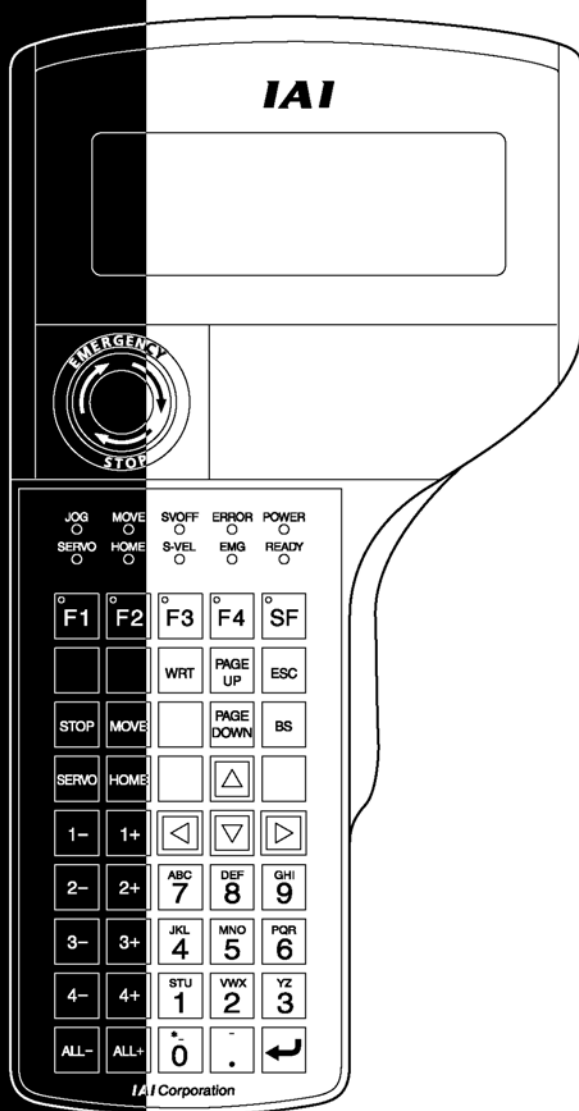




X-SEL ANSI-Compliant Teaching Box

Instruction Manual Ver. 1.0



IAI Corporation

1.	Introduction	1
2.	Before Use	1
3.	Safety Precautions	2
4.	Warranty Term and Coverage	3
5.	Connection to Controller	4
6.	Functions and Specifications of Teaching Box	7
6-1.	Main operation keys and their functions	7
7.	Mode Flow Chart.....	11
8.	Data Storage Method	16
8-1.	Factory setting: When system memory backup battery is used.....	16
8-2.	When system memory backup battery is not used	17
8-3.	Cautions	18
9.	Simple Operating Procedures	19
9-1.	Creation of position data.....	20
9-2.	Creation of program.....	29
9-3.	Change of application program	40
10.	Program Execution.....	47
10-1.	Operation check	47
10-2.	Setting of break point.....	49
10-3.	Monitor while in running.....	49
11.	Position Editing	52
11-1.	Mdi (numeric input).....	52
11-2.	Teac (teaching)	53
11-3.	Teaching input example.....	67
11-4.	Copy and movement of position data	73
11-5.	Deletion of position data	75
12.	Program Editing	77
12-1.	Program input method	77
12-2.	Symbol input during program editing	84
12-3.	One-line comment input	87
12-4.	Copy and movement of program	90
12-5.	Deletion of program	91
12-6.	Flash ROM writing	93

13.	Symbol Editing	94
13-1.	Symbol editing items	95
13-2.	Input example: Symbolization of local integer variables	96
13-3.	Symbol edit screen for each item	100
13-4.	Flash ROM writing	105
14.	Parameter Editing	106
14-1.	Parameter editing items	107
14-2.	Editing of axis-specific parameters	108
15.	Monitoring	112
15-1.	Monitor items	112
15-2.	Input ports	113
15-3.	Output ports	113
15-4.	Global flags	113
15-5.	Global variables	114
15-6.	Axis status	116
15-7.	System status	119
15-8.	Error detail information	121
15-9.	Version information	122
16.	Controller	123
16-1.	Controller items	123
16-2.	Flash ROM writing	124
16-3.	Software reset (restart)	125
16-4.	Error reset	125
16-5.	Memory initialization	126
16-6.	Reconnection	126
16-7.	Baud rate change	127
16-8.	Safety velocity	127
16-9.	Driving power recovery request	128
16-10.	Action restart request	128
16-11.	Driving power recovery request (RPwr) and action restart request (RAct)	129
16-12.	Absolute encoder reset	130
16-13.	Procedures for resetting absolute-battery voltage-down warning error	133
APPENDIX	.....	135
	Error Level Control	135
	X-SEL Teaching Box Error List (Application Part)	136
	X-SEL Teaching box Error List (Core Part)	139

1. Introduction

Thank you very much for purchasing our Teaching Box for the X-SEL Controller. 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 Box, always keep this Manual on 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 Box is left connected, "Effect" is valid for the safety velocity (SVel). Therefore, the maximum velocity achieved by the program startup from the Teaching Box becomes 250 mm/sec. or lower. 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."
Under the "Effect" condition above, Para-Othe (other parameter) No. 21 "Manual mode type" is 0 or 1. (The parameter is generally 0 before domestic shipment.)
When Para-Othe No. 21 is 2, the condition is "No Effect" for SVel.

2. Before Use

- (1) Be sure to read this Instruction Manual for proper use of this product.
- (2) Part or all of this Instruction Manual may not be used or reproduced without permission.
- (3) For any handling and operating methods other than those described in this Instruction Manual, interpret them as "don't" or "can't."
- (4) Please take note that we shall not be liable for any effects resulting from using this Instruction Manual.
- (5) Descriptions in this Instruction Manual are subject to change due to product improvements etc., without prior notice in the future.



3. Safety Precautions

- (1) Use a genuine product specified by us for wiring between the actuator and X-SEL Controller.
- (2) Keep out of the operating range of a machine such as an actuator while it is operating or in a ready state (condition in which the controller's power is ON). When using it in places where persons may approach, fence it off.
- (3) Before carrying out assembly and adjustment work or maintenance and inspection work of the machine, be sure to disconnect the power cord. While working, display the plate specified as such at an easy-to-read location. In addition, give special consideration to prevent third parties from turning on the power carelessly by hauling in the power cord to the operator. Alternatively, lock the power plug or receptacle and direct the operator to keep the key or prepare a safety plug.
- (4) When more than one operator works, advance work by determining the signal method and checking each other's safety. Especially, for work associated with axial movement regardless of power ON/OFF or motor-driven/manual operation, be sure to confirm safety by calling out to other(s) in advance.
- (5) When the user (customer) extends wiring, malfunction may occur due to faulty wiring. In this case, inspect wiring thoroughly and check it for properness before turning on the power.



4. Warranty Term and Coverage

The Teaching Box you purchased has been delivered upon completion of our strict shipping test.

We shall warrantee this product as follows:

1. Warranty term

The warranty term shall be either of the following terms, whichever is reached first.

- 18 months after our shipment
- 12 months after delivery to the place designated by you

2. Warranty coverage

Where a defective condition occurs during proper use conditions and obviously under the responsibility of the manufacturer, within the term above, we shall repair the product without charge. However, any items that apply to the following are excluded from the warranty coverage:

- Defects resulting from changes over time such as natural color fading of paint
- Defects resulting from use wear of consumable parts (such as a cable)
- Defects resulting from sensory phenomena such as generated noise that have no functional effects
- Defects resulting from mishandling or improper use
- Defects resulting from an inadequacy or error in maintenance and inspection
- Defects resulting from the use of any part other than our genuine parts
- Defects resulting from a modification not approved by us or our dealers
- Defects resulting from Acts of God, accident, fire, etc.

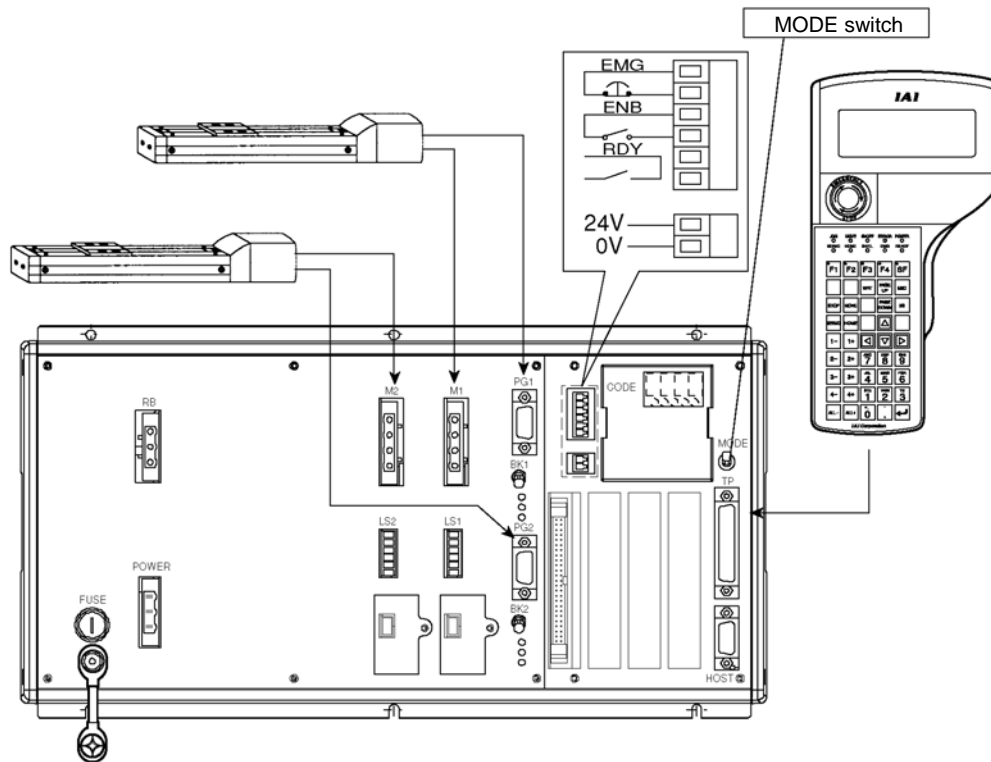
Only a delivered product shall be singly warranted, and no damage induced by the defect of the delivery product can be warranted. For repair, transport the product to our factory.

3. Service coverage

The cost of a delivered product does not include expenses for program creation and engineer dispatching. Therefore, the following are charged separately even within the warranty term:

- Maintenance and inspection
- Technical guidance and technical training in operating instructions
- Technical guidance and technical training on program-related matters such as program creation

5. Connection to Controller



- ① Connect the controller to the actuator, IO 24V power, system IO, etc., in advance.
Connect the cable connector of the Teaching Box to the controller's teaching connector when the main power supply of the controller is OFF.
- ② After flipping the MODE switch of the controller to MANU, turn on the power to the controller.

Teaching Box

LCD display

SEL Teaching		
TP	V1.01	[2003/03/10]
TPc	V1.00	[2003/02/26]
Please wait...		

It displays the version of the Teaching Box and moves to the Mode Selection screen.



Msg [BE1]
TP Deadman SW OFF
F1:Dtl F2: F3: F4:

When the Deadman switch is OFF, the screen shown at the left is displayed. Pressing the **[ESC]** key moves to the Mode Selection screen.
(Even when the Deadman switch is OFF, operations in the mode not requiring servo ON are available.)

Msg [DEE]
Controller not connected
F1:Dtl F2: F3: F4:

When the MODE switch is flipped to AUTO, connection to the controller is not established and the screen shown at the left is displayed. In this case, press the **[ESC]** key to move to the reconnection (Cnct) screen.

Cnct screen

Cnct
Re-connect to the controller? → OK=[F1] / Cancel=[ESC]
F1:OK F2: F3: F4:

Flip the MODE switch to MANU, and press the **[F1]** (OK) key to reconnect the controller.

Mode Selection screen

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

This is the basic screen for all operations.

**⚠ CAUTIONS**

When “OPEN 1” (channel 1 shared for the Teaching Box) is executed within the SEL program in the MANU mode, the right of use of the serial port channel 1 is forcefully moved to the SEL program and communication with the Teaching Box is disconnected. The program is running. (*Error No. A5D “SCIF open error in non-AUTO mode”)

To stop operation after that, be sure to press the EMERGENCY STOP button. (Be careful especially under jog operation.)

* The above is a case for controller main application versions earlier than 0.16.

For the controller main application Ver. 0.16 or later, the following are applied regarding the execution of “OPEN 1” according to the servo not in use or in use:

<MANU mode, servo not in use>

	Before execution of “OPEN 1”	After execution of “OPEN 1”
Connection of channel 1	Connection to Teaching Box	Forced movement to SEL program connection (Message error) Program is running

Error occurring after “OPEN 1” execution: Error No. A5D “SCIF open error in non-AUTO mode”

<MANU mode, servo in use>

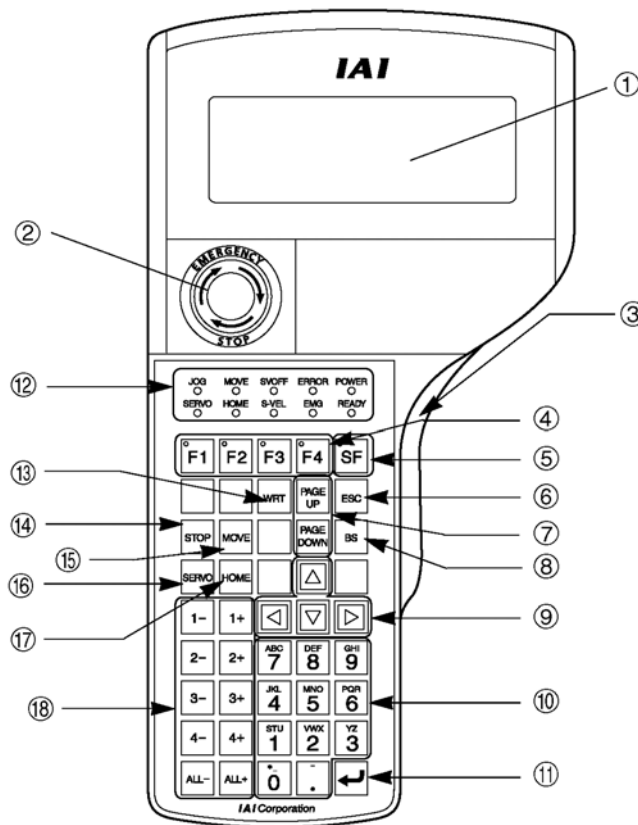
	Before execution of “OPEN 1”	After execution of “OPEN 1”
Connection of channel 1	Connection to Teaching Box	→ Connection to Teaching Box (Cold start error) Program is exited

Error occurring after “OPEN 1” execution: Error No. E.89 “SCIF open error in non-AUTO mode (servo in use)”

Descriptions of the “CAUTIONS” inside the box above are applied to cases where the mode is MANU and the I/O parameter is any other than No. 90 = 2 (IAI protocol).

6. Functions and Specifications of Teaching Box

6-1. Main operation keys and their functions



① LCD display

It displays the program or operation monitor up to 8 lines of 32 characters.

② EMERGENCY STOP button

It makes an emergency stop.

③ Deadman switch

The Deadman switch has 3-level conditions. The ON/OFF conditions at each level are as follows:

1st level	Switch OFF	Condition in which a hand is moved off the switch or the force to press the switch is very weak
2nd level	Switch ON	Condition in which the switch is pressed with a proper force
3rd level	Switch OFF	Condition in which the switch is pressed with a strong force

Under the condition of switch ON, servo ON is available.

Under switch OFF, the driving power is shut down and the servo is turned OFF.

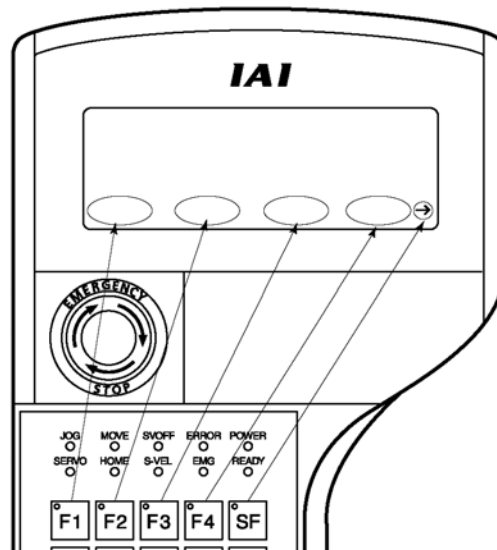
Even under switch OFF, operations in a mode not requiring servo ON (such as program editing) are available.

The Deadman switch is valid when the MODE switch of the controller is flipped to MANU. When the MODE switch is flipped to AUTO, the driving power cannot be shut down regardless of the switch condition.



④ **F1** **F2** **F3** and **F4** keys (function keys)

These keys correspond to each item in the LCD display (function key section).



⑤ **SF** key (shift key)

When there are 5 or more selectable functions (→ is displayed at the right part of the function key section), the display items in the function key section are shifted.

⑥ **ESC** key (escape key)

It returns the current condition to the previous condition.

When this key is used during data input, the input data is canceled.

⑦ **PAGE UP** and **PAGE DOWN** keys (page-up key, page-down key)

These keys increment or decrement the editing/display item No. (position No., program No., step No., etc.).

⑧ **BS** key (backspace key)

It clears the last input character during data input.

It clears the data at the cursor position in other cases.

⑨ **◀** **▼** **▲** **▶** (cursor keys)

These keys move the cursor.

⑩ Ten-key numeric pad

Numeric values, alphabet letters, and symbols can be input with the ten-key numeric pad.

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 section. (Alph: alphabet symbol input, Num: numeric value input)

⑪ **↵** key (return key)

It is used to confirm the input data or move the cursor forward.

⑫ Status display LED

Conditions when each LED is lit are as follows:

	Condition when LED is lit
JOG	Jog operation is available with the 1- to ALL- or 1+ to ALL+ keys.
SERVO	The servo ON/OFF commands are available with the 1- to ALL- or 1+ to ALL+ keys.
MOVE	Position movement and continuous movement are available with the 1- to ALL- or 1+ to ALL+ keys.
HOME	Home position return operation is available with the 1- to ALL- or 1+ to ALL+ keys.
SVOFF	It is lit when the servo is OFF for all the effective physical axes.
S-VEL	It is lit when Effective is selected for the safety velocity.
ERROR	It is lit when an error occurs in the controller.
EMG	It is lit when the controller is in an emergency stop condition.
POWER	It is lit when the power to the Teaching Box is ON.
READY	It is lit when the controller is in a ready condition.

⑬ **WRT** key (write key)

It transfers edit data to the controller. (Stores data in the memory of the controller.)

It transfers only data that is displayed in the LCD display. (Cannot transfer data by merging more than one position No., program step No., etc.)

⑭ **STOP** key

It gives an operation stop command to all the effective physical axes. This is valid in the axis-operable mode.

⑮ **MOVE** key

It changes the operation mode of the axis operation keys (**1-** to **ALL-**, **1+** to **ALL+**) to the POSITION MOVEMENT mode. The **MOVE** LED lights up. This key is valid in the axis-operable modes.

⑯ **SERVO** key

It changes the operation mode of the axis operation keys (**1-** to **ALL-**, **1+** to **ALL+**) to the servo ON/OFF mode. The **SERVO** LED lights up. This is valid in the axis-operable modes.

⑰ **HOME** key

It changes the operation mode of the axis operation keys (**1-** to **ALL-**, **1+** to **ALL+**) to the HOME POSITION RETURN mode. The **HOME** LED lights up. This is valid in the axis-operable modes.



⑮ Axis operation keys (1- to ALL-, 1+ to ALL+)

These keys operate each axis. The functions are as follows according to the operation mode:

Operation mode	Function	
	1- to 4-, ALL-	1+ to 4+, ALL+
JOG	It jogs (inches) the axis in the coordinate minus direction.	It jogs (inches) the axis in the coordinate plus direction.
POSITION MOVEMENT	It moves the axis to the currently displayed position. (In the continuous movement mode, it decrements the position No. after completion of movement.)	It moves the axis to the currently displayed position. (In the continuous movement mode, it increments the position No. after completion of movement.)
SERVO ON/OFF	It gives the servo OFF command.	It gives the servo ON command.
HOME POSITION RETURN	It gives the home position return command.	

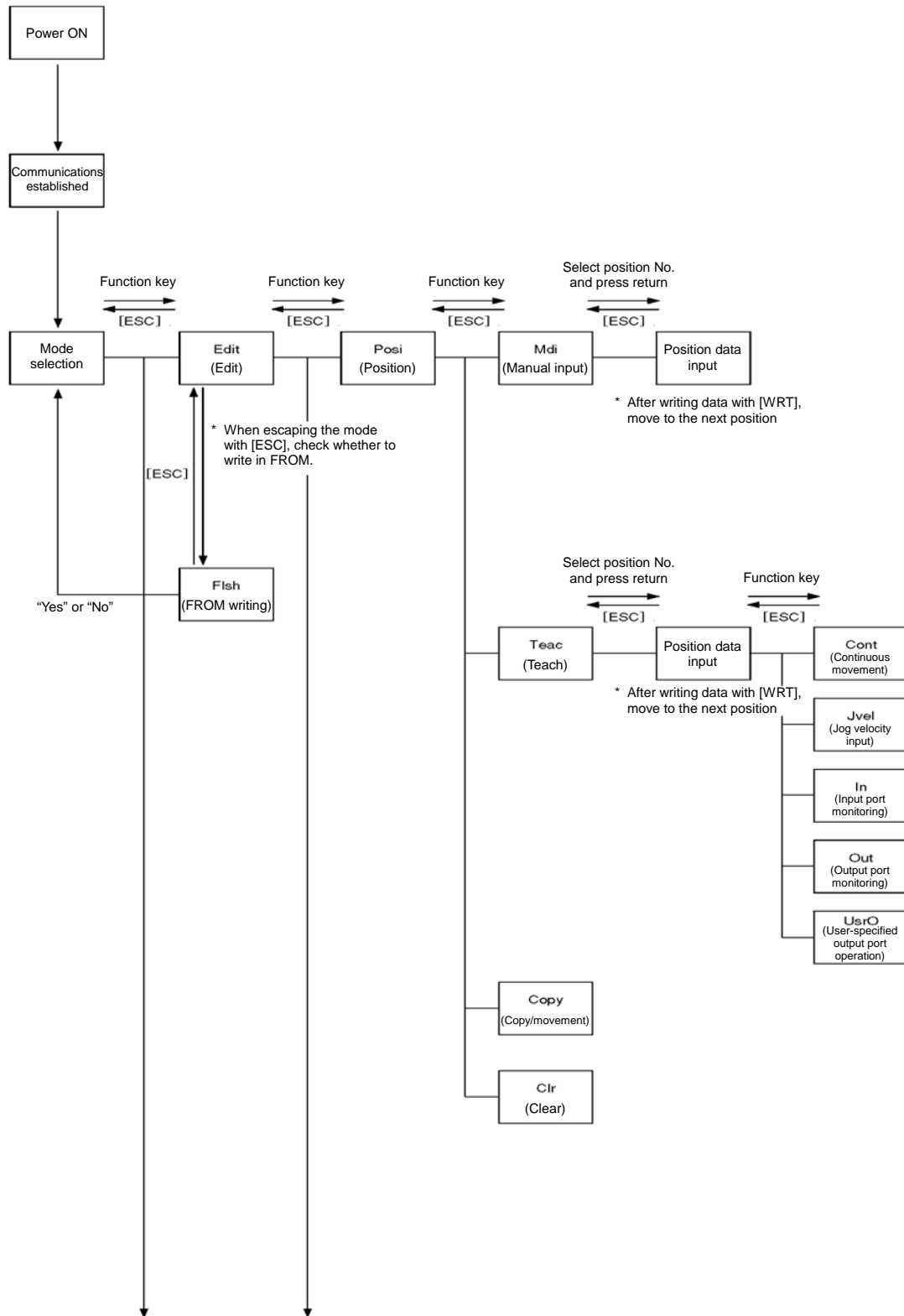
For axial operation, execute it for a single axis or all axes in one operation.

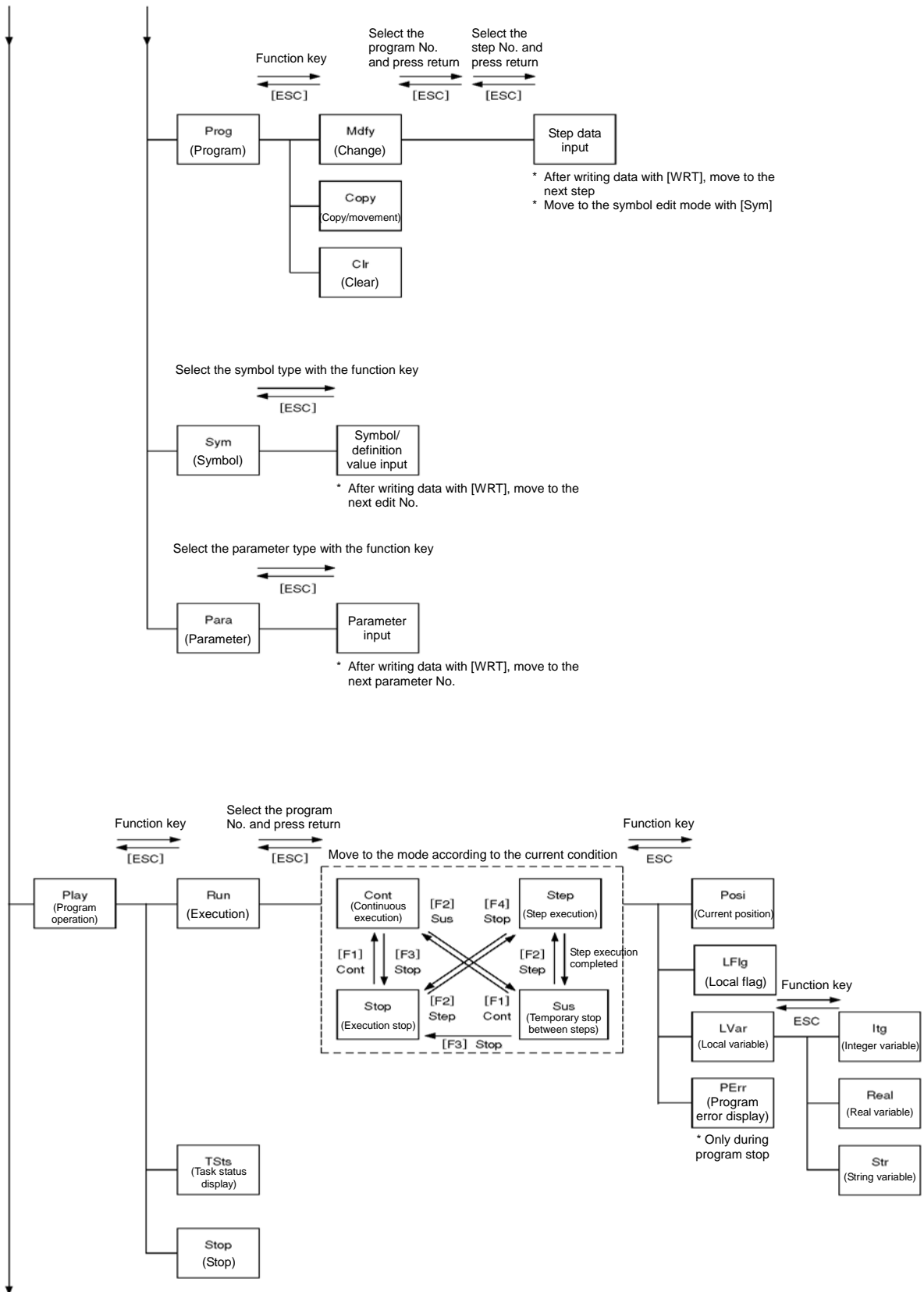
In any operation mode other than JOG, the mode moves to the JOG mode after one operation.

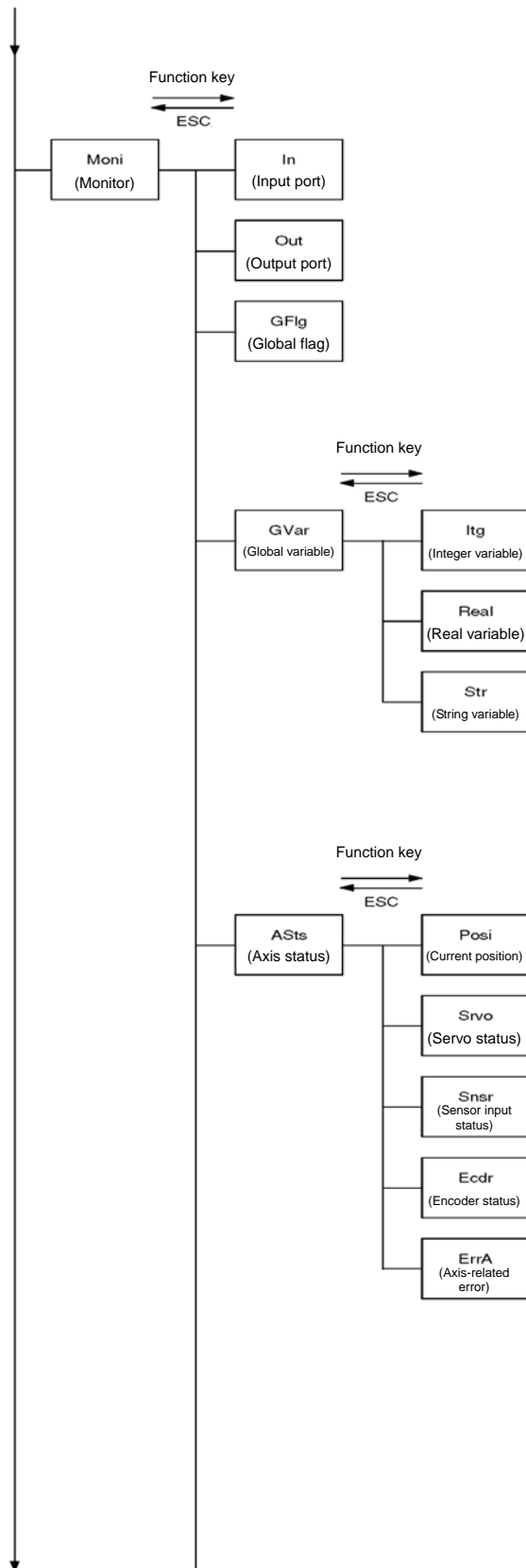
Cautions

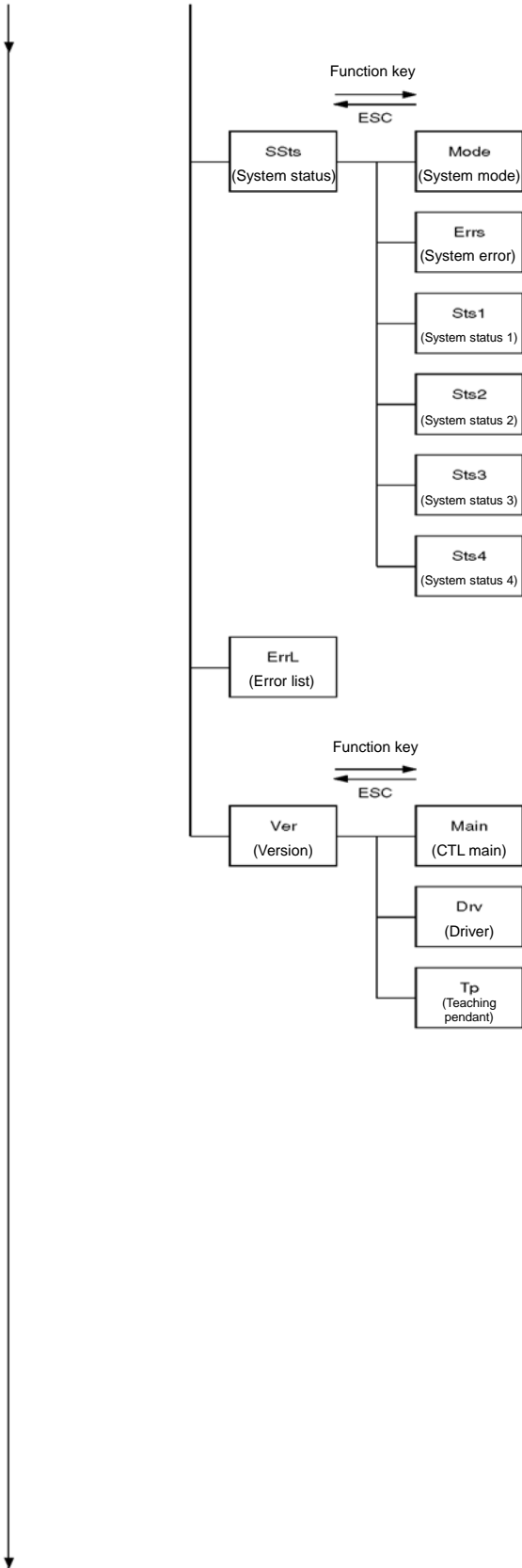
- Such jog actions with the JOG button are also valid for any not-homed axes. However, coordinate values in this case have no meaning. Therefore, be extremely careful about interference with the stroke end.
- If jog operation is performed to the axis in action under the operation-button-acceptable condition, the operation of the applicable axis is aborted when the JOG operation button is turned OFF. (The next operation starts, if any.)

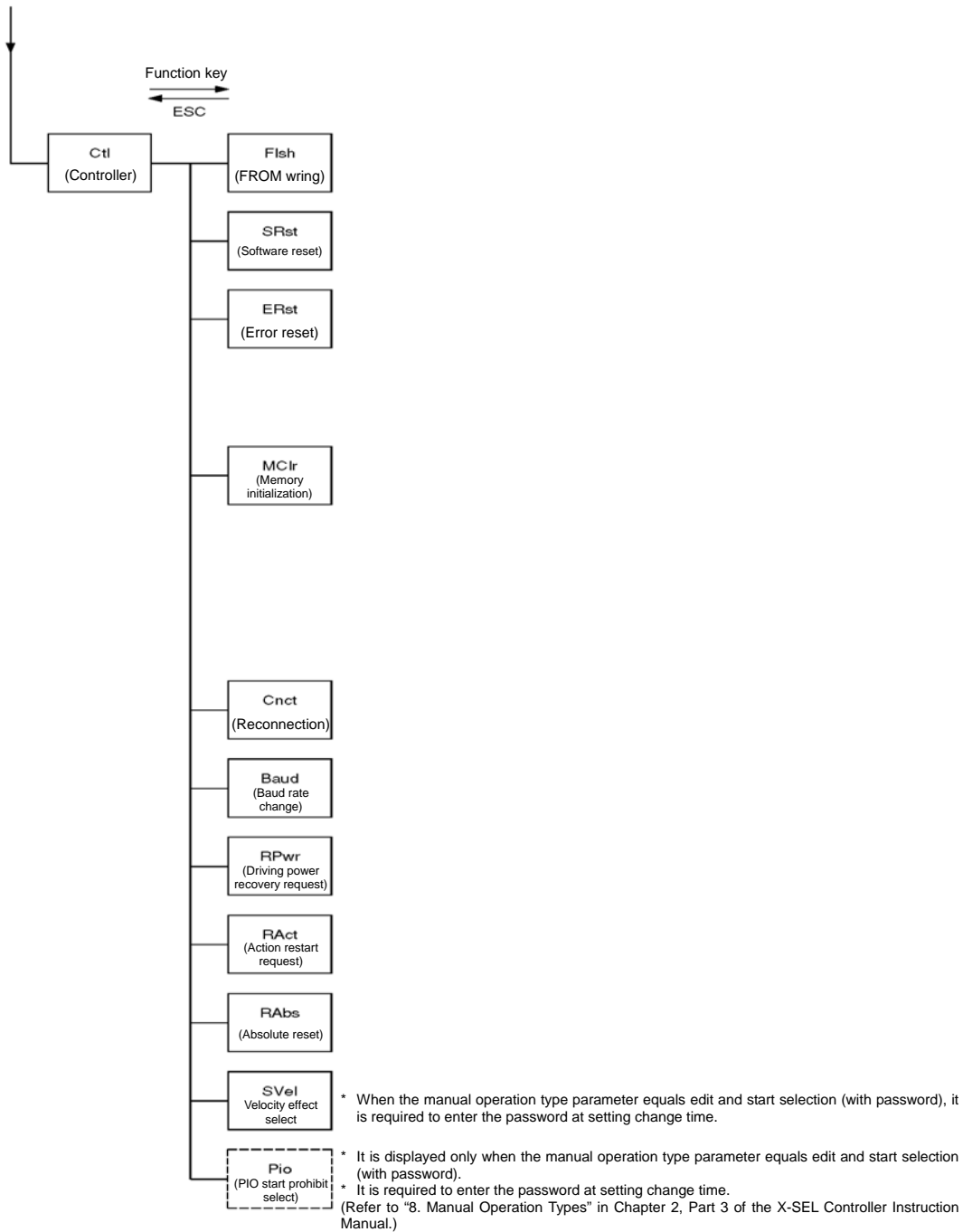
7. Mode Flow Chart



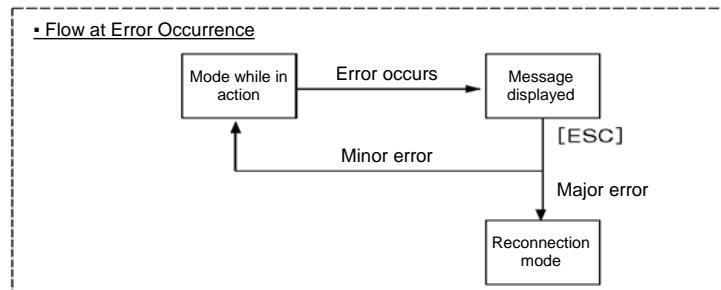








▪ **Flow at Error Occurrence**



8. Data Storage Method

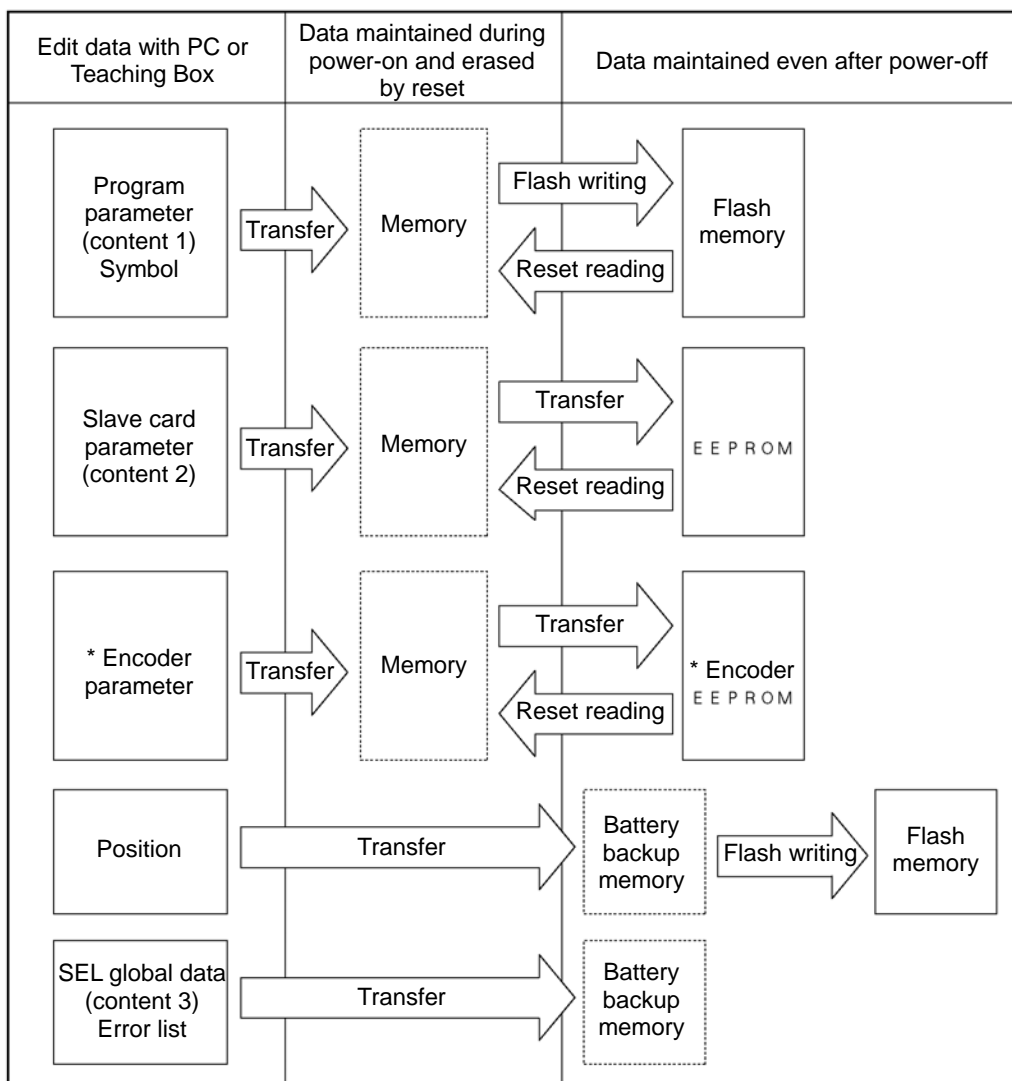
Since the X-SEL Controller adopts flash memory, there is a storage area by battery backup and a storage area by flash memory according to the data to be stored.

In addition, even if data is transferred from the PC software or Teaching Box, 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.

8-1. Factory setting: When system memory backup battery is used

(Para-Othe No. 20 = 2 (system memory backup battery installed))



* 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 are 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.

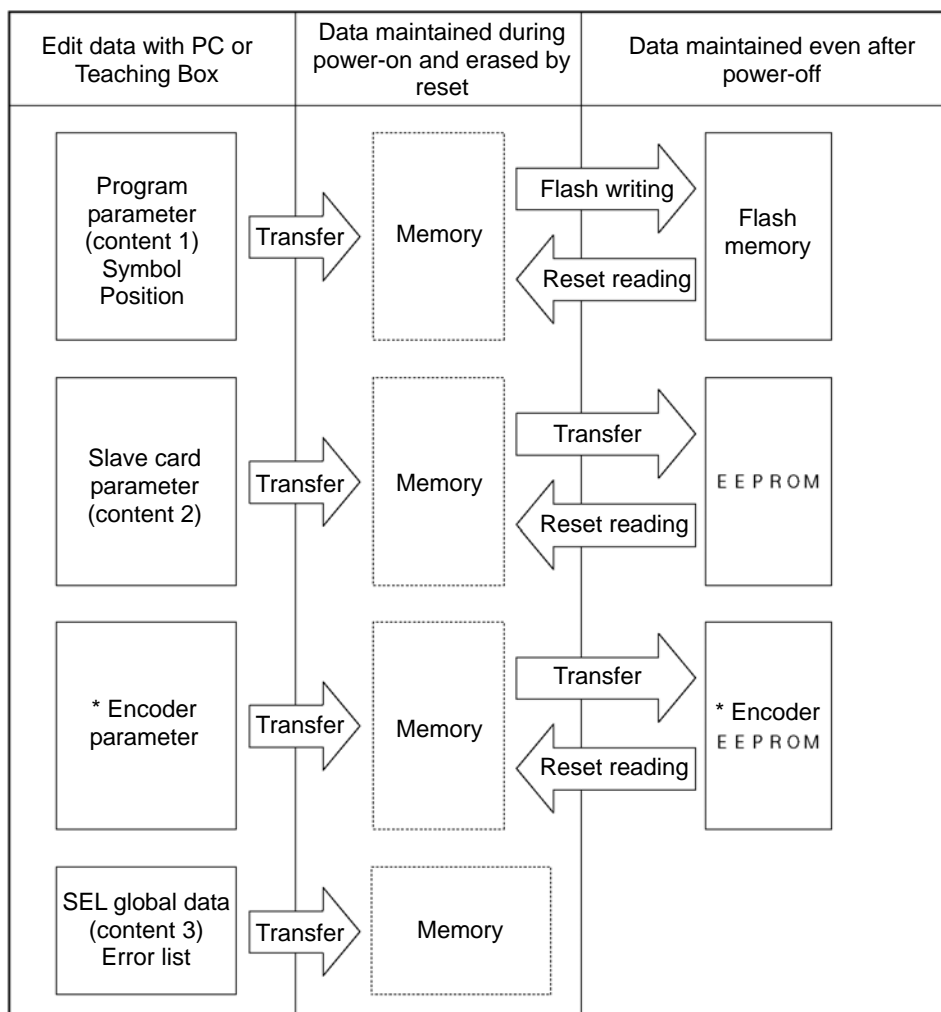
Content 1: Parameters excluding content 2 below and encoder parameters

Content 2: Driver card and IO slot card (power-supply system card) parameters

Content 3: Flags, variables, strings

8-2. When system memory backup battery is not used

Para-Othe No. 20 = 0 (System memory backup battery not installed)



Since the program, parameter, symbol, and position are 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: The SEL global data cannot be maintained when the backup battery is not installed.

8-3. Cautions

Cautions in data transfer and flash writing

Never turn off the main power during data transfer and flash writing.

Failure to do so may result in inoperability of the controller due to data loss.

Cautions in storing parameters in a file

Encoder parameters are stored in EEPROM of the actuator's encoder itself (not in EEPROM within the controller, which is different from the other parameter types). When the power is turned on or software is reset, encoder parameters are read from EEPROM into the controller.

Therefore, if you store the parameters of the controller, which has been powered on or of which software has been reset when the actuator (encoder) is not connected, in a file, the encoder parameters stored in this file become invalid values.

Cautions in transferring a parameter file to controller

When the parameter file is transferred to the controller, the encoder parameters are transferred to EEPROM of the encoder (excluding manufacturing information and function information).

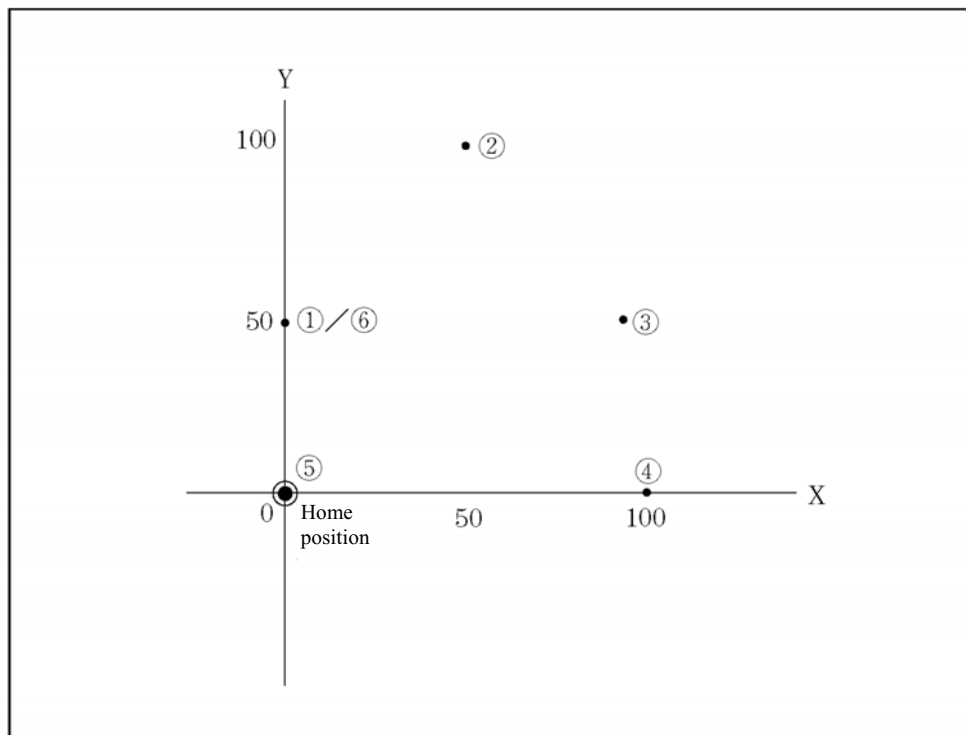
Therefore, if you transfer the parameter file read from the controller, which has started up when the actuator is not connected, to the controller (which is connected to the actuator), the encoder parameters of invalid values are written in EEPROM of the encoder.

When storing the parameters in a file, do so when the actuator is connected.



9. Simple Operating Procedures

In this section, the program and position data to draw a simple “pentagon” passing through the following 6 points (① and ⑥ at the same location) by the actuator of 2 axes (X, Y) are created.



Position Data (① to ⑥)



9-1. Creation of position data

Input the position data of 6 points each to draw a pentagon as shown in the position data list below.

Enter numeric values of the position data with the ten-key numeric pad.

No.	Axis1	Axis2	Vel	Acc	Dcl
1	0.000	50.000	xxxx	x.xx	x.xx
2	50.000	100.000	xxxx	x.xx	x.xx
3	100.000	50.000	xxxx	x.xx	x.xx
4	100.000	0.000	xxxx	x.xx	x.xx
5	0.000	0.000	xxxx	x.xx	x.xx
6	0.000	50.000	xxxx	x.xx	x.xx

Connect the controller to the Teaching Box and flip the MODE switch to MANU.
Turn on the power to the controller.

SEL Teaching	
TP	V1.01 [2003/03/10]
TPc	V1.00 [2003/02/26]
Please wait...	

The version of the Teaching Box is displayed and the screen moves to the Mode Selection screen. (To the following page)

Msg [BE1]	
TP Deadman SW OFF	
F1:Dtl	F2: F3: F4:

When the Deadman switch is OFF, the screen shown at the left is displayed. Pressing the **ESC** key moves to the Mode Selection screen.
(Even when the Deadman switch is OFF, operations in a mode not requiring servo ON are available.)
When entering numeric values of position data with the ten-key numeric pad, operation is available even if the Deadman switch is OFF.

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

Mode Selection screen

This screen becomes the basic screen for all operations.

Press the **F1** (Edit) key.

* When you make a selection error or input error, press the **ESC** key to return to the last screen and continue operation. Pressing the **ESC** key once or several times during an operation can return to the basic screen shown above without fail.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Edit mode screen

Press the **F1** (Posi) key.

Posi
F1:Mdi F2:Teac F3:Copy F4:clr

Posi (position data) edit screen

Press the **F1** (Mdi) key.

1st axis data		2nd axis data		Position No.	
Mdi	1	X.XXX	2	X.XXX	No. 1
3rd axis data		4th axis data			
Vel	0	Acc	0.00	Dcl	0.00
F1:Clr	F2:	F3:	F4:		
Velocity data		Acceleration data		Deceleration data	

The figure above indicates the case of a two-axis controller. Nothing is displayed in the sections for the 3rd- and 4th-axis data.

Position No. input mode

The cursor is located at the position No. When no data is input, X.XXX is displayed. Press the return key to move the cursor to the section of the position data for the 1st axis.

* When data is already input, overwrite it (the original data is lost) or use the **PAGE UP** and **PAGE DOWN** keys to move to the screen with X.XXX displayed and input data.

Pressing the **F1** (Clr) key twice clears the input data for all axes. This key clears the controller's data even if the **WRT** key is not pressed.



Mdi	No. 1
1[X.XXX]	2[X.XXX]
Vel[0] Acc[0.00] Dcl[0.00]	
F1:Canc F2: F3: F4:	

① Data input for 1st point

Enter a numeric value of 0 and press the return key. 0.000 is displayed, the axis No. changes to 2, and the cursor moves to the section for the 2nd-axis position data.

* The position data can be input up to a 4-digit integral number and three digits to the right of the decimal. Since the range varies according to the actuator's model, check it in the catalog etc.

Mdi	No. 1
1[0.000]	2[X.XXX]
Vel[0] Acc[0.00] Dcl[0.00]	
F1:Canc F2: F3: F4:	

Enter 50 for the 2nd-axis position data and press the return key. (* Every time the return key is pressed, the cursor position moves. When you make an input error, move the cursor to the location where you have made the error and overwrite the data.)

The input data can also be returned to X.XXX with the **F1** (Canc) key.

Mdi	No. 1
1[0.000]	2[50.000]
Vel[0] Acc[0.00] Dcl[0.00]	
F1:Canc F2: F3: F4:	

When the data is transferred with the **WRT** key, the position No. is incremented by 1 and becomes 2.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Position No. 2

Mdi	No. 2
1[X.XXX]	2[X.XXX]
Vel[0] Acc[0.00] Dcl[0.00]	
F1:Canc F2: F3: F4:	

② Data input for 2nd point

Enter 50 for the 1st-axis position data and press the return key.



Mdi	No. 2
1 [50.000]	2 [X.XXX]
Vel [0] Acc[0.00] Dcl [0.00]	
F1:Canc F2: F3: F4:	

The cursor moves to the section for the 2nd-axis position data. Enter 100 and press the return key.

Mdi	No. 2
1 [50.000]	2 [100.000]
Vel [0] Acc[0.00] Dcl [0.00]	
F1:Canc F2: F3: F4:	

Transfer the data with the **WRT** key and advance the position No. to 3.

Mdi	No. 3
1 [X.XXX]	2 [X.XXX]
Vel [0] Acc[0.00] Dcl [0.00]	
F1:Canc F2: F3: F4:	

③ Data input for 3rd point

Enter 100 for the 1st-axis position data and press the return key.

Mdi	No. 3
1 [100.000]	2 [X.XXX]
Vel [0] Acc[0.00] Dcl [0.00]	
F1:Canc F2: F3: F4:	

Enter 50 for the 2nd-axis position data and press the return key.



Mdi	No. 3
1 [100.000]	2 [50.000]
Vel [0] Acc [0.00] DcI [0.00]	
F1:Canc F2: F3: F4:	

Transfer the data with the **WRT** key and advance the position No. to 4.

Mdi	No. 4
1 [X.XXX]	2 [X.XXX]
Vel [0] Acc [0.00] DcI [0.00]	
F1:Canc F2: F3: F4:	

④ Data input for 4th point

Enter 100 for the 1st-axis position data and press the return key.

Mdi	No. 4
1 [100.000]	2 [X.XXX]
Vel [0] Acc [0.00] DcI [0.00]	
F1:Canc F2: F3: F4:	

Enter 0 for the 2nd-axis position data and press the return key.

Mdi	No. 4
1 [100.000]	2 [0.000]
Vel [0] Acc [0.00] DcI [0.00]	
F1:Canc F2: F3: F4:	

Transfer the data with the **WRT** key and advance the position No. to 5.



Mdi	No. 5
1[X.XXX]	2[X.XXX]
Vel[0] Acc[0.00] DcI[0.00]	
F1:Canc F2:	F3: F4:

⑤ Data input for 5th point

Enter 0 for the 1st-axis position data and press the return key.

Mdi	No. 5
1[0.000]	2[X.XXX]
Vel[0] Acc[0.00] DcI[0.00]	
F1:Canc F2:	F3: F4:

Enter 0 for the 2nd-axis position data and press the return key.

Mdi	No. 5
1[0.000]	2[0.000]
Vel[0] Acc[0.00] DcI[0.00]	
F1:Canc F2:	F3: F4:

Transfer the data with the **WRT** key and advance the position No. to 6.

Mdi	No. 6
1[X.XXX]	2[X.XXX]
Vel[0] Acc[0.00] DcI[0.00]	
F1:Canc F2:	F3: F4:

⑥ Data input for 6th point

Enter 0 for the 1st-axis position data and press the return key.



Mdi	No. 6
1[0.000]	2[X.XXX]
Vel[0] Acc[0.00] DcI[0.00]	
F1:Canc F2: F3: F4:	

Enter 50 for the 2nd-axis position data and press the return key.

Mdi	No. 6
1[0.000]	2[50.000]
Vel[0] Acc[0.00] DcI[0.00]	
F1:Canc F2: F3: F4:	

Transfer the data with the **WRT** key and advance the position No. to 7.

Mdi	No. 7
1[X.XXX]	2[X.XXX]
Vel[0] Acc[0.00] DcI[0.00]	
F1:Canc F2: F3: F4:	

Complete position editing and write the data in flash ROM.

Pressing the **ESC** key moves the cursor to the location of the position No.

Mdi	No. 7
1[X.XXX]	2[X.XXX]
Vel[0] Acc[0.00] DcI[0.00]	
F1:Canc F2: F3: F4:	

Pressing the **ESC** key returns the screen to the Posi edit screen.



Posi
F1:Mdi F2:Teac F3:Copy F4:clr

Pressing the **ESC** key again moves to the Edit mode screen.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Pressing the **ESC** key once more moves to the Flsh (flash ROM writing) screen.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **F1** (OK) key.

When exiting the Edit mode without writing the data, press the **F2** (Canc) key.

Pressing the **ESC** key returns to the last screen. However, if you attempt to exit the Edit mode, the screen returns to the Flsh screen again.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC] or [F2]
Please wait...

The message “Please wait...” flashes during flash ROM writing.

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

Edit
F1:Posi F2:Prog F3:Sym F4:Para

When flash ROM writing is completed, the screen returns to the Edit screen.

With the above, input of the basic position data is completed.

9-2. Creation of program

The program to move the position data created in 9-1. is created.

Application Program List

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				

In this section, the X-SEL program is inputted.

For further information on the meaning and usage of each command, refer to the Instruction Manual attached to the controller.

Only Cmnd (command) and Operand1 (operation 1) are input here.

Cautions for the HOME command

For restart after home position return temporary stop, execute it from the beginning of the home position return sequence.

The home position return operation of the ABS encoder axis becomes the movement to the multi-rotation data reset position.

When operation is reset during its execution in a mode other than the absolute reset mode of the PC compatible software/Teaching Box, the "actual position soft limit error" may occur depending on the position. It is not recommended to execute home position return at times other than during adjustment time of the absolute encoder axis.

Use the HOME command only for the increment specification.

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

Select the **F1** (Edit) key on the Mode Selection screen.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Select the **F2** (Prog) key on the Edit mode screen.

Prog
0/6000
F1:Mdfy F2:Copy F3:Clr F4:

Number of all program steps stored in the controller's RAM

Select the **F1** (Mdfy) key on the Prog (program edit and new creation) screen.

Program No.		Step No.	
Mdfy	No.	1	[0]
Ext :	Cmnd:		
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:	F2:	F3:	F4:

Number of program steps stored in the controller's RAM for the selected program No.

The screen changes to the Mdfy (program No. input mode) screen. The cursor is located at the program No. Press the return key to move the cursor to the location of the step No.





* When the program's data is already input, overwrite it (the original data is lost) or select the program No. with no data input. The program No. or step No. over which the cursor is located can be changed with the **PAGE UP** and **PAGE DOWN** keys. In addition, pressing the return key after inputting a numeric value with the ten-key numeric pad can change the program No. or step No.



Mdfy	No.	1-	1	[	0]
Ext :	Cmd:				
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:	F2:	F3:	F4:		

The cursor has moved to the location of the step No. Press the return key.

Mdfy	No.	1-	1	[	0]
Ext : ■	Cmd:				
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:LD	F2:A	F3:0	F4:AB		

The cursor moves to the input section for Ext (extension condition). Move the cursor to the input section for Cmd (command) with the return key or     keys.

Mdfy	No.	1- 1	[0]
Ext :	Cmd:	[REDACTED]	
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:ABPG F2:ACC F3:ACHZ F4:ADD →			



Command with an initial letter of G

Mdfy	No.	1- 1	[0]
Ext :	Cmd:	[REDACTED]	
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:EXPG F2:EXSR F3:FMIO F4:GACC →			

Command with an initial letter of H



Mdfy	No.	1- 1	[0]
Ext :	Cmd:	[REDACTED]	
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:GVEL F2:HOLD F3:HOME F4:IFEQ →			



Command with an initial letter of I

Mdfy	No.	1- 1	[0]
Ext :	Cmd:	[REDACTED]	
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:GVEL F2:HOLD F3:HOME F4:IFEQ →			



Enter a command.

The command is displayed in the function key section.

Command search method

① When the cursor is at the location for command input, pressing the **[SF]** key displays commands in alphabetical order.

② Letters/alphabet letters are located for each of the ten keys (such as GHI allocated to the 9 key). Every time a key of the ten-key numeric pad is pressed when the cursor is located at the command input section, the first command of which the initial letter is the relevant alphabet letter is displayed in the function key section.

Display the command for input in the function key section with the steps of ① and ② above and press the corresponding function key.

Search for command **[HOME]**

Pressing the 9 key displays the commands with the initial letters of G, H, and I. (Some commands cannot be displayed only by pressing a key of the ten-key numeric pad. In such cases, display the command by using both the ten-key and the **[SF]** key.



Mdfy	No.	1- 1	[0]
Ext :	Cmd:	HOME	
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:GVEL F2:HOLD F3:HOME F4:IFEQ→			

After displaying HOME in the function key section, press the **F3** (HOME) key. (To return the command input field to blank, press the **BS** key.) Press the return key.

Mdfy	No.	1- 1	[0]
Ext :	Cmd:	HOME	
Cond:	Op-1:		
	Op-2:		
	Post:		
F1: F2:Sym F3:* F4:			

The cursor moves to Op-1.
Enter 11 and press the return key.

To reattempt input:
Move the cursor to the change location with the **←** or return key.
Overwrite the data or delete it with the **BS** key.
Or, reattempt from the step No. with the **ESC** key.

Mdfy	No.	1- 1	[0]
Ext :	Cmd:	HOME	
Cond:	Op-1:	11	
	Op-2:		
	Post:		
F1: F2:Sym F3:* F4:			

Press the **WRT** key to transfer the data to the controller. The step No. advances to 2.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Step No. 2

Mdfy	No.	1- ②	[0]
Ext :	Cmd:		
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:GVEL F2:HOLD F3:HOME F4:IFEQ→			

Press **2** of the ten-key numeric pad or the **SF** key to search VEL.



Mdfy	No.	1	2	[	1]
Ext :		Cmd:			
Cond:		Op-1:			
		Op-2:			
		Post:			
F1:VAL F2:VALH F3:VEL F4:VLMX→					

Select the **F3** (VEL) key.

Mdfy	No.	1	2	[	1]
Ext :		Cmd:	VEL		
Cond:		Op-1:			
		Op-2:			
		Post:			
F1:VAL F2:VALH F3:VEL F4:VLMX→					

Press the return key.

Mdfy	No.	1	2	[	1]
Ext :		Cmd:	VEL		
Cond:		Op-1:			
		Op-2:			
		Post:			
F1: F2:Sym F3:* F4:					

Enter 100 for the velocity* here and press the return key.

* For the maximum velocity, check it with the catalog etc.

When the velocity is input for the position data, that velocity is given priority.

Mdfy	No.	1	2	[	1]
Ext :		Cmd:	VEL		
Cond:		Op-1:	100		
		Op-2:			
		Post:			
F1: F2: F3: F4:					

Press the **WRT** key to transfer the data to the controller.

The step No. advances to 3.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Mdfy	No.	1- 3	[2]
Ext :	Cmd:	[REDACTED]	
Cond:	Op-1:	[REDACTED]	
	Op-2:	[REDACTED]	
	Post:	[REDACTED]	
F1:VAL F2:VALH F3:VEL F4:VLMX→			

Display MOVL with 5 of the ten-key numeric pad and the SF key.

Mdfy	No.	1- 3	[2]
Ext :	Cmd:	[REDACTED]	
Cond:	Op-1:	[REDACTED]	
	Op-2:	[REDACTED]	
	Post:	[REDACTED]	
F1:MOD <u>F2:MOVL</u> F3:MOVP F4:MULT→			

Select the F2 (MOVL) key.

Mdfy	No.	1- 3	[2]
Ext :	Cmd:	MOVL	
Cond:	Op-1:	[REDACTED]	
	Op-2:	[REDACTED]	
	Post:	[REDACTED]	
F1:MOD F2:MOVL F3:MOVP F4:MULT→			

Press the return key.
The cursor moves to the section for Op-1.

Mdfy	No.	1- 3	[2]
Ext :	Cmd:	MOVL	
Cond:	Op-1:	[REDACTED]	
	Op-2:	[REDACTED]	
	Post:	[REDACTED]	
F1: F2:Sym F3:* F4:			

Enter 1 of the position No. 1 and press the return key.



Mdfy	No.	1- 3	[2]
Ext :	Cmd:	MOVL	
Cond:	Op-1:	1	
	Op-2:		
	Post:		
F1:	F2:Sym	F3: *	F4:

Press the **WRT** key to transfer the data to the controller.

The step No. advances to 4.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Mdfy	No.	1- 4	[3]
Ext :	Cmd:		
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:MOD	F2:MOVL	F3:MOVP	F4:MULT→

Input the program data of MOVL 2 to MOVL 6 for the steps No. 4 to No. 8 according to the same procedures and transfer the data to the controller.

Mdfy	No.	1- 9	[8]
Ext :	Cmd:		
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:MOD	F2:MOVL	F3:MOVP	F4:MULT→

Display EXIT in the function key section with **8** of the ten-key numeric pad and the **SF** key.

Mdfy	No.	1- 9	[8]
Ext :	Cmd:		
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:EDSR	F2:ELSE	F3:EOR	F4:EXIT→

Select the **F4** (EXIT) key and press the return key.

Mdfy	No.	1- 9	[8]
Ext :	Cmd:	EXIT	
Cond:	Op-1:	[REDACTED]	
	Op-2:		
	Post:		
F1:	F2:	F3:	F4:

Press the **WRT** key to transfer the data to the controller.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Mdfy	No.	1- 10	[9]
Ext :	Cmd:	[REDACTED]	
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:EDSR	F2:ELSE	F3:EOR	F4:EXIT→

Complete the program editing and write the data in flash ROM.

Press the **ESC** key.

(The cursor moves to the location for step No.)

Mdfy	No.	1- 10	[9]
Ext :	Cmd:		
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:Ins	F2:Del	F3:Cmdt	F4:

(The cursor moves to the location for program No.)

Mdfy	No.	1- 10	[9]
Ext :	Cmd:		
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:	F2:	F3:	F4:

Press the **ESC** key.

Return to the Prog screen.

Prog
Total 9/6000
F1:Mdfy F2:Copy F3:Clr F4:

Press the **ESC** key.
Return to the Edit screen.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Press the **ESC** key.

Flash
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC]or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **F1** (OK) key.
When not writing the data in flash ROM, press the **F2** (Canc) key.

Flash
Write in Flash ROM? —> OK=[F1]/Cancel=[ESC]or [F2]
Please wait...

The message "Please wait..." flashes during flash ROM writing.

* Never turn off the power to the controller during this time.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

When flash ROM writing is completed, the screen returns to the Edit screen.



9-3. Change of application program

The program created in the preceding section (9-2) is changed.

A program step is inserted or deleted to allow the same operation to be repeated.

Step No.

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	

Change

1	HOME	11
2	VEL	100
3	TAG	1
4	MOVL	1
5	MOVL	2
6	MOVL	3
7	MOVL	4
8	MOVL	5
9	GOTO	1

(Insert "TAG 1" into step No. 3, delete "MOVL 6" and overwrite "EXIT" with "GOTO 1")

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

Select the **F1** (Edit) key on the Mode Selection screen.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Press the **F2** (Prog) key on the Edit screen.

Prog	
Total	9/6000
F1:Mdfy F2:Copy F3:Clr F4:	

Select the **F1** (Mdfy) key on the Prog screen.

Mdfy	No.	1	-	1	[	9]
Ext :	Cmd:	HOME				
Cond:	Op-1:	11				
	Op-2:					
	Post:					
F1:	F2:	F3:	F4:			

The display changes to the Mdfy screen. Press the return key once to move the cursor to the location for step No.

Mdfy	No.	1-	1	[	9]
Ext :	Cmnd:HOME				
Cond:	Op-1: 11				
	Op-2:				
	Post:				
F1:Ins F2:Del F3:Cmnt F4:					

Insert one-line step between the program steps No. 2 and No. 3. Enter 3 with the ten-key numeric pad or press the **PAGE UP** key twice to display 3.

Mdfy	No.	1-	3	[	9]
Ext :	Cmnd:MOVL				
Cond:	Op-1: 1				
	Op-2:				
	Post:				
F1:Ins F2:Del F3:Cmnt F4:					

Select the **F1** (Ins) key.

“Ins” is displayed next to Mdfy.



Mdfy[Ins]	No. 1- 3 [9]
Ext :	Cmnd:
Cond:	Op-1:
	Op-2:
	Post:
F1:Ins F2:Del F3:Cmnt F4:	

Press the return key to confirm the step No. to insert.

Mdfy[Ins]	No. 1- 3 [9]
Ext : █	Cmnd:
Cond:	Op-1:
	Op-2:
	Post:
F1:LD F2:A F3:0 F4:AB →	

Move the cursor to Cmnd (command) input section with the return key or ◀ ▶ ▲ ▼ keys.

Mdfy[Ins]	No. 1- 3 [9]
Ext :	Cmnd: █
Cond:	Op-1:
	Op-2:
	Post:
F1:EDSR F2:ELSE F3:EOR F4:EXIT →	

Display TAG with 1 of the ten-key numeric pad or the SF key.

Mdfy[Ins]	No. 1- 3 [9]
Ext :	Cmnd: █
Cond:	Op-1:
	Op-2:
	Post:
F1:SV0F F2:SV0N F3:SYST F4:TAG →	

Select the F4 (TAG) key and press the return key.

Mdfy[Ins]	No.	1- 3	[9]
Ext :	Cmd:	TAG	
Cond:	Op-1:	[REDACTED]	
	Op-2:		
	Post:		
F1:	F2:Sym	F3:*	F4:

Enter a numeric value of 1 for Op-1 and press the return key.

Mdfy[Ins]	No.	1- 3	[9]
Ext :	Cmd:	TAG	
Cond:	Op-1:	1	
	Op-2:	[REDACTED]	
	Post:		
F1:	F2:	F3:	F4:

Press the **WRT** key to transfer the program data to the controller.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Mdfy[Ins]	No.	1- 4	[10]
Ext :	Cmd:	[REDACTED]	
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:SV0F	F2:SV0N	F3:SYST	F4:TAG →

Press the **ESC** key twice to display the screen for step No. 4.

Mdfy	No.	1- 4	[10]
Ext :	Cmd:	MOVL	
Cond:	Op-1:	1	
	Op-2:		
	Post:		
F1:Ins	F2:Del	F3:Cmdt	F4:

Then, delete MOVL 6. Enter 9 for the step No. directly with the ten-key numeric pad while keeping the cursor position, or press the **PAGE UP** key 5 times to display MOVL 6.
(Cursor located at step No. 9)



Mdfy	No. 1- 9 [10]
Ext :	Cmnd:MOVL
Cond:	Op-1: 6
	Op-2:
	Post:
F1:Ins F2:Del F3:Cmnt F4:	

Press the **F2** (Del) key.

Del	No. 1- 9 [10]
Ext :	Cmnd:MOVL
Cond:	Op-1: 6
	Op-2:
	Post:
F1: F2:Del F3: F4:	

Press the **F2** (Del) key again.
(When canceling deletion, press the **ESC** key.)

Mdfy	No. 1- 9 [9]
Ext :	Cmnd:EXIT
Cond:	Op-1:
	Op-2:
	Post:
F1:Ins F2:Del F3:Cmnt F4:	

Press the return key.

Mdfy	No. 1- 9 [9]
Ext : █	Cmnd:EXIT
Cond:	Op-1:
	Op-2:
	Post:
F1:LD F2:A F3:0 F4:AB	

Move the cursor to the Cmnd (command) input section with the return key or **◀** **▼** **▲** **▶** keys.



Mdfy	No.	1-	9	[	9]
Ext :	Cmd:	EXIT			
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:SV0F F2:SV0N F3:SYST F4:TAG →					

Display GOTO with **9** of the ten-key numeric pad or the **SF** key.

Mdfy	No.	1-	9	[	9]
Ext :	Cmd:	EXIT			
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:GDCL F2:GOTO F3:GRP F4:GTTM →					

Select the **F2** (GOTO) key and press the return key.

Mdfy	No.	1-	9	[	9]
Ext :	Cmd:	GOTO			
Cond:	Op-1:	1			
	Op-2:				
	Post:				
F1: F2:Sym F3:* F4:					

Enter the same numeric value as the one input for Op-1 of TAG for Op-1. Enter 1 here and press the return key.

Mdfy	No.	1-	9	[	9]
Ext :	Cmd:	GOTO			
Cond:	Op-1:	1			
	Op-2:				
	Post:				
F1: F2: F3: F4:					

Press the **WRT** key to transfer the program data to the controller.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.



Mdfy	No. 1- 10 [9]
Ext :	Cmd:
Cond:	Op-1:
	Op-2:
	Post:
F1:GDCL F2:GOTO F3:GRP F4:GTTM →	

Press the **ESC** key several times to move to the Flsh screen.

Flsh
Write in Flash ROM?
→ OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **F1** (OK) key.

When not writing the data in flash ROM, press the **F2** (Canc) key.

Flsh
Write in Flash ROM?
→ OK=[F1]/Cancel=[ESC] or [F2]
Please wait...

The message "Please wait..." flashes during flash ROM writing.

* Never turn off the power to the controller during this time.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Flash ROM writing is completed.

Return to the Edit screen with the **ESC** key.

10. Program Execution

Now, operate the program created in “9. Simple Operating Procedures.”

10-1. Operation check

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

Press the **F2** (Play) key to move to the Play mode screen.

Play mode screen

Play
F1:Run F2:TSts F3:Stop F4:

The following 3 items on the Play mode screen exist.

F1 (Run): Moves to the screen for inputting the program No. to execute.

F2 (TSts): Moves to screen for monitoring the status of the task in execution.

F3 (Stop): Completes all programs in execution.
(The **F2** and **F3** keys are function keys to be used after program execution.)

All programs completed

Task status

TSts	No. 1
Prog[1]	Wait[ON]
Step[7]	Hold[OFF]
Stat[WAT]	Canc[OFF]
Lvl [9]	
F1:	F2: F3: F4:

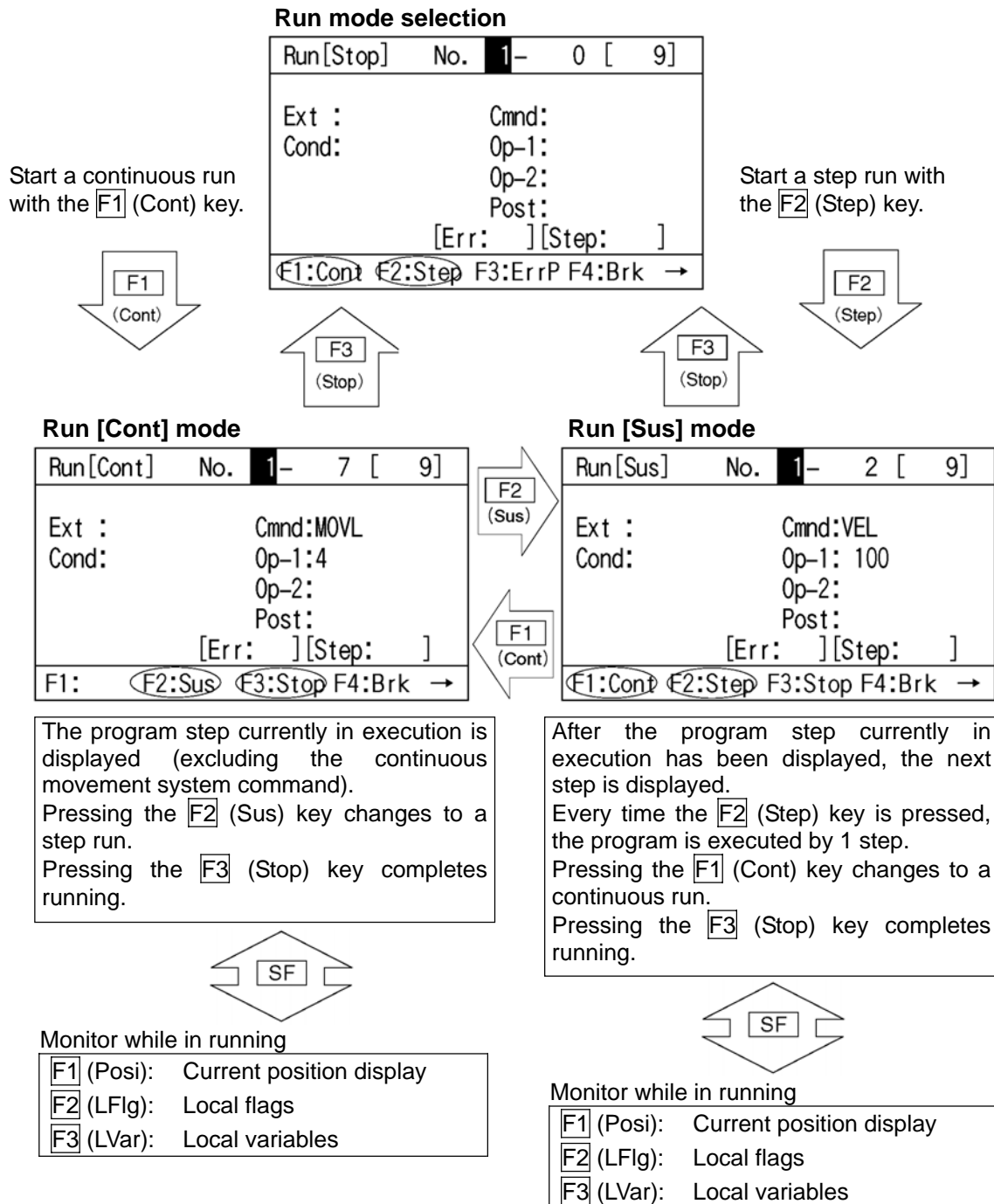
Run [Stop]	No. 1	0 [9]
Ext :	Cmd:	
Cond:	Op-1:	
	Op-2:	
	Post:	
	[Err:]	[Step:]
F1:Cont	F2:Step	F3:ErrP F4:Brk →

The cursor is located at the program No.
Enter the program No. to execute with the ten-key numeric pad or the **PAGE UP** and **PAGE DOWN** keys, and confirm it with the return key.



The screen has moved to the Run mode selection screen.

Select whether to make a run by 1 step of the program or to make a continuous run.



- While the Teaching Box is left connected, "Effect" is valid for the safety velocity (Svel). Therefore, the maximum velocity achieved by the program startup from the Teaching Box becomes 250 mm/sec or lower. To operate the controller according to the program velocity command, it is required to change the condition to "No Effect."
- For the selection of the safety velocity between Effect and No Effect, refer to "16-8. Safety velocity."
- Under the "Effect" condition above, Para-Othe (other parameter) No. 21 "Manual mode type" is 0 or 1. (The parameter is generally 0 before domestic shipment.)
- When Para-Othe No. 21 is 2, the condition is "No Effect" for Svel.

10-2. Setting of break point

The break points in a continuous run can be set.

Press the **F4** (Brk) key on the Run mode selection screen or Run mode screen.

Step No.		Setting
Brk	No. 1-6(B) 9	
Ext :	Cmd:MOVL	
Cond:	Op-1: 3	
	Op-2:	
	Post:	
	[Err:] [Step:]	
F1:Set	F2:AClr	F3: F4:

Step No.

Setting of break point

Select the step No. to set the break point with the **PAGE UP** and **PAGE DOWN** keys.

Every time the **F1** (Set) key is pressed, the break point is set or cleared.

When clearing all the set break points, press the **F2** (ACIr) key.

When setting the break point and making a continuous run, the program temporarily stops before the execution of the command of the set step No.

To restart a continuous run after the stop, press the **F1** (Cont) key. Pressing the **F2** (Step) key makes a step run.

10-3. Monitor while in running

The actuator's current positions or data in the local area can be monitored while in a continuous run or step run.

Press the **SF** key on the Run [Cont] or Run [Sus] mode screen.

Run[Sus]	No.	1	-	8	[9]
Ext :	Cmd:MOVL				
Cond:	Op-1: 5				
	Op-2:				
	Post:				
	[Err:]		[Step:]		
F1:Posi	F2:LFIg	F3:LVar	F4:	→	

Monitor items are displayed in the function key section.

[F1] (Posi): Current position display


F2 (LFlg): Local flags

F3 (LVar): Local variables

(1) Current position display

The current positions of the actuator are displayed.

Select the **F1** (Posi) key on the Run mode screen.

Mode flow: 

Posi
1[50.000N] 2[40.000N]
F1: F2: F3: F4:

N/F at the end of the position data indicates the servo ON/OFF condition.


N: Servo ON

F: Servo OFF

(2) Local flags

The ON/OFF conditions of local flags are displayed. The conditions of local flags can be changed between ON and OFF.

Select the **F2** (LFlg) key on the Run mode screen.

Mode flow: 

LFlg	No.	1
		0 1 2 3 4 5 6 7 8 9
900 →	0	0 0 0 0 0 0 0 0 0 0
910 →	0	0 0 0 0 0 0 0 0 0 0
920 →	0	0 0 0 0 0 0 0 0 0 0
930 →	0	0 0 0 0 0 0 0 0 0 0
940 →	0	0 0 0 0 0 0 0 0 0 0
F1:0/1	F2:	F3:
		F4:

Program No.

Every time the **F1** (0/1) key is pressed, the local flag can be changed between ON and OFF.

Move the cursor with the keys.

Every time the **PAGE UP** or **PAGE DOWN** key is pressed, the flag Nos. are shifted by 20 and displayed.

(3) Local variables

The local variable/local string descriptions are displayed. In addition, a numeric value can be assigned to the local variable while a character string can be assigned to the local string.

Select the **F3** (LVar) key on the Run mode screen.

LVar	No.
	1

F1:Itg F2:Real F3:Str F4:

Program No.

Local variables are displayed by dividing them into the following 3 types:

F1 (Itg): Integer

F2 (Real): Real number


F3	(Str):	String
----	--------	--------

① Local integer variable





Mode flow:

LVar-I _{tg}		No.	1
1 →		0	
2 →		0	
3 →		0	
4 →		0	
5 →		0	
F1:	F2:	F3:	F4:

② Local real variable

Mode flow: 

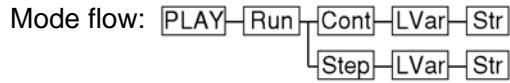
LVar-Real	No.
100 →	0.000000
101 →	0.000000
102 →	0.000000
103 →	0.000000
104 →	0.000000
F1:	F2:
F3:	F4:

The cursor is located at the data (variable description). Entering a numeric value with the ten-key numeric pad and pressing the return key can assign a value. Move the cursor with the return key or     keys.

The variable No. can also be changed with the **PAGE UP** and **PAGE DOWN** keys.



③ Local string



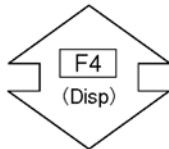
LVar-Str [CHAR]	No.	1
0 -> ■	0	1 2 3 4 5 6 7 8 9
10 ->	10	
20 ->	20	
30 ->	30	
40 ->	40	
F1:Num	F2:	F3: F4:Disp

The cursor is located at the data (column). Entering an ASCII code with the ten-key numeric pad and pressing the return key can assign characters. (A to F of hexadecimal notation can be input by changing Num to Alph with the **F1** [Alph/Num] key.)

Move the cursor with the return key or keys.

The **PAGE UP** and **PAGE DOWN** keys display the column Nos. by shifting the numbers by 50.

The ASCII codes excluding 20h to 7Eh are displayed as "■".



Pressing the **F4** (Disp) key can change the display between [CHAR] (character) and [CODE] (ASCII code).

LVar-Str [CODE]	No.	1
0 -> ■ 00000000000000000000	0	1 2 3 4 5 6 7 8 9
10 -> 00000000000000000000	10	
20 -> 00000000000000000000	20	
30 -> 00000000000000000000	30	
40 -> 00000000000000000000	40	
F1:Num	F2:	F3: F4:Disp

11. Position Editing

11-1. Mdi (numeric input)

Method of inputting a numeric value with the ten-key numeric pad for position data

For the data input of the coordinate position with the ten-key numeric pad, refer to “9. Simple Operating Procedures.”

Method of inputting Vel (velocity), Acc (acceleration), and Dcl (deceleration) for each position No.

Example of Mdi (numeric input):

Mode flow to numeric input screen: **Edit**—**Posi**—**Mdi**— **Position No.** + return

Mdi	No.	1
1[0.000]	2[50.000]	
Vel[0] Acc[0.00] Dcl[0.00]		
F1:Canc F2: F3: F4:		

Position No.

Mdi	No.	1
1[0.000]	2[50.000]	
Vel[0] Acc[0.00] Dcl[0.00]		
F1:Canc F2: F3: F4:		

Mdi	No.	1
1[0.000]	2[50.000]	
Vel[200] Acc[0.50] Dcl[0.50]		
F1:Canc F2: F3: F4:		

Mdi	No.	2
1[50.000]	2[100.000]	
Vel[0] Acc[0.00] Dcl[0.00]		
F1:Canc F2: F3: F4:		

Move the coordinate value, Vel, Acc, or Dcl section with the **▲** **▼** keys.

Vel, Acc, and Dcl input screen

Move the cursor with the return key, enter data in a required section with the ten-key numeric pad, and press the return key.

After entering data, press the **WRT** key to transfer the data to the controller.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

The position No. is incremented and the next Vel, Acc, and Dcl input screen is displayed.



11-2. Teac (teaching)

Teaching (method in which an actuator is moved to any given position and the current positions of the actuator are incorporated as data) is the method for inputting position data.

As the methods of moving the actuator to any given position, jog operation, inching operation, and manual operation in a servo OFF condition exist.

The basic flow of teaching is as follows:

① Move the actuator. (Jog operation, inching operation, or manual operation in a servo OFF condition) Select the position No. and axis No. for data input.

② Incorporate the current positions of the actuator onto the Teac screen.

③ Transfer the data to the controller.

Repeat the steps of ① through ③ above to input the position data by teaching.

Teaching is executed mainly on the Teac screen.

Mode flow to Teac screen: **Edit**—**Posi**—**Teac**

Position No. selection screen

Teac		No. 100	
1[X.XXX]	2[X.XXX]		
Vel[0] Acc[0.00] DcI[0.00]			
1[64.683F]	2[85.317F]		
F1:Clr F2:Scan F3:JVel F4: →			

Enter the position No. for data input.

Position
No.
+

↓

Return

ESC

↑

Axis-specific data input screen

Teac		No. 100	
1[X.XXX]	2[X.XXX]		
Vel[0] Acc[0.00] DcI[0.00]			
1[64.683F]	2[85.317F]		
F1:Canc F2:Scan F3:JVel F4: →			

Move the cursor to the section for the axis to incorporate data.

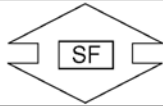
(1) Teac screen

As the Teac screen, the position No. selection screen and the axis-specific data input screen exist.

On the position No. selection screen, teaching (current-position incorporation/clear) is given to all axes simultaneously. On the axis-specific data input screen, teaching is given on an axis basis.

① Position No. selection screen

Teac		No. 100	
1[X.XXX]	2[X.XXX]		
Vel[0] Acc[0.00] Dcl[0.00]			
1[64.683F]	2[85.317F]		
F1:Clr F2:Scan F3:JVel F4: →			



Teac		No. 100	
1[X.XXX]	2[X.XXX]		
Vel[0] Acc[0.00] Dcl[0.00]			
1[64.683F]	2[85.317F]		
F1:In F2:Out F3:Usr0 F4:Cont→			

Enter the position No. with the ten-key numeric pad, and press the return key to move to the axis-specific data input screen.

② Axis-specific data input screen

Teac		No. 100	
1[X.XXX]	2[X.XXX]		
Vel[0] Acc[0.00] Dcl[0.00]			
1[64.683F]	2[85.317F]		
F1:Canc F2:Scan F3:JVel F4: →			



Teac		No. 100	
1[X.XXX]	2[X.XXX]		
Vel[0] Acc[0.00] Dcl[0.00]			
1[64.683F]	2[85.317F]		
F1:In F2:Out F3:Usr0 F4:Cont→			

Function key descriptions

- F1 (Clr):** Pressing it twice clears the all-axis data of the position No. selected. The controller's data is cleared without pressing the **WRT** key.
- F2 (Scan):** It incorporates the current positions of all axes onto the screen.
- F3 (JVel):** It sets the jog velocity.

- F1 (In):** It monitors input ports.
- F2 (Out):** It monitors output ports.
- F3 (UsrO):** It turns ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to set the I/O parameters No. 74 and No. 75.)
- F4 (Cont):** It executes continuous movement.

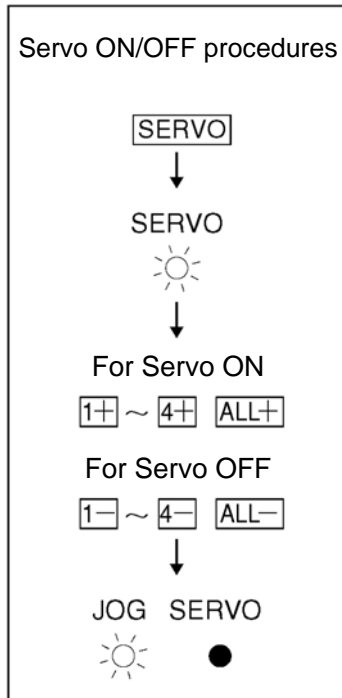
Function key descriptions

- F1 (Canc):** It clears the input data.
- F2 (Scan):** It incorporates the current position of the axis over which the cursor is located onto the screen.
- F3 (JVel):** It sets the jog velocity.

- F1 (In):** It monitors input ports.
- F2 (Out):** It monitors output ports.
- F3 (UsrO):** It turns ON/OFF the output ports (sequential 8 points at the maximum set to parameters). (It is required to set the I/O parameters No. 74 and No. 75.)
- F4 (Cont):** It moves to the continuous movement mode.

③ Servo ON/OFF

The axial servo ON/OFF is executed on an axis basis or for all axes simultaneously on the Teac screen.



Press the **SERVO** key to light up the SERVO status display LED.

Press the plus (+) axis operation key with the axis No. for servo ON. (When turning the servo ON for the Axis No. 1, press the **1+** key.) When turning off the servo, press the minus (-) axis operation key with the axis No. When turning on the servo for all axes at a time, press the **ALL+** key. When turning off the servo for all axes at a time, press the **ALL-** key.

When servo-ON or servo-OFF is executed once, the SERVO status display LED goes out and the JOG status display LED lights up.

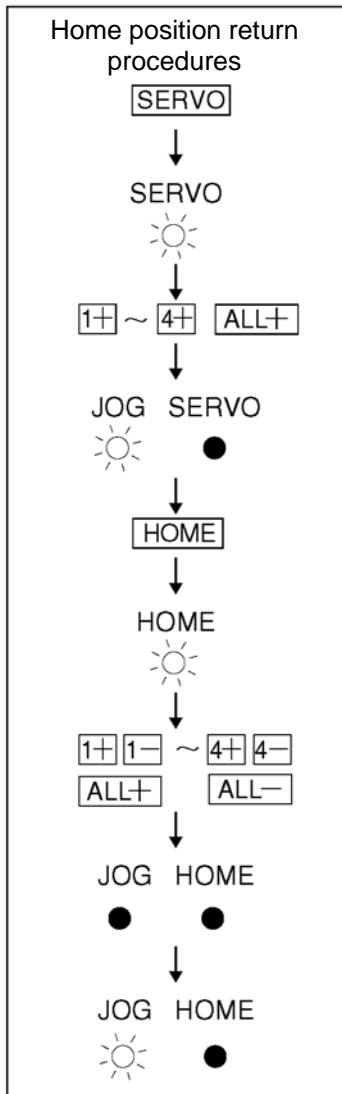
When executing servo-ON or servo-OFF on an axis basis continuously, press the **SERVO** key to light up the SERVO status display LED and press the axis operation key with the axis No. every time.

Teac	No. 100
1[X.XXX]	2[X.XXX]
Vel[0]	Acc[0.00] DcI[0.00]
1[64.683N]	2[85.317N]
F1:Canc	F2:Scan F3:JVel F4: →

N: Servo ON
F: Servo OFF

④ Home position return

For the increment specification, it is required to execute home position return before teaching after turning on the power. Home position return is executed on an axis basis or for all axes at a time on the Teac screen.



Turn on the servo for the axis to be returned to the home, in a Teac screen condition. (It is not required if the axis is already in a servo ON condition.)

Press the **HOME** key to light up the HOME status display LED.

Pressing the axis operation key with the axis No. for home position return makes the axis start home position return. (When returning the axis No. 1 to the home position, press the **1+** or **1-** key.) Pressing the **ALL+** or **ALL-** key makes all axes start home position return.

When home position return starts, the HOME status display LED goes out. When home position return is completed, the JOG status display LED lights up.

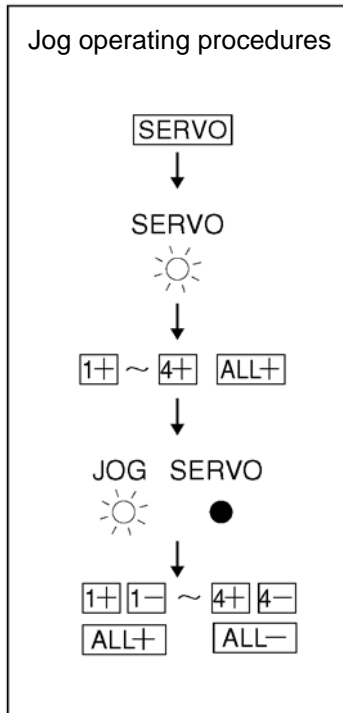
When executing home position return on an axis basis continuously, press the **HOME** key to display the HOME status display LED and press the axis operation key with the axis No. every time.

Teac	No. 100
1[X.XXX]	2[X.XXX]
Vel[0]	Acc[0.00] DcI[0.00]
1[0.000N]	2[0.000N]
F1: Canc	F2: Scan F3: JVel F4: →

After completing home position return, carry out teaching.

(2) Movement of actuator

① Jog operation



Turn on the servo for the axis to be jogged, in a Teac screen condition. (It is not required if the axis is already in a servo ON condition.)

When any status display LED of SERVO, MOVE, and HOME is lit (JOG is extinguished), press the **ESC** key to light up the JOG status display LED.

Press the axis operation key (1+ 1- 2+ 2- 3+ 3- 4+ 4-) with the axis No. for movement to move the actuator to any given position. (1 through 4 indicate the axis numbers, + indicates the coordinate plus direction, and - indicates the coordinate minus direction.)

Teac	No. 100
1[X.XXX]	2[X.XXX]
Vel[0]	Acc[0.00] Dcl[0.00]
1[64.683N]	2[85.317N]
F1:Canc F2:Scan F3:JVel F4: →	

(The figure above indicates the case of the 2-axis specification. Therefore, the effective axis operation keys are 1+ 1- 2+ 2-.)

Jog velocity: 50 mm/sec

JVel	No. 100
Vel[50]	(mm/sec)
Acc[0.30]	(G)
Dcl[0.30]	(G)
Dis[0.000]	(mm)
F1:	F2: F3: F4:

Change of jog velocity

The actuator movement velocity under jog operation is changed.

Display JVel (jog velocity) in the function key section on the Teac screen and press the corresponding function key.

(JVel is not displayed without pressing the **SF** key depending on the screen condition.)

Enter Vel (velocity), Acc (acceleration), and Dcl (deceleration) under jog operation with the ten-key numeric pad and press the return key. Dis (inching distance) should be 0.000. In addition, the inching distance can also be set from this screen.

Return to the Teac screen with the **ESC** key and execute jog operation.



② Inching operation

Inching distance: 0.1 mm

JVel	No. 100
Vel [50] (mm/sec)	
Acc [0.30] (G)	
Dcl [0.30] (G)	
Dis [0.100] (mm)	
F1:	F2: F3: F4:

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

Enter a numeric value for Dis (inching distance) with the ten-key numeric pad on the JVel screen. The numeric input range is between 0.001 and 1.000 (unit: mm). Return to the Teac screen with the **ESC** key to execute inching operation.

Teac	No. 100
1 [X.XXX]	2 [X.XXX]
Vel [0] Acc [0.00] Dcl [0.00]	
1 [64.683N]	2 [85.317N]
F1: Canc	F2: Scan F3: JVel F4: →

Clicking the axis operation 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.

Pressing and holding the axis operation key changes to jog operation. In approximately 1.6 seconds after the axis operation 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→30→50→100 mm/sec.

(The figure above indicates the case of the 2-axis specification. Therefore, the effective axis operation keys are **1+** **1-** **2+** **2-**.)

③ Manual movement under servo OFF

Msg [BE0]
Emergency Stop
F1: Dtl F2: F3: F4:

Press the EMERGENCY STOP button in a Teac screen condition to turn off the servo.

Press the **ESC** key to return to the Teac screen.

Teac	No. 100
1 [X.XXX]	2 [X.XXX]
Vel [0] Acc [0.00] Dcl [0.00]	
1 [64.683F]	2 [85.317F]
F1: Canc	F2: Scan F3: JVel F4: →

Move the actuator to any given position manually.



(3) Incorporation of current positions as data

The confirmed positions of the actuator are incorporated as position data onto the Teac screen.

Teac	No. 100
1[X.XXX] 2[X.XXX]	
Vel[0] Acc[0.00] Dcl[0.00]	
1[64.683N] 2[85.317N]	
F1:Clr F2:Scan F3:JVel F4:	→

Enter the position No. into which data is incorporated with the ten-key numeric pad on the position No. selection screen, and press the return key.

Or, select the position No. into which data is incorporated with the **PAGE UP** and **PAGE DOWN** keys on the data input screen.

Teac	No. 100
1[64.683] 2[X.XXX]	
Vel[0] Acc[0.00] Dcl[0.00]	
1[64.683N] 2[85.317N]	
F1:Canc F2:Scan F3:JVel F4:	→

On the position No. selection screen, pressing the **F2** (Scan) key incorporates the current position data for all axes.

On the axis-specific data input screen, pressing the **F2** (Scan) key incorporates the current position data of the axis over which the cursor is located. (The data is incorporated on an axis basis. The left figure indicates the case of data incorporation on the axis-specific data input screen.)

(4) Transfer to controller

The incorporated data is transferred to the controller.

Teac	No. 100
1[64.683] 2[85.317]	
Vel[0] Acc[0.00] Dcl[0.00]	
1[64.683N] 2[85.317N]	
F1:Canc F2:Scan F3:JVel F4:	→

Press the **WRT** key in a Teac screen condition.

Store the incorporated data in the controller's memory.

Pressing the **WRT** key increments the position No. by 1.

What can be transferred to the controller is the data on one display screen. It is not possible to transfer the data of more than one position No. at a time.

Teac	No. 101
1[X.XXX] 2[X.XXX]	
Vel[0] Acc[0.00] Dcl[0.00]	
1[64.683N] 2[85.317N]	
F1:Canc F2:Scan F3:JVel F4:	→

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.



(5) I/O monitoring and position check

Input and output ports can be monitored during teaching operation. In addition, it is also possible to move the actuator to the location of the position data with teaching and check its position.

① I/O monitoring

Select In or Out among the function keys in a Teac screen condition.

In: Input ports Out: Output ports

The port No. display can be changed with the **PAGE UP** and **PAGE DOWN** keys.

Input ports

In		0	1	2	3	4	5	6	7	8	9
0	->	0	0	0	0	0	0	0	0	0	0
10	->	0	0	0	0	0	0	0	0	0	0
20	->	0	0	0	0	0	0	0	0	0	0
30	->	0	0	0	0	0	0	0	0	0	0
40	->	0	0	0	0	0	0	0	0	0	0
F1:		F2:		F3:		F4:					

Output ports

Out		0	1	2	3	4	5	6	7	8	9
300	->	1	0	0	0	0	0	0	0	0	0
310	->	0	0	0	0	0	0	0	0	0	0
320	->	0	0	0	0	0	0	0	0	0	0
330	->	0	0	0	0	0	0	0	0	0	0
340	->	0	0	0	0	0	0	0	0	0	0
F1:0/1		F2:		F3:		F4:					

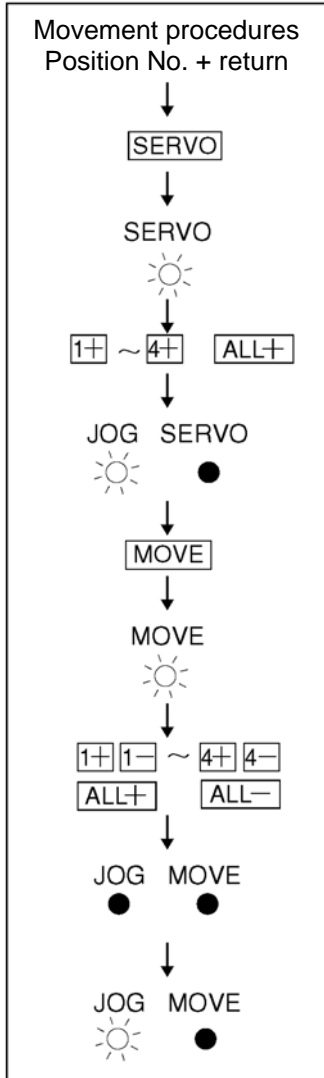
Pressing the **F1** (0/1) key can turn OFF/ON (0/1) the output port at the cursor location.

Every time the **F1** key is pressed, the port is changed between OFF and ON (0 and 1).

The cursor is moved with the **◀** **▼** **▲** **▶** keys.

② Movement

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



Select the position No. you want to move in a Teac screen condition and press the return key.
Turn on the servo for the axis to be moved. (It is not required if the axis is already in a servo ON condition.)

Press the **MOVE** key to light up the MOVE status display LED.

Pressing the axis operation key with the axis No. for movement begins axis movement. (When moving the axis No. 1, press the **1+** or **1-** key.)
When the servo is ON for all axes, pressing the **ALL+** or **ALL-** key begins axis movement.
When movement starts, the MOVE status display LED goes out. When movement is completed, the JOG status display LED lights up. (The mode moves to the JOG operation mode.)

When moving on an axis basis continuously, press the **MOVE** key to light up the MOVE status display LED and press the axis operation key with the axis No. every time.



Teac	No.	1
1[0.000]	2[50.000]	
Vel[0]	Acc[0.00]	Dcl[0.00]
1[64.683N]	2[85.317N]	
F1:Clr	F2:Scan	F3:JVe F4: →

When checking or changing the movement velocity, press the **F3** (JVel) key to move to the screen for changing the velocity etc.

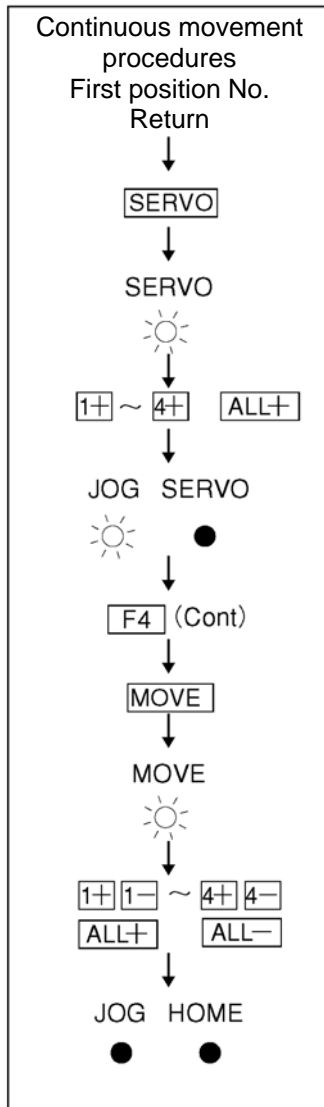
Movement velocity: 50 mm/sec.

JVel
Vel[50] (mm/sec)
Acc[0.30] (G)
Dcl[0.30] (G)
Dis[0.100] (mm)
F1: F2: F3: F4:

Enter the change data with the ten-key numeric pad and press the return key. After changing, return to the previous screen with the **ESC** key.

③ Continuous movement

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



Select the position No. to which you want to move the actuator first in a Teac screen condition, and press the return key.

Turn on the servo for the axis to be continuously moved. (It is not required if the axis is already in a servo ON condition.)

Press the **F4** (Cont) key among the function keys. (Refer to the following page.)

Press the **MOVE** key to light up the MOVE status display LED.

(Pressing the **MOVE** key first and then pressing the **F4** (Cont) key extinguishes the MOVE status display LED. Repress the **MOVE** key.)

Pressing the axis operation key with the axis No. to be moved makes the axis start to move continuously. (When moving the axis No. 1 continuously, press the **1+** or **1-** key.)

When the servo is ON for all axes, pressing the **ALL+** or **ALL-** key begins axis movement.

When continuous movement starts, the MOVE status display LED goes out.

To stop continuous movement, press the **STOP** key. (Pressing the ESC key continuously moves to the JOG operation mode.)

To restart continuous movement, press the **MOVE** key to light up the MOVE status display LED and press the axis operation key.



Teac	No.	2
1[50.000]	2[100.000]	
Vel[0]	Acc[0.00]	Dcl[0.00]
1[43.484N]	2[93.486N]	
F1:In	F2:Out	F3:Usr0 F4:Cont→

Cont	No.	2
1[50.000]	2[100.000]	
Vel[0]	Acc[0.00]	Dcl[0.00]
1[43.484N]	2[93.486N]	
F1:	F2:	F3:JVel F4: →

When checking and changing the movement velocity, press the **F3** (Jvel) key to move to the screen for changing the velocity etc.

Movement velocity: 50 mm/sec.

JVel
Vel[50] (mm/sec)
Acc[0.30] (G)
Dcl[0.30] (G)
Dis[0.100] (mm)
F1: F2: F3: F4:

Enter the change data with the ten-key numeric pad and press the return key. After changing, return to the previous screen with the **ESC** key.
(In the figure at the left, the movement velocity is set to 50 mm/sec.)

Note: Please take note that it may take a few seconds before movement start after the JOG key is pressed. (The time elapsed until movement start varies according to the number of registered position data.)



(6) User-specified output port operation

The output ports set for the parameter can be easily turned ON/OFF.
Select UsrO among the function keys in a Teac screen condition.

Usr0 [308<0000 0000>315] No. 2	
1[50.000]	2[100.000]
Vel[0] Acc[0.00] Dcl[0.00]	
1[43.484N]	2[93.486N]
F1:Usr1 F2:Usr2 F3:Usr3 F4:Usr4	

(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.)

(B) Current position and servo ON/OFF

The current position and servo ON/OFF condition (N=ON, F=OFF) are displayed for each axis.

(C) 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.)



① Setting of user-specified output port parameters

For the operation method for parameter setting, refer to “14. Parameter Editing.”

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

- Number of ports

I/O parameter No. 74 “Qnt Prt Usr Out” (Number of output ports used by TP user [hand etc.])

- First port No.

I/O parameter No. 75 “Top No. Use Out” (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:

I/O parameter No. 74 = 8

I/O parameter No. 75 = 308

“Usr1” (F1 key) ····· Output port 308

“Usr2” (F2 key) ····· Output port 309

“Usr3” (F3 key) ····· Output port 310

“Usr4” (F4 key) ····· Output port 311

“Usr5” (F1 key) ····· Output port 312

“Usr6” (F2 key) ····· Output port 313

“Usr7” (F3 key) ····· Output port 314

“Usr8” (F4 key) ····· Output port 315



11-3. Teaching input example

Data is input for the position No. 10 by jog operation and for the position No. 11 by manual operation under servo OFF.

Mode Selection	
F1:Edit	F2:Play F3:Moni F4:Ctl

Select the **F1** (Edit) key on the Mode Selection screen.

Edit	
F1:Posi	F2:Prog F3:Sym F4:Para

Select the **F1** (Posi) key.

Posi	
F1:Mdi	F2:Teac F3:Copy F4:clr

Select the **F2** (Teac) key.

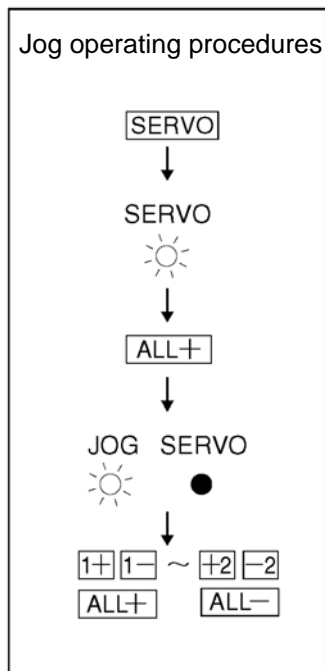
Teac		No.	
1[0.000]	2[50.000]	1	
Vel[0] Acc[0.00] Dcl[0.00]			
1[64.683F]	2[85.317F]		
F1:Clr	F2:Scan	F3:JVel	F4: →

Enter 10 for the position No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad and confirm it with the return key.



Teac		No.	10
1	[X.XXX]	2	[X.XXX]
Vel [0] Acc[0.00] DcI [0.00]			
1	[64.683F]	2	[85.317F]
F1:Clr F2:Scan F3:JVel F4: →			

Turn on the servo for all axes and execute jog operation.



Press the **SERVO** key to light up the SERVO status display LED.

Press the **ALL+** key. (Servo ON for all axes)
(When the Deadman switch is OFF, the servo is not turned ON.)
The JOG status display LED lights up.

Press the axis operation key with the axis No. to be moved (**1+** **1-** **2+** **2-**) to move the actuator to any given position. (1 and 2 indicate the axis No., + indicates the coordinate plus direction, and - indicates the coordinate minus direction.)

Teac		No.	10
1	[X.XXX]	2	[X.XXX]
Vel [0] Acc[0.00] DcI [0.00]			
1	[272.727N]	2	[144.905N]
F1:Canc F2:Scan F3:JVel F4: →			

Pressing the **F2** (Scan) key incorporates the current position of the axis No. over which the cursor is located onto the input screen.



Teac		No.	10
1[	272.727]	2[	X.XXX]
Vel[0] Acc[0.00] Dcl[0.00]			
1[	272.727N]	2[	144.905N]
F1:Canc F2:Scan F3:JVel F4: →			

Press the return key to move the cursor to the next axis, and press the **F2** (Scan) key.

Teac		No.	10
1[	272.727]	2[	144.905]
Vel[0] Acc[0.00] Dcl[0.00]			
1[	272.727N]	2[	144.905N]
F1:Canc F2:Scan F3:JVel F4: →			

Press the **WRT** key to transfer the position data to the controller.
The position No. advances to 11.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Teac		No.	11
1[	X.XXX]	2[	X.XXX]
Vel[0] Acc[0.00] Dcl[0.00]			
1[	272.727N]	2[	144.905N]
F1:Canc F2:Scan F3:JVel F4: →			

Teac		No.	11
1[	X.XXX]	2[	X.XXX]
Vel[0] Acc[0.00] Dcl[0.00]			
1[	272.727F]	2[	144.905F]
F1:Canc F2:Scan F3:JVel F4: →			

Press the EMERGENCY STOP button to turn off the servo. (Or, turn off the Deadman switch.)
Check that the EMG status display LED is lit.

Msg [BE0]
Emergency Stop
F1:Dtl F2: F3: F4:

Press the **ESC** key to return to the Teac screen.

To move the Z-axis manually, it is required to release the brake. Therefore, the Z-axis may lower by the weight of the hand attached to the end when the brake is released. Do not carry out teaching for manual movement to the Z-axis.

Teac	No. 11
1[X.XXX] 2[X.XXX]	
Vel[0] Acc[0.00] Dcl[0.00]	
1[211.970F] 2[96.359F]	
F1:Canc F2:Scan F3:JVel F4: →	

Move each axis to any given position manually. Pressing the **F2** (Scan) key incorporates the current position of the axis No. over which the cursor is located onto the input screen.

Teac	No. 11
1[211.970] 2[X.XXX]	
Vel[0] Acc[0.00] Dcl[0.00]	
1[211.970F] 2[96.359F]	
F1:Canc F2:Scan F3:JVel F4: →	

Press the return key to move the cursor to the next axis, and press the **F2** (Scan) key.

Teac	No. 11
1[211.970] 2[96.359]	
Vel[0] Acc[0.00] Dcl[0.00]	
1[211.970F] 2[96.359F]	
F1:Canc F2:Scan F3:JVel F4: →	

Press the **WRT** key to transfer the position data to the controller. The position No. advances to 12.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.



Teac	No. 12
1[X.XXX] 2[X.XXX]	
Vel[0] Acc[0.00] DcI[0.00]	
1[211.970F] 2[96.359F]	
F1:Canc F2:Scan F3:JVel F4: →	

Complete the position data input by teaching.
Press the **ESC** key.

Teac	No. 12
1[X.XXX] 2[X.XXX]	
Vel[0] Acc[0.00] DcI[0.00]	
1[211.970F] 2[96.359F]	
F1:Canc F2:Scan F3:JVel F4: →	

Press the **ESC** key.

Posi
F1:Mdi F2:Teac F3:Copy F4:Clr

Press the **ESC** key.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Press the **ESC** key.



Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC]or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **F1** (OK) key.

When not writing the data in flash ROM, press the **F2** (Canc) key.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC]or [F2]
Please wait...

The message “Please wait...” flashes during flash ROM writing.

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

Edit
F1:Posi F2:Prog F3:Sym F4:Para

When flash ROM writing is completed, the screen returns to the Edit screen.



11-4. Copy and movement of position data

The following operating instructions are to copy or move the position data to another position No.:

Mode Selection			
F1:Edit	F2:Play	F3:Moni	F4:Ctl

Select the **F1** (Edit) key on the Mode Selection screen.

Edit			
F1:Posi	F2:Prog	F3:Sym	F4:Para

Select the **F1** (Posi) key.

Posi			
F1:Mdi	F2:Teac	F3:Copy	F4:clr

Select the **F3** (Copy) key.

Positions from which data is copied or moved

Posi-Copy			
From	No.	1	10
To	No.	100	109
F1:Copy	F2:Move	F3:	F4:

Enter the first No. of the positions from which data is copied or moved with the ten-key numeric pad and press the return key.

Enter the first No. of the positions to which data is copied or moved with the ten-key numeric pad and press the return key.

When copying the data, press the **F1** (Copy) key.

When moving the data, press the **F2** (Move) key.

Positions to which data is copied or moved
First No.



Posi-Copy			
From	No.	1	- 10
To	No.	100	- 109
→ OK=[F1] / Cancel=[ESC]			
F1:OK	F2:	F3:	F4:

When executing copy or movement, press the **F1** (OK) key.

When canceling it, press the **ESC** key.

The display returns to the previous screen.

Flash			
Write in Flash ROM?			
→ OK=[F1]/Cancel=[ESC] or [F2]			
F1:OK	F2:Canc	F3:	F4:

When writing the data in flash ROM, press the **ESC** key several times to return to the Flash screen.

Press the **F1** (OK) key to execute flash ROM writing.



11-5. Deletion of position data

The following operating instructions are to delete the position data:

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

Select the **F1** (Edit) key on the Mode Selection screen.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Select the **F1** (Posi) key.

Posi
F1:Mdi F2:Teac F3:Copy F4:Clr

Select the **F4** (Clr) key.

Position data to delete

First No. Last No.

Posi-Clr
No. 1 - 10
F1:Clr F2:AClr F3: F4:

Enter the first No. and the last No. of the position data to delete with the ten-key numeric pad and press the return key.

When deleting the selected position data, press the **F1** (Clr) key.

When deleting the data for all positions (No. 1 through No. 3000), press the **F2** (AClr) key.



Posi-Copy			
From	No.	1	- 10
—> OK=[F1] / Cancel=[ESC]			
F1:OK	F2:	F3:	F4:

When executing deletion, press the **F1** (OK) key.
When canceling it, press the **ESC** key.
The display returns to the previous screen.

Flash			
Write in Flash ROM?			
—> OK=[F1]/Cancel=[ESC] or [F2]			
F1:OK	F2:Canc	F3:	F4:

When writing the data in flash ROM, press the **ESC** key several times to return to the Flash screen.
Press the **F1** (OK) key to execute flash ROM writing.



12. Program Editing

12-1. Program input method

The following program is input with the Teaching Box (for explanation of input procedures):

No.	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1			601					
2	A	N	600	CPGE	200	*201	900	
3				SCPY	1	' IAI '		

The program step No. 1 is used to input the extension condition only, No. 2 is used to input all but comment, and No. 3 is used to input a character string.

The screens in each step after input are as follows:

Mdfy	No.	2-	1	[	3]
Ext :		Cmnd:			
Cond: 601		Op-1:			
		Op-2:			
		Post:			
F1:LD	F2:A	F3:0	F4:AB	→	

Mdfy	No.	2-	2	[	3]
Ext :A		Cmnd:CPGE			
Cond:N 600		Op-1: 200			
		Op-2:*201			
		Post: 900			
F1:LD	F2:A	F3:0	F4:AB	→	

Mdfy	No.	2-	3	[	3]
Ext :		Cmnd:SCPY			
Cond:		Op-1: 1			
		Op-2:' IAI '			
		Post:			
F1:Alph	F2:	F3:*	F4:'		

Actual input procedures are explained from the following page:

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

Select the **F1** (Edit) key on the Mode Selection screen.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Select the **F2** (Prog) key on the Edit screen.

Prog
Total 9/6000
F1:Mdfy F2:Copy F3:Clr F4:

Select the **F1** (Mdfy) key on the Prog screen.

Mdfy	No.	1	-	1	[	0]
Ext :	Cmd:	HOME				
Cond:	Op-1:	11				
	Op-2:					
	Post:					
F1:	F2:	F3:	F4:			

Enter the program No. with the ten-key numeric pad and press the return key.



Mdfy	No.	2-	1	[	0]
Ext :	Cmd:				
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:Ins F2:Del F3:Cmdt F4:					

The cursor has moved to the location of the step No.
Press the return key.

Mdfy	No.	2-	1	[	0]
Ext : █	Cmd:				
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:LD F2:A F3:0 F4:AB					

Input section for Ext

Press the return key.

Mdfy	No.	2-	1	[	0]
Ext :	Cmd:				
Cond: █	Op-1:				
	Op-2:				
	Post:				
F1: F2:Sym F3:N F4:					

Input section for N and Cond

Enter 601 with the ten-key numeric pad and press the return key.

Mdfy	No.	2-	1	[	0]
Ext :	Cmd: █				
Cond: 601	Op-1:				
	Op-2:				
	Post:				
F1:ABPG F2:ACC F3:ACHZ F4:ADD →					

Press the **WRT** key to transfer the data of step No. 1 to the controller.

The step No. advances to 2.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.



Mdfy	No.	2-	2	[	1]
Ext :		Cmd:			
Cond:		Op-1:			
		Op-2:			
		Post:			
F1:ABPG F2:ACC F3:ACHZ F4:ADD →					

Move the cursor to the input section for Ext with the return key or ▲ ▼ keys.

Mdfy	No.	2-	2	[	1]
Ext :■		Cmd:			
Cond:		Op-1:			
		Op-2:			
		Post:			
F1:LD F2:A F3:0 F4:AB →					

Input section for Ext

Select the **F2** (A) key and press the return key.

Even for the extension condition of the pseudo ladder task, input it by the function key on this display screen.

Mdfy	No.	2-	2	[	0]
Ext :A		Cmd:			
Cond: ■		Op-1:			
		Op-2:			
		Post:			
F1: F2:Sym F3:N F4:					

Input section for N and Cond

Select the **F3** (N) key first. Enter 600 with the ten-key numeric pad and press the return key.

Mdfy	No.	2-	2	[	1]
Ext :A		Cmd:			
Cond:N 600		Op-1:			
		Op-2:			
		Post:			
F1:ABPG F2:ACC F3:ACHZ F4:ADD →					

Input section for Cmd

Display CPGE in the function key section with 7 of the ten-key numeric pad and the **SF** key.

For the command search method, refer to “9-2. Creation of program.”



Mdfy	No.	2-	2	[	1]
Ext :A	Cmd:	[REDACTED]			
Cond:N 600	Op-1:	[REDACTED]			
	Op-2:	[REDACTED]			
	Post:	[REDACTED]			
F1:CPEQ F2:CPGE F3:CPGT F4:CPL→					

Select the **F2** (CPGE) key and press the return key.

Mdfy	No.	2-	2	[	1]
Ext :A	Cmd:CPGE				
Cond:N 600	Op-1:	[REDACTED]			
	Op-2:	[REDACTED]			
	Post:	[REDACTED]			
F1: F2:Sym F3:* F4:					

Input section for Op-1

Enter 200 with the ten-key numeric pad and press the return key.

When specifying a variable to Operand 1 indirectly, select the **F3** (*) key first.

Mdfy	No.	2-	2	[	1]
Ext :A	Cmd:CPGE				
Cond:N 600	Op-1: 200				
	Op-2:	[REDACTED]			
	Post:	[REDACTED]			
F1: F2:Sym F3:* F4:					

Input section for Op-2 (variable indirect specification)

Select the **F3** (*) key first, enter 201 with the ten-key numeric pad, and press the return key.

Mdfy	No.	2-	2	[	1]
Ext :A	Cmd:CPGE				
Cond:N 600	Op-1: 200				
	Op-2:*201				
	Post:	[REDACTED]			
F1: F2:Sym F3:* F4:					

Input section for Post

Enter 900 with the ten-key numeric pad and press the return key.



Mdfy	No.	2-	1	[	0]
Ext :A	Cmd:CPGE				
Cond:N 600	Op-1: 200				
	Op-2:*201				
	Post: 900				
F1:LD	F2:A	F3:0	F4:AB	→	

Press the **WRT** key to transfer the data of step No. 2 to the controller.
The step No. advances to 3.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Mdfy	No.	2-	3	[	2]
Ext :	Cmd:				
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:CPE0	F2:CPGE	F3:CPGT	F4:CPL	→	

Display SCPY in the function key section with **1** of the ten-key numeric pad or the **SF** key.

Mdfy	No.	2-	3	[	2]
Ext :	Cmd:				
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:RSPG	F2:SCHA	F3:SCMP	F4:SCPY	→	

Select the **F4** (SCPY) key and press the return key.

Mdfy	No.	2-	3	[	2]
Ext :	Cmd:SCPY				
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:	F2:Sym	F3:*	F4:		

Input section for Op-1

Enter 1 with the ten-key numeric pad and press the return key.

Mdfy	No.	2-	3	[	2]
Ext :	Cmnd:SCPY				
Cond:	Op-1: 1				
	Op-2: [REDACTED]				
	Post:				
F1:	F2:Sym	F3:*	F4:'		

Input section for Op-2 (String input)
Press the **F4** (') key. Num or Alph is displayed for F1 in the function key section.

Mdfy	No.	2-	3	[	2]
Ext :	Cmnd:SCPY				
Cond:	Op-1: 1				
	Op-2:' [REDACTED]				
	Post:				
F1:Num	F2:	F3:*	F4:'		

Every time the **F1** key is pressed, the display is changed between Num and Alph. Change the input method between numeric input and alphabetical input.

Num: Numeric input
Alph: Alphabetical input

Press the **F1** (Num) key to display Alph.

Mdfy	No.	2-	3	[	2]
Ext :	Cmnd:SCPY				
Cond:	Op-1: 1				
	Op-2:' [REDACTED]				
	Post:				
F1:Alph	F2:	F3:*	F4:'		

Input I with **9** of the ten-key numeric pad.
Input A with **7** of the ten-key numeric pad.
Input I with **9** of the ten-key numeric pad.

Press the return key twice.
(When correcting it, use the **BS** key.)

Mdfy	No.	2-	3	[	2]
Ext :	Cmnd:SCPY				
Cond:	Op-1: 1				
	Op-2:' |A|				
	Post: [REDACTED]				
F1:	F2:Sym	F3:*	F4:		

Press the **WRT** key to transfer the data of step No. 2 to the controller.
The step No. advances to 3.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Complete the program input. Return to the Flsh screen with the **ESC** key.

12-2. Symbol input during program editing

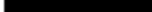
Symbols can be input when the cursor is located at Op-1/Op-2 (operation 1/2), Post (output), or Cond (input condition) and Sym is displayed in the function key section.

Input example)

Symbol input in the following program step:

No.	E	N	Cnd	Cmnd	Operand 1	Operand 2	Pst	Comment
1				MOVL	TAIKIITI			

The position No. 10 is symbolized by “TAIKIITI.”

Mdfy	No.	3-	1	[	0]
Ext :	Cmnd:MOVL				
Cond:	Op-1:				
	Op-2:				
	Post:				
F1:	F2:Sym	F3:*	F4:		

Select the **F2** (Sym) key in the function key section when the cursor is located at Op-1. The screen moves to the Sym-Mdfy screen.

Sym-Mdfy				
Total: 0/1000				
F1:Cnst	F2:Var	F3:Prog	F4:Pos	→

Select the item for symbol editing with a function key. In this case, select the **F4** (Posi) key to edit the position No.

Sym-Mdfy-Pos i				
<div> <div></div> <div>1:</div> </div>				
Total:				0/1000
F1:	F2:	F3:	F4:	

Enter 10 for the position No. with the ten-key numeric pad and press the return key.



Sym-Mdfy-Pos i			
10:			
Total: 0/1000			
F1:Num	F2:	F3:	F4:

Every time the **F1** key is pressed, the display is changed between Num and Alph. Change the input method between numeric input and alphabetical input.

Num: Numeric input

Alph: Alphabetical input

Press the **F1** (Num) key to display Alph.

Sym-Mdfy-Pos i			
10:			
Total: 0/1000			
F1:Alph	F2:	F3:	F4:

The ten-key numeric pad now functions for alphabetical input.

Enter "TAIKIITI."

For the input method, refer to "13. Symbol Editing."

Sym-Mdfy-Pos i			
10:	TAIKIITI		
Total: 0/1000			
F1:Alph	F2:	F3:	F4:

Press the **WRT** key to transfer the symbol data to the controller. The display returns to the previous Mdfy screen.

Mdfy	No.	3-	1	[	0]
Ext :	Cmnd:MOVL				
Cond:	Op-1: TAIKIITI				
	Op-2:				
	Post:				
F1:	F2:Sym	F3:*	F4:		

Selecting the **F2** (Sym) key when the cursor is located at the already-symbolized item moves to the Mdfy screen for the symbol. The symbol can then be changed.



Mdfy	No.	3-	2	[	1]
Ext :					
Cond:					
F1:MOD F2:MOVL F3:MOVP F4:MULT→					

Press the **WRT** key to transfer the data in this program step to the controller.

When completing the program input, return to the Flsh screen with the **ESC** key.



12-3. One-line comment input

A comment is input for the program step (invalid step) with numeric values, alphabet letters, and symbols (*, ·, and _).

Mode flow: [Edit]—[Prog]—[Mdfy]—Program No. + return

Move the cursor to the step No. for comment input.

Mdfy	No. 64—	1	[0]
Ext :	Cmd:		
Cond:	Op-1:		
	Op-2:		
	Post:		
F1:Ins F2:Del F3:Cmnt F4:			

Press the [F3] (Cmnt) key.

Mdfy	No. 64—	1C	[0]
[]
[]
F1:Ins F2:Del [F3:Cmnt] F4:			

C is displayed next to the step No.
Press the return key.

When canceling comment input, press the [F3] (Cmnt) key. The display returns to the previous screen.

Mdfy	No. 64—	1C	[0]
[]
[]
F1:Num F2: F3: F4:			

Every time the [F1] key is pressed, the display in the [F1] key field is changed between Alph and Num.

Mdfy	No. 64—	1C	[0]
[P]
[]
F1:Alph F2: F3: F4:			

Alphabetical input

Display Alph in the [F1] key field.

Alphabet letters are allocated for each key of the ten-key numeric pad.

Example) Every time [6] of the ten-key numeric pad is pressed, the display changes as follows: P→Q→R→p→q→r→P→.... Display the alphabet letters for input and confirm it with the return key. The left figure displays P.

Mdfy	No. 64-	1C [0]
[Palette]		
[]		
F1:Alph	F2:	F3: F4:

The figure at the left is the display example when "Palette" is input.

Mdfy	No. 64-	1C [0]
[Palette]		
[]		
F1:Num	F2:	F3: F4:

Numeric input

Press the **F1** key to display Num.
Enter a numeric value with the ten-key numeric pad.

Mdfy	No. 64-	1C [0]
[Palette1]		
[]		
F1:Num	F2:	F3: F4:

The figure at the left is the display example when 1 is input continuously after Palette.

Mdfy	No. 64-	1C [0]
[Palette1]		
[]		
F1:Num	F2:	F3: F4:

After completing comment input, press the return key again.
Press the **WRT** key to transfer the input data to the controller.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.



Mdfy	No. 64-	2	[	0]
Ext :	Cmd:			
Cond:	Op-1:			
	Op-2:			
	Post:			
F1:Ins F2:Del F3:Cmdt F4:				

The screen advances to the one for the next step No.

When completing program input, return to the Flsh screen with the ESC key.

Note: The data of double byte characters input with PC-compatible software cannot be displayed on the Teaching Box.



12-4. Copy and movement of program

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

Mode flow: **Edit** → **Prog**

Prog
11/6000
F1:Mdfy F2:Copy F3:Clr F4:

Select the **F2** (Copy) key.

Prog-Copy
From No. 1 [10]
To No. 11 [0]
Total: 10/6000
F1:Copy F2:Move F3: F4:

Program No. from which a program is copied or moved

Enter the program No. from which a program is copied or moved with the ten-key numeric pad and press the return key.

Enter the program No. to which a program is copied or moved with the ten-key numeric pad and press the return key.

When copying the program, press the **F1** (Copy) key. When moving the program, press the **F2** (Move) key.

Program No. to which a program is copied or moved

Prog-Copy
From No. 1 [10]
To No. 11 [0]
→ OK=[F1] / Cancel=[ESC]
Total: 10/6000
F1:OK F2: F3: F4:

Press the **F1** (OK) key again.

When canceling it, press the **ESC** key.

Prog-Copy
From No. 1 [10]
To No. 11 [10]
Total: 20/6000
F1:Copy F2:Move F3: F4:

Return to the previous screen with the **ESC** key.

Then, press the **ESC** key several times to return to the Flash screen.



12-5. Deletion of program

The following operating instructions are to delete a program:

Mode flow: **Edit** → **Prog**

Prog	
11/6000	
F1:Mdfy	F2:Copy F3:Clr F4:

Select the **F2** (Clr) key.

Program No. to delete

Prog-Clr	
No. 12 - 12	
Total: 20/6000	
F1:Clr	F2:AClr F3: F4:

Enter the program No. to delete with the ten-key numeric pad and press the return key.

a) When deleting one program, enter the program No. in 2 places.

The figure at the left is the case where the program No. 12 is deleted.

Press the **F1** (Clr) key.

A series of programs
First No. Last No.

Prog-Clr	
No. 4 - 6	
Total: 20/6000	
F1:Clr	F2:AClr F3: F4:

b) When deleting a series of multiple programs, enter the first No. and the last No.

The figure at the left is the case where Programs No. 4, No. 5, and No. 6 are deleted.

Press the **F1** (Clr) key.

c) When deleting all the programs (No. 1 to No. 64), press the **F2** (AClr) key.

Prog-Clr	
No. 12 - 12	
→ OK=[F1] / Cancel=[ESC]	
Total: 20/6000	
F1:OK	F2: F3: F4:

Press the **F1** (OK) key again.

When canceling it, press the **ESC** key.



Prog-Clr	
No. 12 - 12	
Total: 10/6000	
F1:Clr	F2:AClr F3: F4:

Return to the previous screen with the **ESC** key.
Then, press the **ESC** key several times to return to the Flsh screen.



12-6. Flash ROM writing

If data is only transferred to the controller after program editing, the edited program is erased when the power is turned on again or software is reset.

To maintain the edited data even if the power is turned on again or software is reset, the data is written in flash ROM.

Return to the Flsh screen with the **ESC** key from the Edit end screen.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **F1** (OK) key.

When not writing the data in flash ROM, press the **F2** (Canc) key.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC] or [F2]
Please wait...

The message “Please wait...” flashes during flash ROM writing.

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

Edit
F1:Posi F2:Prog F3:Sym F4:Para

When flash ROM writing is completed, the screen returns to the Edit screen.

For the X-SEL Controller, symbols (names) can be given to variables, input ports, flags, points, etc.

Select the **F1** (Edit) key.

Select the **F3** (Sym) key.

Select the **F1** (Mdfy) key.

13-1. Symbol editing items

Sym-Mdfy			
Total 0/1000			
F1:Cnst	F2:Var	F3:Prog	F4:Posi→



Sym-Mdfy			
Total 0/1000			
F1:In	F2:Out	F3:Flag	F4:Axis→



Sym-Mdfy			
Total 0/1000			
F1:Tag	F2:SubR	F3:	F4:→



The items to be symbolized are displayed in the function key section. Every time the **SF** key is pressed, the items are shifted and displayed.

Symbol editing items

Cnst: Constant
 Var: Variable
 Prog: Program No.
 Posi: Position No.

In: Input port No.
 Out: Output port No.
 Flag: Flag No.
 Axis: Axis No.

Tag: Tag No.
 SubR: Subroutine No.

Display the items to be symbolized with the **SF** key and select the function key.

13-2. Input example: Symbolization of local integer variables

The local variable No. 5 of the program No. 3 is symbolized by "Cnt5." Press the **F2** (Var) key.

Mode flow: **Edit** — **Sym** — **Mdfy** — **Var**

Sym-Mdfy-Var			
Total		0/1000	
F1: Itg	F2: Real	F3:	F4: →

Select the integer or real.
Press the **F1** (Itg) key.
(Itg: Integer, Real: Real number)

Sym-Mdfy-Var-Itg			No. 0
200:			
Total		0/1000	
F1:	F2:	F3:	F4: →

The cursor is located at the program No.
Enter the program No. in the local area.
(When symbolizing the global area, the number is left 0 as it is.)
Enter 3 and press the return key.

Program No.

Sym-Mdfy-Var-Itg			No. 3
1:			
Total		0/1000	
F1:	F2:	F3:	F4: →

The cursor is located at the variable No.
Enter 5 and press the return key.

Variable No.

Sym-Mdfy-Var-Itg			No. 3
5:			
Total		0/1000	
F1: Num	F2:	F3:	F4: →

Enter the symbol name "Cnt5."

Input method

Press the **F1** (Num) key to display Alph in the F1 key field. Every time **7** of the ten-key numeric pad is pressed, the display is changed as follows:
A→B→C→a→b→c→A→....
Display C and press the return key.

Sym-Mdfy-Var-ltg	No. 3
5:C	
Total 0/1000	
F1:Alph F2:	F3: F4: →

Then, press **5** of the ten-key numeric pad several times to display n, and press the return key.

Sym-Mdfy-Var-ltg	No. 3
5:Cn	
Total 0/1000	
F1:Alph F2:	F3: F4: →

Then, press **1** of the ten-key numeric pad several times to display t, and press the return key.

Sym-Mdfy-Var-ltg	No. 3
5:Cnt	
Total 0/1000	
F1:Alph F2:	F3: F4: →

Pressing the **F1** (Alph) key changes the display in the **F1** key field to Num for numeric input.

Sym-Mdfy-Var-ltg	No. 3
5:Cnt	
Total 0/1000	
F1:Num F2:	F3: F4: →

Enter 5 with the ten-key numeric pad.



Sym-Mdfy-Var-Itg	No. 3
5:Cnt5	
Total 0/1000	
F1:Num	F2: F3: F4: →

Press the return key to confirm the symbol name.

Sym-Mdfy-Var-Itg	No. 3
5:Cnt5	
Total 0/1000	
F1:Num	F2: F3: F4: →

When the name is confirmed, the cursor's blinking stops.

Before confirmation, the name can be corrected by one character with the **BS** key.

After confirmation, the name is corrected by overwriting all the characters.

Press the **WRT** key to transfer the symbol data to the controller.

* When the screen is changed with the **PAGE UP** and **PAGE DOWN** keys or **ESC** key before data transfer, the input data becomes invalid.

Sym-Mdfy-Var-Itg	No. 3
6:	
Total 1/1000	
F1:Num	F2: F3: F4: →

When completing editing, return to the Flsh screen with the **ESC** key.

Flsh
Write in Flash ROM?
→ OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **F1** (OK) key.

When not writing the data in flash ROM, press the **F2** (Canc) key.



Flsh

Write in Flash ROM?

—> OK=[F1]/Cancel=[ESC] or [F2]

Please wait...

The message “Please wait...” flashes during flash ROM writing.

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

When flash ROM writing is completed, the screen returns to the Edit screen.



13-3. Symbol edit screen for each item

(1) Constant

Select the **F1** (Cnst) key on the Sym-Mdfy screen.

Mode flow: **Edit** — **Sym** — **Mdfy** — **Cnst**

Selection between integer and real

Sym-Mdfy-Cnst			
Total		1/1000	
F1:Itg	F2:Real	F3:	F4: →

Select the integer or real.

F1 (Itg): Integer

F2 (Real): Real number

① Integer constant

Mode flow: **Edit** — **Sym** — **Mdfy** — **Cnst** — **Itg**

② Real constant

Mode flow: **Edit** — **Sym** — **Mdfy** — **Cnst** — **Real**

Integer constant symbol edit screen

Sym-Mdfy-Cnst-Itg			
1:	<input type="text"/>	[]
Enter a symbol with alphabet/numeric values.			
Total		1/1000	
F1:Num	F2:	F3:	F4:

Real constant symbol edit screen

Sym-Mdfy-Cnst-Real			
1:	<input type="text"/>	[]
Enter a constant.			
Total		1/1000	
F1:Num	F2:	F3:	F4:



(2) Constant

Select the **F2** (Var) key on the Sym-Mdfy screen.

Mode flow: **Edit** — **Sym** — **Mdfy** — **Var**

Selection between integer and real

Sym-Mdfy-Var			
Total		1/1000	
F1:Itg	F2:Real	F3:	F4: →

Select the integer or real.

F1 (Itg): Integer
F2 (Real): Real number

① Integer constant No.

Mode flow: **Edit** — **Sym** — **Mdfy** — **Var** — **Itg**

Integer constant No. symbol edit screen

Sym-Mdfy-Var-Itg		No. 0	
200:			
Total		1/1000	
F1:Num	F2:	F3:	F4: →

Enter the constant No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad.

② Real constant No.

Mode flow: **Edit** — **Sym** — **Mdfy** — **Var** — **Real**

Real constant No. symbol edit screen

Sym-Mdfy-Var-Real		No. 0	
300:			
Total		1/1000	
F1:Num	F2:	F3:	F4: →

Enter a symbol with alphabet/numeric values.

Enter the program No. for the local area and 0 for the global area.

(3) Program

Select the **F3** (Prog) key on the Sym-Mdfy screen.

Mode flow: **Edit** — **Sym** — **Mdfy** — **Prog**

Program No. symbol edit screen

Sym-Mdfy-Prog			
1:			
Total		1/1000	
F1:Num	F2:	F3:	F4:

Enter a symbol with alphabet/numeric values.

Enter the program No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad.



(4) Position

Select the **F4** (Posi) key on the Sym-Mdfy screen.

Mode flow: **Edit** – **Sym** – **Mdfy** – **Posi**

Position No. symbol edit screen

Sym-Mdfy-Posi	
1:	<input type="text"/>
Total 1/1000	
F1:Num	F2: F3: F4:

Enter a symbol with alphabet/numeric values.

Enter the position No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad.

(5) Input port

Select the **F1** (In) key on the Sym-Mdfy screen.

Mode flow: **Edit** – **Sym** – **Mdfy** – **In**

Input port No. symbol edit screen

Sym-Mdfy-In	
0:	<input type="text"/>
Total 1/1000	
F1:Num	F2: F3: F4:

Enter a symbol with alphabet/numeric values.

Enter the input port No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad.

(6) Output port

Select the **F2** (Out) key on the Sym-Mdfy screen.

Mode flow: **Edit** – **Sym** – **Mdfy** – **Out**

Output port No. symbol edit screen

Sym-Mdfy-Out	
300:	<input type="text"/>
Total 1/1000	
F1:Num	F2: F3: F4:

Enter a symbol with alphabet/numeric values.

Enter the Output port No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad.

**(7) Flag**

Select the **F3** (Flag) key on the Sym-Mdfy screen.

Mode flow: **Edit** – **Sym** – **Mdfy** – **Flag**

Flag No. symbol edit screen

Sym-Mdfy-Flag		No. 0	
600:	<input type="text"/>		
		Total 1/1000	
F1:Num	F2:	F3:	F4:

Enter the program No. for the local area and 0 for the global area.

Enter a symbol with alphabet/numeric values.

Enter the flag No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad.

(8) Axis

Select the **F4** (Axis) key on the Sym-Mdfy screen.

Mode flow: **Edit** – **Sym** – **Mdfy** – **Axis**

Axis No. symbol edit screen

Sym-Mdfy-Axis			
1:	<input type="text"/>		
		Total 1/1000	
F1:Num	F2:	F3:	F4:

Enter a symbol with alphabet/numeric values.

Enter the axis No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad.

(9) Tag

Select the **F1** (Tag) key on the Sym-Mdfy screen.

Mode flow: **Edit** – **Sym** – **Mdfy** – **Tag**

Tag No. symbol edit screen

Sym-Mdfy-Tag		No. 1	
1:	<input type="text"/>		
		Total 1/1000	
F1:Num	F2:	F3:	F4:

Since the tag No. is in the local area, enter the program No.

Enter a symbol with alphabet/numeric values.

Enter the tag No. with the **PAGE UP** and **PAGE DOWN** keys or the ten-key numeric pad.

(10) Subroutine

Select the F2 (SubR) key on the Sym-Mdfy screen.

Mode flow: Edit – Sym – Mdfy – SubR

Subroutine No. symbol edit screen

Sym-Mdfy-Tag

No. 1

1:

Total 1/1000

F1:Num F2: F3: F4:

Since the subroutine No. is in the local area, enter the program No.

Enter a symbol with alphabet/numeric values.

Enter the subroutine No. with the PAGE UP and PAGE DOWN keys or the ten-key numeric pad.



13-4. Flash ROM writing

If data is only transferred to the controller after symbol editing, the edited program is erased when the power is turned on again or software is reset.

To maintain the edited data even if the power is turned on again or software is reset, the data is written in flash ROM.

Return to the Flsh screen with the **[ESC]** key from the Edit end screen.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **[F1]** (OK) key.

When not writing the data in flash ROM, press the **[F2]** (Canc) key.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC] or [F2]
Please wait...

The message “Please wait...” flashes during flash ROM writing.

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

Edit
F1:Posi F2:Prog F3:Sym F4:Para

When flash ROM writing is completed, the screen returns to the Edit screen.



14. Parameter Editing

Parameters can be changed according to the customer's system.

When you change parameters, record the parameter descriptions.

Parameters after being written in flash ROM become valid when software is reset or the power is turned on again.

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

Select the **F1** (Edit) key on the Mode Selection screen.

Edit
F1:Posi F2:Prog F3:Sym F4:Para

Select the **F4** (Para) key on the Edit screen.

14-1. Parameter editing items

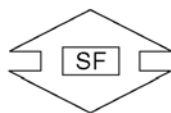
The parameter items are displayed in the function key section.

Every time the **SF** key is pressed, the items are shifted and displayed.

Para
F1:I/O F2:Comn F3:Axis F4:Drv →

Parameter editing items

I/O: I/O parameters
 Comn: All-axis common parameters
 Axis: Axis-specific parameters
 Drv: Driver card parameters



Para
F1:Ecdr F2:IoSl F3:Othe F4: →

Ecdr: Encoder parameters
 IoSl: I/O slot card parameters
 Othe: Other parameters

Select the parameter item for editing with the function key.



14-2. Editing of axis-specific parameters

The axis-specific parameter No. 7 soft limit + is set as axis No. 1 = 300 mm and axis No. 2 = 200 mm.

Select the **F3** (Axis) key on the upper screen shown on the previous page.

Mode flow: **Edit** – **Para** – **Axis**

Para-Axis	Axis. 1
1:Axis Action Typ	
[0]	
F1:	F2: F3:Dev- F4:Dev+

Axis No. in editing

Para-Axis	Axis. 1
7:Soft Limit +	
Initial values are different depending on the model [500000]	
F1:	F2: F3:Dev- F4:Dev+

The function keys of **F3** (Dev-) and **F4** (Dev+) are used to change the axis No.

The cursor is located at the parameter No. Enter 7 with the ten-key numeric pad and press the return key.

The screen for editing the axis-specific parameter No. 7 soft limit + is displayed. The cursor is located at the parameter data.

Data input for axis No. 1

Set the parameter by axis or I/O board depending on the parameter item.

(Axis-specific parameters, driver card parameters, encoder parameters, I/O slot card parameters)

Check that the screen for editing the axis No. 1 is displayed.

Enter 300000 and press the return key. (Unit: 0.001 mm)

Para-Axis	Axis. 1
7:Soft Limit +	
[300000]	
F1:	F2: F3:Dev- F4:Dev+

Press the **WRT** key to transfer the parameter data to the controller.

Note:

One transfer (**WRT** key) with the Teaching Box stores the data only on the current display screen in memory. Therefore, it is required to input the parameter data and transfer it by axis (device).

The untransferred data becomes invalid when the screen is changed.



Para-Axis	Axis. 1
8:Soft Limit -	
[0]	
F1:	F2: F3:Dev- F4:Dev+

Data input for axis No. 2

The display screen advances to the screen for parameter No. 8. Since the axis No. 2 for the parameter No. 7 is unedited, return to the edit screen for the parameter No. 7 with the **PAGE DOWN** key.

Para-Axis	Axis. 1
7:Soft Limit +	
[300000]	
F1:	F2: F3:Dev- <u>F4:Dev+</u>

Change the axis No. to 2 with the **F4** (Dev+) key.

Axis No. 2

Para-Axis	Axis. 2
7:Soft Limit +	
[400000]	
F1:	F2: F3:Dev- F4:Dev+

Enter 200000 with the ten-key numeric pad and press the return key.

Para-Axis	Axis. 2
7:Soft Limit +	
[200000]	
F1:	F2: F3:Dev- F4:Dev+

Press the **WRT** key to transfer the parameter data to the controller.

Para-Axis	Axis. 2
8:Soft Limit -	
[0]	
F1:	F2: F3:Dev- F4:Dev+

When continuing to edit the axis-specific parameters, move the cursor to the parameter No. and enter the parameter No. for editing.
When completing the axis-specific parameter editing, press the **ESC** key to return to the Flsh screen.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **F1** (OK) key.
When not writing the data in flash ROM, press the **F2** (Canc) key.

Flsh
Write in Flash ROM?
—> OK=[F1]/Cancel=[ESC] or [F2]
Please wait...

The message “Please wait...” flashes during flash ROM writing.

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

Flsh
Reset the controller?
—> OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

After flash ROM writing, the screen changes to the one for software reset.
To make the changed parameter valid, reset (restart) software. Press the **F1** (OK) key.



Flsh
Reset the controller? —> OK=[F1]/Cancel=[ESC] or [F2]
Please wait...

The message “Please wait...” flashes during software reset.

Mode Selection
F1:Edit F2:Play F3:Moni F4:Ctl

When software reset is completed, the screen returns to the Mode Selection screen.

15. Monitoring

Various statuses, global variables, port conditions, etc., are monitored.

Mode Selection			
F1:Edit	F2:Play	F3:Moni	F4:Ctl

Select the **F3** (Moni) key on the Mode Selection screen.

15-1. Monitor items

Monitor items are displayed in the function key section.

Every time the **SF** key is pressed, the items are shifted and displayed.

Moni (Monitor item) screen

Moni			
F1:In	F2:Out	F3:GFlg	F4:GVar →

In: Input ports
 Out: Output ports
 GFlg: Global flags
 GVar: Global variables



Moni			
F1:ASts	F2:SSts	F3:ErrL	F4:Ver →

ASts: Axis status
 SSts: System status
 ErrL: Error detail information
 Ver: Version information

Select the item to monitor with the function key.



15-2. Input ports

The ON/OFF conditions of input ports are displayed.

Select the **F1** (In) key on the Moni screen.

Mode flow: **Moni** — **In**

In										
	0	1	2	3	4	5	6	7	8	9
0 ->	0	0	0	0	0	0	0	0	0	0
10 ->	0	0	0	0	0	0	0	0	0	0
20 ->	0	0	0	0	0	0	0	0	0	0
30 ->	0	0	0	0	0	0	0	0	0	0
40 ->	0	0	0	0	0	0	0	0	0	0
F1:	F2:	F3:	F4:							

1: ON 0: OFF

Every time the **PAGE UP** or **PAGE DOWN** key is pressed, the port Nos. are shifted by 50 and displayed.

15-3. Output ports

The ON/OFF conditions of output ports are displayed. In addition, the ON/OFF conditions of output ports can be changed.

Select the **F2** (Out) key on the Moni screen.

Mode flow: **Moni** — **Out**

Out										
	0	1	2	3	4	5	6	7	8	9
300 ->	1	0	1	0	0	0	0	0	0	0
310 ->	0	0	0	0	0	0	0	0	0	0
320 ->	0	0	0	0	0	0	0	0	0	0
330 ->	0	0	0	0	0	0	0	0	0	0
340 ->	0	0	0	0	0	0	0	0	0	0
F1:0/1	F2:	F3:	F4:							

The condition of the output port at which the cursor is located can be changed between ON and OFF every time the **F1** (0/1) key is pressed.

1: ON, 0: OFF

Move the cursor with the **◀** **▼** **▲** **▶** keys.

Every time the **PAGE UP** or **PAGE DOWN** key is pressed, the port Nos. are shifted by 50 and displayed.

(The figure above is the screen on which the output ports No. 300 and No. 302 are ON.)

15-4. Global flags

The ON/OFF conditions of global flags are displayed. In addition, the ON/OFF conditions of global flags can be changed.

Select the **F3** (GFlg) key on the Moni screen.

Mode flow: **Moni** — **GFlg**

GFlg										
	0	1	2	3	4	5	6	7	8	9
600 ->	1	0	0	0	0	0	0	0	0	0
610 ->	0	0	0	0	0	0	0	0	0	0
620 ->	0	0	0	0	0	0	0	0	0	0
630 ->	0	0	0	0	0	0	0	0	0	0
640 ->	0	0	0	0	0	0	0	0	0	0
F1:0/1	F2:	F3:	F4:							

The condition of the global flag at which the cursor is located can be changed between ON and OFF every time the **F1** (0/1) key is pressed.

1: ON, 0: OFF

Move the cursor with the **◀** **▼** **▲** **▶** keys.

Every time the **PAGE UP** or **PAGE DOWN** key is pressed, the flag Nos. can be shifted by 50 and displayed.



15-5. Global variables

The descriptions of global variables and global strings are displayed. In addition, numeric values can be assigned to global variables while character strings can be assigned to global strings.

Select the **F4** (Gvar) key on the Moni screen.

Mode flow: **Moni** — **GVar**

GVar
F1:Itg F2:Real F3:Str F4:Ver

Global variables are displayed with the following 3 types:

Itg: Integer (No. 200 - 299, No. 1200 - 1299)

Real: Real number (No. 300 - 399, No. 1300 - 1399)

Str: String (No. 300 - 999)

(1) Global integer variables

Mode flow: **Moni** — **GVar** — **Itg**

GVar-Itg
200 -> 0
201 -> 0
202 -> 0
203 -> 0
204 -> 0
F1: F2: F3: F4:

(2) Global real variables

Mode flow: **Moni** — **GVar** — **Real**

GVar-Real
300 -> 0.000000
301 -> 0.000000
302 -> 0.000000
303 -> 0.000000
304 -> 0.000000
F1: F2: F3: F4:

The cursor is located at the data (variable description). Entering a numeric value with the ten-key numeric pad and pressing the return key can assign the numeric value to the variable. Move the cursor with the return key or the **◀** **▼** **▲** **▶** keys.

The variable Nos. can be changed with the **PAGE UP** and **PAGE DOWN** keys.

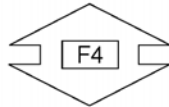


(3) Global strings

Mode flow: Moni — GVar — Str

Character string display

GVar-Str [CHAR]										
		0	1	2	3	4	5	6	7	8 9
300	->	■
310	->
320	->
330	->
340	->
F1:Num F2: F3: F4:Disp										



The cursor is located at the data (column).

Entering an ASCII code with the ten-key numeric pad and pressing the return key can assign the characters.

(A to F of hexadecimal notation can be input by changing Num to Alph with the F1 [Alph/Num] key.)

Move the cursor with the return key or ◀ ▼ ▲ ▶ keys.

The PAGE UP and PAGE DOWN keys display the column Nos. by shifting the numbers by 50.

Pressing the F4 (Disp) key can change the display between character strings and ASCII codes.

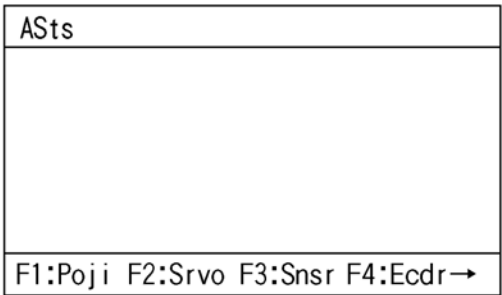
ASCII code display

GVar-Str [CODE]										
		0	1	2	3	4	5	6	7	8 9
300	->	■	0	0	0	0	0	0	0	0
310	->	0	0	0	0	0	0	0	0	0
320	->	0	0	0	0	0	0	0	0	0
330	->	0	0	0	0	0	0	0	0	0
340	->	0	0	0	0	0	0	0	0	0
F1:Num F2: F3: F4:Disp										

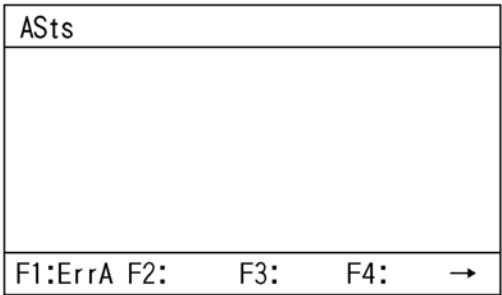
15-6. Axis status

The current position, servo status, sensor status, etc., are displayed.
Select the F1 (ASts) key on the Moni screen.

Mode flow: Moni — ASts



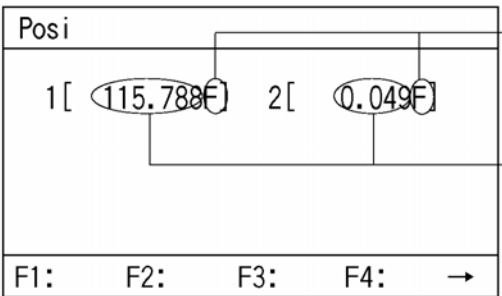
Poji: Current position
Srvo: Servo status
Snsr: Sensor input status
Ecdre: Encoder status



ErrA: Axis-related error

(1)Current position

Mode flow: Moni — ASts — Posi



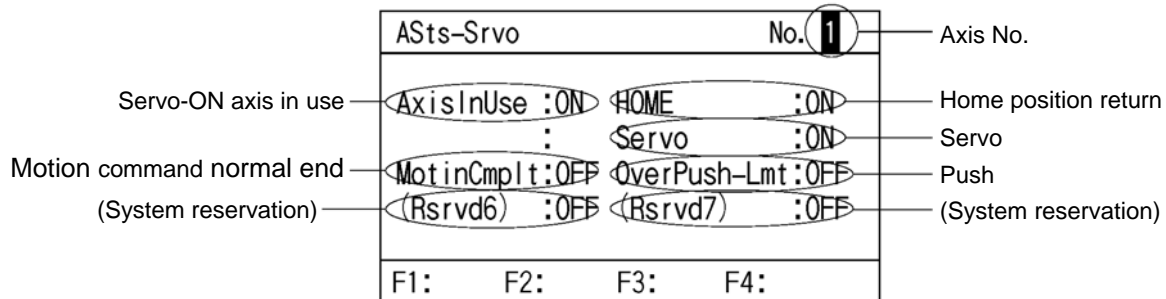
N: Servo ON condition
F: Servo OFF condition

Current position



(2) Servo status

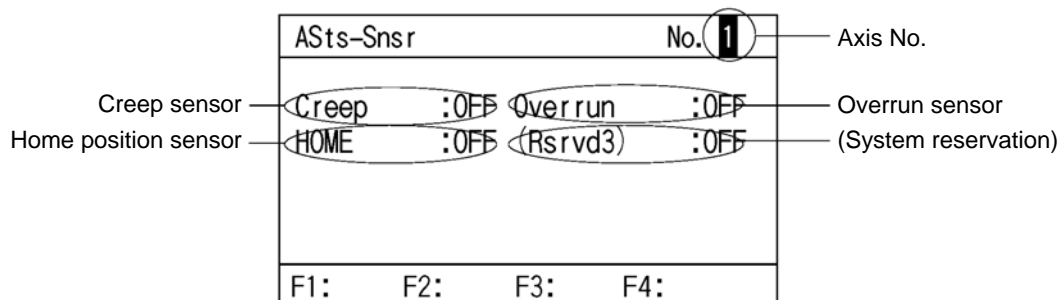
Mode flow: Moni — ASts — Srvo



The axis No. can be changed with the PAGE UP and PAGE DOWN keys.

(3) Sensor input status

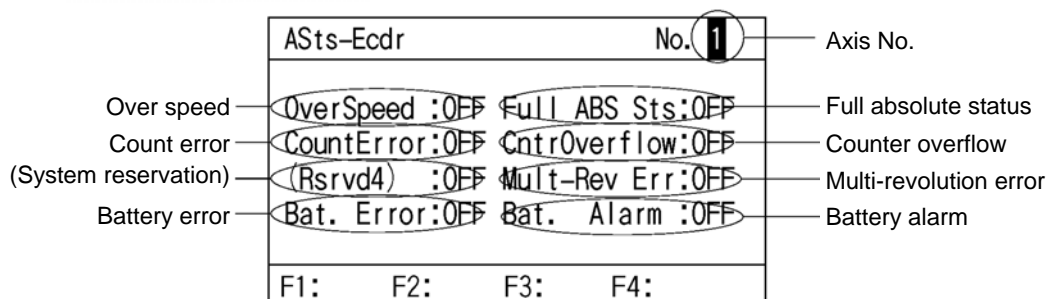
Mode flow: Moni — ASts — Snsr



The axis No. can be changed with the PAGE UP and PAGE DOWN keys.

(4) Encoder status

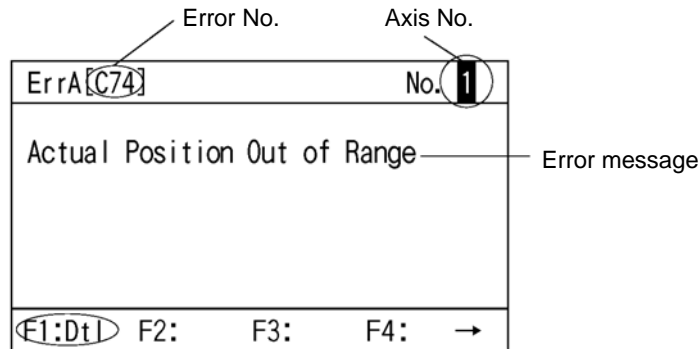
Mode flow: Moni — ASts — Ecdr



The axis No. can be changed with the PAGE UP and PAGE DOWN keys.

(5) Axis-related errors

Mode flow: Moni — ASts — ErrA



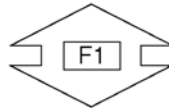
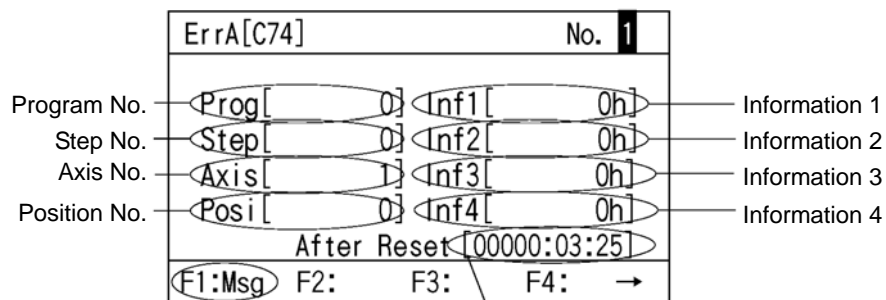
Error No. C74

Axis No. 1

Actual Position Out of Range

F1:Dtl F2: F3: F4: →

The axis No. can be changed with the PAGE UP and PAGE DOWN keys.
Pressing the F1 (Dtl) key can check the error detail information.

ErrA[C74] No. 1

Program No. Prog[0] Inf1[0h] Information 1

Step No. Step[0] Inf2[0h] Information 2

Axis No. Axis[1] Inf3[0h] Information 3

Position No. Posi[0] Inf4[0h] Information 4

After Reset [00000:03:25]

F1:Msg F2: F3: F4: →

Time elapsed from the last software reset or power-on to error occurrence

15-7. System status

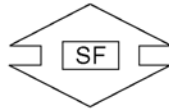
The system status is displayed.

Select the **F2** (SSts) key on the Moni screen.

Mode flow: **Moni** — **SSts**

SSts			
F1:Mode	F2:ErrS	F3:Sts1	F4:Sts2→

Mode: System mode
 ErrS: System error
 Sts1: System status 1
 Sts2: System status 2



SSts			
F1:Sts3	F2:Sts4	F3:	F4: →

Sts3: System status 3
 Sts4: System status 4

(1) System mode

Mode flow: **Moni** — **SSts** — **Mode**

SSts-Mode			
System Mode:MANUAL			
F1:	F2:	F3:	F4:

(2) System error

Mode flow: **Moni** — **SSts** — **ErrS**

SSts-ErrS			
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block; margin-bottom: 10px;">Serious Error:C74</div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">Latest Error:C74</div>			
F1:	F2:	F3:	F4:

Serious level error

Latest error



(3) System status 1

Mode flow: Moni — SSts — Sts1

SSts-Sts1			
Run mode SW status	Mode SW :MAN	TP Enable SW:OFF	Teaching Box Deadman SW status
Safety gate status	SafetyGate:CLS	Emergency SW:OFF	Emergency Stop SW status
Power system error status	Power Err :NON	Bat.Volt Dwn:MON	Battery voltage down warning status
Battery voltage error status	Bat.VltErr:MON	(Rsrvd7) :OFF	(System reservation)
F1: F2: F3: F4:			

(4) System status 2

Mode flow: Moni — SSts — Sts2

SSts-Sts2			
Flash ROM write status	Wrt FROM :NON	Wrt Slv Prm :NON	Slave parameter write status
Servo interlock status	SrvIntrlck:NON	I/O Intrlck :NON	I/O interlock status
Restart waiting status	WaitForRst:NON	PrgExecution:NON	Program execution status
Velocity command/position pulse monitor (main) status	Vel/PosMnt:MON	Drv Monitor :NON	Driver monitor status
F1: F2: F3: F4:			

(5) System status 3

Mode flow: Moni — SSts — Sts3

SSts-Sts3			
Driving power down status	DrvPwrDwn :DWN	System Drive:NON	System run status
System ready status	System Rdy:NON	Rqst Ctl Fnc:OFF	Request flag of controller function specification
(System reservation)	(Rsrvd4) :OFF	(Rsrvd5) :OFF	(System reservation)
(System reservation)	(Rsrvd6) :OFF	(Rsrvd7) :OFF	(System reservation)
F1: F2: F3: F4:			

(6) System status 4

Mode flow: Moni — SSts — Sts4

The system status 4 is all “Reserved” (system reservation).

15-8. Error detail information

Error detail information is displayed.

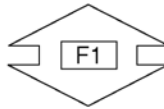
Select the **F3** (ErrL) key on the Moni screen.

Mode flow: **Moni** → **ErrL**

ErrA[C74]	No. 1	List No.
Actual Position Out of Range		
F1:Dtl	F2:	F3: F4: →

The axis No. can be changed with the **PAGE UP** and **PAGE DOWN** keys.

Pressing the **F1** (Dtl) key can check the error detail information.



ErrA[C74]	No. 1	
Program No. Prog[0]	Inf1[0h]	Information 1
Step No. Step[0]	Inf2[0h]	Information 2
Axis No. Axis[1]	Inf3[0h]	Information 3
Position No. Posi[0]	Inf4[0h]	Information 4
After Reset [00000:03:25]		
F1:Msg	F2:	F3: F4: →

Time elapsed from the last software reset or power-on to error occurrence

15-9. Version information

A variety of version information is displayed.

Select the **F4** (Ver) key on the Moni screen.

Mode flow: **Moni** — **Ver**

Ver
F1:Main F2:Drv F3:TP F4:

Main: Main
Drv: Driver
TP: Teaching Box

(1) Main

Mode flow: **Moni** — **Ver** — **Main**

Ver-Main
Main V0.55 [2003/01/21] Maic V0.09 [2001/06/20] (Flash ROM: 8Mbit)
F1: F2: F3: F4:

Version of controller main application part

Version of controller main core part

(2) Driver

Mode flow: **Moni** — **Ver** — **Drv**

Ver-Drv
Drv1 V0.23 [0000/00/00] Drv2 V0.23 [0000/00/00]
F1: F2: F3: F4:

Version of 1st axis driver CPU

Version of 2nd axis driver CPU

(3) Teaching Box

Mode flow: **Moni** — **Ver** — **TP**

Ver-TP
TP V1.01 [2003/03/10] TPc V1.00 [2003/02/26]
F1: F2: F3: F4:

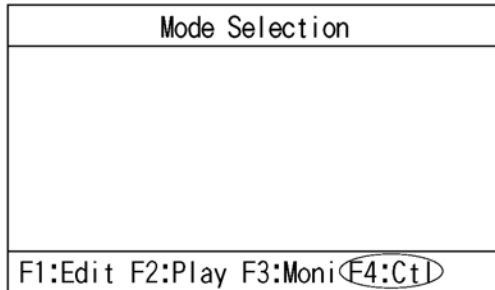
Version of Teaching Box application part

Version of Teaching Box core part



16. Controller

Operations such as software reset and error reset are performed for the controller.

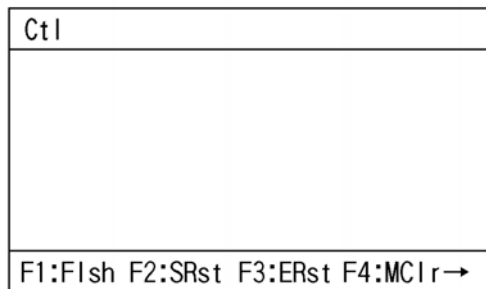


Select the **F4** (Ctl) key on the Mode Selection screen.

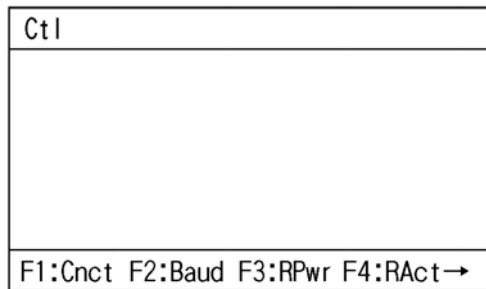
The controller's operation items are displayed in the function key section.

16-1. Controller items

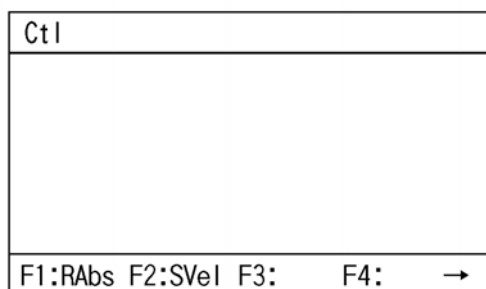
Every time the **SF** key is pressed, operation items are shifted and displayed.



Flsh: Flash ROM writing
SRst: Software reset
ERst: Error reset
MCIr: Memory initialization



Cnct: Reconnection
Baud: Baud rate change
RPwr: Driving power recovery request
RAct: Action restart request



RAbs: Absolute encoder reset
SVel: Safety velocity



Select an operation item with the function key.



16-2. Flash ROM writing

After the data in flash ROM has been erased, the data stored in the controller's memory is written in flash ROM.

Select the **F1** (Flash) key on the Ctl screen.

Mode flow: **Ctl** → **Flash**

Flash
Write in Flash ROM? → OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When writing the data in flash ROM, press the **F1** (OK) key.

When not writing the data in flash ROM, press the **F2** (Canc) or **ESC** key. The screen returns to the Ctl screen.

Flash
Write in Flash ROM? → OK=[F1]/Cancel=[ESC] or [F2]
Please wait...

The message "Please wait..." flashes during flash ROM writing.

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

Flash
Write in Flash ROM? → OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When flash ROM writing is completed, the display returns to the previous screen. (After parameter editing and flash ROM writing, the screen moves to the screen for software resetting [SRst].)



16-3. Software reset (restart)

The controller's software is reset. The data in memory that has not been written in flash ROM is abandoned.

Select the **F2** (SRst) key on the Ctl screen.

Mode flow: **Ctl** → **SRst**

SRst
Reset the controller?
→ OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

When resetting the software, press the **F1** (OK) key.
When not resetting the software, press the **F2** (Canc) or **ESC** key. The screen returns to the Mode Selection screen.

16-4. Error reset

The controller's errors are reset. The message-level and action-reset-level errors are reset. Unless the cause for the error is removed, the error occurs again.

Select the **F3** (ERst) key on the Ctl screen.

Mode flow: **Ctl** → **ERst**

ERst
Reset the error?
→ OK=[F1] / Cancel=[ESC]
F1:OK F2: F3: F4:

When resetting the error, press the **F1** (OK) key.
(Even after the error reset, the screen does not change. Pressing the **ESC** key returns to the Ctl screen.)

When not resetting the error, press the **ESC** key.
The display returns to the Ctl screen.

16-5. Memory initialization

Global variables are cleared to zero.

Select the **F4** (MClr) key on the Ctl screen.

Mode flow: **Ctl** → **MClr**

MClr			
Select initialize type → 0			
0:Global Variable			
→ OK=[F1] / Cancel=[ESC]			
F1:OK	F2:	F3:	F4:

When initializing memory, press the **F1** (OK) key. (Even after memory initialization, the screen does not change. Pressing the **ESC** key returns to the previous screen.)

When not initializing memory, press the **ESC** key. The display returns to the previous screen.

16-6. Reconnection

The Teaching Box is reconnected to the controller. In a communicable state, the off-line mode can be moved to the on-line mode.

Select the **F1** (Cnct) key on the Ctl screen.

Mode flow: **Ctl** → **Cnct**

Cnct			
Re-connect to the controller?			
→ OK=[F1] / Cancel=[ESC]			
F1:OK	F2:	F3:	F4:

When reconnecting, press the **F1** (OK) key. When not reconnecting, press the **ESC** key. The display returns to the previous screen.

SEL Teaching			
TP	V1.01 [2003/03/10]		
TPc	V1.00 [2003/02/26]		
Please wait...			

The message "Please wait..." flashes during reconnection.

After completion of reconnection, the display returns to the Mode Selection screen.



16-7. Baud rate change

The communication baud rate between the controller and the Teaching Box is changed.

Select the **F2** (Baud) key on the Ctl screen.

Mode flow: **Ctl** → **Baud**

Baud
Select Baudrate type --> [2] [0:9.6 1:19.2 2:38.4 (kbps)]
--> OK=[F1] / Cancel=[ESC]
F1:OK F2: F3: F4:

Enter the numeric value corresponding to the baud rate with the ten-key numeric pad and press the return key.

0: 9.6, 1: 19.2, 2: 38.4 (kbps)

When changing the baud rate, press the **F1** (OK) key.

When canceling it, press the **F2** (Canc) key. The display returns to the previous screen.

Baud
Select Baudrate type --> [2] [0:9.6 1:19.2 2:38.4 (kbps)]
--> OK=[F1] / Cancel=[ESC]
Please wait...

The message "Please wait..." flashes during a baud rate change.

The display returns to the screen for changing the baud rate.

The baud rate changed here continues to be valid until the Teaching Box reset.

The Teaching Box reset is any condition of reconnection, controller main power OFF/ON, and Teaching Box connector insertion/removal.

After the Teaching Box reset, the baud rate returns to the prescribed value (38.4 kbps).

16-8. Safety velocity

The safety velocity limit in the MANU mode is changed between Effect and No Effect.

Select the **F2** (SVel) key on the Ctl screen.

Mode flow: **Ctl** → **SVel**

SVel (MANU Mode)
Please select --> [0] [0:No Effect 1:Effect]
--> OK=[F1] / Cancel=[ESC]
F1:OK F2: F3: F4:

Enter 1 or 0 with the ten-key numeric pad and press the return key.

1: Safety velocity limit: Effect

The maximum velocity is 250 mm/sec. or less regardless of the setting of the program and parameters.

0: Safety velocity limit: No Effect

When changing the safety velocity limit between Effect and No Effect, press the **F1** (OK) key.

When canceling it, press the **ESC** key.



16-9. Driving power recovery request

The driving power recovery request is given to the controller.

Select the **F3** (RPwr) key on the Ctl screen.

Mode flow: **Ctl** → **RPwr**

RPwr
Recover the driving Power?
→ OK=[F1] / Cancel=[ESC]
F1:OK F2: F3: F4:

When requesting the driving power recovery, press the **F1** (OK) key. The display returns to the previous screen.

When not requesting the driving power recovery, press the **ESC** key. The display returns to the previous screen.

16-10. Action restart request

The action restart request is given to the controller.

Select the **F4** (RAct) key on the Ctl screen.

Mode flow: **Ctl** → **RAct**

RAct
Re-start the action?
→ OK=[F1] / Cancel=[ESC]
F1:OK F2: F3: F4:

When requesting the action restart, press the **F1** (OK) key. The display returns to the previous screen.

When not requesting the action restart, press the **ESC** key. The display returns to the previous screen.



16-11. Driving power recovery request (RPwr) and action restart request (RAct)

(1) Driving power recovery request

① How to request driving power recovery

The driving power recovery can be requested with any of the following methods:

- Set the I/O parameter No. 44 (input selection function 014 = driving power restart input) to 1, and input ON edge for the input port No. 14.
- Select Controller (C) from the PC software menu and execute Driving Power Recovery Request (P).
- Select Ctl (controller operation) on the Mode Selection screen of the Teaching Box and execute RPwr (driving power recovery request).

② Case where driving power recovery request is required

The driving power recovery request is required only in the following case:

- Where the factor behind the driving power down occurs when the I/O parameter No. 44 is set to 1 and the driving power recovery is attempted after the factor removal

(2) Action restart request

① How to request action restart

The action restart can be requested with any of the following methods:

- Set the I/O parameter No. 35 to 1 (input selection function 005 = action restart signal), and input ON edge for the input port No. 5.
- Select Controller (C) from the PC software menu and execute action restart request (L).
- Select Ctl (controller operation) on the Mode Selection screen of the Teaching Box and execute RAct (action restart request).

② Case where action restart request is required

The action restart request is required in any of the following cases:

- Where the controller in auto run stops with the Deadman switch when the Para-Othe No. 9 is set to 2 (Deadman SW recovery type = action continuation recovery [only in auto run]) and recovery is attempted after the stop reset (action restart)
- Where the controller in auto run makes an emergency stop when the Para-Othe No. 10 is set to 2 (emergency stop recovery type = action continuation recovery [only in auto run]) and recovery is attempted after the emergency stop reset (action restart)
- Where the safety gate is OPEN in auto run when the Para-Othe No. 11 is set to 2 (safety gate OPEN time recovery type = action continuation recovery [only in auto run]) and recovery is attempted after safety gate CLOSE (action restart)
- Where the input port No. 6 OFF level is input (action temporary stop) in auto run when the I/O parameter No. 36 is set to 1 (input selection function 006 = action temporary stop signal) and recovery is attempted after the input port No. 6 ON level input (action restart)

* Where (1) ② overlaps (2) ②, it is required to execute the driving power recovery request first and then the action restart request.

16-12. Absolute encoder reset

The absolute encoder data is reset.

Select the **F1** (RAbs) key on the Ctl screen.

Mode flow: **Ctl** - **RAbs**

RAbs			
Please Select Axis No. [0]			
F1:OK	F2:	F3:	F4:

Axis No. input

Enter the axis No. for absolute encoder resetting with the ten-key numeric pad and press the return key.

Axis No.

RAbs			
Please Select Axis No. [1]			
F1:OK	F2:	F3:	F4:

When continuing the absolute encoder reset, press the **F1** (OK) key.

When canceling the absolute encoder reset, press the **ESC** key.

When canceling the absolute encoder reset on any screen of the following ① through ⑥, press the **ESC** key.

Axis No.

RAbs		Axis. 1	
1:Encoder multi rotation date reset(1)			
Next=[PAGE UP]/Back=[PAGE DOWN]			
F1:OK	F2:	F3:	F4:

① Encoder multi-rotation data reset (1)

Press the **F1** (OK) key.

RAbs		Axis. 1	
2:Controller error reset			
Next=[PAGE UP]/Back=[PAGE DOWN]			
F1:OK	F2:	F3:	F4:

② Controller error reset

Press the **F1** (OK) key.



RAbs	Axis. 1
3: Servo-ON	
Next=[PAGE UP]/Back=[PAGE DOWN]	
F1:OK	F2: F3: F4:

- ③ Servo ON
Press the **F1** (OK) key.

RAbs	Axis. 1
4:Homing	
Next=[PAGE UP]/Back=[PAGE DOWN]	
F1:OK	F2: F3: F4:

- ④ Home position return
Press the **F1** (OK) key.

RAbs	Axis. 1
5: Servo-OFF	
Next=[PAGE UP]/Back=[PAGE DOWN]	
F1:OK	F2: F3: F4:

- ⑤ Servo OFF
The absolute encoder with the driver CPU Ver. 0.23 or later can be reset in a servo ON condition. Press the **PAGE UP** key without pressing the **F1** (OK) key to move to the following “⑥ Encoder multi-rotation data reset (2).”

RAbs	Axis. 1
6: Encoder multi rotation date reset (2)	
Next=[PAGE UP]/Back=[PAGE DOWN]	
F1:OK	F2: F3: F4:

- ⑥ Encoder multi-rotation data reset (2)
Press the **F1** (OK) key.



RAbs	Axis. 1
1:Encoder multi rotation date reset(1)	
Next=[PAGE UP]/Back=[PAGE DOWN]	
F1:OK	F2: F3: F4:

Press the **ESC** key to return to the axis No. input screen.

RAbs
Please Select Axis No. [1]
F1:OK F2: F3: F4:

When resetting the absolute encoder for another axis, enter the axis No. here, press the **F1** (OK) key, and repeat the steps of ① through ⑥ above. When completing the absolute encoder reset, press the **ESC** key.

SRst
Reset the controller?
—> OK=[F1]/Cancel=[ESC] or [F2]
F1:OK F2:Canc F3: F4:

The display moves to the software reset (SRst) screen. Press the **F1** (OK) key to reset software. After completion of software reset, the display returns to the Mode Selection screen.

With the above, the absolute encoder reset is completed.

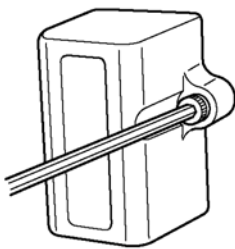
16-13. Procedures for resetting absolute-battery voltage-down warning error

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. The home position return in the absolute encoder 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 off the servo for all the axes for error resetting.
- 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.



Remove the bolt fixing the battery unit on the front panel with an Allen wrench, as shown at the left.

Pull it out directly.

Replace the battery unit with a new one.

Move the display to the absolute encoder reset (RAbs) screen.

Mode flow: Ctl - RAbs

RAbs			
Please Select Axis No. 0			
F1:OK	F2:	F3:	F4:

- ③ Axis No. input

Enter the axis No. for encoder error resetting with the ten-key numeric pad and press the return key.

Axis No.

RAbs			
Please Select Axis No. 1			
F1:OK	F2:	F3:	F4:

- ④ When continuing the encoder error reset, press the F1 (OK) key.
When canceling the encoder error reset, press the ESC key.

RAbs	Axis. 1
1:Encoder multi rotation date reset(1)	
Next=[PAGE UP]/Back=[PAGE DOWN]	
F1:OK	F2: F3: F4:

Axis No.

- ⑤ Press the **PAGE UP** and **PAGE DOWN** keys several times to display the “*: Encoder error reset” screen.
Do not press the **F1** key on the screen at the left.

RAbs	Axis. 1
*:Encoder error reset	
Next=[PAGE UP]/Back=[PAGE DOWN]	
F1:OK	F2: F3: F4:

- ⑥ When resetting the encoder error, press the **F1** (OK) key. (When canceling it, press the **ESC** key.)
The screen does not change even after pressing the **F1** (OK) key.
Pressing the **ESC** key returns to the screen for the axis No. input.

RAbs
Please Select Axis No. [1]
F1:OK F2: F3: F4:

- ⑦ When also resetting the encoder error reset for another axis, enter the axis No. with the ten-key numeric pad and press the return key. Repeat the steps of ④ through ⑦ above in the same manner.
When completing the encoder error reset, press the **ESC** key.

Ctl
F1:Flsh F2:SRst F3:ERst F4:MCIr→

- ⑧ Reset software.
Display SRst in the function key section with the **SF** key.
Press the **F2** (SRst) key. (**Ctl-SRst**)
For the following operations, refer to “16-3. Software reset.”



© Error Level Control

Error level	System error origin	Error No. (HEX)	Display (7SEG, DISPLAY, etc.)	Error list	Error LED output	Program run		Error reset	Remarks
						When Para-Othe No. 4 is 0	When Para-Othe No. 4 is 1		
Secret level	Main application part	800 - 88F							Special error level for maintenance
	Main core part	890 - 8AF							
	PC	8B0 - 8DF							
	TP	8E0 - 8FF							
Message level	Main application part	900 - 93F							Status display, input errors, etc.
	Main core part	940 - 97F							
	PC	980 - 9AF							
	PC (Update tool)	9B0 - 9BF							
	TP	9C0 - 9FF							
	Flash ACK time-out	A00 - A6F							
	Main core part	A70 - A9F							
	PC	AA0 - ACF							
	TP	AD0 - AFF							
	Main application part	B00 - B9F							
Action reset level	Main core part	BA0 - BBF							Errors interfering with action. For a minor errors with a level lower than this, error reset is attempted with the auto-reset function at the external active command (SIO/PIO) receipt.
	PC	BC0 - BDF							
	TP	BE0 - BFF							
	Main application part	C00 - CCF							
	Main core part	CD0 - CDF							
	PC	CE0 - CEF							
	TP	CF0 - CFF							
	Main application part	D00 - D8F							
	Main core part	D90 - DAF							
	PC	DB0 - DCF							
Cold start level	PC (Update tool)	DD0 - DDF							It is required turn on the power again. (Normal execution for CPU and OS)
	TP	DE0 - DFF							
	Main application part	E00 - E8F							
	Main core part	E90 - EBF							
	PC	EC0 - EDF							
	TP	EE0 - EFF							
	Main application part	FF0 - FBF							
	Main core part	FC0 - FCF							
	PC	FD0 - FDF							
	TP	FE0 - FEF							
System down level	Main application part	FF0 - FBF							It is required turn on the power again. (Execution is impossible for CPU and OS)
	Main core part	FC0 - FCF							
	PC	FD0 - FDF							
	TP	FE0 - FEF							

TP: Teaching Box, PC: PC-compatible software

**X-SEL Teaching Box Error List (Application Part)**

The following errors are specific to the Teaching Box. For controller errors, refer to the X-SEL Controller Instruction Manual.)

Error No.	Error message	Special remarks
9C0	Input data error	Input data error. Check the input data.
9C1	Input data tool 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 Cmnd Input Error	SEL command input error. Invalid data is input for the SEL command.
9C4	Inputting Conditions are not allowed	Input-condition input prohibition error. The Input condition is used in a step where use of such condition is not allowed.
9C5	Input Condition Data Error	Input condition data error. An invalid value is input for the input condition.
9C6	Input Condition is out of range	Input condition out-of-range error. A value out of the input range is input for the input condition.
9C7	No Input Condition yet	Input-condition no input error. No input condition is input in the step where such condition is essential.
9C8	Undefined Symbol (Input Condition)	Undefined symbol (input condition) use error. An undefined symbol is used for the input condition.
9C9	Operand not inputted (Oprnd1)	Operand 1 no input error. The operand 1 is not input in the step where the operand 1 is essential.
9CA	Operand not inputted (Oprnd2)	Operand 2 no input error. The operand 2 is not input in the step where the operand 2 is essential.
9CB	Operand not inputted (Oprnd3)	Operand 3 no input error. The operand 3 is not input in the step where the operand 3 is essential.
9CC	Inputting Oprnd is not allowed (Oprnd1)	Operand 1 input prohibition error. The operand 1 is used in the step where use of the operand 1 is prohibited.
9CD	Inputting Oprnd is not allowed (Oprnd2)	Operand 2 input prohibition error. The operand 2 is used in the step where use of the operand 2 is prohibited.
9CE	Inputting Oprnd is not allowed (Oprnd3)	Operand 3 input prohibition error. The operand 3 is used in the step where use of the operand 3 is prohibited.
9CF	Operand1 is invalid	Operand 1 data error. An invalid data is input for the operand 1. Check the data.
9D0	Operand2 is invalid	Operand 2 data error. An invalid data is input for the operand 2. Check the data.
9D1	Operand3 is invalid	Operand 3 data error. An invalid data is input for the operand 3. Check the data.
9D2	Inputted Operand is out of range (Oprnd1)	Operand 1 input out-of-range error. A value out of the allowable input range is input.
9D3	Inputted Operand is out of range (Oprnd2)	Operand 2 input out-of-range error. A value out of the allowable input range is input.
9D4	Inputted Operand is out of range (Oprnd3)	Operand 3 input out-of-range error. A value out of the allowable input range is input.
9D5	Undefined symbol (Oprnd1)	Operand 1 undefined symbol use error. An undefined symbol is used for the operand 1.



9D6	Undefined symbol (Oprnd2)	Operand 2 undefined symbol use error. An undefined symbol is used for the operand 2.
9D7	Undefined symbol (Oprnd3)	Operand 3 undefined symbol use error. An undefined symbol is used for the operand 3.
9D8	Symbol type error (Oprnd1)	Operand 1 symbol type error. A symbol of the type not allowable for the operand 1 or outside of the scope is used.
9D9	Symbol type error (Oprnd2)	Operand 2 symbol type error. A symbol of the type not allowable for the operand 2 or outside of the scope is used.
9DA	Symbol type error (Oprnd3)	Operand 3 symbol type error. A symbol of the type not allowable for the operand 3 or outside of the scope is used.
9DB	Symbol type error (Input Condition)	Input-condition symbol type error. A symbol of the type not allowable for the input condition or outside of the scope is used.
9DC	Invalid Symbol String	Symbol string error. An invalid character is used at the head of the symbol or in the character string.
9DD	Multiple declaration of a Symbol	Symbol multiple declaration error. The same symbol has multiple definitions.
9DE	Symbol value not inputted	Symbol value no input error. No symbol-defined value is input.
9E0	Servo OFF while in Action	Servo OFF while in action. An action command is given to the axis with the servo OFF. Turn on the servo first.
9E1	Not yet Homed MOVE	Movement/continuous movement prohibition error at not-yet-homed time. Complete home position return first.
9E2	Not yet Homed TEACH	Teaching prohibition error at not-yet-homed time. Complete home position return first.
9E3	Function not Supported	Unsupported function error. An unsupported function is attempted to execute.
9E4	Encoder type error	Encoder type error. Check the ABS/INC type (axis-specific parameter No. 38) of the operation target axis.
9E5	Axis number error	Axis No. error. The specification of the axis No. is invalid.
9E6	No effective axis	No effective axis error. There is no 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	Password error. The password is invalid.
9EC	Position Data has been changed.	Movement/continuous movement prohibition error at position data change time. After writing the changed data in the controller, make a reattempt.



9ED	Can not edit while running program (TP)	Program edit prohibition error while running. Editing operation cannot be performed for the running program. Exit from the program first.
9EE	Too many Symbol Definitions	Excessive number of symbol definitions.
9EF	Can not reset M-Dat when servo is ON.	Absolute encoder multi-rotation data reset prohibition error at servo ON time
DE0	Receive Data Invalid	Received data string error (TP). The received data has an error. When it is not eliminated even through reconnection, contact the manufacturer.
DE1	Header Logic Error (IAI Protocol Send)	IAI protocol send data header logic error
DE2	Command ID Logic Err (IAI Protocol Send)	IAI protocol send data command ID logic error
DE3	Receive Data Error (IAI Protocol Recv)	IAI protocol receive data error
DE4	Response Time-out (IAI Protocol Recv)	IAI protocol response time-out error
DE5	Overrun Error (Master Mode)	Overrun error (in Master mode)
DE6	Framing Error (Master Mode)	Framing error (in Master mode)
DE7	Parity Error (Master Mode)	Parity error (in Master mode)
DE8	Send Que Overflow (Master Mode)	SCI send queue overflow (in Master mode)
DE9	Receive Que Overflow (Master Mode)	SCI receive queue overflow (in Master mode)
DEA	Send Buffer Overflow (IAI Protocol Send)	IAI protocol send buffer overflow
DEB	Receive Buffer Overflow (Master Mode)	IAI protocol receive buffer overflow (in Master mode)
DEC	Send Que Overflow (IAI Protocol Send)	IAI protocol send queue overflow
DED	Receive Que Overflow (IAI Protocol Send)	IAI protocol receive queue overflow
DEE	CTL Not Connected	Controller no connection error. Communications cannot be established or an unsupported controller is connected.



X-SEL Teaching box Error List (Core Part)

(The following errors are specific to the Teaching Box. For the controller's errors, refer to the X-SEL Controller Instruction Manual.)

Error No.	Error message	Special remarks
AE0	Overrun error	There is a communication error. Check noise, connecting equipment, communication setting, etc.
AE1	Framing error	There is a communication error. Check noise, connecting equipment, communication setting, etc.
AE2	SCI break detection error	There is a communication error. Check noise, connecting equipment, communication setting, etc.
AE3	Parity error	There is a communication error. Check noise, connecting equipment, communication setting, etc.
AE4	Motorola S checksum error	The update program file has an error. Check the file.
AE5	Motorola S record format error	The update program file has an error. Check the file.
AE6	Motorola S load address error	The update program file has an error. Check the file.
AE7	Motorola S write address over error	The update program file has an error. Check the file.
AE8	Flash ROM timing limit excess error (write)	Flash ROM write has timed out (during update).
AE9	Flash ROM timing limit excess error (erase)	Flash ROM erase has timed out (during update).
AEA	Flash ROM verify error	Flash ROM erase/write is invalid (during update).
AEB	Flash ROM ACK time-out	Flash ROM erase/write is invalid (during update).
AEC	IAI protocol header error	There is a communication error. Check noise, connecting equipment, communication setting, etc.
AED	IAI protocol checksum error	There is a communication error. Check noise, connecting equipment, communication setting, etc.
AEE	IAI protocol terminal ID error	There is a communication error. Check noise, connecting equipment, communication setting, etc.
AEF	IAI protocol command ID error	There is a communication error. Check noise, connecting equipment, communication setting, etc.



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/

Technical Support available in USA, Europe and China

IAI America, Inc.

Head Office: 2690 W. 237th Street, Torrance, CA 90505
TEL (310) 891-6015 FAX (310) 891-0815
Chicago Office: 1261 Hamilton Parkway, Itasca, IL 60143
TEL (630) 467-9900 FAX (630) 467-9912
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066
TEL (678) 354-9470 FAX (678) 354-9471
website: www.intelligentactuator.com

IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany
TEL 06196-88950 FAX 06196-889524

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