



X-SEL

PC Software PC Software for X-SEL

**IA-101-X-MW IA-101-X-MW-JS IA-101-XA-MW
IA-101-X-USBS IA-101-X-USBMW
IA-101-XA-USBMW-JS
IA-101-TT-USB IA-101-TTA-USB
IA-101-N**

Operation Manual **23th Edition**

IAI Corporation

Please Read Before Use

Thank you for purchasing our product.

This instruction manual explains the handling methods, structure and maintenance of this product, providing the information you need in order to use the product safely.

Before using the product, be sure to read this manual and fully understand the contents explained herein to ensure safe use of the product.

Please download the user's manual from our website.

You can download it free of charge. User registration is required for the first time downloading.

URL : www.iai-robot.co.jp/data_dl/CAD_MANUAL/

When using the product, print out of the necessary portions of the relevant manual, or please display it on your computer, tablet terminal, etc. so that you can check it immediately.

After reading the instruction manual, keep it in a convenient place so that whoever is handling the product can refer to it quickly when necessary.

[Important]

- This instruction manual is an original document dedicated for this product.
- This product cannot be used in ways not shown in this instruction manual. IAI shall not be liable for any result whatsoever arising from the use of the product in any other way than what is noted in the manual.
- The information contained in this instruction manual is subject to change without notice for the purpose of product improvement.
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Table of Contents

Support Models	1
Installing V6.0.0.0 Compatible with the IA Super SEL Controller E/G Types and the DS Controller.....	2
Software License Agreement.....	5
A Word of Caution	6
Safety Guide	7
1. Before You Begin	15
1.1 Items Supplied with This Software (Product Components)	15
1.2 System Requirements.....	18
1.3 Installing the Software.....	19
1.3.1 How to Install the PC Software	19
1.3.2 How to Install the USB Conversion Adapter Driver Software	24
1.3.3 How to Install Driver Software for USB Connection of XSEL-RA/SA/RAX/SAX/RAXD/SAXD	28
1.3.4 How to change the USB COM port	29
1.4 Connection to Controller.....	31
1.5 Starting the Software (Online Connection).....	46
1.6 Operation System Command Restriction	49
2. How to Save Data	52
2.1 Factory Setting – When a Backup Battery Is Used (When the X-SEL controller is shipped).....	52
2.2 When a Backup Battery Is Not Used (Table Top Actuator [TT], SSEL, ASEL, PSEL).....	54
2.3 XSEL-R/S/RX/SX/RXD/SXD	56
2.4 XSEL-RA/SA/RAX/SAX/RAXD/SAXD	57
2.5 TTA.....	58
2.6 MSEL	59
2.7 Notes.....	60
3. Menu Window	62
3.1 Explanation of the Menu.....	62
3.1.1 Online Screen	62
3.1.2 Offline Screen	66
3.2 Explanation of the Commands	67
3.3 Explanation of the Toolbar.....	86
3.4 Tree View	88
4. Program Edit Window	90
4.1 Explanation of the Items Displayed in the Program Edit Window.....	90
4.2 Saving a Program, Transferring and Closing the Edit Window.....	98
4.2.1 Saving a Program Online, Transferring and Closing the Edit Window	98
4.2.2 Transferring a Program Created Offline	100
4.3 Saving All Programs to a File	103
4.4 Running the Program	106
4.5 Cycle Time Measurement.....	107
4.5.1 How to Measure Cycle Time	107

5. Copying/Moving/Clearing a Program.....	113
5.1 Program Copy/Move Window.....	113
5.2 Program Clear Window.....	115
6. Position Data Edit Window.....	117
6.1 Explanation of the Items Displayed in the Position Data Edit Window.....	117
6.2 Saving Position Data, Transferring and Closing the Edit Window.....	138
6.2.1 Saving a Program Online, Transferring and Closing the Edit Window.....	138
6.2.2 Transferring a Position Created Offline.....	142
7. Copying/Moving/Clearing Position Data.....	144
7.1 Copying/Moving Position Data.....	144
7.2 Clearing Position Data.....	146
8. Parameter Edit Window.....	148
8.1 Explanation of the Parameter Edit Window.....	148
8.2 Saving Parameter Data and Closing the Edit Window.....	150
8.3 Transferring a Parameter File.....	153
8.3.1 Selecting Categories of Parameters to Be Transferred.....	154
8.3.2 Default Specifications.....	157
8.4 Easy Parameter Setup.....	158
8.4.1 Explanation of Easy Parameter Setup.....	158
8.5 How to Initialize XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, PSEL, MSEL high resolution type, TTA AC servo type / high resolution type Parameters (at the time of shipment).....	163
8.6 Parameter Comparison.....	165
8.6.1 How to Compare Parameters.....	165
9. Symbol Edit Window.....	168
9.1 About Symbols.....	168
9.2 Explanation of the Symbol Edit Window.....	169
9.3 Saving Symbol Data and Closing the Edit Window.....	172
10. Coordinate System Definition Data Edit Window.....	175
10.1 Explanation of Coordinate System Definition data Edit Window.....	175
10.2 Work Coordinate System.....	177
10.3 Tool Coordinate System.....	181
10.4 Simple Interference Check Zone.....	185
10.5 Coordinate System Definition Data Clear Window.....	189
10.6 Printing of Coordinate System Definition Data.....	191
11. Monitor.....	192
12. RC Gateway Function Setting.....	217
13. How to Reset an Absolute Encoder.....	218
13.1 Orthogonal Axis (Absolute Specification) (excluding XSEL-RA/SA, RAX/SAX).....	218
13.2 Orthogonal Axis (Battery-less Absolute Specification and XSEL-RA/SA, RAX/SAX).....	221
13.3 Scara Axis.....	224
13.3.1 Absolute Reset Preparation.....	224
13.3.2 Starting the Absolute Reset Menu.....	225
13.3.3 Absolute Reset Procedure for Arm 1 or 2.....	226
13.3.4 Absolute Reset Procedure for Rotation Axis + Vertical Axis.....	233

13.4	IX-NNN10040 and 12040 SCARA Axes	243
13.4.1	How to Operate the Push Type Absolute Reset	244
13.4.2	How to Acquire the Stopper Interfering Point	256
13.5	IXP SCARA Axis	269
13.6	ZR Unit	278
13.6.1	Absolute Reset on ZR Unit (Absolute Type Only)	278
13.6.2	Ball-screw spline adjustment on ZR unit (Incremental type)	293
13.7	Simple absolute Unit for PSEL Controller (Option)	302
13.7.1	Instructions of Absolute Reset	302
13.8	IXA SCARA Axes	306
13.8.1	Stopper Pressing System Absolute Reset Operation	307
13.8.2	Procedure for Stopper Pressing Position Acquisition Operation	325
14.	Supplemental Information on Controller Menu Items	347
14.1	Software Reset	347
14.2	Reset Error	347
14.3.	Drive-source Recovery Request and Operation-pause Reset Request	348
14.3.1	In the cases of Controllers Other Than SSEL, ASEL or PSEL Controllers	348
14.3.2	In the cases of SSEL, ASEL or PSEL Controllers	349
14.4	Setting Time	350
14.5	SEL Global Data Backup	350
14.6	Control Constant Table Management Information	352
14.7	Execution Stop of Positioner Mode of SSEL, ASEL or PSEL Controller	353
14.8	Getting Positioner Mode Information from SSEL, ASEL and PSEL Controllers	354
14.9	Positioner Mode Management Information for SSEL, ASEL or PSEL Controller	355
14.10	Excel File Save and Readout (Version V13.01.00.00 and later)	356
14.10.1	Excel File Save	356
14.10.2	Excel File Readout	358
14.10.3	Excel File Create and Edit	359
14.10.4	Caution	359
15.	Tool	360
16.	IXA Simulator	365
16.1	Outline	365
16.2	Preparation	365
16.2.1	System Requirements	365
16.2.2	How to Install	366
16.3.	How to Start up	377
16.3.1	Startup	377
16.3.2	Cycle Time Measurement PC Performance Adjustment	378
16.3.3	Warning at First Startup	380
16.3.4	Start of Simulation	380
16.3.5	Stop of Simulation	381
16.3.6	Termination of Simulation	381
16.4	Basic operation in 3D View Window	382
16.4.1	View Operation (Normal Mode)	382
16.4.2	View Operation (Walkthrough Mode)	387
16.4.3	Track Plotting	388
16.4.4	Other Displays	390
16.5	Operation on PC Software	391
16.5.1	FROM Writing Operation	391
16.5.2	Operation of Software Reset	391
16.6	SEL Commands not Applicable for Simulation	391
16.7	Extension Motion Control Feature	392

17. Error Countermeasures.....	393
17.1 Display when Error Occurred	393
18. Appendix.....	394
18.1 Parameter Recovery Method for X-SEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD Controllers	394
18.2 Error Level Control	400
18.3 X-SEL PC Software Error Table.....	401
Change History.....	406



Support Models

Model Name	Various data file extensions								Support Started Version
	Program (Individually)	Program (Batch)	Position	Parameter	Symbol	Coordinate	Global data	Backup Data	
XSEL-J/K	xpg	xpa	Xpt	xpm	xsm	-	xgd	xbk	V1.0.0.0
XSEL-JX/KX	spg	spa	spt	spm	ssm	scd	sgd	sbk	V2.0.0.0
XSEL-P/Q	x2pg	x2pa	x2pt	x2pm	x2sm	-	x2gd	x2bk	V3.0.0.0
XSEL-P/Q (compatible with increased memory) (w/gateway function) Extended Format	x2pg2	x2pa2	x2pt2	x2pm	x2sm2	-	x2gd	x2bk2	V7.2.0.0
TT	tpg	tpa	tpt	tpm	tsm	-	tgd	tbk	V4.0.0.0
TTA	t2pg	t2pa	t2pt t2pt2 (Position Output Operation Function enable)	t2pm	t2sm	t2cd	t2gd	t2bk t2bks (Position Output Operation Function enable)	V10.00.00.00
XSEL-PX/QX	s2pg	s2pa	s2pt	s2pm	s2sm	s2cd	s2gd	s2bk	V5.0.0.0
XSEL-PX/QX (compatible with increased memory) (w/gateway function) Extended Format	s2pg2	s2pa2	s2pt2	s2pm	s2sm2	s2cd	s2gd	s2bk2	V7.2.0.0
XSEL-R/S	x4pg	x4pa	x4pt	x4pm	x4sm	-	x4gd	x4bk	V9.00.00.00
XSEL-RX/SX	s4spg	s4spa	s4spt	s4spm	s4ssm	s4scd	s4sgd	s4sbk	V9.00.00.00
XSEL-RXD/SXD	s4dpg	s4dpa	s4dpt	s4dpm	s4dsm	s4dcd	s4dgd	s4dbk	V9.00.00.00
XSEL-RA/SA	.x6pg	.x6pa	.x6pt	.x6pm	.x6sm	-	.x6gd	x6bk	V13.00.00.00
XSEL-RAX/SAX	.s6spg	.s6spa	.s6spt	.s6spm	.s6ssm	s6scd	.s6sgd	s6sbk	V13.00.00.00
XSEL-RAXD/SAXD	.s6dpg	.s6dpa	.s6dpt	.s6dpm	.s6dsm	s6dcd	.s6dgd	s6dbk	V13.00.00.00
SSEL	sspg	sspa	sspt	sspm	sssm	-	ssgd	ssbk	V6.0.0.0
SSEL (applicable for memory increase)	sspg2	sspa2	sspt	sspm	sssm2	-	ssgd	ssbk2	V7.00.06.00
ASEL	aspg	aspa	aspt	aspm	assm	-	asgd	asbk	V7.0.0.0
PSEL	pspg	pspa	pspt	pspm	pssm	-	psgd	psbk	V7.0.0.0
MSEL-PCX/PGX	s5pg	s5pa	s5pt	s5pm	s5sm	s5cd	s5gd	S5bk	V11.00.00.00
MSEL-PC/PG	m5pg	m5pa	m5pt	m5pm	m5sm	m5cd	m5gd	M5bk	V12.00.01.00

* Extension for RC-axis position data of X-SEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD with gateway function: rpt
 (Note) SSEL and ASEL Controllers version applicable for battery-less absolute type: V12.02.05.03 and later
 XSEL-P/Q Controllers version applicable for battery-less absolute type: V12.02.06.00 and later

Model name	Supported version	Remarks
IA Super SEL Controller E/G Types	V6.0.0.0 ^(Note 1)	Refer to the following page for more information on how to install V6.0.0.0. and V7.07.12.00
DS Controller	V7.07.12.00 ^(Note 2)	

(Note 1) Supported OS: Windows 95, Windows 98, Windows NT, Windows Me, Windows 2000

(Note 2) Supported OS: Windows 98, Windows Me, Windows 2000, Windows XP

Installing V6.0.0.0 Compatible with the IA Super SEL Controller E/G Types and the DS Controller

V6.0.0.0 compatible with the IA Super SEL Controller E/G Types and the DS Controller is included in the DVD-ROM and can be installed based on the following procedure.

(Note) V6.0.0.0 runs with the following Windows operating systems.
Windows 95, Windows 98, Windows NT, Windows Me and Windows 2000

[Installing V7.07.12.00 Compatible]

V7.07.12.00 applicable for IA Super SEL Controller E Type, G Type and DS Controller is also stored in the DVD-ROM.

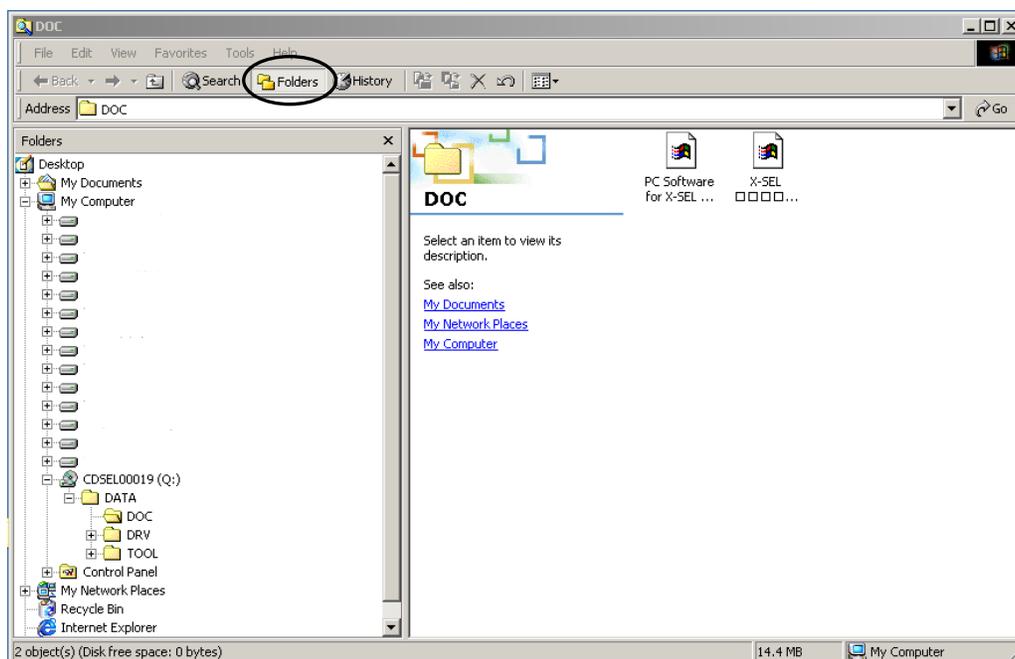
Install it in the same manner as V6.0.0.0.

The applicable OS are Windows 98, Windows Me, Windows 2000 and Windows XP.

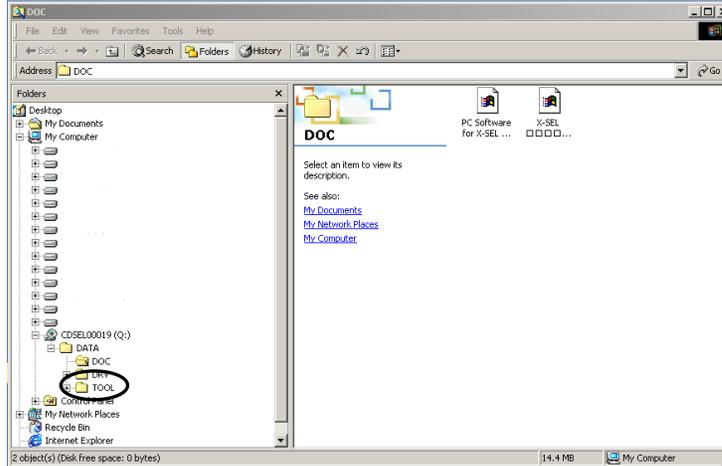
- [1] Insert the DVD-ROM containing the software into the DVD-ROM drive.
- [2] A screen to select the data to be installed will appear.
Click **Manual**.



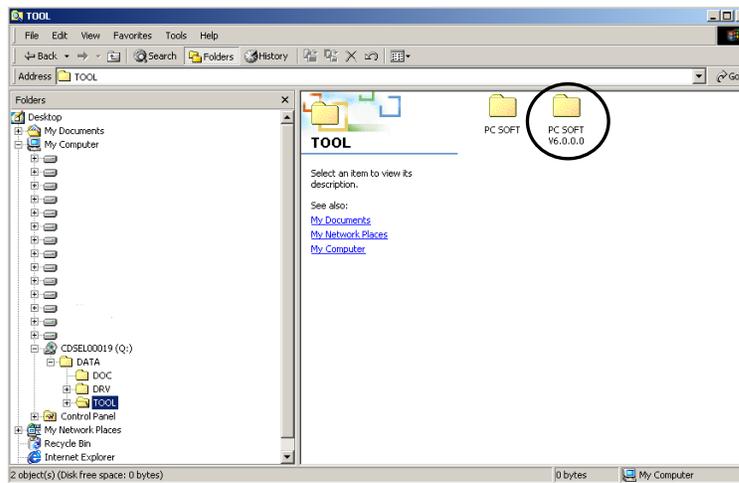
- [3] The folder containing the operation manual will open.
Click **Folders**.



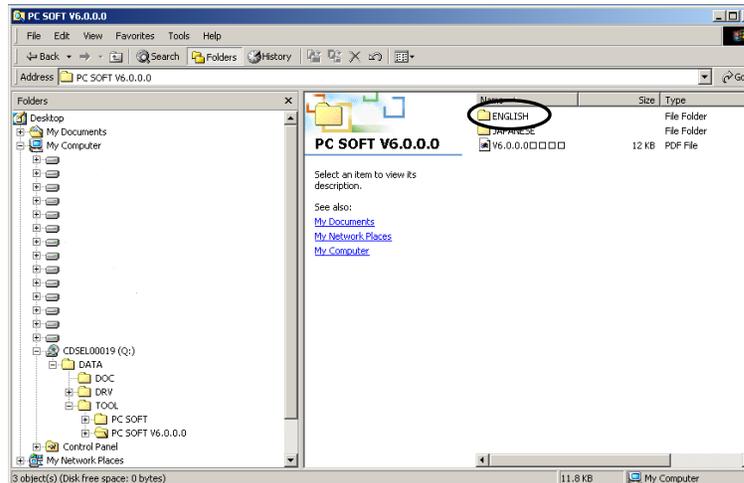
[4] Click **TOOL**.



[5] The PC SOFT V6.0.0.0 folder containing the V6.0.0.0 installer will appear. Click **PC SOFT V6.0.0.0** folder.



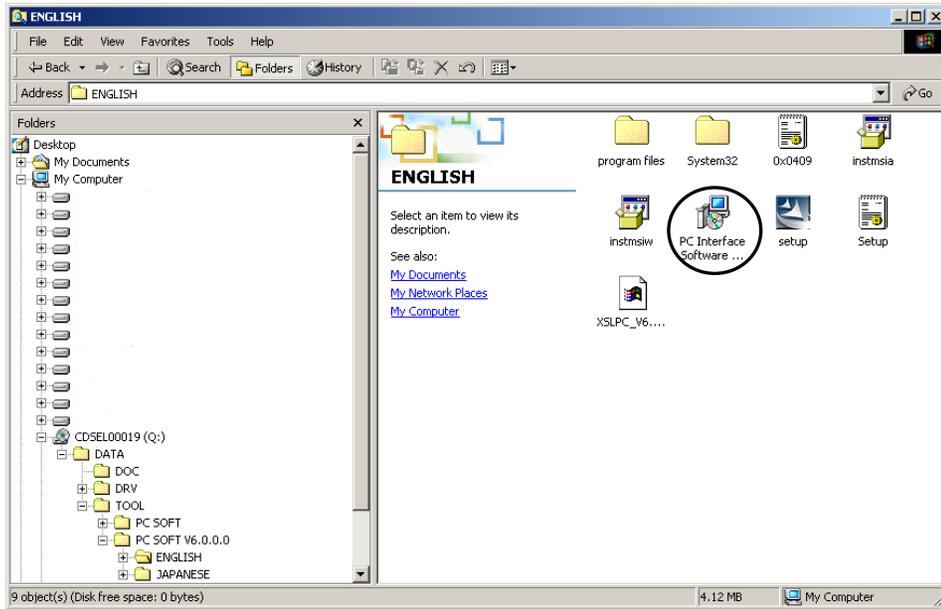
[6] Click the **ENGLISH** folder.



[7] Double-click **PC Interface Software....**

The PC Interface Software for X-SEL installation screen will appear.

Install the software based on the step [3] and thereafter described in 1.3.1 How to Install the PC Interface Software for X-SEL.



Software License Agreement

Before opening the software package, please read this Software License Agreement (hereinafter referred to as "Agreement").

This Agreement is applied to the PC interface software for this product (hereinafter referred to as "this Software", and also includes updated versions.).

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Witnesseth

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- [4] Please note that the version or edition number printed on the face of this manual does not correspond to the software version number.
- [5] The content of this manual is subject to change without notice.
- [6] The software runs with the Windows operation systems listed in the table below. Accordingly, it is a prerequisite to have a basic Windows operating environment to use this software.
(Note, however, that Windows is not included with the software.)

Port used	Type	Operable Windows
RS-232C	IA-101-X-MW-JS IA-101-X-MW IA-101-XA-MW	Windows 10 ^{*1} , Windows 11 ^{*2}
USB	IA-101-X-USBS IA-101-X-USBMW IA-101-TT-USB IA-101-TTA-USB IA-101-N ^(Note 1)	Windows 10 ^{*1} , Windows 11 ^{*2}

*1: Supported by software version V13.01.00.00 or later.

*2: Supported by software version V14.03.00.00 or later.

Note 1 There is no cable enclosed. Please prepare yourself an USB cable to connect to the USB connector on XSEL-RA/SA/RAX/SAX/RAXD/SAXD Controllers.

Microsoft, MS, MS-DOS, Windows, Windows 3.1, Windows 95, Windows 98, Windows NT, Windows 2000, Windows Me, Windows XP, Windows Vista, and Windows 7, Windows 8, Windows 8.1, Windows 10, Windows 11 are registered trademarks of Microsoft Corporation.

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Safety Guide

“Safety Guide” has been written to use the machine safely and so prevent personal injury or property damage beforehand. Make sure to read it before the operation of this product.

Safety Precautions for Our Products

The common safety precautions for the use of any of our robots in each operation.

No.	Operation Description	Description
1	Model Selection	<ul style="list-style-type: none"> ● This product has not been planned and designed for the application where high level of safety is required, so the guarantee of the protection of human life is impossible. Accordingly, do not use it in any of the following applications. <ol style="list-style-type: none"> 1) Medical equipment used to maintain, control or otherwise affect human life or physical health. 2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility) 3) Important safety parts of machinery (Safety device, etc.) ● Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product. ● Do not use it in any of the following environments. <ol style="list-style-type: none"> 1) Location where there is any inflammable gas, inflammable object or explosive 2) Place with potential exposure to radiation 3) Location with the ambient temperature or relative humidity exceeding the specification range 4) Location where radiant heat is added from direct sunlight or other large heat source 5) Location where condensation occurs due to abrupt temperature changes 6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid) 7) Location exposed to significant amount of dust, salt or iron powder 8) Location subject to direct vibration or impact ● For an actuator used in vertical orientation, select a model which is equipped with a brake. If selecting a model with no brake, the moving part may drop when the power is turned OFF and may cause an accident such as an injury or damage on the work piece.

No.	Operation Description	Description
2	Transportation	<ul style="list-style-type: none"> ● When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane. ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When in transportation, consider well about the positions to hold, weight and weight balance and pay special attention to the carried object so it would not get hit or dropped. ● Transport it using an appropriate transportation measure. The actuators available for transportation with a crane have eyebolts attached or there are tapped holes to attach bolts. Follow the instructions in the instruction manual for each model. ● Do not step or sit on the package. ● Do not put any heavy thing that can deform the package, on it. ● When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work. ● When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment’s capability limit. ● Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. ● Do not get on the load that is hung on a crane. ● Do not leave a load hung up with a crane. ● Do not stand under the load that is hung up with a crane.
3	Storage and Preservation	<ul style="list-style-type: none"> ● The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. ● Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.
4	Installation and Start	<p>(1) Installation of Robot Main Body and Controller, etc.</p> <ul style="list-style-type: none"> ● Make sure to securely hold and fix the product (including the work part). A fall, drop or abnormal motion of the product may cause a damage or injury. Also, be equipped for a fall-over or drop due to an act of God such as earthquake. ● Do not get on or put anything on the product. Failure to do so may cause an accidental fall, injury or damage to the product due to a drop of anything, malfunction of the product, performance degradation, or shortening of its life. ● When using the product in any of the places specified below, provide a sufficient shield. <ol style="list-style-type: none"> 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets

No.	Operation Description	Description
4	Installation and Start	<p>(2) Cable Wiring</p> <ul style="list-style-type: none"> ● Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool. ● Do not scratch on the cable. Do not bend it forcibly. Do not pull it. Do not coil it around. Do not insert it. Do not put any heavy thing on it. Failure to do so may cause a fire, electric shock or malfunction due to leakage or continuity error. ● Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error. ● When the direct current power (+24V) is connected, take the great care of the directions of positive and negative poles. If the connection direction is not correct, it might cause a fire, product breakdown or malfunction. ● Connect the cable connector securely so that there is no disconnection or looseness. Failure to do so may cause a fire, electric shock or malfunction of the product. ● Never cut and/or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Failure to do so may cause the product to malfunction or cause fire. <p>(3) Grounding</p> <ul style="list-style-type: none"> ● The grounding operation should be performed to prevent an electric shock or electrostatic charge, enhance the noise-resistance ability and control the unnecessary electromagnetic radiation. ● For the ground terminal (PE) on the AC power cable of the controller and the grounding plate in the control panel, make sure for grounding work. For security grounding, it is necessary to select an appropriate wire thickness suitable for the load. Perform wiring that satisfies the specifications (electrical equipment standards and criteria). For detail, follow the description in [an instruction manual of each controller or controller built-in actuator]. ● Conduct functional grounding on the FG terminal for a controller supplying 24V DC or a controller built-in type actuator. In order to minimize influence to mechanical operation given by electromagnetic interference (noise) to an electrical device or insulation failure, conduct grounding on a terminal or a conductor that is electrically stable. The reference impedance should be Type D (Former Class 3, ground resistance 100Ω or less).

No.	Operation Description	Description
4	Installation and Start	<p>(4) Safety Measures</p> <ul style="list-style-type: none"> ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When the product is under operation or in the ready mode, take the safety measures (such as the installation of safety and protection fence) so that nobody can enter the area within the robot’s movable range. When the robot under operation is touched, it may result in death or serious injury. ● Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation. ● Take the safety measure not to start up the unit only with the power turning ON. Failure to do so may start up the machine suddenly and cause an injury or damage to the product. ● Take the safety measure not to start up the machine only with the emergency stop cancellation or recovery after the power failure. Failure to do so may result in an electric shock or injury due to unexpected power input. ● When the installation or adjustment operation is to be performed, give clear warnings such as “Under Operation; Do not turn ON the power!” etc. Sudden power input may cause an electric shock or injury. ● Take the measure so that the work part is not dropped in power failure or emergency stop. ● Wear protection gloves, goggle or safety shoes, as necessary, to secure safety. ● Do not insert a finger or object in the openings in the product. Failure to do so may cause an injury, electric shock, damage to the product or fire. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.
5	Teaching	<ul style="list-style-type: none"> ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the teaching operation from outside the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. <p>* Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.</p>

No.	Operation Description	Description
6	Trial Operation	<ul style="list-style-type: none"> ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation. ● When the check operation is to be performed inside the safety protection fence, perform the check operation using the previously specified work procedure like the teaching operation. ● Make sure to perform the programmed operation check at the safety speed. Failure to do so may result in an accident due to unexpected motion caused by a program error, etc. ● Do not touch the terminal block or any of the various setting switches in the power ON mode. Failure to do so may result in an electric shock or malfunction.
7	Automatic Operation	<ul style="list-style-type: none"> ● Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence. ● Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication. ● Make sure to operate automatic operation start from outside of the safety protection fence. ● In the case that there is any abnormal heating, smoke, offensive smell, or abnormal noise in the product, immediately stop the machine and turn OFF the power switch. Failure to do so may result in a fire or damage to the product. ● When a power failure occurs, turn OFF the power switch. Failure to do so may cause an injury or damage to the product, due to a sudden motion of the product in the recovery operation from the power failure.

No.	Operation Description	Description
8	Maintenance and Inspection	<ul style="list-style-type: none"> ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the work out of the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the work is to be performed inside the safety protection fence, basically turn OFF the power switch. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● For the grease for the guide or ball screw, use appropriate grease according to the instruction manual for each model. ● Do not perform the dielectric strength test. Failure to do so may result in a damage to the product. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. ● The slider or rod may get misaligned OFF the stop position if the servo is turned OFF. Be careful not to get injured or damaged due to an unnecessary operation. ● Pay attention not to lose the removed cover or screws, and make sure to put the product back to the original condition after maintenance and inspection works. <p>Use in incomplete condition may cause damage to the product or an injury.</p> <p>* Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.</p>
9	Modification and Dismantle	<ul style="list-style-type: none"> ● Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	<ul style="list-style-type: none"> ● When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. ● When removing the actuator for disposal, pay attention to drop of components when detaching screws. ● Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.
11	Other	<ul style="list-style-type: none"> ● Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. ● See Overseas Specifications Compliance Manual to check whether complies if necessary. ● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety.

Alert Indication

The safety precautions are divided into “Danger”, “Warning”, “Caution” and “Notice” according to the warning level, as follows, and described in the instruction manual for each model.

Level	Degree of Danger and Damage	Symbol
Danger	This indicates an imminently hazardous situation which, if the product is not handled correctly, will result in death or serious injury.	 Danger
Warning	This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury.	 Warning
Caution	This indicates a potentially hazardous situation which, if the product is not handled correctly, may result in minor injury or property damage.	 Caution
Notice	This indicates lower possibility for the injury, but should be kept to use this product properly.	 Notice

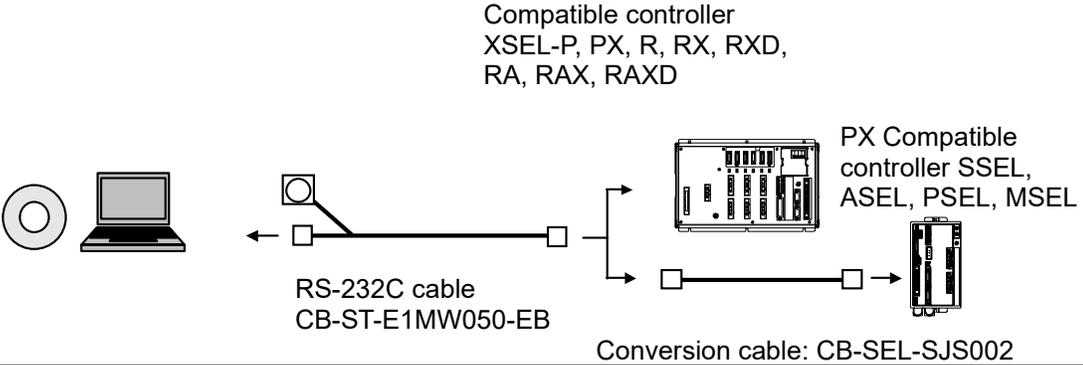


1. Before You Begin

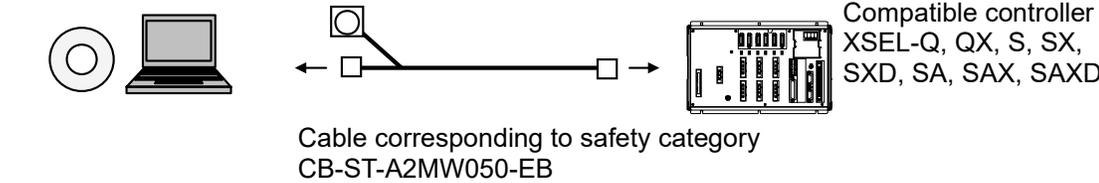
1.1 Items Supplied with This Software (Product Components)

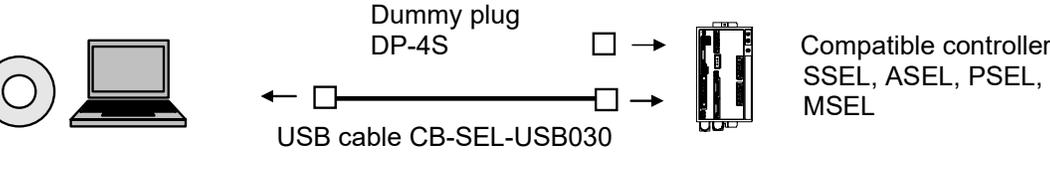
Please check to make sure that the following items are included in your software package.

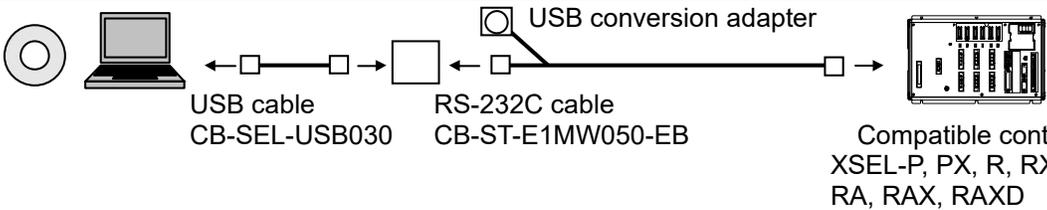
- | | |
|--|---------|
| [1] Operation manual | One |
| [2] DVD-ROM containing the software | One |
| [3] Permission of use contract (manual) for the software | One |
| [4] Connection cables | One set |
- Enclosed connection cables vary depending on the PC interface software type.
The types and connection cables are shown in the table below.

Type	External Connection Cable	
IA-101-X-MW-JS	RS-232C cable (CB-ST-E1MW050-EB):	1 cable
	Conversion cable (CB-SEL-SJS002):	1 cable
IA-101-X-MW	RS-232C cable (CB-ST-E1MW050-EB):	1 cable
Connection Configuration	 <p>Compatible controller XSEL-P, PX, R, RX, RXD, RA, RAX, RAXD</p> <p>PX Compatible controller SSEL, ASEL, PSEL, MSEL</p> <p>RS-232C cable CB-ST-E1MW050-EB</p> <p>Conversion cable: CB-SEL-SJS002</p>	

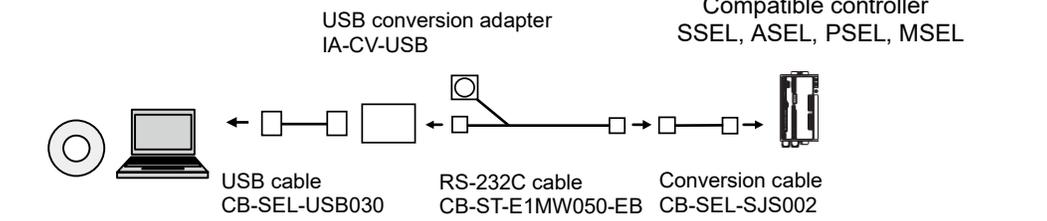
When an NEC computer is used, some models may require an adapter separately for the RS-232C cable.

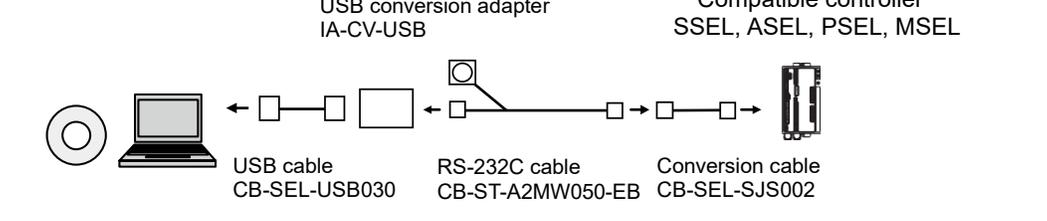
Type	External Connection Cable	
IA-101-XA-MW	Cable Conforming to Safety Category 4 (CB-ST-A2MW050-EB):	1 cable
Connection Configuration	 <p>Compatible controller XSEL-Q, QX, S, SX, SXD, SA, SAX, SAXD</p> <p>Cable corresponding to safety category CB-ST-A2MW050-EB</p>	

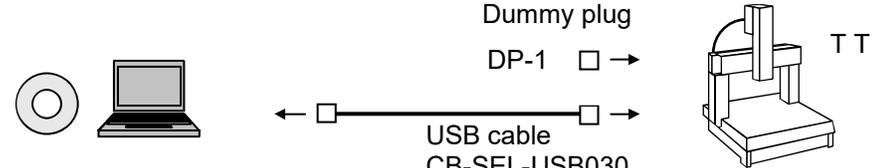
Type	External Connection Cable	
IA-101-X-USBS	USB cable (CB-SEL-USB030):	1 cable
	Dummy plug (DP-4S)	1 unit
Connection Configuration	 <p>Dummy plug DP-4S</p> <p>USB cable CB-SEL-USB030</p> <p>Compatible controller SSEL, ASEL, PSEL, MSEL</p>	

Type	External Connection Cable	
IA-101-X-USBMW	USB conversion adapter (IA-CV-USB): USB cable (CB-SEL-USB030): RS-232C cable (CB-ST-E1MW050-EB):	1 unit 1 piece 1 piece
Connection Configuration	 <p> USB conversion adapter USB cable CB-SEL-USB030 RS-232C cable CB-ST-E1MW050-EB Compatible controller XSEL-P, PX, R, RX, RXD, RA, RAX, RAXD </p>	

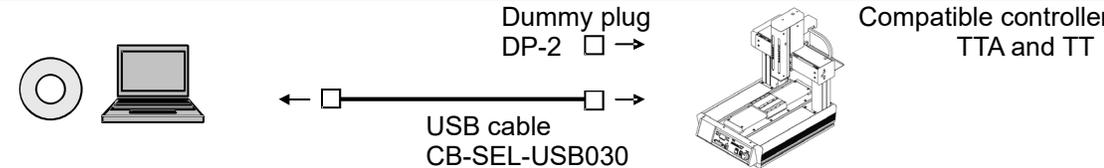
 **Warning:** The internal components of the controller may burn if the following cable is used to connect XSEL-Q, QX, S, SX, SA, SAX, SAXD to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).

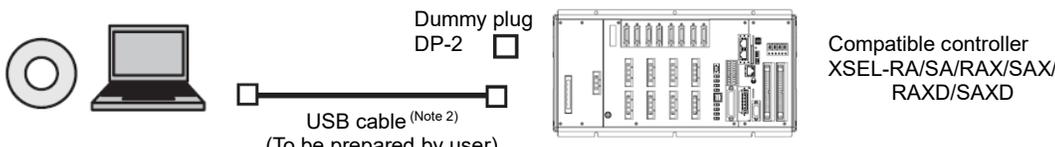
Type	External Connection Cable	
IA-101-X-USBMW-JS	RS-232C cable (CB-ST-E1MW050-EB): Conversion cable (CB-SEL-SJS002): USB conversion adapter (IA-CV-USB): USB cable (CB-SEL-USB030):	1 cable 1 cable 1 unit 1 piece
Connection Configuration	 <p> USB conversion adapter IA-CV-USB Compatible controller SSEL, ASEL, PSEL, MSEL USB cable CB-SEL-USB030 RS-232C cable CB-ST-E1MW050-EB Conversion cable CB-SEL-SJS002 </p>	

Type	External Connection Cable	
IA-101-XA-USBMW-JS	RS-232C cable (CB-ST-A2MW050-EB): Conversion cable (CB-SEL-SJS002): USB conversion adapter (IA-CV-USB): USB cable (CB-SEL-USB030):	1 cable 1 cable 1 unit 1 piece
Connection Configuration	 <p> USB conversion adapter IA-CV-USB Compatible controller SSEL, ASEL, PSEL, MSEL USB cable CB-SEL-USB030 RS-232C cable CB-ST-A2MW050-EB Conversion cable CB-SEL-SJS002 </p>	

Type	External Connection Cable	
IA-101-TT-USB	USB cable (CB-SEL-USB030): Dummy Plug (DP-1):	1 piece 1 unit
Connection Configuration		

(Note) The dummy plug DP-1 can be used for TTA. However, it is applicable only to Safety Categories 1 and 2. When using a dummy plug in Safety Category 3, apply DP-2.
Also, note that TTA is applicable in the software version V10.00.00.00 or later.

Type	External Connection Cable	
IA-101-TTA-USB	USB cable (CB-SEL-USB-030): Dummy Plug (DP-2):	1 piece 1 unit
Connection Configuration		

Type	External Connection Cable	
IA-101-N	No USB cable enclosed (Note 1)	
Connection Configuration		

Note 1 There is no USB cable enclosed. Please prepare yourself a general-purpose USB cable.

Note 2 A general-purpose UBS cable (the connector on the controller side should be mini-B) can be used.
A recommended USB cable is U2C-MF50BK (manufactured by ELECOM).

1.2 System Requirements

The following operating environment is required to run this software.

Supported OS	Type	Operable OS
	IA-101-X-MW-JS, IA-101-X-MW, IA-101-XA-MW, IA-101-X-USBS, IA-101-X-USBMW, IA-101-X-USBMW-JS ^(Note 1) , IA-101-XA-USBMW-JS ^(Note 1) , IA-101-TT-USB, IA-101-TTA-USB, IA-101-N ^(Note 1)	Windows 10 ^{*1} , Windows 11 ^{*2}
	*1: Supported by software version V13.01.00.00 or later. 32-bit and 64-bit operating systems are supported. *2: Supported by software version V14.03.00.00 or later.	
Computer	PC compatible with supported OS (Windows)	
Keyboard	Keyboard compatible with a PC compatible with supported OS (Windows)	
Memory	Capacity of memory necessary to run a supported OS (Windows)	
Display	XGA and above	
Pointing device	Mouse or a compatible driver	
Storage medium drive	DVD-ROM drive	
Hard disk	Hard disk with at least 200 MB of available space (The software is installed on the hard disk.)	
Serial port RS-232C (EIA-S74 compliant)	Required for PC software of the following model number: Model number: IA-101-X-MW-JS, IA-101-X-MW, IA-101-XA-MW	
USB port	Required for PC software of the following model number: Model number: IA-101-X-USBS, IA-101-X-USBMW, IA-101-TT-USB, IA-101-TTA-USB, IA-101-N ^(Note 1)	

Note 1 There is no cable enclosed. Please prepare yourself an USB cable to connect to the USB connector on XSEL-RA/SA/RAX/SAX/RAXD/SAXD Controllers.

1.3 Installing the Software

This software is run from the hard disk. This section explains how to install the software.

1.3.1 How to Install the PC Software

(1) Launching the tool for installation

- 1) Insert the software DVD-ROM into the computer's optical drive.
- 2) The tool for installation screen (Fig. 1.1) will be displayed.

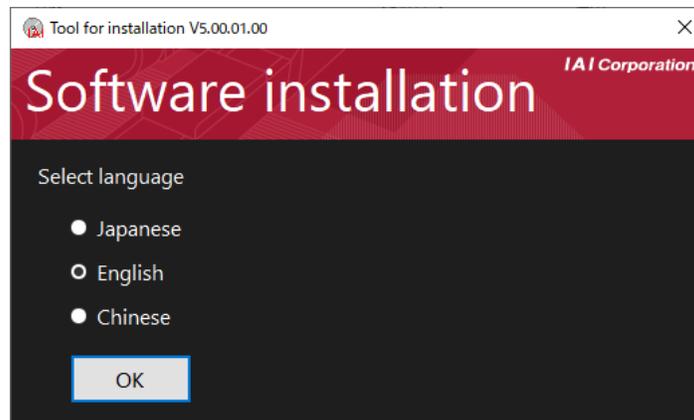


Fig. 1.1 Tool for Installation Screen

(The screen displayed may vary depending on the version, DVD data, etc.)

* What to do if the tool for installation screen (Fig. 1.1) is not displayed
If the data installation selection screen (Fig. 1.1) is not displayed even when the DVD-ROM is inserted, display the screen according to the process below.

- a. Using Explorer, etc., display a list of the folders in the DVD-ROM.
Figure 1.2 is displayed.

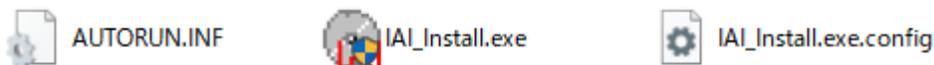


Fig. 1.2 List of Folders, etc., in the DVD-ROM

- b. Double-click  IAI_Install.exe to display the tool for installation screen (Fig. 1.1).

(2) Installation of the computer-dedicated teaching software for XSEL (RSEL)

1) Select "English" on the tool for installation screen (Fig. 1.3) and click **OK**.



Fig. 1.3 Tool for Installation Screen

2) When the tool for installation screen (Fig. 1.4) is displayed, select "PC Interface Software for XSEL."

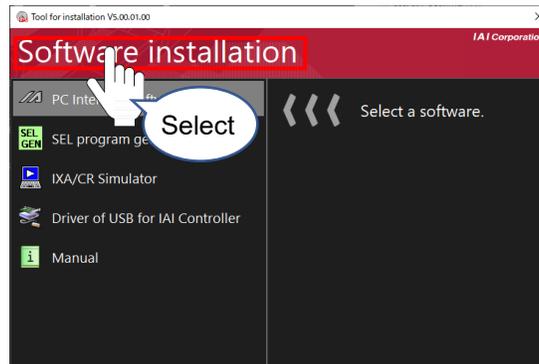


Fig. 1.4 Installation Screen

3) Click **Install**.

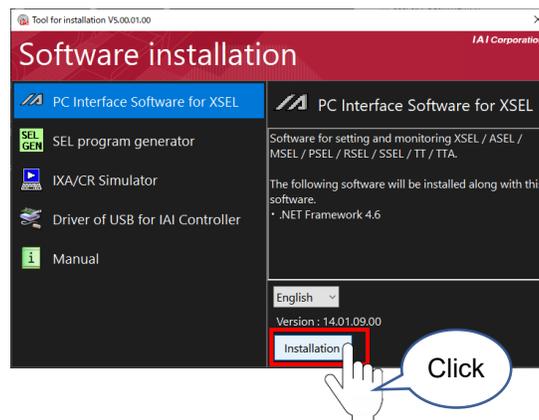


Fig. 1.5 Installation Screen

- 4) The standby screen (Fig. 1.6) is displayed. Wait for the installation to launch.

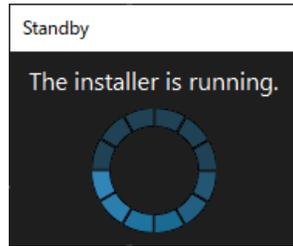


Fig. 1.6 Standby Screen

- 5) Installation preparation (Fig. 1.7) begins.

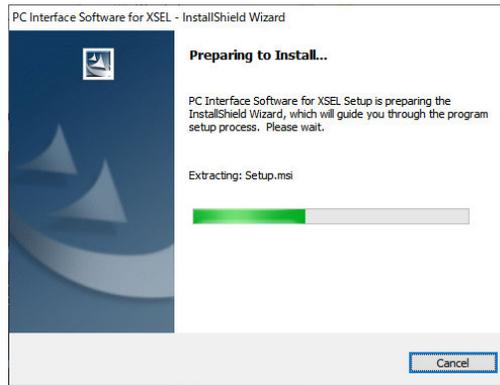


Fig. 1.7 Preparing to Install

- 6) The PC Interface Software for XSEL - InstallShield wizard screen (Fig. 1.8) will be displayed. Click **Next**.

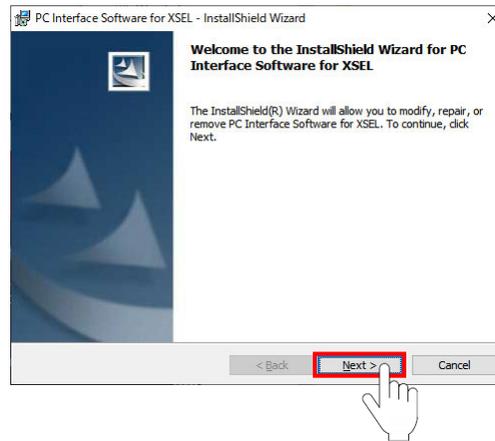


Fig. 1.8 PC Interface Software for XSEL - InstallShield Wizard Screen

- 7) The user information registration screen (Fig. 1.9) will be displayed. Enter user information and click **Next**.

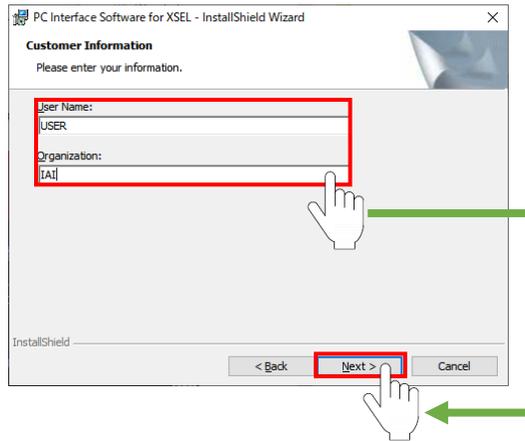


Fig. 1.9 User Information Registration Screen

- 8) Designate the destination for installation of the PC Interface Software for XSEL (Fig. 1.10). Normally, the screen as displayed is fine. After designation, click **Next**.

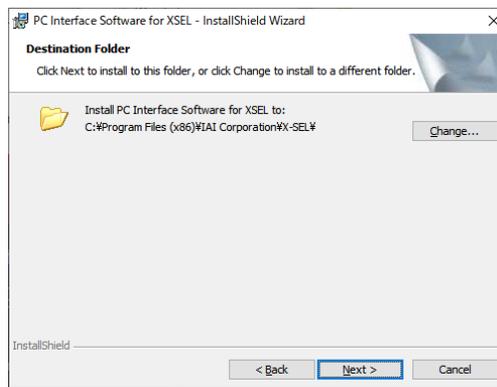


Fig. 1.10 Installation Destination Folder Designation Screen

- 9) Click "Anyone who uses this computer (all users)."

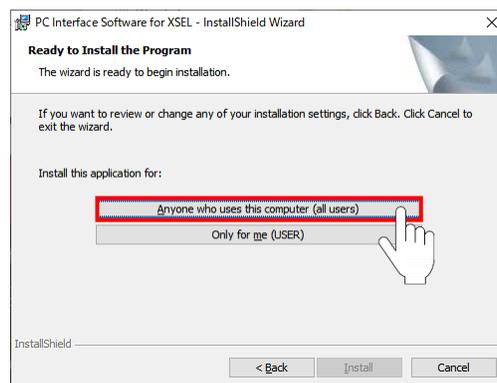


Fig. 1.11 Ready to Install Program Screen

Installation begins. During installation, the screen in Fig. 1.12 will be displayed.

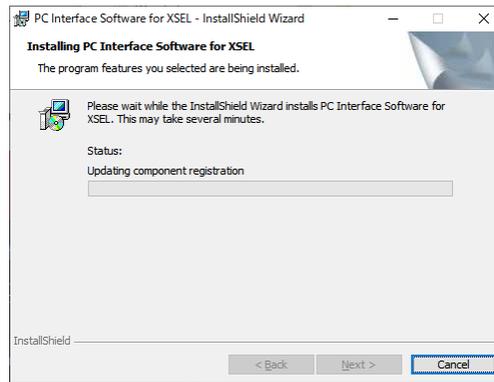


Fig. 1.12 Installing Program Screen

- 10) When installation is complete, the screen in Fig. 1.13 will be displayed. Uncheck "Launch the program" and click "Finish."

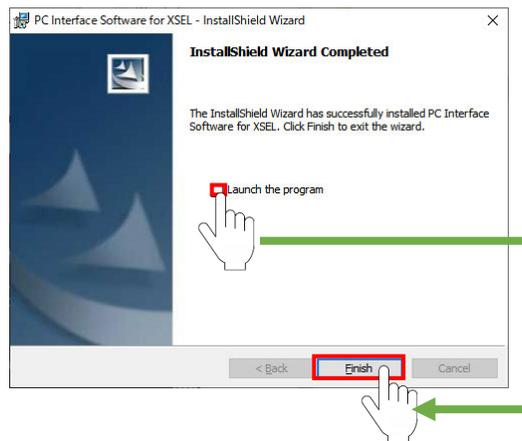


Fig. 1.13 Installation Complete

- 11) When program installation is complete, the start menu program (P) → IAI → X_SEL → PC Interface Software for X-SEL item will be displayed. Select this item to launch the software.
- 12) Eject the DVD-ROM.
- 13) After launching the program, click **Help** in the menu to check whether the version is the same as the DVD-ROM version.
If the version has not been updated, uninstall the program and install from the DVD-ROM again.

1.3.2 How to Install the USB Conversion Adapter Driver Software

When a USB port is used, it is required to install USB conversion adapter driver software.

[Compatible software]

- IA-101-X-USBS (with USB cable)
- IA-101-X-USBMW (with USB conversion adapter + cable)
- IA-101-TT-USB (with USB cable)
- IA-101-TTA-USB (with USB cable)

- [1] Insert the DVD-ROM of this software into your DVD-ROM drive.
- [2] The installed data selection screen (Fig. 1.14) will be displayed.
Select "Drive of USB for IAI Controller" and then click on "Installation".

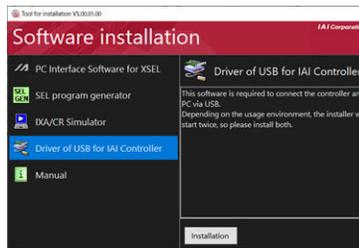


Fig. 1.14 Installed Data Selection Screen

(The displayed screen may vary depending on the version, data in the DVD or other factor.)

- [3] The IAI Corporation USB to UART Bridge Controller Driver Installer screen appears. Click **Next >**.



Fig. 1.15 IAI Corporation USB to UART Bridge Controller Driver Installer Screen

[4] The drivers are now installing... screen appears.

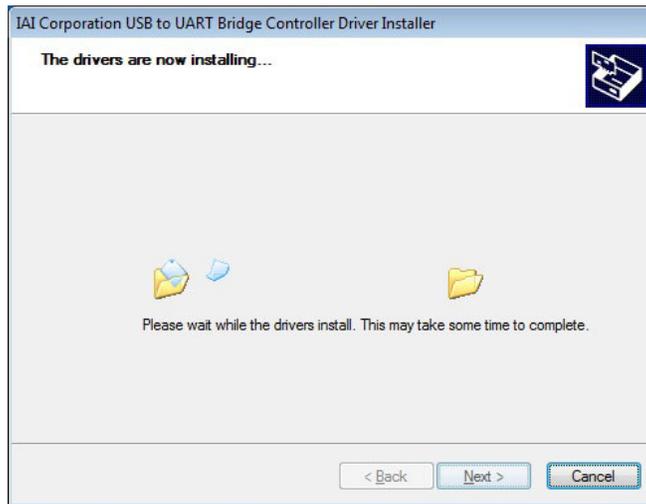


Fig. 1.16 The drivers are now installing Screen

[5] It is displayed on the IAI Corporation USB to UART Bridge Controller Driver Installer screen, "The drivers were successfully installed on this computer". Click **Finish**.



Fig. 1.17 IAI Corporation USB to UART Bridge Controller Driver Installer Confirmation Screen

[6] Connect the PC and the USB conversion adapter with a USB cable.

[7] The driver installation will be completed.

If the installation is not completed, repeat the steps from Step [8].

- [8] Launch Device Manager.
Right-click “CP2102 USB to UART Bridge Controller” and click “Update Driver Software...”

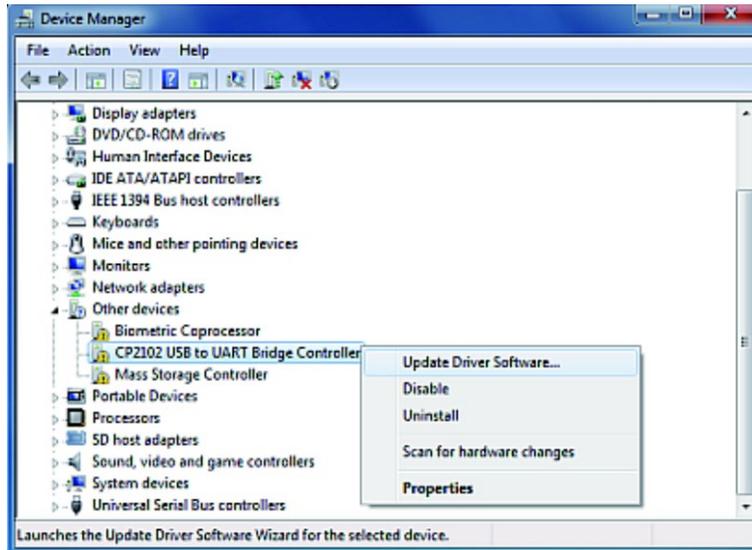


Fig. 1.18 Device Manager Screen

- [9] The Update Driver Software screen appears. On the Update Driver Software screen, click the “Browse my computer for driver software” button.

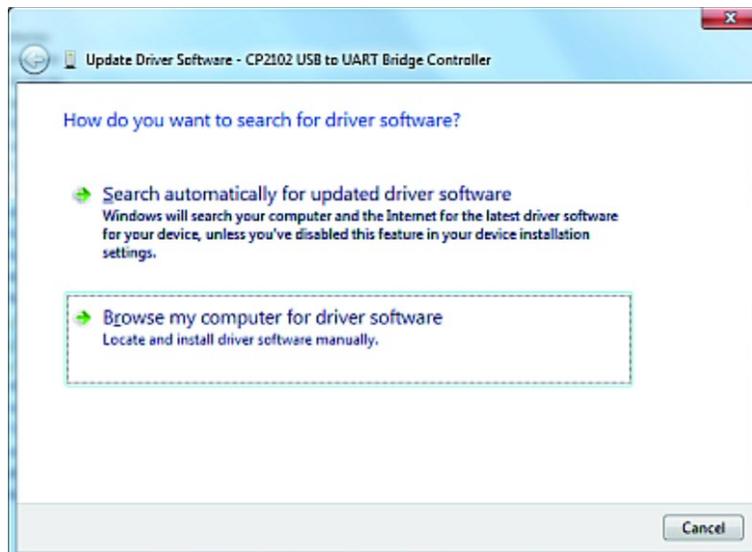


Fig. 1.19 Update Driver Software Screen

- [10] The Update Driver Software screen appears.
In the area circled on the Update Driver Software screen, enter the Save to location, "DATA\DRV\IAI USBv4\Vista-8" Click **Next** >.

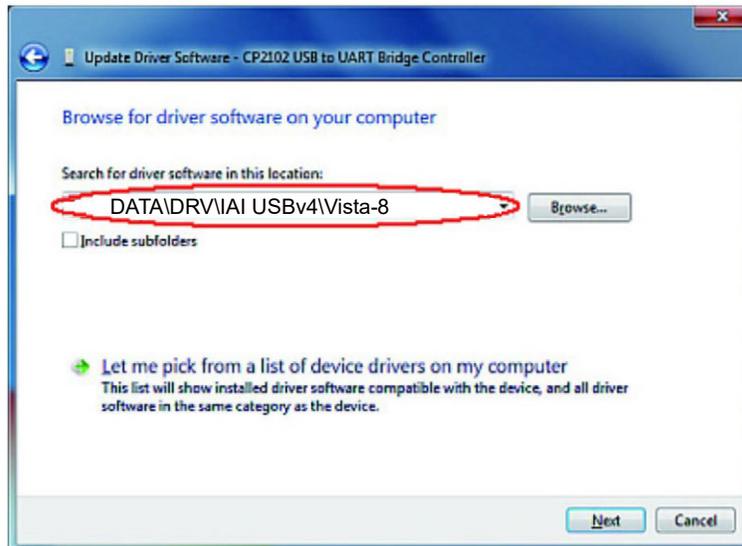


Fig. 1.20 Update Driver Software Screen

- [11] The driver software update completion screen (IAI USB to UART Bridge Controller) appears. Click **Close** on the Update Driver Software screen.

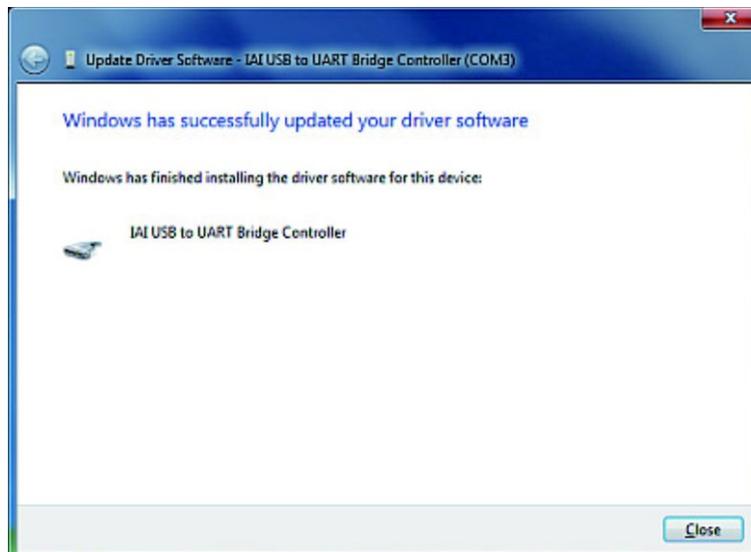


Fig. 1.21 Driver Software Update Completion Screen (IAI USB to UART Bridge Controller)

- [12] The driver installation is now complete.

1.3.3 How to Install Driver Software for USB Connection of XSEL-RA/SA/RAX/SAX/RAXD/SAXD

It is necessary to install the driver software when using USB by connecting to USB connector.
Make sure to prepare the stop switch in your reach when having an actuator operated by USB connection so that you can stop the actuator in an emergency case.
In case you cannot prepare a switch, use IA-101-X-USBMW equipped with a stop switch.

[1] Connect the personal computer to the controller using the USB cable. After connection being established, turn on the power to the controller if it is not on.

[2] Installation process of the driver software automatically starts.

[3] The driver installation is now complete.

[Remarks]

Once the installation of the USB driver is complete, COM port gets automatically added.

[The way to change the COM port, refer to 1.3.4 How to Change COM Port of IAI USB” in XSEL PC Software Instruction Manual]

(The name of the COM port is differ from the one on USB converter adapter)

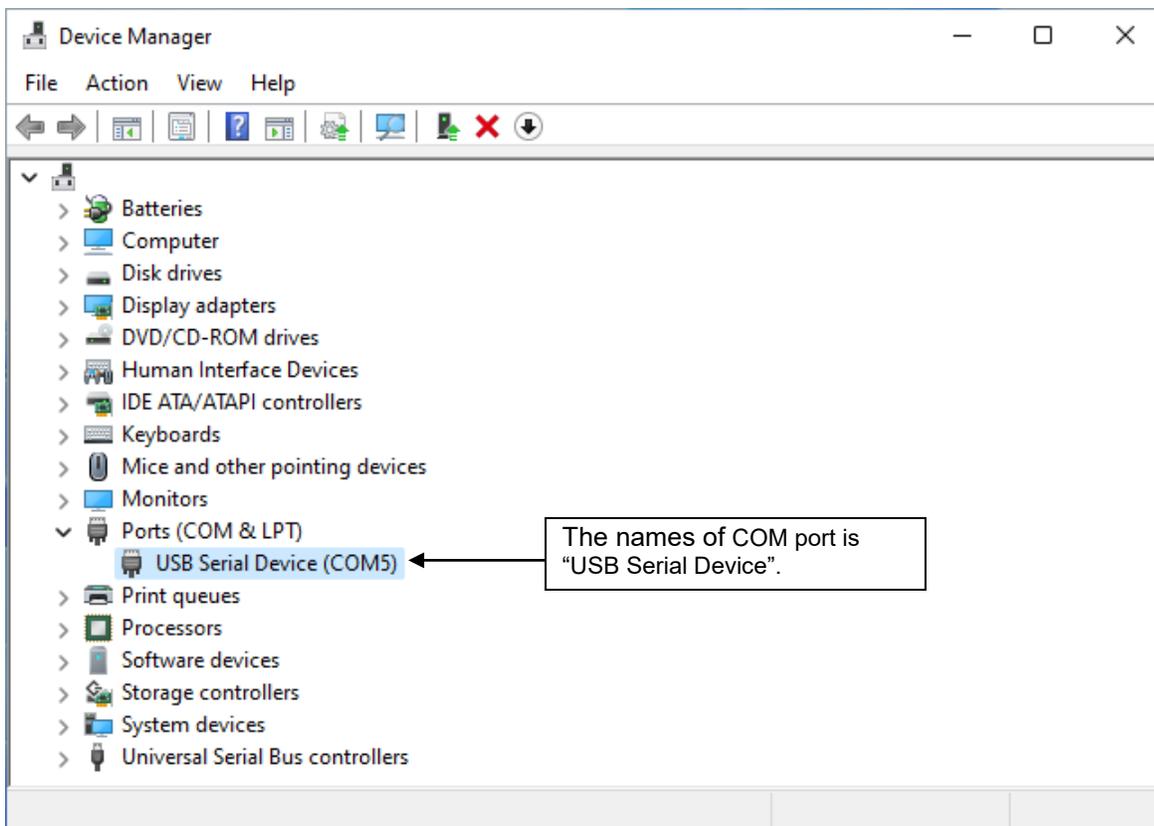


Fig. 1.22 Device Manager Screen

1.3.4 How to change the USB COM port

The COM port set in the installation of USB conversion adapter driver software can be changed by the following procedures.

- [1] Click Windows Start, Setting, and Control Panel to open the Control Panel screen.
 Double click System to open the Property screen.
 Click and open Hardware above the System icon.
 Click and open Device Manager inside the Hardware folder.
 Double click and extend Port (COM and LPT) inside the Device Manager folder.
- [2] Double click IAI USB to UART Bridge Controller (COM?).
 (Note) COM? is the COM port number before the port is changed.

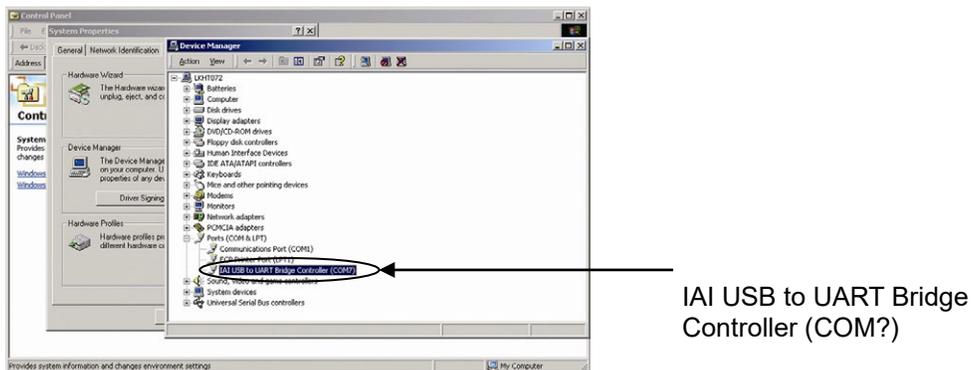


Fig. 1.23 Device Manager Screen

- [3] Property screen of IAI USB to UART Bridge Controller (COM?) will be displayed.
 Click Options (A) on the Property screen.

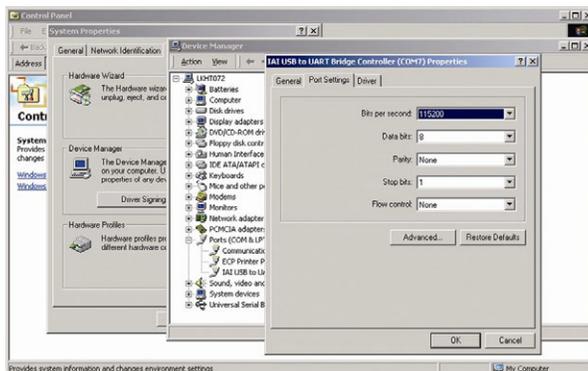


Fig. 1.24 Property Screen

- [4] COM? Port Option screen will be displayed.
Change the COM port number in the COM Port Number (P) box to the number to be set.
Click **OK**.

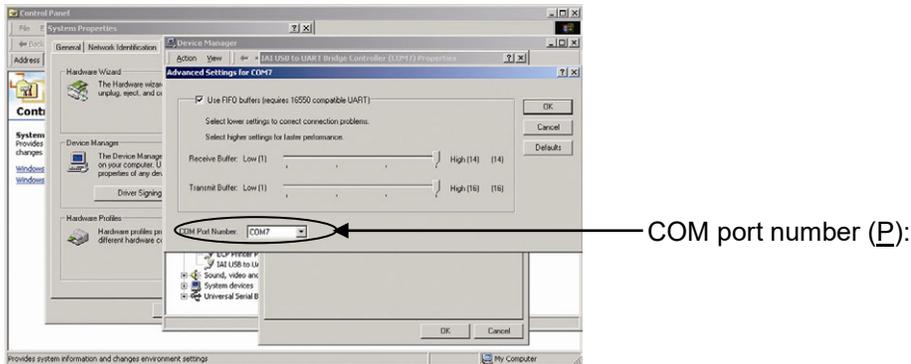


Fig. 1.25 COM? Port Option Screen

- [5] COM? Port Option screen will be disappeared.
COM port number will be changed by clicking OK on the Property screen (Fig. 1.24)
- [6] To confirm that the COM port number is changed, close the Device Manager screen and display it again.
After confirming the change, close all screens including the Device Manager screen.

1.4 Connection to Controller

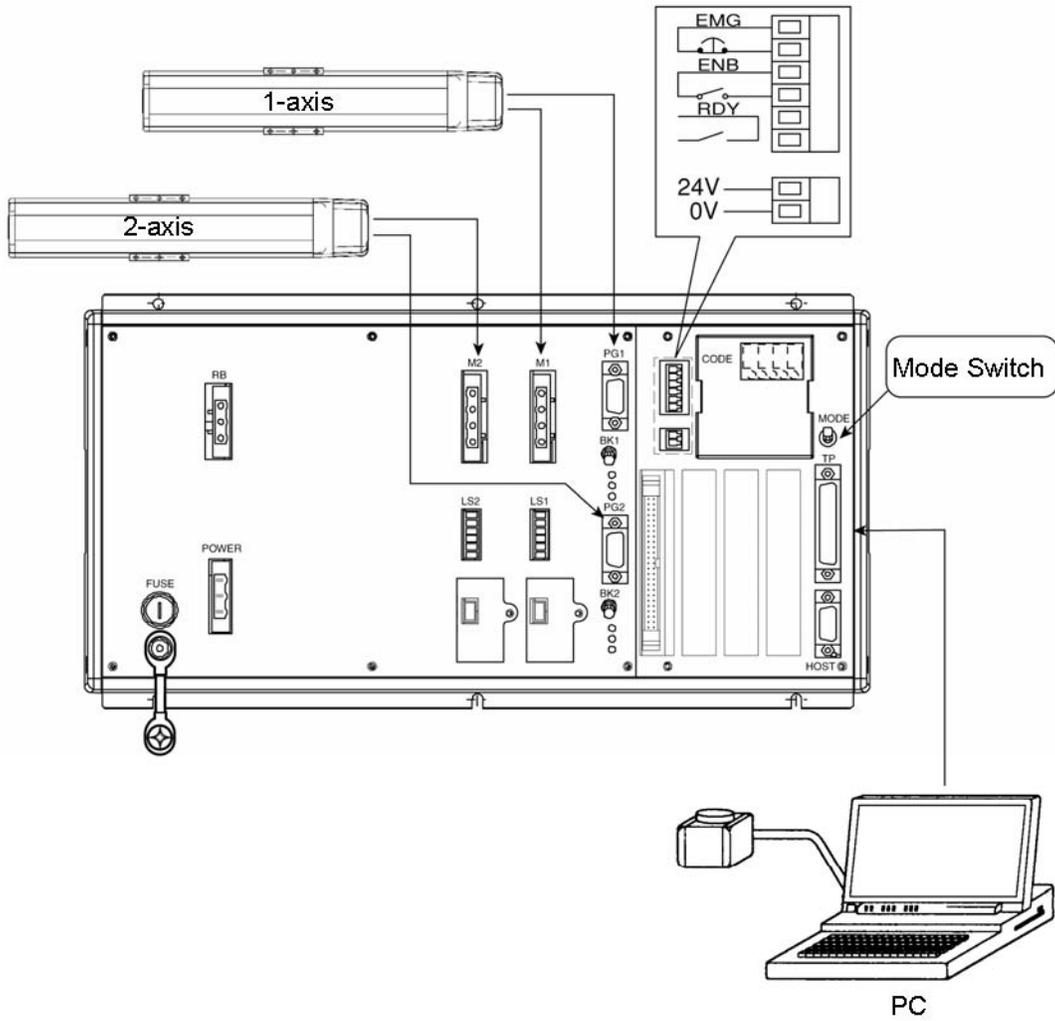


Fig. 1.26 X-SEL-K (J) Type Controller

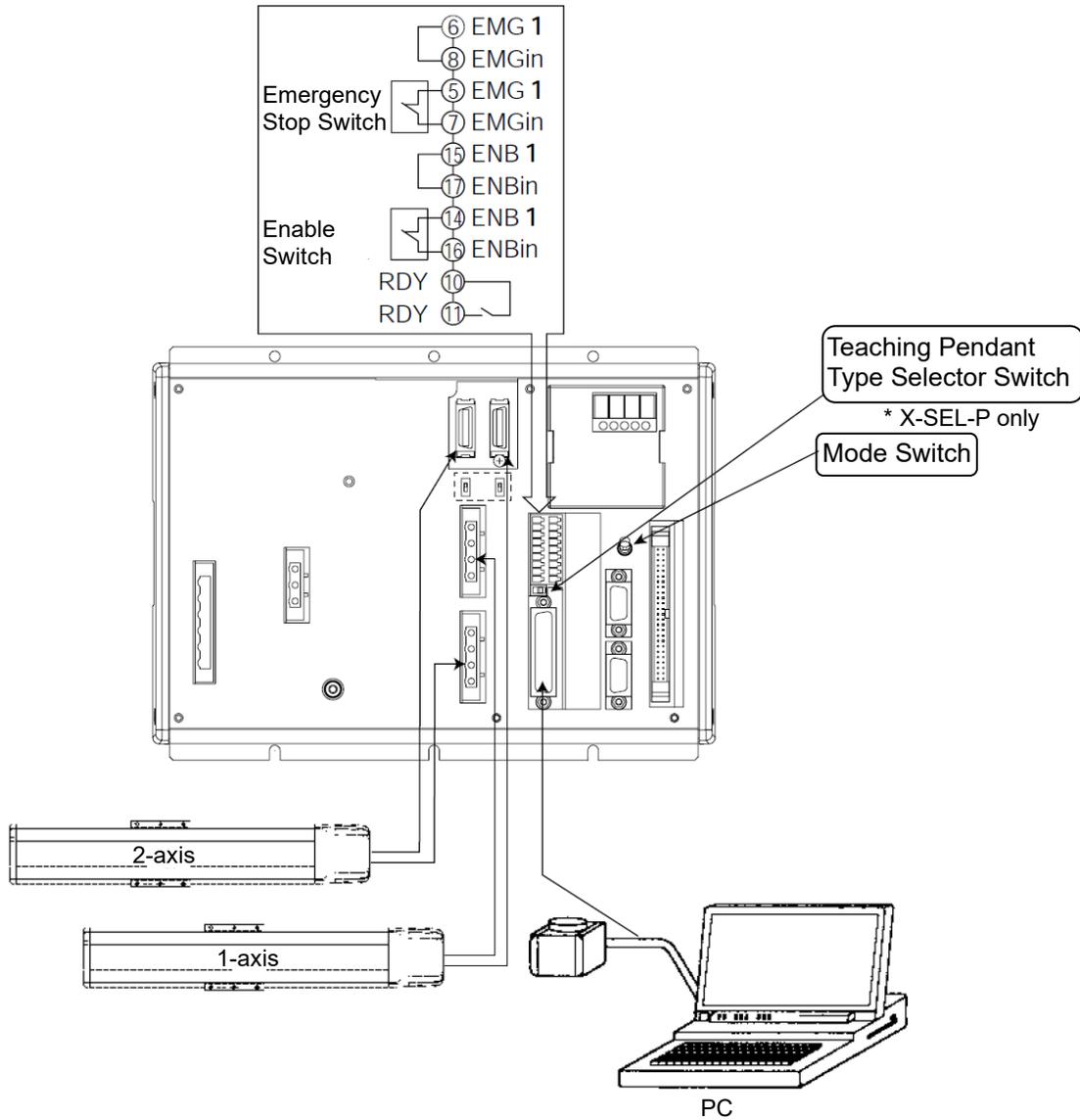


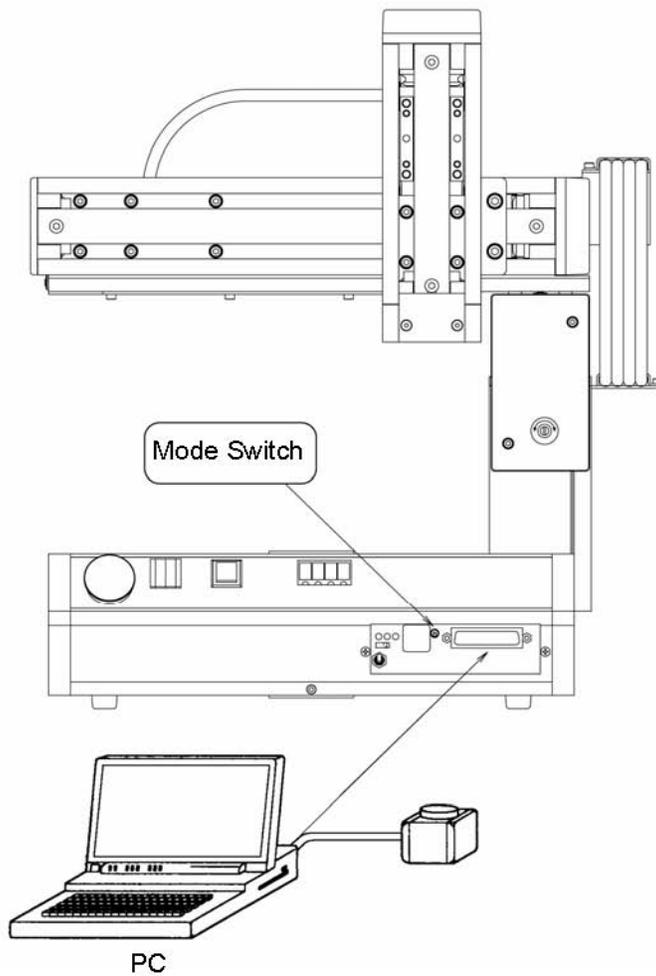
Fig. 1.27 X-SEL-P (Q) Type Controller

Caution

Set the type selector switch of the X-SEL-P teaching pendant to the right.



Warning: The internal components of the controller may burn if the following cable is used to connect XSEL-Q to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).



* Figure shows example of TT.

Fig. 1.28 Table Top Actuator (TT, TTA)

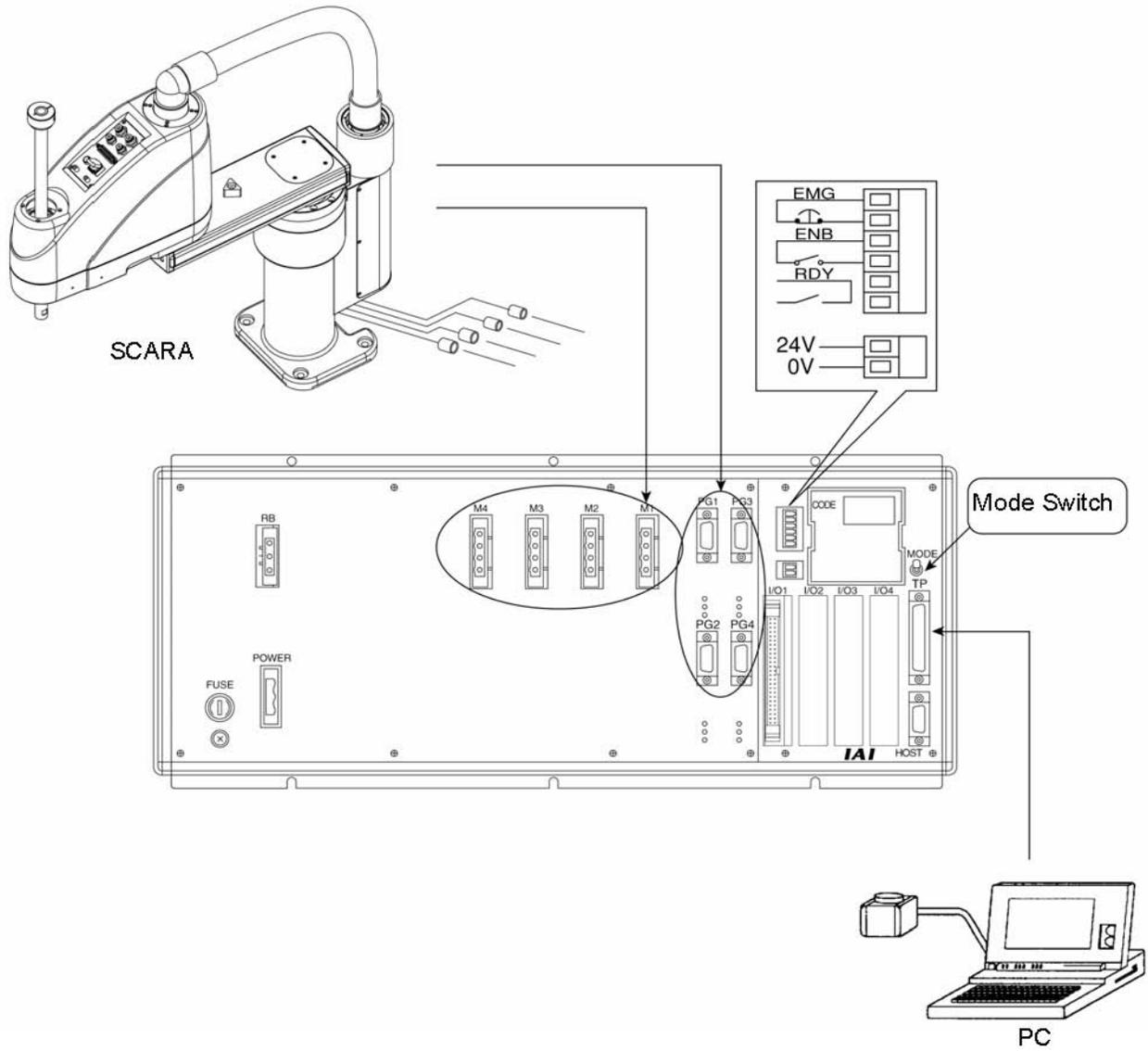


Fig. 1.29 X-SEL-KX (JX) Type Controller

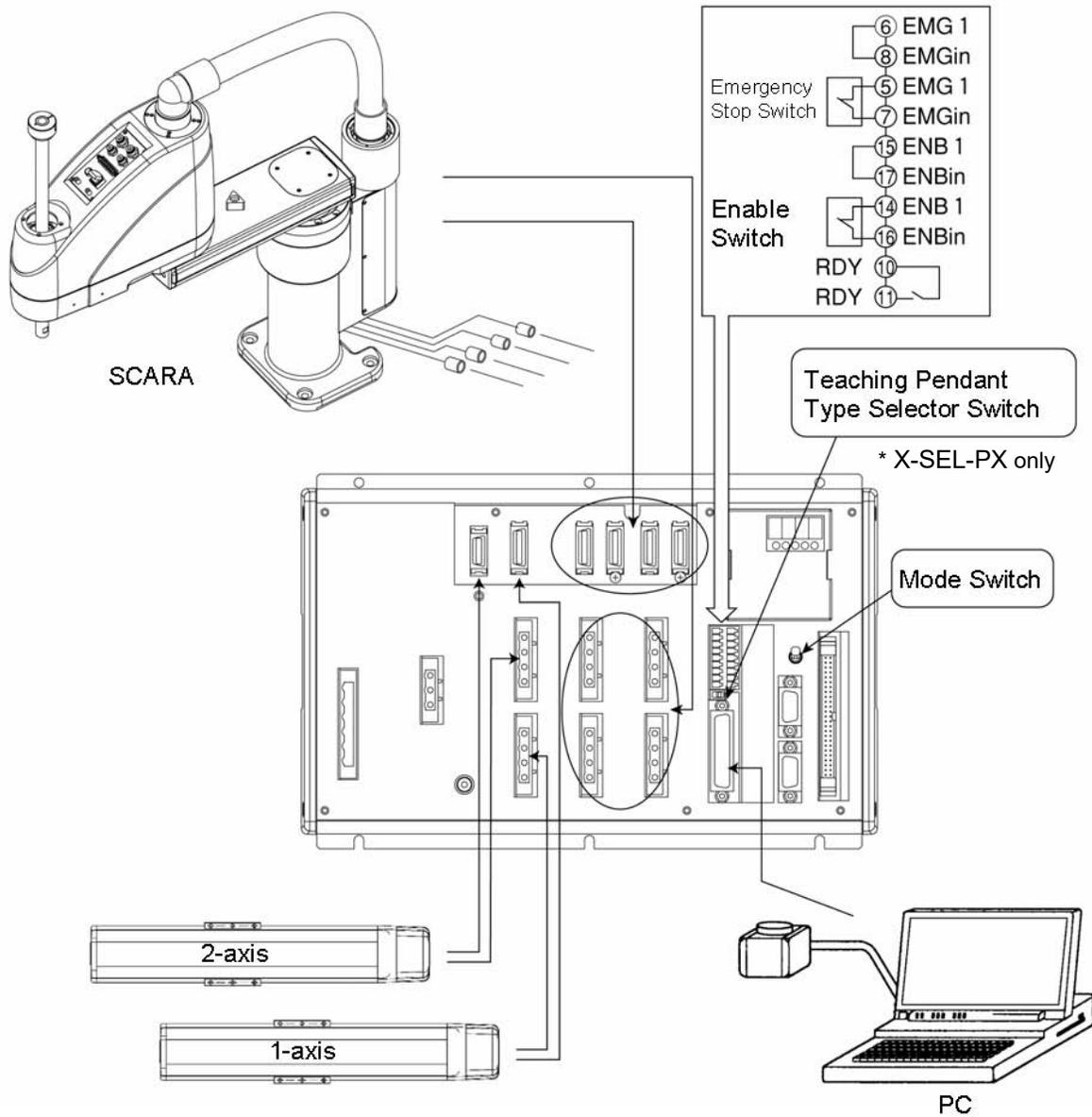


Fig. 1.30 X-SEL-PX (QX) Type Controller

Caution

Set the type selector switch of the X-SEL-PX teaching pendant to the right.

Warning: The internal components of the controller may burn if the following cable is used to connect XSEL-QX to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).

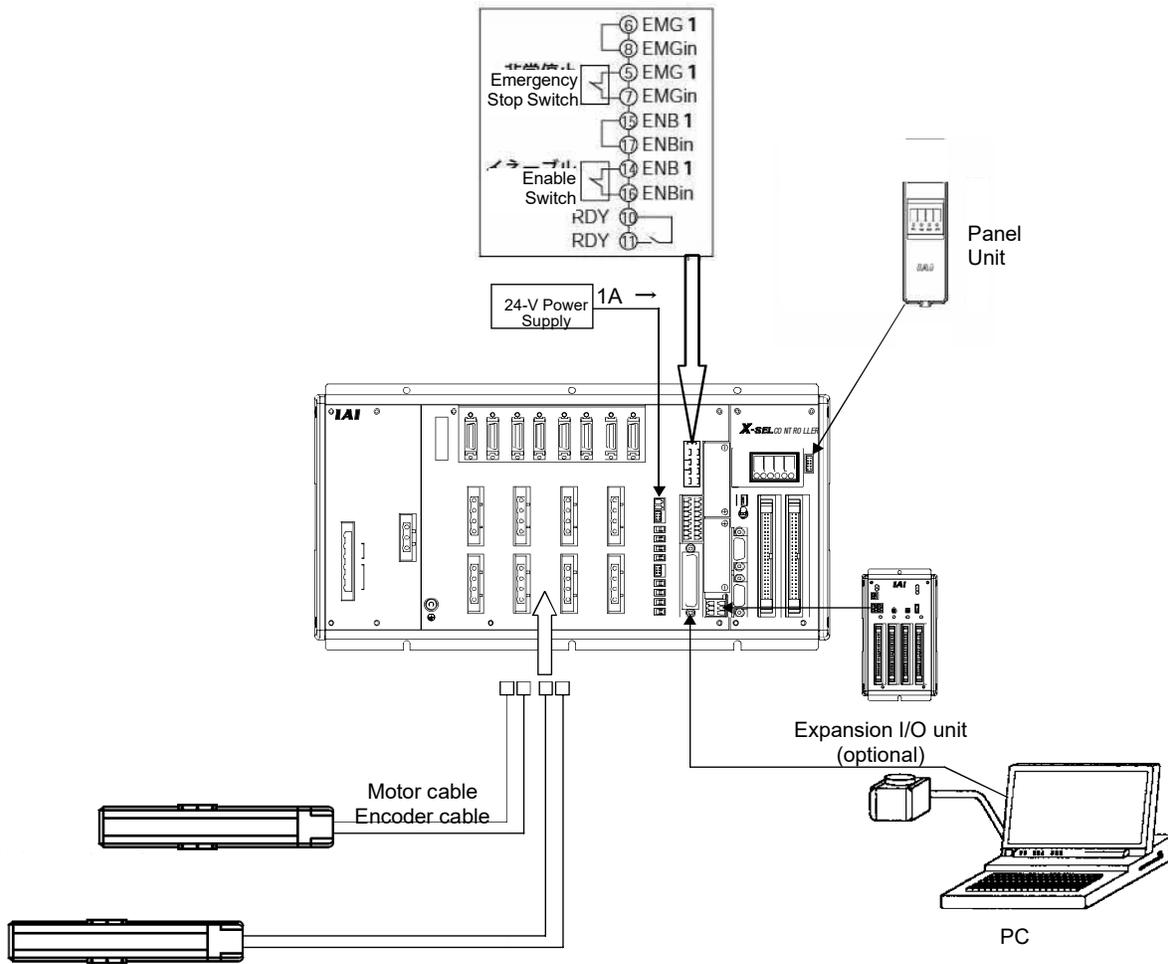


Fig. 1.31 X-SEL-R (S) Type Controller

Warning: The internal components of the controller may burn if the following cable is used to connect XSEL-S to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).

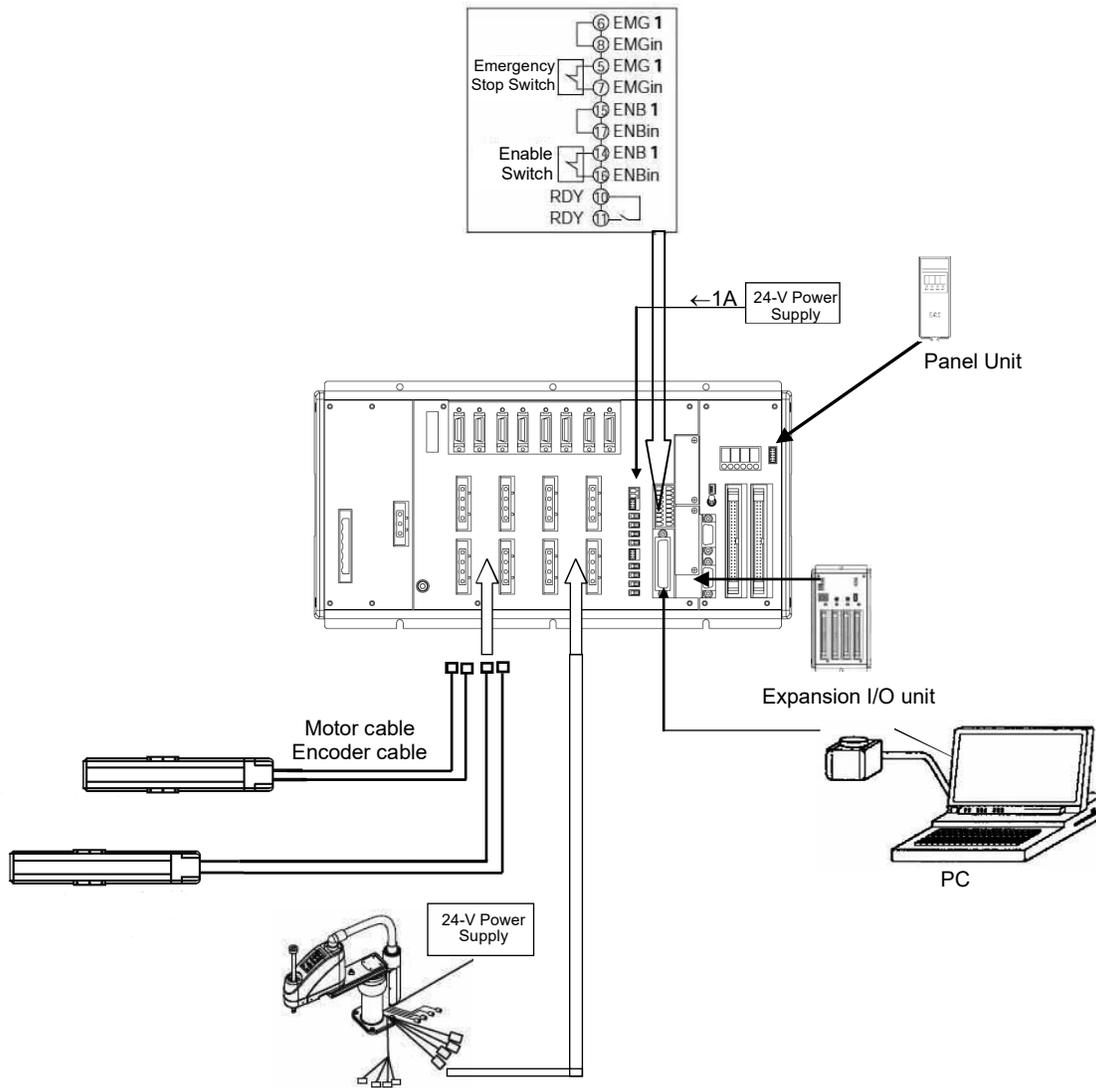


Fig. 1.32 X-SEL-RX (SX) Type Controller

⚠ Warning: The internal components of the controller may burn if the following cable is used to connect XSEL-SX to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).

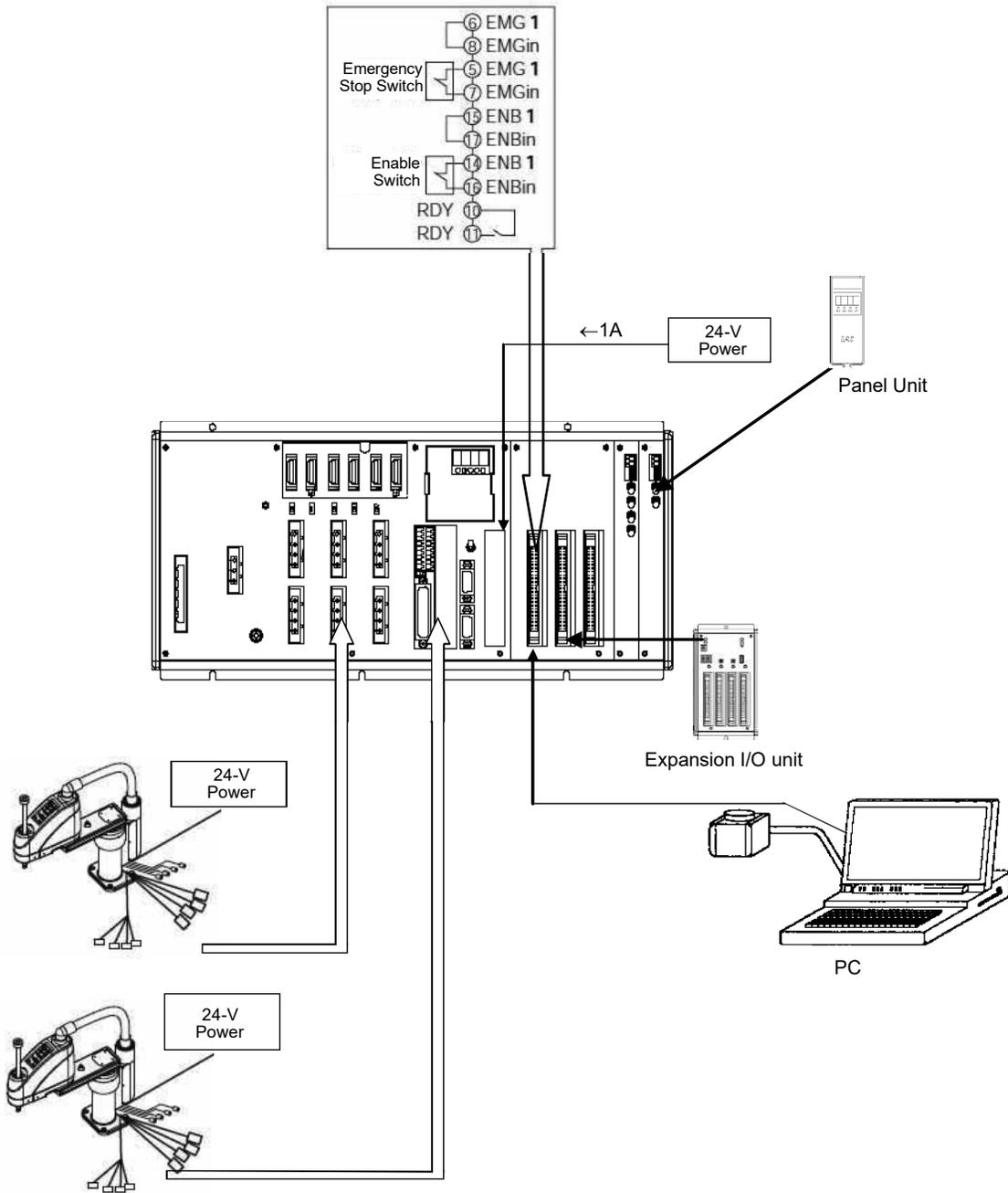


Fig. 1.33 X-SEL-RXD (SXD) Type Controller

 **Warning:** The internal components of the controller may burn if the following cable is used to connect XSEL-SXD to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).

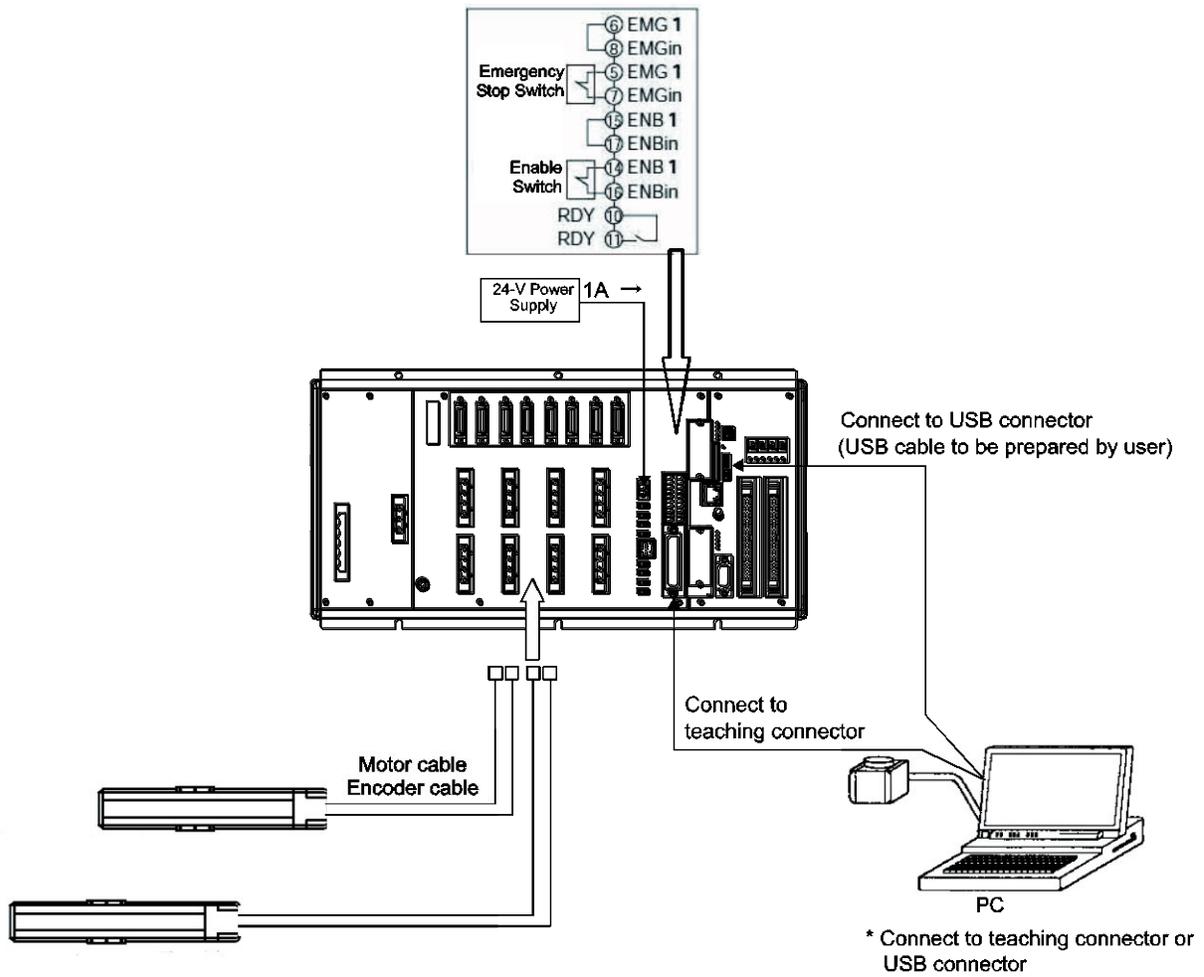


Fig. 1.34 X-SEL-RA (SA) Type Controller

⚠ Caution: Make sure to prepare the stop switch in your reach when having an actuator operated by USB connection so that you can stop the actuator in an emergency case. In case you cannot prepare a switch, use IA-101-X-USBMW equipped with a stop switch.

⚠ Warning: The internal components of the controller may burn if the following cable is used to connect XSEL-SA to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).

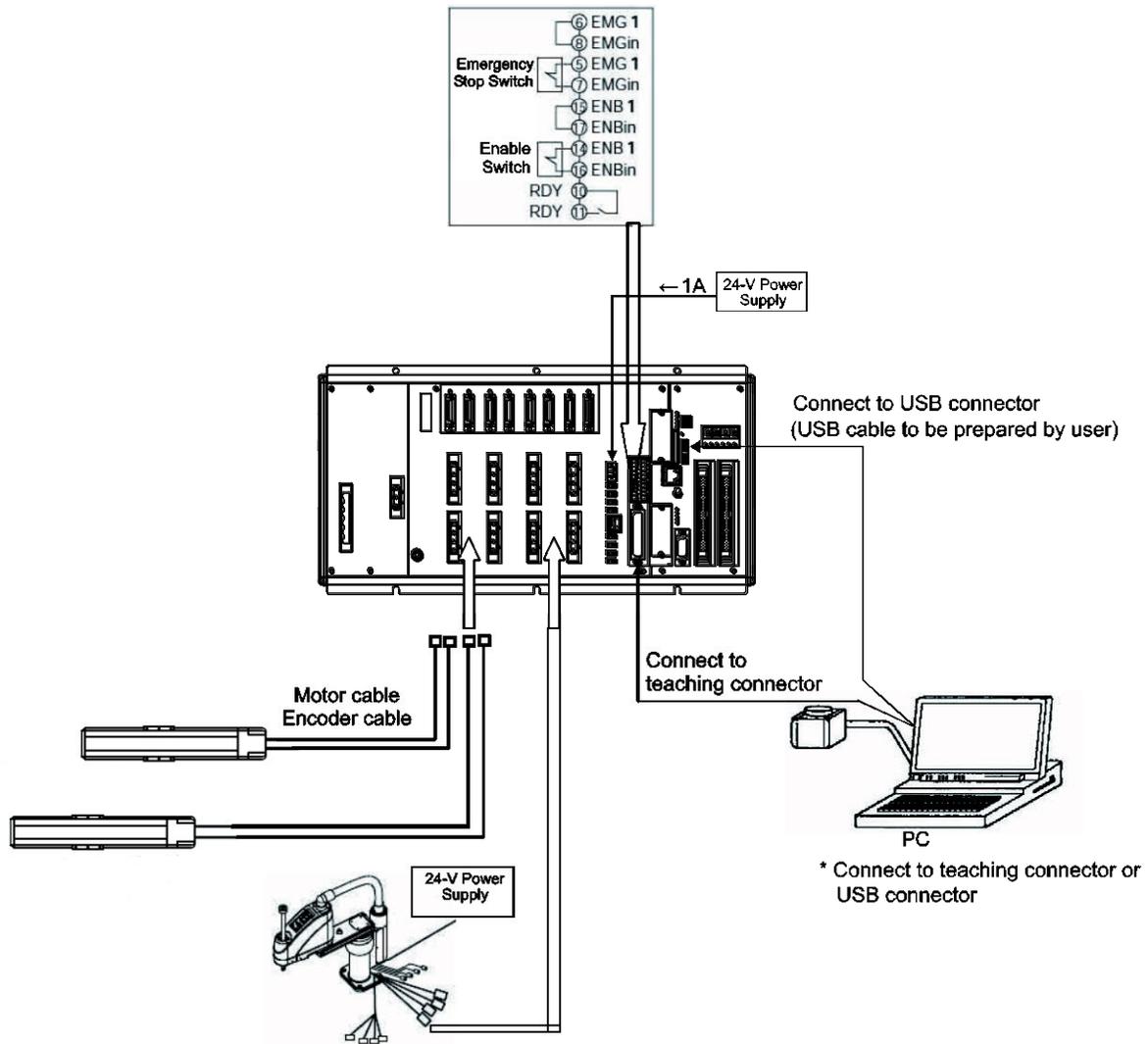


Fig. 1.35 X-SEL-RAX (SAX) Type Controller

 **Caution:** Make sure to prepare the stop switch in your reach when having an actuator operated by USB connection so that you can stop the actuator in an emergency case. In case you cannot prepare a switch, use IA-101-X-USBMW equipped with a stop switch.

 **Warning:** The internal components of the controller may burn if the following cable is used to connect XSEL-SAX to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).

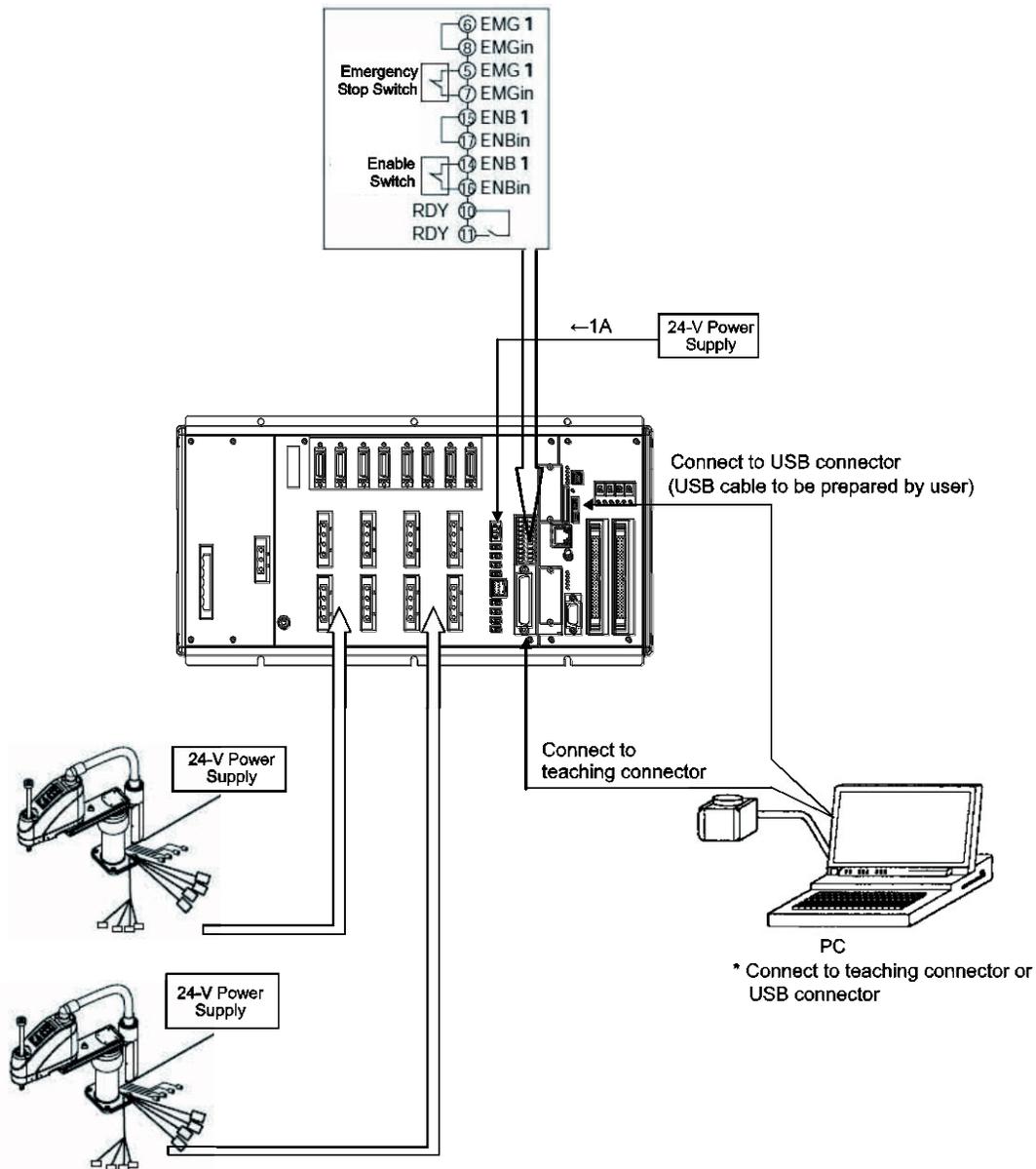


Fig. 1.36 X-SEL-RAXD (SAXD) Type Controller

⚠ Caution: Make sure to prepare the stop switch in your reach when having an actuator operated by USB connection so that you can stop the actuator in an emergency case. In case you cannot prepare a switch, use IA-101-X-USBMW equipped with a stop switch.

⚠ Warning: The internal components of the controller may burn if the following cable is used to connect XSEL-SAXD to a computer.
 PC software IA-101-X-MW
 Accessory cable CB-ST-E1MW050 (black)
 Even though the PC software can be used, make sure to use the cable CB-ST-A2MW050 (gray).

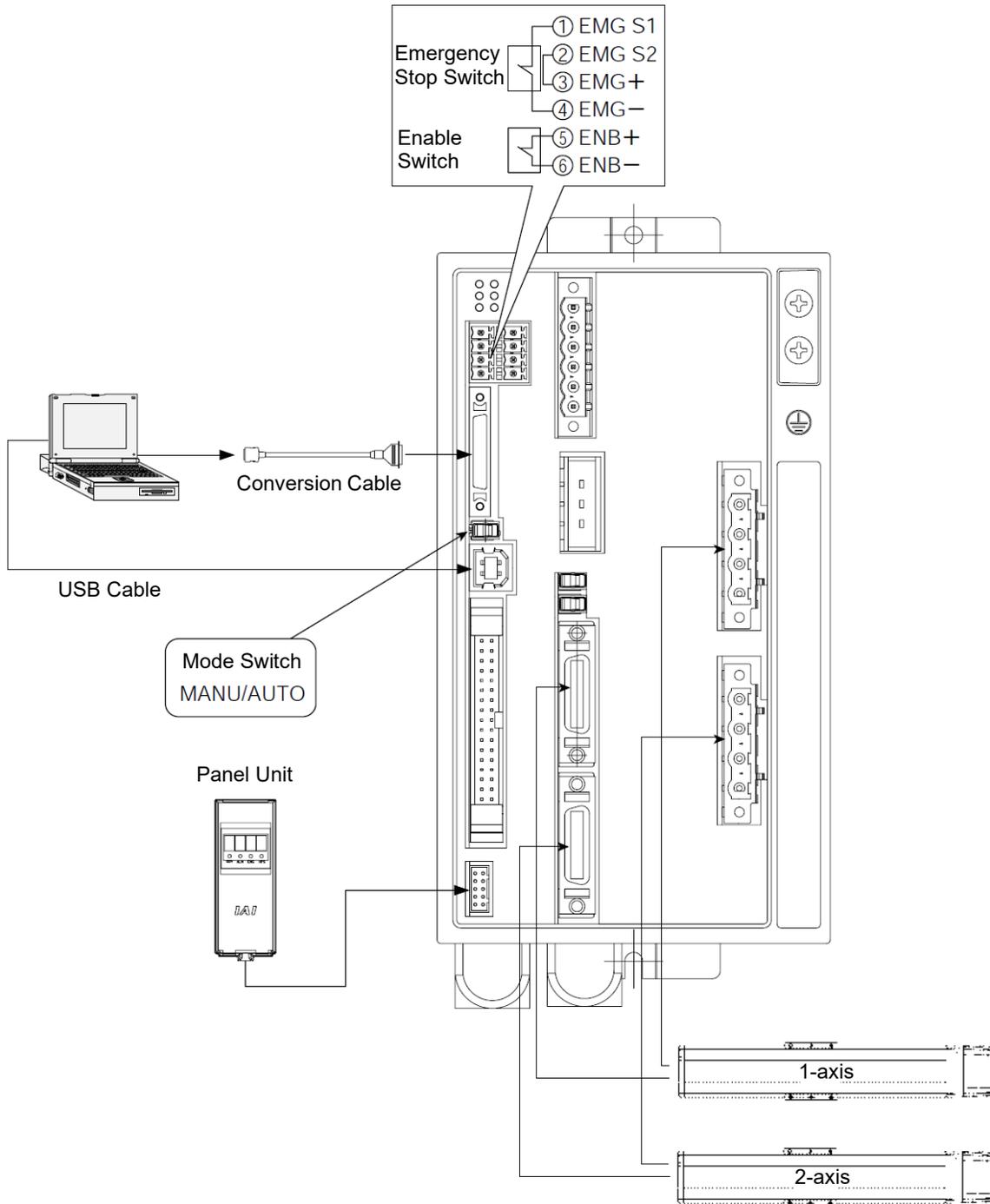


Fig. 1.37 SSEL Type Controller

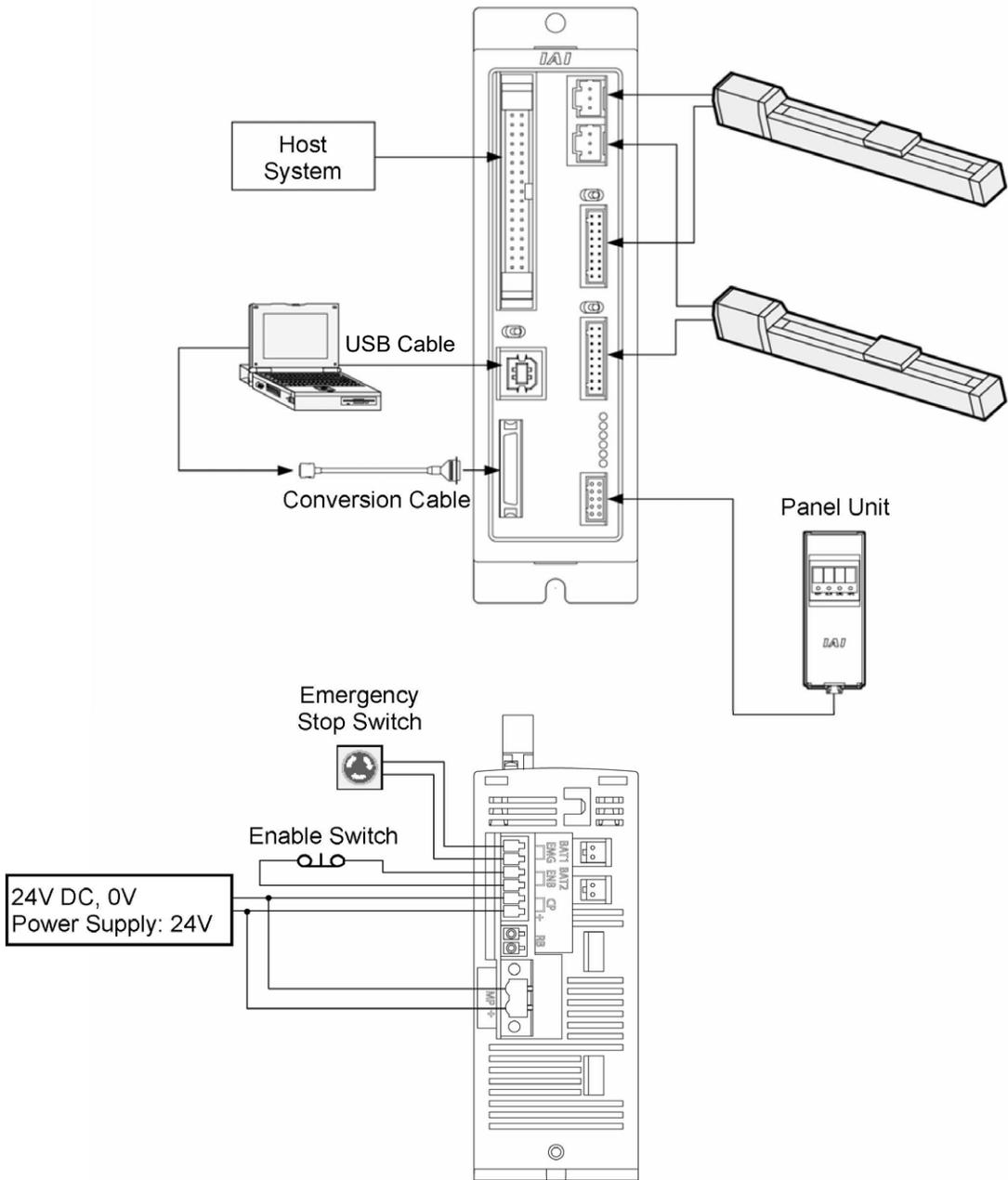


Fig. 1.38 ASEL Type Controller

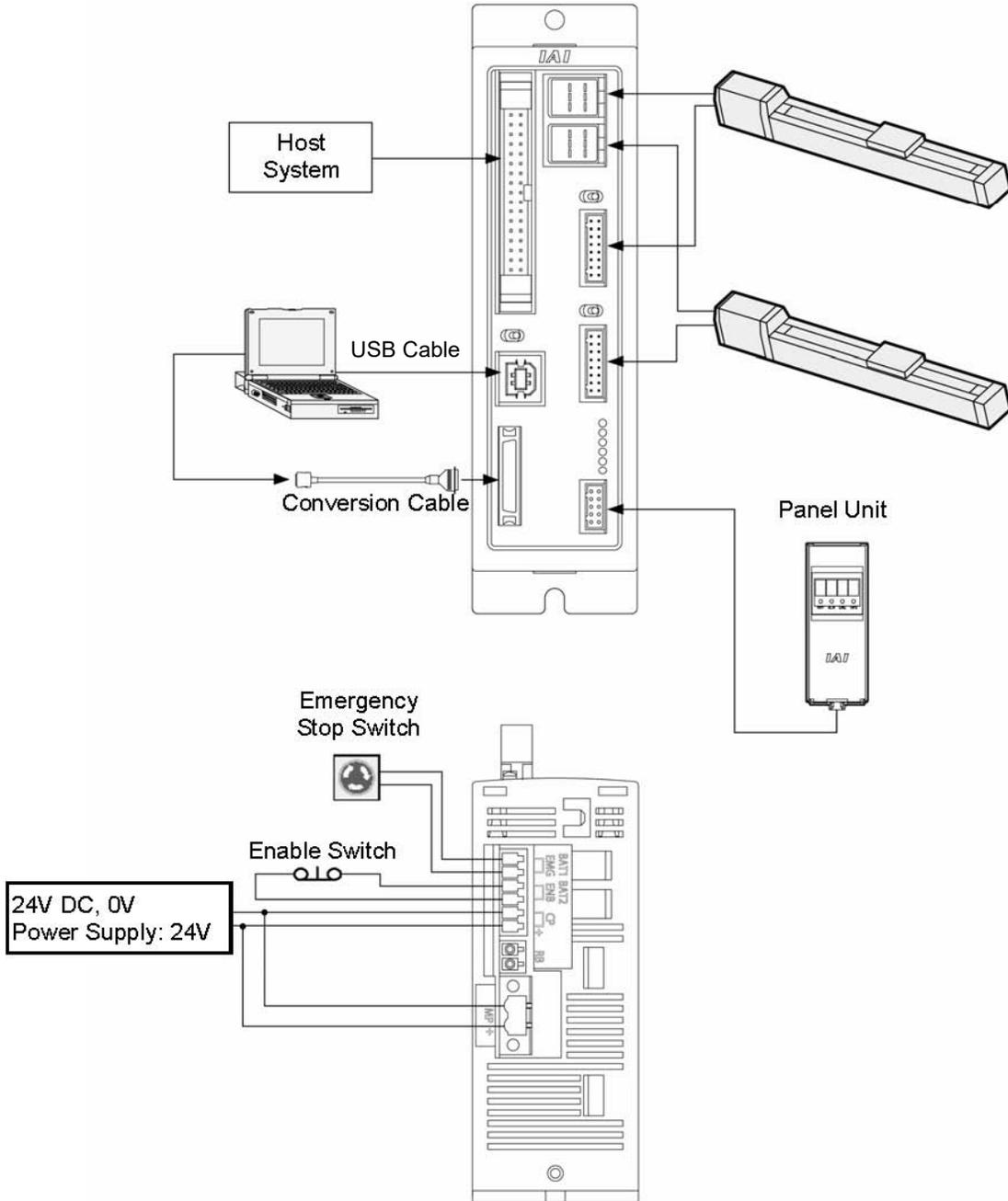
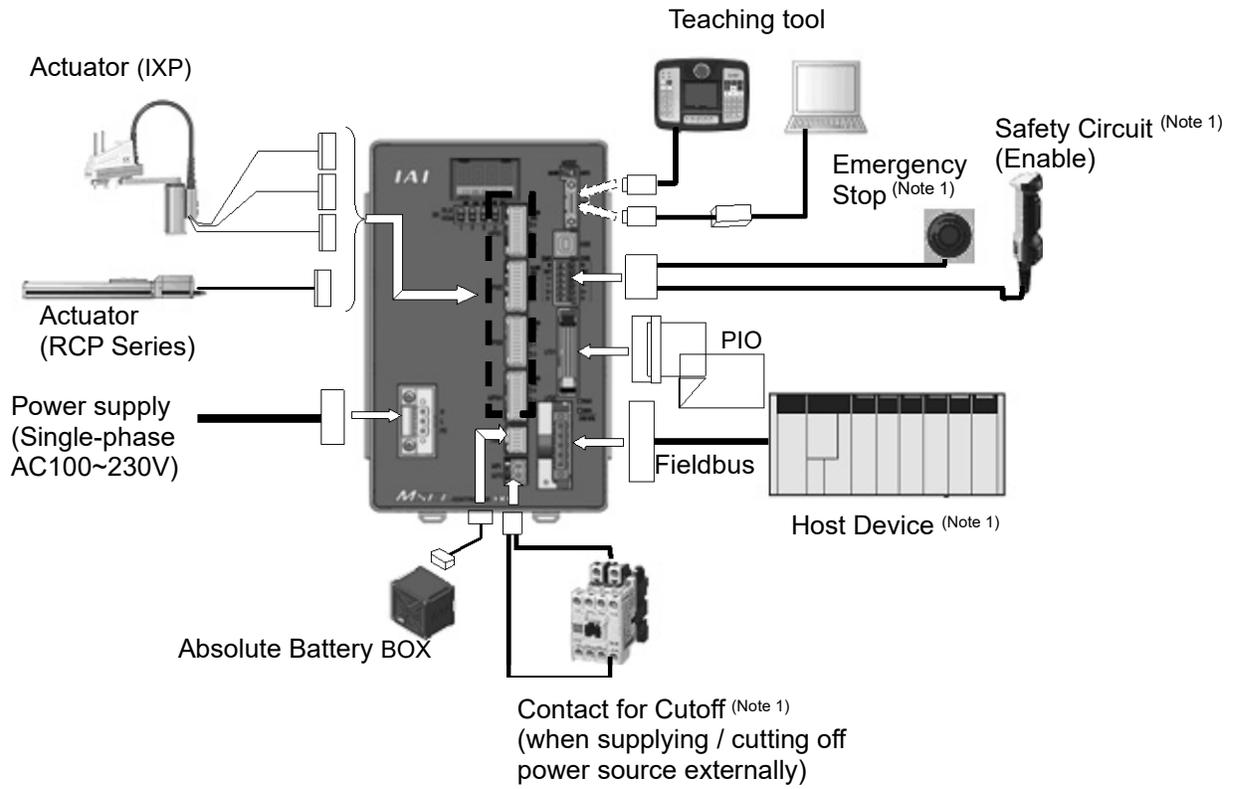


Fig. 1.39 PSEL Type Controller



Note1 Please prepare separately.

Fig. 1.40 MSEL Type Controller

1.5 Starting the Software (Online Connection)

- [1] Turn off the power to the controller and PC, and connect the controller to the PC using the standard RS232 cable or USB cable that comes with the software. Set the mode switch on the controller to the MANU side.

- When this software is started, the “safety velocity” mode is enabled (enable the safety velocity limit). In this mode, in the case of orthogonal axis, the maximum velocity is limited to 250 mm/sec or below in programs started from the PC software. In the case of SCARA axes, the maximum velocity during CP operation is limited to 250 mm/sec or below (PTP operation: 3% or below). To operate programs according to their programmed velocity commands, the safety velocity mode must be disabled. Refer to 3.3, “Explanation of the Toolbar,” for how to enable/disable the safety velocity mode.

- [2] Turn on the power to the controller and PC, and start Windows.
 [3] Start this software. When the application is started, the Connection Confirmation Screen (Fig. 1.41) will open first. In the list boxes of Port Name and Baud Rate (bps), select the communication port (*1) to which the X-SEL, TT, TTA, SSEL, ASEL, PSEL, or MSEL controller is connected and an applicable baud rate (*2), and then click OK.

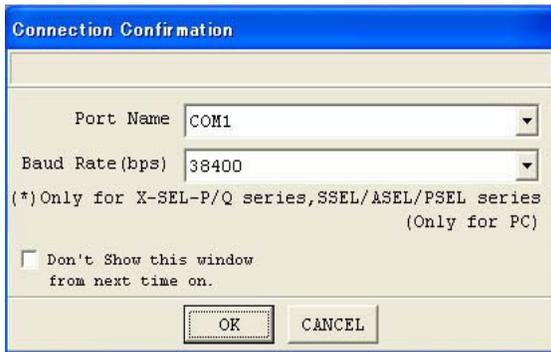


Fig. 1.41 Connection Confirmation Screen

- (*1) Only the communication ports that are available when the application is started can be selected.
- (*2) “57600” and “115200” bps are supported only by the X-SEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA, SSEL, ASEL, PSEL, and MSEL controllers.
- (*3) “230400” bps is applicable only for X-SEL-RA/SA, RAX/SAX, RAXD/SAXD.

- [4] If XSEL-P/Q (application version 0.36 or later), XSEL-PX/QX (application version 0.17 or later), XSEL-R/S, XSEL-RX/SX, XSEL-RXD/SXD, XSEL-RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, PSEL, or MSEL (application version 0.01 or later) is connected, the Two or more programs start permission/prohibition setting screen (Fig. 1.42) will be displayed. Set whether you prohibit or permit the simultaneous starting of multiple programs during the manual mode, and click the OK button.

[Two or more programs start prohibition (MANU)]

It prohibits the simultaneous starting of multiple programs during the manual mode.

[Two or more programs start permission (MANU)]

It permits the simultaneous starting of multiple programs during the manual mode.



Fig. 1.42 Two or More Programs Start Permission/Prohibition Setting Screen

If Don't Show this window from next time on is checked, connection will be established with the settings at the last connection time without displaying the screen in Fig. 1.42.

To remove this check, select the checkbox In Connect, Check Setting of Two or more programs start on the Environment Setup (Online) screen (Fig. 15.2) or Environment Setup (Offline) screen (Fig. 15.1). The screen in Fig. 1.42 will be displayed at the next startup time to remove the check.

For the Environment Setup (Online) screen and Environment Setup (Offline) screen, refer to "15. Tool."

If you set Two or more programs start prohibition (MANU) when multiple programs have already started, the warning message will be displayed. To prohibit the simultaneous starting of multiple programs, click the Yes button to stop all the programs.

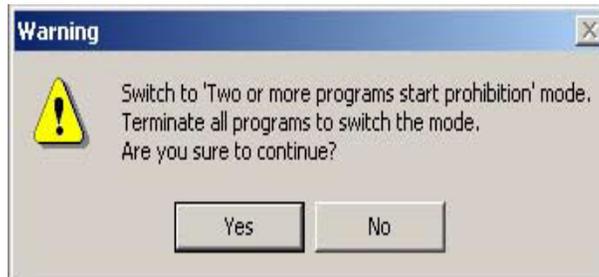


Fig. 1.43 Warning Message

- [5] A confirmation window for the safety circuit will be displayed in V13.00.00.00 and later.

[Refer to 1.6 Operation System Command Restriction]

- [6] Once the controller connection is confirmed, the application will start in the offline mode. If the controller cannot be recognized or the CANCEL button is clicked in this window, the application will start in the offline mode. (Even after the application has started in the offline mode, you can use the "Reconnect" function explained later to switch the application to the online mode.)

If Don't Show this window from next time on is selected, the software will automatically select the port name and baud rate that were in use the last time the application was closed and check the controller connection based on these settings.


**Important note
on transferring**

With J/K type X-SEL controllers, executing the command “OPEN 1” (channel 1 is shared with the PC software) in a SEL program in the MANU (manual) mode will forcibly switch the right of control over serial port channel 1 to the SEL program and disconnect the communication link between the controller and PC software. The program will continue to run. (“Error No. A5D “SCIF open error in non-AUTO mode” will occur.) To stop actuator operation, always use the emergency-stop button. (In particular, exercise due caution when stopping a jogging actuator.)

* This error code is applicable in main controller application 0.16 or earlier.

In the case of a P/Q controller, a J/K controller running main controller application version 0.16 or later or a table top model robot, opening the TP port (teaching connector) may result in the following conditions depending on whether or not the servo is in use.

<MANU mode/Servo not in use>

	Before the OPEN command	After the OPEN command
TP port connection	Connected to the PC software	Forcibly switched to SEL program connection (message error). The program continues to run.

Error No. A50 “SCIF open error in non-AUTO mode” will occur following the OPEN command.

<MANU mode/Servo in use>

	Before the OPEN command	After the OPEN command
TP port connection	Connected to the PC software	Connection to the PC software (cold start error). The program end.

Error No. E89 “SCIF open error in non-AUTO mode” will occur following the OPEN command. (Servo in use)

The channel number assigned to the TP port will vary depending on the controller type.

J/K type, Table top actuator (TT): Channel 1 (“OPEN 1”)

P/Q type, PX/QX type, R/S type, RX/SX type, RXD/SXD type, RA/SA type, RAX/SAX type, RAXD/SAXD type, SSEL, ASEL, PSEL: Channel 0 (“OPEN 0”)

The “Important” information provided in the above box applies to a condition where the controller is in the MANU mode and I/O parameter No. 90 is not set to “2” (IAI protocol).

1.6 Operation System Command Restriction

A system was added to check to the user if there is a stop switch to stop the actuator immediately at hand, and if there is no stop switch, the actuator operation gets controlled from the XSEL PC software when connected with a controller. (V13.00.00.00 or later)

After display of multiple program simultaneous startup permission and prohibition setting windows, the confirmation window for safety circuit will be displayed.

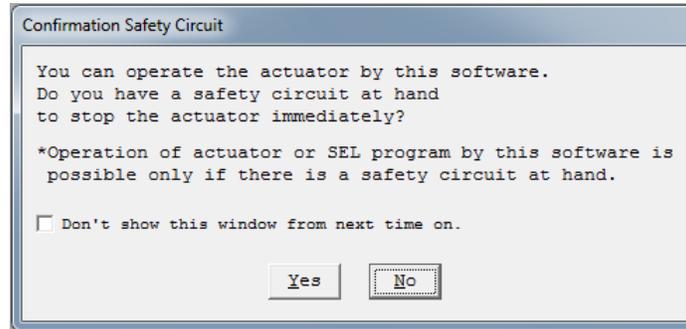


Fig. 1.44 Confirmation Window for Safety Circuit

Select if there is a stop switch to stop the actuator immediately at hand prepared.

Only when "Yes" is selected in the safety circuit confirmation window (there is a stop switch), such operations as actuator operation by the XSEL PC software and SEL program execution (operational system commands) become available.

When "No" is selected in the safety circuit confirmation window (there is no stop switch), such operations as actuator operation by the XSEL PC software and SEL program execution (operational system commands) become unavailable.

(Note) When the operation system commands are to be executed, 9AC "Execution condition unsatisfied error (PC)" is displayed.

The selected content will be shown in the main screen.

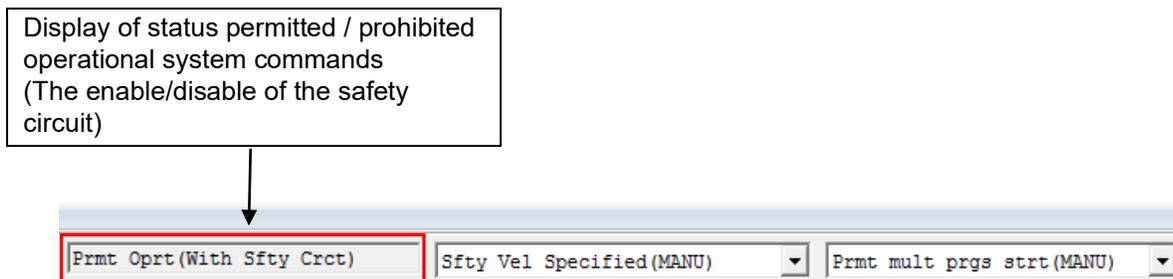


Fig. 1.45 Main window (Tool bar)

- * Put a check mark on “Don’t show this window from next time on.” in the safety circuit confirmation window and the confirmation window for safety circuit will not show up again when the controller is connected. (Operation will be made with the setting of the previous connection)
If it is required to show the safety circuit confirmation window again, put a check mark on “In connect, confirm safety circuit.” in Environment Setup window.

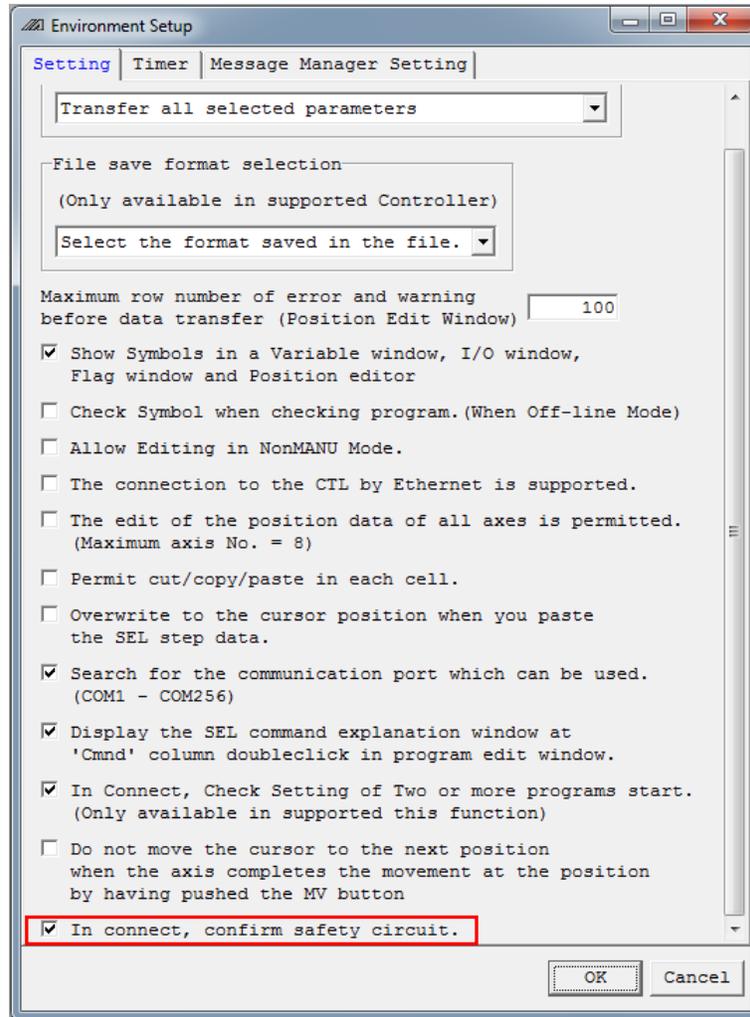


Fig. 1.46 Environment setting Screen

* When "Yes" was selected in the previous safety circuit confirmation window and a check mark was put on "Don't show this window from next time on.", a warning message shown in the figure below will be displayed when a controller is connected.

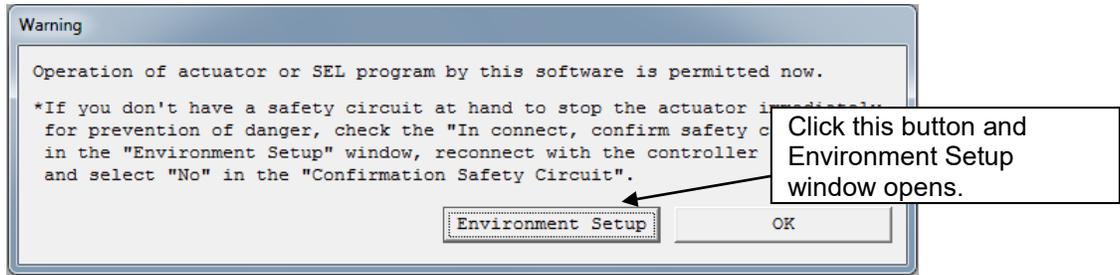


Fig. 1.47 Warning Message (When Operational System Commands Permitted)

2. How to Save Data

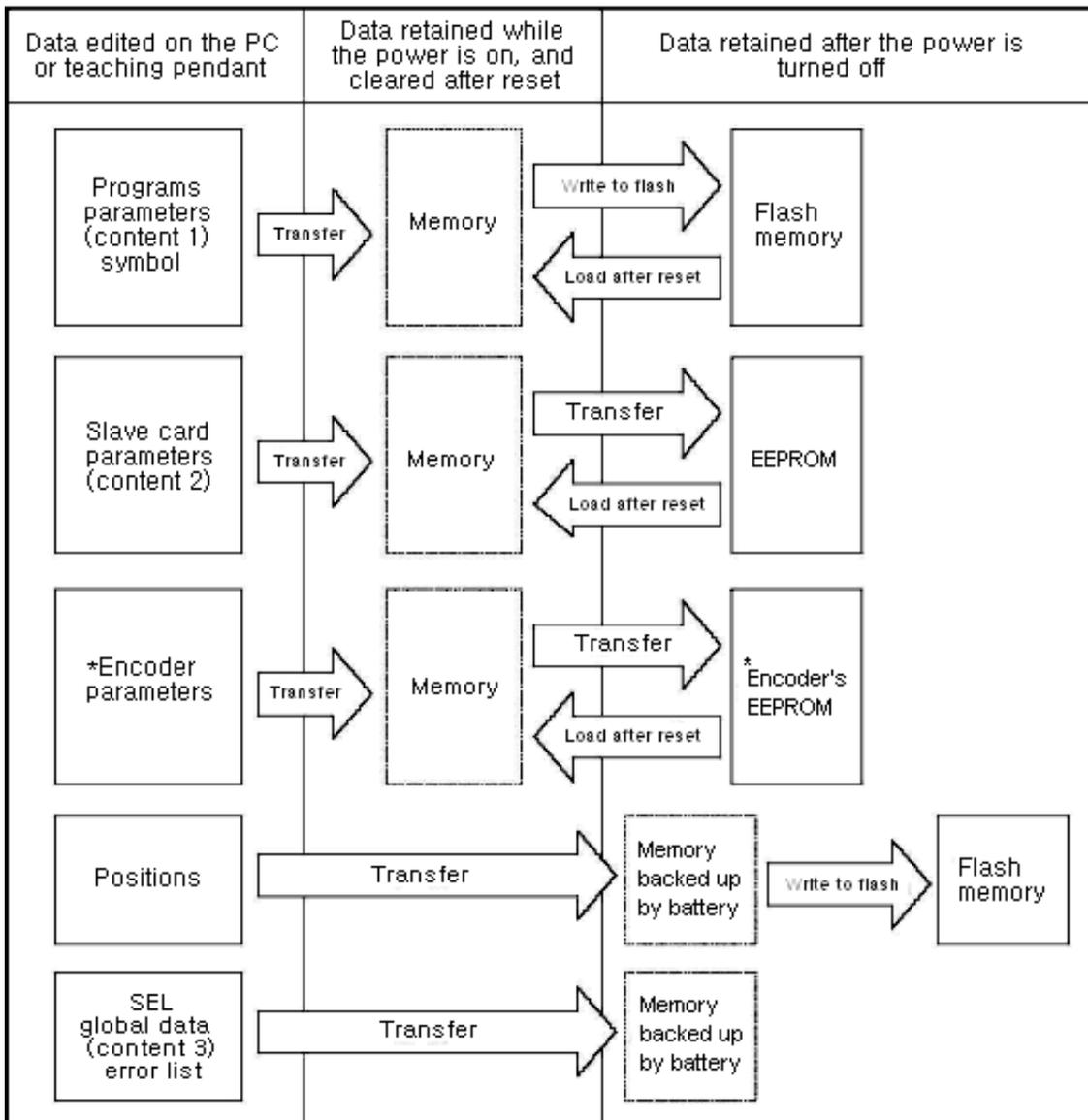
The controller adopts a flash memory. Accordingly, some data is stored in the memory areas backed up by a battery, while other data is stored in the flash memory areas.

Also note that transferring data from the PC software or teaching pendant to the controller will only write the data in the controller's memory, as illustrated below, and the data will be cleared once the controller power is turned off or the controller is reset.

To save important data, always write it in the flash memory.

2.1 Factory Setting – When a Backup Battery Is Used (When the X-SEL controller is shipped)

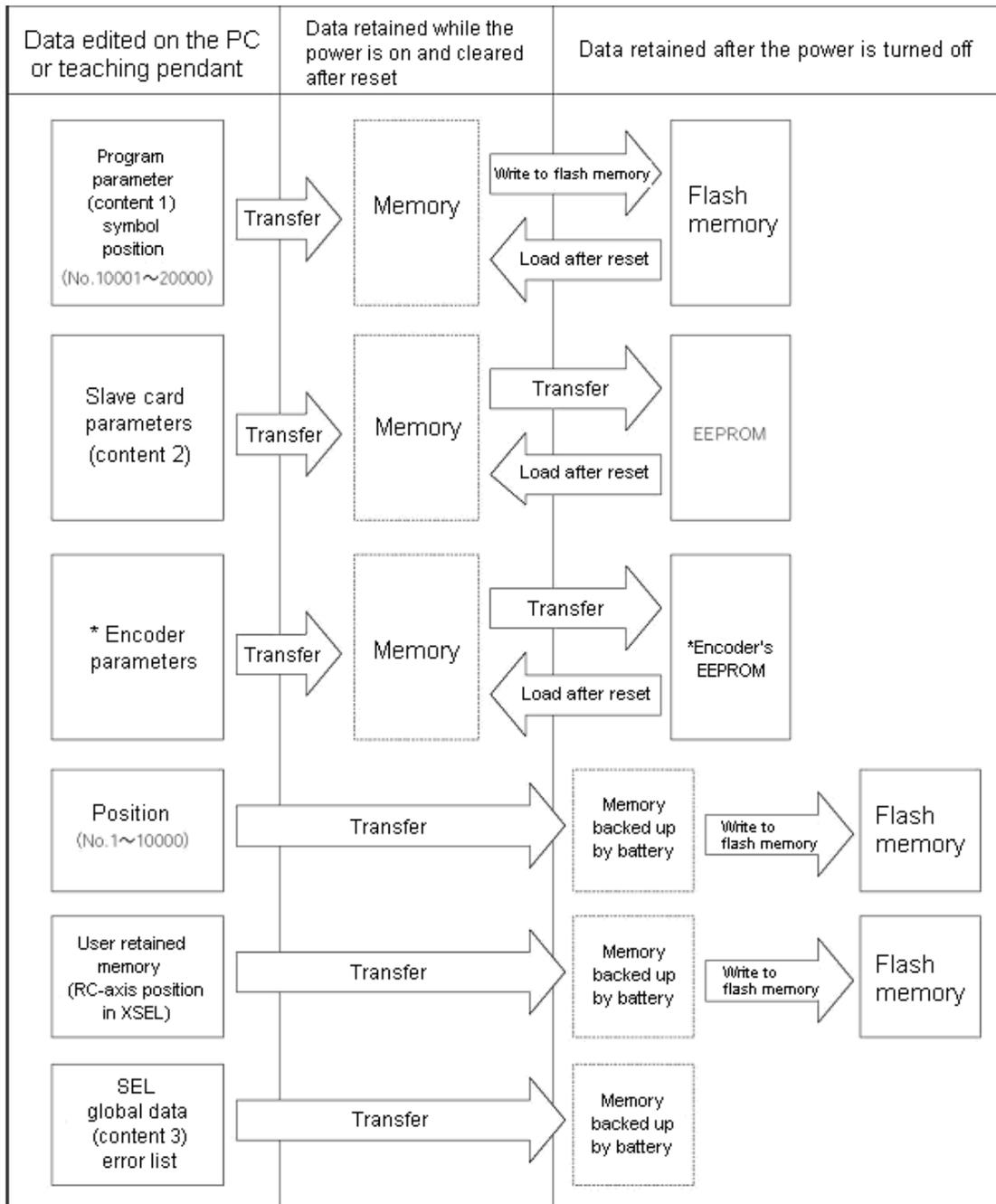
(Other parameter No. 20 = "2" (Backup battery installed))



* Encoder parameters are stored in the EEPROM of the actuator's encoder, not in the controller's EEPROM. Therefore, encoder parameters will be loaded to the controller every time the controller power is turned on or a software reset is executed.

Position No. 10001-20000 and user retained memory (RC-axis position in XSEL) are added to X-SEL-P/Q, PX/QX controller with gateway function.

(Other parameter No. 20 = "2" (Backup battery installed))



* Encoder parameters are stored in the EEPROM of the actuator's encoder, not in the controller's EEPROM. Therefore, encoder parameters will be loaded to the controller every time the controller power is turned on or a software reset is executed.

Programs, parameters and symbols are loaded from the flash memory after the controller is restarted. Unless written to the flash memory, edited programs, parameters and symbols will return to the original data once the controller is restarted.

The controller always operates according to the data (excluding parameters) stored in its memory (indicated by dotted lines).

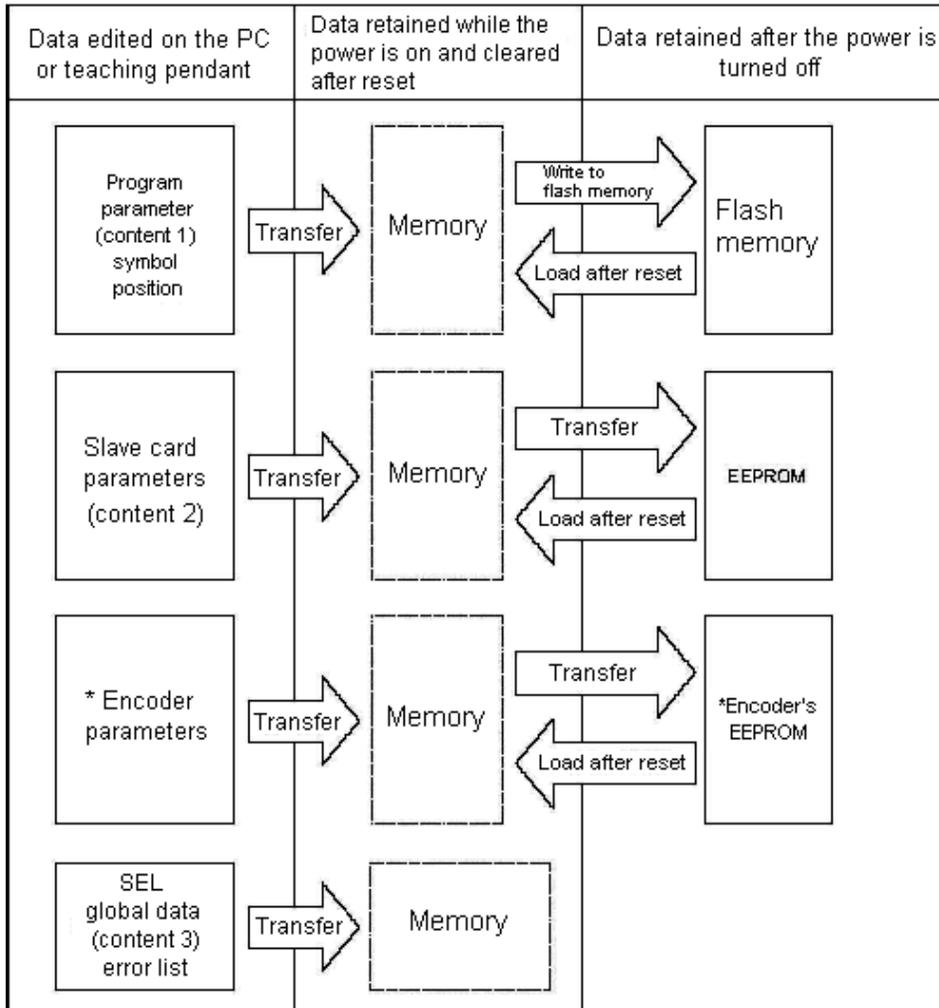
Content 1: All parameters other than those specified under Content 2

Content 2: Driver card, I/O slot card, (power-supply card) parameters (X-SEL-J/K, JX/KX, TT) I/O slot card, (power-supply card) parameters (X-SEL-P/Q, PX-QX, SSEL, ASEL, PSEL)

Content 3: Flags, variables, strings and error lists

2.2 When a Backup Battery Is Not Used (Table Top Actuator [TT], SSEL, ASEL, PSEL)

(Other parameter No. 20 = "0" (Backup battery not installed))



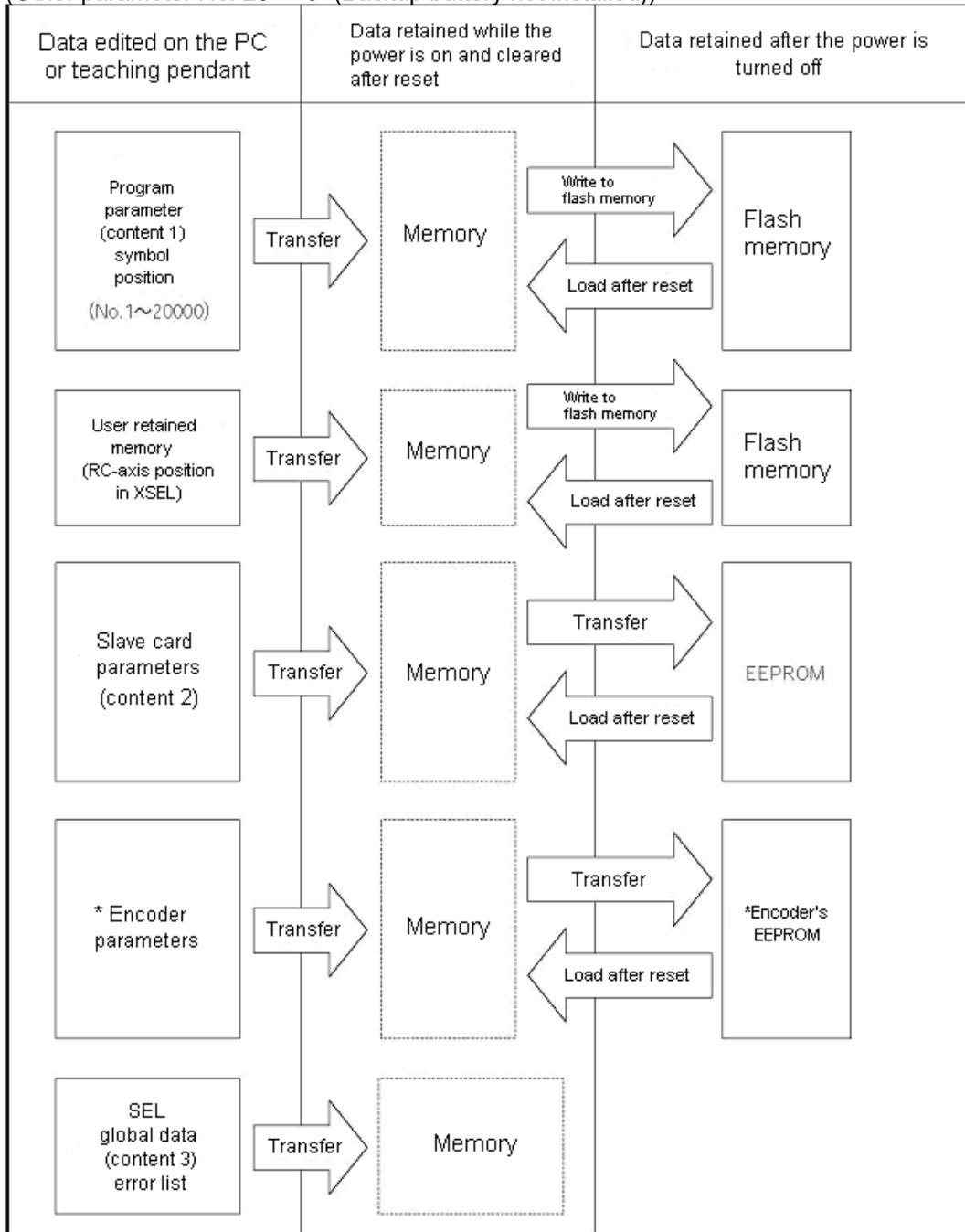
Programs, parameters and symbols are loaded from the flash memory after a restart. Unless written to the flash memory, edited programs, parameters and symbols will return to the original data once the controller is restarted.

The controller always operates according to the data (excluding parameters) stored in its memory (indicated by dotted lines).

Note: SEL global data cannot be retained when a backup battery is not installed.

Position No. 10001-20000 and user retained memory (RC-axis position in XSEL) are added to X-SEL-P/Q, PX/QX controller with gateway function.

(Other parameter No. 20 = "0" (Backup battery not installed))



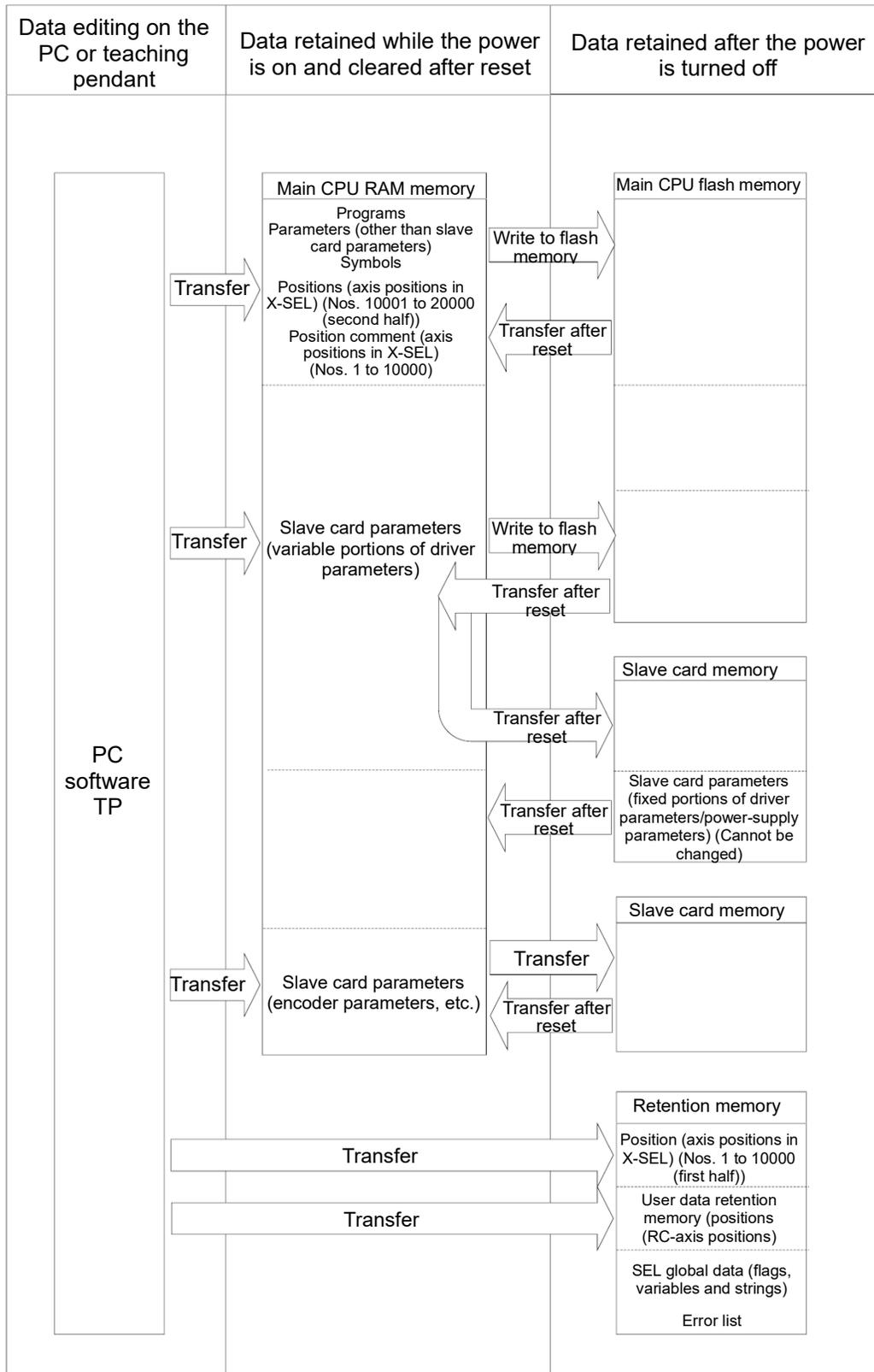
Programs, parameters and symbols are loaded from the flash memory after a restart. Unless written to the flash memory, edited programs, parameters and symbols will return to the original data once the controller is restarted.

The controller always operates according to the data (excluding parameters) stored in its memory (indicated by dotted lines).

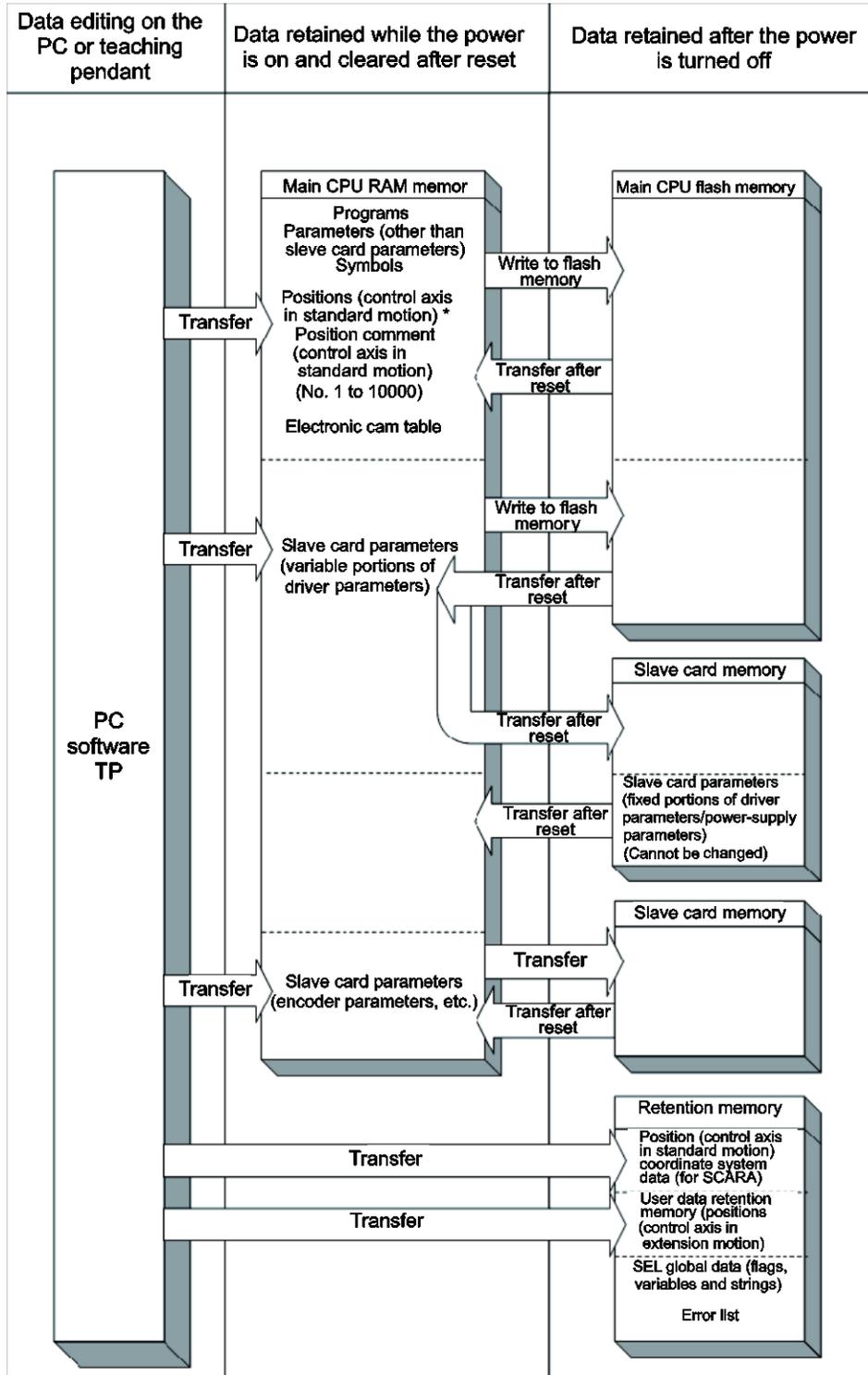
Note: SEL global data cannot be retained when a backup battery is not installed.

2.3 XSEL-R/S/RX/SX/RXD/SXD

An example of 20,000 positions is given below.



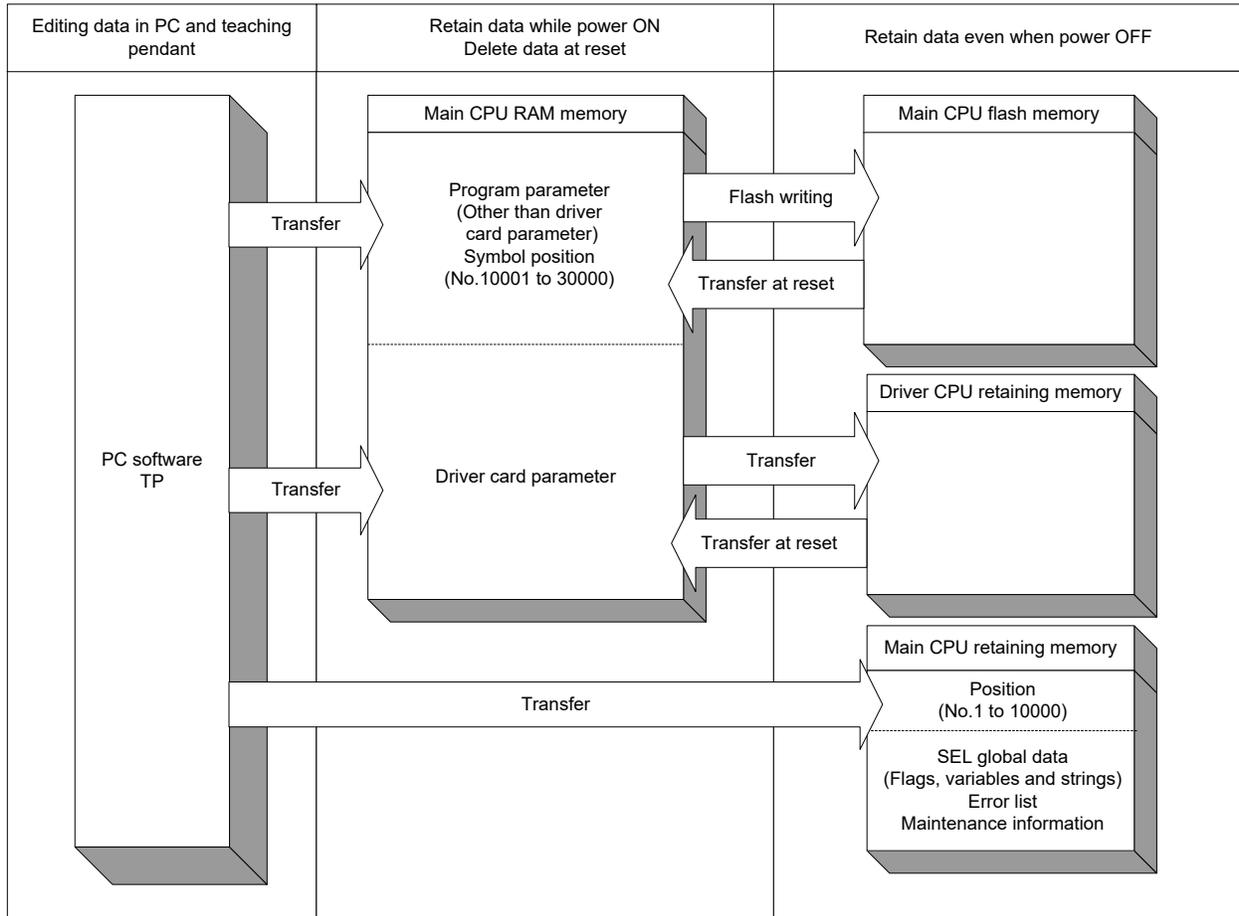
2.4 XSEL-RA/SA/RAX/SAX/RAXD/SAXD



* The position data (standard motion control axis) is divided and saved in the battery-less backup memory and flash memory.

[For the range, refer to the separate XSEL-RA/SA/RAX/SAX/RAXD/SAXD instruction manual.]

2.5 TTA



(Note) The positions (No. 1 to 10000), SEL global data, error list and maintenance information are backed up to the retaining memory (FRAM) in standard with no use of the battery. It is not necessary to write the positions (No. 1 to 10000) into the flash ROM as they are stored into the retaining memory.

2.7 Notes

Note on transferring data and writing it to the flash memory:

Never turn off the main power while data is still being transferred or written to the flash memory. The data may be lost and the controller operation may be disabled.

Note on saving parameters to a file:

Encoder parameters are saved in the EEPROM of the actuator's encoder (unlike other parameters, they are not stored in the controller's EEPROM). Therefore, encoder parameters are loaded from the encoder's EEPROM to the controller after the controller power is turned on or a software reset is executed. For this reason, saving controller parameters to a file after the controller power has been turned on (or software reset has been executed) without the actuator (encoder) connected to the controller will create a file containing invalid encoder parameters.

Note on transferring a parameter file to the controller:

When a parameter file is transferred to the controller, the encoder parameters in the file will be transferred to the encoder's EEPROM (excluding manufacture information and function information). Therefore, transferring to the controller a parameter file that has been read from the controller after the controller was started without the actuator connected will write invalid encoder parameters to the encoder's EEPROM. (This applies when the file is transferred to the controller to which the actuator is currently selected.) Save parameters to a file in a condition where the controller is connected to the actuator.

Note on the increased number of position:

The number of position data for the X-SEL-P/Q, PX/QX controller (w/gateway function) compatible with increased memory has been increased to 20000.

Please be noted as follows.

- * When using a memory backed up by battery (or parameter No.20=2), a memory backed up by battery will be used when the conserved region has position No. 1-10000, and the main CPU flash ROM will be used when it has position No. 10001-20000. Therefore, the data of position No. 1001-20000 will be cleared if the power is turned off or the software is reset without writing to the flash ROM. Then next time the power is turned on, the data from the previous writing to flash ROM will be loaded. To retain the data, write it to the flash ROM. When a memory backed up by battery is not used (or parameter No. 20=0), the conserved region of all the position data No.1-20000 will be the main CPU flash ROM. Write it to the flash ROM if you wish to retain the data.

Note on the increased number of parameters:

The number of the parameters has been increased for the X-SEL-P/Q, PX/QX controllers (w/gateway function) compatible with increased memory.

	The Number of Parameters		
	X-SEL-P/Q incompatible with increased memory	X-SEL-PX/QX incompatible with increased memory	X-SEL-P/Q, PX/QX compatible with increased memory
I/O	250	400	600
For all axes	120	300	400
For each axis	200	220	250
Driver	97	97	97
Encoder	30	30	30
I/O Device	82	82	82
Others	100	120	200

Please be noted as follows.

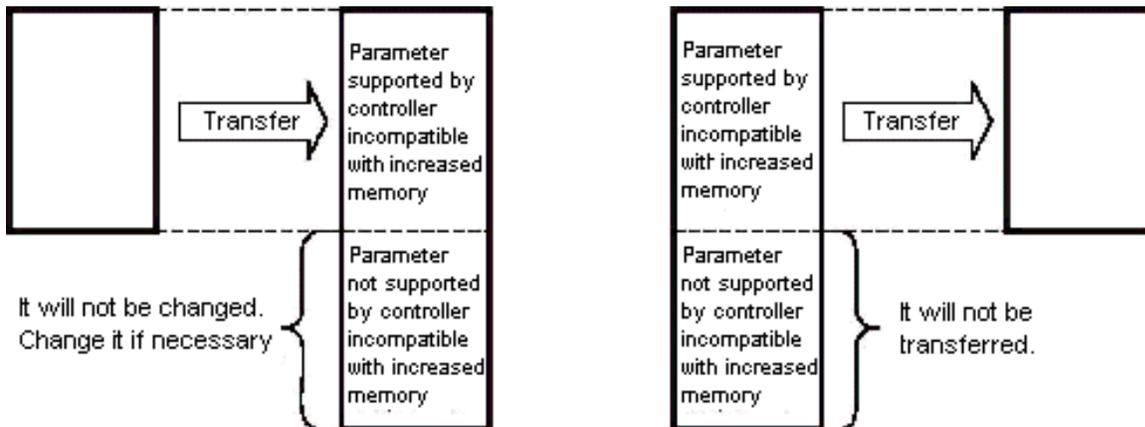
- * When the parameter file saved by the X-SEL-P/Q, PX/QX controller incompatible with increased memory is transferred to the X-SEL-P/Q, PX/QX controller compatible with increased memory, or when the parameter file saved by X-SEL-P/Q, PX/QX controller compatible with increased memory is transferred to the X-SEL-P/Q, PX/QX controller incompatible with increased memory, only the parameters supported by the X-SEL-P/Q, PX/QX controller incompatible with increased memory, as shown below.

Parameter file saved by controller incompatible with increased memory

Parameter saved by controller compatible with increased memory

Parameter file saved by controller compatible with increased memory

Parameter saved by controller incompatible with increased memory



When parameter file saved by controller incompatible with increased memory is transferred to controller compatible with increased memory

When parameter file saved by controller compatible with increased memory is transferred to controller incompatible with increased memory

3. Menu Window

3.1 Explanation of the Menu

3.1.1 Online Screen

(1) X-SEL-J/K or TT controller

When this software has been started, the main window in Fig. 3.1 will open showing the menu items with icons on the tool bar in the case of the X-SEL-J/K or TT controller. The tree view appearing on the left side of the window can be displayed by clicking View (V) from the menu bar and then selecting Tree View (T). (Initial window: Main menu)

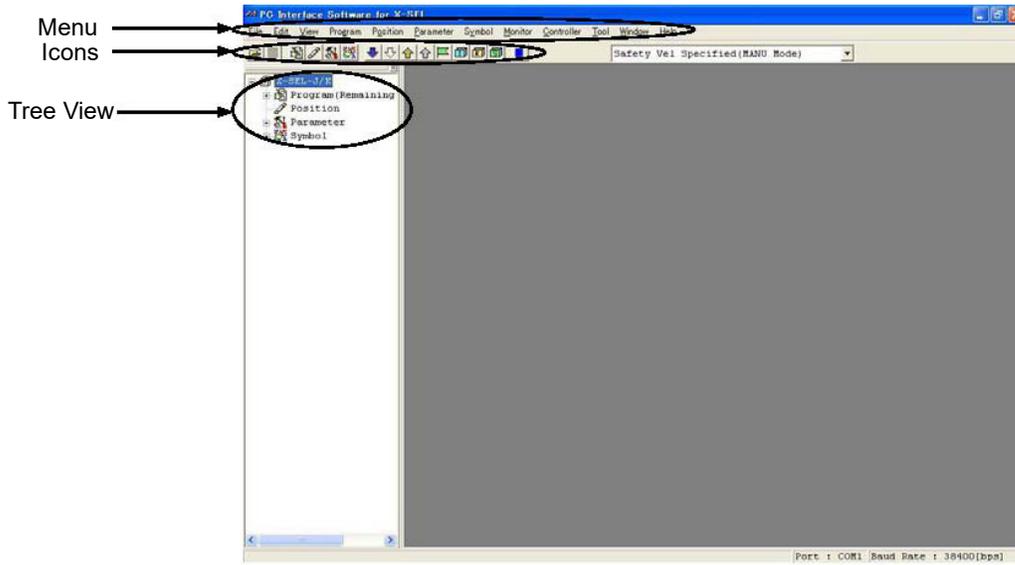


Fig. 3.1 Online Screen (X-SEL-J/K or TT Controller)

(2) X-SEL-P/Q, R/S, RA/SA, TTA and MSEL controllers

When this software has been started, the main window in Fig. 3.2 will open showing the menu items with icons on the tool bar in the case of the X-SEL-P/Q, R/S and TTA controllers. The tree view appearing on the left side of the window can be displayed by clicking View (V) from the menu bar and then selecting Tree View (T). (Initial window: Main menu)

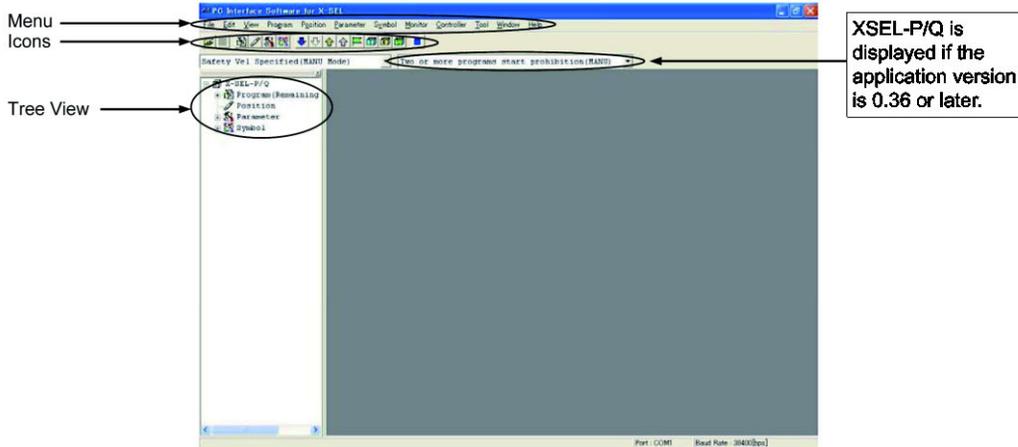


Fig. 3.2 Online Screen (X-SEL-P/Q, R/S and RA/SA Controllers)

(3) X-SEL-JX/KX controller

When this software has been started, the main window in Fig.3.3 will open showing the menu items with icons on the tool bar in the case of the X-SEL-JX/KX controller.

The tree view appearing on the left side of the window can be displayed by clicking View(V) from the menu bar and then selecting Tree View(T). (Initial window: Main menu)

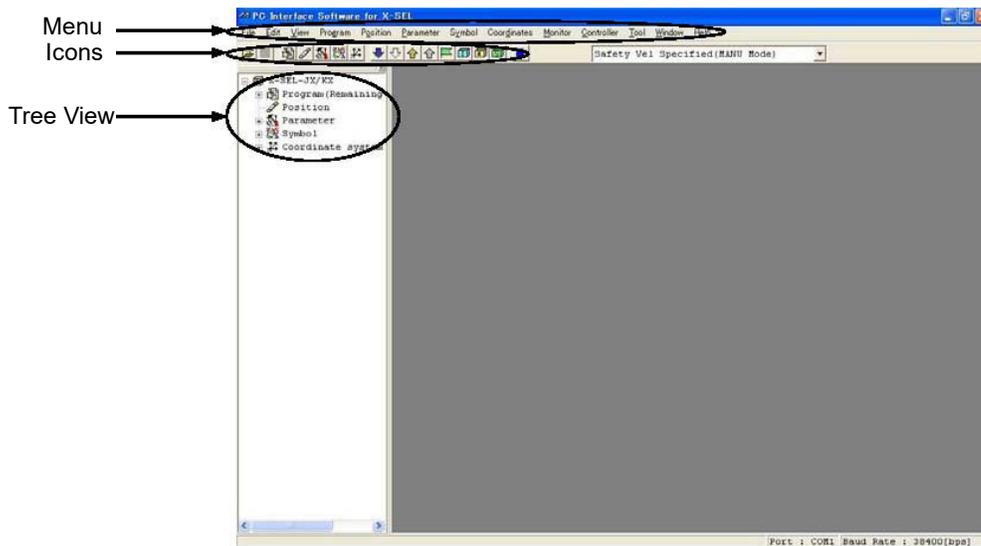


Fig. 3.3 Online Screen (X-SEL-JX/KX Controller)

- (4) X-SEL-PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX controllers
 When this software has been started, the main window in Fig. 3.2 will open showing the menu items with icons on the tool bar in the case of the X-SEL-PX/QX, RX/SX, RXD/SXD and MSEL-PCX/PGX controllers. The tree view appearing on the left side of the window can be displayed by clicking View (V) from the menu bar and then selecting Tree View (T). (Initial window: Main menu)

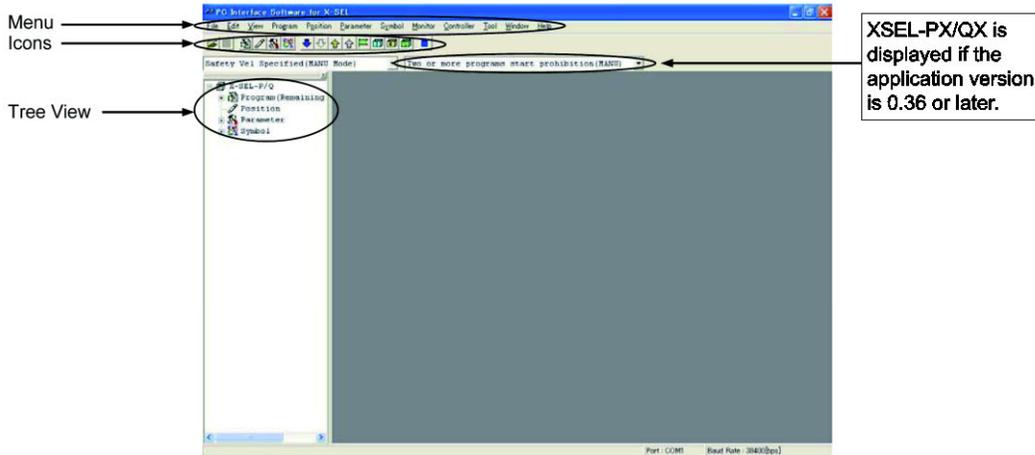


Fig.3.4 Online Screen (X-SEL-PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX Controllers)

- (5) SSEL controller in the program mode.
 When this software has been started, the main window in Fig.3.5 will open showing the menu items with icons on the tool bar in the case of the SSEL controller in the program mode. The tree view appearing on the left side of the window can be displayed by clicking View (V) from the menu bar and then selecting Tree View (T). (Initial window: Main menu)

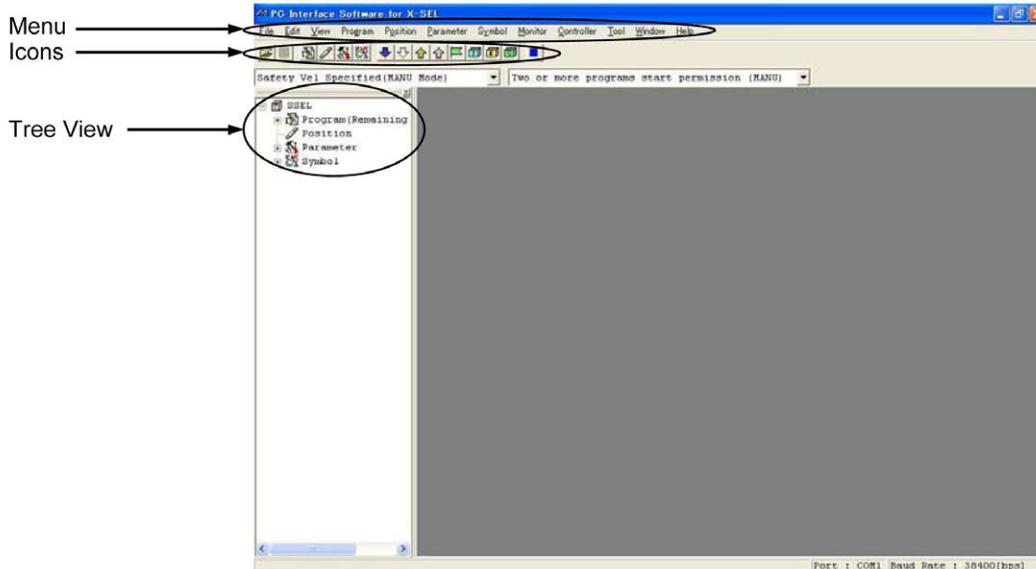


Fig.3.5 Online Screen (SSEL Controller in the Program Mode)

(Note) In the case of the SSEL controller, 2-type selection is possible between the program mode and positioner mode. Set the selection to the other parameter No. 25 "Operation mode type." For details, refer to the operating manual of the SSEL controller.

(6) SSEL controller in the positioner mode

When this software has been started, the main window in Fig. 3.6 will open showing the menu items with icons on the tool bar in the case of the SSEL controller in the positioner mode. The tree view appearing on the left side of the window can be displayed by clicking View (V) from the menu bar and then selecting Tree View (T). (Initial window: Main menu)

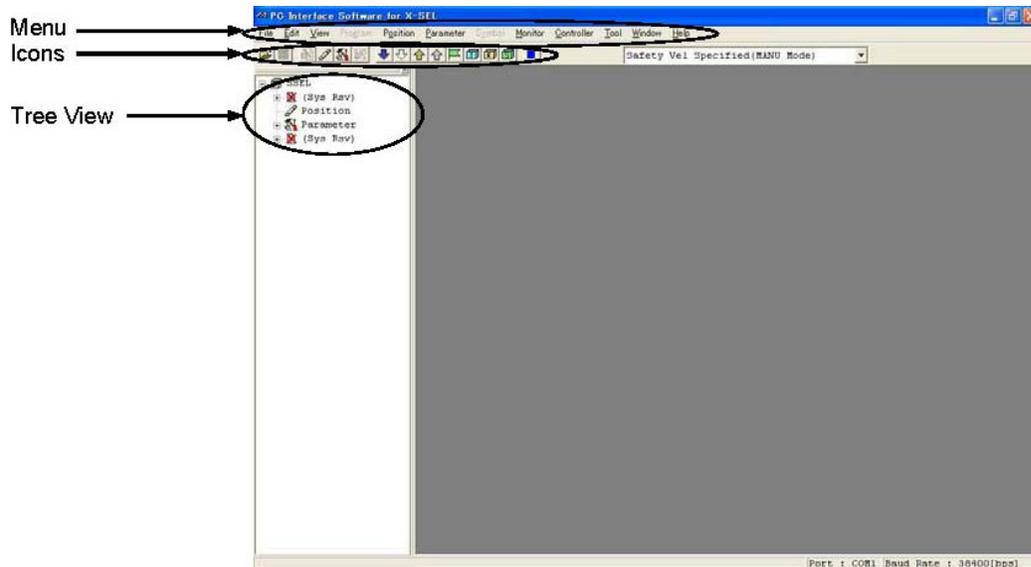


Fig. 3.6 Online Screen (SSEL Controller in the Positioner Mode)

However, “program edit” or “symbol edit” using the menu or tool bar will become unavailable. Icons will also become faint-colored. Two or more programs start prohibition will not be displayed, either.

(7) ASEL controller

When this software has been started, the main window in Fig. 3.7 will open showing the menu items with icons on the tool bar in the case of the ASEL controller. The tree view appearing on the left side of the window can be displayed by clicking View (V) from the menu bar and then selecting Tree View (T). (Initial window: Main menu)

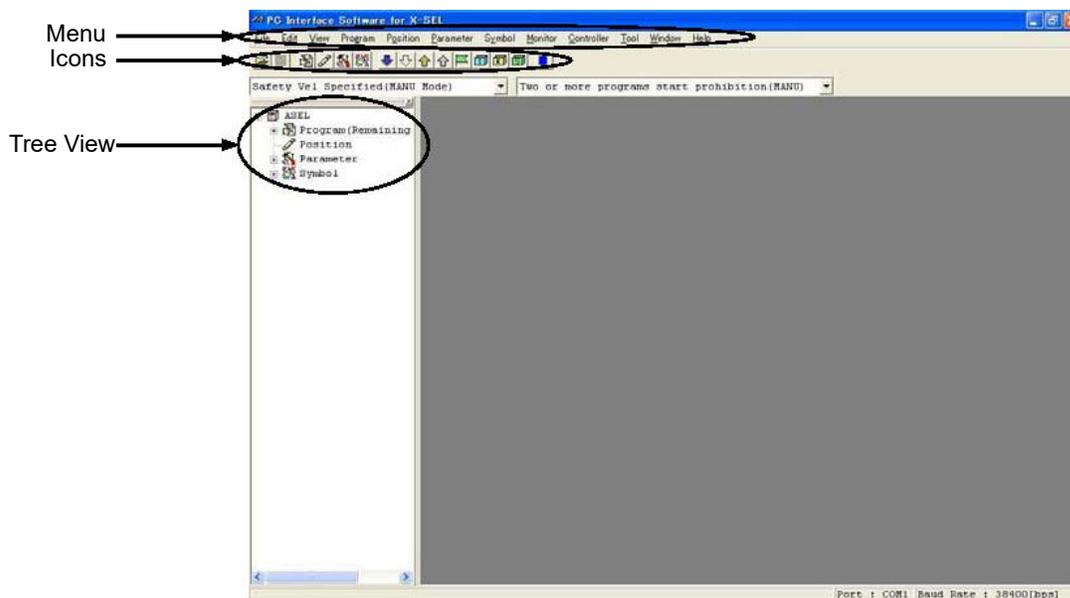


Fig. 3.7 Online Screen (ASEL Controller)

(8) PSEL controller

When this software has been started, the main window in Fig. 3.8 will open showing the menu items with icons on the tool bar in the case of the PSEL controller. The tree view appearing on the left side of the window can be displayed by clicking View (V) from the menu bar and then selecting Tree View (T). (Initial window: Main menu)

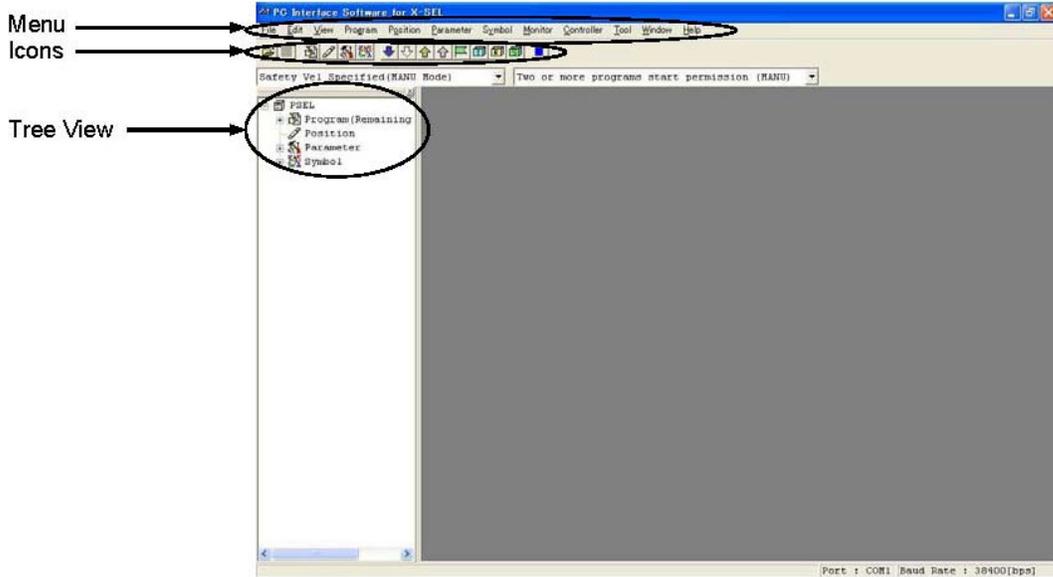


Fig. 3.8 Online Screen (PSEL Controller)

3.1.2 Offline Screen

When this software has been started with no connection to any controller, the screen in Fig. 3.9 will be displayed. The items that cannot be operated offline will be displayed as faint-colored icons.

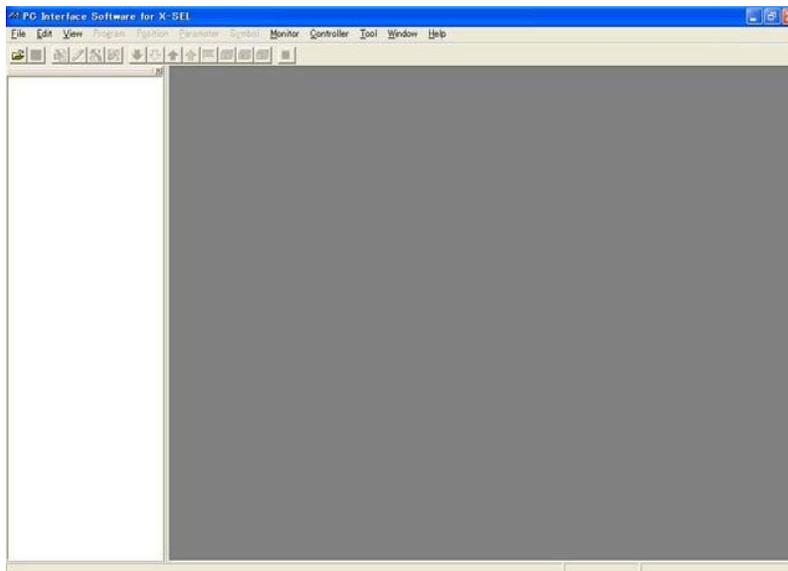


Fig. 3.9 Offline Screen

3.2 Explanation of the Commands

- (1) **File (F)**
- [1] **New (N)** Create new SEL data.
- **Program (S)** Open the edit window for creating a new program.
 - **Position (O)** Open the edit window for creating new position data.
This menu item will become faint-colored and render the command inoperable in the case of the SSEL, ASEL, and PSEL controllers in the positioner mode.
 - **Symbol (Y)** Open the edit window for creating new symbol data.
This menu item will become faint-colored and render the command inoperable in the case of the SSEL, ASEL, and PSEL controllers in the positioner mode.
 - **Coordinate System (D)** Open the edit window for the new coordinate system definition data.
 - **RC-axis Position Data (R)** Open the edit window for creating new RC-axis position data (X-SEL-P/Q/PX/QX (PC software V7.2.0.0 or later) and R/S/RX/SX/RXD/SXD controllers with gateway function)
- * In the case of the X-SEL-P/Q/PX/QX (PC software V7.2.0.0 or later) and R/S/RX/SX/RXD/SXD controllers with gateway function, "RC-axis Position Data File (*.rpt)" can be loaded.

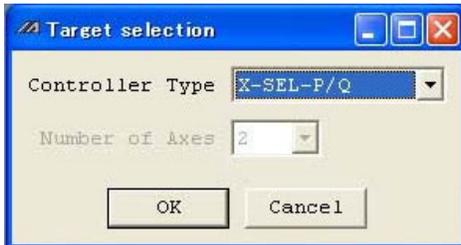


Fig. 3.10 Target Selection Window

The target selection window (Fig. 3.10) will be displayed to select the controller type and the number of axes (required to select it only when position data is created).

* The created data can be saved only in the file format according to the target selected here (refer to the list of support models in the preliminary section of this manual).

- [2] **Open (O)** Load data currently saved in a file.
(Note) In the case of the SSEL, ASEL, or PSEL controller in the positioner mode, the program file or symbol file cannot be open. If the file is open, the ABB File Type Error will be displayed.

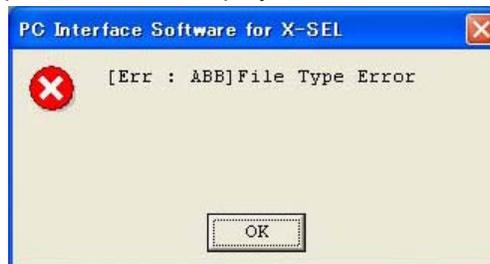


Fig. 3.11 ABB File Type Error

(1) **File (F)** (continued)

- | | | |
|-----|--------------------------|---|
| [3] | Close (C) | Close the currently active window. |
| [4] | Save (S) | Save the data in the active edit window by overwriting the corresponding file. |
| [5] | Save As (A) | Save the data in the active edit window to a different file under a desired name. |
| [6] | Print Setting (P) | Set the print font and printer. |

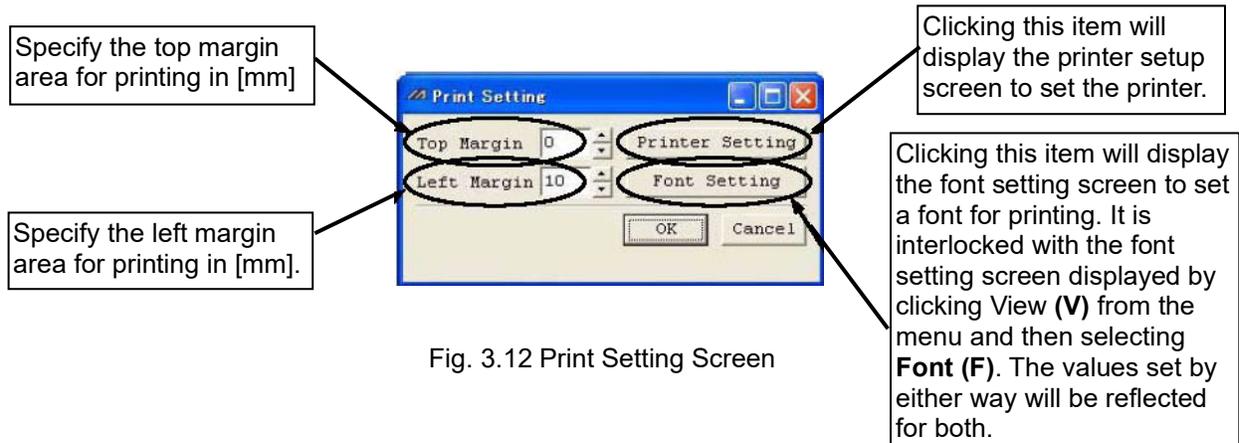


Fig. 3.12 Print Setting Screen

- (Note) If you restart the controller, settings will return to the default values shown below.
- Upper margin: 0 [mm]
 - Left margin: 10 [mm]
 - Font: MS Gothic
 - Style: Standard
 - Size: 10

- (1) **File (F)**, [6] **Print Setting (P)** (continued)

In PC software V9.00.00.00 or later, whether or not to print the folder name can be selected.

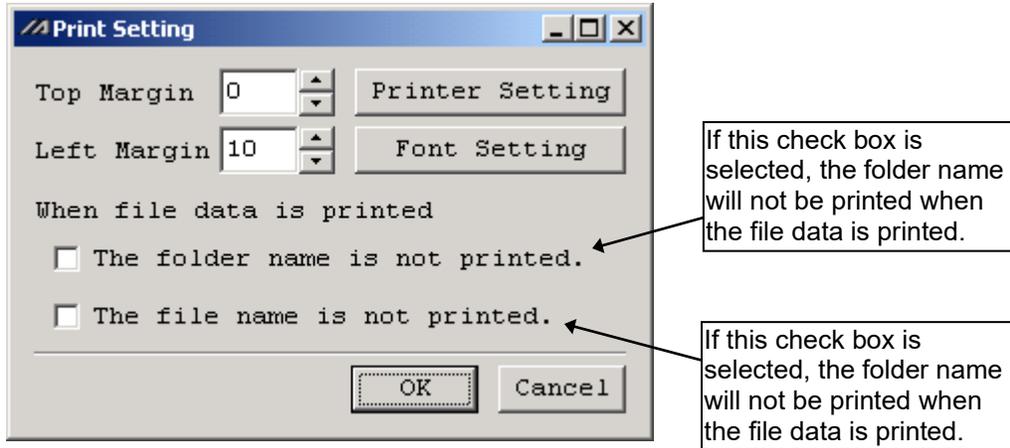


Fig. 3.13 Print Setting Screen (V9.00.00.00 or Later)

- [7] **Most Recently Opened Files (D)**

Selecting this menu item will display a list of files most recently loaded to the software, where you can select and load desired files.

- [8] **Exit (X)**

Close the application.

(2) **Edit (E)**

This menu lets you perform operations used in editing data.

 [1] **Undo (U)**

Up to the most recent 10 operations can be canceled. However, they cannot be canceled when you perform any of the following operations:

- Transfer of data on the editing screen such as the program edit window to the controller
- Saving of data on the editing screen such as the program edit window in a file
- Closing of the editing screen such as the program edit window

The following are the operations for which this function is enabled:

	Input	Line insertion	Line Deletion	Cut	Paste
Program Edit Window	<input type="radio"/>				
Position Edit Window	<input type="radio"/>	-	-	<input type="radio"/>	<input type="radio"/>
Symbol Edit Window	<input type="radio"/>	-	-	<input type="radio"/>	<input type="radio"/>
Parameter Edit Window	<input type="radio"/>	-	-	-	-
Coordinate System Data Edit Window	<input type="radio"/>	-	-	-	-
RC-axis Position Data Edit Window	<input type="radio"/>	-	-	<input type="radio"/>	<input type="radio"/>

When this operation is performed, the warning screen in Fig.3.14 will be displayed.

Clicking Yes will cancel the operation executed immediately before.

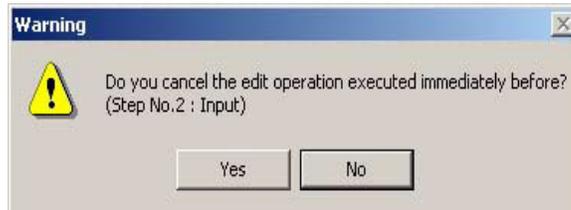


Fig. 3.14 Warning

 [2] **Cut (T)**

Cut the data corresponding to the cursor line in the edit window and save the data to the clipboard.

 [3] **Copy (C)**

Copy to the clipboard the data corresponding to the cursor line in the edit window.

 [4] **Paste (P)**

Paste the data on the clipboard to the cursor line in the edit window.

 [5] **Find (F)**

Find a specified character string.

 [6] **Find Next (S)**

Find the character string specified in [5] again, starting from the cursor line position.

 (3) **View (V)**

This menu lets you set options relating to screen views. (Refer to '3.4 Tree View')

 [1] **Tree View (T)**

Show/hide the tree view that appears on the left side of the main window.

 [2] **Font (F)**

Set the font of text shown in the windows.

(4) **Program (S)**

This menu lets you perform operations relating to programs. (Available only in the online mode.)
(Refer to “4. Program Edit Window.”)

- | | |
|-----------------------------------|---|
| [1] Edit (E) | Load a selected program from the controller for editing.
Cycle time can be measured in XSEL-RA/SA/RAX/SAX/RAXD/SAXD (main CPU application version V1.10 and later).
[Refer to 4.5 Cycle Time Measurement] |
| [2] Copy/Move (C) | Copy/move (cut & paste) a program |
| [3] Clear (L) | Clear a program. |
| [4] Save to File (S) | Save a selected program or all programs to a file under a desired name. |
| [5] End All Operations (T) | End all programs and operations that are currently running/being performed. |

(5) **Position (O)**

This menu lets you operate position data. (Available only in the online mode.)
(Refer to “6. Position Data Edit Window.”)

- | | |
|--------------------------|---|
| [1] Edit (E) | Load position data from the controller for editing. |
| [2] Copy/Move (C) | Copy/move (cut & paste) position data. |
| [3] Clear (L) | Clear position data. |

In the case of the X-SEL-R/S, RX/SX or RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD controller, the position data items to be cleared can be selected on the Clear Position Data screen.

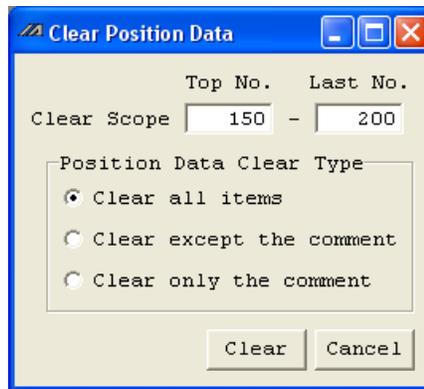


Fig. 3.15 Clear Position Data Screen

- | | |
|------------------------|--|
| Clear All: | Clear all position data items (Axis 1 to 8, Arm 1 to 4, Arm 5 to 8, Vel, Acc, Dcl and Comment). |
| Clear All but Comment: | Clear all position data items except for comment (Axis 1 to 8, Arm1 to 4, Arm 5 to 8, Vel, Acc and Dcl). |
| Clear Comment Only: | Clear only the comments among the position data. |

(6) **Parameter (P)**

This menu lets you operate parameters. (Available only in the online mode.)
(Refer to “8. Parameter Edit Window.”)

[1] **Edit (E)**

Load position parameters from the controller for editing.

[2] **Easy Parameter Setup (S)**

Parameter edit is to be conducted in the setting screen of each feature for those features listed below.

- RS-232C
- Fieldbus (CC-LinK, DeviceNet, PROFIBUS-DP, EtherCAT, CC-Link IE Field)
- Ethernet
- Vision System
(V12.02.00.00 or later)
- Extension SIO
(V12.03.00.00 or later)

(7) **Symbol (Y)**

This menu lets you operate symbol data. (Available only in the online mode.)
(Refer to “9. Symbol Edit Window.”)

[1] **Edit (E)**

Load symbol data from the controller for editing.

[2] **Clear All (C)**

Clear all symbol data.

(8) **Coordinate System (D)**

This item is displayed for X-SEL-JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX controllers and V12.03.00.00 or later and when work and tool coordinate systems are valid in TTA and MSEL-PC/PG.

Edit the coordinate system definition data. (This is available only in the online mode.)
(Refer to “10. Coordinate System Definition Data edit Window.”)

[1] **Edit (E)**

Read the coordinate system definition data from the controller and edit the data.

[2] **Clear (L)**

Clear the coordinate system definition data.

(9) **Monitor (M)**

This menu lets you monitor various statuses, global variables, port statuses, and so on. (Available only in the online mode.) (Refer to “11. Monitor.”)

- [1] **Task Status (T)** Open the task status monitor window.
- [2] **System Status (S)** Open the system status monitor window.
- [3] **Axis Status (A)** Open the axis status monitor window.
- [4] **Input Port (I)** Open the input port monitor window.
- [5] **Virtual Input Port (N)** Open the virtual input port monitor window.
(Not shown if TTA, MSEL, XSEL-RA/SA/RAX/SAX/RAXD/SAXD)
- [6] **Virtual Inpu/Output Port** Open the virtual input and output port monitor window.
(Shown only if TTA, MSEL, XSEL-RA/SA/RAX/SAX/RAXD/SAXD)
- [7] **Output port (O)** Open the output port monitor window.
(Not shown if TTA, MSEL, XSEL-RA/SA/RAX/SAX/RAXD/SAXD)
- [8] **Virtual Output Port (U)** Open the virtual output port monitor window.
- [9] **Global Flag (F)** Open the global flag monitor window.
- [10] **Global Integer (L)** Open the global integer monitor window.
- [11] **Global Real (R)** Open the global real variable monitor window.
- [12] **Global String (G)** Open the global string monitor window.
- [13] **Local Data (B)** Local data (local integers, variables, local real variables, local string real numbers and local flags) for each program number can be shown.
- [14] **Detailed Error Information (E)** Open the detailed error information monitor window.
If you click Monitor (M) from the main menu and then selecting Detailed Error Information (E), the Error number Select screen will be displayed. After setting the number of displayed errors, click OK. The detailed error information screen will be displayed.

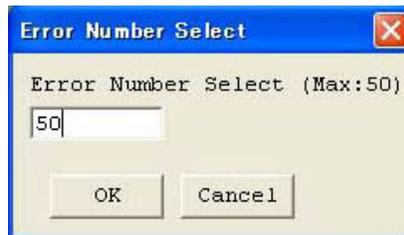


Fig. 3.16 Error Number Select Screen

- [15] **Maintenance Information (X)** Open the maintenance information monitoring window.
This item is displayed on the XSEL-R/RX/RXD/S/SX/SXD, RA/RAX/RAXD/SA/SAX/SAXD, TTA and MSEL controller.
- [16] **Monitoring Data (M)** Open the monitoring data window.
This item is displayed only when the connected controller supports the function.

(10) **Controller (C)**

This menu lets you perform operations relating to the controller, such as executing a software reset or resetting controller errors. (Refer to “15. Supplementary Information in Controller Menu Items.”)

- [1] **Reconnect (C)** Reestablish communication with the controller. If the software is currently in the offline mode but is able to establish communication with the controller, selecting this menu item will switch the software to the online mode.

- [2] **Change Baud Rate (B)** Change the baud rate used for communication between the controller and PC.
- [3] **Offline Operation (Communication port close) (O)**
- [4] **RC Gateway (Y)**
Operational manual for gateway function is in a separate volume.
- | Operational manual | Management number |
|---|-------------------|
| X-SEL controller P/Q/PX/QX and R/S/RX/SX/RXD/SXD
RC gateway function | ME0188 |
- [5] **SEL Global Data Backup**
- Save to File** Can save global flags, global integer variables, global real variables, and global strings.
- Transfer to Controller** Can transfer global flags, global integer variables, global real variables, and global strings to the controller.
- [6] **All Data Backup (X)**
▪ **Save to File (S)** Save all program and position data in the controller.

⊙ Applicable in PC Interface Software of Version 14.00.01.00 or later
The global data and error lists can be saved at the same time when saving the all data backup file.

Select **All Data Backup (X)** → **Save to File (S)** in the menu and the Select Save Data screen to save together with the all data backup file should be displayed.

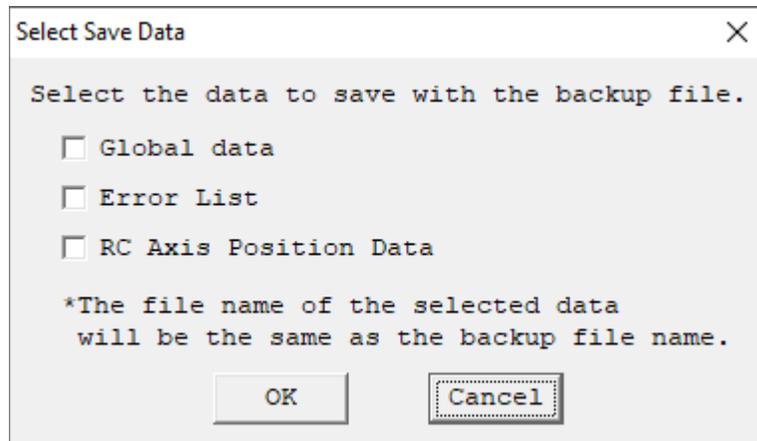


Fig. 3.17 Select Save Data Screen to Saved Together with All Data backup File

Select a file that you would like to save and click [OK] button.
After saving the all data backup file, saving process of the selected file should be performed.

* The data type displayed in the Select Save Data screen should differ depending on the connected controller.

(10) Controller (C) [7] All Data Backup (X) • Save to File (S) (continued)

The file name of the selected data should be the same as the name of the all data backup file. The domain to save the file should be the same as the folder that the all data backup file gets saved.

(e.g.) if the all data backup file name is “Backup.x6bk”, the global data file name should be “Backup.x6gd”.

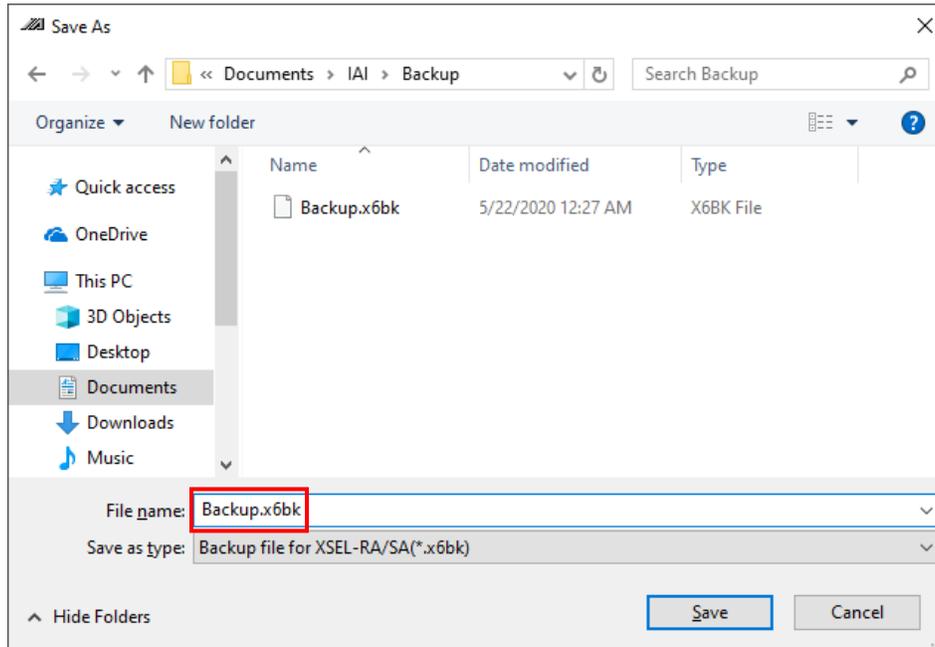


Fig. 3.18 Example of All Data Backup File Name: “Backup.x6bk”

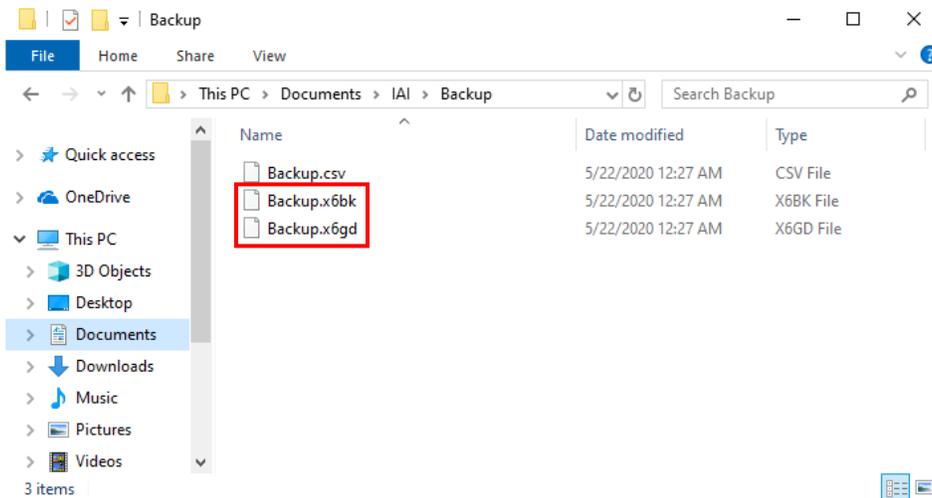


Fig. 3.19 Global Data File Name: “Backup.x6gd”

(10) **Controller (C)** [7] **All Data Backup (X)** ▪ **Save to File (S)** (continued)

If there is a file with the same name as the file name that the selected data would have, a message for confirmation of overwriting should appear. If you would confirm overwriting, select “Yes”. Select “No” and the screen goes back to the file name input for the all data backup file.

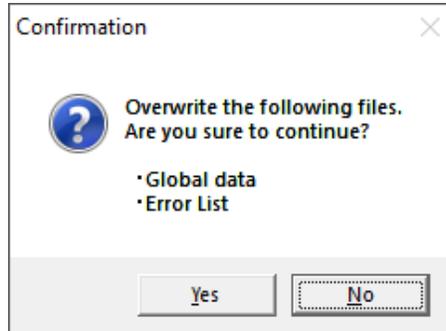


Fig. 3.20 Confirmation Screen

[In the case of X-SEL-P/Q/PX/QX and R/S/RX/SX/RXD/SXD controllers with gateway function]
After the program parameter position symbol is saved, the following confirmation screen will be displayed. However, this screen will not be displayed while the RC gateway function is not valid. (PC interface software V7.2.0.0 or later)

[When the RC-axis position data in X-SEL is used]
Click Yes to save the RC-axis position data in X-SEL.

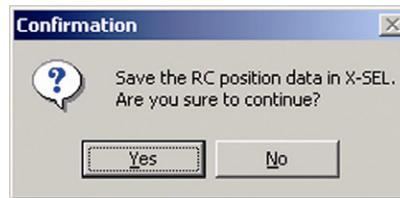


Fig. 3.21 Confirmation Screen (While RC-axis position data is being saved.)

(10) **Controller (C)** [7] **All Data Backup (X)** ▪ **Save to File (S)** (continued)

[When the RC-axis position data in RC controller is used]
RC-axis position data in RC controller can not be saved in the PC interface software for X-SEL.



Fig. 3.22 Warning
(When RC-axis position data is being saved)

◎ **PC Interface Software of a Version Earlier than V7.2.0.0**

▪ **Transfer to Controller (L)** Transfer saved program and position data to the controller.

(Note) Files collected by the SSEL, ASEL, and PSEL controllers in the program mode cannot be transferred to the controller in the positioner mode. In the same way, files collected in the positioner mode cannot be transferred to the controller in the program mode. If any different file is transferred, the following message will be displayed:

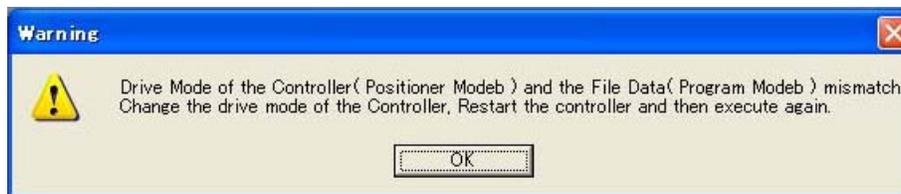


Fig. 3.23 Message

◎ **PC Interface Software of a Version V7.2.0.0 or later**

★ **Online connection with the controller**

▪ **Transfer to Controller/Divide File (L)** Transfer to controller or dividing the file can be chosen in the Transfer/Divide Selection Screen.

★ **Offline**

▪ **Divide File (L)** Transfer to controller or dividing the file can be chosen in the Transfer/Divide Selection Screen.



Fig.3.24 Transfer/Divide Selection Screen
(X-SEL-J/K, P/Q, R/S, RA/SA, TT, TTA, SSEL, ASEL, PSEL)

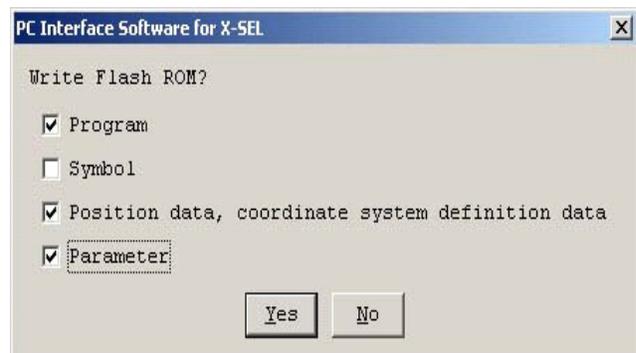


Fig.3.25 Transfer/Divide Selection Screen
(X-SEL-JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD, MSEL-PCX/PGX when work and tool coordinate systems are valid in TTA and MSEL-PC/PG)

(10) **Controller (C)** [7] **All Data Backup (X)** ▪ **Transfer to Controller/Divide File (L)** (continued)

The following section explains about “Transfer to Controller” and “Divide File.”

⚠ **Caution:** When program data (or backup data) saved in a PC software with its version V7.07.12.00 or earlier is transferred to a controller with a PC software with its version V8.01.00.00, and if there is a comment with 19 characters in the comment box, it should generate “Character Count Exceeding Error” and would not transfer the data.
(Countermeasure)

- Transfer program data (or backup data) saved in a PC software with its version V7.07.12.00 or earlier with a software with its version V7.07.12.00.
 - * OS applicable for versions V7.07.12.00 and earlier:
Windows 98, Windows Me, Windows 2000 and Windows XP (32-bit version)
- When data is to be transferred with a PC software with its version V8.01.00.00 or later, set the number of characters at 18 or less in the comment box.
Half-width characters, sonant marks and P-sound sonant marks should be defined as one character, and full-size characters should be defined as two characters.

(Applicable Controllers)

- XSEL-J/K, JX/KX, P/Q, PX/QX
- TT
- SSEL, ASEL, PSEL

▪ **Transfer to Controller**

On the Data Transfer/Division Selection Screen, click **Transfer to Controller**. The File Setup Screen will appear.

Select Backup All Saved Data (all data including programs, positions, etc.) and transfer to the controller. (If you are not selecting all data, click to select the data to be transferred. The selected data will be marked with ✓.)

(Note) The parameter can not be sent if the selected parameter in the controller is the same as the axis pattern.

(Note) Data saved in the regular format can be transferred to the X-SEL-P/Q, PX/QX controller with the gateway function compatible with increased memory.

Program of No. 65 or later will display a screen to ask if the position of No. 4001 or later should be erased. Clicking Yes will clear all the programs of No. 65 or later and positions of No. 4001 or later. Clicking No will not clear them.

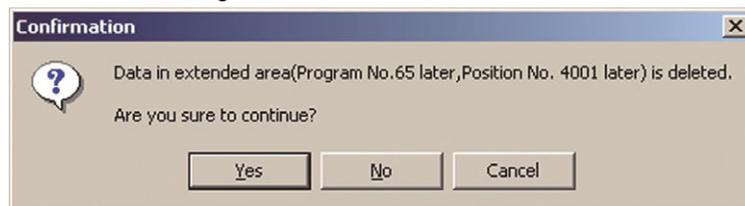


Fig. 3.26 Confirmation Screen

(10) **Controller (C)** [7] **All Data Backup (X)** • **Transfer to Controller/Divide File (L)** (continued)

(Note) Data saved in the extended format can be transferred to the controller incompatible with increased memory.
 Programs of No. 65 or later and positions of No. 4001 or later cannot be transferred.
 Parameters not supported by the controller at the destination cannot be transferred.
 The following warning screen will be displayed. Click Yes to transfer data.

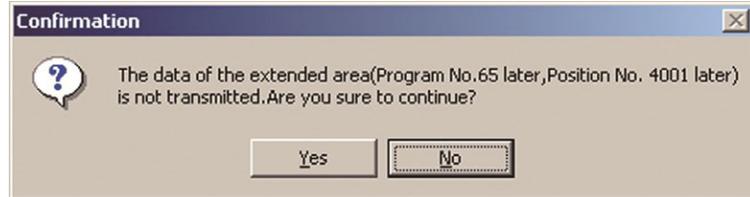


Fig. 3.27 Confirmation Screen

[In the case of X-SEL-P/Q/PX/QX and R/S/RX/SX/RXD/SXD controllers with the gateway function]
 The following confirmation screen will be displayed after the program, parameter, position and symbol are transferred, written to FROM and restarted.

[When RC-axis position data in X-SEL is used]

Click Yes to transfer the RC-axis position data in X-SEL.

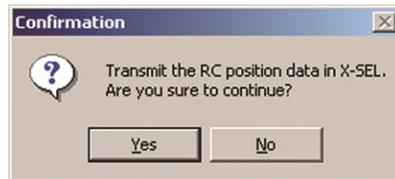


Fig. 3.28 Confirmation Screen (while RC-axis position data is being transferred)

[When RC-axis position data in RC controller is used]

RC-axis position data in RC controller cannot be transferred in PC interface software for X-SEL.



Fig. 3.29 Warning Screen
 (Transferring RC-axis position data when position data in RC is used.)

(10) **Controller (C)** [7] **All Data Backup (X)** • **Transfer to Controller/Divide File (L)** (continued)

When a user data retained memory with a different composition is transferred, the following warning screen will be displayed.

Initialize the user data retained memory and transfer it again.

To initialize the user data retained memory, click **Memory Initialization (I)** and then **User Data Retained Memory (U)**.

In V11.00.00.00 or later, after backup transfer is complete, the user data retain memory will be automatically initialized when it is necessary to initialize it.

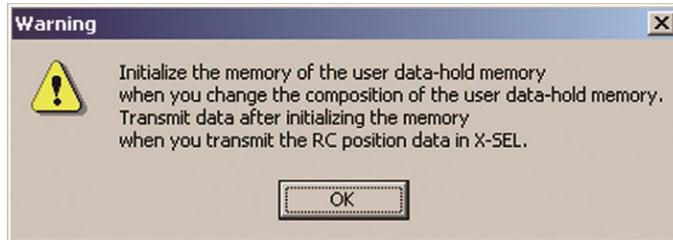


Fig. 3.30 Warning Screen
(Transferring RC-axis position data when position data in RC is used.)

(Note) If the software is reset after changing the following parameter and writing to the flash ROM, UBM Data Composition Change Error (6A1) will be displayed.

- I/O parameter No.502: The largest axis No. for RC gateway position data definition
- No.503: The position data points for RC gateway position data definition

If an error message is displayed, user data retained memory must be initialized. However, all the RC-axis position data will be cleared if the user data retained memory is initialized as described in the note. If you need to save the RC-axis position data, please follow the procedures in the note.

(Note) All the RC-axis position data will be cleared if the user data retained memory is initialized. Please follow the steps below to backup the RC position data.

1. Open Controller, RC-Axis Position Data Edit (R), and then Axes Position Data Save (S) in the Menu screen to save the RC-axis position data.
2. Change the I/O parameter No. 502, 503.
3. Initialize the user data retained memory.
4. Click File (F) and then Open (O) in the Menu screen to open the saved RC-axis data in step 1 and transfer it to X-SEL controller.

(10) **Controller (C)** [7] **All Data Backup (X)** • **Transfer to Controller/Divide File (L)** (continued)

- **Divide Files** Divide all the saved backup data (all data including program and position) into program, position, parameter, symbol, X-SEL-JX/KX, PX/QX, RX/SX/RXD/SXD, RAX/SAX/RAXD/SAXD and MSEL-PCX/PGX axis data. Click Divide Files on the Transfer/Divide data screen. The program, position, parameter symbol and controllers with the coordinate system definition data are displayed in order on the File Save Screen. Save them with a file name.

- [8] **Positioner Mode** This mode can be used when the SSEL, ASEL, or PSEL controller is under the manual mode and positioner mode.
- Start** Start the positioner mode.
- Stop** Stop the positioner mode.

(Note) You can not change the parameters or write to flash ROM while the SSEL, ASEL, or PSEL controller is under the positioner mode. Perform this operation to stop the positioner mode before changing the parameters or writing to flash ROM.

Acquire Positioner Mode Information

Acquire maintenance information (system data) in the positioner mode. This item is displayed for SSEL, ASEL, and PSEL controllers.

- [9] **Write to Flash ROM (W)** Clear the data areas in the flash ROM and then write the data saved in the controller's RAM to the flash ROM.

For SSEL, ASEL, PSEL and X-SEL-P/Q, PX/QX (w/gateway function), R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD compatible with increased memory, you can choose to write either all the data range or selected data range (PC interface software version 7.2.0.0 or later).

- Writing all the data range: All data from the user data retained memory including program, symbol, position, parameter, X-SEL-P/Q, PX/QX, R/S, RX/SX, and RXD/SXD will be written to the flash ROM.
- Writing the selected data range: Only the selected data will be written to the flash ROM.

* There is a limit in the number of writing to the flash ROM (write limit: about 100,000 times). If you do not want to write all the data, select "Select the data range" and write to the flash ROM.

XSEL-RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL and PSEL will not be displayed.

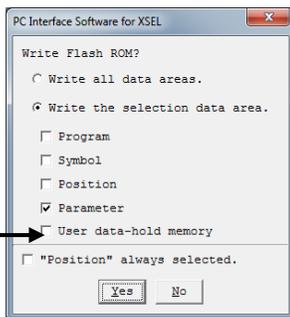


Fig. 3.31 Confirmation (X-SEL-P/Q, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, PSEL)

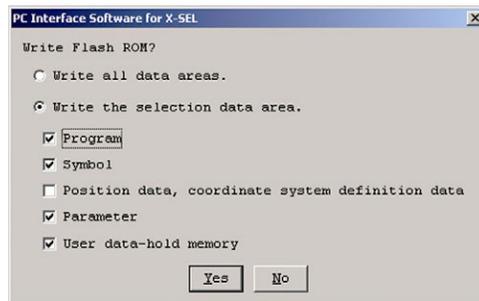


Fig. 3.32 Confirmation (X-SEL-PX/QX)

(10) **Controller (C)** (continued)

[10] **Restoration of Data Written into Flash ROM (for 1 generation before) (Q)**

This item is displayed for TTA, MSEL controller.

- **Program (S)** Restore the program data written into Flash ROM to the written data for 1 generation before.
- **Symbol (Y)** Restore the symbol data written into Flash ROM to the written data for 1 generation before.
- **Position (No.10001 to 30000) (O)** Restore the position data written into Flash ROM (No. 10001 to 30000) to the written data for 1 generation before.
Note: data cannot be restored to the position data No. 1 to 10000.
- **Parameter (P)** Restore the parameter data written into Flash ROM to the written data for 1 generation before.

[11] **Initialize Memory (I)**

- **Position (O)** Clear all position data.
This item is displayed on the X-SEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL controllers.
(Note) If 6BD, “Position data configuration change error”, 6BF, “Position data sum check error” or 69E, “Position data management domain sum check error” occurs, use this command to initialize the position data.
(Note) When XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD is connected, 22B “Position data comment loss error” will occur if the software is reset or power is turned off after this operation without writing the position data to the flash ROM first.
- **Coordinate System Definition Data (C)** Clear all coordinate system definition data.
This item is displayed on the X-SEL-RX/SX, RXD/SXD, RAX/SAX/RAXD/SAXD, TTA (Main Application V2.00 or later), MSEL-PC/PG (Main Application V2.00 or later) and MSEL-PCX/PGX controller.
(Note) if D40, “Coordinate system data management area sum check error”, D41, “Coordinate system data management area ID error” or D42, “Coordinate data sum check error” occurs, use this command to initialize the coordinate system definition data.
- **Global Variable and Flag (V)** Clear all global variables and flags to zero.

(10) **Controller (C)** (continued)

 ▪ **User Data Retained Memory (U)**

In the case of X-SEL-P/Q/PX/QX, R/S/RX/SX/RXD/SXD, RA/SA/RAX/SAX/RAXD/SAXD with gateway function, clear all the contents of user data retained memory containing RC-axis position data in X-SEL controller.

(PC interface software version 7.2.0.0 or later)

- * If the Edit screen for RC-axis position (in X-SEL-P/Q/PX/QX and R/S/RX/SX/RXD/SXD controllers) is opened without resetting the software or turning off the power after performing this operation and writing to the flash ROM, "RC Position NO. Error" message will be displayed.
 - * If the software is reset or the power is turned off without writing to the flash ROM after performing this operation, the last written data in the flash ROM will be retained.
- If the user data retained memory is initialized by a mistake, reset the software without writing to the flash ROM.
- * XSEL-RA/SA, RAX/SAX, RAXD/SAXD do not require flash ROM writing after completing initialization of the user data retaining memory. Only the software reset is required.

 ▪ **Parameter (at the time of shipment) (S)**

Can return parameters to the ones at the time of shipment. This item is not displayed normally. It is a function which will become available by inputting a password. (Refer to "8.5 How to Initialize X-SEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD and SSEL, ASEL, PSEL Parameters (at the time of shipment).")

It is a function of X-SEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, and PSEL controllers.

 [12] **Absolute Reset (A)**

Reset absolute data.

This item is not displayed for XSEL-PX/QX, RX/SX, RAX/SAX, TTA (except for AC servo specification), MSEL-PC/PG controllers.

 [13] **Absolute Reset (Orthogonal Axis) (A)**

Reset the absolute data of the orthogonal axis of the XSEL-PX/QX, RX/SX, RAX/SAX controllers.

This item is displayed for XSEL-PX/QX, RX/SX, RXD/SXD controllers.

 [14] **Absolute Reset (SCARA Axis) (Q)**

Reset the absolute data of the SCARA axis of the X-SEL-PX/QX, RX/SX, RAX/SAX controllers.

This item is displayed for XSEL-PX/QX, RX/SX, RAX/SAX controllers.

 [15] **Calibration Home/Abs. Encoder Reset (A)**

TTA (except for AC servo specification), MSEL-PC/PG, reset the absolute data of SCARA axis of MSEL-PCX/PGX.

This item is displayed for MSEL-PCX/PGX controllers.

 [16] **Software Reset (R)**

Execute software reset of the controller.

 [17] **Reset Error (E)**

Reset errors present in the controller.

 [18] **Drive-source Recovery Request (P)**

Issue a drive-source recovery request to the controller.

(10) **Controller (C)** (continued)

- [19] **Operation-pause Reset Request (L)**
Issue an operation-pause reset request to the controller.
- [20] **Set Time (T)**
Set time.
This function is available on the XSEL-R/RX/RXD/S/SX/SXD, XSEL-RA/RAX/RAXD/SA/SAX/SAXD, TTA and MSEL controller.
- [21] **About ROM Version (V)** Show the various ROM version information regarding the controller.
- [22] **Control Constant Table Management Information (Z)**
Show the control constant table management information.
This item is displayed for X-SEL-P/Q, PX/QX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, and SSEL controllers.
- [23] **Positioner Mode Management information**
Show the operation mode and management number with regard to the positioner mode of SSEL, ASEL, and PSEL controllers.
This information is provided for the manufacturer.
This item is displayed for SSEL, ASEL, and PSEL controllers.

(11) **Tool (T)**
This menu lets you specify settings relating to this application.

- [1] **Environment Setup (S)** Set items that define how the application is run.

(12) **Window (W)**
This menu lets you change how the windows are displayed.

- [1] **Cascade (C)** Cascade all open windows diagonally from top to bottom.
- [2] **Tile Vertically (V)** Arrange all open windows vertically without overlapping.
- [3] **Tile Horizontally (H)** Arrange all open windows horizontally without overlapping.
- [4] **Minimize All (M)** Minimize all open windows (reduce them to icons).
- [5] **Make to Window** Make all minimized windows (window icons) to windows.
- [6] **Arrange Icons (A)** Arrange minimized windows (window icons).

(13) **Help (H)**

[1] **Tool Version Information** Show the version information of this software.

[2] **Search for Error Countermeasures** Shows the error countermeasure search window.

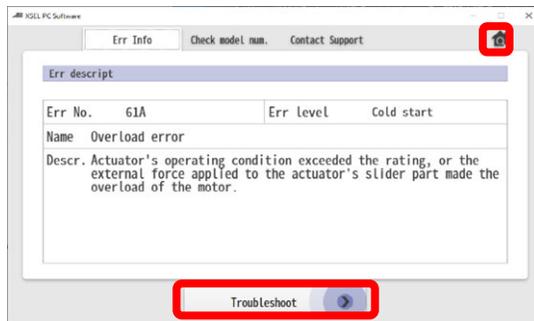
Select “Help (H)” → “Search for Error Countermeasures” in the menu. Following Search for Error Countermeasures window is displayed.



From the **Combo box** at the bottom left of the window, select the controller series that you use.

In the **Text box** at the bottom right of the window, input an error code in three digits.

Click  on the right side of **Text Box** and the error countermeasure window for the input error code should be displayed.



Click **Troubleshoot** at the bottom center of the window, and a countermeasure for the error should be displayed. Follow the instruction in the window to remove the cause of the error.

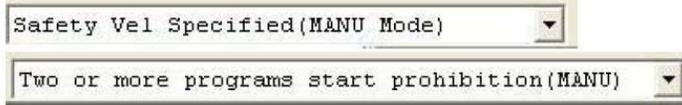
Click  at the top right, and the screen returns to the Search for Error Countermeasures window.

3.3 Explanation of the Toolbar

This section explains the toolbar (Fig.3.33) shown at the top of the main window (below the menu bar).



Fig. 3.33 Toolbar
(Other than TTA, MSEL)



	Open File	Same as clicking File (F) and then selecting Open (O).
	Save	Same as clicking File (F) and then selecting Save (S).
	Edit Program	Same as clicking Program (S) and then selecting Edit (E).
	Edit Position	Same as clicking Position (O) and then selecting Edit (E).
	Edit Parameter	Same as clicking Parameter (P) and then selecting Edit (E)
	Edit Symbol	Same as clicking Symbol (Y) and then selecting Edit (E)
	Edit Coordinate System Definition Data	Same as clicking Coordinate System (D) and then selecting Edit (E). <u>This item is displayed for X-SEL-JX/KX, PX/QX, RX/SX, RAX/SAX, RAXD/SAXD, MSEL-PCX/PGX, V12.03.00.00 or later, when work and tool coordinate systems are valid in TTA and MSEL-PC/PG.</u>
	Monitor Input Port	Same as clicking Monitor (M) and then selecting Input Port (I).
	Monitor Virtual Input Port	Same as clicking Monitor (M) and then selecting Virtual Input Port (N).
	Monitor Output Port	Same as clicking Monitor (M) and then selecting Output Port (O).
	Monitor Virtual Output Port	Same as clicking Monitor (M) and then selecting Virtual Output Prot (U).
	Monitor Global Flag	Same as clicking Monitor (M) and then selecting Global Flag (F).
	Monitor Global Integer Variable	Same as clicking Monitor (M) and then selecting Global Integer (L).
	Monitor Global Real Variable	Same as clicking Monitor (M) and then selecting Global Real (R).
	Monitor Global String Variable	Same as clicking Monitor (M) and then selecting Global String (G).
	End All Operations	Same as clicking Program (S) and then selecting End All Programs (T).

Safety Vel Specified(MANU Mode) ▾

This list box is used to enable/disable the safety velocity limit in the manual mode.

[Safety Vel Specified] --- Enable the safety velocity limit. (The maximum speed during CP operation will be limited to 250 mm/sec or below [PTP operation: 3% or below] regardless of program or parameter settings.)

[Safety Vel Not Specified] --- Disable the safety velocity limit.

Two or more programs start prohibition(MANU) ▾

This list box is used to permit/prohibit the simultaneous starting of multiple programs in the manual mode.

[Two or more programs start prohibition (MANU)]

Prohibit the simultaneous starting of multiple programs in the manual mode.

[Two or more programs start permission (MANU)]

Permit the simultaneous starting of multiple programs in the manual mode. (Supported by software version 5.0.2.0 or later)

This item is displayed for X-SEL-P/Q (application version 0.36 or later), X-SEL-PX/QX (application version 0.17 or later), XSEL-R/S/RX/SX/RXD/SXD,

XSEL-RA/SA/RAX/SAX/RAXD/SAXD, SSEL, ASEL, PSEL and MSEL controllers in the program mode.

Button shown only in TTA, MSEL



Fig. 3.34 Toolbar (TTA, MSEL)



Virtual Input/Output Port Monitor

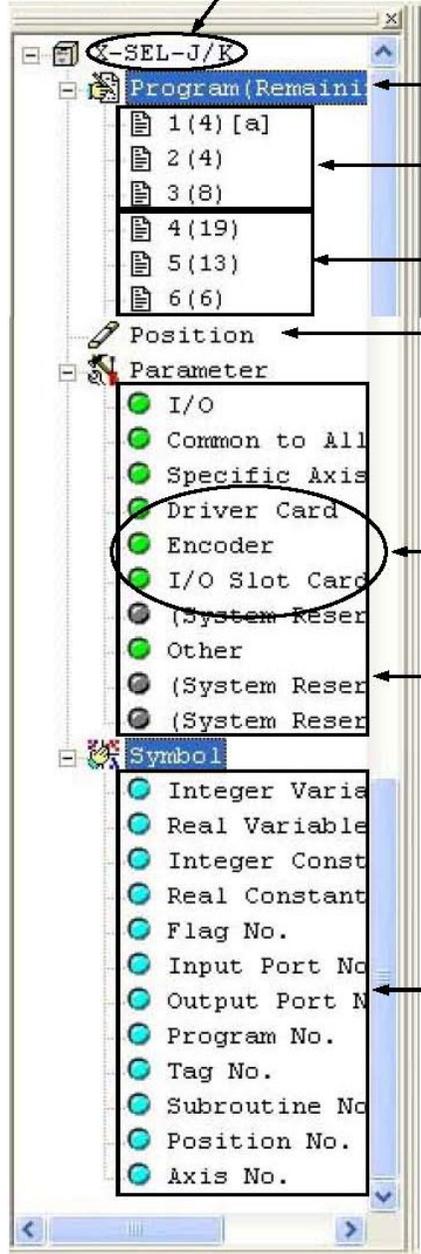
Same as clicking Monitor (M) and then selecting Virtual Input/Output Port (N) (TTA, MSEL, XSEL-RA/SA, RAX/SAX, RAXD/SAXD)

3.4 Tree View

You can display various data edit windows in the online mode by double-clicking the corresponding items displayed in the tree view (Fig. 3.35, Fig. 3.36) that appears on the left side of the main window. You can show or hide the tree view by clicking View (V) from the menu bar and then selecting Tree View (T).

3. Menu Window

Controller model
The example of Fig. 3.35 also applies to X-SEL-P/Q, R/S, RA/SA, TT, TTA, SSEL, ASEL, and PSEL controllers.



Remaining steps that can be stored in the controller

Currently registered programs
Number of registered steps in ()
Program name in [] (if a symbol is registered)

Unregistered programs

Position data edit item
Double-click to open the position edit window.

"Drive," "Encoder" and "I/O System Device" will be displayed for X-SEL-P/Q, R/S, RA/SA, SSEL, ASEL and PSEL controllers.

Parameter edit items
Double-click a desired parameter category to open the corresponding edit window.

Symbol edit items
Double-click a desired symbol category to open the corresponding edit window.

Fig. 3.35 Tree View (X-SEL-J/K)

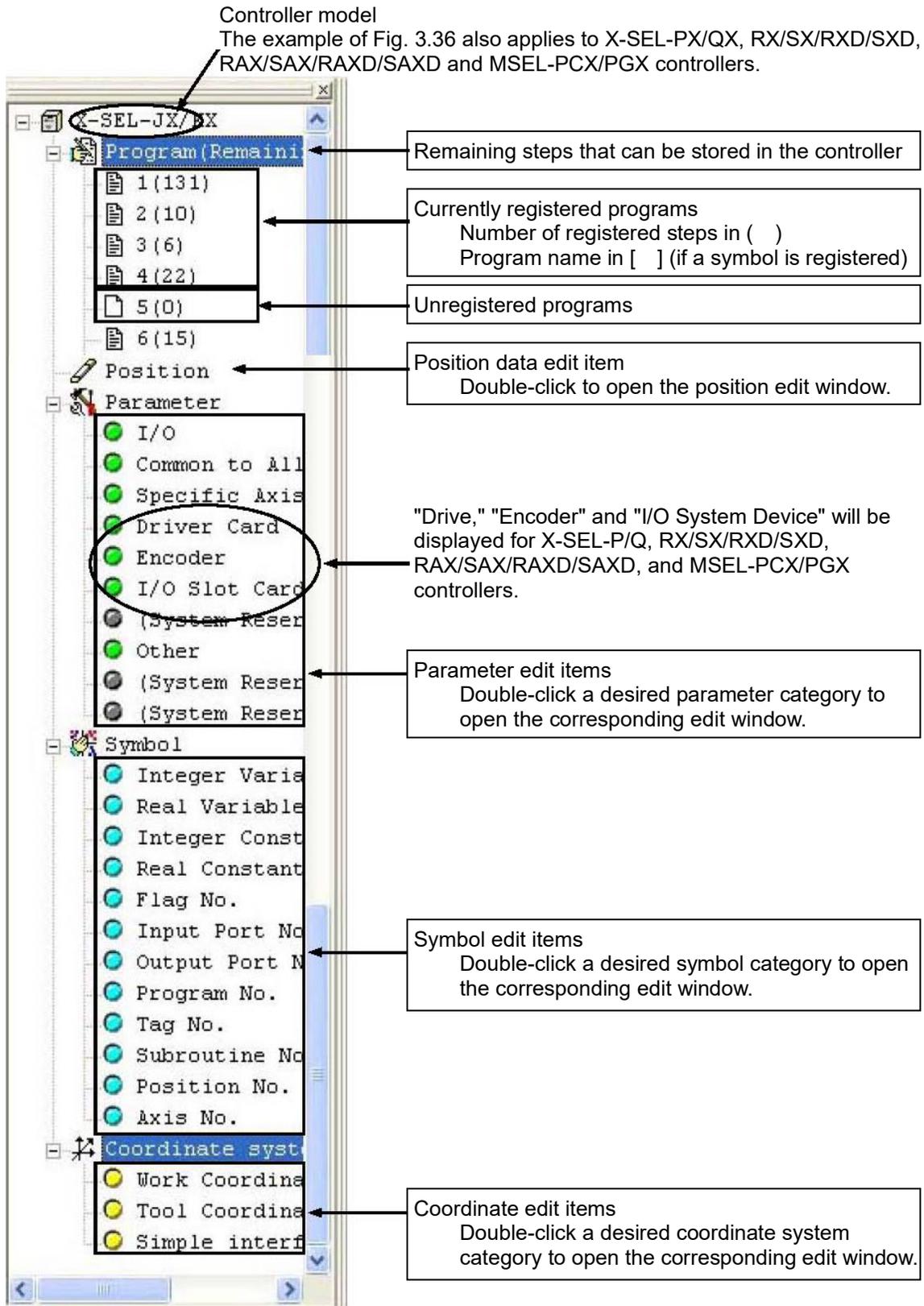


Fig. 3.36 Tree View (X-SEL-JX/KX)

4. Program Edit Window

4.1 Explanation of the Items Displayed in the Program Edit Window

- (1) Click Program (S) from the menu bar, and then select Edit (E).
- (2) When the program number selection window opens, select the program you want to edit, and then click Load.

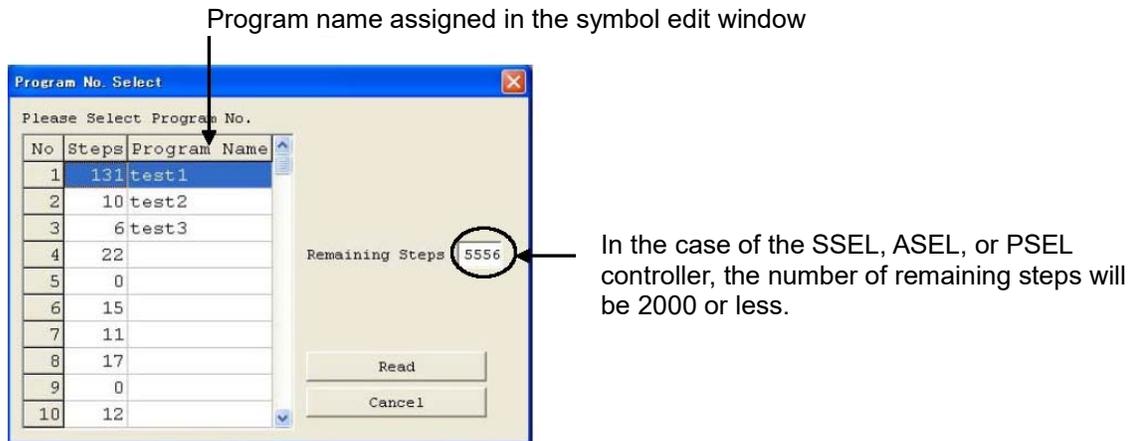


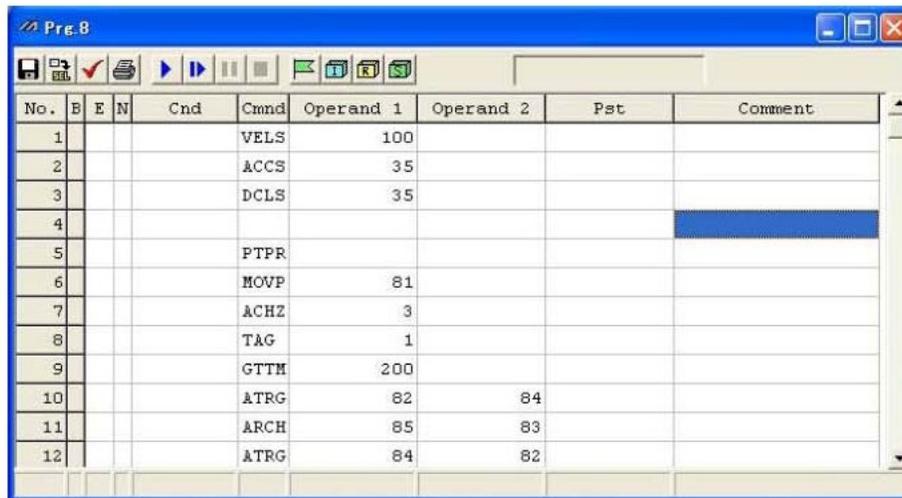
Fig. 4.1 Program Number Selection

- (3) The program edit window will open. This window has the following controls and fields.

No.	Step number.
B	Use this field to set a breakpoint. (Supported only in the online edit mode.) Click the "B" field in the line you want to set a breakpoint for. Once a breakpoint is set, "B" will be shown in the field. A breakpoint will be cancelled by executing software reset.
E	Enter a desired extended condition.
N	Specify reversing "N" of the input condition.
Cnd *	Enter a desired input condition.
Cmnd	Enter a desired SEL command. Double-clicking this field or pressing the F1 key will open the SEL Command Explanation window (Fig. 4.6). This window provides an explanation of each SEL command. You can select a desired command in this window and input it to the step data.
Operand 1 *	Enter desired operand 1.
Operand 2 *	Enter desired operand 2.
Pst *	Enter a desired output (operand 3).
Comment	Enter a command, if necessary (using up to 18 single-byte characters). You can also double-click this field to modify a part of the comment currently entered.

* Press F11 to find a specific symbol in the input condition/operand fields.

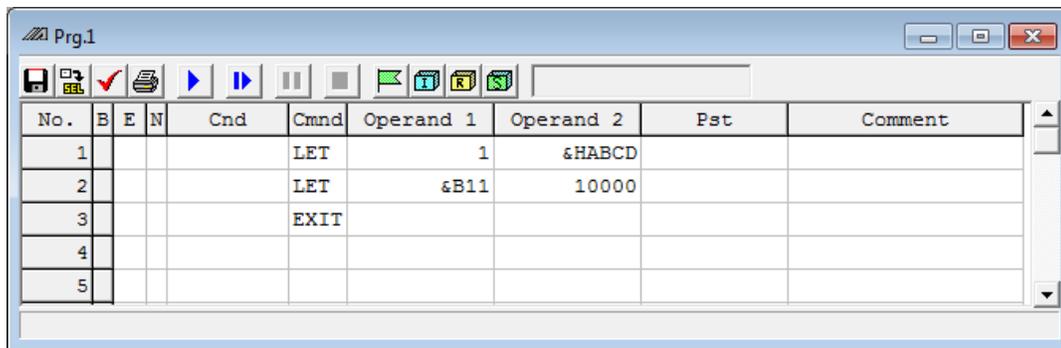
- * Column T should be shown in XSEL-RA/SA/RAX/SAX/RAXD/SAXD controllers (main CPU application version V1.10 and later). Indicate the start point and end point for cycle time measurement. [Refer to 4.5 Cycle Time Measurement]



No.	B	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1					VELS	100			
2					ACCS	35			
3					DCLS	35			
4									
5					PTPR				
6					MOVP	81			
7					ACHZ	3			
8					TAG	1			
9					GTTM	200			
10					ATRG	82	84		
11					ARCH	85	83		
12					ATRG	84	82		

Fig. 4.2 Program Edit

*1 Only XSEL-RA/SA, RAX/SAX and RAXD/SAXD are available for setting with binary and hexadecimal systems in Operand1 and Operand2.



No.	B	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1					LET	1	&HABCD		
2					LET	&B11	10000		
3					EXIT				
4									
5									

Fig.4.3 Setting with Binary and Hexadecimal Systems

[How to set up]

When using the binary numbers, apply “&B” at the top of the value.

When using the hexadecimal numbers, apply “&H” at the top of the value.

Eight digits can be input at maximum for binary and hexadecimal numbers.

* In the operand to input the axis pattern (the operand input values in binary system), do not apply “&B” at the top to input with the binary numbers.

* Binary numbers are treated as an integer with no signal.

(e.g. &B11111111 = 255)

* Hexadecimal numbers treated as an integer with a symbol.

(e.g. &HFFFFFFF = -1)

[Restrictions]

- Binary and hexadecimal systems cannot be used for the operand indirect indication in the program.
- There will be no change to the input range of each operand even if binary or hexadecimal system is used.

*2 Press Enter key in the condition that the cursor is placed on the comment in the final line, and 100 lines of blank step data will be added.

If even one line is changed, all step numbers will be displayed in red. Right-clicking a desired input item in each line will display a pop-up menu (Fig. 4.4). The items in the pop-up menu are explained below.

Cut (T)

Same as clicking Edit (E) from the menu bar and then selecting Cut (T).

Copy (C)

Same as clicking Edit (E) from the menu bar and then selecting Copy (C).

Paste (P)

Copy the entire cursor line. Same as clicking Edit (E) from the menu bar and then selecting Paste (P). The step data saved on the clipboard will be inserted into the cursor line.

Insert 1 Line (I)

Insert one line at the cursor line.

Delete Selected Lines (D)

Delete the lines in the selected range.

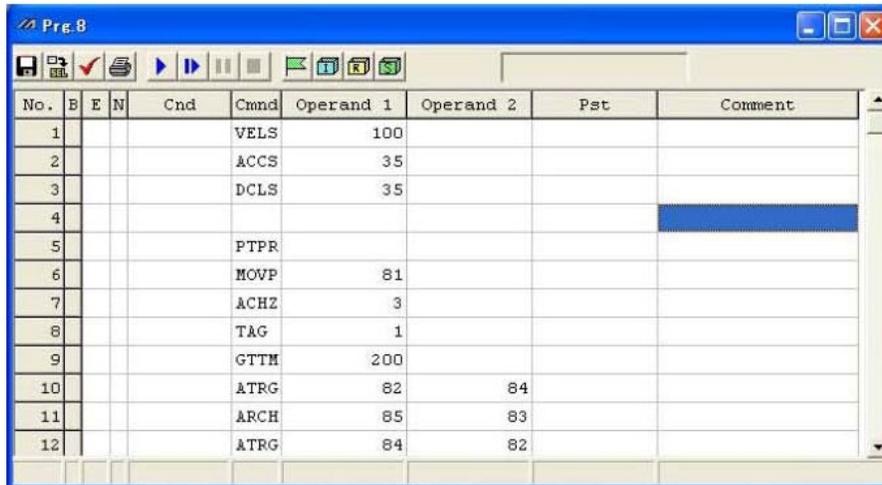
Set Comment (S)

Set the entire cursor line as a comment (invalid step). If a valid step has been set as a comment by mistake, you can select Release Comment explained below to return the line to a valid step.

Executing Release Comment on a line containing character strings will clear all character strings in the line.

Release Comment (R)

Return the selected comment line to a step.



No.	B	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1					VELS	100			
2					ACCS	35			
3					DCLS	35			
4									
5					PTPR				
6					MOVP	81			
7					ACHZ	3			
8					TAG	1			
9					GTTM	200			
10					ATRG	82	84		
11					ARCH	85	83		
12					ATRG	84	82		

Fig. 4.4 Pop-up Menu

In the program edit window, selecting Edit (E) from the menu and then Undo (U) can cancel up to the most recent 10 operations.

Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.

However, the cancel function will become disabled when any of the following operations is performed:

- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 4.5 will be displayed.

Clicking Yes will cancel the operation executed immediately before.



Fig. 4.5 Warning

Double-clicking the Cmnd field or pressing the F1 key will open the SEL Command Explanation window. Use this window as a reference when editing data.

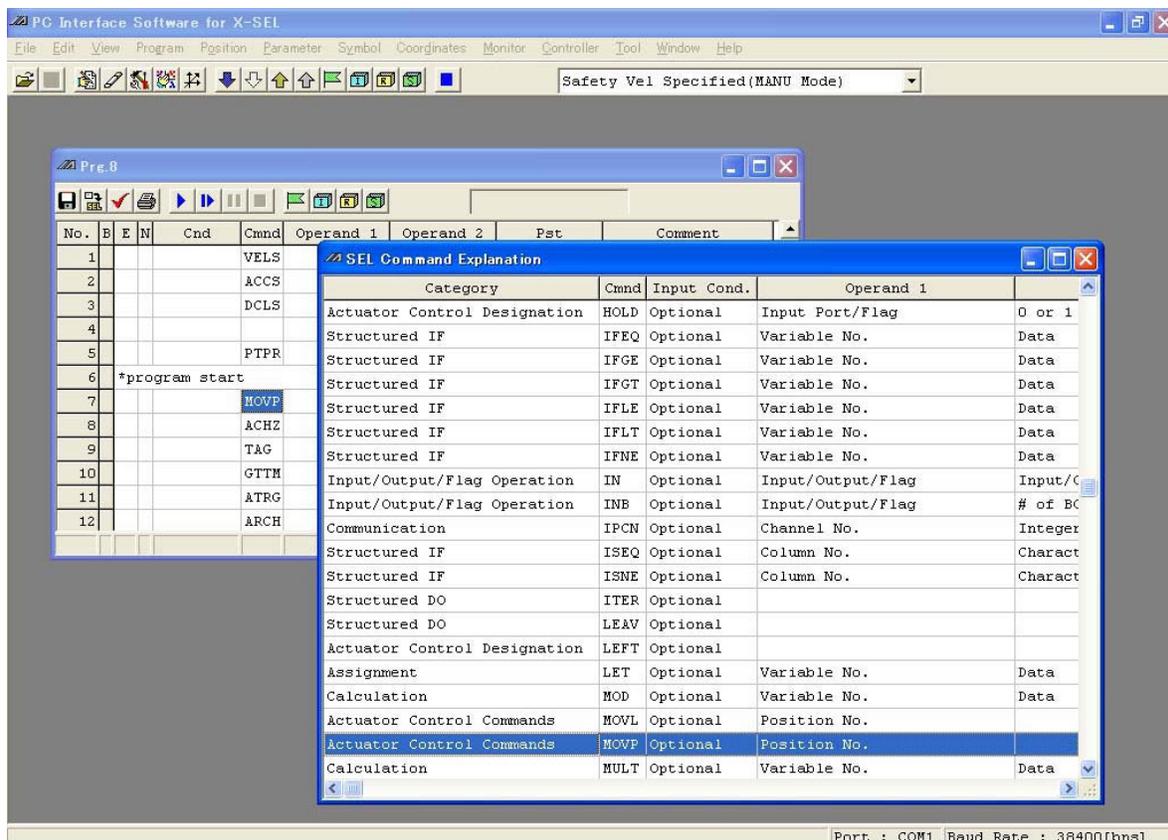


Fig. 4.6 SEL Command Explanation (Example for in the case of X-SEL-J/K)

Pressing the F2 key can change data in the cell partially.

(Example: MOVPL → MOVPL)

Right-clicking on the SEL Command Explanation window will open a pop-up menu containing the following items.

- Input (I)** Input the command in the cursor line to the step data (into the cursor line in the program edit window).
- Font (F)** You can set a desired font for displaying the SEL command explanations.
- Sort (S)** You can sort the command list alphabetically or by command category.

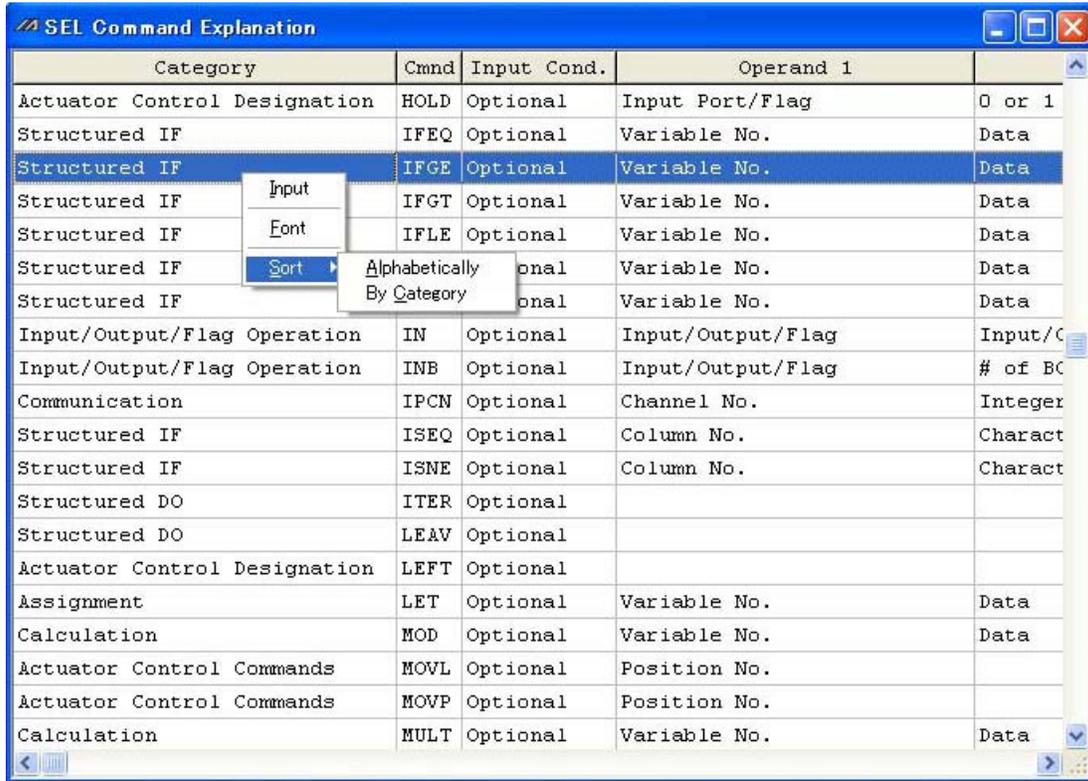


Fig. 4.7 Pop-up Menu

(4) This window has the various buttons shown below.

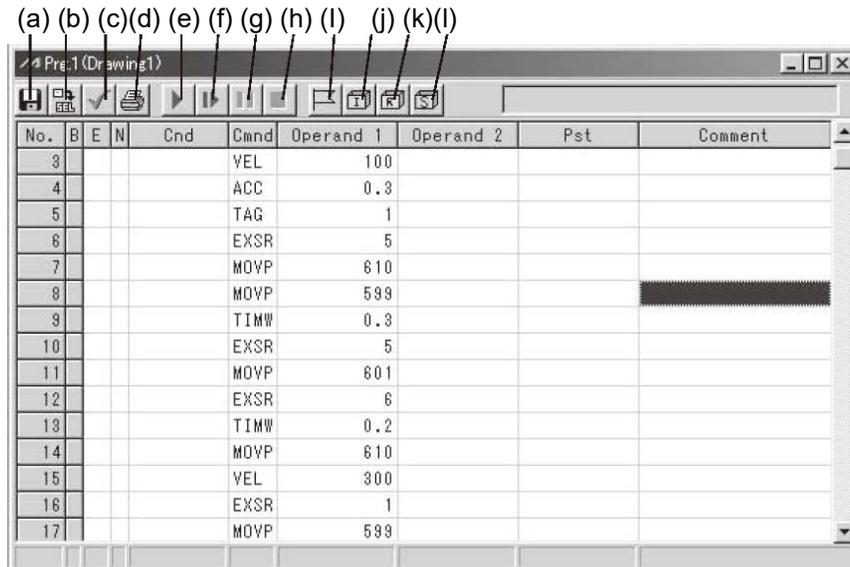


Fig. 4.8 Buttons

(a) Save to File

Click this button to save the program in a file with a name.

Caution: In "Program File Format 1" of the X-SEL-P/Q, PX/QX (with gateway function), controllers that are compatible with increased memory, steps No. 6001 and thereafter and programs No. 65 and thereafter cannot be saved. In case of the SSEL controllers compatible with increased memory (with gateway function), you can not select the Program File Format 1 (normal format) for Step No.2001 or later and Program No.65 or later. Select the Program File Format 2 (extended format) to save.

(b) Transfer to Controller

Clicking this button will prompt the software to check the program data for syntax errors and transfer the program data to the controller if no errors have been found.

(c) Check Program

Clicking this button will display information regarding syntax errors found in the program you have created, as well as operands used in the program.

(d) Print

Clicking this button will print the program.

(e) Run

Clicking this button will run the program. If the program has not yet been saved after editing, you must transfer the program to the controller beforehand.

Caution: Since the controller's processing speed is faster than the PC's communication speed, the cursor position in the program edit window may not always correspond to the actual movement of the actuator.

(f) Run 1 Step

The program will run one step every time this button is clicked.

(g) Pause

Clicking this button will pause the program currently running.

(h) End

Clicking this button will end the program currently running.

(i) Show Local Flag

Clicking this button will show the local flag window for the program currently running.

(j) Show Local Integer Variable

Clicking this button will show the local integer variable window for the program currently running.

(k) Show Local Real Variable

Clicking this button will show the local real variable window for the program currently running.

(l) Show Local String Variable

Clicking this button will show the local string variable window for the program currently running.

(5) Checking the program

The software will check the program you have created, for SEL syntax errors.

[1] Click the Check Program button in the program edit window.

[2] If any error is found, the error list will be displayed.

Check Program button

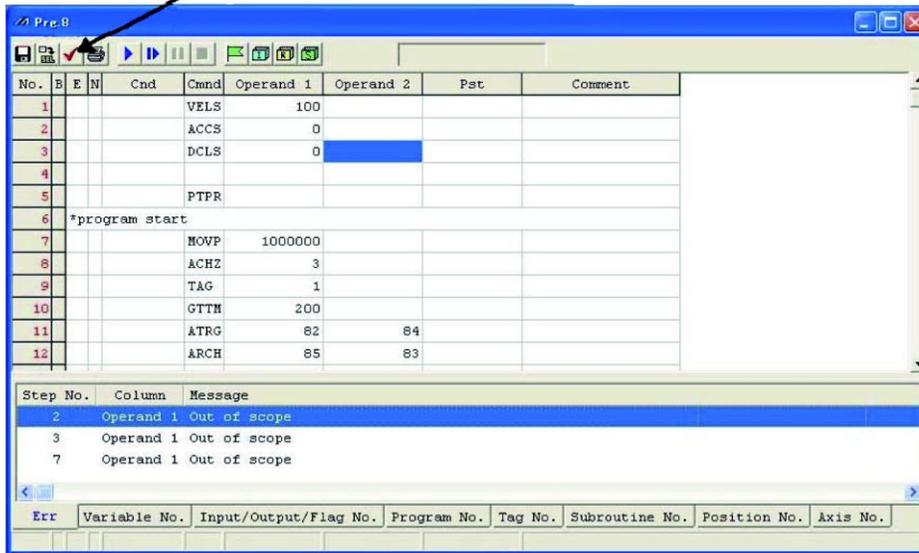


Fig. 4.9 Error List

The error list has the Step No., Column and Message fields. Double-clicking an error line will move the cursor to the location of the corresponding error.

[3] Information regarding the operands (Cnd, Operand 1, Operand 2 and Pst) in the program you are editing is displayed.

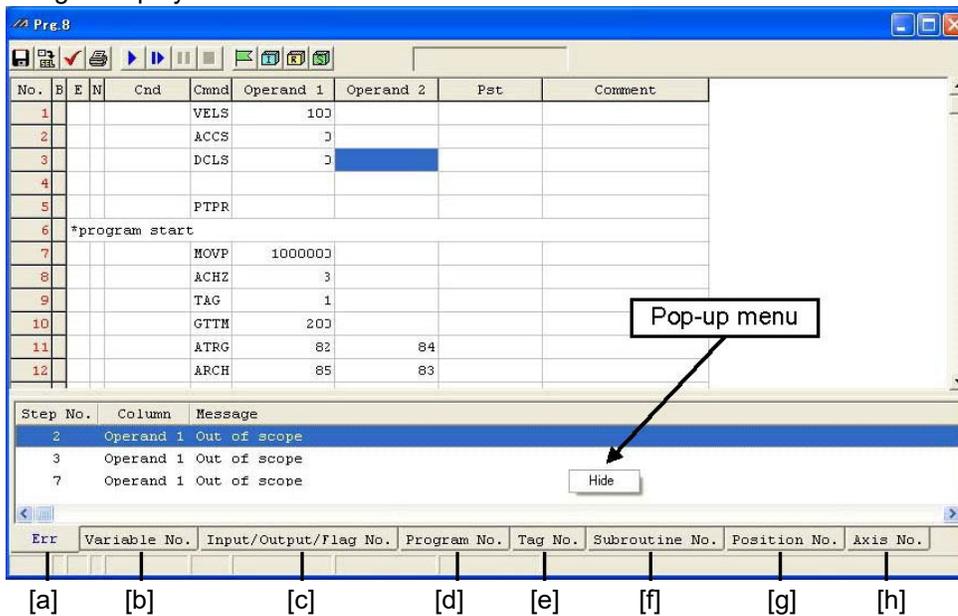


Fig. 4.10 Operand Information

- [a] Syntax Error
Message (error content)

- [b] Variable No. Use Condition
Variable No.
Category (Integer, real number)
Scope (Global, local)
* If the applicable variable number is specified indirectly, the Category and Scope fields will show "Unknown."

- [c] Input/Output/Flag No.
Port/Flag No.
Category (Input Port No., Output Port No., Input/Output Port No. or Flag No.)
Scope (Global or Local)
* If the applicable port/flag number is specified indirectly, the Category and Scope fields will show "Unknown."

- [d] Program No. Use Condition
Program No.

- [e] Tag No. Use Condition
Tag No. (Tag number in use)
Declaration/Jump

- [f] Subroutine No. Use Condition
Subroutine No.
Declaration/Call

- [g] Position No. Use Condition
Position No.

- [h] Axis No. Use Condition
Axis No.

* If a symbol is used in any of the numbers in [b] through [h], the corresponding definition value will be displayed in the margin.

The above information is displayed in an itemized list at the bottom of the program edit window. You can double-click a desired item to move the cursor to the corresponding program. You can also right-click the list to display a pop-up menu and hide the list or sort the records.

4.2 Saving a Program, Transferring and Closing the Edit Window

4.2.1 Saving a Program Online, Transferring and Closing the Edit Window

- (1) Saving to a file the program data you are editing
Click the Save to File button in the program edit window.
This is the same as clicking File (F) and then selecting Save As (A).
After clicking the Save to File button, Save File Select screen will be displayed.

In case of the X-SEL-P/Q, PX/QX controllers compatible with increased memory (with gateway function), you can not select the Program File Format 1 (normal format) for Step No.6001 or later and Program No.65 or later.

In case of the SSEL controllers, you can not select the Program File Format 1 (normal format) for Step No.2001 or later and Program No.65 or later.

Select the Program File Format 2 (extended format) to save.

(PC interface software version 7.2.0.0 or later)

Caution: If you click "Always save with Format 2", files will be always saved with Format 2. And this screen won't be displayed after that. It can be displayed again by setting in the Environment Setup screen (15. Tool).

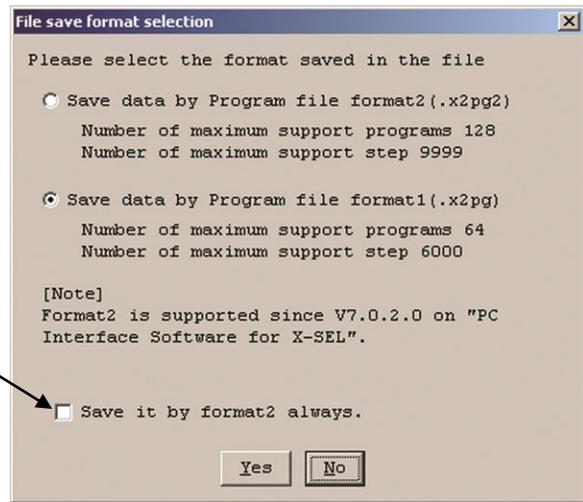


Fig. 4.11 Save File Select Screen

- (2) Transferring to the controller the program data you are editing.
You can save the program data you are editing to the controller's memory.
Click the Transfer to Controller button in the program edit window.
This button is selectable only in the online edit mode.

Caution If the program contains any error, the error will be displayed and the program will not be transferred to the controller.

- * The data saved by the Program File Format 1 (normal format) can be transferred to X-SEL-P/Q, X-SEL-PX/QX controllers incompatible with increased memory (with gateway function).
- * If the data saved by the Program File Format 2 (extended format) of XSEL-P/Q, X-SEL-PX/QX controller (with gateway function) is transferred to the controllers incompatible with the increased memory, the extended part of data (Step No.6001 or later) will not be transferred. SSEL controller is the extended part of data (Step No.2001 or later) will not be transferred. The following Alarm screen will be displayed. Click Yes to transfer the data.

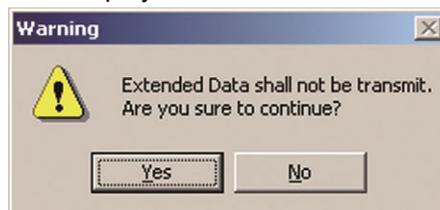


Fig.4.12 Alarm Screen

(3) Writing to the flash ROM

Once the program has been transferred to the controller, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.



Fig. 4.13 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL,
TTA, MSEL-PCX/PGX)

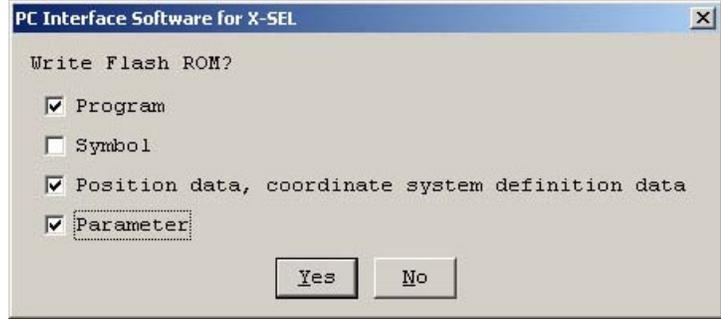


Fig. 4.14 Confirmation
(X-SEL-JX/KX, PX/QX)

In case of SSEL, ASEL, PSEL, X-SEL-P/Q and PX/QX compatible with increased memory (with gateway function), R/S, RX/SX, RA/SA, RAX/SAX, and RAXD/SAXD, the following screens will be displayed. (PC interface software version 7.2.0.0 or later)

This is not displayed
for X-SEL-RA/SA,
RAX/SAX,
RAXD/SAXD, SSEL,
ASEL and PSEL

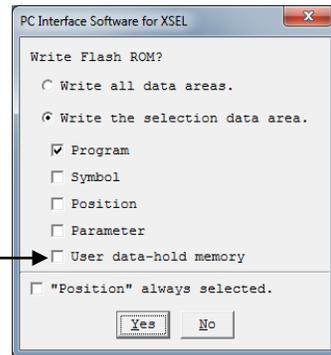


Fig. 4.15 Confirmation
(X-SEL-P/Q, R/S, RX/SX, RXD/SXD,
RA/SA, RAX/SAX, RAXD/SAXD,
SSEL, ASEL, PSEL)

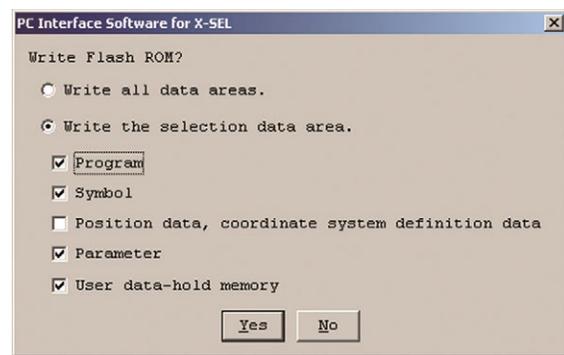


Fig. 4.16 Confirmation
(X-SEL-PX/QX)

Click and select a desired item (Program, etc.) to write to the flash ROM.

Click **Yes (Y)** → The memory data will be written to the flash ROM.

Click **No (N)** → The memory data will not be written to the flash ROM. If No (N) is selected, the controller will clear all data in its memory after a reset (i.e., after the controller power is reconnected or a software reset is executed), and then load the data from the flash ROM. (The controller will operate in accordance with the transferred data until a reset is executed.)

* The number of writing to the flash ROM is limited. (can write approx. 100,000 times)
If you don't want to write all the data to the flash ROM, select "Write selected data region."

(4) Closing the program edit window

Attempting to close the program edit window will display the following confirmation dialog box with the message, "Save edited data in the Controller?"



Fig. 4.17 Confirmation

Yes (Y)

The edited data will be transferred to the controller → (3), "Writing to the flash ROM"

No (N)

The software will close the program edit window without saving the edited data.

Cancel

The software will cancel the operation and return to the program edit window.

4.2.2 Transferring a Program Created Offline

A program created offline can be transferred to a controller by following the steps below.

- ⚠ Caution: When program data (or backup data) saved in a PC software with its version V7.07.12.00 or earlier is transferred to a controller with a PC software with its version V8.01.00.00, and if there is a comment with 19 characters in the comment box, it should generate "Character Count Exceeding Error" and would not transfer the data.
- (Countermeasure)
- Transfer program data (or backup data) saved in a PC software with its version V7.07.12.00 or earlier with a software with its version V7.07.12.00.
 - * OS applicable for versions V7.07.12.00 and earlier:
Windows 98, Windows Me, Windows 2000 and Windows XP (32-bit version)
 - When data is to be transferred with a PC software with its version V8.01.00.00 or later, set the number of characters at 18 or less in the comment box.
Half-width characters, sonant marks and P-sound sonant marks should be defined as one character, and full-size characters should be defined as two characters.
- (Applicable Controllers)
- XSEL-J/K, JX/KX, P/Q, PX/QX
 - TT
 - SSEL, ASEL, PSEL

- (1) Select File → Open from the menu.
In the screen of “Open File”, select a program created offline and open it.
- (2) If a controller is connected, Controller Transfer button  gets activated once the program is opened.
Press Controller Transfer button  .
The program gets transferred to the controller.

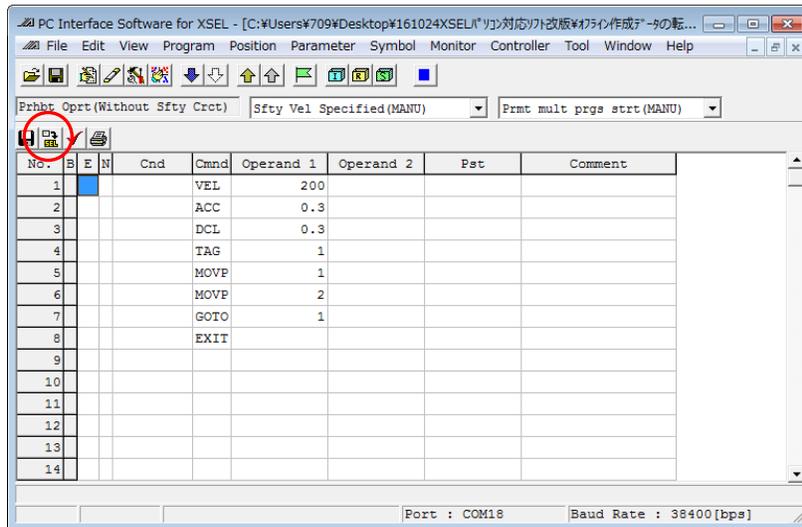


Fig. 4.18 Program Edit Screen

- (3) A confirmation screen asking if it is okay to transfer the data to the controller will appear.
Press **Yes**.

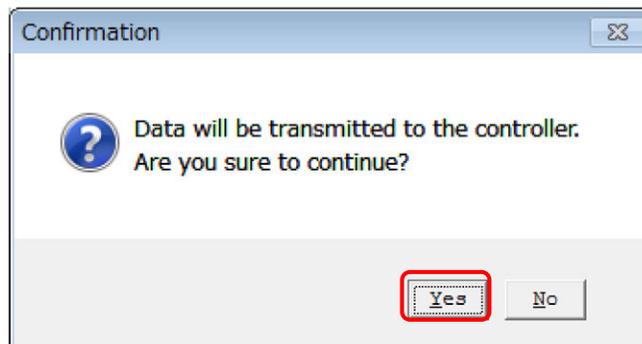


Fig.4.19 Confirmation Screen

- (4) Next, a screen to select the program number for destination will be shown. Click on a program number line for destination to select a destination. Press **Write**.

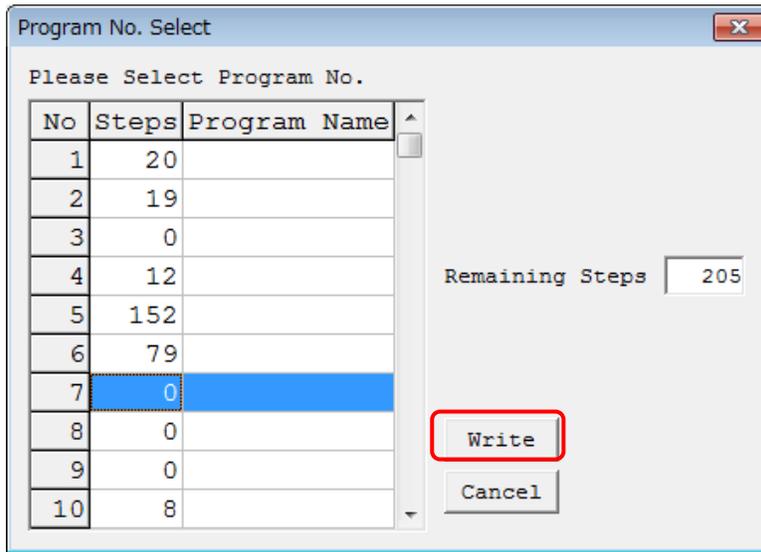


Fig.4.20 Program No. Select

- (5) A confirmation screen stating “Write Flash ROM” will appear. Press **Yes**.

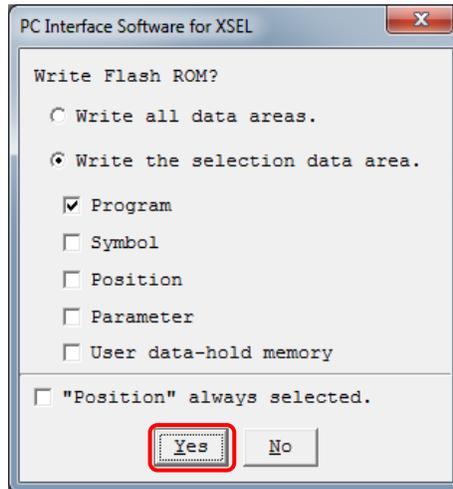


Fig.4.21 Confirmation Screen

- (6) The program will be transferred to the controller. Also, flash ROM writing will be conducted, and the display below flashes during writing. The display will disappear once writing is complete.

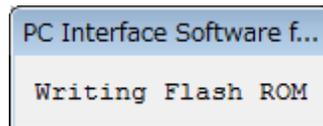


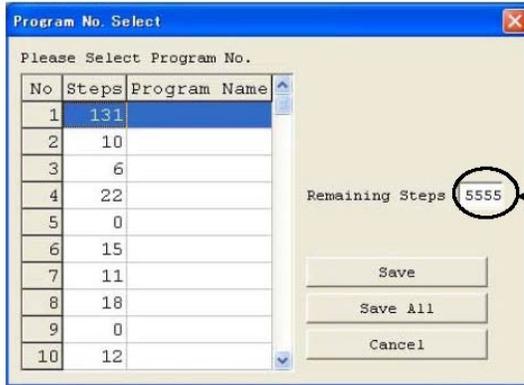
Fig.4.22 Writing Flash ROM Screen

4.3 Saving All Programs to a File

(1) Saving all programs to a file

You can save programs No. 1 to 64 in the controller (or programs No. 1 to 128 for XSEL-P/Q and PX/QX (with gateway function) complied with increased memory, or programs No. 1 to 128 for R/S, RX/SX and RXD/SXD, compatible with increased memory SSEL or programs No. 1 to 255 for XSEL-RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL) to a single file.

- [1] Click Program from the menu bar, and then select Save to File.
- [2] In the program number selection window, click **Save All**. Then specify a desired file name and folder.



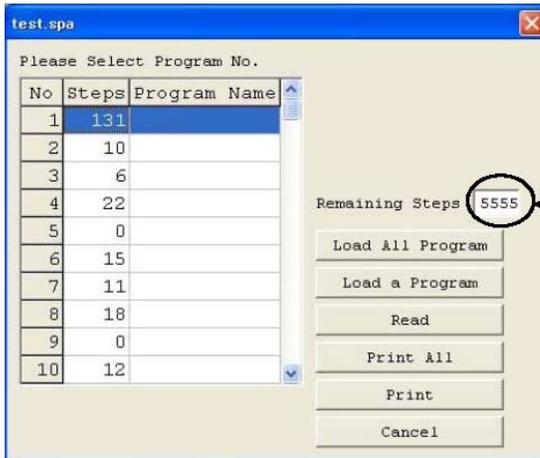
In the case of the SSEL, ASEL, and PSEL controllers, the number of remaining steps will be 2000 or less. The total number of steps should be 9999 or below for SSEL applicable for memory capacity increase.

Fig.4.23 Program Save

(2) Opening the all programs file

- [1] Click File from the menu bar, and then select Open.
- [2] In the file open window, select the file you want to open and then click Open.
- [3] The program No. selection window will be displayed. Select a desired program No. to read and click the Read button.

If you want to transfer all programs to the controller, select Load All Program. If you want to select programs in the all programs file and transfer them individually, select desired program numbers and then click Load a Program to transfer the corresponding programs to the controller.



In the case of the SSEL, ASEL, and PSEL controllers, the number of remaining steps will be 2000 or less. The total number of steps should be 9999 or below for SSEL applicable for memory capacity increase.

Fig. 4.24 Program Transfer (Online)

Print All button: Print all programs (excluding the program with 0 steps).

Print button: Print only the program selected from the list at the left of the button.

(3) Important note on transferring an all programs file to the controller

- [1] Transferring all program files to a controller at once will clear all existing programs No. 1 to 64 (or programs No. 1 to 128 for XSEL-P/Q and PX/QX (with gateway function) complied with increased memory, or programs No. 1 to 128 for R/S, RX/SX and RXD/SXD, compatible with increased memory SSEL or programs No. 1 to 255 for XSEL-RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL controllers. If necessary, back up all current programs before the transfer.
- [2] If the all programs file includes any program that contains symbols and the symbols are not defined in the controller's memory, an error will occur when the applicable program is transferred to the controller. If an error occurs, none of the programs will be transferred to the controller. Therefore, if the applicable symbol data is saved to a file, transfer the symbol definition file first. If there is no symbol definition file, define the applicable symbols in the symbol edit window and then transfer the definitions to the controller, before transferring the all programs file again.
- [3] If the all programs file contains any error, the error window will be displayed and none of the programs will be transferred to the controller. In this case, double-click the error shown in the error window to open the program file that contains the applicable error. Correct the error, and then save the file by overwriting. If multiple errors exist, correct all errors. When all errors have been corrected, transfer the programs to the controller again. The procedure in [3] provides an important recovery method for program files containing errors.
- [4] The data saved by Program File Format 1 (normal format) can be transferred to the X-SEL-P/Q, PX/QX (with gateway function), SSEL controllers compatible with increased memory. The following warning screen will be displayed. Clicking Yes will clear the program of No. 65 or later. Clicking No will not change the program of No. 65 which is saved in the controller to transfer. (The number of possible transferred step depends on the number of remaining step in the controller to transfer.)

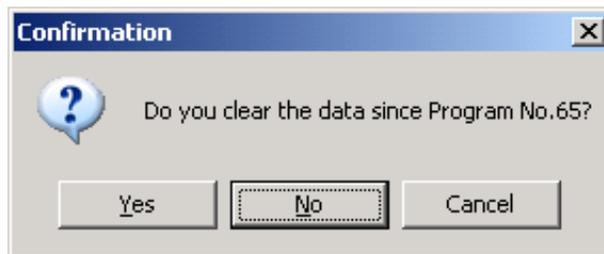


Fig. 4.25 Warning Screen

- [5] If the data saved by the Program File Format 2 (extended format) is transferred to a controller incompatible with increased memory, the programs of No.65 or later will not be transferred. The following warning screen will be displayed. Clicking Yes will transfer all programs. Clicking No will not transfer all programs. (The number of possible transferred step depends on the number of remaining step in the controller to transfer.)

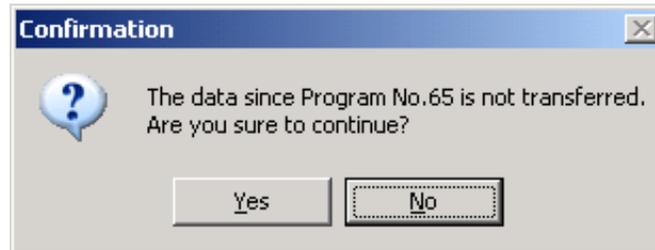


Fig. 4.26 Warning Screen

If the programs are transferred separately, select a program of No.65 or later and click **Controller Transfer** button. Then the following warning screen will be displayed.



Fig. 4.27 Warning Screen

(4) Saving the all programs file

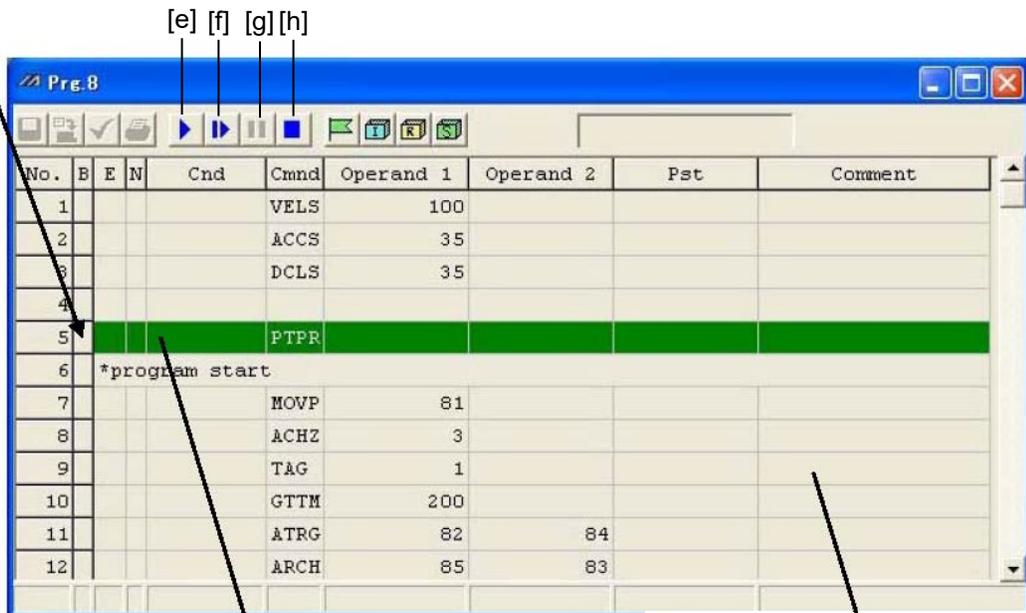
- [1] If the program files read from the all programs file are saved as the all programs file, click **Save**.
- [2] If the program files are saved individually, click **Save as**.

4.4 Running the Program

You can run the program in the program edit window. To run the program you are editing, transfer it to the controller first.

Note) Once transferred to the controller, the program can be run without being written to the flash ROM first. If the program is not written to the flash ROM, however, it will be lost once the controller power is reconnected or a software reset is executed.

- [e]Run: Clicking this button will run the program.
 [f] Run 1 Step: The program will run one step every time this button is clicked.
 [g]Pause: Clicking this button will pause the program currently running. Clicking it again will resume the program. Clicking Run or Run 1 Step will resume the program.
 [h]End: Clicking this button will end the program currently running.
Breakpoint: You can pause the program in a desired step. "B" will appear/disappear every time the field is clicked.
 Note) A breakpoint will be cleared once the controller power is reconnected or a software reset is executed.



Cursor colors
 Green: The program is paused (by step operation, by a breakpoint, by the pause button, by the SSPG command, etc.).
 Red: The program is waiting (in response to the TIMW, WTxx, WZxx, WRIT or READ command, waiting for a servo command to be completed, etc.).
 Blue: Any condition other than those represented by a green or red cursor.

Background colors
 Gray: The program is running.
 White: The program is not running.

Fig. 4.28 Program Run

4.5 Cycle Time Measurement

Target Controller : XSEL-RA/SA/RAX/SAX/RAXD/SAXD (Main CPU application version V1.10 and later)

By setting up the measurement start point and end point in the program, the cycle time during program operation can be measured. (V13.02.00.00 and later)

4.5.1 How to Measure Cycle Time

Select Program (S) → Edit (E) and Program Number Select window appears.

Select a program to operate and click Read.

Program Edit window appears.

Column T (marked in red box), which is for the setup of measurement start point and end point for cycle time measurement, should be shown in Program Edit window.

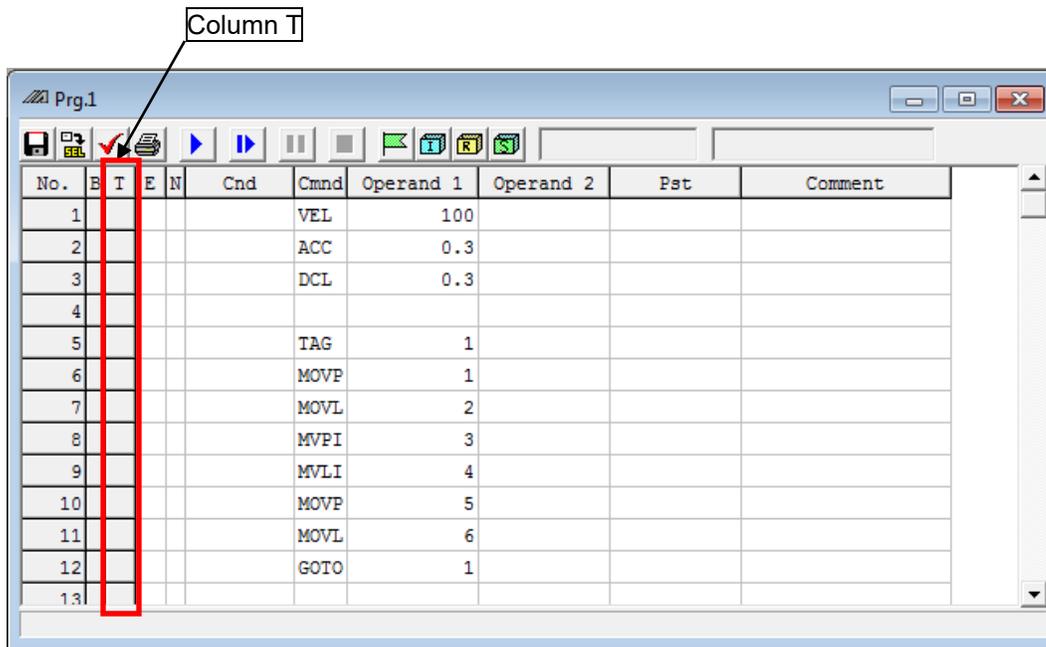


Fig. 4.29 Program Edit window

There are three types of setting in the setup in Column T.

- S : Cycle Time Measurement Start Point
- E : Cycle Time Measurement End Point
- SE : Measurement Point for Cycle Time Measurement for One Step Only

[1] Setting of Cycle Time Measurement Area Section

(Note) The section of area to be set up should be just one section. Two or more sections cannot be established.

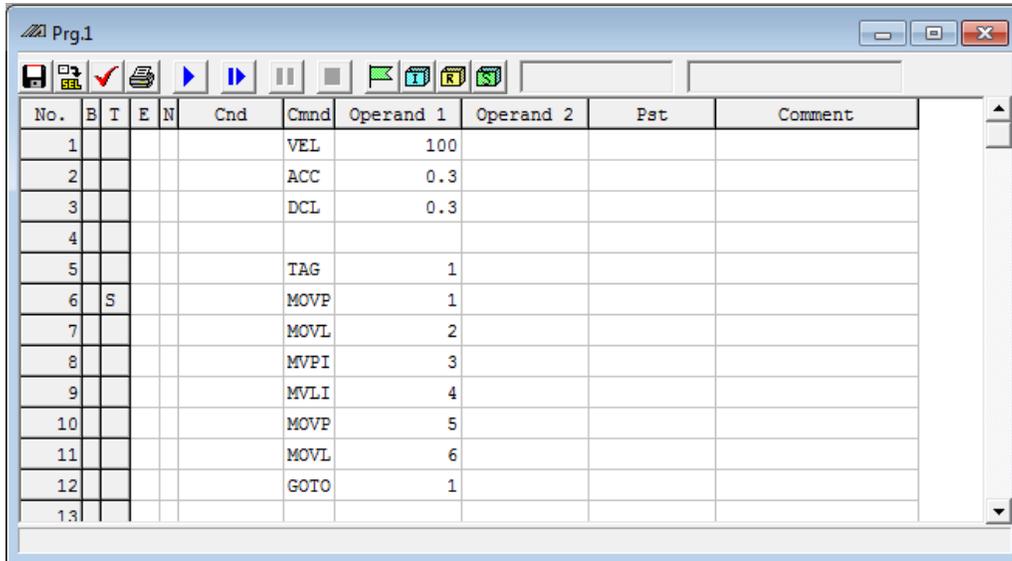
(Note) When establishing the input / extension status setting, set S and E in the command (Cmnd column) description step.

If the setting is established in the steps of only input / extension stays, it will not be subject to measurement.

(1) Measurement Start Point and End Point Setup

[1] Right-click on Column T (blank cell) of the start step of the area section that you would like to measure.

S: Measurement start point will be displayed.

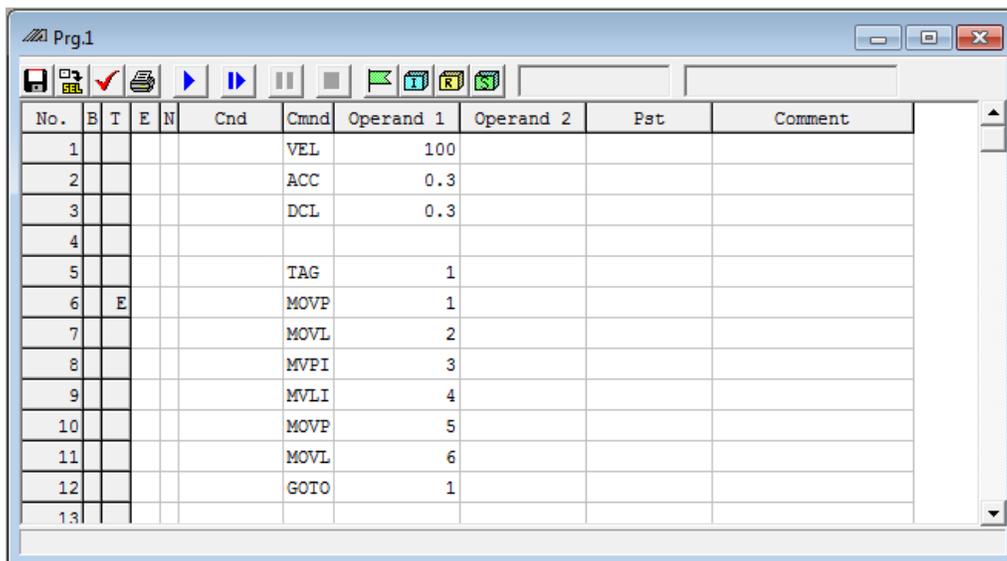


No.	B	T	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1						VEL	100			
2						ACC	0.3			
3						DCL	0.3			
4										
5						TAG	1			
6		S				MOVP	1			
7						MOVL	2			
8						MVPI	3			
9						MVLI	4			
10						MOVP	5			
11						MOVL	6			
12						GOTO	1			
13										

Fig. 4.30 Measurement start point Setup

[2] Secondly, right-click on Column T (blank cell) of the end step of the area section that you would like to measure.

E: Measurement end point will be displayed.

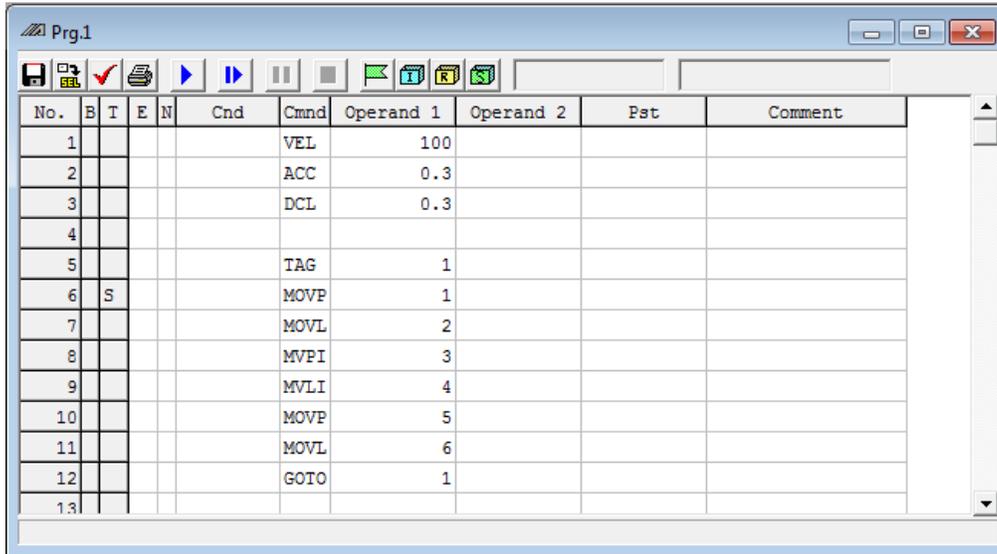


No.	B	T	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1						VEL	100			
2						ACC	0.3			
3						DCL	0.3			
4										
5						TAG	1			
6			E			MOVP	1			
7						MOVL	2			
8						MVPI	3			
9						MVLI	4			
10						MOVP	5			
11						MOVL	6			
12						GOTO	1			
13										

Fig. 4.31 Measurement end point Setup

(2) Measurement One Step Setup

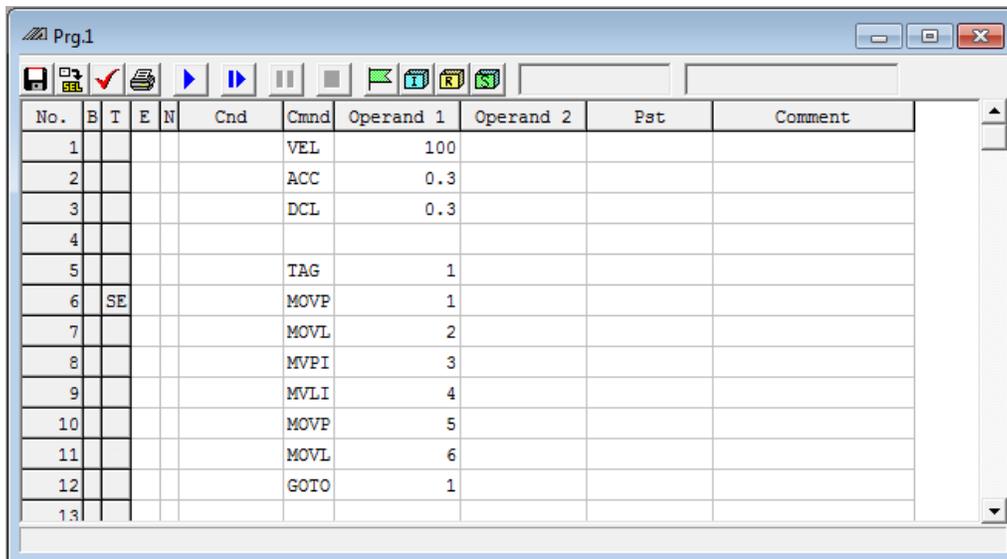
- [1] Right-click on Column T (blank cell) of the step that you would like to measure.
S: Measurement start point will be displayed.



No.	B	T	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1						VEL	100			
2						ACC	0.3			
3						DCL	0.3			
4										
5						TAG	1			
6		S				MOVP	1			
7						MOVL	2			
8						MVPI	3			
9						MVLI	4			
10						MOVP	5			
11						MOVL	6			
12						GOTO	1			
13										

Fig. 4.32 Measurement start point Setup

- [2] Secondly, right-click on the point that S is being displayed.
SE: The measurement point will be displayed.



No.	B	T	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1						VEL	100			
2						ACC	0.3			
3						DCL	0.3			
4										
5						TAG	1			
6		SE				MOVP	1			
7						MOVL	2			
8						MVPI	3			
9						MVLI	4			
10						MOVP	5			
11						MOVL	6			
12						GOTO	1			
13										

Fig. 4.33 The measurement point Setup

Follow the steps below when it is required to set up again or cancel the items that you have already set up.

- When S and E are displayed right-click on the cell of S, and S will be erased.
If E is displayed, it means that the measurement area section setting is not activated.
Right-click on a blank cell, and S will be shown and the measurement area section setting gets activated.
- Right-click on the cell of E, and E will be erased.
If S is displayed, it means that the measurement area section setting is not activated.
Right-click on a blank cell, and E will be shown and the measurement area section setting gets activated.
- Right-click on the cell of SE, and E will be erased.
Click it again, and E will be erased.

[2] Displaying Cycle Time Measurement Result

Once a program gets operated, cycle time will be measured and the result will be displayed at the position marked in red.

Once the program starts executed and the step with “S” being shown gets executed, measurement will start and display shows -----s.

Once the step with “E” being shown is completed, the measurement will finish and the cycle time measurement result will be displayed.

The time to be shown should be from 0.000sec to 86399.999sec (one day).

Once the first measurement is completed and the step with “S” being shown has been executed, measurement will start again and -----s will be displayed.

If a change is made to the cycle time measurement area section after measurement is finished, the display will turn to blank.

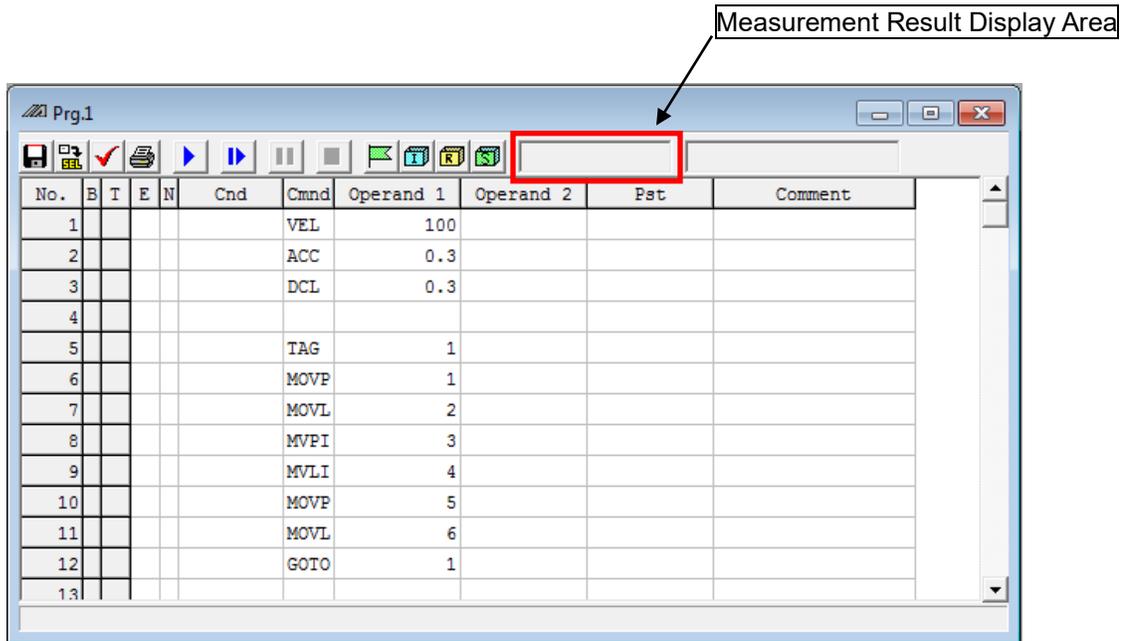


Fig. 4. 34 Measurement Result Display

- Blank : Status of Cycle Time Measurement Not Executed
- -----s Displayed : Status of Cycle Time Measurement Under Execution
- Time Displayed : Status of Cycle Time Measurement Completed

[Note]

- Measurement keeps executed unless the execution of the step with E displayed in Column T is completed.
- In case setting is established in an area section that is looped in short period of time, it could seem as if ----.---s is kept displayed because measurement will start straight after the previous measurement is finished.
- In case of a program being stopped by breakpoint / pause, the stop duration should be included to the cycle time.
- In case the steps with S and E displayed are set to the input / extension status, cycle time will be measured when input / extension status has been succeeded.
- In case the step with S displayed is set to the breakpoint, measurement will start once the program is executed.
- The maximum time to be display should be 86399.999sec (one day). Also, when the cycle time exceeds 4294967.295sec, the cycle time measurement result will not be displayed correctly.

5. Copying/Moving/Clearing a Program

5.1 Program Copy/Move Window

The steps to copy or move a program to other program number are explained below.

- (1) Click Program (S) from the menu bar, and then select Copy/Move (C).
- (2) The program copy/move window will open.

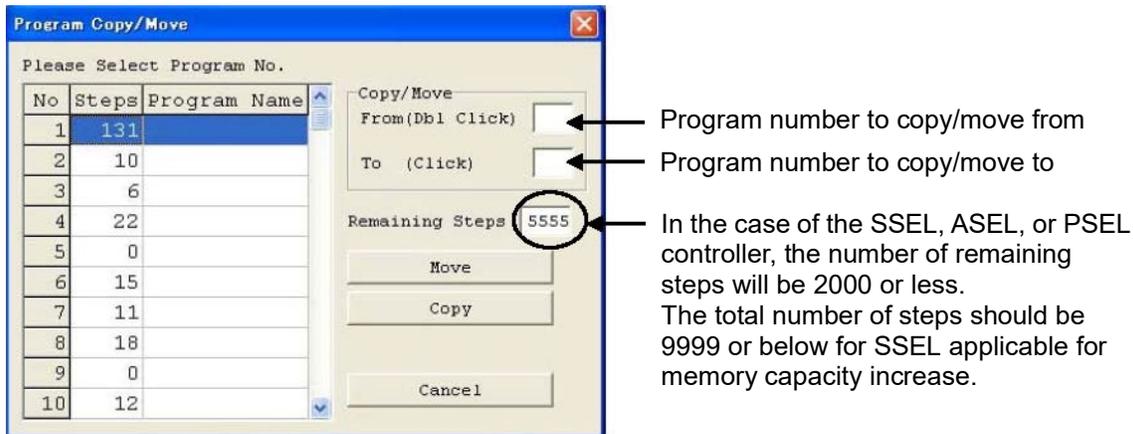


Fig. 5.1 Program Copy/Move

Double-click the source program you want to copy or move.

Click the destination program you want to copy or move the source program to.

To copy the program, click **Copy**. To move the program, click **Move**.

Both operations are done in the memory.

Clicking **Cancel** will cancel the selected operation.

- (3) Writing to the flash ROM

When the copy or move is completed, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.

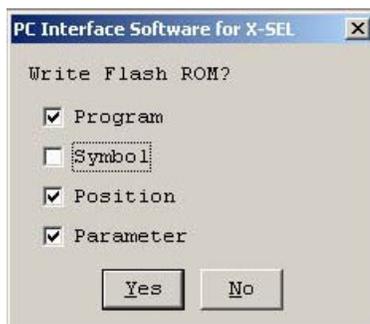


Fig. 5.2 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL,
TTA, MSEL-PCX/PGX)

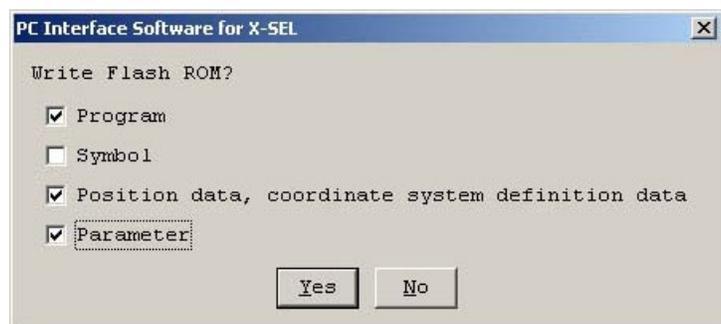


Fig. 5.3 Confirmation
(X-SEL-JX/KX, PX/QX)

In case of SSEL, ASEL, PSEL, X-SEL-P/Q and PX/QX compatible with increased memory (with gateway function), R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD the following screens will be displayed.
(PC interface software version 7.2.0.0 or later)

This is not displayed for XSEL-RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL and PSEL

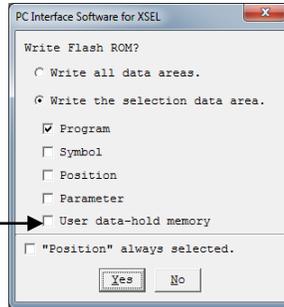


Fig. 5.4 Confirmation (X-SEL-P/Q, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, PSEL)

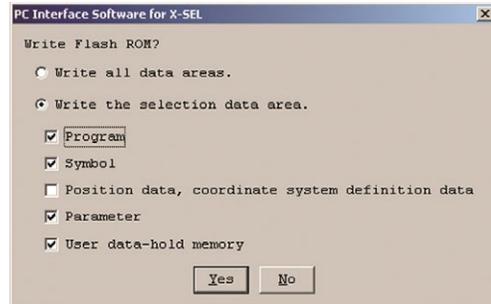


Fig. 5.5 Confirmation (X-SEL-PX/QX)

Click and select a desired item (Program, etc.) to write to the flash ROM.

- Click **Yes (Y)** → The memory data will be written to the flash ROM.
- Click **No (N)** → The memory data will not be written to the flash ROM.

Once the controller is reset (the controller power is reconnected or a software reset is executed), the original program arrangement before the copy or move will be restored.

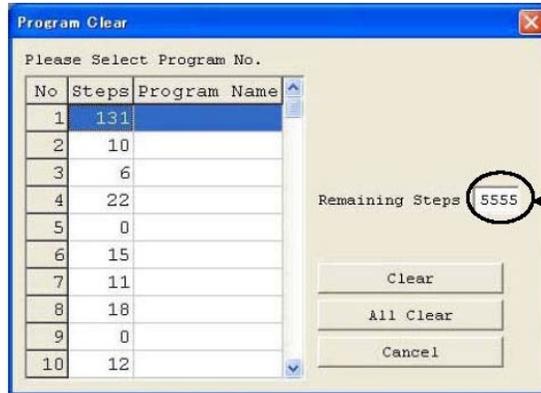
* The number of writing to the flash ROM is limited. (approx. 100,000 times)

If you do not want to write all the data to the flash ROM, select "Write the selection data area."

5.2 Program Clear Window

The steps to clear a program are explained below.

- (1) Click Program (S) from the menu bar, and then select Clear (L).
- (2) The program clear window will open.



In the case of the SSEL, ASEL, and PSEL controllers, the number of remaining steps will be 2000 or less. The total number of steps should be 9999 or below for SSEL applicable for memory capacity increase.

Fig. 5.6 Program Clear

Click the program you want to clear.

You can select multiple programs by dragging the mouse or pressing the Ctrl key and ↑↓ key simultaneously.

Next, click Clear.

(This operation is done in the memory.)

Clicking Cancel will cancel the operation.

When clearing all programs in the controller, click the All Clear button.

- (3) Writing to the flash ROM

When the clear is completed, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.



Fig. 5.7 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL
TTA, MSEL-PCX/PGX)

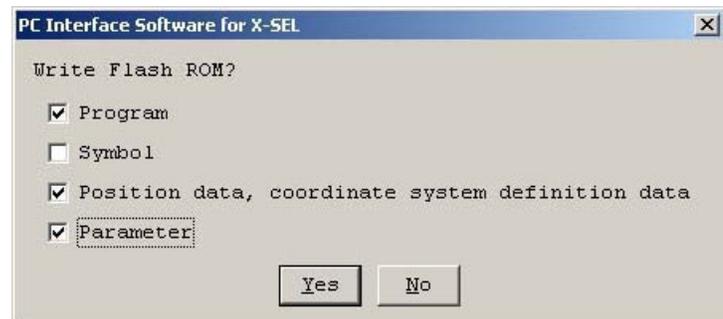


Fig. 5.8 Confirmation
(X-SEL-JX/KX, PX/QX)

In case of SSEL, ASEL, PSEL, RA/SA, RAX/SAX, RAXD/SAXD, X-SEL-P/Q and PX/QX compatible with increased memory (with gateway function), or R/S, RX/SX and RXD/SXD, the following screens will be displayed.

(PC interface software version 7.2.0.0 or later)

This is not displayed for XSEL-RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL and PSEL

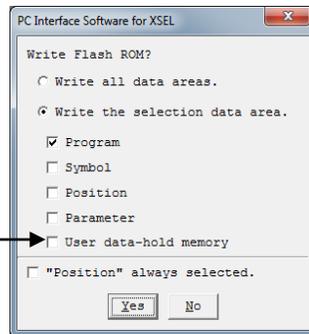


Fig. 5.9 Confirmation (X-SEL-P/Q, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, PSEL)

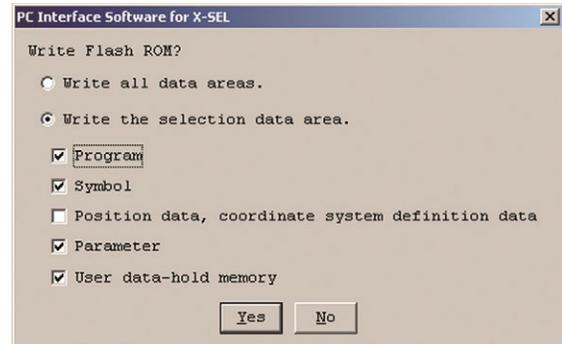


Fig. 5.10 Confirmation (X-SEL-PX/QX)

Click and select a desired item (Program, etc.) to write to the flash ROM.

- Click **Yes (Y)** → The memory data will be written to the flash ROM.
- Click **No (N)** → The memory data will not be written to the flash ROM.

Once the controller is reset (the controller power is reconnected or a software reset is executed), the cleared program will be restored.

* The number of writing to the flash ROM is limited. (approx. 100,000 times)
If you do not want to write all the data to the flash ROM, select "Write the selection data area."

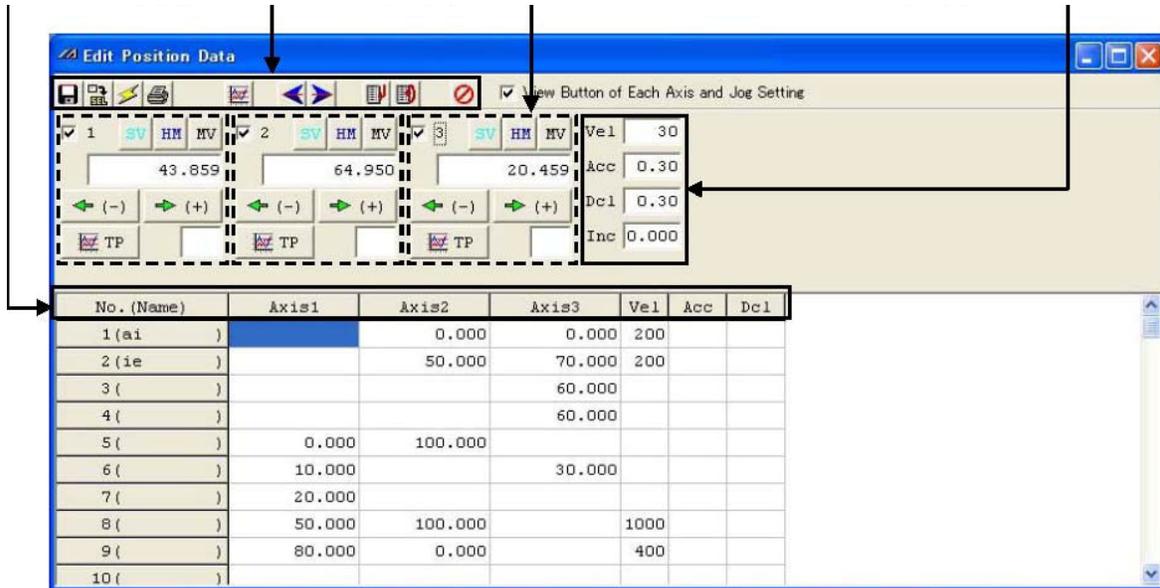
6. Position Data Edit Window

6.1 Explanation of the Items Displayed in the Position Data Edit Window

- (1) Click Position (O) from the menu bar, and then select Edit (E).
- (2) The position data window (Edit Position Data) will open.

This window has the following controls and fields.

- (1) Position data (2) Common buttons (4) Axis-specific buttons (Orthogonal axis) (5) Setting functions (Orthogonal axis)



Data in the change line will be displayed in red.

Fig. 6.1 Position Data Edit (X-SEL-J/K, P/Q, TT, TTA)

(Note) When the work and tool coordinate system features are valid in TTA and MSEL-PC/PG, a window to select the work coordinate system or the tool coordinate system opens like the SCARA axes.

The following position output operation data will be displayed in the position edit data when All Axes Parameter No. 54 "All Axes Setting Bit Pattern 3" Bit 4-7: Position Output Operation Data Effective Select in TTA and MSEL Controllers (main application part V2.00 or later) is set to "1".

(10) Position output operation data

No. (Name)	Axis1	Axis2	Axis3	Axis4	Vel	Acc	Dcl	OutNo	OutPara1	OutPara2	
10 ()	100.000				100	0.30	0.30	ON	316	0.000	0.000
11 ()		150.000			100	0.30	0.30				
12 ()	150.000				100	0.30	0.30				
13 ()		100.000			100	0.30	0.30	OFF	316	0.000	0.000

Fig. 6.2 Position Edit Window (TTA, MSEL (Main Application V2.00 or later)
(PC software V12.03.00.00 or later)

(1) Position data

No. (Name)	Axis1	Axis2	Axis3	Vel	Acc	Dcl
------------	-------	-------	-------	-----	-----	-----

Fig. 6.3 Position data (X-SEL-J/K, P/Q, TT, TTA)

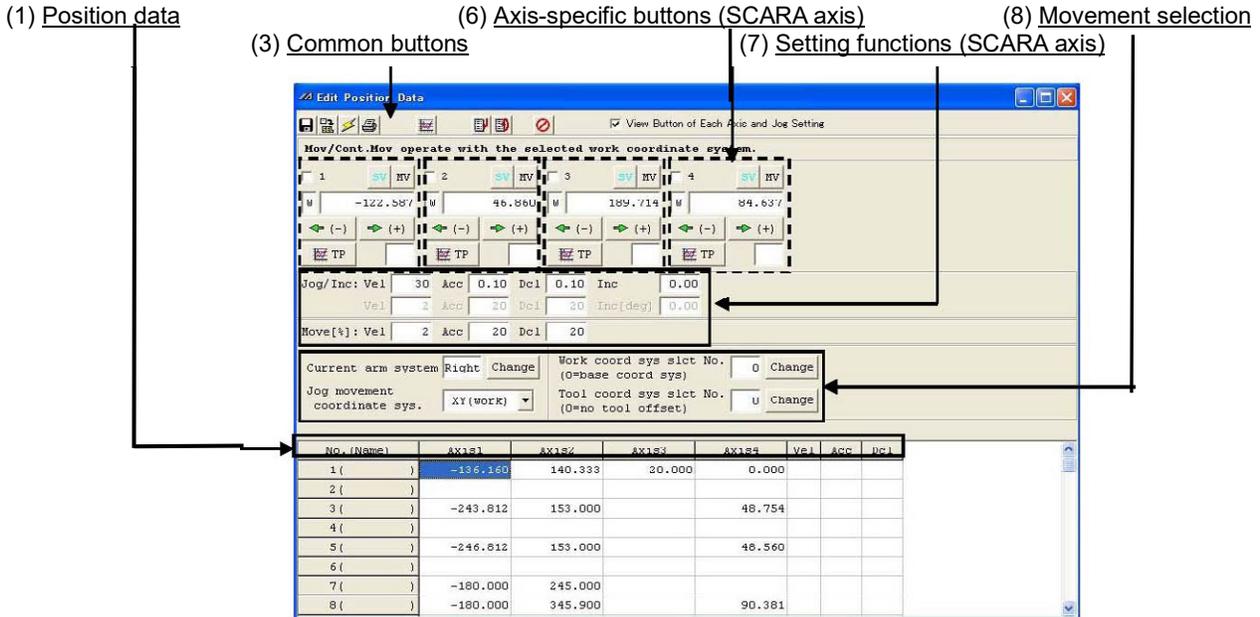


Fig. 6.4 Position Data Edit (X-SEL-JX/KX)

(1) Position data

No. (Name)	Axis1	Axis2	Axis3	Axis4	Vel	Acc	Dcl
------------	-------	-------	-------	-------	-----	-----	-----

Fig. 6.5 Position Data (X-SEL-JX/KX)

6. Position Data Edit Window

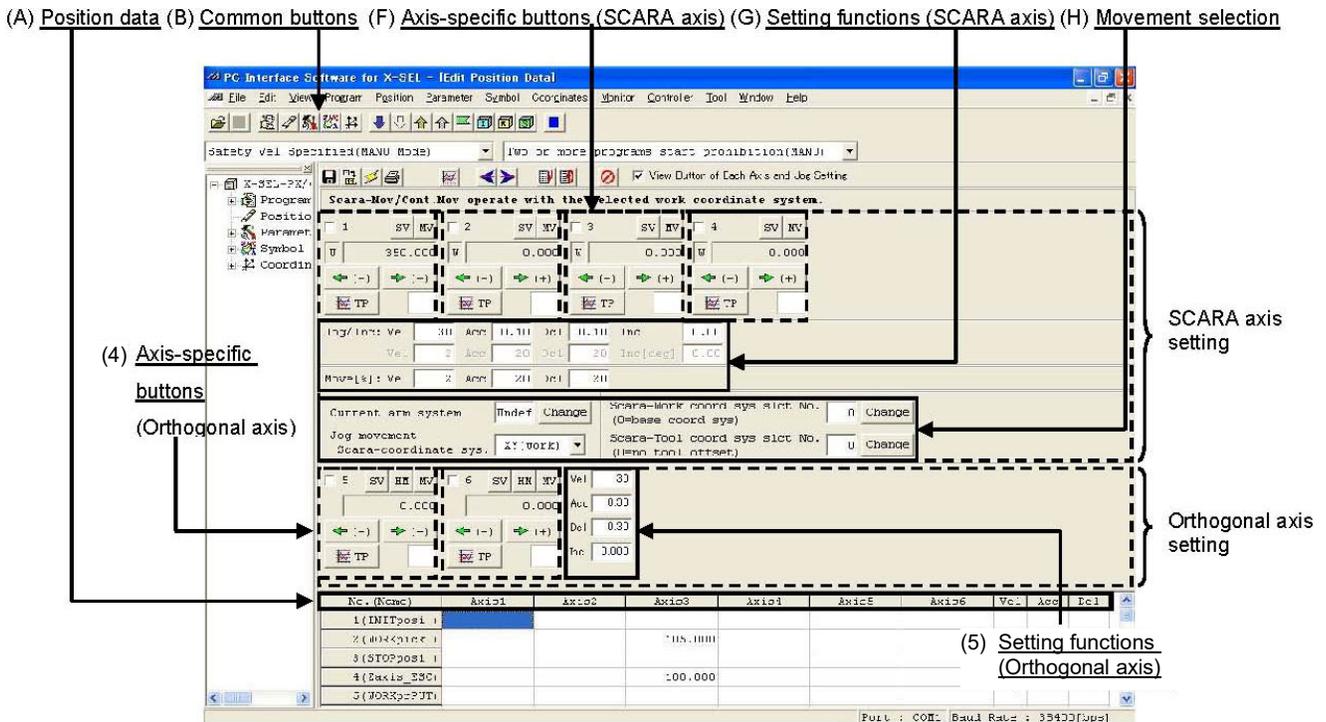


Fig. 6.6 Position Data Edit (X-SEL-PX/QX)

(A) Position data

No. (Name)	Axis1	Axis2	Axis3	Axis4	Axis5	Axis6	Vel	Acc	Dcl
------------	-------	-------	-------	-------	-------	-------	-----	-----	-----

SCARA axis position → ← Orthogonal axis position

Fig. 6.7 Position Data (X-SEL-PX/QX)

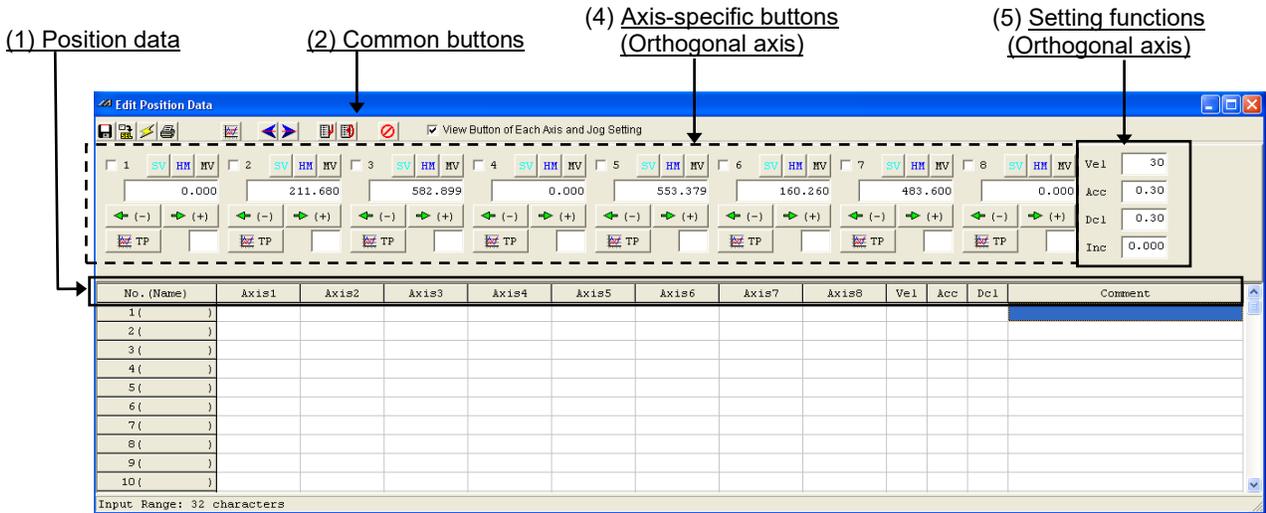


Fig. 6.8 Position Data (XSEL-R/S, RA/SA)



Fig. 6.9 Position Data (XSEL-R/S)

For XSEL-RA/SA, the following position output operation data is displayed in the position edit data.

No.	Axis1	Axis2	Axis3	Axis4
	Axis5	Axis6	Axis7	Axis8
Vel	Acc	Dcl	OutFn	OutNo.
			OutPara1	OutPara2
Comment				

Fig. 6.10 Position Data (XSEL-RA/SA)

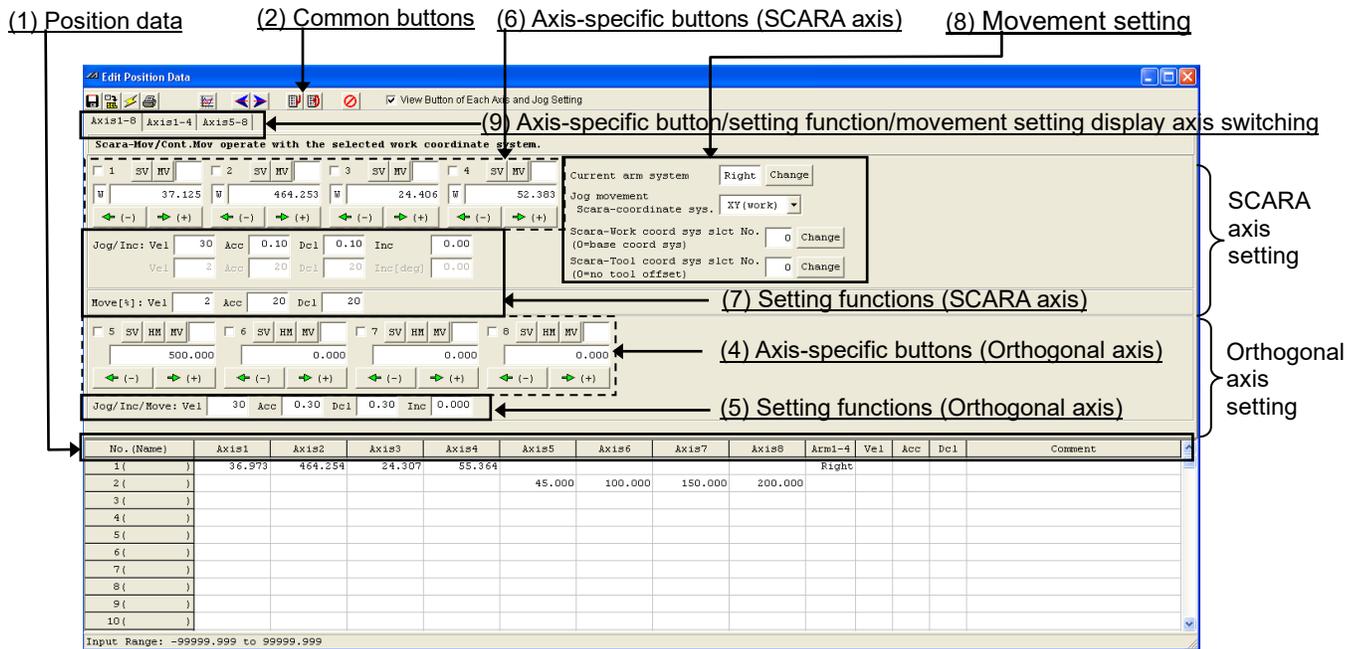


Fig. 6.11 Position Data (XSEL-RX/SX, RAX/SAX)

(1) Position data (2) Common buttons (6) Axis-specific buttons (SCARA axis) (8) Movement setting

Axis1-7 Axis1-3 Axis4-7 ← (9) Axis-specific button/setting function/movement setting display axis switching

Scara-Mov/Cont.Mov operate with the selected work coordinate system.
When Mov/Cont.Mov operate, the output operation function is disabled.

1 SV MV 2 SV MV 3 SV MV
 W 500.000 W 0.000 W 0.000
 ← (-) → (+) ← (-) → (+) ← (-) → (+)

Current arm system Undef Change
 Jog movement Scara-coordinate sys. XY(work)
 Scara-Work coord sys slct No. 0 Change
 (0=base coord sys)
 Scara-Tool coord sys slct No. 0 Change
 (0=no tool offset)

Jog/Inc: Vel 30 Acc 0.10 Dcl 0.10 Inc 0.00
 Vel 2 Acc 20 Dcl 20 Inc[deg] 0.00
 Move[%]: Vel 2 Acc 20 Dcl 20

← (7) Setting functions (SCARA axis)

4 SV HM MV 5 SV HM MV 6 SV HM MV 7 SV HM MV
 0.000 0.000 0.000 0.000
 ← (-) → (+) ← (-) → (+) ← (-) → (+) ← (-) → (+)

← (4) Axis-specific buttons (Orthogonal axis)

Jog/Inc/Move: Vel 30 Acc 0.30 Dcl 0.30 Inc 0.000

← (5) Setting functions (Orthogonal axis)

No. (Name)	Axis1	Axis2	Axis3	Axis4	Axis5	Axis6	Axis7	Arm
1 ()								
2 ()								
3 ()								

Input Range: -99999.999 to 99999.999, PosNo. that is data retained even controller power OFF : 1 to 253

Fig. 6.12 Position Data (3-Axis Type for XSEL-RAX/SAX)

(1) Position data

No. (Name)	Axis1	Axis2	Axis3	Axis4	Axis5	Axis6	Axis7	Axis8	Arm1-4	Vel	Acc	Dcl	Comment
------------	-------	-------	-------	-------	-------	-------	-------	-------	--------	-----	-----	-----	---------

Fig. 6.13 Position Data (X-SEL-RX/SX)

For XSEL-RAX/SAX, the following position output operation data is displayed in the position edit data.

No.	Axis1	Axis2	Axis3	Axis4
	Axis5	Axis6	Axis7	Axis8
	Arm1-4			
	Vel	Acc	Dcl	OutFn
				OutNo.
				OutPara1
				OutPara2
				Comment

10) position output operation data

Fig. 6.14 Position Data (XSEL-RAX/SAX)

Fig. 6.15 Position Data (XSEL-RXD/SXD, RAXD/SAXD) : Versions earlier than V13.02.00.00

* The display is as shown below for the version V13.02.00.00 and later.

Fig. 6.16 Position Data (XSEL-RAXD/SAXD) : Version V13.02.00.00 and later

(1) Position data

No. (Name)	Axis1	Axis2	Axis3	Axis4	Axis5	Axis6	Axis7	Axis8	Arm1-4	Arm5-8	Vel	Acc	Dcl	Comment
------------	-------	-------	-------	-------	-------	-------	-------	-------	--------	--------	-----	-----	-----	---------

Fig. 6.17 Position Data (X-SEL-RXD/SXD)

For XSEL-RAXD/SAXD, the following position output operation data is displayed in the position edit data.

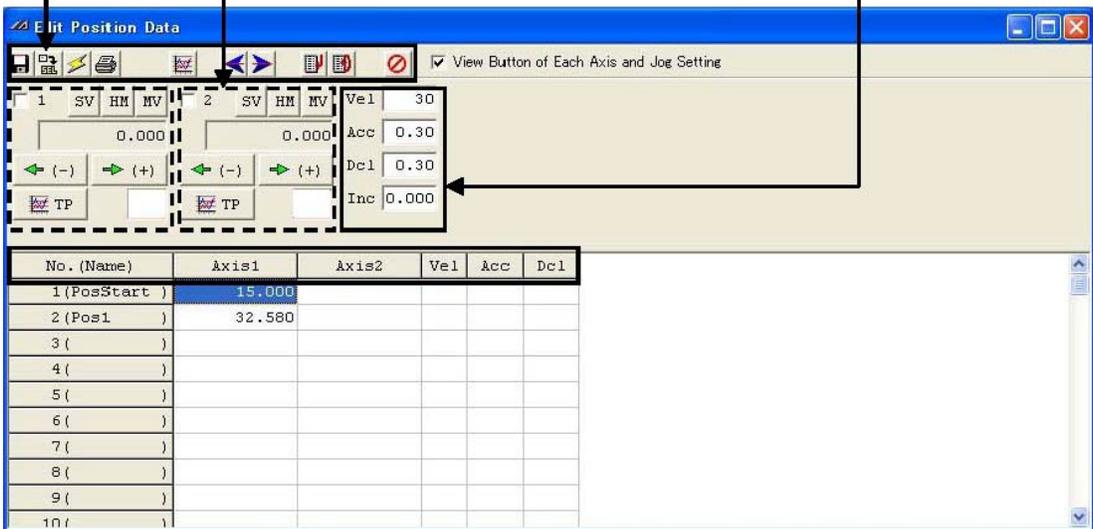
No.	Axis1	Axis2	Axis3	Axis4				
	Axis5	Axis6	Axis7	Axis8	Arm1-4	Arm5-8		
	Vel	Acc	Dcl	OutFn	OutNo.	OutPara1	OutPara2	Comment

10) Position output operation data

Fig. 6.18 Position Data (XSEL-RAXD/SAXD)

(2) Common buttons (4) Axis-specific buttons (Orthogonal axis) (5) Setting functions (Orthogonal axis)

(1) Position data



No. (Name)	Axis1	Axis2	Vel	Acc	Dcl
1 (PosStart)	15.000				
2 (Pos1)	32.580				
3 ()					
4 ()					
5 ()					
6 ()					
7 ()					
8 ()					
9 ()					
10 ()					

Data in the change line will be displayed in red.

Fig. 6.19 Position Data Edit (SSEL, ASEL and PSEL Controller in the Program Mode)

(1) Position data

No. (Name)	Axis1	Axis2	Vel	Acc	Dcl
------------	-------	-------	-----	-----	-----

Fig. 6.20 Position Data (SSEL, ASEL and PSEL)

(1) Position data (2) Common buttons (4) Axis-specific buttons (7) Setting functions (SCARA axis) (8) Movement selection

No. (Name)	Axis1	Axis2	Axis3	Axis4	Arml-4	Vel	Acc	Dcl
1 ()	350.000	0.000	0.000	0.000	Left	100	0.30	0.30
2 ()								
3 ()								
4 ()								
5 ()								

Fig. 6.21 Position Data Edit (MSEL-PCX/PGX Controller)

No. (Name)	Axis1	Axis2	Axis3	Axis4	Arml-4	Vel	Acc	Dcl
------------	-------	-------	-------	-------	--------	-----	-----	-----

Fig. 6.22 Position Data (MSEL-PCX/PGX)

No. (Name)

The position number and corresponding symbol are displayed.

You can press the F11 key to open the symbol edit window where you can edit the symbol assigned to the applicable position number. Pressing the F11 key on the symbol edit window will return the input focus to the applicable position data in the edit window.

* You can press the F11 key to return the input focus from the symbol edit window to the position data edit window only when the position data edit window is currently open.

* To show or hide symbols, do so in the Environment Setup window accessible from Tool. (For the switching method, refer to “15. Tool”)

The symbol assigned to the applicable position data No. will not be displayed in the case of the SSEL, ASEL or PSEL controller in the positioner mode.

No.	Axis1	Axis2	Vel	Acc	Dcl
1			30	0.30	
2	32.580				
3					
4					
5					
6					
7					
8					
9					
10					

Fig. 6.23 Position Data Edit (SSEL Controller in the Positioner Mode)

Axis 1 to 4

Specify each desired position for Axis 1 to Axis 4. In the case of the JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD, and MSEL-PCX/PGX controllers, specify a desired position for each SCARA axis. The setting range is from -99999.999 to 99999.999.

Axis 5, 6

Specify a desired position for Axis 5 and Axis 6. The setting range is from -99999.999 to 99999.99.

Axis 5 to 8

Specify each desired position for Axis 5 to Axis 8.

In the case of the RXD/SXD and RAXD/SAXD controller, specify a desired position for each SCARA axis.

The setting range is from -99999.999 to 99999.999.

Arm 1 to Arm 4, Arm 5 to Arm 8

Specify each desired target arm system for SCARA axes (Axis 1 to Axis 4) and SCARA axes (Axis 5 to Axis 8) as either "Left" or "Right."

(Note) The specification of each target arm system specified by this item is valid with respect to the following operations:

- Move using the "Move" button () or "Continuous Move" button () on the Edit Position screen. (If no PTP target arm system is set as part of the position data, the specified operation is performed by assuming the "current arm system (movement of the opposite arm system permitted if the current arm system cannot be moved).")
- Servo operation SEL command that uses the position data

(Note) When editing, each arm system can be specified by entering the first letter of the pattern to be specified:

- [Example]
- Enter "L" → Left
 - Enter "R" → Right

(Note) Arm 1 to Arm 4 are displayed only on the X-SEL-RX/SX, RXD/SXD, RAX/SAX and MSEL-PCX/PGX controllers.

(Note) Arm 5 to Arm 6 are displayed only when the X-SEL-RXD/SXD and RAXD/SAXD controller is used and SCARA axes (axes 5 to 8) are connected.

Vel

Specify a desired speed.

Available range is from 1 to 9999.

However, for X-SEL-J/K, P/Q, R/S, RA/SA, SSEL, PSEL, TT and TTA, from 1 to All Axes Common Parameter No. 21 "Operation Speed at Max for Input Check" is the setting range when All Axes Common Parameter No. 20 "Maximum Operation Speed Check" is set to 0.

Acc

Specify a desired acceleration.

Available range is from 1 to 9.99.

However, 1 to 4 axes for X-SEL-PX/QX bigger one between from 0.01 to All Axis Common Parameter No. 22 "SCARA Axis CP Acceleration Maximum" and Parameter No. 203 "Linear Axis Acceleration Maximum" is the setting range.

For when All Axes Common Parameter No. 18 "Maximum Operation Acceleration/Deceleration Check Timing" is set to 0 for X-SEL-P/Q, R/S, RA/SA and SSEL, or for X-SEL-J/K, JX/KX, ASEL, TT and TTA, setting value in All Axes Common Parameter No. 22 "Acceleration Maximum" and "CP Acceleration Maximum" is the maximum value.

Dcl

Specify a desired deceleration.

Available range is from 1 to 9.99.

However, for X-SEL-PX/QX, 1 to 4 axes, bigger one between from 0.01 to All Axis Common Parameter No. 23 "SCARA Axis CP Deceleration Maximum" and Parameter No. 204 "Linear Axis Deceleration Maximum" is the setting range.

For when All Axes Common Parameter No. 18 "Maximum Operation Acceleration/Deceleration Check Timing" is set to 0 for X-SEL-P/Q, R/S, RA/SA and SSEL or for X-SEL-J/K, JX/KX, ASEL, TT and TTA, setting in All Axes Common Parameter No. 23 "Deceleration Maximum" and "CP Deceleration Maximum" is the maximum value.

Comment

Enter comment, if necessary (using up to 32 single-byte characters/16 double-byte characters).

Comment can be entered for position Nos. 1 to 10000. Comment cannot be entered for No. 10001 and subsequent positions. (Supported by V9.00.00.00 or later)

In the position edit window, clicking Edit (E) from the menu bar and then selecting Undo (U) can cancel the most recent 10 operations excluding line insertion and line deletion.

Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.

However, the cancel function will become disabled when any of the following operations is performed:

- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 6.24 will be displayed.

Clicking Yes will cancel the operation executed immediately before.

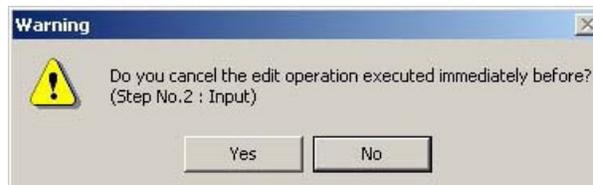


Fig. 6.24 Warning

(2) Common buttons

(X-SEL-J/K, P/Q, PX/QX, R/S, RX/SX, RA/SA, RAX/SAX, TT, SSEL, ASEL, PSEL, TTA and MSEL)



Fig.6.25 Common Buttons (X-SEL-J/K, P/Q, PX/QX, R/S, RX/SX, RA/SA, RAX/SAX, TT, SSEL, ASEL, PSEL, TTA and MSEL)

(3) Common buttons

(X-SEL-JX/KX, RXD/SXD and RAXD/SAXD)



Fig. 6.26 Common Buttons (X-SEL-JX/KX, RXD/SXD, RAXD/SAXD)



Save to File

Clicking this button will open a dialog box where you can save the position data to a file under a desired name.

(Note) X-SEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD controllers compatible with increased memory (with gateway function), the positions of No.4001 or later will not be saved by Position File Format 1 (normal format). Save them by Position File Format 2 (extended format).



Transfer to Controller

Clicking this button will transfer the position data to the controller.



Refresh Position Data

After a program that rewrites position data has been run, click this button to refresh the position data display.



Print

Clicking this button will print the position data.



Capture Current Position

Clicking this button will capture the current position into the position number corresponding to the cursor position for all axes indicated by. (The captured position is not yet transferred to the controller.)

In the case of the X-SEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD, MSEL-PCX/PGX, the screen shown in Fig. 6.27 appears. Select the current position, axis whose current arm system is loaded, and then click the "OK" button.

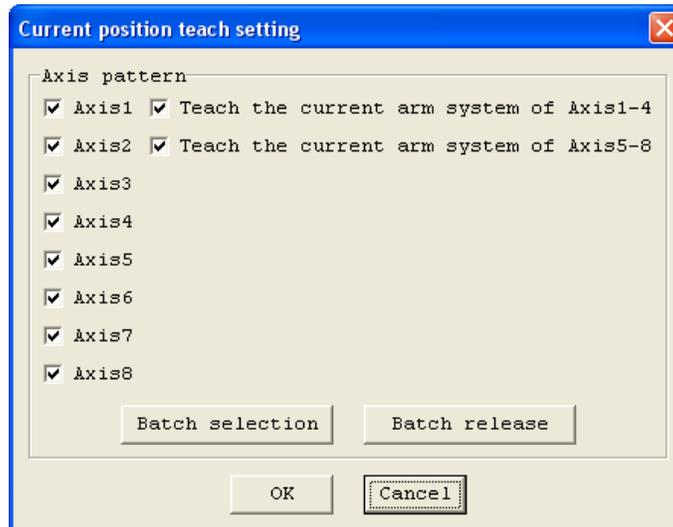


Fig. 6.27 Current Position Load Setting Screen



Jog - This button is not displayed for X-SEL-JX/KX.

The axes specified as the ones to be operated by the common buttons and whose servo is ON will jog backward while this button is pressed. However, axis specification has limitations.



Jog + This button is not displayed for X-SEL-JX/KX.

Axes specified as the ones to be operated by the common buttons and whose servo is ON will jog forward while this button is pressed. However, axis specification has limitations.

- Orthogonal axes Orthogonal axes can be selected simultaneously for simultaneous jog movement.

- SCARA axes of X-SEL-PX-QX, RX/SX and RAX/SAX

This button enables jog movement when only one axis is specified as the one to be operated by the common buttons.

(Note) The SCARA axis and orthogonal axis of the X-SEL-PX/QX, RX/SX and RAX/SAX controllers cannot be specified simultaneously.



Move

Clicking this button will move all axes indicated by  (in the case of the SCARA axis, the 1st arm, 2nd arm and R-axis are interlocked) to the position of the position number corresponding to the cursor position.

(Note) The SCARA axis and orthogonal axis cannot move simultaneously.

* If there is changed position data, transfer the data to the controller first.

 **Move Continuously**

Clicking this button will move all axes indicated by  (in the case of the SCARA axis, the 1st arm, 2nd arm, and R-axis are interlocked) to the position of the position number corresponding to the cursor position. Thereafter, each axis will continue to move to the position set by the data in next position number.

(Note) The SCARA axis and orthogonal axis cannot be moved simultaneously.

In the case of the X-SEL-RXD/SXD and RAXD/SAXD, controller, axes of two SCARA robots cannot be moved continuously.

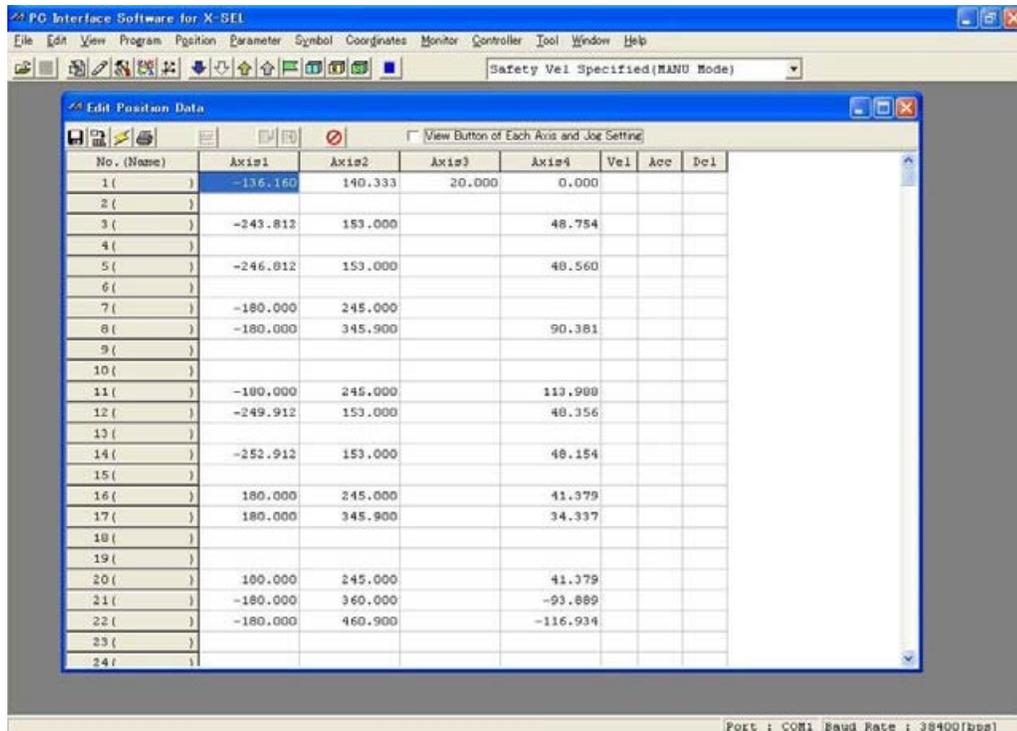
* If any of the applicable position data has been changed, transfer the latest position data to the controller first.

 **Stop All Axes**

Clicking this button will stop all axes currently moving.

View Button of Each Axis and Jog Setting

If a checkmark is placed in the checkbox of this button, the axis-specific button/setting screen (Fig. 6.4 [example of X-SEL-JX/KX]) will be displayed. If the checkmark is not placed, the position data will only be displayed (Fig. 6.28 [example of X-SELJX/KX]).



No. (Name)	Axis1	Axis2	Axis3	Axis4	Vel	Acc	Dec
1 ()	-136.160	140.333	20.000	0.000			
2 ()							
3 ()	-243.812	153.000		48.754			
4 ()							
5 ()	-246.812	153.000		48.560			
6 ()							
7 ()	-180.000	245.000					
8 ()	-180.000	345.900		90.381			
9 ()							
10 ()							
11 ()	-180.000	245.000		113.988			
12 ()	-249.912	153.000		48.356			
13 ()							
14 ()	-252.912	153.000		48.154			
15 ()							
16 ()	180.000	245.000		41.379			
17 ()	180.000	345.900		34.337			
18 ()							
19 ()							
20 ()	180.000	245.000		41.379			
21 ()	-180.000	360.000		-93.889			
22 ()	-180.000	460.900		-116.934			
23 ()							
24 ()							

Fig. 6.28 Screen of Position Data Only (Example of X-SEL-JX/KX)

- (4) Axis-specific buttons (Orthogonal axis)
 (Note) The display on SCRA axis of MSEL-PCX/PGX is the same.

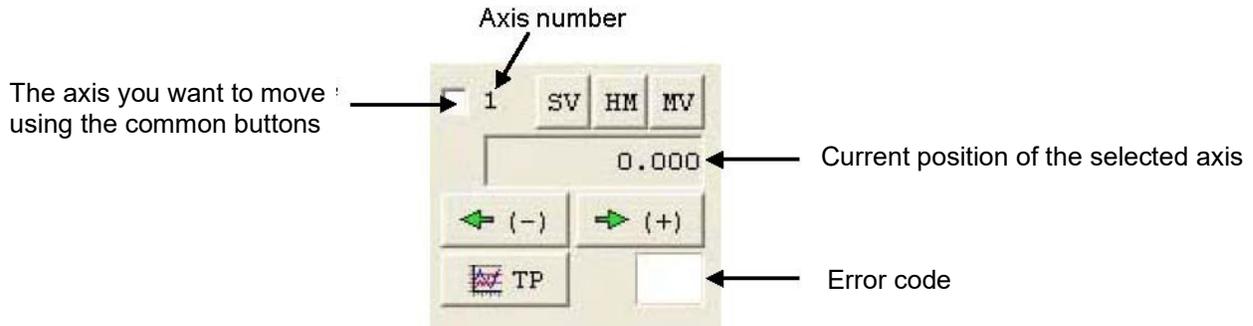


Fig. 6.29 Axis-specific buttons (Orthogonal axis)

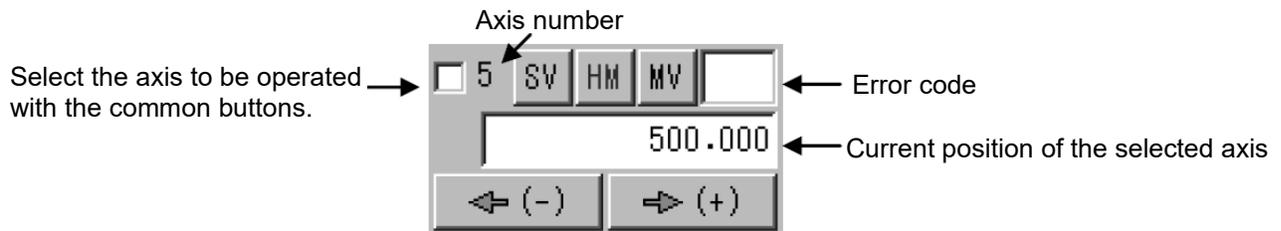


Fig. 6.30 Axis-specific buttons (Orthogonal axis) (X-SEL-RX/SX and RAX/SAX)

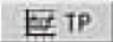
- SV** Clicking this button will turn the servo of the selected axis OFF if it is currently ON, or turn the axis servo ON if it is currently OFF.
 (The button is shown in light blue when the servo is ON.)
- HM** Clicking this button will perform homing if the servo of the selected axis is ON.
 (The button will be shown in light blue after homing.)

 **Note:** For the Linear Servo actuator, LSAS-N10/N15 quasi absolute type, the actuator moves in a range of approximately 16mm from the stop position when a home return operation is conducted after the power is turned on to confirm the current position. Watch the actuator movement during operation.

- MV** Clicking this button will move the selected axis to the position specified by the data in the position number corresponding to the cursor position, if the axis servo is ON. (The button remains yellow while the axis is moving.)

 The selected axis will jog forward while this button is clicked, if the axis servo is ON. If a value (0.001 to 1) is entered in the Inc. field in the setting function group, the axis will perform inching. In this case, one click will move the axis by one inching distance.

 The selected axis will jog backward while this button is clicked, if the axis servo is ON. If a value (0.001 to 1) is entered in the Inc. field in the setting function group, the axis will perform inching. In this case, one click will move the axis by one inching distance.

 Clicking this button will capture the current position of the selected axis into the position number corresponding to the cursor position. (The captured position is not yet transferred to the controller.)

(Note) In the case of the X-SEL-RX/SX and RAX/SAX controller, there is no “TP” button below the axis-specific buttons.

To load the current position, click the current position load button () among the common buttons in [2] and [3].

(5) Setting functions (Orthogonal axis)

Vel	30
Acc	0.30
Dcl	0.30
Inc	0.000

Set the velocity (Vel), acceleration (Acc), deceleration (Dcl) and inching distance (Inc.) to be used when the actuator is operated using the various buttons. If a value is entered in any of the Vel, Acc and Dcl fields in the position data area, the value in the applicable position data field will be given priority for movement to the corresponding position number.

The maximum settings for Vel (Velocity), Acc (Acceleration) and Dcl (Deceleration) are as stated below:

- Fig. 6.31
- Velocity : 250 mm/sec
 - Acceleration : All Axes Common Parameter No. 22
 - Deceleration : All Axes Common Parameter No. 23
- Settings of Velocity,
Acceleration,
Deceleration and
Inching Distance

Jog/Inc/Move: Vel [mm/sec] Acc [G] Dcl [G] Inc [mm]

Fig. 6.32 Setting functions (Orthogonal axis) (X-SEL-RX/SX and RAX/SAX)



Fig. 6.33 Jog Buttons

These jog buttons can also be used to jog those axes that have not yet completed homing. However, coordinate values have no meaning for these axes, so pay due attention to avoid contact with the stroke end. If a value (0.001 to 1) is entered in the Inc. field in the setting function group, the jog buttons will function as inching buttons.

Continue to click an inching button will change the operation to jogging. Specifically, the axis will start jogging approx. 1.6 second after the inching button is clicked. If the button is held continuously, the jogging velocity will change approx. every second thereafter in the order of 1 → 10 → 30 → 50 → 100 [mm/sec].

Note

Operating any selectable jog button for an operating axis will jog the axis, and the axis will stop once the button is released. (If the next operation command is input, the axis will perform the specified operation.)

(6) Axis-specific buttons (SCARA axis)

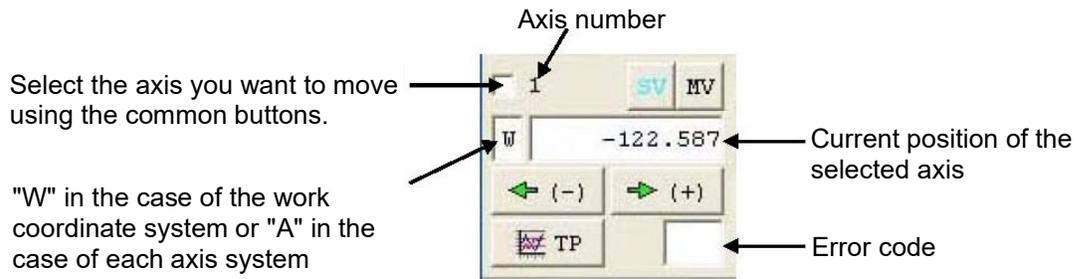


Fig. 6.34 Axis-specific buttons (SCARA axis)

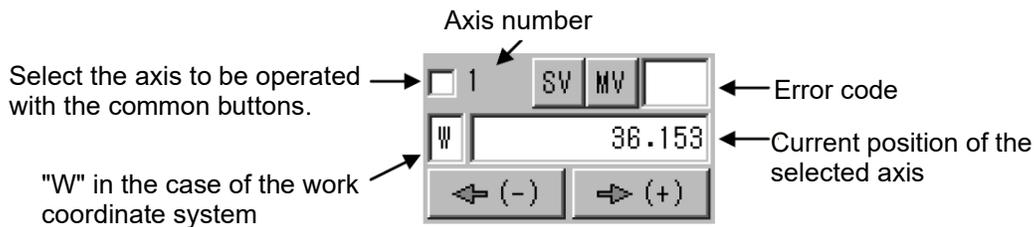


Fig. 6.35 Axis-specific buttons (SCARA axis)

(In the case of the XSEL-RX/SX, RXD/SXD, RAX/SAX and RAXD/SAXD controller)

 Clicking any axis button will turn the servo of all axes ON/OFF. (The button is shown in light blue when the servo is ON.)
Rom

 Clicking this button will turn the servo of all axes ON when the axis servo is OFF, or turn the servo of all axes OFF when the axis servo is ON.

 Clicking this button will move the selected axis to the position specified by the data in the position number corresponding to the cursor position, if the axis servo is ON. (The button remains yellow while the axis is moving.)

 The selected axis will perform jogging while this button is pressed, if the axis servo is ON. If a value (0.01 to 1.00) is entered in the Inc field under Setting Function, the axis will perform inching. In this case, one click will move the axis by one inching distance.



 Clicking this button will capture the current position of the selected axis into the position number corresponding to the cursor position. (The captured position is not yet transferred to the controller.)

Note, however, that the position displayed on the screen cannot be captured for axis systems.

(Note) In the case of the X-SEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD controller, there is no "TP" button below the axis-specific buttons.

To load the current position, click the current position load button () among the common buttons in [2] and [3].

(7) Setting functions (SCARA axis)

Set the velocity (Vel), acceleration (Acc), deceleration (Dcl) and inching distance (Inc.) to be used when the actuator is operated using the various buttons.

Separate sets of data are set for Jog/Inc and Move.
Vel, Acc, Dcl and Inc are set in two different units.

Jog/Inc: Vel	30	Acc	0.10	Dcl	0.10	Inc	0.00
Vel	2	Acc	20	Dcl	20	Inc[deg]	0.00
Move[%]: Vel	2	Acc	20	Dcl	20		

Fig. 6.36 Settings of Velocity, Acceleration, Deceleration and Inching Distance

Jog/Inc

Vel [mm/sec], Acc [G], Dcl [G], Inc [mm]

The above settings are effective on both the work and tool coordinate systems.

Vel [%], Acc [%], Dcl [%], Inc [deg]

The above settings are effective only when the “each Axis” system is selected.

The maximum settings for Vel [mm/sec], Acc [G] and Dcl [G] are as stated below:

© SCARA Axes for Connection to Axes 1 to 4 on SCARA Controller (XY Work Coordinate System, XY Tool Coordinate System)

- Velocity : 250 mm/sec
- Acceleration : All Axes Common Parameter No. 22
- Deceleration : All Axes Common Parameter No. 23

© SCARA Axes for Connection to Axes 5 to 8 on SCARA Controller (XY Work Coordinate System, XY Tool Coordinate System)

- Velocity : 250 mm/sec
- Acceleration : All Axes Common Parameter No. 208
- Deceleration : All Axes Common Parameter No. 209

© Cartesian Axes for Connection to Axes 5 to 8 on SCARA Controller

- Velocity : 250 mm/sec
- Acceleration : All Axes Common Parameter No. 203
- Deceleration : All Axes Common Parameter No. 204

© SCARA Axes on SCARA Controller (Each Axis Coordinate System)

- Velocity : All Axes Common Parameter No. 35
- Acceleration : 100%
- Deceleration : 100%

The jog button functions as the incremental button, if a numeric value (0.01 to 1.00) is entered in the Inc field under Setting Function.

Move

Vel [%], Acc [%], Dcl [%]

Set the moving speed that applies when the MV button is clicked.

Movement occurs in the form of PTP operation.

The maximum settings in [%] are as stated below:

- Velocity : All Axes Common Parameter No. 35
- Acceleration : 100%
- Deceleration : 100%

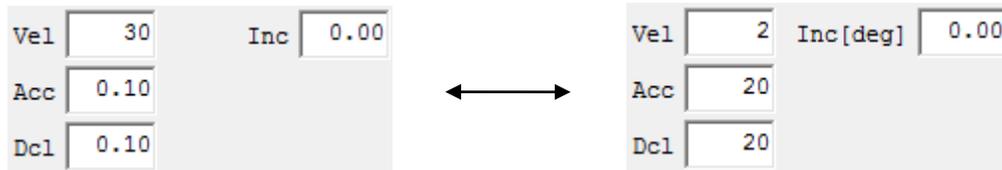
Each percentage setting indicates a percentage with respect to a corresponding parameter setting.

Vel [%] (percentage with respect to "Axis Parameter No. 28: "PTP speed MAX")

Acc [%] (percentage with respect to "Axis Parameter No. 134: "PTP acceleration MAX")

Dcl [%] (percentage with respect to "Axis Parameter No. 135: "PTP deceleration MAX")

*The display of the setting function changes responding to the selection of the JOG movement SCARA coordinate system for the version V13.02.00.00 and later.



When JOG movement SCARA coordinate system is XY (work) coordinate system and XY (tool)

When JOG movement SCARA coordinate system is the system for each axis

Fig. 6.37 Setting of Velocity, Acceleration, Deceleration and Inching Distance

(8) Movement Selection

Various buttons are provided to set Current arm system, Jog movement coordinate system, Work coordinate system select No. and Tool coordinate system select No.

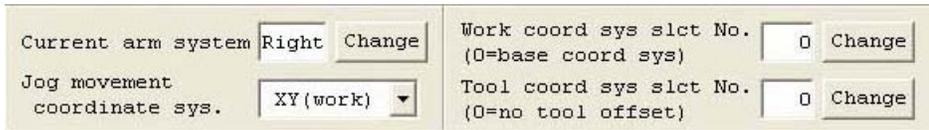


Fig. 6.38 Selection of Current Arm System and Various Coordinate Systems

Current arm system

The arm can be changed by clicking the Change button.

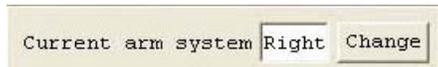


Fig. 6.39 Current Arm System Selection

Caution

If the arm system is changed for a stationary axis, the newly selected arm may move occasionally.

Jog movement coordinate sys.

The coordinate system can be changed by clicking the ▼ button.

XY work coordinate system (Can be offset using Work Coordinate System Selection No.)

XY tool coordinate system

Each axis system

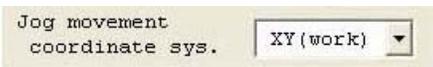


Fig. 6.40 Selection of Jog Movement Coordinate System

Work coord sys slct No.

A desired work coordinate system selection No. can be selected by clicking the Change button.

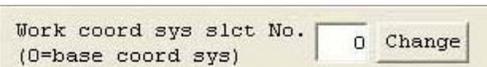


Fig. 6.41 Selection of Work Coordinate System

Tool coord sys slct No.

A desired tool coordinate system selection No. can be selected by clicking the Change button.

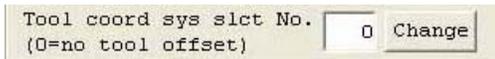


Fig. 6.42 Selection of Tool Coordinate System

*In the version V13.02.00.00 and later, some part of movement selection is hidden.

The display can be scrolled with the vertical scrollbar.

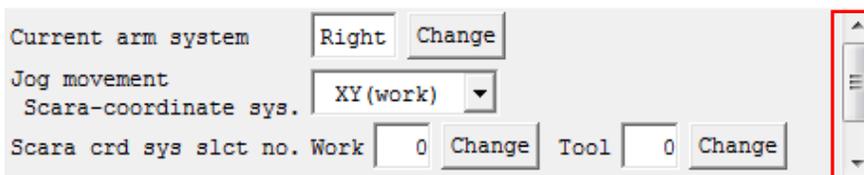


Fig. 6.43 Movement Select Screen

(9) Axis-specific button/setting function/movement selection display axis switching



Fig. 6.44 Axis-specific Button/Setting Function/Movement Selection Display Axis Switching.

Switch the axes displayed in the axis-specific button, setting function and movement selection areas.

Axis1-8: Display the axis-specific buttons, setting functions and movement selections of all effective axes. (This item is displayed only when the X-SEL-PX/QX, RX/SX, RXD/SXD and RAX/SAX, RAXD/SAXD controllers are connected and Axis 5 and subsequent axes are effective axes.)

Axis1-4: Display the axis-specific buttons, setting functions and movement selections only for SCARA axes (Axis 1 to Axis 4).

(This item is displayed only when the X-SEL-JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX and RAXD/SAXD controllers are connected and SCARA axes (Axis 1 to Axis 4) are effective axes.)

Axis5-8: Display the axis-specific buttons, setting functions and movement selections only for SCARA axes (Axis 5 to Axis 8) or orthogonal axes (Axis 5 to Axis 8).

(This item is displayed only when the X-SEL-PX/QX, RX/SX, RXD/SXD, RAX/SAX and RAXD/SAXD, controllers are connected.)

(10) Position Output Operation Data

TTA, MSEL (Main Application V2.00 or later), PC software V12.03.00.00 or later
XSEL-RA/SA, RAX/SAX, RAXD/SAXD

No. (Name)	Axis1	Axis2	Axis3	Axis4	Vel	Acc	Dcl	OutFn	OutNo.	OutPara1	OutPara2
10()	100.000				100	0.30	0.30	ON	316	0.000	0.000
11()		150.000			100	0.30	0.30				
12()	150.000				100	0.30	0.30				
13()		100.000			100	0.30	0.30	OFF	316	0.000	0.000

Fig. 6.45 Position Output Operation Data

OutFn

Set the output function code.

There are two ways to establish setting. Without setting, the output operation will be invalid.

- (1) Bring the cursor to the setting position and click to show the output function code list. Select in the list from ON, OFF, etc.
- (2) Input a number from 1 to 6 that is applicable as an output function from the table below. As shown below, the display will be on if 1 is selected for example.

Output Function Code	Numerical Setting	Display
Turns ON after movement	1	ON
Turns OFF after movement	2	OFF
Turns ON after passed specified distance	3	OND
Turns OFF after passed specified distance	4	OFFD
Turns ON after passed specified ratio	5	ONR
Turns OFF after passed specified ratio	6	OFFR

[Output Function Code]

- Turns ON/OFF after movement : It turns ON/OFF the specified output ports and flags after moved to the applicable position.
- Turns ON/OFF after passed specified distance : It turns ON/OFF the output ports and flags at the position where proceeded from the movement start position for the distance specified in Function Parameter 1 during movement to the applicable position.
- Turns ON after passed specified ratio : It turns ON/OFF the output ports and flags at the position where proceeded from the movement start position for the ratio specified in Function Parameter 1 to the whole movement mount during movement to the applicable position.

OutNo.

Set the output ports and flags applicable for operation.

OutPara1

Set the parameters defined for each output function.

OutPara2

One-shot pulse will be output if output pulse timer time is set.

Settings for Each Output Function

Output Function Code Name	Function Parameter 1	Function Parameter 2
Turns ON after movement	Output Delay Timer Time (0.000 to 999.999 second)	Output Pulse Timer Time (0.000 to 999.999 second)
Turns OFF after movement		
Turns ON after passed specified distance	Output Operation Specified Distance (0.000 to 9999.999mm)	Output Pulse Timer Time (0.000 to 999.999 second)
Turns OFF after passed specified distance		
Turns ON after passed specified ratio	Output Operation Specified Ratio (0.000 to 100.000%)	Output Pulse Timer Time (0.000 to 999.999 second)
Turns OFF after passed specified ratio		

⊙ Display of Output Port (V11.00.00.00 and later)

Output port can be displayed on position edit window.

To show the display, it is necessary to establish the following parameter settings.

I/O Parameter	Name	Setting Details
No.74	Number of Use of PC/TP User Output Ports (such as hand)	Set the number of output ports to be displayed on the position edit window.
No.75	PC/TP User Output Port Start Number (such as hand)	Set the output port start number. With this number as the start number, ports are displayed in a row for the number set in No. 74. (Note) The display will not be shown if a number out of the output ports is set. An error will also not be shown.

(Note) Only in XSEL-P/Q/PCT/QCT, virtual output port number can be set in No. 75 to show on the display. On the position edit window, it is available to check the condition of the virtual output ports of the pick & place axis on CT4 that opens/closes with the turn-ON (open) / OFF (close) of the virtual output port No. 7305.

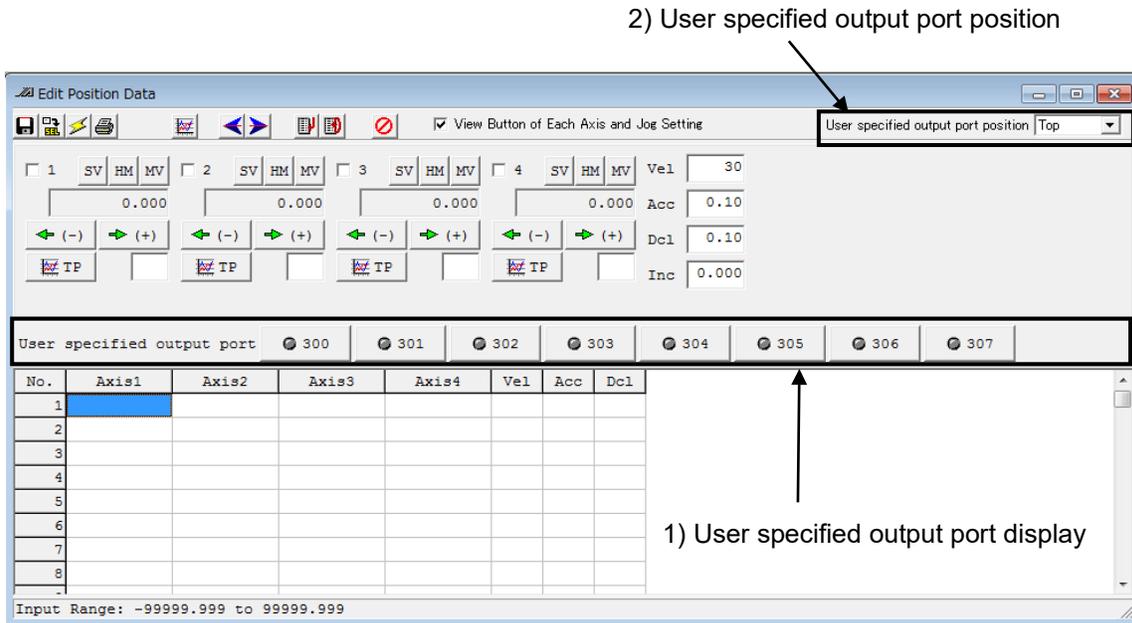


Fig. 6.46 User Specified Output Port Display

1) User Indicated Output Port Display

It shows the user indicated output port. It displays on the position edit window the same condition as 1 (ON) and 0 (OFF) displayed on the monitor output port window. It is on when the light is ON, and OFF when the light is off.

When a check mark is put to the following in the configuration of the tool, not only the output ports such as 300, but also the symbols defined in the symbol edit window will be displayed.

- Display symbol names to variable monitor, I/O port monitor, flag monitor and position edit window [Refer to 9. Symbol Edit and 15. Tools]

2) User Specified Output Port Position

You can choose where around the position data you would like to display the user indicated output port. Selection can be made from 'Top', 'Bottom', 'Left' and 'Right'. Also, by selecting "None", display can be disappeared.

6.2 Saving Position Data, Transferring and Closing the Edit Window

6.2.1 Saving a Program Online, Transferring and Closing the Edit Window

(1) Saving to a file the position data you are editing

Click the Save to File button in the position edit window.

This is the same as clicking File and then selecting Save As.

After clicking Save to File button, File Save Select screen will be displayed.

In case of X-SEL-P/Q and PX/QX controllers compatible with increased memory (with gateway function), positions of No.4001 or later will not be saved by Position File Format 1 (normal format).

In case of the SSEL controllers, you can not select the Position File Format 1 (normal format) for Position No.1501 or later. Use Position File Format 2 (extended format) to save them.

(PC interface software version 7.2.0.0 or later)

The file save format selection window will also show up for TTA, MSEL-PC/PG and PCX/PGX.

Caution: After placing a check mark at 'Save it by Format2 always.' the data will be always saved with Format 2 and this screen will not be displayed again. For displaying this screen, go to the Environment Setup screen (15. Tool).

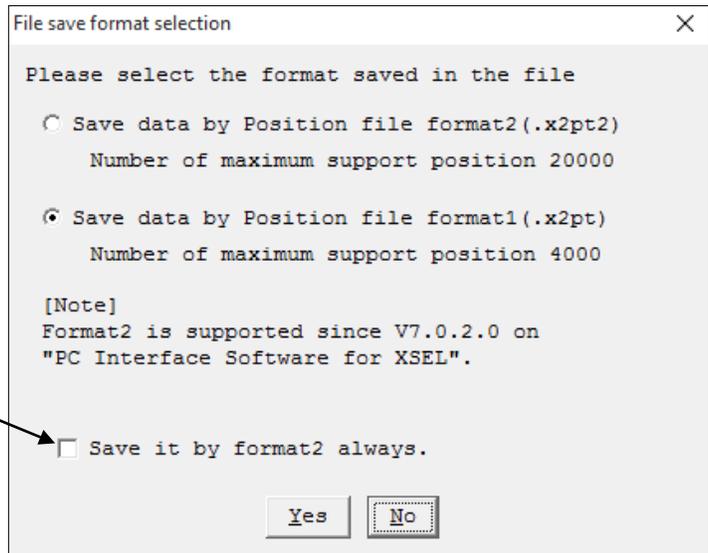


Fig. 6.47 File Save Select Screen

(2) Transferring to the controller the position data you are editing

Click the Transfer to Controller button in the position edit window.

The position data you are editing will be saved to the controller's memory.

This button is selectable only in the online edit mode.

- * The data saved by Position File Format 1 (normal format) can be transferred to the X-SEL-P/Q, PX/QX (with gateway function), SSEL controller compatible with increased memory. Also, for the SSEL controllers, Error AC8 should occur if Position No. 1501 or higher is indicated.
- * If the data saved by Position File Format 2 (extended format) has been transferred to a controller incompatible with increased memory, the extended part of the data (position of No.4001 or later) will not be transferred. The SSEL controller is the extended part of data (Position No.1501 or later) will not be transferred. The following Warning screen will be displayed. Clicking Yes will transfer the data.

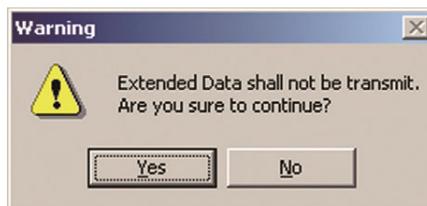


Fig. 6.48 Warning Screen

⊙ Error/warning display before data transfer

When transferring position data to the controller, the position data to be transferred is checked for problems and if any of the data cannot be transferred (due to excessive speed, acceleration, deceleration, etc.), applicable errors/warnings are displayed in a list.

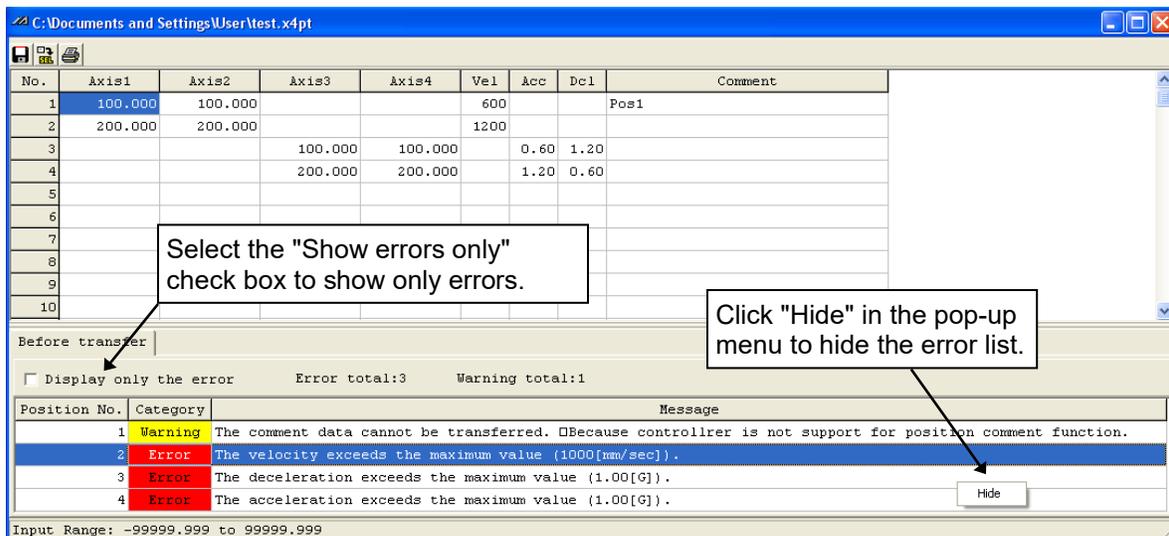


Fig. 6.49 Position Data Error List

If an error is found in the position data to be transferred, the position data will not be transferred. If the position data to be transferred only generates a warning, the warning screen appears.

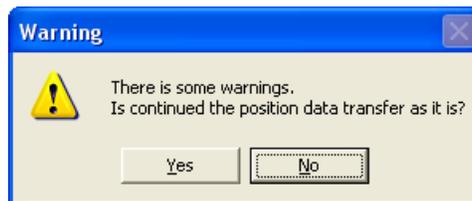


Fig. 6.50 Warning Screen

Click **Yes** to transfer the position data.
 Click **No** to cancel the transfer of position data.

(Note) The maximum number of errors/warnings displayed in the position error list is set on the Environment Setup screen. [Refer to Fig. 15.5, "Environment Setup Screen."]

(3) Writing to the flash ROM

Once the position has been transferred to the controller, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.

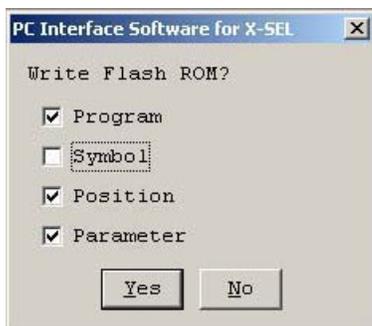


Fig. 6.51 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL,
TTA, MSE-PCX/PGX)

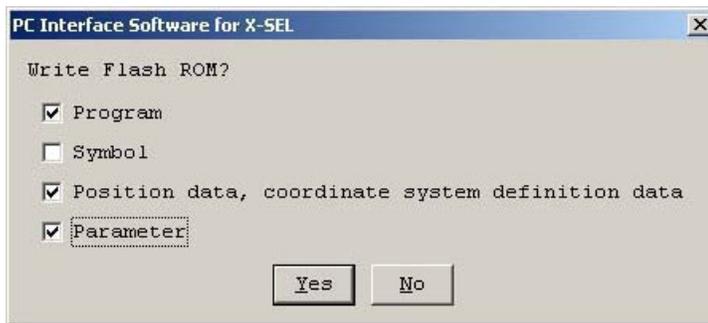


Fig. 6.52 Confirmation
(X-SEL-JX/KX, PX/QX)

In case of SSEL, ASEL, PSEL, X-SEL-P/Q and PX/QX compatible with increased memory (with gateway function), or R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD the following screens will be displayed. (PC interface software version 7.2.0.0 or later)

This is not displayed for XSEL-RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL and PSEL.

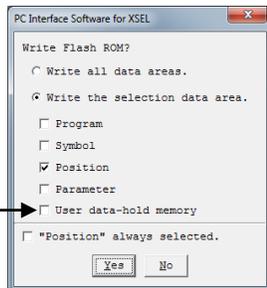


Fig. 6.53 Confirmation
(X-SEL-P/Q, R/S, RX/SX,
RXD/SXD, RA/SA, RAX/SAX,
RAXD/SAXD, SSEL, ASEL, PSEL)

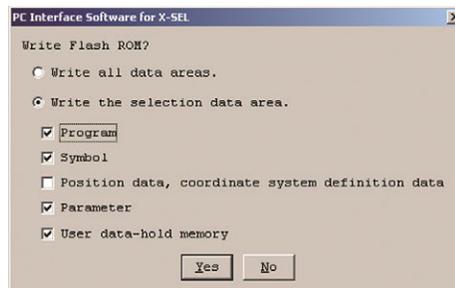


Fig. 6.54 Confirmation
(X-SEL-PX/QX)

Click and select a desired item (Position, etc.) to write to the flash ROM.

Click **Yes** → The memory data will be written to the flash ROM.

Click **No** → The memory data will not be written to the flash ROM.

* The number of writing to the flash ROM is limited (approx. 100,000 times). If you do not write all the data, select Write Selected Data Region and write to the flash ROM.

- (4) Closing the point edit window
Attempting to close the point edit window will open the following confirmation dialog box with the message, "Save edited data in the Controller?"



Fig. 6.55 Confirmation

Yes (Y)
No (N)
Cancel

The edited data will be transferred to the controller → (3), "Writing to the flash ROM"
The software will close the point edit window without saving the edited data.
The software will cancel the operation and return to the position edit window.

- (4) Next, a screen to select the position number for destination will be shown. Select numbers to indicate transfer from what number to what number of the positions to be performed. Press **OK**.

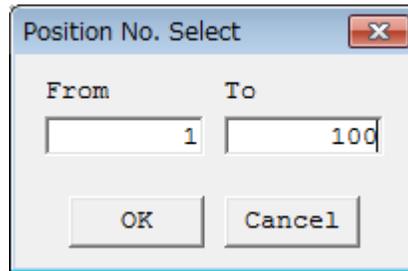


Fig.6.58 Position No. Select

- (5) A confirmation screen stating "Write Flash ROM" will appear. Press **Yes**.

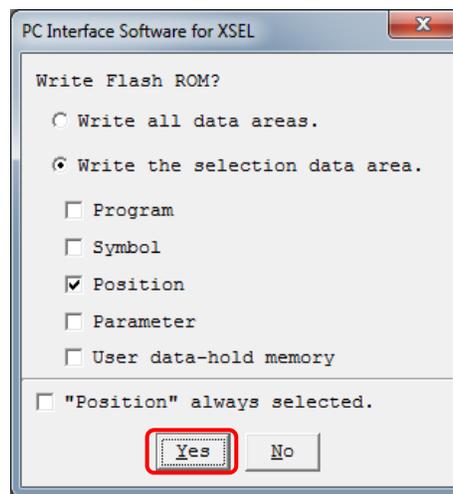


Fig.6.59 Confirmation Screen

- (6) The position will be transferred to the controller. Also, flash ROM writing will be conducted, and the display below flashes during writing. The display will disappear once writing is complete.

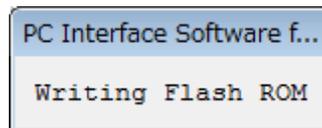


Fig.6.60 Writing Flash ROM Screen

7. Copying/Moving/Clearing Position Data

7.1 Copying/Moving Position Data

- (1) Click Position (O) from the menu bar, and then select Copy/Move (C).
- (2) The position data copy/move window (Copy/Move Position Data) will open.

Copying position data: In Source to Copy/Move, specify the Top No. and Last No. of the position range you want to copy or move. Then, click Copy.

The positions specified in Source to Copy/Move will be copied to the positions specified in Destination to Copy/Move.

Moving position data: Click Move.

The positions specified in Source to Copy/Move will move to the positions specified in Destination to Copy/Move.



In the case of the SSEL, ASEL, or PSEL controller, the number of remaining steps will be 1500 or less.

Fig. 7.1 Position Data Copy/Move

* Clicking Cancel will cancel the selected operation.

- (3) Writing to the flash ROM
When the copy or move is completed, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.



Fig. 7.2 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL,
TTA, MSEL-RCX/PGX)

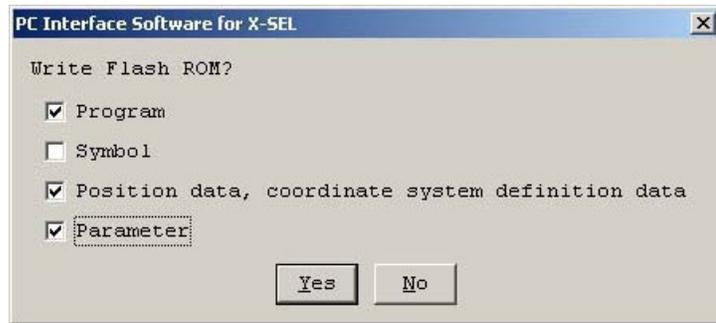


Fig. 7.3 Confirmation
(X-SEL-JX/KX, PX/QX)

In case of SSEL, ASEL, PSEL, X-SEL-P/Q and PX/QX compatible with increased memory (with gateway function), R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD the following screens will be displayed.

(PC interface software version 7.2.0.0 or later)

This is not displayed for XSEL-RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL and PSEL.

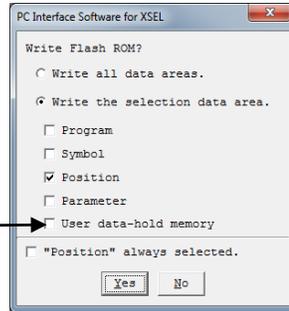


Fig. 7.4 Confirmation
(X-SEL-P/Q, R/S, RX/SX,
RXD/SXD, RA/SA, RAX/SAX,
RAXD/SAXD, SSEL, ASEL, PSEL)

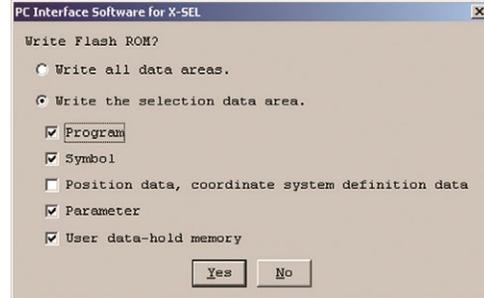


Fig. 7.5 Confirmation
(X-SEL-PX/QX)

Click and select a desired item (Position, etc.) to write to the flash ROM.

Click Yes → The memory data will be written to the flash ROM.

Click No → The memory data will not be written to the flash ROM.

* The number of writing to the flash ROM is limited (approx. 100,000 times). If you do not write all the data, select Write Selected Data Region and write to the flash ROM.

7.2 Clearing Position Data

- (1) Click Position (O) from the menu bar, and then select Clear (L).
- (2) The position data clear window (Clear Position Data) will open.



Fig. 7.6 Clear Position Data

In Clear Scope, specify the Top No. and Last No. of the position range you want to clear. Then, click Clear.

Clicking Cancel will cancel the operation.

- (3) Writing to the flash ROM
When the clear is completed, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.



Fig. 7.7 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL,
TTA, MSEL-PCX/PGX)

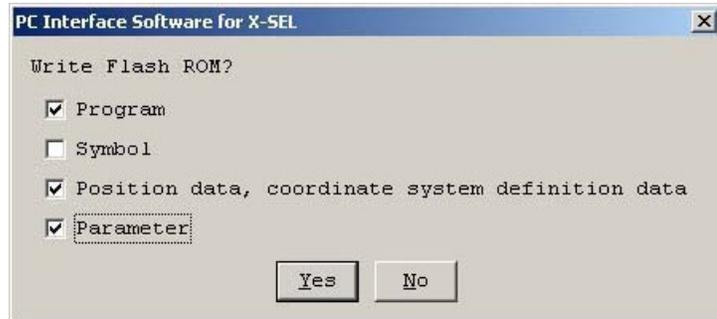


Fig. 7.8 Confirmation
(X-SEL-JX/KX, PX/QX)

In case of SSEL, ASEL, PSEL, X-SEL-P/Q and PX/QX compatible with increased memory (with gateway function), R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD the following screens will be displayed. (PC interface software version 7.2.0.0 or later)

This is not displayed for XSEL-RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL and PSEL.

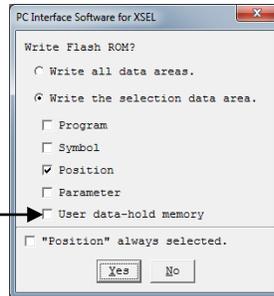


Fig. 7.9 Confirmation
(X-SEL-P/Q, R/S, RX/SX,
RXD/SXD, RA/SA, RAX/SAX,
RAXD/SAXD, SSEL, ASEL, PSEL)

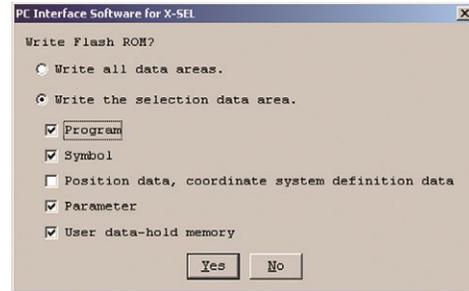


Fig. 7.10 Confirmation
(X-SEL-PX/QX)

Click and select a desired item (Position, etc.) to write to the flash ROM.

Click **Yes** → The memory data will be written to the flash ROM.

Click **No** → The memory data will not be written to the flash ROM.

* The number of writing to the flash ROM is limited (approx. 100,000 times). If you do not write all the data, select Write Selected Data Region and write to the flash ROM.

8. Parameter Edit Window

8.1 Explanation of the Parameter Edit Window

- (1) Click Parameter (P) from the menu bar, and then select Edit (E).
- (2) The parameter edit window (Edit Parameter) will open.
You can select a desired parameter and change the value.
Values that are grayed out are read-only and cannot be changed.

 **Save to File**

Clicking this button will open a dialog box where you can save the parameter data to a file under a desired name.

 **Transfer to Controller**

Clicking this button will transfer the parameter data to the controller.

 **Print**

Clicking this button will print the parameter data.

Easy Parameter Setup

Click this button and you can conduct Easy Parameter Setup.
(V12.02.00.00 or later)

“Driver Card”, “Encoder” and “I/O Slot Card” will be displayed for X-SEL-J/K, JX/KX, TT, TTA and MSEL controllers.

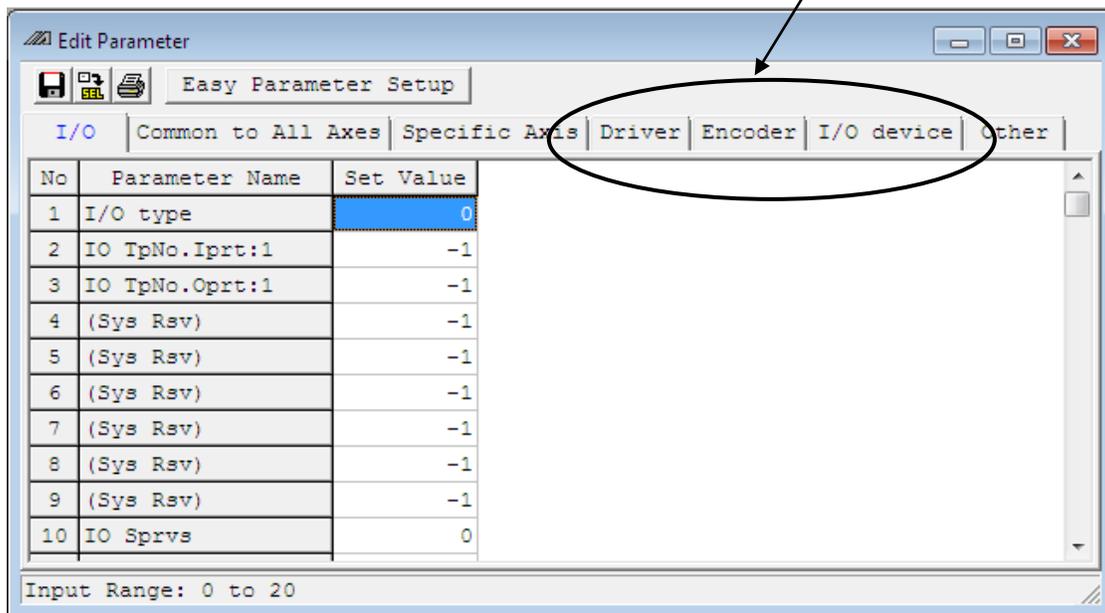


Fig. 8.1 Parameter Edit (X-SEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, PSEL)

* The above window shows I/O parameters. You can display other parameters by clicking each category tab.

Caution: During the positioner mode of SSEL, ASEL and PSEL, the parameter cannot be transferred in the setup status. After stopping them, change and transfer the parameter.
For stopping, click Controller in the Menu screen, Positioner Mode and Stop.

In the parameter edit window, clicking Edit (E) from the menu bar and then selecting Undo (U) can cancel up to the most recent 10 input operations.

Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.

However, the cancel function will become disabled when any of the following operations is performed:

- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 8.2 will be displayed.

Clicking Yes will cancel the operation executed immediately before.

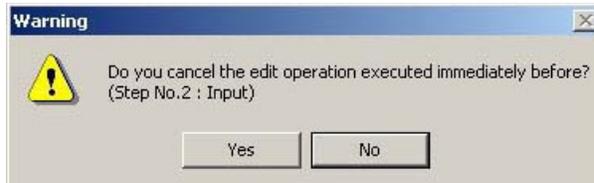


Fig. 8.2 Warning

8.2 Saving Parameter Data and Closing the Edit Window

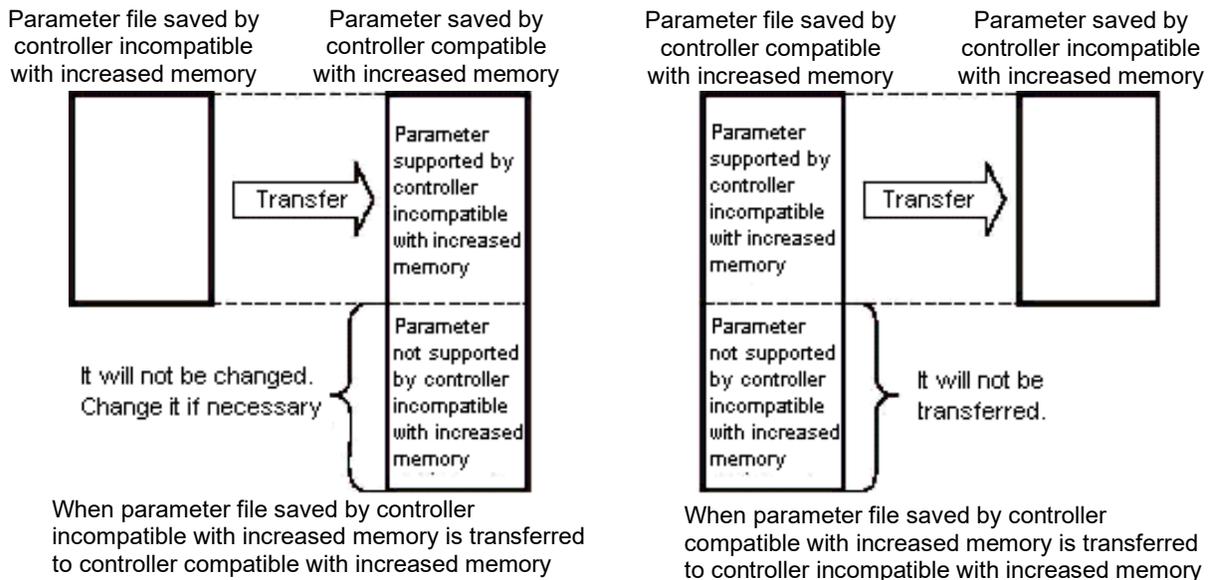
- (1) Saving to a file the parameter data you are editing
Click the Save to File button in the parameter edit window.
This is the same as clicking File (F) and then selecting Save As (A).
- (2) Transferring to the controller the parameter data you are editing
You can save the parameter data you are editing to the controller's memory.
Click the Transfer to Controller button in the parameter edit window.

The number of the parameters has been increased for the X-SEL-P/Q, PX/QX controllers (w/gateway function) compatible with increased memory.

	The Number of Parameters		
	X-SEL-P/Q incompatible with increased memory	X-SEL-PX/QX incompatible with increased memory	X-SEL-P/Q, PX/QX compatible with increased memory
I/O	250	400	600
For all axes	120	300	400
For each axis	200	220	250
Driver	97	97	97
Encoder	30	30	30
I/O Device	82	82	82
Others	100	120	200

Please be noted as follows.

- * When the parameter file saved by the X-SEL-P/Q, PX/QX controller incompatible with increased memory is transferred to the X-SEL-P/Q, PX/QX controller compatible with increased memory, or when the parameter file saved by X-SEL-P/Q, PX/QX controller compatible with increased memory is transferred to the X-SEL-P/Q, PX/QX controller incompatible with increased memory, only the parameters supported by the X-SEL-P/Q, PX/QX controller incompatible with increased memory, as shown below.



(3) Writing to the flash ROM

Once the parameter has been transferred to the controller, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.



Fig. 8.3 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL,
TTA, MSEL-PCX/PGX)

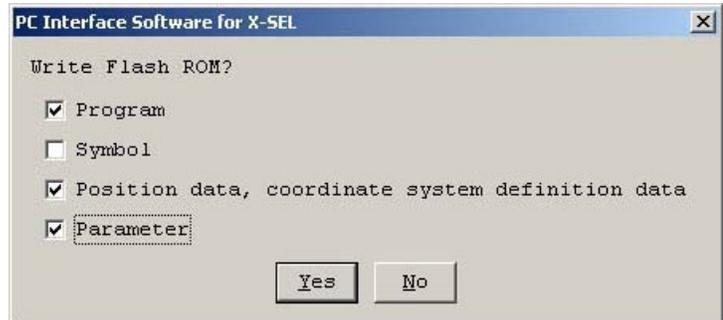


Fig. 8.4 Confirmation
(X-SEL-JX/KX, PX/QX)

In case of SSEL, ASEL, PSEL, X-SEL-P/Q and PX/QX compatible with increased memory (with gateway function), R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD the following screens will be displayed.

(PC interface software version 7.2.0.0 or later)

This is not displayed for
XSEL-RA/SA, RAX/SAX,
RAXD/SAXD, SSEL,
ASEL and PSEL.

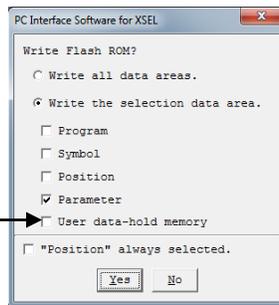


Fig. 8.5 Confirmation
(X-SEL-P/Q, R/S, RX/SX,
RXD/SXD, RA/SA, RAX/SAX,
RAXD/SAXD, SSEL, ASEL, PSEL)

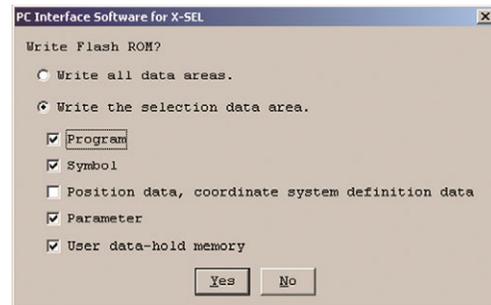


Fig. 8.6 Confirmation
(X-SEL-PX/QX)

Click and select a desired item (Parameter, etc.) to write to the flash ROM.

Click **Yes** → The memory data will be written to the flash ROM.

Click **No** → The memory data will not be written to the flash ROM.

If No is selected, the controller will clear all data in its memory after a reset (i.e., after the controller power is reconnected or a software reset is executed), and then load the data from the flash ROM.

* The number of writing to the flash ROM is limited (approx. 100,000 times). If you do not write all the data, select Write Selected Data Region and write to the flash ROM.

- (4) Restarting the controller (software reset)
 After the data has been written to the flash ROM, the following confirmation dialog box with the message, "Restart the controller" will be displayed.

- | | |
|-----|--|
| Yes | The new parameters will become effective. |
| No | The new parameters will not become effective.
The parameters will become effective after the controller is restarted (software reset) or the controller power is reconnected. |



Fig. 8.7 Confirmation

- (5) Closing the parameter edit window
 Attempting to close the parameter edit window will display the following confirmation dialog box with the message, "Save edited data in the Controller?"



Fig. 8.8 Confirmation

- | | |
|--------|---|
| Yes | The edited data will be transferred to the controller → (3), "Writing to the flash ROM" |
| No | The software will close the parameter edit window without saving the edited data. |
| Cancel | The software will not close and go back to the parameter edit window. |

- *The user of the PC software is recommended to back up the parameters when the controller is delivered and also when the system into which the controller has been assembled is started.
- * There are many customizable parameters. It is recommended that you back up the parameters frequently just like you do the programs.

8.3 Transferring a Parameter File

Pay attention to parameter categories when transferring parameter data files to the controller. The controller is shipped with its axis-related parameters set, for each axis, to values appropriate for the type of the actuator connected.

There are three categories of axis-related parameters: axis-specific parameters, driver card parameters and encoder parameters.

Exercise caution when using an existing file containing customized parameters.

Note: If parameter data is lost during parameter writing to the flash ROM due to main power OFF or any other factor, all parameters will be rewritten to initial values. In the case of the X-SEL-P/Q, PX/QX, R/S, RX/SX and RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD Controllers, an error will be detected after power reconnection or software reset since system-specific settings are lost immediately after parameter initialization. Under such conditions, all parameters cannot be transferred to the controller together. Handle the problem in accordance with the "Parameter Recovery Method for X-SEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD Controllers" in the Appendix at the back of this manual.

Note: In case the I/O parameter on RC position use method in X-SEL is different from the parameter in the controller for X-SEL-P/Q, PX/QX, R/S, RX/SX and RXD/SXD with gateway function, '6A1: UBS data composition change error' will occur when software reset is executed after transferring the parameter and writing to the flash ROM. The alarm message will also appear when all backed up data is transferred. (PC interface software version 7.2.0.0 or later)

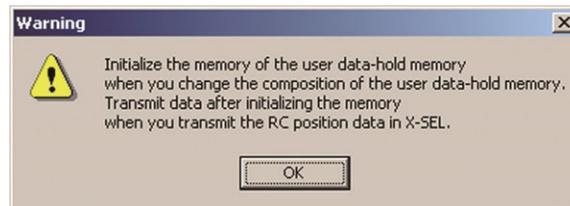


Fig. 8.9 Warning Screen
(When transferring all backed up data)

[I/O parameter on RC position use method in X-SEL]

- No.502: The largest axis No. for RC gateway position data definition
- No.503: The position data points for RC gateway position data definition

If an error message is displayed, user data retained memory must be initialized. However, all the RC-axis position data will be cleared if the user data retained memory is initialized as described in the note. If you need to save the RC-axis position data, please follow the procedures in the note.

Note: All the RC-axis position data will be cleared if the user data retained memory is initialized. Please follow the steps below to backup the RC position data.

1. Open the Controller, RC-Axis Position Data Edit (R), then Axes Position Data Save (S) in the Menu screen to save the RC-axis position data.
2. Change the I/O parameter No. 502, 503.
3. Initialize the user data retained memory.
4. Click File (F) and Open (O) in the Menu screen to open the saved RC-axis data in step 1 and transfer it to X-SEL controller.
Refer to "12. RC Gateway Function Setting" for transferring the RC-axis position data.

8.3.1 Selecting Categories of Parameters to Be Transferred

- (1) Select **Open** from the **File** menu or click the corresponding button in the toolbar. In the file selection dialog box, select the parameter file (extension: .xpm) you want to transfer to the controller. Load the file into the PC software and open the parameter edit window.
- (2) Click the **Transfer to Controller** button in the parameter edit window.
- (3) The Select Parameter Category window (Fig. 8.10) will be displayed. In the case of X-SEL-JX/KX, the screen not showing Actuator specific parameters, transfer from axis # to axis # (Fig. 8.11) will be displayed. In the case of SSEL, the screen not showing Controller basic unit Transmit options (Fig. 8.12) will be displayed. This window has the following items: (The specific items will vary depending on the controller.)

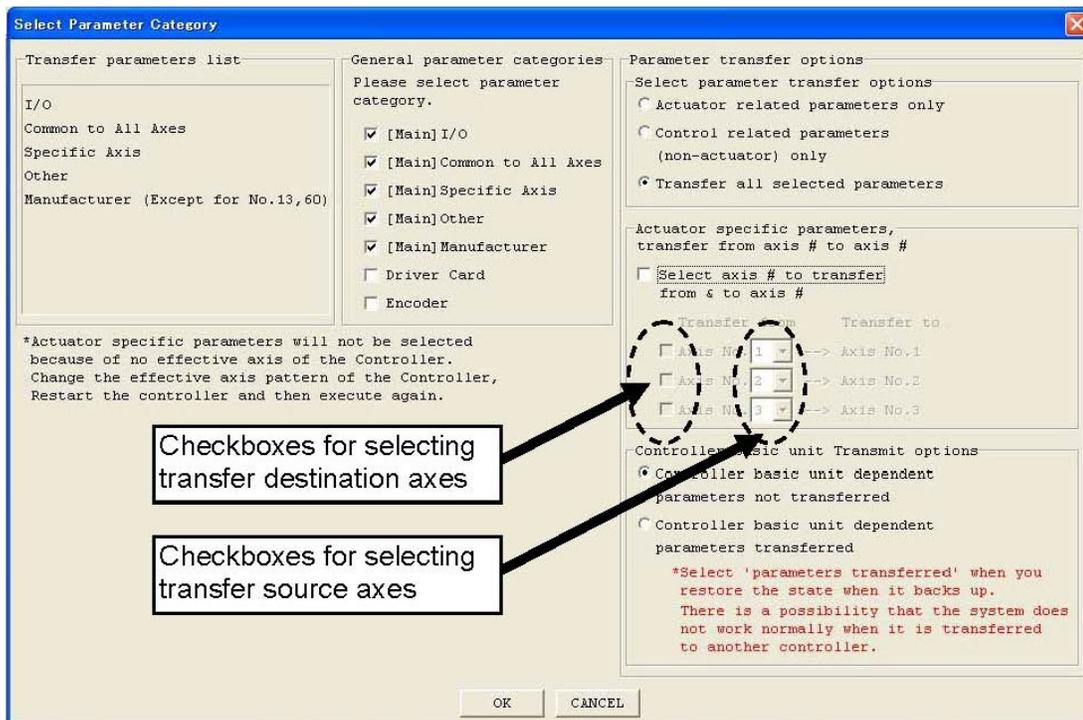


Fig. 8.10 Select Parameter Category Window
(This window is supported by PC software version 3.0.1.0 or later)

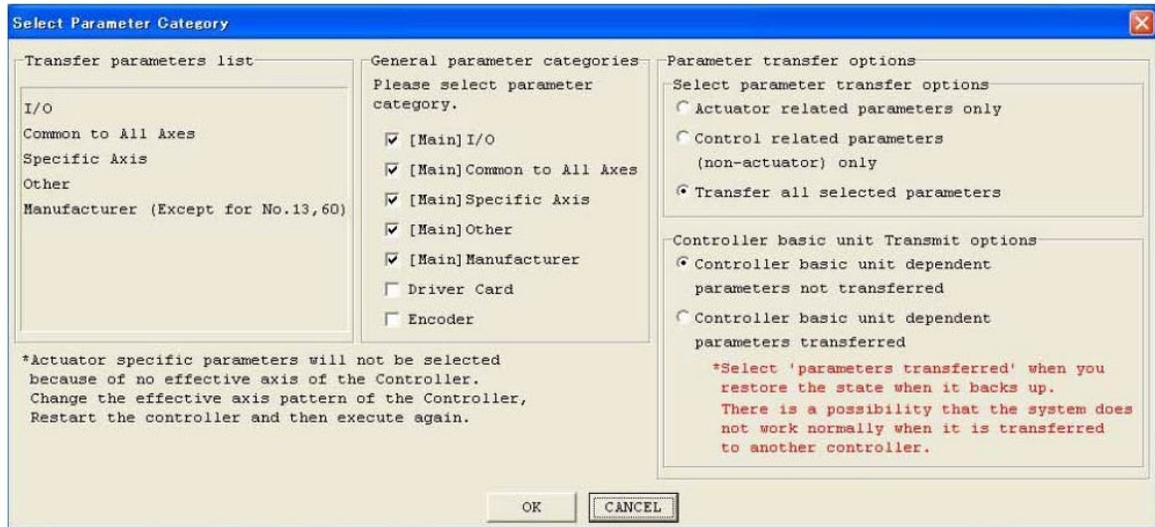


Fig. 8.11 Select Parameter Category Window (X-SEL-JX/KX)
(This window is supported by PC software version 3.0.1.0 or later.)

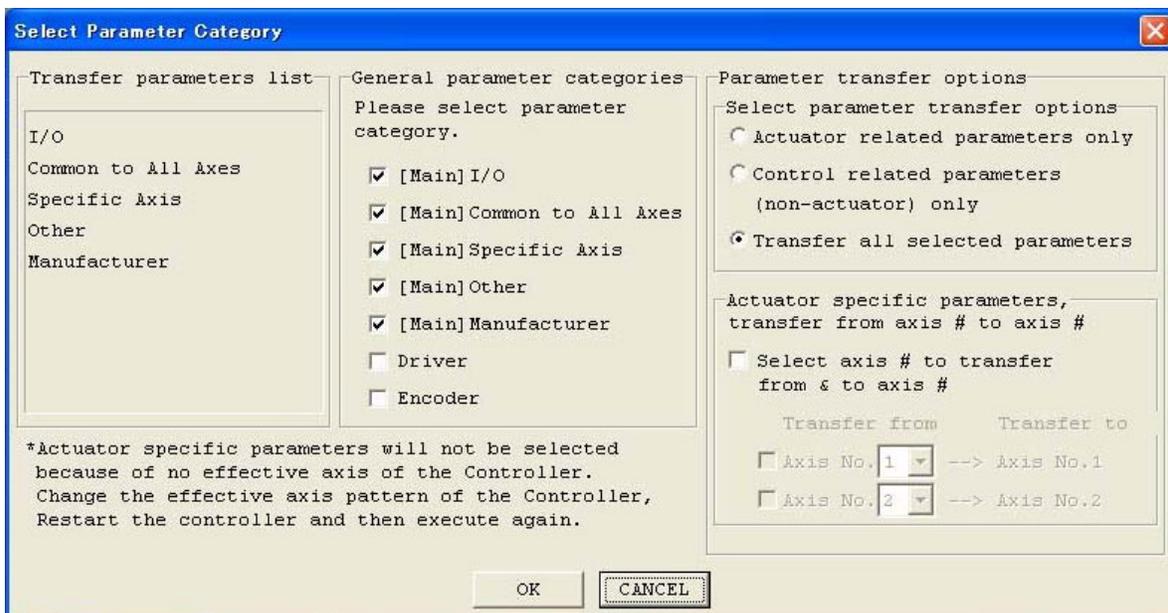


Fig. 8.12 Select Parameter Category Window (SSEL, ASEL, PSEL)
(This window is supported by PC software version 3.0.1.0 or later.)

[1] **Transfer parameters list**

The parameters to be transferred to the controller are displayed in accordance with the selections made in [2] through [5] explained below.

Before clicking **OK**, be sure to check the categories of parameters to be transferred.

[2] General parameter categories

Click the checkbox corresponding to each category of parameters you want to transfer (the clicked checkbox will be selected). Only the parameters of the selected category or categories will be transferred to the controller.

[3] Parameter transfer options – Select parameter transfer options

Of the parameters selected in the General parameter categories group, select whether to transfer actuator-related parameters only, transfer non-actuator parameters only, or transfer all selected parameters. In the following cases, no parameters will be transferred and the warning message, “Parameters will not be transferred” will be displayed.

- Actuator related parameters only is selected under Select parameter transfer options in the Parameter transfer options group when no actuator-related parameter category (Specific Axis, Driver Card or Encoder) is selected in the General parameter categories group.
- Control related parameters (non-actuator) only is selected under Select parameter transfer options in the Parameter transfer options group when no actuator-related parameter category is selected in the General parameter categories group.

[4] Parameter transfer options – Actuator specific parameters, transfer from axis # to axis #

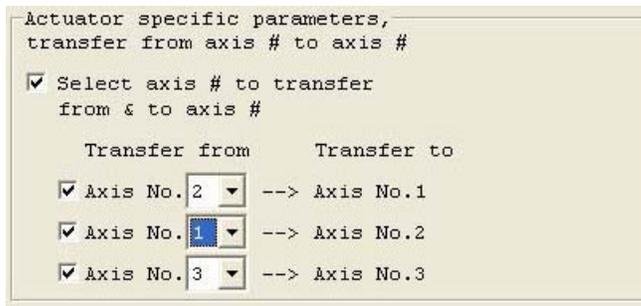
This section will not be displayed for the X-SEL-JX/KX controller.

You can associate axis-related parameters in the source file with a given axis number in the destination controller and transfer them to the specified axis number.

Select ‘Select axis # to transfer from & to axis #.’

Select the checkboxes corresponding to the axes (under Transfer to) you want to transfer the parameters to. They are arranged in the order of axis 1, axis 2, and the like, on the controller side, from the top. Do not select the checkboxes corresponding to the axes you do not want to transfer the parameters to.

In each Transfer from checkbox, specify the axis number whose axis-related parameters in the file you want to transfer.



Actuator specific parameters,
transfer from axis # to axis #

Select axis # to transfer
from & to axis #

Transfer from	Transfer to
<input checked="" type="checkbox"/> Axis No. 2	--> Axis No. 1
<input checked="" type="checkbox"/> Axis No. 1	--> Axis No. 2
<input checked="" type="checkbox"/> Axis No. 3	--> Axis No. 3

In the specification example shown at the left, data for axis 2 in the file is sent to axis 1 in the controller, data for axis 1 in the file is sent to axis 3 in the controller, and data for axis 3 in the file is sent to axis 4 in the controller, respectively. (Data is not sent to axis 3 in the controller.)

Fig. 8.13 Example of Transfer Source/Destination Specifications

Note) Do not select Select axis # to transfer from & to axis # if you want to transfer the axis-related parameters for all axes without changing their axis numbers (i.e., to transfer all axis parameters to the axes of the same numbers), or if no axis-related parameters are transferred. This checkbox is normally not selected. Note that the electrical circuit of each controller depends on the actuator connected to each axis. An attempt to change the axis configuration only by changing parameters may cause problems or errors.

Note) In the case of the X-SEL-PX/QX, RX/SX and RAX/SAX controllers, axis 1 to axis 4 for SCARA are specified simultaneously. They cannot be specified individually, and the axis numbers cannot be selected either. With regard to axis 5 and axis 6 for orthogonal axes, selection can be made between Axis No. 5 and No. 6.

In the case of the XSEL-RX/SX and RAX/SAX controller, selection can be made from Axis No. 5, No. 6, No. 7 and No. 8 for axis 5, axis 6, axis 7 and axis 8 for XSEL-RX/SX orthogonal axes.

Note) In case the numbers of axes differ between the controller side and file side for IXA SCARA Robot (3-axis and 4-axis types), sending and receiving of parameters related to each axis should not be available.

[5] Parameter transfer options – Controller basic unit Transmit options

Select whether to enable transfer of controller basic unit dependent parameters.

If controller basic unit dependent parameters are not included in the selections made in [2], [3] and [4], selecting Controller basic unit type dependent parameters transferred will not transfer the applicable parameters.

Normally, select Controller basic unit dependent parameters not transferred. Select Controller basic unit type dependent parameters transferred only in the following conditions:

- The flash ROM was corrupted, and the parameters must be rewritten.
- Parameters for a wrong controller type were written by mistake, and the parameters must be rewritten.

8.3.2 Default Specifications

In the Parameter transfer options group, you can set the default setting only for Select parameter transfer options in the window accessible by selecting Environment Setup from the Tool menu (Fig. 8.14).

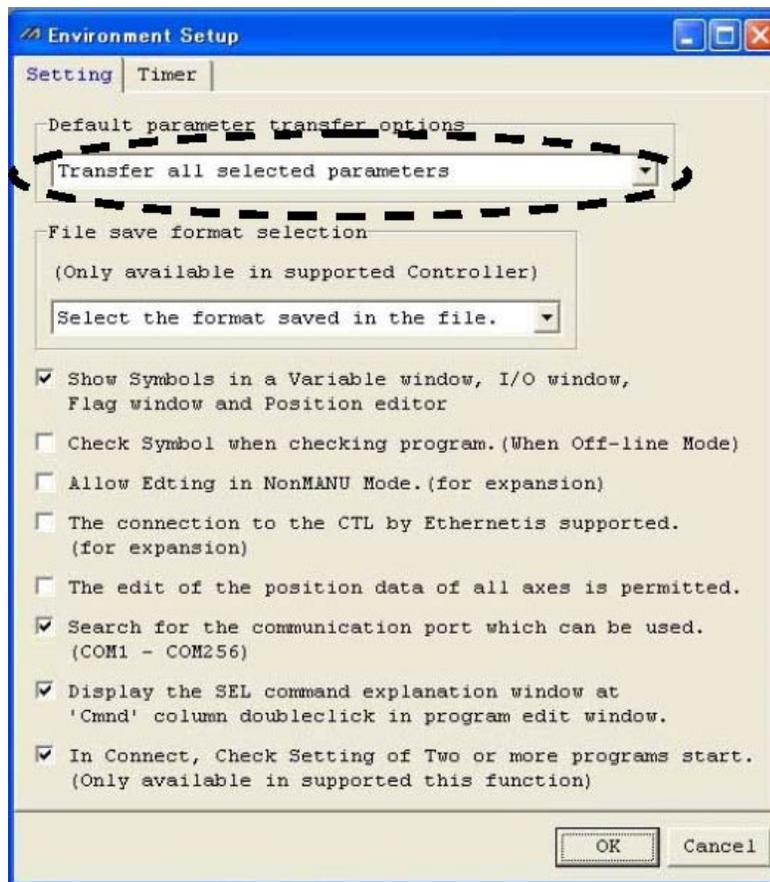


Fig. 8.14 Environment Setup

8.4 Easy Parameter Setup

Parameter edit is to be conducted in the setting screen of each feature for those features listed below. (V12.02.00.00 or later)

- RS-232C
Setup of serial communication by general RS-232C port can be conducted.
- Fieldbus (CC-Link, DeviceNet, PROFIBUS-DP, EtherCAT, CC-Link IE Field)
Setup of Fieldbus communication and I/O assignment can be conducted.
- Ethernet
Setup of I/O communication, IAI protocol B/TCP communication and program message communication by Ethernet can be conducted.
- Vision System
Setup of Vision System I/F feature can be conducted.

Establish the setting for the channel available for SIO communication to the SIO module mounted to the extension SIO (V12.03.00.00 or later) extension I/O slot. (TTA, MSEL-PC/PG, PCX/PGX)

8.4.1 Explanation of Easy Parameter Setup

- (1) Click Easy Parameter Setup button in **Edit Parameter window**.
Or, select Parameter → Easy Parameter Setup from the menu.

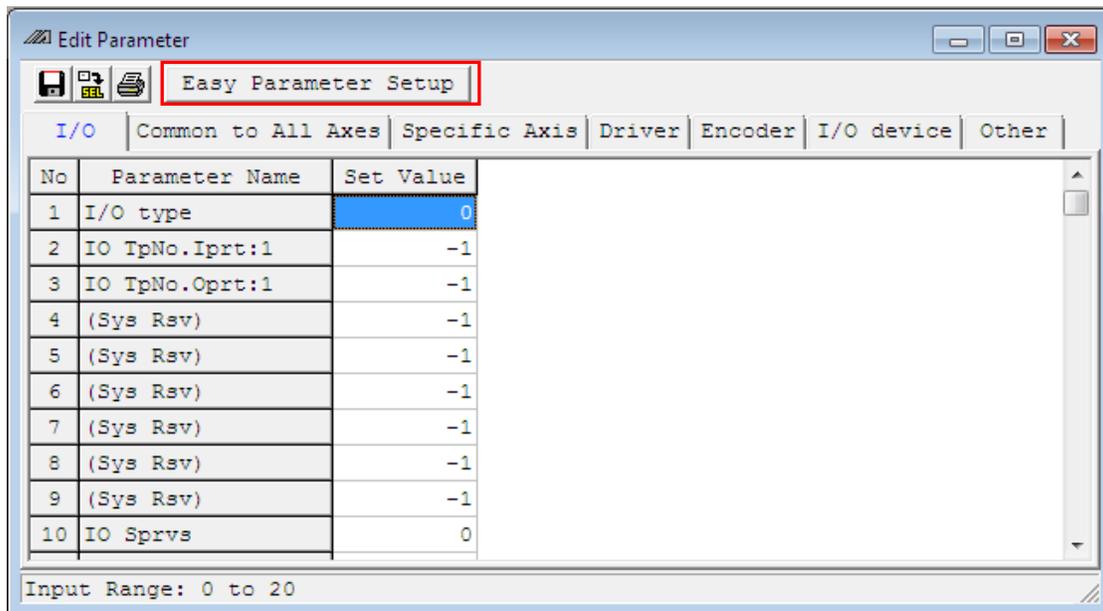


Fig. 8.15 Edit Parameter Window

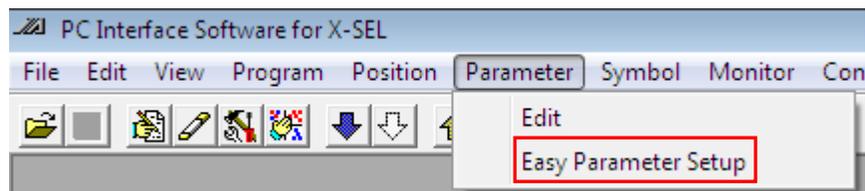


Fig. 8.16 Menu Command

- (2) The top menu of Easy Parameter Setup appears.
Click on a button for a feature of which you would like to set up or change the parameter.

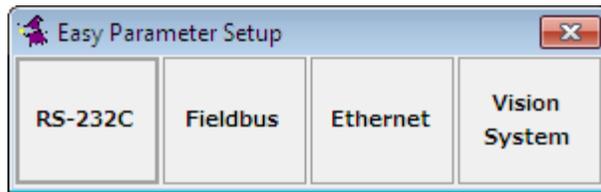


Fig. 8.17 Easy Parameter Setup Top Menu

- (Note) For some controllers, Fieldbus button may be replaced with a network name that is equipped to a controller.
(Note) The features applicable for easy setup may differ depending on the controller model. Refer to the table below.

Easy Parameter Setup Supported Feature List

	RS-232C	Fieldbus	Ethernet	Vision System	Extension SIO
X-SEL-J/K	-	○	○	-	○
X-SEL-JX/KX	-	○	○	-	○
X-SEL-P/Q	○	○	○	○	-
X-SEL-PX/QX	○	○	○	-	-
X-SEL-R/S	○	○(Note 1)	○(Note 2)	○	-
X-SEL-RX/SX	○	○(Note 1)	○(Note 2)	-	-
X-SEL-RXD/SXD	○	○(Note 1)	○(Note 2)	-	-
X-SEL-RA/SA	○	○(Note 1)	○	○	-
X-SEL-RAX/SAX	○	○(Note 1)	○	-	-
X-SEL-RAXD/SAXD	○	○(Note 1)	○	-	-
SSEL	-	○(Note 1)	○(Note 2)	-	-
ASEL	-	○(Note 1)	○(Note 2)	-	-
PSEL	-	○(Note 1)	○(Note 2)	-	-
TT	-	○	○	-	-
TTA	-	○(Note 1)	○(Note 2)	○	○
MSEL-PCX/PGX	-	○(Note 1)	○(Note 2)	-	○
MSEL-PC/PG	-	○(Note 1)	○(Note 2)	○	○

- : Setup Unavailable ○ : Setup Available

- Note 1 Setup can be conducted when a network board is mounted. Display on the button will show a name of the mounted network.
Note 2 Setup is available when Ethernet board is mounted.

- (3) For example, if you click RS-232C button, the setup window for RS-232C will appear. Set up or change the parameters.

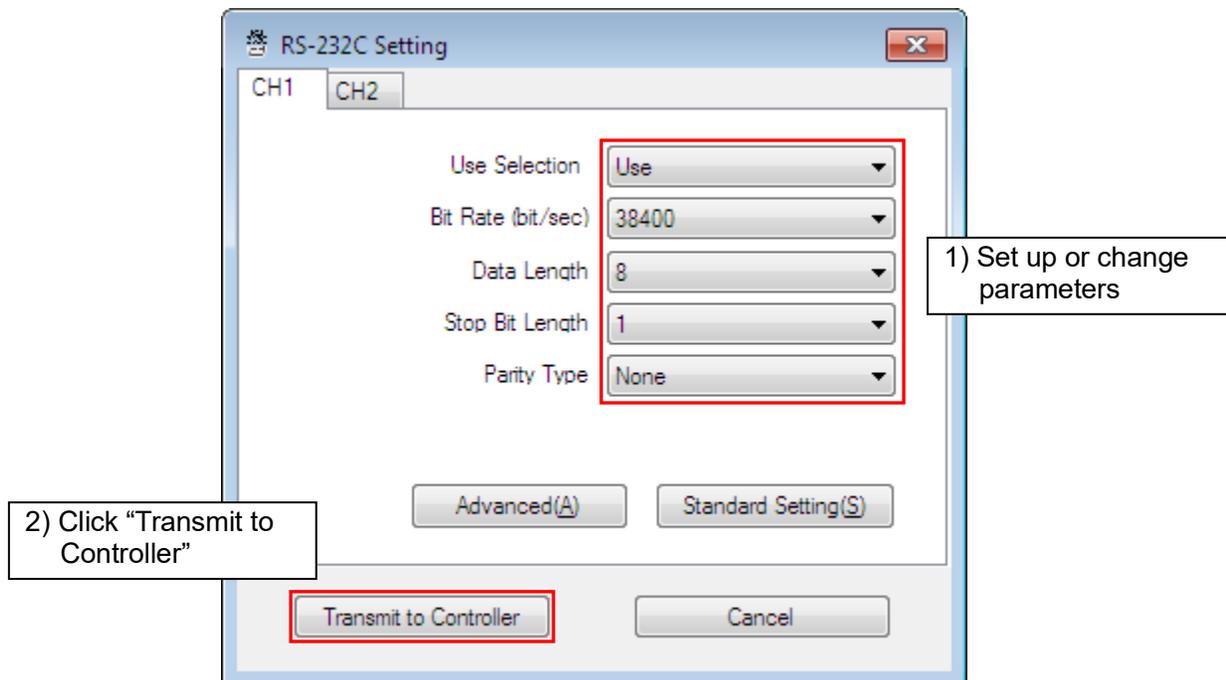


Fig. 8.18 Example for Setup Window (RS-232C)

- (4) After setting up or changing the parameters, click **Transmit to Controller** and the setup change data gets transmitted to the controller and the setup window closes. Once the setup window is finished, close the top menu of Easy Parameter Setup window, and the confirmation for flash ROM writing of parameters will be displayed. Once the flash ROM writing is complete, the controller will get rebooted.

(Note) **Transmit to Controller** Button is displayed when **Easy Parameter Setup** Button is clicked during online edit (controller edit) of parameters, or “Parameter” → “Easy Parameter Setting” is selected in the menu.

(Note) If editing the parameters saved in the PC offline and clicking **Easy Parameter Setup, Transmit to Controller** Button in the setup window changes to **Reflect to Edit Parameter Window** Button. Click **Reflect to Edit Parameter Window** Button, and the settings and changes conducted in Easy Parameter Setup will be reflected (changed) to the setting values in the Edit Parameter window. (But, controller transmission will not be executed.) As parameters will not be transmitted to the controller, close the top menu of Easy Parameter Setup window, go to Edit Parameter window to save the parameter file and transmit the data to the controller.

(Note) If there is data in edit (data in red writing) in Edit Parameter window during online edit (controller edit) of parameters, Easy Parameter Setup feature cannot be used. If you click **Easy Parameter Setup** Button, a message will appear saying “There is data not written to the controller. Write to the controller first, or close the edit window”.

(Note) To have Easy Parameter Setup, it is necessary that .NET Framework 4.0 (Full) or 4.5 is installed to the PC on which the PC software for X-SEL is used.

If attempting to install the PC software for X-SEL (V12.02.00.00 or later) to a PC that .NET Framework 4.0 (Full) or 4.5 is not installed, installation window for .NET Framework 4.0 (Full) will appear. Click "Install" button to install .NET Framework 4.0 (Full).

PC software for X-SEL will be installed after installation of .NET Framework 4.0 (Full) is completed. (Installation of .NET Framework 4.0 (Full) will not be held if there is already .NET Framework 4.0 (Full) or 4.5 installed.)

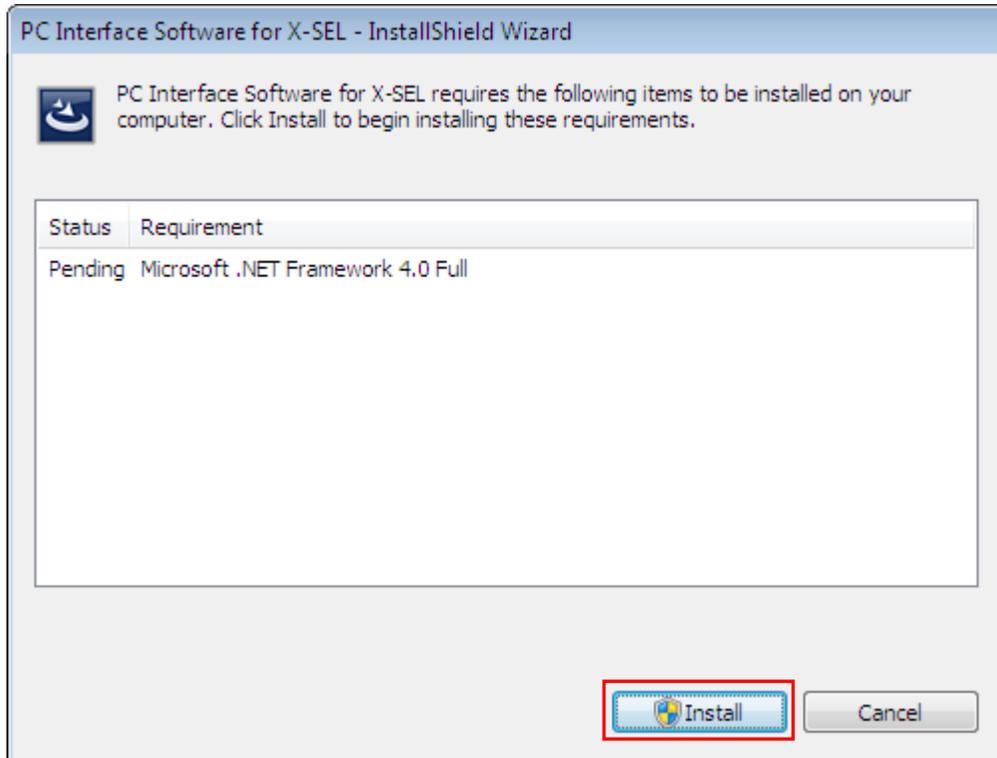


Fig. 8.19 .NET Framework4.0 (Full) Install Window

[Caution 1]

Administrative permission is required to install .NET Framework 4.0 (Full).
Log in to the user with the administrative permission for installation.

[Caution 2]

If .NET Framework 4.0 (Full) is installed to Windows XP, .NET Framework 1.0 gets disabled to install.
When it is necessary to use .NET Framework 1.0, install .NET Framework 1.0 before installing .NET Framework 4.0 (Full).

If it is necessary to use .NET Framework 1.0 after .NET Framework 4.0 (Full) is already installed, have the following process.

- 1) Uninstall .NET Framework 4 Extended.
- 2) Uninstall .NET Framework 4 Client Profile.
- 3) Install .NET Framework 1.0.
(Please prepare the installer for .NET Framework 1.0 on your own)
- 4) Install .NET Framework 4.0(Full).
(You can install .NET Framework 4.0 (Full) at the time of installing the PC software for X-SEL.)

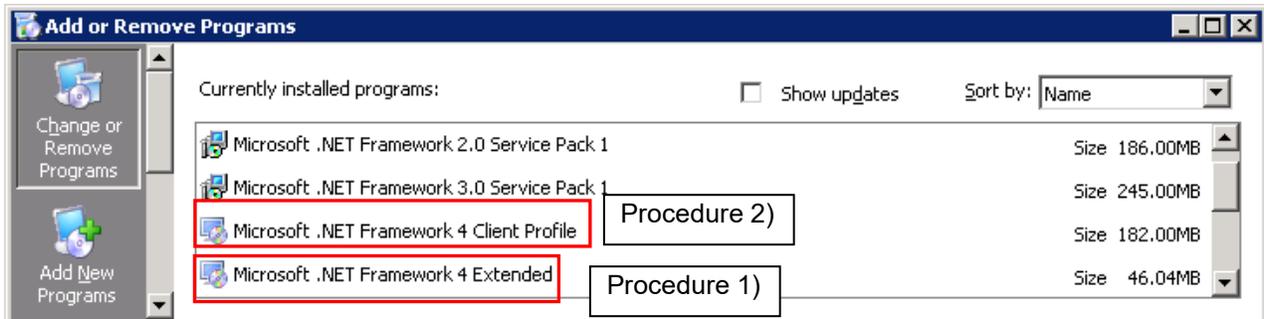


Fig. 8.20 Procedures to uninstall .NET Framework 4

8.5 How to Initialize XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, PSEL, MSEL high resolution type, TTA AC servo type / high resolution type Parameters (at the time of shipment)

Note: Initialization of parameters (at the time of shipment) can be performed only for XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL, PSEL, MSEL-PCX/PGX, PC/PG Controller high resolution type and TTA AC servo type / high resolution type.
(It cannot be use for MSEL-PCX/PGX, PC/PG and TTA with current encoder resolution.)

- (1) Right-click a blank space in the tool bar (refer to Fig. 8.21 while pressing the Ctrl button. The Input Password will be displayed as shown in the Fig. 8.22



Fig. 8.21 Menu Bar



Fig. 8.22 Input Password Screen

Right-click a blank space in the tool bar while pressing **Ctrl**.

- (2) Enter a password (5119) in the displayed Input Password screen. The Parameter of Shipping menu will be displayed in the Initialize Memory menu (Fig. 8.23).

* The password will be valid until the end of application once it has been entered.

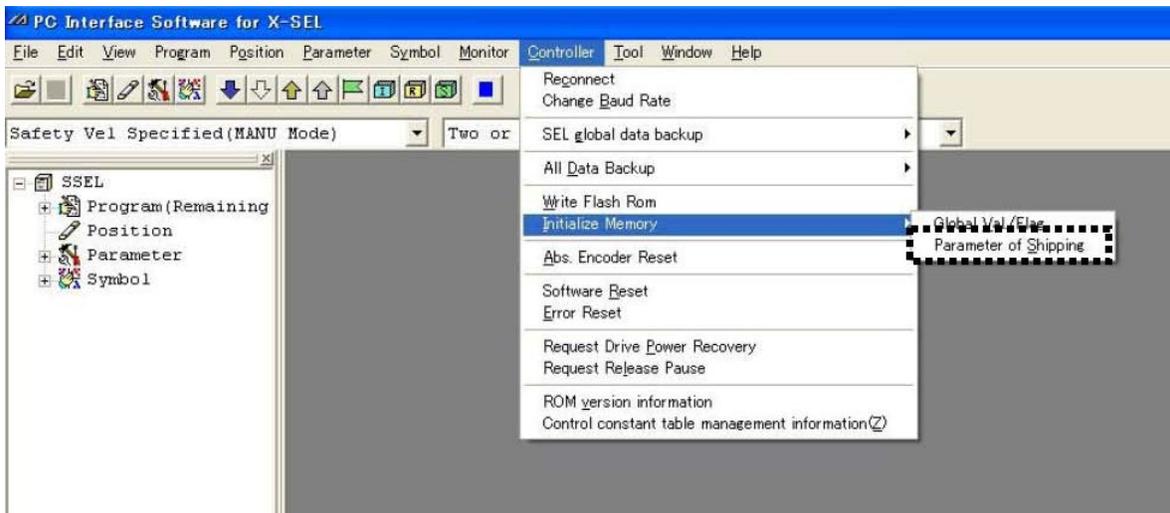


Fig. 8.23 Menu Bar (Parameter Initialization [Shipment Values]: Example of SSEL)

- (3) Selecting the displayed menu Parameter of Shipping displayed in (2) will display a dialog in Fig. 8.24. If you have no problem, click Yes.

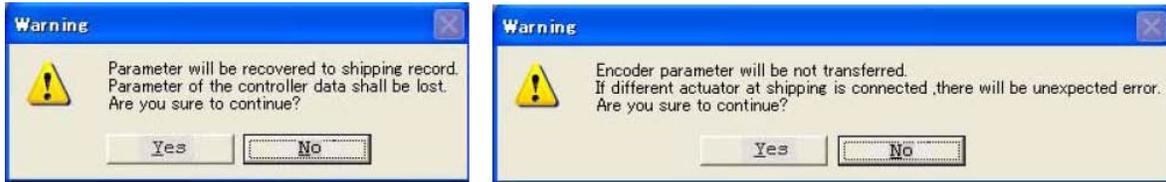


Fig. 8.24 Warning Dialog

- (4) After completion of rewriting, write the parameters to the flash ROM.

Note: Encoder parameters are not initialized. Because of this an unexpected error may be detected when the actuator different from the one at the time of shipment is connected.

8.6 Parameter Comparison

Comparison of the parameter files below can be performed. (V13.02.04.00 or later)

- Saved parameter files
- Parameters in the controller and saved parameters

[Comparable Parameter Files]

Parameters in the same controllers and files of the same activated axis pattern at the same time

8.6.1 How to Compare Parameters

Choose either to open parameter files by selecting **File (F)** → **Open (O)** or to select **Parameter (P)** → **Edit (E)** to open the parameter edit window.

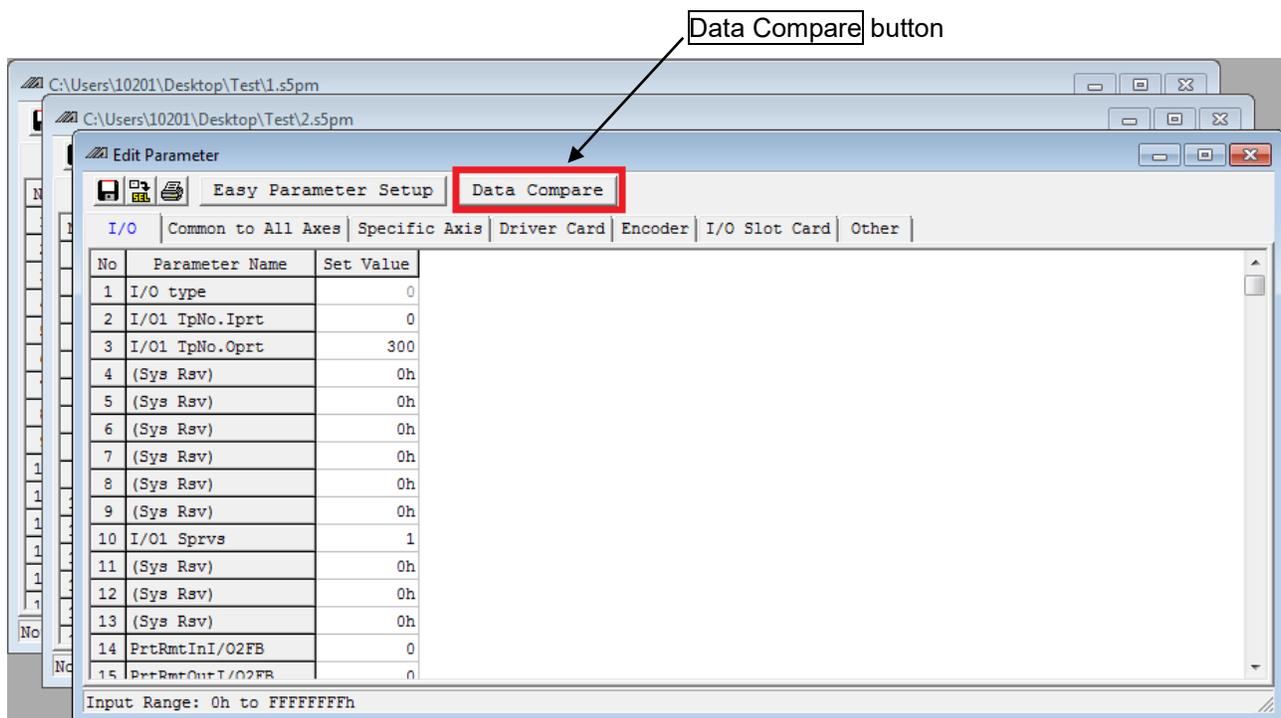


Fig. 8.25 Edit Parameter Window

Click **Data Compare** button located on the right of **Easy Parameter Setup** button.

Parameter files which are open should be subject to comparison.

A dialog will open if there are files exist available for parameter comparison.

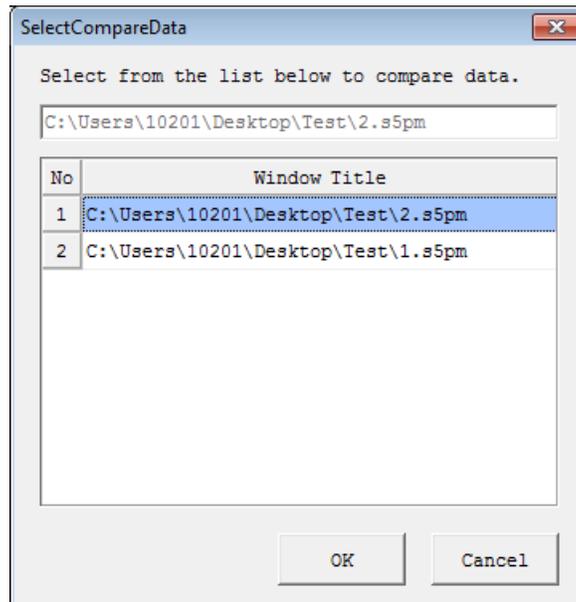


Fig. 8.26 Select Dialog Window

A note will show up stating "There is no parameter comparable data. Make sure that the file of the same controller type and same effective axis pattern or the same controller type and same effective axis pattern as the data in the controller are open." when there is no parameter exist available for parameter comparison.

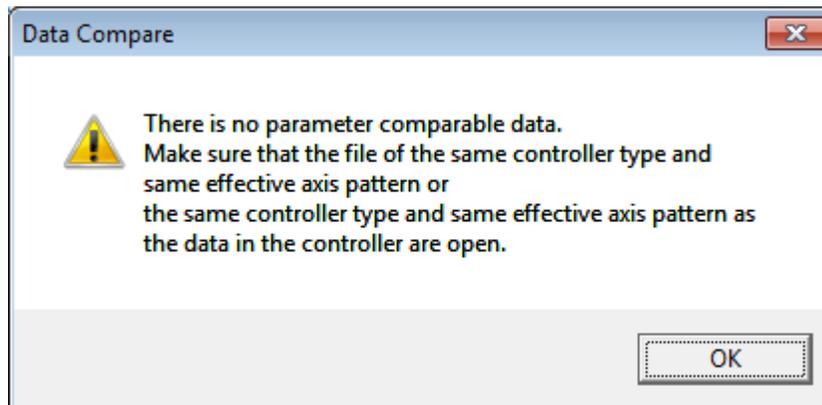


Fig. 8.27 Message

Select parameter data to be compared in the select dialog and press **OK** button. Parameter comparison will start.

After the parameter comparison is finished, the form gets changed and numbers in difference are displayed and parameters in difference turns to yellow.

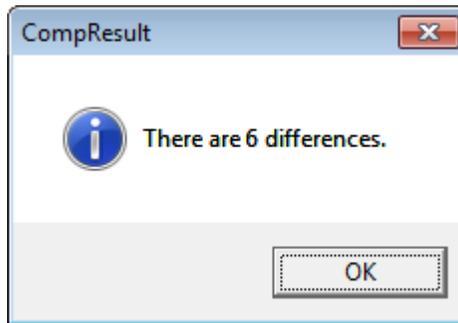


Fig. 8.28 CompResult

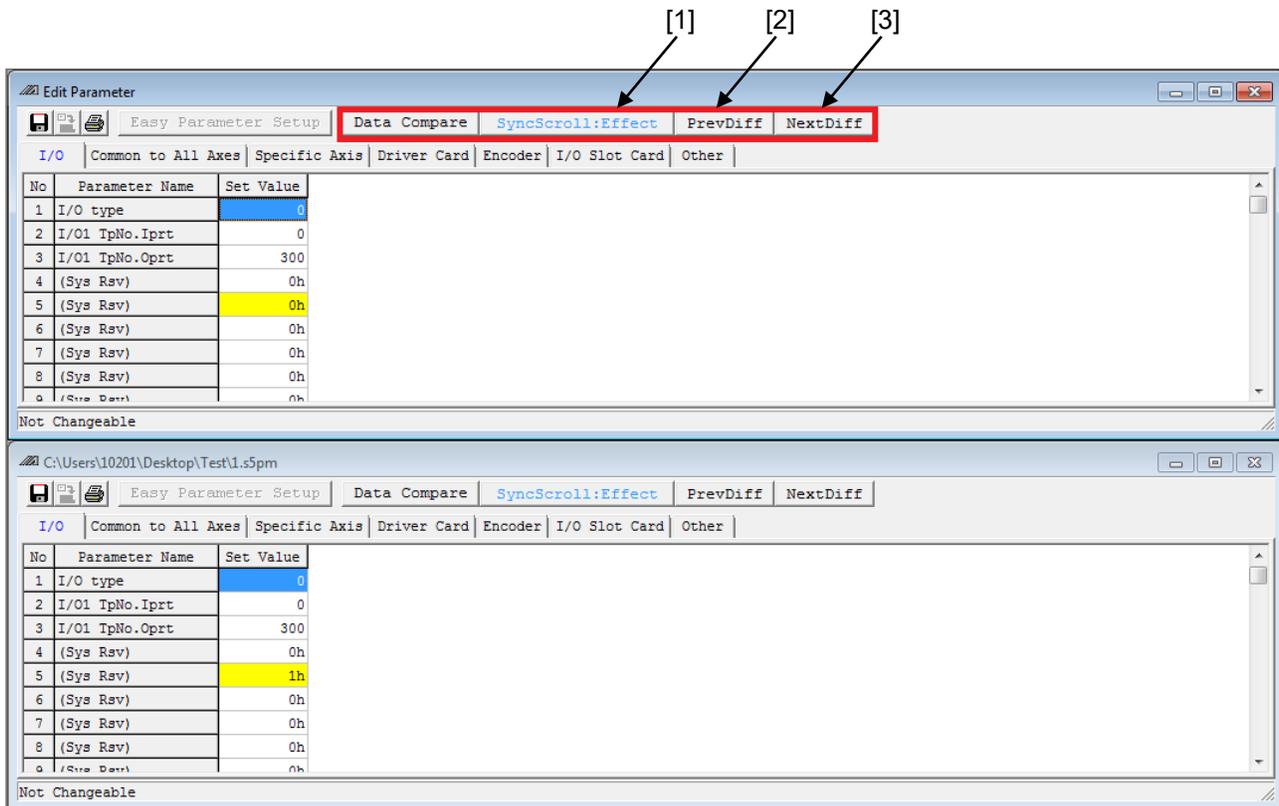


Fig. 8.29 Edit Window after Comparison Result

- [1] **SyncScroll: Effect** : When it is displayed in blue, the scroll of the grid gets synchronized to the move. The form that the button is not pressed also moves. Tab movement also synchronizes.
- SyncScroll: Invalid** : When it is displayed in black, each form scrolls and tab moves individually.
- [2] **PrevDiff** : The actuator moves to the nearest previous difference from the cell position of which PrevDiff button was pressed.
- [3] **NextDiff** : The actuator moves to the nearest previous difference from the cell position of which NextDiff button was pressed.

9. Symbol Edit Window

9.1 About Symbols

In the X-SEL controller, variable numbers, flag numbers and other values can be treated as symbols.

(1) Values supporting symbol conversion

The following values can be treated as symbols:

Variable number, flag number, tag number, subroutine number, program number, position number, input port number, output port number, input/output ports, axis number, constant

(2) Symbol description rules

[1] First character: A single-byte alphabet or single-byte underscore.

[2] Second and subsequent characters: Any characters corresponding to ASCII codes 0x21 to 0x7e that can be entered from the keyboard.

[3] Maximum number of characters: 9 single-byte characters (or 8 single-byte characters in the case of a character string literal).

[4] Definition of the same symbol for two or more values within a given function is prohibited. (The same symbol can be defined for two or more local values that are each used in a different program.)

[5] Definition of the same symbol for two or more flag numbers, input ports, output ports and/or input/output ports is prohibited.

(The same symbol can be defined for two or more local flags/ports that are each used in a different program.)

[6] Definition of the same symbol for two or more integer variable numbers and/or real variable numbers is prohibited.

(The same symbol can be defined for two or more local variables that are each used in a different program.)

[7] Definition of the same symbol for two or more integer constants and/or real constants is prohibited.

(3) Number of symbol definitions: Up to 1,000 (Up to 500 for SSEL (not applicable for memory capacity increase), ASEL and PSEL controllers, Up to 1000 for SSEL (applicable for memory capacity increase))

(4) Number of symbol uses allowed in commands: Up to 5,000 times including character string literals (Up to 2,000 times for ASEL and PSEL controllers)

* Defining the input condition, operands 1 and 2 and output in a step all using symbols is equivalent to four symbol uses in one step.

9.2 Explanation of the Symbol Edit Window

- (1) Click Symbol (Y) from the menu bar, and then select Edit (E).
- (2) The symbol edit window (Edit Symbol) will open.



Save to File

Clicking this button will open a dialog box where you can save the parameter data to a file under a desired name.

Note: For the X-SEL-P/Q compatible with increased memory, PX/QX (with gateway function), SSEL controller symbols of programs No.65 or later and positions No.4001 or later cannot be saved by the Symbol File Format 1 (normal format). Save them by the Symbol File Format 2 (extended format).



Transfer to Controller

Clicking this button will transfer the parameter data to the controller.



Print

Clicking this button will print the parameter data.

Select the scope as Global or Local. If Local is selected, specify a desired program number.

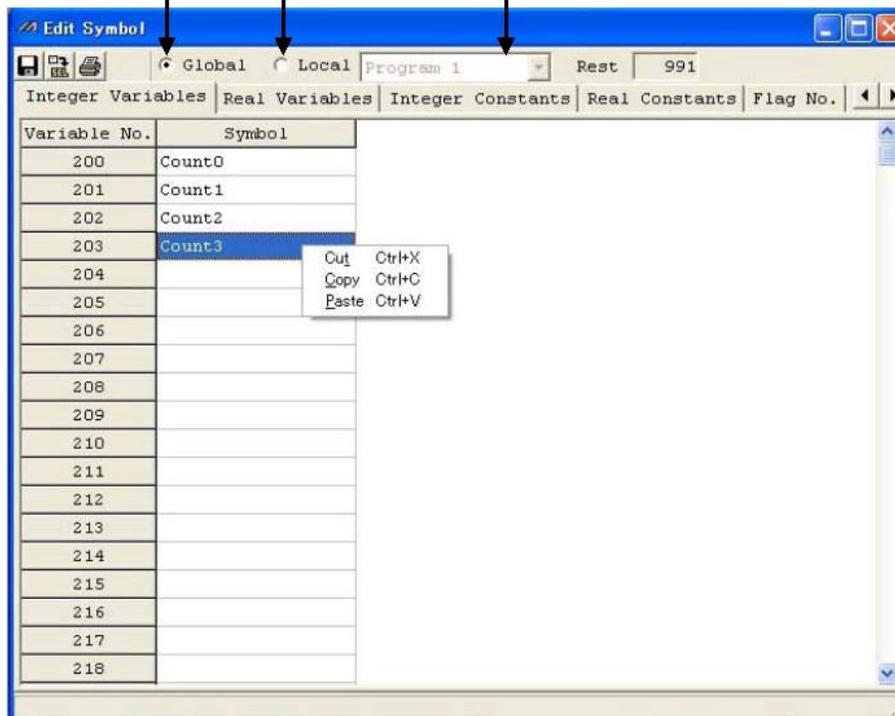


Fig. 9.1 Symbol Edit

* The above symbol edit window is for integer variables. You can display other symbols by clicking each category tab.

- (3) Right-click in the symbol edit window will display the pop-up menu which has the options of Cut (T), Copy (C) and Paste (P).

The cut or copied data can be pasted only in the symbol edit window. (The data cannot be pasted in the other windows such as the program edit window and position data edit window.)

(Supported by software version 4.0.0.0 or later)

(4) A symbol character string can be dragged and dropped between the symbol edit window and program edit window.

By dragging a symbol character string on the symbol edit window while pressing the Ctrl key and then dropping it into any cell of Cnd, Operand 1, Operand 2 and Pst, the symbol character string can be copied. The reverse operation (drag & drop operation from the program edit window to the symbol edit window) is also available.

(Supported by software version 4.0.0.0 or later)

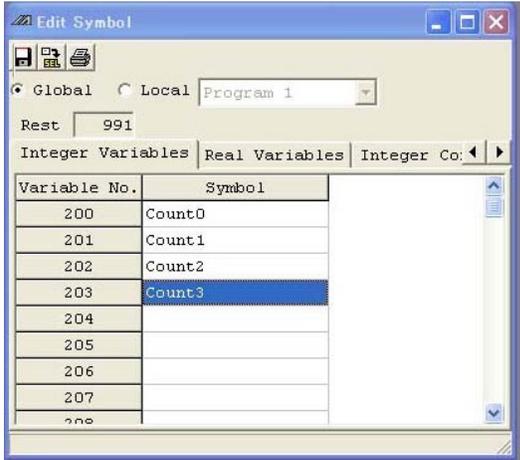


Fig. 9.2 Symbol Edit Window

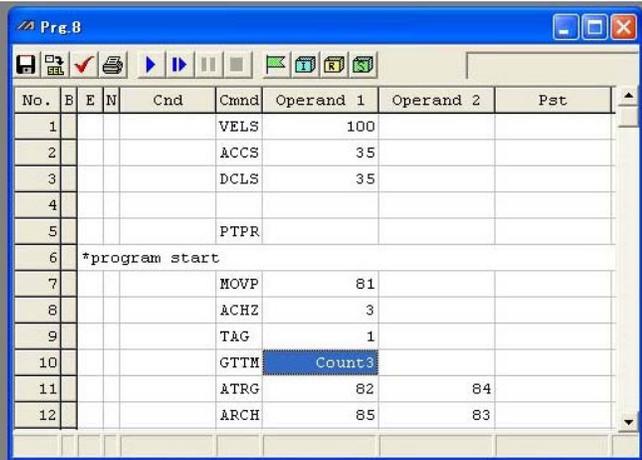


Fig. 9.3 Program Edit Window

In the coordinate system definition data edit window, clicking Edit (E) from the menu bar and then selecting Undo (U) can cancel up to the most recent 10 input operations.

Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.

However, the cancel function will become disabled when any of the following operations is performed:

- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 9.4 will be displayed.

Clicking Yes will cancel the operation executed immediately before.

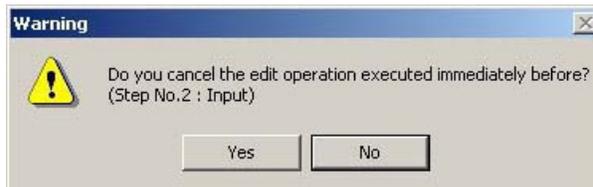


Fig. 9.4 Warning

- (5) Only XSEL-RA/SA, RAX/SAX and RAXD/SAXD are available for setting with binary and hexadecimal systems in the definition value for the integral constants.

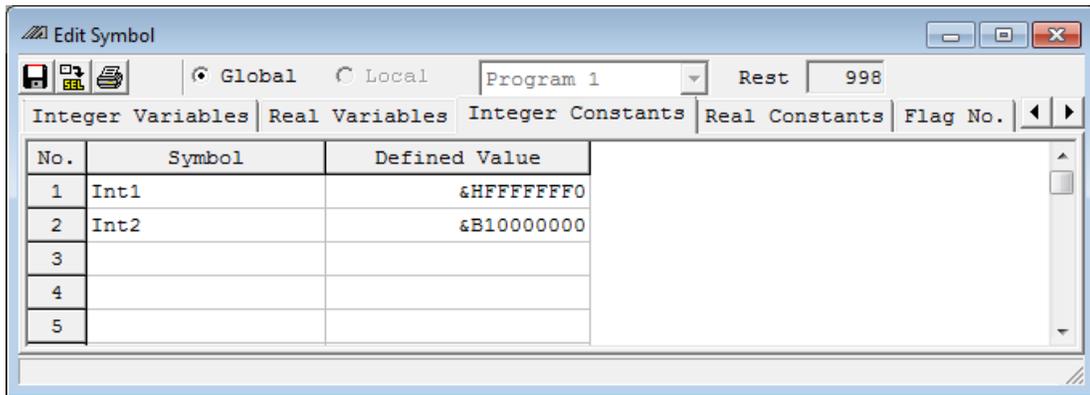


Fig.9.5 2 Setting with Binary and Hexadecimal Systems

[How to set up]

When using the binary numbers, apply “&B” at the top of the value.

When using the hexadecimal numbers, apply “&H” at the top of the value.

Eight digits can be input at maximum for binary and hexadecimal numbers.

* In the operand to input the axis pattern (the operand input values in binary system), do not apply “&B” at the top to input with the binary numbers.

* Binary numbers are treated as an integer with no signal.

(e.g. &B11111111 = 255)

* Hexadecimal numbers treated as an integer with a symbol.

(e.g. &HFFFFFFF = -1)

9.3 Saving Symbol Data and Closing the Edit Window

- (1) Saving to a file the symbol data you are editing

Click the Save to File button in the symbol edit window.

This is the same as clicking File (F) and then selecting Save As (A).

After clicking Save to File button, File Save Select screen will be displayed.

For the X-SEL-P/Q, PX/QX controller compatible with increased memory (with gateway function), symbols of programs No.65 or later and positions No.4001 or later cannot be saved by the Symbol File Format 1 (normal format).

In case of the SSEL controller, you can not select the Symbol File Format 1 (normal format) for Program No. 65 or later, Position No.1501 or later. Number of Symbol is MAX500.

Save them by the Symbol File Format 2 (extended format)

(PC interface software version 7.2.0.0 or later)

Caution: After placing a check mark at 'Save it by format2 always.' the data will be always saved with Format 2 and this screen will not be displayed again. For displaying this screen, go to the Environment Setup screen (15. Tool).

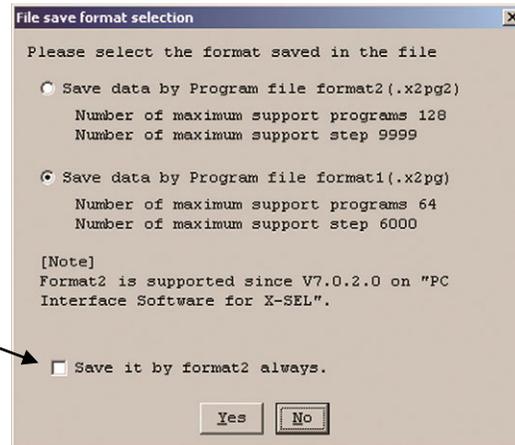


Fig. 9.6 File Save Select Screen

- (2) Transferring to the controller the symbol data you are editing You can save the symbol data you are editing to the controller's memory.

Click the Transfer to Controller button in the symbol edit window.

This button is selectable only in the online edit mode.

* The data saved by Symbol File Format 1 (normal format) can be transferred to the X-SEL-P/Q, PX/QX (with gateway function), SSEL controller compatible with increased memory.

All symbols having been saved in the controller before transferring will be cleared.

* The data saved by Symbol File Format 2 (extended format) can be transferred to a controller incompatible with increased memory. All symbols having been saved in the controller before transferring will be cleared.

(3) Writing to the flash ROM

Once the symbol has been transferred to the controller, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.



Fig. 9.7 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL,
PSEL, TTA, MSEL-PCX/PGX)

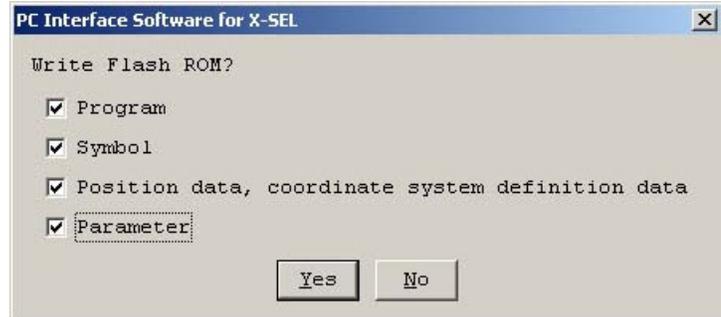


Fig. 9.8 Confirmation
(X-SEL-JX/KX, PX/QX)

In case of SSEL, ASEL, PSEL, X-SEL-P/Q and PX/QX compatible with increased memory (with gateway function), R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD the following screens will be displayed.

(PC interface software version 7.2.0.0 or later)

This is not displayed for
XSEL-RA/SA, RAX/SAX,
RAXD/SAXD, SSEL,
ASEL and PSEL.

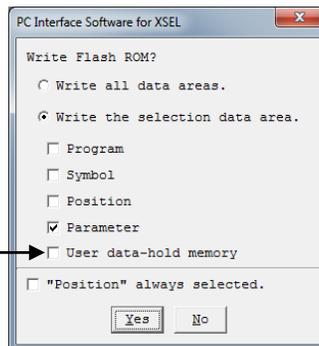


Fig. 9.9 Confirmation
(X-SEL-P/Q, R/S, RX/SX,
RXD/SXD, RA/SA, RAX/SAX,
RAXD/SAXD, SSEL, ASEL, PSEL)

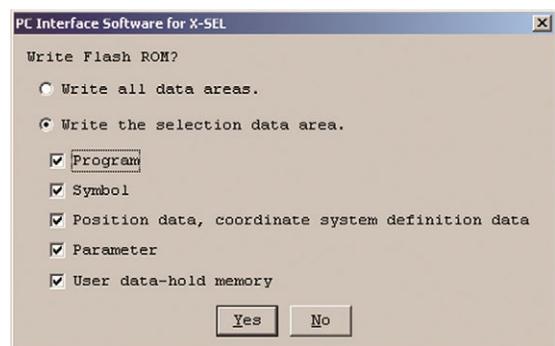


Fig. 9.10 Confirmation
(X-SEL-PX/QX)

Click and select a desired item (Symbols, etc.) to write to the flash ROM.

Click **Yes** → The memory data will be written to the flash ROM.

Click **No** → The memory data will not be written to the flash ROM.

If No is selected, the controller will clear all data in its memory after a reset (i.e., after the controller power is reconnected or a software reset is executed), and then load the data from the flash ROM. (The controller will operate in accordance with the transferred data until a reset is executed.)

* The number of writing to the flash ROM is limited (approx. 100,000 times). If you do not write all the data, select Write Selected Data Region and write to the flash ROM.

(4) Closing the symbol edit window

Attempting to close the symbol edit window will display the following confirmation dialog box with the message, "Save edited data in the Controller?"



Fig. 9.11 Confirmation

Yes

The edited data will be transferred to the controller.

No

The software will close the symbol edit window without saving the edited data.

Cancel

The software will cancel the operation and return to the symbol edit window.

(Note) If a symbol in use in SEL program gets deleted or changed, C47 "Symbol Searching Error" could occur when the SEL program is executed.

In such a case, have the SEL program that refers the deleted or changed symbol transferred again to the controller.

* In case the error would not be cleared, it may be necessary to edit the SEL program again.

10. Coordinate System Definition Data Edit Window

10.1 Explanation of Coordinate System Definition data Edit Window

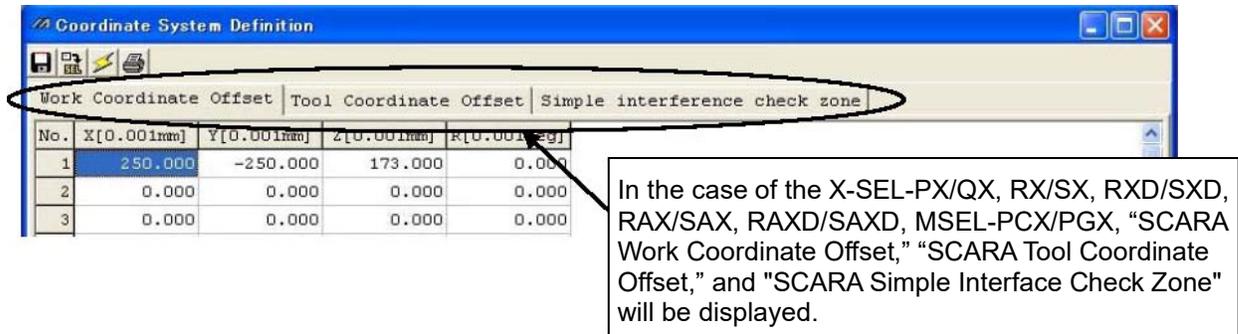


Fig. 10.1 Coordinate System Definition Data Edit Screen

- Click Coordinate System (D) from the menu bar, and then select Edit (E).
 In the coordinate system definition data edit window, clicking Edit (E) from the menu bar and then selecting Undo (U) can cancel up to the most recent 10 input operations.
 Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.
 However, the cancel function will become disabled when any of the following operations is performed:
 - Transfer of data on the edit screen to the controller
 - Saving data on the edit screen to a file
 - Closing of the edit screen

When this operation is performed, the warning screen in Fig. 10.2 will be displayed. Clicking Yes will cancel the operation executed immediately before.

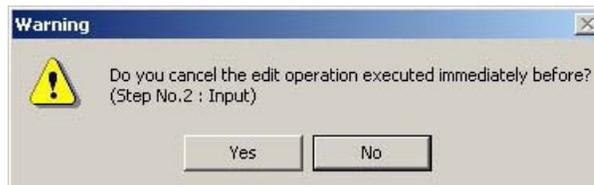


Fig. 10.2 Warning

- (2) The coordinate system definition data edit window will be displayed.
This window provides the following items:

A. Work Coordinate System

Offset No.	Indicate the work coordinate system No.
X [mm]	Enter the offset data for the X-axis.
Y [mm]	Enter the offset data for the Y-axis.
Z [mm]	Enter the offset data for the Z-axis.
R [deg]	Enter the offset data for the R-axis.

B. Tool coordinate System

Offset No.	Indicate the tool coordinate system No.
X [mm]	Enter the offset data for the X-axis.
Y [mm]	Enter the offset data for the Y-axis.
Z [mm]	Enter the offset data for the Z-axis.
R [deg]	Enter the offset data for the R-axis.

C. Simple Interference Check Zone

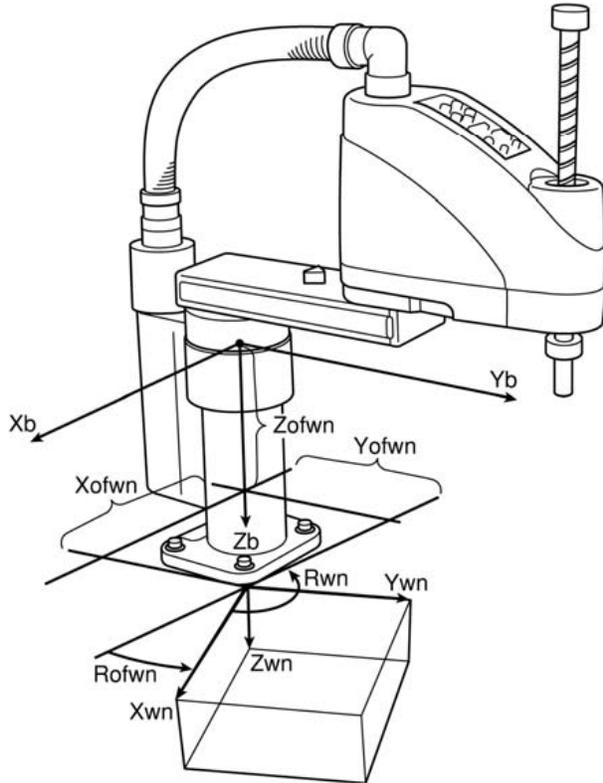
Zone No.	Indicate the zone No.
Coordinates No.	Indicate the coordinate No. Coordinates 1 and Coordinates 2 are available.
X [mm]	Enter the interference range data for the X-axis.
Y [mm]	Enter the interference range data for the Y-axis.
Z [mm]	Enter the interference range data for the Z-axis.
R [deg]	Enter the interference range data for the R-axis.

Physical output port No.

Global flag No.	Select the output number inside the check zone.
Error type	Select the error type. 0 = Error handling is not performed. 1 = Message level error is output. 2 = Movement release level error is output.

10.2 Work Coordinate System

A total of 32 different coordinates, provided as a combination of three-dimensional orthogonal coordinates and rotation axis coordinates, are defined by the offset of each axis with respect to the base coordinate system. Note that work coordinate system No. 0 is reserved in the system as the base coordinates (= work coordinate system offsets are 0).



X_{ofwn} : X work coordinate offset
 Y_{ofwn} : Y work coordinate offset
 Z_{ofwn} : Z work coordinate offset
 R_{ofwn} : R work coordinate offset

X_{wn} : Work coordinate system, X-axis
 Y_{wn} : Work coordinate system, Y-axis
 Z_{wn} : Work coordinate system, Z-axis
 R_{wn} : Work coordinate system, R-axis

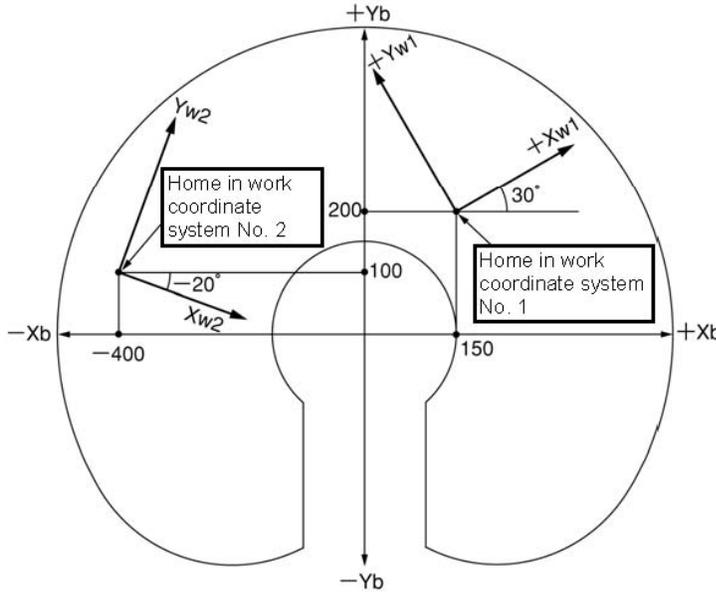
(n indicates work coordinate system No.)

(1) Setting of work coordinate system

Set the offsets with respect to the base coordinate system.

• Setting example of work coordinate system

When defining work coordinate system No. 1 and No. 2 as illustrated below.



Set the offsets for work coordinate system No.1 as $X_{ofw1} = 150$, $Y_{ofw1} = 200$, $Z_{ofw1} = 0$ and $R_{ofw1} = 30$. Set the offsets for work coordinate system No.2 as $X_{ofw2} = -400$, $Y_{ofw2} = 100$, $Z_{ofw2} = 25$ and $R_{ofw2} = -20$. Shown below is the work coordinate system definition data edit window when work coordinate system No. 1 and No. 2 are set.

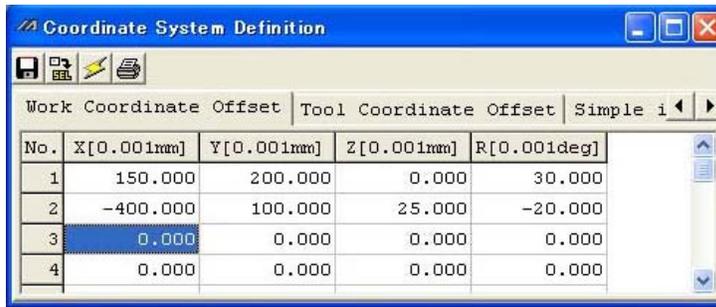


Fig. 10.3 Work Coordinate System Offset Setup Screen

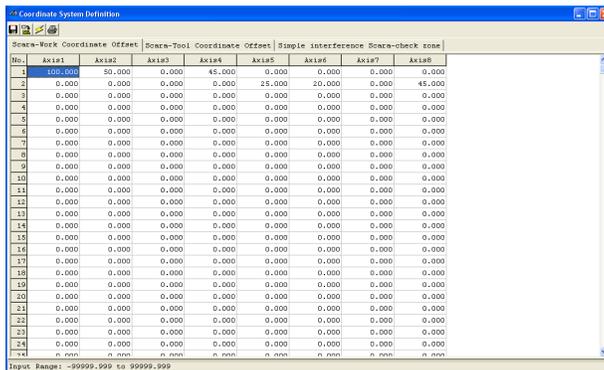


Fig. 10.4 Work Coordinate System Offset Setup Screen (X-SEL-RXD/SXD, RAXD/SAXD)

* Use the DFWK instruction to set the work coordinate system offsets in the SEL program.

(2) Positioning in a work coordinate system

Perform positioning after selecting a desired work coordinate system.

Use the SLWK instruction to select a desired work coordinate system No. in the SEL program.

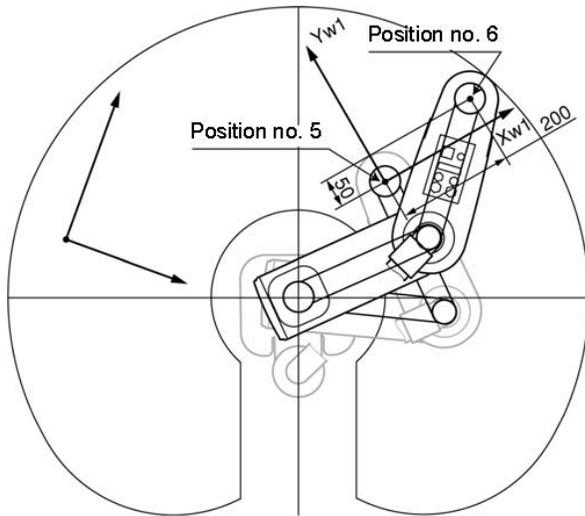
Once set, the work coordinate system selection No. will remain effective after the program ends, and even after the power is reconnected if the system memory backup battery is installed.

[1] When performing PTP positioning to position No. 5 and No. 6 in work coordinate system No. 1:

No. (Name)	Axis1	Axis2	Axis3	Axis4	Vel	Acc	Dcl
4 ()							
5 ()	0.000	0.000	0.000	0.000			
6 ()	200.000	50.000	20.000	40.000			
7 ()							

In the case of X-SEL-PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD, MSEL-PCX/PGX, "SCARA work coord sys slct No" and "SCARA tool coord sys slct No." will be displayed.

Fig. 10.5 Position Data Screen: Work Coordinate System No. 1 Setting

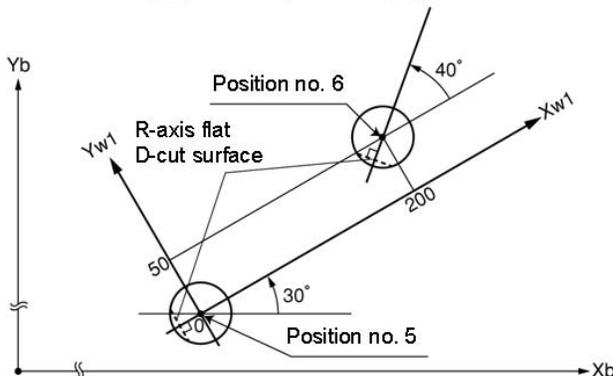


Sample program

```

:
:
:
SLWK 1   Select work coordinate system No. 1.
SLTL 0   Select tool coordinate system No. 0.
PTPR     Specify right arm as the PTP target arm.
MOVP 5   Move to position No. 5.
MOVP 6   Move to position No. 6.
:
:
:

```



The R-axis position is shown at left (top view).

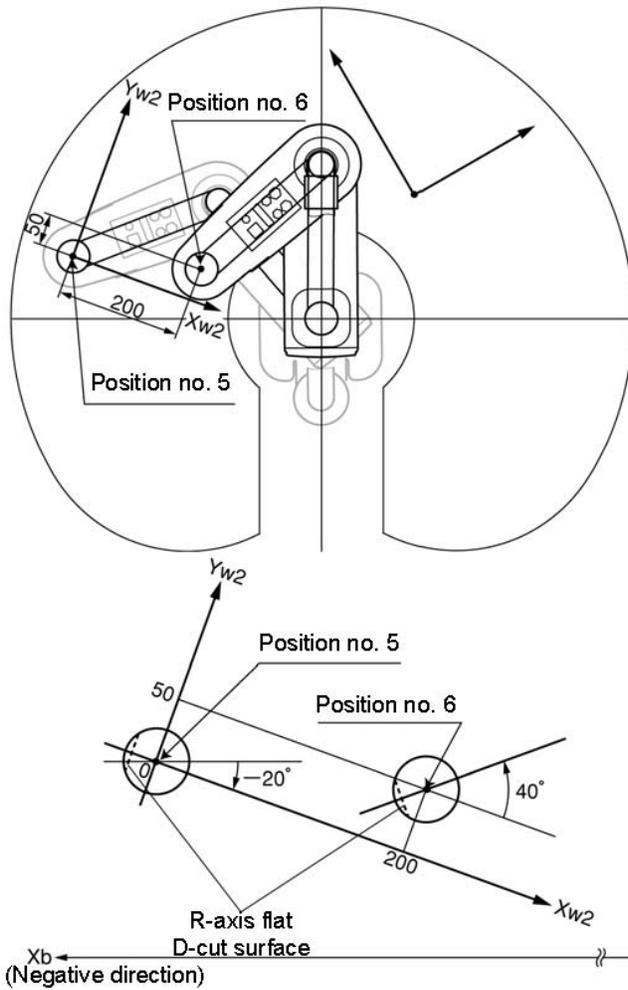
The Z-axis position is as follows:

- Position No. 5 Zb = 0
- Position No. 6 Zb = 20

[2] When performing PTP positioning to position No. 5 and No. 6 in work coordinate system No. 2.

Current arm system	Right	Change	Work coord sys slct No.	2	Change		
			(0=base coord sys)				
Jog movement coordinate sys.	XY(work)		Tool coord sys slct No.	0	Change		
			(0=no tool offset)				
No. (Name)	Axis1	Axis2	Axis3	Axis4	Vel	Acc	Del
4 ()							
5 ()	0.000	0.000	0.000	0.000			
6 ()	200.000	50.000	20.000	40.000			
7 ()							

Fig. 10.6 Position Data Screen: Work Coordinate System No. 2 Setting



Sample program

```

:
:
:
SLWK 2 Select work coordinate system No. 2.
SLTL 0 Select tool coordinate system No. 0.
PTPR Specify right arm as the PTP target arm.
MOVP 5 Move to position No. 5.
MOVP 6 Move to position No. 6.
:
:
:

```

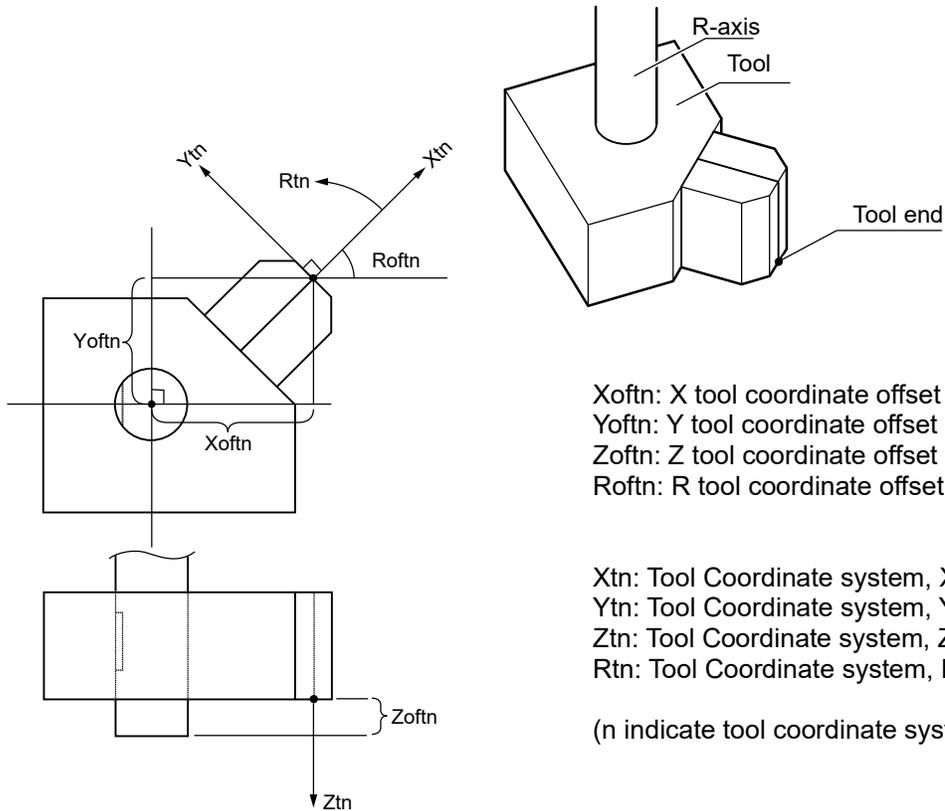
The R-axis position is shown at left (top view).
The Z-axis position is as follows:
Position No. 5 Zb = 25
Position No. 6 Zb = 45

10.3 Tool Coordinate System

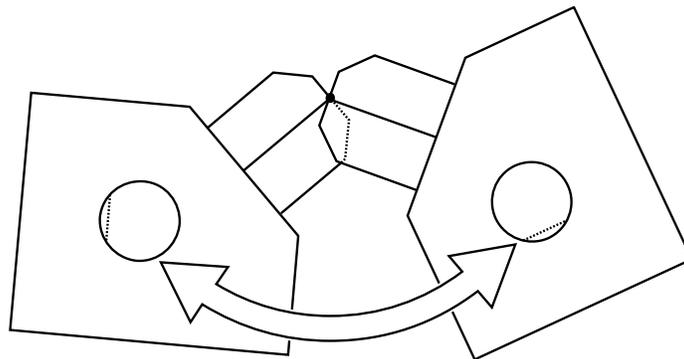
A total of 128 different coordinates, provided as a combination of three-dimensional orthogonal coordinates and rotation axis coordinates, are defined by the dimensions (offsets) of the tool (hand etc.) installed on the tool installation surface. Note that tool coordinate system No. 0 is reserved in the system as the tool coordinate system with 0 offsets.

When a defined tool coordinate system No. is selected, the tool end, not the center of the tool installation surface, is used as the positioning destination.

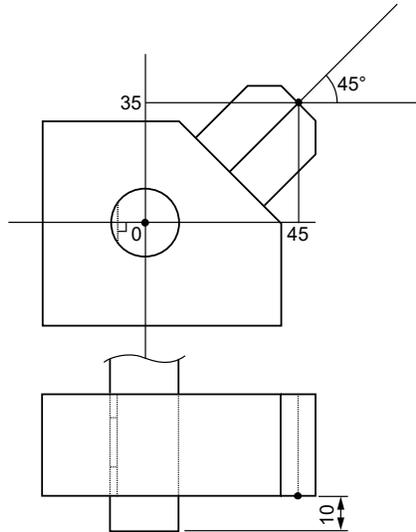
(Note) For 3-axis type of IXP-3N315 and 3N4515, it is ineffective even if it is set to R-axis.



Select a defined tool coordinate system and jog the R-axis, and the machine will operate as illustrated below:



- (1) Setting of tool coordinate system
 Set the offsets from the center of tool installation surface to the tool end.
 • Setting example of tool coordinate system
 When defining tool coordinate system No. 1 as illustrated below:



Set the offsets for tool coordinate system No. 1 as Xoft1 = 45, Yoft1 = 35, Zoft1 = -10 and Roft1 = 45. Shown below is the tool coordinate system definition data edit screen when tool coordinate system No. 1 is set.

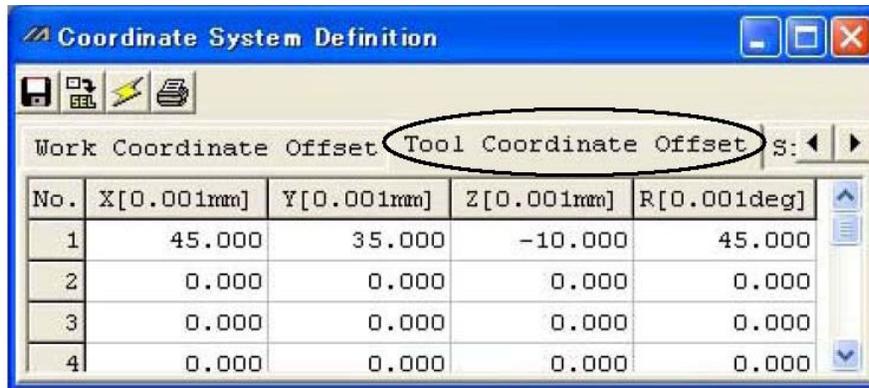


Fig. 10.7 Tool Coordinate System Offset Setting Screen

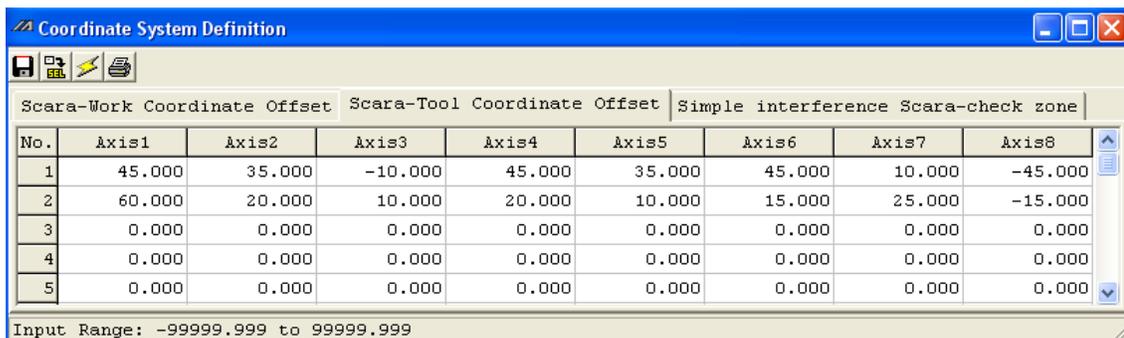


Fig. 10.8 Tool Coordinate System Offset Setting Screen (X-SEL-RXD/SXD, RAXD/SAXD)

* Use the DFTL instruction to set the tool coordinate system offsets in the SEL program

(2) Positioning based on tool coordinate system offsets

Perform positioning after selecting a desired tool coordinate system.

Use the SLTL instruction to select a desired tool coordinate system No. in the SEL program.

Once set, the tool coordinate system selection No. will remain effective after the program ends, and even after the power is reconnected if the system memory backup battery is installed.

- [1] When performing PTP positioning of the tool end in tool coordinate system No. 1 to position No. 5 and No. 6 in work coordinate system No. 1:

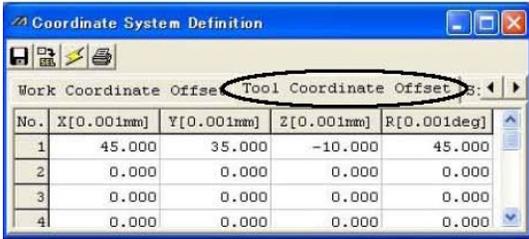


Fig. 10.9 Tool Coordinate System Offset Setting Screen

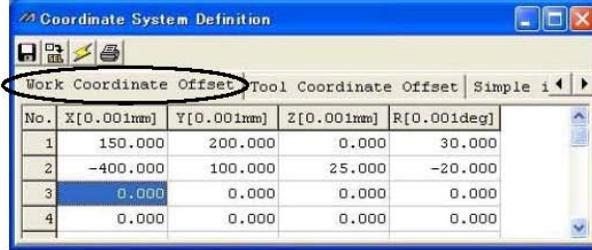


Fig. 10.10 Work Coordinate System Offset Setting Screen

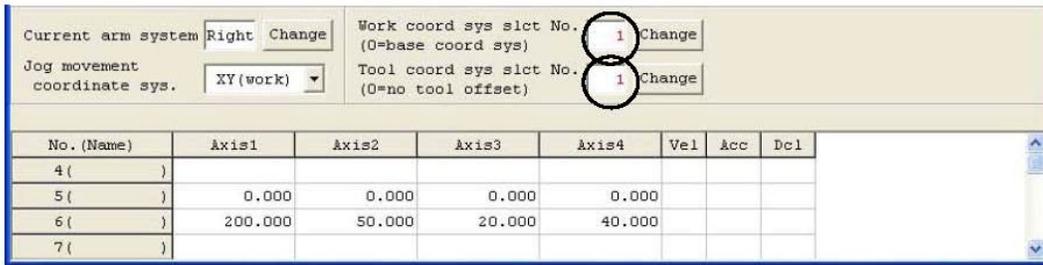
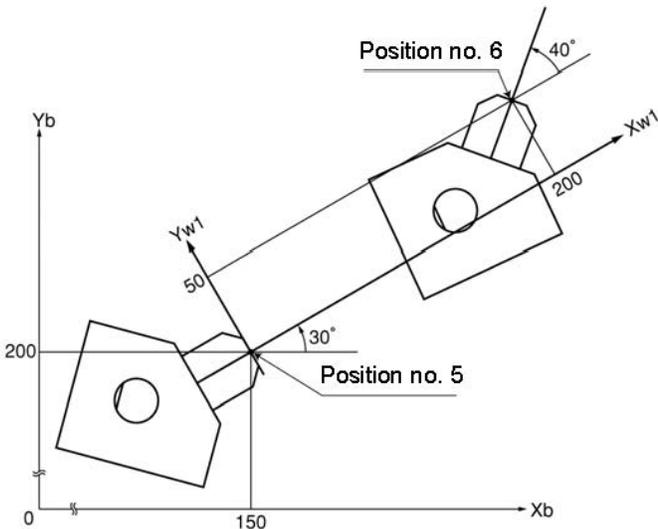


Fig. 10.11 Position Data Screen:
Work Coordinate System No. 1 and Tool Coordinate System No. 1 Setting



Sample program

```

...
SLWK 1  Select work coordinate system No. 1.
SLTL 1  Select tool coordinate system No. 1.
PTPR   Specify right arm as the PTP target arm.
MOV P5  Move to position No. 5.
MOV P6  Move to position No. 6.
...

```

The Z-axis position at the tool end is as follows:
 Position No. 5 Zb = 0
 Position No. 6 Zb = 20
 A top view is shown at the left.

[2] When performing PTP positioning of the tool end in tool coordinate system No. 1 to position No. 5 and No. 6 in work coordinate system No. 2:

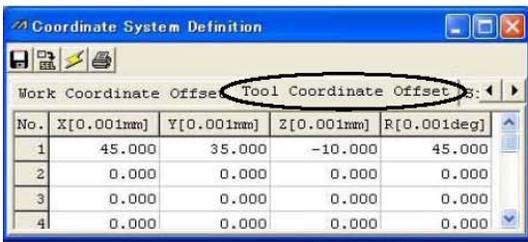


Fig. 10.12 Tool Coordinate System Offset Setting Screen

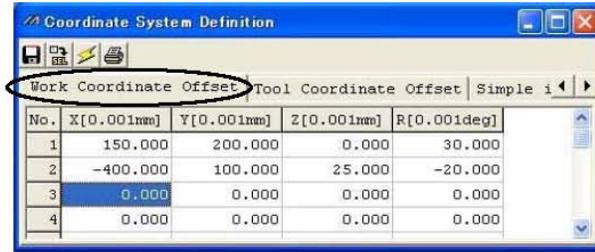


Fig. 10.13 Work Coordinate System Offset Setting Screen

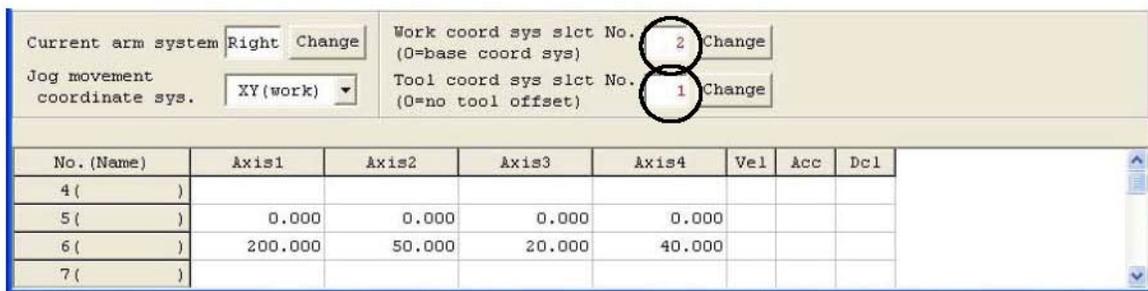
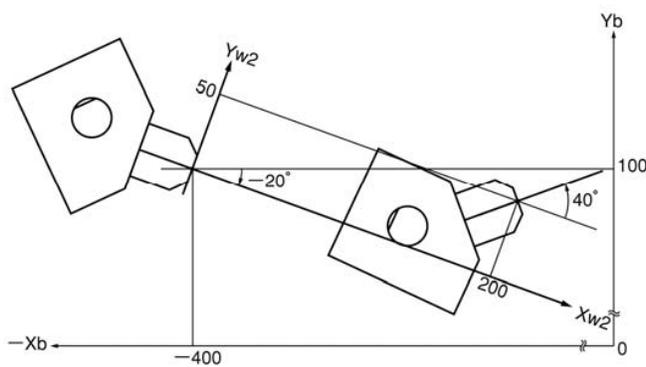


Fig. 10.14 Position Data Screen:
Work Coordinate System No. 2 and Tool Coordinate System No. 1 Setting



Sample program

```

:
:
:
SLWK 2   Select work coordinate system No. 2.
SLTL 1   Select tool coordinate system No. 1.
PTPR     Specify right arm as the PTP target
         arm.
MOVP 5   Move to position No. 5.
MOVP 6   Move to position No. 6.
:
:
:

```

The Z-axis position at the tool end is as follows:
 Position No. 5 Zb = 25
 Position No. 6 Zb = 45

10.4 Simple Interference Check Zone

The simple interference check zone is an area set for the purpose of interference check between the robot and the peripherals. Entry of the center of tool installation surface into the simple interference check zone can be detected when tool coordinate system No. 0 (= tool coordinate system offsets are 0) is selected, while entry of the tool end in the simple interference check zone can be detected when tool coordinate system No. 1 through 127 (= tool coordinate system offset is other than 0) is selected.

(1) Note on using the simple interference check zone

Entry of the center of tool installation surface (when tool coordinate system No. 0 is selected) or tool end (when tool coordinate system No. 1 through 127 is selected) into the simple interference check zone is detected. Entry of the circumference of the R-axis or any part of the tool other than the end is not detected.

This function does not prevent entry of the tool into the simple interference check zone. It only detects that the tool has entered the zone.

Entry cannot be detected reliably unless the applicable part of the tool remains inside the simple interference check zone for at least 5msec. Accordingly, this function is intended as a simple check during low-speed operation.

The actual motion differs between high-speed operation (actual operating condition) and low-speed operation. Provide a sufficient margin to prevent interference. (During high-speed operation, the tool tends to pass along a line further inward compared with low-speed operation.)

The defined coordinates of the simple interference check zone are always handled as data linked to the base coordinate system (work coordinate system selection No. 0). Therefore, the position of simple interference check zone does not change even when the work coordinate system is changed. Exercise caution. If the defined coordinates of the simple interference check zone are changed, it takes 5msec before the check result reflects the new settings.

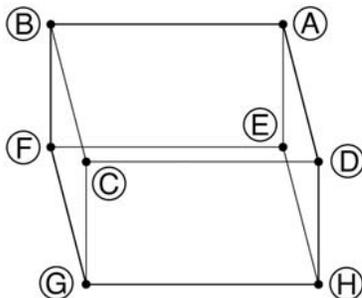
During PTP operation, the tool does not follow specified routes. When operating the tool near an obstacle (including the robot body), always perform test operation at low speed and confirm that interference does not occur. Thereafter, gradually increase the speed to an appropriate level.

(2) Setting of simple interference check zone

Set the simple interference check zone using the position data in the base coordinate system.

Enter the maximum and minimum coordinates of the simple interference check zone.

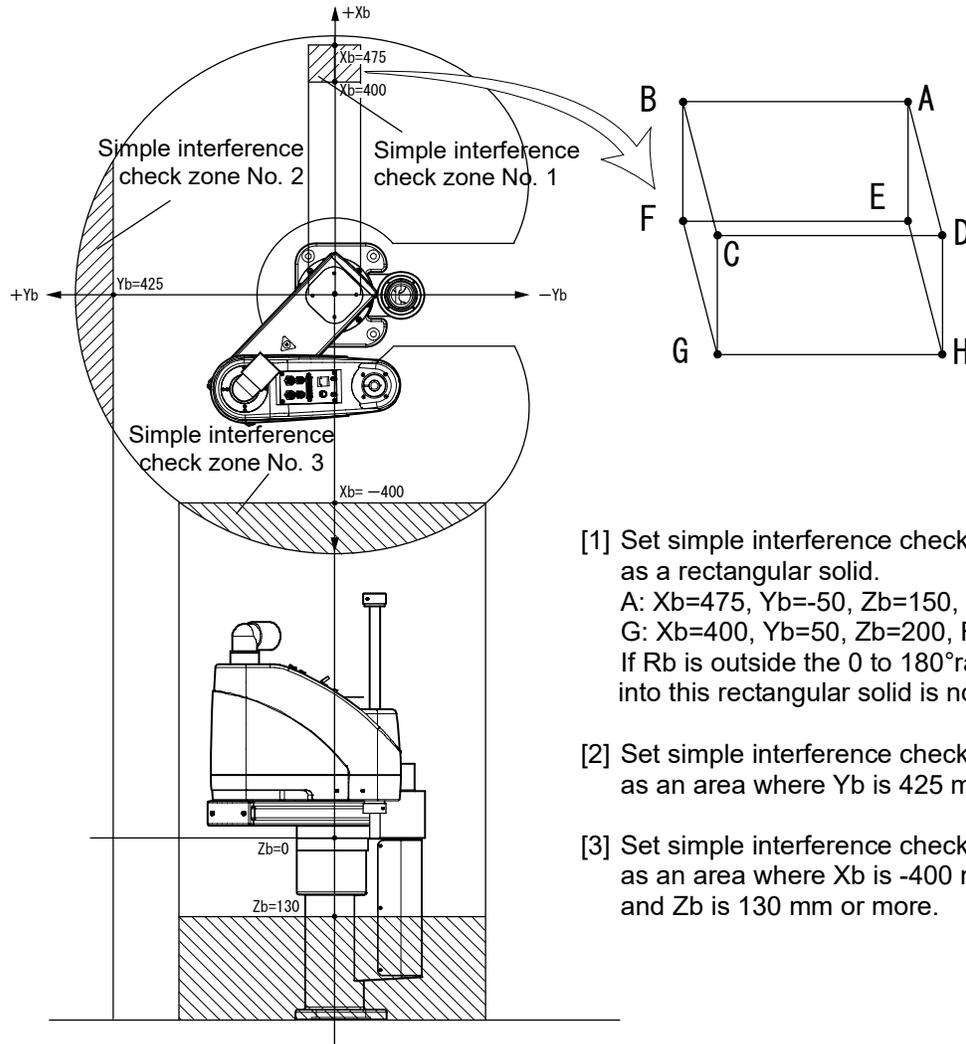
Set the boundaries of the simple interference check zone parallel with the base coordinate axes.



To set the simple interference check zone as a rectangular solid like the one shown at the left, enter the coordinates of two points in any one of the four combinations of A-G, B-H, C-E or D-F.

Setting example of simple interference check zones

Define simple interference check zones No. 1, No. 2 and No. 3 as shown below:



- [1] Set simple interference check zone No. 1 as a rectangular solid.
 A: $Xb=475, Yb=-50, Zb=150, Rb=0$
 G: $Xb=400, Yb=50, Zb=200, Rb=180$
 If Rb is outside the 0 to 180° range, entry into this rectangular solid is not detected.
- [2] Set simple interference check zone No. 2 as an area where Yb is 425 mm or more.
- [3] Set simple interference check zone No. 3 as an area where Xb is -400 mm or less and Zb is 130 mm or more.

Shown below is the data edit screen to define simple interference check zones when simple interference check zones No. 1, No. 2 and No. 3 are set respectively.

Zone No.	Crd No.	X[0.001mm]	Y[0.001mm]	Z[0.001mm]	R[0.001deg]	Phy. Output/Global flag	ErrType
Zone 1	Crd 1	475.000	-50.000	150.000	0.000	311	1
	Crd 2	400.000	50.000	200.000	180.000		
Zone 2	Crd 1		425.000			312	1
	Crd 2		1000.000				
Zone 3	Crd 1	-400.000		130.000		313	2
	Crd 2	-1000.000		1000.000			

Fig. 10.15 Simple Interference Check Zone Definition Coordinates Setting Screen

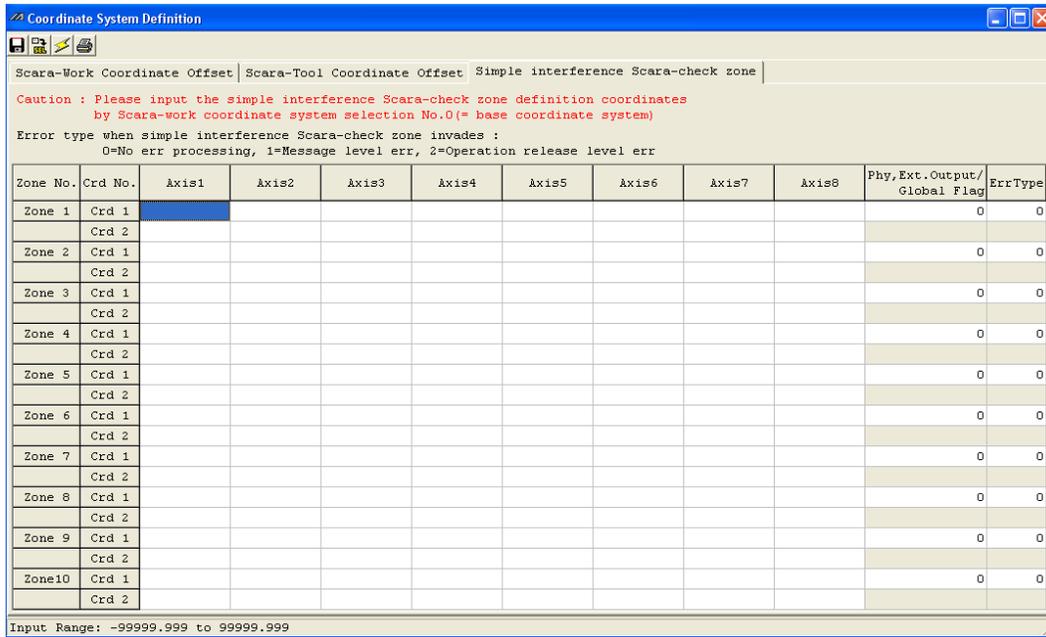


Fig. 10.16 Simple Interference Check Zone Definition Coordinates Setting Screen (X-SEL-RXD/SXD, RAXD/SAXD)

Zone No.: Indicates the zone number.

Coordinate No.: Indicates the coordinate number. Coordinate 1 and Coordinate 2 are available.

Physical/Expansion Output Port No./Global Flag No.:

Select a desired output number to be output when the axis enters the check zone. (In the case of the X-SEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD controller, an expansion output port number can also be entered.)

Error Type: Select a desired type of errors.

0 = Do not handle errors.

1 = Output message level errors.

2 = Output operation-cancellation level errors.

(For Axis 5 to Axis 8, this item is displayed only on the X-SEL/RXD/SXD, RAXD/SAXD controller.)

(Note) Contact area data for two SCARA robots (Axis 1 to Axis 4, and Axis 5 to Axis 8) cannot be set for one check zone.

When simple interference check zone No. 1 is selected, entry of the tool into the rectangular solid will not be detected if Rb is outside the 0 to 180° range. To enable detection regardless of the R-axis coordinate, leave Coordinate 1 and Coordinate 2 in the R column in the Zone 1 line blank.

With simple interference check zone No. 2 and No. 3, where either the maximum or minimum coordinate can be set to any value, enter a value outside the opening range for the maximum or minimum coordinate (1000 in zone 2, 1000 or -1000 in zone 3).

The maximum/minimum coordinate can be set in either Coordinate 1 or Coordinate 2.

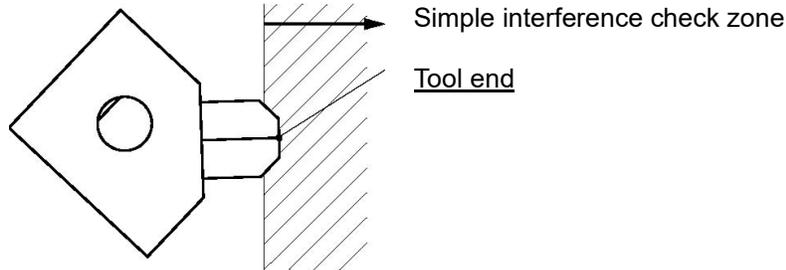
The simple interference check zones are set so that output port No. 311 turns ON when entry into simple interference check zone No. 1 is detected, No. 312 turns ON when entry into simple interference check zone No. 2 is detected, and port No. 313 turns ON when entry into simple interference check zone No. 3 is detected.

If physical output numbers and global flag numbers are duplicated, chattering will occur and the result will become unstable. Do not set overlapping numbers.

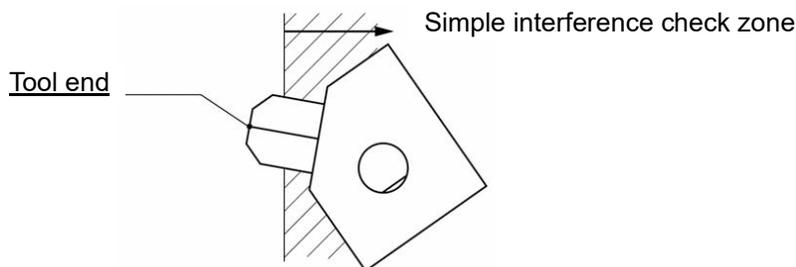
Use of the simple interference check zone function slows the CPU performance significantly. When the function is not used, set 0 in "Phy. Output/Global Flag" and "Err Type" to disable the function.

* Use the DFIF instruction to set the simple interference check zones in the SEL program.

- (3) Note on detection while a tool coordinate system is selected
 While a tool coordinate system is selected, entry into the simple interference check zone is detected based on the tool end, not the center of the installation surface.



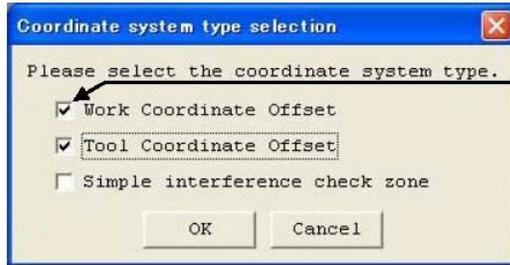
Depending on the moving track, a part of the tool other than the end may enter the simple interference check zone, as illustrated below. In this case, detection will not occur until the tool end enters the simple interference check zone. Exercise due caution.



10.5 Coordinate System Definition Data Clear Window

The procedure to delete coordinate system definition data is explained below:

- [1] Click Coordinate System (D) from the menu bar, and then select Clear (L).
- [2] The coordinate system definition data clear window will be displayed.



Click in the applicable checkbox to select the type of data you wish to delete.

Fig. 10.17 Coordinate System Definition Data Clear

Select the type of coordinate system data you wish to delete.
Next, click the OK button.
A warning message will be displayed to confirm if you really want to delete the data.
Click the OK button.
The data will be transferred to the controller.
Clicking the Cancel button will cancel the operation.

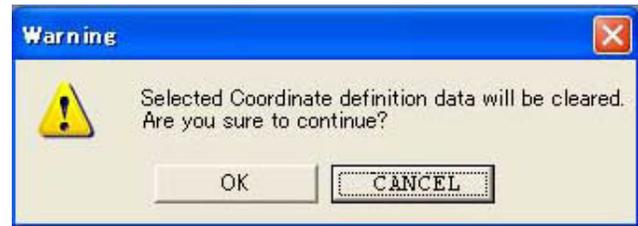
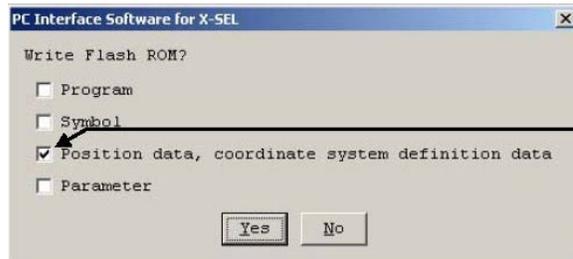


Fig. 10.18 Warning

- [3] Write to the flash ROM.



Click in the applicable checkbox to select the type of data you wish to write.

Fig. 10.19 Confirmation

(Note) XSEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD, TTA, MSEL-PC/PG, PCX/PGX is write to the flash ROM window will not be displayed.

In the case of X-SEL-PX/QX compatible with increased memory (with gateway function), the following screen will be displayed.
(PC interface software version 7.2.0.0 or later)

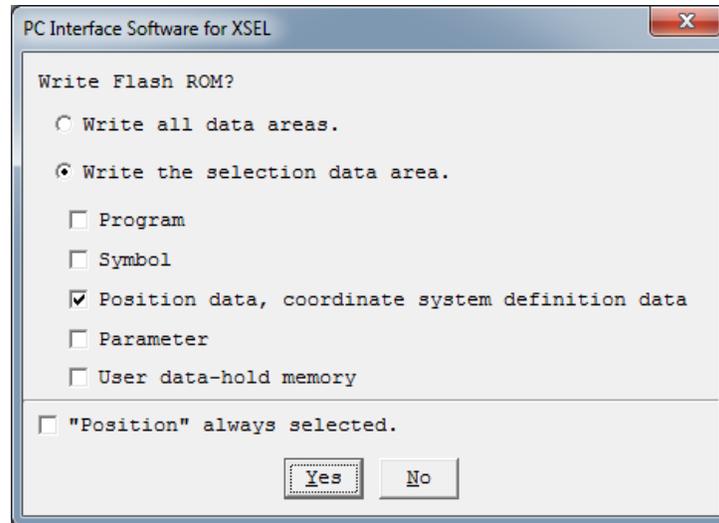


Fig. 10.20 Confirmation (X-SEL-PX/QX)

Click **Yes** → The memory data will be written to the flash ROM.

Click **No** → The memory data will not be written to the flash ROM.

Perform a reset (reconnect the power or reset the software), and the robot will return to the condition before the deletion.

* The number of writing to the flash ROM is limited (approx. 100,000 times). If you do not write all the data, select Write the selection data area and write to the flash ROM.

10.6 Printing of Coordinate System Definition Data

The procedure to print coordinate system definition data is explained below.

- [1] Click the  button in the menu if the coordinate system data definition edit window.
- [2] Select whether to print all types or the coordinate system data being displayed.

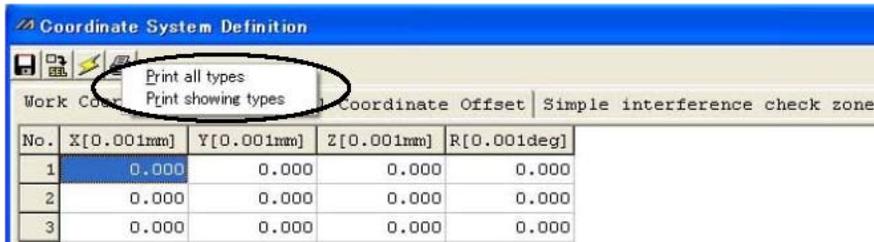


Fig. 10.21 Print Type Selection

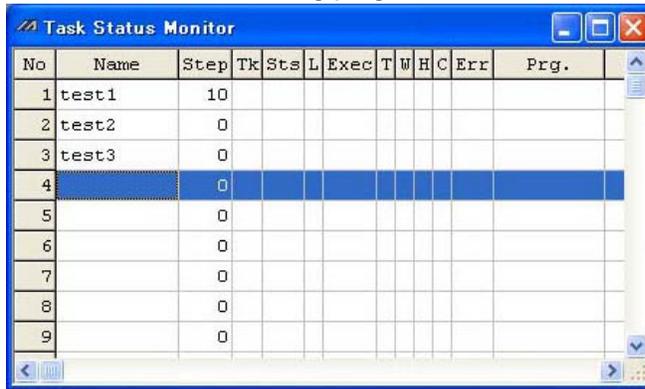
- [3] The coordinate system definition data will be printed in accordance with the selected content.

11. Monitor

You can check the current statuses of various items from the Monitor menu.

(1) Task status monitor window

This window shows the statuses of running programs.



No	Name	Step	Tk	Sts	L	Exec	T	W	H	C	Err	Prg.
1	test1	10										
2	test2	0										
3	test3	0										
4		0										
5		0										
6		0										
7		0										
8		0										
9		0										

Fig. 11.1 Task Status

No.: Program No.

Name: Symbol

Sts: Task status

Task status managed by the internal OS.

- RUN (Run) : Being executed
- RDY (Ready) : The task is ready to be performed.
- WAT (Wait) : The task is suspended.
- WAS (Wait Suspend) : Double Suspension
- SUS (Suspend) : Compulsory Suspension

(Supported by main application version 0.14 or later for X-SEL J/K, and all versions for other controllers.)
(PC software version 0.0.7.2. or later)

L: Task level

Exec: Current step number

T: Paused (by step operation, by a breakpoint, by the pause button, by the SSPG command, etc.)

W: Waiting (in response to the TIMW, WTxx, WZxx, WRIT or READ command, waiting for a servo command to be completed, etc.) (PC software version 1.1.0.5 or later)

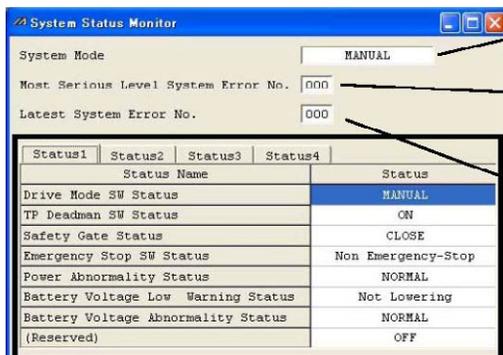
H: HOLD input (Supported by main application version 0.26 or later for X-SEL J/K, and all versions for other controllers.) (PC software version 1.1.0.5 or later)

C: CANC input (main application version 0.26 or later) (PC software version 1.1.0.5 or later)

Err: Error number

Prg. and subsequent fields: Detailed error information

(2) System status monitor window



System Mode	MANUAL		
Most Serious Level System Error No.	000		
Latest System Error No.	000		
Status1	Status2	Status3	Status4
Status Name		Status	
Drive Mode SW Status		MANUAL	
TP Deadman SW Status		ON	
Safety Gate Status		CLOSE	
Emergency Stop SW Status		Non Emergency-Stop	
Power Abnormality Status		NORMAL	
Battery Voltage Low Warning Status		Not Lowering	
Battery Voltage Abnormality Status		NORMAL	
(Reserved)		OFF	

The current operation mode is displayed. (MANUAL, AUTO)

Of the errors currently occurring, the most serious level system error number is displayed.

Of the errors currently occurring, the latest system error number is displayed.

Various statuses are displayed.

Fig. 11.2 System Status

In the case of the SSEL, ASEL or PSEL controller, the Status of Positioner Mode can be checked by Status 3.

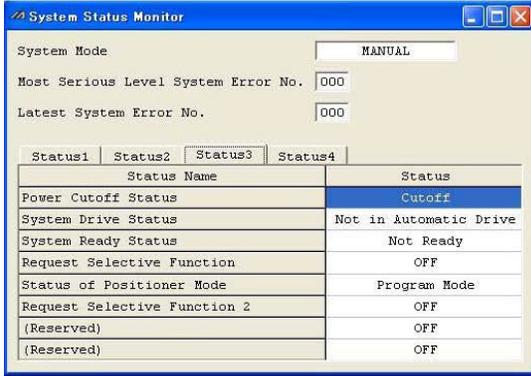


Fig. 11.3 Display in Program Mode

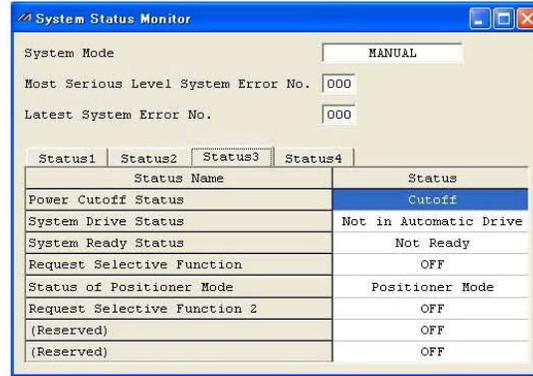


Fig. 11.4 Display in Positioner Mode

(3) Axis status monitor window

This window shows the status of each axis.

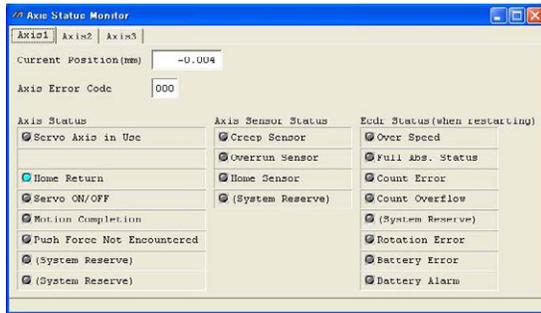


Fig. 11.5 Axis Status



(V12.02.01.00 or later) The figure on the left side shows up for some features.

When the super-high impellent actuator is operated by the SSEL controller, the belt breaking detection sensor can be monitored in Axis Status monitor. (PC interface software version 7.2.0.0 or later)

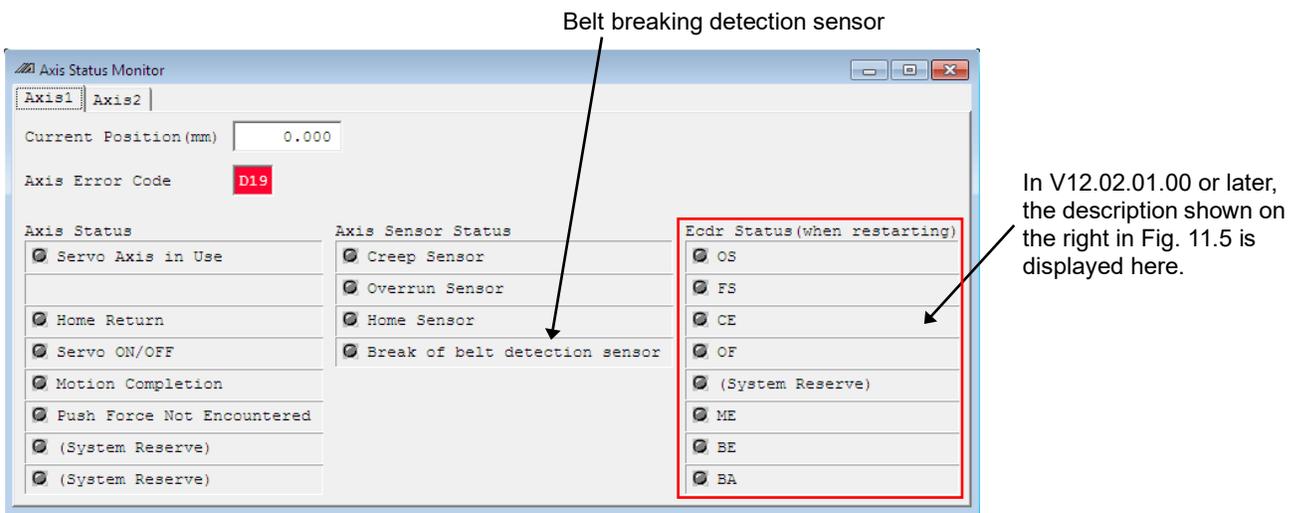


Fig. 11.6 Axis Status (Belt breaking detection sensor is added)

- (4) Input port, virtual input port, output port and virtual output port windows
 These windows show the ON/OFF status of each input/output. 1: ON, 0: OFF
 Display below is shown for those other than TTA, SSEL, ASEL, PSEL and MSEL.

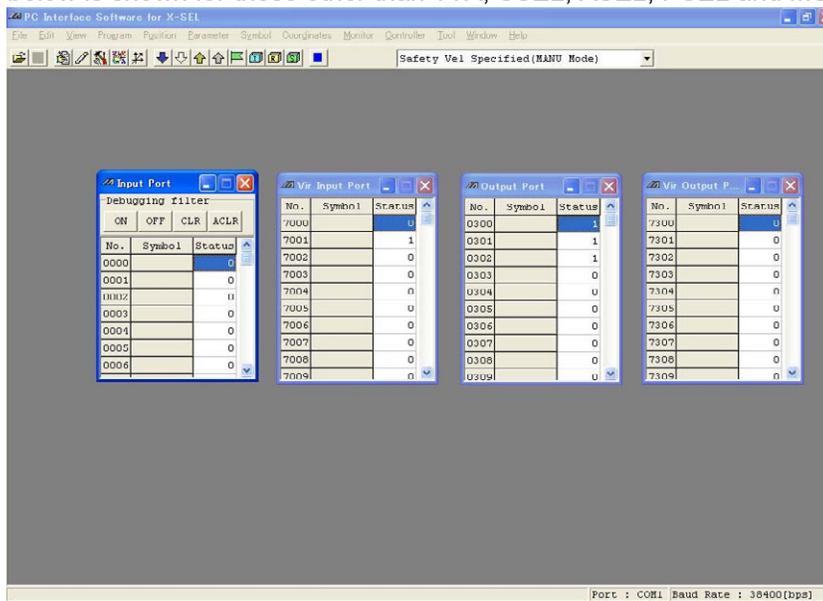


Fig. 11.7 Input/Output Ports

The I/O (ON/OFF) of output ports and virtual output ports can be switched by double-clicking the applicable port or pressing the Ctrl key and space key simultaneously.
 In the case of the SSEL, ASEL or PSEL controller in the positioner mode, no symbol will be displayed.

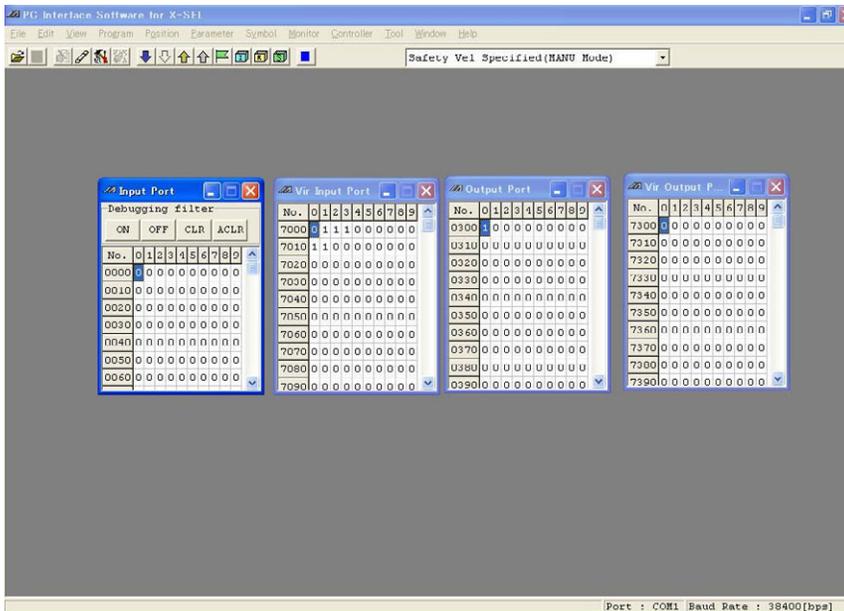


Fig. 11.8 Input/Output Ports (No Symbol)

In XSEL-RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL, the virtual input/output port No. 7000 to 7599 are shown all together.

[Refer to SEL Language Programming Manual for the assignment of the virtual input/output ports]

The display on the right will be shown when a tick mark is put in the “Symbol” box, and the display on the left will be shown when a tick mark is removed.

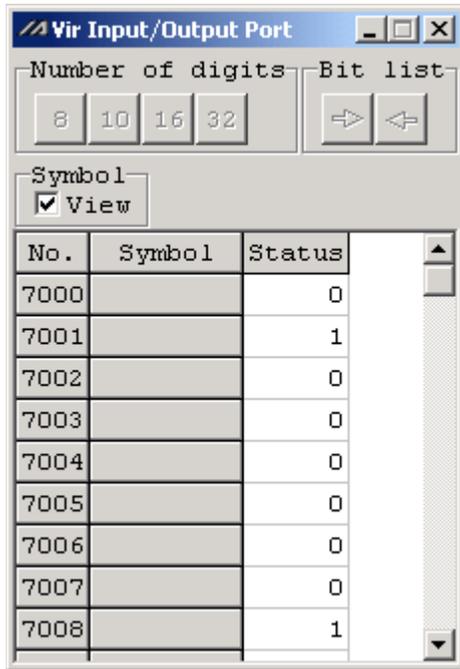


Fig. 11.9 Virtual Input/Output Ports (with Symbol display)

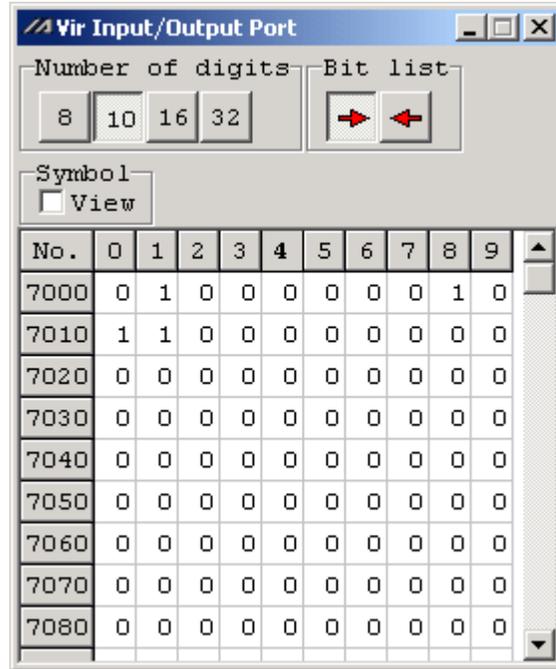


Fig. 11.10 Virtual Input/Output Ports (No Symbol display)

(Note) A48 “Virtual Input/Output Port Operation Error” will occur if the ON/OFF of the input ports in Virtual Input/Output Port No. 7000 to 7599 are switched over.

In the input port window, you can set an input port debug filter.

“Input port debug filter” is a function that causes the controller to recognize a given physical input port as ON or OFF regardless of the actual input status of the physical input port.

(This function is supported by X-SEL PC software version 1.1.1.0 or later.)

To set a debug filter, use the following four buttons provided on the Debug filter setting panel in the input port window (available in the MANUAL mode).

- [1] ON
Clicking this button will set an ON filter for the input port corresponding to the cursor position.
The controller will always recognize the specified port as ON.
- [2] OFF
Clicking this button will set an OFF filter for the input port corresponding to the cursor position.
The controller will always recognize the specified port as OFF.
- [3] CLR
Clicking this button will clear the debug filter currently set for the input port corresponding to the cursor position.
- [4] ACLR
Clicking this button will clear the debug filters currently set for all physical input ports.

* While a debug filter is set, the status of the port (“0” or “1”) for which the ON or OFF filter is set will be shown in red (all ports for which a debug filter is not set will be shown in black).

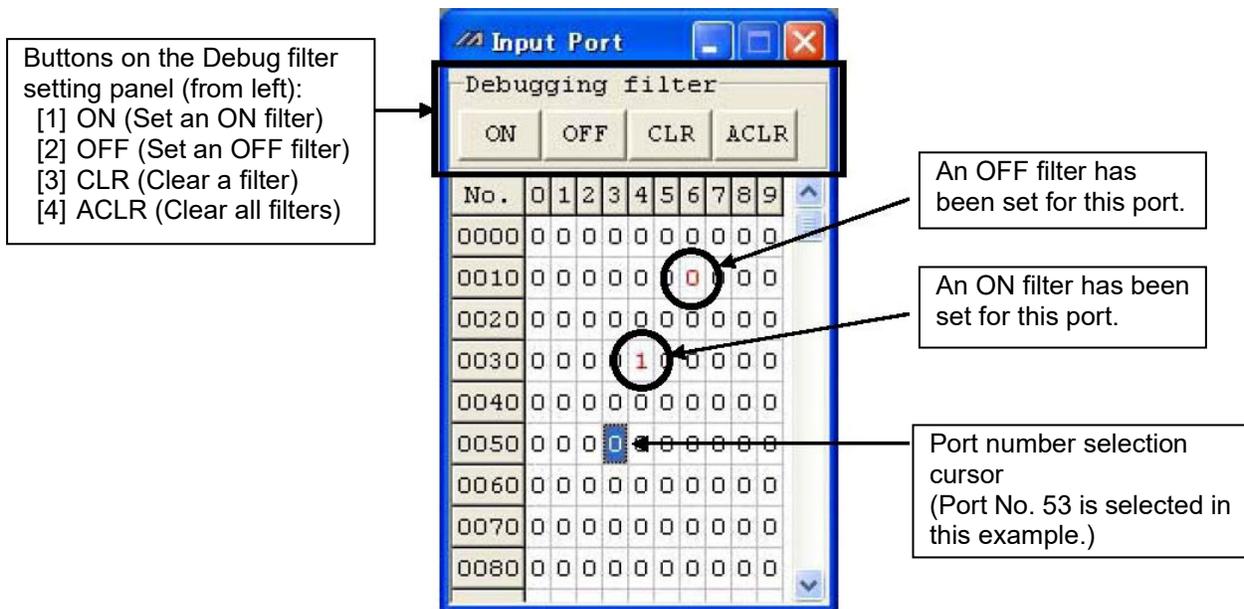


Fig. 11.11 Input Port Window

Clicking CLR or ACLR will display the warning message shown in Fig. 11.12.

Select Yes (clear the filter(s)) or No (cancel the clear) after carefully reading the content of the message.

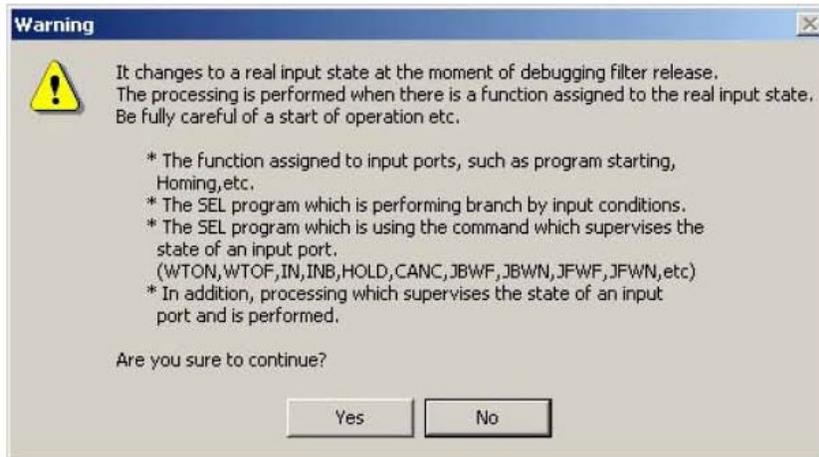


Fig. 11.12 Warning Message

Note

The status (ON/OFF) of each input port as recognized by the controller changes the moment the debug filter is cleared or controller operation mode (MANUAL or AUTO) is changed.

(1) Upon clearing a filter

Filter type \ Actual input status		ON	OFF
		ON	OFF
ON	OFF	————	ON → OFF
OFF	ON	OFF → ON	————

(2) Upon switching the controller mode from MANUAL to AUTO

Filter type \ Actual input status		ON	OFF
		ON	OFF
ON	OFF	————	ON → OFF
OFF	ON	OFF → ON	————

(3) Upon switching the controller mode from MANUAL to AUTO and then back to MANUAL

Filter type \ Actual input status		ON	OFF
		ON	OFF
ON	OFF	————	OFF → ON
OFF	ON	ON → OFF	————

* Changing the controller mode (MANUAL or AUTO) will not clear debug filters. Accordingly, changing the controller mode back to MANUAL from AUTO will make effective again the debug filters that were set in the previous MANUAL mode.

If any function is assigned to an input port, the applicable process will be executed. Exercise caution against start of the following operations and others.

- Functions assigned to input ports, such as program start and homing of all valid axes
- SEL programs that use branching based on input condition
- SEL programs that include commands for monitoring input port statuses (WTON, WTOF, IN, INB, HOLD, CANCEL, JBWF, JBWN, JFWE, JFWN, etc.)
- Other processes executed according to the input port statuses as monitored (recognized) by the controller

(5) Global flag, global integer variable, global real variable and global string windows

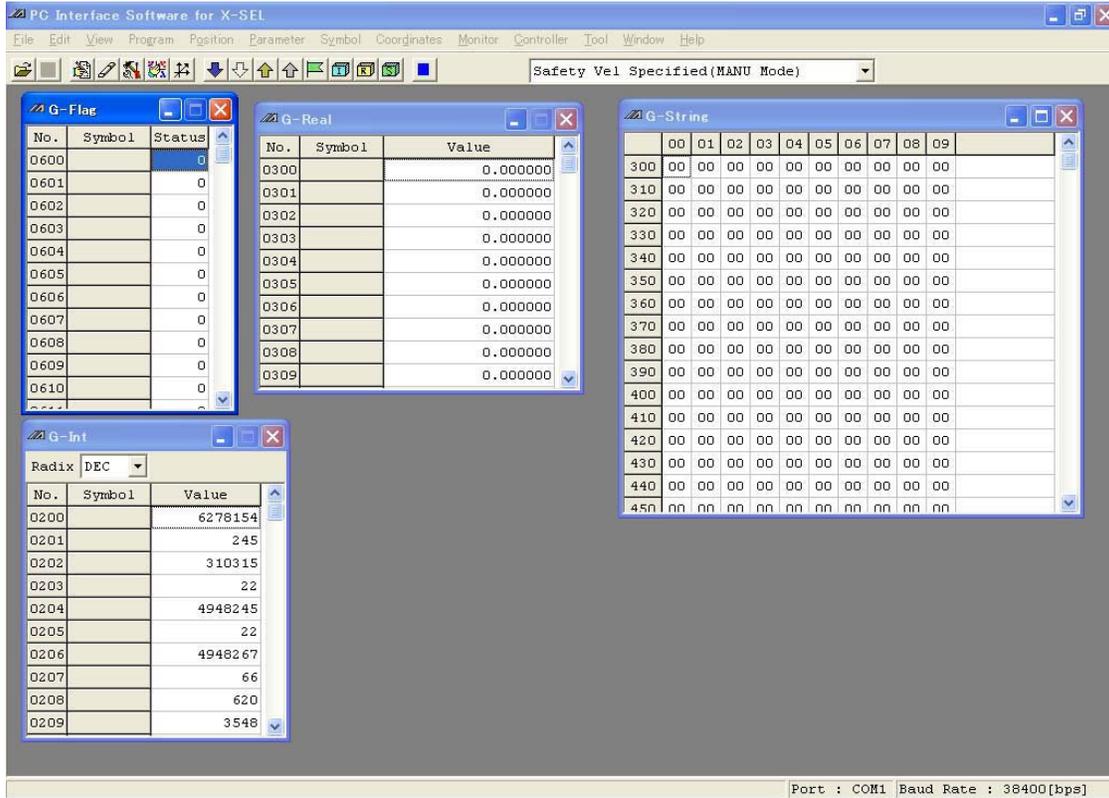


Fig. 11.13 Global

You can change the values in global variables or assign values to global variables. You can also change the characters in global strings or assign characters to global strings. The 1/0 (ON/OFF) of global flags can be switched by double-clicking the applicable global flag or pressing the Ctrl key and space key simultaneously.

In the integer variable monitor, select Decimal or Hexadecimal for the data radix. (Select it from the combo box at the top of the window.)



Fig. 11.14 Decimal Notation

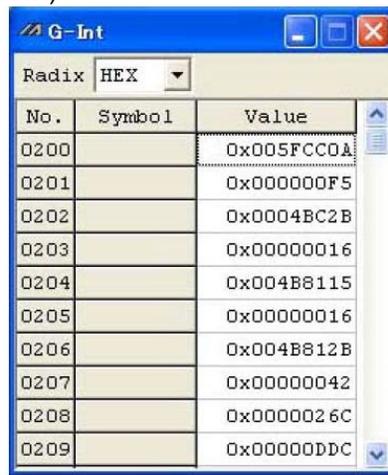


Fig. 11.15 Hexadecimal Notation

(6) Local Data (Version V9.00.01.00 or later)

Select "Monitor (M)" → "Local Data (B)" in the main menu and the Show Local Data window opens. The Program No. selected in the Show Local Data window and the local data in the Category of Local Data are displayed.

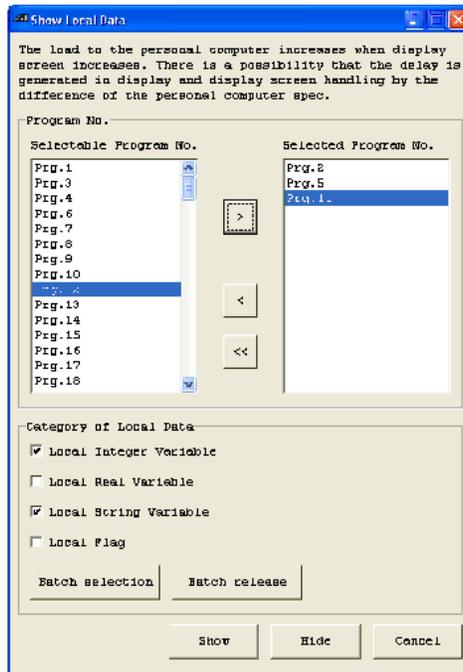


Fig. 11.16 Show Local Data Window

Select the Program No. to the local data and the Category of Local Data by following the steps below to show the local data.

1) Selection of Program No.

Select a Program No. from the Selectable Program No. and click on it. The background color of the Selectable Program No. turns into blue. Click on **>**. The data will be displayed in the Selected Program No..

2) Selection of Category of Local Data

Click in the box for the item to be displayed from the Category of Local Data. A tick mark ✓ will be shown in the selected box.

(Click again to remove the tick mark ✓ and cancel the selection.)

Click on **Batch selection** to select all the selectable items at once.

(Click on **Batch release** to make all the selected ones cancelled.)

3) Click on **Show** and the local data display window will be shown.

(Click on **Hide** and the display window will be hidden.)

All are shown at once at the first time one on top of another.

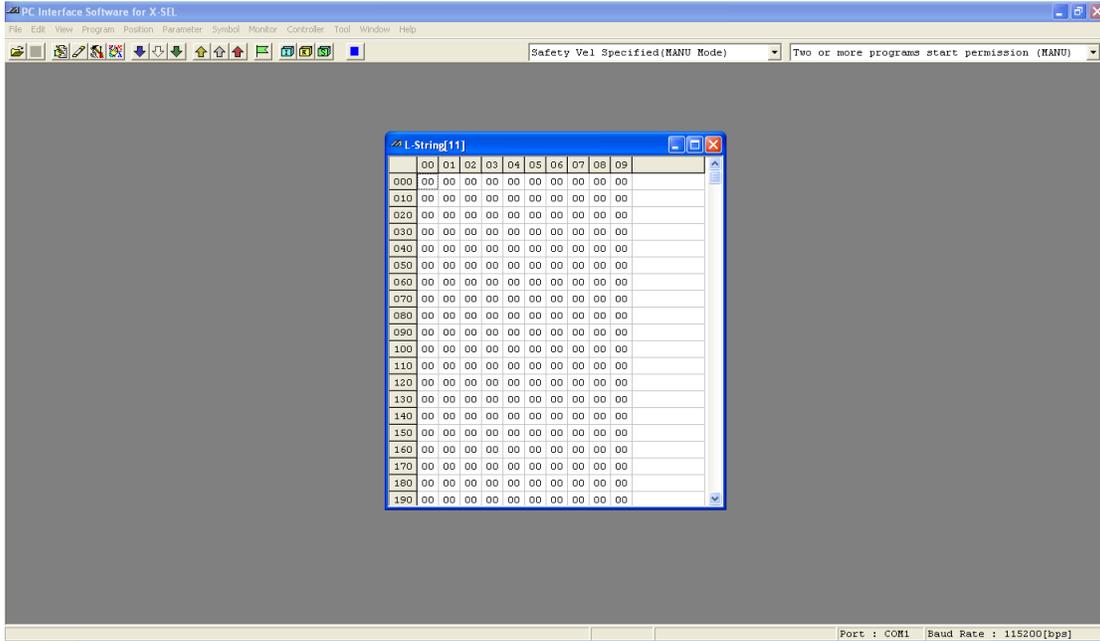


Fig. 11.17 Local Data Display Window (display at first time)

Drag one by one from the top to bottom and show all in the screen.

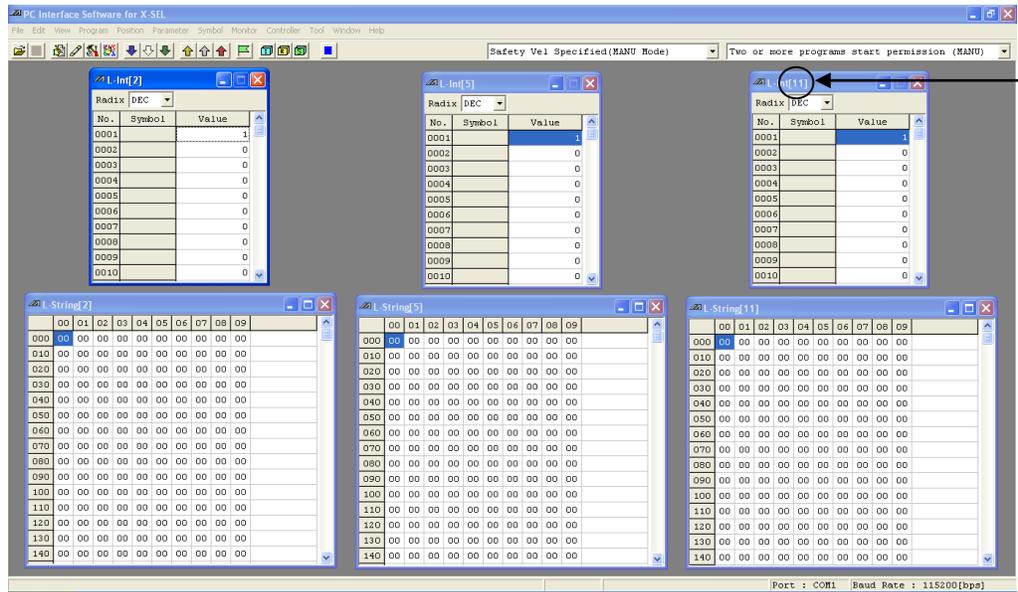


Fig. 11.18 Local Data Display Window

(7) Detailed error information

Clicking Monitor (M) from the main menu and then selecting Detailed Error Information (E) will display the Error Number Select screen.

Clicking OK after setting the Error Number Select will display the Detailed Error Information screen.

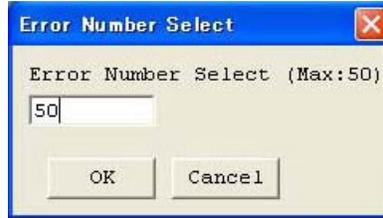
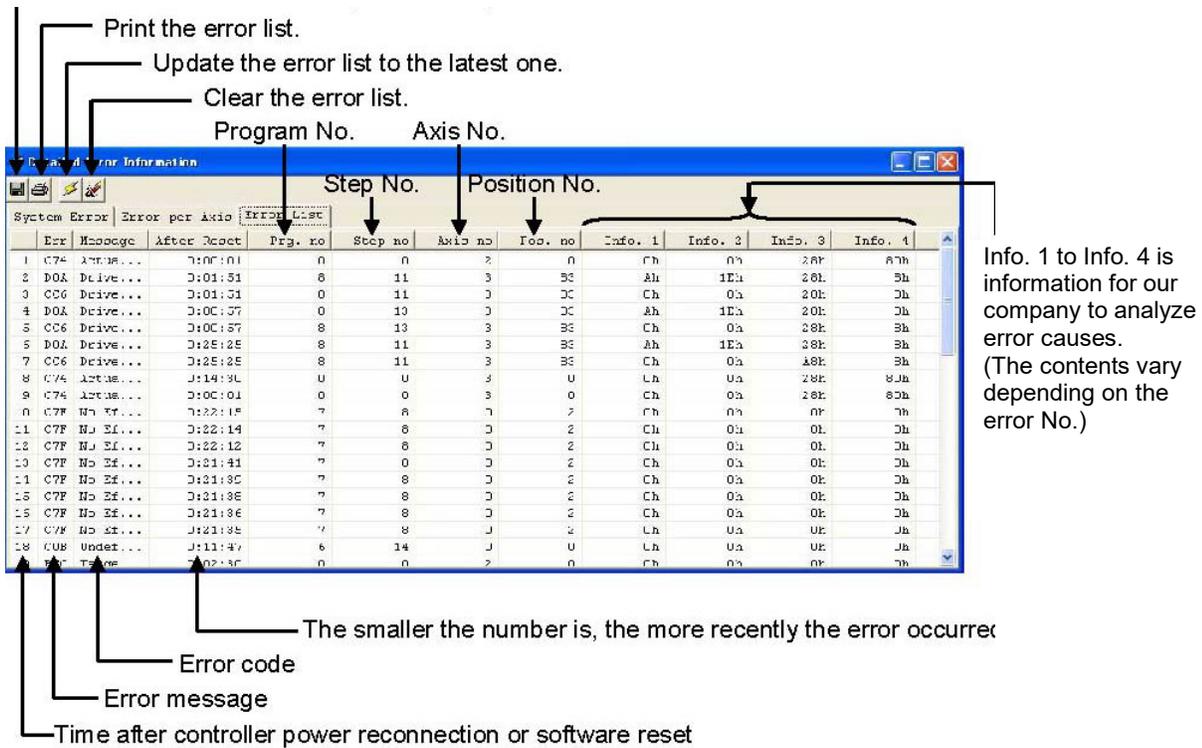


Fig. 11.19 Error Number Select Screen

When errors occur, error codes, messages and other information will be displayed.

Save the error list in a file. (CSV format)*



Print the error list.

Update the error list to the latest one.

Clear the error list.

Program No. Axis No.

Step No. Position No.

System Error	Error per Axis	Error List	Prog. no	Step no	Axis no	Pos. no	Info. 1	Info. 2	Info. 3	Info. 4	
1	C74	Axis...	7:07:01	0	0	2	0	Ch	07	26F	87h
2	D0A	Drive...	3:01:51	8	11	3	3E	Ah	1E1	26L	5h
3	C06	Drive...	3:01:51	0	11	3	3C	Ch	0A	20h	Ch
4	D0A	Drive...	3:02:27	0	13	3	3C	Ah	1E1	20h	Ch
5	C06	Drive...	3:02:57	8	13	3	3E	Ch	0A	28E	5h
6	D0A	Drive...	3:25:25	8	11	3	3E	Ah	1E1	28E	5h
7	C06	Drive...	3:25:25	8	11	3	3E	Ch	0A	28E	5h
8	C74	Axis...	J:14:2L	0	0	3	0	Lh	0A	28E	8Jh
9	C74	Axis...	3:00:01	0	0	3	0	Ch	0A	28E	8Ch
10	C74	No Ef...	7:22:15	7	8	3	2	Ch	07	0F	7h
11	C74	No Ef...	3:22:14	7	8	3	2	Ch	01	0L	Ch
12	C74	No Ef...	3:22:12	7	8	3	2	Ch	01	0L	Ch
13	C74	No Ef...	3:21:41	7	0	3	2	Ch	0A	0E	Ch
14	C74	No Ef...	3:21:35	7	8	3	2	Ch	0A	0E	Ch
15	C74	No Ef...	3:21:38	7	8	3	2	Ch	0A	0E	Ch
16	C74	No Ef...	3:21:36	7	8	3	2	Ch	0A	0E	Ch
17	C74	No Ef...	J:21:35	7	8	3	2	Lh	0A	0E	Jh
18	C06	Under...	J:11:47	6	14	3	0	Lh	0A	0E	Jh
19	C74	Trage	7:02:5F	0	0	2	0	Ch	07	0F	7h

Info. 1 to Info. 4 is information for our company to analyze error causes. (The contents vary depending on the error No.)

The smaller the number is, the more recently the error occurred

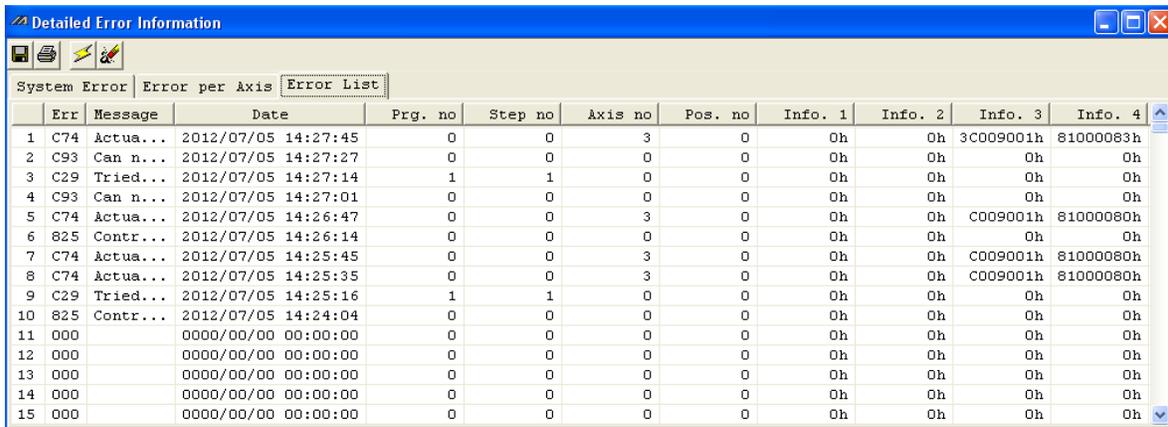
Error code

Error message

Time after controller power reconnection or software reset

Fig. 11.20 Detailed Error Information

In the case of the X-SEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL controller, the header of the time of error column displayed as part of detailed error information becomes “Data (time the error occurred)” instead of “After Reset (elapsed time after the reset).”



Err	Message	Date	Prg. no	Step no	Axis no	Pos. no	Info. 1	Info. 2	Info. 3	Info. 4
1	C74 Actua...	2012/07/05 14:27:45	0	0	3	0	0h	0h	3C009001h	81000083h
2	C93 Can n...	2012/07/05 14:27:27	0	0	0	0	0h	0h	0h	0h
3	C29 Tried...	2012/07/05 14:27:14	1	1	0	0	0h	0h	0h	0h
4	C93 Can n...	2012/07/05 14:27:01	0	0	0	0	0h	0h	0h	0h
5	C74 Actua...	2012/07/05 14:26:47	0	0	3	0	0h	0h	C009001h	81000080h
6	B25 Contr...	2012/07/05 14:26:14	0	0	0	0	0h	0h	0h	0h
7	C74 Actua...	2012/07/05 14:25:45	0	0	3	0	0h	0h	C009001h	81000080h
8	C74 Actua...	2012/07/05 14:25:35	0	0	3	0	0h	0h	C009001h	81000080h
9	C29 Tried...	2012/07/05 14:25:16	1	1	0	0	0h	0h	0h	0h
10	B25 Contr...	2012/07/05 14:24:04	0	0	0	0	0h	0h	0h	0h
11	000	0000/00/00 00:00:00	0	0	0	0	0h	0h	0h	0h
12	000	0000/00/00 00:00:00	0	0	0	0	0h	0h	0h	0h
13	000	0000/00/00 00:00:00	0	0	0	0	0h	0h	0h	0h
14	000	0000/00/00 00:00:00	0	0	0	0	0h	0h	0h	0h
15	000	0000/00/00 00:00:00	0	0	0	0	0h	0h	0h	0h

Fig. 11.21 Detailed Error Information (When the XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL controllers' calendar function is used)

(Note) If date & time data is lost, the following error occurs. In this case, the date & time data becomes 2000/01/01 00:00:00.

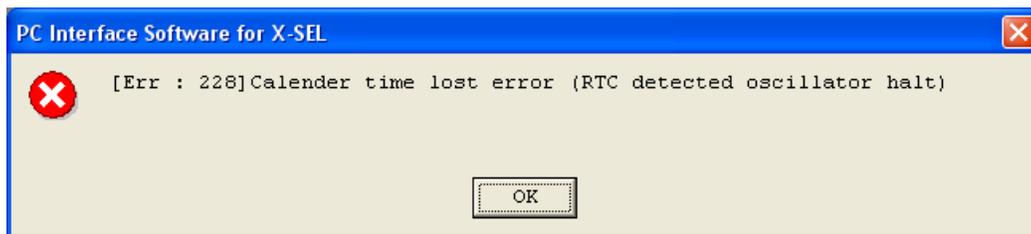


Fig. 11.22 Error Display

(Note) Refer to 14.4, “Setting Time” for how to set the internal clock of the controller.

(Note) When bits 0 to 3 of Other parameter No. 47, “Other setting bit pattern 2” are set to 2, (Do not use the calendar function (use the elapsed time after the reset)), the header of the time of error column becomes “After Reset (elapsed time after the reset).”

(The factory default for bits 0 to 3 of Other parameter No. 47, “Other setting bit pattern 2” is 1 (Use the calendar function).)

If the system memory backup battery is installed, the error list contents will not be cleared even if the power is turned OFF.

When clearing the error list contents, click the alarm list clear  key. A warning in Fig. 11.23 will be displayed. Clicking Yes will clear the error list contents.



Fig. 11.23 Confirmation

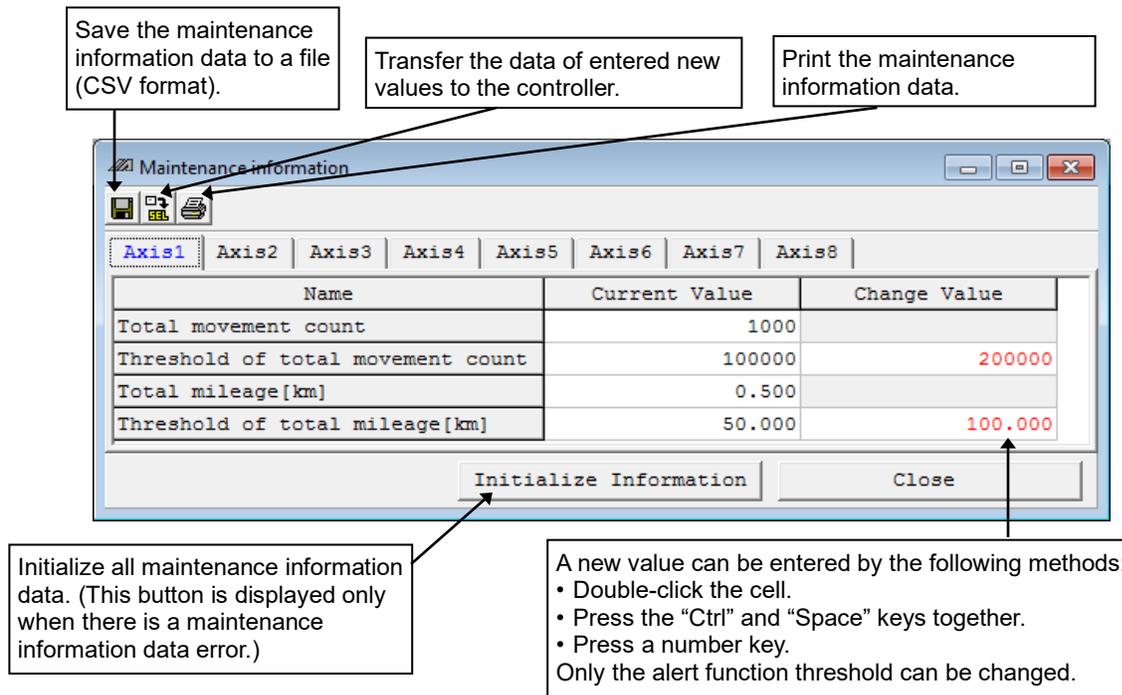
* When trouble occurs, you may be requested to send the error list saved in a file to resolve the problem at an early stage. The error list file cannot be opened by this PC interface software.

(8) Maintenance information screen

The total number of times the actuator has moved, and total distance travelled by the actuator, are displayed.

This screen is displayed on the X-SEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD controller, TTA and MSEL controller.

Also, in TTA and MSEL, the pairing ID for the battery-less absolute encoder can be cleared in this window. (Refer to [How to Clear Pairing ID] in this section.)



Save the maintenance information data to a file (CSV format).

Transfer the data of entered new values to the controller.

Print the maintenance information data.

Name	Current Value	Change Value
Total movement count	1000	
Threshold of total movement count	100000	200000
Total mileage[km]	0.500	
Threshold of total mileage[km]	50.000	100.000

Initialize Information

Close

Initialize all maintenance information data. (This button is displayed only when there is a maintenance information data error.)

A new value can be entered by the following methods:

- Double-click the cell.
- Press the "Ctrl" and "Space" keys together.
- Press a number key.

Only the alert function threshold can be changed.

Fig. 11.24 Maintenance Information

- Total movement count : Indicates the accumulated total of times the actuator has moved
- Threshold of total movement count : Indicates the thresholds for the total number of movements
- Total mileage [km] : Indicates the accumulated total of distance travelled by the actuator
- Threshold of total mileage [km] : Indicates the thresholds for the total distance travelled

By setting thresholds for total number of movements and total distance travelled, you can notify an external device, by means of a message level error or output signal that each threshold has been exceeded. (Alert function)

[How to set a threshold under the alert function]

Method 1:

Change the value of Axis-specific parameter No. 221, "Threshold for total number of movements" or No. 222, "Threshold for total distance travelled," whichever is applicable, on the parameter edit screen.

Method 2:

Perform one of the following operations in the desired "New value" cell and enter a new threshold value:

- Double-click the cell.
- Press the "Ctrl" and "Space" keys together.
- Press a number key.

When the new threshold value has been entered, click the  button to transfer the new threshold to the controller.

When the transfer to the controller is complete, the confirmation message, "Write Flash ROM?" appears.

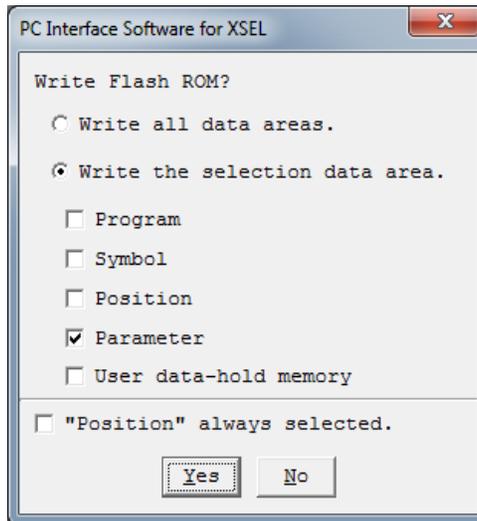


Fig. 11.25 Confirmation

Click to select the items (parameters, etc.) you want to write to the flash ROM.

Yes (Y)
No (N)

Write the memory data to the flash ROM.

Do not write the memory data to the flash ROM.

When a reset is performed (by turning off the power and then turning it back on, or resetting the software), the memory data will be destroyed and data will be loaded from the flash ROM. (The controller will use the transferred memory data until the reset takes effect.)

(Note) If a reset is performed (by turning off the power and then turning it back on, or resetting the software) without writing the parameters to the flash ROM first, the threshold under the alert function will not be changed and the value set before the change will be restored.

(Note) The flash ROM can be written only for so many times (approx. 100,000 times).
Unless all data are written, select "Write the selected data areas" before writing to the flash ROM.

When the flash ROM has been written, the confirmation message, “Restart the controller?” appears.



Fig. 11.26 Confirmation

- Yes (Y)** Restart the controller (reset the software).
- No (N)** Do not restart the controller (reset the software).

[How to Clear Pairing ID]

- (1) Right-click a blank space in the tool bar while pressing the Ctrl button. The Input Password will be displayed.

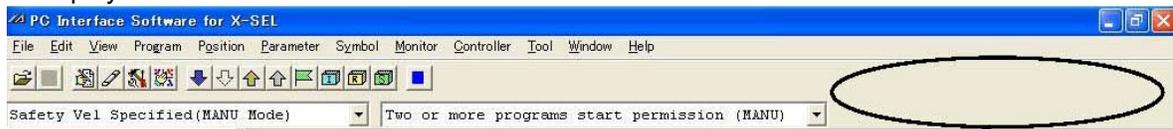


Fig. 11.27 Menu Bar



Fig. 11.28 Input Password Screen

Right-click a blank space in the tool bar while pressing **Ctrl**.

- (2) Enter a password (5119) in the displayed Input Password screen. **Clear Pairing ID** button will show up in the bottom of Maintenance Information screen. Click **Clear Pairing ID** button, and the pairing ID for the battery-less absolute encoder will be cleared.

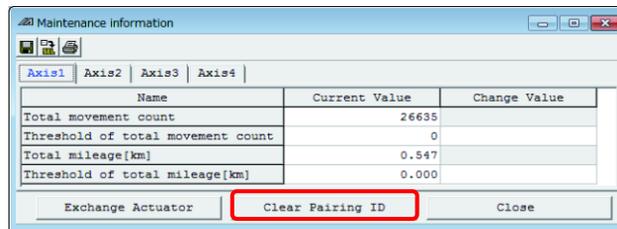


Fig. 11.29 Maintenance Information

Or, “Clear Pairing ID” will show up to the menu in Controller in Menu. Select “Clear Pairing ID”, and the pairing ID for the battery-less absolute encoder will be cleared.

(Note) In case 4A9 “Absolute Reset Data Unmatched Error” has occurred in a controller other than TTA or MSEL, make a recovery by following the procedures below.

- 1) Take a memo for the number (number in Pairing ID) shown in Error List Info1 in 4A9 Error.
- 2) Set the number in your memo to Each Axis Parameter No. 223 “Encoder individual identification number”.
- 3) Transfer the parameter to the controller to written the parameter on the flash ROM. Refer to [8. Parameter Edit Window]
- 4) Conduct the software reset or reboot the power. Pairing between actuator and the controller gets established, and the error should be cancelled.

- (9) Monitoring data This item cannot be displayed for X-SEL-JX/KX controllers.
 With regard to the orthogonal axis selected for Target Axis, the operation amount, velocity instruction and feedback pulse can be displayed. Select the item you want to display for Data Type.
 Clicking the  key can save the acquired data in a file. The data will be stored as numeric data in CSV format.
 (Note) This function is supported by software version 5.0.2.0 or later.
 It is also effective only when the controller supports the function.
 (Note) In the case of X-SEL-PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD the operation amount, velocity instruction and feedback pulse, all of such as position deviation of SCARA axes cannot be monitored.

[CSV File for Monitoring Data]

Shown below is the list of items described in the CSV file. (Excluding XSEL-J/K/JX/KX, TT)
 Items selected in the data type should be shown.

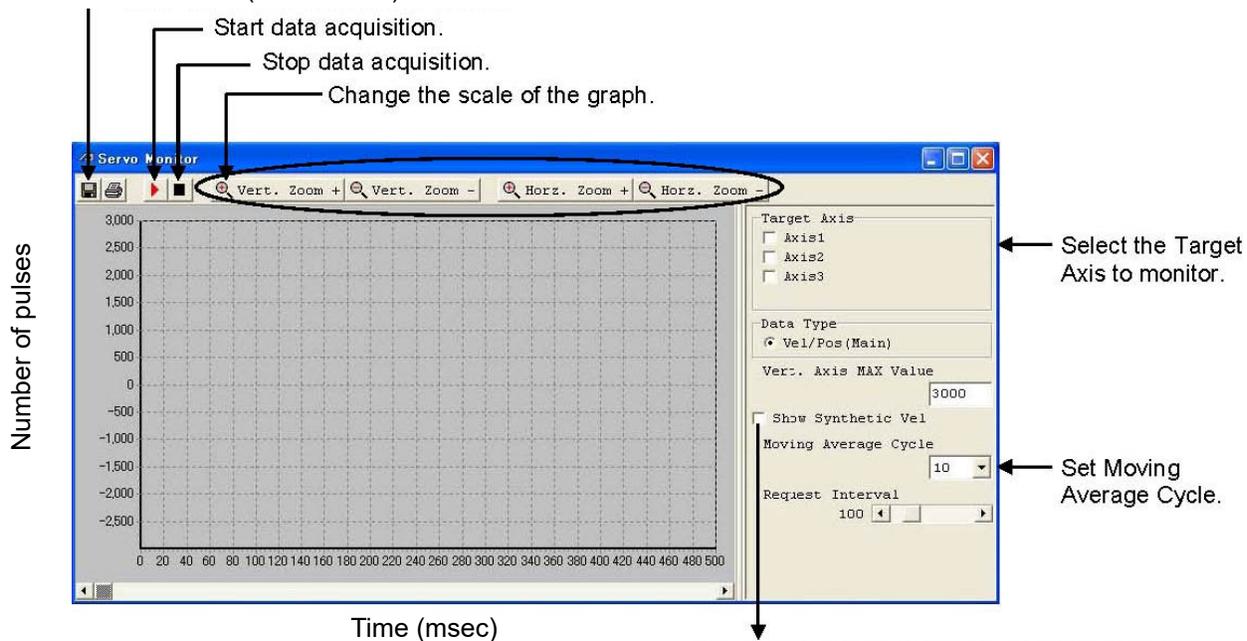
* The acquirable items to be shown should differ depending on controllers.

Shown Items	Contents	Remarks
VelOp [] * ¹	Manipulated Variable of <u>Single Axis</u> Original command pulse that composes the trapezoid or triangular patterns calculated from speed, acceleration and deceleration.	
VelCmnd [] * ¹	Speed Command of <u>Single Axis</u> Real command pulses sent from the controllers to the actuators.	
VelFB [] * ¹	Feedback Pulses of <u>Single Axis</u> Positional pulses transmitted from the actuator encoder.	
Devi [] * ¹	Position Deviation of <u>Single Axis</u> Difference between manipulated variable and feedback pulse (actual position).	
CurFB [] * ¹	Feedback Current of <u>Single Axis</u> Motor Current Shown with rated ratio 100% = 4,096 as the base It should be rated ratio [%] = shown value ÷ 4096 × 100.	
VelOp [Synth]	Synthesis Manipulated Variable of <u>Combined Axes</u> Synthesis manipulated variable of the combined axes calculated from the original command pulse of the single axis that forms a trapezoid or triangle pattern figured out from the velocity, acceleration and deceleration	
VelCmnd [Synth]	Synthesis Speed Command of <u>Combined Axes</u> Synthesis speed command of the combined axes calculated from the actual command pulse of the single axis issued from the controller to the actuator	
VelFB [Synth]	Synthesis Feedback Pulses of <u>Combined Axes</u> Synthesis feedback pulse of the combined axes calculated from the position pulse of the single axis sent from the encoder on the actuator.	
IOMon1 [] * ² to IOMon3 [] * ²	Monitor Value in I/O Data	PC interface software version 7.07.04.00 or later

* 1 In the brackets [], axis number should be expressed as Axis1 for the 1st axis and Axis2 for the 2nd axis.

* 2 In the brackets [], port/flag number that was monitored should be shown.

Save the data in a file. (CSV format)

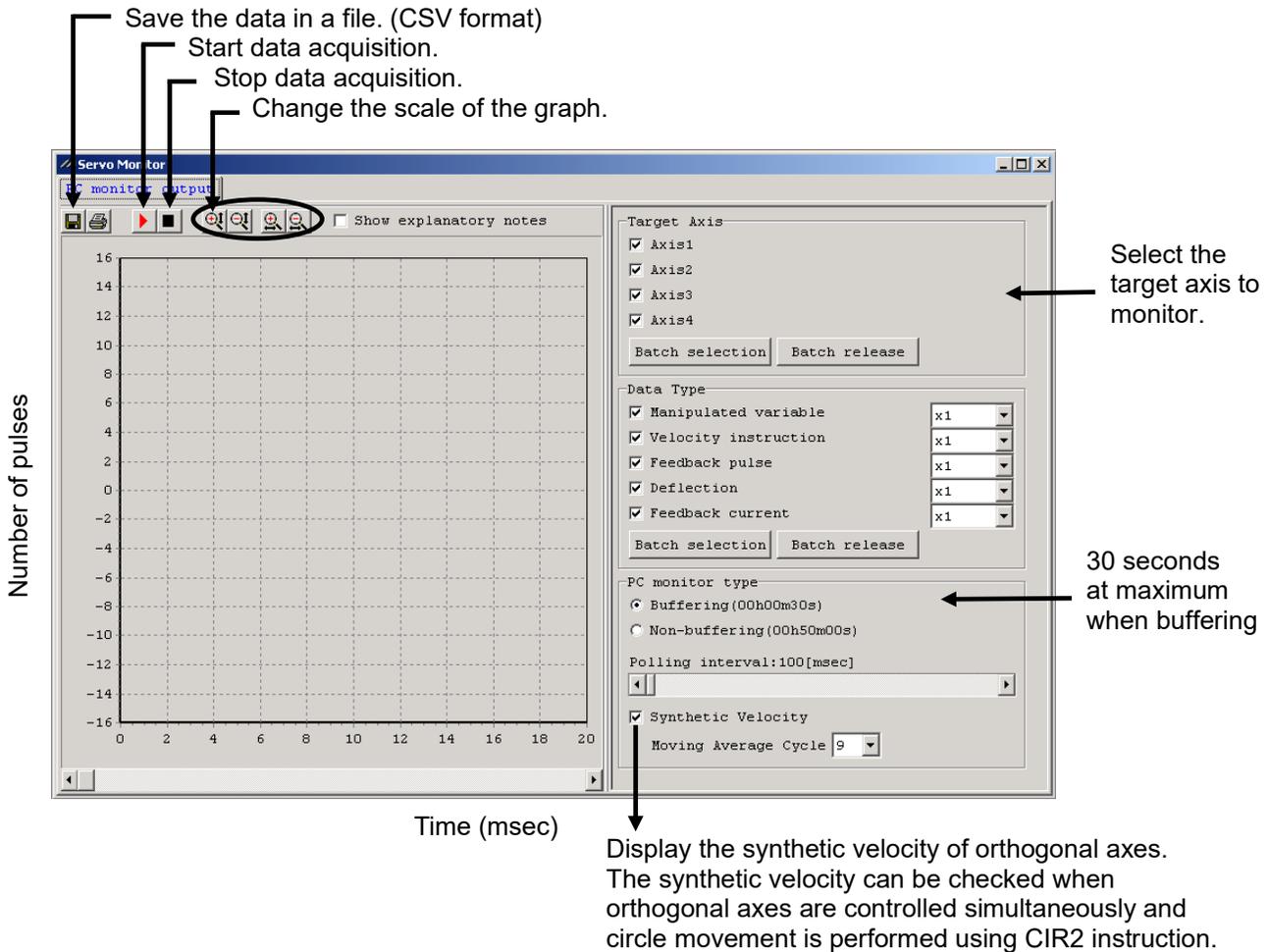


Display the synthetic velocity of orthogonal axes. The synthetic velocity can be checked when orthogonal axes are controlled simultaneously and circle movement is performed using CIR2 instruction.

Speed Command: Real command pulses sent from the controllers to the actuators.
Positional Pulses: Positional pulses transmitted from the actuator encoder. (Feedback pulses)

Fig. 11.30 Monitoring Data (Display Example of X-SEL-J/K and TT)

- ☉ Sampling Cycle when Buffered
The period of sampling cycle for one sample should be 1msec.



Manipulated Variable: Original command pulse that composes the trapezoid or triangular patterns calculated from speed, acceleration and deceleration.

Speed Command: Real command pulses sent from the controllers to the actuators.

Feedback Pulses: Positional pulses (feedback pulses) transmitted from the actuator encoder.

Position Deviation: Difference between manipulated variable and feedback pulse (actual position) (version 7.06.03.00 or later)

The following display is also available in XSEL-P/Q and XSEL-R/S, XSEL-RA/SA.

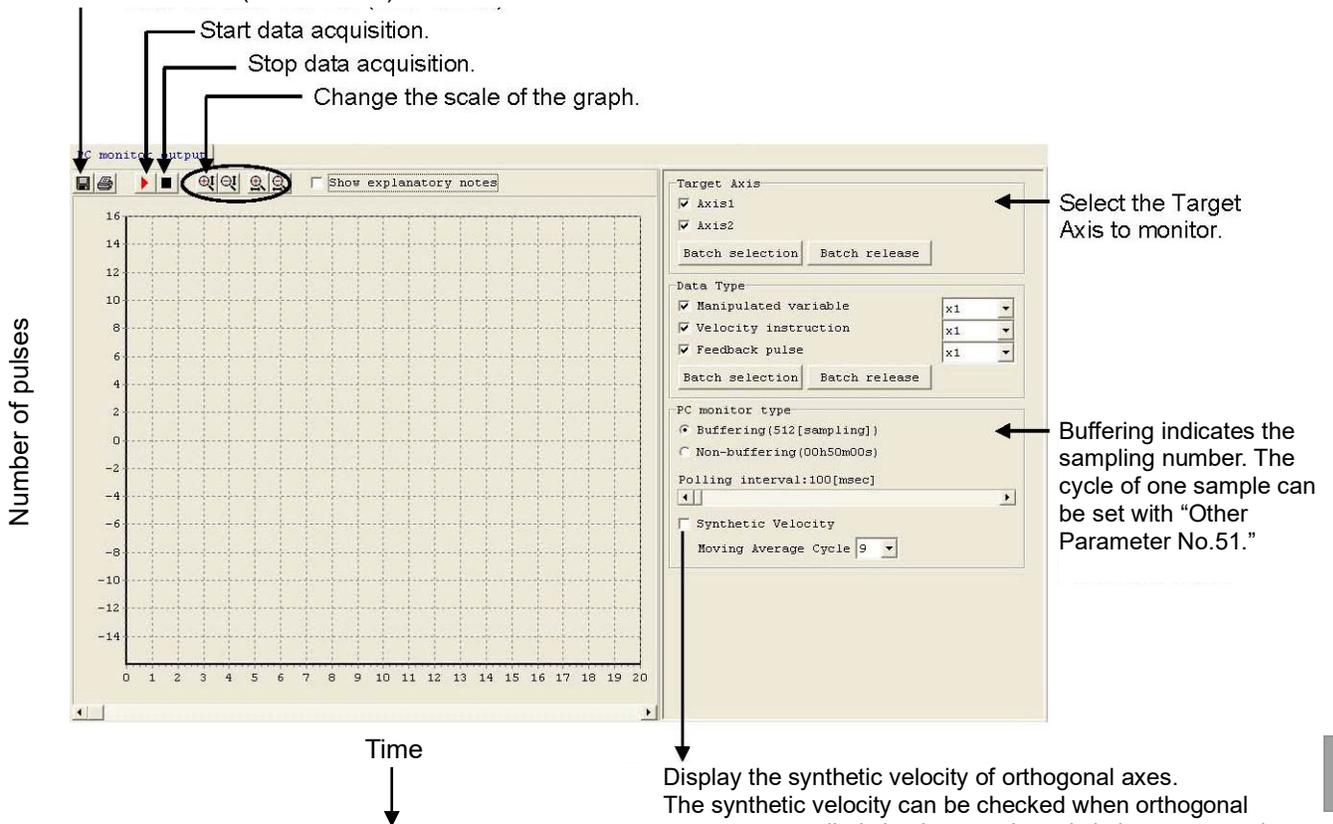
Feedback current: Feedback current on motor (XSEL-P/Q is version 8.01.00.00 or later)

Fig. 11.31 Monitoring Data (Display Example of XSEL-P/Q (orthogonal axes), PX/QX of orthogonal axes, R/S, RX/SX of orthogonal axes, RA/SA, RAX/SAX of orthogonal axes)

◎ Sampling Cycle when Buffered

The period of sampling cycle for one sample should be 1msec.

Save the data in a file. (CSV format)



This should be the number of samples when buffered.
 Multiple this by the period of cycle set in "Other Parameter No. 51", and you will be able to figure out the time.
 Multiple this by 10msec to figure out the time when delivered.
 It shows the time (msec) when unbuffered.

Display the synthetic velocity of orthogonal axes.
 The synthetic velocity can be checked when orthogonal axes are controlled simultaneously and circle movement is performed using CIR2 instruction.

- Manipulated Variable: Original command pulse that composes the trapezoid or triangular patterns calculated from speed, acceleration and deceleration.
- Speed Command: Real command pulses sent from the controllers to the actuators.
- Feedback Pulses: Positional pulses (feedback pulses) transmitted from the actuator encoder.
- Position Deviation: Difference between manipulated variable and feedback pulse (actual position) (version 7.06.03.00 or later)
- Feedback current: Feedback current on motor (version 8.01.00.00 or later)
- (Note) PSEL is can not monitor of feedback current.

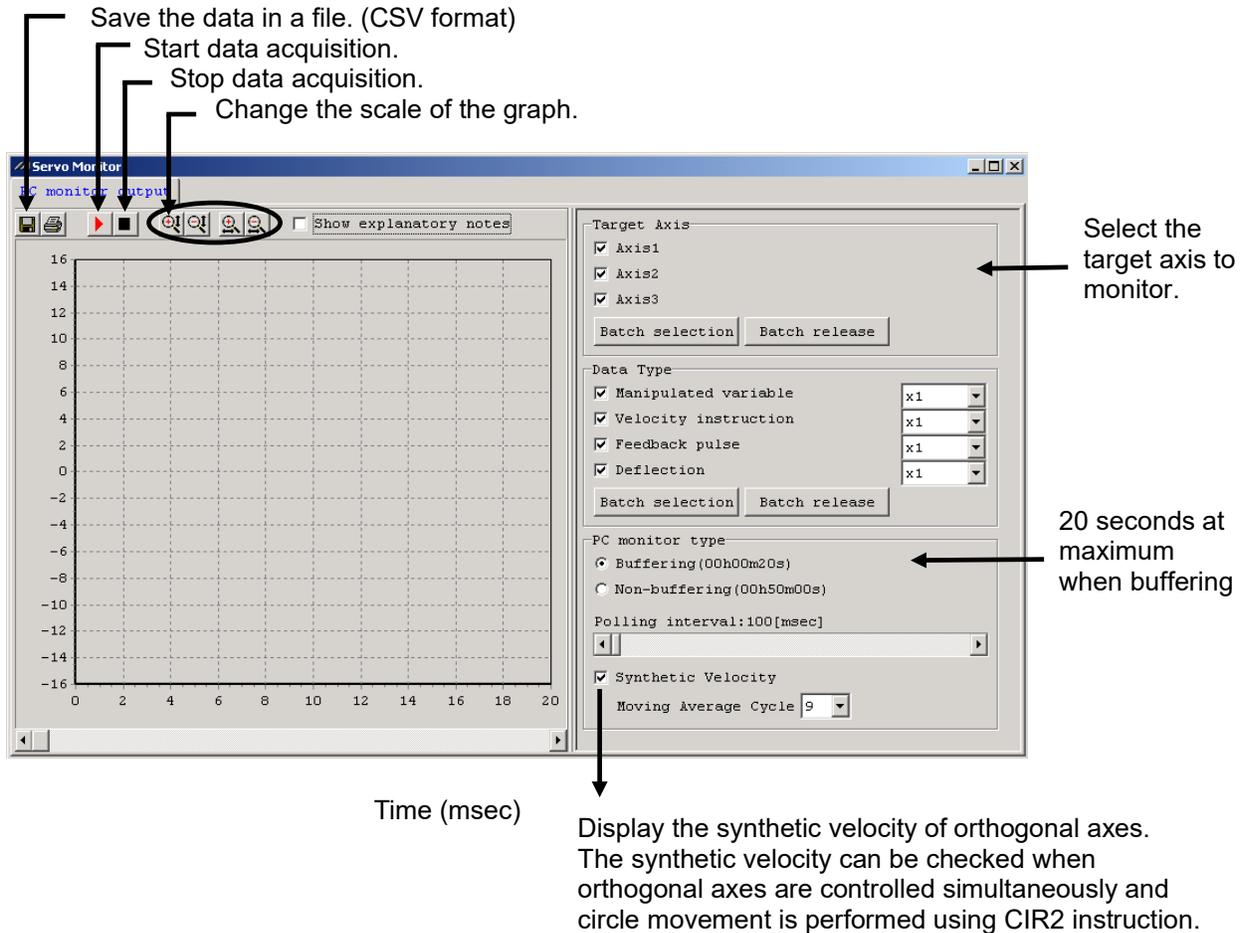
Fig. 11.32 Monitoring Data (Display Example of SSEL, ASEL and PSEL)

☉ Sampling Cycle when Buffered

- The period of sampling cycle for one sample should be the value set in "Other Parameter No. 51: Monitoring Data Buffering Cycle".
 The value can be changed in the range from 1msec to 100msec.
 It should be set to 10msec when delivered.

In other than TTA and SCARA-axis of MSEL, the operation amount, speed command, feedback pulse and position deviation of the axes selected in Applicable Axis can be shown. Select the item desired to be shown in Data Type.

(Note) SCARA Axis cannot be monitored for MSEL.



- Manipulated Variable: Original command pulse that composes the trapezoid or triangular patterns calculated from speed, acceleration and deceleration.
- Speed Command: Real command pulses sent from the controllers to the actuators.
- Feedback Pulses: Positional pulses (feedback pulses) transmitted from the actuator encoder.
- Position Deviation: Difference between actual command pulse and feedback pulse (actual position)

Fig. 11.33 Monitoring Data (Other than TTA and SCARA-axis of MSEL)

- Ⓞ Sampling Cycle when Buffered
The period of sampling cycle for one sample should be 1msec.

① Monitoring of I/O Data (PC interface software version 7.07.04.00 or later)

I/O data can be shown on the monitor data in the controllers listed below.

- X-SEL-P/Q (V1.23 or later on controller main application)
- SSEL (V0.41 or later on controller main application)
- XSEL-R/S, RX/SX, RXD/SXD
- XSEL-RA/SA, RAX/SAX, RAXD/SAXD
- TTA
- MSEL-PC/PG, PCX/PGX

To display, set Bit 8 to 1 in Other Parameter No. 47 “Other Setting Bit Pattern 2”.

(Set up 1 (hexadecimal number) is, bits 7 to 0 of the setting value.

If the current of the setting value is 1 (hexadecimal), □ will be 01 (hexadecimal).

Setting value is the 101 (hexadecimal).)

[Procedure for I/O Data Monitoring]

1) Select “I/O Monitor Setting” tab in Servo Monitor Screen.

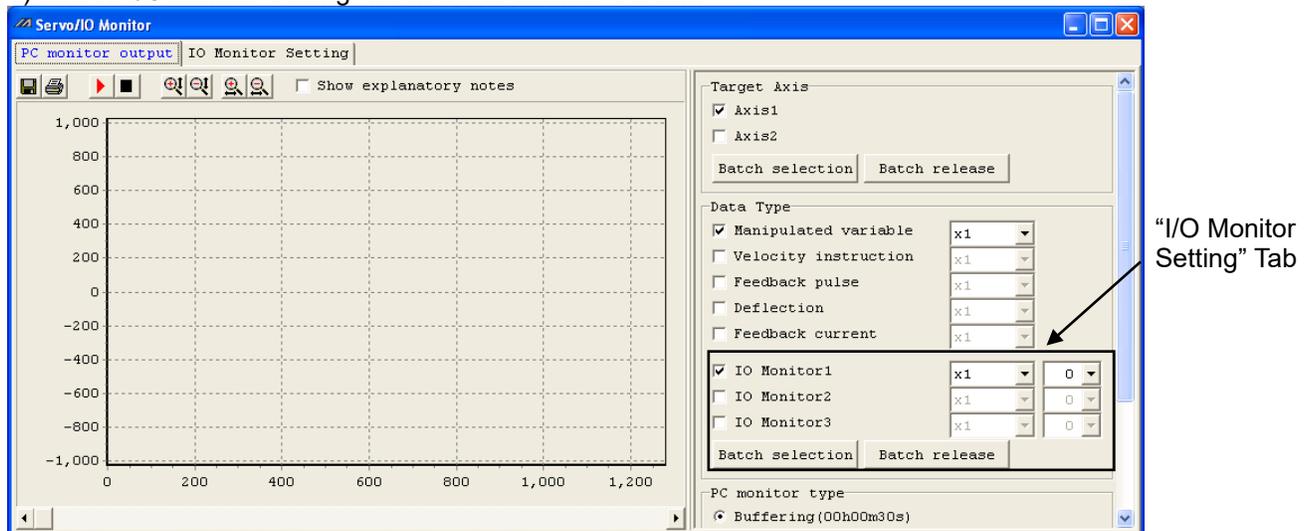
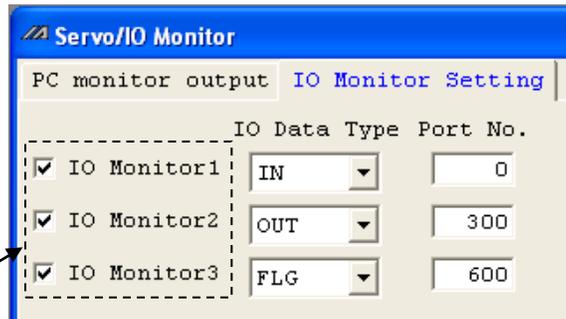


Fig. 11.34 Servo Monitor Window (when I/O monitor is activated)

2) Set the I/O data to monitor



Data with a check mark is available for monitoring

Fig. 11.35 I/O Monitor Setting

[IO Data Type] Select a type of I/O to monitor.

IN : Input port and virtual input port

OUT : Output port and virtual output port

IN/OUT : Virtual input and output port

(XSEL-RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL-PCX/PGX only)

FLG : Global flag (local flag not acceptable)

[Port No.] Input a port number of I/O to monitor.

3) Select "PC Monitor Output" tab in Servo Monitor Screen.

4) Select the applicable axis number for monitor data. It is unnecessary to set up when monitoring only I/O data.

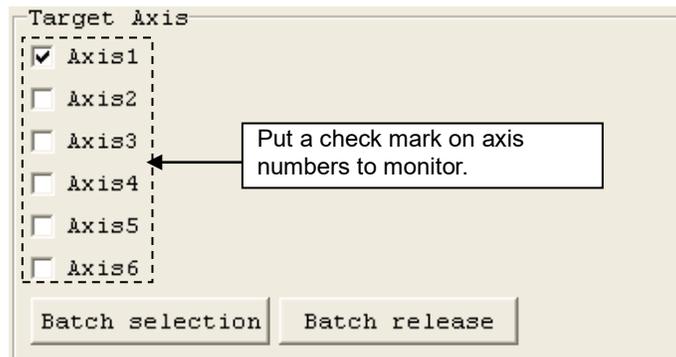
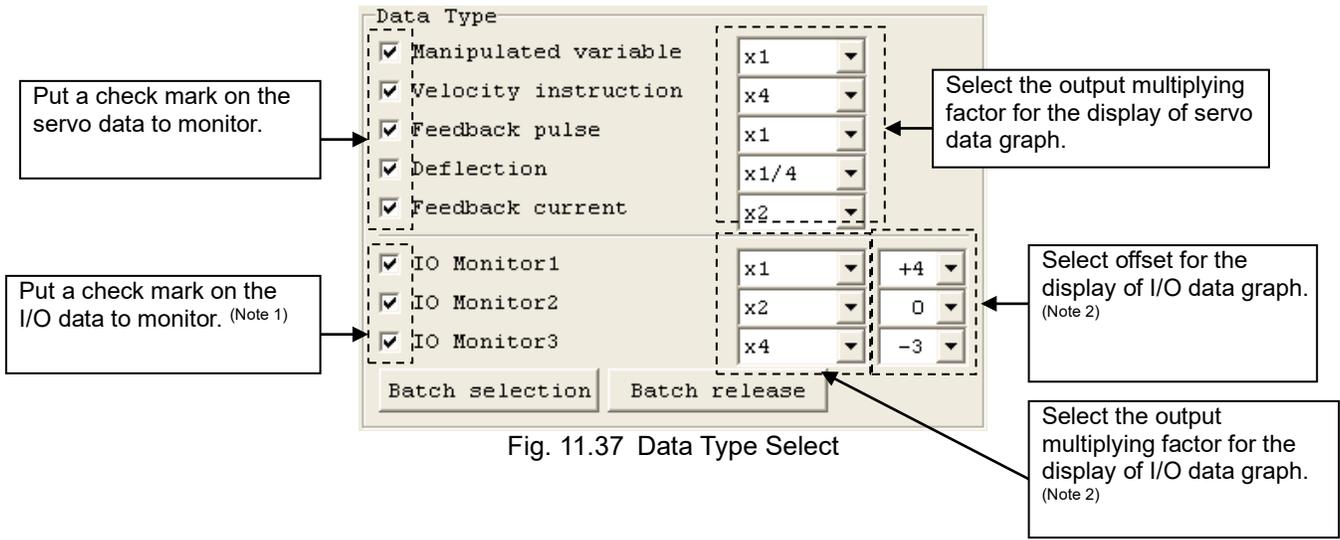


Fig. 11.36 Applicable Axis Number Select

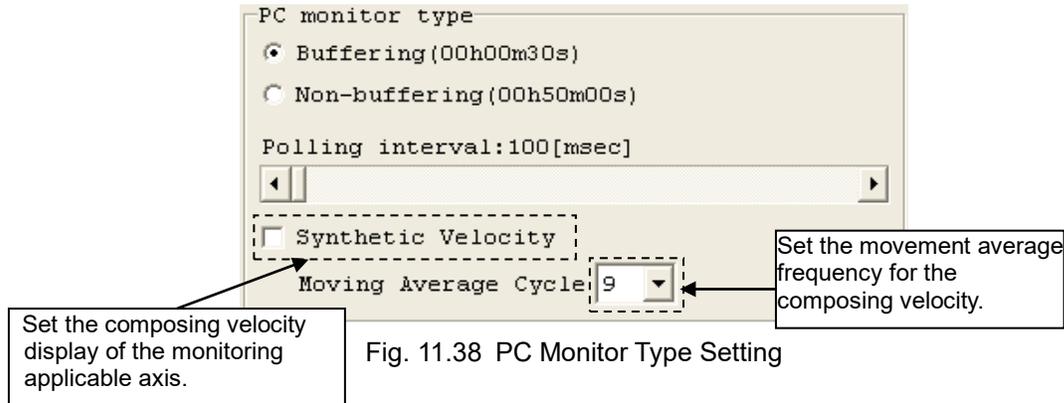
5) Select the data type, output multiplying factor and display offset for the monitor data.



Note 1 Only those with a check mark being put in IO monitor setting (Fig. 11.32) are available for setting.

Note 2 Refer to (7) for detail of I/O data graph display settings.

6) Select a monitor type.



[Buffering]

[Non-Buffering]

[Composing Velocity]

[Movement Average Frequency]

Have the graph displayed by using the data buffering on the controller side.

Have the graph displayed with data read out at the time of every interval set in "Polling Interval".

Set display on/off of composing velocity of the monitoring applicable axis (Dedicated for when buffering).

Set the movement average frequency with calculation of composing velocity (Dedicated for when buffering).

- 7) Click on  the button to start monitoring and output a graph.
Click on  button, and monitoring process stops.

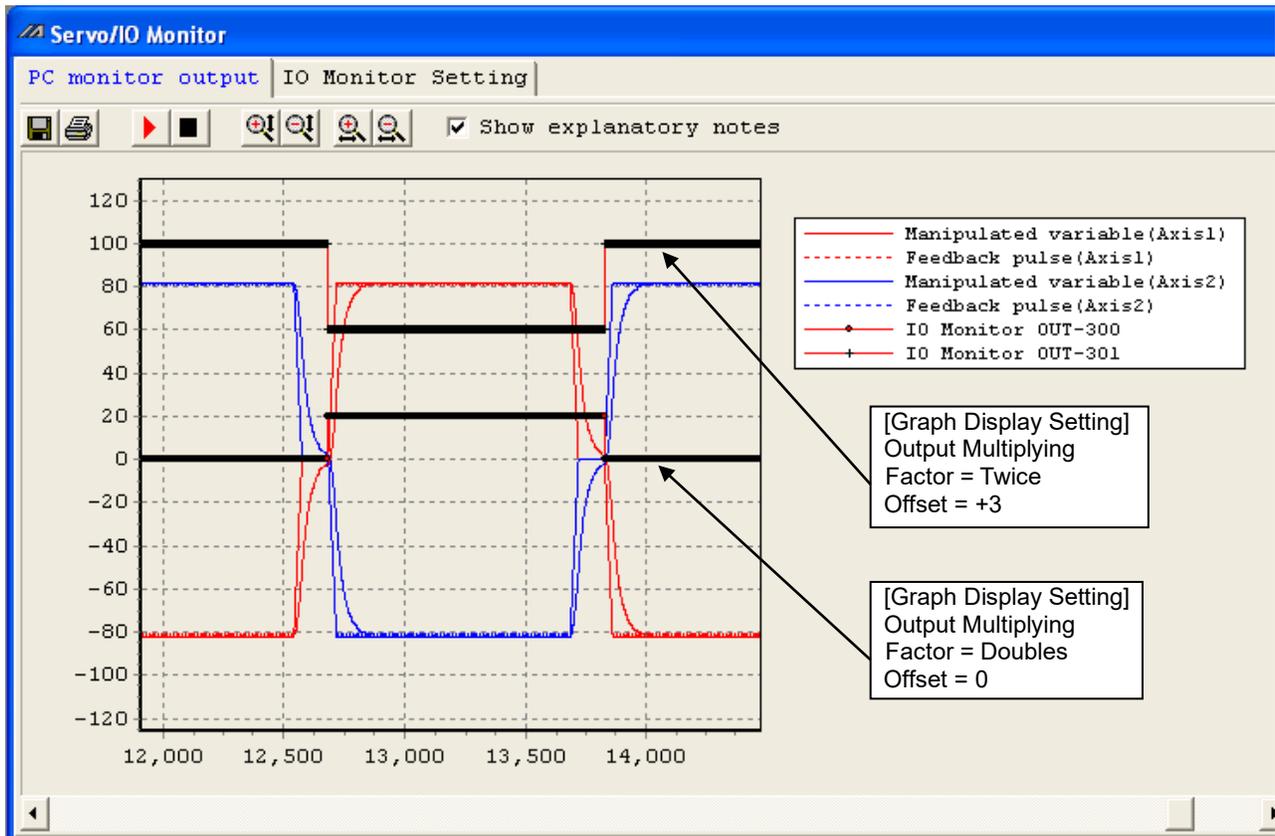


Fig. 11.39 Servo + I/O Data Graph

<I/O Data Graph Display Setting>

- Adjust the level difference of port on/off (output multiplying factor) in the output multiplying factor setting in the data type select (Fig. 11.34).
- Adjust the vertical axis position in port off level in the offset setting in the data type select (Fig. 11.34).
- The graph display setting in I/O data can be adjusted also when the monitor is in stop. Adjust the position for your comfort for monitoring.

- Additional Display in Servo Monitor Display in V13.00.00.00 and Later
 “Monitoring Data Type Detail Information” and “Display of Current Value of Each Axis in Monitoring” are added in V13.00.00.00 and later.

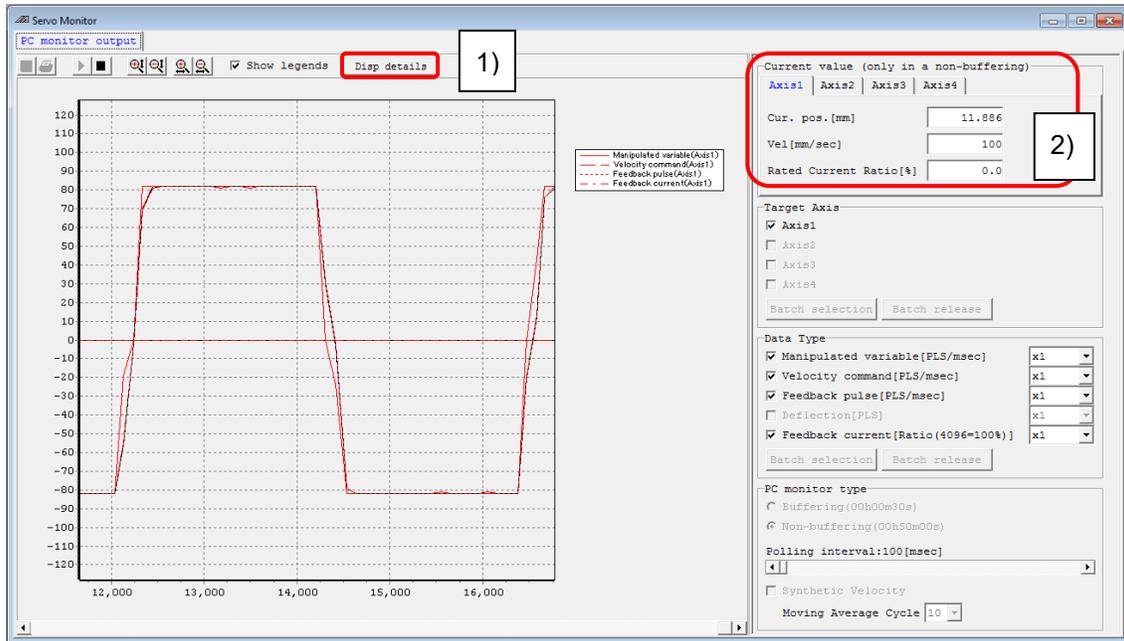


Fig. 11.40 Servo Monitor Screen (V13.00.00.00 or later)

- Click on “Display Content Detail” button, and the detail information for monitoring data type will be displayed.

Data Type	Data Content	Servo Monitor Output Unit (Output Magnification 1 Times)	
Manipulated variable	Original command pulses per 1msec	PLS/msec	
Velocity command	Actual command pulses per 1msec	PLS/msec	Vel [mm/sec] = Pulses / En Vel [mm/sec] = Pulses * En
Feedback pulse	Feedback pulses per 1msec	PLS/msec	
Deflection	Pulses for the differences between the command and the current value	PLS	Dev. dis. [mm] = Pulses / Dev. dis. [mm] = Pulses *
Feedback current	Motor feedback current	Ratio(4096=100%)	Ratio[%] = Display value

*Calculating formula in case of each axis parameter No.44 "Measure Revise" = 0
 *If the axis of rotation, replace "mm" to "deg" and "lead[mm]" to "360[deg]"
 *Encd. res. (after div.) = Encd. res. (before div.) [PLS/rev.] / 2^n (n = Encd. div. ratio) (Rot. encd.)
 Encd. res. (after div.) = Encd. res. (before div.) [micrometer/PLS] * 2^n (n = Encd. div. ratio) (Lnr. encd.)

Fig. 11.41 Detailed information for Monitoring Data Type

2) The current values of each axis in monitoring gets displayed.

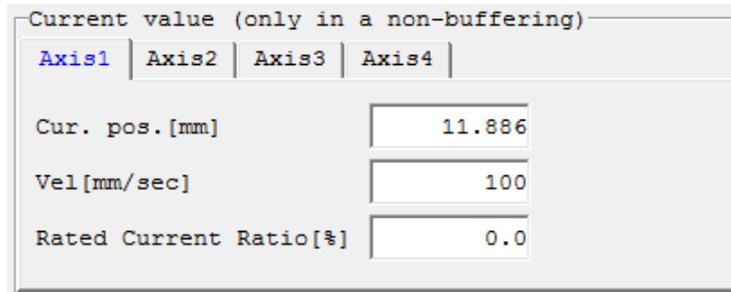


Fig. 11.42 Current Value Display

- Current values will be updated only when non-buffering monitor is under execution.
- “Rated Current Ratio [%]” is displayed only for the models available for monitoring of the feedback current.

(10) Servo Addition Data Monitor

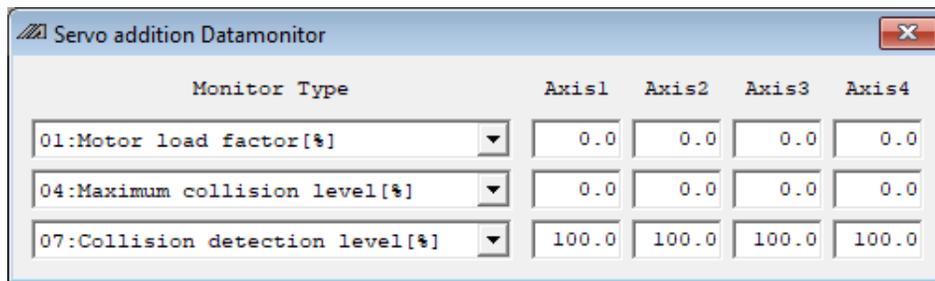


Fig. 11.43 Servo Addition Data Monitor Screen

The data of each data described in the table below should be monitored.

List of Monitor Types

Items	Contents
Motor load factor [%]	Ratio of load when the assumed motor rising temperature to generate the driver overload error set as 100%
Motor feedback current [%]	Current value acquired from motor (rated ratio)
Maximum collision level [%]	Maximum value of collision level (peak value)
Encoder overheat level [%]	Temperature Ratio when the maximum encoder operation temperature to generate the overheating error set as 100%
Regene. resist. ambient temp. [deg. C]	Ambient temperature around the regenerative resistor mounted on the base board (around power supply board) * Only this item is All Axes Common Data
Collision detection level [%]	Collision detection level currently set (collision level judged as collision detection)

Select an item to be monitored in “Monitor Type”.

Items available for selection in “Monitor Type” should differ depending on the controller types and settings.

12. RC Gateway Function Setting

Operational manual for RC gateway function is in a separate volume.

Operational manual	Catalogue number
X-SEL controller P/Q/PX/QX RC gateway function	ME0188

13. How to Reset an Absolute Encoder

13.1 Orthogonal Axis (Absolute Specification) (excluding XSEL-RA/SA, RAX/SAX)

If the voltage of the absolute-encoder backup battery in the X-SEL controller becomes low or after the battery or encoder cable has been disconnected, an encoder battery error will occur. In this case, the absolute encoder must be reset.

- (1) Click Controller from the menu bar, and then select Absolute Reset.
In the case of the X-SEL-PX/QX, RX/SX, and RXD/SXD controllers, select Abs. Encoder Reset (Orthogonal axis).
- (2) When the following warning window appears, click **OK**.



Fig. 13.1 Warning

- * For the controllers other than SSEL and ASEL Controllers that satisfy the following conditions, conduct operation of (3) to (6) and (11) to (13).
(Condition) Main Application: SSEL V0.57 or earlier, ASEL V0.45 or earlier, XSEL PC software: V12.02.05.00 or earlier.
- * Conduct operation of (7) to (13) for a version Main Application: SSEL V0.57 or later, ASEL V0.45 or later, XSEL PC software later than V12.02.05.00
XSEL-P/Q V1.52 or later, XSEL PC software: V12.02.06.00 later than version
XSEL-R/S, RX/SX V1.23 or later, XSEL PC software: V13.00.00.00 later than version

- (3) [Absolute Encoder Reset] window will open.

Click here and the axis number changes.
Select an axis that requires an absolute reset.

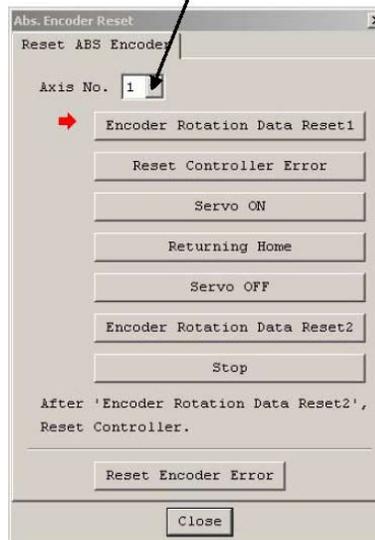


Fig. 13.2 Absolute Reset

- (4) Clicking **Encoder Rotation Data Reset1** will display the following warning window. Click **Yes**.

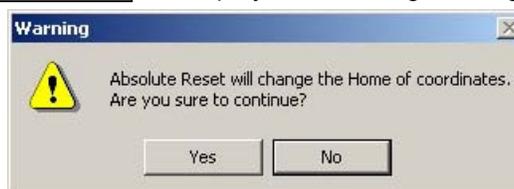


Fig. 13.3 Warning

- (5) When the following 'Warning' dialog box appears, click **Yes**



Fig. 13.4 Warning

- (6) After the Encoder Rotation Data Reset 1 process is completed, the red arrow will move to the next item below. Click the applicable button. Repeat this operation until all of the following processes are completed (every time a process is completed, the red arrow will move to the next item below):

- 1) Reset Controller Error
- 2) Servo ON
- 3) Returning Home
- 4) Servo OFF (Not necessary for Version 1.1.0.0 and later) ^(Note 1)

Note 1: If you are using PC software of version 1.1.0.0 or later and a driver with CPU version 0.23 or later, the Encoder Rotation Data Reset 2 process is performed with the servo ON. Accordingly, the servo OFF step is skipped.

- 5) Encoder Rotation Data Reset 2

(Note) With an earlier product, clicking Reset Controller Error may generate an error (No. D10: IPM error). If this error occurs, close the PC tool, reconnect the controller power, and then repeat from step (2). (If the encoder battery is normal, the error will no longer occur after the power is reconnected and "rdy" or "Ardy" will be shown on the controller's 7-segment display. Take note that the axis has not yet completed homing in this state).

After the **Encoder Rotation Data Reset 2** process is completed, the red arrow will return to the position in (3). If you want to perform an absolute encoder reset for multiple axes, select each subsequent target axis and repeat the steps from (3). To end the reset operation, click **Close** to close the Abs. Encoder Reset dialog box.

(Note) If a need arises to perform an absolute encoder reset for multiple axes, be sure to complete steps (3) through (6) for all applicable axes before performing a software reset in step (7).

* (7) [Absolute Reset] window appears for Main Application: SSEL V0.57 or later, ASEL V0.45 or later, V12.02.05.00.

- (7) [Absolute Reset] window will show up. Select the tab for the axis that requires the absolute reset.

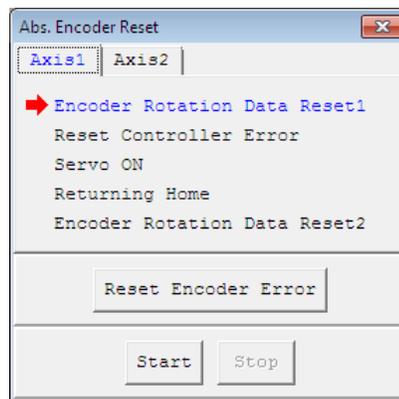


Fig. 13.5 Absolute Reset Window

- (8) Click on **Start** button and a warning window shows up. Release the emergency stop, check the content and click **Yes**. Home-return operation starts on the indicated axis. Absolute reset completes after home return.

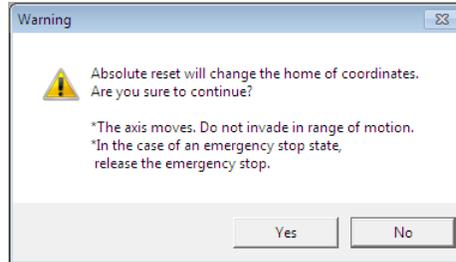


Fig. 13.6 Warning

- (9) Click on the **x** in the [Absolute Reset] window to close it.
- (10) Click **x** in [Absolute Reset] window to close the window and the screen switches to the confirmation window asking "Write Flash ROM?". Put a check mark on "Parameter" and click **Yes** to start writing. After it is finished, conduct a software reset. Writing to the flash ROM can be conducted at once after the absolute reset are completed on each axis.

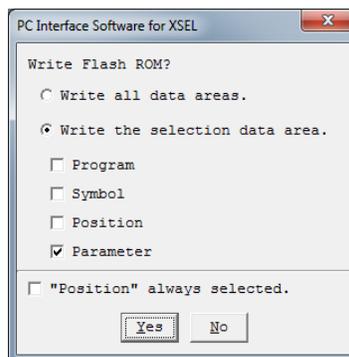


Fig. 13.7 Flash ROM Writing

- (11) When the following confirmation dialog box for software reset appears, click **Yes** to restart the controller.



(Note) After performing an absolute reset, always execute a software reset.

Fig. 13.8 Confirmation

- (12) If no other error is present, the controller's 7-segment display will show "rdy."
- (13) This completes the absolute encoder reset operation. To repeat the reset operation, close the X-SEL PC software first, and then repeat the steps from the beginning.

13.2 Orthogonal Axis (Battery-less Absolute Specification and XSEL-RA/SA, RAX/SAX)

Main Application: SSEL V0.57 or later, ASEL V0.45 or later

XSEL PC Software: V12.02.05.00 or later

Main Application : XSEL-P/Q V1.52 or later

XSEL PC Software : V12.02.06.00 or later

Main Application : XSEL-R/S, RX/SX V1.23 or later

XSEL PC Software : V13.00.00.00 or later

In the absolute type, it is necessary to conduct the absolute reset after motor replacement or when an absolute error (Error No. B0E or 4A9) occurred.

- (1) Make sure to have a backup of the parameters before conducting. Select [Parameter (P)] → [Edit (E)] from the menu in the PC software to show the parameter edit window. Press “Save As” button in the parameter edit window to save the parameters to file data.

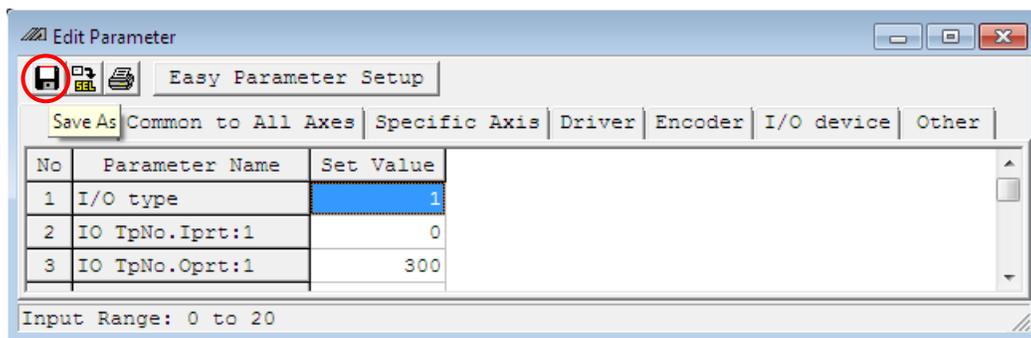


Fig. 13.9 Parameter Edit Window

- (2) Select [Controller (C)] → [Absolute Reset (A)] in the menu on the PC software.

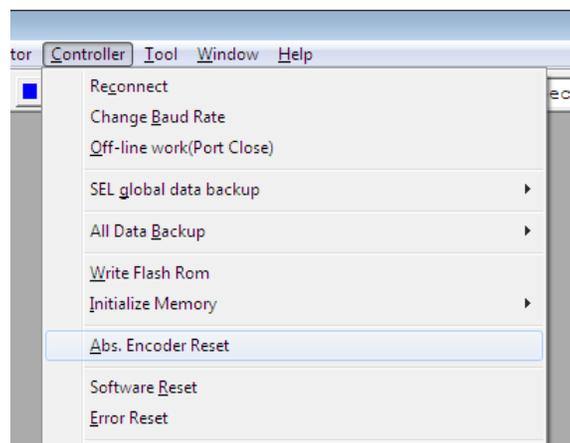


Fig. 13.10 Pull down menu of controller (C)

(3) A warning window shows up. Check the content and click **OK**

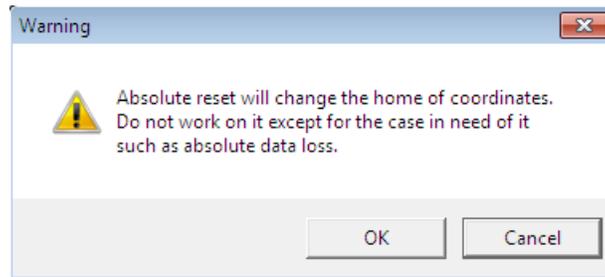


Fig. 13.11 Warning

(4) [Absolute Reset] window will show up. Select the tab for the axis that requires the absolute reset.

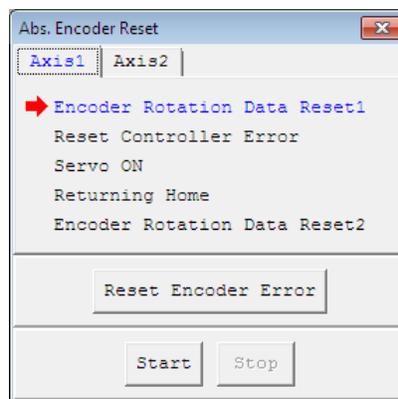


Fig. 13.12 Absolute Reset Window

(5) Click on **Start** button and a warning window shows up. Release the emergency stop, check the content and click **Yes**. Home-return operation starts on the indicated axis. Absolute reset completes after home return.

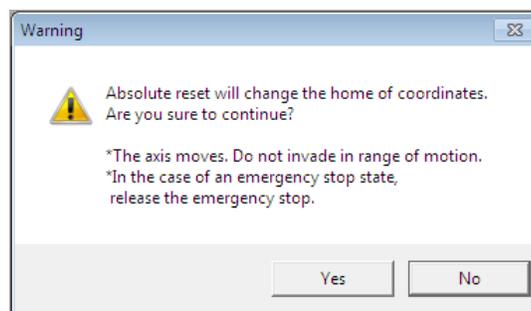


Fig. 13.13 Warning

- (10) Click in [Absolute Reset] window to close the window and the screen switches to the confirmation window asking “Write Flash ROM?”.
Put a check mark on “Parameter” and click to start writing. After it is finished, conduct a software riset. Writing to the flash ROM can be conducted at once after the absolute reset are completed on each axis.

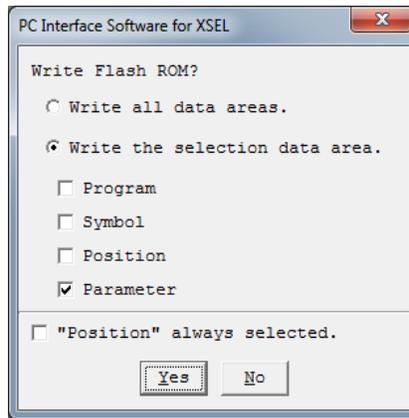


Fig. 13.14 Flash ROM Writing

13.3 Scara Axis

13.3.1 Absolute Reset Preparation

The following jigs are required to perform an absolute reset:

- Absolute Reset Adjustment jigs

Type	Remarks
JG-1	Arm length 500/600
JG-2	Arm length 250/300/350
JG-3	Arm length 700/800
JG-4	Arm length 500/600 high-speed type
JG-5	Arm length 120/150/180

Connect the cables of the actuator, controller and PC to make an operable status. Always check operation of the EMG switch before performing work. The absolute reset adjustment jig is always required to perform an absolute reset for the rotation axis and vertical axis, but not always required for arm 1 and arm 2. (Rotation data can be reset as long as positioning preciseness of “center of positioning mark label ± 1 graduation” is ensured.)

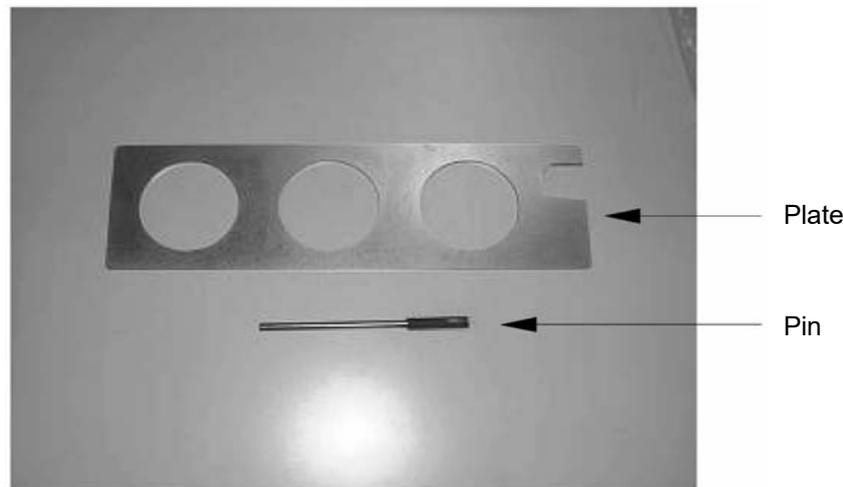


Fig. 13.15 Example of Absolute Reset Adjustment Jig (Type JG-1)

Warning

- Performing work without understanding inspection and maintenance work thoroughly may cause an accident resulting in injury or death.
- Post a sign “MEN WORKING” to prevent other workers from operating the controller, operation panel or other equipment.

13.3.2 Starting the Absolute Reset Menu

- (1) Open the Abs. Encoder Reset window from PC software.
 (Note) In the case of X-SEL-PX/QX, RX/SX, RAX/SAX select Abs Reset (Y) (Scara Axis).
 In the case of XSEL-RXD/SXD, RAXD/SAXD, select Abs Reset (Y).

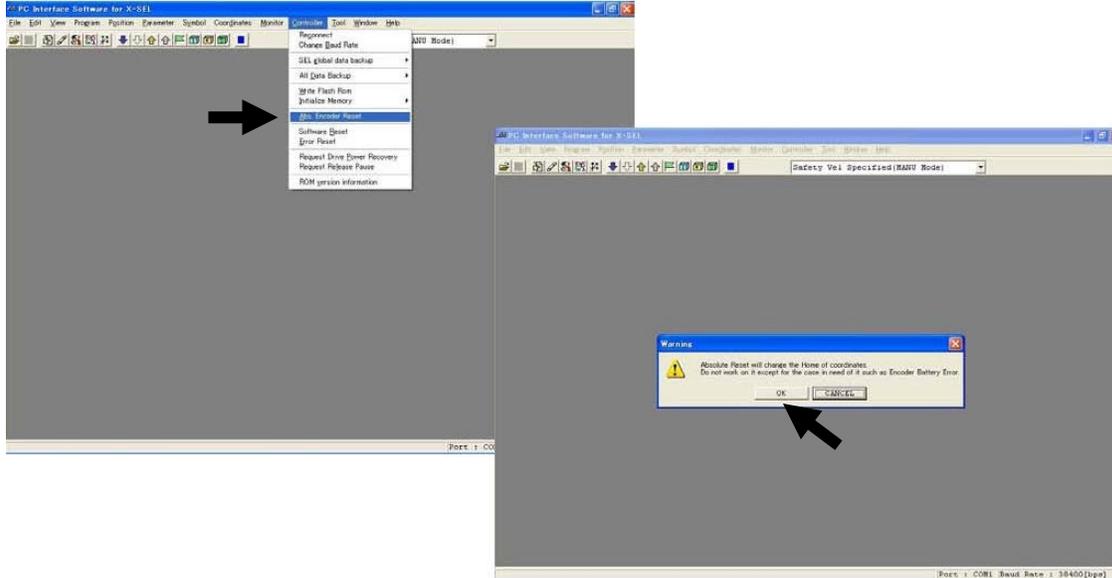


Fig. 13.16 Opening Operation of Abs. Encoder Reset Window

- (2) The Abs. Encoder Reset window will open.
 - One of three Abs. Encoder Reset screens - for Arm1 (A1c), Arm2 (A2c), Rot. Axis (Rc) + Vert. Axis (Zc) - is displayed when a corresponding tab is clicked.

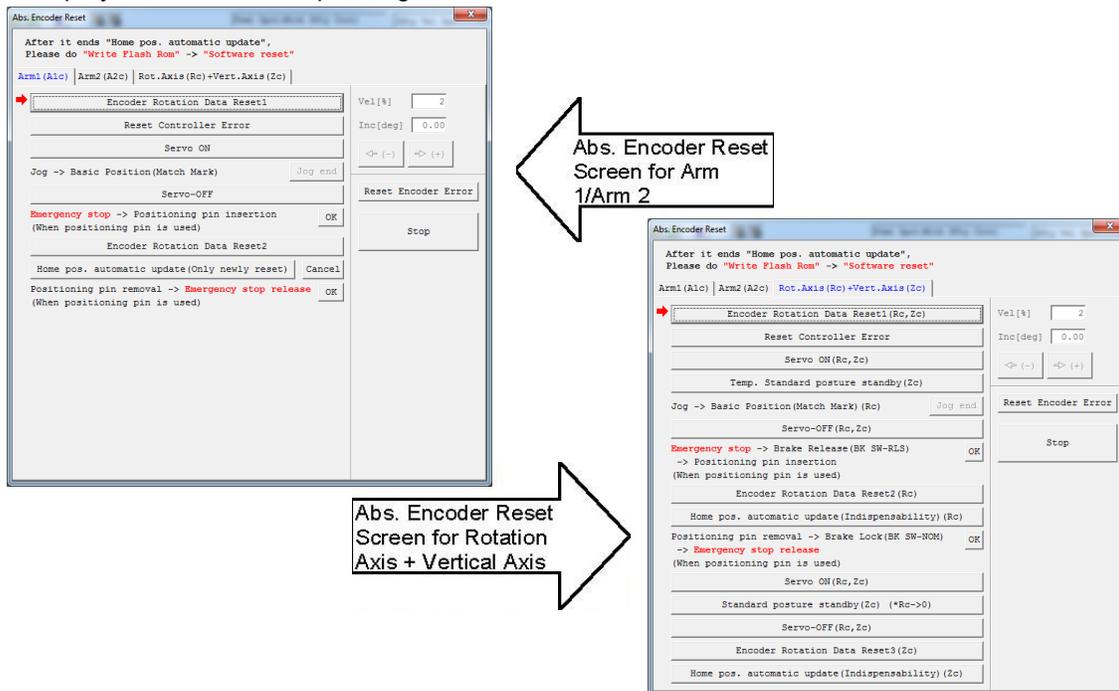


Fig. 13.17 Abs. Encoder Reset Window

13.3.3 Absolute Reset Procedure for Arm 1 or 2

(1) Click the Encoder Rotation Data Reset1 button.

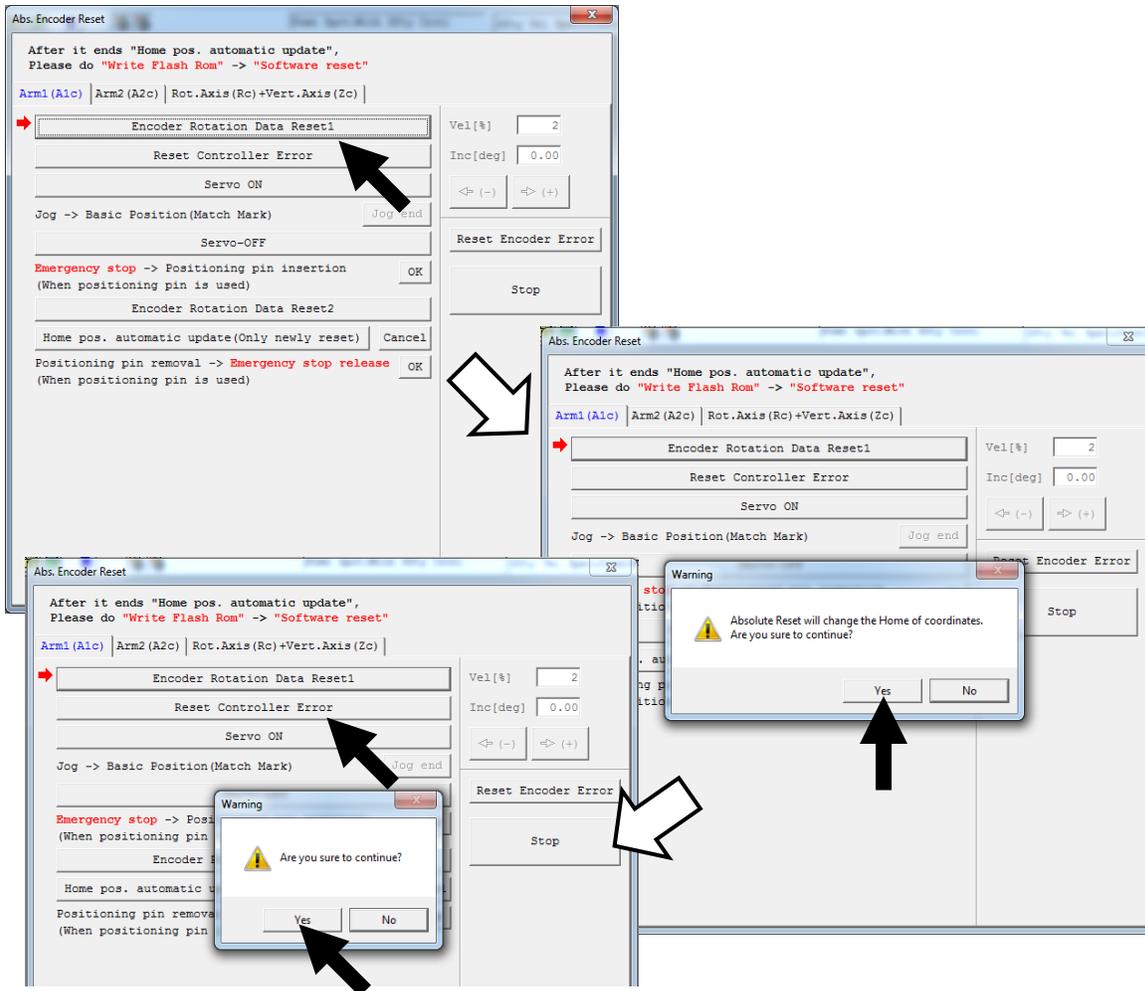


Fig. 13.18 Encoder Rotation Data Reset1 Operation

(2) Click the Reset Controller Error button.

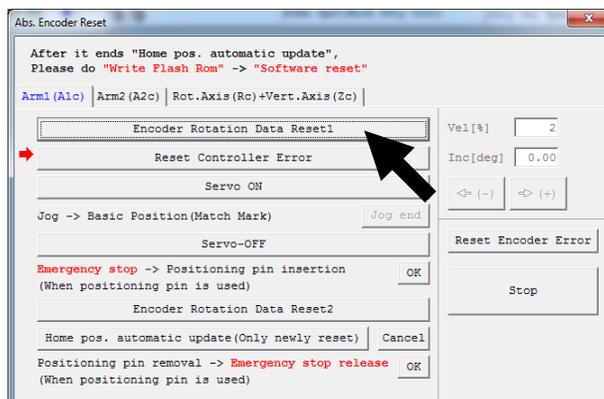


Fig. 13.19 Controller Reset Operation

(3) Click the Servo ON button.

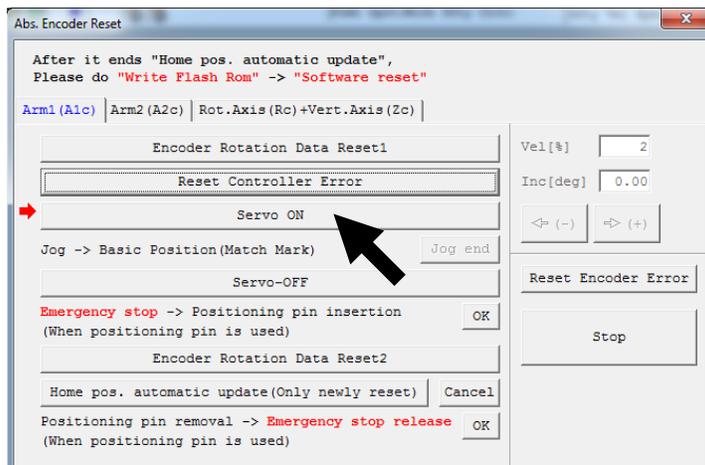


Fig. 13.20 Servo ON Operation

(4) Jog the arm to near the reference position (see reference position drawing in step 7), and click the Jog end button.

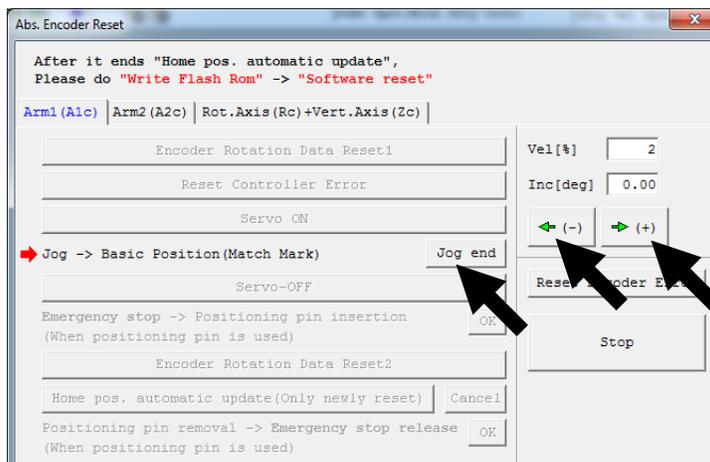


Fig. 13.21 Jog Operation

(5) Click the Servo-Off button.

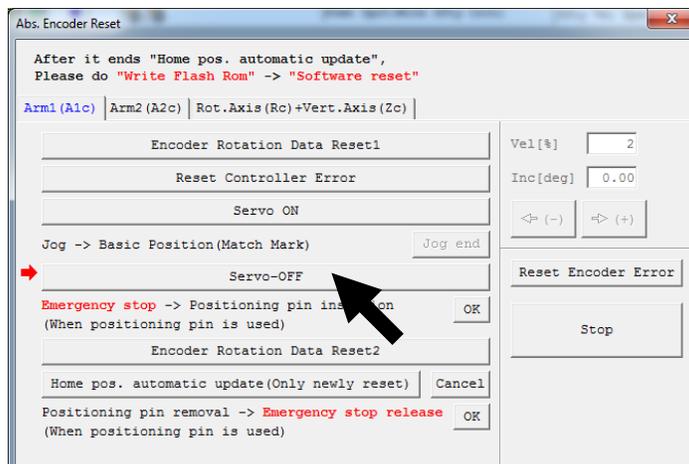


Fig. 13.22 Servo-OFF Operation

- (6) Press the EMERGENCY STOP switch.
- (7) When performing an absolute reset for arm 1, set an adjustment jig (pin) in arm 1 to fix the arm at the reference position. When performing an absolute reset for arm 2, set an adjustment jig (pin) in arm 2 to fix the arm at the reference position.
 - Set the jig after confirming that the EMERGENCY STOP switch is pressed.
 - Set the jig after adjusting the arm to the reference position, using the positioning mark label as a guide.
 - Only arm 1 has a cover, which is fixed with setscrews. Remove the setscrews and remove the cover before setting the jigs.
 - It is recommended that an adjustment jig is used to perform an absolute reset. With arm 1 or 2, however, rotation data can be set as long as positioning preciseness of “center of positioning mark label ± 1 graduation” is ensured.
 - To perform an absolute reset for arm 2 with an arm length of 120, turn the arm at a right angle and set the jig as shown in the reference position drawing in Fig. 13.17.



Arm 1
(Arm length 500/600, 700/800)



Arm 2
(Arm length 500/600, 700/800)

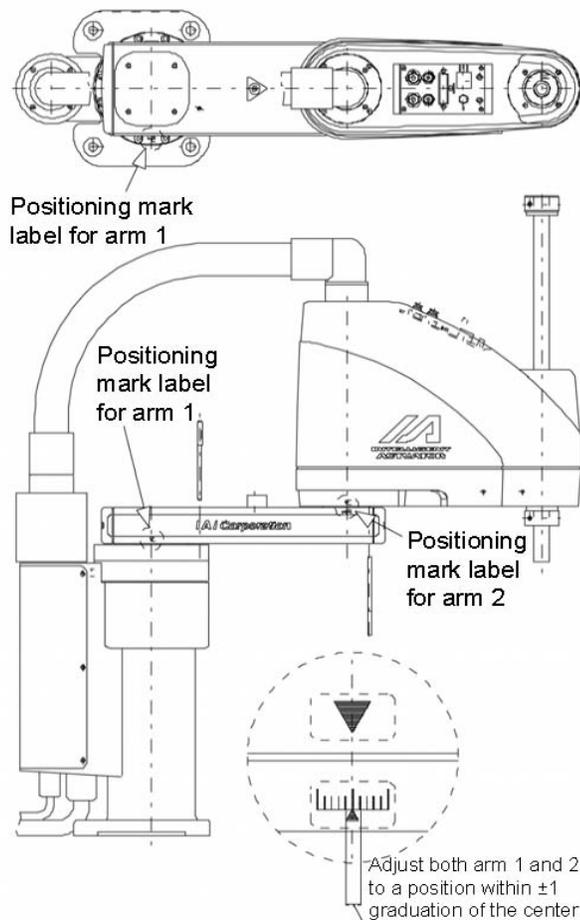


Fig. 13.23 Arm length 500/600, 700/800 Reference Position

 **Warning**

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.



Arm 1
(Arm length 250/300/350)



Arm 2
(Arm length 250/300/350)

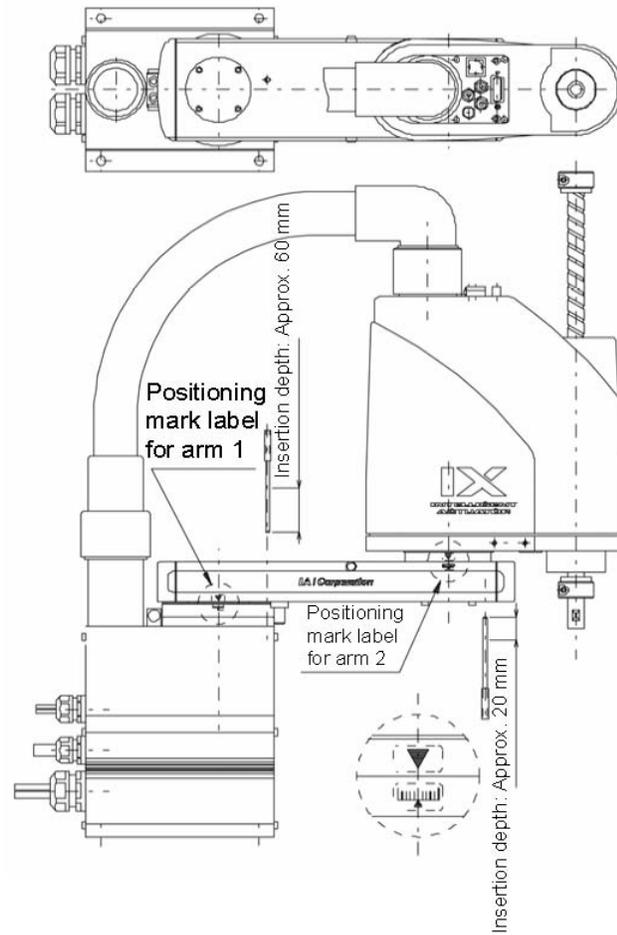
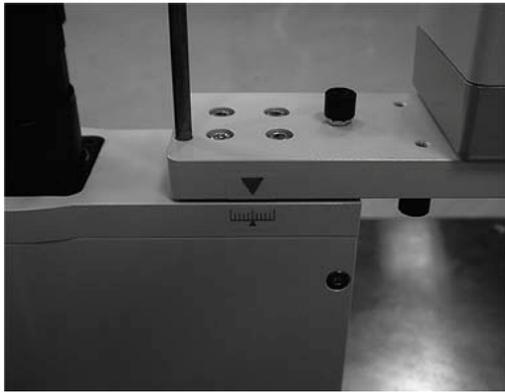


Fig. 13.24 Arm length 250/300/350 Reference Position

(Note) When performing an absolute reset for arm 1 of IX-NNN2515, rotate arm 2 slightly then set with an adjustment jig (pin) to set it.

Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.



Arm 1 (Arm length 120/150/180)



Arm 2 (Arm length 150/180)



Arm 2 (Arm length 120)

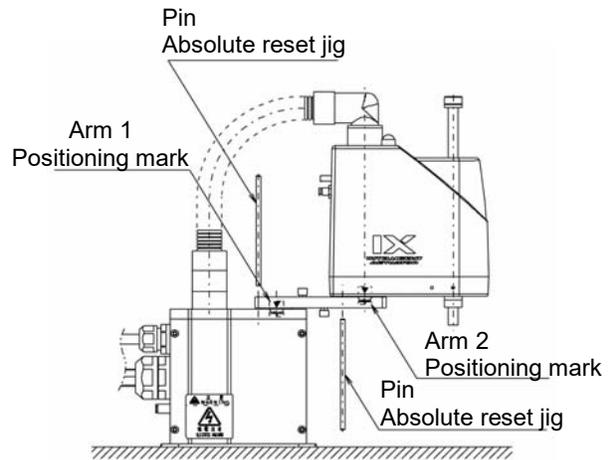


Fig. 13.25 Arm Length 120*¹/150/180 Reference Position

*1: When an absolute reset is performed for arm 1 (arm length: 120)

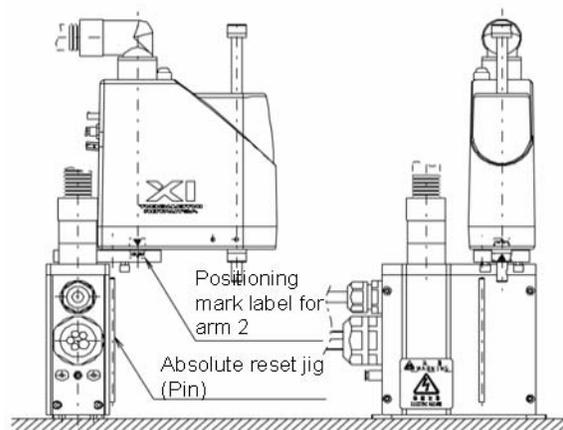
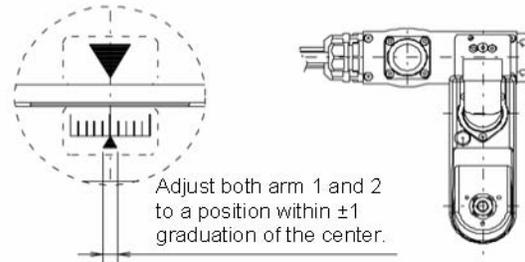


Fig. 13.26 Arm Length 120*² Reference Position

*2: When an absolute reset is performed for arm 2 (arm length: 120)

Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.

(8) Click the OK button.

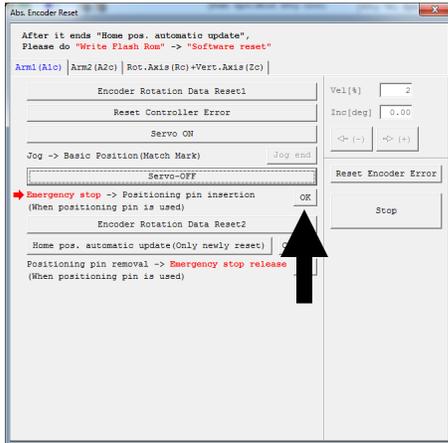


Fig. 13.27 Confirmation Operation

(9) Click the Encoder Rotation Data Reset2 button.

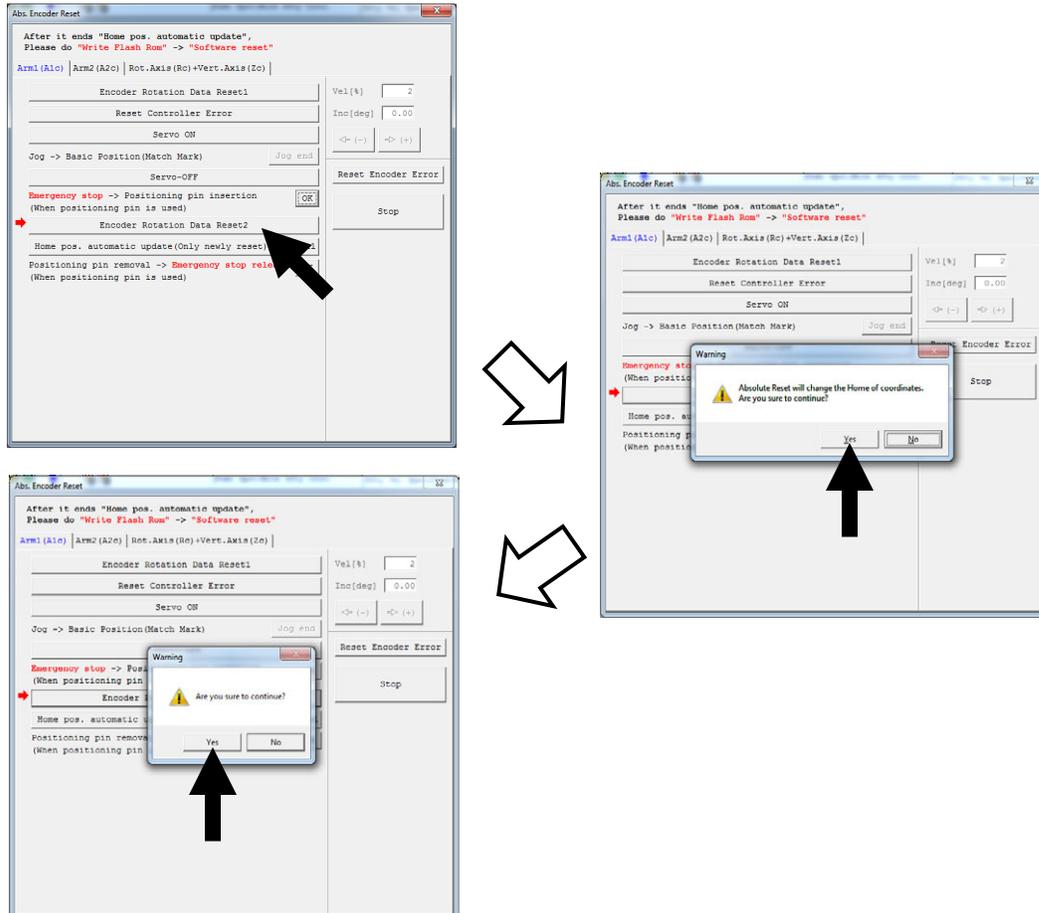


Fig. 13.28 Encoder Rotation Data Reset2 Operation

- (10) Remove the adjustment jig.
 - Install the cover and secure it with the setscrews for arm 1 only.
- (11) Release the EMERGENCY STOP switch.
- (12) Click the OK button.

- An arrow is shown next to the **Home pos. automatic update** button. Do not this item (In particular, be sure this item is not set when performing an absolute reset without using a jig.)
- If the home position has been updated by mistake, perform software reset without writing to the flash ROM. (The status will be the same as the one in which the home position automatic update is not performed.)
- Always click the **OK** button after removing the jig and releasing the EMERGENCY STOP switch.

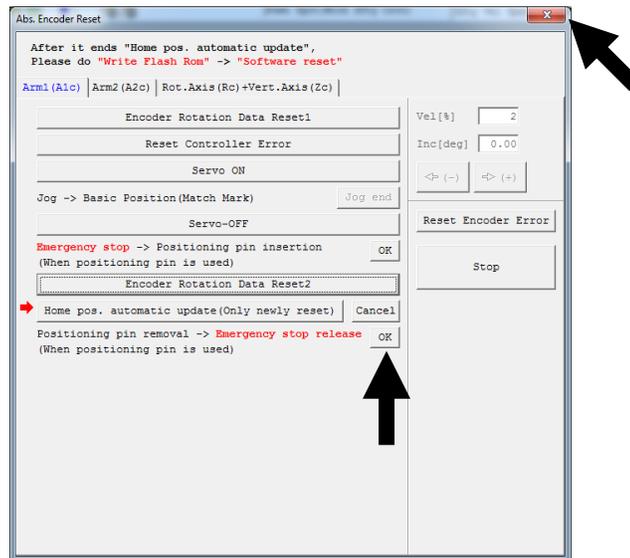


Fig. 13.29 Confirmation Operation

- (13) Click “x” in the top right-hand corner to exit the Abs. Encoder Reset window.
 - Once the absolute reset is completed, be sure to perform software reset.

 **Warning**

- Be careful not to perform a reset using an incorrect sequence, since it may cause the arm position to become offset.
- Perform home pos. automatic update only when any mechanical change such as arm change has been made. (Joint part only)

13.3.4 Absolute Reset Procedure for Rotation Axis + Vertical Axis

(1) Click the Encoder Rotation Data Reset1 button.

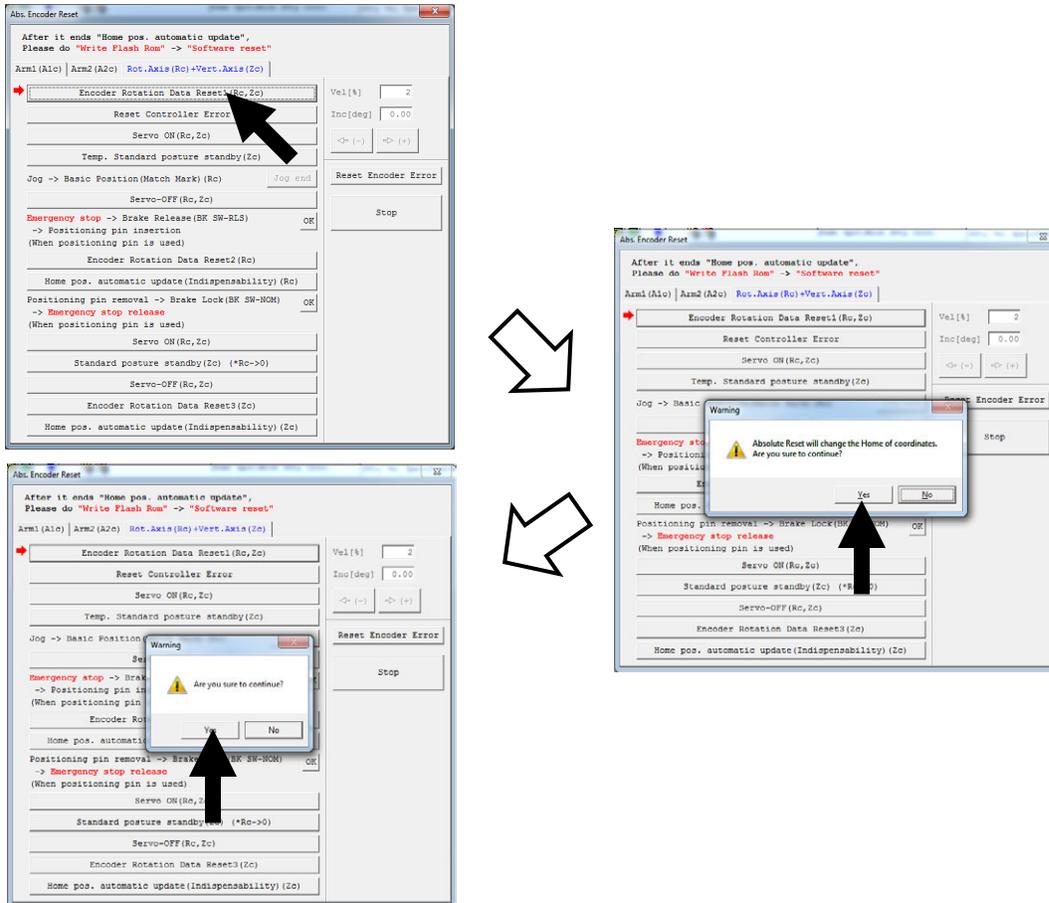


Fig. 13.30 Encoder Rotation Data Reset1 Operation

(2) Click the Reset Controller Error button.

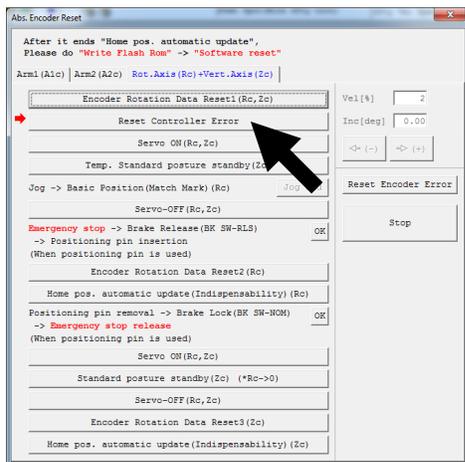


Fig. 13.31 Reset Controller Error Operation

(3) Click the Servo ON button.

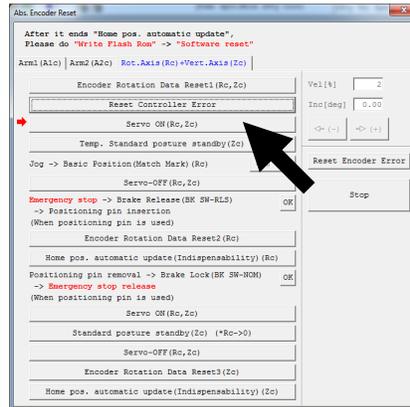


Fig. 13.32 Servo ON Operation

(4) Click the Temp. Standard posture standby button.
 • Please note that the vertical axis returns to its home position.

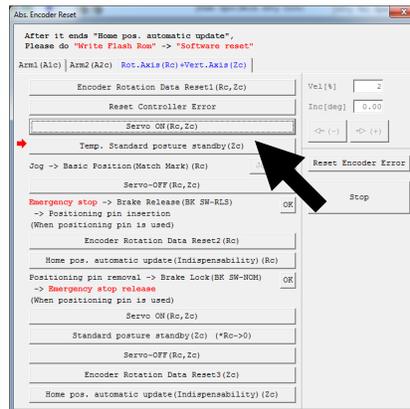


Fig. 13.33 Temp. Standard Posture Standby Operation

(5) Jog the rotation axis to the reference position (see reference position drawing in step 8), and click the Jog end button.

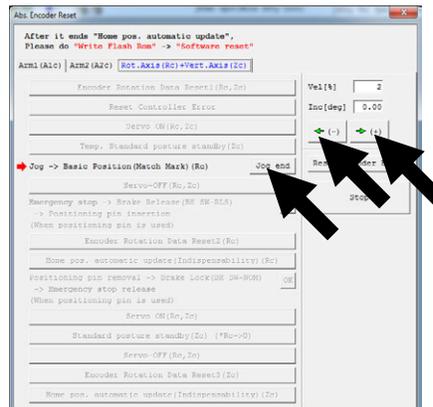


Fig. 13.34 Jog Operation

(6) Click the Servo-OFF button.

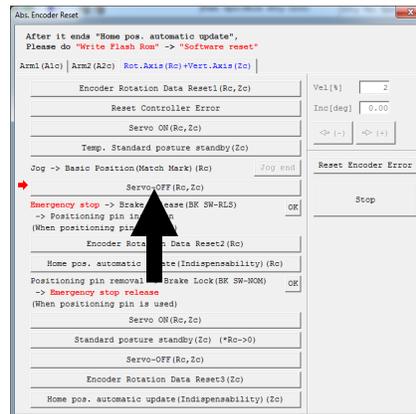


Fig. 13.35 Servo-OFF Operation

(7) Press the EMERGENCY STOP switch.

(8) Affix the rotation axis at the reference position by setting the plate and pin of the adjustment jig as illustrated below.

- Set the jig after confirming that the EMERGENCY STOP switch is pressed.
- Set the jig using the positioning mark as a guide.
- The top face of the stopper should roughly align with the bottom face of arm 2.

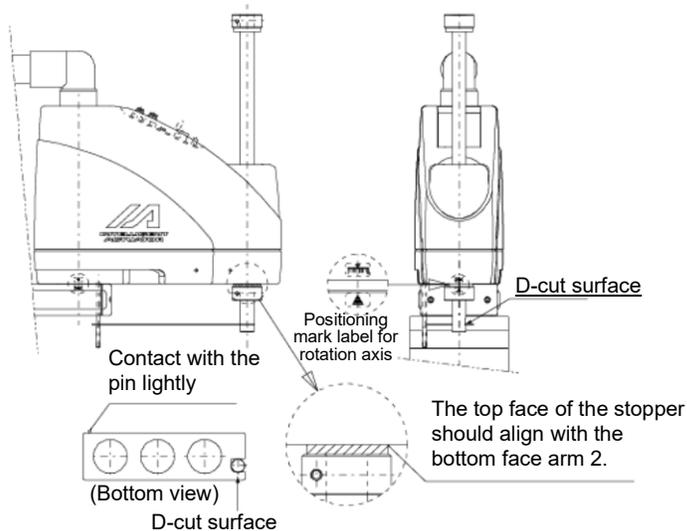
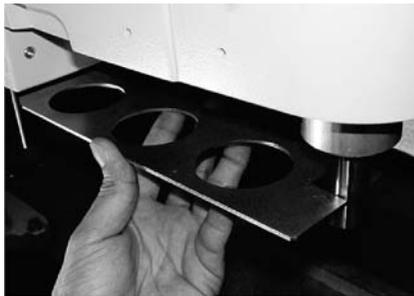
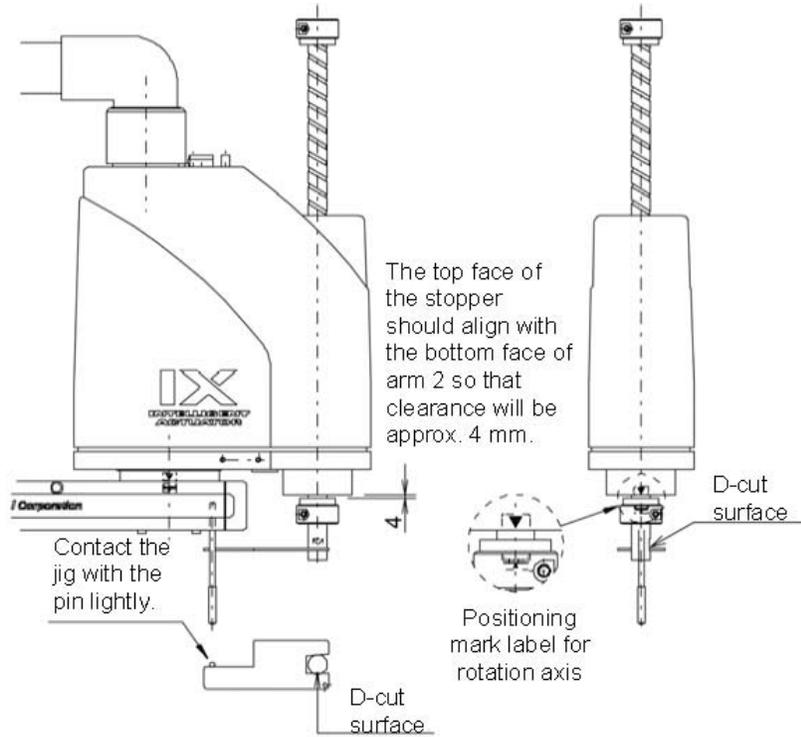


Fig. 13.36 Arm Length 500/600, 700/800 Reference Position

Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.
- Pay attention to the orientation of the D-cut surface of the plate jig.



(Bottom view)

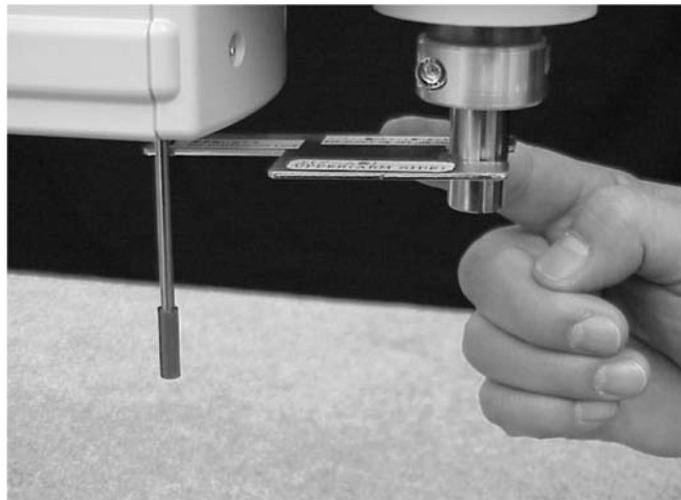


Fig. 13.37 Arm Length 250/300/350 Reference Position

 **Warning**

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.

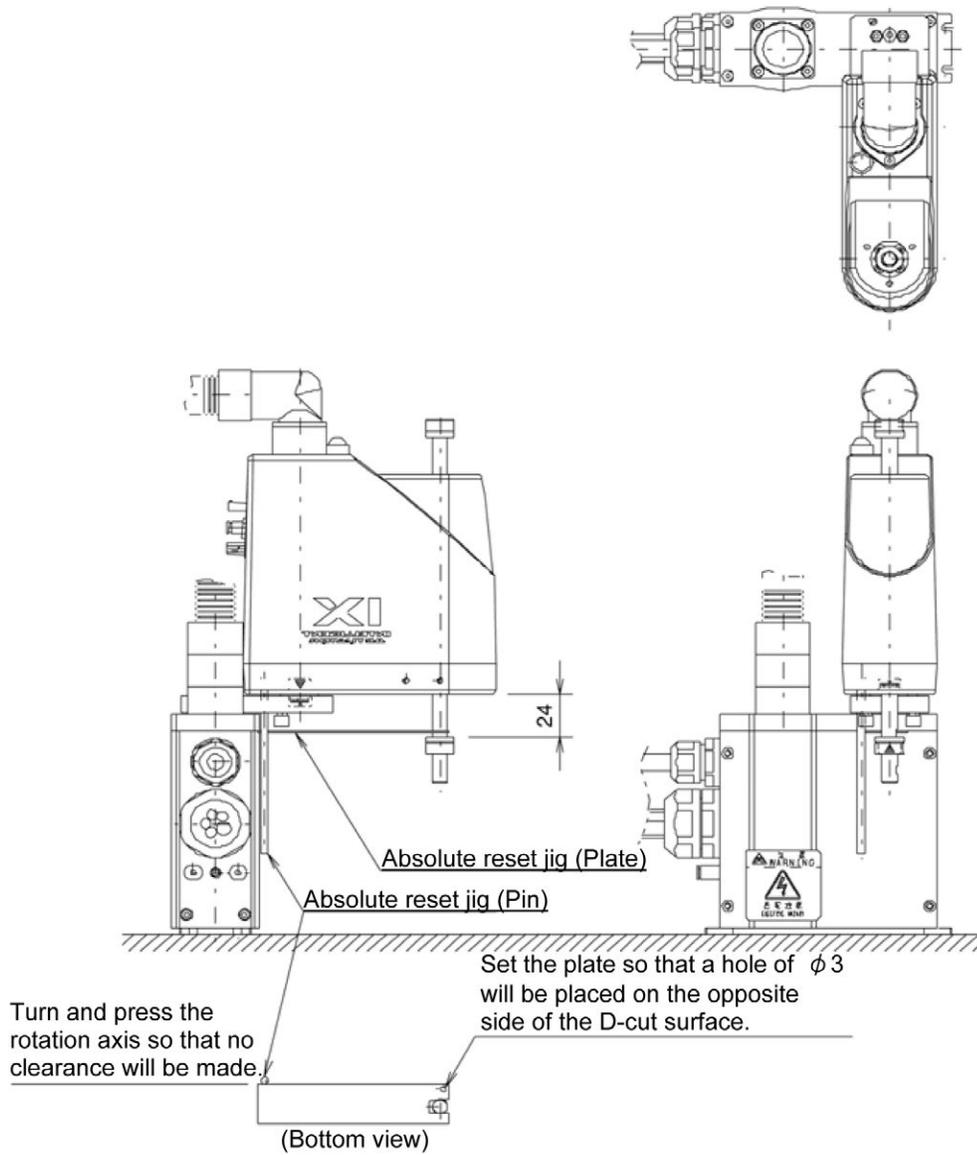


Fig. 13.38 Arm Length 120 Reference Position

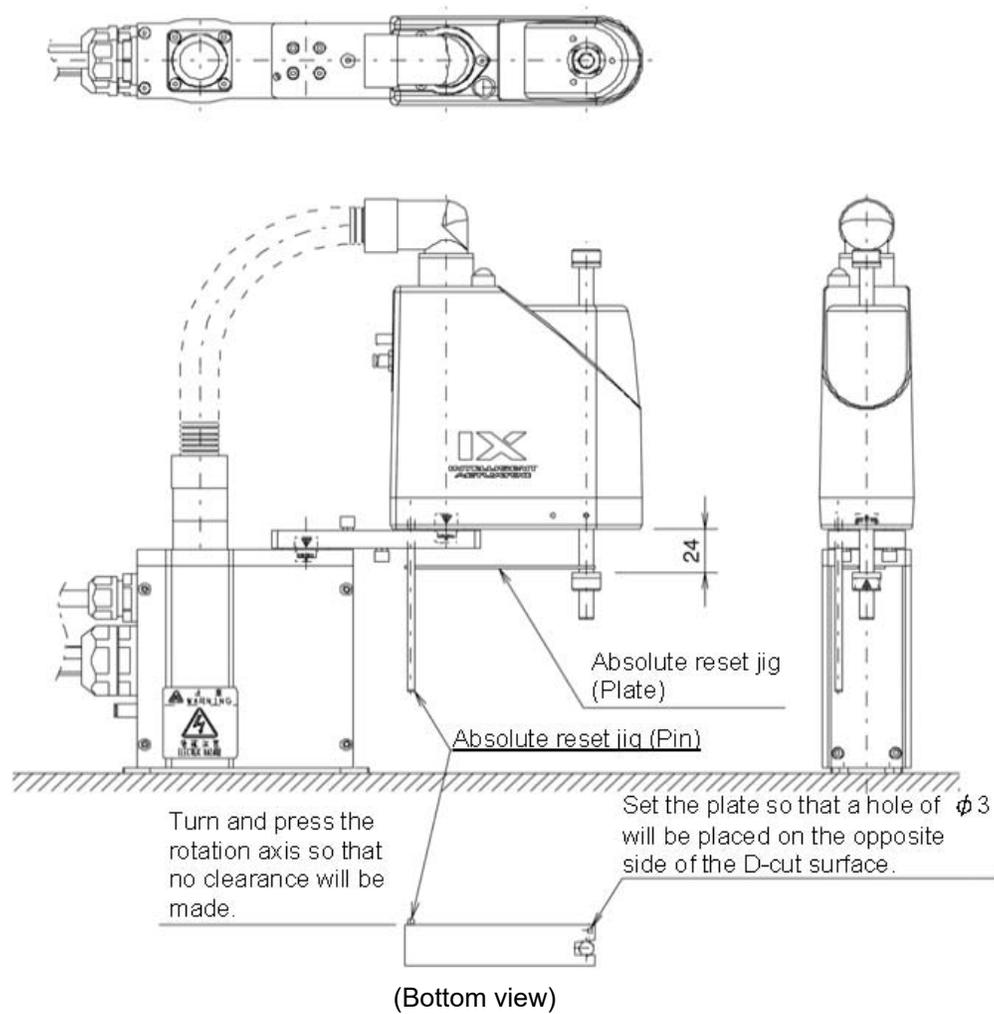


Fig. 13.39 Arm Length 150/180 Reference Position

 **Warning**

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.
- Pay attention to the orientation of the D-cut surface of the plate jig.

(9) Click the OK button.

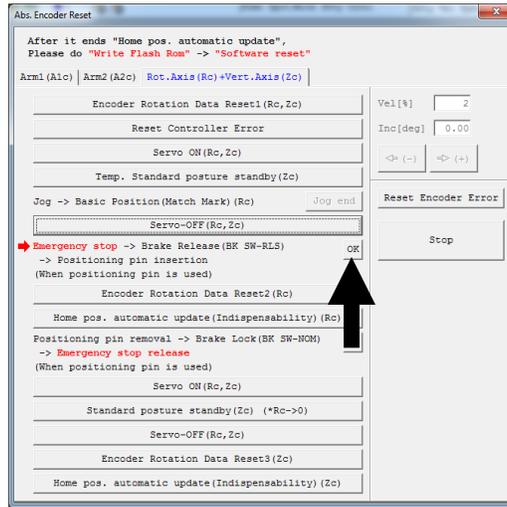


Fig. 13.40 Confirmation Operation

(10) Click the Encoder Rotation Data Reset2 button.

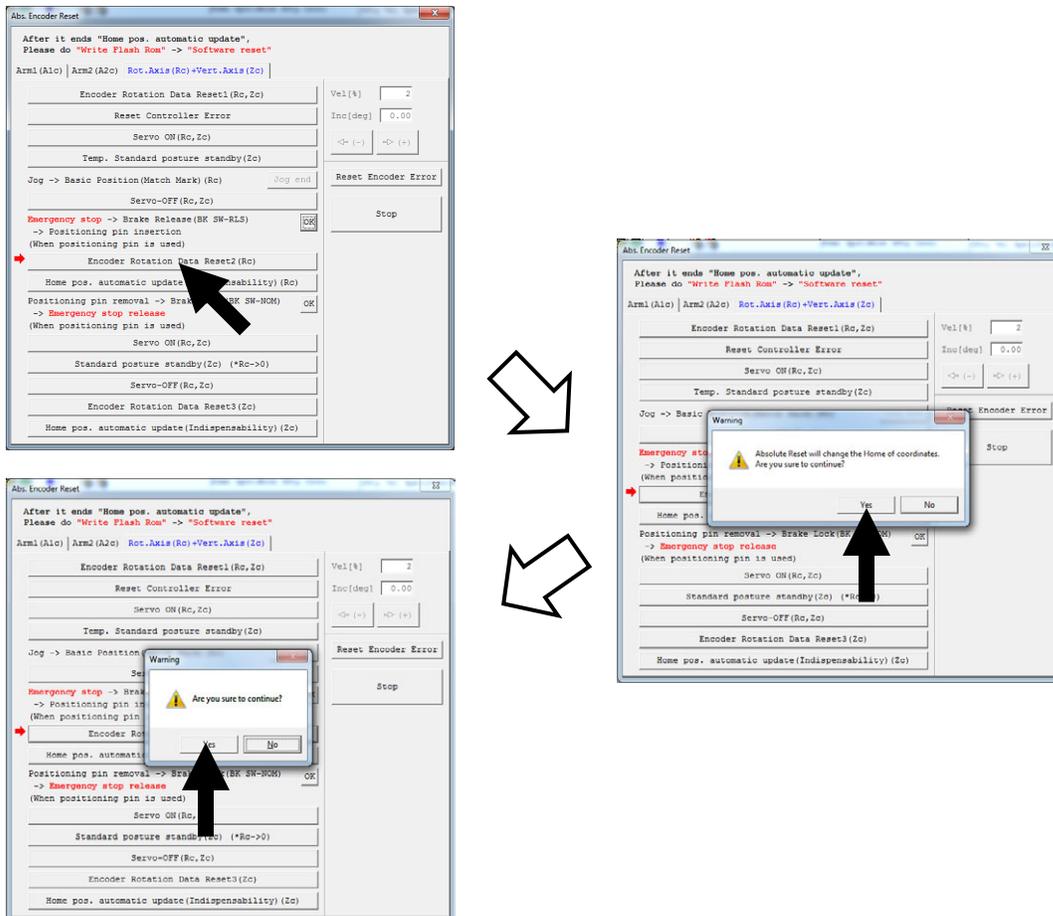


Fig. 13.41 Encoder Rotation Data Reset2 Operation

(11) Click the Home pos. automatic update button.

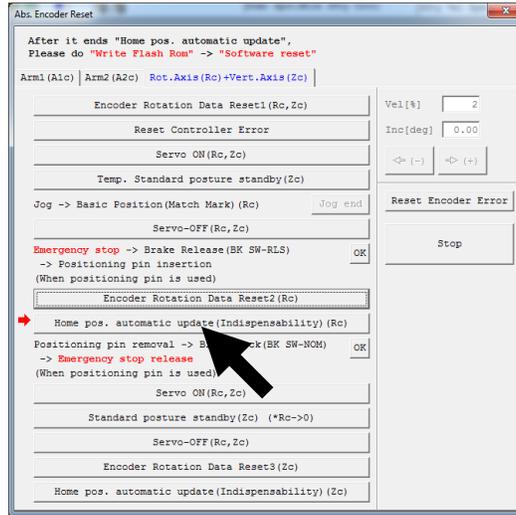


Fig. 13.42 Home Pos. Automatic Update Operation

(12) Remove the adjustment jig.

(13) Release the EMERGENCY STOP switch.

(14) Click the OK.

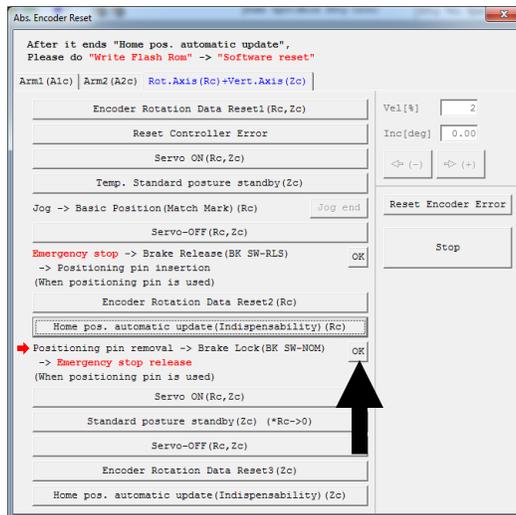


Fig. 13.43 Confirmation Operation

(15) Click the Servo ON button.

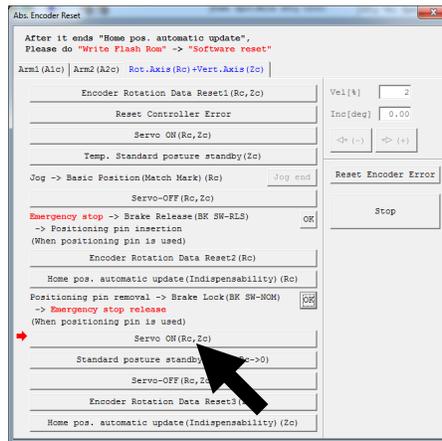


Fig. 13.44 Confirmation Operation

(16) Click the Standard posture standby button.
 • Please note that the vertical axis returns to its home position.

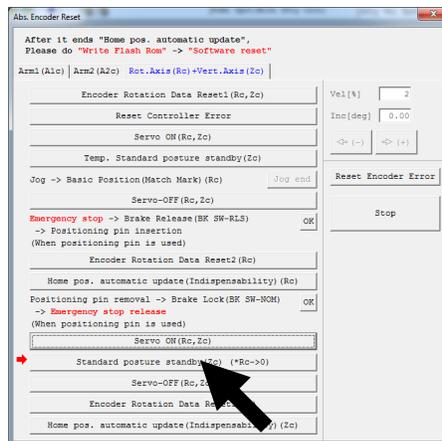


Fig. 13.45 Standard Posture Standby Operation

(17) Click the Servo-OFF button.

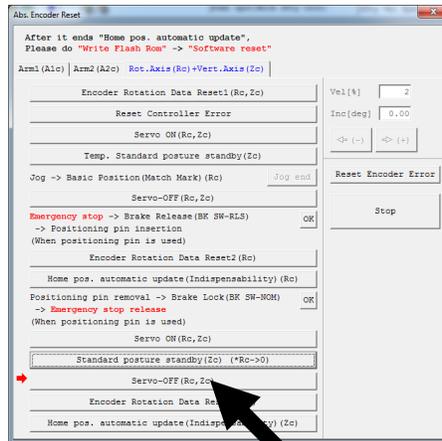


Fig. 13.46 Servo-OFF Operation

(18) Click the Encoder Rotation Data Reset3 button.

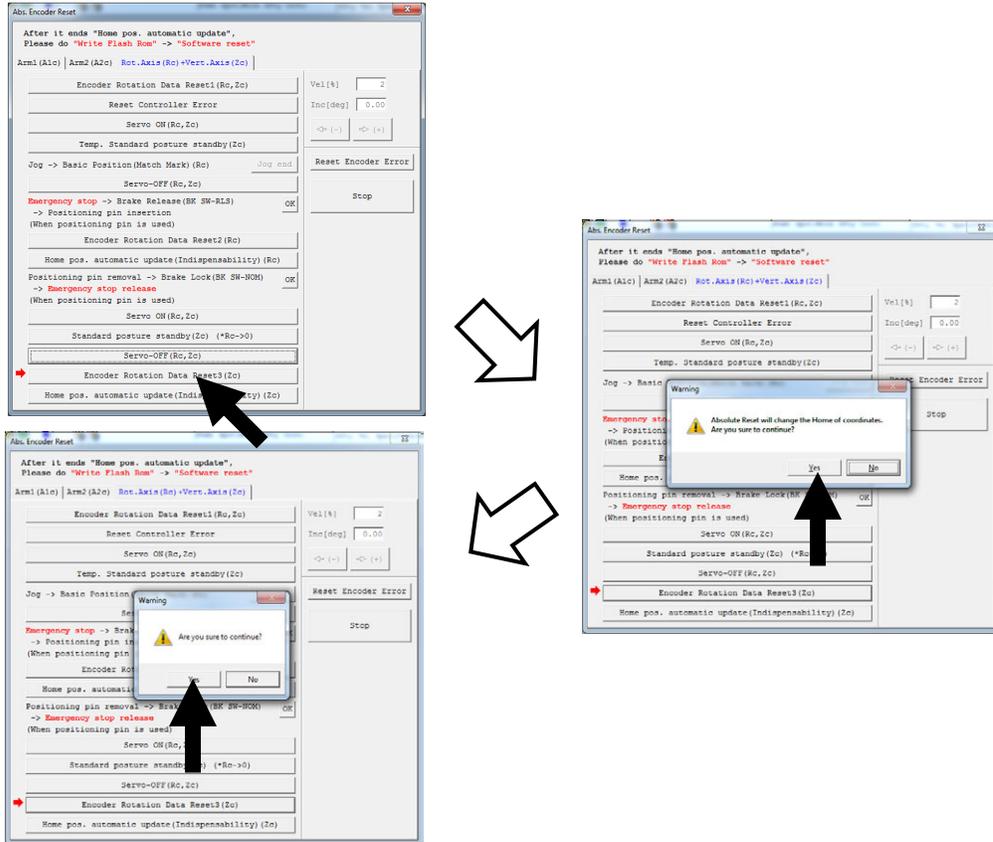


Fig. 13.47 Encoder Rotation Data Reset3 Operation

(19) Click the Home pos. automatic update button, and then click “x” in the top right-hand corner to exit the Abs. Encoder Reset window.

- Be sure to perform “Software Reset” upon completion.

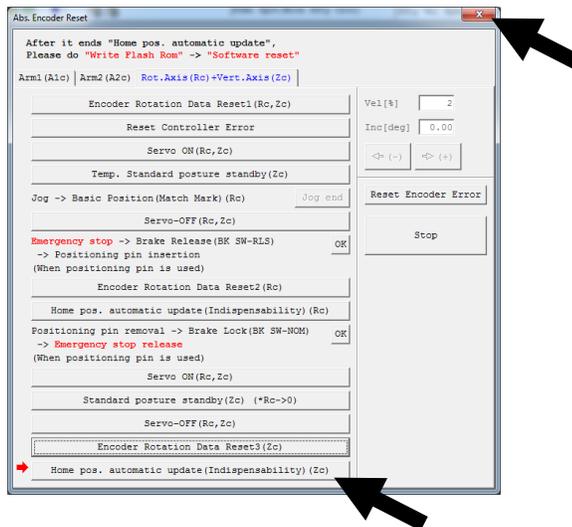


Fig. 13.48 Home Position Automatic Update Operation

13.4 IX-NNN10040 and 12040 SCARA Axes

In case the absolute data is lost, conduct “Stopper push type absolute reset”. [Refer to 13.3.1 How to Operate the Push Type Absolute Reset]

In the following case, conduct “Stopper pressing position acquirement” before having the absolute reset. Do not execute it after it comes to a circumstance that requires the absolute reset. Have it done while the normal operation can be performed.

[Refer to 13.3.2 How to Acquire the Stopper Interfering Point]

- When the absolute reset cannot be performed in the direction of the stopper interfering movement with the initial posture at the delivery from the factory due to such reasons as interference to the peripheral equipment.
- There was a change in the stopper position due to such reasons as a removal of the stopper of the vertical axis.

13.4.1 How to Operate the Push Type Absolute Reset

- 1) Backup the parameters so that they can be put back anytime to those before changing them. Select "Parameter" → "Edit" from PC Software Menu to show the Edit Parameter window. Press the "Save As" button in the Edit Parameter window to store the parameters in the file.

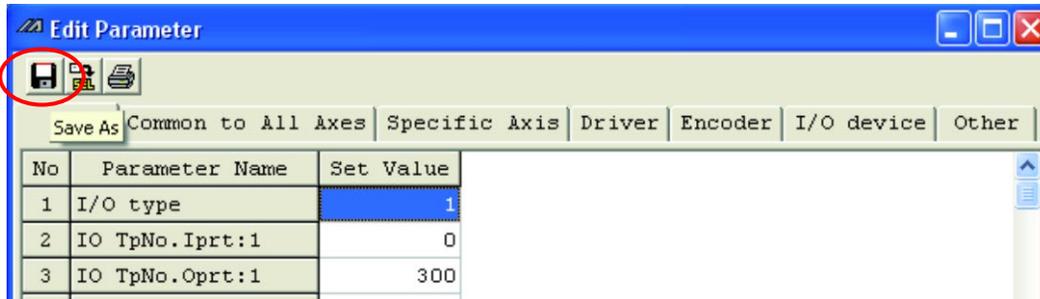


Fig. 13.49 Edit Parameter Window

- 2) Select "Controller" → "Abs. Encoder Reset" → "Push type absolute reset" from the menu.

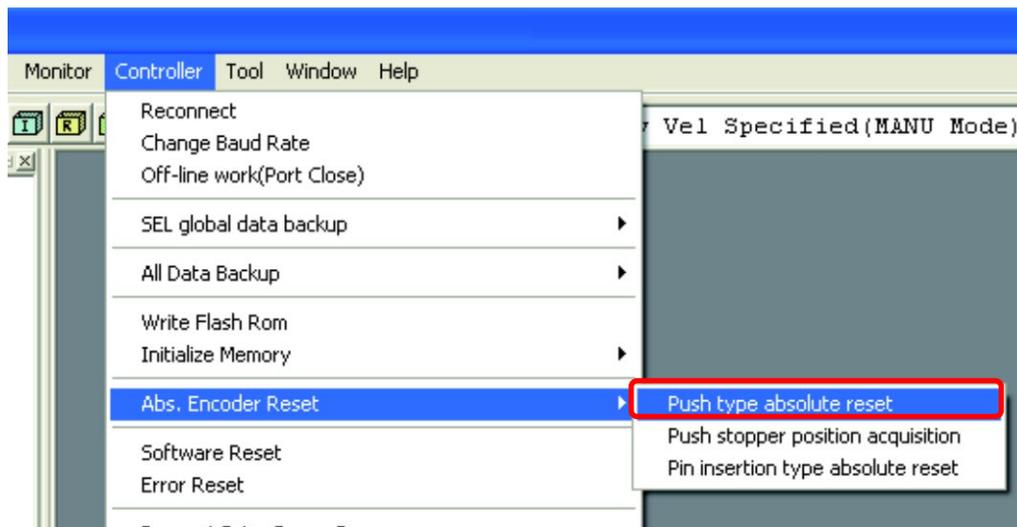


Fig. 13.50 Menu Select Window

- 3) A Confirmation window shows up. Click "Yes".

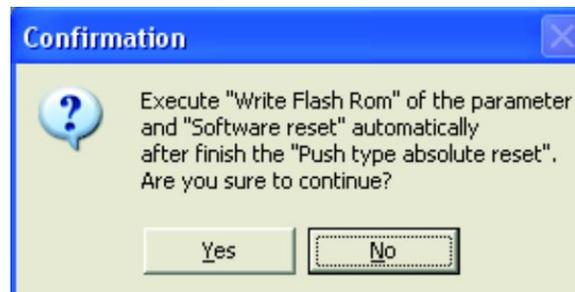


Fig. 13.51 Confirmation Window

If conducting on all the axes at once, have the process of [1].
When not all the axes, but having one or some of the 4 axes to be conducted, have the process of [2].

[1] When Performing Push Stopper Type Absolute Reset to All Axes at Once
To have the push stopper type absolute reset for all the axes at once, follow the steps shown below.

1) Select "All axes".

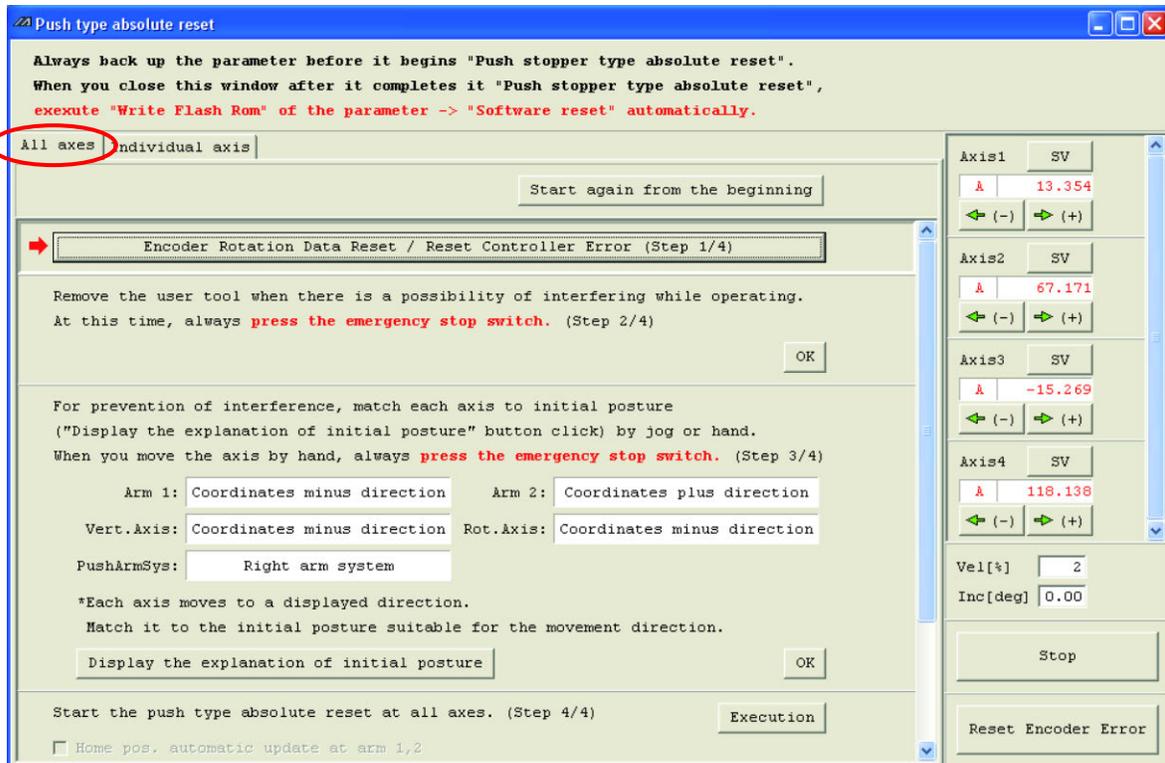


Fig. 13.52 Push Type Absolute Reset Window

2) Click "Encoder Rotation Data Reset / Reset Controller Error (Step 1/4)".

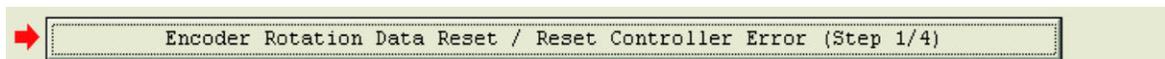


Fig. 13.53 Encoder Rotation Data Reset / Reset Controller Error

- 3) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. Have the work during the emergency stop condition. After the work is finished, click on the “OK” button.

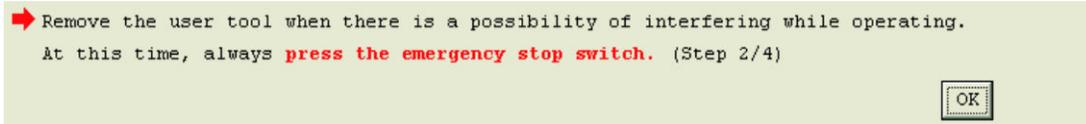


Fig. 13.54 Confirmation Window

- 4) By referring to the displayed movement direction for each axis, adjust the axes to the initial posture. The posture differs depending on the movement direction. Click on “Display the explanation of initial posture” to check the explanations. Make to work on with the emergency stop activated when moving the axes with hand. Click on the “OK” button after the work is finished.

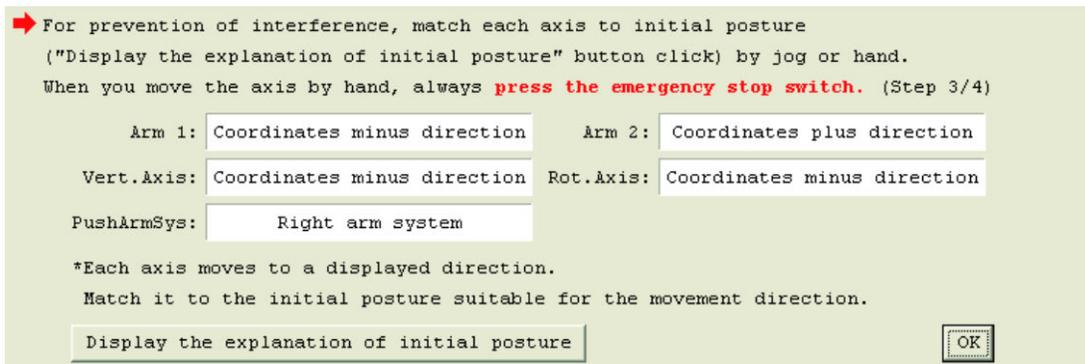


Fig. 13.55 Confirmation Window

[Initial posture]

◎ Arm1, Arm 2

Considering the stopper pressing position, adjust the posture to either of right arm system or left arm system. When the product is delivered, it is set to the right arm system. Adjust to the right arm system. In case the arm interferes with the peripheral in the right arm system, set it to the left arm system in advance, conduct “stopper pressing position acquirement” and then adjust to the left arm system.
[Refer to 13.3.2 How to Acquire the Stopper Interfering Point]

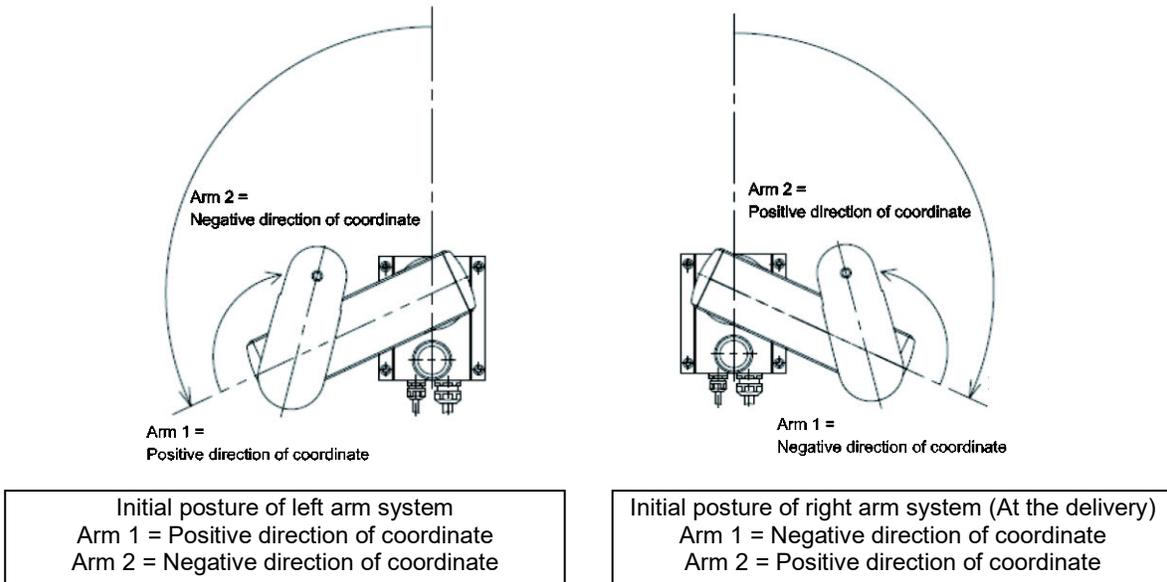


Fig. 13.56 Initial Posture

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D “Push Stopper Operation Start Position Error” may occur at operation.

◎ Vertical Axis

For the position, put it apart from the coordinate 0mm (upward end) for 10mm or more.

Setting it at 10mm or less, Error No. B0D “Push Stopper Operation Start Position Error” may occur at operation.

◎ Rotation axis

There is no specific indication for the position of rotation shaft. It can be set at any position.

- 5) Click “Execution” button.

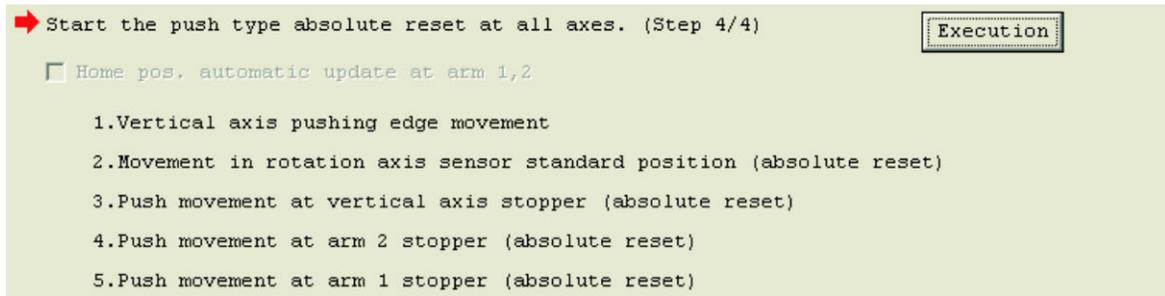


Fig. 13.57 Execution Window

- 6) A Warning window shows up. Click “Yes”. Each operation for the push type absolute reset starts.

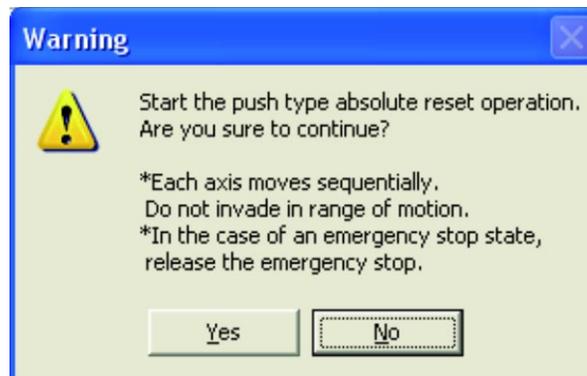


Fig. 13.58 Warning Window

- 7) Once the push type absolute reset for all the axes is finished, the Information window will appear. Click “OK” button.

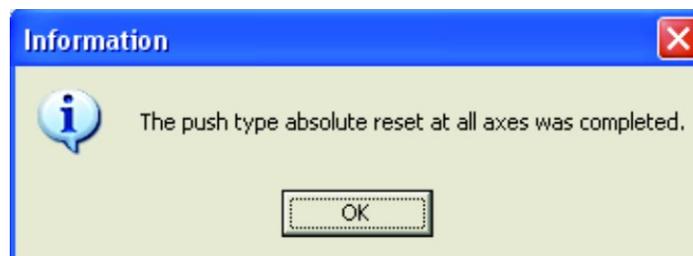


Fig. 13.59 Information Window

- 8) Close the Push stopper position acquisition window by clicking “x” on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.

- [2] When performing Push Stopper Pressing Type Absolute Reset on Each Axis One by One
To have the push stopper type absolute reset for each axis one by one, follow the steps shown below.

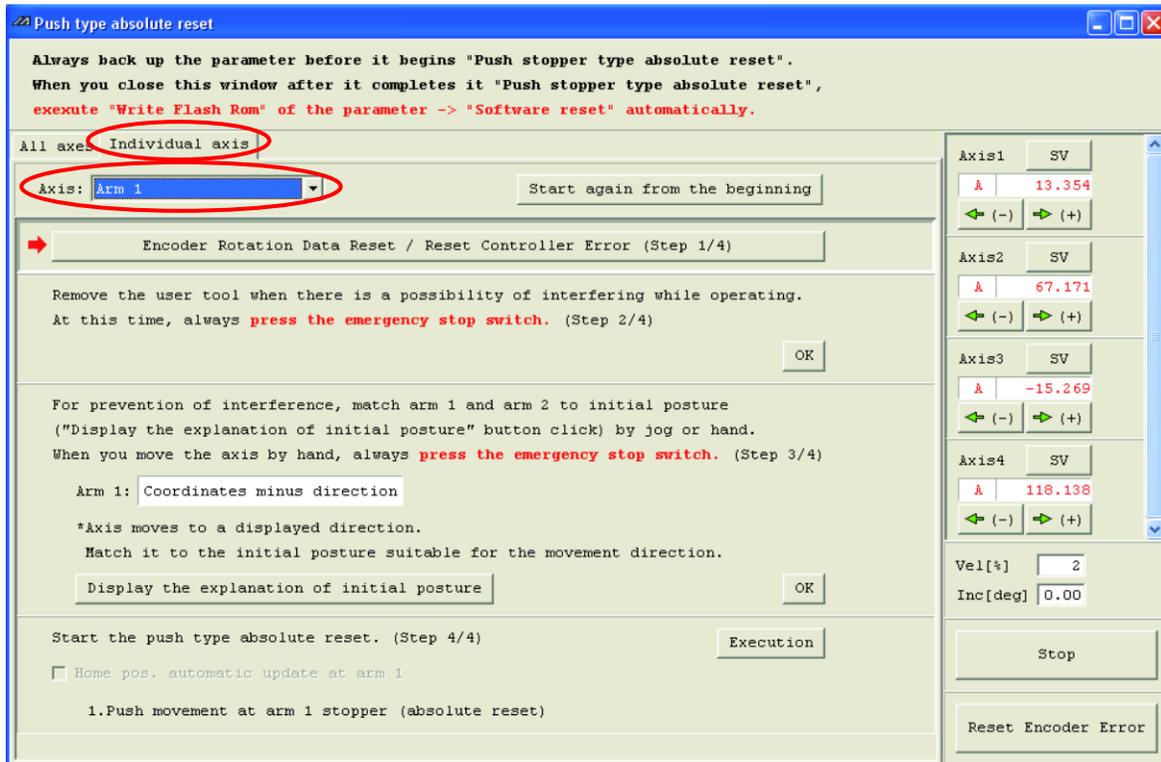


Fig. 13.60 Push Type Absolute Reset Window

- (1) 1st Arm and 2nd Arm
1) Select "Individual axis" in the push type absolute reset window, and set Axis to "Arm 1" (or Arm 2).

- 2) Click “Encoder Rotation Data Reset / Reset Controller Error (Step 1/4)”.



Fig. 13.61 Encoder Rotation Data Reset / Reset Controller Error

- 3) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. Have the work during the emergency stop condition. After the work is finished, click on the “OK” button.

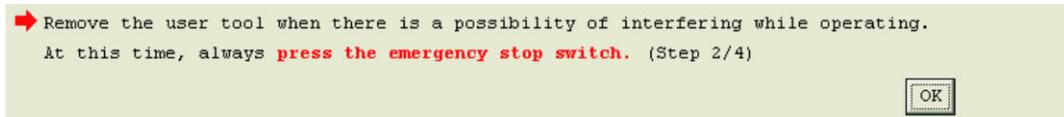


Fig. 13.62 Confirmation Window

- 4) By referring to the displayed movement direction for each axis, adjust the axes to the initial posture. The posture differs depending on the movement direction. Click on “Display the explanation of initial posture” to check the explanations. Make sure to work on with the emergency stop activated when moving the axes with hand. Click on the “OK” button after the work is finished.

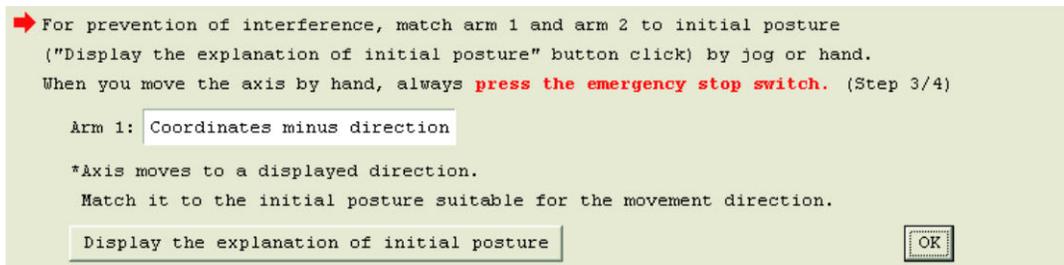


Fig. 13.63 Confirmation Window

[Initial posture]

◎ Arm1, Arm 2

Considering the stopper pressing position, adjust the posture to either of right arm system or left arm system. When the product is delivered, it is set to the right arm system. Adjust to the right arm system. In case the arm interferes with the peripheral in the right arm system, set it to the left arm system in advance, conduct “stopper pressing position acquirement” and then adjust to the left arm system. [Refer to 13.3.2 How to Acquire the Stopper Interfering Point]

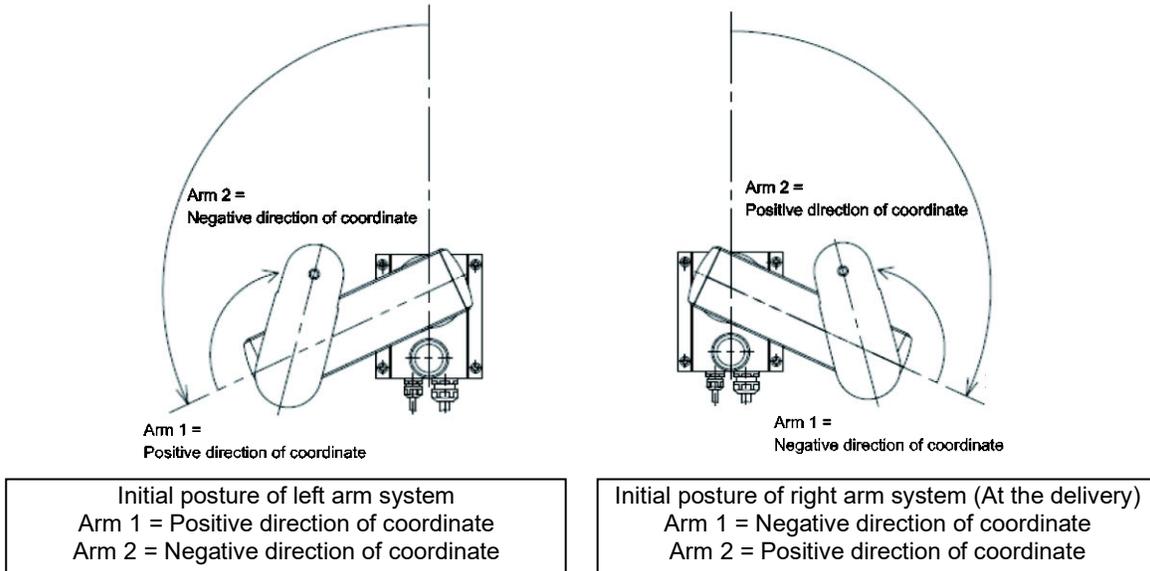


Fig. 13.64 Initial Posture

For the position, put it apart from the stopper position for 10deg or more. Setting it too close to the stopper, Error No. B0D “Push Stopper Operation Start Position Error” may occur at operation.

- 5) Click "Execution" button.

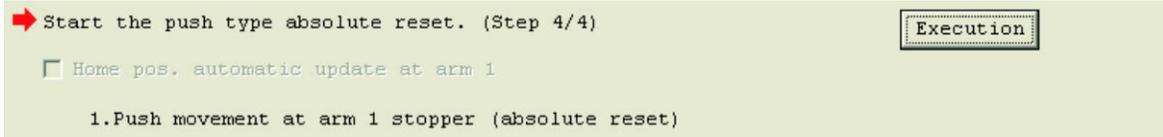


Fig. 13.65 Execution Window

- 6) A Warning window shows up. Click "Yes". Each operation for the push type absolute reset starts.

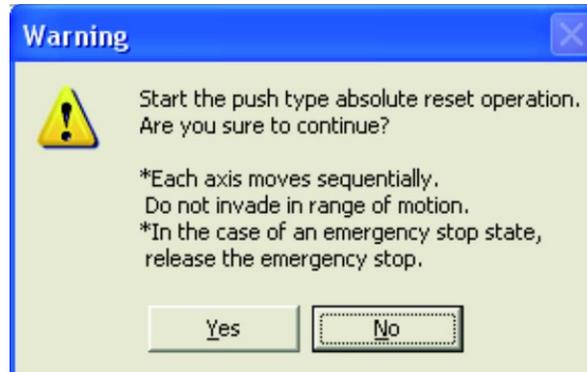


Fig. 13.66 Warning Window

- 7) Once the push type absolute reset, the Information window will appear. Click "OK" button.

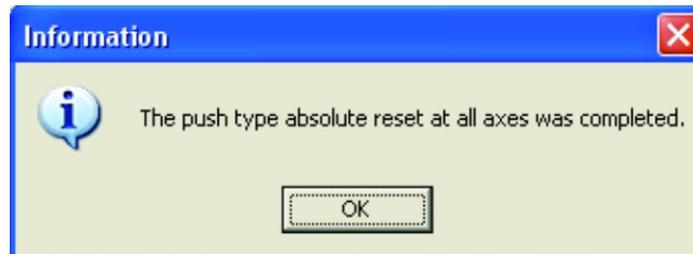


Fig. 13.67 Information Window

- 8) If it is necessary to have the push type absolute reset for another axis, move on to the axis selection. When finishing the process, click "x" on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.

(2) Vertical Axis, Rotation Axis

- 1) Select "Individual axis" in the Push stopper type absolute reset window, and set Axis to "Vert. Axis + Rot. Axis".

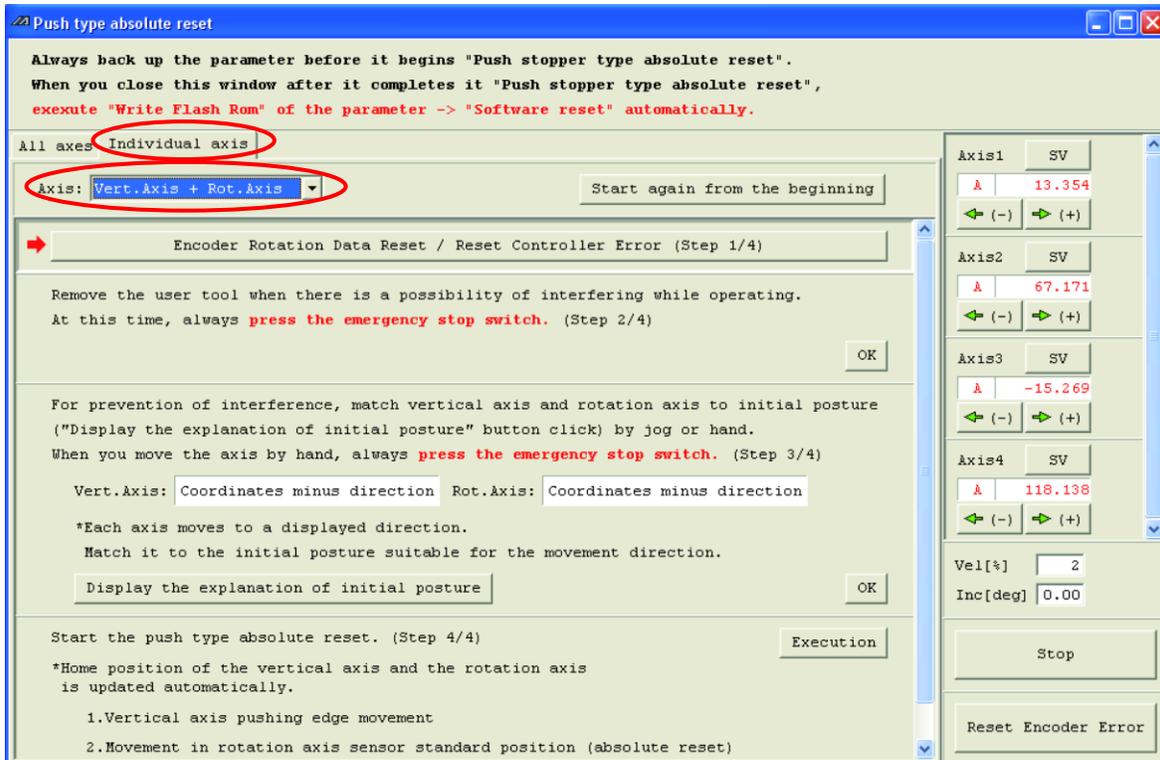


Fig. 13.68 Push Type Absolute Reset Window

- 2) Click "Encoder Rotation Data Reset / Reset Controller Error (Step 1/4)".



Fig. 13.69 Encoder Rotation Data Reset / Reset Controller Error

- 3) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. Have the work during the emergency stop condition. After the work is finished, click on the "OK" button.



Fig. 13.70 Confirmation Window

- 4) By referring to the displayed movement direction for each axis, adjust the axes to the initial posture. The posture differs depending on the movement direction. Click on “Display the explanation of initial posture” to check the explanations. Make to work on with the emergency stop activated when moving the axes with hand. Click on the “OK” button after the work is finished.

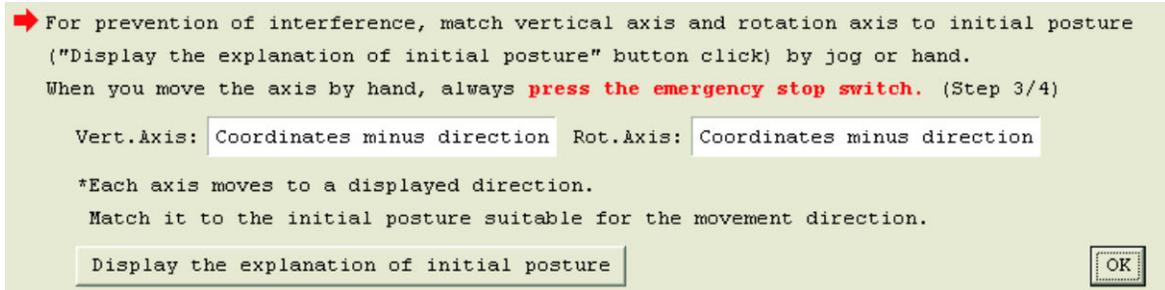


Fig. 13.71 Confirmation Window

[Initial posture]

Ⓞ Vertical Axis

For the position, put it apart from the coordinate 0mm (upward end) for 10mm or more. Setting it at 10mm or less, Error No. B0D “Push Stopper Operation Start Position Error” may occur at operation.

Ⓞ Rotation axis

There is no specific indication for the position of rotation shaft. It can be set at any position.

- 5) Click “Execution” button.

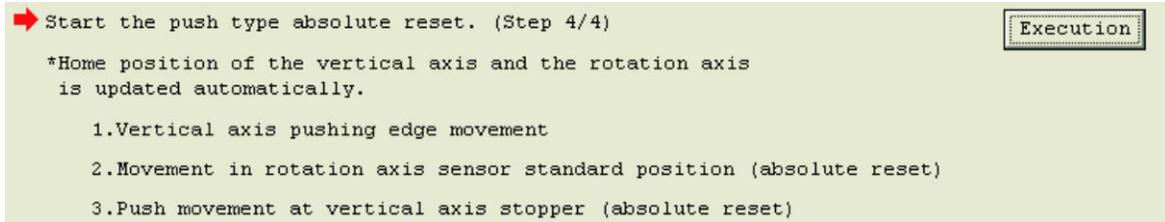


Fig. 13.72 Execution Window

- 6) A Warning window shows up. Click “Yes”. The operation for the push type absolute reset starts.

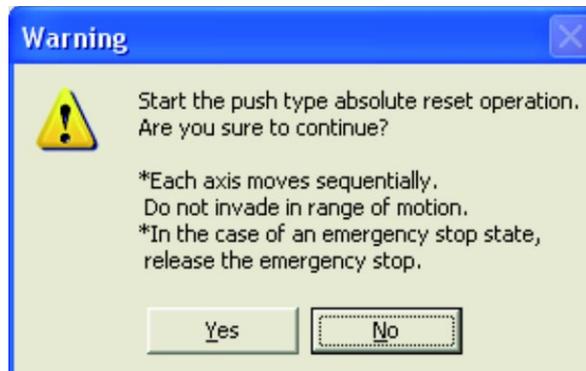


Fig. 13.73 Warning Window

- 7) Once the push type absolute reset for the axis is complete, the information window will appear. Click "OK" button.

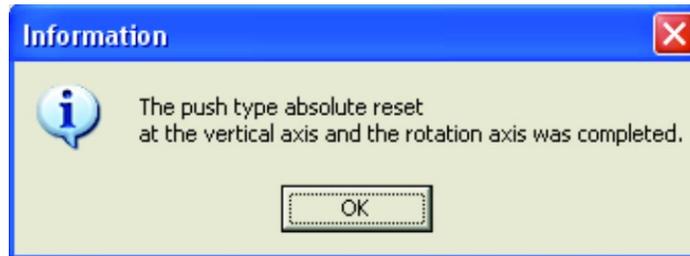


Fig. 13.74 Information Window

- 8) When finishing the process, click "x" on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.

13.4.2 How to Acquire the Stopper Interfering Point

In the following case, conduct “Stopper pressing position acquirement (Note 1)” before having the absolute reset.

- When the absolute reset cannot be performed in the direction of the stopper interfering movement with the initial posture at the delivery from the factory due to such reasons as interference to the peripheral equipment
- There was a change in the stopper position due to such reasons as a removal of the stopper of the vertical axis

Note 1 In case that the absolute reset cannot be performed with the stopper pressing movement direction of the initial posture set at the delivery due to such as interference with peripheral devices, change the setting to the initial posture of the left arm system (stopper pressing direction on opposite side) and conduct the stopper pressing position acquirement.

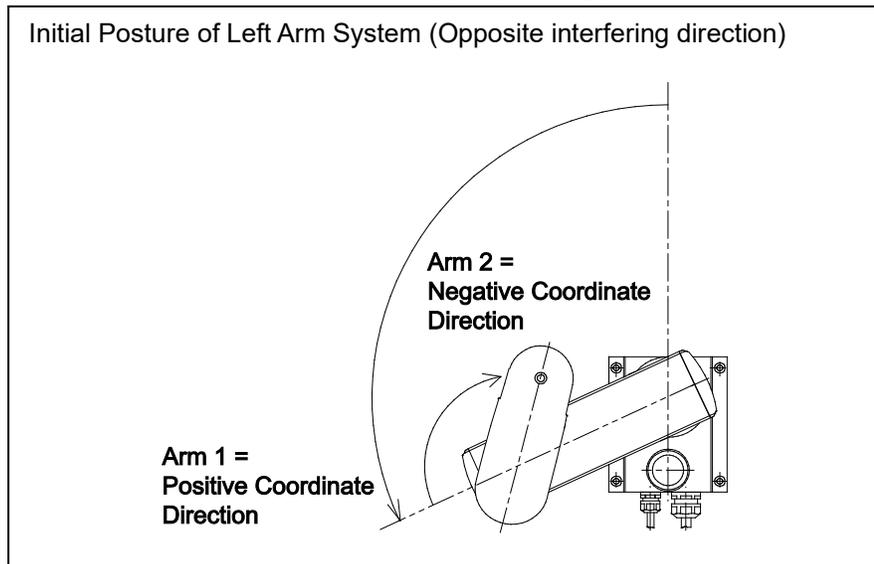


Fig. 13.75 Initial Posture of Left Arm System

(Reference)

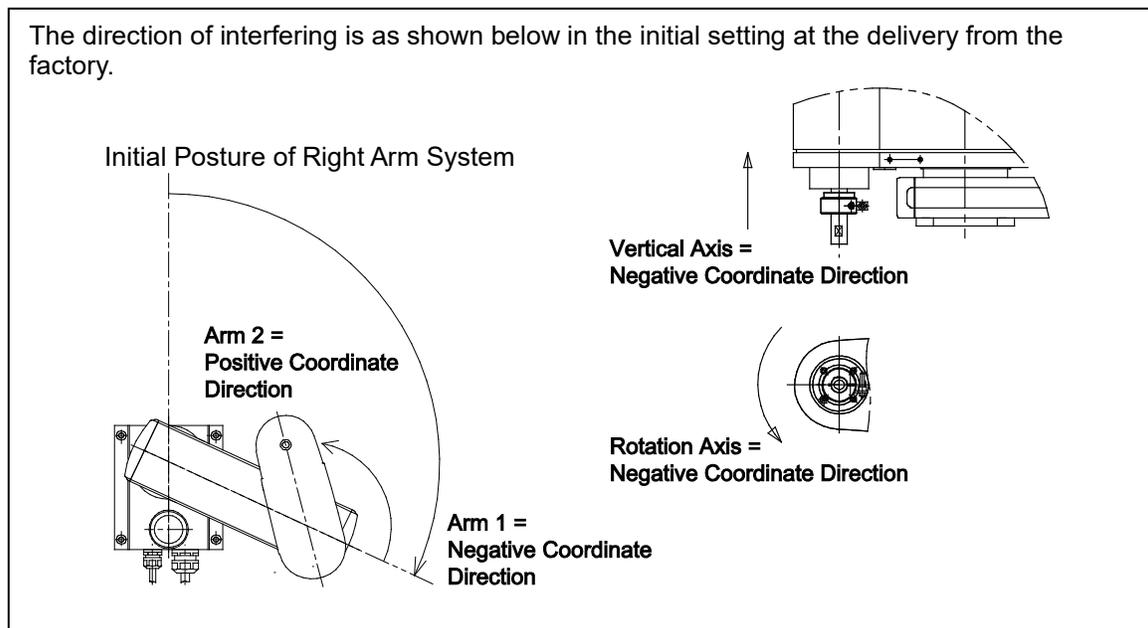


Fig. 13.76 Initial Posture of Right Arm System

Push stopper position acquisition with the process shown below.

- 1) Backup the parameters so that they can be put back anytime to those before changing them. Select “Parameter” → “Edit” from PC Software Menu to show the Edit Parameter window. Press the “Save As” button in the Edit Parameter window to store the parameters in the file.

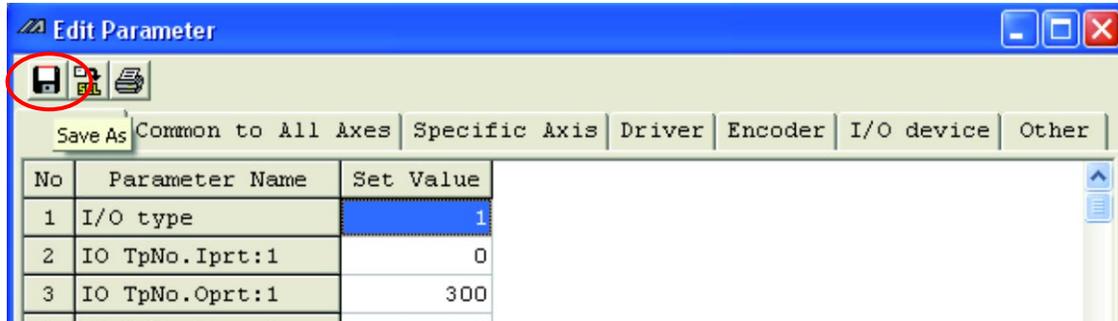


Fig. 13.77 Edit Parameter Window

- 2) Select “Controller” → “Abs. Encoder Reset” → “Push stopper position acquisition” from the menu.

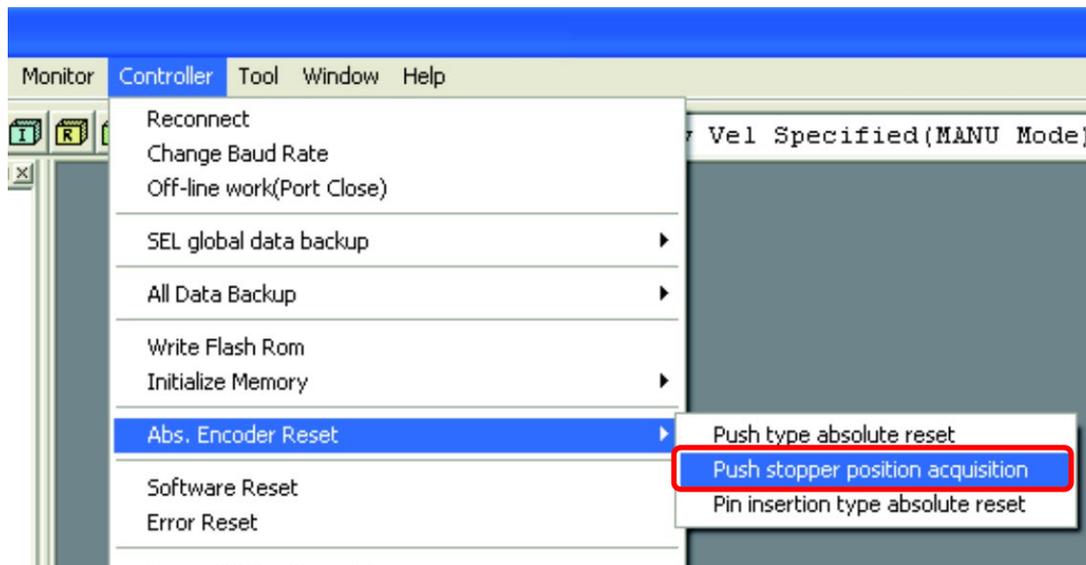


Fig. 13.78 Menu Select Window

- 3) A Warning window shows up. Click “Yes”.

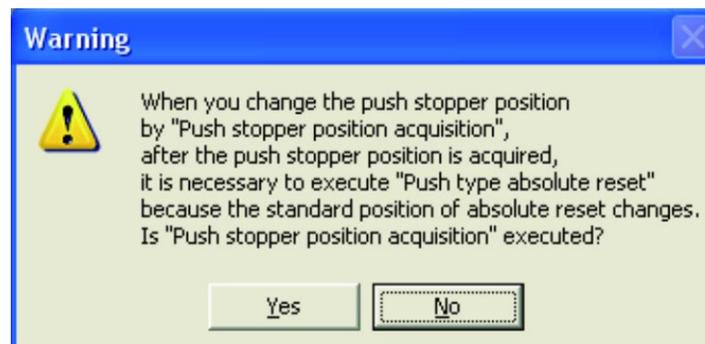


Fig. 13.79 Warning Window

4) A Confirmation window shows up. Click "Yes".

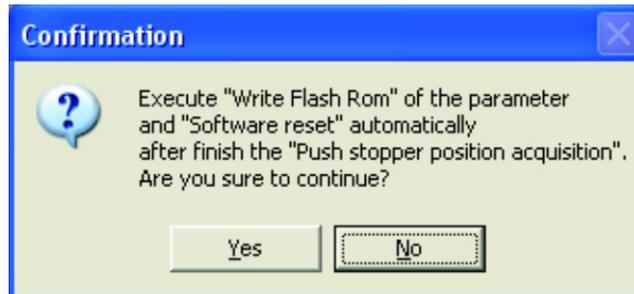


Fig. 13.80 Confirmation Window

If conducting on all the axes at once, have the process of [1].

When not all the axes, but having one or some of the 4 axes to be conducted, have the process of [2].

[1] When Acquiring Push Stopper Position for All Axes at Once
To acquire the push stopper position for all the axes at once, follow the steps shown below.

1) Select "All axes" in the Push stopper position acquisition window.

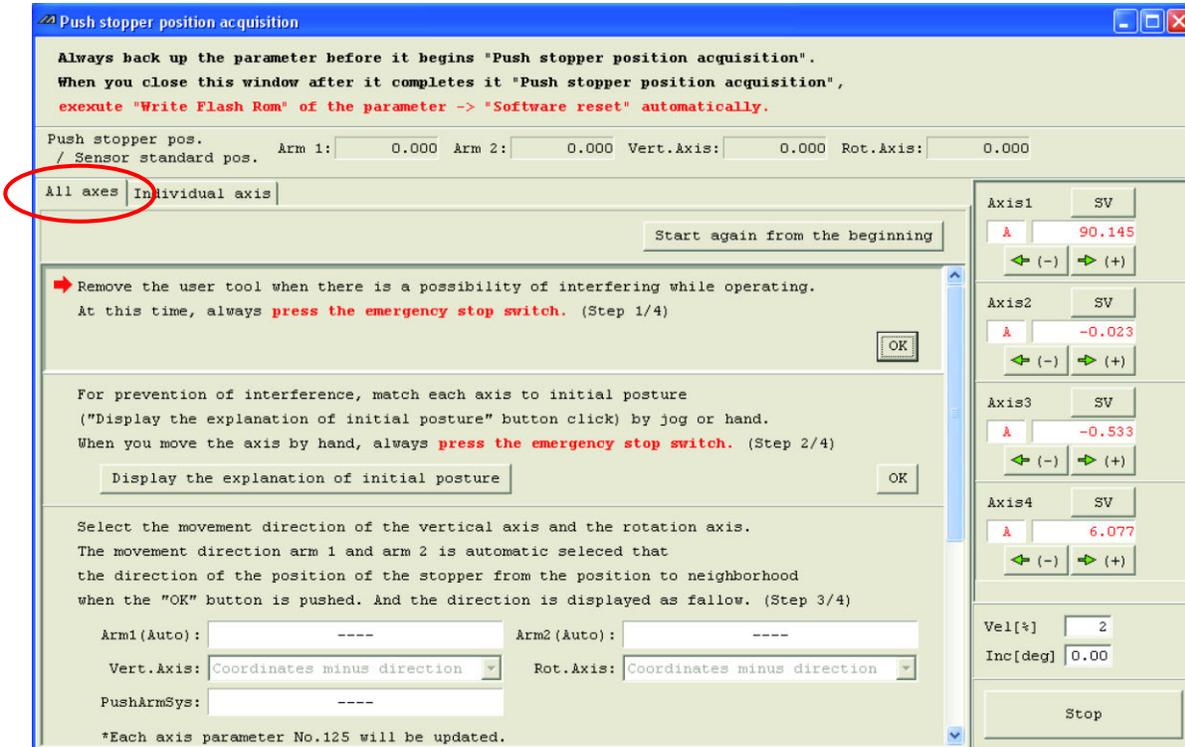


Fig. 13.81 Push Stopper Position Acquisition Window

2) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. Have the work during the emergency stop condition. After the work is finished, click on the "OK" button.

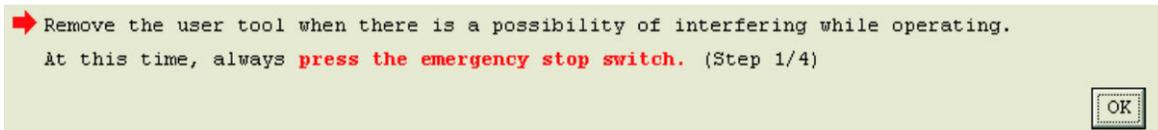


Fig. 13.82 Confirmation Window

- 3) Adjust each axis to the initial posture. The posture differs depending on the movement direction. Click on "Display the explanation of initial posture" to check the explanations. Make to work on with the emergency stop activated when moving the axes with hand. Click on the "OK" button after the work is finished.

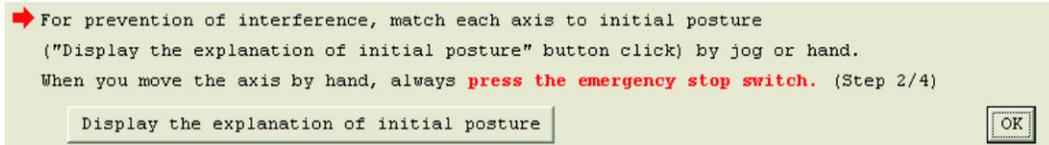


Fig. 13.83 Confirmation Window

[Initial posture]

⊙ Arm1, Arm 2

Remove all the interferences of the peripheral devices, and set the posture to either of the left arm system or the right arm system. It is set to right arm system when the unit is shipped out.

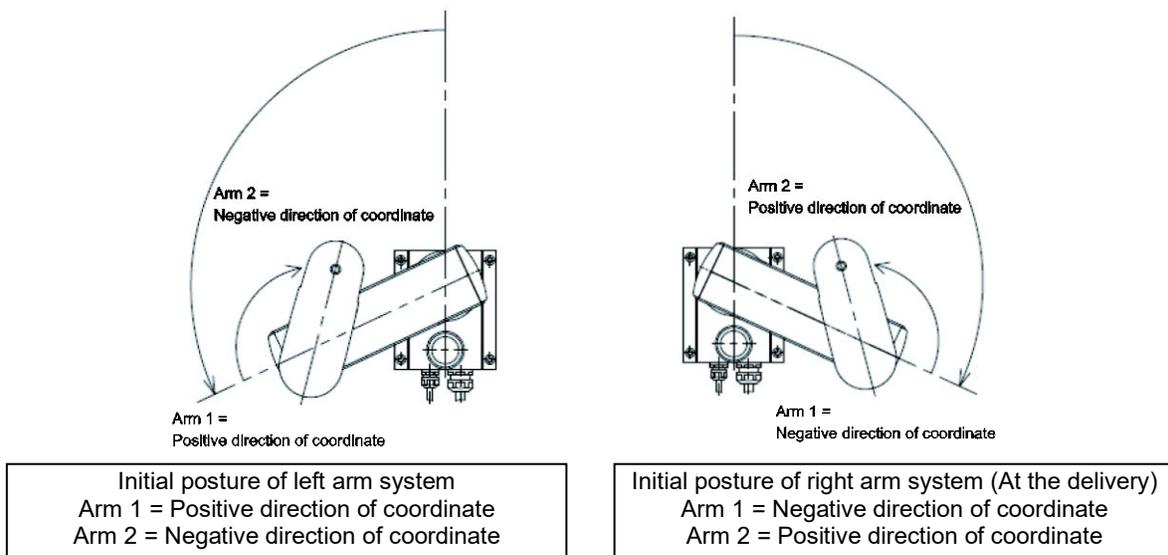


Fig. 13.84 Initial Posture

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D "Push Stopper Operation Start Position Error" may occur at operation.

⊙ Vertical Axis

For the position, put it apart from the coordinate 0mm (upward end) for 10mm or more.

Setting it at 10mm or less, Error No. B0D "Push Stopper Operation Start Position Error" may occur at operation.

⊙ Rotation axis

There is no specific indication for the position of rotation shaft. It can be set at any position.

- 4) Select the direction to move for the vertical axis and rotation axis. It is not necessary to change the direction to move for the vertical axis and rotation axis. Make the vertical axis is in the coordinates minus direction.

Once the selection is made, click on the “OK” button. At this time, the direction of movement from the current position of the initial posture to Arm 1 (1st arm) and Arm 2 (2nd arm) is automatically selected. Check the selected movement direction.

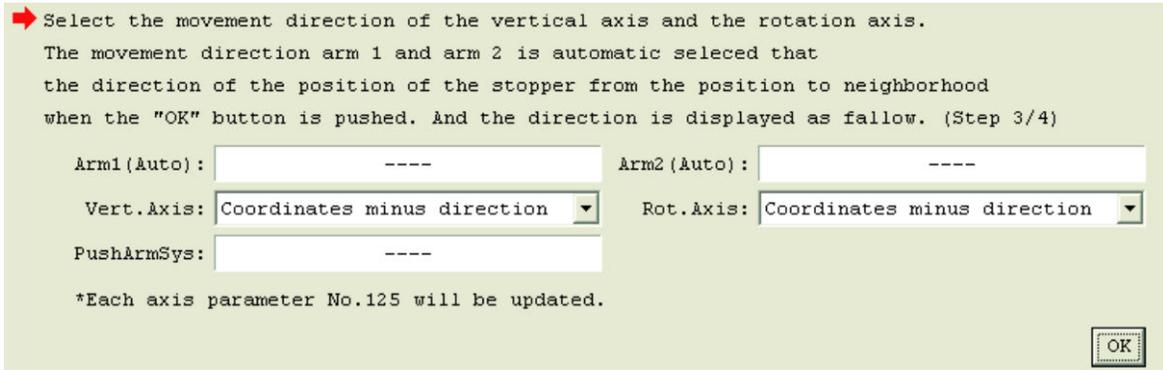


Fig. 13.85 Confirmation Window

- 5) Click “Execution” button.

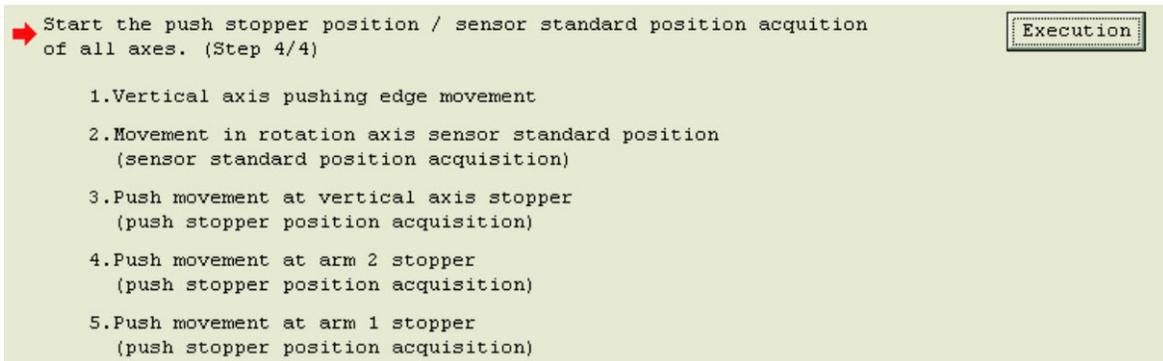


Fig. 13.86 Execution Window

- 6) A Warning window shows up. Click “Yes”. Process to acquire the push stopper position will start.

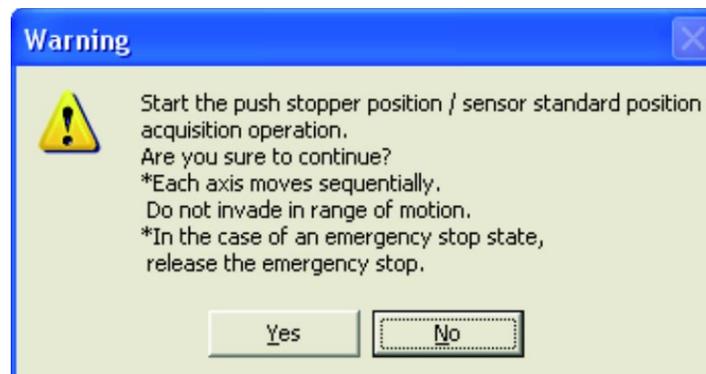


Fig. 13.87 Warning Window

- 7) Once the push stopper position acquirement for all the axes is complete, the Information window will appear. Click "OK" button.

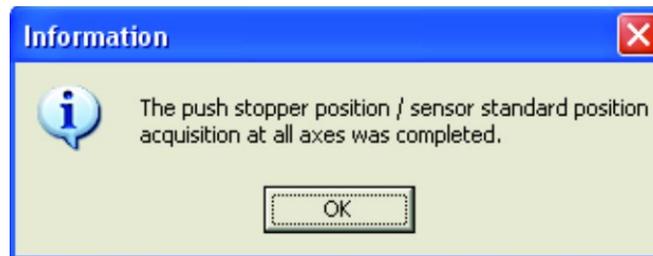


Fig. 13.88 Information Window

- 8) Close the Push stopper position acquisition window by clicking "×" on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.
- 9) Once the controller reboot is finished, conduct the push type absolute reset on all the axes together.

[2] When Acquiring Push Stopper Position on Each Axis One by One
To have an acquirement on each axis, follow the steps below.

(1) 1st Arm and 2nd Arm

- 1) Select "Individual axis" in the Push stopper position acquisition window, and set Axis to "Arm 1" (or Arm 2).

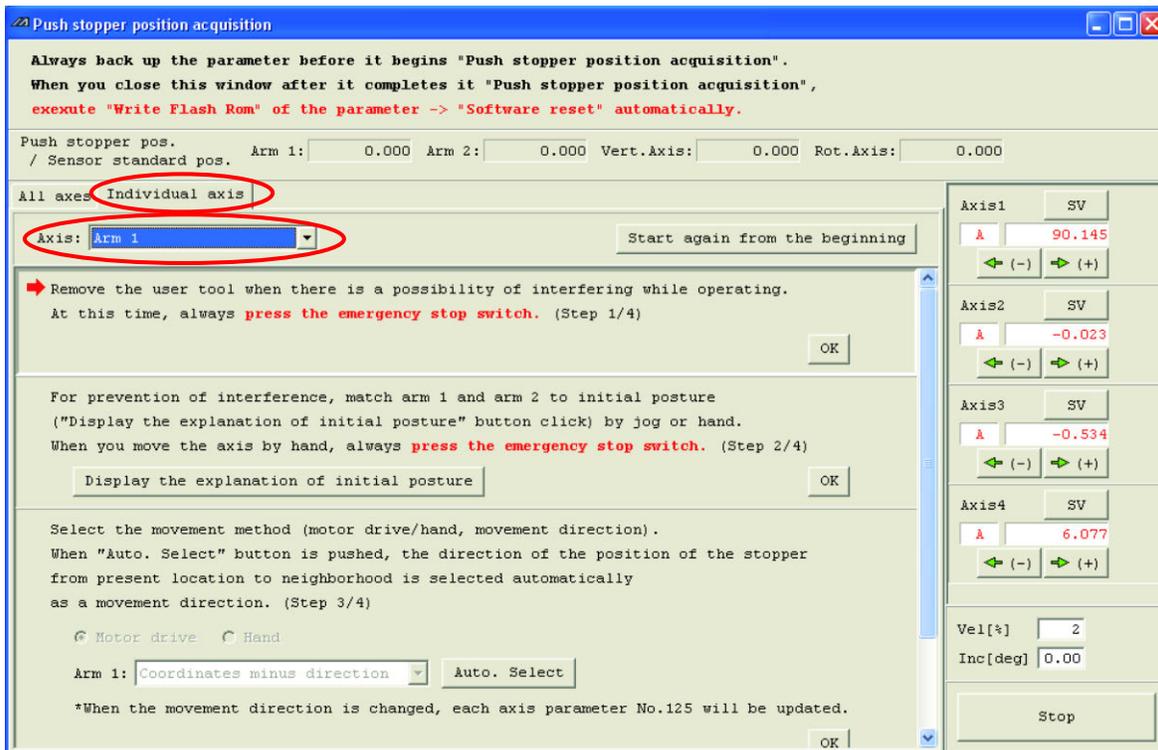


Fig. 13.89 Push Stopper Position Acquisition Window

- 2) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. Have the work during the emergency stop condition. After the work is finished, click on the "OK" button.

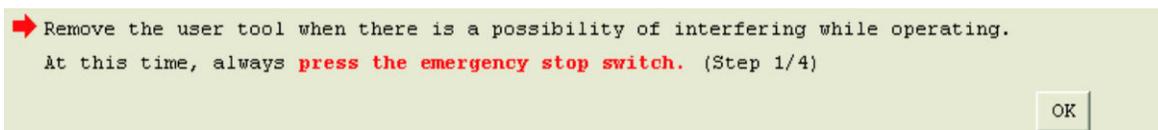


Fig. 13.90 Confirmation Window

- 3) Adjust Arm 1, Arm 2 to the initial posture. The posture differs depending on the movement direction. Click on “Display the explanation of initial posture” to check the explanations. Make to work on with the emergency stop activated when moving the axes with hand. Click on the “OK” button after the work is finished.

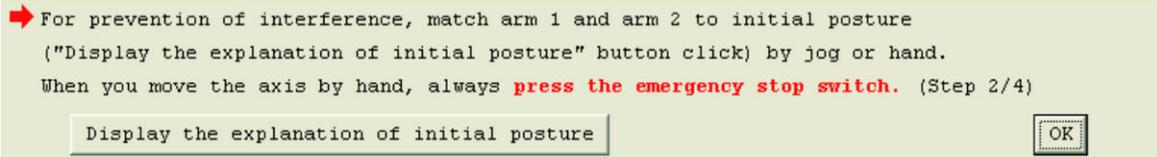
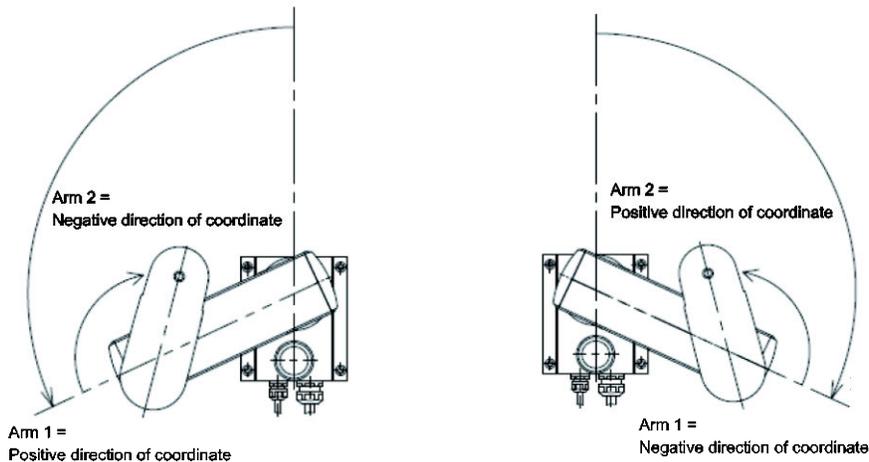


Fig. 13.91 Confirmation Window

[Initial posture]

- ◎ Arm1, Arm 2

Remove all the interferences of the peripheral devices, and set the posture to either of the left arm system or the right arm system. It is set to right arm system when the unit is shipped out.



Initial posture of left arm system
 Arm 1 = Positive direction of coordinate
 Arm 2 = Negative direction of coordinate

Initial posture of right arm system (At the delivery)
 Arm 1 = Negative direction of coordinate
 Arm 2 = Positive direction of coordinate

Fig. 13.92 Initial Posture

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D “Push Stopper Operation Start Position Error” may occur at operation.

- 4) Select the movement method. Make to select motor drive on the selection of motor drive/hand. Change the movement direction if necessary. If clicking on “Auto. Select” button, the direction of movement from the current position of the initial posture is automatically selected. Once the selection is made, click on the “OK” button.

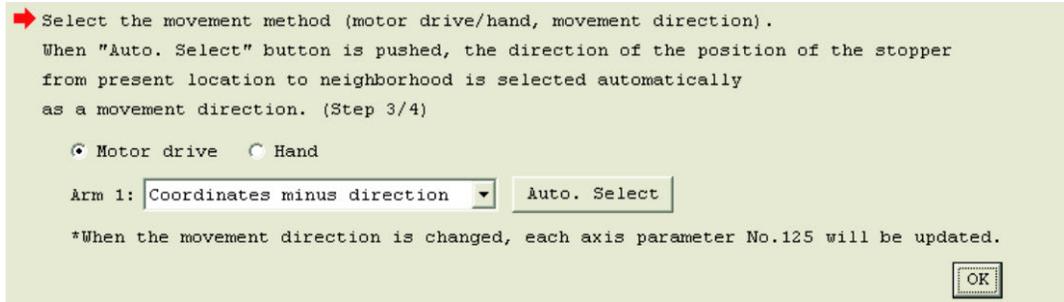


Fig. 13.93 Confirmation Window

- 5) Click “Execution” button.

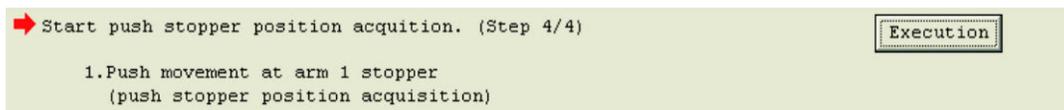


Fig. 13.94 Execution Window

- 6) A Warning window shows up. Click “Yes”. Process to acquire the push stopper position will start.

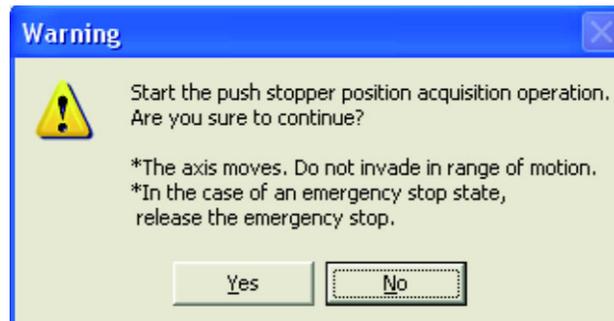


Fig. 13.95 Warning Window

- 7) Once the push stopper position acquisition is complete, the Information window will appear. Click “OK” button.



Fig. 13.96 Information Window

- 8) If it is necessary to have the push stopper position a acquisition for another axis, move on to the axis selection. When finishing the process, click “x” on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.
- 9) Once the controller reboot is finished, conduct the push type absolute reset on the axis with the push stopper position acquisition.

(2) Vertical Axis, Rotation Axis

- 1) Select "Individual axis" in the Push stopper position acquisition window, and set Axis to "Vert. Axis + Rot. Axis".

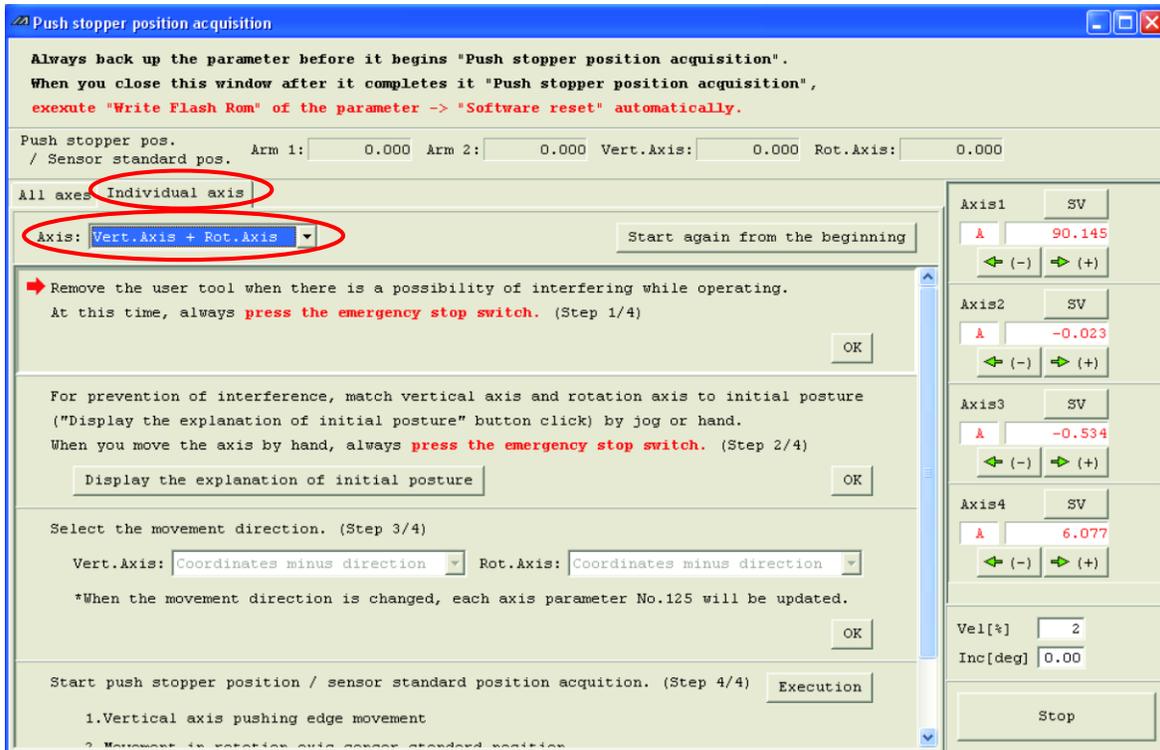


Fig. 13.97 Push Stopper Position Acquisition Window

- 2) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. Have the work during the emergency stop condition. After the work is finished, click on the "OK" button.

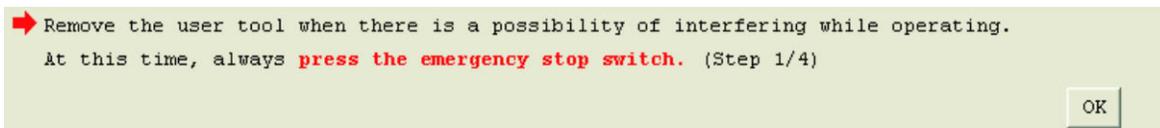


Fig. 13.98 Confirmation Window

- 3) Adjust vertical axis to the initial posture. The posture differs depending on the movement direction. Click on “Display the explanation of initial posture” to check the explanations. Make to work on with the emergency stop activated when moving the axes with hand. Click on the “OK” button after the work is finished.

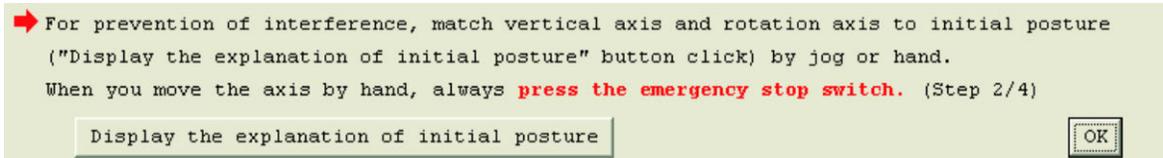


Fig. 13.99 Confirmation Window

[Initial posture]

Ⓒ Vertical Axis

For the position, put it apart from the coordinate 0mm (upward end) for 10mm or more. Setting it at 10mm or less, Error No. B0D “Push Stopper Operation Start Position Error” may occur at operation.

Ⓒ Rotation axis

There is no specific indication for the position of rotation shaft. It can be set at any position.

- 4) It is not necessary to change the direction to move for the vertical axis and rotation axis. Make the vertical axis is in the coordinates minus direction. Once the selection is made, click on the “OK” button.

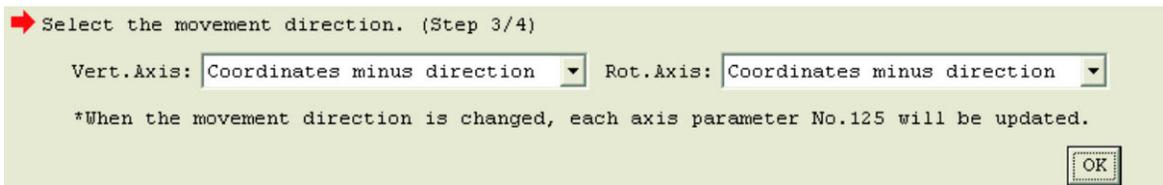


Fig. 13.100 Confirmation Window

- 5) Click “Execution” button.

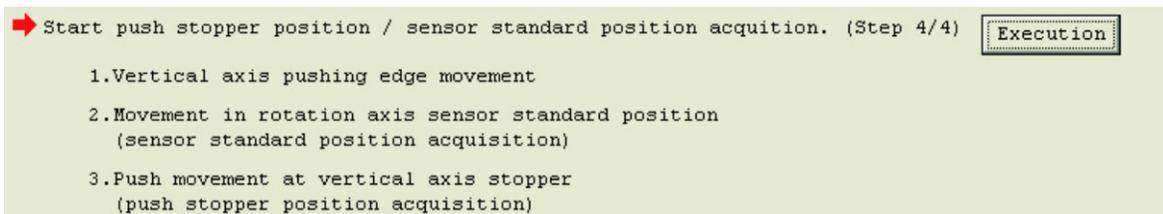


Fig. 13.101 Execution Window

- 6) A Warning window shows up. Click “Yes”. Process to acquire the push stopper position will start.

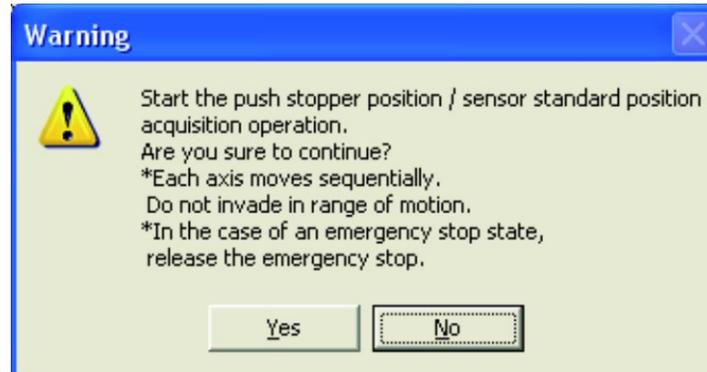


Fig. 13.102 Warning Window

- 7) Once the push stopper position acquisition is complete, the Information window will appear. Click “OK” button.

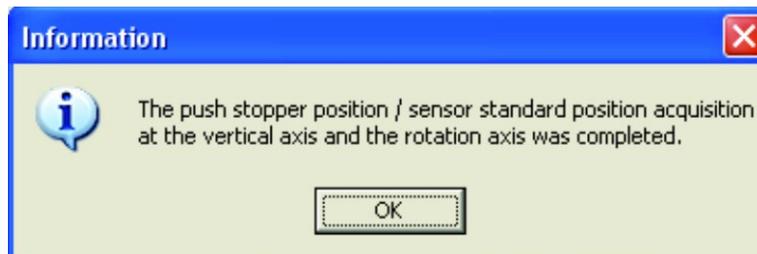


Fig. 13.103 Information Window

- 8) When finishing the process, click “x” on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.
- 9) Once the controller reboot is finished, conduct the push type absolute reset on the axis with the push stopper position acquisition.

13.5 IXP SCARA Axis

In absolute type (WA), make sure to conduct the absolute reset when the absolute data was lost or after the robot is dismantled to replace the motor and so on.

⚠ Caution:

- There may be a risk of robot malfunction or critical operational error such as crash to the stopper or unavailability of expected operation if the absolute reset is not conducted after the motor is replaced and robot is dismantled.
- There may be a case that the indicated coordinates for positioning point cannot be achieved before and after the absolute reset is conducted.

- 1) Make sure to have a backup of the parameters before conducting. Select [Parameter] → [Edit] from the menu in the PC software to show the parameter edit window. Press “Save As” button in the parameter edit window to save the parameters to file data.

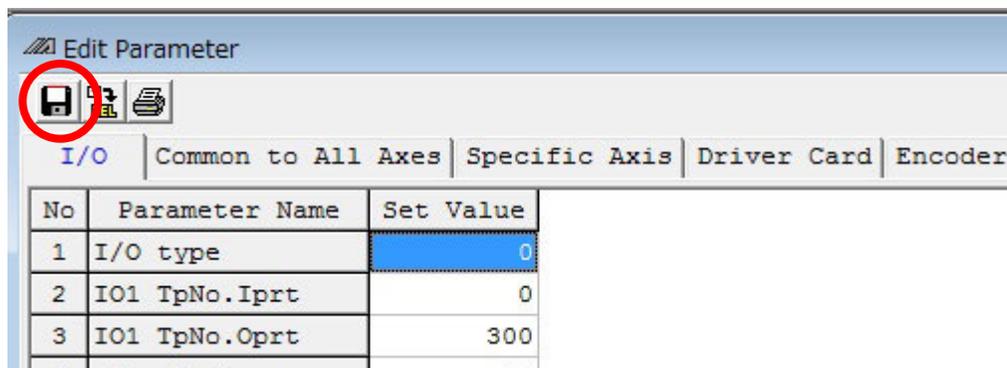


Fig. 13.104

- 2) Select [Controller] → [Calibration Home/Abs. Encoder Reset] from the menu in the PC software.

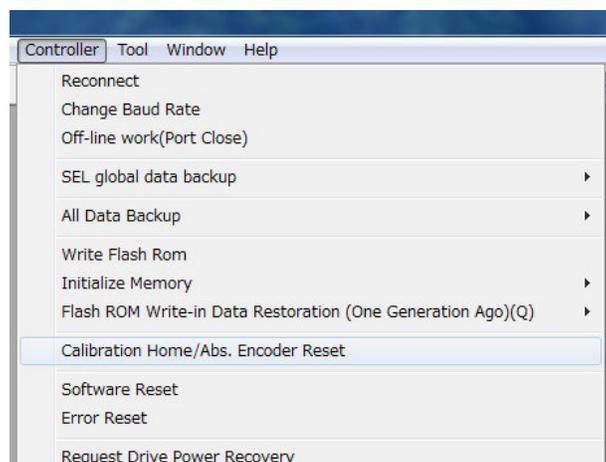


Fig. 13.105

- 3) A warning window shows up. Check the content and click “OK”.

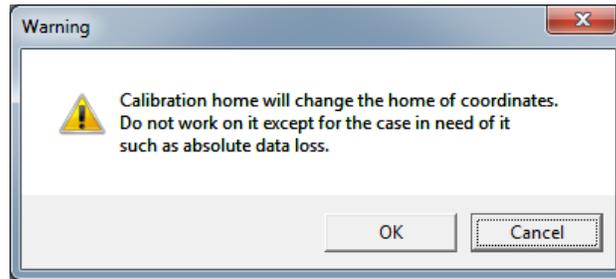


Fig. 13.106

- 4) [Calibration Home/Abs. Encoder Reset] appears. Select the tab for the axis that requires the absolute reset.
 Conduct absolute reset to all the axes.
 (Note) An arrow is displayed in the window for V12.02.01.00 and later.

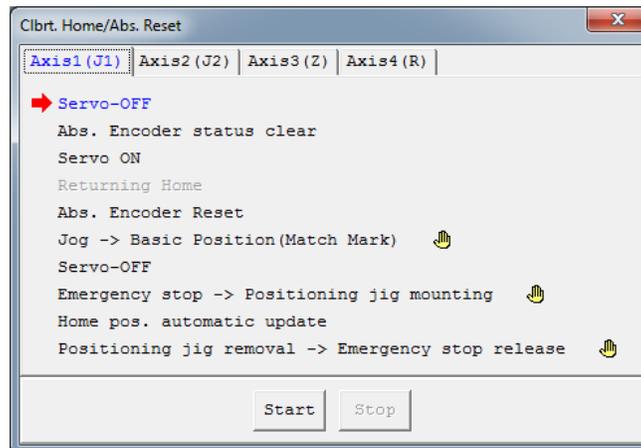


Fig. 13.107

- 5) Conduct absolute reset on [Axis 1 (J1)] or [Axis 2 (J2)]. Click on “Start” button while the [Axis 1 (J1)] or [Axis 2 (J2)] tab is selected, and a warning window shows up. Release the emergency stop, check the content and click “Yes”. When Each Axis Parameter No.10 “Home-Return Method” is set to 2 “Home position = Home preset value set”, conduct the absolute reset, not home-return operation. (Proceed to 6.) When it is set to 0 “Z-phase search after end search”, start the home-return operation for the axes subject to absolute reset.

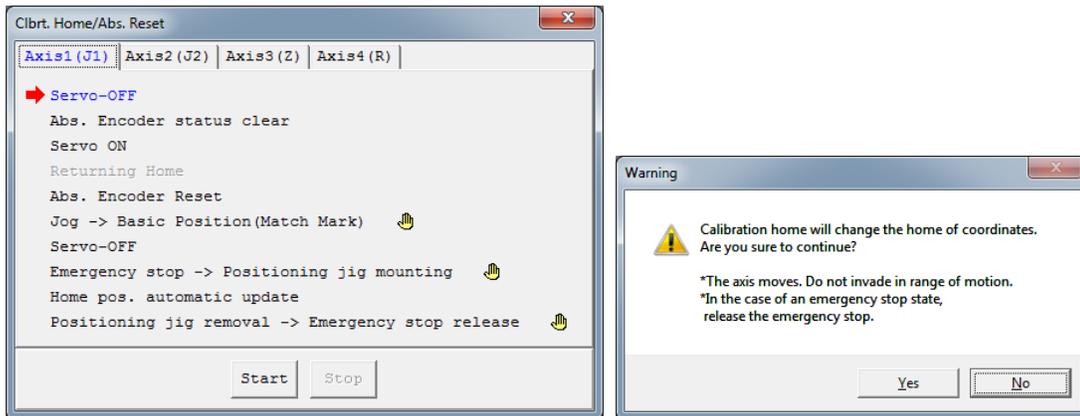
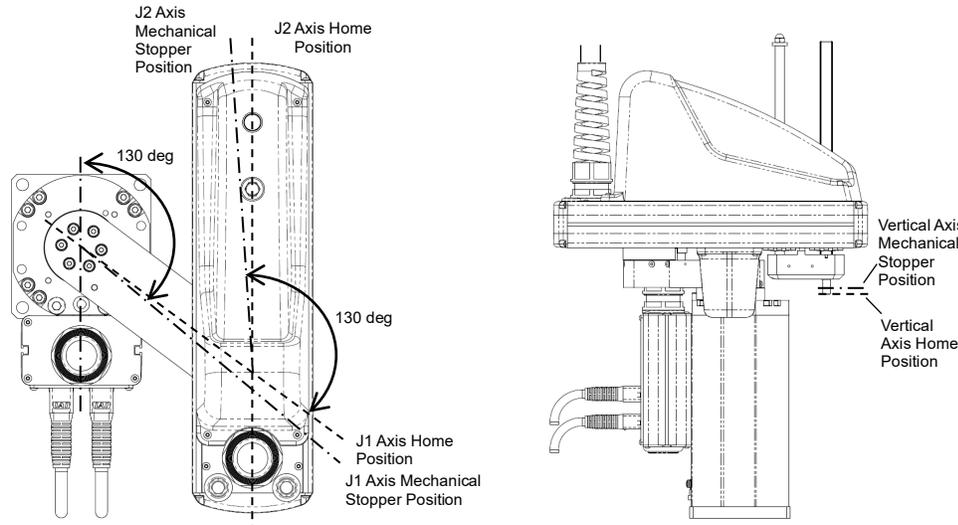


Fig. 13.108

Caution: • Pay attention as the home-return operation starts as soon as clicking “Yes”. The standard home position should be the posture below. Make sure to secure enough area for home-return posture and not to have interference to peripheral equipment.



- The home-return operation is to be conducted with the revolution limiting stopper when revolution limitation is to be performed. [Refer to 1.2.2 Operation Range and Operation Limit]
In this case, check that the home-return posture can be performed, and there is no interference to peripheral equipment.
- In case there is any interference to peripheral equipment during the home-return operation, the home-return operation completes at the position of interference, and the proper home position cannot be acquired. In such cases, it may cause malfunction of robot or peripheral equipment or critical operational error such as crash or expected operation cannot be made.

- 6) “Jog -> Basic position” window appears complete. Press “← (-)” and “→ (+)” buttons to move the arm to a place near the datum position. Refer to Step 7) for the datum position of the J1 axis and J2 axis. Also, change “JOG Vel” and “Inc Distance” if necessary. Click “OK” once the arm gets near the datum position. Click “OK” when moving the arm new the datum position manually by hand.

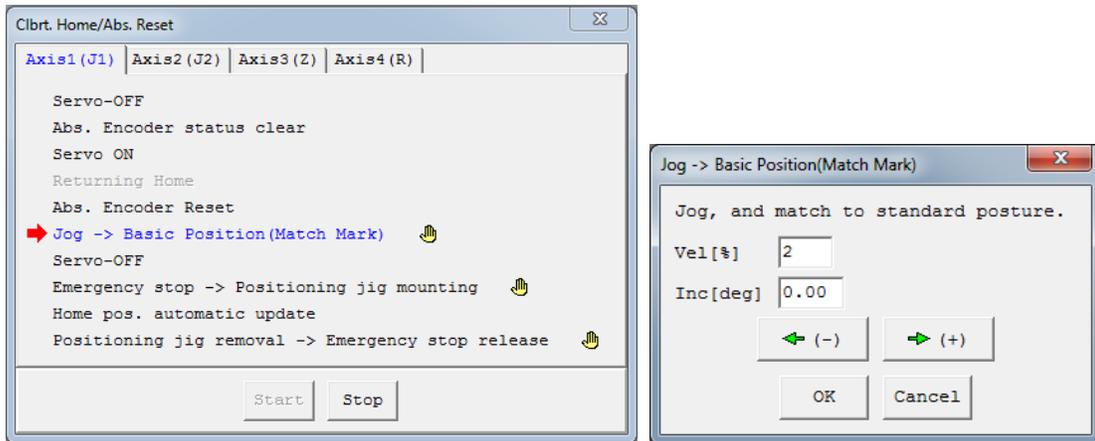


Fig. 13.109

- 7) Have the emergency stop conducted, and insert the home-position adjustment tool ($\phi 4$) at the datum position of J1 axis or J2 axis.

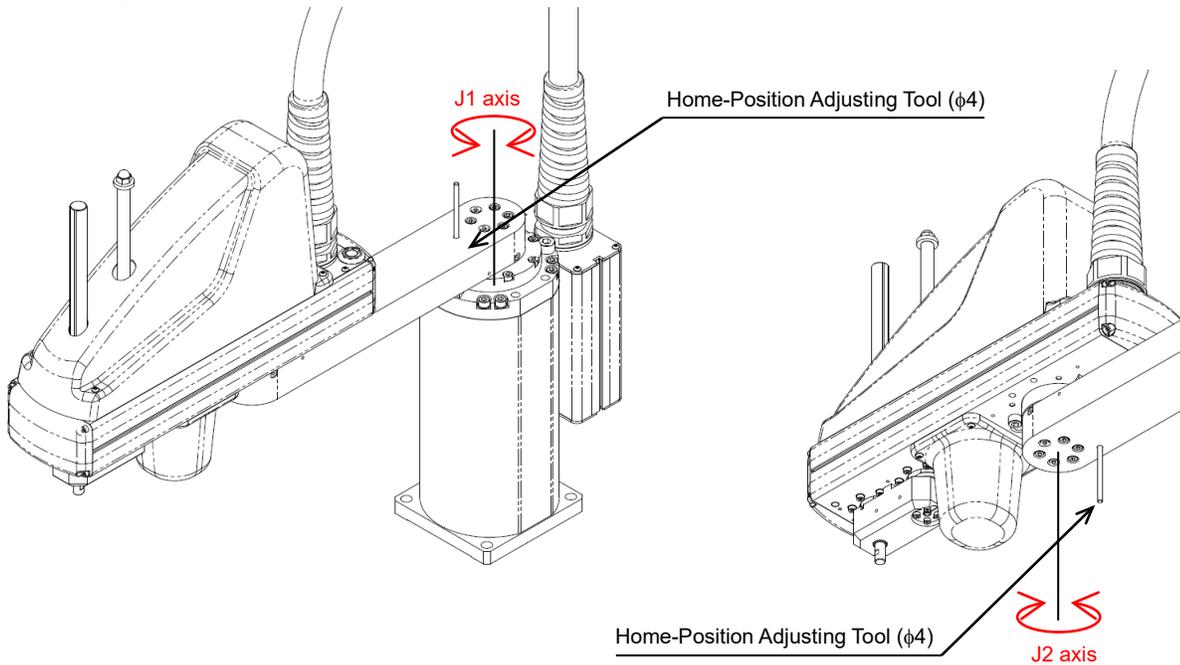


Fig. 13.110

- 8) With the home-position adjustment tool ($\phi 4$) being inserted, click “OK” in “Emergency stop -> Positioning pin insertion” window.

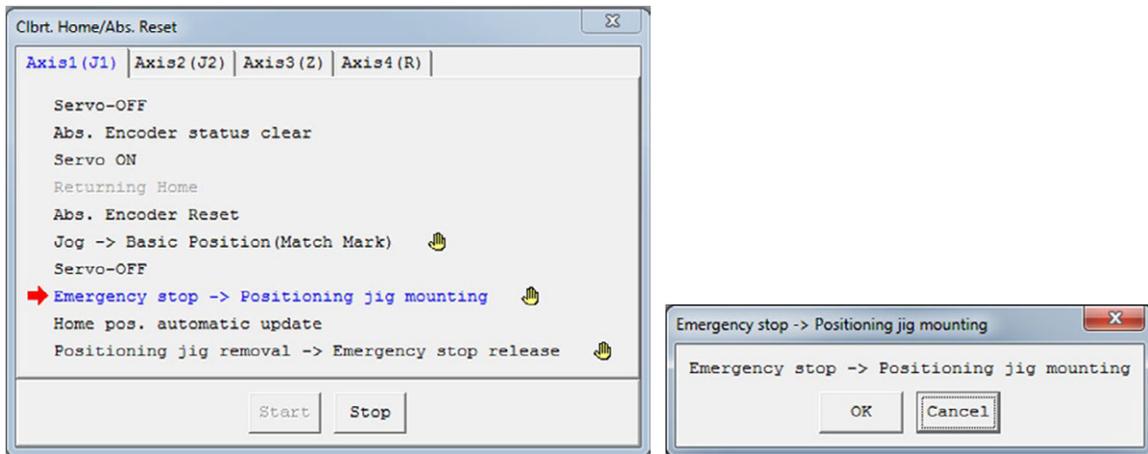


Fig. 13.111

- 9) Remove the home-position adjustment tool ($\phi 4$), and release the emergency stop. Click “OK” in “Positioning pin removal -> Emergency stop release” window.

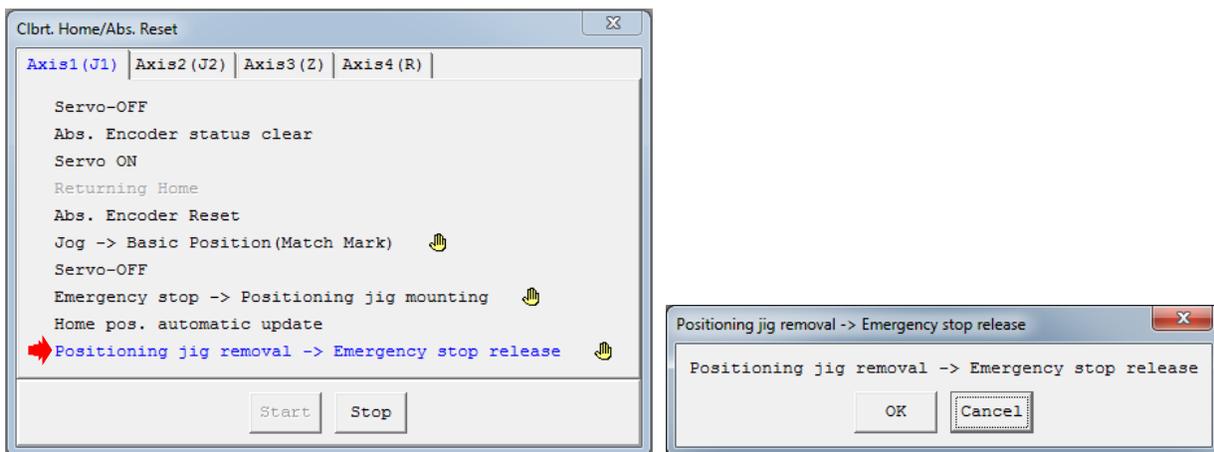


Fig. 13.112

- 10) Conduct absolute reset on [Axis 3 (Z)].
 Click on "Start" button while the [Axis 3 (Z)] tab is selected, and a warning window shows up.
 Release the emergency stop, check the content and click "Yes". Home-return operation starts on the Z-axis.
 Absolute reset completes after home return.

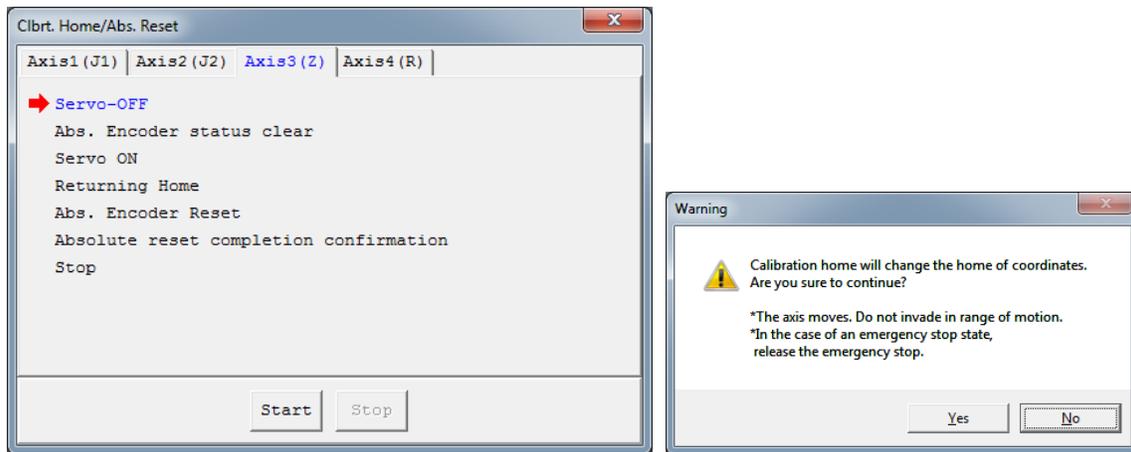
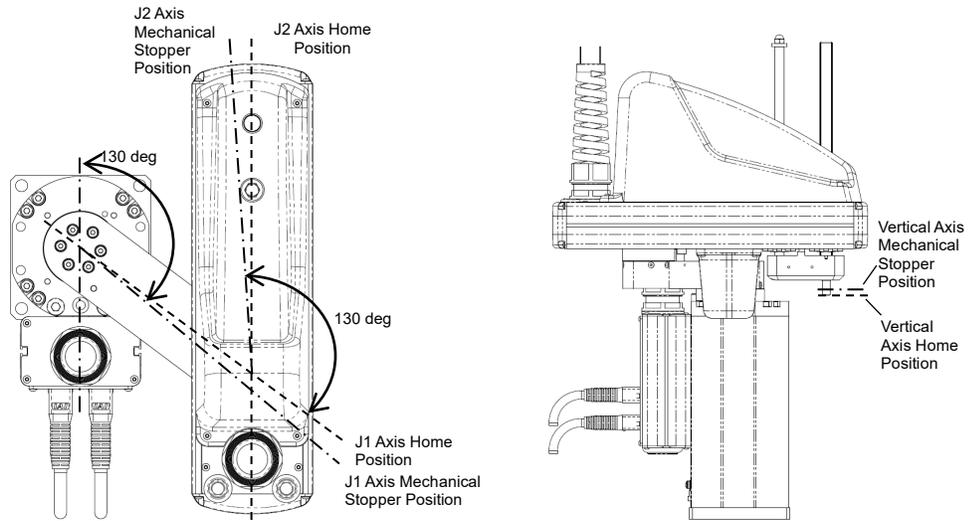


Fig. 13.113

Caution: • Pay attention as the home-return operation starts as soon as clicking "Yes". The standard home position should be the posture below. Make sure to secure enough area for home-return posture and not to have interference to peripheral equipment.



- In case there is any interference to peripheral equipment during the home-return operation, the home-return operation completes at the position of interference, and the proper home position cannot be acquired. In such cases, it may cause malfunction of robot or peripheral equipment or critical operational error such as crash or expected operation cannot be made.

- 11) Conduct absolute reset on [Axis 4 (R)].
 Click on “Start” button while the [Axis 4 (R)] tab is selected, and a warning window shows up.
 Release the emergency stop, check the content and click “Yes”.
 There is no movement on the R-axis by home return.

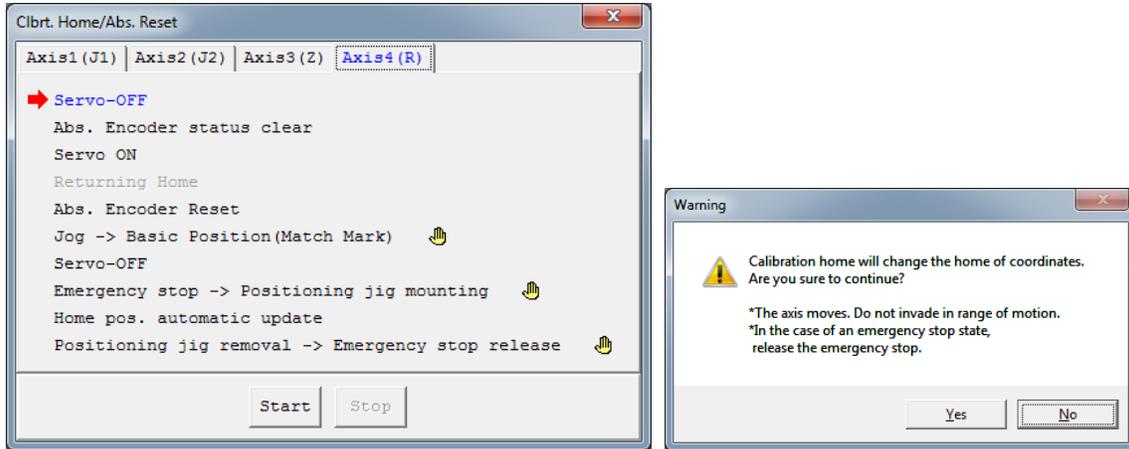


Fig. 13.114

- 12) “JOG -> Basic Position” window appears. Press “← (-)” and “→ (+)” buttons to move the arm to a place near the datum position. Refer to Step 13) for the datum position of the J1 axis and J2 axis. Also, change “JOG Vel” and “Inc Distance” if necessary. Click “OK” once the arm gets near the datum position.
 Click “OK” when moving the arm new the datum position manually by hand.

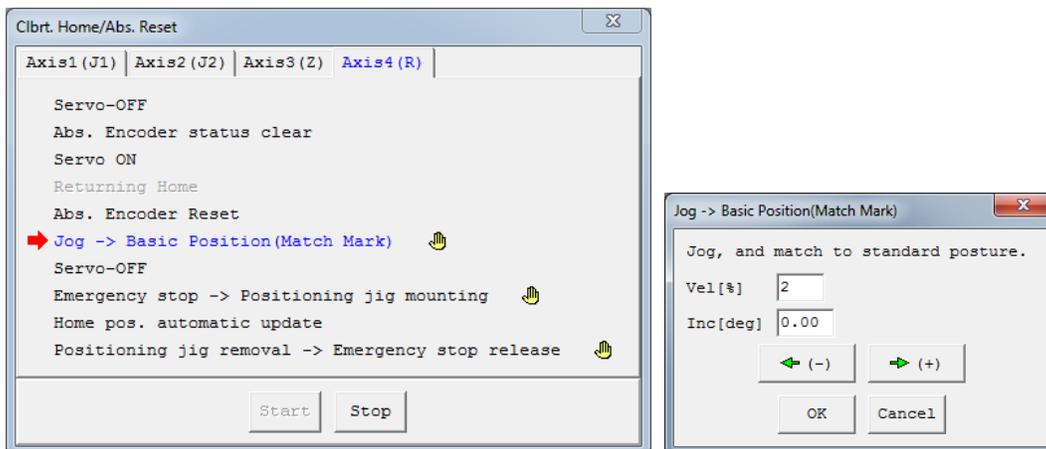


Fig. 13.115

- 13) Have the emergency stop conducted, and insert the home-position adjustment tool ($\phi 3$) at the datum position of R-axis.
 As shown in the figure below align the position of either the D-cut surface on the R-axis tip or the D-cut surface on the hole for insertion of the home-position adjustment tool ($\phi 3$). D-cut surface on the R-axis tip and the D-cut surface on the hole for insertion of the home-position adjustment tool ($\phi 3$) face in the same direction.

⚠ Caution: The datum position of the R-axis is in the same position for every 360deg. Pay attention so the wires or pipes of tools get twisted.

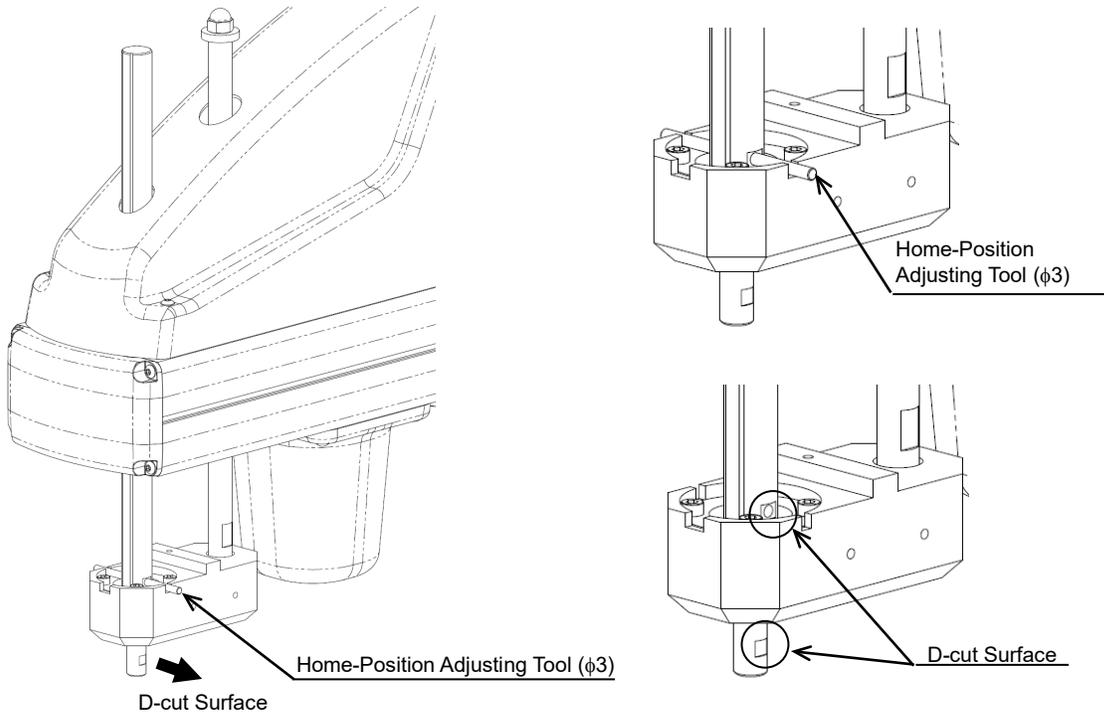


Fig. 13.116

- 14) With the home-position adjustment tool ($\phi 3$) being inserted, click “OK” in “Emergency stop -> Positioning pin insertion” window.

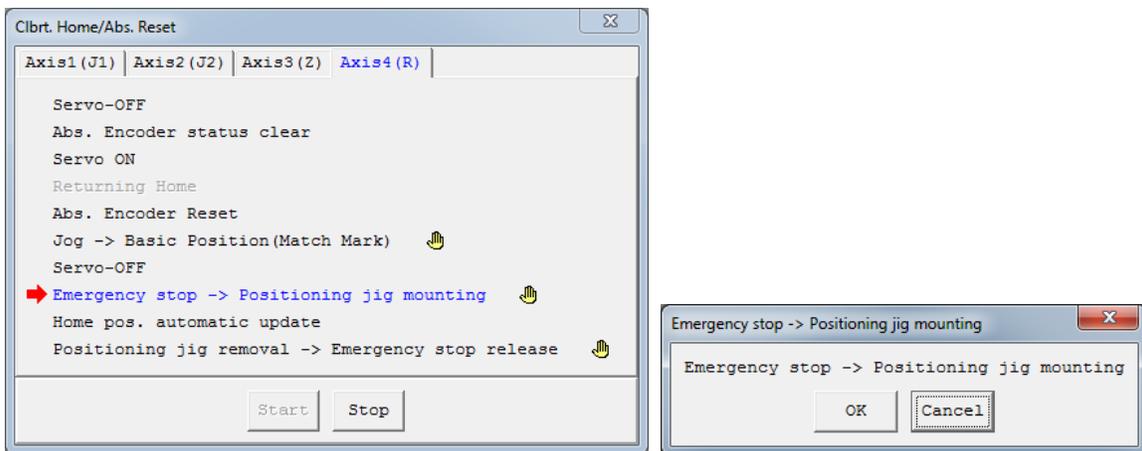


Fig. 13.117

- 15) Remove the home-position adjustment tool ($\phi 3$), and release the emergency stop. Click “OK” in “Positioning pin removal -> Emergency stop release” window.

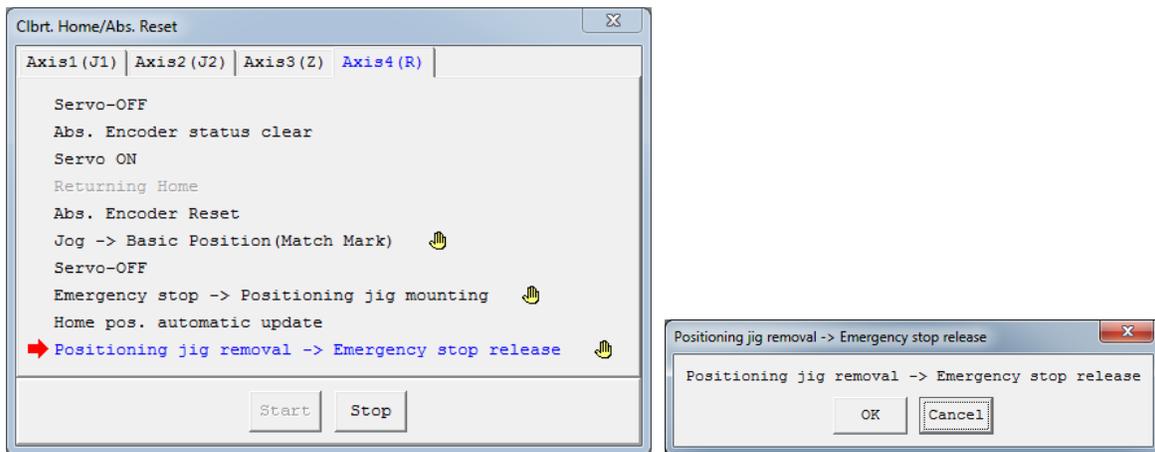


Fig. 13.118

- 16) Once “Calibration Home/Abs. Encoder Reset” window is closed, the screen switches to “Write Flash ROM?” confirmation window. Put a check mark on “Parameter” and click “Yes”, and then conduct the software reset.

Writing to the flash ROM can be conducted at once after the home-position adjustment and absolute reset are completed on each axis.

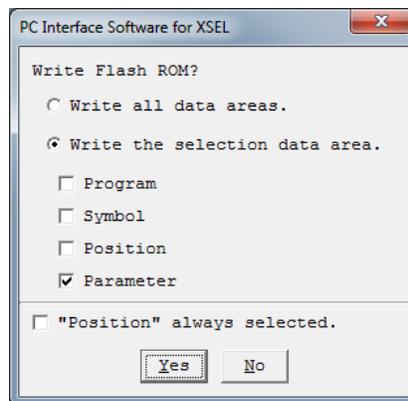


Fig. 13.119

13.6 ZR Unit

13.6.1 Absolute Reset on ZR Unit (Absolute Type Only)

Under certain conditions such as when the ZR unit is connected to the controller for the first time, absolute encoder battery voltage is abnormal, or encoder cable has been disconnected, an encoder battery error will generate and absolute reset will be required.

[1] Preparing for Absolute Reset

On the ZR unit, an absolute reset is performed from the ball-screw spline adjustment menu in the PC software. You also need a special jig to perform an absolute reset.

- Versions supporting absolute reset on ZR unit: V7.4.0.0 or later
- Absolute-reset adjustment jig Model number: JG-ZRS (for ZRS)
JG-ZRM (for ZRM)

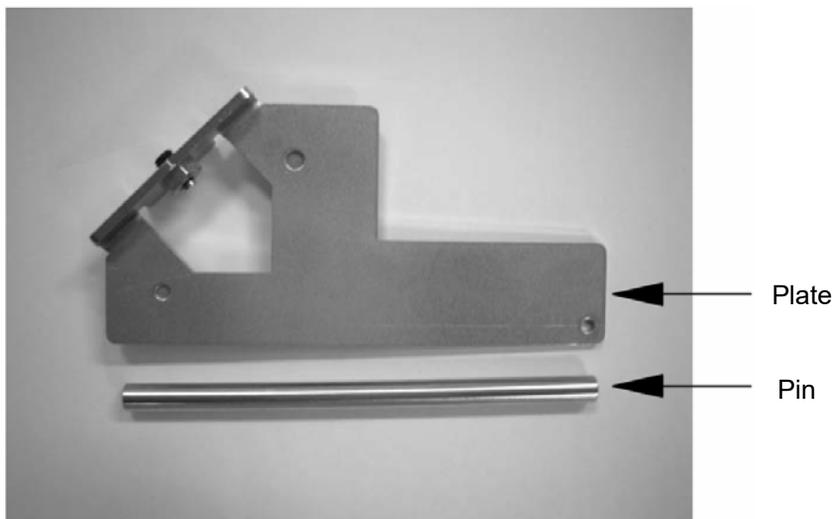


Fig. 13.120

Connect the robot, controller and PC cable to enable operation from the PC software. Before proceeding, be sure to confirm that the EMG switch operates properly.



Warning

- Carrying out any inspection or maintenance work without fully understanding the work may result in serious injury.
- Put up a sign that says “Work in Progress” so as to prevent other operators from accidentally operating the controller, operation panel, etc.
- Back up the parameters before the absolute reset.

[2] Starting the Absolute Reset Menu (Ball-screw Spline Adjustment Window)

(1) Start the ball-screw spline adjustment window from the PC software.

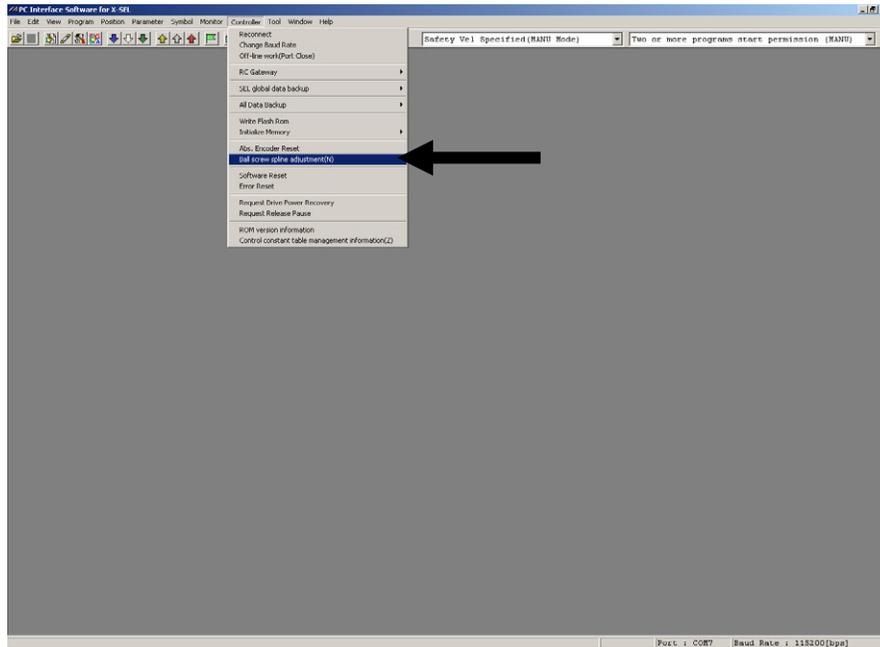


Fig. 13.121 Absolute Reset Window Launching Operation

(2) The ball-screw spline adjustment window starts.

When a "Lnr. Axis No. (linear movement axis number)" is selected, "Rot. Axis No. (Rotational Movement Axis Number) (Mating Axis Number)" and "Encoder Type" are displayed.

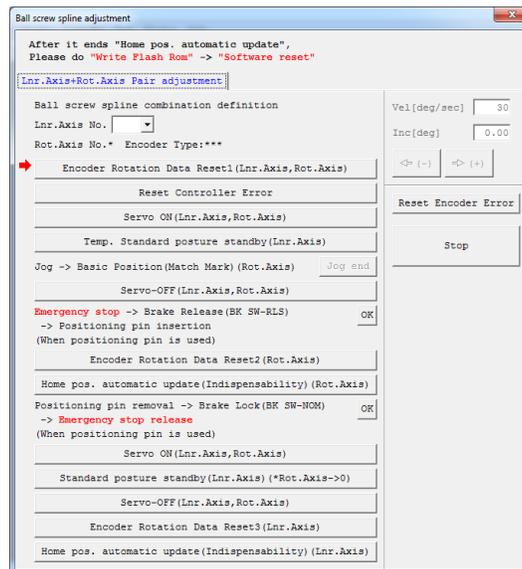


Fig. 13.122 Absolute Reset Window

[3] Absolute Reset (Ball-screw Spline Adjustment) Procedure

For absolute reset for the ZR unit (ball-screw spline adjustment), a series of operations of the up/down axis and rotary axis is performed. Since the adjustment procedure includes items that require robot operation, confirm the range of operation of the actuator, absence of obstructions, etc., to make sure the robot can be operated.

- (1) Select a "Lnr. Axis No. (linear movement axis number)" which will be used to perform an absolute reset (ball-screw spline adjustment).

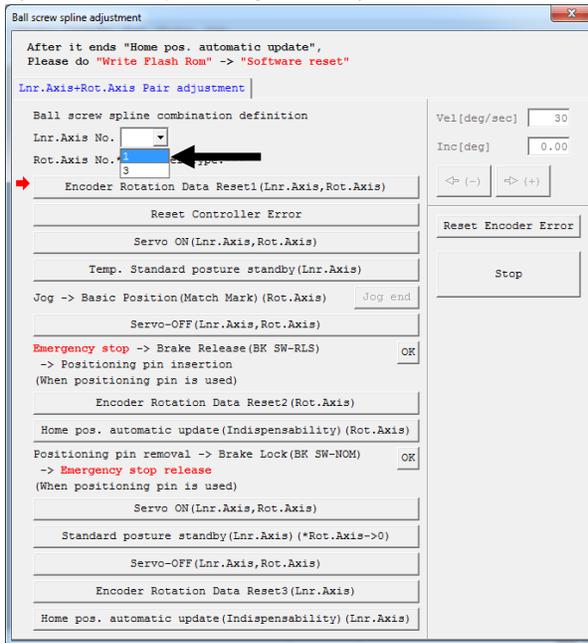


Fig. 13.123 Linear Movement Axis Number Selection Operation

- (2) Click the [Encoder Rotation Data Reset (Lnr. Axis, Rot. Axis)] button.

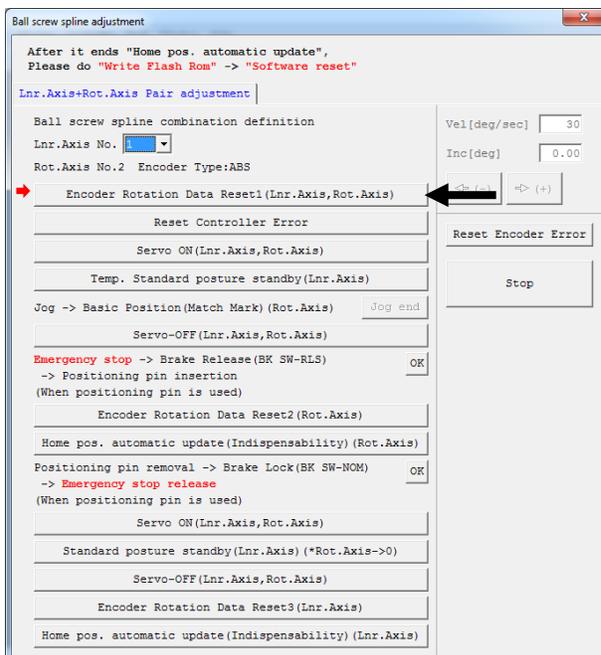


Fig. 13.124 Encoder Multi-Rotation Data Reset 1 Operation

(3) When the dialog box appears, click the [Yes] button.

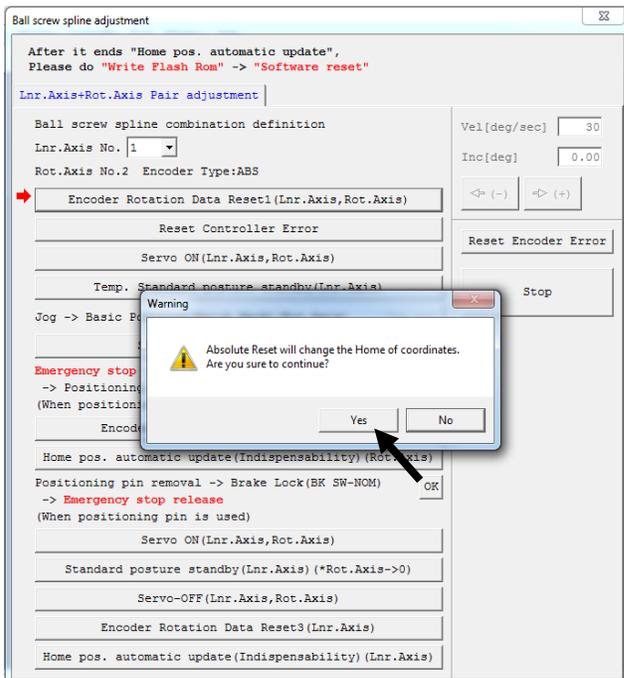


Fig. 13.125 Encoder Multi-Rotation Data Reset 1 Operation

(4) When the dialog box appears, click the [Yes] button.

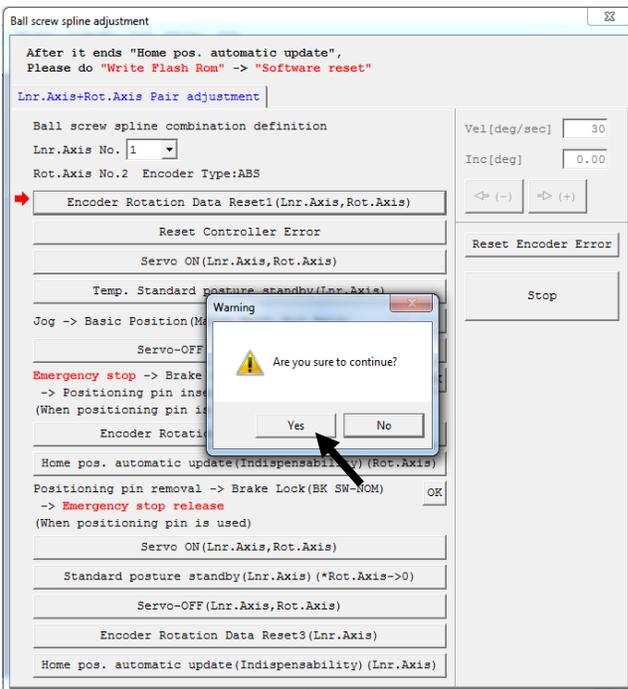


Fig. 13.126 Encoder Multi-Rotation Data Reset 1 Operation

(5) Click the [Reset Controller Error] button.

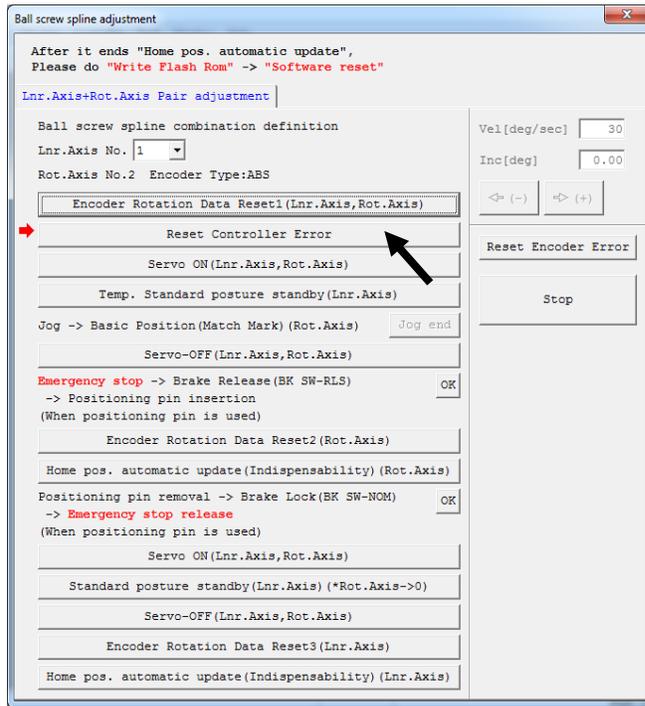


Fig. 13.127 Controller Error Reset Operation

(6) Click the [Servo ON (Lnr. Axis, Rot. Axis)] button.

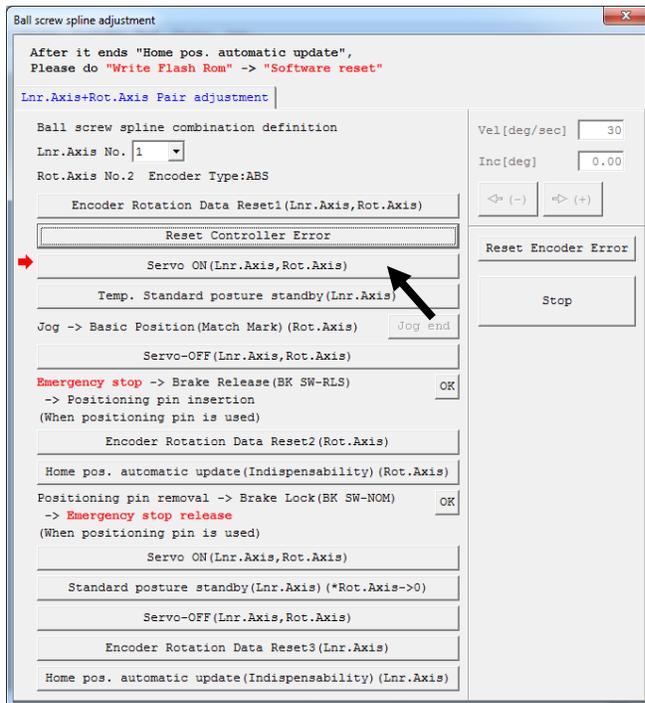


Fig. 13.128 Servo ON Operation

(7) Click the [Temp. Standard posture standby (Lnr. Axis)] button.

Note: Up-down axis will have a home-return operation.

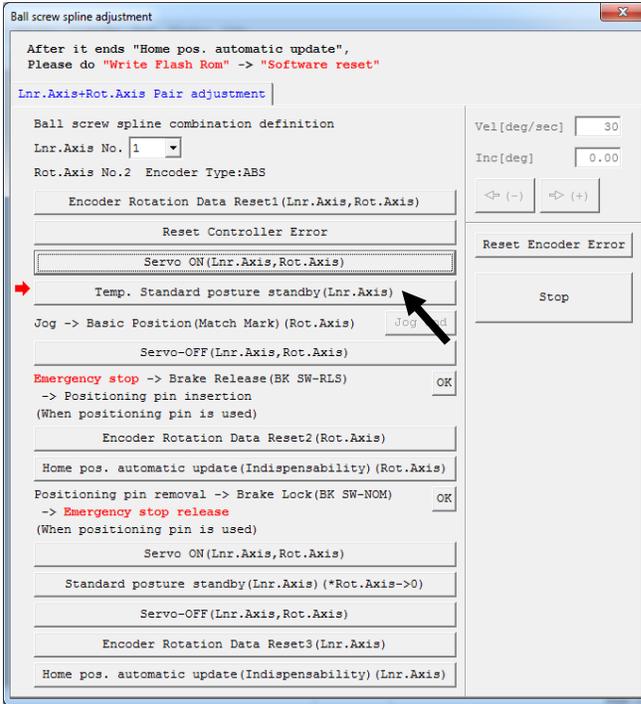


Fig. 13.129 Tentative Reference Posture Operation

(8) Jog the rotational movement axis (R-axis) to the reference posture position (refer to the illustration of reference posture), and then click the [Jog end] button.

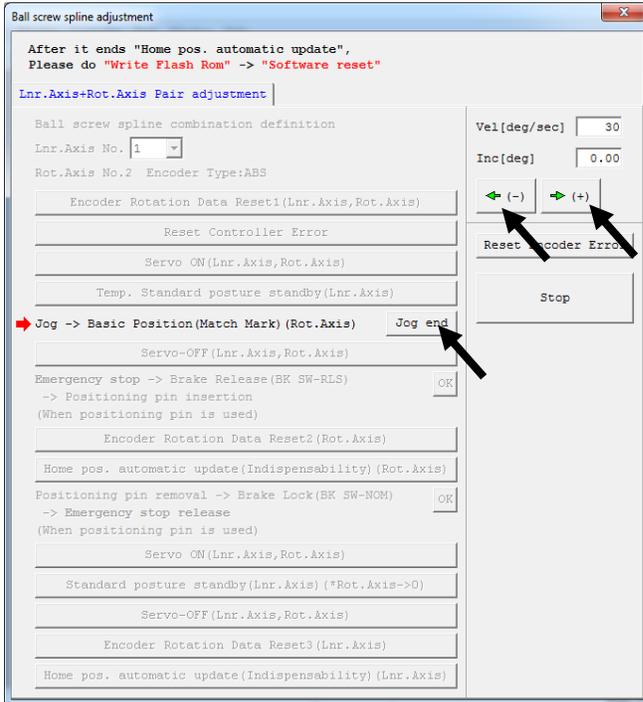
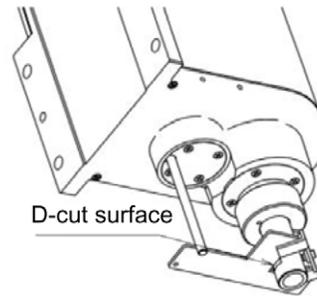


Fig. 13.130 Jogging

Illustration of reference posture



- (9) Click the [Servo-OFF (Lnr. Axis, Rot. Axis)] button.

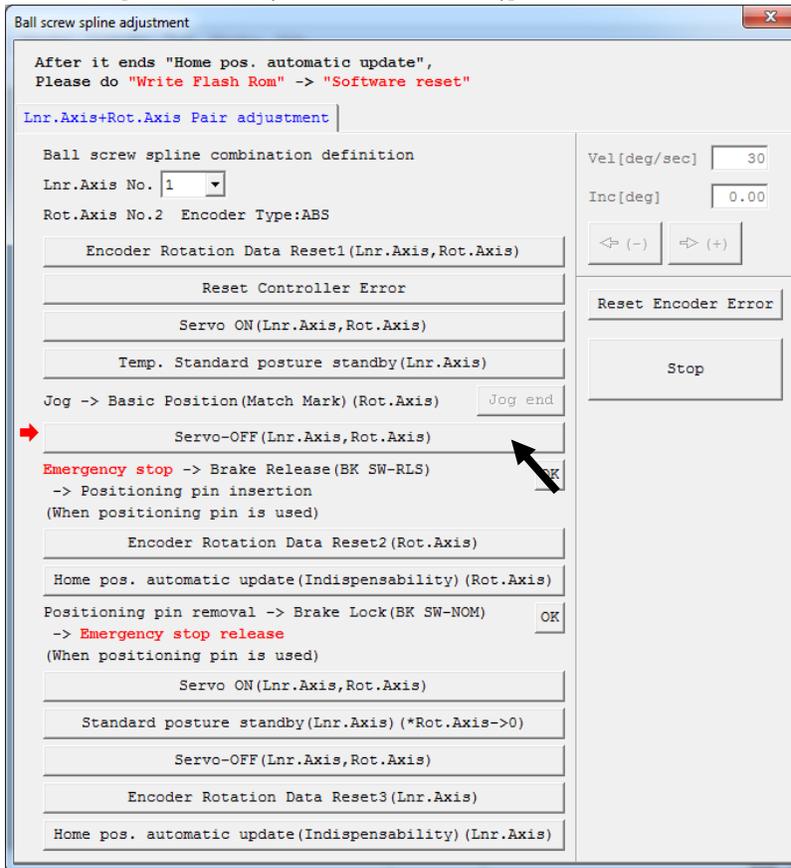
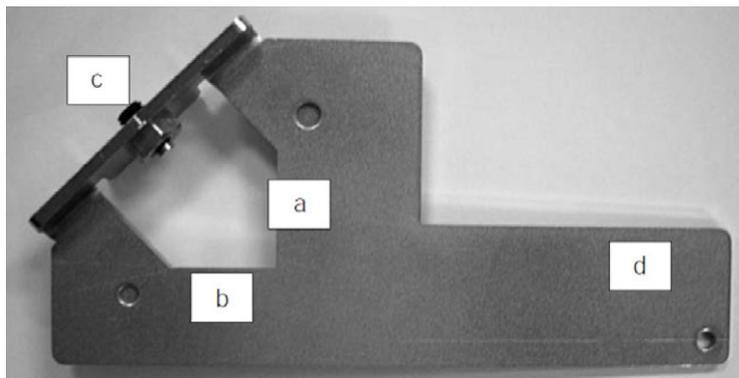
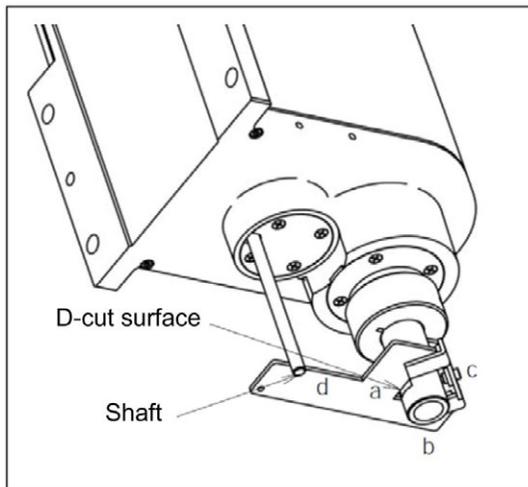


Fig. 13.131 Servo OFF Operation

- (10) Press the emergency stop switch (emergency stop button on the PC cable).
- (11) Release the brake. Release the brake using the switch on the controller side.

Jig Installation method



- [1] Insert the ball-screw spline into the hole in the jig from below.
- [2] Cause the D-cut surface of the ball-screw spline to contact the surface a.
- [3] Cause the side surface of the ball-screw spline to contact the surface b.
- [4] Tighten the screw c to secure the jig onto the ball-screw spline.
 - * At this time, confirm that the adjustment jig is vertical to the ball-screw spline and that the D-cut surface and surface a are firmly in contact.
 - * Applicable screw: Hexagonal socket head setscrew M5
 - * Tightening torque: 20 [N·cm] (reference)
- [5] Insert the supplied shaft into the hole in the ZR unit.
 - * Exercise caution because the shaft will come off if the hand is released.
- [6] Turn the ball-screw spline until the supplied shaft contacts lightly with the surface d of the jig.

Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.

(12) Click the [OK] button.

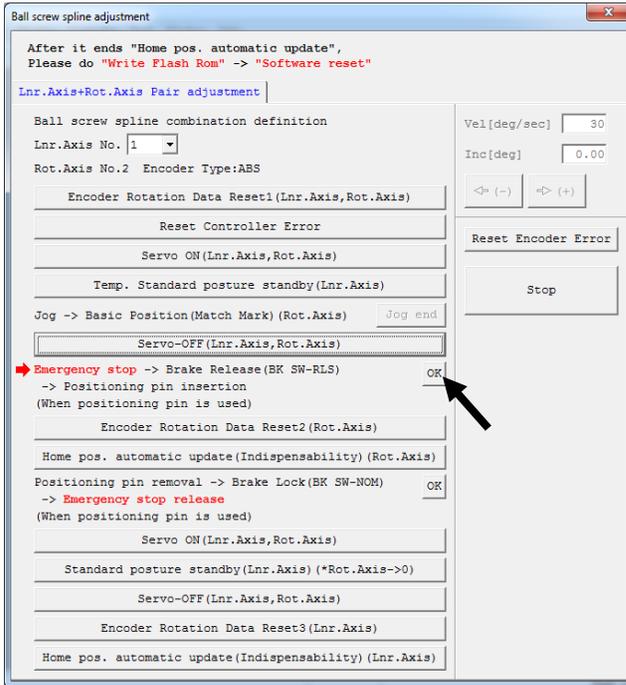


Fig. 13.132 Adjustment Jig Installation Confirmation Screen Operation

(13) Click the [Encoder Rotation Data Reset 2 (Rot. Axis)] button.

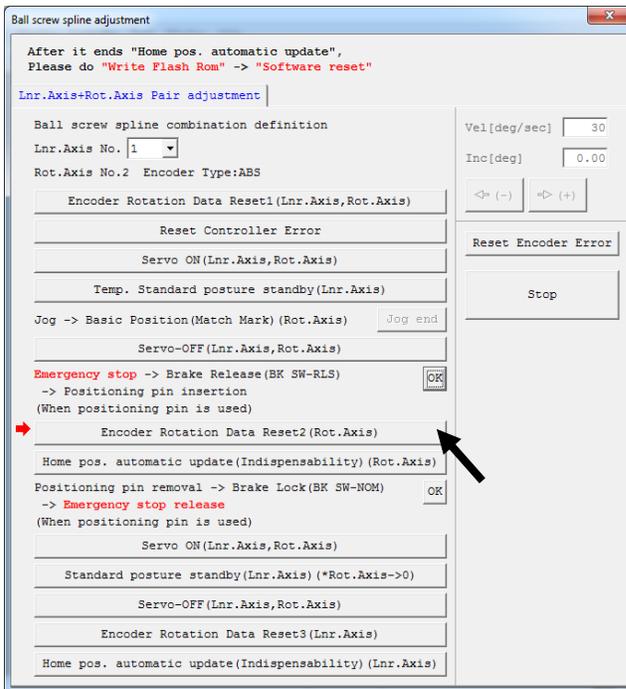


Fig. 13.133 Encoder Multi-Rotation Data Reset 2 Operation

(14) When the dialog box appears, click the [Yes] button.

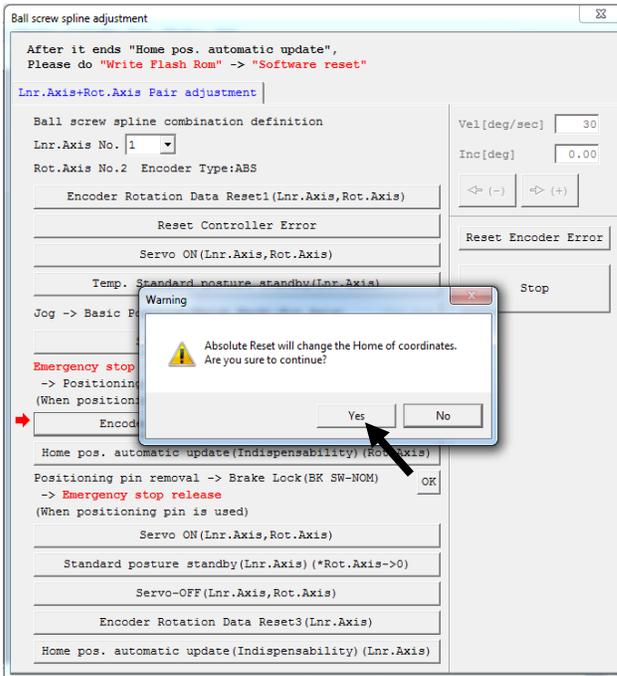


Fig. 13.134 Encoder Multi-Rotation Data Reset 2 Operation

(15) When the dialog box appears, click the [Yes] button.

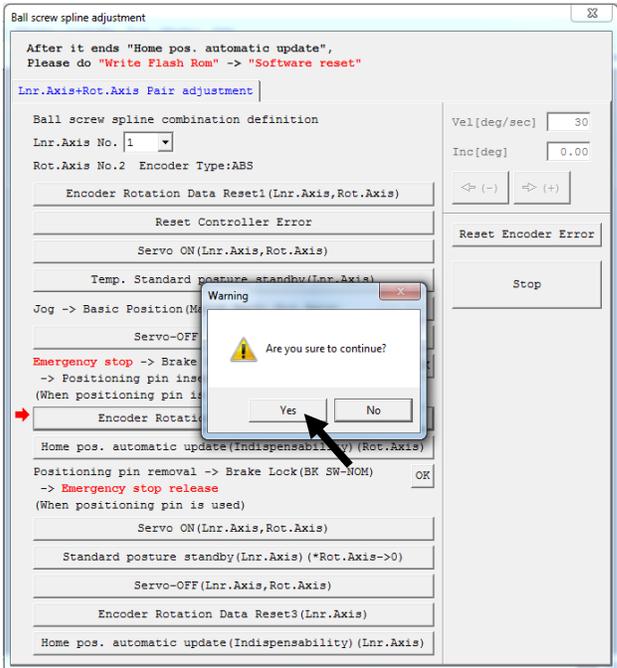


Fig. 13.135 Encoder Multi-Rotation Data Reset 2 Operation

- (16) Click the [Home pos. automatic update (Indispensability) (Rot. Axis)] button.

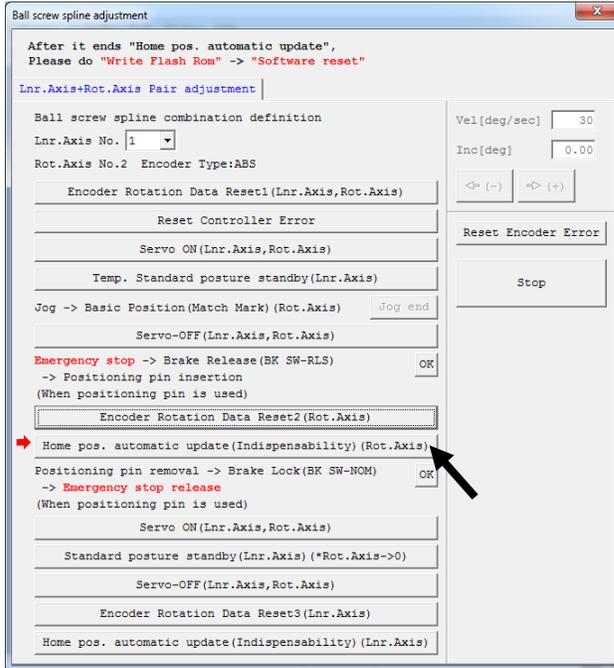


Fig. 13.136 Home Position Automatic Update Operation

- (17) Remove the adjustment tool.
 (18) Lock the brake (on the front panel of the controller).
 (19) Cancel the emergency stop (by releasing the emergency stop button on the PC cable).
 (20) Click the [OK] button.

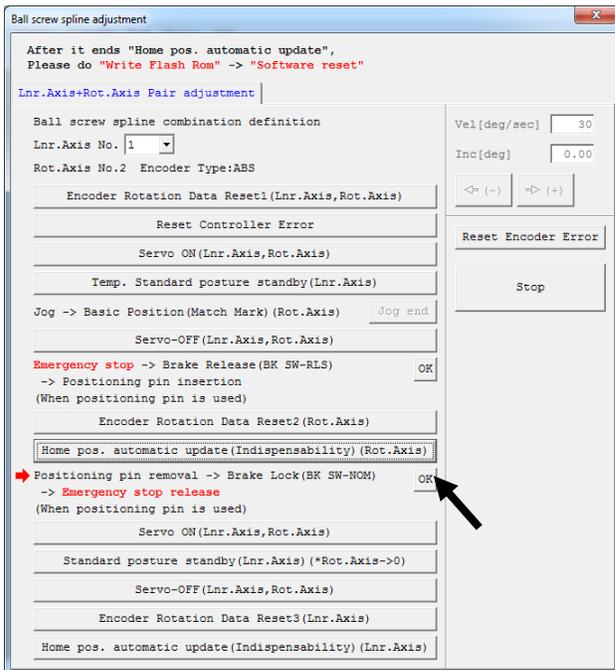


Fig. 13.137 Adjustment Jig Removal Confirmation Operation

(21) Click the [Servo ON (Lnr. Axis, Rot. Axis)] button.

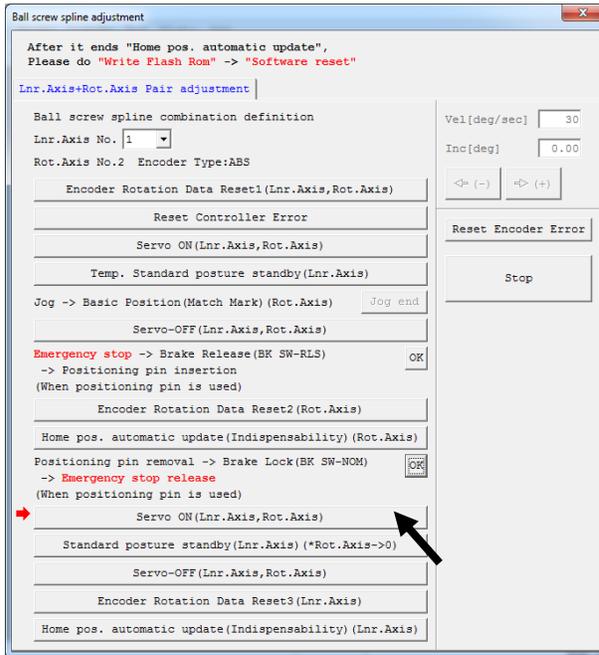


Fig. 13.138 Servo ON Operation

(22) Click the [Standard Posture standby (Lnr. Axis) (Rot. Axis→0)] button.

Note: Up-down axis starts home-return operation after the rotary axis finishes moving to 0 point.

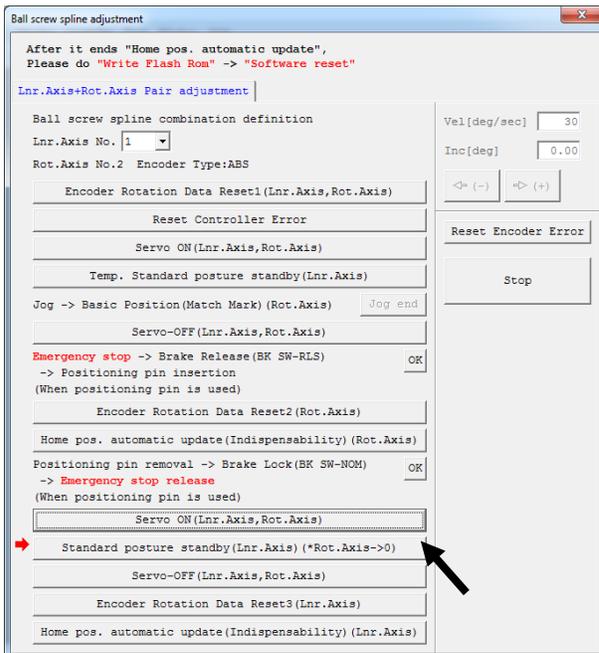


Fig. 13.139 Reference Posture Standby Operation

(23) Click the [Servo-OFF (Lnr. Axis, Rot.Axis)] button.

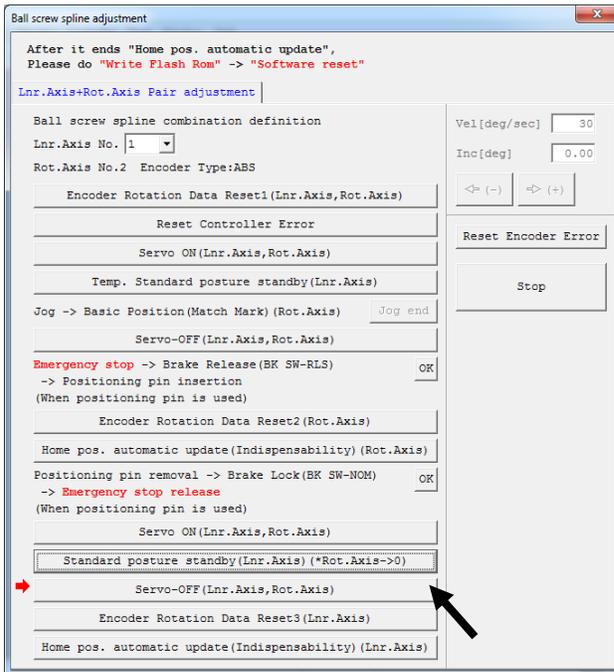


Fig. 13.140 Servo OFF Operation

(24) Click the [Encoder Rotation Data 3 (Lnr. Axis)] button.

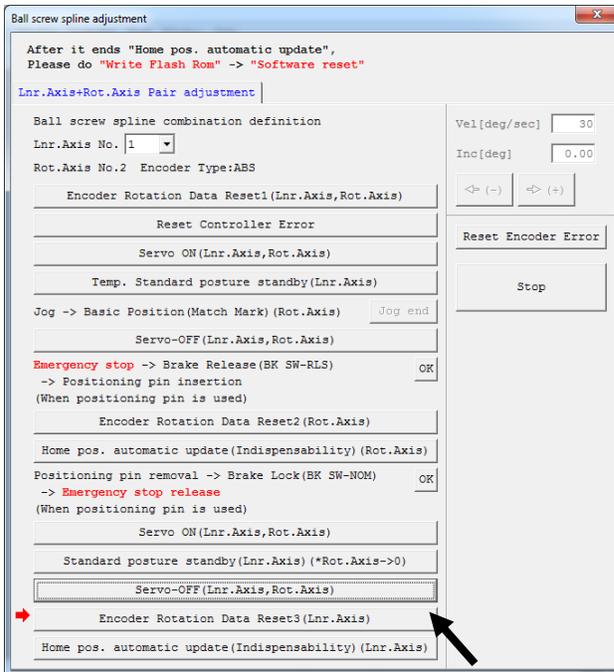


Fig. 13.141 Encoder Multi-Rotation Data Reset 3 Operation

(25) When the dialog box appears, click the [Yes] button.

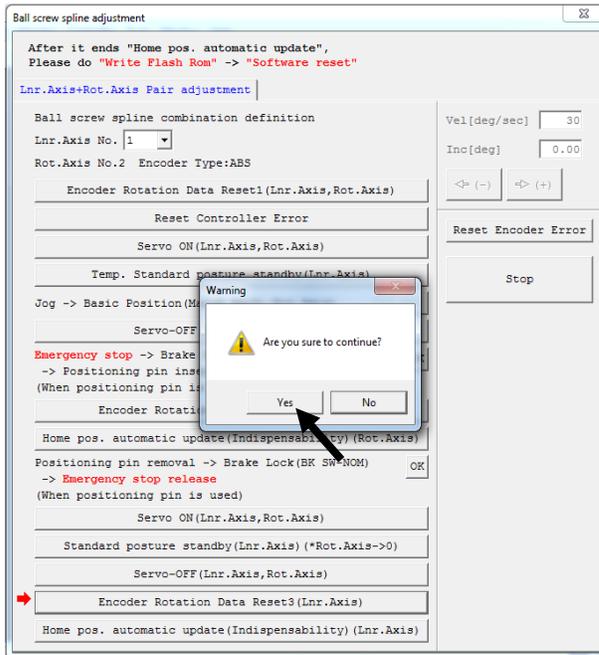


Fig. 13.142 Encoder Multi-Rotation Data Reset 3 Operation

(26) Click the [Home pos. automatic update (Indispensability) (Lnr. Axis)] button, and then click “x” in the top right-hand corner of the window to close the window.

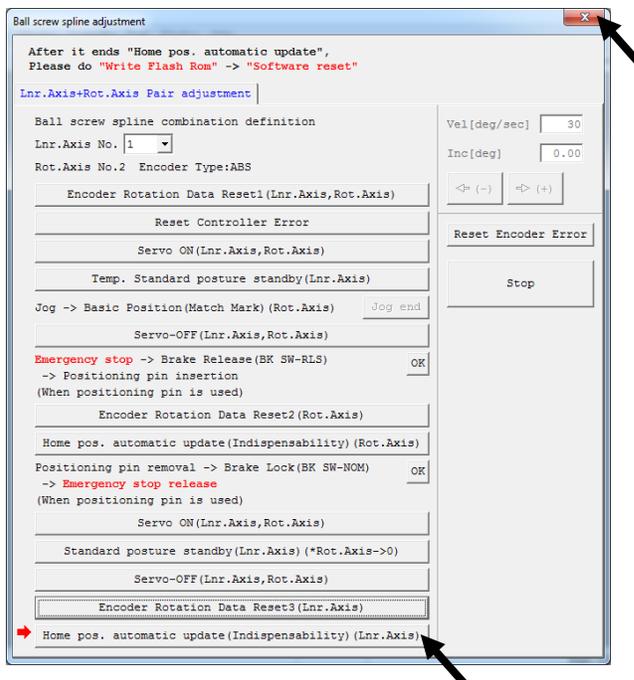


Fig. 13.143 Home Position Automatic Update Operation

- (27) Closing the ball-screw spline adjustment window following the ball-screw spline adjustment opens the following screen. Click the [Yes] button.

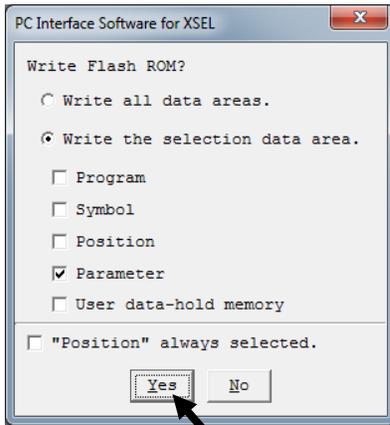


Fig. 13.144 Confirmation

- (28) When all data has been written to the flash ROM, the following screen appears. Click the [Yes] button.



Fig. 13.145 Confirmation

13.6.2 Ball-screw spline adjustment on ZR unit (Incremental type)

Normally, adjustment of the ball-screw spline is not required.

Perform it only when the combination of the main unit and the controller is changed because the ZR unit or controller is changed.

[1] Ball-Screw Spline Adjusting Preparation

The absolute rest jig is required for the adjustment of the ball-screw spline for the ZR unit.

- Versions supporting ball-screw spline adjustment on ZR unit: V7.4.0.0 or later
- Absolute-reset adjustment jig Model number: JG-ZRS (for ZRS)
JG-ZRM (for ZRM)

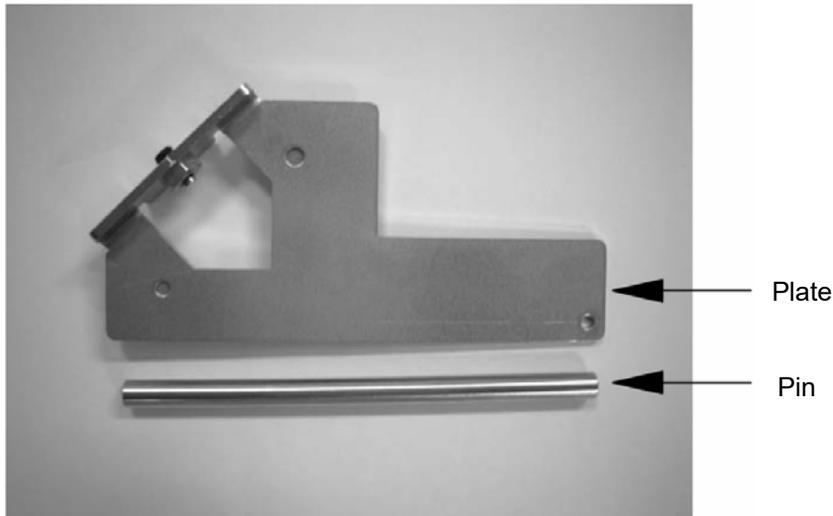


Fig. 13.146

Connect the cables for the robot, controller and teaching pendant to enable operation from the teaching pendant.

Before proceeding, be sure to confirm that the EMG switch operates properly.

Warning

- Carrying out any inspection or maintenance work without fully understanding the work may result in serious injury.
- Put up a sign that says “Work in Progress” so as to prevent other operators from accidentally operating the controller, operation panel, etc.
- Back up the parameters before the ball-screw spline adjustment.

- [2] Starting the Ball-screw Spline Adjustment Window
- (1) Start the ball-screw spline adjustment window from the PC software.

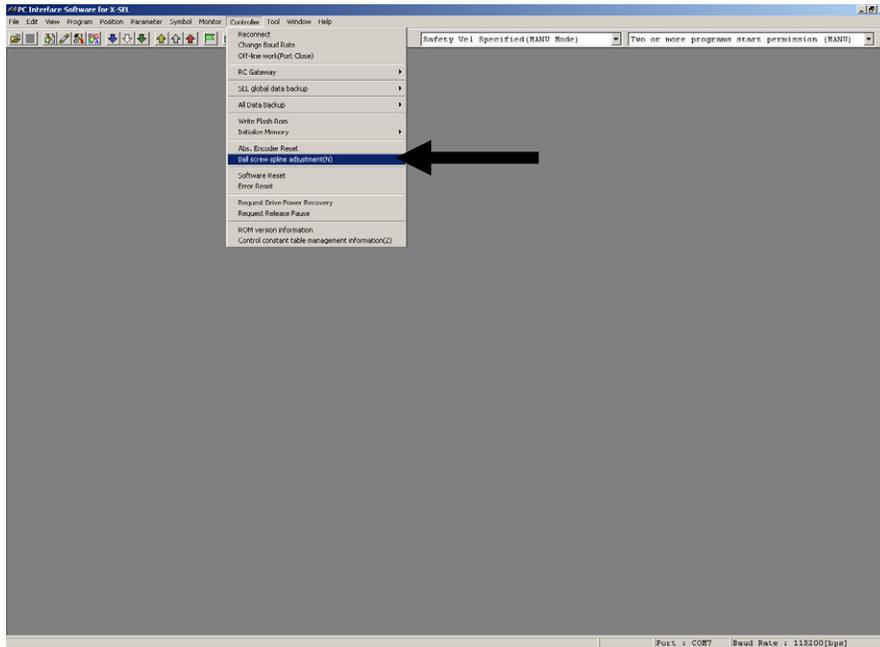


Fig. 13.147 Ball-screw Spline Adjustment Window Launching Operation

- (2) The ball-screw spline adjustment window starts.
When a "Lnr. Axis No. (linear movement axis number)" is selected, "Rot. Axis No. (Rotational Movement Axis Number) (Mating Axis Number)" and "Encoder Type" are displayed.

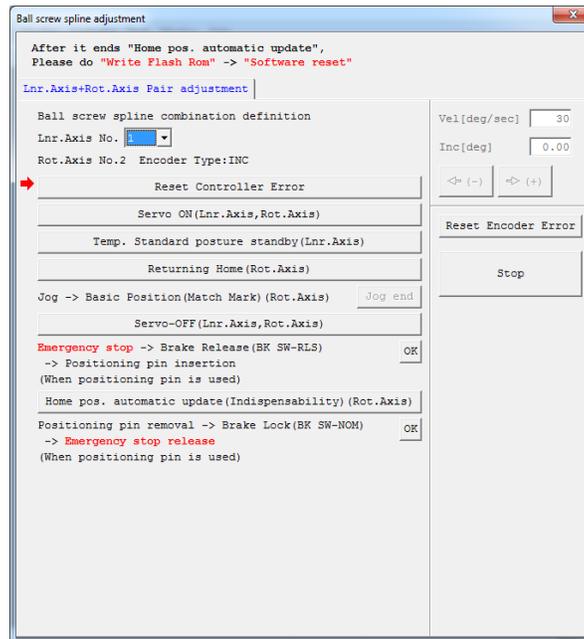


Fig. 13.148 Ball-screw Spline Adjustment Window

[3] Ball-screw Spline Adjustment Procedure

For ball-screw spline adjustment for the ZR unit, a series of operations of the up/down axis and rotary axis is performed. Since the adjustment procedure includes items that require robot operation, confirm the range of operation of the actuator, absence of obstructions, etc., to make sure the robot can be operated.

- (1) Select a "Lnr. Axis No. (linear movement axis number)" which will be used to perform a ball-screw spline adjustment).

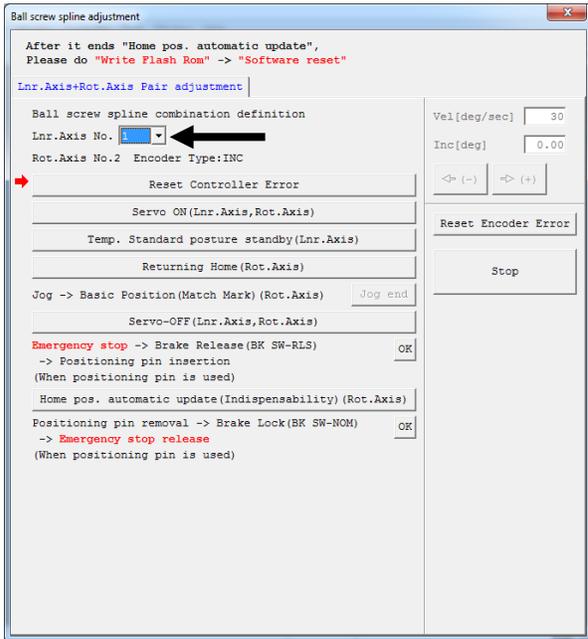


Fig. 13.149 Linear Movement Axis Number Selection Operation

- (2) Click the [Reset Controller Error] button.

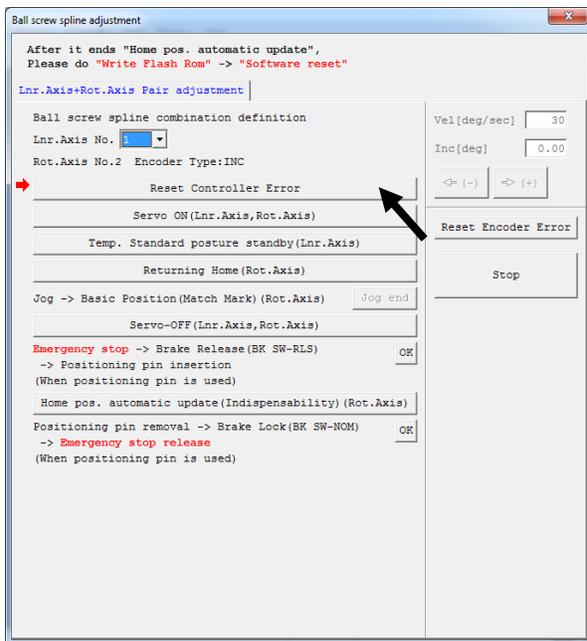


Fig. 13.150 Controller Error Reset Operation

(3) Click the [Servo ON (Lnr. Axis, Rot. Axis)] button.

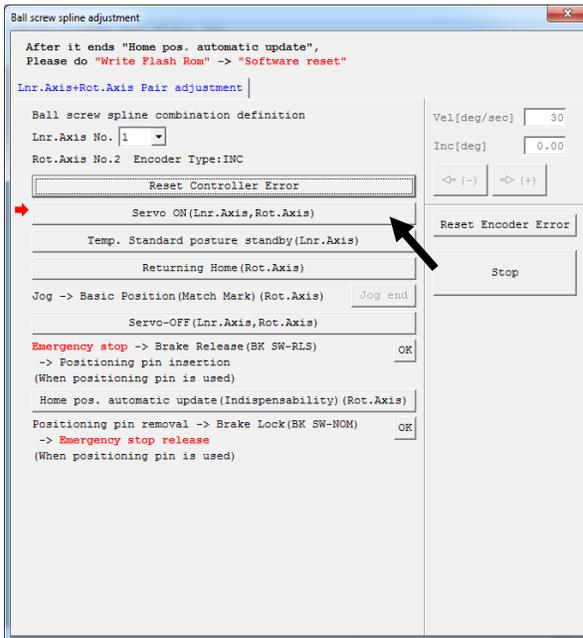


Fig. 13.151 Servo ON Operation

(4) Click the [Temp. Standard posture standby (Lnr. Axis)] button.

Note: Up-down axis will have a home-return operation.

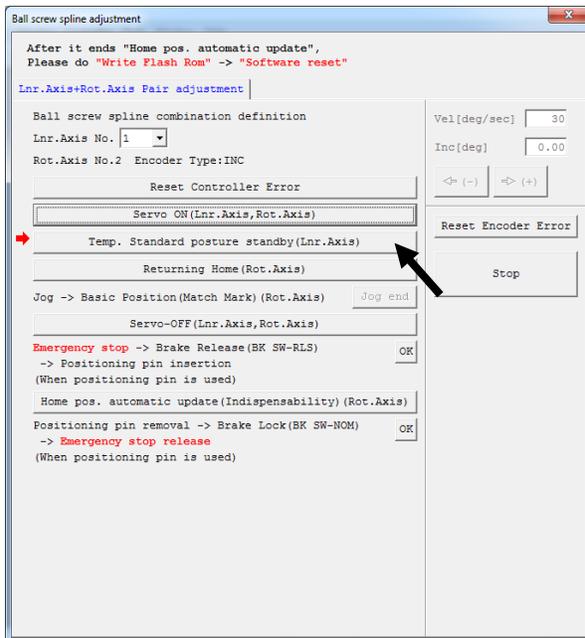


Fig. 13.152 Tentative Reference Posture Operation

(5) Click on “Returning Home (Rot. Axis)” button.

Note: Rotary axis starts home-return operation.

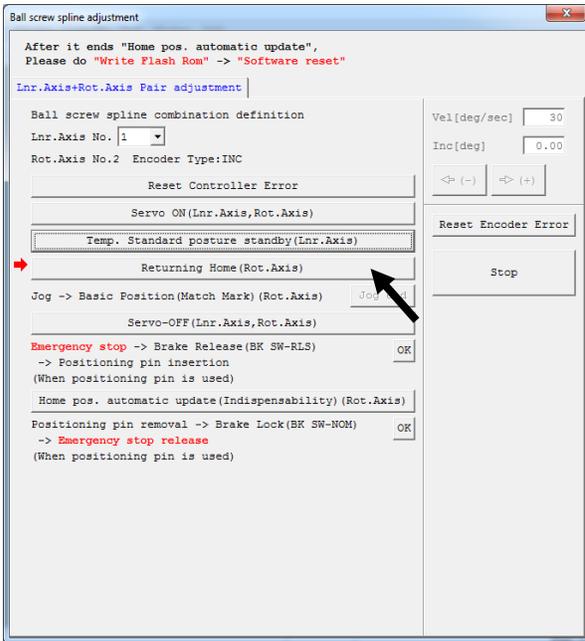


Fig. 13.153 Home-Return Operation

(6) Jog the rotational movement axis to the reference posture position (refer to the illustration of reference posture), and then click the [Jog end] button.

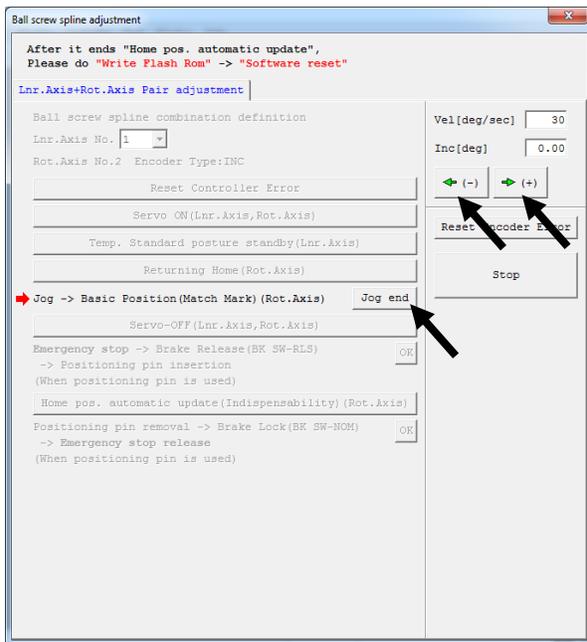
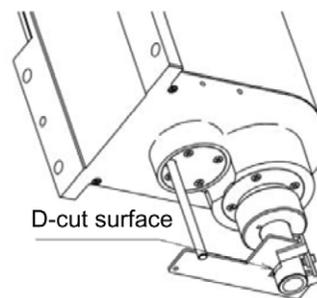


Fig. 13.154 Jogging

Illustration of reference



(7) Click the [Servo-OFF (Lnr. Axis, Rot. Axis)] button.

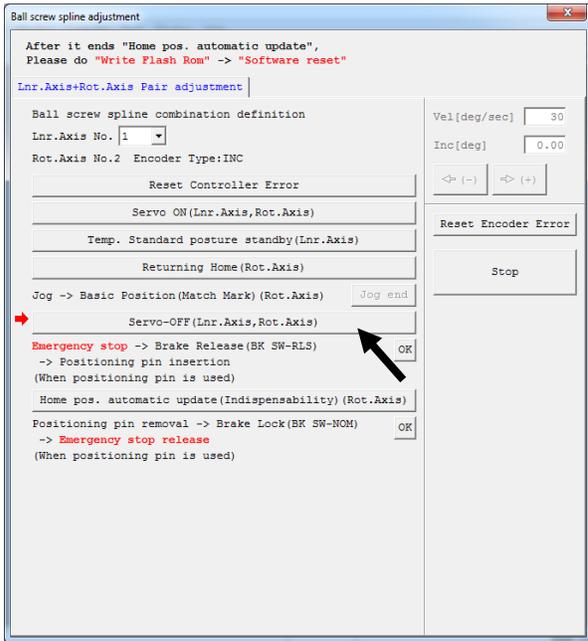
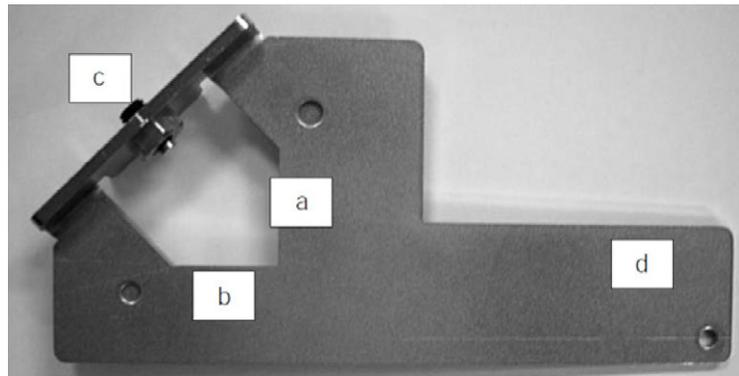
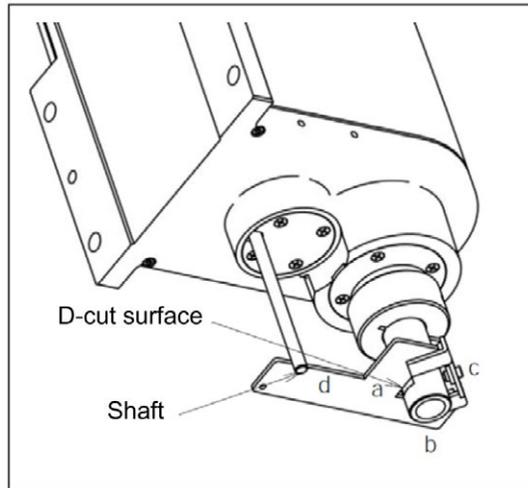


Fig. 13.155 Servo OFF Operation

- (8) Press the emergency stop switch (emergency stop button on the PC cable).
- (9) Release the brake. Release the brake using the switch on the controller side.

Jig Installation method



- [1] Insert the ball-screw spline into the hole in the jig from below.
- [2] Cause the D-cut surface of the ball-screw spline to contact the surface a.
- [3] Cause the side surface of the ball-screw spline to contact the surface b.
- [4] Tighten the screw c to secure the jig onto the ball-screw spline.
 - * At this time, confirm that the adjustment jig is vertical to the ball-screw spline and that the D-cut surface and surface a are firmly in contact.
 - * Applicable screw: Hexagonal socket head setscrew M5
 - * Tightening torque: 20 [N·cm] (reference)
- [5] Insert the supplied shaft into the hole in the ZR unit.
 - * Exercise caution because the shaft will come off if the hand is released.
- [6] Turn the ball-screw spline until the supplied shaft contacts lightly with the surface d of the jig.

Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.

(10) Click the [OK] button.

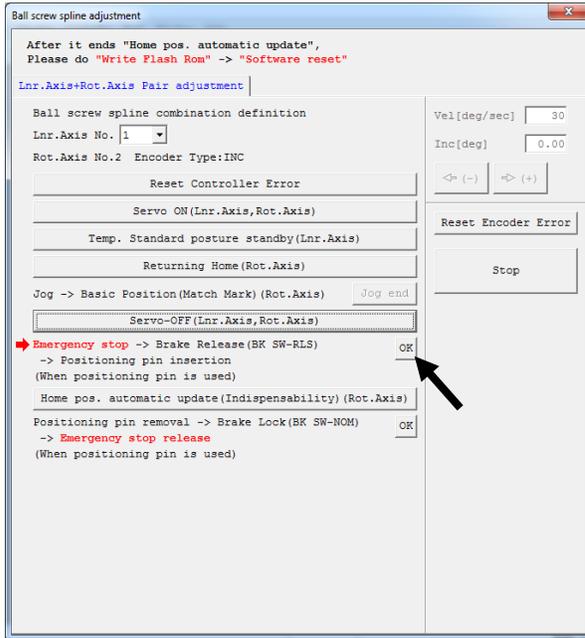


Fig. 13.156 Adjustment Jig Installation Confirmation Screen Operation

(11) Click the [Home pos. automatic update (Indispensability) (Rot. Axis)] button.

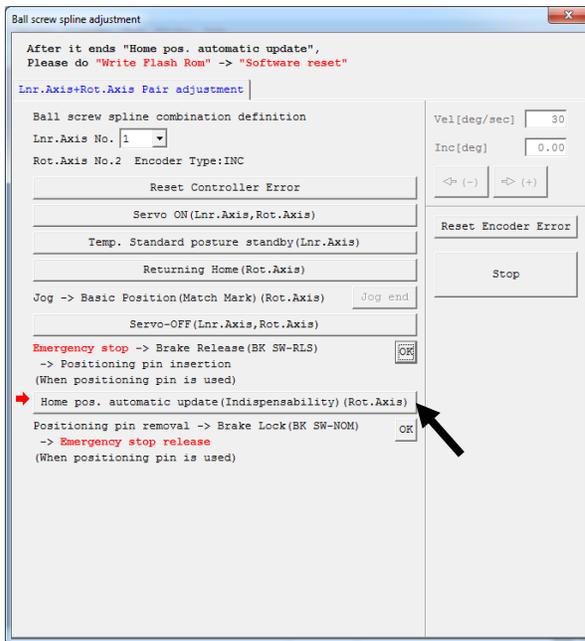


Fig. 13.157 Home Position Automatic Update Operation

- (12) Remove the adjustment tool.
- (13) Lock the brake (on the front panel of the controller).
- (14) Cancel the emergency stop (by releasing the emergency stop button on the PC cable).

(15) Click the [OK] button, and then click “x” in the top right-hand corner of the window to close the window.

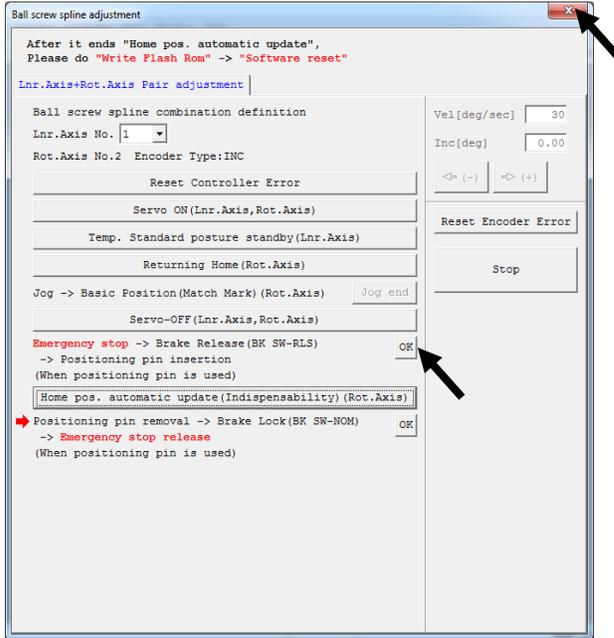


Fig. 13.158 Adjustment Jig Removal Confirmation Operation

(16) Closing the ball-screw spline adjustment window following the ball-screw spline adjustment opens the following screen. Click the [Yes] button.

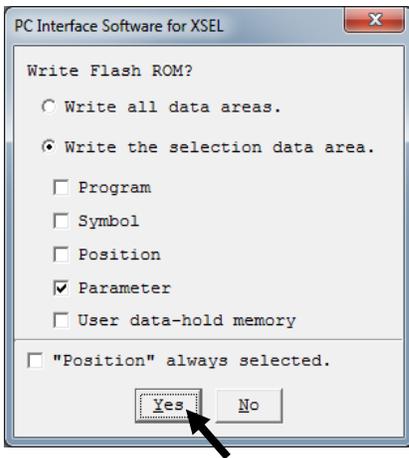


Fig. 13.159 Confirmation

(17) When all data has been written to the flash ROM, the following screen appears. Click the [Yes] button.



Fig. 13.160 Confirmation

13.7 Simple absolute Unit for PSEL Controller (Option)

Perform an absolute reset for following conditions:

- Connect to PSEL controller after starting simple absolute unit
- Disconnect encoder cable of actuator from PSEL controller and reconnect them
- Error No. 41C “ABS unit encoder error (2)”, and Error No.41D “ABS unit encoder error (3)” has occurred
- Possible changes on home position, such as modifying home return and axis behavior related parameter (No.1,6,10,11,12,21,38,42,43,44,46,47,50,51,66,67,68, Driver parameter No.26)

Please follow the instructions below to perform Absolute Reset by using “PC Software for X-SEL”.

13.7.1 Instructions of Absolute Reset

- (1) Supply main power (DC24V) to controller and simple absolute unit.
If there is no adjustment item besides “ABS unit encoder error (2)”, 7 seg LED will display “E41C” when panel unit is connected.
- (2) Connect “PC Software for X- SEL” on online (Controller and PC with original connection cable).
- (3) [Connection confirmation] dialog box will appear on screen. Configure connection port to your PC, then click [OK] button. (Baud rate will be recognized automatically)

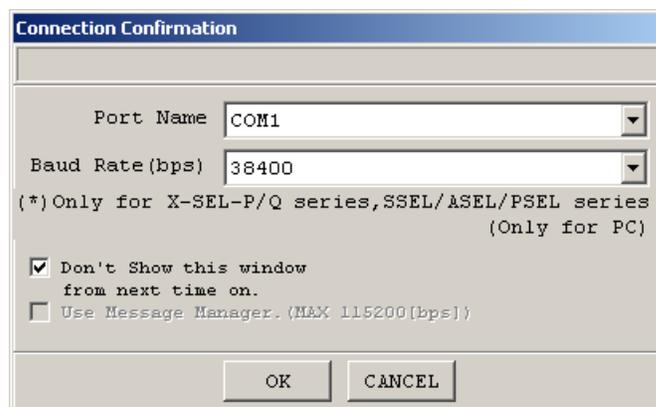


Fig. 13.161 Connection Confirmation Screen

- (4) “PC Software for X-Sel” dialog box will appear on screen. If an error is detected, error message will appear. This message will disappear by click “OK” button. In case of detection of “ABS unit encoder error (2)”, following error message will appear on screen.

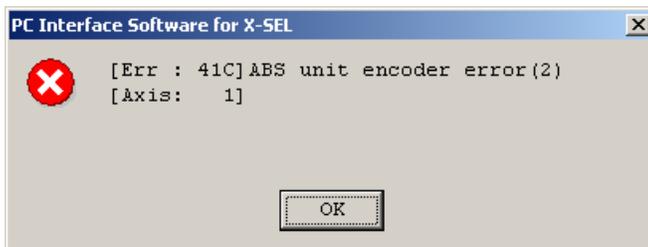


Fig. 13.162 ABS Unit Encoder Error Message

- (5) Current Error status can be checked by selecting [Monitor (M)] - [Error detail information (E)]. Following figure is an example of “ABS Unit Encoder Error (2)” (example of when using simple absolute unit as primary axis). Close dialog box window after checking error detail information.

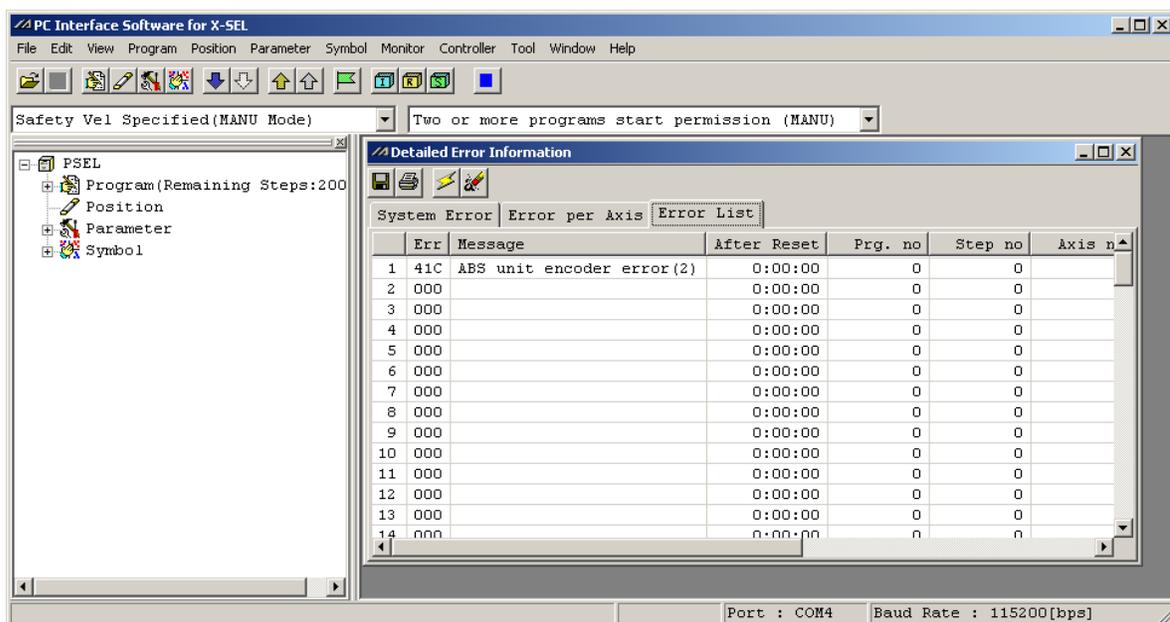


Fig. 13.163 Error Detail Information

- (6) Select Controller – Absolute reset from Menu.
- (7) [Warning] window will appear on screen. Click “OK” button.

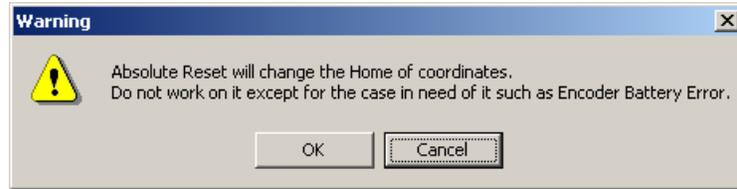


Fig. 13.164 Warning

- (8) [Abs. Encoder Reset] window will appear on screen.
Click [here](#) to select axis to perform Absolute reset.

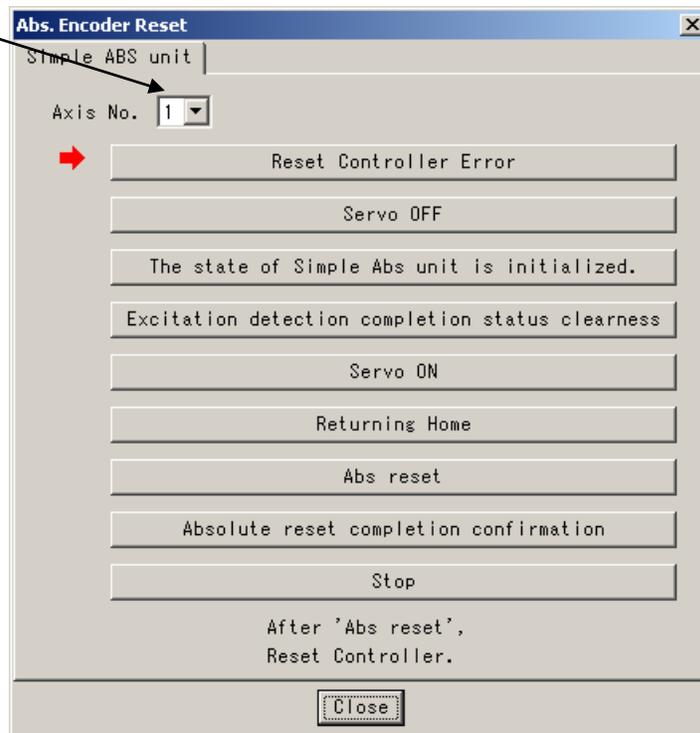


Fig. 13.165 Absolute Reset Window

- (9) Click following process button sequentially. When each processing finishes, red arrow will move to next process.
- [1] Controller error reset
 - [2] Servo OFF
 - [3] Simple ABS unit status reset
 - [4] Excitation detection completion status clear
 - [5] Servo ON
 - [6] Home return
 - [7] Absolute reset
 - [8] Absolute reset completion confirmation

After clicking [Simple ABS unit status reset] button, Warning dialog of starting absolute reset will appear. Click [Yes].



Fig. 13.166 Warning

Dialog will appear again to confirm. Click [Yes] to process.



Fig. 13.167 Warning

After finished processing [Absolute reset completion confirmation], red arrow will be back to normal display as same as (8). If there is another axis to perform absolute reset, select axis of symmetry here, then process from (8). To finish processing, click [close] button to close the [Absolute reset] window.

(Note) To process several axis absolute reset, finish process of (8) to (9) for all of axis before start proceeding "(10) Software reset" explained below.

- (10) [Confirmation] window of Software reset will appear on screen. Click [Yes] to restart controller.



Fig. 13.168 Confirmation

(Note) Software reset must be done after performing absolute reset.

- (11) If there is no error after restart, 7 seg LED will indicate "rdy" when panel unit is connected.
- (12) Absolute reset is completed.

13.8 IXA SCARA Axes

Conduct “Stopper Pressing Type Absolute Reset” if the motor was replaced.

→ Refer to 13.8.1 Stopper Pressing System Absolute Reset Operation.

In the following case, conduct “Stopper pressing position acquirement” before having the absolute reset. Do not execute it after it comes to a circumstance that requires the absolute reset. Have it done while the normal operation can be performed.

→ Refer to 13.8.2 Procedure for Stopper Pressing Position Acquirement Operation.

- When the absolute reset cannot be performed in the direction of the stopper interfering movement with the initial posture at the delivery from the factory due to such reasons as interference to the peripheral equipment.
- There was a change in the stopper position due to such reasons as a removal of the stopper of the vertical axis.

It is necessary to prepare tools shown below for “Stopper Pressing Type Absolute Reset” and “Stopper Pressing Position Acquirement” for the four-axis type.

Model	Model Code
IXA-4NNN1805	JG-IXA2
IXA-□NNN3015/□NSN3015 IXA-□NNN45□□/□NSN45□□ IXA-□NNN60□□/□NSN60□□	JG-IXA1

The procedure and displays of PC software screens of “Stopper Pressing Type Absolute Reset” and “Stopper Pressing Position Acquirement” are slightly different for three-axis and four-axis types.

3-axis Type	4-axis Type
IXA-3NNN1805	IXA-4NNN1805
IXA-3NNN3015/3NSN3015 IXA-3NNN45□□/3NSN45□□ IXA-3NNN60□□/3NSN60□□	IXA-4NNN3015/4NSN3015 IXA-4NNN45□□/4NSN45□□ IXA-4NNN60□□/4NSN60□□

In order to conduct the absolute reset, use the XSEL PC Software with its version V13.02.20.00 or later (version V13.02.24.00 or later for IXA-□NNN1805).

13.8.1 Stopper Pressing System Absolute Reset Operation

- 1) Backup the parameters so that they can be put back anytime to those before changing them. Select “Parameter” → “Edit” from PC Software Menu to show the Edit Parameter window. Press the “Save As” button in the Edit Parameter window to store the parameters in the file.

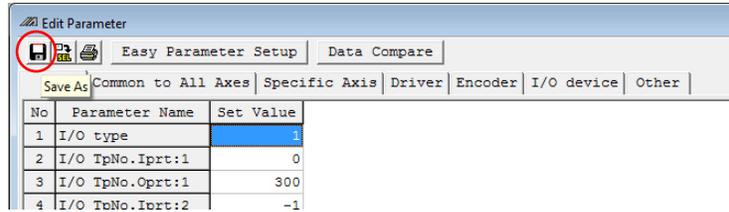


Fig. 13.169 Edit Parameter Window

- 2) Select “Controller” → “Abs. Encoder Reset(Scara)(Q)” → “Push type absolute reset” from the menu.

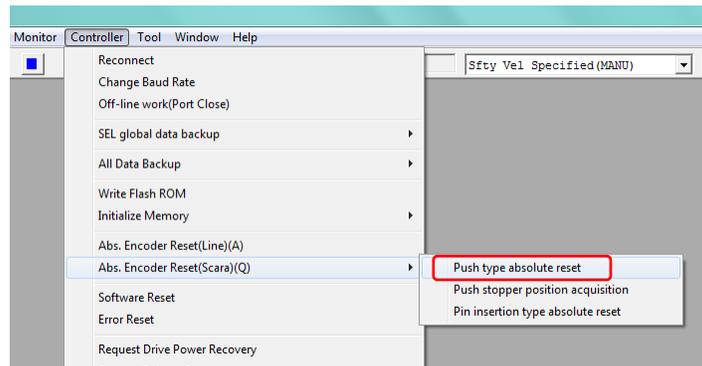


Fig. 13.170 Menu Select Window

- 3) A Confirmation window shows up. Click “Yes”.

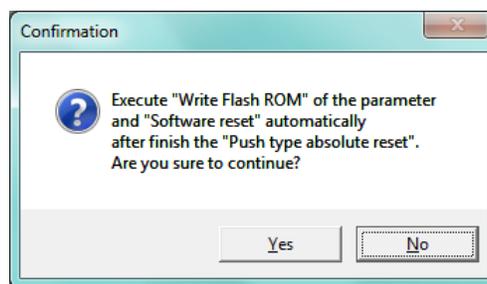


Fig. 13.171 Confirmation Window

[1] When Performing Stopper Pressing Type Absolute Reset to All Axes at Once
To have the push stopper type absolute reset for all the axes at once, follow the steps shown below.

1) Select "All axes".

* The screenshot shows the screen for the four-axis type. Some contents should not be displayed in the three-axis type.

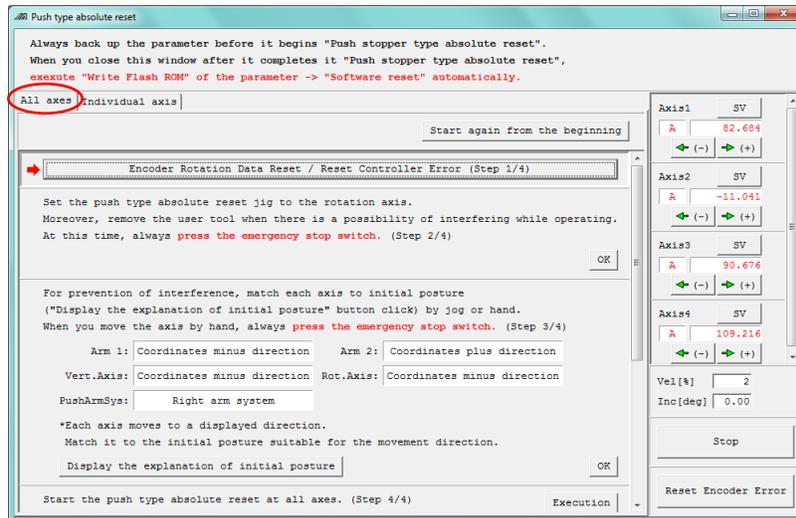


Fig. 13 172 Push Type Absolute Reset Window

2) Click "Encoder Rotation Data Reset / Reset Controller Error (Step 1/4)".

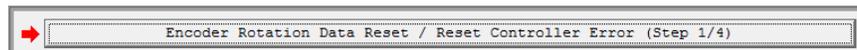


Fig. 13.173 Encoder Rotation Data Reset / Reset Controller Error

Attach the rotary axis pressing absolute reset tool for the four-axis type. (It is not necessary for the three-axis type.)

Have the work during the emergency stop condition.

Regarding the R-axis absolute reset tool, take off the spline cover, apply Jig (A) to the flat on the spline shaft and affix it to Jig (B) with screws. The position where Jig (A) is attached on the ball screw becomes the home position of the R-axis. Pay attention to the orientation of the flat surface on the spline shaft.

[For how to detach and attach the spline cover, refer to 4.6 How to Inspect Visually on Timing Belt for Vertical Axis and Rotary Axis in IXA SCARA Robot Instruction Manual (ME3776).]

[Models Except for IXA-4NNN1805]

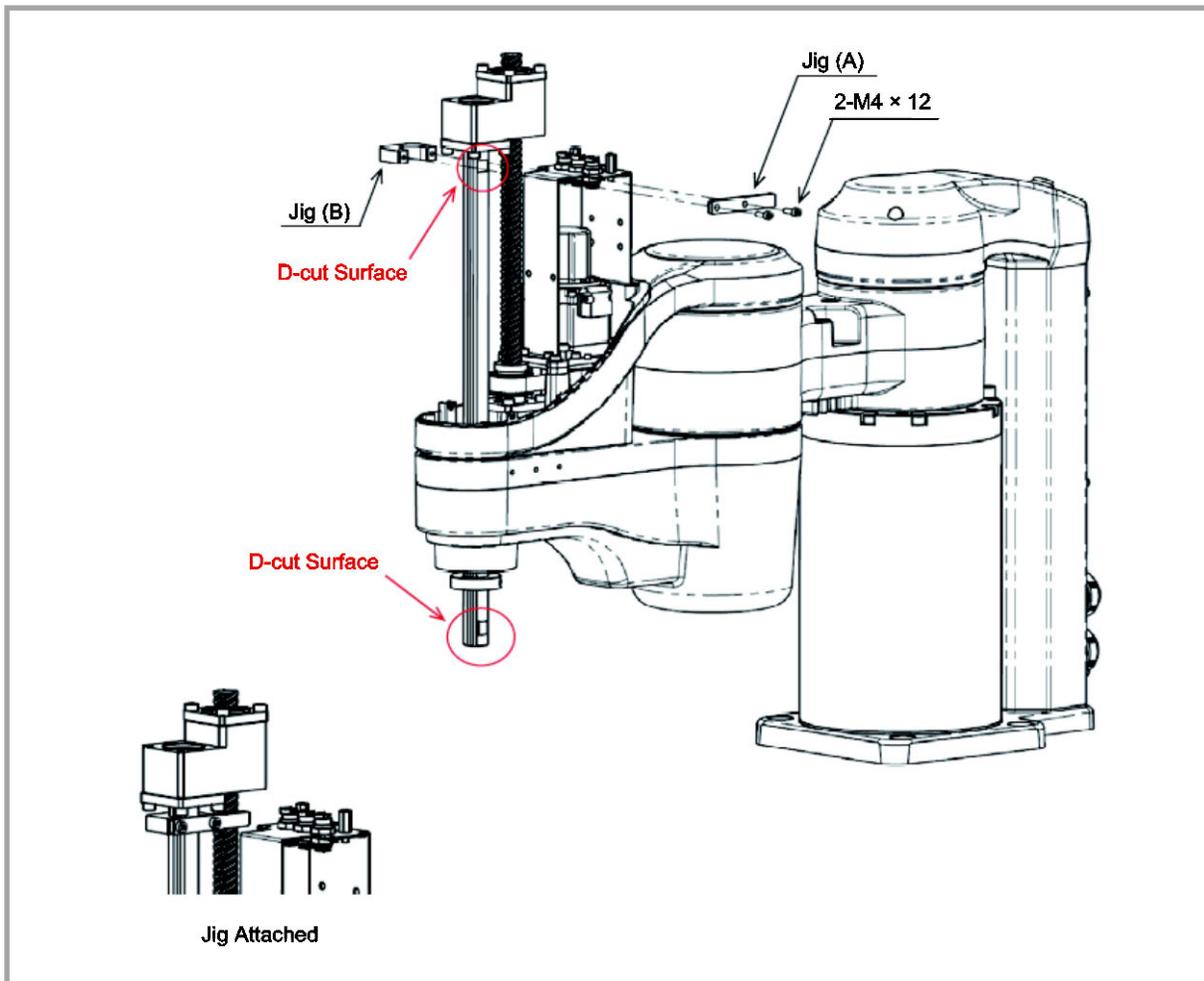


Fig. 13.174 Figure for Attaching Absolute Reset Jig

[IXA-4NNN1805]

Take off the J2 spline cover affixing screw (M3 × 25) on the bottom of the J2 main arm and attach Jig (C).
Align Jig (A) on the D-cut surface on the spline shaft and affix it with Jib (B) with screws.
The position where Jig (A) is attached on the ball screw becomes the home position of the R-axis. Pay attention to the orientation of the flat surface on the spline shaft.

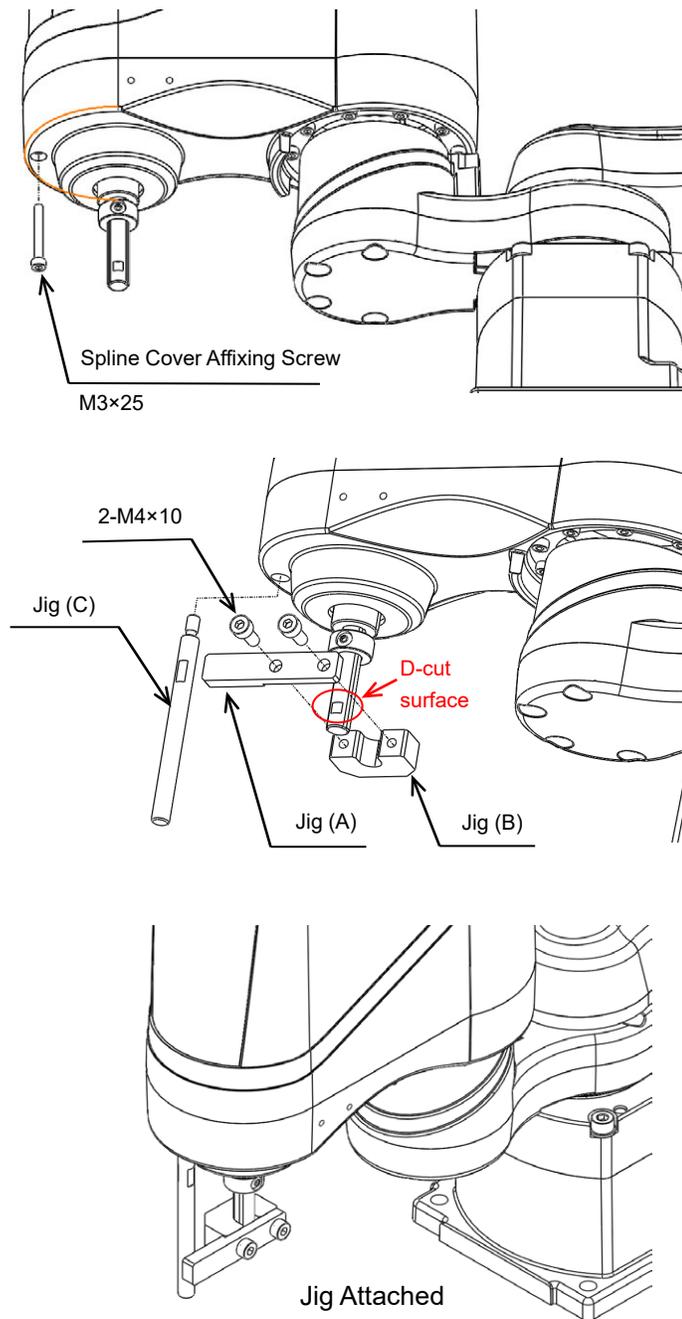


Fig. 13.175 Figure for Attaching Absolute Reset Jig

- 3) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load.
Have the work during the emergency stop condition. After the work is finished, click on the “OK” button.

<For 4-Axis Type>

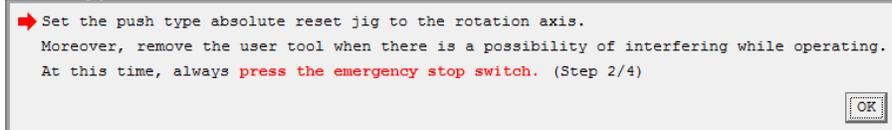


Fig. 13.176 Confirmation Window

<For 3-Axis Type>

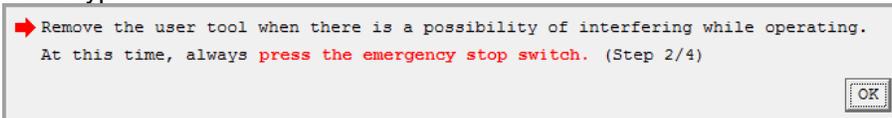


Fig. 13.177 Confirmation Window

- 4) By referring to the displayed movement direction for each axis, adjust the axes to the initial posture. The posture differs depending on the movement direction. Make sure the work is conducted with the emergency stop activated when moving the axes by hand. Click on the “OK” button after the work is finished.

<For 4-Axis Type>

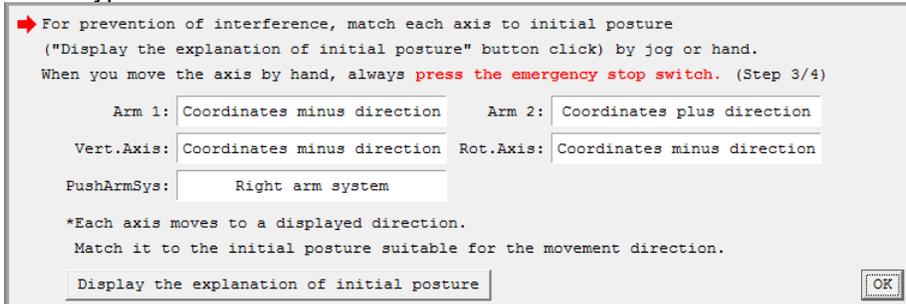


Fig. 13.178 Confirmation Window

<For 3-Axis Type>

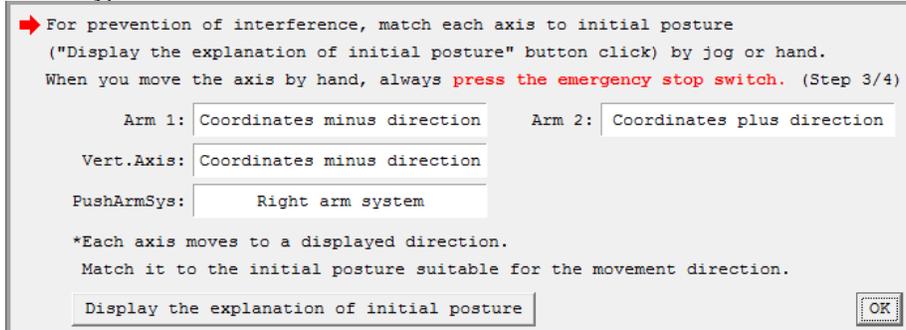


Fig. 13.179 Confirmation Window

[Initial posture]

◎ Arm1 and Arm 2

Considering the stopper pressing position, adjust the posture to either of right arm system or left arm system. When the product is delivered, it is set to the right arm system. Adjust to the right arm system. In case the arm interferes with the peripheral in the right arm system, set it to the left arm system in advance, conduct "stopper pressing position acquirement" and then adjust to the left arm system.

→ Refer to Procedure for Stopper Pressing Position Acquirement Operation.

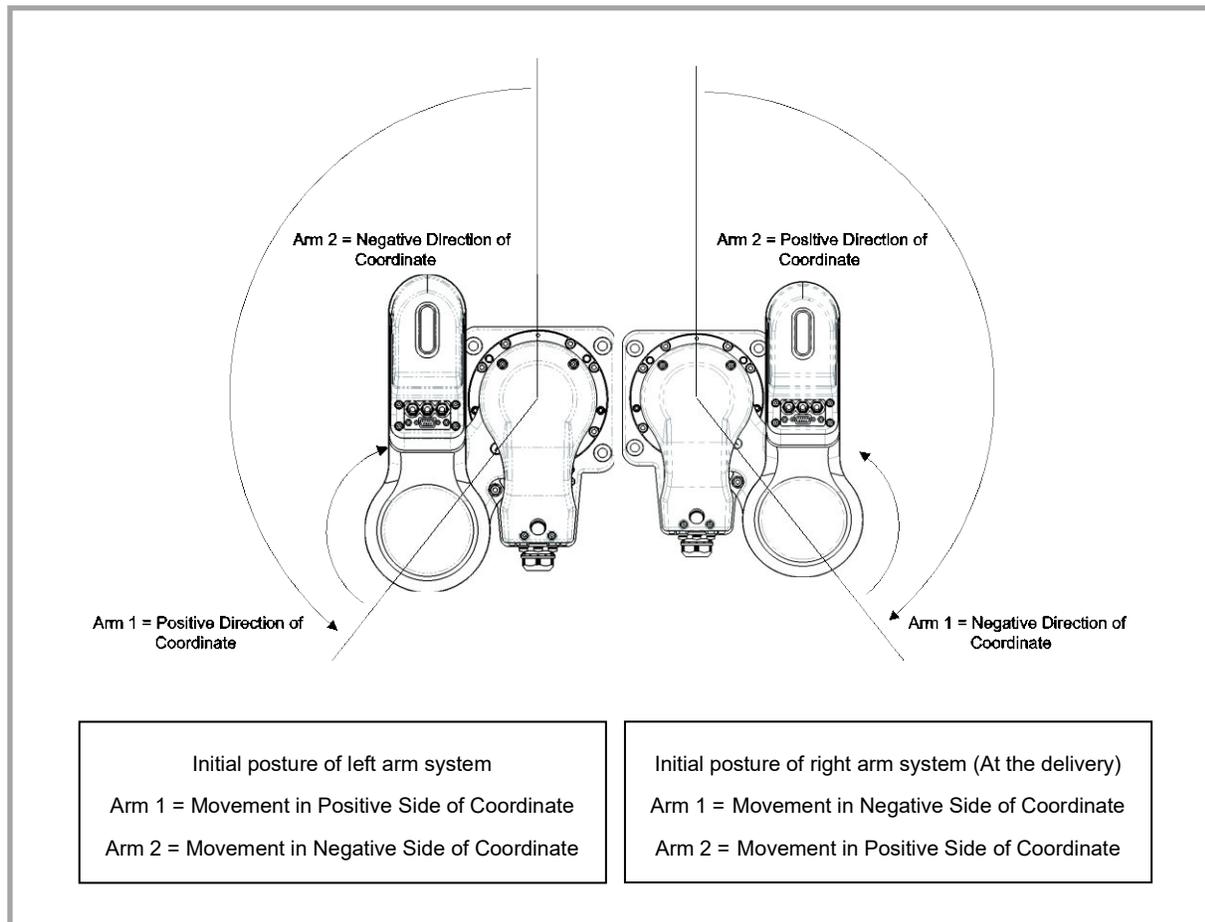


Fig. 13.180 Initial Posture

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D "Stopper Pressing Operation Start Position Error" may occur at operation.

[Initial posture]

◎ Vertical Axis

For the position, put it apart from the coordinate 0mm (upward end) for 10mm or more.

Setting it at 10mm or less, Error No. B0D “Stopper Pressing Operation Start Position Error” may occur at operation.

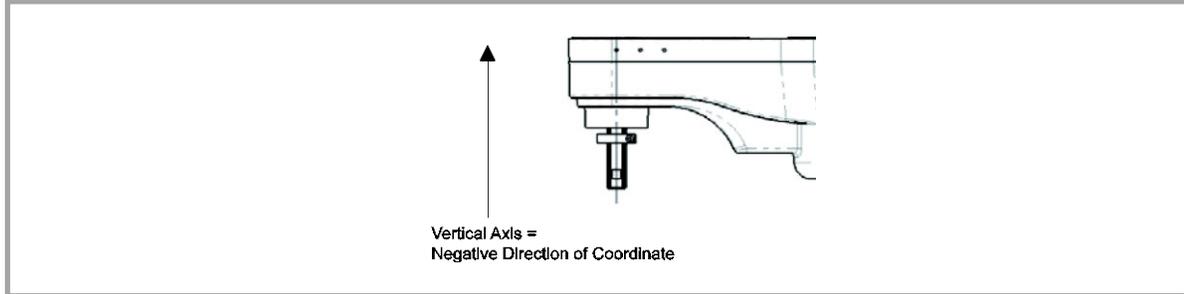


Fig. 13.181 Initial Posture

◎ Rotation Axis (For 4-Axis Type Only)

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D “Stopper Pressing Operation Start Position Error” may occur at operation.

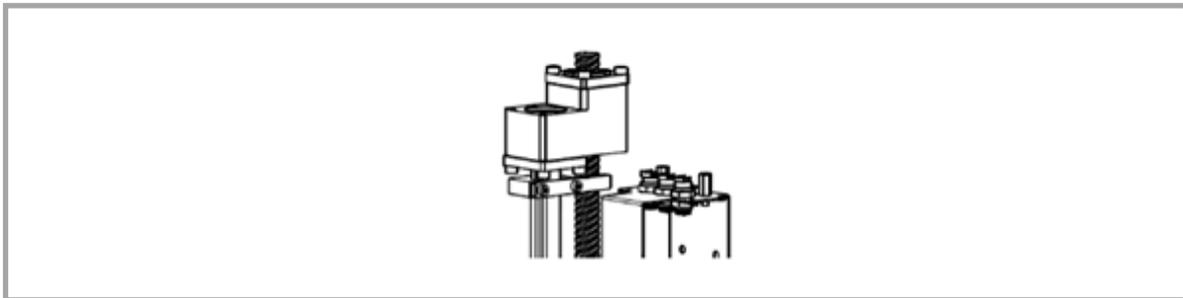


Fig. 13.182 Initial Posture

5) Click on the “Execution” button.

<For 4-Axis Type>

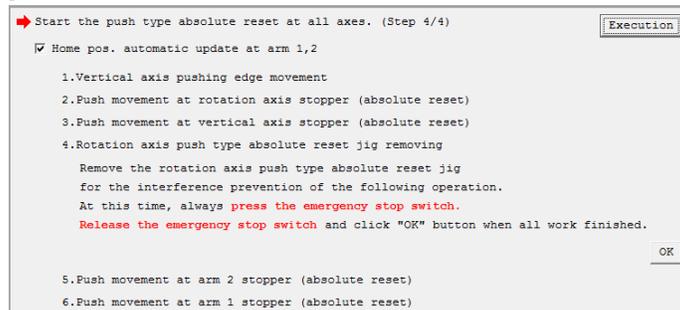


Fig. 13.183 Execution Window

<For 3-Axis Type>

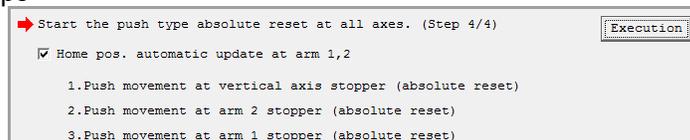


Fig. 13.184 Execution Window

- 6) A Warning window shows up. Click on the “Yes”. Each operation for the push type absolute reset starts.

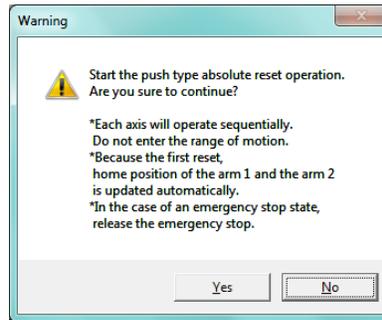


Fig. 13.185 Warning Window

- 7) For the four-axis type, press Execute and proceed to “Removing”, and then take off the rotary axis pressing absolute reset jig. At this time, make sure the work is conducted with the emergency stop activated. Click on the “OK” button after the work is finished.

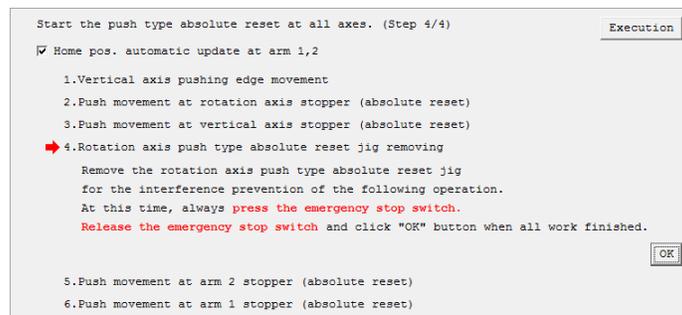


Fig. 13.186 Jig Removing Window

- 8) For the four-axis type, a warning window will be displayed. Click “Yes”. The stopper pressing system absolute reset operation will be resumed.

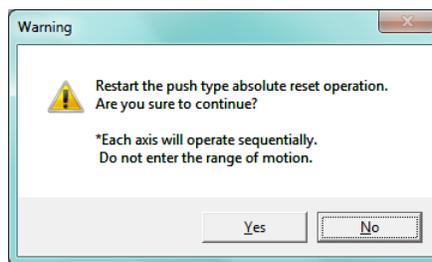


Fig. 13.187 Warning Window

- 9) Once the push type absolute reset for all the axes is finished, the Information window will appear. Click “OK” button.

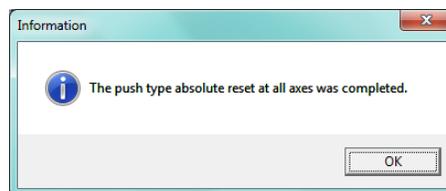


Fig. 13.188 Information Window

- 10) Close the Push stopper position acquisition window by clicking “x” on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.

[2] When Performing Stopper Pressing Type Absolute Reset on Each Axis One by One
To have the push stopper type absolute reset for each axis one by one, follow the steps shown below.

(1) 1st Arm and 2nd Arm

- 1) Select "Individual axis" in the Push type absolute reset window, and set Axis to "Arm 1" (or Arm 2).
* The screenshot shows the screen for the four-axis type. Some contents should not be displayed in the three-axis type.

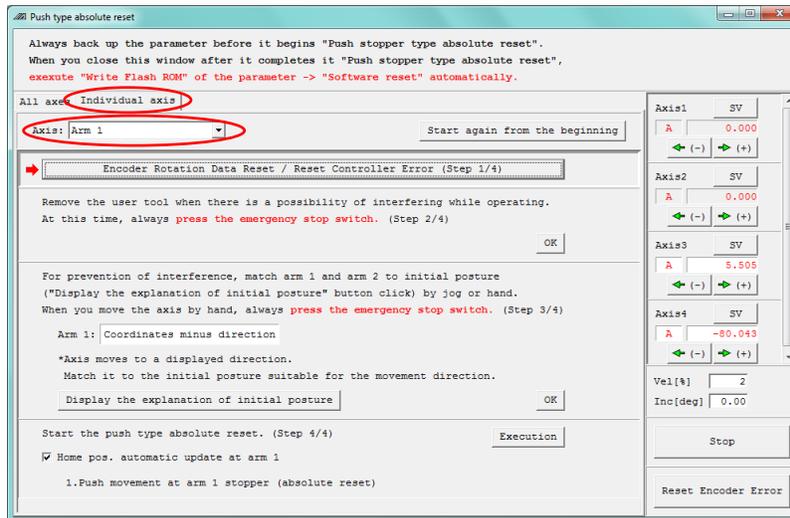


Fig. 13.189 Push Type Absolute Reset Window

- 2) Click "Encoder Rotation Data Reset / Reset Controller Error (Step 1/4)".



Fig. 13.190 Encoder Rotation Data Reset / Reset Controller Error

- 3) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. Have the work during the emergency stop condition. After the work is finished, click on the "OK" button.

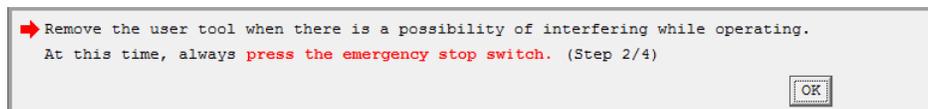


Fig. 13.191 Confirmation Window

- 4) By referring to the displayed movement direction for each axis, adjust the axes to the initial posture. The posture differs depending on the movement direction. Click on "Display the explanation of initial posture" to check the explanations. Make sure to work on with the emergency stop activated when moving the axes with hand. Click on the "OK" button after the work is finished.

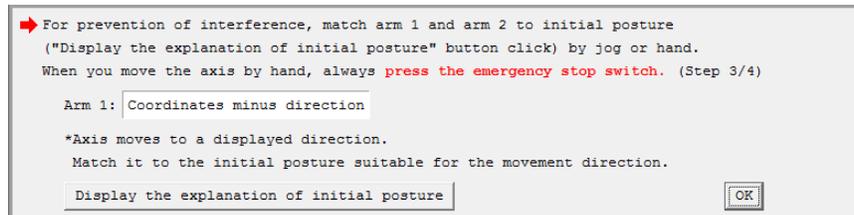


Fig. 13.192 Confirmation Window

[Initial posture]

◎ Arm 1 and Arm 2

Considering the stopper pressing position, adjust the posture to either of right arm system or left arm system. When the product is delivered, it is set to the right arm system. Adjust to the right arm system. In case the arm interferes with the peripheral in the right arm system, set it to the left arm system in advance, conduct "stopper pressing position acquirement" and then adjust to the left arm system.

→ Refer to Procedure for Stopper Pressing Position Acquirement Operation.

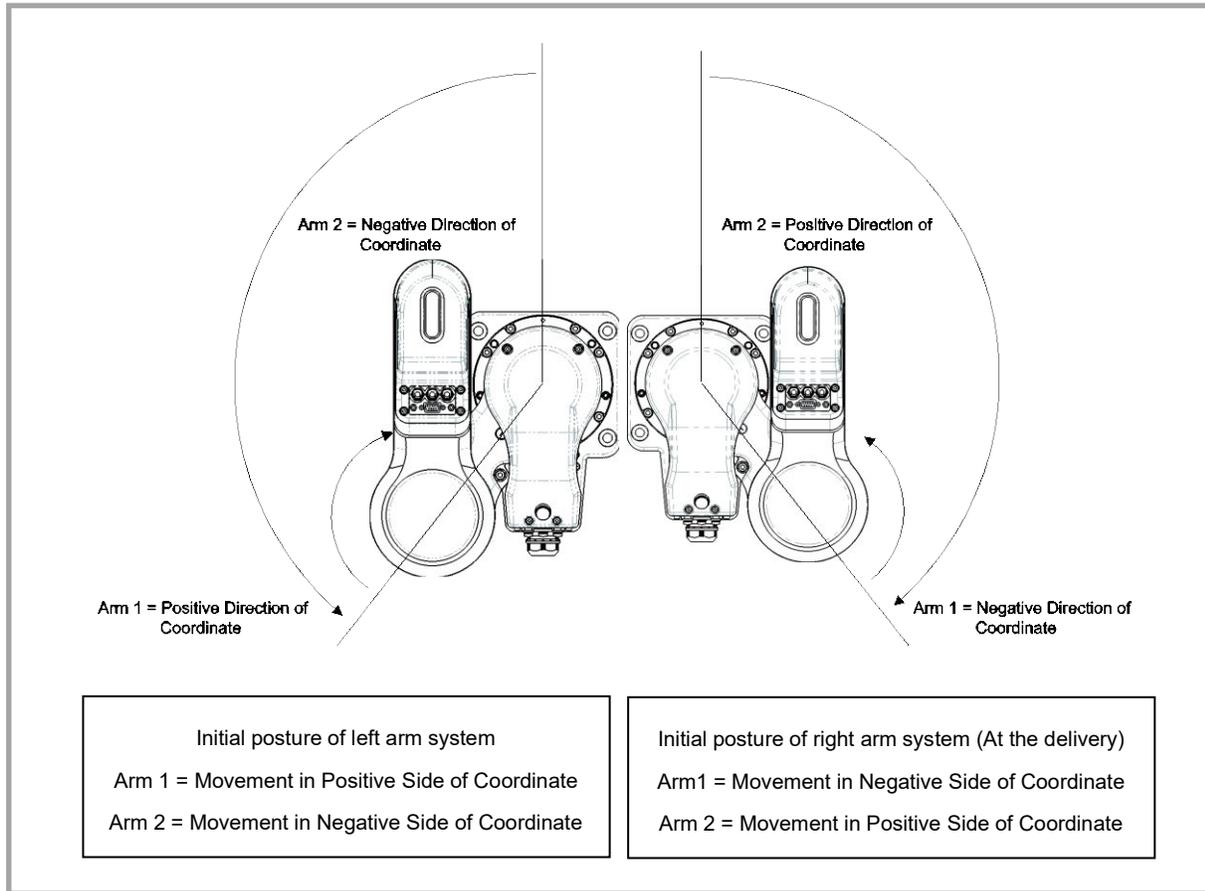


Fig. 13.193 Initial Posture

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D "Stopper Pressing Operation Start Position Error" may occur at operation.

- 5) Click on the “Execution” button.

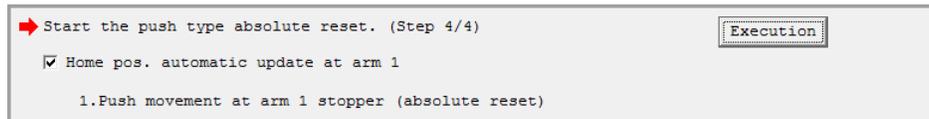


Fig. 13.194 Execution Window

- 6) A Warning window shows up. Click on the “Yes”. Each operation for the push type absolute reset starts.

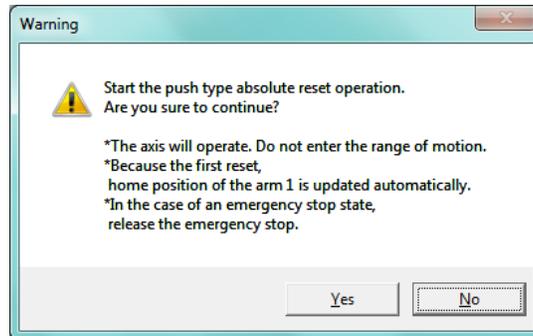


Fig. 13.195 Warning Window

- 7) Once the push type absolute reset, the Information window will appear. Click “OK” button.

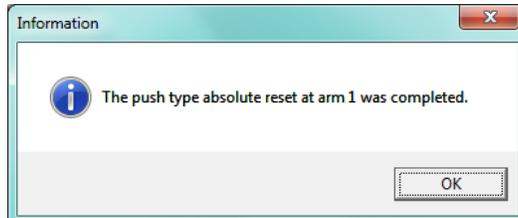


Fig. 13.196 Information Window

- 8) If it is necessary to have the push type absolute reset for another axis, move on to the axis selection. When finishing the process, click “x” on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.

(2) Vertical Axis and Rotation Axis

- 1) Select "Individual axis" in the Push type absolute reset window, and select "Vert. Axis + Rot. Axis" for the four-axis type and "Vert. Axis" for the three-axis type.
 * The screenshot shows the screen for the four-axis type.
 Some contents should not be displayed in the three-axis type.

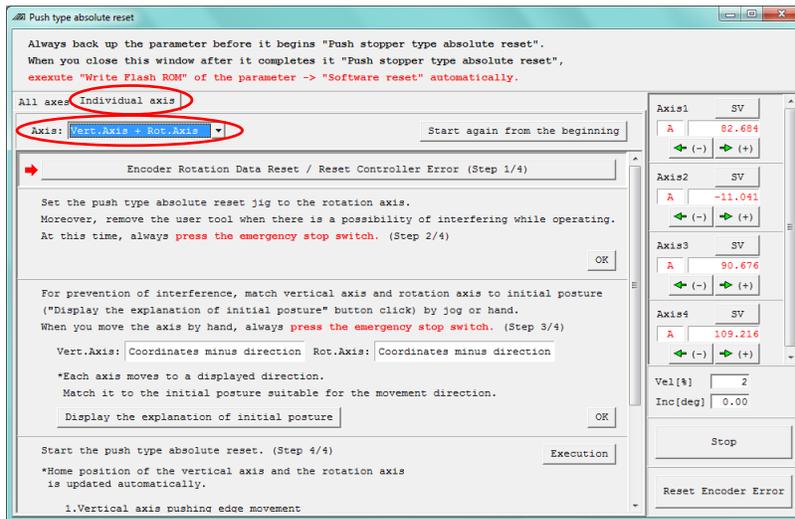


Fig. 13.197 Push Type Absolute Reset Window

- 2) Click "Encoder Rotation Data Reset / Reset Controller Error (Step 1/4)".



Fig. 13.198 Encoder Rotation Data Reset / Reset Controller Error

Attach the rotary axis pressing absolute reset tool for the four-axis type. (It is not necessary for the three-axis type.)

Have the work during the emergency stop condition.

Regarding the R-axis absolute reset tool, take off the spline cover, apply Jig (A) to the flat on the spline shaft and affix it to Jig (B) with screws. The position where Jig (A) is attached on the ball screw becomes the home position of the R-axis. Pay attention to the orientation of the flat surface on the spline shaft.

[For how to detach and attach the spline cover, refer to 4.6 How to Inspect Visually on Timing Belt for Vertical Axis and Rotary Axis in IXA SCARA Robot Instruction Manual (ME3776).]

[Models Except for IXA-4NNN1805]

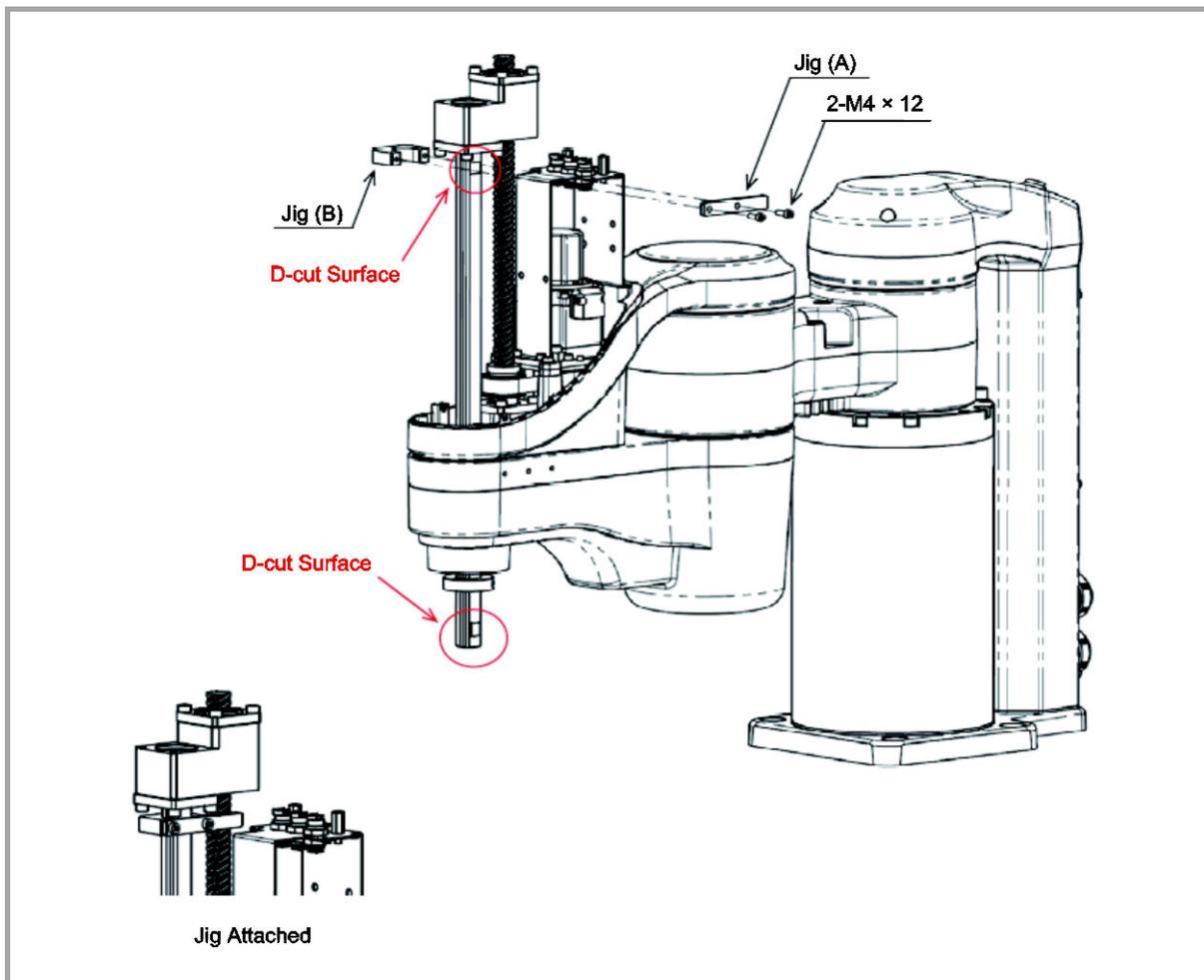


Fig. 13.199 Figure for Attaching Absolute Reset Jig

[IXA-4NNN1805]

Take off the J2 spline cover affixing screw (M3 × 25) on the bottom of the J2 main arm and attach Jig (C).
Align Jig (A) on the D-cut surface on the spline shaft and affix it with Jib (B) with screws.
The position where Jig (A) is attached on the ball screw becomes the home position of the R-axis. Pay attention to the orientation of the flat surface on the spline shaft.

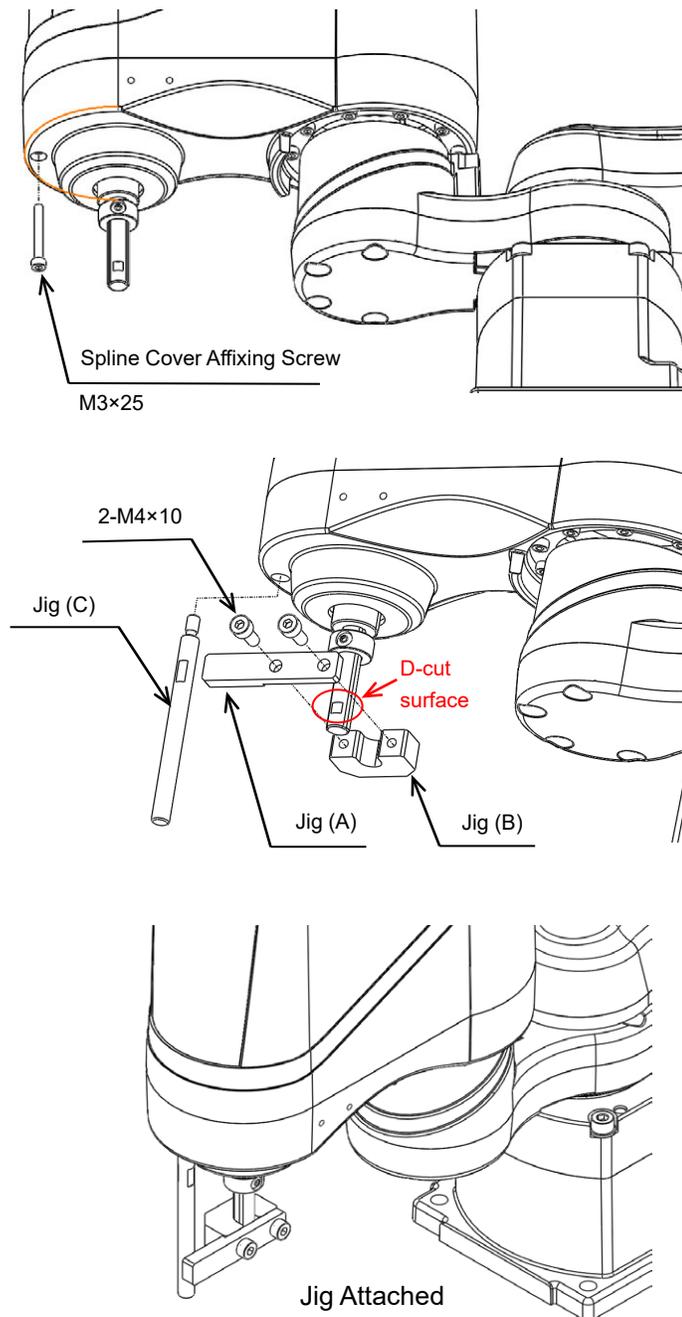


Fig. 13.200 Figure for Attaching Absolute Reset Jig

- 3) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. Have the work during the emergency stop condition. After the work is finished, click on the "OK" button.

<For 4-Axis Type>

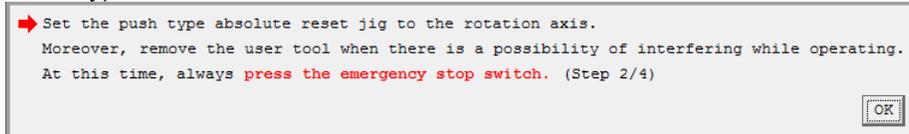


Fig. 13.201 Confirmation Window

<For 3-Axis Type>

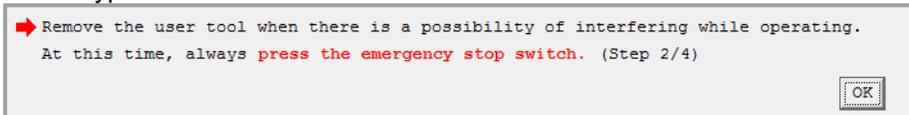


Fig. 13.202 Confirmation Window

- 4) By referring to the displayed movement direction for each axis, adjust the axes to the initial posture. The posture differs depending on the movement direction. Click on "Display the explanation of initial posture" to check the explanations. Make to work on with the emergency stop activated when moving the axes with hand. Click on the "OK" button after the work is finished.

<For 4-Axis Type>

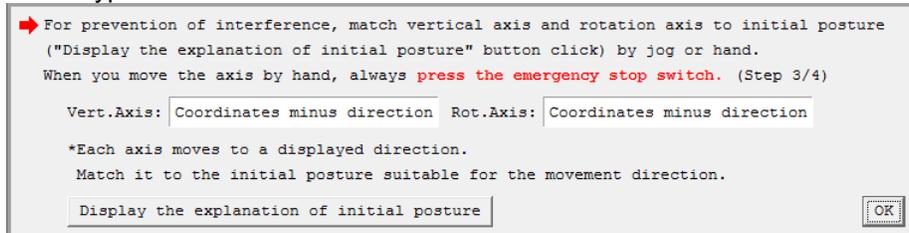


Fig. 13.203 Confirmation Window

<For 3-Axis Type>

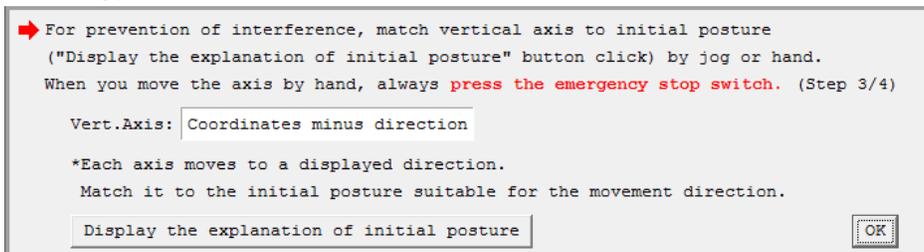


Fig. 13.204 Confirmation Window

[Initial posture]

◎ Vertical Axis

For the position, put it apart from the coordinate 0mm (upward end) for 10mm or more.

Setting it at 10mm or less, Error No. B0D “Stopper Pressing Operation Start Position Error” may occur at operation.

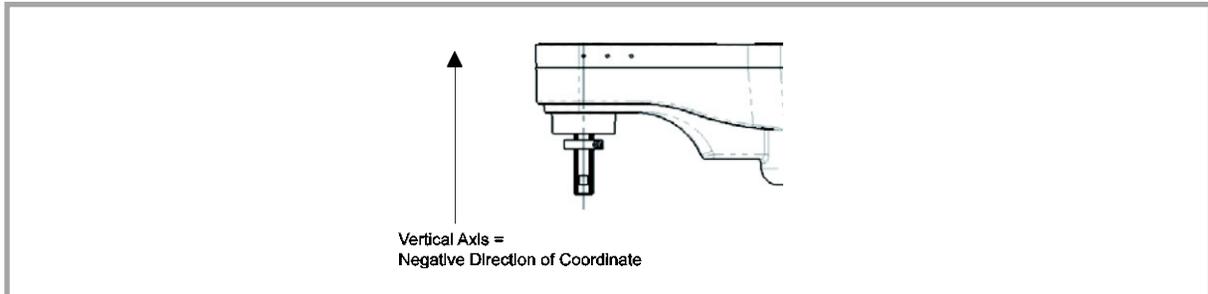


Fig. 13.205 Initial Posture

◎ Rotation Axis (For 4-Axis Type Only)

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D “Stopper Pressing Operation Start Position Error” may occur at operation.

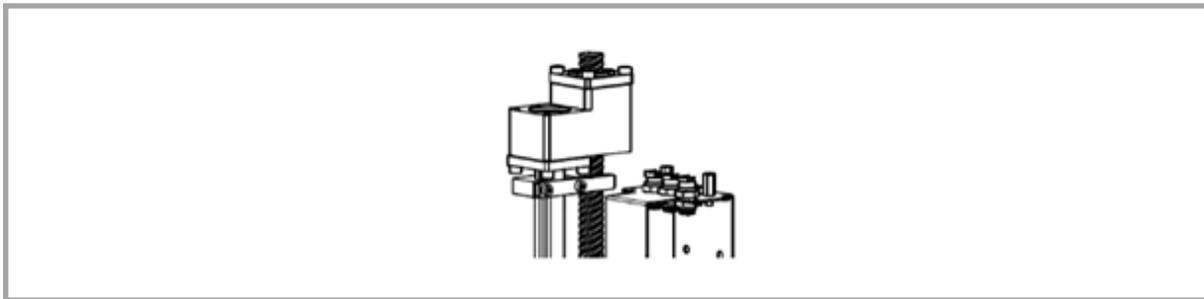


Fig. 13.206 Initial Posture

5) Click “Execution” button.

<For 4-Axis Type>

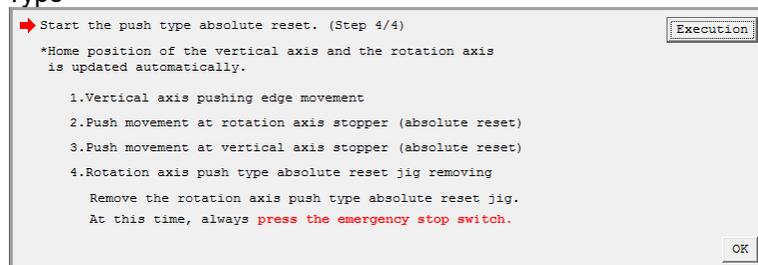


Fig. 13.207 Execution Window

<For 3-Axis Type>

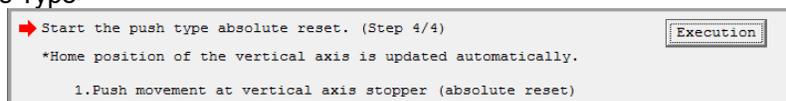


Fig. 13.208 Execution Window

- 6) A Warning window shows up. Click “Yes”. The operation for the push type absolute reset starts.

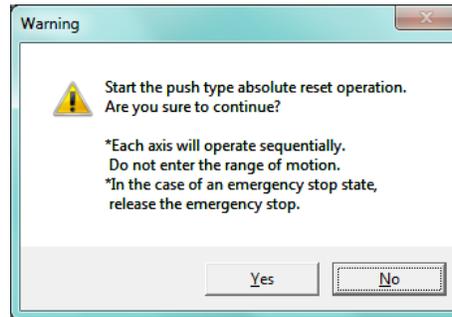


Fig. 13.209 Warning Window

- 7) For the four-axis type, press Execute and proceed to “Removing”, and then take off the rotary axis pressing absolute reset jig. At this time, make sure the work is conducted with the emergency stop activated. Click on the “OK” button after the work is finished.

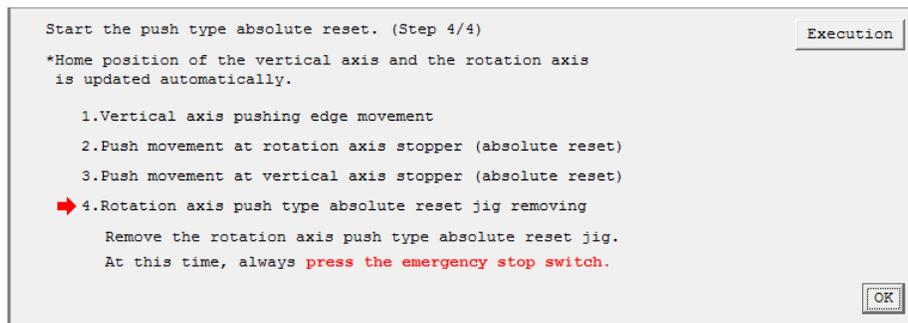


Fig. 13.210 Jig Removing Window

- 8) Once the push type absolute reset for the axis is complete, the information window will appear. Click “OK” button.

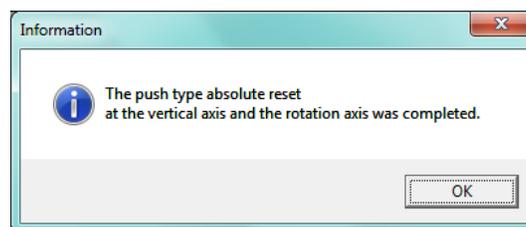


Fig. 13.211 Information Window

- 9) When finishing the process, click “x” on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.

13.8.2 Procedure for Stopper Pressing Position Acquisition Operation

In the following case, conduct “Stopper pressing position acquisition (Note 1)” before having the absolute reset.

- When the absolute reset cannot be performed in the direction of the stopper interfering movement with the initial posture at the delivery from the factory due to such reasons as interference to the peripheral equipment
- There was a change in the stopper position due to such reasons as a removal of the stopper of the vertical axis

Note 1 In case that the absolute reset cannot be performed with the stopper pressing movement direction of the initial posture set at the delivery due to such as interference with peripheral devices, change the setting to the initial posture of the left arm system (stopper pressing direction on opposite side) and conduct the stopper pressing position acquisition.

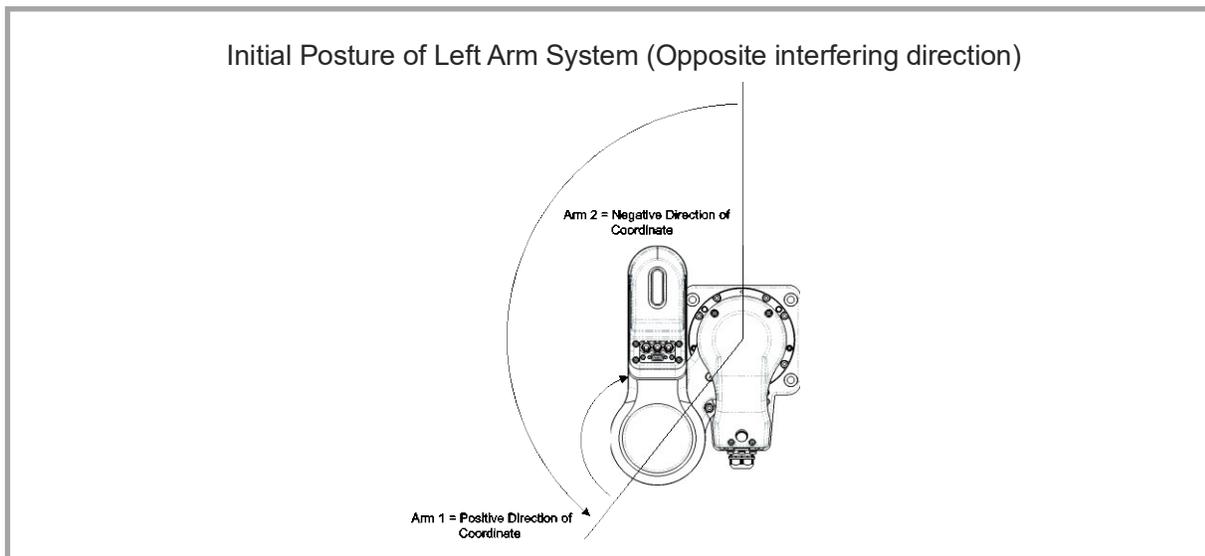


Fig. 13.212 Initial Posture of Left Arm System

(Reference)

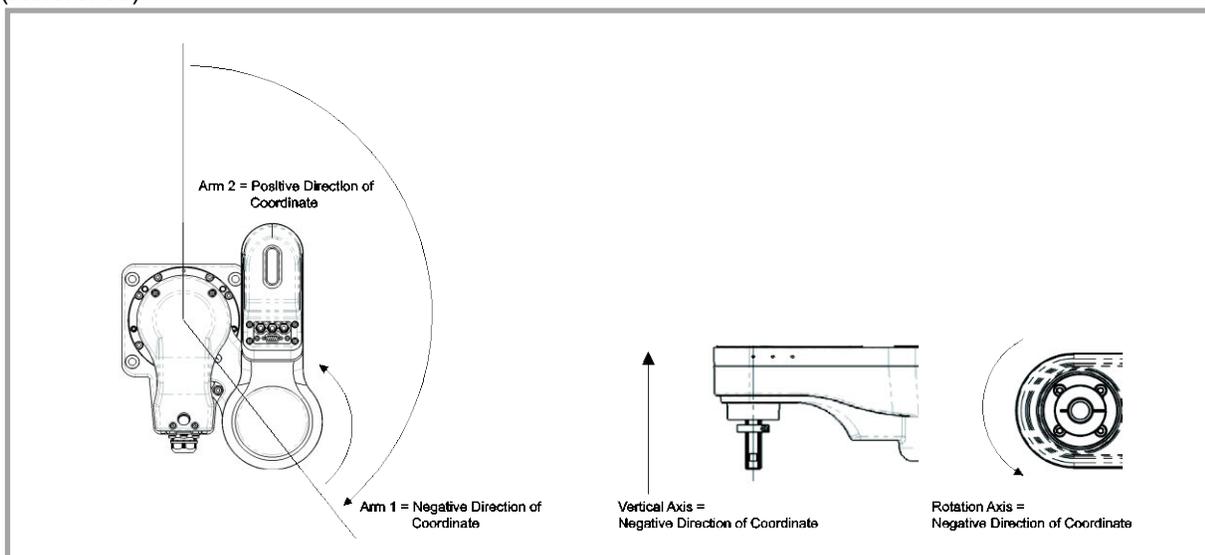


Fig. 13.213 Initial Posture of Right Arm System

- 1) Backup the parameters so that they can be put back anytime to those before changing them. Select “Parameter” → “Edit” from PC Software Menu to show the Edit Parameter window. Press the “Save As” button in the Edit Parameter window to store the parameters in the file.

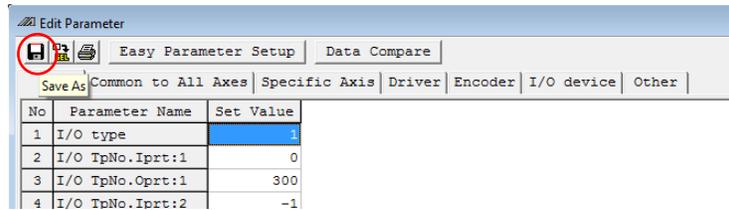


Fig. 13.214 Edit Parameter Window

- 2) Select “Controller” → “Abs. Encoder Reset(Scara)(Q)” → “Push stopper position acquisition” from the menu.

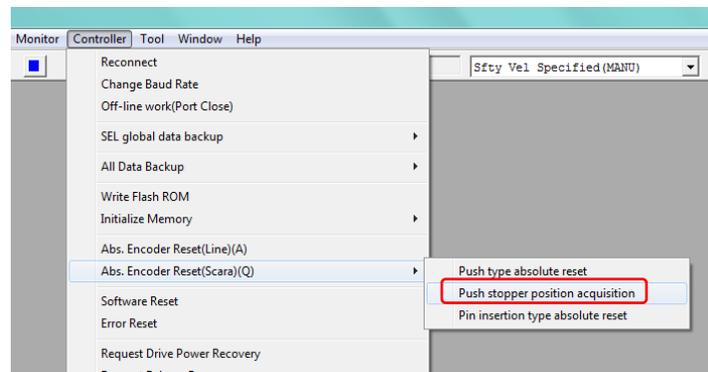


Fig. 13.215 Menu Select Window

- 3) A Warning window shows up. Click “Yes”.

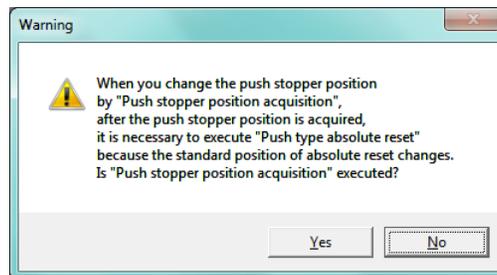


Fig. 13.216 Warning Window

- 4) A Confirmation window shows up. Click “Yes”.

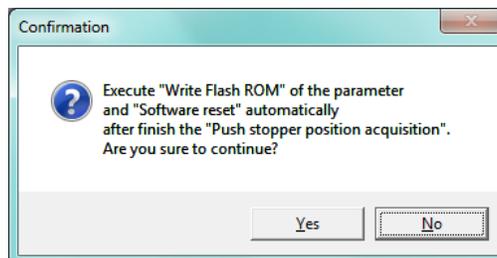


Fig. 13.217 Confirmation Window

[1] When Acquiring Stopper Pressing Position for All Axes at Once
To acquire the push stopper position for all the axes at once, follow the steps shown below.

- 1) Select "All axes" in the Push stopper position acquisition window.
* The screenshot shows the screen for the four-axis type.
Some contents should not be displayed in the three-axis type.

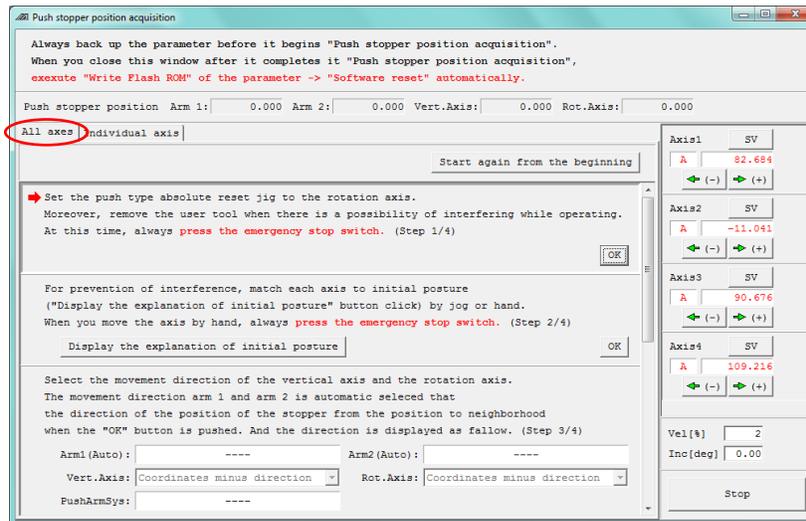


Fig. 13.218 Push Stopper Position Acquisition Window

Attach the rotary axis pressing absolute reset tool for the four-axis type. (It is not necessary for the three-axis type.)

Have the work during the emergency stop condition.

Regarding the R-axis absolute reset tool, take off the spline cover, apply Jig (A) to the flat on the spline shaft and affix it to Jig (B) with screws. The position where Jig (A) is attached on the ball screw becomes the home position of the R-axis. Pay attention to the orientation of the flat surface on the spline shaft.

[For how to detach and attach the spline cover, refer to 4.6 How to Inspect Visually on Timing Belt for Vertical Axis and Rotary Axis in IXA SCARA Robot Instruction Manual (ME3776).]

[Models Except for IXA-4NNN1805]

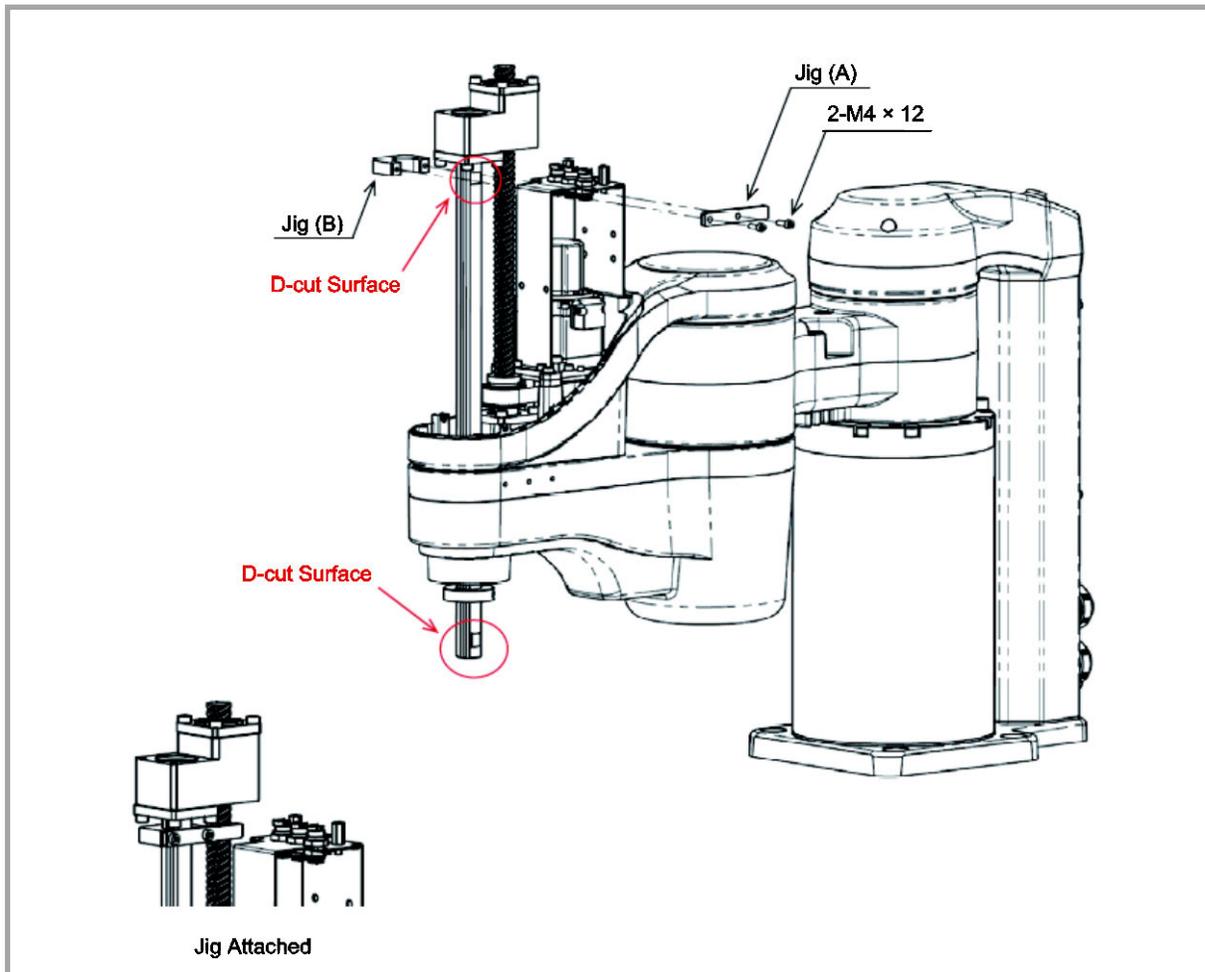


Fig. 13.219 Figure for Attaching Absolute Reset Jig

[IXA-4NNN1805]

Take off the J2 spline cover affixing screw (M3 × 25) on the bottom of the J2 main arm and attach Jig (C).
Align Jig (A) on the D-cut surface on the spline shaft and affix it with Jib (B) with screws.
The position where Jig (A) is attached on the ball screw becomes the home position of the R-axis. Pay attention to the orientation of the flat surface on the spline shaft.

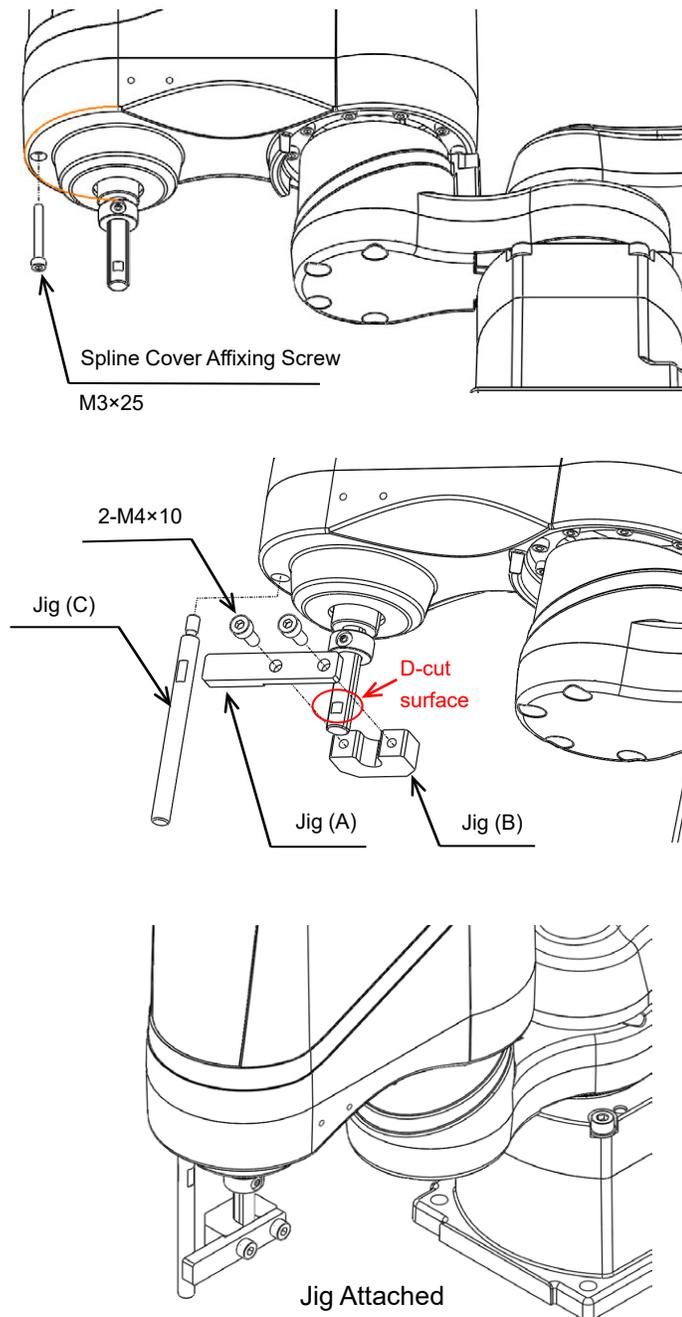


Fig. 13.220 Figure for Attaching Absolute Reset Jig

- 2) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load.
At this time, make sure the work is conducted with the emergency stop activated. After the work is finished, click on the “OK” button.

<For 4-Axis Type>

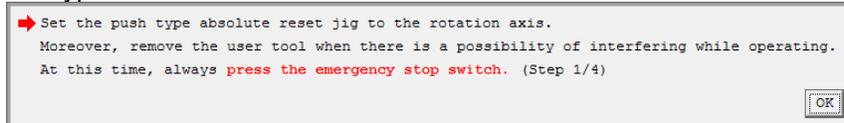


Fig. 13.221 Confirmation Window

<For 3-Axis Type>

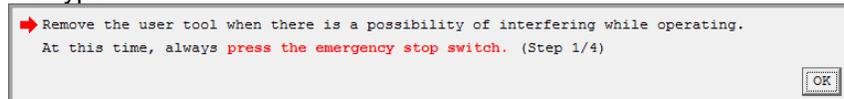


Fig. 13.222 Confirmation Window

- 3) Adjust each axis to the initial posture.
The posture differs depending on the movement direction.
Click on “Display the explanation of initial posture” to check the explanations.
Make to work on with the emergency stop activated when moving the axes with hand. Click on the “OK” button after the work is finished.

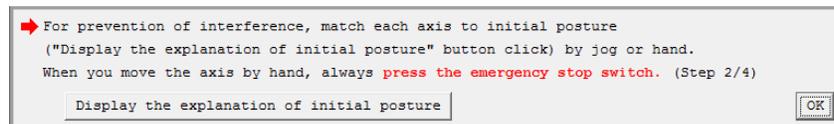


Fig. 13.223 Confirmation Window

[Initial posture]

◎ Arm 1 and Arm 2

Remove all the interferences of the peripheral devices, and set the posture to either of the left arm system or the right arm system. It is set to right arm system when the unit is shipped out.

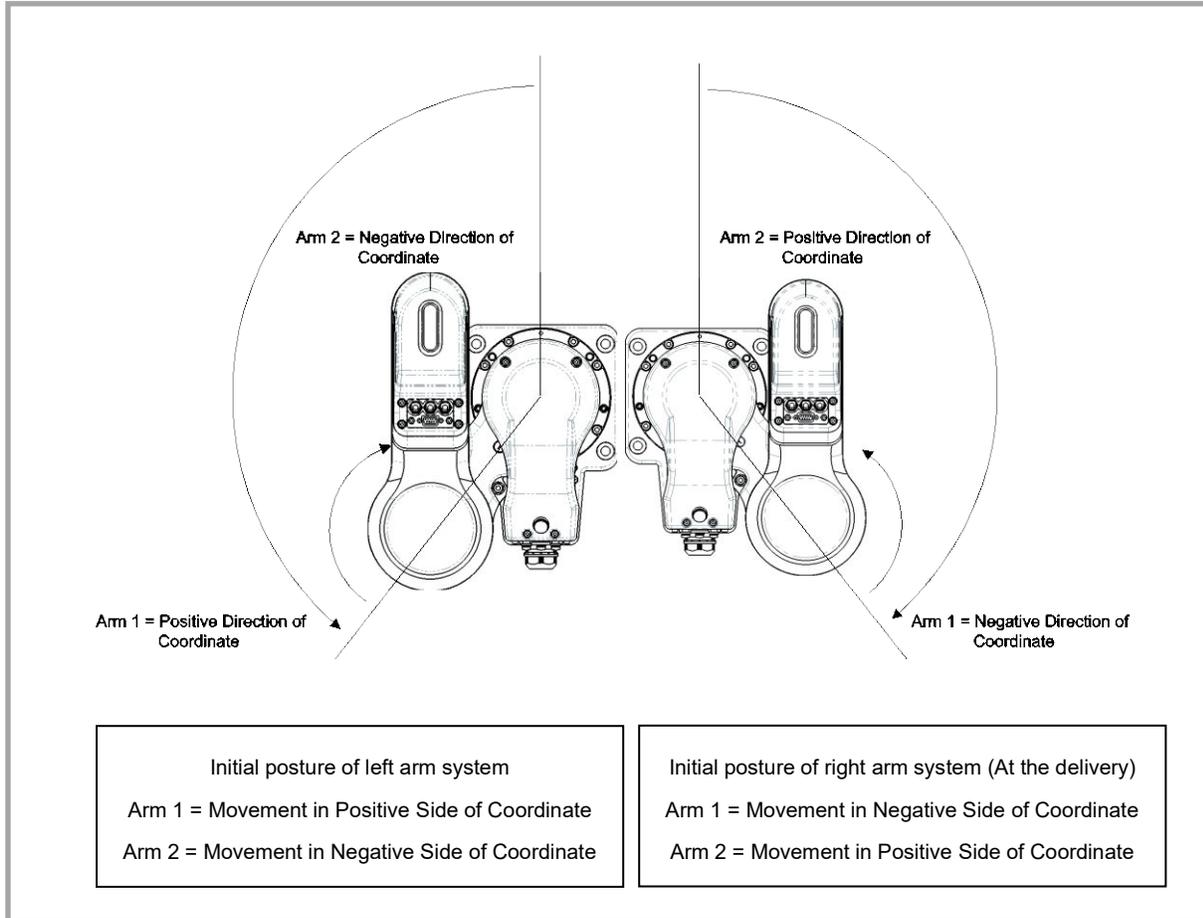


Fig. 13.224 Initial Posture

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D "Stopper Pressing Operation Start Position Error" may occur at operation.

[Initial posture]

◎ Vertical Axis

For the position, put it apart from the coordinate 0mm (upward end) for 10mm or more.

Setting it at 10mm or less, Error No. B0D “Stopper Pressing Operation Start Position Error” may occur at operation.

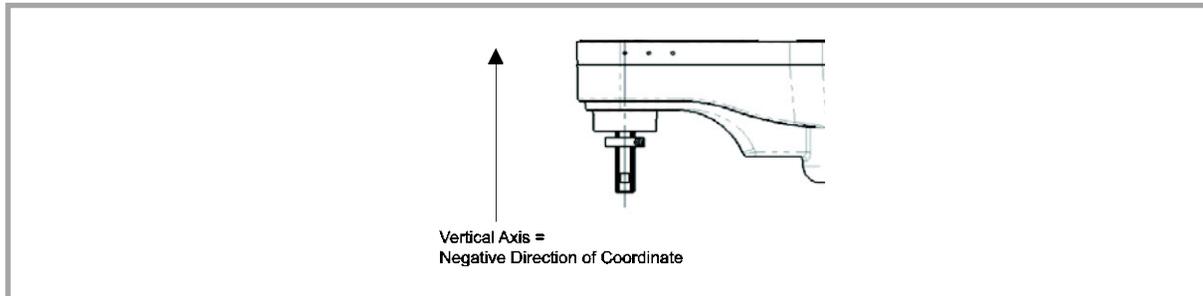


Fig. 13.225 Initial Posture

◎ Rotation axis (For 4-Axis Type Only)

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D “Stopper Pressing Operation Start Position Error” may occur at operation.

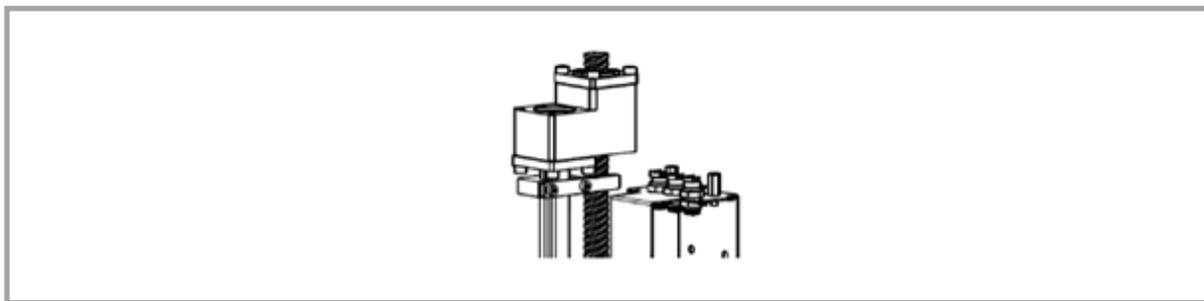
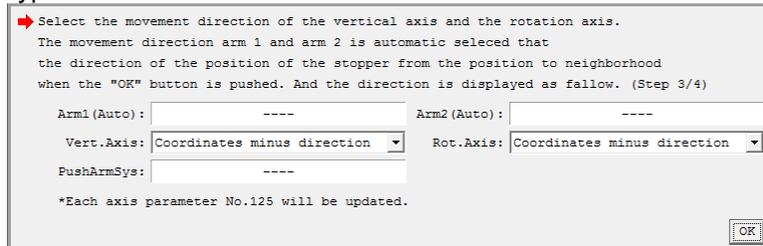


Fig. 13.226 Initial Posture

- 4) Select the direction to move for the vertical axis and rotation axis. It is not necessary to change the direction to move for the vertical axis and rotation axis. Make the Vert. Axis is in the Coordinates minus direction.

Once the selection is made, click on the “OK” button. At this time, the moving directions of Arm 1 (1st Arm) and Arm 2 (2nd Arm) should be automatically selected from the current position in the initial posture set in 3. Check the selected movement direction.

<For 4-Axis Type>



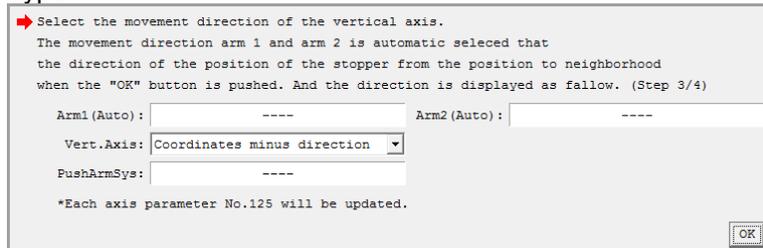
Select the movement direction of the vertical axis and the rotation axis.
 The movement direction arm 1 and arm 2 is automatic selected that the direction of the position of the stopper from the position to neighborhood when the "OK" button is pushed. And the direction is displayed as follow. (Step 3/4)

Arm1 (Auto): Arm2 (Auto):
 Vert.Axis: Rot.Axis:
 PushArmSys:

*Each axis parameter No.125 will be updated.

Fig. 13.227 Confirmation Window

<For 3-Axis Type>



Select the movement direction of the vertical axis.
 The movement direction arm 1 and arm 2 is automatic selected that the direction of the position of the stopper from the position to neighborhood when the "OK" button is pushed. And the direction is displayed as follow. (Step 3/4)

Arm1 (Auto): Arm2 (Auto):
 Vert.Axis:

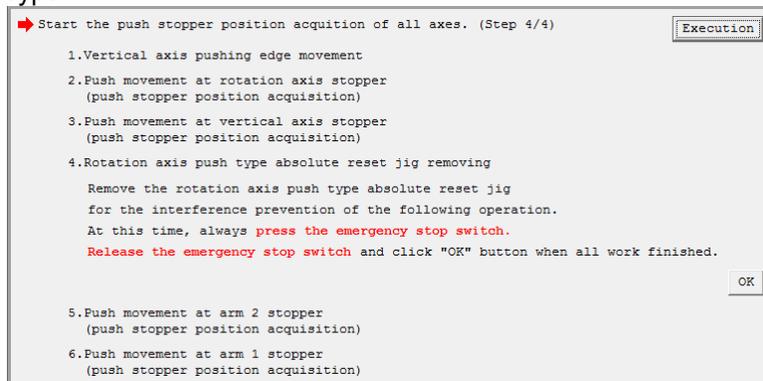
PushArmSys:

*Each axis parameter No.125 will be updated.

Fig. 13.228 Confirmation Window

- 5) Click on the “Execution” button.

<For 4-Axis Type>

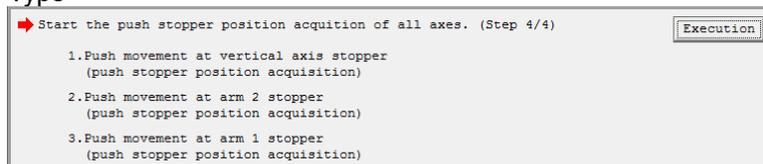


Start the push stopper position acquisition of all axes. (Step 4/4)

- 1.Vertical axis pushing edge movement
- 2.Push movement at rotation axis stopper (push stopper position acquisition)
- 3.Push movement at vertical axis stopper (push stopper position acquisition)
- 4.Rotation axis push type absolute reset jig removing
 Remove the rotation axis push type absolute reset jig for the interference prevention of the following operation.
 At this time, always **press the emergency stop switch.**
Release the emergency stop switch and click "OK" button when all work finished.
- 5.Push movement at arm 2 stopper (push stopper position acquisition)
- 6.Push movement at arm 1 stopper (push stopper position acquisition)

Fig. 13.229 Execution Window

<For 3-Axis Type>



Start the push stopper position acquisition of all axes. (Step 4/4)

- 1.Push movement at vertical axis stopper (push stopper position acquisition)
- 2.Push movement at arm 2 stopper (push stopper position acquisition)
- 3.Push movement at arm 1 stopper (push stopper position acquisition)

Fig. 13.230 Execution Window

- 6) A Warning window shows up. Click “Yes”. Process to acquire the push stopper position will start.

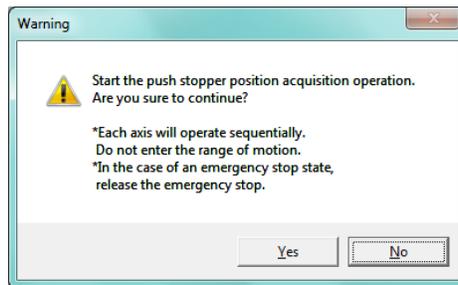


Fig. 13.231 Warning Window

- 7) For the four-axis type, press Execute and proceed to “Removing”, and then take off the rotary axis pressing absolute reset jig. At this time, make sure the work is conducted with the emergency stop activated. Click on the “OK” button after the work is finished.

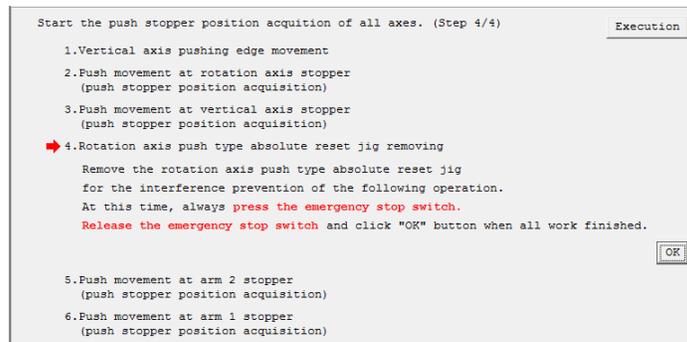


Fig. 13.232 Jig Removing Window

- 8) For the four-axis type, a warning window will be displayed. Click “Yes”. Operation for the stopper pressing position acquirement will be resumed.

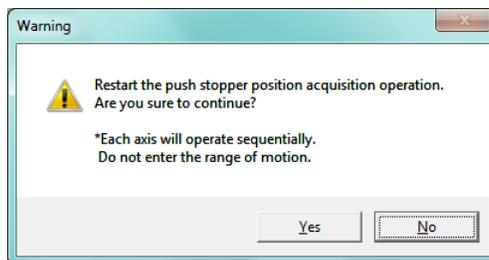


Fig. 13.233 Warning Window

- 9) Once the push stopper position acquirement for all the axes is complete, the Information window will appear. Click “OK” button.



Fig. 13.234 Information Window

- 10) Close the Push stopper position acquisition window by clicking “x” on the upper right side of the window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.
- 11) Once the controller reboot is finished, conduct the push type absolute reset on all the axes together.

[2] When Acquiring Stopper Pressing Position on Each Axis One by One
Follow the steps below if it is necessary to acquire the stopper pressing position separately for each axis.

(1) 1st Arm and 2nd Arm

1) Select "Individual axis" in the Push stopper position acquisition window, and set Axis to "Arm 1" (or Arm 2).

* The screenshot shows the screen for the four-axis type. Some contents should not be displayed in the three-axis type.

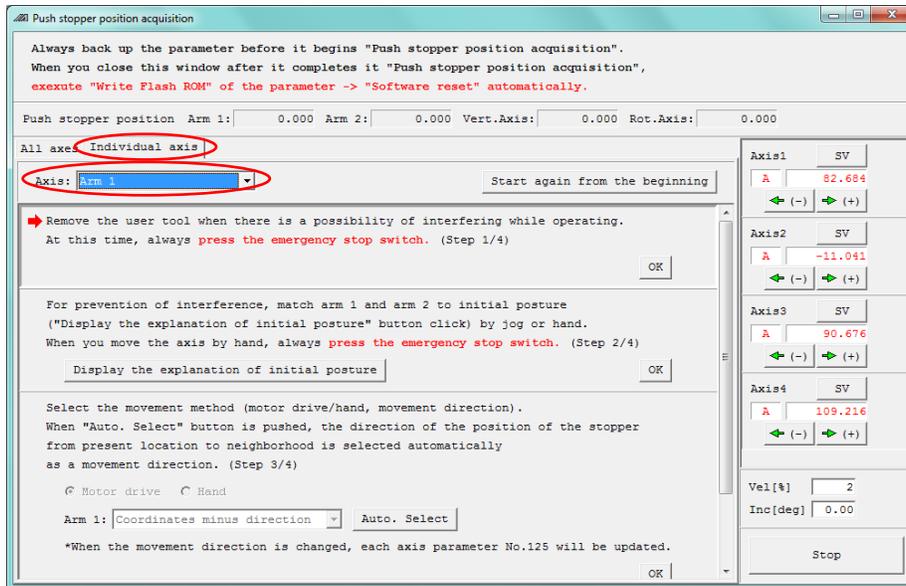


Fig. 13.235 Push Stopper Position Acquisition Window

2) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. At this time, make sure the work is conducted with the emergency stop activated. After the work is finished, click on the "OK" button.

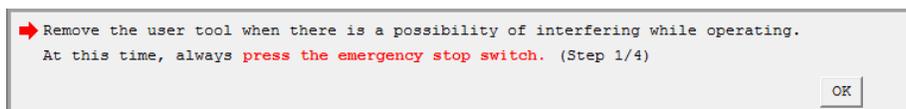


Fig. 13.236 Confirmation Window

3) Adjust 1st Arm and 2nd Arm to the initial posture. The posture differs depending on the movement direction. Click on "Display the explanation of initial posture" to check the explanations. Make to work on with the emergency stop activated when moving the axes with hand. Click on the "OK" button after the work is finished.

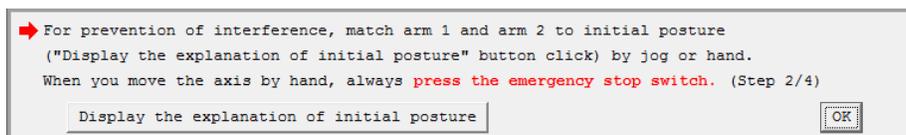


Fig. 13.237 Confirmation Window

[Initial posture]

◎ Arm1 and Arm 2

Remove all the interferences of the peripheral devices, and set the posture to either of the left arm system or the right arm system. It is set to right arm system when the unit is shipped out.

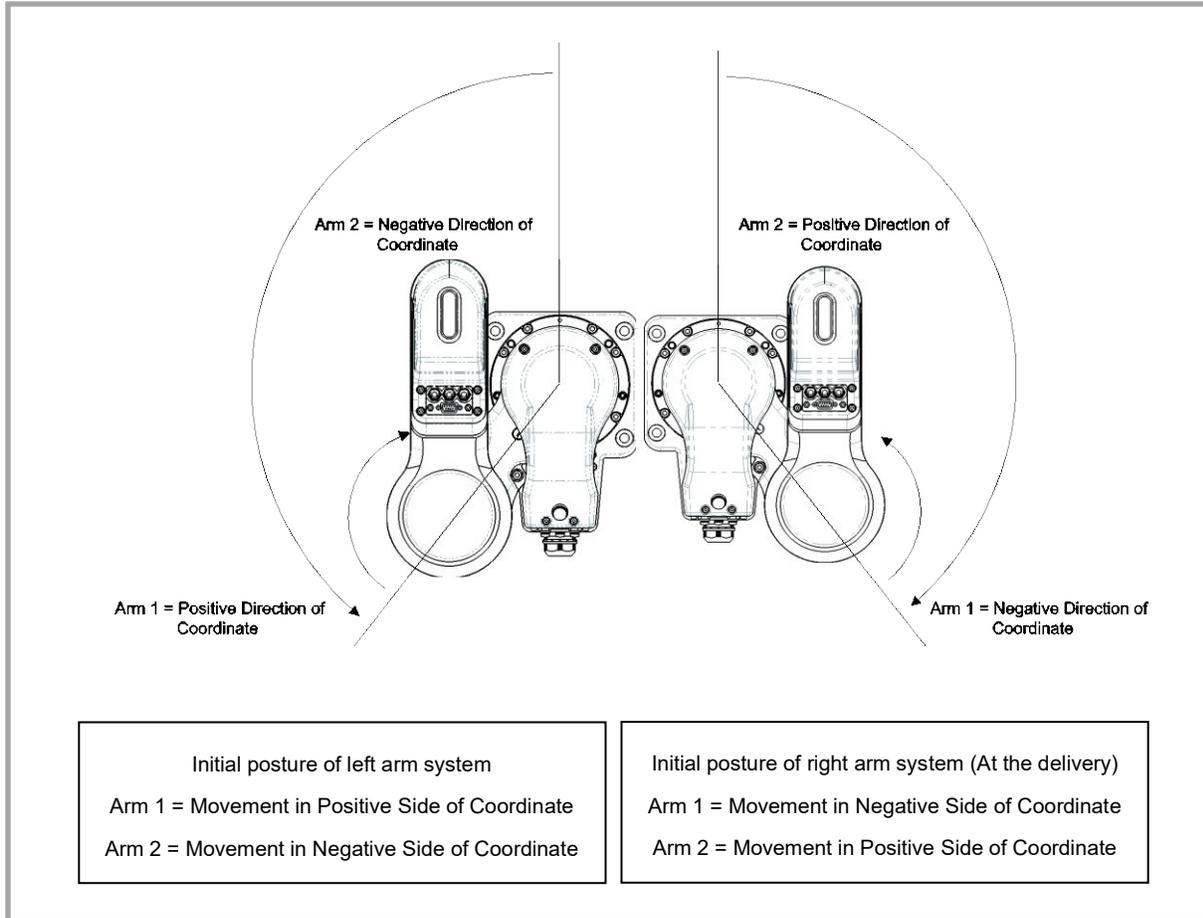


Fig. 13.238 Initial Posture

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D "Stopper Pressing Operation Start Position Error" may occur at operation.

- 4) Select the movement method. Make to select Motor drive on the selection of Motor drive/Hand. Change the movement direction if necessary. If clicking on “Auto. Select” button, the direction of movement from the current position of the initial posture is automatically selected. Once the selection is made, click on the “OK” button.

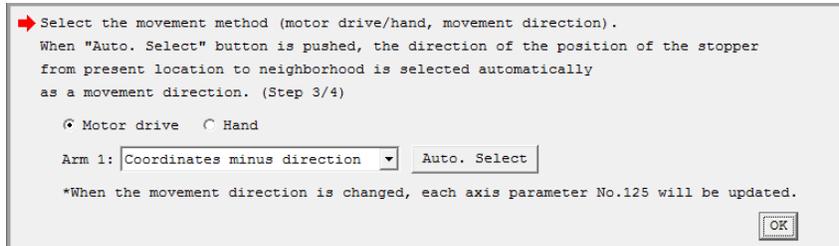


Fig. 13.239 Confirmation Window

- 5) Click “Execution” button.



Fig. 13.240 Execution Window

- 6) A Warning window shows up. Click “Yes”. Process to acquire the push stopper position will start.

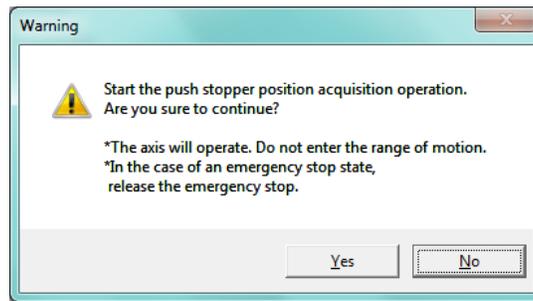


Fig. 13.241 Warning Window

- 7) Once the push stopper position acquisition is complete, the Information window will appear. Click “OK” button.



Fig. 13.242 Information Window

- 8) If it is necessary to have the Push stopper position an acquisition for another axis, move on to the axis selection.
When finishing the process, click “x” on the upper right side of the Push stopper position acquisition window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.
- 9) Once the controller reboot is finished, conduct the push type absolute reset on the axis with the push stopper position acquisition.

(2) Vertical Axis and Rotation Axis

- 1) Select "Individual axis" in the Push stopper position acquisition window, and set Axis to "Vert. Axis + Rot. Axis".
 - * The screenshot shows the screen for the four-axis type. Some contents should not be displayed in the three-axis type.

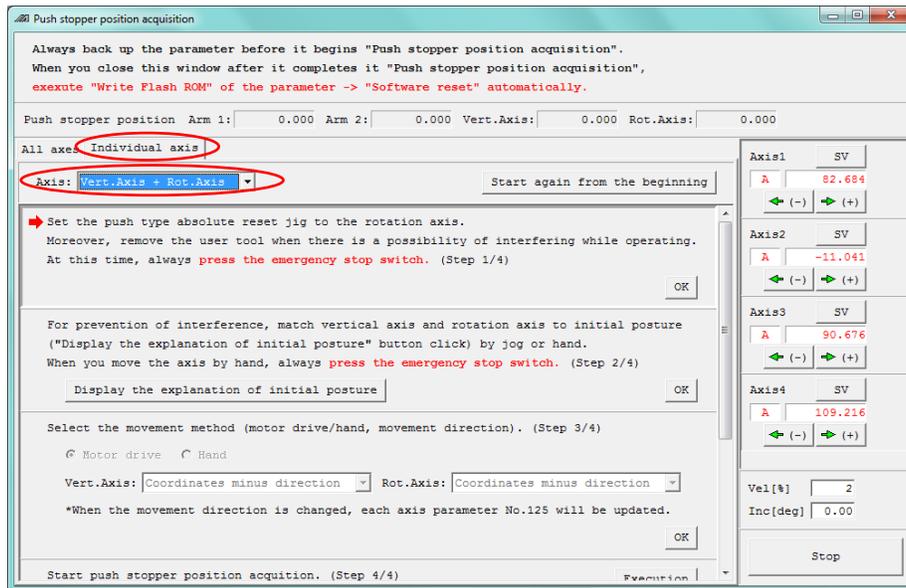


Fig. 13.243 Push Stopper Position Acquisition Window

Attach the rotary axis pressing absolute reset tool for the four-axis type. (It is not necessary for the three-axis type.)
Have the work during the emergency stop condition.

Regarding the R-axis absolute reset tool, take off the spline cover, apply Jig (A) to the flat on the spline shaft and affix it to Jig (B) with screws. The position where Jig (A) is attached on the ball screw becomes the home position of the R-axis. Pay attention to the orientation of the flat surface on the spline shaft.
[For how to detach and attach the spline cover, refer to 4.6 How to Inspect Visually on Timing Belt for Vertical Axis and Rotary Axis in IXA SCARA Robot Instruction Manual (ME3776).]

[Models Except for IXA-4NNN1805]

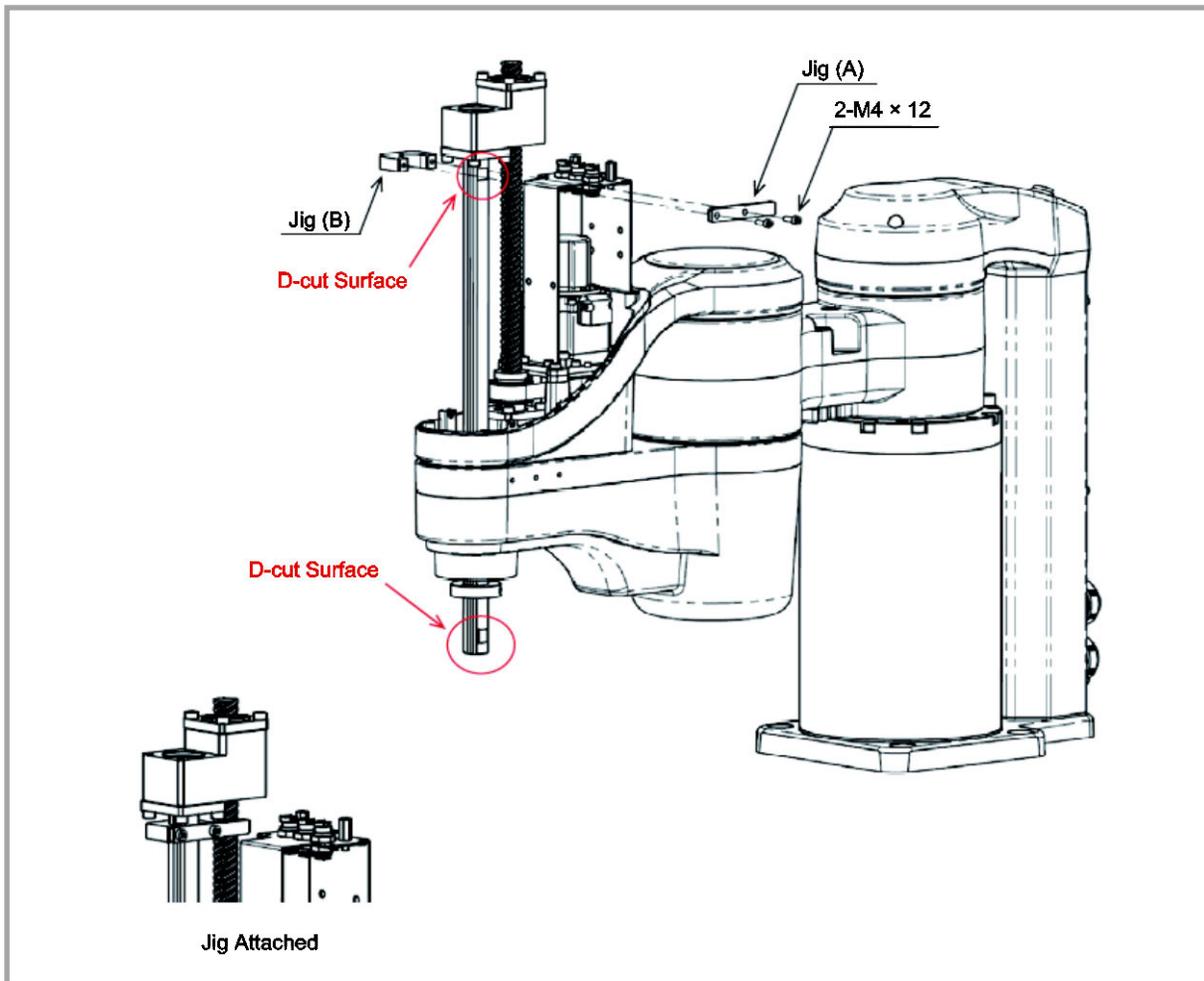


Fig. 13.244 Figure for Attaching Absolute Reset Jig

[IXA-4NNN1805]

Take off the J2 spline cover affixing screw (M3 × 25) on the bottom of the J2 main arm and attach Jig (C).
Align Jig (A) on the D-cut surface on the spline shaft and affix it with Jib (B) with screws.
The position where Jig (A) is attached on the ball screw becomes the home position of the R-axis. Pay attention to the orientation of the flat surface on the spline shaft.

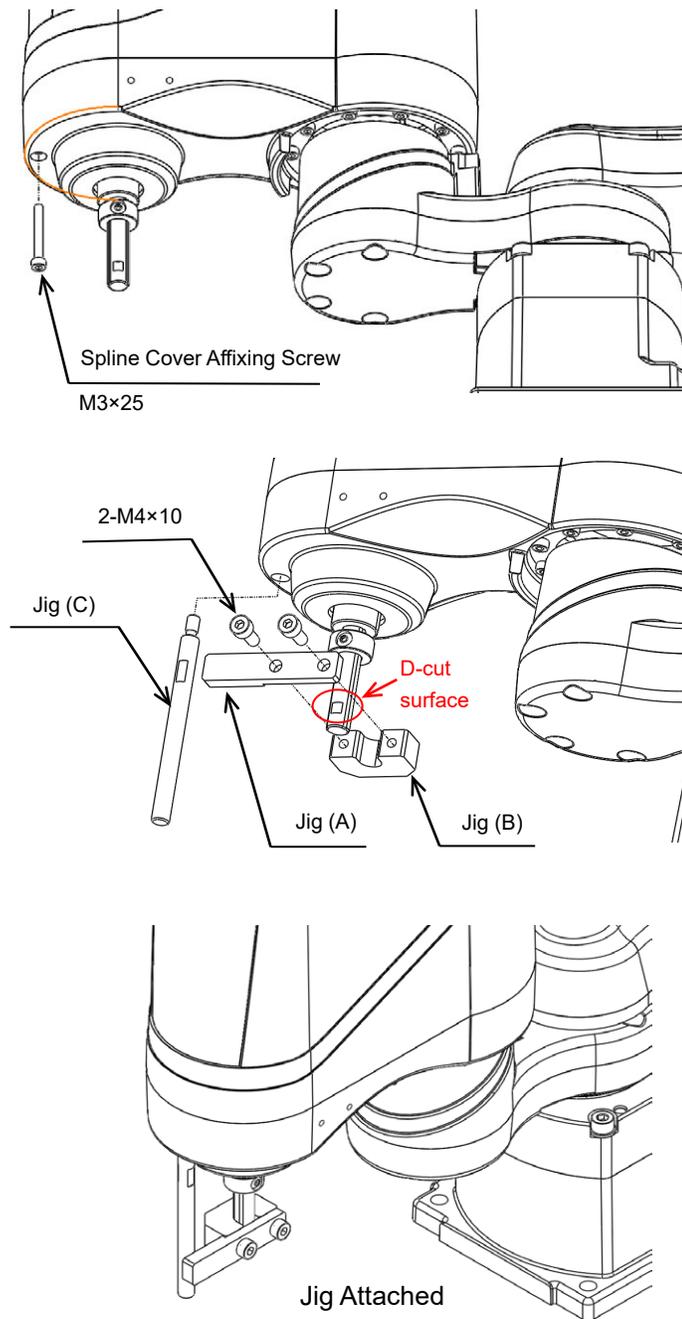


Fig. 13.245 Figure for Attaching Absolute Reset Jig

- 2) In case there is a concern that a load may interfere with surroundings at the absolute reset, detach the load. At this time, make sure the work is conducted with the emergency stop activated. After the work is finished, click on the “OK” button.

<For 4-Axis Type>

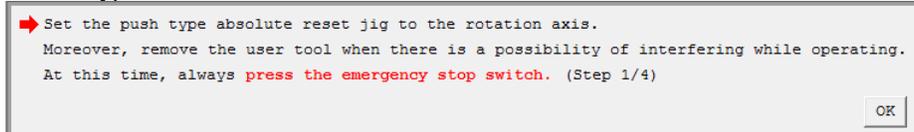


Fig. 13.246 Confirmation Window

<For 3-Axis Type>

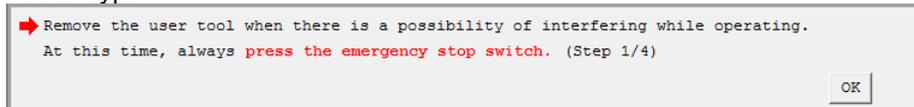


Fig. 13.247 Confirmation Window

- 3) Adjust vertical axis to the initial posture.
 The posture differs depending on the movement direction.
 Click on “Display the explanation of initial posture” to check the explanations. Make to work on with the emergency stop activated when moving the axes with hand. Click on the “OK” button after the work is finished.

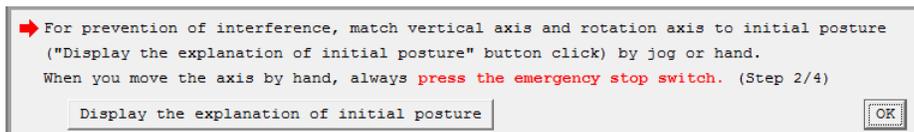


Fig. 13.248 Confirmation Window

[Initial posture]

◎ Vertical Axis

For the position, put it apart from the coordinate 0mm (upward end) for 10mm or more.
 Setting it at 10mm or less, Error No. B0D “Stopper Pressing Operation Start Position Error” may occur at operation.

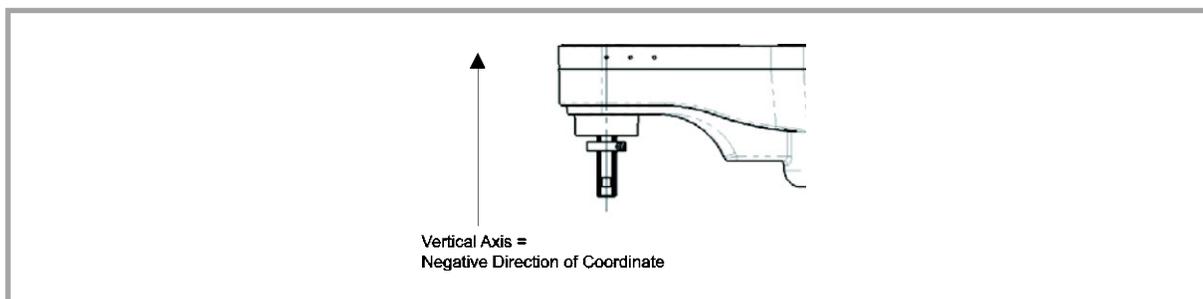


Fig. 13.249 Initial Posture

◎ Rotation Axis (For 4-Axis Type Only)

For the position, put it apart from the stopper position for 10deg or more.

Setting it too close to the stopper, Error No. B0D “Stopper Pressing Operation Start Position Error” may occur at operation.

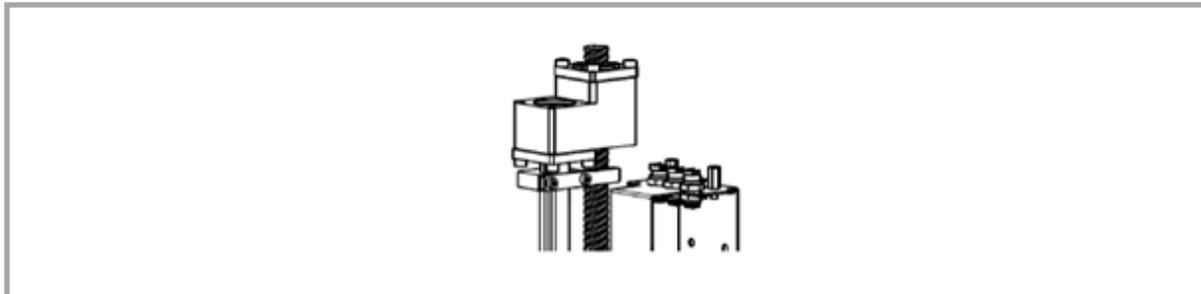


Fig. 13.250 Initial Posture

- 4) Select the movement method. Make to select Motor drive on the selection of Motor drive/Hand. It is not necessary to change the direction to move for the vertical axis and rotation axis. Make the Vert. Axis is in the Coordinates minus direction. Once the selection is made, click on the “OK” button.

<For 4-Axis Type>

➡ Select the movement method (motor drive/hand, movement direction). (Step 3/4)

Motor drive Hand

Vert.Axis:
 Rot.Axis:

*When the movement direction is changed, each axis parameter No.125 will be updated.

Fig. 13.251 Confirmation Window

<For 3-Axis Type>

➡ Select the movement method (motor drive/hand, movement direction). (Step 3/4)

Motor drive Hand

Vert.Axis:

*When the movement direction is changed, each axis parameter No.125 will be updated.

Fig. 13.252 Confirmation Window

- 5) Click “Execution” button.

<For 4-Axis Type>

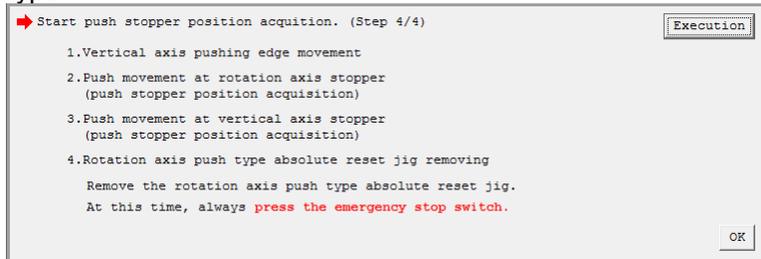


Fig. 13.253 Execution Window

<For 3-Axis Type>



Fig. 13.254 Execution Window

- 6) A Warning window shows up. Click “Yes”. Process to acquire the push stopper position will start.

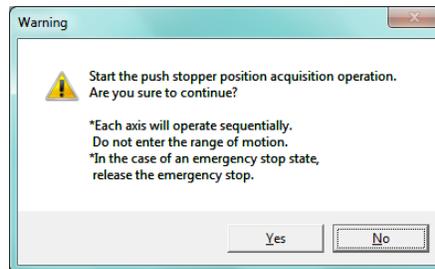


Fig. 13.255 Warning Window

- 7) For the four-axis type, press Execute and proceed to “Removing”, and then take off the rotary axis pressing absolute reset jig. At this time, make sure the work is conducted with the emergency stop activated. Click on the “OK” button after the work is finished.

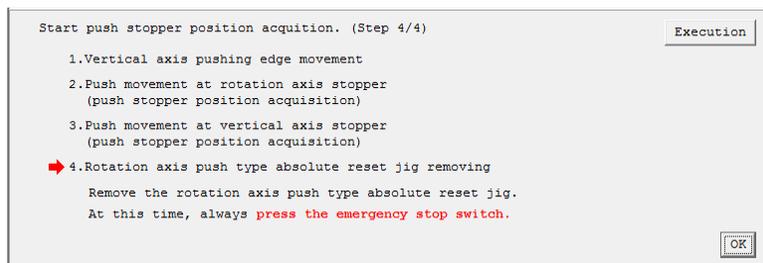


Fig. 13.256 Jig Removing Window

- 8) Once the push stopper position acquisition is complete, the Information window will appear. Click “OK” button.

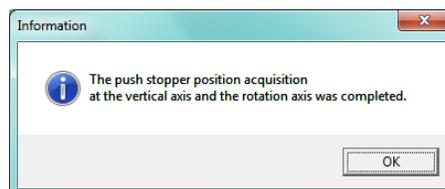


Fig. 13.257 Information Window

- 9) When finishing the process, click “x” on the upper right side of the Push stopper position acquisition window. Once the window is closed, the parameters start to be written automatically to the flash ROM, and controller is rebooted by the software reset.

- 10) Once the controller reboot is finished, conduct the push type absolute reset on the axis with the push stopper position acquisition.

14. Supplemental Information on Controller Menu Items

14.1 Software Reset

Selecting this menu item will restart the controller.

Caution is required because data that is not yet written to the flash ROM will be lost after this operation. Click Controller (C) from the menu bar, and then select Software Reset (R).

14.2 Reset Error

Selecting this menu item will reset message level errors and operation-cancellation level errors.

Even after selecting Reset Error, those errors whose cause has not been removed will occur again.

Click Controller (C) from the menu bar, and then select Reset Error (E).

14.3. Drive-source Recovery Request and Operation-pause Reset Request

14.3.1 In the cases of Controllers Other Than SSEL, ASEL or PSEL Controllers

(1) Drive-source recovery request

[1] How to issue a drive-source recovery request A drive-source recovery request is required only in the following case:

- When you set I/O parameter No.44 to 1, drive power cut-off occurs. → Recovery after the main cause of cut-off is solved.

[2] How to issue a drive-source recovery request A drive-source recovery request can be issued using one of the following methods:

- Set I/O parameter No.44 to 1 (input selection function 014 = Drive-source cut-off reset input), and then input the ON edge on input port No. 14
- From the software menu, execute Controller (C) → Request Drive Power Recovery (P).

(2) Operation pause release request

[1] Case where an operation pause release request is required

An operation pause release request is required in any of the following cases:

- When you set other parameter No.9 to 2, (Deadman SW recovery release according to type = continuous operation release [during automatic operation only], stop according to Deadman SW during automatic operation → recovery after release stop (operation pause release).
- When you set other parameter No.10 to 2, (emergency stop recovery according to type = continuous operation recovery during automatic operation only), emergency stop during automatic operation → recovery after emergency stop release (operation pause release).
- When you set other parameter No.11 to 2, (according to recovery type during safety gate open recovery = continuous operation recovery (during automatic operation only), safety gate OPEN during automatic operation → recovery after safety gate CLOSE (operation pause release).
- When you set I/O parameter No.36 to 1, (input selection function 006 = pausing operation signal), OFF level input on input port No.6 at automatic operation (pausing operation) → recovery after ON level input on input port No.6 (operation pause release).

[2] How to issue an operation pause release request An operation pause release request can be issued using one of the following methods:

- Set I/O parameter No.35 to 1 (input selection function 005 = operation pause release signal), and then input the ON edge on input port No.5.
- From the software menu, execute Controller (C) → Request Release Pause (L).

Note) If the case in [2] of (1) and any of the cases in [2] of (2) are present at the same time, a drive-source recovery request must be issued first, followed by an operation-pause reset request.

14.3.2 In the cases of SSEL, ASEL or PSEL Controllers

(1) Drive-source recovery request

- [1] Case where a drive-source recovery request is required A drive-source recovery request is required only in the following case:
- When you specify any input port for the drive power cut-off release input signal (dedicated function), drive power cut-off occurs. → recovery after the main cause of cut-off is solved.
- [2] How to issue an operation pause release request An operation pause release request can be issued using one of the following methods:
- Set the I/O parameter (No.30 - No.45, No.251 - No.258) corresponding to the input port No. to 17 (specified input function value). (Refer to the list of I/O functions and I/O parameters in the SSEL, ASEL or PSEL controller operation manual.)
Input the ON edge on the specified input port No.
 - From the software menu, execute Controller (C) → Request Drive Power Recovery (P).

(2) Operation pause release request

- [1] An operation pause release request is required in any of the following methods: Only the following case requires executing Request Release Pause:
- When you set other parameter No.10 to 2, (emergency stop recovery release according to type = continuous operation release [during automatic operation only], emergency stop during automatic operation → recovery after release of emergency stop (operation pause release).
 - When you set other parameter No.11 to 2, (Deadman SW/Enable SW recovery according to type = continuous operation recovery during automatic operation only), stop by Deadman SW or Enable SW during automatic operation → recovery after emergency stop release (operation pause release).
 - Specify any input port for the operation pause release signal (dedicated function). Set the I/O parameter (No.30 - No.45, No. 251 - No.258) corresponding to the input port No. to 8 (specified input function value). (Refer to the list of I/O functions and I/O parameters.)
OFF level input on the input port No. specified at automatic operation (pause operation) → recovery after ON level input on the input port No. (operation pause release).
- [2] How to issue an operation pause release request An operation pause release request can be issued using one of the following methods:
- Specify any input port for the operation pause release signal (dedicated function). Set the I/O parameter (No.30 - No.45, No.251 - No.258) input port No. corresponding to the input port No. to 7 (specified input function value). (Refer to the list of I/O functions and I/O parameters.)
Input the ON edge on the specified input port No.
 - From the software menu, execute Controller(C) → Request Release Pause (L).

Note) If the case in [1] of (1) and any of the cases in [1] of (2) are present at the same time, a drive-source recovery request must be issued first, followed by an operation pause release request.

14.4 Setting Time

Select “Controller (C)” → “Time Setting (T)” from the PC Software Menu to display the Set Time screen.

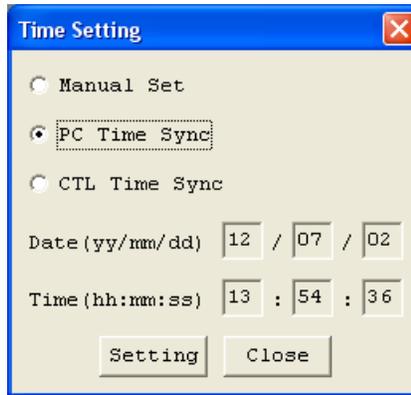


Fig. 14.1 Time Setting Screen

Manual entry: Directly enter the time (date & time) you want to set to the controller.
 Show PC time: The time (date & time) set in the PC you are currently using is shown.
 Show controller time: The time (date & time) currently set in the controller is shown.
 “Setting” button: Set the time (date & time) shown on the screen to the controller.

14.5 SEL Global Data Backup

[1] Saving to a file

Global flags, global integer variables, global real variables and global strings can be saved. Select SEL global data backup (G) from the Controller pop-up menu and then click Save File AS (S). The SEL global data backup screen (Save File AS) will be displayed.

Clicking  will save the global data.

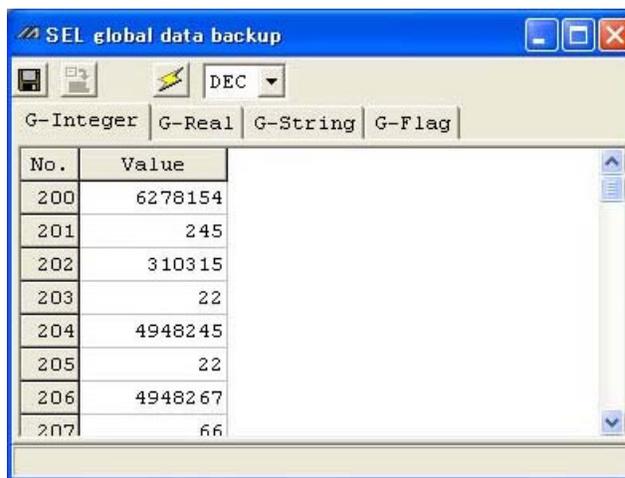


Fig. 14.2 SEL Global Data Backup Screen (Save File AS)

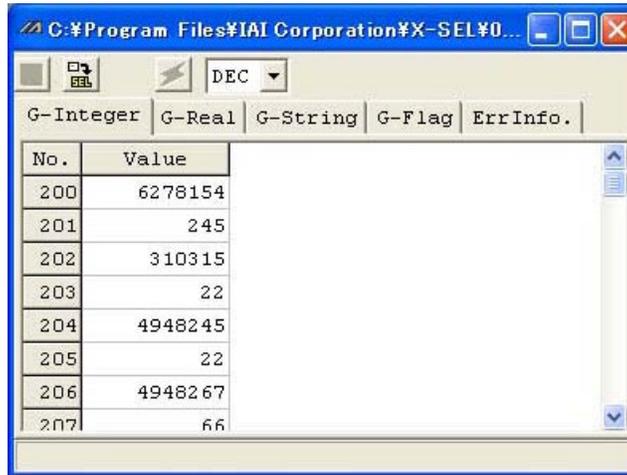
[2] Transmitting to the controller

Global flags, global integer variables, global real variables and global strings can be transmitted to the controller.

Select SEL global data backup (G) from the Controller (C) pop-up menu and then click Transmit to Controller(L).

The SEL global data backup screen (Transmit to Controller) will be displayed.

If an error occurs, focus will move to the Detailed Error Information tag to display the error description.

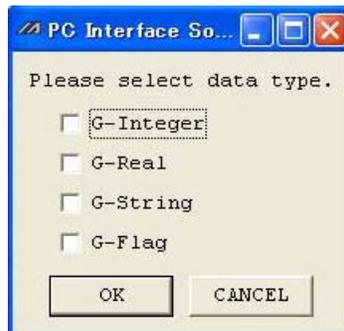


No.	Value
200	6278154
201	245
202	310315
203	22
204	4948245
205	22
206	4948267
207	66

Fig. 14.3 SEL Global Data Backup Screen (Transmit to Controller)

Clicking  will display the SEL global data type select screen.

Select a desired data type and click OK. The data will be transmitted to the controller.



Please select data type.

G-Integer

G-Real

G-String

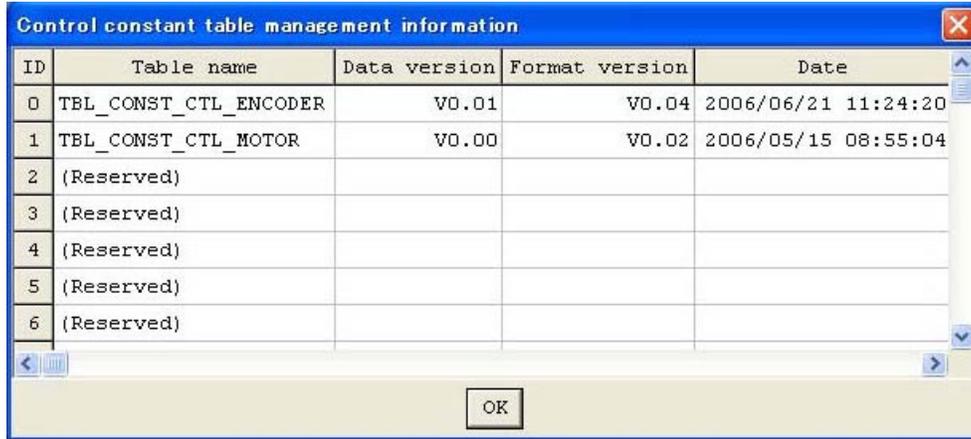
G-Flag

OK CANCEL

Fig. 14.4 SEL Global Data Type Select Screen

14.6 Control Constant Table Management Information

The versions of control constant tables for the encoder and motor can be checked. Select Controller (C) from the menu tool bar and then click Control constant table management information (Z). (Supported by X-SEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL and PSEL only.)



ID	Table name	Data version	Format version	Date
0	TBL_CONST_CTL_ENCODER	V0.01	V0.04	2006/06/21 11:24:20
1	TBL_CONST_CTL_MOTOR	V0.00	V0.02	2006/05/15 08:55:04
2	(Reserved)			
3	(Reserved)			
4	(Reserved)			
5	(Reserved)			
6	(Reserved)			

Fig. 14.5 Control Constant Table Management Information

14.7 Execution Stop of Positioner Mode of SSEL, ASEL or PSEL Controller

If you select Execute when the SSEL, ASEL or PSEL controller is in the manual mode and positioner mode, the positioner mode can be executed from your PC.

(The 7-segment display will show "PN##." ## indicates the positioner mode No.)

Executing the positioner mode manually enables a test run at safe speed, monitoring of I/O ports and others. Select Positioner Mode (O) from the Controller pop-up menu and then click Execute (E).

Pressing the EMERGENCY STOP button or Stop in the screen of Fig. 14.6 will stop the positioner mode. Select Positioner Mode (O) from the Controller pop-up menu and then click Stop (S).

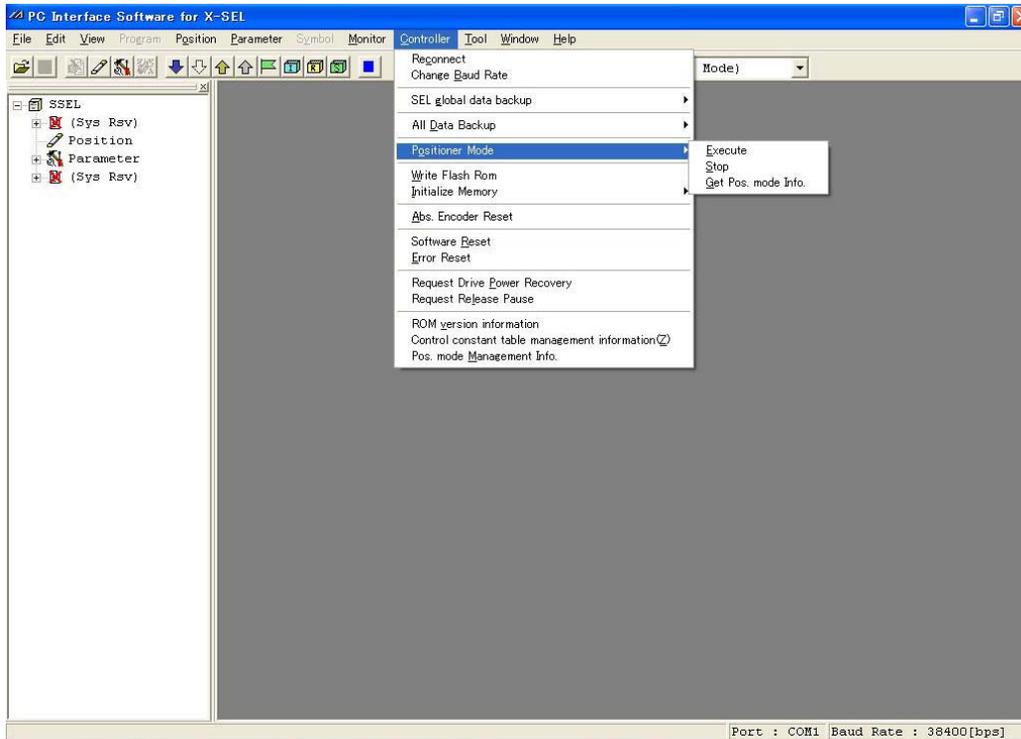


Fig. 14.6 Execue or Stop of Positioner Mode

Note: When the SSEL, ASEL or PSEL controller is in the positioner mode and being executed, some operations such as changing the parameter or writing to the flash ROM cannot be performed. Change parameters, write to flash ROM or perform any other operation only after stopping the mode with the procedure described above.

14.8 Getting Positioner Mode Information from SSEL, ASEL and PSEL Controllers

Positioner mode maintenance information (system data) can be collected from the SSEL, ASEL and PSEL controllers.

After the dialog indicating “Getting Pos. mode data” has been displayed, select the “Pos. mode sys1 data for PSEL” and click the Save (S) button. The system data can be saved.

This function is used when making inquiries for support regarding the positioner mode.

Select Positioner Mode (O) from the Controller pop-up menu and then click Get Pos. mode Info (G).

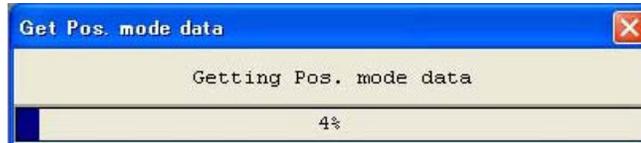


Fig. 14.7 Dialog Box Indicating System Data is Being Acquired

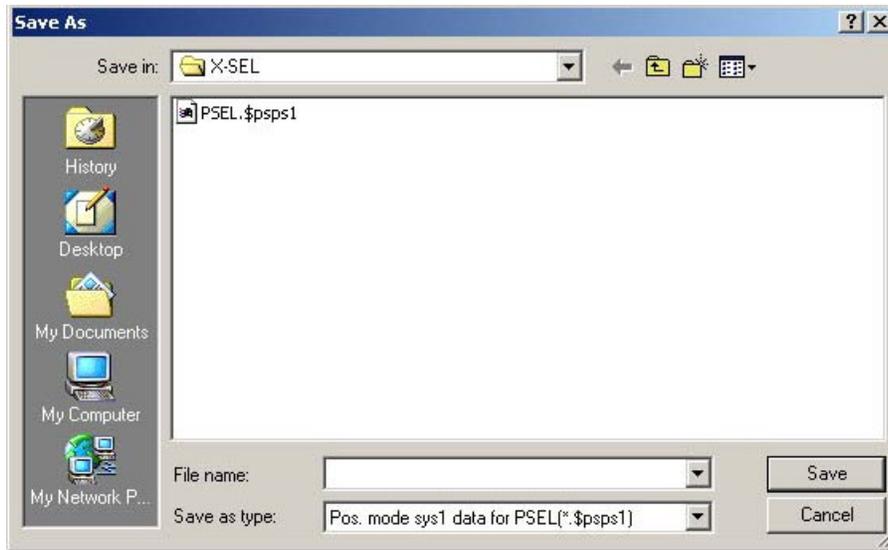


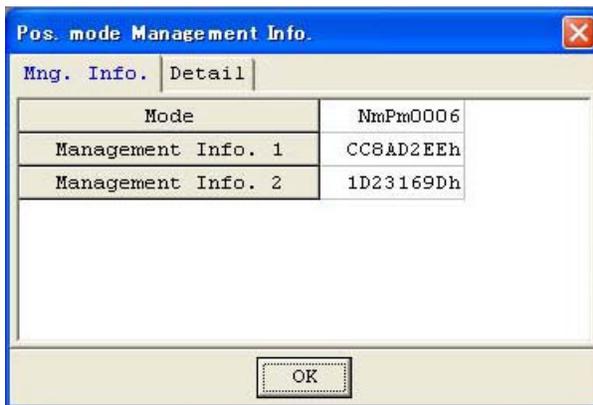
Fig. 14.8 Saving the System Data

14.9 Positioner Mode Management Information for SSEL, ASEL or PSEL Controller

The operation mode and management information as to the positioner mode will be displayed. This information is intended for manufacturers.

- [1] Mng. Info. Tab
 - Mode: Display a specified positioner mode.
 - Management Info. 1, 2: Display the management information of system data.
- [2] Detail tab
Display the mode name and management information for each system data.

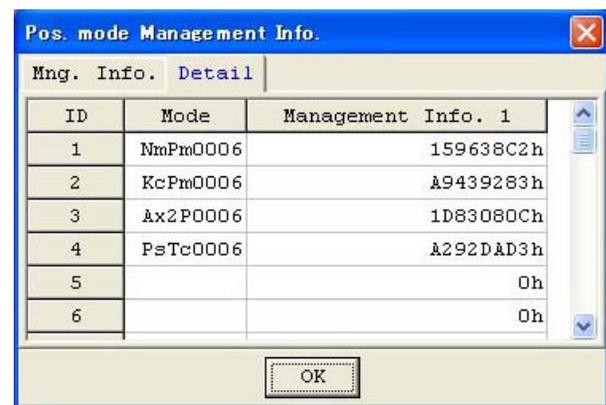
Click Pos. mode Management Info (M). from the Controller pop-up menu.



Pos. mode Management Info. Management Info. Tab

Mode	NmPm0006
Management Info. 1	CC8AD2EEh
Management Info. 2	1D23169Dh

Fig. 14.9 Pos. Mode Management Info.Management Info. Tab



Pos. mode Management Info. Detail Tab

ID	Mode	Management Info. 1
1	NmPm0006	159638C2h
2	KcPm0006	A9439283h
3	Ax2P0006	1D83080Ch
4	PsTc0006	A292DAD3h
5		0h
6		0h

Fig. 14.10 Pos. Mode Management Info.Detail Tab

14.10 Excel File Save and Readout (Version V13.01.00.00 and later)

The position data can be saved and read out in the Excel file formats. However, it can only be available on a PC that Microsoft Office Excel has already been installed.

14.10.1 Excel File Save

Click the Save to File button in the position edit window.

This is the same as clicking File (F) and then selecting Save As (A).

For the memory capacity increase applicable X-SEL-P/Q and PX/QX Controllers (equipped with the gateway feature), SSEL Controller, TTA, MSEL-PC/PG and PCX/PGX controllers, "File Save Format Selection" window will appear after clicking "Save As" button.

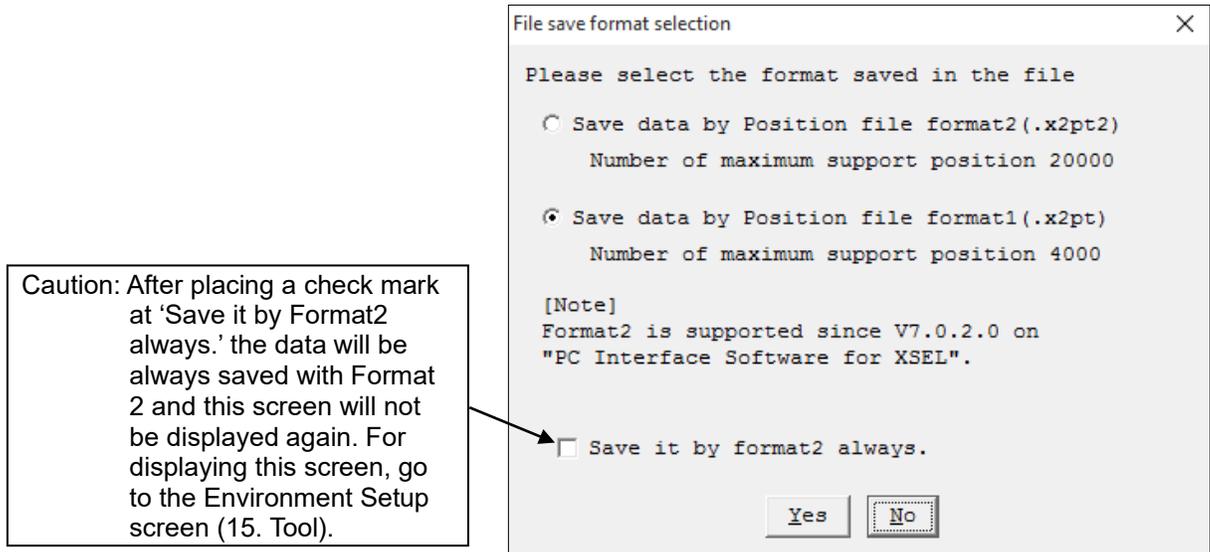


Fig. 14.11 File Save Select Screen

(Note) For XSEL-P/Q, PX/QX and SSEL Controllers, a file will be saved in "Position Format 2" regardless of which format you have chosen.

Next, the file save dialog will show up.

Select "Excel 97-2003 Workbook (*.xls)", put a file name and conduct saving.

Excel will open and the file will be saved to the sheet on the leftmost.

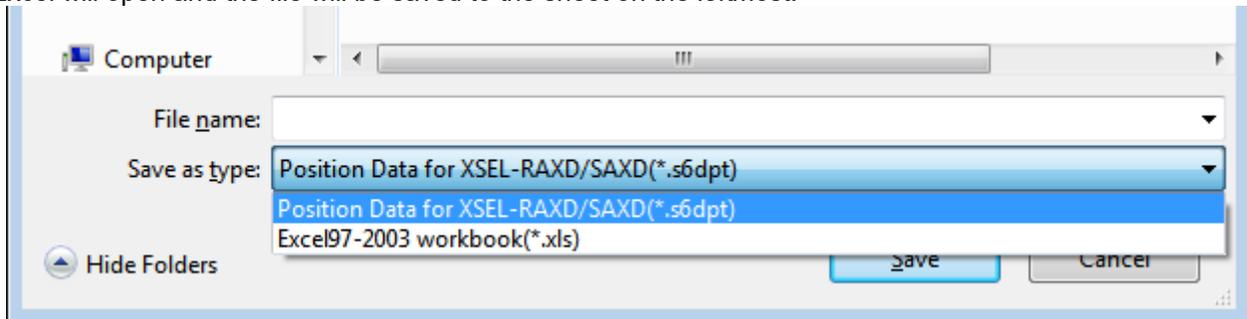


Fig. 14.12 File Save Dialog

[File Format]

The file format available to save file is only “Excel 97-2003 Workbook (*.xls)”.

(Note) Files cannot be saved or read out in other formats such as “Excel Workbook (.xlsx)”.

[Position Data Format]

The first line of the saved Excel data will become the next title and the data in the second line and below are to be stored.

No.	Axis (1 to 8)	(Arm (1 to 4- 5 to 8))	Vel	Acc	Dcl	(Out Fn)	(Out No.)	(Out Para1)	(Out Para2)	(Comment)
Position No.	Each axis position data	Arm system	Velocity	Acceleration	Deceleration	Output function code	Output ports and flags	Function Parameter 1	Function Parameter 2	Position comment

Title Line

- * 1 It should be displayed on XSEL-RX/SX, RAX/SAX, MSEL-PCX/PGX, XSEL-RXD/SXD and RAXD/SAXD Controllers.
One column for XSEL-RX/SX, RAX/SAX and MSEL-PCX/PGX, and one column when the number of activated axes is four and two columns when the number of activated axes is eight for XSEL-RXD/SXD and RAXD/SAXD Controllers.
- * 2 These should be displayed when the output operation feature is valid in TTA, MSEL and XSEL-RA/SA/RAX/SAX/RAXD/SAXD Controllers.
- * 3 It should be displayed only on the models with the position comment feature available.

◎Explanation of Each Column Data

- No. Column ...Position No.. Data with only integer digits
- Axis Column ...Position data. Data with down to three decimal digits.
- Arm Column ...Arm system data. Data of “Right” or “Left”.
- Vel Column ...Velocity data. Data with only integer digits.
- Acc Column ...Acceleration data. Data with down to two decimal digits.
- Dcl Column ...Deceleration data. Data with down to two decimal digits.
- OutFn Column ...Output Function code. Data of any from “ON”, “OFF”, “OND”, “OFFD”, “ONR” or “OFFR”.
- OutNo. Column ...Output ports and flags. Data with only integer digits
- Outpara1 Column ...Function Parameter 1. Data with down to three decimal digits.
- Outpara2 Column ...Function Parameter 2. Data with down to three decimal digits.
- Comment Column ...Position comment.

14.10.2 Excel File Readout

Click the Open File button in the toolbar.

It can also be conducted by operating File → Open.

Open File dialog will appear.

Select either “Excel 97-2003 Workbook (*.xls)” or “All Files (*.*)” and all the “.xls” files should appear.

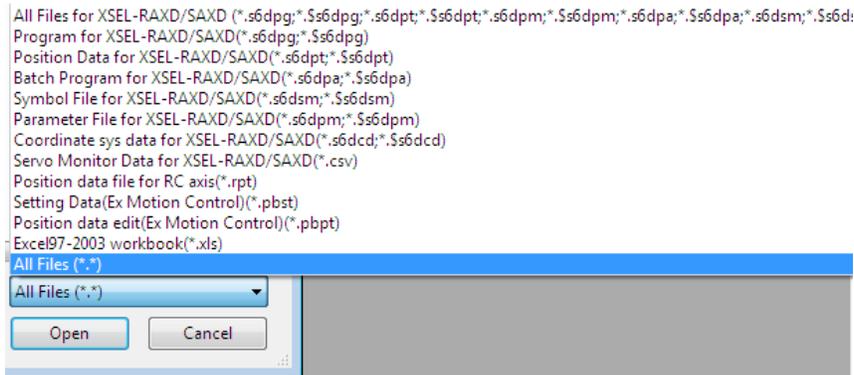


Fig. 14.13 Open File Dialog

The controller selection window will show up once a “Excel 97-2003 Workbook (.xls)” file with the correct position data file format is selected. Select a controller to be used, press **OK** button, and Microsoft Office Excel opens and the file will start to be read out. File readout error will be displayed if the file format is incorrect.

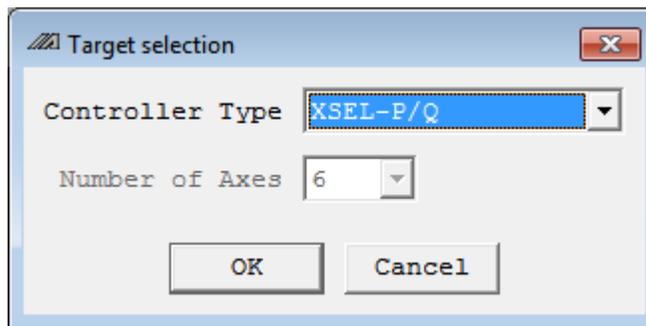


Fig. 14.14 Target Selection

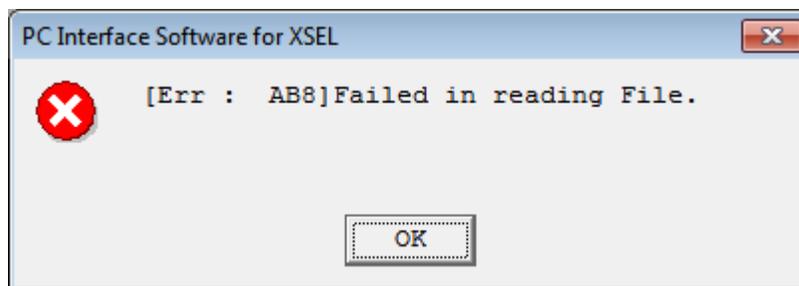


Fig. 14.15 File Readout Error

14.10.3 Excel File Create and Edit

When creating and editing the position data in Microsoft Office Excel and reading out in the XSEL PC software, input the title line in the first line of the first Excel sheet, and input the position data from the second line.

Or, by creating a new file and save it with a name in the XSEL PC software, an Excel file with title line and number column are already input can be generated. With using this file, create and edit the position data on the Excel sheet.

[Refer to 14.10.1 “Position Data Format” for the title line]

14.10.4 Caution

- (1) Do not attempt to input any information except for those described in the position data format to the title line and position number column. Doing so will disturbs reading the data correctly.

In the area hatched in the figure below can be used for free input.

(Note) Once the file gets overwritten in the XSEL PC software, the data input in the hatched area will all be deleted.

No	Axis1	Axis2	Axis3	Axis4	Axis5	Axis6	Axis7	Axis8	Axis9	Axis10	Axis11	Axis12	Vel	Acc	Dcl	OutFn	OutNo	OutParam1	OutParam2	Comment
1	1.001	2.001	3.001	4.001	5.001	6.001	7.001	8.001	Right	1	1.01	2.01	OND	300	3.001	4.001	Pos1			
2	1.002	2.002	3.002	4.002	5.002	6.002	7.002	8.002	Left	2	1.02	2.02	OFF	300	3.002	4.002	Pos2			
3	1.003	2.003	3.003	4.003	5.003	6.003	7.003	8.003	Left	3	1.03	2.03	OND	300	3.003	4.003	Pos3			
4	1.004	2.004	3.004	4.004	5.004	6.004	7.004	8.004	Right	4	1.04	2.04	OFFD	300	3.004	4.004	Pos4			
5	1.005	2.005	3.005	4.005	5.005	6.005	7.005	8.005	Right	5	1.05	2.05	ONR	300	3.005	4.005	Pos5			
6	1.006	2.006	3.006	4.006	5.006	6.006	7.006	8.006	Left	6	1.06	2.06	OFFR	300	3.006	4.006	Pos6			
7	1.007	2.007	3.007	4.007	5.007	6.007	7.007	8.007	Right	7	1.07	2.07					Pos7			
8	1.008	2.008	3.008	4.008	5.008	6.008	7.008	8.008	Left	8	1.08	2.08	ON	300	3.008	4.008	Pos8			
9	1.009	2.009	3.009	4.009	5.009	6.009	7.009	8.009	Left	9	1.09	2.09	OFF	300	3.009	4.009	Pos9			
10	1.01	2.01	3.01	4.01	5.01	6.01	7.01	8.01	Right	10	1.1	2.1	OND	300	3.01	4.01	Pos10			

Fig. 14.16 Position Data Input Area

- (2) If there is a restriction on the edit or readout of the Excel file, it will cause a file readout error.
- (3) If you work on Microsoft Office Excel while the file is being saved or read out, file save or readout could fail.

15. Tool

The Environment Setup window accessible from the Tool menu consists of the Setting and Timer tabs.

(1) Setting

Specify whether or not to check symbols during the program error check.

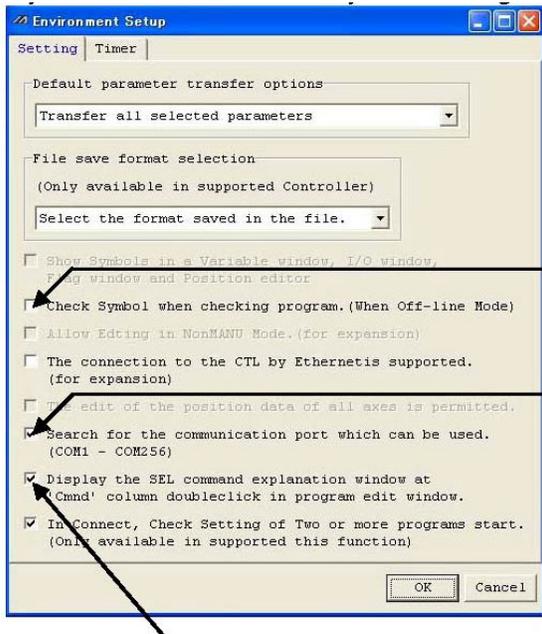


Fig. 15.1 Setting (Offline)

If this checkbox is not selected, symbol errors will not be checked.

If this checkbox is not selected, the communication port which can be used will not be checked.

However, selectable communication ports are extended to COM1 to COM256 in the communication check window.

If the selected communication port cannot be used, the "EC5: communication port open error" will occur.

If this checkbox is not selected, partial correction will be possible when the 'Cmd' column is double-clicked.

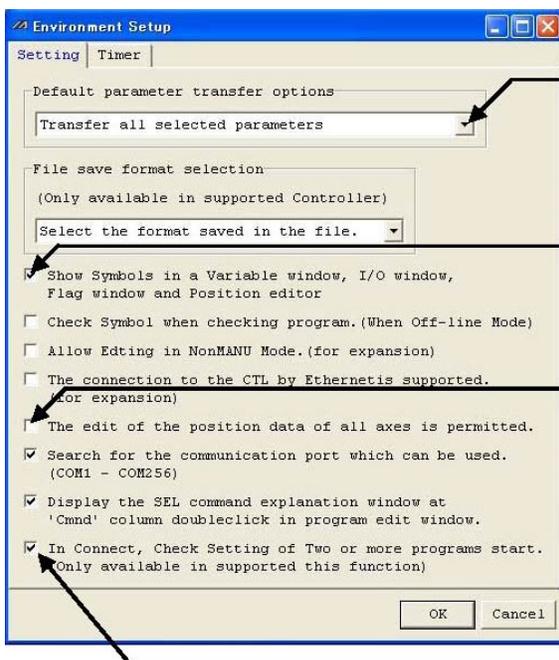


Fig. 15.2 Setting (Online)

Specify the default parameter transfer option.

If this checkbox is selected, symbols will be shown in the variable window, I/O window, flag monitor window and position data edit window.

Position data editing is permitted for four axes in the case of X-SEL J/K controllers, and six axes in the case of the P/Q and PX/QX controllers. In the case of the R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD type, editing of position data for eight axes is permitted.

This function is not supported by the X-SEL-J/K, JX/KX, TT, XSEL-P/Q (application version 0.01 - 0.35) or X-SEL-PX/QX controller (application version 0.01 - 0.16).

For PC interface software version 7.2.0.0 or later, saving method can be chosen in the Environment Setup screen.

- Always save by Format 2: Files are always saved by the extended format (Format 2). This is supported by the X-SEL-P/Q, PX/QX, SSEL, TTA, MSEL-PC/PG, PCX/PGX controllers compatible with increased memory.
- Choose the format type: When saving programs or position data, either saving by the normal format (Format 1) or saving with the extended format (Format 2) can be chosen in the select screen.

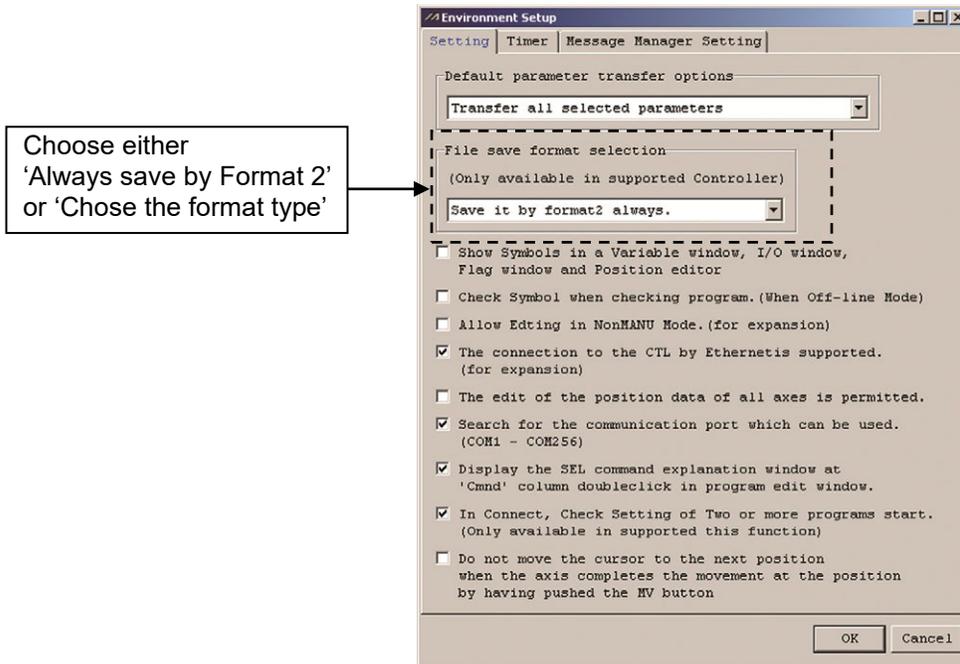


Fig. 15.3 Setting (PC interface software V7.2.0.0 or later)

(2) Timer

You can set the times required for the controller to make reference to the various data. This determines the frequency of updates for each monitor. Normally the settings need not be changed. The setting range is from 100 to 3,000 [ms].

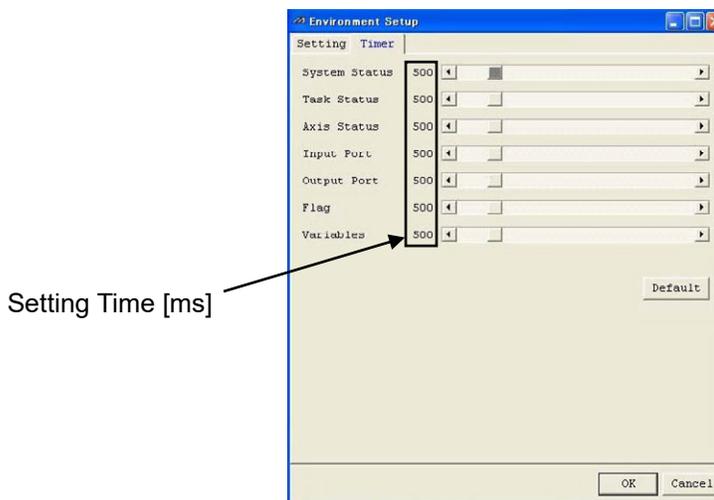


Fig. 15.4 Timer

In PC Software V9.00.00.00 or later, “Maximum number of errors/warnings shown on the Edit Position screen before transfer” is displayed.

[For the function to display errors/warnings before data transfer (common to all models), refer to 6.2, “Saving Positions and Ending Editing.”]

The largest axis number among the axes whose data can be edited is shown after “Permit editing of position data for all axes.”

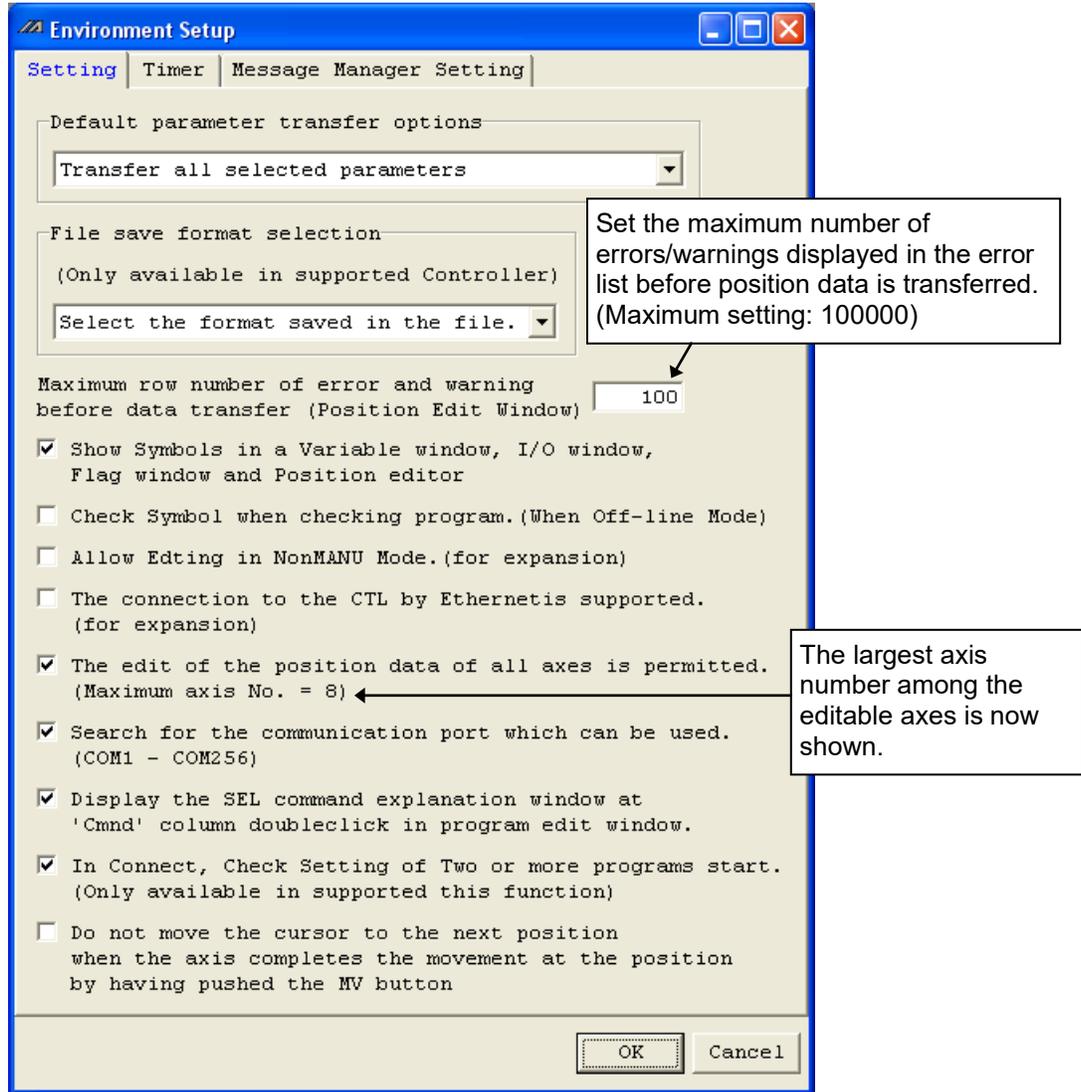


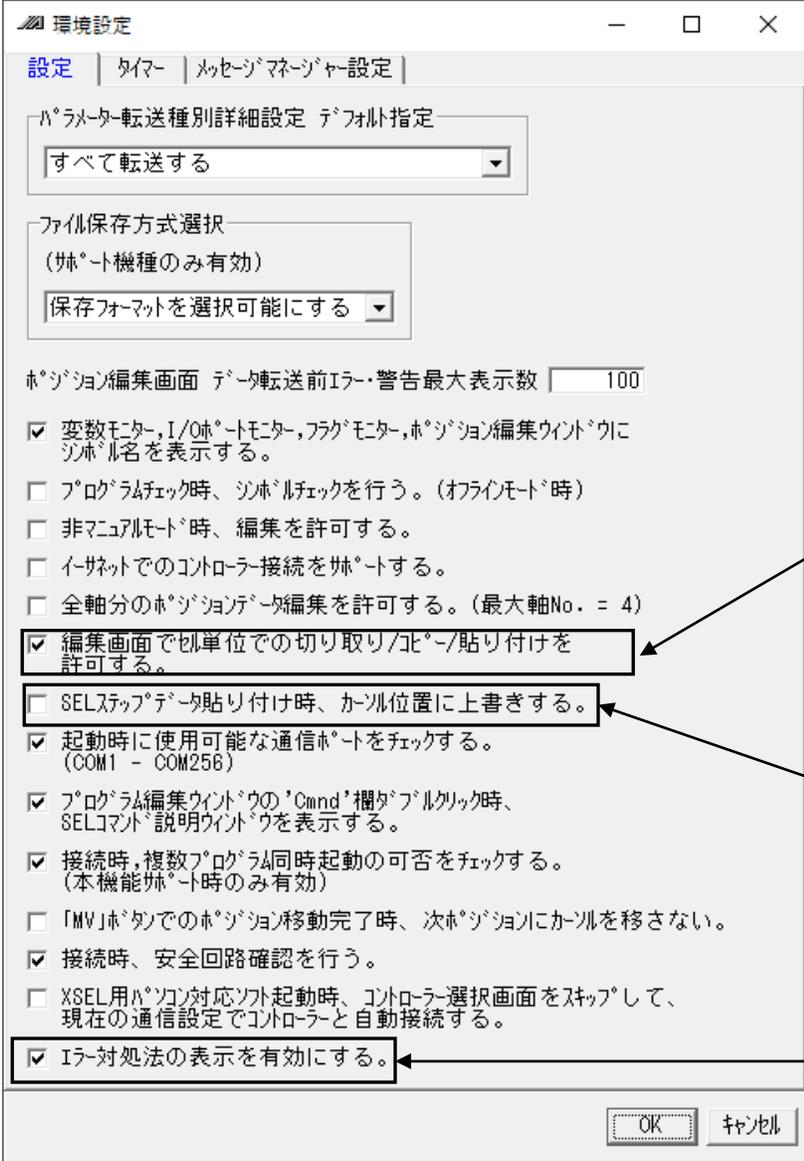
Fig. 15.5 Environment Setup Screen (V9.00.00.00 or later)

(Note) In the case of the X-SEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD controller, the maximum axis number for which position data editing is permitted varies depending on how the controller is set up.

Cut, copy and paste in cell unit in the following edit screen are available in the PC software version V12.02.00.00 and later.

- Edit Program window
- Edit Position window
- Edit Symbol window
- Edit RC Axis Position Data window

Also, paste is operated in Edit Program window, it can be chosen from overwriting and inserting.



環境設定

設定 | タイマー | メッセージマネージャ設定

パラメータ転送種別詳細設定 デフォルト指定
すべて転送する

ファイル保存方式選択
(特殊機種のみ有効)
保存フォーマットを選択可能にする

ポジション編集画面 データ転送前エラー警告最大表示数 100

- 変数モニター, I/O特殊モニター, フラグモニター, ポジション編集ウィンドウにシンボル名を表示する。
- プログラムチェック時、シンボルチェックを行う。(オフラインモード時)
- 非マニュアルモード時、編集を許可する。
- インターネットでのコントローラ接続を特殊にする。
- 全軸分のポジションデータ編集を許可する。(最大軸No. = 4)
- 編集画面でセル単位での切り取り/コピー/貼り付けを許可する。
- SELステップデータ貼り付け時、カーソル位置に上書きする。
- 起動時に使用可能な通信ポートをチェックする。(COM1 - COM256)
- プログラム編集ウィンドウの「Cmd」欄ダブルクリック時、SELコマンド説明ウィンドウを表示する。
- 接続時、複数プログラム同時起動の可否をチェックする。(本機能特殊時のみ有効)
- 「MV」モードでのポジション移動完了時、次ポジションにカーソルを移さない。
- 接続時、安全回路確認を行う。
- XSEL用ポジション対応ソフト起動時、コントローラ選択画面をスキップして、現在の通信設定でコントローラと自動接続する。
- エラー対処法の表示を有効にする。

OK キャンセル

Put a checkmark to enable cut, copy and paste in cell unit.

Put a checkmark here, and the copy data overwrites when paste is operated in Edit Program window.
With no checkmark, the copy data is inserted when paste is operated in Edit Program window.

Remove the checkmark, and the Error Countermeasures window (refer to Chapter 17 "Error Countermeasures") should not open when an error is occurred, and an error dialog (Fig. 15.7) should notify that an error has been occurred.

Fig. 15.6 Environment Setup Window (V12.02.00.00 or later)

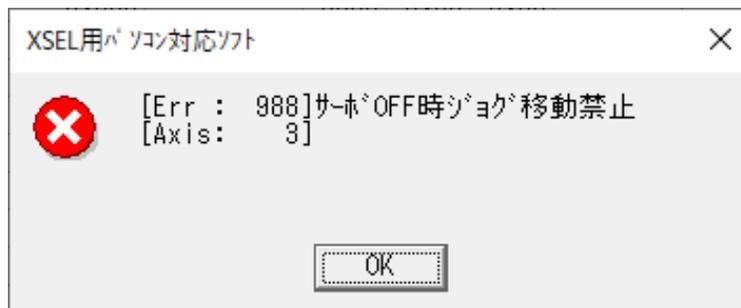


Fig.15.7 Error Dialog

16. IXA Simulator

16.1 Outline

By editing the SEL program or position data and operating the program execution in the program editing window, operation check becomes available on the PC.

Note: Even though operation can be performed in simulation, there may be a case that the overload error can occur and not able to operate in the actual robot operation.

Note: If there is an input signal awaiting in a program, it will not go on to the next step until this program gets executed. If there is an input signal awaiting, use the debug filtering feature in the input port monitor window.

16.2 Preparation

16.2.1 System Requirements

16.2.1.1 Required System / Recommended System Requirements

Item	Specifications
OS	Windows 10
CPU	Intel Core i Series or Intel Core 2 Quad or higher
Memory	2G byte or more
Hard Disk Space	Space of 1G byte or more required (This software is to be installed to the hard disk drive to use)
Graphic	1280 × 1024 dots or more Operating environment of DirectX 9.0c is required Graphic memory of 64MB or more required
Others	.Net Framework 4.0 or more required

Note: The software cannot be installed to a PC with Virfit provided by Computer Engineering & Consulting Ltd. already installed.

16.2.2 How to Install

It is mandatory that X-SEL PC Software V13.02.24.00 or later is installed in order to operate the IXA simulator.

- [1] Insert the DVD-ROM containing this software into your DVD-ROM drive.
- [2] The installed data selection screen will be displayed.

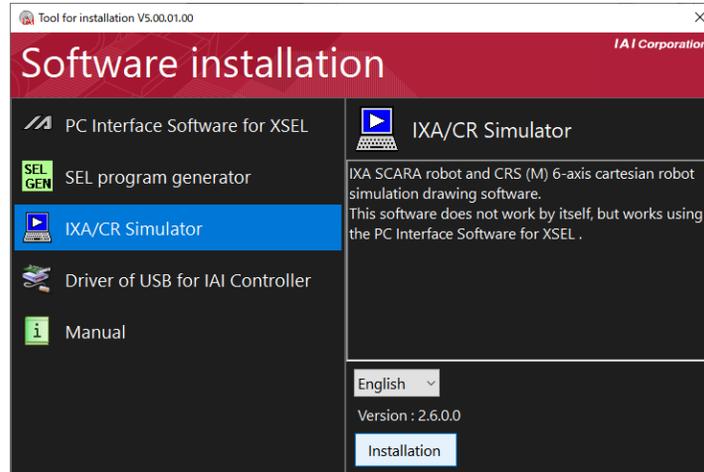


Fig. 16.1 Installed Data Selection Screen

Select "IXA/CR Simulator" and then click on "Installation".

- [3] The screen will change to the installation screen.

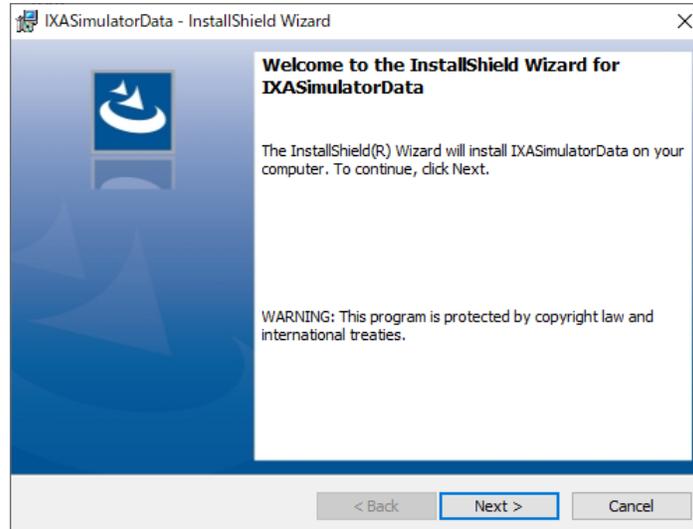


Fig. 16.2 Installation Screen

- [4] Click Next >. The data necessary for simulation gets installed.
Following window appears when the installation of simulation data is complete.

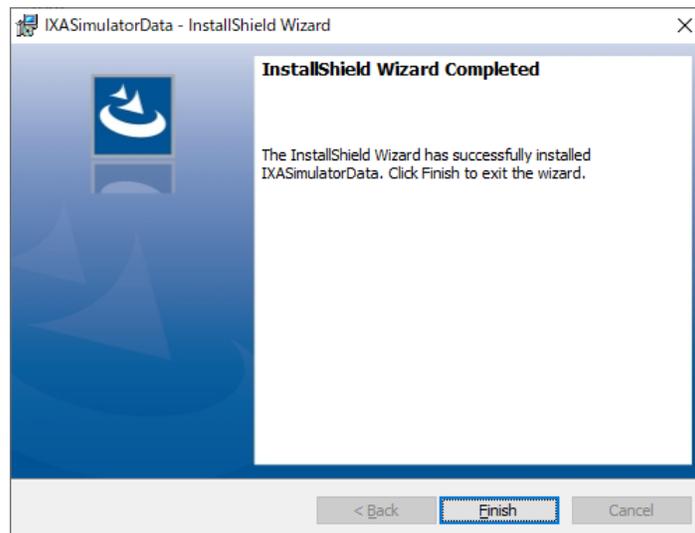


Fig. 16.3 Installation Screen

- [5] Click Finish.

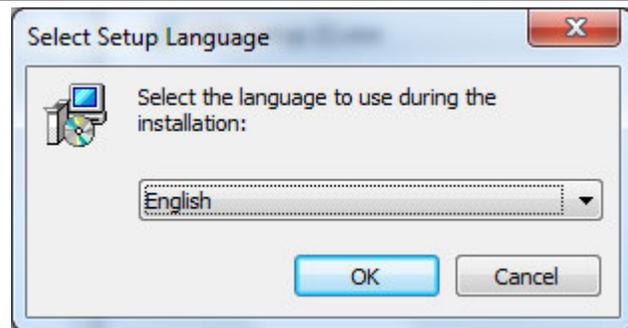
[6] Installation of 3D Drawing Software (Virfit) starts.

Note: If this software is installed to a PC with Virfit provided by Computer Engineering & Consulting Ltd. already installed, it will be overwritten by the one dedicated for IXA simulation. Cancel the process and install the software to another PC.

1. Select English as the language to be displayed in Virfit.

Click OK.

* It is the display only in recovery installation.



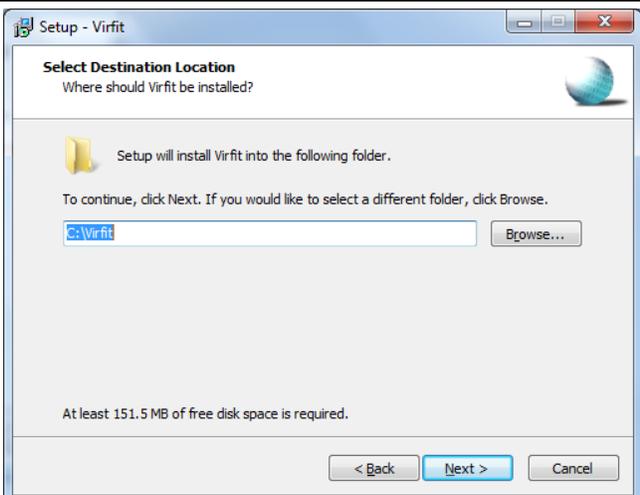
2. The setup start window for installation appears.

Click Next >.



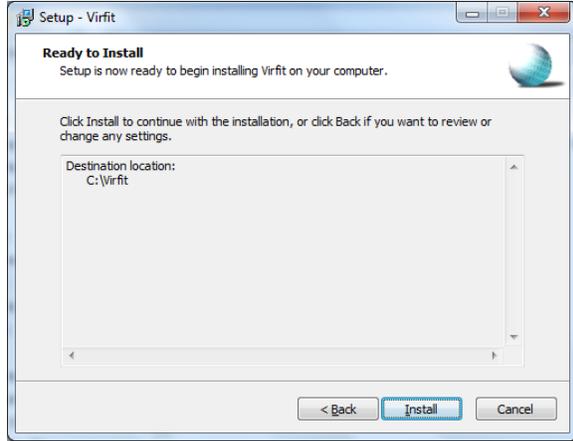
3. A window to indicate the destination location to install the software shows up.

Click Next > with the default setting unless necessary to change.



4. Ready to Install window comes up.

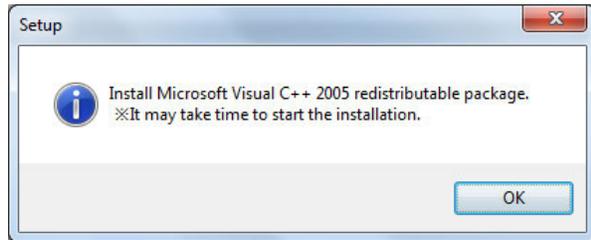
Confirm there is no problem in the display and click Install.



5. Install Visual C++ 2005 Redistributable Package.

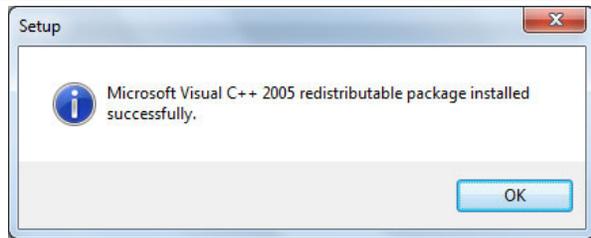
Click OK.

* It may take time to start the installation.



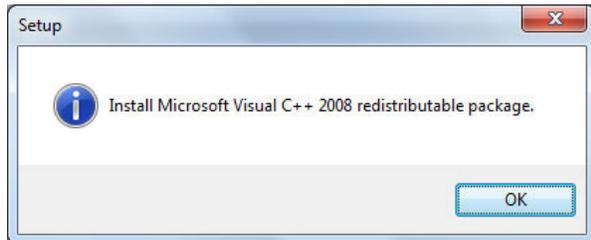
6. A message appears when the installation of Visual C++ 2005 Redistributable Package is complete.

Click OK.



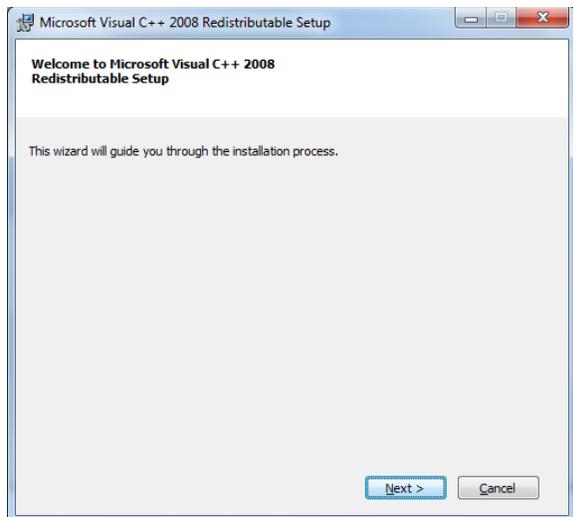
7. Install Visual C++ 2008 Redistributable Package.

Click OK.



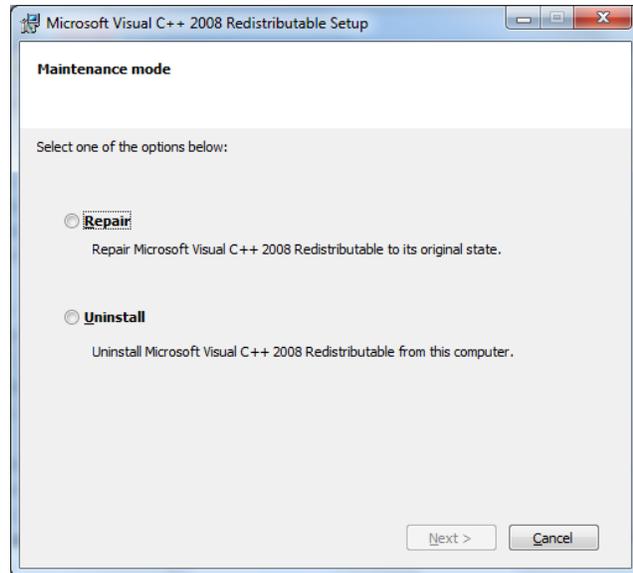
8. A setup window for Visual C++ 2008 Redistributable shows up.

Click Next >.
Move on to Step 9.



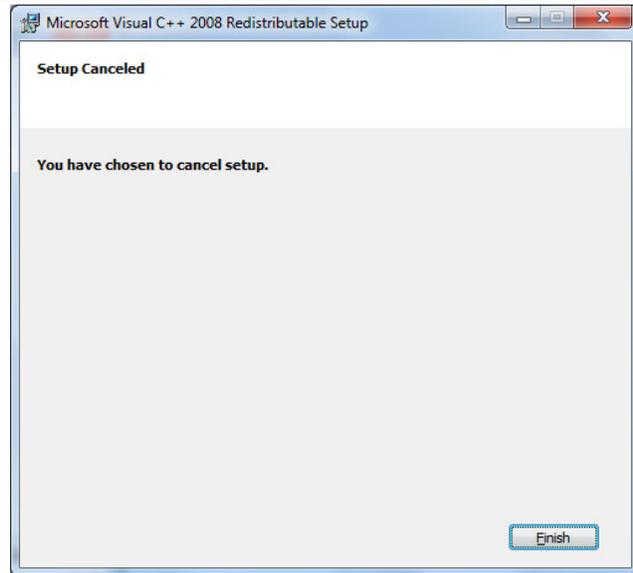
8-1. For a PC with Visual C++ 2008 Redistributable Package already installed, a window shown on the right appears.

Click Cancel.



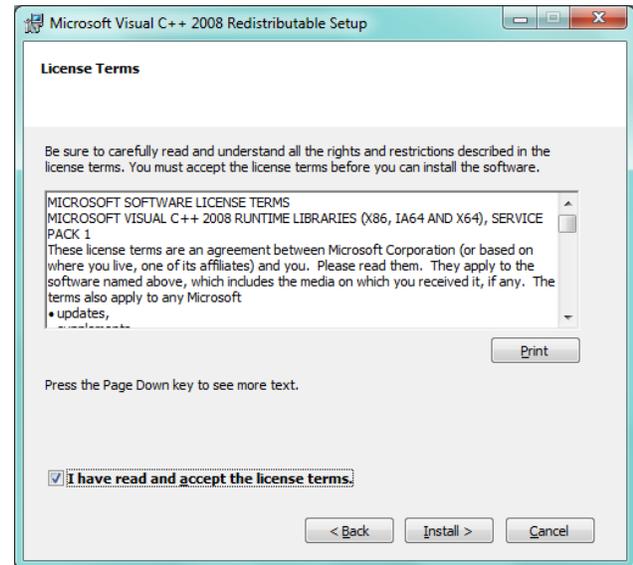
8-2. Setup should be cancelled and a window shown on the right appears.

Click Finish.
Move on to Step 11.



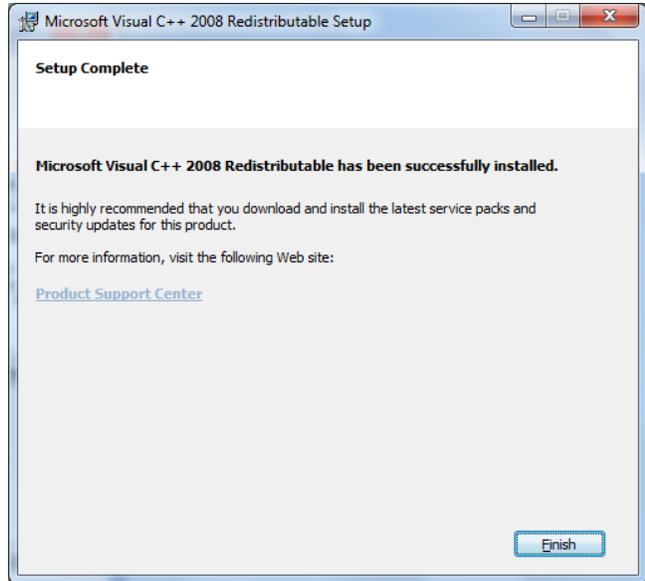
9. License Terms for Visual C++ 2008 Redistributable software gets displayed.

Check to the acceptance and click Install.



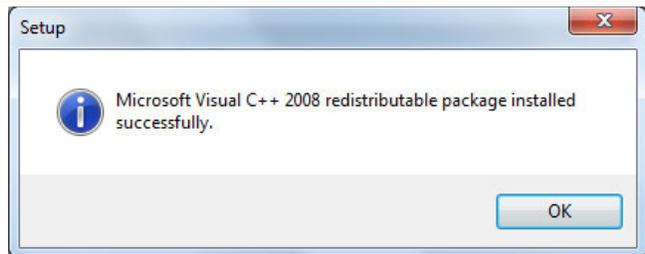
10. A setup complete window for Visual C++ 2008 Redistributable appears.

Click Finish.



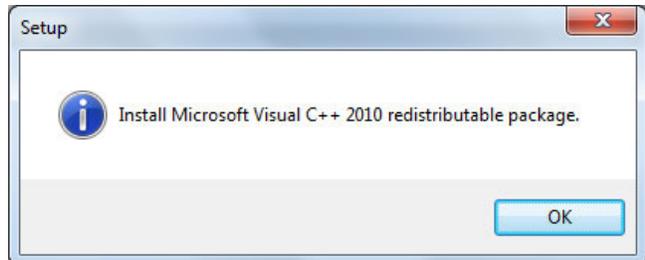
11. A message appears when the installation of Visual C++ 2008 Redistributable Package is complete.

Click OK.



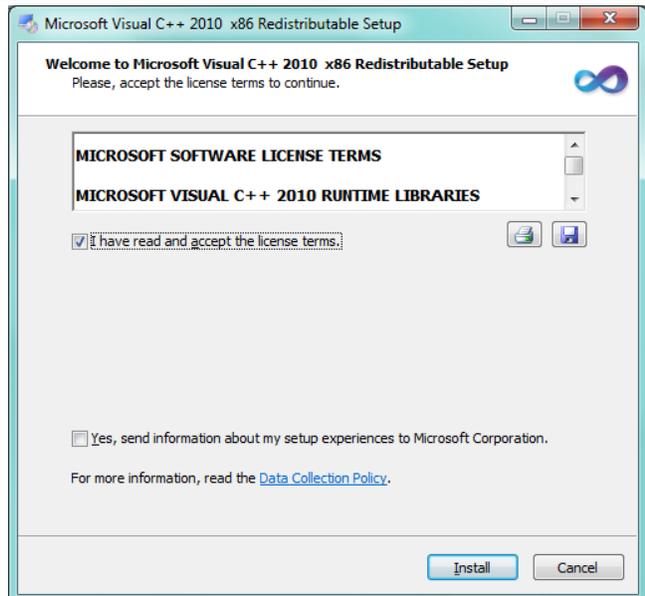
12. Install Visual C++ 2010 Redistributable Package.

Click OK.
* For a PC with Visual C++ 2010 Redistributable Package already installed, this window will not appear and the process moves on to Step 16.



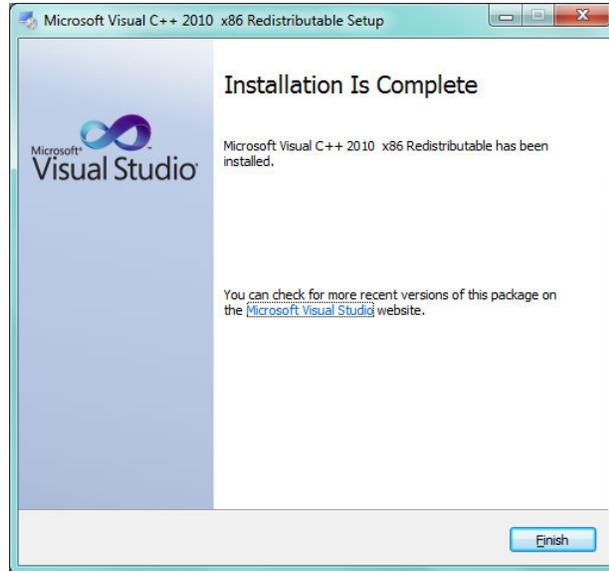
13. License Terms for Visual C++ 2010 Redistributable software gets displayed.

Check to the acceptance and click Install.
* It may not be displayed in some environments of use.



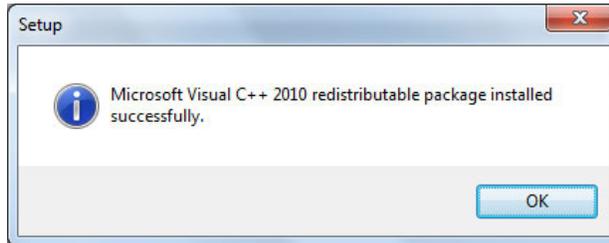
14. A setup complete window for Visual C++ 2010 Redistributable appears.

Click Finish.



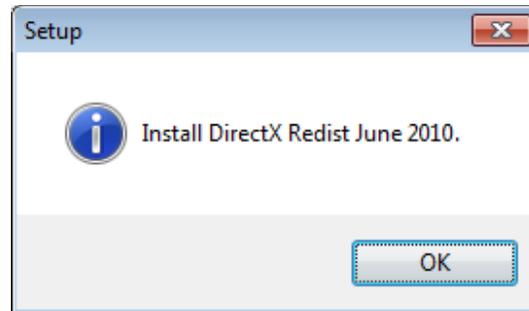
15. A message appears when the installation of Visual C++ 2010 Redistributable Package is complete.

Click OK.



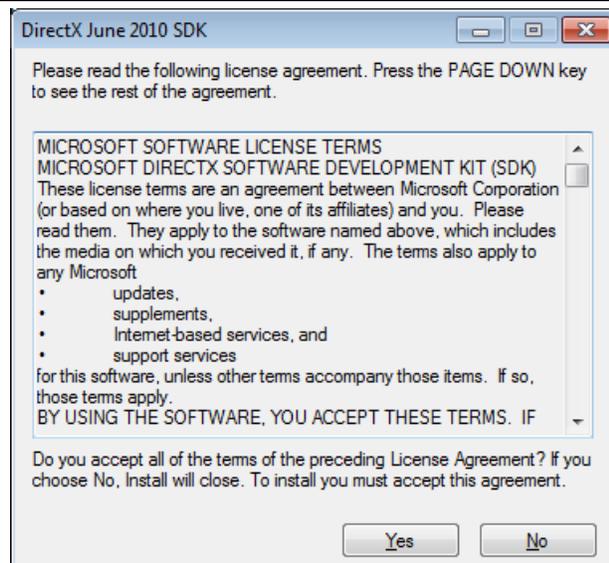
16. Install DirectX Runtime.

Click OK.
* For a PC with DirectX already installed, this window will not appear and the process moves on to Step 22.



17. The software license agreement shows up.

Click Yes.



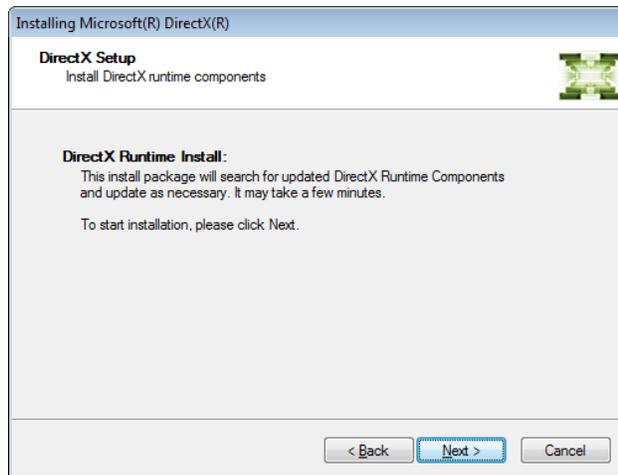
18. A setup window for DirectX shows up.

Check on accept the agreement and click Next >.



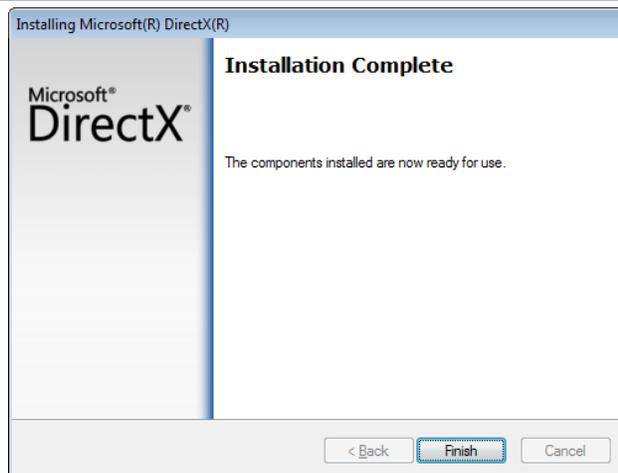
19. A installation confirmation window comes up.

Click Next >.



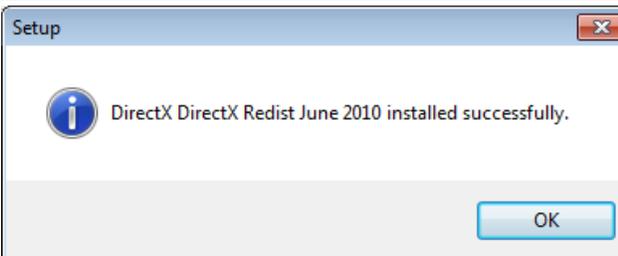
20. A DirectX installation complete window appears.

Click Finish.



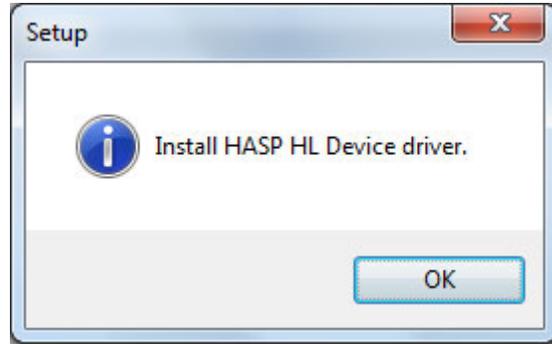
21. A message appears when the installation of DirectX Runtime is complete.

Click OK.



22. Install HASP HL Device Driver.

Click OK.



23. A setup window for Sentinel Runtime shows up.

Click Next >.



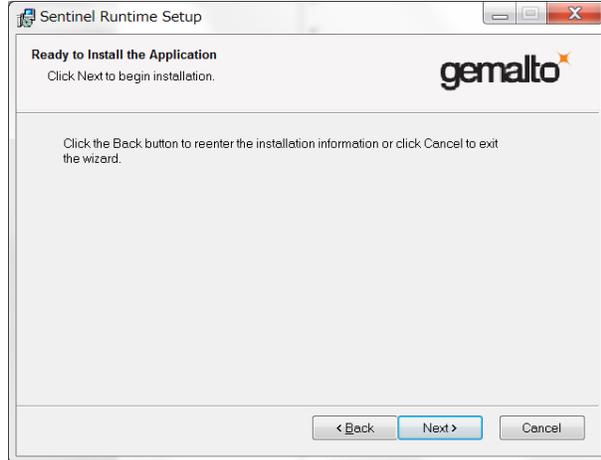
24. A license agreement window shows up.

Check on "I accept the license agreement" and click "Next >".



25. Ready to Install window comes up.

Click Next >.



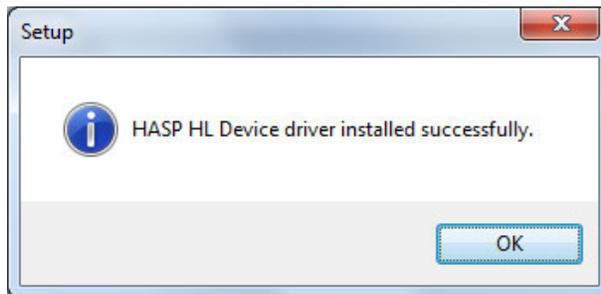
26. A Sentinel Runtime installation complete window appears.

Click Finish.



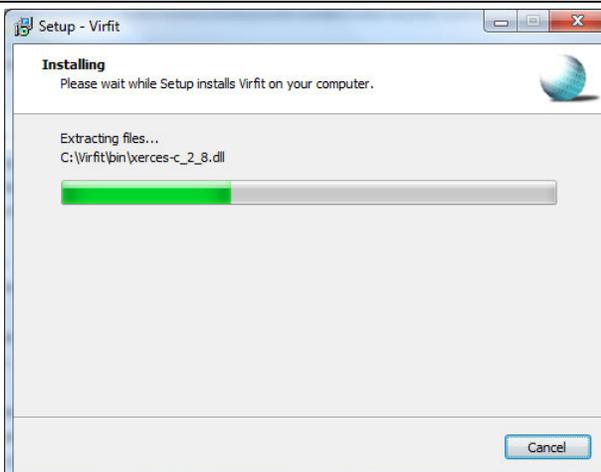
27. A message appears when the installation of HASP HL Device Driver is complete.

Click OK.



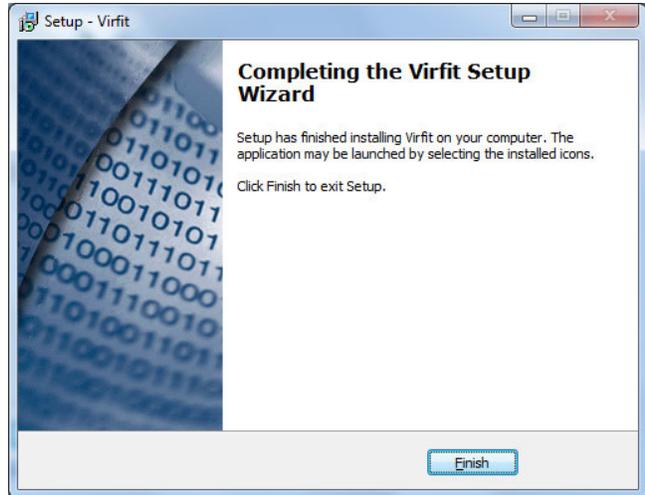
28. Installation of Virfit starts.

Wait for a while.



29. A setup complete window for Virfit appears.

Click Finish to complete the installation.



16.3. How to Start up

16.3.1 Startup

When the X-SEL PC software is started, the Connection Confirmation window will open first. Select “Simulator” (*1) from the list in “Port Name” and click on [OK] button.

* 1 PC software can be launched in several windows on one PC, however it should be only one window on one PC that can be connected to the simulator.

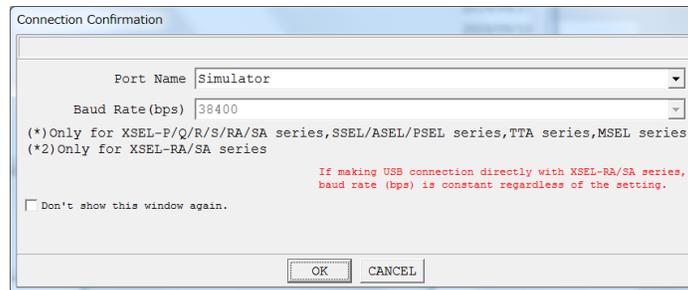


Fig. 16.4 Connection Confirmation Screen

After clicking on [OK] button, a robot select window comes up. Select “Controller Type” next.

Select the name of the robot to be simulated from the lists in “Type” and “Model”.

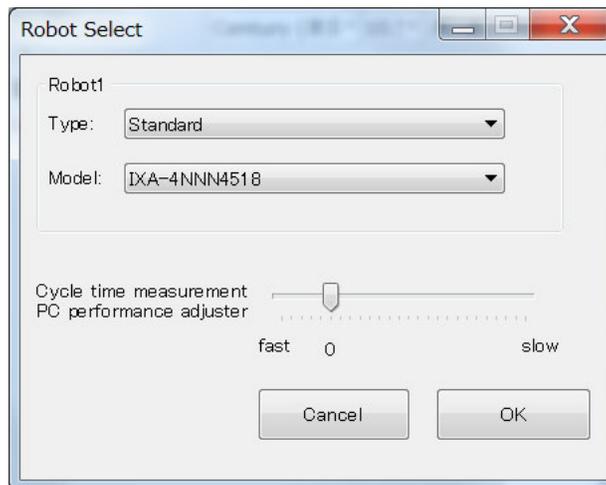


Fig. 16.5 Robot Select Screen

The parameters should be initialized when a robot model different from the one selected previously is selected.

[Refer to 16.5.1 FROM Writing Operation]

In case requires to change the robot model, end the simulation once and reboot.

16.3.2 Cycle Time Measurement PC Performance Adjustment

Cycle time measurement is available also when connected to the simulator, however, it can vary due to the performance and load on the PC to be used, and will not perfectly match with the time measured on the actual controller. Utilize this as a reference for cycle time consideration. If the difference between the actual controller and the simulator is expectable in advance, the result on the PC (simulator) can be adjusted slower or faster on the slider bar. (10% of increase/decrease by one gradation)
[Refer to 4.5 Cycle Time Measurement]

[1] Conditions at Cycle Time Measurement

Note that there are some limitations as follows in the cycle time measurement in the simulator.

Note:

- Do not attempt to use a program with conditional change of input signals.
A program that waits for a signal from outside should be commented out at that part or extract only the part to be measured to conduct the cycle time measurement. In case of considering the cycle time of such a program, add the waiting time into the consideration on top of the measurement result.
- Use a program that does not run in infinite loop.
In case of a program in loop and the time between the end and start in the range of measurement is short, the measurement result display time gets short and always displays under measurement.

[2] Cause of Cycle Time Measurement Variance in Simulator

(1) Variance due to CPU Process Speed and Memory Access Difference

There is a tendency in general that a PC has a CPU with better performance and the process is faster (cycle time measurement result shorter) except for the robot operation system commands (arithmetic operation, brunch instruction, etc.). Also in commands to operate the global data, the way of memory access is different from the controller making the cycle time measurement result shorter in a PC (simulator).

(2) Using Commands Dependent to Condition of Robot Main Unit

In the cycle time measurement in a simulator, there is no connection to a robot unit or external device. This makes the simulator unable to measure the cycle time properly in such commands as those to monitor external force against the robot or those to communicate with external devices. Described below are the applicable commands.

No.	Feature	Command	Explanation
1	Pressing	PUSH	As there is nothing to push against, always finishes with miss-pressing.
2	Communication	OPEN/CLOS/READ/ WRIT/TMRW	Moves on to the next step without conducting communication process. It makes the cycle time shorter than the actual controller.
3	Compliance	COMP	Equivalent result to that with compliance mode inactivated comes out. (External force against robot monitored)
4	Collision detection	COL	Equivalent result to that with no collision detection comes out. (External force against robot monitored)

16.3.3 Warning at First Startup

There may be a case that a warning window as shown below appears at the first startup of the simulator. When this window appears, confirm that there is a check mark in a check box corresponding to your environment of use and click on the allow access button. It is necessary in order to operate of 3D view.

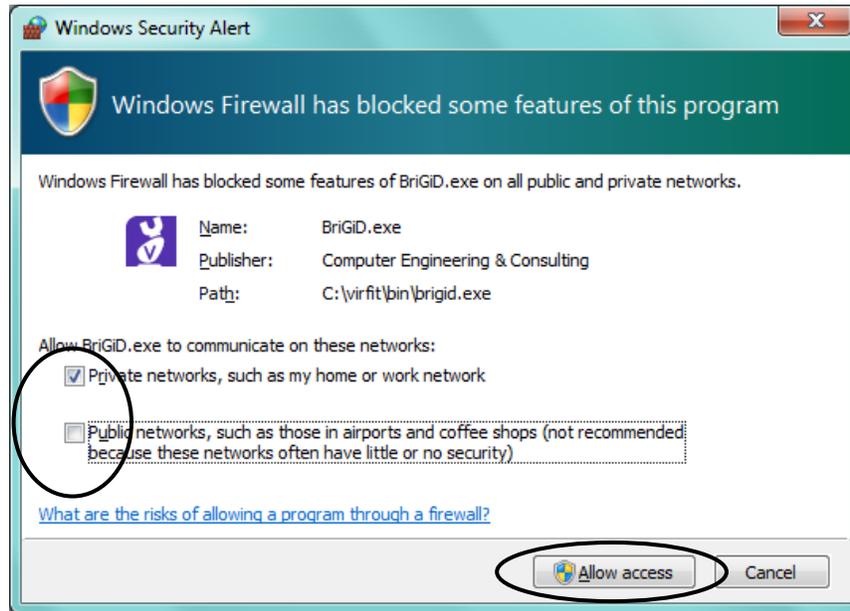


Fig. 16.6 Example of Warning Window at First Startup of Simulator

16.3.4 Start of Simulation

Either read out a SEL program or position data to be simulated from a file (File - Open in the menu bar) or create a new (File - Create New in the menu bar) and transfer to the simulator. Refer to 3.2 Explanation of the Commands [1], 4. Program Edit Window and 6. Position Data Edit Window for detail of how to edit and transfer a SEL program or position data.

After data transfer, refer to 4.4 Running the Program in order to execute a program.

Note: As it will be launched with "Safety VEL Specified" at the PC software startup, switch it to "Safety VEL Not Specified" if necessary. [Refer to 3.3 Explanation of the Toolbar]

16.3.5 Stop of Simulation

Refer to 4.4 Running the Program in order to stop the program.

16.3.6 Termination of Simulation

Either finish the PC software or execute Off-line work (Exit Simulator) in the controller menu. If it is required to perform simulation again from offline condition, reconnect and execute it in the process of startup in 3.1. (Reconnection menu gets active offline.)

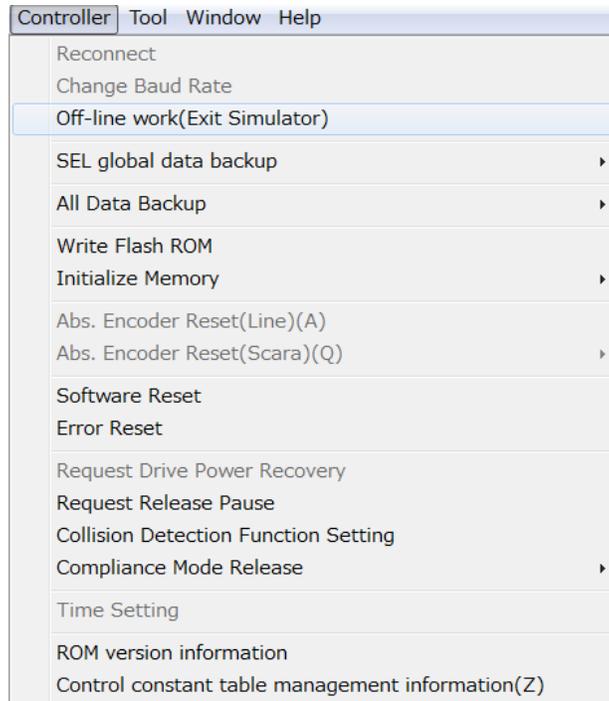


Fig 16.7 Controller Menu

16.4 Basic operation in 3D View Window

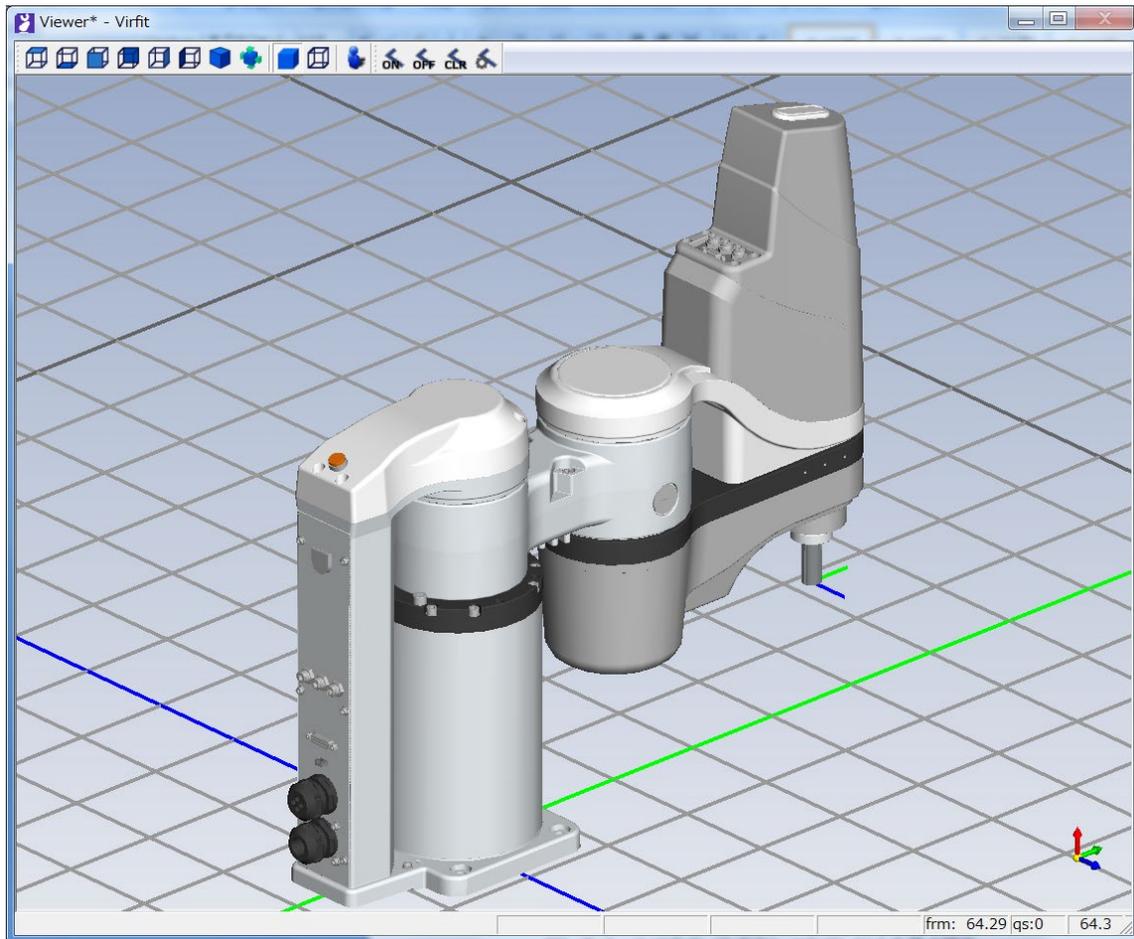


Fig. 16.8 3D View Window

16.4.1 View Operation (Normal Mode)

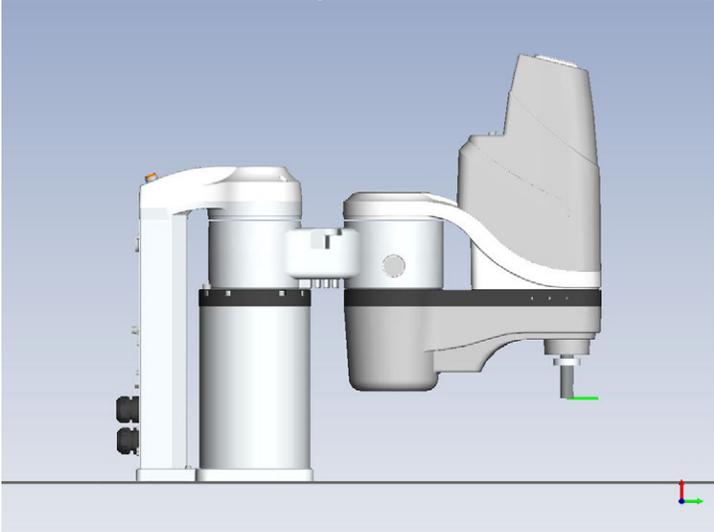
(1) View Operation Using a Wheel Mouse (3-button Mouse)

Action	How to Operate
Rotation	Press and hold the wheel button (middle button) and press the left button to drag.
Panning	Press and hold the wheel button (middle button) and drag it.
Zooming	When using a wheel mouse, turn the wheel to zoom in and out. When using a 3-button mouse, press and hold the middle button, click the left button once and then drag.
Changing Rotation Center	Click the wheel button (middle button) at a point to make the center.

(2) View Operation Using Keys and Mouse

Action	How to Operate
Rotation	Press and hold Alt Key and press the left button and drag.
Panning	Press and hold Ctrl Key and press the left button and drag.
Zooming	Press and hold Ctrl + Alt Keys and press the left button and drag.
Changing Rotation Center	Press and hold Ctrl + Alt Keys and click the left button.

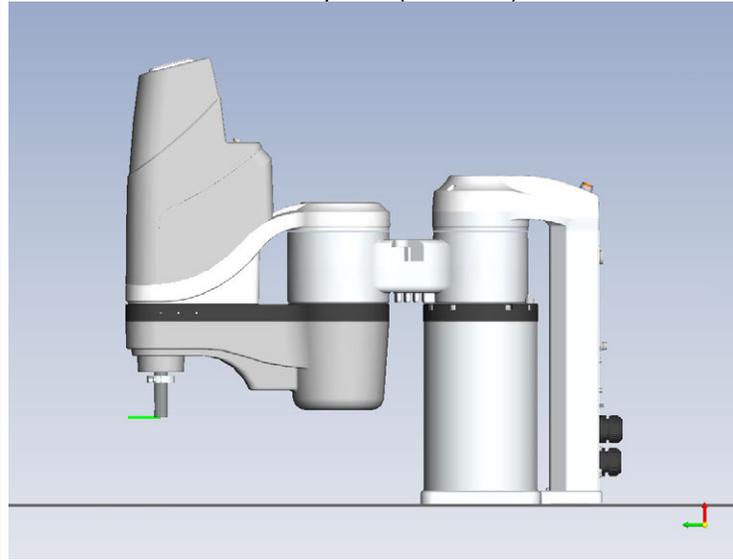
(3) Normal Camera Work from Tool Bar

	<p>Click [Front View Icon] in the tool bar. The view confronts the ZX plane.</p> 
	<p>Click [Right View Icon] in the tool bar. The view confronts the ZY plane.</p> 

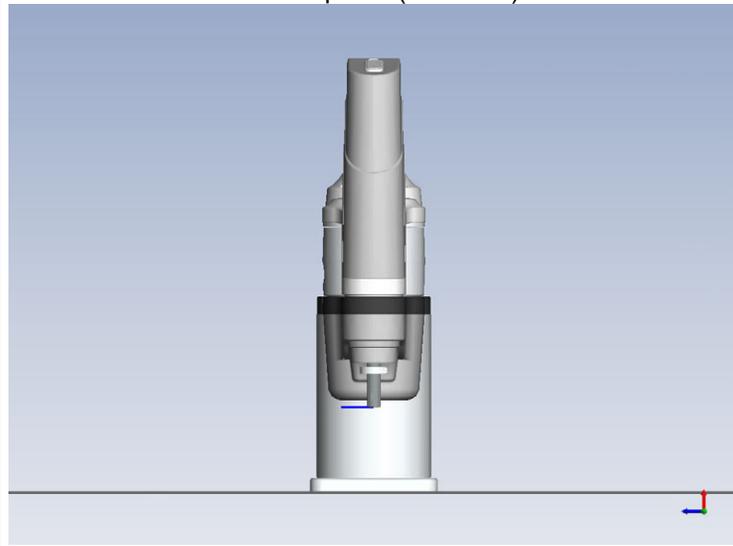


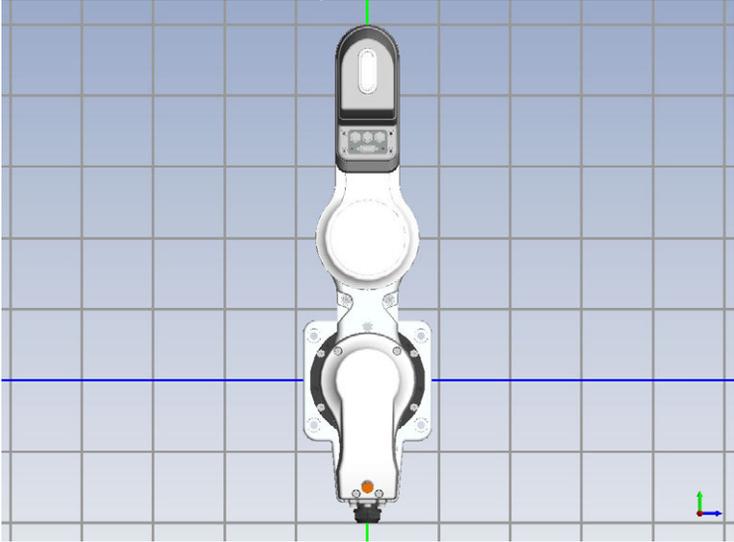
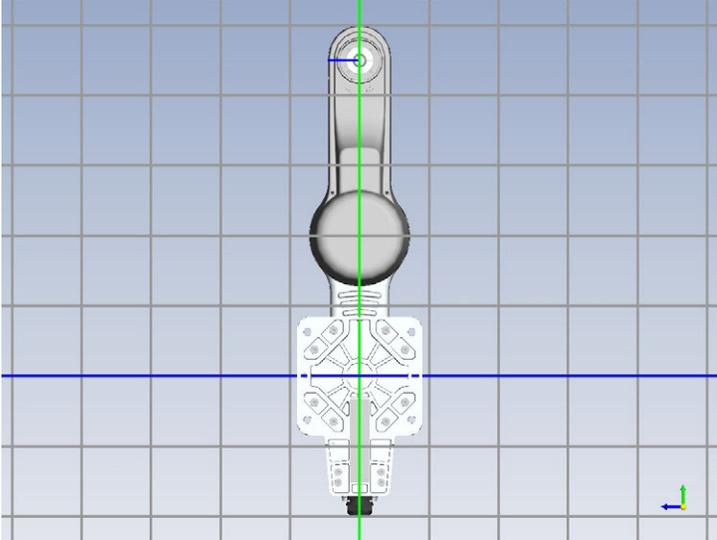


Click [Left View Icon] in the tool bar.
The view confronts the ZY plane (backside).

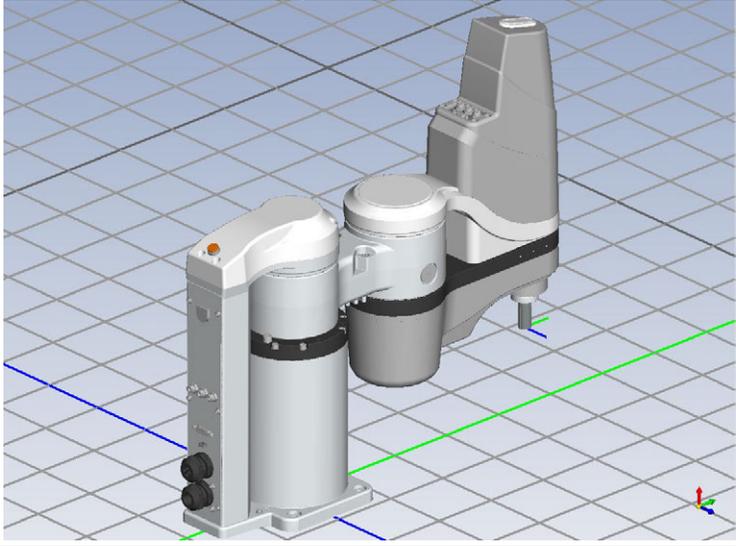


Click [Rear View Icon] in the tool bar.
The view confronts the ZX plane (backside).



	<p>Click [Top View Icon] in the tool bar. The view confronts the YX plane.</p> 
	<p>Click [Bottom View Icon] in the tool bar. The view confronts the YX plane (backside).</p> 



	<p>Click [Isometric View Icon] in the tool bar. The view comes slanted (isometric view).</p> 
	<p>Click [Zoom to Fit Icon] in the tool bar. The view shows the whole element without changing the view angle.</p>

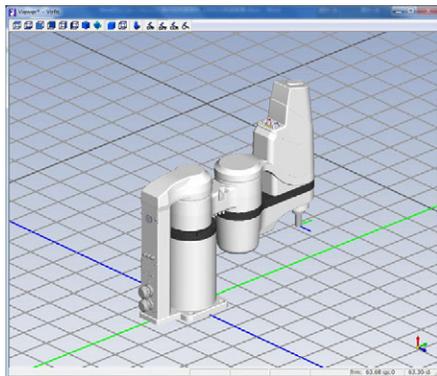
16.4.2 View Operation (Walkthrough Mode)

(1) Switching to Walkthrough Mode

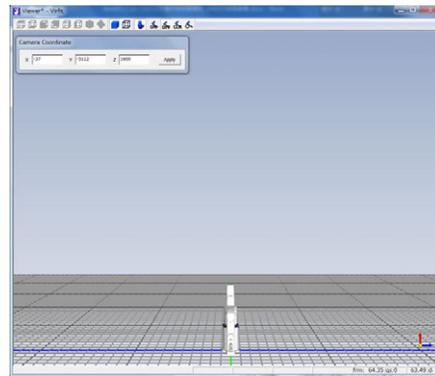
Click [Walkthrough Icon] .

During Walkthrough Mode, the icon is kept pressed.

Click on the icon while it is pressed, it gets back to the normal mode.



Normal Mode



Walkthrough Mode

(2) View Operation Using a Wheel Mouse (3-button Mouse)

Action	How to Operate
Panning (XY plane)	Press the left button and drag it. For a wheel mouse, turn the wheel to move back and forth.
Vertical Move (Z direction)	Press and hold the wheel button (middle button) and drag it.
Camera Rotation	Press the right button and drag it.

(3) View Operation in Camera Coordinate Window

Input numbers in camera coordinate window and click [Apply].

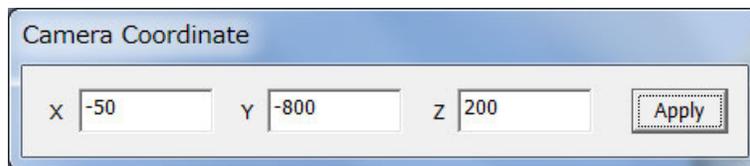


Fig. 16.9 Camera Coordinate Screen

The view moves to the point of coordinates that was input.

Note: Moving the mouse pointer in the view area during number input should cancel the input.

16.4.3 Track Plotting

The track of the vertical axis tip can be displayed. If the SCARA tool coordinate system offset in the coordinate system definition data is set up, the amount of offset is considered in the display.

(1) Turning on Track Plotting

Click [Track Display Activated Icon]  .

The track of the tip of the vertical axis gets plotted in response to the robot animation.

The track display shows a certain amount of movement and disappears from the older.

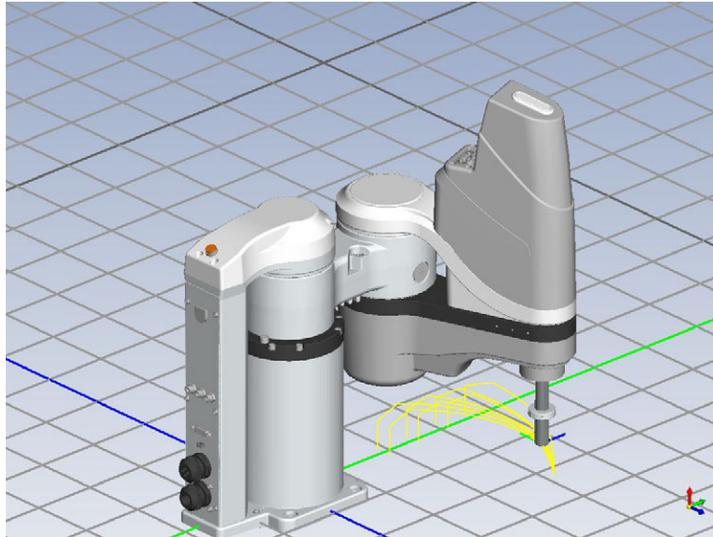


Fig. 16.10 During Track Plotting

Note: The pitch of robot track plotting may get longer in such conditions as described below:

- Robot movement speed high
- View changed
- PC performance is low
- Another application in operation etc.

Click [Track Display Inactivated Icon]  .

Track plotting stops.

Click [Track Display Clear Icon]  .

The displayed track are cleared up.

Click [Track Display Setup Icon] .

Color and line width of track and show/hide of robot is to be set up.

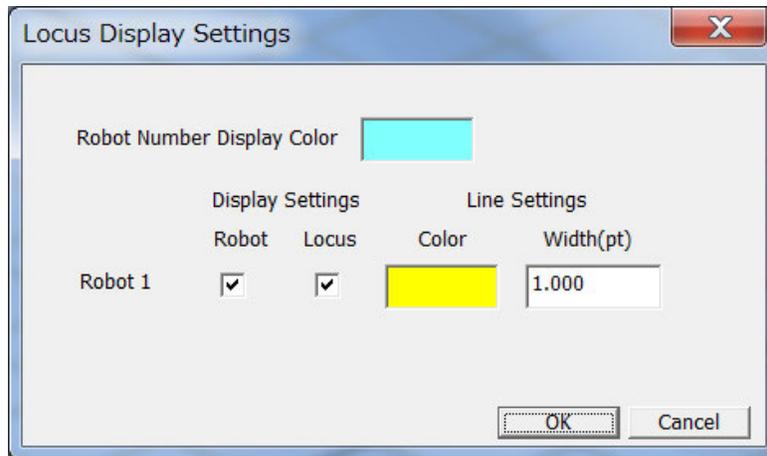


Fig. 16.11 Locus Display Settings

* Robot Number Display Color: Color of “Robot 1” displayed on the 3D view robot in the track display setup window

To change color, click on the colored portion and a color setting window pops up. Select a desired color and click [OK].

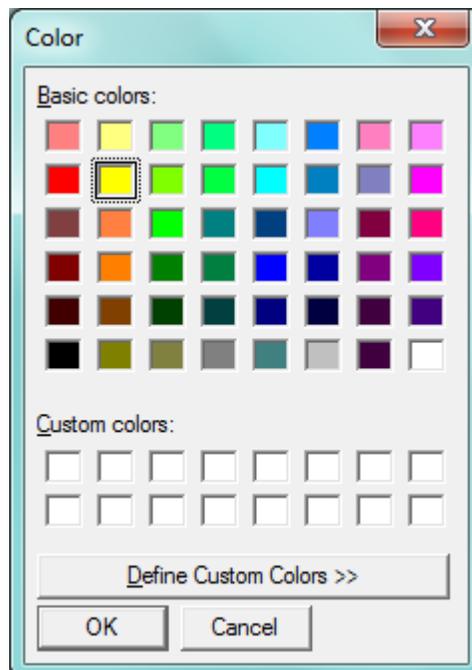


Fig. 16.12 Color

Line width can be changed in the range from 0.1 to 10.0.

16.4.4 Other Displays

(1) Lettering Mode

Display format of an object can be changed.

◆ Solid

Click [Solid Display Icon] .

During the solid display, the icon is kept pressed.

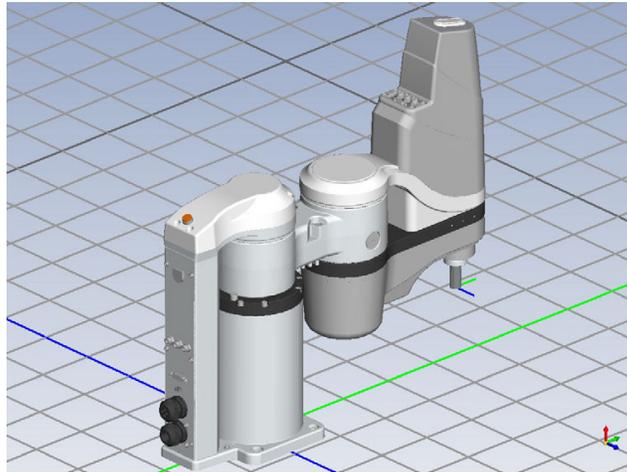


Fig. 16.13 Solid Display

◆ Wireframe

Click [Wireframe Display Icon] .

During the wireframe display, the icon is kept pressed.

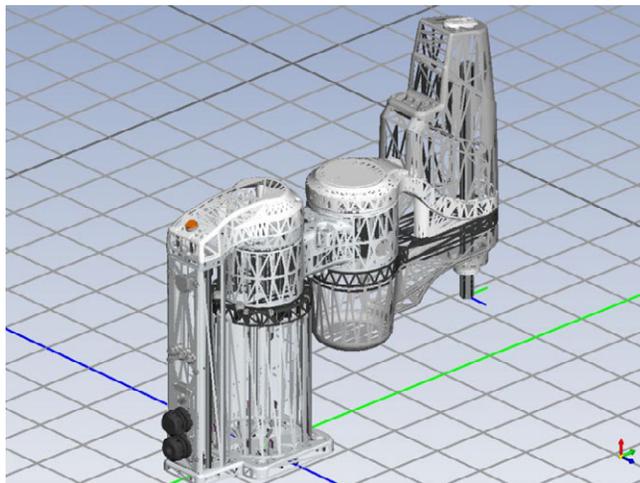


Fig. 16.14 Wireframe Display

16.5 Operation on PC Software

The features described in Chapters from 4 to 11, 14 and 15 are available to use while the simulator is connected. However, in Chapter 14, 14.3 Drive-source Recovery Request and 14.4 Setting Time cannot be used.

16.5.1 FROM Writing Operation

Conducting FROM writing operation in the PC software should make each type of data (program data, position data, symbols, coordinate system definition data and parameters) recorded in the hard disk in the PC. The recorded data is available for simulation in the next startup.

However, when the robot model is changed in the robot select window at the startup, each type of data (program data, position data, symbols, coordinate system definition data and parameters) will get initialized.

16.5.2 Operation of Software Reset

Conducting an operation of software reset in the PC software should bring the robot current position data back to the initial position.

16.6 SEL Commands not Applicable for Simulation

Shown below are those with different behaviors between controller and simulator in SEL Commands.

No.	Feature	Command	Explanation
1	Pressing	PUSH	As there is nothing to push against, always finishes with miss-pressing.
2	Communication	OPEN/CLOS/READ/ WRIT/TMRW	Moves on to the next step without conducting communication process. The output part should be set, but return codes or received messages should not be set. In case of debugging READ Command, set the received message in advance to executing READ Command.
3	Expansion Command	ECMD 1 / ECMD 2 / ECMD 3 / ECMD 4	The value read out always comes 0.
4	Task Level Change	CHPR	This software runs on Windows and strict level change operation cannot be performed.

16.7 Extension Motion Control Feature

Establish the setting as described below when using the extension motion control feature.

- Set to drive invalid (Extension Motion Control Axis-Specific Parameter No. 1 = 3).
- Set the values in Extension Motion Control Axis-Specific Parameter No. 2 and later to the same parameters as those actually used.

* Virfit is a registered trademark of Computer Engineering & Consulting Ltd.

17. Error Countermeasures

17.1 Display when Error Occurred

When an error has occurred, an error countermeasure window should open in the default setting.

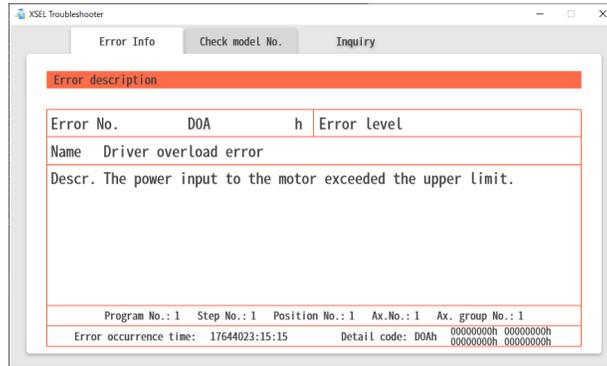


Fig. 17-1 Error details

- * When it is not required to show the error countermeasures, this feature can be disabled in "Tool (T)" → "Environment Setting (S)" in the menu.

18. Appendix

18.1 Parameter Recovery Method for X-SEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD Controllers

If parameter data is lost during parameter writing to the flash ROM due to main power OFF or any other factor, all parameters will be rewritten to initial values. In the case of the X-SEL-P/Q or PX/QX controller, an error will be detected after power reconnection or software reset since system-specific settings are lost immediately after parameter initialization.

Under such conditions, all parameters cannot be transferred to the controller.

In this case, follow steps 1 to 3 to recover the parameters.

Note: This method is intended to write the parameter data back to the controller for recovery. Please note that serious effects such as home displacement, inoperability and error occurrence may result when recovery parameters are transferred to any controller other than the target one, even if the model is the same

Step 1. Setting of Effective Axis Pattern of the Controller

Note: Prepare a parameter file for recovery. Check that the prepared parameter file for recovery is the file of the target controller.

From the menu, select Parameter (P) → Edit (E) to display the parameter edit screen. Match the All Axes common parameter No. 01 (effective axis pattern) on the controller to the effective axis pattern in the recovery parameter file data (111111b etc.) (Fig. 18.1).

If the effective axis patterns of the controller and the parameter file to transfer mismatch, the parameter file cannot be transferred. (A warning dialog in Fig. 18.2 will be displayed during file transfer.)

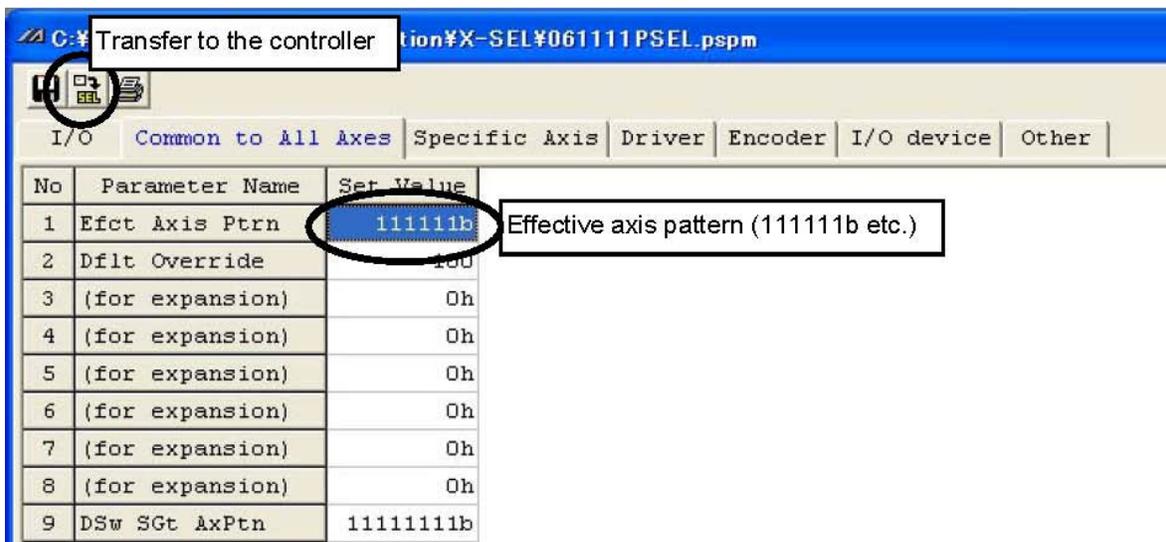


Fig. 18.1 Parameter editing screen (controller)

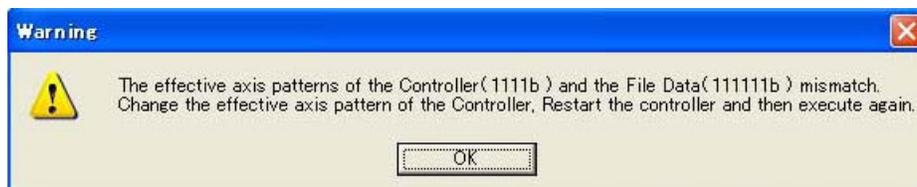


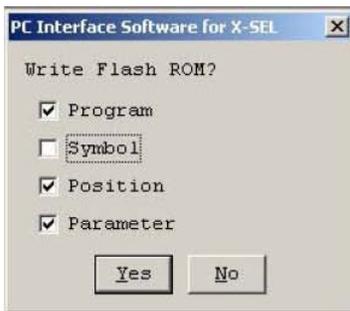
Fig. 18.2 Parameter Transfer when Effective Axis Patterns Mismatch

Clicking the transfer to the controller button (Fig. 18.1) after changing the parameters will display the transfer confirmation dialog (Fig. 18.3). Click Yes to transfer the changed parameters to the controller.

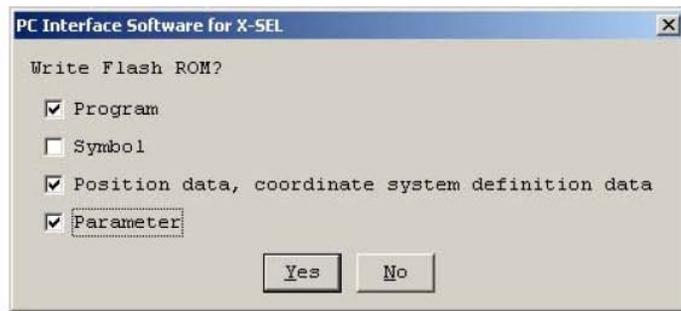


Fig. 18.3 Transfer Confirmation Dialog

Once the transfer has been completed, the flash ROM write confirmation dialog will be displayed (Fig. 18.4). After confirming that Parameter is selected, click Yes to write the parameters to the flash ROM.



P/Q Controller



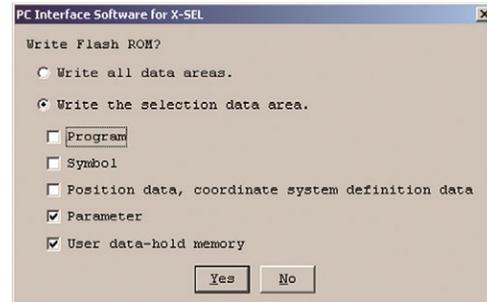
PX/QX Controller

In the case of X-SEL-P/Q compatible with increased memory, PX/QX (with gateway function), R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD the following dialog box will be displayed. (PC interface software version 7.2.0.0 or later)

This is not displayed for XSEL-RA/SA, RAX/SAX, RAXD/SAXD, SSEL, ASEL and PSEL.



X-SEL-P/Q, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD compatible with increased memory



X-SEL-PX/QX compatible with increased memory

Fig. 18.4 Flash ROM Write Confirmation Dialog.

* The number of writing to the flash ROM is limited (approx. 100,000 times). If you do not write all the data, select Write Selected Data Region and write to the flash ROM.

Once the parameters have been written to the flash ROM, the software reset confirmation dialog (Fig. 18.5) will be displayed. Click Yes to execute software reset.



Fig. 18.5 Software Reset Confirmation Dialog

Since the system-specific setting is still lost, an error will be detected after power reconnection or software reset. Even if an error is detected, perform the next step as it is.

Step 2. Transfer of Actuator Non-specific Parameters

First, select File (F) → Open (O) from the menu and open the recovery parameter file.
Click the "Transfer to controller" button to display the parameter type selection for loading screen.

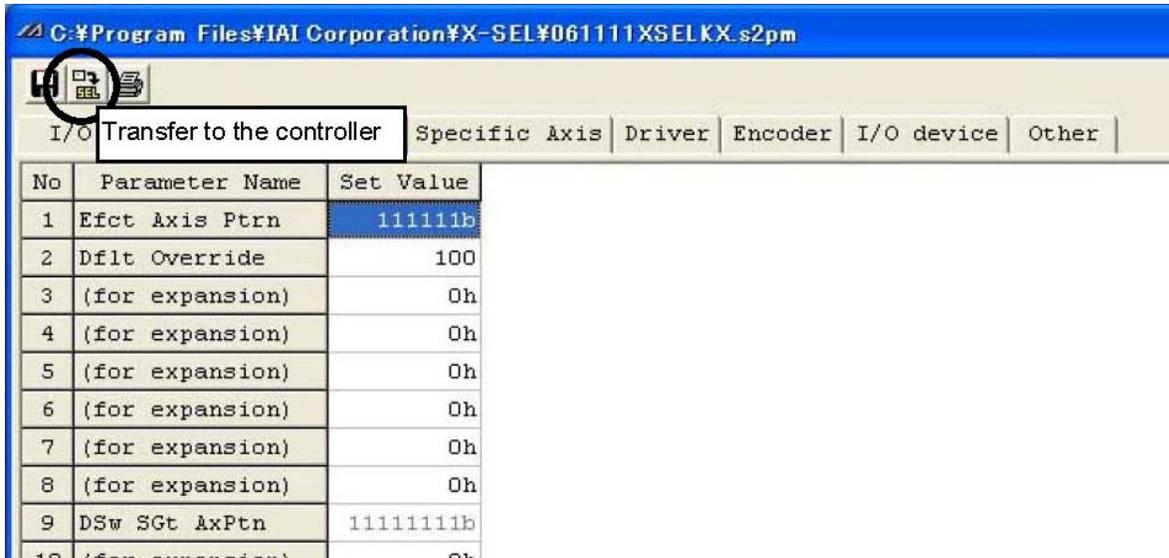


Fig. 18.6 Recovery parameter file screen

On the transfer parameter type selection screen (Fig. 18.7), set as follows.

- [1] Select Transfer all selected parameters under the Select parameter transfer options.
- [2] Select Controller basic unit dependent parameters transferred under Controller basic unit transmit options.
- [3] Select “I/O”, “Common for All Axes”, “Others” and “Manufacturer Inside” in “Basic Setting”.
Select “I/O System Device” in addition when controller is XSEL-RA/SA, RAX/SAX or RAXD/SAXD.

After completing the above settings, click the OK button.
Parameter transfer will start.

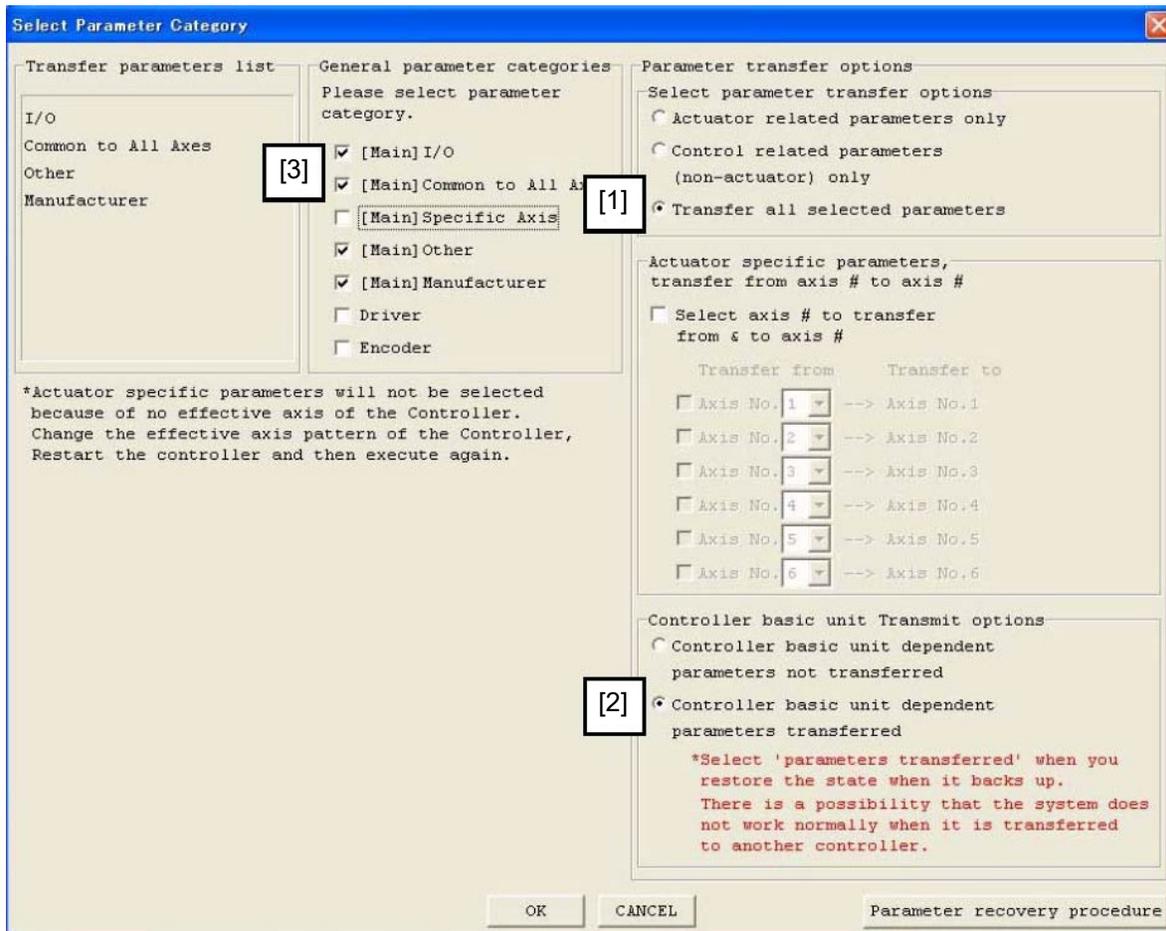


Fig. 18.7 Transfer of Actuator Non-specific Parameters

After performing this procedure, always write the parameters to the flash ROM and reset software.

Since the data specific to each axis of the actuator has not been set, an error may be detected after power reconnection or software reset. Even if an error is detected, perform the next step as it is.

Step 3. Transfer of Actuator Specific Parameters

As in step 2, select File (F) → Open (O) from the menu and display the transfer parameter type selection screen from the recovery parameter file. Next, on the transfer parameter type selection screen (Fig. 18.8), set as follows.

- [1] Select Specific Axis, Driver and Encoder in the General parameter categories group.
- [2] Select Transfer all selected parameters under Select parameter transfer options.

After completing the above settings, click the OK button.

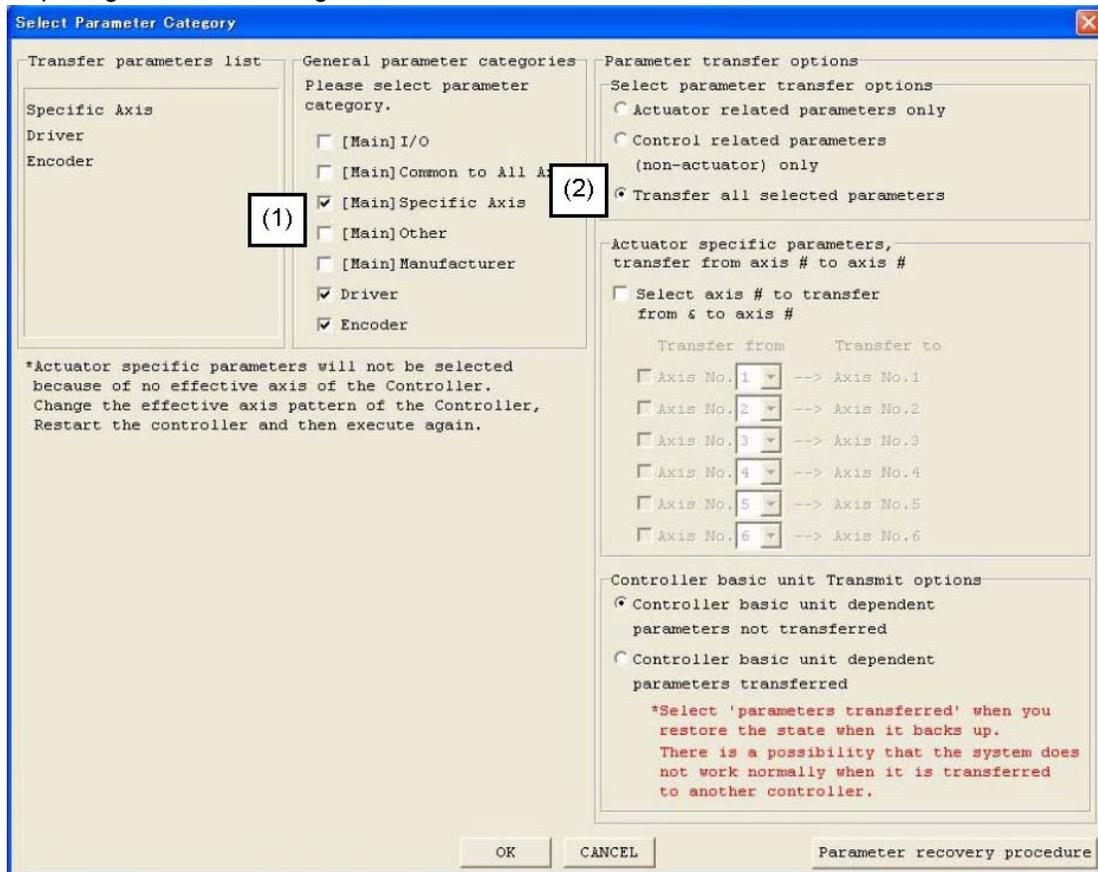


Fig. 18.8 Transfer of Actuator Specific Parameters

Once the OK button has been clicked, a dialog in Fig. 18.9 will be displayed. Select Yes to execute parameter transfer.

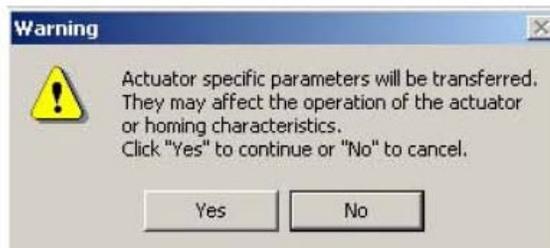


Fig. 18.9 Warning Dialog before Transfer of Actuator Specific Parameters

After performing this procedure, always write the parameters to the flash ROM and reset software.

This completes transfer of all parameter data. Confirm that parameters are recovered to the conditions at backup time.

18.2 Error Level Control

Error level	System error origin	Error No. (HEX)	Display (7SEG, DISPLAY, etc.)	Error list	Error LED output	Program run		Remarks
						When Para-Othe No. 4 is 0	When Para-Othe No. 4 is 1	
Secret level	Main application part	800 - 88F						Special error level for maintenance
	Main core part	890 - 8AF		○				
Message level	PC	8B0 - 8DF						Special error level for maintenance
	TP	8E0 - 8FF						
	Main application part	900 - 93F						
	Main core part	940 - 97F						
	PC	980 - 9AF		△ (Battery-related and field-path-related errors are registered in the error list.)				
	PC (Update tool)	9B0 - 9BF						
	TP	9C0 - 9FF		○				
	Flash ACK time-out	A00 - A6F						
	Main core part	A70 - A9F						
	PC	AA0 - ACF						
Action reset level	TP	AD0 - AFF						Errors interfering with action. For a minor errors with a level lower than this, error reset is attempted with the auto-reset function at the external active command (SIO/PIO) receipt.
	Main application part	B00 - B9F						
	Main core part	BA0 - BBF						
	PC	BC0 - BDF						
	TP	BE0 - BFF		○				
	Main application part	C00 - CCF						
	Main core part	CD0 - CDF						
	PC	CE0 - CEF						
	TP	CF0 - CFF						
	Cold start level	Main application part	D00 - D8F					
Main core part		D90 - DAF						
PC		DB0 - DCF						
PC (Update tool)		DD0 - DDF						
TP		DE0 - DFF		○				
Main application part		E00 - E8F						
Main core part		E90 - EBF						
PC		EC0 - EDF						
TP		EE0 - EFF						
Main application part		FE0 - FBF						
System down level	Main core part	FC0 - FCF						It is required turn on the power again. (Execution is impossible for CPU and OS)
	PC	FD0 - FDF		○				
	TP	FE0 - FEF						

PC: PC-compatible software, TP: Teaching Pendant

18.3 X-SEL PC Software Error Table

(Errors specific to the PC Software are listed below. See the X-SEL Controller Operation Manual for controller errors.)

Error No.	Error name	Special note
980	Cannot Copy, Move, Clear Program being edited on-line.	Program copy/move/clear was performed while the online program edit window was open. Close the online program edit window first.
981	Cannot transmit the program file being edited on-line.	Program file transfer was performed to/from the program being edited online. Close the online edit window for the target program first.
982	Cannot Copy, Move, Clear Position data being edited on-line.	Position data copy/move/clear was performed while the online position data edit window was open. Close the online position data edit window first.
983	Cannot transmit the Position data being edited on-line.	Position data file transfer was performed while the online position data edit window was open. Close the online position data edit window first.
984	Cannot transmit the Parameter file being edited on-line.	Parameter file transfer was performed while the online parameter edit window was open. Close the online parameter edit window first.
985	Cannot Clear Symbol data being edited on-line.	Symbol data clear was performed while the online symbol data edit window was open. Close the online symbol data edit window first.
986	Cannot transmit Symbol data file being edited on-line.	Symbol data file transfer was performed while the online symbol data edit window was open. Close the online symbol data edit window first.
987	Cannot initialize memory being edited on-line.	Memory initialization was performed while the program/symbol/position data online edit window was open. Close the applicable online edit window first.
988	Cannot Jog when Servo OFF.	Jogging was performed for an axis whose servo was OFF. Turn ON the servo first.
989	Acceleration specification error for jog, move or continuous move.	The specified acceleration during jog, move or continuous move exceeds the allowable range or is invalid. Check the specified acceleration.
98A	Deceleration specification error for jog, move or continuous move.	The specified deceleration during jog, move or continuous move exceeds the allowable range or is invalid. Check the specified deceleration.
98B	Cannot edit while running program. (PC)	Write, copy, move, clear or other edit operation was performed for the program currently running. End the program you wish to edit, and then try again.
98C	Lacking Empty Step (PC)	There are not enough empty steps in the controller.
98D	Data editing prohibited in non-manual mode	Data edit operation (write, copy, move, clear, etc.) was performed in non-manual mode.
98E	Cannot read so many data from the file.	The number of data sets in the file (number of steps, number of positions, etc.) exceeds the allowable value.
98F	Cannot write so many data to the file.	The number of data sets written to the file (number of steps, number of positions, etc.) exceeds the allowable value.
990	Baud rate specification error.	The specified baud rate is invalid (at connection check, when changing the baud rate, etc.).
991	File data transfer prohibited during data transmission.	Data read from a file cannot be transferred to the controller during data transmission (i.e. while data is being read or written).

Error No.	Error name	Special note
992	Clear of coordinate system definition data prohibited while being edited on-line	Coordinate system definition data cannot be cleared while the online edit window for coordinate system definition data is open. Close the online edit window first.
993	Arm change prohibited when servo OFF	Arm cannot be changed while the servo is OFF.
994	Transfer of a coordinate system data file prohibited while being edited on-line	The coordinate system definition data file was transferred while the online edit window for coordinate system definition data is open.
995	Effective axis pattern mismatch error in 'Crd1' and 'Crd2'	Close the online edit window first.
996	Output port/flag error type specification prohibited when the effective axis pattern is 0 for 'Crd1' and 'Crd2'	The specified axis patterns for Coordinate 1 and Coordinate 2 of the simple interference check zonedefinition data do not match.
997	Can not select so many axes for monitoring	Coordinate values are not entered in the simple interference check zone definition data.
998	Read-protected data read error	Certain operations, such as read, copy and move, cannot be performed for read-protected data.
999	Write-protected data write error	Certain operations, such as read, copy, move and clear, cannot be performed for write-protected data.
99A	Protection setting parameter error	An invalid value is set in protection setting parameters (Other Parameter Nos. 36 - 39).
99B	Position No. specification error	The specification of the number of point data is abnormal.
99C	Port No. specification error	The specification of the communication socket number is abnormal.
99E	Function unsupported rejection error (PC)	Unsupported function.
9A5	Extension motion control board position data file transfer prohibited while being edited on-line	The extension motion control board position data file cannot be transferred during the on-line editing.
9A6	Extension motion control board parameter cam data file transfer prohibited while being edited on-line	The extension motion control board parameter cam data file cannot be transferred during the on-line editing.
9A7	File Format Version Error	The file format is not applicable to this system. Update the PC software to become applicable to the file.
9A8	Extension motion control board locus calculation error	The information required for the extension motion control board locus calculation has not been collected.
9A9	IO Function designation error (PC)	Incorrect setting (function duplicated, out of input range, successive designation error, etc.) has been done in I/O parameter No. 30 ~ 45, 46 ~ 61, 251 ~ 266, 267 ~ 282 (IO function designation related parameters).
9AA	Controller support out-of-range SEL data symbol editing error	Symbol editing for the data No. that is unsupported by the controller, or data transfer to the controller is not available.
9AB	Teaching prohibited when the arm system is not confirmed	When the arm system is not confirmed, the arm system teaching is not available.
9AC	Execution condition unsatisfied error (PC)	The conditions for executing the function have not been satisfied. (In the case that the actuator movement or SEL program is executed under the condition of operation system command prohibited)
9AD	Separator String Error (PC)	Either the character string of the decimal point is set to a character other than ".", or the divider character string between numbers is set to a character other than ",".
AA0	Input data error	A value outside the allowable range or invalid character has been input.
AA1	Password Error.	The entered password is invalid. Enter the correct password.
AA2	Failed in writing file.	



Error No.	Error name	Special note
AA3	Data edit prohibited in operating mode	Data edit was performed in operating mode. Check the type of manual operation (Other Parameter No.21 and the type of manual PC Software operation currently selected).
AA4	Data write prohibited during flash ROM write	Data write was performed while the flash ROM was written. Data edit cannot be performed while the flash ROM is written.
AA5	File data error	The data read from a file is abnormal.
AA6	Jog/move/continuous move speed too low	
AA7	Jog/move/continuous move speed too high	
AA8	Data transmission not possible offline	Data transmission cannot be performed while the communication with the controller is cut off. Try again after starting the application in online mode.
AA9	Teaching prohibited before completion of homing	Teaching operation (current position capture) was performed for an axis whose homing was not yet complete. Complete homing first.
AAA	Memory initialization prohibited in operating mode	Memory initialization was performed in operating mode. Check the type of manual operation (Other Parameter No. 21 and the type of manual PC Software operation currently selected).
AAB	Writing to flash ROM prohibited in operating mode	An operation to write to the flash ROM was performed in operating mode. Check the type of manual operation (or other parameter No. 21 and the type of manual operation with the PC software currently selected).
AAC	Error list clearing prohibited in operating mode	An operation to clear the error list was performed in operating mode. Check the type of manual operation (or other parameter No. 21 and the type of manual operation with the PC software currently selected).
AAD	Slave unit type not entered	
AAE	Slave unit type error	
AAF	Slave device number not entered	
AB0	Slave device number error	
AB1	Slave command ID not entered	
AB2	Slave command ID error	
AB3	Prohibited slave command issued	
AB4	Slave command prohibited with incomplete home return issued	A slave command that is prohibited when home return is not complete was issued.
AB5	Slave command prohibited with Servo ON issued	A slave command that is prohibited when the Servo is ON was issued.
AB6	Movement/Continuous movement with incomplete home return prohibited	An operation to move/continuously move an axis was performed when home return is not complete. Complete the home return operation first.
AB7	Another home return attempt not completed	An operation to reset the absolute encoder multi-rotation data was performed when another attempt for home return is not complete. Whether home return is completed or not, home return must be completed when resetting the absolute encoder multi-rotation data.
AB8	File read error	The file format is not correct or abnormal data is included.
AB9	The number of breakpoint setting is exceeded	The number of breakpoint setting exceeds the setting limit. Release other breakpoints first, and try again.
ABA	File opening error	The file cannot be opened. Check if the file is being used by another application.
ABB	Filter type error	The file type is not correct. Check the file type (extension).

Error No.	Error name	Special note
ABC	Data not entered	Data is not entered in the required data field. Enter data.
ABD	Symbol first character error	A character not permitted at the beginning of a symbol is used.
ABE	Symbol character string error	Invalid characters are included in the symbol character string.
ABF	Symbol defined more than once	The same symbol is defined more than once.
AC0	Program name defined more than once	The same program name is defined more than once.
AC1	Encoder type error	Check the encoder ABS/INC type for the target operation axis, etc. (parameter No. 38 for each axis).
AC2	Monitoring axis not selected	
AC3	Date entry error	
AC4	Time entry error	
AC5	Inching distance excessive	
AC6	Window closing prohibited during data transmission	The edit window whose data is being transmitted cannot be closed. Close the window after the transmission is complete.
AC7	Too many symbol definitions	The number of symbol definitions exceeds the allowable range. Create empty area by deleting unnecessary symbols, and then try again.
AC8	Entered value too large	
AC9	Entered value too small	
ACA	Parameter initialization prohibited during online edit	Parameter initialization was performed while the online parameter edit window was open. Close the online parameter edit window first.
ACB	SEL program/symbol/position data initialization prohibited during online edit	SEL program/symbol/position data initialization was performed while the program/symbol/position data online edit window was open. Close the applicable online edit window first.
ACC	Symbol not defined	An undefined symbol or symbols is/are used in the program step data.
ACD	File not found	The specified file cannot be found. Check the file name.
ACE	File not supported	The specified file format is not supported by the application. Check the file type.
ACF	No available axis	There is no available axis that can be edited/operated. Check the available axis pattern (All-Axis Common Parameter No. 1).
EC0	Received message string error (PC)	The received message contains error. If the error persists after reconnection, contact IAI.
EC1	Controller not connected	Communication may not yet be established or the connected controller may not be supported. Check the physical connection with the controller and then perform "Reconnection."
EC2	Receive time out. (PC)	Communication error. Check the cable connection, short, noise, etc.
EC3	Receive Length Error. (PC)	Communication error. Check the cable connection, short, noise, etc.
EC5	Com Port Open Error.	The COM port cannot be opened. Check if the COM port is available.
EC6	Sum Check Error. (PC)	Communication error. Check the cable connection, short, noise, etc.
EC7	Receive Buffer Overflow. (PC)	The receive buffer (PC) overflowed. Perform "Reconnection."
EC8	Receive Buffer Overflow Error (PC) (OS)	The receive buffer overflowed. Perform "Reconnection."
EC9	Receive Overrun Error (PC)	Receive overrun occurred. Perform "Reconnection."

Error No.	Error name	Special note
ECA	Framing Error (PC)	Framing error occurred. Perform "reconnection."
ECB	Communication Error (PC) (OS)	Communication error occurred. Perform "reconnection."
ECC	Unsupported controller connection error	The connected controller is not supported.
ECD	Ethernet Receive Timeout Error (PC)	Communication error. Check the HUB, cable connection, short, noise, etc.
ECE	Disconnection Error (PC)	Communication error. Check the HUB, cable connection, short, noise, etc.
ECF	Socket Error (PC)	Communication error. The cable may be removed or disconnected.
ED0	Service Port No. Being Used (PC)	The specified port number may be being used by another connection. Change the port number.
ED1	Cannot connect so many sockets (PC)	This error occurs when 64 or more controllers are connected.

Change History

Revision Date	Description of Revision
December 2010	The 4th edition Page 86: Added a caution on the movement of the linear servo actuator LSAS-N10/N15 para-absolute when it is returned to the original.
July 2011	The 5th edition Pages 46-50: Added offline file division.
August 2011	The 6th edition Modified the Software License Agreement.
December 2011	The 7th edition Added to the list of supported models the method of installing V6.0.0.0 as a supported version for the IA Super SEL Controller E/G Types.
March 2012	The 8th edition Page 9: Added a warning that the internal components of the controller may burn if the supplied cable CB-ST-E1MW050 (black) is used with the XSEL-Q or QX controller.
June 2012	The 9th edition Page 6: A word of Caution, Operating environment, Windows Vista and Windows 7 were added. 32-35: The installation procedure for Windows 7 or Windows Vista was added to the USB conversion adapter driver installation procedure.
September 2012	The 10th edition Pages 1-7: Added a Safety Guide. 3.2 Explanation of command Eliminated the contents regarding [3] RC gateway. 12. Eliminated the section of RC position data edit. 12. Added a section for the RC gateway function setting. 13.3. Added an instruction of Absolute reset of ZR unit (Absolute type). 13.4. Added an instruction of Absolute reset of Simple absolute unit (Option) of PSEL Controller. Added information on XSEL-R/S, RX/SX and RXD/SXD controllers.
December 2012	The 11th edition [6] Local Data added in 11. Monitor
September 2013	The 12th edition <ul style="list-style-type: none"> • Pages 6, 16, 17 and 22: Added IA-101-X-MW-JS and IA-101-X-USBS • Note added for how to absolute reset IX-1000/1200 SCARA Robot • Added Ball-screw spline adjustment of ZR unit (incremental type) procedure.

Revision Date	Description of Revision
October 2013	The 13th edition Added information on Tabletop Robot TTA actuator.
June 2014	The 14th edition Added the contents of the MSEL-PCX/PGX.
October 2014	The 15th edition Page 1: MSEL-PC/PG added in Support Models
January 2015	The 16th edition Page 6, 16: Windows 8 and 8.1 added Windows 2000 deleted
February 2015	The 16B edition Page 28-31: Installation procedure of USB conversion adapter changed for Windows Vista, Windows 7, Windows 8 and 8.1
May 2015	The 17th edition Page 68, 126, 136-140: 286: Contents added for Easy Parameter Setup Explanation made for additional functions of environment setting window
September 2015	The 17B edition Page 181, 182: Correction made Actual command pulse → Manipulated variable
December 2015	The 18th edition Page 167: Axis status screen added for V12.02.01.00 and later 189-191: Operation of new absolute reset window for SSEL and ASEL added 192-194: 13.2 Orthogonal Axis (Battery-less absolute specification) added 241-248: An arrow → added in IXP SCARA axis absolute reset window
February 2016	The 19th edition Page 100, 115, 116: Explanations added for position output operation data for TTA and MSEL Controller
May 2016	The 19B edition Page 184 Correction Bit 8 to Bit 11 → Bit 8 F□ → 1□□
July 2016	The 20th edition Contents added for XSEL-RA/SA, RAX/SAX, RAXD/SAXD.

Revision Date	Description of Revision
August 2016	The 20B edition Contents changed in the Software License Agreement Page 16,17: PC software IA-101-N with no enclosed cable added Page 50, 51, 52: USB feature added for XSEL-RA/SA, RAX/SAX, RAXD/SAXD
September 2016	The 20C edition Page 60: The description that 9AC error is displayed when the operation system commands are executed, was added. Page 154: The extention SIO “-“ was changed to “O” for XSEL-J/K, JX/KX. Page 320: 9AS to 9AC errors were added. Page 322: Special notes for AC3 and AC4 were deleted.
October 2016	The 20D edition Page 161: Note added stating definition for SSEL (applicable for memory capacity increase) controllers is 1000
November 2016	The 20E edition Page 264: Note added stating not to conduct home-return operation and conduct absolute reset when Each Axis Parameter No.10 is set to 2 for IXP SCARA
April 2017	The 21th edition Page 6, 17: Windows 10 added Windows XP, Vista deleted Page 33, 39: Contents added to be applicable for Windows 10 Page 57: Connection window deleted for V7.2.0.0 and later “4.2.2 Transferring a Program Created Offline” added Page 121, 132, 133: Changed contents added for Version 13.02.00.00 and later “6.2.2 Transferring a Position Created Offline” added Page 162: MSEL-PCX/PGX and PC/PG high resolution type and TTAAC servo type / high resolution type added to applicable feature in initialization 14.10 “Excel File Save and Readout” added Page 203: Notes added for how to clear pairing ID
June 2017	The 21B edition Page 1: Battery-less absolute type applicable version added for SSEL, ASEL and XSEL-P/O 4.5 Cycle Time Measurement added 8.6 Parameter comparison added Page 332: Change made to Procedure
August 2017	The 21C edition Page 1: Note added for SSEL (applicable for memory increase) Page 198: Contents changed for task status Page 209: Change made to Fig.11.24 Maintenance Information Window (m→km) Page 216: MSEL-PC/PG added

Revision Date	Description of Revision
September 2017	The 21D edition Page 212 to 215: Note added for sampling cycle when buffered
October 2017	The 21E edition Page 15 to 16, 43 to 52: Change made to Cable Type CB-ST-A1MW050-EB → CB-ST-A2MW050-EB
November 2017	The 21E edition Page 58, 94: TTA deleted
December 2017	The 22th edition Page 127: Position data added for IXA SCARA Robot 3-axis type 13.8 IXA SCARA Axes and Procedure for absolute reset added for IXA
February 2018	The 22B edition Page 312: Model code changed to JG-IXA1
March 2018	The 22C edition Page 127: Change made to Figure 6.12 for window of IXA 3-axis type
May 2018	The 22D edition Page 180: Caution note added for case of symbol deleted or changed CD-ROM changed to DVD-ROM
July 2018	The 22E edition 13.8 IXA SCARA Axes Change made partially in absolute reset window
April 2019	The 22F edition Page 137, 139, 140: Description added for Vel, Acc and Dcl max. settings Page 213: Note added for how to cancel 4A9 "Absolute reset information inconsistency error" in IXA SCARA Robot Page 364: Explanation added for timer
July 2019	The 22H edition Page 214: Description added regarding CSV file of monitoring data
October 2019	The 22I edition 16. IXA Simulator added
November 2019	The 22J edition 13.8 IXA-□NNN1805 added in IXA SCARA absolute reset

Revision Date	Description of Revision
July 2020	The 22K edition Page 85: Operation to save global data and error list together at saving of all data backup added Page 226: Servo Addition Data Monitor added Page 403: Content partly changed in 16.5.1 FROM Writing Operation
May 2021	The 22L edition Page 89, 110: Caution note added for when transferring program
June 2021	The 22M edition Page 83, 168: CC-Link IE Field added Page 15, 16, 17, 83, 168, 170: Correction made for RS-232C Page 213: Change made in explanation for (8) Maintenance information screen Page 215: Change made in contents of note for [How to Clear Pairing ID]
April 2022	The 23A edition Pg. 9 Applicable models added, expressions revised Pg. 18, 19, 20, 21, 22 Installation method changed in "1.3 Installing the Software" Pg. 23, 376 Installed data selection screen changed, explanation revised Pg. 403 Applicable models added, expressions revised in "Appendix"
April 2024	The 23B edition Pg.6, 17 Change made to applicable OS Pg. 17 Correction made to open capacity in hard disk to 200MB or more Pg. 23 Procedures in old OS deleted in "How to Install the USB Conversion Adapter Driver Software" Pg.27 Procedures in old OS deleted in "How to Install Driver Software for USB Connection of XSEL-RA/SA/RAX/SAX/RAXD/SAXD"

Revision Date	Description of Revision	
August 2024	Pg.6	Added IA-101-X-USBMW-JS, IA-101-XA-USBMW-JS
	Pg.18	Added supported OS
	Pg.85	"Search for Error Countermeasures(T)" added in (13) Help (H)
	Pg.138	Contents in * partially added
	Pg.363	Added that Fig. 15.7 Error Dialog is displayed
	Pg.393	Added 17. Error Countermeasures





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