INSTRUCTION MANUAL

ABSODEX

AX Tools for Windows®
Common for TS-Type, TH-Type, MU-Type and S-Type Drivers

- Be sure to read this instruction manual thoroughly before using the software.
- For directions and precautions in using the product, refer to the instruction manual accompanying the product.
- If this software is used for drivers other than TS, TH, MU or S type, certain functions are restricted.
- Among all, carefully read the descriptions related to safety.
- Keep this instruction manual in a safe place so that you can read it at any time when necessary.

Ver. 3
CKD Corporation
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1-1 Introduction

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1-2 Operating environment

Windows® 7, Windows® Vista, Windows® XP SP3
If your PC does not support Japanese fonts, characters may appear garbled.
* Simultaneous operation with other communications software is prohibited.

1-3 Precautions for use

1. To communicate with ABSODEX, use the special RS-232C cable (marketed).
   To prepare the RS-232C cable by yourself, refer to the instruction manual of the each driver "Example of RS-232C Interface Cable Connection Diagram."
2. Do not connect or disconnect the connector of the RS-232C cable or turn ABSODEX on or off during communication with ABSODEX. Otherwise ABSODEX or AxTools may malfunction.
   Close all dialog boxes or finish communication before connecting or disconnecting the connector or turning on or off the power.
3. When the communication port is closed in the communication error and so on, click and make [Opening communication port] of the [File] menu the condition about which is possible to communicate with ABSODEX.
4. This AxTools is for use with the TS, TH, MU and S type ABSODEX drivers.
   Some functions are restricted for discontinued models (GS, GH, H, C type and older types of drivers).
5. Simultaneous operation of another communication software over the RS-232C cable is not supported.
   When using this software, terminate other communication software.
Section 2  Operation procedure

2-1  New
When you launch AxTools or select [New] in the function's File menu, the function selection screen appears. Select the desired function or driver type. The selectable driver types are [TS type], [TH type], [MU type] and [Other type]. To use [S type] driver, select [Other type]. For the operation after selecting the function, refer to the instruction manual provided for the relevant function.

2-2  Basic function
Description about the common part among functions of AX Tools is given below.

2-2-1  File
The file menu includes [New], [Open] and [Save]. The communications port can be selected among COM ports 1 to 6. Use [Reset Communications Port] to ready the system for communications with the ABSODEX.

2-2-2  Operation command
This is the same function as [Operation command] in Teaching Note. Refer to the instruction manual for Teaching Note.

2-2-3  Terminal
This is the same function as [Terminal] in Teaching Note. Refer to the instruction manual for Teaching Note.
2-2-4 Options

Select the language used in AxTools.

Select the language to be used from the [LANGUAGE] list. Clicking [OK] sets the language selected in the [LANGUAGE] list. The selected language is enabled after you restart AxTools. Click [CANCEL] to cancel the language change.

2-2-5 Window

This is a standard function of Windows®.
Teaching Note

Section 1 Introduction

1-1 Introduction
This software serves as a guide to set up the programs and parameters.
We do not guarantee the contents, accuracy and safety of the information provided with this software, or marketability or applicability of the information for special purposes.
CKD Corporation shall be exempt from any losses caused by this software.
This software is subject to change without prior notice.

1-2 Operating environment
If your PC does not support Japanese font display, garbage characters may be displayed.
* Simultaneous operation with another piece of communications software is prohibited.
Section 2 Operation procedure

2-1 File

Select [File] from the main menu. Following item is displayed.

![File menu screenshot](image)

The contents with each items of file are as follows.

2-1-1 Making a new file [New]

Make a new file.
2-1-2 Opening file [Open]

Open the saved file.
Only files with the ".axw" extension can be opened.
When the save of the file to be editing isn't done, follow the indication as the DIALOG to confirm is displayed.

When selecting [Yes], the DIALOG which saves the file is displayed.

After saving, or when selecting [No], following DIALOG is displayed.

Select file and click [Open].
2-1-3 Saving editorial data to file [Save]

[Save]
Save file to be editing in address.

[Save As]
Put name to file to be editing and save it. Extension becomes ".axw".

Following DIALOG is displayed.

![Save As dialog]

Input file name and click [Save].

2-1-4 Printing editorial data [Print]

Prints such as NC programs, equal segment programs, table programs and value of parameters.

2-1-5 Opening communication port [Reset COM port]

To make communication with ABSODEX possible, and open communication port.

When the communication port isn't open or is closed, it isn’t possible to communicate with ABSODEX.

2-1-6 Ending AxTools [Exit]

End AxTools.

When save of file to be editing isn't done, follow the indication as the DIALOG which prompts for the save is displayed.
When selecting [Yes], end after save to file.
When selecting [No], end without saving to file.

2-1-7 Displaying the driver type

The current driver type is displayed in the status bar.
When the driver communicates with ABSODEX, the status bar shows the ABSODEX driver type with which a connection has been established.
Prior to communication, the status bar shows the driver type when a new file was created or when the file was saved.

The driver type displayed in the editing workspace indicates the driver type for which parameters are being edited.
※If you connect to ABSODEX with [Import parameter] or [Store parameter], or if you use [Change driver type], the driver type displayed in editing workspace changes.
2-2 Edit

Select [Edit] from main menu. Following items are displayed.

The contents with each items of edit are as follows.
Also, "editorial work" in the following sentences shows editorial area inside the personal computer.

※Before the program editing
When editing the program or the parameter, except for the case to make data newly, all the data is read from the editorial origin (ABSODEX or file) to editorial work.
After editing, store it to ABSODEX or save to file.
(The data of editorial work is completely erased when reading again or ending the system.)
The newly or changed data in editorial work can not be executed when not storing it into ABSODEX.

※When the data exists already in editorial work
Follow the indication as the DIALOG to confirm is displayed.
2-2-1 Clearing editorial data [Editorial data clearance]
Deletes data in editorial work.
Select from the following two items.
[Program and Parameter]
It deletes program and parameter data in editorial work.
[Only Program]
It deletes only program data in editorial work. The data of the parameter isn't deleted.

※When the data exists already in editorial work.
Follow the indication as the DIALOG to confirm is displayed.

2-2-2 Reading data from ABSODEX [Reading(ABSODEX)]
Read the data into the editorial work from ABSODEX.
Select from the following two items.
[Program and Parameter]
Read the all programs and the value of parameters into editorial work from ABSODEX.
[Only Program]
Read only all programs from ABSODEX. The value of parameters aren't read.

※When the data exists already in editorial work.
Follow the indication as the DIALOG to confirm is displayed.
2-2-3 Storing editorial data into ABSODEX [Storage (ABSODEX)]

Store editorial data into ABSODEX.
Select from the following two items.
[Program and Parameter]
Store programs and value of parameters into ABSODEX.
[Only Program]
Store program only into ABSODEX. The value of parameters aren't stored.

1. Before parameters are stored, a storage confirmation dialog box is displayed.

![Parameter storage confirmation dialog box]

- [Store]: ON The parameter is stored in ABSODEX.
- [Store]: OFF The parameter is not stored in ABSODEX.

When clicking [OK]
The parameters with [Store]: ON selected are stored in ABSODEX.

When clicking [CANCEL]
Parameter storage is cancelled (no parameters are stored).

※Parameter storage ON/OFF settings can be changed in [Parameter setting].
   For details, refer to "2-2-8 Setting parameters [Parameter setting]".
※If the driver type in the editing workspace differs from the stored driver type, parameter storage fails.
   To store parameters for a different driver type, change the driver type.
   For details, refer to "2-2-4 Changing the driver type [Change driver type]".
2. The following DIALOG is displayed before storing program.

Select the program to store (It is possible to select when clicking with the mouse or pushing the space key) and click [OK].
When selecting all program, click [Select all (A)].

3. When the program number to store is already used in ABSODEX, the DIALOG of confirmation of program rewriting is displayed.

When rewriting
Select [Yes(Y)]. Rewrite displayed program number.
When selecting [Rewriting all(A)], the all selected programs are rewrote without opening this DIALOG.

When not rewriting
Select [No(N)]. Displayed programs aren’t rewrote.

When stopping
When selecting [Cancel], Stop storage of the programs.
The data before canceling is stored into ABSODEX.
2-2-4 Changing the driver type [Change driver type]

Use this procedure to change the driver type in the editing workspace.

![Driver type conversion dialog box]

[Before change] Shows the current driver type.
[After change] Select the driver type you want to change to.

Select the driver type you want to change to and then click [OK] to change the driver type. Click [CANCEL] to cancel changing the driver type.

When you click [OK], a confirmation dialog box appears. Follow the on-screen instructions.

![Confirmation dialog box]

Drivers can be converted to the following 7 types:
- TS type
- TH type
- MU type
- GS type
- S type
- GH type
- H type
After parameter conversion, a conversion results confirmation dialog box is displayed.

Click [OK] to close the dialog box.

※For parameters with NG or N/A as the conversion result, configure the settings in the Parameter setting screen.
   For details, refer to "2-2-8 Setting parameters [Parameter setting]".
2-2-5 Editing equal segment program [Division equal segment program editing]

Use this procedure to edit division equal segment programs. (For other programs, use NC program editing or table program editing.)
The following DIALOG is displayed.

The contents of each input are displayed in "Explanation :" on the display screen.

1. Select program
   (1) Program number
       Select equal segment program to edit from “Program number”.
   (2) Memo
       Select equal segment program to edit from "Memo".
2. Input setting value
   (1) Home position
       Select home position before starting from following two and input the number.
       1 : Home position,  2 : Indexed position
   (2) Home positioning rotation direction
       Select home positioning rotation direction from following three and input the number.
       1 : CW,  2 : CCW,  3 : Near Head
       (NOTE) When selecting home position, "Near Head" can not be selected.
   (3) Home positioning speed
       Input home positioning speed.
       When selecting home position in (1)
       Input movement speed to home position from current position.
       Setting range: 1~100 rpm
       (When check box is OFF, the value of parameter becomes effective.)
       When selecting indexed position in (1)
       Input movement time or movement speed to indexed position from current position.
       Setting range: 0.01~100 sec or 1~100 rpm  (Select unit to use.)
   (4) Shift amount of home position
       When selecting indexed position in (1), input shift amount of home position.
       Setting range: -360~360 Degree or -540672~540671 Pulse
   (5) Number of segment
       Input number of segment.
       Setting range: 1~255
   (6) Movement time
       Input movement time with 1 index part.
       Setting range: 0.01~100 sec

※ The timing is checked when input of the number of segments and time has been completed. When movement time is too short, following DIALOG is displayed and the movement time is automatically corrected.
(7) Direction of turn
   Select direction of motor rotation from following two and input the number.
   1: CW, 2: CCW

(8) Processing after stop
   Select stop processing after positioning from following two and input the number.
   1: Start input standby, 2: DWELL

(9) DWELL
   Input time only when selecting DWELL in (8).
   Setting range: 0.01~99.99 sec

(10) Brake
    Input the number whether or not to use a brake.
    1: Use, 2: Not use

(11) Delay timer
    Input time only when selecting brake use in (10).
    (When not using the delay timer, make the check box OFF.)
    ※ The delay timer indicates the time from completion of positioning to brake application.
    Use the delay timer to apply the brake at a higher accuracy even in a system which has a smaller rigidity and therefore takes time until settling.
    The delay timer is inserted in NC programs as a dwell command.
    ※ Specify the time from brake release to rotation command issuance in response to a travel command, in parameter 27 (delay after brake output).
    If the time is not specified, rotation is commanded in a braking state when a motor rotation command is issued immediately after the brake is released, causing vibration and/or oscillation.

(12) M code
    Select M code processing from the following three and input the number.
    1: M code, 2: Division position output, 3: Not use

(13) Output bit at M code
    Input only when selecting M code in (12).
    Input numerical value which corresponds to the bit of M code to output.
    Setting range: 0~7
3. Making of new program
   Save program to be editing into editorial work and Make new program.
   Click [New].
   Follow the indication as the DIALOG is displayed.

4. Changing of editorial program number
   Change number of program to be editing into new number.
   (It is possible to change memo, too.)
   Click [Change].
   Follow the indication as the DIALOG is displayed.

5. Copying of editorial program
   Copy and Register program to be editing on another number.
   Click [Copy].
   Follow the indication as the DIALOG is displayed.
6. Deleting of editorial program.
   Delete program to be editing from editorial work.
   If you delete program once it doesn't return to Origin.
   Click [Delete].
   Follow the indication as the DIALOG is displayed.

![Delete program dialog]

7. Ending editing.
   Click [Close].
   Follow the indication as the DIALOG is displayed.

![AxTools dialog]

Editorial DIALOG closes when clicking [OK].
Program is saved into editorial work.
2-2-6 Editing program with NC code [NC program editing]

Editing is made with NC code.
The following DIALOG is displayed.

![NC program editing dialog](image)

The contents of each input are displayed in "Explanation :" on display screen.

1. Select program
   (1) Program Number
   Select NC program to edit in program number.
   (2) Memo
   Select NC program to edit in "memo".
   " * " is displayed in program which was edited by the equal segment program editing.

2. Editing of the NC program
   Input the letter from the keyboard and edits NC program. (Maximum of 2000 letters.)
   Refer to the NC code list of the manual.

3. Making of new program
   Save program to be editing into editorial work and makes new program.
   Click [New].
   Follow the indication as the DIALOG is displayed.

4. Change of editorial program number
   Change number of program to be editing into new number.
   Click [Change].
   Follow the indication as the DIALOG is displayed.
5. Copying of editorial program
   Copy and register the program to be editing on another number.
   Click [Copy].
   Follow the indication as the DIALOG is displayed.

6. Deleting of editorial program
   Delete program to be editing from editorial work.
   If you delete program once, it doesn't return to origin.
   Click [Delete].
   Follow the indication as the DIALOG is displayed.

7. Displaying of sample program
   Displays NC sample program in editorial window.
   Program to be editing is erased.
   Click [Sample].
   Displaying following DIALOG, select the sample name and click [OK].

8. Ending editing.
   Click [Close].
   Follow the indication as the DIALOG is displayed.

Clicking [OK], the editorial DIALOG closes.
The program is saved into editorial work.
2-2-7 Editing table programs [Table program Editing]

Use this procedure to edit programs with the table method.
The following dialog box is displayed.

The description entered is displayed in "Description" on the screen.

1. Select the program
   (1) Program number
   Select the table program to be edited from its number.
   (2) Memo
   Select the table program to be edited from a memo.

2. Edit the table program.
   Select and enter items in the table editing pane.
   Select [Select command], [Select operation] and [Setting value] in order, and enter a value.
   Then use [Confirm table].
   Edit the table program by repeating the above steps.

3. Creating a new program
   To create a new program, simply save the program being edited in the editing workspace.
   Click [New].
   When the dialog box appears, follow the on-screen instructions.

4. Renumbering an edited program
   Assign a new number to the program being edited.
   Click [Change].
   When the dialog box appears, follow the on-screen instructions.

5. Copying an edited program
   Copy the program being edited and register it under a different number.
   Click [Copy].
   When the dialog box appears, follow the on-screen instructions.

6. Deleting an edited program
   Delete the program being edited from the editing workspace.
   Note that deleted programs cannot be recovered.
   Click [Delete].
   When the dialog box appears, follow the on-screen instructions.
The functions used in table program editing are summarized below.

2-2-7-1 Program number, Memo
1. Select the program.
   (1) Program number
       Select the program to be edited by its number.
   (2) Memo
       Select the table program to from a Memo.

2-2-7-2 Table list
Displays the description set during table editing.

2-2-7-3 Editing the table list [Edit row]
Adding, deleting, copying and cutting table list entries

2-2-7-3-1 Inserting a new row [Insert new]
When you click the [Insert new] button, a new row is added to the table list. (After a new row is inserted, the [Insert new] button changes to the [Undo insertion] button.)
※Before the [Insert new] button is clicked

※After the [Insert new] button is clicked

Clicking [Undo insertion] after a new row has been inserted deletes the inserted row.
※After the [Undo insertion] button is clicked
2-2-7-3-2 Deleting rows [Delete]
Clicking the [Delete] button deletes the currently selected row.

2-2-7-3-3 Cutting rows [Cut]
Clicking the [Cut] button deletes the currently selected row and enables the [Insert copied row] button.
※Before the [Cut] button is clicked

![Diagram before Cut button clicked]

※After the [Cut] button is clicked

![Diagram after Cut button clicked]

2-2-7-3-4 Copying rows [Copy]
Clicking the [Copy] button enables the [Insert copied row] button.
※Before the [Copy] button is clicked

![Diagram before Copy button clicked]

※After the [Copy] button is clicked

![Diagram after Copy button clicked]
2-2-7-3-5 Inserting a copied row [Insert copied row]
Clicking the [Insert copied row] button inserts a cut or copied row in the row selected as the destination.
※Before the [Insert copied row] button is clicked

※After the [Insert copied row] button is clicked

2-2-7-4 Editing tables
Use this procedure to configure the settings for the currently selected row in the [Table list].

(1) [Table No.]
The currently selected [Table list] number is displayed.
Changing the list number selects the table list number with the new number.
(2) [Select command]
Select the command to be set.
(3) [Select operation]
Select the operation for the command selected in [Select command].
(4) [Setting]
Enter the setting for the operation.
(5) [Brake]
Set a brake operation.
(6) [M code]
Set the M code processing.
(7) [Start input wait]
Specify whether there is a start input wait.

(8) [Next operation]
Set the table number to be processed next.
You can specify the table number with [Continuous] or with the [Specification No.] list.
When [Continuous] is specified, the table number in the next row is processed.
When [Specification No.] is specified, the specified number is processed.

(9) [Confirm table] button
Confirms the description set in [Edit table].
When you click the [Confirm table] button, the [Edit table] description is applied to the [Table list].

(10) [Description]
Displays the description for the item selected in [Edit table].

2-2-7-4-1 Details of the table editing settings
The tables below show the values that can be set in table editing.

(1) Available settings when [Rotation command] is selected in [Select command]

<table>
<thead>
<tr>
<th>Command selection [ Rotation command ]</th>
<th>Operation selection</th>
<th>Setting 1</th>
<th>Unit</th>
<th>Setting 2</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute</td>
<td>Enter a setting.</td>
<td>[Degree]</td>
<td>Pulse</td>
<td>Enter a setting.</td>
<td>[Sec.] [rpm]</td>
</tr>
<tr>
<td>Absolute (shortest route)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute (CW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute (CCW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental</td>
<td>Enter a rotation speed.</td>
<td>[rpm]</td>
<td>Enter an acceleration / deceleration time.</td>
<td>[Sec.]</td>
<td></td>
</tr>
<tr>
<td>Incremental (1 rotation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous rotation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2) Available settings when [Brake] or [M code] is selected in [Operation selection]

<table>
<thead>
<tr>
<th>Command selection [ Rotation command ]</th>
<th>Operation selection</th>
<th>Brake</th>
<th>M code</th>
<th>Start input wait</th>
<th>Next operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute</td>
<td>[None] [Operation]</td>
<td></td>
<td>[None] [M code]</td>
<td>[Available] [None]</td>
<td>[Continuous] [No. specification]</td>
</tr>
<tr>
<td>Absolute (shortest route)</td>
<td></td>
<td>[Delay timer] can be used when [Operation] is selected.</td>
<td></td>
<td></td>
<td>* [Specification No.] can be used when [No. specification] is selected.</td>
</tr>
<tr>
<td>Absolute (CW)</td>
<td></td>
<td></td>
<td>[None] [M code]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute (CCW)</td>
<td></td>
<td></td>
<td>[None] [M code]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental</td>
<td></td>
<td></td>
<td>[None] [M code]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental (1 rotation)</td>
<td></td>
<td></td>
<td>[None] [M code]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous rotation</td>
<td></td>
<td></td>
<td>[None] [M code]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### (2) Available settings when [Number of segments command] is selected in [Select command] list

<table>
<thead>
<tr>
<th>Operation selection</th>
<th>Setting 1</th>
<th>Unit</th>
<th>Setting 2</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute</td>
<td>Enter a setting.</td>
<td>[Number of segments]</td>
<td>Enter a setting.</td>
<td>[Sec.] [rpm]</td>
</tr>
<tr>
<td>Absolute (shortest route)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute (CW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute (CCW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental</td>
<td>Enter a rotation speed.</td>
<td>[rpm]</td>
<td>Enter an acceleration / deceleration time.</td>
<td></td>
</tr>
<tr>
<td>Incremental (1 rotation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous rotation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### (3) Available settings when [Home position return command] is selected in [Select command] list

<table>
<thead>
<tr>
<th>Operation selection</th>
<th>Setting 1</th>
<th>Unit</th>
<th>Setting 2</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home position return (shortest route)</td>
<td>Enter a rotation speed.</td>
<td>[rpm]</td>
<td>Enter an acceleration / deceleration time.</td>
<td>[Sec.]</td>
</tr>
<tr>
<td>Home position return (CW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home position return (CCW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation selection</th>
<th>Brake</th>
<th>M code</th>
<th>Start input wait</th>
<th>Next operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute</td>
<td>[None] [Operation]</td>
<td>[None] [Division position output] [M code]</td>
<td>[Available] [None]</td>
<td>[Continuous] [No. specification]</td>
</tr>
<tr>
<td>Absolute (shortest route)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute (CW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute (CCW)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental</td>
<td>* [Delay timer] can be used when [Operation] is selected.</td>
<td>* [M code output bit] can be used when [M code] is selected.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental (1 rotation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous rotation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Additional notes:
- * [Delay timer] can be used when [Operation] is selected.
- * [M code output bit] can be used when [M code] is selected.
- * [Specification No.] can be used when [No. specification] is selected.
## Available settings when [Coordinate system setting] is selected in [Select command] list

<table>
<thead>
<tr>
<th>Command selection [ Coordinate system setting ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation selection</td>
</tr>
<tr>
<td>Current position setting</td>
</tr>
<tr>
<td>Home position shift</td>
</tr>
</tbody>
</table>

## Available settings when [Other command] is selected in [Select command] list

<table>
<thead>
<tr>
<th>Command selection [ Other command ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation selection</td>
</tr>
<tr>
<td>Pulse string input</td>
</tr>
<tr>
<td>Change gain magnification</td>
</tr>
<tr>
<td>Change parameter</td>
</tr>
<tr>
<td>Dwell</td>
</tr>
<tr>
<td>Brake operation only</td>
</tr>
<tr>
<td>Brake release only</td>
</tr>
<tr>
<td>M code output only</td>
</tr>
<tr>
<td>Division position output only</td>
</tr>
</tbody>
</table>

## Available settings when [Coordinate system setting] is selected in [Select command] list

<table>
<thead>
<tr>
<th>Command selection [ Coordinate system setting ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation selection</td>
</tr>
<tr>
<td>Current position setting</td>
</tr>
<tr>
<td>Home position shift</td>
</tr>
</tbody>
</table>

## Available settings when [Other command] is selected in [Select command] list

<table>
<thead>
<tr>
<th>Command selection [ Other command ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation selection</td>
</tr>
<tr>
<td>Pulse string input</td>
</tr>
<tr>
<td>Change gain magnification</td>
</tr>
<tr>
<td>Change parameter</td>
</tr>
<tr>
<td>Dwell</td>
</tr>
<tr>
<td>Brake operation only</td>
</tr>
<tr>
<td>Brake release only</td>
</tr>
<tr>
<td>M code output only</td>
</tr>
<tr>
<td>Division position output only</td>
</tr>
</tbody>
</table>

A-25
### 2-2-7-4-2 Range of the table editing settings

<table>
<thead>
<tr>
<th>Command selection</th>
<th>Operation selection</th>
<th>Unit</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute</td>
<td>Degree</td>
<td>-6658.380</td>
<td>6658.380</td>
</tr>
<tr>
<td></td>
<td>Absolute (shortest route)</td>
<td></td>
<td>-360.000</td>
<td>360.000</td>
</tr>
<tr>
<td></td>
<td>Absolute (CW)</td>
<td></td>
<td>-360.000</td>
<td>360.000</td>
</tr>
<tr>
<td></td>
<td>Absolute (CCW)</td>
<td></td>
<td>-360.000</td>
<td>360.000</td>
</tr>
<tr>
<td></td>
<td>Incremental</td>
<td></td>
<td>-6658.380</td>
<td>6658.380</td>
</tr>
<tr>
<td></td>
<td>Incremental (1 rotation)</td>
<td></td>
<td>-6658.380</td>
<td>6658.380</td>
</tr>
<tr>
<td></td>
<td>Absolute</td>
<td>Pulse</td>
<td>-9999999</td>
<td>9999999</td>
</tr>
<tr>
<td></td>
<td>Absolute (shortest route)</td>
<td></td>
<td>-540672</td>
<td>540672</td>
</tr>
<tr>
<td></td>
<td>Absolute (CW)</td>
<td></td>
<td>-540672</td>
<td>540672</td>
</tr>
<tr>
<td></td>
<td>Absolute (CCW)</td>
<td></td>
<td>-540672</td>
<td>540672</td>
</tr>
<tr>
<td></td>
<td>Incremental</td>
<td></td>
<td>-9999999</td>
<td>9999999</td>
</tr>
<tr>
<td></td>
<td>Incremental (1 rotation)</td>
<td></td>
<td>-9999999</td>
<td>9999999</td>
</tr>
<tr>
<td></td>
<td>Absolute</td>
<td>Sec.</td>
<td>0.01</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>Absolute (shortest route)</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>Absolute (CW)</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>Absolute (CCW)</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>Incremental</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>Incremental (1 rotation)</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>Absolute</td>
<td>rpm</td>
<td>0.11</td>
<td>300.00</td>
</tr>
<tr>
<td></td>
<td>Absolute (shortest route)</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
</tr>
<tr>
<td></td>
<td>Absolute (CW)</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
</tr>
<tr>
<td></td>
<td>Absolute (CCW)</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
</tr>
<tr>
<td></td>
<td>Incremental</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
</tr>
<tr>
<td></td>
<td>Incremental (1 rotation)</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
</tr>
<tr>
<td></td>
<td>Continuous rotation</td>
<td>rpm</td>
<td>-80.00</td>
<td>-0.11</td>
</tr>
<tr>
<td></td>
<td>Continuous rotation</td>
<td>Sec.</td>
<td>0.01</td>
<td>50.00</td>
</tr>
<tr>
<td>Number of segments command</td>
<td>Operation selection</td>
<td>Unit</td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------</td>
<td>---------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Absolute</td>
<td></td>
<td>(9999999/540672 x specified number of segments) with fractions truncated x -1</td>
<td>(9999999/540672 x specified number of segments) with fractions truncated</td>
<td></td>
</tr>
<tr>
<td>Absolute (shortest route)</td>
<td></td>
<td>-Specified number of segments</td>
<td>Specified number of segments</td>
<td></td>
</tr>
<tr>
<td>Absolute (CW)</td>
<td></td>
<td>-Specified number of segments</td>
<td>Specified number of segments</td>
<td></td>
</tr>
<tr>
<td>Absolute (CCW)</td>
<td></td>
<td>-Specified number of segments</td>
<td>Specified number of segments</td>
<td></td>
</tr>
<tr>
<td>Incremental</td>
<td>Number of segments</td>
<td>(9999999/540672 x specified number of segments) with fractions truncated x -1</td>
<td>(9999999/540672 x specified number of segments) with fractions truncated</td>
<td></td>
</tr>
<tr>
<td>Incremental (1 rotation)</td>
<td></td>
<td>(9999999/540672 x specified number of segments) with fractions truncated x -1</td>
<td>(9999999/540672 x specified number of segments) with fractions truncated</td>
<td></td>
</tr>
<tr>
<td>Absolute</td>
<td>Sec.</td>
<td>0.01</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Absolute (shortest route)</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Absolute (CW)</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Absolute (CCW)</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Incremental</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Incremental (1 rotation)</td>
<td></td>
<td>0.01</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Absolute</td>
<td>rpm</td>
<td>0.11</td>
<td>300.00</td>
<td></td>
</tr>
<tr>
<td>Absolute (shortest route)</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
<td></td>
</tr>
<tr>
<td>Absolute (CW)</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
<td></td>
</tr>
<tr>
<td>Absolute (CCW)</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
<td></td>
</tr>
<tr>
<td>Incremental</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
<td></td>
</tr>
<tr>
<td>Incremental (1 rotation)</td>
<td></td>
<td>0.11</td>
<td>300.00</td>
<td></td>
</tr>
<tr>
<td>Continuous rotation</td>
<td>rpm</td>
<td>-80.00 or 0.11</td>
<td>-0.11 or 80.00</td>
<td></td>
</tr>
<tr>
<td>Continuous rotation</td>
<td>Sec.</td>
<td>0.01</td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>Command selection</td>
<td>Operation selection</td>
<td>Unit</td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------</td>
<td>------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Home position return</td>
<td>(shortest route)</td>
<td>rpm</td>
<td>1.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Home position return</td>
<td>(CW)</td>
<td>rpm</td>
<td>1.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Home position return</td>
<td>(CCW)</td>
<td>rpm</td>
<td>1.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Home position return</td>
<td>(shortest route)</td>
<td>Sec.</td>
<td>0.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Home position return</td>
<td>(CW)</td>
<td>Sec.</td>
<td>0.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Home position return</td>
<td>(CCW)</td>
<td>Sec.</td>
<td>0.1</td>
<td>2.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coordinate system setting</th>
<th>Current position setting</th>
<th>Degree</th>
<th>-360.000</th>
<th>360.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home position shift</td>
<td></td>
<td></td>
<td>-360.000</td>
<td>360.000</td>
</tr>
<tr>
<td>Current position setting</td>
<td></td>
<td>Pulse</td>
<td>-540672</td>
<td>540672</td>
</tr>
<tr>
<td>Home position shift</td>
<td></td>
<td></td>
<td>-540672</td>
<td>540672</td>
</tr>
<tr>
<td>Change gain magnification</td>
<td>Parameter number</td>
<td>%</td>
<td>0 or 50</td>
<td>200</td>
</tr>
<tr>
<td>Change parameter setting</td>
<td>Parameter setting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2-2-7-4-3 [#REF!] errors

If a table number is specified in [No. specification] in [Next operation], and the table number referencing destination for [Next operation] no longer exists due to a deletion or similar operation, [#REF!] is displayed.

Situation where a [#REF!] error occurs

When [#REF!] is displayed, select the row on which [#REF!] appears and select the table number where the [No. specification] for [Next operation] is located.

[#REF!] occurs in the following situations:

- If a table number for a referencing destination is deleted or cut, the referencing origin encounters a [#REF!].
- If a table number for a referencing origin is deleted or cut, a [#REF!] occurs in the row where a copied row is inserted.
- If a table number for a referencing origin is copied, the copy origin is unaffected but a [#REF!] occurs in the row where the copied row is inserted.
2-2-7-5 Editing programs

Use the procedures below for operations such as creating or modifying table programs.

<table>
<thead>
<tr>
<th>Edit program</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Close</td>
<td>New</td>
<td>Change</td>
<td>Copy</td>
<td>Delete</td>
</tr>
</tbody>
</table>

[Close] button
- Ends table program editing.
- The editing dialog box closes.
- The program is saved in the editing workspace.

[New] button
- Create a new program.
- When the dialog box appears, follow the on-screen instructions.

[Change] button
- Change the program number being edited.
- When the dialog box appears, follow the on-screen instructions.

[Copy] button
- Copy the program being edited and register it under a different number.
- When the dialog box appears, follow the on-screen instructions.

[Delete] button
- Delete the program being edited from the editing workspace.
- Note that deleted programs cannot be recovered.
- When the dialog box appears, follow the on-screen instructions.
2-2-8 Setting parameters [Parameter setting]

Perform editing to enter or edit parameters.

※Before executing [Parameter setting], be sure to execute [Reading(ABSODEX)] to load parameters from the driver to the editing work.

For details, refer to Section 2-2-2 "Reading data from ABSODEX."

The dialog box shown below is displayed.

※Depending on the driver type, some parameters may not be displayed.
※The I/O setting function can be used with TS, TH and MU type drivers. The I/O setting is not required for driver types other than the above. Simply click [Next].

※Depending on the driver type, some parameters may not be displayed.
The contents of parameter are displayed in "Explanation :" on display screen.

1. Edit the setting value
   Move a cursor to the parameter to edit and inputs the value.
   
   Settings for parameters 1-20
   When [Parameter setting] starts, the setting screen for parameters 1-20 is displayed.
   Click [Next >].
   
   Settings for parameters 21-51
   The setting screen for parameters 21-51 is displayed.
   Click [Next >].
   
   The setting of the I/O
   Setting screen of I/O is displayed.
   Click [Next >].
   
   Settings for parameters 62-89
   The setting screen for parameters 62-89 is displayed.
   ※For MU type drivers, the setting screen for parameters 62-102 is displayed.
   
   Clicking [Back] displays the previous parameter setting screen.

2. Cancel parameter setting
   Click [Cancel].
   The setting is canceled. The parameter value is not saved in editing work.

3. Settle parameter setting
   From the "Parameter setting No. 62-89" screen, click [Completed].
   The dialog box closes and the parameter values are saved in the editing workspace.

4. Store parameter

   ![Storage No. Name]

   The checkboxes for each parameter determine whether the parameters are stored in ABSODEX.

   If the checkbox is ticked, the parameter is stored in ABSODEX.

   If the checkbox is left blank, the parameter is not stored in ABSODEX.

   After entering or editing parameters of editing work, store parameters from the editing work to the ABSODEX driver, using [Storage(ABSODEX)].

   For details, refer to Section 2-2-3 "Storing editorial data into ABSODEX."
2-2-9 Setting station number of serial communication

[CC-Link], [PROFIBUS], [DeviceNet]

Settings such as station number for each serial communication are made. ※This is available only when communication with ABSODEX is enabled. The corresponding serial communication setting is available for selection once the ABSODEX model is identified.

For details, refer to the driver instruction manual, as appropriate.

The following DIALOG is displayed. (ex. DeviceNet)
2-3 Operation order

Select [Motion] from main menu. The following DIALOG is displayed.

Displays the operating situation of present ABSODEX at real time.
※The position displays during the motor rotation may delay.
Starting, the stop, the specification of number, execution of reset, and so on, input directly without the code.
The contents with each item of operation order mode are as follows.
2-3-1 Starting program [Automatic operation starting]
Program with number which is selected at present starts.
Change operation mode into "Automatic operation mode" automatically.
In servo off condition, it isn't possible to execute.

2-3-2 Stopping program [Automatic operation stopping]
Program in operating stops.

2-3-3 Selecting starting program number [Select program number]
The following DIALOG is displayed.
Program number which is registered in ABSODEX is displayed.

![Select program number dialog]
Select number and click [OK].

2-3-4 Home positioning [Home positioning]
Return home position.
In servo off condition, it isn't possible to execute.

2-3-5 Controlling servo-on and servo-off [Servo On-Off]
The following DIALOG is displayed.

![Servo On-Off dialog]
Displays the current servo status. If the value set in parameter 52 is 1, the status can be changed by selecting ON or OFF and then by clicking [OK].

2-3-6 Starting program step by step [Single block starting]
Start 1 block of programs with number which is selected at present.
Change operation mode into "Single block mode" automatically.
In servo off condition, it isn't possible to execute.
2-3-7 Controlling brake [Brake operation]
The following DIALOG is displayed.

Displays the current brake status. To change the status, select ON or OFF and then click [OK].
※For the sake of safety, the brake cannot be released in servo-off condition.

2-3-8 Setting home position offset amount [Home position offset amount]
Set amount of home position offset.
※Turning off the servo with the actuator on the sides may cause the weight of the load to rotate the output shaft to cause a danger.
In this procedure, don't do and do in following "2. After adjusting a position in the servo on condition, it sets amount of home position offset".
1.Adjust the position manually and set amount of home position offset.
<Operation>
(1)The following DIALOG is displayed.

(2)Click [OK]. The following DIALOG is displayed.

(3)Select [Yes]. The following DIALOG is displayed.
(4) Click [OK] if adjusting position manually. (Stop setting processing by [Cancel].) The following DIALOG is displayed.

![Dialog Image](image1)

(5) When selecting [Yes], Set. (Return to process 4 when selecting [No].) ※ The amount of home position offset to have turned on once again to or to have been set to it after returning in home position becomes effective.

2. After adjusting a position in the servo on condition, set amount of home position offset.
   <Operation>
   (1) First, drive to the position where to be set as home position.
   (2) Select [Home position offset amount] from the operation mode menu. The following DIALOG is displayed.

![Dialog Image](image2)

(3) Click [OK]. The following DIALOG is displayed.

![Dialog Image](image3)

(4) Select [No]. The following DIALOG is displayed.

![Dialog Image](image4)

(5) Home position offset amount is established when selecting [Yes]. (Stop the setting process when selecting [No].) ※ The amount of home position offset to have turned on once again to or to have been set to it after returning in home position becomes effective.
2-3-9 Resetting alarm [Alarm reset]
Reset alarm which occurs at present.

2-3-10 Displaying present operation situation [Displays of operation situation]
Begin to display the real time the operation situation of ABSODEX.

2-3-11 Displaying I/O condition of the present input/output signal [I/O display]
The following DIALOG is displayed.

1. Displays I/O condition of the present input/output signal CN3
   Click [Display].
   Begin to display the real time of I/O condition.
   “Input 2” supports TB3 (Emergency Stop input) which uses serial communication interface (such as CC-Link).

2. End the displays of I/O condition
   Click [Close].
   The DIALOG closes.
   ※I/O displays don’t sometimes change when input/output time is too short.

3. Displays CC-Link condition
   Click [CC-Link].
   ※This is available only when communication with ABSODEX is enabled. [CC-Link] is available for selection once the ABSODEX model is identified.
   For details, refer to the driver instruction manual.

※The displayed I/O data names differ depending on the driver type and the parameter settings.
2-3-12 Semi-auto tuning [Gain]

The following DIALOG is displayed.

1. Displays the Gain setting
   Displays the setting of DIP switches, G1 and G2 on the front panel.
   ※Parameters 101 (Gain 1) and 102 (Gain 2) apply to MU type drivers.

2. Gain Adjustment
   Fine adjustments to Servo Gain can be made after executing Auto tuning.
   ※Data is valid when Gain SW is 00.
   ※The Servo Gain cannot be set until the tasks in "2-4 Tuning" have been carried out.
   ※Semi-auto tuning function is not available for TH type.
   ※The Semi auto tuning function is not displayed for GS, S, GH or H type drivers.
2-4 Tuning

The Auto tuning function can be used with TS, MU, GS and S type drivers. It cannot be used with TH, GH or H type drivers. Select [Tuning] from the main menu. The dialog box for carrying out auto tuning operations is displayed. The dialog box displayed differs depending on the driver type.

2-4-1 Dialog box for GS and S type drivers

The input dialog box shown below is displayed.

![Auto tuning dialog box]

2-4-1-1 Set up

1. Responsibility
   Tunes responsibility.
   Convergence at stops and holding force will increase when the set value is larger.
2. Friction load
   Choose larger value in case the friction load is high.
3. Oscillation angle
   Adjusts the angle of oscillation.
4. Gain setting
   Set gain value chosen by auto tuning will be displayed,
5. Alarm states
   Alarm state will be displayed.
2-4-1-2 Execute

Auto tuning will start when [Tuning Start] is clicked.
Servo off will be confirmed.
Click [OK] if there is no problem.

There is a confirmation before it starts oscillations.
If it is OK, please click [OK].

When the oscillation of actuator stops, auto tuning is considered completed.
(It may take a few to ten plus seconds depending on the load.)
※Check that oscillation has stopped before clicking [OK].
Clicking [OK] before oscillation stops may prevent the successful completion of tuning.

※If the gain adjustment DIP switches G1 and G2 on the driver panel are not ‘0 - 0’ the dialog box shown below is displayed.

Adjust the DIP switches to ‘0 - 0’ and click [OK].
Click [Tuning Start] in the auto tuning dialog box again to execute.
2-4-2 Dialog box for TS type drivers
The input dialog box shown below is displayed.

2-4-2-1 Setting
1. Response
   Adjusts the responsiveness.
   Raising the value increases the convergence when movement ends and the holding force
   when the actuator is stopped.
   The responsiveness value is indicated by the slider range (1-32).
   The slider arrow displayed below the value range indicates the current responsiveness
   setting.
   You can move the arrow using the up and down arrow buttons at the right end of the slider.
   The value to the right of the up and down arrow buttons shows the current responsiveness
   setting.
2. Friction load
   Increase this setting if the friction load is high.
3. Oscillation angle
4. Gain setting
   Displays the gain set by the Auto tuning function.
5. Alarm status
   Displays the alarm setting.

2-4-2-2 Tuning Start
The dialog box for GS and S type drivers is the same.
Refer to “2-4-1-2 Execution".
2-4-3 Dialog box for MU type drivers

The dialog box displayed differs depending on the [Gain 1] and [Gain 2] settings in ABSODEX.

If the [Gain 1/2] setting is ‘0 - 0’: [Auto] dialog box is displayed.
If the [Gain 1/2] setting is not ‘0 - 0’: [Manual] dialog box is displayed.

2-4-3-1 [Auto] dialog box

2-4-3-1-1 Setting

1. Setting method
2. Response
   Adjusts the responsiveness.
   Raising the value increases the convergence when movement ends and the holding force when the actuator is stopped.
   The responsiveness value is indicated by the slider range (1-32).
   The slider arrow displayed below the value range indicates the current responsiveness setting.
   You can move the arrow using the up and down arrow buttons at the right end of the slider.
   The value to the right of the up and down arrow buttons shows the current responsiveness setting.
3. Friction load
   Increase this setting if the friction load is high.
4. Oscillation angle
   Adjusts the angle of oscillation.
5. Gain setting
   Displays the gain set by the Auto tuning function.
6. Alarm status
   Displays the alarm setting.
2-4-3-1-2 Tuning Start

The dialog box for GS and S type drivers is the same. Refer to "2-4-1-2 Execution".

2-4-3-2 [Manual] dialog box

2-4-3-2-1 Setting

1. Setting method
2. Gain 1 (Response)
   [Before change] (top): Current ABSODEX setting for Gain 1
   [After change] (bottom): Gain 1 setting after the change (made using the up and down arrow buttons on the right)
   To the right of the up and down arrow buttons: Gain 1 settings after the change
3. Gain 2 (load inertia moment)
   [Before change] (top): Current ABSODEX setting for Gain 2
   [After change] (bottom): Gain 2 setting after the change (made using the up and down arrow buttons on the right)
   To the right of the up and down arrow buttons: Gain 2 settings after the change
4. Gain setting
   Displays the gain set by the Auto tuning function.
5. Alarm status
   Displays the alarm setting.
2-4-3-2-2 Storing the settings

The settings specified in [After change] in the dialog box are applied to [Gain 1] and [Gain 2] in ABSODEX.

When you click the [Store] button, the message shown below appears if the operation mode is "M6 (Pulse string input mode)".

![Message]

Gain G1 and G2 cannot be changed in pulse string input mode. Switch to another mode and then execute storing.

Change the mode as indicated in the message.
2-5 Terminal

Select [Terminal] from main menu. The following input DIALOG is displayed.

1. Operation
   (1) Enter a communication code in the position where the cursor blinks, and press the Return key.
       Or click [Send].
   (2) Sending data is displayed after “>” and reception data is displayed in line under it.
       At the normal time, “0” is displayed and at time of error, “*” is displayed.

2. When inputting from communication code list
   (1) Move the cursor to the communication code list and move the cell to the communication code to be entered, and press the Return key. Or double click the mouse button.
   (2) If necessary, enter data next to the communication code, and press the Return key.
       Or click [Send].
   (3) Reception data is displayed.

3. When sending using the communication code which was inputted before
   (1) Select communication code as the record of sending and receiving is displayed when pushing ↑ key.
   (2) To change data, edit the data directly and press the Return key.
       Or click [Send].
   (3) Sending data and new reception data are registered on record as the latest data. (To 100)

4. Ending terminal mode
   Click [Close].
   Follow indication as the following DIALOG is displayed.

End work when clicking [OK].
All records are erased.
2-6 Options
This is the same feature as [Options] in AxTools.
Refer to the instruction manual for AxTools.

2-7 Window
This is a standard Windows® function.

2-8 Help
Select [Help] from main menu. The following input DIALOG is displayed.

The contents with each items of help are as follows.

2-8-1 Displays the software version  [About TeachingNote…]
Displays the version of TeachingNote.
Displays the information of ABSODEX.

The following DIALOG is displayed.

The contents with each items of ABSODEX are as follows.

1. **Actuator**
   - Displays the serial number and model of Actuator.
2. **Driver**
   - Displays the serial number and type of Driver.
3. **Program**
   - Displays the program number which is registered in ABSODEX.
4. **Gain information**
   - Displays the Gain 1 and Gain 2 settings for the actuator.
5. **Alarm information**
   - Displays the current alarm status.
6. **Alarm**
   - Displays the history of important alarms that occurred in the past.
7. **Save**
   - Saves ABSODEX information in a file.
   - The information can be checked using a text editor or the like since it is saved as plain text.
Section 3  Code list

3-1 NC code

<table>
<thead>
<tr>
<th>Code</th>
<th>Function</th>
<th>Data Range</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>Program number</td>
<td>0 to 999</td>
<td>0 to 255 can be selected from I/O. &quot;o&quot; is automatically added.</td>
</tr>
<tr>
<td>N</td>
<td>Sequence number</td>
<td>0 to 999</td>
<td>Can be omitted.</td>
</tr>
<tr>
<td>G</td>
<td>Preparation function</td>
<td>0 to 999</td>
<td>Refer to Section 3-2 &quot;G code.&quot;</td>
</tr>
<tr>
<td>A</td>
<td>Instruction to move coordinate axis</td>
<td>±9999999 Unit: pulse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±6658.380 Unit: angle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±4716 Unit: number of indexes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±540672 Unit: pulse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±360.000 Unit: angle</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G90, G91, G91.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G90.1, G90.2, G90.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 to Designated number of segments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designation of segment numbers</td>
<td>1 to 255</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous rotation speed</td>
<td>±300.00 (Note) Unit: rpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Designation of speed</td>
<td>0.01 to 300.00 (Note) Unit: rpm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.01 to 100.00 Unit: sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Auxiliary function</td>
<td>0 to 99</td>
<td>Refer to Section 3-3 &quot;M code.&quot;</td>
</tr>
<tr>
<td>P</td>
<td>Dwell</td>
<td>0.01 to 99.99 Unit: sec</td>
<td>G40P□□. □□</td>
</tr>
<tr>
<td></td>
<td>Designation of sub-program number</td>
<td>0 to 999</td>
<td>Program No. M98P□□□</td>
</tr>
<tr>
<td></td>
<td>Gain magnification</td>
<td>0, 50 to 200 Unit: %</td>
<td>G12P□□□</td>
</tr>
<tr>
<td></td>
<td>0% input will set servo-off.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acceleration and deceleration for continuous rotation</td>
<td>0.01 to 50 Unit: sec</td>
<td>G08P□□□</td>
</tr>
<tr>
<td></td>
<td>0.01 to 50</td>
<td>G09P□□□</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parameter data setting</td>
<td>Range defined by parameters</td>
<td>Unit: the unit defined by each parameter; G79S□□□P□□□</td>
</tr>
<tr>
<td>L</td>
<td>Numbers of repetition</td>
<td>1 to 999</td>
<td>Repeats the block as specified.</td>
</tr>
<tr>
<td>J</td>
<td>Jump</td>
<td>0 to 999</td>
<td>J0 causes a return to the top of the program.</td>
</tr>
<tr>
<td>S</td>
<td>Parameter data setting</td>
<td>1 to 99</td>
<td>Setting parameter No.; G79S□□□P□□□</td>
</tr>
</tbody>
</table>

(Note) The minimum rotation speed of the actuator is 0.11rpm. The rotation speed varies according to the model. For details, refer to "ACTUATOR SPECIFICATIONS" in the driver instruction manual.
### 3-2 G code

<table>
<thead>
<tr>
<th>Group</th>
<th>Code</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
</table>
| **A** | *G01* | Positioning | To position at A with speed F.  
*Input Method*  
G01 A □ □ □ F □ □ ;  
Note: A □ □ □ command can make positioning without G01. |
| G07 | Continuous rotation | Under continuous rotation at the speed A (rpm).  
*Input Method*  
G07 A ± □ □ ;  
Unit of A: rpm  
"+" indicates clockwise rotation, while "-" indicates counterclockwise rotation.  
Note: Select less than 80 rpm for G07 continuous rotation. |
| G28 | Home positioning | Enable home positioning |
| G72 | Pulse string input | Motion with accordance with the pulse string input by CN3.  
The program stop input or start input will terminate the execution of G72. |
| G92 | Setting of coordinate system | Enables setting or changing coordinate system.  
Like G92A0, with the code A suffixed to G code, the coordinate system is set so that the current position is the value to follow A. |
| G92.1 | Setting of coordinate system | To set the home position of G92 user coordinate at power-on is the value which follows A. |
| **B** | G04 | Dwell | Delay to shift to the next block.  
*Input Method*  
G04 P □ □ □ ; |
| G08 | Acceleration time for continuous rotation | Acceleration takes place for the time specified by P for continuous rotation.  
*Input Method*  
G08 P0.5; acceleration time 0.5sec. |
| G09 | Deceleration time for continuous rotation | Deceleration takes place for the time specified by P for continuous rotation.  
*Input Method*  
G09 P0.5; deceleration time 0.5sec. |
| G12 | Change of Gain Magnification Rate | Displays the magnification for the gain determined by Gain 1 and Gain 2.  
*Input Method*  
G12 P100; 100%  
G12 P0; cause servo-off at 0%. |
| G79 | Parameter data setting | Substitute the parameter number with "S" for the value of P.  
*Input Method*  
G79S1P2; To substitute the parameter 1 for 2. |
| **C** | G101 | Designation of Segment Numbers | One rotation is equally segmented to set A unit to index number G106.  
*Input Method*  
G101A10; ←One rotation = 10 segments  
G01A1; ←Unit of A is index number  
Note: Do not specify "G101" in the same block as the A-group. |
| G104 | Designation of pulses | Unit of A is pulse. |
| * | G105 | Designation of angles | Unit of A is angle. |
| | G106 | Designation of index | Unit of A is numbers of index.  
If not set by G101, program error will occur. |

The asterisk ( * ) indicates the power-on setting.
<table>
<thead>
<tr>
<th>Group</th>
<th>Code</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>G10</td>
<td>Designation of rotation number</td>
<td>Unit of F is rpm. Moving speed is specified by the maximum rotation number.</td>
</tr>
<tr>
<td></td>
<td>G11</td>
<td>Designation of time</td>
<td>Unit of F is second. Moving time is specified.</td>
</tr>
<tr>
<td>E</td>
<td>G90</td>
<td>Absolute dimension</td>
<td>The value of A to be made absolute value from the home position of coordinates.</td>
</tr>
<tr>
<td></td>
<td>G90.1</td>
<td>One rotation absolute dimension</td>
<td>The actuator moves to the nearer direction with the value A as the one (1) rotation absolute value from the coordinate home position. The user coordinate after completion of positioning is adjusted within -180° to 179.999°. The specified range of A is within ±360°. Specifying 180° will cause the actuator to rotate CCW.</td>
</tr>
<tr>
<td></td>
<td>G90.2</td>
<td>CW direction absolute dimension</td>
<td>The actuator moves to the CW direction with the value A as the one (1) rotation absolute value from the coordinate home position. The user coordinate after completion of positioning is adjusted within -180° to 179.999°. The specified range of A is within ±360°. (The actuator motions between 0 to 360° in the CW direction.)</td>
</tr>
<tr>
<td></td>
<td>G90.3</td>
<td>CCW direction absolute dimension</td>
<td>The actuator moves to the CCW direction with the value A as the one (1) rotation absolute value from the coordinate home position. Same as G90.2 except for the rotation direction changes to CCW. The user coordinate after completion of positioning is adjusted within -180° to 179.999°. The specified range of A is within ±360°. (The actuator motions between 0 to 360° in the CCW direction.)</td>
</tr>
<tr>
<td></td>
<td>G91</td>
<td>Incremental dimension</td>
<td>The value of A to be made incremental value from the current position. Designate the direction of rotation, using the sign attached to the value following &quot;A&quot;. A positive value (without a sign) indicates clockwise rotation, while a negative value (-) indicates counterclockwise rotation.</td>
</tr>
<tr>
<td></td>
<td>G91.1</td>
<td>One rotation incremental dimension</td>
<td>The value of A is the incremental value from the current position. Designate the direction of rotation, using the sign attached to the value following &quot;A&quot;. A positive value (without a sign) indicates clockwise rotation, while a negative value (-) indicates counterclockwise rotation. The user coordinate after completion of positioning is adjusted within -180° to 179.999°.</td>
</tr>
</tbody>
</table>

The asterisk (*) indicates the power-on setting.
### 3-3 M code

<table>
<thead>
<tr>
<th>Group</th>
<th>Code</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>M00</td>
<td>Program Stop</td>
<td>After completion of the current block, the program stops. When the start signal is input again, program execution starts with the next block.</td>
</tr>
<tr>
<td></td>
<td>M30</td>
<td>End of Program</td>
<td>The program terminates to return the head block of the program.</td>
</tr>
</tbody>
</table>
| B     | M98  | Sub-program call | Executes sub-program.  
  *Input Method*
  
  \[
  \text{M98 P \text{sub-program number}} \\
  \text{Nest is feasible up to four times.}
  \] |
|       | M99  | End of sub-program | Indicates the end of sub-program. After executing the block containing M99, the main program is resumed. |
| C     | M68  | Braking Motion | De-energize the valve for the brake and do not make servo system integral control. Turn off across the BK+ and BK- terminals of the driver. |
|       | M69  | Brake Releasing | Energize the valve for the brake and makes servo system integral control. Turn on (24VDC) across the BK+ and BK- terminals of the driver. |
| D     | M20 to M27 | I/O Output | M signal in bit corresponding to the first digit is output to CN3, and M code strobe output will turn ON simultaneously. Three (3) M codes can be written in the same block, and can be output simultaneously. |
| E     | M70  | Segment position output | When "G101" is used, the M code output corresponding to the indexing position (bits 0 to 7: binary format) and the segment position strobe output are simultaneously output at CN3. The segment position for n segmentation is expressed 1 to n. |
Section 4  Example of RS-232C Interface Cable Connection Diagram

4-1 PC side Dsub 9-pin (DOS/V machine)

<table>
<thead>
<tr>
<th>Signal name</th>
<th>Pin No.</th>
<th>Pin No.</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCD</td>
<td>1</td>
<td>1</td>
<td>TXD</td>
</tr>
<tr>
<td>RD</td>
<td>2</td>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>TD</td>
<td>3</td>
<td>3</td>
<td>RTS</td>
</tr>
<tr>
<td>DTR</td>
<td>4</td>
<td>4</td>
<td>FGND</td>
</tr>
<tr>
<td>GND</td>
<td>5</td>
<td>5</td>
<td>FGND</td>
</tr>
<tr>
<td>DSR</td>
<td>6</td>
<td>6</td>
<td>CTS</td>
</tr>
<tr>
<td>RTS</td>
<td>7</td>
<td>7</td>
<td>EMG</td>
</tr>
<tr>
<td>CTS</td>
<td>8</td>
<td>8</td>
<td>DGND</td>
</tr>
<tr>
<td>RI</td>
<td>9</td>
<td>9</td>
<td>+5V</td>
</tr>
</tbody>
</table>

※ Pins 7 and 9 of CN1 of the driver are designed to connect Dialogue Terminal (AX0170H). If another device is connected, leave pins 7 and 9 open to avoid breakage of the driver that may be caused by a possible connection error.

※ For D-sub 9 pin on the PC side, the fitting screw may vary depending on the PC makers. Make sure of the screw type with the manufacturer.

The hood model numbers are different depending on the size of the screws;
- M2.6 (Metric) Hood: XM2S-□□11 (OMRON)
- M3 (Metric) Hood: XM2S-□□12 (OMRON)
- #4-40UNC (Inch) Hood: XM2S-□□13 (OMRON)

(□□ denotes 25 or 09.)
AX Speed

Section 1 Introduction

1-1 Introduction
This software is necessary to display the velocity waveform the ABSODEX. We do not guarantee the contents, accuracy and safety of the information provided with this software, or marketability or applicability of the information for special purposes. CKD Corporation shall be exempt from any losses caused by this software. This software is subject to change without prior notice.

1-2 Operating environment
Windows® 7, Windows® Vista, Windows® XP SP3. If your PC does not support Japanese font display, garbage characters may be displayed.
* Simultaneous operation with another piece of communications software is prohibited.
Section 2  Operation procedure

2-1 File
The file menu includes [New], [Open] and [Save].
The communications port can be selected among COM ports 1 to 6.
Use [Reset Communications Port] to ready the system for communications with the ABSODEX.

2-2 View
[Maximum value] shows the maximum value of waveform of velocity.

2-3 Operation order
Refer to the instruction manual for Teaching Note.

2-4 Terminal
Refer to the instruction manual for Teaching Note.

2-5 Options
This is the same feature as [Options] in AxTools.
Refer to the instruction manual for AxTools.

2-6 Window
Application window is Windows® standard function.
2-7 Help
You can use this to check the AxSpeed version.

2-8 Tuning
Fine adjustments to auto tuning are made while observing the velocity waveform

2-8-1 Running Auto tuning [Auto tuning]
Executes Auto tuning.
For details, refer to “Teaching Note 2-4 Tuning”.
(However, note that the [Manual] dialog box for MU type drivers cannot be used in AxSpeed. Only the [Auto] dialog box can be used.)

2-8-2 Fine tuning with Auto tuning while checking the velocity waveform [Semi auto]
The input dialog box shown below is displayed.

2-8-2-1 Setting
1. Servo Gain
   Specify the servo gain value.
   Raising the value increases the convergence when movement ends and the holding force when the actuator is stopped.
2. Integral gain, Proportional gain, Differential gain
   Displays the gain set by the Auto tuning function.
3. Oscillation angle
   Adjusts the angle of oscillation.
4. Time
   Specify the movement time per block.
5. Position deviation amount
   Displays the amount of positional deviation.
2-8-2-2 Start
When you click the [Start] button, the velocity waveform is acquired. Make fine adjustments while observing the results in the velocity waveform displayed.

2-8-2-3 Restrictions
The [Semi auto] dialog box can only be used after Auto tuning. Be sure to carry out Auto tuning before running [Semi auto] tuning.

Note also that the [Semi auto] dialog box can only be used for TS and MU type drivers.

2-8-3 Setting Gain 1 and Gain 2 [Manual tuning]
The input dialog box shown below is displayed.

![Tuning dialog box]

2-8-3-1 Setting
1. Setting method
   Only [Manual] can be selected. [Auto] cannot be selected.

※All other settings are the same as in Teaching Note. Refer to "2-4-3-1 [Manual] dialog box".

2-8-3-2 Storing the settings
Same as for Teaching Note. Refer to "2-4-3-1 [Manual] dialog box".

2-8-3-3 Restrictions
Note also that the [Manual tuning] dialog box can only be used for MU type drivers.
2-9 Mode of velocity waveform display

2-9-1 Display the velocity waveform [Monitor start]
This application software read the velocity date and display the graph.

2-9-2 Select the data display mode [Monitor mode]
Select the data to display.
When selecting [Speed], the velocity waveform (green) will be shown, while selecting [Move], the difference (yellow) between the displacement (light blue) calculated by velocity data and the target calculated by the displacement be shown.
[Filter] converts the curve smooth by calculating the average.

2-9-3 To change the length of data to be acquired [Monitor length]
Click on the arrow buttons to change the length of data (i.e., time to acquire data).
Because the number of data items does not change, the time between data items is proportional to the data length.

2-9-4 To change the time scale of horizontal axis [TIME]
Click the arrow button to change the time scale of horizontal axis.

2-9-5 To change the velocity scale of vertical axis [rpm]
Click the arrow button to change the velocity scale of vertical axis

2-9-6 To change the displacement scale of vertical axis [Pulse]
Click the arrow button to change the displacement scale of vertical axis.

2-9-7 To read the time of graph [Cursor]
Click the arrow button to change the cursor position.
The position is indicated next to "Cursor position" below the graph.
Cursor can be also moved by handling the mouse.

2-9-8 To scroll the graph
Move the scroll bar to adjust the graph position.
AX FFT

Section 1 Introduction to damping properties

1-1 Introduction
The ABSODEX is susceptible to resonance with the load unit if the rigidity of the load unit
connected with the ABSODEX is too small.
If this occurs, use a digital filter assembled in the ABSODEX driver to suppress resonance to
a certain degree. This software serves as a guide to set up the digital filter.

We do not guarantee the contents, accuracy and safety of the information provided with this
software, or marketability or applicability of the information for special purposes.
CKD Corporation shall be exempt from any losses caused by this software.
This software is subject to change without prior notice.

1-2 Operating environment
If your PC does not support Japanese font display, garbage characters may be displayed.
* Simultaneous operation with another piece of communications software is prohibited.

CAUTION
Before starting tuning of the ABSODEX with this software, be sure to
read the instruction manual to be familiar with correct operation methods.
The actuator may show unexpected actions in the adjustment stage.
Avoid mechanical interference and keep away from moving parts.
1-3 Digital filter of ABSODEX driver

Four digital filters are assembled in the ABSODEX driver. Specify the cutoff frequency of each, using parameters.

<table>
<thead>
<tr>
<th>Parameter No.</th>
<th>Function</th>
<th>Setting range</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>Low pass filter 1</td>
<td>10 to 1000</td>
<td>200</td>
<td>Cutoff frequency (Hz)</td>
</tr>
<tr>
<td>63</td>
<td>Low pass filter 2</td>
<td>10 to 1000</td>
<td>500</td>
<td>Cutoff frequency (Hz)</td>
</tr>
<tr>
<td>64</td>
<td>Notch filter 1</td>
<td>10 to 1000</td>
<td>500</td>
<td>Notch frequency (Hz)</td>
</tr>
<tr>
<td>65</td>
<td>Notch filter 2</td>
<td>10 to 1000</td>
<td>500</td>
<td>Notch frequency (Hz)</td>
</tr>
<tr>
<td>66</td>
<td>Filter switch</td>
<td>0 to 15</td>
<td>1</td>
<td>Filter validation switch</td>
</tr>
<tr>
<td>69</td>
<td>Test gain</td>
<td>1 to 2000</td>
<td>500</td>
<td>Random number gain</td>
</tr>
<tr>
<td>70</td>
<td>Q value for notch 1</td>
<td>0.1 to 9.9</td>
<td>1.0</td>
<td>Band width setting</td>
</tr>
<tr>
<td>71</td>
<td>Q value for notch 2</td>
<td>0.1 to 9.9</td>
<td>1.0</td>
<td>Band width setting</td>
</tr>
</tbody>
</table>

* For the filter switch setting method, refer to "1-3-2 Filter switch."

* The setting range for parameters 62-65 using the procedure in "2-8-3 Filter settings" is 100-500.
To set values outside that range, use Terminal mode.

1-3-1 Characteristics of filter

The low pass filter attenuates the signal in the high frequency area. The notch filter attenuates signals at specific frequencies.
1-3-2 Filter switch
Use parameter 66 (filter switch) to designate whether or not to use four filters.

Each bit of the switch corresponds to a specific filter. "1" at the bit indicates a valid filter. "0" indicates an invalid filter.

<Switch setting example>
Parameter 66 = "9" (= "1001"): Use low pass filter 1 and notch filter 2.
Parameter 66 = "3" (= "0011"): Use low pass filter 1 and low pass filter 2.

1-3-3 Q value of notch filter
Use parameters 70 and 71 to specify the band width Q of the notch filter. A larger Q value causes a narrower band width, while a smaller value causes a wider band width. The default Q value is "1."
There is no need to change the Q value in most cases.
Section 2  Operation procedure

2-1 File
The file menu includes [New], [Open] and [Save].
The communications port can be selected among COM ports 1 to 6.
Use [Reset Communications Port] to ready the system for communications with the ABSODEX.

2-2 View
Select [Single Scope] to display only one graph.
Select [Double Scope] to display two graphs simultaneously.

2-3 Operation order
Refer to the instruction manual for Teaching Note.

2-4 Terminal
Refer to the instruction manual for Teaching Note.

2-5 Options
Refer to the instruction manual for AxTools.

2-6 Window
This is a standard function of Windows®.

* The maximum value displayed in the graph indicates the maximum value in the area larger than 70Hz. Note that the maximum value is not always a resonance point.
2-7 Help
You can use this to check the AxFFT version.

2-8 Damping adjustment mode

2-8-1 Checking the response [Test mode]
The ABSODEX is driven with a random number generation function assembled in the driver, and the motion data obtained in the procedure is subjected to FFT calculation.

Use [Test Mode Start] to observe the response of the actuator. Use [Filter Response] to observe the response of the filter. Select either one, then click on [START].

2-8-2 Selecting displayed data 1 [Scope 1]
Select the graph data to be displayed.

Select the displayed waveform at [Form]. Select [Wave] to display the FFT-unprocessed waveform data. Select [Gain] or [Phase] to display the FFT-processed gain and phase.
2-8-3 lter setting [Set filter]

Change the settings of the ABSODEX digital filter.
A communication error is caused if the communication cable is not connected with the driver or the driver is not turned on.

Enter the amplitude of the generated random number as a gain. Leave default value 500 unchanged in regular cases.
Place a check mark in the check box to validate the corresponding filter. Up to three filters can be validated.
A larger Q value causes a narrower band width, while a smaller value causes a wider band width. The default Q value is "1." In most cases, there is no need to change the Q value.
Click on [OK] to write data to the driver.

Click on [Default] to restore the default parameters of the ABSODEX in the boxes. To write data to the driver, click on [OK].

2-8-4 lecting displayed data 2 [Scope 2]

Similar to Scope 1. The settings can be used only if [Double mode] is selected as a [View] mode. The settings are not used in the [Single mode].
Section 3 Damping method

The waveform of the actuator gain obtained in the [Test mode] is a straight line with the right side down at an inclination of -20dB/dec as shown in the graph below, in the theoretical case.

If there is resonance, projection or swelling is observed near the resonance frequencies in this gain waveform. It is the objective of damping adjustment to cut the projection with a filter to realize an ideal gain waveform. However, deviation from the completely ideal waveform is frequently observed. At the last stage, observe the actual motions and finish adjustment upon confirmation of absence of resonance.

3-1 Damping procedure
1. Check that the bolts of the ABSODEX and mechanical units are tight.
2. Check that the equipment is free from interference during rotation of the ABSODEX.
3. Select the [Test mode] and measure the waveform of the response from the actuator.
4. Check for projections in the gain waveform to read the resonance frequencies.
5. Provide low pass filters and notch filters to suppress the gain at the resonance point.
6. Check if resonance is suppressed. If suppression is insufficient, repeat the procedure from step 3.

If alarm 1 is caused in the [Test mode], reduce the [Gain] value of [Set filter]. Or increase the upper limit value of position deviation (parameter 19) to suppress the alarm.
If oscillation is likely to occur after the [Test mode] is started, start the [Test mode] in the servo-off state to suppress oscillation. (After the test is finished, the original operation mode before execution of the [Test mode] is restarted.

3-2 Cautionary item
If resonance is caused, install a dummy inertial body, improve the rigidity or take other measures to the mechanical system in principle. Take these measures before using the damping software.
If a low frequency is set at the low pass filter (80Hz or below), the ABSODEX may operate unstably. Specify 80Hz or a larger frequency (100Hz or larger recommended) whenever possible.
3-3 Examples of damping adjustment

Measure the waveform of the response from the actuator in the [Test mode]. Suppose that the graph shown below is displayed.

Because resonance is observed at about 228Hz, specify "228" for notch filter 1 to reduce the gain of the resonance point. Select [Filter response] to observe the response of the filter. The graph shown below is displayed.

Because the low pass filter is set at 200Hz, the right side of the graph line declines after "200Hz."

The notch filter causes a drop at about 228Hz.

This filter causes the [Test mode] graph to change in the following way.
A gain of about 35dB at about 228Hz in the first graph is reduced to about 21dB. Thus the filter damps the resonance point for adjustment.
AX I/O

Section 1   Introduction

1-1 Introduction
This software is necessary to display the I/O status of the ABSODEX.
We do not guarantee the contents, accuracy and safety of the information provided with this software, or marketability or applicability of the information for special purposes.
CKD Corporation shall be exempt from any losses caused by this software.
This software is subject to change without prior notice.

1-2 Operating environment
If your PC does not support Japanese font display, garbage characters may be displayed.
* Simultaneous operation with other pieces of communications software is prohibited.
Section 2  Operation procedure

2-1 File
The file menu includes [New], [Open] and [Save].
The communications port can be selected among COM ports 1 to 6.
Use [Reset Communications Port] to ready the system for communications with the ABSODEX.

2-2 View
Select whether to display or to hide the [Tool bar] and [Status bar].
Select the [Normal I/O view mode] to display signal switching at a certain interval without
relations to the signal length.
Select [Real I/O view mode] to display according to the signal length.

2-3 Operation order
Refer to the instruction manual for Teaching Note.

2-4 Terminal
Refer to the instruction manual for Teaching Note.

2-5 Options
Refer to the instruction manual for AxTools.

2-6 Window
This is a standard function of Windows®.
2-7 Help
You can use this to check the AxIO version.

![AxIO Check-E](image)

2-8 I/O status display mode

2-8-1 Starting I/O display [Monitor start]

Specify the I/O switching counts. The I/O status of the ABSODEX is read and a graph is displayed.
Up to 3000 pieces of data is stored each time, while the data is reset upon each switching.
The function is automatically stopped when the designated count is reached, while you can stop it manually.
Enter "999" to cause an infinite switching. Switching continues until you stop it.

2-8-2 Exiting from I/O display [Monitor stop]
I/O status reading of the ABSODEX is stopped and graph display is terminated.

2-8-3 Selecting I/O status displayed in graph [I/O name select]

Select the I/Os displayed in the graph, from the box on the left side.
Up to 21 items can be displayed at a time.
※ The I/O data names differ depending on the driver type and parameter settings.

2-8-4 Changing the scale of I/O graph [I/O scale]
Click on the arrow button to change the scale of the axis of abscissas (I/O).
2-8-5 Reading time from the graph

If you click and drag the mouse, "Cursor position" below the graph shows the time between the cursor movement starting and ending positions. Do this while holding down the "Shift" key, to move another cursor.

Click the right mouse button to display the interval between signals at a time.

2-8-6 Scrolling the graph

Use the scroll bar at the bottom of the graph to scroll the graph.