Product：4-axis controller with built-in driver

Model：FMAX-4X-2SD

User's Manual

(Driver version)

NPM Impress, not just satisfy
Nippon Pulse Motor Co., Ltd.

Revision History

No.	Date	Contents	Approval	Check	Translation
0	2017.04.07	Initial Release			
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

INDEX

1. [Product warranty]

1.1. In the case of purchase from a supplier other than NPM

If this product is purchased from a supplier other than NPM, please contact the supplier for product warranty information.

1.2. Warranty period

The warranty period is one year from the date of the delivery.

1.3. Warranty scope

If defects are found in the product during the warranty period under normal use following this document, NPM will repair the product without charge. However, the following cases are not covered by the warranty and free repair does not apply to the product even during the warranty period.

- The products are modified or repaired by anyone other than NPM or a person authorized by NPM.
- The defect results from falling of the product after delivery or mishandling in transit.
- Wearing of components, natural deterioration or fatigue (motor axle bearing, gear, grease, cables, etc.)
- The defect results from any use other than original use.
- The product has been subjected to natural disaster or force majeure such as fire, earthquake, lightning strike, wind and flood, salt, and electrical surges.
- The defects or damage results from the cause other than the fault of NPM.

Note 1) NPM will not provide on-site repair. If the product is defective, the product must be sent to a specified location for repair.

Note 2) The warranty period of the repaired product is not extended beyond the warranty period of the product before the failure. It is the same as the warranty of the product before the repair.

Note 3) This warranty covers the product itself. The detriments or damages induced by the product failure etc. will not be covered by the warranty.

Note 4) A replacement may be provided instead of a repair at the discretion of NPM.

1.4. This document

This documents aims to describe the detail of the function of the product and it does not denote fitness for a particular purpose of the customer's.

The examples of application and circuit diagram in this manual are described for your reference. Please confirm the feature and the safety of device or equipment before use.

1.5. Unavailable usages

Please do not use this product for the following use in principle.

If you use the product for the following uses, please contact our sales department.

- Any equipment that may require high reliability or safety, such as nuclear facility, electricity or gas supply system, transportation facilities, vehicle, various safety system, medical equipment, etc.
- Any equipment that may directly affect human survival or property
- Usage under conditions or circumstances that are not specified in the brochure, manual, etc.

When this product is used in any equipment where faults or malfunctions may directly affect human survival or property, please secure high reliability and security with redundancy design, etc.

2. Safety Precautions

Please read this document, manuals and attached documents thoroughly before installation, using product, maintenance and inspection and use the product properly.
Please use the product after mastering about the machine, safety information and precautions.
Electrical products may malfunction or have a breakdown. Please use the product with cautions in order to prevent injuries or property damage affecting the people that use this product.

2.1. Symbols

Symbols	Description
	**This symbol indicates "Caution".** **Incorrect handling may cause a hazard that could result in injury, property damage accident or breakdown.**
	**This symbol indicates "Instruction".** **Please follow the instruction without fail.**
	**This symbol indicates a prohibition. Must not be done.**

2.2. Precautions

2.2.1. Precautions for delivery

Caution		
	● This product is accurate equipment. Do not drop or impact it.	It could cause breakdown.
	● Overloading could cause load collapse.	It could cause breakdown or injury.

2.2.2. Precautions for installation

Caution		
	● Do not install the product in place with corrosive gas, oil, dust, vapor or metal powder etc.	It could cause breakdown or fire.
	● Do not install the product at a site where this product is exposed to severe vibration.	It could cause breakdown.
	● Do not use excessive force when installing the product.	It could cause breakdown.
	● Do not install or remove the product while it is being supplied with electric power.	It could cause an electric shock or breakdown.
	● Do not use in humid place or in place that is always hot.	It could cause breakdown.
	● Do not cover the product with blanket, etc.	It could result in fire.
	● Do not block air/cooling vents.	It could cause breakdown or fire.

2.2.3. Precautions for wiring

Caution		
	● Please wire properly and securely. Failure to do so could cause motor runaway. That could cause injury.	It could cause breakdown or injury.
	● Never wire to wrong terminals.	It could cause breakdown.
	● Please fix cables and do not add a tensile stress to cables.	It could cause breakdown or injury.
	● Please use end limit signals or emergency signals, etc. as needed for safety.	It could cause breakdown or injury.
	● Please ground without fail.	It could cause breakdown or an electric shock
	● Please ensure that foreign agents do not enter the body case when wiring.	It could cause breakdown.

2.2.4. Precautions for operation

Caution		
	● If you notice abnormality (smoke), please power off.	It could cause breakdown or fire.
	● If the products get a foreign object in the case, please remove it after powering off.	It could cause breakdown or an electric shock.
	● Please power off before inserting or pulling the plug.	It could cause breakdown
	● Do not touch terminals during being supplied with electric power.	It could cause breakdown or an electric shock.

2.2.5. Precautions for maintenance

Caution		
	● Do not install or remove the product or wire while it is being supplied with electric power.	It could cause breakdown or an electric shock.
	● Do not disassemble, convert or repair the product.	It could cause breakdown.

3. Outline

3.1. Outline

This controller is a product for 4-axis motion control, and ARCUS PMX-4JX-CR manufactured by ARCUS is adopted as the core part. Two out of the four axes have Elmo driver built−in, and the other two axes are equipped with various signals so that drivers can be connected externally.

This manual is mainly an instruction manual concerning the adjustment of the built-in Elmo driver (TWE3/60). If you would like to learn more about the Elmo driver, please download the manual from Elmo's website and refer to it.

For the details on hardware and software of this controller, please refer to hardware and software version manuals respectively.

3.2. Features

This controller is a 4-axis controller, including two axes of drivers that can drive shaft motors. The two axes can be connected directly to shaft motors, and the remaining two axes can control various motors by connecting with external drivers. Two types of control method can be used: USB communication method with PC and Standalone method which controls by this controller alone. In addition, since analog input terminals are prepared, jog operations by joysticks, etc. is also available.
The following are other main functions:

- ◆13 types of Homing mode
- ◆Manual pulsar operation
- ◆On-the-fly speed change
- ◆On-the-fly target position change
- ◆2 to 4-axis linear interpolation
- ◆2-axis circular interpolation
- ◆Circular interpolation with Z-axis synchronization (helical interpolation operation)
- ◆Absolute positioning and incremental positioning can be selected
- ◆Comparator function
- ◆12 inputs and 12 outputs of general-purpose input/output signals

3.3. Supported OS

- ◆Windows 7 and 8

4. Driver specification

4.1. Outline

This manual describes typical specifications of the Elmo drivers built-in this controller. Due to the specifications of the hardware, some specifications are kept lower than the driver ratings. If you would like to learn more detailed specifications, please download “Installation Guide” from Elmo’s website.

4.2. Specification

Built-in driver		
Item	Specification	Note
Driver name	Tweeter	
Model number	TWE 3/60	
Power supply	DC12 to DC48 [V]	*1
Maximum output current	1 [A]	*1
Maximum slewing frequency	2 [MHz]	
Serial port for adjustment	RS-232C	
*1. Due to the hardware specification of this controller, they are set lower than the ratings of the Elmo driver.		
Software for adjustment		
Item	Specification	Note
Software for adjustment	Composer	
Supported OS	Windows7 , 8	
Language	English / Japanese	Automatic Identification during installation

Table 4-2-1

5. Installation of Composer

In order to adjust the built-in drivers, Elmo’s Composer is required. Please download Composer from Elmo’s website and install in your PC before making adjustments. Please refer to “Composer User Manual” for installation.

6. Auto tuning

6.1. Outline

Auto tuning is a method to set complicated parameters automatically.

The explanation here refers to the shaft motor (Motor type: Linear brushless) as the target. Even with other motors, the basic operation flow is the same.

For detailed operation and other adjustment methods, please refer to Elmo's "Composer User Manual".

6.2. Operation method

6.2.1. Pre-boot preparation

1) Connect the driver to be adjusted and your PC via RS-232C.
   Connect to CNX 3 when adjusting X axis. When adjusting Y axis, connect to CNY 3

2) Supply power (DC12V to DC48V) to driver (CN11).

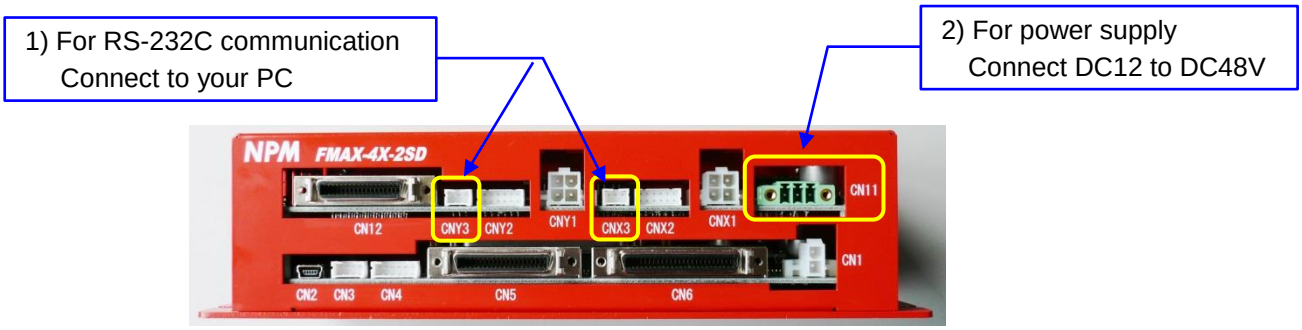


Fig. 6-2-1

Connector number	CN11	CNX3 , CNY3
Connector part number	MC 1,5/3-STF-3.81	PHR-3
Crimp terminal part number	---	SPH-002T-P0.5S
Manufacturer	PHOENIX CONTACT	JST

Table 6-2-1

6.2.2. Start-up

1) Launch the Elmo's driver adjustment software "Composer".
Start → Right click "Composer" → Click "Run as administrator".
Elmo's Composer screen (Fig. 6-2-3) will be displayed.
Be sure to click "Run as administrator" to start it. If you start up with "Open", the initial screen will open, but you cannot move to the next tuning screen. Even if you create a shortcut key, please click "Run as administrator" to start.

2) Click button (Create a New Application)
Communication type setting screen (Fig.6-2-4) will be displayed

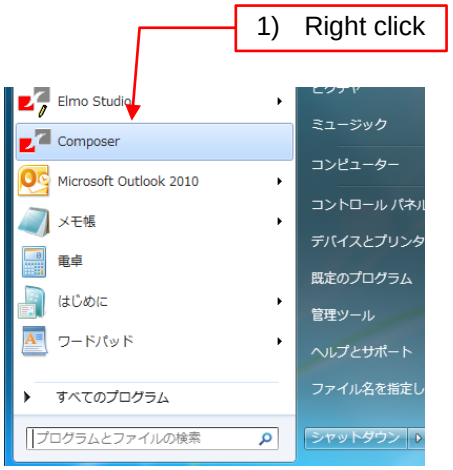


Fig. 6-2-2(A)

Fig. 6-2-2(B)

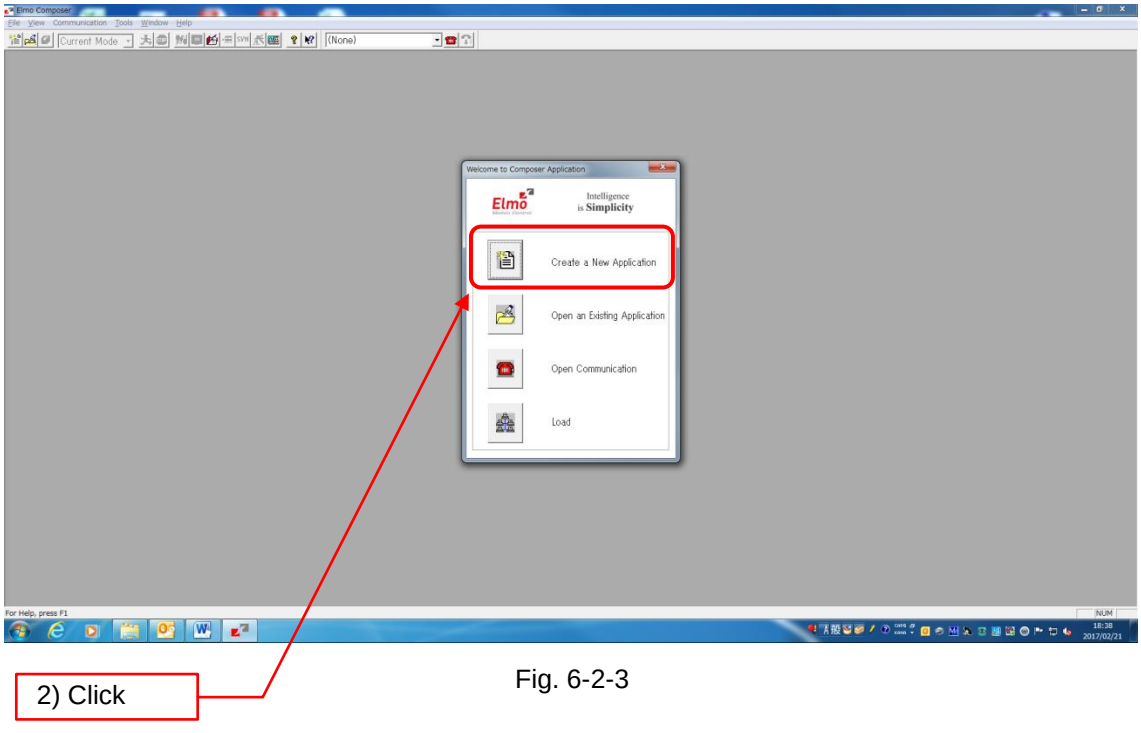


Fig. 6-2-3

6.2.3. Communication setting

(1) When there is no change in communication parameters

1) Enter an application file name.
The application name can be set arbitrarily.

2) Confirm communication parameters.
If there is no change in communication parameters, click [Next >] button.

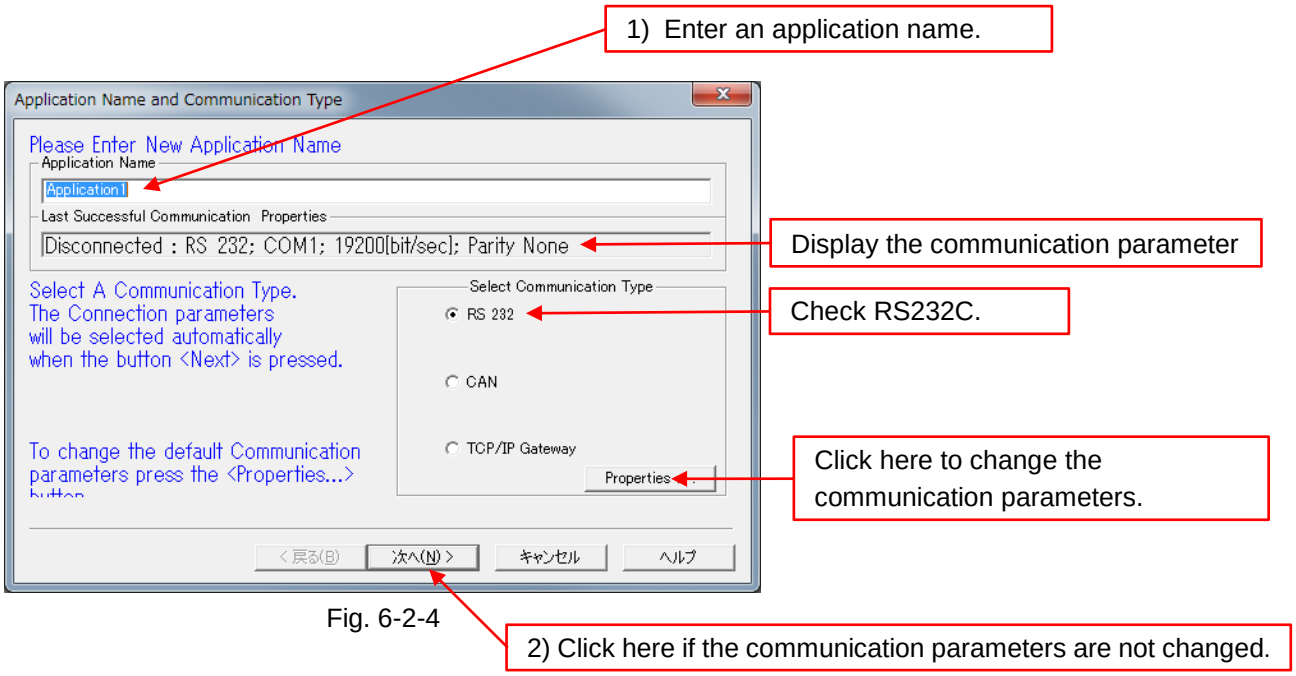


Fig. 6-2-4

3) When the excitation of the axis, which will be adjusted, is ON, the following message (Fig.6-2-5) will be displayed.
When it is off, the motor selection screen (Fig.6-2-8) will be displayed.

Click [Yes] button to turn off the excitation and move to the motor selection screen. If you click [No] button, you will return to the original screen (Fig.6-2-4) with excitation ON.

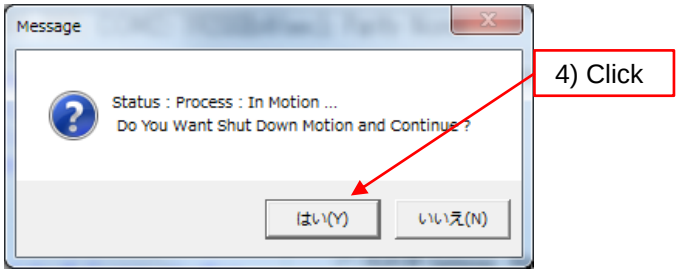


Fig. 6-2-5

(2) When there are changes in communication parameters

1) Enter an application name.
The application name can be set arbitrarily.

2) Click Properties… button. Communication parameter screen (Fig.6-2-6) will be displayed.

3) Select Communication parameters from the drop-down list.

4) Click Connect button.
If the connection with your PC is established normally, you will return to the communication setting screen (Fig.6-2-4).

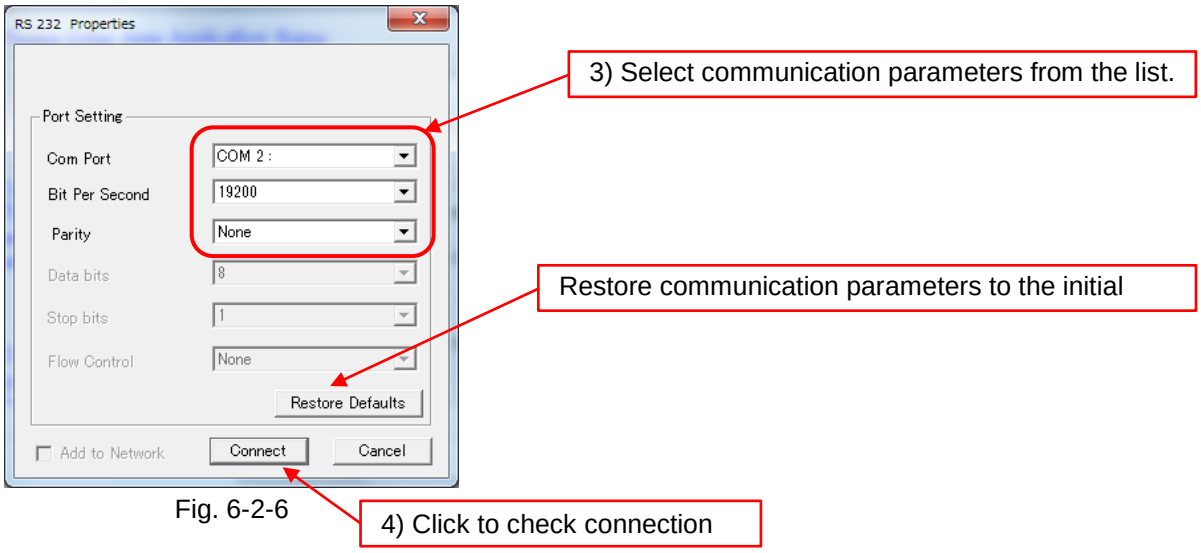


Fig. 6-2-6

4) If there is a problem in the connection with PC, the following message (Fig.6-2-7) will be displayed.
When you click OK button, you will return to communication parameter screen (Fig.6-2-6), so please check the set parameters. Also, check to ensure the cables in use are not broken, disconnected or connected incorrectly.

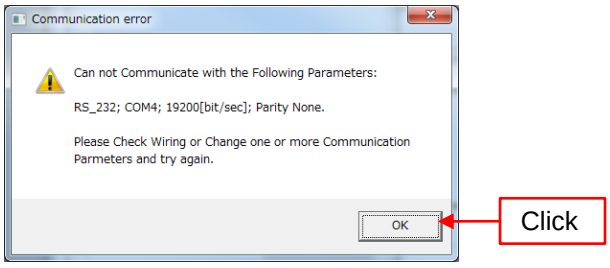


Fig. 6-2-7

6.2.4. Motor selection

(1) List of saved motor

Motor Type	Elmo	Motor Power Company	My Motor	Nippon Pulse Motor / GMC		SEM Controlled Motor Technology
Linear Brushless	---	---	---	S040D	S040Q	---
				S040T	S040X	
				S080D	S080Q	
				S080T		
				S120D	S120Q	
				S120T		
				S160D	S160Q	
				S160T		
				S200D	S200Q	
				S200T		
				S250D	S250Q	
				S250T	S250X	
				S320D	S320Q	
				S320T	S320X	
				S350D	S350Q	
				S350T		
				S427D	S427Q	
				S427T		
				S435D	S435Q	
				S435T		
				S500D	S500Q	
				S500T		
Rotating Brush	---	---	---	---		---
Rotating Brushless	SAR3ACN	T85SR2.2EH14	---	---		HD92C4-64S
	SAR5ACN	T85SR2.2EH15				HD92E4-64S
	SAR3ACN-20	T85SR2.2EH17				HD92G4-64S
	SAR5ACN-20	T85SR2.2EH18				HD92J4-64S
	SB02ADK	T115SR5.2EH14				HD115A6-88S
	SB02ADK-9	T115SR5.2EH15				HD115B6-88S
	SB03ADK-9	T115SR5.2EH16				HD115C6-88S
	SB04ADK	T115SR5.2EH17				HD115E6-88S
	SC05ADK-9	T115SR5.2EH18				
	SC06ADK	T115SR5.2EH19				
	SC06ADK-52					
	SC08ADK-52					
	SE09ADK					
	SE09ADK-52					
	SE15AEK					
	SE22AEK					
	SE30AEK					
Linear, DC, Voice Coil	---	---	---	---		---

Table 6-2-2

(2) When the motor is in the list

1) Select the motor manufacturer in the drop-down list.
2) Select the motor type
3) Select the motor part number in the drop-down list.
4) Confirm the rated current value of selected motor is 1A or less, and click Next > button.
Feedback pulse setting screen (Fig.6-2-10) will be displayed.

[Caution]	
	Please select the motor which does not exceed the maximum current value (1A) as in "4.2. Specification".

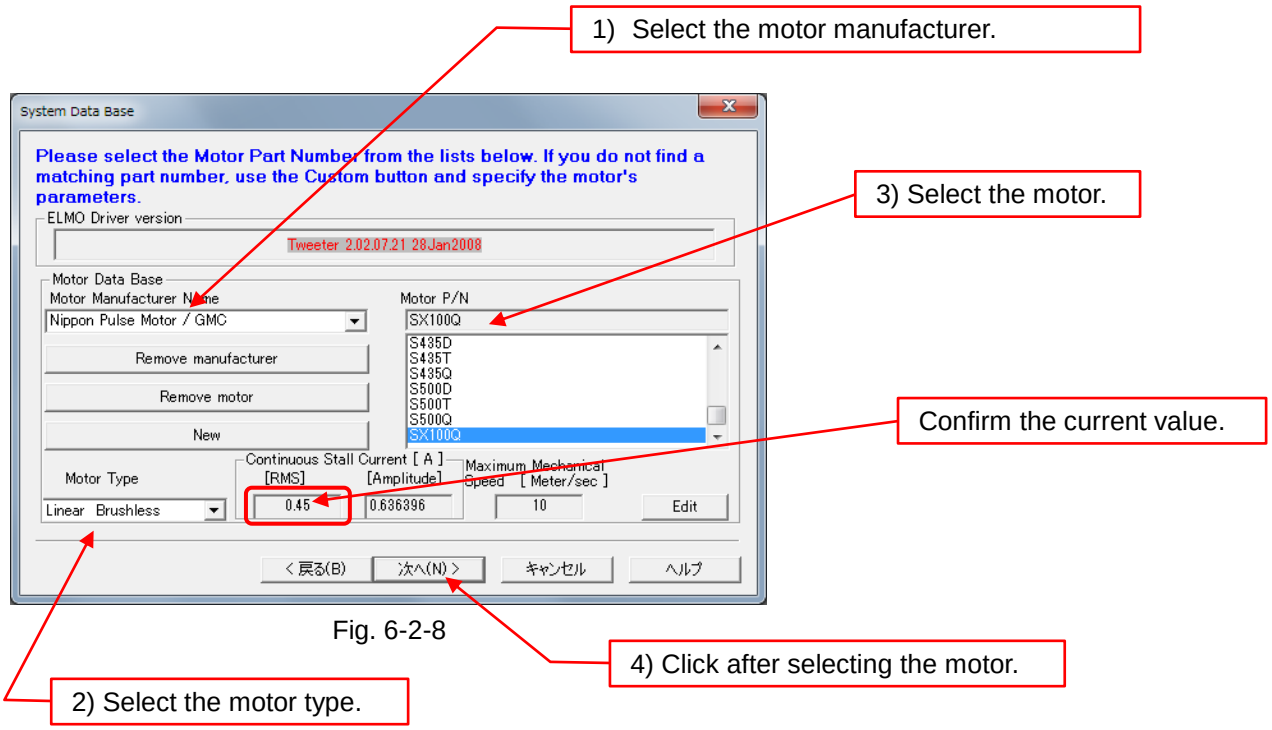


Fig. 6-2-8

(3) If the motor is not in the list

If the motor is not in the list, please add the motor in the following procedure.

1) Select the motor manufacturer in the drop-down list.
   If the manufacturer is not in the list, click [New] button.
2) Select the motor type.
3) Click [Edit] button
4) [Edit] button will change to [Cancel] button, and [Add] button will be added over [Cancel] button.
5) Enter the model number in the Motor P/N column.
6) Enter the rated current and the max speed values.
7) Click [Add] button to add it to the list.
   [Add] button will disappear, and [Cancel] button will return to [Edit] button.
8) Check the rated current value [RMS] of the selected motor, and click [Next] button.
   Feedback pulse setting screen (Fig.6-2-10) will be displayed.

[Caution]	
	Please add a motor which does not exceed the maximum current value (1A) as in “4.2. Specification”.

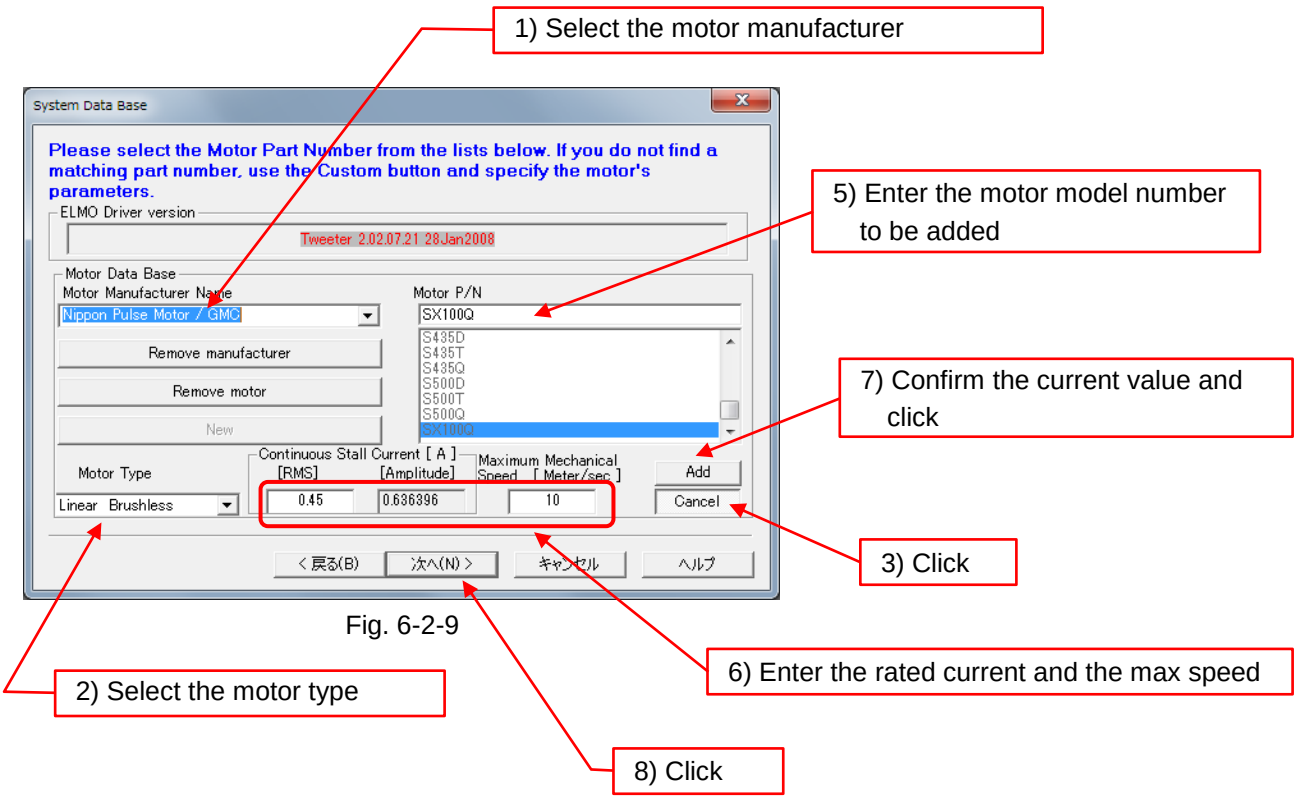


Fig. 6-2-9

6.2.5. Feedback pulse setting

1) Select the encoder type
   Either “Encoder” or “Encoder & Digital Hall” would be selected.
2) Enter the magnetic pitch of the motor.
3) Enter the resolution of the encoder.
4) Click Next > button.

The driver output parameter setting screen (Fig.6-2-11) will be displayed.

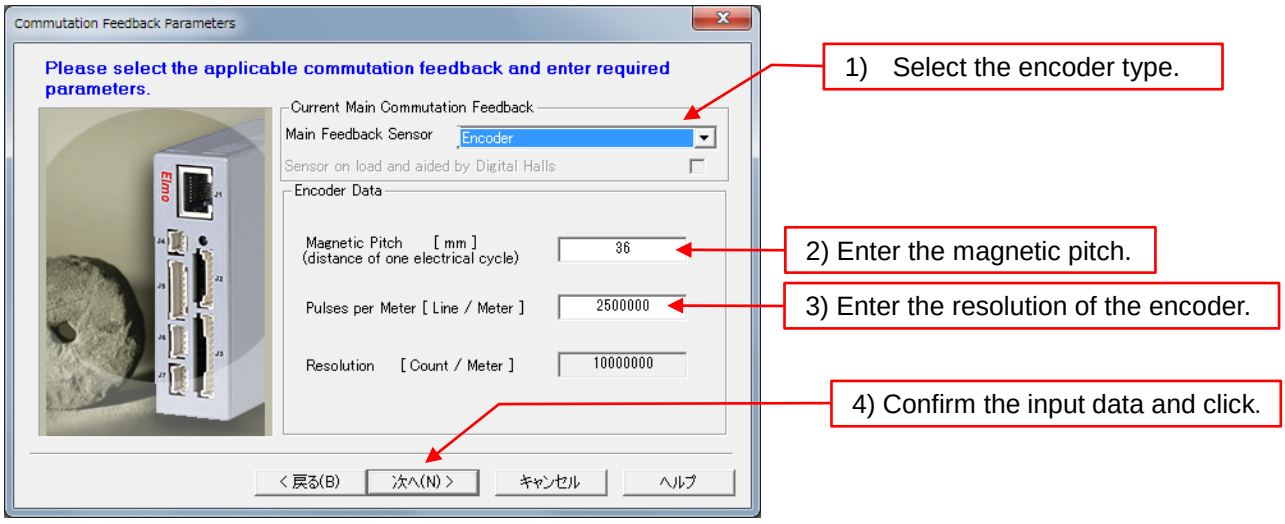


Fig. 6-2-10

6.2.6. Driver output parameter setting

1) Enter the output current value during constant speed drive.
2) Enter the output current value during acceleration (peak time).
3) Click Next > button.
   Setting screen of the general-purpose input signal (Fig.6-2-12) will be displayed.

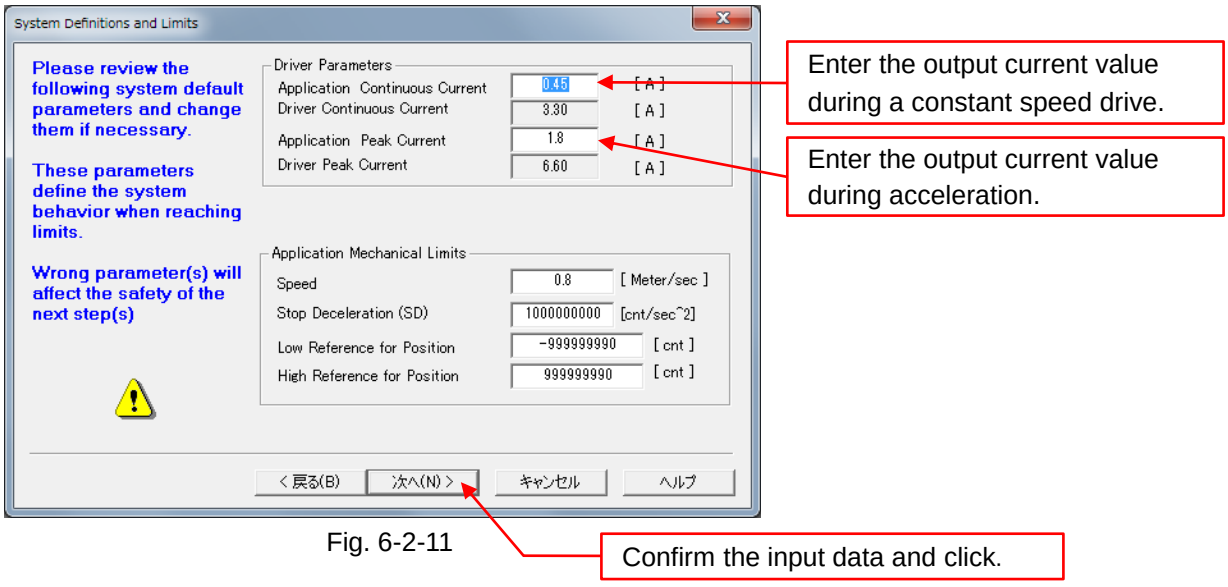


Fig. 6-2-11

6.2.7. Setting of general-purpose input signal

1) Set general-purpose input signal referring to the table below.
As for functions (Function behaviors), please set as shown in the table below.
As for logic (Logic level), adjust to the settings in the controller side. Input 3 to Input 6 are not connected.

Signal	Function behaviors	Logic level	Terminal assignment signal name
Input 1	Soft & Hard Stop	Low	Deviation counter clear signal
Input 2	Inhibit (Freewheel)	High	Excitation ON/OFF signal
Input 3	Ignore	Low	Unused
Input 4	Ignore	Low	Unused
Input 5	Ignore	Low	Unused
Input 6	Ignore	Low	Unused

Table 6-2-3

2) Click Next > button.
Setting screen of general-purpose output signal setting screen (Fig.6-2-13) will be displayed.

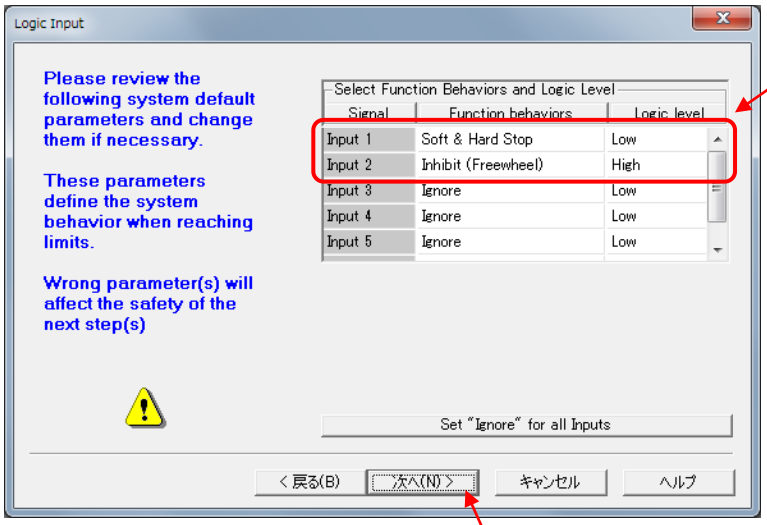


Fig. 6-2-12

1) Set the contents of Input 1 and Input 2.

2) Click after setting general-purpose input signal.

6.2.8. Setting of general-purpose output signal

1) Set general-purpose output signal referring to the table below.
As for functions (Function behaviors), please set as shown in the table below.
As for logic (Logic level), adjust to the settings in the controller side.

Signal	Function behaviors	Logic level	Terminal assignment signal name
Output 1	General-purpose	Low	In position signal
Output 2	General-purpose	High	Alarm signal

Table 6-2-4

1) Click Next > button.
Tuning items confirmation screen (Fig.6-2-14) will be displayed.

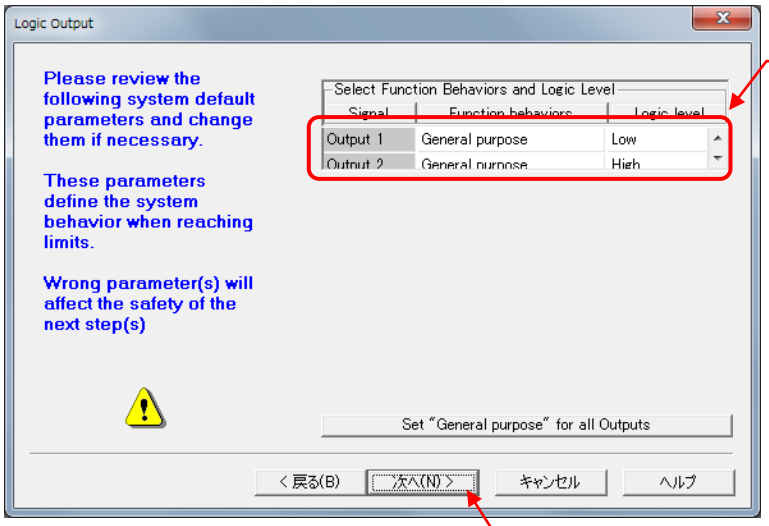


Fig. 6-2-13

6.2.9. Confirmation of tuning items

1) It is automatically selected per the type of motor.
If there is no change, click Next > button.
Current loop tuning screen (Fig.6-2-15) will be displayed.

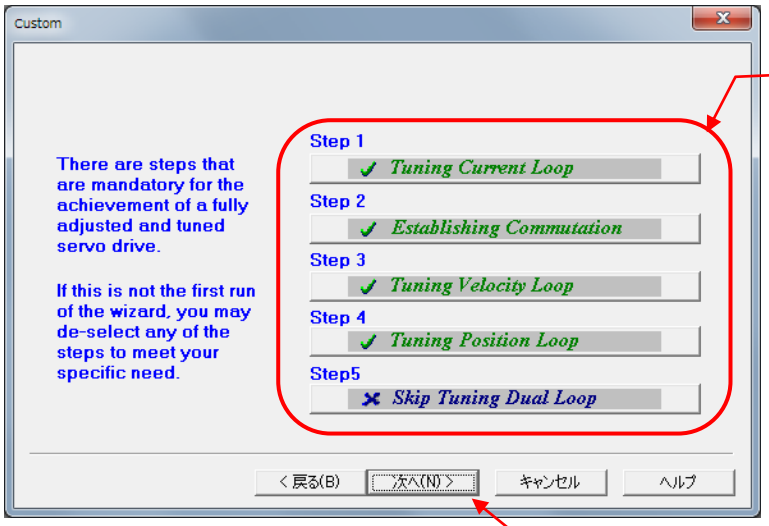


Fig. 6-2-14

6.2.10. Current loop tuning

1) Confirm there would be no danger if motors move.

[Caution]	
	Once a tuning starts, a motor repeatedly moves and stops. To avoid a danger, be careful not to touch the motor during tuning.

2) Click Run button.

Current loop tuning starts.

At this time, the screen (Fig.6-2-16) is displayed to indicate the tuning is in progress.

To cancel tunings, click Cancel button.

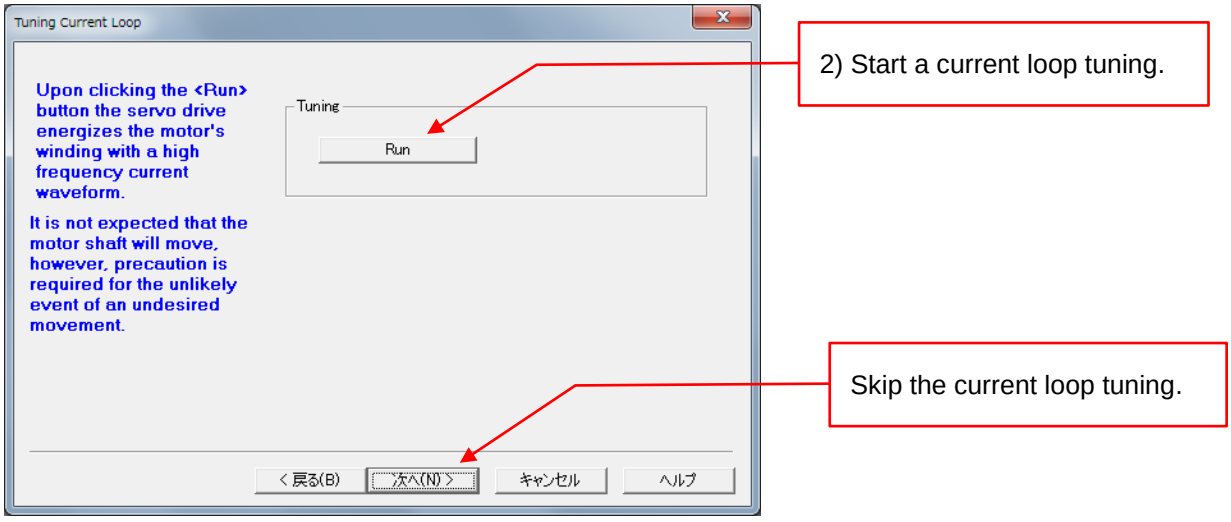


Fig. 6-2-15

3) When a tuning completes, an end screen (Fig.6-2-17) will be displayed.

If you will execute another tuning, click Yes button.

The commutation setting screen (Fig.6-2-18) will be displayed.

If you will execute a current loop tuning again, click No button, and click Run button in the current loop setting screen (Fig.6-2-15).

Screen to show the tuning is in progress

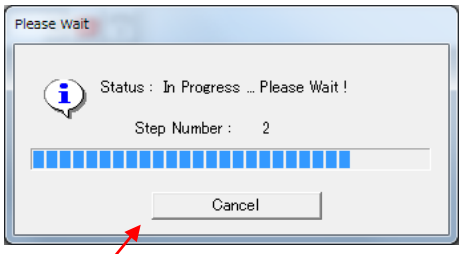


Fig. 6-2-16

Tuning end screen

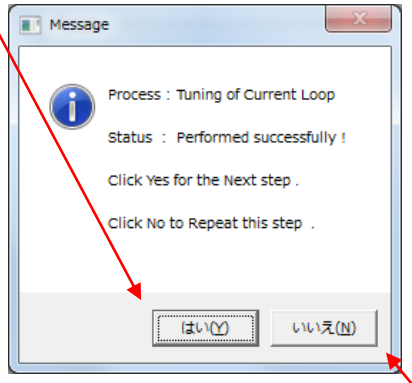


Fig. 6-2-17

3) Click to execute another tuning.

Click to cancel a tuning.

Click to execute the same tuning again.

6.2.11. Commutation setting

1) Confirm there would be no danger if motors move.

[Caution]	
	Once a commutation setting starts, a motor repeatedly moves and stops. To avoid injury, be careful not to touch the motor during commutation setting.

2) Click Run button.

The screen (Fig.6-2-19) for confirming the movement in the positive direction in the system will be displayed.

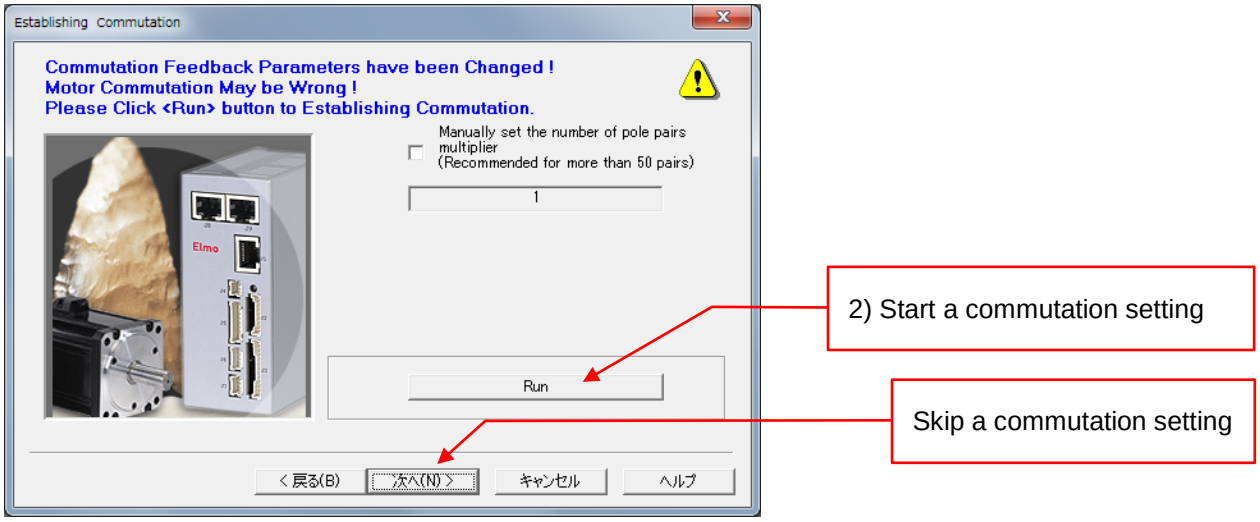


Fig. 6-2-18

3) Click OK button if you are ready to start a commutation setting. The commutation setting starts and the movement starts in the positive direction in a system.

At this time, the screen (Fig.6-2-20) is displayed to indicate the commutation setting is in progress.

Movement start confirmation screen

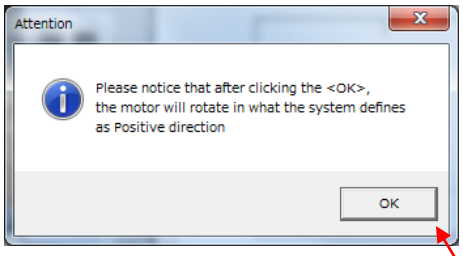


Fig. 6-2-19

Commutation setting in progress screen

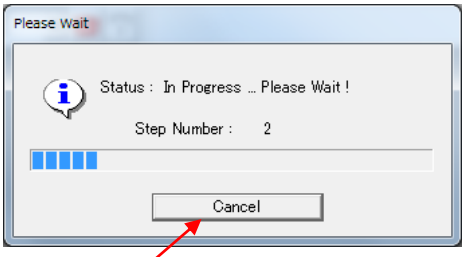


Fig. 6-2-20

3) The motor starts moving.

Click to cancel the commutation setting

4) The motor stops after a while, and the confirmation screen of the movement direction (Fig.6-2-21) will be displayed.
Click [Yes] button if the positive direction in the system and the positive direction in the actual machine are the same, and click [No] button if they are opposite. The screen (Fig.6-2-22) will be displayed to indicate a commutation setting resumes, and the setting is in progress.

Movement direction confirmation screen

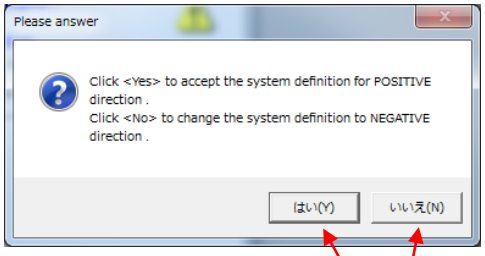


Fig. 6-2-21

Commutation setting in progress screen

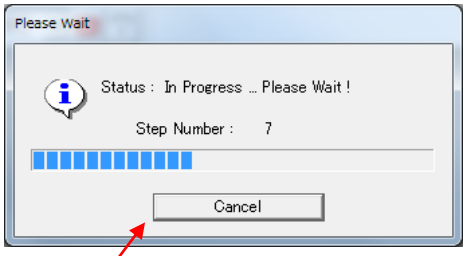


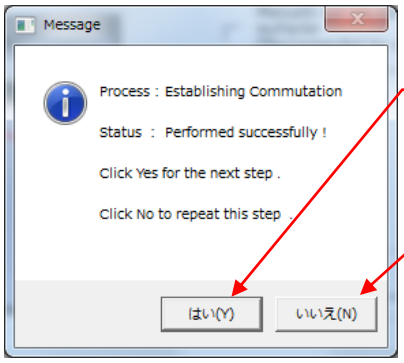
Fig. 6-2-22

4) A motor starts moving

Click to cancel the commutation setting

5) When the commutation setting completes, the end screen (Fig.6-2-23) will be displayed.
If you will execute another tuning, click [Yes] button.
The velocity loop tuning screen (Fig.6-2-24) will be displayed.
If you will execute a commutation setting again, click [No] button, and click [Run] button in the commutation setting screen (Fig.6-2-18).

Commutation setting end screen



5) Click to execute the next tuning.

Click to execute a commutation setting again.

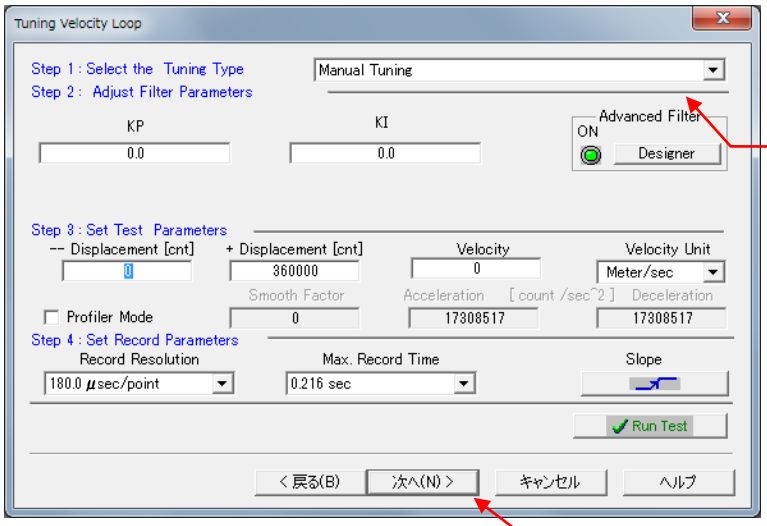
Fig. 6-2-23

6.2.12. Velocity loop tuning

1) Confirm there would be no danger if motors move.

[Caution]	
	Once a tuning starts, a motor repeatedly moves and stops. To avoid injury, be careful not to touch the motor during tuning.

2) Select “Auto Tuning for Speed Design” as a tuning type.
The screen switches to Auto tuning screen (Fig.6-2-25).

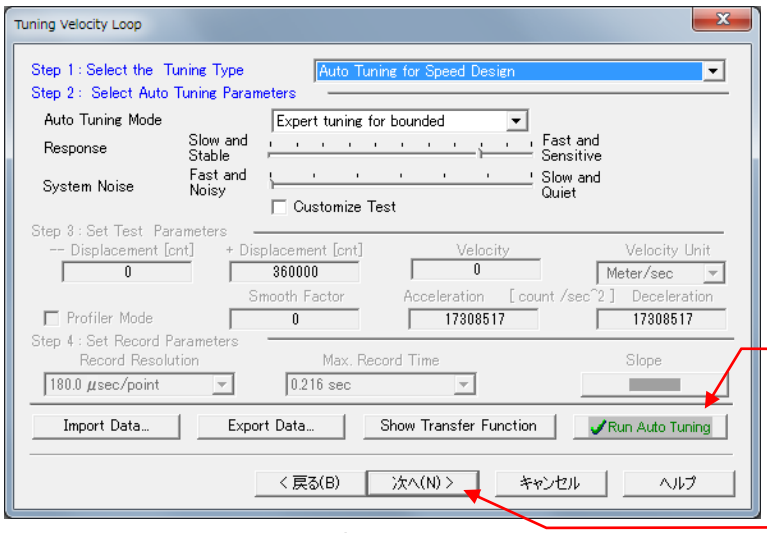


2) Select “Auto Tuning for Speed Design”.

Skip Velocity loop tuning.

Fig. 6-2-24

3) Click Run Auto Tuning button
The screen of the auto tuning start confirmation (Fig.6-2-26) will be displayed.



3) Start a velocity loop tuning

Skip a velocity loop tuning.

Fig. 6-2-25

4) Click OK button if a motor is ready to move.
A tuning starts.
At this time, the screen (Fig.6-2-27) is displayed to indicate the tuning is in progress.

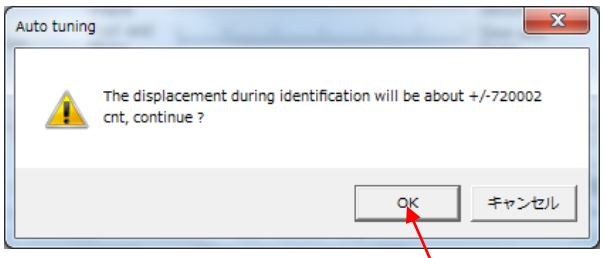


Fig. 6-2-26

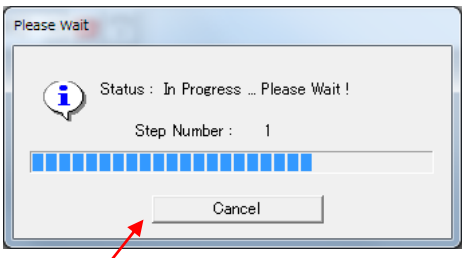


Fig. 6-2-27

4) A motor start moving.

Click to cancel a velocity loop tuning.

5) When the velocity loop tuning completes, the following graph (Fig.6-2-27) is shown as a tuning result
6) Click Next > button in the velocity loop tuning screen (Fig.6-2-29).
The screen of position loop tuning screen (Fig.6-2-30) will be displayed.

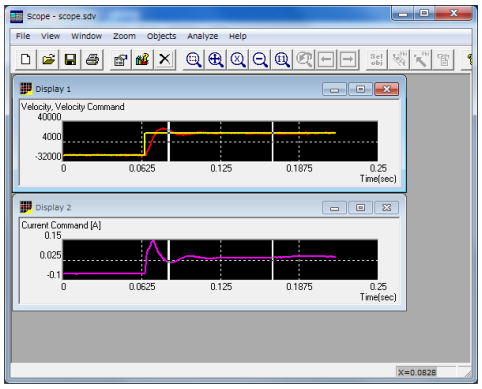


Fig. 6-2-28

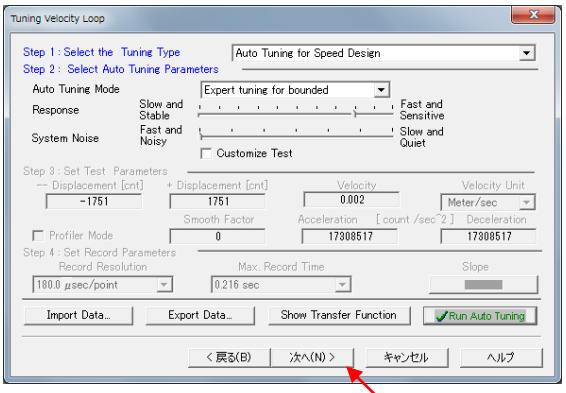


Fig. 6-2-29

6) Click after the tuning completes

6.2.13. Position loop tuning

1) Click Run Auto Tuning button

A position loop tuning starts.

At this time, the screen (Fig.6-2-31) is displayed to indicate the tuning is in progress.

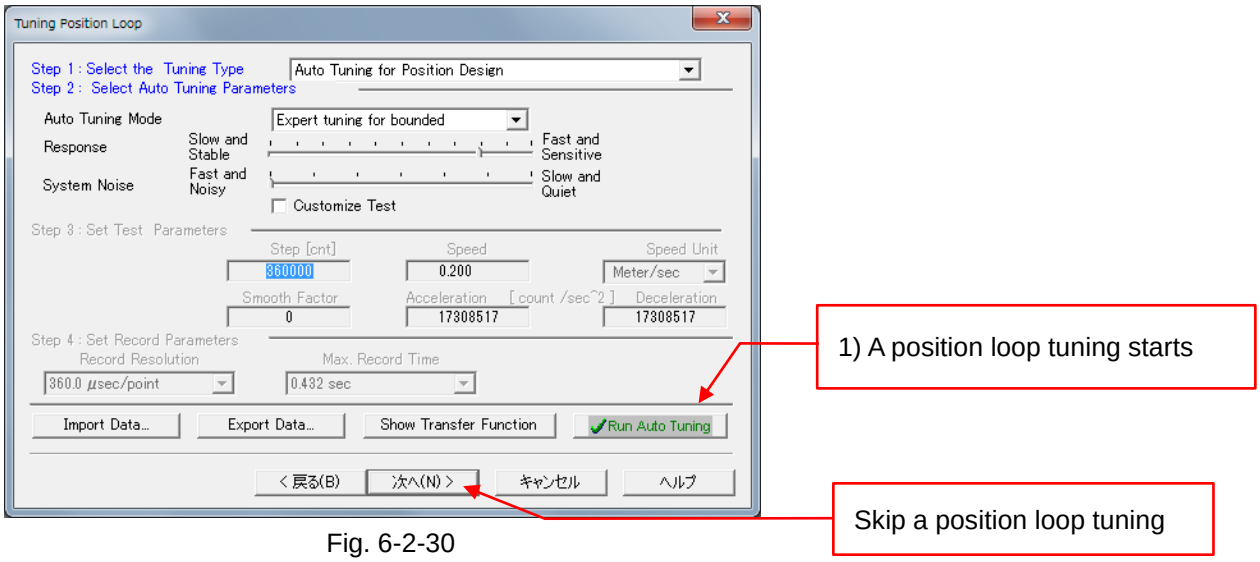


Fig. 6-2-30

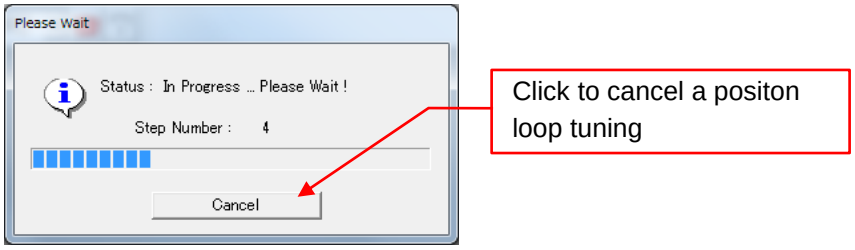


Fig. 6-2-31

2) When the position loop tuning completes, the following graph (Fig.6-2-31) is shown as a tuning result

3) Click Next > button in the position loop tuning screen (Fig.6-2-33).

The screen of tuning information screen (Fig.6-2-34) will be displayed.

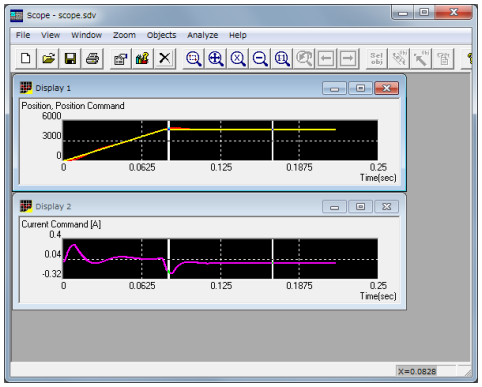


Fig. 6-2-32

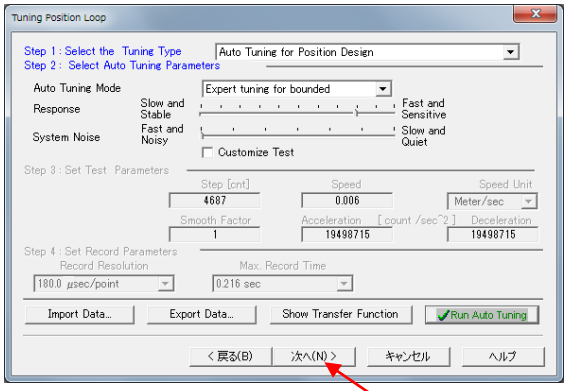


Fig. 6-2-33

6.2.14. Display and save the tuning results.

1) Confirm the result information of the tuning.

2) Click Finish button .

Save As request screens (Fig.6-2-35) of the data set by auto tuning will be displayed.

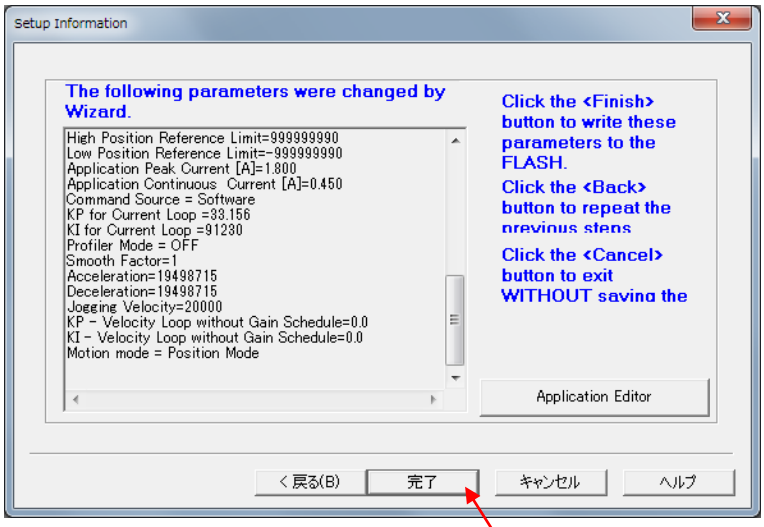


Fig. 6-2-34

2) Confirm the contents and click.

3) Specify the file name and the folder for saving, and click save button.

This will complete the auto tuning operation.

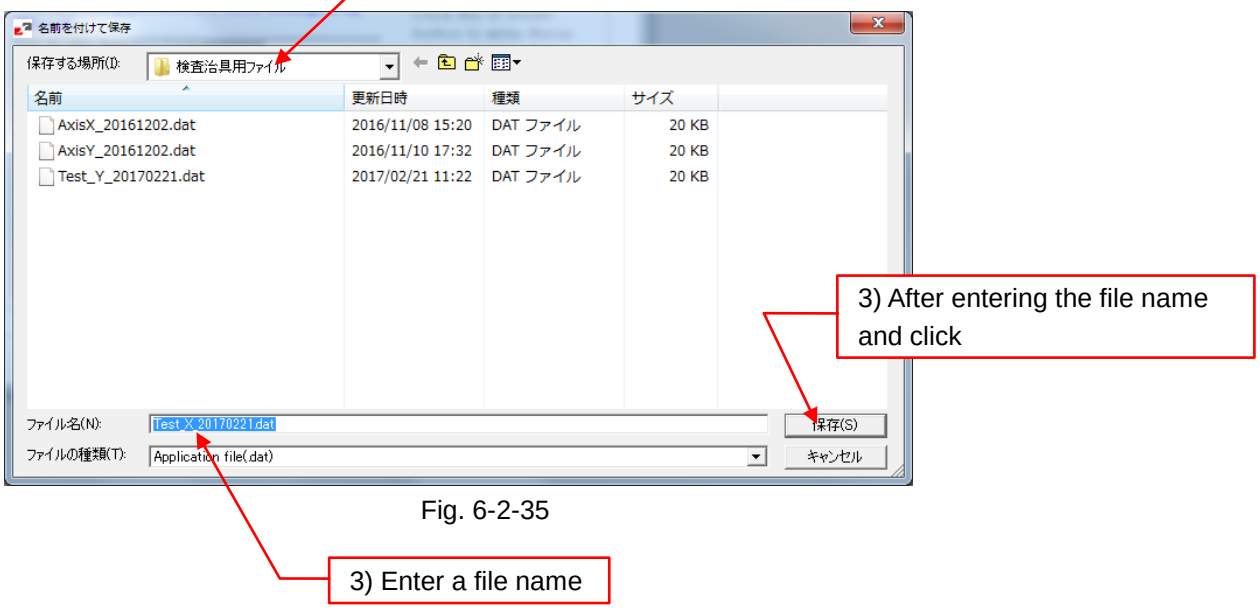
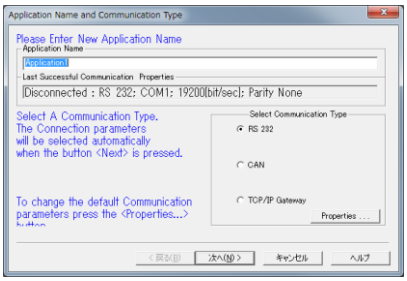


Fig. 6-2-35

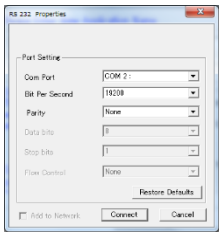
6.3. Auto tuning screen transition diagram

Activation selection

Application name and communication setting



Communication setting

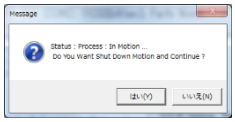


Current excitation status

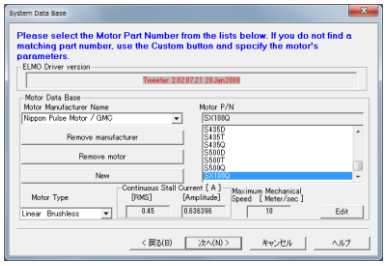
ON

OFF

Excitation OFF message

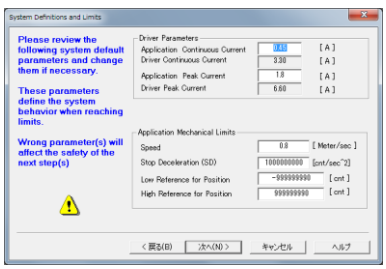


Motor selection

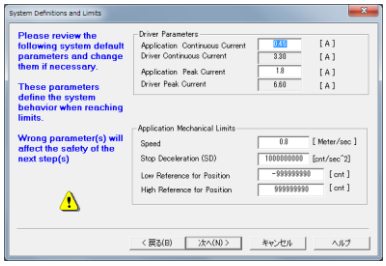


Feedback pulse setting

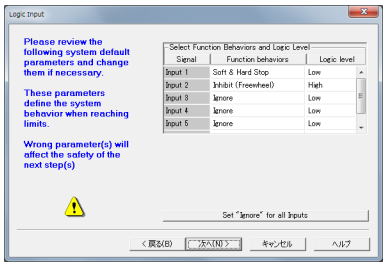
Driver output parameter setting



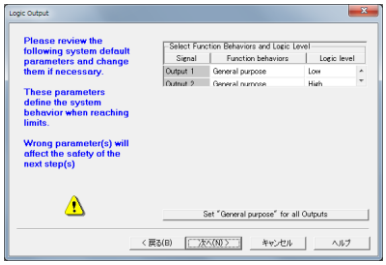
Driver output parameter setting.



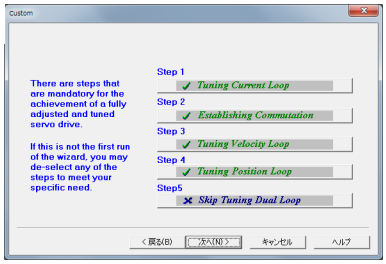
General-purpose input signal setting



General-purpose output signal setting

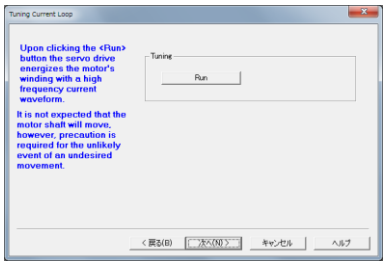


Tuning items confirmation



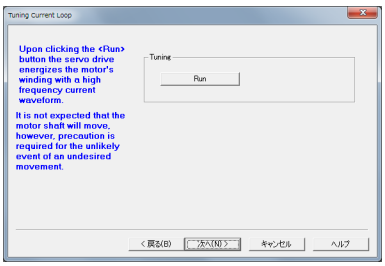
Tuning

(Current loop)

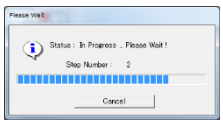


Tuning in progress

(Current loop)

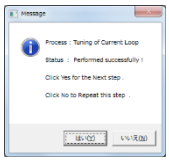


Run



Running screen

Display by tuning completion

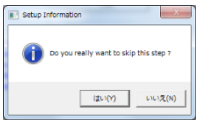


Tuning end screen

次へ(N) >

はい(Y)

Skip confirmation

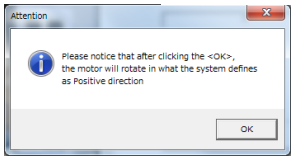


はい(Y)

Movement start confirmation screen

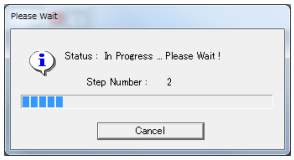
Commutation setting

Run



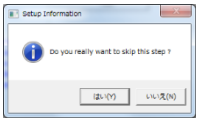
OK

Running screen



次へ(N) >

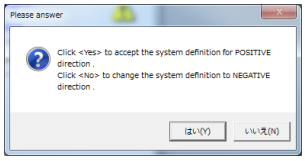
Skip confirmation



A motor slightly moves and is displayed

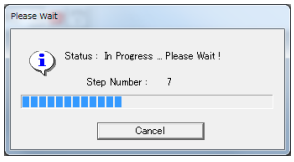
はい(Y)

Direction confirmation screen



はい(Y) いいえ(N)

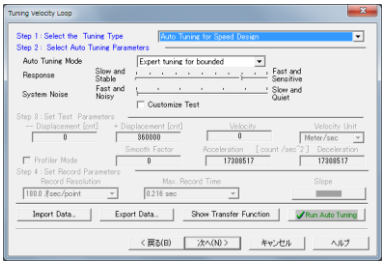
Running screen



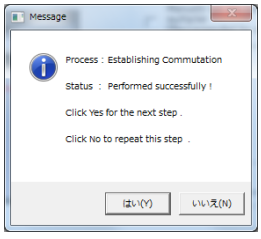
Displayed at the end of commutation setting

Tuning in progress

(Velocity loop)



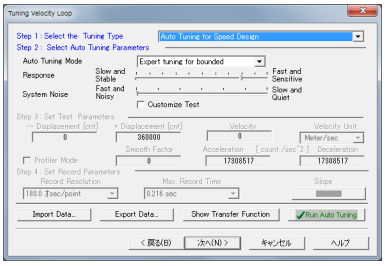
Commutation setting end screen

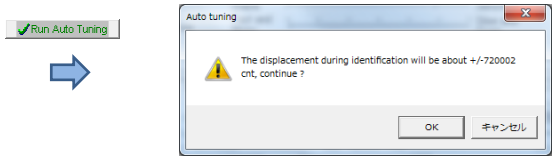


はい(Y)

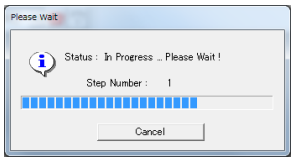
Tuning in progress

(Velocity loop)

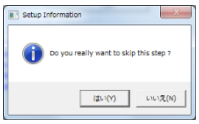




Tuning in progress



Skip confirmation

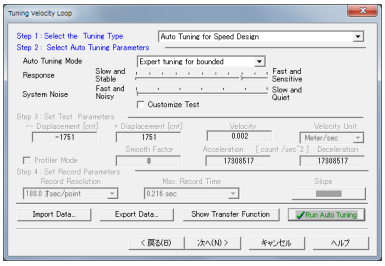


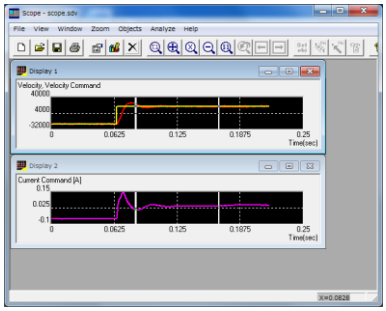
Displayed at the end of the tuning

Tuning result

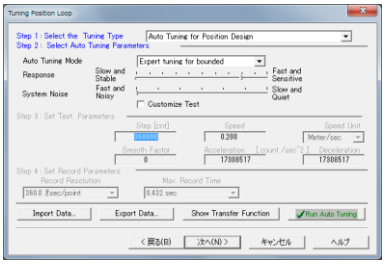
Tuning in progress

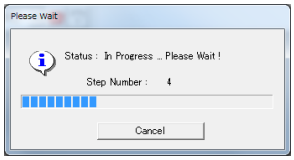
(Velocity loop)





Tuning in progress





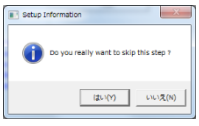
Tuning in progress

（Position loop）

Display at the end of the tuning

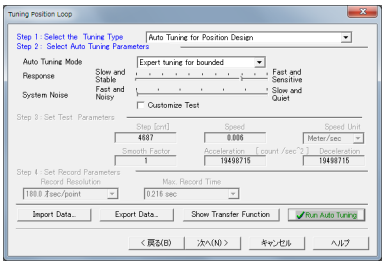
Tuning result

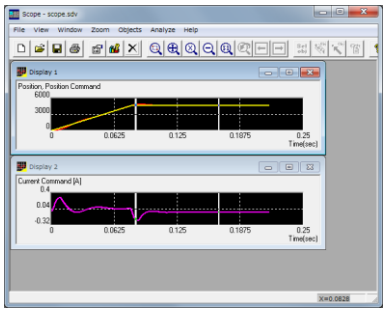
Skip confirmation



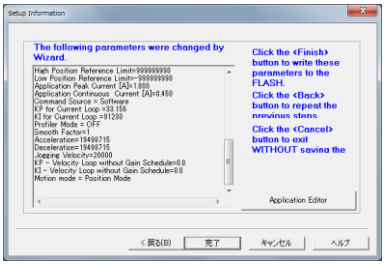
Tuning in progress

（Position loop）

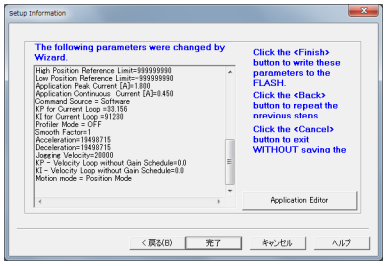




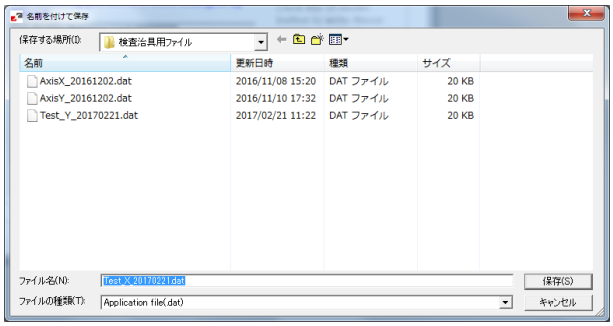
Tuning information



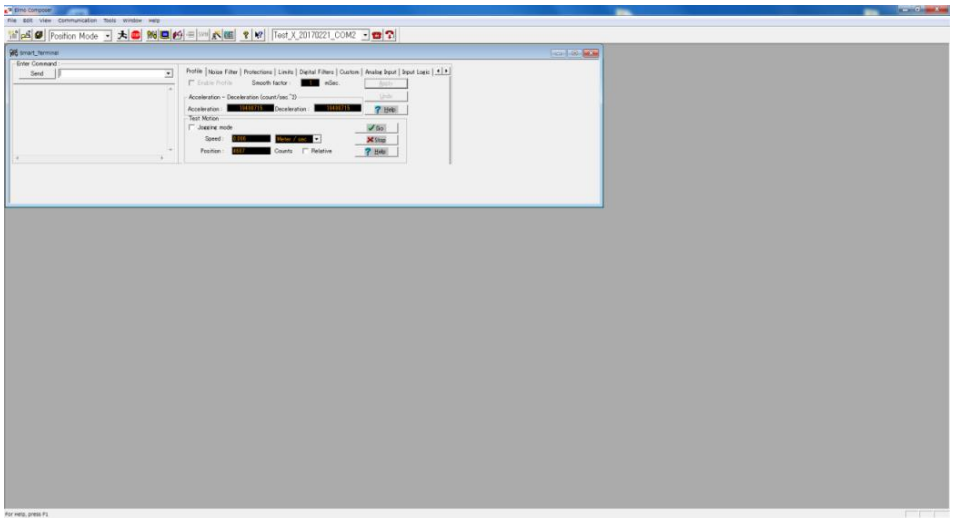
Tuning information



Save the tuning data



Tuning completed.



7. Setting of pulse input signal and general-purpose I/O signal

7.1. Outline

The contents here are already set before this controller is shipped. Basically, you do not have to operate.

7.2. Operation method

7.2.1. Start the Elmo Studio

1) Start the Elmo Studio

Click the button to open the Elmo Studio screen in the Composer screen.

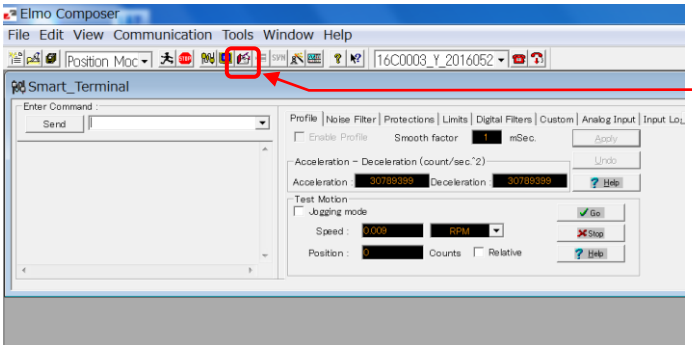


Fig. 7-2-1(A)

Or, click Tools ⇒ Elmo Studio

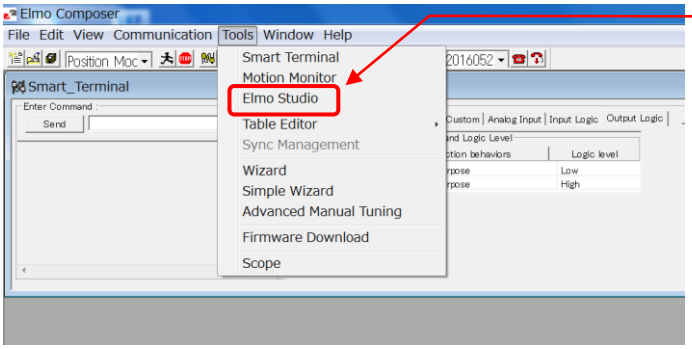


Fig. 7-2-1(B)

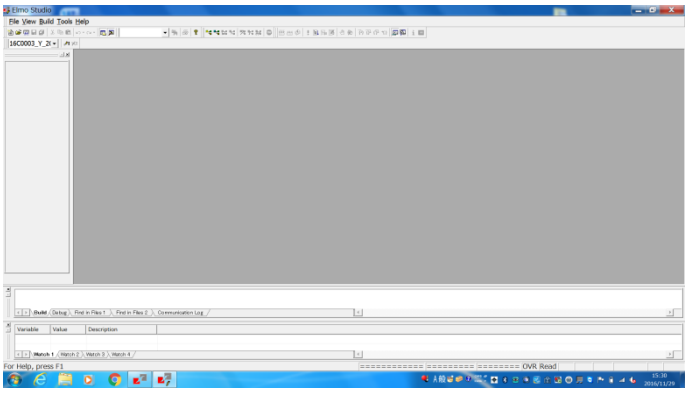


Fig. 7-2-2

7.2.2. Write program codes

1) Open the screen to write program codes.
Click New creation button in the Elmo Studio.

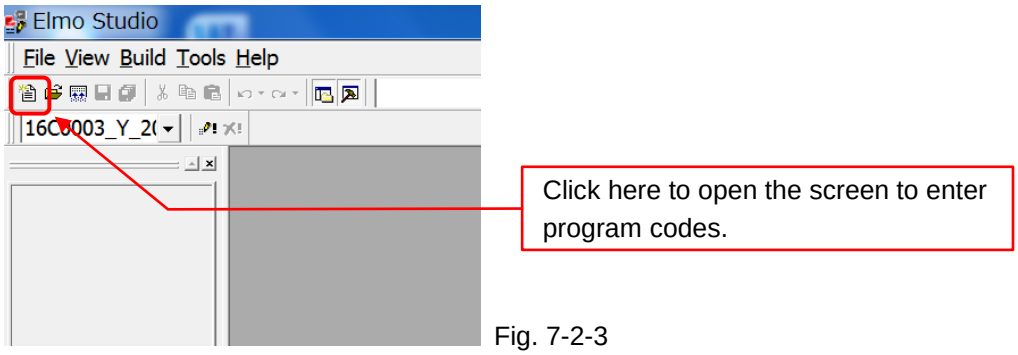


Fig. 7-2-3

2) Select a file format and enter the file name.
Select EHL Program for file format. File name does not require an extension. An extension will be automatically added per the selected file format.
Also, the first letter of the file name is limited to alphabet. If there is an error in the file name, OK button will be invalid.

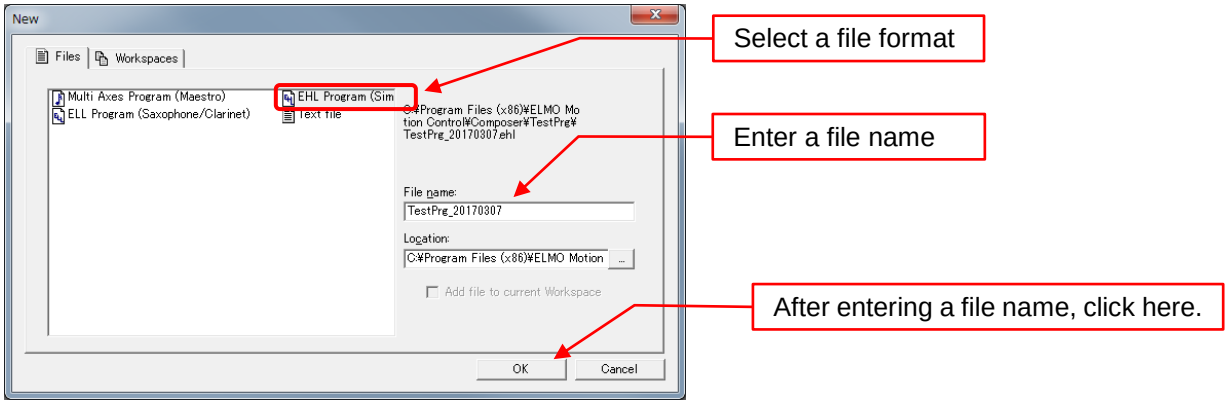


Fig. 7-2-4

3) Write a program code.
Enter a code described in “7.3 Program code”

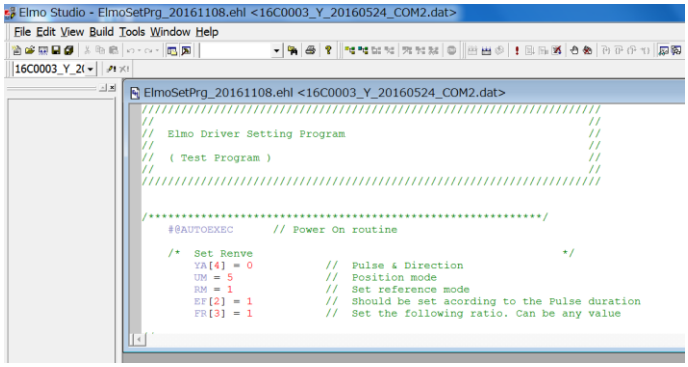


Fig. 7-2-5

4) Build the described program

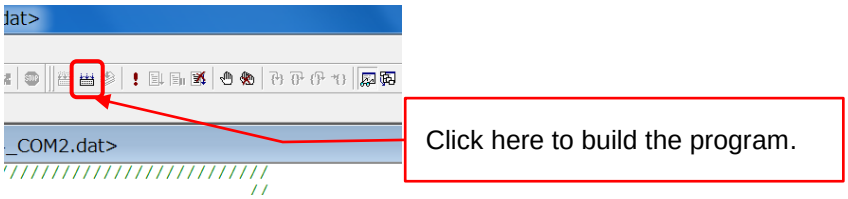


Fig.7-2-6

7.2.3. Program transfer and start/stop

1) Transfer and start the program

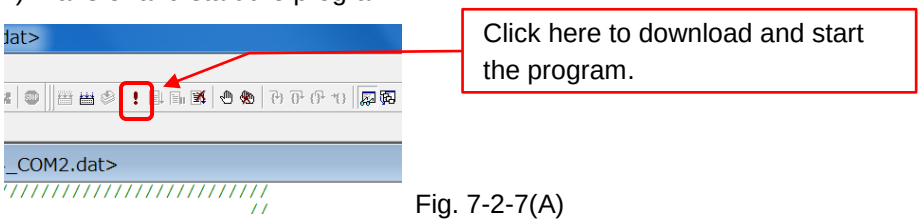


Fig. 7-2-7(A)

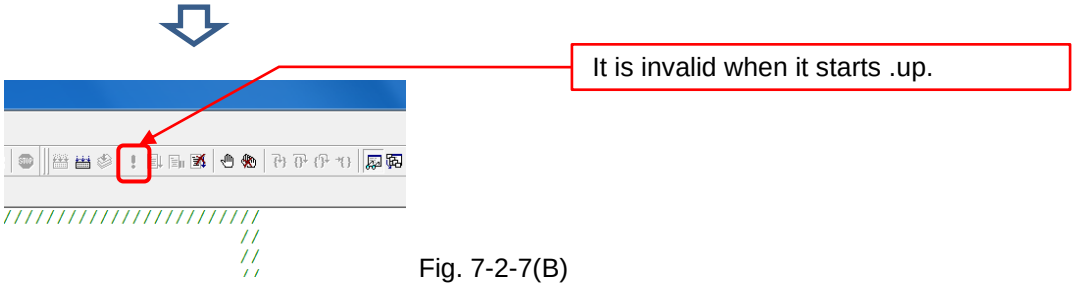


Fig. 7-2-7(B)

2) Stop the program after confirming the program to start up.

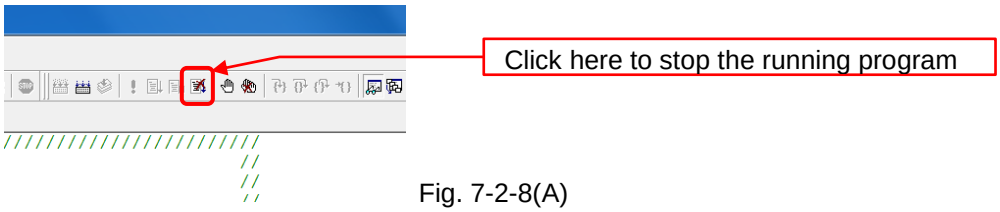


Fig. 7-2-8(A)

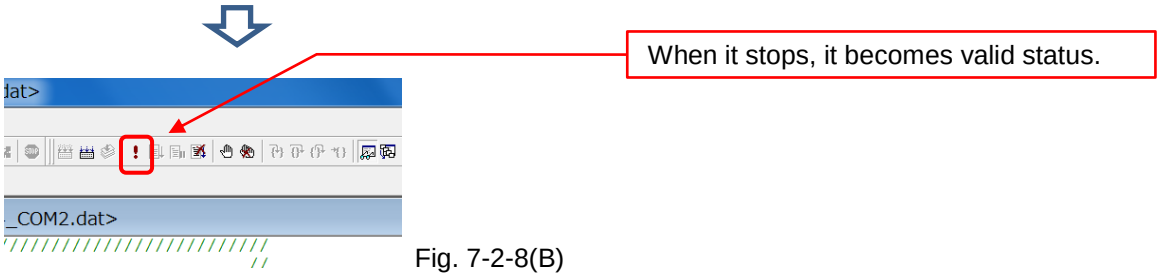


Fig. 7-2-8(B)

7.2.4. Close the Elmo Studio

1) To exit the Elmo Studio

Click [×] at the upper right corner in the screen or File → Exit and exit the Elmo Studio.

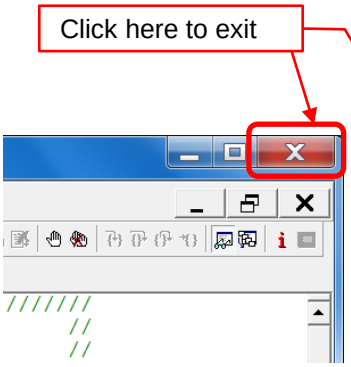


Fig. 7-2-9

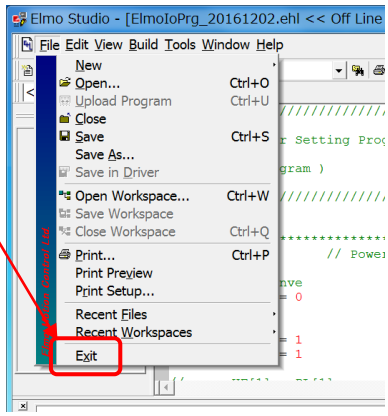


Fig. 7-2-10

7.3. Program code

```
////////////////////////////////////////////////////////////////
//                                                            //
// Elmo Driver Setting Program                                //
//                                                            //
////////////////////////////////////////////////////////////////

/*************************************************************/
  #@AUTOEXEC      // Power On routine

  /*  Set Renve                                          */
      YA[4] = 0         //  Pulse & Direction
      UM = 5            //  Position mode
      RM = 1            //  Set reference mode
      EF[2] = 1         //  Should be set according to the Pulse duration
      FR[3] = 1         //  Set the following ratio. Can be any value
      wait 2000

  /*  Set General-Purpose Input Pin                      */
  //  InPort1       ERC Clear
      IL[1] = 20        //  Soft & Hard Stop    Active Low

  //  InPort2       Motor On/Off
      IL[2] = 1         //  Motor On/Off        Active High
      MO = 1            //  Motor On
```

```
/*  Set General Purpose Output Pin                          */
//  OutPort1  Alarm
    ER[3] = 100000  //  Max. ERC Error Counter
    OL[1] = 0       //  General Purpose     Active Low

//  OutPort2  Inposition
    TR[1] = 100     //  Inposition range    Count ( pulse )
    TR[2] = 30      //  Inposition range    Time   ( ms )
    OL[2] = 0       //  General Purpose     Active Low

/*  Eternal loop                                            */
    while 1
        if MO == 1  //  Motor On/Off Check
            OB[1] = 0 //  Alarm Off
        end

        if MS == 0 && DV[2] == 0    //  Motor Status Check
            OB[2] = 1 //  Inp On
        else
            OB[2] = 0 //  Inp Off
        end
    end
return



/*************************************************************/
  #@AUTO_ER      //  Driver error routine

    MI=0xFFFF   //  Disable all auto routines
    OB[1] = 1   //  Alarm On
    MI=0        //  Enable all auto routines

  return
```

CAUTION	The descriptions in this specification may be changed without prior notice to improve performance or quality.

NPM Impress, not just satisfy
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