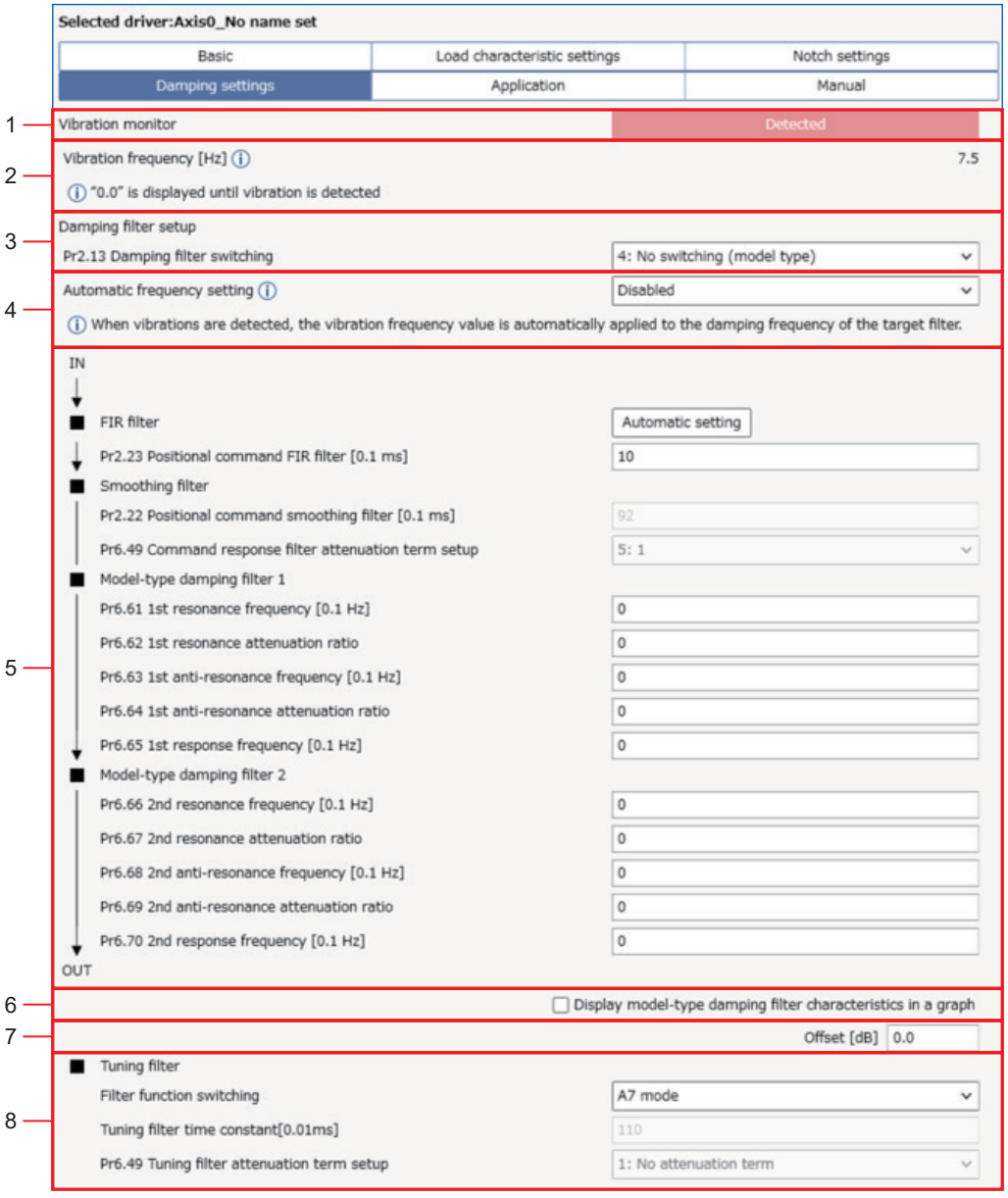
■ Manual TUNING Screen (Category: Notch Settings)



No.	Name	Description	Reference
1	Resonance monitor	Displays the resonance monitor. “Detected” is displayed If resonance is detected and “Not detected” is displayed if resonance is not detected.	—
2	Resonance frequency [Hz]	Displays the resonance frequency.	—
3	Tuning based on positioning operation	Set Pr2.00 “Adaptive filter mode setup” for tuning based on positioning operation.	—
4	Tuning based on frequency characteristics	Configure settings for notches and torque filters for tuning based on frequency characteristics.	—

No.	Name	Description	Reference
5	Display notch filter characteristics in a graph	Display the filter characteristics for notch filter characteristics in a frequency response graph.	*“11.4.3”*
6	Offset	Set the offset of the filter characteristics for notch filter characteristics.	*“11.4.3”*
7	Notch settings	Configure the notch settings. The third and fourth notches are set automatically depending on Pr2.00 “Adaptive filter mode setup” .	—
8	Torque filter settings	Configure the torque filter settings.	—
9	Mode setting	Set the operation mode.	—
10	Gain setting	Configure gain settings.	—
11	Load fluctuation control function	Set the load fluctuation suppression function.	—

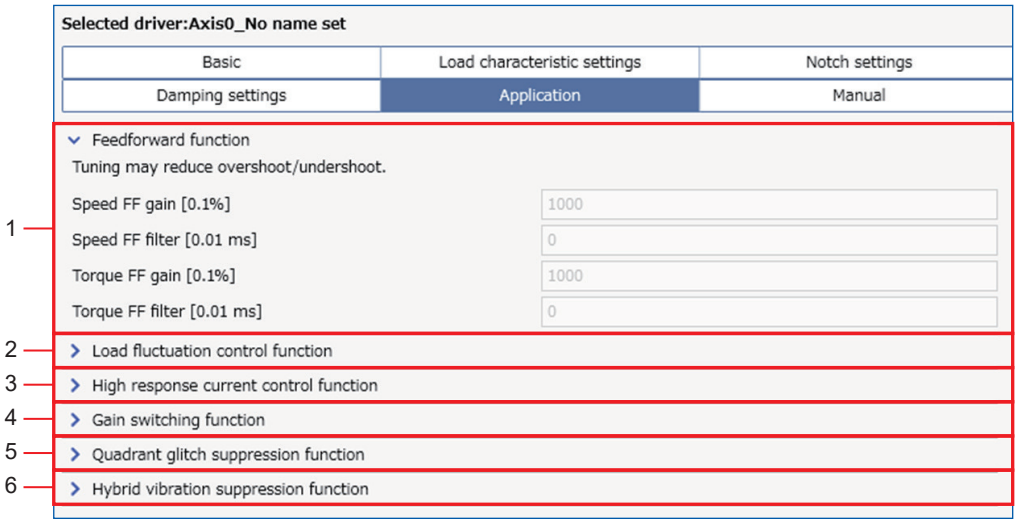
■ Manual TUNING Screen (Category: Damping Settings)



No.	Name	Description	Reference
1	Vibration monitor	Displays the vibration monitor. “Detected” is displayed If vibration is detected and “Not detected” is displayed If vibration is detected.	—

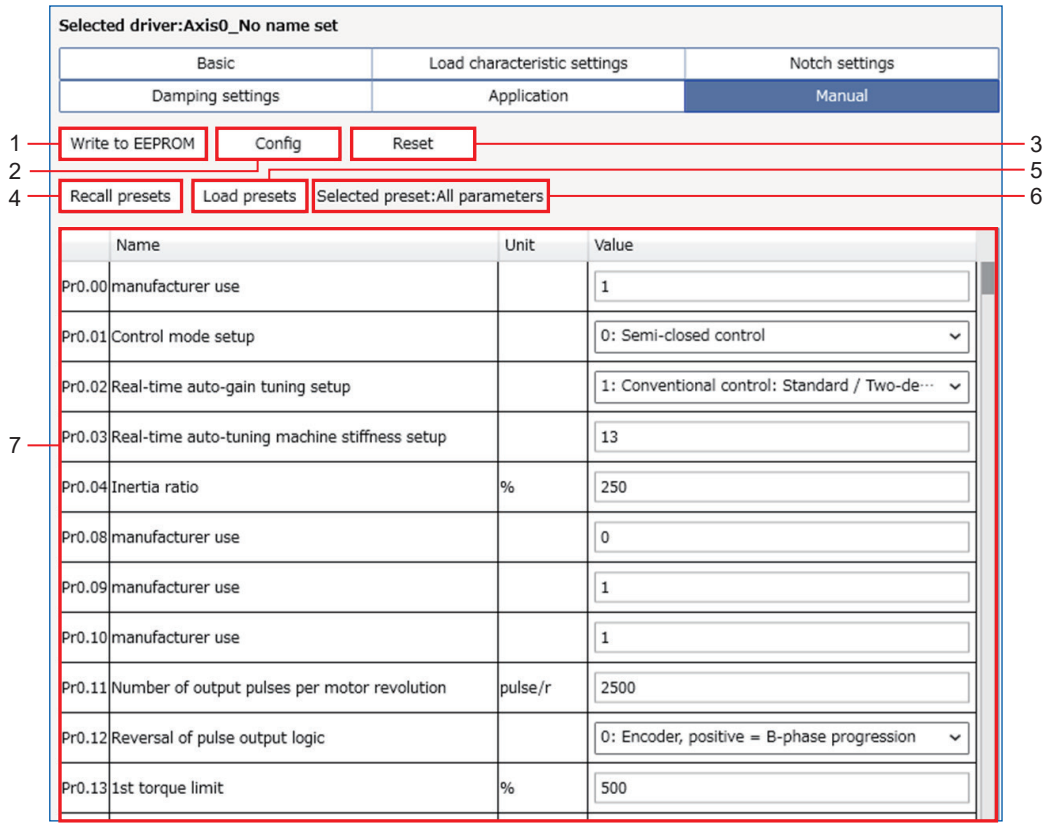
No.	Name	Description	Reference
2	Vibration frequency [Hz]	Displays the vibration frequency.	—
3	Damping filter setup	Configure the damping filter settings.	—
4	Automatic frequency setting	Configure the automatic frequency setting settings.	—
5	Damping filter display area	Configure settings for each filter. The contents displayed change depending on the damping filter settings in 3.	—
6	Display model-type damping filter characteristics in a graph	Check the box to display model-type damping filter characteristics in a frequency response graph. The check box is displayed if 4, 5 or 6 (model type) are set in Pr2.13 “Selection of damping filter switching” .	*“11.4.3”*
7	Offset [dB]	Set the offset for model-type damping filter characteristics. The check box is displayed if 4, 5 or 6 (model type) are set in Pr2.13 “Selection of damping filter switching” .	—
8	Tuning filter	Configure the tuning filter settings.	—

■ Manual TUNING Screen (Category: Application)



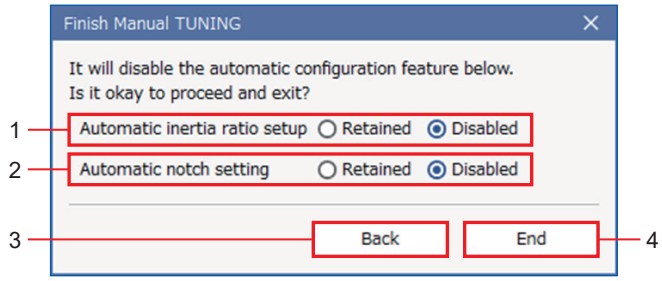
No.	Name	Description	Reference
1	Feedforward function	Configure settings related to the feedforward function.	—
2	Load fluctuation control function	Configure settings related to the load fluctuation control function.	—
3	High response current control function	Configure settings related to the high response current control function.	—
4	Gain switching function	Configure settings related to the gain switching function.	—
5	Quadrant glitch suppression function	Configure settings related to the quadrant glitch suppression function.	—
6	Hybrid vibration suppression function	Configure settings related to the hybrid vibration suppression function.	—

■ Manual TUNING Screen (Category: Manual)



No.	Name	Description	Reference
1	Write to EEPROM	Writes to EEPROM.	—
2	Config	Performs Config.	—
3	Reset	Performs reset.	—
4	Recall presets	Recalls presets.	*"10.2.8"*
5	Load presets	Loads presets.	*"10.2.9"*
6	Selected preset name	Displays the name of the selected preset.	—
7	Parameter display area	Displays the parameters of the selected preset.	—

■ End Manual TUNING dialog box



No.	Name	Description	Reference
1	Automatic inertia ratio set-up	Set whether to retain/disable the automatic inertia ratio setting.	—
2	Automatic notch setting	Set whether to retain/disable the automatic notch setting.	—
3	Back	Go back to Manual TUNING.	—
4	End	End Manual TUNING.	—

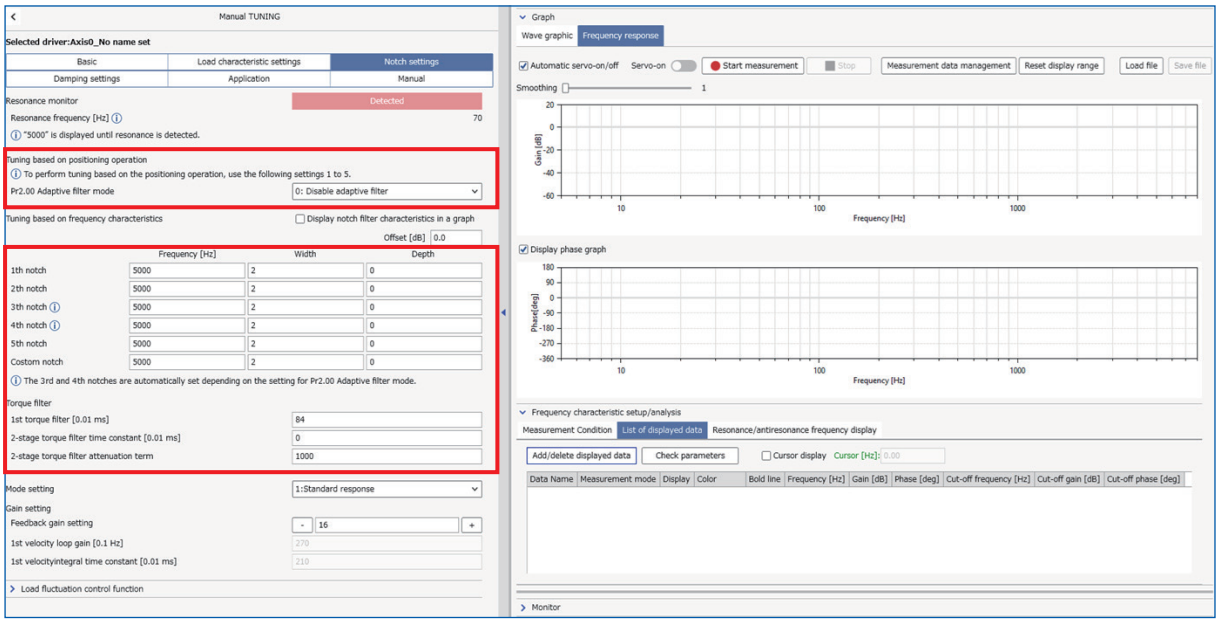
11.4.3 Displaying Filter Characteristics

Filter characteristics can be displayed in notch settings and damping settings, respectively.

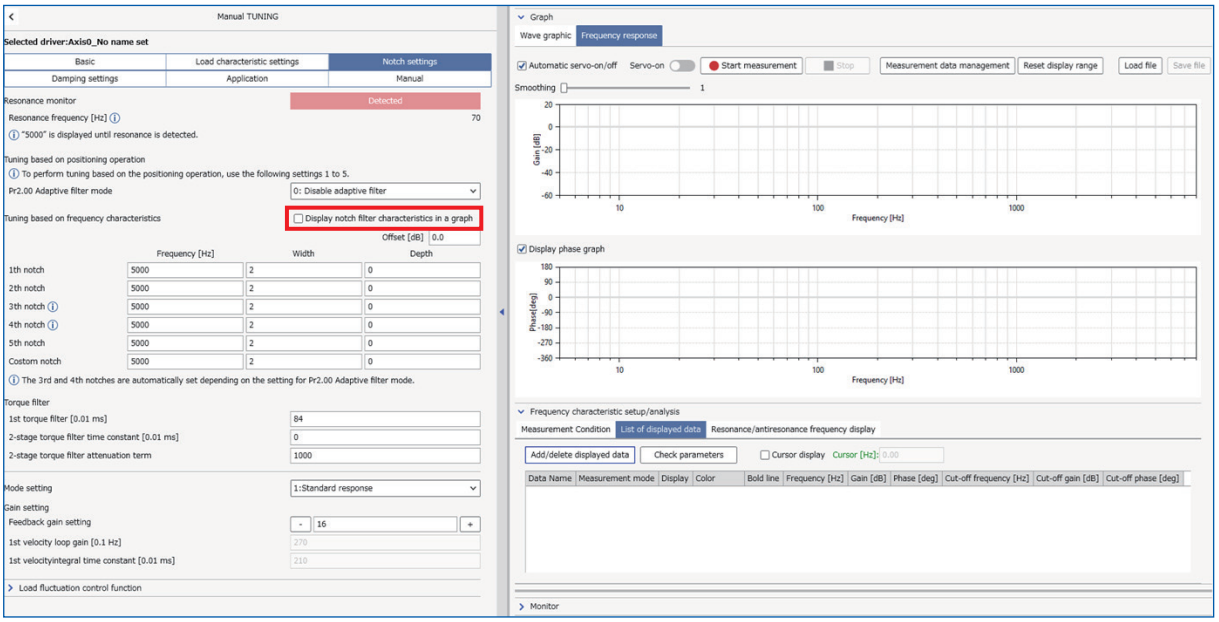
11.4.3.1 Notch Settings

<< Procedure >>

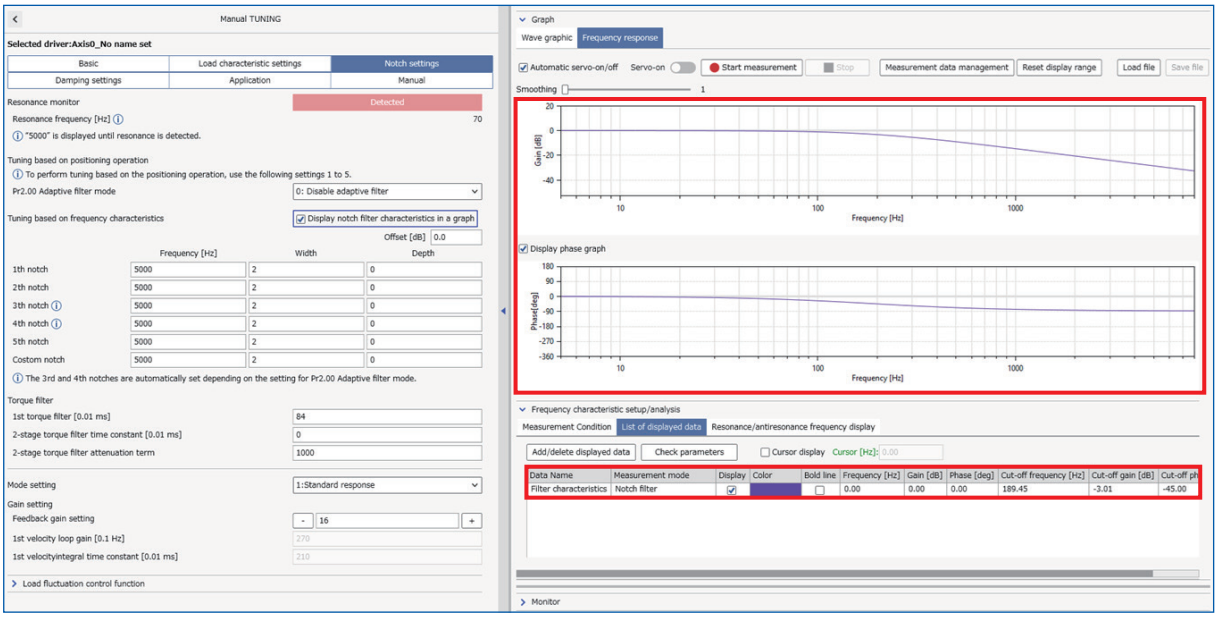
1. Set the applicable filter mode, notch settings, and torque filter settings.



2. Check the “Display notch filter characteristics in a graph” check box.



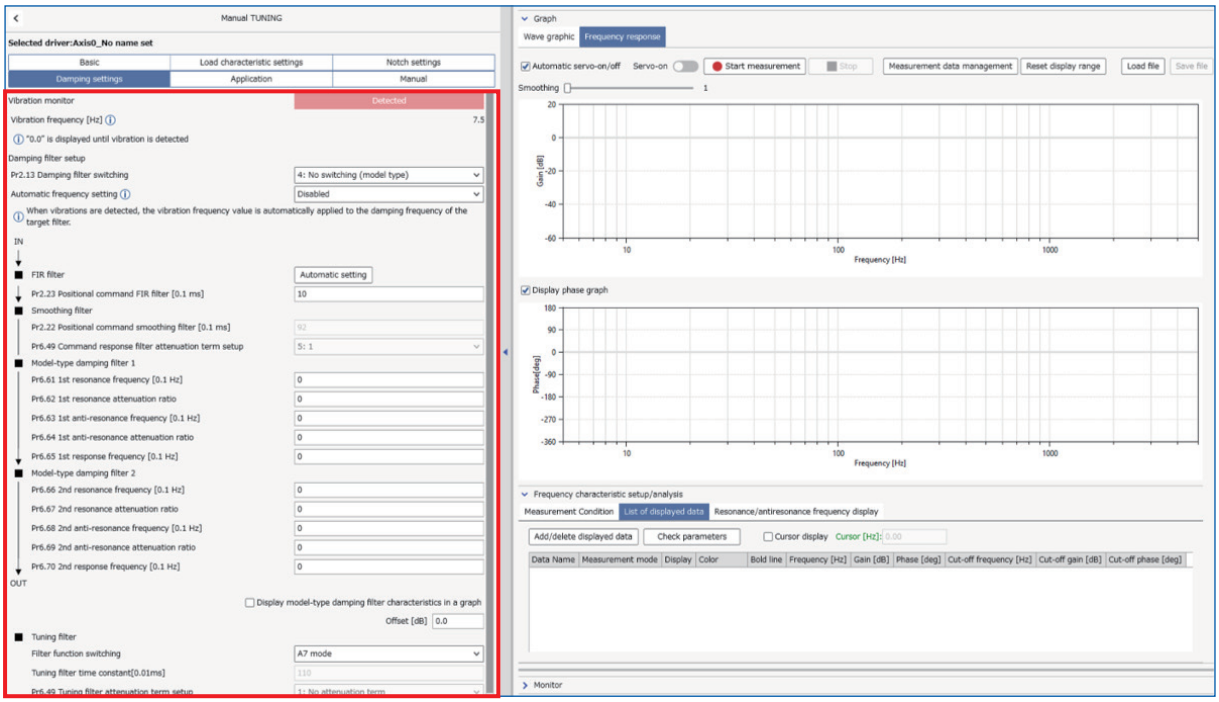
3. Plot the filter characteristics in the “Graph display area (frequency characteristic screen)”.



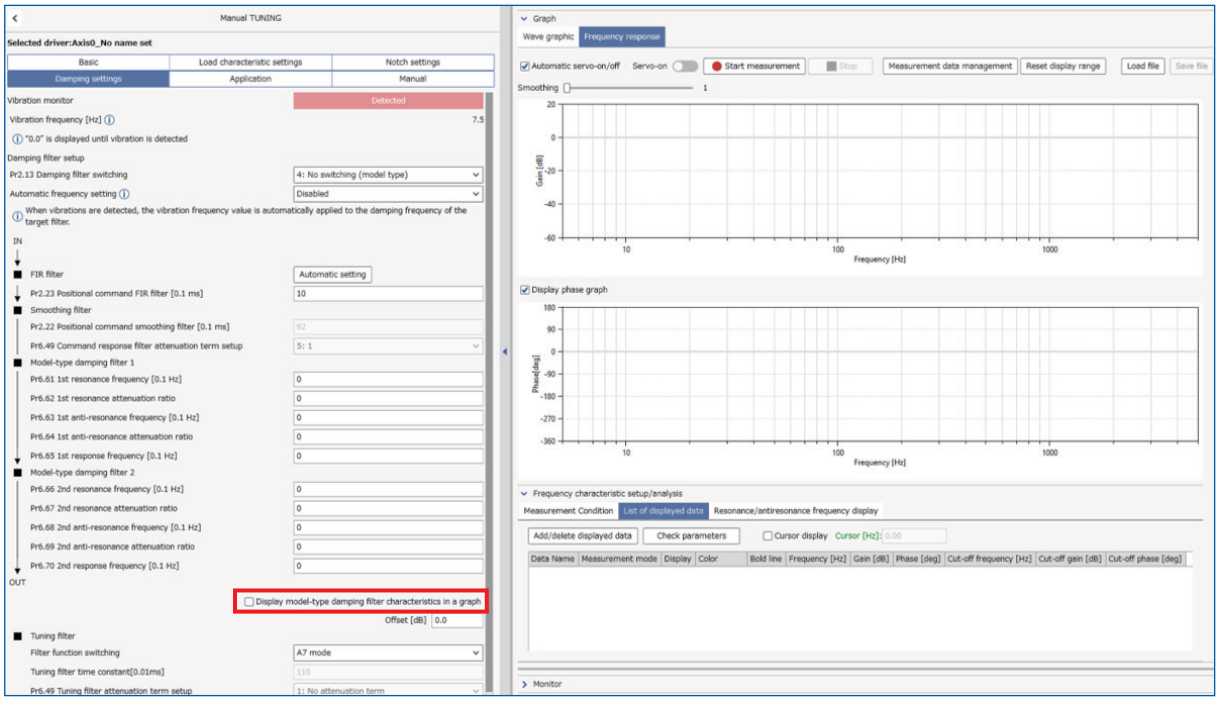
11.4.3.2 Damping Settings

<< Procedure >>

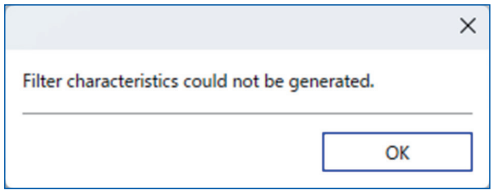
1. Configure settings for each filter.



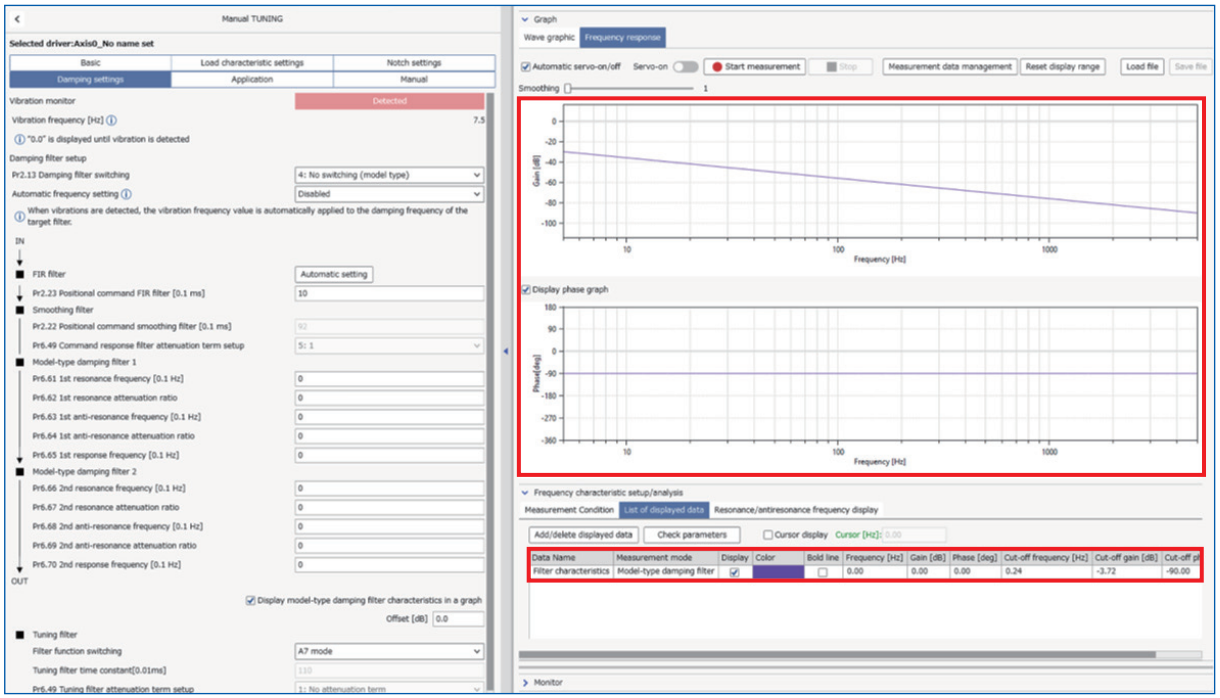
2. Check the “Display model-type damping filter characteristics in a graph” check box.



3. If the following dialog box appears, the settings are incomplete and the settings should be reconfigured from “Step 1” again.



4. Plot the filter characteristics in the “Graph display area (frequency characteristic screen)”.



11.5 Load Fluctuation Suppression Tuning (Stabilizing Load Fluctuation Applications)

Select “Load fluctuation suppression tuning (stabilizing load fluctuation applications)” from the tuning menu.

This function suppresses motor speed fluctuations caused by disturbance torque and load fluctuations and improves stability.

This is effective when real-time auto tuning cannot handle load variation sufficiently.

Operation commands during tuning are issued from the Set-up Support Software (PANATERM ver.7) trial run function or host device.

Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model for details of the specifications and function of each parameter.

- A7: Operating Instructions (Tuning)

11.5.1 Opening Load Fluctuation Suppression Tuning (Stabilizing Load Fluctuation Applications)

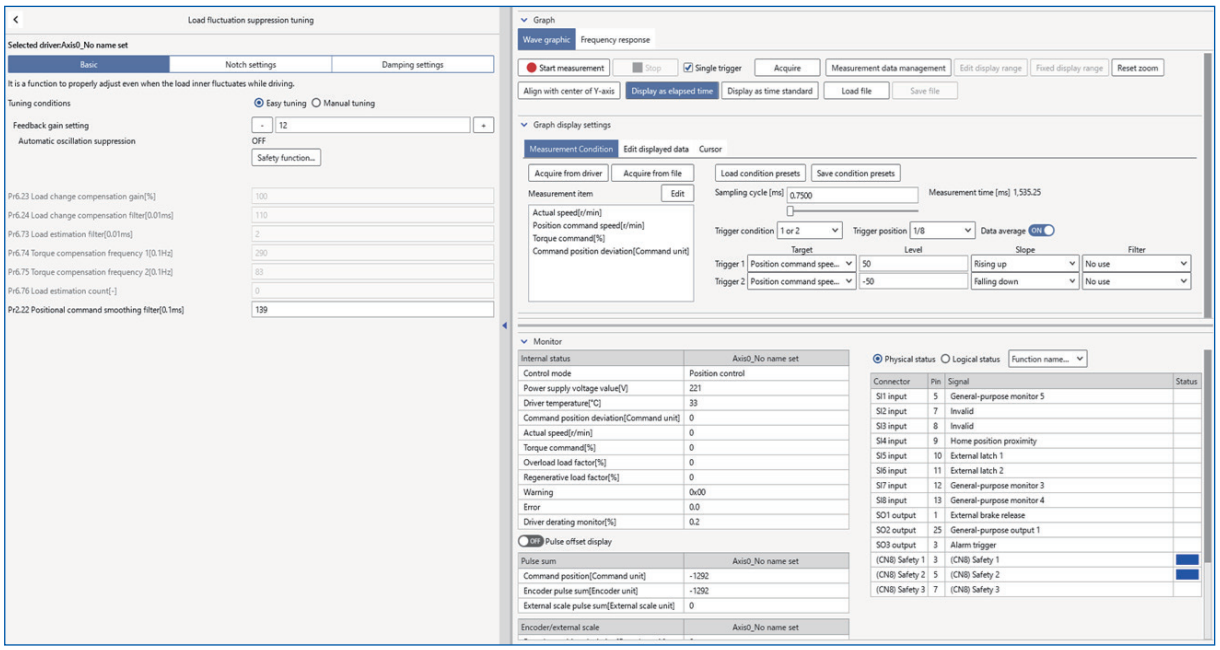
<< Procedure >>

1. In the function display area of the main screen, select “Load fluctuation suppression tuning (stabilizing load fluctuation applications)” and click the [Go to the Tuning screen] button.

   See *“11.1.1 Opening the Tuning Screen”* .

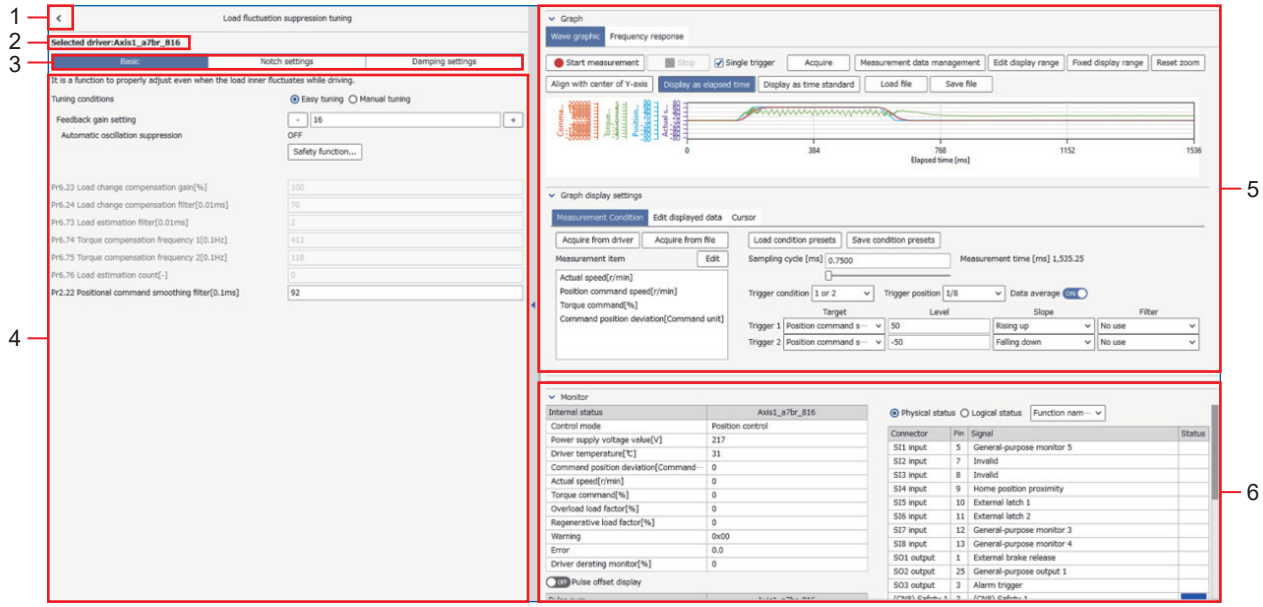
2. A dialog box appears. Click as indicated.

3. The “Load fluctuation suppression tuning” screen is displayed.



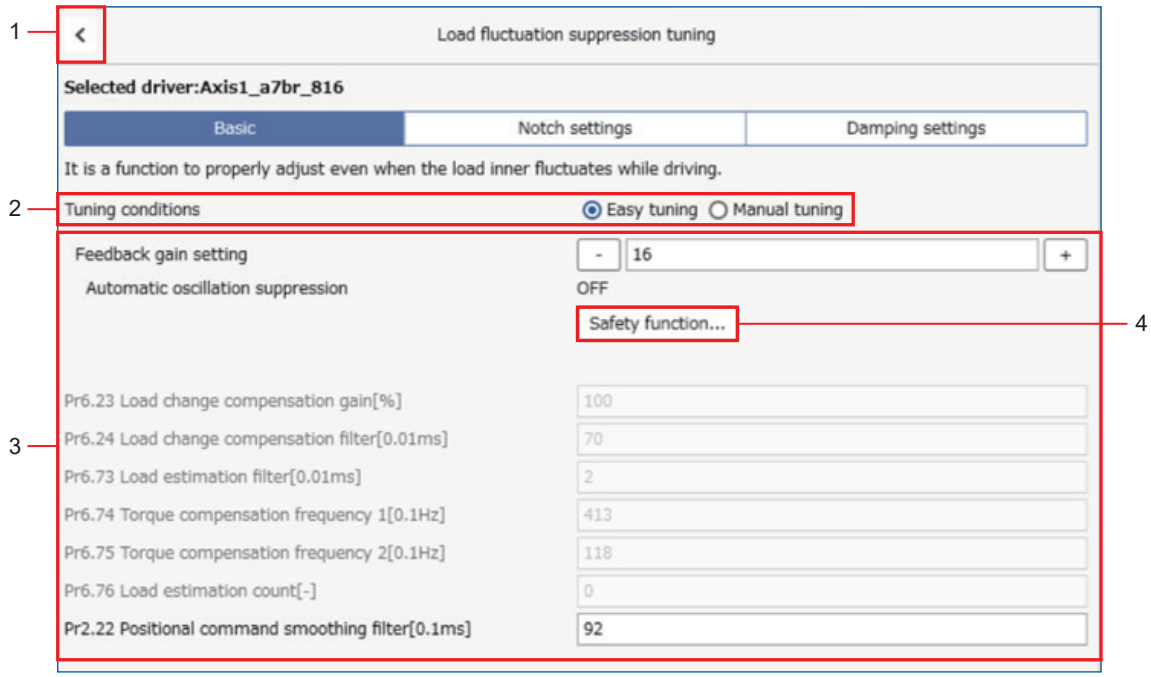
11.5.2 Configuration of the Load Fluctuation Suppression Tuning Screen

■ Load Fluctuation Suppression Tuning Screen (Category: Base)



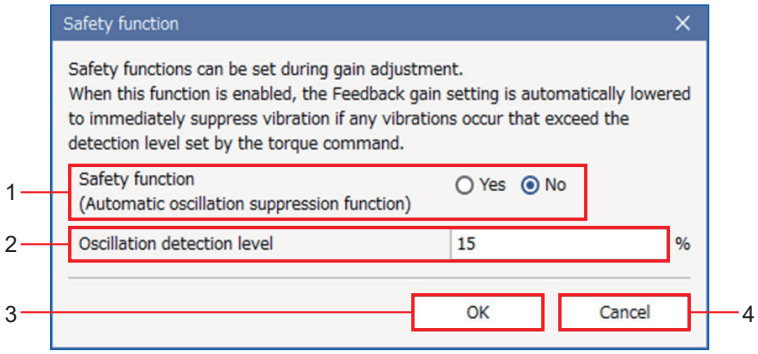
No.	Name	Description	Reference
1	Back	Ends tuning and displays the “Tuning selection” screen.	—
2	Selected driver	Displays the selected driver.	—
3	Category selection	Select a category.	—
4	Category display area	Displays a description of the selected category.	—
5	Graph display area	Displays “Waveform measurement” and “Frequency response” screens.	*“10.1”* *“10.2”*
6	Monitor display area	Displays the “IO monitor” screen.	*“9.1”*

■ Load Fluctuation Suppression Tuning Screen (Category: Basic Settings)



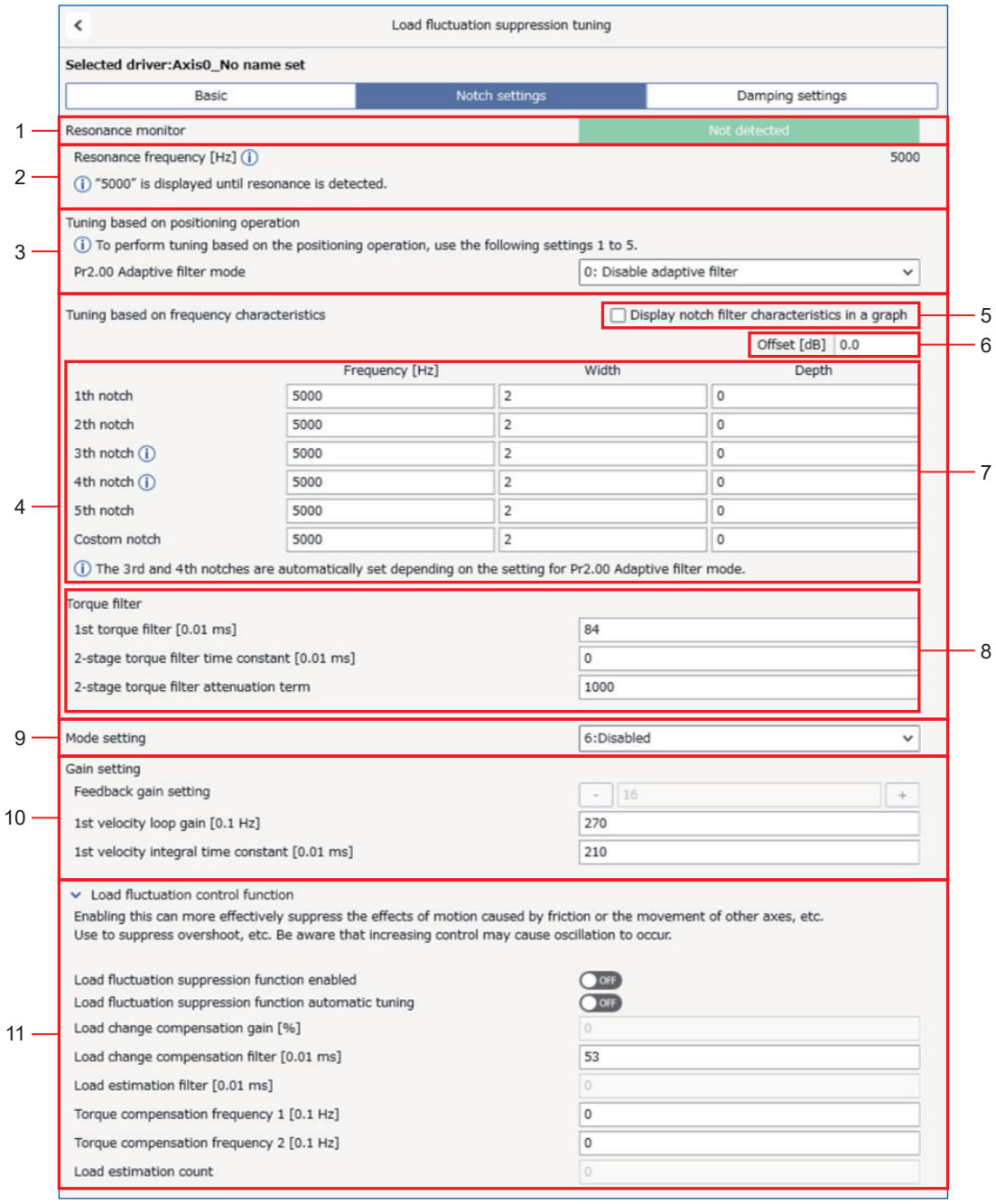
No.	Name	Description	Reference
1	Back	Ends tuning and displays the “Tuning selection” screen.	—
2	Tuning conditions	Set either simple tuning or manual tuning.	—
3	Parameter Setup area	Configure settings for each gain, filter and torque.	—
4	Safety function	Open the “Safety function” dialog box and configure the settings.	—

■ Safety Function dialog box



No.	Name	Description	Reference
1	Safety function settings	Configure the safety function settings.	—
2	Oscillation detection level settings	Set the oscillation detection level.	—
3	OK	Apply the settings and close the dialog box.	—
4	Cancel	Close the dialog box without applying the settings.	—

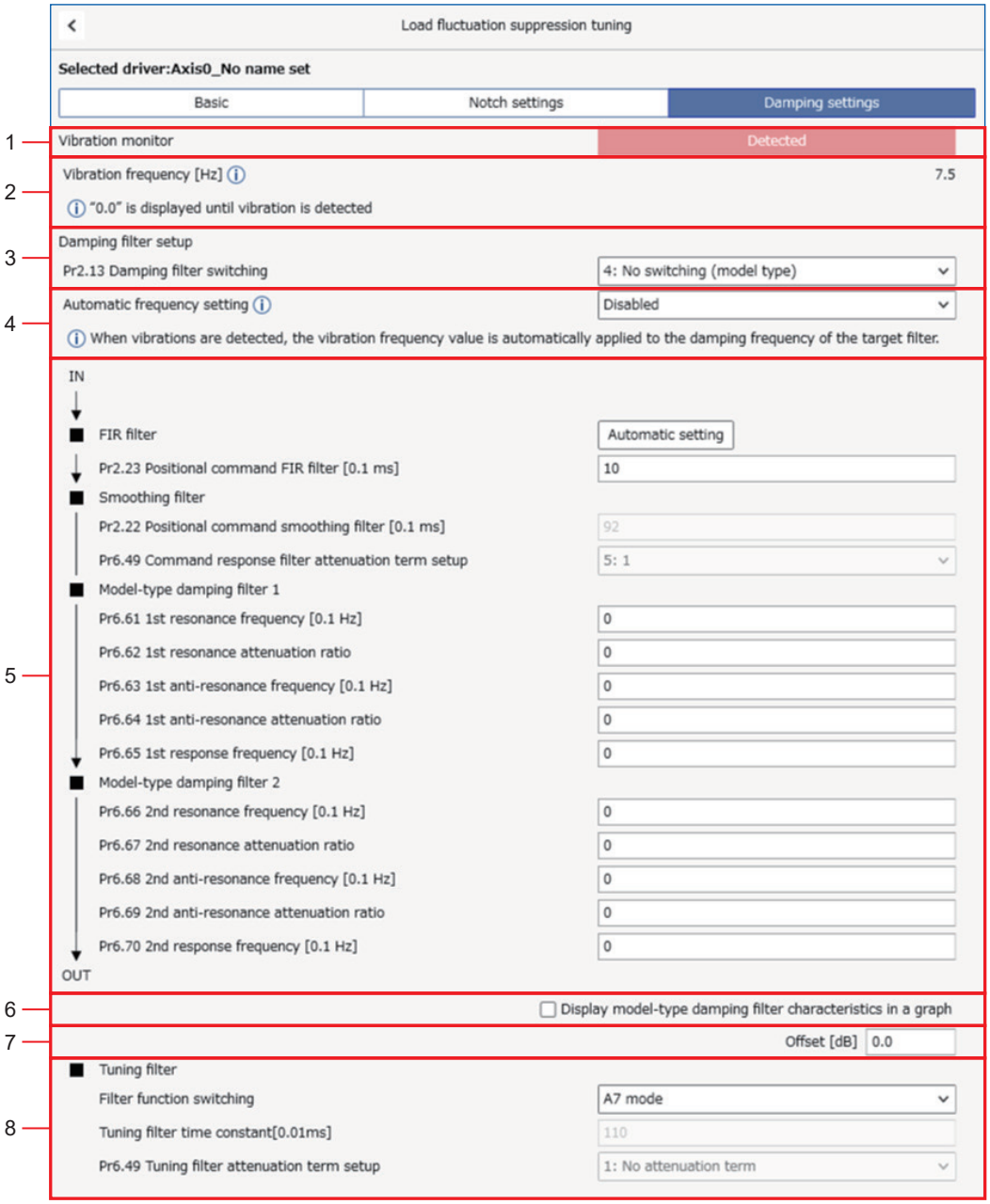
■ Load Fluctuation Suppression Tuning Screen (Category: Notch Settings)



No.	Name	Description	Reference
1	Resonance monitor	Displays the resonance monitor. “Detected” is displayed If resonance is detected and “Not detected” is displayed if resonance is not detected.	—
2	Resonance frequency [Hz]	Displays the resonance frequency.	—
3	Tuning based on positioning operation	Set Pr2.00 “Adaptive filter mode setup” for tuning based on positioning operation.	—
4	Tuning based on frequency characteristics	Configure settings for notches and torque filters for tuning based on frequency characteristics.	—
5	Display notch filter characteristics in a graph	Display the filter characteristics for notch filter characteristics in a frequency response graph.	*“11.4.3”*
6	Offset [dB]	Set the offset of the filter characteristics for notch filter characteristics.	—

No.	Name	Description	Reference
7	Notch settings	Configure the notch settings. The third and fourth notches are set automatically depending on Pr2.00 “Adaptive filter mode setup” .	—
8	Torque filter settings	Configure the torque filter settings.	—
9	Mode setting	Set the operation mode.	—
10	Gain setting	Configure gain settings.	—
11	Load fluctuation control function	Set the load fluctuation suppression function.	—

■ Load Fluctuation Suppression Tuning Screen (Category: Damping Settings)



No.	Name	Description	Reference
1	Vibration monitor	Displays the vibration monitor. “Detected” is displayed If vibration is detected and “Not detected” is displayed If vibration is detected.	—
2	Vibration frequency [Hz]	Displays the vibration frequency.	—

No.	Name	Description	Reference
3	Damping filter setup	Configure the damping filter settings.	—
4	Automatic frequency setting	Configure the automatic frequency setting settings.	—
5	Damping filter display area	Configure settings for each filter. The contents displayed change depending on the damping filter settings in 3.	—
6	Display model-type damping filter characteristics in a graph	Check the box to display model-type damping filter characteristics in a frequency response graph. The check box is displayed if 4, 5 or 6 (model type) are set in Pr2.13 “Selection of damping filter switching” .	*“11.4.3”*
7	Offset [dB]	Set the offset for model-type damping filter characteristics. The check box is displayed if 4, 5 or 6 (model type) are set in Pr2.13 “Selection of damping filter switching” .	—
8	Tuning filter	Configure the tuning filter settings.	—

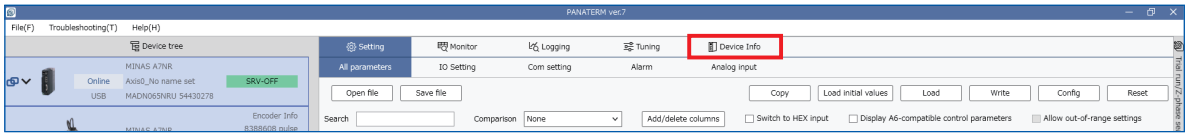
12 Device Information

12.1 Opening the Device Information Screen

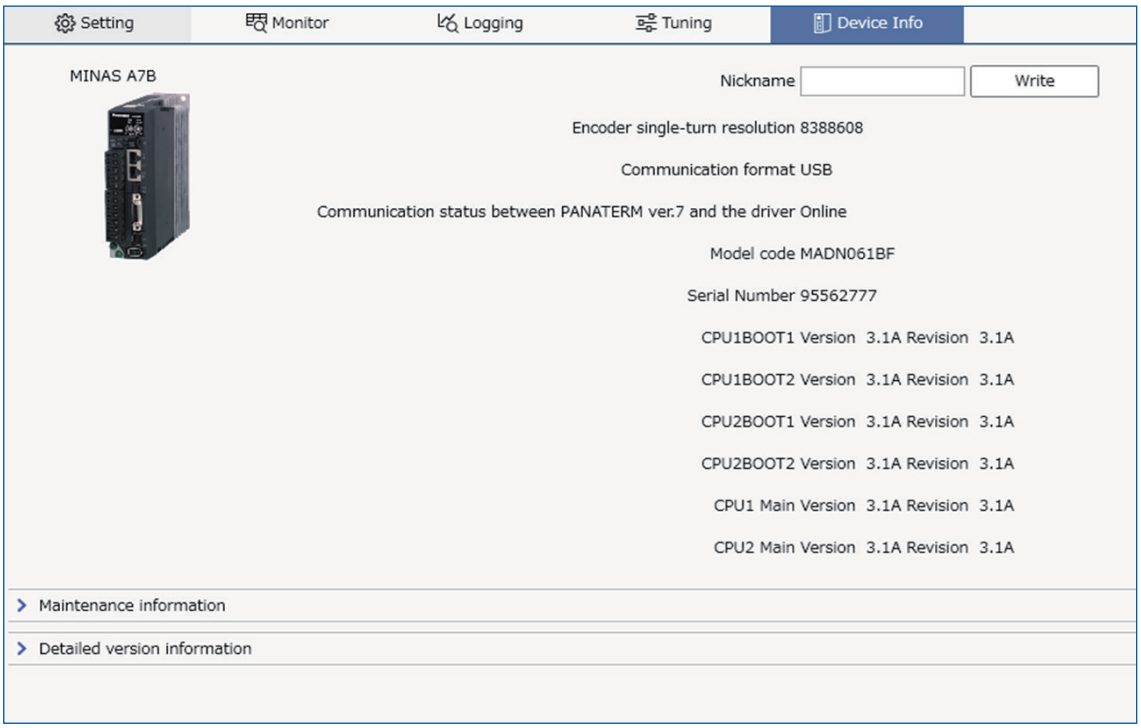
Display information on connected drivers and motors.

<< Procedure >>

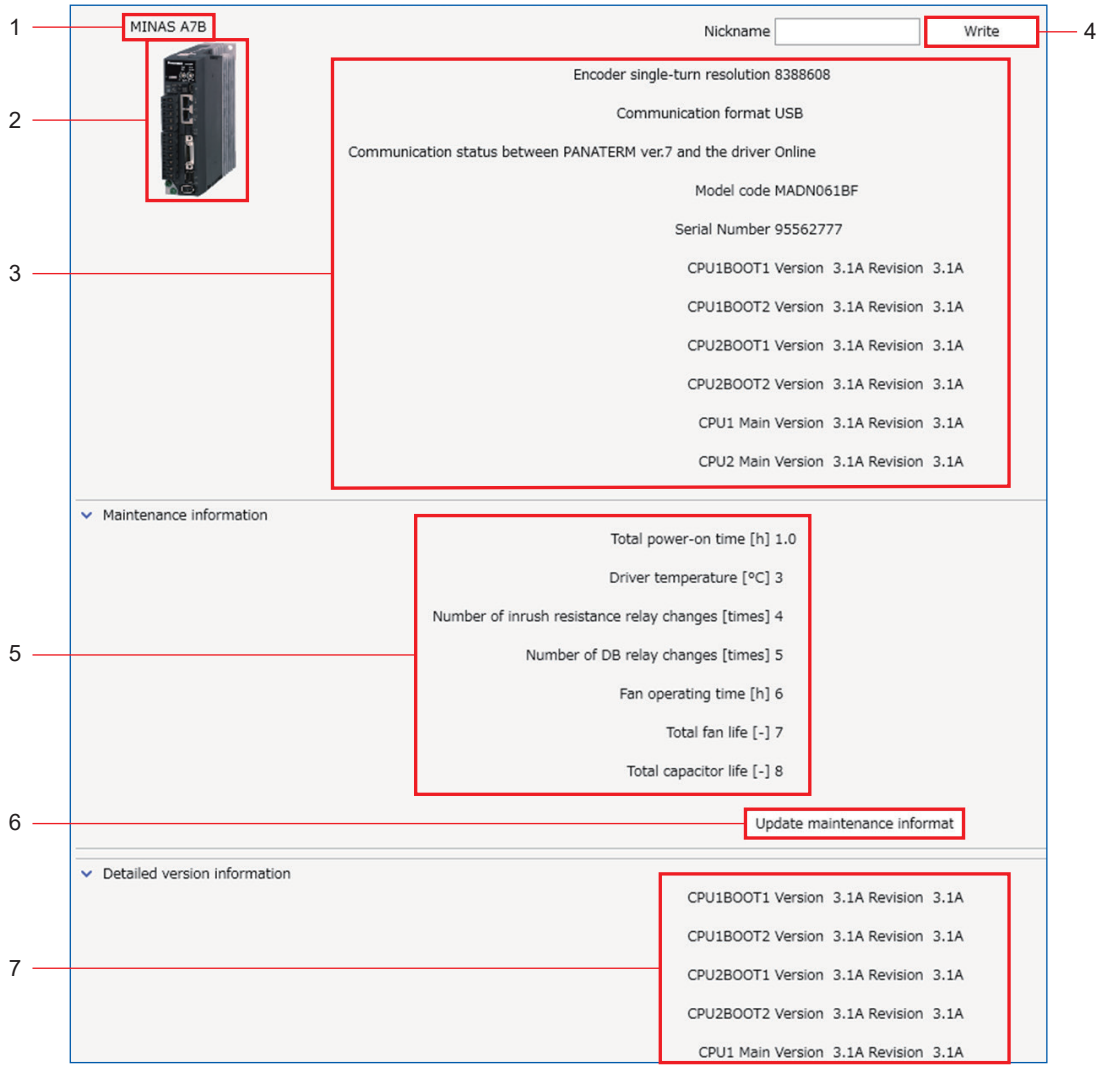
1. Click on the “Device information” tab.



2. The device information screen is displayed.



12.2 Configuration of the Device Information Screen



No.	Name	Description	Reference
1	Driver series name	The driver series name is displayed.	—
2	Driver product image	An image of the driver is displayed.	—
3	Basic information	Basic information about the driver/motor is displayed.	—
4	Write settings	The nickname entered in the “Nickname” entry field is written to the driver. When offline, only settings are configured.	*“12.3”*
5	Maintenance information	Maintenance information is displayed.	—
6	Update maintenance information	This button updates maintenance information.	*“12.4”*
7	Detailed version information	CPU and FPGA version and revision information is displayed.	—

— Precautions —

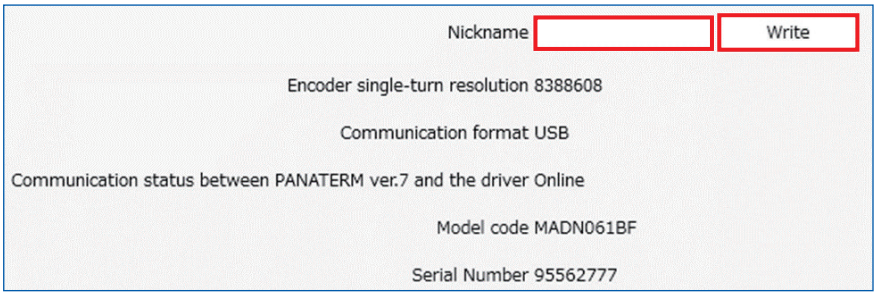
- When a device is selected from the device tree while the equipment information screen is displayed, the display switches to showing information for the selected device.
- Multiple devices cannot be selected while the equipment information screen is displayed.

12.3 Setting Nicknames

The nickname setting for the selected driver can be changed on the device Information screen.

<< Procedure >>

1. Enter text in the Nickname entry field and click the [Write] or [Set] button.



- Nicknames can be up to 8 characters in length and can contain alphanumeric characters as well as "-" and "_".
- Nicknames are initially blank. If a nickname has already been set, the nickname set is displayed.

Nickname settings can also be configured in the device tree. For details, see *"7.5 Setting Nicknames"* .

─ Precautions ─

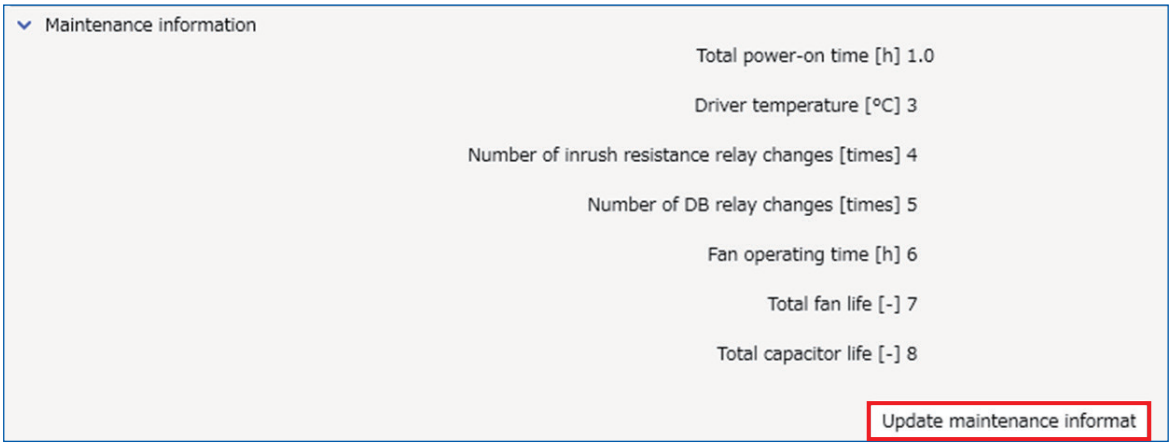
- If not setting a nickname, click the [Write] button without entering anything. ("Name not set" is displayed in the device tree.)
- Nicknames cannot be written to the driver if the driver and computer are disconnected.

12.4 Updating Maintenance Information

Update the maintenance information displayed on the device information screen to the latest information on the driver.

<< Procedure >>

1. Click the [Update maintenance information] button.



The maintenance information on the device information screen is updated to the latest information on the driver.

─ Precautions ─

- Maintenance information cannot be updated if the driver and computer are disconnected.

13 Trial Run/Z-phase Search

13.1 About Trial Runs

Even without a host device connected, motor trial runs can be performed from a computer.

- Gain adjustment of the driver and some parameter settings are required even for trial runs. Familiarize yourself with the contents of the relevant documentation (see *"1.3 Related Documents"*) for your model before use.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- Whether the servo motor rotates in the "positive direction" or "negative direction" during the trial run depends on the parameter Pr0.00 "Rotational direction setup" and object Obj.607Eh:00h "Polarity" settings.
- If a warning or error is triggered in the servo-on state during the trial run, an error message and the "Alarm notification" dialog box appear. After eliminating the cause, clear the alarm and resume the trial run.
- An error message may appear during execution if the driver is not in servo-ready state (alarm is triggered or main power is off), or if it is being used for other processes (during network establishment for example), or if an external servo-on input is input. After eliminating the primary cause, close the screen once and then run it again.

  For details of the servo ready state, familiarize yourself with the contents of the relevant documentation (see *"1.3 Related Documents"*) for your model.
  - A7: Operating Instructions (Overall)
  - A6: Technical Reference Functional Specification
- Changes to parameters related to the trial run in "All parameters" are not applied to the trial run until they are written to the driver. After changing parameters in "All parameters", write the parameters to the driver.

13.1.1 Precautions for Trial Runs

— Precautions —

- A trial run cannot be performed while frequency response operations are executed.
- The trial run screen cannot be hidden during servo-on state.
- Performing a trial run during EoE communication is extremely dangerous. During EoE communication, there is a risk that user operations will not be accepted until the system is forcibly stopped due to a timeout, resulting in unsafe operation. Conduct thorough safety checks before performing a trial run.

13.1.2 Command Saturation Display Function for Trial Runs

The following primary causes may require limits on operations, and messages are displayed to this effect on the trial run screen.

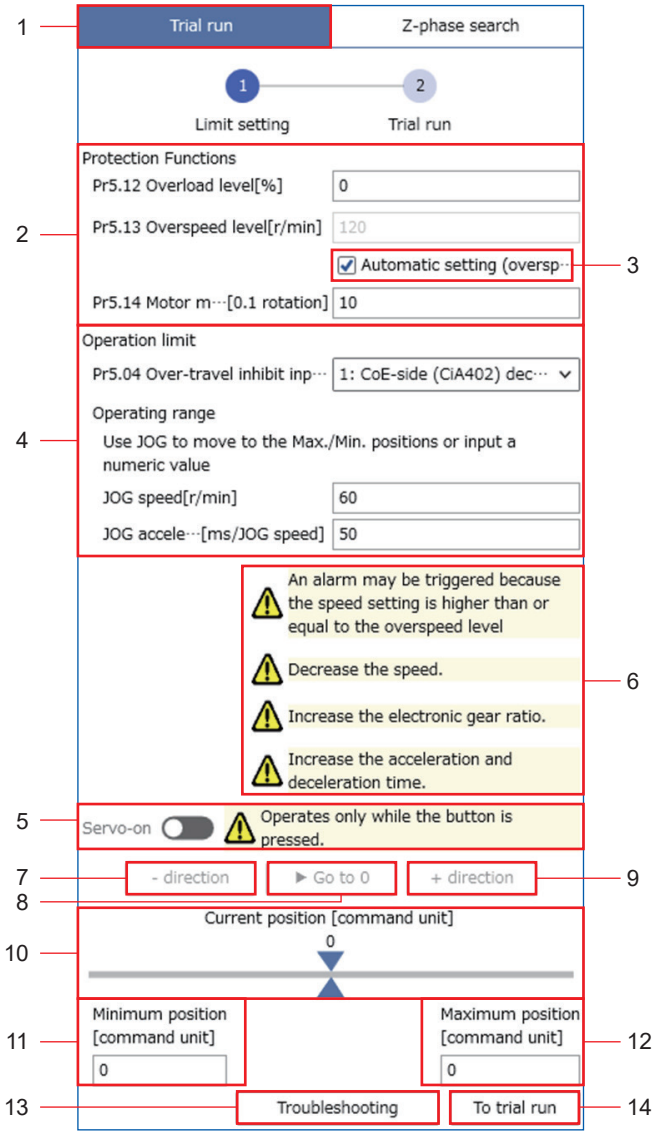
Change the parameters as instructed in the message.

Primary cause	Limit	Message
The specified speed exceeds the maximum motor speed (r/min), etc.	Operate with speed limited to the maximum motor speed	Decrease the speed.
When the specified speed is converted to command units/s, the command unit/s exceeds 32 bits	Operate with speed (command unit/s) limited to 32 bits	Increase the electronic gear ratio.
When the specified acceleration time is converted to acceleration (command units/s^2), the acceleration exceeds 32 bits	Operate with acceleration (command unit/s^2) limited to 32 bits	Increase the acceleration and deceleration time.
When the deceleration time is converted to deceleration (command units/s^2), the deceleration exceeds 32 bits	Operate with deceleration (command unit/s^2) limited to 32 bits	Increase the acceleration and deceleration time.

13.2 Limit Setting

Use limit setting to set parameters related to protection functions and operation limits, and to set the operating range during JOG/STEP operations.

13.2.1 Configuration of the Limit Settings Screen



No.	Name	Description	Reference
1	Trial Run tab	Displays the trial run function. The limit settings are displayed first.	—
2	Protection functions	Sets parameters related to protection functions.	(*1)
3	Automatic setting (over-speed)	Check the box to change the overspeed level to twice the JOG speed.	—
4	Operation limits	Sets parameters related to operation limits. When the over-travel inhibit input setup is changed, it is written to the driver.	(*1)
5	Servo-on	Toggle the driver between servo-on/servo-off. Servo-off can also be perform by pressing the ESC key. If Set-up Support Software (PANATERM ver.7) is inactive while operating another application such as Excel, servo-off cannot be performed by pressing the ESC key.	—

No.	Name	Description	Reference
6	Command saturation/ Overspeed warning display	A message is displayed when the driver command value exceeds the operating limit or the speed setting is above the overspeed level.	*"13.1.2"*
7	Negative direction	The motor rotates as long as the button is pressed. (The direction of rotation depends on the parameter Pr0.00 "Rotational direction setup" and the object Obj.607Eh:00h "Polarity" .) Enabled only during servo-on.	—
8	To position 0	Operation steps are executed to the current position "0". Enabled only during servo-on and when the motor is not in the 0 position. The current position of the motor is the command unit value set to 0 in the servo-on state.	—
9	Positive direction	The motor rotates as long as the button is pressed. (The direction of rotation depends on the parameter Pr0.00 "Rotational direction setup" and the object Obj.607Eh:00h "Polarity" .) Enabled only during servo-on.	—
10	Current position/Minimum position/Maximum position slider	Indicates the current position of the motor and the minimum and maximum positions of the motor operating range. Move the "Min. Position" and "Max. Position" sliders (▲) left and right to set the minimum and maximum positions. The current position of the motor is the command unit value set to 0 in the servo-on state.	—
11	Minimum position	Input a numerical value to set the minimum position of the motor operating range.	—
12	Maximum position	Input a numerical value to set the maximum position of the motor operating range.	—
13	Troubleshooting	Displays Troubleshooting.	*"7.10"*
14	To trial run	Displays the screen for executing the trial run.	—

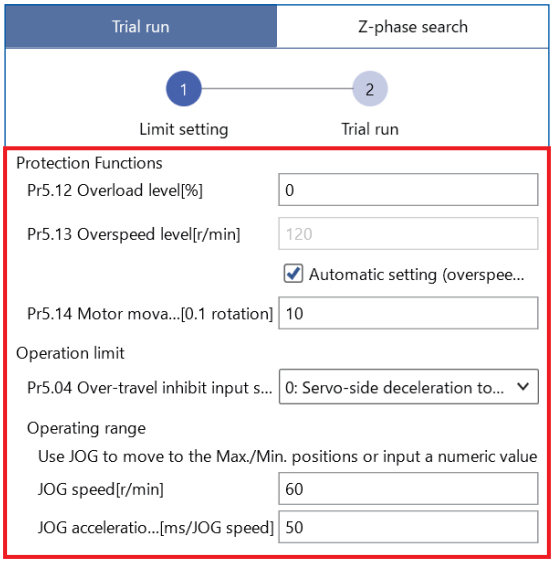
*1 Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model.

- A7:Operating Instructions (Tuning)
- A6:Technical Reference Functional Specification

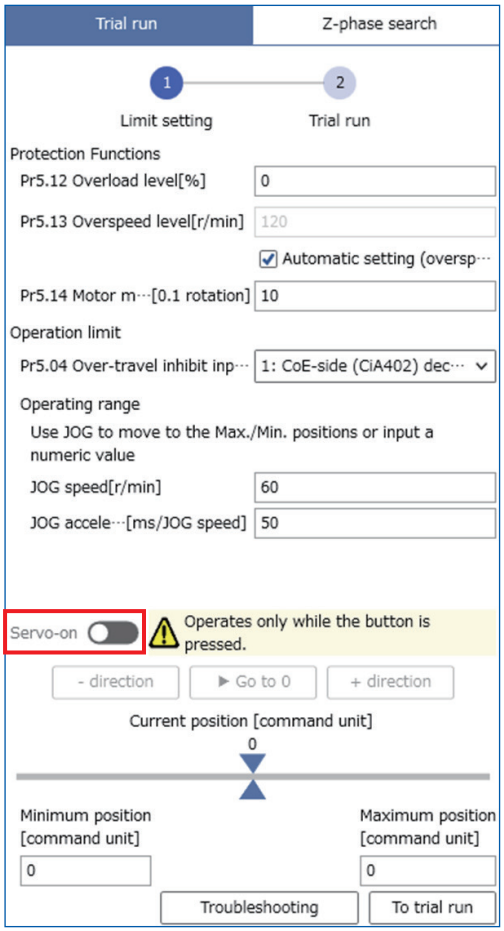
13.2.2 Configuring Limit Settings

<< Procedure >>

1. Sets "Protection functions" and "Operation limits".

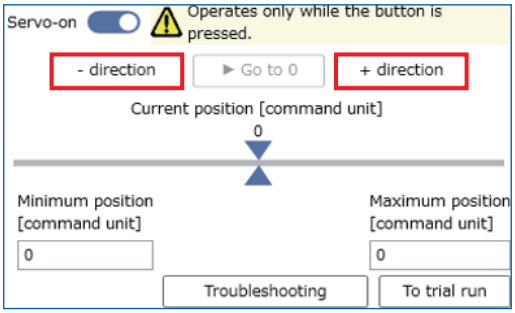


2. Click [Servo-on] in the limit setting screen for “Trial run” and put the driver in the servo-on state.

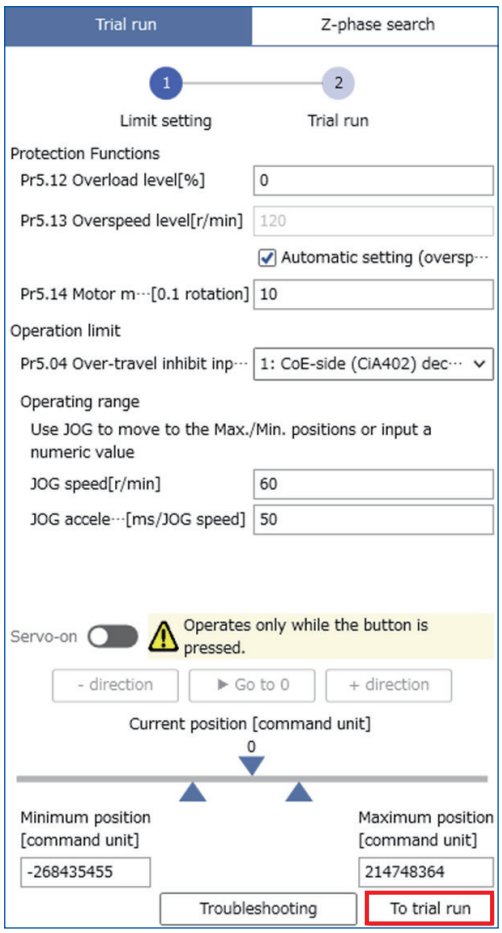


If a warning or error is triggered at this stage, eliminate the cause then clear the alarm and repeat “Step 1” again.

3. While checking the operation of the actual device, set the “Minimum position” and “Maximum position” of the motor operating range by moving the motor with the [- direction] and [+ direction] buttons.



4. When the motor operating range settings are complete, click the [To trial run] button to transition to the trial run screen.



— Precautions —

- If the [To trial run] button is clicked without changing the maximum and minimum positions, an operation that exceeds the actual scale is possible because the operating range is not limited. Be sure to set the maximum and minimum positions to avoid the risk of accidents.

13.3 Trial run

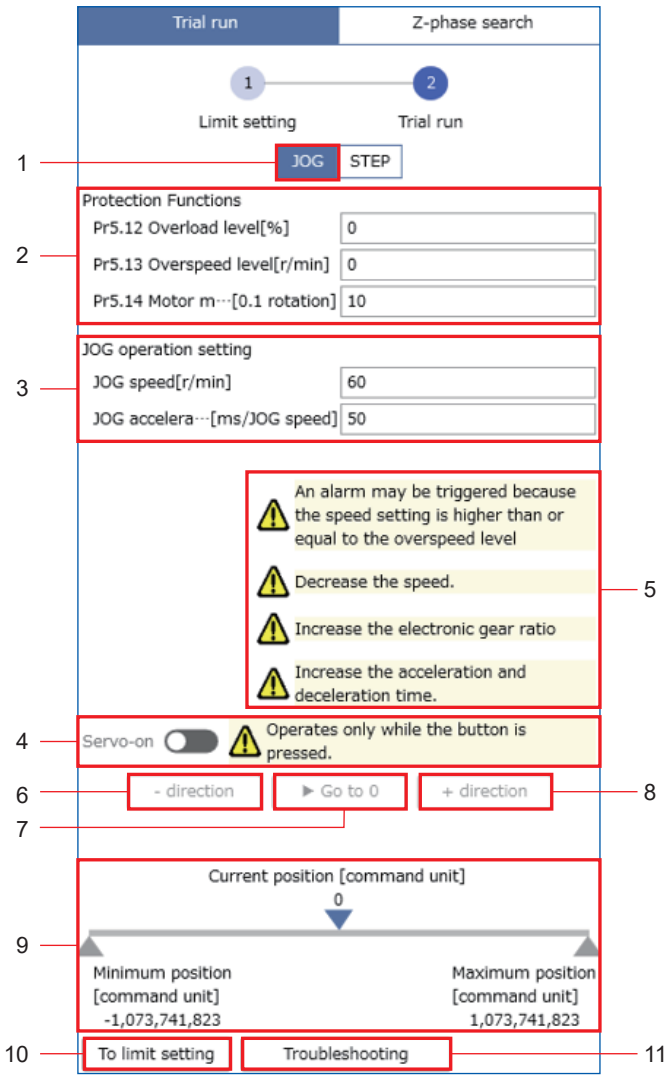
JOG and STEP operations are possible with trial run.

13.3.1 JOG

In JOG operation, the motor can be rotated in the positive (+ direction) or negative (- direction) direction at the touch of a button.

— Precautions —

- Perform this operation when the power can be shut off immediately in case of unexpected operation of the motor or other hazards.



No.	Name	Description	Reference
1	JOG	Switches to JOG operation.	—
2	Protection functions	Sets parameters related to protection functions.	(*1)
3	JOG operation setting	Sets the speed and acceleration and deceleration time for JOG operation.	—
4	Servo-on	Toggle the driver between servo-on/servo-off. Servo-off can also be perform by pressing the ESC key. If Set-up Support Software (PANATERM ver.7) is inactive while operating another application such as Excel, servo-off cannot be performed by pressing the ESC key.	—

No.	Name	Description	Reference
5	Command saturation/ Overspeed warning display	This message appears when the driver command value exceeds the operating limit or the speed setting is above the overspeed level.	*"13.1.2"*
6	Negative direction	The motor rotates as long as the button is pressed (the direction of rotation depends on the parameter Pr0.00 "Rotational direction setup" and the object Obj.607Eh:00h "Polarity") Enabled only during servo-on.	—
7	To position 0	Operation steps are executed to the current position "0". Enabled only during servo-on and when the motor is not in the 0 position. The current position of the motor is the command unit value set to 0 in the servo-on state.	—
8	Positive direction	The motor rotates as long as the button is pressed (the direction of rotation depends on the parameter Pr0.00 "Rotational direction setup" and the object Obj.607Eh:00h "Polarity") Enabled only during servo-on.	—
9	Current position/Minimum position/Maximum position slider	Indicates the current position of the motor and the minimum and maximum positions of the motor operating range.	—
10	To limit setting	Displays the "Limit setting" screen for the trial run.	—
11	Troubleshooting	Displays Troubleshooting.	*"7.10"*

*1 Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model.

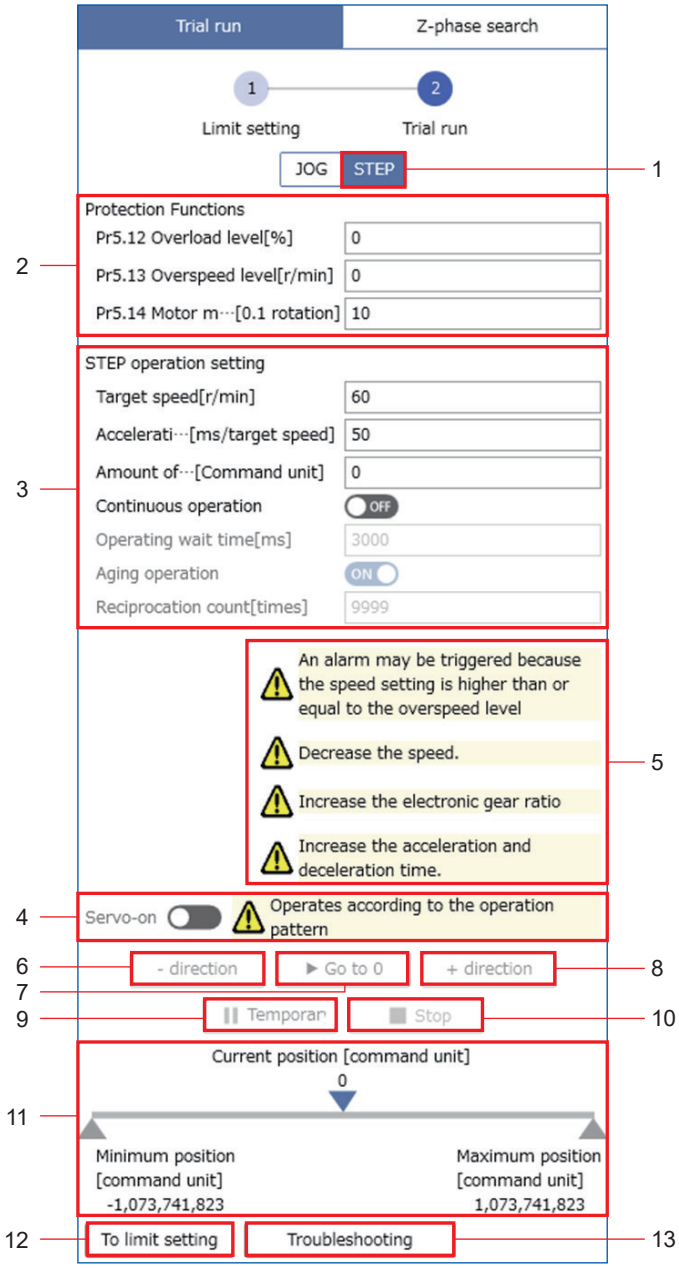
- A7:Operating Instructions (Tuning)
- A6:Technical Reference Functional Specification

13.3.2 STEP

In STEP operation, the amount of movement and operation pattern can be set, and the motor can be operated according to the setting.

— Precautions —

- Perform this operation when the power can be shut off immediately in case of unexpected operation of the motor or other hazards.



No.	Name	Description	Reference
1	STEP	Switches to STEP operation.	—
2	Protection functions	Sets parameters related to protection functions.	(*1)
3	STEP operation setting	Set the target speed, acceleration and deceleration time, amount of movement, operation pattern, etc. for during STEP operation. For details on operation patterns, see *"Operation Patterns"* . **Notes** ● The operating wait time may be longer than the set time depending on the load conditions of the computer or driver.	—
4	Servo-on	Toggle the driver between servo-on/servo-off. Servo-off can also be perform by pressing the ESC key. If the servo is turned off during STEP operation, the operation stops immediately without deceleration time. **Notes** ● If Set-up Support Software (PANATERM ver.7) is inactive while operating another application such as Excel, servo-off cannot be performed by pressing the ESC key.	—

No.	Name	Description	Reference
5	Command saturation/ Overspeed warning display	A message is displayed when the driver command value exceeds the operating limit or the speed setting is above the overspeed level.	*"13.1.2"*
6	Negative direction	The motor rotates by the amount set in [Amount of movement [command unit]] (the direction of rotation depends on the parameter Pr0.00 "Rotational direction setup" and the object Obj.607Eh:00h "Polarity") Enabled only during servo-on.	—
7	To position 0	Operation steps are executed to the current position "0". Enabled only during servo-on and when the motor is not in the 0 position. The current position of the motor is the command unit value set to 0 in the servo-on state.	—
8	Positive direction	The motor rotates by the amount set in [Amount of movement [command unit]] (the direction of rotation depends on the parameter Pr0.00 "Rotational direction setup" and the object Obj.607Eh:00h "Polarity") Enabled only during servo-on.	—
9	Temporary stop/Resume	The motor is decelerated to a stop according to the acceleration and deceleration time, and the STEP operation is stopped temporarily. Click the [Resume] button after a temporary stop to resume the STEP operation from the position at which it stopped.	—
10	Operation end	Ends the STEP operation after the motor decelerates and stops according to the acceleration and deceleration time.	—
11	Current position/Minimum position/Maximum position slider	Indicates the current position of the motor and the minimum and maximum positions of the motor operating range.	—
12	To limit setting	Displays the "Limit setting" screen for the trial run.	—
13	Troubleshooting	Displays Troubleshooting.	*"7.10"*

*1 Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model.

- A7:Operating Instructions (Tuning)
- A6:Technical Reference Functional Specification

■ Operation Patterns

The movement of the servo motor when the [+ direction] or [- direction] buttons are clicked depends on the "Operation pattern" setting.

Operation patterns include one-way operation in a positive direction or negative direction, and reciprocating operation from a positive direction to a negative direction and from a negative direction to a positive direction.

The operation pattern can be switched from one-way operation to reciprocating operation using the [Continuous operation] button in "STEP operation settings".

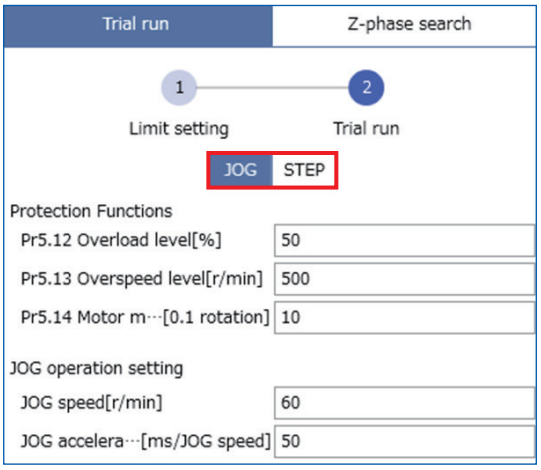
Operation	Operation pattern	Continuous operation	Description
One-way operation	Positive direction or Negative direction	OFF	The motor rotates by the amount set in "Amount of movement [command unit]". (The direction of rotation depends on the parameter Pr0.00 "Rotational direction setup" and the object Obj.607Eh:00h "Polarity" .) When the position set by "Amount of movement [command unit]" is reached, the movement stops.

Operation	Operation pattern	Continuous operation	Description
Reciprocating operation	+ direction to - direction or -direction to +direction	ON	After the motor is rotated by the amount set in “Amount of movement [Command unit]”, it is rotated in the opposite direction by the amount set in “Amount of movement [cCommand unit]”. (The direction of rotation depends on the parameter Pr0.00 “Rotational direction setup” and the object Obj.607Eh:00h “Polarity” .) When “Aging operation” is ON, the reciprocating operation is repeated until the [Operation end] button or the [Temporary stop] button is clicked. When “Aging operation” is OFF, the reciprocating operation is repeated for the number of times set in “Reciprocation count [times]”.

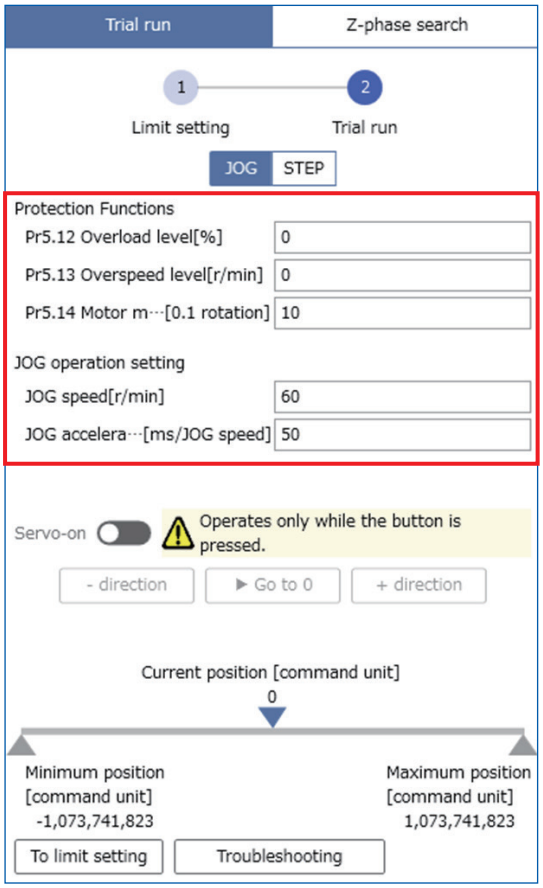
13.3.3 Performing a Trial Run

<< Procedure >>

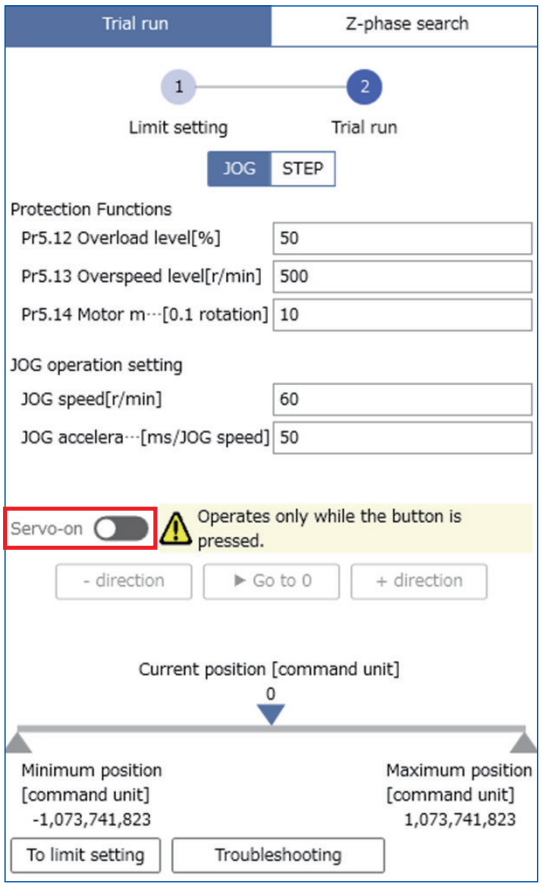
1. Select whether to perform JOG or STEP operation.



2. Set the “Protection functions” and “Operation settings”.

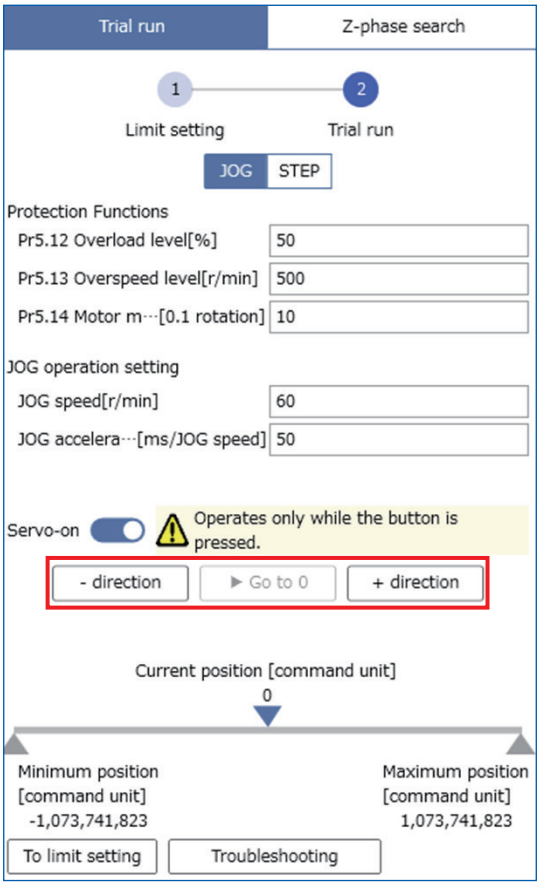


3. Click [Servo-on].

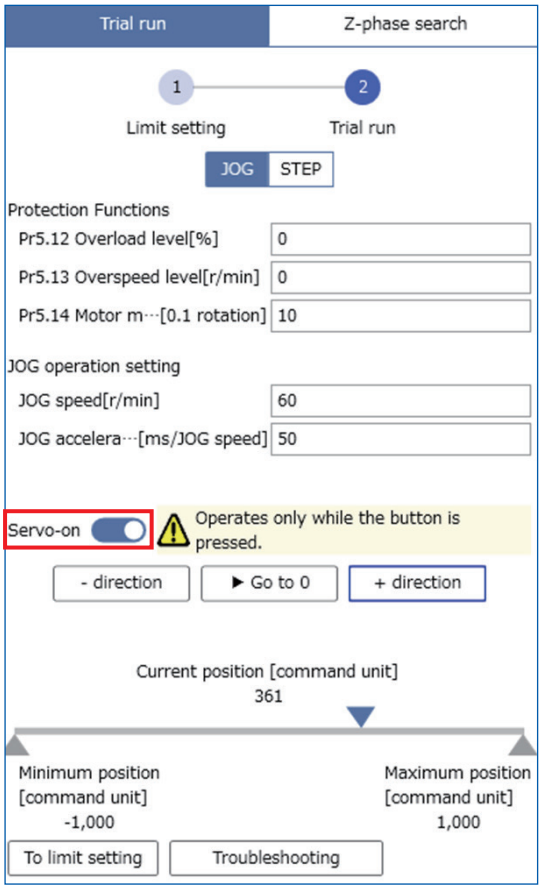


4. A dialog box appears. If you are satisfied with the contents, click the [Yes] button.

5. Perform the trial run operation using each button.



6. Click “Servo-on” to end the trial run operation. (Go back to *“13.2 Limit Setting”*)



13.4 Z-phase Search

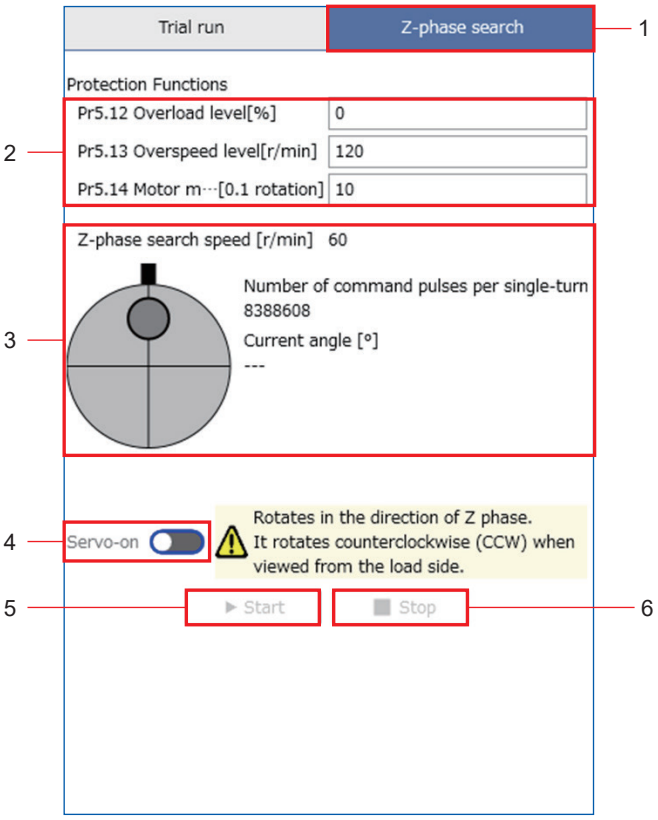
13.4.1 Z-phase Search

Z-phase search allows the motor to rotate to the position where the Z-phase output turns on.

The motor rotates toward Z-phase at a speed of 60 [r/min] in a CCW direction when viewed from the load side.

— Precautions —

- Perform this operation when the power can be shut off immediately in case of unexpected operation of the motor or other hazards.



No.	Name	Description	Reference
1	Z-phase Search	Displays the Z-phase search function.	—
2	Protection functions	Sets parameters related to protection functions. Each time settings are changed, they are written to the driver.	(*1)
3	Z-phase search speed	Displays the Z-phase search speed, motor image, number of command pulses per single-turn, and the current angle.	—
4	Servo-on	Toggle the driver between servo-on/servo-off.	—
5	Start	Starts a Z-phase search.	—
6	Stop	Stops a Z-phase search.	—

*1 Refer to the relevant documentation (see *"1.3 Related Documents"*) for your model.

- A7:Operating Instructions (Tuning)
- A6:Technical Reference Functional Specification

— Precautions —

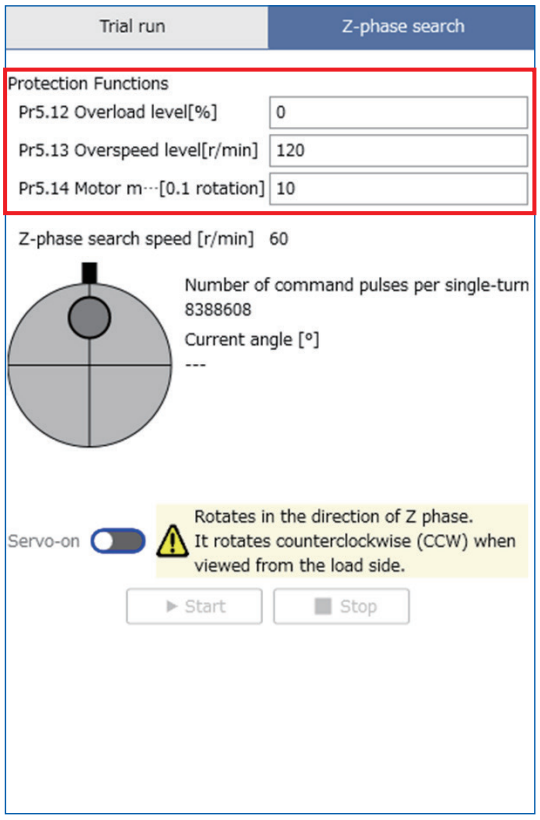
- If the motor and load are connected in a servo-on state after Z-phase search, any sudden change in inertia ratio may cause oscillation, which is extremely dangerous. Be sure to turn off the servo, and if

possible, disconnect the main power supply or disconnect the motor wiring to ensure that the motor cannot move by itself during installation.

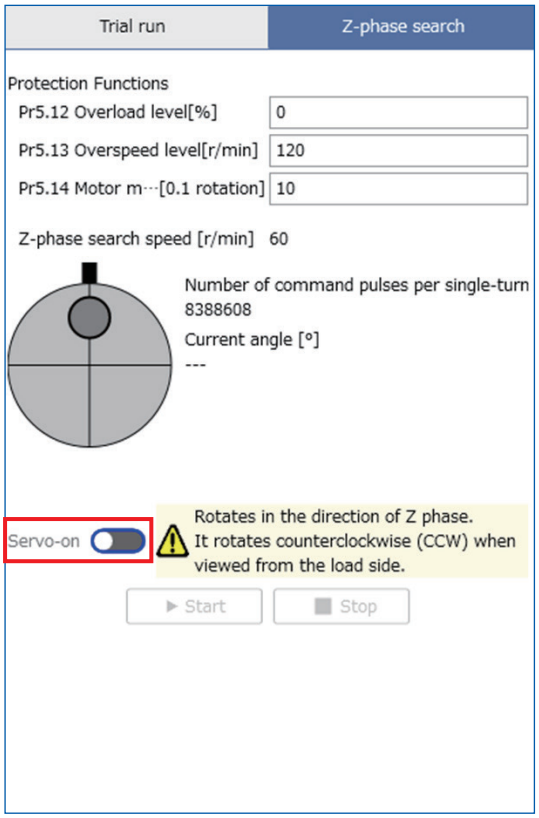
13.4.2 Executing a Z-phase Search

<< Procedure >>

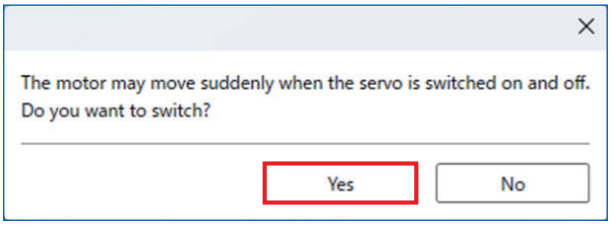
1. Set the protection functions.



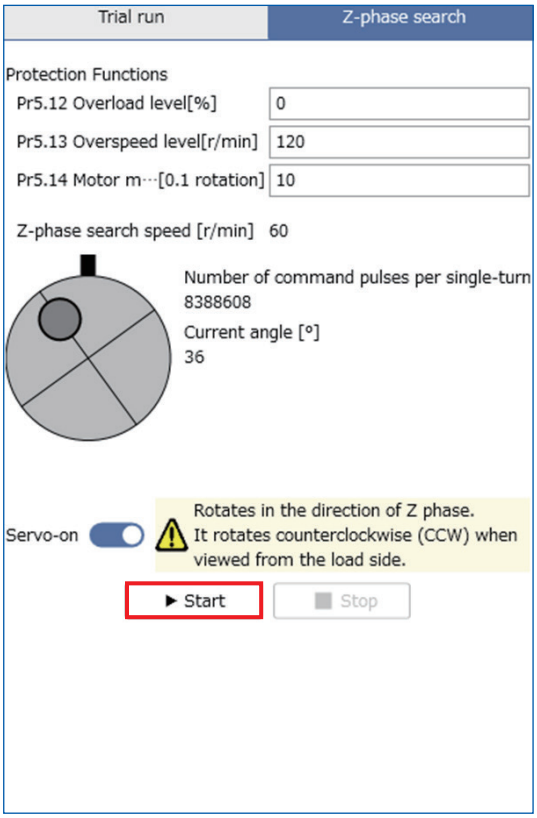
2. Click [Servo-on].



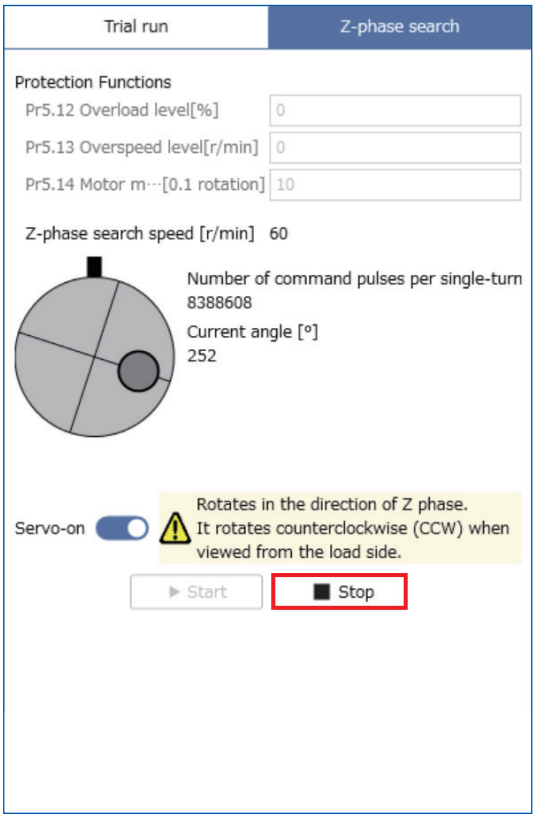
3. A dialog box appears as shown below. If you are satisfied with the contents, click the [Yes] button.



4. Click the [Start] button.



5. Z-phase search is executed and automatically stops when Z-phase is detected. To stop the search, click the [Stop] button.



14 Troubleshooting

14.1 Setup Not Possible

■ Setup is aborted

Solution	See *"2.1 Minimum System Requirements"* and make sure that the computer on which you are installing the software meets the requirements.

■ Downloading fails

Solution	The installer may be corrupted. Clear your browser's cache and download again.

14.2 Set-up Support Software (PANATERM ver.7) Is Not Working Properly

■ The window protrudes from the screen and is difficult to see

Solution	Set the screen size to 1920×1080 or more.

■ Set-up Support Software (PANATERM ver.7) response is slow and sluggish

Solution	End functions that frequently communicate with the driver, such as the monitor function. If USB devices other than drivers are connected, take measures such as temporarily stopping their operation to reduce the load on USB communication.

■ Cannot open windows, and icons and other displayed items change randomly

Cause	Insufficient computer memory.
Solution	End Set-up Support Software (PANATERM ver.7) , close any unused applications, and start Set-up Support Software (PANATERM ver.7) again. Alternatively, restart the computer and start Set-up Support Software (PANATERM ver.7) again.

■ Set-up Support Software (PANATERM ver.7) Is no longer responding

Solution	Press CTRL+ALT+DEL to select Task Manager and end Set-up Support Software (PANATERM ver.7) .

■ After starting Set-up Support Software (PANATERM ver.7) , the driver is not displayed on the Connect with Driver screen

Solution	Check that control power to the driver is turned on. Check that USB communication cable connections are not loose, that cables are not disconnected, and that the correct cables are being used. Check that the computer's USB port is functioning normally. (Check the operating instructions for the computer used.)

14.3 Main Screen Is Not Working Properly

■ Cannot collapse the trial run screen

Cause	If the currently selected driver is in the servo-on state, the trial run screen cannot be collapsed.
Solution	Switch the currently selected driver to servo-off state.

14.4 Device Tree Is Not Working Properly

■ Unable to connect with driver

Cause	If the computer and driver are not connected or the driver is not turned on, the driver is not displayed in the "Adding driver" and "Selection of Ddivers" dialog boxes.
Solution	Check the computer and driver connections. Check that power to the driver is turned on.

Cause	Of the drivers connected to the computer, drivers with different product numbers than the driver selected in the device tree are not displayed in the “Select driver” dialog box.
Solution	Add a driver offline with the same product number as the driver connected to the computer. Click the [Connect] button and check that the driver is connected to the computer.

■ Nickname settings are not applied to the driver

Cause	If the computer and driver are not connected, only the nicknames on Set-up Support Software (PANATERM ver.7) are updated.
Solution	If you want to set a nickname in the driver, set the nickname again with the driver connected.

■ Cannot execute battery refresh

Cause	Battery refresh can only be executed in combination with a supported control mode and encoder. (Example: position control and 23-bit ABS encoder)
Solution	Check the control mode and encoder combination.

■ Cannot select multiple drivers

Cause	Multiple drivers cannot be selected.
Solution	Select one of each driver.

■ Cannot select a different driver to be added to the device tree

Cause	If the currently selected driver is in the servo-on state due to the trial run function, a different driver cannot be selected in the device tree.
Solution	Switch the currently selected driver to servo-off state and select a driver.

■ Cannot delete driver

Cause	If the currently selected driver is in the servo-on state due to the trial run function, the driver cannot be deleted.
Solution	Switch the currently selected driver to servo-off state. Then delete the driver.

14.5 Alarm Notification Screen Is Not Working Properly

■ Cannot stop the alarm

Solution	After eliminating the cause of the alarm, clear the alarm. Some alarms cannot be cleared by operation from Set-up Support Software (PANATERM ver.7) . In this case, turn off the driver, remove the cause, and then turn the driver on again. When the driver external alarm clear input signal is on, the alarm cannot be cleared with the [Clear alarm] button on Set-up Support Software (PANATERM ver.7) . To clear the alarm from Set-up Support Software (PANATERM ver.7) , turn off the driver external alarm clear input signal beforehand. The external alarm clear input signal is a function of models that support EtherCAT communication. Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model. ● A7B: Operating Instructions (Overall) ● A6B: Technical Reference Functional Specification

■ Past error history is not displayed

Cause	If an error has never occurred in the past or if the error history has been cleared, the error history is not displayed. If an error occurred for which no error history is kept, the error is not displayed in the error history.

■ Alarm error trigger time is not displayed

Cause	The alarm error trigger time is not recorded after power to the driver is turned on if it is not connected to either Set-up Support Software (PANATERM ver.7) or the host device, and it is not displayed on the alarm notification screen.
Solution	If you wish to record the error trigger time, turn on the power to the driver and keep it connected to either Set-up Support Software (PANATERM ver.7) or the host device.

14.6 Settings Screen Is Not Working Properly

■ Cannot open EtherCAT object tab

Cause	“ The EtherCAT object” tab is displayed on the settings screen when a “EtherCAT communication type” driver is selected in the device tree.
Solution	Select a driver of “EtherCAT communication type” in the device tree.

■ The driver or motor does not operate according to the parameter values sent

Cause	It is possible that when the parameter values were written they were written only to EEPROM.
Solution	Send the parameters to the driver. Alternatively, turn the power on again.

Cause	You may have sent parameters that are not enabled until the Config command is executed or power is restored, but you have not performed these operations.
Solution	If the parameter sent is an attribute C parameter, execute the Config command. If the parameter sent is an attribute R parameter, If the transmitted parameter is of the "R" attribute, turn the power to the driver on again. For details, see *“8.7 Writing Parameters”* .

14.7 Monitor Is Not Working Properly

■ Graphs and values on monitor do not change

Cause	The [Stop] button may have been clicked.
Solution	If the status display in the upper left corner indicates that the program is paused, click on the [Start] button.

■ In input and output signals, the waveform changes even though the High/Low counts remain the same

Cause	If the processing speed of the computer is slow, High data may be plotted as Low data because the results of communication with the driver are not plotted in time.
Solution	Increase the communication interval (cycle) with the driver.

14.8 Waveform Measurement Is Not Working Properly

■ Graphs are not displayed or updated

Cause	Trigger conditions may not be met. If the “Trigger condition” is “1 and 2”, the graph id displayed only when the trigger 1 and trigger 2 conditions are met simultaneously.
Solution	Check the trigger conditions again. Set the “Trigger condition” to “No trigger” and click the [Start measurement] button. (However, some measurement conditions are cleared when measurements are executed with “No trigger”.) Use the presets from [Load condition presets] to perform measurement. If digital data is selected in the trigger “Target”, set the trigger “Slope” to “Match” or “Mismatch”.

Cause	The graph display data may not have been selected.

Solution	Use “Add/delete data” to add data to the graph display data. In the “Edit displayed data” tab, make sure that “Display” is checked for the measurement data you wish to display.

Cause	It is possible that the “Measurement target” is not set in “Multiple axis measurement settings”.
Solution	Check the “Measurement target” box for the drivers you wish to perform measurements for.

■ Trigger position is misaligned

Cause	With network types, if a network is established while waiting for a waveform measurement trigger, the detected trigger position may shift.
Solution	Do not allow the network to be established while waiting for waveform measurement trigger.

■ The driver or motor does not operate according to the parameter values set

Solution	See *“The driver or motor does not operate according to the parameter values sent”* .

■ The Measurement Conditions tab is not displayed

Cause	The “Measurement conditions” tab is not displayed when the “Graph” tab is selected.
Solution	Operate with the driver “Axis” tab selected.

■ No specific general-purpose IO Settings are displayed in the measurement conditions

Cause	The general-purpose IO Settings displayed in the measurement conditions are the parameters set in “IO Settings” in the “Settings” tab.
Solution	Change the settings to the parameters you wish to display and write the parameters to the driver using “Write”. To enable some parameters, it is necessary to execute the Config command or reconnect the power supply. Execute the Config command or reconnect the power.

■ Certain measurement data is not deleted even after clicking the [Delete all] button in measurement data management

Cause	The “Data protection” check box for the measurement data may be checked.
Solution	Uncheck the measurement data you wish to delete, and then delete it again. **— Precautions —** ● The measurement data in “Latest measurement results” is not deleted even if“Data protection” is not checked.

14.9 Frequency Response Is Not Working Properly

■ Frequency response cannot be measured or measurement results are skewed

Cause	The motor may not be operating under normal operating conditions.
Solution	Check the torque limit, over-travel inhibit function, etc.

Cause	The measurement conditions may not be suitable.
Solution	Measurement results vary significantly depending on the measurement conditions. ● When measuring the speed closed loop characteristics, pay attention to the operating range and try measuring under conditions where the motor does not stop with the amplitude equal to the offset absolute value. ● Starting with a low value, measure the amplitude settings at the largest possible setting within a range where torque saturation does not occur and that does not adversely affect the device.

Cause	Non-linear characteristics such as backlash or dead zones may exist in the device.
Solution	The resonance frequency may change depending on the amplitude setting or offset setting and may not be correct. Review the settings again.

14.10 Tuning Is Not Working Properly

■ The servo cannot be turned off with the “ESC” key in “One Minute TUNING” and “precAlse TUNING”

Cause	The servo does not turn off by pressing the “ESC” key from the application in “One Minute TUNING” and “precAlse TUNING” because the trial run function is operated at the driver side.
Solution	Click “Servo-on”to turn the servo off. Refer to the relevant documentation (see *“1.3 Related Documents”*) for your model for more details. ● A7: Operating Instructions (Tuning)

14.11 Trial Run Is Not Working Properly

■ Cannot operate the trial run screen

Cause	The screen can only be operated when in communication with the driver.
Solution	Check the communication status between the driver selected in the device tree and the computer.

Cause	It is sometimes not possible to operate the screen if the driver is not in ready state (alarm is triggered or main power is off), or if it is being used for other processes (during network establishment for example), or if an external servo-on input is input.
Solution	After eliminating the primary cause, run it again.

■ Error occurs as soon as the motor is operated

Solution	Perform tuning. Change the operation command.

Cause	The speed setting may have exceeded the maximum motor speed.
Solution	Set the speed to the maximum motor speed or less.

■ Motor suddenly stops operating

Cause	In JOG operation, the motor operates only while the button is pressed.
Solution	In JOG operation, keep the button pressed for as long as you want the motor to run.

Cause	The amount of movement with the STEP operation may be small.
Solution	Since the amount of movement with STEP operation is set in command units, the amount of motor rotation varies depending on the electronic gear ratio. Review the settings.

Cause	The operating range may be limited.
Solution	Return to the limit setting screen to set the operating range again, or if no operation limits are required, set the minimum and maximum positions to be the same and transition to the trial run screen.

Cause	The operating range must be between -1,073,741,823 and 1,073,741,823.
Solution	Check the operating range set and set values within the range.

■ Motor does not operate at the set speed

Cause	Acceleration [command unit/s^2] is limited to between 10,000 and 327,670,000.

Solution	Refer to the following formula to set a value within the range. ● For position control • Acceleration [command unit/s^2] = speed [r/min] / 60 × encoder resolution/electronic gear ratio / acceleration and deceleration time [s] ● For velocity control or torque control • For velocity control and torque control, operate the motor the same as for position control. The formula for acceleration is the same as for position control. ● For full-closed control • Acceleration [command unit/s^2] = speed [r/min] / 60 × encoder resolution/ external scale dividing ratio / electronic gear ratio / acceleration and deceleration time [s] ● For linear motors • Acceleration [command unit/s^2] = speed [mm/s] / scale resolution [nm] × 10^6 / electronic gear ratio / acceleration and deceleration time [s]

14.12 What to Do in the Event of a Malfunction

If you suspect that the driver is malfunctioning, check “Repairs, Inquiries and Technical Information”.

REVISIONS

Date	Rev.	Page	Description
Oct. 25, 2024	0.0	—	NEWLY ISSUED
Dec. 20, 2024	0.1	1.7 1.7, 2.3	Software version upgrade 7.0.0.0 → 7.0.1.1 Supported the precAIseTUNING function
Feb. 5, 2025	0.2	1.7 11.3	Software version upgrade 7.0.1.1 → 7.0.2.0 Added a note about precAIseTUNING
Apr. 4, 2025	0.3	1.7 — 10.1.3.2	Software version upgrade 7.0.2.0 → 7.0.3.0 Changed UI Added procedure for measuring waveforms while offline

Repairs, Inquiries and Technical Information

Repairs

Contact your dealer regarding repairs.

If installed in a machine or device, consult with the machine or device manufacturer first.

Contact us

If you have any questions, please contact the seller of the product (Sales office or Distributor).

Technical information

- **Operating instructions, technical reference, CAD data downloads, and Web-based inquiries are available online.**

"industry.panasonic.com/global/en/"

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