

PCL6115 Starter Kit

PCL6115-EV

User's Manual

Application Software

PCL6115 Starter Kit x

File (F) Tool (T) Other (O)

X-axis

MSTSW	0000 h	SSTSW	0000 h	RENV1	00000002 h	RIRQ	00000000 h
RMV	2304	PRMV	2304	RENV2	80001D40 h	RLTC1	0
RFL	400	PRFL	400	RENV3	00000000 h	RLTC2	0
RFH	1500	PRFH	1500	RENV4	00000000 h	RLTC3	0
RUR	1227	PRUR	1227	RCUN1	0	RLTC4	0
RDR	0	PRDR	0	RCUN2	0	RSTS	0000BD00 h
RMG	1199	PRMG	1199	RCMP1	0	REST	00000000 h
RDP	0	PRDP	0	RCMP2	0	RIST	00000000 h
RMD	00000041 h	PRMD	00000041 h	RCMP3	0	RPLS	0
RIP	0	PRIP	0	RCMP4	0	RSPD	0
RUS	0	PRUS	0			RSDC	0
RDS	0	PRDS	0				

Command Data

A3 h 0 d RGPD 0000 h

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1. Introduction

Thank you for considering our PCL6115-EV Starter Kit Application software.

This manual describes specifications, functions of our PCL6115-EV Starter Kit Application software and how to connect and use it. In order to use this product safely, please read this manual thoroughly and keep it.

1.1 How to use this manual

1. Reproduction of this manual in whole or in part without permission is prohibited by the Copyright Act.
2. The contents of this manual are subject to change without the prior notice along with the improvement of performance and quality.
3. Although this manual is produced with the utmost care, please contact our sales representative if there are any questions, errors or omissions.

1.1.1 Symbol description

1.1.1.1 Physical damage level

In this manual, the physical damage level is defined as follows.

- **Serious injury**
Those that might cause aftereffects such as loss of sight, wound, burn, electric shock, fracture, poisoning, or those requiring hospitalization or long-term outpatient treatment.
- **Minor injury**
Those not requiring hospitalization or long-term outpatient treatment. (Other than "serious injury" above)

1.1.1.2 Hazardous level

The product is designed with the top priority for the safety of operators. However, due to the nature of the product, there are risks that cannot be eliminated. In this manual, the seriousness and level of these risks are divided into three categories: "Danger," "Warning," and "Caution." Be sure to read and understand the symbols descriptions thoroughly before operating or performing maintenance work on the product.

"Danger", "Warning", and "Caution" are indicated in the order of severity of hazard: (danger > warning > caution), and the meanings are described underneath.



D a n g e r

"Danger" indicates that it might cause an imminent risk that could result in the death or serious injury of the operator during operations of this product.



W a r n i n g


"Warning" indicates that it may result in the death or serious injury of the operator during operations of this product.



C a u t i o n

"Caution" indicates that it may result in minor injury of the operator during operations of this product.

C a u t i o n

"Caution" without warning symbol  indicates that the operator is not likely to be injured, but it can cause damage or result in a malfunction to this product, your equipment, or your instruments.

In addition to the hazardous level classifications described above, the following notations are also used.

I m p o r t a n c e

"Importance" indicates the information and contents that must be known particularly in operations and maintenance works of this product.

R e m a r k s

"Remarks" initiates the useful information or contents for operations and maintenance works of this product.

1.1.1.3 Warning symbol

In this manual, the following symbols are added along with the notations "Danger," "Warning," "Caution," and "Importance" to indicate the warning contents in an easy-to-understand manner.



This symbol indicates that a high voltage may be applied.
Failure to confirm safety or mishandling of this product might cause a risk of electric shock, burn, or death.



This symbol indicates that some parts have a high surface temperature, and the mishandling can cause a risk of burns.



This symbol indicates that mishandling may cause a fire.



This symbol indicates "prohibited" actions that must not be performed in the operation and the maintenance work of this product.



This symbol indicates "mandatory" actions that must be performed in the operation and the maintenance work of this product.

1.2 Production warranty

This content is the warranty of the product purchased from Nippon Pulse Motor.

When the product is purchased from a supplier other than NPM, please contact that supplier regarding the product's warranty.

1.2.1 Warranty period

The warranty period is one year from the date of the delivery to an assigned place.

1.2.2 Warranty scope

If any defect is found in a product during the warranty period under the normal use following this document, NPM will repair or replace the product without charge.

However, the following cases are not covered by the warranty even during the warranty period.

- 1) Products modified or repaired by anyone other than NPM or a person authorized by NPM.
- 2) Defects that result from dropping after the delivery or mishandling in transit.
- 3) Natural deterioration, wearing, and fatigue of components.
- 4) Defects result from any usage other than the original described in this manual.
- 5) Defects result from natural disaster or force majeure such as fires, earthquakes, lightning strikes, winds, floods, salts or electrical surges.
- 6) Defects or damages result from a cause that is not the fault of NPM.

Free repairs will only be conducted at NPM locations; no repairs will be made by business trips.

Warranty period of repaired product is the same as the warranty period before repair.

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

1.3 Notice

This document aims to describe the details of functions of the product. It does not warrant fitness for a particular purpose of the customer. Also, the examples of applications and circuit diagrams in this manual are included only for your reference.

Please confirm the features and the safety of device or equipment before use.

1.4 Confirmation

Please do not use this product in the following conditions. If you need to use in the following conditions, please contact our sales representatives:

1. Any equipment that may require a high reliability or a safety, such as nuclear facilities, electricity or gas supply systems, transportation facilities, vehicles, various safety systems, medical equipment, etc.
2. Any equipment that may directly affect human survival or property.
3. Usages under conditions or circumstances that are not specified in the catalog, manual, etc.

For applications that may cause serious damages to a human life or property due to failure of this product, ensure high reliability and safety by redundant design.

2. Introduction

This manual is the operation manual of the application software that operates a control board.

By using this software and PCL6115-EV Starter Kit, you can learn motor control functions with pulse control LSI PCL6115.

Please refer to the following manuals along with this manual.

(x: revision)

	Manual Name [Outline]	Document File name	Software File name	Document No.
Hardware Manual	PCL6115 Starter Kit User's Manual (Hardware)	PCL6115-EV_Hardware Manual_VerxE.pdf	—	TA600021-ENx/x
	PCL6115 Starter Kit User's Manual (Simple Manual)	PCL6115-EV_Simple Manual_VerxJE.pdf	—	TA600020-ENx/x
Application Software Manual	PCL6115 Starter Kit User's Manual (Application Software) [Setting acceleration/deceleration pattern and register display]	PCL6115-EV_Application Manual_VerxE.pdf	PCL6115-EV_Application_VxxxJE.zip	TA600018-ENx/x (This document)
	PCL6115 Starter Kit User's Manual (Language File Creation Rule) [Multi-language]	PCL6115-EV_Application Language File Manual_VerxE.pdf	PCL6115-EV_Application Language File_VxxxE.zip	TA600007-ENx/x
	PCL6115 Starter Kit User's Manual (Sample program) [Check and add motion pattern on development environment]	PCL6115-EV_Application Sample Manual_VerxE.pdf	PCL6115-EV_Application Sample_VxxxE.zip	TA600022-ENx/x

(x: revision)

	Manual Name [Outline]	Document File name	Software File name	Document No.
Motion Pattern Builder Manual	PCL6115 Starter Kit User's Manual (Motion Pattern Builder Application Software) [To describe function to perform axis control visually with a flowchart]	PCL6115-EV _Motion Builder Manual_VerxE.pdf	PCL6115-EV _Motion Builder _VxxxJE.zip	TA600023-ENx/x
	PCL6115 Starter Kit User's Manual (Motion Pattern Builder Language File Creation Rule) [Motion Pattern Builder in Multi-language]	PCL6115-EV _Motion Builder Language File Manual _VerxE.pdf	PCL6115-EV _Motion Builder Language File _VxxxE.zip	TA600008-ENx/x
	PCL6115 Starter Kit User's Manual (Motion Pattern Builder Sample Project) [Check and add motion pattern created by Motion Pattern Builder on development environment]	PCL6115-EV _Motion Builder Sample Manual_VerxE.pdf	PCL6115-EV _Motion Builder Sample_VxxxE.zip	TA600024-ENx/x
Reference	PCL6115/6125/6145 User's Manual		-	DA70152-0/xE

Please download application software and related materials from our NPM website.

2.1 Operating environment

We checked this software operation on Windows 7 and Windows10 (both 32-bit and 64-bit).

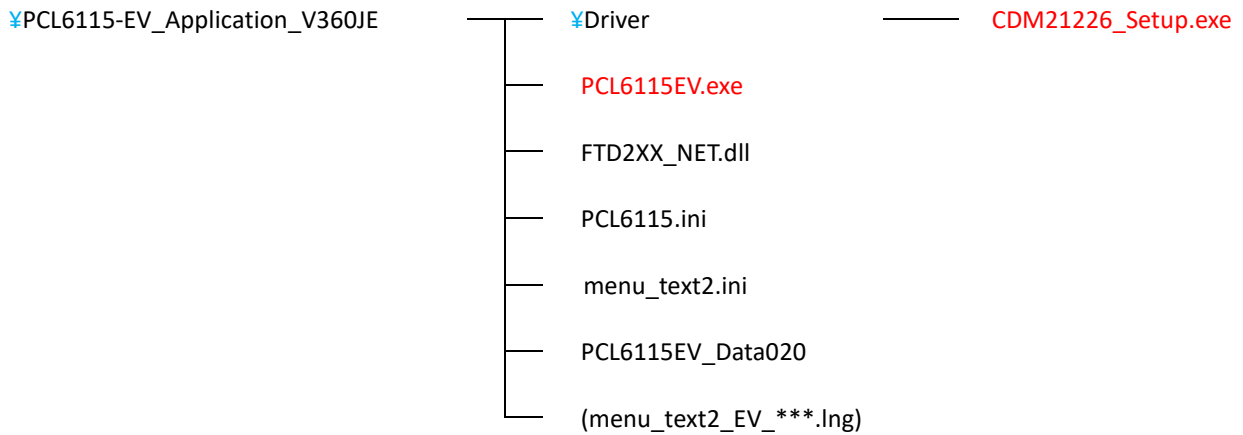
(We do not check it on OS other than the above.)

Please change power saving setting so as not to operate sleep mode during operation.

3. Install the device driver

3.1 Folder structure

When unzipping the compressed file ([PCL6115-EV_Application_V360JE.zip](#)), the following folders are generated.



“[PCL6115EV.exe](#)” is an executable file of the software and “[CDM21226_Setup.exe](#)” is a device driver installer.

"PCL6115.ini", "menu_text2.ini" is a text file for PCL6115EV.

"PCL6115EV_Data020" is the setting data file for PCL6115EV.

"menu_text2_EV_***.Ing" is a multilingual text file for PCL6115EV.

This file is not included at the time of decompressing the compressed file.

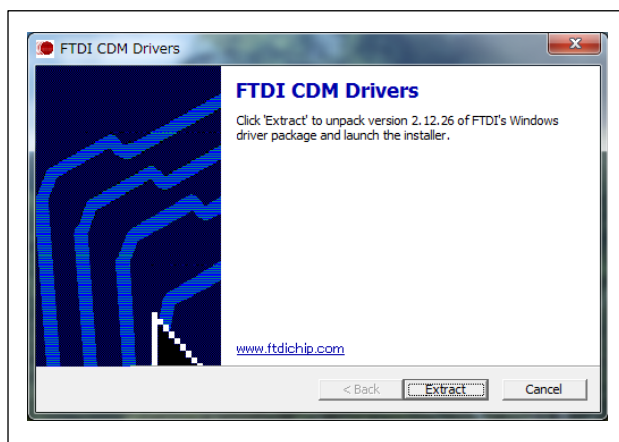
As an example, unzip the compressed file ([PCL6115-EV_ApplicationLanguageFile_V360JE.zip](#)) and place Chinese (traditional) and German in this folder and check it.

If you need multiple languages, create a multilingual text file and put it in this folder.

3.2 Install

Double-click “[CDM21226_Setup.exe](#)” to launch the installer and follow the instructions on the screen to complete the installation.

If you have already installed it, you do not need to install it again.

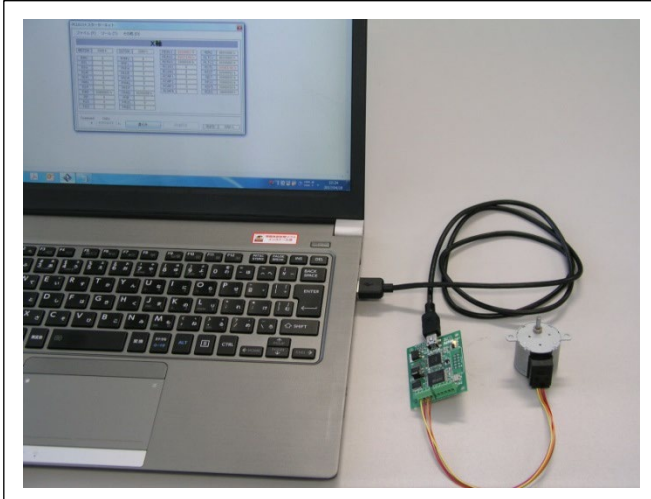


Note: There is the latest version of the device driver on FTDI's website (<http://www.ftdichip.com/Drivers/D2XX.htm>). If the version you have is not the latest one, download from the above website.

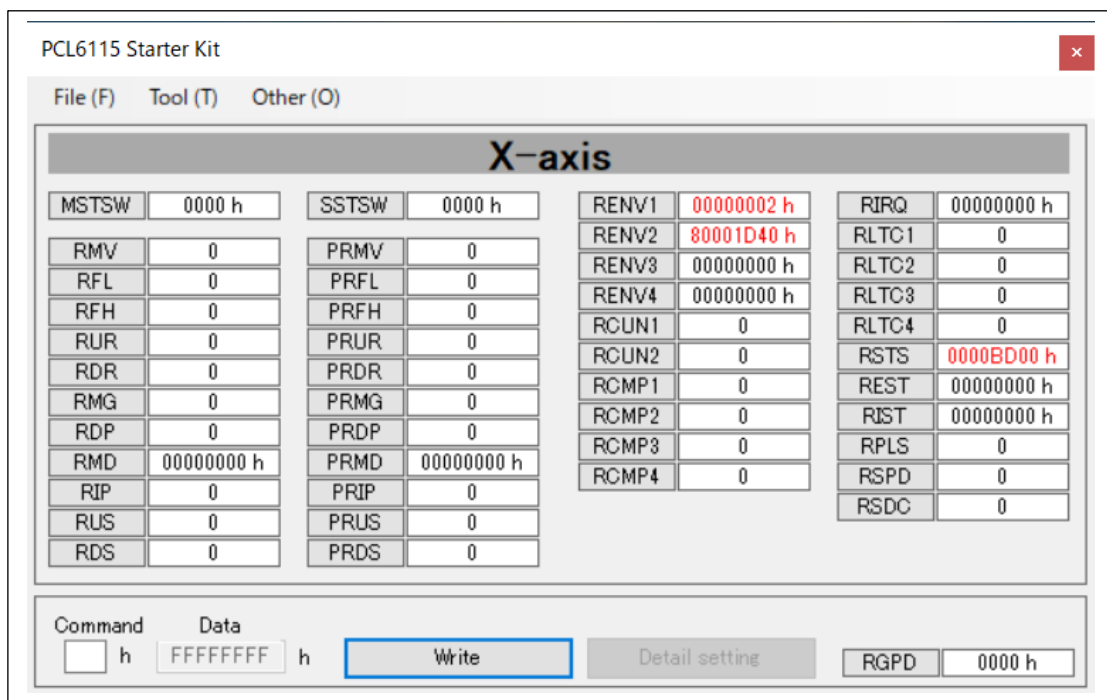
4. Basic operation method of software

4.1 Startup software

Please make sure that PCL6115-EV is connected to a PC.



Double-click on the executable file “PCL6115EV.exe”. The following main screen appears.



This screen shows contents that are read regularly from the registers of the PCL6115.

If a value is zero, it is displayed in black letters, and values other than zero are displayed in red letters.

PCL6115 can control one axis and all registers that can be set are displayed.

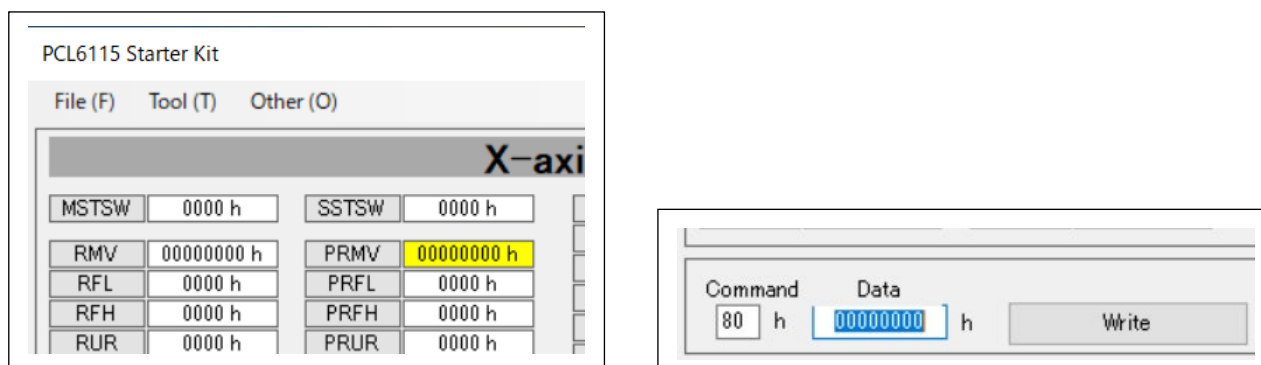
4.1.1 Changing radix of register

You can switch notation between decimal and hexadecimal by right-clicking on columns where a register value is displayed. Radix can be changed individually for each register.

However, registers having meaning in bit units (such as RENV1) are fixed to hexadecimal and cannot be switched.

4.1.2 Writing data to register

By double clicking on a column where a value of a register is displayed, the data column is highlighted in yellow as follows and the cursor moves to the column for inputting data (Data). In the column "Command", a register write command is set.



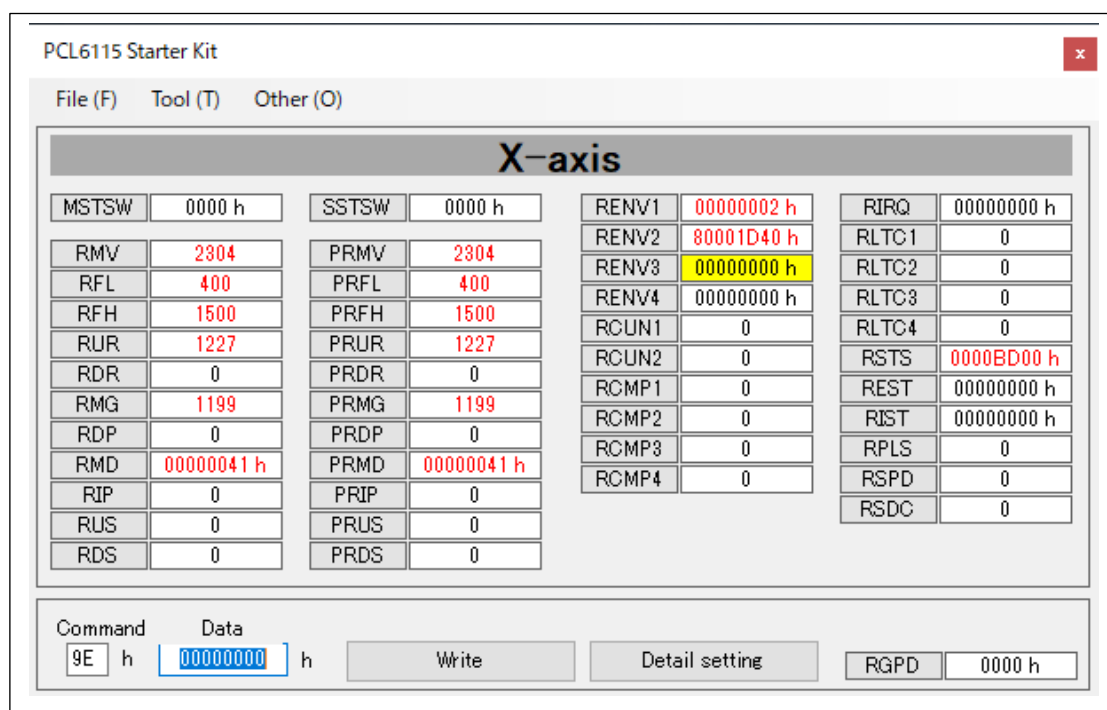
Enter a data you want to write to the column "Data" and click the "Write" button. Radix of the data to be written is the same as the setting in "4.1.1 Changing radix of register". Read-only registers cannot be written.

4.1.3 Detailed setting of register data

Registers (such as RENV1) having meanings in bit unit can be set in detail.

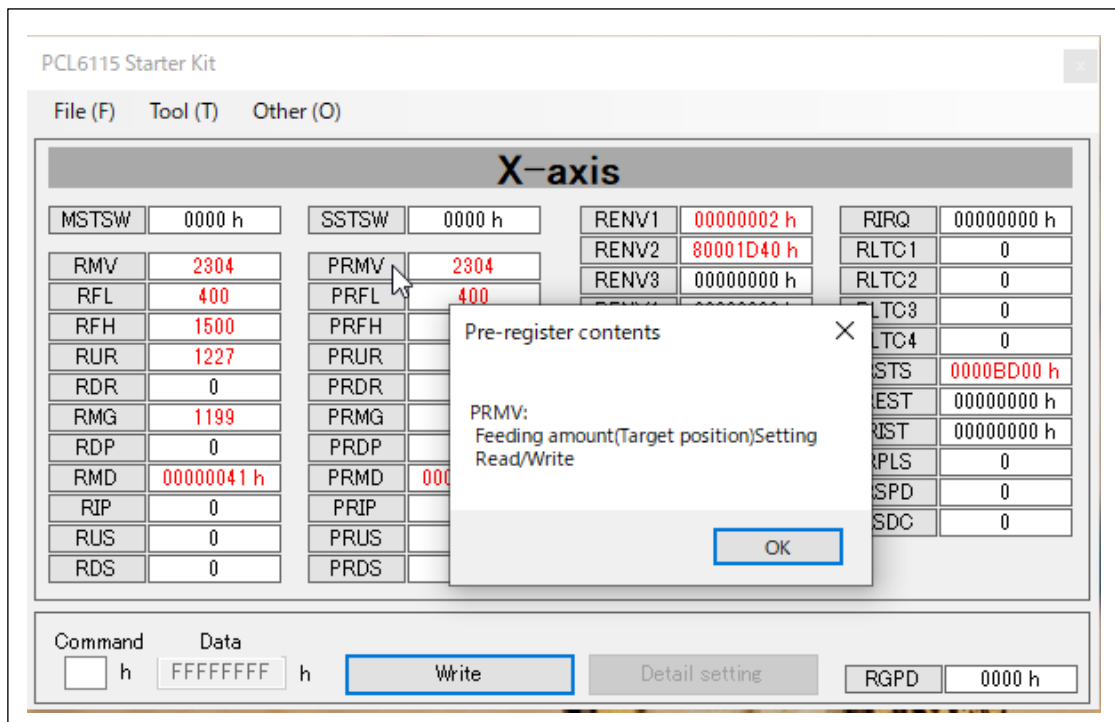
If you select a column of such register, the "Detail setting" button is enabled.

By clicking the "Detail setting" button, the detailed setting screen is displayed. Please refer to the sections from "4.3.6 PRMD (operation mode) menu" to "4.3.12 PRMG (speed magnification rate) menu".



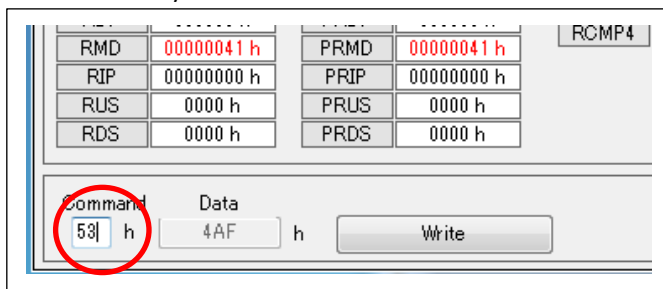
Right-click on each register name to display the register contents.

After confirming the contents, press the "OK" button or press the close mark on the upper right to clear the display screen.



4.1.4 Write command

Please write PCL6115 operation command, general-purpose output bit control command, and control command in the column "Command" directly.

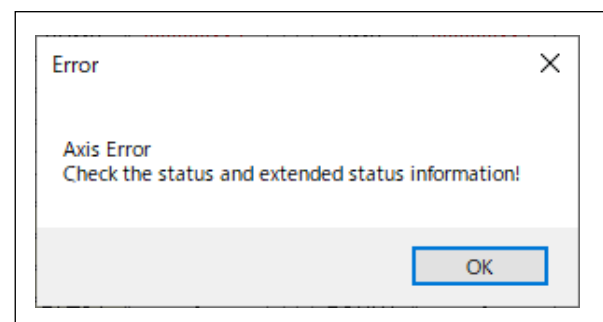
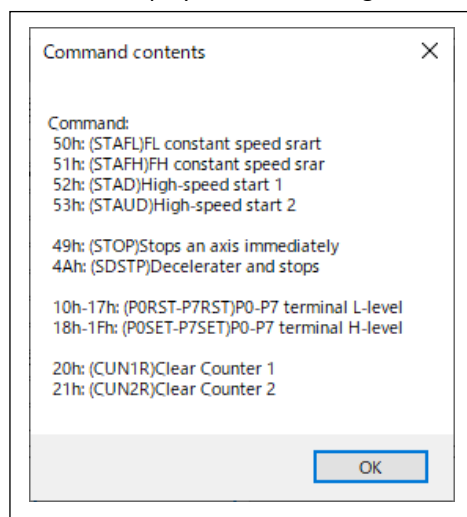


Do not use a register readout command.

Click the cursor on "Command" to display the command contents. After confirming the contents, press the "OK" button or press the close mark on the upper right to clear the display screen.

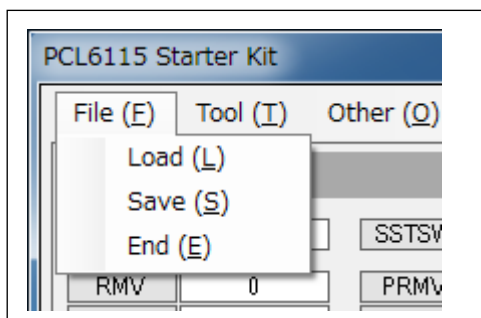
In addition, please refer to the PCL6115/6125/6145 User's Manual, because not all commands are displayed.

If the end limit signal and alarm signal are ON when you enter the start command and click the "Write" button, the device will not operate and will display an error message. Turn off the end limit signal and alarm signal and click again.



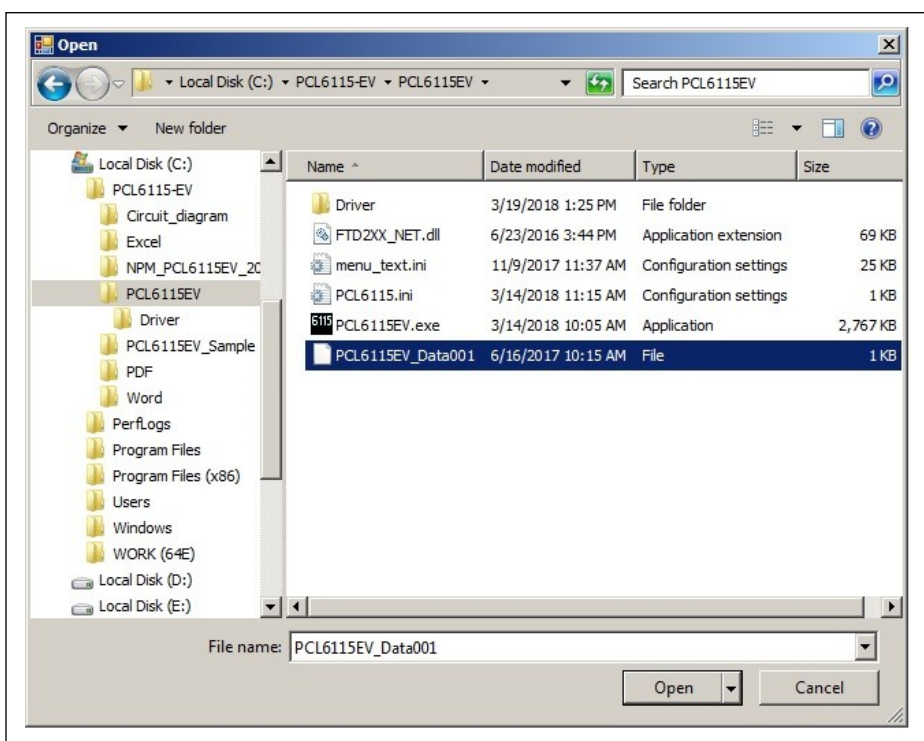
4.2 File menu

Click "File" to display the file menu.



4.2.1 Load menu

Register status saved by "Save" menu (refer to "4.2.2 Save menu") can be written to PCL6115".



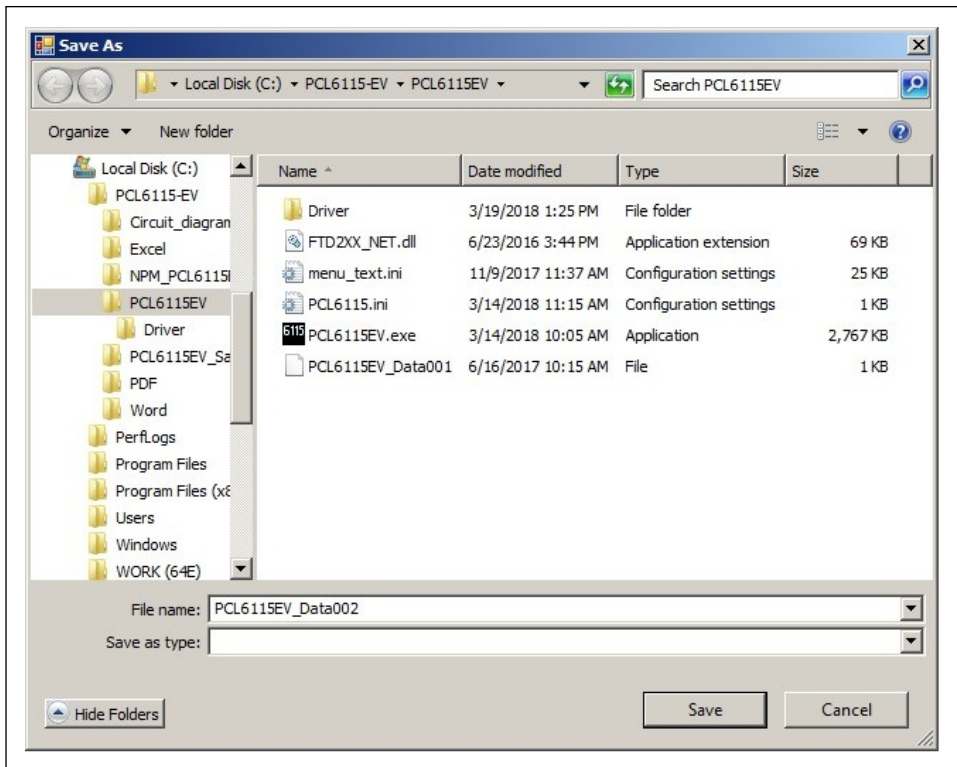
Please select a saved file name and click the "Open" button.

Registers you can write data are as follows.

PRMV, PRFL, PRFH, PRUR, PRDR, PRMG, PRDP, PRMD, PRIP, PRUS, PRDS, RENV1, RENV2, RENV3, RENV4, RCUN1, RCUN2, RCMP1, RCMP2, RCMP3, RCMP4, RIRQ

4.2.2 Save menu

You can save values (including status values) of registers displayed on the main screen in a text file.



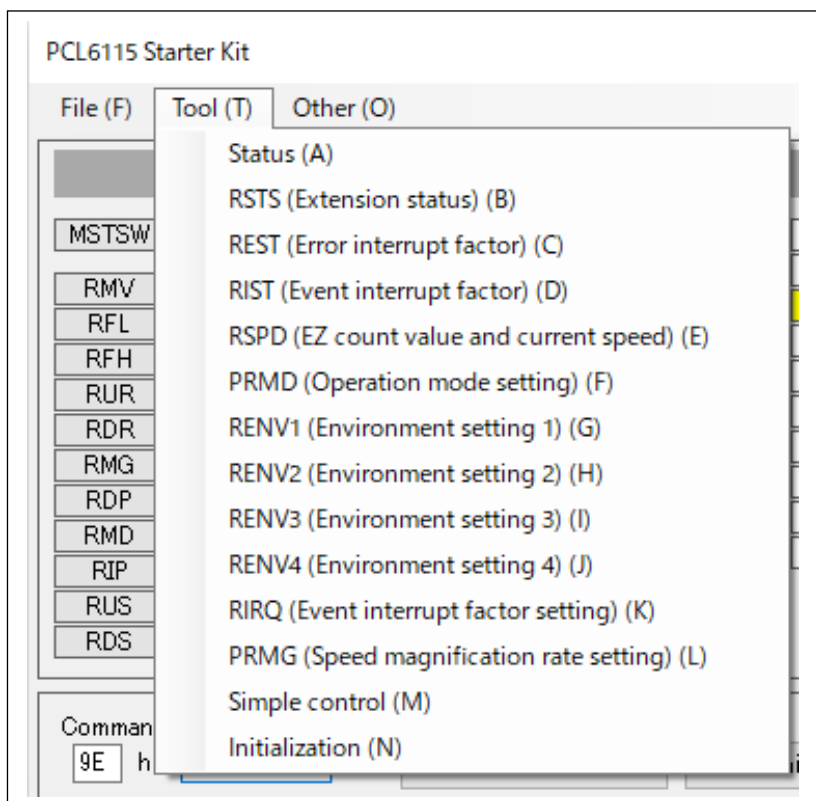
Please write a file name and click the "Save" button.

4.2.3 End menu

Quit the application software.

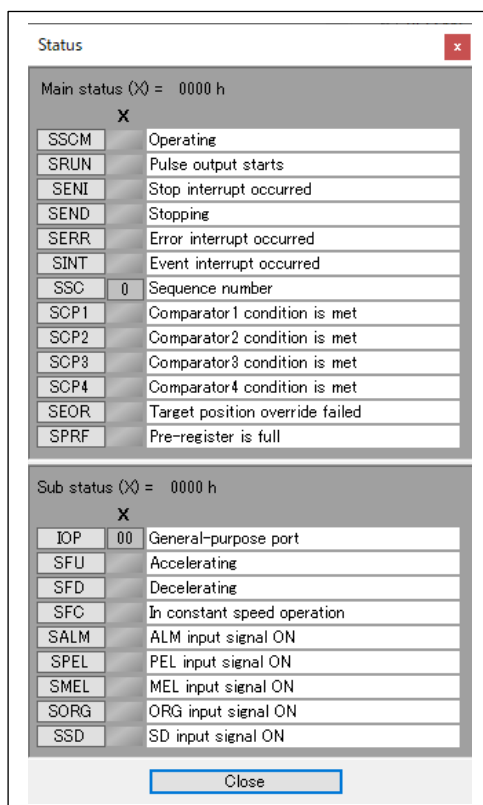
4.3 Tool menu

Click "Tool" to display the Tool menu.



4.3.1 Status menu

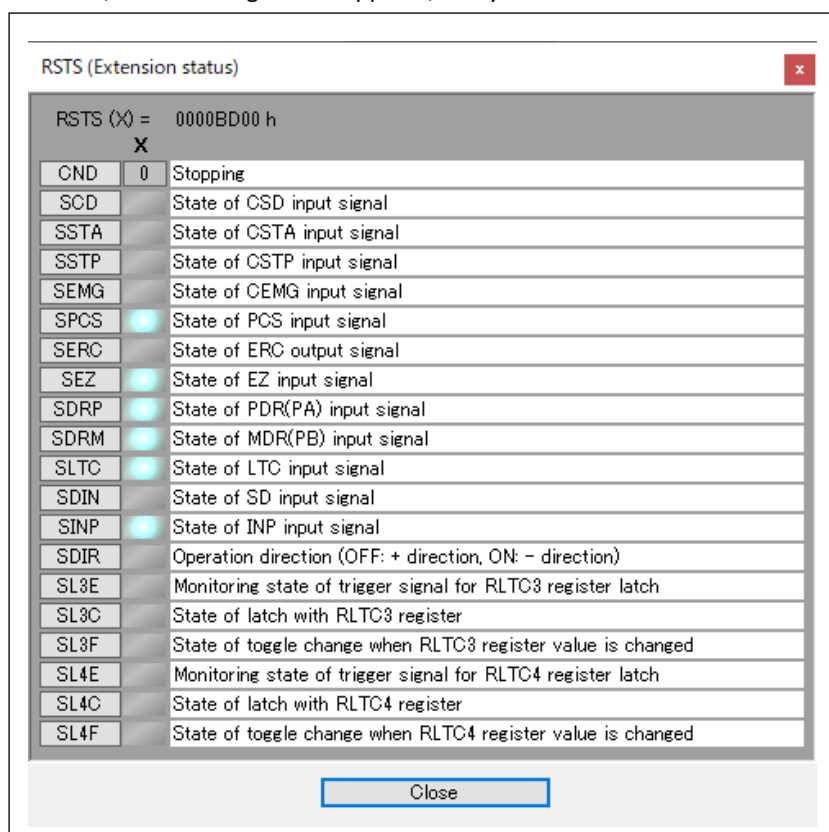
By clicking this menu, the following screen appears. You can check detailed status of each status and sub-status bit.



Bit items that are set to "1" in registers are displayed in blue. Close the "Status" menu screen by pressing the "Close" button.

4.3.2 RSTS (extension status) menu

When you click on this menu, the following screen appears, and you can check the details of each bit of RSTS register.

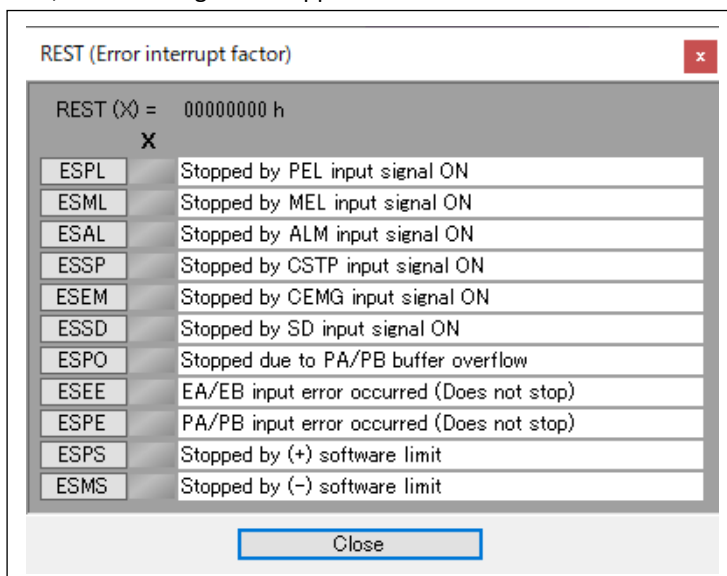


Bit items that are set to "1" in RSTS register are displayed in blue.

Close "RSTS (Extension status)" menu screen by pressing the "Close" button.

4.3.3 REST (error interrupt factor) menu

By clicking on this menu, the following screen appears. You can check details of each bit of REST register.



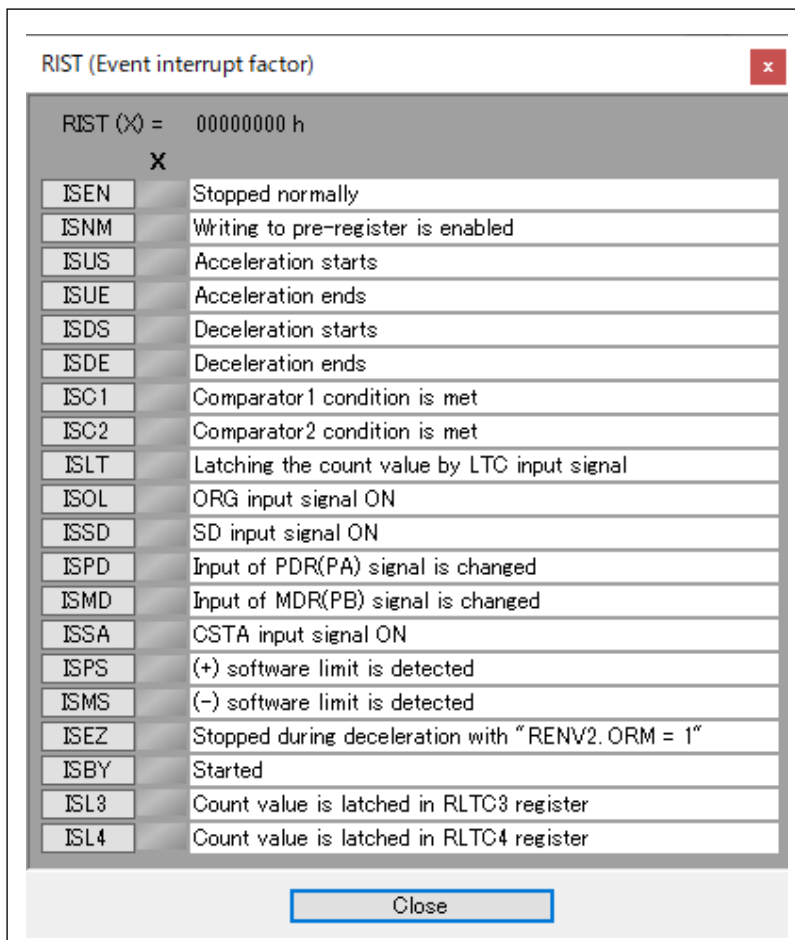
Bit items that are set to "1" in REST register are displayed in red.

Close "REST (Error interrupt factor)" menu screen by pressing the "Close" button.

Since PCL6115-EV is serial bus I / F, write from the main screen and clear the bit which is "1".

4.3.4 RIST (event interrupt factor) menu

By clicking on this menu, the following screen appears. You can check details of each bit of RIST register.



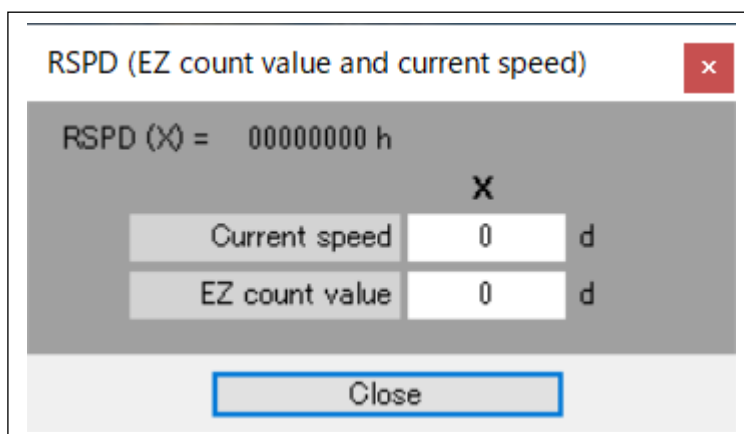
Bit items that are set to "1" in RIST register are displayed in red.

Close "RIST (Event interrupt factor)" menu screen by pressing the "Close" button.

Since PCL6115-EV is serial bus I / F, write from the main screen and clear the bit which is "1".

4.3.5 RSPD (EZ counter value and current speed) menu

By clicking on this menu, the following screen will show. You can check details of each bit of RSPD register.



Close "RSPD (EZ counter value and current speed)" menu screen by pressing the "Close" button.

4.3.6 PRMD (operation mode setting) menu

By clicking on this menu, the following screen appears, detailed for each bit of PRMD register can be set and the set data can be written.

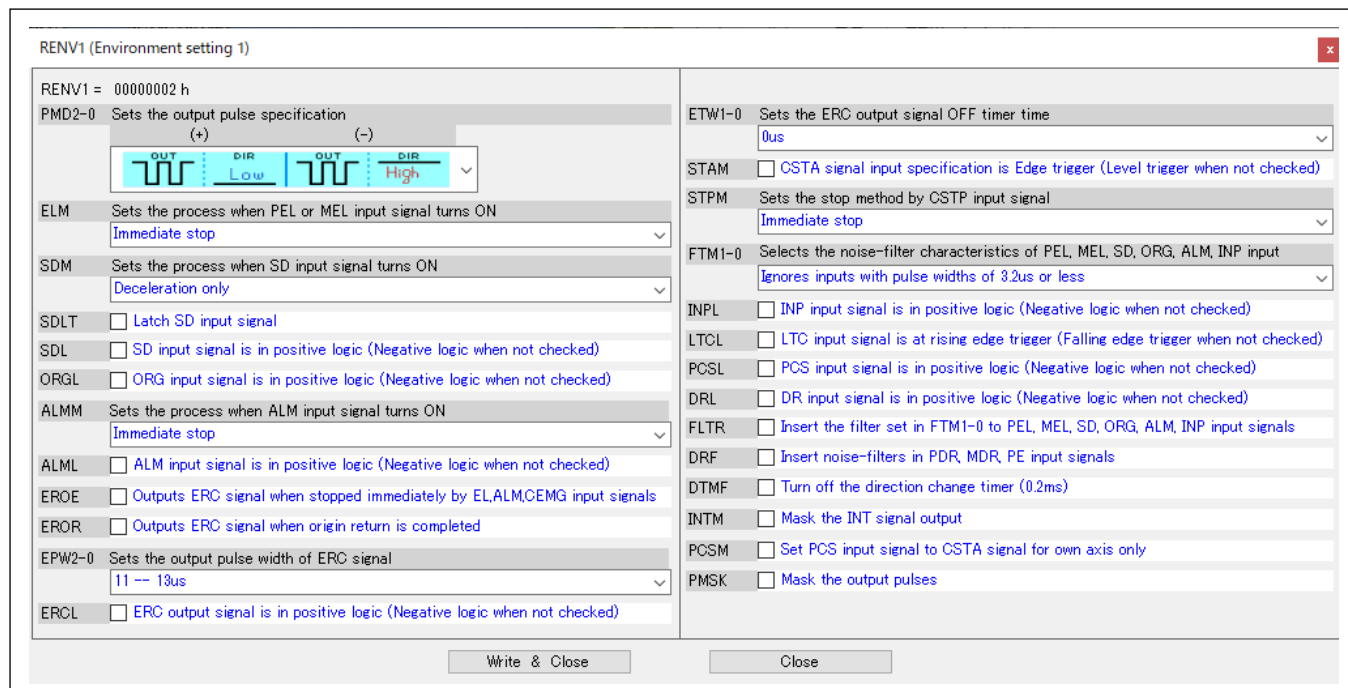
Select a desired setting state from the pull-down menu, check menu, and click the "Write & Close" button. Write to PRMD (or RMD) register and close "PRMD (Operation mode)" menu screen.

You can also display this screen by clicking the "Detail setting" button when writing PRMD (or RMD) register.

Click the down arrow on the right side of the combo box to display the selected item and click the item. Close "PRMD (Operation mode)" menu screen by clicking the "Close" button.

4.3.7 RENV1 (environment setting 1) menu

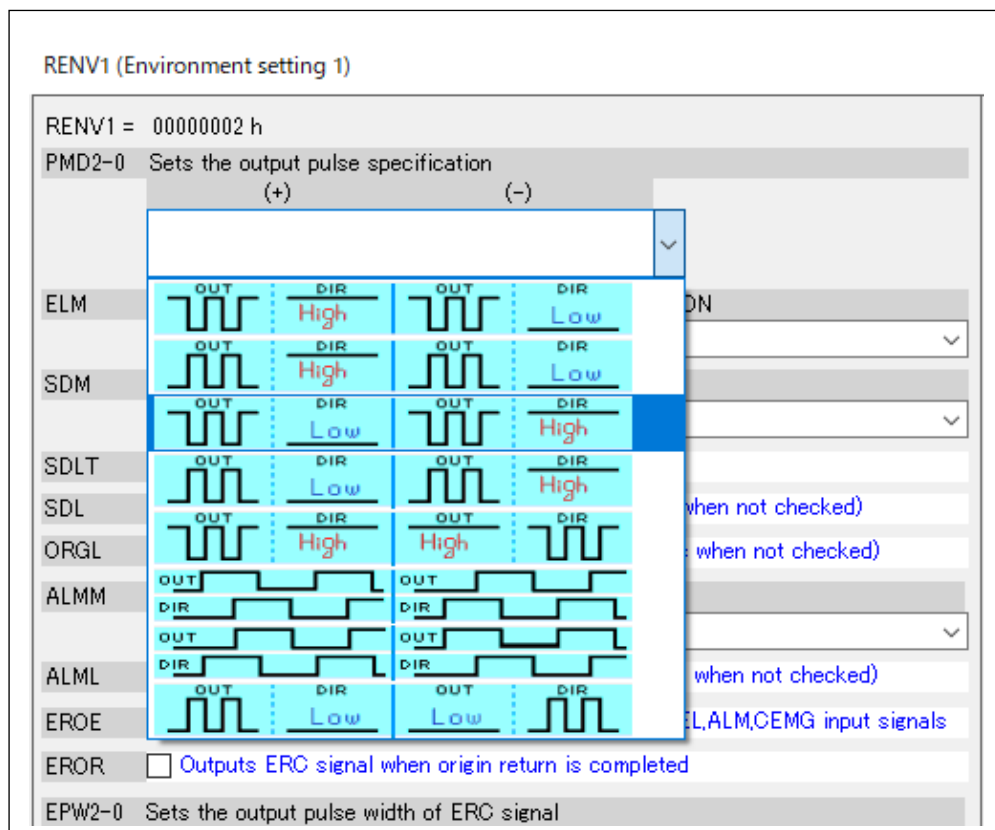
By clicking on this menu, the following screen appears. Detailed for each bit of RENV1 register can be set and the data can be written.



Select the desired setting state from the pull-down menu and check menu and click the “Write & Close” button.

Write to RENV1 register and close “RENV1 (Environment setting 1)” menu screen.

You can also display this screen by clicking the "Detail setting" button when writing RENV1 register.



Click the down arrow on the right side of the combo box to display the selected item and click the item.

Close “RENV1 (Environment setting 1)” menu screen by clicking the “Close” button.

4.3.8 RENV2 (environment setting 2) menu

By clicking on this menu, the following screen appears. Detailed for each bit of RENV2 register can be set and the data can be written.

RENV2 (Environment setting 2)

RENV2 = 80001D40 h

P0M1-0	Sets the specification of P0/FUP pins	General-purpose input	E0FF	<input type="checkbox"/> Disables EA/EB input (Input error detection is also disabled)
P1M1-0	Sets the specification of P1/FDW pin	General-purpose input	P0FF	<input type="checkbox"/> Disables PA/PB input (Input error detection is also disabled)
P2M1-0	Sets the specification of P2/MVC pin	General-purpose input	EIM1-0	Sets the EA/EB input specification Multiplies the 90-degree phase difference by 1
P3M1-0	Sets the specification of P3/CP1 pin	General-purpose output	EINF	<input type="checkbox"/> Insert a noise filter to EA/EB/EZ inputs
P4M1-0	Sets the specification of P4/CP2 pin	General-purpose output	EDIR	<input type="checkbox"/> Reverses the counting direction of EA/EB inputs
P5M	Sets the specification of P5 pin	General-purpose output	PIM1-0	Sets the PA/PB input specification Multiplies the 90-degree phase difference by 1
P6M	Sets the specification of P6 pin	General-purpose output	PINF	<input type="checkbox"/> Insert a noise filter to PA/PB inputs
P7M	Sets the specification of P7 pin	General-purpose output	PDIR	<input type="checkbox"/> Reverses the counting direction of PA/PB inputs
CSPO	<input type="checkbox"/> Outputs CSTA signal when command stops (when RMD.MSPO = 1)		EZD3-0	Sets the EZ count value used for origin return up 0 Times down
			EZL	<input type="checkbox"/> EZ input signal is at rising edge (Falling edge when not checked)
			ORM	Selects the origin return method Origin return operation0
			IEND	<input type="checkbox"/> Outputs INT signal when stopped
			MRST	<input checked="" type="checkbox"/> Auto reset function of MSTSW, REST, R1ST is not used

Write & Close Close

Select the desired setting state from the pull-down menu and check menu and click the “Write & Close” button.

Write to RENV2 register and close “RENV2 (Environment setting 2)” menu screen.

You can also display this screen by clicking the “Detail setting” button when writing to RENV2 register.

RENV2 (Environment setting 2)

RENV2 = 80001D40 h

P0M1-0	Sets the specification of P0/FUP pins	General-purpose input	E
P1M1-0	Sets the specification of P1/FDW pin	General-purpose input	P
P2M1-0	Sets the specification of P2/MVC pin	General-purpose input	E
P3M1-0	Sets the specification of P3/CP1 pin	General-purpose output	E
P4M1-0	Sets the specification of P4/CP2 pin	General-purpose output	P
P5M	Sets the specification of P5 pin	General-purpose output	P
			E

Click the down arrow on the right side of the combo box to display the selected item and click the item.

Close “RENV2 (Environment setting 2)” menu screen by clicking the “Close” button.

Because PCL6115-EV is serial bus I/F, the RENV2.MRST bit is fixed to 1.

In PCL6115-EV, the P3 and P4 terminals are used for the excitation mode output circuit, and the P5, P6 and P7 terminals are used for the operation mode output circuit.

4.3.9 RENV3 (environment setting 3) menu

By clicking on this menu, the following screen appears. Detailed for each bit of RENV3 register can be set and the data can be written.

Select the desired setting state from the pull-down menu, check menu, and click the “Write & Close” button.

Write to RENV3 register and close “RENV3 (Environment setting 3)” menu screen.

You can also display this screen by clicking the "Detail setting" button when writing to RENV3 register.

Click the down arrow on the right side of the combo box to display the selected item and click the item.

Close “RENV3 (Environment setting 3)” menu screen by clicking the “Close” button.

4.3.10 RENV4 (environment setting 4) menu

By clicking on this menu, the following screen appears. Detailed for each bit of RENV4 register can be set and the data can be written.

RENV4 (Environment setting 4)

RENV4 = 00000000 h

L3T2-0 Selects the input pin of a trigger signal latched in RLTC3 register
Disable

L3TL Selects the input specification of a trigger signal latched in RLTC3 register

L3DT Selects the counter latched in RLTC3 register

L3MD Selects the latch operation specification of RLTC3 register

L3F1-0 Selects the input noise filter characteristic of a trigger signal latched in RLTC3 register
No filter (Input pulse width > CLK frequency)

L4T2-0 Selects the input pin of a trigger signal latched in RLTC4 register
Disable

L4TL Selects the input specification of a trigger signal latched in RLTC4 register

L4DT Selects the counter latched in RLTC4 register

L4MD Selects the latch operation specification of RLTC4 register

L4F1-0 Selects the input noise filter characteristic of the trigger signal latched in RLTC4 register
No filter (Input pulse width > CLK frequency)

Write & Close Close

Select the desired setting state from the pull-down menu, check menu, and click the “Write & Close” button. Write to RENV4 register and close “RENV4 (Environment setting 4)” menu screen.

You can also display this screen by clicking the "Detail setting" button when writing to RENV4 register.

RENV4 (Environment setting 4)

RENV4 = 00000000 h

L3T2-0 Selects the input pin of a trigger signal latched in RLTC3 register
Disable

L3TL Selects the input specification of a trigger signal latched in RLTC3 register

L3DT Selects the counter latched in RLTC3 register

L3MD Selects the latch operation specification of RLTC3 register

L3F1-0 Selects the input noise filter characteristic of a trigger signal latched in RLTC3 register
No filter (Input pulse width > CLK frequency)

L4T2-0 Selects the input pin of a trigger signal latched in RLTC4 register
Disable

L4TL Selects the input specification of a trigger signal latched in RLTC4 register

L4DT Selects the counter latched in RLTC4 register

L4MD Selects the latch operation specification of RLTC4 register

Click the down arrow on the right side of the combo box to display the selected item and click the item. Close “RENV4 (Environment setting 4)” menu screen by clicking the “Close” button.

4.3.11 RIRQ (event interrupt factor setting) menu

By clicking on this menu, the following screen appears. Detailed for each bit of RIRQ register can be set and the data can be written.

RIRQ (Event interrupt factor setting)

RIRQ = 00000000 h

Sets the bit corresponding to the event interrupts to "1"

IREN	<input type="checkbox"/>	Stops normally
IRNM	<input type="checkbox"/>	Writing to pre-register is enabled
IRUS	<input type="checkbox"/>	Acceleration starts
IRUE	<input type="checkbox"/>	Acceleration ends
IRDS	<input type="checkbox"/>	Deceleration starts
IRDE	<input type="checkbox"/>	Deceleration ends
IRC1	<input type="checkbox"/>	Comparator1 condition is met
IRC2	<input type="checkbox"/>	Comparator2 condition is met
IRLT	<input type="checkbox"/>	Latching the count value by LTC input signal
IROL	<input type="checkbox"/>	ORG input signal ON
IRSD	<input type="checkbox"/>	SD input signal ON
IRDR	<input type="checkbox"/>	PDR(PA) and MDR(PB) input signals are changed
IRSA	<input type="checkbox"/>	CSTA input signal ON
IREZ	<input type="checkbox"/>	Stopped during deceleration with "RENV2. ORM = 1"
IRBY	<input type="checkbox"/>	Starts
IRL3	<input type="checkbox"/>	Latches the count value to RLTC3 register
IRL4	<input type="checkbox"/>	Latches the count value to RLTC4 register

Write & Close Close

Select the desired setting state from the pull-down menu, check menu, and click the "Write & Close" button.

Write to RIRQ register and close "RIRQ (Event interrupt factor setting)" menu screen.

You can also display this screen by clicking the "Detail setting" button when writing RIRQ register.

Close "RIRQ (event interrupt factor)" menu screen by clicking the "Close" button.

4.3.12 PRMG (speed magnification rate) menu

By clicking on this menu, the following screen appears. You can set PRMG register by entering speed magnification rate you want to set.

PRMG (Speed magnification rate setting)

PRMG = 000004AF h

19.6608 MHz Magnification 1 X

Value set in the register and the actual

PRMG = 1199 1 X

Write & Close Close

Please enter magnification you want to set in decimal number (You can set value that is not an integer).

The value of PRMG is calculated and displayed so that the magnification is realized based on the input. In addition, an actual magnification with this value is recalculated and displayed.

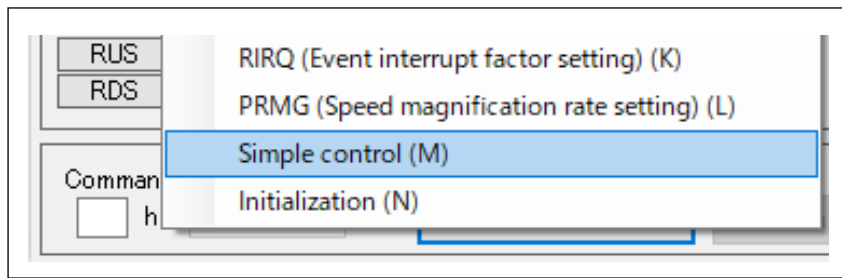
You can write a value by clicking the "Write & Close" button.

Write to PRMG register and close "PRMG (Speed magnification rate)" menu screen.

You can also display this screen by clicking the "Detail setting" button when writing to PRMG register.

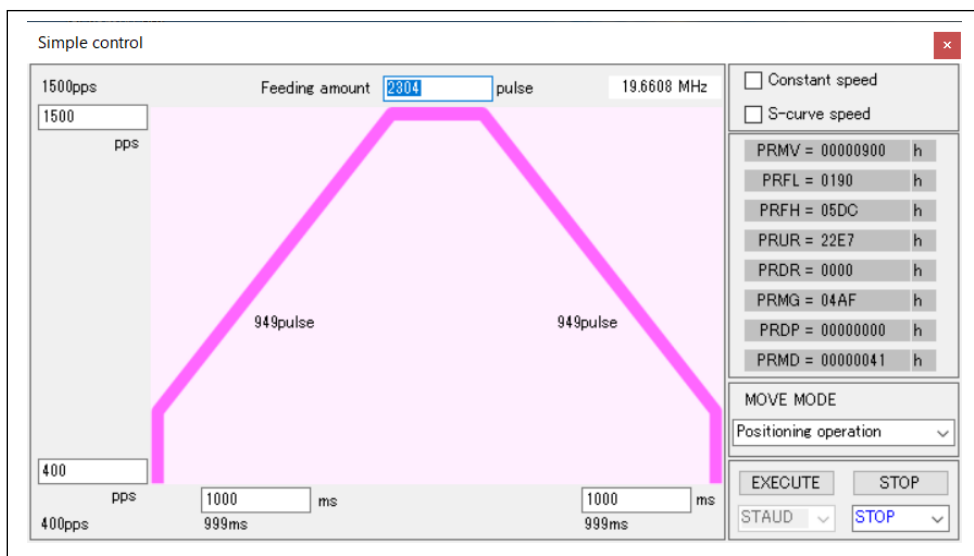
Close "PRMG (Speed magnification rate)" menu screen by clicking the "Close" button.

4.3.13 Simple control menu



Click the “Simple control (M)” menu to display Axis in the following screen. You can set an operation pattern to perform a simple motion control.

When a value (other than 0) is input to RFH, RFL, RMV, RUR, and (RDR) on the main screen, its value is displayed.

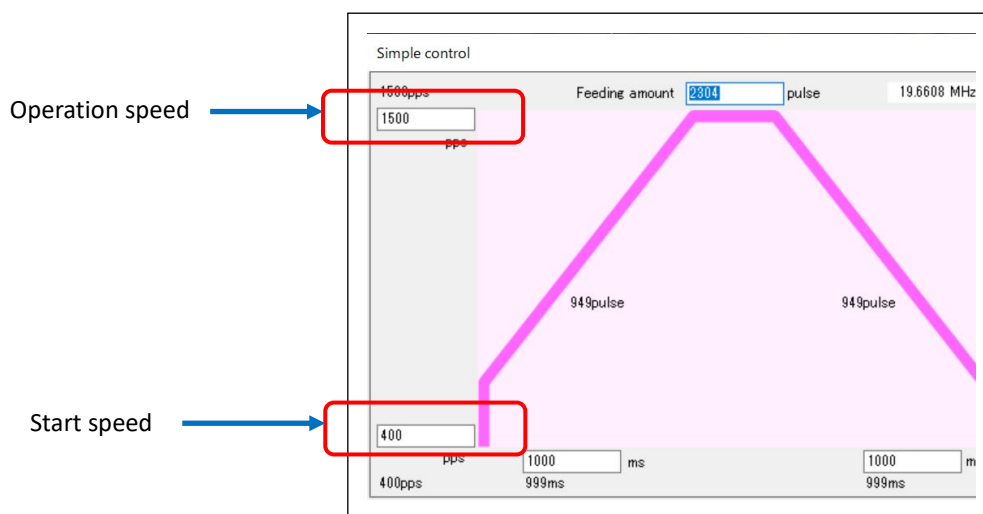


Close the “Simple control (M)” menu screen by clicking the "Close" button or close mark at the upper right corner.

4.3.13.1 Setting speed

You can set a frequency of control pulses to operate a stepping motor.

Please set start speed and an operation speed as decimal numbers respectively.



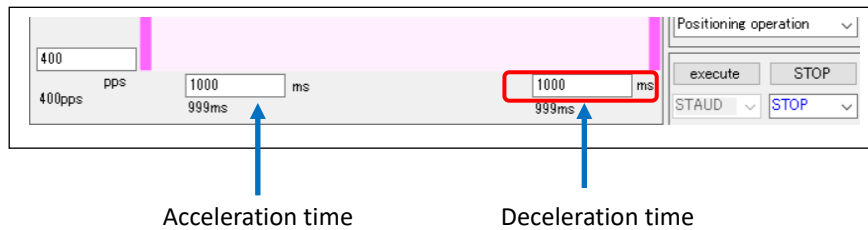
4.3.13.2 Setting acceleration/deceleration time

Acceleration time and deceleration time can be set in milliseconds and decimal number.

When the acceleration time and deceleration time are the same value, the selection of the slowdown point is automatically set.

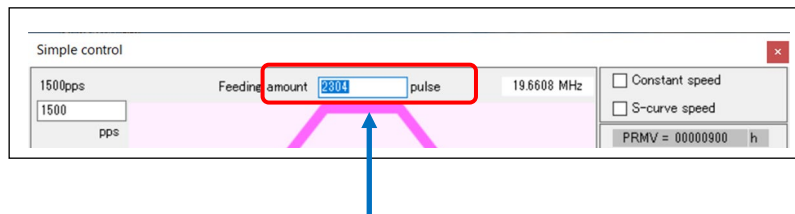
If the acceleration time and the deceleration time are different values, the selection of the slow-down point becomes manual setting.

Calculate the slow-down point value and write it in the slow-down point register (PRDP) and display it.



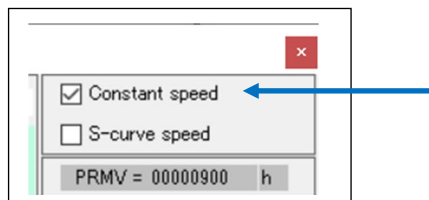
4.3.13.3 Setting positioning amount

You can set numbers of how many times to output control pulses.

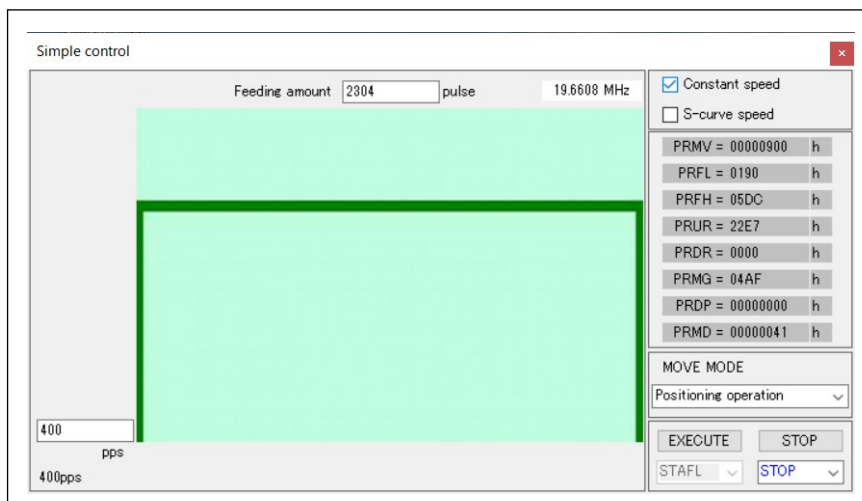


4.3.13.4 Acceleration/Deceleration characteristics settings

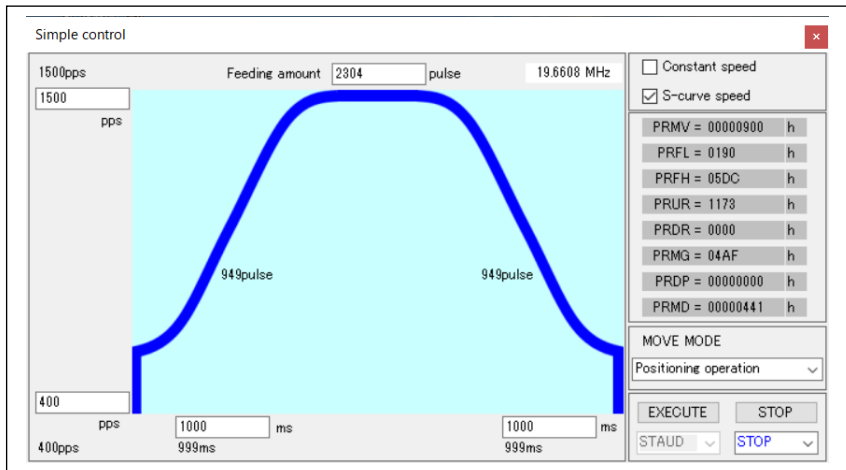
You can select constant speed control, Linear control, and S-curve control for the characteristics of acceleration and deceleration.



When you select constant speed control, the screen shows as follows.

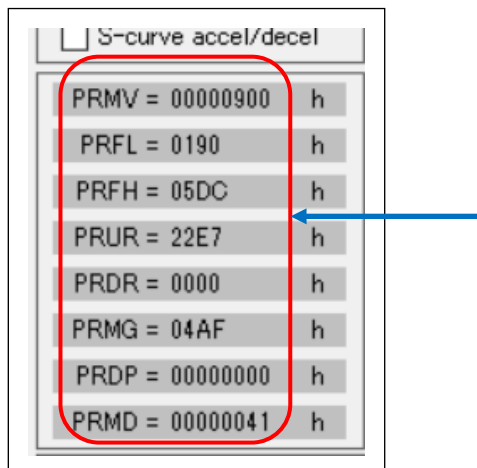


When you select S-curve control, the screen shows as follows.



4.3.13.5 Check of the value to be written to Register

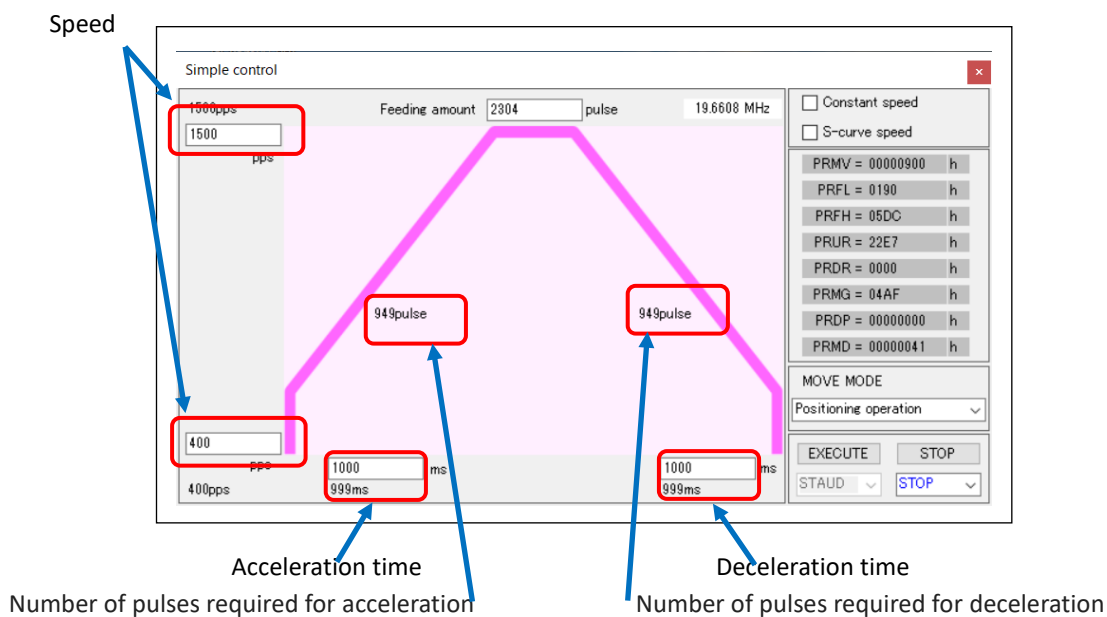
The following screen shows values to be written to the registers to realize a set value.



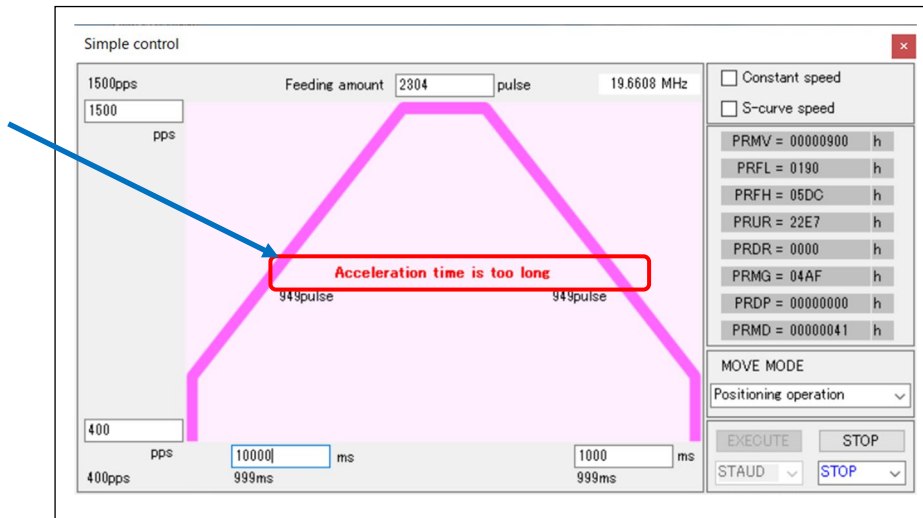
Please refer the above when you create a program to control PCL6115.

4.3.13.6 Display recalculation of operation time with value set to register

Depending on a value set in register, a result of recalculating motion profile is displayed.



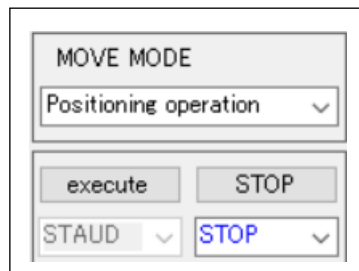
Pulses are calculated by integers, so a motion profile may not be realized as specified values. Also, if you set an impossible value, an error will be displayed.



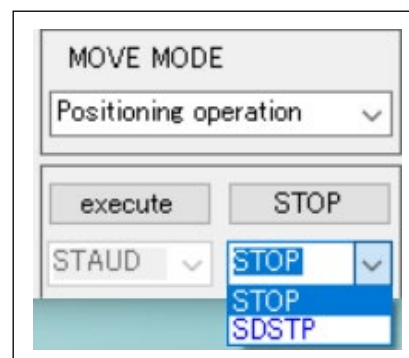
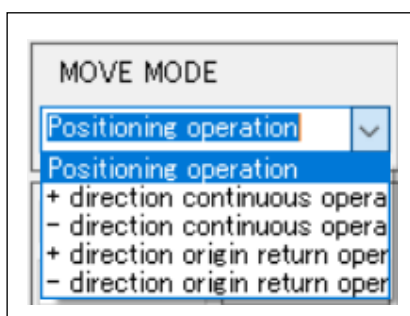
4.3.13.7 Perform a set operation

You can select the settings for "MOVE MODE" and "STOP".

"EXECUTE" is determined by "4.3.13.4 Acceleration/Deceleration characteristics settings".



" MOVE MODE " can be selected from 5 operations "Positioning operation", "+ direction continuous operation", "- direction continuous operation", "+ direction origin return operation", and "- direction origin return operation". "STOP" can be selected from two actions "STOP" and "SDSTP".

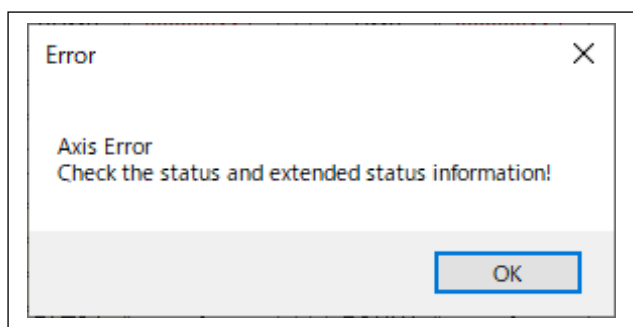


After setting the operation pattern, when you click the "EXECUTE" button, the value of each register is written to PCL6115, and the set operation is performed once. At this time, "FH high speed start" (STAUD: 53h) is written to PCL6115 as a start command for linear control and S-curve control, and "FL constant speed start" (STAFL: 50h) is written to PCL6115 for constant speed control.

If you click the "STOP" button during operation, operation will stop immediately by selecting "STOP". At this time, a command "immediate stop" (STOP: 49h) is written to PCL6115.

Operation stop after slow down by selecting "SDSTP". At this time, a command "Slow down stop" (SDSTP: 4Ah) is written to PCL6115.

If the end limit signal and alarm signal are ON when you click the "EXECUTE" button, it will not operate, and an error message will be displayed. Turn off the end limit signal and alarm signal and click again.



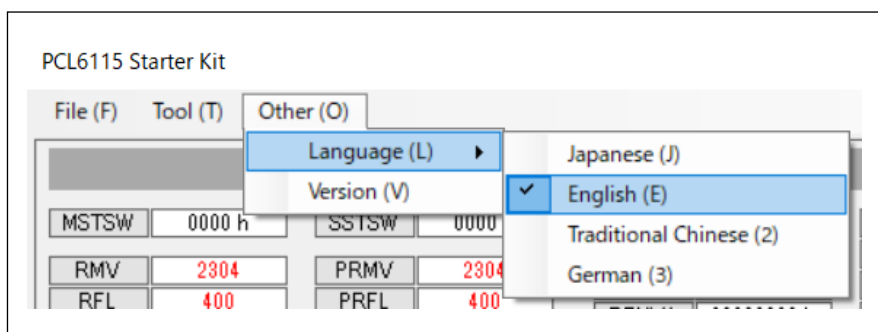
Close the "Simple Control" menu screen by clicking the end mark on the upper right.

4.3.14 Reset menu

PCL6115 is initialized by writing a software reset command.

4.4 Other menus

By clicking "Other", you can check the multi-language notation switching and the software version.



4.4.1 Language menu

Two languages of Japanese and English can be selected by default.

Up to 18 different languages can be added by creating a multilingual text file ("menu_text2_***.lng").

A check mark is displayed in front of the selected language.

(The example displays that traditional Chinese, and German are added.)

For details, refer to "PCL6115-EV_Application Language File Manual".

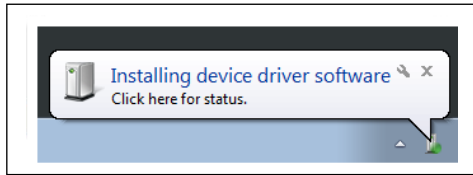
4.4.2 Version menu

You can check a software version.

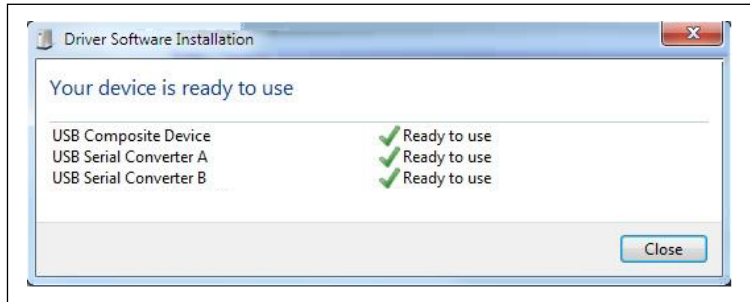


5. PCL6115-EV setting and operation

The following shows a setting for operating a stepping motor PFCU30-24V4GM (1/12) attached to PCL6115-EV. When you connect PCL6115-EV to a PC for the first time, install the device driver.



It may take several minutes to install the device driver.

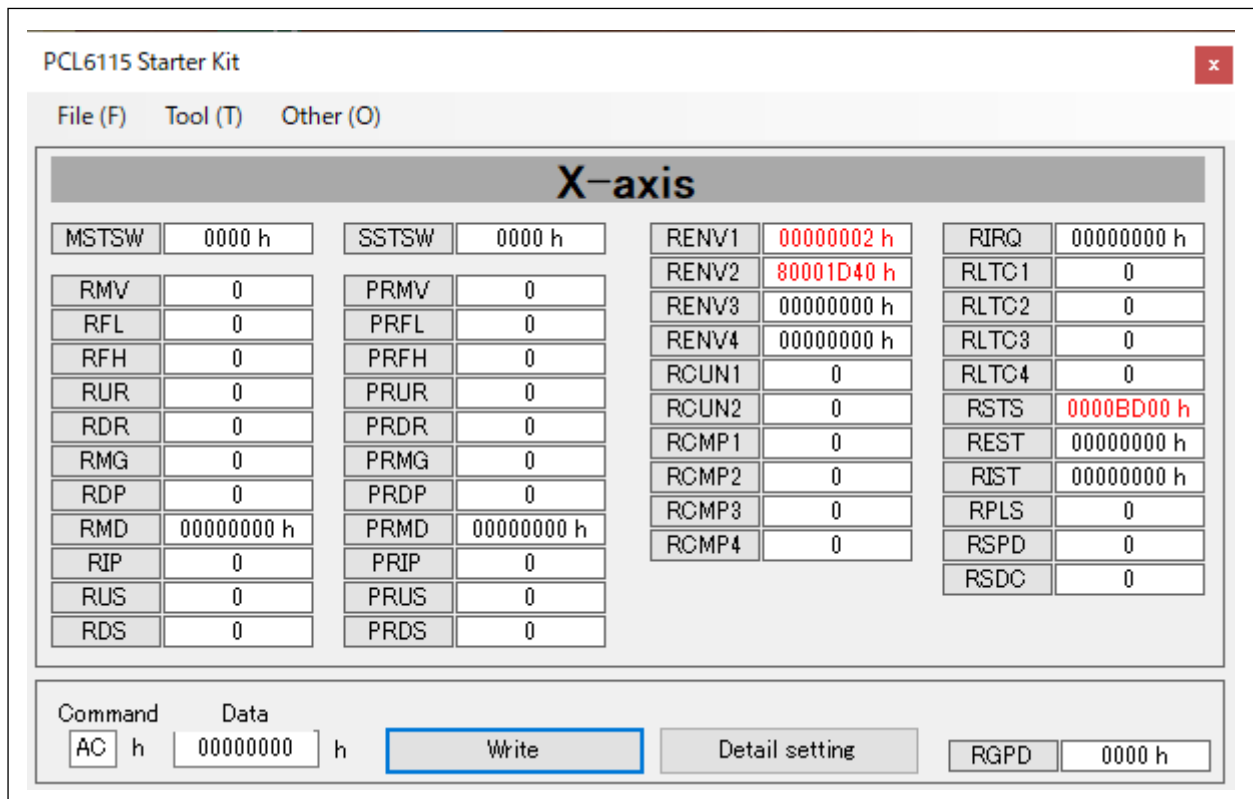


CAUTION: The above screen may not be displayed according to PC's OS (Windows8, Windows10).

5.1 Startup software

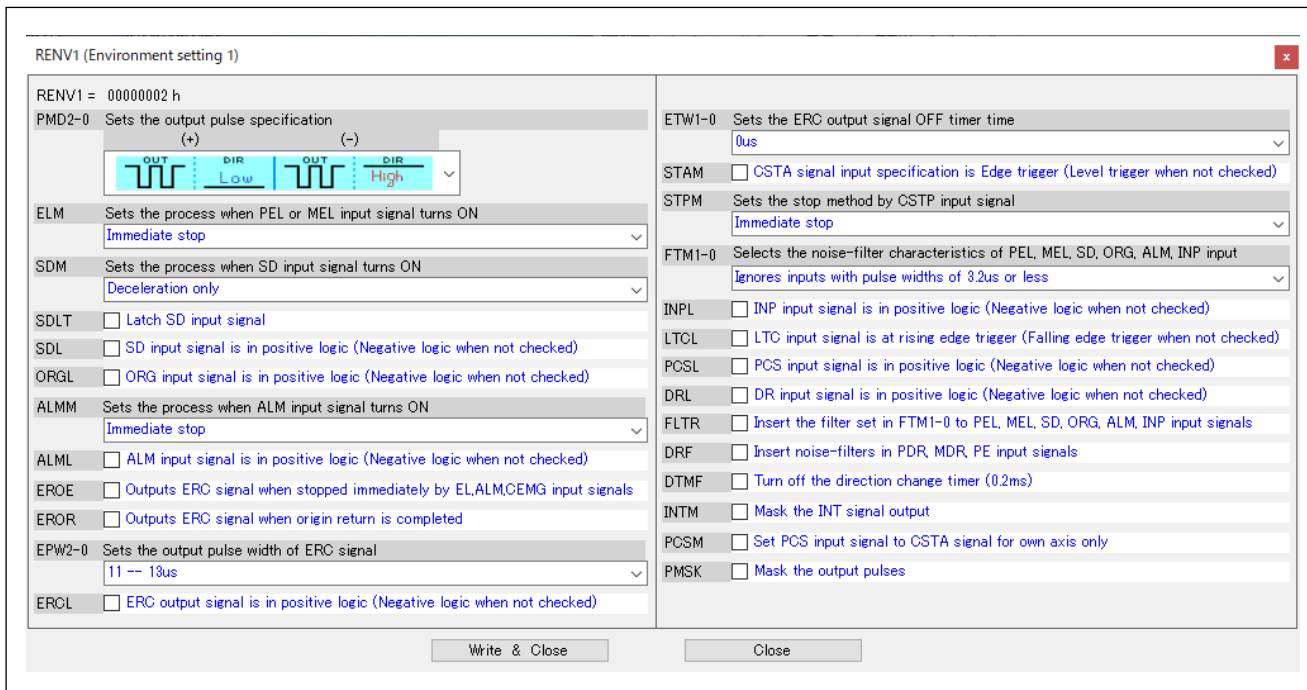
Please make sure that PCL6115-EV is connected to a PC.

By double-click on the executable file "PCL6115EV.exe", the following main screen appears.



Default values are displayed in RENV1 (Environment setting 1) and RENV2 (Environment setting 2).

Output pulse is specified to clock input and direction input signal of the stepping motor driver IC (TB6608FNG) mounted on PCL6115-EV board.

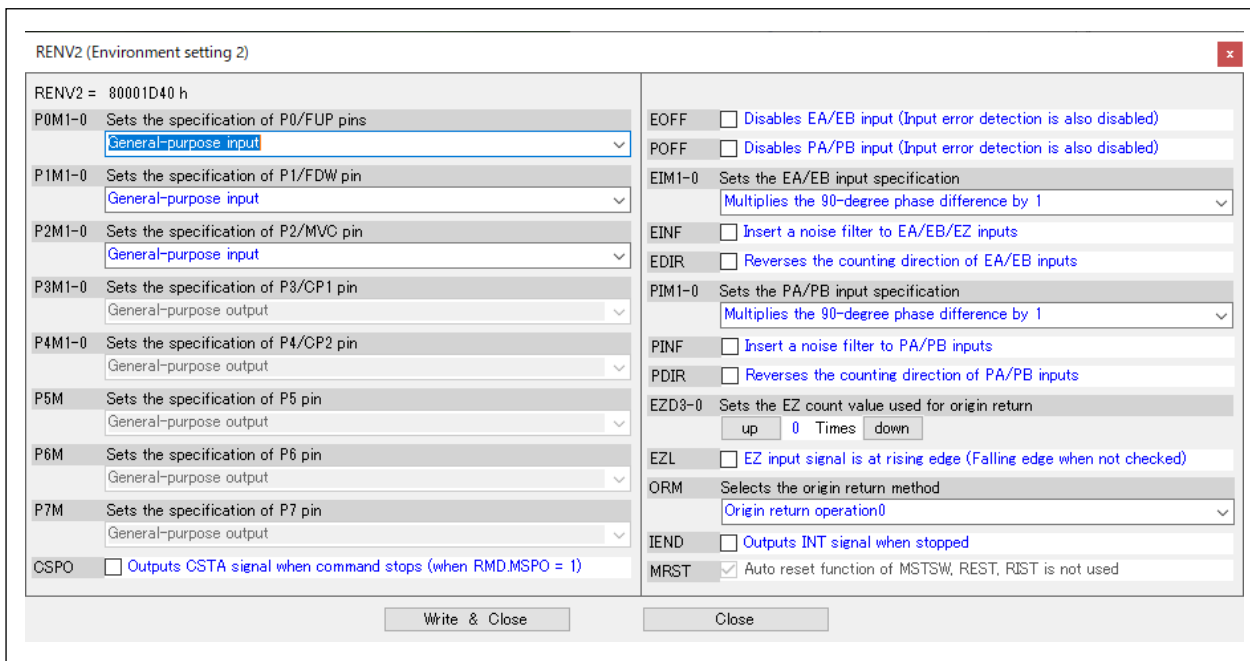


OUT	DIR	Output pulse specification
	L	CW
	H	CCW

CW: Output shaft of the stepping motor PFCU30-24V4GM (1/12) rotates clockwise
 The direction is CW when you select “(+) direction constant operation by command control”, “(+) direction origin return operation”, and “positioning operation with positive PRMV” as an operation mode of PRMD.MOD.

CCW: Output shaft of the stepping motor PFCU30-24V4 GM (1/12) rotates counterclockwise
 The direction is CCW when you select “(-) direction constant operation by command control”, “(-) direction origin return operation”, and “positioning operation with negative PRMV” as an operation mode of PRMD.MOD.

Since the terminals P3 - P7 are connected to each input terminal of the stepping motor driver IC (TB6608FNG), they are set as general-purpose output. MRST setting is enabled (not reset automatically).



P4	P3	Excitation mode
L	H	1-2 phase
H	L	W1-2 phase
L	L	2W1-2 phase

The default setting is 2W1-2 phase excitation mode.

P6	P7	P5	Mode
L	L	L	operable mode
H	L	L	initial mode
x	H	L	enable standby mode
x	x	H	standby mode

The default setting is operable mode.

To change settings, refer to general-purpose output bit control commands in “PCL6115/6125/6145 User's Manual” and write corresponding commands.

Excitation mode	Command Write Value		Setting Status Display (SSTSW) *
	P4	P3	
1-2 phase	14 (L Level)	1B (H Level)	0008h
W1-2 phase	1C (H Level)	13 (L Level)	0010h
2W1-2 phase	14 (L Level)	13 (L Level)	0000h

* The written content display is in the operation enabled mode (P5 to P7 are all L).

5.2 Setting for each register

To set the value of register, decimal input is used. Refer to “4.1.1 Changing radix of register”.

PCL6115 Starter Kit

File (F) Tool (T) Other (O)

X-axis

MSTSW	0000 h	SSTSWS	0000 h	RENV1	00000002 h	RIRQ	00000000 h
RMV	0	PRMV	0	RENV2	80001D40 h	RLTC1	0
RFL	0	PRFL	0	RENV3	00000000 h	RLTC2	0
RFH	0	PRFH	0	RENV4	00000000 h	RLTC3	0
RUR	0	PRUR	0	RCUN1	0	RLTC4	0
RDR	0	PRDR	0	RCUN2	0	RSTS	0000BD00 h
RMG	0	PRMG	0	RCMP1	0	REST	00000000 h
RDP	0	PRDP	0	RCMP2	0	RIST	00000000 h
RMD	00000000 h	PRMD	00000000 h	RCMP3	0	RPLS	0
RIP	0	PRIP	0	RCMP4	0	RSPD	0
RUS	0	PRUS	0			RSDC	0
RDS	0	PRDS	0				

Command: AC h Data: 00000000 h Write Detail setting RGPD: 0000 h

For PRMV setting value, write a value that an output shaft of a stepping motor PFCU30-24V4GM (1/12) rotates once.

When stepping motor is in 1-2 phase excitation, a shaft rotates once with 48 pulses. With 1/12 gear and 2W1-2 phase excitation mode, Data = $48 * 12 * 4 = 2304$.

Set start speed PRFL = 400, operation speed PRFH = 1500, acceleration rate PRUR = 1786 (200 ms), speed magnification PRMG = 1199, operation mode PRMD = 00000041h.

PCL6115 Starter Kit

File (F) Tool (T) Other (O)

X-axis

MSTSW	0000 h	SSTSWS	0000 h	RENV1	00000002 h	RIRQ	00000000 h
RMV	2304	PRMV	2304	RENV2	80001D40 h	RLTC1	0
RFL	400	PRFL	400	RENV3	00000000 h	RLTC2	0
RFH	1500	PRFH	1500	RENV4	00000000 h	RLTC3	0
RUR	1227	PRUR	1227	RCUN1	0	RLTC4	0
RDR	0	PRDR	0	RCUN2	0	RSTS	0000BD00 h
RMG	1199	PRMG	1199	RCMP1	0	REST	00000000 h
RDP	0	PRDP	0	RCMP2	0	RIST	00000000 h
RMD	00000041 h	PRMD	00000041 h	RCMP3	0	RPLS	0
RIP	0	PRIP	0	RCMP4	0	RSPD	0
RUS	0	PRUS	0			RSDC	0
RDS	0	PRDS	0				

Command: AC h Data: 00000000 h Write Detail setting RGPD: 0000 h

To set a value to PRMG, the setting menu is displayed by clicking the “Detail setting” button. Set a magnification rate to 1 and click the “Write & Close” button.

For details, refer to “4.3.12 PRMG (speed magnification rate) menu” menu.

PRMG (Speed magnification rate setting)

PRMG = 000004AF h

19.6608 MHz Magnification 1 X

Value set in the register and the actual

PRMG = 1199 1 X

Write & Close Close

To set a value to PRMD, the setting menu is displayed by clicking the “Detail setting” button.

Select “Positioning operation (specifies target position)” as an operation mode, and select “Automatic setting” as slow-down point. Click the “Write & Close” button.

For details, refer to “4.3.6 PRMD (operation mode) menu” menu.

PRMD (Operation mode setting)

PRMD = 00000041 h

MOD6-0 Selection of operating mode
Positioning operation (Sets the target incremental position)

MSDE Decelerates (deceleration stop) by SD input ON

MINP Operation completed by INP input ON

MSMD Selects acceleration/deceleration operation
Linear acceleration/deceleration

MCCE Stop counting of COUNTER1 and COUNTER2 by output pulses

METM Selects the operation complete timing
Cycle completion

MSDP Select the slow-down point
Automatic setting

MPCS Starts control the number of pulses after PCS input ON

MSN1-0 Sequence number of the operation (No effect on operation)
0

MSY1-0 Select the start command function
Start immediately

MAX3-0 Specify the axis to confirm stops
 X axis Y axis Z axis U axis

MSPE Deceleration stop or immediate stop by CSTP input signal

MSPO Outputs CSTP signal due to abnormal stops

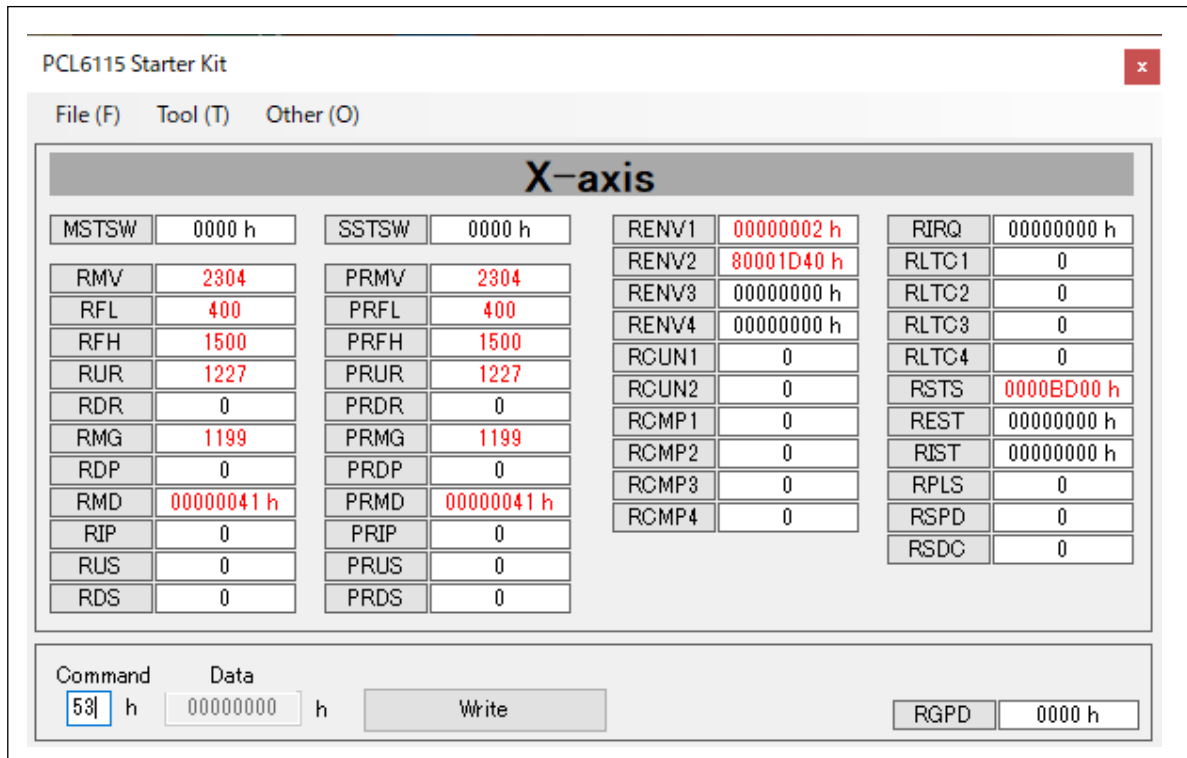
MADJ FH correction function is not used

MCDE Decelerates when CSD pin is Low level

MCDO Outputs Low level from CSD pin when decelerating or running at FL constant speed

Write & Close Close

5.3 Operation



Write a start command 53h in the column “Command” and click the “Write button.

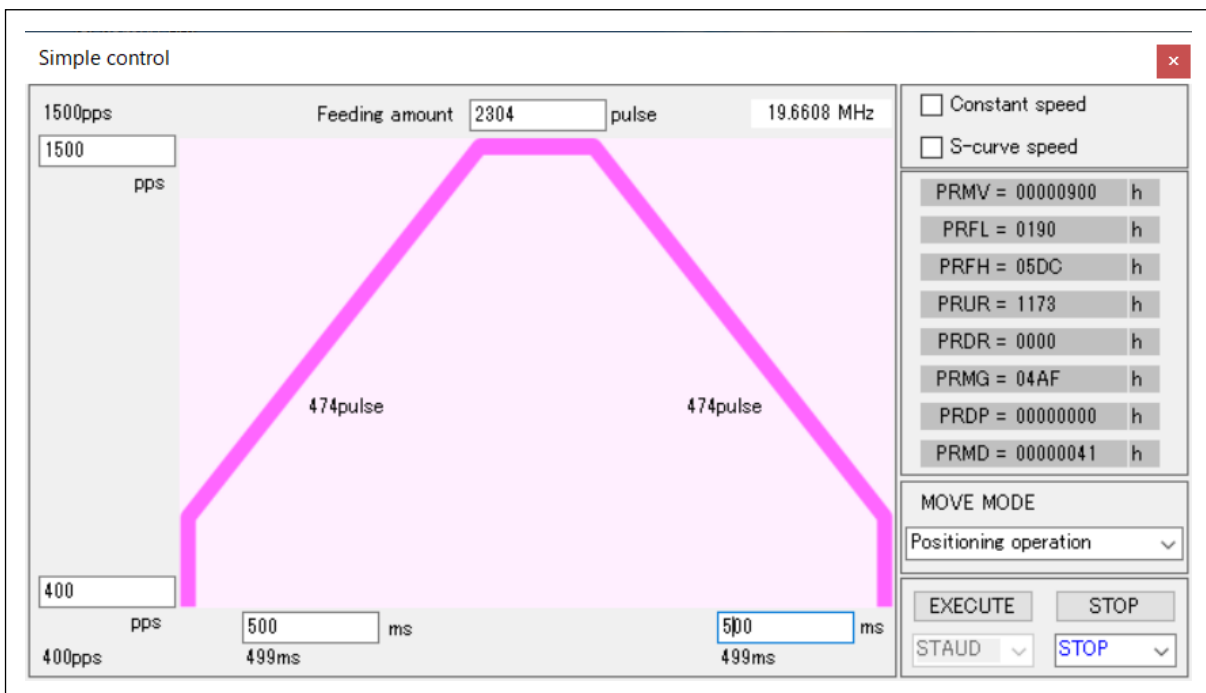
The output shaft of the stepping motor PFCU30-24V4GM (1/12) rotates once in the clockwise direction.

5.4 Simple control operation

Simple control menu is displayed by clicking “Tools (T)” → “Simple control (L)”.

For details, refer to “4.3.13 Simple control menu”.

Set feeding amount (PRMV = 2304), frequency (PRFL = 400/PRFH = 1500), acceleration / deceleration time (200 ms), and click the “execute” button. The output shaft of the stepping motor PFCU30-24V4GM (1/12) rotates once in the clockwise direction.



5.5 Other setting and notes

By changing selection of operation mode, you can check operation mode such as continuous operation, return to origin, etc.

PRMD (Operation mode setting)

PRMD = 00000041 h

MOD6-0 Selection of operating mode
Positioning operation (Sets the target incremental position)

MSDE Continuous (+) rotation by command control
Continuous (-) rotation by command control
Continuous movement by (PA/PB) input

MINP Continuous movement by external (PDR/MDR) input

MSMD (+) direction origin return operation
(-) direction origin return operation
Positioning operation (Sets the target incremental position)

MCCE Timer operation
Positioning operation by (PA/PB) input
Positioning operation by (PDR/MDR) input

METM Continuous linear interpolation
Linear interpolation

MSDP Select the slow-down point
Automatic setting

MPCS Starts control the number of pulses after PCS input ON

MSN1-0 Sequence number of the operation (No effect on operation)
0

MSY1-0 Select the start command function
Start immediately

MAX3-0 Specify the axis to confirm stops
 X axis Y axis Z axis U axis

MSPE Deceleration stop or immediate stop by CSTP input signal

MSPO Outputs CSTP signal due to abnormal stops

MADJ FH correction function is not used

MCDE Decelerates when CSD pin is Low level

MCDO Outputs Low level from CSD pin when decelerating or running at FL constant speed

Write & Close Close

The following 8 types of operation modes can be selected.

1. Continuous (+) rotation controlled by command control
2. Continuous (-) rotation controlled by command control
3. (+) rotation origin return operation
4. (-) rotation origin return operation
5. Positioning operation (specifies target position)
6. Timer operation
7. Continuous linear interpolation
(The sign of PRMV register value specifies the direction of movement)
8. Linear interpolation (PRMV register value = PRIP register value)

The maximum speed of the stepping motor PFCU30-24V4GM (1/12) is the value listed in the table below. If bigger values are set, step-out will occur.

P4	P3	Excitation mode	Maximum speed	Feeding amount per rotation
L	H	1-2 phase	375 pps	576
H	L	W1-2 phase	750 pps	1152
L	L	2W1-2 phase	1500 pps	2304

Revision

Revision	Date	Contents
1st	April 4, 2018	Initial Release
2nd	Dec 10, 2018	<p>Change Operation speed to 1500 pps</p> <p>Cover</p> <p>4.1 Startup software</p> <p>5.2 Setting for each register</p> <p>5.3 Operation</p> <p>5.4 Simple control operation</p> <p>5.5 Other setting and notes</p> <p>Delete M614 of RENV3(environment setting 3)</p> <p>4.3.9 RENV3(environment setting 3) menu</p> <p>Multi-legalization</p> <p>3.1 Folder structure</p> <p>4.2 File menu</p> <p>4.3 Tool menu</p> <p>4.4 Other menus</p> <p>4.4.1 Language menu</p>
3rd	April 23,2019	<p>RENV4: Environment setting 4 register and RLTC3: latch data 3 register andRLTC4: latch data 4 register are added</p> <p>Cover</p> <p>4.1 Startup software</p> <p>4.1.3 Detailed setting of register data</p> <p>4.3 Tool menu</p> <p>4.3.10 RENV4 (environment setting 4) menu</p> <p>5.1 Startup software</p> <p>5.2 Setting for each register</p> <p>5.3 Operation</p> <p>Add Bit 17-22 of RSTS: Extension Status Register</p> <p>4.3.2 RSTS (extension status) menu</p> <p>Add Bit 16-19 of RIST: Event Interrupt Factor Register</p> <p>4.3.4 RIST (event interrupt factor) menu</p> <p>Add Bit 13,14,16 and 17 of RIRQ: Event Interrupt Factor Setting Register</p> <p>4.3.11 RIRQ (event interrupt factor setting) menu</p> <p>Display changed to P5M, P6M, P7M of RENV2: Environment Setting 2 register</p> <p>4.3.8 RENV2 (environment setting 2) menu</p> <p>Changed Document No. from YA7258-0 to TA600018-EN0/0</p>
4th	July 16, 2019	<p>Change cover.</p> <p>Add the manual list</p>
5th	April 20,2023	<p>Added and corrected "Simple control" menu</p> <ol style="list-style-type: none"> 1. Added "Constant speed" check, "MOVE MODE" selection, "EXECUTE" (STAUD/STAFL), "STOP" (STOP/SDSTP) 2. Added "Constant speed" screen 3. Fixed a bug that the rise time and fall time changed every time the "simple control" menu screen was started. <p>Corrected language files</p>

Revision	Date	Contents
6th	December 13, 2023	Added error display when end limit signal and alarm signal are ON during operation P9. Enter the start command and click the "Write" button P25. Click the "EXECUTE" button Corrected language files



Information
www.pulsemotor.com/group/support