

# Touch Panel Teaching

## TB-01, TB-01D, TB-01DR

---

Applicable for Program Controller  
**Instruction Manual Fourth Edition**





## 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/](http://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.
- If any issues arise regarding the information contained in this instruction manual, contact our customer center or the nearest sales office.
- Use or reproduction of this instruction manual in full or in part without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the text are registered trademarks.

## Support Models

---

This instruction manual states the details for those for program controller.

For how to handle the position controllers (ERC2/ERC3/ACON/DCON/PCON/SCON/MCON/MSCON/RCP6S/RACON/RPCON/ASEP/DSEP/PSEP/MSEP/AMEC/PMEC), refer to “Instruction Manual for Touch Panel Teaching to Apply for TB-01, TB-1D, TB01DR Position Controllers” provided separately.

Shown below is the list of the supported models.

List of Supported Models

Model Name	Support Started Version
XSEL-J/K	V1.00
XSEL-JX/KX	V1.00
XSEL-KT/KET	V1.00
XSEL-P/Q/PCT/QCT	V1.00
XSEL-PX/QX	V1.00
XSEL-R/S	V1.00
XSEL-RX/SX	V1.00
XSEL-RA/SA/RAX/SAX/RAXD/SAXD	V1.60
TT	V1.00
TTA	V1.00
ASEL	V1.00
PSEL	V1.00
SSEL	V1.00
MSEL-PCX/PGX	V1.02
MSEL-PC/PG	V1.10
MSEL-PCF/PGF	V1.70

## Table of Contents

Safety Guide.....	1
Caution in Handling.....	8
International Standards Compliances .....	8
Product Check.....	9
1. Forward .....	11
2. Warranty.....	12
2.1 Warranty Period.....	12
2.2 Scope of Warranty.....	12
2.3 Honoring the Warranty .....	12
2.4 Limited Liability .....	12
2.5 Conditions of Conformance with Applicable Standards/Regulations, Etc., and Applications .....	13
2.6 Other Items Excluded from Warranty .....	13
3. Specifications Check.....	14
3.1 Basic Specifications.....	14
3.2 Environmental Specifications .....	15
3.3 External Dimensions.....	16
3.4 Externals.....	16
3.4.1 TB-01 (Standard) Externals .....	16
3.4.2 TB-01D (With Deadman Switch Type) Externals.....	17
3.4.3 TB-01DR (Type with Deadman Switch Attached on the Right) Externals .....	17
3.5 Explanation of Each Part.....	18
3.6 Life of Touch Panel LCD .....	23
3.7 Life of Battery .....	23
3.8 Optional Items .....	23
4. Connection with the Controller .....	24
4.1 XSEL-J/K Type Controller .....	24
4.2 XSEL-KT/KET Type Controller.....	25
4.3 XSEL-P/Q, R/S, RA/SA Type Controller .....	26
4.4 XSEL-JX/KX Type Controller.....	27
4.5 XSEL-PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD Type Controller.....	28
4.6 TT/TTA Type Controller.....	29
4.7 SSEL Type Controller.....	30
4.8 ASEL Type Controller.....	31
4.9 PSEL Type Controller.....	32
4.10 MSEL Type Controller .....	33
4.11 Safety Category Compliant (Connection to the IA-LB-TGS).....	34
4.12 Connection Cable .....	35
4.12.1 Cable for Program Controller (XSEL-J and XSEL-JX Excluded) .....	35
4.12.2 XSEL-J, XSEL-JX Dedicated Cable .....	36
4.13 Teaching Pendant Connection Procedure .....	37
5. How to Save Data .....	39
5.1 Set-up at Shipment with System Memory Backup Battery.....	39
5.2 Set-up at Shipment without System Memory Backup Battery (Table Top Actuator (TT), SSEL, ASEL, PSEL).....	42
5.3 XSEL-R/S/RX/SX/RXD/SXD .....	44

5.4	XSEL-RA/SA/RAX/SAX/RAXD/SAXD .....	45
5.5	TTA, MSEL-PCX/PGX/PC/PG/PCF/PGF .....	46
5.6	Caution .....	47
6.	Mode Transition Diagram .....	48
6.1	XSEL-J/K, P/Q, R/S, RA/SA, TT/TTA Controller .....	48
6.2	XSEL-JX/KX Controller .....	54
6.3	XSEL-PX/QX, RX/SX, RAX/SAX Controller .....	59
6.4	XSEL-RXD/SXD, RAXD/SAXD Controller .....	65
6.5	MSEL-PCX/PGX/PC/PG/PCF/PGF Controller .....	71
6.6	SSEL, ASEL, PSEL Controller .....	76
6.6.1	Program Mode .....	76
6.6.2	Positioner Mode .....	81
7.	Menu Selection .....	85
8.	Execute or Stop the Positioner Mode of the SSEL, ASEL and PSEL Controller .....	86
9.	Position Edit .....	87
9.1	Manual Input (Numerical Input) .....	87
9.1.1	Basic Operation .....	90
9.1.2	Flash ROM Writing .....	98
9.2	Teaching of the Orthogonal Axis: XSEL-J/K, P/Q, or 5th and 6th Axes of XSEL-PX/QX Controller, XSEL-R/S, or 5th to 8th Axes of XSEL-RX/SX Controller, XSEL-RA/SA, or 5th to 8th Axes of XSEL-RAX/SAX Controller, Additional Axes on 3-axis SCARA Type MSEL-PCX/PGX Controller, MSEL-PC/PG/PCF/PGF, TT, TTA, SSEL, ASEL or PSEL Controller .....	99
9.2.1	Teaching .....	99
9.2.2	Example of Teaching Input .....	114
9.3	Teaching for SCARA axis: XSEL-JX/KX, PX/QX, or 1st to 4th Axes of XSEL-RX/SX, RAX/SAX Controller, 1st to 4th Axes or 5th to 8th Axes of XSEL-RXD/SXD, RAXD/SAXD Controller or 1 to 4 Axes on MSEL-PCX/PGX Controller (1 to 3 Axes for 3-axis SCARA Type) .....	120
9.3.1	Teaching .....	120
9.3.2	Jog Movement Direction and Coordinate System .....	123
9.3.3	Actuator Operation .....	129
9.3.4	Example of Teaching Input .....	144
9.4	Copy and Movement of Position Data .....	150
9.5	Deletion of Position Data .....	153
10.	Program Edit .....	156
10.1	How to Input Program .....	156
10.2	Symbol Input During Program Edit .....	171
10.2.1	Input by Symbol Edit Screen .....	171
10.2.2	Input with Touch Panel and Keyboard .....	175
10.3	Single Line Comment Input .....	176
10.4	To Change Program Steps .....	178
10.5	Program: Copy or Move .....	187
10.6	Program: Clear .....	189
10.7	Flash ROM Writing .....	191
11.	Program Execution .....	192
11.1	Operation Confirmation .....	192
11.2	Setting of Brake Point .....	196
11.3	Monitoring in Program Operation .....	197
12.	Coordinate System Data Editing of the SCARA Axis .....	206
12.1	Editing of Work Coordinate System Data .....	207
12.2	Editing of Tool Coordinate System Data .....	214

12.3	Editing of Simple Interference Check Zone.....	221
13.	Symbol Edit (Excluding the positioner mode of the SSEL, ASEL and PSEL Controller.).....	228
13.1	Symbol Edit Items.....	229
13.2	Input Example: Symbolize Local Integer Variable No. ....	230
13.3	Symbol Edit Screen of Each Items.....	234
14.	Parameter Edit .....	238
14.1	Parameter Edit Items.....	239
14.2	Input Example: Edit Specific-Axis Parameter.....	240
15.	Monitor .....	245
15.1	Monitor Items.....	245
15.2	Input Port .....	246
15.3	Output Port .....	247
15.4	Input/Output Port .....	247
15.5	Global Flag .....	248
15.6	Global Variable .....	248
15.7	Axis Status.....	251
15.8	System Status .....	254
15.9	Error List.....	256
15.10	Version Information .....	259
15.11	Control Constant Table Administration Information .....	261
15.12	Maintenance Information.....	262
15.12.1	Actuator Replacement .....	264
15.12.2	Pairing ID Clear.....	266
16.	Controller.....	268
16.1	Controller Items .....	268
16.2	Flash ROM Writing .....	270
16.3	Software Reset.....	271
16.4	Error Reset .....	272
16.5	Memory Clear .....	273
16.5.1	Memory Initialization Items .....	273
16.5.2	Global Variable.....	274
16.5.3	User Data Hold Memory .....	274
16.5.4	Position Data (XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF Only).....	275
16.5.5	Coordinate System Data (XSEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX Only) .....	278
16.5.6	The value of this parameter at the factory (SSEL, ASEL, PSEL, XSEL-R/S, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD, TTA AC Servo Type / High-Resolution Type and MSEL High-Resolution Type Only).....	280
16.5.7	Program Data (Previous Value Restore) .....	283
16.5.8	Symbol Data (Previous Value Restore) .....	285
16.5.9	Position Data (Previous Value Restore) .....	286
16.5.10	Parameter Data (Previous Value Restore) .....	287
16.6	Re-Connection.....	288
16.7	Baud Rate Change .....	289
16.8	Safety Velocity .....	290
16.9	Driver Power Recovery Request .....	290
16.10	Action Pause Release Request.....	291
16.11	Simultaneous Operation of Multiple Programs.....	292
16.12	Driver Power Recovery Request (RPwr) and Action Pause Release Request (RAct) .....	294
16.12.1	In the Case of Controller Other Than SSEL, ASEL and PSEL Controllers.....	294
16.12.2	In the Case of SSEL, ASEL or PSEL Controller .....	295
16.13	Time Setting .....	296

17. Absolute Reset .....	298
17.1 Absolute Reset of the Orthogonal Axis: XSEL-JK, P/Q, or 5th and 6th Axes of XSEL-PX/QX Controller, XSEL-R/S or 5th to 8th Axes of XSEL-RX/SX Controller, SSEL or ASEL Controller .....	298
17.2 Absolute Reset of the SCARA Axis: XSEL-JX/KX, 1st to 4th Axes of XSEL-PX/QX or 1st to 4th Axes of XSEL-RX/SX, RAX/SAX Controller, or XSEL-RXD/SXD, XSEL-RAXD/SAXD Controller.....	302
17.3 Perform Absolute Reset on ZR Unit (Absolute Type) .....	325
17.4 Perform Ball Screw Spline Shaft Adjusting on ZR Unit (Incremental Type).....	337
17.5 Orthogonal Axis Synchro Specification Absolute Reset 5th and 6th Axes of XSEL-J/K, P/Q or PX/QX Controller, 5th to 8th Axes of XSEL-R/S or RX/SX Controller, or SSEL Controller.....	346
17.5.1 Synchro Axes .....	346
17.5.2 Location Adjustment of Synchro Axes Sliders .....	347
17.5.3 Special Procedure Absolute Reset .....	348
17.5.4 Standard Procedure Absolute Reset .....	360
17.6 How to Perform Pressing Absolute Reset on IX-1000/1200 .....	361
17.6.1 How to Acquire Stopper Pressing Position .....	363
17.6.2 How to Conduct Stopper Pressing Absolute Reset .....	377
17.7 How to Home Adjustment / Absolute Reset on MSEL-PCX/PGX/PC/PG/PCF/PGF and PSEL <sup>(*)</sup> .....	390
17.7.1 SCARA J1, J2 and R Axes.....	392
17.7.2 SCARA Z-Axis, Battery-less Absolute Type Additional Axes and Linear Axes .....	397
17.8 Absolute Reset of the Orthogonal Axis: PSEL Controller .....	400
17.9 How to Conduct Absolute Reset for Battery-less Absolute Type .....	405
17.9.1 How to Conduct Absolute Reset for Battery-less Absolute Type .....	406
17.9.2 Special Procedure: How to Conduct Absolute Reset Battery-less Absolute Synchronizing Type.....	409
17.10 How to Conduct Absolute Reset on Pulse Motor Type TTA .....	414
17.10.1 How to Conduct Absolute Reset on Pulse Motor Type TTA .....	414
17.11 Procedures for Resetting Absolute-Battery Voltage-Down Warning Error for Orthogonal Axis: XSEL-J/K, P/Q, 5th and 6th Axes of XSEL-PX/QX, XSEL-RS, 5th to 8th Axes of XSEL-RX/SX, XSEL-RA/SA, 5th to 8th Axes of XSEL-RAX/SAX, SSEL, ASEL and PSEL Controller.....	417
18. Gateway Function Associated.....	420
18.1 Editing of the RC Position Data in XSEL.....	420
18.1.1 RC Position Data Creation.....	420
18.1.2 RC Position Data Input Using the Teaching Operation.....	430
18.1.3 RC Position Data Deletion .....	439
18.2 RC Actuator Monitoring .....	444
18.3 User Data Hold Memory Initialization .....	448
18.3.1 Description .....	448
18.3.2 Operation Procedure.....	448
19. Extended Motion Control Function Related Associated .....	452
19.1 Extended Motion Control Position Data Editing .....	452
19.1.1 Extended Motion Control Position Data Creation .....	452
19.1.2 Extended Motion Control Position Data Input using the Teaching Operation.....	460
19.1.3 Extended Motion Control Axis Position Data Deletion.....	470
19.2 Extended Motion Control Axis Monitoring .....	473
19.3 User Data Hold Memory Initialization .....	475
19.3.1 Description .....	475
19.3.2 Operation Procedure.....	475
20. Data Backup .....	476
20.1 Data Backup of the Controller .....	477
20.2 Restore to Controller .....	484



21. Environment Setting .....	493
⊙ About Error Level Management .....	504
Change History.....	508



## 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"> <li>• 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"> <li>1) Medical equipment used to maintain, control or otherwise affect human life or physical health.</li> <li>2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility)</li> <li>3) Important safety parts of machinery (Safety device, etc.)</li> </ol> </li> <li>• Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product.</li> <li>• Do not use it in any of the following environments.               <ol style="list-style-type: none"> <li>1) Location where there is any inflammable gas, inflammable object or explosive</li> <li>2) Place with potential exposure to radiation</li> <li>3) Location with the ambient temperature or relative humidity exceeding the specification range</li> <li>4) Location where radiant heat is added from direct sunlight or other large heat source</li> <li>5) Location where condensation occurs due to abrupt temperature changes</li> <li>6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid)</li> <li>7) Location exposed to significant amount of dust, salt or iron powder</li> <li>8) Location subject to direct vibration or impact</li> </ol> </li> <li>• 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.</li> </ul>

No.	Operation Description	Description
2	Transportation	<ul style="list-style-type: none"> <li>● When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane.</li> <li>● 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.</li> <li>● 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.</li> <li>● 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.</li> <li>● Do not step or sit on the package.</li> <li>● Do not put any heavy thing that can deform the package, on it.</li> <li>● When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work.</li> <li>● When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment's capability limit.</li> <li>● Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength.</li> <li>● Do not get on the load that is hung on a crane.</li> <li>● Do not leave a load hung up with a crane.</li> <li>● Do not stand under the load that is hung up with a crane.</li> </ul>
3	Storage and Preservation	<ul style="list-style-type: none"> <li>● The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation.</li> <li>● Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.</li> </ul>
4	Installation and Start	<p>(1) Installation of Robot Main Body and Controller, etc.</p> <ul style="list-style-type: none"> <li>● 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.</li> <li>● 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.</li> <li>● When using the product in any of the places specified below, provide a sufficient shield.               <ol style="list-style-type: none"> <li>1) Location where electric noise is generated</li> <li>2) Location where high electrical or magnetic field is present</li> <li>3) Location with the mains or power lines passing nearby</li> <li>4) Location where the product may come in contact with water, oil or chemical droplets</li> </ol> </li> </ul>

No.	Operation Description	Description
4	Installation and Start	<p>(2) Cable Wiring</p> <ul style="list-style-type: none"> <li>● Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool.</li> <li>● 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.</li> <li>● Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error.</li> <li>● 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.</li> <li>● 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.</li> <li>● 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.</li> </ul> <p>(3) Grounding</p> <ul style="list-style-type: none"> <li>● 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.</li> <li>● For the ground terminal 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 technical standards). For detail, follow the description in an instruction manual of each controller.</li> <li>● Perform Class D Grounding (former Class 3 Grounding with ground resistance 100Ω or below).</li> </ul>

No.	Operation Description	Description
4	Installation and Start	<p>(4) Safety Measures</p> <ul style="list-style-type: none"> <li>● 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.</li> <li>● 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.</li> <li>● Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation.</li> <li>● 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.</li> <li>● 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.</li> <li>● 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.</li> <li>● Take the measure so that the work part is not dropped in power failure or emergency stop.</li> <li>● Wear protection gloves, goggle or safety shoes, as necessary, to secure safety.</li> <li>● 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.</li> <li>● 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.</li> </ul>
5	Teaching	<ul style="list-style-type: none"> <li>● 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.</li> <li>● 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.</li> <li>● 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.</li> <li>● 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.</li> <li>● Place a sign “Under Operation” at the position easy to see.</li> <li>● 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.</li> </ul> <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"> <li>● 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.</li> <li>● After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation.</li> <li>● 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.</li> <li>● 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.</li> <li>● 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.</li> </ul>
7	Automatic Operation	<ul style="list-style-type: none"> <li>● Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence.</li> <li>● Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication.</li> <li>● Make sure to operate automatic operation start from outside of the safety protection fence.</li> <li>● 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.</li> <li>● 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.</li> </ul>

No.	Operation Description	Description
8	Maintenance and Inspection	<ul style="list-style-type: none"> <li>● 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.</li> <li>● 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.</li> <li>● When the work is to be performed inside the safety protection fence, basically turn OFF the power switch.</li> <li>● 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.</li> <li>● 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.</li> <li>● Place a sign “Under Operation” at the position easy to see.</li> <li>● For the grease for the guide or ball screw, use appropriate grease according to the instruction manual for each model.</li> <li>● Do not perform the dielectric strength test. Failure to do so may result in a damage to the product.</li> <li>● 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.</li> <li>● 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.</li> <li>● 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. Use in incomplete condition may cause damage to the product or an injury.</li> </ul> <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"> <li>● Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.</li> </ul>
10	Disposal	<ul style="list-style-type: none"> <li>● When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste.</li> <li>● When removing the actuator for disposal, pay attention to drop of components when detaching screws.</li> <li>● Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.</li> </ul>
11	Other	<ul style="list-style-type: none"> <li>● 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.</li> <li>● See Overseas Specifications Compliance Manual to check whether complies if necessary.</li> <li>● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety.</li> </ul>

## 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.	 <span style="margin-left: 20px;">Danger</span>
Warning	This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury.	 <span style="margin-left: 20px;">Warning</span>
Caution	This indicates a potentially hazardous situation which, if the product is not handled correctly, may result in minor injury or property damage.	 <span style="margin-left: 20px;">Caution</span>
Notice	This indicates lower possibility for the injury, but should be kept to use this product properly.	 <span style="margin-left: 20px;">Notice</span>

## Caution in Handling

---

- In this touch panel teaching, the language to be displayed can be changed. Refer to the following for how to change it.
  - Section 21 Environment Setting [Language]
- Do not attempt to give mechanical shock on this touch panel teaching pendant TB-01/TB-01D/TB-01DR as it may cause malfunction.
- When operating this touch-panel teaching pendant TB-01/TB-01D/TB-01DR, be sure to hold the teaching pendant to prevent the cables from receiving unnecessary tensile loads.
- The LCD screen drops brightness if it is used for long time. In order to extend the life of LCD, set the time setting to turn off in the environment setting to turn it off automatically, and disconnect from the controller when it is not in use.
- Do not touch two points on the screen at the same time as the touch panel adopts the analog resistive film system. Touching two points at the same time can make the system detect the middle point on a line between the two points that you touched and react.
- Make operation on the touch panel with force of 0.5N or less. Applying higher force can damage the panel.
- The life of the touch panel is 1,000,000 times of pressing on the same spot (in environment of 25degC).

 **Caution:** *This touch-panel teaching pendant TB-01/TB-01D/TB-01DR is exclusively designed for use with IAI controllers. Never connect it to other equipment. Failure may occur.*

## International Standards Compliances

---

This product comply with the following international standards:

RoHS3 Directive	CE Marking	UL
○	Applicable for option	-

## Product Check

This product, if adopting a standard configuration, consists of the parts listed below.

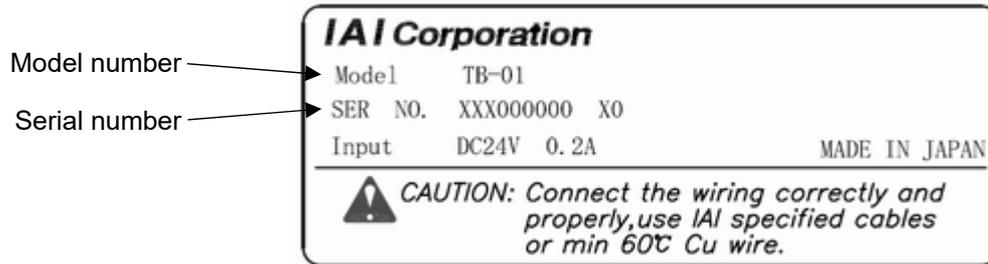
### 1. Component (excluding options)

No.	Product name	Model number	Remarks
1	Teaching pendant	Refer to "How to Read Model Nameplate" and "How to Read Model Number".	
Accessories			
2	Cable for Position Controllers	CB-TB1-C050	when model C and SC selected
3	Cable for program Controllers	CB-TB1-X050	when model S, SJ and SC selected
4	Replacement Cable	CB-SEL-SJS002	when model SJ and SC selected
5	Touch pen	Built into teaching pendant	
6	First step guide	ME0327, ME0328	
7	Safety guide	M0194	

### 2. Instruction manual related to this product

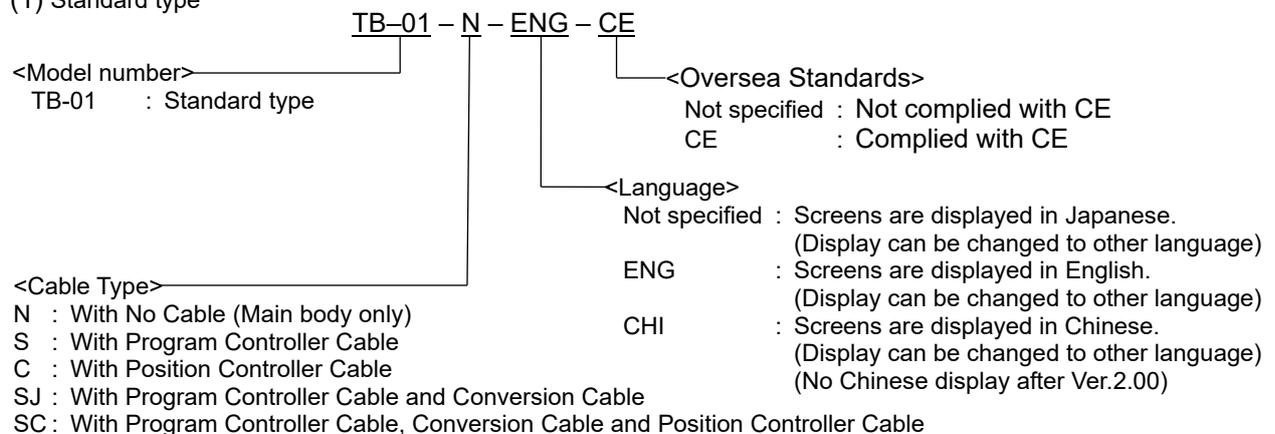
No.	Name	Control number
1	Instruction manual for touch-panel teaching pendant TB-01/TB-01D/TB01DR	ME0325
2	Instruction manual for XSEL-J/K/KE controller	ME0116
3	Instruction manual for XSEL-JX/KX controller	ME0119
4	Instruction manual for XSEL-KT/KET controller	ME0134
5	Instruction manual for XSEL-P/Q/PCT/QCT controller	ME0148
6	Instruction manual for XSEL-PX/QX controller	ME0152
7	Instruction manual for XSEL-R/S/RX/SX/RXD/SXD controller	ME0313
8	Instruction manual for tabletop robot TT	ME0149
9	Instruction manual for tabletop robot TTA	ME0320
10	Instruction manual for SSEL controller	ME0157
11	Instruction manual for ASEL controller	ME0165
12	Instruction manual for PSEL controller	ME0172
13	Instruction manual for MSEL controller	ME0336
14	Instruction manual for XSEL-RA/SA/RAX/SAX/RAXD/SAXD controller	ME0359

### 3. How to Read Model Nameplate

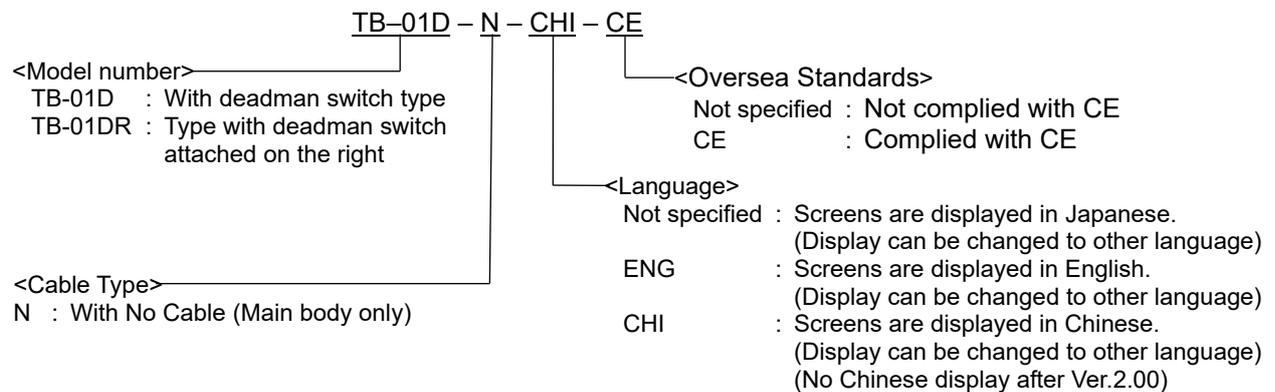


### 4. How to Read Model Number

#### (1) Standard type



#### (2) With deadman switch type and Type with deadman switch attached on the right



There is no cable set form for TB-01D and TB-01DR.  
Prepare a following cable.

- Position controller cable: CB-TB1-C050
- Position controller TP adapter connection cable: CB-TB1-GC050

\* It is necessary to have a dedicated cable to connect to XSEL-J and XSEL-JX controllers.  
[Refer to 4.12.2 XSEL-J, XSEL-JX Dedicated Cable]

## 1. Forward

Thank you very much for purchasing our XSEL, TT/TTA, SSEL, ASEL, PSEL and MSEL Controller Teaching Pendant. Improper usage or mishandling may result in a product not only being unable to deliver full functions but also produce unexpected troubles or shorten the product's life. Please read this Manual carefully, and operate the product properly by paying attention to its handling.

When operating the Teaching Pendant, always keep this Manual at hand and read the relevant items as required.

For the actuator and controller to be used, be sure to refer to the Instruction Manuals attached to the products.

- While the teaching pendant is left connected, "Effect" is valid for the safety velocity. Therefore, in the case of the orthogonal axis, the maximum velocity is 250 mm/sec or lower when the program is started from the teaching pendant. In the case of the SCARA axis, the maximum velocity is 250 mm/sec or lower for CP motion and 3% or less for PTP motion. To operate the controller according to the program velocity command, it is required to change the condition to "No Effect." For selection of the safety velocity between Effect and No Effect, refer to "16.8. Safety Velocity."
- The display screens of this manual are of version 1.60 or later of the teaching pendant application. To confirm the version, refer to the section "15.10. Version Information."

## 2. Warranty

### 2.1 Warranty Period

One of the following periods, whichever is shorter:

- 18 months after shipment from our company
- 12 months after delivery to the specified location

### 2.2 Scope of Warranty

Our products are covered by warranty when all of the following conditions are met. Faulty products covered by warranty will be replaced or repaired free of charge:

- (1) The breakdown or problem in question pertains to our product as delivered by us or our authorized dealer.
- (2) The breakdown or problem in question occurred during the warranty period.
- (3) The breakdown or problem in question occurred while the product was in use for an appropriate purpose under the conditions and environment of use specified in the Operation Manual and catalog.
- (4) The breakdown or problem in question was caused by a specification defect or problem, or by a quality issue with our product.

Note that breakdowns due to any of the following reasons are excluded from the scope of warranty:

- 1) Anything other than our product
- 2) Modification or repair performed by a party other than us (unless we have approved such modification or repair)
- 3) Anything that could not be easily predicted with the level of science and technology available at the time of shipment from our company
- 4) A natural disaster, man-made disaster, incident or accident for which we are not liable
- 5) Natural fading of paint or other symptoms of aging
- 6) Wear, depletion or other expected result of use
- 7) Operation noise, vibration or other subjective sensation not affecting function or maintenance

Note that the warranty only covers our product as delivered and that any secondary loss arising from a breakdown of our product is excluded from the scope of warranty.

### 2.3 Honoring the Warranty

As a rule, the product must be brought to us for repair under warranty.

### 2.4 Limited Liability

- (1) We shall assume no liability for any special damage, consequential loss or passive loss such as a loss of expected profit arising from or in connection with our product.
- (2) We shall not be liable for any program or control method created by the customer to operate our product or for the result of such program or control method.

## 2.5 Conditions of Conformance with Applicable Standards/Regulations, Etc., and Applications

- (1) If our product is combined with another product or any system, device, etc., used by the customer, the customer must first check the applicable standards, regulations and/or rules. The customer is also responsible for confirming that such combination with our product conforms to the applicable standards, etc.

In such a case we will not be liable for the conformance of our product with the applicable standards, etc.

- (2) Our product is for general industrial use. It is not intended or designed for the applications specified below, which require a high level of safety. Accordingly, as a rule our product cannot be used in these applications.

Contact us if you must use our product for any of these applications:

- 1) Medical equipment pertaining to maintenance or management of human life or health
  - 2) A mechanism or mechanical equipment intended to move or transport people (such as a vehicle, railway facility or aviation facility)
  - 3) Important safety parts of mechanical equipment (such as safety devices)
  - 4) Equipment used to handle cultural assets, art or other irreplaceable items
- (3) Contact us at the earliest opportunity if our product is to be used in any condition or environment that differs from what is specified in the catalog or Operation Manual.

## 2.6 Other Items Excluded from Warranty

The price of the product delivered to you does not include expenses associated with programming, the dispatch of engineers, etc. Accordingly, a separate fee will be charged in the following cases even during the warranty period:

- 1) Guidance for installation/adjustment and witnessing of test operation
- 2) Maintenance and inspection
- 3) Technical guidance and education on operating/wiring methods, etc.
- 4) Technical guidance and education on programming and other items related to programs

### 3. Specifications Check

#### 3.1 Basic Specifications

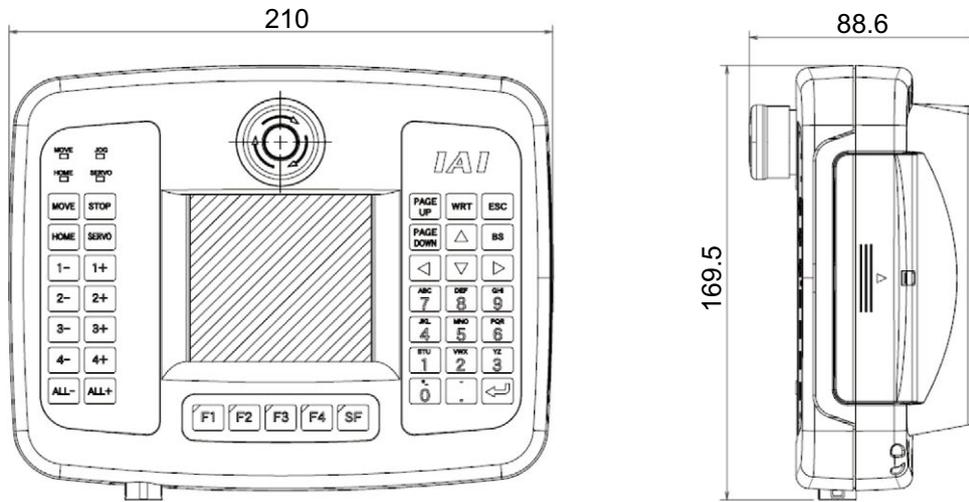
Item		TB-01/ TB-01D/ TB-01DR type
Body		Black
Display Colors		65536 colors (16-bit colors)
Backlight Type		White LED backlight
Touch Panel Display		3.5 inch TFT color LCD QVGA
Touch Detection Type		4-wire resistive type
Hardware Keys		40-key input with jog, function keys, etc.
External Memory		SD/SDHC memory card <sup>(Note 1)</sup> interface installed (1G to 8G) (Toshiba-made recommended)
Environmental Resistance		IP 40 or equivalent
Size		169.5mm (H) × 210mm (W) × 88.6mm (D)
Mass		TB-01: 507g approx. (excluding cable) TB-01D/TB-01DR: 539g approx. (excluding cable)
Cable Length		5m (Standard)
Wall-mounting Hook		Hook available to use with M8 hex socket head cap screw
Touch Pen		φ5 × 100mm
Strap		Width 6mm, reversed length 190mm (Option)
Function	Languages	Japanese/English/Chinese (No Chinese display after Ver.2.00)
	Touch Sound	ON/OFF Volume Settable in 3 steps, S, M, and L
	Monitor	Input port, output port, input/output port, global flags, global variables, axis status, system statuses, error list, version information, control constant table administration information, maintenance information
	Position Data Edit	Target position, speed, acceleration, deceleration, target arm system, comment
	Operational Functions	Set position operation, jog operation
	Parameter Edit	I/O, all axes common, each axis, driver encoder, I/O slot card, other
	Version Information	Main, driver, TP, other
	Alarm History	Depends on connected controller
	Data Storage	Applicable to have data saved to and read from external Secure Digital memory card (Position data, program, symbol, parameter, global data alarm list)
	Display Adjustment	Brightness adjustable for contrast and backlight
	Clock Setting	Clock setting available with real time clock (Backup held with CR2032 button battery)
	Maintenance Information	Total moving count, Total moving distance, etc. (XSEL-R/S/RX/SX/RXD/SXDSXD/RA/SA/RAX/SAX/RAXD/SAXD, TTA or MSEL-PCX/PGX/PC/PG/PCF/PGF are applicable)

Item		TB-01/ TB-01D/ TB-01DR type
Communication	Communication Standard	Based on RS232C
	Communication Conditions	Transmission Speed 9,600bps/19,200bps/38,400bps/57,600bps/115,200bps /230,400bps
	Protocol	Dedicated format
	Connector	D sub 25 pin
	Number of Connectable Controllers	Depends on controller to be connected
Font		Japanese Bitmap Font: Gothic Fonts supplied by LIM Corporation Ltd. are used.
Note 1		Secure Digital card is a registered trademark for SD-3C, LLC and SDA.

### 3.2 Environmental Specifications

Item	TB-01/ TB-01D/ TB-01DR type
Rated Voltage	24V DC
Operational Voltage Range	21.6 to 26.4V DC
Power Consumption	3.6W or less (150mA or less)
Ambient Operating Temperature	0 to 50°C
Ambient Operating Humidity	20 to 85%RH (non-condensing)
Ambient Storage Temperature	-20 to 60°C
Ambient Storage Humidity	10 to 85%RH (non-condensing)
LCD Life	20,000 hours (in ambient temperature at 25°C)
Vibration Endurance	10 to 55Hz (1-minute period) Double amplitude 0.75mm to X, Y and Z directions for 10min
Shock Endurance	147 m/s <sup>2</sup> , 11msec, applied 4 times each in X, Y and Z directions
Environmental Resistance	IP40 (in initial condition)

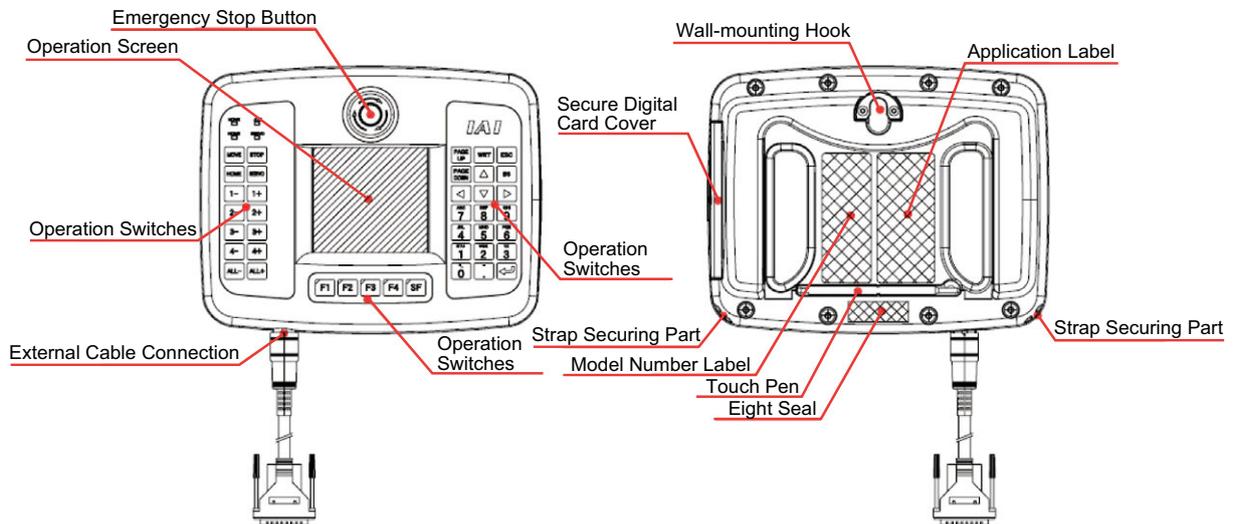
### 3.3 External Dimensions



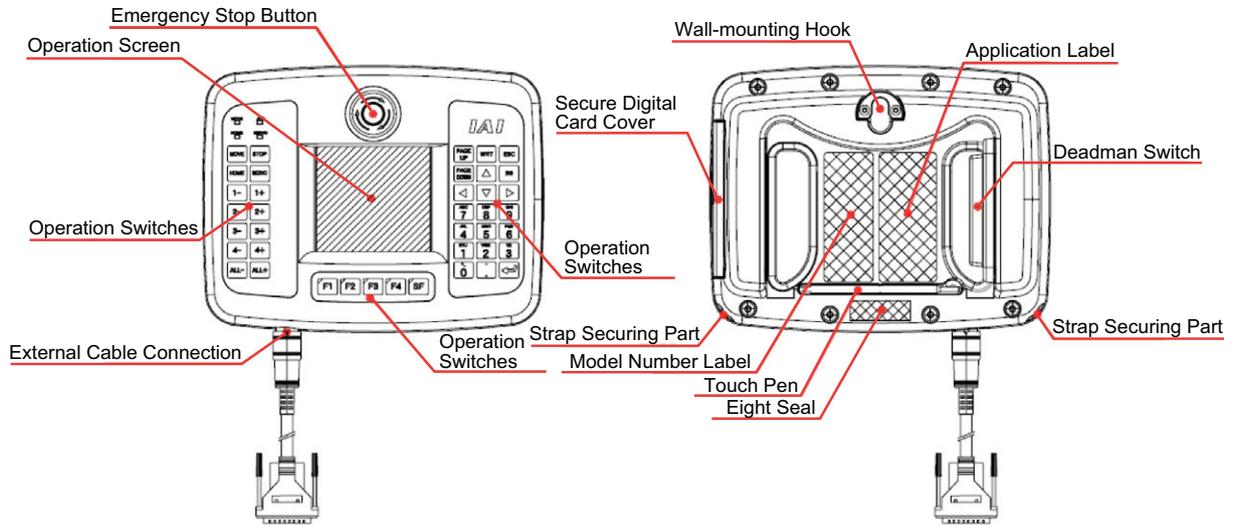
3. Specifications Check

### 3.4 Externals

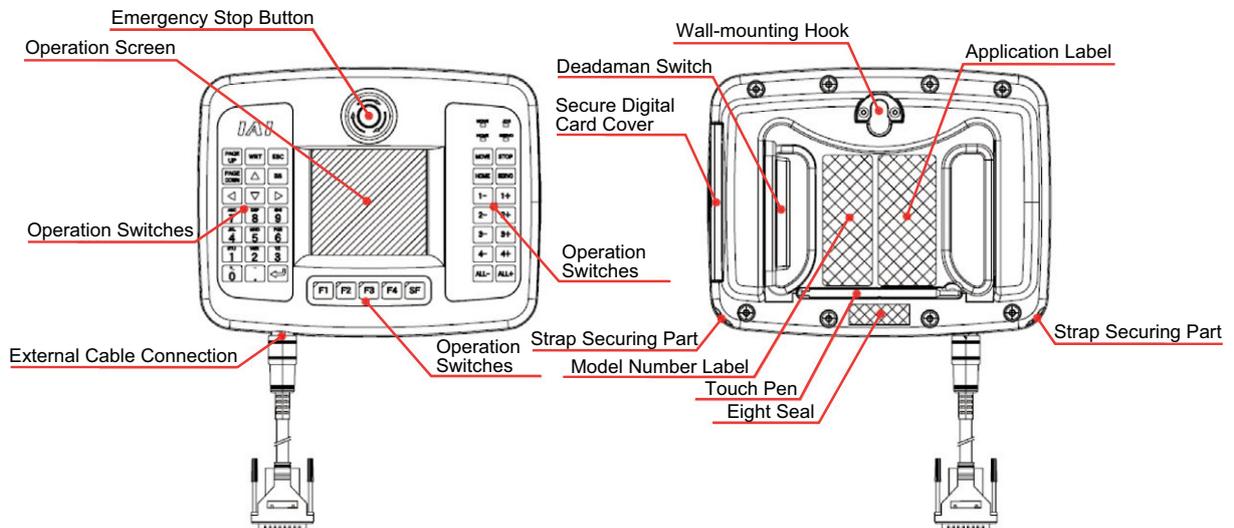
#### 3.4.1 TB-01 (Standard) Externals



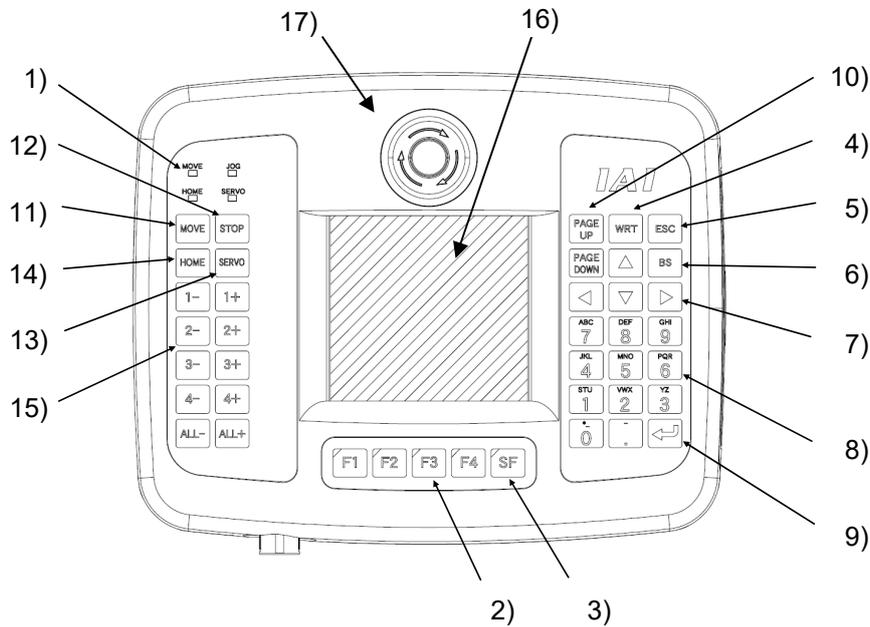
### 3.4.2 TB-01D (With Deadman Switch Type) Externals



### 3.4.3 TB-01DR (Type with Deadman Switch Attached on the Right) Externals



### 3.5 Explanation of Each Part



1) LED

- JOG : When this LED is lit, jog operation is possible with **1-**, **2-**, **3-**, **4-**, **ALL-**, **1+**, **2+**, **3+**, **4+** or **ALL+** keys.
- MOVE : When this LED is lit, position movement or continuous movement operation is possible with **1-**, **2-**, **3-**, **4-**, **ALL-**, **1+**, **2+**, **3+**, **4+** or **ALL+** keys.
- SERVO: When this LED is lit, servo ON/OFF operation is possible with **1-**, **2-**, **3-**, **4-**, **ALL-**, **1+**, **2+**, **3+**, **4+** or **ALL+** keys.
- HOME : When this LED is lit, homing operation is possible with **1-**, **2-**, **3-**, **4-**, **ALL-**, **1+**, **2+**, **3+**, **4+** or **ALL+** keys.

2) **F1** to **F4** keys (Function keys)

Correspond to each item in the Touch-panel operation display screen (function key section). The LED is lit when the relevant key is operable.

3) **SF** key (Shift key)

If there are more than 5 selectable functions (“→” will be displayed at right side of the function key area), it will change the display items in the function key area.) When the key is operable, its LED is lit.

4) **WRT** key (Write key)

Transmits edit data to the controller. (Data will be saved in the memory of the controller.)

5) **ESC** key (Escape key)

Returns to the previous status from the current status.

6) **BS** key (Backspace key)

If you press this key during data input, clear one letter before. At other time, clear the data where the cursor is placed.

7) **◀**, **▲**, **▼** or **▶** keys (Cursor keys)

Moves the cursor.

- 8) **[1]** to **[9]** or **[0]** keys (Numeric keys)  
 You can input number, alphabet, and sign.  
 When the cursor is at any item requiring the input of characters other than “0” to “9” (such as hexadecimal and character strings), the input mode selection is displayed in the function key area. (Alph: alphabet symbol input, Num: numerical value input)
- 9) **[↵]** key (Return key)  
 Confirms the input data and moves the cursor position forward .
- 10) **[PAGE UP]** / **[PAGE DOWN]** keys (Page up / Page down keys)  
 Increment or decrement edit and display item No. (Position No., Program No., Step No., etc.)
- 11) **[MOVE]** key (Move key)  
 Enables actuator movement or continuous operation. The LED of MOVE is lit. When you press a jog key such as **[1+]** key and **[1-]** key after enabling movement or continuous operation, movement action starts. However, it is required to switch servo ON when the servo is OFF.  
 Jog operation is made possible after the action has been completed or stopped. The LED of JOG is lit up.
- 12) **[STOP]** key (Stop key)  
 Stops actuator movement or continuous movement.
- 13) **[SERVO]** key (Servo key)  
 Enables axis servo ON/OFF switching operation. The LED of SERVO is lit up. When you press a + jog key such as **[1+]** key after enabling servo ON/OFF switching operation, the servo is turned ON. When you press a - jog key such as **[1-]** key, the servo is turned OFF.  
 Jog operation is made possible after the servo has been turned ON/OFF. The LED of JOG is lit. However, when the servo is OFF, the actuator cannot be moved by jog or inching operation unless the servo is turned ON.
- 14) **[HOME]** key (Home key)  
 Enables homing operation. The LED of HOME is lit. When you press a jog key such as **[1+]** key and **[1-]** key after enabling homing operation, homing starts. However, it is required to turn the servo ON when the servo is OFF. Jog operation is made possible after homing has been completed. The LED of JOG is lit.
- 15) **[1-]**, **[1+]**, **[2-]**, **[2+]**, **[3-]**, **[3+]**, **[4-]**, **[4+]**, **[ALL-]** or **[ALL+]** keys (Jog keys)
- |               |  |
|---------------|--|
| <b>[1-]</b>   | Minus direction jog movement for the 1st axis and 5th axis |
| <b>[1+]</b>   | Plus direction jog movement for the 1st axis and 5th axis  |
| <b>[2-]</b>   | Minus direction jog movement for the 2nd axis and 6th axis |
| <b>[2+]</b>   | Plus direction jog movement for the 2nd axis and 6th axis  |
| <b>[3-]</b>   | Minus direction jog movement for the 3rd axis and 7th axis |
| <b>[3+]</b>   | Plus direction jog movement for the 3rd axis and 7th axis  |
| <b>[4-]</b>   | Minus direction jog movement for the 4th axis and 8th axis |
| <b>[4+]</b>   | Plus direction jog movement for the 4th axis and 8th axis  |
| <b>[ALL-]</b> | Minus direction jog movement for all axes                  |
| <b>[ALL+]</b> | Plus direction jog movement for all axes                   |

By pressing either of the keys while the backlight is off, it will be turned back on.

16) Touch-panel operation display screen

The screen consists of a TFT Color LCD Type and a touch panel.

Various settings that have been edited or taught are displayed.

To operate the screen, use a finger or the touch pen to touch desired parts of the touch panel.

\*1 In a use of the LCD display for a long term, the brightness may drop.

In order to extend the life of the LCD display, establish the setting in the environment setting to turn it off automatically, and remove it from the controller when it is not in use.

\*2 This touch panel is of analog resistance membrane type, so do not touch two or more locations on the screen at the same time.

If two or more locations are touched at the same time, the centers of all touched locations may respond and trigger multiple operations.

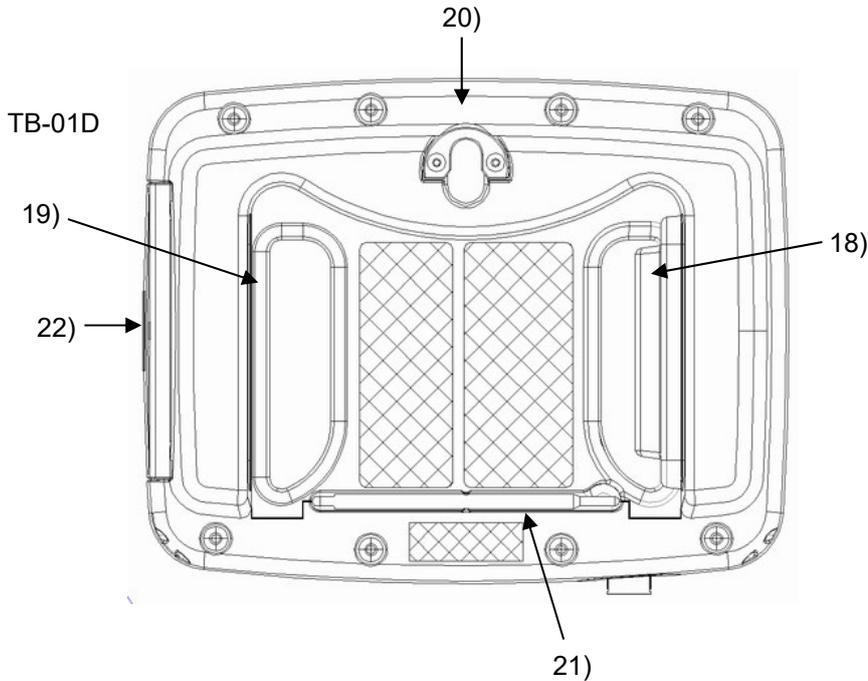
\*3 When operating the touch panel, do not apply a force exceeding 0.5 N.

If any greater force is applied, the touch panel may be damaged.

\*4 The life of touch panel is approx. 1 million touches at the same location. (Assuming a use environment of 25°C)

17) EMERGENCY STOP (Pushbutton switch for emergency stop)

This switch actuates an emergency stop.



18) or 19) Dead man Switch

(It is placed at 18) for TB-01D and 19) for TB-01DR. It is not equipped on TB-01.)

The dead man switch has three conditions corresponding to three levels. The meaning of ON/OFF in each condition is explained below.

Level 1	Switch OFF	The hand is off the switch, or the switch is pressed with a very small force.
Level 2	Switch ON	The switch is pressed with an appropriate force.
Level 3	Switch OFF	The switch is pressed with a strong force.

When the switch is ON, the servo can be turned ON.

When the switch is OFF, the drive source is cut off and the servo remains OFF.

Even when the switch is OFF, operation is still possible in modes where the servo need not be ON (such as in the edit mode).

20) Wall-mounting hook

This hook is used to mount the touch panel on a wall.

21) Touch pen

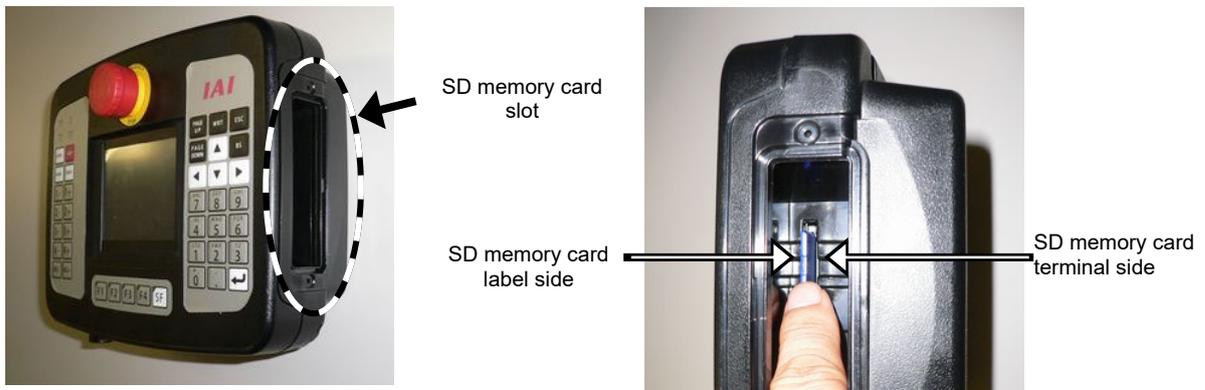
This touch pen is used to touch the touch-panel operation display screen.

22) SD memory card slot

The SD memory card is inserted into this slot. Open the lid and insert the SD memory card.

- Face the card's label toward the operation panel, and insert until a click is heard.
- To remove the card, press it lightly. It will pop out slightly, so pull it out straight.

*[Caution] Some card such as a new memory card may be difficult to take out. Try to put it in and out several times and it gets easier to take out.*

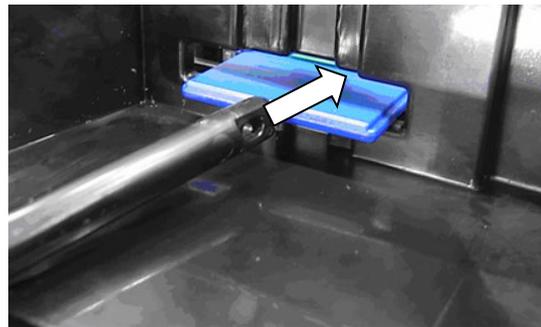


The SD memory card can also be inserted and removed with the following method.

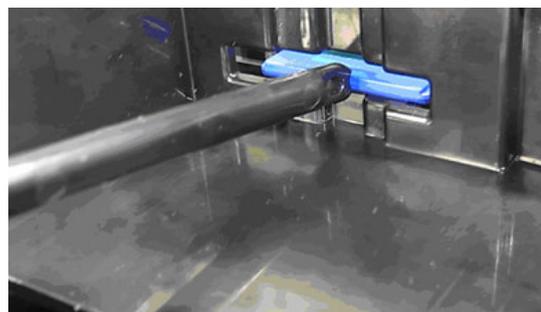
■ When locking and releasing by pressing with finger is difficult

[Locking]

- 1) Using the back end of the touch pen, press until the SD memory card is locked.

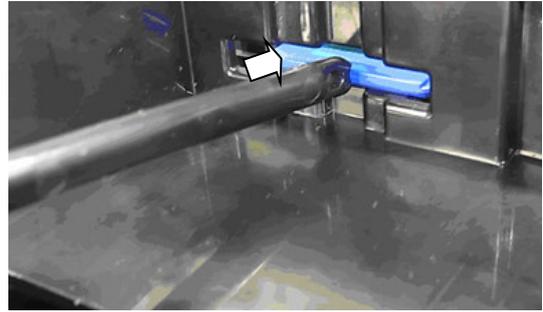


- 2) Press in until a click is heard. The SD memory card will be locked.

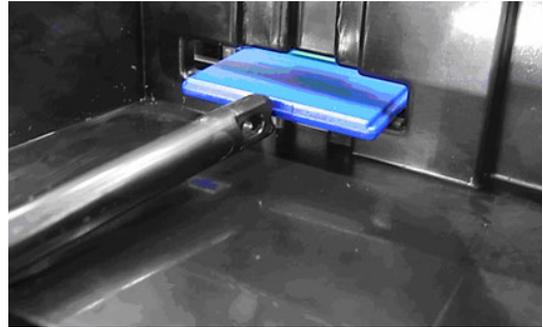


[Releasing]

- 1) Using the back of the touch pen, press the SD memory card in until a click is heard.

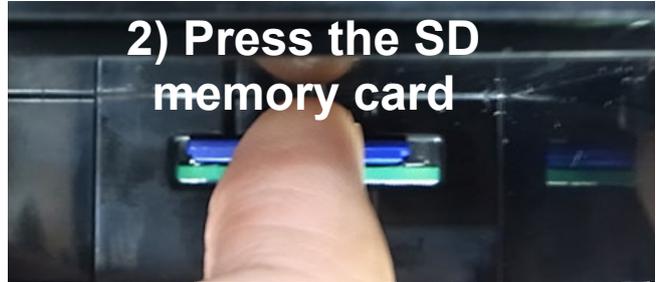


- 2) When the touch pen is pulled forward, the SD memory card will be released.



■ When removing with fingers is difficult

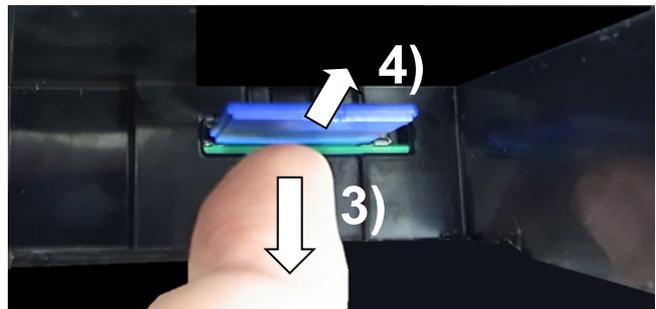
- 1) From the state with the SD memory card mounted, press the SD memory card and release it.
- 2) Press the SD memory card in to where it is released.



- 3) Slide your finger down in this state.

- 4) The force of the spring will cause the SD memory card to pop out.

The SD memory card can be popped out in the same manner as the finger when using the touch pen.



**[Caution]**

*If your finger is released with force, the SD memory card will pop out of the slot and could be lost or damaged.*

### 3.6 Life of Touch Panel LCD

The life of the touch panel is 20,000 hours (in ambient temperature at 25°C).

### 3.7 Life of Battery

Battery Connector BAT1, used battery CR2032

The nominal life of the button battery CR2032 that the manufacturer states is approximately five years (in ambient temperature at 25°C).

The replacement of the battery cannot be held at customer's site.  
Please contact IAI when you require a replacement.

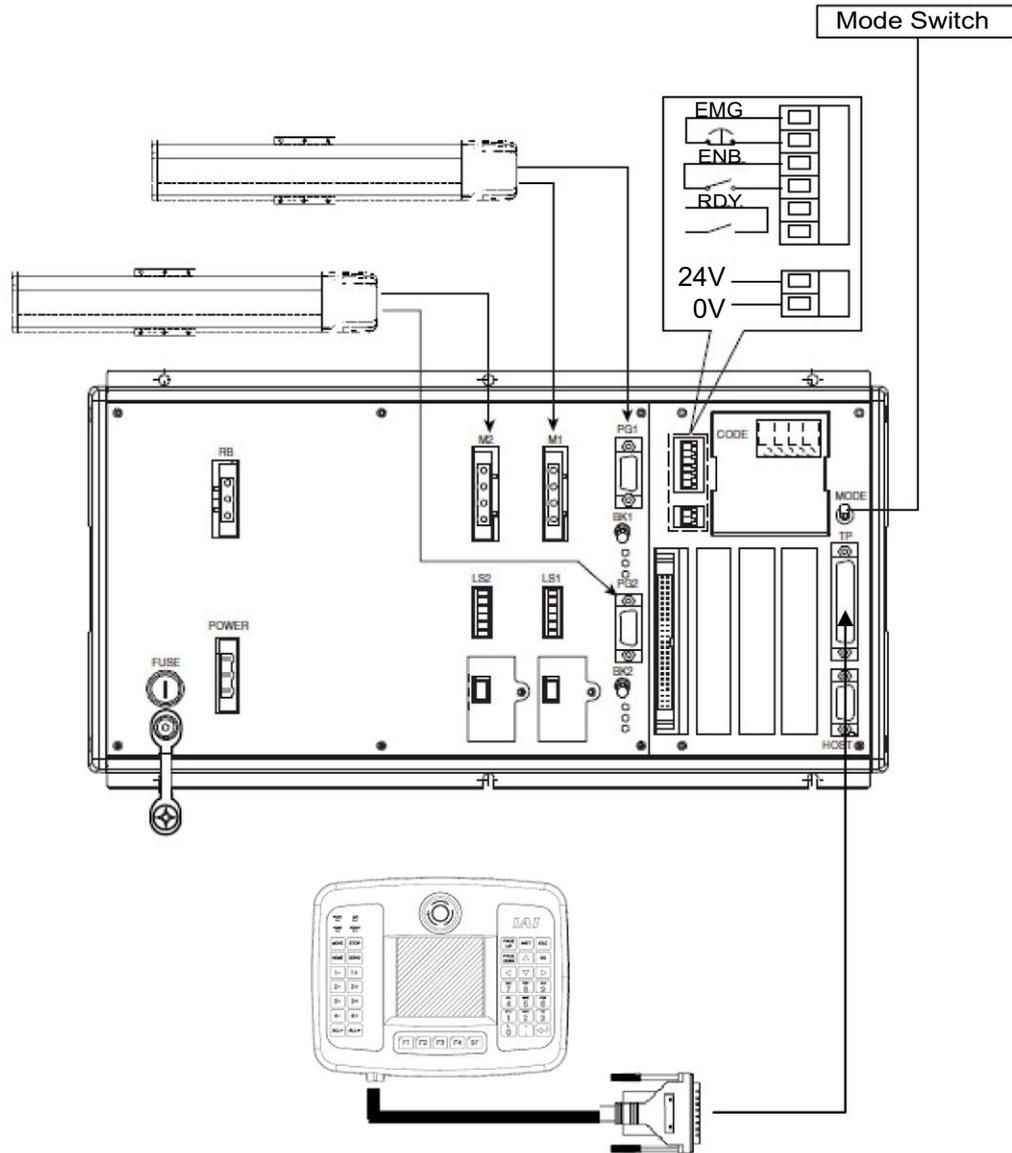
### 3.8 Optional Items

#### ■ IAI Products

- Touch pen (\* enclosed to main unit, for cases of loss and malfunction)
- Strap (STR-1)

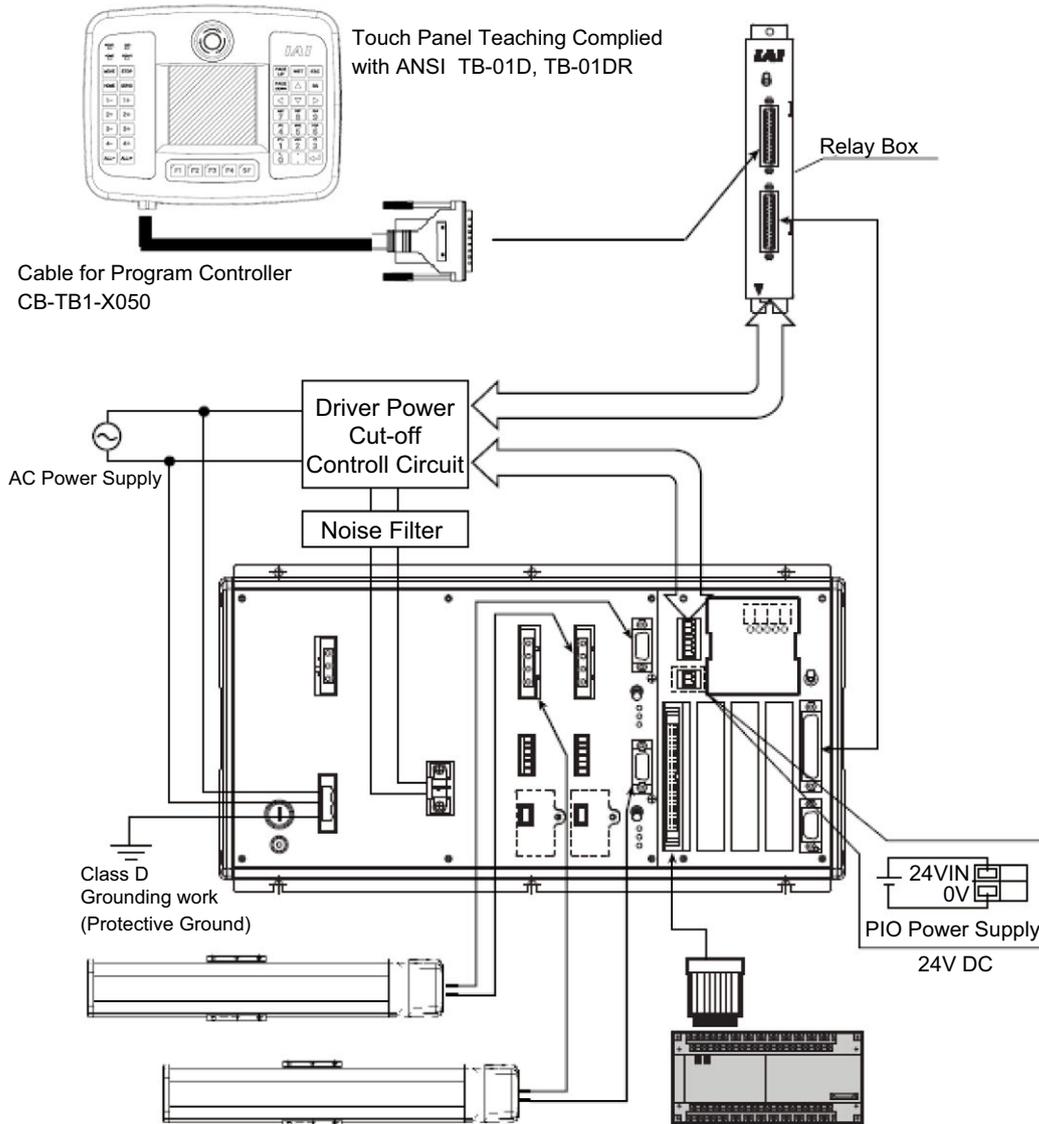
## 4. Connection with the Controller

### 4.1 XSEL-J/K Type Controller



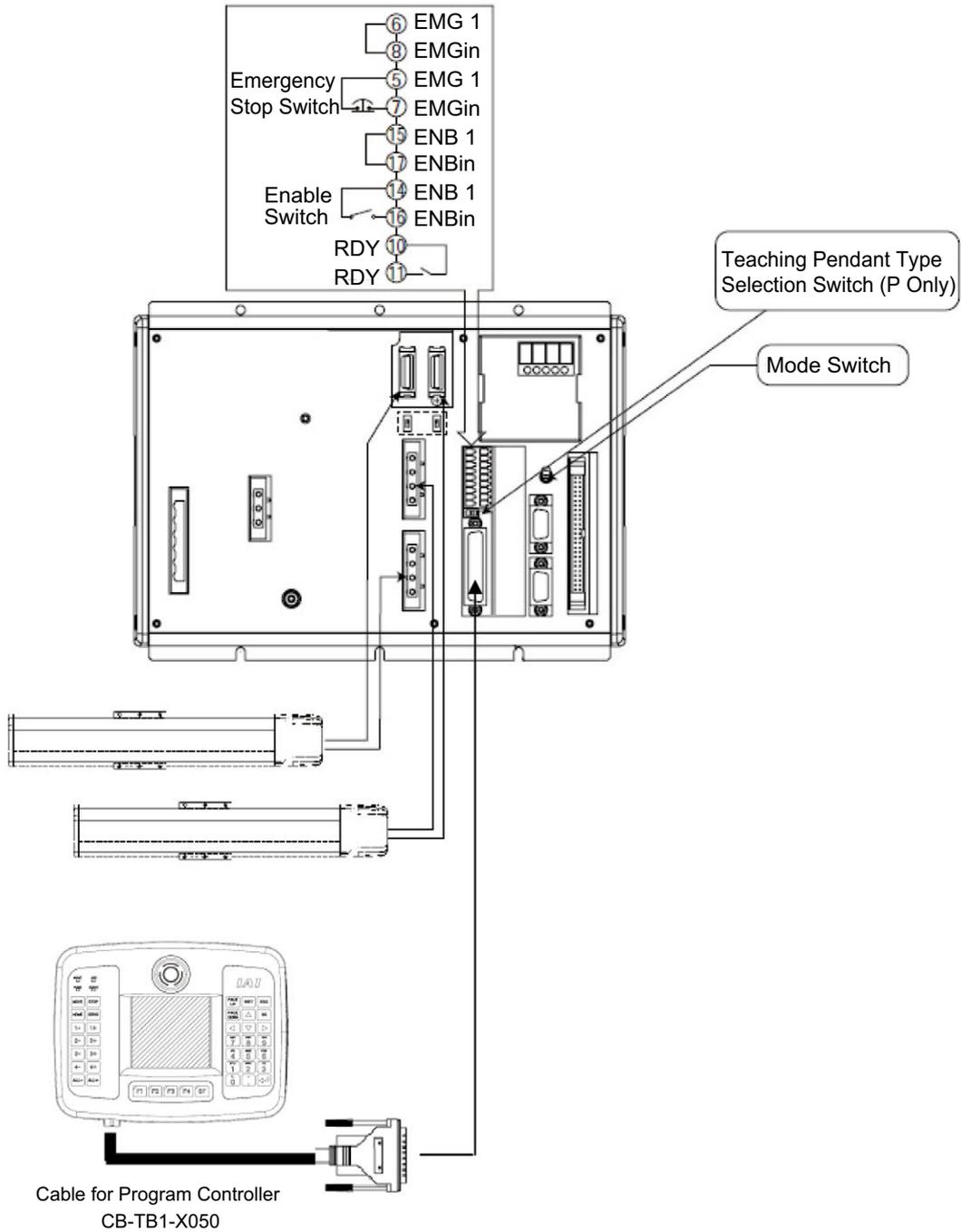
Cable for Program Controller  
 For XSEL-J: CB-TB1-XJ050  
 For XSEL-K: CB-TB1-X050

## 4.2 XSEL-KT/KET Type Controller



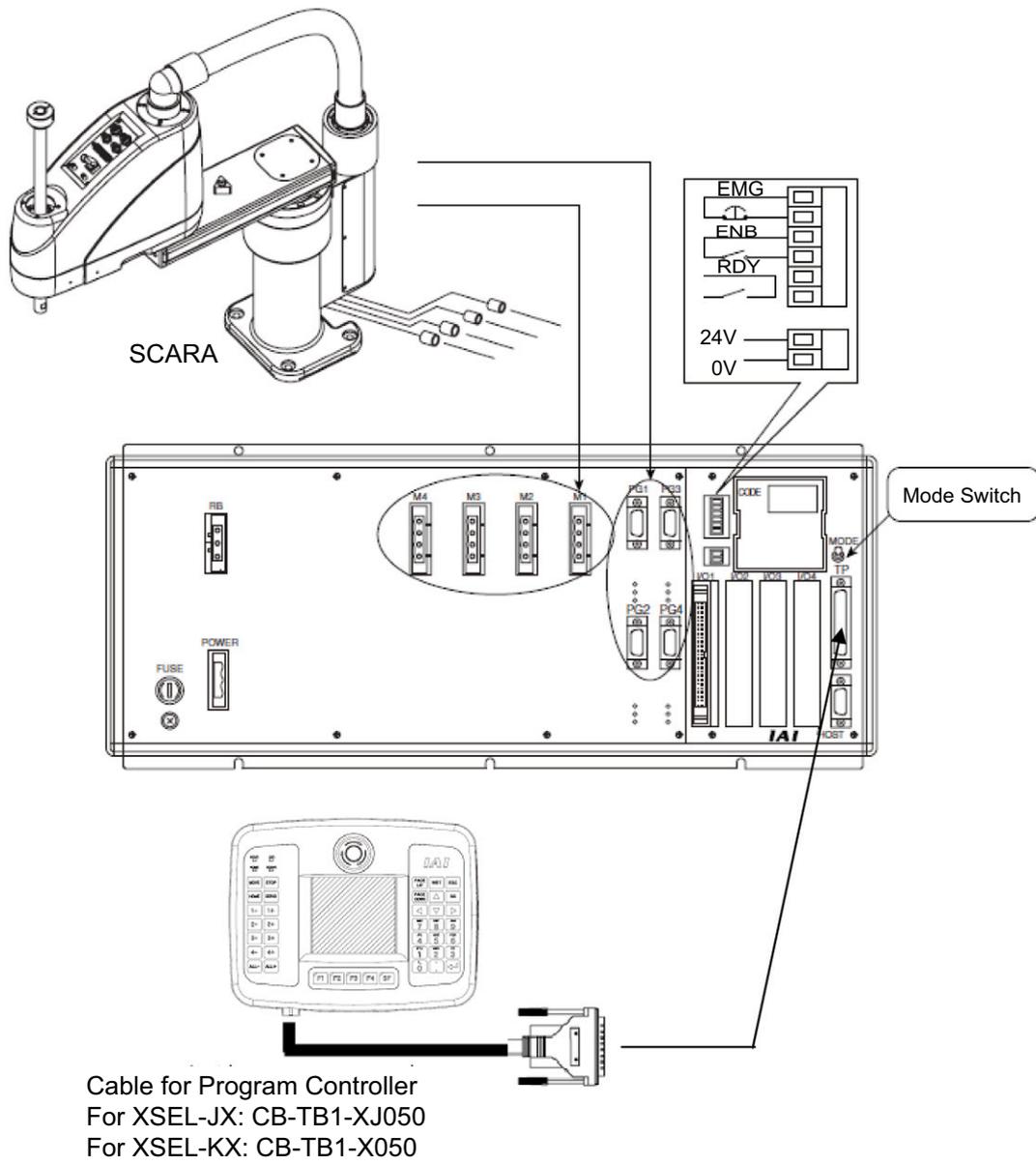
4.3 XSEL-P/Q, R/S, RA/SA Type Controller

4. Connection with the Controller



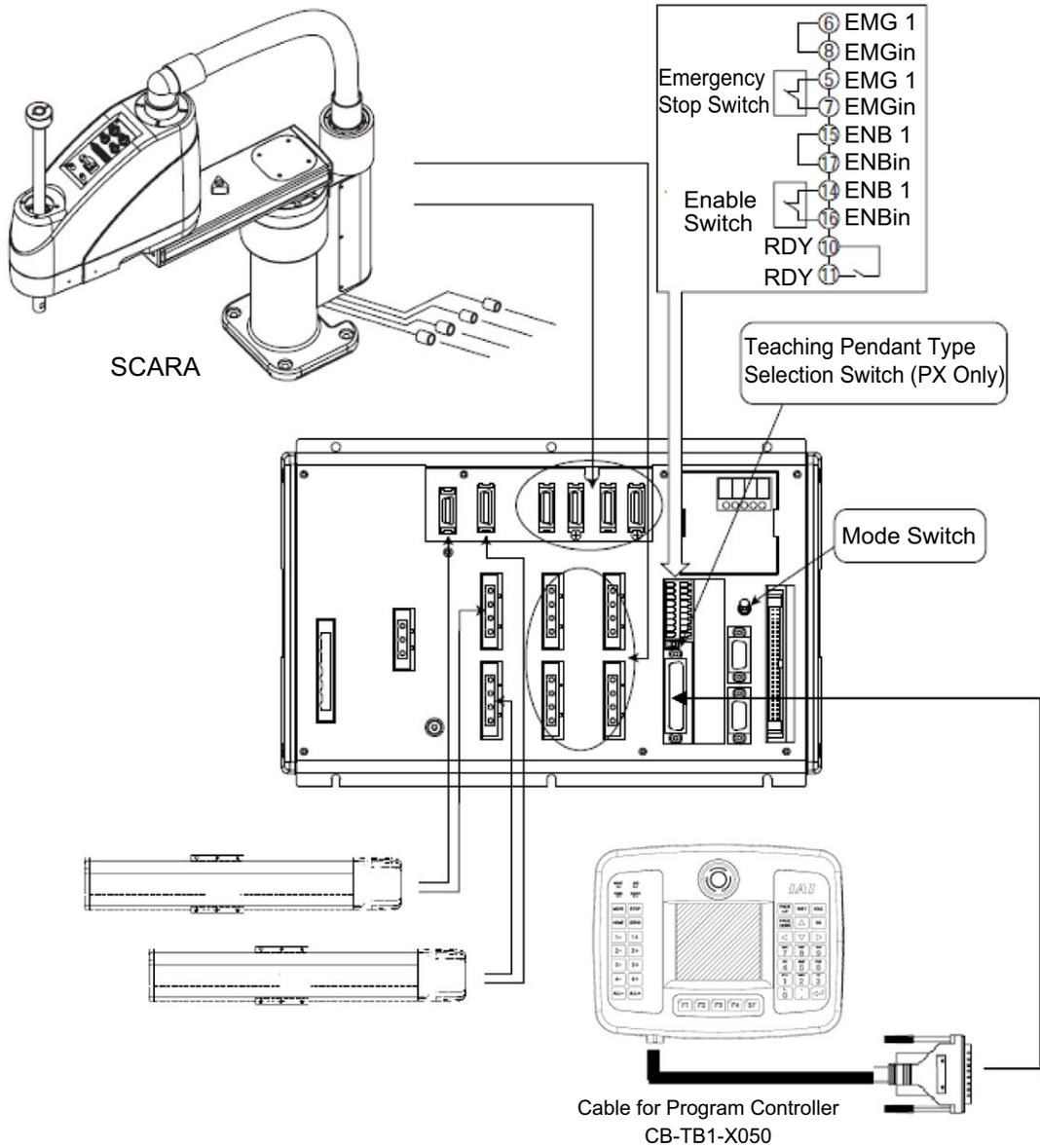
**Caution:** Set the teaching pendant type selection switch of the XSEL-P type to the left.

4.4 XSEL-JX/KX Type Controller



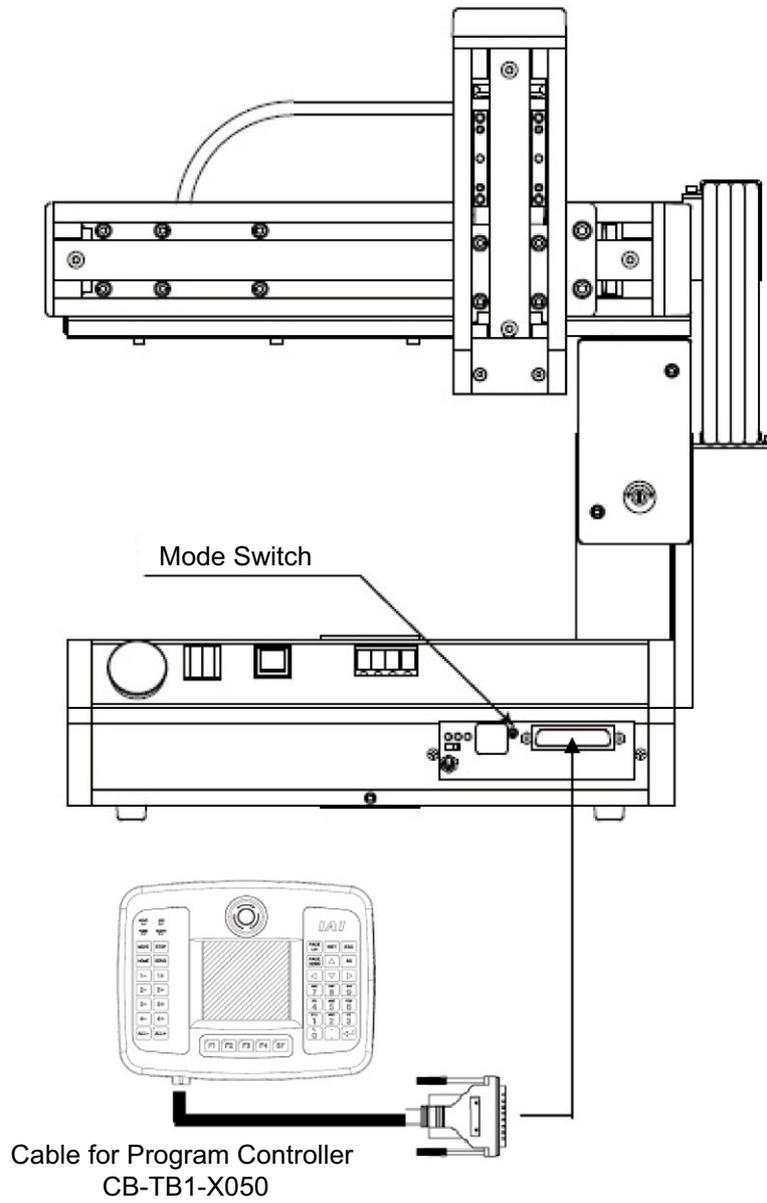
4.5 XSEL-PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD Type Controller

4. Connection with the Controller

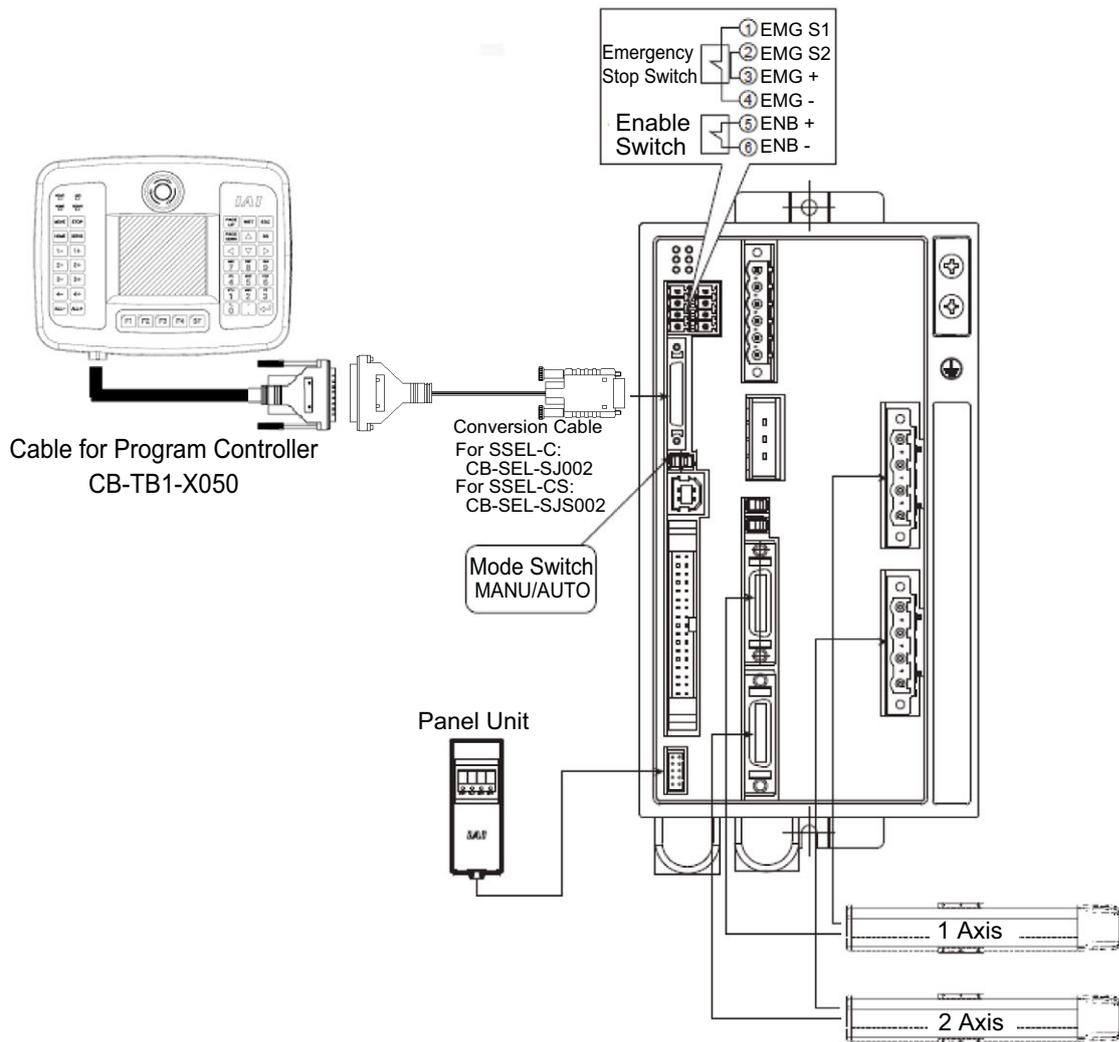


**Caution:** Set the teaching pendant type selection switch of the XSEL-PX type to the left.

4.6 TT/TTA Type Controller

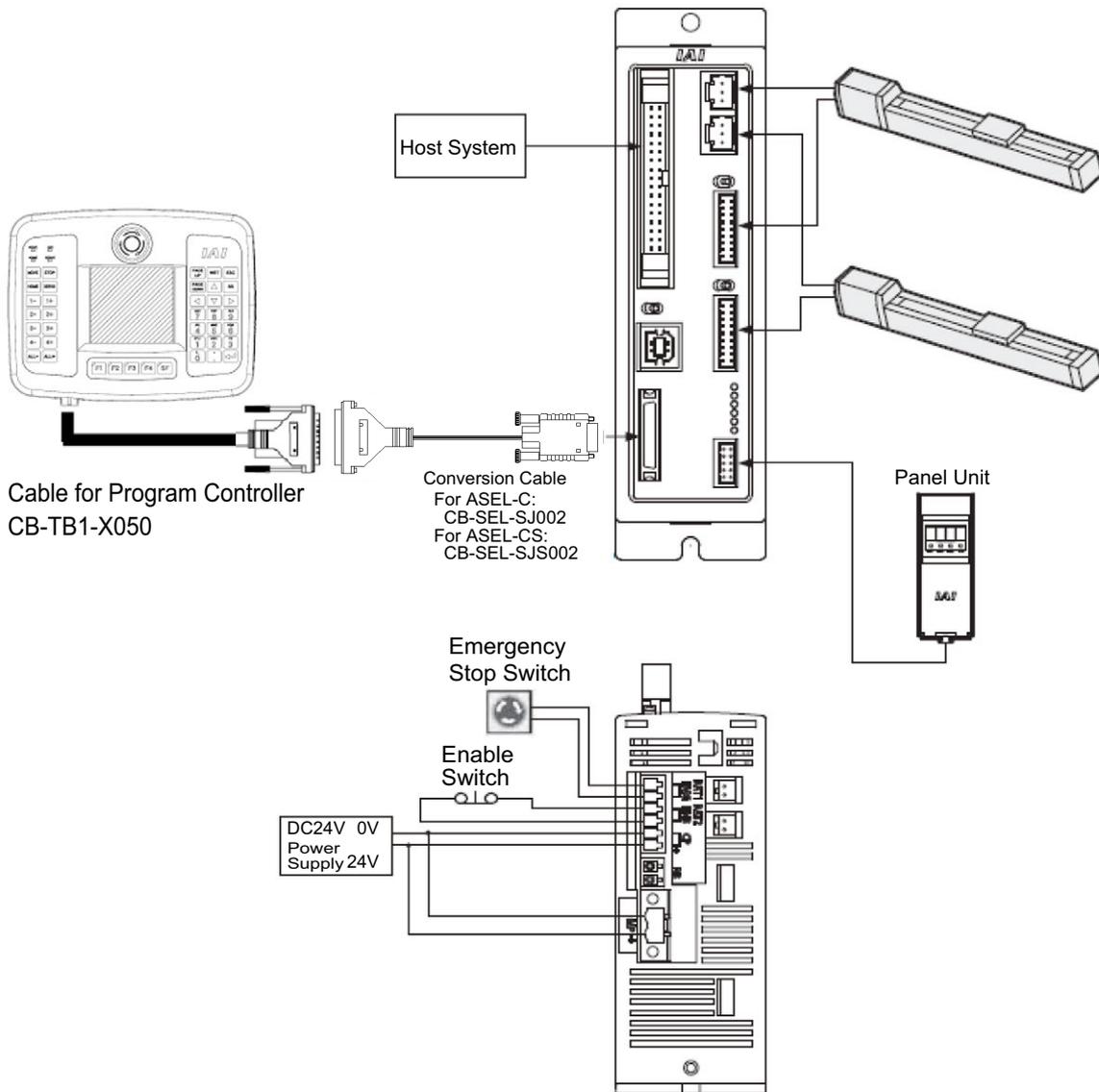


4.7 SSEL Type Controller

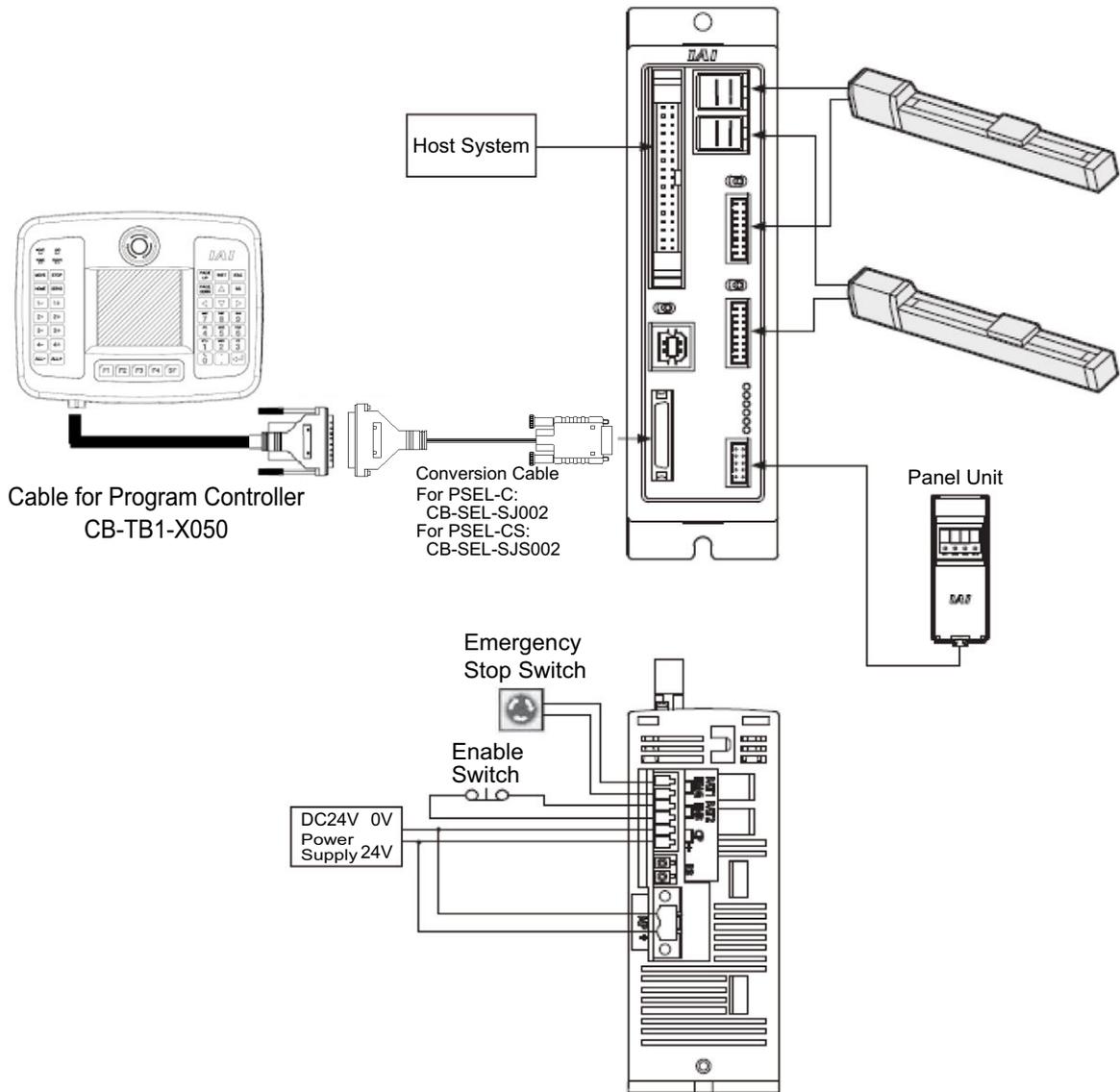


4. Connection with the Controller

4.8 ASEL Type Controller

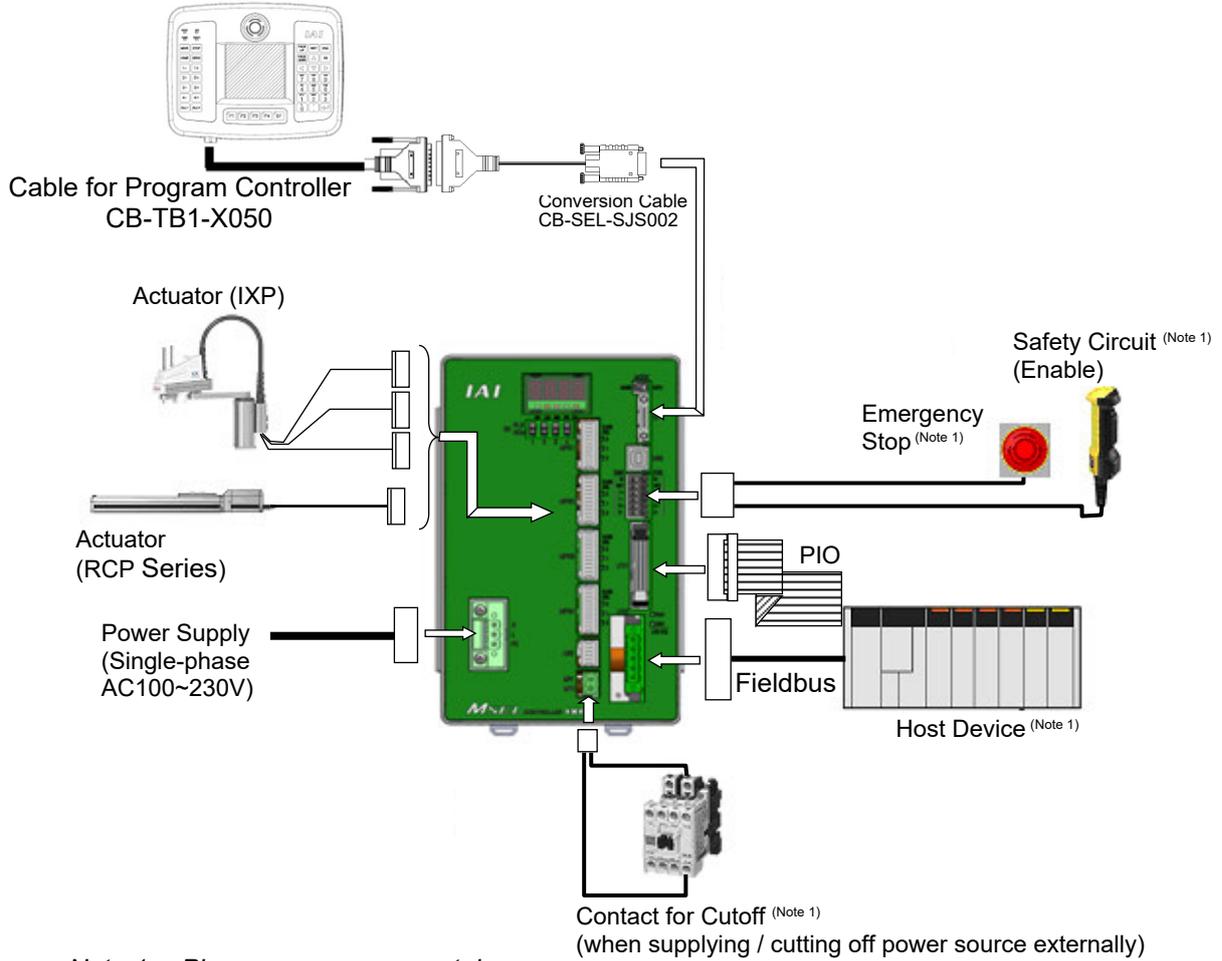


4.9 PSEL Type Controller



4. Connection with the Controller

4.10 MSEL Type Controller



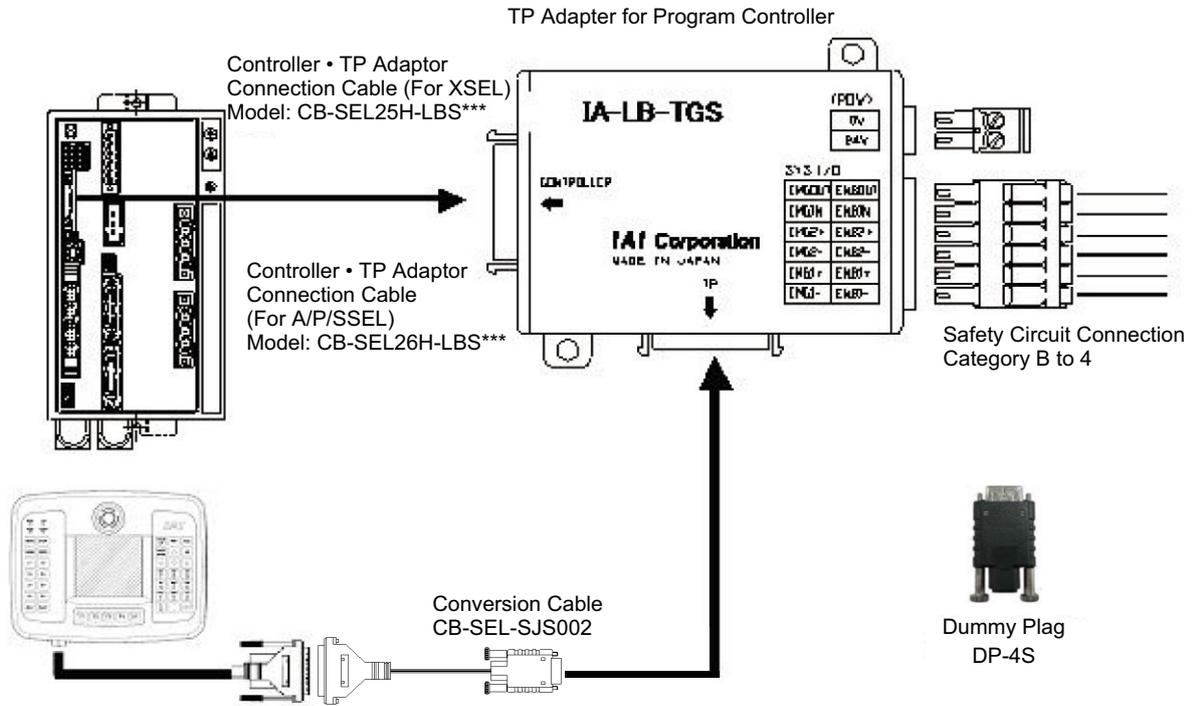
Note 1 Please prepare separately.

#### 4.11 Safety Category Compliant (Connection to the IA-LB-TGS)

To make the system compliant with Safety Category 4, it is necessary to establish the safety circuit by connecting TB-01D/TB-01DR with the TP adapter for program controller.

\* XSEL-KT/KET, XSEL-Q/QX/QCT, XSEL-S/SX/SXD and XSEL-SA/SAX/SAXD are applicable for Safety Category 4 with using the system IO terminals, with using no TP adapter.

4. Connection with the Controller



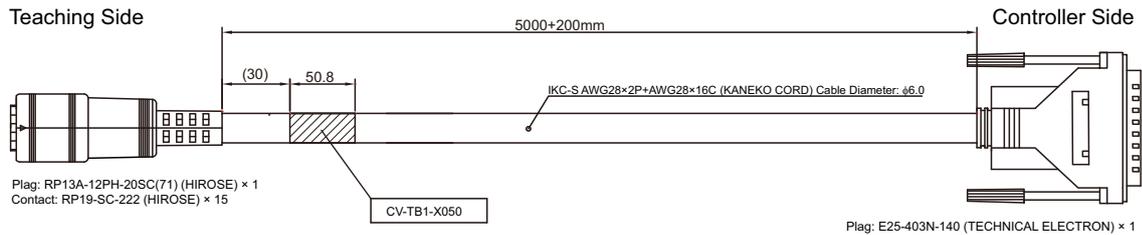
*Note: When TB-01D/TB-01DR is not to be connected, make sure to put the dummy plug DP-4S on the TP adapter for program controller.*

## 4.12 Connection Cable

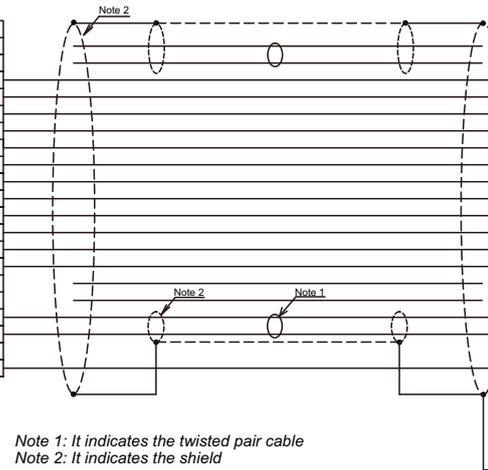
The cables stated below are required for connection to the program controllers.

### 4.12.1 Cable for Program Controller (XSEL-J and XSEL-JX Excluded)

Model Code	CB-TB1-X050
Name	Controller Connection Cable for TB-01 (for XSEL-K/P/Q/R/S/RA/SA types and TT/TTA)
Connector Code on Controller Side	E25-403N-140 (Manufactured by TECNICAL ELECTRON)
Connector Code on TB-01 Unit Side	RP13A-12PH-20SC (71) (Manufactured by HIROSE)



Cable Color	Signal Name	No.	
—	N.C	1	
—	N.C	2	
Green	TBXVCC	3	
Brown	ENB2+	4	
Gray	T24V	5	
Red	EMG1-	6	
Black	EMG2+	7	
Yellow	EMG2-	8	
Pink	ENB1+	9	
Purple	T24G	10	
White	GND	11	
Blue/Red1	ENB2-	12	
Orange/White1	EMG1+	13	
Green/White1	ENB1-	14	
—	N.C	15	
—	N.C	16	
AWG28	Red/White1	TXD	17
—	Black/White1	RXD	18
—	N.C	19	
AWG28	Orange	FG	20



No.	Signal Name	Cable Color
4	RTS	Cables complied with UL1571
5	CTS	—
18	VCC	Green
21	ENBVCC2	Brown
15	RSVVCC	Gray
13	EMGIN1	Red
16	EMGOUT2	Black
24	EMGIN2	Yellow
17	ENBVCC1	Pink
25	SG	Purple
7	SG	White
22	ENBTBX2	Blue/Red1
12	ENBOUT1	Orange/White1
19	ENBTBX1	Green/White1
8	N.C	—
9	N.C	—
3	RXD	Red/White1
2	TXD	Black/White1
10	N.C	—
1	FG	Orange
6	DSR	Cables complied with UL1571
20	DTR	—
11	N.C	—
14	N.C	—
23	N.C	—

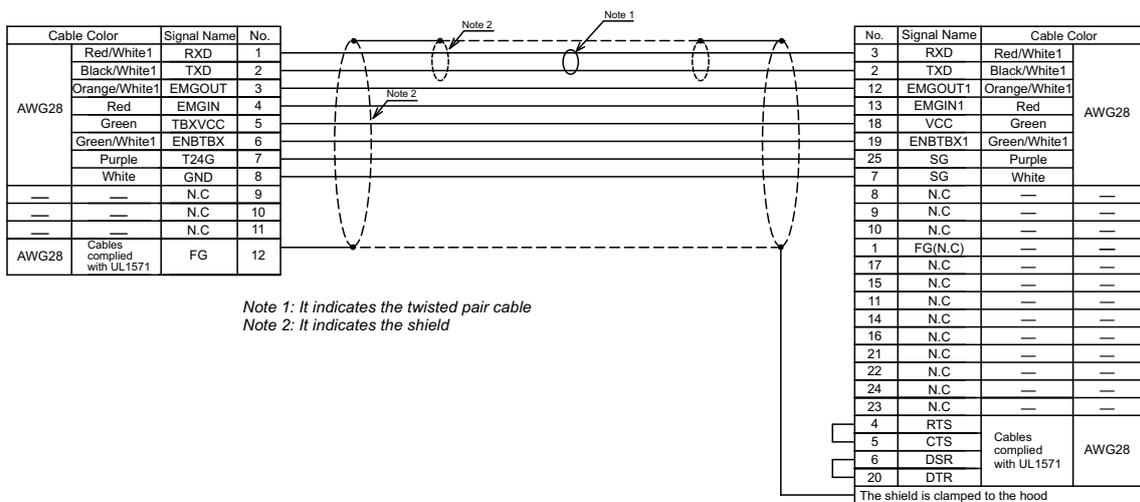
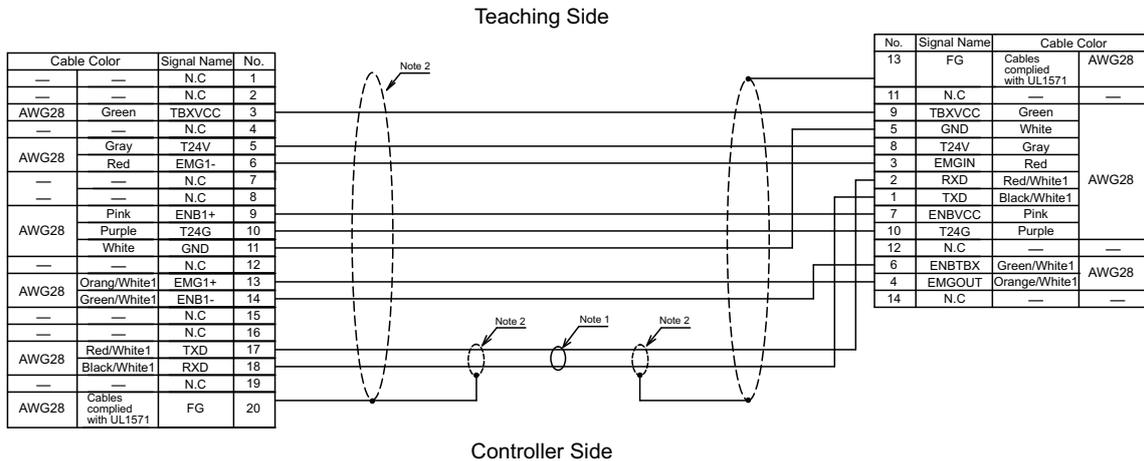
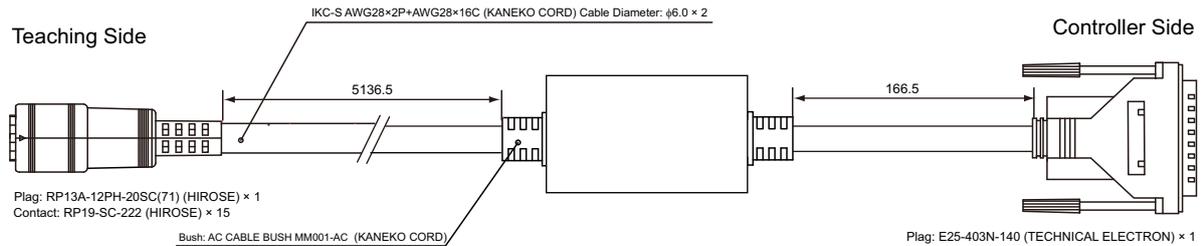
Note 1: It indicates the twisted pair cable  
Note 2: It indicates the shield

The shield is clamped to the hood

### 4.12.2 XSEL-J, XSEL-JX Dedicated Cable

The cables stated below are required for connection to XSEL-J and XSEL-JX.

Model Code	CB-TB1-XJ050
Name	Controller Connection Cable for TB-01 (for XSEL-J and XSEL-JX types)
Connector Code on Controller Side	E25-403N-140 (Manufactured by TECHNICAL ELECTRON)
Connector Code on TB-01 Unit Side	RP13A-12PH-20SC (71) (Manufactured by HIROSE)



### 4.13 Teaching Pendant Connection Procedure

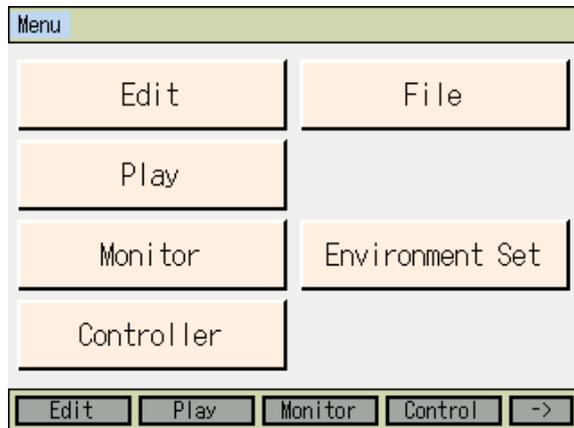
- 1) Connect actuators, I/O 24VDC power source, and system I/O to the controller first. Then connect the cable connector of the teaching pendant to the controller's teaching connector when the main power supply of the controller is OFF.
- 2) After you flip the mode switch to MANU side, supply power to the controller.

Teaching Pendant  
LCD Display



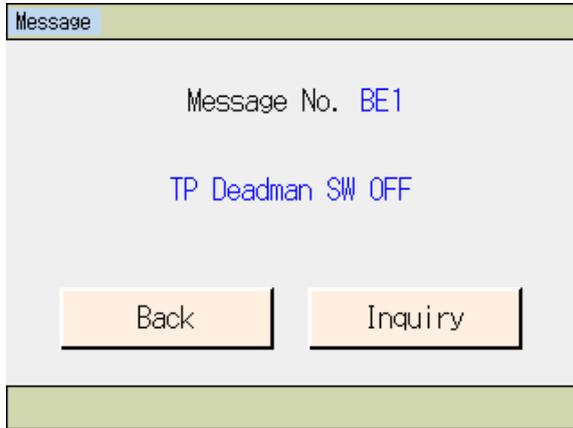
Displays the version of the teaching pendant and moves to the following main menu screen.

Main Menu Screen



This will be the basic window for all operations.

- Ⓞ The following message may appear on some controllers such as XSEL-K Controller when the power is turned on.  
Either touch **Return** button or press **ESC** key to show the main menu window, and operations that do not require servo-on in the condition of switched off can be performed.



## 5. How to Save Data

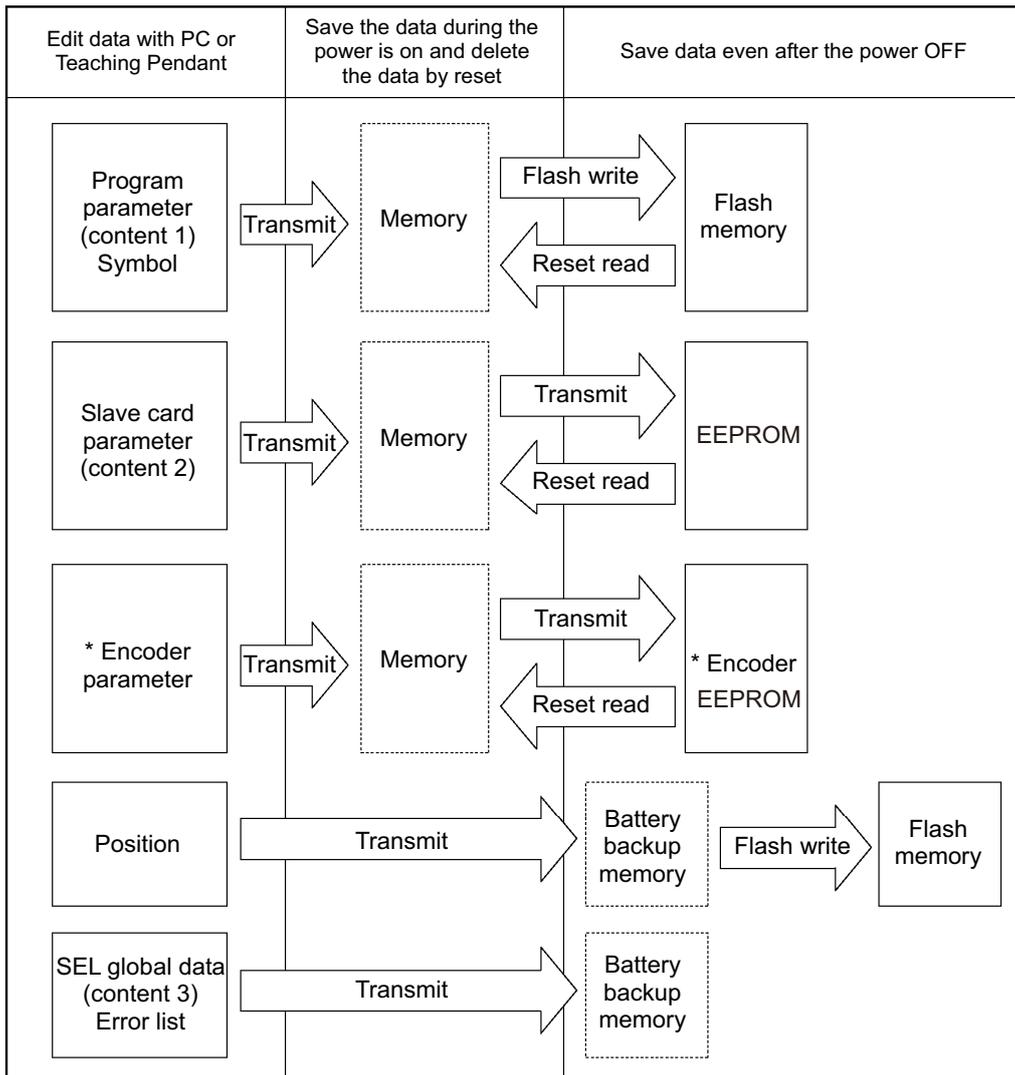
Since the Controller adopts flash memory, there is a storage area by battery backup and a storage area by flash memory according to the data to be stored.

In addition, even if data is transferred from the PC software or Teaching Pendant, the data is only to be written in memory as shown in the chart below and the data is erased by power-off or controller reset.

To ensure data storage, write the data you want to store in flash memory.

### 5.1 Set-up at Shipment with System Memory Backup Battery

(Other parameter No. 20=2 (System memory backup battery equipped))



\* Encoder parameters are not stored within the controller but in the EEPROM of the actuator's encoder itself. They are read into the controller at power-on or software-reset time.



Since the program, parameter, and symbol will be read from flash memory at restart time, the data in memory becomes the original data before editing unless the data is written in flash memory. The controller always operates according to the data in memory (within the dotted box) excluding parameters.

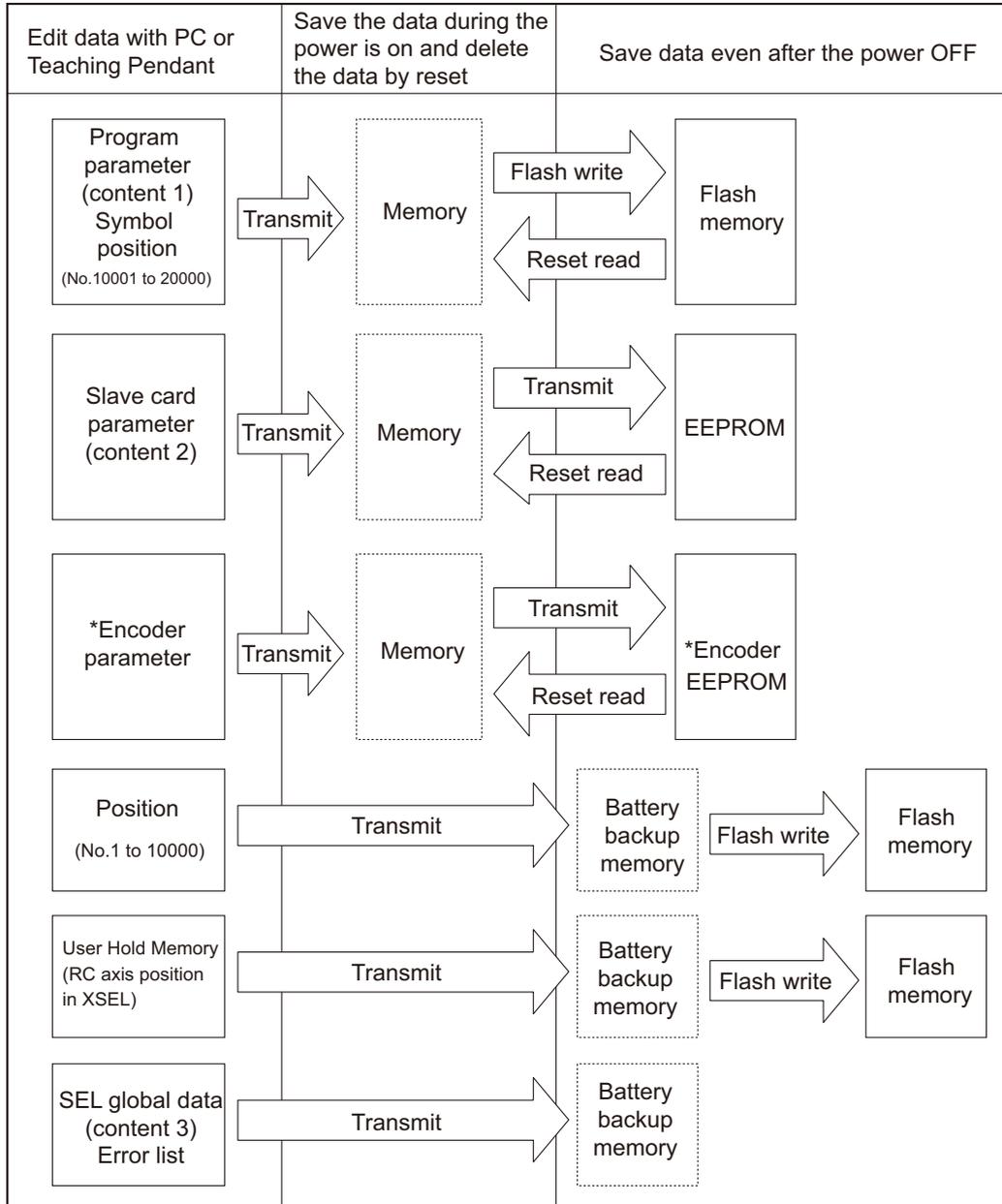
Content 1: Parameters excluding content 2 below and encoder parameter

Content 2: Driver card, IO slot card (electric power type card) parameter (XSEL-J/K, JX/KX, TT/TTA) :  
IO slot card (electric power type card) parameter (XSEL-P/Q, PX/QX, SSEL, ASEL, PSEL)

Content 3: Flag, Variable, and String

For the XSEL-P/Q and PX/QX controllers with the gateway function, the position Nos. 10001 to 20000 data memory and user hold memory (RC axis position in XSEL) have been added.

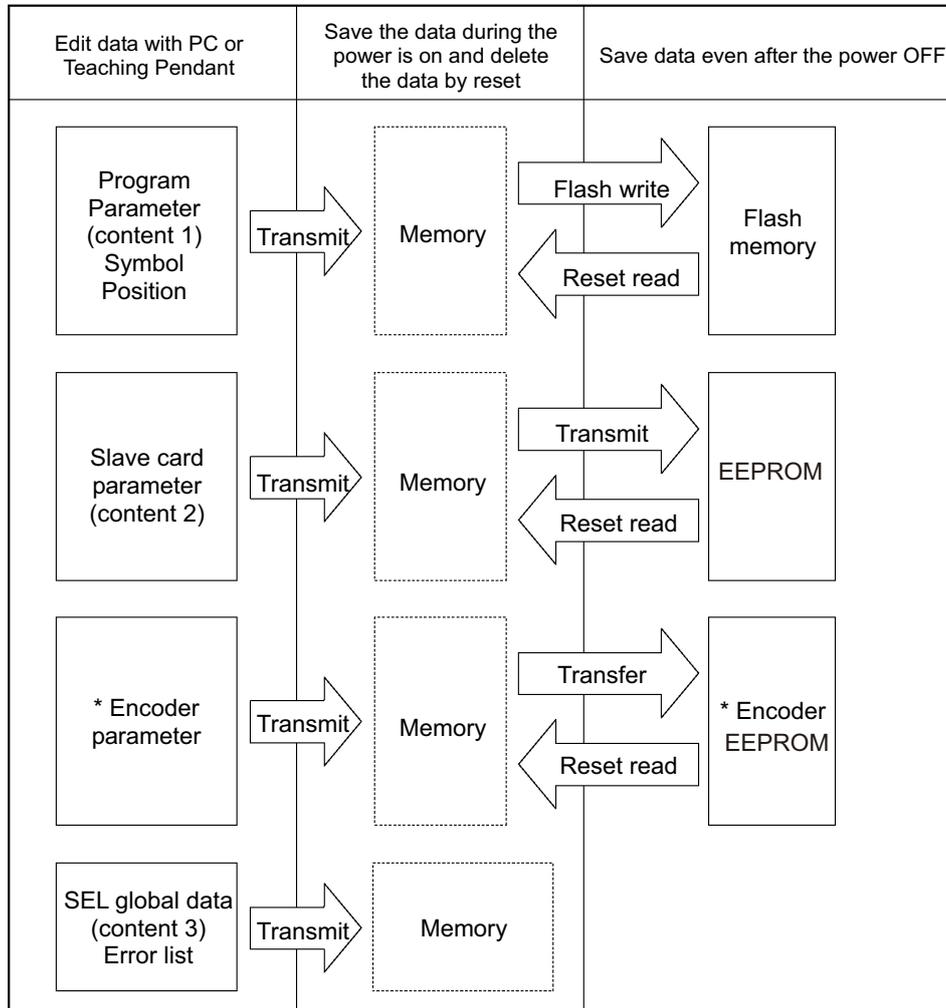
(Other parameter No.20=2 (System memory backup battery equipped))



\* Encoder parameters are not stored within the controller but in the EEPROM of the actuator's encoder itself. They are read into the controller at power-on or software-reset time.

## 5.2 Set-up at Shipment without System Memory Backup Battery (Table Top Actuator (TT), SSEL, ASEL, PSEL)

(Other parameter No.20=0 (System memory backup battery unequipped))

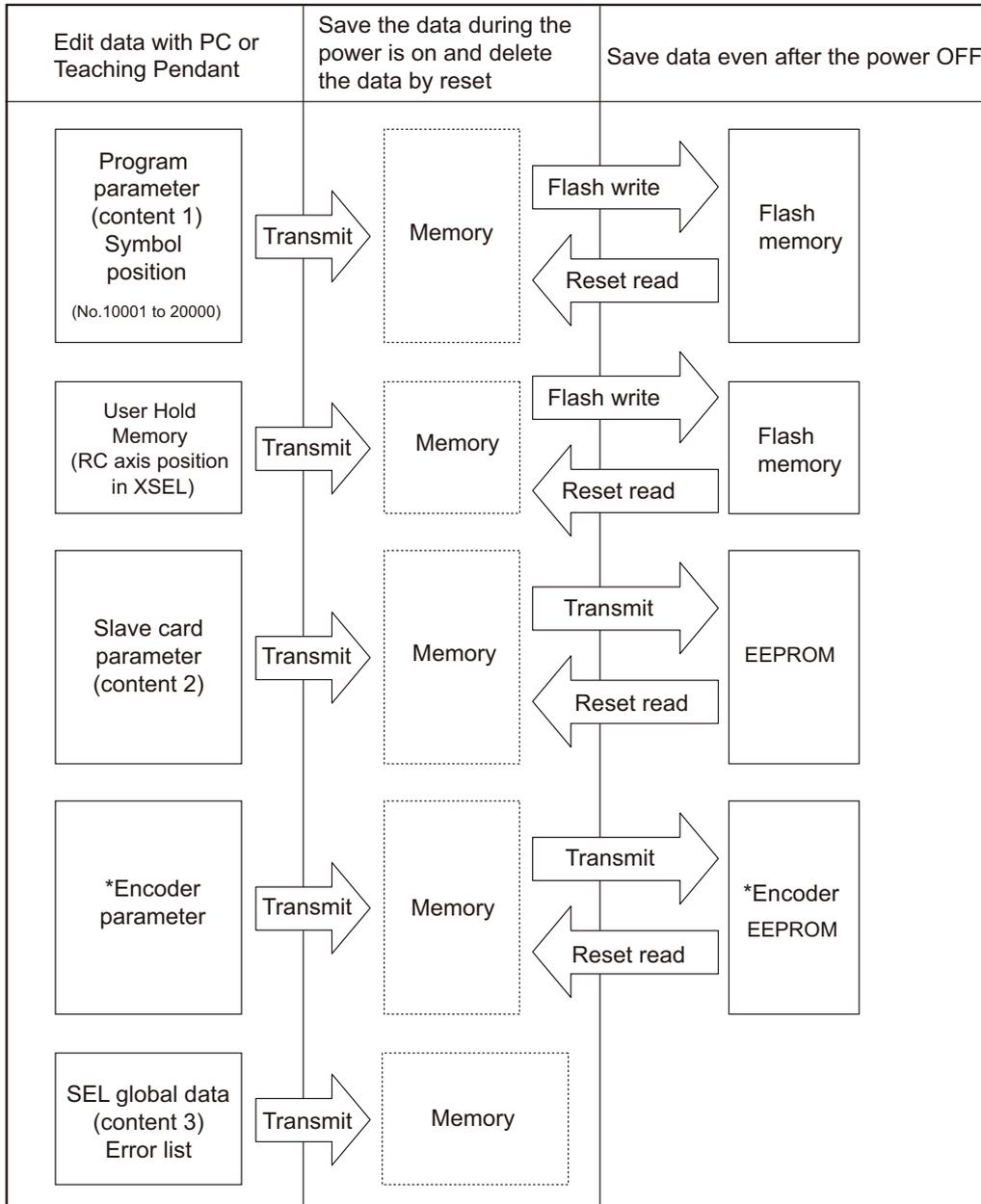


Since the program, parameter, symbol, and position will be read from flash memory at restart time, the data in memory becomes the original data before editing unless the data is written in flash memory. The controller always operates according to the data in memory (within the dotted box) excluding parameters.

*Note: SEL global data can't be saved without the backup battery.*

For the XSEL-P/Q and PX/QX controllers with the gateway function, the position Nos. 10001 to 20000 data memory and user hold memory (RC axis position in XSEL) have been added.

(Other parameter No.20=0 (System memory backup battery unequipped))

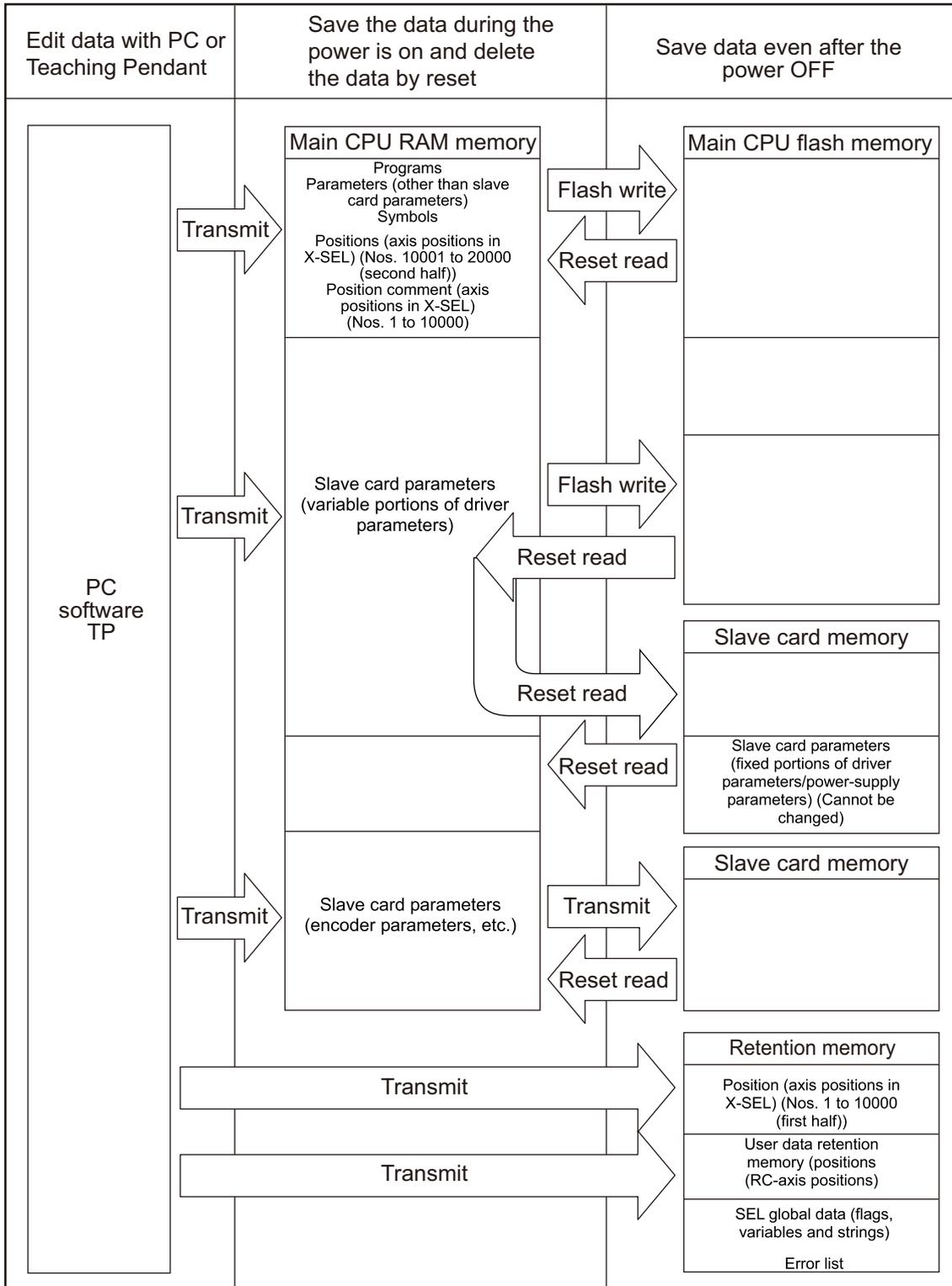


Since the program, parameter, symbol, and position will be read from flash memory at restart time, the data in memory becomes the original data before editing unless the data is written in flash memory. The controller always operates according to the data in memory (within the dotted box) excluding parameters.

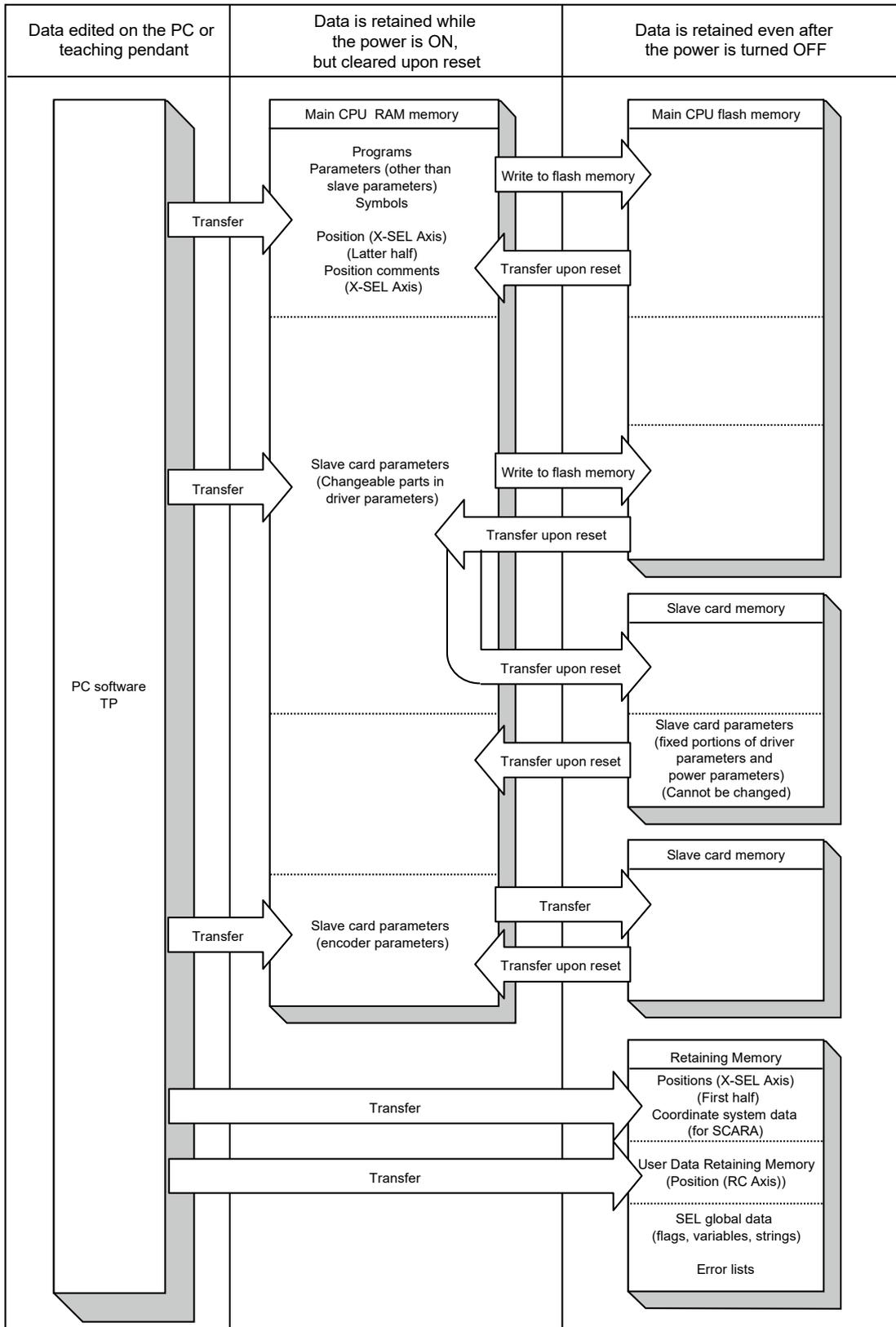
*Note: SEL global data can't be saved without the backup battery.*

### 5.3 XSEL-R/S/RX/SX/RXD/SXD

An example of 20,000 positions is given below.

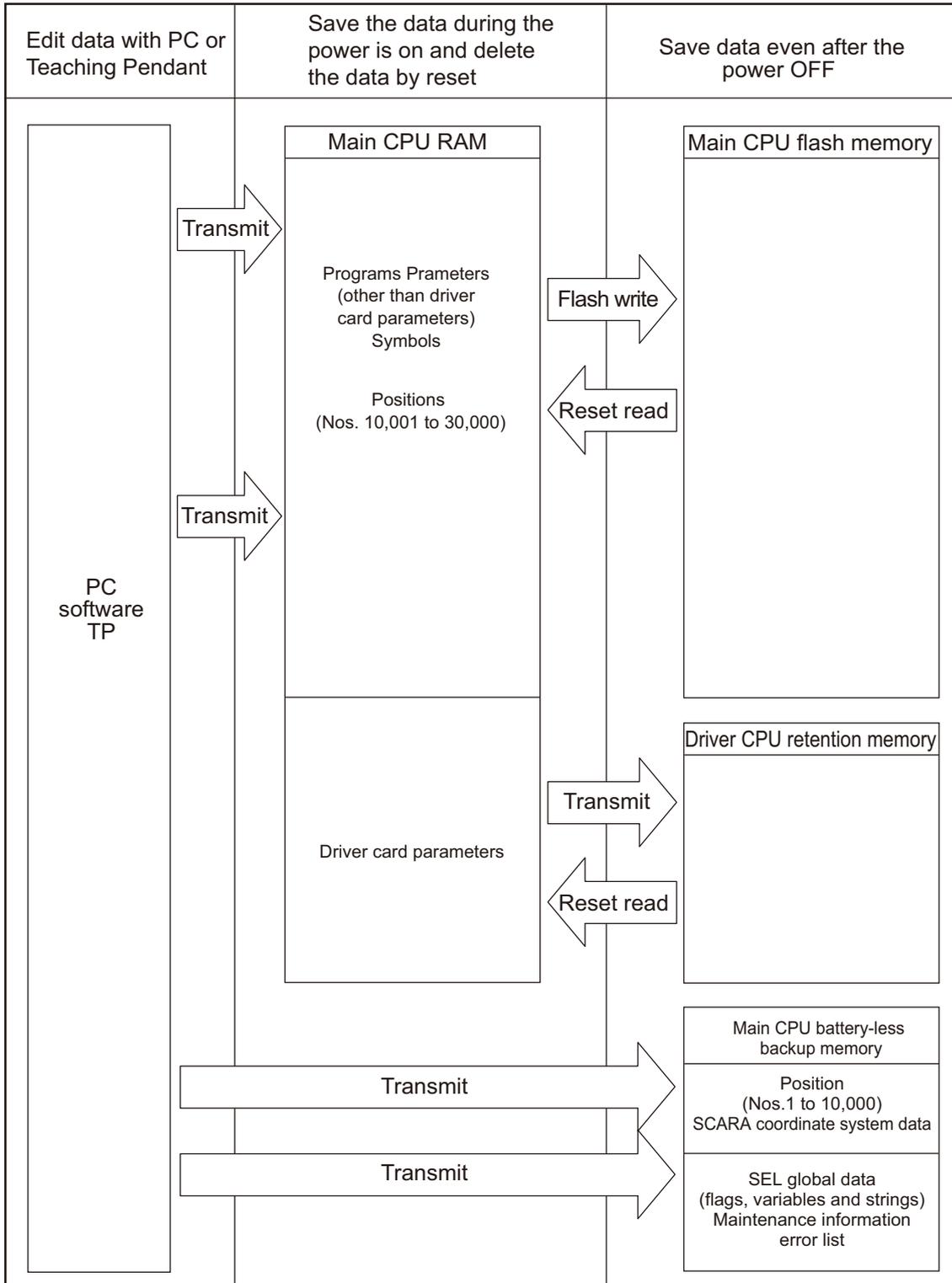


### 5.4 XSEL-RA/SA/RAX/SAX/RAXD/SAXD



## 5.5 TTA, MSEL-PCX/PGX/PC/PG/PCF/PGF

Positions (No. 1 to 10000), SEL global data, error list, maintenance information and SCARA coordinate system data are stored in the battery-less backup memory (FRAM). It is not necessary to have a flash ROM writing.



## 5.6 Caution

### *Cautions in data transfer and flash writing*

*Never shut OFF the main power while the data is transmitting and writing into flash.  
Data may be lost and controller may be rendered inoperable.*

### *Cautions concerning the increase in the number of positions*

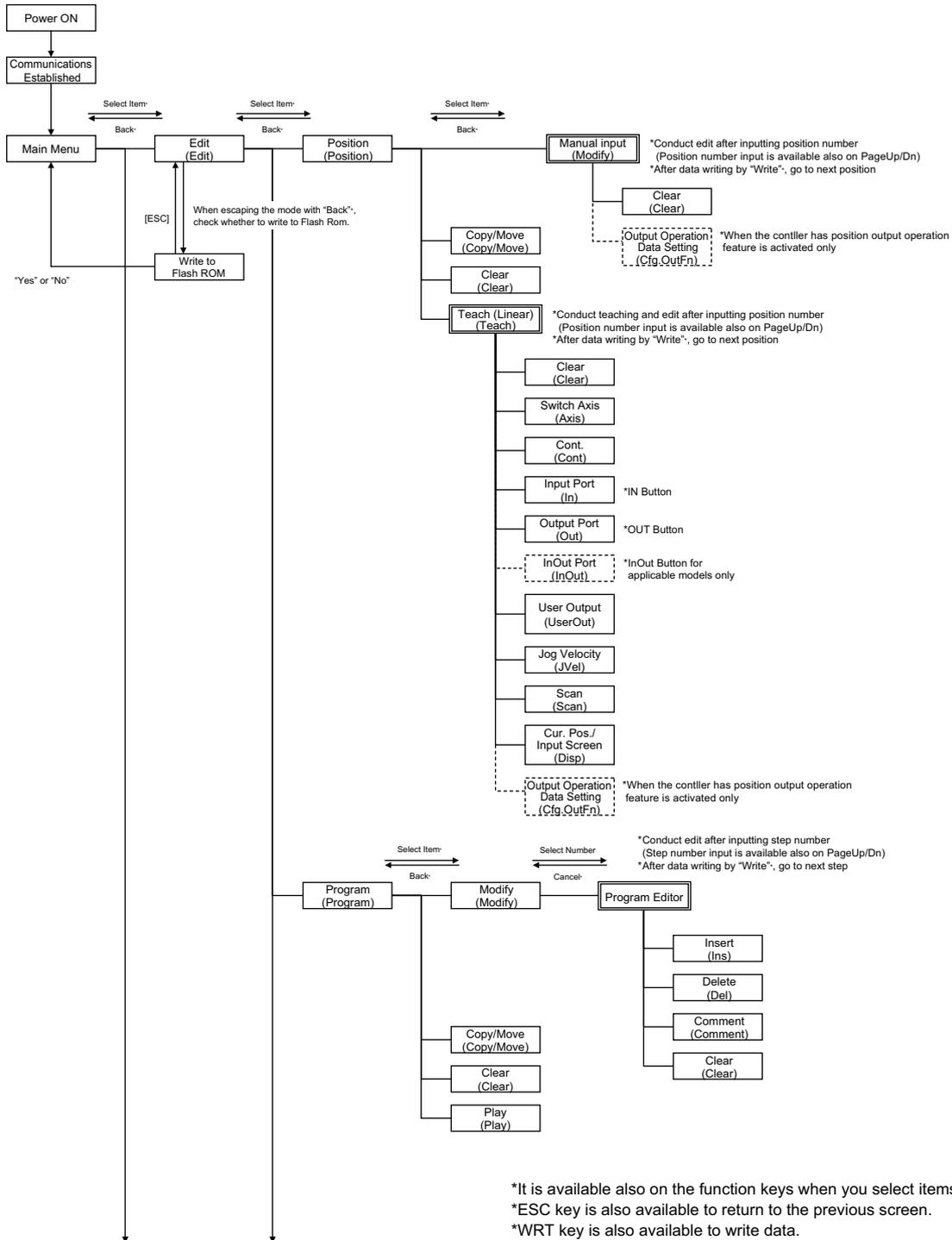
*The number of position data items has been raised to 20,000 in the XSEL-P/Q and PX/QX controllers for the increased memory capacity (with gateway function).*

*Take care with the following items.*

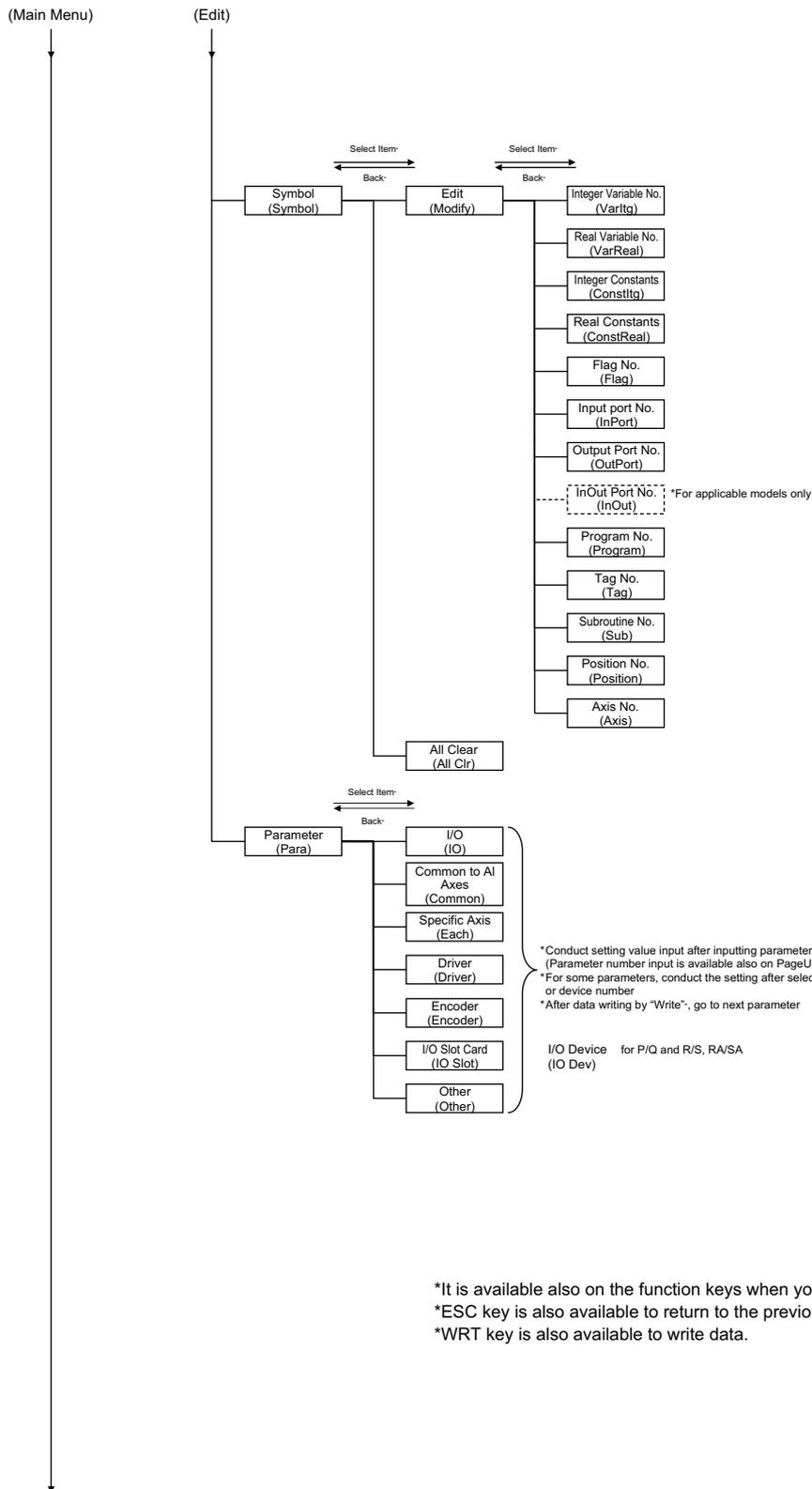
*\* When the battery backup memory is used (Other Parameter No. 20 is set to "2"), the position data save domain is in the battery backup memory for the Position No. 1 to 10000, and in the main CPU flash ROM for the position No. 10001 to 20000. Accordingly, when the data is not written in the flash ROM and the power is turned OFF or the software reset is performed, the data items for the position No. 10001 to 20000 are deleted. After that, the next time the machine is turned ON, the data written in the flash ROM from before is read. When the data is to be held, write the data into the flash ROM. Also, when the battery backup memory is not used (Other Parameter No. 20 is set to "2"), the data save domain for all data items for the Position No. 1 to 20000 is in the main CPU flash ROM. In this case, when the data is to be held, write the data also in the flash ROM.*

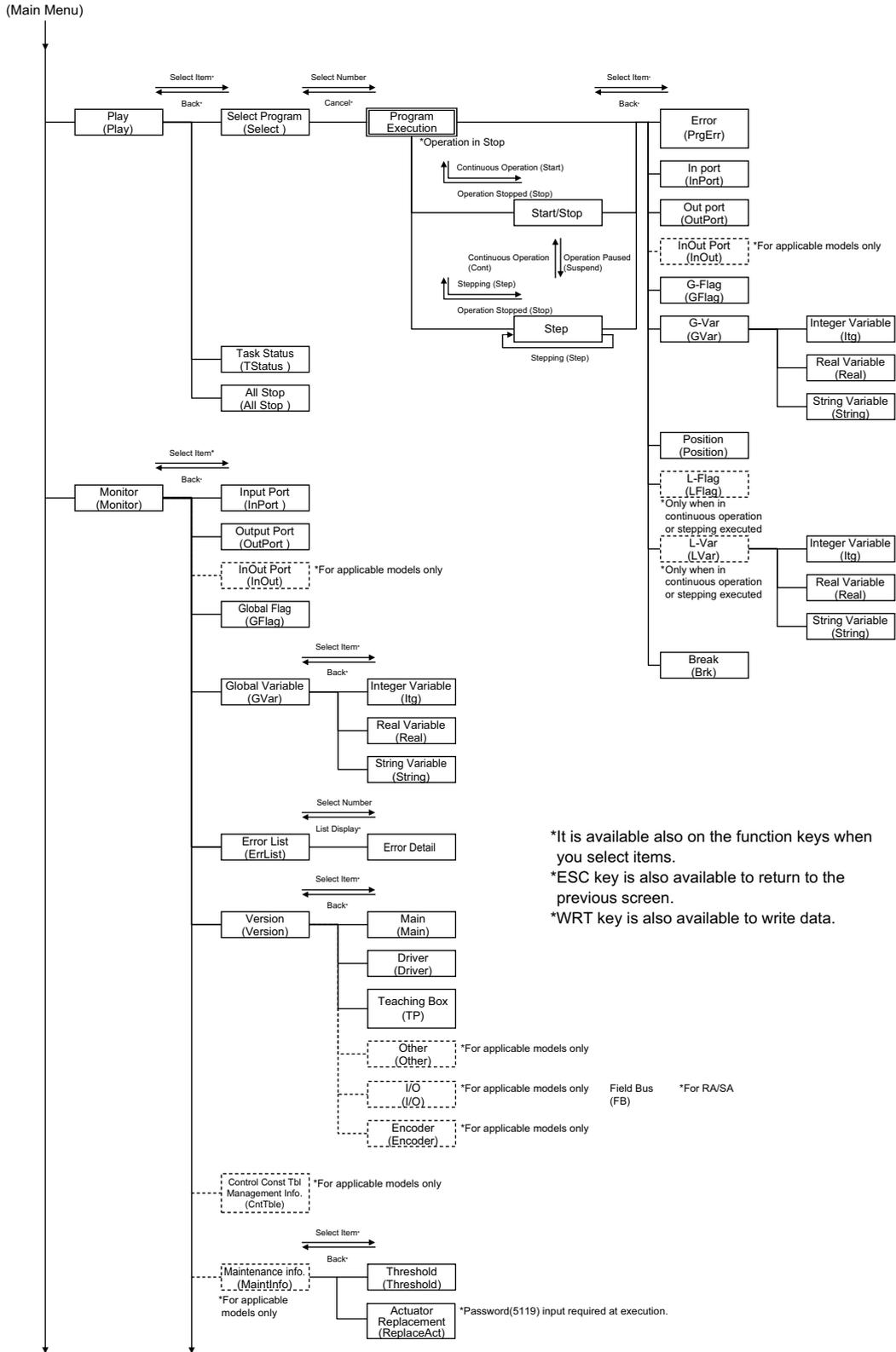
## 6. Mode Transition Diagram

### 6.1 XSEL-J/K, P/Q, R/S, RA/SA, TT/TTA Controller



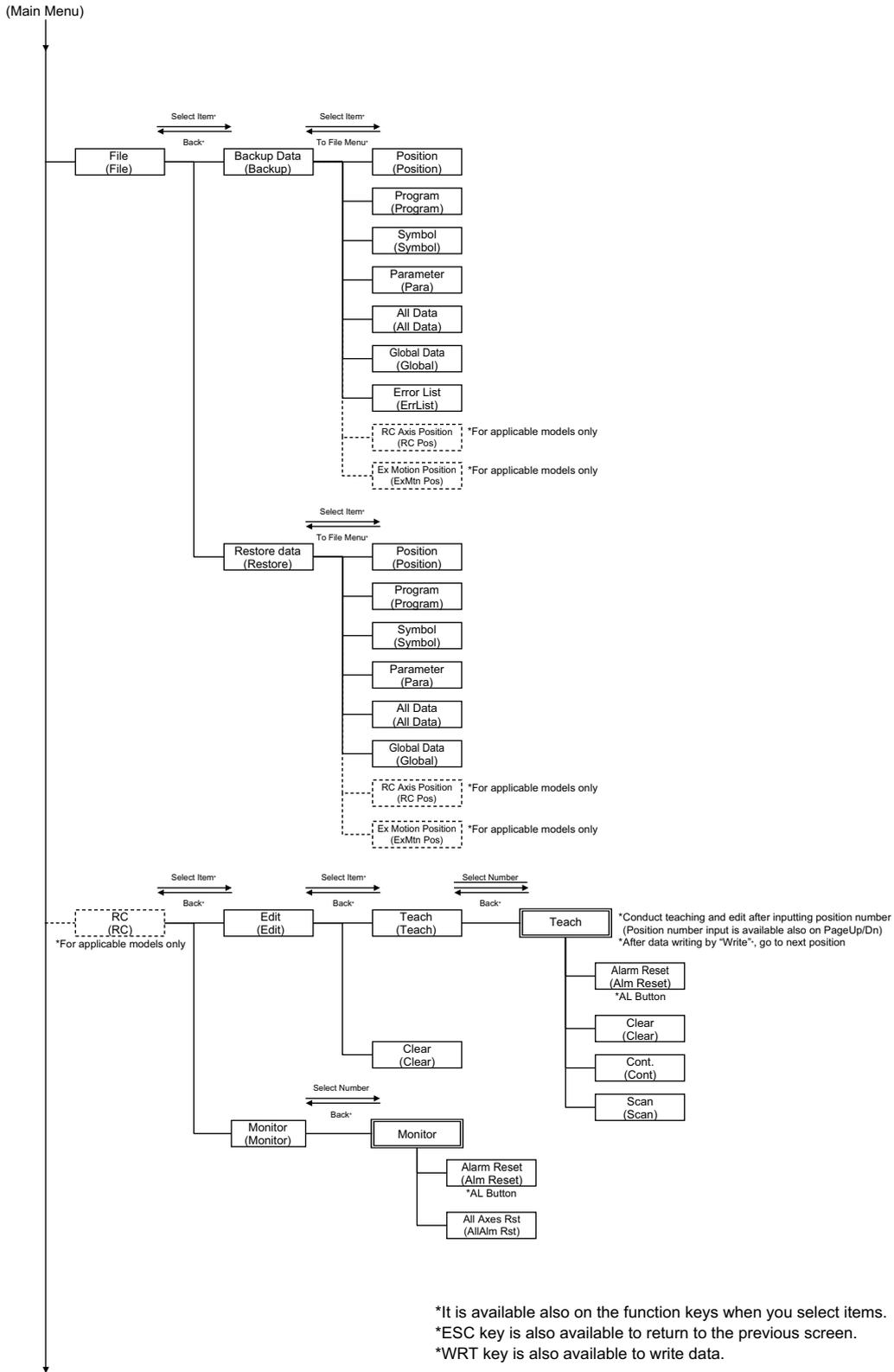
6. Mode Transition Diagram

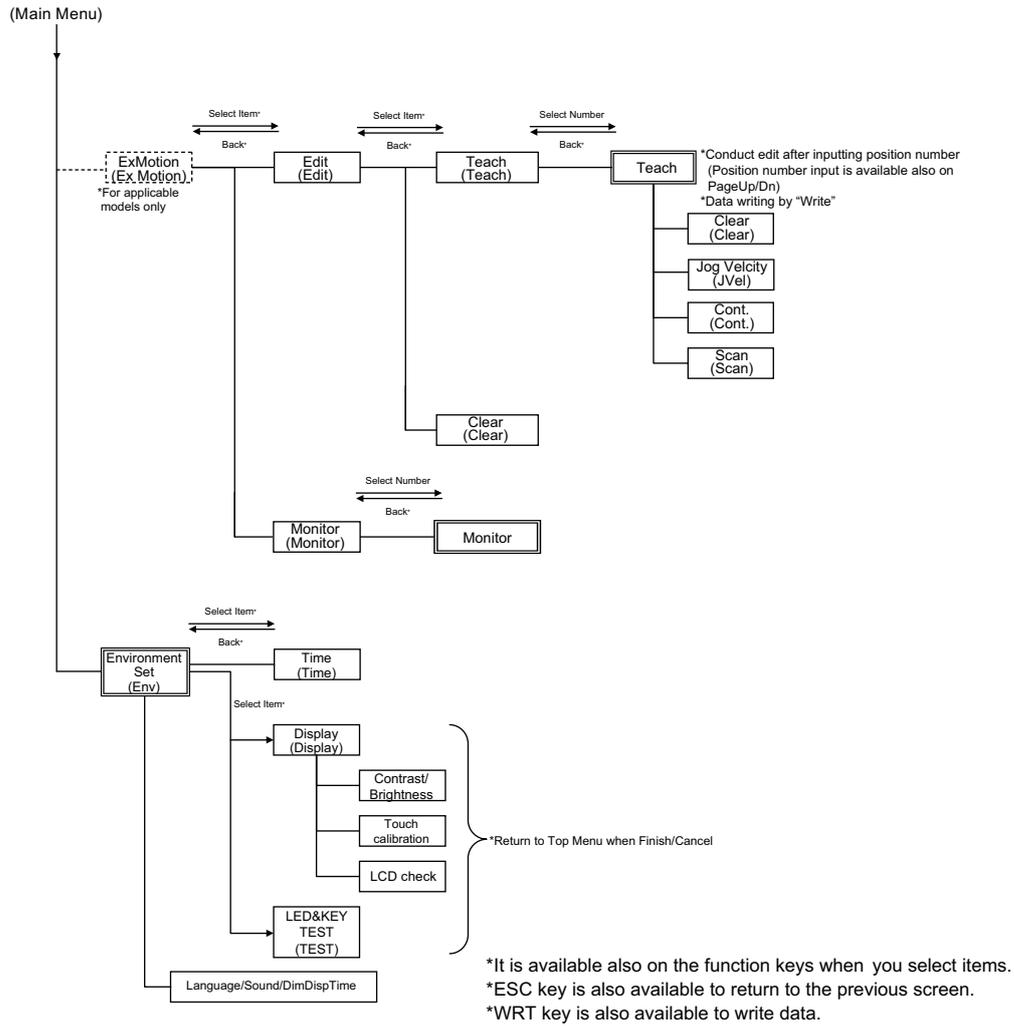






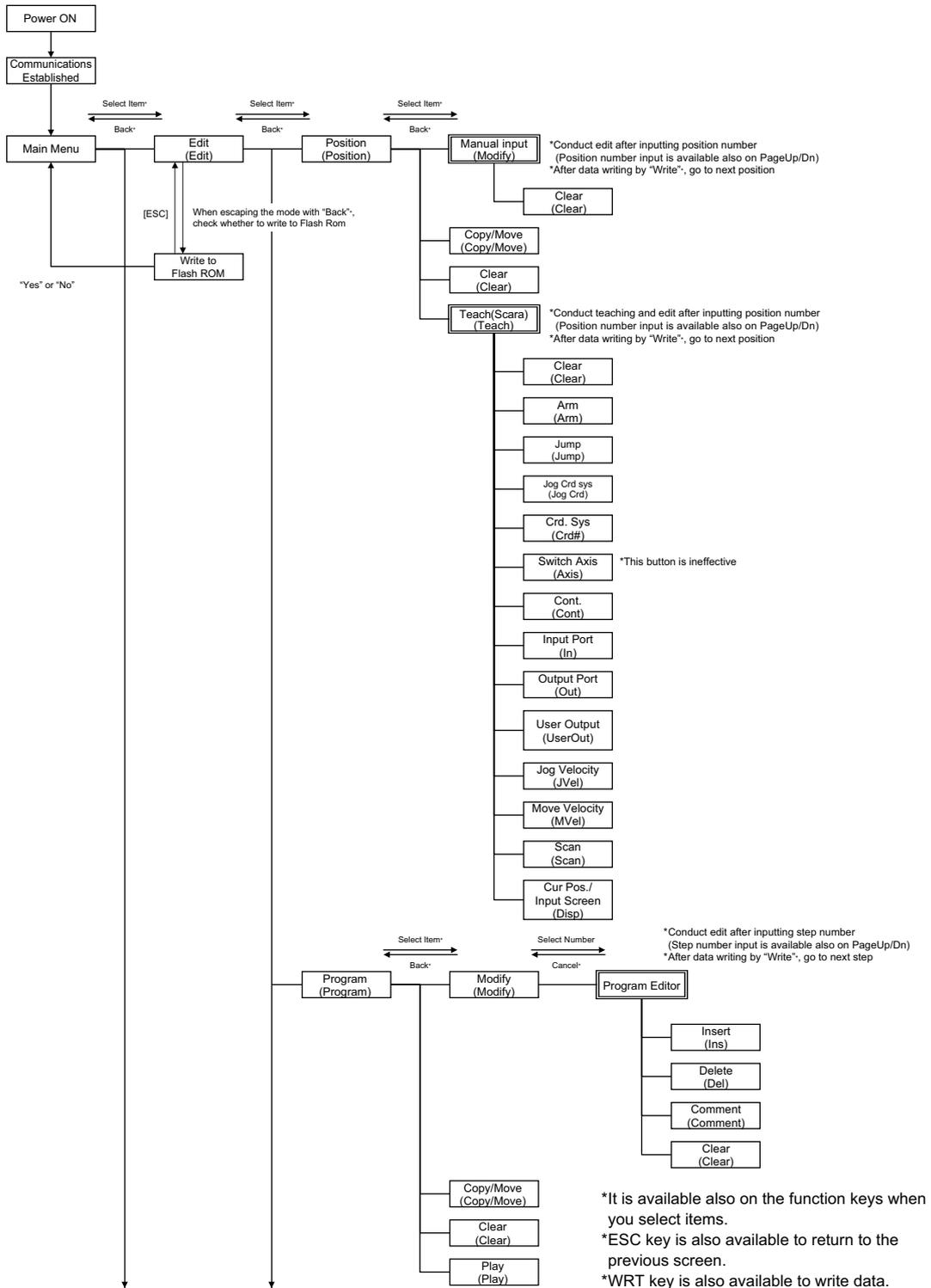
6. Mode Transition Diagram

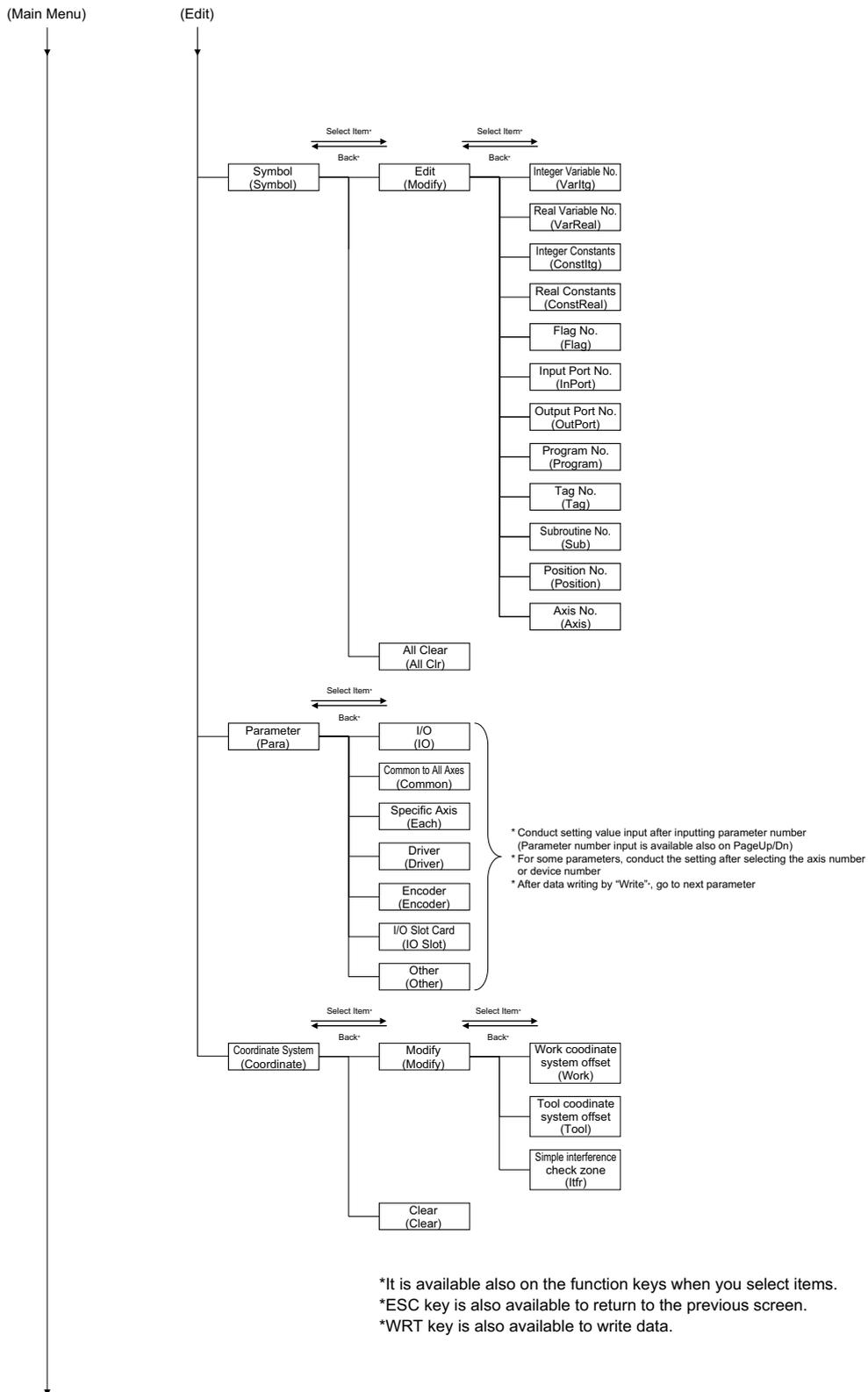


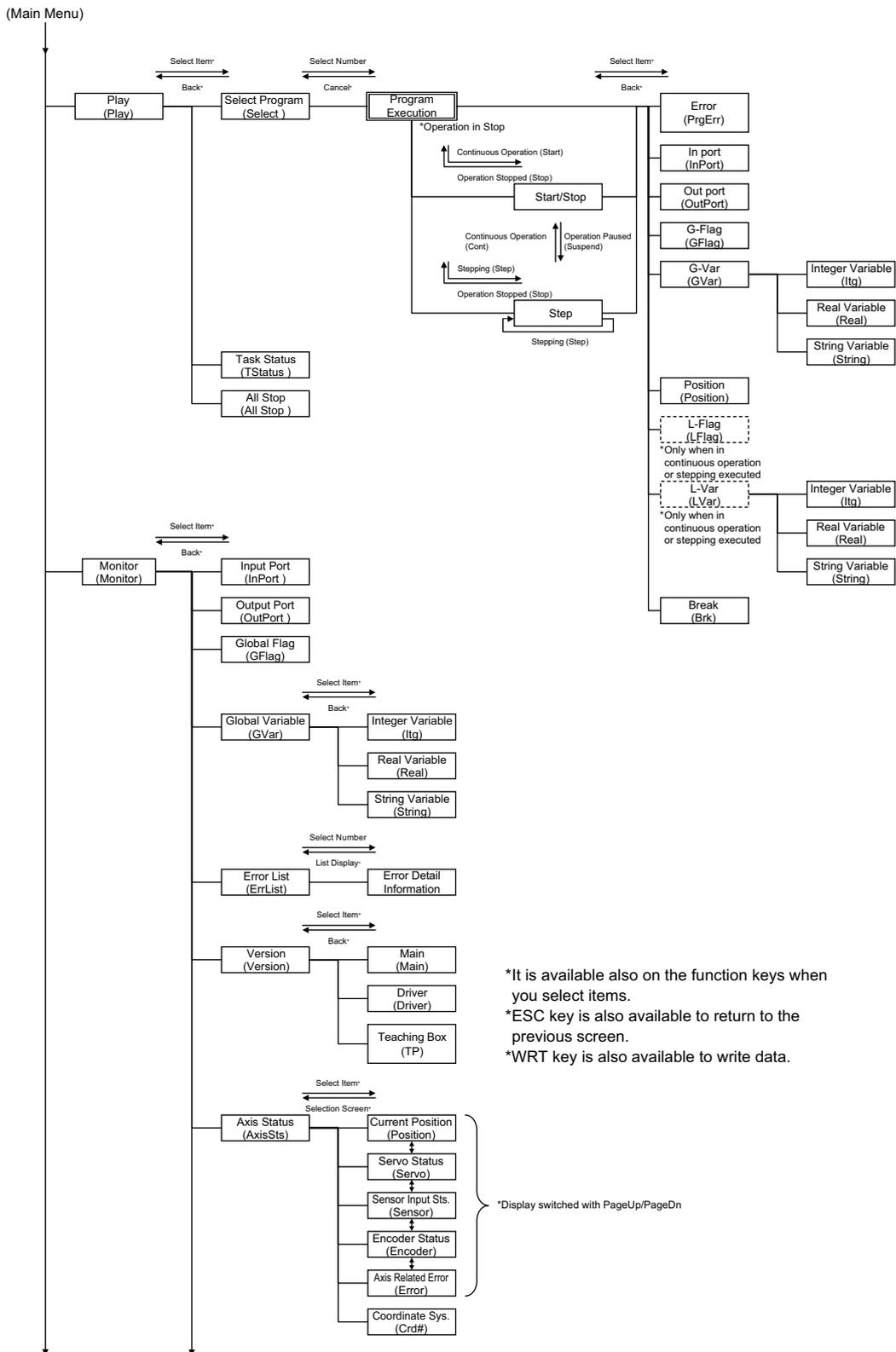


## 6.2 XSEL-JX/KX Controller

6. Mode Transition Diagram

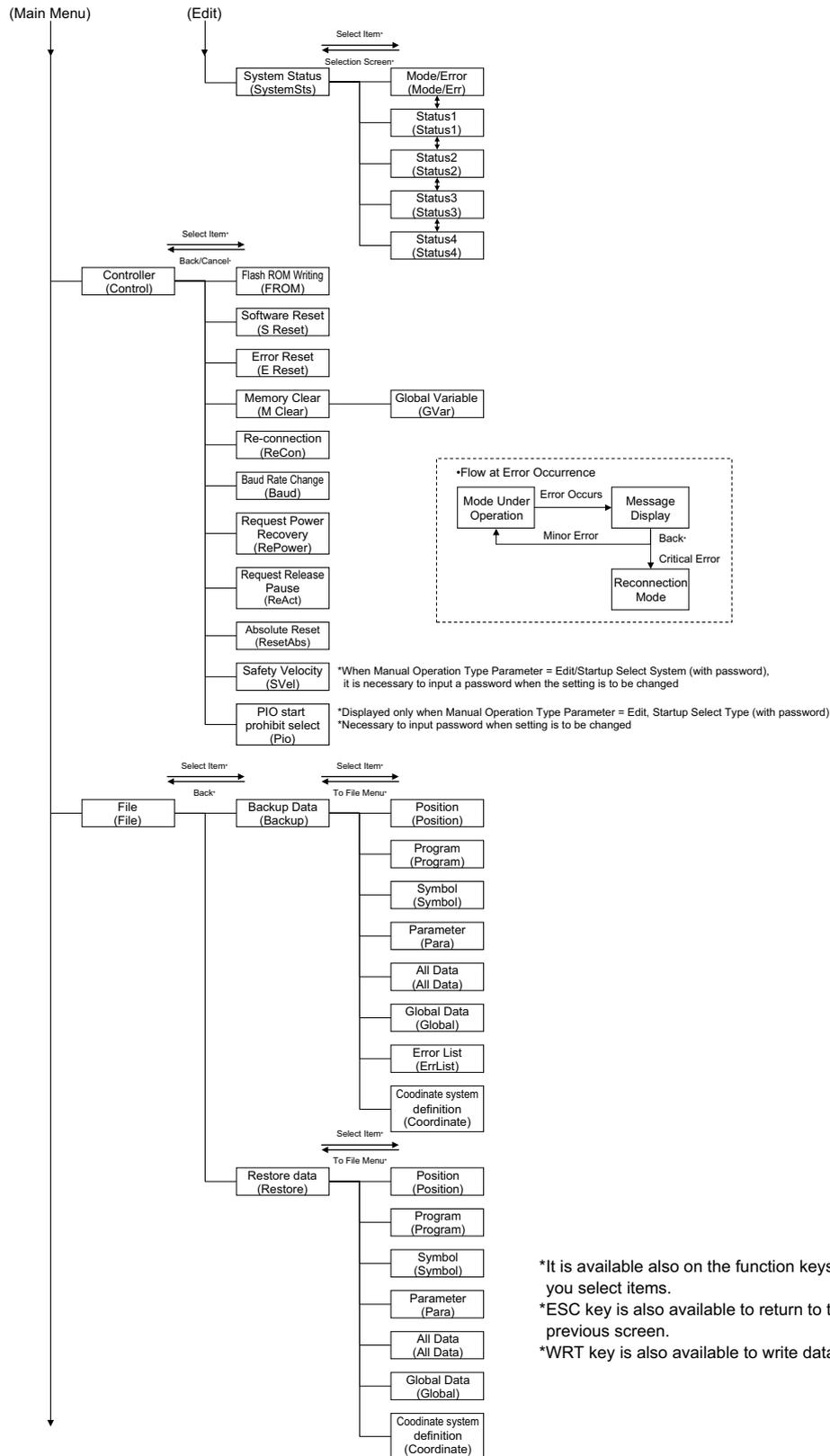


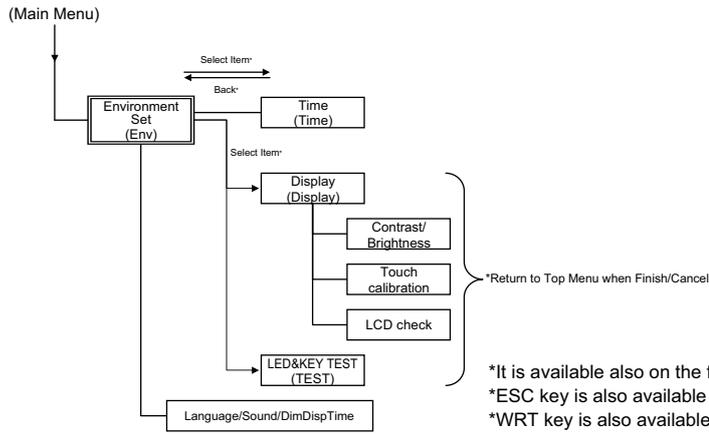




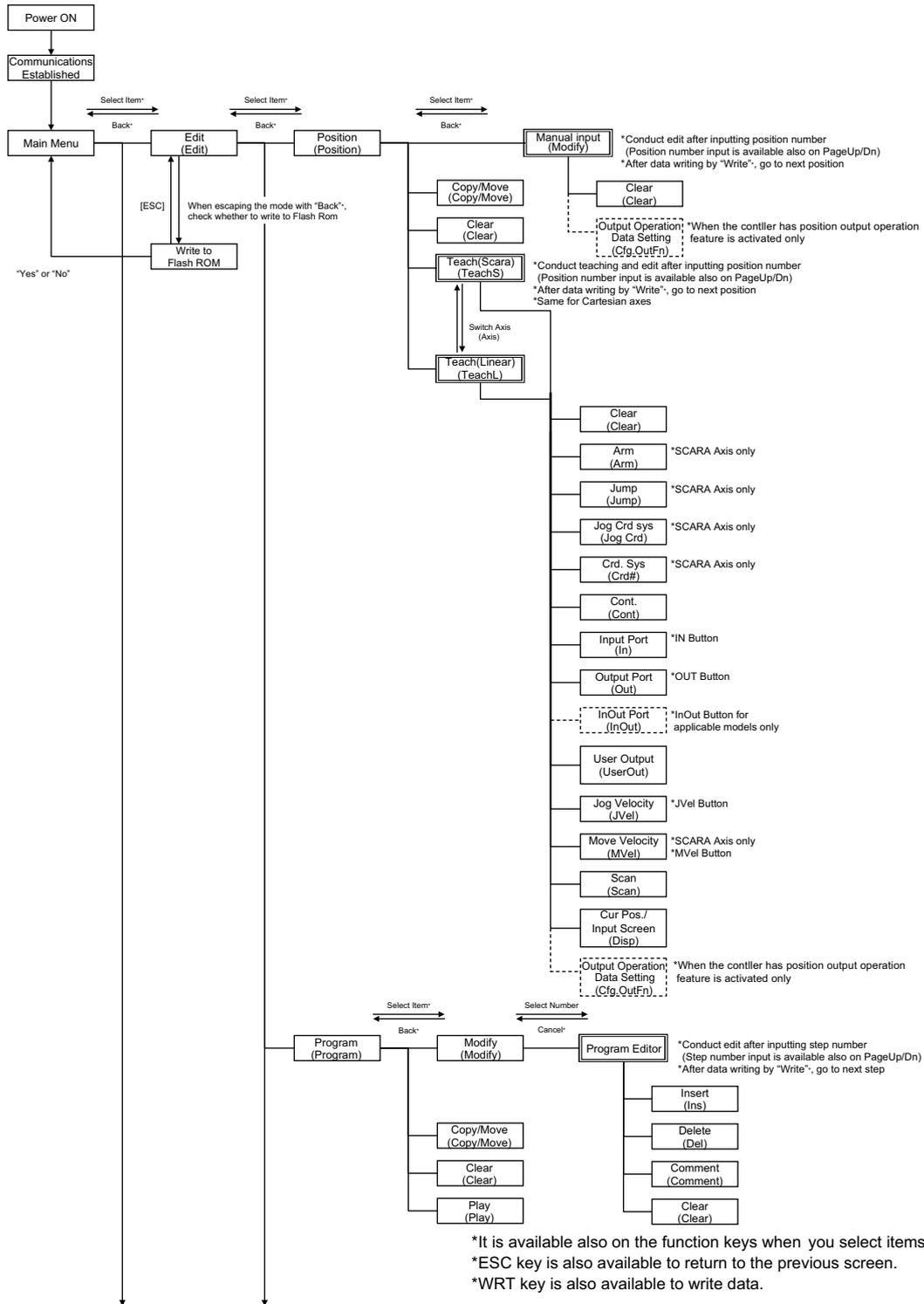
\*It is available also on the function keys when you select items.  
 \*ESC key is also available to return to the previous screen.  
 \*WRT key is also available to write data.

\*Display switched with PageUp/PageDn

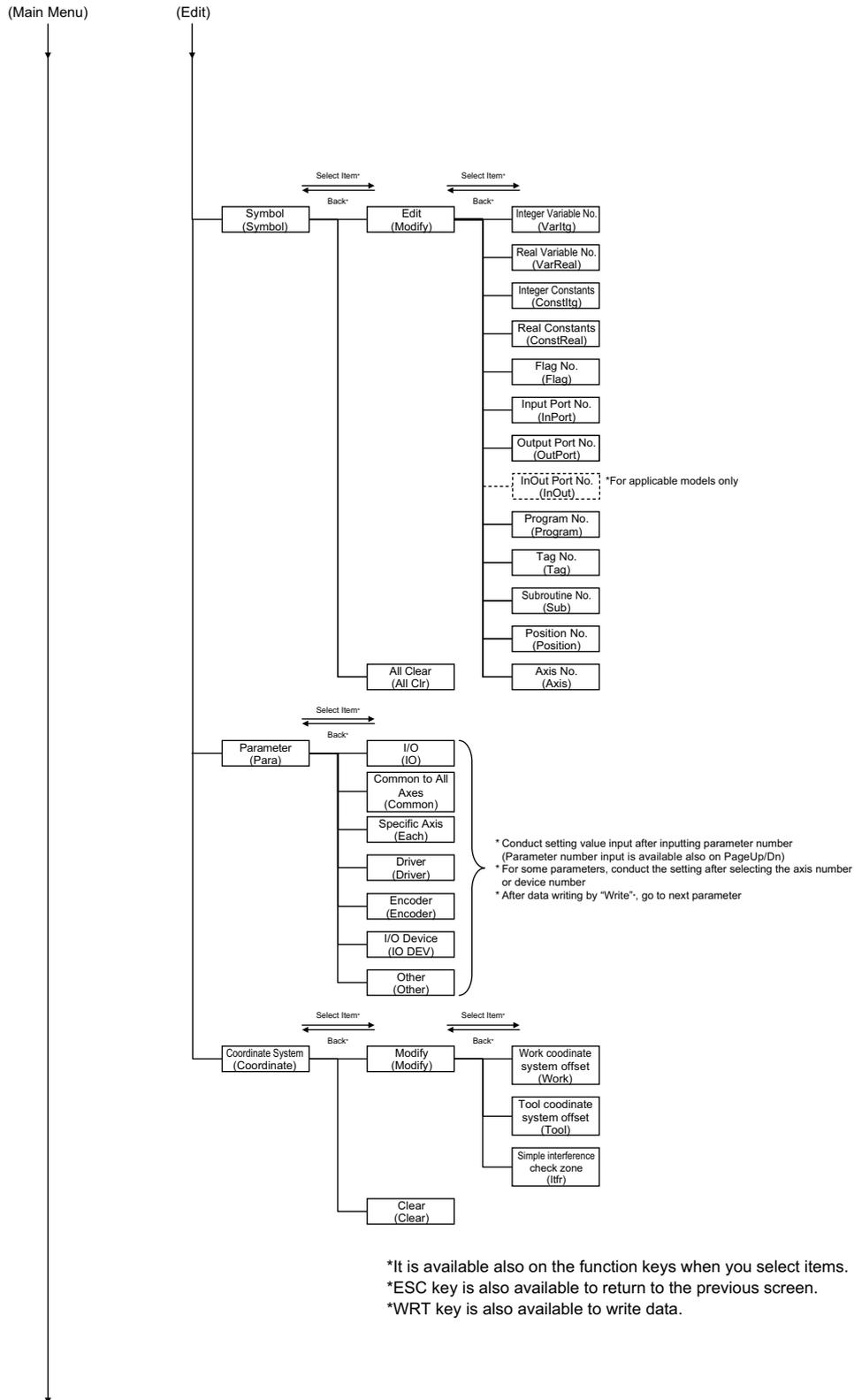


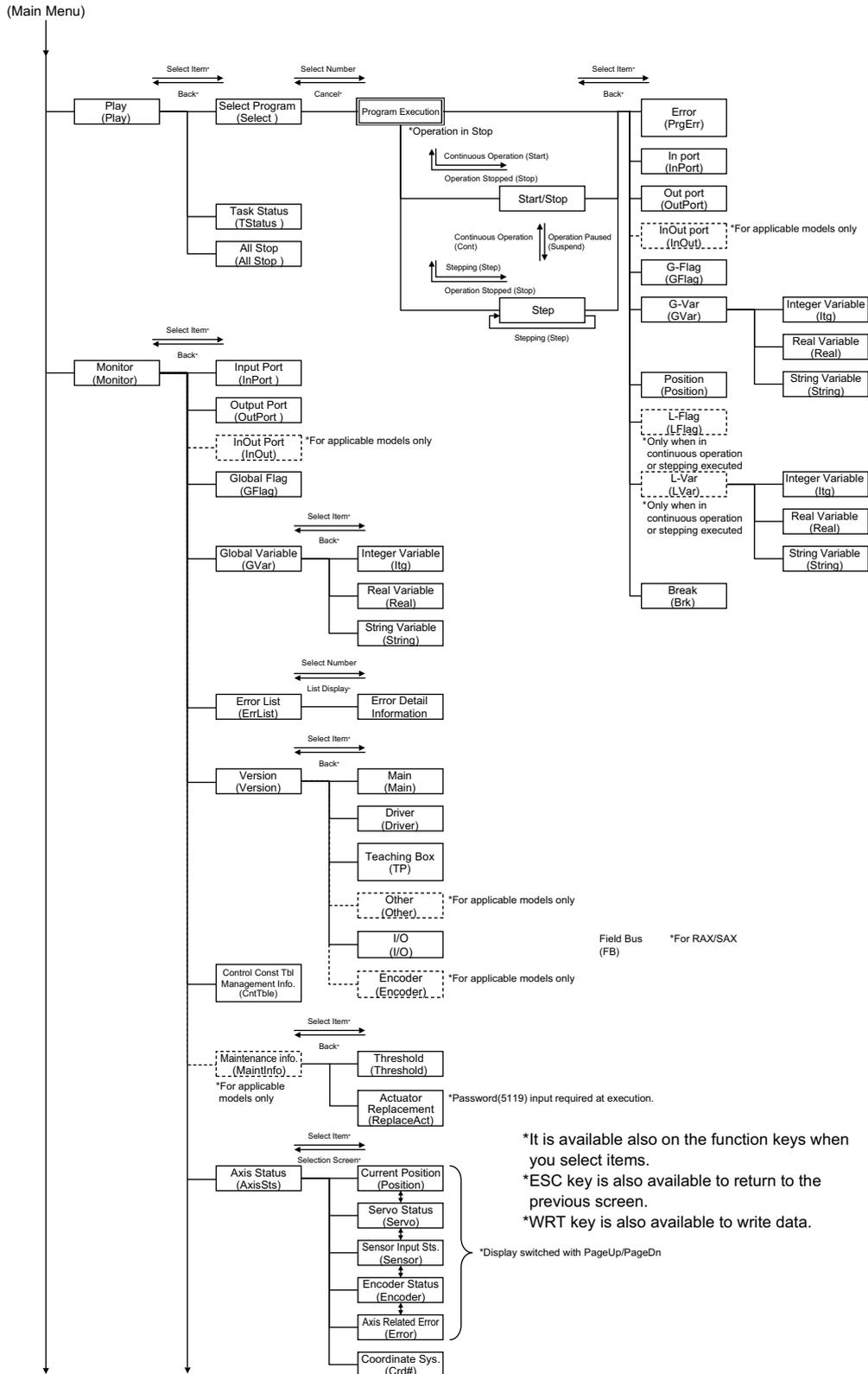


### 6.3 XSEL-PX/QX, RX/SX, RAX/SAX Controller

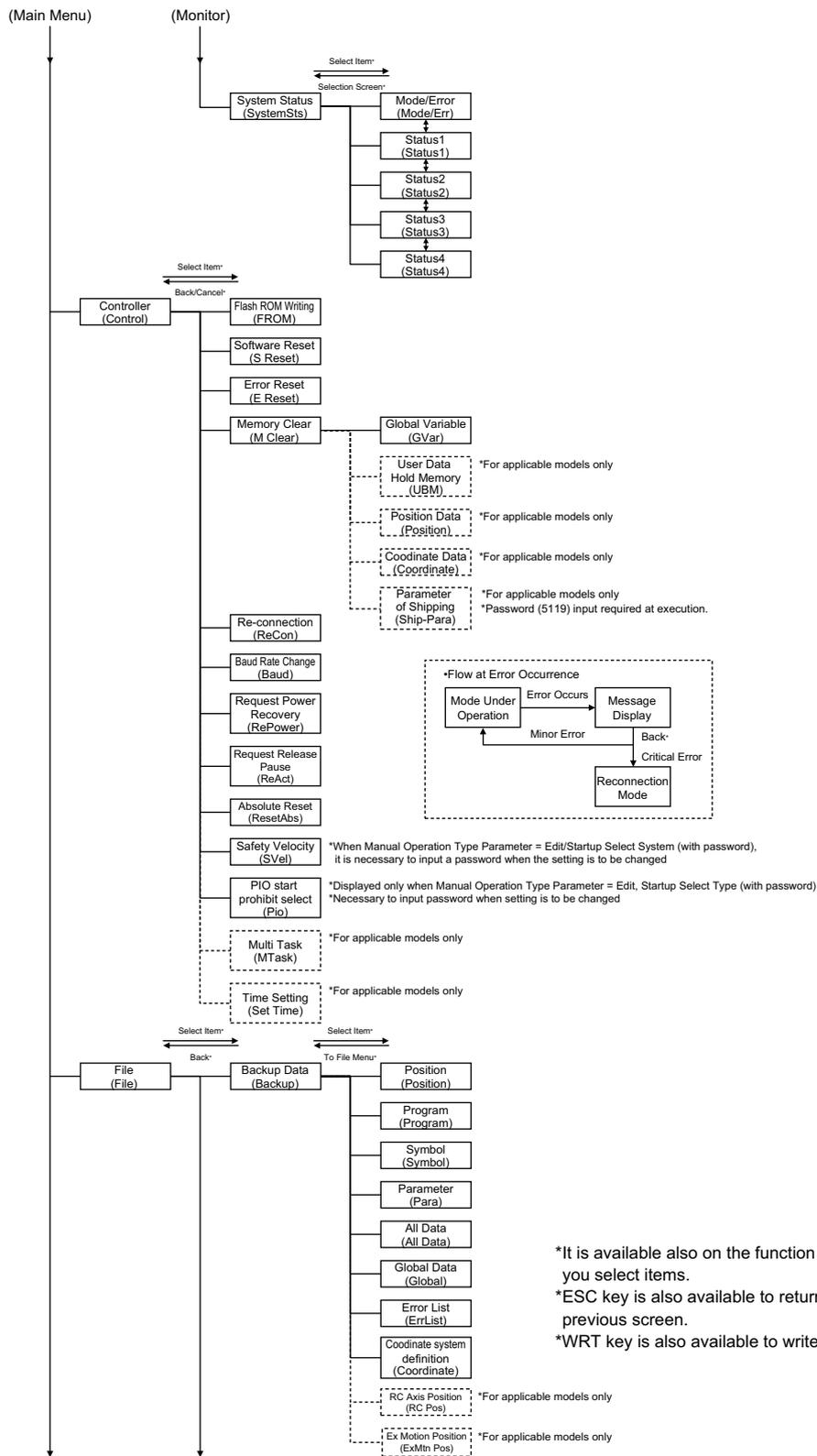


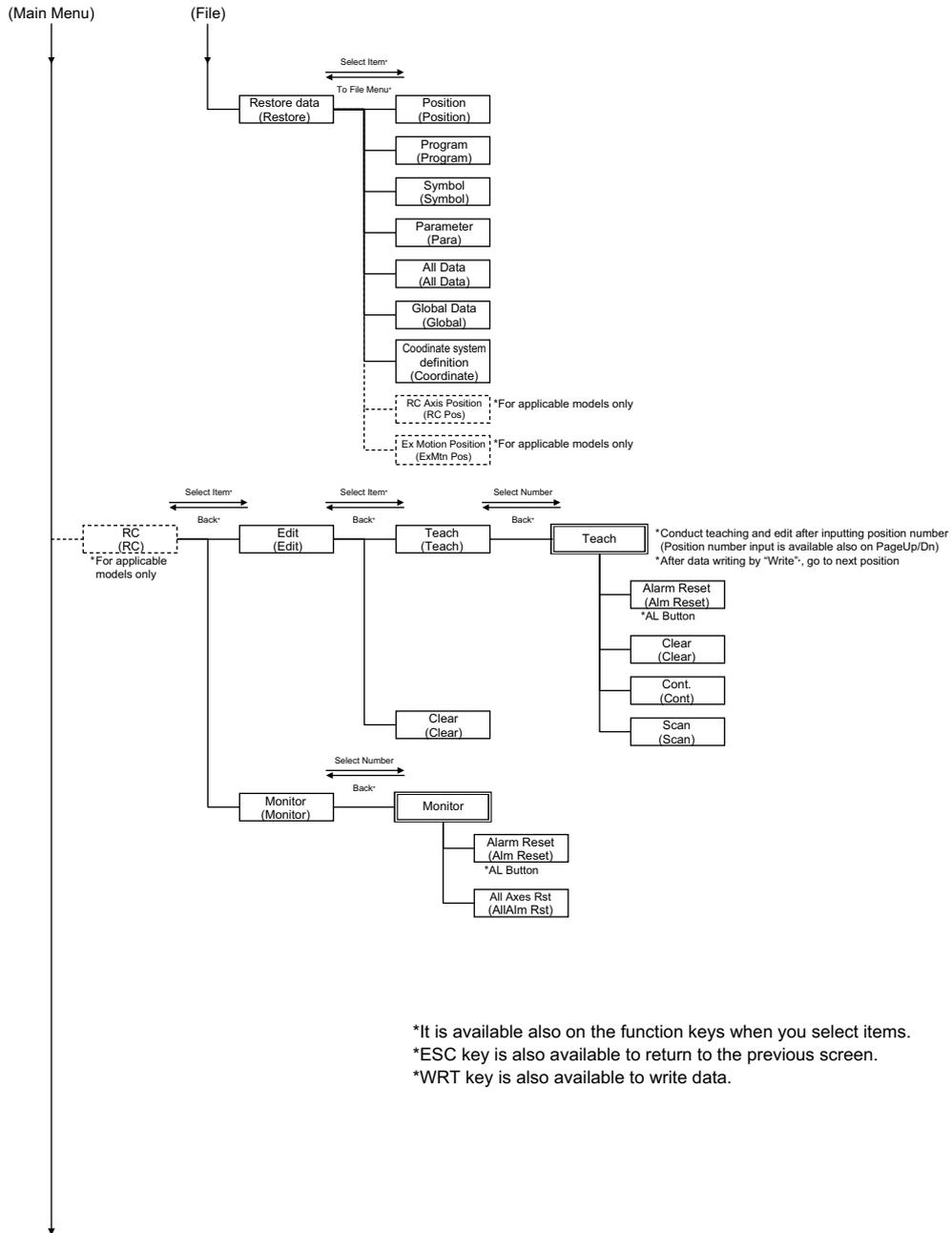
6. Mode Transition Diagram



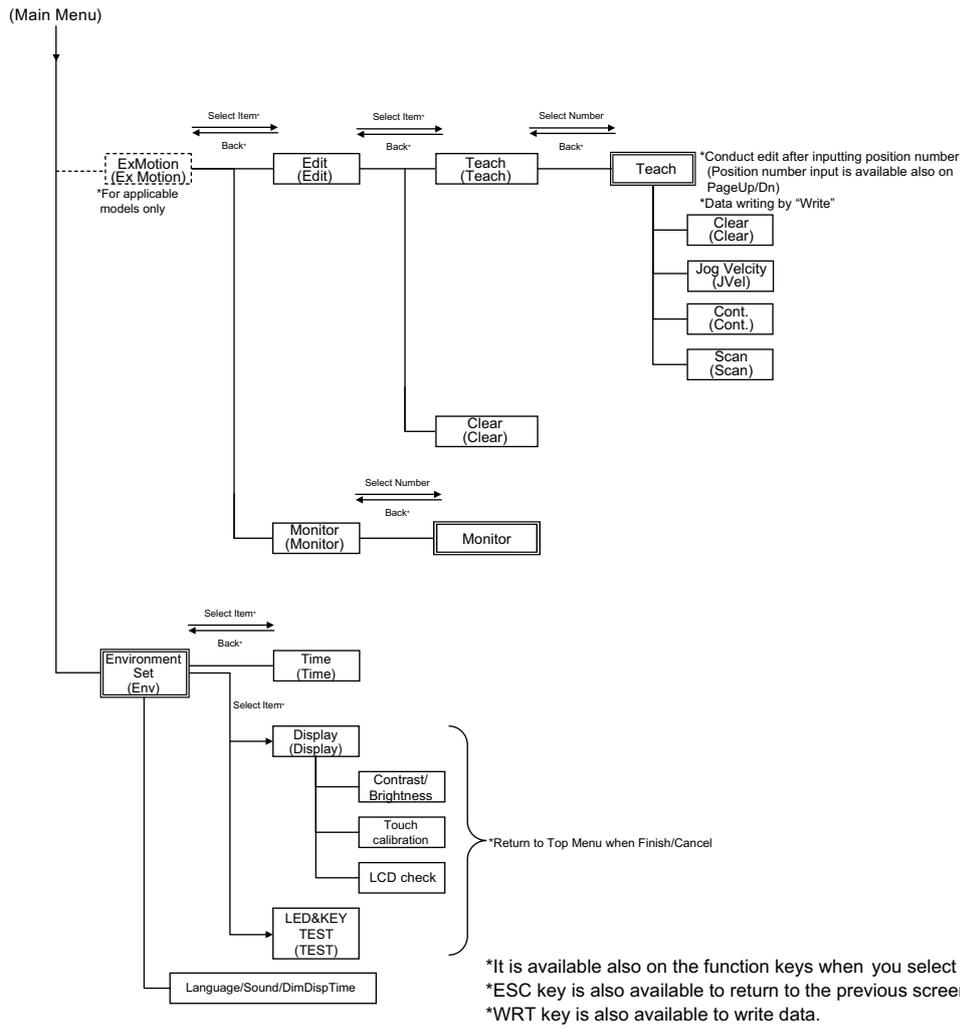


6. Mode Transition Diagram

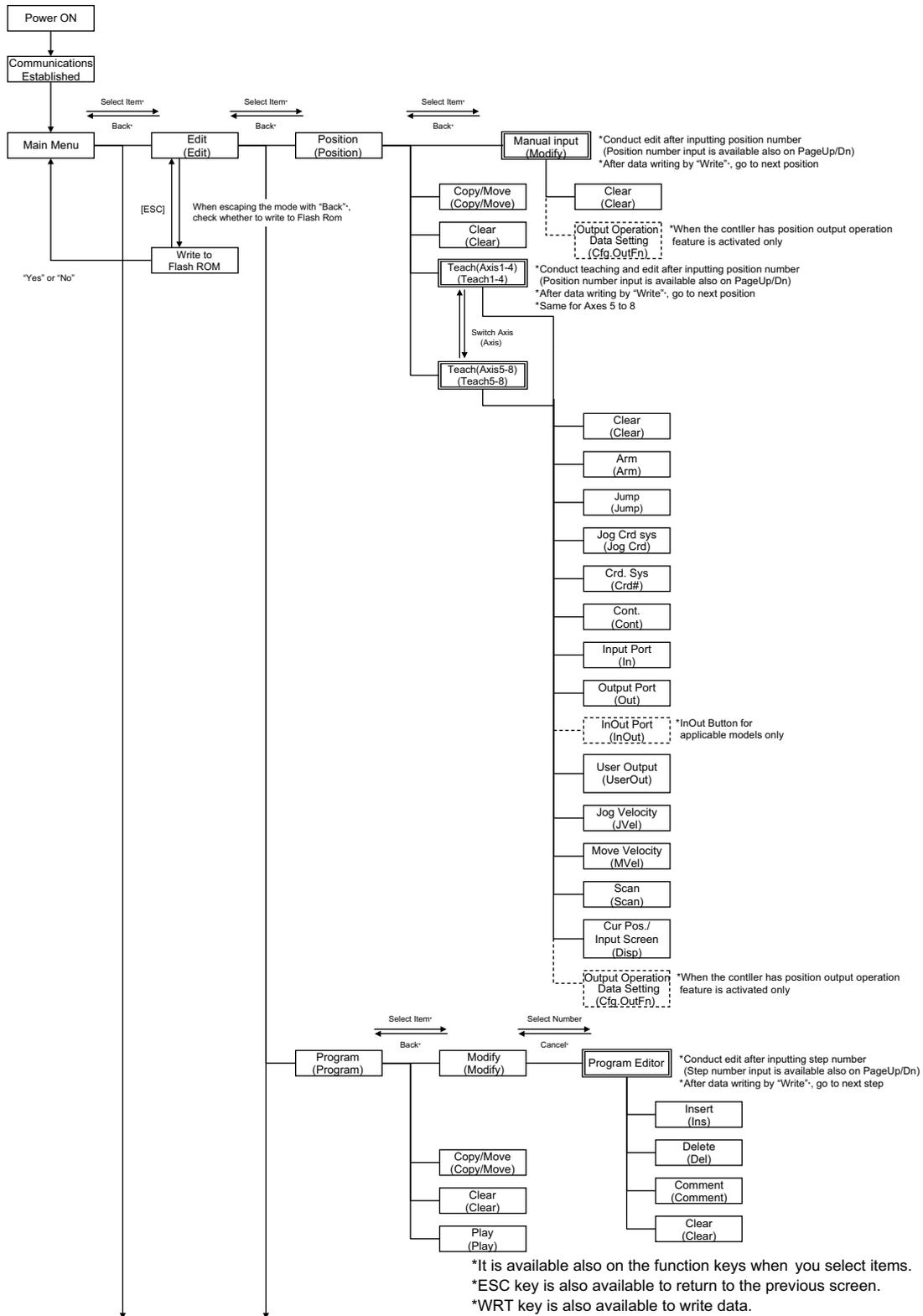




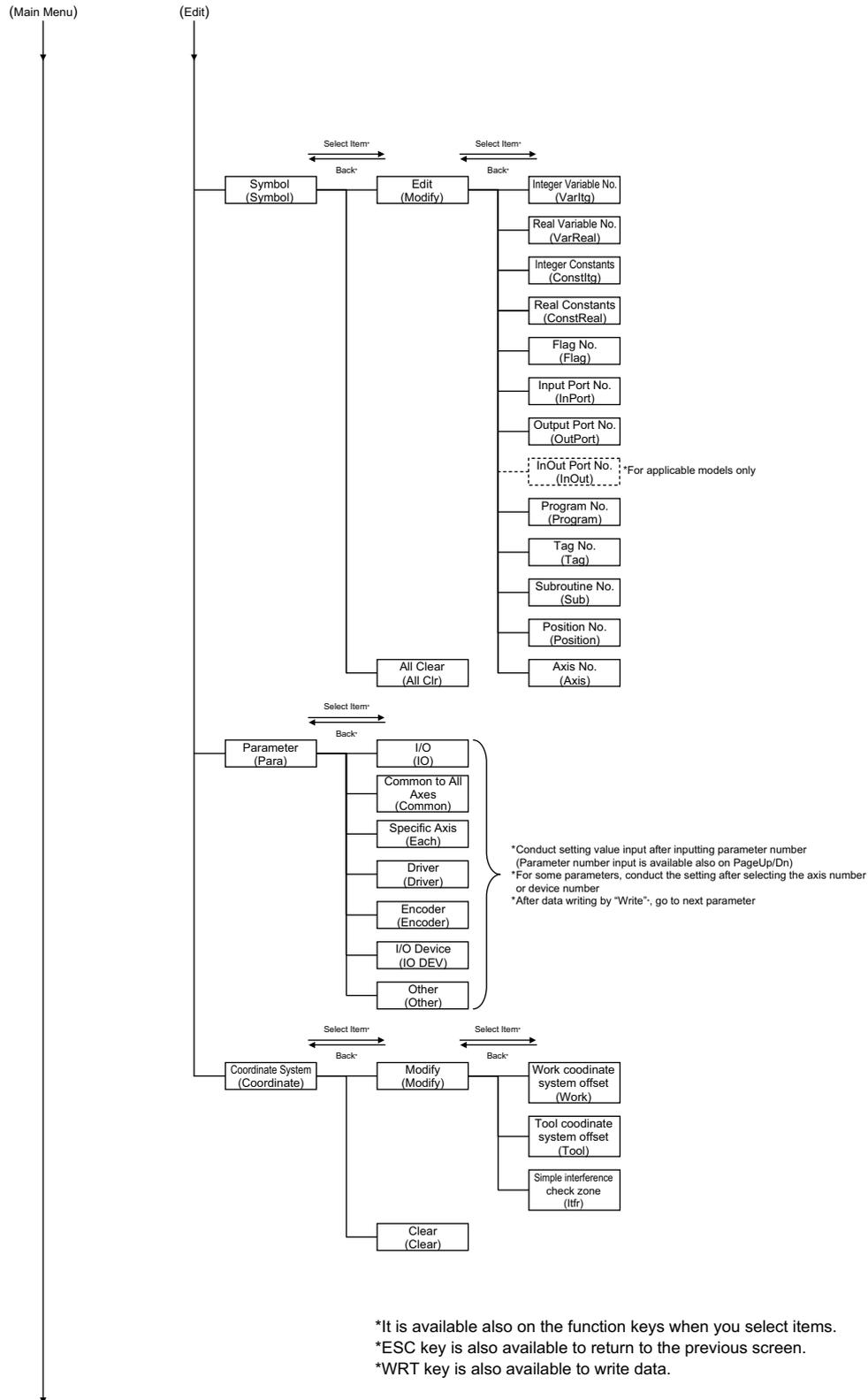
6. Mode Transition Diagram

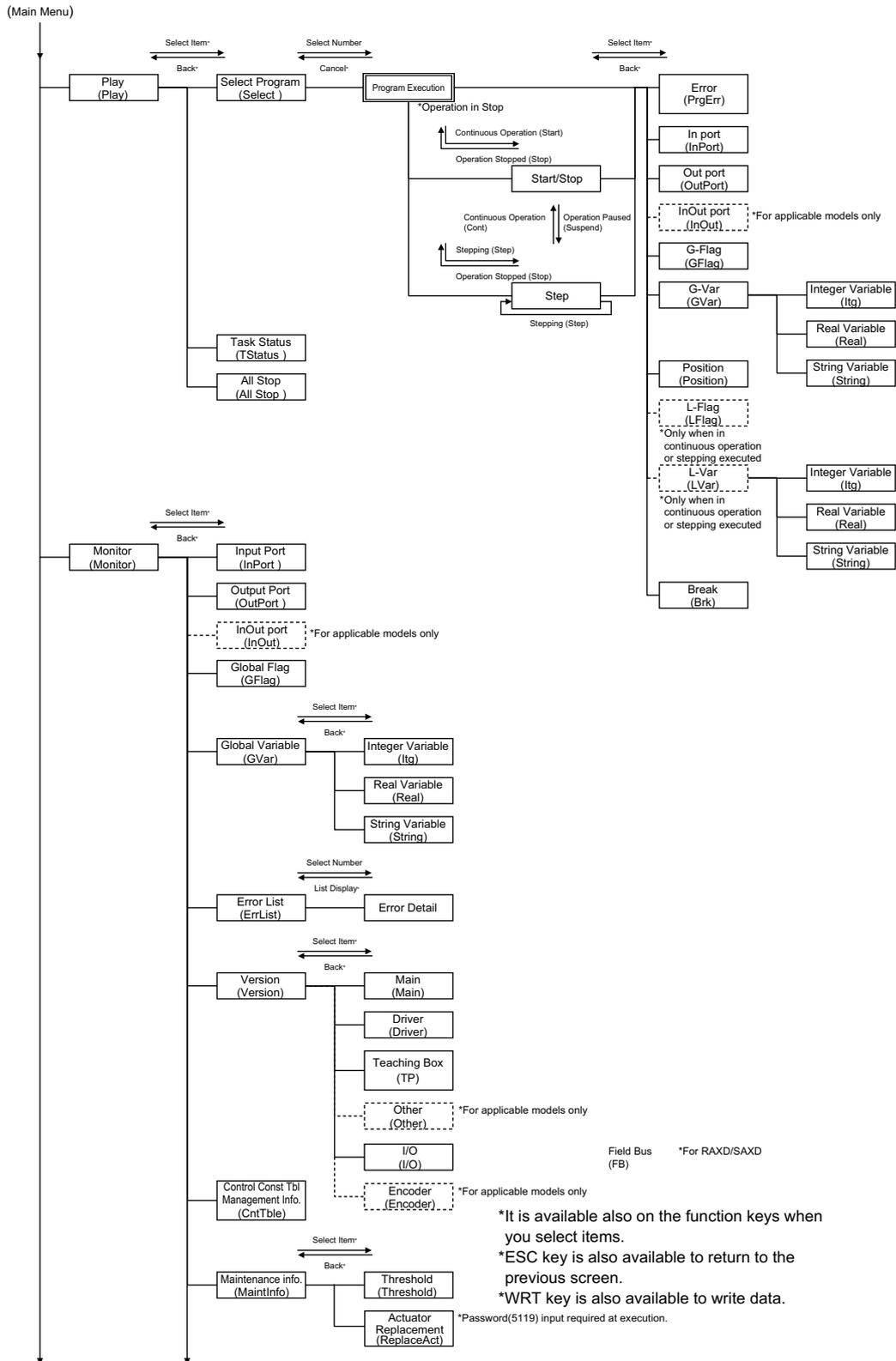


## 6.4 XSEL-RXD/SXD, RAXD/SAXD Controller

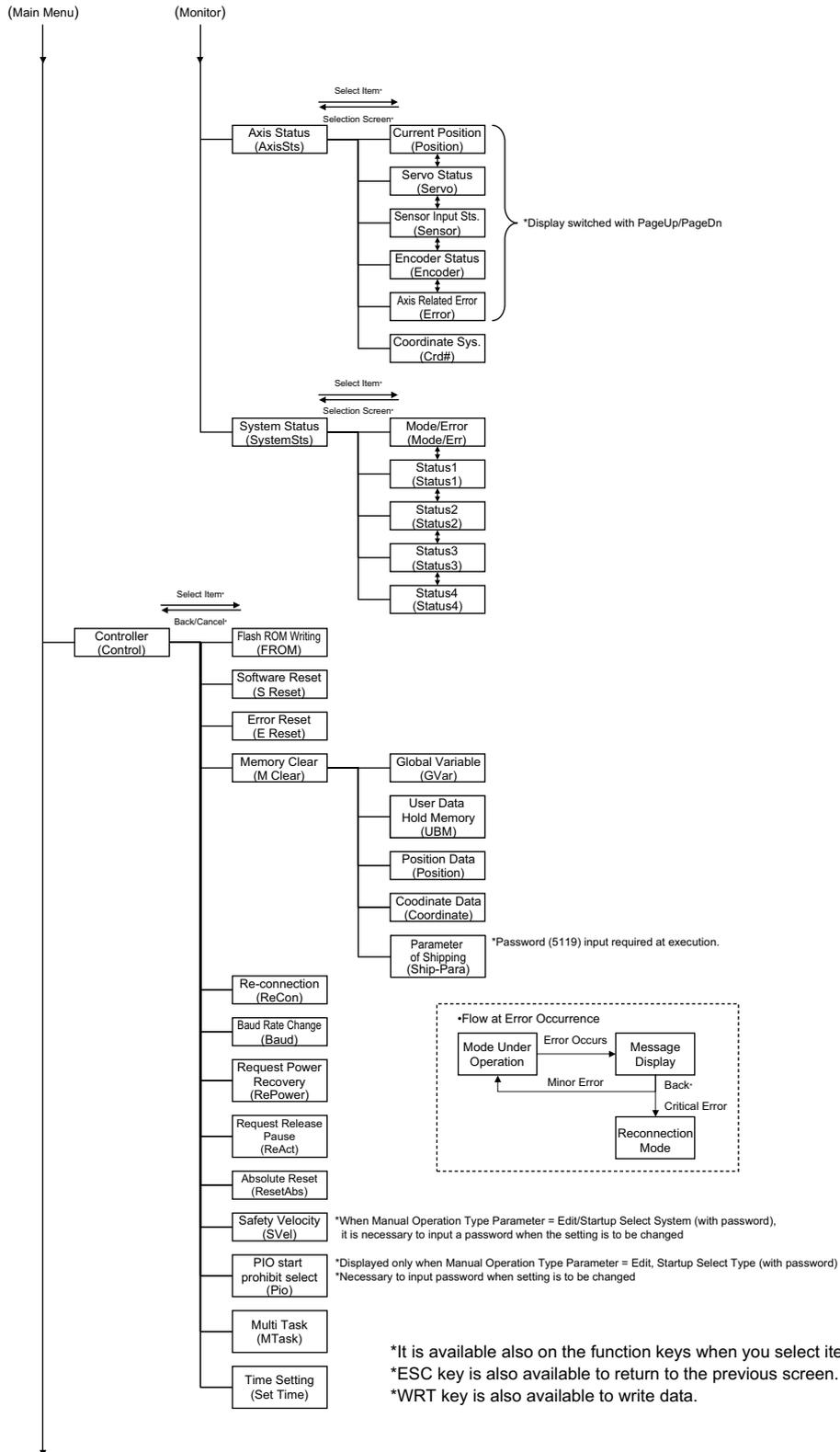


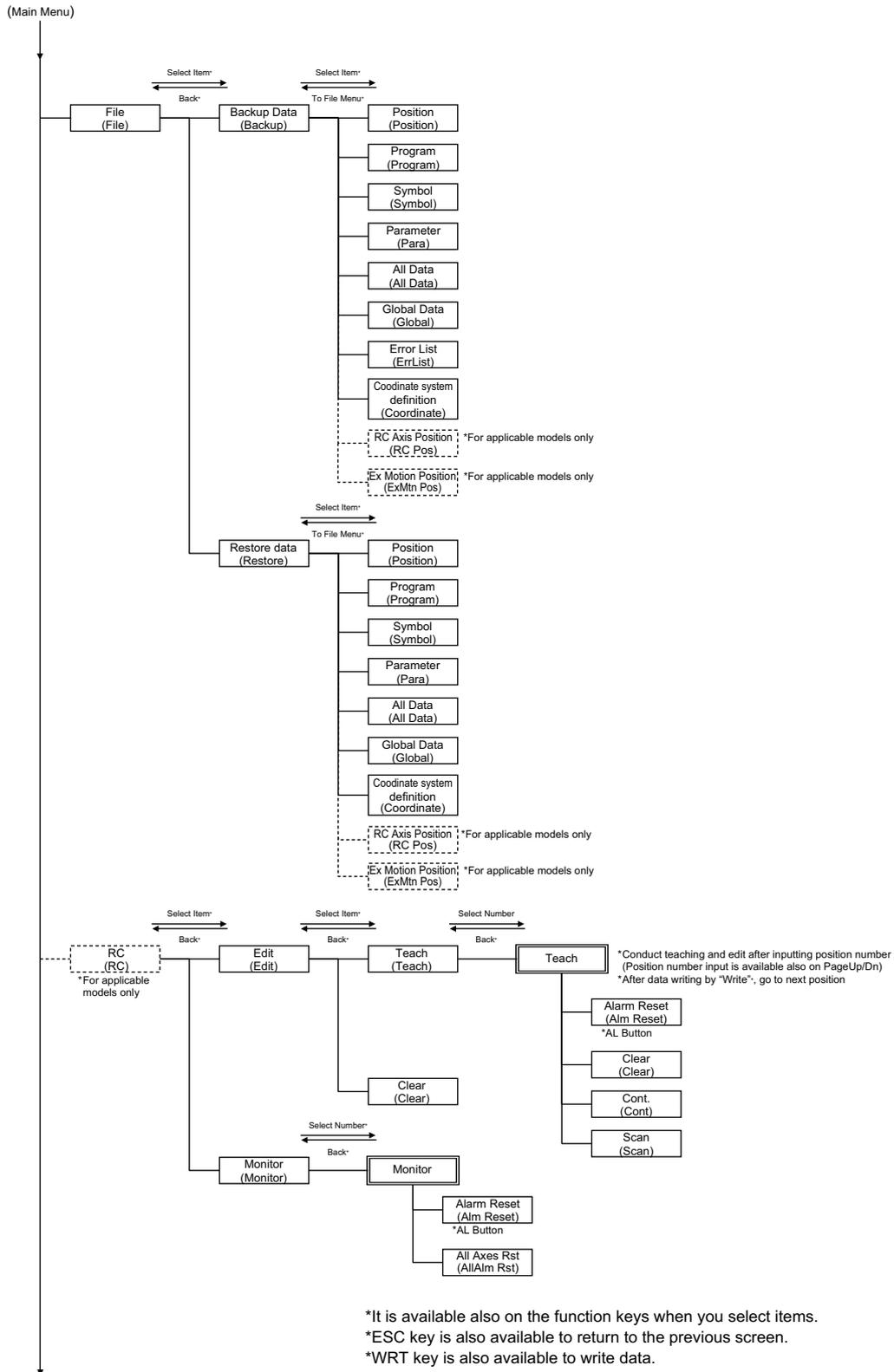
6. Mode Transition Diagram



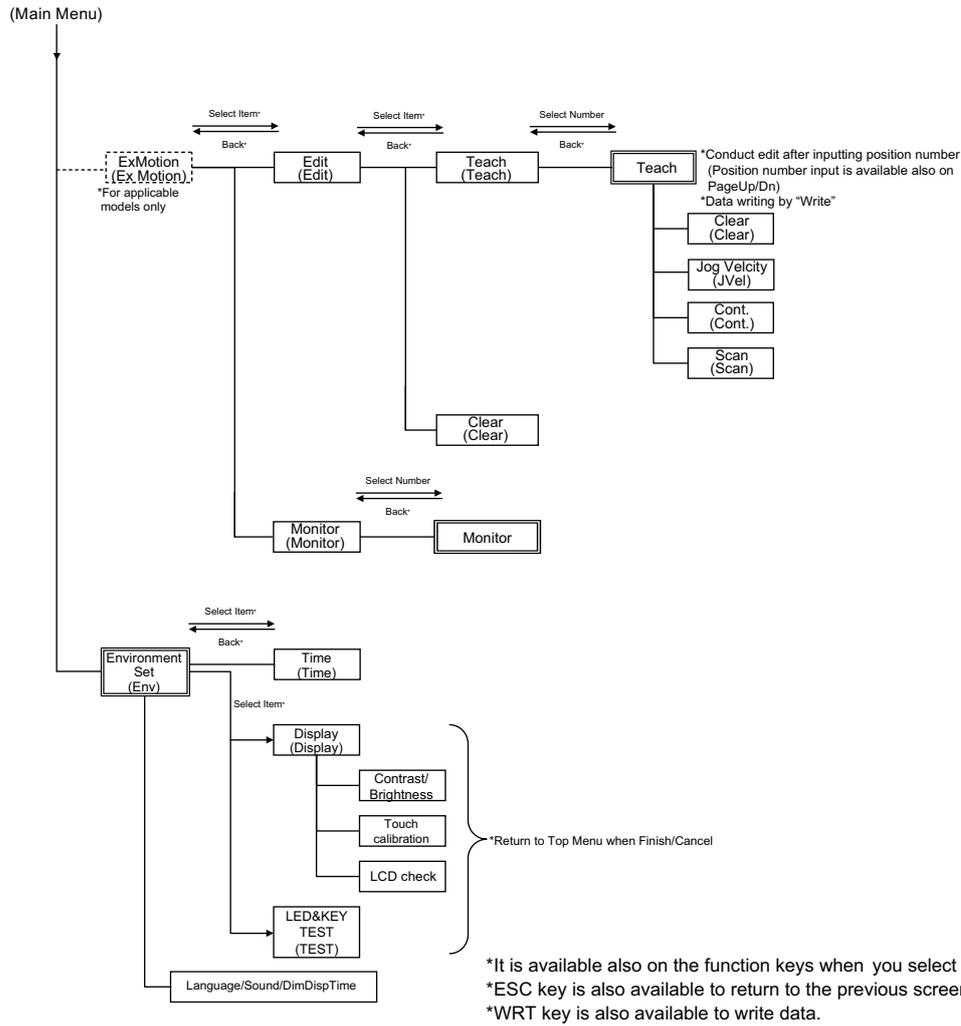


6. Mode Transition Diagram



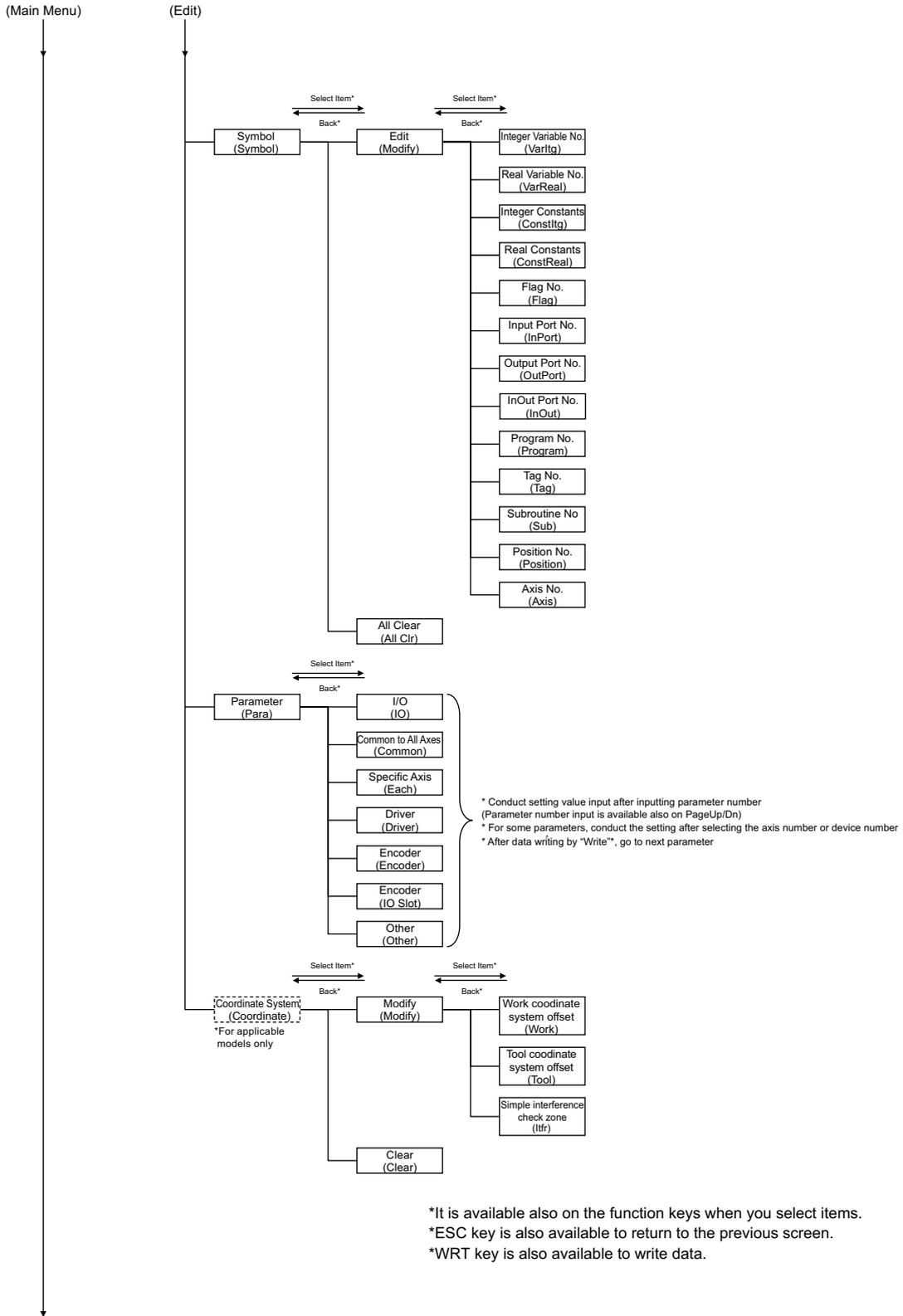


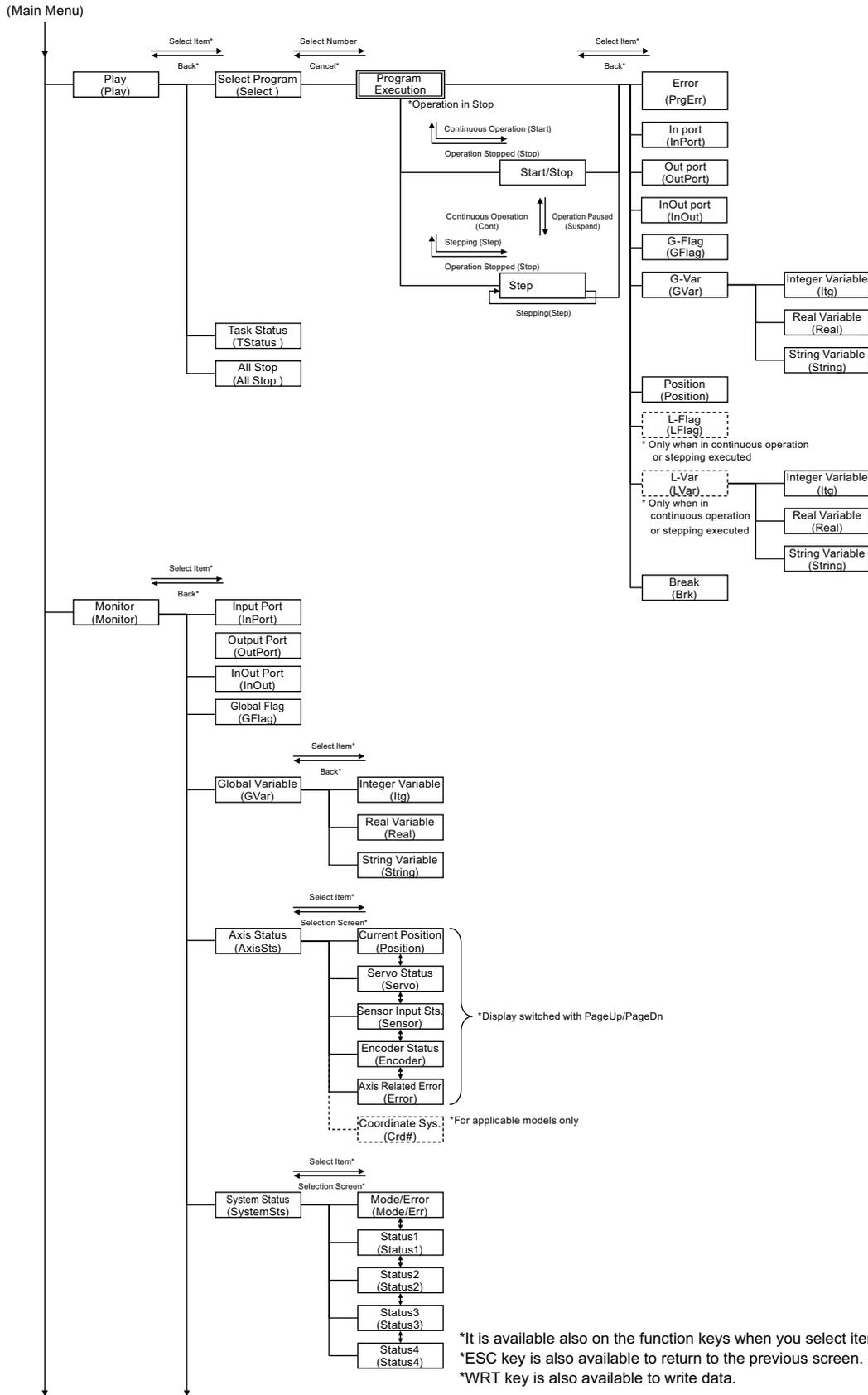
6. Mode Transition Diagram

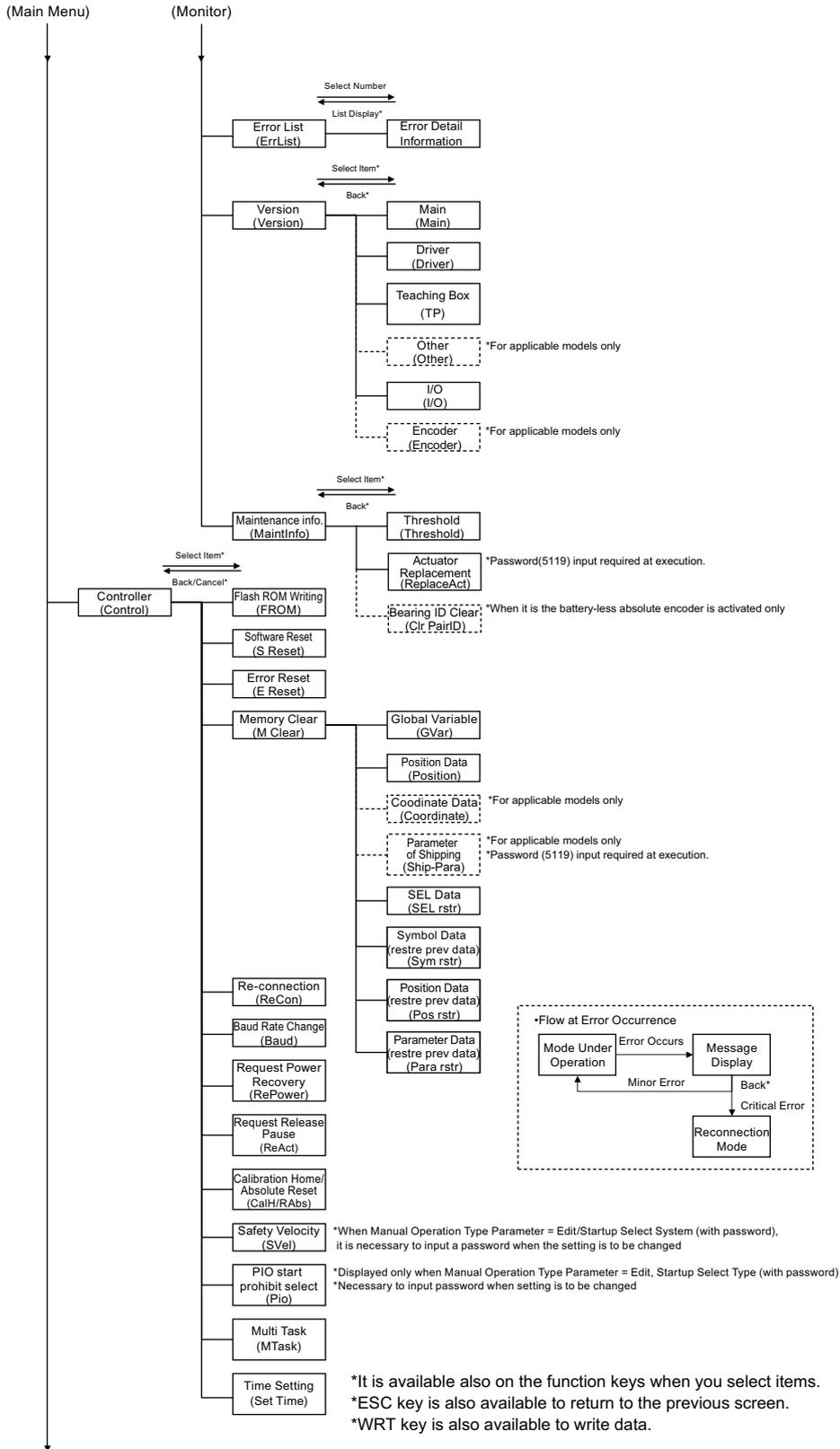




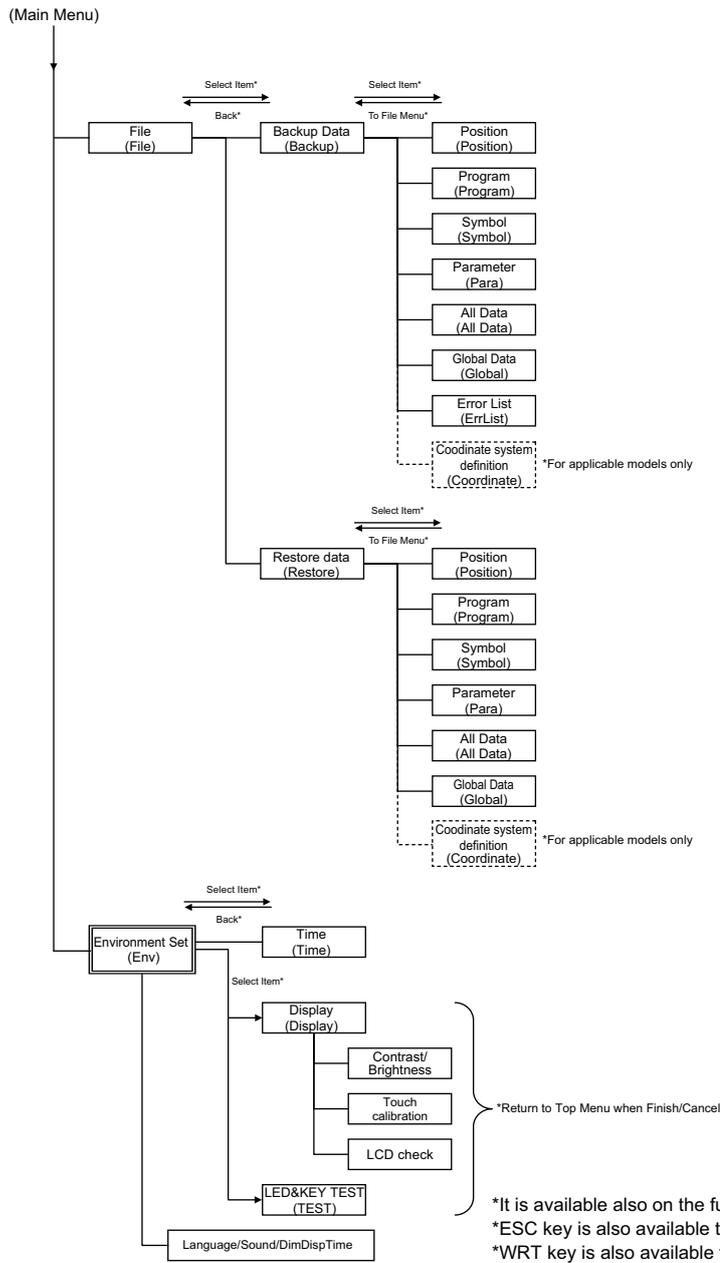
6. Mode Transition Diagram







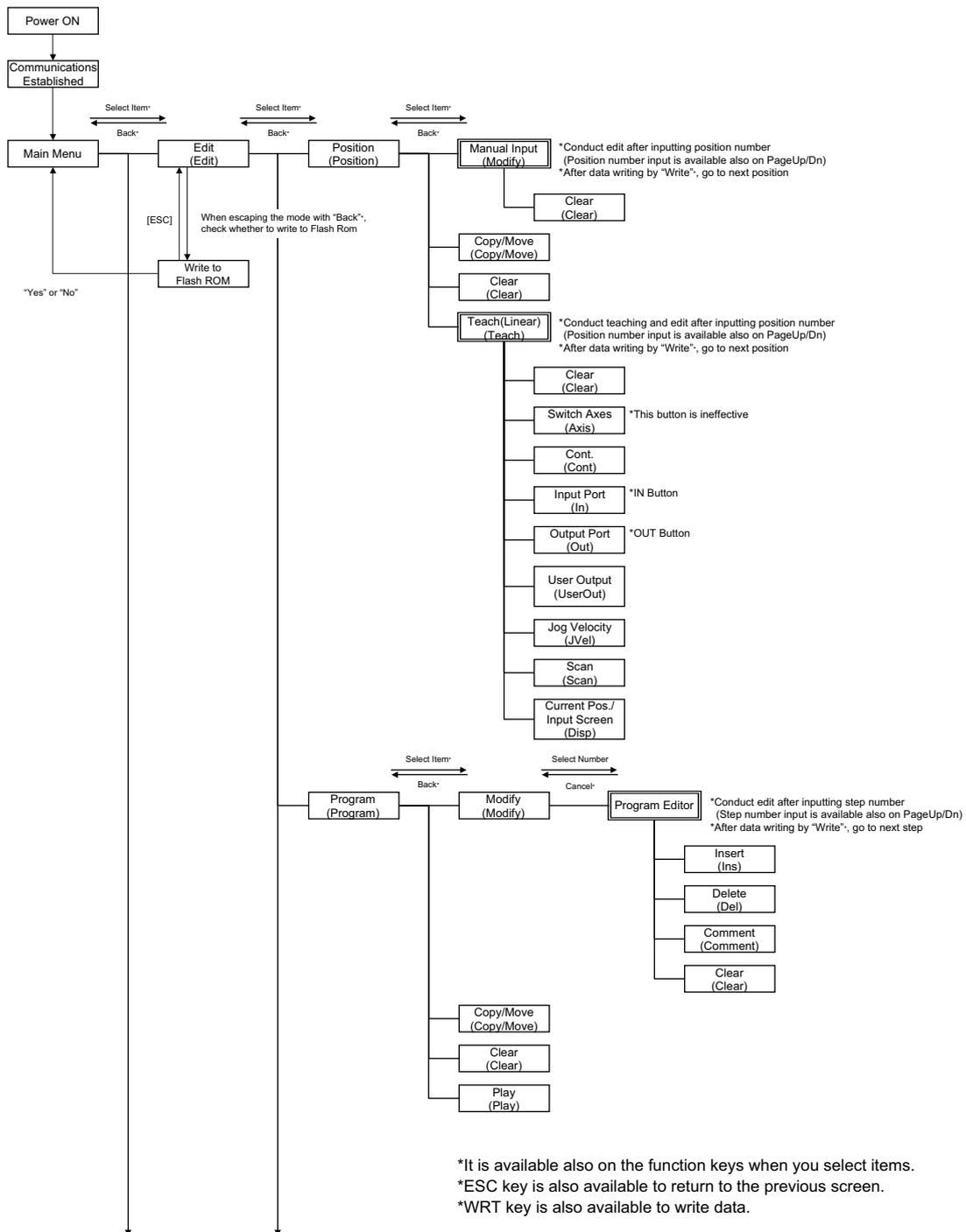
6. Mode Transition Diagram

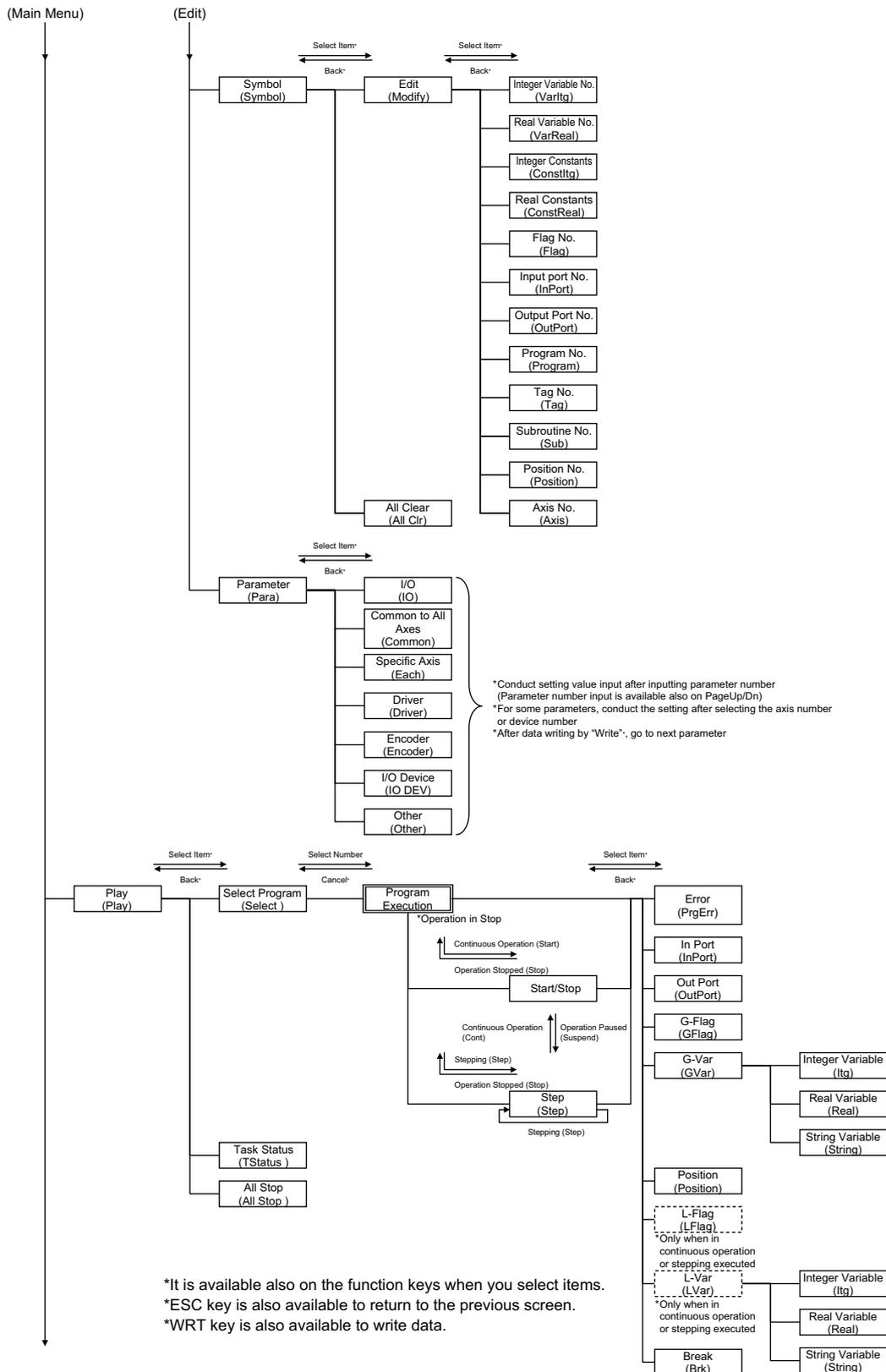


## 6.6 SSEL, ASEL, PSEL Controller

In the case of the SSEL, ASEL or PSEL 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, ASEL or PSEL controller.

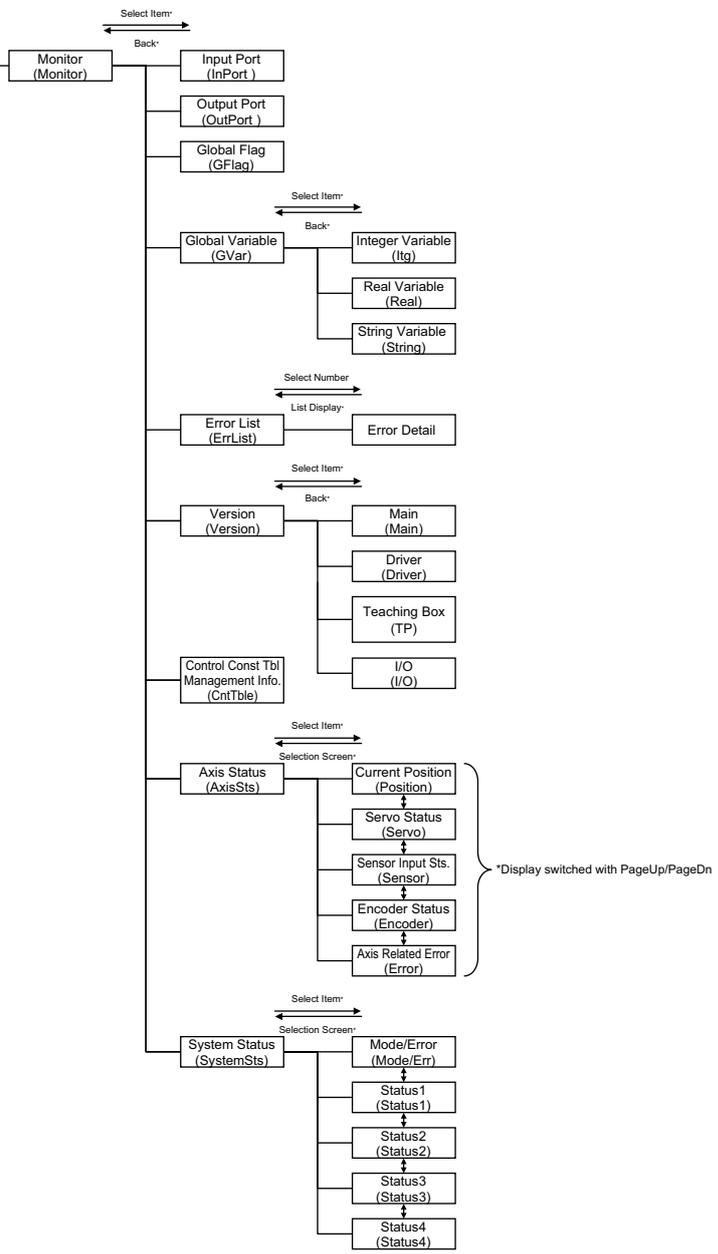
### 6.6.1 Program Mode





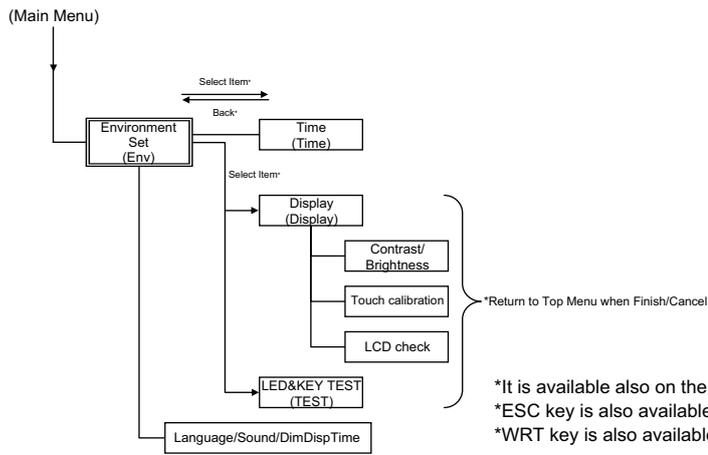
(Main Menu)

6. Mode Transition Diagram



\*It is available also on the function keys when you select items.  
 \*ESC key is also available to return to the previous screen.  
 \*WRT key is also available to write data.

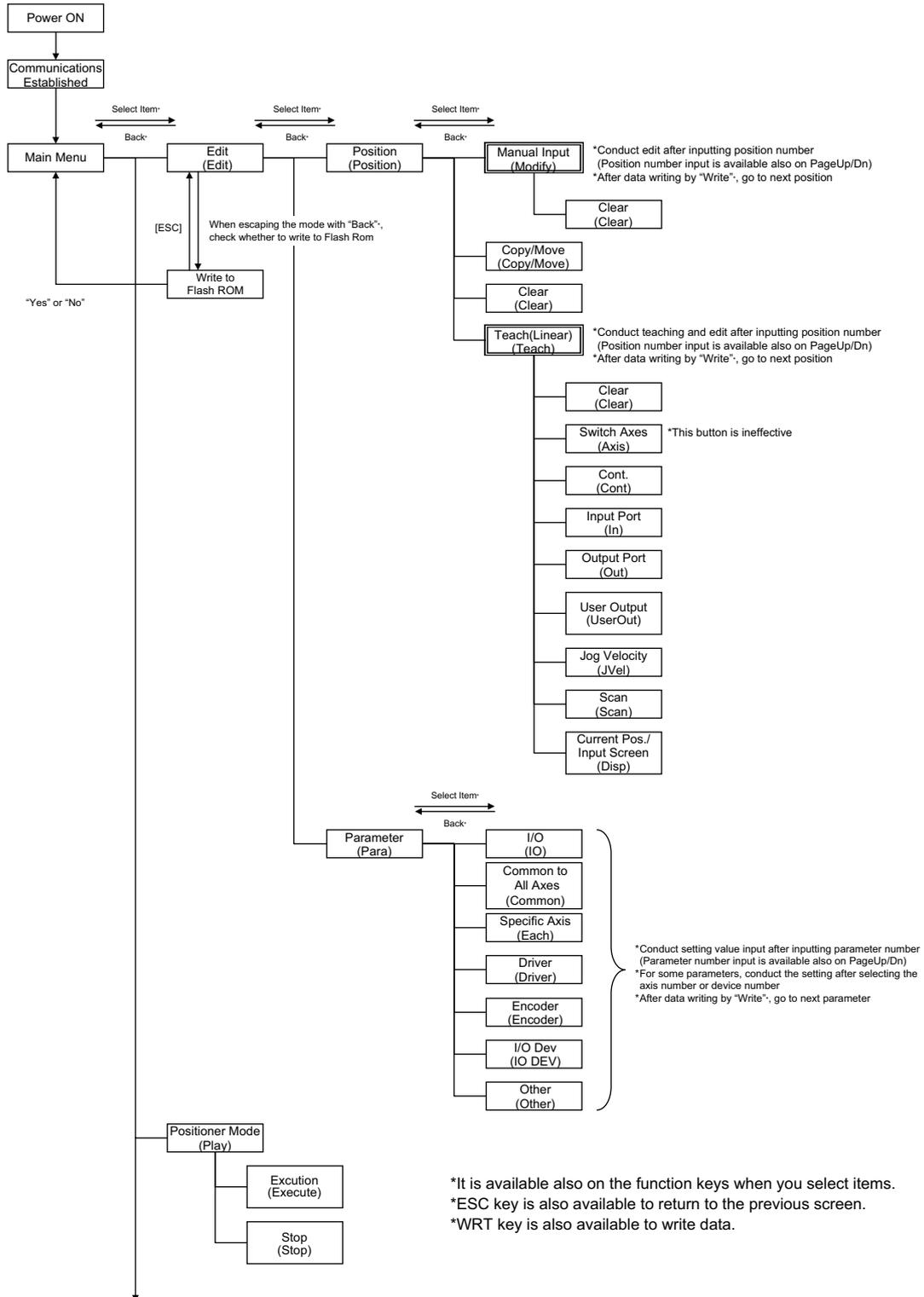


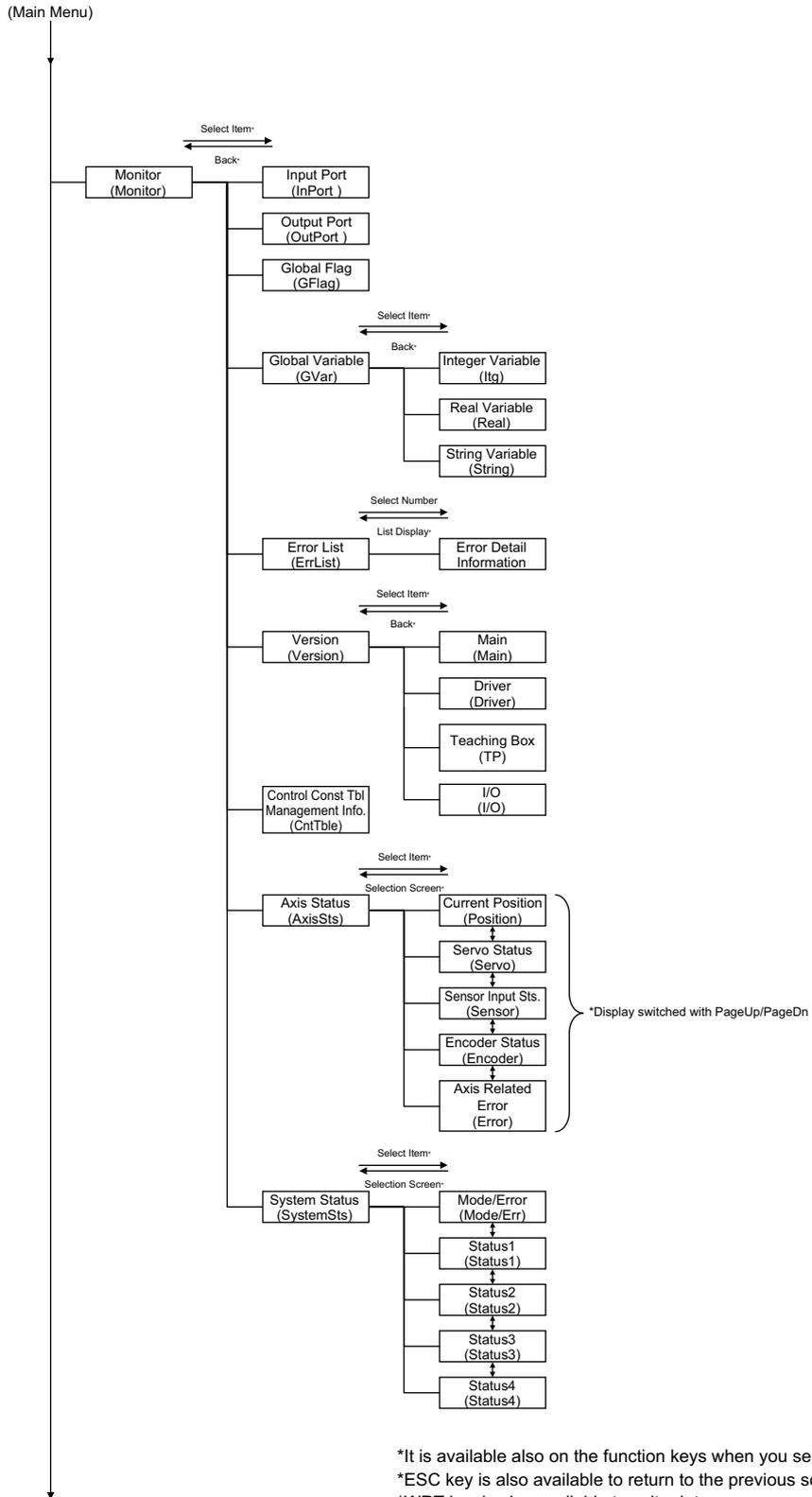


\*It is available also on the function keys when you select items.  
 \*ESC key is also available to return to the previous screen.  
 \*WRT key is also available to write data.

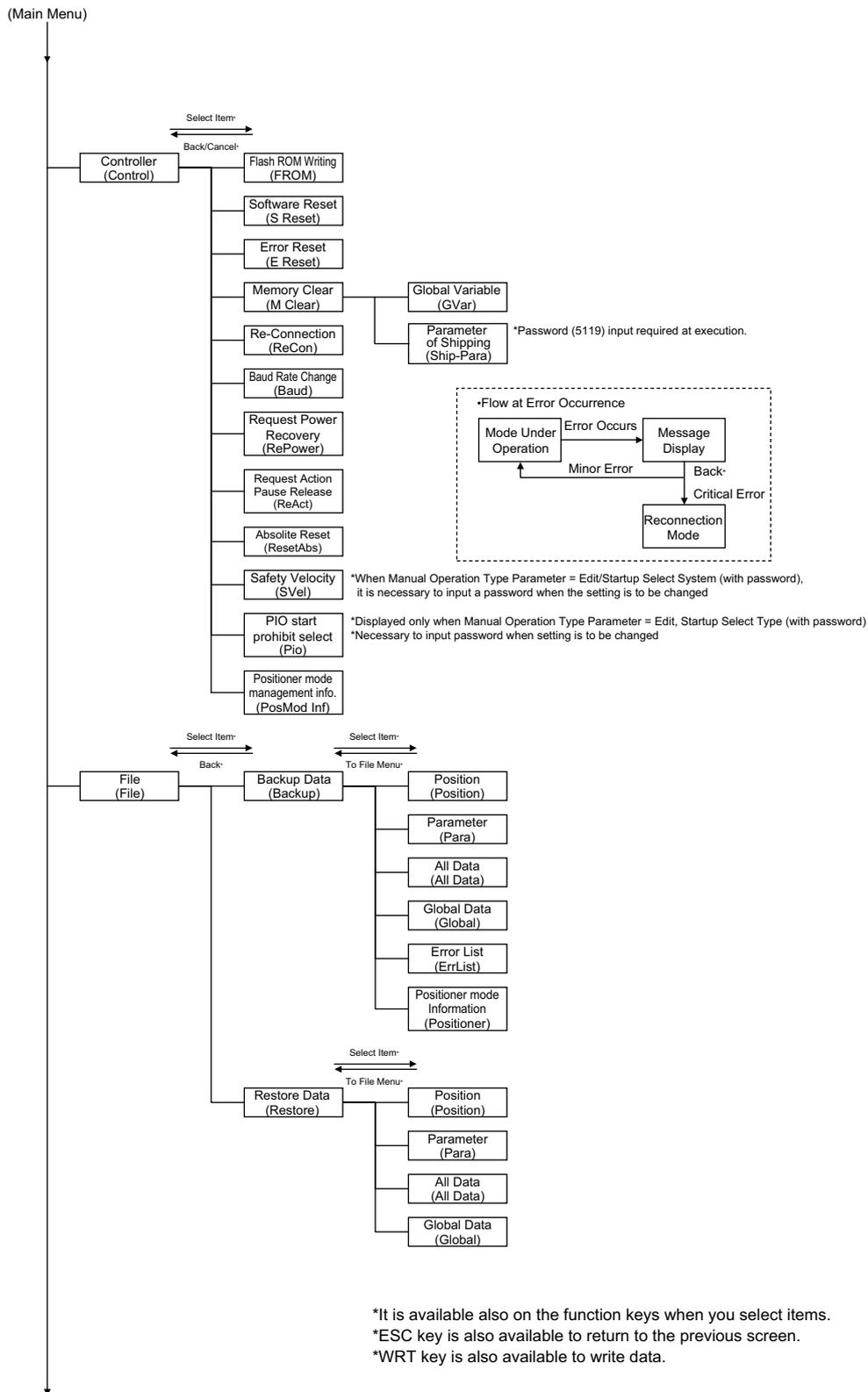
## 6.6.2 Positioner Mode

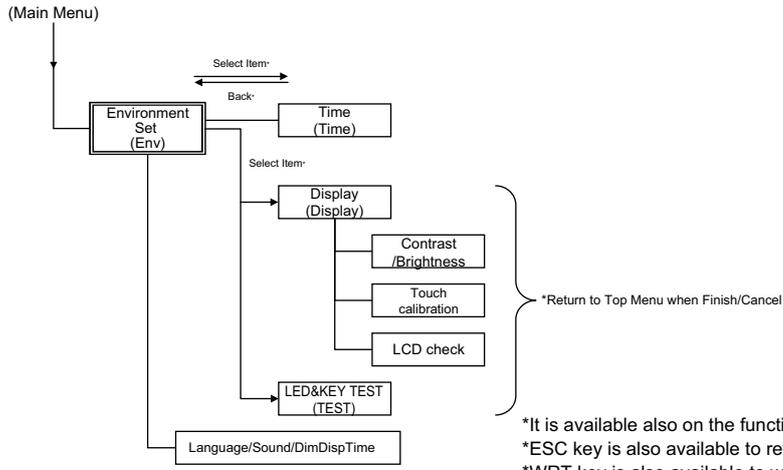
(Note) In the positioner mode, “Program edit” or “Symbol edit” is unavailable. “Two or more programs start prohibition” (MTsk) operation cannot be performed, either.





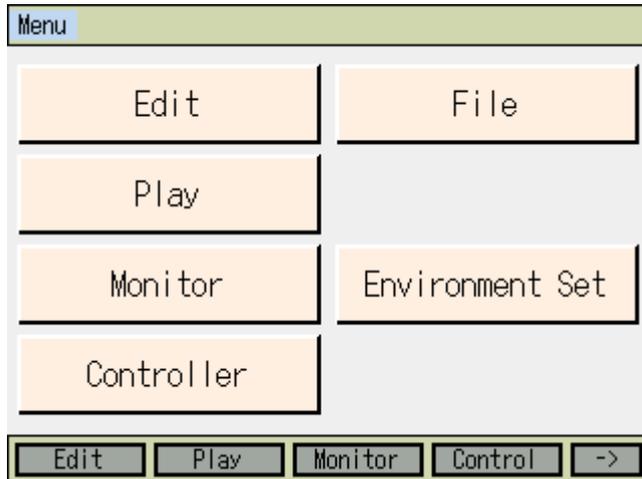
6. Mode Transition Diagram





\*It is available also on the function keys when you select items.  
 \*ESC key is also available to return to the previous screen.  
 \*WRT key is also available to write data.

## 7. Menu Selection



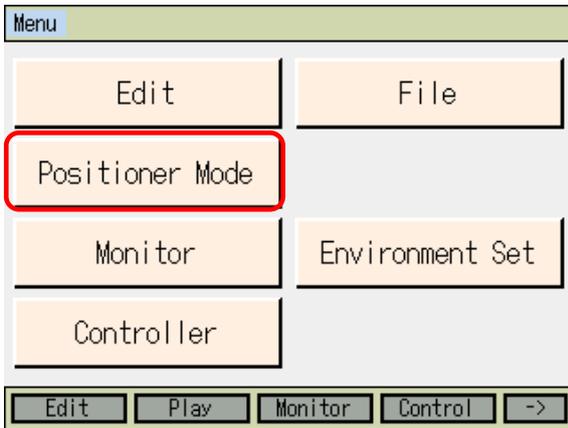
There are six menus in Menu that you can select and touch. The screen changes to the touched menu.

### Menu list

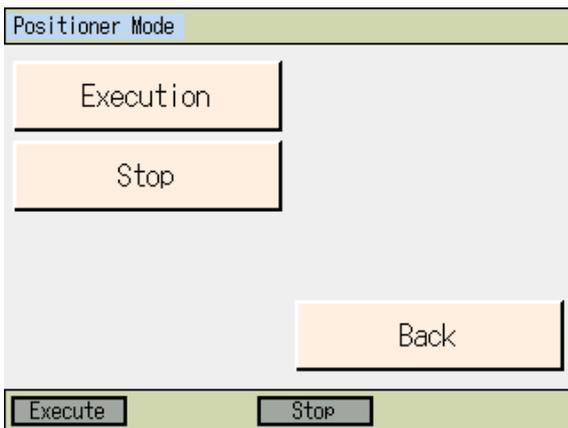
- Edit To edit position data, programs, symbols, parameters and coordinate system definition data
- Play To execute programs
- Monitor The controller status is displayed
- Controller To write in flash ROM, reset software and so on
- File To backup data in controller and restore
- Environment Set Set the language, touch tone and time setting, etc.

## 8. Execute or Stop the Positioner Mode of the SSEL, ASEL and PSEL Controller.

When the SSEL, ASEL or PSEL controller is in the positioner mode, execute or stop the positioner mode.



Touch **Positioner Mode** button in the Menu screen or press **F2** (Play) key.



There are two items in the Positioner Mode screen.

**Execution** : Start up the positioner mode that is currently indicated.

**Stop** : Finish the positioner mode that is currently indicated.

Function keys are assigned as **F1** (Execute) and **F3** (Stop).

**⚠ Caution:** When the SSEL, ASEL or PSEL controller is executing in the positioner mode, parameter changes or Flash ROM writing cannot be performed. After stopping the positioner mode by the above operation, perform parameter changes or Flash ROM writing.

## 9. Position Edit

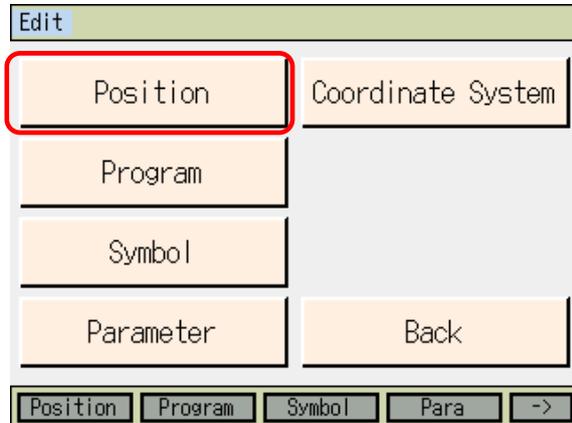
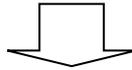
There are two ways to input the position data.

- (1) Numerical input · It is the way to input numbers directly on the numeric keys in the touch panel in the position edit screen or the numeric keys on the hardware.
- (2) Teaching ······ The way to set on the target position by manual movement (direct teaching) of either JOG operation or inching operation with the servo being off, and to indicate to read that position (current position) in the position table.

### 9.1 Manual Input (Numerical Input)



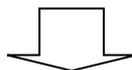
Touch **Edit** button in the Menu screen or press **F1** (Edit) key.

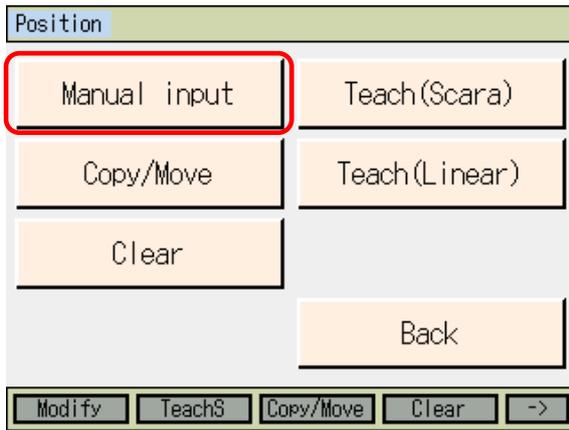


Touch **Position** button on the Edit screen or press **F1** (Position) key.

\* Example shown on the left is for XSEL-JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX.

\* There is no coordinate system buttons shown when a controller other than above is connected.





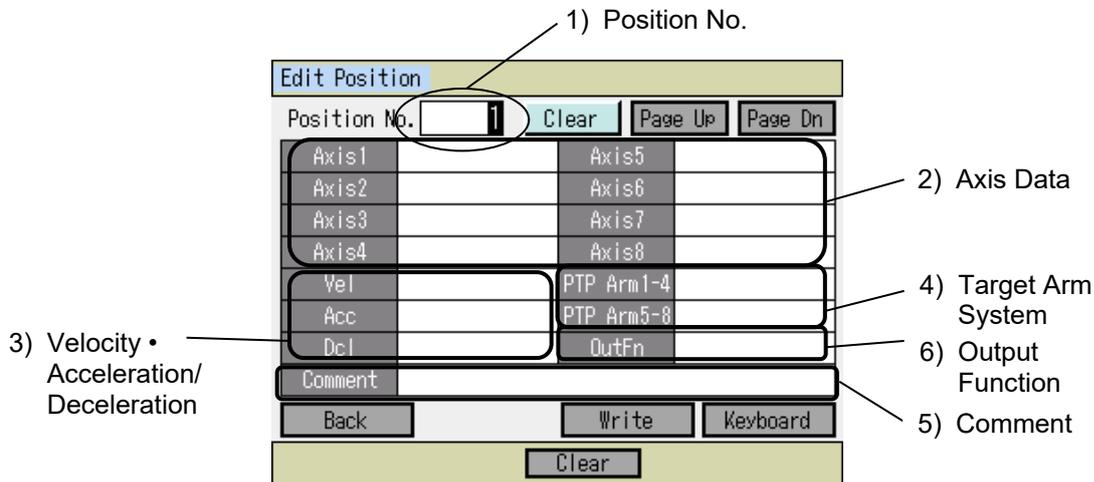
Touch **Manual input** button in Position menu screen or press **F1** (Modify) key. Edit Position screen will appear.

\* Example shown on the left is for XSEL-PX/QX, RX/SX, RAX/SAX and MSEL-PCX/PGX (for 3-axis SCARA + additional axis type).

\* When there is no Scara or orthogonal axis, the applicable buttons will not be shown.

\* For XSEL-RXD/SXD and RAXD/SAXD the buttons are replaced with **Teach (Axis 1-4)** and **Teach (Axis 5-8)**.

[Items Shown in Edit Position Screen]



1) Position No.  
It shows the Position No.

2) Axis Data  
It is shown for the number of axes actually installed.

Axes 1 to 4

Indicate the positions of Axes 1 to 4.

Indicate the positions of SCARA axes for XSEL-JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX controllers. (For 3-axis SCARA type, Axes 1 to 3 are for the position indication of SCARA axis, and Axis 4 for additional axis.)

The range available to indicate is from -99999.999 to 99999.999.

Axes 5 to 8

Indicate the positions of Axes 5 to 8.

Indicate the positions of SCARA axes for XSEL-RXD/SXD and RAXD/SAXD controllers.

The range available to indicate is from -99999.999 to 99999.999.

3) Velocity • Acceleration/Deceleration

Vel

Indicate the velocity.

The range available to indicate is from 1 to 9999. However, when the controller is XSEL-J/K, P/Q, R/S, RA/SA, SSEL, PSEL, ASEL, TT, TTA or MSEL-PC/PG/PCF/PGF and All Axes Common Parameter No. 20 “Max. Operation Velocity Check” is set to 0, the range is from 1 to All Axis Common Parameter No. 21 “Max. Operation Velocity for Input Check”.

Acc

Indicate the Acceleration.

The range available to indicate is from 0.01 to 9.99. However, when the controller is XSEL-PX/QX, the range is from 0.01 to the higher value in either of All Axes Common Parameter No. 22 “SCARA Axis Max. CP Acceleration” or All Axes Common Parameter No. 203 “Linear Axis Max. Acceleration”.

When the controller is XSEL-P/Q, R/S, RA/SA or SSEL and All Axes Common Parameter No. 18 “Max. Operation Acceleration/Deceleration Velocity Check Timing” is set to 0, and when the controller is XSEL-J/K, JX/KX, ASEL, PSEL, TT, TTA or MSEL-PC/PG/PCF/PGF, All Axes Common Parameter No. 22 “Max. Acceleration” is the maximum value for “Max. CP Acceleration”.

Dcl

Indicate the Deceleration.

The range available to indicate is from 0.01 to 9.99. However, when the controller is XSEL-PX/QX, the range is from 0.01 to the higher value in either of All Axes Common Parameter No. 23 “SCARA Axis Max. CP Acceleration” or All Axes Common Parameter No. 204 “Linear Axis Max. Deceleration”.

When the controller is XSEL-P/Q, R/S, RA/SA or SSEL and All Axes Common Parameter No. 18 “Max. Operation Acceleration/Deceleration Velocity Check Timing” is set to 0, and when the controller is XSEL-J/K, JX/KX, ASEL, PSEL, TT, TTA or MSEL-PC/PG/PCF/PGF, All Axes Common Parameter No. 23 “Max. Deceleration” is the maximum value for “Max. CP Deceleration”.

4) Target Arm System

PTP Arm1-4 (Arm1-3), PTP Arm 5-8

Indicate the target arm system of SCARA Axis (Axes 1 to 4 or Axes 1 to 3) and SCARA Axis (Axes 5 to 8) with Left and Right.

Arms 1 to 4 (Arms 1 to 3) are displayed only when XSEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD or MSEL-PCX/PGX controller is connected.

Arms 5 to 8 are displayed only when XSEL- RXD/SXD, RAXD/SAXD controller is connected.

The target arm system indication set in this section is effective in the following operations.

- Movement by **MOVE** key in Teaching screen (When there is no PTP target arm system setting in the position data, operation is made as “current arm system (movement of opposite arm system allowed when impossible)”)
- Servo operation SEL Command which the position data is used

5) Comment

Comment

It is displayed only when XSEL-R/S, RX/SX or RXD/SXD controller is connected.

Input a comment if necessary. (32 letters with half-size font at max.)

Input of comments is available in Position No. 1 to 10000.

6) Output Function

When the controller has position output operation feature support and the feature is activated only.

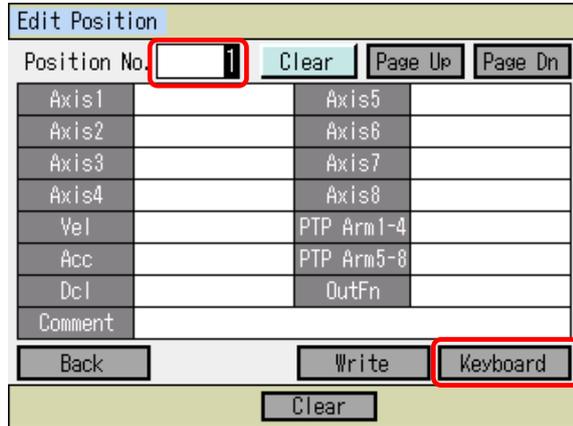
OutFn

Output functions of the position output operation feature are displayed. Setting is to be conducted with the function keys (Cfg.OutFn). (Display will be shown when cursor is placed in OutFn box.)

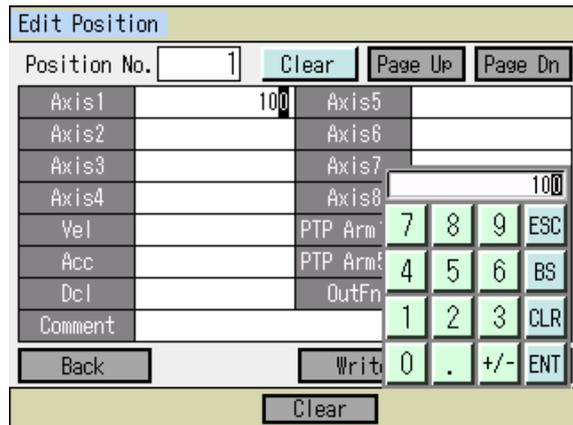
### 9.1.1 Basic Operation

#### [Addition and Change of Position Data]

First, indicate the position number that an addition or a change is required. When the screen is opened for the first time, a cursor is flashing in the position number input box. (When no flashing is confirmed, touch in the position number input box.)



Input the position number by displaying the numeric keys on the touch panel by touching **Keyboard** button or input the position number on the hardware numeric keys.



Touch the numerical part when it is desired to input number on the touch panel numeric keys when inputting the position number.

The contents of input will be shown in the box above the touch panel numeric keys.

When confirming the input number, touch **ENT**.

Touch panel numeric keys will close, the data in the indicated position number is shown, and the cursor moves to the input box for Axis1.

When redoing the input, touch **ESC**.

When it is desired to cancel the input, touch **ESC** again, and the touch panel numeric keys will close.

Also **ESC** key on the hardware acts in the same way.

When it is desired to use the hardware numeric keys for inputting, input the desired number by pressing the numeric keys and press **ENT** key to confirm your input. Once the input is confirmed, the cursor moves to Axis1 box. The contents of input are displayed in the position number box. When redoing the input, press **ESC** key. It is not available to input numbers on the hardware numeric keys while the touch panel numeric keys are displayed on the screen.

[Input of Axis Data (Axes 1 to 8), Vel (Velocity), Acc (Acceleration) and Dcl (Deceleration)]  
 Show the cursor to the input area for the item which is desired for inputting. To show the cursor in the input area for the item which is desired for inputting is to touch in that area (white area in the background, or an area framed in red for Axis1).

Edit Position			
Position No.	<input type="text" value="1"/>	Clear	Page Up Page Dn
Axis1	<input style="border: 2px solid red;" type="text"/>	Axis5	
Axis2		Axis6	
Axis3		Axis7	
Axis4		Axis8	
Vel		PTP Arm1-4	
Acc		PTP Arm5-8	
Dcl		OutFn	
Comment			
Back		Write	<input style="border: 2px solid red;" type="button" value="Keyboard"/>
Clear			

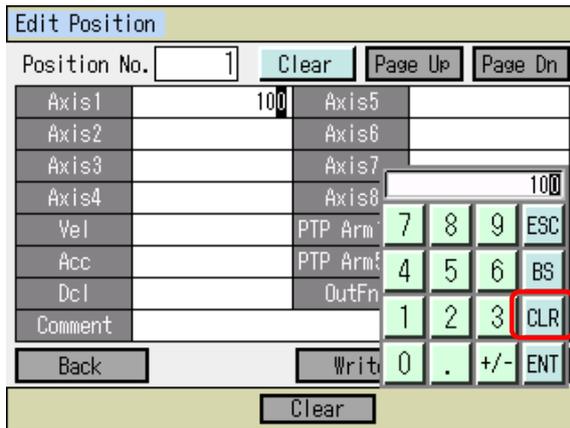
With the cursor shown in the appropriate area, touch **Keyboard** button to make the touch panel numeric keys appear on the screen to input a number, or input a number on the hardware numeric keys.

Edit Position			
Position No.	<input type="text" value="1"/>	Clear	Page Up Page Dn
Axis1		Axis5	
Axis2		Axis6	
Axis3		Axis7	
Axis4		Axis8	<input style="border: 1px solid gray;" type="text" value="1"/>
Vel		PTP Arm	<input type="button" value="7"/> <input type="button" value="8"/> <input type="button" value="9"/> <input type="button" value="ESC"/>
Acc		PTP Arm	<input type="button" value="4"/> <input type="button" value="5"/> <input type="button" value="6"/> <input type="button" value="BS"/>
Dcl		OutFn	<input type="button" value="1"/> <input type="button" value="2"/> <input type="button" value="3"/> <input type="button" value="CLR"/>
Comment			
Back		Write	<input type="button" value="0"/> <input type="button" value="."/> <input type="button" value="+/-"/> <input type="button" value="ENT"/>
Clear			

If you want to input 100 to Axis1 (1<sup>st</sup> axis), touch **Keyboard** button to show the touch panel numeric keys, and touch **1 0 0 ENT** on the touch panel numeric keys.

Edit Position			
Position No.	<input type="text" value="1"/>	Clear	Page Up Page Dn
Axis1	<input type="text" value="100.000"/>	Axis5	
Axis2	<input style="border: 1px solid gray;" type="text"/>	Axis6	
Axis3		Axis7	
Axis4		Axis8	
Vel		PTP Arm1-4	
Acc		PTP Arm5-8	
Dcl		OutFn	
Comment			
Back		Write	Keyboard
Clear			

If it is accepted correctly, the focus moves onto Axis2. (If only one axis is installed, the cursor moves to Vel.)  
 Axes 2 to 8 (for number of actually installed), Vel (velocity), Acc (acceleration) and Dcl (deceleration) are available to input.



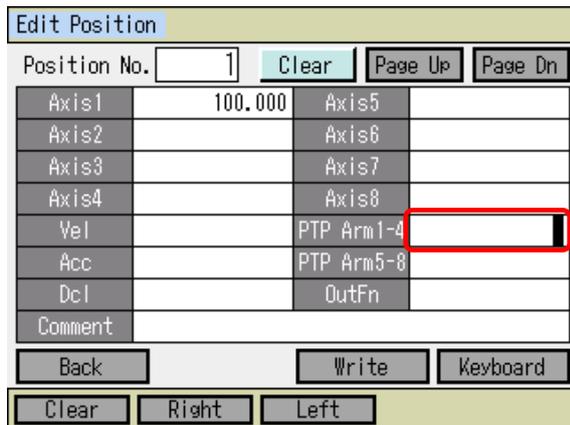
When you want to erase the data that is already input, touch **CLR** **ENT** on the touch panel numeric keys to delete what you want.

On the hardware numeric keys, data already input can be deleted with **BS** key and key to remove.

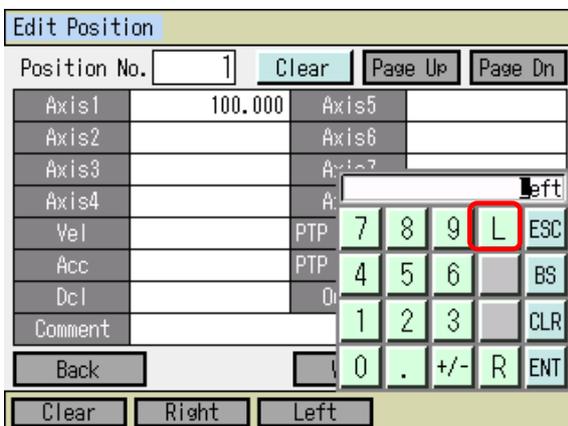
[Input of Target Arm System Data (Arm1 to 4 or Arm 1 to 3), (Arm5 to 8)]

\* Arm1 to 4 (Arm1 to 3) is a function dedicated only for XSEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD or MSEL-PCX/PGX, Arm5 to 8 is a function dedicated only for XSEL-RXD/SXD and RAXD/SAXD

Show the cursor to the input area for the item which is desired for inputting. To show the cursor in the input area for the item which is desired for inputting is to touch in that area (white area in the background, or an area framed in red for Arm1 to 4 or Arm1 to 3).



With the cursor being displayed, touch **Keyboard** button to show the touch panel numeric keys to input L/R, or input it on the hardware function keys.

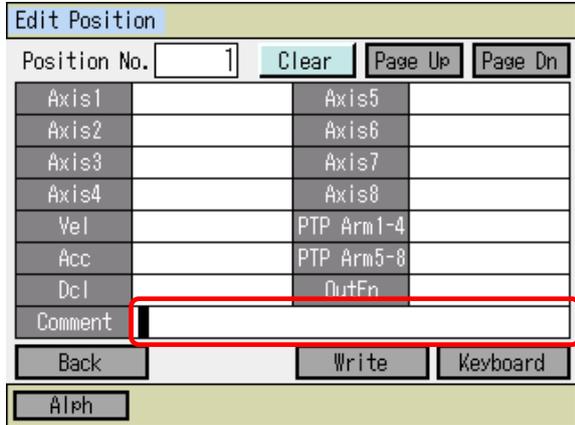


When you want to input Left (left arm), touch **Keyboard** button to show the touch panel numeric keys, and touch **L** **ENT** on the touch panel numeric keys.

When you want to input Right (right arm), touch **R** **ENT**, and when you delete what is input, touch **CLR** **ENT**.

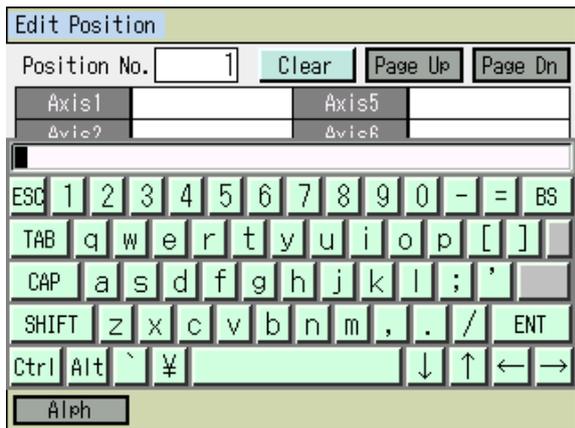
[Input Comment]

\* Function dedicated only for XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD  
 Have the cursor displayed in the comment input box. To show the cursor, touch the white area in the background beside "Comment" (an area framed in red).

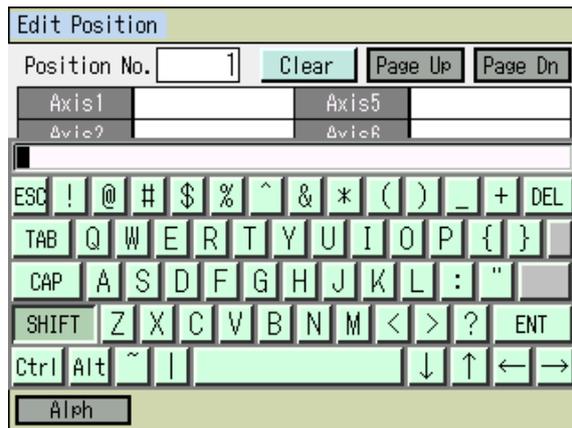


With the cursor being displayed, touch **Keyboard** button to show the touch panel keyboard to input words.

When you want to use the hardware keys for input, letters on the top of a hardware numeric key is what is to be input. If you look at the hardware numeric key **7**, the letters change in order of A-B-C-a-b-c. Press **↵** key on a letter that you desire to confirm. When you want to change the input letter to a number, press **F1** key and then press a number key on the hardware numeric keys.



Initial Screen



SHIFT key being touched

Use the keyboard shown in the figure above to input a comment. When you want to input a capital letter, either touch **SHIFT** key or touch **CAP** key to show the capital letters. (Figure on top right) **SHIFT** key gets released every time after a letter is input while **CAP** key is remained on until it is touched again. Touch **ENT** or **TAB** key to confirm the letter you have input.

Operation of Special Function Keys out of Letters

- ESC** Cancels what was input and clear all the input conditions. When nothing is input, they keyboard closes by touching this key.
- BS** It deletes a letter in front of the cursor. When nothing is input, all letters are deleted.
- DEL** It deletes letters on the cursor.
- TAB** It confirms the input letters and closes the keyboard.
- ←** It moves the cursor one step to the left.
- It moves the cursor one step to the right.
- ↑** It moves the cursor one step to the left.
- ↓** It moves the cursor one step to the right.
- SHIFT** It converts the letters on the keyboard to capital letters. It is released by inputting one letter or touching **SHIFT** again.
- CAP** It converts the letters on the keyboard to capital letters. Touch **CAP** again and it is released.
- ENT** It confirms the input letters and closes the keyboard.

[Position Output Operation Data Input]

\* Feature available only when position output operation feature is valid

Place the cursor on the output function box. To place the cursor, touch the blank area with white background (area marked with red highlight) beside "OutFn".

If the cursor is placed in the output function box, F2 (Cfg.OutFn) will be displayed in the function key. Press **F2** (Cfg.OutFn) key.

Select the output functions. Either touch the radio button you would like to select (figure in left, area marked with red highlight) or input with using the hardware function keys.

Input Output Ports / Flag Numbers, Parameter1 and Parameter2. Touch an input part where you would like to input contents (area marked with red highlight for Output Ports / Flag Numbers) to show the cursor.

Input numbers either by touching the **Keyboard** button with the cursor being displayed to show the touch panel numeric keys, or by inputting with hardware numeric keys.

Output Operation Data Setting

Function    Invalid   ON    OFF  
                   OND    OFFD  
                   ONR    OFFR

Output Port / Flag No.   

Parameter1   

Parameter2   

OK    CANCEL

Invalid   ON   OFF   OND   ->

When you would like to input 331 in Output Ports / Flag Numbers, touch the **Keyboard** button to show the touch panel numeric keys and touch **3 3 1 ENT** on the touch panel numeric keys.

Output Operation Data Setting

Function    Invalid   ON    OFF  
                   OND    OFFD  
                   ONR    OFFR

Output Port / Flag No.   

Parameter1   

Parameter2   

OK    CANCEL    Keyboard

Invalid   ON   OFF   OND   ->

If the data is received properly, the screen goes back to the position output operation data setting window, and the cursor moves to the input area for the next item.

Touch the **OK** button after all the necessary items are input. The screen goes back to the previous window. Touch the **CANCEL** button when you wish to cancel the inputs.

Edit Position

Position No.        Clear    Page Up    Page Dn

Axis1		Axis5	
Axis2		Axis6	
Axis3		Axis7	
Axis4		Axis8	
Vel		PTP Arm1-4	
Acc		PTP Arm5-8	
Dcl		OutFn	ON
Comment			

Back    Write    Keyboard

Cfg.OutFn    Clear

The selected output functions will be displayed in the output function column (OutFn).

[Data Transfer]

Edit Position			
Position No.	1	Clear	Page Up Page Dn
Axis1	100,000	Axis5	
Axis2		Axis6	
Axis3		Axis7	
Axis4		Axis8	
Vel		PTP Arm1-4	
Acc		PTP Arm5-8	
Dcl			
Comment			
Back	Write	Keyboard	
Clear			

After data input is complete, either touch **Write** button on the touch panel or press **WRT** key on the hardware keys to transfer the data to the controller.

Edit Position			
Position No.	2	Clear	Page Up Page Dn
Axis1		Axis5	
Axis2		Axis6	
Axis3		Axis7	
Axis4		Axis8	
Vel		PTP Arm1-4	
Acc		PTP Arm5-8	
Dcl			
Comment			
Back	Write	Keyboard	
Clear			

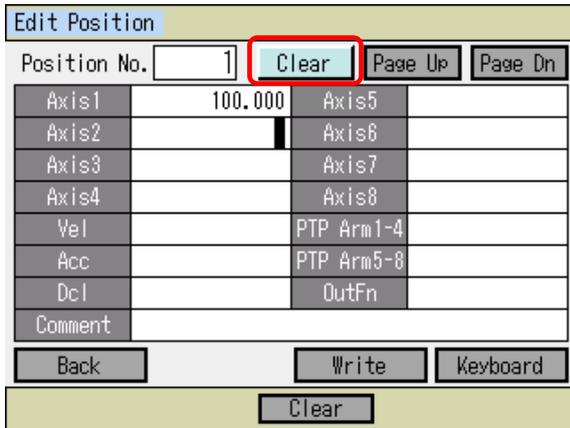
Once the transfer to the controller is complete, the position number gets incremented and the next data input screen is shown.

9. Position Edit

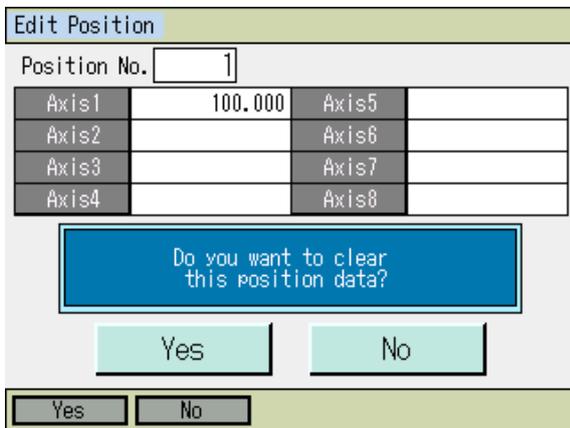
Only transferring the data to a controller by touching **Write** button or pressing **WRT** key will lose the edit data when the power gets rebooted or the software reset is conducted\*1. Go back from the position edit screen to the flash ROM writing screen by using **Back** button or **ESC** key, and have 9.1.2 Flash ROM Writing conducted.

(\*1 Except for controllers which possess feature to retain data)

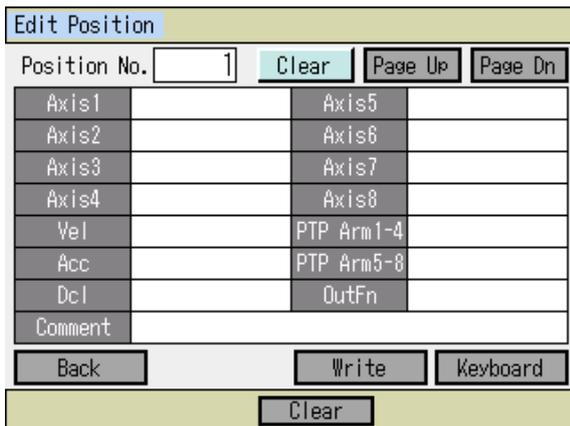
[Data Clear]



When you want to delete the data in the position number being displayed, touch **Clear** button in the touch panel, or press **F3** (Clear) key on the hardware keys.



Press **Yes** button in the touch panel or press **F1** (Yes) key on the hardware keys to transfer the data to the controller.



Once the clear is succeeded, the data in the same position number (after cleared) is displayed.

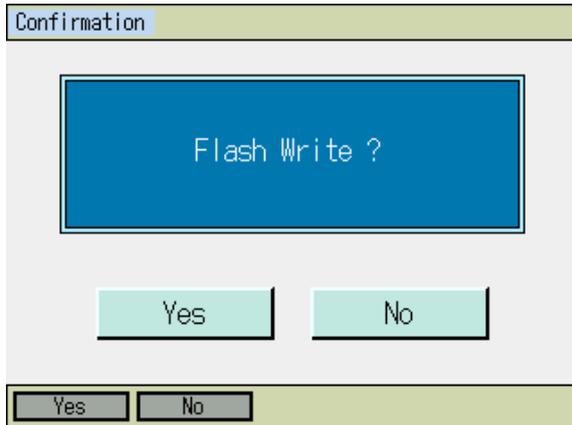
Only transferring the data to a controller by having the clear process will lose the edit data when the power gets rebooted or the software reset is conducted\*1. Go back from the position edit screen to the flash ROM writing screen by using **Back** button or **ESC** key, and have 9.1.2 Flash ROM Writing conducted.

(\*1 Except for controllers which possess feature to retain data)

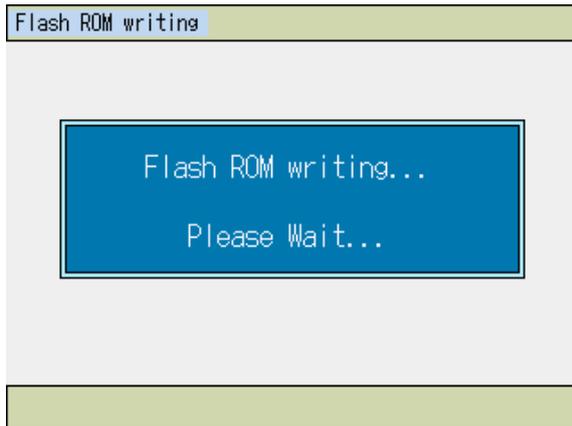
### 9.1.2 Flash ROM Writing

The edit data will be cleared by restoring the power and executing software reset, only if the position edit data was transmitted to the controller.

To save the data after restoring the power and executing software reset, write the data to Flash ROM. From the final editing screen, return to the Flash ROM writing screen with the **ESC** key or **Back** button.

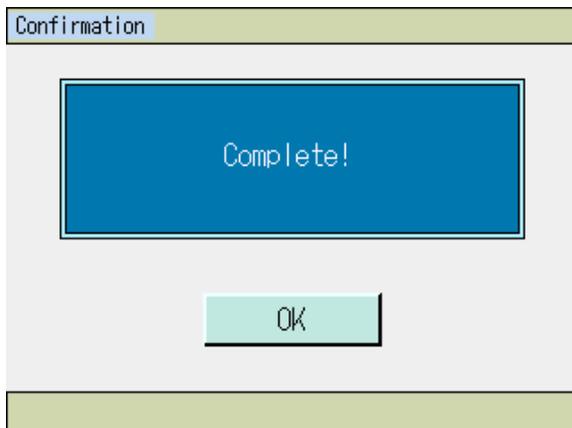


To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key. If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

***Never turn off the power to the Controller at this time.***



Flash ROM writing is completed. Either touch **OK** button or press **ESC** key to return to the edit menu screen.

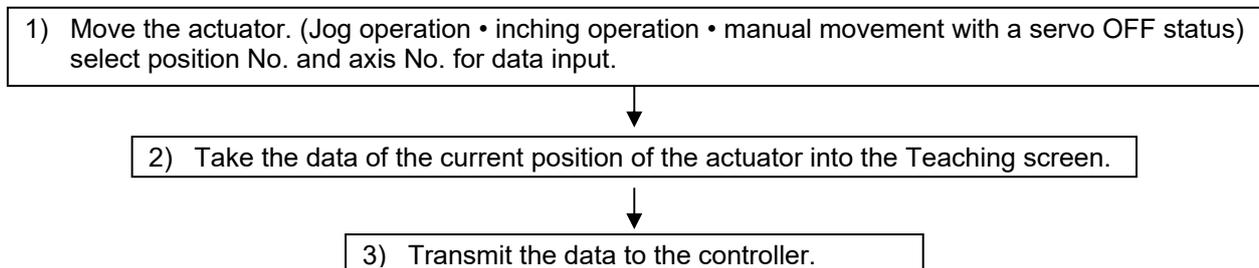
## 9.2 Teaching of the Orthogonal Axis: XSEL-J/K, P/Q, or 5th and 6th Axes of XSEL-PX/QX Controller, XSEL-R/S, or 5th to 8th Axes of XSEL-RX/SX Controller, XSEL-RA/SA, or 5th to 8th Axes of XSEL-RAX/SAX Controller, Additional Axes on 3-axis SCARA Type MSEL-PCX/PGX Controller, MSEL-PC/PG/PCF/PGF, TT, TTA, SSEL, ASEL or PSEL Controller

### 9.2.1 Teaching

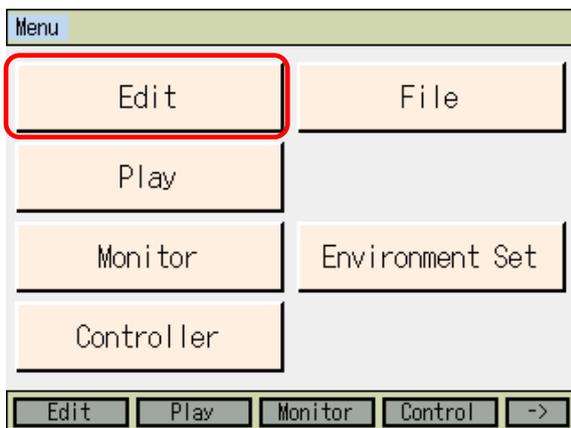
Teaching is one way to input position data (moving the actuator to an arbitrary position and getting that actuator's current position as data).

Methods for moving the actuators to an arbitrary position are the jog operation, inching operation, and manual movement (direct teaching) with a servo OFF status.

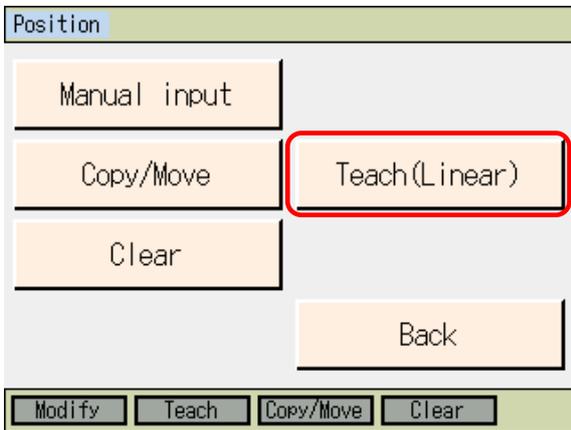
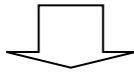
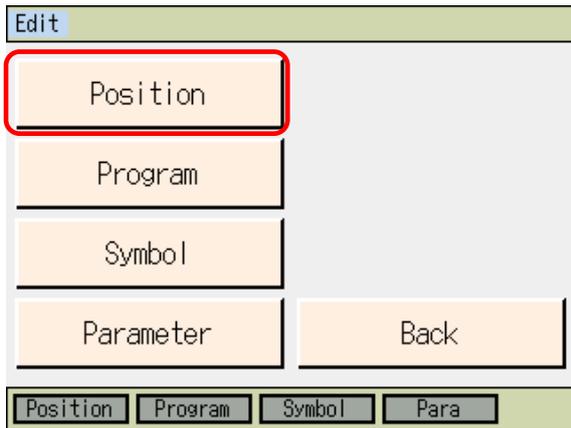
The fundamental flow of teaching is as follows:



Input the position data by teaching and repeating 1) to 3).  
Teaching is transacted mainly at the Teaching screen.



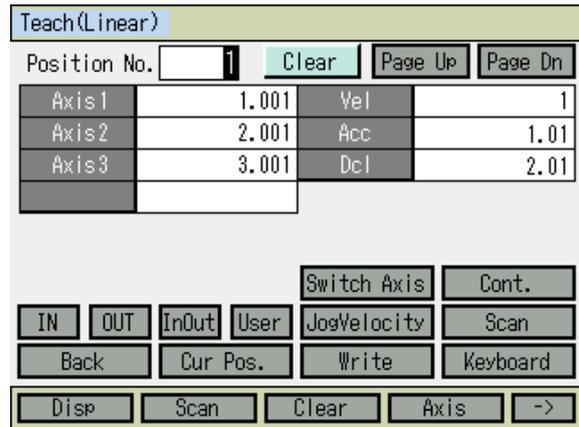
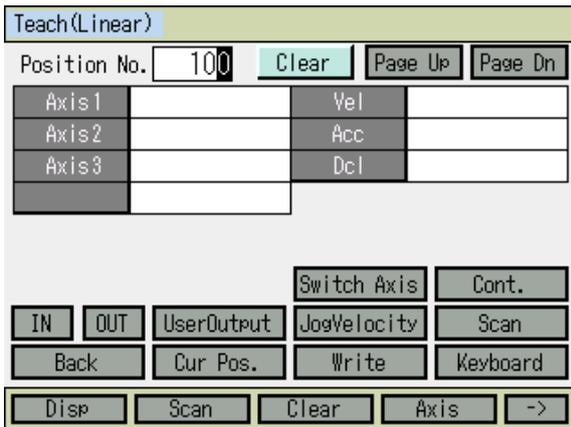
Touch **Edit** in the Menu screen or press **F1** (Edit) key.



Touch **Position** button on the Edit screen or press **F1** (Position) key.

\* Example shown on the left is for XSEL-J/K, P/Q, R/S, RA/SA, TT, TTA, SSEL, ASEL, PSEL and MSEL-PC/PG/PCF/PGF.

Touch **Teach (Linear)** button in Position menu screen, or press **Teach** or **TeachL** keys. (To show **TeachL**, press **SF** key.)



For Input and Output Ports

Explanation for each Display Area

- Position No. : Currently displayed position number
- Axis1-4 : Position data for Axes 1 to 4 (There are also Axes 5 to 6 for XSEL-PX/QX Controllers, Axes 5 to 8 for XSEL-R/S, RX/SX, RA/SA and RAX/SAX Controllers and Axis 4 for MSEL-PCX/PGX Controllers) (Figure above is an image for 3-axis type)
- Vel : Velocity
- Acc : Acceleration
- Dcl : Deceleration

Explanation for each Touch Panel Button (Function Key)



- Current Position: F1 (Disp) : Switch the input data screen to the current position display.
- Load : F2 (Scan) : Current position is loaded to the screen. When the cursor is in Axes1 to 4 (Axis5 to 8), the axis the cursor is on is loaded, and all the axes are loaded when the cursor is on an axis out of Axis 1 to 4 or the cursor is not displayed. (For 8 axes for XSEL-R/S and RA/SA)
- Clear : F3 (Clear) : It clears all the axes data in the displayed position number.
- Axis Switchover: F4 (Axis) : Switch the 1st to 4th axes display screen to the 5th to 8th axes display screen (Effective for 5 axes or more) For (3-axis SCARA type). MSEL-PCX/PGX, the display switches over to the SCARA axes screen.



- Continuous Operation: F1 (Cont) : Execute continuance operation.
- Jog Velocity : F2 (JVel) : Set the jog velocity, etc.
- IN : F3 (In) : Monitor the input port.
- OUT : F4 (Out) : Monitor the output port.

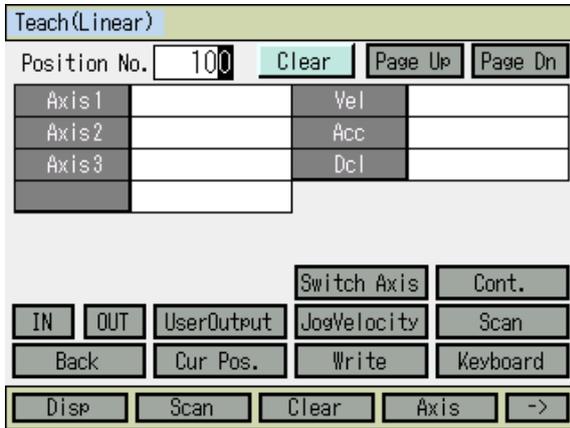


Use: F2 (UserOut): Turn ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to preset the I/O parameters No. 74 and No. 75.)



For models applicable for input and output ports  
 InOut: F1 (InOut) : Input and output ports are monitored.  
 User : F2 (UserOut): Turn ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to preset the I/O parameters No. 74 and No. 75.)

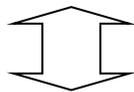
For incremental encoder specification, it is required to execute homing after supplying power or software reset before you start teaching.



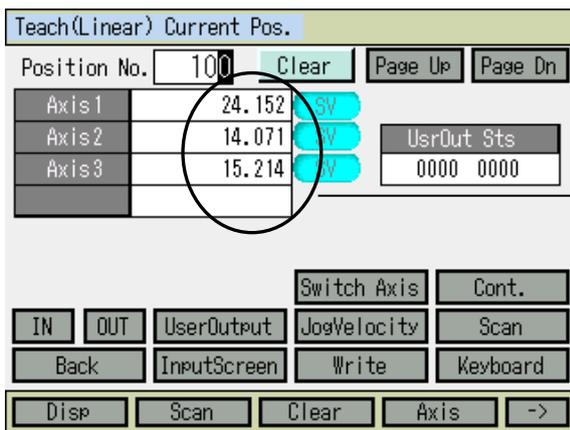
Turn the servo ON condition by pressing the **SERVO** key and then the **ALL+** key in the Teaching screen condition.

To check if servo is turned ON or OFF, either touch **Cur Pos.** button or press **F1** (Disp) key.

Press **HOME** key, and then press **ALL+** or **ALL-** to start home-return operation on all the axes.

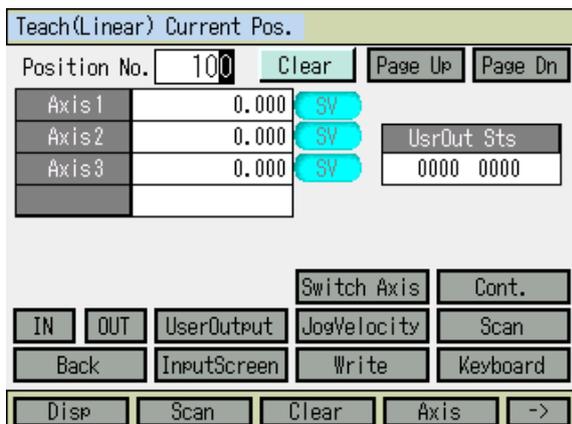


**F1** (Disp) key or **Cur Pos.** (InputScreen) Button



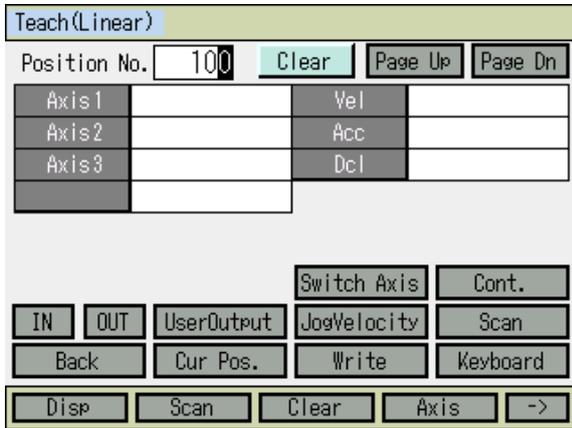
The data of the current position screen before homing doesn't have meaning.

9. Position Edit



After homing is complete, execute teaching.

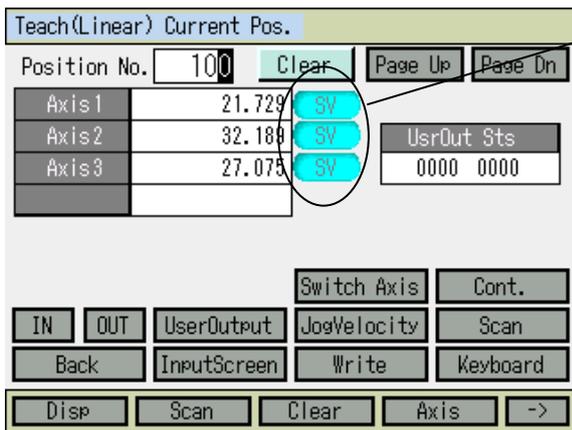
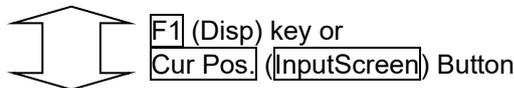
(1) Movement of an actuator  
1) Jog Operation



Turn the servo ON condition by pressing the **SERVO** key and then the **ALL+** key in the Teaching screen condition.

Execute the all-axis servo OFF command when there is any axis in the servo ON status, and execute the all-axis servo ON command when all axes are in the servo OFF status.

To check if servo is turned ON or OFF, either touch **Cur Pos.** button or press **F1** (Disp) key to show the current position display.



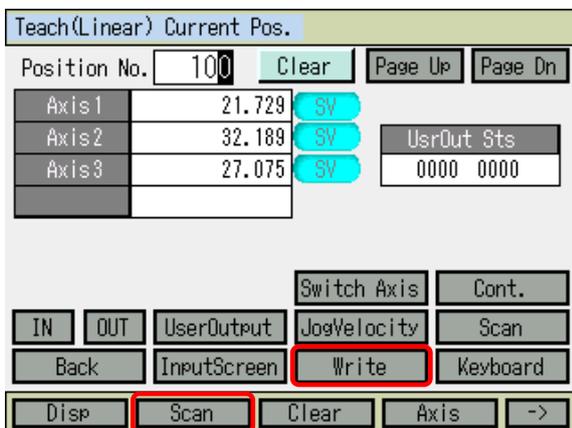
Servo Status  
Light Blue: Servo ON, Black: Servo OFF

Press the **1-**, **1+**, **2-**, **2+**, **3-**, **3+**, **4-** and **4+** keys to move the actuator to a designated position. (1 to 4 indicate axis No. and + represents plus direction [forward] while - represents minus direction [backward].)

To execute jog operation for the 5th and 8th axes, press the **F4** (Axis) key to switch the display to the 5th and 8th axes data display screen.

- 1+**: Plus direction for the 5th axis,
- 1-**: Minus direction for the 5th axis,
- 2+**: Plus direction for the 6th axis,
- 2-**: Minus direction for the 6th axis,
- 3+**: Plus direction for the 7th axis,
- 3-**: Minus direction for the 7th axis,
- 4+**: Plus direction for the 8th axis,
- 4-**: Minus direction for the 8th axis.)

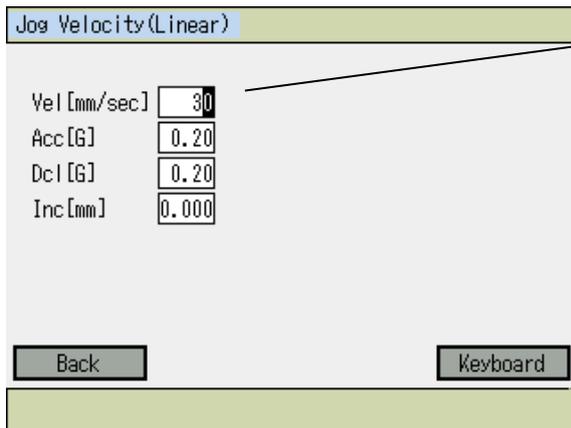
(The above diagram is 3 axes specification; Press valid jog keys are **1+** **1-** **2+** **2-** **3+** **3-**.)



Changing the Jog Velocity

Change the actuator's moving velocity at the time of the jog operation.

Touch **JogVelocity** button in Teaching screen or have 'JVel' (Jog Velocity) displayed in the function key box and press the applicable function key. (Depending on the screen condition, you need to press **SF** key to display 'JVel'.)



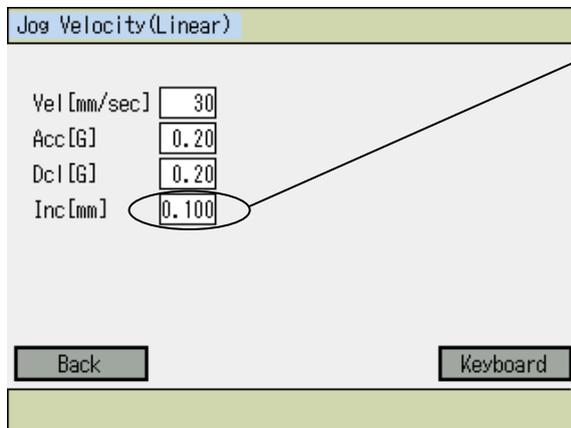
Jog velocity

Input Vel (velocity), Acc (acceleration), and Dcl (deceleration) at the time of the jog operation with the numeric keys and press the return key. Set Inc (inching distance) 0.000. (To open the touch panel numeric keys, touch **Keyboard** button.)

You can also set the inching distance from this screen.

Either touch **Back** button or press **ESC** key to return to Teaching screen to conduct the jog operation.

## 2) Inching Operation



Inching distance

Set the inching distance. (the moving distance each time pressing jog key.) In the jog velocity change screen, input a number in Inc (Inching Distance) with the numeric keys and press the return key. (To open the touch panel numeric keys, touch **Keyboard** button.)

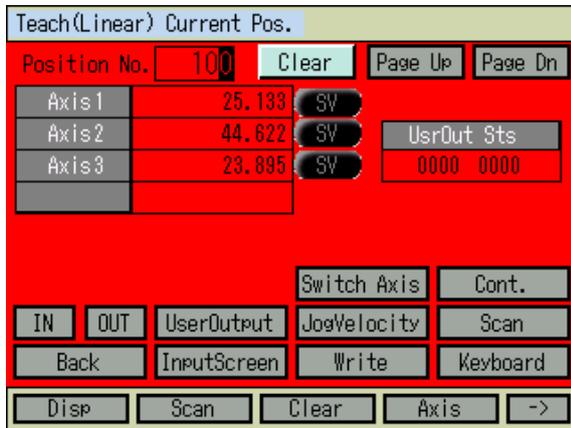
Value input range is 0.001 to 1.000 [unit: mm].

Either touch **Back** button or press **ESC** key to return to Teaching screen to conduct the inching operation.

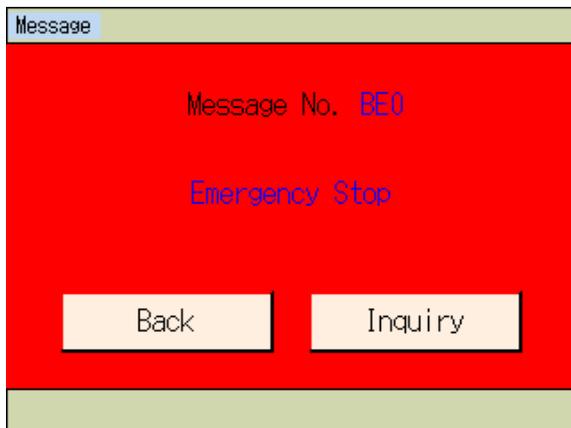
Press the jog key once and the actuator moves for the distance of 1 inching. Press **1+** to **4+** keys to perform inching movement in the positive direction of the coordinate and **1-** to **4-** to perform inching in the negative direction.

Pressing and holding the jog key changes to jog operation. In approximately 1.6 seconds after the jog key is pressed, inching operation changes to jog operation and further continuing to press the key changes the jog velocity per second as follows: 1→10→50→100 [mm/sec].

### 3) Manual Movement with Servo OFF Status (Direct Teaching)



In the teaching screen, press **SERVO** key and then press **ALL-** key to turn the servo OFF. To check if servo is turned ON or OFF, either touch **Cur Pos.** button or press **F1** (Disp) key. Move the actuators to the designated position via manual mode. (The background color in the screen turns to red during the emergency stop.)



Pressing the EMERGENCY STOP button switches the display to the emergency stop screen.

Either touch **Back** button or press **ESC** key to return to Teaching screen.

**Warning:**  
Be sure to execute manual movement when the EMERGENCY STOP button is pressed.

(2) Take in the current position as a data

The determined actuator position is uploaded to the teaching screen as the position data.

Teach(Linear)				
Position No.	100	Clear	Page Up	Page Dn
Axis1		Vel		
Axis2		Acc		
Axis3		Dcl		
		Switch Axis	Cont.	
IN	OUT	UserOutput	JogVelocity	Scan
Back	Cur Pos.	Write	Keyboard	
Disp	Scan	Clear	Axis	->

Touch in the position number input box to show the cursor and input a value either on the hardware numeric keys or touch panel numeric keys. (Touch panel numeric keys can be shown by touching **Keyboard** button.)

Or, select the position number to load the data from by touching **Page Up** and **Page Dn** buttons or using **PAGE UP** and **PAGE DOWN** keys.

Teach(Linear)				
Position No.	100	Clear	Page Up	Page Dn
Axis1	25.133	Vel		
Axis2		Acc		
Axis3		Dcl		
		Switch Axis	Cont.	
IN	OUT	UserOutput	JogVelocity	Scan
Back	Cur Pos.	Write	Keyboard	
Disp	Scan	Clear	Axis	->

When the cursor is placed in the axis box, press **F2** (Scan) key or touch **Scan** button to load the current position data of the axis that the cursor is placed on. Press **F2** (Scan) key or touch **Scan** button when the cursor is not shown or placed in an area other than the axis box, the current position data of all the axes is loaded.

### (3) Transmit to the Controller

Transmit the taken-in data to the controller.

Teach(Scara)			
Position No.	100	Clear	Page Up Page Dn
Axis1	39.183	Vel	
Axis2		Acc	
Axis3		Dcl	
Axis4		Arm	
Arm: Right	Chg	Jump: OFF	Chg Crd. Sys
Jog Crd sys: W 0	Chg	Switch Axis	Cont.
IN	OUT	UserOutput	JVel MVel Scan
Back	Cur Pos.	Write	Keyboard
Disp	Scan	Clear	Jog Crd ->

In Teaching screen, either touch **Write** button or press **WRT** key.

The loaded data is stored in the memory in the controller. Once the transfer to the controller is complete, the position number is incremented by one.

The data available to transfer to the controller is one position data that is being displayed. It is not possible to transfer the data of more than one position number at a time.

Teach(Linear)			
Position No.	101	Clear	Page Up Page Dn
Axis1		Vel	
Axis2		Acc	
Axis3		Dcl	
		Switch Axis	Cont.
IN	OUT	UserOutput	JogVelocity Scan
Back	Cur Pos.	Write	Keyboard
Disp	Scan	Clear	Axis ->

If the screen is switched with touching **Page Up** or **Page Dn**, or using **PAGE UP**, **PAGE DOWN** or **ESC** key before the data is transferred, the input data will become invalid.

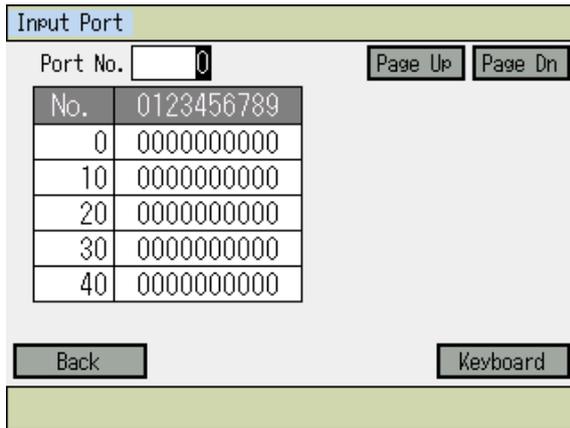
(4) I/O Monitor • Position Confirmation

During teaching operation, you can monitor various ports. You can also confirm the location by moving an actuator to a to the location of the position data with teaching.

1) Input/Output Monitor

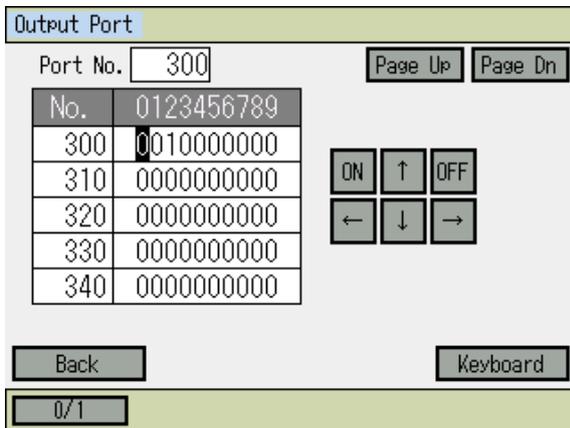
Either touch **IN** or **OUT** button in Teaching screen or select “In” or “Out” in the function keys. For models applicable for input and output ports, monitoring of the input and output ports is available by either touching **InOut** button or selecting **InOut** in the function keys.

Input Port



No.	0123456789
0	0000000000
10	0000000000
20	0000000000
30	0000000000
40	0000000000

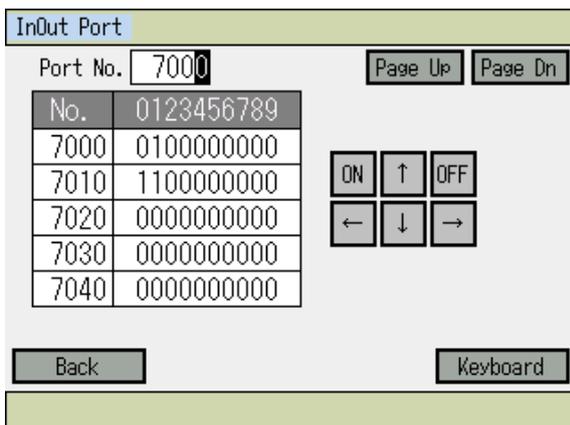
Output Port



No.	0123456789
300	0010000000
310	0000000000
320	0000000000
330	0000000000
340	0000000000

Either touch **ON** or **OFF** button or press **F1** key to switch ON/OFF (1/0) the output port on the cursor position. (For **F1** key, the port is switched ON and OFF (1/0) every time the key is pressed.)

Input/Output Port (for applicable models)

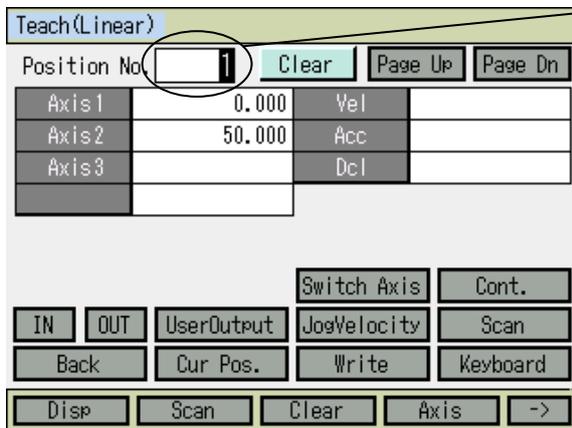


No.	0123456789
7000	0100000000
7010	1100000000
7020	0000000000
7030	0000000000
7040	0000000000

The way to operate is the same as the output port.

## 2) Moving

Move the actuator to the location of the position data transmitted to the controller.



Teach(Linear)			
Position No.	1	Clear	Page Up Page Dn
Axis 1	0.000	Vel	
Axis 2	50.000	Acc	
Axis 3		Dcl	

Buttons: IN, OUT, UserOutput, JogVelocity, Scan, Switch Axis, Cont., Back, Cur Pos., Write, Keyboard, Disp, Scan, Clear, Axis, ->

Position No. to move

Select position No. to move in the Teaching screen condition.

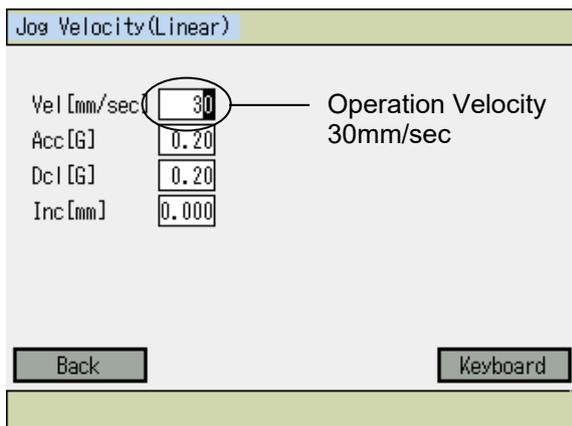
Press **SERVO** key and then press **ALL+** key to turn the servo ON.

To check if servo is turned ON or OFF either touch **Cur Pos.** button or press **F1** (Disp) key.

The actuator starts moving by pressing the **MOVE** key and then the **ALL+** or **ALL-** key, in the case of all-axis movement. Press the **1-**, **1+**, **2-**, **2+**, **3-**, **3+**, **4-** and **4+** keys in the case of each axis movement.

To stop movement halfway, press the **STOP** key.

To check or change the operation velocity, either touch **JogVelocity** button or press **F2** (JVel) key. (When JVel is not shown on **F2**, use **SF** key to make it appear.)



Jog Velocity(Linear)	
Vel [mm/sec]	30
Acc [G]	0.20
Dcl [G]	0.20
Inc [mm]	0.000

Buttons: Back, Keyboard

Touch **Keyboard** button to show the touch panel numeric keys. (When cursor is not in Vel box, touch Vel box to make the cursor appear.) Input the change data on the numeric keys, and touch **ENT**.

(Hardware numeric keys are also available for input.)

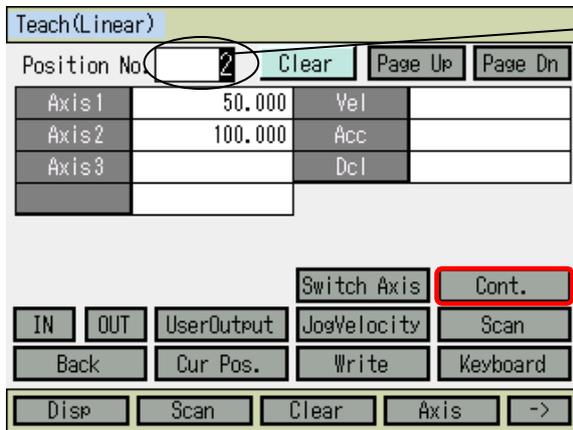
After changing, touch **Back** button or press **ESC** key.

If the velocity, acceleration and deceleration are set in the position data, these settings are prioritized.

Priority: Parameter < JVel < Position Data

### 3) Continuous movement

Move the actuator continuously to the location of the position data transmitted to the controller.



Position No. you'd like to move first

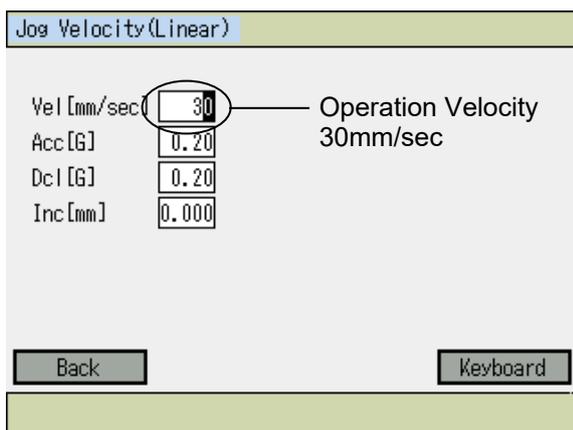
In Teaching screen, select the position number to operate first.

Press **SERVO** key and then press **ALL+** key to turn the servo ON.

To check if servo is turned ON or OFF, either touch **Cur Pos.** button or press **F1** (Disp) key.

Touch **Cont.** button or press **F1** (Cont) key. (When Cont is not shown on **F1**, use **SF** key to make it appear.)

To check or change the operation velocity, either touch **JogVelocity** button or press **F2** (JVel) key. (When JVel is not shown on **F2**, use **SF** key to make it appear.)



Touch **Keyboard** button to show the touch panel numeric keys. (When cursor is not in Vel box, touch Vel box to make the cursor appear.) Input the change data on the numeric keys, and touch **ENT**.

(Hardware numeric keys are also available for input.)

After changing, touch **Back** button or press **ESC** key.

If the velocity, acceleration and deceleration are set in the position data, these settings are prioritized.

Priority: Parameter < JVel < Position Data

Teach(Linear) Current Pos.	
Position No.	3 Clear Page Up Page Dn
Axis1	25.373 SY
Axis2	45.009 SY
Axis3	23.850 SY
	UsrOut Sts 0000 0000
Switch Axis Cont. IN OUT UserOutput JogVelocity Scan Back InputScreen Write Keyboard Disp Axis	

The actuator (in all axes) starts continuous movement by pressing the **MOVE** key and then the **ALL+** or **ALL-** key, in the case of all-axis movement. Press the **1-**, **1+**, **2-**, **2+**, **3-**, **3+**, **4-** and **4+** keys in the case of each axis movement. During continuous movement, the display changes to the current position display. To stop, press the **STOP** key.

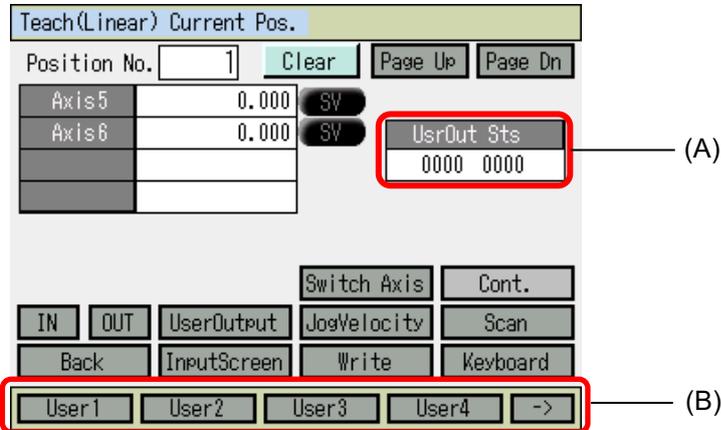
To restart continuous movement, press the **MOVE** key.

**Caution:**  
 Please note that it may take a few seconds before movement start after the **ALL+** or **ALL-** key are pressed. (The time elapsed until movement start varies according to the number of registered position data.)  
 If **ESC** key is pressed before the continuous operation starts, the operation start will be cancelled.

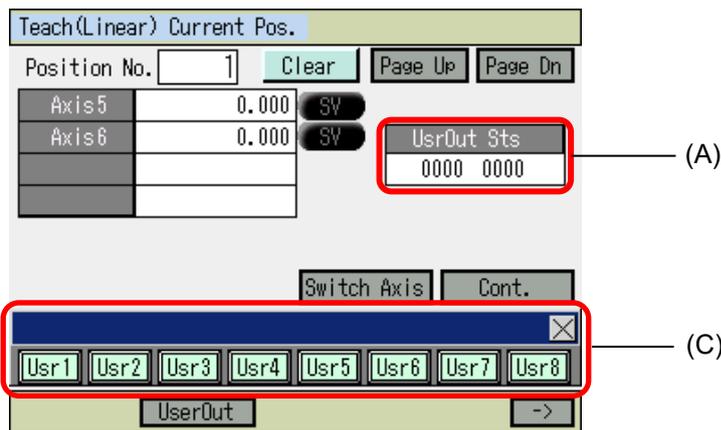
(5) User-specified output port operation

The output ports set for the parameter can be easily turned ON/OFF.

Teaching screen or select **UserOutput** button or **UserOut** in the function keys.



When function key (UserOut) is pressed



When **UserOutput** button is touched

(A) User-specified output port status

The conditions of user-specified output ports are displayed as '1' (=ON) and '0' (=OFF).

(The conditions are displayed from the first specified port for the number of specified ports from the left.)

(B) Function for operation of user-specified output ports

This is the function for ON/OFF operation of user-specified output ports.

Assignment is made for the number of specified ports in the order of 'Usr1', 'Usr2', 'Usr3' ... from the top of the user-specified output ports.

('Usr1' to 'Usr4' and 'Usr5' to 'Usr8' are changed with the **SF** key.)

ON/OFF operation can be performed for each output port by pressing the function keys (**F1** to **F4**) corresponding to 'Usr1' to 'Usr4' and 'Usr5' to 'Usr8'.

(Port ON Command is executed when the port status display is '0' (OFF) and Port OFF Command when the status display is '1' (ON)).

When you return to the standard functions, press **ESC** key.

(C) User-Specified Output Port Operation Panel Window

It is a panel window to perform the operation to turn ON/OFF the user-specified output ports. Assignment is made for the number of specified ports in the order of 'Usr1', 'Usr2', 'Usr3' ... from the top of the user-specified output ports.

By touching a Usr1 to Usr8 buttons, an operation can be performed to turn each output port ON/OFF.

(Port ON Command is executed when the port status display is '0' (OFF) and Port OFF Command when the status display is '1' (ON).

To close this panel window, touch X on the top right or press ESC key.

1) Setting of user-specified output port parameters

For the operation method for parameter setting, refer to "14. Parameter Edit."

The first port No. and the number of ports are set with the following parameters:

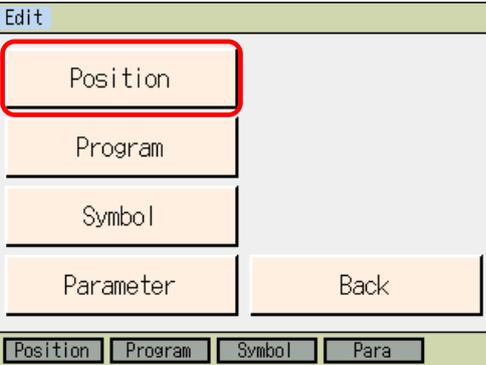
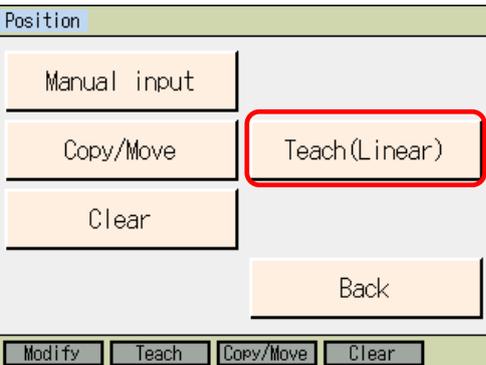
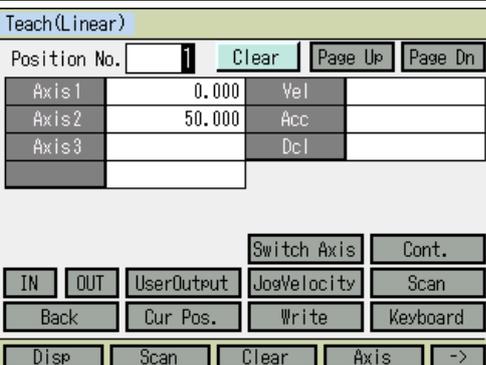
- Number of ports  
I/O parameter No. 74 "QntPrtUsrOut" (Number of output ports used by TP user (hand, etc.))
- First port No.  
I/O parameter No. 75 "TopNo.UseOut" (First output port No. by TP user (hand, etc.))

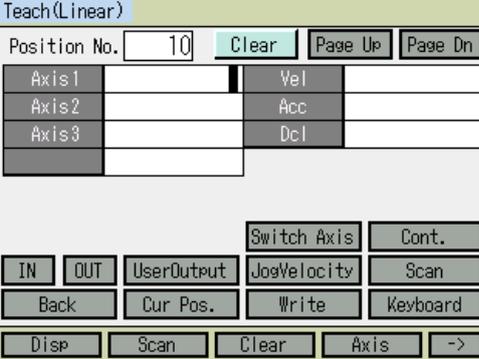
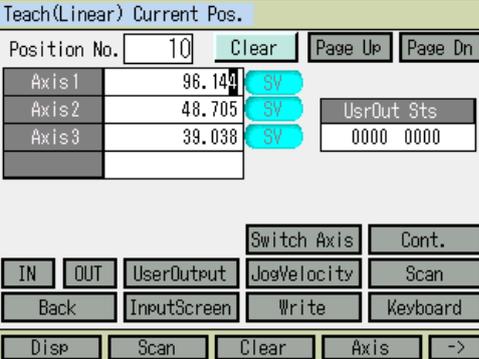
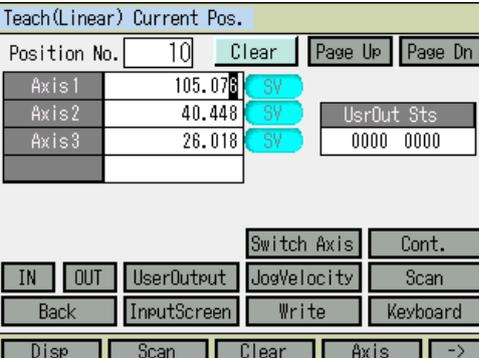
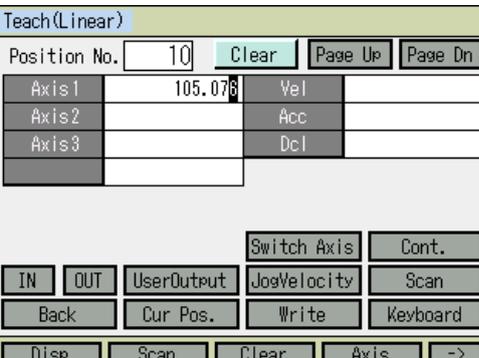
(Setting example) When the first port No. is set to 308 and the number of ports is set to 8:

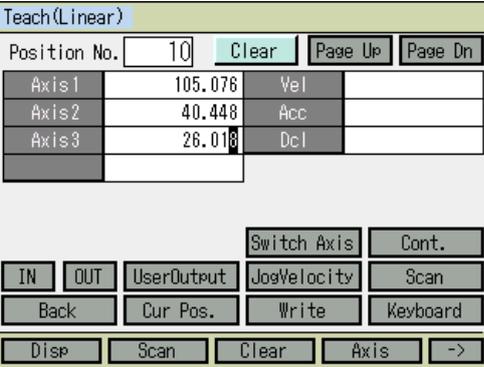
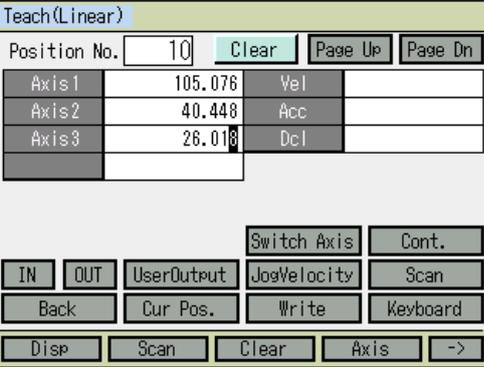
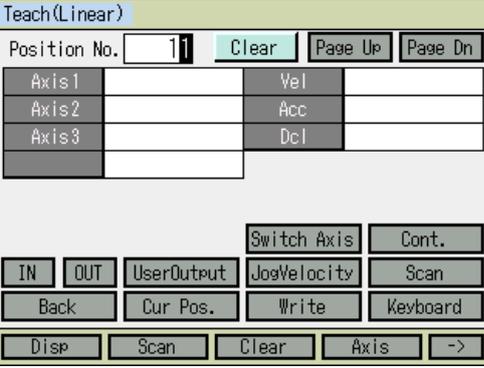
'Usr1'	<span style="border: 1px solid black; padding: 0 2px;">F1</span> key)	.....	Output port 308
'Usr2'	<span style="border: 1px solid black; padding: 0 2px;">F2</span> key)	.....	Output port 309
'Usr3'	<span style="border: 1px solid black; padding: 0 2px;">F3</span> key)	.....	Output port 310
'Usr4'	<span style="border: 1px solid black; padding: 0 2px;">F4</span> key)	.....	Output port 311
'Usr5'	<span style="border: 1px solid black; padding: 0 2px;">F1</span> key)	.....	Output port 312
'Usr6'	<span style="border: 1px solid black; padding: 0 2px;">F2</span> key)	.....	Output port 313
'Usr7'	<span style="border: 1px solid black; padding: 0 2px;">F3</span> key)	.....	Output port 314
'Usr8'	<span style="border: 1px solid black; padding: 0 2px;">F4</span> key)	.....	Output port 315

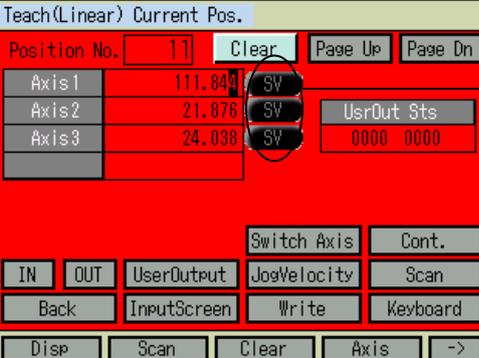
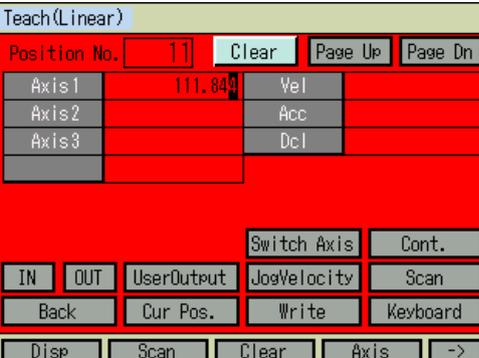
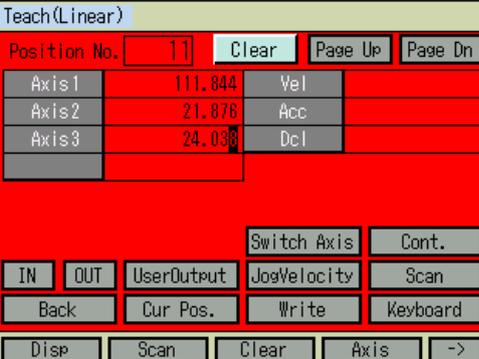
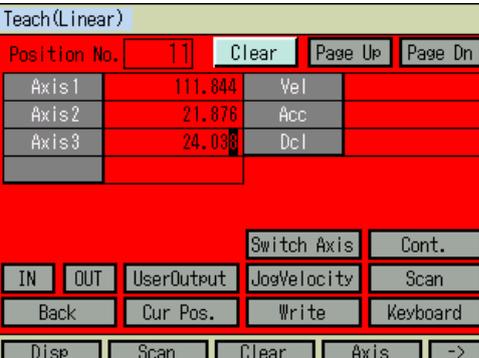
### 9.2.2 Example of Teaching Input

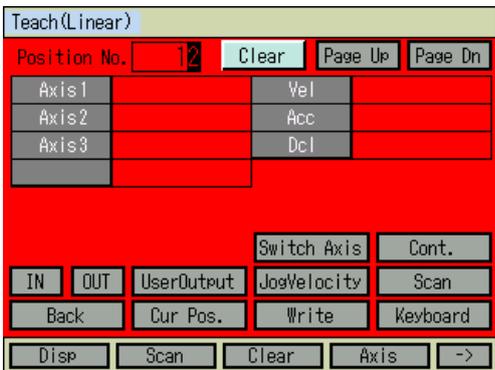
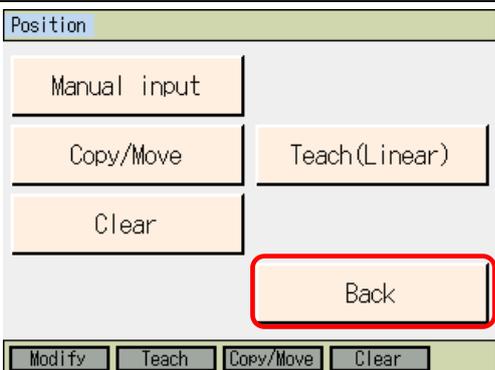
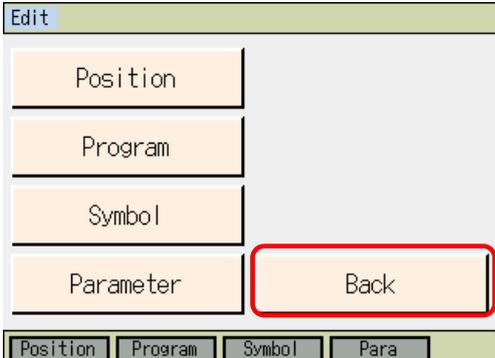
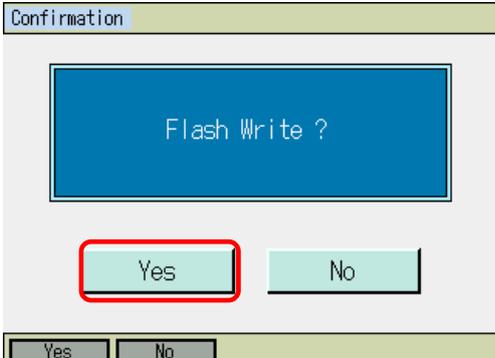
Entering the data into position No. 10 using the jog and into position No. 11 by manual movement (direct teaching) with Servo OFF status.

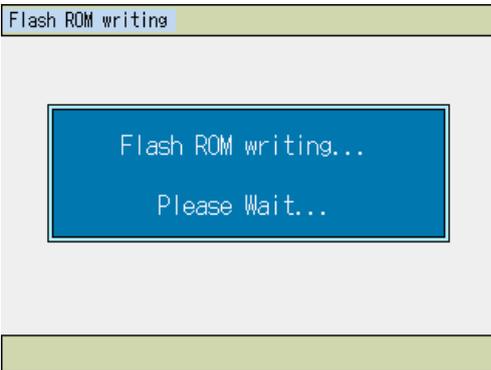
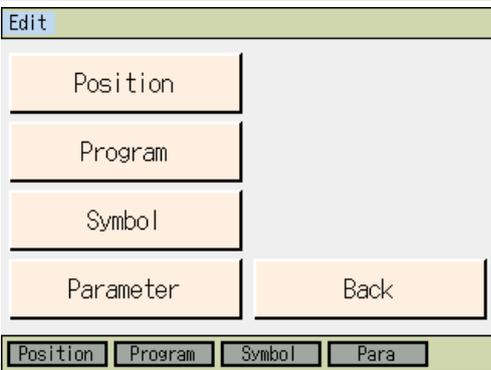
No.	Operation		
1	Touch <b>Edit</b> button. Or, Select the <b>F1</b> (Edit) key.		
2	Touch <b>Position</b> button. Or, Select the <b>F1</b> (Position) key.		
3	Touch <b>Teach(Linear)</b> button. Or, Select the <b>F2</b> (Teach) key.		For XSEL-PX/QX, RX/SX, RAX/SAX and MSEL-PCX/PGX press <b>SF</b> key to display <b>F1</b> (TeachL) and then press <b>F1</b> key.
4	Either use <b>Page Up</b> button and <b>Page Dn</b> button in the touch panel, or <b>PAGE UP</b> key and <b>PAGE DOWN</b> key in the hardware keys, or input "10" in the position number on the numeric key, and then touch <b>ENT</b> for confirmation.		

No.	Operation		
5	Press <b>SERVO</b> key and then press <b>ALL+</b> key to turn the servo ON.		
6	Press the jog keys <b>1-</b> , <b>1+</b> , <b>2-</b> , <b>2+</b> , <b>3-</b> and <b>3+</b> to move the robot to a desired position.		
7	Either touch <b>Scan</b> button or press <b>F2</b> (Scan) key to load the axis number current position where the cursor is to the input screen. Either touch <b>Cur Pos.</b> button or press <b>F1</b> (Disp) key to confirm that the data has been loaded.		
8	Press Return, touch in the input area for Axis2 to move the cursor to the next axis and touch <b>Scan</b> button, or press <b>F2</b> (Scan) key.		

No.	Operation		
9	Load the data also for the 3rd axis.		
10	Either touch <b>Write</b> button or press <b>WRT</b> key to transfer the position data to the controller. The position moves to No. 11.		If the screen is switched with <b>Page Up</b> button or <b>Page Dn</b> button before the data is transferred, the input data will become invalid.
11	Press <b>SERVO</b> key and then press <b>ALL</b> key to turn the servo OFF.		
12	Press the EMERGENCY STOP button. Either touch <b>Back</b> button or press <b>ESC</b> key to return to No. 11 screen.		<div style="border: 1px solid black; padding: 5px;">  <b>Warning:</b>                  Be sure to execute manual movement when the EMERGENCY STOP button is pressed.             </div> <p>To have manual operation on Z-axis, it is necessary to release the brake. As a result, the Z-axis may drop by the weight of such as a hand installed on the end when the brake is released. Do not attempt to conduct teaching manually on the Z-axis.</p>

No.	Operation		
13	<p>Either touch <b>Cur Pos.</b> button or press <b>F1</b> (Disp) key to confirm that the servo is OFF. Move each axis manually to a desired position.</p>		<p>Servo OFF</p> <p>It turns to light blue when the servo is turned ON.</p>
14	<p>Either touch <b>Scan</b> button or press <b>F2</b> (Scan) key to load the axis number current position where the cursor is to the input screen.</p>		
15	<p>Press Return, touch in the input area for Axis2 to move the cursor to the next axis and touch <b>Scan</b> button, or press <b>F2</b> (Scan) key. Load the data also for the 3rd axis in the same manner.</p>		
16	<p>Either touch <b>Write</b> button or press <b>WRT</b> key to transfer the position data to the controller. The position moves to No. 12.</p>		<p>If the screen is switched with <b>Page Up</b> button or <b>Page Dn</b> button before the data is transferred, the input data will become invalid.</p>

No.	Operation		
17	Finish the position data input with teaching. Touch <b>Back</b> button or press <b>ESC</b> key.		If the cursor is not in the position number, move to the position number with <b>ESC</b> key. Press <b>ESC</b> key again to return to the menu screen.
18	Touch <b>Back</b> button or press <b>ESC</b> key.		The figures shown hereafter are in the condition of the emergency stop being cancelled.
19	Touch <b>Back</b> button or press <b>ESC</b> key.		
20	To write the data to the flash ROM, touch <b>Yes</b> button or press <b>F1</b> (Yes) key. If writing is not necessary, touch <b>No</b> button or press <b>F2</b> (No) key.		

No.	Operation		
21	While in writing process to flash ROM, the display 'Flash ROM writing...' flashes.	 <p>The screenshot shows a light green header bar with the text 'Flash ROM writing'. Below it is a blue rectangular box containing the text 'Flash ROM writing...' and 'Please Wait...'. At the bottom of the screen is another light green bar.</p>	<b>Never shut off the power to the controller during Flash ROM writing.</b>
22	The flash ROM writing process is finished. Touch <b>OK</b> button or press <b>ESC</b> key. The screen returns to Edit menu.	 <p>The screenshot shows a light green header bar with the text 'Confirmation'. Below it is a blue rectangular box containing the text 'Complete!'. Below the box is a light green button with the text 'OK' outlined in red. At the bottom of the screen is another light green bar.</p>	
23		 <p>The screenshot shows a light green header bar with the text 'Edit'. Below it are four orange buttons: 'Position', 'Program', 'Symbol', and 'Parameter'. To the right of the 'Parameter' button is another orange button labeled 'Back'. At the bottom of the screen is a light green bar containing four smaller buttons: 'Position', 'Program', 'Symbol', and 'Para'.</p>	

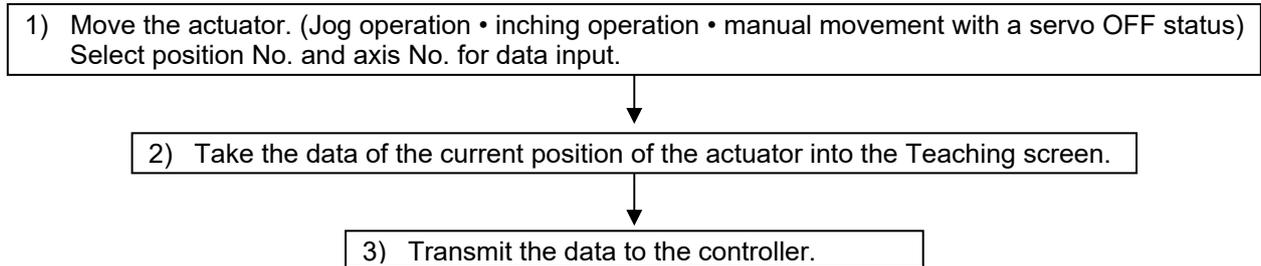
### 9.3 Teaching for SCARA axis: XSEL-JX/KX, PX/QX, or 1st to 4th Axes of XSEL-RX/SX, RAX/SAX Controller, 1st to 4th Axes or 5th to 8th Axes of XSEL-RXD/SXD, RAXD/SAXD Controller or 1 to 4 Axes on MSEL-PCX/PGX Controller (1 to 3 Axes for 3-axis SCARA Type)

#### 9.3.1 Teaching

Teaching is one way to input position data (moving the actuator to an arbitrary position and getting that actuator's current position as data).

Methods for moving the actuators to an arbitrary position are the jog operation, inching operation, and manual movement (direct teaching) with a servo OFF status.

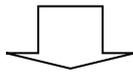
The fundamental flow of teaching is as follows:

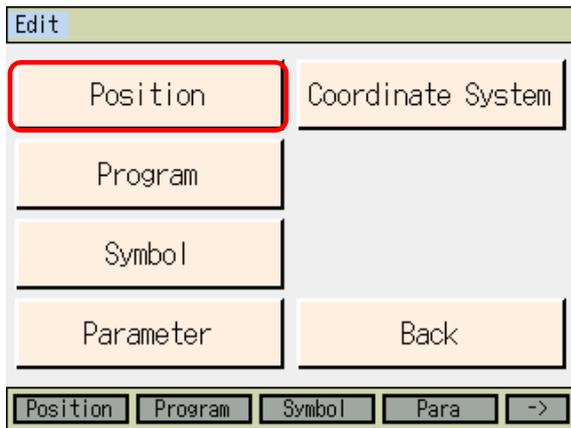


Input the position data by teaching and repeating 1) to 3).  
Teaching is transacted mainly at the Teaching screen.



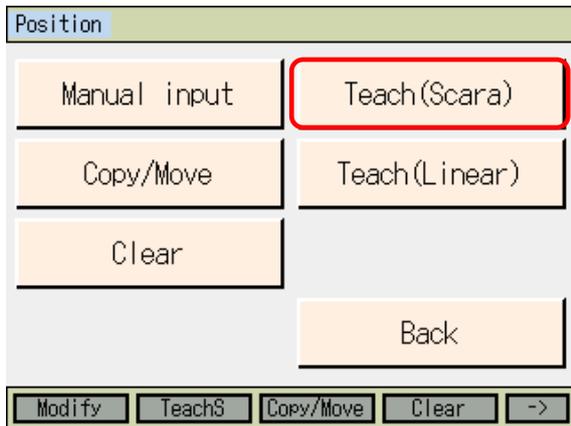
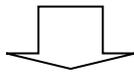
Touch **Edit** button in the Menu screen or press **F1** (Edit) key.



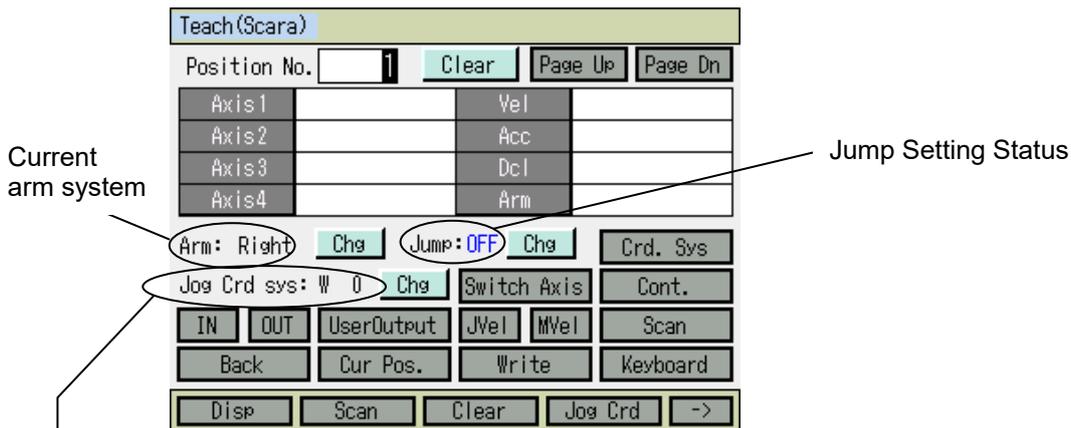


Touch **Position** button on the Edit screen or press **F1** (Position) key.

- \* Example shown on the left is for XSEL-JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX.
- \* There is no coordinate system buttons shown when a controller other than above is connected.



Touch **Teach(Scara)** button in Position menu screen, or press **Teach** or **TeachS** keys.

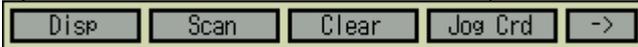


Coordinate system for jog operation  
 Wn: Work coordinate system  
     n: Work coordinate system No. (0: Base coordinate system)  
 Tn : Tool coordinate system  
     n: Tool coordinate system No.  
 A : Each axis system

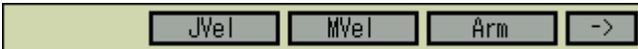
Explanation for each Display Area

- Position No. : Currently displayed position number
- Axis1-4 : SCARA Axis position data (There are also Axes 5 to 8 for XSEL-RXD/SXD, RAXD/SAXD Controllers and Axes 1 to 3 for 3-axis SCARA type MSEL-PCX/PGX Controllers)
- Vel : Velocity
- Acc : Acceleration
- Dcl : Deceleration
- Arm : Target Arm (for XSEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX Controllers only)

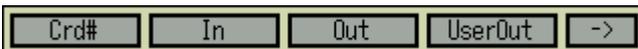
Explanation for each Touch Panel Button (Function Key)



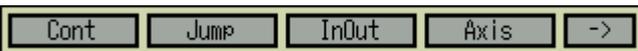
- Current Position : F1 (Disp) : Switch the input data screen to the current position display.
- Load : F2 (Scan) : Current position is loaded to the screen. When the cursor is in Axes1 to 4, the axis the cursor is on is loaded, and all the axes are loaded when the cursor is on an axis out of Axes1 to 4 or the cursor is not displayed. (For 8 axes for XSEL- RXD/SXD and RAXD/SAXD, 4 axes for XSEL- JX/KX and PX/QX, 4 or 3 axes for MSEL-PCX/PGX (for number of SCARA axes))
- Clear : F3 (Clear) : It clears all the axes data in the displayed position number.
- Jog Coordinate System Chg : F4 (Jog Crd): It switches over the coordinate system for jog operation.



- JVel : F2 (JVel) : Set the jog velocity.
- MVel : F3 (MVel) : It determines the operation speed in Continuous Operation Mode or operation with **MOVE** key.
- Arm System **Chg**: F4 (Arm) : It switches over the arm system. (It is necessary that the servo is turned ON in advance)



- Coordinate System Setting: F1 (Crd#) : Selection of the coordinate system number is conducted.
- In : F2 (In) : Input port is monitored.
- Out : F3 (Out) : Output port is monitored.
- User : F4 (UserOut): Turn ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to preset the I/O parameters No. 74 and No. 75.)



For models applicable for input and output ports

- Continuous Operation : F1 (Cont) : The mode is changed to Continuous Operation Mode.
- Jump Coordinate System **Chg** : F2 (Jump) : Jump operation setting is conducted.
- InOut : F3(InOut) : Monitoring is conducted on input and output ports (for applicable models only)
- Axis Switchover : F4 (Axis) : Switch over the displayed axis when 5 or more axes are mounted or additional axes are mounted to 3-axis SCARA Type MSEL-PCX/PGX.

### 9.3.2 Jog Movement Direction and Coordinate System

#### (1) Jog keys and movement directions

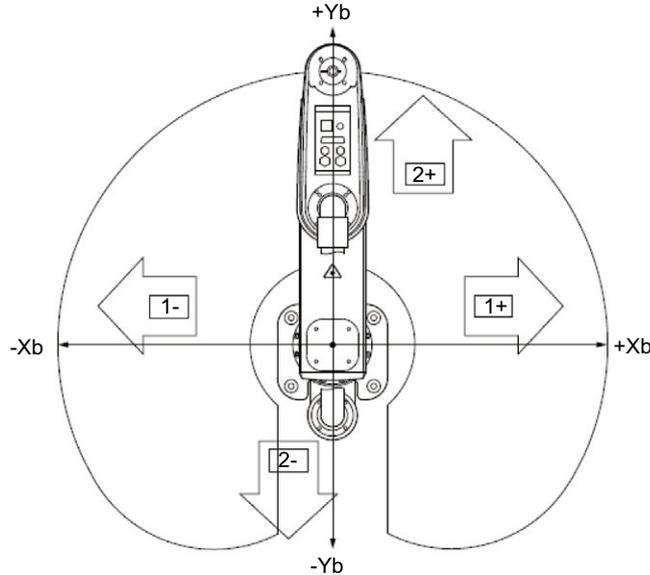
The movement direction during jog operation changes according to the coordinate system No. selected.

The status before shipment is the base coordinate system (work coordinate system No. 0) and tool coordinate system No. 0.

For the setting of coordinate system data, refer to “12. SCARA Axis Coordinate System Data Edit”

#### 1) Jog operation on base coordinate system

The jog keys and movement directions on the base coordinate system are as shown below.



Jog movement on base coordinate system (work coordinate system No. 0)

Teach(Scara)		Current Pos.	
Position No.	<input type="text" value="1"/>	Clear	Page Up Page Dn
Axis1	0.001	SV	UsrOut Sts 0000 0000
Axis2	500.000	SV	
Axis3	0.000	SV	
Axis4	0.000	SV	
Arm: Left	Chg	Jump: OFF	Chg Crd. Sys
Jog Crd sys	W 0	Chg	Switch Axis Cont.
IN	OUT	UserOutput	Vel MVel Scan
Back	InputScreen	Write	Keyboard
Disp	Scan	Clear	Jog Crd ->

Left arm system

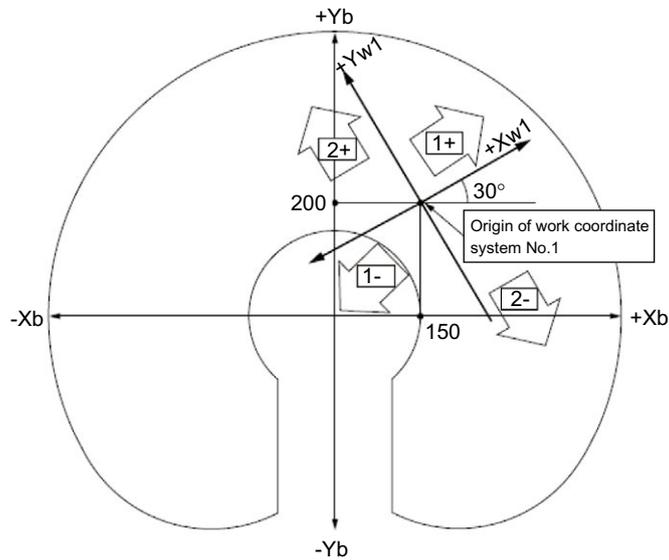
Switchover of input data screen and current position display is to be conducted by pressing **F1** (Disp) key or touching **InputScreen** button.

Switchover of the coordinate system for jog operation is to be conducted by pressing **F4** (Jog Crd) key or touching **Chg** button.

2) Jog operation on work coordinate system

Example) The jog keys and movement directions on the work coordinate system No. 1 are as shown below.

The offset values from the work coordinate system No. 1 become  $X_{ofw1} = 150$ ,  $Y_{ofw1} = 200$ ,  $Z_{ofw1} = 0$ , and  $R_{ofw1} = 30$ .



Jog movement on work coordinate system No. 1

Teach(Scara)		Current Pos.	
Position No.	1	Clear	Page Up Page Dn
Axis1	20.090	SV	UsrOut Sts 0000 0000
Axis2	334.807	SV	
Axis3	0.001	SV	
Axis4	-0.029	SV	
Arm	Left	Chg	Jump: OFF Chg Crd. Sys
Jog Crd sys	W 1	Chg	Switch Axis Cont.
IN	OUT	UserOutput	Vel MVel Scan
Back	InputScreen	Write	Keyboard
Disp	Scan	Clear	Jog Crd ->

Left arm system

Switchover of input data screen and current position display is to be conducted by pressing **F1** (**Disp**) key or touching **InputScreen** button.

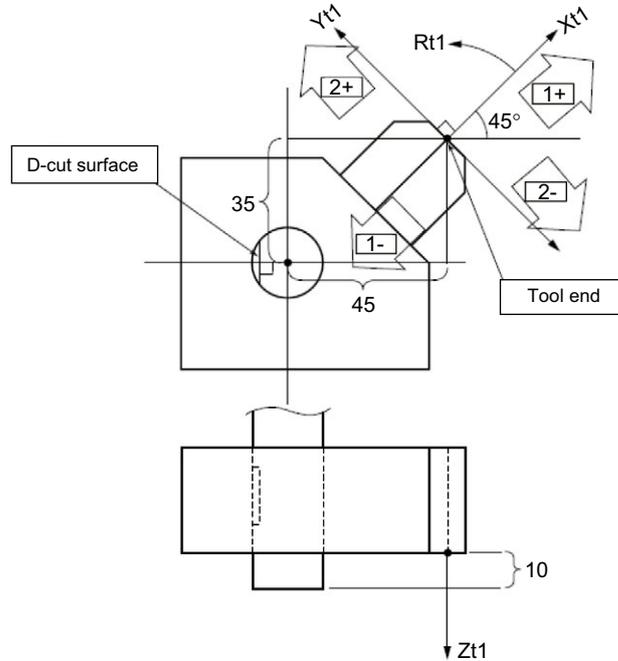
Switchover of the coordinate system for jog operation is to be conducted by pressing **F4** (**Jog Crd**) key or touching **Chg** button.

3) Jog operation on tool coordinate system

Example) The jog keys and movement directions on the tool coordinate system No. 1 are as shown below.

The offset values from the tool coordinate system No. 1 become  $Xoft1 = 45$ ,  $Yoft1 = 35$ ,  $Zoft1 = -10$ , and  $Roft1 = 45$ .

(For 3-axis SCARA type,  $Roft1$  will not be taken into account)



Jog movement on tool coordinate system No. 1

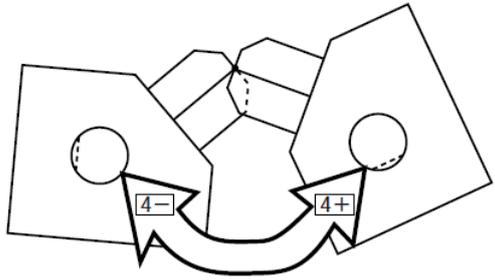
Teach(Scara)		Current Pos.	
Position No.	1	Clear	Page Up Page Dn
Axis1	45.001	SV	UsrOut Sts 0000 0000
Axis2	535.000	SV	
Axis3	-10.000	SV	
Axis4	45.000	SV	
Arm:	Left	Chg	Jump: OFF Chg
Jog Crd sys	T 1	Chg	Switch Axis
IN	OUT	UserOutput	Vel MVel
Back	InputScreen	Write	Keyboard
Disp	Scan	Clear	Jog Crd ->

Left arm system

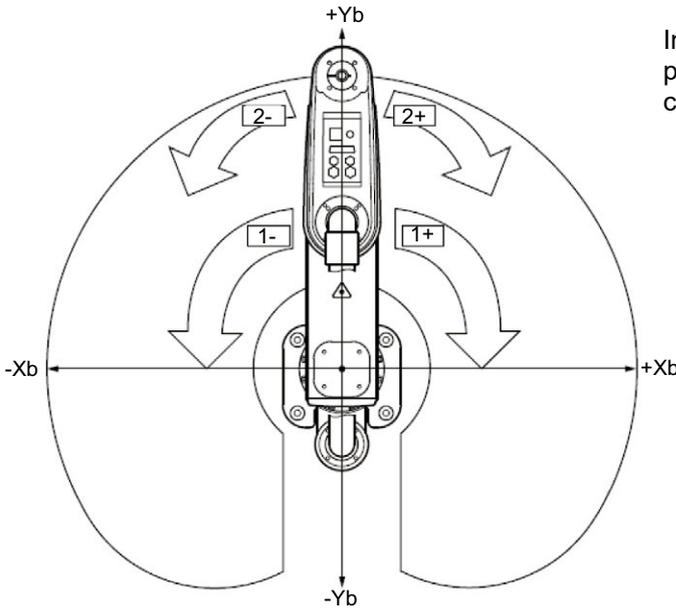
Switchover of input data screen and current position display is to be conducted by pressing **F1** (Disp) key or touching **InputScreen** button.

Switchover of the coordinate system for jog operation is to be conducted by pressing **F4** (Jog Crd) key or touching **Chg** button.

Pressing the jog key for the 4th axis (R axis) performs rotary movement centering on the tool end as shown in the figure on the right.  
(For 4-axis SCARA type only)

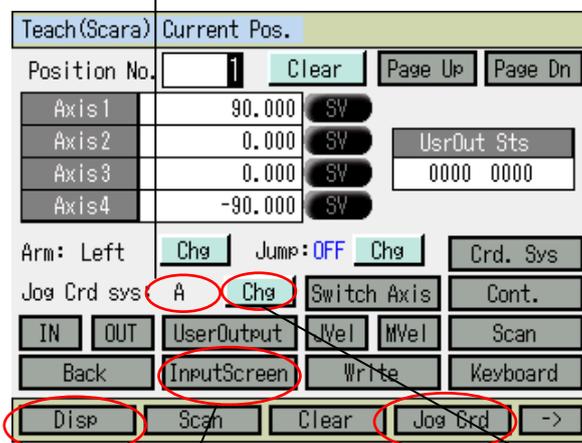


- 4) Jog operation on each axis system (jog operation on each arm)  
 Each arm, jog keys and movement directions are as shown below.



In the case of each axis system, the position display on the teaching screen cannot be incorporated.

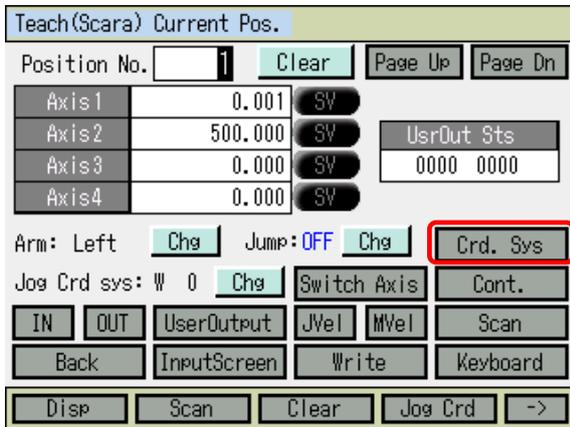
Jog movement on each axis system



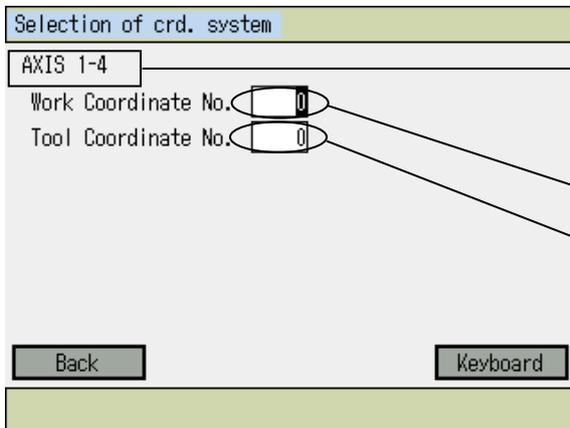
Switchover of input data screen and current position display is to be conducted by pressing **F1** (Disp) key or touching **InputScreen** button.

Switchover of the coordinate system for jog operation is to be conducted by pressing **F4** (Jog Crd) key or touching **Chg** button.

(2) Selection of coordinate system No.



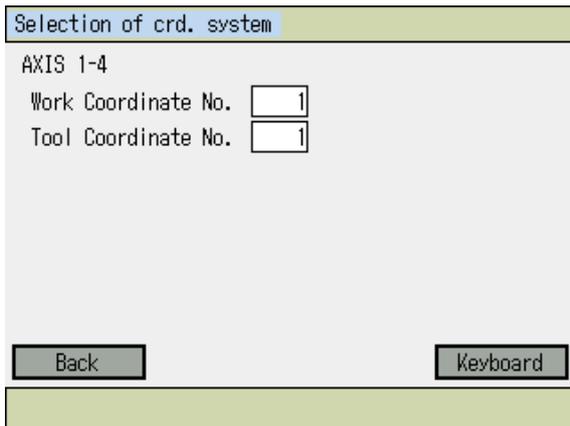
Touch **Crds. Sys** button, or press **F1** (Crd#) key.  
 (When Crd# is not shown, use **SF** key to make it appear.)



Displayed only for XSEL-RXD/SXD and RAXD/SAXD.  
 The axis number displayed in Teach screen is shown.

Enter the work coordinate system No.

Enter the tool coordinate system No.



This is a screen displayed when the work coordinate system No. 1 and the tool coordinate system No. 1 are selected.  
 Touch **Back** button to return to Teaching screen.  
 Or, press **ESC** key to return to Teaching screen.  
 (When the cursor is not shown, press **ESC** key to show the cursor, and press **ESC** key again to return to Teaching screen.)

Teach(Scara) Current Pos.			
Position No.	<input type="text" value="1"/>	Clear	Page Up Page Dn
Axis1	56.750	SV	
Axis2	342.619	SV	UsrOut Sts
Axis3	-10.000	SV	0000 0000
Axis4	15.000	SV	
Arm: Left	Chg	Jump: OFF	Chg Crd. Sys
Jog Crd sys: W 1	Chg	Switch Axis	Cont.
IN	OUT	UserOutput	JVel MVel Scan
Back	InputScreen	Write	Keyboard
Disp	Scan	Clear	Jog Crd ->

The coordinate values displayed indicate the tool tip position of the tool coordinate system No. 1 on the work coordinate system No. 1.

### 9.3.3 Actuator Operation

Jog the actuator or move it to the input (transferred) position data by using the Teaching Pendant. Operate the actuator on the Teaching screen.

#### How to Open to Teaching Screen

Go to **Edit** → **Position** → **Teach (SCARA)** in touch panel operation

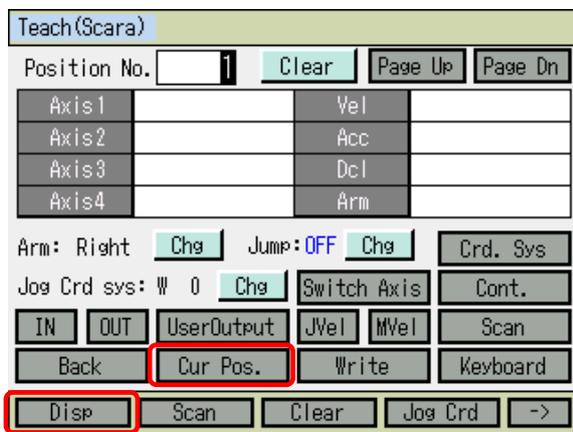
For XSEL-RXD/SXD, RAXD/SAXD, go to **Edit** → **Position** → **Teach (Axes 1-4)** or **Teach (Axes 5-8)**

Go to **Edit** → **Position** → **Teach** in hardware function key operation

For XSEL-PX/QX, RX/SX, RAX/SAX, MSEL-PCX/PGX (for 3-axis SCARA + additional axis type), go to **Edit** → **Position** → **TeachS**

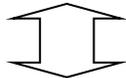
For XSEL-RXD/SXD, RAXD/SAXD, go to **Edit** → **Position** → **Teach1-4** or **Teach5-8**

#### (1) Jog operation

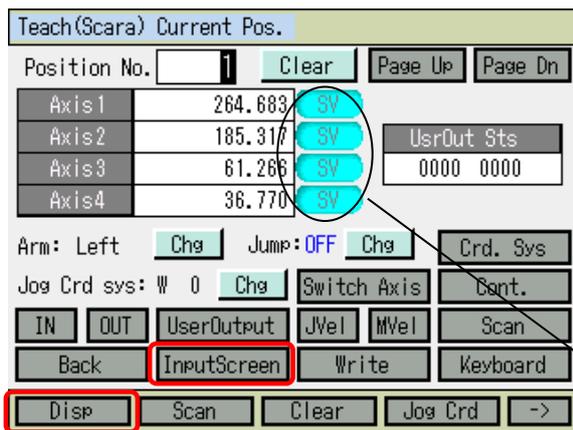


Turn the servo ON condition by pressing the **SERVO** key and then the **ALL+** key in the Teaching screen condition.

To check if servo is turned ON or OFF, either touch **Cur Pos.** button or press **F1** (Disp) key.



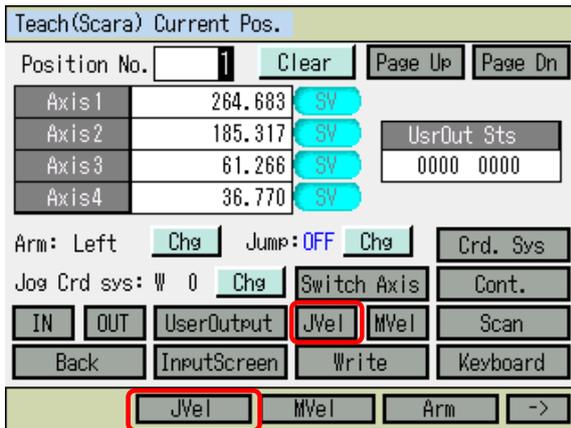
Press **F1** (Disp) key or touch **Cur Pos.** (InputScreen) key



Before operation, check the jog operation coordinate system selected.

Press the **1-**, **1+**, **2-**, **2+**, **3-**, **3+**, **4-** and **4+** keys (**1-**, **1+** to **3-** and **3+** keys for 3-axis SCARA type) to move the actuator to any given position. (1 to 4 indicate axis No. and + represents plus direction while - represents minus direction.)

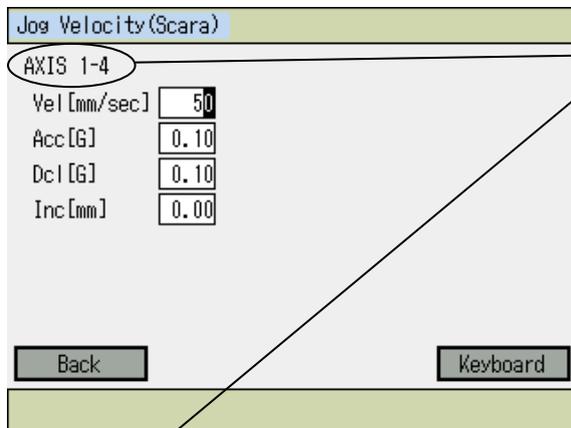
Servo ON



### Change of jog velocity

The actuator movement velocity under jog operation is changed.

Touch **JVel** button in Teaching screen or have 'JVel' (Jog Velocity) displayed in the function key box and press the applicable function key. ('JVel' is not displayed without pressing the **SF** key depending on the screen condition.)



It is displayed in XSEL-RXD/SXD and RAXD/SAXD only. When teaching on Axes 5 to 8, it shows AXIS 5-8.

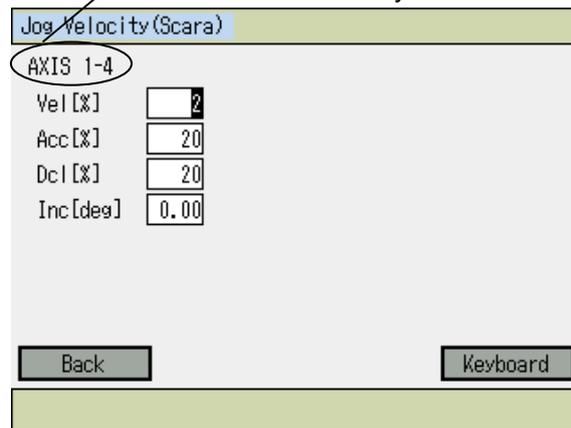
Input the Vel (velocity), Acc (acceleration) and Dcl (deceleration) in the jog operation on the hardware numeric keys or touch panel numeric keys and press the return key.

Inc (inching distance) should be 0.00.

In addition, the inching distance can also be set from this screen.

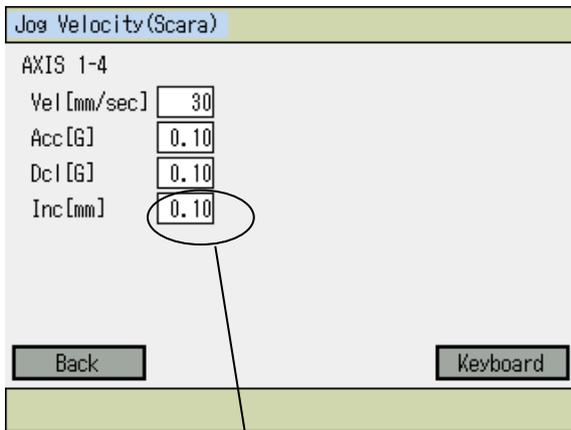
However, in the each axis system, input percentage (%) values for Vel (velocity), Acc (acceleration) and Dcl (deceleration).

Either touch **Back** button or press **ESC** key to return to Teaching screen to conduct the jog operation.



Each axis system

### (2) Inching operation



Inching distance: 0.1 mm

Set the inching distance (travel made every time the JOG key is pressed once).

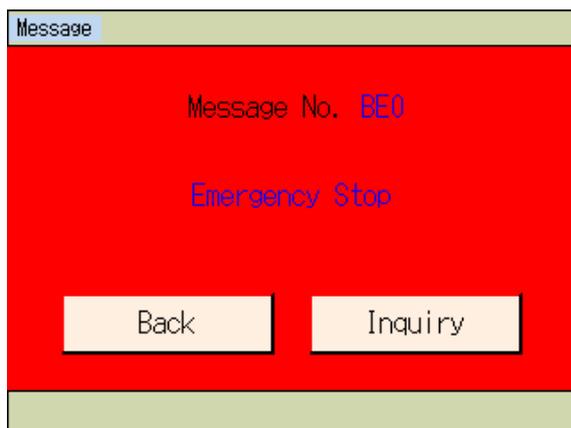
In the jog velocity change screen, input a number in Inc (inching distance) on the hardware numeric keys or touch panel numeric keys and press the return key. The numerical input range is between 0.01 and 1.00 [unit: mm].

Either touch **Back** button or press **ESC** key to return to Teaching screen to conduct the inching operation.

Clicking the jog key once makes 1- inching distance movement.

Clicking any of **1+** through **4+** makes inching movement in the coordinate plus direction, while clicking any of **1-** through **4-** makes inching movement in the coordinate minus direction.

### (3) Manual movement (direct teaching) under servo OFF



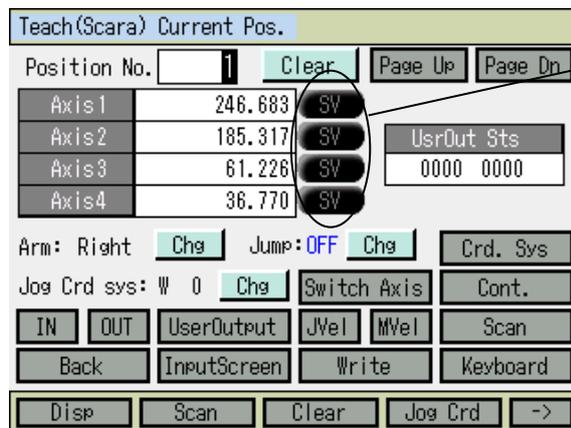
Press **SERVO** key and then press **ALL-** key to turn the servo OFF.

Press the EMERGENCY STOP button.

Emergency stop input screen

Either press **ESC** key or touch **Back** button to return to Teaching screen.

**Warning:**  
Be sure to execute manual movement when the EMERGENCY STOP button is pressed.



Servo OFF

Move the actuator to any given position manually.

To move the Z-axis or R-axis manually, the brake must be released. Consequently, the Z-axis may drop under the weight of the hand attached to the tip when the brake is released.  
Do not perform teaching by manual movement of the Z-axis or R-axis.

#### (4) Arm system change

Change the current arm system over to the opposite arm system (Right arm → left arm, left arm → right arm). The 1st arm does not move and the 2nd arm moves in such a way that it becomes straightened with the 1st arm.

Switchover of the arm system can be conducted on the teaching screen.

#### How to Open to Teaching Screen

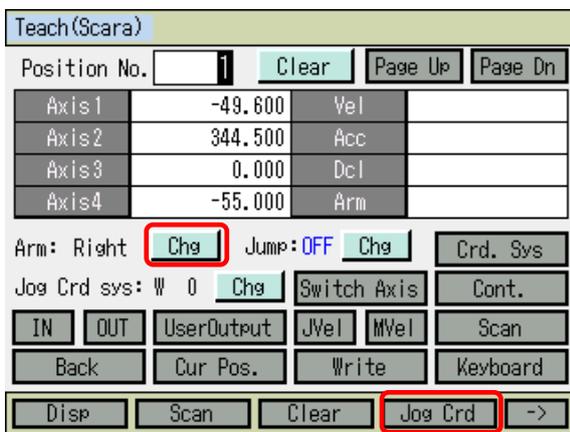
Go to **Edit** → **Position** → **Teach (SCARA)** in touch panel operation

For XSEL-RXD/SXD, RAXD/SAXD, go to **Edit** → **Position** → **Teach (Axes1-4)** or **Teach (Axes5-8)**

Go to **Edit** → **Position** → **Teach** in hardware function key operation

For XSEL-PX/QX, RX/SX, RAX/SAX, MSEL-PCX/PGX (for 3-axis SCARA + additional axis type), go to **Edit** → **Position** → **TeachS**

For XSEL-RXD/SXD, RAXD/SAXD, go to **Edit** → **Position** → **Teach 1-4** or **Teach 5-8**



Press **SERVO** key and then press **ALL+** key to turn the servo ON.

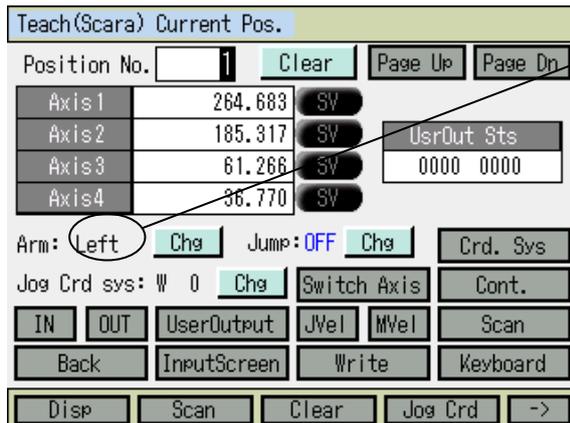
Touch **F4** (Arm) key or touch **Arm** change button. (When Arm is not shown in the function, use **SF** key to make it appear.)

9. Position Edit



Select whether or not to change the arm system. Press **MOVE** key when desired to execute.

When execution is not desired, either press **ESC** key or touch **CANCEL** button.



Current arm system display

When the **MOVE** key is pressed, the display changes over to the screen under movement and the 2nd arm moves until it becomes straightened with the 1st arm.

After completion of the operation, the current arm system display will change.

(5) Load Current Position as Data

Check the work coordinate system No., tool coordinate system No., and arm system currently selected in advance.

Display Change : Go to **Edit** → **Position** → **Teach (SCARA)** → **Crd. Sys** in touch panel operation  
 For XSEL-RXD/SXD, RAXD/SAXD, go to **Edit** → **Position** → **Teach (Axes1-4)** or **Teach (Axes5-8)** → **Crd. Sys**

Go to **Edit** → **Position** → **Teach** → **Crd#** in function key operation

For XSEL-PX/QX, RX/SX, RAX/SAX, MSEL-PCX/PGX (for 3-axis SCARA + additional axis type), go to **Edit** → **Position** → **TeachS** → **Crd#**

For XSEL-RXD/SXD, RAXD/SAXD, go to **Edit** → **Position** → **Teach 1-4** (or **Teach 5-8**) → **Crd#**

Teach(Scara)			
Position No.	100	Clear	Page Up Page Dn
Axis1		Vel	
Axis2		Acc	
Axis3		Dcl	
Axis4		Arm	
Arm: Right	Chg	Jump: OFF	Chg Crd. Sys
JoG Crd sys: W 0	Chg	Switch Axis	Cont.
IN	OUT	UserOutput	JVel MVel Scan
Back	Cur Pos.	Write	Keyboard
Disp	Scan	Clear	JoG Crd ->

The selected actuator's location is incorporated as position data into the teaching screen.

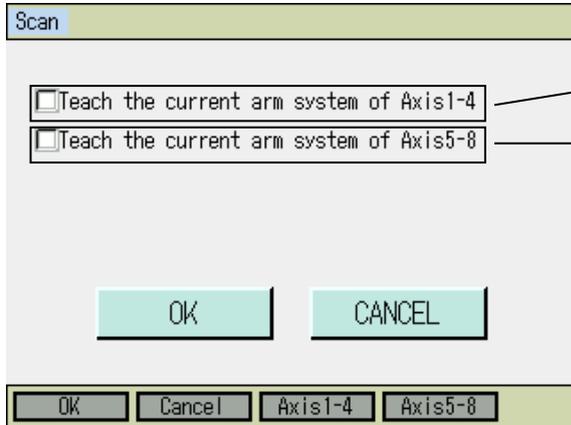
Touch in the position number input box to show the cursor and input a value either on the hardware numeric keys or touch panel numeric keys. (Touch panel numeric keys can be shown by touching **Keyboard** button.)

Or, select the position number to load the data from by touching **Page Up** and **Page Dn** buttons or using **PAGE UP** and **PAGE DOWN** keys.

Teach(Scara)			
Position No.	100	Clear	Page Up Page Dn
Axis1	39.183	Vel	
Axis2		Acc	
Axis3		Dcl	
Axis4		Arm	
Arm: Right	Chg	Jump: OFF	Chg Crd. Sys
JoG Crd sys: W 0	Chg	Switch Axis	Cont.
IN	OUT	UserOutput	JVel MVel Scan
Back	Cur Pos.	Write	Keyboard
Disp	Scan	Clear	JoG Crd ->

When the cursor is placed in the axis box, press **F2** (Scan) key or touch **Scan** button to load the current position data of the axis that the cursor is placed on. Press **F2** (Scan) key or touch **Scan** button when the cursor is not shown or placed in an area other than the axis box, the current position data of all the axes is loaded.

In the case of the XSEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD or MSEL-PCX/PGX controller, it can be selected as to whether or not the arm system is scanned and the data is set on the position data.



Arm System Data for Axes 1 to 4 Scanning Selection

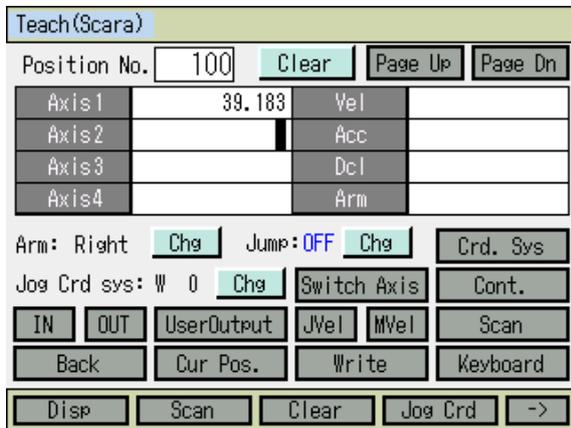
Arm System Data for Axes 5 to 8 Scanning Selection

For 3-axis SCARA type, the display shows Axis 1-3 instead of Axis 1-4. Also, Axes 5 to 8 arm system load check box and **F4** (Axis 5-8) are displayed only in XSEL-RXD/SXD and RAXD/SAXD.

Touch in the check box for the applicable axis to put a check mark and establish the load setting. If you touch in the box in which there is already a check mark, the check mark will be removed and loading will not be conducted. On the function keys, choose the applicable key from **F3** or **F4** and condition gets changed between checked and unchecked every time the key is pressed.

#### (6) Transfer to Controller

The incorporated data is transferred to the controller.



In Teaching screen, either touch **Write** button or press **WRT** key.

The loaded data is stored in the memory in the controller. Once the transfer to the controller is complete, the position number is incremented by one.

The data available to transfer to the controller is one position data that is being displayed. It is not possible to transfer the data of more than one position number at a time.

If the screen is switched with touching **Page Up** or **Page Dn** buttons, or using **PAGE UP**, **PAGE DOWN** or **ESC** keys before the data is transferred, the input data will become invalid.

(7) I/O Monitor

1) Input/Output Monitor

Either touch **IN** or **OUT** button in Teaching screen or select **In** or **Out** in the function keys.  
 For models applicable for input and output ports, monitoring of the input and output ports is available by either touching **InOut** button or selecting **InOut** in the function keys.

Input ports

**Input Port**

Port No.  Page Up Page Dn

No.	0123456789
0	0000000000
10	0000000000
20	0000000000
30	0000000000
40	0000000000

Back Keyboard

Output ports

**Output Port**

Port No.  Page Up Page Dn

No.	0123456789
300	0010000000
310	0000000000
320	0000000000
330	0000000000
340	0000000000

ON ↑ OFF  
← ↓ →

Back Keyboard

0/1

Either by touching **ON** and **OFF** buttons or pressing **F1** key, the output port of the cursor position can be turned ON/OFF (1/0). (For **F1** key, the port is switched ON and OFF (1/0) every time the key is pressed.)

Input/Output Port (for applicable models)

**InOut Port**

Port No.  Page Up Page Dn

No.	0123456789
7000	0100000000
7010	1100000000
7020	0000000000
7030	0000000000
7040	0000000000

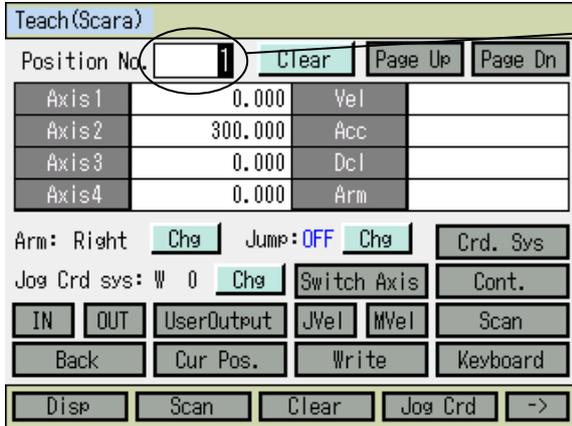
ON ↑ OFF  
← ↓ →

Back Keyboard

The way to operate is the same as the output port.

(8) Movement

The actuator is moved to the location of the position data transferred to the controller.  
(Check the location of the teaching position data.)



Position number to move

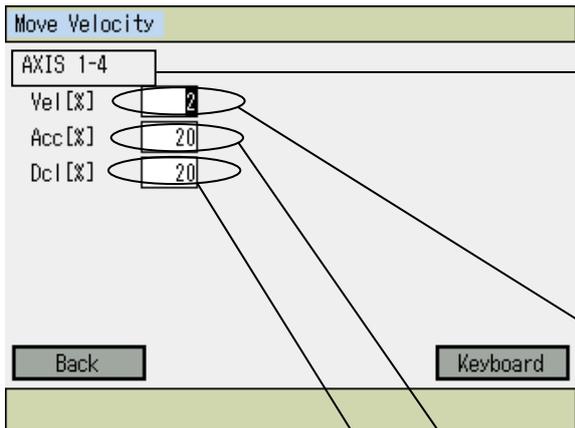
Select the position number you want to move in a Teaching screen condition.

Press the **SERVO** key and then the **ALL+** key to turn the servo ON.

To check if servo is turned ON or OFF, it is necessary to switch to the current position window. It shows the servo is ON when SV mark beside the position in the current position display screen is in light blue.

The actuator starts moving by pressing the **MOVE** key and then the **ALL+** or **ALL-** key. To stop movement halfway, press the **STOP** key.

To check or change the operation velocity, either touch **MVel** button or press **F3** (MVel) key to open the operation velocity setting window.



Displayed only in XSEL-RXD/SXD and RAXD/SAXD, axis number in teach window

Input the change data on the hardware numeric keys or touch panel numeric keys (which are displayed by touching **Keyboard** button). After the change is made, touch **Back** button or press **ESC** key.

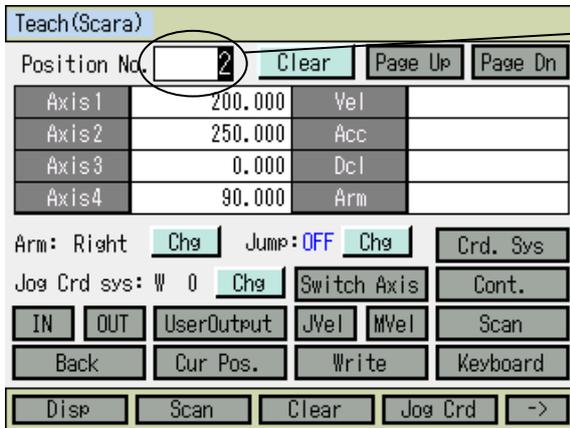
Ratio to maximum PTP velocity (axis-specific parameter No. 28)

Ratio to maximum PTP acceleration (axis-specific parameter No. 134)

Ratio to maximum PTP deceleration (axis-specific parameter No. 135)

### (9) Continuous movement

The actuator is continuously moved to the location of the position data transferred to the controller.



Position No. to move first

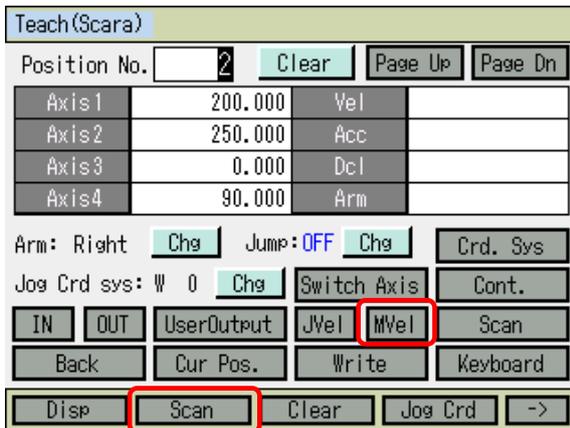
In Teaching screen, use the numeric keys, **Page Up** and **Page Dn** button to select the position number to operate first.

Press the **SERVO** key and then the **ALL+** key to turn the servo ON.

To check if servo is turned ON or OFF, either touch **Cur Pos** button or press **F1** (Disp) key.

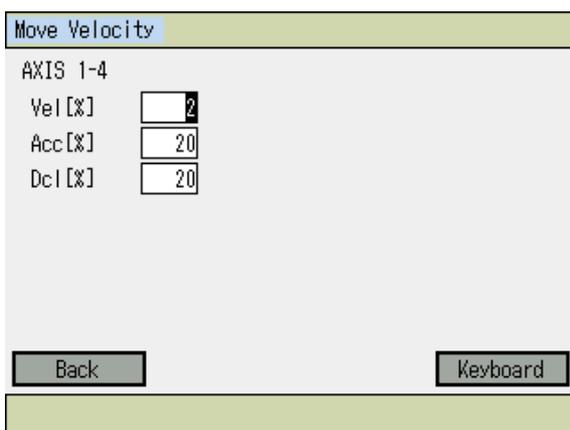
It shows the servo is ON when SV mark beside the position in the current position display screen is in light blue.

Touch **Cont.** button or press **F1** (Cont) key. (Use **SF** key when Cont is not shown in **F1**.)



Once the status gets in the continuous operation mode, the background color of **Cont.** button turns darker, and also the function key display changes as shown in the figure on the left.

To check or change the movement velocity, either touch **MVel** button or press **F2** (MVel) key to open the edit window for velocity and others.



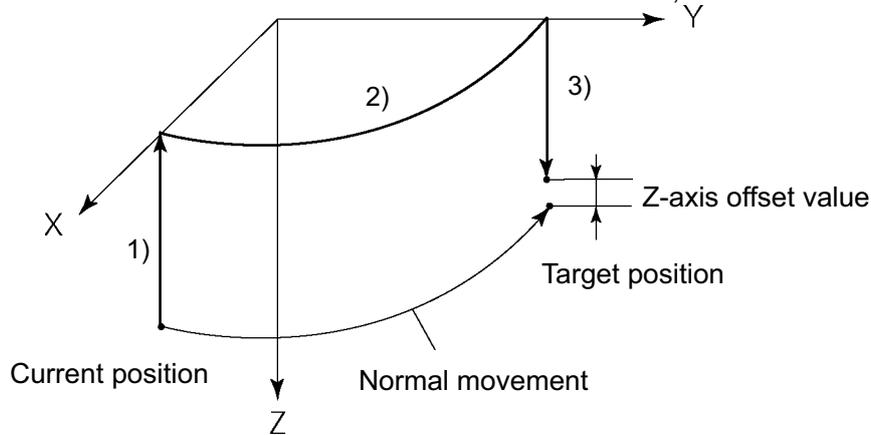
After change or confirm parameters, either touch **Back** button or press **ESC** key to go back to the previous screen.

Teach(Scara) Current Pos.			
Position No.	<input type="text" value="2"/>	Clear	Page Up Page Dn
Axis1	17.465	SV	
Axis2	474.360	SV	UsrOut Sts
Axis3	23.187	SV	0000 0000
Axis4	80.683	SV	
Arm: Right	Chg	Jump: OFF	Chg Crd. Sys
Joë Crd sys: W 0	Chg	Switch Axis	Cont.
IN	OUT	UserOutput	JVel MVel Scan
Back	InputScreen	Write	Keyboard
Disp	Scan	Clear	Joë Crd ->

Press **MOVE** key, and then press **ALL+** or **ALL-** to have the actuator start the continuous operation.

(10) Jump movement

The actuator is moved to the location of the position data transferred to the controller by jump motion (arch motion). Before/after normal movement or continuous movement, the Z-axis is moved up and down.



Motion sequence

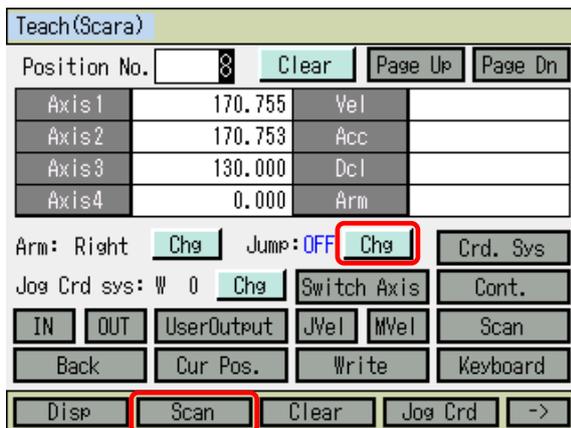
- 1) Raise the Z-axis from the current position to the top position (Z = 0). (Motion of the Z-axis only)
- 2) Movement is performed to above the target position by PTP motion while the Z-axis stays at the top position. (Motion of the X-axis, Y-axis and R-axis only)
- 3) Lowering is performed to the target position. (Motion of the Z-axis only). When the Z-axis offset value is set, the Z-axis stops before (above) the target position by the same amount.

Z-axis offset value: Specify how many millimeters before the target position to stop the Z-axis.

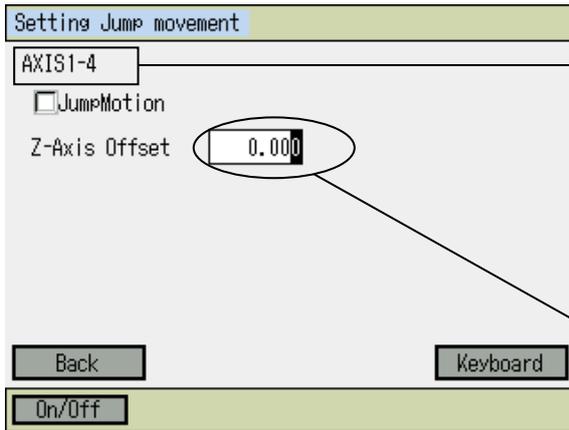
No minus value can be input.

(Example) When the Z-axis target position is 100.000 mm and the Z-axis offset value is 30.000 mm, the Z-axis stops at the position of 70.000 mm.

Setting of jump movement is performed on the Teaching screen.



Either touch Jump **Chg** button or press **F2** (Jump) key.  
 (When Jump is not shown, use **SF** key to make it appear.)

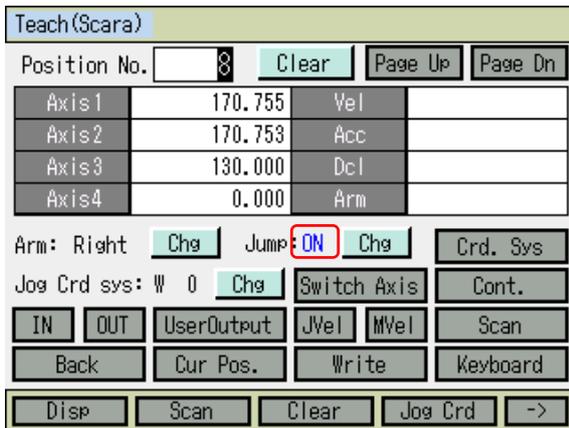


Displayed only in XSEL-RXD/SXD and RAXD/SAXD, axis number in teach window

To set the jump operation valid/invalid, touch in the check box at **JumpMotion**, or press **F1** (On/Off) key to put or remove a check mark.

Enter the Z-axis offset value.  
Enter the offset value (mm) from the Z-axis target position coordinate and press the return key.

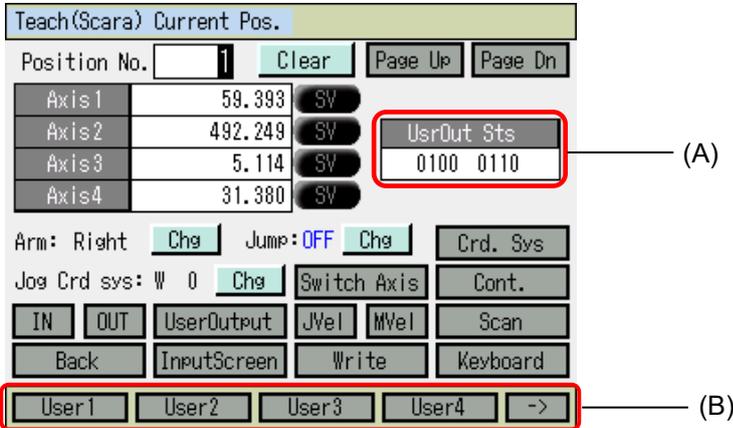
The set value is effective until the Teaching Pendant is reset or reconnected.



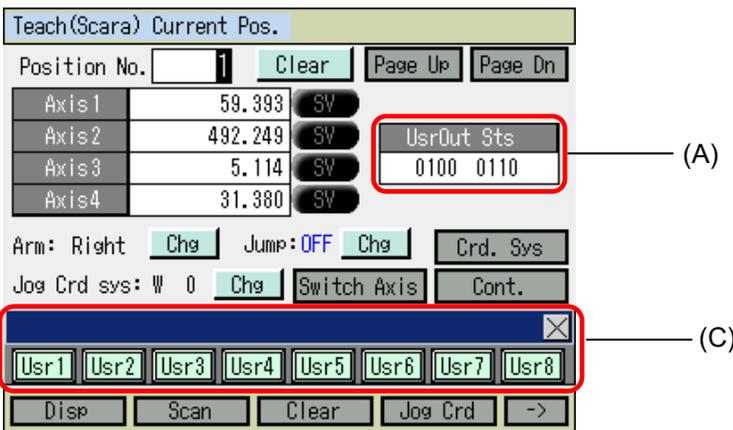
Either touch **Back** button or press **ESC** key to return to Teaching screen. After selecting the target position number, press **MOVE** key, and then press **ALL+** or **ALL-** key to start the jump operation. When the jump operation is active, the right of Jump: is turned to 'ON'. ('OFF' when inactivated)

(11) User-specified output port operation

The output ports set in the parameter can easily be turned ON/OFF. In Teaching screen (or the current position display screen in Teaching), select UserOut in the function keys or touch **UserOutput** button. When in Teaching screen, it automatically changes to the current position display screen.



When function key (UserOut) is pressed



When **UserOutput** button is touched

(A) User-specified output port status

The conditions of user-specified output ports are displayed as '1' (=ON) and '0' (=OFF).  
(The conditions are displayed from the first specified port for the number of the specified ports from the left.)

(B) Function for operation of user-specified output ports

This is the function for ON/OFF operation of user-specified output ports.  
This function is allocated to 'Usr1', 'Usr2', 'Usr3'...in this order from the first user-specified port for the number of specified ports.

(Usr1 to Usr4 and Usr5 to Usr8 are changed with the **SF** key.)

ON/OFF operation can be performed for each output port by pressing the function keys (F1 to F4) corresponding to 'Usr1' to 'Usr4' and 'Usr5' to 'Usr8'.

(When the port status display is '0' (OFF), the port ON command is given. When the port status display is '1' (ON), the port OFF command is given.)

When you return to the standard functions, press **ESC** key.

(C) User-Specified Output Port Operation Panel Window

It is a panel window to perform the operation to turn ON/OFF the user-specified output ports. Assignment is made for the number of specified ports in the order of 'Usr1', 'Usr2', 'Usr3' ... from the top of the user-specified output ports.

By touching a Usr1 to Usr8 buttons, an operation can be performed to turn each output port ON/OFF.

(Port ON Command is executed when the port status display is '0' (OFF) and Port OFF Command when the status display is '1' (ON).

To close this panel window, touch X on the top right or press ESC key.)

1) Setting of user-specified output port parameters

For the operation method for parameter setting, refer to "14. Parameter Edit."

The first port No. and the number of ports are set with the following parameters:

- Number of ports  
I/O parameter No. 74 "QntPrtUsrOut" (Number of output ports used by TP user (hand, etc.))
- First port No.  
I/O parameter No. 75 "TopNo.UseOut" (First output port No. by TP user (hand, etc.))

(Setting example) When the first port No. is set to 308 and the number of ports is set to 8:

'Usr1'	<span style="border: 1px solid black; padding: 0 2px;">F1</span> key)	.....	Output port 308
'Usr2'	<span style="border: 1px solid black; padding: 0 2px;">F2</span> key)	.....	Output port 309
'Usr3'	<span style="border: 1px solid black; padding: 0 2px;">F3</span> key)	.....	Output port 310
'Usr4'	<span style="border: 1px solid black; padding: 0 2px;">F4</span> key)	.....	Output port 311
'Usr5'	<span style="border: 1px solid black; padding: 0 2px;">F1</span> key)	.....	Output port 312
'Usr6'	<span style="border: 1px solid black; padding: 0 2px;">F2</span> key)	.....	Output port 313
'Usr7'	<span style="border: 1px solid black; padding: 0 2px;">F3</span> key)	.....	Output port 314
'Usr8'	<span style="border: 1px solid black; padding: 0 2px;">F4</span> key)	.....	Output port 315

(12) Arm System setting

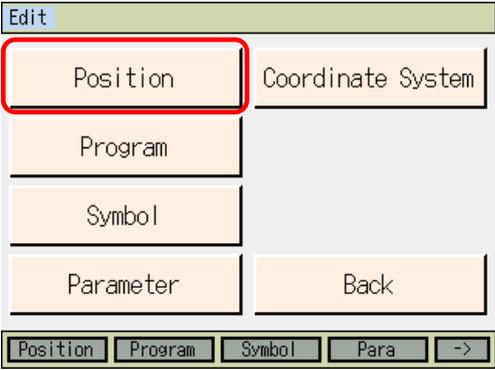
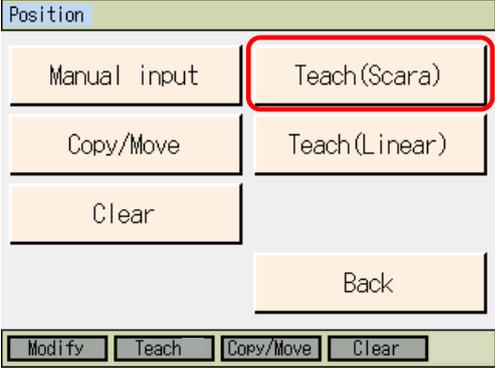
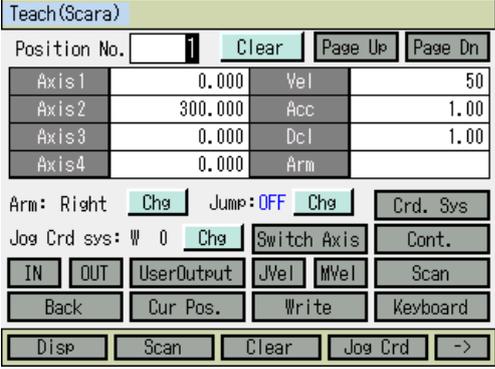
In the case of the XSEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD or MSEL-PCX/PGX Controller, the arm system data can be set on the position data.

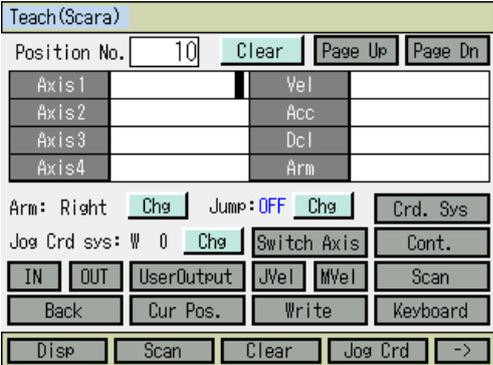
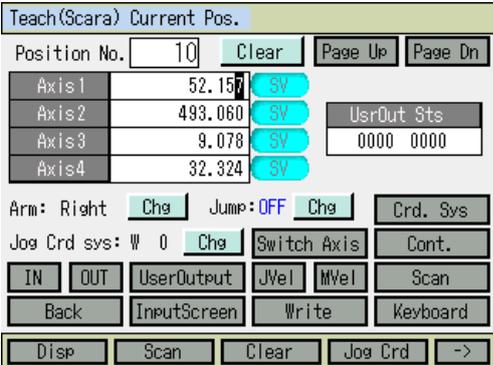
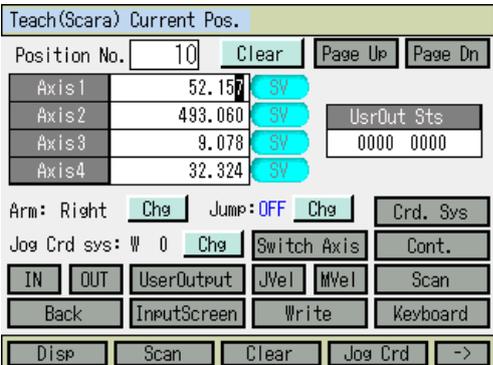
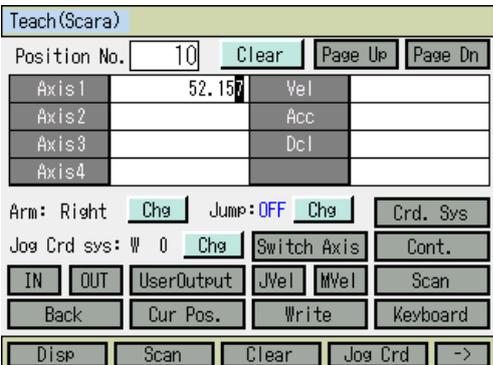
Teach(Scara)			
Position No.	1	Clear	Page Up Page Dn
Axis1	-49.600	Vel	
Axis2	344.500	Acc	
Axis3	0.000	Dcl	
Axis4	-55.000	Arm	<input type="text"/>
Arm: Right	Chg	Jump: OFF	Chg Crd. Sys
Job Crd sys: W 0	Chg	Switch Axis	Cont.
IN	OUT	UserOutput	JVel MVel Scan
Back	Cur Pos.	Write	Keyboard
Clear	Right	Left	

The arm system settings for Axes1 to 4 (Axes 1 to 3 for 3-axis SCARA) or Axes5 to 8 (Axes5 to 8 are for XSEL-RXD/SXD and RAXD/SAXD only) that is currently shown can be established. Touch in Arm box to show the cursor. Refer to 9.1.1 [Input of Target Arm System Data (Arm1-4 or Arm1-3) and (Arm5-8)] for show to input.

### 9.3.4 Example of Teaching Input

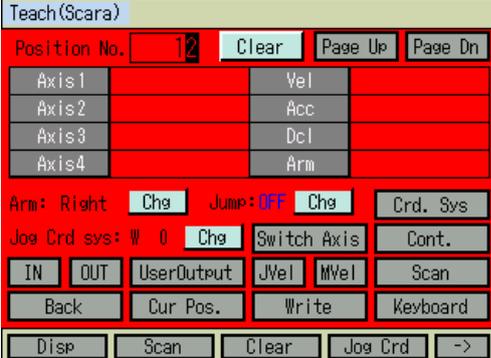
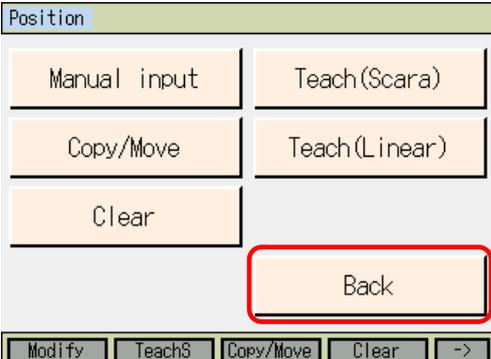
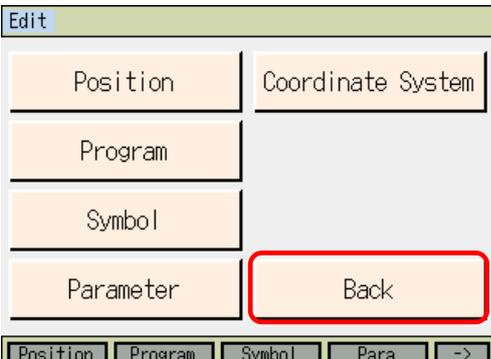
Entering the data into position No. 10 using the jog and into position No. 11 by manual movement (direct teaching) with Servo OFF status.

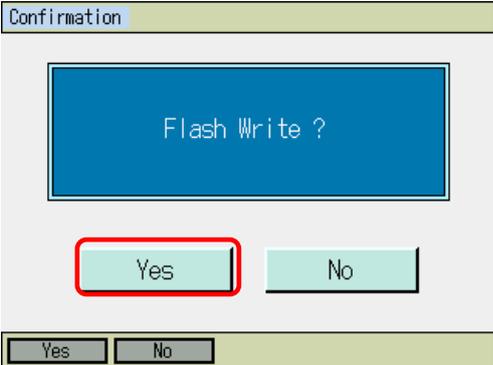
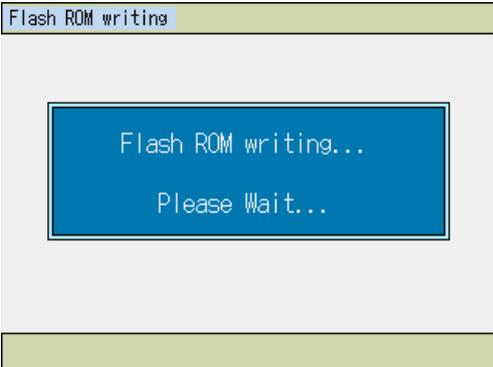
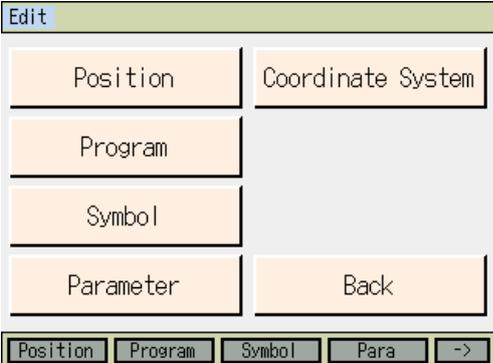
No.	Operation		
1	Touch <b>Edit</b> button. Or, Select the <b>F1</b> (Edit) key.		
2	Touch <b>Position</b> button. Or, Select the <b>F1</b> (Position) key.		
3	Touch <b>Teach(Scara)</b> button. Or, Select the <b>F2</b> (TeachS) key.		There is no <b>Teach(Linear)</b> button in XSEL-JX/KX. Also <b>F2</b> key is treated as Teach.
4	Either use <b>Page Up</b> button and <b>Page Dn</b> button in the touch panel, or <b>PAGE UP</b> key and <b>PAGE DOWN</b> key in the hardware keys, or input "10" in the position number on the numeric key, and then touch <b>ENT</b> for confirmation.		

No.	Operation		
5	Press <b>SERVO</b> key and then press <b>ALL+</b> key to turn the servo ON.		
6	Press the jog keys <b>1-</b> , <b>1+</b> , <b>2-</b> , <b>2+</b> , <b>3-</b> , <b>3+</b> , <b>4-</b> and <b>4+</b> to move the robot to a desired position.		
7	Either touch <b>Scan</b> button or press <b>F2</b> (Scan) key to load the axis number current position where the cursor is to the input screen. Either touch <b>InputScreen</b> button or press <b>F1</b> (Disp) key to confirm that the data has been loaded.		When the jog coordinate system is each axis system "A" display, the current position cannot be loaded.
8	Press Return, touch in the input area for Axis2 to move the cursor to the next axis and touch <b>Scan</b> button, or press <b>F2</b> (Scan) key.		

No.	Operation		
9	Also, load the data for Z-axis and R-axis in the same manner.		
10	Either touch <b>Write</b> button or press <b>WRT</b> key to transfer the position data to the controller. The position moves to No. 11.		If the screen is switched with <b>Page Up</b> button or <b>Page Dn</b> button before the data is transferred, the input data will become invalid.
11	Press <b>SERVO</b> key and then press <b>ALL-</b> key to turn the servo OFF.		
12	Press the EMERGENCY STOP button. Either touch <b>Back</b> button or press <b>ESC</b> key to return to No. 11 screen.		<div style="border: 1px solid black; padding: 5px;"> <p><b>Warning:</b> Be sure to execute manual movement when the EMERGENCY STOP button is pressed.</p> </div> <p>To have manual operation on Z-axis/R-axis, it is necessary to release the brake. As a result, the Z-axis may drop by the weight of such as a hand installed on the end when the brake is released. Do not attempt to conduct teaching manually on the Z-axis/R-axis.</p>

No.	Operation		
13	Either touch <b>Cur Pos.</b> button or press <b>F1</b> (Disp) key to confirm that the servo is off. Move each axis manually to a desired position.		Servo OFF  It turns to light blue when the servo is turned ON.
14	Either touch <b>Scan</b> button or press <b>F2</b> (Scan) key to load the axis number current position where the cursor is to the input screen.		
15	Press Return key, touch in the input area for Axis2 to move the cursor to the next axis and touch <b>Scan</b> button, or press <b>F2</b> (Scan) key.		
16	Also, load the data for Z-axis and R-axis in the same manner.		

No.	Operation		
17	Either touch <b>Write</b> button or press <b>WRT</b> key to transfer the position data to the controller. The position moves to No. 12.		If the screen is switched with <b>Page Up</b> button or <b>Page Dn</b> button before the data is transferred, the input data will become invalid.
18	Finish the position data input with teaching. Touch <b>Back</b> button or press <b>ESC</b> key.		If the cursor is not in the position number, move to the position number with <b>ESC</b> key. Press <b>ESC</b> key again to return to the menu screen.
19	Touch <b>Back</b> button or press <b>ESC</b> key.		The figures shown hereafter are in the condition of the emergency stop being cancelled.
20	Touch <b>Back</b> button or press <b>ESC</b> key.		

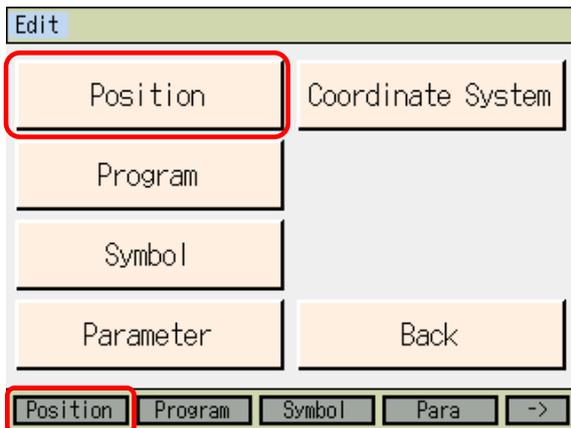
No.	Operation		
21	To write the data to the flash ROM, touch <b>Yes</b> button or press <b>F1</b> (Yes) key. If writing is not necessary, touch <b>No</b> button or press <b>F2</b> (No) key.		
22	While in writing process to flash ROM, the display 'Flash ROM writing...' flashes.		<b>Never shut off the power to the controller during Flash ROM writing.</b>
23	The flash ROM writing process is finished. Touch <b>OK</b> button or press <b>ESC</b> key. The screen returns to Edit menu.		
24			

## 9.4 Copy and Movement of Position Data

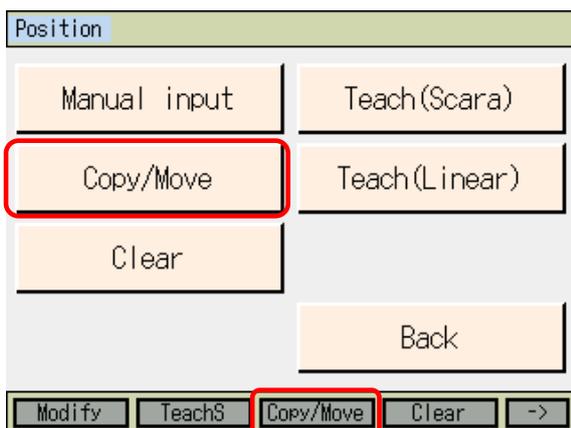
It is a way to copy or move the position data to another position number.



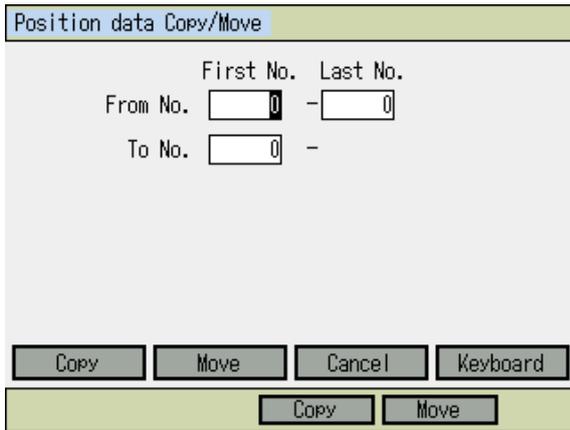
Touch **Edit** button in the Menu screen or press **F1** (Edit) key.



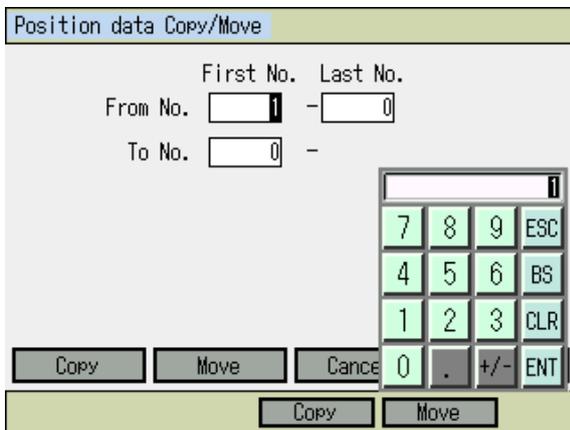
Touch **Position** button on the Edit screen or press **F1** (Position) key.



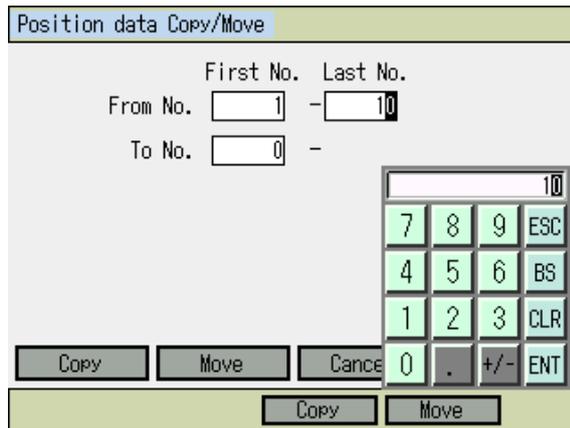
Either touch **Copy/Move** button in Position screen or press **F3** (Copy/Move) key.



Touch **Keyboard** button to show the touch panel keyboard.  
 If the cursor is not on From No. First No., touch on From No. First No. to show the cursor.  
 \* It is available to input on the hardware numeric keys without using the touch panel keyboard.



Input a value in From No. First No. and touch **ENT**.  
 The cursor moves to From No. Last No. and touch panel keyboard closes.



Touch **Keyboard** button again to show the touch panel keyboard.  
 Input a value in From No. Last No. and touch **ENT**.

Position data Copy/Move

	First No.		Last No.
From No.	<input type="text" value="1"/>	-	<input type="text" value="10"/>
To No.	<input type="text" value="100"/>	-	<input type="text" value="109"/>

Copy   Move   Cancel   Keyboard

Copy   Move

Input a value in To No. First No. in the same manner.  
 After completing the input, To No. Last No. will be shown.  
 When you want to copy, touch **Copy** button or press **F3** (Copy) key. When you want to move, touch **Move** button or press **F4** (Move) key.  
 Execution Confirmation screen appears.

Confirmation

Position data will be copied.  
 Are you sure to continue?

Yes   No

Yes   No

If you want to copy, touch **Yes** button or press **F1** (Yes) key.  
 If copy is not necessary, touch **No** button or press **F2** (No) key.

Confirmation

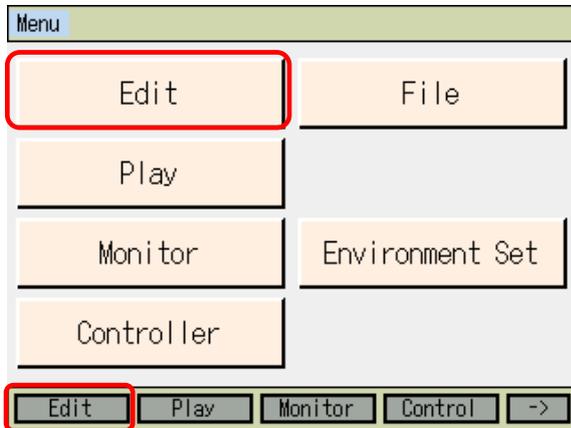
Complete!

OK

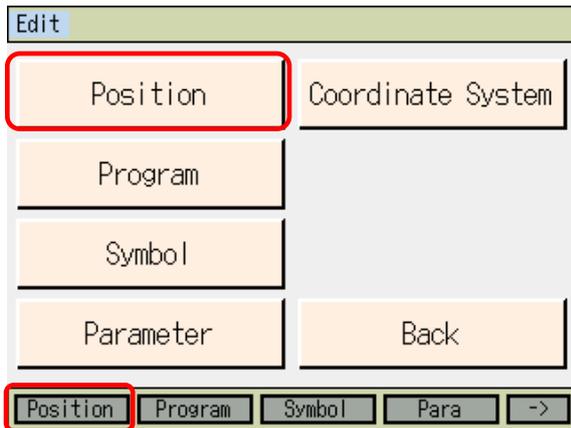
Touch **OK** button or press **ESC** key to go back to the previous screen.  
 When you want to write in the flash ROM, go back to Flash ROM Writing screen by touching **Back** button and so on. Write the data in the Flash ROM referring to "9.1.2 Flash ROM Writing".

## 9.5 Deletion of Position Data

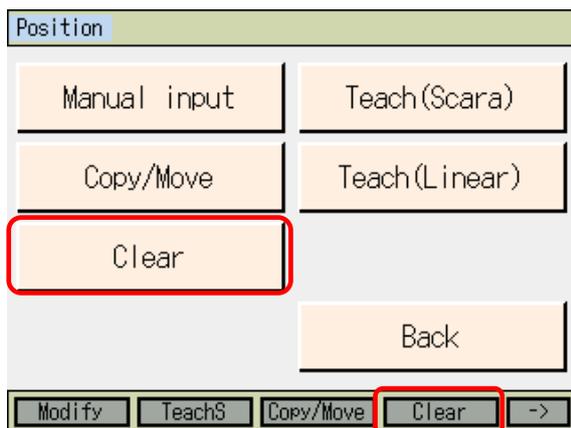
The following operating instructions are to delete the position data.



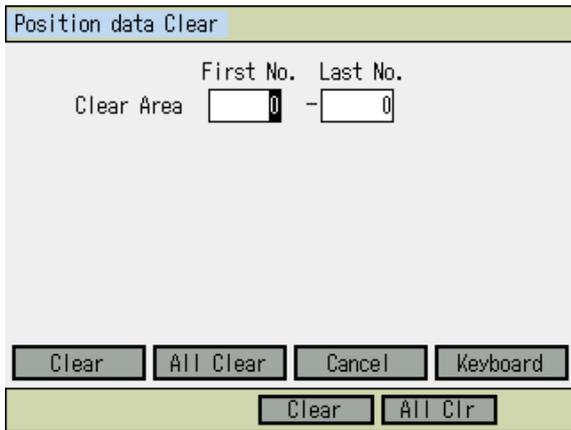
Touch **Edit** button in the Menu screen or press **F1** (Edit) key.



Touch **Position** button on the Edit screen or press **F1** (Position) key.



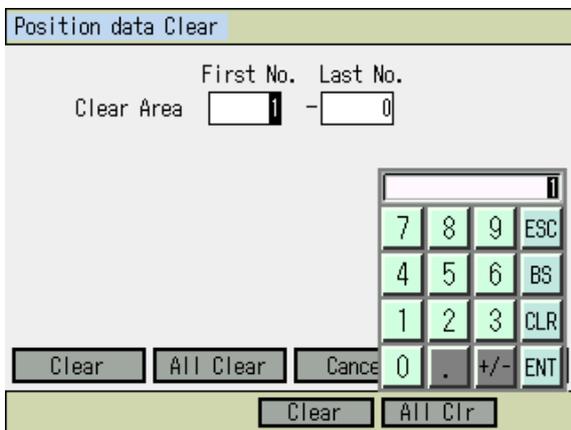
Touch **Clear** button on the Position screen or press **F4** (Clear) key.



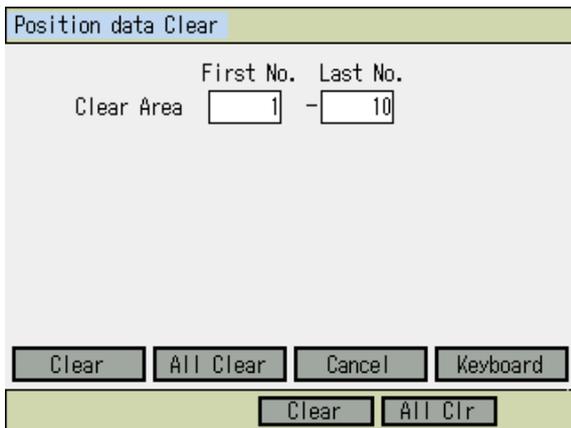
Touch **Keyboard** button to show the touch panel keyboard.

If the cursor is not on the top number, touch the top number to show the cursor.

\* It is available to input on the hardware numeric keys without using the touch panel keyboard.



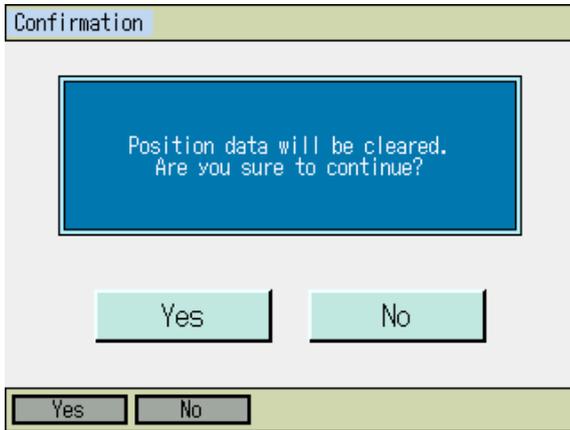
Input the First No. and touch **ENT**. The cursor moves to the Last No. and the touch panel keyboard closes.



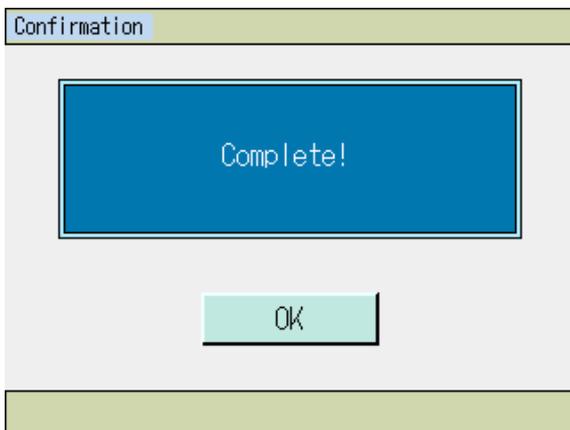
Touch **Keyboard** button again to show the touch panel keyboard.

Input the Last No. and touch **ENT**. When you want to delete the selected position data, touch **Clear** button or press **F3** (Clear) key.

When you want to delete all the position data, touch **ALL Clear** button or press **F4** (All Clr) key. Execution Confirmation screen appears.



If you want to delete, touch **Yes** button or press **F1** (Yes) key.  
If delete is not necessary, touch **No** button or press **F2** (No) key.



Touch **OK** button or press **ESC** key to go back to the previous screen.  
When you want to write in the flash ROM, go back to Flash ROM Writing screen by touching **Back** button and so on. Write the data in the Flash ROM referring to "9.1.2 Flash ROM Writing".

## 10. Program Edit

(Excluding the positioner mode of the SSEL, ASEL and PSEL controller.)

### 10.1 How to Input Program

Input the program step below as an example.

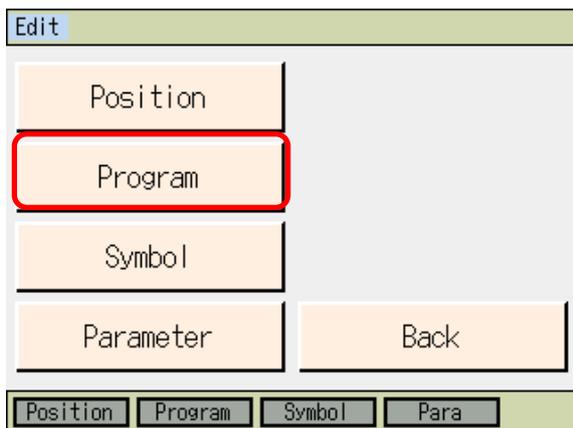
Program No. 2

No.	E	N	Cnd	Cmnd	Operand1	Operand2	Pst	Comment
1			601					
2	A	N	600	CPGE	200	*201	900	Compare Data
3				SCPY	1	'1234		

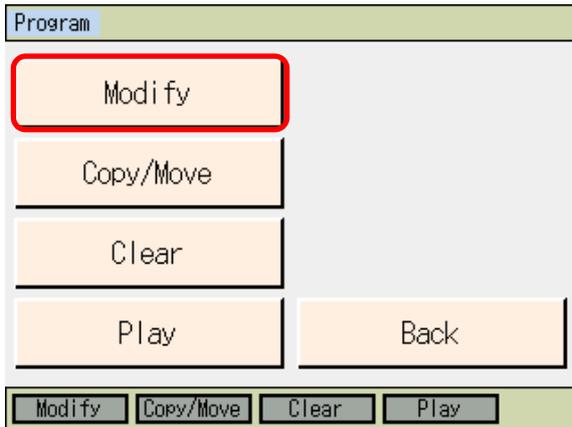
Input only the Input Condition at step No. 1 and input data all at step No. 2.



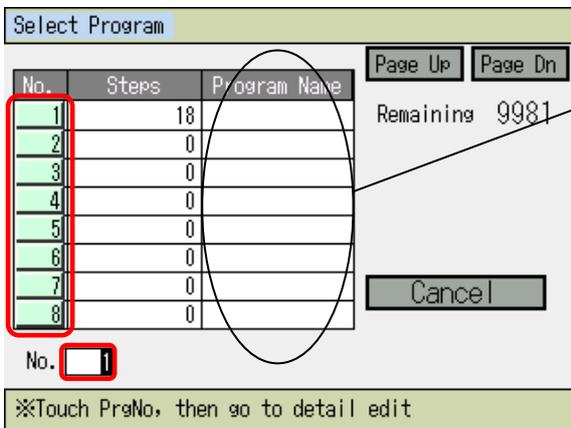
Either touch **Edit** button in the Menu screen or press **F1** (Edit) key.



Either touch **Program** button in the Edit screen or press **F2** (Program) key.

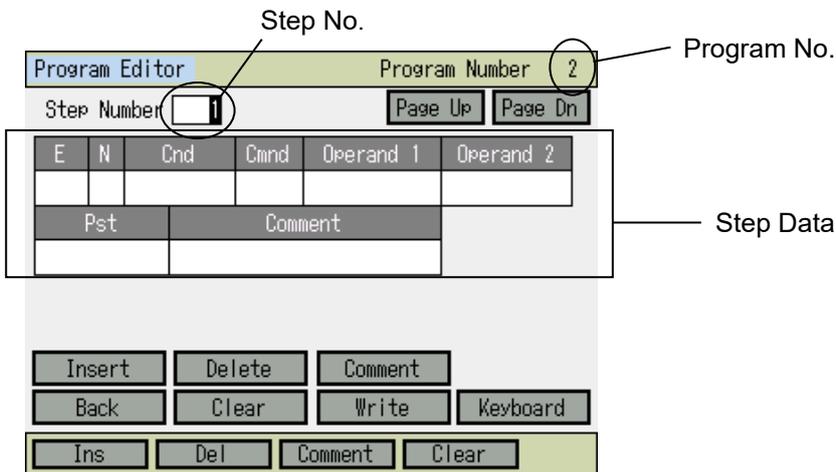


Either touch **Modify** button in the Program screen or press **F1** (Modify) key.



Program names created in symbol edit

Touch the number you want to edit, or input the program number you want to edit on the hardware numeric keys if the cursor in the number box below. (Touch **Page Up** and **Page Dn** buttons and the displayed program numbers go up and down by eight items.)



[Items Shown in Program Step Edit Screen]

Program No.: Displayed Program Number

Step No. : Displayed Stem Number

Step Data

E : Input an extension condition.

N : Input the reversion of input condition.

Cnd : Input the input condition.

Cmd : Input a SEL command language.

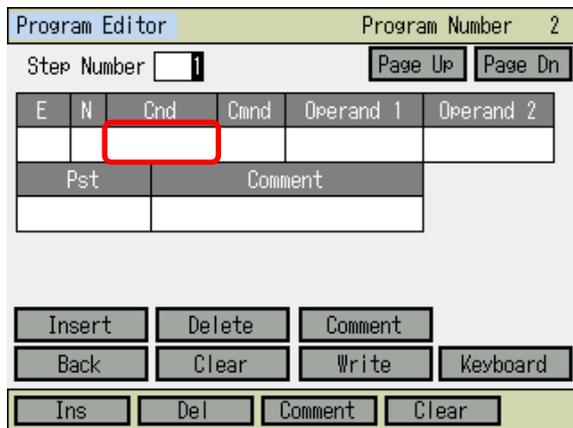
Operand1 : Input Operation 1 (Operand 1).

Operand2 : Input Operation 2 (Operand 2).

Pst : Input the output part (Operand 3).

Comment : Input a comment if necessary (18 letters with half-size font at max.)

(Hiragana, Katakana and Kanji (1st standard) characters can be displayed, but cannot be input.)



Program Editor Program Number 2

Step Number 1 Page Up Page Dn

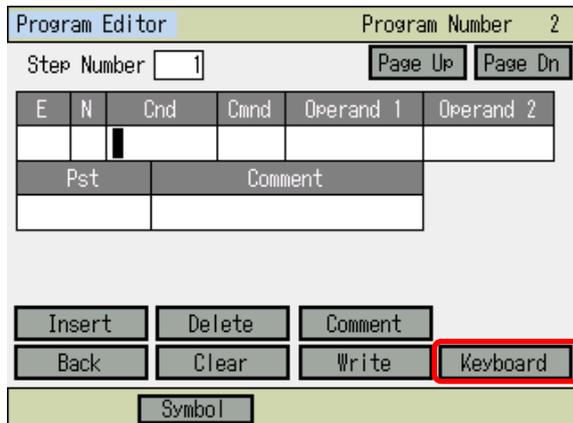
E	N	Cnd	Cmd	Operand 1	Operand 2
Pst		Comment			

Insert Delete Comment

Back Clear Write Keyboard

Ins Del Comment Clear

If the return key on the hardware numeric keys is pressed in the condition that the cursor is on the step number, the cursor moves to the input area of E, press  key or the return key two times to move the cursor to Cnd input area, or touch Cnd input area to bring the cursor.



Program Editor Program Number 2

Step Number 1 Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
Pst		Comment			

Insert Delete Comment

Back Clear Write **Keyboard**

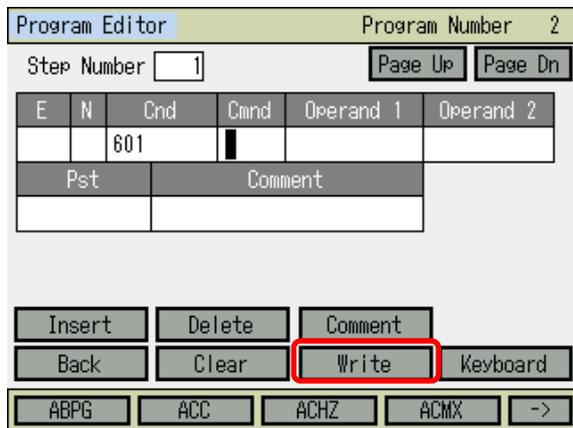
Symbol

With the cursor being in Cnd input area, touch the **keyboard** button to show the touch panel keyboard and input 601, or input 601 on the hardware numeric keys and press the return key.

### Condition of Touch Panel Keyboard Displayed

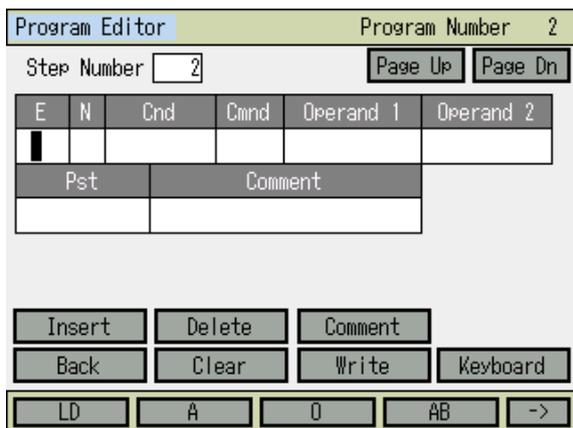


When you use the touch panel keyboard, also input 601 and touch **ENT**. The touch panel keyboard closes and 601 is input in Cnd.



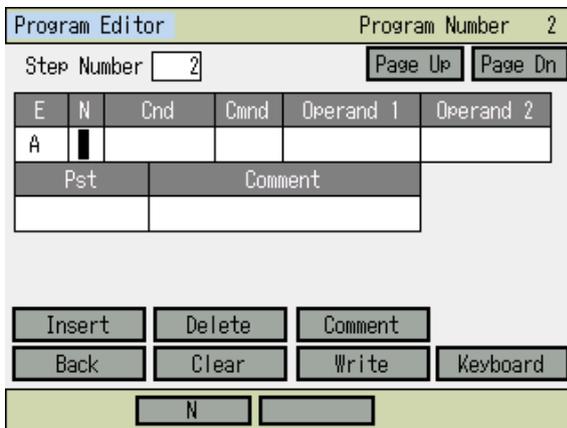
Either touch **Write** button or press **WRT** key to transfer the data in Step No. 1 to the controller. The step proceeds to No. 2.

When the screen is changed with the **Page Up** and **Page Dn** buttons, **ESC** key, **Back** button before data transfer, the input data becomes invalid.

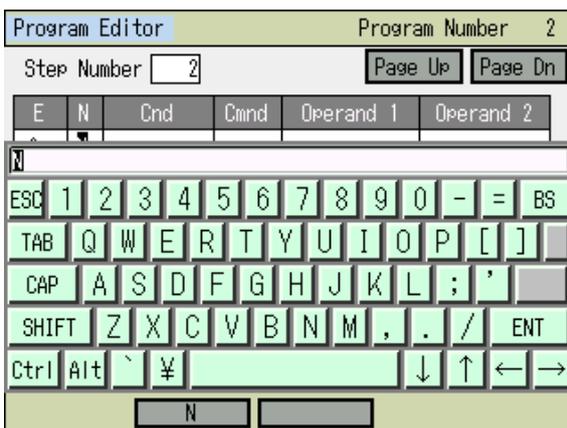




Touch **Keyboard** button to show the touch panel keyboard, input A and touch **ENT** button. When you want to input with the function keys, press **F2** (A) key and then press the return key for confirmation.



Either press **F2** (N) key and then the return key for confirmation, or touch **Keyboard** button to show the touch panel keyboard, input 'N' and then touch **ENT**.



Example for input on touch panel keyboard

Program Editor Program Number 2

Step Number  Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
A	N				
Pst		Comment			

Insert Delete Comment

Back Clear Write Keyboard

Symbol

The cursor moves to the Cnd input area. Input 600 on the hardware numeric keys and then press the return key, or input 600 on the touch panel keyboard and then touch **ENT** button. (Touch panel keyboard will close.)

Program Editor Program Number 2

Step Number  Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
A	N	600			
Pst		Comment			

ESC 1 2 3 4 5 6 7 8 9 0 - = BS

TAB q w e r t y u i o p [ ]

CAP a s d f g h j k l ; ' /

SHIFT z x c v b n m , . / ENT

Ctrl Alt ` ¥ ↓ ↑ ← →

Symbol

Example for input on touch panel keyboard

Program Editor Program Number 2

Step Number  Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
A	N	600			
Pst		Comment			

Insert Delete Comment

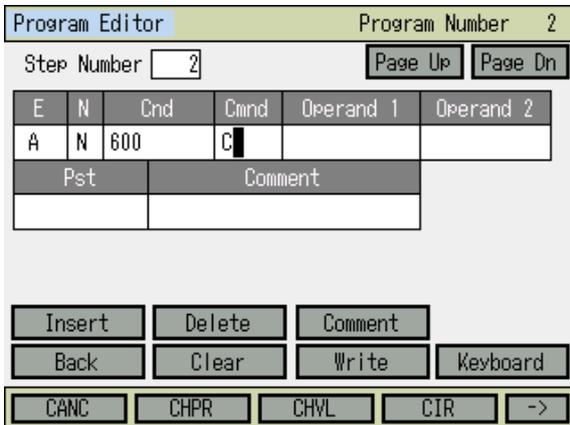
Back Clear Write Keyboard

ABPG ACC ACHZ ACMX ->

The cursor moves to the Cmd input area.



Touch **Keyboard** button to show the touch panel keyboard, input CPGE and touch **ENT** button.



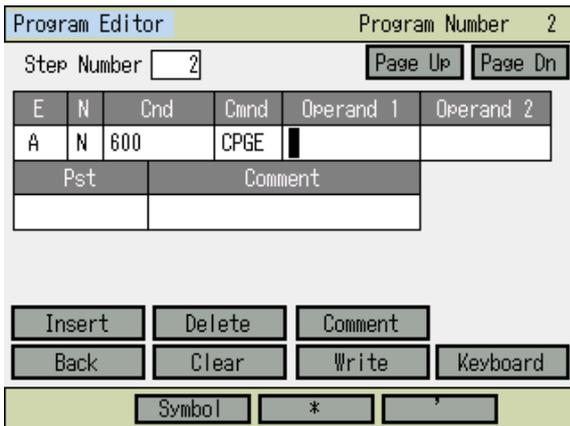
When you want to use the hardware keys, press **7** three times. (Every time you press **7** key, the letter changes in the order of A → B → C.) Commands start with C will be displayed in the function box. By using **SF** key (for next command) or **.** key (for previous command), you can search for commands.

Also, if you press **6** key after C is shown, P is displayed and commands start with CP will appear in the function box.

Once a command is selected with the function keys, the selected command is shown in Cmnd box. Press the return key for confirmation.

All the process can be performed on the hardware numeric keys.

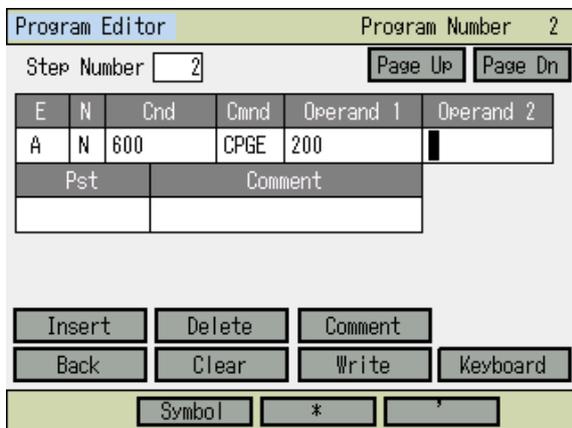
(Inputting **7776988** **↵** will make CPGE)



The cursor moves to the Operand 1 input box.



Touch **Keyboard** button to show the touch panel keyboard, input 200 and touch **ENT** button. Or, use the hardware numeric key, input 200 and then press the return key.



The cursor moves to the Operand 2 input area.



Touch **Keyboard** button to show the touch panel keyboard. Touch **SHIFT** button to switch the letters displayed on the keyboard.



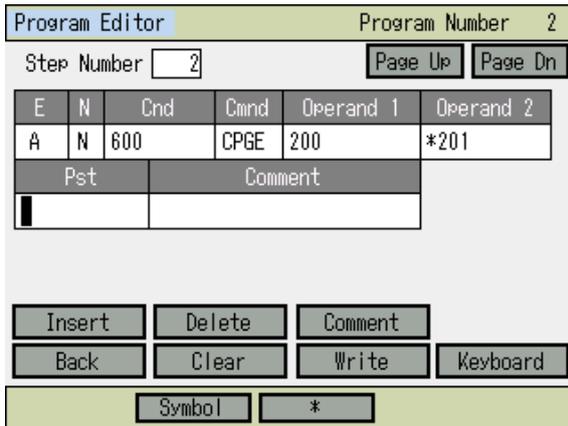
Touch **\***.



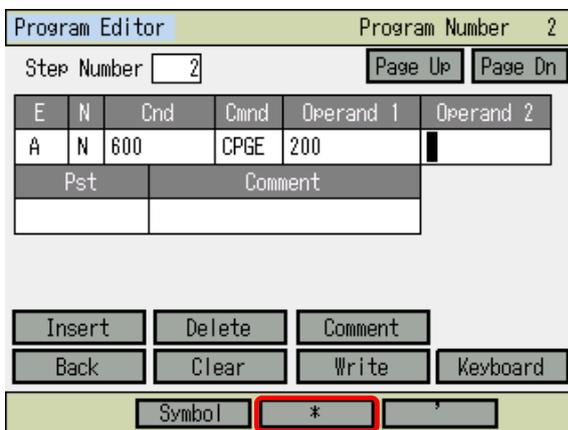
The letters displayed on the keyboard return to normal.



Input \* followed by 201, and then touch **ENT**.



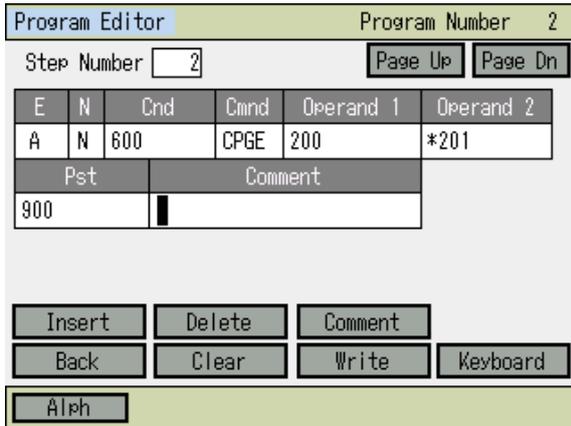
The touch panel keyboard closes and the cursor moves to Pst box.



When you want to use the hardware numeric keys for input, press **F3** (\*) key, input 201 on the numeric keys and then the return key.



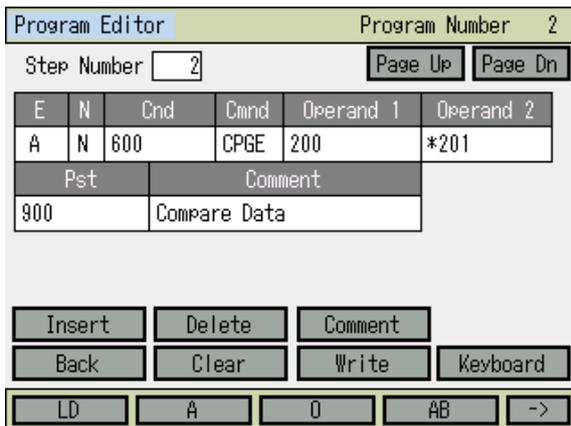
Touch **Keyboard** button to show the touch panel keyboard, input 900 and touch **ENT** button. Or, use the hardware numeric key, input 900 and then press the return key.



The cursor moves to the Comment input area.

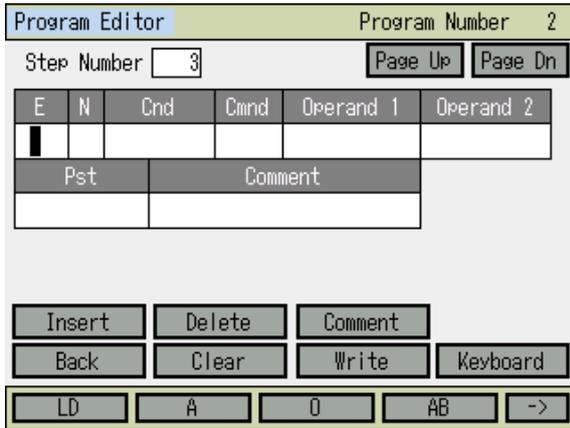


Touch **Keyboard** button to show the touch panel keyboard. Any alphabetical and numerical letters can be used for input.  
 If you touch **SHIFT** button, buttons with capital letters show up, and go back to small letters once a letter in input.  
 If you touch **CAP** button, buttons with capital letters show up, and capital letters will be kept unless **CAP** button is pressed again.  
 Touch **ENT** button for confirmation and the touch panel keyboard closes.

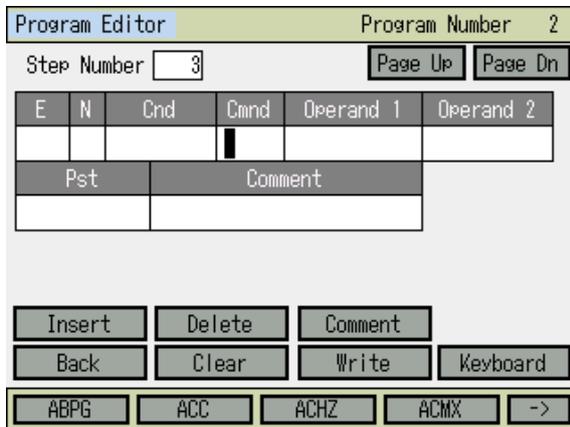


Either touch **Write** button or press **WRT** key. The step proceeds to No. 3.

When the screen is changed with the **Page Up** and **Page Dn** buttons, **ESC** key, **Back** button before data transfer, the input data becomes invalid.



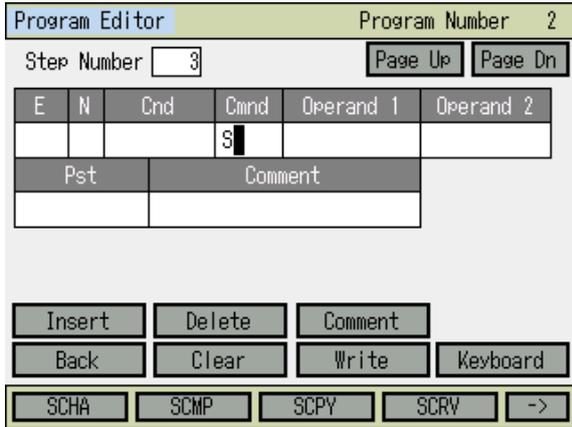
Either touch in Cmnd input box, or use  key or the return key to move the cursor to Cmnd input box.



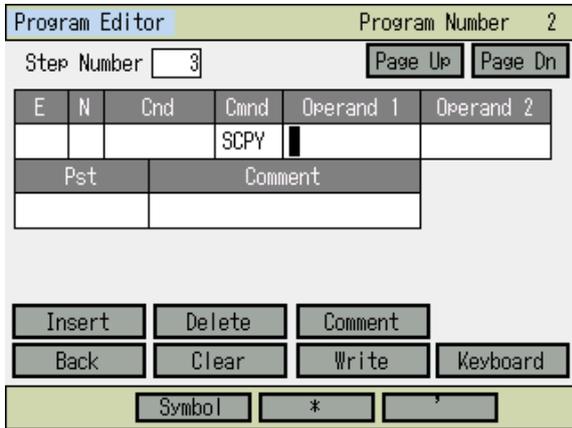
Touch **Keyboard** button to show the touch panel keyboard.



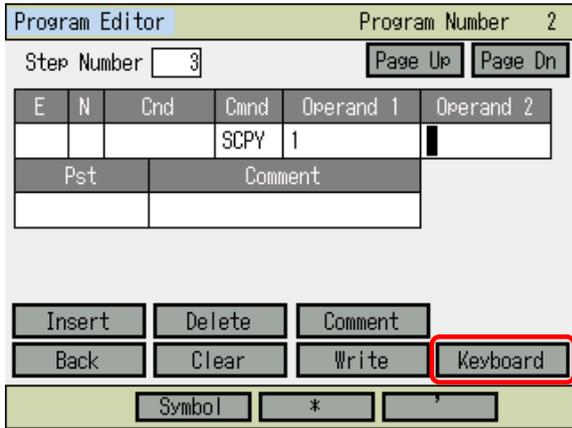
Input SCPY and touch **ENT**. The touch panel keyboard closes and SCPY is displayed in Cmnd box.



When you want to use the hardware keys, press **1**. (Every time you press **1** key, the letter changes in the order of S→T→U.) Commands start with S will be displayed in the function box. By using **SF** key (for next command) or **.** key (for previous command), you can search for commands. Also, if you press **7** key three times after S is shown, C is displayed and commands start with SC will appear in the function box. Once a command is selected with the function keys, the selected command is shown in Cmd box. Press the return key for confirmation. All the process can be performed on the hardware numeric keys. (inputting **177763** **↵** will make SCPY)



With the cursor being in Operand 1 box, touch **Keyboard** button to show the touch panel keyboard. Input 1 and touch **ENT** button.

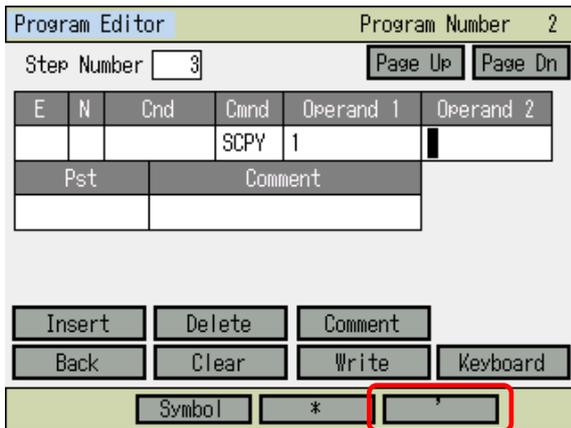


The touch panel closes and the cursor moves to Operand 2.

Touch **Keyboard** button to show the touch panel keyboard.



Input '1234 and touch **ENT** button.



When you want to use the hardware keys, press **F4** (') key and then **F1** key to switch to Num input, and input 1234 on the numeric keys.

Program Editor Program Number 2

Step Number  Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			SCPY	1	'1234
Pst		Comment			

Either touch **Write** button or press **WRT** key to transfer the data in Step No. 3 to the controller. The step proceeds to No. 4.

When the screen is changed with the **Page Up** and **Page Dn** buttons, **ESC** key, **Back** button before data transfer, the input data becomes invalid.

Finish the program input. Return to the Flash ROM writing screen by using the **Back** button or **ESC** key. Follow "10.7 Flash ROM Writing" to conduct the flash ROM writing.

[For Operand Binary/Hexadecimal Digit Input]

For XSEL-RA/SA/RAX/SAX/RAXD/SAXD, binary/hexadecimal digits can be used for Operand 1 and 2.

- Only constant value can be used. They cannot be used for indirection.
- When binary digits are to be used, input them each with "&B" before the value, and hexadecimal digits are to be used, "&H" before the value (When there is no such prefix, the figures are treated as decimal digits).
  - \* When Operand is for axis pattern, input the figure without prefix "&B" (The figure is treated as binary digit).
- For binary/Hexadecimal digits, max. 8 figures can be input.
- For binary digits, they are treated as integral numbers without codes (ex. &B11111111 = 255). For hexadecimal digits, they are treated as integral numbers with codes (ex. &HFFFFFFF = -1).
- Even in the case that binary/hexadecimal digits are to be used, the input range is unchanged.
- In the case that the program using binary/hexadecimal digits is backed up and transmitted to the incompatible controller, the binary/hexadecimal digits are converted to decimal numbers.

## 10.2 Symbol Input During Program Edit

Symbol input is available when the cursor is on Operand 1 or 2 (Operation 1 or 2) or Pst (output).

Method 1: Read out the symbol edit screen to have symbol registration and it becomes available.

Method 2: In case symbol registration has already been conducted, direct input is available from the touch panel keyboard.

Example:

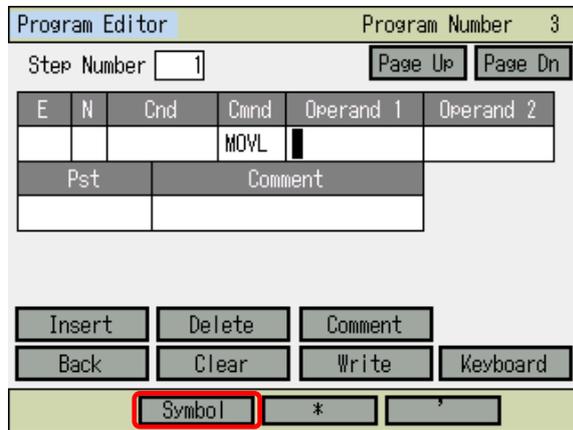
Input of following program steps

Program No. 3

No.	E	N	Cnd	Cmd	Operand1	Operand2	Pst	Comment
1				MOVL	TAIKIITI			

Position No. 10 is registered as 'TAIKIITI'.

### 10.2.1 Input by Symbol Edit Screen



Program Editor Program Number 3

Step Number 1 Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			MOVL		
Pst			Comment		

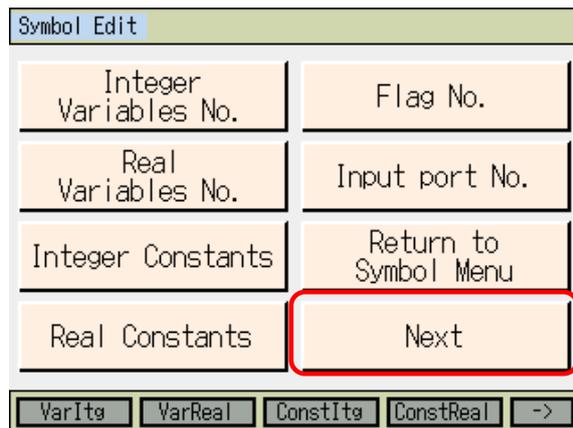
Insert Delete Comment

Back Clear Write Keyboard

Symbol \* ,

Select the **F2** (Symbol) key in the function key area within the state of the cursor that has been located in the Operand 1 section.

Move to the symbol menu screen.

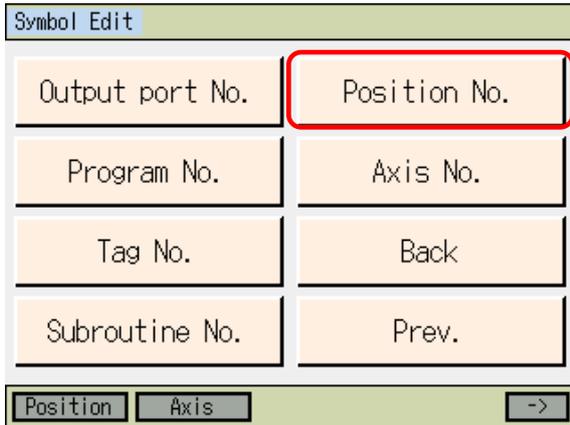


Symbol Edit

Integer Variables No.	Flag No.
Real Variables No.	Input port No.
Integer Constants	Return to Symbol Menu
Real Constants	Next

VarIts VarReal ConstIts ConstReal ->

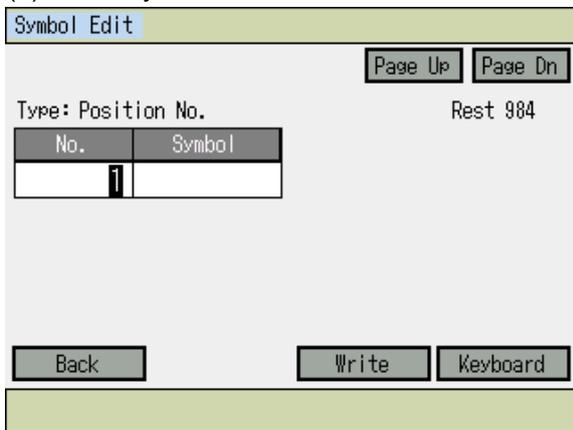
Touch **Next** button several times or press **SF** key several times to make **Position No.** button (function: Position) appear.



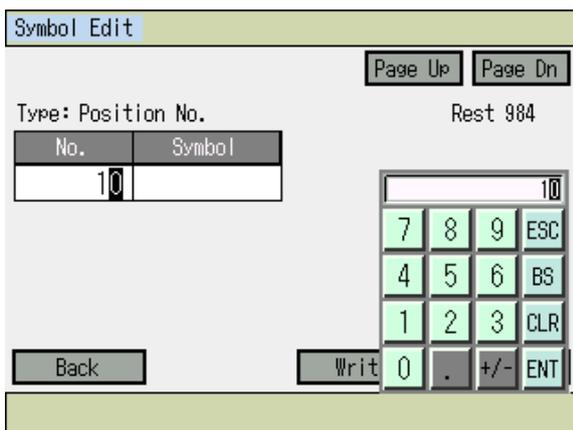
Either touch **Position No.** button or press function (Position) key.

\* The position of the button may differ depending on the connected controller.

(1) When Symbol Not Defined



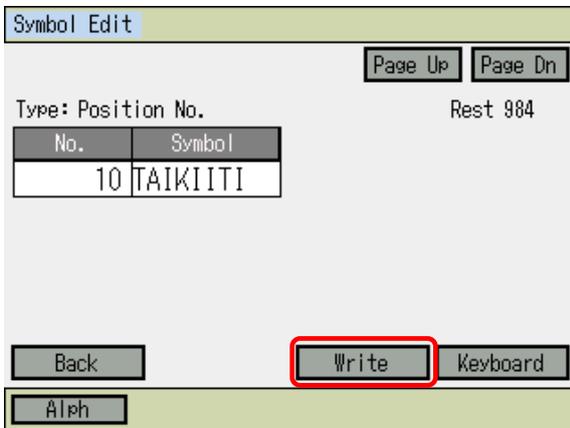
Touch **Keyboard** button to show the touch panel numeric keys, or input 10 on the hardware numeric keys and press the return key.



Input 10 on the touch panel numeric keys and then touch **ENT** button. Touch panel keyboard will close.

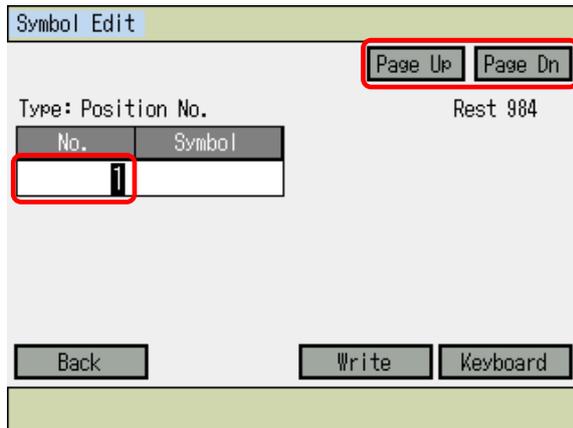


With the cursor being in the symbol input box, touch **Keyboard** button. Input 'TAIKIITI' on the touch panel keyboard and touch **ENT** button. (If you touch **CAP** button, the keyboard changes to capital-letter input. If you touch **CAP** button again, it goes back to small-letter input.) Without showing the touch panel keyboard, it is available to input on the hardware numeric keys.

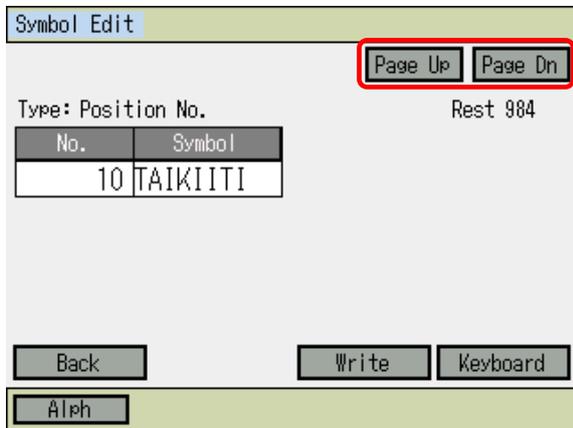


Either touch **Write** button or press **WRT** key to transfer the symbol data to the controller. Once the transfer to the controller is complete, the display returns to the original program edit screen.

(2) When There is Symbol Definition



Either input directly a number with using the touch panel keyboard or hardware keys, or switch over the display with using **PageUp** and **PageDn** buttons or **PAGE UP** and **PAGE DOWN** keys to display the symbols ('TAIKIITI' in this case) that you may want to input.



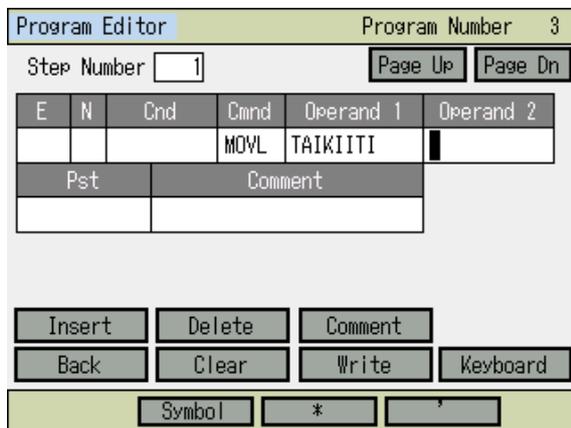
Either touch **Write** button or press **WRT** key to transfer the symbol data to the controller. Once the transfer to the controller is complete, the display returns to the original program edit screen.

### 10.2.2 Input with Touch Panel and Keyboard



With the cursor being in Operand 1 box, touch **Keyboard** button to show the touch panel keyboard. Input 'TAIKIITI' and touch **ENT** button.

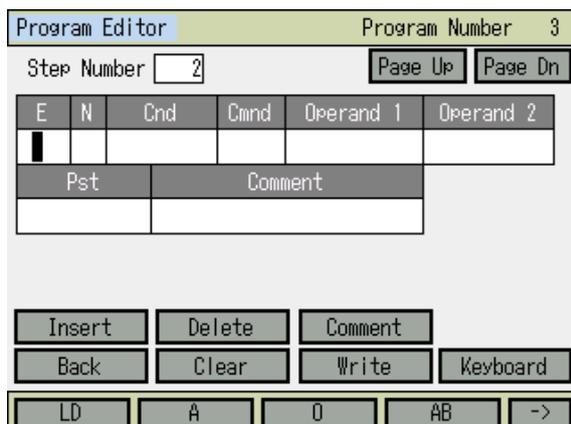
\* It is not available to use the hardware numeric keys to directly input the symbols.



The touch panel key board closes and the cursor moves to Operand 2.

Either touch **Write** button or press **WRT** key to transfer this program step data to the controller.

To finish the program input, return to the Flash ROM writing screen by using the **ESC** key or **Back** button. Follow "10.7 Flash ROM Writing" to conduct the flash ROM writing.

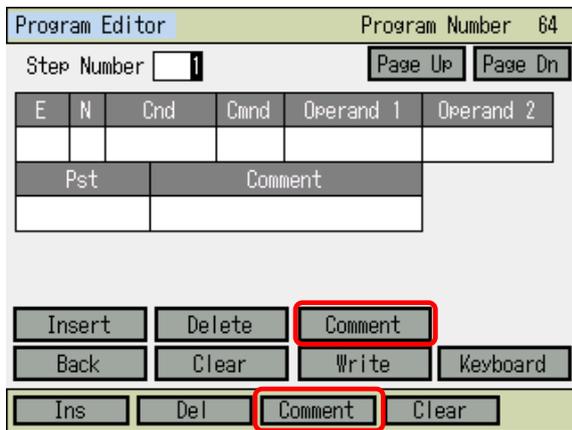


The step data moves to No. 2.

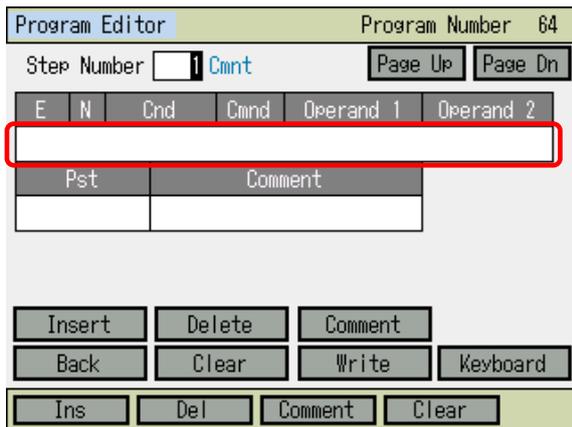
### 10.3 Single Line Comment Input

Turns a step from a program into a comment (invalid step) and you can input numbers, alphabets and signs.

The step number for commentating gets displayed.



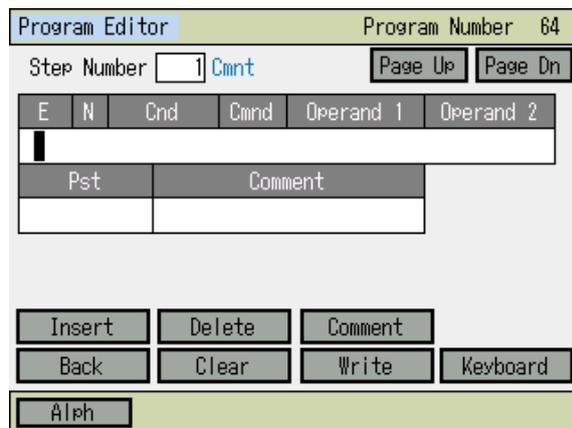
Either touch **Comment** button or press **F3** (Comment) key.



'Cmnt' gets displayed after the Step Number. Also, in the input box at the bottom, the boundaries such as E and N get removed.

Touch in the input box or press the return key on the hardware numeric keys.

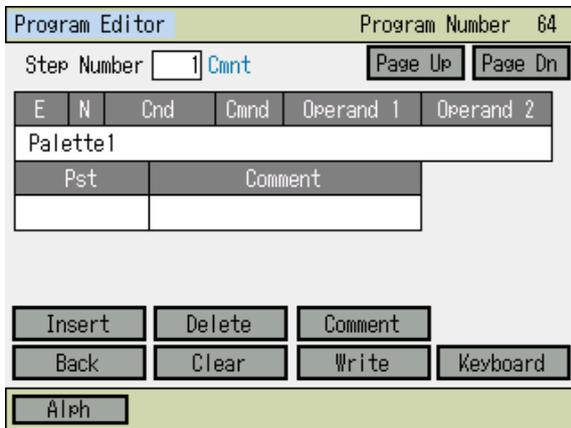
\* If you touched **Comment** button to choose single line comment mode, touch the input box.



The cursor gets displayed in the input box. Touch **Keyboard** button to show the touch panel keyboard.

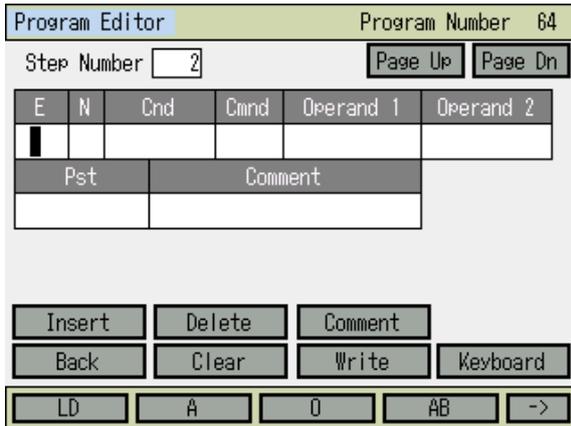


Input desirable letters on the keyboard. Shown in the figure on the left is an example for when Palette1 is input. (To input capital letters, touch **CAP** key or **SHIFT** key to switch the mode.) Touch **ENT** for confirmation. It is also available to input on the hardware numeric keys without displaying the touch panel keyboard.



Once the comment input is finished, either touch **Write** button or press **WRT** key to transfer the input data to the controller.

When the screen is changed with the **Page Up** and **Page Dn** buttons, **ESC** key, **Back** button before data transfer, the input data becomes invalid.



The screen moves onto the next step.

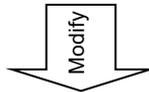
To finish the program input, return to the Flash ROM writing screen by using the **ESC** key or **Back** button. Follow "10.7 Flash ROM Writing" to conduct the flash ROM writing.

## 10.4 To Change Program Steps

Program No. 4

It is assumed the programs listed below are already input.

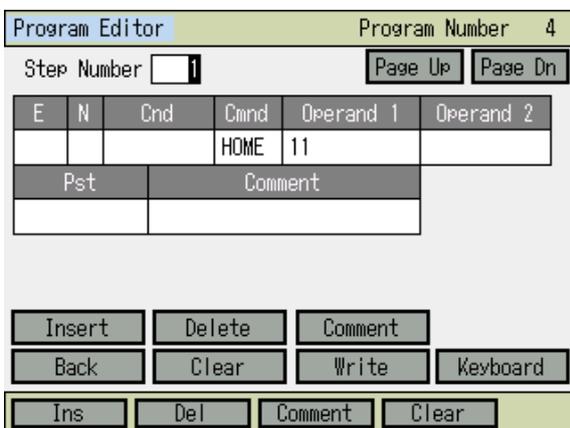
No.	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1				HOME	11			
2				VEL	100			
3				MOVL	1			
4				MOVL	2			
5				MOVL	3			
6				MOVL	4			
7				MOVL	5			
8				MOVL	6			
9				EXIT				



No.	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1				HOME	11			
2				VEL	100			
3				TAG	1			
4				MOVL	1			
5				MOVL	2			
6				MOVL	3			
7				MOVL	4			
8				<del>MOVL</del>	<del>5</del>			
9				GOTO	1			

(Insert TAG1 to Step 3, inactivate MOVL5 (single line comment), delete MOVL6 and overwrite GOTO1 to EXIT)

Open Program No. 4.



Program Editor Program Number 4

Step Number  Page Up Page Dn

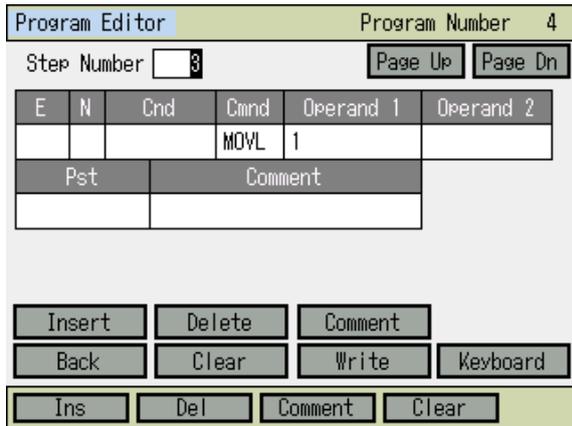
E	N	Cnd	Cmnd	Operand 1	Operand 2
			HOME	11	
Pst		Comment			

Insert Delete Comment

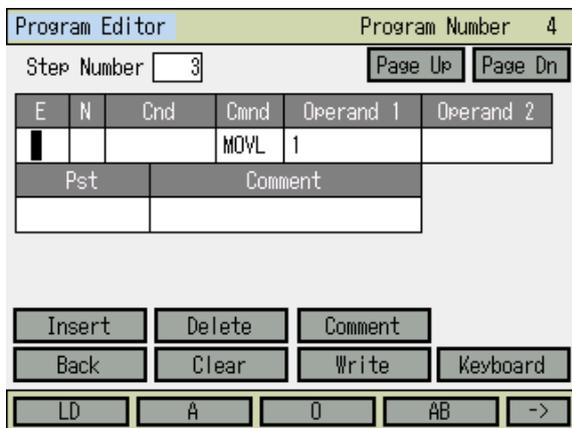
Back Clear Write Keyboard

Ins Del Comment Clear

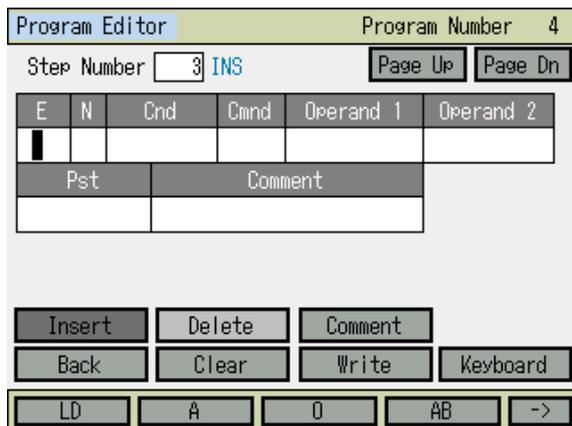
Insert a single line step between Program Steps No. 2 and No. 3. With the cursor being in the step number input box, input 3 either on the touch panel numeric keys or the hardware numeric keys, or touch **Page Up** button two times or press **PAGE UP** key two times to show 3.



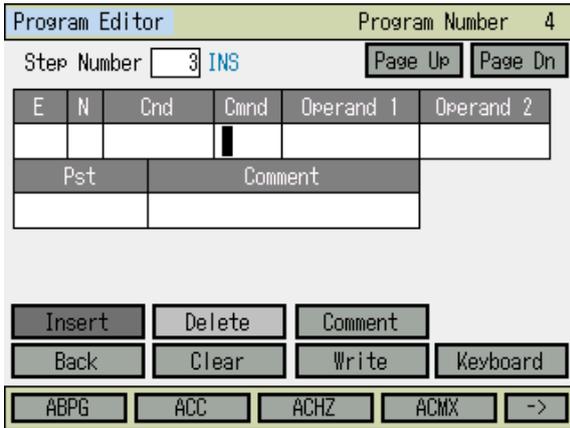
When 3 is displayed with Page Up function as shown in the figure on the left, either touch **Insert** button or press **F1** (Ins) key.



In the figure in the left, when 3 is input in the step number to show it, the cursor moves to the 'E' box. If you want to have the function keys to get in the insertion mode, either touch in the step number box or press **ESC** key to show the cursor in the step number box. Touch **Insert** button.



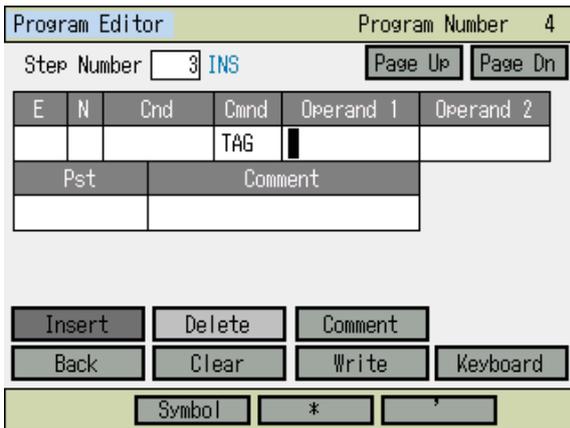
'INS' is displayed beside the step number box, which shows that the condition is now in the insertion mode. When the cursor is in the step number box, press the return key to move the cursor to E box.



Touch in Cmnd input box or use key to show the cursor in Cmnd box.  
Touch button to show the touch panel keyboard.



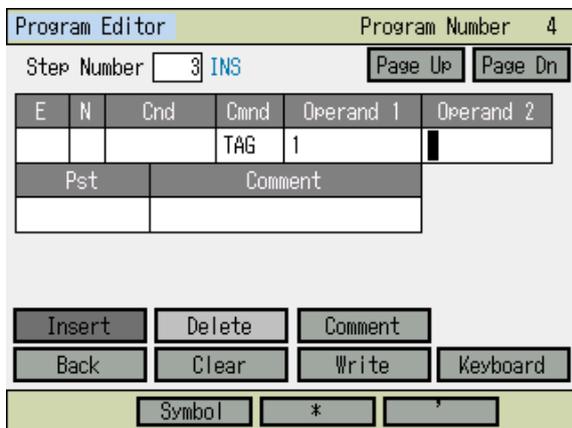
Input TAG and touch .  
When you want to input on the function keys, without using the touch panel keyboard, press on the hardware numeric keys two times. Display TAG by using key and key to input.



Touch button again to show the touch panel keyboard.  
If you do not use the touch panel keyboard, press on the hardware numeric keys and press return.

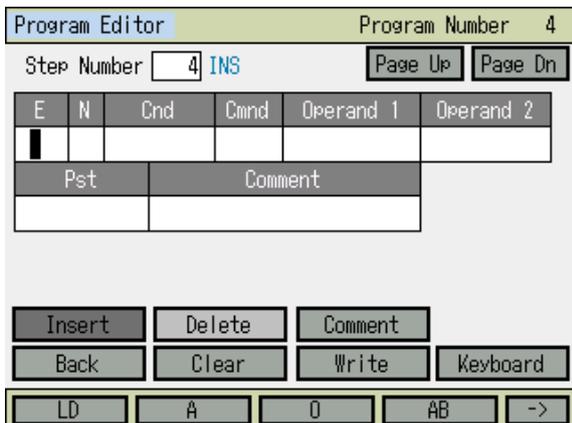


Input 1 and touch **ENT**.



Either touch **Write** button or press **WRT** key to transfer the program data to the controller.

When the screen is changed with the **Page Up** and **Page Dn** buttons, **ESC** key, **Back** button before data transfer, the input data becomes invalid.



Touch **Insert** button or press **ESC** key two times to show the data in Step No. 4.

Program Editor Program Number 4

Step Number  Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
█			MOVL	1	
Pst		Comment			

Insert Delete Comment

Back Clear Write Keyboard

LD A 0 AB ->

Inactivate MOVL5 next.  
 Either touch in the step number input box or press **ESC** key one time to show the cursor in the step input box, and input 8 on either the touch panel numeric keys or the hardware numeric keys.  
 Or, use **Page UP** button to show MOVL5.

Program Editor Program Number 4

Step Number  Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			MOVL	5	
Pst		Comment			

Insert Delete Comment

Back Clear Write Keyboard

Ins Del Comment Clear

Either touch **Comment** button or press **F3** (Comment) key.  
**F3** (Comment) key would not be displayed if the cursor is not in the step number box.

Program Editor Program Number 4

Step Number  Cmnt Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			MOVL	5	
Pst		Comment			

Insert Delete Comment

Back Clear Write Keyboard

Ins Del Comment Clear

'Cmnt' is displayed beside the step number box.  
 To cancel the invalid condition, either touch **Comment** button or press **F3** (Comment) key again.  
 Either touch **Write** button or press **WRT** key to transfer the program data to the controller.  
 If the valid step is inactivated, input of desirable letters is invalid.

Program Editor Program Number 4

Step Number 8 Cmnt Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			MOVL	5	
Pst		Comment			

Insert Delete Comment

Back Clear Write Keyboard

Ins Del Comment Clear

When the screen is changed with the Page Up and Page Dn buttons, ESC key, Back button before data transfer, the input data becomes invalid.

The step proceeds to No. 9.

Delete Step No. 9 next.

Either touch Delete button or press F2 (Del) key.

Program Editor Program Number 4

Step Number 9

E	N	Cnd	Cmd	Operand 1	Operand 2
			MOVL	6	
Pst		Comment			

Do you want to delete this program data?

Yes No

Del

Either touch Yes button or press F1 (Del) key. (To cancel deletion, either touch No button or press ESC key.)

Program Editor Program Number 4

Step Number 9 Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			EXIT		
Pst		Comment			

Insert Delete Comment

Back Clear Write Keyboard

Ins Del Comment Clear

Touch in Cmd box or use the return key and key to show the cursor in Cmd box.

Program Editor Program Number 4

Step Number 9 Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			EXIT		
Pst		Comment			

Insert Delete Comment

Back Clear Write Keyboard

ABPG ACC ACHZ ACMX ->

Touch **Keyboard** button to show the touch panel keyboard.

Program Editor Program Number 4

Step Number 9 Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			GOTO		
Pst		Comment			

ESC 1 2 3 4 5 6 7 8 9 0 - = BS

TAB Q W E R T Y U I O P [ ]

CAP A S D F G H J K L ; '

SHIFT Z X C V B N M , . / ENT

Ctrl Alt ¥ ↓ ↑ ← →

ABPG ACC ACHZ ACMX ->

Input GOTO on the touch panel keyboard and then touch **ENT**. Hardware numeric keys and function keys are also available for input.

Program Editor Program Number 4

Step Number 9 Page Up Page Dn

E	N	Cnd	Cmd	Operand 1	Operand 2
			GOTO		
Pst		Comment			

Insert Delete Comment

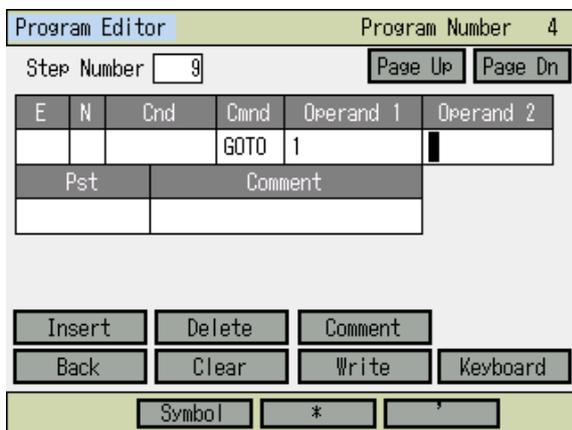
Back Clear Write Keyboard

Symbol \* '

Input in Operand 1 box the value same as what was input in Operand 1 box in 'TAG'. Touch **Keyboard** button to show the touch panel keyboard. It is also available to input 1 on the hardware numeric keys and press the return key.

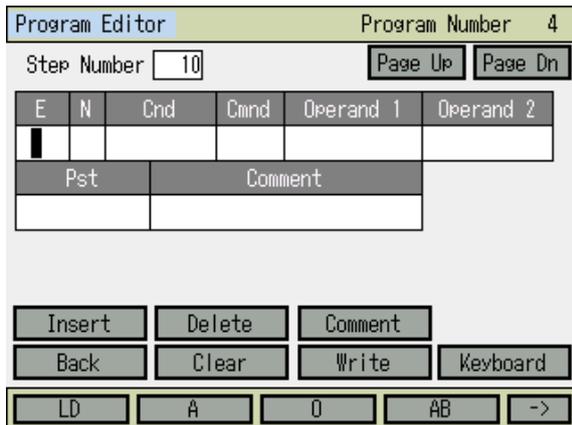


Input 1 and touch **ENT**.

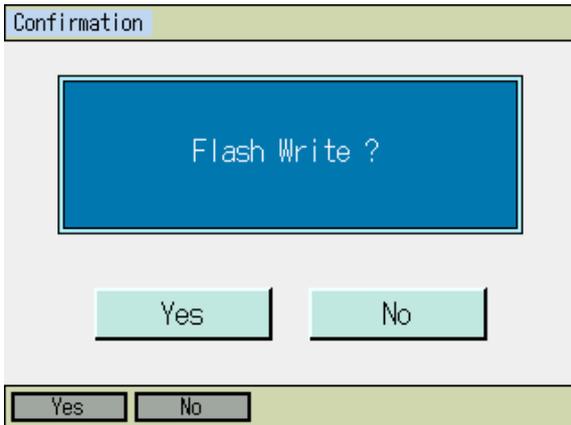


Either touch **Write** button or press **WRT** key.

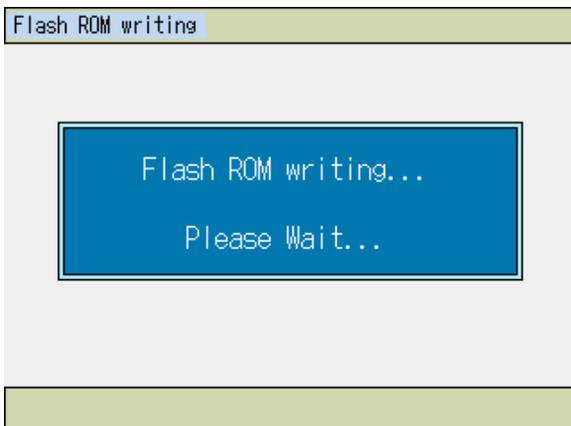
When the screen is changed with the **Page Up** and **Page Dn** buttons, **ESC** key, **Back** button before data transfer, the input data becomes invalid.



Touch **Back** button or **Cancel** button to go to the flash ROM writing screen.  
Or press **ESC** key several times to go to the flash ROM writing screen.

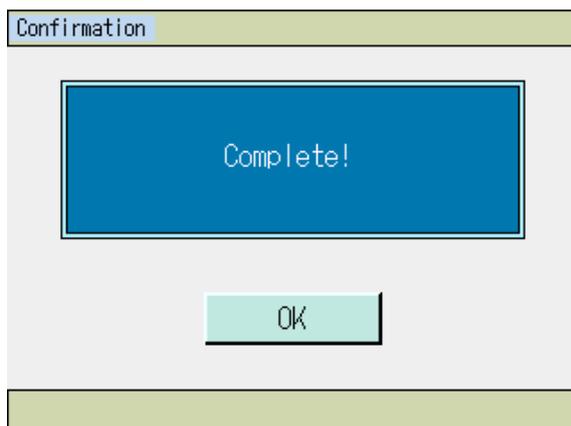


To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.  
If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

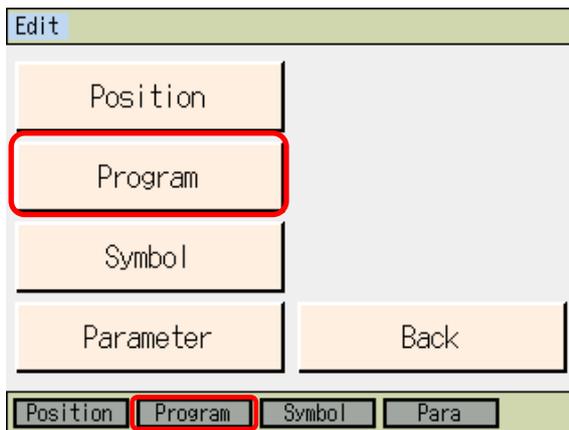
***Never turn off the power to the Controller at this time.***



Flash ROM writing is completed.  
Either touch **OK** button or press **ESC** key to return to the edit menu screen.

## 10.5 Program: Copy or Move

The following operating instructions are to copy or move a program to another program No.



Operation on touch panel : Touch **Edit** → **Program** → **Copy/Move**.

Operation on Function keys : Press **F1** (Edit) → **F2** (Program) → **F2** (Copy/Move).

Program Copy or Move

No.	Steps	Program Name
1	18	
2	3	
3	1	
4	9	
5	0	
6	0	
7	0	
8	0	

Page Up Page Dn

Remaining 9968

From

To

Copy

Move

Cancel

Keyboard

Copy Move

Copy/Origin Program Number

Copy/Destination Program Number

Touch **Keyboard** button and input the program number on the touch panel keyboard, or input the program number on the hardware numerical keys. If the cursor is in From or To box, touch the No. column in the table and the number you touched gets input in the box. The table can be changed with **Page Up** and **Page Dn** buttons.

When you want to copy, touch **Copy** button or press **F3** (Copy) key.  
 When you want to move, touch **Move** button or press **F4** (Move) key.  
 Execution Confirmation screen appears.

Confirmation

Program will be copied.  
Are you sure to continue?

Yes No

Yes No

To execute, touch **Yes** button or press **F1** (Yes) key. To cancel, touch **No** button or press **F2** (No) key.

Confirmation

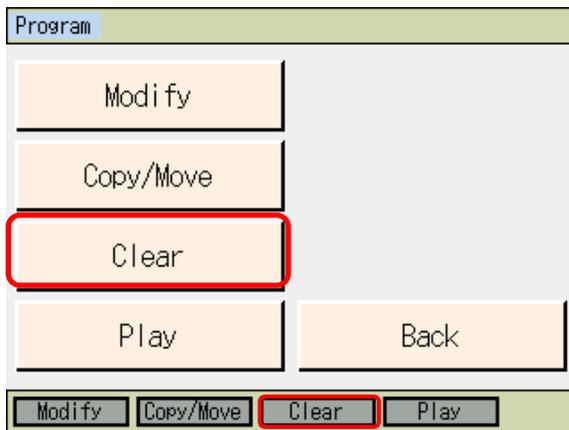
Complete!

OK

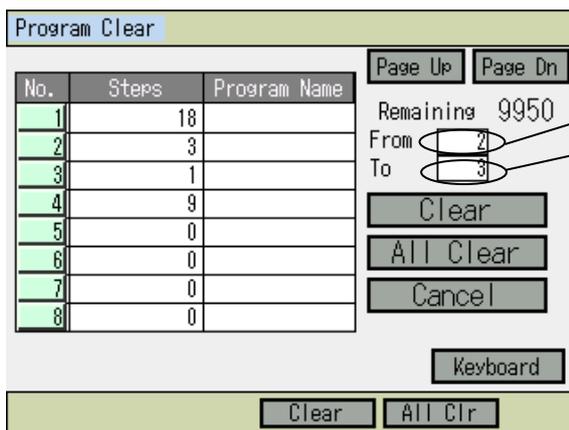
Touch **OK** button or press **ESC** key to go back to the previous screen. In addition, touch **Back** or **Cancel** button, or press **ESC** key several times to go to the flash ROM writing screen.

Follow "10.7 Flash ROM Writing" to conduct the flash ROM writing.

## 10.6 Program: Clear



Either touch **Clear** button or press **F3** (Clear) key in the program menu screen. Refer to Section 10.5 for how to go to the program menu screen.

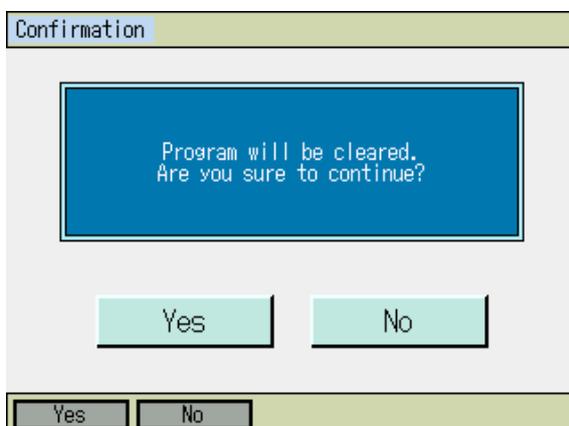


Top number to be deleted  
Last number to be deleted

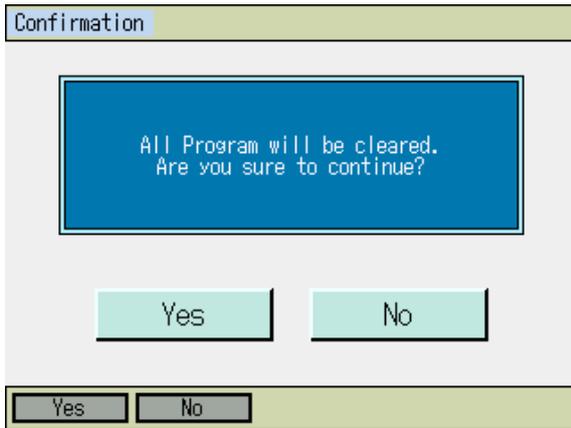
Input the program number to be deleted either on the touch panel numeric keys or the hardware numeric keys. To show the touch panel numeric keys, touch **Keyboard** button. If the cursor is in From or To box, touch the No. column and the number you touched gets set in From or To input box.

When the same number is input in the top number and the last number, just one program will be deleted.

Either touch **Clear** button or press **F3** (Clear) key, and the execution confirmation screen opens.

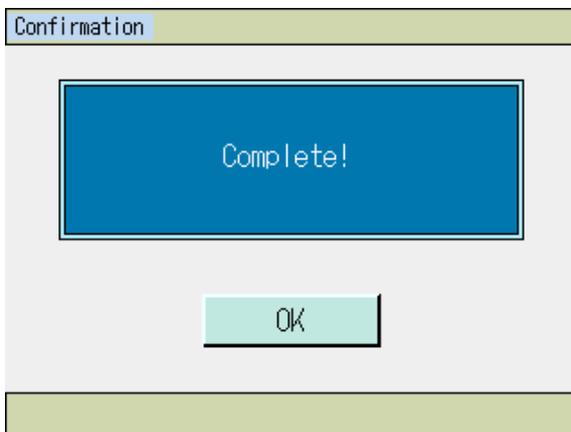


To execute, touch **Yes** button or press **F1** (Yes) key. To cancel, touch **No** button or press **F2** (No) key.



Touch **All Clear** button or press **F4** (All Clr) key in the program number select screen to delete all the programs.

To execute, touch **Yes** button or press **F1** (Yes) key. To cancel, touch **No** button or press **F2** (No) key.



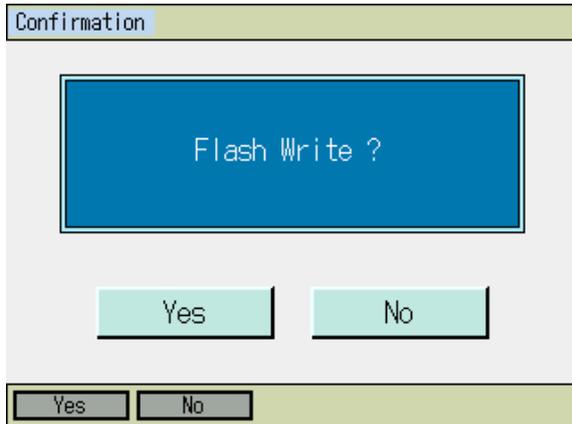
Touch **OK** button or press **ESC** key to go back to the previous screen. In addition, touch **Back** or **Cancel** button, or press **ESC** key several times to go to the flash ROM writing screen.

Follow "10.7 Flash ROM Writing" to conduct the flash ROM writing.

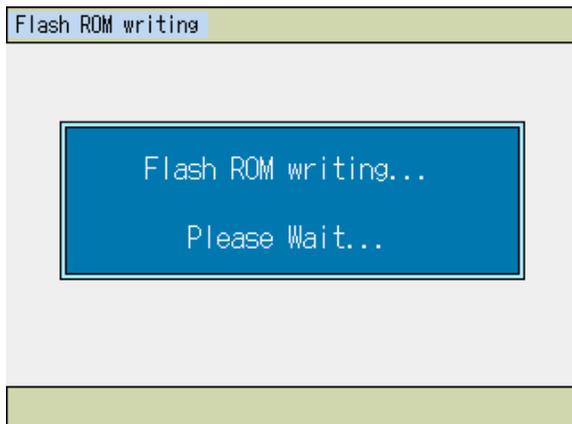
## 10.7 Flash ROM Writing

The edit data will be cleared by restoring the power and executing software reset, only if the program edit data was transmitted to the controller.

To save the data after restoring the power and executing software reset, write the data to Flash ROM. From the final editing screen, return to the Flash ROM writing screen with the **ESC** key or **Back** button.



To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key. If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

***Never turn off the power to the Controller at this time.***

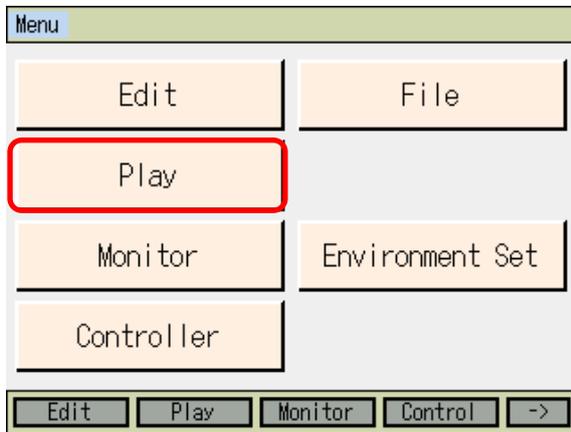


Flash ROM writing is completed. Either touch **OK** button or press **ESC** key to return to the edit menu screen.

## 11. Program Execution

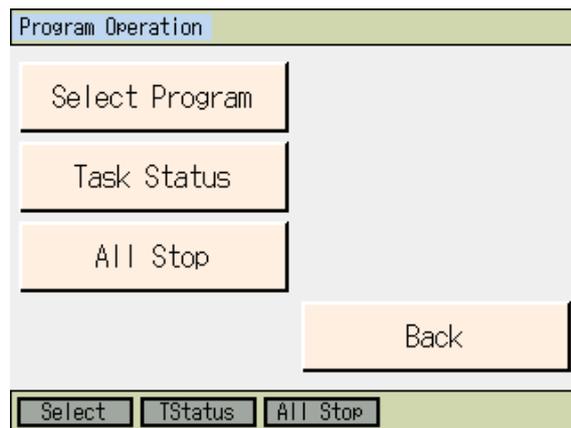
(Excluding the positioner mode of the SSEL, ASEL and PSEL controller.)

### 11.1 Operation Confirmation



Either touch **Play** button or press **F2** (Play) key in the main menu.

Also, in the program edit menu, there is **Play** button.



There are three items in the program operation menu.

Program Select : It opens the screen to select the program to be executed. (**F1** for function key)

Task Status : It opens the screen to show the task status. (**F2** for function key)

All Stop : It terminates all the programs. (**F3** for function key)

Select Program

No.	Steps	Program Name
1	18	
2	3	
3	1	
4	9	
5	0	
6	0	
7	0	
8	0	

Page Up Page Dn  
Remaining 9968

Cancel

No.

※Touch PrgNo, then go to play program

Input the program number that you want to have the program operation conducted in on the hardware numeric keys and press the return key, or touch the number column (the circled area in the left) in the table. To show No. 9 and further, use **Page Up** and **Page Dn** buttons to change the display.

Task Status

No.	Prg.	Sts	Lvl	Step	T	W	H	C
1	1	WAT	9	2	1	0	0	0
2								
3								
4								
5								
6								
7								
8								

Page Up Page Dn

Back

To show Task No. 9 and further, use **Page Up** and **Page Dn** buttons to change the display. Either touch **Back** button or press **ESC** key to return to Program Operation Menu screen.

- No. : Task No.
- Prg. : Program No.
- Sts : Task Status (Task status in OS administration inside) (For XSEL-J/K, the main application is applicable in Ver. 0.14 and later.)
- Lvl : Task Level
- Step: Step number in execution
- T : In execution stop command (Stop by step operation, stop at break point and stop by pause button)
- W : WAIT in process (In condition to wait for completion of TIMW, WTxx, WZxx, WRIT, READ, servo command, etc.)
- H : HOLD input (For XSEL-J/K, the main application is applicable in Ver. 0.26 and later.)
- C : CANC input (For XSEL-J/K, the main application is applicable in Ver. 0.26 and later.)

Once a program is selected in the program select screen, the display is switched to the following screen. (Figure below is the case Program No. 1 is selected.)

Select whether to operate one step by one or have the continuous operation.

Program Execution		Program No. 1				
Step No.		0				
E	N	Cnd	Cmnd	Operand 1	Operand 2	
Pst		Comment				
		Error	In port	Out port		
G-Flag	G-Var	Position	L-Flag	L-Var		
Back	Start	Step	Stop	Break		
Start		Step	PrgrErr	Brk	->	

Touch **Start** button or press **F1** (Start) key to start operation.

Start F1 (Start)      Stop F3 (Stop)

**Continuance Operation Mode**

Program Execution		Program No. 1				
Step No.		8 Run				
E	N	Cnd	Cmnd	Operand 1	Operand 2	
			MOVP	3		
Pst		Comment				
		Error	In port	Out port		
G-Flag	G-Var	Position	L-Flag	L-Var		
Back	Start	Suspend	Stop	Break		
Suspend		Stop	Brk	->		

Touch **Step** button or press **F2** (Step) key to start step operation.

Stop F3 (Stop)      Step F2 (Step)

**Step Operation Mode**

Program Execution		Program No. 1				
Step No.		2 Sus				
E	N	Cnd	Cmnd	Operand 1	Operand 2	
			DCLS	50		
Pst		Comment				
		Error	In port	Out port		
G-Flag	G-Var	Position	L-Flag	L-Var		
Back	Start	Step	Stop	Break		
Cont		Step	Stop	Brk ->		

Suspend F2 (Suspend) →

← Start F1 (Cont)

The screen shows the program step currently in execution. (Continuous operation related commands excluded)

Touch **Suspend** button or press **F2** (Suspend) key and the operation program switches to the step operation.

Touch **Stop** button or press **F3** (Stop) key to terminate the operation.

The screen shows the program step currently in execution, and then the next step.

Touch **Step** button or press **F2** (Step) key to execute one step.

Touch **Suspend** button or press **F1** (Cont) key and the operation program switches to the continuous operation.

Touch **Stop** button or press **F3** (Stop) key to terminate the operation.

**Caution:** When a teaching pendant is connected, the condition is in 'limited for safety speed'. Therefore, the maximum velocity for the orthogonal axis is limited to 250mm/sec or lower no matter the setting in the programs or parameters. The maximum velocity for the SCARA axis is limited to 250mm/sec or lower in CP operation, and 3% or less in PTP operation. Refer to "16.8 Safety Speed" for how to activate/inactivate the safety speed.

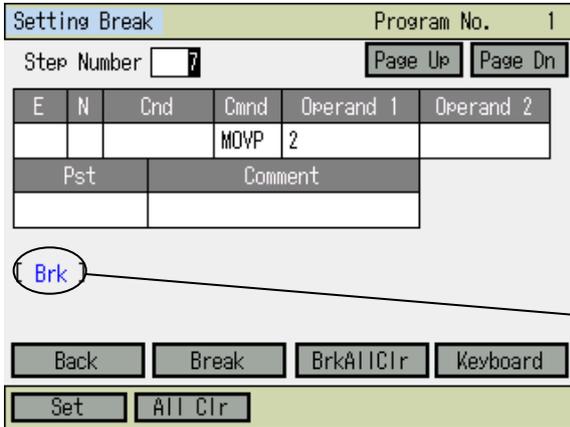
Program Execution					Program No.	1
Step No.		2 Sus				
E	N	Cnd	Cmd	Operand 1	Operand 2	
A	N	600	CPGE	200	*201	
Pst		Comment				
900						
Error		In port	Out port	InOut		
G-Flag	G-Var	Position	L-Flag	L-Var		
Back	Start	Step	Stop	Break		
Cont	Step	Stop	Brk	->		

Example of Screen When Connecting Model Applicable for Input and Output Ports

## 11.2 Setting of Brake Point

Brake point can be set with the continuance operation.

Either touch **Break** button or press **F4** (Brk) key in the operation mode select screen or operation mode screen.

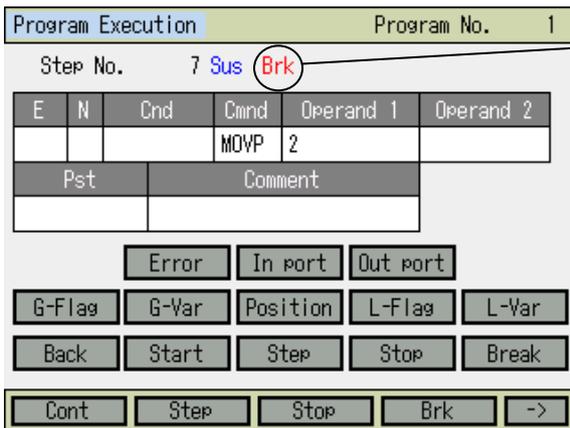


E	N	Cnd	Cmd	Operand 1	Operand 2
			MOVP	2	
Pst		Comment			

Either directly input the step number to set the brake point on the touch panel numeric keys or the hardware numeric keys, or select the step number with using **Page Up** and **Page Dn** buttons.

The brake point is set and cancelled every time you touch **Break** button or press **F1** (Set) key.

Brk: Set brake point  
Blank: Release brake point



E	N	Cnd	Cmd	Operand 1	Operand 2
			MOVP	2	
Pst		Comment			

Showing stopped at brake point

When the continuous operation is carried out with the brake point setting established, the program gets paused before executing a command in the step number that the setting is conducted in. To resume the continuous operation after the pause, either touch **Start** button or press **F1** (Cont) key. Also, if you touch **Step** button or press **F2** (Step) key, the step operation starts executed. The brake points are all cleared if the power supply to the controller is turned OFF/ON or the software reset is conducted.

### 11.3 Monitoring in Program Operation

The current position of the actuator and the data in the local and global domains can be monitored during the continuous operation or step operation.

To show the function keys, press **[SF]** key in the screen for the continuous operation mode or step operation mode.

(1) Display the Current Position

Display the current position of the actuators.

Touch **[Cur pos.]** button in the operation mode screen. For the function keys, press **[F1]** (Position) key. (When assignment is not found, press **[SF]** key to switch the display.)

Orthogonal Axis

No.	Current Position	SV
1	76.635	SV
2	116.880	SV
3	0.000	SV

SCARA Axis

No.	Current Position	SV
1	134.658	SV
2	479.066	SV
3	-6.476	SV
4	3.806	SV

AxisNo. 1-4  
Crd. type W 0  
Chg Crd.

Multi-Axis

No.	Current Position	SV
1	500.000	SV
2	0.000	SV
3	0.000	SV
4	0.000	SV
5	493.597	SV
6	0.771	SV
7	-16.969	SV
8	111.247	SV

AxisNo. 1-4  
Crd. type W 0  
Chg Crd.

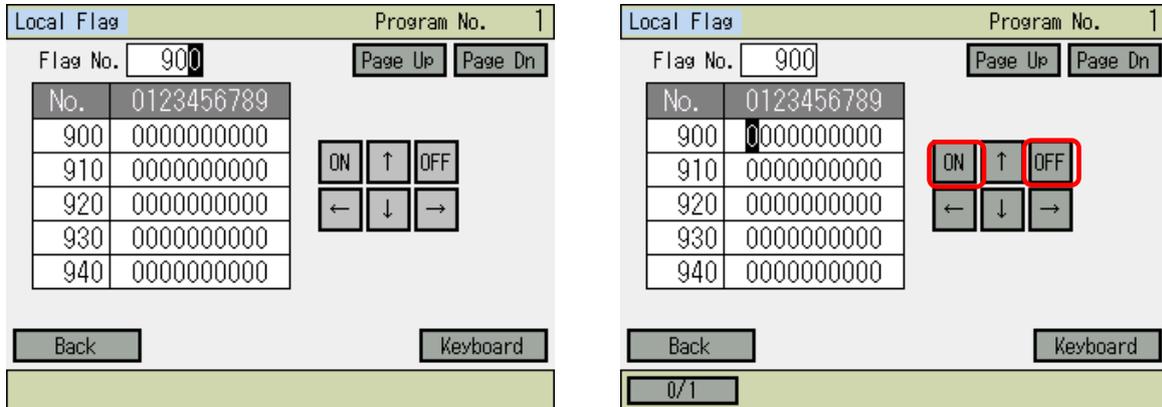
AxisNo. 5-8  
Crd. type W 0  
Chg Crd.

For XSEL-RXD/SXD and RAXD/SAXD Controllers For SCARA type, the coordinate system type to show can be switched.

## (2) Local Flag

This is the local flag ON/OFF display. It can be switched ON/OFF.

Touch **L-Flag** button in the operation mode screen. For the function keys, press **F2** (LFlag) key.



When the cursor is in the flag data box as the figure on the top right shows, switchover of ON/OFF is available for the flag which the cursor is placed on.

To move the cursor from a flag number box to a flag data box, either press the return key in the flag number box or touch a flag data box.

To switch on/off at the cursor place, either touch **ON** or **OFF** button in the touch panel, or press **F1** (0/1) key for switchover.

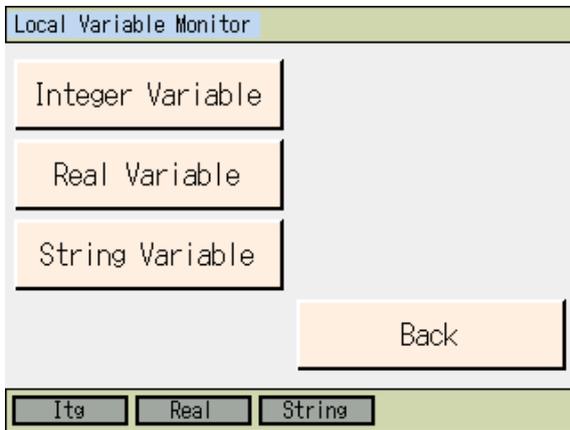
To move the cursor, either touch **←** **↑** **↓** **→** in the touch panel or press **←** **▲** **▼** **▶** keys.

Every touch of **Page Up** and **Page Dn** buttons scrolls up/down the flag numbers by 50 items. (**PAGE UP** and **PAGE DOWN** keys also scroll in 50.)

### (3) Local Variables

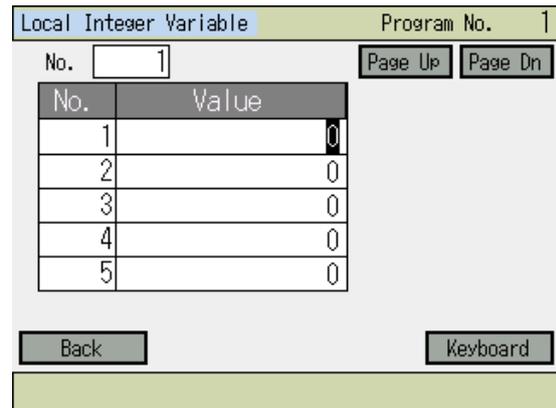
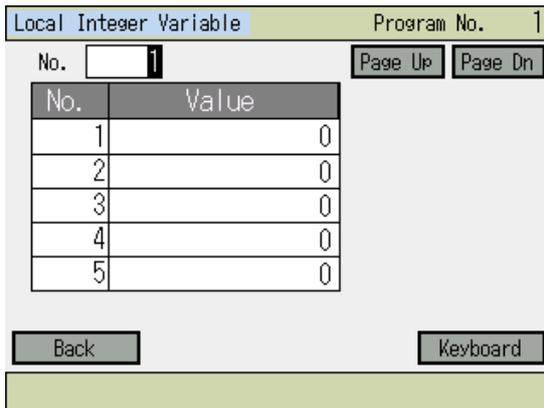
Displays the contents of the local variables and the local strings. Moreover, values can be substituted for a local variable and the character sequence can be substituted for a local string.

Touch **L-Var** button in Operation Mode screen. For function keys, press **F3** (LVar) key.



There are three types of local variables. Touch each button to show each monitor screen. The function keys are assigned as stated below.  
 F1 (Itg) : Integer Variables  
 F2 (Real) : Real Variables  
 F3 (String) : String Variables

#### 1) Local Integer Variables



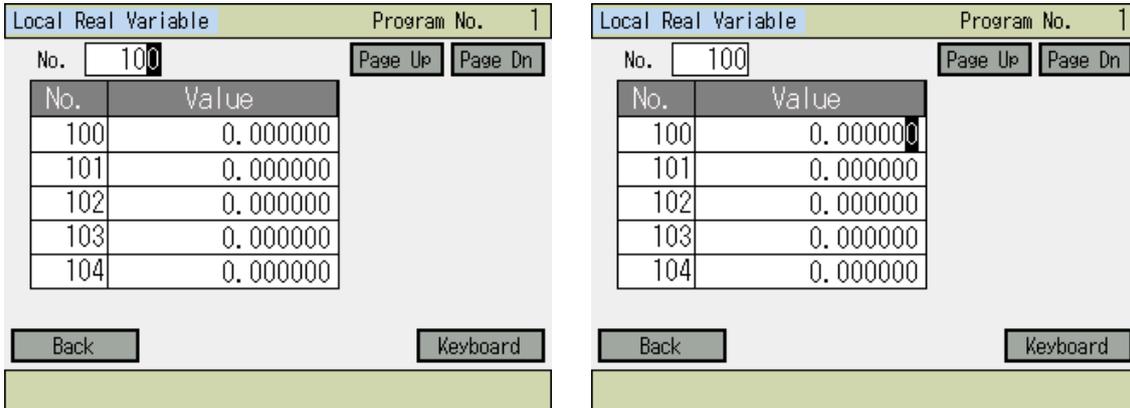
When the Local Integer Variable screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons.

Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box.

The data with the cursor placed on can be substituted by inputting on the touch panel numeric keys and touching **ENT** button. It is also available to use the hardware numeric keys to input a value and press the return key for substitution.

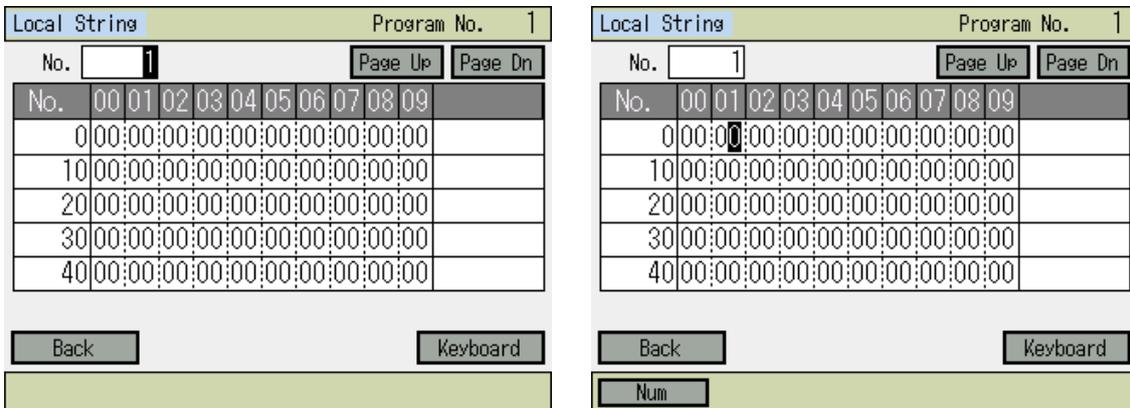
To move the cursor, either touch in the Value input box or press **▲** and **▼** keys.

## 2) Local Real Variables

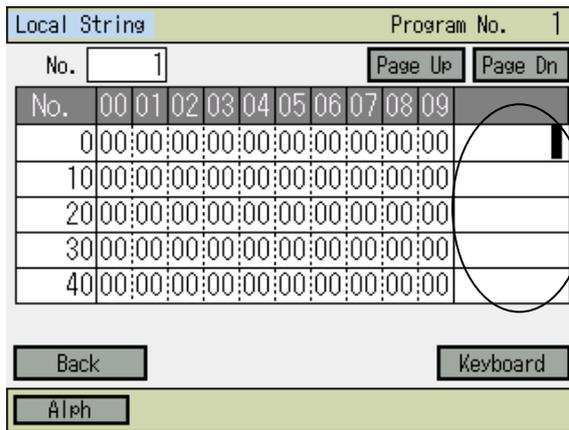


When the Local Real Variable screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons. Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box. The data with the cursor placed on can be substituted by inputting on the touch panel numeric keys and touching **ENT** button. It is also available to use the hardware numeric keys to input a value and press the return key for substitution. To move the cursor, either touch in the Value input box or press **▲** and **▼** keys.

## 3) Local String Variables



When the Local String variable screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons. Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box. The data with the cursor placed on can be substituted by inputting ASCII code on the touch panel numeric keys and touching **ENT** button. It is also available to use the hardware numeric keys to input a value and press the return key for substitution. To input A to F in the hexadecimal system, press **Alph/Num** key and switch the mode to **Alph**.



Character strings display and input box

Touch in a character strings display and input box to show the cursor in it, and input of character strings is available.

Touch **Keyboard** button to show the touch panel keyboard, or use the hardware numeric keys to input.

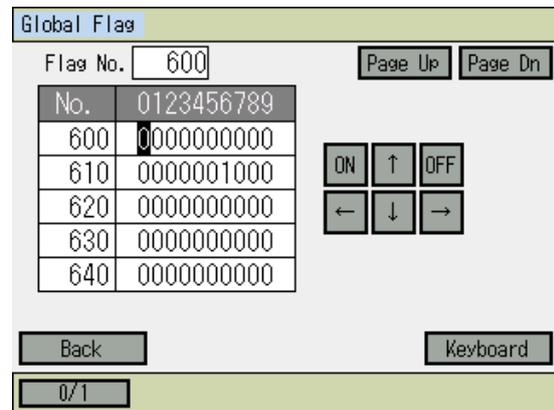
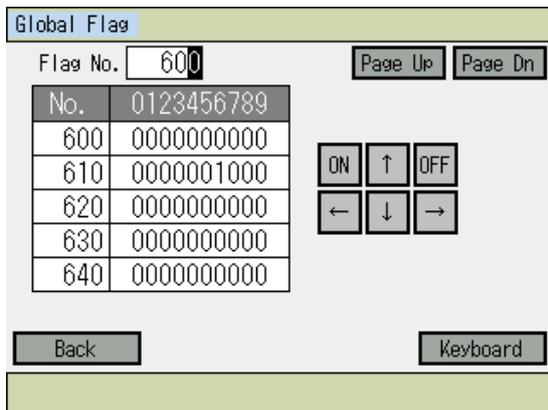
To move the cursor, touch on an area that you want to place it as the cursor cannot be moved with **◀ ▶ ▲ ▼** keys between the character strings display and input box and the data box.

In the character display column, only alphabetical and numerical letters and half-size font Kana characters can be displayed. Input is available only with the alphabetical and numerical letters.

(4) Global Flag

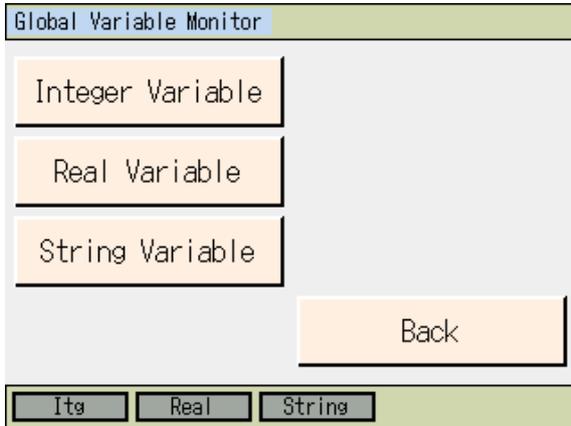
It shows the status ON/OFF of the global flags. In this screen, the global flags can be switched ON/OFF.

Touch **G-Flag** button in Operation Mode screen. For function keys, press **F2** (GFlag) key. When the function is not shown, use **SF** key to make it appear.



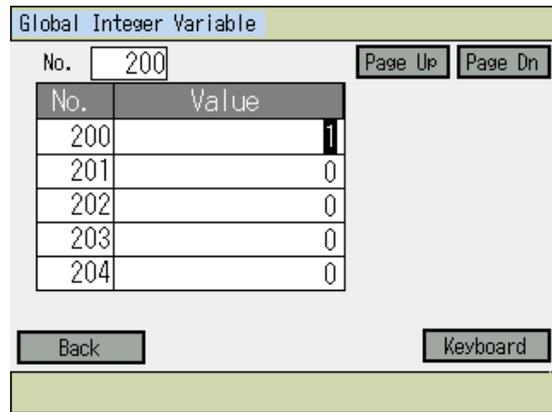
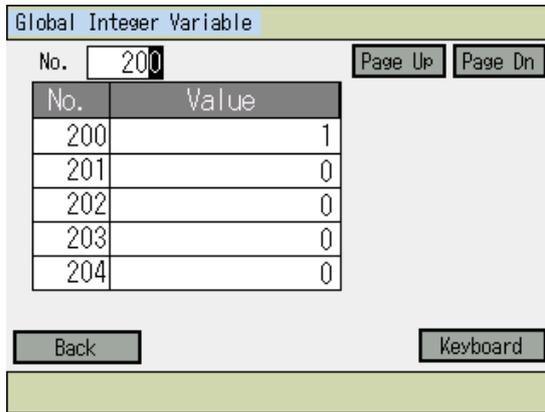
The way to operate is the same as (2) Local Flag.

(5) Global Variables



There are three types of global variables.  
 Touch each button to show each monitor screen.  
 The function keys are assigned as stated below.  
 F1 (Itg) : Integer Variables  
 F2 (Real) : Real Variables  
 F3 (String) : String Variables

1) Global Integer variables



When the Global Integer Variable screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons. Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box. The way to substitute a value is the same as (3) 1) Local Integer Variables.

## 2) Global Real Variables

Global Real Variable

No.  Page Up Page Dn

No.	Value
300	0.230000
301	0.000000
302	0.000000
303	0.000000
304	0.000000

Back Keyboard

Global Real Variable

No.  Page Up Page Dn

No.	Value
300	0.230000
301	0.000000
302	0.000000
303	0.000000
304	0.000000

Back Keyboard

When the Global Real Variable screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons. Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box. The way to substitute a value is the same as (3) 2) Local Real Variables.

## 3) Global String Variables

Global String

No.  Page Up Page Dn

No.	00 01 02 03 04 05 06 07 08 09
300	00:00:00:00:00:00:00:00:00:00
310	00:00:00:00:00:00:00:00:00:00
320	00:00:00:00:00:00:00:00:00:00
330	00:00:00:00:00:00:00:00:00:00
340	00:00:00:00:00:00:00:00:00:00

Back Keyboard

Global String

No.  Page Up Page Dn

No.	00 01 02 03 04 05 06 07 08 09
300	00:00:00:00:00:00:00:00:00:00
310	00:00:00:00:00:00:00:00:00:00
320	00:00:00:00:00:00:00:00:00:00
330	00:00:00:00:00:00:00:00:00:00
340	00:00:00:00:00:00:00:00:00:00

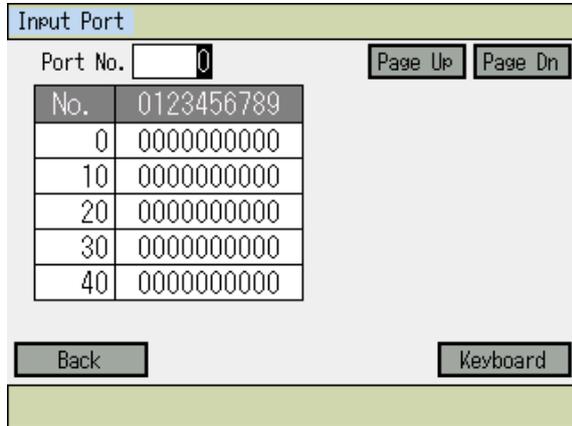
Back Keyboard

Num

When the Global String variable screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons. Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box. The way to substitute a value is the same as (3) 3) Local String Variables. In the character display column, only alphabetical and numerical letters and half-size font Kana characters can be displayed. Input is available only with the alphabetical and numerical letters.

### (6) Input Port

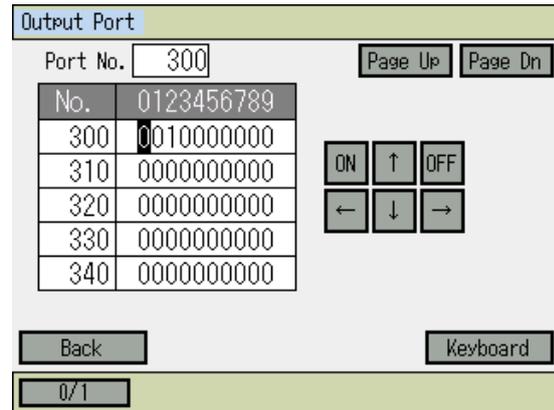
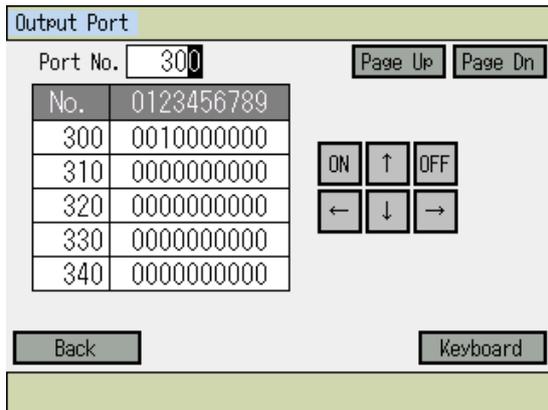
Touch **IN port** button. For function keys, press **F2** (InPort) key. When InPort function is not shown, use **SF** key to make it appear. (Press **SF** key three times from the initial screen to show it up.)



Touch **Keyboard** button to open the touch panel numeric keys, input a port number that you want to show, and touch **ENT** button for confirmation. It is also available on the hardware numeric keys. Every touch of **Page Up** and **Page Dn** buttons scrolls up/down the displayed input port numbers by 50 items.

### (7) Output Port

Touch **OUT port** button. For function keys, press **F3** (OutPort) key. When OutPort function is not shown, use **SF** key to make it appear. (Press **SF** key three times from the initial screen to show it up.)



When the cursor is in the flag data box as the figure on the top right shows, switchover of ON/OFF is available for the flag which the cursor is placed on.

To move the cursor from a port number box to an output port data box, either press the return key in the port number box or touch an output port data box.

To switch on/off at the cursor place, either touch **ON** or **OFF** button in the touch panel, or press **F1** (0/1) key for switchover.

To move the cursor, either touch **←** **↑** **↓** **→** in the touch panel or press **←** **▲** **▼** **▶** keys.

Every touch of **Page Up** and **Page Dn** buttons scrolls up/down the output port numbers by 50 items. (**PAGE UP** and **PAGE DOWN** keys also scroll in 50.)

(8) Input/Output Port (for applicable models only)

InOut Port

Port No.  Page Up Page Dn

No.	0123456789
7000	0100000000
7010	1100000000
7020	0000000000
7030	0000000000
7040	0000000000

ON ↑ OFF  
← ↓ →

Back Keyboard

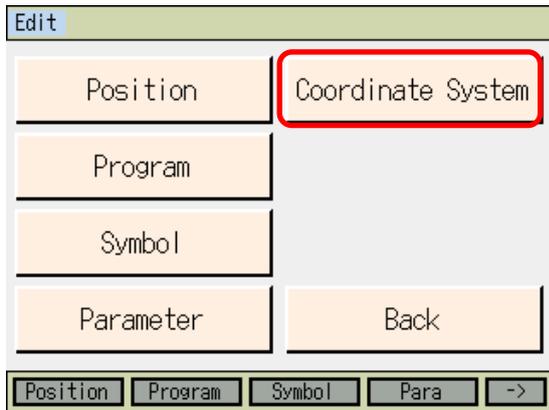
The way to operate is the same as (7) Output Port.

## 12. Coordinate System Data Editing of the SCARA Axis

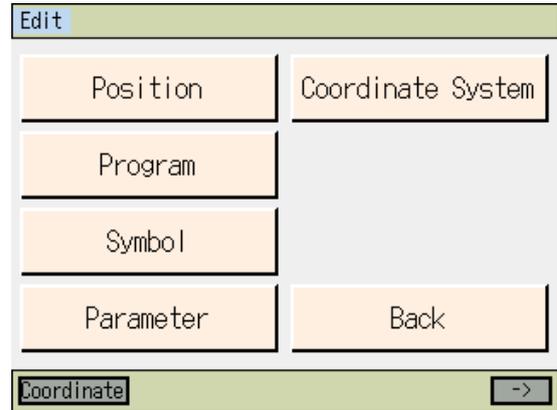
XSEL-JX/KX and 1st to 4th Axes of XSEL-PX/QX, 1st to 4th Axes of XSEL-RX/SX, RAX/SAX, 1st to 8th Axes of XSEL-RXD/SXD, RAXD/SAXD, 1st to 4th Axes of MSEL-PCX/PGX (1 to 3 axis when using 3-axis SCARA)



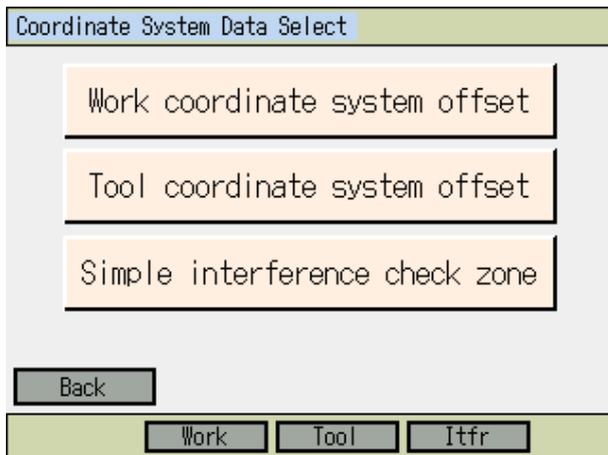
Either touch **Edit** button or press **F1** (Edit) key.



Either touch **Coordinate System** button or press **F1** (Coordinate) key.



To select on the function keys, press **SF** key to show Coordinate and press **F1** key.

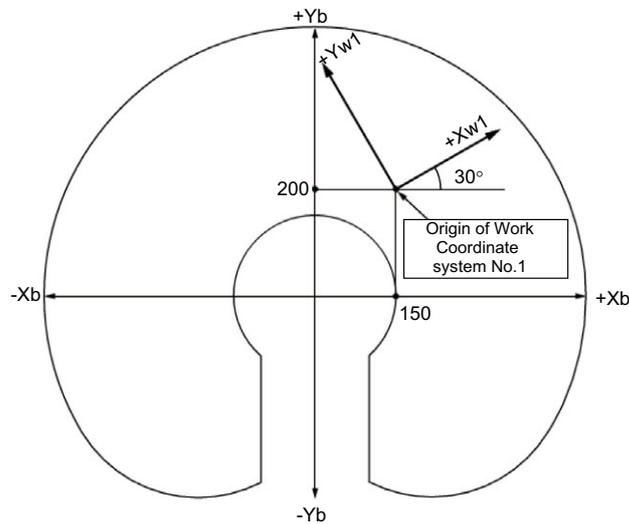


Select the coordinate system subject to editing in this screen.

## 12.1 Editing of Work Coordinate System Data

As an input example of the work coordinate system data, a coordinate system as shown below is set for the work coordinate system No. 1.

(Motion range at the arm length 500-type stroke)



The offset values from the work coordinate system No. 1 are  $X_{ofw1} = 150$ ,  $Y_{ofw1} = 200$ ,  $Z_{ofw} = 0$  and  $R_{ofw1} = 30$ .

Either touch **Work coordinate system offset** button or press **F2** (Work) key in the all coordinate system data select screen.

Coordinate System Data Edit	
Type: Work Coordinate Offset	No. <input type="text" value="1"/> <input type="button" value="Clear"/>
X [mm]	<input type="text" value="0.000"/>
Y [mm]	<input type="text" value="0.000"/>
Z [mm]	<input type="text" value="0.000"/>
R [deg]	<input type="text" value="0.000"/>
<input type="button" value="Page Up"/> <input type="button" value="Page Dn"/>	
<input type="button" value="Back"/> <input type="button" value="Write"/> <input type="button" value="Keyboard"/>	
<input type="button" value="Clear"/>	

X-axis Offset Input Box

The cursor is placed at the number. To select the work coordinate system number, touch **Keyboard** button to show the touch panel keyboard to input, input on the hardware numeric keys, or use either **Page Up** and **Page Dn** buttons or **PAGE UP** and **PAGE DOWN** keys.

Press the return key in the number box or touch in an X-axis offset input box.

Coordinate System Data Edit

Type: Work Coordinate Offset No.

Axis1	0.000
Axis2	0.000
Axis3	0.000
Axis4	0.000

Edit Screen for XSEL-RX/SX and RAX/SAX

Coordinate System Data Edit

Type: Work Coordinate Offset No.

Axis1	0.000	Axis5	0.000
Axis2	0.000	Axis6	0.000
Axis3	0.000	Axis7	0.000
Axis4	0.000	Axis8	0.000

Edit Screen for XSEL-RXD/SXD and RAXD/SAXD

Coordinate System Data Edit

Type: Work Coordinate Offset No.

X [mm]	0.000
Y [mm]	0.000
Z [mm]	0.000
R [deg]	0.000

With the cursor being on the X-axis offset data, touch  button to shown the touch panel keyboard.  
Or, input 150 and press return on the hardware numeric keys.

Coordinate System Data Edit

Type: Work Coordinate Offset No.

X [mm]	150
Y [mm]	0.000
Z [mm]	0.000
R [deg]	0.000

Input 150 and touch **ENT** button.

Coordinate System Data Edit

Type: Work Coordinate Offset No.

X [mm]	150.000
Y [mm]	0.000
Z [mm]	0.000
R [deg]	0.000

The cursor is placed on the Y-axis offset data. Touch **Keyboard** button to show the touch panel keyboard. Or, input 200 and press return on the hardware numeric keys.

Coordinate System Data Edit

Type: Work Coordinate Offset No.

X [mm]	150.000
Y [mm]	200
Z [mm]	0.000
R [deg]	0.000

Input 200 and touch **ENT** button.

Coordinate System Data Edit

Type: Work Coordinate Offset No.

X [mm]	150.000
Y [mm]	200.000
Z [mm]	0.000
R [deg]	0.000

The cursor is placed on the Z-axis offset data. As the offset of Z-axis remains at 0, either press the return key or touch in the R-axis offset input box.

R-axis offset input box

Coordinate System Data Edit

Type: Work Coordinate Offset No.

X [mm]	150.000
Y [mm]	200.000
Z [mm]	0.000
R [deg]	0.000

The cursor is placed on the R-axis offset data. Touch  button to show the touch panel keyboard. Or, input 30 and press return on the hardware numeric keys.

Coordinate System Data Edit

Type: Work Coordinate Offset No.

X [mm]	150.000
Y [mm]	200.000
Z [mm]	0.000
R [deg]	30

			30
7	8	9	ESC
4	5	6	BS
1	2	3	CLR
0	.	+/-	ENT

Input 30 and touch .

Coordinate System Data Edit

Type: Work Coordinate Offset No.

X [mm]	150.000
Y [mm]	200.000
Z [mm]	0.000
R [deg]	30.000

Either touch **Write** button or press **WRT** key to transfer the data to the controller. The position moves to Work Coordinate Offset No. 2.

Coordinate System Data Edit

Type: Work Coordinate Offset No.

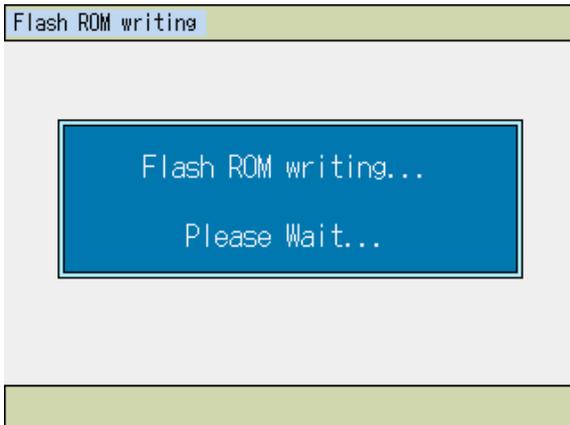
X [mm]	0.000
Y [mm]	0.000
Z [mm]	0.000
R [deg]	0.000

Touch **Back** button or **Cancel** button to go to the flash ROM writing screen.  
Or press **ESC** key several times to go to the flash ROM writing screen.

Confirmation

Flash Write ?

To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.  
If writing is not necessary, touch **No** button or press **F2** (No) key.



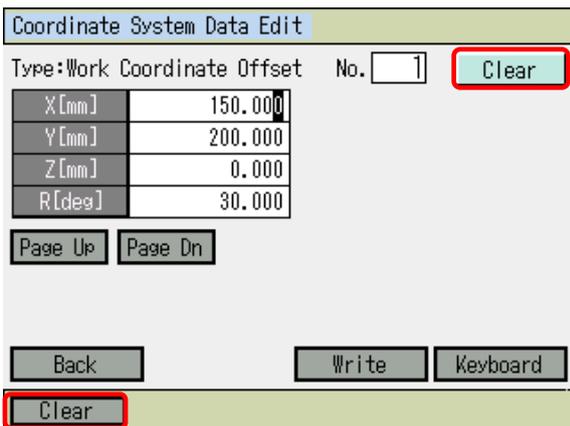
While in writing process to flash ROM, the screen shown in the left will be displayed.

**Never turn off the power to the Controller at this time.**



Flash ROM writing is completed. Either touch **OK** button or press **ESC** key to return to the edit menu screen.

Regarding **Clear** button and **F1** (Clear) key in Work Coordinate System Data Edit screen



No matter where the cursor is placed, all the values in X, Y, Z and R-axes offset are set to 0. To transfer the data to the controller, either touch **Write** button or press **WRT** key.

Coordinate System Data Edit

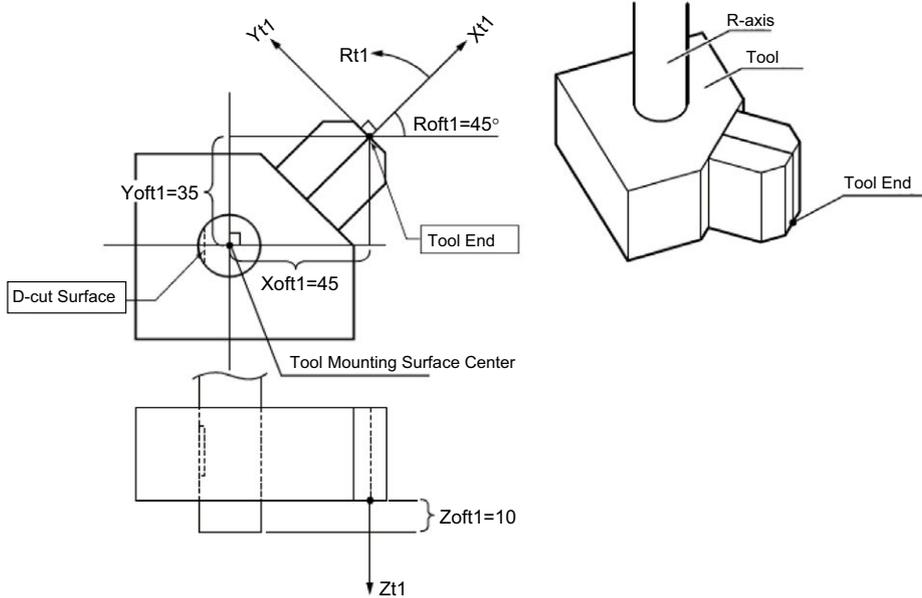
Type: Work Coordinate Offset No.

X[mm]	0.000
Y[mm]	0.000
Z[mm]	0.000
R[deg]	0.000

Example of Screen after Touching Clear Button

## 12.2 Editing of Tool Coordinate System Data

As an input example of the tool coordinate system data, a tool as shown below is set for the tool coordinate system No. 1.



The offset values from the tool coordinate system No. 1 become Xoft1 = 45, Yoft1 = 35, Zoft = -10 and Roft1 = 45.

(For 3-axis SCARA type, Roft will not be taken into account)

Coordinate System Data Edit

Type: Tool Coordinate Offset No.

X [mm]	<input type="text" value="0.000"/>
Y [mm]	<input type="text" value="0.000"/>
Z [mm]	<input type="text" value="0.000"/>
R [deg]	<input type="text" value="0.000"/>

X-axis Offset Input Box

The cursor is placed at the number. To select the tool coordinate system number, touch **Keyboard** button to show the touch panel keyboard to input, input on the hardware numeric keys, or use either **Page Up** and **Page Dn** buttons or **PAGE UP** and **PAGE DOWN** keys.

Press the return key in the number box or touch in an X-axis offset input box.

Coordinate System Data Edit

Type: Tool Coordinate Offset No.

Axis1	0.000
Axis2	0.000
Axis3	0.000
Axis4	0.000

Edit Screen for XSEL-RX/SX and RAX/SAX

Coordinate System Data Edit

Type: Tool Coordinate Offset No.

Axis1	0.000	Axis5	0.000
Axis2	0.000	Axis6	0.000
Axis3	0.000	Axis7	0.000
Axis4	0.000	Axis8	0.000

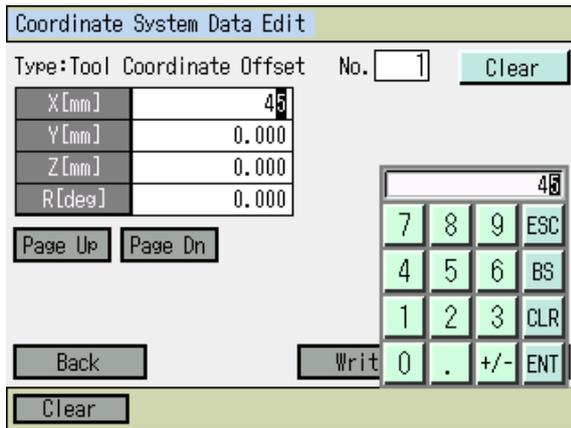
Edit Screen for XSEL-RXD/SXD and RAXD/SAXD

Coordinate System Data Edit

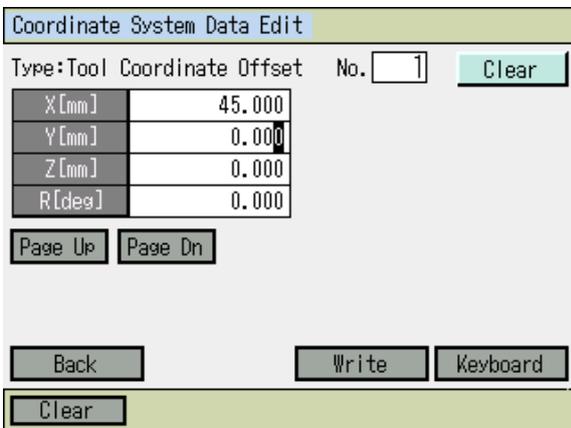
Type: Tool Coordinate Offset No.

X [mm]	0.000
Y [mm]	0.000
Z [mm]	0.000
R [deg]	0.000

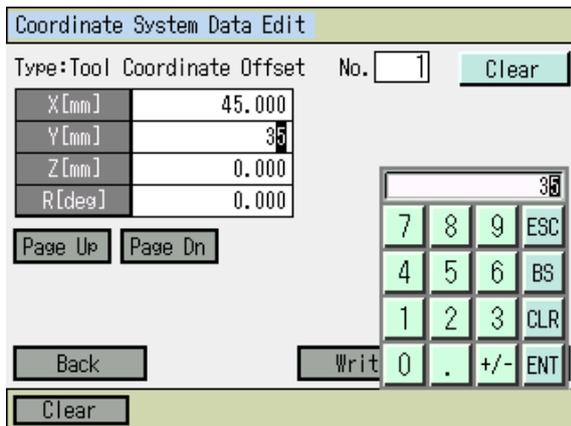
With the cursor being on the X-axis offset data, touch **Keyboard** button to shown the touch panel keyboard.  
Or, input 45 and press return on the hardware numeric keys.



Input 45 and touch **ENT** button.



The cursor is placed on the Y-axis offset data. Touch **Keyboard** button to show the touch panel keyboard. Or, input 35 and press return on the hardware numeric keys.



Input 35 and touch **ENT** button.

Coordinate System Data Edit

Type: Tool Coordinate Offset No.

X[mm]	45.000
Y[mm]	35.000
Z[mm]	0.000
R[deg]	0.000

The cursor is placed on the Z-axis offset data. Touch  button to show the touch panel keyboard. Or, input -10 and press return on the hardware numeric keys.

Coordinate System Data Edit

Type: Tool Coordinate Offset No.

X[mm]	45.000
Y[mm]	35.000
Z[mm]	-10
R[deg]	0.000

-10			
7	8	9	ESC
4	5	6	BS
1	2	3	CLR
0	.	+/-	ENT

Input -10 and touch  button.

Coordinate System Data Edit

Type: Tool Coordinate Offset No.

X[mm]	45.000
Y[mm]	35.000
Z[mm]	-10.000
R[deg]	0.000

The cursor is placed on the R-axis offset data. Touch  button to show the touch panel keyboard. Or, input 45 and press return on the hardware numeric keys.

Coordinate System Data Edit

Type: Tool Coordinate Offset No.

X [mm]	45.000
Y [mm]	35.000
Z [mm]	-10.000
R [deg]	45

Input 45 and touch **ENT** button.

\* In 3-axis SCARA type, the offset of R-axis is not taken into account on the controller side.

Coordinate System Data Edit

Type: Tool Coordinate Offset No.

X [mm]	45.000
Y [mm]	35.000
Z [mm]	-10.000
R [deg]	45.000

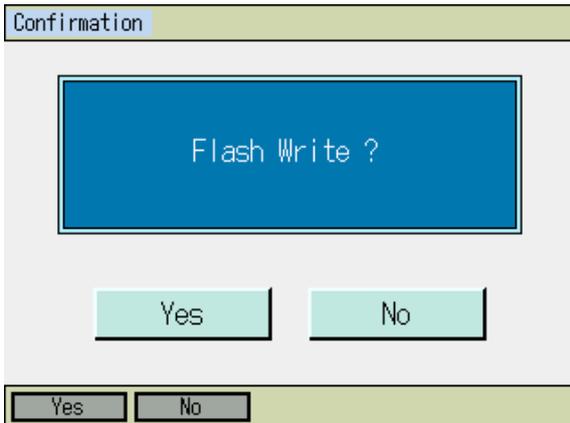
Either touch **Write** button or press **WRT** key to transfer the data to the controller. The position moves to Tool Coordinate Offset No. 2.

Coordinate System Data Edit

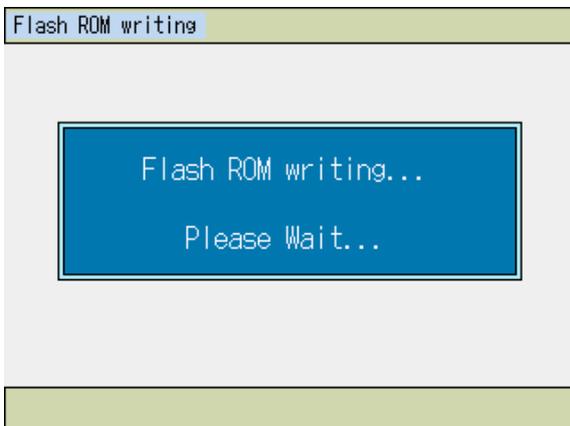
Type: Tool Coordinate Offset No.

X [mm]	0.000
Y [mm]	0.000
Z [mm]	0.000
R [deg]	0.000

Touch **Back** button or **Cancel** button to go to the flash ROM writing screen.  
Or press **ESC** key several times to go to the flash ROM writing screen.



To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.  
If writing is not necessary, touch **No** button or press **F2** (No) key.



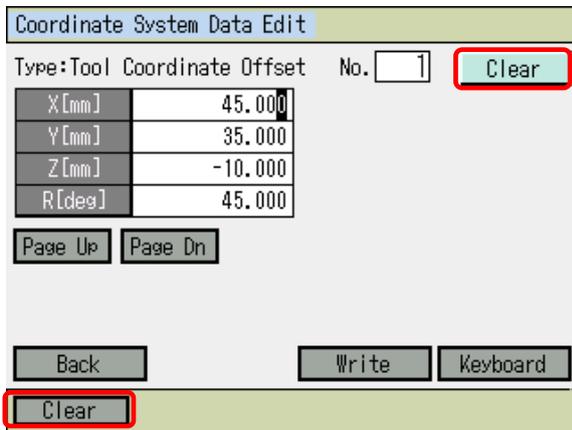
While in writing process to flash ROM, the screen shown in the left will be displayed.

***Never turn off the power to the Controller at this time.***

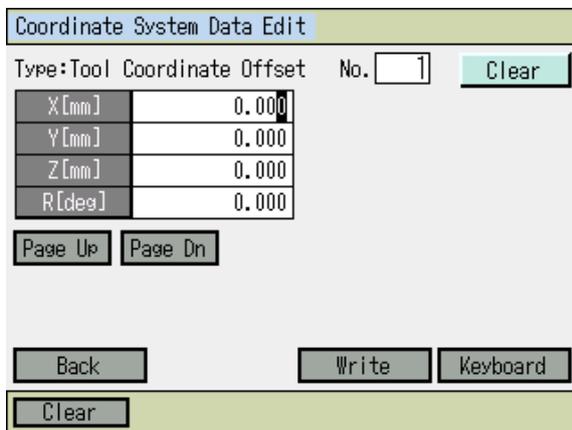


Flash ROM writing is completed.  
Either touch **OK** button or press **ESC** key to return to the edit menu screen.

Regarding **Clear** button and **F1** (Clear) key in Tool Coordinate System Data Edit screen



No matter where the cursor is placed, all the values in X, Y, Z and R-axes offset are set to 0. To transfer the data to the controller, either touch **Write** button or press **WRT** key.



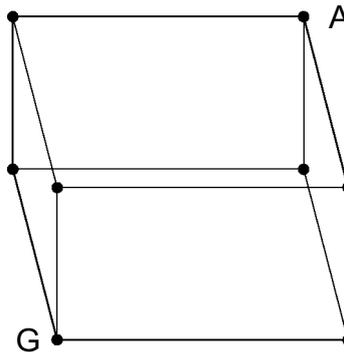
Example of Screen after Touching **Clear** Button

### 12.3 Editing of Simple Interference Check Zone

It is required to input the following 3 items to set the simple interference check zone:

- 2-point position data to define the zone. (Input the values of the base coordinate system.)
- Output port No. or global flag No. for output during zone invasion.
- Error type at zone invasion time. (0: No error-handling, 1: Message level error, 2: Motion reset level error.)

As an input example of the simple interference check zone, a zone as shown below is set for the simple interference check zone No. 1.



Base coordinate values of A: Xb = 475, Yb = -50, Zb = 150, Rb = 0

Base coordinate values of G: Xb = 400, Yb = 50, Zb = 200, Rb = 180

Output port for output during zone invasion: No. 311

Error type at zone invasion time: 1.

\* In 3-axis SCARA type, the setting of Rb does not have a meaning. (It gets out of account on controller side.)

Coordinate System Data Edit			
Type: Simple interference check zone No. <input type="text" value="1"/> <input type="button" value="Clear"/>			
X[mm][1]		X[mm][2]	
Y[mm][1]		Y[mm][2]	
Z[mm][1]		Z[mm][2]	
R[deg][1]		R[deg][2]	
Port/Flag	0		
ErrorType	0		
<input type="button" value="Page Up"/>		<input type="button" value="Page Dn"/>	
<input type="button" value="Back"/>		<input type="button" value="Write"/>	<input type="button" value="Keyboard"/>
<input type="button" value="Clear"/>			

This is the simple interference check zone No. selection screen.

The cursor is located at the simple interference check zone No.

To select the simple interference check zone number, input a number on the touch panel numeric keys or by using  and  buttons (keys) in this screen.

This example indicates the setting of the simple interference check zone No. 1. Press the return key with no change or touch on the coordinate input position that you want to input.

Coordinate System Data Edit

Type: Simple interference check zone No.

Axis1[1]		Axis1[2]	
Axis2[1]		Axis2[2]	
Axis3[1]		Axis3[2]	
Axis4[1]		Axis4[2]	
Port/Flag	0		
ErrorType	0		

Edit Screen for XSEL-RX/SX and RAX/SAX

Coordinate System Data Edit

Type: Simple interference check zone No.

Axis 1 [1]		Axis 1 [2]	
Axis 2 [1]		Axis 2 [2]	
Axis 3 [1]		Axis 3 [2]	
Axis 4 [1]		Axis 4 [2]	
Port/Flag	0		
ErrorType	0		

1-4 axes  5-8 axes

To switch the axis in XSEL-RXD/SXD and RAXD/SAXD, touch a radio button or press **F3** (Axis) key.

Axis Switchover

Edit Screen for XSEL-RXD/SXD and RAXD/SAXD

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]		X[mm][2]	
Y[mm][1]		Y[mm][2]	
Z[mm][1]		Z[mm][2]	
R[deg][1]		R[deg][2]	
Port/Flag	0		
ErrorType	0		

Input of base coordinate values of A.  
The cursor is located at the X-axis data.  
Touch **Keyboard** button to show the touch panel keyboard.  
Or, input 475 and press return on the hardware numeric keys.

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]	475	X[mm][2]	
Y[mm][1]		Y[mm][2]	
Z[mm][1]		Z[mm][2]	475
R[deg][1]		R[deg][2]	
Port/Flag	0		
ErrorType	0		

Input 475 and touch  button.

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]	475.000	X[mm][2]	
Y[mm][1]		Y[mm][2]	
Z[mm][1]		Z[mm][2]	
R[deg][1]		R[deg][2]	
Port/Flag	0		
ErrorType	0		

The cursor is located at the Y-axis data. Touch  button to show the touch panel keyboard to input -50 and touch , or input -50 on the hardware numeric keys and then press the return key.

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]	475.000	X[mm][2]	
Y[mm][1]	-50.000	Y[mm][2]	
Z[mm][1]		Z[mm][2]	
R[deg][1]		R[deg][2]	
Port/Flag	0		
ErrorType	0		

The cursor is located at the Z-axis data. Touch  button to show the touch panel keyboard to input 150 and touch , or input 150 on the hardware numeric keys and then press the return key.

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]	475.000	X[mm][2]	
Y[mm][1]	-50.000	Y[mm][2]	
Z[mm][1]	150.000	Z[mm][2]	
R[deg][1]		R[deg][2]	
Port/Flag	0		
ErrorType	0		

The cursor is located at the R-axis data. Touch  button to show the touch panel keyboard to input 0 and touch , or input 0 on the hardware numeric keys and then press the return key.

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]	475.000	X[mm][2]	
Y[mm][1]	-50.000	Y[mm][2]	
Z[mm][1]	150.000	Z[mm][2]	
R[deg][1]	0.000	R[deg][2]	
Port/Flag	0		
ErrorType	0		

The cursor moves to the other X-axis data. Enter the base coordinate values of G in the same way as A.

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]	475.000	X[mm][2]	400.000
Y[mm][1]	-50.000	Y[mm][2]	50.000
Z[mm][1]	150.000	Z[mm][2]	200.000
R[deg][1]	0.000	R[deg][2]	180.000
Port/Flag	0		
ErrorType	0		

Once the input of coordinate data is finished (the input for R-axis is confirmed), the cursor moves to the input port/flag input box.

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]	475.000	X[mm][2]	400.000
Y[mm][1]	-50.000	Y[mm][2]	50.000
Z[mm][1]	150.000	Z[mm][2]	200.000
R[deg][1]	0.000	R[deg][2]	180.000
Port/Flag	311		
ErrorType	0		

Touch **Keyboard** button to show the touch panel keyboard to input 311 and touch **ENT**, or input 311 on the hardware numeric keys and then press the return key.

The cursor moves to the Error Type input area.

Coordinate System Data Edit

Type: Simple interference check zone No.

X[mm][1]	475.000	X[mm][2]	400.000
Y[mm][1]	-50.000	Y[mm][2]	50.000
Z[mm][1]	150.000	Z[mm][2]	200.000
R[deg][1]	0.000	R[deg][2]	180.000
Port/Flag	311		
ErrorType	1		

Touch **Keyboard** button to show the touch panel keyboard to input 1 and touch **ENT**, or input -1 on the hardware numeric keys and then press the return key.

Either touch **Write** button or press **WRT** key to transfer the data.

Coordinate System Data Edit

Type: Simple interference check zone No.

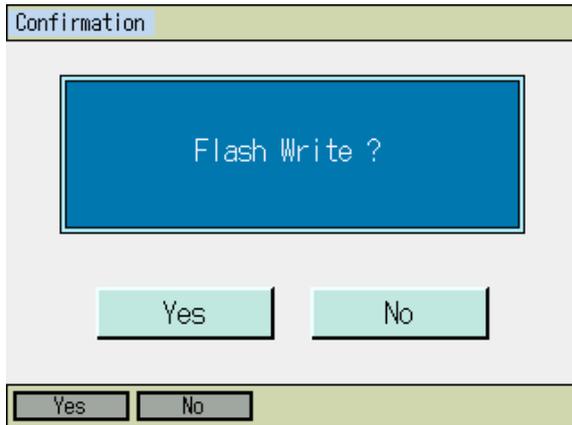
X[mm][1]		X[mm][2]	
Y[mm][1]		Y[mm][2]	
Z[mm][1]		Z[mm][2]	
R[deg][1]		R[deg][2]	
Port/Flag	0		
ErrorType	0		

The screen advances to the edit screen for the simple interference check zone No. 2.

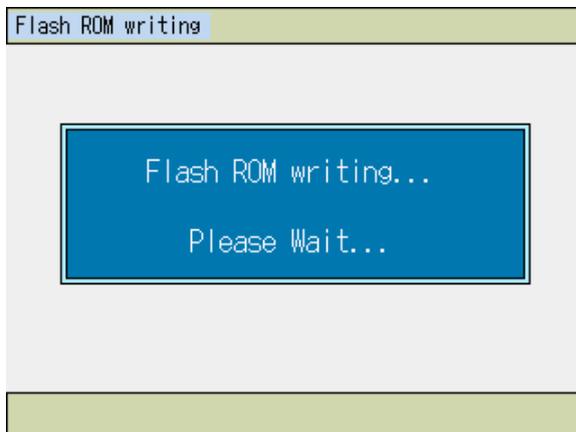
When the axial pattern of A does not agree with that of G, the "9F0" error occurs.

When the axial pattern of A and G is 0, the "9F1" error occurs if the output port or error type is specified.

Touch **Back** button or **ESC** Key to go to the flash ROM writing screen.



To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.  
If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

***Never turn off the power to the Controller at this time.***



Flash ROM writing is completed.  
Either touch **OK** button or press **ESC** key to return to the edit menu screen.

Regarding **Clear** button and **F1** (Clear) key in Simple interference check zone Data Edit screen

Coordinate System Data Edit			
Type: Simple interference check zone No.	<input type="text" value="1"/>	<b>Clear</b>	
X[mm][1]	475.000	X[mm][2]	400.000
Y[mm][1]	-50.000	Y[mm][2]	50.000
Z[mm][1]	150.000	Z[mm][2]	200.000
R[deg][1]	0.000	R[deg][2]	180.000
Port/Flag	311		
ErrorType	1		
Page Up		Page Dn	
Back		Write	Keyboard
<b>Clear</b>			

No matter where the cursor is placed, all the coordinate values in X, Y, Z and R-axes are turned invalid and the output port/flag box and error type box are set to 0.

To transfer the data to the controller, either touch **Write** button or press **WRT** key.

Coordinate System Data Edit			
Type: Simple interference check zone No.	<input type="text" value="1"/>	<b>Clear</b>	
X[mm][1]		X[mm][2]	
Y[mm][1]		Y[mm][2]	
Z[mm][1]		Z[mm][2]	
R[deg][1]		R[deg][2]	
Port/Flag	0		
ErrorType	0		
Page Up		Page Dn	
Back		Write	Keyboard
<b>Clear</b>			

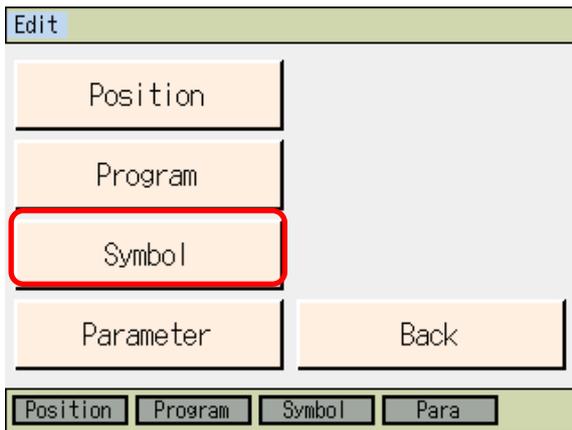
Screen after Touching **Clear** Button

### 13. Symbol Edit (Excluding the positioner mode of the SSEL, ASEL and PSEL Controller.)

Symbol (Names) can be applied to variables, ports, flags, position, etc.

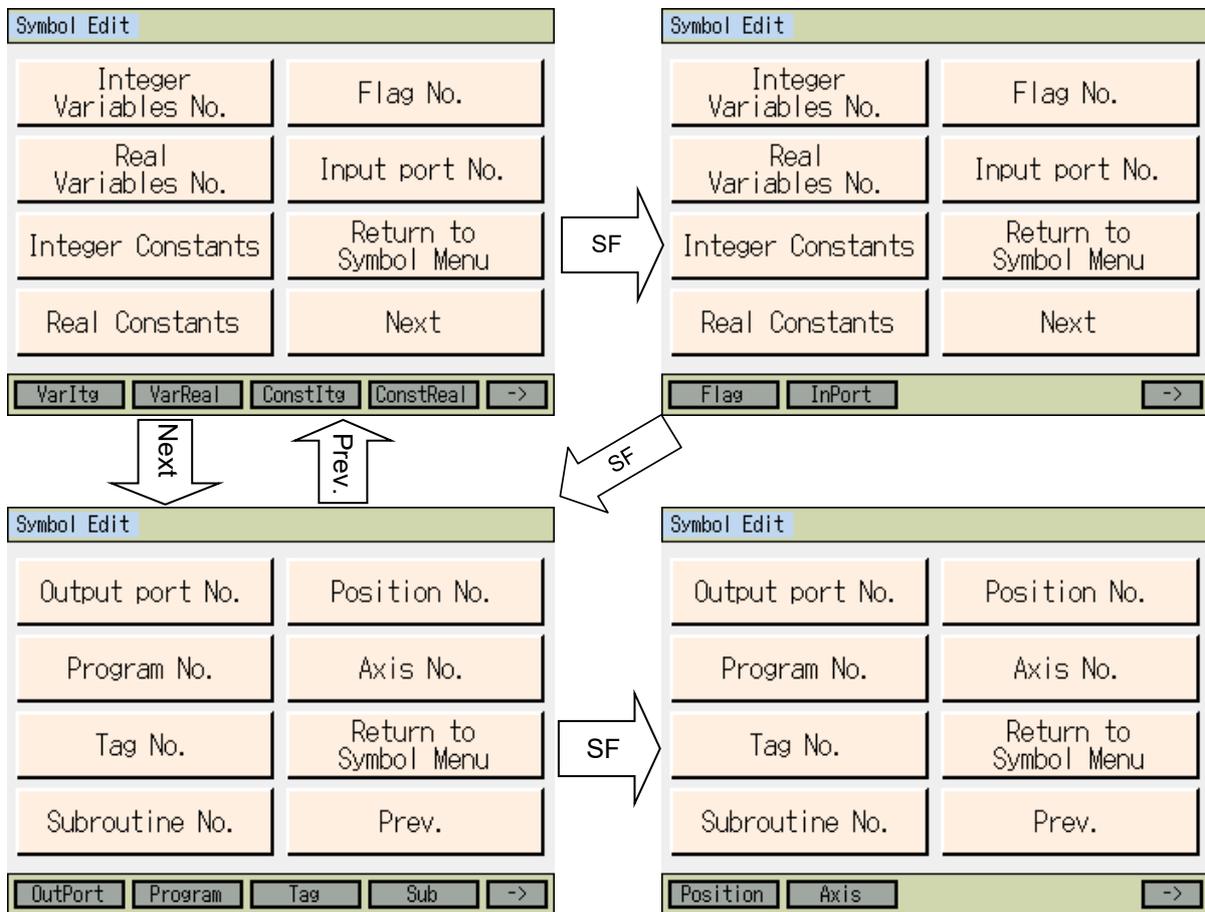


Either touch **Edit** button in the Menu screen or press **F1** (Edit) key.



Either touch **Symbol** button in the Edit screen or press **F3** (Symbol) key.

## 13.1 Symbol Edit Items



Symbol Select Menu (some models excluded)

(1) The items object to editing is as stated below;

\* Editing is available on the input and output port numbers (InOut) in the input and output port applicable models.

Integer Variables No.: F1 (VarItg), Real Variables No.: F2 (VarReal), Integer Constants: F3 (ConstItg), Real Constants: F4 (ConstReal)

Flag No.: F1 (Flag), Input port No. : F2 (InPort)

Output port No.: F1 (OutPort), Program No.: F2 (Program), Tag No.: F3 (Tag), Subroutine No.: F4 (Sub)

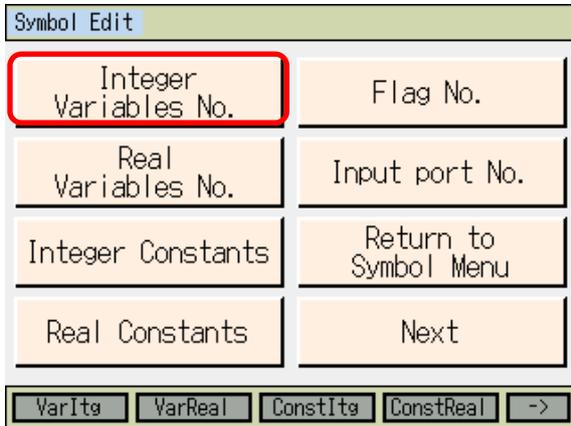
Program No.: F1 (Position), Axis No.: F2 (Axis)

(2) Articles for Symbol Descriptions

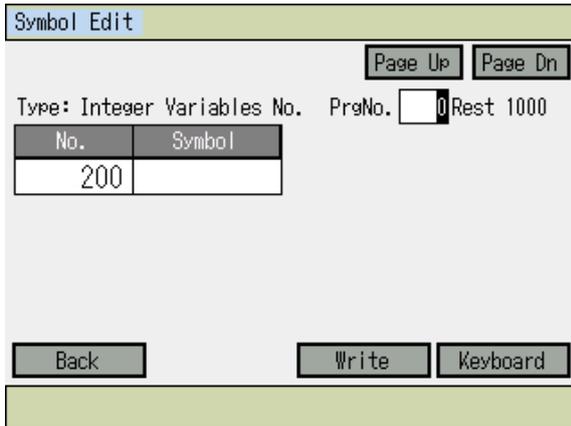
- 1) The top letter needs to be an alphabet or underscore.
- 2) The second letter and after should be ASCII Code 0x21 to 0x7e.
- 3) The maximum number of letters should be 9. (String literal should be 8 letters at maximum.)
- 4) It is not accepted to have the same symbol definition name in the same function. (It is allowed to be in different locals in a program.)
- 5) It is not accepted to have the same symbol definition name in the flag number/input port number/output port number/input output port number group. (It is allowed to be in different locals in a program.)
- 6) It is not accepted to have the same symbol definition name in the integer variable number/real variable number group. (It is allowed to be in different locals in a program.)
- 7) It is not accepted to have the same symbol definition name in the integral constant/real constant group.

### 13.2 Input Example: Symbolize Local Integer Variable No.

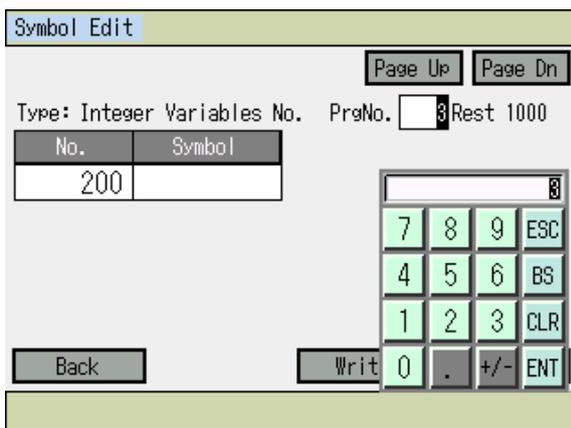
Assuming Variable No. 5 in Program No. 3 is symbolized as 'Cnt5'.



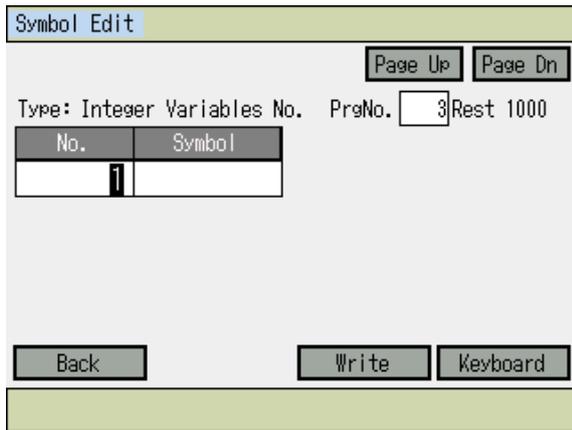
Either touch **Integer Variables No.** button or press **F1** (Varltg) key.



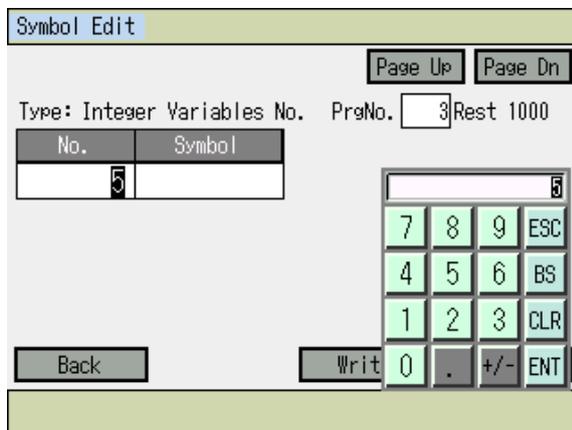
The cursor is located at program No. box  
Input the local area program No.  
(To symbolize global area, leave 0.)  
Touch **Keyboard** button to show the touch panel  
numeric keys.  
Or, input 3 and press return on the hardware  
numeric keys.



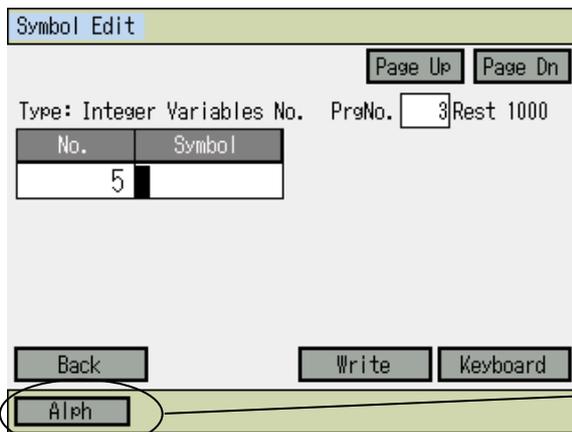
Input 3 and touch **ENT**.



The cursor moves to the number box.  
 Touch **Keyboard** button to show the touch panel numeric keys.  
 Or, input 5 and press return on the hardware numeric keys.



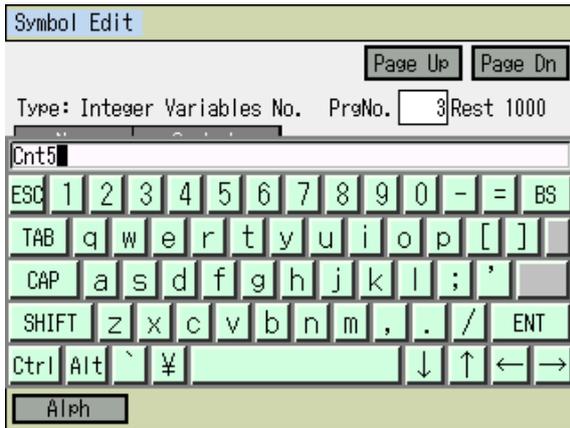
Input 5 and touch **ENT**.



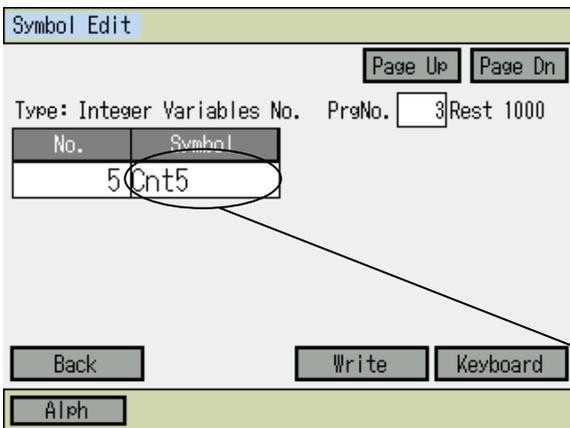
The cursor moves to the Symbol box.

Touch **Keyboard** button to show the touch panel numeric keys.  
 Or, input on the hardware numeric keys.  
 Every time you press **7** key, the letter changes in the order of A → B → C → a → b → c → A ... .  
 Show 'C' and press return.  
 Next, press **5** several times to show 'n' and press return. 't' is assigned to **1**.  
 Press **F1** key and Alph switches to Num, which enables you to input numerical letters. Press **5**.

Alphabetical Letter Input



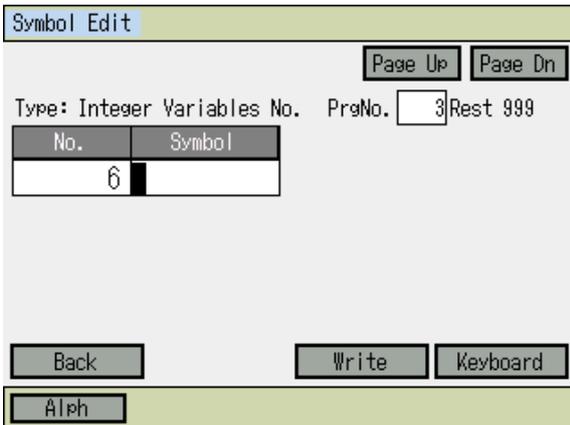
To input 'C', touch **SHIFT** and then touch **C**. The keyboard automatically returns to small letter input. Continue to type in **nt5**, and touch **ENT**.



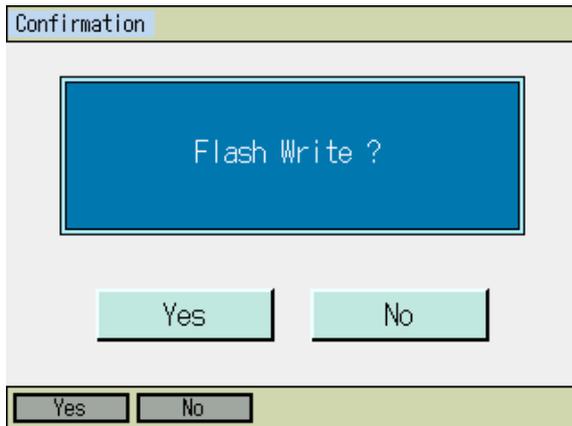
Once the input is confirmed, the cursor disappears. If you want to input again, touch in the symbol input box. Either touch **Write** button or press **WRT** key to transfer the symbol data to the controller.

When the screen is changed with the **Page Up** and **Page Dn** buttons, **ESC** key, **Back** button before data transfer, the input data becomes invalid.

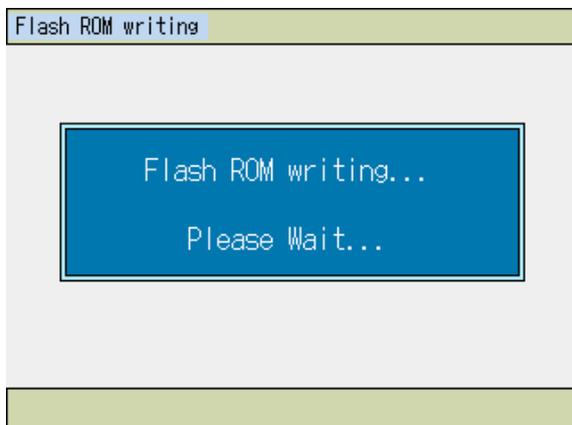
Symbol Input Box



Touch **Back** button or **Cancel** button to go to the flash ROM writing screen. Or press **ESC** key several times to go to the flash ROM writing screen.



To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.  
If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

**Never turn off the power to the Controller at this time.**

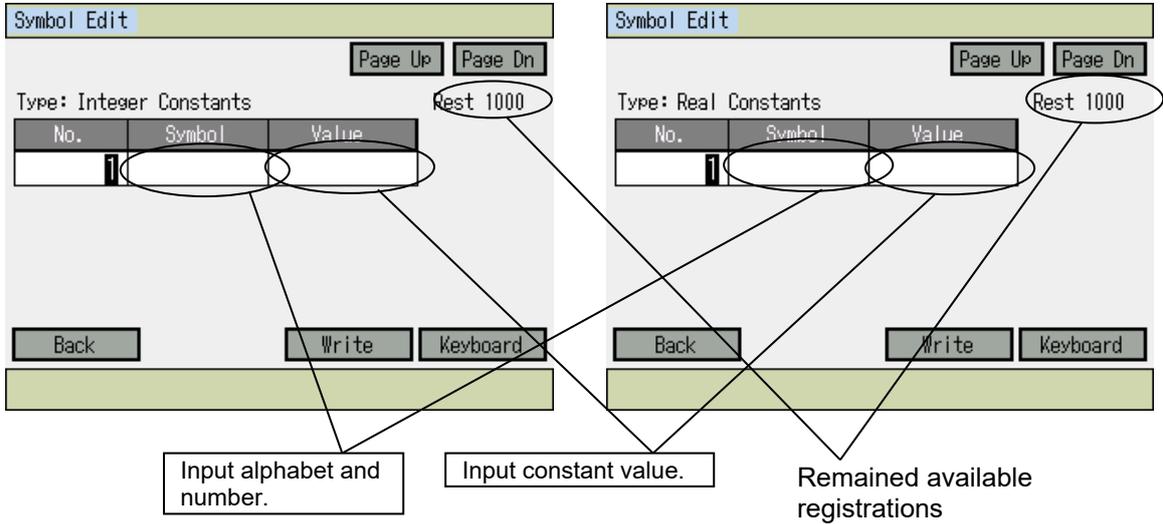


Flash ROM writing is completed.  
Either touch **OK** button or press **ESC** key to return to the edit menu screen.

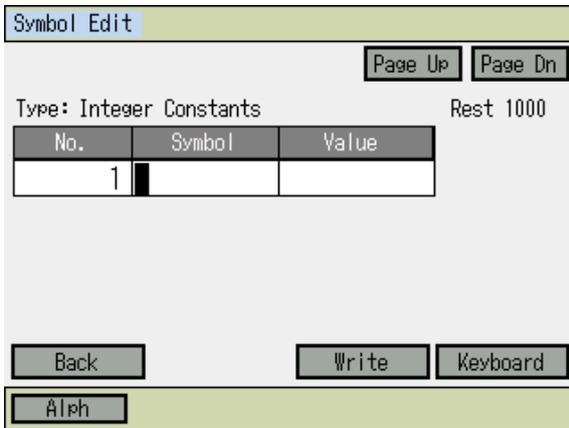
### 13.3 Symbol Edit Screen of Each Items

#### (1) Constant Number

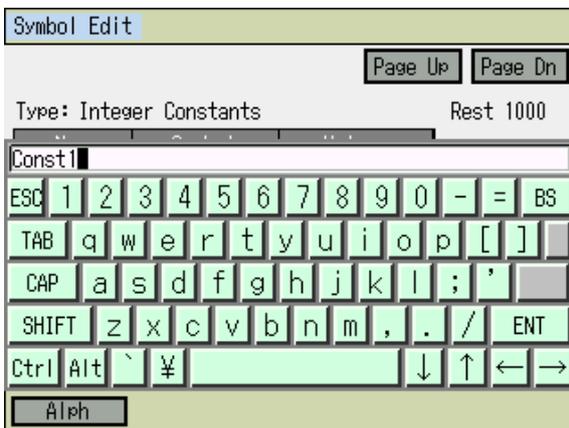
Integer Type Constant Number Symbol Edit Screen    Real Type Constant Number Symbol Edit Screen



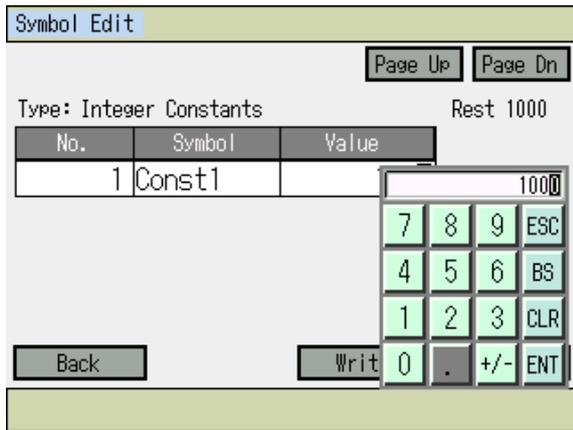
Example for input of integer constants:  
Define 1000 to the symbol name 'Const1' using the touch panel keyboard.



Touch in the symbol input box to move the cursor there.  
Touch **Keyboard** button to show the touch panel keyboard.



Input Const1 and touch **ENT**.  
Input **SHIFT** **C** **o** **n** **s** **t** **1**.  
The cursor moves to the Value input box.

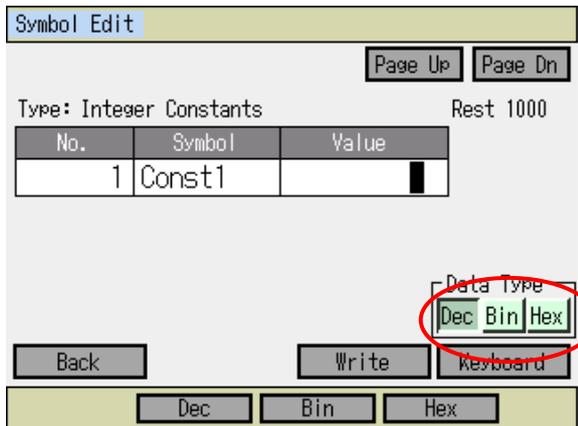


Touch **Keyboard** button to show the touch panel numeric keys.  
Input 1000 and touch **ENT**.

After finished inputting, either touch Write button or press WRT key to transfer the symbol data to the controller.

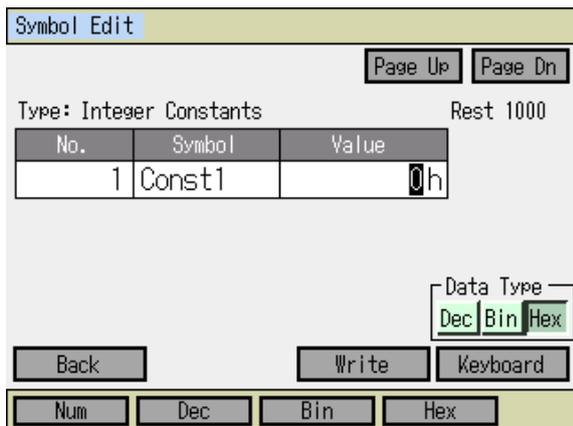
After that, perform the Flash ROM writing referring to 13.2.

In the case of integer constant symbol binary/hexadecimal digit input applicable model, the integer constant symbol defined value can be input using the binary or hexadecimal system.



In the case of an applicable model, the data type selection button appears on the lower right of the screen with the cursor shown in the defined value box.

When the data type is to be changed, touch one of these buttons.



The display in the defined value box is changed based on the data type. (The left figure shows the case when the hexadecimal digit (Hex) has been selected). The fundamental number is shown after the defined value (for binary: b, for hexadecimal: h, for decimal: (blank)).

Touch the **Keyboard** button to input the defined value using the touch panel ten-key pad.

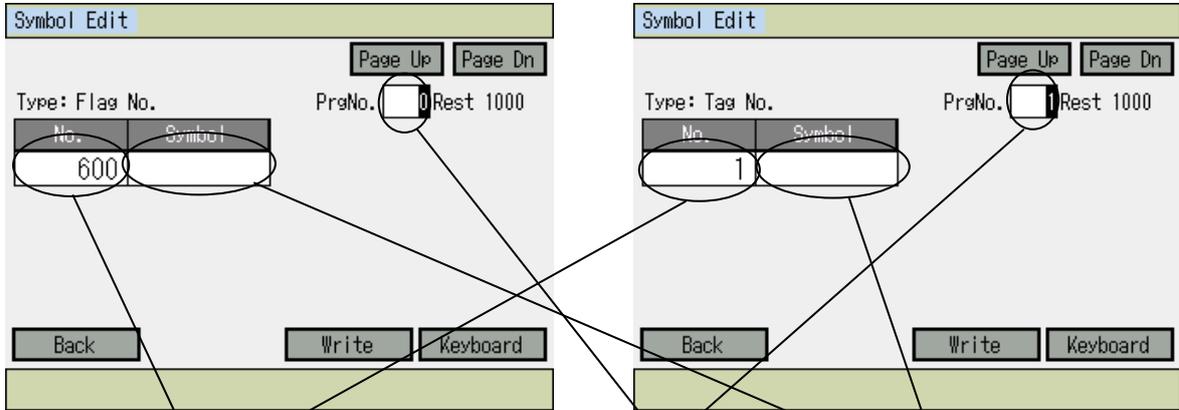
After the value input, touch the **Write** button to transfer the symbol data to the controller. After that, perform the Flash ROM writing referring to 13.2.

(2) Program Number Indicative Definition Data

Integer variable number, real variable number, flag number, tag number and subroutine number

Flag Number Symbol Edit Screen

Tag Number Symbol Edit Screen



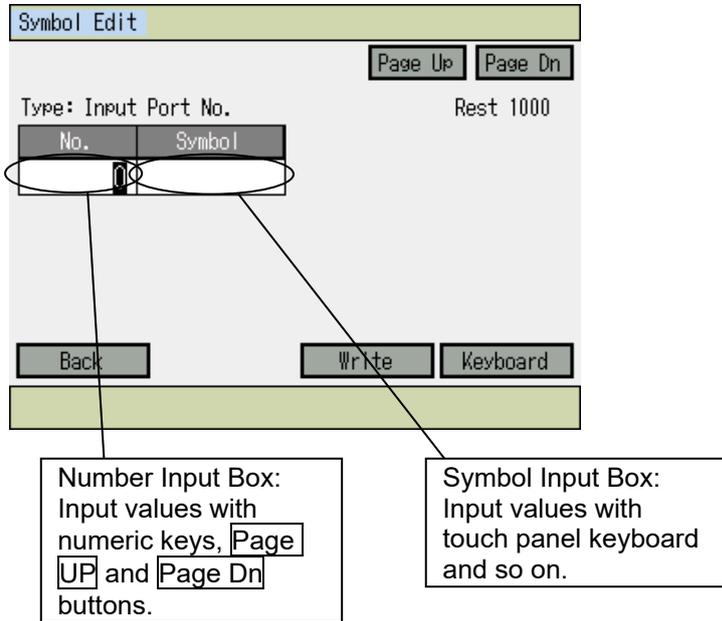
Number Input Box:  
Input values with  
numeric keys, **Page UP**  
and **Page Dn**  
buttons.

Program Number Input Box:  
As the integer variable  
numbers, real variable numbers  
and flag numbers can have  
data in the global domains, it is  
available to input 0.  
As the tag numbers and  
subroutine numbers are for the  
local domains, it is available  
only to set the program  
numbers.  
Input values with numeric keys,  
**Page UP** and **Page Dn**  
buttons.  
\* When you move the cursor to  
the program number box, the  
program number goes  
up/down if you use **Page Up**  
and **Page Dn** buttons.

Symbol Input Box:  
Input values with  
touch panel keyboard  
and so on.

(3) Program Number Non-indicative Definition Data

Input port No., Output port No., Input/Output port No. (for applicable models only), Program No., Position No. Axis No.



The screenshot shows the 'Symbol Edit' interface. At the top, there is a title bar 'Symbol Edit' and two buttons: 'Page Up' and 'Page Dn'. Below this, the text 'Type: Input Port No.' is displayed on the left and 'Rest 1000' on the right. A table with two columns, 'No.' and 'Symbol', is shown. The 'No.' column contains the number '0'. Below the table are three buttons: 'Back', 'Write', and 'Keyboard'. Two callout boxes are present: one pointing to the '0' in the 'No.' column, and another pointing to the 'Symbol' column.

**Number Input Box:**  
Input values with numeric keys, Page UP and Page Dn buttons.

**Symbol Input Box:**  
Input values with touch panel keyboard and so on.

## 14. Parameter Edit

You can change the parameters corresponding to your system.

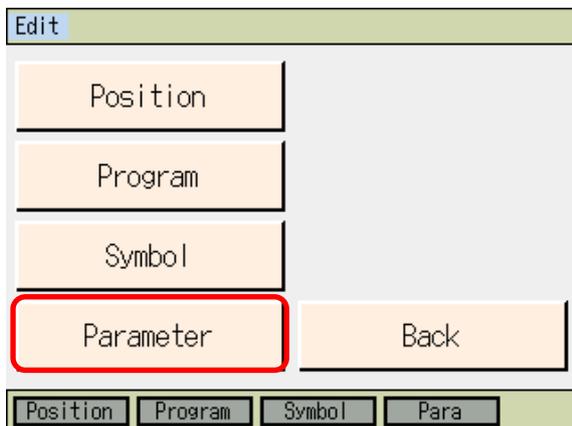
When you change the parameters by yourself, please note the parameter contents.

The parameter will be effective after flash ROM writing is finished and performing a software reset or power reboot.

**⚠ Caution:** *In the case of SSEL, ASEL or PSEL in the positioner mode, parameter transfer cannot be performed when the controller is executing. Stop the controller before changing or transferring parameters. To stop, touch **Positioner Mode** → **Stop** in the main menu.*

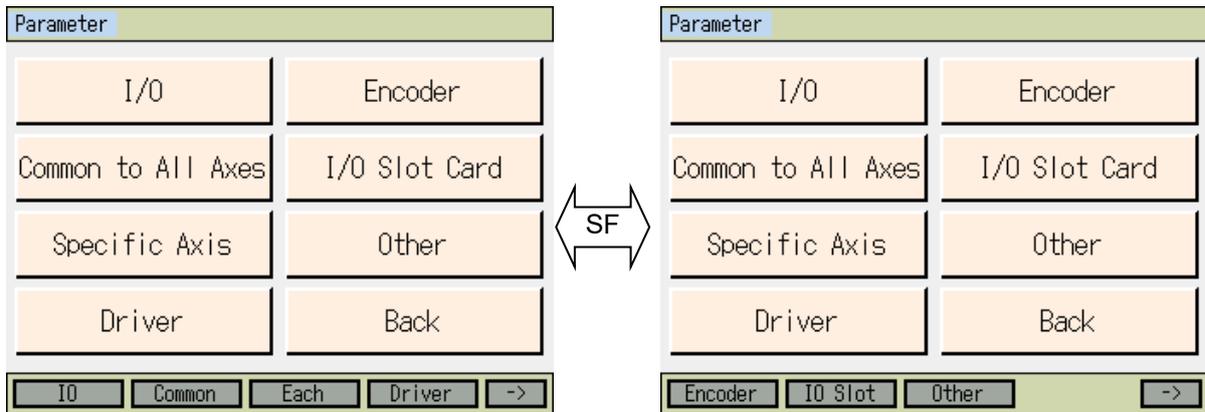


Either touch **Edit** button in the Menu screen or press **F1** (Edit) key.



Either touch **Parameter** button in the Edit screen or press **F4** (Para) key.

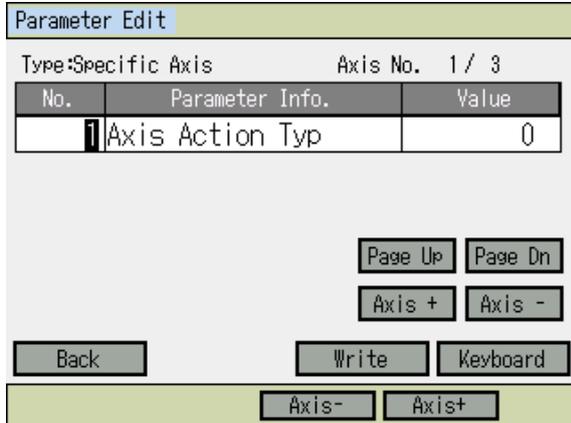
## 14.1 Parameter Edit Items



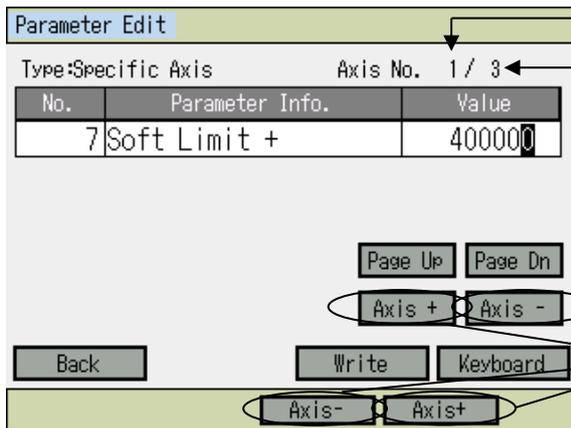
Every time you press **SF** key, the function items are shifted and displayed.  
 In some controllers, "I/O Slot Card" changes to names of "I/O System Device". (The function name is changed from "IO Slot" to "IO Dev".)

## 14.2 Input Example: Edit Specific-Axis Parameter

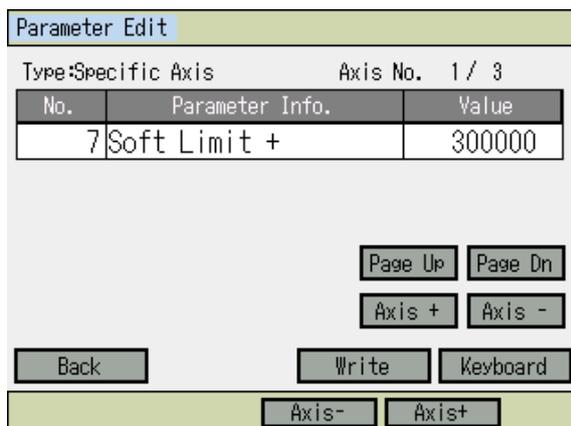
Establish the setting in specific-axis parameter No. 7 soft limit + to axis 1 = 300mm, axis 2 = 200mm.



The cursor is located at Parameter No. Touch **Keyboard** button to open the touch panel numeric keys to input **7** and then **ENT**. Or, use the hardware numeric key, input **7** and then press the return key. It is able to show it by pressing **Page Up** button for several times.



It becomes the soft limit + of specific-axis parameter No. 7 edit screen. The cursor is in the value box.

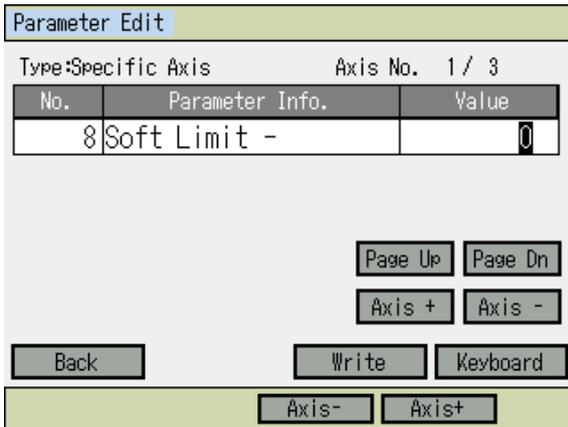


Input 300000 on the touch panel numeric keys and touch **ENT**. Or, use the hardware numeric key, input 300000 and then press the return key. [Unit: 0.001mm]

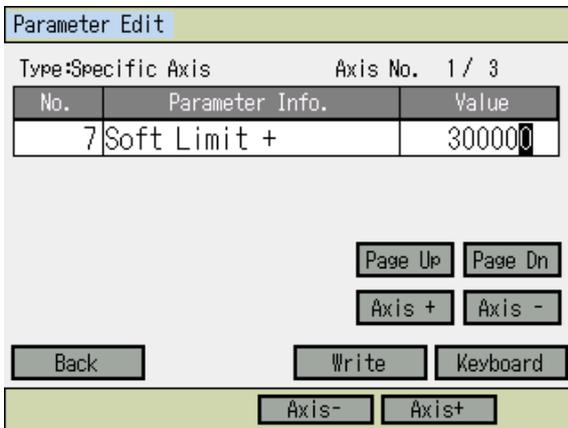
Once the value is confirmed the cursor disappears. If you want to input again, touch in the value box. Or, press **ESC** key. In this case, the cursor gets shown in the parameter number box and the value goes back to the one before input.

Either touch **Write** button or press **WRT** key to transfer the parameter data to the controller.

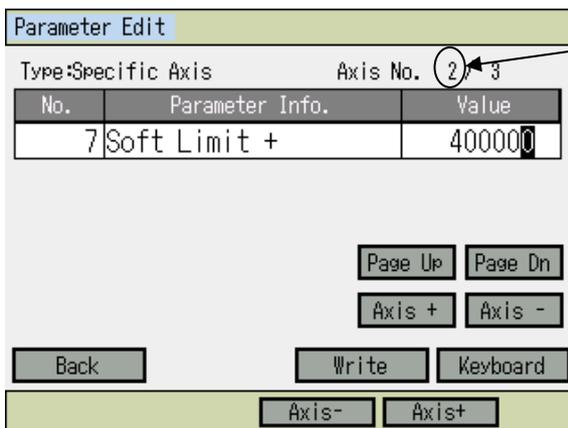
**⚠ Caution:** One transfer with the Teaching Pendant saves the data only on the current screen in memory. Therefore, it is required to input the parameter data and transfer it by axis (device).  
Un-transmitted data will be invalid when switching the screen.



Input data of axis No. 2  
 The display screen moves to parameter No. 8. To edit Axis No. 2 in Parameter No. 7, either touch **Page Dn** button, or press **PAGE DOWN** key to show Parameter No. 7.



Either touch **Axis +** button or press **F4** (Axis+) key.



Axis No.2

Input 200000 on the touch panel numeric keys and touch **ENT**. Or, use the hardware numeric key, input 200000 and then press the return key.

Parameter Edit

Type: Specific Axis      Axis No. 2 / 3

No.	Parameter Info.	Value
7	Soft Limit +	200000

Page Up    Page Dn

Axis +    Axis -

Back      Write    Keyboard

Axis-    Axis+

Either touch **Write** button or press **WRT** key to transfer the parameter data to the controller.

Parameter Edit

Type: Specific Axis      Axis No. 2 / 3

No.	Parameter Info.	Value
8	Soft Limit -	0

Page Up    Page Dn

Axis +    Axis -

Back      Write    Keyboard

Axis-    Axis+

To continue editing Specific Axis Parameter, move the cursor to Parameter No. and input the parameter number you want to edit.

To finish editing Specific Axis Parameter, go back to the flash ROM writing screen with **Back** button or **ESC** key.

Confirmation

Flash Write ?

Yes      No

Yes    No

To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.

If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

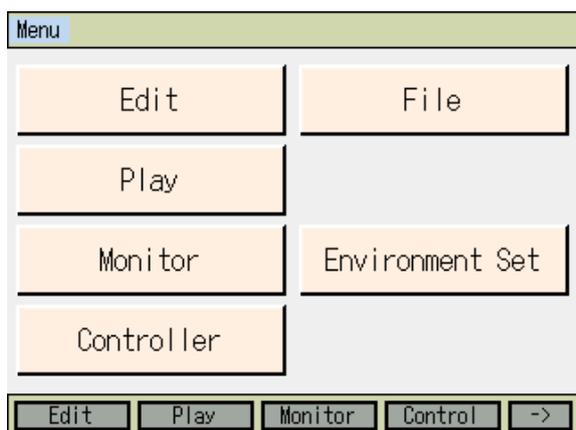
**Never turn off the power to the Controller at this time.**



After flash ROM writing is complete, the display changes to the Software Reset screen. To activate the parameters that you had changes, it is necessary to have a software reset. Either press **Yes** button in the touch panel or press **F1** (Yes) key.



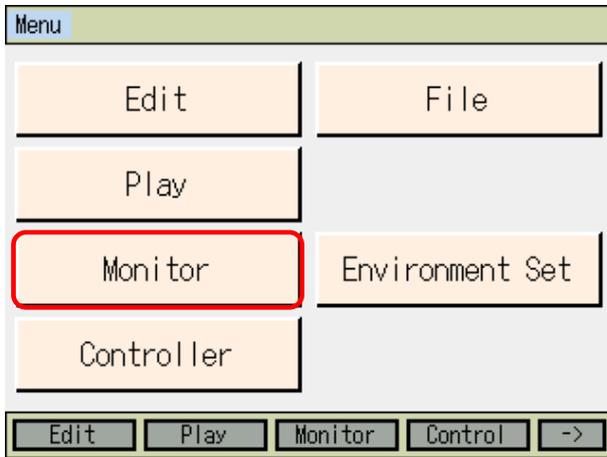
The screen shown on the left is displayed during the software reset.



Once the software reset is complete, the display returns to the main menu screen.

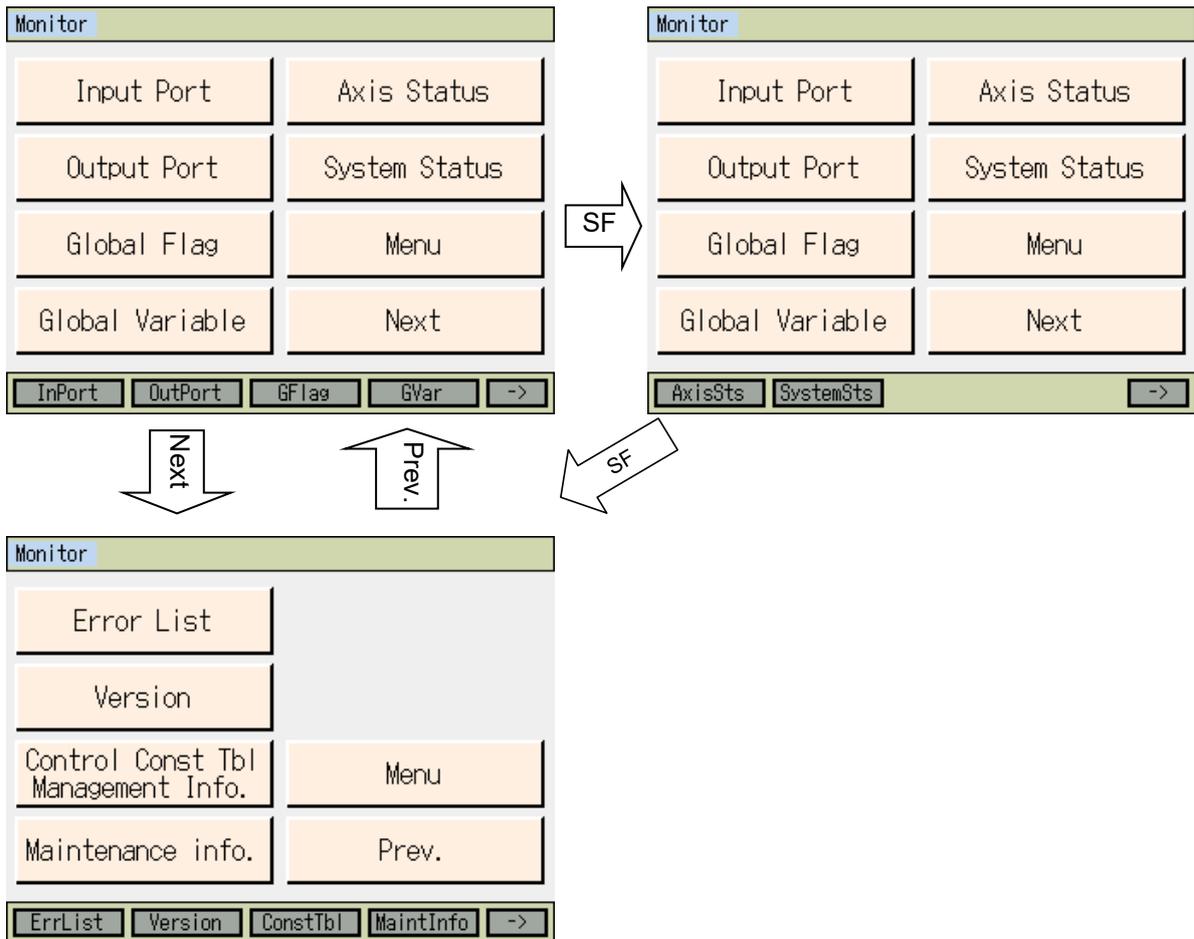
## 15. Monitor

Monitor each status, global variable, port status, etc.



Touch **Monitor** in the menu screen or press **F3** (Monitor) key.

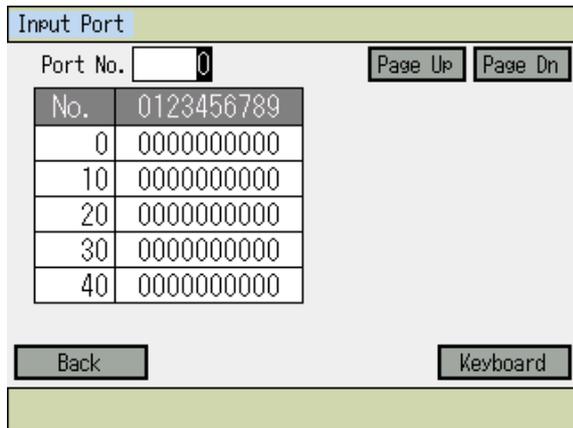
### 15.1 Monitor Items



\* The types and the positions of the buttons shown on the screen differ depending on the motel types.

- Input Port : (InPort) : Displays the input port monitor screen
- Output Port : (OutPort) : Displays the output port monitor screen
- Input/Output port : (InOut) : Displays the input/output port monitor screen (applicable models only)
- Global Flag : (GFlag) : Displays the global flag monitor screen
- Global Variable : (GVar) : Displays the select screen in the global variable monitor
- Axis Atatus : (AxisSts) : Displays the select screen in the axis status monitor
- System Status : (SystemSts) : Displays the select screen in the system status monitor
- Error List : (ErrList) : Displays the error list screen
- Version : (Version) : Displays the version display screen
- Control Const Tbl : (ConstTbl) : Displays the control constant table administration information Management Info. screen (applicable models only)
- Maintenance info. : (MaintInfo) : Displays the maintenance information screen (applicable models only)

## 15.2 Input Port



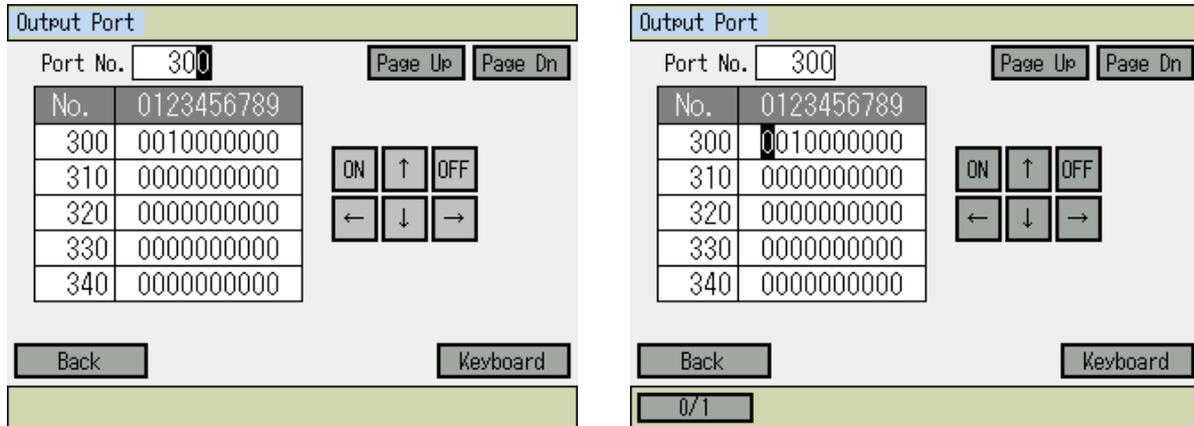
No.	0123456789
0	0000000000
10	0000000000
20	0000000000
30	0000000000
40	0000000000

1: ON, 0: OFF

Input the port number that you want to show in the port number input box by using the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key.

It is also available to use **Page Up** and **Page Dn** buttons to change the number to show.

### 15.3 Output Port



As shown in the figure in the top right, it is available to switch ON/OFF the output port that the cursor is placed on when the cursor is in the output port data box. 1: ON, 0: OFF

To move the cursor from a port number box to an output port data box, either press the return key in the port number box, or touch the output port data box.

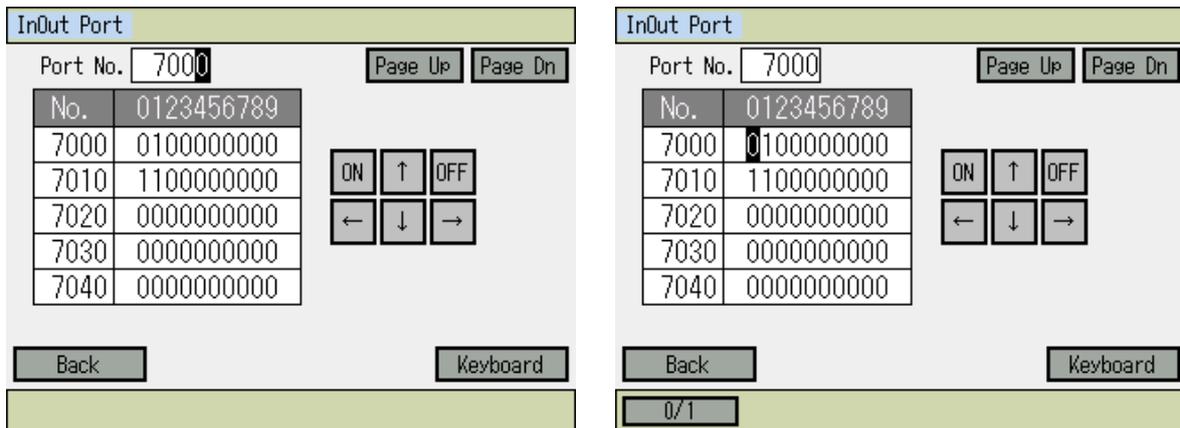
To switch on/off at the cursor place, either touch **ON** or **OFF** button in the touch panel, or press **F1** (0/1) key for switchover.

To move the cursor, either touch **←** **↑** **↓** **→** in the touch panel or press **◀** **▲** **▼** **▶** keys.

Every touch of **Page Up** and **Page Dn** buttons scrolls up/down the output port numbers by 50 items. (**PAGE UP** and **PAGE DOWN** keys also scroll in 50.)

### 15.4 Input/Output Port

(applicable models only)

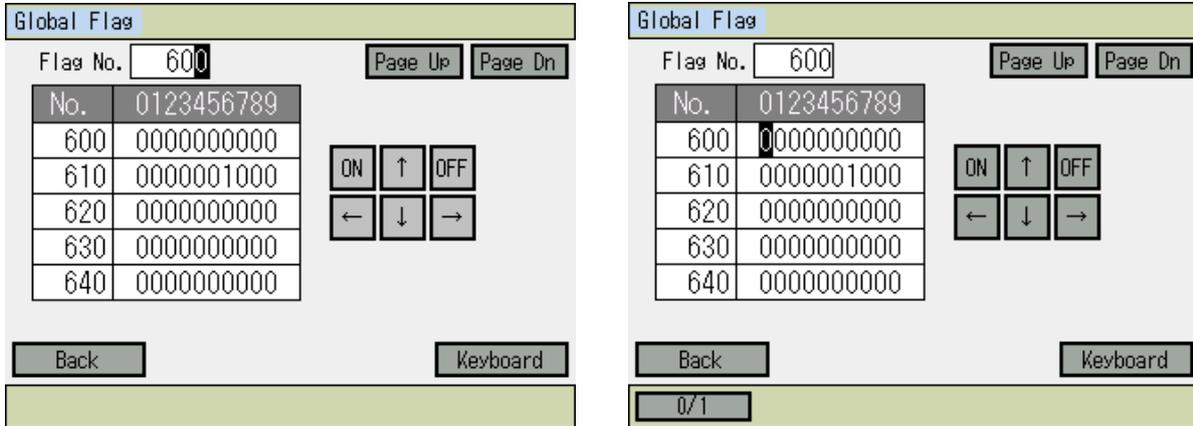


It is available to display and operate the input and output ports for those models applicable for input and output ports.

The way how to operate is the same as 15.3 Output Port.

## 15.5 Global Flag

Displays the ON/OFF status of global flag. Also, it can switch the ON/OFF status of the global flags.  
1: ON, 0: OFF



To move the cursor from a flag number box to a flag data box, either press the return key in the flag number box or touch a flag data box.

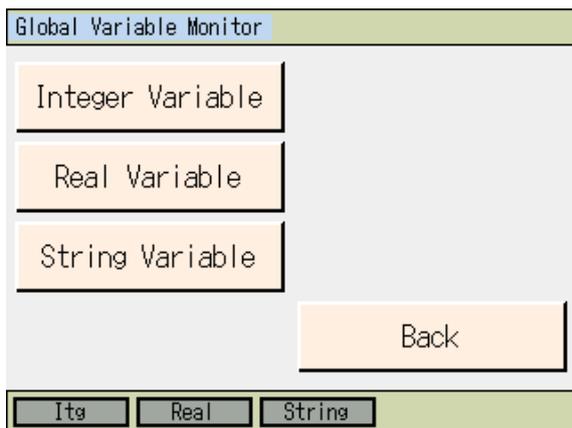
To switch on/off at the cursor place, either touch **ON** or **OFF** button in the touch panel, or press **F1** (0/1) key for switchover.

To move the cursor, either touch **←** **↑** **↓** **→** in the touch panel or press **←** **↑** **↓** **→** keys.

Every touch of **Page Up** and **Page Dn** buttons scrolls up/down the flag numbers by 50 items. (**PAGE UP** and **PAGE DOWN** keys also scroll in 50.)

## 15.6 Global Variable

Displays the contents of global variable and global string. Also, a numerical value can be substituted for a global variable and letter string can be substituted for a global string.



There are three types of global variables.

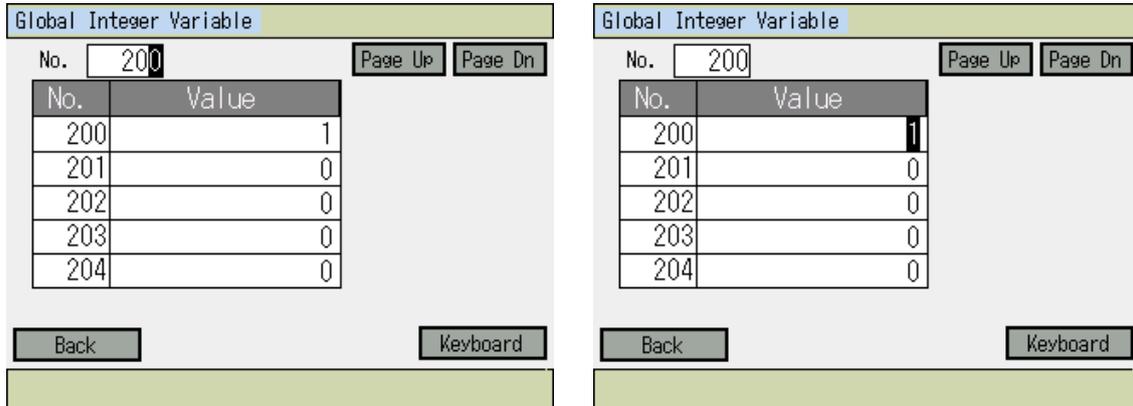
Touch each button to show each monitor screen. The function keys are assigned as stated below.

F1 (Itg) : Integer Variables

F2 (Real) : Real Variables

F3 (String) : String Variables

### 1) Global Integer variables



No.	Value
200	1
201	0
202	0
203	0
204	0

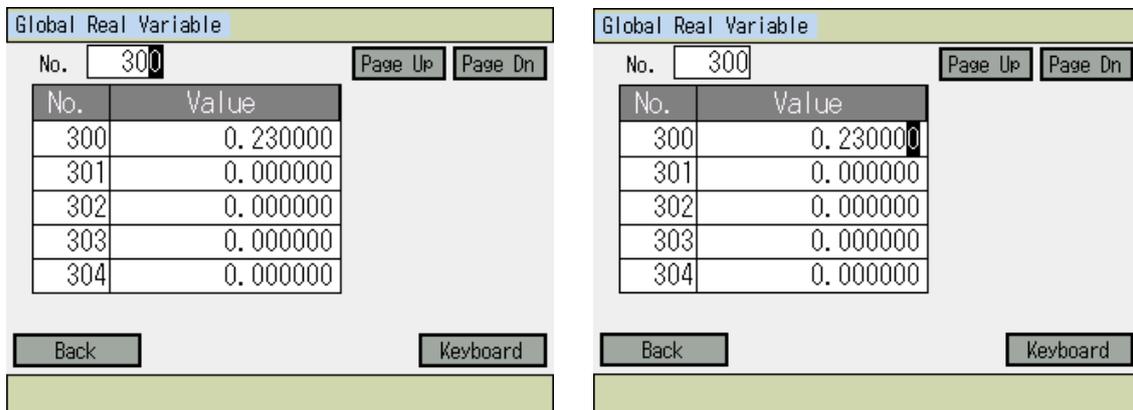
When the global Integer variables screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons.

Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box.

The data with the cursor placed on can be substituted by inputting on the touch panel numeric keys and touching **ENT** button. It is also available to use the hardware numeric keys to input a value and press the return key for substitution.

To move the cursor, either touch in the value input box or press **▲** and **▼** keys.

### 2) Global Real Variables



No.	Value
300	0.230000
301	0.000000
302	0.000000
303	0.000000
304	0.000000

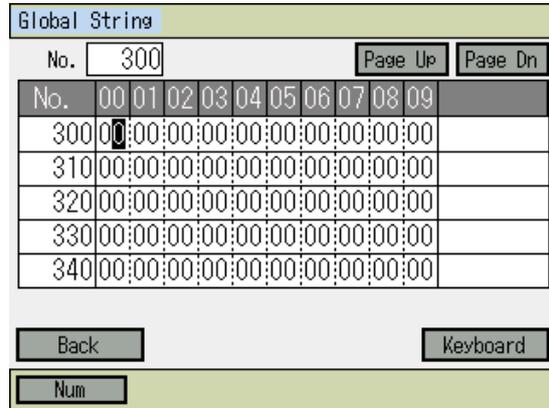
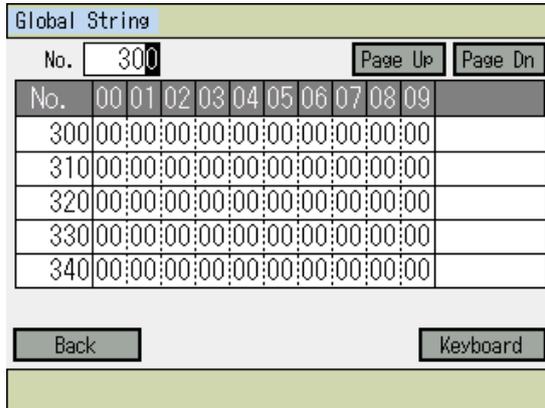
When the global real variables screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons.

Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box.

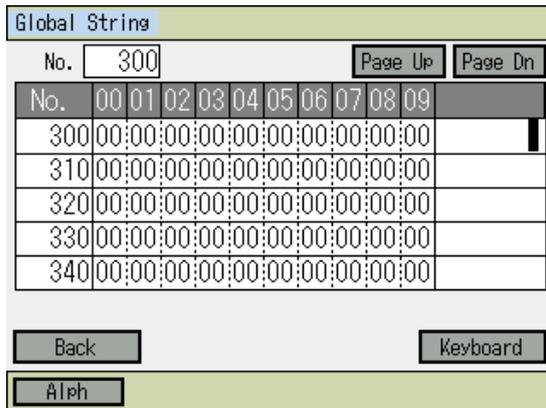
The data with the cursor placed on can be substituted by inputting on the touch panel numeric keys and touching **ENT** button. It is also available to use the hardware numeric keys to input a value and press the return key for substitution.

To move the cursor, either touch in the value input box or press **▲** and **▼** keys.

### 3) Global String Variables



When the global string variables screen is opened, the cursor should be placed in a number box. Make the number to be monitored shown by using **Page Up** and **Page Dn** buttons. Inputting a number on the touch panel numeric keys or hardware numeric keys is also available. The cursor moves to the data box. The data with the cursor placed on can be substituted by inputting ASCII code on the touch panel numeric keys and touching **ENT** button. It is also available to use the hardware numeric keys to input a value and press the return key for substitution. To input A to F in the hexadecimal system, press **Alph/Num** key and switch the mode to Alph.

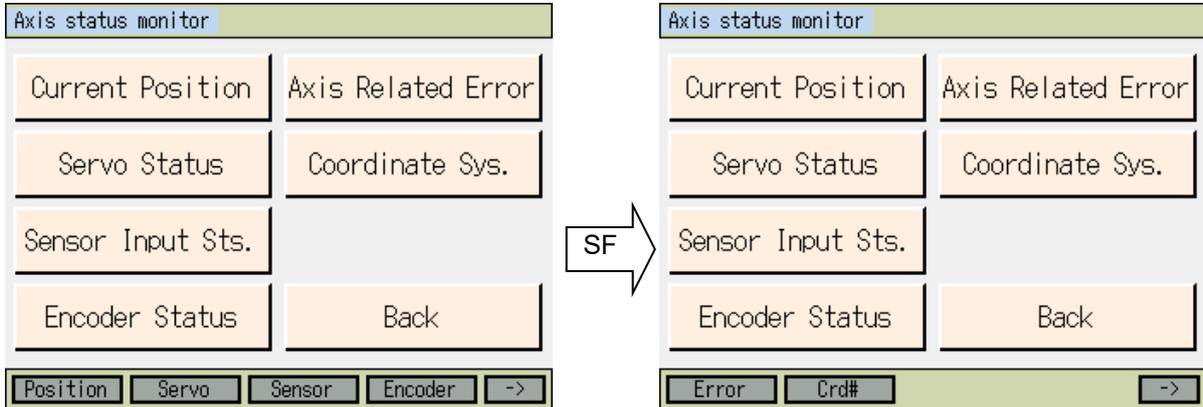


Touch in a character strings display and input box to show the cursor in it, and input of character strings is available. Touch **Keyboard** button to show the touch panel keyboard, or use the hardware numeric keys to input. To move the cursor, touch on an area that you want to place it as the cursor cannot be moved with **◀ ▲ ▼ ▶** keys between the character strings display and input box and the data box. In the character display column, only alphabetical and numerical letters and half-size font Kana characters can be displayed. Input is available only with the alphabetical and numerical letters.

## 15.7 Axis Status

Displays the current position of each axis, servo status, sensor status, etc.  
The status items may vary depending on the model.

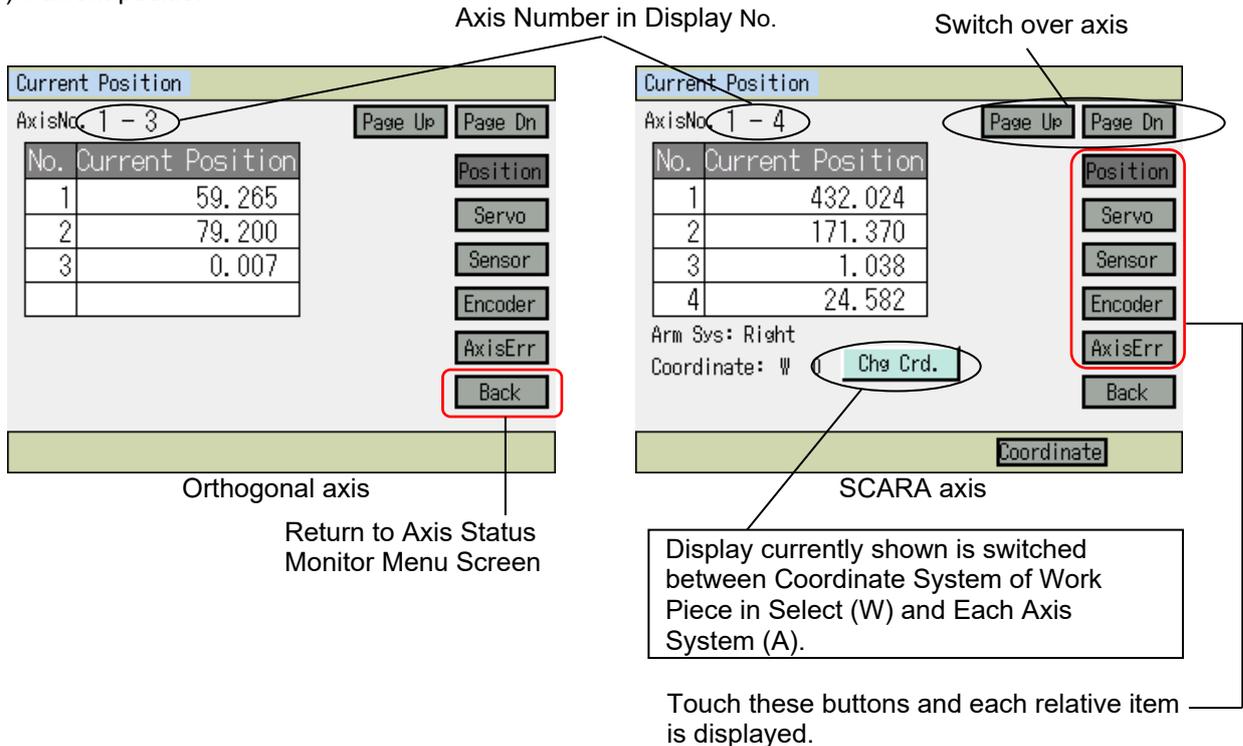
Select the item to show on the monitor in the menu screen shown in the figure below.



Current Position : F1 (Position) : Displays the current position  
 Servo Status : F2 (Servo) : Displays the servo status  
 Sensor Input Sts. : F3 (Sensor) : Displays the status of the sensor input  
 Encoder Status : F4 (Encoder) : Displays the encoder status

Axis Related Error : F1 (Error) : Displays the errors related to axis  
 Coordinate Sys. : F2 (Crd#) : Displays the work coordinate system number and tool coordinate system number for the work piece currently being selected (XSEL-JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX only)

### (1) Current position



## (2) Servo status

Servo Status			
AxisNo. 1 - 3	Page Up	Page Dn	
Servo Status	1	2	3
Servo ON axis in use	●	●	●
Homing	●	●	●
Servo	●	●	●
Moving Command Normal End	●	●	●
Over Push Limit Error	●	●	●
(System Reservation)	●	●	●
(System Reservation)	●	●	●

It is available to switch the axis number with **Page Up** and **Page Dn** buttons.

The status of ON/OFF is displayed with (ON) and (OFF).

## (3) Sensor Input Status

Sensor Input Status			
AxisNo. 1 - 3	Page Up	Page Dn	
Sensor Input Status	1	2	3
Creep Sensor	●	●	●
Overrun Sensor	●	●	●
Home Sensor	●	●	●
(System Reservation)	●	●	●

Orthogonal axis

Sensor Input Status				
AxisNo. 1 - 4	Page Up	Page Dn		
Sensor Input Status	1	2	3	4
(System Reservation)	●	●	●	●
(System Reservation)	●	●	●	●
(System Reservation)	●	●	●	●
(System Reservation)	●	●	●	●

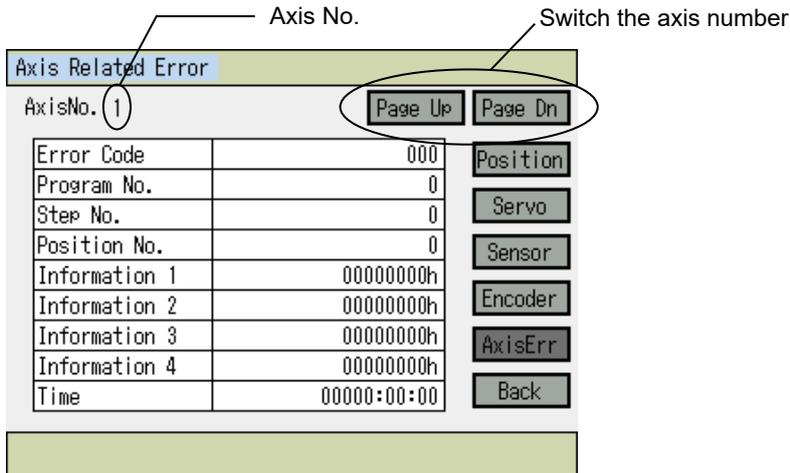
SCARA axis

## (4) Encoder Status

Encoder Status			
AxisNo. 1 - 3	Page Up	Page Dn	
Encoder Status	1	2	3
Over Speed	●	●	●
Full Absolute Status	●	●	●
Count Error	●	●	●
Counter Overflow	●	●	●
(System Reservation)	●	●	●
Multi-rotation Error	●	●	●
Battery Error	●	●	●
Battery Alarm	●	●	●

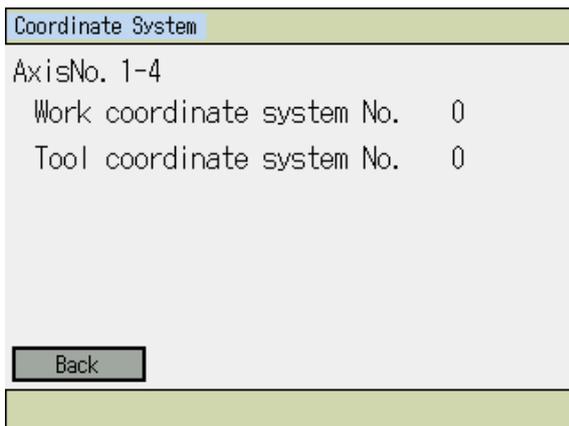
\* The items displayed on each status screen differ depending on the models.

(5) Axis Related Error

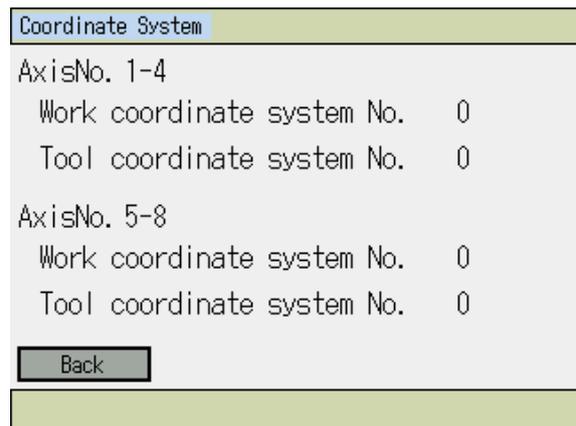


(6) Selected Coordinate System (XSEL-JX/KX, PX/QX, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX only)

The coordinate system number currently selected is displayed.



XSEL-JX/KX, PX/QX, RX/SX, RAX/SAX and MSEL-PCX/PGX  
(Shown as Axis No. 1-3 in 3-axis SCARA type)



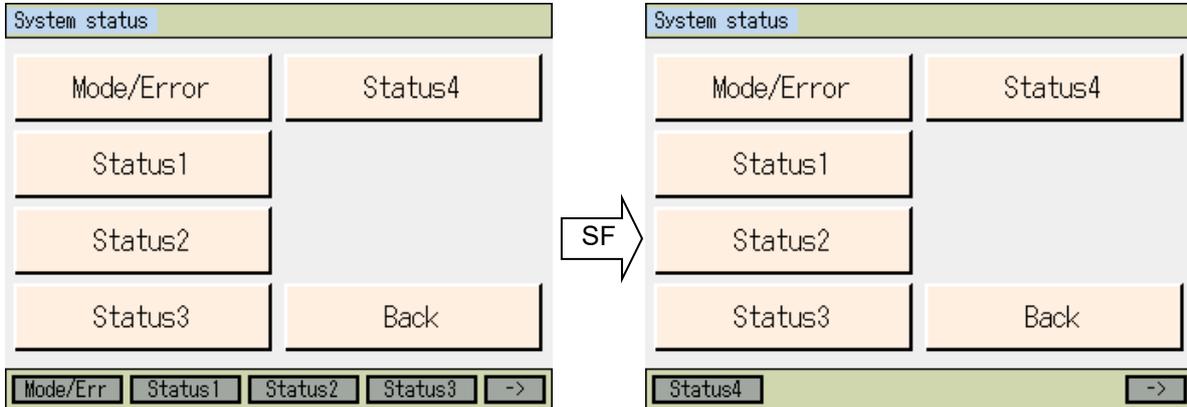
XSEL-RXD/SXD and RAXD/SAXD

## 15.8 System Status

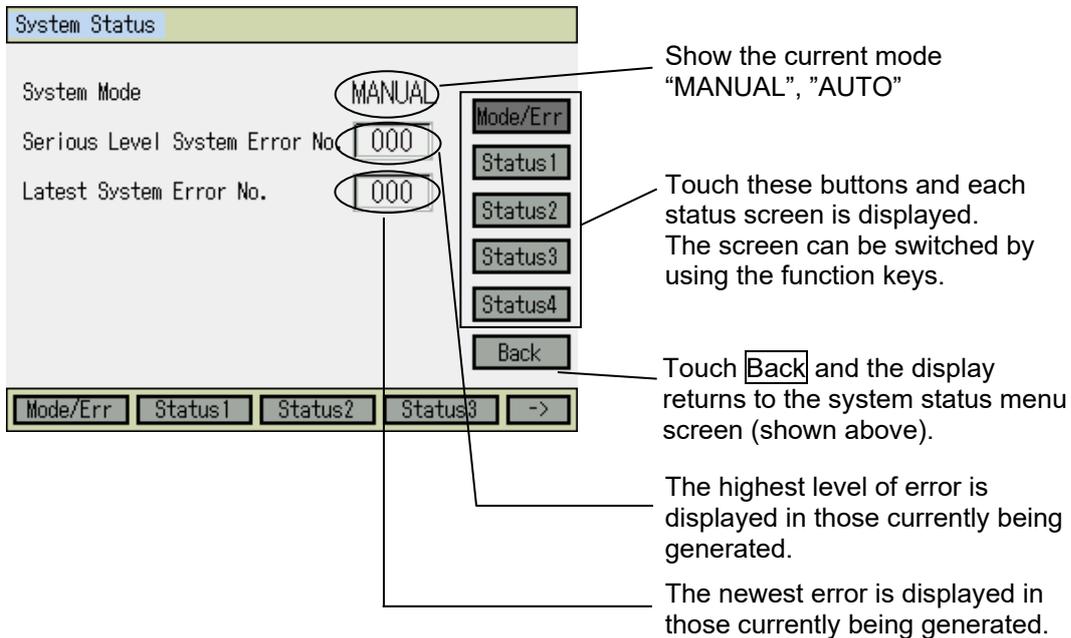
Display system status.

The status items may vary depending on the model.

Select the item to show on the monitor in the menu screen shown in the figure below



- Mode/Error : F1 (Mode/Err) : Displays the current operation mode and error number
- Status1 : F2 (Status1) : Displays System Status 1
- Status2 : F3 (Status2) : Displays System Status 2
- Status3 : F4 (Status3) : Displays System Status 3
- Status4 : F1 (Status4) : Displays System Status 4



System Status 1		
Indication	Status	
Operation Mode SW Status	MANUAL	Mode/Err
TP Enable SW Status	ON	
Safety Gate Status	OPEN	Status1
Emergency Stop SW Status	NON	Status2
Power Abnormality Status	NORMAL	
Battery Voltage Down Warning Sts.	NON	Status3
Battery Voltage Error Status	NORMAL	Status4
(System Reservation)	OFF	
Back		

Mode/Err   Status1   Status2   Status3   ->

System Status (1)

System Status 2		
Indication	Status	
Application Data FROM Write Sts.	NON	Mode/Err
Slave Parameter Write Status	NON	
Servo Interlock Status	NON	Status1
I/O Interlock Status	NON	Status2
Wait for Reset Status	NON	
Program Execution Status	NON	Status3
Vel Cmd/Pos Pulse Mon(Main) Sts.	NON	Status4
Driver Monitor Status	NON	
Back		

Mode/Err   Status1   Status2   Status3   ->

System Status (2)

System Status 3		
Indication	Status	
Power Down Status	NON	Mode/Err
System Drive Status	NON	
System Ready Status	READY	Status1
Function select flag request sts.	OFF	Status2
Status of Positioner Mode	PRG	
Request Selective Function 2	NON	Status3
(System Reservation)	OFF	Status4
(System Reservation)	OFF	
Back		

Mode/Err   Status1   Status2   Status3   ->

System Status (3)

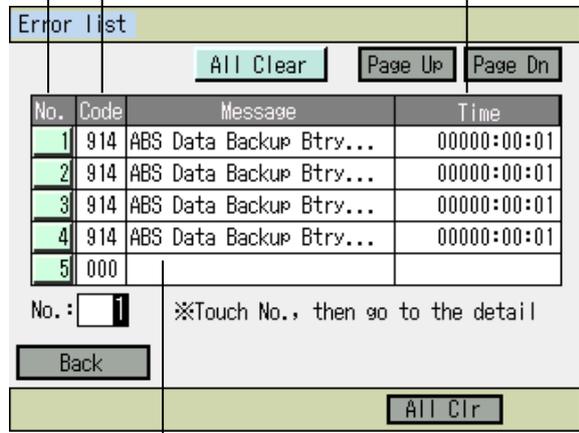
## 15.9 Error List

Select **Error List** in the monitor items.

The younger the number is, the newer the error.

Error Code

Generated Time shows the time after the power started to be supplied to the controller or after the software reset.



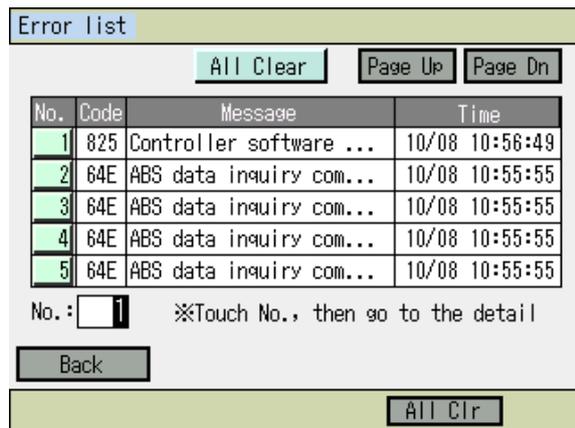
No.	Code	Message	Time
1	914	ABS Data Backup Btry...	00000:00:01
2	914	ABS Data Backup Btry...	00000:00:01
3	914	ABS Data Backup Btry...	00000:00:01
4	914	ABS Data Backup Btry...	00000:00:01
5	000		

No. :  ※Touch No., then go to the detail

Back

All Clr

Error Message



No.	Code	Message	Time
1	825	Controller software ...	10/08 10:56:49
2	64E	ABS data inquiry com...	10/08 10:55:55
3	64E	ABS data inquiry com...	10/08 10:55:55
4	64E	ABS data inquiry com...	10/08 10:55:55
5	64E	ABS data inquiry com...	10/08 10:55:55

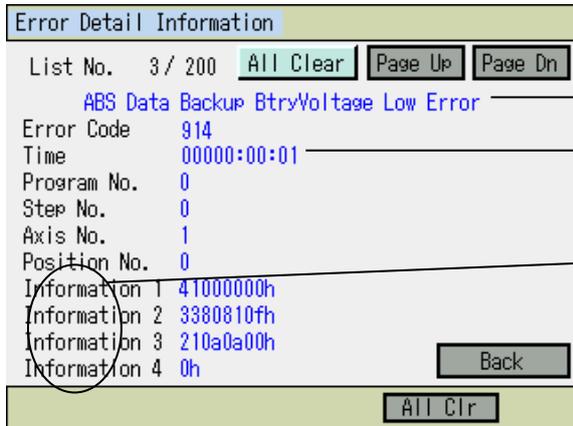
No. :  ※Touch No., then go to the detail

Back

All Clr

For XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF, the content of generated time is the time of generation.

(1) Error Detail Information

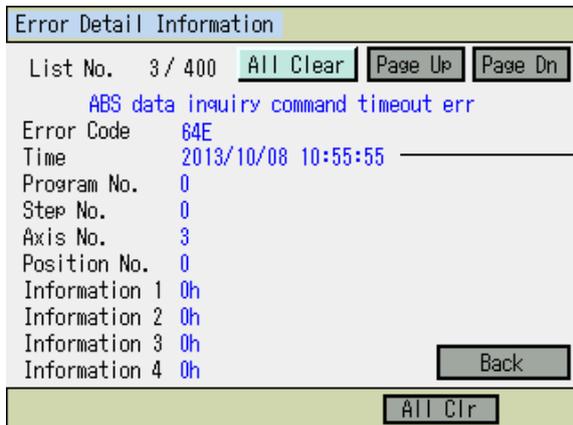


Error Message

Time after power started to be supplied to controller or after software reset

Information 1 to 4 are the information for IAI to analyze the cause of an error. (The content differs depending on the error number.)

Either touch **Back** or press **ESC** key to return to the error list display screen.



Time of generation (Year/month/day hour: minute: second)

For XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF

(2) Delete Error List

Either touch **All Clear** button or press **F4** (All Clr) key to show the confirmation screen to clear the error list.

Either touch **Yes** button or press **F1** (Yes) key when you want to clear the error list.

If you do not want to delete, either touch **No** button or press **F2** (No) key.

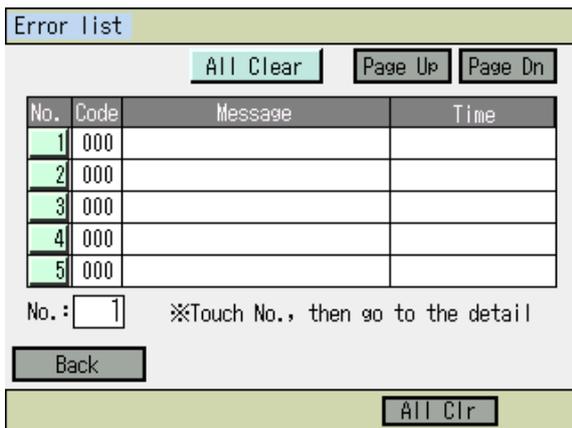
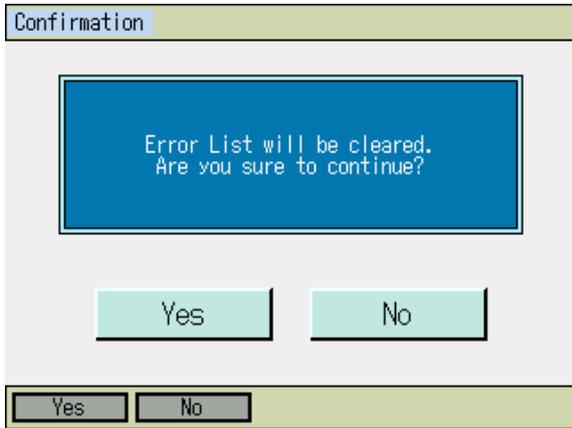
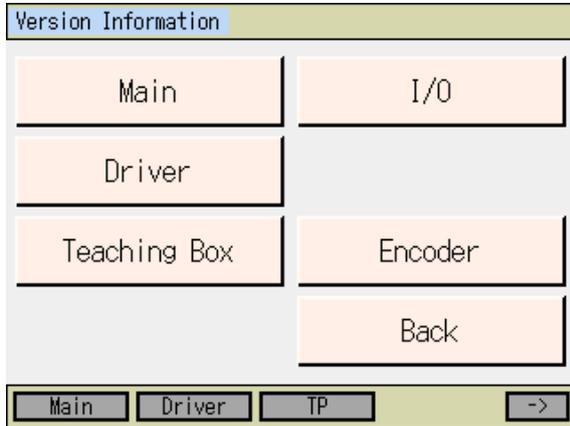


Image after Completing to Delete

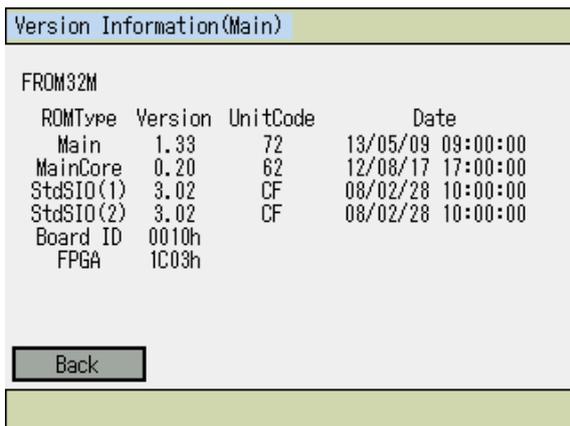
## 15.10 Version Information

Displays version information. The items available to select and display in each screen, may differ depending on the model.



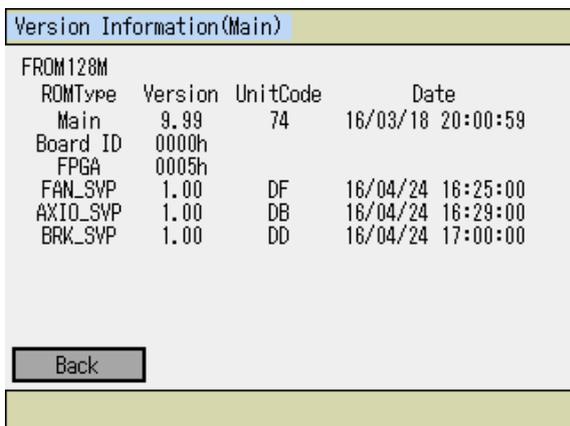
Depending on the controller, the [I/O] button may be changed to the [Field Bus] button.

### (1) Main



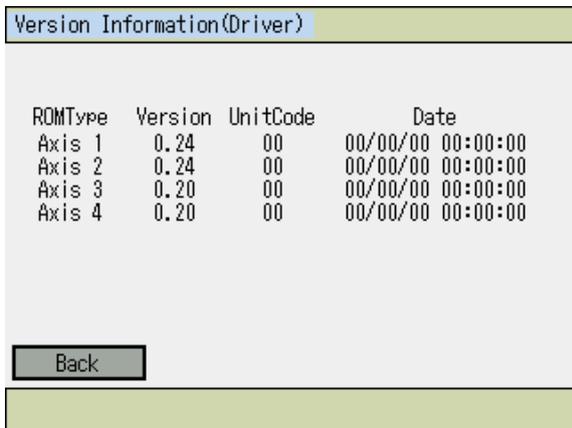
Main : Controller application version  
 MainCore : Controller core version  
 StdSIO (1) : Channel 1 version \*1  
 StdSIO (2) : Channel 2 version \*1  
 Board ID : Board ID (HEX)  
 FPGA : FPGA version (HEX)  
 FAN\_SVP : FAN\_SVP version  
 AXIO\_SVP : AXIO\_SVP version  
 BRK\_SVP : BRK\_SVP version

\*1: 'Nouse' is shown in channel's set as "Not to Use" in I/O Parameter No. 201 and 213.



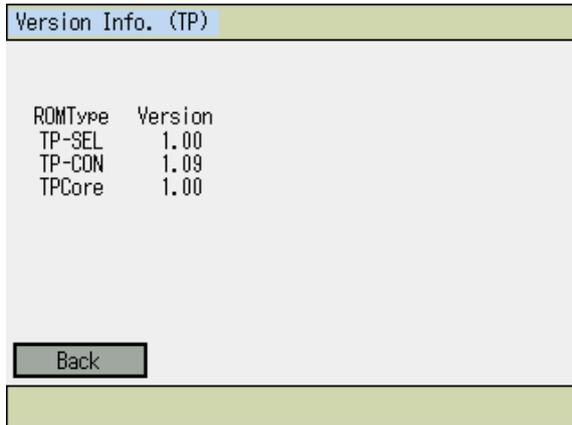
For XSEL-RA/SA/RAX/SAX/RAXD/SAXD

(2) Driver



The driver CPU version is displayed.

(3) Teaching Pendant



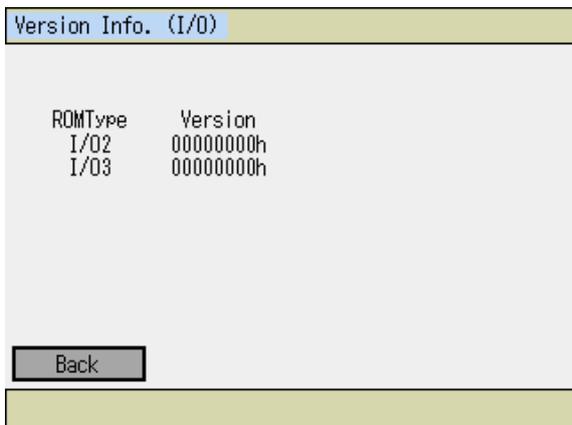
The version of this product is shown.

TP-SEL : Application version for when SEL type controller is connected

TP-CON : Application version for when CON type controller is connected

TPCore : Core version

(4) I/O



Version of extension I/O module is displayed

(5) Encoder

Version Information(Encoder)			
ROMType	Version	UnitCode	Date
Axis 1	FFD9h	00	00/00/00 00:00:00
Axis 2	FFD9h	00	00/00/00 00:00:00
Axis 3	FFD9h	00	00/00/00 00:00:00
Axis 4	FFD9h	00	00/00/00 00:00:00

Back

Version of encoder CPU is displayed

### 15.11 Control Constant Table Administration Information

(applicable models only)

Control Const Table Management Info.			
ID	Data	Format	Date
0	0.19	0.05	2012/08/03 18:55:00
1	0.24	0.01	2012/08/03 18:10:00
2	-----	-----	
3	-----	-----	
4	-----	-----	
5	-----	-----	
6	-----	-----	
7	-----	-----	

Page Up Page Dn

Back

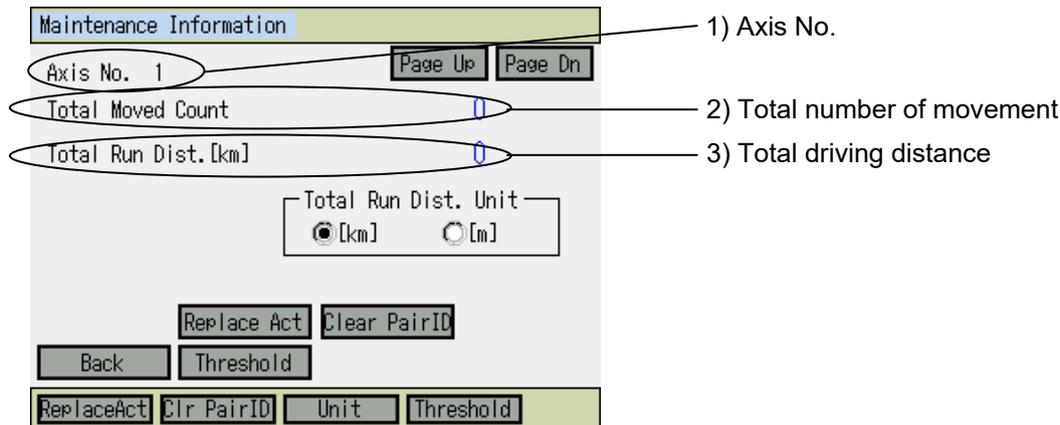
It is available to check the version of the control constant table for the encoder and monitor.

## 15.12 Maintenance Information

(applicable models only)

Displays the number of actuator movement and distance.

[Items Shown in Maintenance Information Screen]



- 1) Axis No.  
It shows the axis number.
- 2) Total number of movement  
Displays the total No. of actuator movement times.
- 3) Total driving distance  
Displays the total distance of the actuator movement. Display in [km] or [m] is available. (Numbers are shown in an integer with the nearest decimal rounded down.)

Every time **Page Up** or **Page Dn** button is touched, the axis number is switched in the screen. (The display also switches with **PAGE UP** and **PAGE DOWN** keys.)

By either touching **Replace Actuator** button or pressing **F1** (ReplaceAct) key, the total operation times and total operation distance can be initialized (cleared).

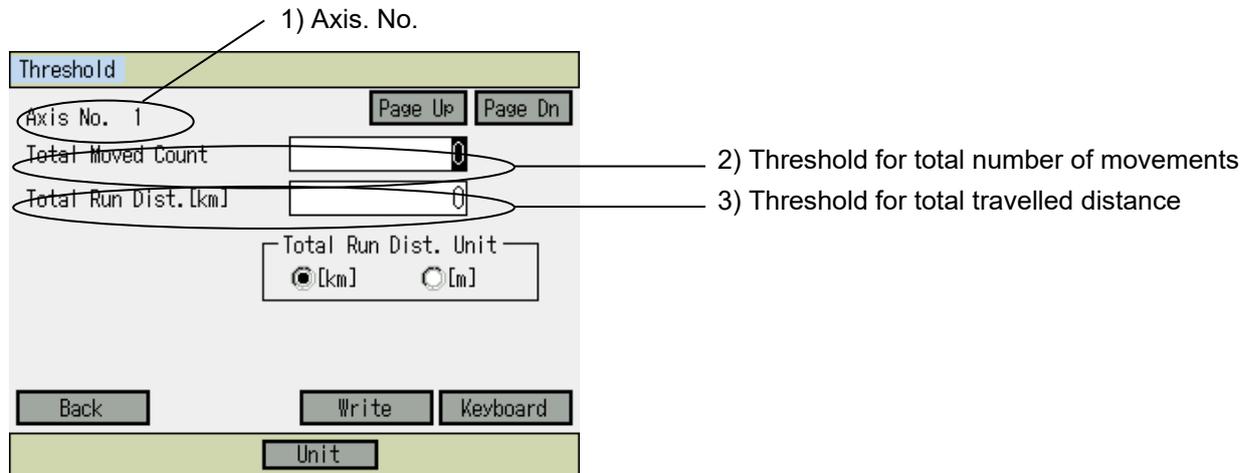
By either touching **Clear PairID** button or pressing **F2** (Clr PairID) key, the paired I.D. can be cleared.

By either touching each button in the total operation distance display unit box or pressing **F3** (Unit), the unit of the total operation distance display can be switched over.

Either touch **Threshold** button or press **F4** (Threshold) key, and the display changes to the Threshold screen.

Either touch **Back** button or press **ESC** key to return to Monitor Menu screen.

[Output Timing (Threshold) Setting of Signals]



- 1) Axis No.  
It shows the axis number.
- 2) Threshold for total number of movements  
It shows the threshold for the total number of the movements.
- 3) Threshold for total travelled distance  
It shows the threshold for the total number of the travelled distance. Display in [km] or [m] is available. (Numbers are shown in an integer with the nearest decimal rounded down.)

Every time **Page Up** or **Page Dn** button is touched, the axis number is switched in the screen. (The display also switches with **PAGE UP** and **PAGE DOWN** keys.)

By either touching each button in the total operation distance display unit box or pressing **F3** (Unit), the unit of the total operation distance target value display can be switched over.

The threshold for total number of movements and the threshold for total number of travelled distance are available for edit.

- (1) Touch the item you want to edit and the cursor is shown on the item.
- (2) Touch **Keyboard** button to show the touch panel keyboard, input a value and then touch **ENT** button, or input a value on the hardware numeric keys and then press **↵** key.
- (3) After inputting data, either touch **Write** button or press **WRT** key to transfer the data to the controller.

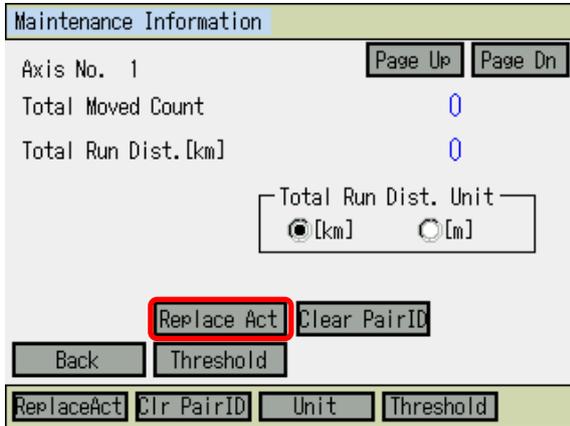
In case writing was conducted, when you return to the menu screen with **Back** button or **ESC** key, confirmation screen for flash ROM writing and software reset appears. In order to apply the written data, import the data on the flash ROM and reset the software.

*(Note) In the case that the Axis No. or Maintenance Information screen is changed without importing the data, the input data is erased.*

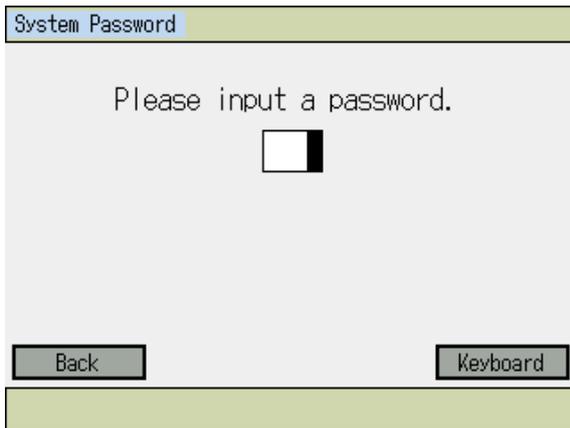
Either touch **Back** button or press **ESC** key to return to Maintenance Information screen.

### 15.12.1 Actuator Replacement

When the actuator is replaced, the total operation times and total operation distance can be initialized (cleared).

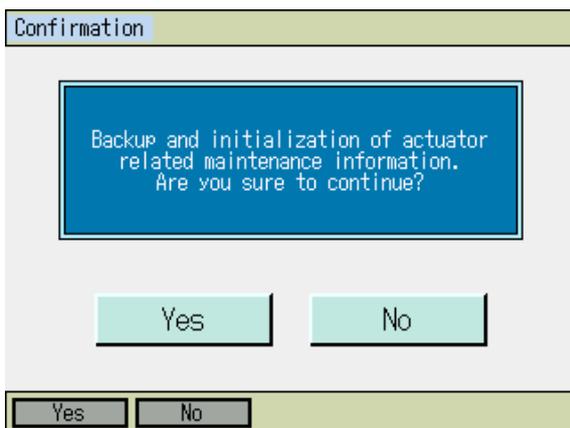


Either touch **Replace Act** button or press **F1** (ReplaceAct) key.

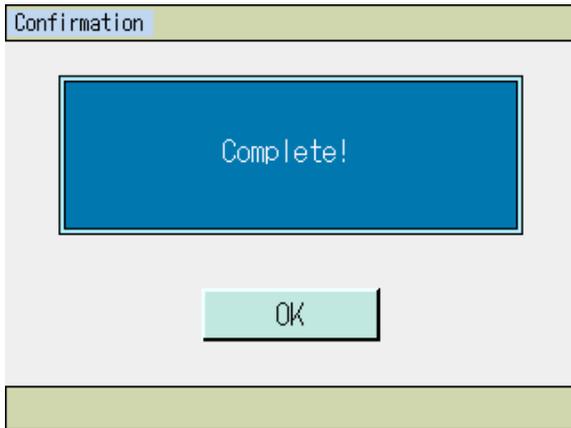


The password input window appears. Input 5119 either on the keyboard or in the hardware keys.

\* Once the password is input, it is effective until getting out of the maintenance information window.



Either touch **Yes** button or press **F1** (Yes) key when initializing of the total operation times and total operation distance is required.  
Either touch **No** button or press **F2** (No) key when initializing of the total operation times and total operation distance is not required.



Once the process is completed, the screen changes to the figure shown in the left. Touch **OK** button or press **ESC** key.

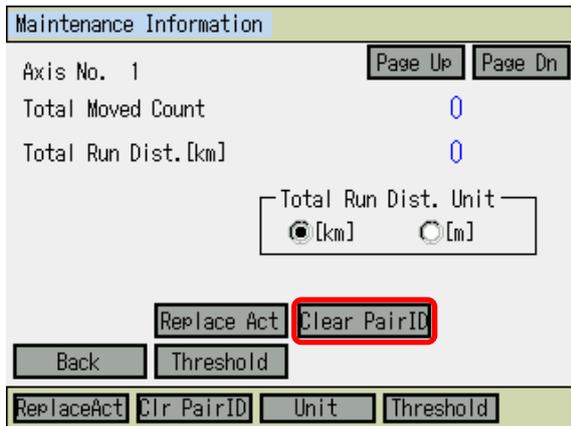
When the battery-less absolute encoder is connected and the pairing I.D. clear feature is activated, the pairing I.D. clear execution confirmation window appears continually. Refer to 15.12.2 Pairing I.D. Clear to conduct the pairing I.D. clear if necessary.

In any cases other than above, back to maintenance information screen.

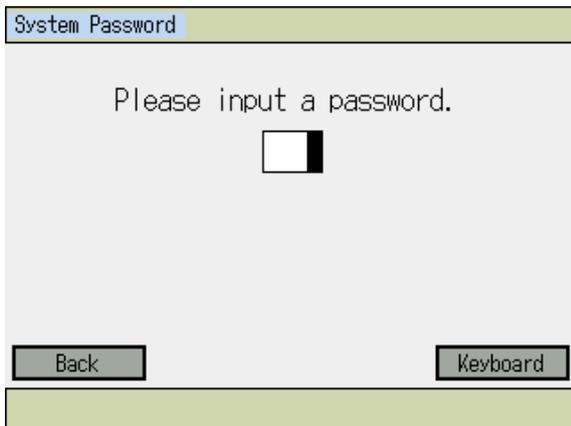
### 15.12.2 Pairing ID Clear

The controller possesses a feature to output an absolute error when it checks the encoder I.D. and detects it is wrong. In case replacement is conducted with an actuator which the absolute reset has been executed, it is necessary to clear the existing I.D. (pairing I.D.).

This feature is available only when the battery-less absolute encoder is connected and the pairing I.D. clear feature is activated.

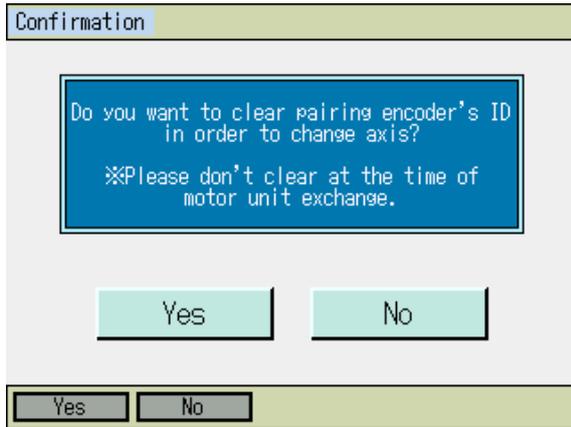


Either touch **Clear PairID** button or press **F2** (Clr PairID) key.



The password input window appears. Input 5119 either on the keyboard or in the hardware keys.

\* Once the password is input, it is effective until getting out of the maintenance information window.



Either touch **Yes** button or press **F1** (Yes) key when the paired I.D. is to be cleared.

Either touch **No** button or press **F2** (No) key when the paired I.D. is not to be cleared.

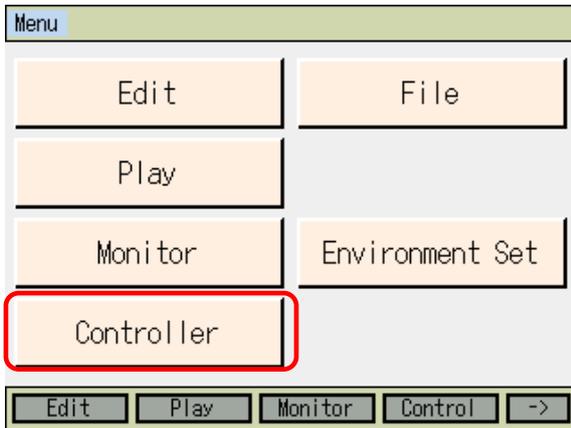


Once the process is completed, the screen changes to the figure shown in the left. Either touch **OK** button or press **ESC** key to go back to maintenance information screen.

## 16. Controller

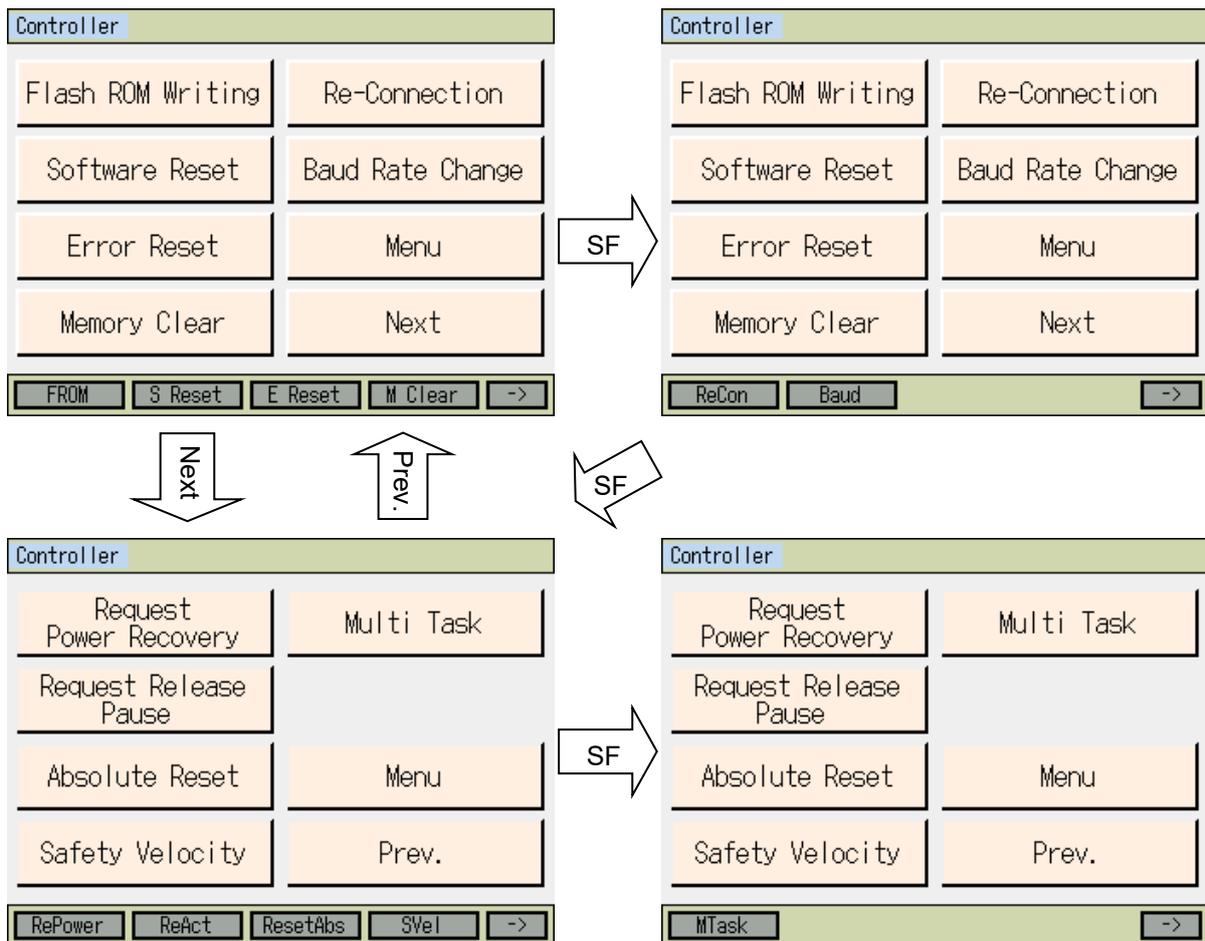
How to execute operation related to the controller such as a software reset and an error reset.

### 16.1 Controller Items



Touch **Controller** button or press **F4** (Control) key.

In the controller menu below, the available items to select from differ depending on the model.



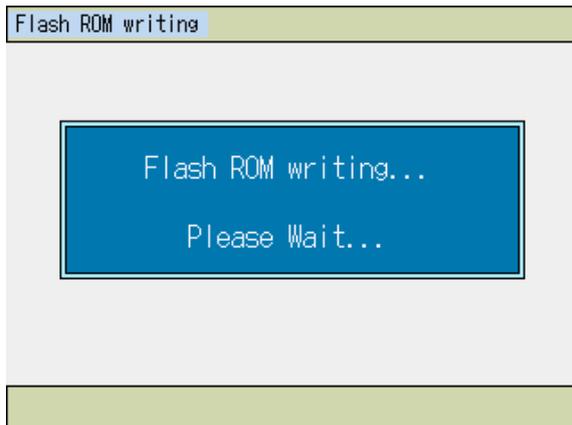
Flash ROM Writing	: F1 (FROM)	: Conducts flash ROM writing
Software Reset	: F2 (S Reset)	: Conducts software reset on controller
Error Reset	: F3 (E Reset)	: Resets the controller error
Memory Clear	: F4 (M Clear)	: Clears each memory on controller
Re-Connection	: F1 (ReCon)	: Conducts reconnection of the controller
Baud Rate Change	: F2 (Baud)	: Changes the baud rate for communication with the controller
Request Power Recovery:	F1 (RePower)	: Demands the drive source recovery to the controller
Request Release Pause	: F2 (ReAct)	: Demands the cancellation of pause to the controller
Absolute Reset	: F3 (ResetAbs)	: Resets the absolute data. (In some models, it may be displayed as Home Position Adjustment / Absolute Reset (CalH/RAbs). In such a case, adjust the home position and reset the absolute data.)
Safety Velocity	: F4 (SVel)	: Switches valid/invalid of safety speed limit at Manual Mode
Multi Task	: F1 (MTask)	: Allows simultaneous operation of multiple programs at Manual Mode. (XSEL-P/Q Main Application V0.36 to, XSEL-PX/QX Main Application V0.17 to, SSEL/PSEL/ASEL (only in the program mode), XSEL-R/S,RX/SX,RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX/PC/PG/PCF/PGF)

## 16.2 Flash ROM Writing

After clearing the data from Flash ROM, write data which is saved in controller memory to Flash ROM.



To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.  
If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

***Never turn off the power to the Controller at this time.***



Flash ROM writing is completed.

Either touch **OK** button or press **ESC** key to return to the controller menu screen.

### 16.3 Software Reset

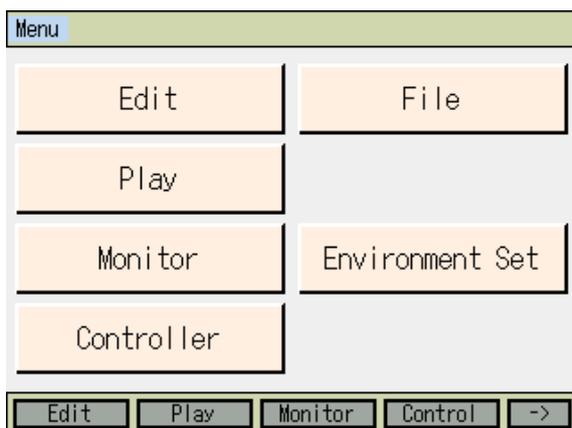
Executes software reset of the controller. The data which is not written to Flash ROM will be cleared.



Either touch **Yes** button or press **F1** (Yes) key when you want to have a software reset. When the software reset is not necessary, touch **No** button or press **F2** (No) key. The display returns to Controller Menu.



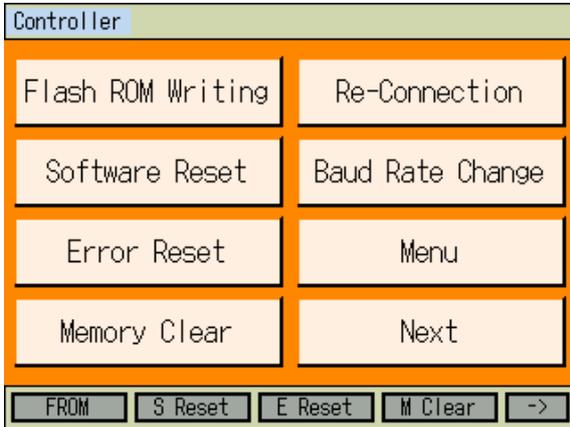
The screen shown on the left is displayed during the software reset.



Once the software reset is complete, the display returns to the main menu screen.

## 16.4 Error Reset

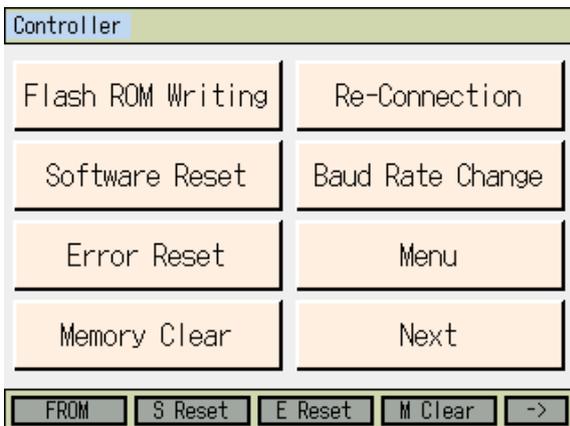
Executes error reset of the controller. Reset the message-level and action-release-level errors. If the cause of an error is already removed, the background color is changed from orange to white which shows in normal condition.



The background color is orange when an error in being generated. Touch **Error Reset** button or press **F3** (E Reset) key.



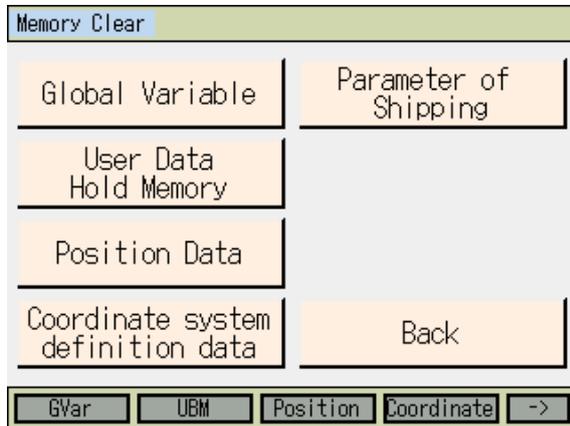
Either touch **Yes** button or press **F1** (Yes) key when you want to have an error reset. When the error reset is not necessary, touch **No** button or press **F2** (No) key.



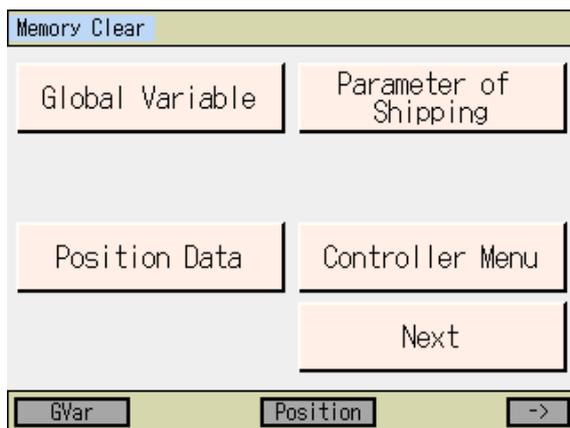
As shown in the figure on the left, if the cause of an error is already removed, the background color is changed from orange to white which shows in normal condition.

## 16.5 Memory Clear

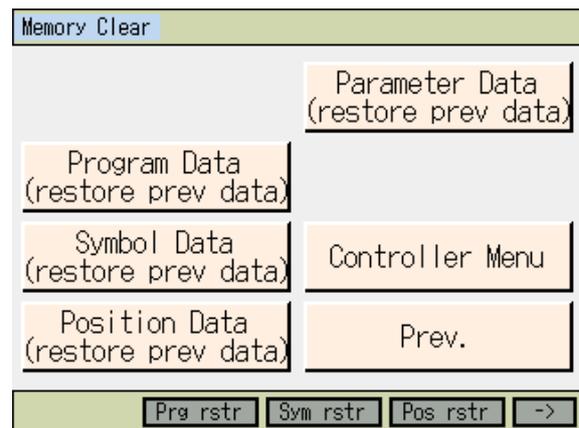
### 16.5.1 Memory Initialization Items



Example for Memory Initializing Menu Screen (XSEL-RXD/SXD)



Example for Memory Initializing Menu Screen (TTA)



(2nd page in the same section)

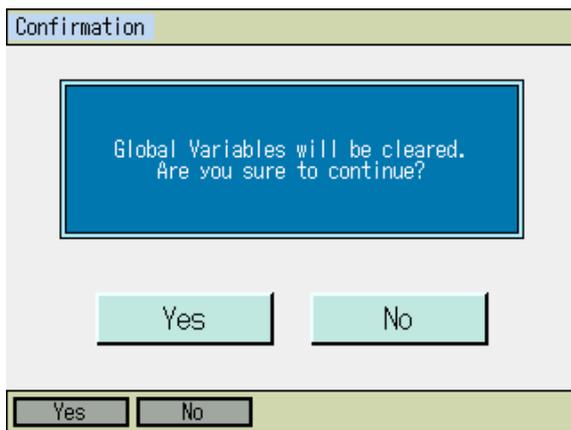
\* The types of buttons to be displayed will differ depending on models.

Global Variable	: F1(GVar)	: Conducts Zero-Clear to global variables
User Data Hold Memory	: F2(UBM)	: Initializes the user data hold memory (for XSEL-P/Q, PX/QX, R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD equipped with gateway function)
Position Data	: F3(Position)	: Clears all the position data (XSEL- R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF only)
Coordinate system definition data	: F4(Coordinate)	: Clears all the coordinate system definition data (XSEL-RX/SX, RXD/SXD RA/SA, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX only)
Parameter of Shipping	: F1(Ship-Para)	: Set the parameters back to the condition of delivery from the production plant. (For SSEL, ASEL, PSEL, XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX and RAXD/SAXD, TTA AC Servo Type / High-Resolution Type and MSEL High-Resolution Type)

- Program Data (restore prev data) : F2 (Prg rstr) : Recover the flash ROM writing data for the program data to the writing data of one generation before. (TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF only)
- Symbol Data (restore prev data) : F3 (Sym rstr) : Recover the flash ROM writing data for the symbol data to the writing data of one generation before. (TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF only)
- Position Data (restore prev data) : F4 (Pos rstr) : Recover the flash ROM writing data for the position data to the writing data of one generation before. (TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF only) *(Note) No. 1 to 10000 cannot be recovered.*
- Parameter Data (restore prev data): F1 (Para rstr) : Recover the flash ROM writing data for the parameter data to the writing data of one generation before. (TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF only)

### 16.5.2 Global Variable

Conducts Zero-Clear (initialization) to global variables



Either touch **Yes** button or press **F1** (Yes) key when you want to initialize the global variables. When the initialization of the global variables is not necessary, touch **No** button or press **F2** (No) key.



If the initialization of the global variables is finished, the display changes to the screen shown on the left.

Either touch **OK** button or press **ESC** key to return to Memory Initialization Menu screen.

### 16.5.3 User Data Hold Memory

Refer to “19.3 Initialization of User Data Hold Memory”.

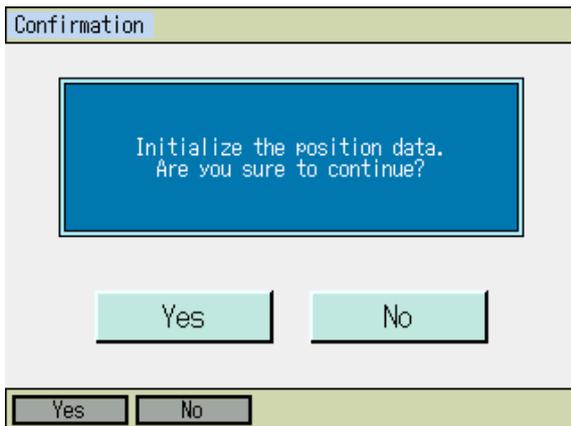
### 16.5.4 Position Data

(XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA and MSEL-PCX/PGX/PC/PG/PCF/PGF Only)

Position data is cleared.

Initialize the position data by using this function in case 6BD "Position Data Construction Change Error" or 6BF "Position Data Sum Check Error" is occurred.

Note) 22B "Position Data Comment Loss Error" will be generated if a software reset is conducted or the power is turned off without writing the position data to the flash ROM after this function is used.



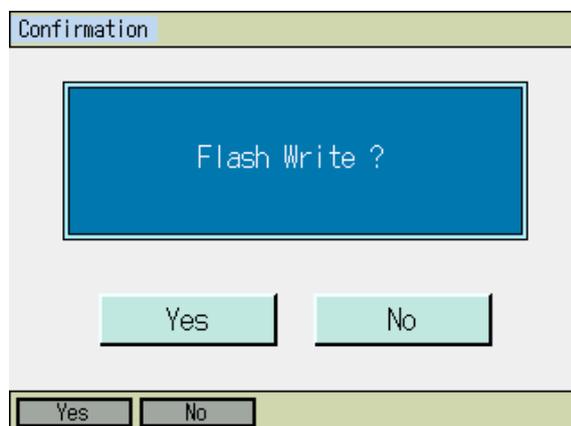
Either touch **Yes** button or press **F1** (Yes) key when you want to initialize the position data. When the initialization of the position data is not necessary, touch **No** button or press **F2** (No) key.



If the initialization of the position data is finished, the display changes to the screen shown on the left.

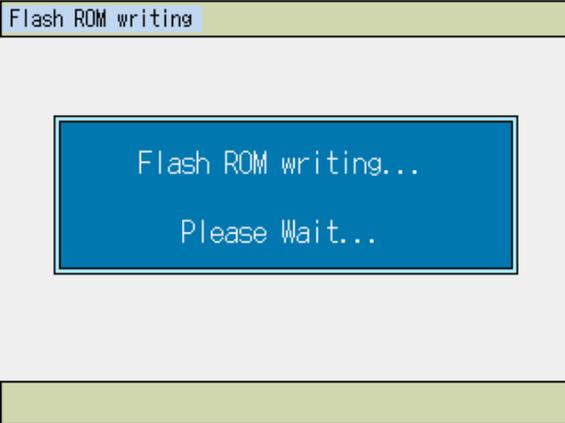
Either touch **OK** button or press **ESC** key to return to Memory Initialization Menu screen.

Either touch **Back** button or press **ESC** key to return to the flash ROM writing screen.



To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.

If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

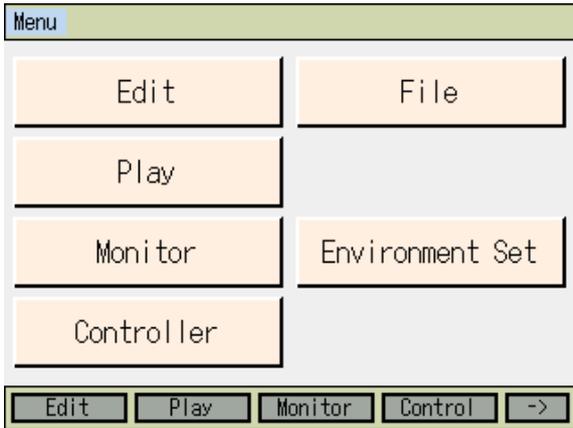
**Never turn off the power to the Controller at this time.**



After flash ROM writing is complete, the display changes to the software reset screen. Either press **Yes** button in the touch panel or press **F1** (Yes) key.



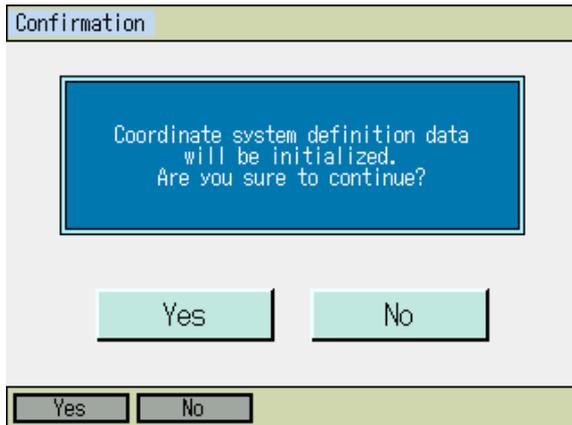
The screen shown on the left is displayed during the software reset.



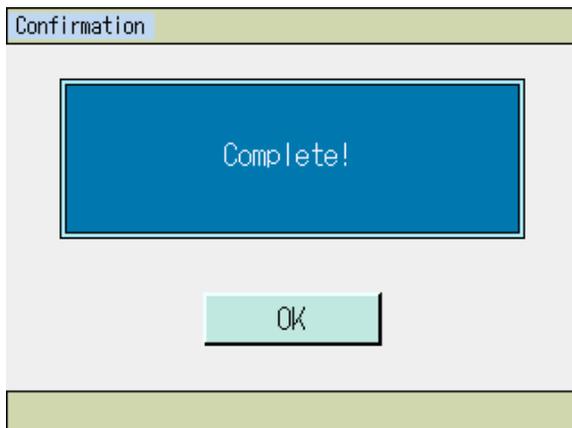
Once the software reset is complete, the display returns to the main menu screen.

### 16.5.5 Coordinate System Data (XSEL-RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD and MSEL-PCX/PGX Only)

All the coordinate system definition data is cleared.  
Initialize the coordinate system definition data by using this function in case D40 “Coordinate System Data Control Area Sum Check Error”, D41 “Coordinate System Control Area ID Error” or D42 “Coordinate System Data Sum Check Error” is occurred.



Either touch **Yes** button or press **F1** (Yes) key when you want to initialize the coordinate system data.  
When the initialization of the coordinate system data is not necessary, touch **No** button or press **F2** (No) key.



If the initialization of the coordinate system data is finished, the display changes to the screen shown on the left.  
Either touch **OK** button or press **ESC** key to return to Memory Initialization Menu screen.

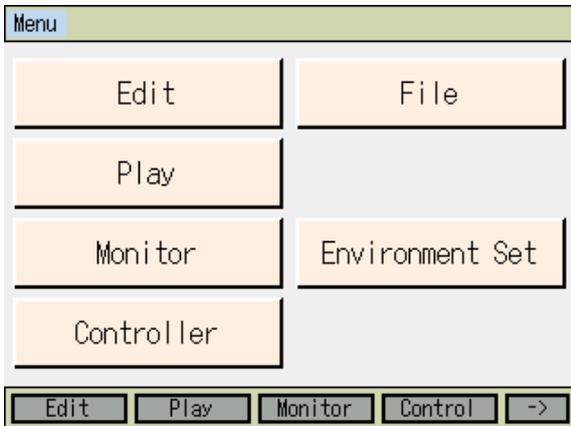
Either touch **Back** button or press **ESC** key to return to the controller reset screen.



Either press **Yes** button in the touch panel or press **F1** (Yes) key.



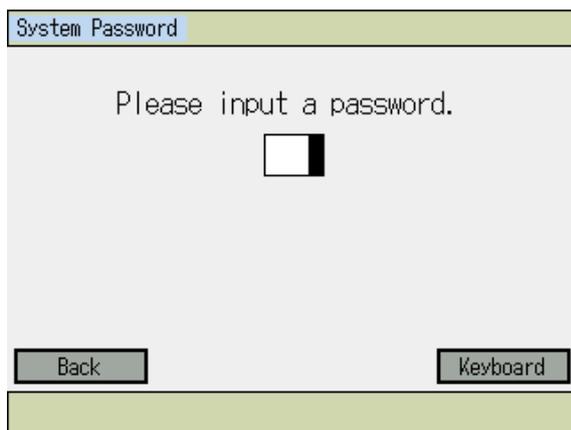
The screen shown on the left is displayed during the software reset.



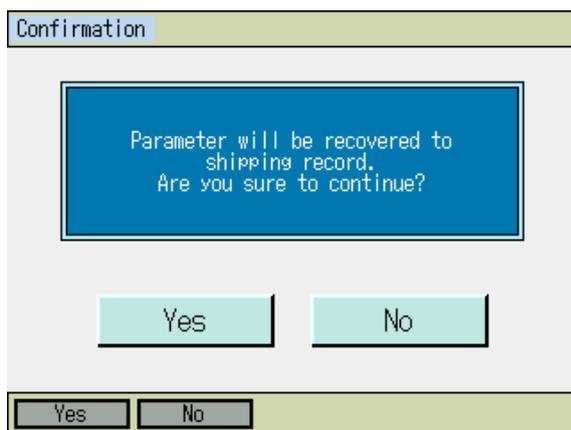
Once the software reset is complete, the display returns to the main menu screen.

16.5.6 The value of this parameter at the factory  
(SSEL, ASEL, PSEL, XSEL-R/S, RX/SX, RXD/SXD, RAX/SAX, RAXD/SAXD,  
TTA AC Servo Type / High-Resolution Type and MSEL High-Resolution Type  
Only)

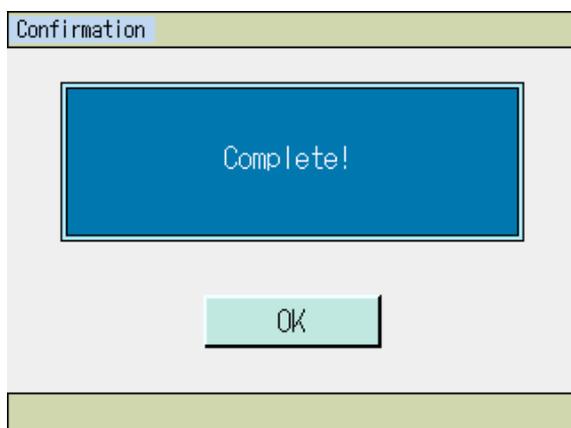
Set the parameters back to the condition of delivery from the production plant.



The password input window appears. Input 5119 either on the keyboard or in the hardware keys.

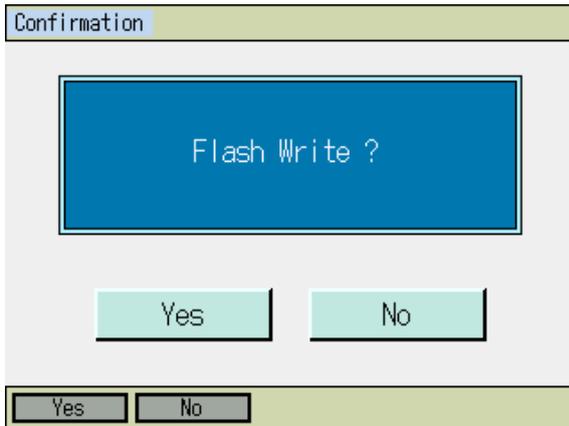


Either touch **Yes** button or press **F1** (Yes) key when it is required to set the parameters back to the condition of those at delivery.  
Either touch **No** button or press **F2** (No) key when it is not required to set the parameters back to the condition of those at delivery.

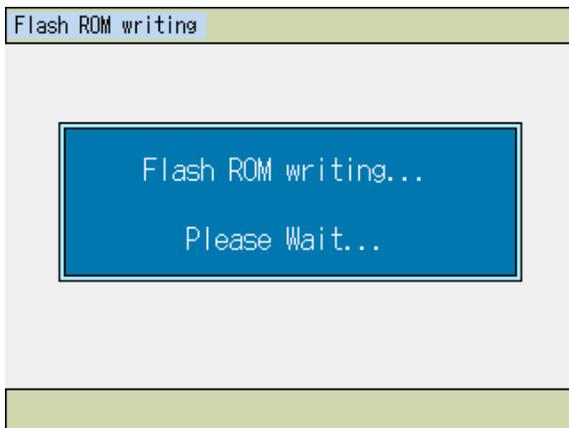


Once the process is complete, the window changes as shown in the figure in the left. Either touch **OK** button or press **ESC** key to go back to the memory initializing menu screen.

Touch **Return** button or press **ESC** key to go back to the flash ROM writing screen.

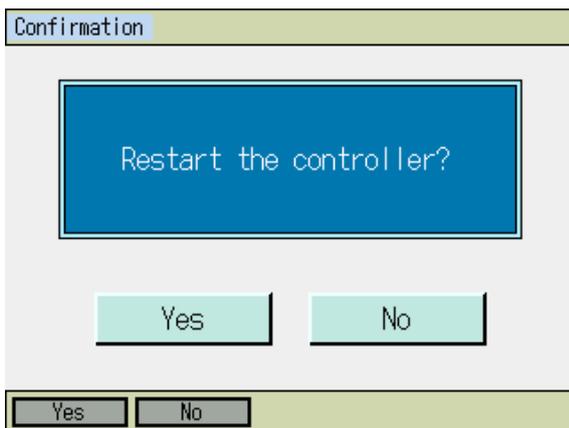


To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.  
If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

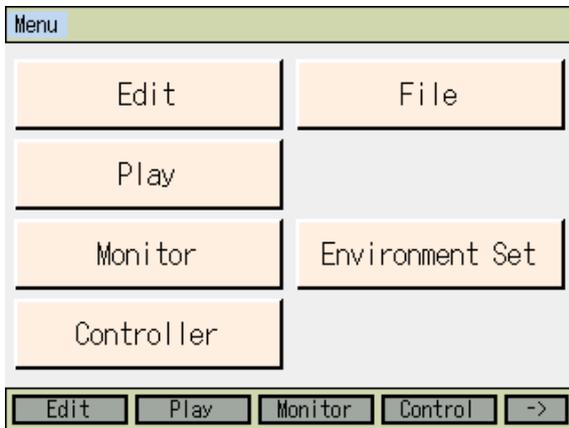
***Never turn off the power to the Controller at this time.***



After flash ROM writing is complete, the display changes to the software reset screen.  
Touch **OK** button or press **ESC** key.



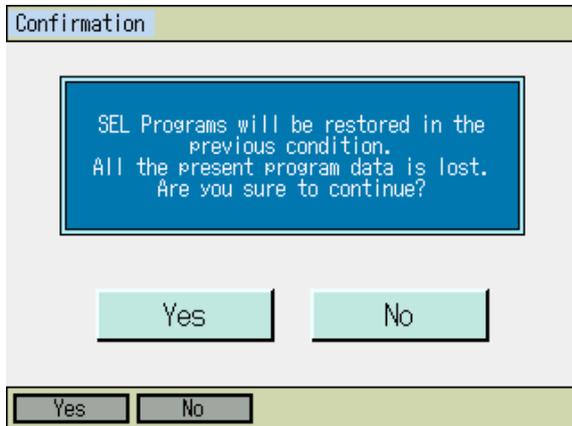
The screen shown on the left is displayed during the software reset.



Once the software reset is complete, the display returns to the main menu screen.

### 16.5.7 Program Data (Previous Value Restore)

The flash ROM writing data in the program data is recovered to the writing data of one generation before.



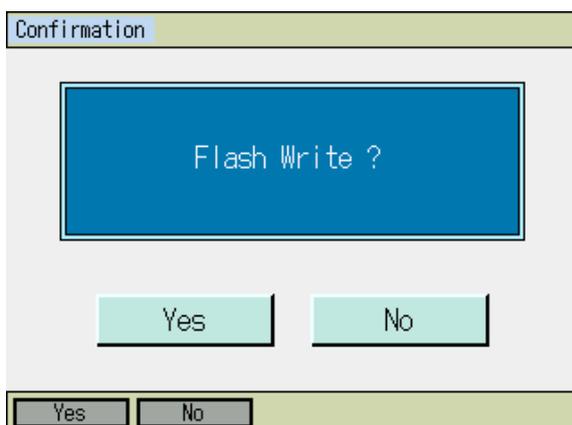
Either touch **Yes** button or press **F1** (Yes) key when you want to set the program data one generation before.

When it is not necessary to set the program data one generation before, touch **No** button or press **F2** (No) key.



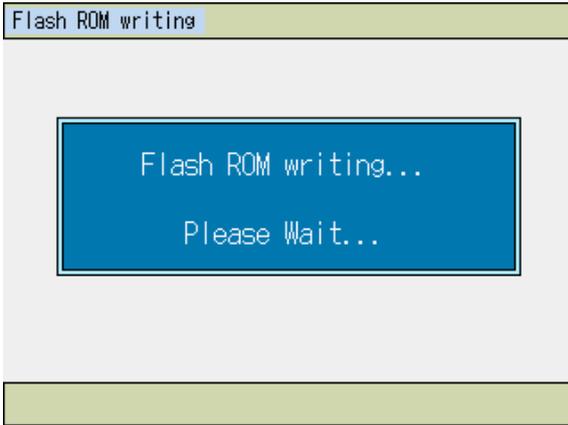
If the recovery of the program data is finished, the display changes to the screen shown on the left. Either touch **OK** button or press **ESC** key to return to Memory Initialization Menu screen.

Either touch **Back** button or press **ESC** key to return to the flash ROM writing screen.



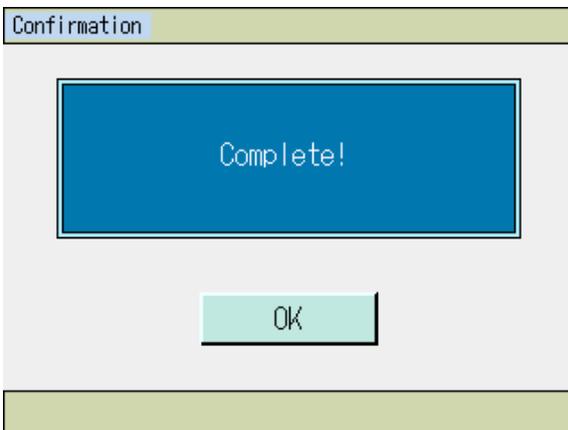
To write the data to the flash ROM, touch **Yes** button or press **F1** (Yes) key.

If writing is not necessary, touch **No** button or press **F2** (No) key.



While in writing process to flash ROM, the screen shown in the left will be displayed.

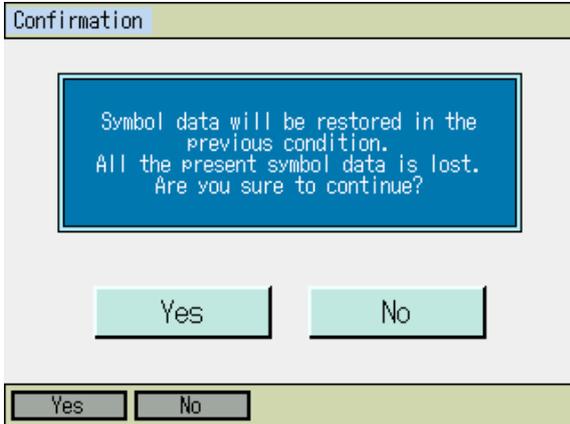
***Never turn off the power to the Controller at this time.***



Either touch **OK** button or press **ESC** key to return to the edit menu screen.

### 16.5.8 Symbol Data (Previous Value Restore)

The flash ROM writing data in the symbol data is recovered to the writing data of one generation before.



Either touch **Yes** button or press **F1** (Yes) key when you want to set the symbol data one generation before.

When it is not necessary to set the symbol data one generation before, touch **No** button or press **F2** (No) key.



If the recovery of the symbol data is finished, the display changes to the screen shown on the left. Either touch **OK** button or press **ESC** key to return to Memory Initialization Menu screen.

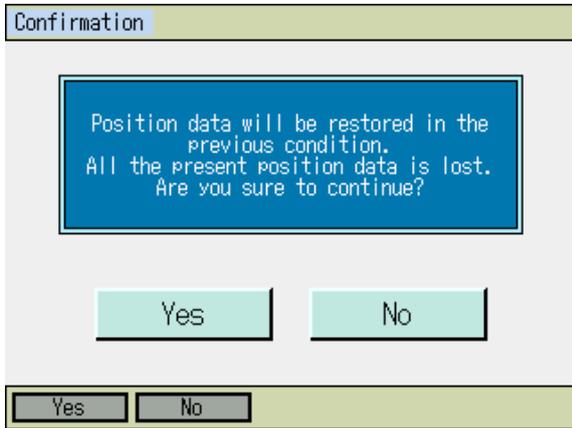
Either touch **Back** button or press **ESC** key to return to the flash ROM writing screen.

The way to write to the flash ROM is the same as 16. 5. 7 Program Data (Previous Value Restore).

### 16.5.9 Position Data (Previous Value Restore)

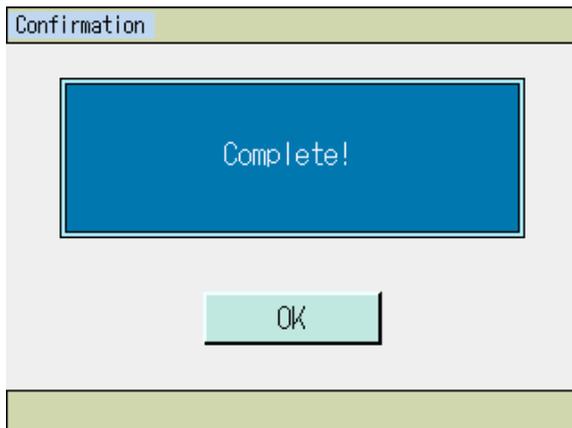
The flash ROM writing data in the position data is recovered to the writing data of one generation before.

Also, Position Data No. 1 to 10000 cannot be recovered.



Either touch **Yes** button or press **F1** (Yes) key when you want to set the position data one generation before.

When it is not necessary to set the position data one generation before, touch **No** button or press **F2** (No) key.



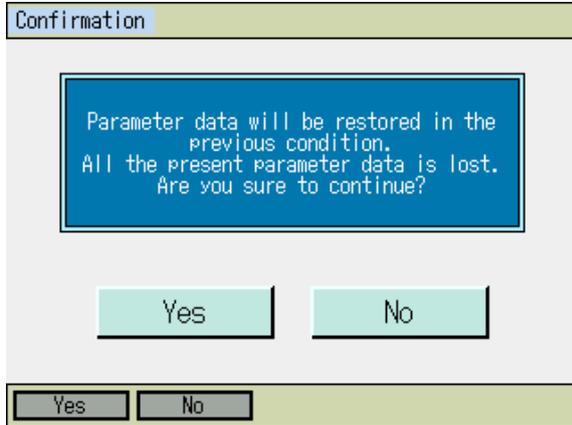
If the recovery of the position data is finished, the display changes to the screen shown on the left. Either touch **OK** button or press **ESC** key to return to Memory Initialization Menu screen.

Either touch **Back** button or press **ESC** key to return to the flash ROM writing screen.

The way to write to the flash ROM is the same as 16. 5. 7 Program Data (Previous Value Restore).

### 16.5.10 Parameter Data (Previous Value Restore)

The flash ROM writing data in the Parameter data is recovered to the writing data of one generation before.



Either touch **Yes** button or press **F1** (Yes) key when you want to set the parameter data one generation before.  
When it is not necessary to set the parameter data one generation before, touch **No** button or press **F2** (No) key.

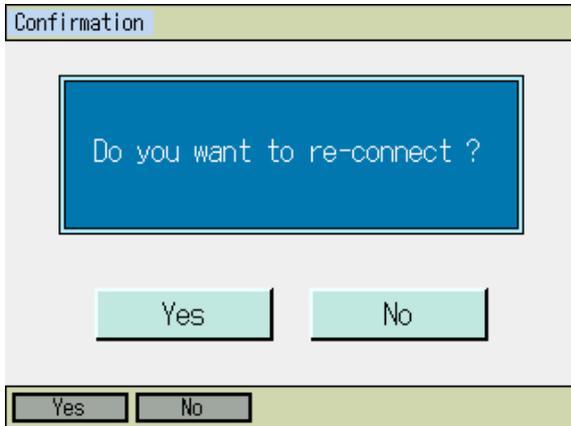


If the recovery of the parameter data is finished, the display changes to the screen shown on the left.  
Either touch **OK** button or press **ESC** key to return to Memory Initialization Menu screen.  
Either touch **Back** button or press **ESC** key to return to the flash ROM writing screen.

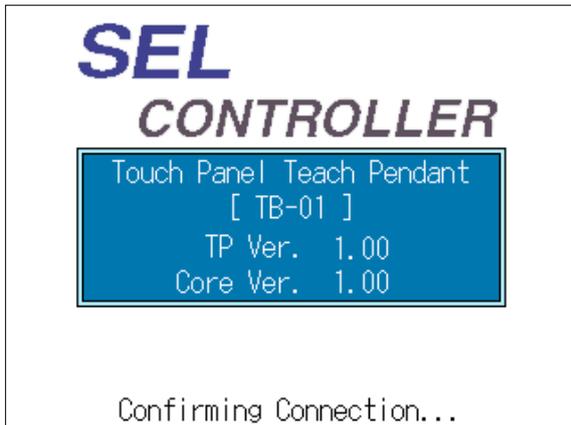
The way to write to the flash ROM is the same as 16. 5. 7 Program Data (Previous Value Restore).

## 16.6 Re-Connection

Re-connect to the controller.



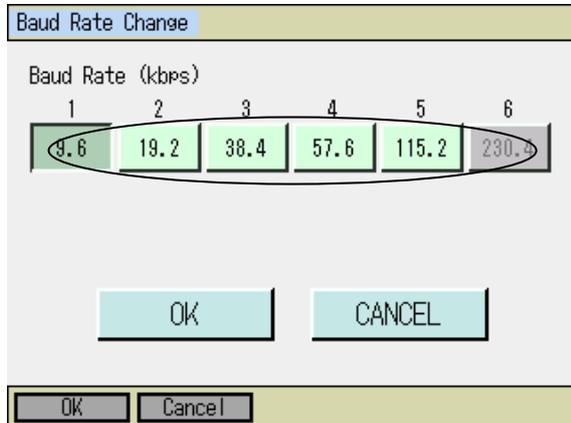
Either touch **Yes** button or press **F1** (Yes) key when you want to reconnect the controller. When it is not necessary to reconnect the controller, touch **No** button or press **F2** (No) key. Once you either touch **Yes** button or press **F1** (Yes) key, the reboot of this teaching pendant starts.



The screen shown on the left is displayed after IAI logo mark is shown. "Confirming Connection ..." flashes during reconnection process. The display returns to the menu screen after reboot.

## 16.7 Baud Rate Change

Changes the communication baud rate between the controller and the teaching pendant.



Either touch a button for the baud rate of change, or press a hardware numeric key that corresponds to the number 1 to 6 shown above the buttons. Either touch **OK** button or press **F1** (OK) key when you change the baud rate.

When change of the baud rate is not necessary, touch **CANCEL** button or press **F2** (Cancel) key. If the baud rate is changed, the connection will be established with the changed baud rate from the next connection.

\* The button of baud rate that the controller does not support should be shown in gray. It cannot be selected.

\* When setting is established to baud rate not supported in connection with other controllers, it switches automatically to available baud rate.

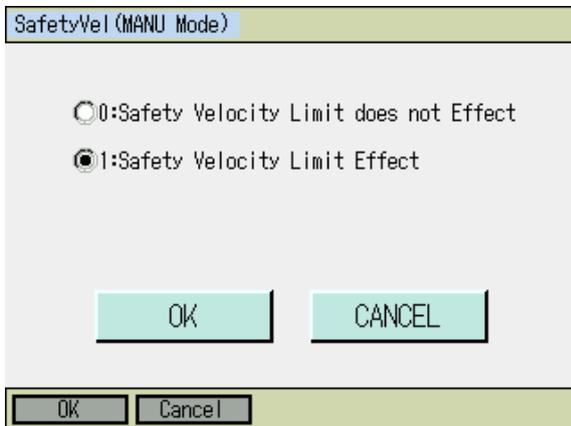


“Baud Rate Changing ...” flashes during the baud rate change.

The display returns to Controller Menu screen after the baud rate change.

## 16.8 Safety Velocity

Switches the safety velocity limit status at manual mode.



0: Safety Velocity Limit does not Effect...

There is no safety speed limitation

1: Safety Velocity Limit Effect...

There is safety speed limitation

(No matter what the settings are for the programs and parameters, the maximum velocity for orthogonal axis is 250mm/sec or less, CP operation 250mm/sec or less for SCARA and PTP operation at 3% or below.)

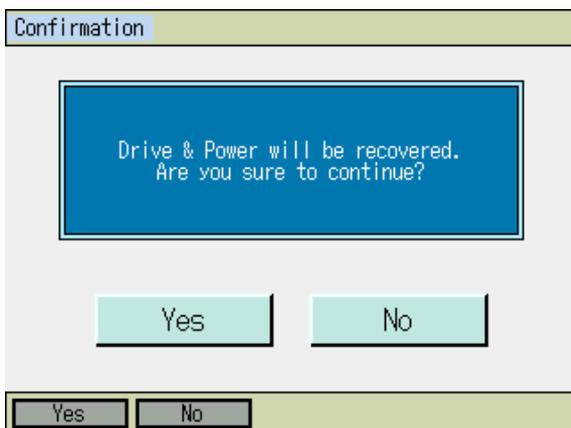
Either touch a radio button or select 0 or 1 on the hardware numeric keys.

Either touch **OK** button or press **F1** (OK) key when you switch the valid/invalid of the safety speed limitation.

When the valid/invalid of the safety speed limitation is not necessary to be changed, touch **CANCEL** button or press **F2** (Cancel) key.

## 16.9 Driver Power Recovery Request

Requests to recover driver power to the controller.

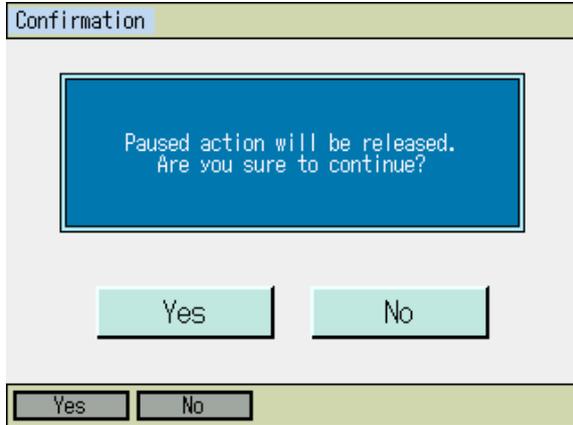


To demand the driver power recovery request, either touch **Yes** button or press **F1** (Yes) key. The display returns to the previous screen.

When it is not necessary to demand the driver power recovery request, touch **No** button or press **F2** (No) key. The display returns to the previous screen.

### 16.10 Action Pause Release Request

Requests to release action pause to the controller.



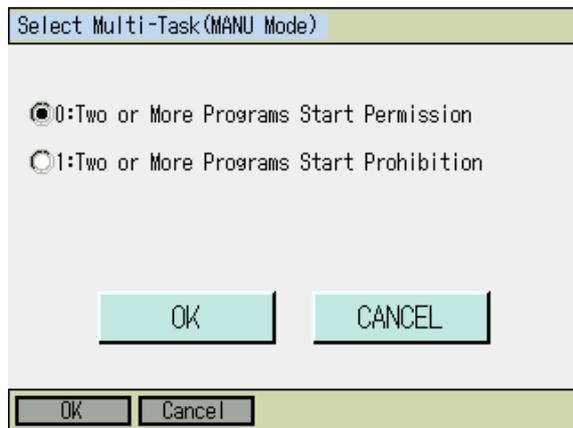
To demand the cancellation of the operation pause, either touch **Yes** button or press **F1** (Yes) key. The display returns to the previous screen. When it is not necessary to demand the cancellation of the operation pause, touch **No** button or press **F2** (No) key. The display returns to the previous screen.

## 16.11 Simultaneous Operation of Multiple Programs

Set whether to allow simultaneous operation of multiple programs or not at Manual Mode. When it is set to forbid, multiple programs cannot be executed at the same time. (Error No. 913 Multiple Program Simultaneous Operation Forbidden Error)

\* This function is valid only for the following models :

- XSEL-P/Q (MAIN Application from Version 0.36)
- XSEL-PX/QX (MAIN Application from Version 0.17)
- XSEL-R/S, RX/SX, RXD/SXD (MAIN Application from Version 0.01)
- XSEL-RA/SA, RAX/SAX, RAXD/SAXD (MAIN Application from Version 0.01)
- SSEL, ASEL, PSEL (MAIN Application from Version 0.01) (\* only in the program mode.)
- MSEL-PCX/PGX/PC/PG/PCF/PGF (MAIN Application from Version 0.01)



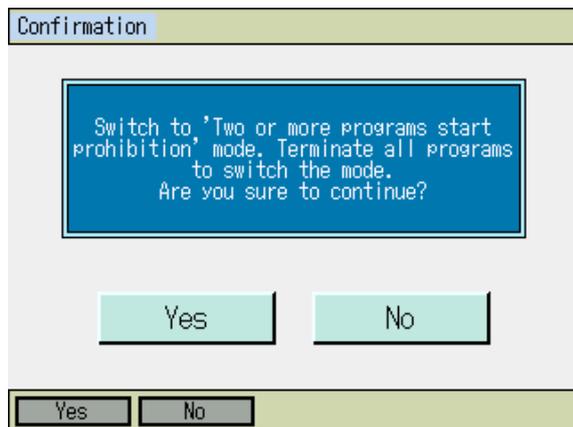
0:Two or More Programs Start Permission  
Simultaneous operation of multiple programs is allowed.

1:Two or More Programs Start Prohibition  
Simultaneous operation of multiple programs is forbidden.

Either touch a radio button or select **0** or **1** on the hardware numeric keys.

When you want to change the condition of allowance for the simultaneous operation of multiple programs, either touch **OK** button or press **F1** (OK) key.

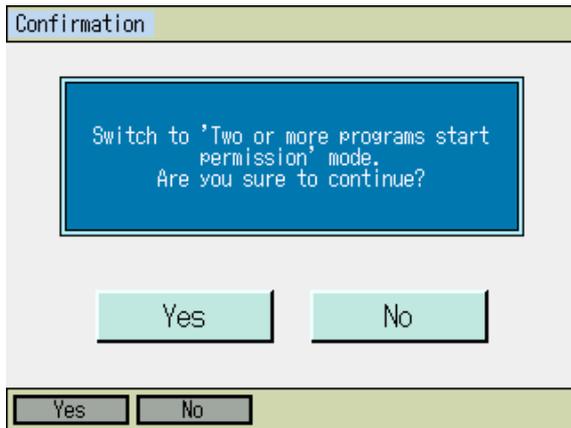
When it is not necessary to change the condition of allowance for the simultaneous operation of multiple programs, touch **CANCEL** button or press **F2** (Cancel) key.



When you select to forbid the simultaneous operation of multiple programs, the confirmation screen will be displayed.

To establish the setting, either touch **Yes** button or press **F1** (Yes) key.

When it is not necessary to establish the setting, touch **No** button or press **F2** (No) key.



When you select to allow the simultaneous operation of multiple programs, the confirmation screen will be displayed.

To establish the setting, either touch **Yes** button or press **F1** (Yes) key.

When it is not necessary to establish the setting, touch **No** button or press **F2** (No) key.

## 16.12 Driver Power Recovery Request (RPwr) and Action Pause Release Request (RAct)

### 16.12.1 In the Case of Controller Other Than SSEL, ASEL and PSEL Controllers

#### (1) Driver Power Recovery Request

##### 1) Case which requires executing Driver Power Recovery Request

Only the following case requires executing Driver Power Recovery Request:

- When you set 1 in I/O parameter No. 44, Driver Power Cut-off cause occurs → Recovery after the main cause of cut-off is solved.

##### 2) How to execute Driver Power Recovery Request

Execute Driver Power Recovery Request by either of the following:

- Set 1 in I/O parameter No. 44 (Input Select Function 014 = Driver Power Cut-off Release Input) and ON edge input on input port No. 14.
- Select Controller → Driver Power Recovery Request from the software menu to execute.
- Select Controller → Driver Power Recovery Request from the menu in the teaching pendant to execute.

#### (2) Action Pause Release Request

##### 1) Case which requires Action Pause Release Request

Each of the following cases requires executing Action Pause Release Request:

- When you set 2 on other parameter No. 9 (Deadman SW recovery type = action continuation recovery [during automatic operation only]), stop according to deadman SW during automatic operation → recovery after releasing stop (action pause release).
- When you set 2 on other parameter No. 10 (emergency stop recovery type = action continuation recovery [during automatic operation only]), emergency stop during automatic operation → recovery after emergency stop release (action pause release).
- When you set 2 on other parameter No. 11 (safety gate OPEN time recovery type = action continuation recovery [during automatic operation only]), safety gate OPEN during automatic operation → recovery after safety gate CLOSE (action pause release).
- When you set 1 on I/O parameter No. 36 (input selection function 006 = pausing action signal), OFF level input on input port No. 6 during automatic operation (pausing action) → recovery after ON level input on input port No. 6 (action pause release).

##### 2) How to execute Action Pause Release Request

Execute Action Pause Release Request by any of the following:

- Set 1 in I/O parameter No. 35 (input selection function 005 = Action Pause Release Signal) and ON edge input on input port No. 5.
- Select Controller → Action Pause Release Request from the software menu to execute.
- Select Controller → Action Pause Release Request from the menu in the teaching pendant to execute.

\* If case (1) 1) and (2) 1) occur at the same time, you need to first execute Driver Power Recovery Request. After completing it, execute the Action Pause Release Request.

## 16.12.2 In the Case of SSEL, ASEL or PSEL Controller

### (1) Driver Power Recovery Request

#### 1) Case which requires executing Driver Power Recovery Request

Only the following case requires executing Driver Power Recovery Request:

- When you specify any input port for the driver power cut-off release input signal (dedicated function), driver power cut-off occurs → recovery after the main cause of cut-off is solved.

#### 2) How to execute Driver Power Recovery Request

Execute Driver Power Recovery Request by any of the following:

- Set 17 (specified input function value) in the I/O parameter (No. 30 to No. 45, No. 251 to No. 258) corresponding to the input port No. (Refer to the list of I/O functions and I/O parameters.)

ON edge input on the specified input port No.

- Select **Controller** → **Driver Power Recovery Request** from the software menu to execute.
- Select **Controller** → **Driver Power Recovery Request** from the menu in the teaching pendant to execute.

### (2) Action Pause Release Request

#### 1) Action Pause Release Request

Each of the following cases requires executing Action Pause Release Request:

- When you set 2 on other parameter No. 10 (emergency stop recovery type = action continuation recovery [during automatic operation only]), emergency stop during automatic operation → recovery after emergency stop release (action pause release).
- When you set 2 on other parameter No. 11 (deadman SW/enable SW recovery type = action continuation recovery [during automatic operation only]), stop according to deadman SW or enable SW during automatic operation → recovery after releasing stop (action pause release).
- Specify any input port for the action pause input signal (dedicated function). Set "8" (specified input function value) in the I/O parameter (No. 30 - No. 45, No. 251 - No. 258) corresponding to the input port No. (Refer to the list of I/O functions and I/O parameters.) OFF level input in the input port No. specified during automatic operation (action pause) → recovery after ON level input on the input port No. (action pause release)

#### 2) How to execute Action Pause Release Request

Execute Action Pause Release Request by any of the following:

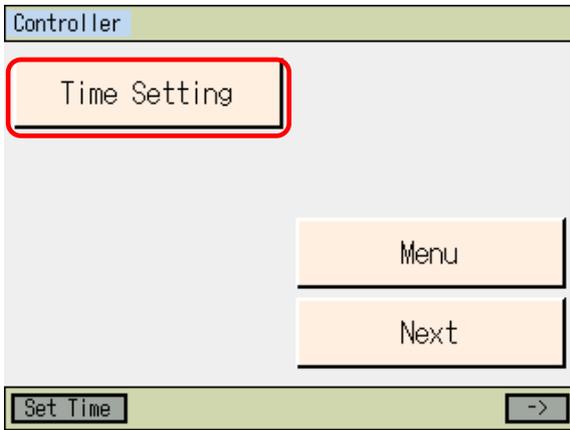
- Specify any input port for the action pause release signal (dedicated signal). Set "7" (specified input function value) in the I/O parameter (No. 30 - No. 45, No. 251 - No. 258) corresponding to the input port No. (Refer to the list of I/O functions and I/O parameters.) ON edge input on the specified input port No.
- Select **Controller** → **Action Pause Release Request** from the software menu to execute.
- Select **Controller** → **Action Pause Release Request** from the menu in the teaching pendant to execute.

\* If case (1) 1) and (2) 1) occur at the same time, you need to first execute Driver Power Recovery Request. After completing it, execute the Action Pause Release Request.

### 16.13 Time Setting

In the case of the XSEL-R/S, RX/SX, RXD/SXD, RA/SA, RAX/SAX, RAXD/SAXD, TTA or MSEL-PCX/PGX/PC/PG/PCF/PGF Controller, set the clock.

The time displayed in the Error Detailed Data window is the error occurrence time.



Either touch **Time Setting** button or press **F1** (Set Time) key in Controller Menu screen.

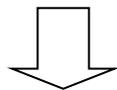
\* The position of the button may differ depending on the model to connect. When the button is not displayed, either touch **Next** / **Prev.** button or press **SF** key to switch the screen.

\* The button would not be displayed when the connection is established to a model that does not support the controller clock.



Controller clock is displayed.

Either touch **Time Edit** button or press **F1** (Edit) key to move to the edit screen.

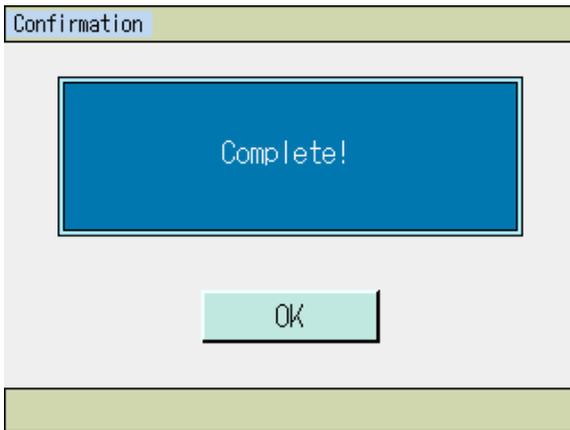


Touch **Time Edit** button or press **F1** (Edit) key.



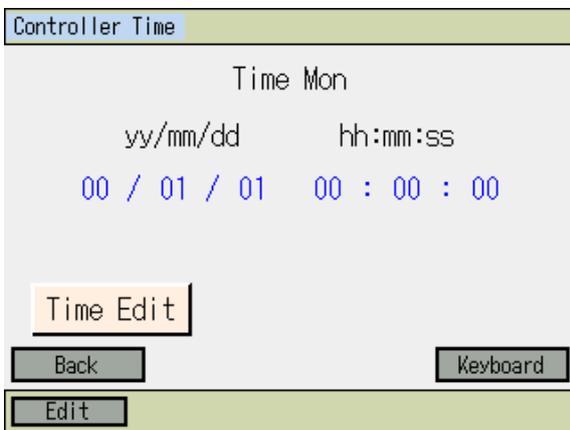
The controller clock can be edited.

1. Input the time on **Keyboard** or hardware keys.
2. Either touch **Set** button or press **F2** (Set) key.



The display turns to the confirmation screen when the controller clock setting is finished.

Either touch **OK** button or press **ESC** key to return to the clock display screen.



The display returns to this screen.

Either touch **Back** button or press **ESC** key to return to Controller Menu screen.

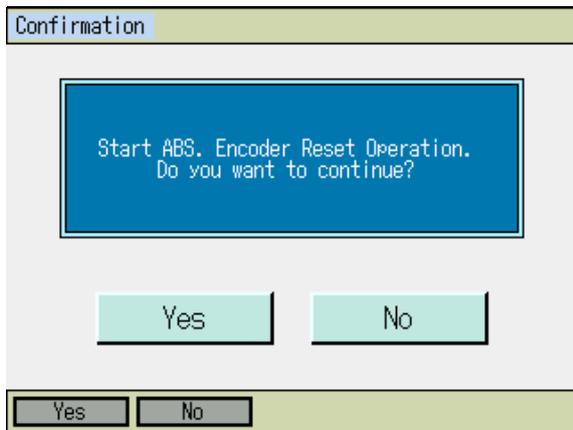
## 17 Absolute Reset

### 17.1 Absolute Reset of the Orthogonal Axis:

XSEL-JK, P/Q, or 5th and 6th Axes of XSEL-PX/QX Controller, XSEL-R/S or 5th to 8th Axes of XSEL-RX/SX Controller, SSEL or ASEL Controller

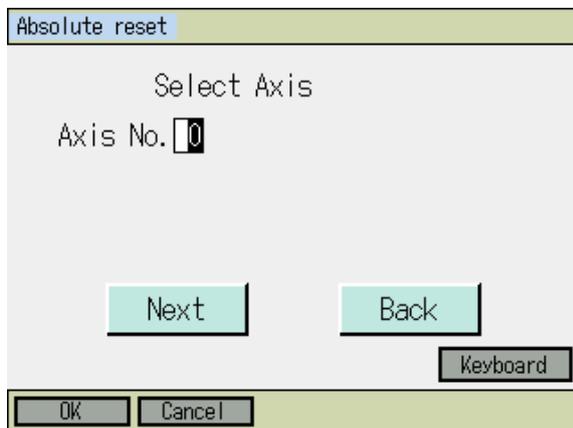
The procedures will differ if the controller is applicable for the battery-less absolute specifications. In that case, conduct the absolute reset by following “17.9 Procedures of Absolute Reset for Battery-less Absolute Applicable Type”.

Select **Absolute Reset** from Controller Menu.



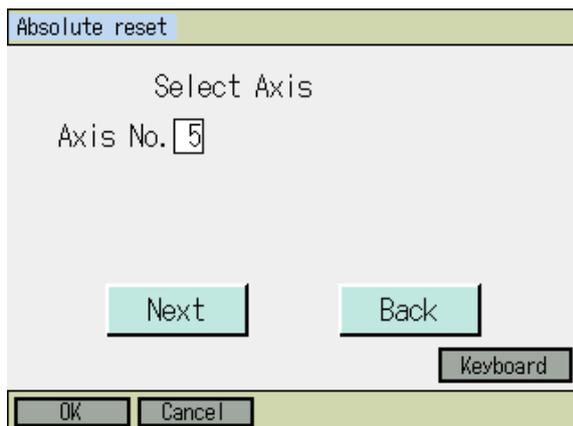
To have an absolute reset, either touch **Yes** button or press **F1** (Yes) key.

When not to have an absolute reset, either touch **No** button or press **F2** (No) key. The display returns to the previous screen.



Axis No. Input

Input the axis number that you want to have an absolute reset on the touch panel numeric keys or hardware numeric keys and then touch **ENT** button or press the return key for confirmation.

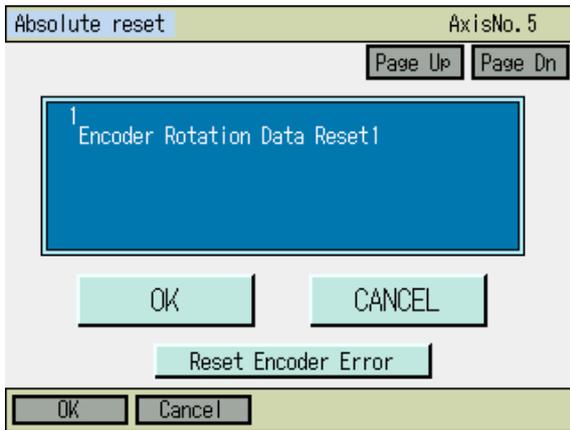


Once the input is confirmed, the cursor disappears. If you want to redo the input, touch the axis number input box or press **ESC** key.

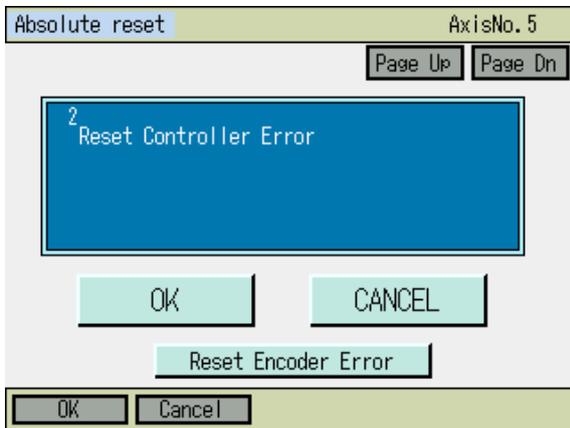
If you want to continue absolute reset, either touch **Next** button or press **F1** (OK) key.

When you cancel absolute reset, either touch **Back** button or press **F2** (Cancel) key.

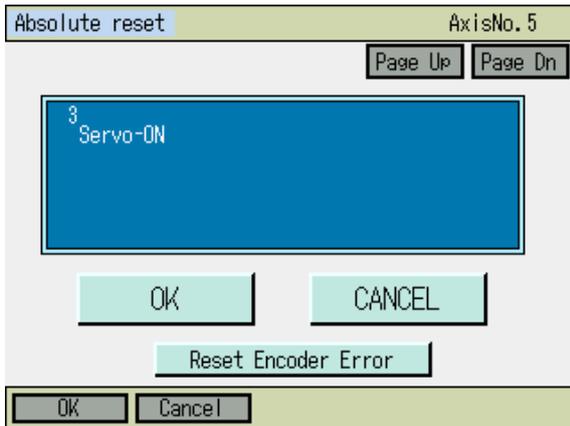
When canceling an absolute reset on any screen of the following (1) through (6) press the F2 (Cancel) key or **CANCEL** Button.



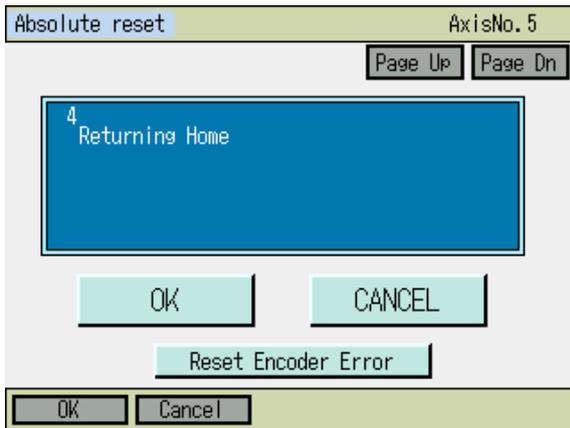
1) Encoder Rotation Data Reset 1  
Touch **OK** button or press **F1** (OK) key.



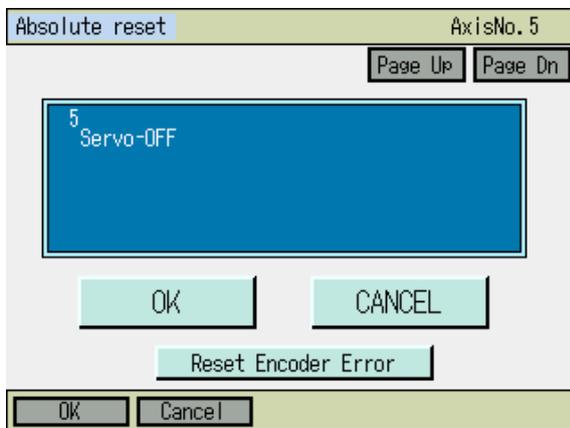
2) Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.



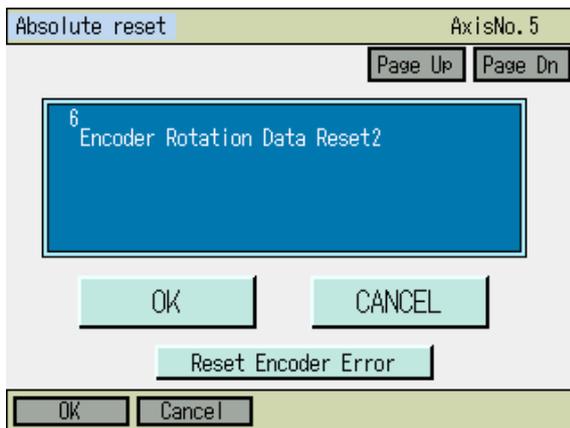
3) Servo-ON  
Touch **OK** button or press **F1** (OK) key.



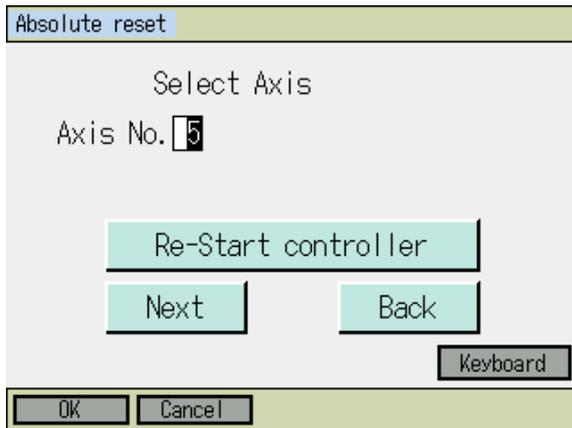
4) Returning Home  
Touch **OK** button or press **F1** (OK) key.



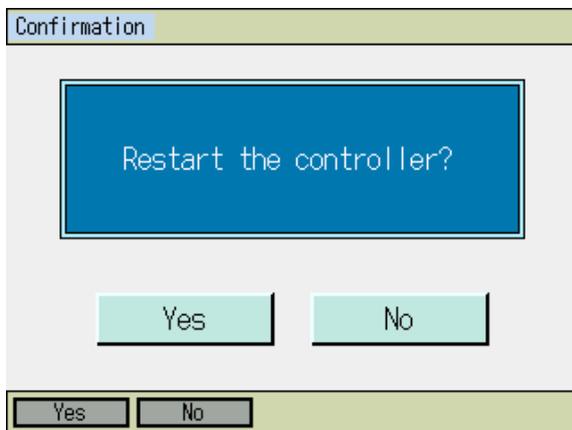
5) Servo-OFF  
Touch **OK** button or press **F1** (OK) key.



6) Encoder Rotation Data Reset 2  
Touch **OK** button or press **F1** (OK) key.



Return to the axis No. input screen.  
When you want to have another axis conduct absolute reset, input the axis number and touch **OK** button or press **F1** (OK) key.  
To finish absolute reset, either touch **Re-Start controller** button or press **ESC** key.



Restart the controller.  
Touch **Yes** button or press **F1** (OK) key.  
The display returns to the main menu when the reboot is finished.

After executing absolute reset, be sure to reset software or reconnect the power.

17.2 Absolute Reset of the SCARA Axis:  
 XSEL-JX/KX, 1st to 4th Axes of XSEL-PX/QX or 1st to 4th Axes of  
 XSEL-RX/SX, RAX/SAX Controller, or XSEL-RXD/SXD, XSEL-  
 RAXD/SAXD Controller

Absolute Reset Preparation

The following jigs are required to perform an absolute reset:  
 Absolute Reset Adjustment jigs

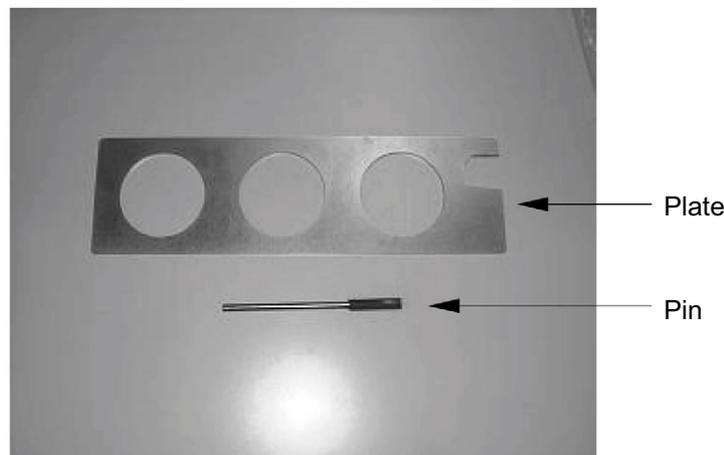
Type	Remarks
JG-1	Arm length 500/600
JG-2	Arm length 250/300/350
JG-3	Arm length 700/800
JG-4	Arm length 500/600 high-speed type
JG-5	Arm length 120/150/180

Connect the robot, controller and teaching pendant to make an operable status from the teaching pendant.

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 accuracy of “center of positioning mark label  $\pm 1$  graduation” is ensured.)



Example of Absolute Reset Adjustment Jig (Type JG-1)



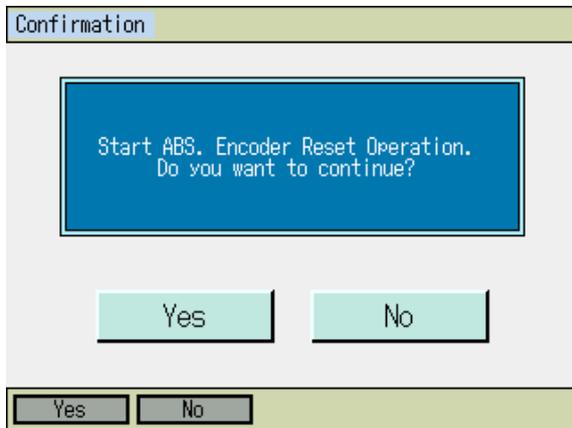
**Warning:**

- 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.

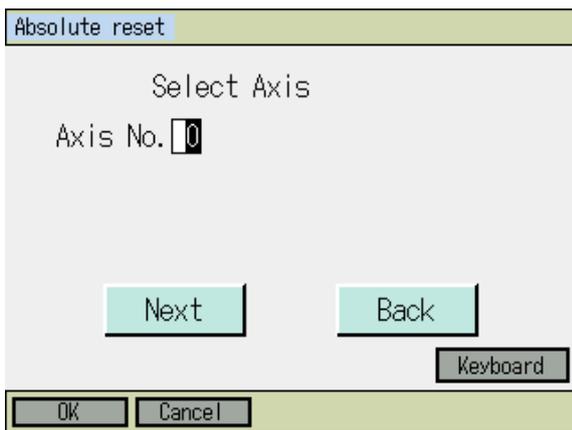
There are three types of absolute reset, Arm 1, Arm 2 and Z-axis + R-axis.

(1) Absolute Reset on Arm 1 and Arm 2

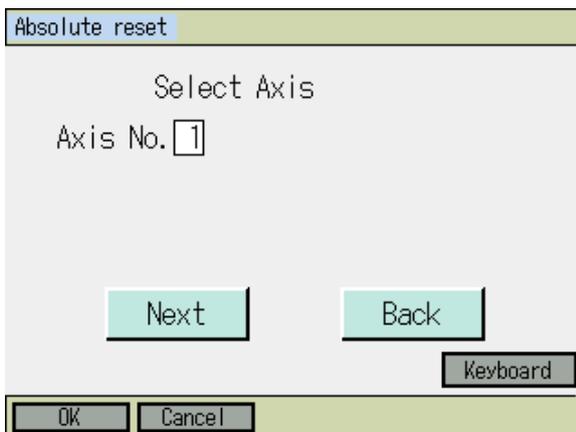
Select **Absolute Reset** from Controller Menu.



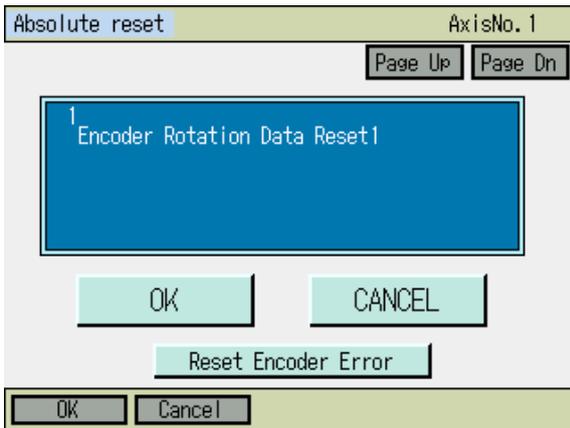
To have an absolute reset, either touch **Yes** button or press **F1** (Yes) key. When not to have an absolute reset, either touch **No** button or press **F2** (No) key. The display returns to the previous screen.



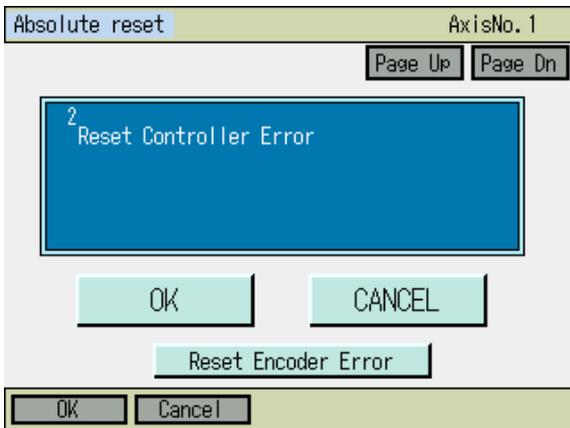
**Axis No. Input**  
Input the axis number that you want to have an absolute reset on the touch panel numeric keys or hardware numeric keys and then touch **ENT** button or press the return key for confirmation. Input 1 when you conduct the absolute reset on Arm 1 and 2 when on Arm 2.



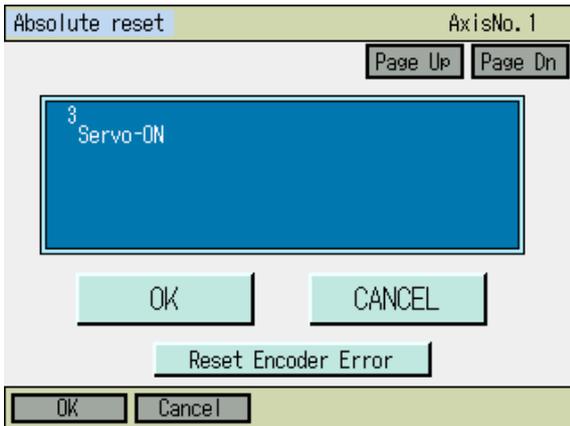
Once the input is confirmed, the cursor disappears. If you want to redo the input, touch the axis number input box or press **ESC** key. If you want to continue absolute reset, either touch **Next** button or press **F1** (OK) key. When you cancel absolute reset, either touch **Back** button or press **F2** (Cancel) key. When canceling an absolute reset on any screen of the following 1) through 9) press the **F2** (Cancel) key or **CANCEL** Button.



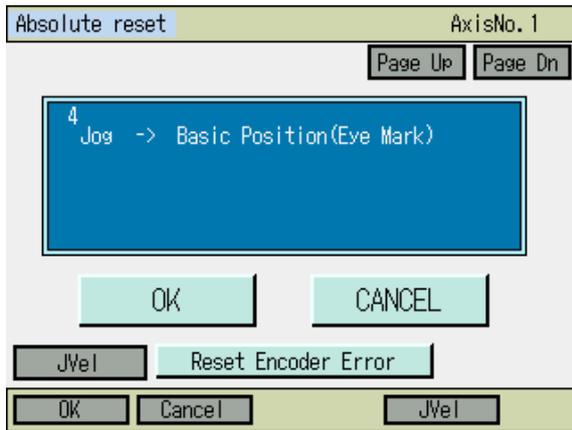
1) Encoder Rotation Data Reset 1  
Touch **OK** button or press **F1** (OK) key.



2) Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.

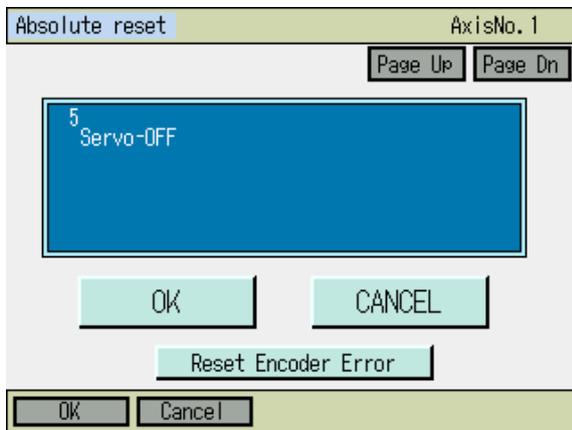


3) Servo-ON  
Touch **OK** button or press **F1** (OK) key.



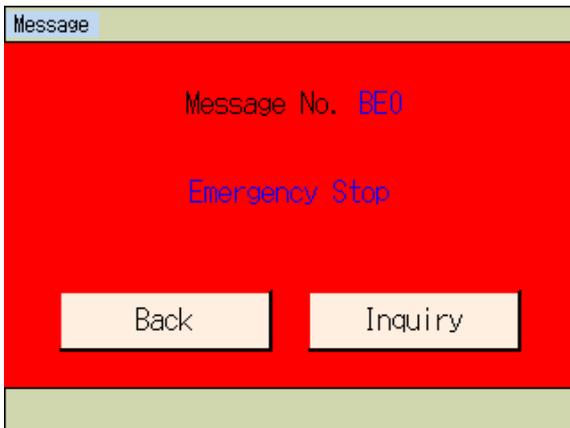
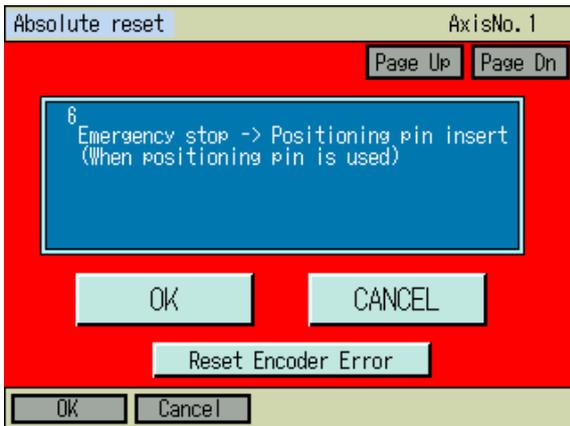
4) Jog Movement

Move the actuator with jog to a point near the datum posture (refer to the figures for datum posture in the following pages), and either touch **OK** button or press **F1** (OK) key.



5) Servo-OFF

Touch **OK** button or press **F1** (OK) key.



6) Emergency stop input and adjusting jig set  
Press the EMERGENCY STOP button and set an adjusting jig.

Fix at the datum posture described in the next page, and either touch **OK** button or press **F1** (OK) key.

Inputting emergency stop displays the screen at the left

Either touch **Back** button or press **ESC** key to go back to the previous screen.

Check that the EMERGENCY STOP button has been pressed.

When performing an absolute reset for arm 1, set an adjustment jig (pin) in arm 1 to fix the arm at the reference position. In that case, arm 2 may be moved.

When performing an absolute reset for arm 2, set an adjustment jig (pin) in arm 2 to fix the arm at the reference position. In that case, arm 1 may be moved.

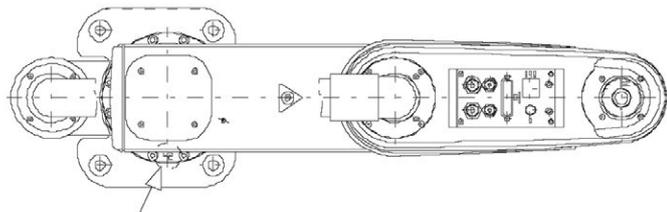
- After checking that the EMERGENCY STOP button has been pressed, set the jig.
- Decide the basic position referring to the positioning mark seal and set the jig.
- Only the arm 1 is covered with a lid with setscrews. Remove them and set the jig.
- An absolute reset on the arm with the adjusting jig is recommended. However, a multi-rotation reset is possible if the arm position is within the range of the mark seal  $\pm 1$  scale.



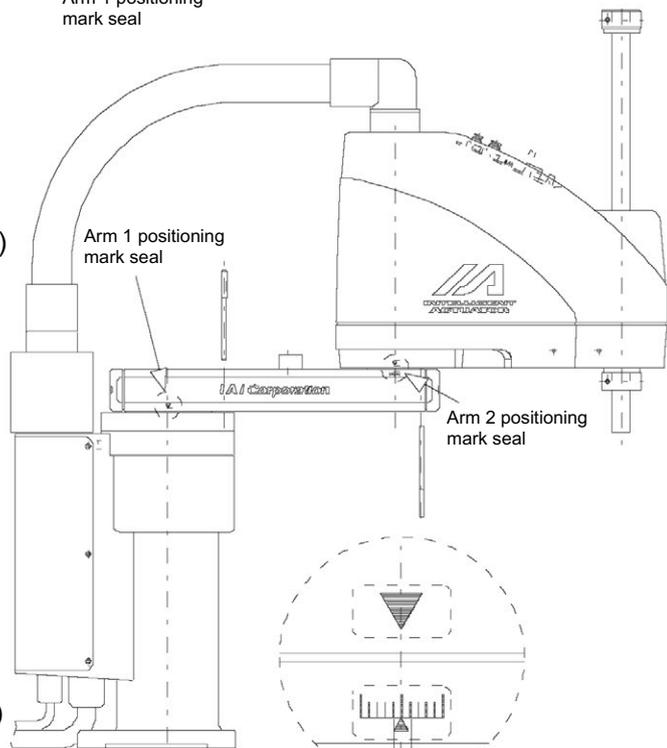
Arm 1  
(Arm length 500/600, arm length 700/800)



Arm 2  
(Arm length 500/600, arm length 700/800)



Arm 1 positioning mark seal



Place both the arm 1 and arm 2 within the range of  $\pm 1$  scale.

Arm length 500/600/700/800 Standard Posture Drawing

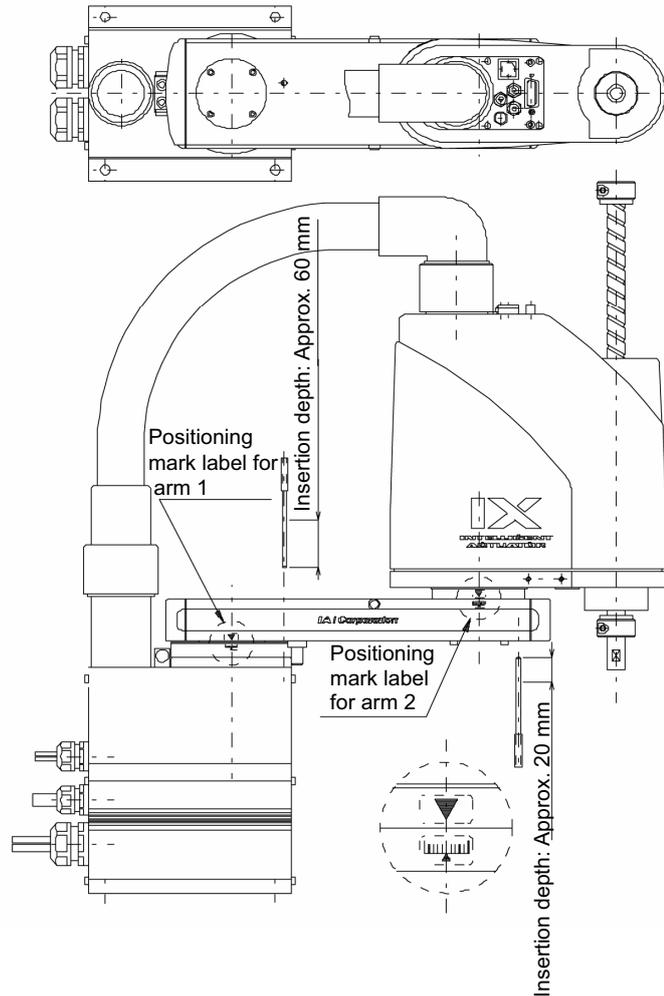
 **Warning:** Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.



Arm 1  
(Arm length 250/300/350)



Arm 2  
(Arm length 250/300/350)



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.



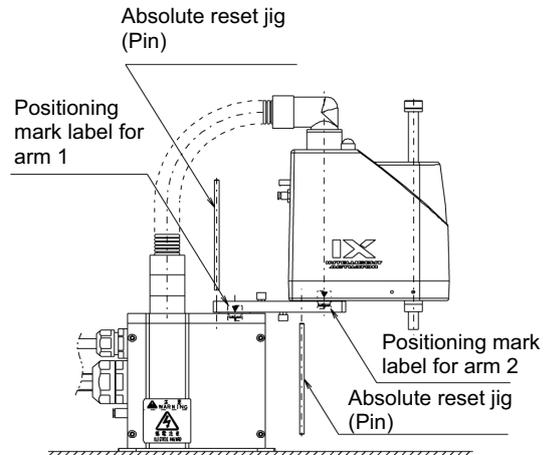
Arm 1 (Arm length 120/150/180)



Arm 2 (Arm length 150/180)

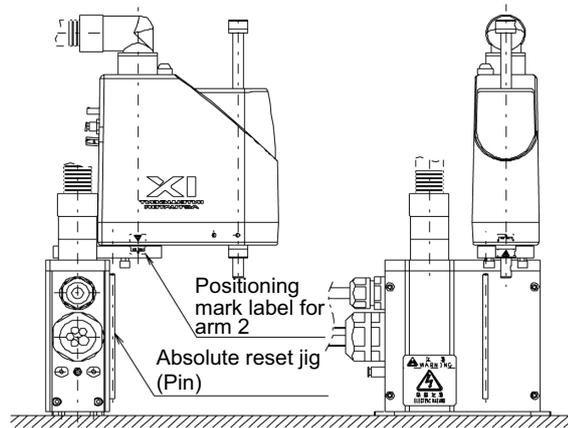
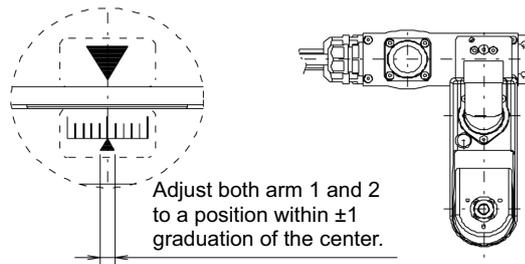


Arm 2 (Arm length 120)



Arm Length 120<sup>\*1</sup>/150/180 Reference Position

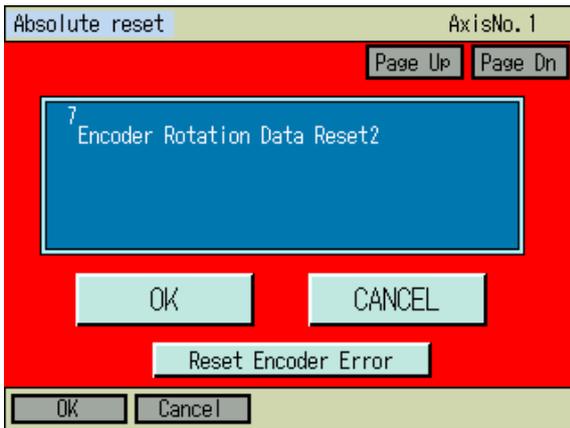
\*1: When an absolute reset is performed for arm 1 (arm length: 120)



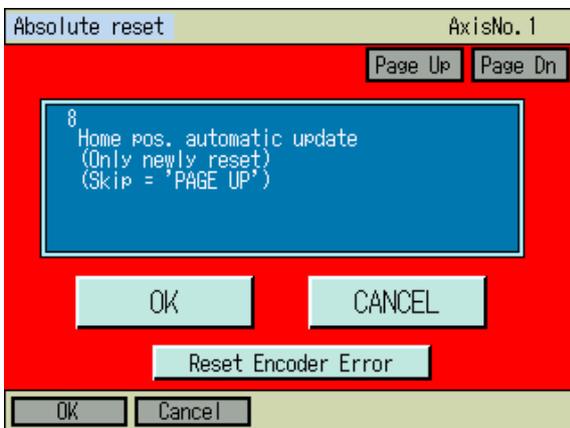
Arm Length 120<sup>\*2</sup> Reference Position

\*2: When an absolute reset is performed for arm 2 (arm length: 120)

**⚠ Warning:** Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.

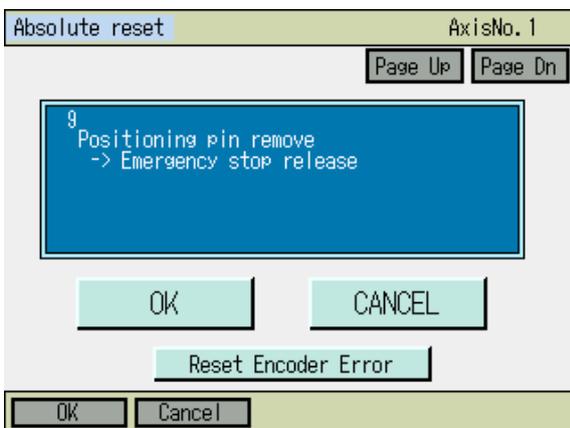


7) Encoder Rotation Data Reset 2  
Touch **OK** button or press **F1** (OK) key.

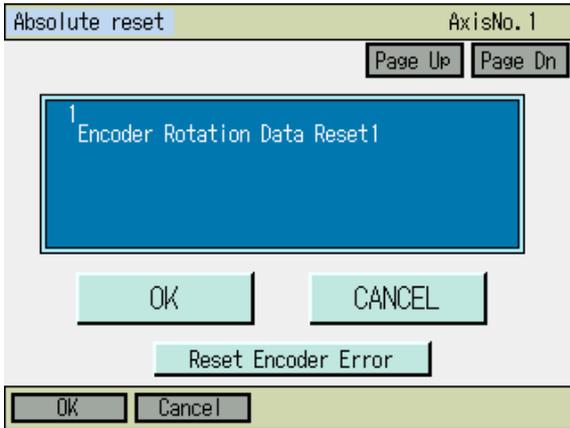


8) Home pos. automatic update  
Touch **Page Up** button or press **PAGEUP** key.  
Make sure not to touch **OK** button.  
Also, do not attempt to press **F1** (OK) key.

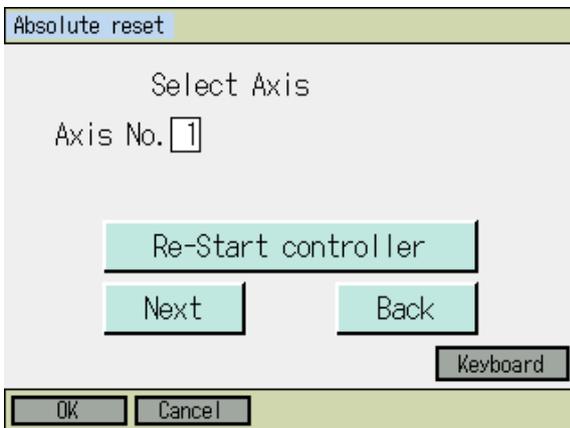
- Do not execute the item of “Home pos. automatic update” (Be careful especially when performing an absolute reset without a jig.)
- If “Home pos. automatic update” is executed by mistake, perform absolute reset work without writing to Flash ROM. (The status will be the same as the one in which “Home pos. automatic update” is not executed.)



9) Remove the adjusting jig, release the emergency stop button and then touch OK button or press F1 (OK) key.



The display returns to the first screen. Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.



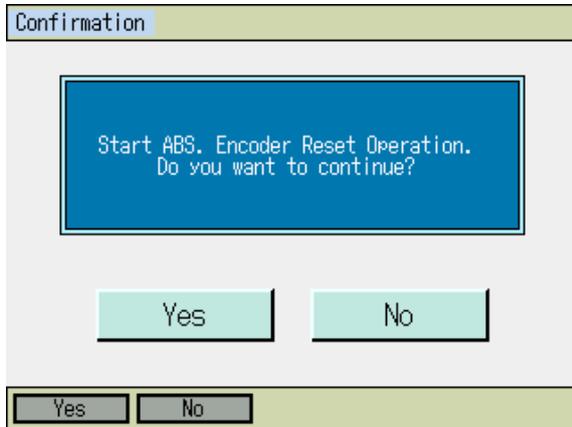
Touch **Re-Start controller** button or press **ESC** key.



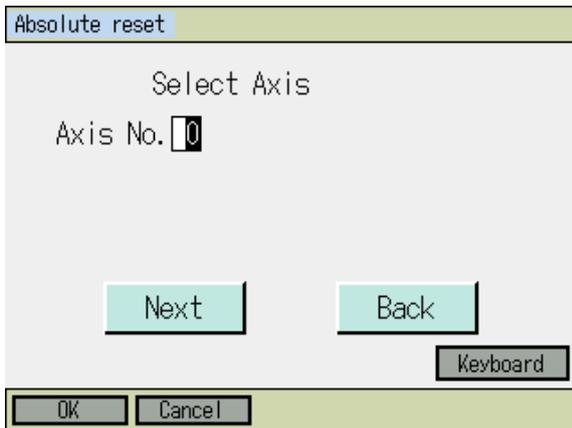
Restart the controller. Touch **Yes** button or press **F1** (OK) key. The display returns to the main menu when the reboot is finished.

**⚠ Caution:** Be careful not to perform reset using an incorrect sequence, since it may cause the arm position to become offset. Execute "home preset value auto refresh" only when any mechanical change such as arm change has been made. (Joint part only)

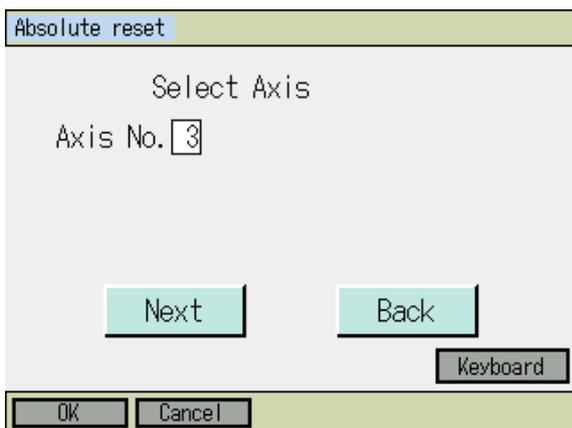
(2) Absolute reset on Z-axis + R-axis  
 Select **Absolute Reset** from Controller Menu.



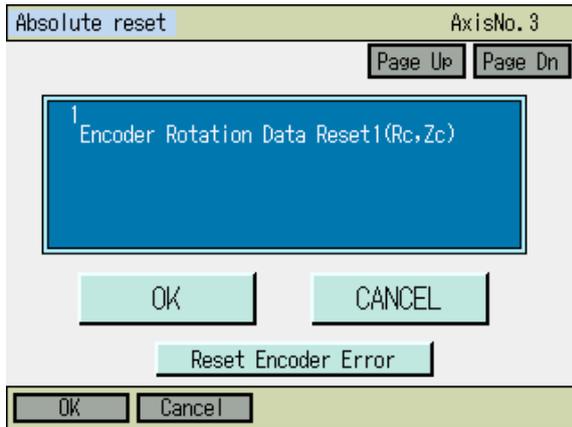
To have an absolute reset, either touch **Yes** button or press **F1** (Yes) key.  
 When not to have an absolute reset, either touch **No** button or press **F2** (No) key. The display returns to the previous screen.



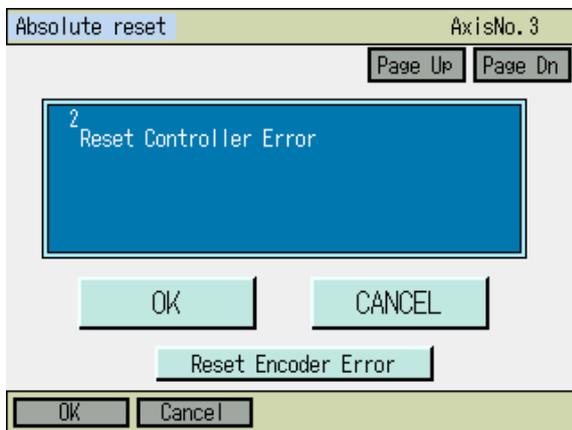
Axis No. input  
 Input 3 on the touch panel numeric keys or hardware numeric keys to indicate the axis number to have the absolute reset conducted, and either touch **ENT** button or press the return key for confirmation.



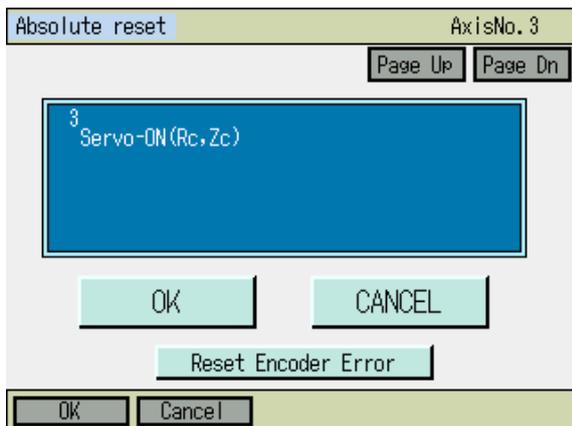
Once the input is confirmed, the cursor disappears. If you want to redo the input, touch the axis number input box or press **ESC** key.  
 If you want to continue absolute reset, either touch **Next** button or press **F1** (OK) key.  
 When you cancel absolute reset, either touch **Back** button or press **F2** (Cancel) key.  
 When canceling an absolute reset on any screen of the following 1) through 15) press the **F2** (Cancel) key or **CANCEL** Button.



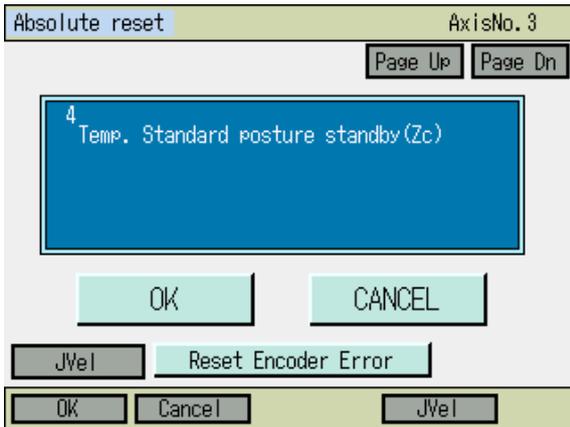
1) Encoder Rotation Data Reset 1  
Touch **OK** button or press **F1** (OK) key.



2) Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.

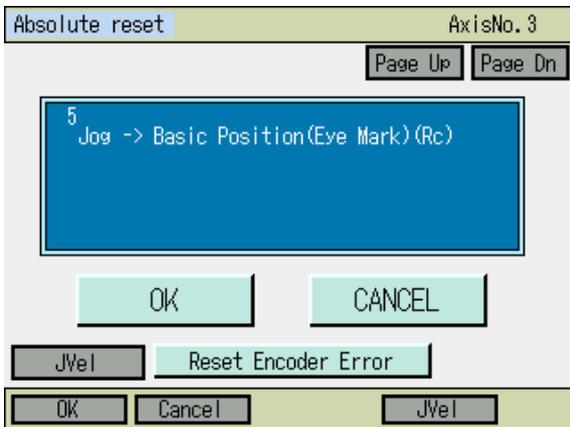


3) Servo-ON  
Touch **OK** button or press **F1** (OK) key.

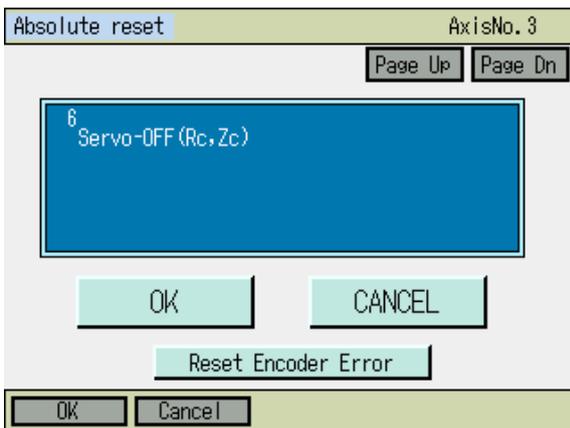


4) Temp. standard posture standby  
Touch **OK** button or press **F1** (OK) key.

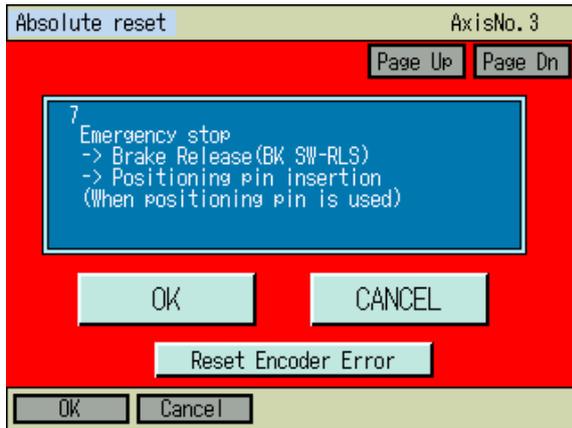
**Caution**  
The Z-axis returns to the home position.



5) Jog Movement  
Move the R-axis with the jog key to a place around the basic posture (refer to the figures of basic posture in the next page and after), and either touch **OK** button or press **F1** (OK) key.



6) Servo-OFF  
Touch **OK** button or press **F1** (OK) key.



7) Emergency stop input and adjusting jig set  
Press the EMERGENCY STOP button.  
Press the brake release switch to release the brake.

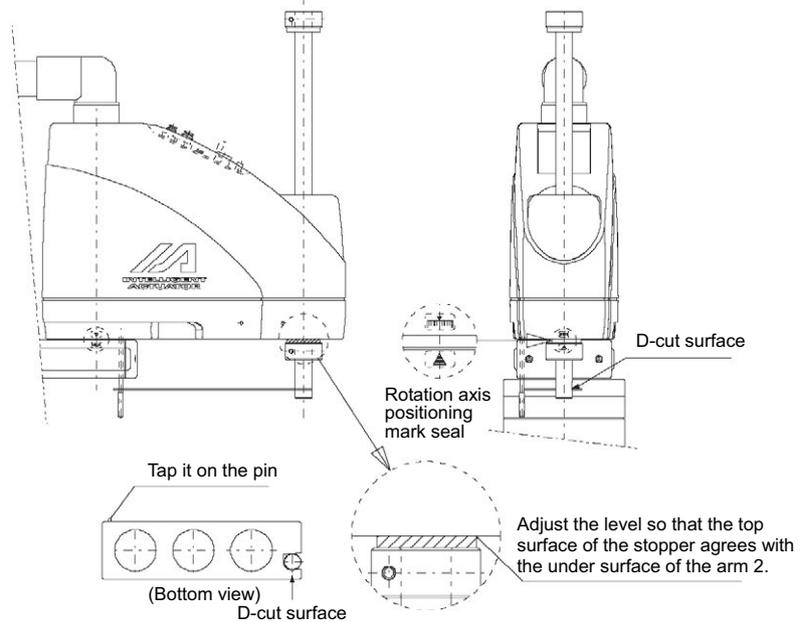
Fix at the datum posture described in the next page, and either touch **OK** button or press **F1** (OK) key.

Inputting emergency stop displays the screen at the left.

Either touch **Back** button or press **ESC** key to go back to the previous screen.

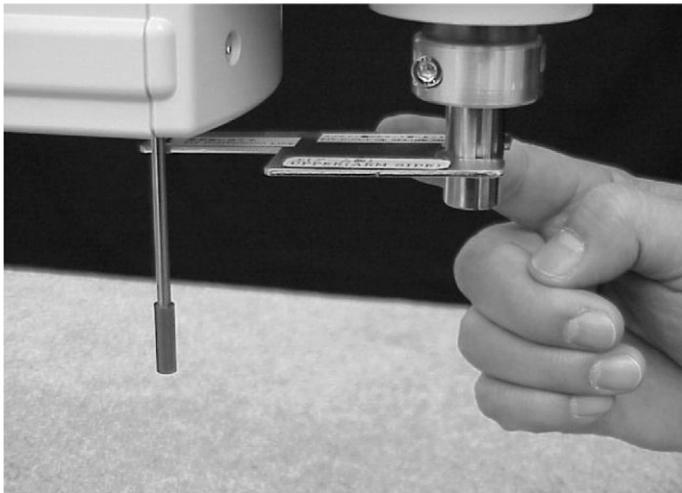
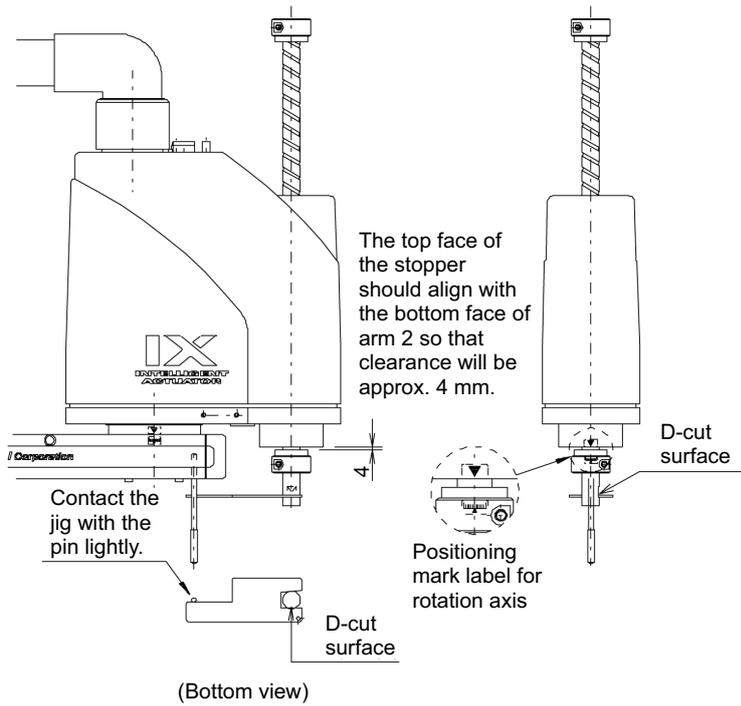
Place the adjusting jig plate and pin as shown below and fix the standard posture.

- After checking that the EMERGENCY STOP switch has been pressed, set the jig.
- Set the jig by referring to the positioning mark.
- Adjust the level so that the top surface of the stopper approximately agrees with the under surface of the arm 2.



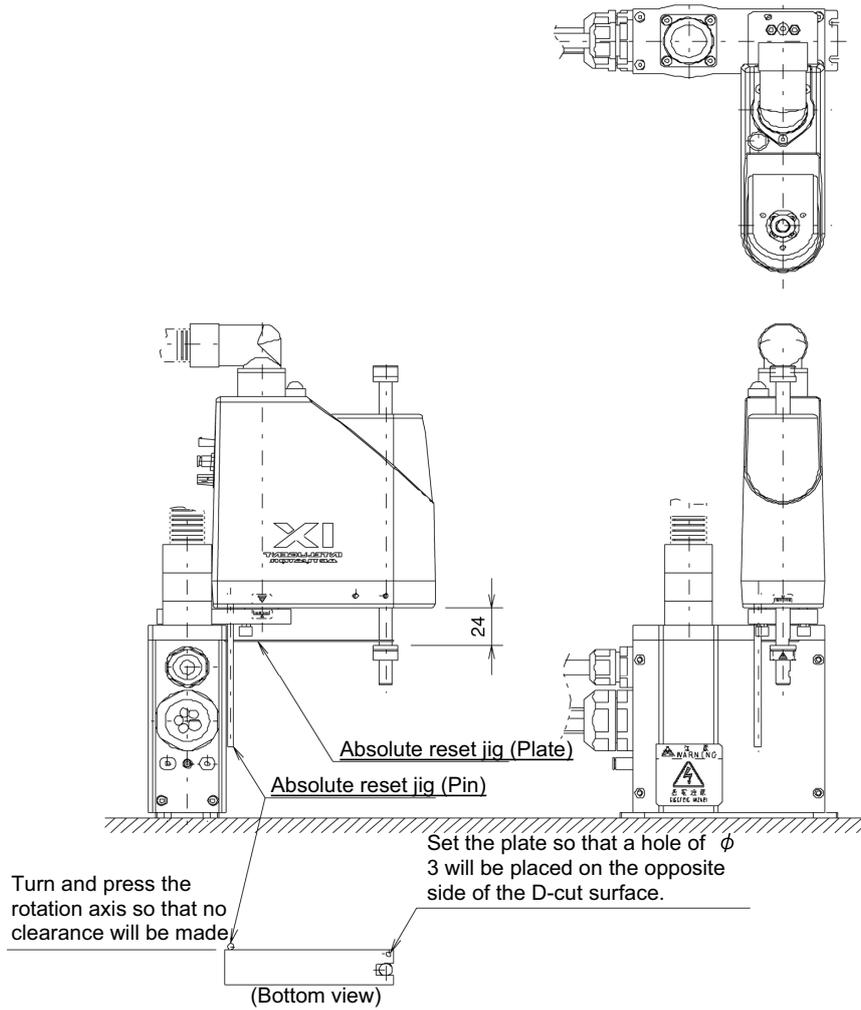
Arm length 500/600/700/800 Reference Position

**⚠ Warning:** Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.

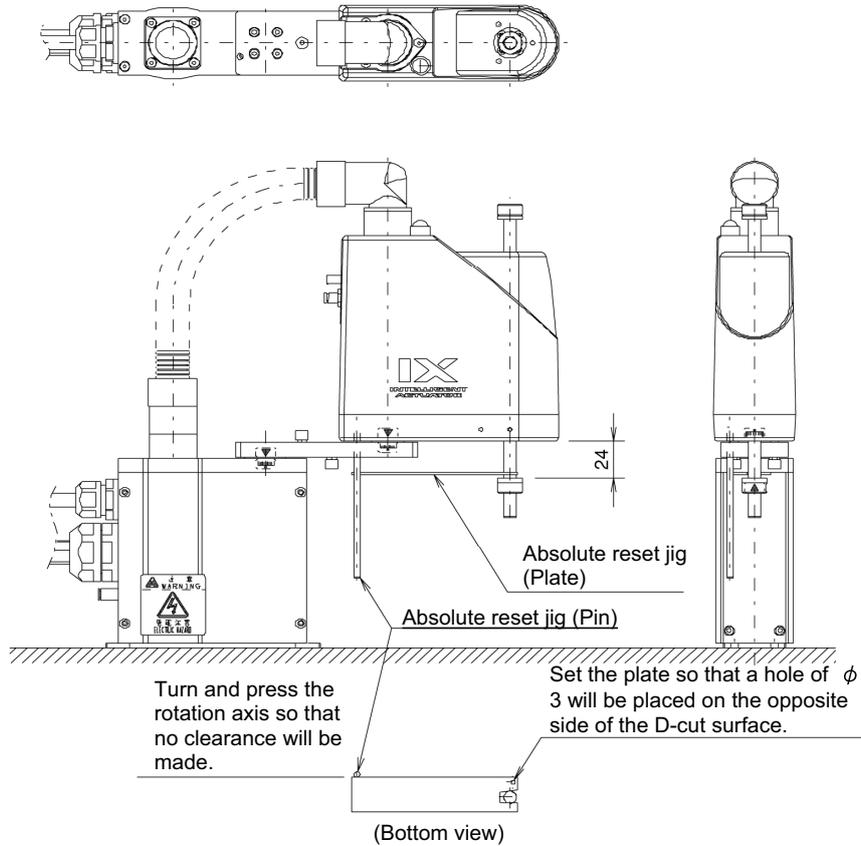


Arm Length 250/300/350 Reference Position

**Warning:** Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.

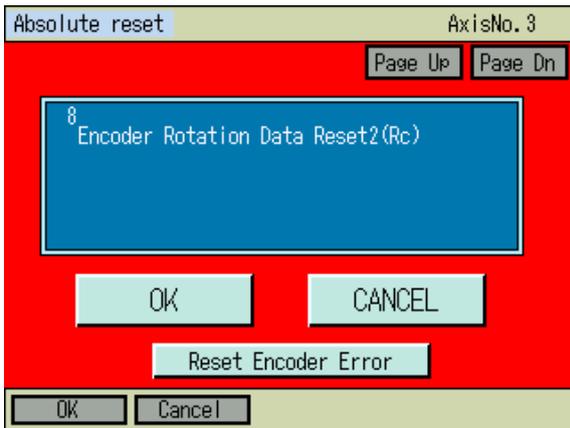


Arm Length 120 Reference Position

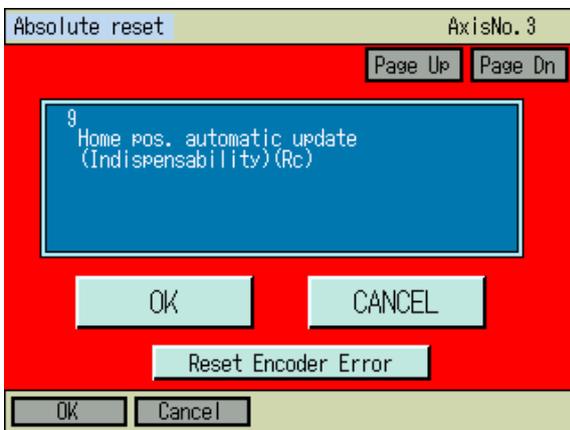


Arm Length 150/180 Reference Position

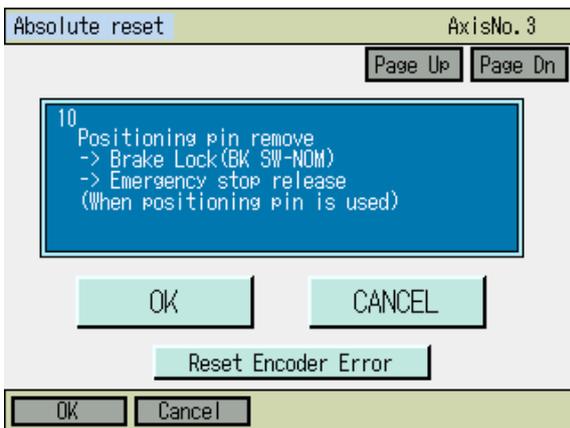
**Warning:** • Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.  
• Pay attention to the orientation of the D-cut surface of the plate jig.



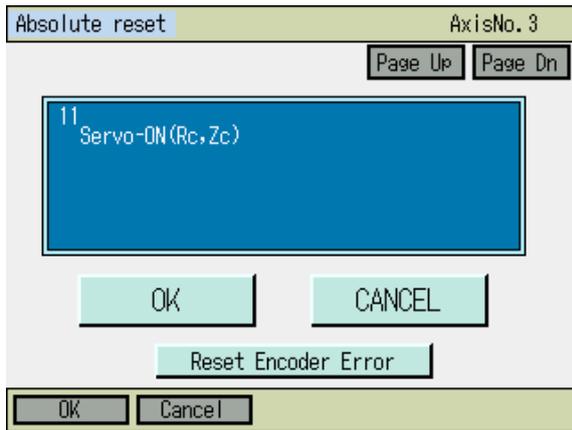
8) Encoder Rotation Data Reset 2  
Touch **OK** button or press **F1** (OK) key.



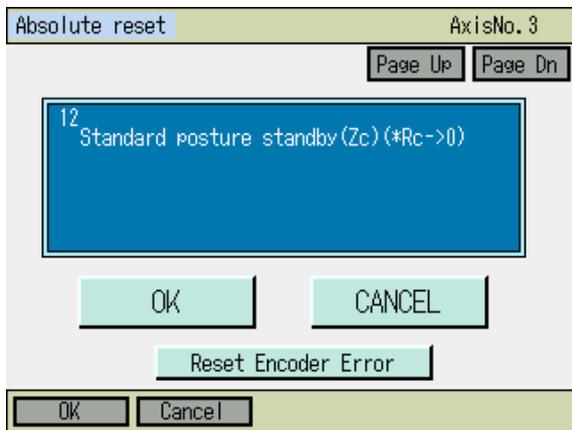
9) Home pos. automatic update  
Touch **OK** button or press **F1** (OK) key.



10) Adjusting jig removal and emergency off  
Remove the adjusting jig.  
Turn off the brake release switch to enable the brake.  
Turn off the EMERGENCY STOP button.  
Touch **OK** button or press **F1** (OK) key.

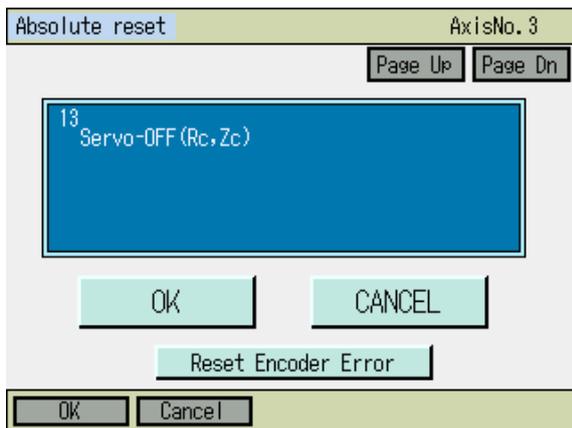


11) Servo-ON  
Touch **OK** button or press **F1** (OK) key.

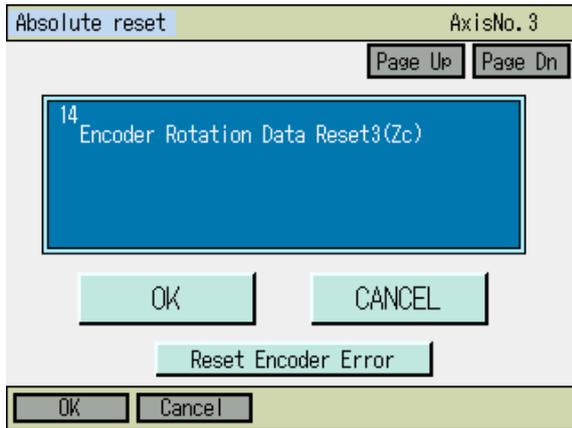


12) Standard posture standby  
Touch **OK** button or press **F1** (OK) key.

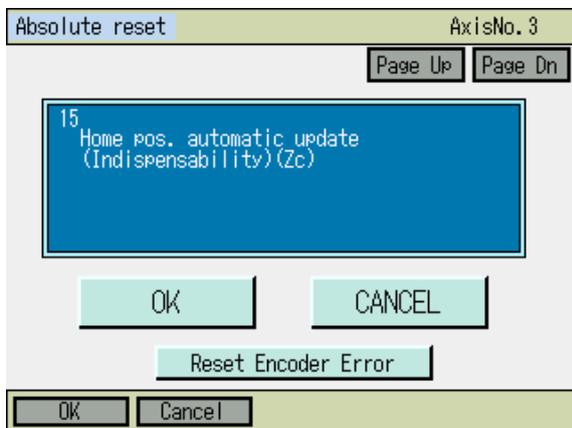
**Caution:**  
The Z-axis returns to the home position.



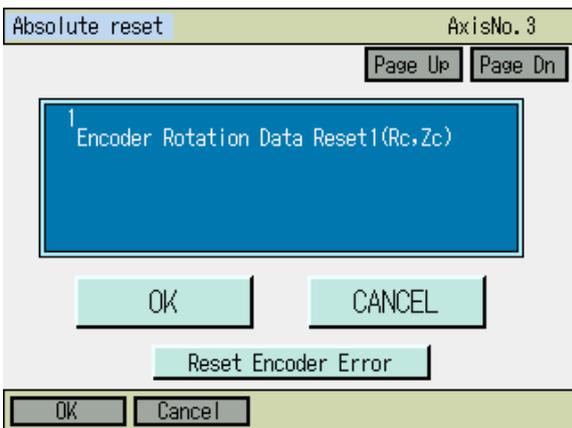
13) Servo-OFF  
Touch **OK** button or press **F1** (OK) key.



14) Encoder Rotation Data Reset 3  
Touch **OK** button or press **F1** (OK) key.



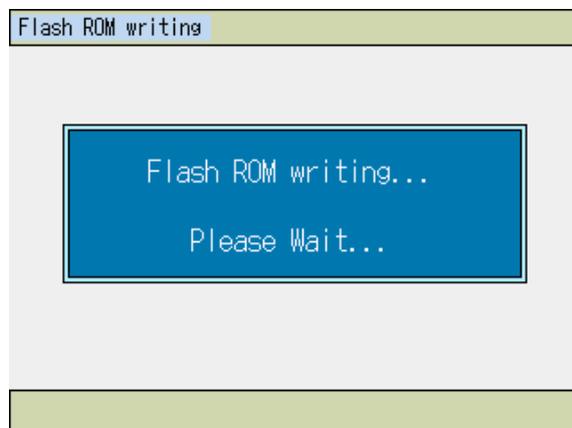
15) Home pos. automatic update  
Touch **OK** button or press **F1** (OK) key.



The display returns to the first screen.  
Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.  
The display returns to the previous screen.



Do not fail to conduct Flash ROM Writing → Software Reset after the home preset automatic updating.



While in writing process to flash ROM, the screen shown in the left will be displayed.

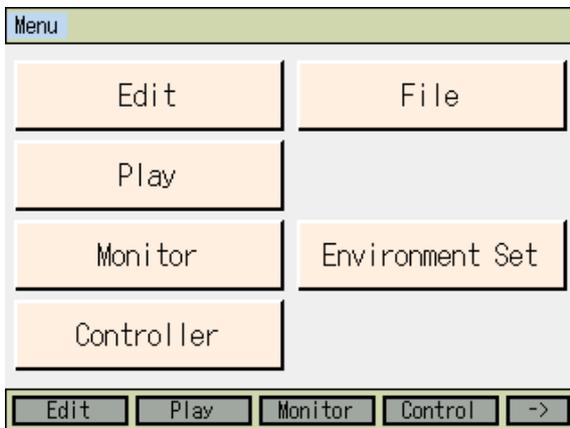
***Never turn off the power to the Controller at this time.***



After flash ROM writing is complete, the display changes to the software reset screen. To activate the parameters that you had changes, it is necessary to have a software reset. Either press **Yes** button in the touch panel or press **F1** (Yes) key.



The screen shown on the left is displayed during the software reset. Once the software reset is complete, the display returns to the main menu screen.



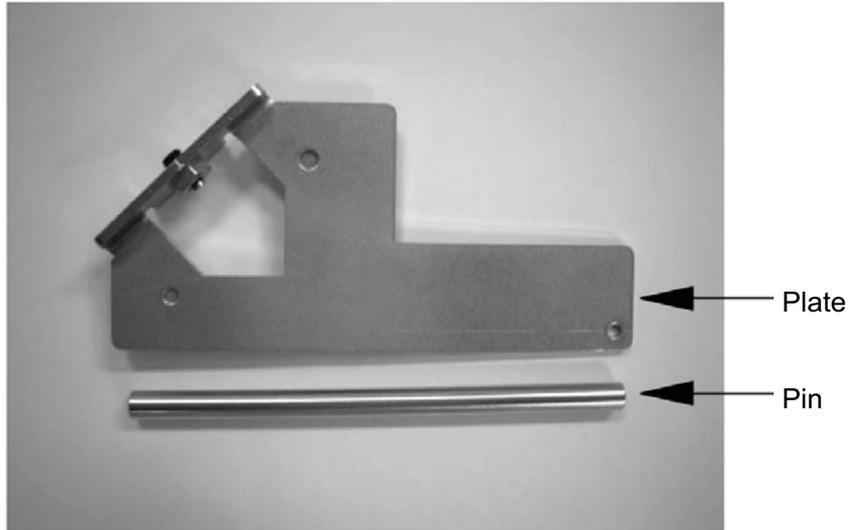
### 17.3 Perform Absolute Reset on ZR Unit (Absolute Type)

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

You also need a special jig to perform an absolute reset.

- Absolute-reset adjustment jig Model number : JG-ZRS (for ZRS)  
JG-ZRM (for ZRM)



Connect the cables for the robot, controller and teaching pendant to enable operation from the teaching pendant.

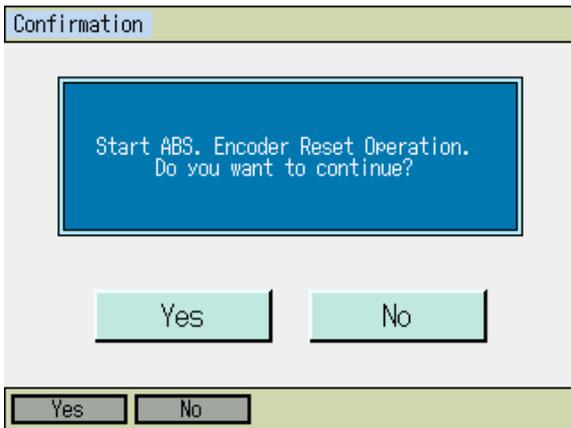
Before proceeding, be sure to confirm that the EMG switch operates properly.

- 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 absolute reset.*

[2] Absolute Reset Procedures

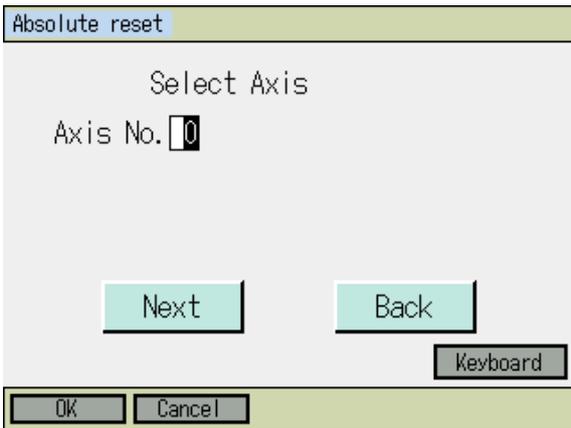
For absolute reset for the ZR unit, a series of operations of the vertical axis and rotation axis is performed. Because there is an item for operating the robot in the adjustment procedure, perform the adjustment in the condition where the actuator is available by setting the appropriate moving range of the actuator and arranging it so there are no obstacles etc. for the actuator.

Select **Absolute Reset** from Controller Menu.



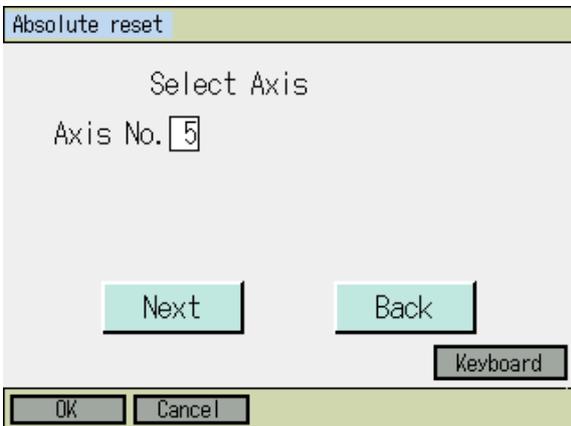
To have an absolute reset, either touch **Yes** button or press **F1** (Yes) key.

When not to have an absolute reset, either touch **No** button or press **F2** (No) key. The display returns to the previous screen.



Axis No. input

Input the axis number of the vertical axis on ZR Unit on the touch panel numeric keys or hardware numeric keys, and confirm the input with **ENT** button or the return key.

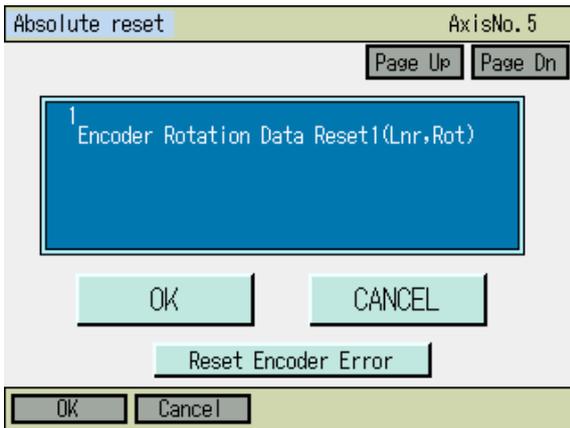


Once the input is confirmed, the cursor disappears. If you want to redo the input, touch the axis number input box or press **ESC** key.

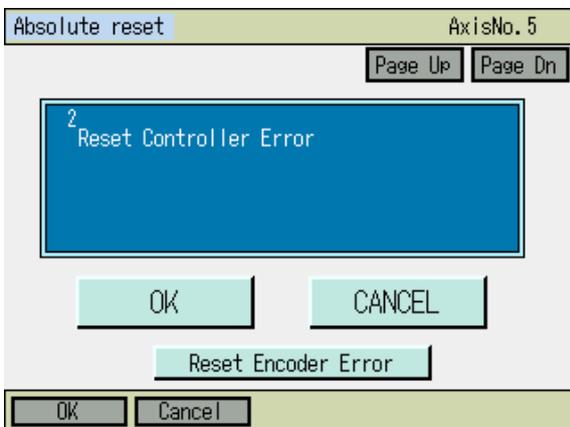
If you want to continue absolute reset, either touch **Next** button or press **F1** (OK) key.

When you cancel absolute reset, either touch **Back** button or press **F2** (Cancel) key.

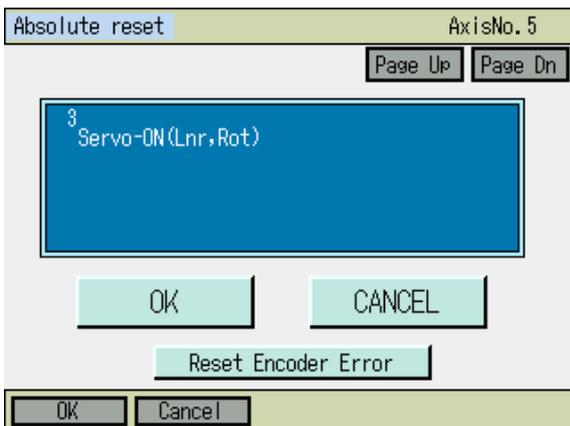
When canceling an absolute reset on any screen of the following 1) through 15) press the **F2** (Cancel) key or **CANCEL** Button.



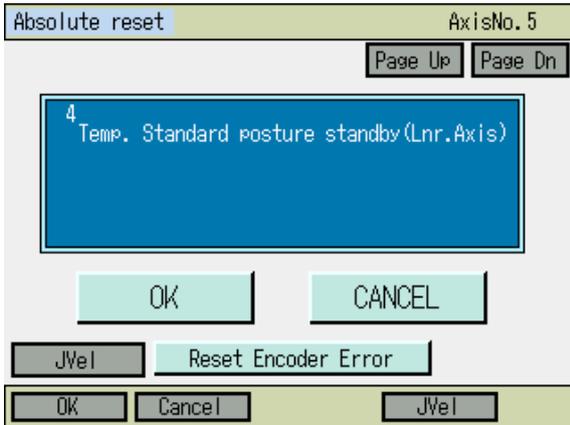
1) Encoder Rotation Data Reset 1  
Touch **OK** button or press **F1** (OK) key.



2) Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.

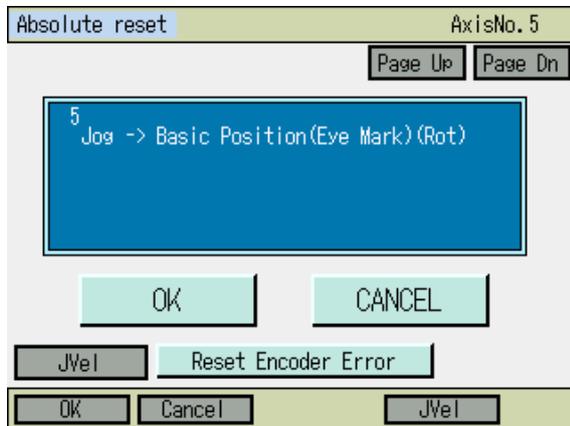


3) Servo-ON  
Touch **OK** button or press **F1** (OK) key.

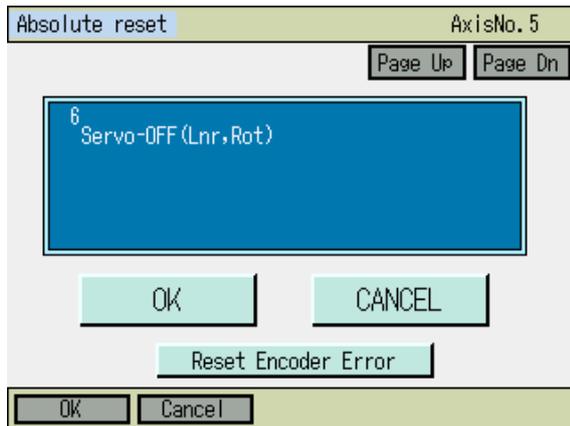


4) Temp. standard posture standby  
Touch **OK** button or press **F1** (OK) key.

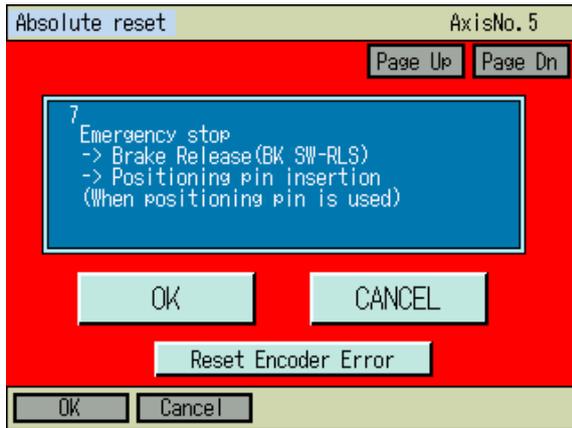
**Caution:**  
*The vertical axis returns to the home position*



5) Jog Movement  
Move the rotary axis with the jog key to a place around the basic posture (refer to the figures of basic posture in the next page and after), and either touch **OK** button or press **F1** (OK) key.



6) Servo-OFF  
Touch **OK** button or press **F1** (OK) key.



7) Emergency stop input and adjusting jig set  
Press the EMERGENCY STOP button.

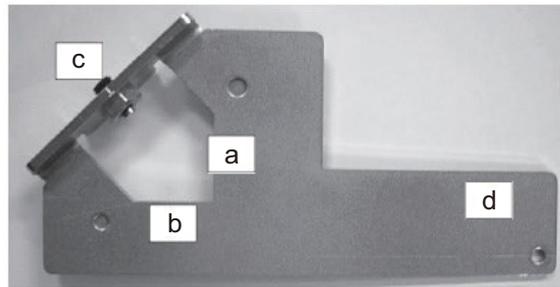
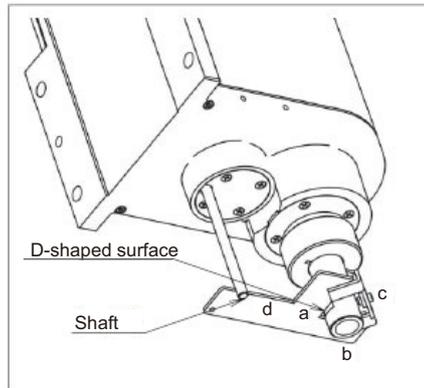
Press the brake release switch to release the brake.

Fix at the datum posture described in the next page, and either touch **OK** button or press **F1** (OK) key.

Inputting emergency stop displays the screen at the left.

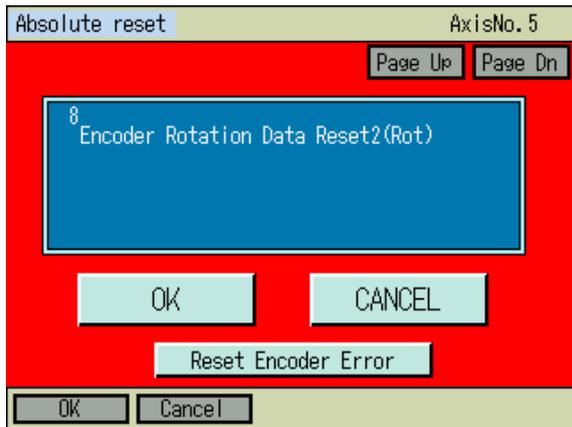
Either touch **Back** button or press **ESC** key to go back to the previous screen.

Jig Attachment Procedure

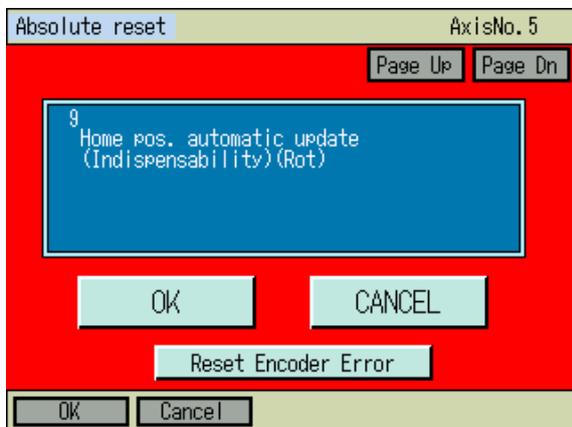


- 1) Insert the ball screw spline shaft into the jig hole from the lower side.
- 2) Put the D-cut surface of the ball screw spline shaft onto the surface "a".
- 3) Put the ball screw spline shaft side surface onto the surface "b".
- 4) Fasten the screw "c" and fix the jig onto the ball screw spline shaft.
  - \* At that time, make sure that the adjusting jig is placed vertically to the ball screw spline shaft and the D-cut surface closely contacts the surface "a".
  - \* Screws to be used : Hexagon socket head set screw M5
  - \* Tightening Torque : 20 [N·cm] (reference)
- 5) Insert the attached shaft into the hole on the ZR unit body.
  - \* Be careful because the shaft comes off easily when your hand is released.
- 6) Turn the ball screw spline shaft and put the attached shaft onto the surface "d" of the jig.

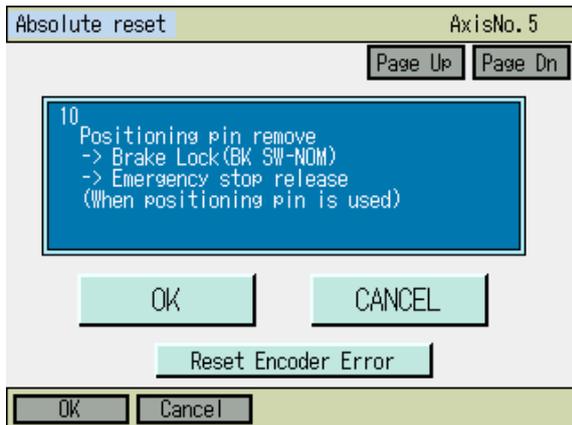
**⚠ Warning: Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.**



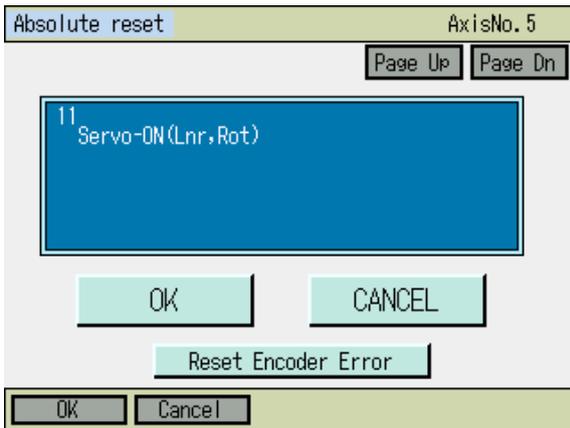
8) Encoder Rotation Data Reset 2  
Touch **OK** button or press **F1** (OK) key.



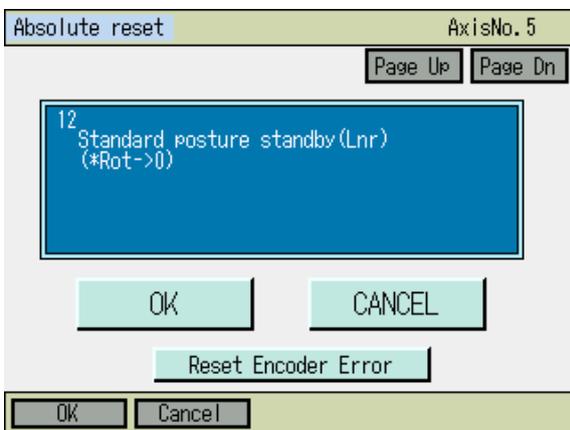
9) Home pos. automatic update  
Touch **OK** button or press **F1** (OK) key.



10) Adjusting jig removal and emergency off  
Remove the adjusting jig.  
Turn off the brake release switch to enable the brake.  
Turn off the EMERGENCY STOP button.  
Touch **OK** button or press **F1** (OK) key.

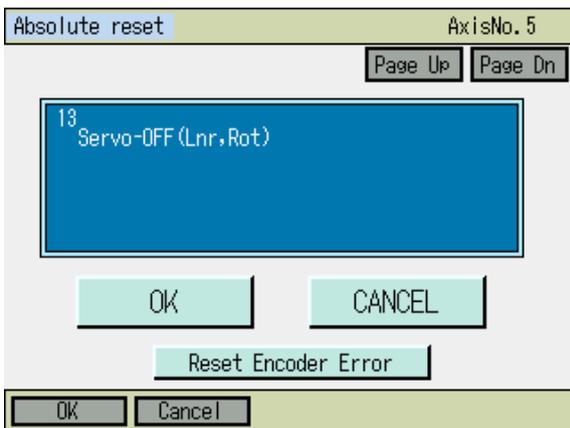


11) Servo-ON  
Touch **OK** button or press **F1** (OK) key.

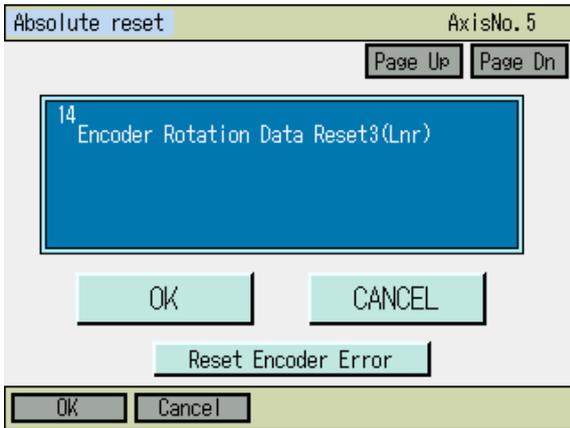


12) Standard posture standby  
Touch **OK** button or press **F1** (OK) key.

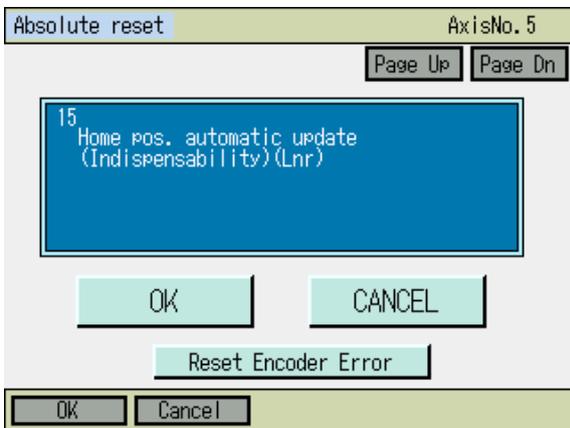
**Caution:**  
*The vertical axis returns to the home position*



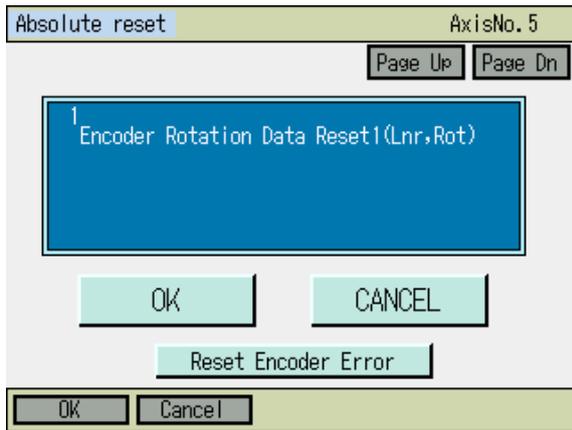
13) Servo-OFF  
Touch **OK** button or press **F1** (OK) key.



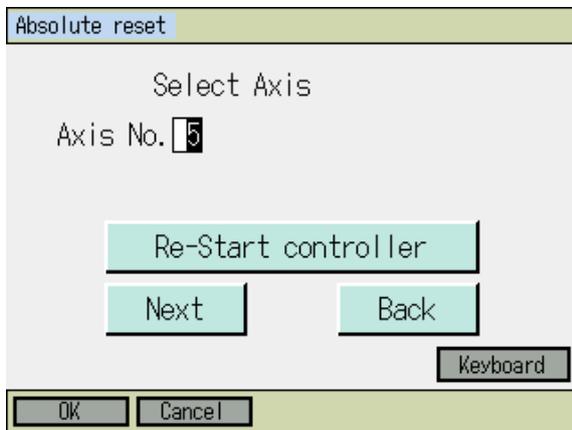
14) Encoder Rotation Data Reset 3  
Touch **OK** button or press **F1** (OK) key.



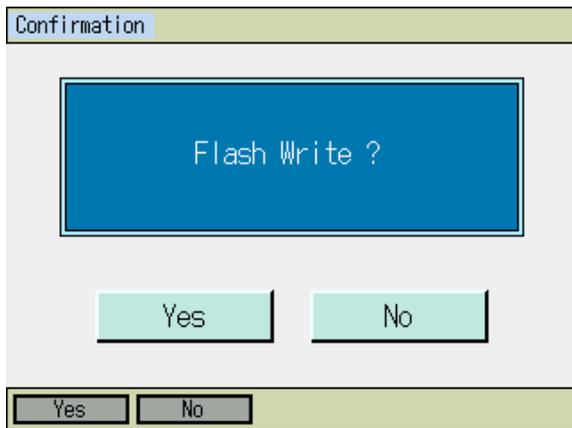
15) Home pos. automatic update  
Touch **OK** button or press **F1** (OK) key.



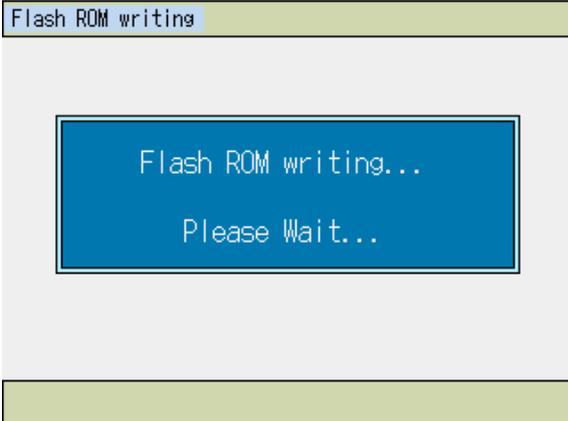
Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.



Touch **Re-Start controller** button or press **ESC** key.



Do not fail to conduct Flash ROM Writing → Software Reset after the home preset automatic updating.



While in writing process to flash ROM, the screen shown in the left will be displayed.

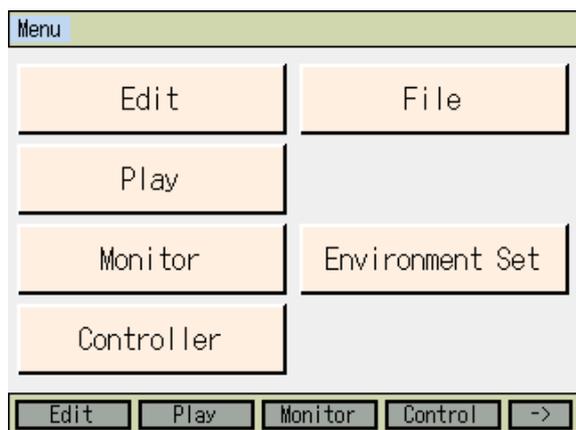
***Never turn off the power to the Controller at this time.***



After flash ROM writing is complete, the display changes to the software reset screen. To activate the parameters that you had changes, it is necessary to have a software reset. Either press **Yes** button in the touch panel or press **F1** (Yes) key.



The screen shown on the left is displayed during the software reset. Once the software reset is complete, the display returns to the main menu screen.



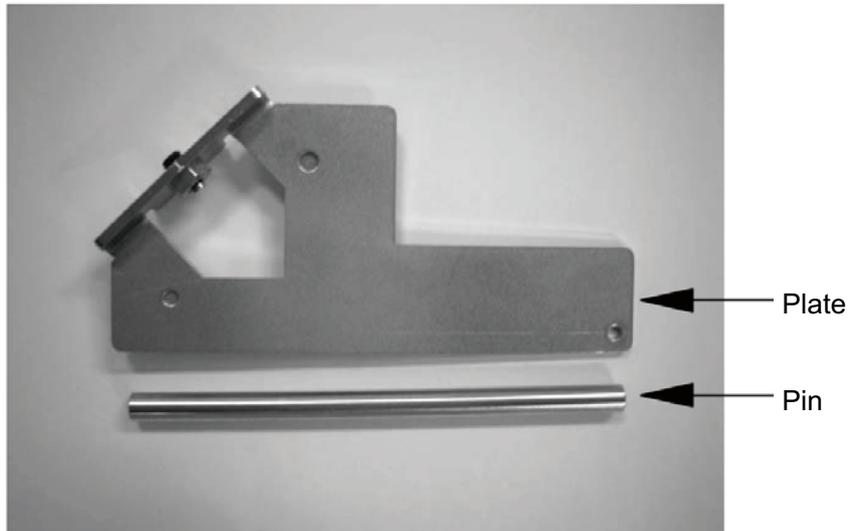
## 17.4 Perform Ball Screw Spline Shaft Adjusting on ZR Unit (Incremental Type)

Normally, adjustment of the ball screw spline shaft adjusting 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 Shaft Adjusting Preparation

The absolute rest jig is required for the adjustment of the ball screw spline shaft adjusting for the ZR unit.

- Absolute-reset adjustment jig Model number : JG-ZRS (for ZRS)  
JG-ZRM (for ZRM)



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.

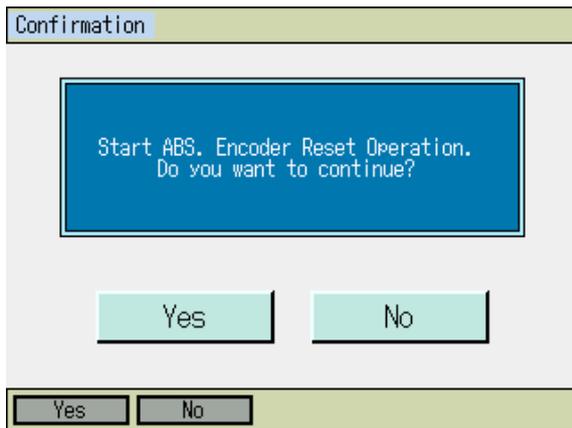
-  **Warning:** • *Carrying out any inspection or maintenance work without fully understanding the work may result in serious injury.*

  - *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 absolute reset.*

## [2] Ball Screw Spline Shaft Adjusting Procedure

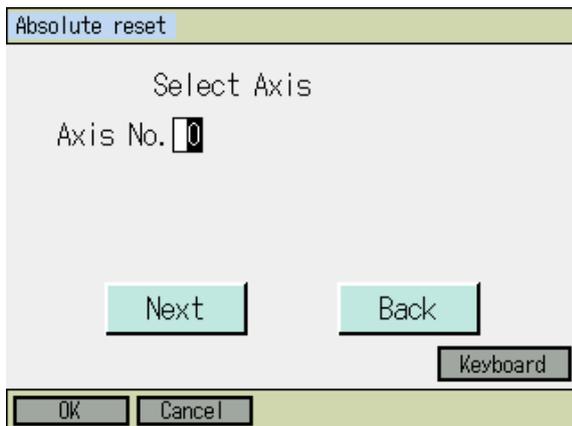
For ball screw spline shaft adjusting for the ZR unit, a series of operations of the vertical axis and rotation axis is performed. Because there is an item for operating the robot in the adjustment procedure, perform the adjustment in the condition where the actuator is available by setting the appropriate moving range of the actuator and arranging it so there are no obstacles etc. for the actuator.

Select **Absolute Reset** from Controller Menu.



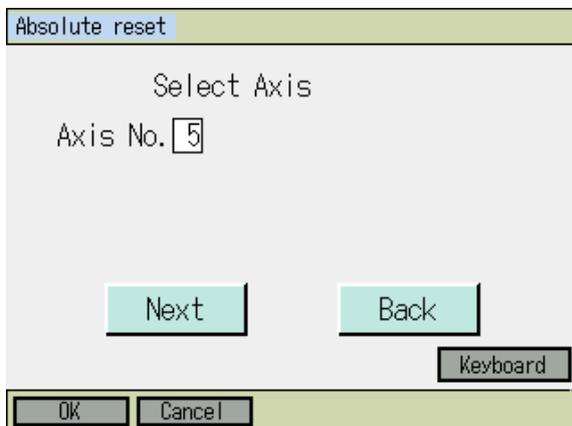
To have an absolute reset, either touch **Yes** button or press **F1** (Yes) key.

When not to have an absolute reset, either touch **No** button or press **F2** (No) key. The display returns to the previous screen.



Axis No. Input

Input the axis number of the vertical axis on ZR Unit on the touch panel numeric keys or hardware numeric keys, and confirm the input with **ENT** button or the return key.

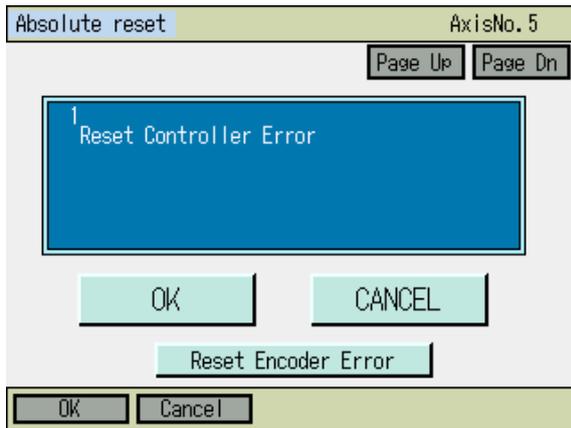


Once the input is confirmed, the cursor disappears. If you want to redo the input, touch the axis number input box or press **ESC** key.

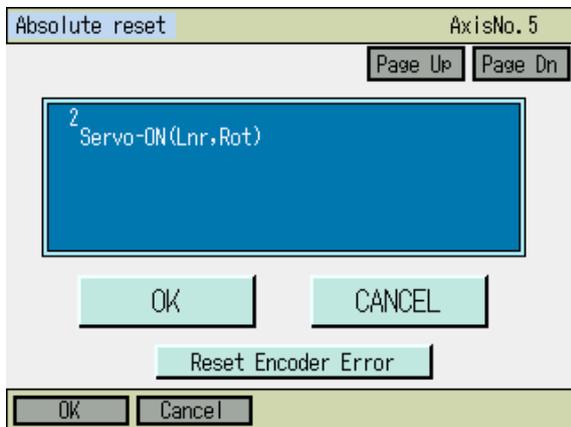
If you want to continue absolute reset, either touch **Next** button or press **F1** (OK) key.

When you cancel absolute reset, either touch **Back** button or press **F2** (Cancel) key.

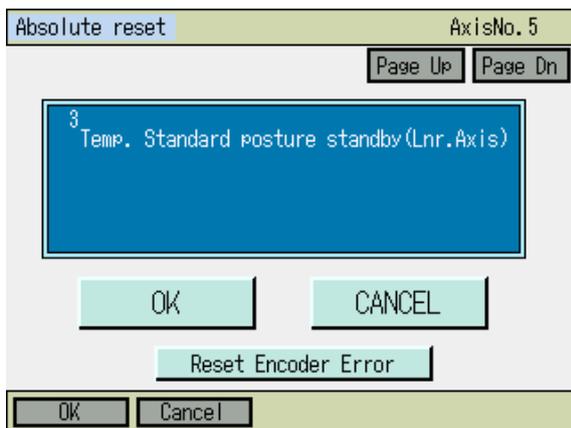
When canceling an absolute reset on any screen of the following 1) through 9) press the **F2** (Cancel) key or **CANCEL** Button.



1) Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.

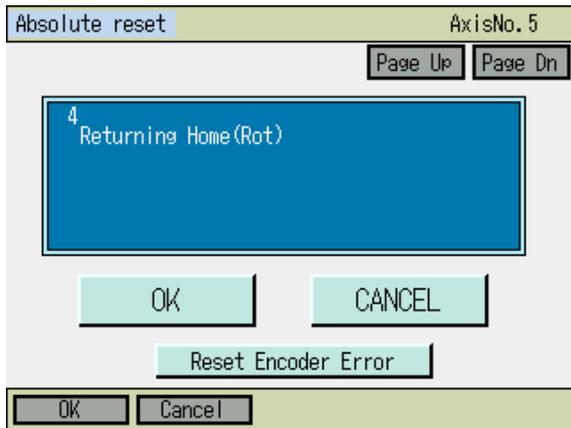


2) Servo-ON  
Touch **OK** button or press **F1** (OK) key.



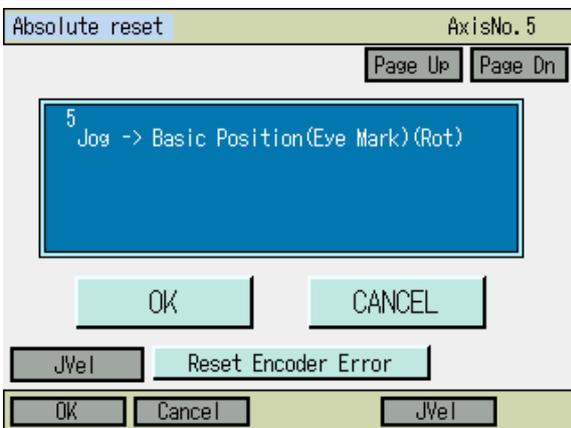
3) Temp. standard posture standby  
Touch **OK** button or press **F1** (OK) key.

**⚠ Caution:**  
*The vertical axis returns to the home position*

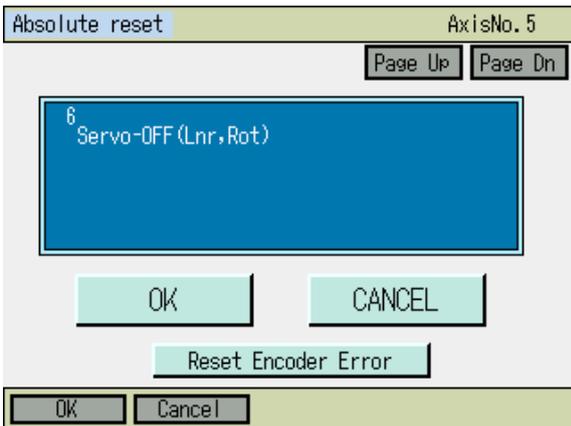


4) Returning Home  
Touch **OK** button or press **F1** (OK) key.

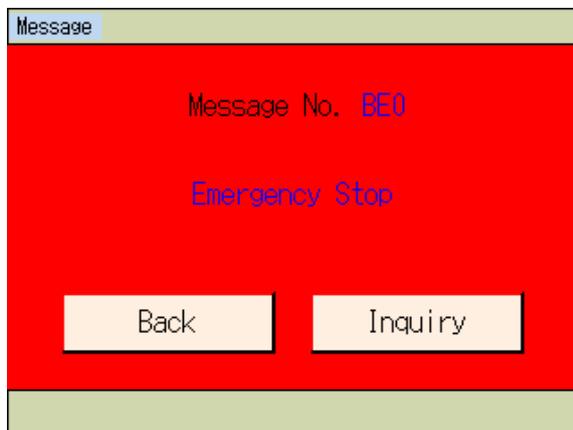
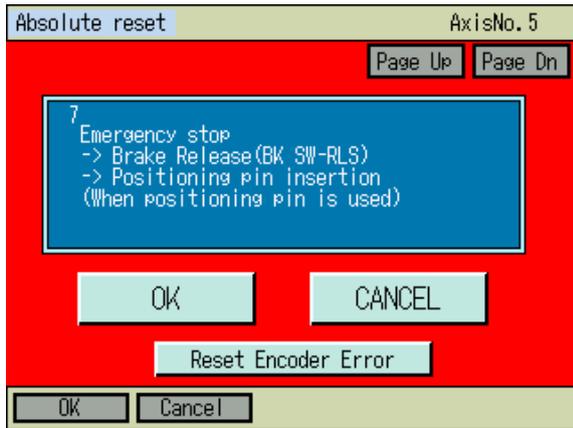
**Caution:**  
*The rotation axis returns to the home position.*



5) Jog Movement  
Move the rotation axis to the vicinity of the basic position with jog keys (see the “Standard Posture Drawing” on the next page).  
Touch **OK** button or press **F1** (OK) key.



6) Servo-OFF  
Touch **OK** button or press **F1** (OK) key.



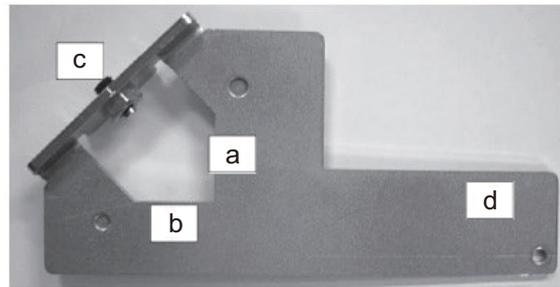
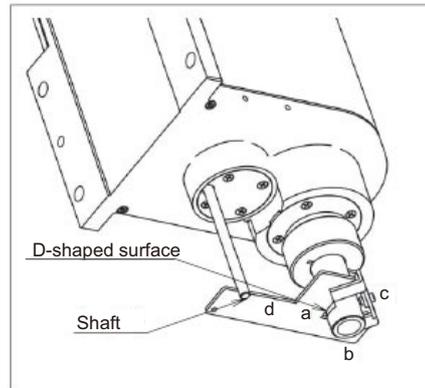
7) Emergency stop input and adjusting jig set  
Press the EMERGENCY STOP button.  
Press the brake release switch to release the brake.

Fix at the datum posture described in the next page with using a fixture, and either touch **OK** button or press **F1** (OK) key.

Inputting emergency stop displays the screen at the left.

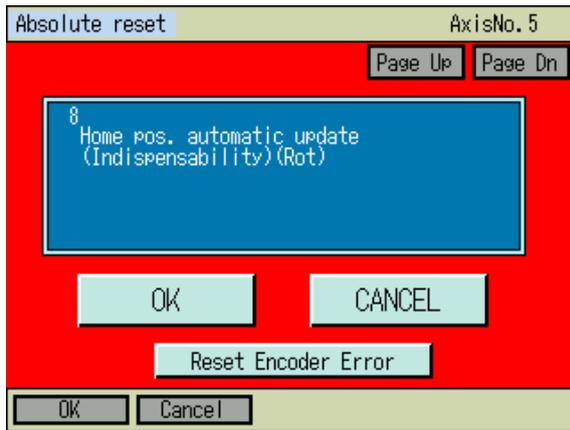
Either touch **Back** button or press **ESC** key to go back to the previous screen.

### Jig Attachment Procedure

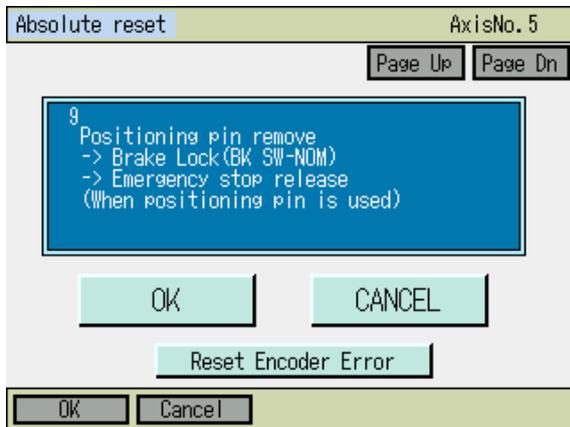


- 1) Insert the ball screw spline shaft into the jig hole from the lower side.
- 2) Put the D-cut surface of the ball screw spline shaft onto the surface "a".
- 3) Put the ball screw spline shaft side surface onto the surface "b".
- 4) Fasten the screw "c" and fix the jig onto the ball screw spline shaft.
  - \* At that time, make sure that the adjusting jig is placed vertically to the ball screw spline shaft and the D-cut surface closely contacts the surface "a".
  - \* Screws to be used : Hexagon socket head set screw M5
  - \* Tightening Torque : 20 [N·cm] (reference)
- 5) Insert the attached shaft into the hole on the ZR unit body.
  - \* Be careful because the shaft comes off easily when your hand is released.
- 6) Turn the ball screw spline shaft and put the attached shaft onto the surface "d" of the jig.

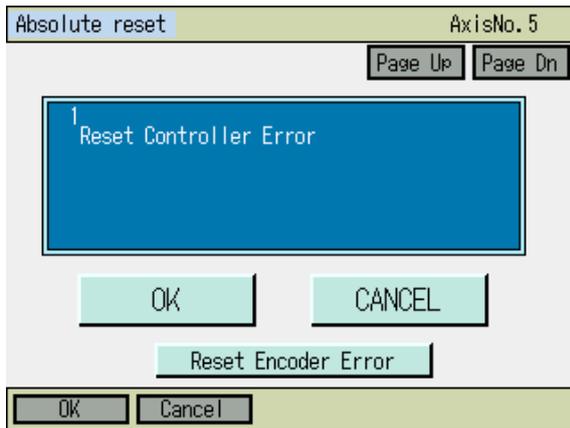
 **Warning:** Be sure to press the EMERGENCY STOP switch before setting an adjusting jig. Failure to do so may cause a robot malfunction, which may lead to a serious accident resulting in injury or death.



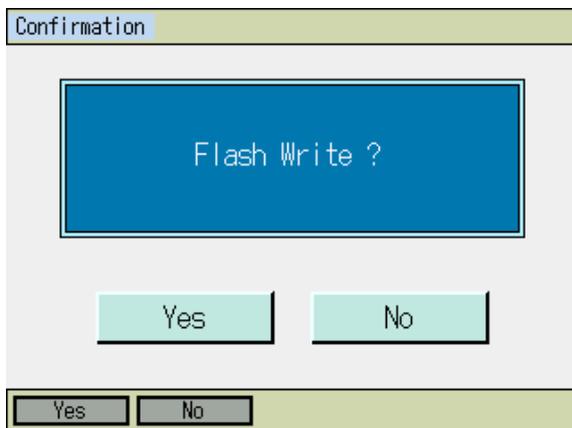
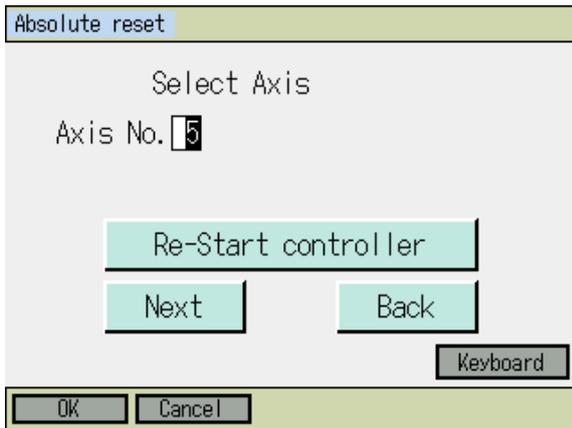
8) Home pos. automatic update  
Touch **OK** button or press **F1** (OK) key.



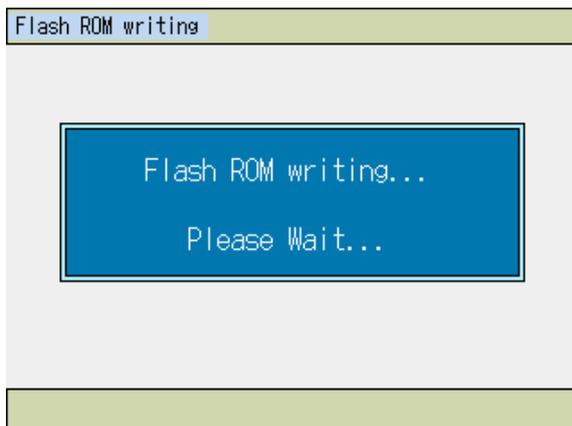
9) Adjusting jig removal and emergency off  
Remove the adjusting jig.  
Turn off the brake release switch to enable the brake.  
Touch **OK** button or press **F1** (OK) key.



Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.

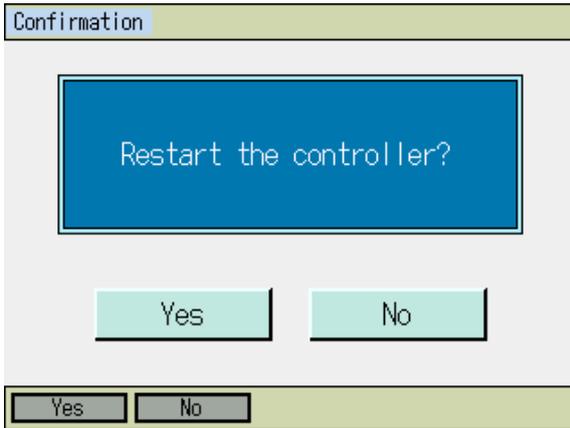


Do not fail to conduct Flash ROM Writing → Software Reset after the home preset automatic updating.



While in writing process to flash ROM, the screen shown in the left will be displayed.

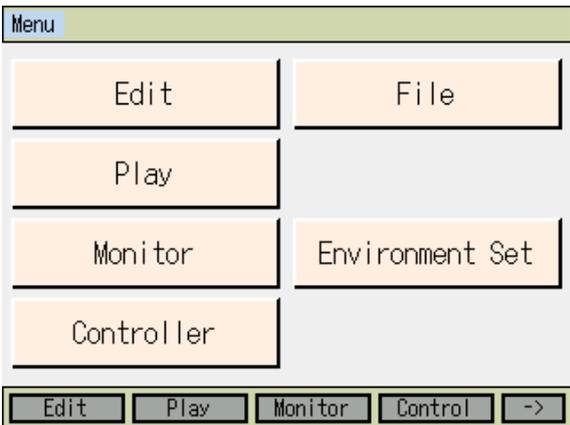
**Never turn off the power to the Controller at this time.**



After flash ROM writing is complete, the display changes to the software reset screen.  
Reset software.  
Either press **Yes** button in the touch panel or press **F1** (Yes) key.



The screen shown on the left is displayed during the software reset.  
Once the software reset is complete, the display returns to the main menu screen.



## 17.5 Orthogonal Axis Synchro Specification Absolute Reset 5th and 6th Axes of XSEL-J/K, P/Q or PX/QX Controller, 5th to 8th Axes of XSEL-R/S or RX/SX Controller, or SSEL Controller

The following are descriptions about the absolute reset methods for synchro specification axes. The products ordered as the synchro specification are shipped after setting parameters to the synchro specification. However, change the parameters when executing an absolute reset.

### 17.5.1 Synchro Axes

Synchro axes are comprised of the master axis (main axis) and the slave axis (sub-axis). The axis of which the number is smaller becomes the master axis.

Program commands are valid only for the master axis. (Commands to the slave axis are prohibited.) As the absolute reset methods, there is the standard procedure and the special procedure. Which procedure to be used is determined by the “specific-axis parameter No. 38 encoder ABS/INC type” values for the master and slave axes.

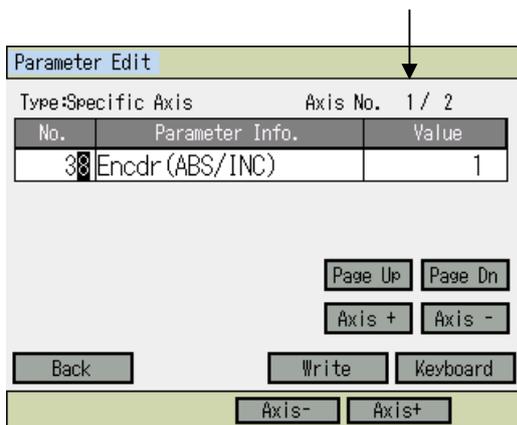
“Specific-Axis Parameter No. 38 Encoder ABS/INC Type” Values		Absolute Reset Methods
Master Axis	Slave Axis	
1	1	Special procedure
1	0	Standard procedure
0	0	

(When the value is 0 for both the master axis and the slave axis, both the axes are of the increment specification.)

Example 1) When special procedure is executed for 2-axis controller:

Display Transition: **Edit** → **Parameter** → **Specific Axis**

Smaller axis number is the master axis



Parameter Edit

Type: Specific Axis      Axis No. 1 / 2

No.	Parameter Info.	Value
38	Encdr (ABS/INC)	1

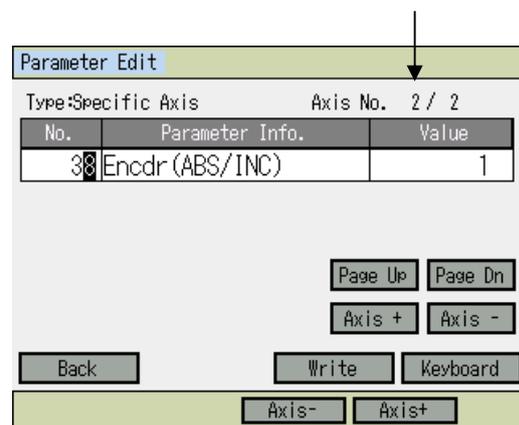
Page Up    Page Dn

Axis +    Axis -

Back      Write    Keyboard

Axis-    Axis+

Slave axis



Parameter Edit

Type: Specific Axis      Axis No. 2 / 2

No.	Parameter Info.	Value
38	Encdr (ABS/INC)	1

Page Up    Page Dn

Axis +    Axis -

Back      Write    Keyboard

Axis-    Axis+

**Caution:** To change the axis number, either touch **Axis +** and **Axis -** buttons or press **F3** (Axis -) and **F4** (Axis +) keys.

Example 2) When standard procedure is executed for 2-axis controller:

Parameter Edit		
Type:Specific Axis		Axis No. 1 / 2
No.	Parameter Info.	Value
38	Encdr (ABS/INC)	1

Parameter Edit		
Type:Specific Axis		Axis No. 2 / 2
No.	Parameter Info.	Value
38	Encdr (ABS/INC)	0

### 17.5.2 Location Adjustment of Synchro Axes Sliders

Align the synchro axes sliders. (Physical parallel adjustment)

- (1) Adjust the relative locations between the sliders of the master and slave axes and connect them while the axes are not connected to the controller via cables (controller main power OFF).
- (2) If location adjustment cannot be made while the axes are not connected to the controller via cables (such as with the brake), follow the steps below.
  - 1) Disconnect the sliders temporarily and connect the axes to the controller via cables.
  - 2) Record the current values of the "Specific-axis parameter No. 65 synchro other axis No." For the master and slave axes. (Record them to return to their original values in a later process.)
  - 3) To cancel the synchro function temporarily, input 0 to the "Specific-axis parameter No. 65 synchro other axis No." for both the master and slave axes, and execute the data transfer to the controller, Flash ROM writing and controller restart (software reset) in this order.
  - 4) Execute an absolute reset (standard procedure) for specific of the master and slave axes as a single axis.
  - 5) Adjust the relative locations of the sliders by jog operation, etc., and connect them.
  - 6) To activate the synchro function again, input the values recorded in 2) above to the "Specific-axis parameter No. 65 synchro other axis No." for the master and slave axes, and execute the data transfer to the controller, Flash ROM writing and controller restart (software reset) in this order.

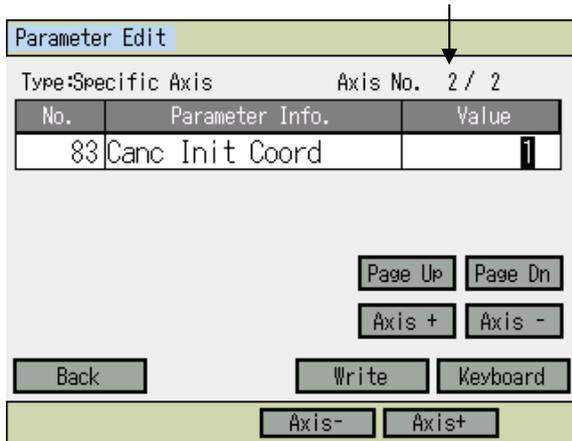
### 17.5.3 Special Procedure Absolute Reset

In the case of “Specific-axis parameter No. 38 encoder ABS/INC type”: master axis = 1 and slave axis = 1:

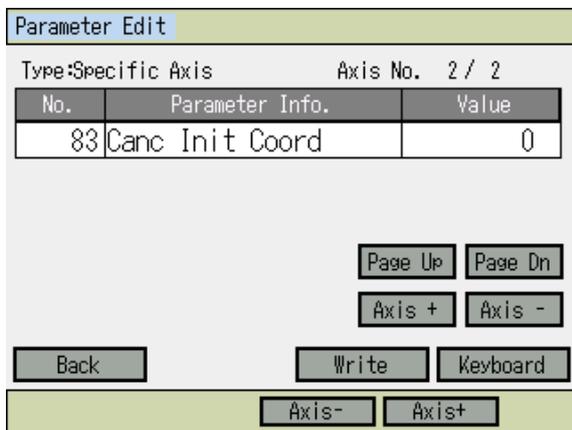
- (1) Record the current value of the “Specific-axis parameter No. 83 ABS synchro slave axis coordinate initialization cancel” for the slave axis.  
(Record it to return to the original value in a later process.)

Display Transition: **Edit** → **Parameter** → **Specific Axis**

Slave axis

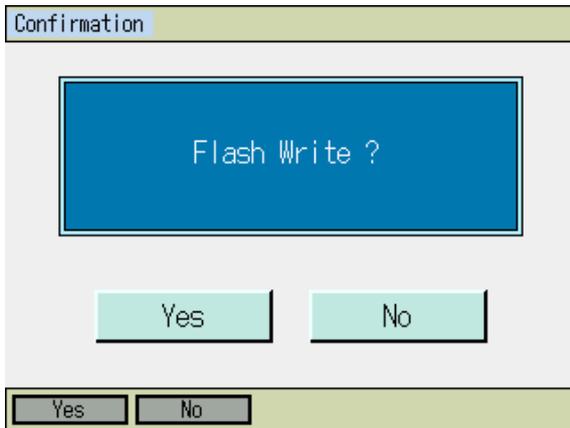


- (2) Input 0 for the “Specific-axis parameter No. 83 ABS synchro slave axis coordinate initialization cancel” for the slave axis.



Input 0 on the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key to confirm the input. The cursor disappears once the input is confirmed. Either touch **Write** button or press **WRT** key to transfer the data to the controller.

Touch **Back** button or press **ESC** key several times to go to the flash ROM writing screen.



Write the data to Flash ROM.  
Touch **Yes** button or press **F1** (Yes) key.



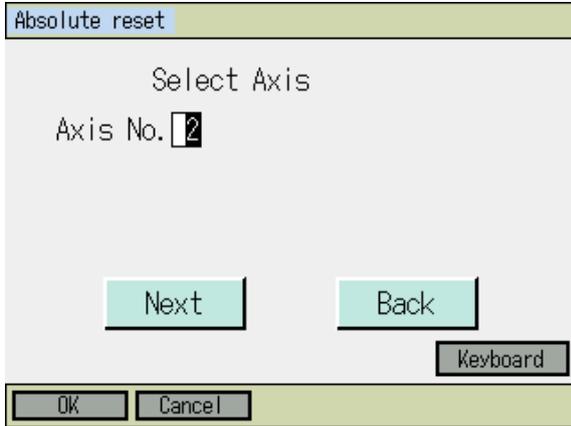
Restart the controller.  
Touch **Yes** button or press **F1** (Yes) key.

- (3) Execute an absolute reset according to the following special procedure (forced operation by ignoring the screen steps):

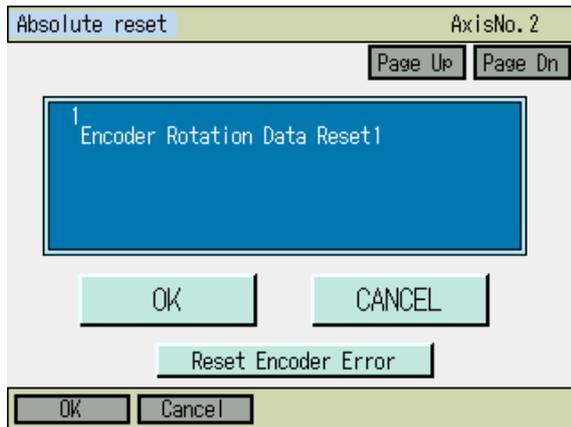
When the controller is applicable to the “battery-less absolute reset”, the procedure is different. In such case, perform the absolute reset operation following the “17.9.2 Special Procedure: How to Conduct Absolute Reset Battery-less Absolute Synchronizing Type”.

Select **Absolute Reset** in the controller menu.

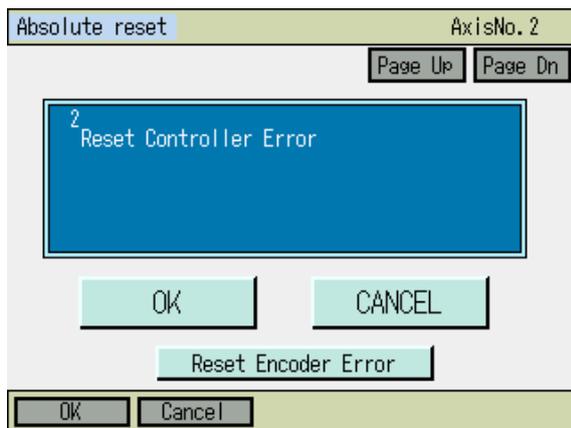
- 1) Execute the “Encoder Rotation Data Reset1” for the slave axis.



Input the axis number of the slave axis by using the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key to confirm the input. Touch **Next** button or press **F1** (OK) key.

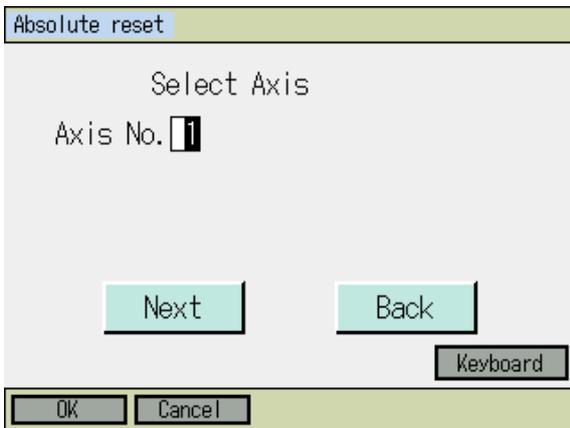


Touch **OK** button or press **F1** (OK) key.

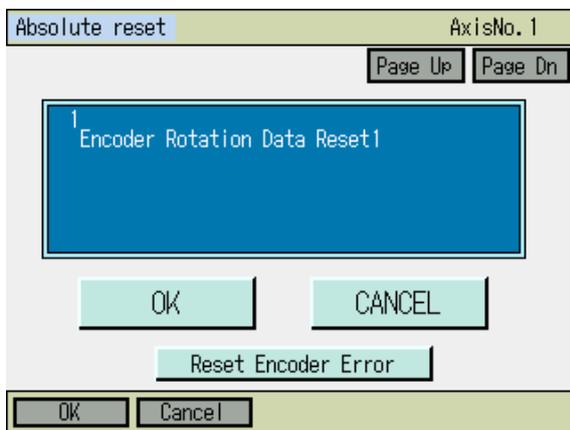


Touch **CANCEL** button or **ESC** key. Make sure not to touch **OK** button. Get out of Absolute Reset Mode for now.

2) Execute an absolute reset for the master axis according to the screen steps.



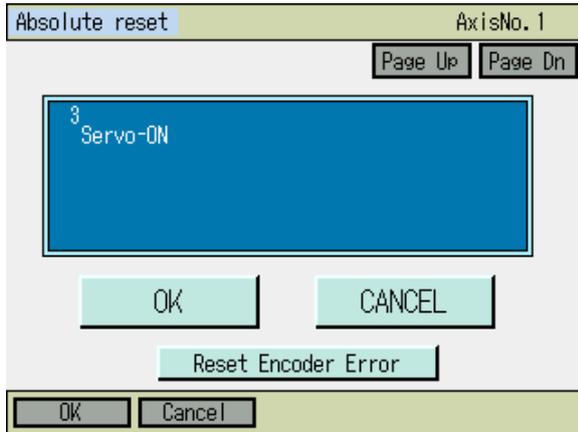
Input the axis number of the master axis by using the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key to confirm the input. Touch **Next** button or press **F1** (OK) key.



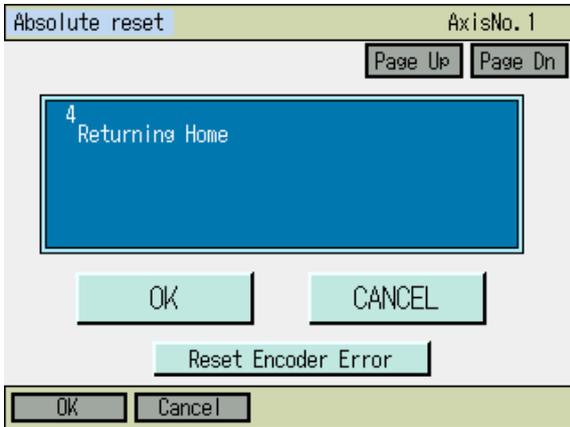
Touch **OK** button or press **F1** (OK) key.



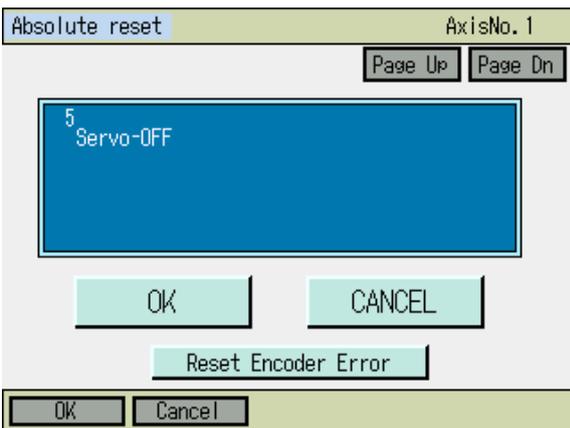
Touch **OK** button or press **F1** (OK) key.



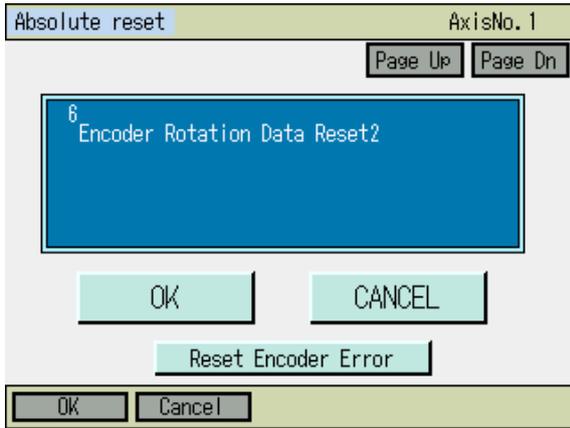
Touch **OK** button or press **F1** (OK) key.



Returning Home  
Touch **OK** button or press **F1** (OK) key.

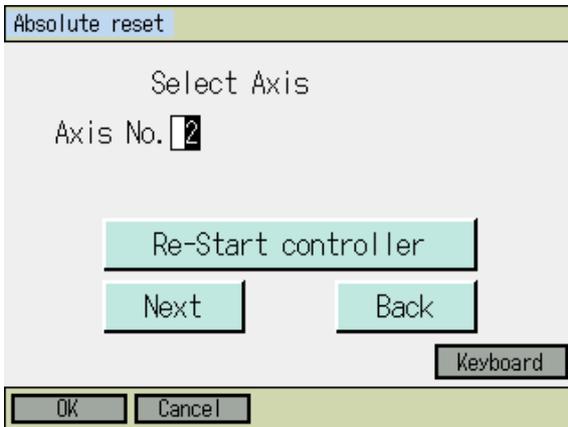


Servo-OFF  
Touch **PageUp** button or **PAGEUP** key to forward the screen. Make sure not to touch **OK** button.

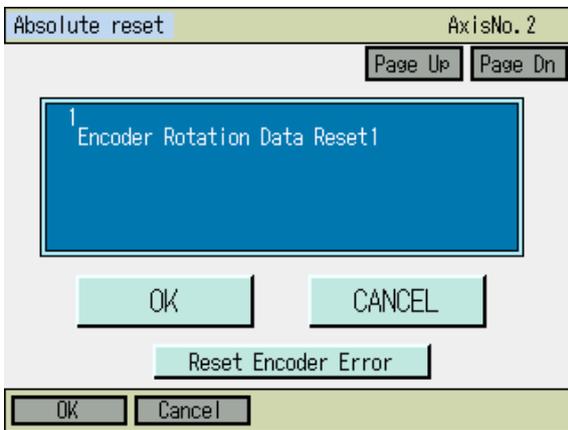


Touch **OK** button or press **F1** (OK) key.

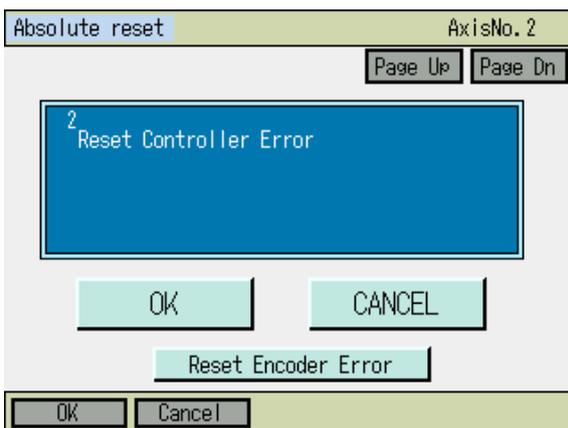
3) Execute the “Encoder Rotation Data Reset1” for the slave axis again



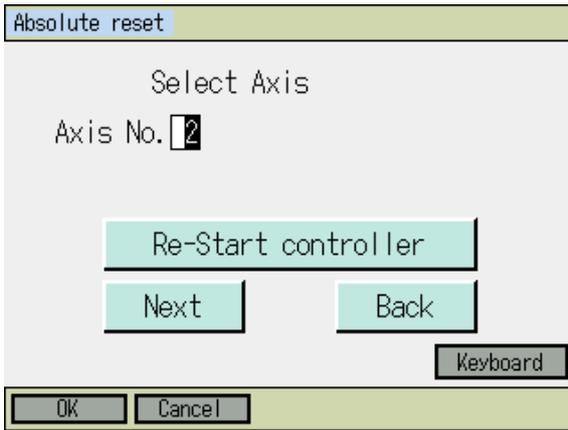
Input the axis number of the slave axis by using the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key to confirm the input. Touch **Next** button or press **F1** (OK) key.



Touch **OK** button or press **F1** (OK) key.



Touch **CANCEL** button or **ESC** key. Make sure not to touch **OK** button. Get out of Absolute Reset Mode for now.



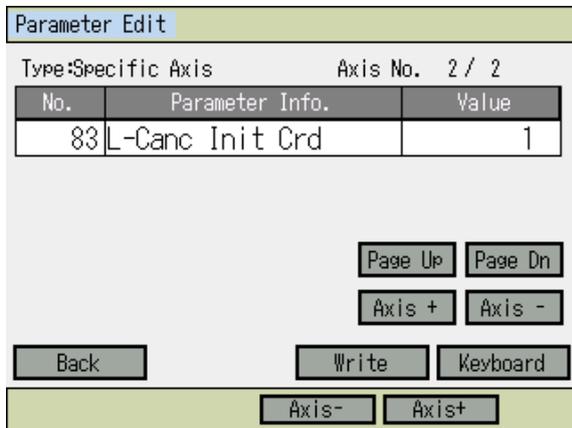
Touch **Re-Start controller** button or press **ESC** key.



Restart the controller.  
Touch **Yes** button or press **F1** (OK) key.

- Return the slave-axis value for the “specific-axis parameter No. 83 ABS synchro slave axis coordinate initialization cancel” to the original value.

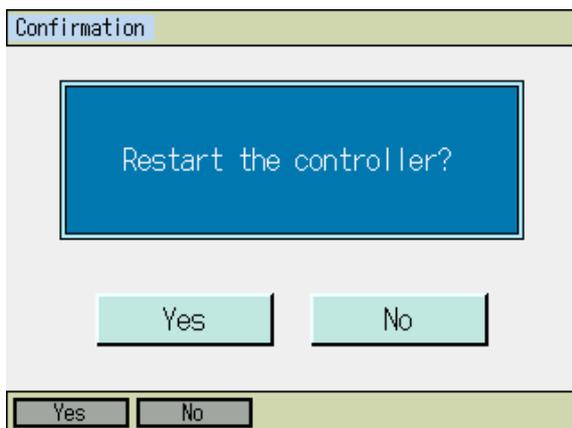
Display Transition: **Edit** → **Parameter** → **Specific Axis**



Input 1 on the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key to confirm the input. The cursor disappears once the input is confirmed. Either touch **Write** button or press **WRT** key to transfer the data to the controller. Once the transfer is complete, the display proceeds to the next parameter number. Use **Back** button or **ESC** key to go to the flash ROM writing screen.



Write the data to Flash ROM. Touch **Yes** button or press **F1** (Yes) key.



Restart the controller. Touch **Yes** button or press **F1** (Yes) key.

- (5) Set the preset home value to uniform the coordinate values of the master and slave axes.
- 1) If the controller 7 segment display is “rdy” while the servo is OFF, read the displayed current positions of the master and slave axes.  
(If the error No. C74 real position soft limit over error occurs, reset the error. When “rdy” is displayed, the displayed current positions can be read.)

Display Transition: Monitor → Specific Axis → Cur pos.

Current Position	
AxisNo. 1 - 2	
No.	Current Position
1	-0.006
2	1.731

Page Up Page Dn
Position
Servo
Sensor
Encoder
AxisErr
Back

\* If the servo is turned ON at this stage, error No. D0A driver overload error, error No. C6B deviation overflow error, error No. CA5 stop deviation overflow error, etc., occurs.

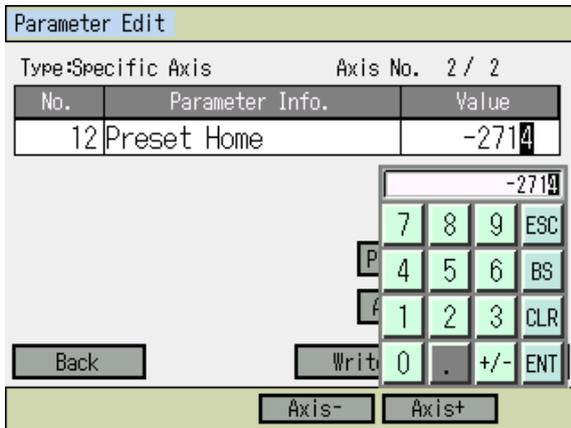
- 2) Calculate the following:  
Specific-axis parameter No. 12 preset home value for slave axis [0.001 mm]  
+ ((displayed current position value for master axis [mm] - displayed current position value for slave axis [mm]) × 1000)

Parameter Edit		
Type: Specific Axis	Axis No. 2 / 2	
No.	Parameter Info.	Value
12	Preset Home	-977

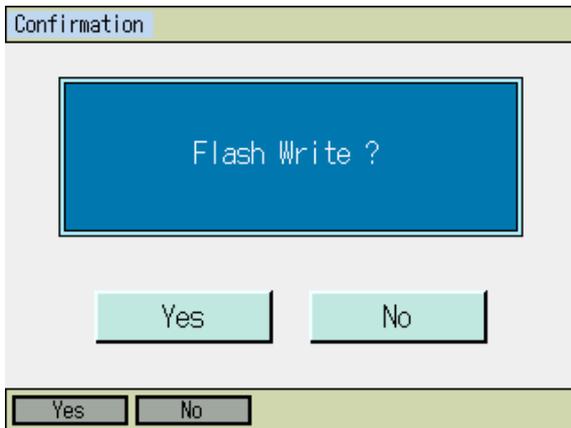
Page Up Page Dn
Axis + Axis -
Back Write Keyboard
Axis- Axis+

In this example:  $-977 + ((-0.006 - 1.731) \times 1000) = -2714$

- Input the calculation result in 2) above to the “Specific-axis parameter No. 12 preset home value” for the slave axis.



After touching **ENT** button, either touch **Write** button or press **WRT** key to transfer the data to the controller. The hardware numeric keys are also available for input. Use **Back** button or **ESC** key to go to the flash ROM writing screen.



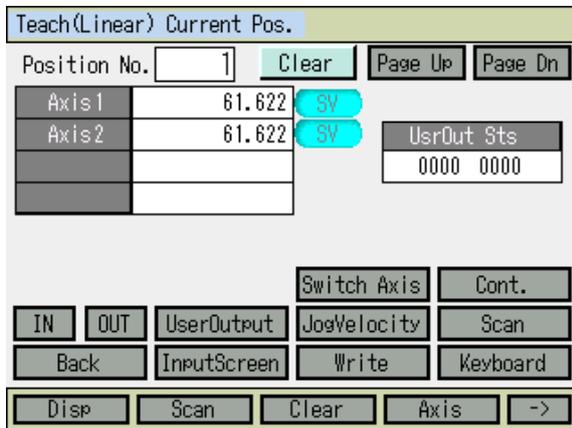
Write the data to Flash ROM  
Touch **Yes** button or press **F1** (Yes) key.



Restart the controller.  
Touch **Yes** button or press **F1** (Yes) key.

- (6) Display the current positions on the teaching screen.  
 After turning the servo ON, execute action check by jogging. (Master axis operation)

Display Transition: **Edit** → **Position** → **Teach(Linear)**



Use **F1** (Disp) key to switch to the current position.  
 To turn the servo ON/OFF, use the **SERVO**, **1-**, **1+**, **2-**, **2+**, **3-**, **3+**, **4-** and **4+** keys.

If the error No. D0A driver overload error, error No. C6B deviation overflow error, error No. CA5 stop deviation overflow error, etc., occurs, check the following items:

- If the current position of the master axis is greatly different from that of the slave axis, setting in (5) may be wrong.
- Confirm that there are no input errors or change omissions as for the parameters below.  
 “Specific-axis parameter No. 65 synchro other axis No.”  
 “Specific-axis parameter No. 83 ABS synchro slave axis coordinate initialization cancel”
- Confirm that slider actions are not restrained.

#### 17.5.4 Standard Procedure Absolute Reset

In the case of “Specific-axis parameter No. 38 encoder ABS/INC type”: master axis = 1 and slave axis = 0:

After “17.5.2 Location Adjustment of Synchro Axes Sliders,” execute a normal absolute reset only for the master axis.

For the operating method, refer to the “17.1 Absolute Reset of the Orthogonal Axis:”

*Note: The synchro axis for which the standard procedure absolute reset has been executed does not have the function of correcting the slider displacement during power OFF after the servo is turned ON.*

## 17.6 How to Perform Pressing Absolute Reset on IX-1000/1200

Have “Pressing Absolute Reset” conducted in case the absolute data is lost in Ultra Large SCARA Robot IX-NNN10040/NNN12040.

Also, in the following cases, have “Stopper Pressing Position Acquirement” before conducting the absolute reset to change the initial posture.

- 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.

Refer below for each procedure.

Item	“Push Type Absolute Reset”	“Stopper pressing position acquirement”
All axes	Conduct “17.6.2.1 Procedures for All Axes in Batch”	Conduct “17.6.1.1 Procedures for All Axes in Batch” and then “17.6.2.1 Procedures for All Axes in Batch”.
Individual axis	Conduct “17.6.2.2 Procedures for Individual Axis”	Conduct “17.6.1.2 Procedures for Individual Axis” and then “17.6.2.2 Procedures for Individual Axis”.
(Applicable Axes)	How to Operate Each Axis Conduct “17.6.2.2 (1) Arm 1 and Arm 2” Conduct “17.6.2.2 (2) Vertical Axis + Rotation Axis”	How to Operate Each Axis Conduct “17.6.1.2 (1) Arm 1 and Arm 2” Conduct “17.6.1.2 (2) Vertical Axis + Rotation Axis”

 **Caution:** “Stopper pressing position acquirement” may not be available in the situation that the absolute reset is required. Have it done while the normal operation can be performed.

[Initial posture]

◎ Arm1, Arm 2

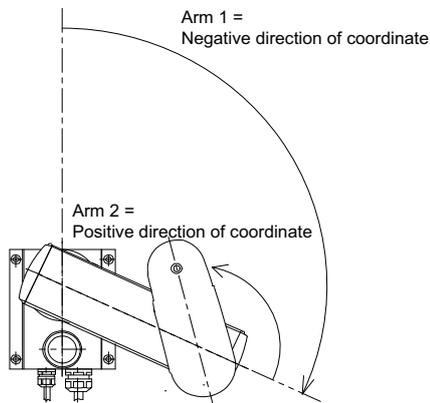
Considering the stopper pressing position, adjust the posture to either of right arm system or left arm system.

When the product is delivered, it is set to the right arm system.

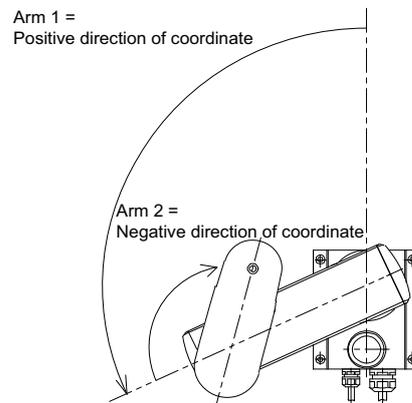
In case the arm interferes with the peripheral in the right arm system, set it to the left arm system in advance, conduct "Push stopper position acquisition" and then adjust to the left arm system.

For the position of the initial posture, have the arm away for 10deg or more from the position where it was pressed to the stopper.

Error No. B0D "Push Stopper Operation Start Position Error" will occur if the arm is too close to the position where it was pressed to the stopper.



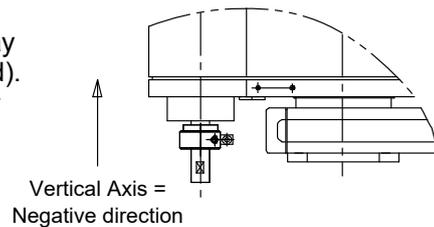
Initial posture of right arm system (At the delivery)  
 Arm 1 = Negative direction of coordinate  
 Arm 2 = Positive direction of coordinate



Initial posture of left arm system  
 Arm 1 = Positive direction of coordinate  
 Arm 2 = Negative direction of coordinate

◎ Vertical Axis

For the position of the initial posture, have the arm away for 10mm or more from the coordinate 0mm (upper end). "Push Stopper Operation Start Position Error" will occur if the arm is too close to the upper end.

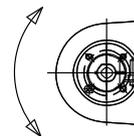


Vertical Axis =  
 Negative direction

◎ Rotation axis

There is no indication in specific for the position of the initial posture of the rotation axis. It can be set at any position.

Rotation axis = Positive direction



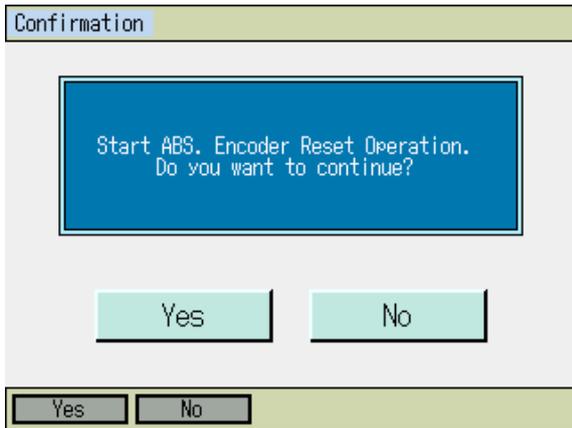
From Bottom

Rotation axis = Negative direction  
 (Pressing direction at delivery)

### 17.6.1 How to Acquire Stopper Pressing Position

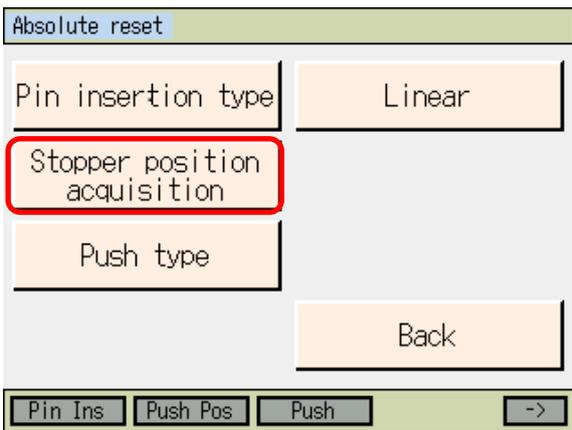
Backup the parameters so that they can be put back anytime to those before changing them. (Go to **File** – **Backup** – **Parameter** in the main menu to open the parameter backup screen and save the file.)

- 1) Select **Absolute Reset** from Controller Menu.



- 2) To have an absolute reset, either touch **Yes** button or press **F1** (Yes) key.

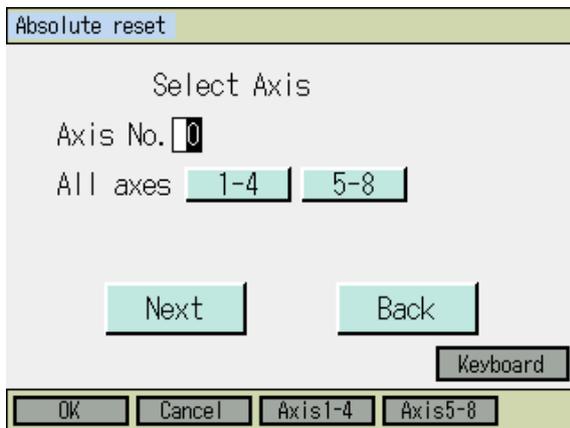
When not to have an absolute reset, either touch **No** button or press **F2** (No) key. The display returns to the previous screen.



- 3) Either touch **Stopper position acquisition** button or press **F2** (Push Pos) key.

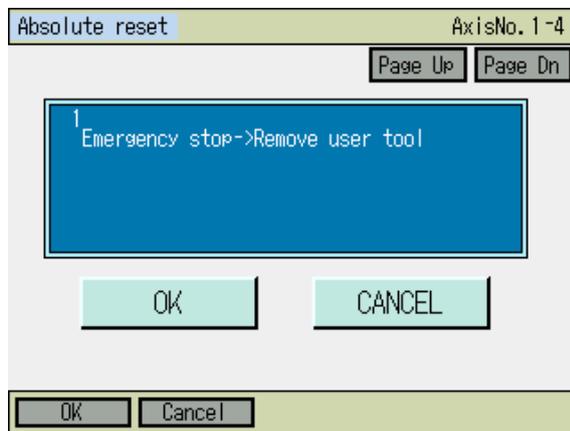
\* There is no **Linear** button equipped in XSEL-RXD/SXD and RAXD/SAXD.

### 17.6.1.1 Procedures for All Axes in Batch



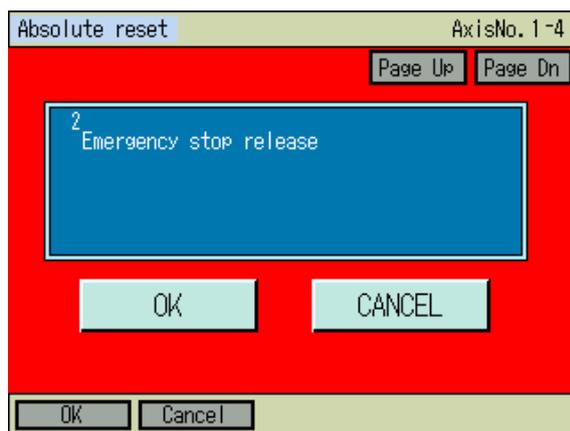
1) Either touch **1-4** or **5-8** button, or press **F3** (Axis 1-4) or **F4** (Axis 5-8) key, and either touch **Next** button or press **F1** (OK) key.

\* There is no **5-8** button and **F4** (Axis 5-8) key equipped in XSEL-RXD/SXD and RAXD/SAXD.

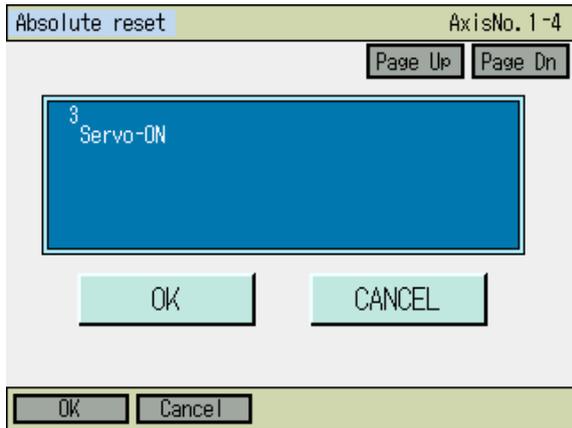


2) Remove user tool  
In case there is a concern of interference during operation, detach the user tool in the emergency stop condition. After detaching, either touch **OK** button or press **F1** (OK) key.

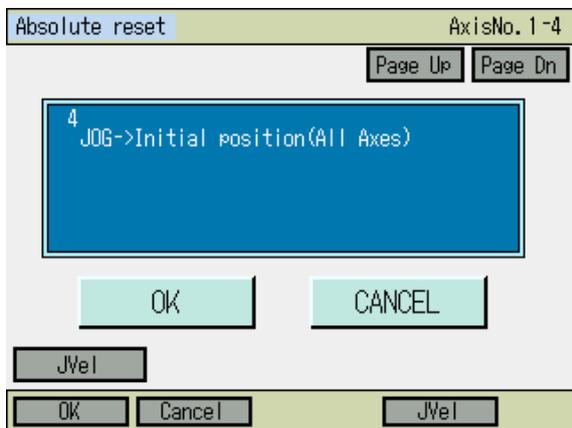
To cancel the process, either touch **CANCEL** button or press **F2** (Cancel) key.



3) Emergency stop release  
If the emergency stop is conducted in the previous section, cancel the emergency stop. (Shown in the figure on the left is the screen for emergency stop)  
Touch **OK** button or press **F1** (OK) key.



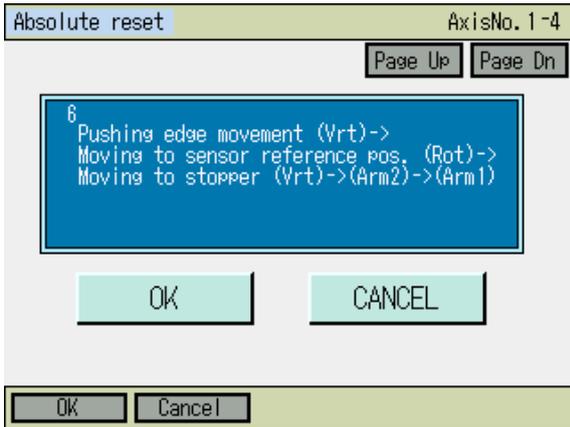
- 4) Align the arm to the initial posture with JOG operation or manually.  
(The initial posture is the position stated in the beginning of 17.6.)
  1. If using JOG operation to align to initial posture  
Either touch **OK** button or press **F1** (OK) key to turn the servo ON.
  2. If aligning to initial posture manually  
Touch **Page Up** button or **PAGEUP** key.



- 5) Moving to Initial Posture
  1. If using JOG operation to align to initial posture  
To avoid interference, use JOG operation to align each axis to the initial posture. Touch **OK** button or press **F1** (OK) key.
  2. If aligning to initial posture manually  
Turn on the emergency stop. Align each axis to the initial posture manually. Turn OFF the emergency stop. Touch **OK** button or press **F1** (OK) key

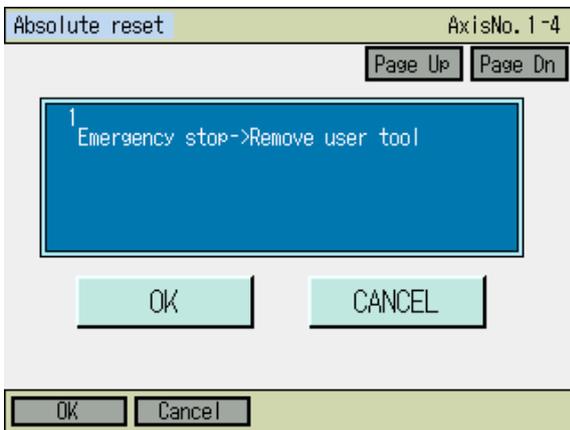


- 6) Selection for Moving Direction of Vertical Axis and Rotation Axis  
It is not necessary to change the moving direction in ordinary use. Make sure to set the vertical axis to the negative side of the coordinate.  
To select the moving direction, either touch on a radio button or press the hardware numeric keys to enter an item number.  
Touch **OK** button or press **F1** (OK) key.

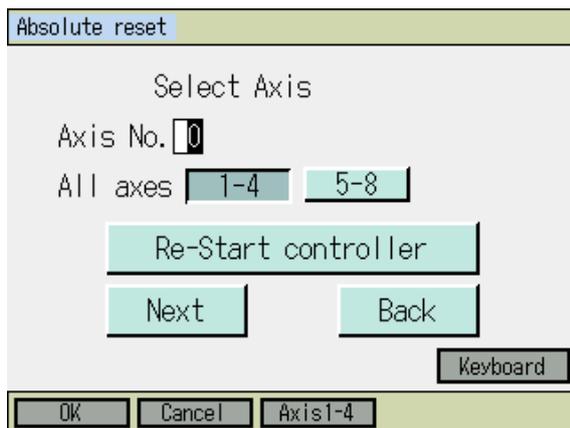


- 7) Acquisition of Stopper Pressing Position / Sensor Datum Position for All Axes  
Touch **OK** button or press **F1** (OK) key.

The axes shift in the order of vertical pressing position movement, rotation axis sensor datum position movement, vertical stopper pressing movement, Arm 2 stopper pressing movement and Arm 1 stopper pressing movement to acquire the pressing position.

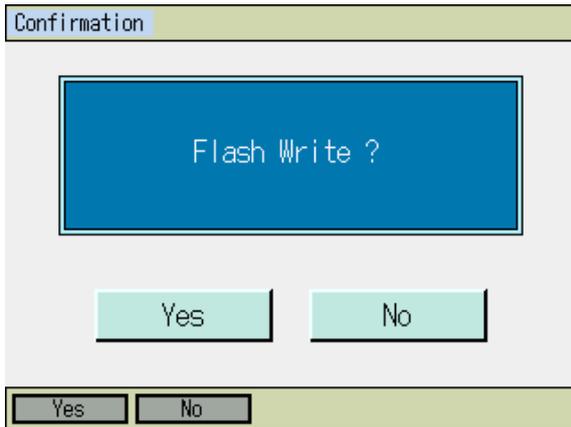


- 8) The screen goes back to the first window once the process is complete.  
Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.

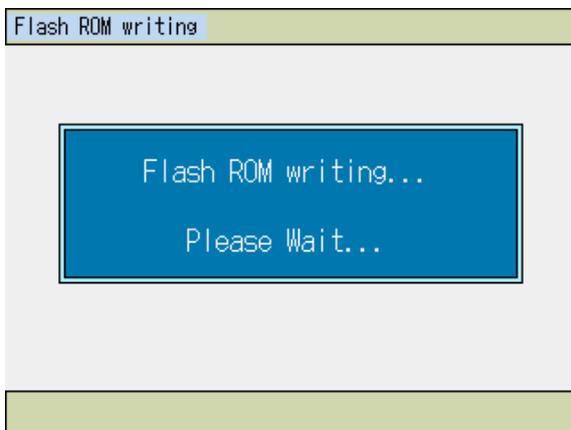


- 9) Touch **Re-Start controller** button or press **ESC** key.

A confirmation window for the flash ROM writing appears.



10) Either touch **Yes** button or press **F1** (Yes) key to start flash ROM writing.



11) While in writing process to flash ROM, the screen.

**Never turn off the power to the Controller at this time.**

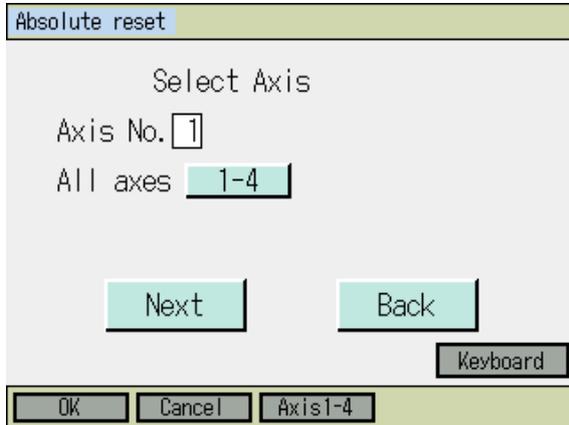


12) Once the flash ROM writing is finished, the screen changes to the window for software reset. Either touch **Yes** button or press **F1** (Yes) key to reflect the pressing position.

After finished, conduct the stopper pressing absolute reset.

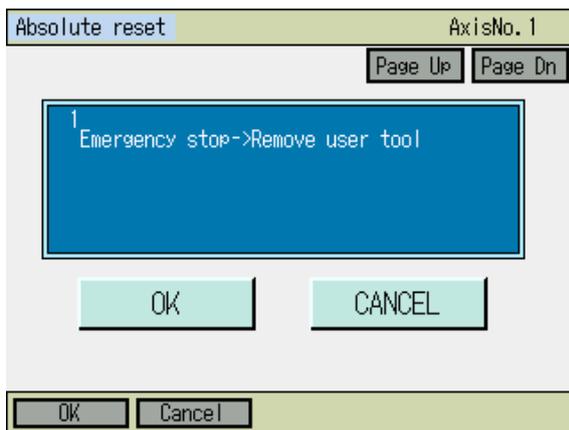
### 17.6.1.2 Procedures for Individual Axis

#### 17.6.1.2 (1) Arm 1 and Arm 2



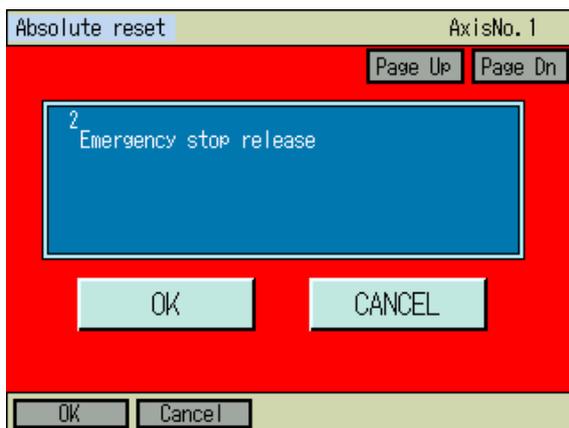
- 1) Input either 1 or 2 (5 or 6) in Axis No. box with using either the software numeric keys or hardware numeric keys, and then touch **Next** button or press **F1** (OK) key.

Shown in the figure on the left is a condition that Arm 1 has been selected in XSEL-RX/SX.

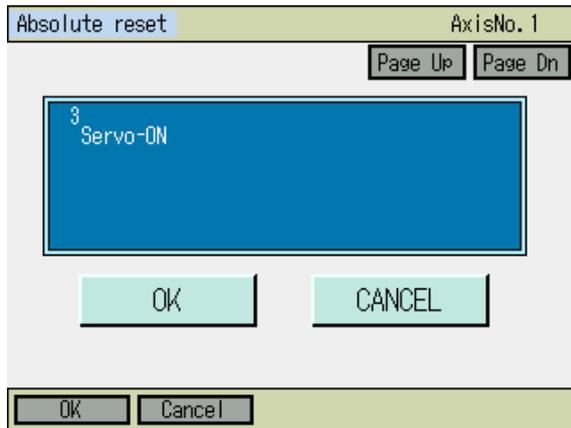


- 2) Remove user tool  
In case there is a concern of interference during operation, detach the user tool in the emergency stop condition. After detaching, either touch **OK** button or press **F1** (OK) key.

To cancel the process, either touch **CANCEL** button or press **F2** (Cancel) key.



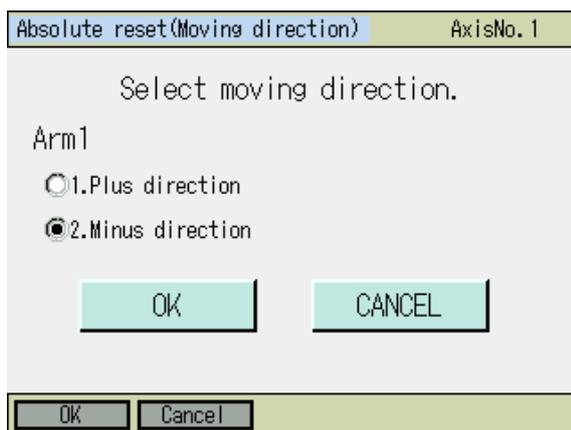
- 3) Emergency stop release  
If the emergency stop is conducted in the previous section, cancel the emergency stop. (Shown in the figure on the left is the screen for emergency stop)  
Touch **OK** button or press **F1** (OK) key.



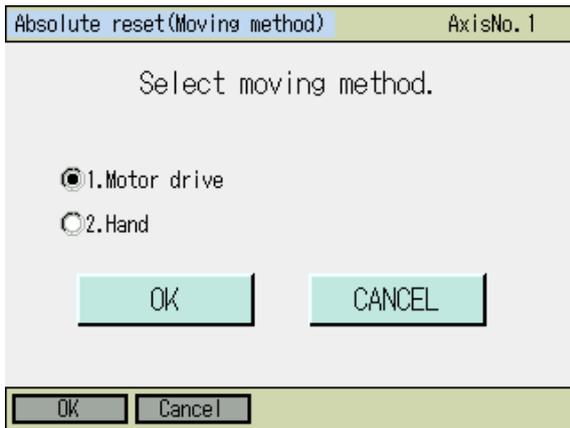
- 4) Align the arm to the initial posture with JOG operation or manually.  
(The initial posture is the position stated in the beginning of 17.6.)
  1. If using JOG operation to align to initial posture  
Either touch **OK** button or press **F1** (OK) key to turn the servo ON.
  2. If aligning to initial posture manually  
Touch **Page Up** button or press **PAGEUP** key.



- 5) Moving to Initial Posture
  1. If using JOG operation to align to initial posture  
To avoid interference, use JOG operation to align each axis to the initial posture.  
Touch **OK** button or press **F1** (OK) key.
  2. If aligning to initial posture manually  
Turn ON the emergency stop. Align each axis to the initial posture manually. Turn OFF the emergency stop.  
Touch **OK** button or press **F1** (OK) key.



- 6) Selection for Moving Direction of Arm 1 (2)  
The vicinity stopper position direction is selected as the moving direction in the initial setting.  
To select the moving direction, either touch on a radio button or press the hardware numeric keys to enter an item number.  
Touch **OK** button or press **F1** (OK) key.

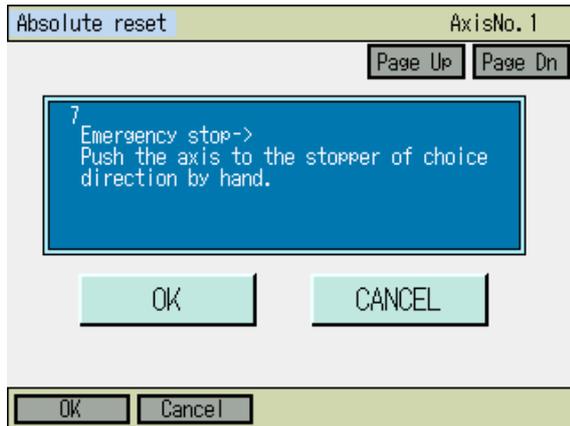


- 7) Selection for Moving Direction of Arm 1 (2)
  1. If conducting with motor drive  
Either touch the radio button for motor drive or press 1 in the hardware numeric keys.  
Touch **OK** button or press **F1** (OK) key.
  2. If conducting manually  
Either touch the **radio** button for manual (hand) or press 2 in the hardware numeric keys.  
Touch **OK** button or press **F1** (OK) key.

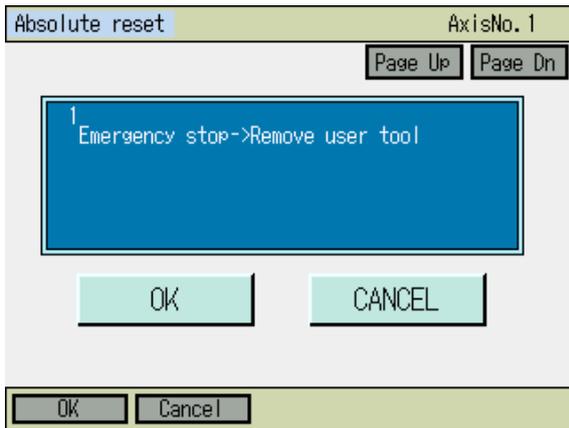
*Note: Either touch **CANCEL** button or press **F2** (Cancel) key to finish the absolute reset.*



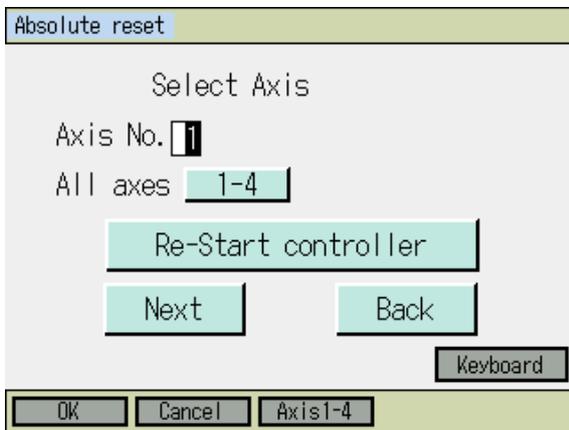
- 8) Stopper Pressing Position of Arm 1 (2) (in motor drive)  
Touch **OK** button or press **F1** (OK) key.  
Arm 1 or 2 moves for stopper pressing and acquire the pressing position.



- 9) Stopper Pressing Position of Arm 1 (2) (in hand operation)  
Turn ON the emergency stop, and have the stopper pressing of Arm 1 or 2 manually by hand.  
Touch **OK** button or press **F1** (OK) key.

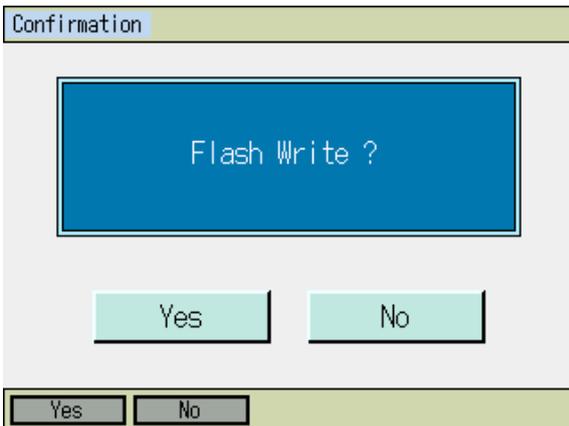


10) The screen goes back to the initial window once it is finished.  
Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.

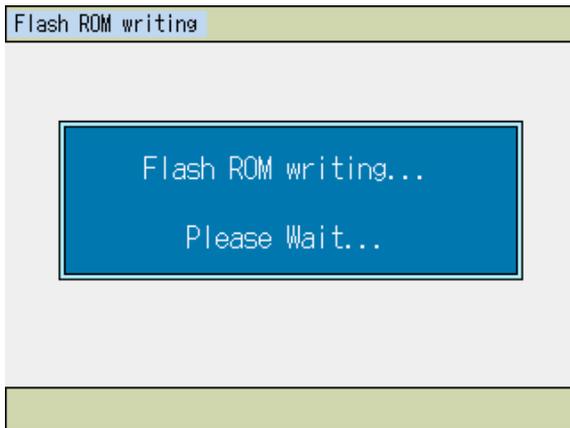


11) Touch **Re-Start controller** button or press **ESC** key.

A confirmation window for the flash ROM writing appears.

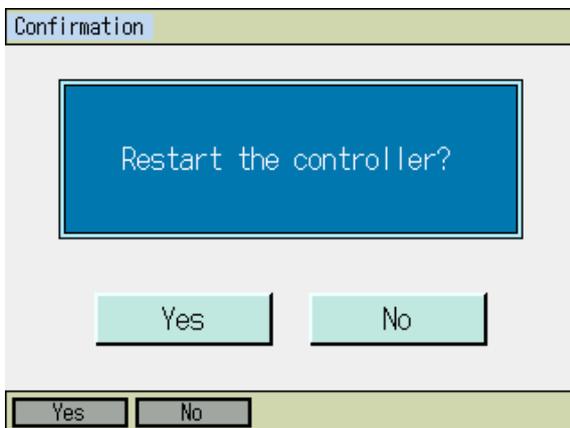


12) Either touch **Yes** button or press **F1** (Yes) key to start flash ROM writing.



13) While in writing process to flash ROM, the screen.

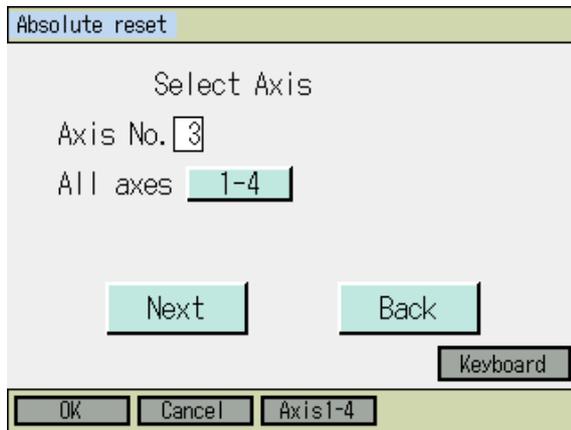
**Never turn off the power to the Controller at this time.**



14) Once the flash ROM writing is finished, the screen changes to the window for software reset. Either touch **Yes** button or press **F1** (Yes) key to reflect the pressing position.

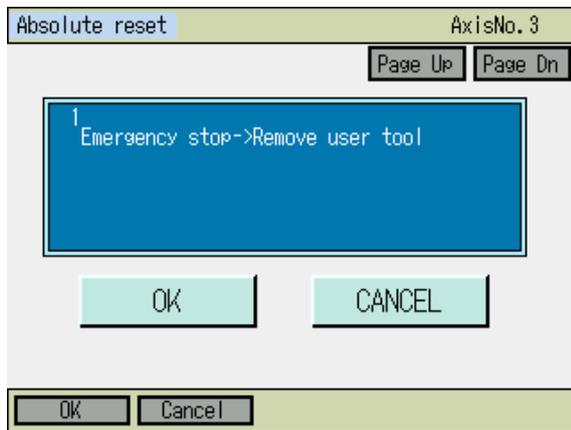
After finished, conduct the stopper pressing absolute reset.

### 17.6.1.2 (2) Vertical Axis + Rotation Axis



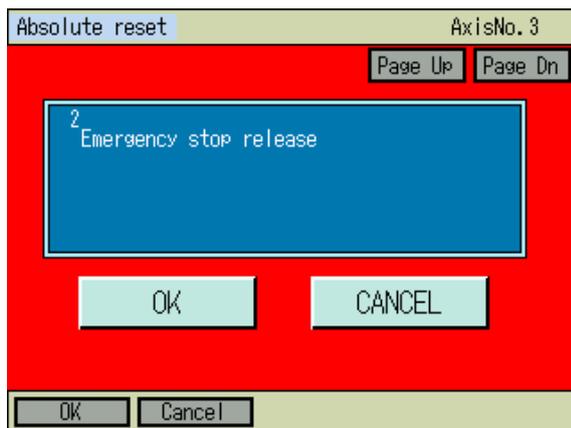
- 1) Input either 3 or 7 (7 for XSEL-RXD/SXD and RAXD/SAXD only) in Axis No. box with using either the software numeric keys or hardware numeric keys, and then either touch **Next** button or press **F1** (OK) key.

Shown in the figure on the left is a condition that vertical axis + rotation axis are selected in XSEL-RX/SX.

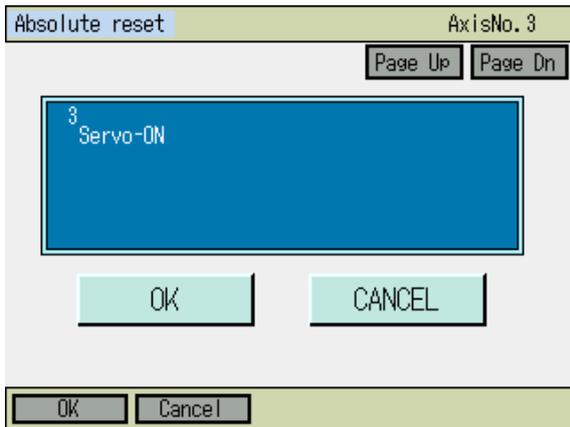


- 2) Remove user tool  
In case there is a concern of interference during operation, detach the user tool in the emergency stop condition. After detaching, either touch **OK** button or press **F1** (OK) key.

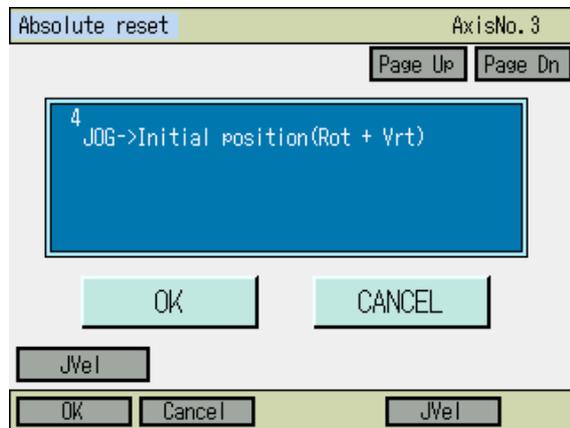
To cancel the process, either touch **CANCEL** button or press **F2** (Cancel) key.



- 3) Emergency stop release  
If the emergency stop is conducted in the previous section, cancel the emergency stop. (Shown in the figure on the left is the screen for emergency stop)  
Touch **OK** button or press **F1** (OK) key.



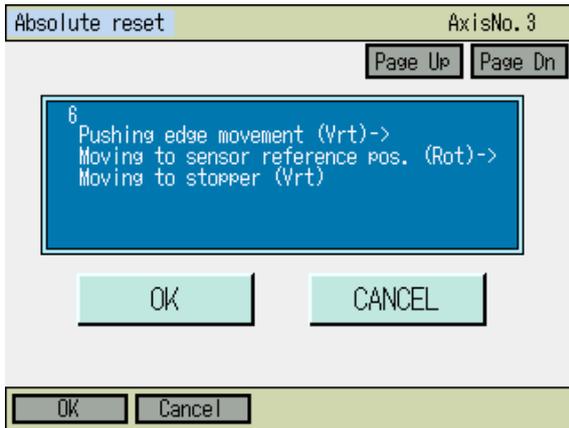
- 4) Align the arm to the initial posture with JOG operation or manually.  
(The initial posture is the position stated in the beginning of 17.6.)
  1. If using JOG operation to align to initial posture  
Either touch **OK** button or press **F1** (OK) key to turn the servo ON.
  2. If aligning to initial posture manually  
Touch **Page Up** button or press **PAGEUP** key.



- 5) Moving to Initial Posture
  1. If using JOG operation to align to initial posture  
To avoid interference, use JOG operation to align the vertical axis and rotary axis to the initial posture.  
Touch **OK** button or press **F1** (OK) key.
  2. If aligning to initial posture manually  
Turn ON the emergency stop. Align the vertical axis and rotary axis to the initial posture manually. Turn OFF the emergency stop.  
Touch **OK** button or press **F1** (OK) key.

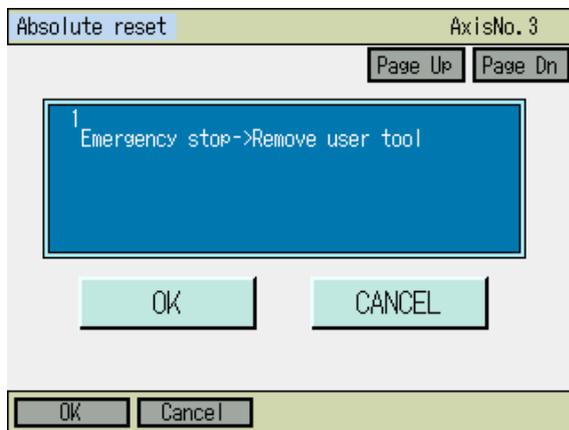


- 6) Selection for Moving Direction of Vertical Axis and Rotation Axis  
The vicinity stopper position direction is selected as the moving direction in the initial setting.  
To select the moving direction, either touch on a radio button or press the hardware numeric keys to enter an item number.  
Touch **OK** button or press **F1** (OK) key.

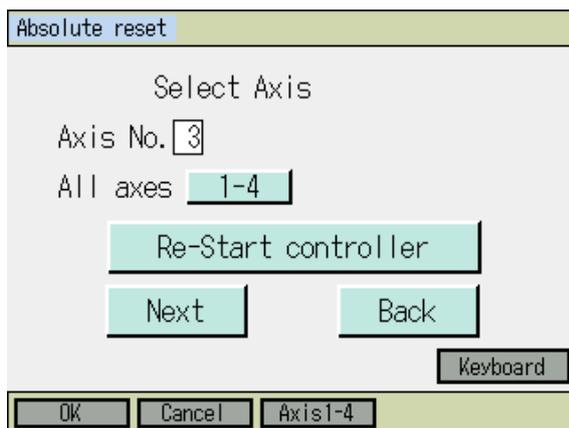


- 7) Acquirement of Stopper Pressing Position / Sensor Datum Position  
Touch **OK** button or press **F1** (OK) key.

The axes shift in the order of vertical pressing position movement, rotation axis sensor datum position movement, vertical stopper pressing movement and to acquire the pressing position.

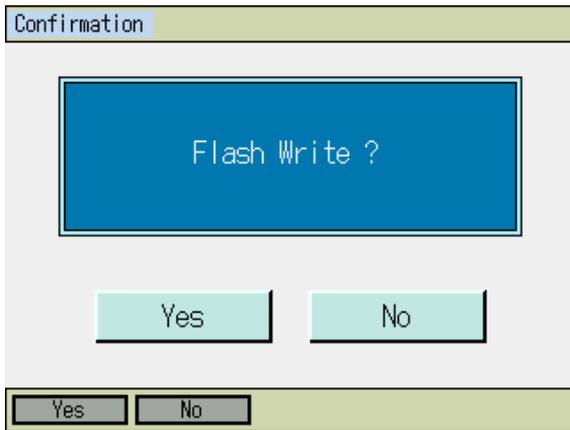


- 8) The screen goes back to the initial window once it is finished.  
Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.

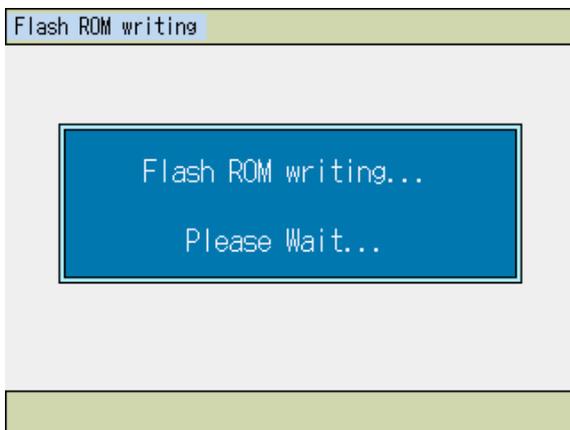


- 9) Touch **Re-Start controller** button or press **ESC** key.

A confirmation window for the flash ROM writing appears.



10) Either touch **Yes** button or press **F1** (Yes) key to start flash ROM writing.



11) While in writing process to flash ROM, the screen.

**Never turn off the power to the Controller at this time.**



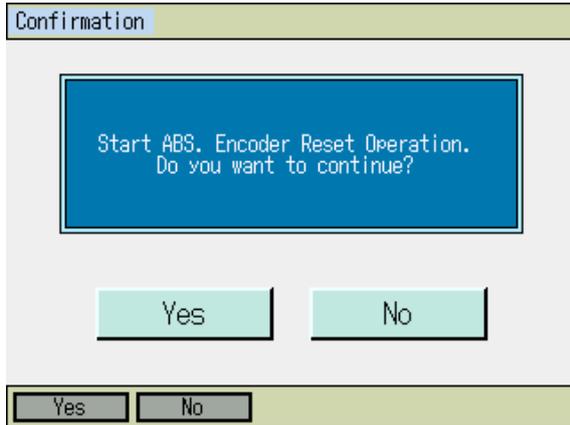
12) Once the flash ROM writing is finished, the screen changes to the window for software reset. Either touch **Yes** button or press **F1** (Yes) key to reflect the pressing position.

After finished, conduct the stopper pressing absolute reset.

## 17.6.2 How to Conduct Stopper Pressing Absolute Reset

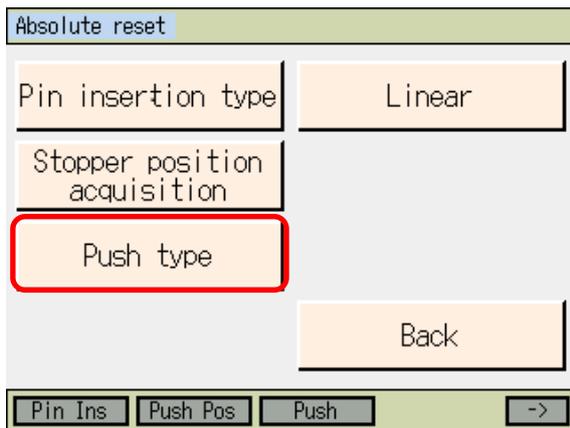
Backup the parameters so that they can be put back anytime to those before changing them. (Go to **File** – **Backup** – **Parameter** in the main menu to open the parameter backup screen and save the file.)

- 1) Select **Absolute Reset** from Controller Menu.



- 2) Touch **Yes** button or press **F1** (Yes) key to conduct the absolute reset.

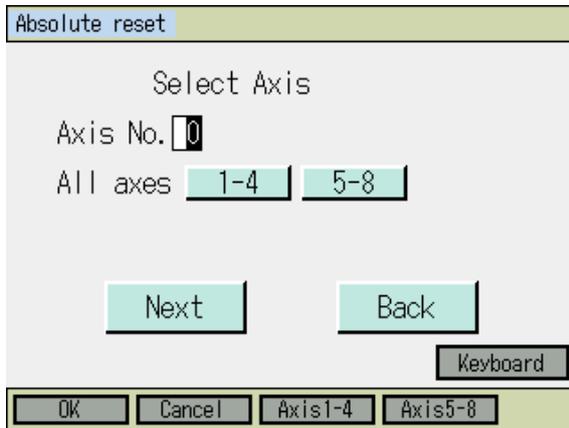
If the absolute reset is not required, touch **No** button or press **F2** (No) key. The screen goes back to the previous window.



- 3) Touch **Push type** button or press **F3** (Push) key.

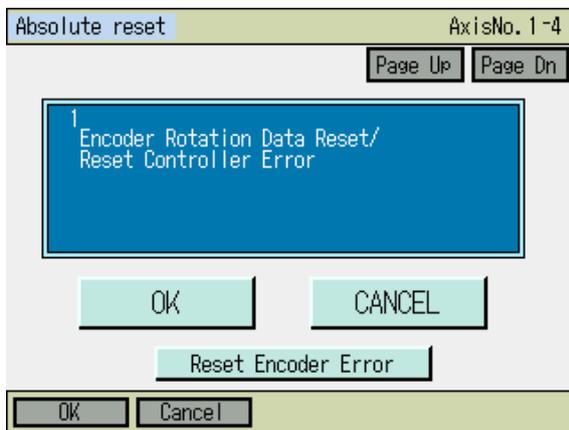
\* There is no **Linear** button equipped in XSEL-RXD/SXD and RAXD/SAXD.

### 17.6.2.1 Procedures for All Axes in Batch

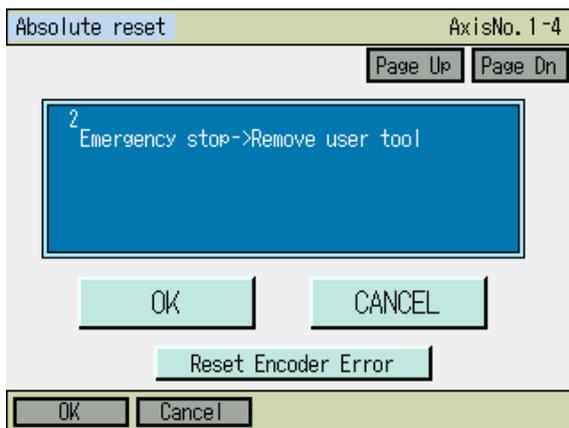


1) Either touch **1-4** or **5-8** button, or press **F3** (Axis 1-4) or **F4** (Axis 5-8) keys, and either touch **Next** button or press **F1** (OK) key.

\* There is no **5-8** button and **F4** (Axis 5-8) key equipped in XSEL-RXD/SXD and RAXD/SAXD.

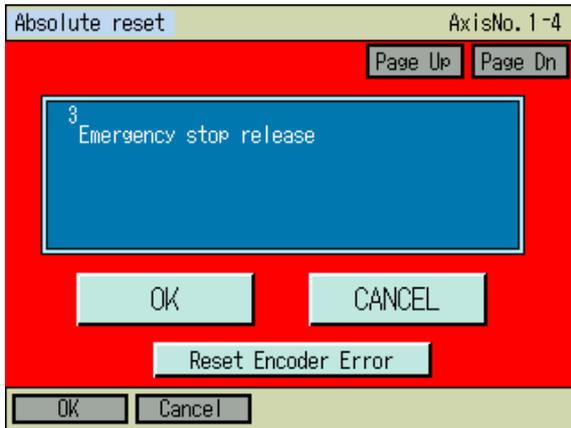


2) Encoder Rotation Data Reset / Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.

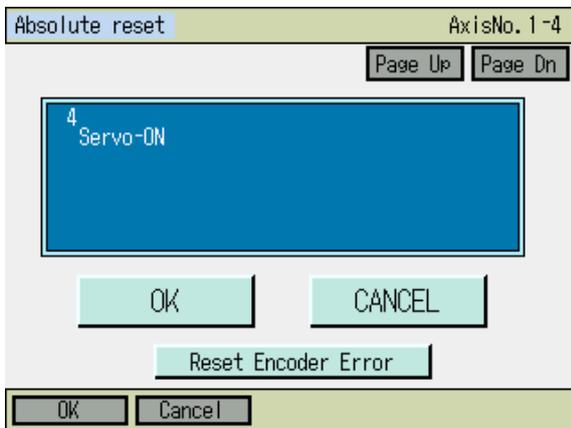


3) Remove user tool  
In case there is a concern of interference during operation, detach the user tool in the emergency stop condition.  
After detaching, either touch **OK** button or press **F1** (OK) key.

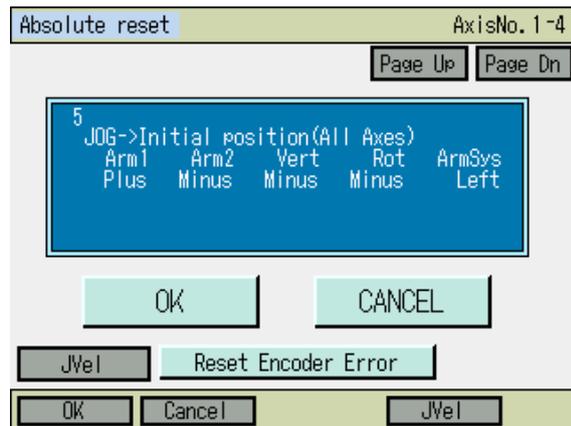
To cancel the process, either touch **CANCEL** button or press **F2** (Cancel) key.



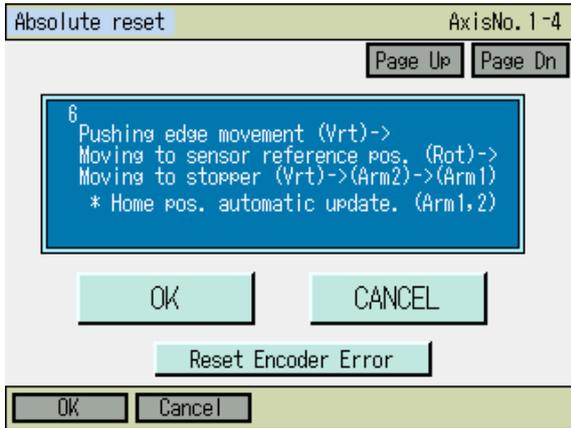
- 4) Emergency stop release  
 If the emergency stop is conducted in the previous section, cancel the emergency stop. (Shown in the figure on the left is the screen for emergency stop)  
 Touch **OK** button or press **F1** (OK) key.



- 5) Align the arm to the initial posture with JOG operation or manually.  
 (The initial posture is the position stated in the beginning of 17.6.)
1. If using JOG operation to align to initial posture  
 Either touch **OK** button or press **F1** (OK) key to turn the servo on.
  2. If aligning to initial posture manually  
 Touch **Page Up** button or press **PAGEUP** key.

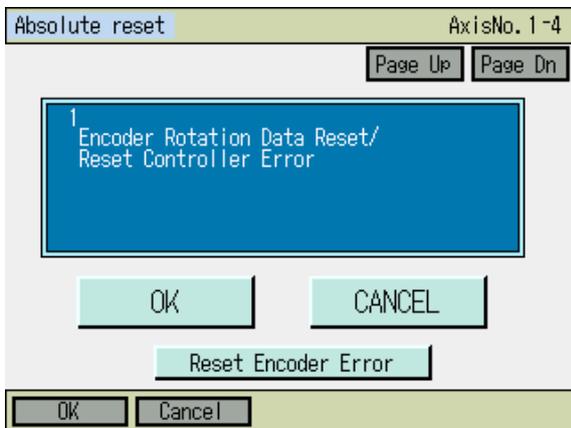


- 6) Moving to Initial Posture
1. If using JOG operation to align to initial posture  
 To avoid interference, use JOG operation to align each axis to the initial posture.  
 Touch **OK** button or press **F1** (OK) key.
  2. If aligning to initial posture manually  
 Turn ON the emergency stop. To avoid interference, align each axis to the initial posture manually. Turn OFF the emergency stop.  
 Touch **OK** button or press **F1** (OK) key.
- \* With the operation in Step 7), each axis moves to the direction shown in this screen.

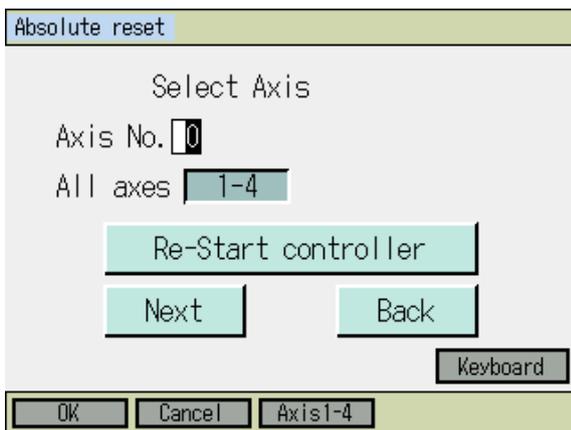


- 7) Stopper Pressing Absolute Reset on All Axes  
Touch **OK** button or press **F1** (OK) key.

The axes shift in the order of vertical pressing position movement, rotation axis sensor datum position movement, vertical stopper pressing movement, Arm 2 stopper pressing movement and Arm 1 stopper pressing movement.



- 8) The screen goes back to the initial window once it is finished.  
Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.

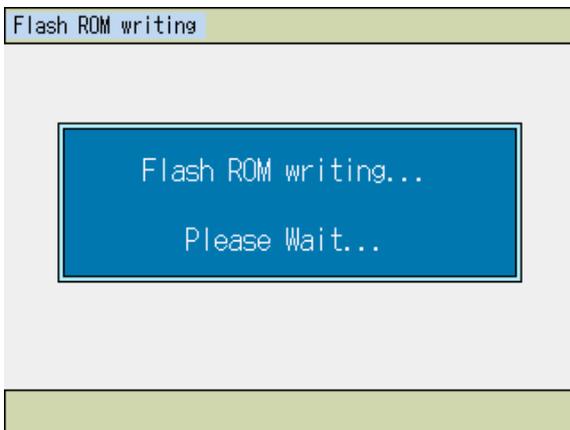


- 9) Touch **Re-Start controller** button or press **ESC** key.

A confirmation window for the flash ROM writing appears.



10) Either touch **Yes** button or press **F1** (Yes) key to start flash ROM writing.



11) While in writing process to flash ROM, the screen.

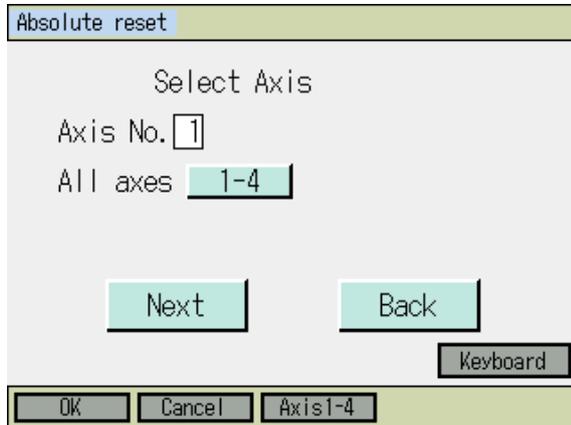
***Never turn off the power to the Controller at this time.***



12) Once the flash ROM writing is finished, the screen changes to the window for software reset.  
Touch **Yes** button or press **F1** (Yes) key.

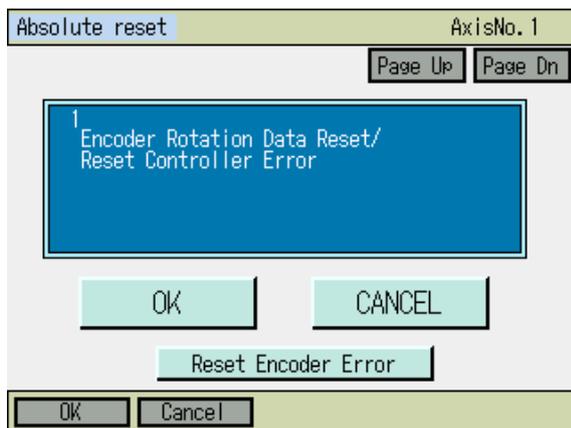
## 17.6.2.2 Procedures for Individual Axis

### 17.6.2.2 (1) Arm 1 and Arm 2

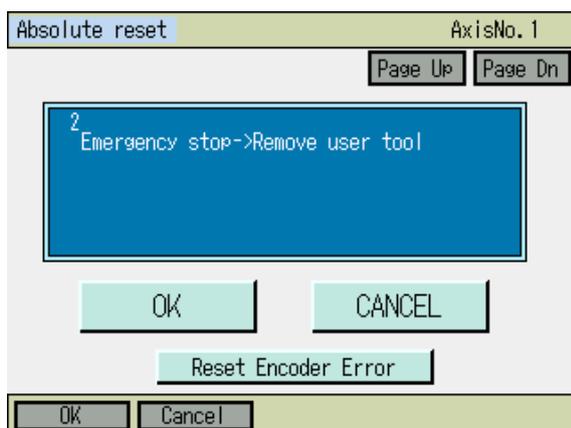


- 1) Input either 1 or 2 (5 or 6) in Axis No. box with using either the software numeric keys or hardware numeric keys, and then touch **Next** button or press **F1** (OK) key.

Shown in the figure on the left is a condition that Arm 1 has been selected in XSEL-RX/SX.

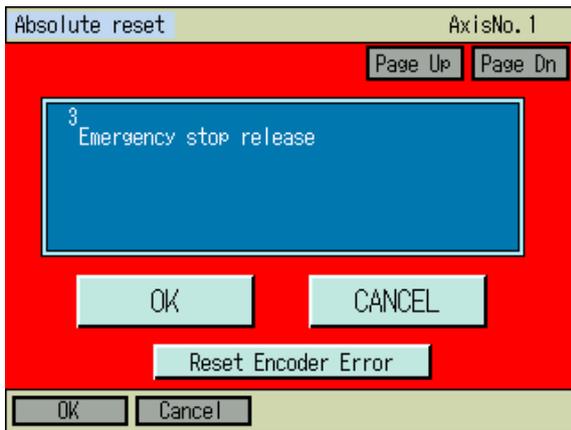


- 2) Encoder Rotation Data Reset / Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.

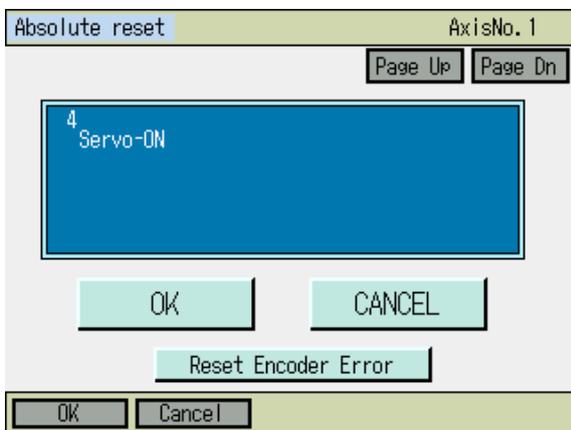


- 3) Remove user tool  
In case there is a concern of interference during operation, detach the user tool in the emergency stop condition.  
After detaching, either touch **OK** button or press **F1** (OK) key.

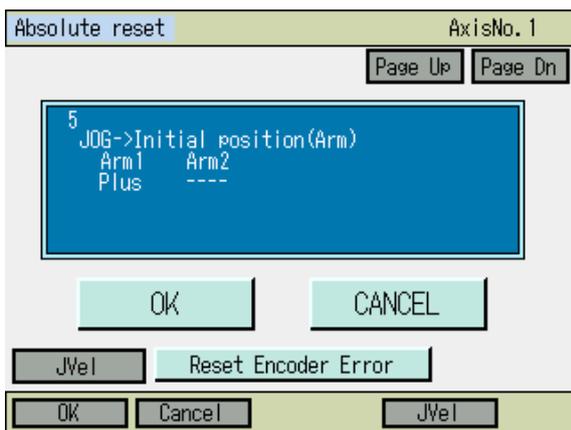
To cancel the process, either touch **CANCEL** button or press **F2** (Cancel) key.



- 4) Emergency stop release  
If the emergency stop is conducted in the previous section, cancel the emergency stop. (Shown in the figure on the left is the screen for emergency stop)  
Touch **OK** button or press **F1** (OK) key.

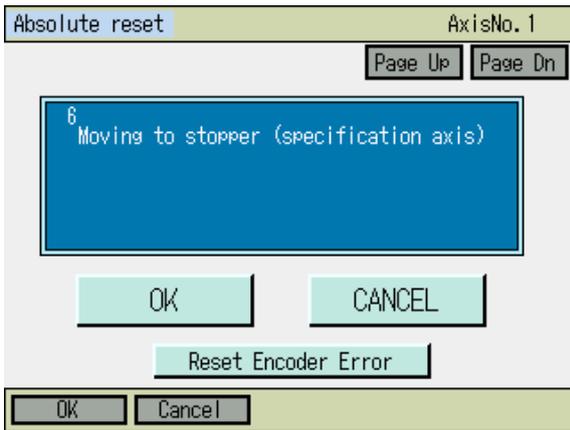


- 5) Align the arm to the initial posture with JOG operation or manually.  
(The initial posture is the position stated in the beginning of 17.6.)
  1. If using JOG operation to align to initial posture  
Either touch **OK** button or press **F1** (OK) key to turn the servo ON.
  2. If aligning to initial posture manually  
Touch **Page Up** button or press **PAGEUP** key.



- 6) Moving to Initial Posture
  1. If using JOG operation to align to initial posture  
To avoid interference, use JOG operation to align Arm 1 (2) to the initial posture.  
Touch **OK** button or press **F1** (OK) key.
  2. If aligning to initial posture manually  
Turn ON the emergency stop. To avoid interference, align indicated axis to the initial posture manually. Turn OFF the emergency stop.  
Touch **OK** button or press **F1** (OK) key.

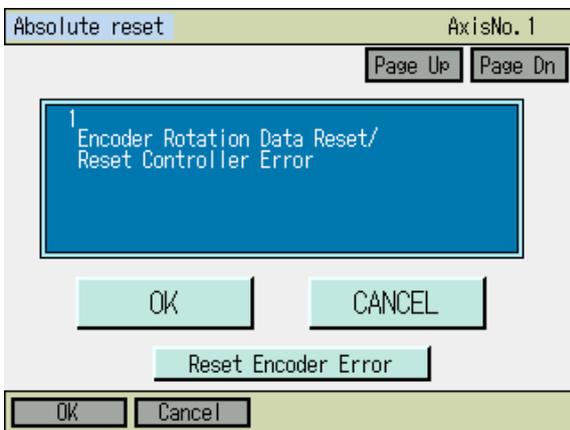
\* With the operation in Step 7), the axis moves to the direction shown in this screen.



- 7) Stopper Pressing Absolute Reset on Indicated Axis

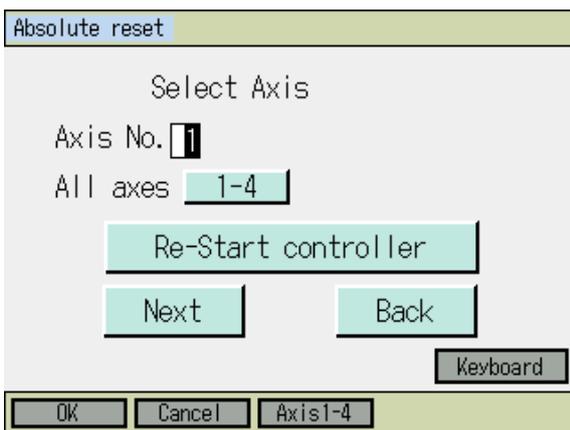
Touch **OK** button or press **F1** (OK) key.

Arm 1 (2) moves for stopper pressing.



- 8) The screen goes back to the initial window once it is finished.

Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.

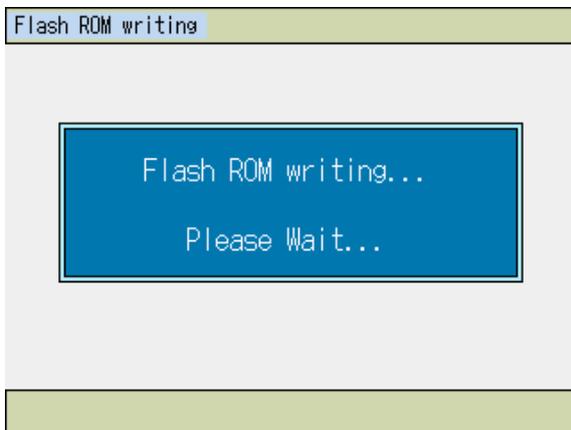


- 9) Touch **Re-Start controller** button or press **ESC** key.

A confirmation window for the flash ROM writing appears.



10) Either touch **Yes** button or press **F1** (Yes) key to start flash ROM writing.



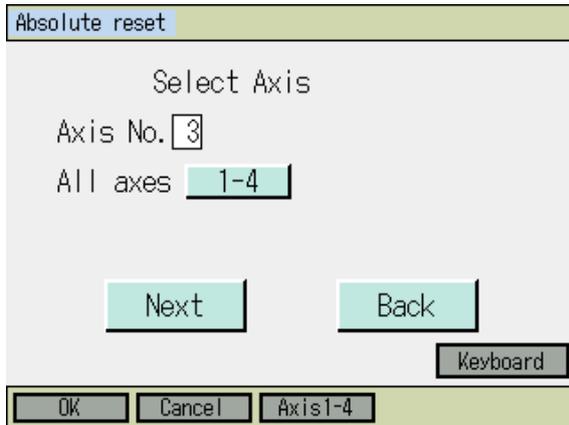
11) While in writing process to flash ROM, the screen.

**Never turn off the power to the Controller at this time.**



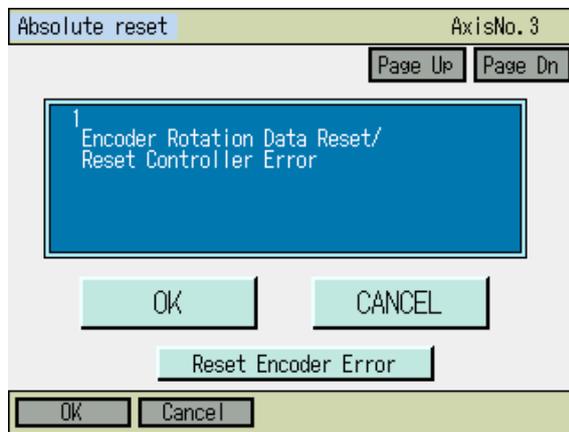
12) Once the flash ROM writing is finished, the screen changes to the window for software reset.  
Touch **Yes** button or press **F1** (Yes) key.

### 17.6.2.2 (2) Vertical Axis + Rotation Axis

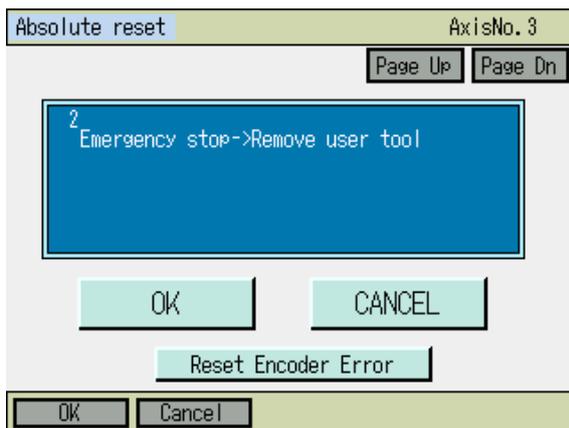


- 1) Input either 3 or 7 (7 for XSEL-RXD/SXD and RAXD/SAXD only) in Axis No. box with using either the software numeric keys or hardware numeric keys, and then either touch **Next** button or press **F1** (OK) key.

Shown in the figure on the left is a condition that vertical axis + rotation axis are selected.

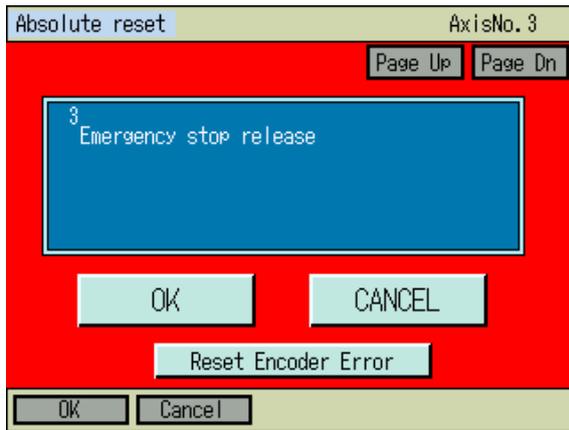


- 2) Encoder Rotation Data Reset / Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.

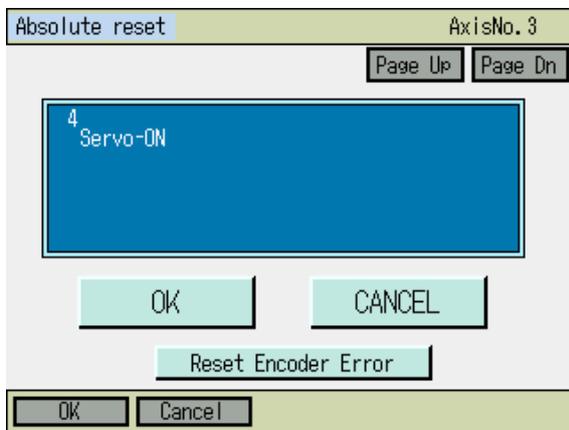


- 3) Remove user tool  
In case there is a concern of interference during operation, detach the user tool in the emergency stop condition.  
After detaching, either touch **OK** button or press **F1** (OK) key.

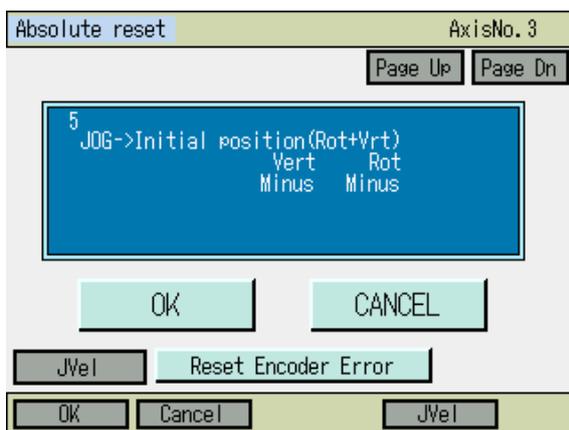
To cancel the process, either touch **CANCEL** button or press **F2** (Cancel) key.



- 4) **Emergency stop release**  
 If the emergency stop is conducted in the previous section, cancel the emergency stop. (Shown in the figure on the left is the screen for emergency stop)  
 Touch **OK** button or press **F1** (OK) key.

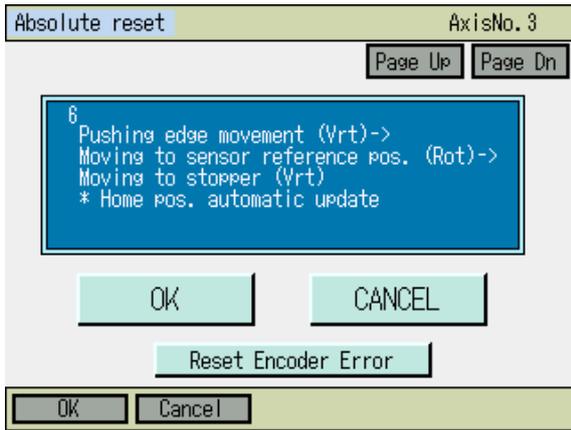


- 5) **Align the arm to the initial posture with JOG operation or manually.**  
 (The initial posture is the position stated in the beginning of 17.6.)
1. **If using JOG operation to align to initial posture**  
 Either touch **OK** button or press **F1** (OK) key to turn the servo ON.
  2. **If aligning to initial posture manually**  
 Touch **Page Up** button or press **PAGEUP** key.



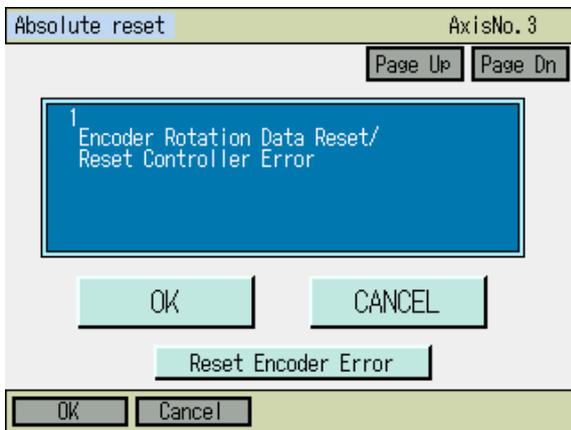
- 6) **Moving to Initial Posture**
1. **If using JOG operation to align to initial posture**  
 To avoid interference, use JOG operation to align the vertical axis and rotary axis to the initial posture.  
 Touch **OK** button or press **F1** (OK) key.
  2. **If aligning to initial posture manually**  
 Turn ON the emergency stop. To avoid interference, align each axis to the initial posture manually. Turn OFF the emergency stop.  
 Touch **OK** button or press **F1** (OK) key.

\* With the operation in Step 7), the axis moves to the direction shown in this screen.

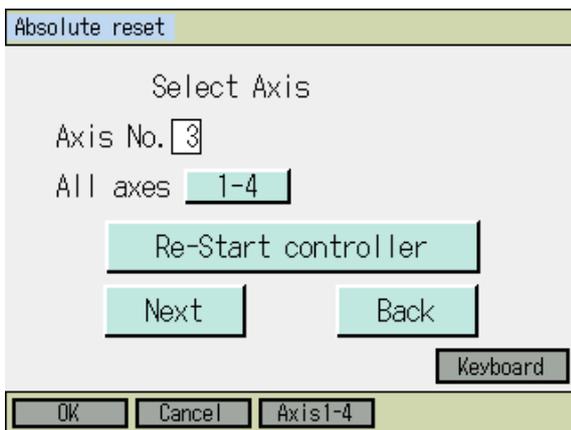


- 7) Stopper Pressing Absolute Reset on Vertical and Rotation Axes  
Touch **OK** button or press **F1** (OK) key.

The axes shift in the order of vertical pressing end movement, rotation axis sensor datum position movement and vertical stopper pressing movement.



- 8) The screen goes back to the initial window once it is finished.  
Either touch **CANCEL** button, or press **F2** (Cancel) or **ESC** key.

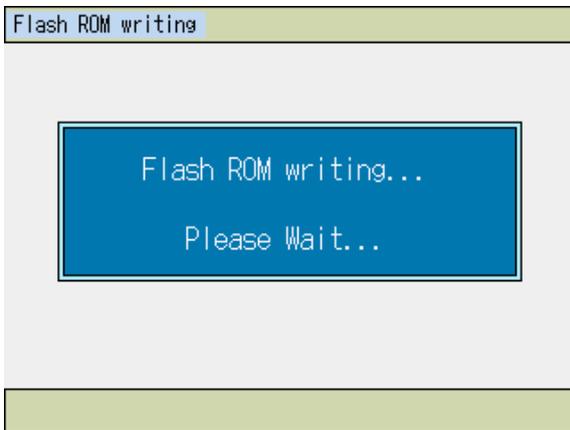


- 9) Touch **Re-Start controller** button or press **ESC** key.

A confirmation window for the flash ROM writing appears.



10) Either touch **Yes** button or press **F1** (Yes) key to start flash ROM writing.



11) While in writing process to flash ROM, the screen.

**Never turn off the power to the Controller at this time.**

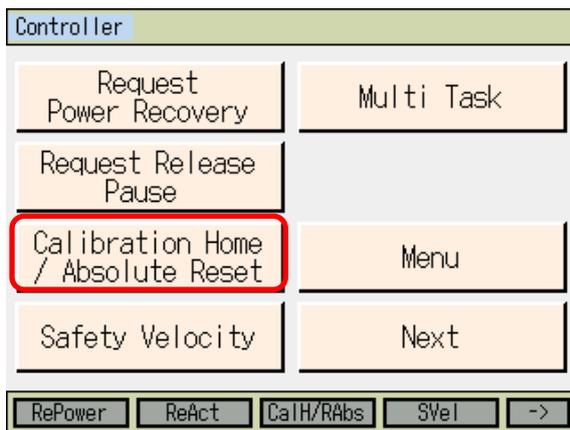


12) Once the flash ROM writing is finished, the screen changes to the window for software reset.  
Touch **Yes** button or press **F1** (Yes) key.

## 17.7 How to Home Adjustment / Absolute Reset on MSEL-PCX/PGX/PC/PG /PCF/PGF and PSEL<sup>(\*1)</sup>

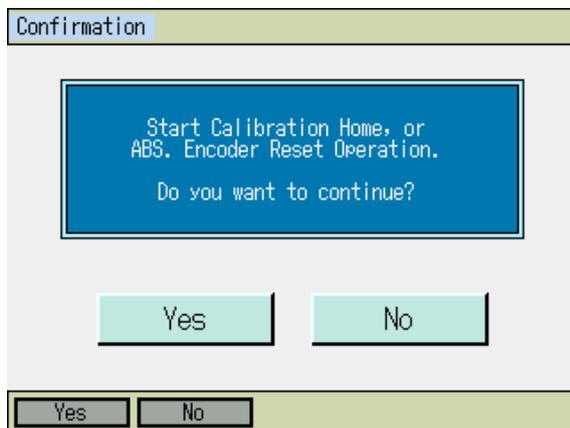
\*1 When TB-01 (SEL system) application part version is Ver1.60 and later  
 Refer to "17.8 Absolute Reset of the Orthogonal Axis: PSEL Controller" if the application part version is Ver1.60 or earlier.

Backup the parameters so that they can be put back anytime to those before changing them.  
 (Go to **File** – **Backup** – **Parameter** in the main menu to open the parameter backup screen and save the file.)



1) Select **Calibration Home / Absolute Reset** from Controller Menu.

\* Depending on the controller, **Absolute Reset** may be displayed. In such case, select it.



2) Either touch **Yes** button or press **F1** (Yes) key to conduct home adjustment / absolute reset. If the absolute reset is not required, touch **No** button or press **F2** (No) key. The screen goes back to the previous window.

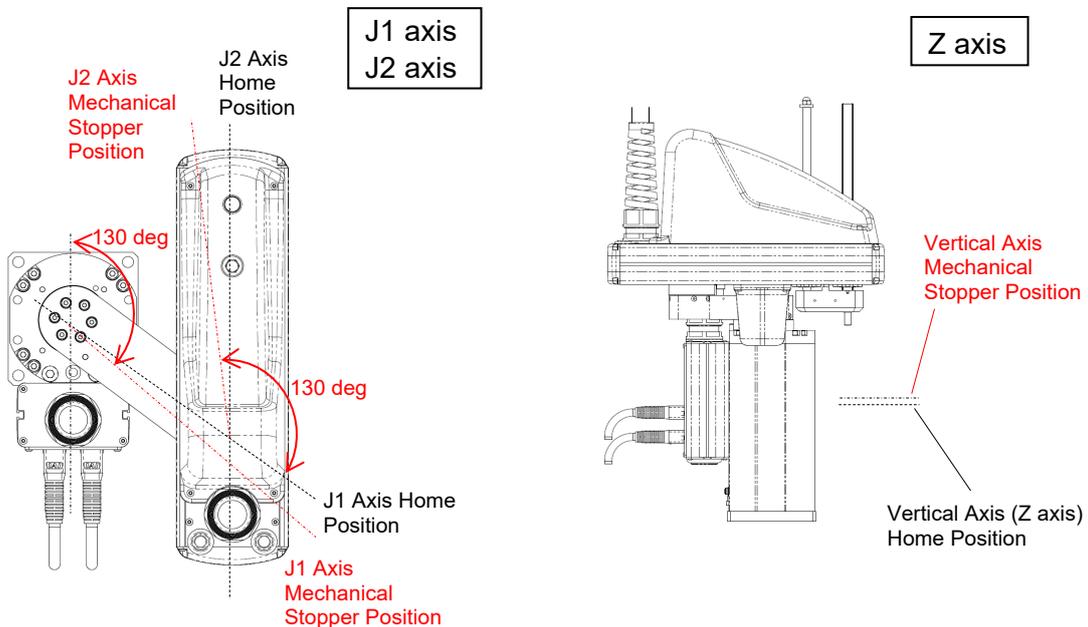
It is available to perform operation on SCARA Robot without having anything special as an absolute reset has already been conducted before delivered out from our factory. It is necessary to have an absolute reset when an absolute error generates or the robot is dismantled for such a reason as motor replacement work.

**Caution:** *In case of not having the absolute reset conducted, it may cause malfunction of the robot or a critical operational error.*

The way to have the home adjustment / absolute reset differs depending on the axis types. (It will be selected automatically considering the specifications of the axis.) Refer to each chapter for details.

Model of the Robot	3N3515-WA / 3N4515-WA (3-axis Absolute Type)	4N3515-WA / 4N4515-WA (4-axis Absolute Type)
J1 axis	17.7.1.1 Calibration Home / Absolute reset	17.7.1.1 Calibration Home / Absolute reset
J2 axis	17.7.1.1 Calibration Home / Absolute reset	17.7.1.1 Calibration Home / Absolute reset
Z axis	17.7.2.1 Absolute reset	17.7.2.1 Absolute reset
R axis		17.7.1.1 Calibration Home / Absolute reset
Added Axis	17.7.2.1 Absolute reset	

[Home position]

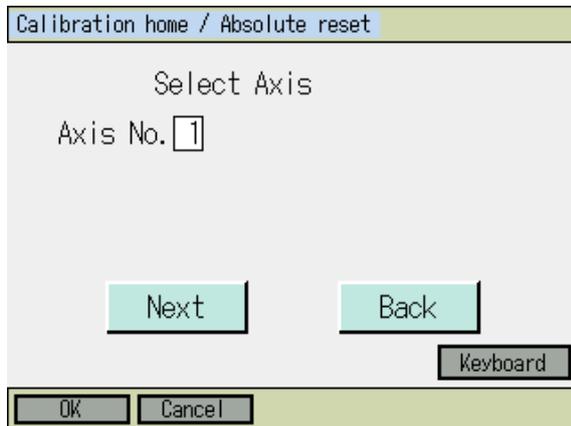


**Caution:** *Home-return operation is to have the actuator pressed against the mechanical stopper. Make sure that the home-return posture shown in the figure above can be performed at the standard home position or that there is no interference to peripheral devices during home-return operation.*

## 17.7.1 SCARA J1, J2 and R Axes

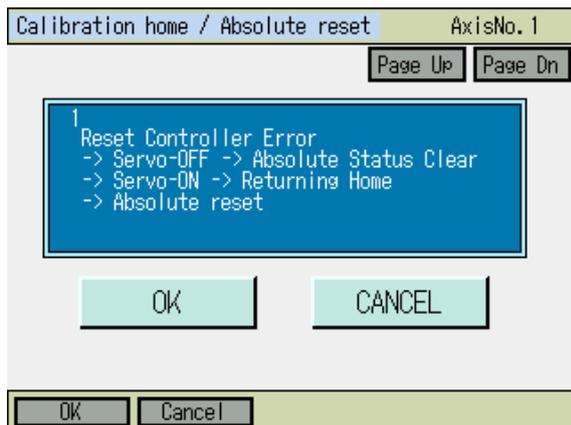
### 17.7.1.1 How to Home Adjustment / Absolute Reset

Have the absolute reset and home adjustment (home preset automatic update) conducted with the following steps for SCARA J1, J2 and R axes.



- 1) Input a number in Axis No. box with using either the software numeric keys or hardware numeric keys, and then either touch **Next** button or press **F1** (OK) key.

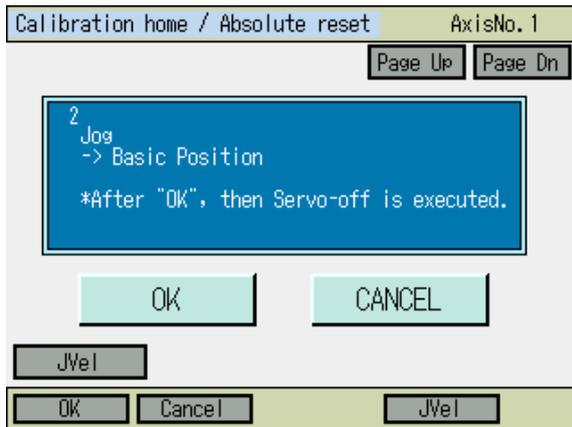
\* 1, 2 or 4 for 4-axis SCARA and 1 or 2 for 3-axis SCARA is available to indicate. (1: J1 axis, 2: J2 axis, 4: R axis)



- 2) Home-Return Operation and Absolute Reset Touch **OK** button or press **F1** (OK) key.

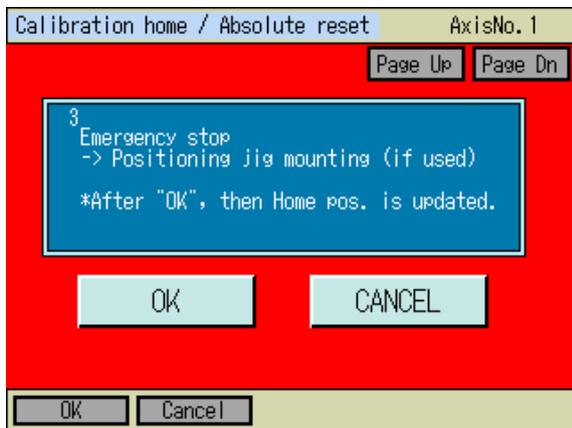
\* After confirmed OK, the process is carried out from the controller error reset to the absolute reset in order.

**Caution:** Home-return operation starts as soon as either touching **OK** button or pressing **F1** (OK) key. The standard home position is the posture described in the beginning of 17.7.  
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 a crash or unexpected operation, which could cause malfunction or critical operation error to the robot or the peripherals. Make sure to secure enough space for home-return posture to avoid any interference to the peripherals during the home-return operation.



- 3) Jog -> Basic Position  
Align the indicated axis to the vicinity of the datum position with JOG operation. (Refer to the figure in Step 6) for the datum position.)  
After finished, either touch **OK** button or press **F1**(OK) key

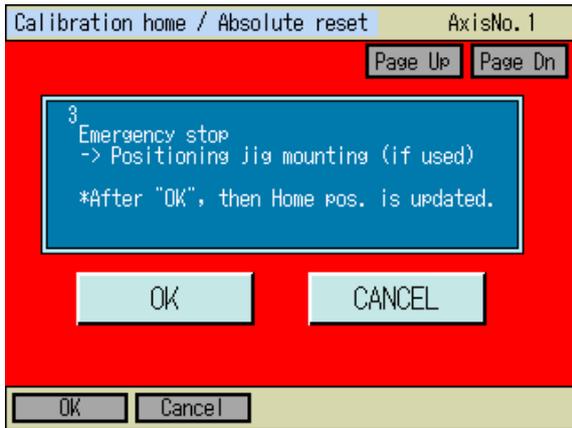
\* After confirming OK, the servo off the indicated axis turns off automatically.



- 4) Emergency stop  
Press the EMERGENCY STOP button.

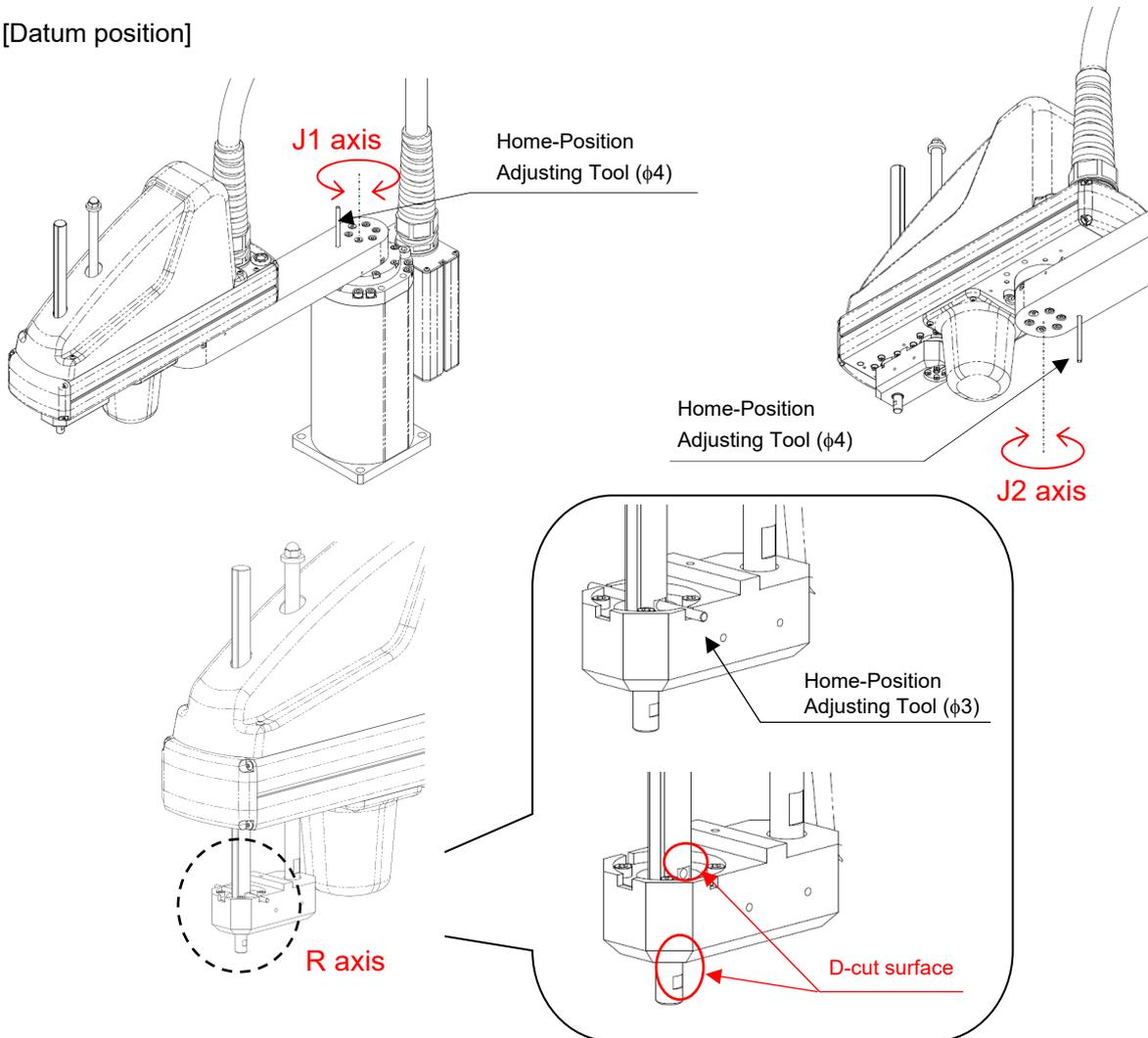


- 5) Once the emergency stop is input, the screen turns to the window shown in the figure on the left.  
Touch **Back** button or press **ESC** key.

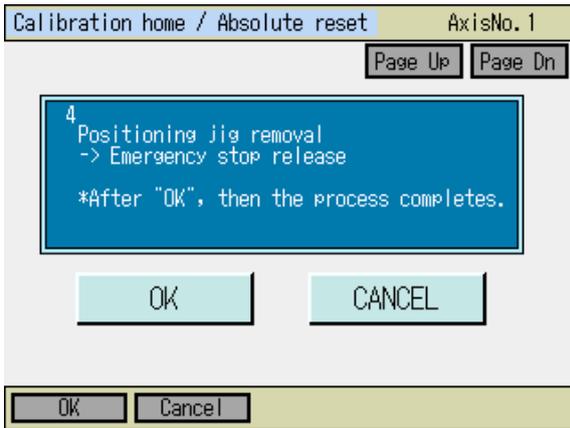


- 6) Fixture Set for Home Adjustment  
Set the fixture (positioning jig) for home adjustment.  
After setting is complete and fixed at the datum posture, touch **OK** button or press **F1** (OK) key.
- \* After confirming OK, home preset gets automatically updated.

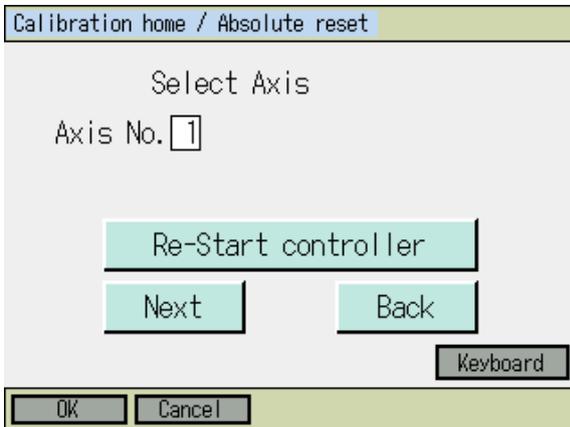
[Datum position]



**Caution:** Pay attention not to get the cables and pipes on the tool twisted.

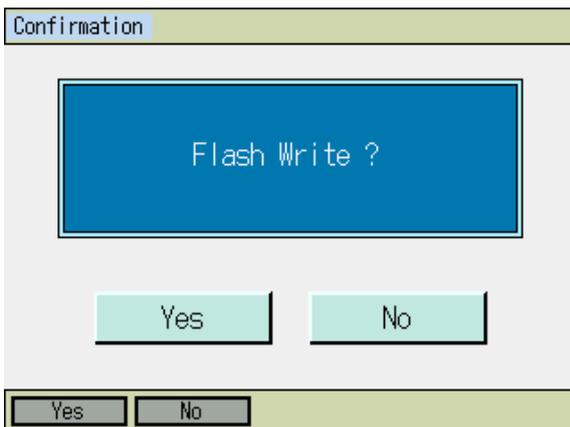


- 7) Removal of Fixture for Home Adjustment and Cancel of Emergency Stop  
Remove the fixture for home adjustment (positioning jig) if it is attached.  
After releasing the emergency button, touch **OK** button or press **F1** (OK) key.  
\* After confirming OK, the screen automatically returns to the axis select window.

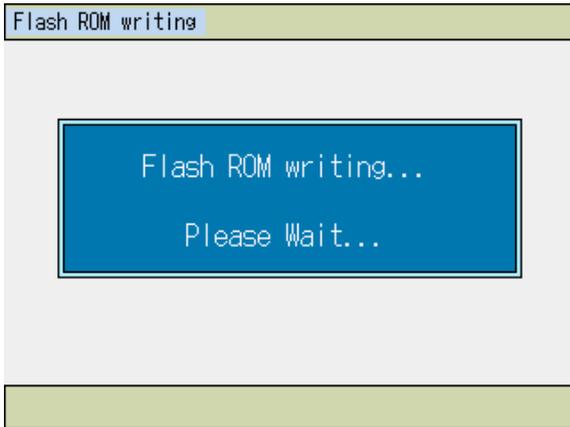


- 8) Touch **Re-Start controller** button or press **ESC** key.  
A confirmation window for the flash ROM writing appears.

(Reference) Flash ROM writing can be conducted at once after absolute reset completes on each axis.



- 9) Make sure to conduct flash ROM writing and then software reset as the parameters are updated.



10) While in writing process to flash ROM, the screen.

**Never turn off the power to the Controller at this time.**



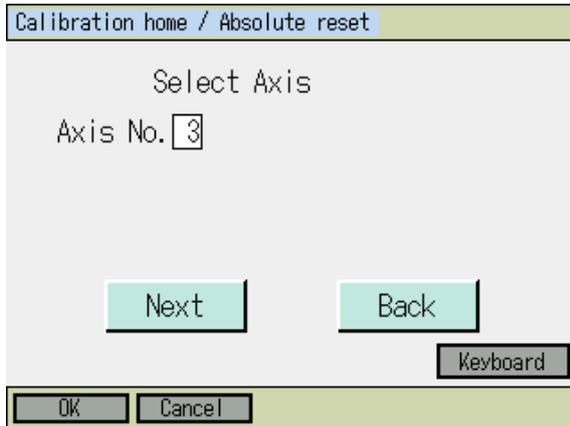
11) After flash ROM writing is complete, the display changes to the Software Reset screen. To activate the parameters that you had changes, it is necessary to have a software reset. Either press **Yes** button in the touch panel or press **F1** (Yes) key.

Once the software reset is complete, the screen automatically returns to the main menu window.

## 17.7.2 SCARA Z-Axis, Battery-less Absolute Type Additional Axes and Linear Axes

### 17.7.2.1 How to Absolute Reset

For SCARA Z-axis, the battery-less absolute type additional axes and the linear axes, have the absolute reset conducted with the following steps.



- 1) Input a number in Axis No. box with using either the software numeric keys or hardware numeric keys, and then either touch **Next** button or press **F1** (OK) key.

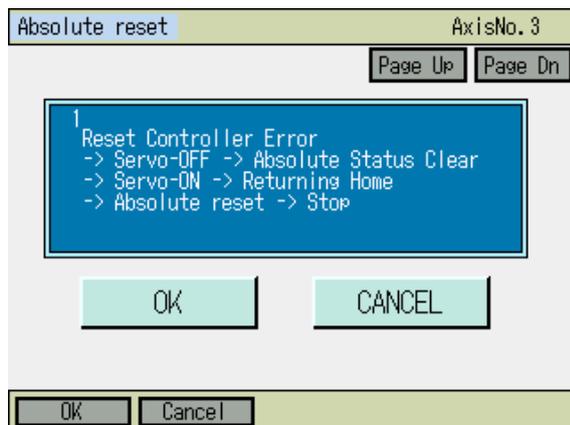
\* 3 (and 4 when with additional axes) is available to indicate for Axis No. (3: Z axis, 4: additional axes)

\* For axis Nos., the following Nos. can be designated.

MSEL-PCX/PGX: 3 (for Z-Axis), 4(for Additional Axis) ("4" is selectable, only when there is an additional axis).

MSEL-PC/PB/PCF/PGF: 1~4

PSEL : 1~2



- 2) Home-Return Operation and Absolute Reset Touch **OK** button or press **F1** (OK) key.

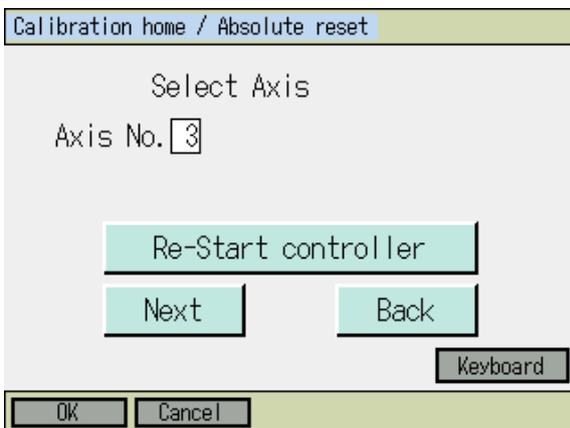
\* After confirmed OK, the process is carried out from the controller error reset to the stop in order.

 **Caution:** Home-return operation starts as soon as either touching **OK** button or pressing **F1** (OK) key. The standard home position is the posture described in the beginning of 17.7.

*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 a crash or unexpected operation, which could cause malfunction or critical operation error to the robot or the peripherals. Make sure to secure enough space for home-return posture to avoid any interference to the peripherals during the home-return operation.*

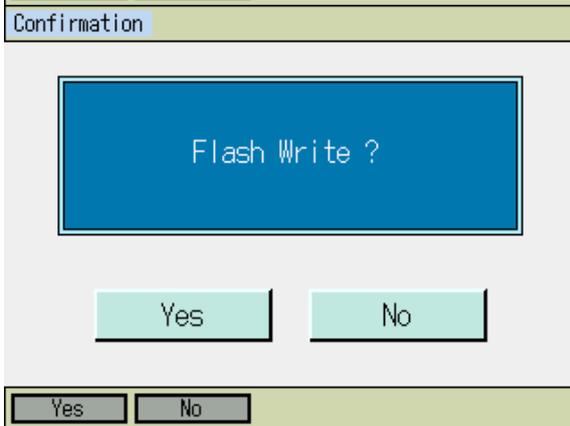


- 3) Complete!  
Touch **OK** button or press **F1** (OK) key.
- \* After confirming OK, the screen automatically returns to the axis select window.

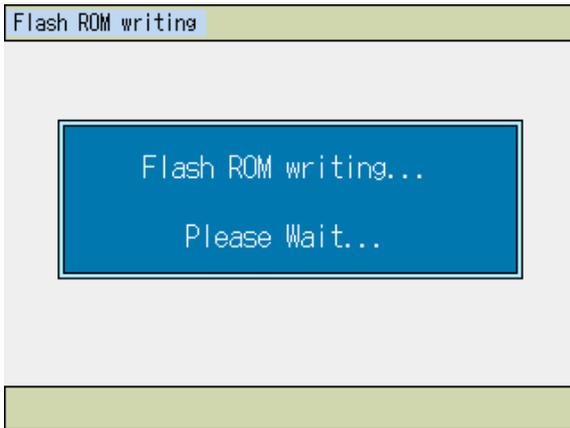


- 4) Touch **Re-Start controller** button or press **ESC** key.  
A confirmation window for the flash ROM writing appears.

(Reference) Flash ROM writing can be conducted at once after absolute reset completes on each axis.



- 5) Make sure to conduct flash ROM writing and then software reset as the parameters are updated.



6) While in writing process to flash ROM, the screen.

**Never turn off the power to the Controller at this time.**



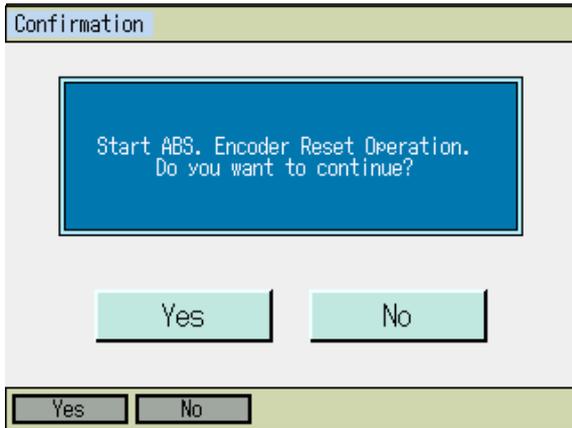
7) After flash ROM writing is complete, the display changes to the Software Reset screen. To activate the parameters that you had changes, it is necessary to have a software reset. Either press **Yes** button in the touch panel or press **F1** (Yes) key.

Once the software reset is complete, the screen automatically returns to the main menu window.

## 17.8 Absolute Reset of the Orthogonal Axis: PSEL Controller

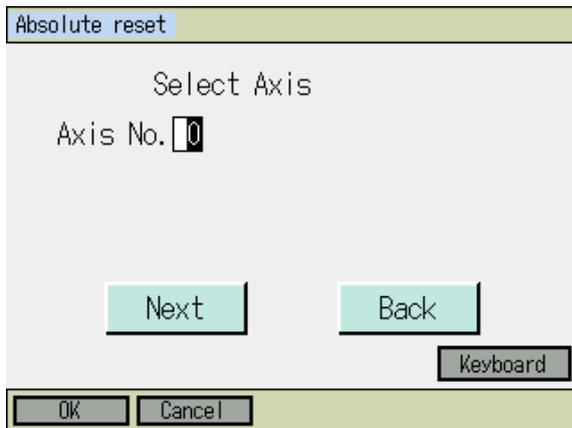
This process is for when TB-01 with an old version is used. For TB-01 (SEL system) with the application part version Ver1.60 and later, conduct the absolute reset following “Appendix 3 Home Position Adjustment / Absolute Reset Procedures for MSEL-PCX/PGX/PC/PG/PCF/PGF and PSEL”

Select **Absolute Reset** from Controller Menu.



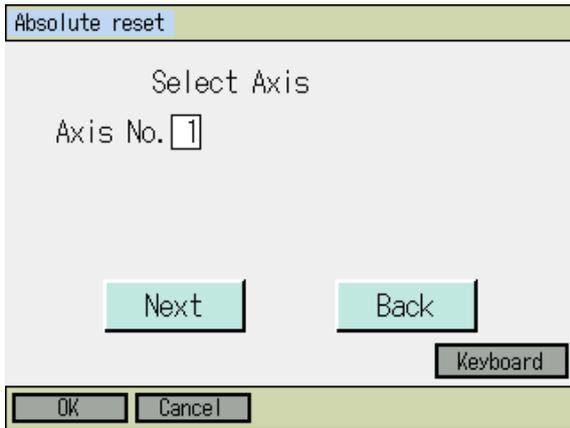
To have an absolute reset, either touch **Yes** button or press **F1** (Yes) key.

When not to have an absolute reset, either touch **No** button or press **F2** (No) key. The display returns to the previous screen.

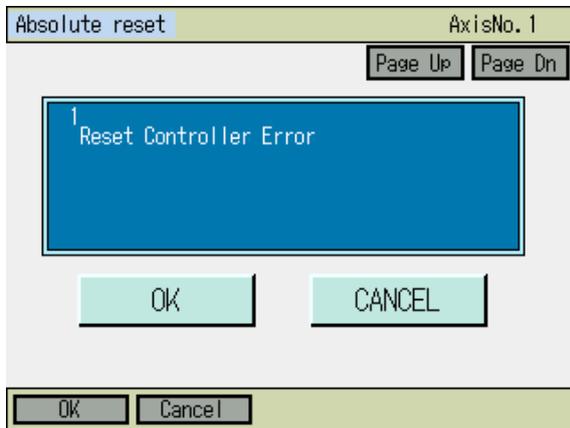


Axis No. Input

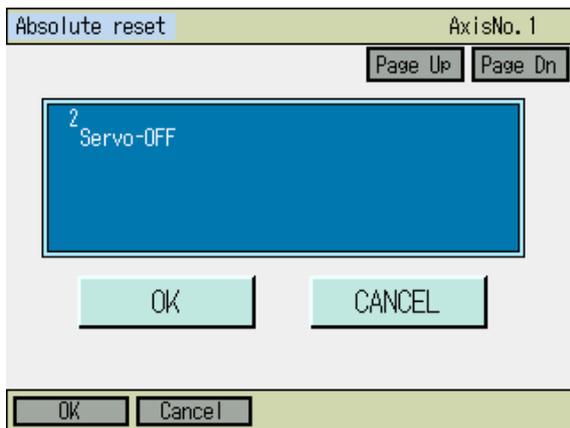
Input the axis number that you want to have an absolute reset on the touch panel numeric keys or hardware numeric keys and then touch **ENT** button or press the return key for confirmation.



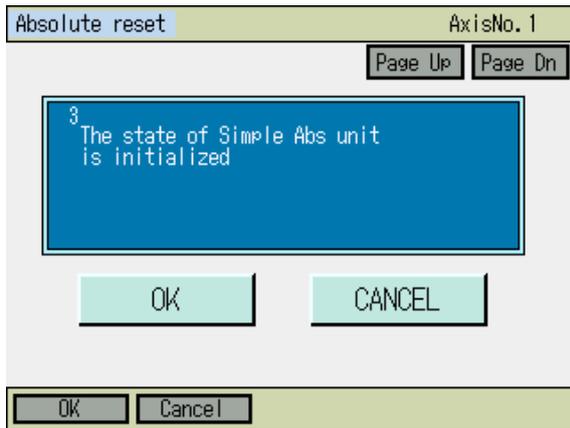
Once the input is confirmed, the cursor disappears. If you want to redo the input, touch the axis number input box or press **ESC** key. If you want to continue absolute reset, either touch **Next** button or press **F1** (OK) key. When you cancel absolute reset, either touch **Back** button or press **F2** (Cancel) key. When canceling an absolute reset on any screen of the following 1) through 8) press the F2 (Cancel) key or **CANCEL** Button.



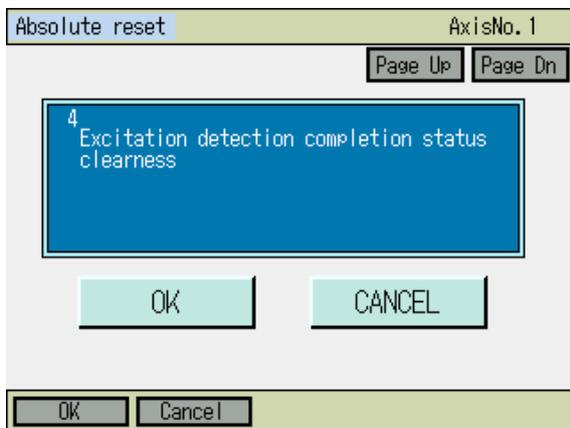
1) Reset Controller Error  
Touch **OK** button or press **F1** (OK) key.



2) Servo-OFF  
Touch **OK** button or press **F1** (OK) key.



3) The state of Simple Abs unit is initialized  
Touch **OK** button or press **F1** (OK) key.



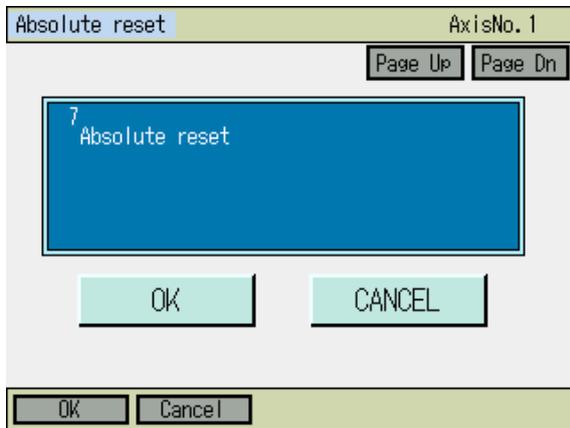
4) Excitation detection completion status clearness  
Touch **OK** button or press **F1** (OK) key.



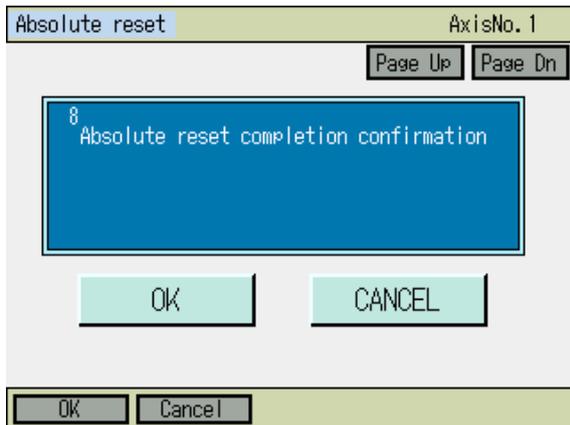
5) Servo-ON  
Touch **OK** button or press **F1** (OK) key.



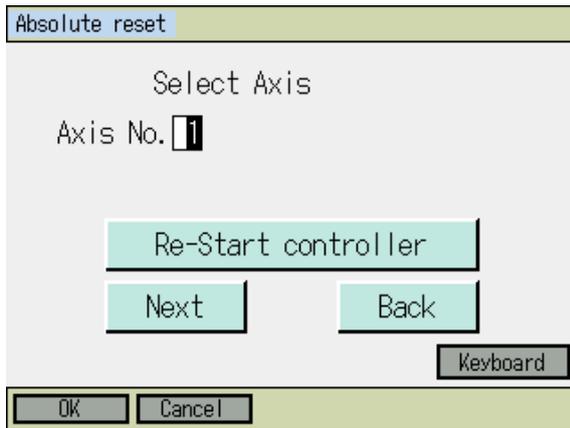
6) Returning Home  
Touch **OK** button or press **F1** (OK) key.



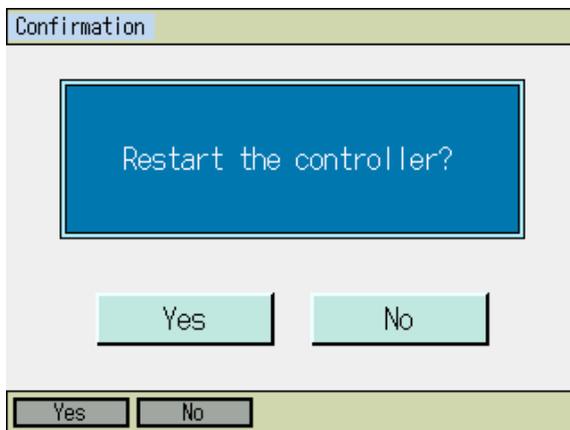
7) Absolute reset  
Touch **OK** button or press **F1** (OK) key.



8) Absolute reset completion confirmation  
Touch **OK** button or press **F1** (OK) key.



Return to the axis No. input screen. When you want to have another axis conduct absolute reset, input the axis number and touch **OK** button or press **F1** (OK) key. To finish absolute reset, either touch **Re-Start controller** button or press **ESC** key.

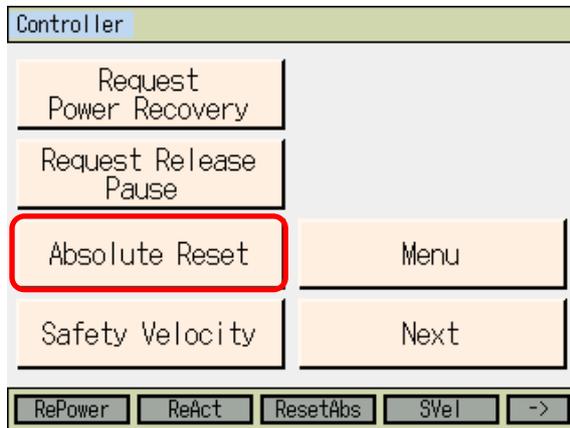


Restart the controller. Touch **Yes** button or press **F1** (OK) key. The display returns to the main menu when the reboot is finished.

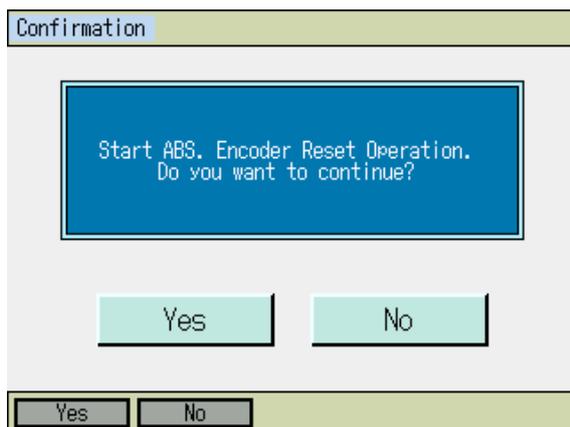
After executing absolute reset, be sure to reset software or reconnect the power.

## 17.9 How to Conduct Absolute Reset for Battery-less Absolute Type

Backup the parameters so that they can be put back anytime to those before changing them. (Go to **File** – **Backup** – **Parameter** in the main menu to open the parameter backup screen and save the file.)



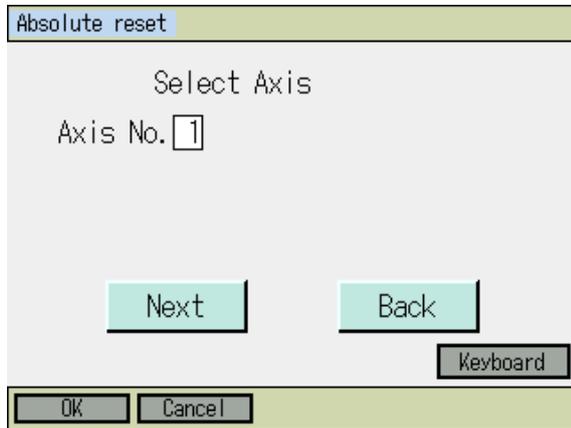
1) Select **Absolute Reset** from Controller menu.



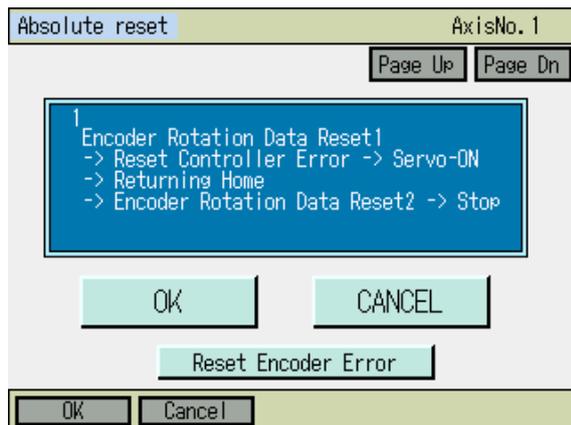
2) Either touch **Yes** button or press **F1** (Yes) key to conduct absolute reset. If the absolute reset is not required, touch **No** button or press **F2** (No) key. The screen goes back to the previous window.

### 17.9.1 How to Conduct Absolute Reset for Battery-less Absolute Type

Absolute Reset on Cartesian Axes: For AC Servomotor Type TTA, XSEL-P/Q (V1.52 or later), XSEL-R/S, five to eight axes in RX/SX (V1.23 or later), XSEL-RA/SA, five to eight axes in RAX/SAX, SSEL (V0.57 or later) and ASEL (V0.45 or later), conduct the absolute reset in the following procedures.

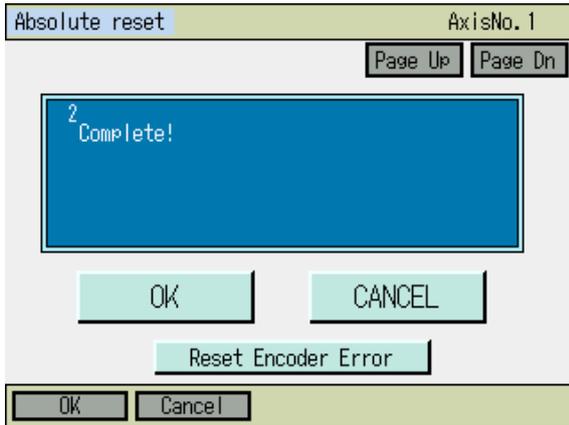


- 1) Input a number in Axis No. box with using either the software numeric keys or hardware numeric keys, and then either touch **Next** button or press **F1** (OK) key.

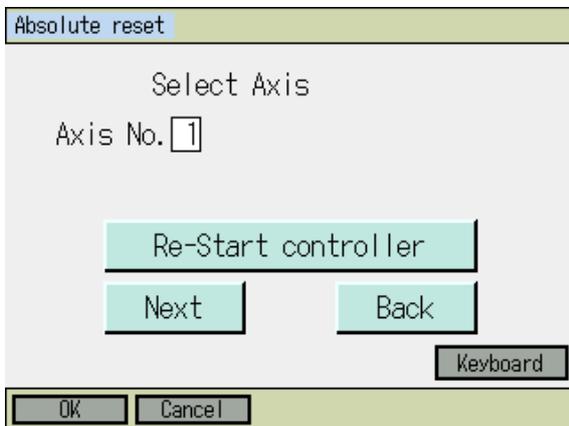


- 2) Absolute Reset  
Touch **OK** button or press **F1** (OK) key.
- \* After confirmed OK, the process is carried out from the controller error reset to the absolute reset in order.

*Caution: The indicated axis conducts the home-return operation.*

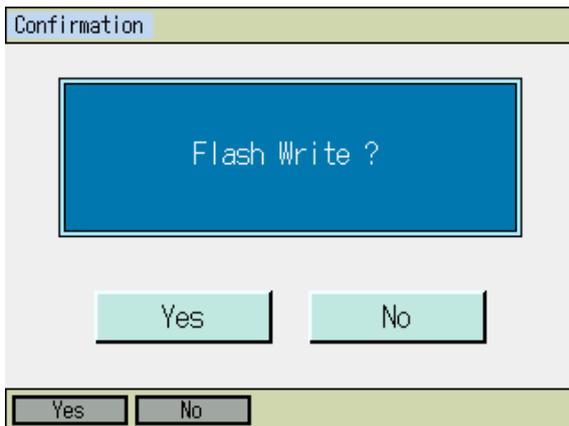


- 3) Complete!  
Touch **OK** button or press **F1**(OK) key
- \* After touching OK, the screen automatically goes back to the axis select screen.



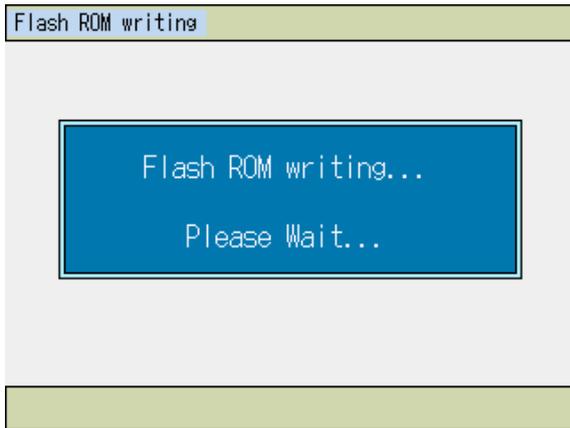
- 4) Touch **Re-Start controller** button or press **ESC** key.

A confirmation window for the flash ROM writing appears.



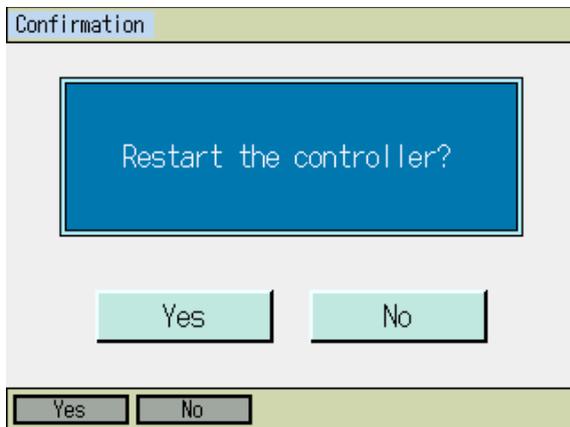
- 5) Touch **Yes** button.

Make sure to conduct flash ROM writing and then software reset as the parameters are updated.



- 6) While in writing process to flash ROM, the screen.

***Never turn off the power to the Controller at this time.***



- 7) After flash ROM writing is complete, the display changes to the Software Reset screen. To activate the parameters that you had changes, it is necessary to have a software reset. Either press **Yes** button in the touch panel or press **F1** (Yes) key.

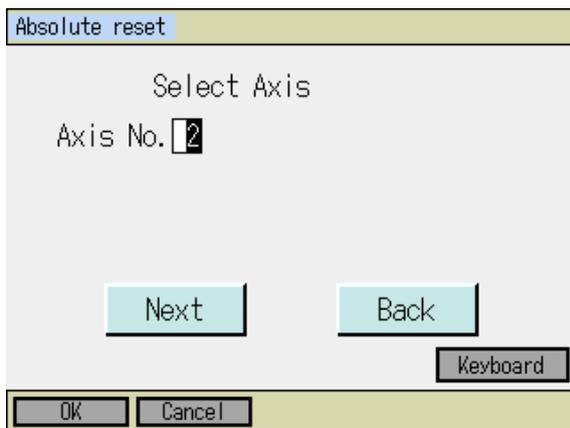
Once the software reset is complete, the screen automatically returns to the main menu window.

## 17.9.2 Special Procedure: How to Conduct Absolute Reset Battery-less Absolute Synchronizing Type

For SCARA Z-axis, the battery-less absolute type additional axes and the linear axes, have the absolute reset conducted with the following steps.

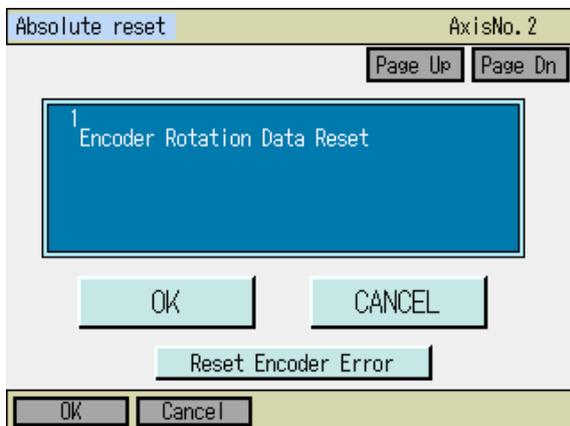
This section describes only the corresponding section to (3) Special Procedure Absolute Reset in the “17.5.3 Special Procedure Absolute Reset” procedures. Perform the procedures before (2) or after (4) the same as above, referring to “17.5.3 Special Procedure Absolute Reset”.

- 1) Execute the absolute reset for the slave axis.

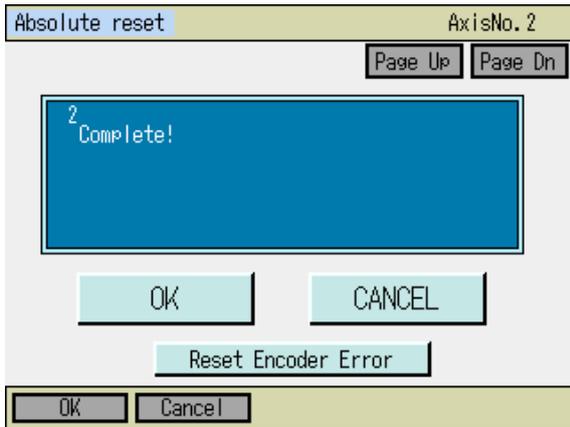


Input the axis number of the slave axis by using the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key to confirm the input.

Touch **Next** button or press **F1** (OK) key.



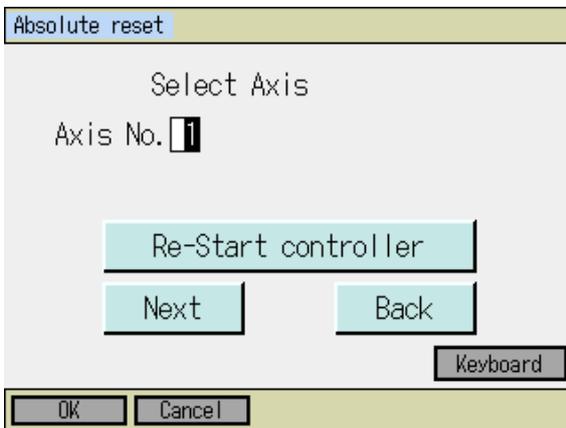
Touch **OK** button or press **F1** (OK) key.



Touch **OK** button or press **F1** (OK) key.

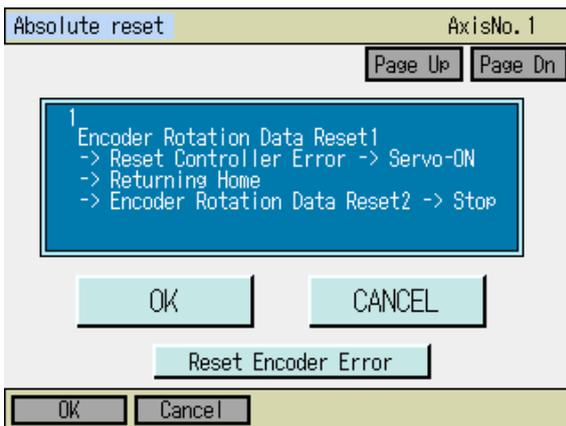
- \* After confirming OK, the screen automatically returns to the axis select screen.

2) Conduct the absolute reset on the master axis.



Input the axis number of the master axis by using the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key to confirm the input.

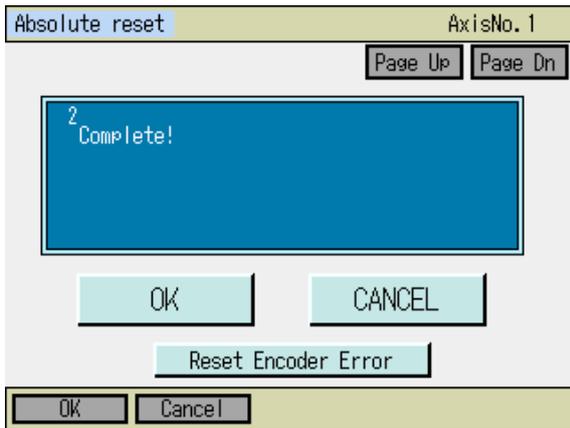
Touch **Next** button or press **F1** (OK) key.



Touch **OK** button or press **F1** (OK) key.

- \* After touching OK, the process is carried out in order from Encoder Multi-Rotation Data Reset 1 till it stops.

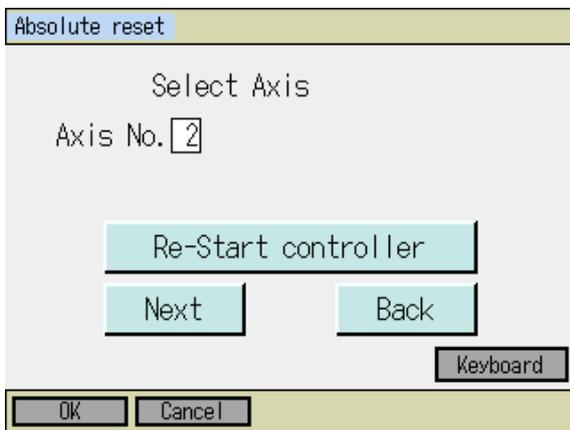
*Caution: The indicated axis conducts the home-return operation.*



Touch **OK** button or press **F1** (OK) key.

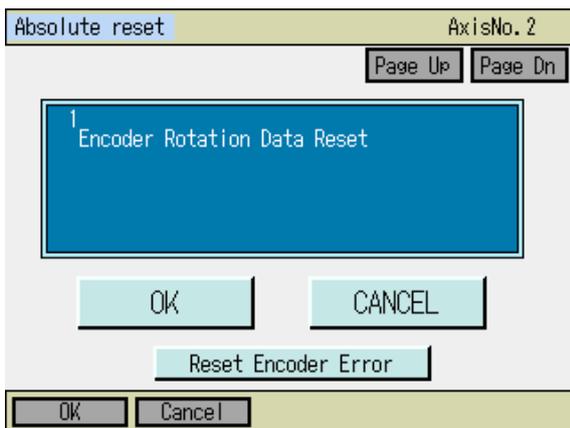
\* After confirming OK, the screen automatically returns to the axis select screen.

3) Conduct the absolute reset on the master axis.

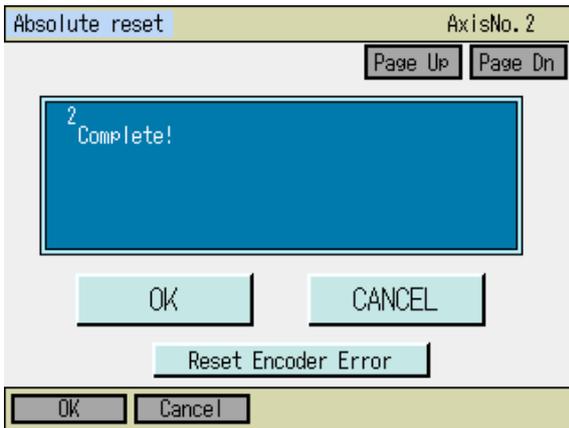


Input the axis number of the slave axis by using the touch panel numeric keys or the hardware numeric keys, and then either touch **ENT** button or press the return key to confirm the input.

Touch **Next** button or press **F1** (OK) key.

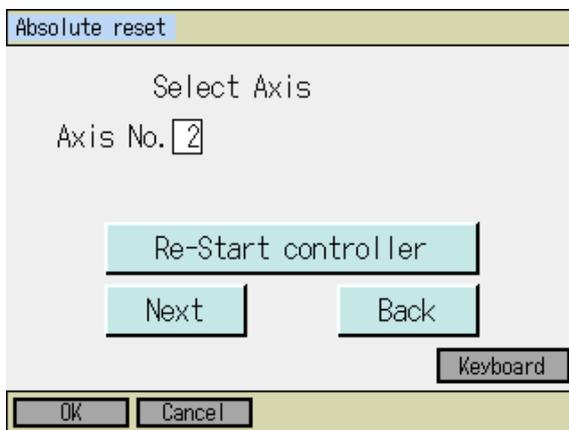


Touch **OK** button or press **F1** (OK) key.



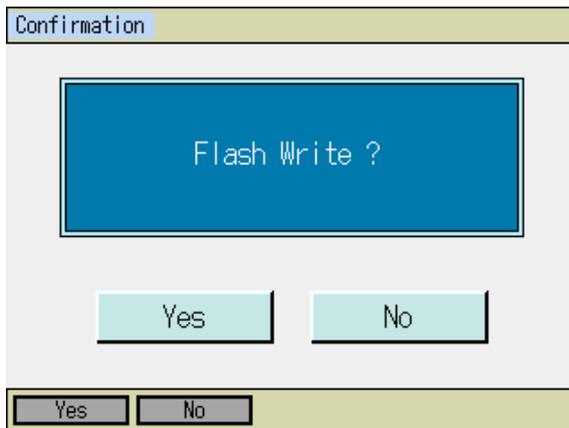
Touch **OK** button or press **F1** (OK) key.

\* After confirming OK, the screen automatically returns to the axis select screen.

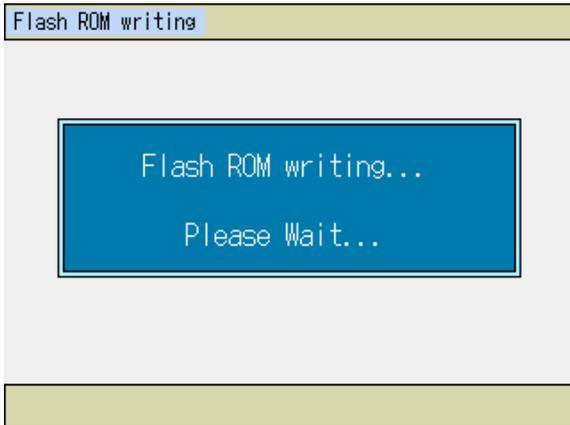


Touch **Re-Start controller** button or press **ESC** key.

A confirmation screen for the flash ROM writing appears.

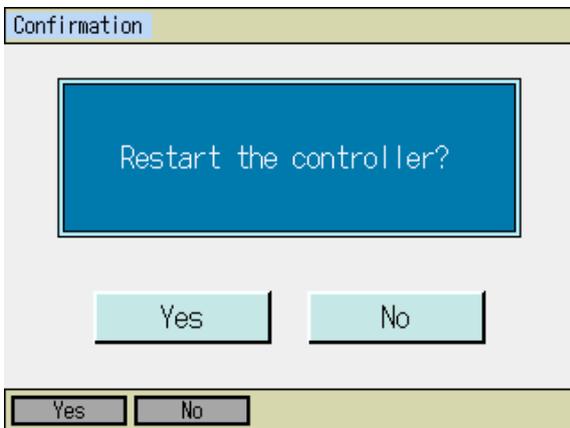


Touch **Yes** button or press **F1** (Yes) key.



While in writing process to flash ROM, the screen.

***Never turn off the power to the Controller at this time.***



Once the flash ROM writing is finished, the screen changes to the window for software reset. Either touch **Yes** button or press **F1** (Yes) key to reflect the pressing position.

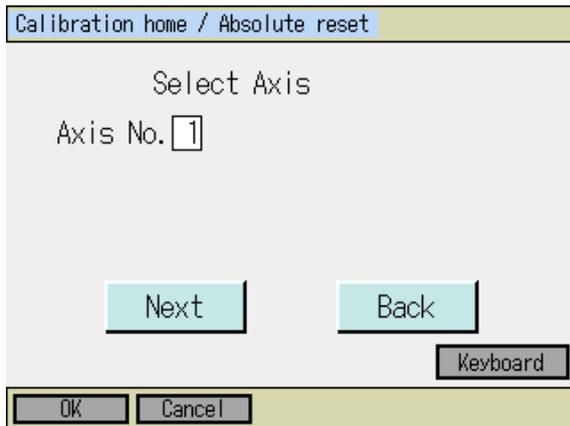
Once the software reset is complete, the screen automatically returns to the main menu screen.

## 17.10 How to Conduct Absolute Reset on Pulse Motor Type TTA

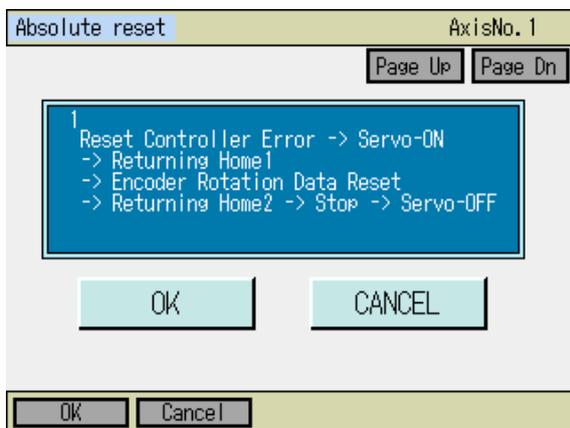
Make sure to have a backup before conducting it so the parameters can be set back any time. (Go to **File** - **Backup** - **Parameter** from the main menu to open the parameter backup screen to save a file.)

### 17.10.1 How to Conduct Absolute Reset on Pulse Motor Type TTA

For Pulse Motor Type TTA, conduct the absolute reset in the following procedures.



- 1) Input the axis number to the axis number box using either of software or hardware numeric keys and then either touch **Next** button or press **F1** (OK) key.



- 2) Touch **OK** button or press **F1** (OK) key.

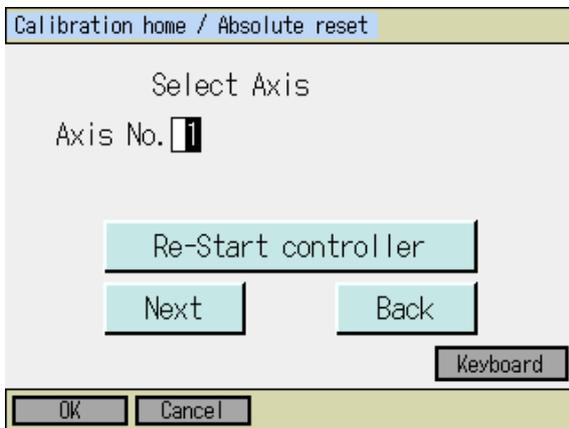
\* After touching **OK**, the process is carried out in order from Controller Error Reset till the servo is turned off.

*Caution: The indicated axis conducts the home-return operation.*

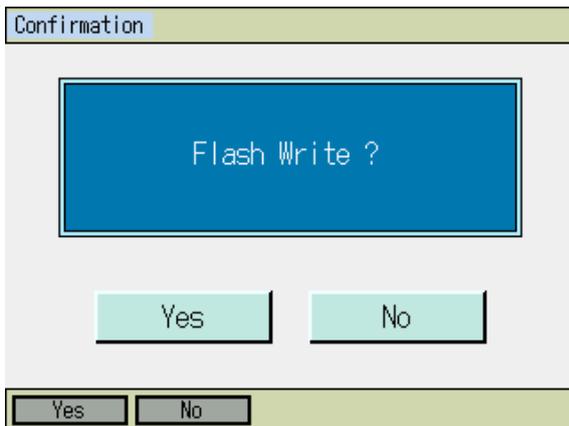


3) Complete screen  
Touch **OK** button or press **F1** (OK) key.

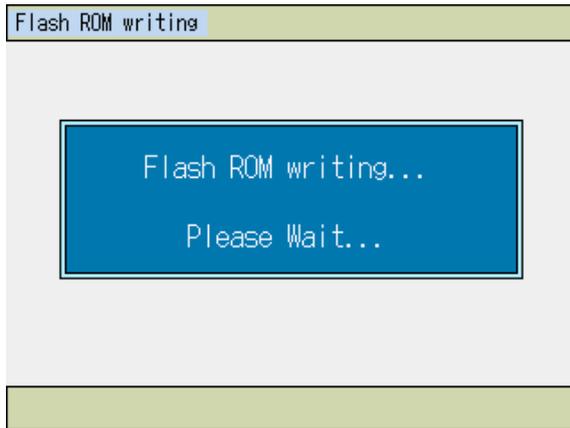
\* After touching **OK**, the screen automatically goes back to the axis select screen.



4) Touch Re-Start controller button or press ESC key.  
Flash ROM writing confirmation screen opens.

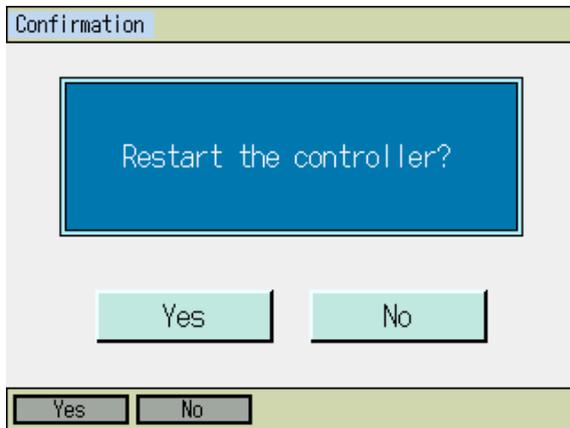


5) Touch **Yes** button.



- 6) While in writing process to flash ROM, the screen shown in the left will be displayed.

***Never turn off the power to the Controller at this time.***



- 7) After flash ROM writing is complete, the display changes to the Software Reset screen.

Touch **Yes** button or press **F1** (Yes) key.

Once software reset is finished, the screen automatically goes back to the main menu screen.

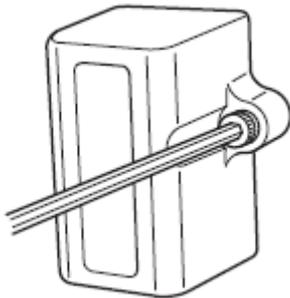
### 17.11 Procedures for Resetting Absolute-Battery Voltage-Down Warning Error for Orthogonal Axis:

XSEL-J/K, P/Q, 5th and 6th Axes of XSEL-PX/QX, XSEL-RS, 5th to 8th Axes of XSEL-RX/SX, XSEL-RA/SA, 5th to 8th Axes of XSEL-RAX/SAX, SSEL, ASEL and PSEL Controller.

When the absolute-encoder-battery voltage-down warning error (error code A03) occurs or a battery with no error occurring is replaced, the encoder error and software are reset. Homing in the absolute reset procedures does not have to be attempted again.

Keep the controller's main power ON until the following procedures have been completed:

- 1) Turn the servo OFF for all the axes for error resetting. (Use the **SERVO**, **1**, **2**, **3** and **4** keys on the teaching screen.)
- 2) Replace the batteries of the axes for error resetting.  
When the voltage of absolute data holding batteries decreases, replace them together with the battery unit.



In the case of a controller other than XSEL-P/Q, PX/QX, R/S, RX/SX, RA/SA, RAX/SAX, SSEL, ASEL and PSEL controllers, remove the bolt fixing the battery unit on the front panel with a hexagonal wrench, as shown in the diagram at the left. pull it out as it is toward you.

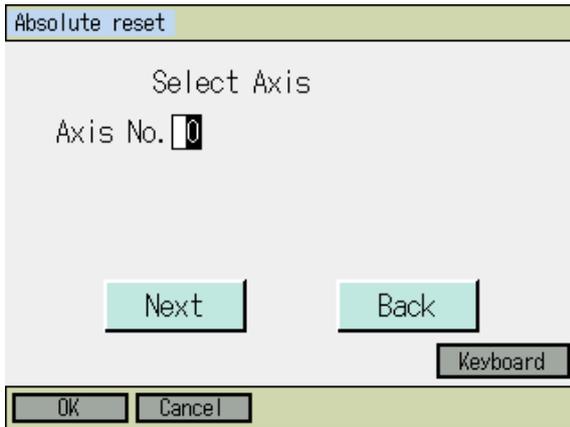
For the replacement of the batteries of XSEL-P/Q, PX/QX, R/S, RX/SX, RA/SA, RAX/SAX, SSEL, ASEL and PSEL controllers, refer to the instruction manual of each controller.

Select **Absolute Reset** from Controller Menu.

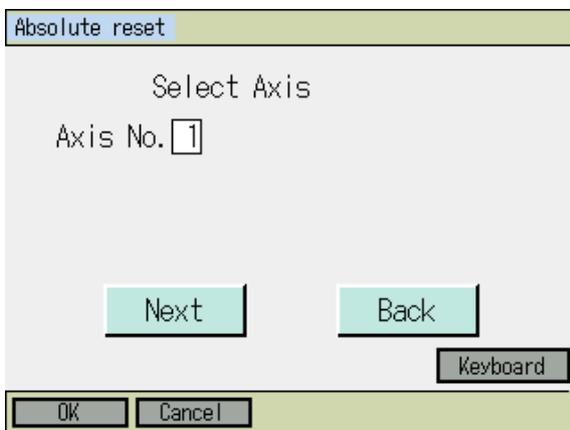


3) To have an encoder error reset, either touch **Yes** button or press **F1** (Yes) key.

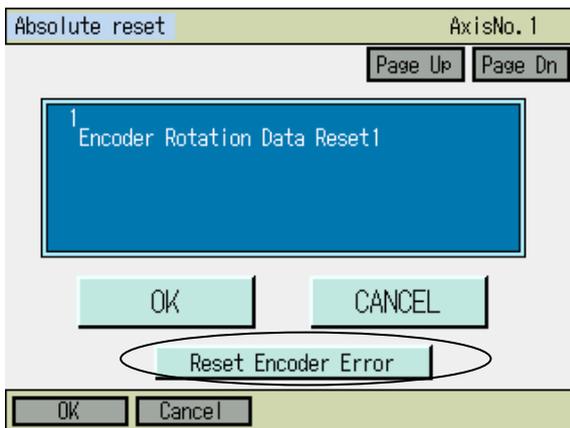
When not to have an encoder error reset, either touch **No** button or press **F2** (No) key. The display returns to the previous screen.



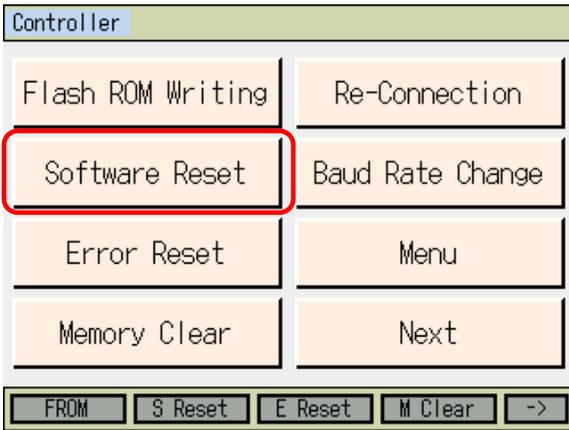
4) Axis No. Input  
Input a number on the touch panel numeric keys or hardware numeric keys to indicate the axis number to have the encoder error reset conducted, and either touch **ENT** button or press the return key for confirmation.



5) Once the input is confirmed, the cursor disappears. If you want to redo the input, touch the axis number input box or press **ESC** key. If you want to continue encoder error reset, either touch **Next** button or press **F1** (OK) key. When you cancel encoder error reset, either touch **Back** button or press **F2** (Cancel) key.



6) Encoder error reset  
Touch **Reset Encoder Error** button. Either touch **CANCEL** button, or **ESC** or press **F2** (Cancel) key. When you want to have the encoder error reset on other axes, repeat the steps in (4) to (6). To finish the process, either touch **Back** button or press **ESC** key to return to Controller Menu screen.



7) Reset software.

Touch **Software Reset** button or press **F2** (S Reset) key.

For the following operations, refer to "16.3. Software Reset."

## 18. Gateway Function Associated

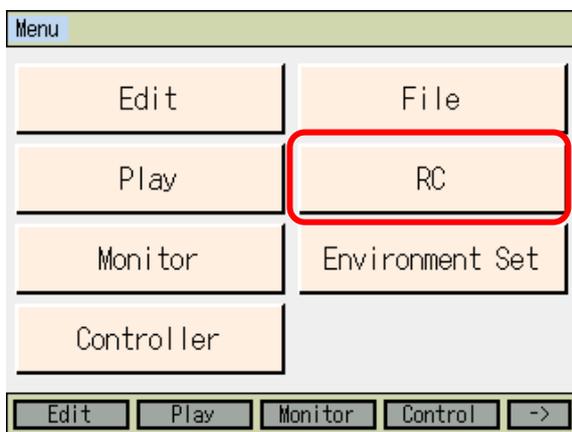
In the case of the XSEL-P/Q/PX/QX, XSEL-R/S/RX/SX/RXD/SXD controllers with the RC gateway function, the following operations are available.

- Editing of the RC Position Data in XSEL
- RC-axis Monitoring

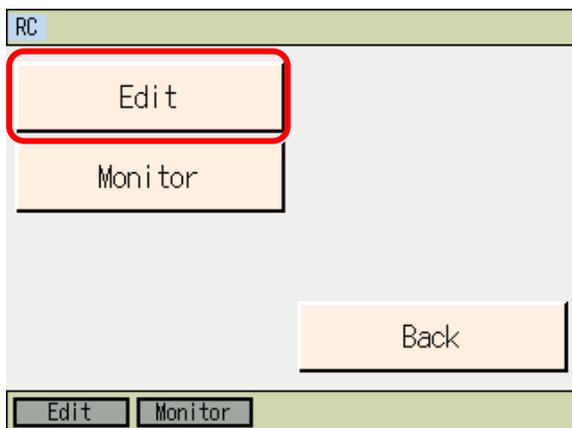
### 18.1 Editing of the RC Position Data in XSEL

#### 18.1.1 RC Position Data Creation

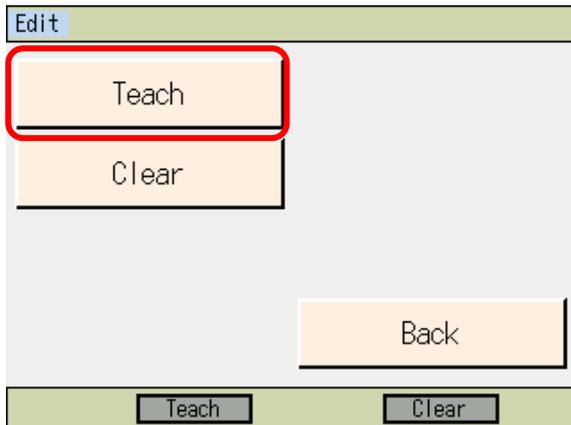
The RC position data to be set in the XSEL controller is edited.



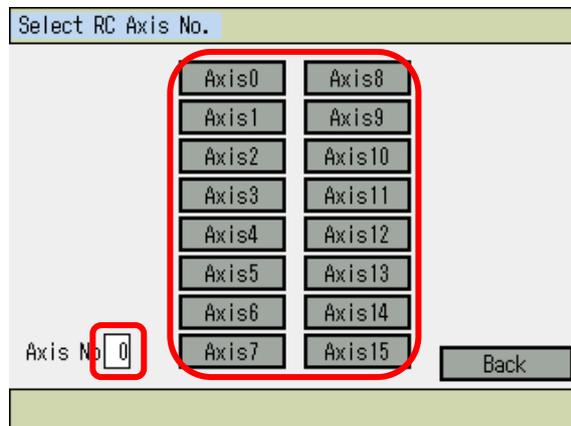
Either touch **RC** button or press **SF**(->) → **F2** (RC) keys in the menu screen.



Touch **Edit** in the menu screen or press **F1** (Edit) key.

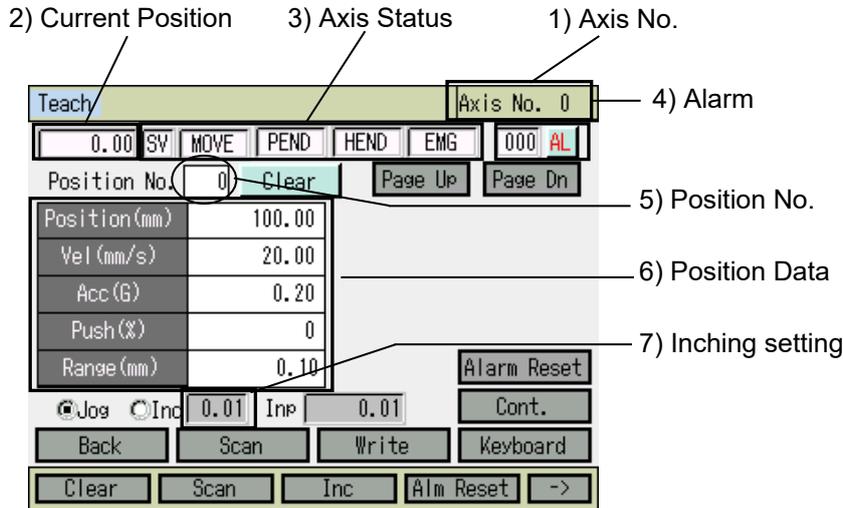


Either touch **Teach** button or press **F2** (Teach) key in the RC edit menu screen.



Select the RC axis number to have the position edit by touching the appropriate button. Also, when the cursor is placed in "Axis No." box, it is available to select by inputting an RC Axis number on the hardware numeric keys and pressing **↵** key. The display returns to the RC edit menu screen if you either touch **Back** button or press **ESC** key.

[Items Displayed in RC Teach Screen]



- 1) Axis No.  
The axis number in edit is displayed.
- 2) Current Position  
The current position [mm] of the actuator is displayed.
- 3) Axis Status  
The status of the actuator is displayed.  
SV : Turns on when the servo is on  
MOVE : Turns on during operation  
PEND : Turns on when positioning is finished  
HEND : Turns on when home-return operation is finished  
EMG : Turns on during emergency stop
- 4) Alarm  
An alarm code is displayed.  
If you touch **AL** button, an alarm reset is held on the axis in edit.
- 5) Position No.  
The position number is shown.

6) Position Data

Position (mm)

The target position for the actuator to be moved is indicated.

Absolute coordinate specification : Distance from home position of actuator

Incremental coordinate specification : Relative amount (movement amount) from current position

It is determined by the command in SEL language if the target position is indicated in absolute coordinates or relative coordinates (\*).

(e.g.: RMVP Command → Absolute coordinates indication, RMP Command → Relative coordinates indication)

Vel (mm/s)

The velocity of the actuator in operation is indicated.

Acc (G)

The acceleration/deceleration of the actuator in operation is indicated.

The Acceleration and Deceleration can not be set separately.

Push (%)

Current limit in the pressing operation (RPUS Command) is indicated. Indicate 0 when pressing is unnecessary.

Range (mm)

Indication made to determine how much before the target position the positioning should finish.

In pressing operation (RPUS Command), indication of maximum pressing amount from the target position is to be made.

7) Inching setting

The distance in the inching operation (distance of movement in each press of the jog key) is indicated. [Unit: mm]

[Explanation on each Touch Panel Button (Function Key)]



- Clear : F1 (Clear) : Clears the displayed position data.  
Caution: At the time when this function is executed, the position data is cleared. Please take care.
- Scan : F2 (Scan) : Inputs the current position in the target position data section.
- Jog/Inc : F3 (Inc) : Operation is switched during jog execution (jog/inching).
- Alm Reset : F4 (Alm Reset): Have an alarm reset conducted on the indicated axis.



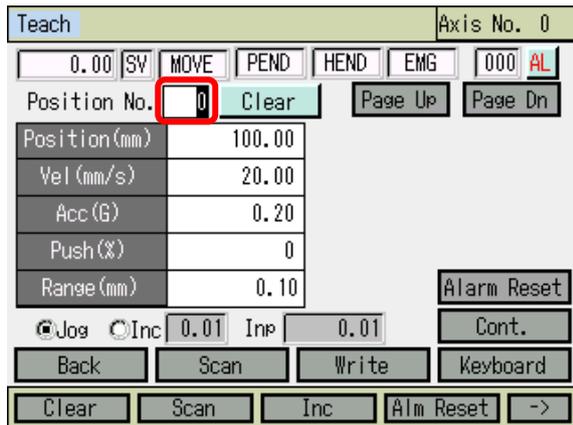
- Cont : F1 (Cont) : Execute continuance operation.

[Addition and Change of Position Data]

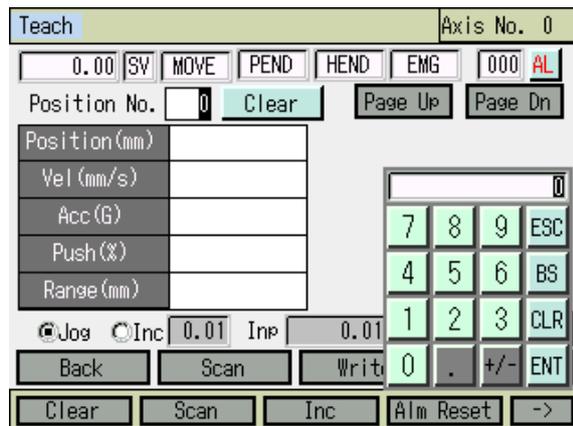
First, indicate the position number that an addition or a change is required.  
When the screen is opened for the first time, a cursor is flashing in the position number input box.  
(When no flashing is confirmed, touch in the position number input box.)

[Caution]

The position data starts from No. 0 unlike XSEL.



Input the position number by displaying the numeric keys on the touch panel by touching **Keyboard** button or input the position number on the hardware numeric keys.



Touch the numerical part when it is desired to input number on the touch panel numeric keys when inputting the position number.  
The contents of input will be shown in the box above the touch panel numeric keys.  
When confirming the input number, touch **ENT**.  
The touch panel numeric keys close and the data of the indicated position number is displayed.  
When redoing the input, touch **ESC**.  
When it is desired to cancel the input, touch **ESC** again, and the touch panel numeric keys will close.  
Also **ESC** key on the hardware acts in the same way.

When it is desired to use the hardware numeric keys for inputting, input the desired number by pressing the numeric keys and press **ENT** key to confirm your input. The contents of input are displayed in the position number box. When redoing the input, press **ESC** key. It is not available to input numbers on the hardware numeric keys while the touch panel numeric keys are displayed on the screen.

\* The position number can also be changed on **Page Up**/**Page Dn** buttons in the screen or **PAGEUP**/**PAGEDOWN** keys on the hardware keys.

Next, show the cursor to the input part in the item you want to make an input.  
To show the cursor, touch on the input part (the white area in the background, or area in the red frame for target position (mm)) in the item you want to make an input.  
(If the cursor is shown, it can be moved with **←** **→** **▲** **▼** keys pressed.)

Teach										Axis No. 0	
0.00	SV	MOVE	PEND	HEND	EMG	000	AL				
Position No.	0	Clear	Page Up	Page Dn							
Position (mm)											
Vel (mm/s)											
Acc (G)											
Push (%)											
Range (mm)											
										Alarm Reset	
<input checked="" type="radio"/> Jog		<input type="radio"/> Inc		0.01	Inp	0.01	Cont.				
Back		Scan		Write		Keyboard					
Clear		Scan		Inc		Alm Reset		->			

With the cursor shown in the appropriate area, touch **Keyboard** button to make the touch panel numeric keys appear on the screen to input a number, or input a number on the hardware numeric keys.

Teach										Axis No. 0	
0.00	SV	MOVE	PEND	HEND	EMG	000	AL				
Position No.	0	Clear	Page Up	Page Dn							
Position (mm)	100										
Vel (mm/s)											
Acc (G)											
Push (%)											
Range (mm)											
										Alarm Reset	
<input checked="" type="radio"/> Jog		<input type="radio"/> Inc		0.01	Inp	0.01	Cont.				
Back		Scan		Write		Keyboard					
Clear		Scan		Inc		Alm Reset		->			

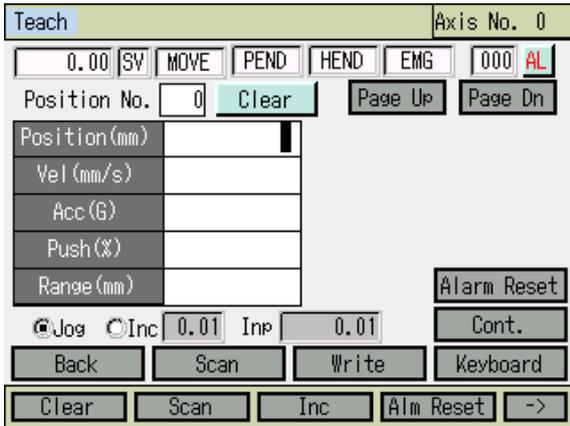
If you want to input 100 to Position (mm), touch **Keyboard** button to show the touch panel numeric keys, and touch **1 0 0 ENT** on the touch panel numeric keys.

Teach										Axis No. 0	
0.00	SV	MOVE	PEND	HEND	EMG	000	AL				
Position No.	0	Clear	Page Up	Page Dn							
Position (mm)	100.00										
Vel (mm/s)											
Acc (G)											
Push (%)											
Range (mm)											
										Alarm Reset	
<input checked="" type="radio"/> Jog		<input type="radio"/> Inc		0.01	Inp	0.01	Cont.				
Back		Scan		Write		Keyboard					
Clear		Scan		Inc		Alm Reset		->			

If the input is accepted, the cursor moves to the input box for Vel (mm/s). Then, input values for Vel (mm/s), Acc (G), Push (%) and Range (mm).

**[Caution]**

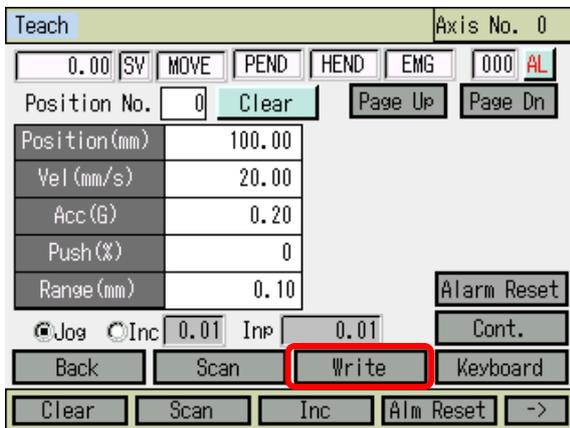
In the TB-01, the input range check is not performed. Confirm the specifications for the RC actuator in using, and input the data.



When you want to erase the data that is already input, touch **CLR** **ENT** on the touch panel numeric keys to delete what you want.

On the hardware numeric keys, data already input can be deleted with **BS** and **↵** to remove.

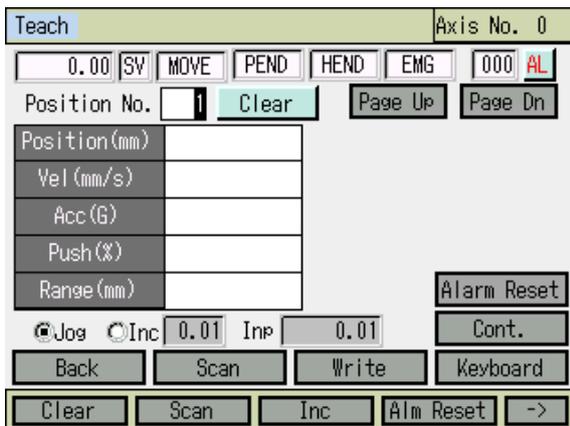
**[Data Transfer]**



After data input is complete, either touch **Write** button on the touch panel or press **WRT** key on the hardware keys to transfer the data to the controller.

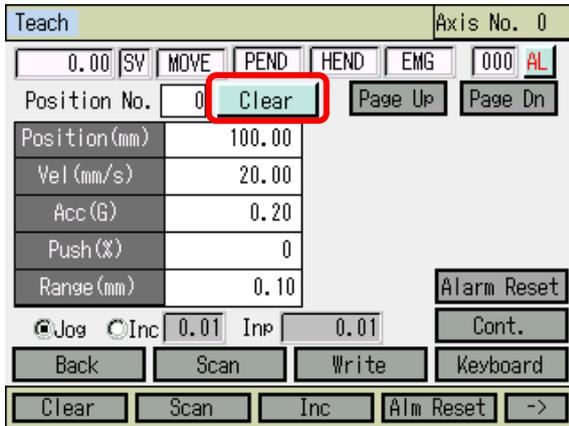
**[Caution]**

*The input data would not be written to the controller unless the operation above is conducted. In case the position number is changed without the operation above being conducted, the data remains the same as before change.*

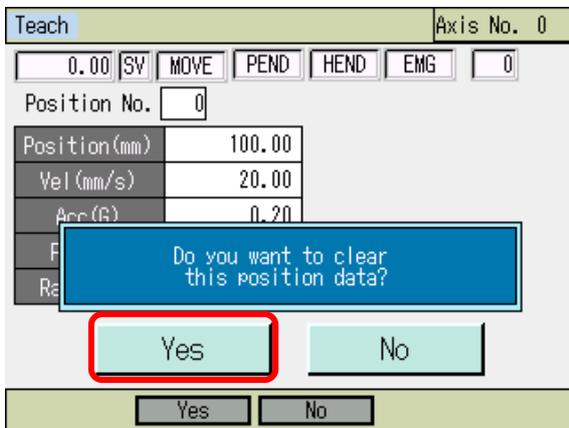


Once the transfer to the controller is complete, the position number gets incremented and the next data input screen is shown.

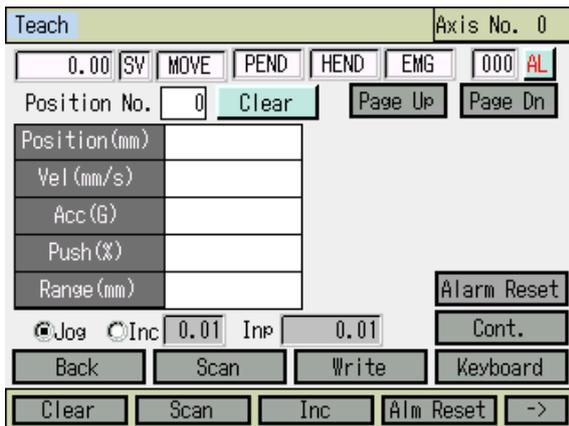
[Data Clear]



When you want to delete the data in the position number being displayed, touch **Clear** button in the touch panel, or press **F1** (Clear) key on the hardware keys.

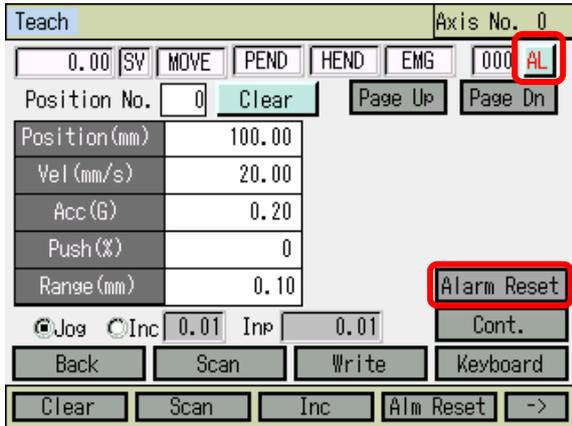


Press **Yes** button in the touch panel or press **F2** (Yes) key on the hardware keys to transfer the data to the controller.



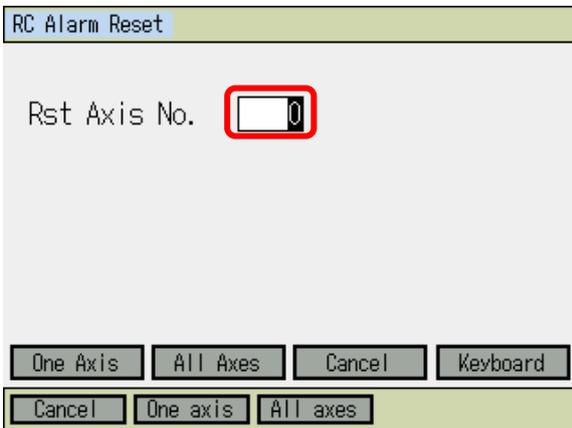
Once the clear is succeeded, the data in the same position number (after cleared) is displayed.

[Alarm Reset]



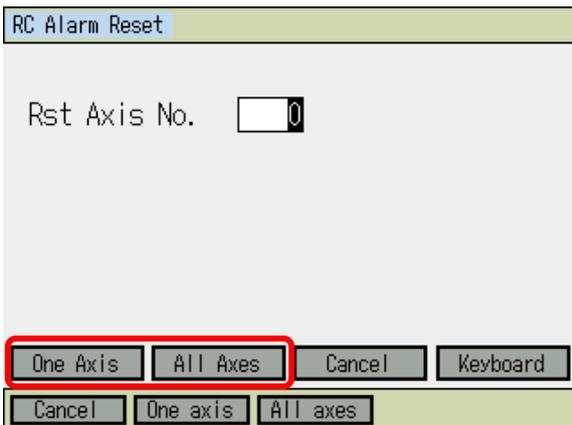
If you want to have an alarm reset on the RC axis in edit, touch **AL** button.

When you want to have an alarm reset on the RC axes you want to choose, either touch **Alarm Reset** button or press **F4** (Alm Reset) key.



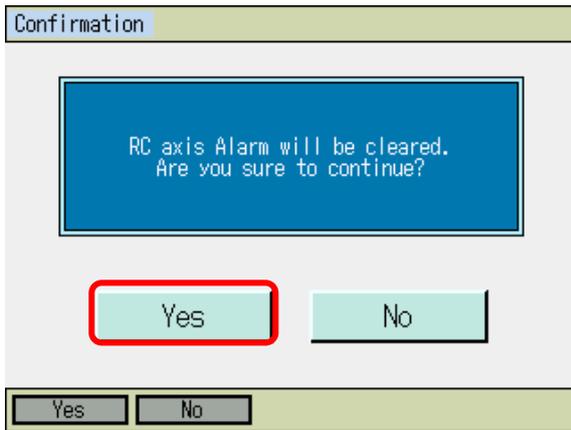
When you want to have an alarm reset only on the indicated axis, set the axis number.

With the cursor shown in the appropriate area, touch **Keyboard** button to make the touch panel numeric keys appear on the screen to input a number, or input a number on the hardware numeric keys.

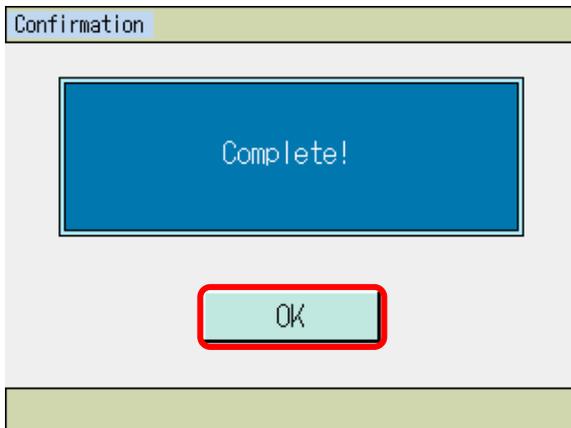


When you want to have an alarm reset only on the indicated axis, either touch **One Axis** button or press **F2** (One axis) key.

When you want to have an alarm reset on all the RC axes, either touch **All Axes** button or press **F3** (All axes) key.



Either touch **Yes** button or press **F1** (Yes) key.  
Either touch **No** button, or press **F2** (No) or **ESC** key to return to the RC alarm reset screen.



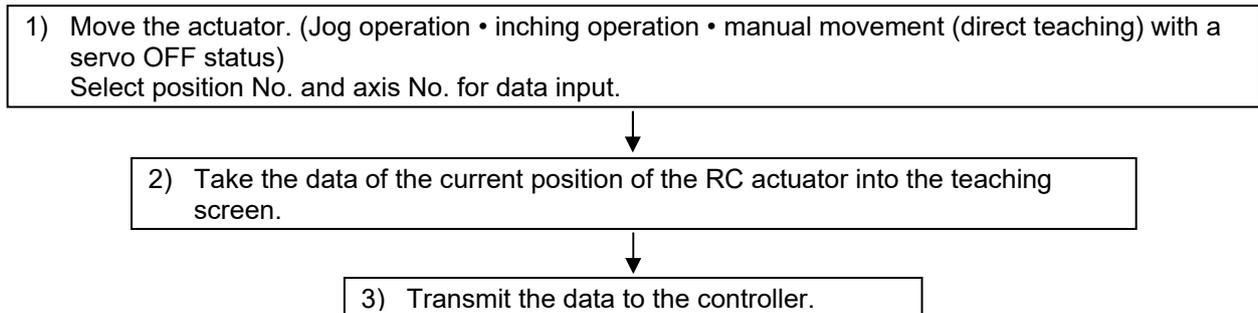
The display shows this screen when the alarm reset is finished.  
Either touch **OK** button, or press **ESC** key or **↵** key to return to the RC alarm reset screen.

### 18.1.2 RC Position Data Input Using the Teaching Operation

One of the methods for the RC position data input is the teaching operation (The RC actuator is moved to any position and the RC actuator current position is captured as the data).

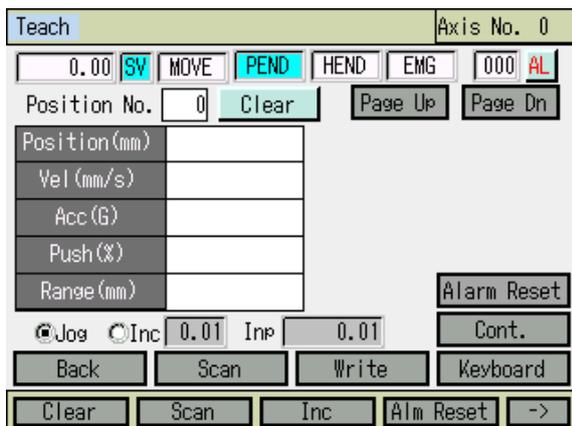
The methods for moving the RC actuator to any position are the jog operation, inching operation and manual movement (direct teaching) with the servo-motor turned OFF.

The basic flow of teaching is as follows:



#### (1) Servo ON/OFF Operation

Using this operation, the RC actuator servo-motor is turned ON/OFF. This operation is available only in the single axis.



Press the **SERVO** key

Presses the **1+** key after the SERVO LED is turned ON to turn ON the servo-motor.

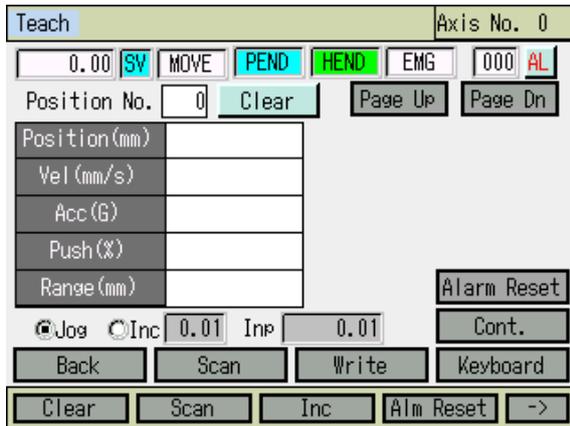
(When the servo-motor is to be turned OFF, press the **SERVO** key and after the SERVO LED is turned ON, press the **1-** key).

The condition of servo-on/off can be checked on the axis status display "SV", which turns on when the servo is on and turns off when the servo is off.

## (2) Home Return Operation

In the case of the incremental encoder applicable RC actuator, it is required to perform the home return operation after the power is turned on, or after the software reset and before the teaching operation.

This operation is available only in the single axis.



Turn the servo-motor ON.

Press the **HOME** key.

After the HOME LED is turned ON, press the **1-** or **1+** key to perform the home return operation.

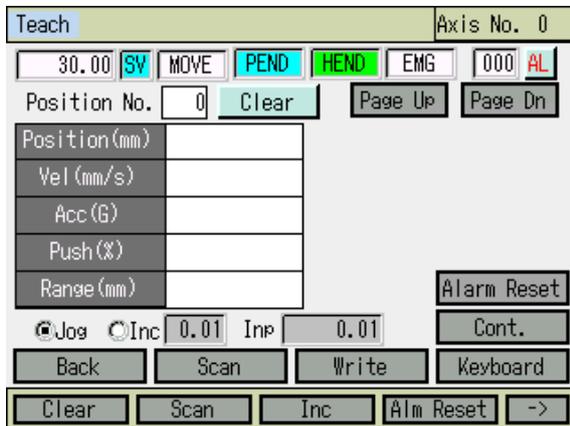
The axis status display "HEND" turns on when the home-return operation is finished.

## (3) Actuator Movement

### 1) Jogging Operation

Perform the jogging operation of the RC actuator.

This operation is available only in the single axis.



Turn the servo-motor ON.

Press the **1-** or **1+** key to move the actuator to any position. ("+" means the movement to the plus direction on the coordinates and "-" means the movement to the minus direction on the coordinates).

- 2) Inching Operation  
 Perform the RC actuator inching operation.  
 This operation is available only in the single axis.

Teach Axis No. 0

30.00 SV MOVE PEND HEND EMG 000 AL

Position No. 0 Clear Page Up Page Dn

Position (mm)

Vel (mm/s)

Acc (G)

Push (%)

Range (mm)

Alarm Reset

Jog  Inc 0.01 Inp 0.01 Cont.

Back Scan Write Keyboard

Clear Scan Inc Alm Reset ->

Either touch **Inc** button directly or press **F3** (Inc) to make **Inc** button selected.

Teach Axis No. 0

30.00 SV MOVE PEND HEND EMG 000 AL

Position No. 0 Clear Page Up Page Dn

Position (mm)

Vel (mm/s)

Acc (G)

Push (%)

Range (mm)

Alarm Reset

Jog  Inc 1.00 Inp 0.01 Cont.

Back Scan Write Keyboard

Clear Scan Inc Alm Reset ->

Set the inching distance (travel distance for each pressing of the JOG key).  
 Show the cursor in the input area beside "Inc" and input a value on the numeric keys and press **↵** key. (Touch **Keyboard** button to open the touch panel numeric keys if you want to use them.)  
 The numerical value input range is from 0.00 to 1.00 (Unit: mm).

Teach Axis No. 0

30.00 SV MOVE PEND HEND EMG 000 AL

Position No. 0 Clear Page Up Page Dn

Position (mm)

Vel (mm/s)

Acc (G)

Push (%)

Range (mm)

Alarm Reset

Jog  Inc 1.00 Inp 0.10 Cont.

Back Scan Write Keyboard

Clear Scan Inc Alm Reset ->

Set the positioning band (to set how much in front of the inching movement amount the positioning should complete).  
 Show the cursor in the input area beside "Inp" and input a value on the numeric keys and press **↵** key. (Touch **Keyboard** button to open the touch panel numeric keys if you want to use them.)  
 The numerical value input range is from 0.01 to 9999.99 (Unit: mm).

Teach		Axis No. 0	
30.00	SV	MOVE	PEND
		HEND	EMG
	000	AL	
Position No.	0	Clear	Page Up
		Page Dn	
Position (mm)			
Vel (mm/s)			
Acc (G)			
Push (%)			
Range (mm)			Alarm Reset
<input type="radio"/> Jog	<input checked="" type="radio"/> Inc	1.00	Inp 0.10
			Cont.
Back	Scan	Write	Keyboard
Clear	Scan	Inc	Alm Reset ->

Turn the servo-motor ON.

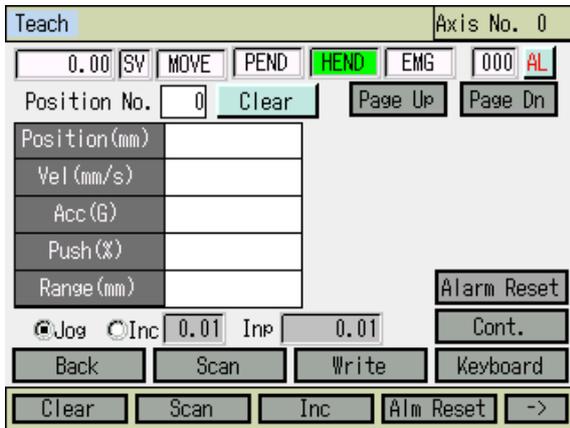
The condition of servo-on/off can be checked on the axis status display “SV”, which turns on when the servo is on and turns off when the servo is off.

Teach		Axis No. 0	
31.00	SV	MOVE	PEND
		HEND	EMG
	000	AL	
Position No.	0	Clear	Page Up
		Page Dn	
Position (mm)			
Vel (mm/s)			
Acc (G)			
Push (%)			
Range (mm)			Alarm Reset
<input type="radio"/> Jog	<input checked="" type="radio"/> Inc	1.00	Inp 0.10
			Cont.
Back	Scan	Write	Keyboard
Clear	Scan	Inc	Alm Reset ->

Press the **1-** or **1+** key to move the actuator to any position. (“+” means the movement to the plus direction on the coordinates and “-“means the movement to the minus direction on the coordinates).

### 3) Manual Movement (direct teaching) with the servo-motor turned OFF

18. Gateway Function Associated



Press the **SERVO** key.

Press **1-** key after the LED for SERVO is turned on to make the servo turned off.

The condition of servo-on/off can be checked on the axis status display "SV", which turns on when the servo is on and turns off when the servo is off. Move the RC actuators to the designated position via manual mode.

The background color in the screen turns to red during the emergency stop.



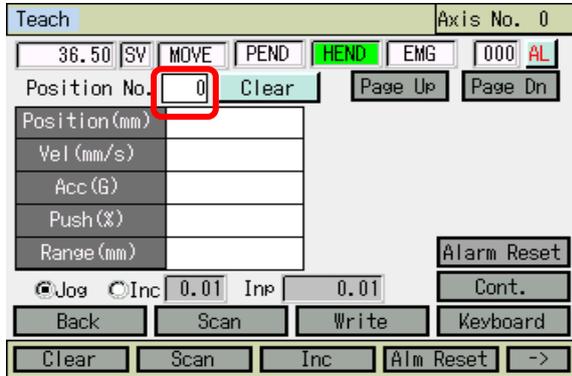
Pressing the EMERGENCY STOP button switches the display to the emergency stop screen.

Either touch **Back** button or press **ESC** key to return to Teaching screen.

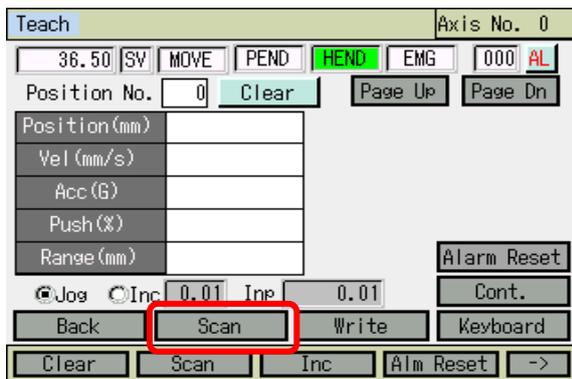
**Warning:**  
Be sure to execute manual movement when the EMERGENCY STOP button is pressed.

#### (4) Current Position captured as the Data

The chosen RC actuator position is taken in the teaching window as the position data.



Set the position number from which the current position is to be loaded.

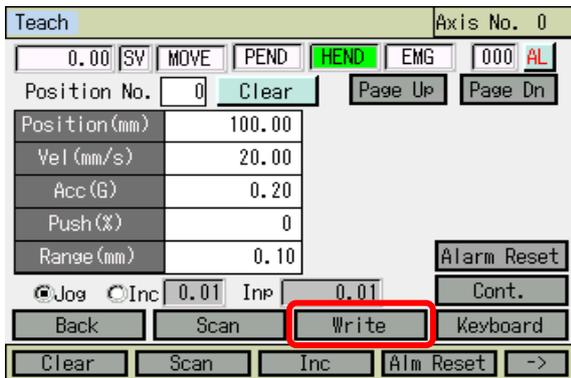


Either touch **Scan** button or press **F2** (Scan) key to load the current position to the target position from with the data is loaded.

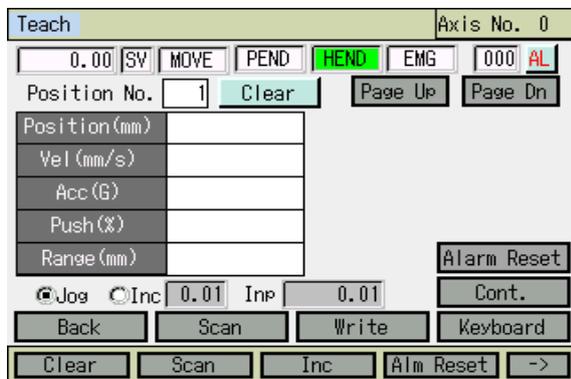
#### [Caution]

- In order to capture the current position data in the target position data section, the home return operation has to be completed.  
Execute it after it is confirmed that "HEND" in the axis status display is turned on.  
If it is executed before the home return operation, the [(9E2) Not yet Homed TEACH] message is displayed and the current position cannot be captured.
- Writing to the controller would not be executed unless you touch **Write** or press **WRT** key.

(5) Data Transfer to the Controller



After data input is complete, either touch **Write** button on the touch panel or press **WRT** key on the hardware keys to transfer the data to the controller.



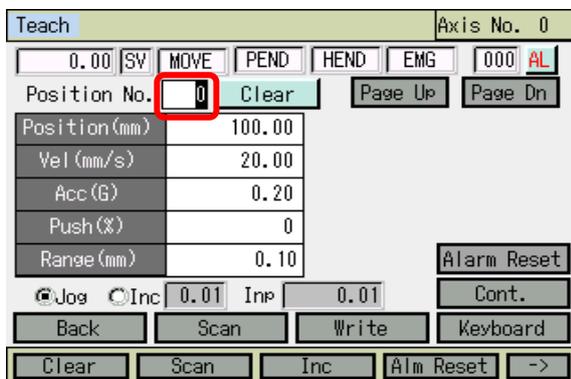
Once the transfer to the controller is complete, the position number gets incremented and the next data input screen is shown.

(6) Position Check

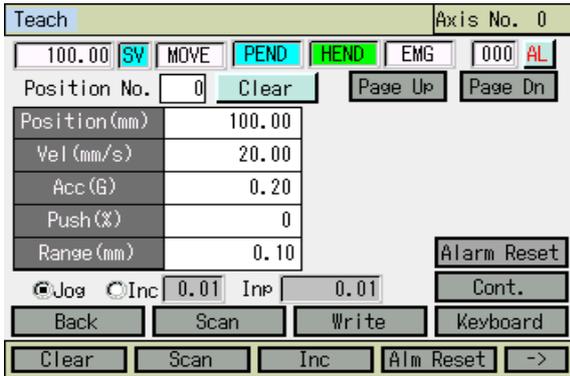
When the RC actuator is moved to the place corresponding to the taught position data, the position check can be performed.

1) Movement

Move the RC actuator to the position corresponding to the position data transferred to the controller.



Set the position number you want to move to.

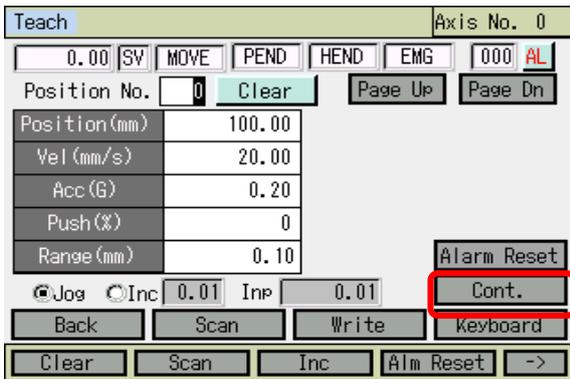


Turn the servo-motor ON.  
Perform the home return operation.

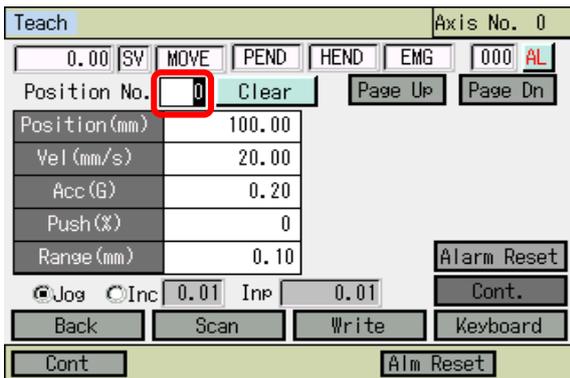
Press the **MOVE** key.  
When the **1-** or **1+** key is pressed after the MOVE LED is turned ON, the axis movement is started.  
When it is stopped on the way, press the **STOP** key.

## 2) Continuous Movement

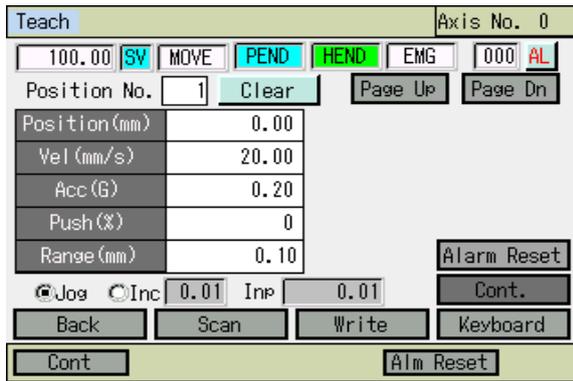
The RC actuator automatically follows the position corresponding to the position data transferred to the controller.



Either touch **Cont.** button or press **SF** (->) → **F1** (Cont) keys to switch to the continuous operation mode.



Set the position number you want to move to first.



Turn the servo-motor ON.  
Perform the home return operation.

Press the **MOVE** key.  
When the **1-** or **1+** key is pressed after the MOVE LED is turned ON, the axis movement is started.  
When it is stopped on the way, press the **STOP** key.

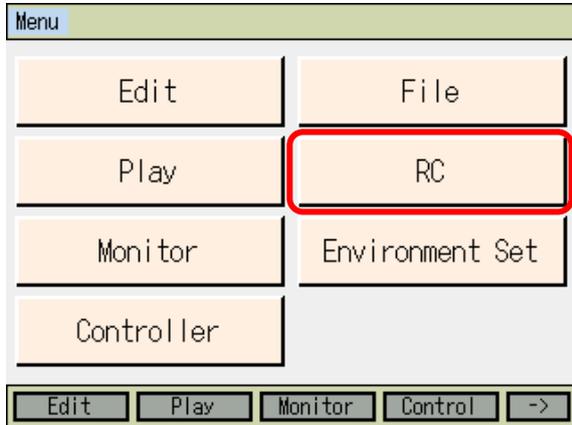
**[Caution]**

Sometimes it takes some time before movement commences after the **ESC** key **1-** or **1+** key is pressed. Be careful. (The time interval for movement start varies depending on the number of registered position data items).

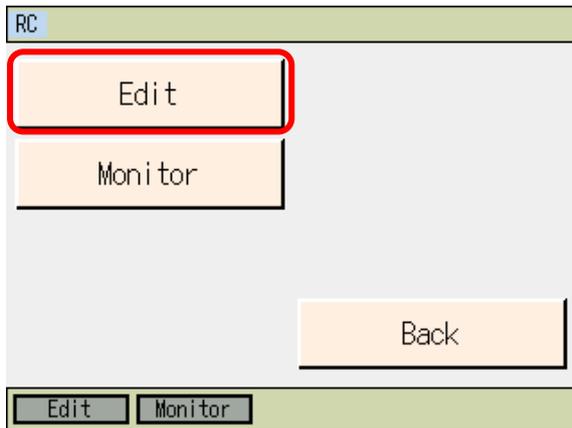
If **ESC** key is pressed before the continuous operation starts, the operation start will be cancelled.

### 18.1.3 RC Position Data Deletion

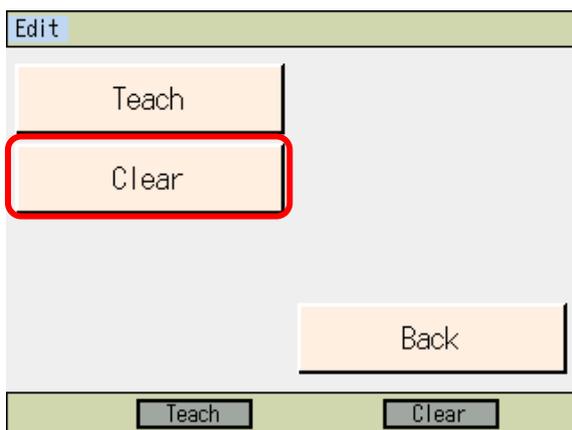
Position Data with the selected Axis No. and Position No., is deleted.



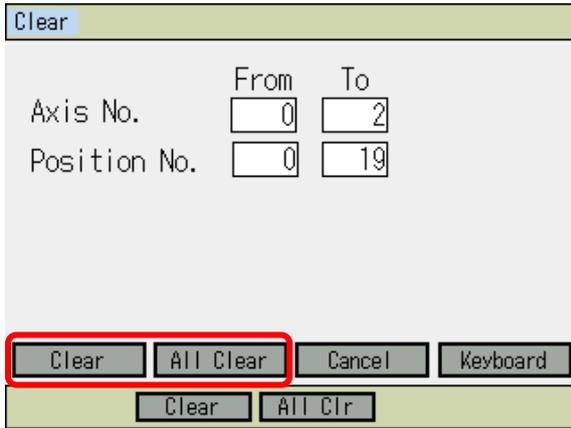
Either touch **RC** button or press **SF (->) → F2 (RC)** keys in the menu screen.



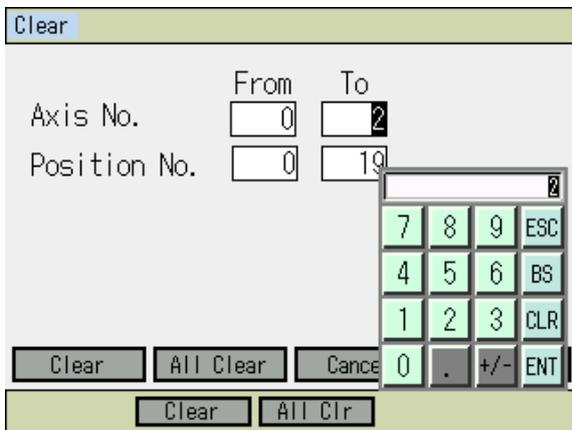
Either touch **Edit** button or press **F1 (Edit)** key.



Either touch **Clear** button or press **F4 (Clear)** key.



Input the axis number to have the position delete and the range of the position number, and either touch **Clear** button or press **F2** (Clear) key. When you want to delete all the position data, touch **All Clear** button or press **F3** (All Clr). If you touch **Cancel** button or press **ESC** key, the display returns to the RC edit menu screen.



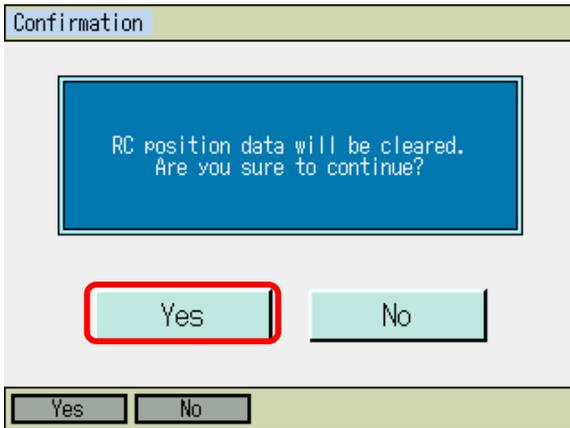
If you touch in the input area on “Axis No.” or “Position No.”, the cursor will be shown on the touched item.

Input the position number by displaying the numeric keys on the touch panel by touching **Keyboard** button or input the position number on the hardware numeric keys.

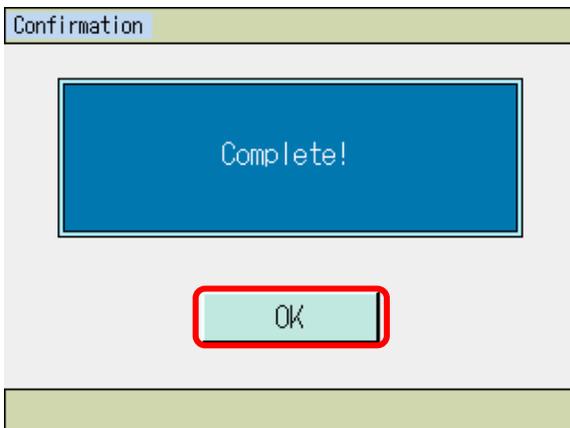
Touch on the numeric part if you want to input on the touch panel numeric keys. The contents of input will be shown in the box above the touch panel numeric keys. When confirming the input number, touch **ENT**. The touch panel numeric key close and the cursor moves to the next input box.

When redoing the input, touch **ESC**. When it is desired to cancel the input, touch **ESC** again, and the touch panel numeric keys will close. Also **ESC** key on the hardware acts in the same way.

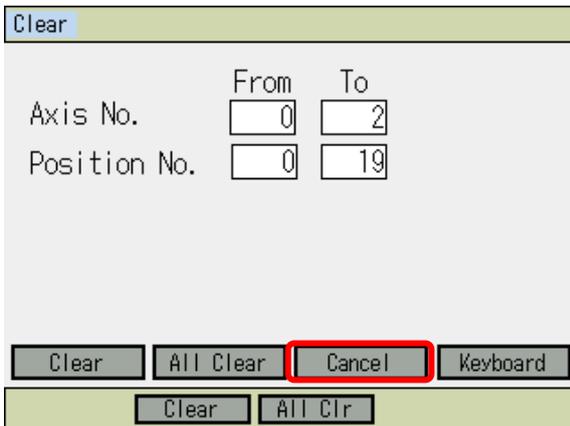
When it is desired to use the hardware numeric keys for inputting, input the desired number by pressing the numeric keys and press **ENT** key to confirm your input. Once confirmation is made, the cursor moves to the next input box. Also, the detailed input in work is shown in the axis number box and the position number box. When redoing the input, touch **ESC**. It is not available to input numbers on the hardware numeric keys while the touch panel numeric keys are displayed on the screen.



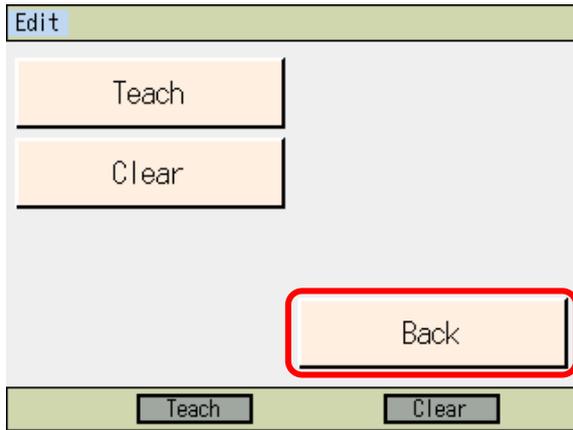
Either touch **Yes** button or press **F1** (Yes) key.  
 Either touch **No** button, or press **F2** (No) or **ESC** key to return to the RC position clear screen.



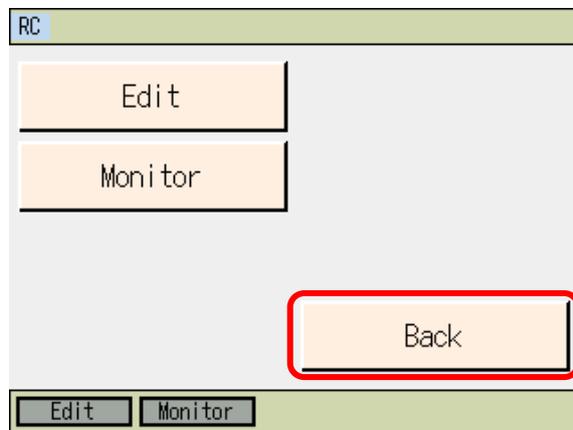
The display shows this screen when the position clear is finished.  
 Either touch **OK** button, or press **ESC** or **↵** key to return to the RC position clear screen.



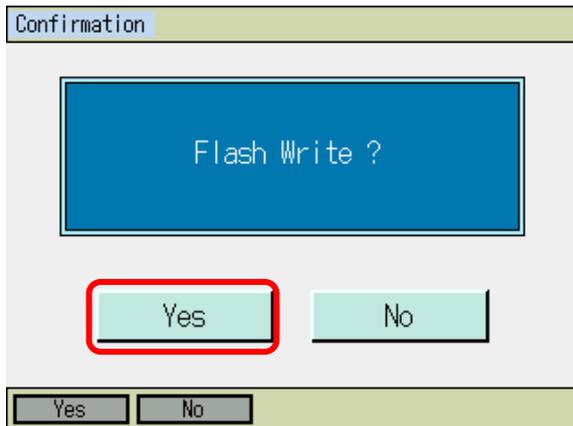
Either touch **Cancel** button or press **ESC** key.



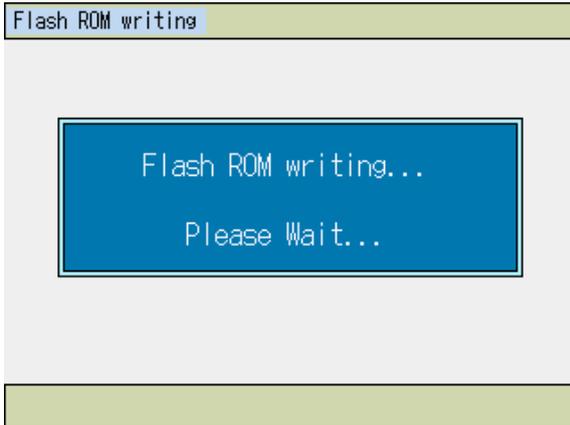
Either touch **Back** button or press **ESC** key.



Either touch **Back** button or press **ESC** key.



To write the data to the flash ROM, either touch **Yes** button or press **F1** (Yes) key.  
When it is not necessary to write the data to the flash ROM, touch **No** button, or press **F2** (No) or **ESC** key.



“Flash ROM writing...” flashes during the flash ROM writing.

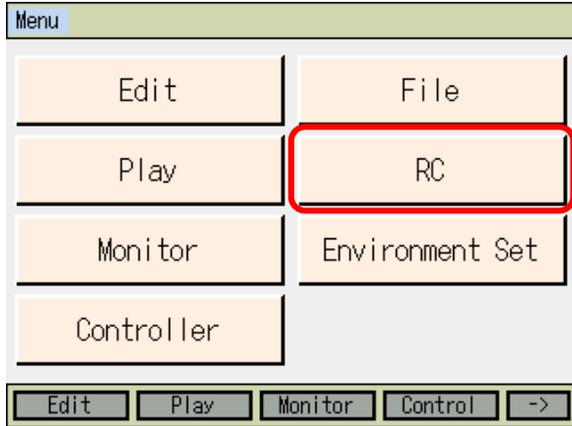
***Never turn off the power to the Controller at this time.***



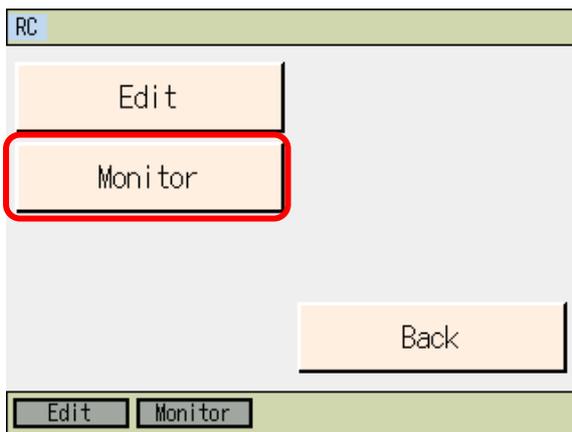
The display shows this screen when the flash ROM writing is finished.  
Either touch **OK** button, or press **ESC** or **↵** key to return to the RC menu screen.

## 18.2 RC Actuator Monitoring

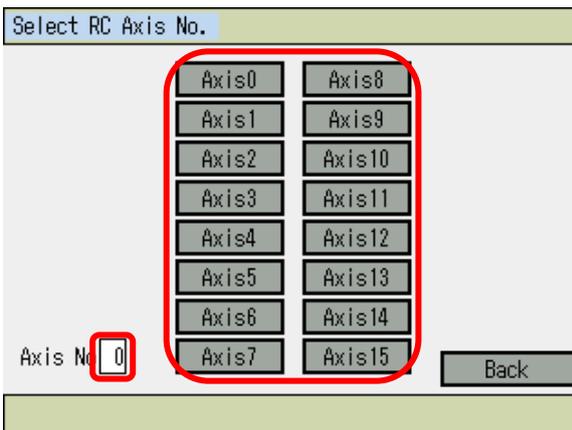
The RC actuator's status, current position and alarm code are displayed.



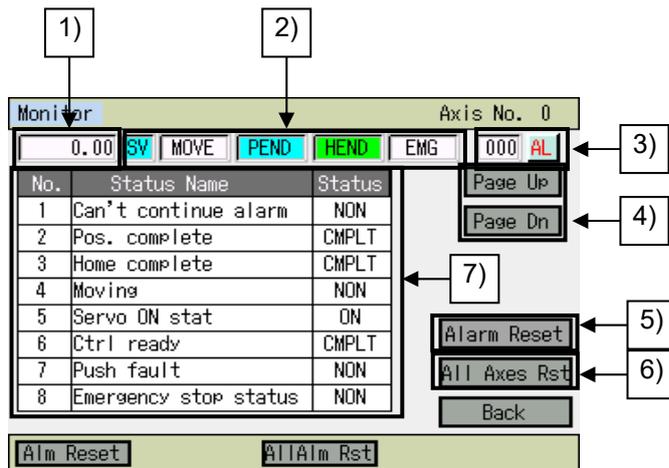
Either touch **RC** button or press **SF (->) → F2 (RC)** keys in the menu screen.



Either touch **Monitor** button or press **F2 (Monitor)** key.

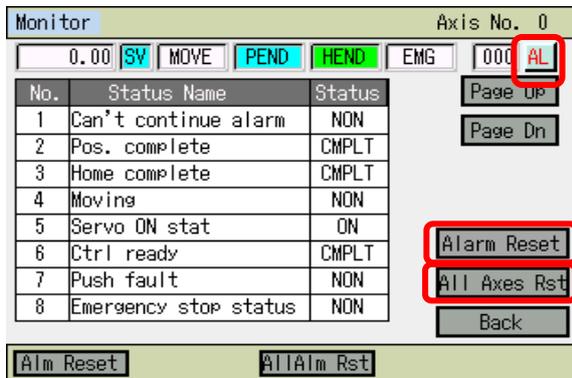


Select the RC axis number to monitor by touching the appropriate button. Also, when the cursor is placed in "Axis No." box, it is available to select by inputting an RC Axis number on the hardware numeric keys and pressing **↵** key. The display returns to the RC menu screen if you either touch **Back** button or press **ESC** key.



- 1) The current position [mm] is displayed.
- 2) The status of the actuator is displayed.  
 SV : Turns on when the servo is on  
 MOVE : Turns on during operation  
 PEND : Turns on when positioning is finished  
 HEND : Turns on when home-return operation is finished  
 EMG : Turns on during emergency stop
- 3) An alarm code is displayed.  
 If you touch **AL** button, an alarm reset is held on the axis in display.
- 4) Touch **Page Up**/**Page Dn** buttons or **PAGEUP**/**PAGEDOWN** keys and the status displayed in 7) switches.
- 5) Either touch **Alarm Reset** button or press **F1** (Alm Reset) key, and the display shows the RC alarm reset screen.
- 6) Touch **All Axes Rst** button or press **F3** (AllAlm Rst) key, and an alarm reset is held on all the axes.
- 7) The status of the actuators and RC controllers are displayed.

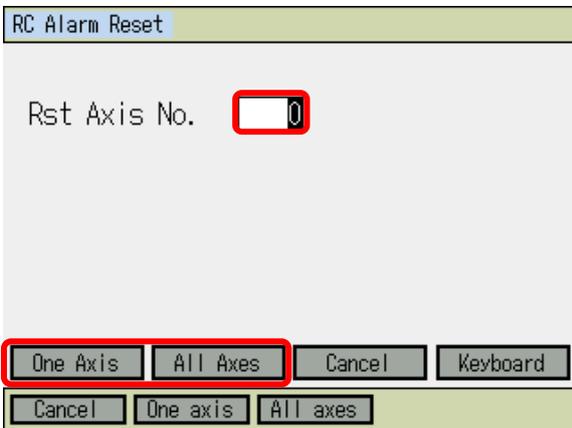
[Alarm Reset]



If you want to have an alarm reset on the axis in display, either touch **AL** button.

When you want to have an alarm reset on the RC axes you want to choose, either touch **Alarm Reset** button or press **F1** (Alm Reset) key.

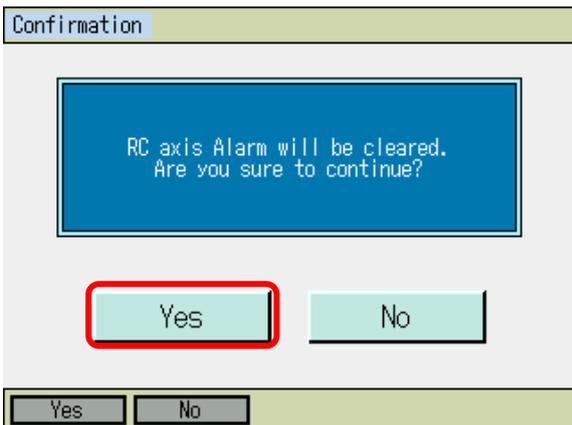
If you want to have an alarm reset on all the axes, either touch **All Axes Rst** button or press **F3** (AllAlm Rst) key.



When either touched **Alarm Reset** button or pressed **F1** (Alm Reset) key, the display shows the RC alarm reset screen.

Select the axis number you want to have an alarm reset, and either touch **One Axis** button or press **F2** (One axis) key.

Either touch **All Axes** button or press **F3** (All axes) key, and an alarm reset is held on all the RC axes.



Either touch **Yes** button or press **F1** (Yes) key. Either touch **No** button, or press **F2** (No) or **ESC** key to return to the RC monitor screen.



The display shows this screen when the alarm reset is finished.  
Either touch **OK**, or press **ESC** or **↵** key to return to the RC monitor reset screen.

## 18.3 User Data Hold Memory Initialization

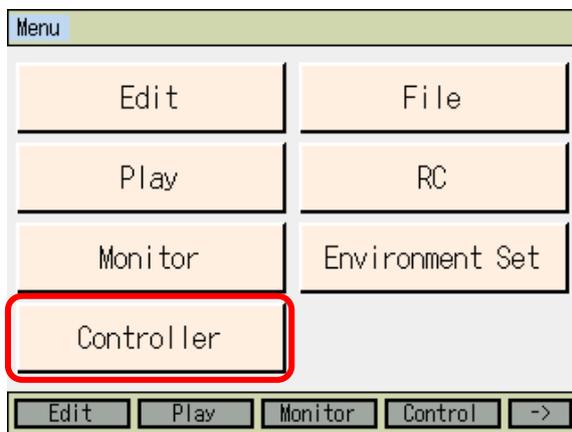
### 18.3.1 Description

(6A1) "UBM Data Construction Change Error" will be generated if changes are made in I/O Parameter No. 502 "RC Gateway Position Data Definition Max. Axis Number" and 503 "RC Gateway Position Data Definition Position Data Points", and software reset is held after the flash ROM writing. When the error occurs, the initialization of the user data hold memory is required.

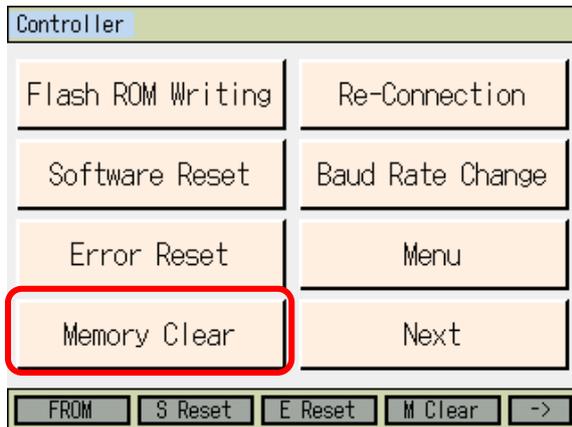
**[Caution]**

*When the user data hold memory is initialized, all the RC-axis position data items are cleared. Backup the RC position data items using the personal computer (PC) application software for XSEL or TB-01.*

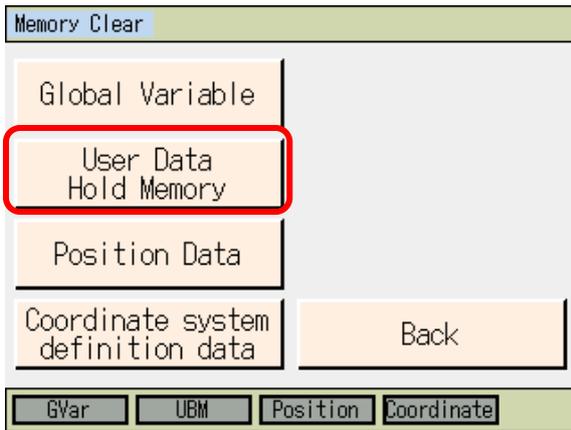
### 18.3.2 Operation Procedure



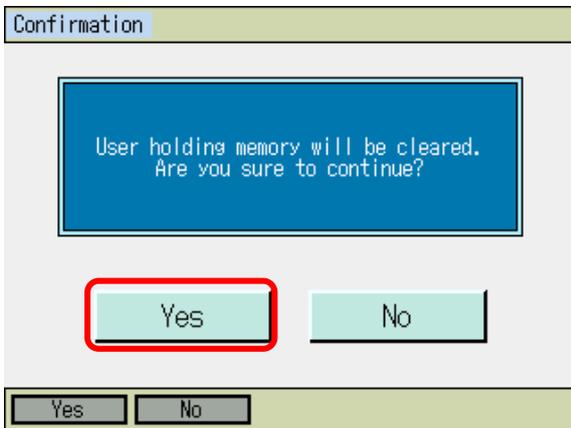
Either touch **Controller** button or press **F4** (Control) key.



Either touch **Memory Clear** button or press **F4** (M Clear) key.



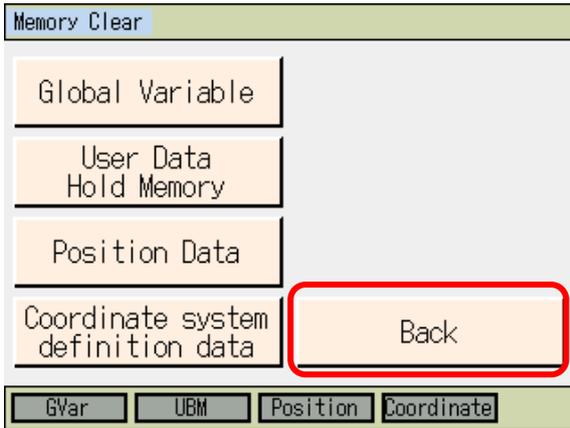
Either touch **User Data Hold Memory** button or press **F2** (UBM) key.



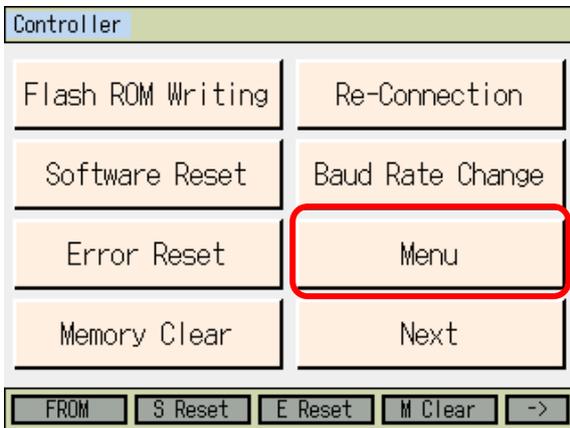
Either touch **Yes** button or press **F1** (Yes) key. Either touch **No** button, or press **F2** (No) or **ESC** key to return to the memory initialization menu screen.



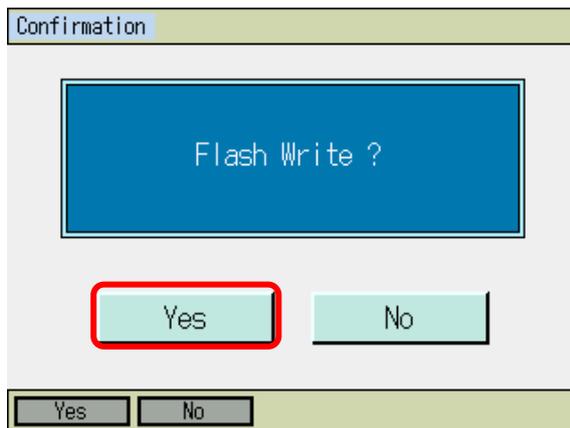
The display shows this screen when the initializing in the user data retaining memory is finished. Either touch **OK** button, or press **ESC** or **↵** key to return to the memory initialization menu screen.



Either touch **Back** button or press **ESC** key.



Either touch **Menu** button or press **ESC** key.



To write the data to the flash ROM, either touch **Yes** button or press **F1** (Yes) key. When it is not necessary to write the data to the flash ROM, touch **No** button, or press **F2** (No) or **ESC** key.



“Flash ROM writing...” flashes during the flash ROM writing.

***Never turn off the power to the Controller at this time***



The display shows this screen when the flash ROM writing is finished.  
Either touch **OK** button, or press **ESC** or **↵** key to return to the main menu screen.

## 19. Extended Motion Control Function Related Associated

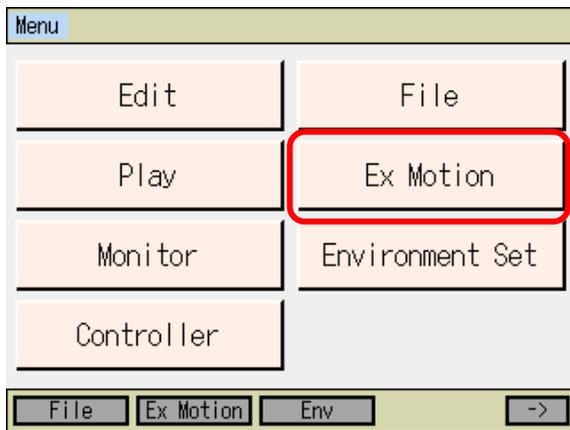
In the case of the XSEL-RA/SA/RAX/SAX/RAXD/SAXD controllers, the following operations are available.

- Extended Motion Control Position Data Editing
- Extended Motion Control Axis Monitoring

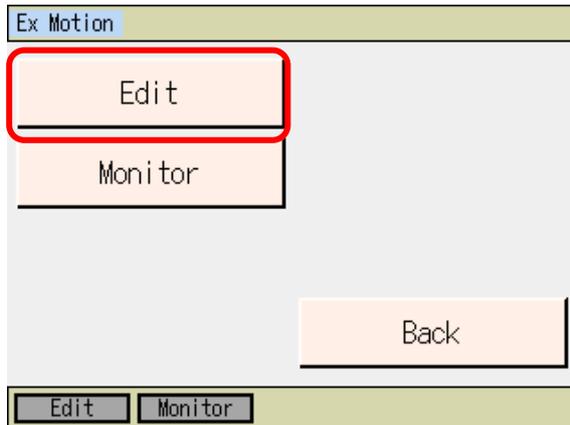
### 19.1 Extended Motion Control Position Data Editing

#### 19.1.1 Extended Motion Control Position Data Creation

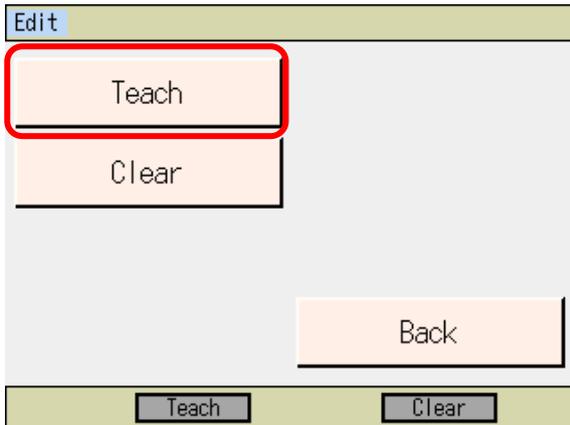
The extended motion control position data is to be edited.



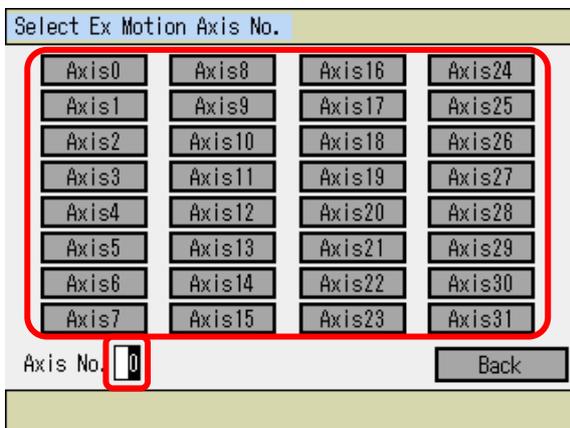
Either touch **Ex Motion** button or press **SF(->)** → **F2** (Ex Motion) keys in the menu screen.



Touch **Edit** in the Ex Motion menu screen or press **F1** (Edit) key.

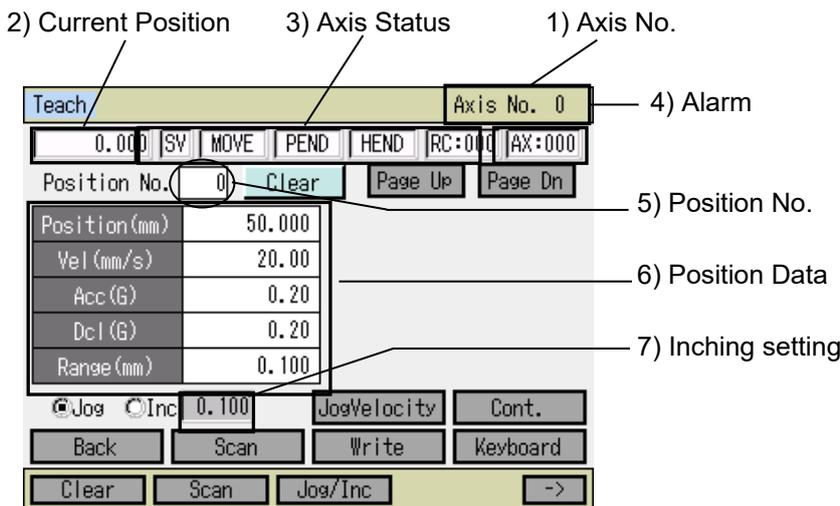


Either touch **Teach** button or press **F2** (Teach) key in the Ex Motion Edit menu screen.



Select the extended motion control axis number to have the position edit by touching the appropriate button. Also, when the cursor is placed in "Axis No." box, it is available to select by inputting an extended motion control axis number on the hardware numeric keys and pressing **↵** key. The display returns to the Ex Motion Edit menu screen if you either touch **Back** button or press **ESC** key.

[Display Items in the Extended Motion Teaching Screen]



- 1) Axis No.  
The axis number in edit is displayed.
- 2) Current Position  
The current position [mm] of the actuator is displayed.

- 3) Axis Status  
The status of the actuator is displayed.  
SV : Turns on when the servo is on  
MOVE : Turns on during operation  
PEND : Turns on when positioning is finished  
HEND : Turns on when home-return operation is finished
- 4) Alarm  
An alarm code is displayed.  
RC : RC-Axis Alarm Code  
(Alarm code for the alarm generated in the RC controller is displayed).  
AX : Axis Related Alarm Code  
(Alarm code for the alarm generated in the XSEL controller is displayed).
- 5) Position No.  
The position number is shown.
- 6) Position Data  
Position (mm)  
The target position for the actuator to be moved is indicated.  
Vel (mm/s)  
The velocity of the actuator in operation is indicated.  
Acc (G)  
The acceleration of the actuator in operation is indicated.  
Dcl (G)  
The deceleration of the actuator in operation is indicated.  
Range (mm)  
Indication made to determine how much before the target position the positioning should finish.
- 7) Inching setting  
The distance in the inching operation (distance of movement in each press of the jog button) is indicated. [Unit: mm]

[Explanation on each Touch Panel Button (Function Key)]



- Clear : F1 (Clear) : Clears the displayed position data.  
Caution: At the time when this function is executed, the position data is cleared. Please take care.
- Scan : F2 (Scan) : Inputs the current position in the target position data section.
- Jog/Inc : F3 (Inc) : Operation is switched during jog execution (jog/inching).



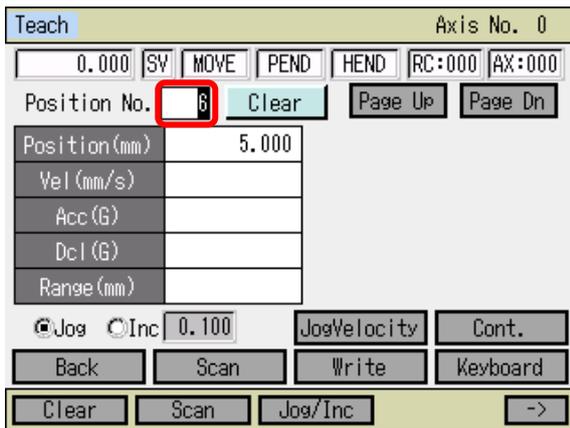
- Cont : F1 (Cont) : Execute continuance operation.
- JVel : F2 (JVel) : The velocity at the time of jog feeding execution is designated.

[Addition and Change of Position Data]

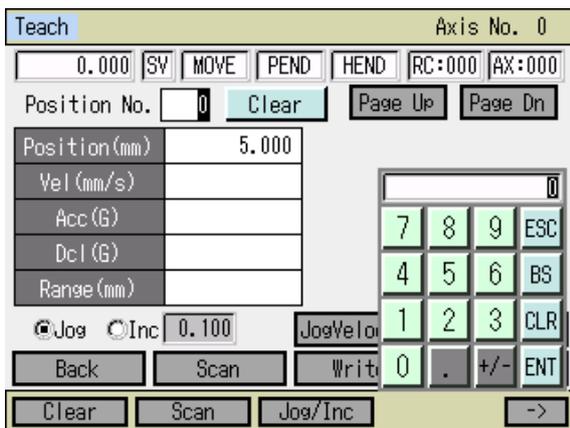
First, indicate the position number that an addition or a change is required. When the screen is opened for the first time, a cursor is flashing in the position number input box. (When no flashing is confirmed, touch in the position number input box.)

[Caution]

The position data starts from No. 0 unlike XSEL.



Input the position number by displaying the numeric keys on the touch panel by touching **Keyboard** button or input the position number on the hardware numeric keys.



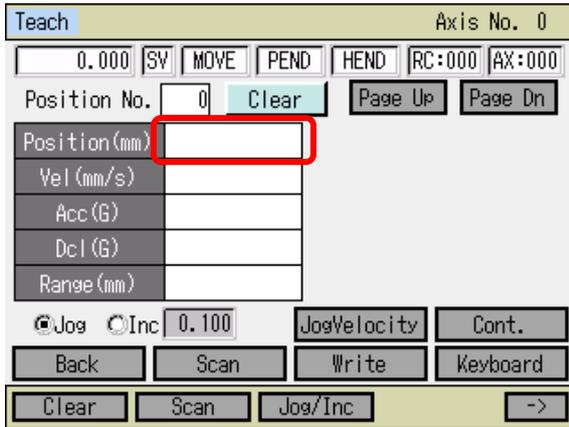
Touch the numerical part when it is desired to input number on the touch panel numeric keys when inputting the position number. The contents of input will be shown in the box above the touch panel numeric keys. When confirming the input number, touch **ENT**. The touch panel numeric keys close and the data of the indicated position number is displayed. When redoing the input, touch **ESC**. When it is desired to cancel the input, touch **ESC** again, and the touch panel numeric keys will close. Also **ESC** key on the hardware acts in the same way.

When it is desired to use the hardware numeric keys for inputting, input the desired number by pressing the numeric keys and press **ENT** key to confirm your input. The contents of input are displayed in the position number box. When redoing the input, press **ESC** key. It is not available to input numbers on the hardware numeric keys while the touch panel numeric keys are displayed on the screen.

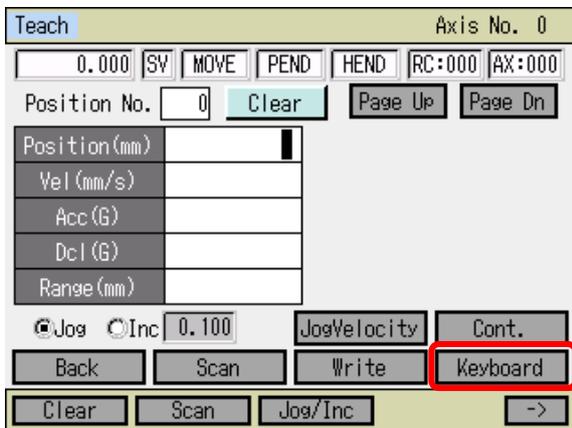
\* The position number can also be changed on **Page Up/Page Dn** buttons in the screen or **PAGEUP/PAGEDOWN** keys on the hardware keys.

Next, show the cursor to the input part in the item you want to make an input. To show the cursor, touch on the input part (the white area in the background, or area in the red frame for target position (mm)) in the item you want to make an input.

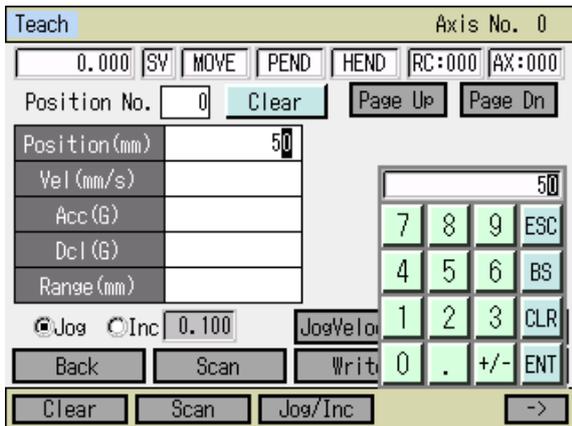
(If the cursor is shown, it can be moved with **←** **→** **▲** **▼** keys pressed.)



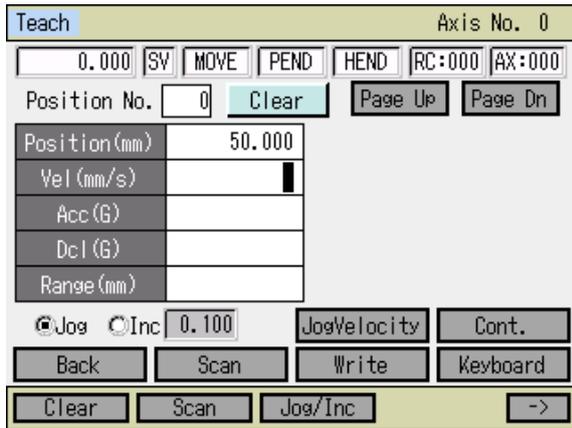
When the target position (mm) is to be input, touch the section inside the red frame.



With the cursor shown in the appropriate area, touch **Keyboard** button to make the touch panel numeric keys appear on the screen to input a number, or input a number on the hardware numeric keys.



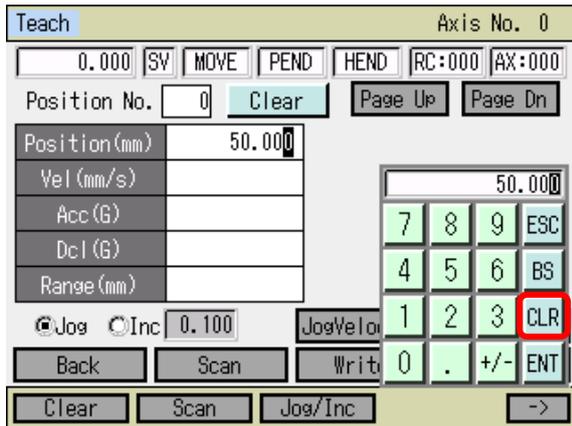
If you want to input 50 to Position (mm), touch **Keyboard** button to show the touch panel numeric keys, and touch **5 0 ENT** on the touch panel numeric keys.



If the input is accepted, the cursor moves to the input box for Vel (mm/s). Then, input values for Vel (mm/s), Acc (G), Push (%) and Range (mm).

**[Caution]**

In the TB-01, the input range check is not performed. Confirm the specifications for the axis in using, and input the data.



When you want to erase the data that is already input, touch **CLR** **ENT** on the touch panel numeric keys to delete what you want.

On the hardware numeric keys, data already input can be deleted with **BS** and **↵** to remove.

[Data Transfer]

Teach		Axis No. 0	
0.000	SV	MOVE	PEND
	HEND	RC:000	AX:000
Position No.	0	Clear	Page Up Page Dn
Position (mm)	50.000		
Vel (mm/s)	20.00		
Acc (G)	0.20		
Dcl (G)	0.20		
Range (mm)	0.100		
<input checked="" type="radio"/> Jog	<input type="radio"/> Inc	0.100	JogVelocity Cont.
Back	Scan	Write	Keyboard
Clear	Scan	Jog/Inc	->

After data input is complete, either touch **Write** button on the touch panel or press **WRT** key on the hardware keys to transfer the data to the controller.

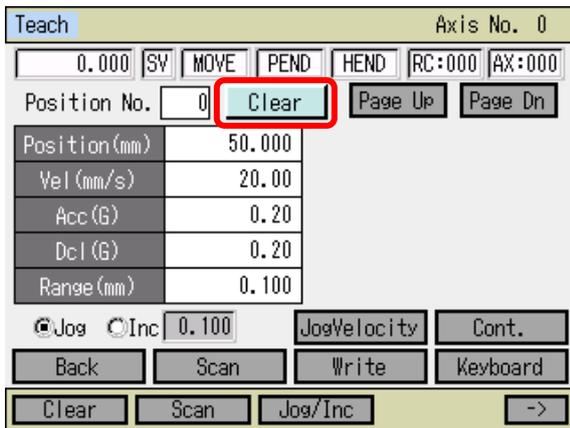
[Caution]

The input data would not be written to the controller unless the operation above is conducted. When the position No. is changed without performing the above operation, the input data is cleared.

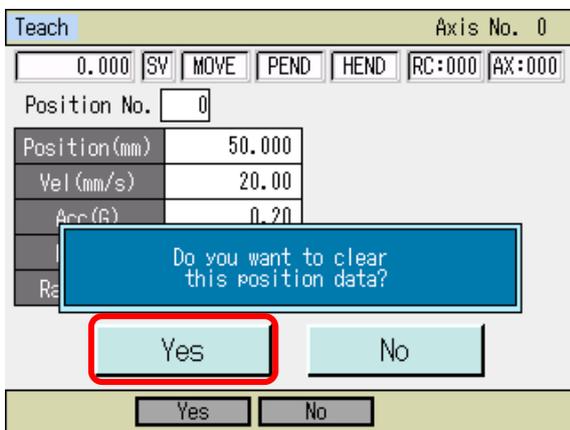
Teach		Axis No. 0	
0.000	SV	MOVE	PEND
	HEND	RC:000	AX:000
Position No.	0	Clear	Page Up Page Dn
Position (mm)	50.000		
Vel (mm/s)	20.00		
Acc (G)	0.20		
Dcl (G)	0.20		
Range (mm)	0.100		
<input checked="" type="radio"/> Jog	<input type="radio"/> Inc	0.100	JogVelocity Cont.
Back	Scan	Write	Keyboard
Clear	Scan	Jog/Inc	->

Once the transfer to the controller is complete, the position number gets incremented and the next data input screen is shown.

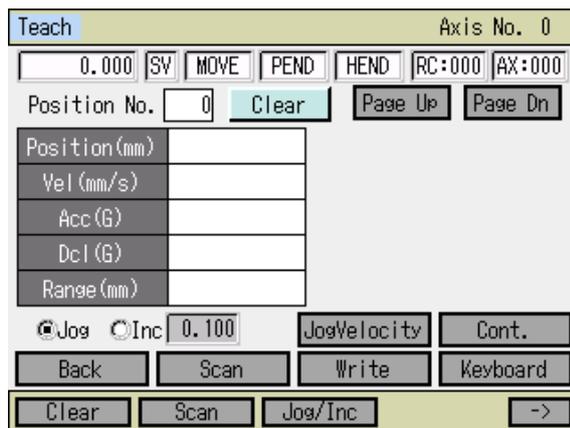
[Data Clear]



When you want to delete the data in the position number being displayed, touch **Clear** button in the touch panel, or press **F3** (Clear) key on the hardware keys.



Press **Yes** button in the touch panel or press **F2** (Yes) key on the hardware keys to transfer the data to the controller.



Once the clear is succeeded, the data in the same position number (after cleared) is displayed.

### 19.1.2 Extended Motion Control Position Data Input using the Teaching Operation

One of the extended motion control position data input method, is teaching (moving the extended motion control axis to the appropriate position and such extended motion control axis current position is captured as data).

The methods of moving the extended motion control axis to the appropriate position, are jog feeding/inching operation and manual movement (direct teaching) with the servo turned off.

The basic flow of teaching is as follows:

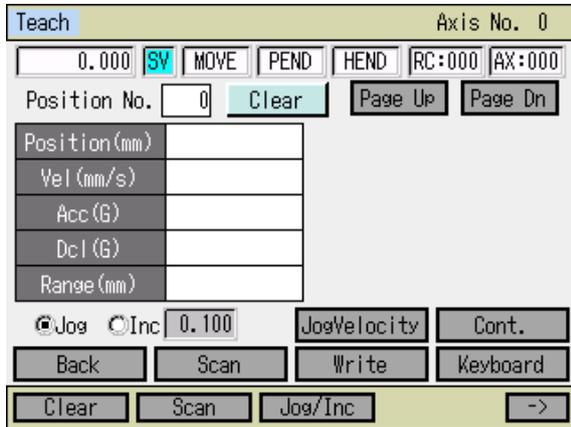
1) Move the extended motion control axis. (Jog operation • inching operation • manual movement (direct teaching) with a servo OFF status)  
Select position No. and axis No. for data input.

2) Take the data of the current position of the extended motion control axis into the teaching screen.

3) Transmit the data to the controller.

### (1) Servo ON/OFF Operation

Using this operation, the RC actuator servo-motor is turned ON/OFF. This operation is available only in the single axis.

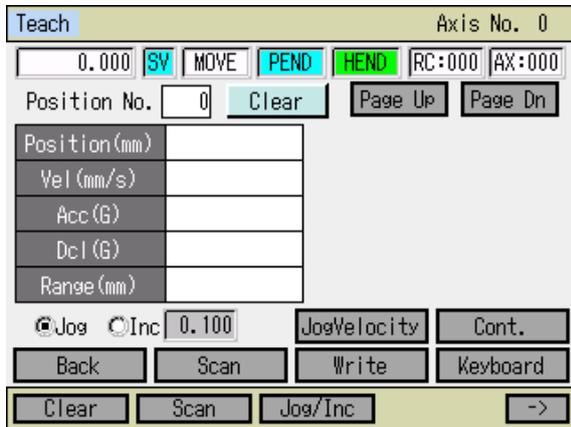


Press the **SERVO** key  
 Presses the **[1+]** key after the SERVO LED is turned ON to turn ON the servo-motor.  
 (When the servo-motor is to be turned OFF, press the **SERVO** key and after the SERVO LED is turned ON, press the **[1-]** key).

The condition of servo-on/off can be checked on the axis status display "SV", which turns on when the servo is on and turns off when the servo is off.

### (2) Home Return Operation

In the case of the incremental encoder type extended motion control axis, after the power is turned ON or software is reset, home return operation is required before the teaching operation. This operation is available only in the single axis.



Turn the servo-motor ON.  
 Press the **HOME** key.  
 After the HOME LED is turned ON, press the **[1-]** or **[1+]** key to perform the home return operation.

The axis status display "HEND" turns on when the home-return operation is finished.

### (3) Actuator Movement

#### 1) Jogging Operation

Perform the jog feeding operation for the extended motion control axis.  
This operation is available only in the single axis.

Turn the servo-motor ON.

Press the **1-** or **1+** key to move the actuator to any position. (“+” means the movement to the plus direction on the coordinates and “-” means the movement to the minus direction on the coordinates).

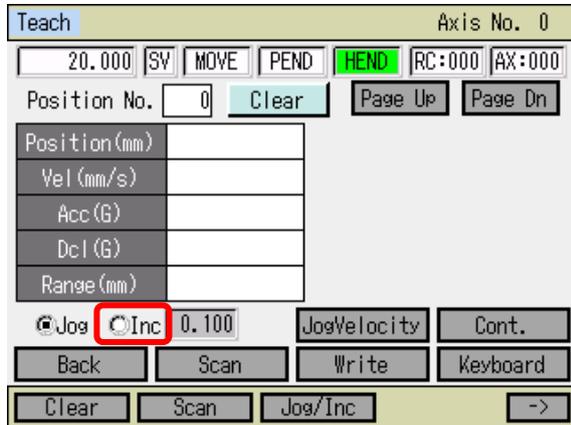
The actuator movement speed, etc., at the time of jog feeding, can be changed using the **JogVelocity** button.

Either touch **Jog Velocity** button or press **F2** (JVel) key. (When JVel is not shown on F2, use SF key to make it appear.)

Input the parameters for the Vel (Velocity), Acc (Acceleration) and Dcl (Deceleration) at the time of jog feeding using the numeric keys, and press the return key. (The touch panel ten-key pad is opened by means of touching the **Keyboard** button.)  
Either touch **Return** button or press **ESC** key to return to the extension motion teaching screen and perform the jog feeding operation.

## 2) Inching Operation

Perform the inching operation for the extended motion control axis.  
This operation is available only in the single axis.



Teach Axis No. 0

20.000 SV MOVE PEND HEND RC:000 AX:000

Position No. 0 Clear Page Up Page Dn

Position (mm)

Vel (mm/s)

Acc (G)

Dcl (G)

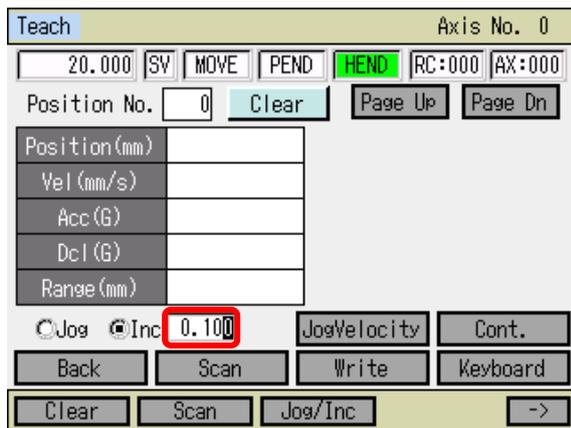
Range (mm)

Jog  Inc 0.100 JogVelocity Cont.

Back Scan Write Keyboard

Clear Scan Jog/Inc ->

Either touch **Inc** button directly or press **F3** (Jog/Inc) to make **Inc** button selected.



Teach Axis No. 0

20.000 SV MOVE PEND HEND RC:000 AX:000

Position No. 0 Clear Page Up Page Dn

Position (mm)

Vel (mm/s)

Acc (G)

Dcl (G)

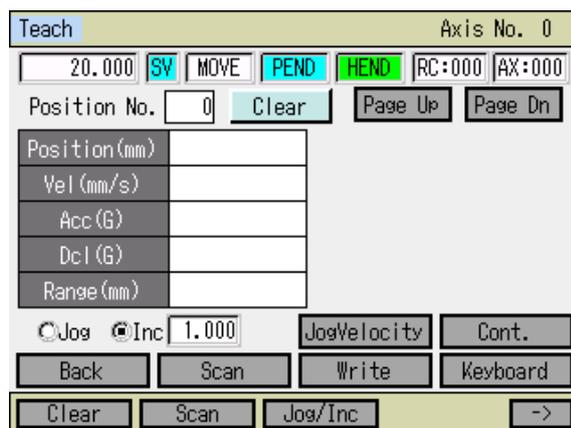
Range (mm)

Jog  Inc 0.100 JogVelocity Cont.

Back Scan Write Keyboard

Clear Scan Jog/Inc ->

Set the inching distance (travel distance for each pressing of the JOG key).  
Show the cursor in the input area beside “Inc” and input a value on the numeric keys and press **Enter** key. (Touch **Keyboard** button to open the touch panel numeric keys if you want to use them.)  
The numerical value input range is from 0.00 to 1.00 (Unit: mm).



Teach Axis No. 0

20.000 SV MOVE PEND HEND RC:000 AX:000

Position No. 0 Clear Page Up Page Dn

Position (mm)

Vel (mm/s)

Acc (G)

Dcl (G)

Range (mm)

Jog  Inc 1.000 JogVelocity Cont.

Back Scan Write Keyboard

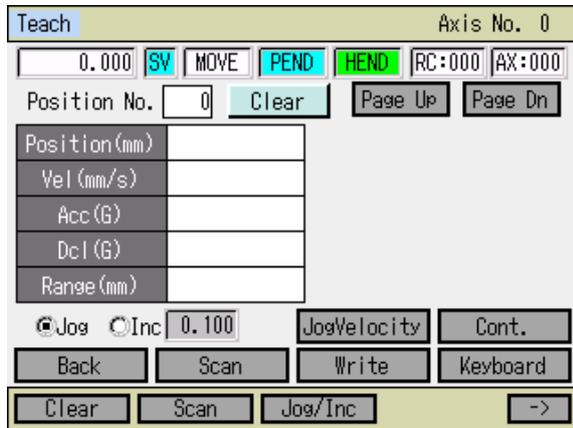
Clear Scan Jog/Inc ->

Turn the servo-motor ON.  
The condition of servo-on/off can be checked on the axis status display “SV”, which turns on when the servo is on and turns off when the servo is off.

Teach		Axis No. 0	
21.000	SV	MOVE	PEND
	HEND	RC:000	AX:000
Position No.	0	Clear	Page Up
			Page Dn
Position (mm)			
Vel (mm/s)			
Acc (G)			
Dcl (G)			
Range (mm)			
<input type="radio"/> Jog	<input checked="" type="radio"/> Inc	1.000	JogVelocity
			Cont.
Back	Scan	Write	Keyboard
Clear	Scan	Jog/Inc	->

Press the **1-** or **1+** key to move the actuator to any position. (“+” means the movement to the plus direction on the coordinates and “-“means the movement to the minus direction on the coordinates).

### 3) Manual Movement (direct teaching) with the servo-motor turned OFF



Press the **SERVO** key.

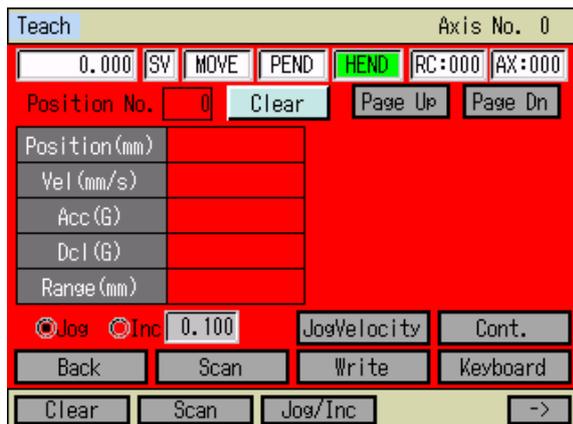
Press **1-** key after the LED for SERVO is turned on to make the servo turned off.

The condition of servo-on/off can be checked on the axis status display "SV", which turns on when the servo is on and turns off when the servo is off.



Pressing the EMERGENCY STOP button switches the display to the emergency stop screen.

Either touch **Back** button or press **ESC** key to return to Teaching screen.

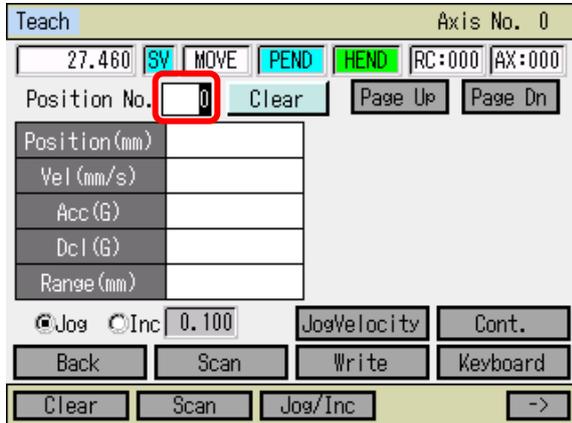


Move the actuator to any given position manually.

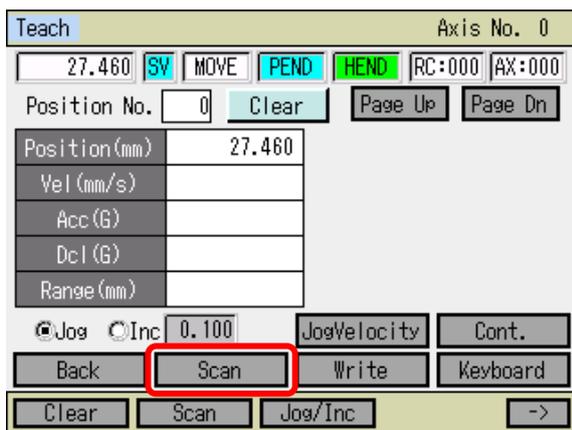
**Warning:**  
Be sure to execute manual movement when the EMERGENCY STOP button is pressed.

(4) Current Position captured as the Data

The chosen extension motion control axis position is taken in the teaching window as the position data.



Set the position No. for the import destination.



Either touch **Scan** button or press **F2** (Scan) key to load the current position to the target position box.

**[Caution]**

- In order to capture the current position data in the target position data section, the home return operation has to be completed.  
Execute it after it is confirmed that "HEND" in the axis status display is turned on.  
If it is executed before the home return operation, the [(9E2) Not yet Homed TEACH] message is displayed and the current position cannot be captured.
- Writing to the controller would not be executed unless you touch **Write**.

### (5) Data Transfer to the Controller

Teach		Axis No. 0	
0.000	SV	MOVE	PEND
Position No. 0		Clear	Page Up
Position (mm)	50.000		
Vel (mm/s)	20.00		
Acc (G)	0.20		
Dec (G)	0.20		
Range (mm)	0.100		
<input checked="" type="radio"/> Jog	<input type="radio"/> Inc	0.100	JogVelocity
Back	Scan	Write	Cont.
Clear	Scan	Jog/Inc	->

After data input is complete, either touch **Write** button on the touch panel or press **WRT** key on the hardware keys to transfer the data to the controller.

Teach		Axis No. 0	
0.000	SV	MOVE	PEND
Position No. 1		Clear	Page Up
Position (mm)	50.000		
Vel (mm/s)	20.00		
Acc (G)	0.20		
Dec (G)	0.20		
Range (mm)	0.100		
<input checked="" type="radio"/> Jog	<input type="radio"/> Inc	0.100	JogVelocity
Back	Scan	Write	Cont.
Clear	Scan	Jog/Inc	->

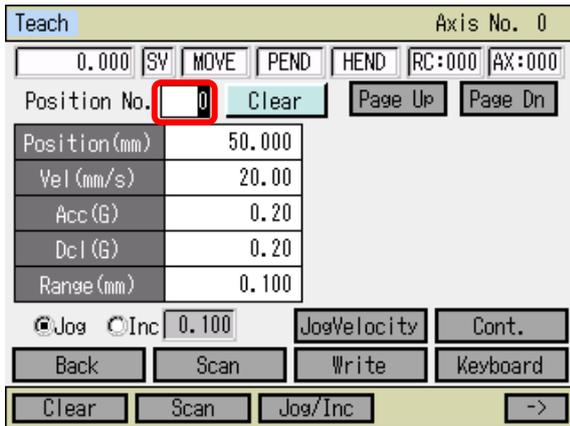
Once the transfer to the controller is complete, the position number gets incremented and the next data input screen is shown.

(6) Position Check

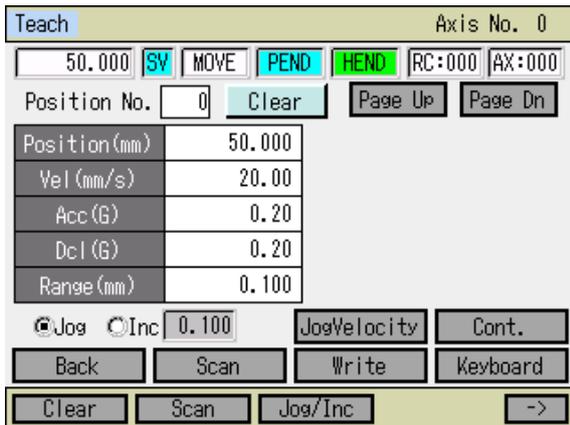
When the extended motion control axis is moved to the place corresponding to the taught position data, the position check can be performed.

1) Movement

Move the extended motion control axis to the position corresponding to the position data transferred to the controller.



Set the position number you want to move to.

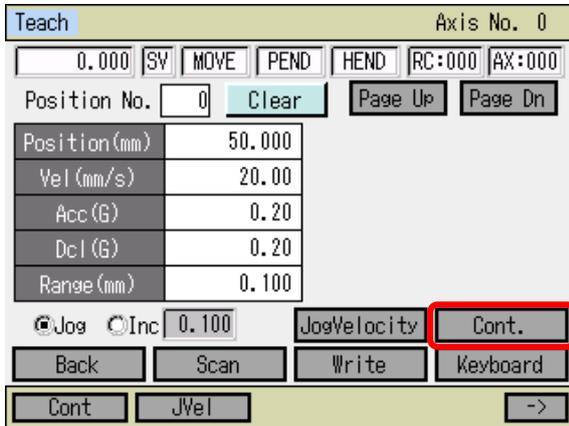


Turn the servo-motor ON.  
Perform the home return operation.

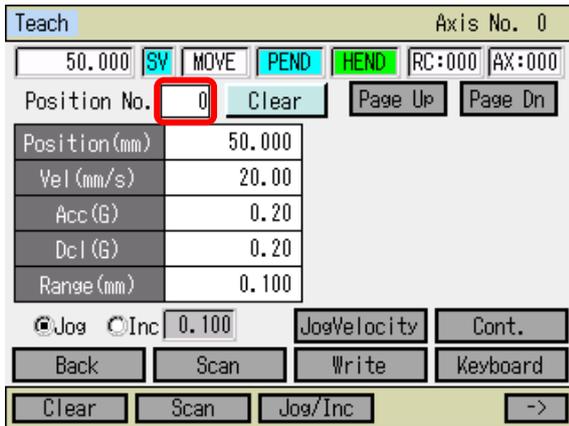
Press the **MOVE** key.  
When the **1-** or **1+** key is pressed after the MOVE LED is turned ON, the axis movement is started.  
When it is stopped on the way, press the **STOP** key.

## 2) Continuous Movement

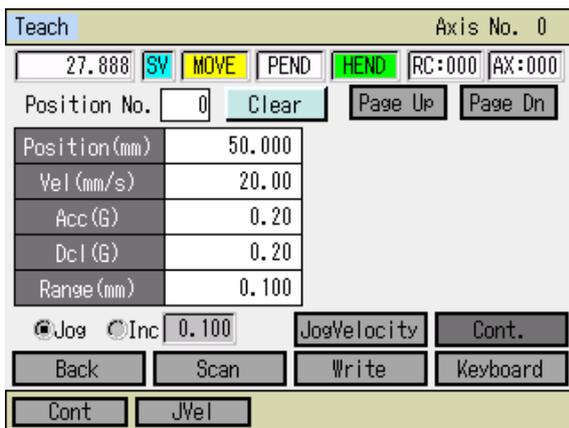
Have the extension control axis moved in link to the point of the position data transferred to the controller.



Either touch **Cont.** button or press **SF** (->) → **F1** (Cont) keys to switch to the continuous operation mode. (When Cont. is not shown on **F1**, use **SF** key to make it appear.)



Set the position number you want to move to first.



Turn the servo-motor ON.  
Perform the home return operation.

Press the **MOVE** key.  
When the **1-** or **1+** key is pressed after the MOVE LED is turned ON, the axis movement is started.  
When it is stopped on the way, press the **STOP** key.

### [Caution]

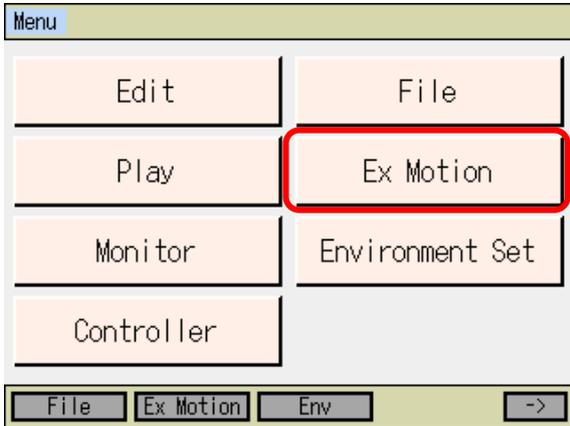
Note that it may take a while before start moving after **1-** or **1+** key is pressed. (The time interval for movement start varies depending on the number of registered position data items).

If **ESC** key is pressed before the continuous operation starts, the operation start will be cancelled.

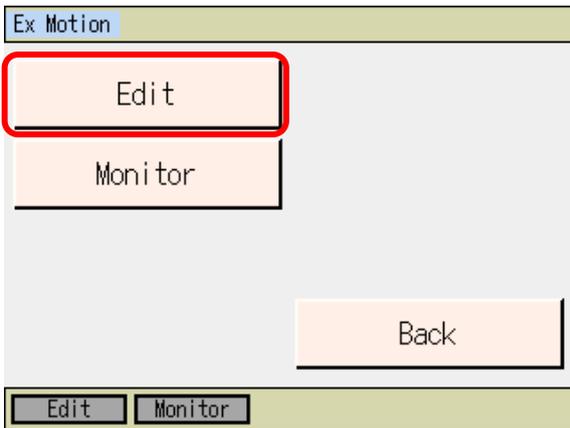
### 19.1.3 Extended Motion Control Axis Position Data Deletion

Position Data with the selected Axis No. and Position No., is deleted.

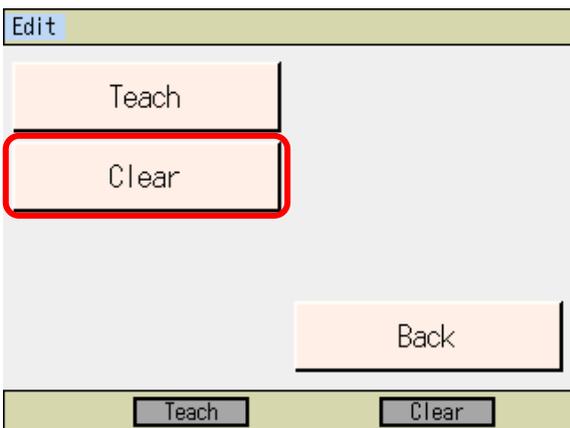
19. Extended Motion Control Function Related Associated



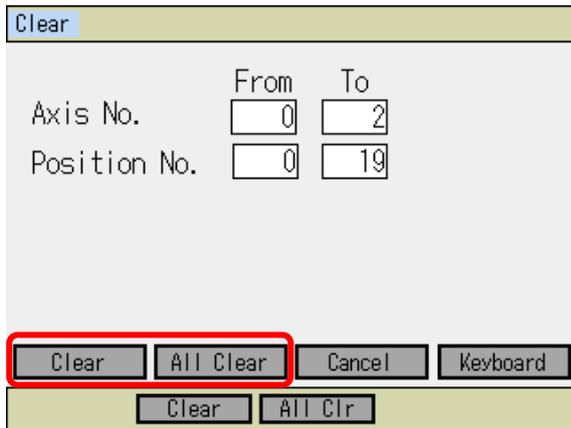
Either touch **Ex Motion** button or press **SF (->)** → **F2** (Ex Motion) keys in the menu screen.



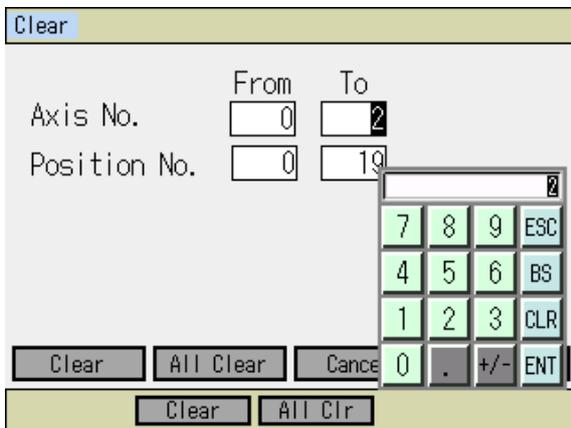
Either touch **Edit** button or press **F1** (Edit) key.



Either touch **Clear** button or press **F4** (Clear) key.



Input the axis number to have the position delete and the range of the position number, and either touch **Clear** button or press **F2** (Clear) key. When you want to delete all the position data, touch **All Clear** button or press **F3** (All Clr). If you touch **Cancel** button or press **ESC** key, the display returns to extension motion edit menu screen.



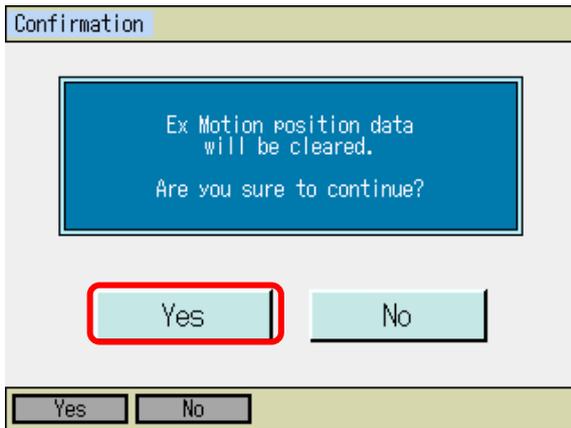
If you touch in the input area on “Axis No.” or “Position No.”, the cursor will be shown on the touched item.

Input the position number by displaying the numeric keys on the touch panel by touching **Keyboard** button or input the position number on the hardware numeric keys.

Touch on the numeric part if you want to input on the touch panel numeric keys. The contents of input will be shown in the box above the touch panel numeric keys. When confirming the input number, touch **ENT**. The touch panel numeric key close and the cursor moves to the next input box.

When redoing the input, touch **ESC**. When it is desired to cancel the input, touch **ESC** again, and the touch panel numeric keys will close. Also **ESC** key on the hardware acts in the same way.

When it is desired to use the hardware numeric keys for inputting, input the desired number by pressing the numeric keys and press **ENT** key to confirm your input. Once confirmation is made, the cursor moves to the next input box. Also, the detailed input in work is shown in the axis number box and the position number box. When redoing the input, touch **ESC**. It is not available to input numbers on the hardware numeric keys while the touch panel numeric keys are displayed on the screen.



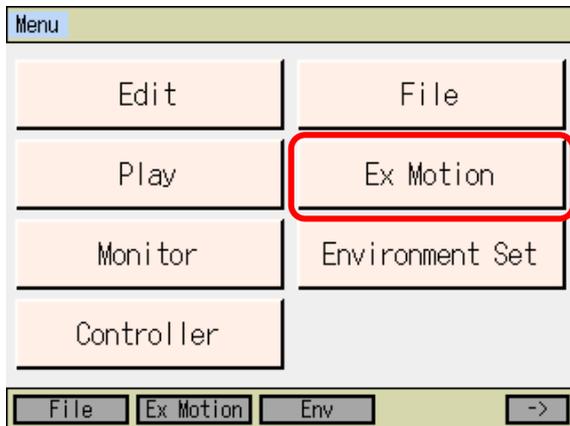
Either touch **Yes** button or press **F1** (Yes) key.  
Either touch **No** button, or press **F2** (No) or **ESC** key to return to the extension motion control position data clear screen.



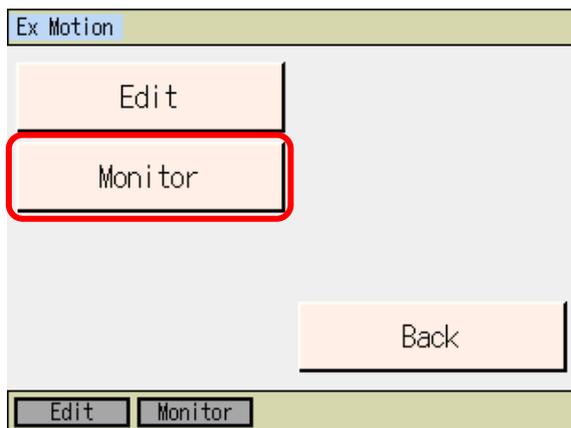
The display shows this screen when the position clear is finished.  
Either touch **OK** button, or press **ESC** or **↵** key to return to the extension motion control position data clear screen.

## 19.2 Extended Motion Control Axis Monitoring

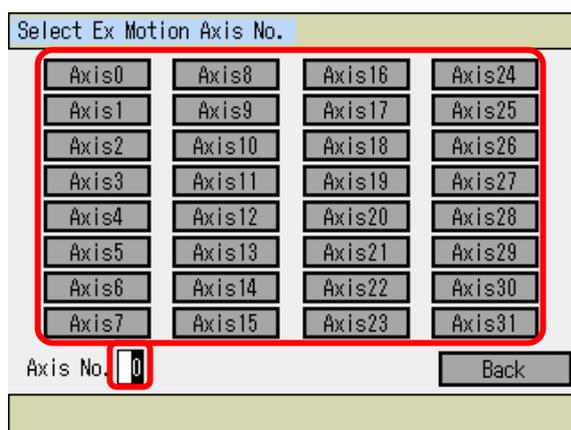
The extended motion control axis's status, current position and alarm code are displayed.



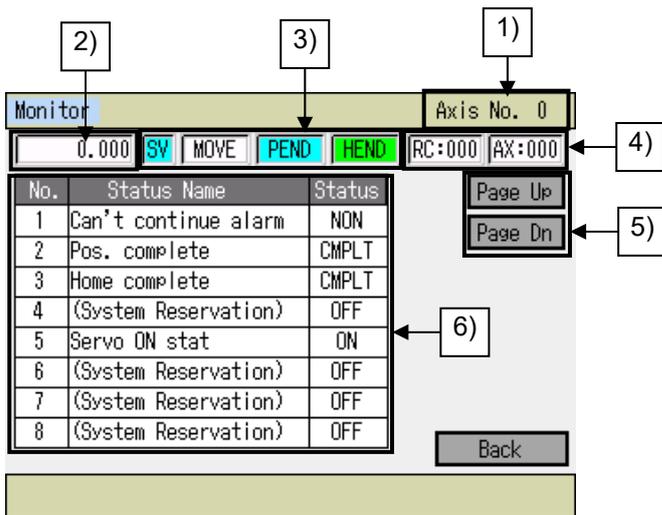
Either touch **Ex Motion** button or press **SF (->) → F2 (Ex Motion)** keys in the menu screen.



Either touch **Monitor** button or press **F2 (Monitor)** key.



Select the extended motion control axis No. to be monitored, by means of touching the corresponding button. Also, when the cursor is placed in "Axis No." box at the bottom, it is available to select by inputting an extension motion control axis number on the hardware numeric keys and pressing **↵** key. The display returns to the Ex Motion menu screen if you either touch **Back** button or press **ESC** key.



- 1) Axis No.  
The axis No. that is being monitored is displayed.
- 2) Current position  
The actuator current position (mm) is displayed.
- 3) Axis Status  
The status of the actuator is displayed.  
SV : Turns on when the servo is on  
MOVE : Turns on during operation  
PEND : Turns on when positioning is finished  
HEND : Turns on when home-return operation is finished
- 4) Alarm  
An alarm code is displayed.  
RC : RC-Axis Alarm Code  
(Alarm code for the alarm generated in the RC controller is displayed).  
AX : Axis Related Alarm Code  
(Alarm code for the alarm generated in the XSEL controller is displayed)..
- 5) Page Up / Page Dn button  
When touched, the items displayed in (6) are changed. Switchover of the display can also be available with PAGE UP / PAGE DOWN in the hardware keys.
- 6) Status Display  
The status of the actuators and controllers are displayed.

## 19.3 User Data Hold Memory Initialization

### 19.3.1 Description

When the I/O Parameter No. 531 “Extended Motion Control Position Data Defined Max. Axis No.”, and 532 “No. of Defined Extended Motion Control Position Data Items” are changed and software is reset after the Flash ROM writing, (6A1) “UBM Data Configuration Change Error” occurs. When the error occurs, the initialization of the user data hold memory is required.

*[Caution]*

*When the user data hold memory is initialized, all the extended motion control axis position data items are cleared.*

*Backup the extended motion control axis position data items using the personal computer (PC) application software for XSEL or TB-01.*

### 19.3.2 Operation Procedure

For the operation procedure, refer to “18.3.2 Operation Description”.

## 20. Data Backup

Data is transferred between the Secure Digital memory card in the touch panel teaching pendant and the controller.

### [Type of Stored Data]

- Position
- Program (individual, total)
- Symbol
- Parameter
- All data backup
- Global data
- Error list
- Coordinate system definition data
- Positions for RC axes
- Positioner mode information
- Extended motion position

### [Compatibility of Stored Data]

- The extensions of the data to be stored in a Secure Digital card are the same as those handled in the PC software for XSEL, thus there is compatibility.  
The extension of the position data for XSEL-J/K for example is “.xpt”.  
(Refer to “List of Supported Models” in PC Software Instruction Manual for XSEL.)
- The error list is object only to backup. It cannot be restored. Data is in a CSV file.

### [Directories of the Stored Data]

The folders to store the backup data of the controller and the folder to read the data from when restoring the data to the controller are as listed below. The directories to store the files cannot be changed. The files existing in other directories other than the specified folders cannot be listed up in the file name list in the file select at the initial setting or restore.

If the folder does not exist, it is automatically created.

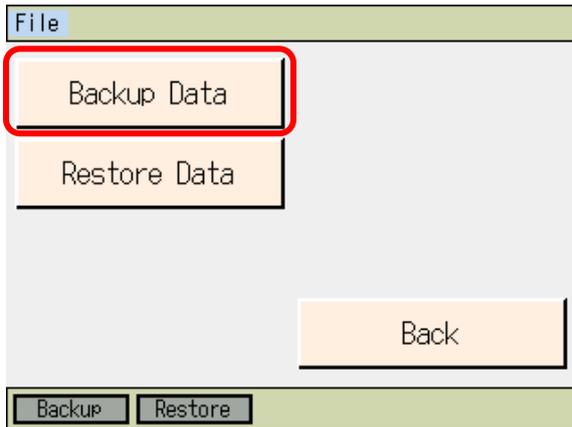
Data Type	Directory
Position	\TB_SEL\Position\File Name
Program (individual)	\TB_SEL\Program\File Name
Program (total)	\TB_SEL\ProgramAll\File Name
Symbol	\TB_SEL\Symbol\File Name
Parameter	\TB_SEL\Parameter\File Name
All data backup	\TB_SEL\Backup\File Name
Global data	\TB_SEL\Global\File Name
Error list	\TB_SEL\ErrorList\File Name
Coordinate system definition data	\TB_SEL\Coordinate\File Name
Positions for RC axes	\TB_SEL\RcPosition\File Name
Positioner mode information	\TB_SEL\PosMode\File Name
Extended motion position	\TB_SEL\ExMotionPos\File Name

## 20.1 Data Backup of the Controller

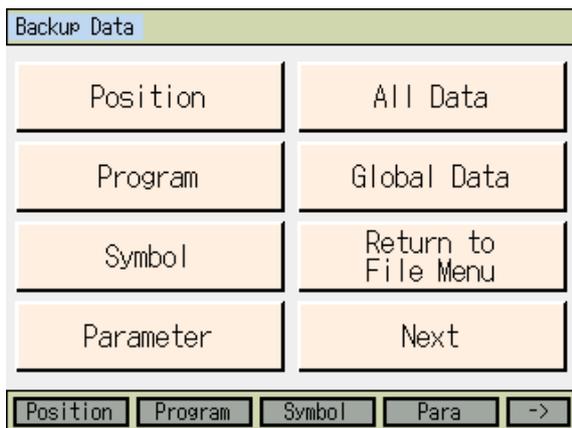
The data in the controller is transferred to the Secure Digital memory card for backup.



Either touch **File** button or press **SF (->)** → **F1** (File) keys in the menu screen.



Either touch **Backup Data** button or press **F1** (Backup) key in the file menu screen.



Select the data type that you want to store either by touching the appropriate button or press from **F1** to **F4** keys.

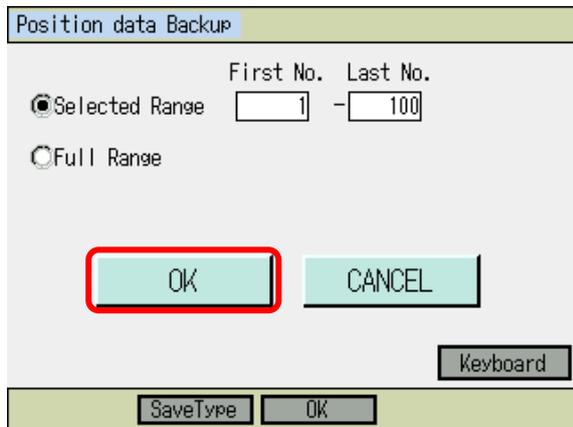
Touch **Next** button and the data types displayed in the screen will be switched.

Press **SF (->)** key and the data types shown on the function keys will be switched.

When you store the data stated below, it is necessary to select the range of file storage after the data type to store is selected.

- (i) Position
- (ii) Program
- (iii) Positions for RC axes

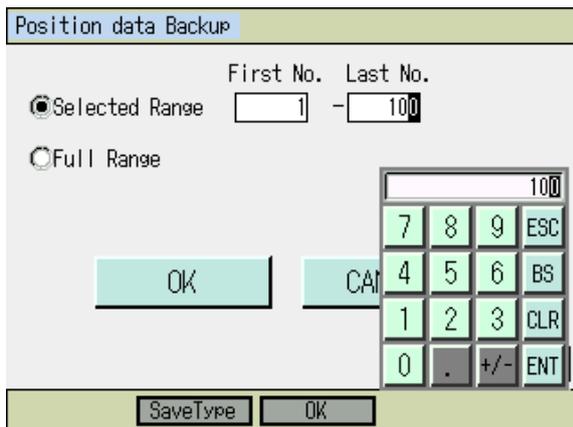
(i) Position



Input the position number range for backup and touch **OK** button or press **F3** (OK) key. If you touch **CANCEL** button or **ESC** key, the display returns to the backup menu screen.

[Selected Range]: Only the position data in the range input in “First No.” and “Last No.” is stored.  
 [Full Range] : All the position data in the controller is stored.

“Selected Range” or “Full Range” is to be selected by touching the appropriate one or by pressing **F2** (Save Type) key.



When you select “Selected Range”, input the position storage range. If you touch in the input area on “First No.” or “Last No.”, the cursor appears in the item you have touched.

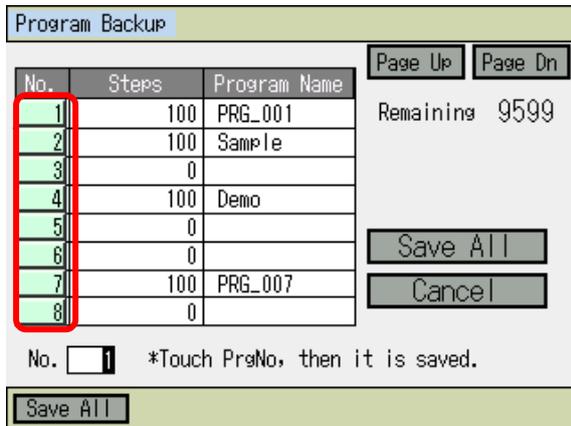
Input the position number by displaying the numeric keys on the touch panel by touching **Keyboard** button or input the position number on the hardware numeric keys.

Touch on the numeric part if you want to input on the touch panel numeric keys. The contents of input will be shown in the box above the touch panel numeric keys. When confirming the input number, touch **ENT**. The touch panel numeric key close and the cursor moves to the next input box. (The cursor will disappear if Last No. is input.)

When redoing the input, touch **ESC**. When it is desired to cancel the input, touch **ESC** again, and the touch panel numeric keys will close. Also **ESC** key on the hardware acts in the same way.

When it is desired to use the hardware numeric keys for inputting, input the desired number by pressing the numeric keys and press **↵** key to confirm your input. Once confirmation is made, the cursor moves to the next input box. (The cursor will disappear if Last No. is input.) Also, the contents of input are displayed in the top (last) number box. When redoing the input, touch **ESC**. It is not available to input numbers on the hardware numeric keys while the touch panel numeric keys are displayed on the screen.

(ii) Program



No.	Steps	Program Name
1	100	PRG_001
2	100	Sample
3	0	
4	100	Demo
5	0	
6	0	
7	100	PRG_007
8	0	

Page Up Page Dn  
Remainings 9599

Save All  
Cancel

No. 1 \*Touch Pr#No, then it is saved.

Save All

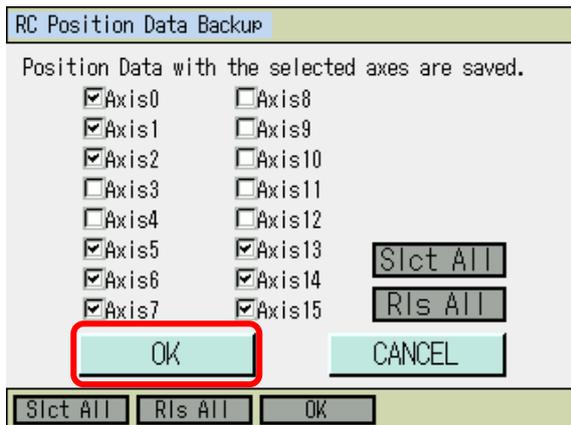
Touch the program number to have a backup, or input a value in the input area at “No.” on the hardware numeric keys and press **[↵]** key. (Touch the input area at “No.” and the cursor will appear.)

If you touch **CANCEL** button or **[ESC]** key, the display returns to the backup menu screen.

Touch **Save All** button or press **[F1]** (Save All) key, and all the programs in the controller can be stored at once as one file.

\* A program number with 0 for number of steps cannot be indicated.

(iii) Positions for RC axes



RC Position Data Backup

Position Data with the selected axes are saved.

Axis0     Axis8  
 Axis1     Axis9  
 Axis2     Axis10  
 Axis3     Axis11  
 Axis4     Axis12  
 Axis5     Axis13  
 Axis6     Axis14  
 Axis7     Axis15

Slect All  
Rls All

OK    CANCEL

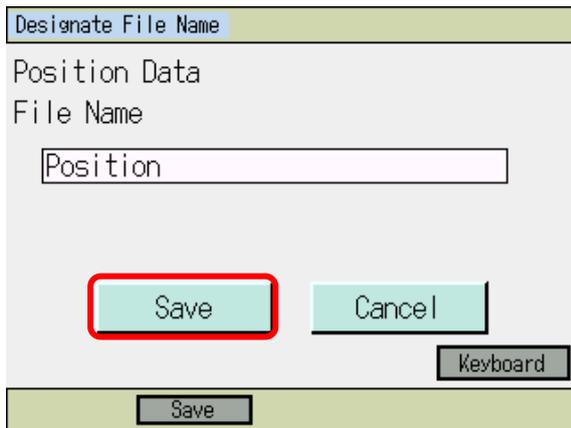
Slect All    Rls All    OK

Touch the RC axis numbers to store to put a check mark. (Only activated axes are subject to select.) After selecting the RC axis numbers to be stored, either touch **OK** button or press **[F3]** (OK) key. If you touch **CANCEL** button or **[ESC]** key, the display returns to the backup menu screen.

Touch **Slect All** button or press **[F1]** (Slect All) key, and all the activated axes can be selected.

Touch **Rls All** button or press **[F2]** (Rls All) key, and all the activated axes can be released from selected.

After the file storage range is selected, the display goes to the file name indication screen. (When data other than programs, positions and RC axis positions is to be stored, the display immediately goes to the file name indication screen after the file data select.)

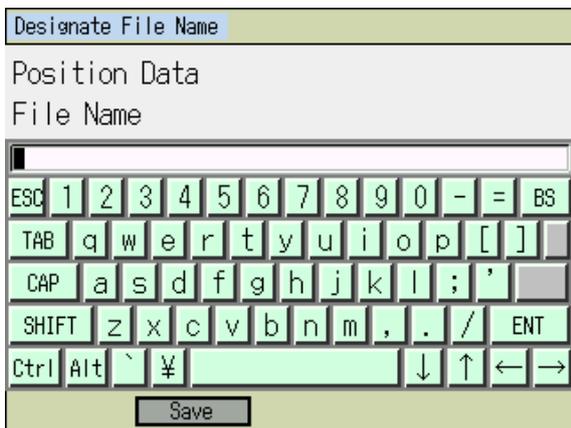


Input the stored file name, and touch **Save** button or press **F2** (Save) key.

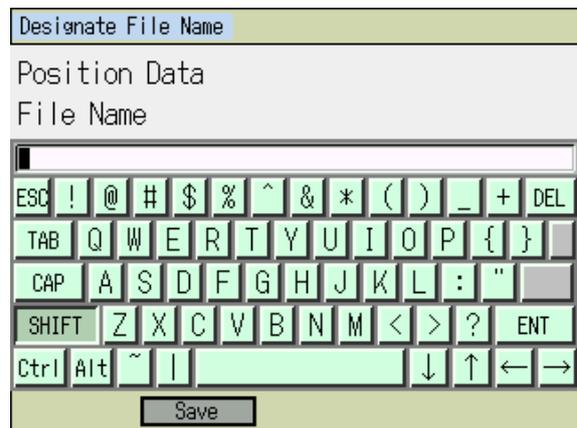
Touch **CANCEL** button or **ESC** key, and the display returns to the previous screen.

\* The number of letters available to input in the stored file name is 31 at maximum with half-size font characters.

Touch in the input area for "File Name", the cursor appears in the item you have touched. With the cursor being displayed, touch **Keyboard** button to show the touch panel numeric keys to input words.



Initial Screen



SHIFT key being touched

Use the keyboard shown in the figures above to input the file name. When you want to input a capital letter, either touch **SHIFT** key or touch **CAP** key to show the capital letters. (Figure on top right) **SHIFT** key gets released every time after a letter is input while **CAP** key is remained on until it is touched again. Touch **ENT** or **TAB** key to confirm the letter you have input.

[Operation of Special Function Keys out of Letters]

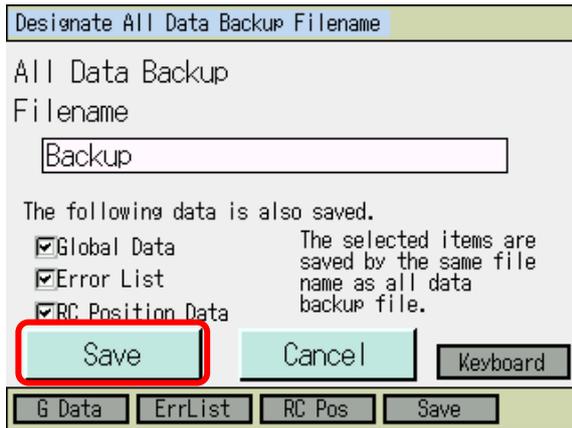
- ESC** cancels what was input and clear all the input conditions. When nothing is input, they keyboard closes by touching this key.
- BS** It deletes a letter in front of the cursor. When nothing is input, all letters are deleted.
- DEL** It deletes letters on the cursor.
- TAB** It confirms the input letters and closes the keyboard.
- ←** It moves the cursor one step to the left.
- It moves the cursor one step to the right.
- ↑** It moves the cursor one step to the left.
- ↓** It moves the cursor one step to the right.
- SHIFT** It converts the letters on the keyboard to capital letters. It is released by inputting one letter or touching **SHIFT** key again.
- CAP** It converts the letters on the keyboard to capital letters. Touch **CAP** key again and it is released.
- ENT** It confirms the input letters and closes the keyboard.

When you want to use the hardware keys for input, letters on the top of a hardware numeric key is what is to be input.

If you look at the hardware numeric key “7”, the letters change in order of A-B-C-a-b-c. Press  key on a letter that you desire to confirm.

When you want to change the input letter to a number, press  key and then press a number key on the hardware numeric keys.

When all the data backup files are to be stored, the following screen will be shown to designate the backup file names.



Input the stored file name, and touch  button or press  (Save) key.

(The way to input the file name is the same as the way to save other data.)

If you touch  button or  key, the display returns to the backup menu screen.

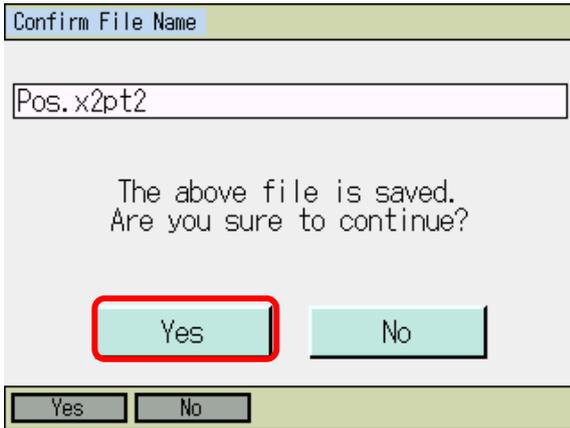
\* The number of letters available to input in the stored file name is 31 at maximum with half-size font characters.

When the backup file for all the data is stored, the global data, error list, RC position data and Extended Motion Position Data can be stored at the same time. In order to store this data, either touch the data name (global data, error list, RC axis position data or extension motion position data) or press a function key (G Data, ErrList, PC Pos or ExMtn Pos) to put a check mark.

\* The items of RC-axis Position Data and Extended Motion Position Data are displayed only when these functions have become available.

\* The file names for the data stored at the same time are the same as that for the backup file for all the data. (Only the extensions differ.)

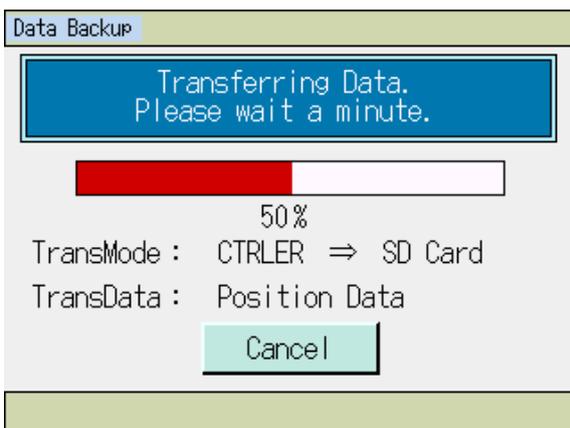
For instance, if the backup file name for all the data is “Backup.xbk”, the file name for the global data stored together is “Backup.xgd”.



Check the storage file name, and touch **Yes** button or press **F1** (Yes) key.  
 Either touch **No** button, or press **F2** (No) or **ESC** key to return to the backup file name indication screen.



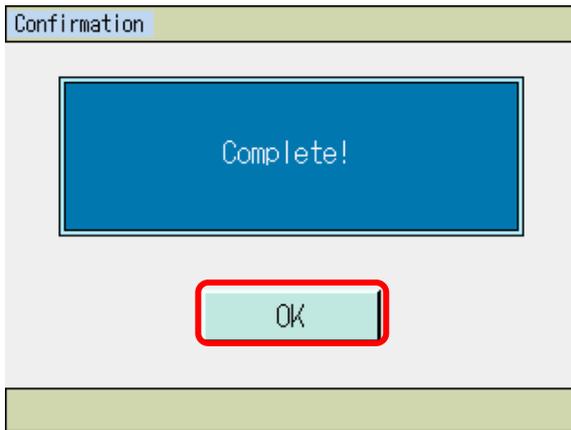
When there is the same file name already exists, the screen below will be shown.  
 Either touch **Yes** button or press **F1** (Yes) key.  
 Either touch **No** button, or press **F2** (No) or **ESC** key to return to the backup file name indication screen.



Data transfer screen will be shown.

If you touch **CANCEL** button or **ESC** key, the file storage process is cancelled.

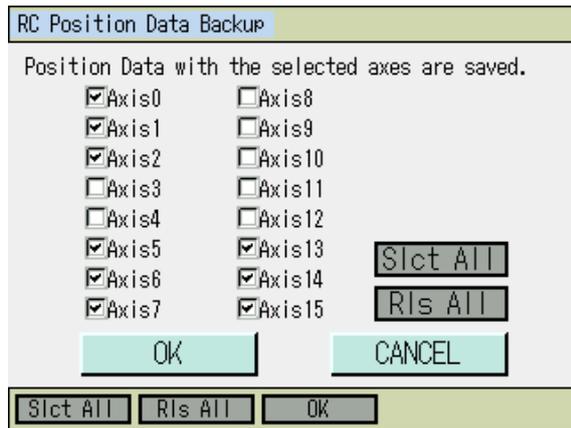
**[Caution]**  
 In case the file storage process is cancelled, there is no guarantee of the saved data contents.



The display shows this screen when the initializing in the data transfer is finished. Either touch **OK** button, or press **ESC** or **↵** key to return to the backup menu screen.

**[Remark]**

When the backup file for all the data and the data file for the RC axis positions are stored together, the select screen for the RC axis number to be stored opens after the backup file for all the data is stored. The way to operate this screen is the same as when you store the RC axis position data file individually.

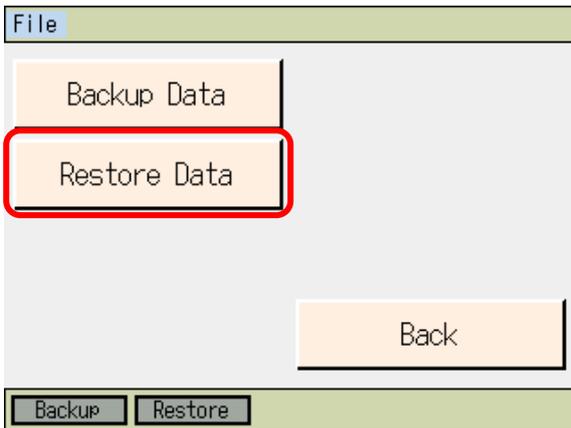


## 20.2 Restore to Controller

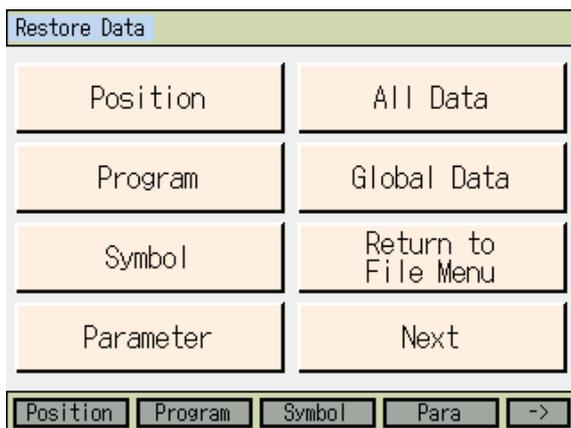
Data in the Secure Digital card is transferred to the controller.



Either touch **File** button or press **SF (->) → F1** (File) keys in the menu screen.



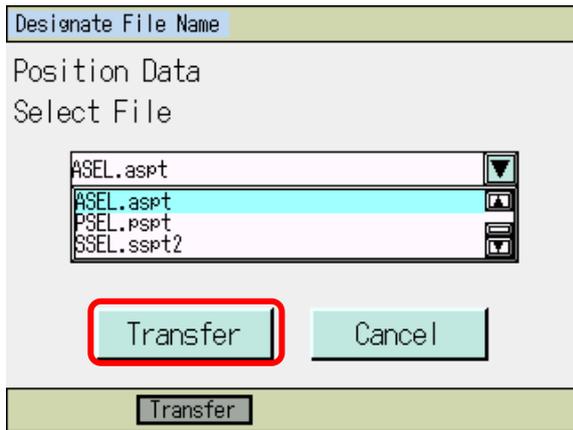
Either touch **Restore Data** button or press **F2** (Restore) key in the file menu screen.



Select the data type that you want to store either by touching the appropriate button or press from **F1** to **F4** keys.

Touch **Next** button and the data types displayed in the screen will be switched.

Press **SF (->)** key and the data types shown on the function keys will be switched.



Touch ▲ and ▼ to select a file to transfer to the controller from the file list in a Secure Digital card.

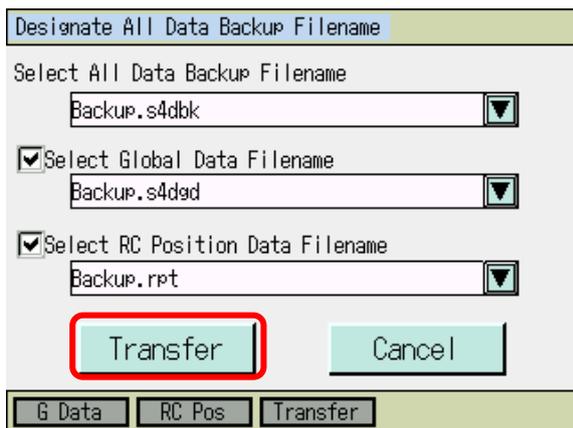
Either touch **Transfer** button or press **F2** (Transfer) key.

If you touch **CANCEL** button or **ESC** key, the display returns to the restore menu screen.

\* In case the name of the file name exceeds 38 characters in half-size font and the extension is in 3 characters, the short file name (8.3 Format) should be shown in the file list. Those files with the extension in 4 characters or more will not be displayed in the file list.

\* The No. of files that can be displayed in the file list, is up to 300. The excessive files are not displayed in the file list.

The display moves to the restore file name indication screen as shown in the figure below only when the backup file is transferred for all the data.



Touch ▲ and ▼ to select a file to transfer to the controller from the file list in a Secure Digital card.

Either touch **Transfer** button or press **F3** (Transfer) key.

If you touch **Cancel** button or **ESC** key, the display returns to the restore menu screen.

\* In case the name of the file name exceeds 38 characters in half-size font and the extension is in 3 characters, the short file name (8.3 Format) should be shown in the file list. Those files with the extension in 4 characters or more will not be displayed in the file list.

\* The No. of files that can be displayed in the file list, is up to 100. The excessive files are not displayed in the file list.

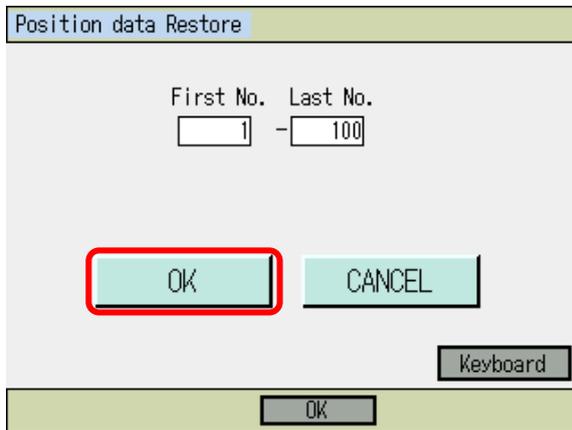
When the backup file is transferred for all the data, it is available to transfer the global data file, RC axis position data file and extended motion position data file at the same time.

To transfer these sorts of data, either touch on the data name (global data, RC position data and extended motion position data file) or press function keys (G Data, RC Pos or ExMtn Pos) to put a check mark.

Next, select the files you want to transfer from the file list.

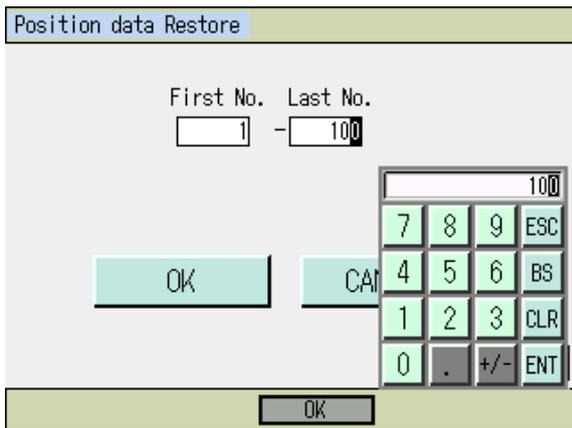
After selecting the file to be transferred, set the controller transfer range.  
 (When the symbol files and backup file for all the data are transferred, the transfer range select screen will not be shown. The data stored in the file are all transferred.)

(i) Position



Input the position number range for the transfer to the controller and touch **OK** button or press **F3** (OK) key.

If you touch **CANCEL** button or **ESC** key, the display returns to the restore file name indication screen.



If you touch in the input area on "First No." or "Last No.", the cursor appears in the item you have touched.

Input the position number by displaying the numeric keys on the touch panel by touching **Keyboard** button or input the position number on the hardware numeric keys.

Touch on the numeric part if you want to input on the touch panel numeric keys. The contents of input will be shown in the box above the touch panel numeric keys. When confirming the input number, touch **ENT**. The touch panel numeric key close and the cursor moves to the next input box. (The cursor will disappear if Last No. is input.)

When redoing the input, touch **ESC**. When it is desired to cancel the input, touch **ESC** again, and the touch panel numeric keys will close. Also **ESC** key on the hardware acts in the same way.

When it is desired to use the hardware numeric keys for inputting, input the desired number by pressing the numeric keys and press **ENT** key to confirm your input. Once confirmation is made, the cursor moves to the next input box. (The cursor will disappear if Last No. is input.) Also, the contents of input are displayed in the top (last) number box. When redoing the input, touch **ESC**. It is not available to input numbers on the hardware numeric keys while the touch panel numeric keys are displayed on the screen.

## (ii) Program (individual)

No.	Steps	Program Name
1	100	PRG_001
2	100	Sample
3	0	
4	100	Demo
5	0	
6	0	
7	100	PRG_007
8	0	

Page Up Page Dn  
Remaining 9599  
Cancel

No.  \*Touch PrNo, then it is restored.

Touch the program number that the data is to be transferred to, or input the program number that you want to transfer the data to in the input area at “No.” on the hardware numeric keys and press key.

(Touch the input area at “No.” and the cursor will appear.)

If you touch **CANCEL** button or **ESC** key, the display returns to the restore file name indication screen.

## (iii) Program (total)

No.	Steps
1	100
2	100
3	0
4	100
5	0
6	0
7	100
8	0

Page Up Page Dn  
Restore All  
Cancel

No.  \*Touch PrNo, then it is restored.

Rstr All

Touch individually the program number that the data is to be transferred to, or input the program number that you want to transfer the data to in the input area at “No.” on the hardware numeric keys and press key.

(Touch the input area at “No.” and the cursor will appear.)

If you touch **CANCEL** button or **ESC** key, the display returns to the restore file name indication screen.

Touch **Restore All** button or press **F3** (Load All) key, and all the programs in the file can be transferred at once to the controller.

## (iv) Parameter

Restore Parameter

Item selection

[Main]I/O       Driver card  
 [Main]Cmn all axis       Encoder  
 [Main]Specific axis  
 [Main]Other  
 [Main]Mfg.use  
 Transfer controller unit dependent parameters

\*Do not select except when you restore the state at the time of backup.  
The system may not work normally.

OK      CANCEL

OK

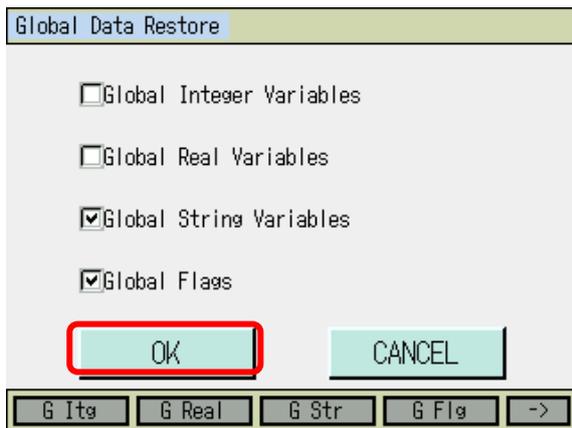
Touch the parameter type to be transferred to put a check mark.

Select the transferred parameter type individually and touch **OK** button or press **F4** (OK) key.

If you touch **CANCEL** button or **ESC** key, the display returns to the restore file name indication screen.

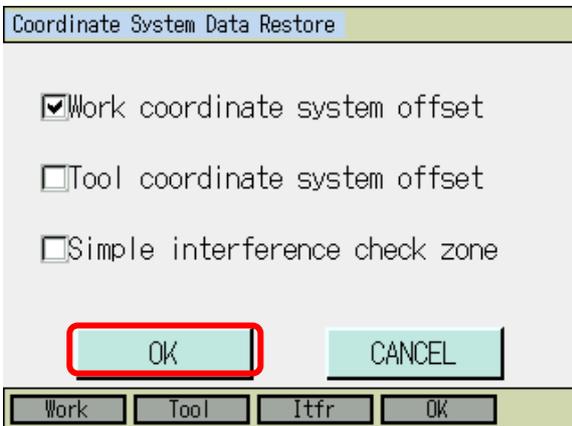
- \* The controller basic unit dependent parameters are transferred only when a check mark is on "Transfer controller unit dependent parameters". Do not attempt to put a check mark on this in normal use. This setting is to be conducted in following cases.
  - When it is necessary to rewrite the parameters because the flash ROM data is broken
  - When it is necessary to rewrite the parameters because the basic unit dependent parameters on a wrong controller type is accidentally written
  - When the status at the backup process needs to be recovered
- \* It is not available to have a parameter transfer on a specific axis. The parameters on all the axes stored in the file are transferred.

(v) Global data



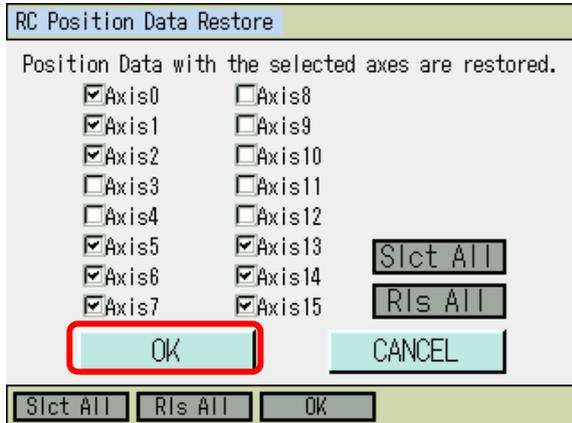
Either touch on the global data types that you want to transfer, or press **F1** to **F4** (G Itg, G Real, G Str and G Flg) keys to put a check mark. After finished to select the transferred global data types, either touch **OK** button or press **SF** (->) → **F4** (OK) keys. If you touch **CANCEL** button or **ESC** key, the display returns to the restore file name indication screen.

(vi) Coordinate system definition data



Either touch on the coordinate system definition data types that you want to transfer, or press **F1** to **F3** (Work, Tool and Itfr) keys to put a check mark. After finished to select the transferred coordinate system definition data types, either touch **OK** button or press **F4** (OK) key. If you touch **CANCEL** button or **ESC** key, the display returns to the restore file name indication screen.

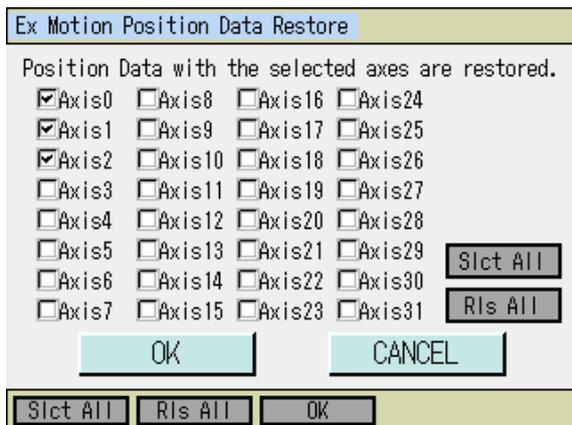
(vii) RC position data



Touch on the axis numbers that you want to transfer to put a check mark. After finished to select the transferred axis numbers, either touch **OK** button or press **F3** (OK) key. If you touch **CANCEL** button or **ESC** key, the display returns to the restore file name indication screen.

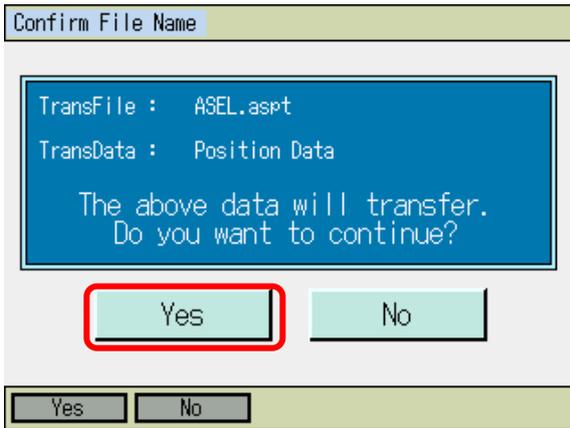
Touch **Slct All** button or press **F1** (Slct All) key, and all the activated axes can be selected. Touch **Rls All** button or press **F2** (Rls All) key, and all the activated axes can be released from selected.

(viii) Extended motion position data

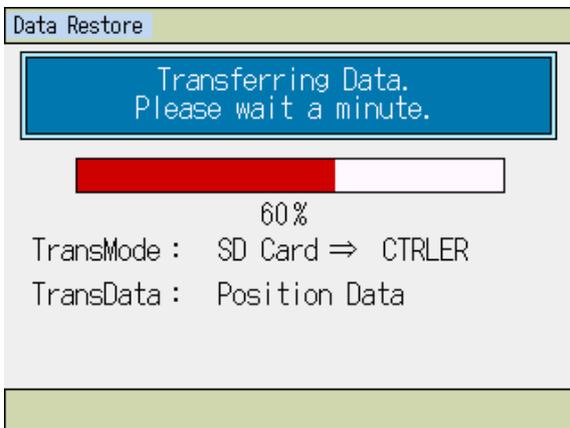


Touch on the axis numbers that you want to transfer to put a check mark. After finished to select the transferred axis numbers, either touch **OK** button or press **F3** (OK) key. If you touch **CANCEL** button or **ESC** key, the display returns to the restore file name indication screen.

Touch **Slct All** button, and all the activated axes can be selected. Touch **Rls All** button, and all the activated axes can be released from selected status.



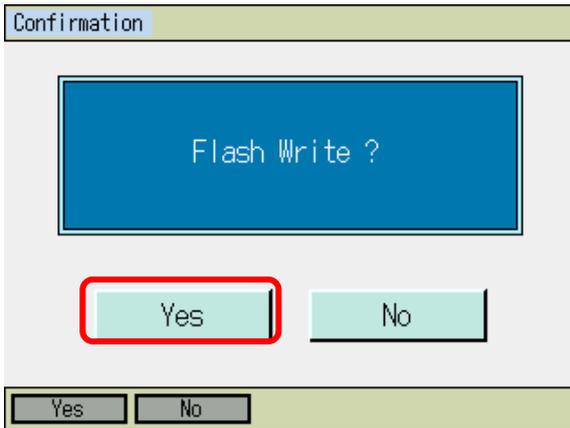
Check the contents of transfer, and touch **Yes** button or press **F1** (Yes) key.  
If you touch **No** button or press **ESC** key, the display goes back to the previous screen.



Data transfer screen will be shown.

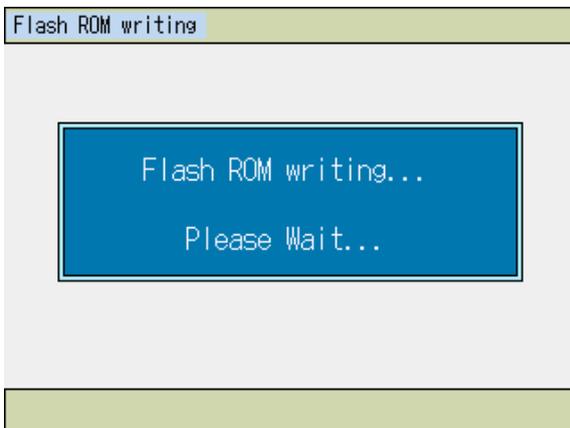


The display shows this screen when the initializing in the data transfer is finished.  
If you touch **OK** button, or press **ESC** or **↵** key, the display returns to the restore menu screen.



To write the transferred data to the flash ROM, either touch **Yes** button or press **F1** (Yes) key. When it is not necessary to write the data to the flash ROM, touch **No** button, or press **F2** (No) or **ESC** key.

\* This screen would not be shown when the flash ROM writing is not necessary (in such cases as global data file transfer).



"Flash ROM writing..." flashes during the flash ROM writing.

***Never turn off the power to the Controller at this time.***



The display shows this screen when the flash ROM writing is finished. If you touch **OK** button, or press **ESC** or **↵** key, the display returns to the restore menu screen.

[Remark]

When the backup file for all the data, the data file for the RC axis positions and the data file for the extension motion positions are stored together, the select screen for the axis numbers for the RC axes and the extension motion control axes to be stored to the controller opens after the backup file for all the data is stored.

The way to operate this screen is the same as when you store the RC axis position data file and the extension motion position data individually.

RC Position Data Restore

Position Data with the selected axes are restored.

<input checked="" type="checkbox"/> Axis0	<input type="checkbox"/> Axis8	
<input checked="" type="checkbox"/> Axis1	<input type="checkbox"/> Axis9	
<input checked="" type="checkbox"/> Axis2	<input type="checkbox"/> Axis10	
<input type="checkbox"/> Axis3	<input type="checkbox"/> Axis11	
<input type="checkbox"/> Axis4	<input type="checkbox"/> Axis12	
<input checked="" type="checkbox"/> Axis5	<input checked="" type="checkbox"/> Axis13	<input type="button" value="Slct All"/>
<input checked="" type="checkbox"/> Axis6	<input checked="" type="checkbox"/> Axis14	<input type="button" value="Ris All"/>
<input checked="" type="checkbox"/> Axis7	<input checked="" type="checkbox"/> Axis15	

In the case that the RC-axis position data file is transferred at the same time

Ex Motion Position Data Restore

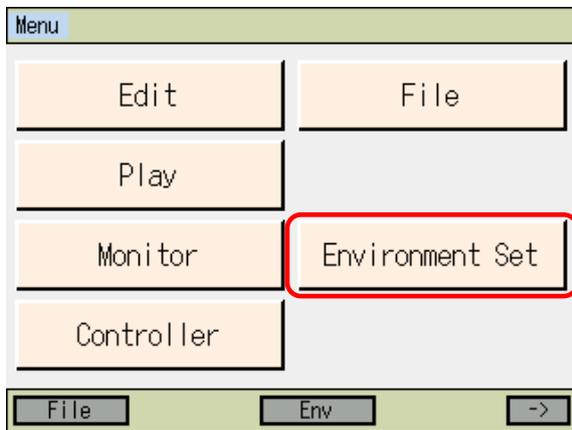
Position Data with the selected axes are restored.

<input checked="" type="checkbox"/> Axis0	<input type="checkbox"/> Axis8	<input type="checkbox"/> Axis16	<input type="checkbox"/> Axis24
<input checked="" type="checkbox"/> Axis1	<input type="checkbox"/> Axis9	<input type="checkbox"/> Axis17	<input type="checkbox"/> Axis25
<input checked="" type="checkbox"/> Axis2	<input type="checkbox"/> Axis10	<input type="checkbox"/> Axis18	<input type="checkbox"/> Axis26
<input type="checkbox"/> Axis3	<input type="checkbox"/> Axis11	<input type="checkbox"/> Axis19	<input type="checkbox"/> Axis27
<input type="checkbox"/> Axis4	<input type="checkbox"/> Axis12	<input type="checkbox"/> Axis20	<input type="checkbox"/> Axis28
<input type="checkbox"/> Axis5	<input type="checkbox"/> Axis13	<input type="checkbox"/> Axis21	<input type="checkbox"/> Axis29
<input type="checkbox"/> Axis6	<input type="checkbox"/> Axis14	<input type="checkbox"/> Axis22	<input type="checkbox"/> Axis30
<input type="checkbox"/> Axis7	<input type="checkbox"/> Axis15	<input type="checkbox"/> Axis23	<input type="checkbox"/> Axis31

In the case that the extended motion position data file is transferred at the same time:

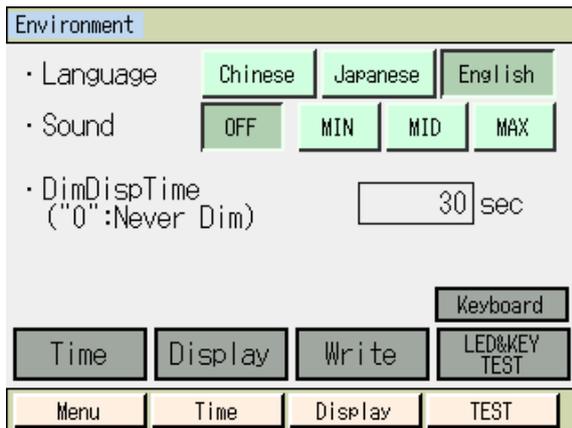
## 21. Environment Setting

Settings are established for the language, touch operation sound, sleep timer, clock and display. Also, it is available to have an operation check on the LED lamps and hardware keys.



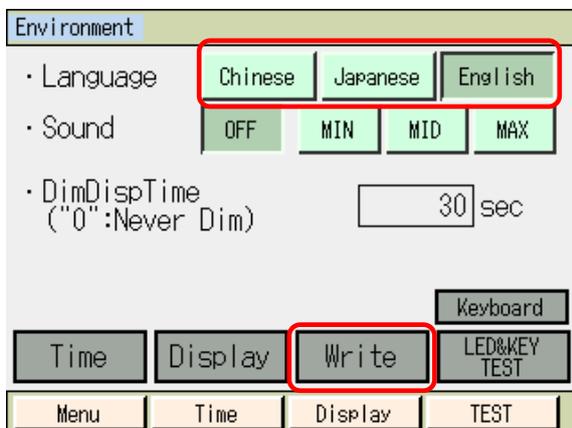
Either touch **Environment Set** button or press **F3** (Env) key in the menu screen. (Press **SF** key to display **F3** (Env).)

The environment setting screen appears.



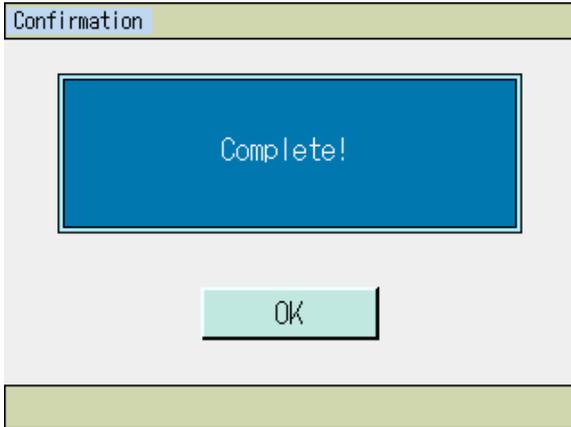
[Language]

Language can be selected and changed. (No Chinese display after Ver.2.00)



1. Select either of **Chinese**, **Japanese** or **English** and touch.
2. Touch **Write** button or press **WRT** key.

(Note) If writing is not conducted, the values will go back to those before making a change when moving to another window.

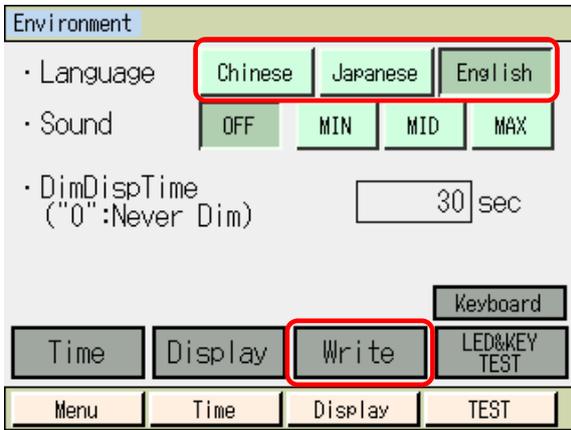


When the writing process is finished, the confirmation screen opens.

Either touch **OK** button or press **ESC** key to return to the environment setting screen.

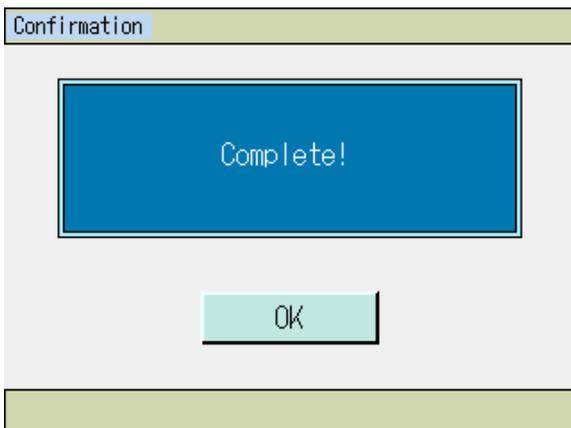
[Touch Operation Sound Setting]

Setting can be established whether to output the touch sound or not.



1. Select either of **OFF**, **Min**, **MID** or **MAX** and touch.
2. Touch **Write** button or press **WRT** key.

(Note) If writing is not conducted, the values will go back to those before making a change when moving to another window.

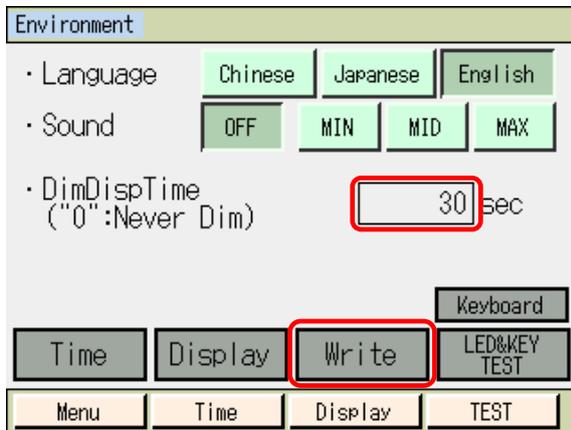


When the writing process is finished, the confirmation screen opens.

Either touch **OK** button or press **ESC** key to return to the environment setting screen.

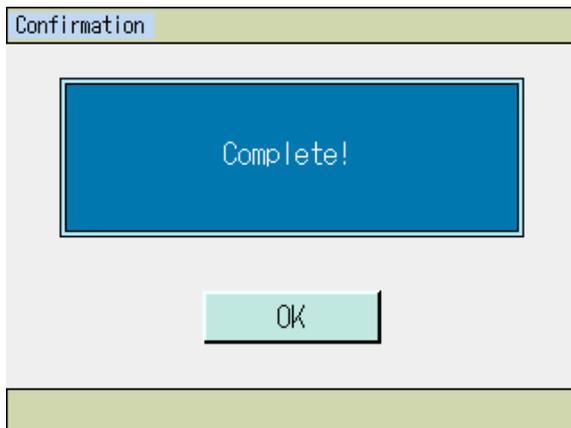
[SleepTimer]

Timer setting can be established for the screen to go to the sleep mode when no operation is held.



1. Touch in the input box (highlighted in a square) at DimDispTime.
2. Input a value to set on the keyboard or hardware keys.
3. Touch **Write** button or press **WRT** key.

*(Note) If writing is not conducted, the values will go back to those before making a change when moving to another window.*



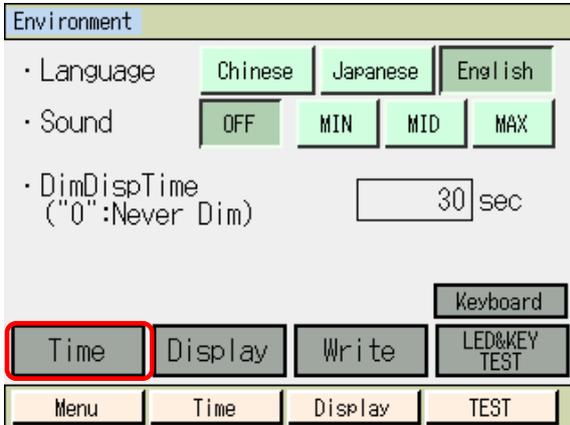
When the writing process is finished, the confirmation screen opens.

Either touch **OK** button or press **ESC** key to return to the environment setting screen.

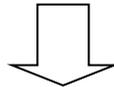
[Time Setting]

Clock setting can be established on TB-01. It is also available to set the TB-01 clock to the controller clock when a model that supports the controller clock is connected.

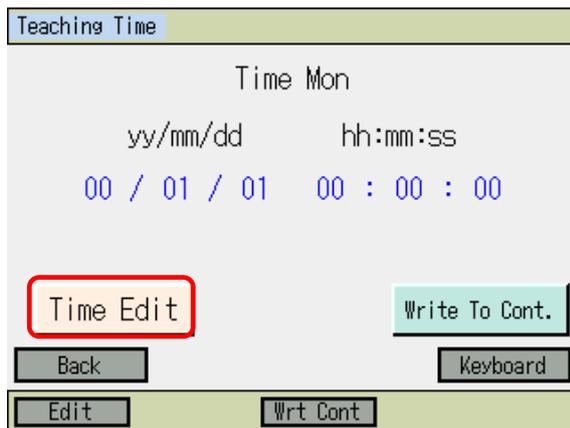
21. Environment Setting



Either touch **Time** button or press **F2** (Time) key.

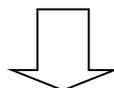


Either touch **Time** button or press **F2** (Time) key.



TB-01 clock is displayed.

Either touch **Time Edit** button or press **F1** (Edit) key, and the displays proceeds to the edit screen.

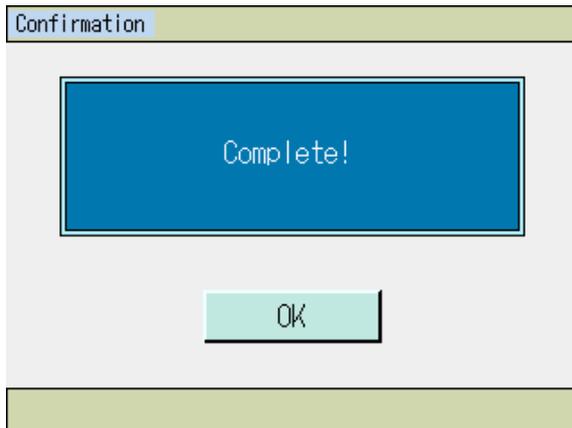


Touch **Time** button or press **F1** (Edit) key.

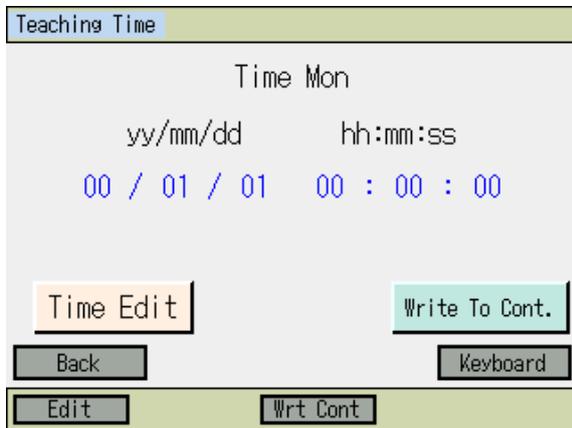


TB-01 clock can be changed.

1. Input the time on **Keyboard** or hardware keys.
2. Either touch **Set** button or press **F2** (Set) key.



When the TB-01 clock edit is finished, the confirmation screen opens. Either touch **OK** button or press **ESC** key to return to the clock display screen.



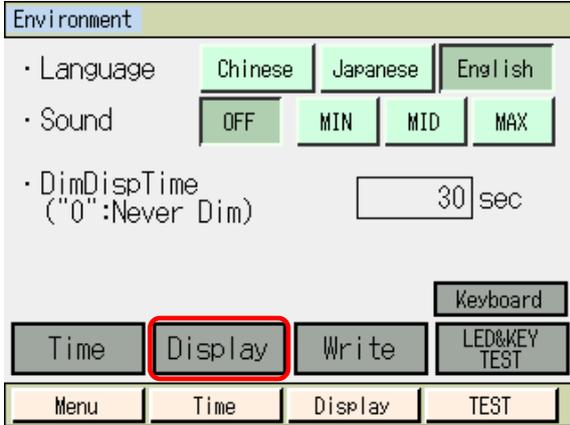
The display returns to this screen.

Either touch **OK** button or press **ESC** key to return to the environment setting screen.

It is available to set the TB-01 clock to the controller clock if you touch **Write To Cont.** button or press **F3** (Wrt Cont) key either in the clock display screen or the clock edit screen. (**Write To Cont.** appears only when a model that supports the controller clock is connected.)

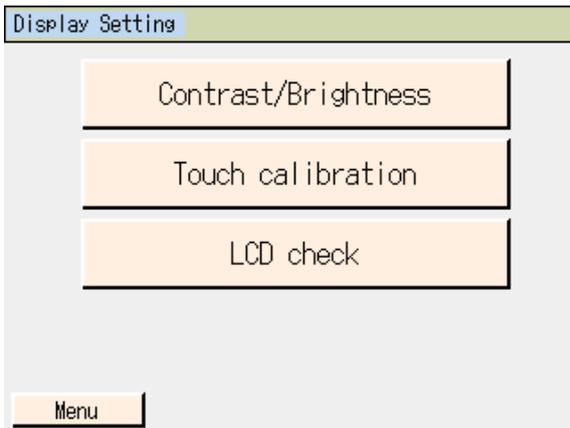
[Display]

Adjustment of contrast and brightness of the screen, position tuning for touch panel and LCD screen check can be performed



Touch **Display** button or press **F3** (Display) key.

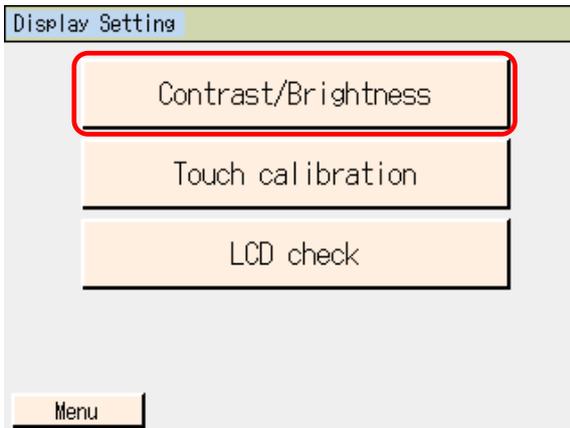
Display Setting menu Window is displayed.



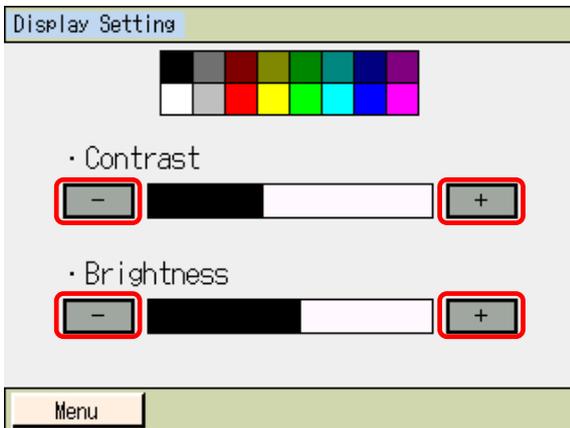
Select Display Setting menu.

Either touch **Menu** button or press **F1** key to return to the menu screen.

- Change the Contrast/Brightness



Touch **Contrast/Brightness**.

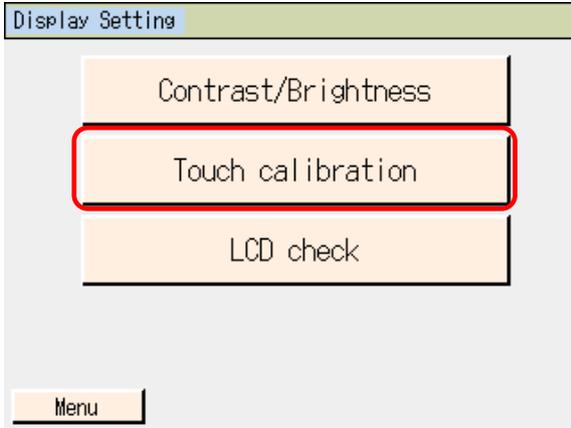


Touch **-** and **+** under Contrast to adjust the contrast of the screen.  
Touch **-** and **+** under Brightness to adjust the brightness of the screen.

Either touch **Menu** button or press **F1** key to return to the menu screen.

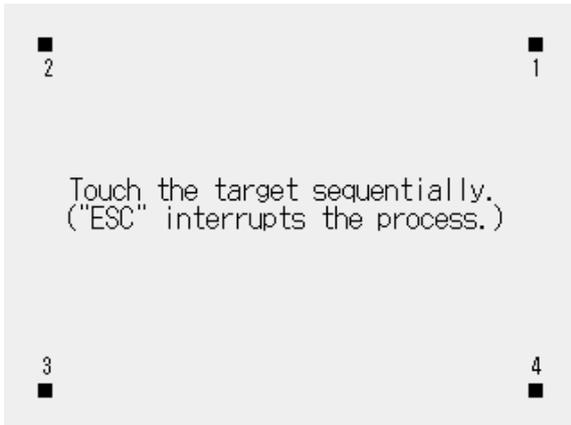
- Touch calibration

A calibration for the position detection of the touch panel is performed.



Touch Touch calibration.

21. Environment Setting



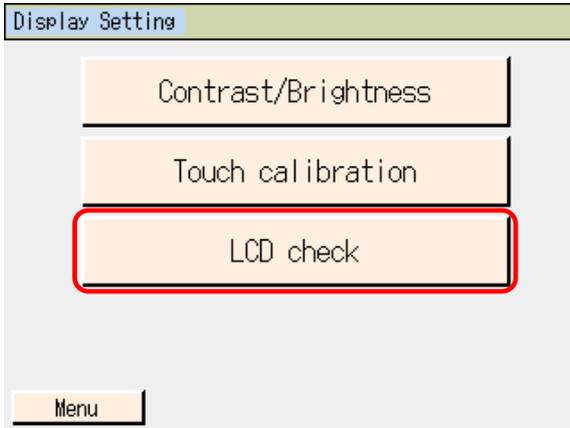
Touch ■ in the order of 1, 2, 3 and 4.

After finished, the display automatically returns to the menu screen.

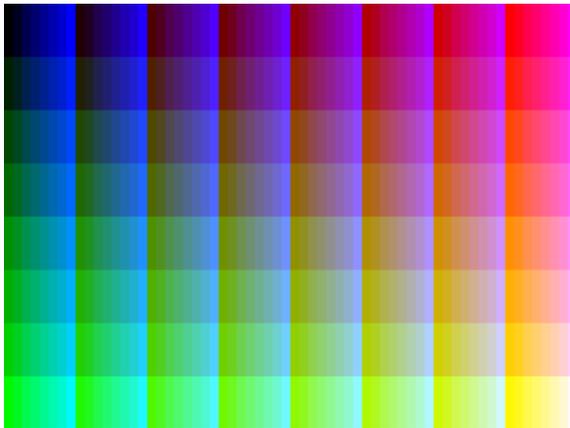
\* The process can be cancelled any time by pressing ESC key.

● LCD Check

LCD Display can be checked in the order of color pattern, White only and Black only.



Touch **LCD check** button.



Color Pattern is displayed.

Touch any point on the screen.



White Only is displayed.

Touch any point on the screen.



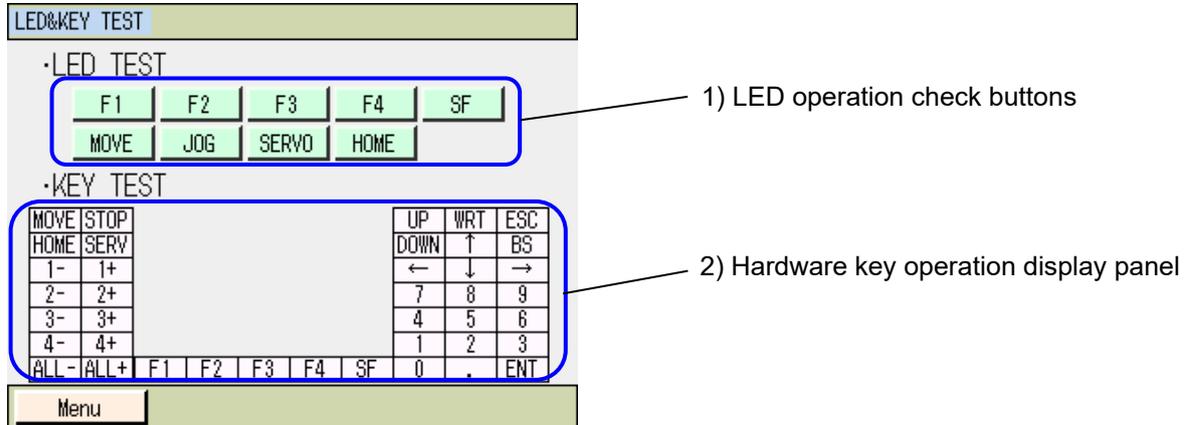
Black Only is displayed.

Touch any point on the screen.

After the color patterns are displayed again, the display automatically returns to the menu screen.

[Operation Check on LED Lamps and Hardware Keys]

Operation check can be held to see the LED lamps turn on and the hardware keys reacts with no failure.



1) LED Operation Check Buttons

Operation can be checked on the LED lamps. By touching these buttons, the condition switches ON/OFF.

(It is ON when a button is depressed, and OFF when popped up.)

The LED lamps on the TB-01 main unit turn on/off in response to the status of the buttons.

2) Hardware Key Operation Display Panel

The operational condition of the hardware keys is displayed. A button being press is shown in yellow. Also, a key that is pressed once or more since this panel is opened is shown in green.

Touch Menu button to return to the menu screen.



(In the panel window, the three digits after “E” indicate an error number.)

Error No.	Error name	Description, action, etc.
9C0	Input data error	Input data error. Check the input data.
9C1	Input data too small	Too-small input data. Check the allowable input range.
9C2	Input data too large	Too-large input data. Check the allowable input range.
9C3	SEL Cmnnd Input Error	Invalid data is input for the SEL command.
9C4	Inputting Conditions are not allowed	The input condition is used in the step where use of such condition is not allowed.
9C5	Input Condition DataError	An invalid value is input for the input condition.
9C6	Input Condition is out of range	A value out of the input range is input for the input condition.
9C7	No Input Condition yet	No input condition is input in the step where such condition is essential.
9C8	Undefined Symbol (Input Condition)	An undefined symbol is used for the input condition.
9C9	Operand not inputted(Oprnd1)	The operand 1 is not input in the step where the operand 1 is essential.
9CA	Operand not inputted(Oprnd2)	The operand 2 is not input in the step where the operand 2 is essential.
9CB	Operand not inputted(Oprnd3)	The operand 3 is not input in the step where the operand 3 is essential.
9CC	Inputting Oprnd is not allowed (Oprnd1)	The operand 1 is used in the step where use of the operand 1 is prohibited.
9CD	Inputting Oprnd is not allowed (Oprnd2)	The operand 2 is used in the step where use of the operand 2 is prohibited.
9CE	Inputting Oprnd is not allowed (Oprnd3)	The operand 3 is used in the step where use of the operand 3 is prohibited.
9CF	Oprand1 is invalid	An invalid data is input for the operand 1. Check the data.
9D0	Oprand2 is invalid	An invalid data is input for the operand 2. Check the data.
9D1	Oprand3 is invalid	An invalid data is input for the operand 3. Check the data.
9D2	Inputted Operand is out of range(Oprnd1)	A value out of the allowable input range is input for the operand 1.
9D3	Inputted Operand is out of range(Oprnd2)	A value out of the allowable input range is input for the operand 2.
9D4	Inputted Operand is out of range(Oprnd3)	A value out of the allowable input range is input for the operand 3.
9D5	Undefined symbol (Oprnd1)	An undefined symbol is used for the operand 1.
9D6	Undefined symbol (Oprnd2)	An undefined symbol is used for the operand 2.
9D7	Undefined symbol (Oprnd3)	An undefined symbol is used for the operand 3.
9D8	Symbol type error (Oprnd1)	A symbol of the type not allowable for the operand 1 or outside of the scope is used.
9D9	Symbol type error (Oprnd2)	A symbol of the type not allowable for the operand 2 or outside of the scope is used.
9DA	Symbol type error (Oprnd3)	A symbol of the type not allowable for the operand 3 or outside of the scope is used.
9DB	Symbol type error (Input Condition)	A symbol of the type not allowable for the input condition or outside of the scope is used.
9DC	Invalid Symbol String	An invalid character is used at the head of the symbol or in the character string.
9DD	Multiple declaration of a Symbol	The same symbol has multiple definitions.
9DE	Symbol value not inputted	No symbol-defined value is input.
9E0	Servo OFF while in Action	It is forbidden to make an operation or continuous operation when the home-return operation is incomplete. Turn on the servo first.

Error No.	Error name	Description, action, etc.
9E1	Not yet Homed MOVE	It is forbidden to have teaching when the home-return operation is incomplete. Complete homing first.
9E2	Not yet Homed TEACH	Teaching prohibition error at not-yet-homed time. Complete homing first.
9E3	Function not Supported	An unsupported function is attempted to execute.
9E4	Encoder type error	Encoder type error. Check the ABS/INC type (each-axis parameter No. 38) of the operation target axis.
9E5	Axis number error	The specification of the axis No. is invalid.
9E6	No effective axis	There is no effective axis that can be edited and operated. Check the effective axis pattern (all-axis common parameter No. 1).
9E7	EEPROM write error (1)	EEPROM write error.
9E8	EEPROM write error (3)	EEPROM write error.
9E9	EEPROM read error (4)	EEPROM read error.
9EA	EEPROM read error (5)	EEPROM read error.
9EB	Password error	The password is invalid.
9EC	Position Data has been changed	It is forbidden to make an operation or continuous operation while the position data is being changed. After writing the changed data in the controller, make a reattempt.
9ED	Can not edit while running program (TP)	Editing operation cannot be performed for the running program. Exit from the program first.
9EE	Too many Symbol Definitions	The number of symbol definitions has exceeded the limit.
9EF	Can not reset M-Dat when servo is ON.	It is forbidden to reset the ABS encoder multi-rotation data when the servo is on.
9F0	Crdf[1] and Crdf[2] donot have consistency	The indicated axis patterns in Coordinate [1] and Coordinate [2] in the simple interference check zone definition data do not match with each other.
9F1	No effective data in Crdf[1] and Crdf[2]	No coordinate value is input in the simple interference check zone definition data.
9F2	'Scan' prohibition at each axis system	"Scan" (current position load) cannot be conducted on each axis coordinate system.
9F3	Can't read the protected data	Such operation as readout, copy or move cannot be conducted to the readout protected data.
9F4	Can't write to the protection area	Such operation as white, move or clear cannot be conducted to the write protected data.
9F5	Protection setting prmtr is abnormal	An appropriate value is set in the protection setting parameter (Other Parameter No. 36 to 39 or No. 55 to 57).
9F6	Mismatch Md RC Gateway Error	There is a mismatch in RC Gateway Mode.
9F7	Non Lnk Axis Error	There is no RC link axis.
9F8	Error without axis which can be moved	There is no axis available for operation.
9F9	IO Selective Function Error	There is a mistake in IO function indication.
9FA	Execute Condition Fail Error	The condition is not established to execute the command.
9FB	No effective position	There is no effective position.
9FC	Can not reset Enc-Err when servo is ON.	It is forbidden to reset an error on ABS encoder when the servo is on.
9FD	Too many BreakPoints	The number of the brake point settings has exceeded the limit.
9FE	Position Output Operation Data Designation Error	The data designation for the position output operation is faulty.
AD0	File Open Error	It is a Secure Digital card error. The file cannot be opened.

Error No.	Error name	Description, action, etc.
AD1	Failed in Writing File	It is a Secure Digital card error. The file cannot be written in.
AD2	Failed in Reading File	It is a Secure Digital card error. The file cannot be read out.
AD3	File Close Error	It is a Secure Digital card error. An error has occurred when the file was closed.
AD4	Undefined Command Detection Error	Undefined SEL command was detected.
AD5	Can not Edit Data in NON-MANUAL Mode	It is forbidden to edit data in Non-Manual Mode.
AD6	Lacking Empty Step	Number of the empty steps is not enough.
AD7	RTC voltage reduction	The voltage on the RTC backup battery has dropped.
AD8	Symbol outside support range	A symbol out of the range of numbers supported in the controller was attempted to be edited.
AD9	SDCard Open Error	Secure Digital card was not identified.
DE0	Receive Data Invalid	The received data has an error. When it is not eliminated even through re-connection, contact the manufacturer.
DE1	Header Logic Error (IAI Protocol Send)	It is a communication error. IAI protocol send data header logic error
DE2	Command ID Logic Err(IAI Protocol Send)	It is a communication error. IAI protocol send data command ID logic error
DE3	Receive Data Error (IAI Protocol Recv)	It is a communication error. IAI protocol receive data error
DE4	Response Time-out (IAI Protocol Recv)	It is a communication error. IAI protocol response time-out error
DE5	Overrun Error (Master Mode)	It is a communication error. Overrun error (in Master mode)
DE6	Framing Error (Master Mode)	It is a communication error. Framing error (in Master mode)
DE7	Parity Error (Master Mode)	It is a communication error. Parity error (in Master mode)
DE8	Send Que Overflow (Master Mode)	It is a communication error. SCI send queue overflow (in Master mode)
DE9	Receive Que Overflow(Master Mode)	It is a communication error. SCI receive queue overflow (in Master mode)
DEA	Send Buffer Overflow(IAI Protocol Send)	It is a communication error. IAI protocol send buffer overflow (in Master mode)
DEB	Receive Buf Overflow(Master Mode)	It is a communication error. IAI protocol receive buffer overflow (in Master mode)
DEC	Send Que Overflow (IAI Protocol Send)	It is a communication error. IAI protocol send queue overflow
DED	Receive Que Overflow(IAI Protocol Recv)	It is a communication error. IAI protocol receive queue overflow
DEE	CTL Not Connected	Controller no connection error. Communications cannot be established or an unsupported controller is connected. The probable causes are as follows: 1) It is a communication failure due to a break in or noise from the communication line. 2) The communication baud rate of the controller is not supported by the teaching pendant. (The failure may be resolved by the controller power reconnection.) 3) The model not supported by the teaching pendant is connected. (Refer to Support Models.)
DEF	Emergency Stop	The EMERGENCY STOP button of the teaching pendant is pressed.
DF0	Unsupported CTL is connected	Non-supported controller is connected.
DF1	Communication string unmatched error	There is a mismatch in the communication string.

## Change History

Revision Date	Revision Description
2013.11	First Edition
2014.07	Second Edition <ul style="list-style-type: none"> <li>• Made applicable for MSEL-PCX/PGX</li> <li>• Cables and related added in Product Check 1. Component</li> <li>• 4.13 Teaching Pendant Connection Procedure added</li> <li>• 9.1.2 Flash ROM Writing added</li> <li>• Name in each item changed in 12. Coordinate System Data Editing (X-SEL-RX/SX only)</li> <li>• Change made in item names and unit of total operation distance in 15.12 Maintenance Information</li> <li>• Item names changed in 16.5 Memory Initializing Menu</li> <li>• Absolute Reset Preparation added in 16.13.2</li> <li>• Appendix 2 How to Perform Pressing Absolute Reset on IX-1000/1200 added</li> <li>• Appendix 3 How to Perform Home Position Adjustment / Absolute Reset on MSEL-PCX/PGX</li> <li>• Made applicable for Chinese</li> <li>• Correction made</li> </ul>
2016.09	Third Edition <ul style="list-style-type: none"> <li>• Applicable for MSEL-PC/PG and XSEL-RA/SA/RAX/SAX/RAXD/SAXD</li> <li>• Description added in front page stating it is the contents for programming controllers</li> <li>• Section added for caution in handling</li> <li>• Complied with oversea standards added</li> <li>• Layout revised in Product Check 4. Model Code</li> <li>• Got applied to 9.1 Position Output Operation Feature</li> <li>• Contents revised in 15.12 Maintenance Information</li> <li>• Contents revised in 16.5 Memory Initialization</li> <li>• Contents revised in 15.10 Version Display</li> <li>• Contents added and revised in Chapter 17 Absolute Reset Procedures</li> <li>• Alarm reset button added in 18.1.1 RC Gateway Feature Related Windows</li> <li>• Chapter 19 Extension Motion Control Feature added</li> <li>• Terms integrated, note added, correction made</li> </ul>
2022.07	Fourth Edition <ul style="list-style-type: none"> <li>• Applicable for MSEL-PCF/PGF</li> <li>• Not applicable to Chinese after V2.00</li> </ul>





## ***IAI Corporation***

Head Office: 577-1 Obane Shimizu-KU Shizuoka City Shizuoka 424-0103, Japan  
TEL +81-54-364-5105 FAX +81-54-364-2589  
website: [www.iai-robot.co.jp/](http://www.iai-robot.co.jp/)

## ***IAI America, Inc.***

Head Office: 2690 W. 237th Street, Torrance, CA 90505  
TEL (310) 891-6015 FAX (310) 891-0815  
Chicago Office: 110 East State Parkway, Schaumburg, IL 60173  
TEL (847) 908-1400 FAX (847) 908-1399  
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066  
TEL (678) 354-9470 FAX (678) 354-9471  
website: [www.intelligentactuator.com](http://www.intelligentactuator.com)

Technical Support available in Europe

## ***IAI Industrieroboter GmbH***

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany  
TEL 06196-88950 FAX 06196-889524  
website: [www.iai-automation.com](http://www.iai-automation.com)

Technical Support available in Great Britain



Duttons Way, Shadsworth Business Park, Blackburn, Lancashire, BB1 2QR, United Kingdom  
TEL 01254-685900  
website: [www.lcautomation.com](http://www.lcautomation.com)

## ***IAI (Shanghai) Co., Ltd.***

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China  
TEL 021-6448-4753 FAX 021-6448-3992  
website: [www.iai-robot.com](http://www.iai-robot.com)

## ***IAI Robot (Thailand) Co., Ltd.***

825 PhairojKijja Tower 7th Floor, Debaratana RD., Bangna-Nuea, Bangna, Bangkok 10260, Thailand  
TEL +66-2-361-4458 FAX +66-2-361-4456  
website: [www.iai-robot.co.th](http://www.iai-robot.co.th)