

**mitsubishi**

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# MOTION CONTROLLER

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*Operating Manual*

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type **SW2SRX-GSV22PE/  
SW0IX-CAMPE**

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## INTRODUCTION

Thank you for purchasing the Mitsubishi Motion Controller/Personal Machine Controller. This instruction manual describes the handling and precautions of this unit. Incorrect handling will lead to unforeseen events, so we ask that you please read this manual thoroughly and use the unit correctly. Please make sure that this manual is delivered to the final user of the unit and that it is stored for future reference.

### Precautions for Safety

Please read this instruction manual and enclosed documents before starting installation, operation, maintenance or inspections to ensure correct usage. Thoroughly understand the machine, safety information and precautions before starting operation. The safety precautions are ranked as "Warning" and "Caution" in this instruction manual.



When a dangerous situation may occur if handling is mistaken leading to fatal or major injuries.














When a dangerous situation may occur if handling is mistaken leading to medium or minor injuries, or physical damage.

Note that some items described as cautions may lead to major results depending on the situation. In any case, important information that must be observed is described.

## For Safe Operations





### 1. Prevention of electric shocks

#### **WARNING**

-  Never open the front case or terminal covers while the power is ON or the unit is running, as this may lead to electric shocks.
-  Never run the unit with the front case or terminal cover removed. The high voltage terminal and charged sections will be exposed and may lead to electric shocks.
-  Never open the front case or terminal cover at times other than wiring work or periodic inspections even if the power is OFF. The insides of the control unit and servo amplifier are charged and may lead to electric shocks.
-  When performing wiring work or inspections, turn the power OFF, wait at least ten minutes, and then check the voltage with a tester, etc. Failing to do so may lead to electric shocks.
-  Always ground the control unit, servo amplifier and servomotor with Class 3 grounding. Do not ground commonly with other devices.
-  The wiring work and inspections must be done by a qualified technician.
-  Wire the units after installing the control unit, servo amplifier and servomotor. Failing to do so may lead to electric shocks or damage.
-  Never operate the switches with wet hands, as this may lead to electric shocks.
-  Do not damage, apply excessive stress, place heavy things on or sandwich the cables, as this may lead to electric shocks.
-  Do not touch the control unit, servo amplifier or servomotor terminal blocks while the power is ON, as this may lead to electric shocks.
-  Do not touch the internal power supply, internal grounding or signal wires of the control unit and servo amplifier, as this may lead to electric shocks.







### 2. For fire prevention

#### **CAUTION**

-  Install the control unit, servo amplifier, servomotor and regenerative resistor on inflammable material. Direct installation on flammable material or near flammable material may lead to fires.
-  If a fault occurs in the control unit or servo amplifier, shut the power OFF at the servo amplifier's power source. If a large current continues to flow, fires may occur.
-  When using a regenerative resistor, shut the power OFF with an error signal. The regenerative resistor may abnormally overheat due to a fault in the regenerative transistor, etc., and may lead to fires.
-  Always take heat measures such as flame proofing for the inside of the control panel where the servo amplifier or regenerative resistor is installed and for the wires used. Failing to do so may lead to fires.

### 3. For injury prevention

#### CAUTION

-  Do not apply a voltage other than that specified in the instruction manual on any terminal. Doing so may lead to destruction or damage.
-  Do not mistake the terminal connections, as this may lead to destruction or damage.
-  Do not mistake the polarity (+/-), as this may lead to destruction or damage.
-  The servo amplifier's heat radiating fins, regenerative resistor and servo amplifier, etc., will be hot while the power is ON and for a short time after the power is turned OFF. Do not touch these parts as doing so may lead to burns.
-  Always turn the power OFF before touching the servomotor shaft or coupled machines, as these parts may lead to injuries.
-  Do not go near the machine during test operations or during operations such as teaching. Doing so may lead to injuries.














### 4. Various precautions

Strictly observe the following precautions.





Mistaken handling of the unit may lead to faults, injuries or electric shocks.

#### (1) System structure

#### CAUTION













-  Always install a leakage breaker on the control unit and servo amplifier power source.
-  If installation of a magnetic contactor for power shut off during an error, etc., is specified in the instruction manual for the servo amplifier, etc., always install the magnetic contactor.
-  Install an external emergency stop circuit so that the operation can be stopped immediately and the power shut off.
-  Use the control unit, servo amplifier, servomotor and regenerative resistor with the combinations listed in the instruction manual. Other combinations may lead to fires or faults.
-  If safety standards (ex., robot safety rules, etc.) apply to the system using the control unit, servo amplifier and servomotor, make sure that the safety standards are satisfied.
-  If the operation during a control unit or servo amplifier error and the safety direction operation of the control unit differ, construct a countermeasure circuit externally of the control unit and servo amplifier.
-  In systems where coasting of the servomotor will be a problem during emergency stop, servo OFF or when the power is shut OFF, use dynamic brakes.
-  Make sure that the system considers the coasting amount even when using dynamic brakes.
-  In systems where perpendicular shaft dropping may be a problem during emergency stop, servo OFF or when the power is shut OFF, use both dynamic brakes and magnetic brakes.
-  The dynamic brakes must be used only during emergency stop and errors where servo OFF occurs. These brakes must not be used for normal braking.
-  The brakes (magnetic brakes) assembled into the servomotor are for holding applications, and must not be used for normal braking.
-  Construct the system so that there is a mechanical allowance allowing stopping even if the stroke end limit switch is passed through at the max. speed.
-  Use wires and cables that have a wire diameter, heat resistance and bending resistance compatible with the system.

 **CAUTION**

-  Use wires and cables within the length of the range described in the instruction manual.
-  The ratings and characteristics of the system parts (other than control unit, servo amplifier, servomotor) must be compatible with the control unit, servo amplifier and servomotor.
-  Install a cover on the shaft so that the rotary parts of the servomotor are not touched during operation.
-  There may be some cases where holding by the magnetic brakes is not possible due to the life or mechanical structure (when the ball screw and servomotor are connected with a timing belt, etc.). Install a stopping device to ensure safety on the machine side.



















## (2) Parameter settings and programming

 **CAUTION**

-  Set the parameter values to those that are compatible with the control unit, servo amplifier, servomotor and regenerative resistor model and the system application. The protective functions may not function if the settings are incorrect.
-  The regenerative resistor model and capacity parameters must be set to values that conform to the operation mode, servo amplifier and servo power unit. The protective functions may not function if the settings are incorrect.
-  Set the mechanical brake output and dynamic brake output validity parameters to values that are compatible with the system application. The protective functions may not function if the settings are incorrect.
-  Set the stroke limit input validity parameter to a value that is compatible with the system application. The protective functions may not function if the setting is incorrect.
-  Set the servomotor encoder type (increment, absolute position type, etc.) parameter to a value that is compatible with the system application. The protective functions may not function if the setting is incorrect.
-  Set the servomotor capacity and type (standard, low-inertia, flat, etc.) parameter to values that are compatible with the system application. The protective functions may not function if the settings are incorrect.
-  Set the servo amplifier capacity and type parameters to values that are compatible with the system application. The protective functions may not function if the settings are incorrect.
-  Use the program commands for the program with the conditions specified in the instruction manual.
-  Set the sequence function program capacity setting, device capacity, latch validity range, I/O assignment setting, and validity of continuous operation during error detection to values that are compatible with the system application. The protective functions may not function if the settings are incorrect.
-  Some devices used in the program have fixed applications, so use these with the conditions specified in the instruction manual.
-  The input devices and data registers assigned to the link will hold the data previous to when communication is terminated by an error, etc. Thus, an error correspondence interlock program specified in the instruction manual must be used.
-  Use the interlock program specified in the special function unit's instruction manual for the program corresponding to the special function unit.

### (3) Transportation and installation

#### CAUTION

-  Transport the product with the correct method according to the weight.
-  Use the servomotor suspension bolts only for the transportation of the servomotor. Do not transport the servomotor with machine installed on it.
-  Do not stack products past the limit.
-  When transporting the control unit or servo amplifier, never hold the connected wires or cables.
-  When transporting the servomotor, never hold the cables, shaft or detector.
-  When transporting the control unit or servo amplifier, never hold the front case as it may fall off.
-  When transporting, installing or removing the control unit or servo amplifier, never hold the edges.
-  Install the unit according to the instruction manual in a place where the weight can be withstood.
-  Do not get on or place heavy objects on the product.
-  Always observe the installation direction.
-  Keep the designated clearance between the control unit or servo amplifier and control panel inner surface or the control unit and servo amplifier, control unit or servo amplifier and other devices.
-  Do not install or operate control units, servo amplifiers or servomotors that are damaged or that have missing parts.
-  Do not block the intake/outtake ports of the servomotor with cooling fan.
-  Do not allow conductive matter such as screw or cutting chips or combustible matter such as oil enter the control unit, servo amplifier or servomotor.
-  The control unit, servo amplifier and servomotor are precision machines, so do not drop or apply strong impacts on them.
-  Securely fix the control unit and servo amplifier to the machine according to the instruction manual. If the fixing is insufficient, these may come off during operation.
-  Always install the servomotor with reduction gears in the designated direction. Failing to do so may lead to oil leaks.
-  Store and use the unit in the following environmental conditions.

Environment	Conditions	
	Control unit/servo amplifier	Servomotor
Ambient temperature	0°C to +55°C (With no freezing)	0°C to +40°C (With no freezing)
Ambient humidity	According to each instruction manual.	80%RH or less (With no dew condensation)
Storage temperature	According to each instruction manual.	-20°C to +65°C
Atmosphere	Indoors (where not subject to direct sunlight). No corrosive gases, flammable gases, oil mist or dust must exist.	
Altitude	1000m (305 Feet) or less above sea level.	
Vibration	According to each instruction manual.	

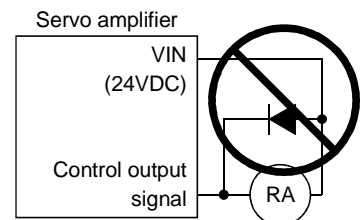
**⚠ CAUTION**

- ⚠ When coupling with the synchronization encoder or servomotor shaft end, do not apply impact such as by hitting with a hammer. Doing so may lead to detector damage.
- ⚠ Do not apply a load larger than the tolerable load onto the servomotor shaft. Doing so may lead to shaft breakage.
- ⚠ When not using the unit for a long time, disconnect the power line from the control unit or servo amplifier.
- ⚠ Place the control unit and servo amplifier in static electricity preventing vinyl bags and store.
- ⚠ When storing for a long time, contact the Service Center or Service Station.

**(4) Wiring**

**⚠ CAUTION**

- ⚠ Correctly and securely wire the wires. Reconfirm the connections for mistakes and the terminal screws for tightness after wiring. Failing to do so may lead to run away of the servomotor.
- ⚠ After wiring, install the protective covers such as the terminal covers to the original positions.
- ⚠ Do not install a phase advancing capacitor, surge absorber or radio noise filter (option FR-BIF) on the output side of the servo amplifier.
- ⚠ Correctly connect the output side (terminals U, V, W). Incorrect connections will lead the servomotor to operate abnormally.
- ⚠ Do not connect a commercial power supply to the servomotor, as this may lead to trouble.
- ⚠ Do not mistake the direction of the surge absorbing diode installed on the DC relay for the control signal output of brake signals, etc. Incorrect installation may lead to signals not being output when trouble occurs or the protective functions not functioning.
- ⚠ Do not connect or disconnect the connection cables between each unit, the encoder cable or sequence expansion cable while the power is ON.
- ⚠ Securely tighten the cable connector fixing screws and fixing mechanisms. Insufficient fixing may lead to the cables combing off during operation.
- ⚠ Do not bundle the power line or cables.



**(5) Trial operation and adjustment**

**⚠ CAUTION**

- ⚠ Confirm and adjust the program and each parameter before operation. Unpredictable movements may occur depending on the machine.
- ⚠ Extreme adjustments and changes may lead to unstable operation, so never make them.
- ⚠ If the absolute positioning system is used, home position return is required after initial start up or after replacement of a controller or absolute positioning compatible motor.

## (6) Usage methods

### ⚠ CAUTION

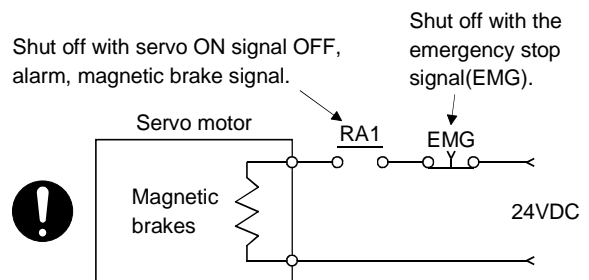
- ⚠ Immediately turn OFF the power if smoke, abnormal sounds or odors are emitted from the control unit, servo amplifier or servomotor.
- ⚠ Always execute a test operation before starting actual operations after the program or parameters have been changed or after maintenance and inspection.
- ⚠ The units must be disassembled and repaired by a qualified technician.
- ⚠ Do not make any modifications to the unit.
- ⚠ Keep the effect of magnetic obstacles to a minimum by installing a noise filter or by using wire shields, etc. Magnetic obstacles may affect the electronic devices used near the control unit or servo amplifier.
- ⚠ Use the units with the following conditions.

Item	Conditions
Input power	According to the separate instruction manual.
Input frequency	According to the separate instruction manual.
Tolerable momentary power failure	According to the separate instruction manual.

## (7) Remedies for errors

### ⚠ CAUTION

- ⚠ If an error occurs in the self diagnosis of the control unit or servo amplifier, confirm the check details according to the instruction manual, and restore the operation.
- ⚠ If a dangerous state is predicted in case of a power failure or product failure, use a servomotor with magnetic brakes or install a brake mechanism externally.
- ⚠ Use a double circuit construction so that the magnetic brake operation circuit can be operated by emergency stop signals set externally.
- ⚠ If an error occurs, remove the cause, secure the safety and then resume operation.
- ⚠ The unit may suddenly resume operation after a power failure is restored, so do not go near the machine. (Design the machine so that personal safety can be ensured even if the machine restarts suddenly.)









## (8) Maintenance, inspection and part replacement

### ⚠ CAUTION

- ⚠ Perform the daily and periodic inspections according to the instruction manual.
- ⚠ Perform maintenance and inspection after backing up the program and parameters for the control unit and servo amplifier.
- ⚠ Do not place fingers or hands in the clearance when opening or closing any opening.
- ⚠ Periodically replace consumable parts such as batteries according to the instruction manual.






 **CAUTION**

-  When replacing the control unit or servo amplifier, always set the new unit settings correctly.
-  To prevent positional displacements after a controller or absolute positioning compatible motor is replaced, use one of the following methods to conduct home position return.
  - 1) PC write the servo data with the peripheral device, turn the power OFF and back ON, then conduct home position return.
  - 2) Use the peripheral device back-up functions to load the data backed up before replacement.
-  After maintenance and inspections are completed, confirm that the position detection of the absolute position detector function is correct.
-  Do not short circuit, charge, overheat, incinerate or disassemble the batteries.
-  The electrolytic capacitor will generate gas during a fault, so do not place your face near the control unit or servo amplifier.
-  The electrolytic capacitor and fan will deteriorate. Periodically change these to prevent secondary damage from faults. Replacements can be made by the Service Center or Service Station.



**(9) Disposal**

 **CAUTION**

-  Dispose of this unit as general industrial waste.
-  Do not disassemble the control unit, servo amplifier or servomotor parts.
-  Dispose of the battery according to local laws and regulations.

**(10) General cautions**

 **CAUTION**

-  All drawings provided in the instruction manual show the state with the covers and safety partitions removed to explain detailed sections. When operating the product, always return the covers and partitions to the designated positions, and operate according to this manual.
-  Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment. All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples. Owing to the very great variety in possible applications of this equipment, you must satisfy yourself as to its suitability for your specific application.

# Revisions

\*The manual number is given on the bottom left of the back cover.

Print Date	*Manual Number	Revision
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<b>24. CAMPE ERROR MESSAGES .....</b>	<b>24 - 1</b>
---------------------------------------	---------------



# **GENERAL INFORMATION**

# 1. GENERAL DESCRIPTION

---

## 1. GENERAL DESCRIPTION

(1) This manual describes the software packages which set the data and create the programs required for positioning control by the SV22 motion controller.

(a) Software packages to set data for PCPU and SCPU programs

SW2SRX-GSV22PE software package

In this manual, the software package above is referred to as GSV22PE.

(b) Software packages to set cam data

SW0IX-CAMPE software package

In this manual, the software package above is referred to as CAMPE.

(c) Software packages for installation

The following OS (operating systems) are available for positioning with the SV22 motion controller:

1) SW2SRX-SV22LE

2) SW0SRX-SV22CE

3) SW0SRX-SV22FE

4) SW2SRX-SV22JE




5) SW2SRX-SV22UE

..... Hereafter "SV22"

In this manual, the software packages to install OS 1) through 5) above are referred to as SV22.

(2) Except when otherwise specified, the screens shown in this manual are for the A273UHCPU (8-axis specification).

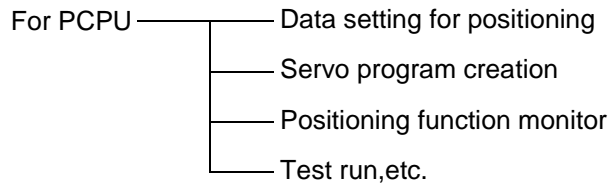
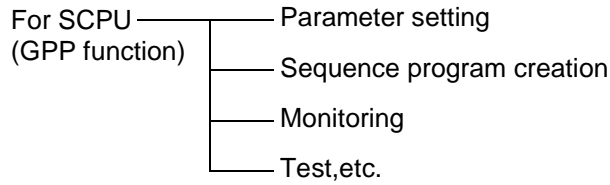
 <b>CAUTION</b>
--

- |  |
|--|
| <p> All settings and control procedures should be executed within the ranges specified in this manual.</p> <p> In order to prevent servo system CPU problems, an external safety circuit should be installed.</p> <p> As some of the components mounted on the PCBs (printed circuit boards) are susceptible to static electricity, either the work table or the worker should be grounded when handling the PCBs. The PCB conductive areas and electrical components should not be touched directly.</p> |
|--|

# 1. GENERAL DESCRIPTION

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- (3) The following equipment started up with GSV22PE:
- IBM PC/AT computer running PC-DOS V5.0, or above (hereafter referred to as "IBM PC");
- offers the following functions:  
(Hereafter the hardware listed above is referred to as the "personal computer".)



IBM PC/AT is a registered trademark of International Business Machines Corporation.

The GSV22PE allows programming and monitoring in the mechanical system support language to allow synchronizing mechanisms on the main shaft to be replaced by a servomotor.

- (4) A computer started up with CAMPE allows cam data to be set to set up cams as a synchronizing mechanism.
- (5) The A171SCPU/A171SHCPU/A172SHCPU/A273UHCPU (hereafter referred to as "servo system CPU") comes with the following OS.

CPU type	OS
A171SCPU	SV42L
A171SHCPU	Not installed
A172SHCPU	Not installed
A273UHCPU	Not installed

Install the OS used for positioning control from the INSTALL floppy disk to the servo system CPU.

# 1. GENERAL DESCRIPTION

(6) This manual comprises the following three sections:

**GENERAL INFORMATION**

Describes items common for GSV22PE and CAMPE operation.

**SERVO-RELATED INFORMARION**

Describes how to create positioning data and servo programs using GSV22PE.

**CAM DATA SETTING**

Describes the operations to set cam data using CAMPE.

An understanding of the main features in all three sections is required before using this manual

Concerning the GPP function, refer to the SW0IX-GPPAE Operation Manual (IB-66314).

<b>POINT</b>	With regard to the GPP function and SFC function, only functions equivalent to SW1[ ][ ]-GPPA can be supported. Additional functions outside the range available with SW2[ ][ ]-GPPA cannot be supported.
--------------	---

<b>IMPORTANT</b>	<p>(1) GSV22PE and CAMPE are dedicated software packages for the servo system CPU.</p> <p>(2) Before conducting GV22PE ONLINE mode operation, verify the name of the positioning OS registered at the servo system CPU. (When A273UHCPU is used) To verify the name of the positioning OS, press the indicator "reset" button on the front panel of the servo system CPU. The name and version of the positioning OS registered at the servo system CPU is indicated at the LED display as shown below. LED display for A273UHCPU with SV22 registered:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; padding: 2px;">S</td> <td style="border: 1px solid black; padding: 2px;">V</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;"> </td> <td style="border: 1px solid black; padding: 2px;"> </td> <td style="border: 1px solid black; padding: 2px;"> </td> <td style="border: 1px solid black; padding: 2px;">V</td> <td style="border: 1px solid black; padding: 2px;">E</td> <td style="border: 1px solid black; padding: 2px;">R</td> <td style="border: 1px solid black; padding: 2px;">.</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">A</td> </tr> <tr> <td colspan="6" style="text-align: center;">OS name</td> <td colspan="7" style="text-align: center;">Version</td> </tr> </table> <p>(When A171SCPU/A171SHCPU/A172SHCPU is used) Turn the A171SCPU/A171SHCPU/A172SHCPU "install" switch ON. (See A171SCPU user's manual IB-67276, A172SHCPU/A171SHCPU user's manual IB-67395) Run the installation functions from GSV22PE.</p> <pre> [ Servo function selection window ] → [ 8 ] → [ Installation function selection window ] → [ 1 ]     </pre> <p>The name and version of the positioning OS registered at the servo system CPU will be displayed on-screen.</p> <p>(3) Installation of GSV22PE/CAMPE requires 13Mbytes on the computer hard disk. Check that 13Mbytes is free on the hard disk before commencing installation.</p>	S	V	2	2				V	E	R	.	0	0	A	OS name						Version						
S	V	2	2				V	E	R	.	0	0	A															
OS name						Version																						

# 1. GENERAL DESCRIPTION

---

[Shipping Container Contents]

The following items are shipped together with the GSV22PE package.

Item	Name
Software package	SW2SRX-GSV22PE - 1 to 9

The following items are shipped together with the SW0IX-CAMPE package.

Item	Name
Software package	SW0IX-CAMPE

## REMARK

The abbreviations used in this manual are listed in the table below.

Name	Abbreviation
A172SHCPU/A171SHCPU/A171SCPU module	A17[ ]CPU
A273UHCPU module	A273UHCPU
Operating system	OS
Hard disk	HD
Floppy disk	FD
SW0IX-GPPAE GPP function software package	GPP
AC motor drive module	ADU
MR-H-B/MR-J-B/MR-J2-B servo amplifier	MR-[ ]-B
Dynamic brake module	DY
Capacitor module	CU

# 1. GENERAL DESCRIPTION

---

## 1.1 Features

The features of GSV22PE/CAMPE are listed below.

- (1) Control of up to 32 axes (A273UHCPU (32-axis specification))  
An A273UHCPU used with an extension base unit permits servomotors to be controlled on up to 32 axes.
- (2) Innovative programming environment  
The mechanical system support language achieves the control of synchronized machine movements simply by positioning virtual mechanical modules on a virtual main shaft on the CRT display.  
Of course, positioning data and programs can also be created for control using conventional, real machine mechanisms.
- (3) Set mechanical system programs and cam data  
Create mechanical system programs for synchronization control by using the mouse to combine software mechanical modules.  
In addition, cam data (cam curves) can be set to permit movements equivalent to movements under conventional mechanical cam control.
- (4) Data settings which enable feed forward control can be designated.  
A feed forward coefficient can be designated which minimizes the servo motor's follow-up error.
- (5) Direct mutual switching to sequence programs is possible while creating positioning programs.  
Switching to the ladder programming mode is possible while positioning programs(servo programs) are being created by servo instructions.  
The sequence program required to start a newly created servo program can be created simultaneously with the servo program.
- (6) Direct mutual switching to a PC test is possible during test runs.  
Switching to the PC test is possible from the servo test mode. Refer to the results of the test operation to check the wiring and debug sequence programs.
- (7) Direct mutual switching to the ladder monitor is possible during servo PC / servo monitoring.  
Switching to the ladder monitor is possible while in the servo PC/servo monitor mode.  
The status of the sequence ladder used to start the servo program can therefore be monitored while checking the positioning data and/or errors.
- (8) Positioning data and servo program settings can be designated in an interactive manner.  
Creation and revision of positioning data and servo programs is possible by either selecting the desired on-screen item, or by entering the desired setting value.

# 1. GENERAL DESCRIPTION

---

## 1.2 Upgraded Functions

The functions newly added or upgraded from the previous version are described below.

- (1) Addition of the function to change the present value in one-turn of the cam-axis in the virtual mode  
The CHGA instruction, specified in a sequence program during the virtual mode operation, permits the present value in one-turn of the cam-axis to be changed.
- (2) Addition of indirect designation for gear ratio in the mechanical system program  
For the setting of the gear ratio in the mechanical system program, indirect designation is possible by using D and W in addition to the designation with a constant.
- (3) Addition of high-speed data read function  
The function to read out up to 11 kinds of data simultaneously to the designated device is added. The signal input from the input module which is mounted to the motion controller base is used as the trigger for reading processing. 11 kinds of data are specified among a total of 16 kinds of data including present position data, deviation counter data, etc.
- (4) Addition of the function to cancel and start the servo program presently executed  
By entering the cancel function to a servo program, it is possible to decelerate and stop an axis movement in response to turning ON of the cancel signal (designated bit device) during the execution of a servo program.  
If the start function is designated with the cancel function, the designated servo program automatically starts after the stop.
- (5) Upgraded constant speed control instruction  
The following three functions are added.
  - (a) Skip function  
By setting a skip signal (designated bit device) at pass points, it is possible to interrupt positioning at the pass point for which the skip signal is turned ON and to execute positioning at the next point.
  - (b) FIN signal wait function  
By designating the FIN signal wait function with an M code set for pass points, the function synchronizes the completion of positioning at individual pass points with turning ON of the FIN signal.
  - (c) Circular interpolation function using CPSTART3 and CPSTART4  
Circular interpolation in two axes is made possible.
- (6) Compatibility with MR-J2-B servo amplifier
- (7) Improved management of present value when using an absolute encoder (see Section 1.2.1)

# 1. GENERAL DESCRIPTION

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## 1.2.1 Improved present value management

By adding the functions described below, present value management when using an absolute encoder has been improved.

(1) Added functions

(a) An encoder data validity check is now possible during operation.

- It is checked whether the amount of change at the encoder in 3.5 ms intervals corresponds to rotation within 180° at the motor shaft. (If abnormal, an error is displayed.)
- Consistency between the encoder data and the feedback position controlled at the servo amplifier is checked. (If abnormal, an error is displayed.)

(b) Addition of the present value history monitor has enabled monitoring of the following data at a peripheral device.

- Encoder present value/servo command value/monitor present value when the power is switched ON.
- Encoder present value/servo command value/monitor present value when the power is switched OFF.
- Encoder present value/servo command value/monitor present value when a home position return is performed.

(c) By setting the allowable travel while the power is OFF, a change in the encoder data to a value outside the setting range while the power is OFF can now be checked when the servo amplifier power is turned ON. (If abnormal, an error is displayed.)



# 1. GENERAL DESCRIPTION

## 1.3 Real Mode and Virtual Mode

The servo system CPU allows positioning control in:

- the real mode, and
- the virtual mode.

The real mode allows direct control with servo programs of servomotors connected to AC motor drive modules (ADU) or MR-[ ] -B.

The virtual mode allows servo program control of servomotors in the mechanical system created using mechanical modules.

This makes it easy to replace a mechanism using a main shaft for synchronized operation with a servomotor.

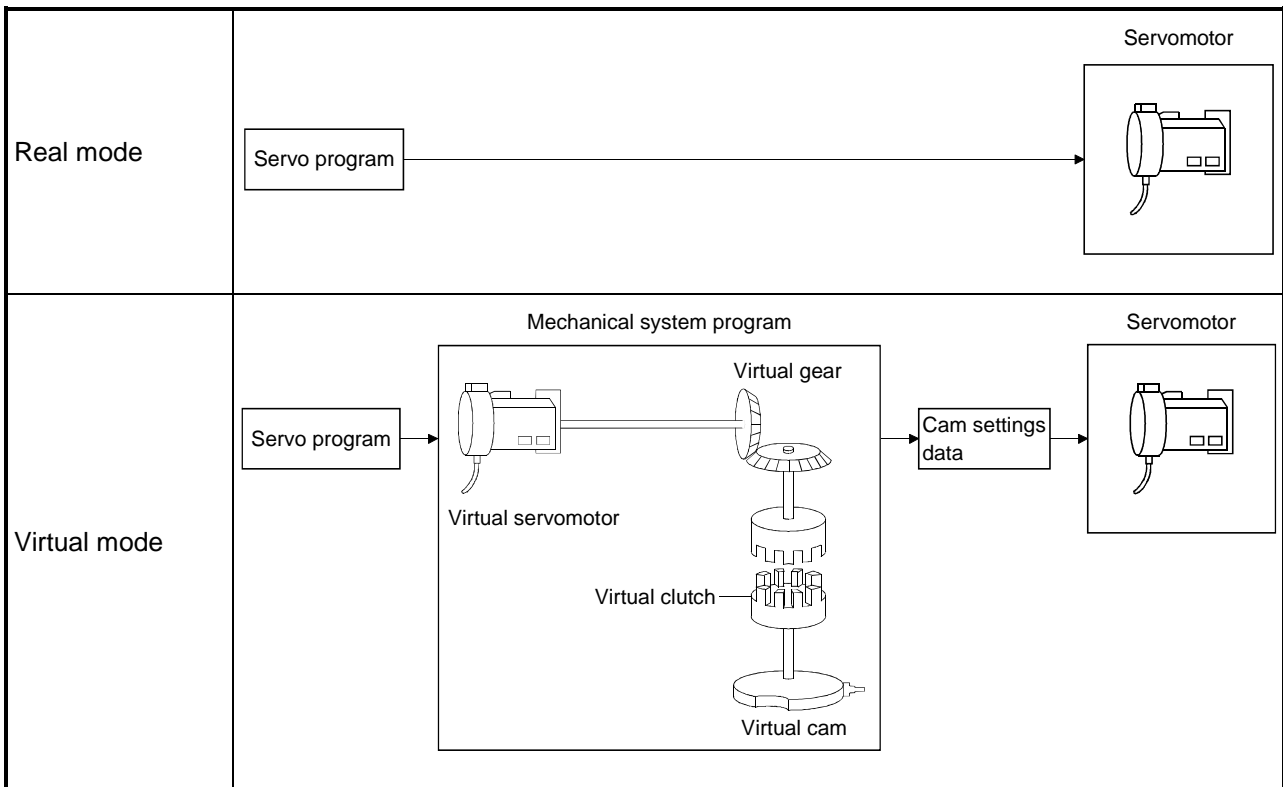


Fig. 1.1 Real Mode and Virtual Mode

# 1. GENERAL DESCRIPTION

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The following data settings and programs are required in GSV22PE/CAMPE for servo system CPU positioning control in the real mode and virtual mode.

- (1) GSV22PE control in real mode
  - System settings data
  - Fixed parameter settings data
  - Home position return
  - Jog operation data
  - Parameter block data
  - Limit switch setting data
  - Servo program
  
- (2) GSV22PE control in virtual mode
  - System settings data\*
  - Fixed parameter settings data\*
  - Home position return data\*
  - JOG operation data\*
  - Parameter block data\*
  - Limit switch setting data
  - Servo program
  - Mechanical system program
  - Cam data

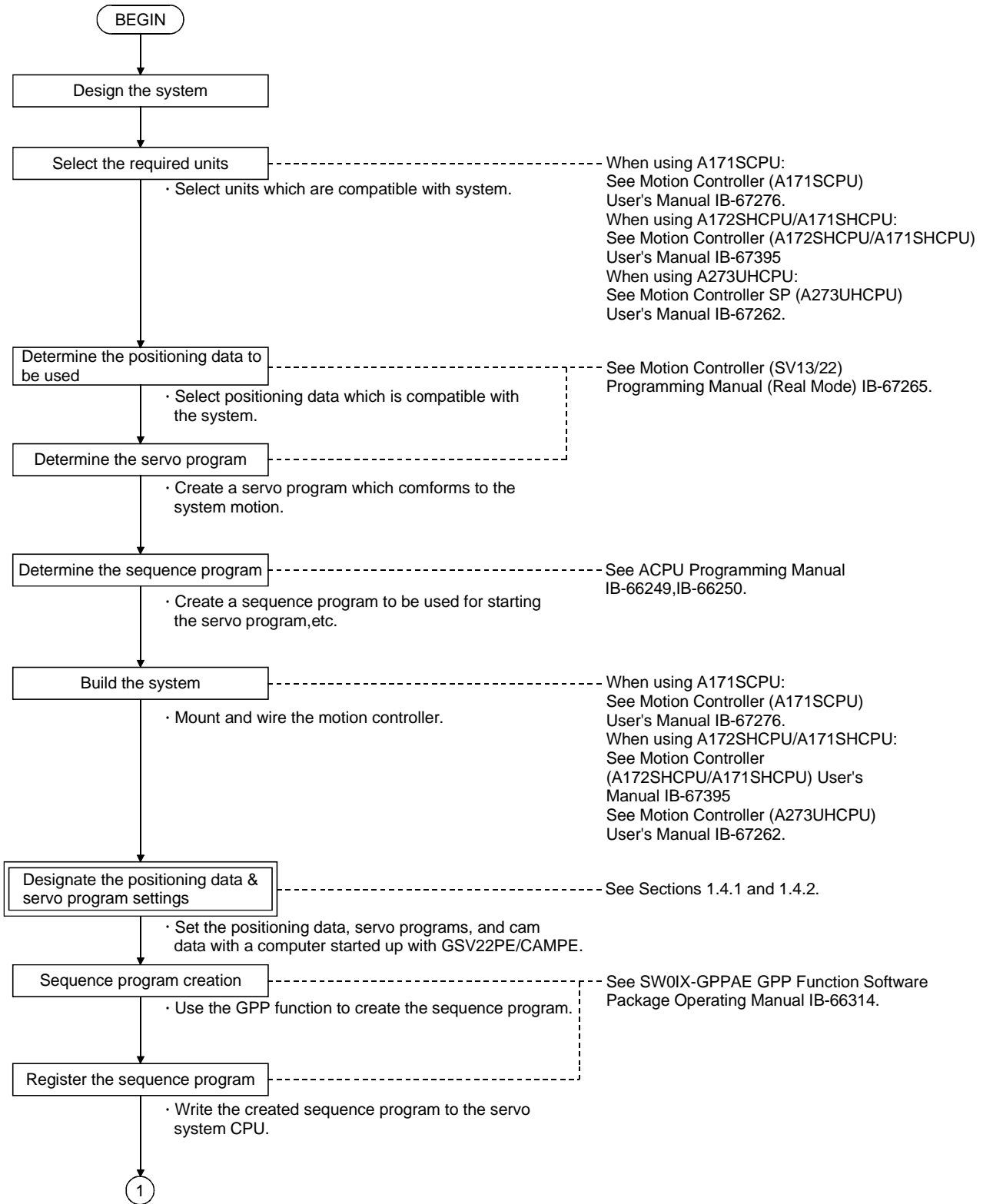
<b>REMARKS</b>
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- (1) Setting cam data  
It is only necessary to set cam data settings with CAMPE if a cam is set as the output module in the mechanical system.
- (2) The data marked with an asterisk (\*) are used in the real mode before switching to the virtual mode.

# 1. GENERAL DESCRIPTION

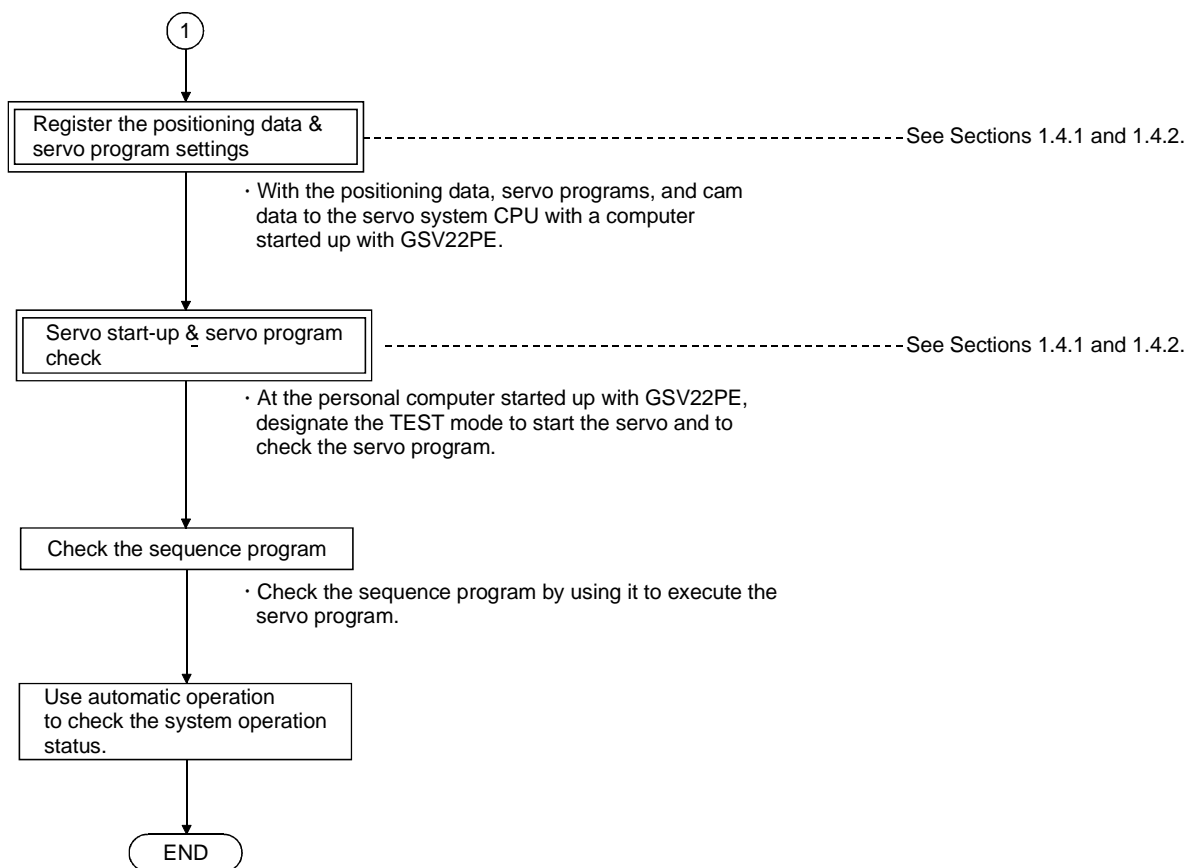
## 1.4 Procedural Flowchart to System Start

The following flowchart shows the procedure for starting the designed system.



# 1. GENERAL DESCRIPTION

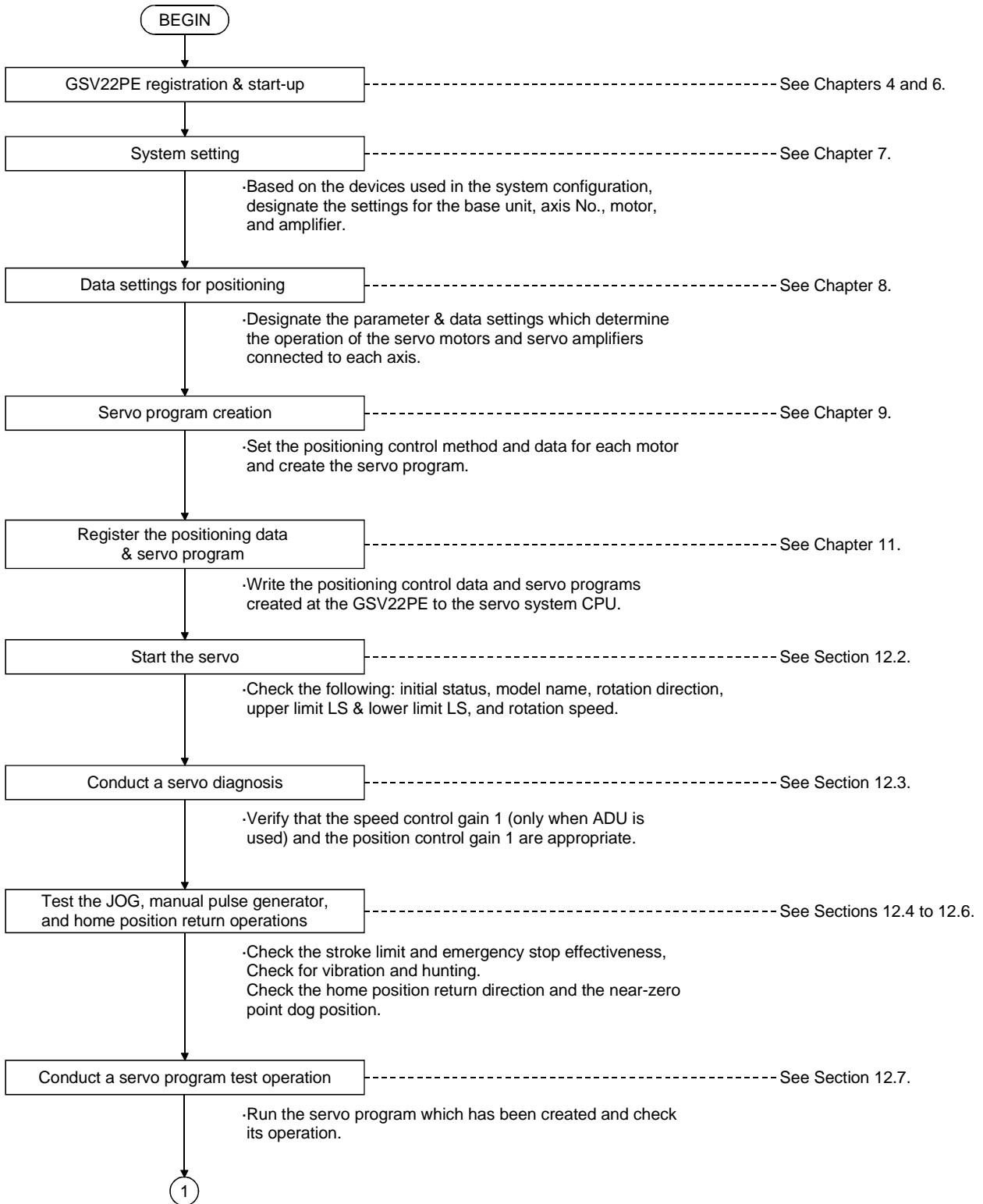
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# 1. GENERAL DESCRIPTION

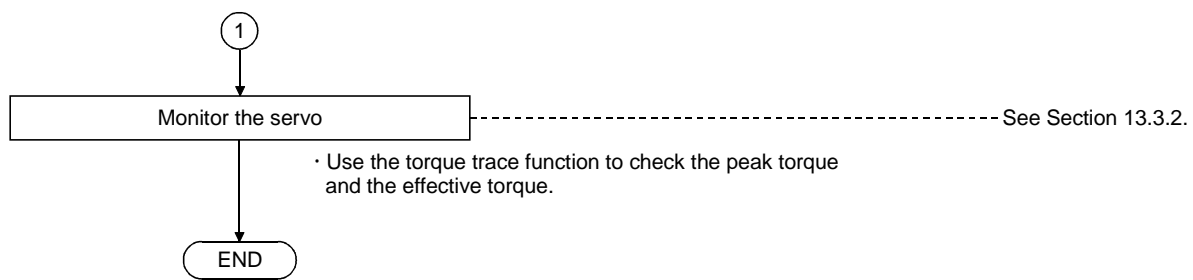
## 1.4.1 Procedural flowchart for the GSV22PE (in real mode)

The basic GSV22PE operations in real mode are shown in the flowchart below.



# 1. GENERAL DESCRIPTION

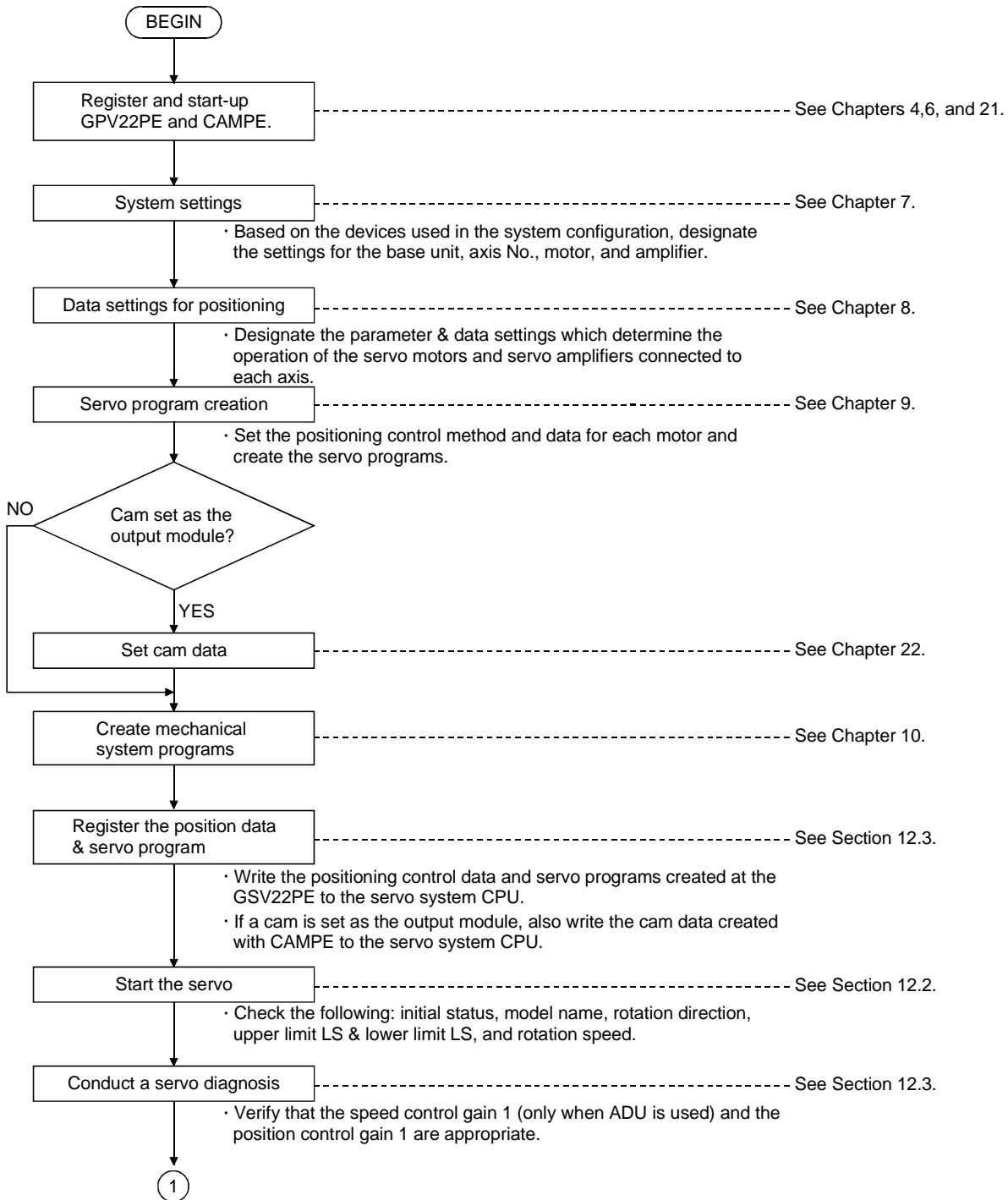
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# 1. GENERAL DESCRIPTION

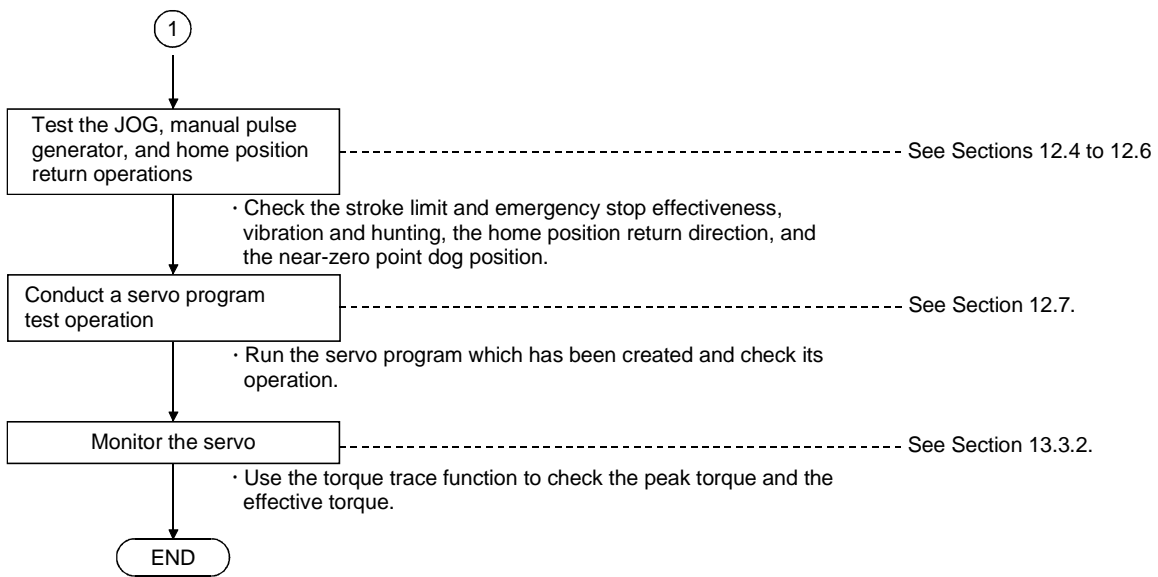
## 1.4.2 Procedural flowchart for the GSV22PE and CAMPE (in virtual mode)

The basic GSV22PE and CAMPE operations in virtual mode are shown in the flowchart below.



# 1. GENERAL DESCRIPTION

---



\*Home position return must be completed in real mode before switching to virtual mode.



## 2. SYSTEM CONFIGURATION

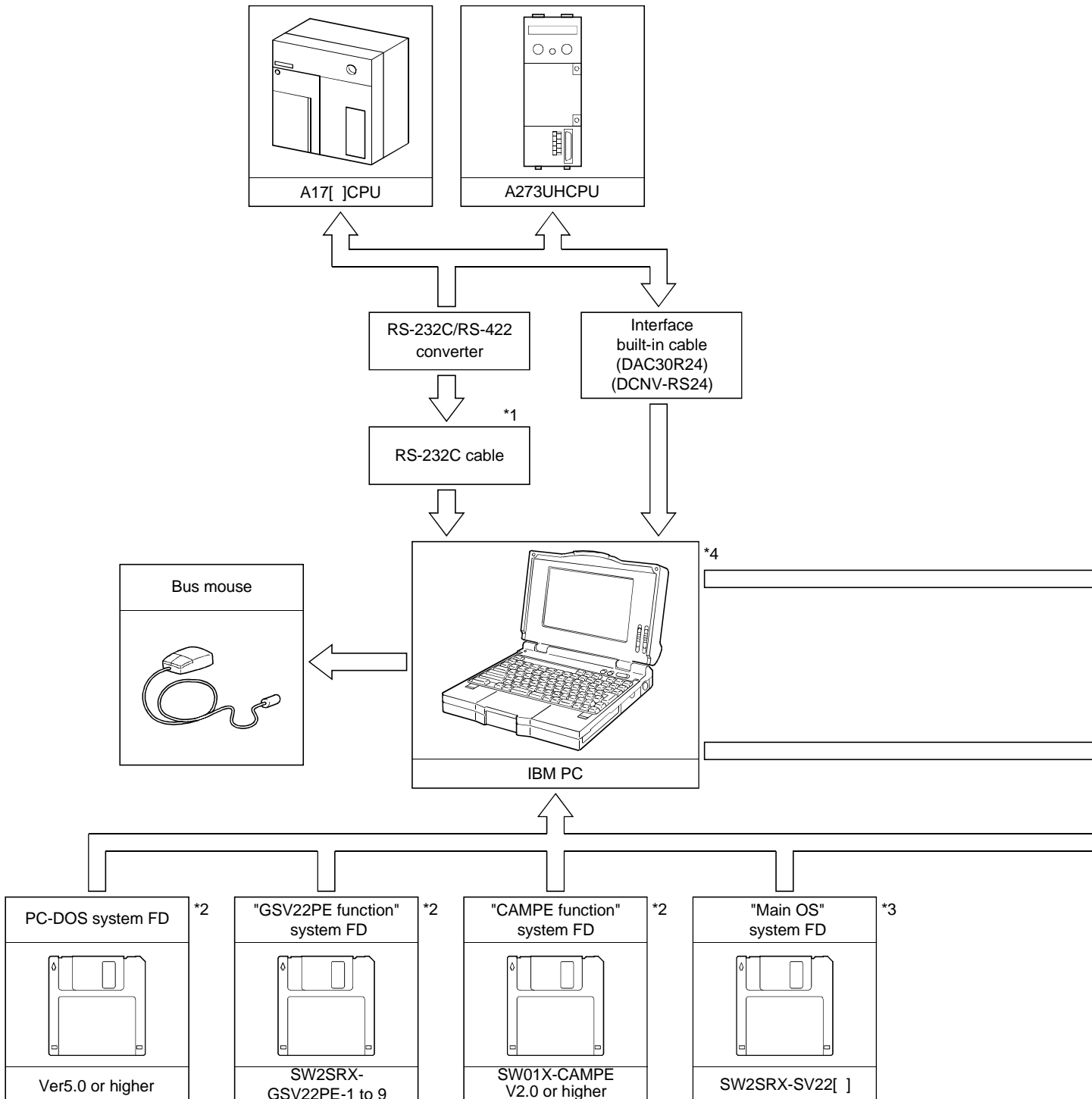
### 2. SYSTEM CONFIGURATION

This chapter describes the system configuration and cautions about the system configuration when using GSV22PE and CAMPE.

#### 2.1 System Configuration

##### 2.1.1 System configuration when IBM PC is used

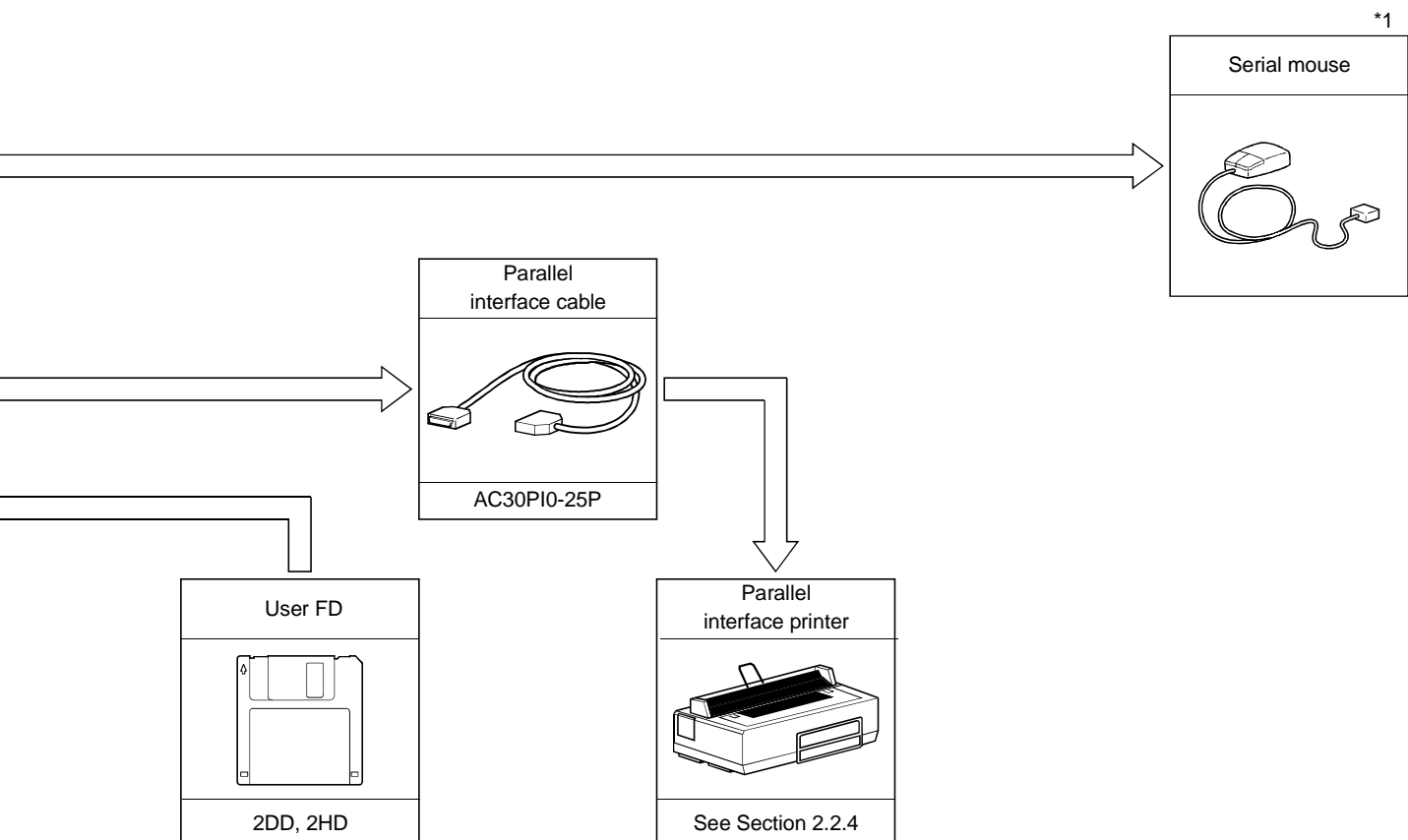
The system configuration for using GSV22PE and CAMPE with an IBM PC is shown below.



## 2. SYSTEM CONFIGURATION

### POINTS

- (1) \*1: A personal computer or serial mouse can be connected to the RS-232C interface.
- (2) \*2: The PC-DOS system FDs, and the "GSV22PE function" system FD data are to be installed at the IBM PC.
- (3) \*3: The main OS system FD is inserted in the floppy disk drive for installation to the servo system CPU.
- (4) \*4: Operation environment is indicated below.  
CPU :80386 or above  
Free main memory area :560 KB or more  
EMS memory :1 MB or more  
At the start of GSV22PE, the hard disk must have at least 1 MB free area.



## 2. SYSTEM CONFIGURATION

### 2.2 Further Information Regarding the System Configuration

Further information regarding the system configuration for GSV22PE operation is given below.

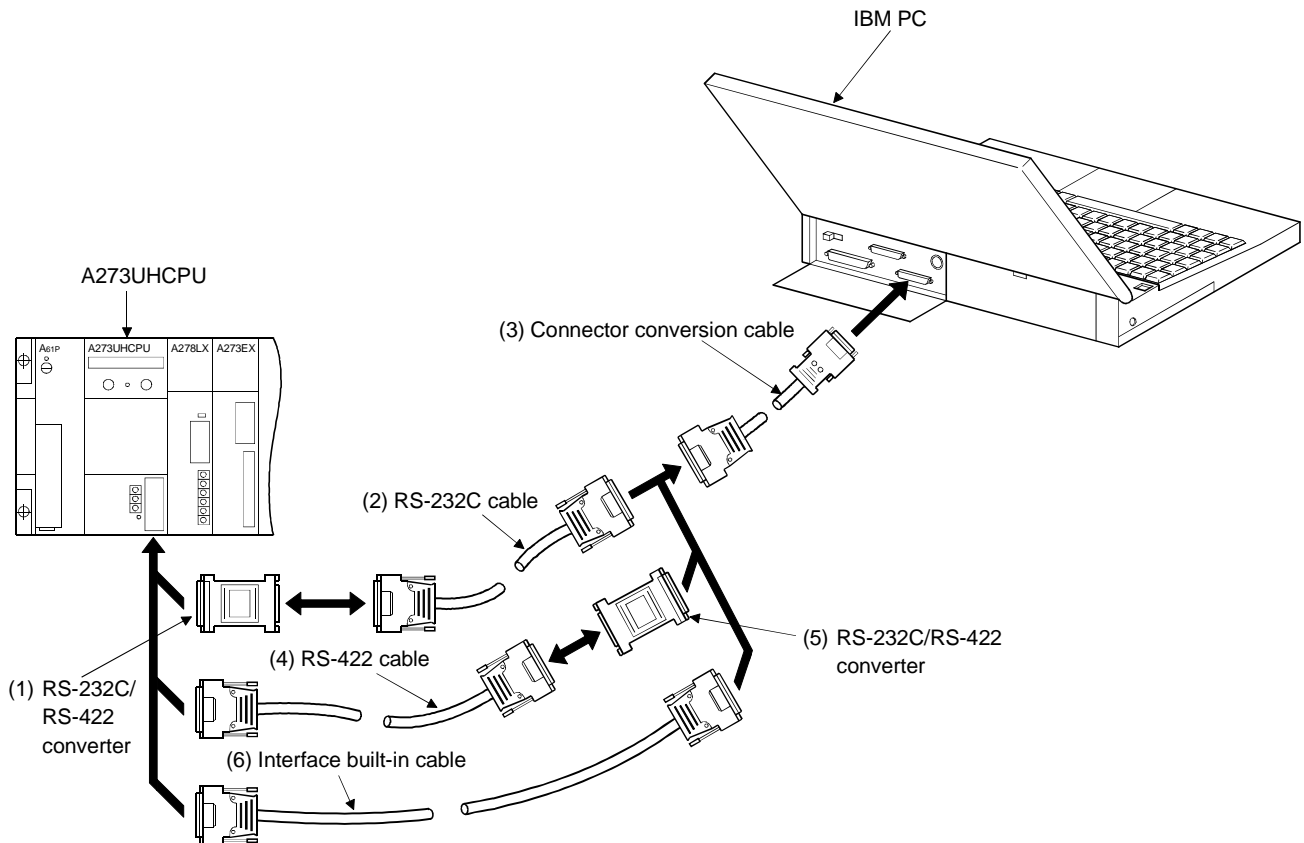
#### 2.2.1 Applicable CPU

GSV22PE and CAMPE can be used with the following CPUs.

Peripheral Software Package	OS	CPU
SW2SRX-GSV22PE SW0IX-CAMPE	SW2SRX-SV22L	A171S
	SW0SRX-SV22C	A172SH
	SW0SRX-SV22F	A171SH
	SW2SRX-SV22J	A273UH (8-axis specification)
	SW2SRX-SV22U	A273UH (32-axis specification)

#### 2.2.2 Personal computer & servo system CPU connection method

(1) IBM-PC & servo system CPU connection method

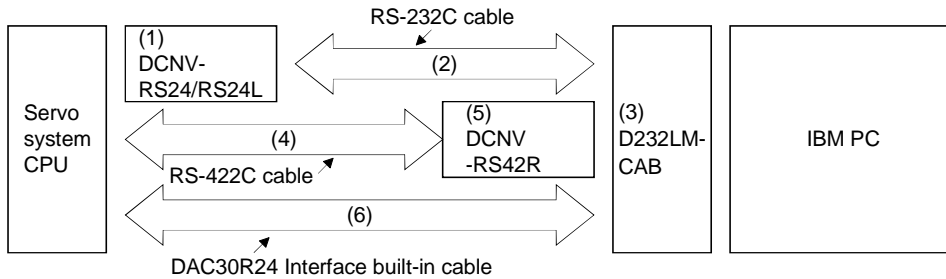


## 2. SYSTEM CONFIGURATION

### REMARK

The following converters are recommended in the IBM-PC and servo system CPU connection.

- (1) DCNV-RS24 ([1]) Diatrend Co., Osaka, Japan
- DCNV-RS24L (with operation indicators) ([1])
- D232LM-CAB ([3])
- DCNV-RS42R ([5])
- DAC30R24 interface built-in cable ([6])
- DAFX-LMCAB interface built-in cable ([7])

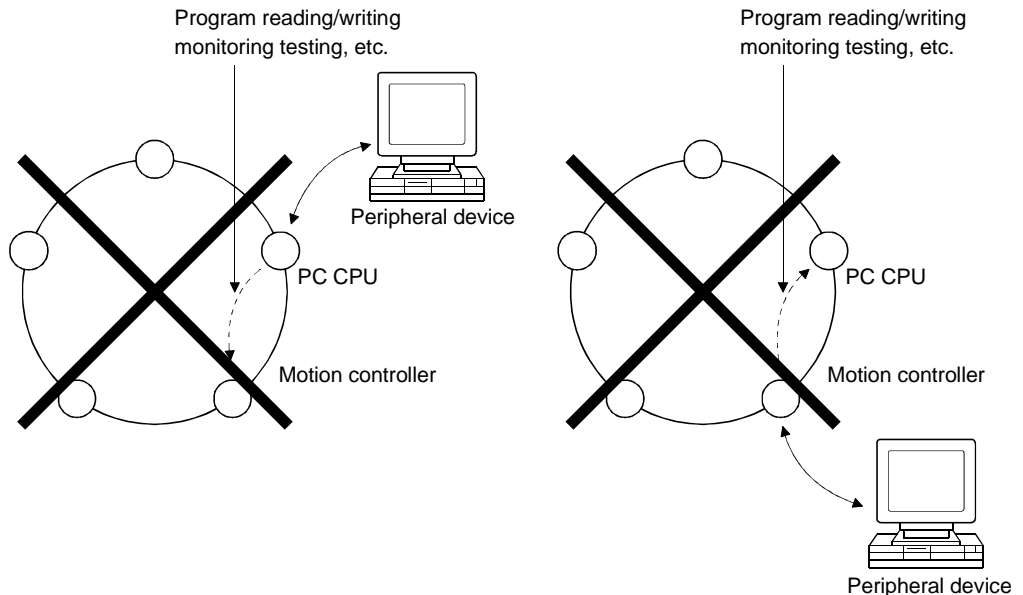


### 2.2.3 Printer

A parallel printer (ESC/P24-J84) can be used.

### 2.2.4 Note on accessing other stations in a data link system

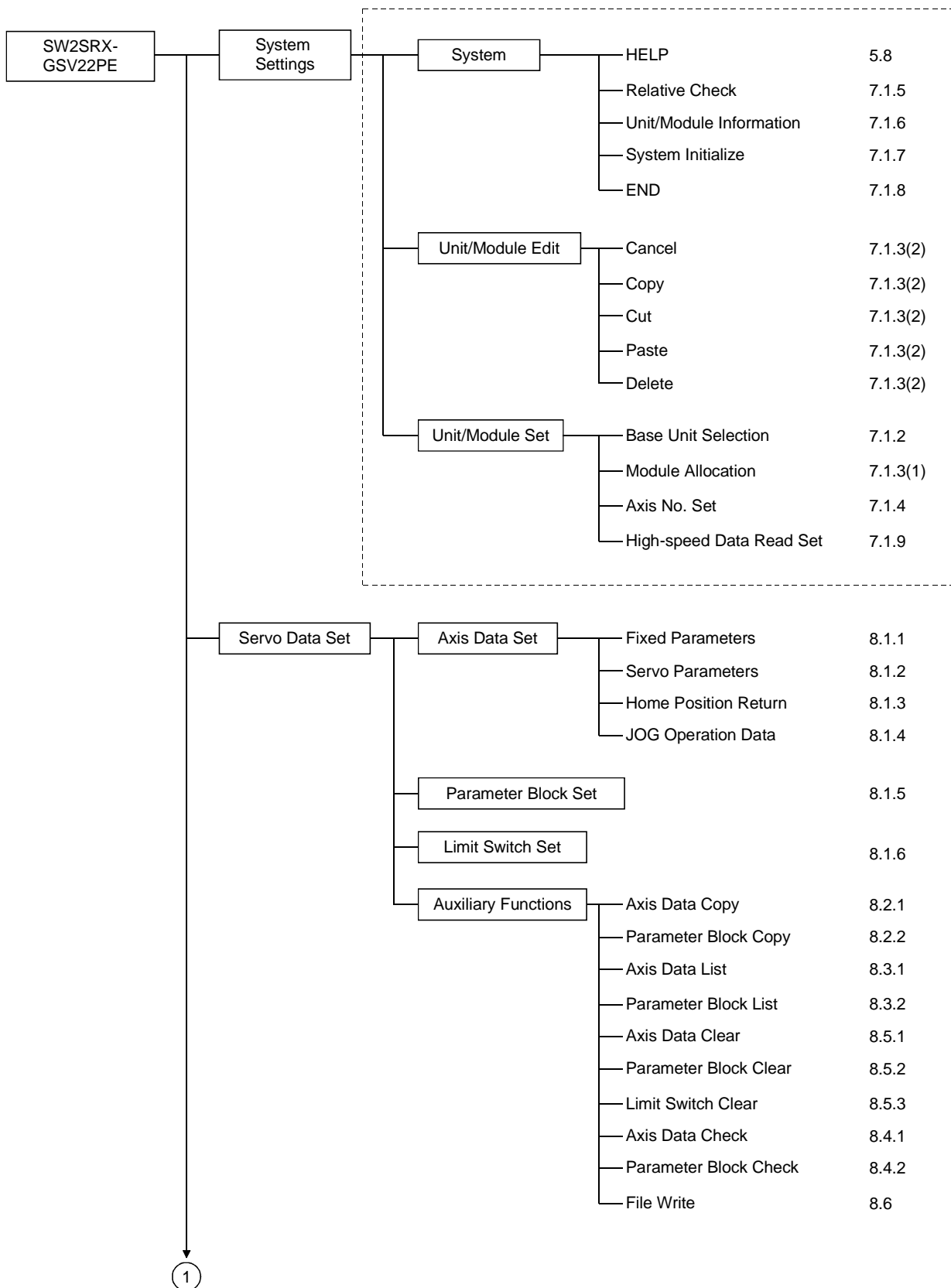
Other station access involving the motion controller is not possible. For example the following are not possible: accessing the motion controller from a peripheral device connected to the PC CPU; accessing the PC CPU from a peripheral device connected to the motion controller; and accessing the motion controller from a personal computer in the network.



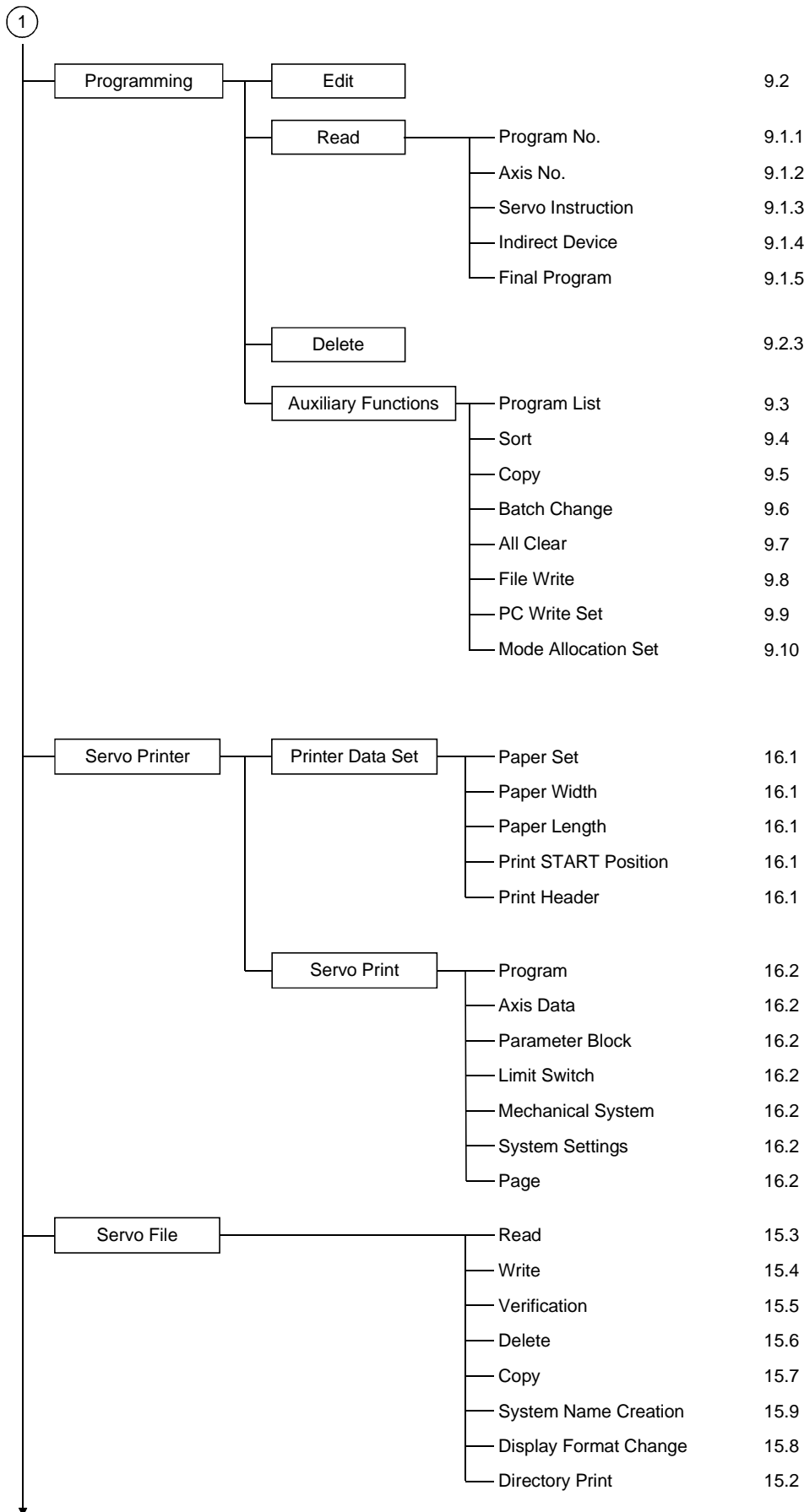
### 3. FUNCTION LIST

### 3. FUNCTION LIST

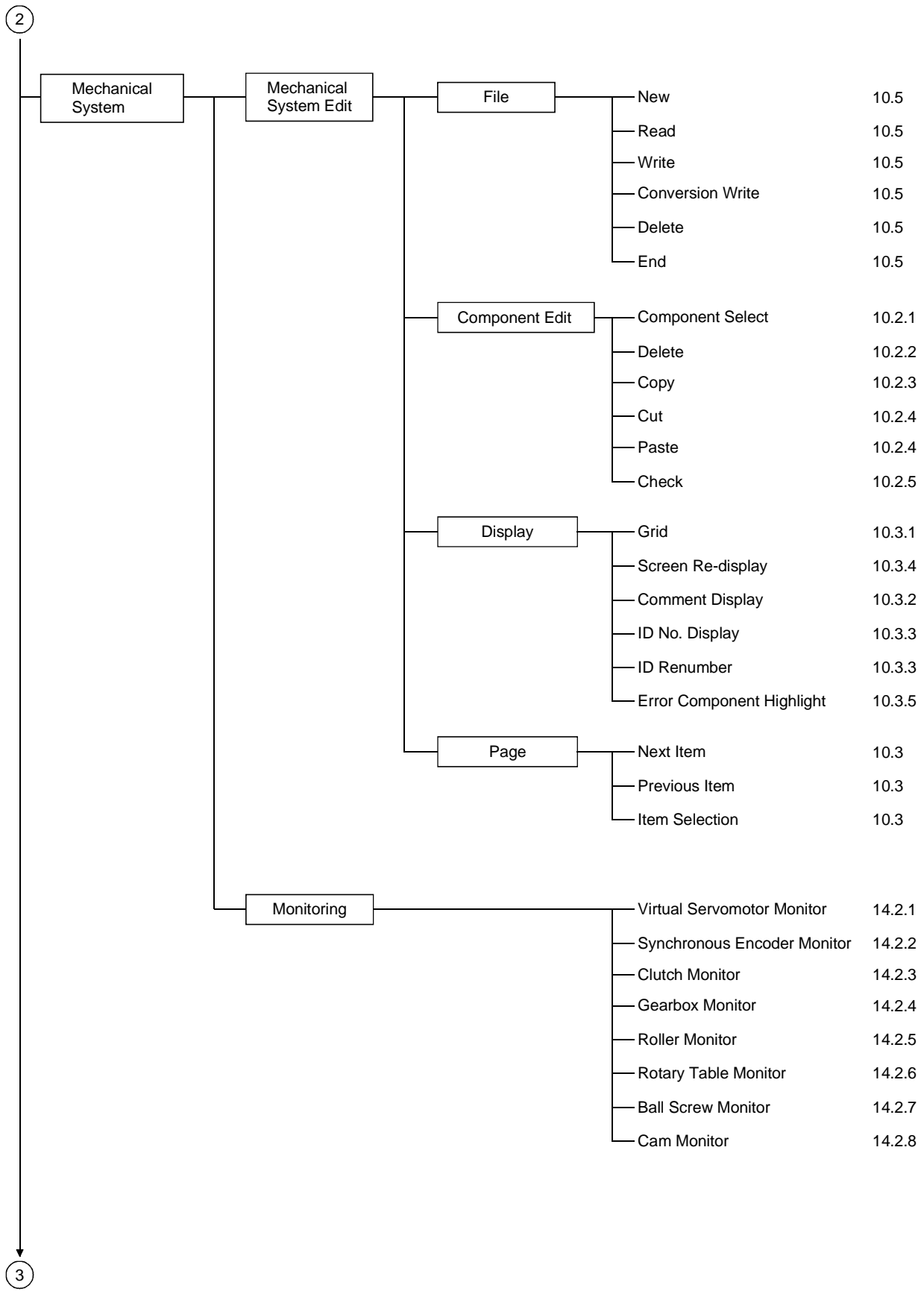
#### GSV22PE and CAMPE Functions



### 3. FUNCTION LIST



### 3. FUNCTION LIST



### 3. FUNCTION LIST

3			
	Online	Servo PC	Read 11.2
			Write 11.1
			Verification 11.3
		Servo Monitor	Present Position Monitor 13.1
			Error List Monitor 13.2
			Axis Monitor 13.3
			Scroll Monitor 13.4
			Present Value History Monitor 13.5
		Servo Test	Servo Start-Up 12.2
			Servo Diagnosis 12.3
			JOG Operation 12.4
			Manual Pulse Generator 12.5
			Home Position Return Test 12.6
			Servo Program Test 12.7
			Teaching 12.8
			Error Reset 12.9
			Present Value Change
			Present Feed Position Data 12.10
			Present Value in One-turn 12.13
			of Cam-axis (in the Virtual Mode)
			Servo ON/OFF 12.11
			Real/Virtual Switching 12.12
	Install	Install Function	17.1
		Verify Function	17.2
	Backup	Backup	18.1
		Load	18.2
	A273U → A273UH Conversion		19

#### REMARKS

- (1) GSV22PE incorporates the GPP functions.
- (2) See Section 5.10 for information on the GPP functions.



### 3. FUNCTION LIST

---

SW0IX-CAMPE	File	New Setting	22.4.1
		Read	22.4.2
		Write	22.4.3
		Copy	22.4.4
		Verification	22.4.5
		Delete	22.4.6
		End	21.3
	Initial Setting	22.1.1	
	Stroke Setting	22.1.2	
	Cam Curve Select	22.1.3	
	Graph Display	All Graphs	22.2.1
		Comparative Graphs	22.2.2
		Individual Graphs	22.2.3
	Data Display	22.3	
	Printing	Cam Data	23.1
		Sub-system Name Table	23.2
		Cam No. Table	23.3

# 4. REGISTERING GSV22PE AND CAMPE AT THE COMPUTER

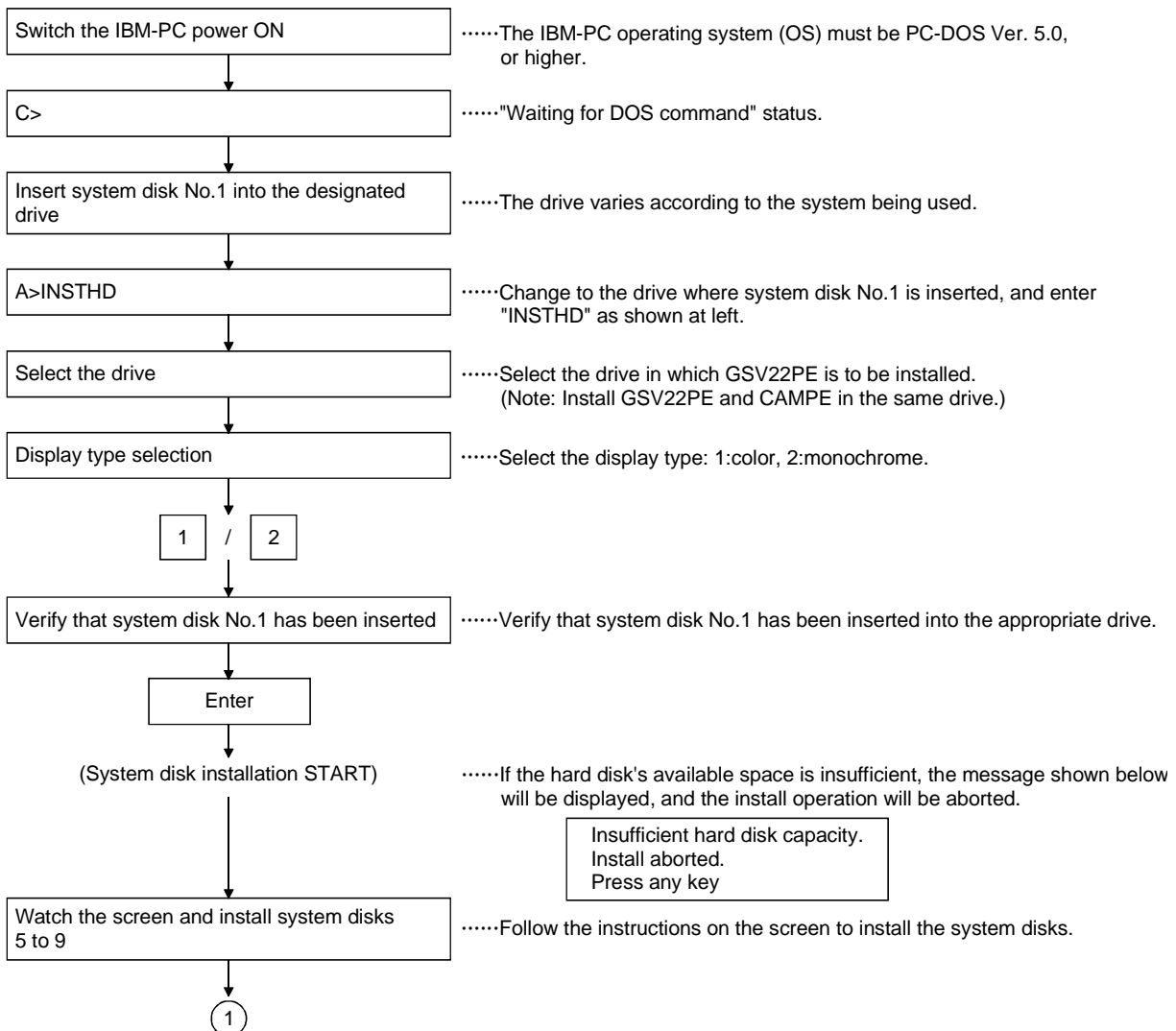
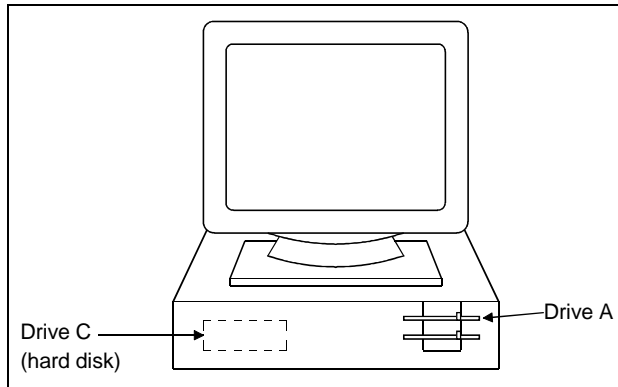
## 4. REGISTERING GSV22PE AND CAMPE AT THE COMPUTER

The procedure for registering GSV22PE and CAMPE to hard disk is shown below.

### 4.1 Registering GSV22PE at an IBM-PC

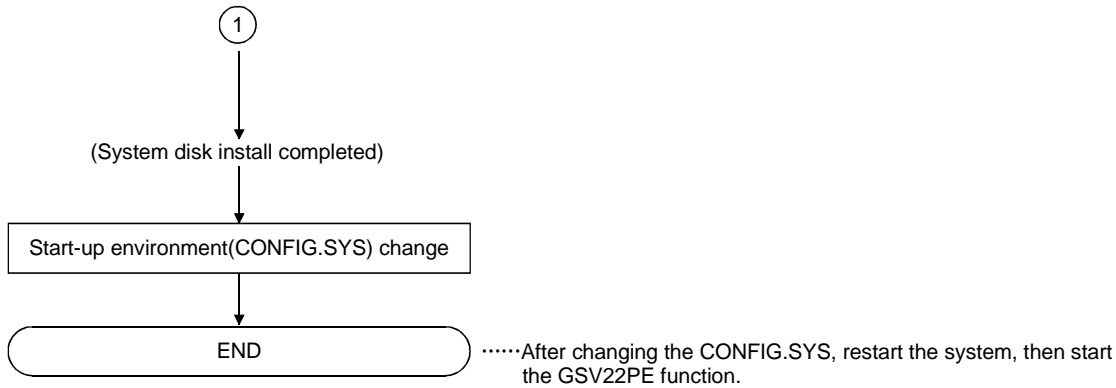
(1) Registration procedure

The procedure described below assumes a hardware configuration like the one shown below.



## 4. REGISTERING GSV22PE AND CAMPE AT THE COMPUTER

---



### (2) Personal computer specifications

The specifications of a personal computer (IBM PC) required to run the GSV22PE are indicated below.

CPU	: 80386 or above
EMS	: 1 MB or more
Free area in HD	
(for installation)	: 13 MB or more
(for execution)	: 1 MB or more
Free area in main memory during execution	: 560 KB or more

### (3) Start-up environment settings

CONFIG.SYS environment settings are required in order to start-up the GSV22PE function.

In order to start the GSV22PE function at IBM-PCs, the CONFIG.SYS settings shown below are required.

#### CONFIG.SYS

```
BUFFERS=20
FILES=30
DOS=HIGH, UMB
SHELL=C:\DOS\COMMAND.COM /P /E: 512
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE RAM 2048 X=C800-CFFFF D=64 FRAME=D000
DEVICEHIGH=C:\DOS\SETVER.EXE
DEVICEHIGH=C:\DOS\ANSI.SYS /X
```

## 4. REGISTERING GSV22PE AND CAMPE AT THE COMPUTER

---

(a) Batch files

1) Starting GSV22PE

In order to start the GSV22PE function, GSV22PE2.BAT must be copied as a batch file to the root directory.

System rewriting occurs at the drive designated at the install operation.

```
ECHO OFF
MOUSE
CLS
CD\GPP\2GSV
GSV22P
CD\
```

2) Starting CAMPE

i) Environment settings for IBM-PC

In order to start the CAMPE function, CAMPE.BAT must be copied as a batch file to C:\CAM\SYS.

```
ECHO OFF
MOUSE
CLS
CD\CAM\SYS
CAMMAINS
```

# 5. COMMON ITEMS

---

## 5. COMMON ITEMS

This chapter describes items common to both GSV22PE and CAMPE operations.

### 5.1 Common File Management Items

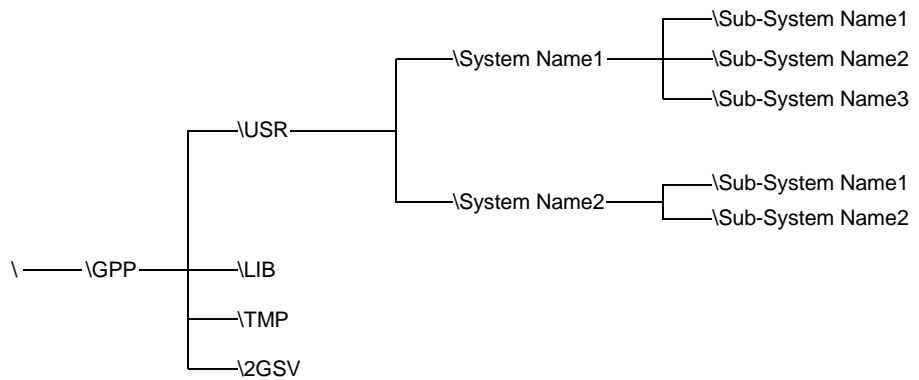
This section describes common items and cautions related to file management for both GSV22PE and CAMPE.

#### 5.1.1 Drive name

The drive name is a directory name where data is stored.

#### 5.1.2 System name

GSV22PE utilizes the hierarchical directory shown below.



**Fig. 5.1 System Names & Sub-System Names**

The system name comprises several sub-system names where data created by the user has been stored.

A maximum of 8 alphanumeric characters, hyphens, and underline marks may be used in the system name, but the name must begin with an alphabetic character.

#### 5.1.3 Sub-system name

The sub-system name is a directory name where data created by the user is stored. As shown in Fig.5-1, multiple sub-system names are possible.

A maximum of 8 alphanumeric characters, hyphens, and underline marks may be used in the sub-system name, but the name must begin with an alphabetic character.

## 5. COMMON ITEMS

---

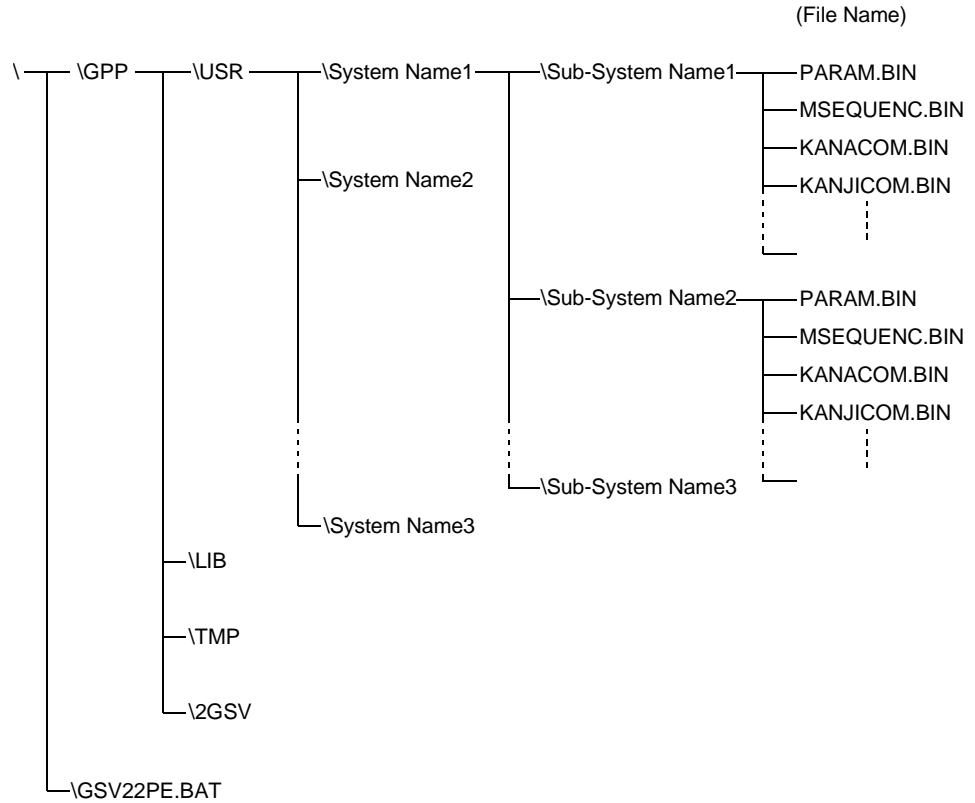
POINT	
	<p data-bbox="478 1624 798 1646"><b>Comment &amp; comment GPP</b></p> <p data-bbox="478 1653 1420 1742">Comments are comments for system names or sub-system names. Comments can store a program summary or creation date as an aid to check the name during a search.</p> <p data-bbox="478 1749 1396 1805">A maximum of 32 alphanumeric characters and special symbols may be used in the comment.</p> <p data-bbox="478 1812 1388 1966">The comment GPP is a comment to provide compatibility with the A6GPP comments. When a program created with the GPP functions is converted for A6GPP use, the comment GPPs are appended to the file after conversion. When the A6GPP directory is displayed, comment GPPs are displayed in the comment column.</p> <p data-bbox="478 1973 1396 2029">A maximum of 20 alphanumeric characters and special symbols may be used in the comment GPP.</p>

# 5. COMMON ITEMS

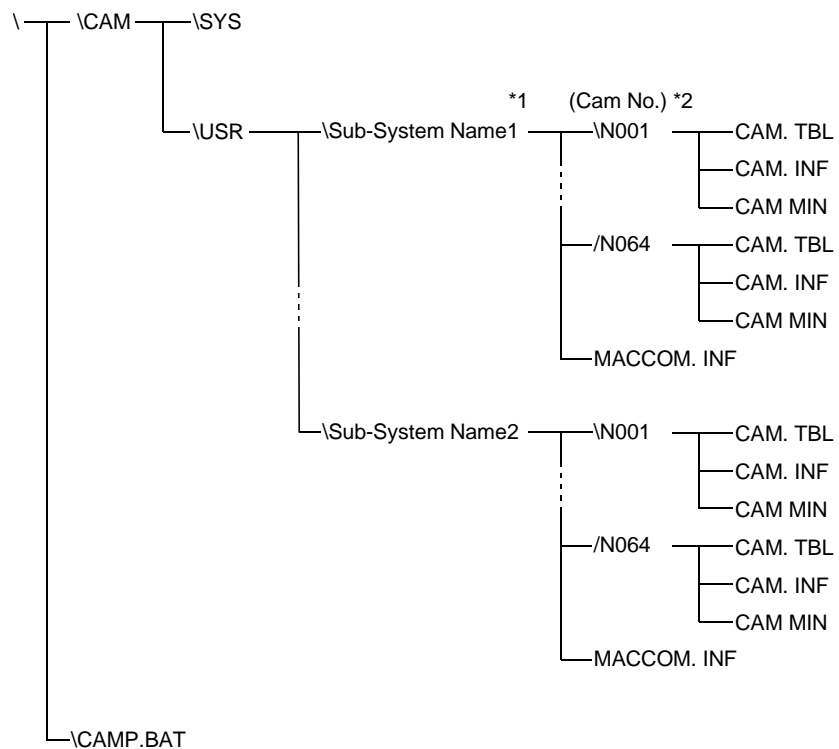
## 5.2 File Configuration

This section describes the GSV22PE and CAMPE file configuration.

### (1) GSV22PE file configuration



### (2) CAMPE file configuration



\*1 A maximum of 64 sub-system names can be created.

\*2 A maximum of 64 cam numbers can be created for each sub-system name.

## 5. COMMON ITEMS

### (3) File name

Files are created under the GSV22PE sub-system names according to the data content.

#### (a) Files created by GSV22PE

	(File Name)	
1. Parameter	PARAM.BIN	}
2. Main sequence program (incl. T/C setting values)	MSEQUENC.BIN	
3. Sub-sequence program (incl. T/C set values)	SSEQUENC.BIN	
4. Step trace	STPTRACE.BIN	
5. Main microcomputer program	MMICRO.BIN	
6. Sub microcomputer program	SMICRO.BIN	
7. Comment 1	KANACOM.BIN	
8. Comment 2	KANJICOM.BIN	
9. Main statement	MSTATEM.BIN	
10. Sub statement	SSTATEM.BIN	
11. Main note	MNOTE.BIN	
12. Sub note	SNOTE.BIN	
13. Sampling trace	[DATA NAME].STR	
14. Status latch	[DATA NAME].SLT	}
15. Device memory	[DATA NAME].DEV	
16. System information (PC type, comment, printer information)	GPPA.CNF	}
17. PC type (for PCPU)	GSVP.CNF	
18. Print Header	PHEADER.BIN	
19. Extension comment	NEWCOM.BIN	
20. System settings data	SVSYSTEM.BIN	
21. Servo data	SVDATA.BIN	
22. Servo program	SVPROG.BIN	
23. Trace graph data	SVTRCEn.BIN (n=01 to 32)	
24. Backup data	SVBACKUP.BIN	
25. Mechanical system program editing file	SVEDTDAn.BIN (n=1 to 4)	
26. Mechanical system program conversion file	SVMCHPRM.BIN	
27. Cam data conversion file	SVCAMPRM.BIN SVCAMPRn.BIN (n=1 to 3)	

File name is fixed.

Identifier is fixed.  
File name may consist of up to 8 characters.

File name is fixed

#### (b) Files created by CAMPE

1. Cam table data	CAM. TBL	}
2. Data for editing	CAM. INF	
3. Sub-system name comment	MACCOM. ING	

File name is fixed.



## 5. COMMON ITEMS

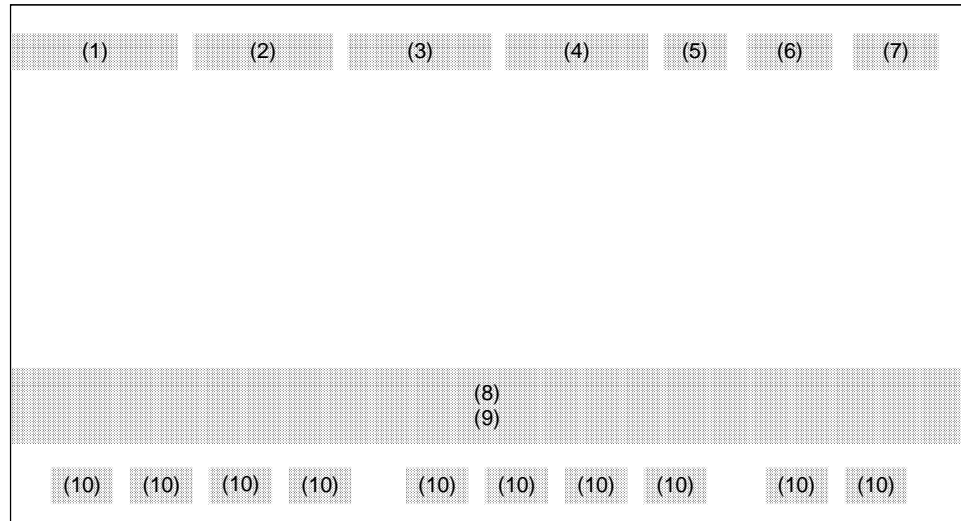
### 5.3 Common Display Format

This section describes screen layout and display details which are common to all GSV22PE and CAMPE operations.

(1) Display items common to all GSV22PE operations

(a) Not SYSTEM SETTING mode or MECHANICAL SYSTEM mode

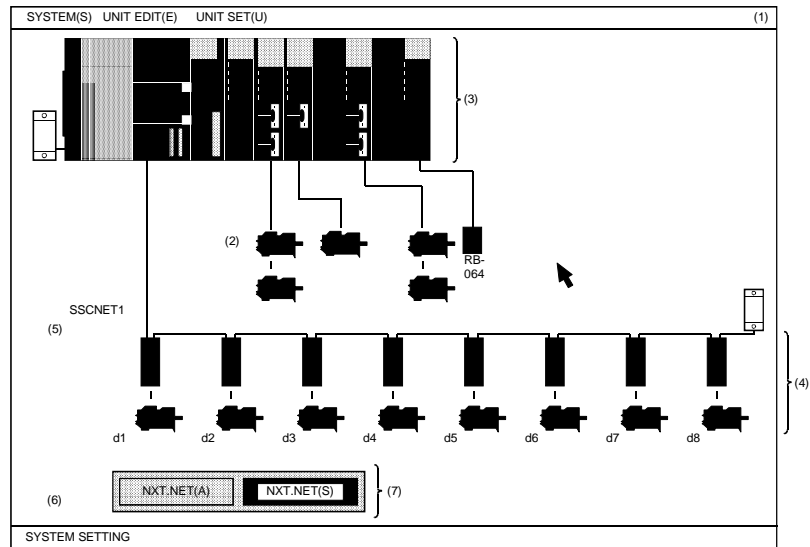
The common display areas when a mode other than the SYSTEM SETTING mode or MECHANICAL SYSTEM mode is selected are described below.



No.	Name	Description
1	Mode/Function Display Area	The mode or function which is currently active is displayed.
2	PC Type - PC No. - Monitor Destination Display Area	The following items designated by the initial settings are displayed here: PC type, channel No., PC No., monitor destination (PC, DM (device memory), SL (status check)), and network No.
3	Memory Used Steps Used/Free Display Area	When in the PROGRAMMING mode, the number of steps used and the remaining number of steps are displayed here.
4	Drive Name, Sub-system Name Display Area	The drive name and sub-system name designated by the initial settings are displayed here.
5	Main (Sub) Display Area	This display indicates whether the current program is a "main" or "sub" program.
6	[F11] Function Display Area	[F11] Function Display Area: MENU (The Menu Selection Window is displayed when the F11 key is pressed.)
7	[F12] Function Display Area	[F12] Function Display Area: HELP (The Help Window is displayed when the F12 key is pressed.)
8	Key-In Data Display Area	The key-in data for the GPP (ladder mode, list mode) and SFC functions are displayed here.
9	Guidance/Error Message Display Area	Guidance and error messages are displayed here.
10	Function Key Name Display Area	The names of function keys [F1] to [F10] are displayed here.

## 5. COMMON ITEMS

- (b) Display items when in the SYSTEM SETTINGS mode  
(When the A273UHCPU (32-axis specification) is used)

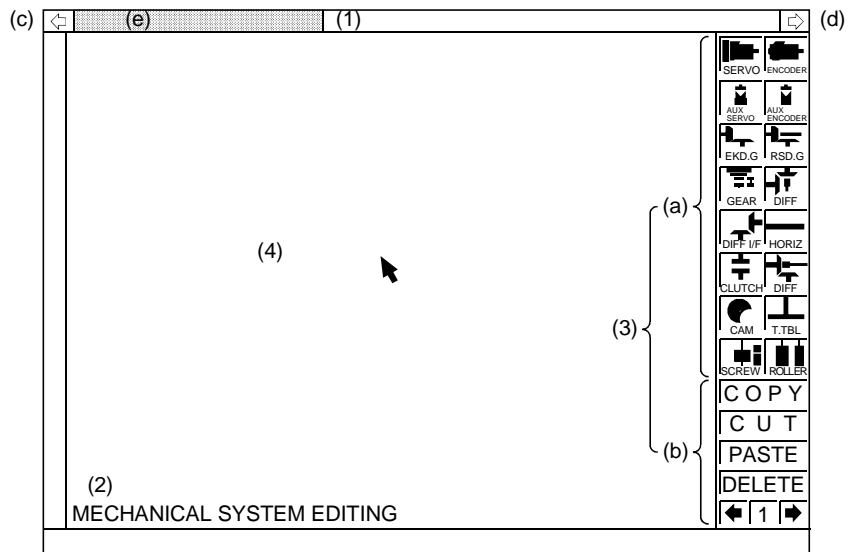


No.	Name	Description
1	Menu Bar Display Area	The menu bar is displayed when the right mouse button or the [Esc] key is pressed.
2	System Setting Area	This entire window is for system settings. Unit allocations, etc., are designated here.
3	Base Unit Display Area	The designated base unit and the module mounting status are displayed here.
4	Servo Amplifier Display Area	The operation status of the servo amplifiers (d1 to d4) is displayed here. (A171SCPU is used.)
		The operation status of the servo amplifiers (d1 to d8) is displayed here. (A273UHCPU (8-/32-axis specification) is used.)
5	Dialog Box/Alert Display Area	This is the dialog box/alert display area.
6	System Message Display Line	The current EDIT mode, etc., is displayed here.
7	SSC Network Selection Button (For A273UHCPU (32-axis specification) only)	Selection of SSC network 1 to 4 occurs here.

## 5. COMMON ITEMS

### (c) MECHANICAL SYSTEM EDITING mode

The common display areas in the MECHANICAL SYSTEM EDITING mode are shown below.



No.	Name	Description
1	Menu Bar and Scroll Bar Display Area	The scroll bar is normally displayed. Right-press (hold down right mouse button) to display the menu bar.
2	System Message Display Line	Various messages are displayed here during mechanical system editing.
3	Side Menu Display Area	(a) Component image buttons The symbols required for mechanical system editing are displayed here. (b) Function buttons The function buttons are displayed here for the copy, cut, paste, delete, and page-switching functions. Right-click the function button to select the corresponding function.
4	Edit Area	The mechanical system program is edited in this area. If the grid is turned ON, it is displayed in this area.

### POINTS

#### Scroll bar configuration and functions

##### (1) Scroll bar functions

The mechanical system editing mode provides an area to set a maximum of 16 components horizontally  $\times$  7 components vertically. The scroll bar is used to scroll the displayed area left or right.

##### (2) Scroll box and slider

Scroll boxes and a slider are displayed in the scroll bar display area.

The display can be scrolled in one of the following two ways:

- using the scroll boxes ((c) and (d) in the diagram above);
- using the slider ((e) in the diagram above).

Each method is described below.

##### (a) Scroll box method

Left-click on (c) or (d) to scroll the display one column at a time to the left or right.

##### (b) Slider

Left-drag (move while holding down the left button) the slider (e) to move the display several columns at a time to the left or right. The display scrolls a number of columns equivalent to the distance the slider is moved.

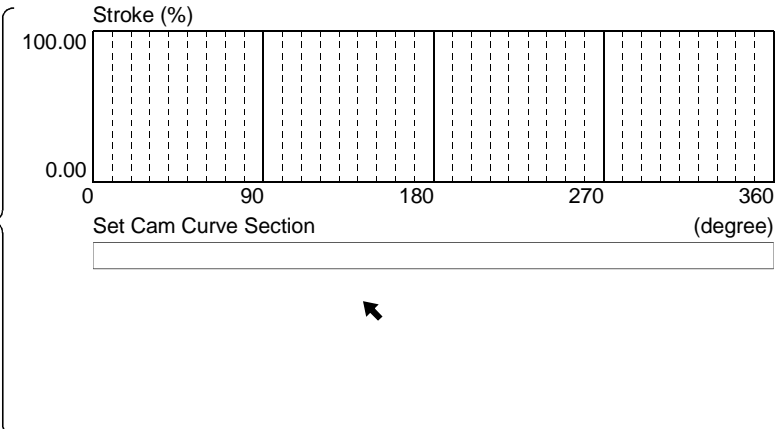
## 5. COMMON ITEMS

(2) Display items common to all CAMPE operations

The common display areas when cam data is created are described below.

(1) Sub-system : Cam No. :

(2)

(3) 

No.	Name	Description
1	Sub-system Name, Cam No. Display Areas	Display the sub-system name and cam number of the cam data currently being set. Blank if no sub-system name or cam No. is set.
2	Menu Display Area	Displays the name of each function.
3	Cam Data Creation Area	Contains all displays to set the cam data, and dialogs and alerts for operation confirmation, input requests, and error messages.

## 5. COMMON ITEMS

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### 5.4 Windows/Guidance

The following eight types of window or guidance can be displayed during GSV22PE or CAMPE operation.

- Menu selection window ..... See Section 5.5.1
- Mode/function selection window ..... See Section 5.5.2
- Sub-function selection window ..... See Section 5.5.3
- EXECUTE/SET window ..... See Section 5.5.4
- Check dialog box ..... See Section 5.5.5
- Option dialog box ..... See Section 5.5.6
- Run dialog box ..... See Section 5.5.7
- Select dialog box ..... See Section 5.5.8

The following 3 methods can be used to select a desired function.

(1) Selection by numerical key input

The desired item can be selected from the menu or option selection display by entering the number of that item.

(2) Selection by cursor position (cursor control keys)

The desired item can be selected from the menu or option selection display by moving the cursor to that item with the cursor control keys and pressing the [Enter] key.

(3) Selection by mouse

Select a function from the menu bar by executing a mouse right- drag and right-release.

Select an item from a selection display by executing a mouse left- click at that item.

However, function selection with the mouse is possible only in the GSV22PE SYSTEM SETTING mode or MECHANICAL SYSTEM EDITING mode, and when setting cam data with CAMPE. When setting cam data with CAMPE, functions can only be selected with the mouse.

## 5. COMMON ITEMS

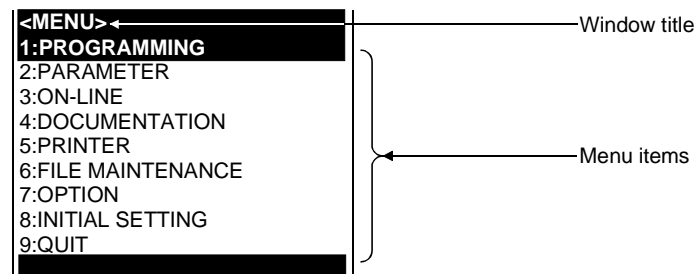
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### 5.4.1 Menu selection window

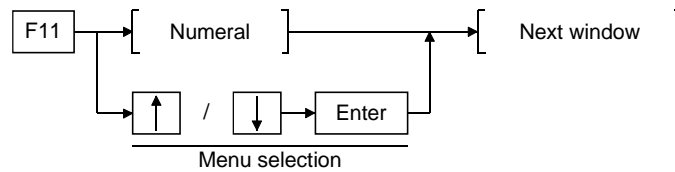
The menu selection window allows selection of the various operations available under the GPP function. The menu selection window can be displayed by pressing the [F11] key during function operations other than in the GSV22PE initial setting mode and system setting mode.

During operations in the initial setting mode, system setting mode, and mechanical system mode, this window will be displayed on quitting the mode.

If CAMPE has been started up, this window will be displayed when on quitting CAMPE and starting up GSV22PE.



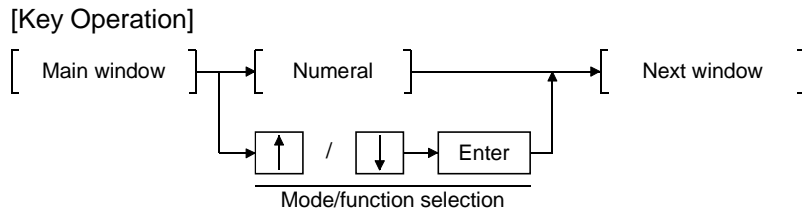
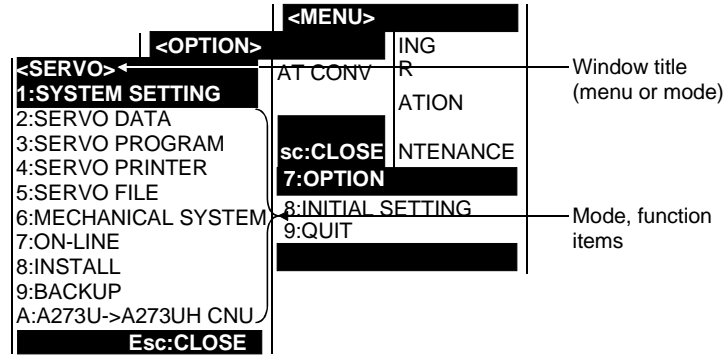
#### [Key Operation]



# 5. COMMON ITEMS

## 5.4.2 Mode/function selection window

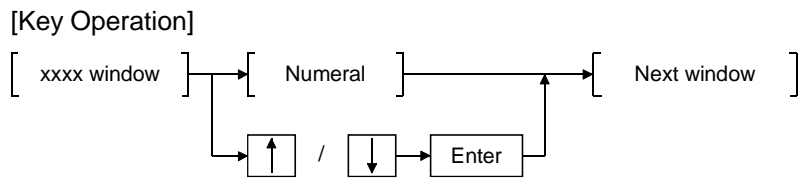
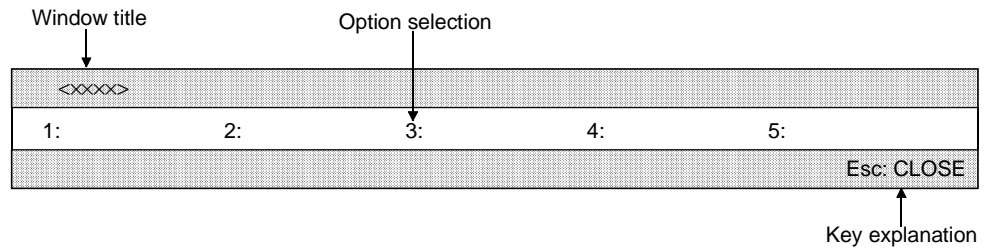
Mode and function selection windows are provided for each of the main window items at the menu window, etc., with additional sub-windows displayed for lower ranking setting items.



Press the [ESC] key to return to the main window.

## 5.4.3 Sub-function selection window

When a mode/function is selected, function selection sub-windows are provided when additional selection items exist.

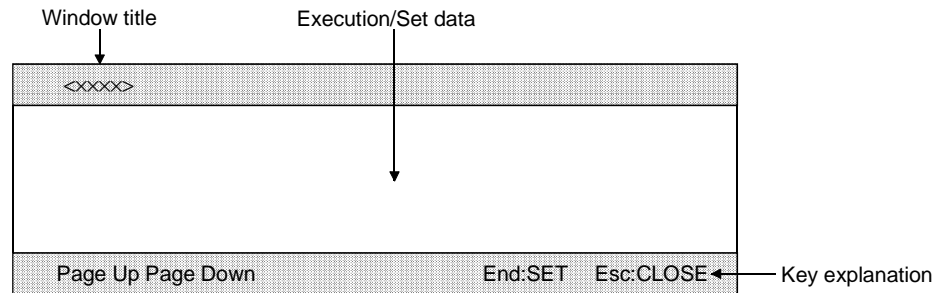


Press the [Esc] key to return to the main window.

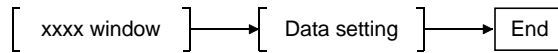
## 5. COMMON ITEMS

### 5.4.4 Execute/set window

The execute/set window is where numerical value inputs, option selections, etc., occur, depending on the selected function.



[Key Operation]



Press the [Esc] key to return to the main window.

When multiple execute/set windows exist, use the [Page Up] key to display the previous page, and the [Page Down] key to display the next page.

### 5.4.5 Confirmation dialog box

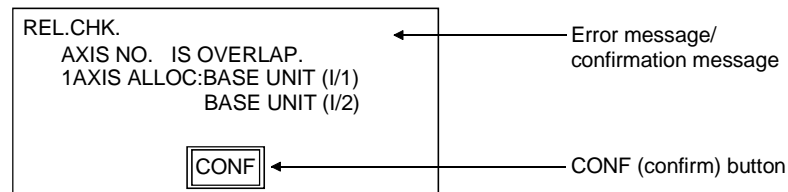
A confirmation dialog box:

- displays an error message when a fatal error occurs;
- displays a message to confirm operation execution.

When an error message is displayed, check the error content and take the appropriate action to correct the problem.

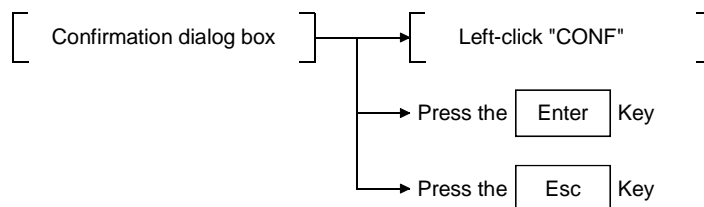
When a confirmation message is displayed, confirm execution of the processing.

[Confirmation Dialog Box]



[Key/Mouse Operation]

- Error message check





## 5. COMMON ITEMS

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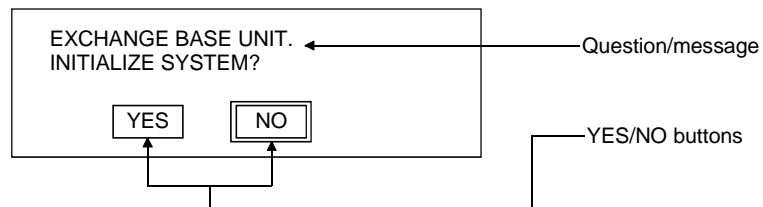
### 5.4.6 Option dialog box

Questions, messages, and setting options are displayed at the option selection dialog box.

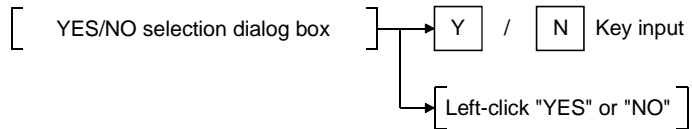
The two types of dialog box are shown below.

The option dialog box displays a question, message, or setting details and offers a choice of actions, such as YES or NO, OK or CANCEL.

[YES/NO Selection Dialog Box]

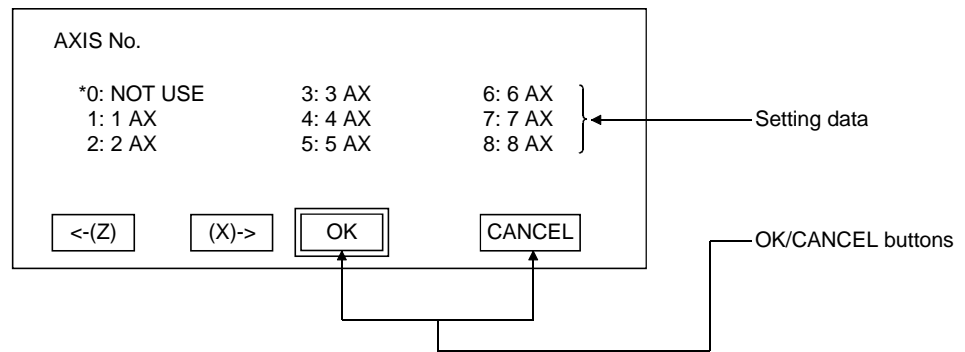


[Key/Mouse Operation]

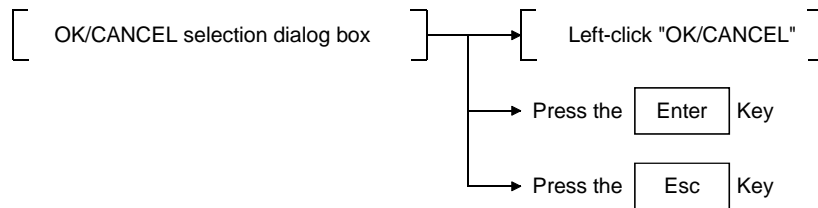


## 5. COMMON ITEMS

[OK/CANCEL Selection Dialog Box]



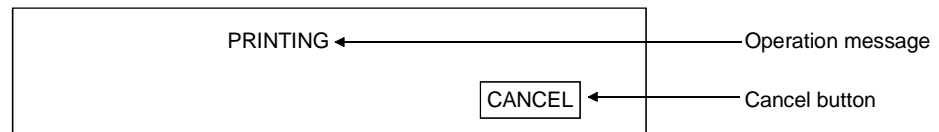
[Key/Mouse Operation]



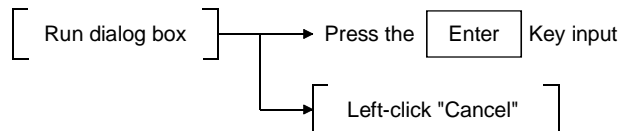
### 5.4.7 Run dialog box

The run dialog box displays the currently executing operation. The operation can be stopped using the Cancel button.

[Run Dialog Box]



[Key/Mouse Operation] (To cancel operation)



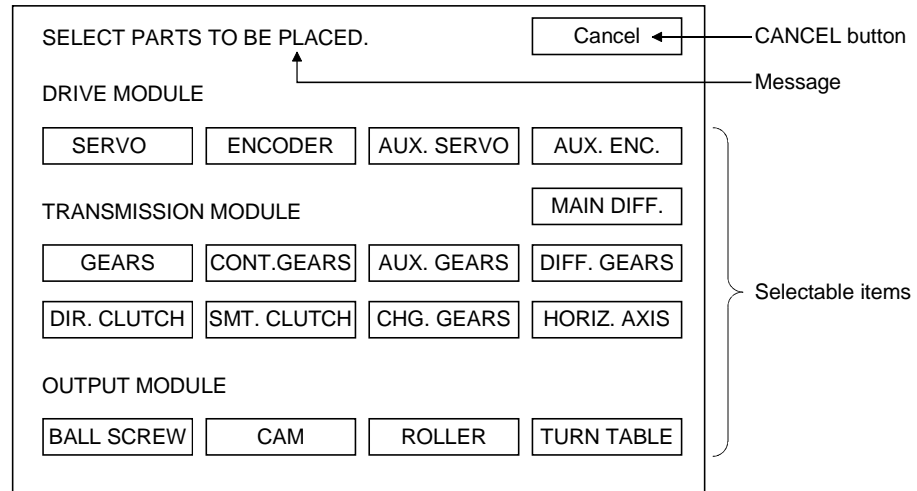
## 5. COMMON ITEMS

### 5.4.8 Select dialog box

The select dialog box is used to select an item to run from a number of displayed items.

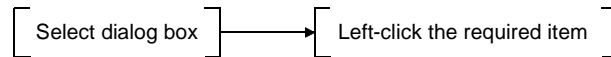
The selection can be stopped using the Cancel button.

[Select Dialog Box]

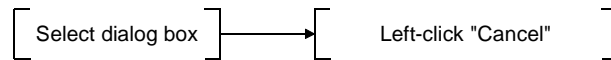


[Mouse Operation Procedure]

- To select an item



- To cancel an item



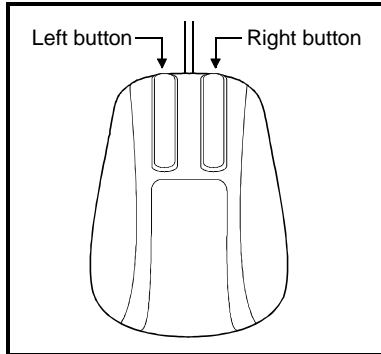
# 5. COMMON ITEMS

## 5.5 Basic Mouse Operation

This section describes how to use the mouse used with GSV22PE and CAMPE, and its functions.

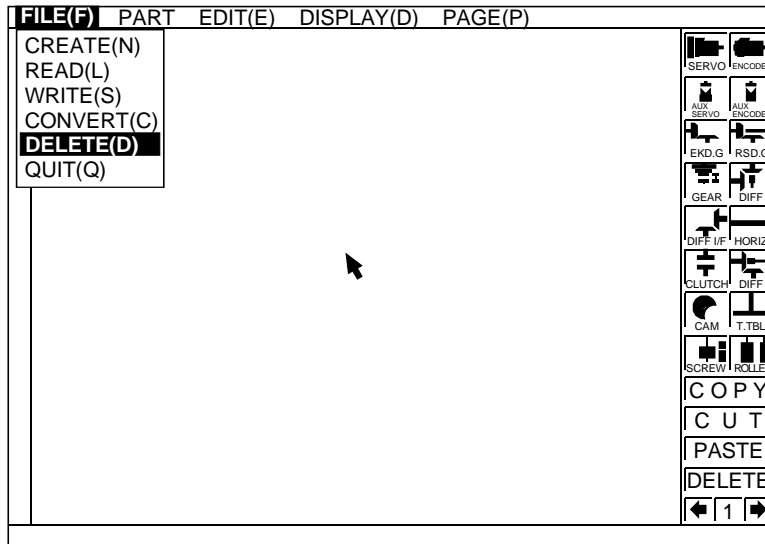
### (1) Mouse appearance & mouse cursor

[Mouse Appearance]



As shown at left, the mouse is equipped with left and right buttons.

[Mouse Cursor]



The mouse cursor is used to select functions and items, and to designate settings. The mouse cursor is displayed when mouse operations are enabled (GSV22PE SYSTEM SETTING mode or MECHANICAL SYSTEM EDITING mode, CAMPE operations).

### (2) Mouse operation & functions

#### (a) Button press (ON)

The operation of holding down a mouse button. Holding down the right button is called a "right-press" and holding down the left button is called a "left-press".

[Left-Press]

- Displays the menu selection window (during CAMPE operation)  
A left-press in the menu bar displays a pull-down menu.
- Displays the menu bar (during GSV22PE operation)

[Right-Press]

The menu bar will be displayed in response to a right-press during a system "waiting for input" status.

## 5. COMMON ITEMS

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### (b) Button release (turn OFF)

Releasing the left or right button during a left-press or right-press is known as "left-release" or "right-release" respectively.

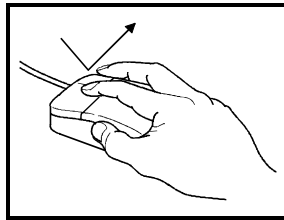
[Left-release]

- Designates a menu item selection (during CAMPE operation)  
To select an item from a pull-down menu, drag to the required item and left-release.

[Right-release]

- Designates a menu item selection (during GSV22PE operation)  
To select an item from a pull-down menu, drag to the required item and right-release.
- Designates drag destination position (during GSV22PE operation)  
Drag a component or dialog box to the required position and right-release to set the position.

### (c) Click



Pressing and immediately releasing the left or right button is known as "left-click" or "right-click" respectively.

[Left-click]

- Function selection & execution (during GSV22PE and CAMPE operation)  
Move the mouse cursor to the desired item, then execute a left-click to select and execute the function.

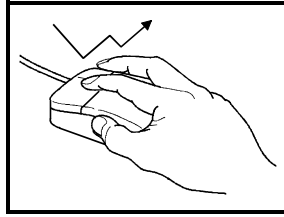
[Right-press]

- Cancellation of selected function (in the mechanical system editing mode)  
Right click to cancel the selected function.

## 5. COMMON ITEMS

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### (d) Double-click



Pressing and immediately releasing the left or right button twice in rapid succession is known as "left double-click" or "right double-click" respectively.

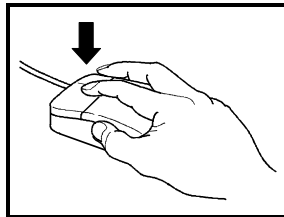
#### [Left double-click]

- Displays dialog box to set parameters or unit/module data (during GSV22PE operation). Move the mouse cursor to the unit/module for which parameters or unit/module data are to be set and left double-click to display the dialog box.

#### [Right double-click]

- NOT USED  
This operation is not used by GSV22PE and CAMPE.

### (e) Drag



Moving the mouse body to a desired position while the left or right button is pressed is referred to as a "drag" operation. Mouse movement with the left-button pressed is referred to as a "left-drag". Mouse movement with the right-button pressed is referred to as a "right-drag".

#### [Left-drag]

- Moving a selected item  
To move a selected item, left-drag it to the required position and release the button.
- Selecting from a pull-down menu (during CAMPE operation)  
To select an item from the pull-down menu displayed by left-press, left-drag to the required item and release the button.

#### [Right-drag]

- Selection of menu bar & pull-down menu items (during GSV22PE operation)  
A right-drag is executed to move to the position of the desired item at the menu bar displayed by a right-press. When positioned at the desired item, execute a right-release.

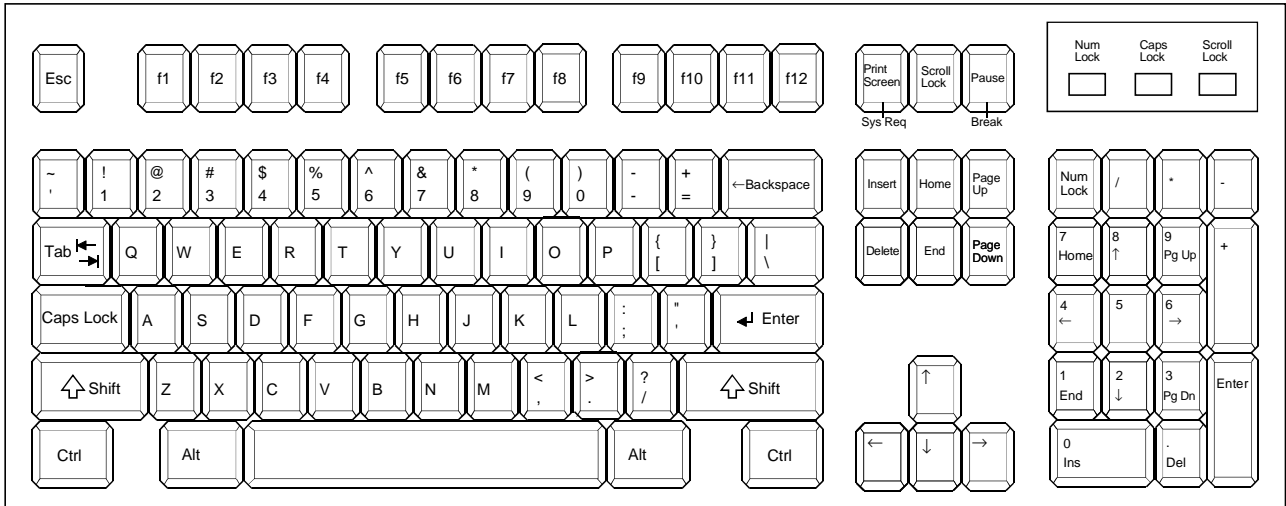
# 5. COMMON ITEMS

## 5.6 Keyboard

This section describes the keyboards used with GSV22PE and CAMPE and the operations of the keys.

### 5.6.1 For IBM-PC

The IBM-PC keyboard layout is shown below.



## 5. COMMON ITEMS

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### 5.6.2 Common keys

This section describes the operations of common keys for GSV22PE and CAMPE.

#### (1) IBM-PC

##### (a) Key applications

Key Name	Application
Esc	Closes windows and aborts operations.
Tab	Displays the HELP menu.
Ctrl	Used in combination with alphanumeric keys (See (b) below).
Shift	Used in combination with function keys.
Caps Lock	Switches between upper-case and lower-case alphabetic characters.
Alt	Used in combination with the [F11] function key. (Refer to item (b) below.)
Back Space	Deletes the character to the left of the cursor. Rapidly stops all axis in the TEST mode.
• (Enter)	Registers an input or item selection.
Page Up	Displays the previous page on ladder, list and HELP screens. This key is also used for axis No. switching (-1) during servo monitor and servo test operations, etc.
Page Down	Displays the next page on ladder, list and HELP screens. This key is also used for axis No. switching (+1) during servo monitor and servo test operations, etc.
Insert	Inserts a space at the cursor position.
Delete	Deletes 1 character at the cursor position.
Home	Moves the cursor to the home position.
End	Closes windows and ends setting operations.
Cursor control keys	These keys are used to move the cursor.
Print Screen	Copies the TEXT screen.
Num Lock	Designates the ten-key pad for exclusive numerical key use.
F11	Displays the menu selection window.
F12	Displays the HELP window.



## 5. COMMON ITEMS

### (b) Control key & alternate key specifications

Key Input	Function
Ctrl+E	Moves the cursor UP (same as the [↑]key).
+X	Moves the cursor DOWN (same as the [↓] key).
+D	Moves the cursor to the right (same as the [→] key).
+S	Moves the cursor to the left (same as the [←] key).
+F	Moves the cursor 1 word rightward. At ladders, this key moves the cursor to the right edge.
+A	Moves the cursor 1 word leftward. At ladders, this key moves the cursor to the left edge.
+R	Displays the previous page. Same function as [Page Up] key.
+C	Displays the next page. Same function as [Page Down] key.
+G	Deletes 1 character at the cursor position (same as the [Delete] key).
+Y	Deletes 1 line at the key-in data area.
+H	Deletes 1 character to the left of the cursor position.
+F1	Saves positioning data and servo program files.
+F11	Switches between servo programming and ladder editing. Switches from ladder monitoring to servo programming. Switches from servo PC servo monitoring to PC TEST. Switches between servo TEST and PC TEST.
Alt+F11	Switches between SERVO PC and ladder monitoring. Switches between servo monitoring and ladder monitoring. Switches from servo TEST to ladder monitoring.

### POINTS

- (1) In this manual, key inputs are indicated as shown below.

At Procedural Explanation:

[A] + [B] .....The [B] key is pressed while the [A] key is being pressed.

[A] → [B] .....The [B] key is pressed after the [A] key has been pressed.

At Key Operation Explanations:

[A] + [B].....The [B] key is pressed while the [A] key is being pressed.

[A] → [B].....The [B] key is pressed after the [A] key has been pressed.

- (2) A YES/NO dialog box prompts whether to write the file when the [Ctrl] + [F1] keys are pressed.

If "YES" is selected, the setting data will be written to the file of the currently designated sub-system.

If "NO" is selected, the file writing operation will be abandoned, and the YES/NO dialog box will be closed.

## 5. COMMON ITEMS

### 5.7 HELP Function

The HELP function explains functions, operations, and corrective action procedures for errors.

The GSV22PE package consists of the following 3 types of HELP functions:

- For guidance
- For troubleshooting
- For menu

The HELP types which correspond to each function are shown below.

Function	HELP Function		
	Guidance HELP	Troubleshooting HELP	HELP Menu
System settings	○	—	—
Servo data set	○	○	○
Servo programming	○	○	○
Servo printer	○	○	○
Servo file	○	○	○
Mechanical system	—	—	—
Online	○	○	○
Install	○	○	○
Backup	○	○	○
A273U → A273UH conversion	○	○	○

#### (1) Guidance HELP window

The guidance HELP window explains operation procedures.

To display this HELP window, verify that "F12:HELP" is displayed at the upper right of the screen, then press the [F12] function key. (For details regarding the guidance HELP window when in the SYSTEM SETTING mode, see the following item (4).)

An example of the guidance HELP window is shown below.

```

LADDER WRITE A3U-0-FF-PC- 0 1/6142 C:TEMP8 MAIN F11:MON F12:HELP
[HELP] 3.1.4 READ
(1)LADDER READ STEPS
[BASIC OPERATION]
1. Step number → [Enter] (step number designation) (no setting key)
2. Ladder symbol key → Device → Number → [Enter] (device with
ladder symbol designation)
3. Device → Number → [Enter] (device designation)
4. [F8]({-}) → Instruction → [Enter] (instruction designation)
5. [F8]({-}) → Instruction → [Space] → Device → Number [Enter]
(instruction designation)
6. [E][N][D] → [Enter] (end circuit designation)
7. Device → Number → [Space] → [I][K] → [Enter]
(device used in instruction with digit is also searched)
Tab:HELP MENU Pg Up:PREVIOUS Pg Dn:NEXT Esc:CLOSE
1 WRITE 2 READ 3 MON 4 AUX 5 ← 6 ← 7 ← 8 ← 9 — 0 |

```

#### [Key Operation]

Page change

Press the [Page Up] key to display the previous page, and the [Page Down] key to display the next page.

HELP menu display

Press the [Tab] key to display the HELP menu.

Ending the guidance HELP display

Press the [ESC] key to end the guidance HELP display.

## 5. COMMON ITEMS

### (2) Troubleshooting HELP window

The troubleshooting HELP window displays the causes of, and corrective actions for, errors which occur at each of the functions.

To display this HELP window, press the [Shift] + [F12] keys while an error message is displayed.

An example of the troubleshooting HELP window is shown below.

SERVO PROGRAM A3U-0-FF-PC- 0 0/14334 C:TEMP8 MAIN F11:MENU F12:HELP											
[HELP] NO 'END' COMMAND											
Cause					Action						
A program which does not contain the END instruction is displayed.					Write END instruction.						
A servo program which does not contain neither VEND nor CPEND instruction is displayed.					Write VEND or CPEND instruction at the end of servo program.						
NO 'END' COMMAND. Page Up:Previous Page Down:Next Esc:Close											
1	END	2	DELETE	3	4	5	6	7	8	9	0

#### [Key Operation]

Page change

Press the [Page Up] key to display the previous page, and the [Page Down] key to display the next page.

Ending the troubleshooting HELP display

Press the [Esc] key to end the troubleshooting HELP display.

### (3) HELP menu

The HELP menu is the table of contents for the guidance HELP function.

To display the HELP menu window, press the [Tab] key while the guidance HELP window is displayed.

An example of the HELP menu is shown below.

LADDER WRITE A3U-0-FF-PC- 0 1/6142 C:TEMP8 MAIN F11:MON F12:HELP																	
[HELP] 3.1.4 READ																	
[HELP MENU] Up/Dn:Scrolls 1 line Pg Up:PREVIOUS Pg Dn:NEXT																	
3.1.4 READ																	
[1] AUXILIARY FUNCTION (LADDER READ FUNCTION)																	
(1) MAIN/SUB SWITCH																	
(2) BATCH N/O,N/C CONTACTS CONVERSION																	
(3) BATCH DEVICE CONVERSION																	
(4) T.C SETTING VALUE LIST																	
(5) ALL CLEAR																	
(6) MEMORY CAPACITY SETTING																	
(7) BATCH COPY																	
(8) BATCH MOVE																	
(9) BATCH DELETE																	
(10) CONTACT AND COIL LIST																	
(11) DEVICE USED LIST																	
(12) COMMENT (DISPLAY SWITCH)																	
(13) COMMENT CREATION																	
(14) NOTE CREATION																	
(15) STATEMENT CREATION																	
Tab:HELP MENU Pg Up:PREVIOUS Enter:OPEN Esc:CLOSE Pg Dn:NEXT Esc:CLOSE																	
1	WRITE	2	READ	3	MON	4	AUX	5	←	6	→	7	←	8	→	9	0

#### [Key Operation]

Page change

Press the [Page Up] key to display the previous page, and the [Page Down] key to display the next page.

Close HELP menu

Press the [ESC] key to close the HELP menu.

#### POINT

If the [Shift] + [F12] keys are pressed when no error message is displayed, a beep will sound and the troubleshooting HELP window will not be displayed.

## 5. COMMON ITEMS

### (4) Guidance HELP window in SYSTEM SETTING mode

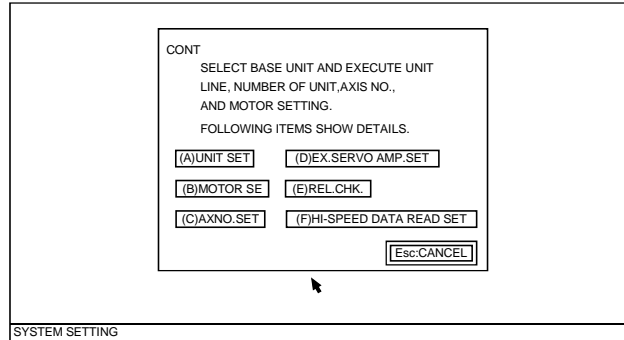
In the SYSTEM SETTING mode, there is a HELP table of contents window and a HELP window.

To display the HELP table of contents, execute a left-click at the menu bar's "HELP" item.

Left-click "HELP" in the menu bar.

- HELP table of contents window

An example of the HELP table of contents window is shown below.



#### [Key Operation]

Selecting a HELP table of contents item

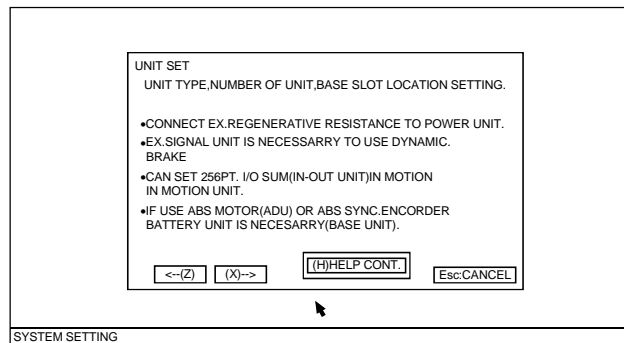
Execute a left-click at the desired display item, or press the [A]-[F] key which corresponds to the desired item. The HELP window is displayed.

Ending the HELP table of contents display

To end the table of contents display, execute a left-click at the "CANCEL" position, or press the [Esc] key.

- HELP window

An example of a HELP window is shown below.



#### [Key Operation]

Page change

To display the previous page, execute a left-click at the "<- (Z)" item, or press the [Z] key.

To display the next page, execute a left-click at the "X ->" item, or press the [X] key.

Displaying the HELP table of contents

To display the HELP table of contents, execute a left-click at the "(H) HELP CONT." item, or press the [H] key.

Quitting the HELP display

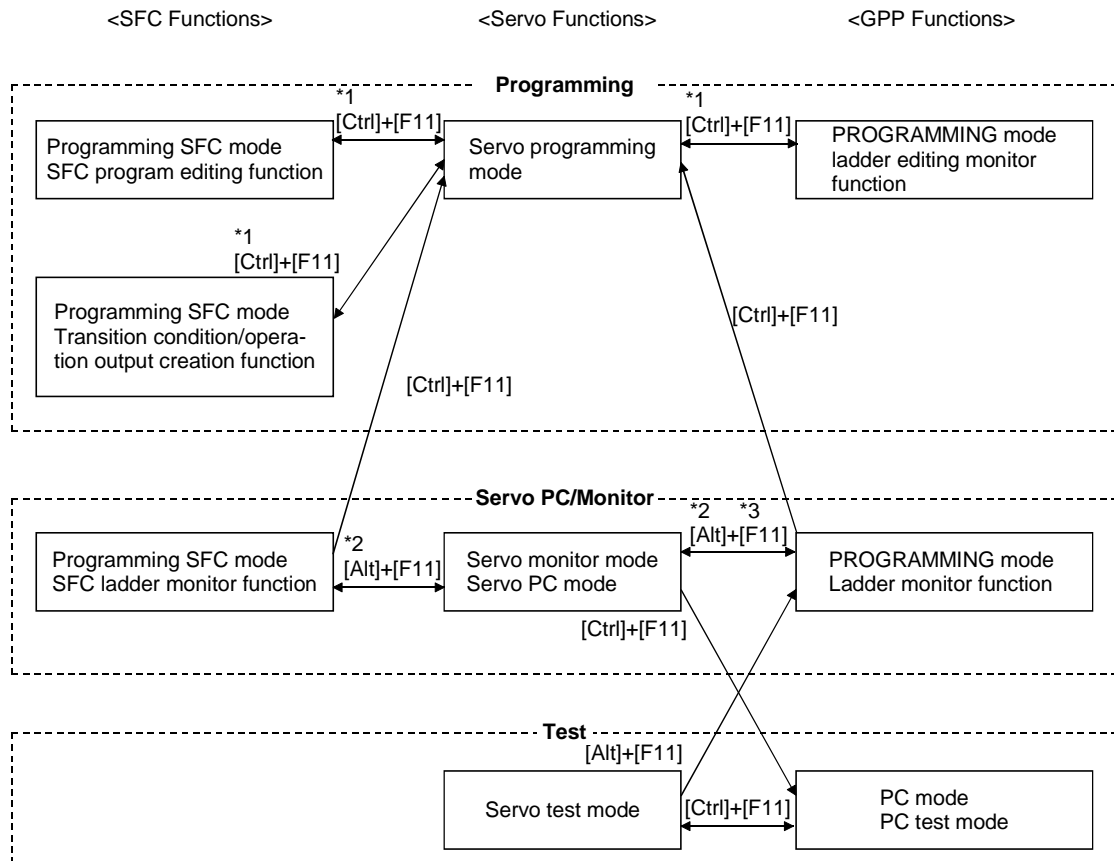
To quit the HELP display, execute a left-click at the "CANCEL" item, or press the [Esc] key.

## 5. COMMON ITEMS

### 5.8 Switching Between the Servo Functions and GPP/SFC Functions

When using GSV22PE, it is possible to switch to GPP or SFC functions while executing servo functions, and vice versa.

Details of the possible switching operations are presented below.



\*1 If [Ctrl] + [F11] is pressed in the servo programming mode without first having entered the SFC mode/ladder mode at least once, the system will switch to the ladder mode.

\*2 If [Alt] + [F11] is pressed in the servo monitor/servo PC mode without first having entered the SFC mode/ladder mode at least once, the system will switch to the ladder monitor function.

\*3 It is not possible to switch from the ladder monitor function to the servo PC mode.

## 5. COMMON ITEMS

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### 5.9 Differences with the SW0IX-GPPAE Functions

The GSV22PE includes the GPP functions.

See the SW0IX-GPPAE Operating Manual (IB-66314) for details on the GPP functions.

Differences exist between the GSV22PE GPP functions and the SW0IX-GPPAE software package GPP functions.

These differences are shown below.

For information on the system configuration and GSV22PE registration, see Chapters 2 and 4 of this manual. This information is not included in the manual cited above.

#### (1) Editing and monitoring functions

In the GPP function PROGRAMING mode, the following servo instructions can be printed when editing or monitoring the servo instructions.

- DSFRP instruction..... Start request instruction for 1- to 3-axis servo programs
- SVST instruction..... Start request instruction for 1- to 4-axis servo programs.
- DSFLP instruction..... Present value change, speed change instructions
- CHGA instruction..... Present value change instruction
- CHGV instruction..... Speed value change instruction

#### (2) Printing functions

The following servo instructions can be printed in the GPP function PRINT-OUT mode.

- DSFRP instruction..... Start request instruction for 1- to 3-axis servo programs
- SVST instruction..... Start request instruction for 1- to 4-axis servo programs
- DSFLP instruction..... Present value change, speed change instructions
- CHGA instruction..... Present value change instruction
- CHGV instruction..... Speed value change instruction

## 5. COMMON ITEMS

### 5.10 Table of Differences with SW0I-SAP2E

The differences between the SFC functions of the SW0IX-SAP2E software packages and the GSV22PE are listed in the table below.

The GSV22PE offers the following additional functions.

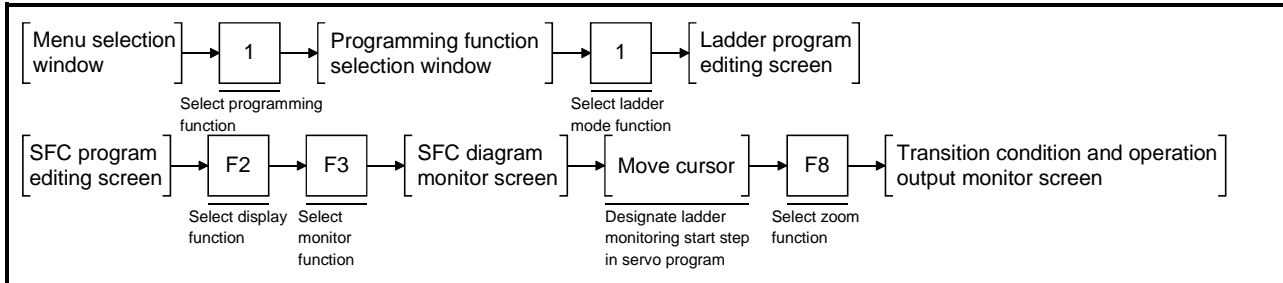
Mode	Added Function	Description
SFC program editing function	Additional editing functions for servo SFC symbols.	Editing of [SV] servo program start symbol.
	Additional servo instructions to create operation output and transition condition programs.	Editing of sequence programs using DSFRP, DSFLP, SVST instructions.
	Additional transition condition automatic insertion and deletion functions.	Automatic insertion and deletion of interlock conditions when editing DSFRP, DSFLP, SVST instructions.
	Switching to servo program functions.	Permits switching when editing operation outputs and transition conditions.
SFC monitor functions	Additional monitor functions for servo instructions set with operation output and transition condition programs.	Permits monitoring of DSFRP, DSFLP, SVST instructions.
	Servo program display during SFC diagram monitoring.	Permits reference to the running servo program when conducting SFC diagram monitoring.
SFC print functions	Additional printing functions for servo SFC symbols.	Printing of [SV] servo program start symbol.
	Additional printing functions for servo instructions to create operation output and transition condition programs.	Printing of sequence programs using DSFRP, DSFLP, SVST instructions.

## 5. COMMON ITEMS

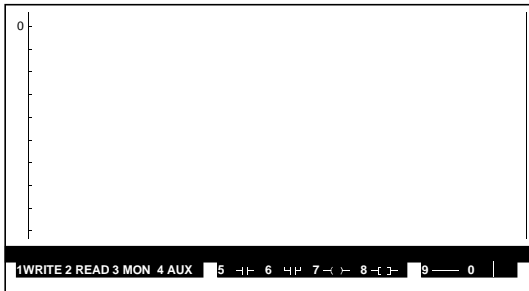
### 5.11 Axis No. Batch Copy to SVST Instruction

Automatically copies the axis numbers used in the motion program to the axis designation area of the SVST instruction in the sequence program.

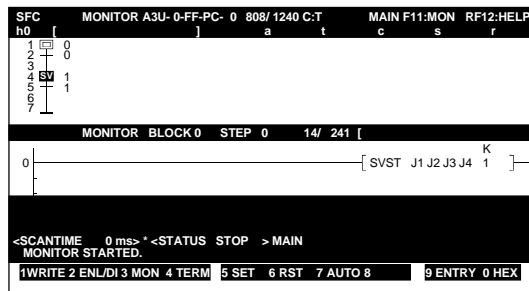
#### [Procedure for Displaying Ladder Program Editing Screen and Transition Condition/Operation Output Monitor Screen]



#### [Ladder Program Editing Screen]



#### [Transition Condition and Operation Output Monitor Screen]



#### [Display/Setting Content]

##### Running Batch Copy

- 1) Press the [Shift] + [F7] (SVST axis) keys from the ladder program editing screen or transition condition/operation output monitor screen.
- 2) If no motion program or sequence program exists, the error message "PROGRAM DOES NOT EXIST" is displayed.
- 3) A message indicates that the batch copy to the SVST instruction has been successfully completed.

#### [Caution]

- 1) This function does not work if the program number is indirectly designated in the SVST instruction.
- 2) Interlocks applied to the SVST instruction axis numbers in the SFC program transitions conditions are not copied by the batch copy function.
- 3) If the simultaneous start instruction is used in the motion program, only the first axis number declared in the simultaneously started programs is copied.
- 4) Copying to a sub-program is not possible during editing of the main program.
- 5) The instruction can be executed only in the read function. Execution of the instruction is not possible in other functions (write, insert, etc.).



# 5. COMMON ITEMS

## 5.12 Transition Condition Automatic Insertion and Deletion Functions

When conversion is carried out after the servo instructions listed below are edited to create a transition condition and operation output program, interlock signals are automatically inserted or deleted at the transition conditions above and below each step of the created SFC program.

Servo Instruction	Inserted/Deleted Interlock Signal	Device		
		A17[ ]CPU	A273UHCPU (8-axis Specification)	A273UHCPU (32-axis Specification)
DSFRP*/CHGA SVST	Start accept bits for axes used	M2001 to M2008	M2001 to M2008	M2001 to M2032
DSFLP*/CHGV	Speed change flags	M2021 to M2028	M2021 to M2028	M2061 to M2092
CHGA(E)	Synchronous encoder shaft present value change in progress flag	M2031	M2031 to M2033	M2101 to M2112

\*Used only as a normal sequence instruction flag for the A273UHCPU (32-axis specification). No automatic insertion or deletion of interlock signals.

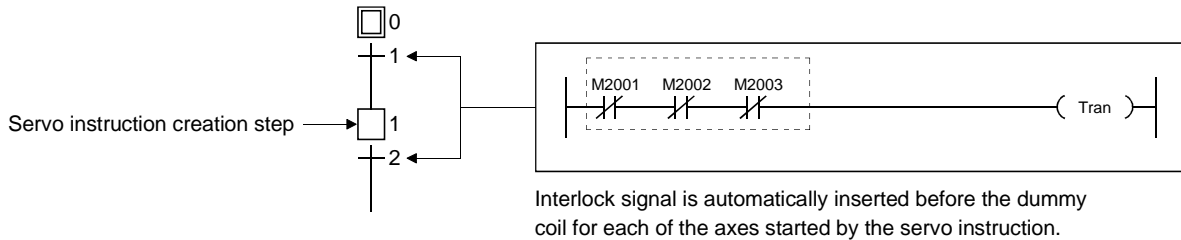
- (1) Automatic insertion of transition conditions.
  - (a) During editing of DSFRP\*/CHGA/SVST instructions (DSFRP\* for A17[ ]CPU/A273UHCPU (8-axis specification) only)

### 1) Serial transition

The    region is automatically inserted into the transition condition ladder blocks above and below the servo instruction creation step.

Example)

If Axis 1, Axis 2, and Axis 3 are used at Step 1, interlock signals are automatically inserted in transition 1 and 2.

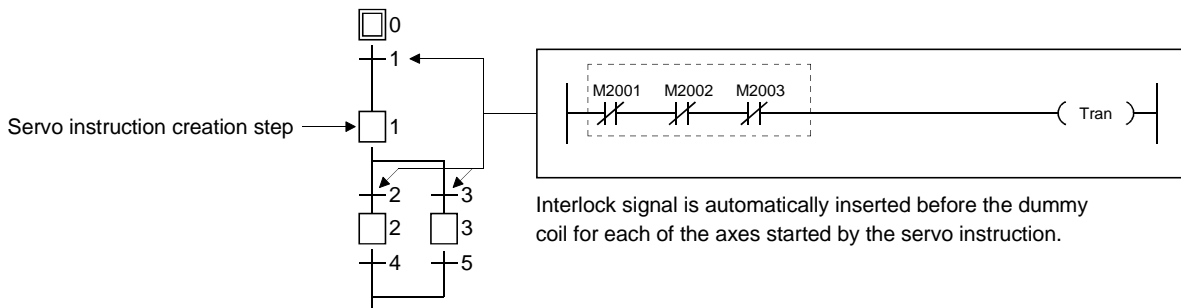


### 2) Selective branching

The    region is automatically inserted into all the transition condition ladder blocks connected above and below the servo instruction creation step.

Example)

If Axis 1, Axis 2, and 3 are used at Step 1, interlock signals are automatically inserted in transition conditions 1, 2, and 3.



### POINT

After the addition or insertion of a step, the interlocks may not be automatically inserted into or deleted from the transition conditions correctly during conversion. Always use zoom display at the transition conditions to check the interlocks after the addition or insertion of a step.

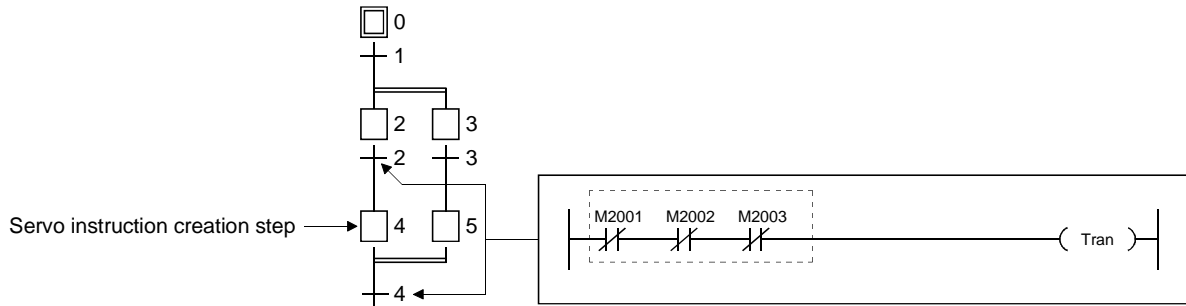
## 5. COMMON ITEMS

### 3) parallel coupling

- i) If a servo instruction is created in one of the queued steps in a parallel coupling.

Example)

If Axis 4 Axis 2, and Axis 3 are used at Step 4, interlock signals are automatically inserted in transition conditions 2 and 4.

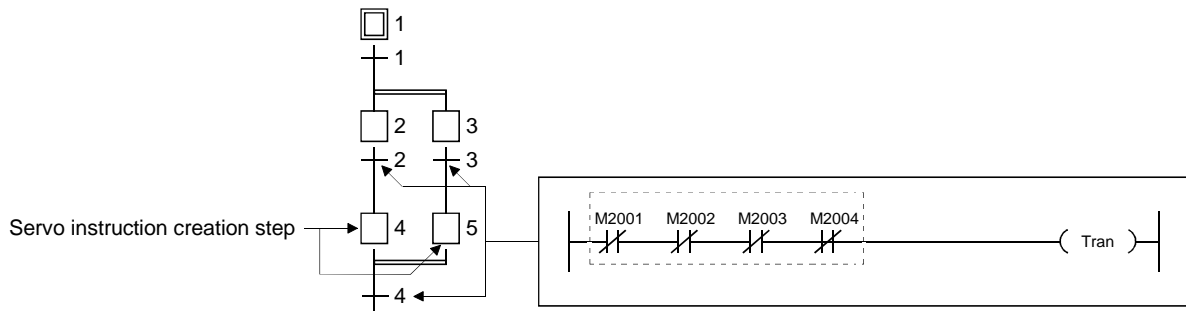


Interlock signal is automatically inserted before the dummy coil for each of the axes started by the servo instruction.

- ii) If servo instructions are created in multiple queued steps in a parallel coupling.

Example)

If Axis 1, Axis 2, and Axis 3 are used at Step 4, and axis 2, Axis 3, and Axis 4 are used at Step 5, interlock signals are automatically inserted in transition 2, 3 and 4.

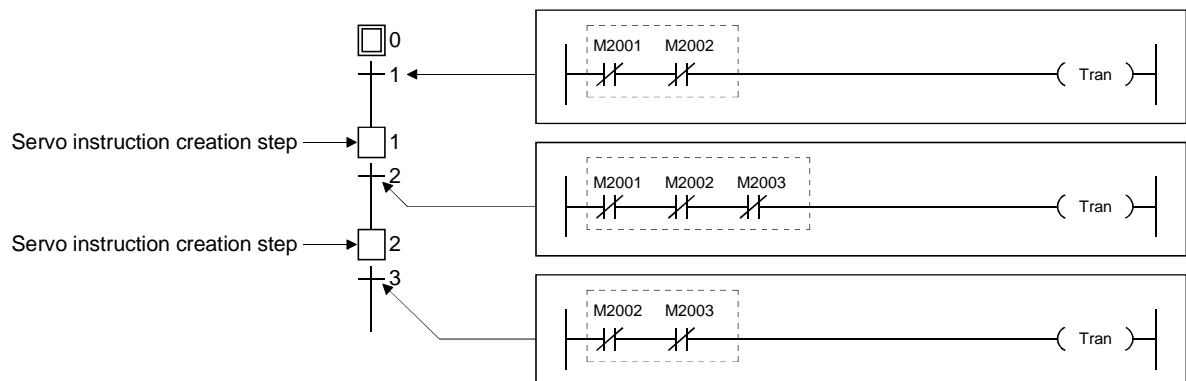


Interlock signal is automatically inserted before the dummy coil for each of the axes used at Step 4 or 5. Interlocks are not duplicated for duplicated axes.

- 4) In continuous servo instruction creation steps with duplicated axes used at each step and duplicated interlock signals the duplicated interlock signals are automatically replaced by one interlock signal.

Example)

If Axis 1 and Axis 2 are used at Step 1, and Axis 2 and Axis 3 are used at Step 2, the interlock signals shown below are automatically inserted in transition conditions 1, 2, and 3.



## 5. COMMON ITEMS

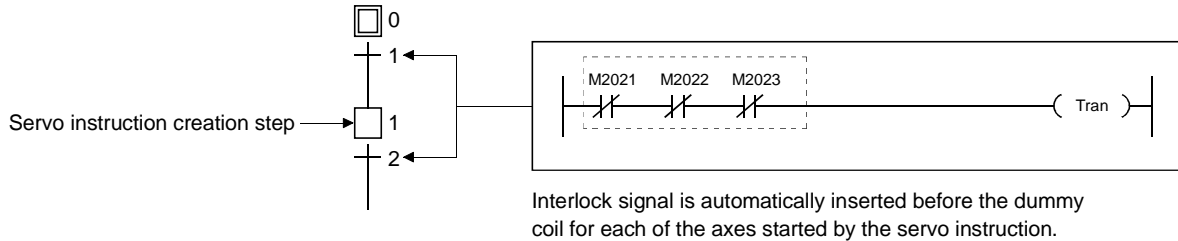
(b) During editing of DSFLP\*/CHGV instructions  
(DSFLP\* for A17[ ]CPU/A273UHCPU (8-axis specification) only)

### 1) Serial transition

The    region is automatically inserted into the transition condition ladder blocks above and below the servo instruction creation step.

Example)

If Axis 1, Axis 2, and Axis 3 are used at Step 1, interlock signals are automatically inserted in transition conditions 1 and 2.

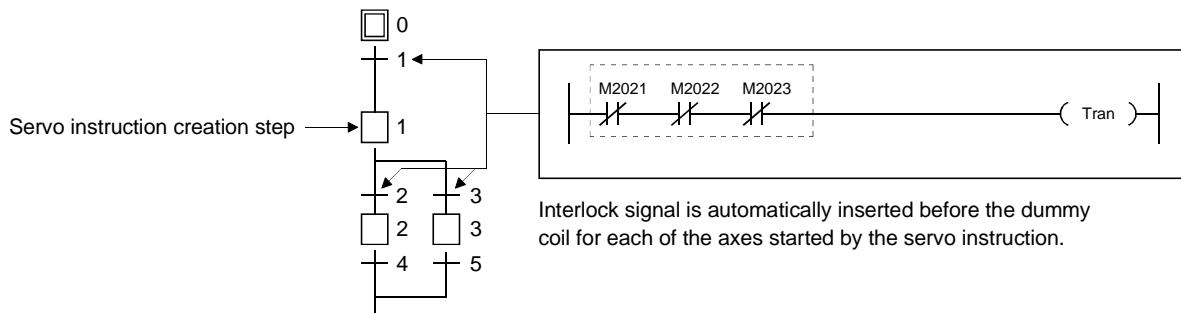


### 2) Selective branching

The    region is automatically inserted into all the transition condition ladder blocks connected above and below the servo instruction creation step.

Example)

If Axis 1, Axis 2, and Axis 3 are used at Step 4, interlock signals are automatically inserted in transition conditions 1,2, and 3.

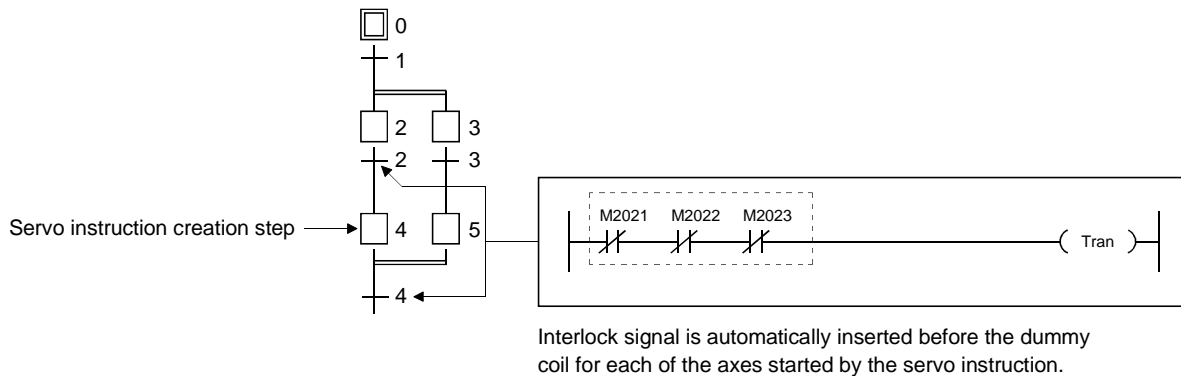


### 3) Parallel coupling

i) If a servo instruction is created in one of the queued steps in a parallel coupling.

Example)

If Axis 1 Axis 2, and Axis 3 are used at Step 4, interlock signals are automatically inserted in transition conditions 2 and 4.

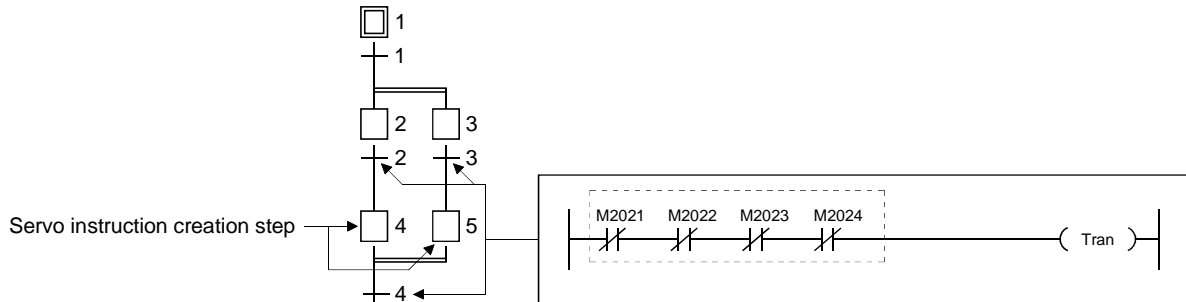


## 5. COMMON ITEMS

- ii) If servo instructions are created in multiple queued steps in a parallel coupling.

Example)

If Axis 1, Axis 2, and Axis 3 are used at Step 4, and Axis 2, Axis 3, and Axis 4 are used at Step 5, interlock signals are automatically inserted in transition conditions 2, 3 and 4.

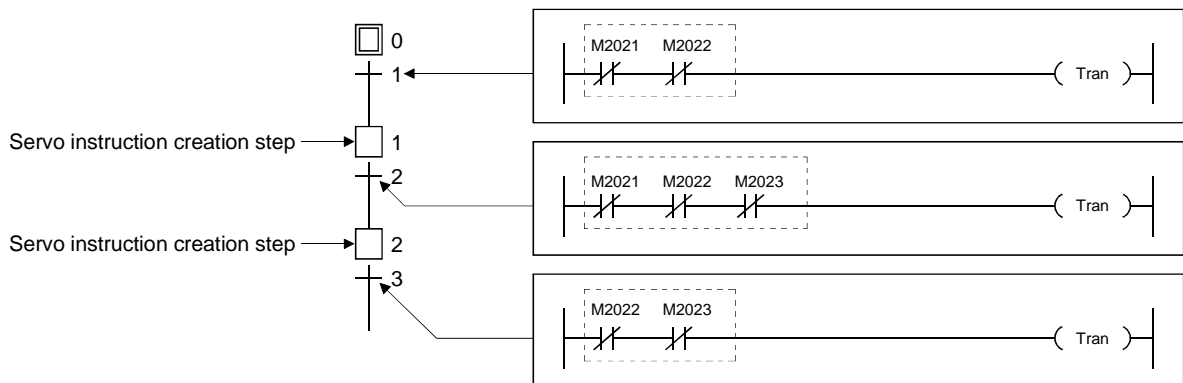


Interlock signal is automatically inserted before the dummy coil for each of the axes used at Step 4 or Step 5. Interlocks are not duplicated for duplicated axes.

- 4) In continuous servo instruction creation steps with duplicated axes used at each step and duplicated interlock signals, the duplicated interlock signals are automatically replaced by one interlock signal.

Example)

If Axis 1 and Axis 2 are used at Step 1, and Axis 2 and Axis 3 are used at Step 2, the interlock signals shown below are automatically inserted in transition conditions 1,2, and 3.

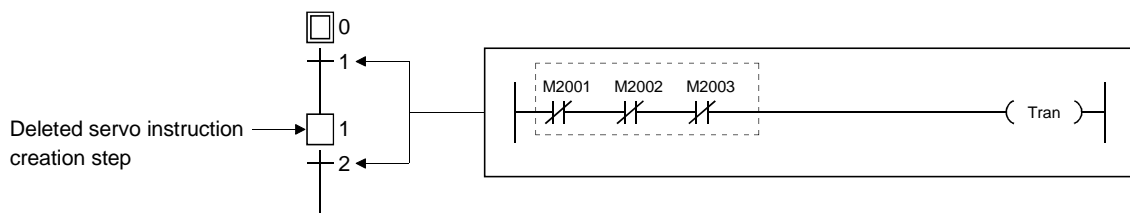


- (2) Automatic deletion of transition conditions

When a step containing a servo instruction is deleted, the interlock signals automatically inserted into the transition conditions at previous or subsequent steps are automatically deleted.

Example)

If Step 1 is deleted, the regions that were automatically inserted into the transition condition 1 and 2 ladder blocks are automatically deleted.

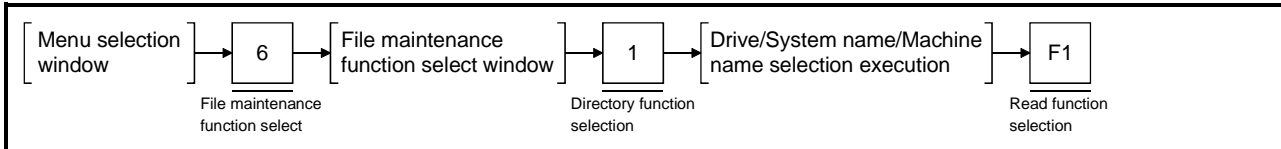


## 5. COMMON ITEMS

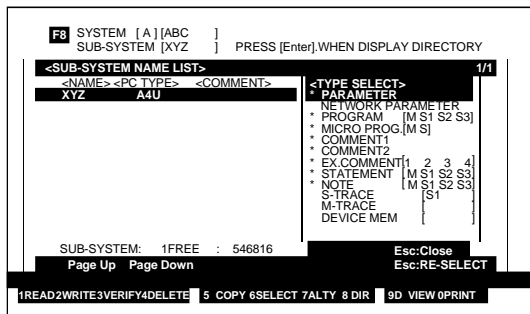
### 5.13 Reading the SFC Program File Created by SW1[ ]-GSV22P

The SFC program file created by SW1[ ]-GSV22P cannot be read directly by SW2[ ]-GSV22p. Use the procedure below for reading the SFC program created by SW1[ ]-GSV22P:

#### [Procedure for displaying the read execution result screen]



#### [Read execution result screen]



#### [Description of key operations]

- 1) Move the cursor bar onto the item "Microcomputer" using the [↑]/[↓] keys.
- 2) Press the [F6] (selection) key. The microcomputer selection window is displayed.
- 3) Move the cursor bar again using the [↑]/[↓] keys to select the item "Main program" or "Subprogram", then press the [F6] (selection) key. Once the item is selected, the " \* " symbol on the screen is changed to " # ".
- 4) Press the  key to execute a read operation.
- 5) After the read operation is complete, the message "Finished" is displayed.

#### REMARK

For details of the file maintenance function which can be selected from the menu, refer to the SW1[ ]-GPPA Operating Manual.

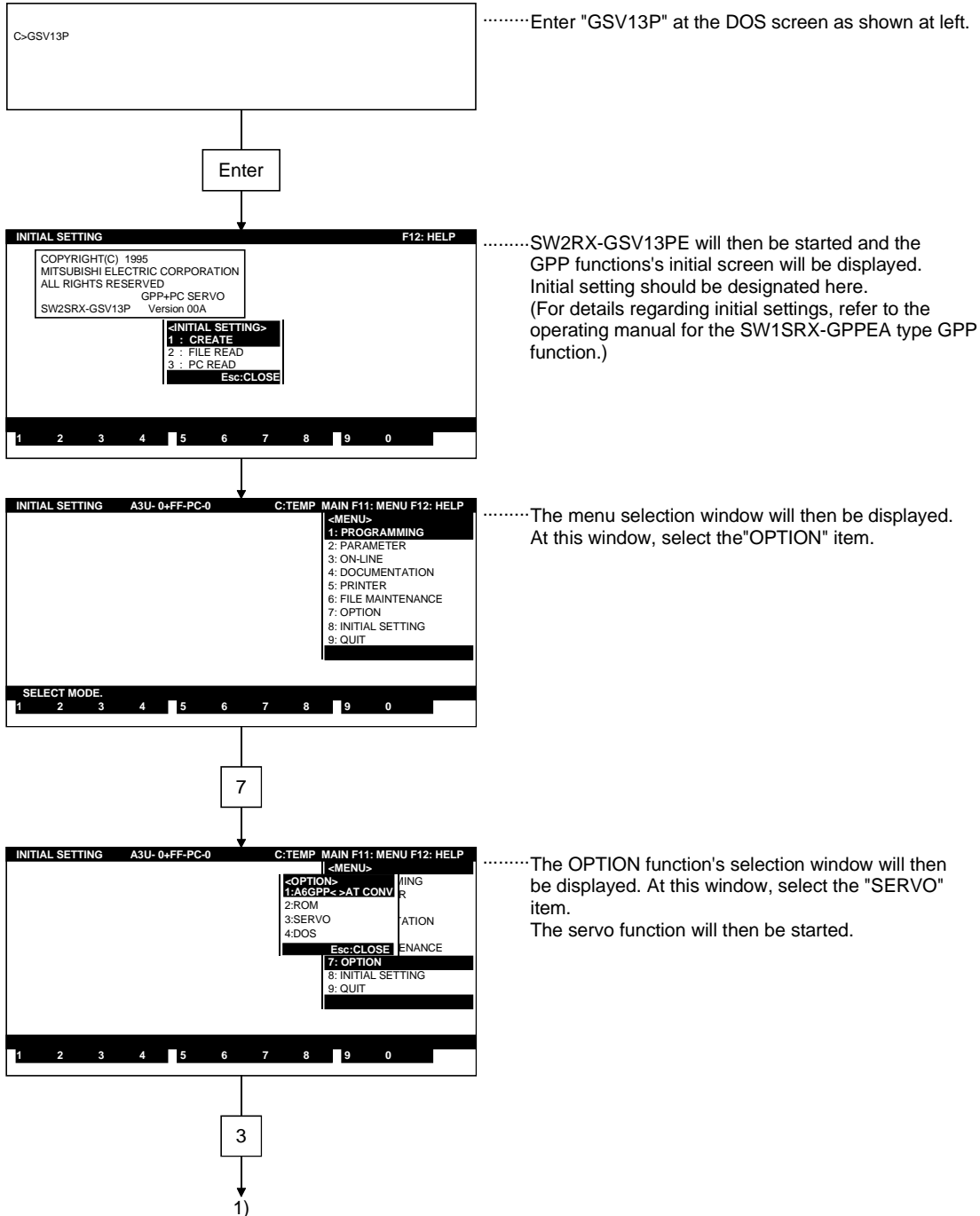
# **SERVO-RELATED INFORMATION**

# 6. STARTING & QUITTING GSV22PE

## 6. STARTING & QUITTING GSV22PE

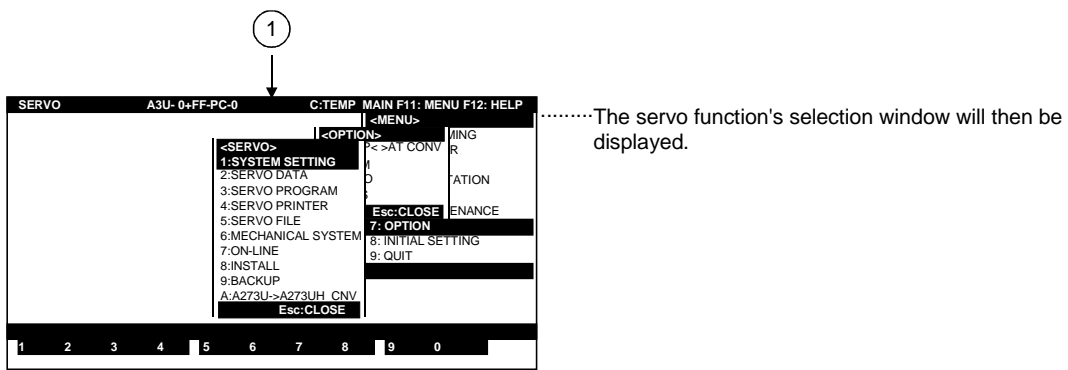
### 6.1 Start-Up Procedure

This section describes the procedure for displaying the GPP function's initial screen after starting the personal computer where GSV22PE has been registered (installed).



## 6. STARTING & QUITTING GSV22PE

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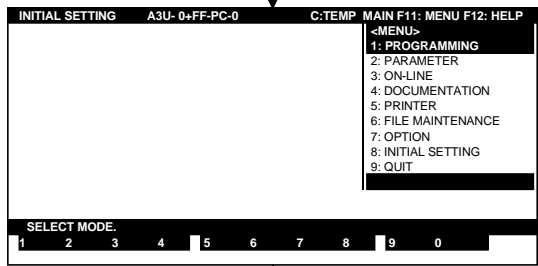


# 6. STARTING & QUITTING GSV22PE

## 6.2 Ending GSV22PE Operation

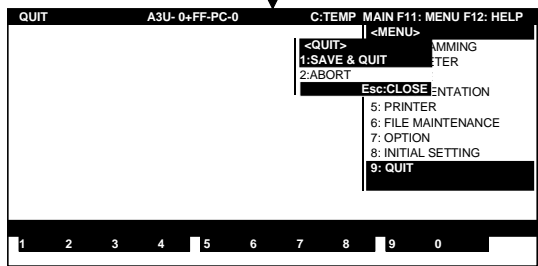
The procedure for ending GSV22PE operation and returning to the DOS screen is described below.

The data setting windows and sub-function selection windows can be closed by pressing the [Esc] key. Alternatively, press the [F11] key to display the menu selection window.



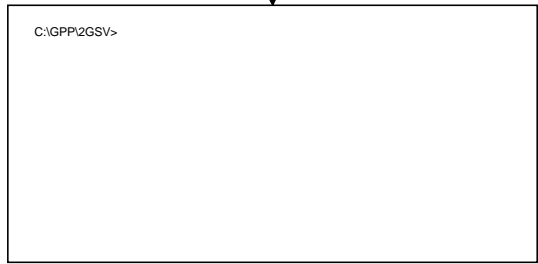
.....The menu selection window will then be displayed. The GSV22PE operation is ended. Select the "QUIT" item from the menu. This is for quitting the GPP function.

9



.....The QUIT menu window will then be displayed. At this window, select the manner in which operation is to be ended.  
 •@Enter "1" to designate "SAVE & QUIT". Operation will be ended after the designated servo data has been written to the file.  
 •@Enter "2" to designate "ABORT". Operation will be ended without writing the designated servo data to the file.

1 or 2



.....The DOS prompt will be displayed.

**POINT**  
 "SAVE & QUIT" operation:  
 When the servo function has been ended without file writing, select the "SAVE & QUIT" item at the GPP function's QUIT window to write the current program's data to the file before operation is ended.

# 7. SYSTEM SETTINGS

## 7. SYSTEM SETTINGS

Base unit selection, module allocation, program axis No. settings, servomotor settings, and servo amplifier settings are all made in accordance with the actual system configuration.

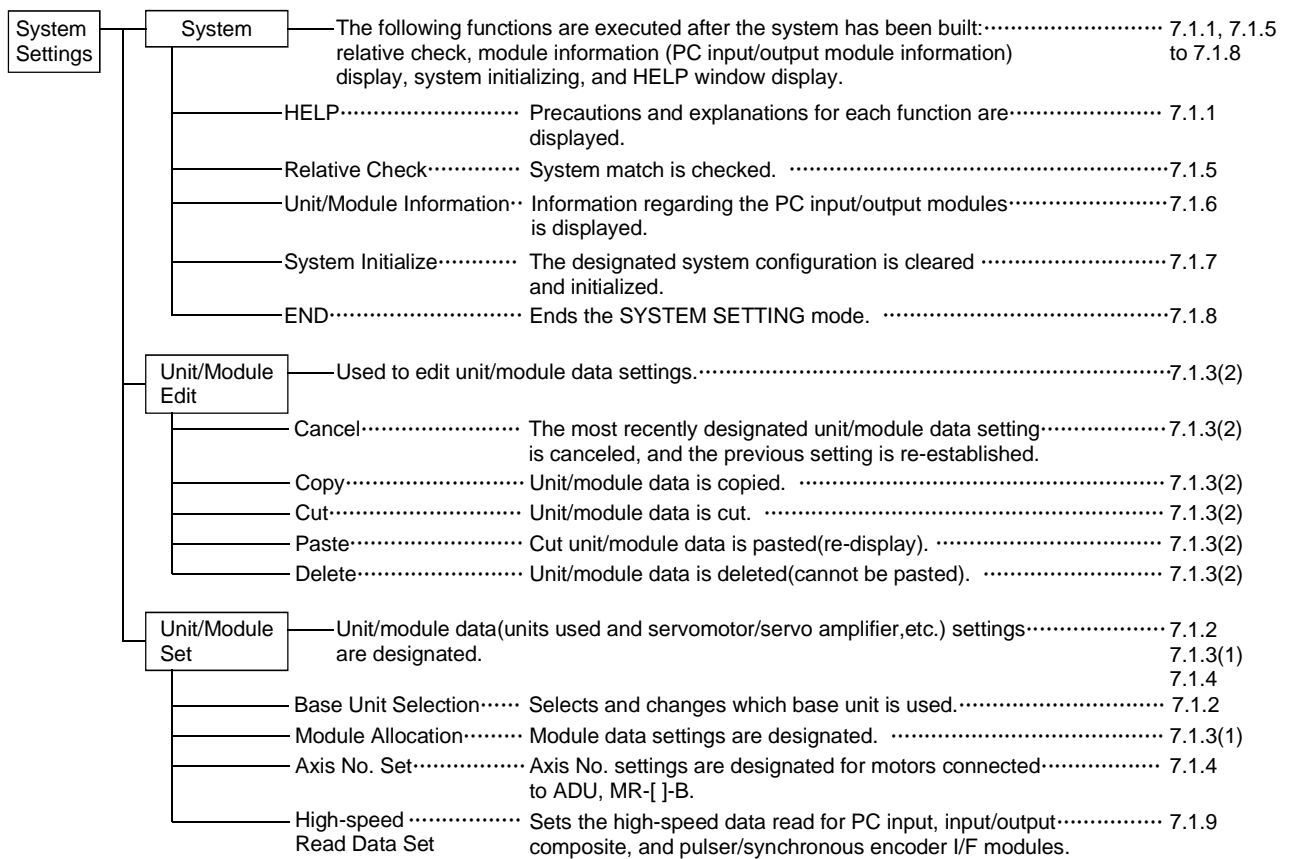
Moreover, the designated system configuration should be checked to ensure that it is the correct one.

Unless otherwise stated, display screen examples are the screens of the A273UHCPU (8-axis specification).

### 7.1 System Settings

#### (1) Function summary

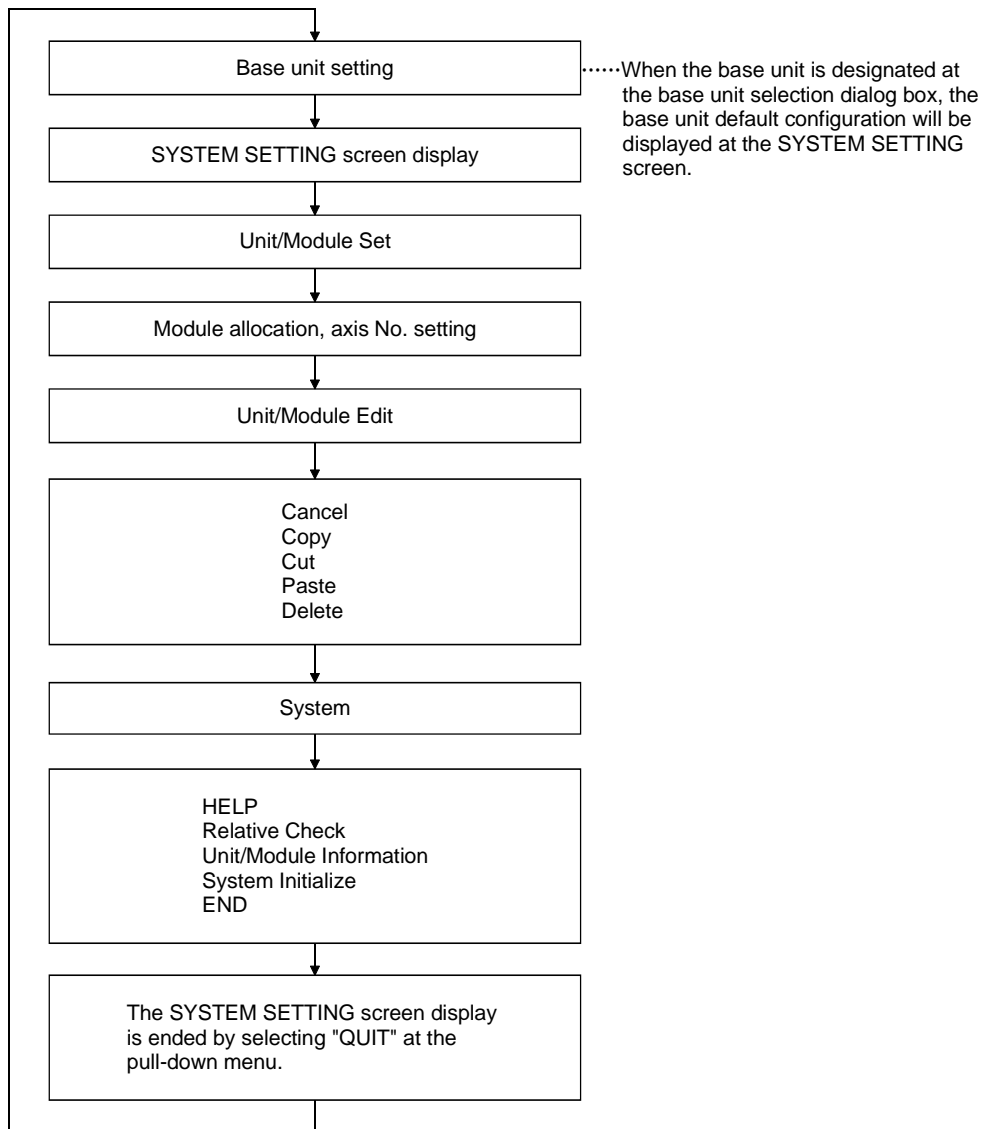
The following functions are available in the SYSTEM SETTING mode.



## 7. SYSTEM SETTINGS

### (2) Outline flowchart

The basic procedures for the SYSTEM SETTING mode are shown in the following flowchart.



# 7. SYSTEM SETTINGS

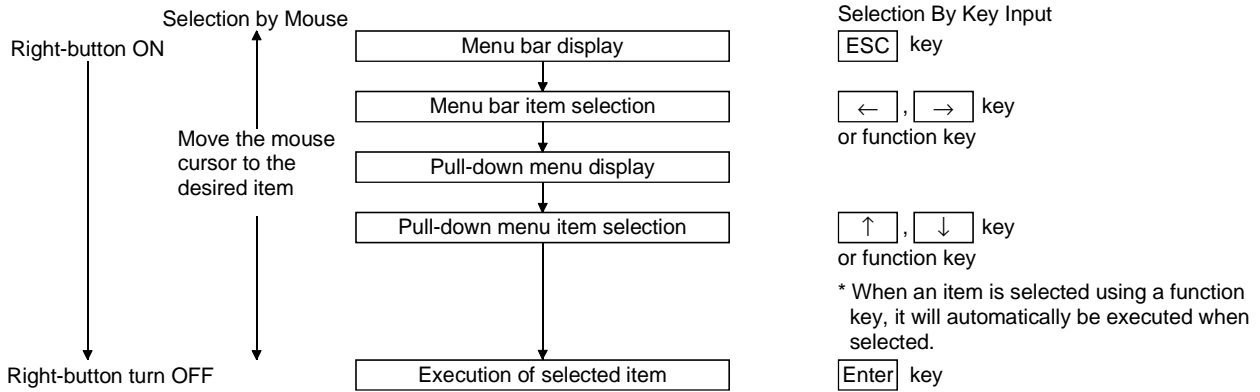
## 7.1.1 Common items

The following items are common to all SYSTEM SETTING mode operations.

### (1) Menu selection

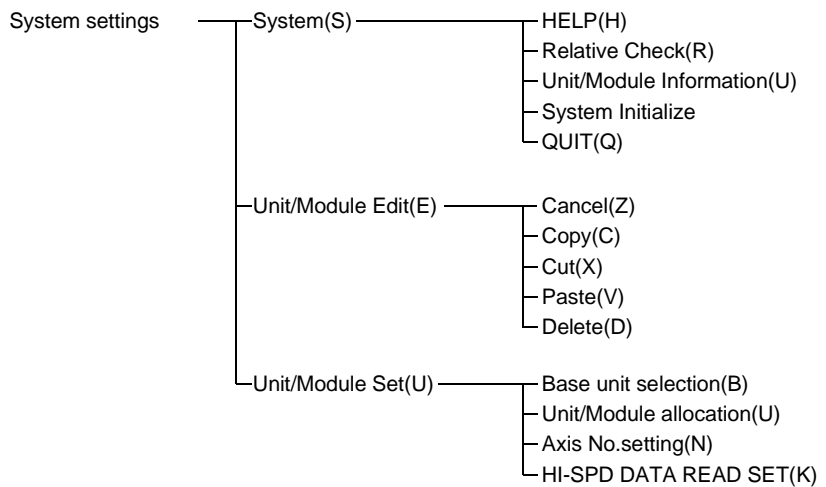
#### (a) Mouse and key operations

Menu items can be selected by using the mouse or by key inputs. Both methods are described below.



#### (b) Function key allocation

The character keys used in menu selection procedures are shown in parentheses below.

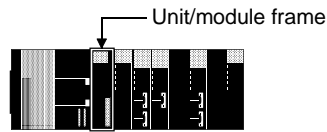


## 7. SYSTEM SETTINGS

### (2) Terminology used in this section

#### (a) Unit/module frame

Frame which indicates that a module or unit selection has been determined.



### (3) HELP function

In the SYSTEM SETTING mode, the HELP function displays precautions and explanations for each of the functions. (Refer to section 5.8(4)).

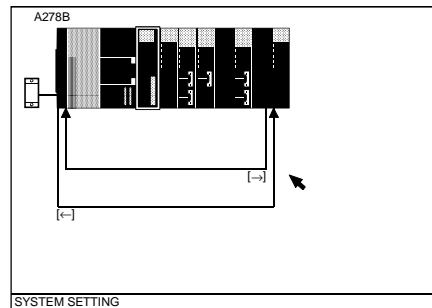
### (4) Basic operation

#### (a) Module selection

##### 1) Module selection by key input

Use the [←][→] keys to move the unit/module frame to the desired module.

#### [Key Input Selection Screen]



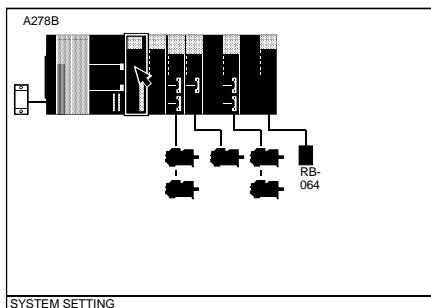
If the [←] key is pressed when the frame is at the left-most module position, the frame will move to the right-most module position.  
If the [→] key is pressed when the frame is at the right-most module position, the frame will move to the left-most module position.

##### 2) Module selection by mouse(mouse click)

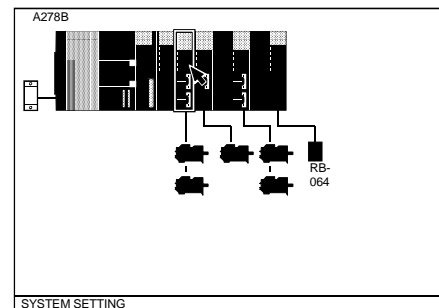
Click to Select:

- i) Move the mouse cursor to the desired module position and execute a left-click.
- ii) The selected module will then be framed.

#### [Selection (by Click) Execution Screen]



#### [Selection (by Click) END Screen]



# 7. SYSTEM SETTINGS

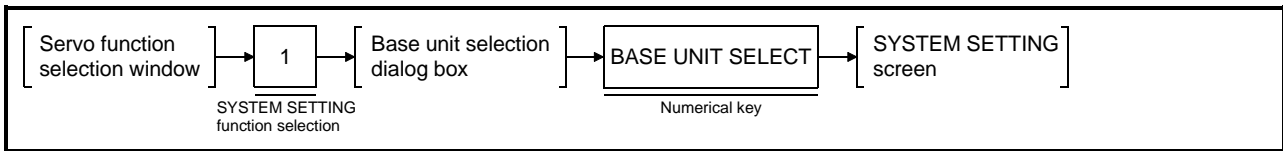
## 7.1.2 Setting the base unit

Designate the base unit to be used in the manner described below.

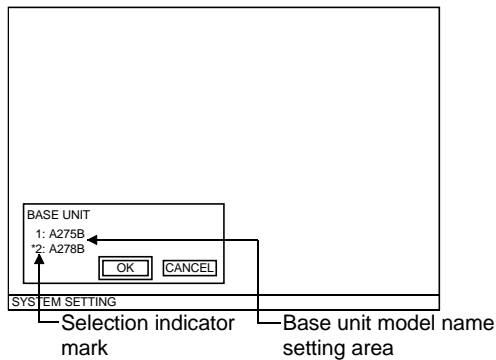
### (1) Base unit selection

A base unit selection is required when a "no base unit setting" status exists. If a base unit setting already exists, the base unit selection procedure is unnecessary.

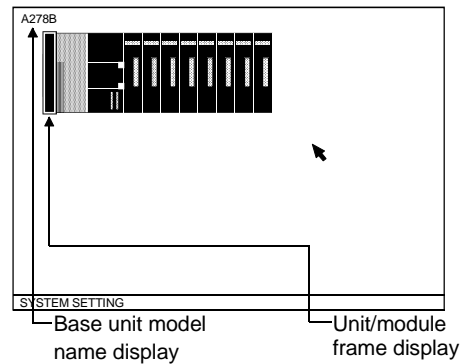
#### [Base Unit Setting Procedure]



#### [Base Unit Setting Dialog Box]



#### [SYSTEM SETTING Screen] (When A278B is selected)



#### [Display/Setting Content]

**Base unit model name setting area** The selectable base unit model names are displayed here.

**Selection indicator mark** Indicates the selected model name.

**Unit/module frame display** The frame used for selecting units is displayed.

**Base unit model name display** The name of the selected base unit is displayed here.

#### [Mouse Operation Procedure]

**Base Unit Selection** 1) If SYSTEM SETTING data has not been set, select the "SYSTEM SETTING" item at the servo function selection window in order to display the SYSTEM SETTING screen. The base unit setting dialog box will also be displayed at this time.

Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name.

The selection indicator mark will then be displayed at the selected model name.

**Setting END** 1) To end the settings, left-click "OK" or press the [Enter] key.

The setting will then be registered, and the system will return to the base unit display screen where the default configuration for the designated base unit will be displayed.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.

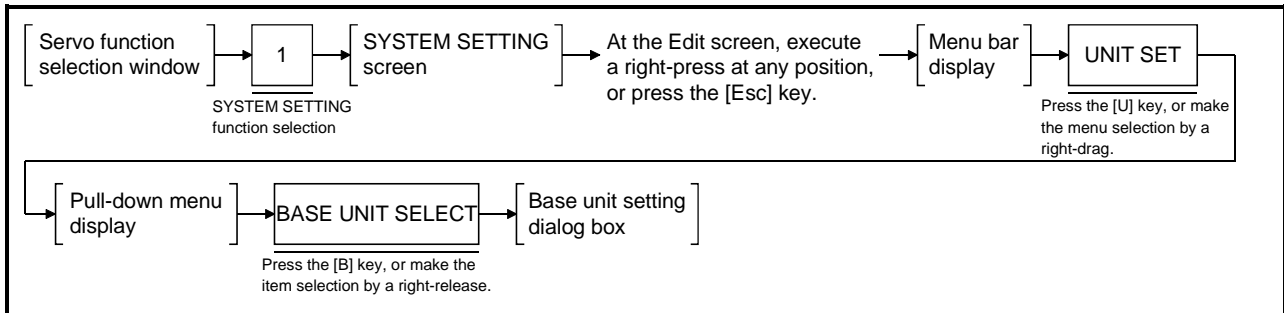
The entered SETTINGS will be canceled, and the system will return to the SYSTEM SETTING screen.

## 7. SYSTEM SETTINGS

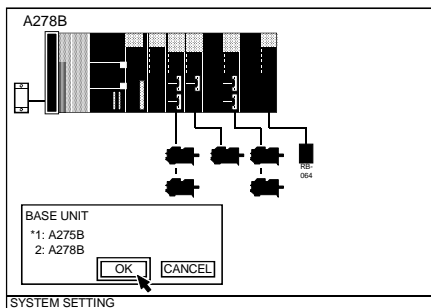
### (2) Changing the base unit setting

The procedure for changing an existing base unit setting is described below.

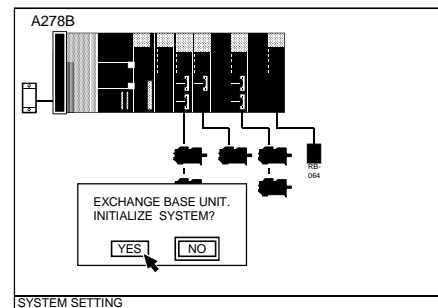
#### [Base Unit Change Procedure]



#### [Base Unit Setting Dialog Box] (When A278B is selected)



#### [Base Unit Initialize YES/NO Dialog Box]



#### [Mouse Operation Procedure]

##### Changing the Base Unit Setting

- 1) In order to change an existing base unit setting, execute a right-press at any position on the EDIT screen in order to display the menu bar.
- 2) With the right-button pressed, move the mouse cursor to the menu's "UNIT SET (U)" item to display the pull-down menu. At the pull-down menu, execute a right-release at the "BASE UNIT SELECTION (B)" item. The base unit dialog box will then be displayed.
- 3) Move the mouse cursor to the base unit model name to be newly designated and execute a left-click, or key-in the number shown at the left of the model name. The selection indicator mark will then be displayed at the selected model name.
- 4) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key. The "Base Unit Initialize YES/NO" dialog box will then be displayed. To save data settings which existed prior to the base unit change, execute a left-click at the "NO" item. The base unit setting will then be changed and the pre-change settings will be saved (within the possible range). If the pre-change data settings are no longer required, execute a left-click at the "YES" item. The default configuration for the newly designated base unit will be displayed.
- 5) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the Base Unit screen status which existed prior to the change.

## 7. SYSTEM SETTINGS

### 7.1.3 Designation of system modules & servomotor/servo amplifier

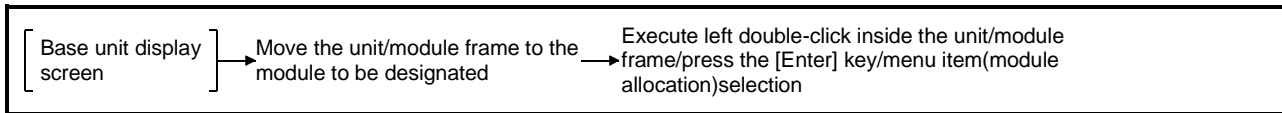
The procedures for designating and editing the system module and the servomotor/servo amplifier settings are described below.

(1) Designation of system modules & servomotor/servo amplifier

The type/model name of the system modules and the servo motor/servo amplifier are designated.

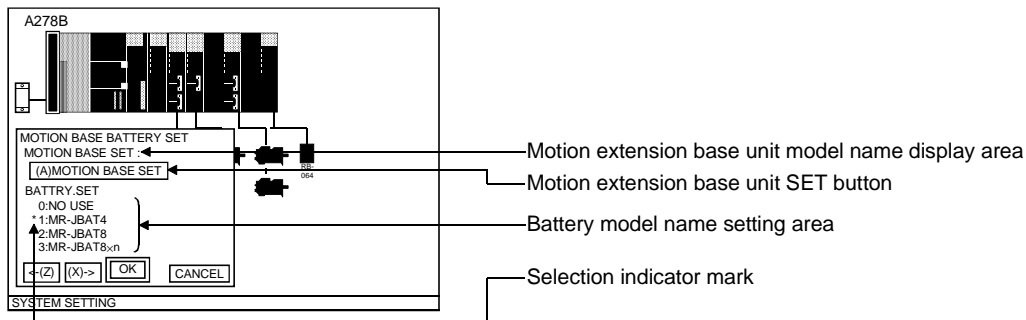
(a) Designation of modules to be used (system modules)

#### [Procedure for Displaying System Module Designation Dialog Box]



1) Motion extension base unit and battery setting  
(for A273UHCPU (8-/32 axis specification) only)

#### [Motion Extension Base Unit and Battery Setting Dialog Box]



#### [Display/Setting Content]

**Motion extension base unit model name display area** The name of the selected motion extension base unit is displayed here.

**Motion extension base unit SET button** Opens the motion extension base unit setting dialog box.

**Battery model name setting area** The model names of selectable battery units are displayed here.

**Selection indicator mark** Indicates the model name of the selected battery unit.

#### [Mouse Operation Procedure]

**Selecting the motion extension base unit** 1) To select the motion extension base unit, execute a left-click at the MOTION BASE SET button, or press the [A] key. The motion extension base setting dialog box will then be displayed.

**Battery model name setting** 1) Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name. The selection indicator mark will move to the selected name. Be sure to set a battery unit when an ABS motor or A273EX is connected.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key. The setting will then be registered, and the system will return to the base unit display screen.

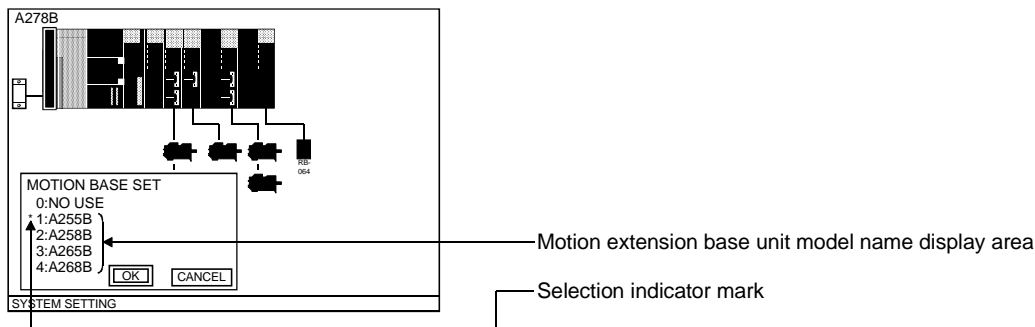
**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the base unit display screen.



## 7. SYSTEM SETTINGS

### To Use A Motion Extension Base Unit

#### [Motion Extension Base Unit Dialog Box]



#### [Display/Setting Content]

**Motion extension base unit model name setting area** The selectable motion extension base unit names are displayed here.

**Selection indicator mark** Indicates the model name of the selected motion extension base unit.

#### [Mouse Operation Procedure]

**Motion extension base unit model name setting** 1) Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name.

The selection indicator mark will move to the selected name.

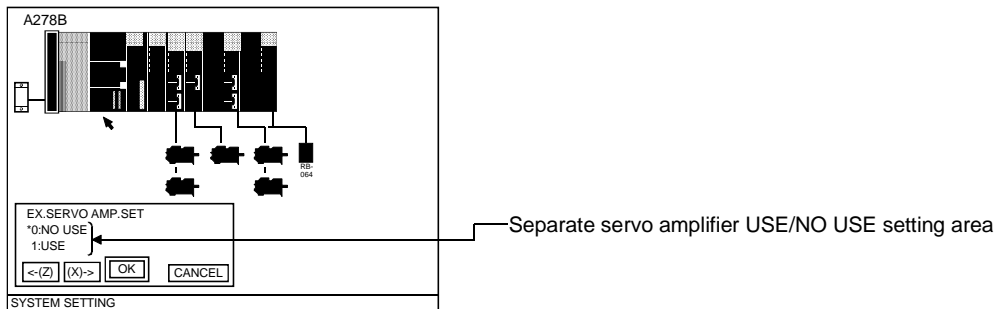
**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The entered settings will be confirmed, and the system will return to the motion extension base & battery setting dialog box.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the motion extension base & battery setting dialog box.

## 7. SYSTEM SETTINGS

### 2) Selecting separate servo amplifiers

#### [Separate Servo Amplifier Setting Dialog Box]



#### [Display/Setting Content]

**Separate servo amplifier USE/NO USE setting area** The USE/NO USE setting is designated here for the separate servo amplifier.

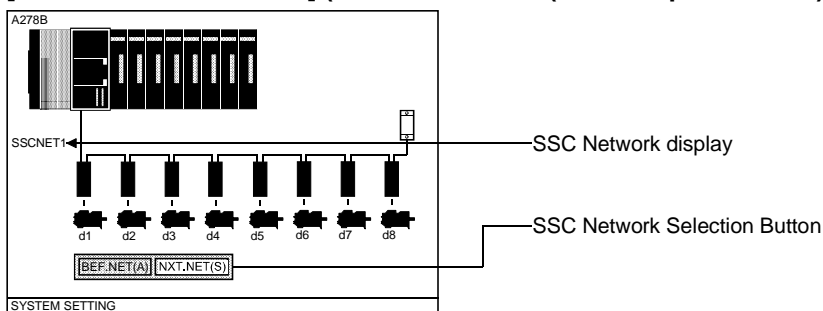
#### [Mouse Operation Procedure]

**Separate servo amplifier USE/NO USE setting** 1) Move the mouse to the "USE" or "NO USE" item and execute a left-click, or key in the number shown at the left of the item. The selection indicator mark will move to the selected name.

**Setting END** 1) To end the settings, left-click "OK" or press the [Enter] key. The setting will then be registered, and the system will return to the base unit display screen.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the base unit display screen.

#### [SSC Network Selection] (For A273UHCPU (32-axis specification) only)



\*The screen shown above is the A273UHCPU (32-axis specification) screen.

#### [Display/Setting Content]

**SSC network display** The No. of the currently selected SSC network is displayed (SSCNET 1-4).

**SSC Network Selection Button** Changes the SSC network No.

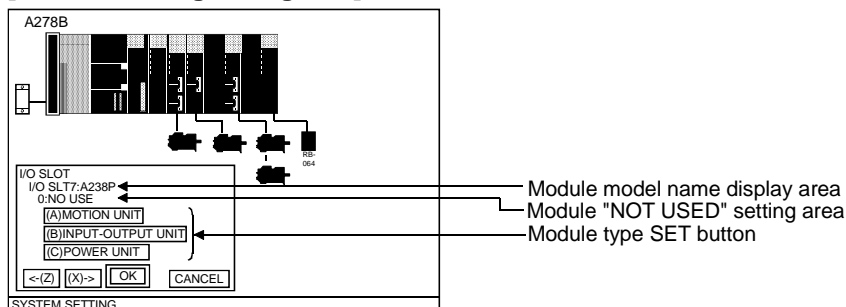
#### [Mouse Operation Procedure]

**SSC network selection** 1) Execute a left-click at the "BEF.NET" or "NXT.NET" item, or key in [A] or [S]. Changes the SSC network No.

## 7. SYSTEM SETTINGS

### 3) I/O slot setting

#### [I/O Slot Setting Dialog Box]



#### [Display/Setting Content]

**Module model name display area** The name of the selected module is displayed here.

**Module "NOT USED" setting area** Designated when the I/O slot is not used (vacant).

**Module type SET button** Module types which are installable at the I/O slot are displayed here. When a selection is made, a model name setting dialog box for that module will be opened.

#### [Mouse Operation Procedure]

**Module type setting** 1) Move the mouse cursor to the desired module type and execute a left-click, or key in the number shown at the left of the module type. A model name setting dialog box for the selected module will then be displayed.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key. The setting will then be registered, and the system will return to the base unit display screen.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the base unit display screen.

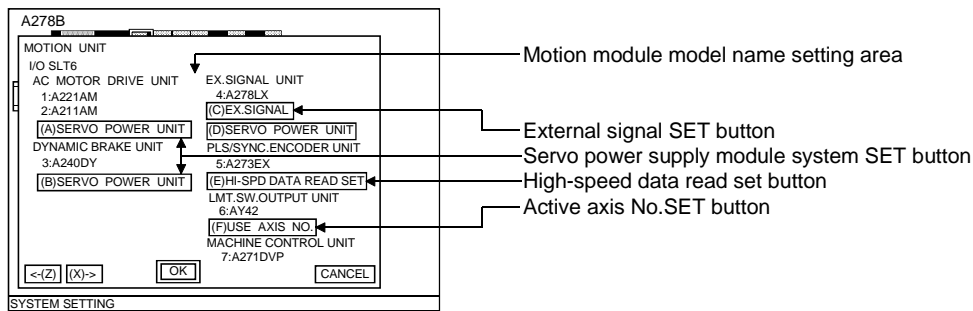
#### POINT

With an A17[ ]CPU, the module frame does not move to the following modules.  
 Base module model name:  
 A172B :Right side I/O module (S-I/00 slot)  
 A178B :Second slot from the left end and on (S-I/00 to S-I/06 slots)  
 A178B-S1 :Third slot from the left end and on (S-I/00 to S-I/05 slots)  
 A PC module can be installed at S-I/0 slot (for modules that can be installed in this slot, see Motion Controller (A171SCPU, A172SHCPU/A171SHCPU) User's Manual.  
 Note that these modules are not related to the motion controller and, accordingly, setting of a model name is not necessary in the system setting operation.

## 7. SYSTEM SETTINGS

### To Install A Motion Module

#### [Motion Module Setting Dialog Box]



\*The screen shown above is the A273UHCPU (32-axis specification) screen.

#### [Display/Setting Content]

**Motion module model name setting area** The selectable motion module names and types are displayed here.

**External signal SET button** Opens the external signal setting dialog box (for installing a servo external signal module).

**Servo power supply module system setting button\*** Opens the servo power supply module system designation SET dialog box. (For installing an ADU/dynamic brake module/servo external signal module.)

**High-speed data read set button** Opens the high-speed data read setting dialog box (when high-speed data read function is used).

**Active axis No. SET button\*** Opens the active axis No. dialog box. (Only when a limit output module is installed.)

#### [Mouse Operation Procedure]

**Motion module model name setting**

- 1) Move the mouse cursor to the desired motion module name and execute a left-click, or key-in the number shown at the left of the name. The selection indicator mark will move to the selected name. To make external signal, servo power supply module system, or active axis No. settings for each module after setting the module name, either execute a left-click on the relevant SET button, or press the function key ([A] to [F]) which corresponds to it. The setting dialog box for that item will then be opened. (Servo power supply module system & active axis No. settings apply only for the A273UHCPU (32-axis specification) module.)

**Setting END**

- 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key. The entered settings will be confirmed and the I/O slot setting dialog box will be opened.

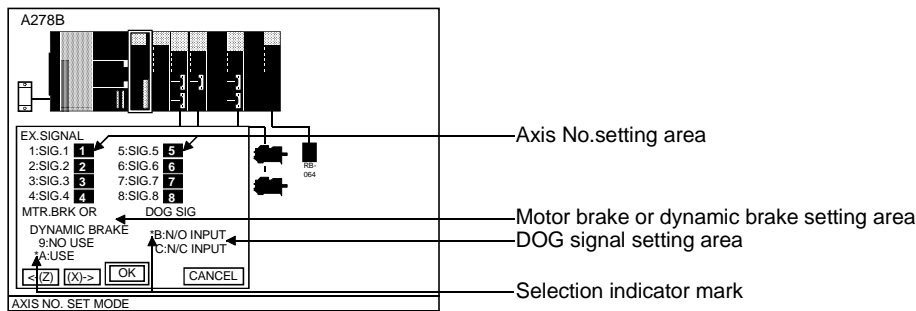
**Setting Abort**

- 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the I/O slot setting dialog box.

\* Displayed only when using the A273UHCPU (32-axis specification).

## 7. SYSTEM SETTINGS

### [External Signal Setting Dialog Box]



### [Display/Setting Content]

- Axis No. setting area** Designate the axis No. which corresponds to the input signal of the servo external signal module here.
- Motor brake or dynamic brake setting area** Designate a USE or NO USE setting for the motor brake or dynamic brake here.
- DOG signal setting area** Designate an N/O INPUT or N/C INPUT input setting for the DOG signal here.
- Selection indicator mark** Indicates the USE/NO USE status for the motor brake or dynamic brake, and the N/O INPUT or N/C INPUT input status of the DOG signal.

### [Mouse Operation Procedure]

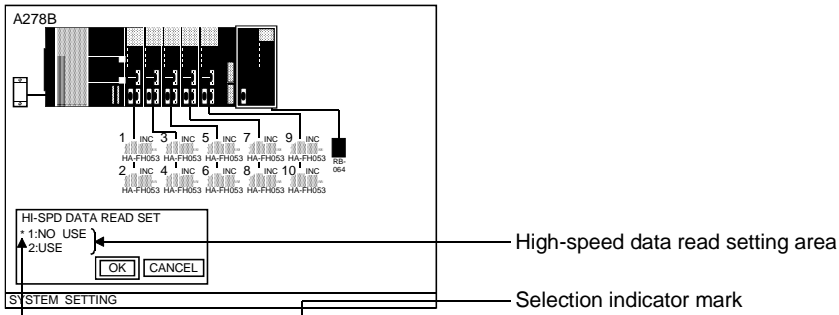
- Axis No. setting area**
- 1) Move the mouse cursor to the axis No. setting area and execute a left-click, or key-in the number shown at the left of the signal No. The cursor will move to the axis No. setting area.
- Axis No. setting change**
- 1) To change the displayed axis No. setting, press the [Back Space] key to delete the displayed No., then key-in the desired axis No. Next, execute a left-click outside the axis No. setting area, or press the [Enter] key.
  - 2) If a number outside the permissible range is designated, an error message will be displayed at the system message display line. In this case, re-designate the axis No. setting.
- Motor brake or dynamic brake setting**
- 1) Move the mouse cursor to the USE or NO USE position and execute a left-click, or key-in the alphanumeric character shown at the left of the "USE" or "NO USE" item. The selection indicator mark will move to the selected item.
- DOG signal setting**
- 1) Move the mouse cursor to the "N/O INPUT" or "N/C INPUT" item and execute a left-click, or key-in the alphabetic character shown at the left of the "N/O INPUT" or "N/C INPUT" item. The selection indicator mark will move to the selected item.
- Setting END**
- 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key. The entered settings will be confirmed and the system will return to the motion module setting window.
- Setting Abort**
- 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the motion module setting window.

#### POINT

External servo signals indicate FLS, RLS, STOP, DOG and CHANGE of A171SENC/A172SENC/A278LX. By setting an axis No. for signals 1 to 8, input of the corresponding external servo signal becomes valid. For details of signals, see the Programming Manual.

## 7. SYSTEM SETTINGS

### [High-speed Data Read Setting Dialog Box]



### [Display/Setting Content]

**High-speed data read setting area** Whether or not high-speed data read is used is set.

**Setting indicator mark** The set processing is indicated.

### [Mouse Operation Procedure]

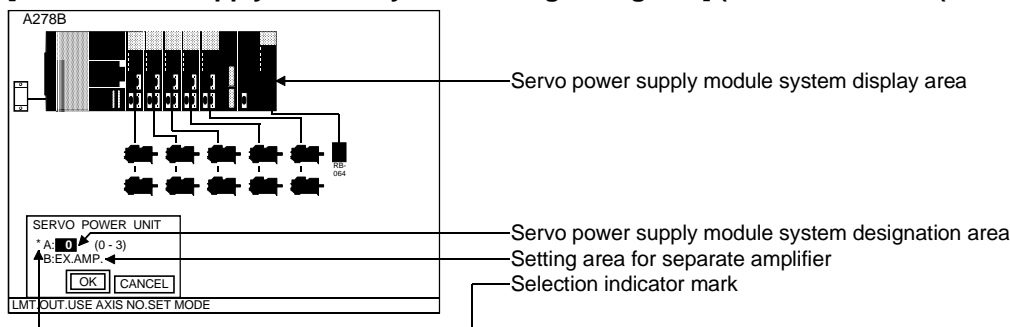
**High-speed data read setting** 1) Move the mouse cursor to the item to be set and execute left-click, or key-in the number shown at the left of the item  
The selection indicator mark will move to the selected item.

**Setting END** 1) To end the setting operation, execute a left-click at the "OK" item, or press the [Enter] key.  
The content of setting will be confirmed and the system returns to the motion module setting dialog box

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The content of setting will be canceled, and the system returns to the motion module setting dialog box.

## 7. SYSTEM SETTINGS

### [Servo Power Supply Module System Setting Dialog Box] (For A273UHCPU (32-axis specification) only)



\*The screen shown above is the A273UHCPU (32-axis specification) screen.

#### [Display/Setting Content]

<b>Servo power supply module system area</b>	The servo power supply module system for each module (AC motor drive module, dynamic brake module, servo external signal module, servo power supply module) is indicated here.
<b>Servo power supply module system designation area</b>	The servo power supply module system for the selected module (AC motor drive module, dynamic brake module, servo external signal module, servo power supply module) is designated here.
<b>Setting area for separate amplifier*</b>	A setting is designated when a dynamic brake is used for the separate amplifier.
<b>Selection indicator mark*</b>	Indicates the selected item.

#### [Mouse Operation Procedure]

<b>Servo power supply module system designation</b>	<ol style="list-style-type: none"> <li>1) Move the mouse cursor to the servo power supply module system designation area and execute a left-click, or key-in the number shown at the left of the desired servo power supply module system. The cursor is displayed in the servo power supply module system designation area. (The selection indicator mark is displayed when a dynamic brake module is set.)</li> </ol>
<b>Servo power supply module system No. change</b>	<ol style="list-style-type: none"> <li>1) To change the displayed servo power supply module system No., press the [Back Space] key, key-in the desired system No., then execute a left-click outside the servo power supply module setting area, or press the [Enter] key.</li> <li>2) If a number outside the permissible range is designated, an error message will be displayed at the system message display line. In this case, re-designate the servo power module system No. setting.</li> </ol>
<b>Setting area for separate amplifier*</b>	<ol style="list-style-type: none"> <li>1) Move the mouse cursor to the separate amplifier setting area and execute a left-click, or key-in the number shown at the left of the separate amplifier setting area. A selection indicator mark will be displayed.</li> </ol>
<b>Setting END</b>	<ol style="list-style-type: none"> <li>1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key. The entered settings will be confirmed and the system will return to the motion module setting window.</li> </ol>
<b>Setting Abort</b>	<ol style="list-style-type: none"> <li>1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the motion module setting window.</li> </ol>

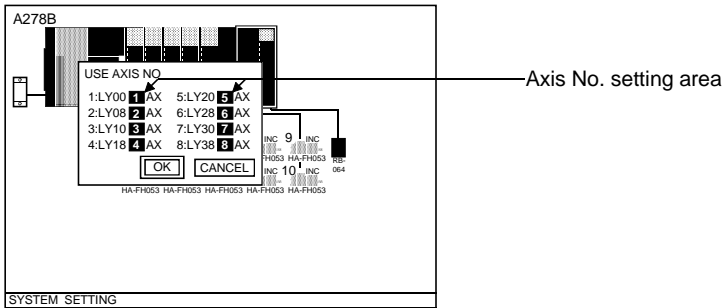
\* Display/setting occurs only for the "dynamic brake module" setting operation.

#### POINT

An error will occur if the same servo power supply module system No. is used more than once when making settings for multiple servo power supply modules.

## 7. SYSTEM SETTINGS

### [Active Axis No. Setting Dialog Box] (For A273UHCPU (32-axis specification) only)



\*The screen shown above is the A273UHCPU (32-axis specification) screen.

### [Display/Setting Content]

**Axis No. setting area** The axis No. to be used at the limit output module is designated.

### [Mouse Operation Procedure]

**Axis No. setting area designation** 1) Move the mouse cursor to the axis No. setting area and execute a left-click, or key-in the number shown at the left of the signal No.

The cursor will move to the axis No. setting area.

**Axis No. setting change** 1) To change the displayed axis No. setting, press the [Back Space] key to delete the displayed No., then key-in the desired axis No. Next, execute a left-click outside the axis No. setting area, or press the [Enter] key.

2) If a number outside the permissible range is designated, an error message will be displayed at the system message display line.  
In this case, re-designate the axis No. setting.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The entered settings will be confirmed and the system will return to the motion module setting window.

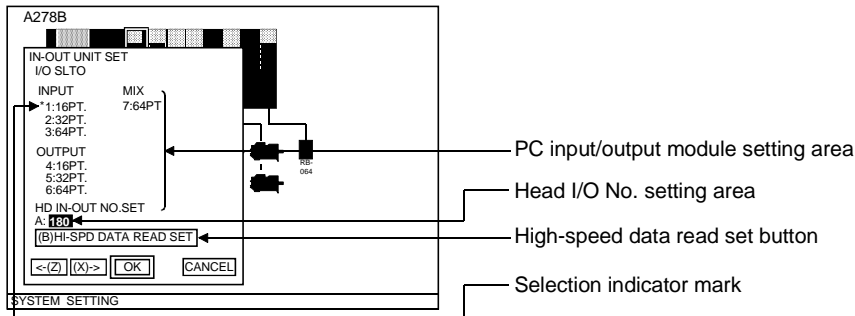
**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the motion module setting window.



## 7. SYSTEM SETTINGS

### Installing PC Input/Output Modules

#### [PC Input/Output Module Setting Dialog Box]



#### [Display/Setting Content]

- PC input/output module setting area** The selectable PC input/output module types, and the number of points are displayed.
- Head I/O No. setting area** The first I/O No. of the I/O No. range occupied by the PC input/output module is designated here.
- Selection indicator mark** The selected PC input/output module type, and the number of points are displayed.
- High-speed data read set button** Opens the high-speed data read setting dialog box (when high-speed data read function is used.).

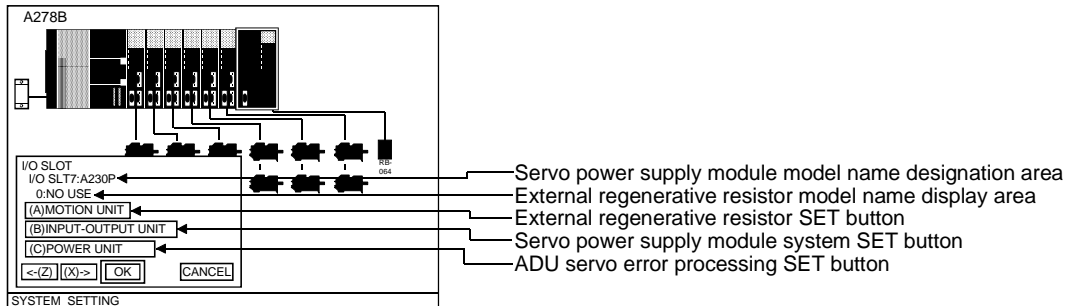
#### [Mouse Operation Procedure]

- PC input/output module setting**
- 1) Move the mouse cursor to the number of points to be designated and left-click. Alternatively, use the numeric keys to enter the number to the left of the number of points to be designated. The selection indicator mark will move to the set number of points.
- Head I/O No. setting area change**
- 1) Move the mouse cursor to the "HD IN-OUT NO.SET" setting area and execute a left-click, or press the [A] key. A cursor will be displayed in the "HD IN-OUT NO.SET" setting area.
  - 2) Key-in the desired head input/output No., then execute a left-click outside the "HD IN-OUT NO.SET" setting area, or press the [Enter] key.
  - 3) To change the displayed head input/output No., delete the No. by pressing the [Back Space] key, then enter the desired No.
  - 4) If a number outside the permissible range is designated, an error message will be displayed at the system message display line. In this case, re-designate the "SET DATA IS NOT PROPER" setting. Set the head I/O number again.
- Setting END**
- 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key. The entered settings will be confirmed and the I/O slot setting dialog box will be opened.
- Setting Abort**
- 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the I/O slot setting dialog box.

## 7. SYSTEM SETTINGS

### Installing Servo Power Supply Modules

#### [Servo Power Supply Module Setting Dialog Box]



\*The screen shown above is the A273UHCPU (32-axis specification) screen.

#### [Display/Setting Content]

- Servo power supply module model name designation area** The selectable servo power supply module names are displayed here.
- External regenerative resistor model name display area** The designated external regenerative resistor name is displayed here.
- External regenerative resistor SET button** Opens the external regenerative resistor setting dialog box.
- Servo power supply module system SET button\*1** Opens the servo power supply module system designation SET dialog box.
- ADU servo error processing SET button** Opens the servo error processing setting dialog box.  
(For A273UHCPU (32-axis specification) only)

#### [Mouse Operation Procedure]

- Servo power supply module model name designation** 1) Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name.  
The selection indicator mark will then be displayed at the selected model name.
- External regenerative resistor setting** 1) Move the mouse cursor to the External regenerative resistor SET button position and execute a left-click, or press the [A] key.  
The external regenerative resistor setting dialog box will then be opened.
- Servo power supply module system setting \*2** 1) Move the mouse cursor to the Servo power supply module system SET button position and execute a left-click, or press the [B] key.  
The servo power supply module system setting dialog box will then be opened.
- ADU servo error processing setting** 1) Move the mouse cursor to the ADU servo error processing SET button position and execute a left-click, or press the [C] key.  
The ADU servo error processing setting dialog box will then be opened.
- Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The entered settings will be confirmed and the I/O slot setting dialog box will be opened.
- Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the I/O slot setting dialog box.

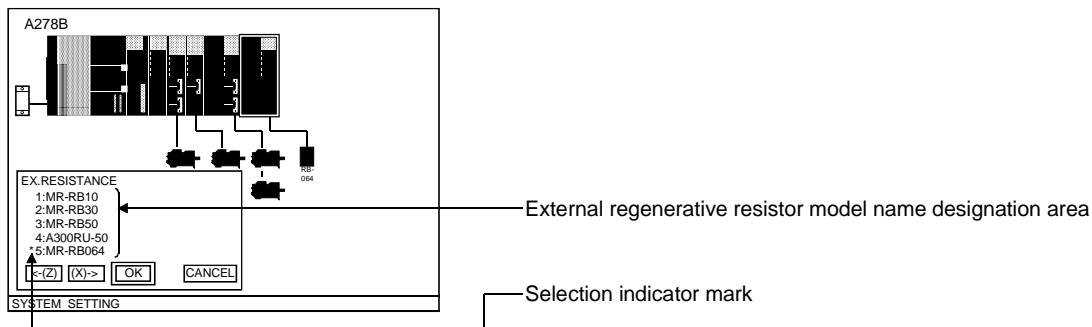
\*1 Displayed only when using A273UHCPU (32-axis specification).

\*2 Set only when using A273UHCPU (32-axis specification).

(For details, see Section 7.1.3 (1)(a)3)"Servo Power Supply Module System Setting Dialog Box".)

## 7. SYSTEM SETTINGS

### [External Regenerative Resistor Setting Dialog Box]



### [Display/Setting Content]

**External regenerative resistor model name designation area** The selectable regenerative resistor names are displayed here.

**Selection indicator mark** Indicates the selected model name.

### [Mouse Operation Procedure]

**External regenerative resistor model name designation**

- 1) Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name.  
The selection indicator mark will move to the selected name.

**Setting END**

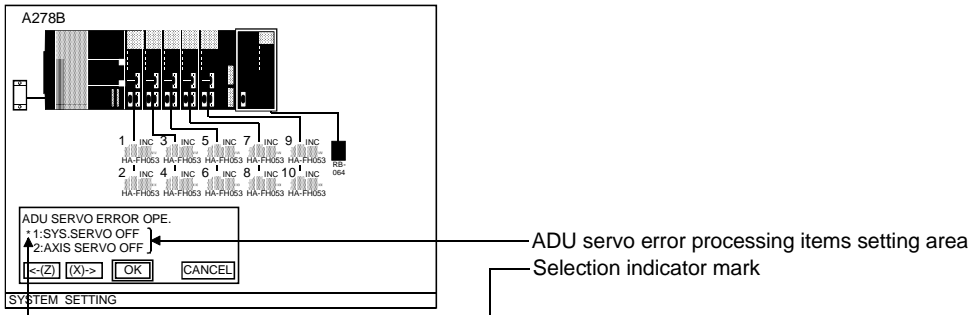
- 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The entered settings will be confirmed and the system will return to the servo power supply module setting dialog box.

**Setting Abort**

- 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the servo power supply module setting dialog box.

# 7. SYSTEM SETTINGS

## [ADU Servo Error Processing Setting Dialog Box] (For A273UHCPU (32-axis specification) only)



### [Display/Setting Content]

**ADU servo error processing items setting area** The selectable servo error processing items are displayed.

**Selection indicator mark** Indicates the selected processing item.

### [Mouse Operation Procedure]

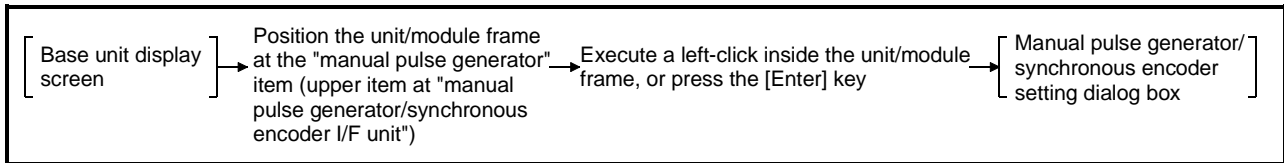
**ADU servo error processing items setting area** 1) Move the mouse cursor to the desired setting item and execute left-click, or key-in the number shown at the left of the desired item. The selection indicator mark will move to the selected item position.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key. The entered settings will be confirmed and the system will return to the servo power supply module setting dialog box.

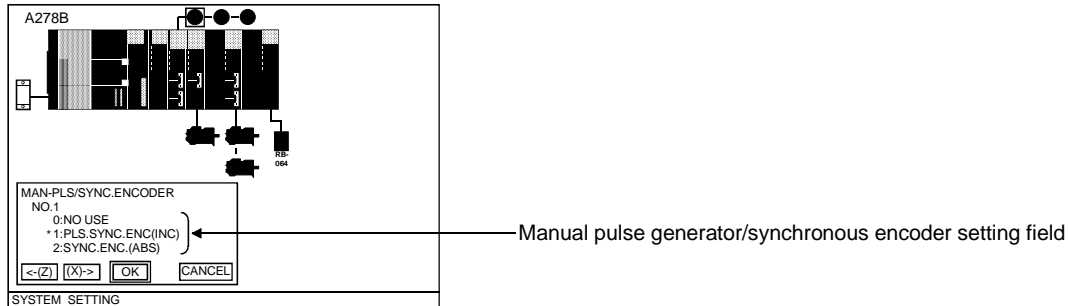
**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key. The entered settings will be canceled, and the system will return to the servo power supply module setting dialog box.

## 7. SYSTEM SETTINGS

### 4) Manual pulse generator setting



#### [Manual Pulse Generator/Synchronous Encoder Setting Dialog Box]



#### [Display/Setting Content]

**Manual pulse generator setting area** Sets whether the manual pulse generator/synchronous encoder is used.

#### [Mouse Operation Procedure]

**Manual pulse generator setting** 1) Move the mouse to the "NO USE" , "PLS.SYNC.ENC.(INC)" or "SYNC.ENC.(ABS)" and left-click. Alternatively, use the numeric keys to enter the number to the left of the required setting.

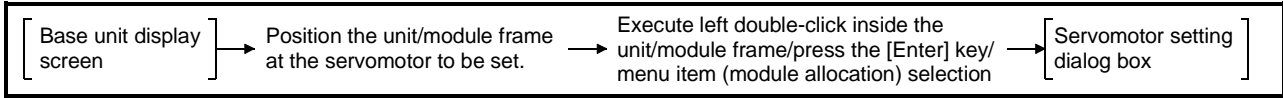
**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The setting will then be registered, and the system will return to the base unit display screen.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the base unit display screen.

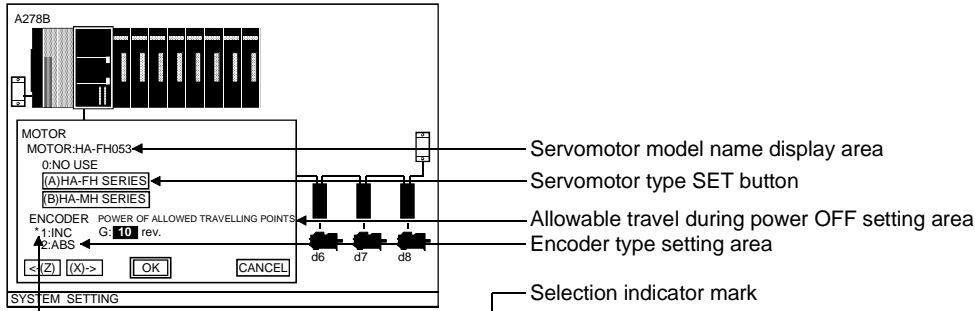
# 7. SYSTEM SETTINGS

## (b) Servomotor setting

### [Procedure for Displaying the Servomotor Setting Dialog Box]



### [Servomotor Setting Dialog Box]



### [Display/Setting Content]

- Servomotor model name display area** The selected servomotor name is displayed here.
- Servomotor type SET button** Opens the servomotor model name designation dialog box.
- Encoder type setting area** Designates whether the servomotor is an absolute data method or incremental method type.
- Allowable travel during power OFF setting area** Set the value for the amount of travel allowable while the servo amplifier power is OFF. (Set as the number of motor revolutions.) This setting is only valid when using an absolute encoder.
- Selection indicator mark** Indicates the selected servomotor type.

### [Mouse Operation Procedure]

- Servomotor type setting** 1) Move the mouse cursor to the desired servomotor type position and execute a left-click, or key-in the alphabetic character shown at the desired type. The servomotor model name designation dialog box for the selected servomotor type will then be opened.
- Encoder type setting** 1) Move the mouse cursor to the "INC" or "ABS" position and execute a left-click, or key-in the number shown at the left of the "INC" or "ABS" item. The selection indicator mark will move to the selected item.
- Selecting the allowable travel during power OFF setting area** 1) Move the mouse cursor to the allowable travel during power OFF setting area and click the left mouse button or press the "G" key. The cursor will be displayed in the allowable travel during power OFF setting area
- Changing the allowable travel (number of revolutions)** 1) To change the displayed allowable travel value (number of revolutions), delete the existing value by pressing the [Back space] key, enter the required allowable travel value with the alphanumeric keys, then either left click on the allowable travel during power OFF setting area or press the [Enter] key.  
2) If an out-of-range value is set, an error message is displayed on the system message display line. If a message is displayed, check the setting.

### POINT

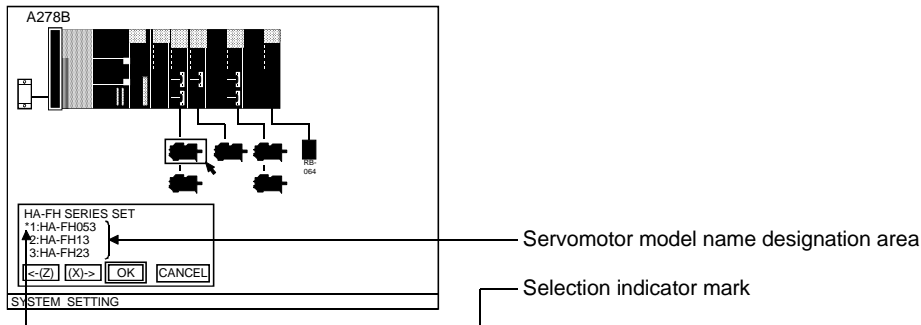
Set the allowable travel during power OFF within the range indicated below.  
 $0 \leq \text{allowable travel during power OFF (number of revolutions)} \leq 16383$

## 7. SYSTEM SETTINGS

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The setting will then be registered, and the system will return to the base unit display screen.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the base unit display screen.

### [Servomotor Model Name Designation Dialog Box] (For HA-FH Series)



### [Display/Setting Content]

**Servomotor model name designation area** The selectable servo motor names are displayed here.

**Selection indicator mark** Indicates the selected model name.

### [Mouse Operation Procedure]

**Servomotor model name designation** 1) Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name.  
The selection indicator mark will move to the selected name.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The entered settings will be confirmed and the system will return to the servomotor setting dialog box.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the servo motor setting dialog box.

#### POINT

The unit/module frame can be moved to the servomotor position by the following 2 methods:

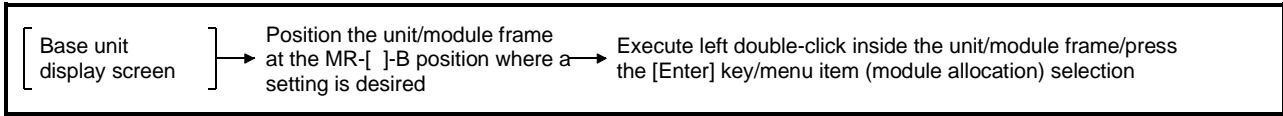
- (1) By key operation  
Press the [↓] key to move the unit/module frame from the CPU module/control power supply module to a servomotor, then use the [←][→] keys to move the unit/module frame to the desired servomotor. (If the [↑] key is pressed, the unit/module frame will move to the ADU position.)
- (2) Selection by mouse  
Move the mouse cursor to the desired servomotor and execute a left-click.

# 7. SYSTEM SETTINGS

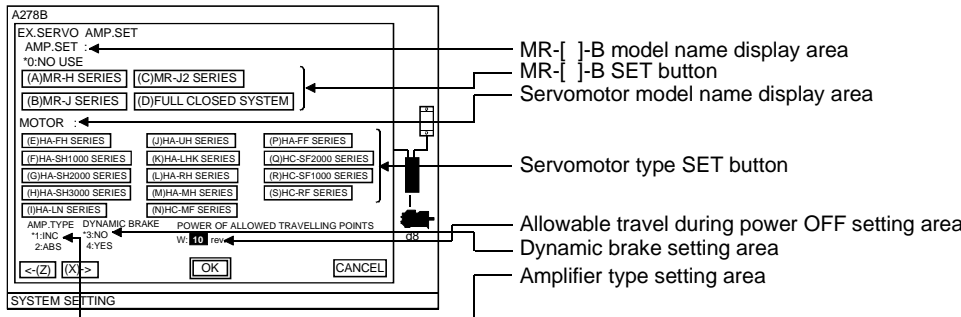
## (c) MR-[ ]-B setting

The model name of the MR-[ ]-B to be used is designated.

### [Procedure for Displaying the Separate Amplifier Setting Dialog Box]



### [Separate Servo Amplifier Setting Dialog Box]



### [Display/Setting Content]

- MR-[ ]-B model name display area** The selected MR-[ ]-B name is displayed.
- MR-[ ]-B SET button** Opens the MR-[ ]-B model name setting dialog box.
- Servomotor model name display area** The selected servomotor name is displayed here.
- Servomotor type SET button** Opens the servomotor model name designation dialog box.
- Allowable travel during power OFF setting area** Set the value for the amount of travel allowable while the servo amplifier power is OFF. (Set as the number of motor revolutions.)
- Dynamic brake setting area** Designates whether or not the dynamic brake is to be operative.
- Amplifier type setting area** Designated whether the servo motor is an absolute data method or incremental method type.

POINT
<p>(1) The unit/module frame can be moved to the MR-[ ]-B items by the following 2 methods:</p> <ul style="list-style-type: none"> <li>(a) By key operation Press the [↓] key to move the unit/module frame from the "CPU module/control power supply module" item to the "MR-[ ]-B" items, then use the [←][→] keys to move the unit/module frame to the desired MR-[ ]-B item.(If the [↑] key is pressed, the unit/module frame will move to the CPU module position.)</li> <li>(b) Selection by mouse Move the mouse cursor to the desired MR-[ ]-B item and execute a left-click.</li> </ul> <p>(2) Set the allowable travel during power OFF within the range indicated below.  <math>0 \leq \text{allowable travel during power OFF}(\text{number of revolutions}) \leq 16383</math></p>



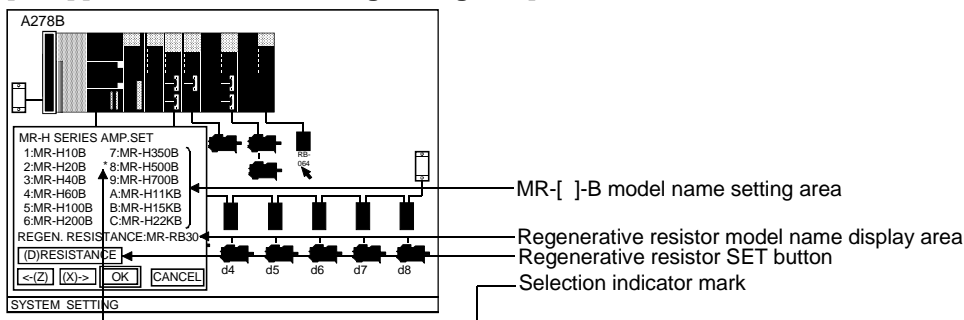
# 7. SYSTEM SETTINGS

## [Mouse Operation Procedure]

- Servo amplifier setting** 1) Move the mouse cursor to the MR-[ ]-B SET button position and execute a left-click, or press the [A] key.  
The servo amplifier model name setting dialog box will then be opened.  
[See Section 7.2.3 (1)(c)1].]
- Servomotor type setting** 1) Move the mouse cursor to the desired servomotor type SET button and execute a left-click, or key-in the alphabetic character shown at the left of the desired type.  
The servomotor model name designation dialog box for the selected servomotor type will then be opened.[See Section 7.2.3(1)(c)2].]
- Amplifier type setting** 1) Move the mouse cursor to the INC or ABS position and execute a left-click, or key-in the number shown at the left of the "INC" or "ABS" item.  
The selection indicator mark will move to the selected item.
- Dynamic brake setting** 1) Move the mouse cursor to the "NO" or "YES" position and execute a left-click, or key-in the number shown at the left of the "NO" or "YES" item.  
The selection indicator mark will move to the selected item.
- Selecting the allowable travel during power OFF setting area** 1) Move the mouse cursor to the allowable travel during power OFF setting area and click the left mouse button or press the "W" key.  
The cursor will be displayed in the allowable travel during power OFF setting area.
- Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The setting will then be registered, and the system will return to the base unit display screen.
- Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the base unit display screen.

### 1) MR-[ ]-B model name setting

## [MR-[ ]-B Model Name Setting Dialog Box]



## 7. SYSTEM SETTINGS

### [Display/Setting Content]

**MR-[ ]-B model name setting area** The selectable MR-[ ]-B names are displayed.

**Regenerative resistor model name display area** The designated regenerative resistor name is displayed.

**Regenerative resistor SET button** Opens the regenerative resistor setting dialog box.

**Selection indicator mark** Indicates the selected model name.

### [Mouse Operation Procedure]

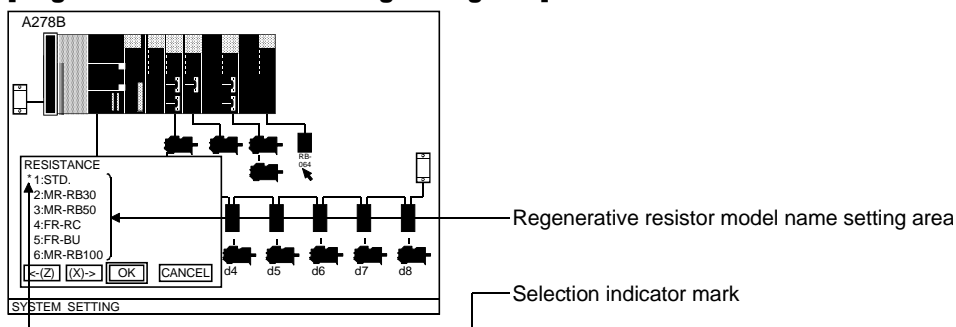
**MR-[ ]-B model name setting** 1) Move the mouse cursor to the desired name and execute a left-click, or key-in the alphabetic character shown at the left of the name.  
The selection indicator mark will move to the selected name.

**Regenerative resistor setting** 1) To designate the regenerative resistor setting, execute a left-click at the regenerative resistor SET button, or press the [D] key.  
The regenerative resistor setting dialog box will then be opened.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The entered settings will be confirmed and the system will return to the separate servo amplifier setting dialog box.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the separate servo amplifier setting dialog box.

### [Regenerative Resistor Setting Dialog Box]



### [Display/Setting Content]

**Regenerative resistor model name setting area** The selectable regenerative resistor names are displayed here.

**Selection indicator mark** Indicates the selected model name.

### [Mouse Operation Procedure]

**Regenerative resistor model name setting** 1) Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name.  
The selection indicator mark will move to the selected name.

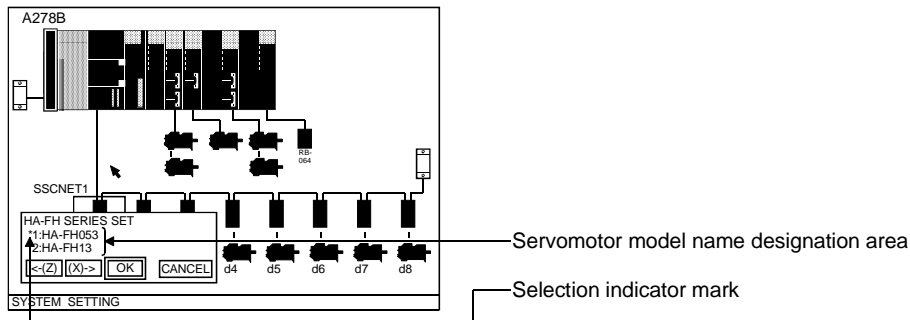
**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The entered settings will be confirmed and the system will return to the MR-[ ]-B model name setting dialog box.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the MR-[ ]-B model name setting dialog box.

## 7. SYSTEM SETTINGS

2) Designation of servomotor connected to MR-[ ]-B

### [Servomotor Model Name Setting Dialog Box]



### [Display/Setting Content]

**Servomotor model name designation area** The selectable servo motor names are displayed here.

**Selection indicator mark** Indicates the selected model name.

### [Mouse Operation Procedure]

**Servomotor model name setting** 1) Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name.  
The selection indicator mark will move to the selected name.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The entered settings will be confirmed and the system will return to the separate servo amplifier setting dialog box.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the separate servo amplifier setting dialog box.

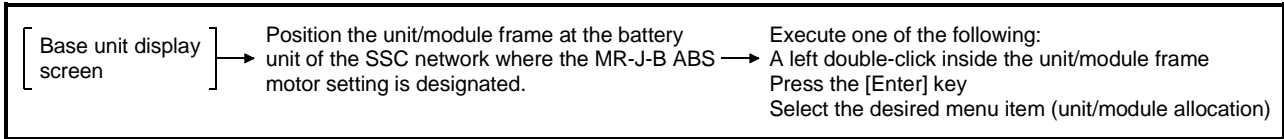
#### POINT

When an MR-J-B ABS motor setting has been designated at the A273UH (32-axis specification), be sure to designate a battery unit setting.  
[See Section 7.2.3 (1)(c)3.]

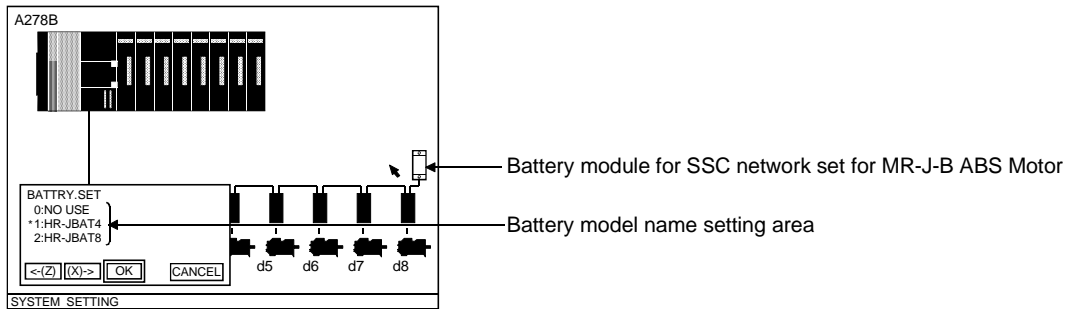
## 7. SYSTEM SETTINGS

### 3) Setting battery module during MR-J-B ABS motor set-up (A273UHCPU (8-/32-axis specification) only)

#### [Procedure for Displaying the Battery Setting Dialog Box when an MR-J-B ABS Motor is Used]



#### [Battery Setting Dialog Box]



\*The screen shown above is the A273UHCPU (32-axis specification) screen.

#### [Display/Setting Content]

**Battery model name setting area** The model names of selectable battery units are displayed here.

#### [Mouse Operation Procedure]

**Battery model name setting** 1) Either move the mouse cursor to the desired base unit model name and execute a left-click, or key-in the number shown at the left of the desired base unit model name.  
The selection indicator mark will move to the selected name.  
A battery unit setting is required when an MR-J-B ABS motor is connected in the currently selected SSC network.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The setting will then be registered, and the system will return to the base unit display screen.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the base unit display screen.

## 7. SYSTEM SETTINGS

### (2) Editing unit/module data settings

Existing unit/module data settings can be edited as described below.

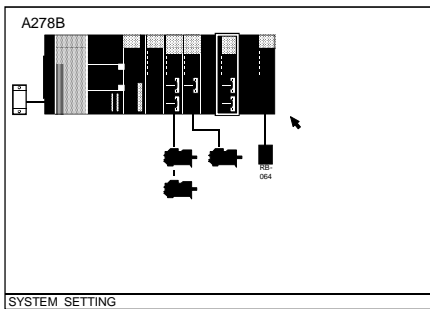
#### (a) Unit/module cancel

Cancels the most recently entered setting and re-establishes the setting which existed prior to the canceled setting.

#### [Procedure for Unit/Module Cancel]



#### [Before Data Setting]



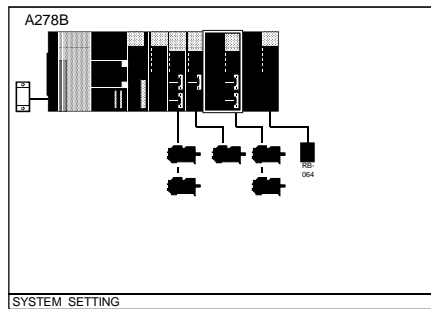
Data setting



Execution of  
CANCEL  
function



#### [After Data Setting](ADU setting at slots 4 & 5)



#### [Mouse Operation Procedure]

##### Designating the CANCEL function

- 1) Execute a right-press at any point on the base unit display screen in order to display the menu bar.
- 2) With the right button still pressed, move the mouse cursor to the "UNIT EDIT (E)" menu to display the pull-down menu, then release the right button (right-release) at the "UNDO (Z)" position.

The most recently entered setting will be canceled, and the system will return to the setting which existed prior to the canceled setting.

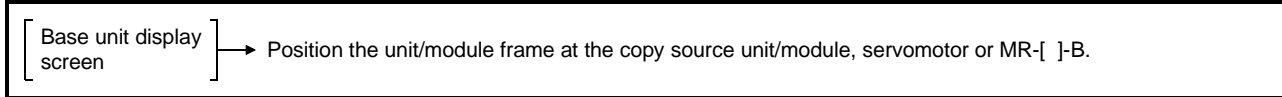
#### POINT

Canceled data can be restored by executing the CANCEL function again (first time cancels the data, second time restores it).

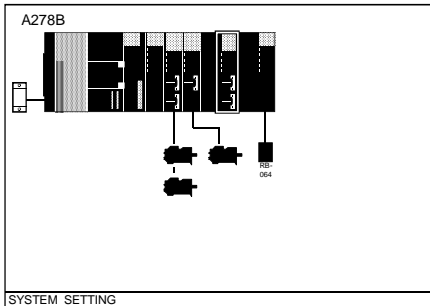
## 7. SYSTEM SETTINGS

- (b) Copying unit/module data settings  
Unit/module and servomotor/servo amplifier setting data can be copied as described below.

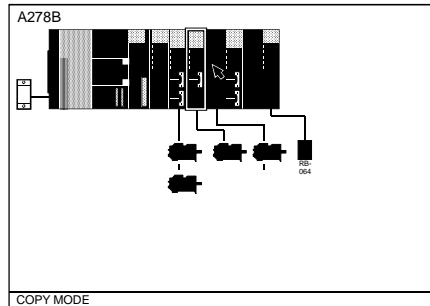
### [Procedure for Copying Unit/Module Data]



#### [Before Operation]



#### [After Operation]



### [Mouse Operation Procedure]

#### Designating the COPY function

- 1) Execute a right-press at any point on the base unit display screen in order to display the menu bar.
- 2) With the right button still pressed, move the mouse cursor to the "UNIT EDIT (E)" menu to display the pull-down menu, then release the right button (right-release) at the "COPY (C)" position.  
"COPY MODE" is displayed in the system message display line to show that copying is enabled. The [▼], [▲], and [◀] marks are displayed.

#### Designating the COPY destination & executing the COPY function

- 1) Execute a left-press at the copy source unit/module frame, then, with the left button still pressed, move the unit/module frame to the copy destination and release the left button (left-release).  
The COPY function will then be executed.  
To execute the COPY function by key operation, use the [←][→] keys to move the [▼], [▲] and [◀] marks to the COPY destination, then press the [Enter] key.

#### Ending & Aborting the COPY function

- 1) To end or abort the COPY function, execute a left-click outside the unit/module frame.  
(The system will then return to the base unit display screen.)  
(To end or abort the COPY function by key operation, press the [Esc] key.)

### REMARK

- (1) The COPY function remains operative at the COPY source unit/module after the COPY operation has been executed.  
This enables consecutive COPY operations by simply repeating the COPY destination selection and executing the COPY operation.

## 7. SYSTEM SETTINGS

### POINTS

- (1) Executing COPY copies not only the unit/module model names, but also all set data for the motors connected to the units/modules.
- (2) If data already exists at the copy destination, it will be overwritten.  
(Overwriting is impossible at I/O slots where data settings exist.)
- (3) The following modules can be copied: motion modules, PC input/output modules, servomotors, MR-[ ]-B, and manual pulse generators. However, some motion modules cannot be copied, or copying is subject to a number of restrictions.

#### <A17[ ]CPU>

Motion module	Manual pulse generator & synchronous encoder I/F module (A171SENC/A172SENC)	COPY impossible
	Limit output module (A1SY42)	COPY impossible

#### <A273UHCPU (8-axis specification)>

Motion module	Limit input & brake output module (A278LX)	COPY impossible
	Manual pulse generator & synchronous encoder I/F module (A273EX)	COPY impossible
	Limit output module (AY42)	COPY impossible
	DY (A240DY)	2 or less
	ADU (A2**AM)	COPY possible
	Servo power supply module (A230P)	COPY impossible

#### <A273UHCPU (32-axis specification)>

Motion module	Limit input & brake output module (A278LX)	4 or less
	Manual pulse generator & synchronous encoder I/F module (A273EX)	4 or less
	Limit output module (AY42)	4 or less
	DY (A240DY)	8 or less
	ADU (A2**AM)	COPY possible
	Servo power supply module (A230P)	4 or less

#### (a) Copied data

##### <A17[ ]CPU>

Servomotor	Servomotor model name, encoder type
Manual pulse generator & synchronous encoder	Setting information
PC input/output module	Module model name
MR-[ ]-B	Servo amplifier model name, regenerative resistor, servo motor

##### <A273UHCPU (8-/32-axis specification)>

Motion module	DY	Module model name
	ADU	Module model name, servomotor
Servomotor	Servomotor model name, encoder type	
Manual Pulse Generator	Setting information	
PC input/output module	Number of I/O points, head I/O No.	
MR-[ ]-B	Servo amplifier model name, regenerative resistor, servomotor	

- (4) Axis numbers are not copied in the case of servomotors.
- (5) The copy destination must be the same module type as the copy source.  
(Servomotor to servomotor; I/O slot module to I/O slot, etc.)
- (6) Copying between the main base unit and a motion extension base unit is not possible.

## 7. SYSTEM SETTINGS

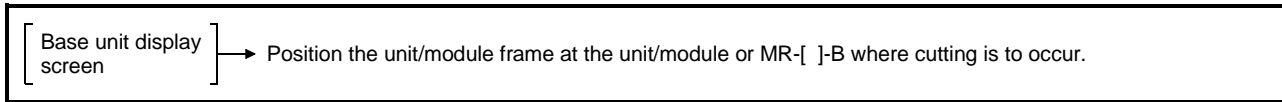
### (c) Editing by CUT & PASTE

The cut and paste procedure for module, servomotor/servo amplifier setting data is described below.

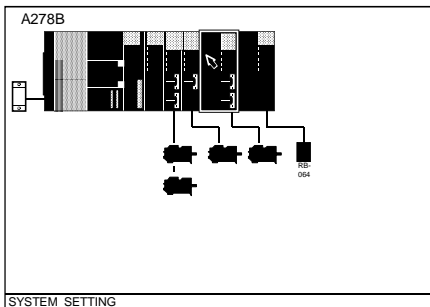
#### 1) Cut

Setting data is moved to the system buffer.

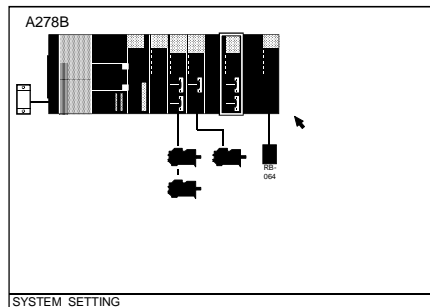
#### [CUT Procedure]



#### [Before Operation]



#### [After Operation]



#### [Mouse Operation Procedure]

##### Selecting, executing, and ending the CUT function

- 1) Right-press at any position in the base unit display screen to display the menu bar.
- 2) With the right button still pressed, move the mouse cursor to the "UNIT/Module Edit (E)" menu to display the pull-down menu, then release the right button (right-release) at the "CUT (X)" position.  
The CUT function will then be executed, and the unit/module data within the unit/module frame will be deleted.

#### POINTS

- (1) The unit/module or servomotor/servo amplifier setting data which has been moved to the system buffer by the CUT function represents 1 unit. If subsequent data is moved to the buffer by another CUT operation, the previous data will be overwritten.
- (2) The unit/module or servomotor/servo amplifier setting data which has been CUT remains valid even if the base unit is changed. Another base unit can be displayed again using the PASTE function.
- (3) The following modules can be cut: motion expansion base unit battery connector information, MR-[ ]-B connection information, motion modules, PC input/output modules, servomotors, MR-[ ]-B, and manual pulse generators. The position is free after the CUT is completed.
- (4) Regarding CUTS at a motion extension base unit and battery connector, a "NOT USED" status will be designated for the battery information but not for the motion extension base unit. The motion extension base information remains as is.
- (5) Because MR-[ ]-B connections are designated at the CPU slot, a CUT at the CPU slot will cause all the MR-[ ]-B connection information to be CUT as well.



## 7. SYSTEM SETTINGS

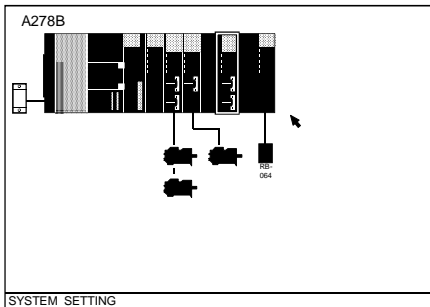
### 2) Paste

Setting data which has been moved to the system buffer by the CUT function can be returned to the base unit display screen by the PASTE function.

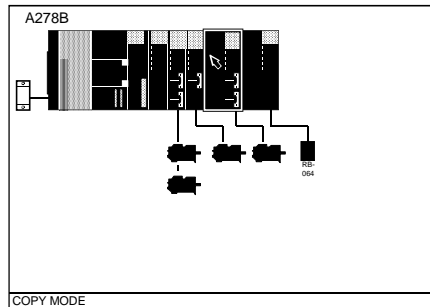
#### [PASTE Procedure]



#### [Before Operation]



#### [After Operation]



#### [Mouse Operation Procedure]

##### Selecting the PASTE function

- 1) Execute a right-press at any point on the base unit display screen in order to display the menu bar.
- 2) With the right button still pressed, move the mouse cursor to the "Unit/Module Edit (E)" menu to display the pull-down menu, then release the right button (right-release) at the "PASTE (V)" position.  
The PASTE function will then be executed, and the unit/module data within the unit/module frame will be displayed on-screen again.

#### POINTS

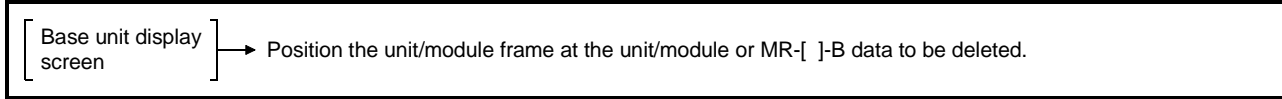
- (1) Overwriting will occur if subsequent pasting occurs where previous data exists.  
(Overwriting is impossible at I/O slots where data settings exist.)
- (2) When unit/module data which has been CUT is then PASTED at several locations, the axis No. can be pasted at the first location only; the axis No. will be "0" at subsequent PASTE locations.
- (3) The following modules can be pasted: motion extension base units, battery connector information, MR-[ ]-B connection information, motion modules, PC input/output modules, servomotors, MR-[ ]-B, and manual pulse generators.
- (4) PASTING is impossible if the CUT function has never been executed.
- (5) PASTING is only possible for the most recent CUT data.
- (6) PASTING can only occur at locations of the same type as that where the CUT function was executed.

## 7. SYSTEM SETTINGS

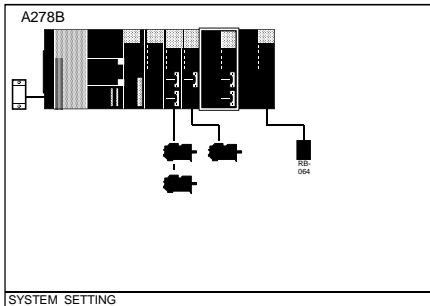
### (d) Unit/module data delete

The procedure for deleting unit/module & servomotor/servo amplifier setting data is described below.

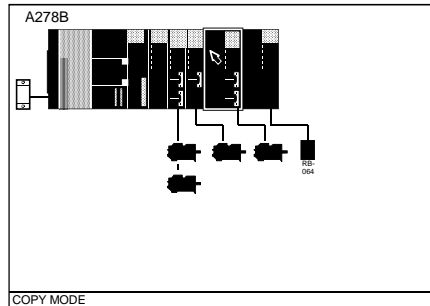
#### [Unit/Module Data Delete Procedure]



#### [Before Operation]



#### [After Operation]



#### [Mouse Operation Procedure]

##### Selecting the DELETE function

- 1) Execute a right-press at any point on the base unit display screen in order to display the menu bar.
- 2) With the right button still pressed, move the mouse cursor to the "Unit/Module Edit(E)" menu to display the pull-down menu, then release the right button (right-release) at the "DELETE (D)" position.  
The DELETE function will then be executed, and the unit/module data within the unit/module frame will be deleted.

#### POINTS

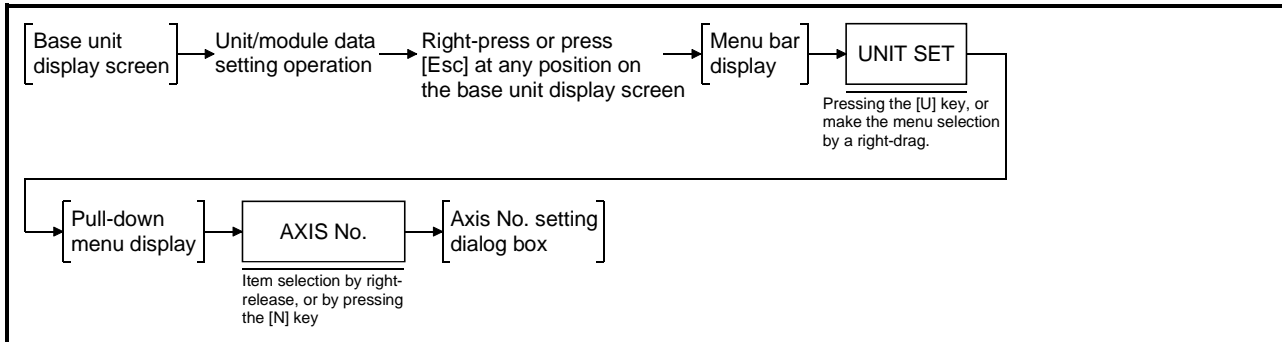
- (1) The following modules can be deleted: motion extension base unit, battery connector information, MR-[ ]-B connection information, motion modules, PC input/output modules, servomotors, MR-[ ]-B, and manual pulse generators. The position is free after the DELETE is completed.
- (2) Regarding DELETIONS at a motion extension base unit and battery connector, a "NO USE" status will be designated for the battery information but not for the motion extension base unit. The motion extension base information remains as is.
- (3) Because MR-[ ]-B connections are designated at the CPU slot, a DELETE at the CPU slot will cause all the MR-[ ]-B connection information to be deleted as well.

## 7. SYSTEM SETTINGS

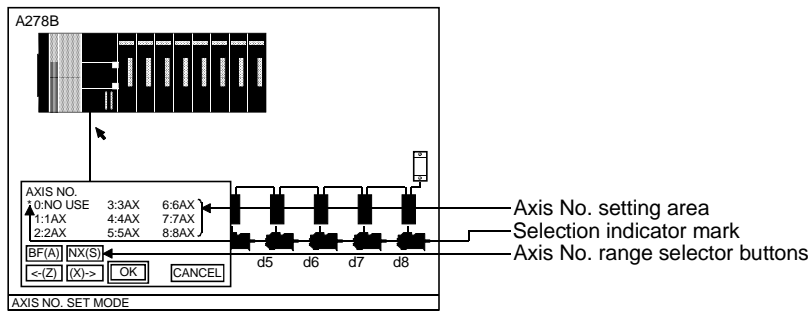
### 7.1.4 Axis No. setting

The procedure for designating the program axis Nos. for the motors connected to each ADU and MR-[ ]-B is described below.

#### [Procedure for Displaying the Axis No. Setting Dialog Box]



#### [Axis No. Setting Dialog Box]



\*The screen shown above is the A273UHCPU (32-axis specification) screen.

#### [Display/Setting Content]

**Axis No. setting area** Axis Nos. are displayed here.

**Selection indicator mark** Indicates the selected axis No.

**Axis No. selector buttons \*1** Change the axis No. setting range.

#### [Mouse Operation Procedure]

**Axis No. setting** 1) Move the mouse cursor to the desired axis No. and execute a left-click, or key-in the number shown at the left of the axis No.  
The selection indicator mark will move to the selected axis No.

**Axis No. range selection \*2** 1) Either execute a left-click at "BF" or "NX", or press the [A] key or [S] key.  
The axis No. setting range will change.

**Setting END** 1) After the base unit has been designated, execute a left-click at the "OK" item, or press the [Enter] key.  
The setting will then be registered, and the system will return to the base unit display screen.

**Setting Abort** 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The entered settings will be canceled, and the system will return to the base unit display screen.

\*1 Displayed only when using A273UHCPU (32-axis specification).

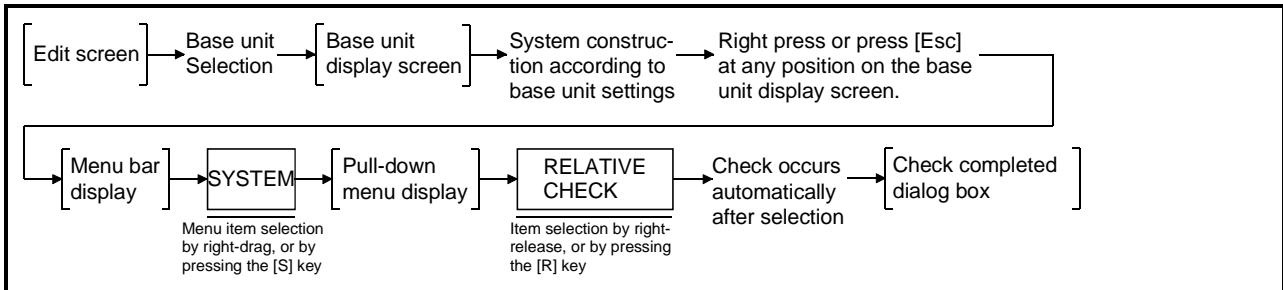
\*2 Set only when using A273UHCPU (32-axis specification).

# 7. SYSTEM SETTINGS

## 7.1.5 Relative check

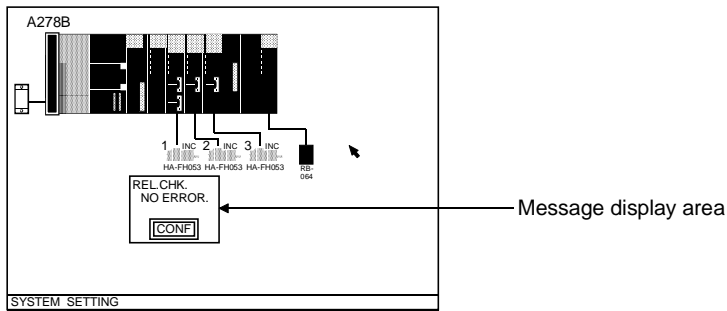
The procedure for checking the match status of a constructed system is described below.

### [Relative Check Procedure]



### When Operation was Error-Free

#### [Check Completed Dialog Box]



#### [Display/Setting Content]

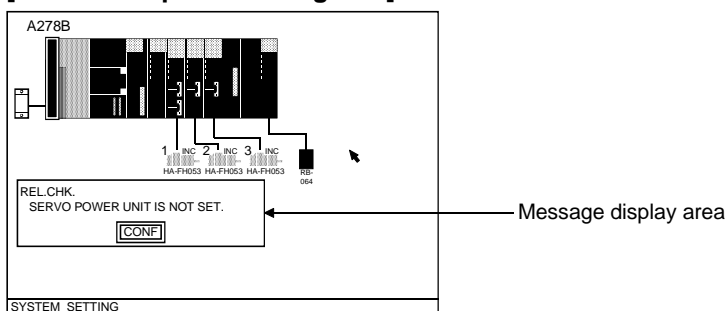
**Message display area** "NO ERROR." is displayed.

#### [Mouse Operation Procedure]

**Dialog box CLOSE** 1) To close the dialog box, execute a left-click at the "CONF" item, or press the [Enter] key.

### When an Error Occurred

#### [Check Completed Dialog Box]



#### [Display/Setting Content]

**Message display area** Error description for each check item is displayed.

#### [Mouse Operation Procedure]

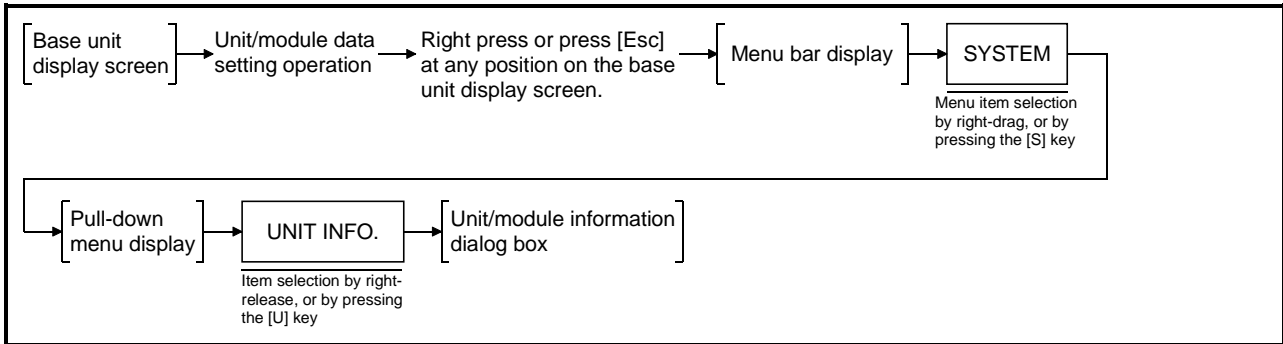
**Dialog box CLOSE** 1) To close the dialog box, execute a left-click at the "CONF" item, or press the [Enter] key.

# 7. SYSTEM SETTINGS

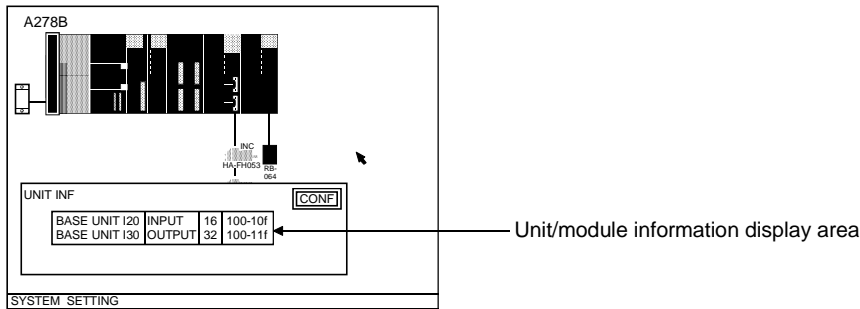
## 7.1.6 Unit/module information

The procedure for displaying information regarding the designated PC input/output module is described below.

### [Procedure for Displaying Unit/Module Information]



### [Unit/Module Information Dialog Box]



### [Display/Setting Content]

#### Unit/module information display area

The following PC input/output module information is displayed:  
 Connected slots, module model names, number of I/O points, and I/O Nos.  
 If no PC input/output module setting has been designated, a "IN-OUT UNIT IS NOT REGISTERED." message will be displayed.

### [Mouse Operation Procedure]

#### Dialog box CLOSE

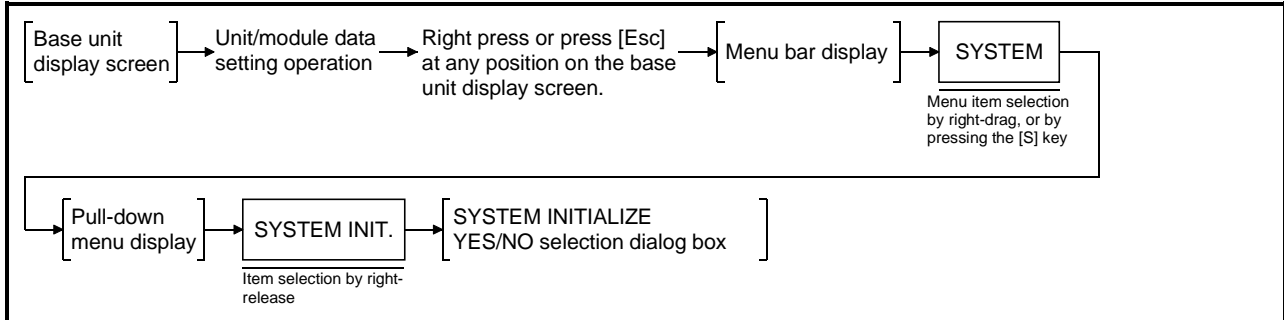
- 1) To close the dialog box, execute a left-click at the "CONF" item, or press the [Enter] key.

# 7. SYSTEM SETTINGS

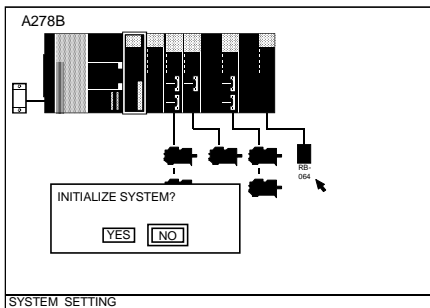
## 7.1.7 System data initialize

The procedure for initializing all the system's setting data is described below.

### [System Data Initialize Procedure]



### [SYSTEM INITIALIZE YES/NO Selection Dialog Box]



### [Mouse Operation Procedure]

#### For YES (initialize) selection

- 1) To initialize, left-click "YES" or press the [Y] key. The base unit setting dialog box is displayed. Select the base unit to be set.

#### For NO (do not initialize) selection

- 1) To abort initialization, left-click "NO" or press the [Esc]/[Enter] key. Initialization is not conducted and the display reverts to the base unit display screen.

## 7. SYSTEM SETTINGS

### 7.1.8 System setting END

The procedure for ending the system setting operation and returning to the servo function selection window is described below.

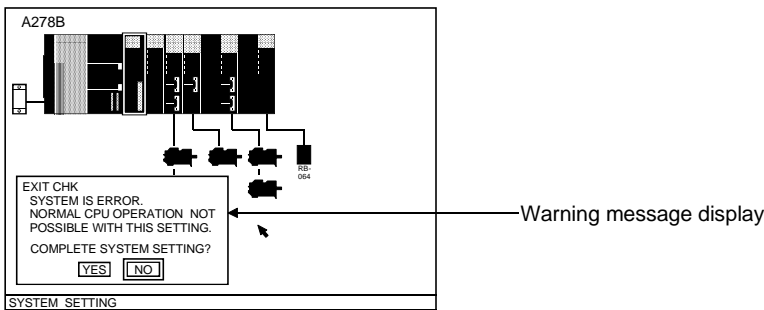
#### [Mouse Operation Procedure]

- System Setting END**
- 1) Execute a right-press at any point on the base unit display screen in order to display the menu bar.
  - 2) With the right button still pressed, move the mouse cursor to the "SYSTEM (S)" menu to display the pull-down menu, then release the right button (right-release) at the "END (Q)" position.

The procedure for ending the system setting operation and returning to the servo function selection window is described below.

#### System Setting END when an Error Exists

##### [Warning Dialog Box]



#### [Display/Setting Content]

**Warning message display** A warning message is displayed when an attempt to end the system setting operation is made while an error status exists.

#### [Mouse Operation Procedure]

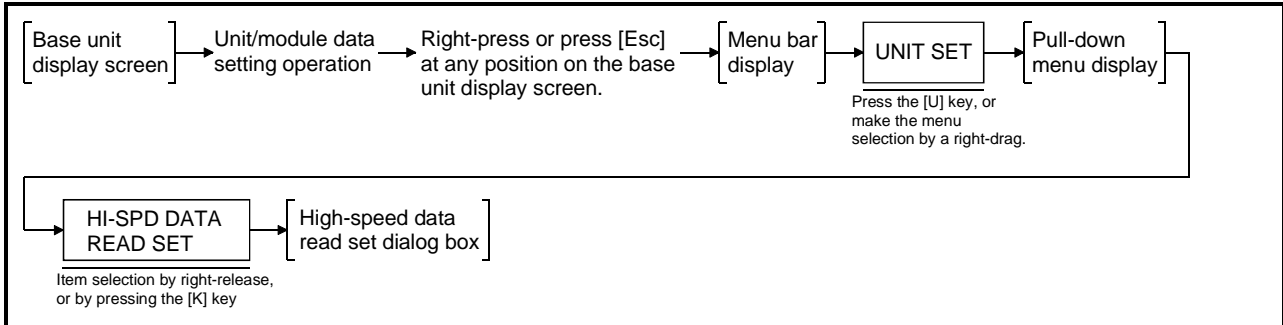
- To correct the system setting**
- 1) To modify the system setting, execute a left-click at the "NO" item, or press the [Esc]/[Enter] key.  
The warning dialog box closes. Run the relative check function to determine details of the error, then correct the set data.
- System Setting END**
- 1) To end the system setting operation while an error status is in effect, execute a left-click at the "YES" item, or press the [Y] key.  
The system will then return to the servo function selection window.

# 7. SYSTEM SETTINGS

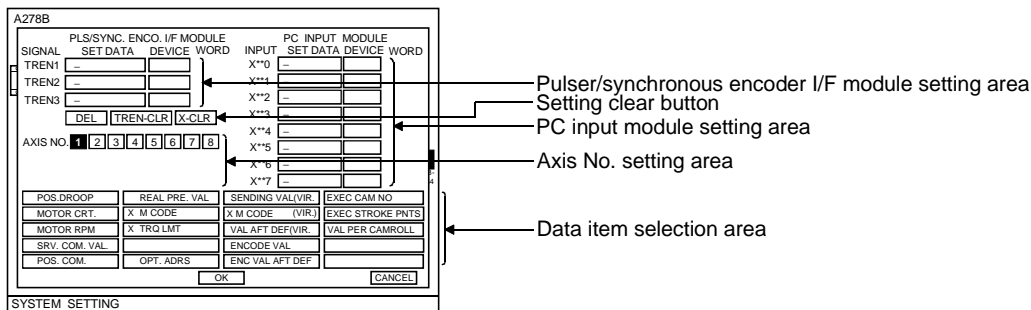
## 7.1.9 High-speed data read setting

The procedure for setting the high-speed data read for the PC CPU module, input/output composite module, and pulser/synchronous encoder interface module.

### [Procedure for Displaying the High-speed Data Read Set Dialog Box]



### [High-speed Data Read Set Dialog Box]



\*The screen shown above is the A273UHCPU (32-axis specification) screen.

### [Display/Setting Content]

#### Pulser/synchronous encoder I/F module setting area

Axis number, setting data, and device set for the TREN signal of the pulser/synchronous encoder I/F module are displayed.

#### PC input module setting area

Axis number, setting data, and device set for the input signal of the PC input module are displayed.

#### Axis No. selection area

Select the axis No. to be set for the TERM signal and the input signal.

#### Data item selection area

Select the setting data item to be set for the TERM signal and the input signal.

### [Mouse Operation Procedure]

#### SET DATA setting

1) Execute left-click at the set data area of the TREN signal or input signal where the setting is made.

The selected area is highlighted.

2) Execute left-click at the data item to be set. The selected data item is highlighted. At the same time, the selected data item is displayed in the highlighted set data area.

The axis number presently highlighted is selected and displayed at the left end in the set data area

Cautions on selecting the data item area

- For the setting in the set data area of the TREN signal, the item for which "X" mark is displayed in the data item selection area cannot be selected.
- If OPT. ADRS (optional address) is selected, the DEVICE/ADDRESS WINDOW is displayed. Set the address in this window. The procedure is described later.



## 7. SYSTEM SETTINGS

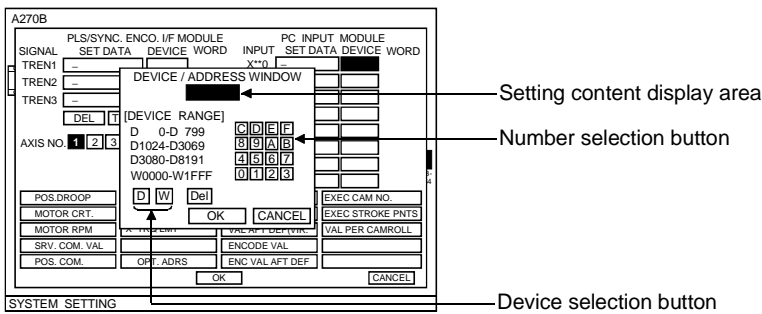
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- DEVICE setting**
- 1) Execute left-click at the DEVICE area of the TREN signal or input signal to be set.  
The DEVICE/WORD WINDOW is displayed.
  - 2) Set the device in the DEVICE/WORD WINDOW.  
The procedure is described later.
- AXIS NO. setting**
- 1) Left-click the axis number of the data to be set.  
The selected axis number is highlighted.
- DEL button**
- 1) Deletes the contents in the highlighted SET DATA area.
- TRE-CLR button**
- 1) Clears all contents in the SET DATA and DEVICE areas of the TREN signal.
- X-CLR button**
- 1) Clears all contents in the SET DATA and DEVICE areas of the input signal.
- Setting END**
- 1) To end the setting operation, execute a left-click at the "OK" item, or press the [Enter] key.  
The content of setting will be confirmed and the system returns to the base unit display screen.
- Setting Abort**
- 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The content of setting will be canceled, and the system returns to the base unit display screen.

POINTS
<ol style="list-style-type: none"><li>(1) High-speed data read set is possible only by using a mouse. When setting high-speed data read, set the mouse in the operable state before starting up the GSV22PE.</li><li>(2) Sequencer input address setting is made by a system setting. The I/O address to be used is assigned the starting I/O number of the I/O units for which "2 : Use" has been set for high-speed data read in the I/O unit setting.</li></ol>

## 7. SYSTEM SETTINGS

### [Device/Address Window]



### [Mouse Operation Procedure]

#### Device setting

- 1) At the device selection button of the device to be selected, execute left-click.
- 2) Execute left-click at number selection buttons to set the device number.  
Device D : Only 0 to 9 are valid.  
Device W : 0 to 9 and A to F are valid.
- 3) The content of setting is displayed in the setting content display area.

#### Address setting

- 1) Execute left-click at number selection buttons to set the address.
- 2) The content of setting is displayed in the setting content display area.

#### Del button

- 1) Left-click at the Del button deletes the contents displayed in the setting content display area.

#### Setting END

- 1) To end the setting operation, execute a left-click at the "OK" item, or press the [Enter] key.  
The content of setting will be confirmed and the system returns to the high-speed data read set dialog box display screen.

#### Setting Abort

- 1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [Esc] key.  
The content of setting will be canceled, and the system returns to high-speed data read set dialog box display screen.

# 8. DATA SETTINGS FOR POSITIONING

## 8. DATA SETTINGS FOR POSITIONING

The SERVO DATA SETTING mode is the mode in which positioning related data settings are designated.

### (1) Function summary

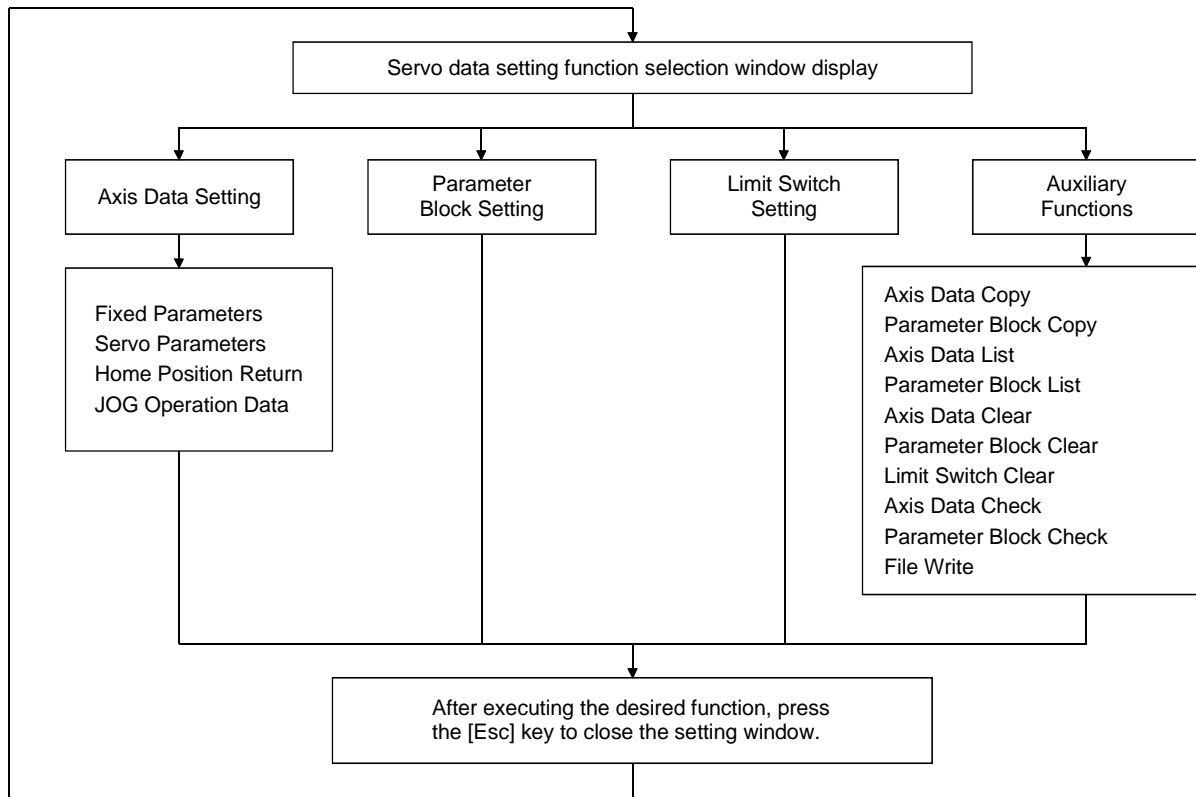
The GSV22PE SERVO DATA SETTING mode consists of the functions shown below.

Data settings for positioning	Axis Data Setting	Designation of parameter settings for positioning. ....	8.1	
	Fixed parameter setting	Machine characteristics values required for positioning related servo operation are designated. ....	8.1.1	
	Servo parameter setting	Servo characteristics values required for positioning related servo operation are designated. ....	8.1.2	
	Home position return data setting	Data settings required for a home position return are designated. ....	8.1.3	
	JOG data setting	Data settings required for JOG operation are designated. ....	8.1.4	
	Parameter Block Setting	Parameter block settings used for home position return and JOG data, and for servo programs are designated. ....	8.1.5	
	Limit Switch Setting	The limit switch output ON/OFF setting for the specified axis is designated. ....	8.1.6	
	Auxiliary Functions	Positioning data COPY	Positioning related data settings are copied. ....	8.2
	Axis Data Copy	Data for a given axis is copied to another axis. ....	8.2.1	
	Parameter Block Copy	Specified parameter block data is copied to another parameter block. ....	8.2.2	
	Positioning data list	The positioning data list is displayed. ....	8.3	
	Axis Data List	A list of axis data settings is displayed. ....	8.3.1	
	Parameter Block List	A list of parameter block settings is displayed. ....	8.3.2	
	Positioning data CHECK	Positioning data is checked. ....	8.4	
	Axis Data Check	A relative check of axis data occurs. ....	8.4.1	
	Parameter Block Check	A relative check of parameter block data occurs. ....	8.4.2	
	Positioning data CLEAR	Positioning data is cleared. ....	8.5	
	Axis Data Clear	Axis data settings are cleared. ....	8.5.1	
	Parameter Block Check	Parameter block data settings are cleared. ....	8.5.2	
	Limit Switch Clear	Limit switch output data settings are cleared. ....	8.5.3	
	File Write	Setting data is written to the user file. ....	8.6	


## 8. DATA SETTINGS FOR POSITIONING

### (2) Procedure outline

An outline of the procedure for designating positioning data settings is shown below.



### CAUTION

 Parameter settings which are appropriate for the system's application should be designated. Incorrect settings could disable the protective function.

### POINTS

- (1) When selecting a function from the servo data setting function selection window, a "SYSTEM NOT SET" error message will be displayed if the system setting hasn't been designated. The system settings should be designated before selecting the servo data setting function.
- (2) If an axis setting is designated for a "not used" axis during system settings, an "UNUSED AXIS." error message will be displayed.

# 8. DATA SETTINGS FOR POSITIONING

## 8.1 Data Settings for Positioning

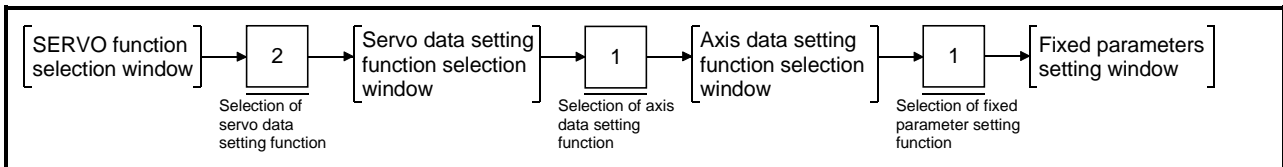
The procedure for designating the data settings (fixed parameters, servo parameters, home position return data, JOG operation data) required for positioning control is described below.

### 8.1.1 Designating the fixed parameter (axis data) settings

When constructing the positioning system, the machine characteristic value settings required for machine operation must be designated.

The fixed parameter settings must therefore be designated before the positioning data settings. Fixed parameter settings are designated for each axis.

#### [Procedure for Displaying the Fixed Parameter Setting Window]



#### [Fixed Parameters Setting Window]

<FIXED PARAMETERS>		
1:AXIS <mm>	SET DATA	SETTING RANGE
A UNIT SETTING	0	0:mm 1:inch 2:degree 3:PULSE
B PULSE/TURN(AL)	20000	1 - 65535 (PLS)
C MOVEMENT/TURN(AL)	2000.0	0.1 - 6553.5 (µm)
D UNIT MAG.(AM)	1	1:1 10:10 100:100 1000:1000
E BACKLASH	0.0	0.0 - 6553.5 (µm)
F STROKE LIMIT MAX.	214748364.7	-214748364.8 - 214748364.7 (µm)
G STROKE LIMIT MIN.	0.0	-214748364.8 - 214748364.7 (µm)
H CMD.IN-POS RANGE	10.0	0.1 - 214748364.7 (µm)
I LMT.SW.OUTPUT	0	0:NO USE 1:USE

Setting data area  
Setting range area  
Relative error display area

End:SET Esc:STOP

1 2 3 4 5 6 7 8 9 0 AXIS

#### [Display/Setting Content]

- Setting data area** Either the default value or the previously designated value is displayed here.
- Setting range area** The setting range for each setting item is indicated here.
- Relative error display area** The relative check range is displayed here (in the currently selected "UNIT SETTING") when an error is detected by the relative check function.

#### [Key Operation]

- Setting item selection** 1) Use the [↑] [↓] keys to move the cursor to the desired data setting item.
- Data setting**
  - Using the numeric keys, key in the desired setting value at the cursor position. Be sure that the designated setting is within the setting range shown at the right side of the window.
  - After entering the desired setting value, press the [Enter] key to register the setting.  
If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

## 8. DATA SETTINGS FOR POSITIONING

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- Axis setting change**
- 1) Press the [F10] function key to change axis settings.  
When the [F10] key is pressed, the Axis Setting Change window will be displayed.
  - 2) Using the numeric keys, key-in the desired axis No. and press the [Enter] key.  
The Fixed Parameter Setting window for that axis No. will then be displayed.  
If a No. outside the prescribed range is designated, an "OUT OF SETTING RANGE" error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
  - 3) To abort the axis No. setting operation, press the [Esc] key.
- Fixed parameter setting END**
- 1) To end the fixed parameter setting operation, press the [End] key.  
A relative check of the setting data will then occur, and if no error is found, the system will return to the Axis Data Setting Function Selection window. If an error is found, a highlighted "E" will be displayed next to the error item.  
At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area.  
After checking the setting data, make the necessary corrections then press the [End] key again.
- Window CLOSE**
- 1) To close the window, press the [Esc] key.  
The system will then return to the Axis Data Setting Function Selection window.
- File WRITE**
- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.  
The file write YES/NO dialog box will be displayed.
  - 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
  - 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

POINTS
<ol style="list-style-type: none"><li>(1) The setting range shown at the setting range display area varies according to the "UNIT SETTING" designation.</li><li>(2) When the number of pulses per revolution, travel value per revolution, and unit magnification are changed, the backlash compensation amount, and setting range of the command in-position range will change.</li></ol>

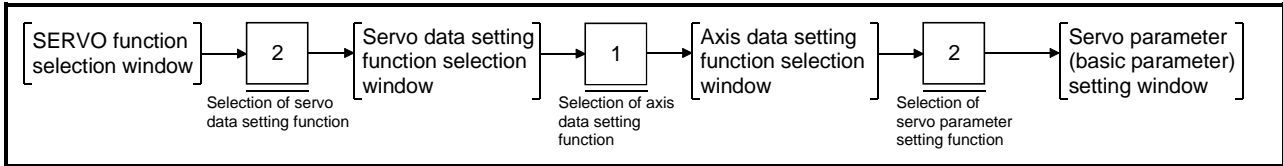
# 8. DATA SETTINGS FOR POSITIONING

## 8.1.2 100Servo parameter (axis data) settings

When constructing the positioning system, the servo characteristic value settings required for servo operation must be designated. The setting procedure is described below.

Data settings are designated for each axis.

### [Procedure for Displaying the Servo Parameter Setting Window]



- (1) When ADU is used
- (a) Basic parameter setting

### [Servo Parameter (Basic Parameter) Setting Window]

<SERVO PARAMETER>		SET DATA	SETTING RANGE
1 AXIS <PULSE>		1	0:ADJ_INC 1:ADU_ABS
A AMP. SETTING			
B RESISTANCE			
C EXT.DYNAMIC BREAK			
D MOTOR TYPE		3	0:HA-FH 1:HA-SH2 2:HA-SH3 3:HA-LH 4:HA-UH 5:HA-MH
E MOTOR CAPACITY		0.50	MOTOR CAPACITY (Kw)
F MOTOR RAT.SPEED		2000	MOTOR RAT.SPEED (r/min)
G FEEDBACK PULSE(N)		16384	1 - 65536(ENCODER PULSE)*4
H TURN DIRECTION		0	0:FOR(ccw) 1:REV(cw)
I AUTO-TUNING		1	0:VELOCITY 1:POS.&VEL. 2:NONE
J SERVO RESPONSE		1	1 - 12

Setting data area

Setting range area

Relative error display area

End:SET Esc:STOP

1 ADJ.PA 2 3 4 5 6 7 8 9 0 AXIS

### [Display/Setting Content]

**Setting data area** Either the default value or the previously designated value is displayed here.

**Setting range area** The setting range for each setting item is indicated here.

**Relative error display area** The relative check range is displayed (in the currently selected "UNIT SETTING") when an error is detected by the relative check function.

### [Key Operation]

**Setting item selection** 1) Use the [↑] [↓] keys to move the cursor to the desired data setting item.

**Data setting**

- 1) Using the numeric keys, key in the desired setting value at the cursor position. Be sure that the designated setting is within the setting range shown at the right side of the window.
- 2) After entering the desired setting value, press the [Enter] key to register the setting.  
If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

## 8. DATA SETTINGS FOR POSITIONING

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### Setting the servo parameters (adjustment parameters)

- 1) To set the servo parameters (adjustment parameters), press the [F1] key. The following checks will then be performed:
  - A relative check of the fixed parameter data
  - A check of the servo parameter (basic parameter) setting ranges
  - A relative check between the fixed parameter data and the servo parameter (basic parameter) data

If no error is found, the system will return to the servo parameter (adjustment parameter) setting window (see Section 8.1.2 (1) (b)).

If an error is found in the relative check, highlighted "E" will be displayed in the left of the corresponding item. At the same time, the relative check range will be shown at the relative error display area, and the error message will be displayed at the message area.

After checking the setting data, make the necessary corrections then press the [F1] key.

### Axis setting change

- 1) Press the [F10] function key to change axis settings. When the [F10] key is pressed, the Axis Setting Change window will be displayed.
- 2) Using the numeric keys, key in the desired axis No. and press the [Enter] key. The Servo Parameter (basic parameter) Setting window for that axis No. will then be displayed. If an axis No. outside the prescribed axis No. range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- 3) To abort the axis No. setting operation, press the [Esc] key.

### Servo parameter setting END

- 1) To end the servo parameter setting operation, press the [End] key. The following checks will be performed:
  - A relative check of the fixed parameter data.
  - A check of the servo parameter setting ranges.
  - A relative check of the fixed parameter data and servo parameter data.If no error is found, the system will return to the Axis Data Setting Function Selection window. If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [End] key again.

### Servo parameter setting ABORT

- 1) To abort the servo parameter setting operation, press the [Esc] key. The system will then return to the Axis Data Setting Function Selection window.

### File WRITE

- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed. The file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.



## 8. DATA SETTINGS FOR POSITIONING

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<b>POINTS</b>
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- |  |
|--|
| <p>(1) Setting values for items not highlighted at the servo parameter (basic parameter) setting window are values which are based on data designated by the System Setting function.<br/>These setting values cannot be designated by the Servo Parameter (basic parameter) Setting function.<br/>Data settings can only be designated at the highlighted items.</p> <p>(2) The setting range for servo parameter (basic parameter) data varies according to the "UNIT SETTING" designated with the Fixed Parameter Setting function.</p> |
|--|

## 8. DATA SETTINGS FOR POSITIONING

(b) Adjustment parameter setting

### [Servo Parameter (Adjustment Parameter) Setting Window]

<SERVO PARAMETER (ADJUSTMENT PARAMETER)>			
1 AXIS <PULSE>	SET DATA	SETTING RANGE	
A LOAD INERTIA RATIO	1.0	0.1 -	20.0 (RATIO)
B POSITION LOOP GAIN 1	70	1 -	9999 (rad/sec)
C VELOCITY LOOP GAIN 1	1200	1 -	9999 (rad/sec)
D POSITION LOOP GAIN 2	25	1 -	9999 (rad/sec)
E VELOCITY LOOP GAIN 2	300	1 -	9999 (rad/sec)
F VEL. INTEGRAL COMPS.	20	2 -	240 (msec)
G NOTCH FILTER			
H FEED FORWARD GAIN	0.0	0.0 -	150.0 (%)
I IN-POSITION RANGE	100	1 -	32767 (PLS)
J SOLENOID BRAKE OUT			

Setting range area

Setting data area

Relative error display area

End:SET Esc:STOP

1 STD.PA 2 3 4 5 6 7 8 9 0 AXIS

### [Display/Setting Content]

**Setting data area** Either the default value or the previously designated value is displayed here.

**Setting range area** The setting range for each setting item is indicated here.

**Relative error display area** The relative check range is displayed (in the currently selected "UNIT SETTING") when an error is detected by the relative check function.

### [Key Operation]

**Setting item selection** 1) Use the [↑] [↓] keys to move the cursor to the desired data setting item.

**Data setting**

- 1) Using the numeric keys, key in the desired setting value at the cursor position. Be sure that the designated setting is within the setting range shown at the right side of the window.
- 2) After entering the desired setting value, press the [Enter] key to register the setting.  
If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

### Setting the servo parameters (basic parameters)

- 1) To set the servo parameters (basic parameters), press the [F1] key. The following checks will then be performed:
  - A relative check of the fixed parameter data
  - A check of the servo parameter (adjustment parameter) setting ranges
  - A relative check between the fixed parameter data and the servo parameter (adjustment parameter) data

If no error is found, the system will return to the servo parameter (basic parameter) Setting window. (see Section 8.1.2 (1)(a).)

If an error is found in the relative check, highlighted "E" will be displayed in the left of the corresponding item. At the same time, the relative check range will be shown at the relative error display area, and the error message will be displayed at the message area.

After checking the setting data, make the necessary corrections then press the [F1] key.

### Axis setting change

- 1) Press the [F10] function key to change axis settings. When the [F10] key is pressed, the Axis Setting Change window will be displayed.
- 2) Using the numeric keys, key in the desired axis No. and press the [Enter] key. The Servo Parameter (basic parameter) Setting window for that axis No. will then be displayed.  
If an axis No. outside the prescribed axis No. range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- 3) To abort the axis No. setting operation, press the [Esc] key.

## 8. DATA SETTINGS FOR POSITIONING

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### Servo parameter setting END

- 1) To end the servo parameter setting operation, press the [End] key.  
The following checks will be performed:
  - A relative check of the fixed parameter data.
  - A check of the servo parameter setting ranges.
  - A relative check of the fixed parameter data and servo parameter data.If no error is found, the system will return to the Axis Data Setting Function Selection window.  
If an error is found, a highlighted "E" will be displayed next to the error item.  
At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area.  
After checking the setting data, make the necessary corrections then press the [End] key again.

### Servo parameter setting ABORT

- 1) To abort the servo parameter setting operation, press the [Esc] key.  
The system will then return to the Axis Data Setting Function Selection window.

### File WRITE

- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.  
The file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

POINTS
(1) Setting values for items not highlighted at the servo parameter (adjustment parameter) setting window are values which are based on data designated by the System Setting function. These setting values cannot be designated by the Servo Parameter (adjustment parameter) Setting function. Data settings can only be designated at the highlighted items.
(2) The setting range for servo parameter (adjustment parameter) data varies according to the "UNIT SETTING" designated with the Fixed Parameter Setting function.

## 8. DATA SETTINGS FOR POSITIONING

- (2) When MR-[ ]-B is used  
 (a) Basic parameter setting

### [Servo Parameter (Basic Parameter) Setting Window] (For MR-H-B)

<SERVO PARAMETER (STANDARD PARAMETER)>			
1 AXIS <PULSE>	SET DATA	SETTING RANGE	
A AMP SETTING	0	0:MR-H-INC	1:MR-H-RSS
B RESISTANCE	0	0:STANDARD	1:FR-RC/BU
		2:MR-RB013	
		3:MR-RB033	4:MR-RB042
		5:MR-RB32	
		6:MR-RB34	7:MR-RB54
		8:MR-RB30	
		9:MR-RB60	A:MR-RB100
		B:MR-RB31	
C EXT.DYNAMIC BRAKE	0	B:MR-RB01	E:STD-4FAN
D MOTOR TYPE	3	0:NO	1:YES
		0:HA-SH STD.	1:HA-LH LOW
		2:HA-LH FLET	
		3:HA-FH	4:HA-RH
E MOTOR CAPACITY	0.05	MOTOR CAPACITY (Kw)	
F MOTOR REVOLUTION(R)	3000	REVOLUTION (r/min)	
G FEEDBACK DLS(SEN)	8192	1	65536(ENCORDER PULSE)*4
H TURN DIRECTION	0	0:FOR(ccw)	1:REV(cw)
I SERVO IDENTITY	1	0:VELOCITY	1:POS.&VEL
J SERVO RESPONSE	1	1	12

Setting data area  
 Setting range area  
 Relative error display area

### [Display/Setting Content]

- Setting data area** Either the default value or the previously designated value is displayed here.
- Setting range area** The setting range for each setting item is indicated here.
- Relative error display area** The relative check range is displayed (in the currently selected system-of-units) when an error is detected by the relative check function.

### [Key Operation]

- Setting item selection** 1) Use the [↑] [↓] keys to move the cursor to the desired data setting item.
- Data setting**
- Using the numeric keys, key in the desired setting value at the cursor position. Be sure that the designated setting is within the setting range shown at the right side of the window.
  - After entering the desired setting value, press the [Enter] key to register the setting.  
 If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- Servo parameter (adjustment parameter) setting**
- To designate the servo parameters (adjustment parameters) settings, press the [F1] key.  
 The following checks will then be performed:
    - A relative check of the fixed parameter data.
    - A check of the servo parameter (basic parameter) setting ranges.
    - A relative check of the fixed parameter data and servo parameter (basic parameter) data.
 If no error is found, the system will return to the Servo Parameter (Adjustment) Setting window. (See Section 8.1.2 (2)(b).)  
 If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [F1] key again.

## 8. DATA SETTINGS FOR POSITIONING

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### Servo parameter (expansion parameter) setting

- 1) To designate the servo parameters (expansion parameters) settings, press the [F2] key.  
The following checks will then be performed:
  - A relative check of the fixed parameter data.
  - A check of the servo parameter (basic parameter) setting ranges.
  - A relative check of the fixed parameter data and servo parameter (basic parameters) data.If no error is found, the system will return to the Servo Parameter (expansion parameters) Setting window. (See Section 8.1.2 (2)(c).)  
If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [F2] key again.

### Axis setting change

- 1) Press the [F10] function key to change axis settings.  
When the [F10] key is pressed, the Axis Setting Change window will be displayed.
- 2) Using the numeric keys, key in the desired axis No. and press the [Enter] key.  
The Servo Parameter (basic parameter) Setting window for that axis No. will then be displayed.  
If an axis No. outside the prescribed axis No. range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- 3) To abort the axis No. setting operation, press the [Esc] key.

### Servo parameter setting END

- 1) To end the servo parameter setting operation, press the [End] key.  
The following checks will then be performed:
  - A relative check of the fixed parameter data.
  - A check of the servo parameter setting ranges.
  - A relative check of the fixed parameter data and servo parameter data.If no error is found, the system will return to the Axis Data Setting Function Selection window.  
If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [End] key again.

### Servo parameter setting ABORT

- 1) To abort the servo parameter setting operation, press the [Esc] key.  
The system will then return to the Axis Data Setting Function Selection window.

POINTS
<ol style="list-style-type: none"><li>(1) Setting values for items not highlighted at the Servo Parameter (basic parameter) Setting window are values which are based on data designated by the System Setting function. These setting values cannot be designated by the Servo Parameter (basic parameter) Setting function. Data settings can only be designated at the highlighted items.</li><li>(2) The setting range for servo parameter (basic parameters) data varies according to the "UNIT SETTING" designated with the Fixed Parameter Setting function.</li></ol>

## 8. DATA SETTINGS FOR POSITIONING

### File WRITE

- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.  
The file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

(b) Adjustment parameter setting

### [Servo Parameter (Adjustment Parameter) Setting Window] (For MR-H-B)

<SERVO PARAMETER (ADJUSTMENT PARAMETER 1/2)>							
1 AXIS	<PULSE>	SET DATA	SETTING RANGE				
A	LOAD INERTIA RATIO	3.0	0.1	-	100.0	(RATIO)	
B	POSITION LOOP GAIN 1	70	1	-	9999	(rad/sec)	
C	VELOCITY LOOP GAIN 1	1200	1	-	9999	(rad/sec)	
D	POSITION LOOP GAIN 2	25	1	-	9999	(rad/sec)	
E	VELOCITY LOOP GAIN 2	600	1	-	9999	(rad/sec)	
F	VEL. INTERGAL COMPS.	20	1	-	9999	(msec)	
G	NOTCH FILTER	0	0: NO USE	1: 1125	2: 750	3: 562	4: 450
			5: 375	6: 321	7: 281		(Hz)
H	FEED FORWARD GAIN	0	0	-	100	(%)	
I	IN-POSITION RANGE	100	1	-	2147483647	(PLS)	
J	SOLENOID BRAKE OUT	100	0	-	1000	(msec)	

Setting data area

Setting range area

Relative error display area

End:SET Esc:STOP

1 STD.PA 2 EXP.PA 3 NEXT 4 5 6 7 8 9 0 AXIS

### [Display/Setting Content]

- Setting data area** Either the default value or the previously designated value is displayed here.
- Setting range area** The setting range for each setting item is indicated here.
- Relative error display area** The relative check range is displayed (in the currently selected "UNIT SETTING") when an error is detected by the relative check function.

### [Key Operation]

- Setting item selection** 1) Use the [↑] [↓] keys to move the cursor to the desired data setting item.
- Data setting**
- 1) Using the numeric keys, key in the desired setting value at the cursor position.  
Be sure that the designated setting is within the setting range shown at the right side of the window.
  - 2) After entering the desired setting value, press the [Enter] key to register the setting.  
If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

### Servo parameter (basic parameter) setting

- 1) To designate the servo parameter (basic parameters) settings, press the [F1] key.  
The following checks will then be performed:
  - A relative check of the fixed parameter data.
  - A check of the servo parameter (adjustment parameter) setting ranges.
  - A relative check of the fixed parameter data and servo parameter (adjustment parameter) data.

If no error is found, the system will return to the Servo Parameter (Basic Parameters) Setting window. (See Section 8.1.2 (2)(a).)

If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [F1] key again.

## 8. DATA SETTINGS FOR POSITIONING

- Servo parameter (expansion parameter) setting**
- 1) To designate the servo parameter (expansion parameter) settings, press the [F2] key.  
The following checks will then be performed:
    - A relative check of the fixed parameter data.
    - A check of the servo parameter (adjustment parameter) setting ranges.
    - A relative check of the fixed parameter data and servo parameter (adjustment parameter) data.
 If no error is found, the system will return to the Servo Parameter (Expansion Parameters) Setting window. (See Section 8.1.2 (2)(c).)  
 If an error is found, a highlighted "E" will be displayed next to the error item.  
 At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area.  
 After checking the setting data, make the necessary corrections then press the [F2] key again.
- Page change**
- 1) Press the [F3] key to switch between the next and previous setting data display pages.
- Axis setting change**
- 1) Press the [F10] function key to change axis settings.  
When the [F10] key is pressed, the Axis Setting Change window will be displayed.
  - 2) Using the numeric keys, key in the desired axis No. and press the [Enter] key.  
The Servo Parameter (basic parameter) Setting window for that axis No. will then be displayed.  
If an axis No. outside the prescribed axis No. range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
  - 3) To abort the axis No. setting operation, press the [Esc] key.
- Servo parameter setting END**
- 1) To end the servo parameter setting operation, press the [End] key.  
The following checks will then be performed:
    - A relative check of the fixed parameter data.
    - A check of the servo parameter setting ranges.
    - A relative check of the fixed parameter data and servo parameter data.
 If no error is found, the system will return to the Axis Data Setting Function Selection window.  
 If an error is found, a highlighted "E" will be displayed next to the error item.  
 At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area.  
 After checking the setting data, make the necessary corrections then press the [End] key again.
- Servo parameter setting ABORT**
- 1) To abort the servo parameter setting operation, press the [Esc] key.  
The system will then return to the Axis Data Setting Function Selection window.

POINTS
<p>(1) Setting values for items not highlighted at the servo parameter (adjustment parameters) setting window are values which are based on data designated by the System Setting function. These setting values cannot be designated by the Servo Parameter (Adjustment Parameters) Setting function. Data settings can only be designated at the highlighted items.</p> <p>(2) The setting range for servo parameter (adjustment parameters) data varies according to the "UNIT SETTING" designated with the Fixed Parameter Setting function.</p>

## 8. DATA SETTINGS FOR POSITIONING

### File WRITE

- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.  
The file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

(c) Expansion parameter setting

### [Servo Parameter (Expansion Parameter) Setting Window] (For MR-H-B)

<SERVO PARAMETER (EXPANDED PARAMETER 1/2)>		1 AXIS <PULSE>	SET DATA	SETTING RANGE
A	MON.OUT.1 OFFSET	0	-9999	9999 (mV)
B	MON.OUT.2 OFFSET	0	-9999	9999 (mV)
C	REF. ALRM DATA SELECT (SAMPLING TIME SEL.) (DATA SEL.1)	0	0:1.77 1:3.55 2:7.11 3:14.2 4:28.4(ms)	
	(DATA SEL.2)	1	0:VEL(+) 1:TRO(+) 2:VEL(+) 3:TRO(+)	
			4:CUR.CMD.OUT 5:CMD.FIN.T	
			6:DEV.PULS1/1 7:DEV.PULS1/4	
			8:DEV.PULS1/16 9:DEV.PULS1/32	
D	ZERO SPEED	10000	0	10000 (r/min)
E	EX.ERROR ALARM LEVEL (PI-PID CTRL.CHG.)	80	0	1000 (kpulse)
	(DYNAMIC BRAKE) (SERVO READ LANG)	0	0:NONE 1:CAN CHG. BY DROOP WHEN POS. CTRL. 2:VEL.AMP.CTRL.	
			0:JAPANESE 1:ENGLISH	
		End:SET		Esc:STOP
1 STD.PA 2 ADJ.PA 3 NEXT 4		5	6	7
		8	9	0 AXIS

Setting data area

Setting range area

Relative error display area

### [Display/Setting Content]

#### Setting data area

Either the default value or the previously designated value is displayed here.

#### Setting range area

The setting range for each setting item is indicated here.

#### Relative error display area

The relative check range is displayed (in the currently selected system-of-units) when an error is detected by the relative check function.

### [Key Operation]

#### Setting item selection

- 1) Use the [↑] [↓] keys to move the cursor to the desired data setting item.

#### Data setting

- 1) Using the numeric keys, key in the desired setting value at the cursor position.  
Be sure that the designated setting is within the setting range shown at the right side of the window.
- 2) After entering the desired setting value, press the [Enter] key to register the setting.  
If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

#### Servo parameter (basic parameter) setting

- 1) To designate the servo parameter (basic parameters) settings, press the [F1] key.  
The following checks will then be performed:
  - A relative check of the fixed parameter data.
  - A check of the servo parameter (expansion parameters) setting ranges.
  - A relative check of the fixed parameter data and servo parameter (expansion parameters) data.
If no error is found, the system will return to the Servo Parameter (basic parameters) Setting window. (See Section 8.1.2 (2)(a).)  
If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [F1] key again.



## 8. DATA SETTINGS FOR POSITIONING

- Servo parameter (adjustment parameter) setting**
- To designate the servo parameter (adjustment parameters) settings, press the [F2] key.  
The following checks will then be performed:
    - A relative check of the fixed parameter data.
    - A check of the servo parameter (expansion parameters) setting ranges.
    - A relative check of the fixed parameter data and servo parameter (expansion parameters) data.
 If no error is found, the system will return to the Servo Parameter (adjustment parameters) Setting window. (See Section 8.1.2 (2)(b).)  
If an error is found, a highlighted "E" will be displayed next to the error item.  
At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area.  
After checking the setting data, make the necessary corrections then press the [F2] key again.
- Page change**
- Press the [F3] key to switch between the next and previous setting data display pages.
- Axis setting change**
- Press the [F10] function key to change axis settings.  
When the [F10] key is pressed, the Axis Setting Change window will be displayed.
  - Using the numeric keys, key in the desired axis No. and press the [Enter] key.  
The Servo Parameter (basic parameter) Setting window for that axis No. will then be displayed.  
If an axis No. outside the prescribed axis No. range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
  - To abort the axis No. setting operation, press the [Esc] key.
- Servo parameter setting END**
- To end the servo parameter setting operation, press the [End] key.  
The following checks will then be performed:
    - A relative check of the fixed parameter data.
    - A check of the servo parameter setting ranges.
    - A relative check of the fixed parameter data and servo parameter data.
 If no error is found, the system will return to the Axis Data Setting Function Selection window.  
If an error is found, a highlighted "E" will be displayed next to the error item.  
At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area.  
After checking the setting data, make the necessary corrections then press the [End] key again.
- Servo parameter setting ABORT**
- To abort the servo parameter setting operation, press the [Esc] key.  
The system will then return to the Axis Data Setting Function Selection window.

POINTS
<p>(1) Setting values for items not highlighted at the servo parameter (expansion parameters) setting window are values which are based on data designated by the System Setting function. These setting values cannot be designated by the Servo Parameter (expansion parameters) Setting function. Data settings can only be designated at the highlighted items.</p> <p>(2) The setting range for servo parameter (expansion parameters) data varies according to the "UNIT SETTING" designated at the Fixed Parameter Setting function.</p>

## 8. DATA SETTINGS FOR POSITIONING

---

### File WRITE

- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.  
The file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

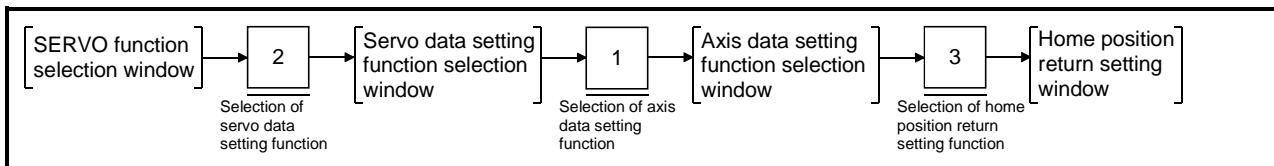
## 8. DATA SETTINGS FOR POSITIONING

### 8.1.3 Home position return data (axis data) setting

The procedure for designating the "home position return" settings is described below.

Data settings are designated for each axis.

#### [Procedure for Displaying the Home Position Return Setting Window]



#### [Home Position Return Setting Window] (For A17[ ]/A273UHCPU)

<ZERO POINT DATA>		
1.AXIS <mm>	SET DATA	SETTING RANGE
A DIRECTION	0	0:REVERSE(cw) 1:FORWARD(ccw)
B METHOD	0	0:DOG 1:COUNT 2:DATA SET
C ADDRESS	0.0	-214748364.8 - 214748364.7(μm)
D SPEED	0.01	0.01 600000.00(mm/min)
E CREEP SPEED	0.01	0.01 - 600000.00(mm/min)
F MOVEMENT AFTER DOG		
G P.B. NO.	1	1 - 16

Setting data area

Setting range area

Relative error display area

End:SET Esc:STOP

1 2 3 4 5 6 7 8 9 0 AXIS

#### [Display/Setting Content]

**Setting data area** Either the default value or the previously designated value is displayed here.

**Setting range area** The setting range for each setting item is indicated here.

**Relative error display area** Either an error message or the relative check range is displayed here (in the currently selected UNIT SETTING) when an error is detected by the relative check function.

#### [Key Operation]

**Setting item selection** 1) Use the [↑] [↓] keys to move the cursor to the desired data setting item.

**Data setting**

- 1) Using the numeric keys, key in the desired setting value at the cursor position. Be sure that the designated setting is within the setting range shown at the right side of the window.
- 2) After entering the desired setting value, press the [Enter] key to register the setting.  
If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

**Axis setting change**

- 1) Press the [F10] function key to change axis settings. When the [F10] key is pressed, the Axis Setting Change window will be displayed.
- 2) Using the numeric keys, key-in the desired axis No. and press the [Enter] key. The Servo Parameter Setting window for that axis No. will then be displayed. If an axis No. outside the prescribed axis No. range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- 3) To abort the axis No. setting operation, press the [Esc] key.

## 8. DATA SETTINGS FOR POSITIONING

---

**Home Position return setting END** 1) To end the home position return setting operation, press the [End] key. A relative check of the setting data will then be executed, and if no error is found, the system will return to the Axis Data Setting Function Selection window.  
If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [End] key again.

**Home position return setting ABORT** 1) To abort the home position return setting operation, press the [Esc] key. The system will then return to the Axis Data Setting Function Selection window.

**File WRITE** 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed. The file write YES/NO dialog box will be displayed.  
2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)  
3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

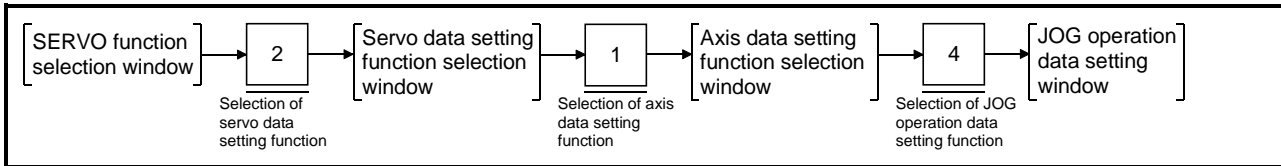
POINTS
(1) The home position return setting range will vary according to the "UNIT SETTING" designated at the Fixed Parameter Setting function. (2) Items for which settings can be designated will vary according to the "METHOD" which is used. a) Dog type: Designate settings for items A to E, and G. No setting can be designated for item F. b) Count type: Designate settings for all items. c) Data set type: Only designate settings for items A, B and C. Settings cannot be designated for any other items.

## 8. DATA SETTINGS FOR POSITIONING

### 8.1.4 JOG operation data (axis data) setting

The procedure for designating the JOG operation data settings is described below. Data settings are designated for each axis.

#### [Procedure for Displaying the JOG Operation Data Setting Window]



#### [JOG Operation Data Setting Window] (For A17[ ]/A273UHCPU)

<JOG DATA>			
1 AXIS <mm>	SET DATA	SETTING RANGE	
A JOG SPEED LIMIT	200.00	0.01	- 6000000.00(mm/min)
B P.B. NO.	1 1	-	16

Setting data area

Setting range area

End:SET Esc:STOP

1 2 3 4 5 6 7 8 9 0 AXIS

#### [Display/Setting Content]

- Setting data area** Either the default value or the previously designated value is displayed here.
- Setting range area** The setting range for each setting item is indicated here.

#### [Key Operation]

- Setting item selection** 1) Use the [↑] [↓] keys to move the cursor to the desired data setting item.
- Data setting**
- Using the numeric keys, key in the desired setting value at the cursor position. Be sure that the designated setting is within the setting range shown at the right side of the window.
  - After entering the desired setting value, press the [Enter] key to register the setting.  
If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- Axis setting change**
- Press the [F10] function key to change axis settings. When the [F10] key is pressed, the Axis Setting Change window will be displayed.
  - Using the numeric keys, key-in the desired axis No. and press the [Enter] key. The Servo Parameter Setting window for that axis No. will then be displayed. If an axis No. outside the prescribed axis No. range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
  - To abort the axis No. setting operation, press the [Esc] key.

## 8. DATA SETTINGS FOR POSITIONING

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### JOG operation data setting END

- 1) To end the JOG operation data setting procedure, press the [End] key. A relative check of the setting data will then be executed, and if no error is found, the system will return to the Axis Data Setting Function Selection window.  
If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [End] key again.

### JOG operation data setting ABORT

- 1) To abort the JOG operation data setting procedure, press the [Esc] key. The system will then return to the Axis Data Setting Function Selection window.

### File WRITE

- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.  
The file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

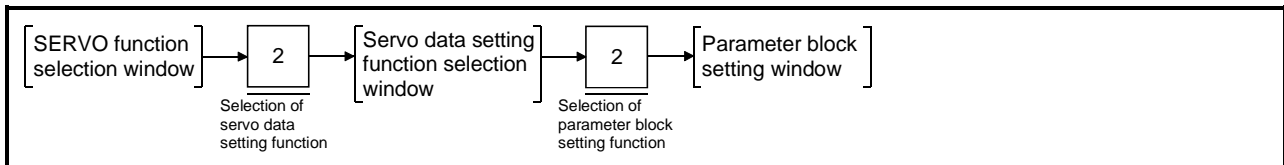
<b>POINT</b>
The setting range for JOG operation data varies according to the "UNIT SETTING" designated at the Fixed Parameter Setting function.

## 8. DATA SETTINGS FOR POSITIONING

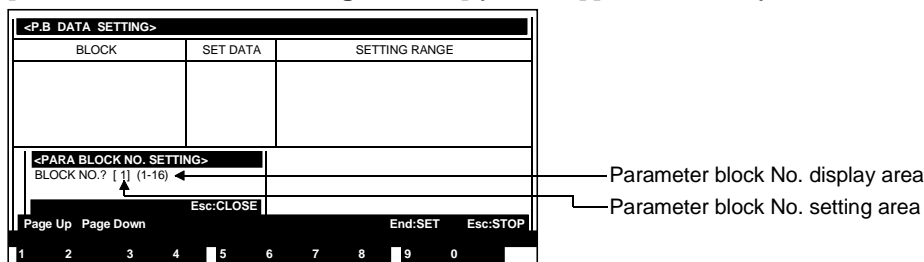
### 8.1.5 Parameter block setting

The procedure for designating the parameter block settings used at home position return data, JOG operation data, and servo programs is described below. Parameter block data is used for acceleration/deceleration control, etc., during positioning operations.

#### [Procedure for Displaying the Parameter Block Setting Window]



#### [Parameter Block No. Setting Window] (For A17[ ]/A273UHCPU)



#### [Display/Setting Content]

**Parameter block No. setting area** Either the default value or the previously designated value is displayed here.

**Parameter block No. display area** The range of parameter block Nos. for which setting is possible is displayed.

#### [Key Operation]

**Parameter block No. setting**

- Using the numeric keys, input the block No. for which the parameter block data is to be designated, and press the [Enter] key. After the parameter block No. is designated, the system will return to the Parameter Block Data Setting window. If a block No. outside the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

**Parameter block No. setting ABORT**

- To abort the parameter block No. setting operation, press the [Esc] key. The system will then return to the Servo Data Setting Function Selection window.

## 8. DATA SETTINGS FOR POSITIONING

### [Parameter Block Setting Window]

<P. B. DATA SETTING>				
BLOCK	SET DATA	SETTING RANGE		
A CONTROL UNIT	0	0: mm	1: inch	2: degree
B SPEED RESTRICTION	2000.00	0.01	-	600000.00 ( min/min)
C ACCELERATION TIME	1000	1	-	65535 (msec)
D DECELERATION TIME	1000	1	-	65535 (msec)
E SHORT STOP TIME	1000	1	-	65535 (msec)
F S RATIO	0	0	-	100 (%)
G TORQUE LIMIT	300	1	-	500 (%)
H STOP METHOD	0	0: DECEL STOP	1: SHORT STOP	( um)
I CIRCULAR ERROR RANGE	10.0	0.0	-	10000.0

Setting data area

Setting range area

Relative error display area

Page Up Page Down End:SET Esc:STOP

1 2 3 4 5 6 7 8 9 0

### [Display/Setting Content]

**Setting data area** Either the default value or the previously designated value is displayed here.

**Setting range area** The setting range for each setting item is indicated here.

**Relative error display area** When an error is detected by the relative check, the relative check calculation formula and error message are displayed here.

### [Key Operation]

**Setting item selection** 1) Use the [ $\uparrow$ ] [ $\downarrow$ ] keys to move the cursor to the desired data setting item.

**Data setting**

- 1) Using the numeric keys, key in the desired setting value at the cursor position. Be sure that the designated setting is within the setting range shown at the right side of the window.
- 2) After entering the desired setting value, press the [Enter] key to register the setting. If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

**Block No. change**

- 1) Use the [Page Up]/[Page Down] keys to change the block No. The [Page Up] key reduces the current block No. by 1. The [Page Down] key increases the current block No. by 1.

**Parameter block data setting END**

- 1) To end the parameter block data setting operation, press the [End] key. A relative check of the setting data will then be executed, and if no error is found, the system will return to the Servo Data Setting Function Selection window. If an error is found, a highlighted "E" will be displayed next to the error item. At this time, the relative check range will be shown at the relative error display area, and an error message will be displayed at the message area. After checking the setting data, make the necessary corrections then press the [End] key again.

**Parameter block data setting ABORT**

- 1) To abort the parameter block data setting operation, press the [Esc] key. The system will then return to the Servo Data Setting Function Selection window.

### POINT

The setting range of the parameter blocks varies according to the "UNIT SETTING" designated with the Fixed Parameter Setting Function.



## 8. DATA SETTINGS FOR POSITIONING

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### File WRITE

- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.  
The file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

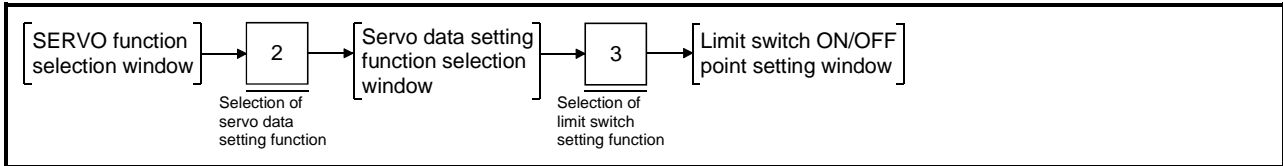
## 8. DATA SETTINGS FOR POSITIONING

### 8.1.6 Limit switch output data setting

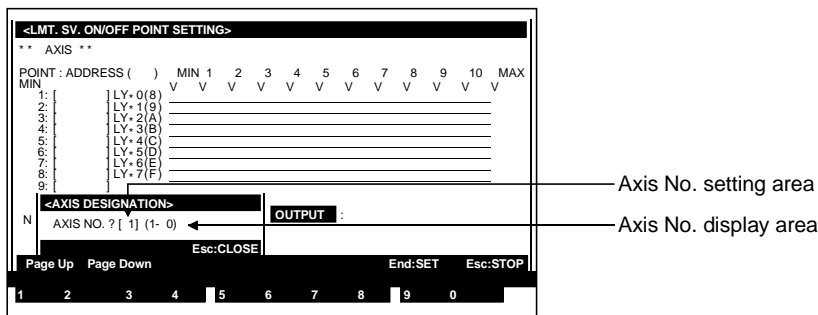
The procedure for designating the limit switch output ON/OFF setting for a given axis is described below.

A limit switch ON/OFF setting can be designated only at axes where a "USE" status has been selected at the fixed parameter data settings.

#### [Procedure for Displaying the Limit Switch ON/OFF Point Setting Window]



#### [Axis Designation Window] (For A273UHCPU)



Axis No. setting area

Axis No. display area

#### [Display/Setting Content]

**Axis No. setting area** Either the default value or the previously designated value is displayed here.

**Axis No. display area** The range of selectable axis Nos. is displayed here.

#### [Key Operation]

##### Axis No. setting

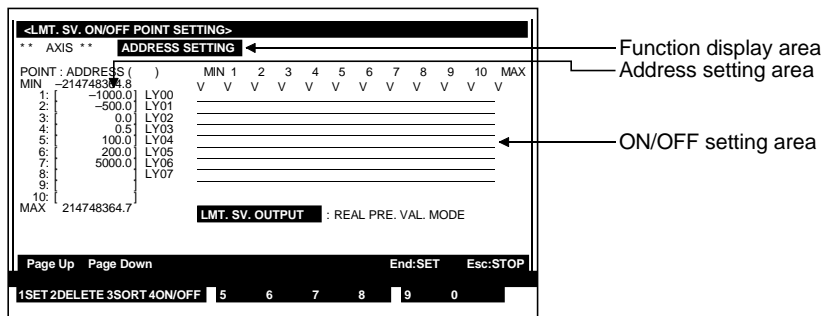
- Using the numeric keys, key in the axis No. where a limit switch ON/OFF setting is to be designated, then press the [Enter] key. The limit switch ON/OFF point setting window will then be displayed. If an axis No. setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

##### Axis No. setting ABORT

- To abort the axis No. setting operation, press the [Esc] key. The system will then return to the Servo Data Setting Function Selection window.

## 8. DATA SETTINGS FOR POSITIONING

### [Limit Switch ON/OFF Point Setting Window]



### [Display/Setting Content]

**Function display area** A highlight display of the selected function occurs here.

**Address setting area** The designated address setting is displayed here.

**ON/OFF setting area** A highlight display occurs between points where ON/OFF settings are designated and points to the right of those points.

### [Key Operation]

#### Designating the Limit Switch ON/OFF Point Address

**Selecting the address setting function** 1) Point addresses can be designated when the "ADDRESS SETTING" item at the function display area is highlighted.  
If the "ADDRESS SETTING" item is not highlighted, press the [F1] key to highlight it.

**Point No. selection** 1) Use the [↑] [↓] keys to select the point No. where an address setting is to be designated.

**Address setting procedure** 1) Using the numeric keys, key in the desired address.  
Designate the address within the range between MIN and MAX.  
If a setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

**Address setting ABORT** 1) To abort the address setting operation, press the [Esc] key.

#### Deleting Address Settings

**Selecting the address delete function** 1) Press the [F2] key to highlight the "POINT DELETE" item at the function display area.  
The address data at the cursor line will also be highlighted at this time.

**Address selection** 1) Use the [↑] [↓] keys to select the address to be deleted, then press the [Enter] key. The selected address will then be deleted.  
The address setting area for the point No. where the deletion occurred will become blank.

**Address setting ABORT** 1) To abort the address deletion operation, press the [Esc] key.  
The "ADDRESS SETTING" item will then be highlighted, indicating that address settings can be designated.

## 8. DATA SETTINGS FOR POSITIONING

### Sorting Addresses

#### Address SORT

- 1) Press the [F3] key to sort the address settings in ascending order. Addresses will be displayed, beginning from point No. 1.
- 2) If an address setting which is the same as the MIN or MAX value exists at point Nos.1-10, it will automatically be deleted, and the subsequent addresses will be moved up to fill that vacant position.
- 3) If identical addresses exist, one of them will be designated at a point No., and the others will be deleted. Subsequent addresses will be moved up to fill those vacant positions.

### Limit Switch ON/OFF Setting

#### Selecting the ON/OFF setting function

- 1) Press the [F4] key. The cursor will move to the uppermost MIN position, and the "ON/OFF SETTING" item at the function display area will be highlighted. The limit switch ON/OFF pattern can now be designated.
- 2) The limit switch ON/OFF pattern is designated in 1-point (LY□□) units, with up to 8 points per axis.

#### ON/OFF setting procedure

- 1) Using the cursor control keys (arrow keys), move the cursor to the position where an ON setting is desired, then press the [Space] key to designate the setting.  
ON settings will be designated for the point where the cursor is positioned, and for the point which follows, with the points then being highlighted. To designate an OFF setting for the highlighted points, press the [Space] key again. However, ON/OFF settings will not be made if the [Space] key is pressed while the cursor is at the "MAX" position. In this case, the cursor will simply move down one level to the LY□□ "MIN" position. If there is no LY□□ one level down, the cursor will move to the lowest LY□□ "MIN" position for the axis in question.

#### Address setting procedure

- 1) Press the [F4] key when the "ON/OFF SETTING" item at the function display area is highlighted. "ADDRESS SETTING" will then be highlighted at the same position, and the cursor will return to the address setting area.

#### ON/OFF setting operation ABORT

- 1) To abort the ON/OFF setting operation, press the [Esc] key. The system will then return to the Servo Data Setting Function Selection window.

#### File WRITE

- 1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.  
The file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

### POINTS

- (1) After setting, modifying, changing, or deleting point addresses, always execute the SORT function by pressing the [F3] key.  
If a limit switch ON/OFF setting operation is attempted by pressing the [F4] key without first executing the SORT function, a "SORT." message will be displayed.
- (2) When designating limit switch ON/OFF settings, the cursor will only move to point positions where point addresses have been designated.

## 8. DATA SETTINGS FOR POSITIONING

### Limit Switch Mode Setting

#### [Limit Switch Output Mode Setting Window]

<LMT. SV. ON/OFF POINT SETTING>													
** AXIS ** ADDRESS SETTING													
POINT	ADDRESS (um)	MIN	1	2	3	4	5	6	7	8	9	10	MAX
MIN	-214748364.8		V	V	V	V	V	V	V	V	V	V	V
1:	LY00												
2:	LY01												
3:	LY02												
4:	LY03												
5:	LY04												
6:	LY05												
7:	LY06												
8:	LY07												
9:													

<LS OUTPUT MODE>		
1: RAL PRE. VAL.	2: CAM PRE. VAL 1REV.	PRE. VAL MODE

Page Up Page Down Esc:Close End:SET Esc:STOP

1 2 3 4 5 6 7 8 9 0

Mode setting area

#### [Display/Setting Content]

In the Limit Switch ON/OFF Point Setting Window, when the [F5] key is pressed, the Limit Switch Output Mode Setting Window is displayed.

For limit switch output (Cam axis), designate whether to use the cam stroke (actual present value) or the present value in one cam revolution.

**Mode setting area** Either the default value or the previously designated mode is highlighted here.

#### [Key Operations]

##### Mode setting

- 1) Use the [←] [→] keys to highlight the limit switch output mode, and then press the [Enter] key.  
(The Actual Present Value mode is the default mode.)  
After the designated mode is decided, return to the Limit Switch ON/OFF Point Setting Window.

##### Mode setting ABORT

- 1) To abort a mode setting operation, press the [Esc] key.  
The system will then return to the Limit Switch ON/OFF Point Setting window.

# 8. DATA SETTINGS FOR POSITIONING

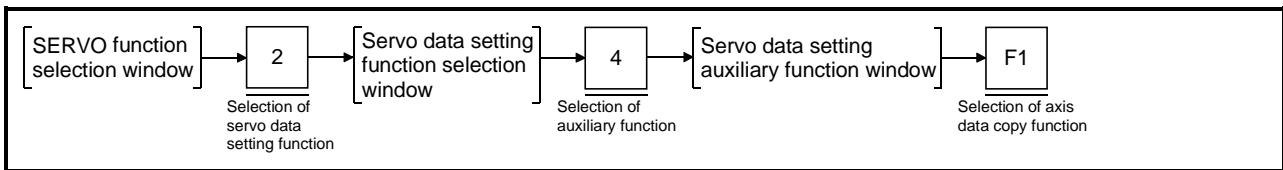
## 8.2 Positioning Data Copy

The procedure for copying positioning data is described below.

### 8.2.1 Axis data copy

The procedure for copying axis data (fixed parameters, servo parameters, home position return data, JOG operation data) to another axis is described below. The axis data COPY operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Axis Data COPY Designation Procedure]



#### [Servo Data Setting Auxiliary Function Window] (For A273UHCPU)

Copy source axis No. setting area  
 Copy destination axis No. setting area  
 Axis No. display area

#### [Display/Setting Content]

- Copy source axis No. setting area** Either the default value or the designated copy source axis No. is displayed here.
- Copy destination axis No. setting area** Either the default value or the designated copy destination axis No. is displayed here.
- Axis No. display area** The range of selectable axis Nos. is displayed here.

#### [Key Operation]

- Selecting the axis data to be copied**
  - Use the numeric keys to designate the axis data to be copied. The axis data to be copied can also be designated using the [↑] [↓] keys, followed by pressing the [Enter] key. The designated axis data will be highlighted, and the cursor will flash at the copy source axis No. setting area.
- Designating the copy source axis No.**
  - Using the numeric keys, key in the desired copy source axis No. If an axis No. setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
  - After entering the axis No., press either the [Enter] or [→] key. The cursor will then move to the copy destination axis No. setting area.

## 8. DATA SETTINGS FOR POSITIONING

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- Setting the copy destination axis No.**
- 1) Using the numeric keys, key in the desired copy destination axis No.  
The [←] key can be pressed to return the cursor to the copy source axis No. setting area.  
If an axis No. setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.  
If the same axis No. is designated for both the copy source and copy destination, an "INCORRECT DATA." error message will be displayed.
  - 2) After entering the axis No., press the [Enter] key.  
The axis data copy YES/NO dialog box will be displayed.
- Copy EXECUTE**
- 1) To execute an axis data COPY, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
  - 2) When copying of the axis data is completed, the system will return to the Servo Data Setting Auxiliary Function window.
- Copy CANCEL**
- 1) To cancel the axis data copy operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Servo Data Setting Auxiliary Function window without executing the copy operation.
- Copy ABORT**
- 1) To abort a copy operation, press the [Esc] key.  
The system will then return to the Servo Data Setting Auxiliary Function window.

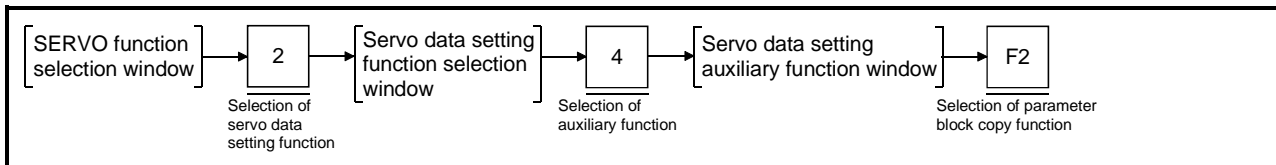
## 8. DATA SETTINGS FOR POSITIONING

### 8.2.2 Parameter block data COPY

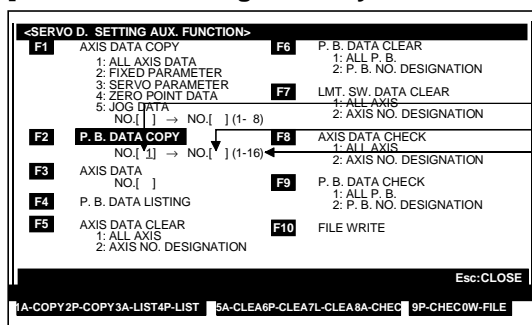
The procedure for copying parameter block data to another parameter block is described below.

The axis data COPY operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Parameter Block COPY Designation Procedure]



#### [Servo Data Setting Auxiliary Function Window] (For A273UHCPU)



Copy source parameter block No. setting area  
 Copy destination parameter block No. setting area  
 Parameter block No. display area

#### [Display/Setting Content]

**Copy source parameter block No. setting area** Either the default value or the designated copy source parameter block No. is displayed here.

**Copy destination parameter block No. setting area** Either the default value or the designated copy destination parameter block No. is displayed here.

**Parameter block No. display area** The range of parameter block Nos. for which setting is possible is displayed.

#### [Key Operation]

##### Designating the copy source parameter block No.

- 1) Using the numeric keys, key in the desired copy source parameter block No.  
 If a parameter block No. setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed.  
 In this case, the setting should be re-designated within the prescribed range.
- 2) After entering the parameter block No., press either the [Enter] or [→] key.  
 The cursor will then move to the "copy destination parameter block No." setting area.



## 8. DATA SETTINGS FOR POSITIONING

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- Designating the copy destination parameter block No.**
- 1) Using the numeric keys, key in the desired copy destination parameter block No.  
The [←] key can be pressed to return the cursor to the "copy source parameter block No." setting area.  
If a parameter block No. setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.  
If the same axis No. is designated for both the copy source and copy destination, an "INCORRECT DATA." error message will be displayed.
  - 2) After entering the parameter block No., press the [Enter] key.  
A YES/NO dialog box is displayed to prompt whether to copy the parameter block data.
- Copy EXECUTE**
- 1) To execute a parameter block data COPY, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
  - 2) When copying of the parameter block data is completed, the system will return to the Servo Data Setting Auxiliary Function window.
- Copy CANCEL**
- 1) To cancel the parameter block data copy operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Servo Data Setting Auxiliary Function window without executing the copy operation.
- Copy ABORT**
- 1) To abort a copy operation, press the [Esc] key.  
The system will then return to the Servo Data Setting Auxiliary Function window.

## 8. DATA SETTINGS FOR POSITIONING

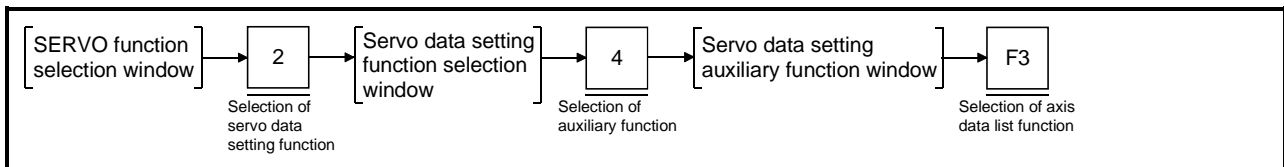
### 8.3 Positioning Data List

The procedure for displaying a list of the setting data is described below.

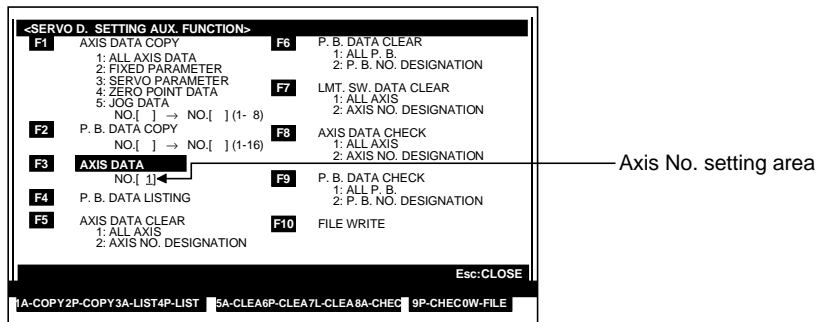
#### 8.3.1 Axis data list

A list of the axis data (fixed parameters, servo parameters, home position return data, JOG operation data) settings for a designated axis is displayed. The axis data COPY operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Procedure for Displaying the Axis Data List]



#### [Servo Data Setting Auxiliary Function Window] (For A273UHCPU)



#### [Display/Setting Content]

**Axis No. setting area** Either the default value or the previously designated value is displayed here.

#### [Key Operation]

##### Axis No. setting

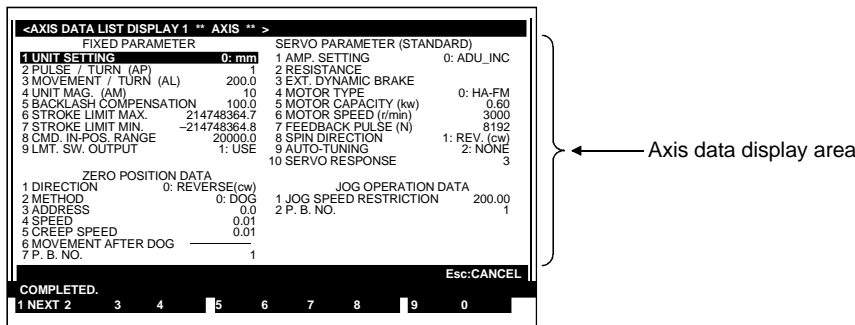
- 1) Use the numeric keys to designate the axis No. for which an axis data list is desired.
- 2) Press the [Enter] key. The Axis Data List window for the designated axis No. will then be displayed.

If an axis No. setting which violates the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

## 8. DATA SETTINGS FOR POSITIONING

(1) When ADU is used

### [Axis Data List Window]



← Axis data display area

### [Display/Setting Content]

**Axis data display area** Settings designated with the Axis Data Setting function are displayed here.

### [Key Operation]

#### Highlight display of setting items & data

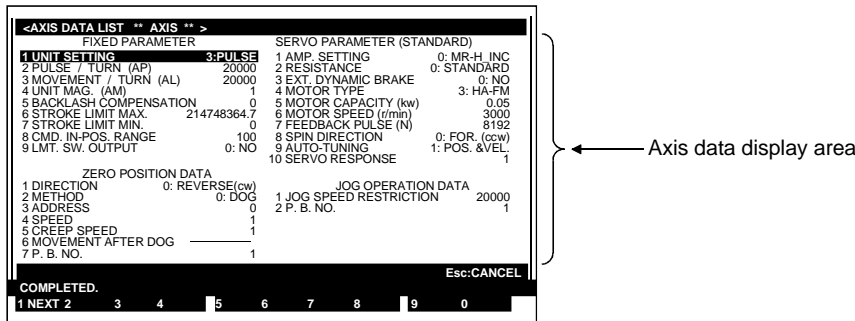
- 1) Each of the setting items and setting data can be highlighted for confirmation by using the cursor control keys (arrow keys).

#### Axis data list operation ABORT

- 1) To abort the axis data List operation, press the [Esc] key. The system will then return to the Servo Data Setting Auxiliary Function window.

(2) When MR-[ ]-B is used

### [Axis Data List Window] (For MR-H-B)



← Axis data display area

### [Display/Setting Content]

**Axis data display area** Settings designated with the Axis Data Setting function are displayed here.

### [Key Operation]

#### Highlight display of setting items & data

- 1) Each of the setting items and setting data can be highlighted for confirmation by using the cursor control keys (arrow keys).

#### Page change

- 1) Press the [F1] key for previous/next page switching of data displayed at the axis data display area.

#### Axis data list operation ABORT

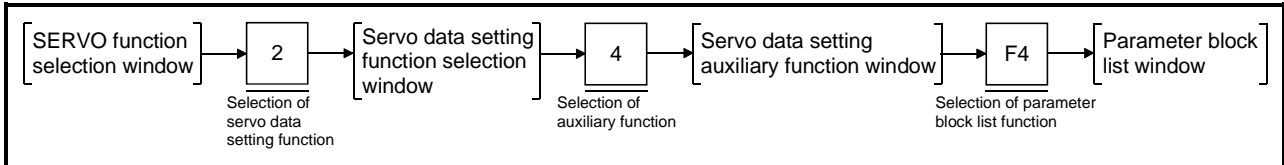
- 1) To abort the axis data List operation, press the [Esc] key. The system will then return to the Servo Data Setting Auxiliary Function window.

## 8. DATA SETTINGS FOR POSITIONING

### 8.3.2 Parameter block list

A list of the parameter block setting data is displayed.  
The axis data COPY operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Procedure for Displaying the Parameter Block List]



#### [Parameter Block List Window]

<PARAMETER BLOCK LIST DISPLAY>							
P.B.NO.	CONTROL UNIT	SPEED RESTRICT	ACCEL TIME	DECEL TIME	SHORT TIME	TORQUE LIMIT	S RATIO
P.B. 1	3-PULSE	200000	1000	1000	1000	300	0
P.B. 2	3-PULSE	200000	1000	1000	1000	300	0
P.B. 3	3-PULSE	200000	1000	1000	1000	300	0
P.B. 4	3-PULSE	200000	1000	1000	1000	300	0
P.B. 5	3-PULSE	200000	1000	1000	1000	300	0
P.B. 6	3-PULSE	200000	1000	1000	1000	300	0
P.B. 7	3-PULSE	200000	1000	1000	1000	300	0
P.B. 8	3-PULSE	200000	1000	1000	1000	300	0
P.B. 9	3-PULSE	200000	1000	1000	1000	300	0
P.B.10	3-PULSE	200000	1000	1000	1000	300	0
P.B.11	3-PULSE	200000	1000	1000	1000	300	0
P.B.12	3-PULSE	200000	1000	1000	1000	300	0
P.B.13	3-PULSE	200000	1000	1000	1000	300	0
P.B.14	3-PULSE	200000	1000	1000	1000	300	0
P.B.15	3-PULSE	200000	1000	1000	1000	300	0
P.B.16	3-PULSE	200000	1000	1000	1000	300	0
	3-PULSE (PLS:sec)		(msec)	(msec)	(msec)	(%)	(%)

Parameter block data display area

System-of-units display area

COMPLETED. Esc:STOP

1 2 3 4 5 6 7 8 9 0

#### [Display/Setting Content]

**Parameter block data display area** Settings designated with the Parameter Block Data Setting function are displayed here.

**System-of-units display area** The system-of-units for the highlighted parameter block data is displayed here.

#### [Key Operation]

**Highlight display of setting items and data**

- 1) Each of the setting items and setting data can be highlighted for confirmation by using the [↑] [↓] keys.
- 2) The [←] [→] keys are used for switching the display to the remaining items.

**Parameter block data list operation ABORT**

- 1) To abort the parameter block data List operation, press the [Esc] key. The system will then return to the Servo Data Setting Auxiliary Function window.

# 8. DATA SETTINGS FOR POSITIONING

## 8.4 Positioning Data Check

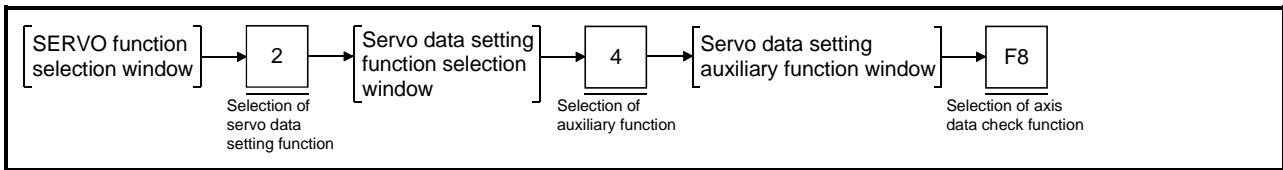
The procedure for conducting a relative check of setting data to check for errors is described below.

### 8.4.1 Axis data check

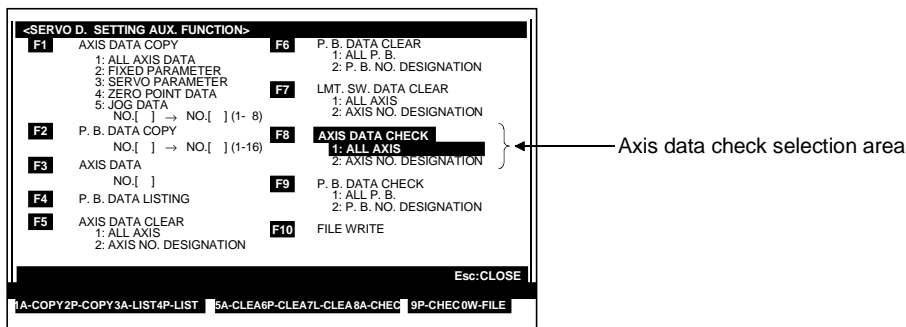
A relative check of the designated axis No. data (fixed parameters, servo parameters, home position return data, JOG operation data) and parameter block setting data is executed to check for errors.

The axis data COPY operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Axis Data Check Designation Procedure]



#### [Servo Data Setting Auxiliary Function Window] (For A273UHCPU)



#### [Display/Setting Content]

**Axis data check selection area** All axes or designated axis data check function is selected here.

#### [Key Operation]

##### All Axes Check

**Selecting all axes check**

- 1) Select the "ALL AXIS" item by pressing the [1] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The all axes data check YES/NO dialog box will be displayed.

**Designated parameter block check EXECUTE**

- 1) To conduct an all axes check operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) When the all axes check is completed, the Axis Data Error window will be displayed.

**Designated parameter block check CANCEL**

- 1) To cancel the all axes check operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Servo Data Setting Auxiliary Function window without executing the "all axes check" operation.

## 8. DATA SETTINGS FOR POSITIONING

---

### Designated Axis Check

#### Selecting the designated axis item

- 1) Select the "designated axis" item by pressing the [2] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The Axis No. Designation window will then be displayed.

#### Designating the axis No.

- 1) Use the cursor control keys (arrow keys) to move the cursor to the axis No. to be designated, then press the [Space] key.  
The designated axis No. will be highlighted. To cancel an axis No. designation, press the [Space] key again. To cancel all axis No. designations, press the [Delete] key.  
Multiple axes can be designated for the axis data check.
- 2) Use the [Page Up]/[Page Down] keys to see the previous or next page of axis data error codes.  
Press the [Page Up] key to display the previous error code page.  
Press the [Page Down] key to display the next error code page.  
(Error codes are displayed for axes 1 to 32 only when using A273UHCPU (32-axis specification).)

#### Axis No. designation ABORT

- 1) To abort the axis No. designation procedure, press the [Esc] key.  
The system will then return to the Servo Data Setting Auxiliary Function window.

#### Axis No. designation END

- 1) After the axis No. (Nos.) has been designated for the axis data check operation, press the [End] key.  
The designated axis data check YES/NO dialog box will be displayed.

#### Designated axis check EXECUTE

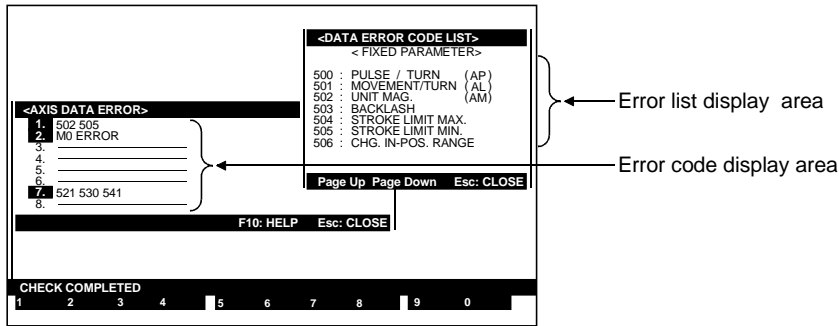
- 1) To conduct a designated axis check operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) When the designated axis check is completed, the Axis Data Error window will be displayed.

#### Designated axis check CANCEL

- 1) To cancel the designated axis check operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Axis No. Designation window without executing the designated axis check operation.

## 8. DATA SETTINGS FOR POSITIONING

### [Axis Data Error Window] (For A273UHCPU)



### [Display/Setting Content]

#### Error code display area

An error code is displayed when an error has occurred, and "NO ERROR" is displayed when no error has occurred.  
Up to 9 error codes are displayed for each axis.

**Error list display area** A list of error content is displayed here.

### [Key Operation]

#### Displaying the axis data error code list

- 1) Press the [F10] key when the Axis Data Error window is displayed. An Axis Data Error Code List window will then be displayed at the upper right of the Axis Data Error window.
- 2) Use the [Page Up]/[Page Down] keys to refer to the previous or next display page of the error list.  
Press the [Page Up] key to display the previous page of the error list .  
Press the [Page Down] key to display the next page of the error list.

#### Closing the Axis Data Error Code List window

- 1) Press the [Esc] key to close the Axis Data Error Code List window.  
The system will then return to the Axis Data Error window.

#### Closing the Axis Data Error window

- 1) Press the [Esc] key to close the Axis Data Error window.  
The system will then return to the Servo Data Setting Auxiliary Function window.

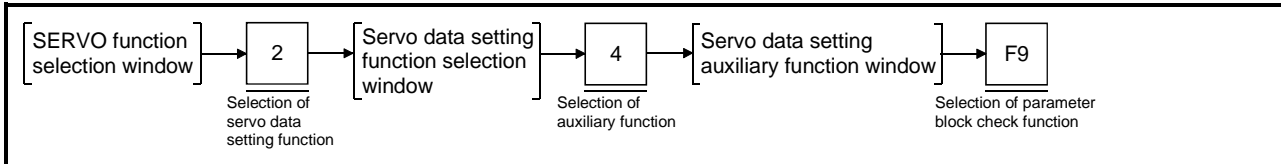
## 8. DATA SETTINGS FOR POSITIONING

### 8.4.2 Parameter block check

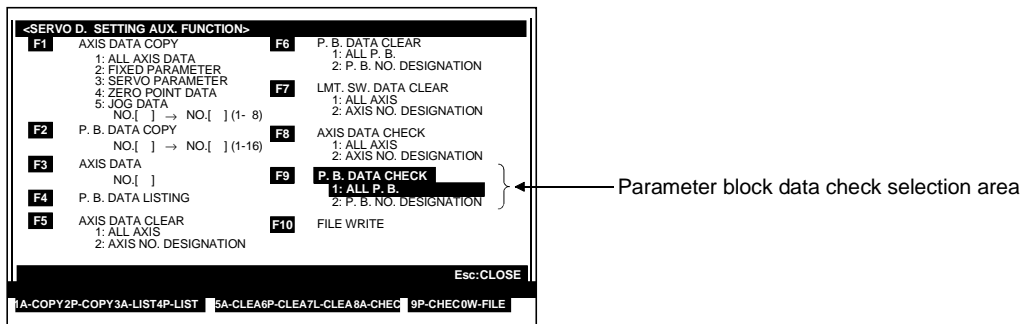
A relative check of the designated parameter block data is conducted to check for errors.

The parameter block check operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Parameter Block Check Designation Procedure]



#### [Servo Data Setting Auxiliary Function Window] (For A273UHCPU)



#### [Display/Setting Content]

**Parameter block data check selection area** All parameter blocks or designated blocks No. is selected here.

#### [Key Operation]

##### All Blocks Check

**Selecting all blocks check**

- 1) Select the "ALL P.B." item by pressing the [1] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The all parameter blocks check YES/NO dialog box will be displayed.

**All blocks check EXECUTE**

- 1) To conduct an all parameter blocks check operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) When the all parameter blocks check is completed, the Parameter Block Data Error window will be displayed.

**All blocks check CANCEL**

- 1) To cancel the all parameter blocks check operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Servo Data Setting Auxiliary Function window without executing the all parameter blocks check operation.



## 8. DATA SETTINGS FOR POSITIONING

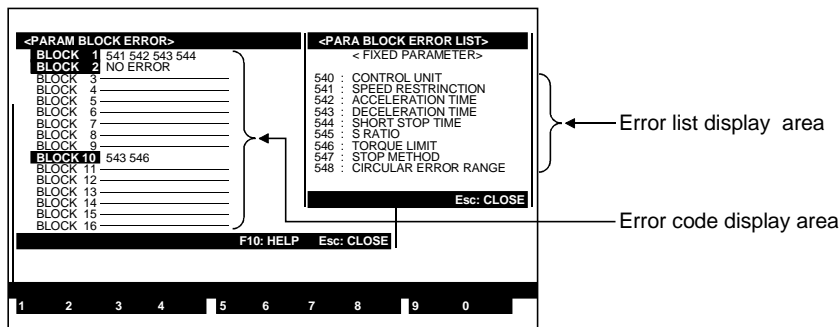
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### Designated Parameter Block Check

- Selecting the designated parameter blocks No.**
- 1) Select the "P.B. NO. DESIGNATION" item by pressing the [2] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The Parameter Block No. Designation window will then be displayed.
- Designating the parameter block No.**
- 1) Use the cursor control keys (arrow keys) to move the cursor to the parameter block No. to be designated, then press the [Space] key.  
The designated parameter block No. will be highlighted. To cancel a parameter block No. designation, press the [Space] key again. To cancel all parameter block No. designations, press the [Delete] key.  
Multiple blocks can be designated for the parameter block data check.
  - 2) Use the [Page Up]/[Page Down] keys to refer to the previous or next display page of the axis data error codes.  
Press the [Page Up] key to display the previous error code page.  
Press the [Page Down] key to display the next error code page.  
(Error codes are displayed for parameter block No. 1 to 64 only when using A273UHCPU (32-axis specification).)
- Parameter block No. designation ABORT**
- 1) To abort the parameter block No. designation procedure, press the [Esc] key.  
The system will then return to the Servo Data Setting Auxiliary Function window.
- Parameter block No. designation END**
- 1) After the parameter block No. (Nos.) has been designated for the block data check operation, press the [End] key.  
The designated parameter block data check YES/NO dialog box will be displayed.
- Designated parameter block check EXECUTE**
- 1) To conduct a parameter block data check operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
  - 2) When the designated parameter block data check is completed, the Parameter Block Data Error window will be displayed.
- Designated parameter block check CANCEL**
- 1) To cancel the designated block data check operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Parameter Block No. Designation window without executing the designated parameter block data check operation.

## 8. DATA SETTINGS FOR POSITIONING

### [Parameter Block Error Window]



### [Display/Setting Content]

#### Error code display area

An error code is displayed when an error has occurred, and "NO ERROR" is displayed when no error has occurred.

Up to 5 error codes are displayed for each parameter block.

#### Error list display area

A list of the error content is displayed here.

### [Key Operation]

#### Displaying the parameter block error list

- 1) Press the [F10] key when the Parameter Block Error window is displayed. A Parameter Block Error List window will then be displayed at the upper right of the Parameter Block Error window.

#### Closing the Parameter Block Error List window

- 1) Press the [Esc] key to close the Parameter Block Error List window. The system will then return to the Parameter Block Error window.

#### Closing the Parameter Block Error window

- 1) Press the [Esc] key to close the Parameter Block Error window. The system will then return to the Servo Data Setting Auxiliary Function window.

# 8. DATA SETTINGS FOR POSITIONING

## 8.5 Positioning Data Clear

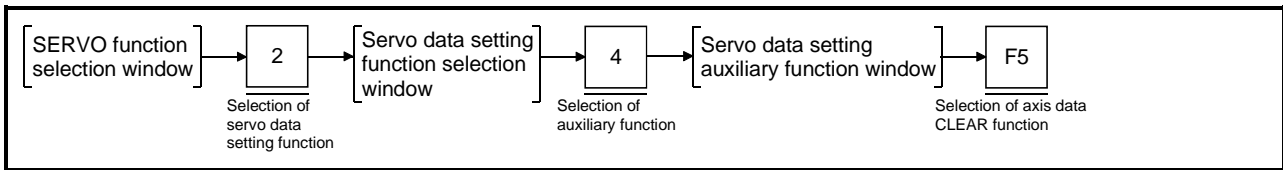
The procedure for clearing positioning data (restoring the default values) is described below.

### 8.5.1 Axis data clear

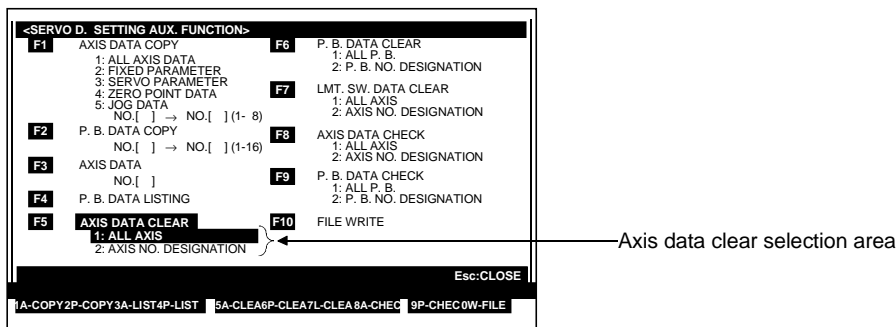
This function clears the setting data (fixed parameters, servo parameters, home position return data, JOG operation data) for a designated axis, and restores the default values.

The axis data COPY operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Axis Data Clear Designation Procedure]



#### [Servo Data Setting Auxiliary Function Window] (For A273UHCPU)



#### [Display/Setting Content]

##### Axis data clear selection area

All axes or designated axis data clear function is selected here.

#### [Key Operation]

##### All Axes Clear

##### Selecting all axes clear

- 1) Select the "ALL AXIS" item by pressing the [1] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The all axis clear YES/NO dialog box will be displayed.

##### All axes CLEAR → EXECUTE

- 1) To conduct an all axes clear operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) When the all axes clear operation is completed, the Servo Data Setting Auxiliary Function window will be displayed.

##### All axes CLEAR → CANCEL

- 1) To cancel the all axes clear operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Servo Data Setting Auxiliary Function window without executing the all axes clear operation.

## 8. DATA SETTINGS FOR POSITIONING

---

### Designated Axis Clear

#### Selecting the designated axis

- 1) Select the "AXIS NO. DESIGNATION" item by pressing the [2] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The Axis No. Designation window will then be displayed.

#### Designating the axis No.

- 1) Use the cursor control keys (arrow keys) to move the cursor to the axis No. to be designated, then press the [Space] key.  
The designated axis No. will be highlighted. To cancel an axis No. designation, press the [Space] key again. To cancel all axis No. designations, press the [Delete] key.  
Multiple axes can be designated for the axis data clear operation.

#### Axis No. designation ABORT

- 1) To abort the axis No. designation procedure, press the [Esc] key.  
The system will then return to the Servo Data Setting Auxiliary Function window.

#### Axis No. designation END

- 1) After the axis No. (Nos.) has been designated for the axis data clear operation, press the [End] key.  
The designated axis data clear YES/NO dialog box will be displayed.

#### Designated axis CLEAR → EXECUTE

- 1) To conduct a designated axis clear operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) When the designated axis clear operation is completed, the Servo Data Setting Auxiliary Function window will be displayed.

#### Designated axis CLEAR → CANCEL

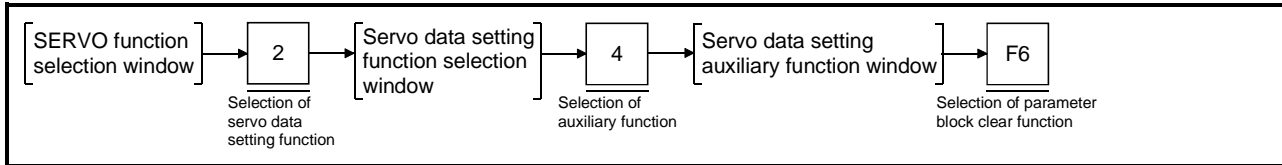
- 1) To cancel the designated axis clear operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Axis No. Designation window without executing the designated axis clear operation.

## 8. DATA SETTINGS FOR POSITIONING

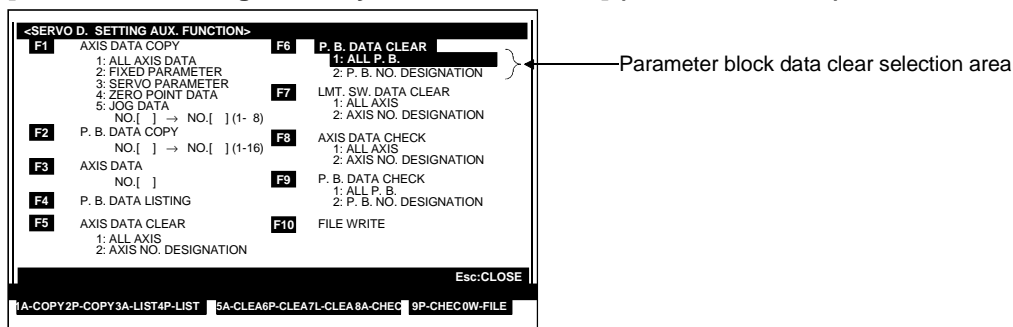
### 8.5.2 Parameter block clear

Clears the designated block No. parameter block data and sets the default values. The parameter block clear operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Parameter Block Clear Designation Procedure]



#### [Servo Data Setting Auxiliary Function Window] (For A273UHCPU)



#### [Display/Setting Content]

**Parameter block data clear selection area** Selects the all data block/designated block No. data clear function.

#### [Key Operation]

##### All Blocks Clear

**Selecting all blocks clear**

- 1) Select the "ALL P.B." item by pressing the [1] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The all parameter block data clear YES/NO dialog box will be displayed.

**All blocks CLEAR → EXECUTE**

- 1) To conduct an all parameter block data clear operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) When the all parameters block data clear is completed, the Servo Data Setting Auxiliary Function window will be displayed.

**All blocks CLEAR → CANCEL**

- 1) To cancel the all blocks clear operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Servo Data Setting Auxiliary Function window without executing the all blocks clear operation.

## 8. DATA SETTINGS FOR POSITIONING

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### Designated Parameter Blocks Clear

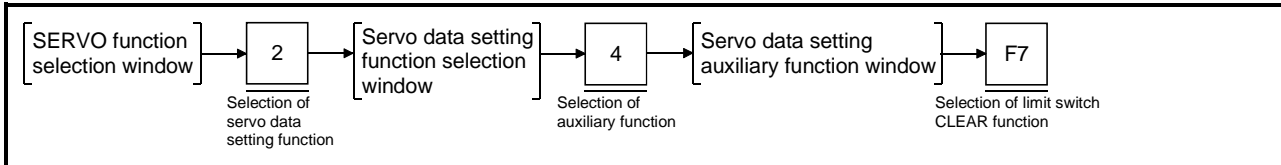
- Selecting the designated parameter blocks**
- 1) Select the "P.B. NO. DESIGNATION" item by pressing the [2] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The Parameter Block No. Designation window will then be displayed.
- Designating the parameter block No.**
- 1) Use the cursor control keys (arrow keys) to move the cursor to the block No. to be designated, then press the [Space] key.  
The designated block No. will be highlighted. To cancel a block No. designation, press the [Space] key again. To cancel all block No. designations, press the [Delete] key.  
Multiple parameter blocks can be designated for the block data clear operation.
- Parameter block No. designation ABORT**
- 1) To abort the parameter block No. designation procedure, press the [Esc] key.  
The system will return to the Servo Data Setting Auxiliary Function window.
- Parameter block No. designation END**
- 1) After the block No. (Nos.) has been designated for the block data clear operation, press the [End] key.  
The designated parameter block data clear YES/NO dialog box will be displayed.
- Designated parameter block data CLEAR → EXECUTE**
- 1) To conduct a designated parameter block clear operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
  - 2) When the designated block clear operation is completed, the Servo Data Setting Auxiliary Function window will be displayed.
- Designated parameter block data CLEAR → CANCEL**
- 1) To cancel the designated block clear operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Parameter Block No. Designation window without executing the designated parameter block data clear operation.

## 8. DATA SETTINGS FOR POSITIONING

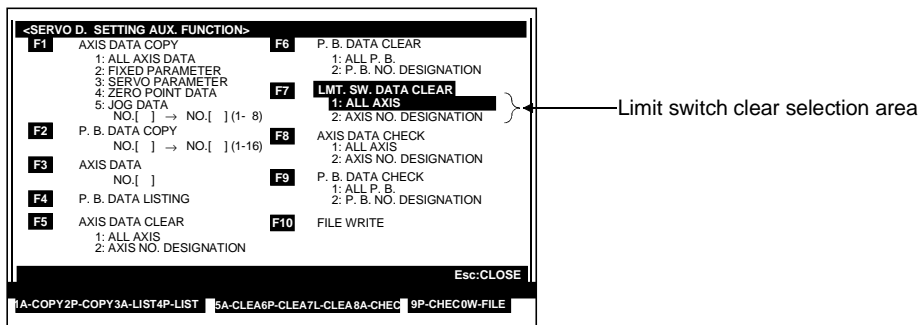
### 8.5.3 Limit switch output data clear

Limit switch output data at the designated axis No. is cleared.  
The limit switch output data clear operation is designated from the Servo Data Setting Auxiliary Function window.

#### [Limit Switch Output Data CLEAR Designation Procedure]



#### [Servo Data Setting Auxiliary Function Window] (For A273UHCPU)



#### [Display/Setting Content]

**Limit switch clear selection area** All axes or designated axis limit switch clear function is selected here.

#### [Key Operation]

##### All Axes Limit Switch Output Data Clear

**Selecting "all axes limit switch output data clear"**

- 1) Select the "ALL AXIS" item by pressing the [1] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The all axis limit switch output data clear YES/NO dialog box will be displayed.

**All axes limit switch output data CLEAR → EXECUTE**

- 1) To conduct an all axes limit switch output data clear operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) When the all axes limit switch output data clear operation is completed, the Servo Data Setting Auxiliary Function window will be displayed.

**All axes limit switch output data CLEAR → CANCEL**

- 1) To cancel the all axes limit switch output data clear operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Servo Data Setting Auxiliary Function window without executing the all axes limit switch output data clear operation.

## 8. DATA SETTINGS FOR POSITIONING

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### Designated Axes Limit Switch Output Data Clear

- Selecting the designated axis**
- 1) Select the "AXIS NO. DESIGNATION" item by pressing the [2] key or by using the [↑] [↓] keys, then press the [Enter] key.  
The Axis No. Designation window will then be displayed.
- Designating the axis No.**
- 1) Use the cursor control keys (arrow keys) to move the cursor to the axis No. to be designated, then press the [Space] key.  
The designated axis No. will be highlighted. To cancel an axis No. designation, press the [Space] key again. To cancel all axis No. designations, press the [Delete] key.  
Multiple axis Nos. can be designated for the limit switch output data CLEAR operation.
- Axis No. designation ABORT**
- 1) To abort the axis No. designation procedure, press the [Esc] key.  
The system will then return to the Servo Data Setting Auxiliary Function window.
- Axis No. designation END**
- 1) After the axis No. (Nos.) has been designated for the limit switch output data CLEAR operation, press the [End] key.  
The designated axis limit switch output data clear YES/NO dialog box will be displayed.
- Designated axis limit switch output data CLEAR → EXECUTE**
- 1) To conduct a designated axis limit switch output data clear operation, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
  - 2) When the designated axis limit switch output data CLEAR operation is completed, the Servo Data Setting Auxiliary Function window will be displayed.
- Designated axis limit switch output data CLEAR → CANCEL**
- 1) To cancel the designated axis limit switch output data clear operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.  
The system will then return to the Axis No. Designation window without executing the designated axis limit switch output data clear operation.

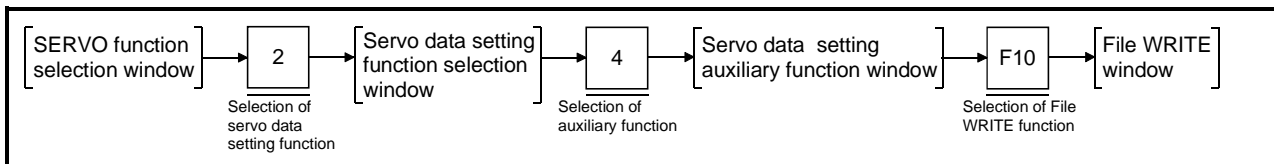


## 8. DATA SETTINGS FOR POSITIONING

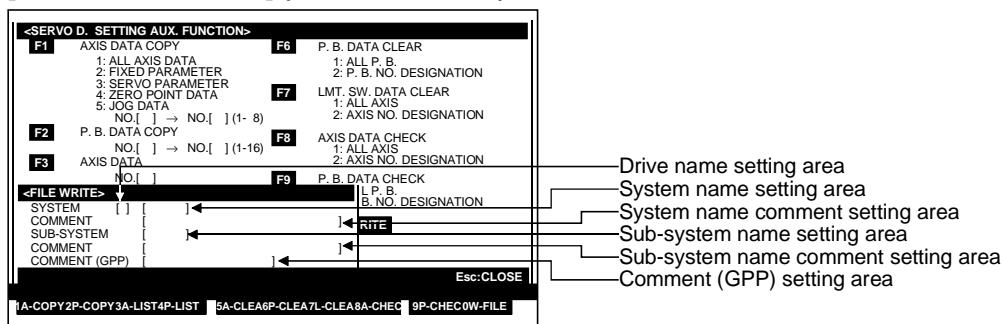
### 8.6 Writing Positioning Data to a File

The procedure for writing positioning data to a user file (HD/FD) is described below. The axis data COPY operation is designated from the Servo Data Setting Auxiliary Function window.

#### [File WRITE Designation Procedure]



#### [File WRITE Window] (For A273UHCPU)



#### [Display/Setting Content]

- Drive name setting area** The currently designated drive name is displayed.
- System name setting area** The currently designated system name is displayed.
- System name comment setting area** The currently designated system name comment is displayed.
- Sub-system name setting area** The currently designated sub-system name is displayed.
- Sub-system name comment setting area** The currently designated sub-system name comment is displayed.
- Comment (GPP) setting area** The currently designated comment (GPP) is displayed.

#### [Key Operation]

- System name comment setting**
- 1) Designate (or change) the system name comment. If the displayed comment is to be used as is, press the [Enter] key. The cursor will then move to the sub-system name comment setting area.
- Sub-system name comment setting**
- 1) Designate (or change) the sub-system name comment. The cursor can be moved back to the system name comment setting area by pressing the [↑] key.
  - 2) If the displayed comment is to be used as is, press the [Enter] key. The cursor will then move to the comment (GPP) setting area.
- Comment (GPP) setting**
- 1) Designate (or change) the comment (GPP). The cursor can be moved back to the sub-system name comment setting area by pressing the [↑] key.
  - 2) If the displayed comment is to be used as is, press the [Enter] key. The file write YES/NO dialog box will be displayed.

## 8. DATA SETTINGS FOR POSITIONING

---

- File Write EXECUTE**
- 1) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
  - 2) When the File WRITE operation is completed, the Servo Data Setting Auxiliary Function window will be displayed.
- File Write CANCEL**
- 1) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.  
The system will then return to the File WRITE window without executing the File WRITE operation.

<b>POINT</b>
--------------

The drive name, system name, and sub-system name settings are fixed and cannot be re-designated.
--

# 9. SERVO PROGRAM CREATION/MODIFICATION

## 9. SERVO PROGRAM CREATION/MODIFICATION

The PROGRAMMING mode is used to designate the positioning method and positioning speed settings, etc., and to create servo programs.

### (1) Function summary

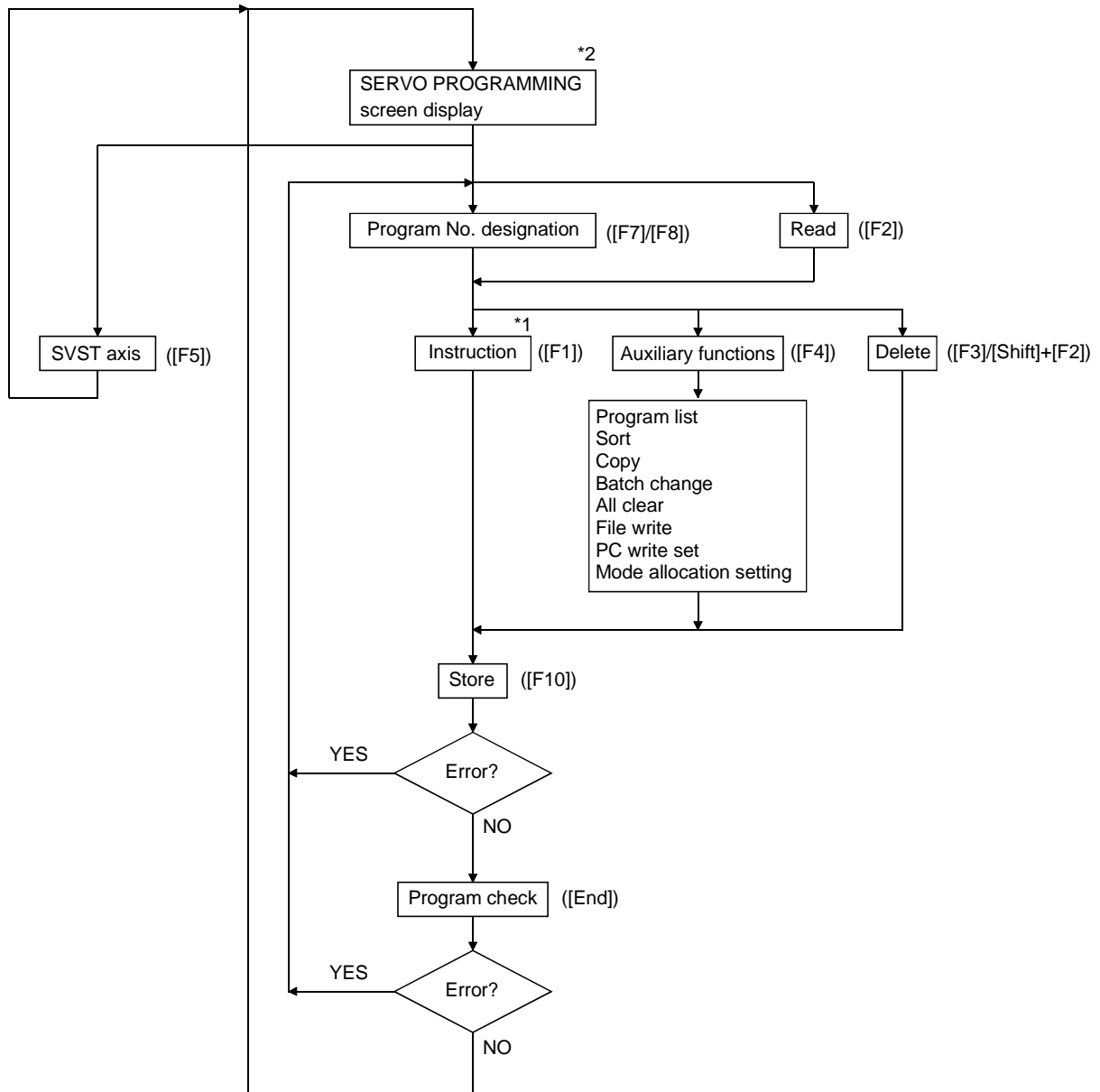
The GSV22PE PROGRAMMING mode consists of the following functions.

Servo programming	EDIT	Used for servo program creation/modification, and to check the created/modified programs. ....	9.2	
	READ	Used to read a designated servo program. ....	9.1	
		Program No. ....	The designated servo program No. is read. ....	9.1.1
		Axis No. ....	The servo program for the designated axis No. is read. ....	9.1.2
		Servo instruction ....	The servo program which contains the designated servo instruction is read. ....	9.1.3
		Indirect device ....	The servo program at the designated indirect device is read. ....	9.1.4
	Final program ....	The final program is read. ....	9.1.5	
	DELETE	Used to delete servo programs. ....	9.2.3	
	Auxiliary functions	Program LIST	Used to display a servo program use list. ....	9.3
		No.use list ....	A list of program No. use statuses (USED/NOT USED) is displayed. ....	9.3.1
		Program list ....	A list of program use statuses is displayed. ....	9.3.2
		Designated axis No. ....	An axis No. use status list is displayed. ....	9.3.3
		Designated servo instruction ....	A servo instruction use status list is displayed. ....	9.3.4
		Designated indirect device ....	An indirect device use status list is displayed. ....	9.3.5
		SORT	Servo programs are moved up to fill vacant positions, and programs which can't be decoded are deleted. ....	9.4
COPY		Servo programs are copied. ....	9.5	
Batch CHANGE		Axis No. batch changes occur. ....	9.6	
All CLEAR		All created servo programs are cleared. ....	9.7	
File WRITE	Servo programs are written to the user file. ....	9.8		
PC WRITE set	The setting for direct writing of created/modified servo programs to the servo system CPU is designated. ....	9.9		
Mode allocation setting	Allocates the program No. used in virtual mode. ....	9.10		
SVST axis	Automatically copies the axis numbers used in the motion program to the axis designation area of the SVST instruction entered with the GPP function. ....	9.12		

## 9. SERVO PROGRAM CREATION/MODIFICATION

### (2) Outline flowchart

The procedural flowchart for the SERVO PROGRAMMING mode is shown below.



\*1. At the instruction selection window, select the instruction type and the servo instruction, then execute the EDIT function.

\*2. To switch to the GPP function's LADDER mode, press the [F11] key while the [Ctrl] key is pressed.

## 9. SERVO PROGRAM CREATION/MODIFICATION

### (3) Servo instruction selection display

The servo instruction area content varies depending on which instruction category is highlighted.

The servo instruction area contents for each type are shown below.

(1) Positioning	
1 : ABS-1	9 : INC-1
2 : ABS-2	A : INC-2
3 : ABS-3	B : INC-3
4 : ABS-4	C : INC-4

(2) Positioning Circular Interpolation	
1 : ABS ↗	8 : INC ↗
2 : ABS ↘	9 : INC ↘
3 : ABS ↙	A : INC ↙
4 : ABS ↕	B : INC ↕
5 : ABS ↻	C : INC ↻
6 : ABS ↺	D : INC ↺
7 : ABS ↻	E : INC ↻

(3) Fixed-Pitch Feed	
1 : FEED-1	
2 : FEED-2	
3 : FEED-3	

(4) Speed Control	
1 : VF	
2 : VR	
3 : VVF (only when REAL mode)	
4 : VVR (only when REAL mode)	

(5) Speed/Position Control (only when REAL mode)	
1 : VPF	
2 : VPR	
3 : VPSTART	

(6) Speed Switching Control	
(Start)	(Point)
1 : VSTART	8 : VABS
(End-point)	9 : VINC
2 : ABS-1	(End)
3 : ABS-2	A : VEND
4 : ABS-3	(Repeat)
5 : INC-1	B : FOR-ON
6 : INC-2	C : FOR-OFF
7 : INC-3	D : FOR-TIMES
	E : NEXT

(7) Constant Speed Control		
(Start)	(Point)	
1 : CPSTART1	E : ABS —	M : INC —
2 : CPSTART2	F : ABS ↗	N : INC ↗
3 : CPSTART3	G : ABS ↘	O : INC ↘
4 : CPSTART4	H : ABS ↙	P : INC ↙
(End)	I : ABS ↕	Q : INC ↕
9 : CPEND	J : ABS ↻	R : INC ↻
(Repeat)	K : ABS ↺	S : INC ↺
A : FOR-ON	L : ABS ↻	T : INC ↻
B : FOR-OFF		
C : FOR-TIMES		
D : NEXT		

(8) Position Follow-Up	
1 : PFSTART	

(A) High-speed Oscillation (only when REAL mode)	
1 : OSC	

(B) Home Position Return (only when REAL mode)	
1 : ZERO	

(C) Simultaneous Start	
1 : START	

## 9. SERVO PROGRAM CREATION/MODIFICATION

---

### 9.1 Servo Program Read

Reads previously created servo programs from the internal memory of the personal computer, and displays them on the screen.

Servo program readouts can be designated by the following 5 methods:

- Readout by program No. designation
- Readout by axis No. designation
- Readout by servo instruction designation
- Readout by indirect device designation
- Readout by "final program" designation

At the Servo Program READ window, designate the desired readout method, then execute the servo program readout operation.

<b>POINT</b>
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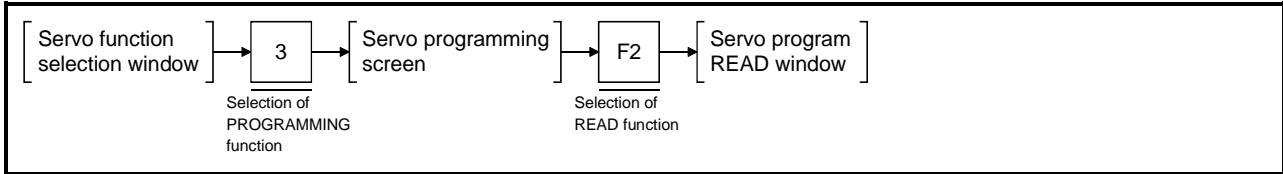
- |   |
|---|
| (1) Program No. designation at servo program creation<br>The servo program READ function can also be used when designating a program No. at the servo program creation operation. |
|---|

# 9. SERVO PROGRAM CREATION/MODIFICATION

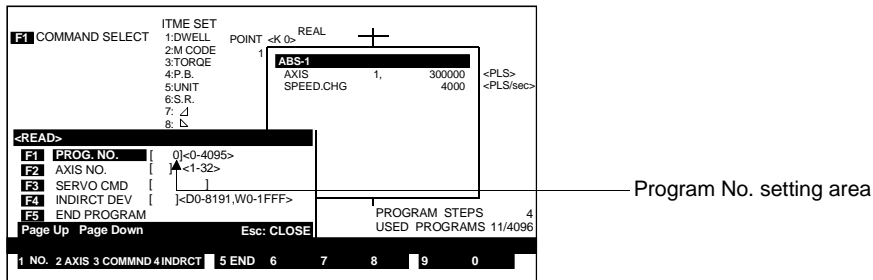
## 9.1.1 Readout of servo program by program No. designation

The desired servo program can be displayed by designating that servo program No.

### [Procedure for Displaying the Servo Program Read Window]



### [Servo Program Read Window] (For A273UHCPU)



### [Display/Setting Content]

#### Program No. setting area

Either the No. of the program currently being read, or the designated program No. is displayed here.

### [Key Operation]

#### Designating a readout by program No.

- 1) Press the [F1] key.  
The "PROGRAM NO." item will then be highlighted, and the cursor will be displayed at the program No. setting area.

#### Designating the program No.

- 1) Using the numeric keys, key-in the program No. of the servo program to be read, then press the [Enter] key.  
The corresponding servo program will then be displayed at the right side of the screen.
- 2) If a program No. outside the prescribed range is designated, an "OUT OF SETTING RANGE" error message will be displayed.  
In this case, the setting should be re-designated within the prescribed range.

#### Program search

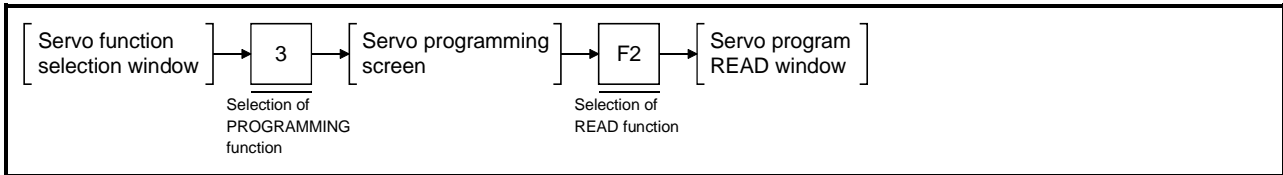
- 1) Use the [Page Up]/[Page Down] keys to conduct a program search.  
Press the [Page Up] key to search for, and display, the preceding servo program.  
Press the [Page Down] key to search for, and display, the next servo program.

# 9. SERVO PROGRAM CREATION/MODIFICATION

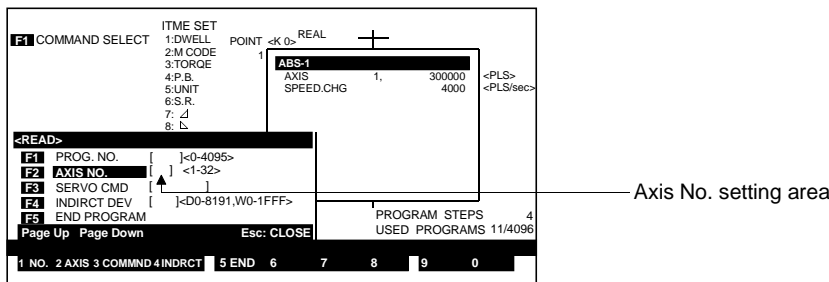
## 9.1.2 Readout of servo program by axis No. designation

The lowest No. servo program that uses a particular axis can be displayed by designating that axis.

### [Procedure for Displaying the Servo Program Read Window]



### [Servo Program Read Window] (For A273UHCPU)



### [Display/Setting Content]

**Axis No. setting area** The designated axis No. is displayed here.

### [Key Operation]

**Designating a readout by axis No.** 1) Press the [F2] key.  
The "AXIS NO." item will then be highlighted, and the cursor will be displayed at the axis No. setting area.

**Axis No. Setting** 1) Using the numeric keys, to input the servo program axis No. to be read, and then press the [Enter] key.  
The lowest No. servo program for that axis will then be displayed at the right side of the screen.  
2) If an axis No. outside the prescribed range is designated, an "OUT OF SETTING RANGE." error message will be displayed.  
In this case, the setting should be re-designated within the prescribed range.

**Program search** 1) Use the [Page Up]/[Page Down] keys to conduct a search for a program at a designated axis No.  
Press the [Page Up] key to search for, and display, the servo program used at the previously designated axis No.  
Press the [Page Down] key to search for, and display, the servo program used at the subsequently designated axis No.

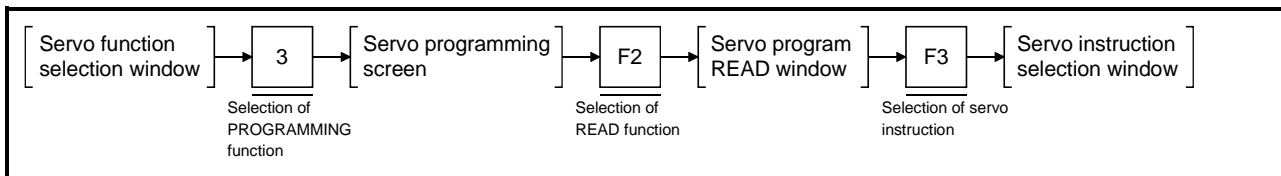


## 9. SERVO PROGRAM CREATION/MODIFICATION

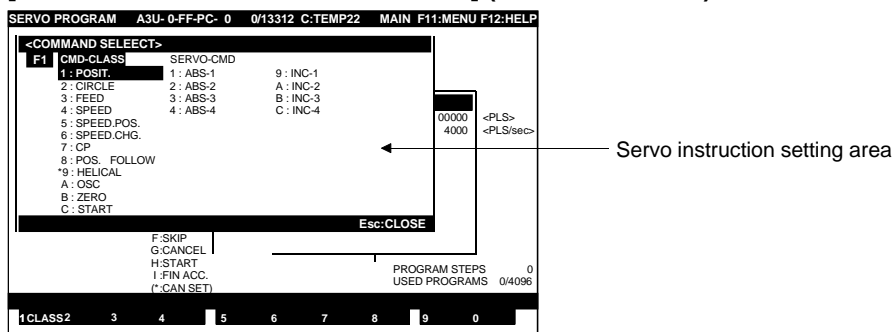
### 9.1.3 Readout of servo program by servo instruction designation

The lowest No. servo program which contains a particular instruction can be displayed by designating that instruction.

#### [Procedure for Displaying the Instruction Selection Window]



#### [Servo Instruction Selection Window] (For A273UHCPU)



#### [Display/Setting Content]

**Servo instruction setting area** The designated servo instructions are displayed here.

#### [Key Operation]

##### Selecting the instruction category

- 1) Key in the instruction category No. of the servo program to be read, or use the [↑]/[↓] keys to move the cursor to the desired instruction category, then press the [Enter] key.  
The selected instruction category will then be highlighted, and the cursor will move to the Servo Instruction Designation area.  
The servo instructions for the selected type will be displayed at the servo instruction designation area.

##### Designating the servo instruction

- 1) Key in the number or letter of the desired servo instruction, or use the [↑]/[↓] keys to move the cursor to that instruction, then press the [Enter] key.  
The Servo Instruction Selection window will then be closed, and the lowest No. servo program which contains the designated servo instruction will be displayed.

##### Program search

- 1) Use the [Page Up]/[Page Down] keys to conduct a program search.  
Press the [Page Up] key to search for, and display, the servo program which contains the previously designated servo instruction.  
Press the [Page Down] key to search for, and display, the servo program which contains the subsequently designated servo instruction.

#### POINT

Selection of "\*9: HELICAL" in the instruction category is not possible.

# 9. SERVO PROGRAM CREATION/MODIFICATION

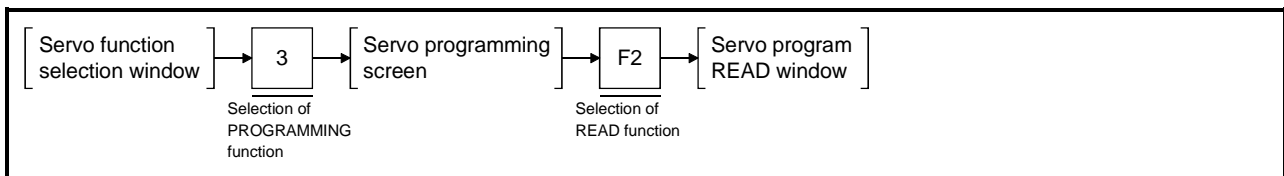
## 9.1.4 Servo program readout by indirect device designation

The lowest No. servo program in which a particular device is used can be displayed by designating the device name.

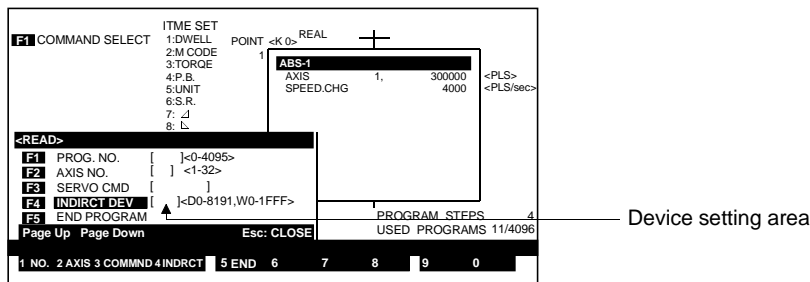
A servo program readout by indirect device designation can be executed by the following 3 methods:

- Readout of all servo programs where indirect devices are used
- Readout of servo programs where the designated device name (D/W) is used
- Readout of servo programs where the designated device No. (D0 to D1023/ D8191, W0 to W3FFF/W1FFF) is used

### [Procedure for Displaying the Servo Program Read Window]



### [Servo Program Read Window] (For A273UHCPU)



### [Display/Setting Content]

**Device setting area** The designated device is displayed.

### [Key Operation]

#### Readout of ALL Servo Programs where Indirect Devices are Used

**Selecting the "indirect device" designation method** 1) Press the [F4] key.  
The "INDIRCT DEV" item will be highlighted, and the cursor will be displayed at the device setting area.

**"All-Devices" designation** 1) Press the [Enter] key to display (at right of screen) the lowest No. servo program where an indirect device (D/W) is used.

**Program search** 1) Use the [Page Up]/[Page Down] keys to search for programs using designated device.  
Press the [Page Up] key to search for, and display, the servo program for the previously designated device.  
Press the [Page Down] key to search for, and display, the servo program for the subsequently designated device.

## 9. SERVO PROGRAM CREATION/MODIFICATION

### Readout of Servo Programs where the Designated Device Name (D/W) is Used

- Selecting the "indirect device" designation method** 1) Press the [F4] key.  
The "INDIRCT DEV" item will be highlighted, and the cursor will be displayed at the device setting area.
- Designating the device name** 1) Use the [D]/[W] keys to input the device name to read, and then press the [Enter] key  
The lowest No. servo program where that device name is used will be displayed at the right side of the screen.
- Program search** 1) Use the [Page Up]/[Page Down] keys to search for programs using a designated device.  
Press the [Page Up] key to search for, and display, the servo program for the previously designated device.  
Press the [Page Down] key to search for, and display, the servo program for the subsequently designated device.

### Readout of Servo Programs where a Designated Device No. (D0 to D1023/D8191, W0 to W3FF/W1FFF is Used)

- Selecting the "indirect device" designation method** 1) Press the [F4] key.  
The "INDIRCT DEV" item will be highlighted, and the cursor will be displayed at the device setting area.
- Designating the device No.** 1) Enter the indirect device name and device No. for which a readout is desired, then press the [Enter] key to display (at right side of screen) the lowest No. servo program where that device No. is used will be displayed at the right side of the screen.  
2) The device No. setting range is shown in the table below.

Register	CPU	A171S/A171SH/ A172SH	A273UH (8-axis Specification)	A273UH (32-axis Specification)
	Data register (D)		D0 to D1023* <sup>1</sup>	D0 to D8191* <sup>1</sup>
Link register (W)		W0 to W3FF	W0 to W1FFF	W0 to W1FFF

\*1: In real mode, 800 to 1023 is used in the servo system CPU

In virtual mode, 670 to 1023 is used in the servo system CPU

\*2: In real mode, 0 to 799 is used in the servo system CPU

In virtual mode, 0 to 1599 is used in the servo system CPU

- 3) If a device No. outside the permissible range is designated, an "DEVICE NUMBER OUT OF RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

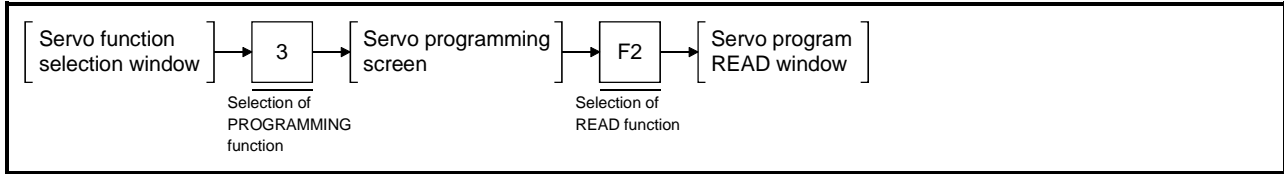
- Program search** 1) Use the [Page Up]/[Page Down] keys to search for programs using a designated device.  
Press the [Page Up] key to search for, and display, the servo program for the previously designated device.  
Press the [Page Down] key to search for, and display, the servo program for the subsequently designated device.

# 9. SERVO PROGRAM CREATION/MODIFICATION

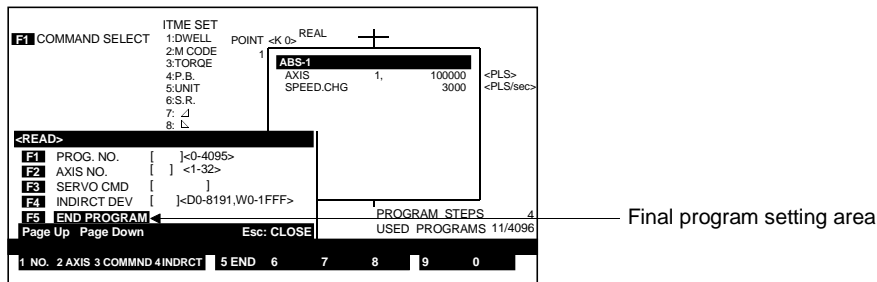
## 9.1.5 Readout by "final program" designation

A "final program" designation can be made to display only the final servo program.

### [Procedure for Displaying the Servo Program Read Window]



### [Servo Program Read Window] (For A273UHCPU)



### [Display/Setting Content]

**Final program setting area** The "END PROGRAM" readout function is selected here.

### [Key Operation]

**Selecting the "END PROGRAM" designation method**

- 1) Press the [F5] key.  
The "END PROGRAM" item will be highlighted, and the final servo program will be displayed at the right side of the screen.

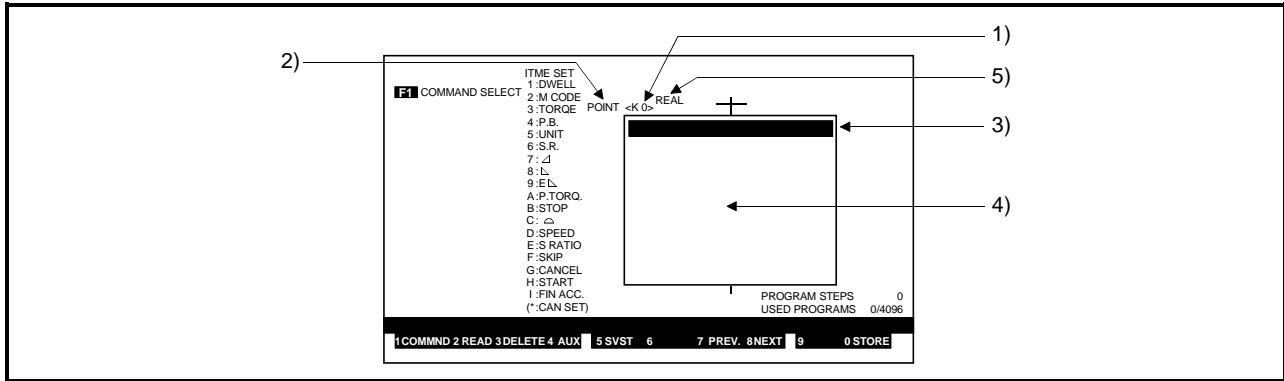
# 9. SERVO PROGRAM CREATION/MODIFICATION

## 9.2 Servo Program Creation

The procedure for creating, modifying, and deleting servo programs is described below.

### (1) Servo programming screen

The screen used for creating servo programs is shown below.



Display Item	Description
(1) Program No. display area	The program No. is displayed here.
(2) Point No. display area	<p>Either the designated positioning point No., or the number of points in the servo program is displayed here.</p> <p>Point No.: Speed-switching control switching point constant-speed control pass point.</p> <p>Number of points: Total number of points for speed-switching control and constant-speed control (Usually "1" is displayed for control other than speed switching or constant-speed control.)</p>
(3) System-of-units display area	The system-of-units is displayed here.
(4) Servo program display area	After servo instruction selection, the servo instructions, required setting items, and setting values are displayed.
(5) Real/virtual display area	<p>The designated servo program No. servo program mode (real/virtual) is displayed.</p> <p>Designate the servo program mode to be used for mode allocation settings (See Section 9.10.)</p>

### CAUTION

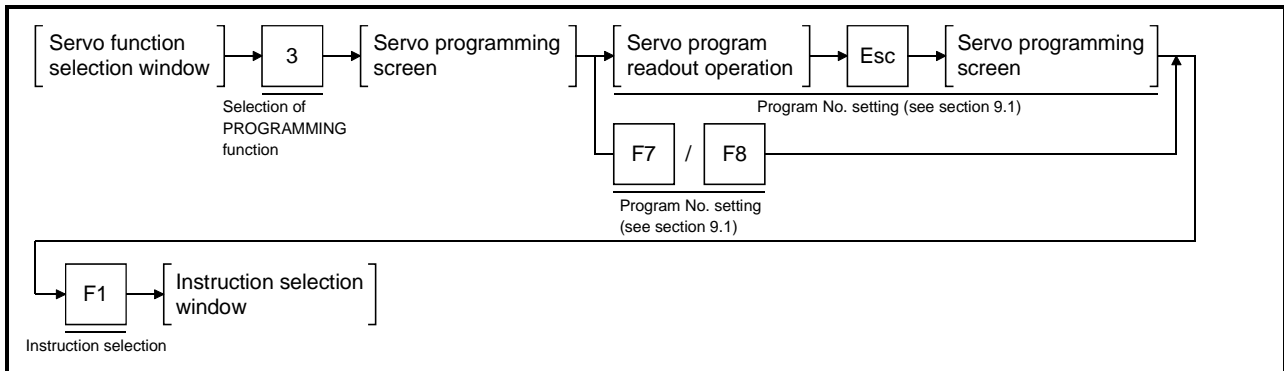
- Instructions used in programs must conform to the conditions described in this manual.
- Device settings used in programs must be within the ranges given in this manual. Since some devices - such as special devices - have fixed applications, devices suitable for the intended application must be used.

# 9. SERVO PROGRAM CREATION/MODIFICATION

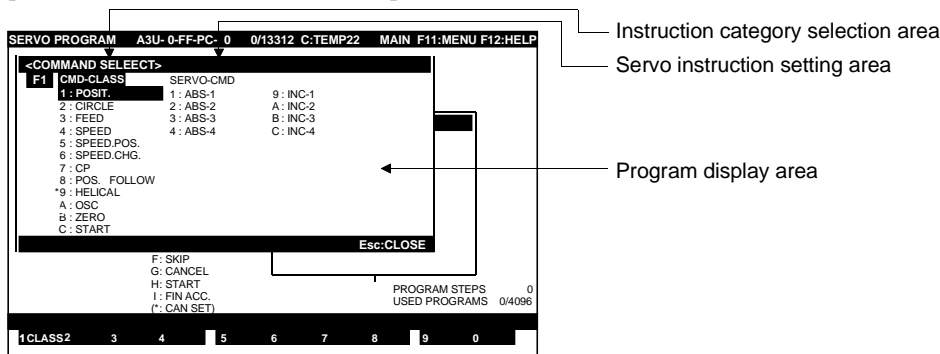
## 9.2.1 Servo program creation

Servo programs are created at the Servo Programming screen, and are written one by one to the personal computer's internal memory.

### [Procedure for Displaying the Instruction Selection Window]



### [Instruction Selection Window]



### [Display/Setting Content]

**Instruction category selection area** The servo instruction categories are displayed here.

**Servo instruction setting area** The servo instructions in the selected instruction category are displayed here.

**Program display area** Servo programs are displayed here. (This display area will be vacant when the status of a designated program No. is "NOT CREATED".)

### [Key Operation]

#### Selecting the instruction category

- 1) Designate the desired instruction category by a numeric key input, or by using the [↑]/[↓] keys to move the cursor to the desired type, then press the [Enter] key.

The selected instruction category will be highlighted, and the cursor will move to the servo instruction selection area.

The servo instructions which correspond to the designated instruction type will be displayed at the Servo Instruction Selection area.

#### Designating the servo instruction

- 1) Designate the desired servo instruction by a numeric key input, or by using the [↑]/[↓] keys to move the cursor to the desired instruction, then press the [Enter] key.

After a servo instruction is selected, the Servo Instruction Selection window will be closed, and the selected instruction will be displayed at the program display area.

(For 2 to 4 axes linear interpolation control designations, a Speed Type Selection window will be displayed.)

## 9. SERVO PROGRAM CREATION/MODIFICATION

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### Selecting the speed type

- 1) When 2 to 4 axes linear interpolation control is selected, the positioning speed must be designated at the Speed Type Selection window. Designate the desired speed type by a numeric key input, or by using the [↑]/[↓] keys to move the cursor to the desired speed type, then press the [Enter] key. After a speed type is selected, the Servo Instruction Selection window will be closed, and the selected servo instruction and speed type will be displayed at the program display area.

<b>POINT</b>
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Servo program No. designation

Always designate the program No. before creating a servo program.

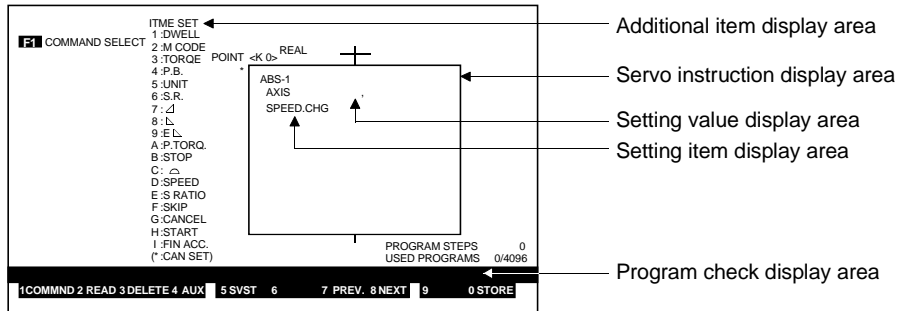
The program No. can be designated by the following 2 methods:

- Program No. designation by servo program readout  
(See Section 9.1).
- Program No. designation by [F7]/[F8] key input  
(See following page).

With either method, the number of the servo program to be created should be designated by a servo program readout operation.

## 9. SERVO PROGRAM CREATION/MODIFICATION

### [Servo Programming Screen]



### [Display/Setting Content]

**Servo instruction display area** The designated servo instructions are displayed here.

**Setting item display area** The designated items are displayed here.

**Setting value display area** The designated setting values are displayed here.

**Additional item display area** Setting items which can be added to the servo program are displayed here. (Selectable items are indicated by an asterisk (\*) to their left. The selectable items vary according to the servo instruction which has been designated.)

**Program check display area** An error message is displayed here when an error is detected by the program check function.

### [Key Operations]

#### Designating data settings

- 1) At the setting value display area, use the numeric keys to key in the desired setting value, then press either the [Enter] or [↓] key to register the setting. The cursor will then move to the next setting value display area.
- 2) When the final data setting for the displayed setting items is registered, the cursor will move to the next line where "additional item" settings are possible.

#### Designating additional items

- 1) Refer to the additional item display area to see which items can be added, then use the numeric or alphabetic keys to designate the desired item. Selected items will be displayed at the setting item display area.
- 2) At the setting value display area, use the numeric keys to key in the desired setting value, then press either the [Enter] or [↓] key to register the setting. The cursor will then move to the next line.

#### Program STORE procedure

- 1) When the servo program creation operation is completed, press the [F10] key. The created program will then undergo the following checks: data check, grammar check, device No. check, memory overflow check. If no errors are found, the created program will be written to the internal memory.
- 2) If an error is found, an "E" is displayed to the left of the appropriate item, and an error message is displayed. In this case, the setting should be re-designated within the prescribed range.
- 3) If the [F2], [F4], [F7], [F8], [F11], [Shift] + [F1], or [Ctrl] + [F11] key is pressed before pressing the [F10] key after completing a servo program creation operation, a dialog box containing the message "NOT STORED. OK?" will be displayed. After the created servo program has been written to the servo system CPU, proceed to another function.
- 4) If "PC AUTO WRITE" has been designated as an auxiliary function, the servo program will automatically be written to the servo system CPU when the [F10] key is pressed.



## 9. SERVO PROGRAM CREATION/MODIFICATION

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- Batch check of all programs** 1) Press the [END] key to execute a batch check of all servo programs. (See section 9.12.)
- Program No. designation** 1) To switch to another servo program No., press the [F7] or [F8] key. Press the [F7] key to designate the program No. which immediately precedes the currently displayed servo program. Press the [F8] key to designate the program No. which immediately follows the currently displayed servo program.
- File WRITE** 1) When the [Ctrl] + [F1] keys are pressed, the file write YES/NO dialog box will be displayed.  
2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)  
3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.
- Servo programming END** 1) To end the servo programming operation, press the [Shift] + [F1] keys. The system will then return to the Servo Function Selection window.

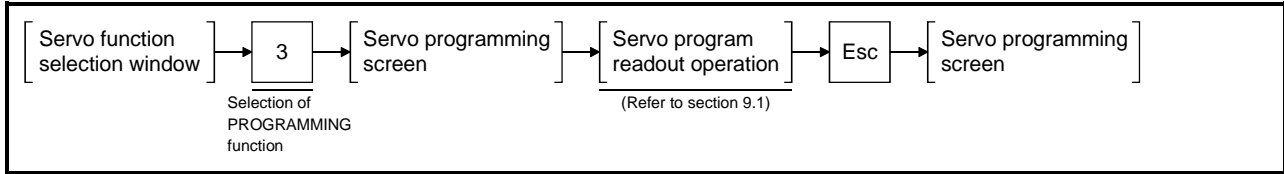
POINTS
(1) In the virtual mode, speed control (WF/WR), speed/position, high-speed oscillation, and home position return cannot be selected. If speed control (VVF/VVR), speed/position, high-speed oscillation, or home position return is selected a "CANNOT SELECT" message will be displayed.
(2) A maximum of 768 steps per program can be created. If the step count exceeds 768, screen scrolling by cursor operation will be disabled, and servo program creation will be impossible.

# 9. SERVO PROGRAM CREATION/MODIFICATION

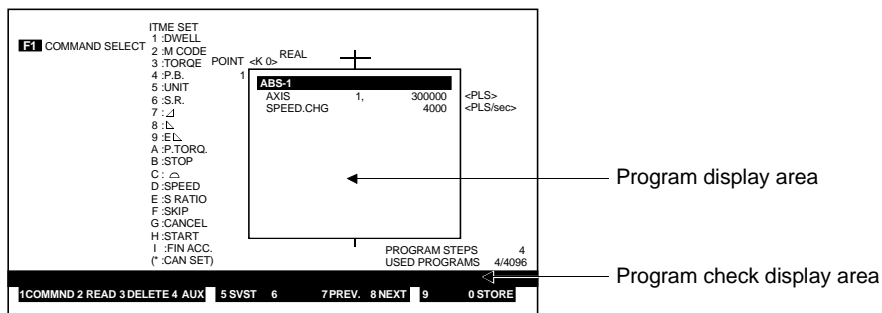
## 9.2.2 Servo program modification

This function is used to modify created servo programs.

### [Procedure for Displaying the Servo Instruction Data Setting Screen]



### [Servo Programming Screen]



Program display area

Program check display area

### [Display/Setting Content]

**Program display area** The program which was read is displayed here.

**Program check display area** An error message is displayed here when an error is detected by the program check function.

### [Key Operations]

#### Modifying Data Settings

#### Modifying data settings

- 1) Use the cursor control keys (arrow keys) to move the cursor to the item where a modification is desired, then enter the new data setting

#### Program STORE procedure

- 1) When the servo program modification operation is completed, press the [F10] key.  
The modified program will then undergo the following checks: data check, grammar check, device No. check, memory overflow check. If no errors are found, the modified program will be written to the internal memory.
- 2) If an error is found, an "E" is displayed to the left of the appropriate item, and an error message will be displayed.  
In this case, the setting should be re-designated within the prescribed range.
- 3) If the [F2], [F4], [F7], [F8], [F11], [Shift] + [F1], or [Ctrl] + [F11] key is pressed before pressing the [F10] key after completing a servo program modification operation, a dialog box containing the message "NOT STORED. OK?" will be displayed.  
After the modified servo program has been written to the servo system CPU, proceed to another function.
- 4) If "PC AUTO WRITE" has been designated as an auxiliary function, the servo program will automatically be written to the servo system CPU when the [F10] key is pressed.

#### Batch check of all programs

- 1) Press the [END] key to execute a batch check of all servo programs. (See Section 9.11.)

## 9. SERVO PROGRAM CREATION/MODIFICATION

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### Switching between program Nos.

- 1) To switch to another servo program No., press the [F7] or [F8] key.  
Press the [F7] key to designate the program No. which immediately precedes the currently displayed servo program.  
Press the [F8] key to designate the program No. which immediately follows the currently displayed servo program.

### File Write

- 1) When the [Ctrl] + [F1] keys are pressed, the file write YES/NO dialog box will be displayed.
- 2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

### Servo programming END

- 1) To end the servo programming operation, press the [Shift] + [F1] keys.  
The system will then return to the Servo Function Selection window.

### Deleting Data Settings

#### Selecting data to be deleted

- 1) Use the cursor control keys (arrow keys) to move the cursor to the data position where a deletion is desired.

#### Program delete

- 1) To delete a servo instruction other than the first instruction, or to delete a single setting item, press any of the following keys: [F3], [Delete], or [Shift] + [F2].  
The designated position will then be highlighted, and a dialog box containing the message "DELETE?" will be displayed.  
If "YES" is selected, the highlighted content will be deleted, and the system will return to the Servo Programming screen.  
If "NO" is selected, the highlighted content will not be deleted, and the system will return to the Servo Programming screen where an "STOPPED" message will be displayed.

#### Program store

(This operation is not necessary when an entire program has been deleted)

- 1) When the servo program deletion operation is completed, press the [F10] key.  
The modified program will then undergo the following checks: data check, grammar check, device No. check, memory overflow check. If no errors are found, the modified program will be written to the internal memory.
- 2) If an error is found, an "E" will appear to the left of the erroneous item, and an error message will be displayed. If this occurs, re-designate the setting correctly.
- 3) If the [F2], [F4], [F7], [F8], [F11], [Shift] + [F1], or [Ctrl] + [F11] key is pressed before pressing the [F10] key after completing a servo program deletion operation, a dialog box containing the message "NOT STORED. OK?" will be displayed.  
After the modified servo program has been written to the servo system CPU, proceed to another function.
- 4) If "PC AUTO WRITE" has been designated as an auxiliary function, the servo program will automatically be written to the servo system CPU when the [F10] key is pressed.

#### Batch check of all programs

- 1) Press the [End] key to execute a batch check of all servo programs. (See Section 9.10.)

## 9. SERVO PROGRAM CREATION/MODIFICATION

---

### File Write

- 1) When the [Ctrl] + [F1] keys are pressed, the file write YES/NO dialog box will be displayed.
- 2) If file writing is not desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.

### Servo programming END

- 1) To end the servo programming operation, press the [Shift] + [F1] keys. The system will then return to the Servo Function Selection window.

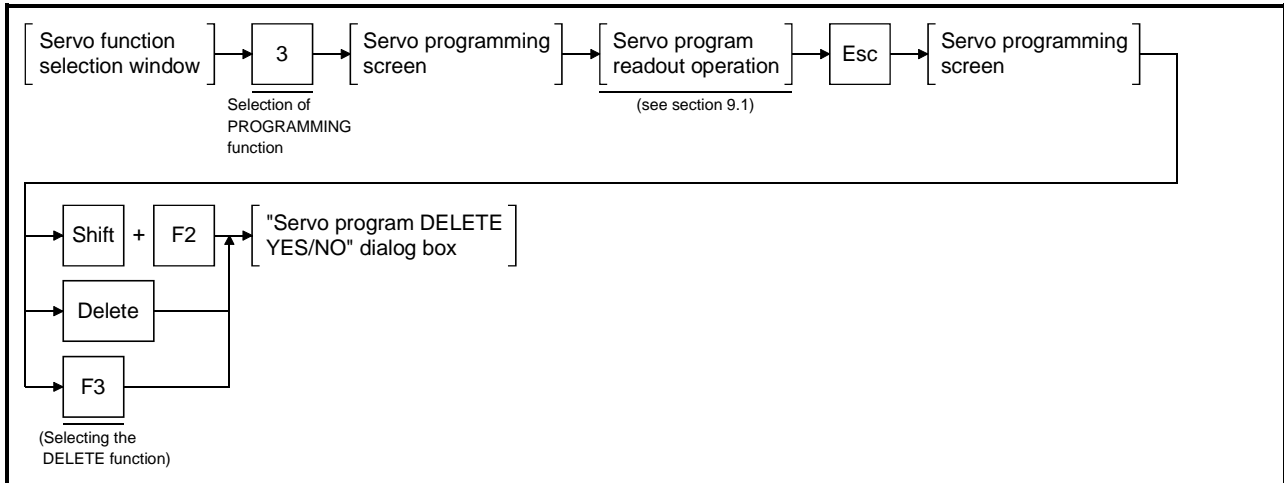
POINTS	
(1) The deletion range varies as shown below.	
<b>Cursor Position</b>	<b>Deleted Data</b>
First instruction line	1 program
Speed switching & constant speed servo instruction point line	1 point
Setting item line	Setting item
(2) When the cursor is in designated data position in the designated item line, the designated data can be deleted by pressing the [Ctrl] + [Y] keys.	

# 9. SERVO PROGRAM CREATION/MODIFICATION

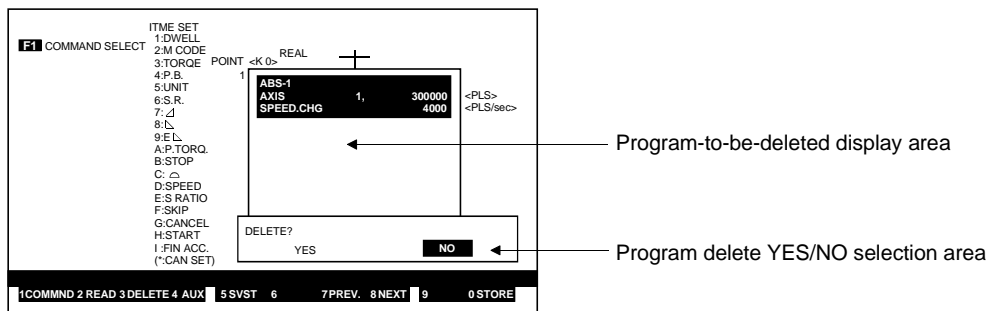
## 9.2.3 Servo program deletion

Servo programs which have been written to the internal memory can be read out and deleted, one by one.

### [Procedure for Displaying the Servo Program Delete YES/NO Dialog Box]



### [Servo Program Delete YES/NO Dialog Box]



### [Display/Setting Content]

**Program-to-be-deleted display area** The program which was read is displayed here.

**Program delete YES/NO selection area** The program deletion YES/NO selection is designated here.

### POINTS

- (1) Cursor position confirmation  
To delete an entire program, verify that the cursor is at the first instruction line, then press one of the following keys: [Shift] + [F2], [Delete], or [F3].
- (2) Deleting additional items  
When additional items have been designated at a servo program, they can be deleted in 1-line units.  
Move the cursor to the line to be deleted, then press one of the following keys: [Shift] + [F2], [Delete], or [F3].

## 9. SERVO PROGRAM CREATION/MODIFICATION

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### [Key Operation]

- Servo Program Delete EXECUTE** 1) To delete the servo program, press the [←] key to highlight the "YES" item, then press the [Enter] key. (The default setting is "NO".)  
When servo program deletion is completed, the highlighted content will be deleted.
- Servo Program Delete CANCEL** 1) To cancel the servo program delete operation, press the [Enter] key when "NO" is highlighted. (If "YES" is highlighted, press the [→] key to move the highlight to the "NO" position.)  
The system will then return to the Servo Programming screen without deleting the servo program.
- Batch check of all programs** 1) Press the [End] key to execute a batch check of all servo programs.  
(See Section 9.10.)
- Switching between program Nos.** 1) To switch to another servo program No., press the [F7] or [F8] key.  
Press the [F7] key to designate the program No. which immediately precedes the currently displayed servo program.  
Press the [F8] key to designate the program No. which immediately follows the currently displayed servo program.
- File Write** 1) When the [Ctrl] + [F1] keys are pressed, the file write YES/NO dialog box will be displayed.  
2) If file writing is desired, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)  
3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.
- Servo programming END** 1) To end the servo programming operation, press the [Shift] + [F1] keys. The system will then return to the Servo Function Selection window.

## 9. SERVO PROGRAM CREATION/MODIFICATION

### 9.3 Servo Program Use List Display

A servo program use list is displayed at the Servo Programming screen, showing the servo program use status.

The program use list display can be designated by following 4 methods:

- By program No. designation
- By axis No. designation
- By servo instruction designation
- By indirect device designation

At the Program Use List Selection window, select the list format, and execute a list readout.

(1) Program use list display data

The data items shown in Table 9.1 below are displayed at the program use list for confirmation.

**Table 9.1 Program Use List Confirmation Data**

Designated Item	Display Data						Reference Section
	Use Status	Program No.	Servo Instruction	Axis No.	Number of Steps	Additional Item	
Program No.	○						9.3.1
		○	○	○	○	○	9.3.2
Axis No.		○	○	○	○ (Interpolation axis)	○	9.3.3
Servo Instruction		○		○	○	○	9.3.4
Indirect Device		○	○	○	○	○	9.3.5

(2) Regarding the "additional Item" entry at Table 9.1 above, a single additional item can be selected from the items designated at the servo program to display the setting data for that item.

The additional items are listed below.

- Address
- Speed
- Dwell time
- M code
- Torque
- Parameter block No.
- Interpolation control units
- Speed limit value
- Acceleration time
- Deceleration time
- Rapid stop deceleration time
- Parameter & torque limit value
- Deceleration processing at STOP input
- Allowable error range for circular interpolation
- Constant speed control & change speed
- S-curve ratio
- Skip
- Cancel
- Start
- FIN acceleration/deceleration

**POINT**

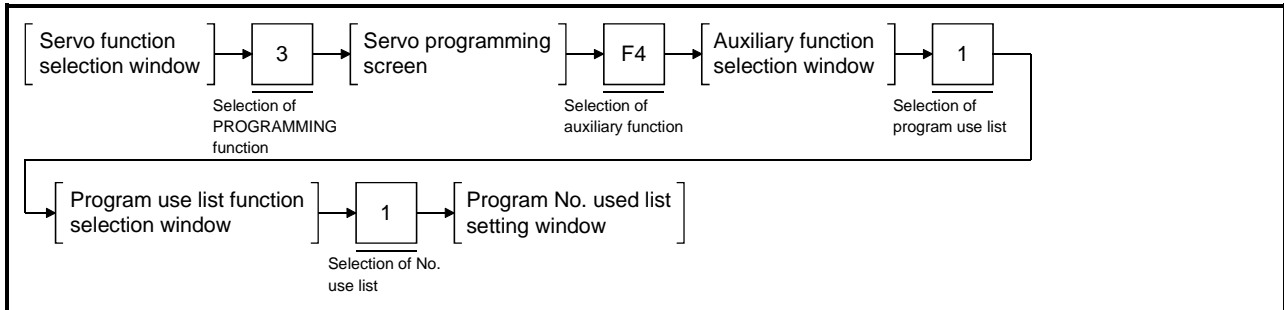
The setting data for an additional item not designated at the servo program will not be displayed.

# 9. SERVO PROGRAM CREATION/MODIFICATION

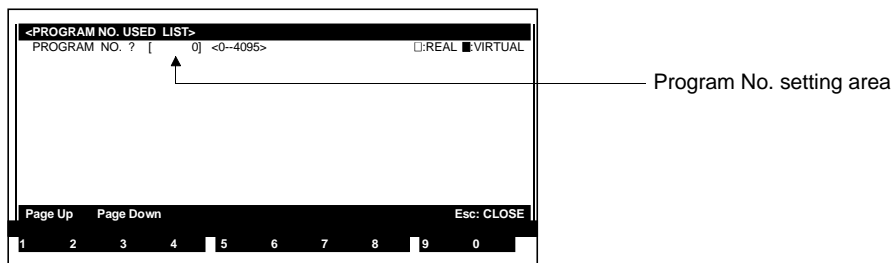
## 9.3.1 No. used list

A program No. is designated to display a list showing that servo program's use status (USED/NOT USED).

### [Procedure for Displaying The Program No. Used List Setting Window]



### [Program No. Used List Setting Window]



Program No. setting area

### [Display/Setting Content]

**Program No. setting area** Either the default value or the designated program No. is displayed here.

### [Key Operation] Designating the program No.

- 1) Using the numeric keys, key-in the program No. from which the list is to begin, then press the [Enter] key.  
If a program No. outside the permissible range is designated, an "OUT OF SETTING RANGE." error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- 2) A list showing the USED/NOT USED statuses of 224 programs will then be displayed, beginning with the program No. which was designated above.
  - Highlighted program No.....USED
  - Normal display program No.....NOT USED

### Page change

- 1) Use the [Page Up]/[Page Down] keys to switch display pages.  
Press the [Page Up] key to display the previous 224 programs.  
Press the [Page Down] key to display the next 224 programs.



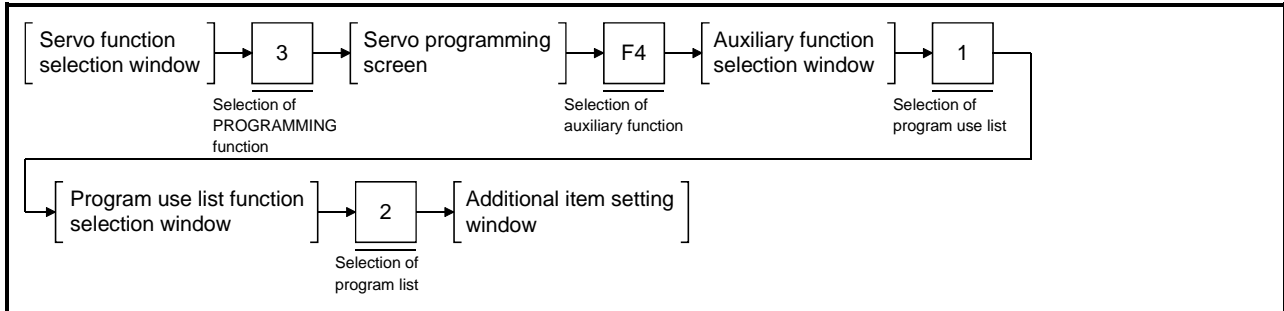
# 9. SERVO PROGRAM CREATION/MODIFICATION

## 9.3.2 Program list

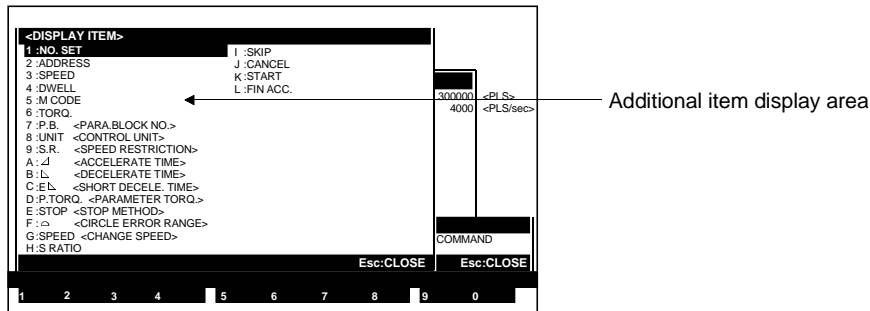
When a program No. is designated, a list of programs (program No., servo instruction, axis No., number of steps) will be displayed, beginning with the designated program No.

If an "additional item" is designated, the data for that item will also be displayed.

### [Procedure for Displaying the Program List Setting Window]



### [Additional Item Setting Window]



### [Display/Setting Content]

**Additional item display area** The designated additional item is displayed here.

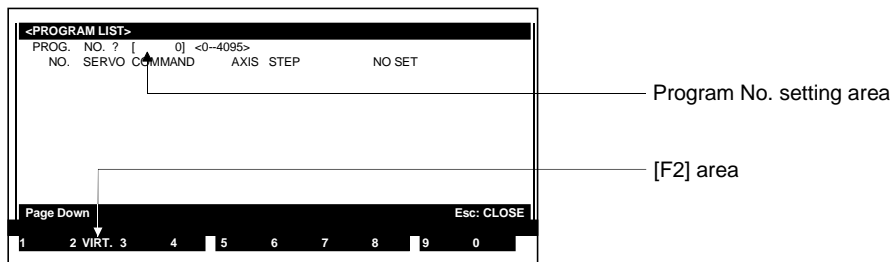
### [Key Operation]

**Designating additional items** 1) Select the desired additional item by using the numeric/character keys, or by using the [↑][↓] keys to move the cursor to the desired item, then press the [Enter] key.

When an additional item is selected, the Program List Setting window will be displayed.

## 9. SERVO PROGRAM CREATION/MODIFICATION

### [Program List Setting Window]



### [Display/Setting Content]

**Program No. setting area** Either the default value or the designated program No. is displayed here.

**[F2] area** Displays whether real mode or virtual mode programs are displayed.

### [Key Operation]

#### Designating the program No.

- 1) Using the numeric keys, key-in the program No. from which the list is to begin, then press the [Enter] key.  
If a No. outside the prescribed setting range is designated, an "OUT OF SETTING RANGE" error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- 2) The real mode/virtual mode program list will be displayed, starting with the designated program No.  
If the first program No. of the designation is real mode, the real mode programs will be displayed. If it is virtual mode, the virtual mode programs will be displayed in the list.
- 3) The Program List contains 18 lines per screen.

#### Displaying the next screen

- 1) Use the [Page Down] key to display the remainder of the list.  
When the program list readout is completed, a "COMPLETED." message will be displayed.

#### Switching between real/virtual mode

- 1) Use the [F2] key to switch between the real/virtual mode display.  
Each time the [F2] key is pressed the real mode or virtual mode servo program numbers will be displayed from the lowest No. first.
- 2) The [F2] area display is as follows.
  - In real mode display ..... VIRT.
  - In virtual mode display ..... REAL.

#### POINT

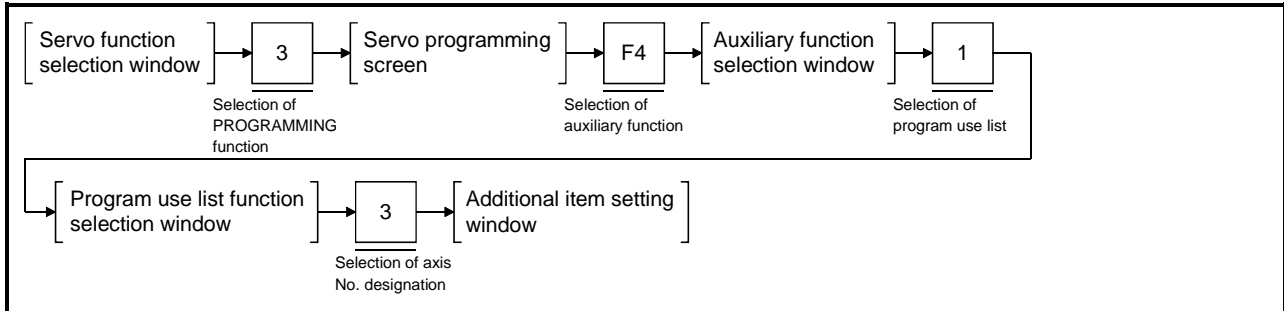
- (1) Switching between real and virtual mode displays  
Switch between the real mode servo program and virtual mode servo program list display after checking that the program list display readout is complete.

# 9. SERVO PROGRAM CREATION/MODIFICATION

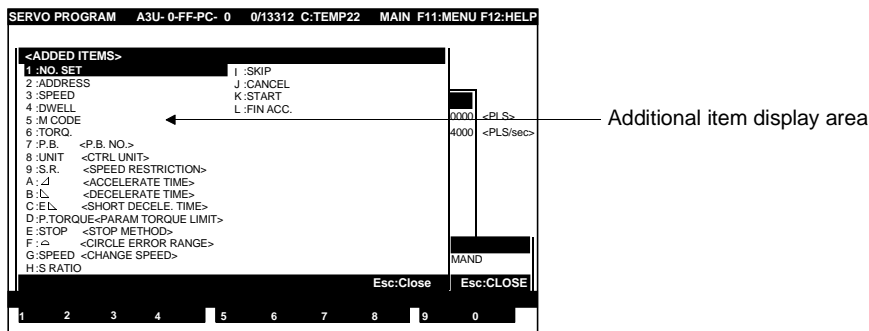
## 9.3.3 Designated axis No.

When an axis No. is designated, a list of programs (program No., servo instruction, interpolation axis, number of steps) where the designated axis No. is used will be displayed.

### [Procedure for Displaying the Axis No. Designation Window]



### [Additional Item Setting Window]



### [Display/Setting Content]

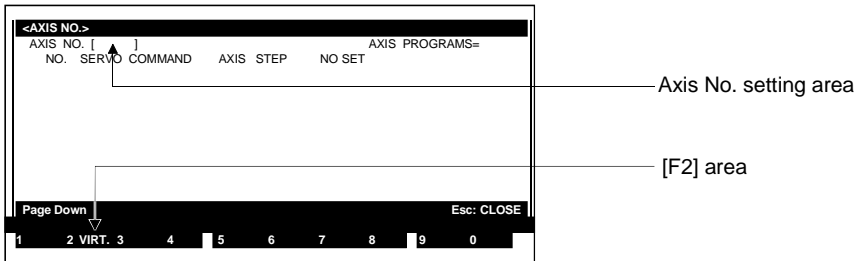
**Additional item display area** The designated additional item is displayed here.

### [Key Operation]

**Designating additional items** 1) Select the desired additional item by using the numeric/character keys, or by using the [↑][↓] keys to move the cursor to the desired item, then press the [Enter] key.  
When an additional item is selected, the Axis No. Designation window will be displayed.

## 9. SERVO PROGRAM CREATION/MODIFICATION

### [Axis No. Designation Window]



### [Display/Setting Content]

**Axis No. setting area** The designated axis No. is displayed here.

**[F2] area** Displays whether real mode or virtual mode programs are displayed.

### [Key Operation]

#### Axis No. Setting

- 1) Use the numeric keys to select the desired axis No., then press the [Enter] key. If an axis No. outside the prescribed range is designated, an "OUT OF SETTING RANGE" error message will be displayed. In this case, the setting should be re-designated within the prescribed range.
- 2) The real mode servo program using the designated axis No. is displayed from the lowest program No. The total number programs where the axis No. is used is shown at the upper right of the window.
- 3) The Program List contains 18 lines per screen.

#### Displaying the next screen

- 1) Use the [Page Down] key to display the remainder of the list. When the program list readout is completed, a "COMPLETED." message will be displayed.

#### Switching between real/virtual mode

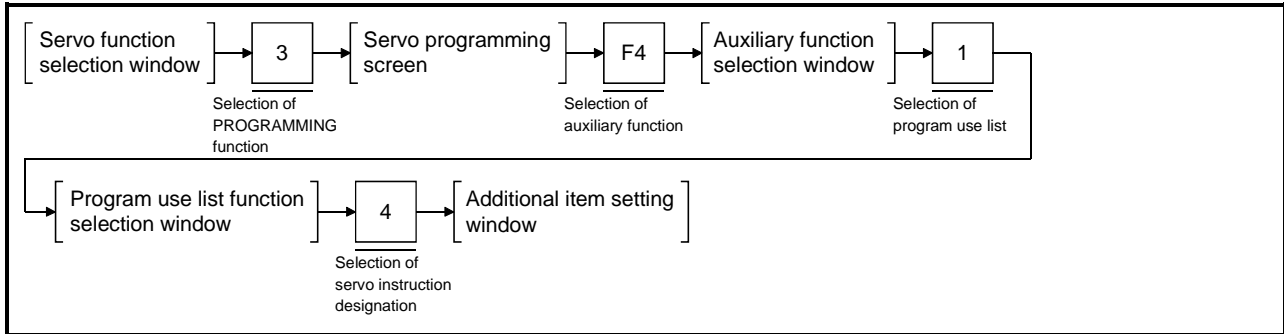
- 1) Use the [F2] key to switch between the real/virtual mode display. Each time the [F2] key is pressed, the real mode or virtual mode servo program numbers will be displayed from the lowest No. first.
- 2) The [F2] area display is as follows.
  - In real mode display ..... VIRT.
  - In virtual mode display ..... REAL.

# 9. SERVO PROGRAM CREATION/MODIFICATION

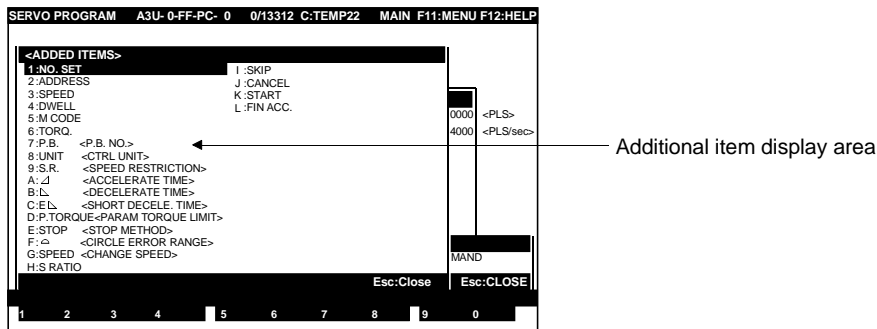
## 9.3.4 Designated servo instruction

When a servo instruction is designated, a list of programs (program No., servo instruction, axis No., number of steps) where the designated servo instruction is used will be displayed.

### [Procedure for Displaying the Additional Item Setting Window]



### [Additional Item Setting Window]



### [Display/Setting Content]

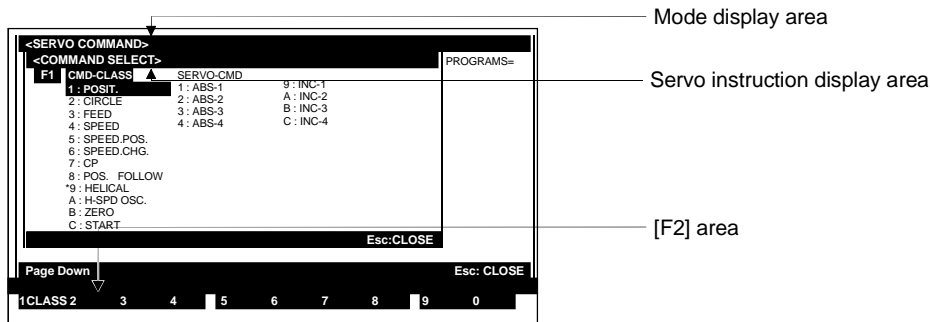
**Additional item display area** The designated additional item is displayed here.

### [Key Operation]

**Designating additional items** 1) Use the numeric/character keys to select the items (1 to 9, A to L) to be displayed, or use the [↑][↓] keys to move the cursor to the items to be displayed, then press the [Enter] key.  
When an additional item is selected, the Servo Instruction Designation window will be displayed.

## 9. SERVO PROGRAM CREATION/MODIFICATION

### [Servo Instruction Designation Window]



Mode display area

Servo instruction display area

[F2] area

### [Display/Setting Content]

#### Mode display area

When real mode is selected "REAL" is displayed, and when virtual mode is selected "VIRT." is displayed.

#### Servo instruction display area

The servo instruction selected at the Servo Instruction Selection window is displayed here.

#### [F2] area

The applicable program mode of the real display program is displayed.

### [Key Operation]

#### Selecting the instruction category

- 1) Use the numeric keys to select the instruction category which includes the servo instruction to be displayed, or use the [↑][↓] keys to move the cursor to the category, then press the [Enter] key.  
The selected instruction category will then be highlighted, and the cursor will move to the Servo Instruction Designation area.  
The servo instructions in each servo instruction category are displayed in the servo instruction display area.

#### Designated the servo instruction

- 1) Use the numeric keys to select the servo instruction to be displayed, or use the [↑][↓] keys to move the cursor to the instruction, then press the [Enter] key.  
Only the first servo instruction can be selected.
- 2) When the servo instruction is selected, the servo instruction selection window closes, and the real mode servo programs using the designated servo instruction are displayed from the lowest program No.  
The total number of programs is shown at the upper right of the window.
- 3) The Program List contains 18 lines per screen.

#### Displaying the next screen

- 1) Use the [Page Down] key to display the remainder of the list.  
When the program list readout is completed, a "COMPLETED." message will be displayed.

#### Switching between real/virtual mode

- 1) Use the [F2] key to switch between the real/virtual mode display.  
Each time the [F2] key is pressed, the real mode or virtual mode servo program numbers will be displayed from the lowest No. first.
- 2) The [F2] area display is as follows.
  - In real mode display ..... VIRT.
  - In virtual mode display ..... REAL.

# 9. SERVO PROGRAM CREATION/MODIFICATION

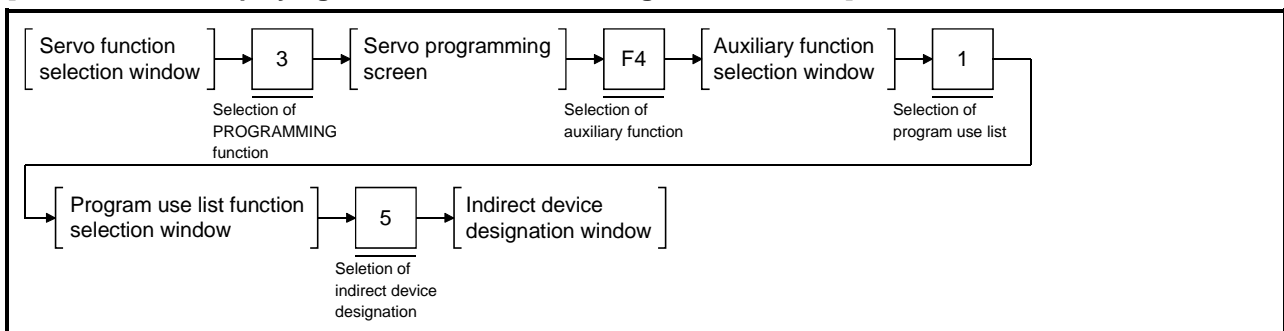
## 9.3.5 Designated indirect device

When an indirect device is designated, a list of programs (program No., servo instruction, axis No., number of steps, setting item, device No.) where the designated device is used will be displayed.

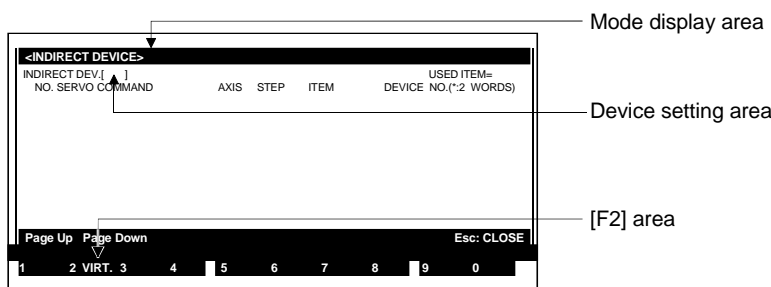
A list display by indirect device designation can be executed by the following 3 methods:

- Display of all servo programs where indirect devices are used.
- Display of servo programs where the designated device name (D/W) is used.
- List display of servo programs using the designated device No. (D0 to D1023/D8191, W0 to W3FF/W1FFF).

### [Procedure for Displaying the Indirect Device Designation Window]



### [Indirect Device Designation Window]



### [Display/Setting Content]

**Mode display area** When real mode is selected "REAL" is displayed, and when virtual mode is selected "VIRT." is displayed.

**Device setting area** The designated device is shown here.

**[F2] area** The applicable program mode of the real display program is displayed.

### [Key Operations]

#### Display of All Servo Programs where Indirect Devices are Used

**Switching between real/virtual mode**

- 1) Use the [F2] key to switch between the real/virtual mode display. Each time the [F2] key is pressed, the real mode or virtual mode servo program numbers will be displayed from the lowest No. first.
- 2) The [F2] area display is as follows.
  - In real mode display ..... VIRT.
  - In virtual mode display..... REAL.

**"All devices" (D/W) designation**

- 1) When the [Enter] key is pressed, the servo program using the direct device (D/W) is displayed from the lowest program No. The total number of programs where indirect devices are used is shown at the upper right of the window.
- 2) The Program List contains 18 lines per screen.

## 9. SERVO PROGRAM CREATION/MODIFICATION

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- Page change**
- 1) Use the [Page Up]/[Page Down] keys to switch display pages.  
Press the [Page Up] key to display the previous 18 programs.  
Press the [Page Down] key to display the next 18 programs.  
When the program list readout is completed, a "COMPLETED." message will be displayed.

### Readout of Servo Programs where the Designated Device Name (D/W) is Used

- Switching between real/virtual mode**
- 1) Use the [F2] key to switch between the real/virtual mode display.  
Each time the [F2] key is pressed, the real mode or virtual mode servo program numbers will be displayed from the lowest No. first.
  - 2) The [F2] area display is as follows.
    - In real mode display ..... VIRT.
    - In virtual mode display ..... REAL.

- Designating the device name**
- 1) Press either the [D] or [W] key to designate the desired device name, then press the [Enter] key.
  - 2) A list of servo programs where the designated device name is used will then be displayed in ascending program No. order.  
The total number of programs where the device name is used is shown at the upper right of the window.
  - 3) The Program List contains 18 lines per screen

- Page change**
- 1) Use the [Page Up]/[Page Down] keys to switch display pages.  
Press the [Page Up] key to display the previous 18 programs.  
Press the [Page Down] key to display the next 18 programs.  
When the program list readout is completed, a "COMPLETED." message will be displayed.

- Changing the device name setting**
- 1) To change the device name, press the [Delete] key to clear the old name, then enter the new name.



## 9. SERVO PROGRAM CREATION/MODIFICATION

### List Display of Servo Programs Using the Designated Device No. (D0 to D1023/D8191, W0 to W3FF/W1FFF)

- Switching between real/virtual mode**
- 1) Use the [F2] key to switch between the real/virtual mode display. Each time the [F2] key is pressed, the real mode or virtual mode servo program numbers will be displayed from the lowest No. first.
  - 2) The [F2] area display is as follows.
    - In real mode display .....VIRT.
    - In virtual mode display.....REAL.

- Designating the device No.**
- 1) Enter the name and No. of the indirect device to be displayed, then press the [Enter] key.
  - 2) A list of servo programs where the designated device No. is used will then be displayed in ascending program No. order. The total number of programs where the device No. is used is shown at the upper right of the window.
  - 3) The Program List contains 18 lines per screen.
  - 4) The device No. setting range is shown in the table below.

CPU	A171S/A171SH/ A172SH	A273UH (8-axis Specification)	A273UH (32-axis Specification)
<b>Register</b>			
Data register (D)	D0 to D1023* <sup>1</sup>	D0 to D8191* <sup>1</sup>	D0 to D8191* <sup>1</sup>
Link register (W)	W0 to W3FF	W0 to W1FFF	W0 to W1FFF

\*1: In real mode, 800 to 1023 is used by the servo system CPU  
In virtual mode, 670 to 1023 is used by the servo system CPU

\*2: In real mode, 0 to 799 is used by the servo system CPU  
In virtual mode, 0 to 1599 is used by the servo system CPU

- 5) If a device No. outside the permissible range is designated, an "DEVICE NUMBER OUT OF RANGE" error message will be displayed. In this case, the setting should be re-designated within the prescribed range.

- Page change**
- 1) Use the [Page Up]/[Page Down] keys to switch display pages. Press the [Page Up] key to display the previous 18 programs. Press the [Page Down] key to display the next 18 programs. When the program list readout is completed, a "COMPLETED." message will be displayed.

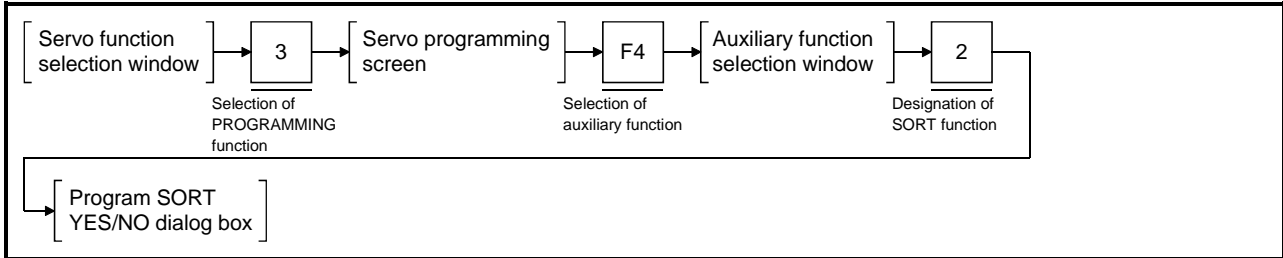
- Changing the device name & No. setting**
- 1) To change the device name and device No., press the [Delete] key to clear the old name and No., then enter the new name and No.

# 9. SERVO PROGRAM CREATION/MODIFICATION

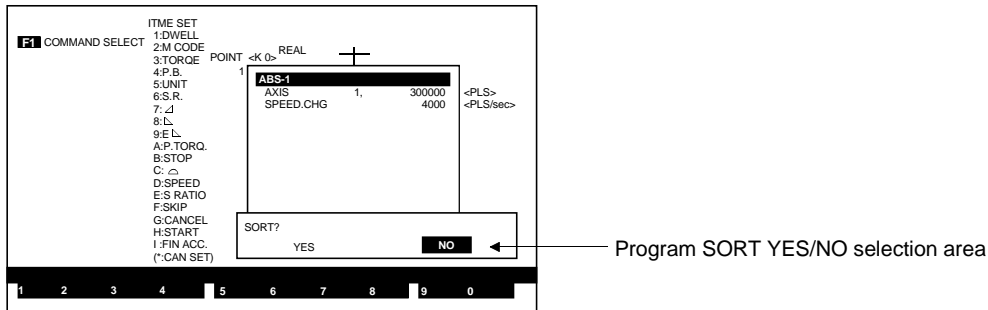
## 9.4 Servo Program Sort

In order to conserve space, servo programs stored in the internal memory are moved up to fill vacant areas.

### [Procedure for Displaying the Program Sort YES/NO Selection Dialog Box]



### [Program Sort YES/NO Dialog Box]



### [Display/Setting Content]

**Program Sort YES/NO selection area** A YES/NO selection is made here to determine if the program sort function is to be executed.

### [Key Operation]

#### Program Sort EXECUTE

- 1) To execute the program sort function, press the [←] key to highlight the "YES" item, then press the [Enter] key. (The default setting is "NO".)
- 2) When program sorting is completed, the system will return to the Servo Programming screen, and "COMPLETED." will be displayed. "Number of programs" and "number of steps" values which have been updated by the program sort function will be displayed again.

#### Program Sort CANCEL

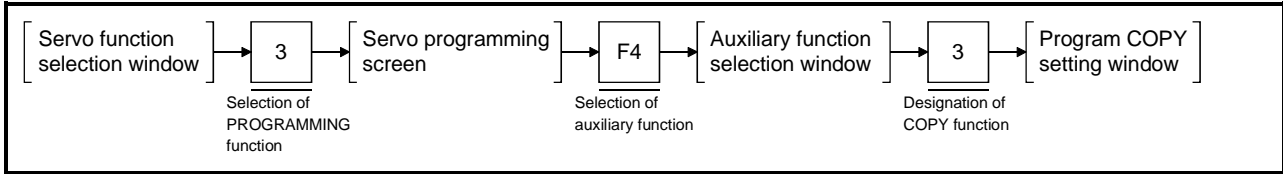
- 1) To cancel a program sort operation, press the [Enter] key at the "NO" highlight display. (If "YES" is highlighted, press the [→] key to move the highlight to the "NO" item.)  
The system will then return to the Auxiliary Function Selection window without executing the program SORT function.

# 9. SERVO PROGRAM CREATION/MODIFICATION

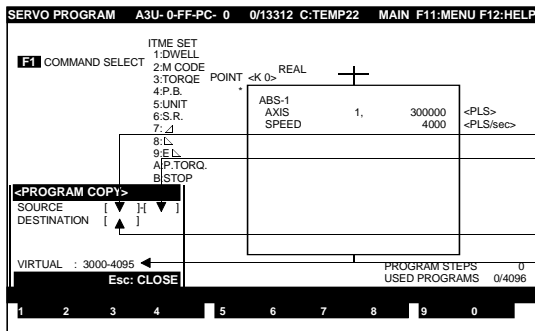
## 9.5 Servo Program COPY

Servo programs within the designated program No. range are copied.

### [Procedure for Displaying the Program Copy Setting Window]



### [Program COPY Setting Window]



Copy source FIRST program No. setting area  
Copy source LAST program No. setting area  
Copy destination FIRST program No. setting area  
Virtual mode program No. display area

### [Display/Setting Content]

**Copy source FIRST program No. setting area**

The designated copy source FIRST program No. is displayed here.

**Copy source LAST program No. setting area**

The designated copy source LAST program No. is displayed here.

**Copy destination FIRST program No. setting area**

The designated copy destination FIRST program No. is displayed here.

**Virtual mode program No. display area**

The program Nos. allocated for the virtual mode are displayed here.

### [Key Operation]

**Designating the copy source FIRST program No.**

- 1) Use the numeric keys to key-in the desired copy source FIRST program No., then press the [Enter] key.  
The cursor will then move to the Copy Source LAST Program No. setting area.

**Designating the copy source LAST program No.**

- 1) Use the numeric keys to key-in the desired copy source LAST program No., then press the [Enter] key.  
The cursor will then move to the Copy Destination FIRST Program No. setting area.

Copy source program No. setting condition:

- [Copy source FIRST program No.] ≤ [Copy source LAST program No.]

### POINT

The COPY operation cannot be executed between a real mode servo program and a virtual mode servo program.  
Copy between real mode programs or between virtual mode programs.

## 9. SERVO PROGRAM CREATION/MODIFICATION

**Designating the copy destination FIRST program No.** 1) Use the numeric keys to key in the desired copy destination program No., then press the [Enter] key.  
The program copy YES/NO dialog box will then be displayed.

[Conditions for designating the copy destination program No.]

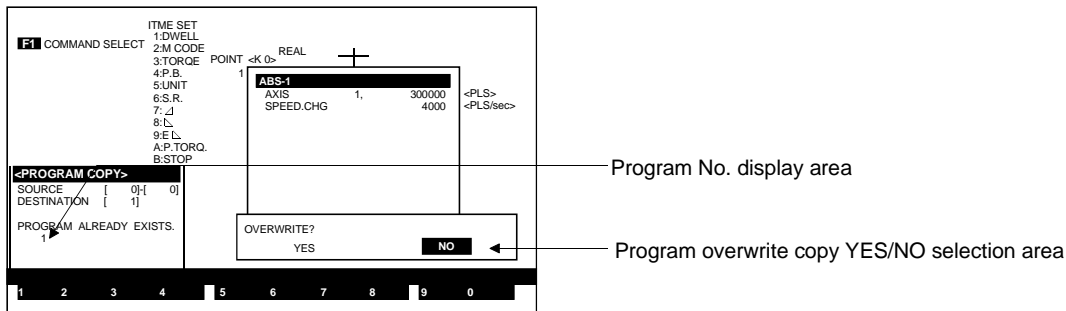
- Copy destination last program No. < copy source first program No.  
OR copy source last program No. < copy destination first program No.
- Copy destination first program No.  
+ (copy source last program No. – copy source first program No.) < 4096
- Copy source first program No. ≠ copy destination first program No.

**Copy EXECUTE** 1) To execute the program copy, press the [Enter] key at the "YES" highlight display. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)  
2) When copying is completed, the system will return to the Servo Programming screen, and "COMPLETED." will be displayed.

**Copy CANCEL** 1) To cancel the copy function, press the [→] key to highlight the "NO" item, then press the [Enter] key.  
The cursor will then return to the Copy Source FIRST Program No. Setting area without the COPY function being executed.

### When a Program Exists at the Copy Destination

#### [Overwrite YES/NO Dialog Box]



#### [Display/Setting Content]

**Program No. display area** If a servo program exists at the copy destination, 10 copy destination FIRST program Nos. will be checked in ascending order, and the relevant program Nos. will be displayed.

**Program overwrite copy YES/NO selection area** The overwrite YES/NO dialog box is displayed here. This setting determines whether or not overwriting occurs.

#### [Key Operation]

**Overwrite Copy EXECUTE** 1) To execute program overwriting, press the [←] key to highlight the YES item, then press the [Enter] key. (The default setting is "NO".)  
2) The program copy YES/NO dialog box will be displayed.  
Select "YES" to execute overwrite copying, or "NO" if overwriting is not desired.

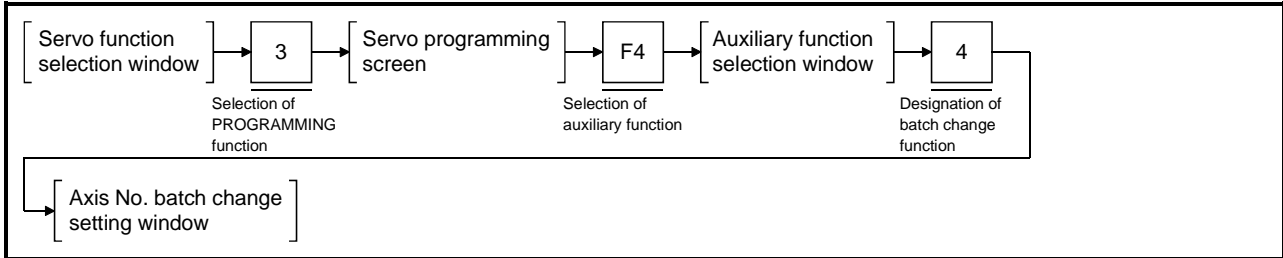
**Overwrite Copy CANCEL** 1) If overwrite copying is not desired, press the [Enter] key while the "NO" item is highlighted.  
The cursor will then return to the Copy Source FIRST Program No. Setting area without copying being executed.

# 9. SERVO PROGRAM CREATION/MODIFICATION

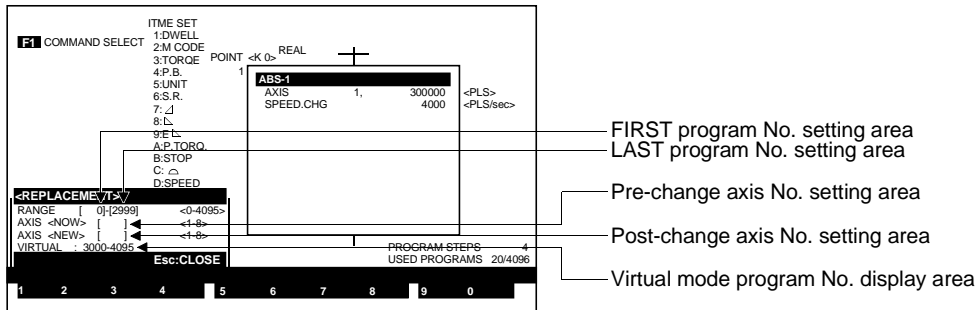
## 9.6 Batch Change of Servo Program Axis No.

An axis No. batch change can be executed at servo programs within a designated program No. range.

### [Procedure for Displaying the Axis No. Batch Change Setting Window]



### [Axis No. Batch Change Setting Window] (For A273UHCPU)



### [Display/Setting Content]

- FIRST program No. setting area** Either the default value or the designated FIRST program No. is displayed here.
- LAST program No. setting area** Either the default value or the designated LAST program No. is displayed here.
- Pre-change axis No. setting area** The pre-change axis No. is displayed here.
- Post-change axis No. setting area** The post-change axis No. is displayed here.
- Virtual mode program No. display area** The program Nos. allocated for the virtual mode are displayed here.

### [Key Operation]

- Designating the program range**
  - 1) Using the numeric keys, key-in the FIRST and LAST servo program Nos. to designate the range where an axis No. batch change is desired, then press the [Enter] key.  
The cursor will then move to the pre-change axis No. setting area.  
Program No. setting condition:
    - [FIRST program No.] ≤ [LAST program No.]
    - Do not mix real mode servo programs and virtual mode servo programs.
- Designating the pre-change axis No.**
  - 1) Using the numeric keys, key-in the pre-change axis No., then press the [Enter] key.  
The cursor will then move to the post-change axis No. setting area.

## 9. SERVO PROGRAM CREATION/MODIFICATION

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- Designating the post-change axis No.**
- 1) Using the numeric keys, key-in the post-change axis No., then press the [Enter] key.  
The batch change YES/NO dialog box will then be displayed.  
Axis No. setting condition:
    - [Pre-change axis No.] ≠ [Post-change axis No.]
- Batch Change EXECUTE**
- 1) To execute an axis No. batch change, press the [Enter] key when "YES" is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
  - 2) When the axis No. batch change is completed, the system will return to the Servo Programming screen, and "COMPLETED." will be displayed.
- Batch Change CANCEL**
- 1) To cancel the batch change function, press the [→] key to highlight the "NO" item, then press the [Enter] key.  
The cursor will then return to the servo program FIRST program No. setting area without the batch change function being executed.

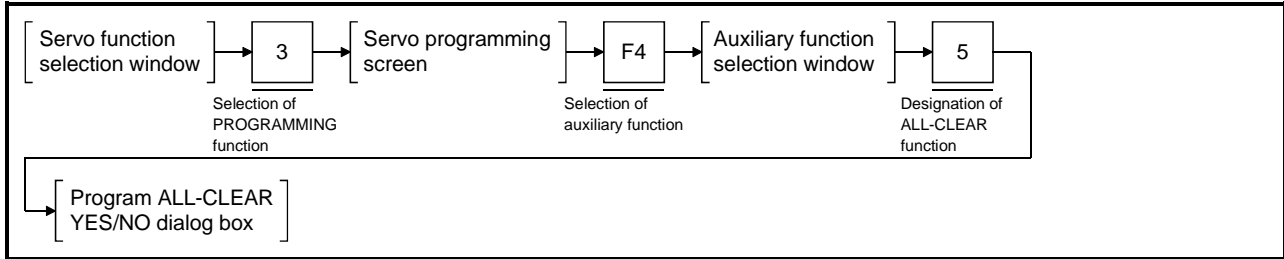
POINT
(1) An axis No. batch change cannot be executed for both real mode servo programs and virtual mode servo programs. Conduct axis No. batch changes separately for real mode servo programs and virtual mode servo programs

# 9. SERVO PROGRAM CREATION/MODIFICATION

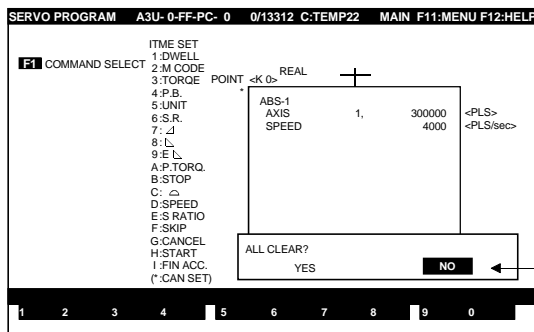
## 9.7 Servo Program All-Clear

All servo programs stored in the internal memory are cleared.

### [Procedure for Displaying the Program All-Clear YES/NO Selection Dialog Box]



### [Program All Clear YES/NO Dialog Box]



Program all-clear YES/NO selection area

### [Display/Setting Content]

**Program all-clear YES/NO selection area** The all-clear YES/NO dialog box is displayed here. This setting determines whether or not the all-clear function is executed.

### [Key Operation]

#### All-Clear EXECUTE

- 1) To execute the all-clear function, press the [←] key to highlight the "YES" item, then press the [Enter] key. (The default setting is "NO").
- 2) When the program all-clear function is completed, system will return to the Servo Programming screen, and "COMPLETED." will be displayed.

#### All-Clear CANCEL

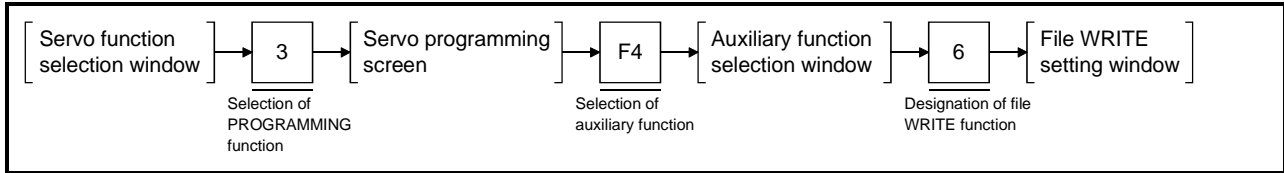
- 1) To cancel the all-clear function, press the [Enter] key while the "NO" item is highlighted. (If "YES" is highlighted, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.)  
The system will then return to the Auxiliary Function Selection window without the all-clear function being executed.

# 9. SERVO PROGRAM CREATION/MODIFICATION

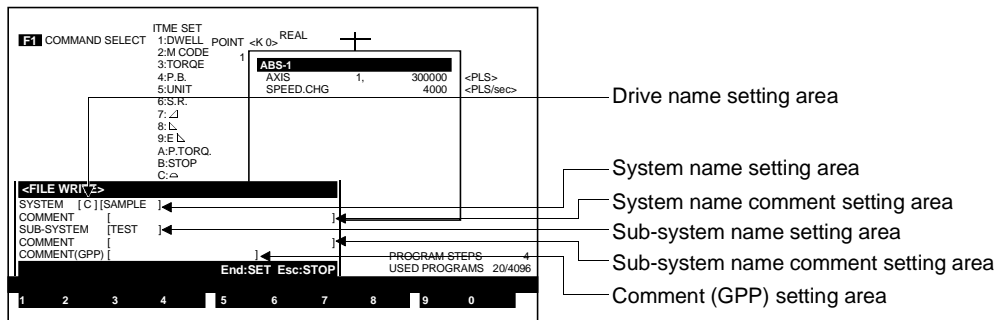
## 9.8 Writing Servo Programs to the User File

Servo programs are written to the user file.

### [Procedure for Displaying the File Write Setting Window]



### [File Write Setting Window]



### [Display/Setting Content]

- Drive name setting area** The currently designated drive name is displayed.
- System name setting area** The currently designated system name is displayed.
- System name comment setting area** The currently designated system name comment is displayed.
- Sub-system name setting area** The currently designated sub-system name is displayed.
- Sub-system name comment setting area** The currently designated sub-system name comment is displayed.
- Comment (GPP) setting area** The currently designated comment (GPP) is displayed.

### [Key Operation]

- System name comment setting**
  - 1) Designate (or change) the system name comment. If the displayed comment is to be used as is, press the [Enter] key. The cursor will then move to the sub-system name comment setting area.
- Sub-system name comment setting**
  - 1) Designate (or change) the sub-system name comment. If the displayed comment is to be used as is, press the [Enter] key. The cursor will then move to the sub-system name comment setting area and will begin to flash.
  - 2) If the [↑] key is pressed before pressing the [Enter] key, the cursor will return to the system name comment setting area.
- Comment (GPP) setting**
  - 1) Designate (or change) the sub-system name comment (GPP). If no setting or change is required, simply press the [Enter] key. A file write YES/NO dialog box will then be displayed.
  - 2) If the [↑] key is pressed before pressing the [Enter] key, the cursor will return to the sub-system name comment setting area.
- YES/NO (EXECUTE/CANCEL) Selection**
  - 1) "YES": The file write function will be executed.
  - "NO": The file write function will not be executed.

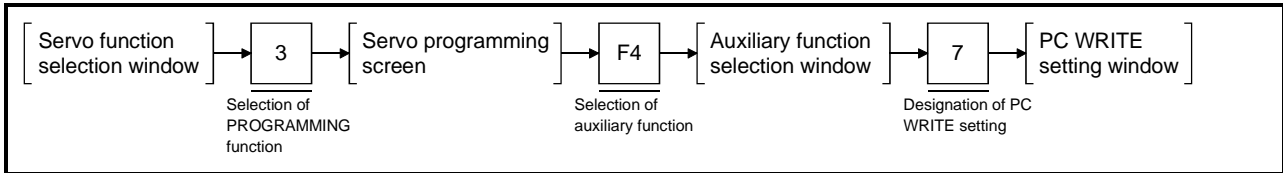


# 9. SERVO PROGRAM CREATION/MODIFICATION

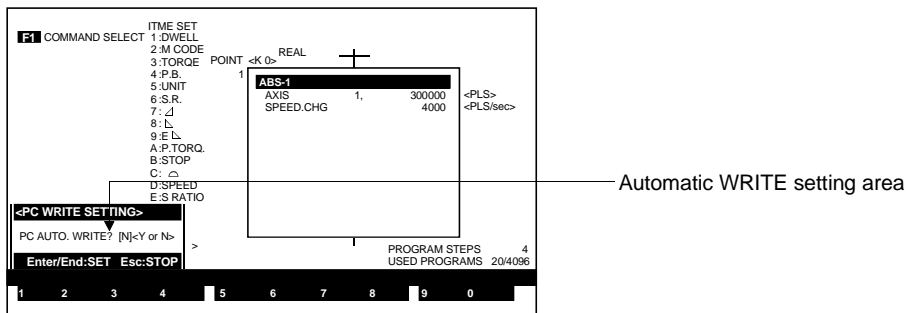
## 9.9 Automatic Writing of Servo Programs to the Servo System CPU

By connecting the servo system CPU to a personal computer, the created/modified servo programs can be written directly to the servo system CPU.

### [Procedure for Displaying the PC Automatic Write Setting Window]



### [PC WRITE Setting Window]



### [Display/Setting Content]

#### Automatic WRITE setting area

Either the default value or the previously designated value is displayed here. When the automatic WRITE function is on, "Y" is displayed; when off, "N" is displayed.

### [Key Operation]

#### Automatic WRITE "ON" (Y) setting

- 1) To conduct a PC automatic write, turn the function ON by pressing the [Y] key and the [Enter]/[END] keys. (The default setting is "N".)  
If the PC automatic write function is turned ON, the system will return to the Servo Programming screen and "A" is displayed after the mode name.  
If the PC automatic write function is turned ON, press the [F10] key when creating or modifying a program to check the servo program and automatically write it to the servo system CPU.

#### Automatic WRITE "OFF" (N) setting

- 1) The PC automatic writing function will be turned OFF by any of the conditions shown below. To continue the automatic writing function, it must be turned ON again.
  - When "N" is designated at the PC Write Setting window.
  - When the personal computer power is switched OFF, or a reset is executed.
  - When a COPY, BATCH CHANGE, or ALL-CLEAR function is executed from the Servo Program Auxiliary Function Selection window.
  - When an error occurs during automatic writing.
  - When the operation mode is changed to any mode other than SERVO PROGRAMMING.

### IMPORTANT

- (1) Do not turn on the PC READY signal when program is being automatically written to the servo system CPU.  
If the READY signal is turned ON at this time, the contents of the program memory may be lost.

## 9. SERVO PROGRAM CREATION/MODIFICATION

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<b>POINT</b>
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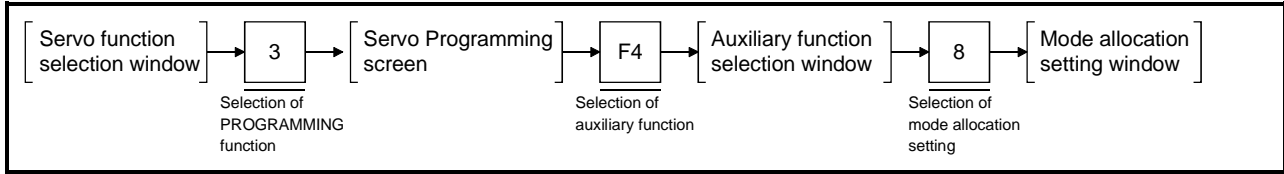
- |   |
|---|
| <p>(1) Before executing the automatic writing operation, it is advisable to establish the SERVO PC mode in order to verify that the content of the servo system CPU memory matches that of the personal computer's internal memory.</p> |
|---|

# 9. SERVO PROGRAM CREATION/MODIFICATION

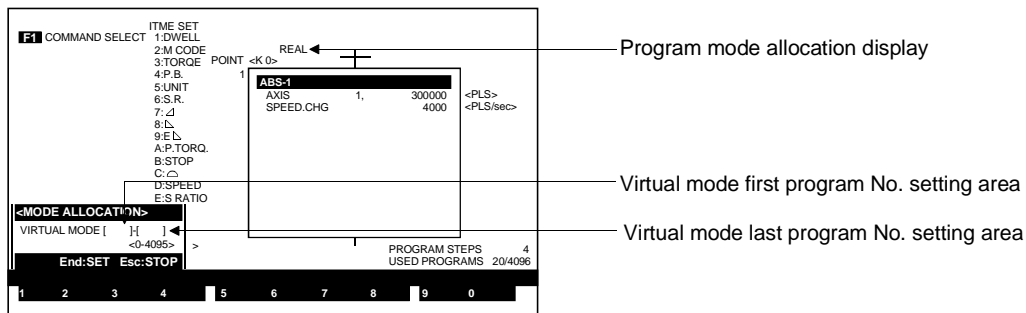
## 9.10 Mode Allocation Setting

Designate the operation program Nos. for the virtual mode.

### [Procedure for Displaying the Mode Allocation Setting Window]



### [Mode Allocation Setting Window]



### [Display/Setting Content]

#### Program mode allocation display

The displayed program operating mode is shown here.

#### Virtual mode first program No. setting area

The designated program No. or the previous set value is shown here.

#### Virtual mode last program No. setting area

The designated program No. or the previous set value is shown here.

### [Key Operation]

#### Setting the virtual mode first program No.

- 1) Use the numeric keys to input the virtual mode first program No., and then press the [Enter] key.  
The cursor will move to the virtual mode last program No. setting area.

#### Setting the virtual mode last program No.

- 1) Use the numeric keys to input the virtual mode last program No., and set by pressing the [Enter] key.  
After the mode allocation is set, the system will return to the Servo Programming screen. If the program is a virtual mode servo program, "VIRT." will be displayed in the program mode display area.

#### Virtual mode allocation ABORT

- 1) To abort, press the [Esc] key. The system returns to the Auxiliary Function Selection Window.

#### Virtual mode program No. CLEAR

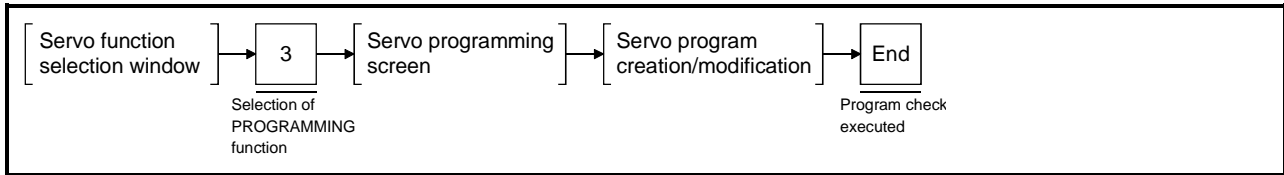
- 1) Press the [Delete] key to clear the virtual mode first program No. and last program No.

# 9. SERVO PROGRAM CREATION/MODIFICATION

## 9.11 Program Check

After servo program creation/modification, a batch check of all servo programs is executed.

### [Batch Check Procedure]



### [Error Program & List Display Window]

The screenshot shows a window titled "<EROR PROGRAM LIST>". It contains a table with columns: NO., PROGRAM, SERVO COMMAND, AXIS, and ERROR CONTENTS. Below the table, there are navigation instructions: "Page Down CHECK COMPLETED." and "Esc: CLOSE". At the bottom, there is a numeric keypad with digits 1-0. An arrow points from the text "Error display area" to the table content.

NO.	PROGRAM	SERVO COMMAND	AXIS	ERROR CONTENTS
1	5	ABS-1	2	SPEED BEYOND SPEED RESTRICTION.
2	20	ABS-1	1	SPEED BEYOND SPEED RESTRICTION.
3	21	ABS-1	1	SPEED BEYOND SPEED RESTRICTION.
4	202	CPSTART2 4.ABS-2	2,3	AXIS3 BEYOND STROKE LIMIT RANGE.

### [Display/Setting Content]

**Error display area** When an error is detected by the program check function, an error message is displayed here.

### [Key Operation]

**Displaying the next screen** 1) Press the [Page Down] key to display the next page.


**Window CLOSE** 1) Press the [Esc] key to close the window and return to the Servo Programming screen.

## 9. SERVO PROGRAM CREATION/MODIFICATION

### [Program Check Content]

Error Item	Error Cause
Instruction code error	<ul style="list-style-type: none"> <li>An improper instruction code which cannot be read was designated.</li> </ul>
Program No. outside applicable range	<ul style="list-style-type: none"> <li>At the simultaneous start instruction, the designated program No. is outside the 0 to 4095 range.</li> </ul>
Program doesn't exist	<ul style="list-style-type: none"> <li>At the simultaneous start instruction, the designated program (K0 to K4095) has not yet been created.</li> <li>If the program No. 0 is displayed, press the "PREV." [F7] key.</li> <li>If the program No. 4095 is displayed, press the "NEXT" [F8] key.</li> </ul>
START instruction designated	<ul style="list-style-type: none"> <li>At the simultaneous start instruction, the designated program (K0 to K4095) is a start instruction.</li> </ul>
Duplicated START axes	<ul style="list-style-type: none"> <li>There is duplication among the axes to be started in the programs (K0 to K4095) designated in the simultaneous START instruction.</li> <li>Duplication of interpolation control START axes.</li> </ul>
Incorrect end-point instruction position	<ul style="list-style-type: none"> <li>At the speed change instruction (VSTART), the end-point instruction (ABS-1 to ABS-4, INC-1 to INC-4) is at an incorrect position. (Should be positioned just after VSTART.)</li> </ul>
No end-point instruction	<ul style="list-style-type: none"> <li>At the speed change instruction (VSTART), there is no end-point instruction.</li> </ul>
Multiple end-point instructions	<ul style="list-style-type: none"> <li>At the speed change instruction (VSTART), there is more than one end-point instruction.</li> </ul>
Incorrect FOR-NEXT instruction	<ul style="list-style-type: none"> <li>At the constant speed / speed change instruction, the repeat instruction (FOR-ON, FOR-OFF, FOR-TIMES, NEXT) is used incorrectly. (Nesting status exists. Either FOR-[ ] or NEXT must be designated.)</li> </ul>
Axis No. outside applicable range	<ul style="list-style-type: none"> <li>The designated axis No. is outside the applicable range.</li> <li>The same axis No. has been designated at multiple locations.</li> </ul>
Interpolation control units mismatch	<ul style="list-style-type: none"> <li>At the interpolation control instruction, the system-of-units for the interpolation axis is different from the control unit specified in the designated parameter block.</li> </ul>
No END command	<ul style="list-style-type: none"> <li>At the speed change instruction (VSTART), there is no END instruction (VEND).</li> <li>At the constant speed instruction (CPSTART), there is no END instruction (CPEND).</li> </ul>
Incorrect setting data	<ul style="list-style-type: none"> <li>The designated setting is outside the applicable range.</li> </ul>
Stroke limit range violation	<ul style="list-style-type: none"> <li>At the "absolute method" instruction (ABS**) or fixed-pitch feed instruction (FEED**), the positioning address (end-point address for circular interpolation) is outside the stroke limit range specified in the fixed parameters.</li> </ul>
Speed control value over	<ul style="list-style-type: none"> <li>The speed setting value exceeds the speed limit value specified in the relevant parameter block</li> </ul>
Incorrect indirect device setting	<ul style="list-style-type: none"> <li>The indirect setting value is outside the applicable range for the designated device. The setting ranges are as shown below. For A171SCPU ..... D0 to D1023, W0 to W3FF For A273UHCPU (8/32-axis specification) D0 to D8191, W0 to W1FFF</li> <li>The following devices set for two-word data items. For A171SCPU ..... D1023, W3FF For A273UHCPU (8/32 axis specification) D8191, W1FFF</li> <li>At the speed/position instruction (VPF, VPR), the travel value is other than that at the indirect device travel value change register.</li> </ul>
Cannot use in virtual mode	<ul style="list-style-type: none"> <li>Speed/position instructions and home return position instructions which cannot be designated were selected.</li> </ul>
Incorrect program mode	<ul style="list-style-type: none"> <li>Both real mode and virtual mode servo programs were designated for simultaneous start.</li> </ul>

### CAUTION

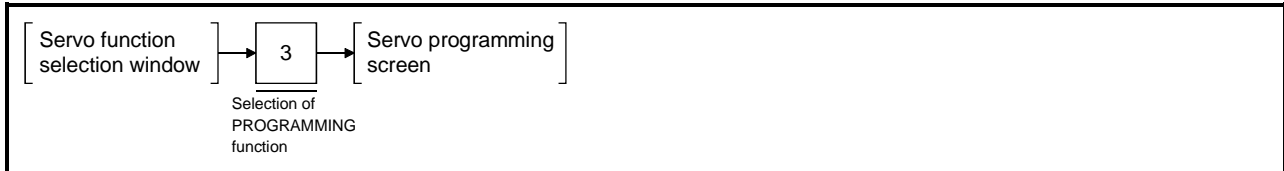
 When an error occurs, check the error items described above before resetting it. Failure to do so could disable the CPU PROTECT function.

# 9. SERVO PROGRAM CREATION/MODIFICATION

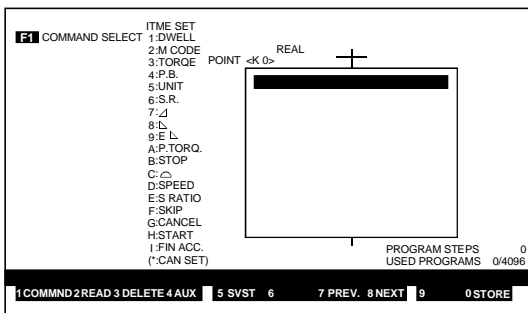
## 9.12 Batch Copy to SVST Instructions

Automatically copies the axis numbers used in the motion program to the axis designation area of the SVST instruction entered with the GPP function in the sequence program.

### [Procedure for Displaying the Screen where Batch Copy to SVST Instruction is Possible]



### [Servo Programming Screen]



### [Display/Setting Content]

#### Executing the batch copy

- 1) At the Programming screen, press the [F5] (SVST AXIS) key.
- 2) If no motion program or sequence program exists, the error message "PROGRAM DOES NOT EXIST" is displayed.
- 3) On completion of batch copy to the SVST instructions, the message "COMPLETED." is displayed.

### [Cautions]

- 1) This function does not work if the program number is indirectly designated in the SVST instruction.
- 2) Interlocks applied to the axes that correspond to the SVST instruction axis numbers in the SFC program transition conditions are not copied by the batch copy function.
- 3) If the simultaneous start instruction is used in the motion program, only the first axis number declared in the simultaneously started programs is copied.

# 10. MECHANICAL SYSTEM PROGRAMS

## 10. MECHANICAL SYSTEM PROGRAMS

The mechanical system editing mode is found under the mechanical system mode. It is used to create mechanical system programs by connecting images of components and setting the parameters for the components.

### (1) Function summary

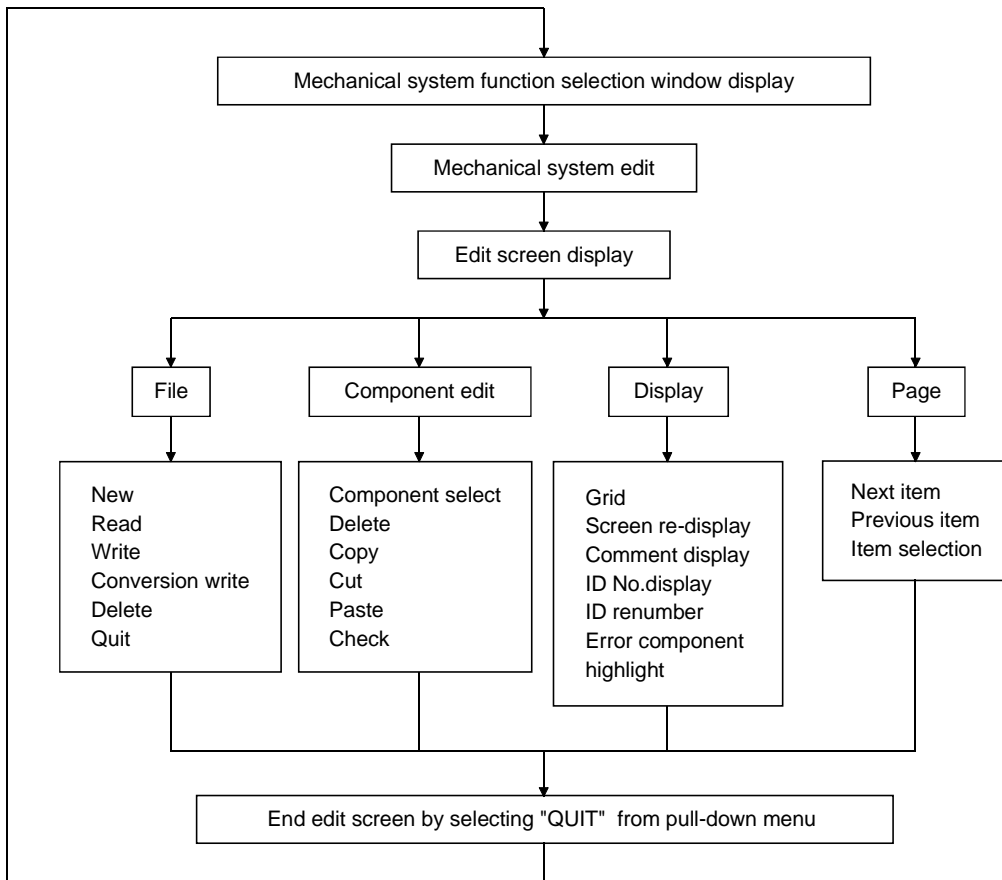
The mechanical system editing mode has the below functions.

Mechanical system	Mechanical system edit	Creating mechanical system programs	— Create mechanical system programs by selecting ..... and connecting components, and edit components. ....	10.2
		— Component select .....	Selects components and places them on the ..... edit screen.	10.2.1
		— Delete .....	Deletes designated components. ....	10.2.2
		— Copy .....	Copies designated components. ....	10.2.3
		— Cut .....	Cuts designated components to system buffer. ....	10.2.4
		— Paste .....	Re-displays cut components. ....	10.2.4
		— Check .....	Conducts data matching checks. .... (connection of components, etc.)	10.2.5
		— Set component parameter .....	Sets parameters for each component. ....	10.2.6
		Display	— Displays edit screen display mode changes, and component information. ....	10.3
		— Grid .....	Switches between grid display/non-display. ....	10.3.1
		— Screen re-display .....	Returns to a clean edit screen display. ....	10.3.4
		— Comment display .....	Switches between displaying or not displaying ..... output components.	10.3.2
		— ID No.display .....	Switches between component ID No. .... display/non-display.	10.3.3
		— ID renumber .....	Switches between ID No.display formats. ....	10.3.3
		— Error component highlight .....	Switches between highlighting or not highlighting ..... components where errors were detected.	10.3.5
		Page	— Switches between edit screen pages. ....	10.4
		— Next item/Previous item .....	Switches between next page/previous page. ....	10.4
		— Item selection .....	Switches to a designated page. ....	10.4
		File	— Conducts data and file operations, and ends mechanical system editing mode. ....	10.5
		— New .....	Clears editing data and creates a new file. ....	10.5
		— Read .....	Reads file data to edit screen. ....	10.5
		— Write .....	Writes created data to a file. ....	10.5
		— Conversion write .....	Converts created data to a file executable ..... in the servo system CPU.	10.5
		— Delete .....	Deletes files. ....	10.5
		— END .....	Ends mechanical system mode. ....	10.5

# 10. MECHANICAL SYSTEM PROGRAMS

## (2) Outline flowchart

Describes outline flowchart in mechanical system editing mode.





# 10. MECHANICAL SYSTEM PROGRAMS

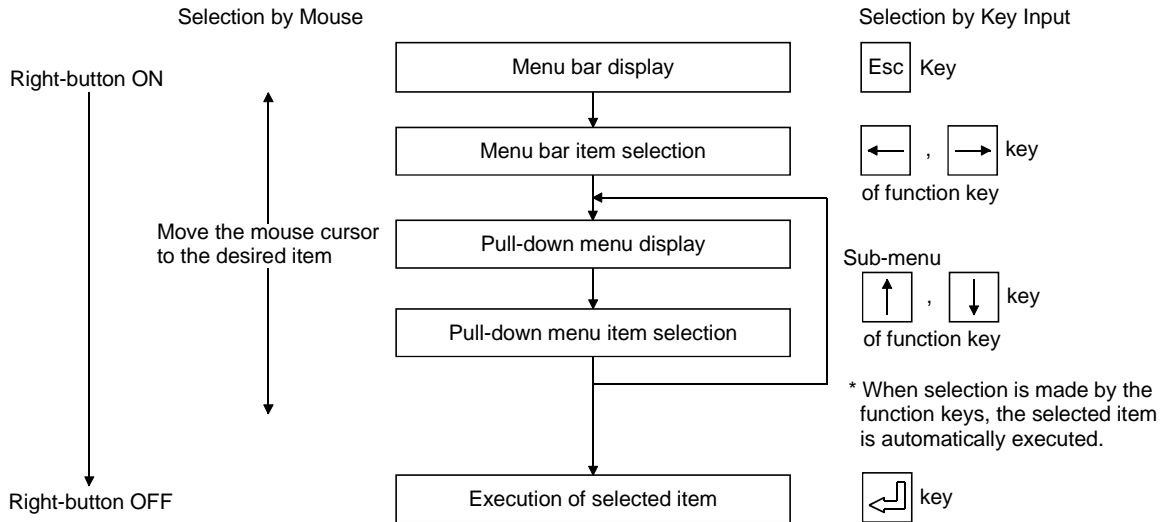
## 10.1 Common Items

Common items for the mechanical system editing mode are shown below.

### (1) Menu selection

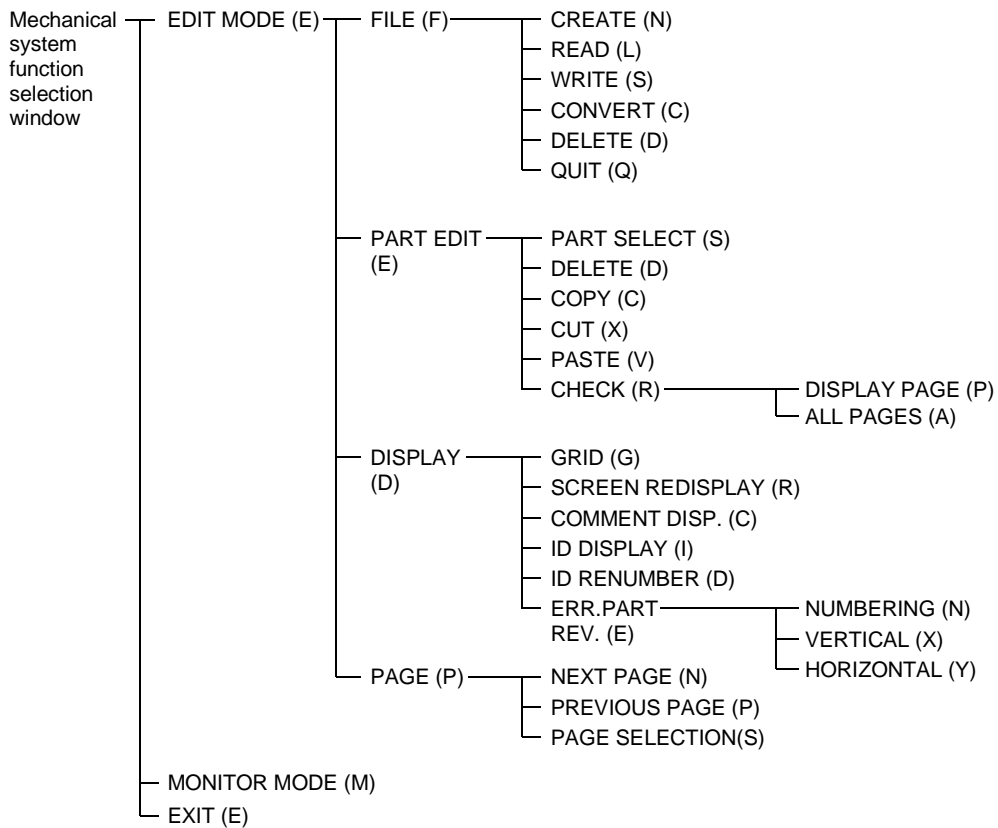
#### (a) Mouse and key operation

Menu items can be selected by using the mouse or by key inputs. Both methods are described below.



#### (b) Function key allocation

The character keys used in menu selection procedures are shown in parentheses below.



# 10. MECHANICAL SYSTEM PROGRAMS

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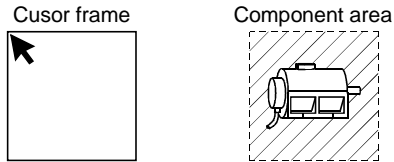
(2) Terminology used in this section

(a) Cursor frame

A frame to select and set components

(b) Component area

The valid area when a component is individually selected.



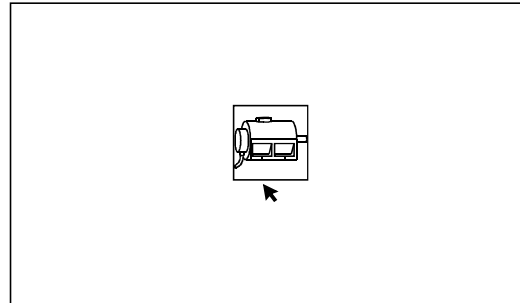
(3) Basic operations

(a) Movement of components

1) Moving individual components

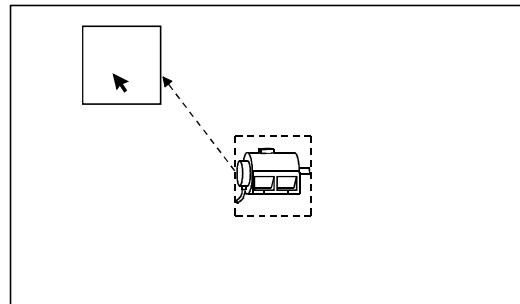
Move the mouse inside the component area, then execute a left-press to display the cursor frame.

**[Screen Displaying the Cursor Frame]**



Holding down the left button, move the cursor frame to the desired location.

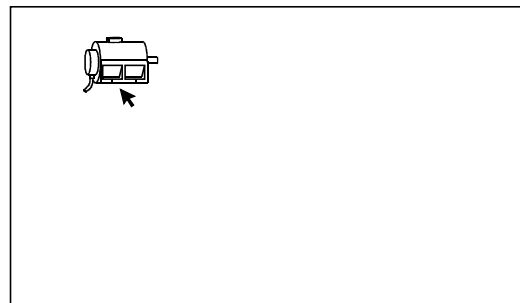
**[Screen Showing Travel Destination]**



After moving the cursor frame to the desired position, release the left button.

The component is moved.

**[Screen after Moving Component]**

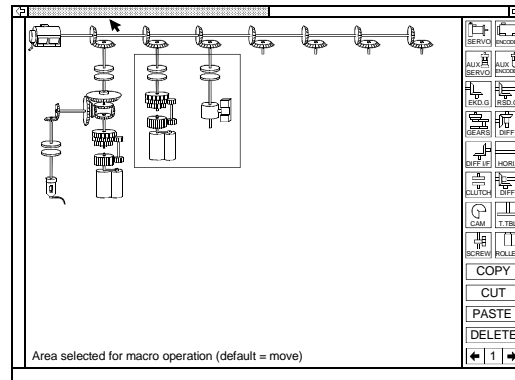


# 10. MECHANICAL SYSTEM PROGRAMS

## 2) Moving multiple components

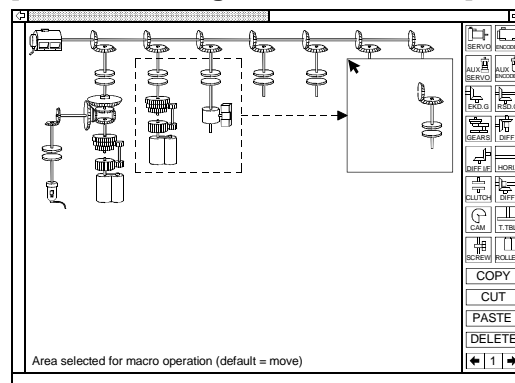
Using the component designation operation, enclose the desired component. (See Section 10.1(3) (b).)

### [Multiple Component Designation]



Move the mouse cursor inside the cursor frame, hold the left button down and move the cursor frame to the desired location.

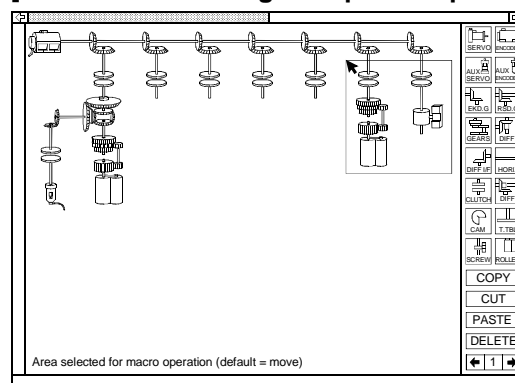
### [Screen Showing Travel Destination]



After moving the cursor frame to the desired location, release the left button.

The multiple components are moved.

### [Screen after Moving Multiple Components]

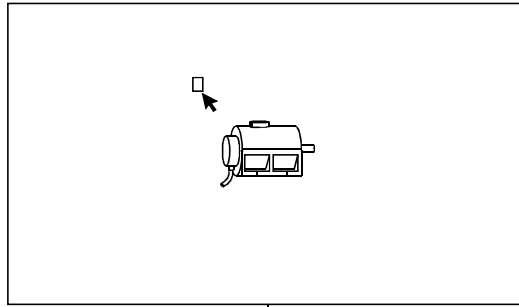


## 10. MECHANICAL SYSTEM PROGRAMS

### (b) Component designation

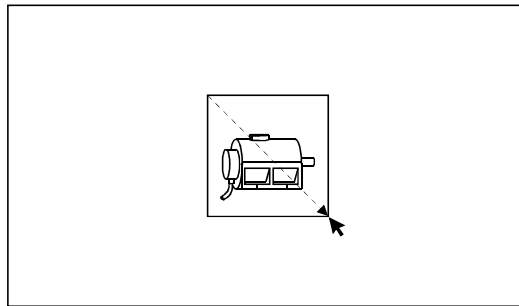
Execute a left-press at the top-left of the desired component to enable cursor frame designation.

#### [Waiting for Cursor Frame Designation]



Hold down the left button and move the mouse cursor diagonally down so that the cursor frame encloses the component.

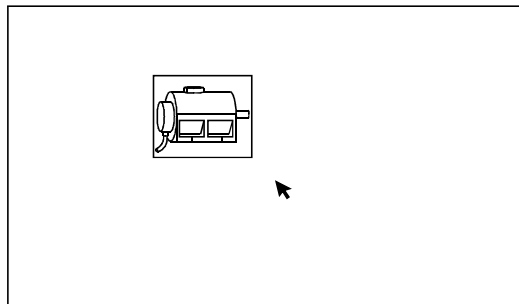
#### [Cursor Frame Designation]



\* Set the cursor frame to a larger area than the component area. If the enclosed area is smaller than the component, the component cannot be set.

After the desired component is enclosed, release the left button. The component is designated.

#### [Screen Showing Designated Component]



### POINTS

- (1) Editing functions required for component designation  
To use the following editing functions, designate the desired component before selecting the function.
  - Component DELETE
  - Component COPY
  - Component CUT
- (2) Component designation
  - Components cannot be simultaneously designated in multiple areas.
  - Components can be designated either independently, or as a group (within a single screen).

# 10. MECHANICAL SYSTEM PROGRAMS

## (c) Component designation conditions

The component cannot be designated by moving the mouse cursor inside the component area and pressing the left button.

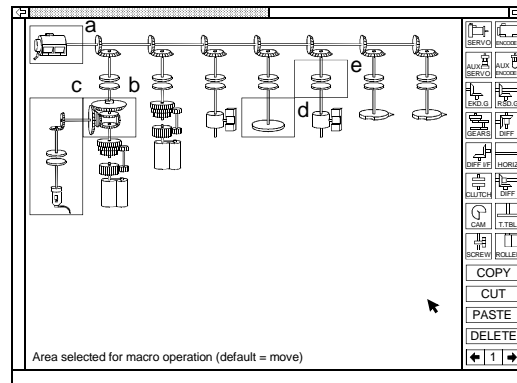
To designate a component, the left button must be pressed outside the component area.

However, the desired component will not be designated when the left button is pressed outside the component area if another component is already designated.

The component can be designated only if the arrangement of the components meets the conditions below.

- No component is designated for is at least one area above, below, left, or right of the designated component.

### [Screen showing component arrangement example]



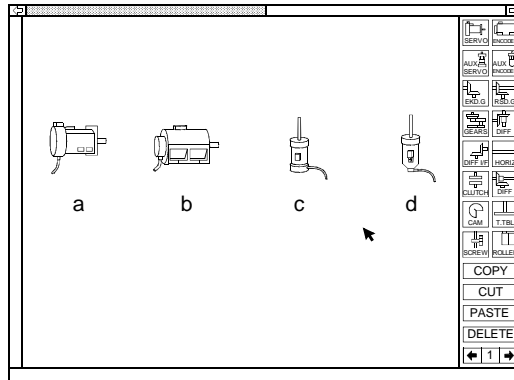
- a: Designation possible
- b: Designation possible
- c: Designation possible
- d: Designation possible
- e: Designation not possible

If the component is in a position where it cannot be designated, move it to a position where it can be designated before designating it.

# 10. MECHANICAL SYSTEM PROGRAMS

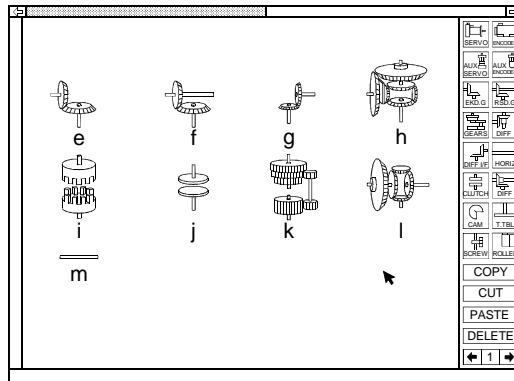
## (4) Component names

### (a) Drive module



- a: Servomotor
- b: Synchronous encoder
- c: Auxiliary shaft input servomotor
- d: Auxiliary shaft input encoder

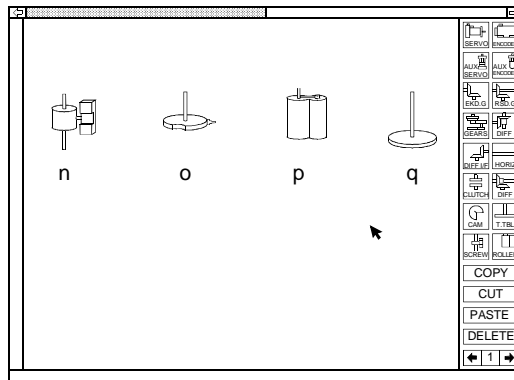
### (b) Transmission module



- e: Gear (rear edge)
- f: Gear (continuous)
- g: Auxiliary shaft gear
- h: Differential gear
- i: Direct clutch
- j: Smoothing clutch
- k: Gear box
- l: Spindle differential gear
- m: Horizontal spacer main shaft  
(used with differential gears)

i-k for both virtual main shaft and auxiliary shaft

### (c) Output module

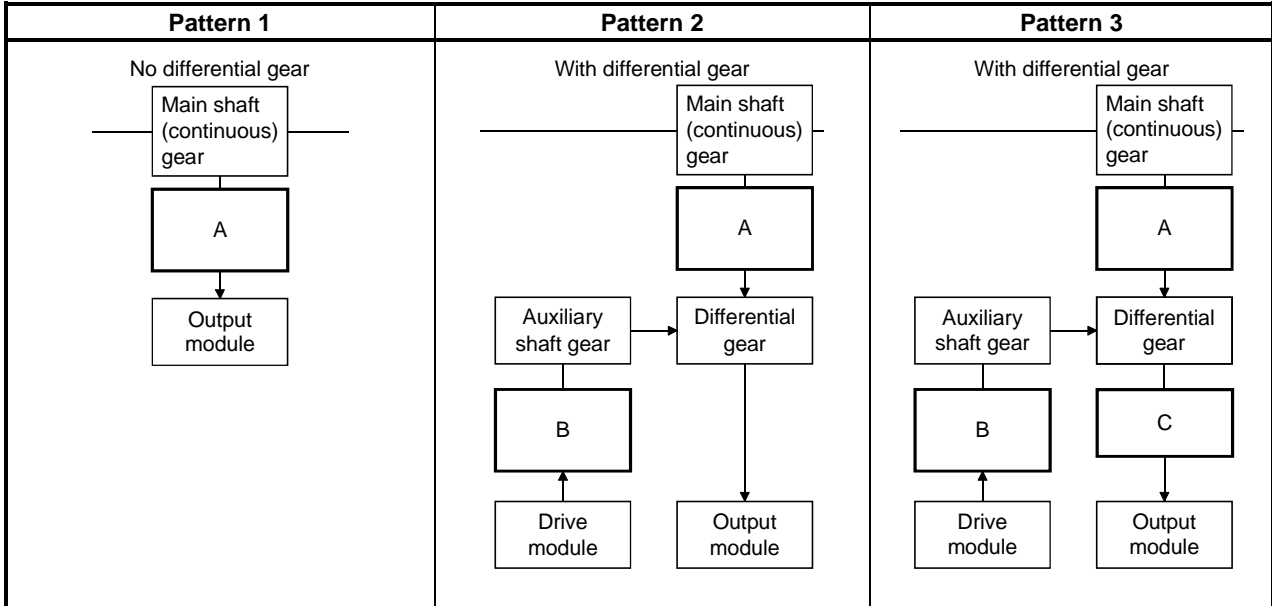


- n: Ball screw
- o: Cam
- p: Roller
- q: Rotary table

# 10. MECHANICAL SYSTEM PROGRAMS

(5) Connection patterns and limitations of virtual transmission module  
 This section describes the connection patterns and limitations of the virtual transmission modules.

(a) Virtual transmission module connection pattern  
 The three connection patterns are described below.



A: Input block  
 B: Auxiliary input block  
 C: Output block

(b) Connection limitations on virtual transmission modules

This section describes the limitations on connecting modules.

- Only one clutch and gearbox can be connected to A.
- Only one clutch and gearbox can be connected to B.
- Only one gearbox can be connected to C.

The clutch and gearbox can be connected above or below A or B.

When a gearbox is connected to A, a gearbox cannot be connected to C.

Similarly, if a gearbox is connected to C, a gearbox cannot be connected to A.

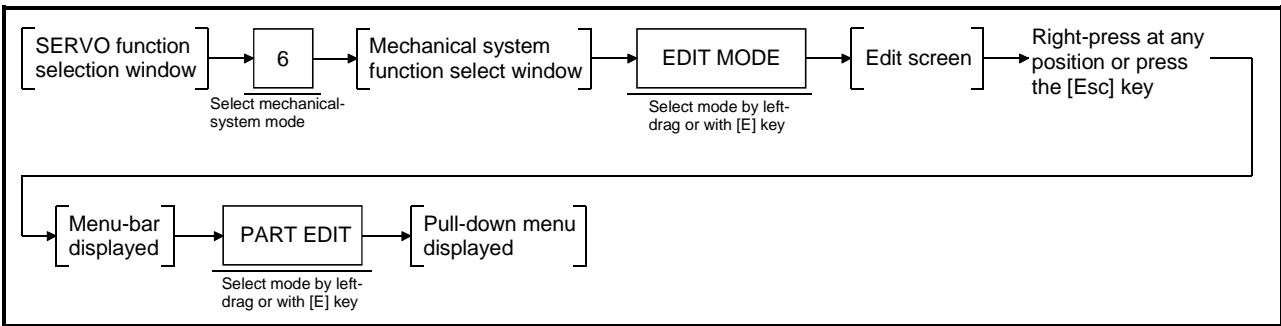
# 10. MECHANICAL SYSTEM PROGRAMS

## 10.2 Mechanical System Program Creation

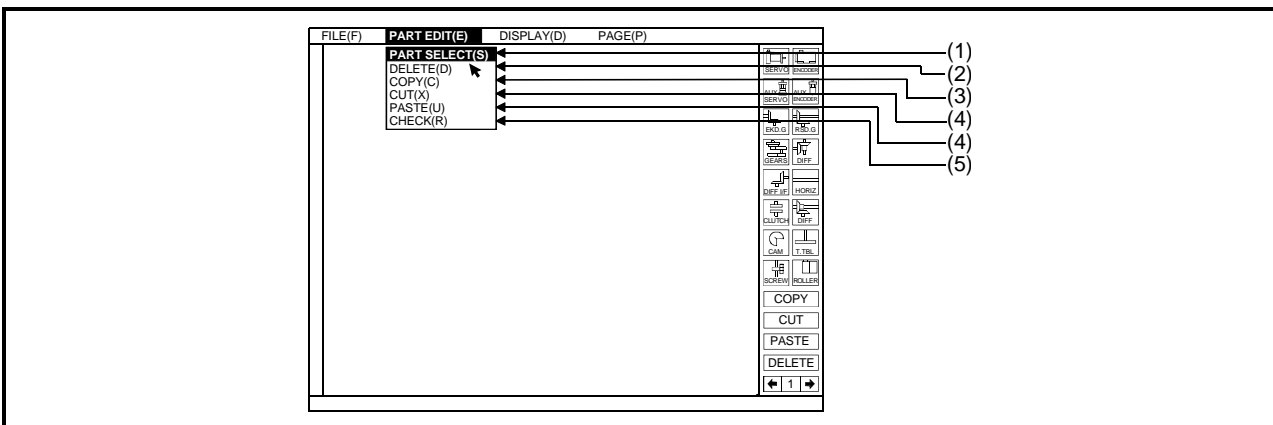
The operations described below are used to create mechanical system programs.

- Selection and arrangement of components comprising the mechanical system.
- Setting component parameters
- Checking the created mechanical system program.
- Editing (component copy, delete, cut, paste)

### [Procedure for Displaying the Component Edit Menu]



### [Screen with Component Edit Menu Displayed]



Function	Operation Description
(1) Component select	Select components from component select dialog box or side menu, and place in edit screen.
(2) Component delete	Delete is executed by designating the components to be deleted with the cursor frame, and then selecting the delete function from the pull-down menu or side menu.
(3) Component copy	Copy is executed by designating the components to be copied with the cursor frame, and then selecting the copy function from the pull-down menu or side menu.
(4) Component cut/paste	Cut and paste are executed by designating the components to be cut or pasted with the cursor frame, and then selecting the cut or paste function from the pull-down menu or side menu.
(5) Check	After the mechanical system program creation, checking can be executed by selecting the check function from the pull-down menu.
(6) Setting component parameters	By double clicking the right button on the components arranged in the edit screen, the parameter setting window is displayed to set the parameters.

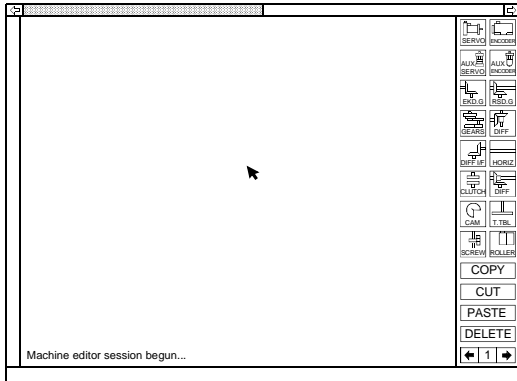


# 10. MECHANICAL SYSTEM PROGRAMS

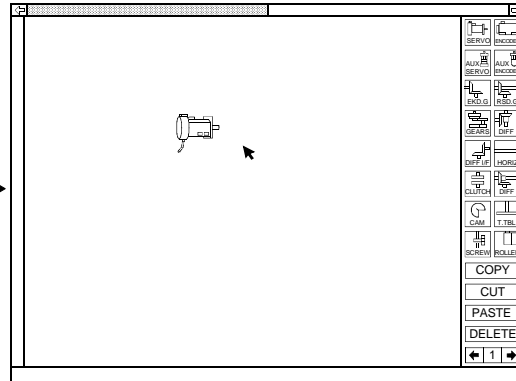
## 10.2.1 Component selection

Select the components for the mechanical system and arrange them in the edit screen.

**[Before Operation]**



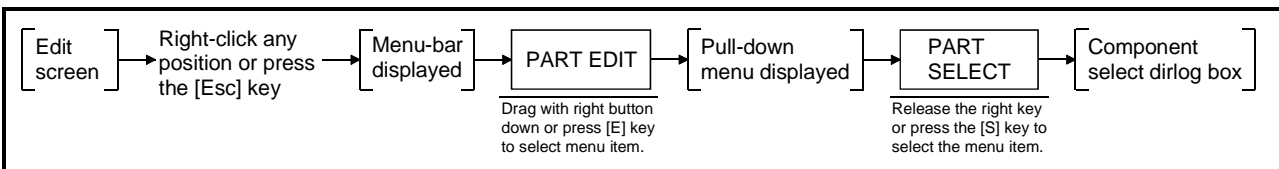
**[After Operation](A servomotor is selected)**



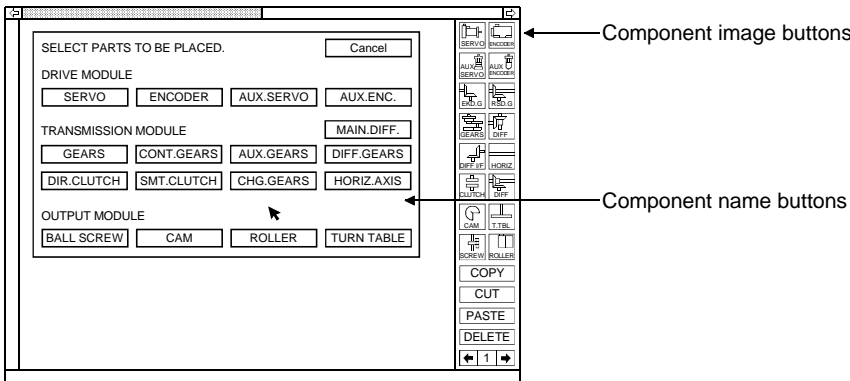
(1) Selecting from Component Select Dialog Box

Components can be selected and arranged from the component select dialog box.

**[Procedure for Displaying the Component Select Dialog Box]**



**[Component select dialog box]**



**[Display/Setting Content]**

Component name button Enters component selection.

**[Mouse Operation Procedure]**

**Component select**

- 1) Move the mouse cursor above the button with the component name to be selected, and click the left button.  
The component select dialog box closes.  
The message "Left button to repeat place operation" will be displayed in the system message display line, and the cursor frame will be displayed in the edit screen.

**Component select CANCEL**

- 1) To cancel a component selection, left-click on "Cancel".  
The system will return to the edit screen.

## 10. MECHANICAL SYSTEM PROGRAMS

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### Component arrangement

- 1) Move the cursor frame to the position where the component is to be arranged, and left-click.  
The component image of the component selected for that cursor position will be displayed.

<b>REMARK</b>
---------------

- (1) After component arrangement, the cursor frame continues to be displayed. To repeatedly place the same component, move the cursor frame to the arrangement position, and left-click.

### Component select END

- 1) When the right button is clicked, the cursor frame disappears from the screen, and component selection is ended.
- (2) Selection from side-menu  
Components can be arranged in the edit screen using the component image button in the side-menu.

### [Mouse Operation Procedure]

#### Component select

- 1) Move the mouse cursor over the component name of the component to be selected, and click the left button.  
The selected component image button is highlighted.  
The message "Left button to repeat place operation" will be displayed in the system message display line, and the cursor frame will be displayed in the edit screen.

### Component arrangement

- 1) Move the cursor frame to the position where the component is to be arranged, and left-click.  
The component image of the component selected for that cursor position will be displayed.

<b>REMARK</b>
---------------

- (1) After component arrangement, the cursor frame continues to be displayed. To repeatedly place the same component, move the cursor frame to the required position, and left-click.

### Component select END

- 1) When the right button is clicked, the cursor frame disappears from the screen, and component selection is ended.

<b>POINT</b>
--------------

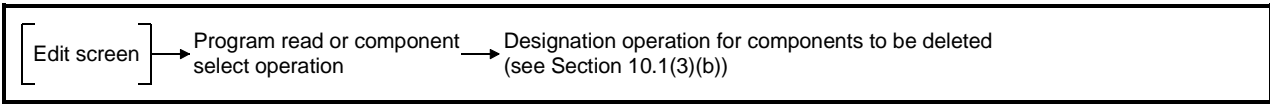
- (1) If grid display is ON  
Turn on the grip display allows components to be quickly positioned and arranged.

# 10. MECHANICAL SYSTEM PROGRAMS

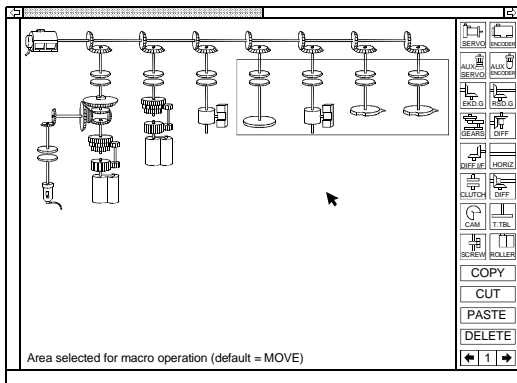
## 10.2.2 Deleting components

Delete components selected with the cursor frame.

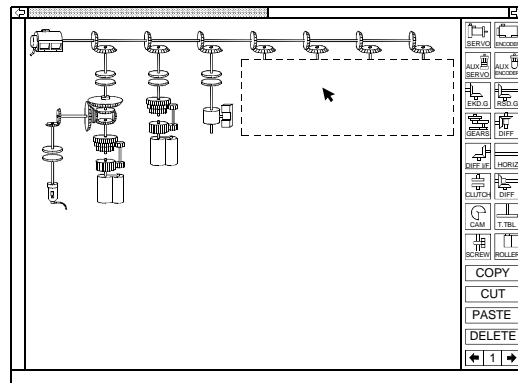
### [Procedure For Deleting Components]



### [Before Operation]



### [After Operation]



(1) Selection from menu-bar

### [Mouse Operation Procedure]

#### Selecting the DELETE function

- 1) Display the menu-bar by pressing the right button at any position on the edit screen.
- 2) While holding down the right button, move the mouse cursor over the "PART EDIT (E)" menu, and after the pull-down menu is displayed, release the right button at "DELETE (D)" position.  
The message "Click inside enclosed area to delete selected objects" will be displayed in the system message display line, and the components within the cursor frame are selected as the components to be deleted.

#### Delete ABORT

- 1) To ABORT a delete operation, click on the right button, or left-click outside of the cursor frame.

#### Delete EXECUTE and END

- 1) Right-click inside the cursor frame.  
The component inside the frame is deleted, and the delete function will end.

(2) Selection from side-menu

### [Mouse Operation Procedure]

#### Selecting the DELETE function

- 1) Move the mouse cursor to over "DELETE", and left-click.  
The message "Click inside enclosed area to delete selected objects" will be displayed in the system message display line, and the components within the cursor frame are set as components to be deleted.

#### Delete ABORT

- 1) To ABORT a delete operation, click on the right button, or left-click outside of the cursor frame.

#### Delete EXECUTE and END

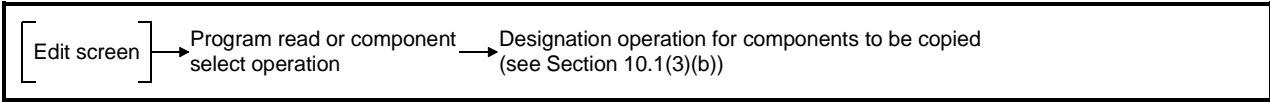
- 1) Right-click inside the cursor frame.  
The component inside the frame is deleted, and the delete function will end.

# 10. MECHANICAL SYSTEM PROGRAMS

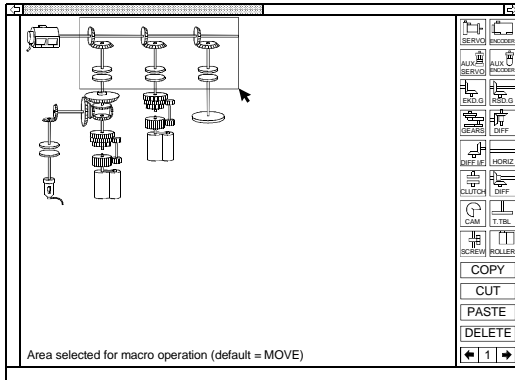
## 10.2.3 Component COPY

After designating the components to copy, copy by moving the cursor frame.

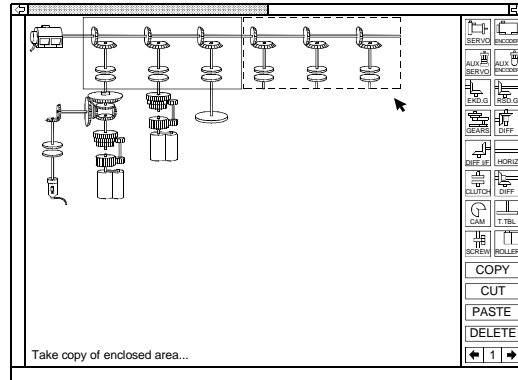
### [Procedure For Copying Components]



### [Before Operation]



### [After Operation]



(1) Selection from menu-bar

### [Mouse Operation Procedure]

#### Selecting the COPY function

- 1) Display the menu-bar by pressing the right button at any position on the edit screen.
- 2) While holding down the right button, move the mouse cursor over the "PART EDIT (E)" menu, and after the pull-down menu is displayed, release the right button at the "COPY (C)" position.  
The message "Take copy of enclosed area" will be displayed in the system message display line, and the components within the cursor frame will be set as components to be copied.

#### Copy ABORT

- 1) To ABORT a copy operation, click on the right button, or left-click outside of the cursor frame.

#### Copy EXECUTE

- 1) While holding down the left button within the cursor frame move the cursor frame to copy destination, and then release the left button.  
The component in the cursor frame will be copied.

### REMARK

- (1) The mouse cursor will continue to be displayed after copying.  
To repeatedly copy the same component, move the cursor frame to the copy designation, and left-click.

#### Copy END

- 1) When the right button is clicked, or the mouse left-clicked outside the cursor frame, the cursor frame disappears from the screen, and the copy function is ended.

### POINT

- (1) Only component images can be copied  
Parameters set for a component are not copied when the component image is copied.

## 10. MECHANICAL SYSTEM PROGRAMS

---

(2) Selection from side-menu

### [Mouse Operation Procedure]

#### **Designating the COPY function**

- 1) Move the mouse cursor over "COPY", and left-click.  
The message "Take copy of enclosed area" will be displayed in the system message display line, and the components within the cursor frame will be set as the copy source components.

#### **Copy ABORT**

- 1) To ABORT a copy operation, click on the right button, or left-click outside of the cursor frame.

#### **Copy EXECUTE**

- 1) While holding down the left button within the cursor frame move the cursor frame to copy destination, and then release the left button.  
The component in the cursor frame will be copied.

<b>REMARK</b>
---------------

- (1) The mouse cursor will continue to be displayed after copying.  
To repeatedly copy the same component, move the cursor frame to the copy designation, and left-click.

#### **Copy END**

- 1) When the right button is clicked, or the mouse left-clicked outside the cursor frame, the cursor frame disappears from the screen, and the copy function is ended.

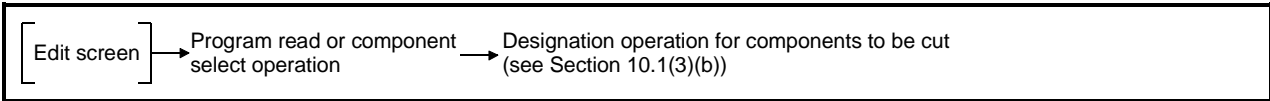
# 10. MECHANICAL SYSTEM PROGRAMS

## 10.2.4 Component cut-and-paste

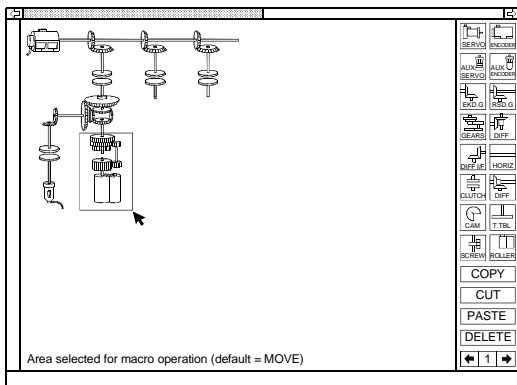
Designated components can be cut (cleared from the edit screen and stored in system buffer), or pasted (components stored in the system buffer re-displayed).

(1) Component cut

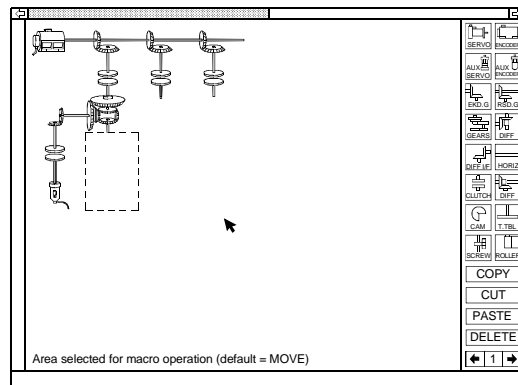
### [Procedure for Cutting Components]



### [Before Operation]



### [After Operation]



(a) Selection from menu-bar

### [Mouse Operation Procedure]

#### Selecting, executing, and ending the CUT function

- 1) Display the menu-bar by clicking the right button at any position on the edit screen.
- 2) While holding down the right button, move the mouse cursor over the "PART EDIT (E)" menu option, and after the pull-down menu is displayed, release the right button at the "CUT (X)" position.  
The components within the cursor frame are cleared from the screen (stored in the system buffer), and the CUT function is ended.

(b) Selection from side menu

### [Mouse Operation Procedure]

#### Selecting, executing, and ending the CUT function

- 1) Move the mouse cursor over "CUT", and left-click.  
The component within the cursor frame is cleared (and stored in the system buffer), and the CUT function is ended.

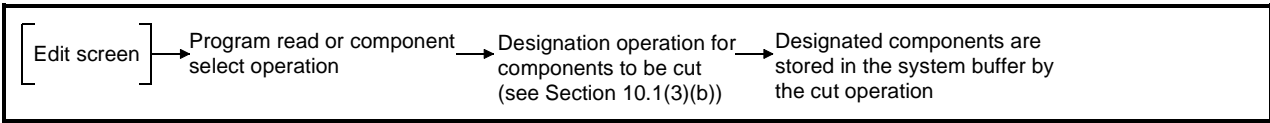
### POINTS

- (1) Only 1 component (or group) can be stored in the system buffer. Therefore, when a separate component (or group) is cut, the previous component (or group) is overwritten.
- (2) The cut component remains stored in the system buffer if the page is switched. The component can be re-displayed on multiple pages by pasting the component.

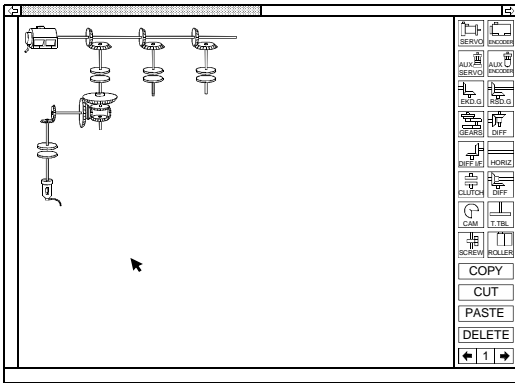
# 10. MECHANICAL SYSTEM PROGRAMS

## (2) Component paste

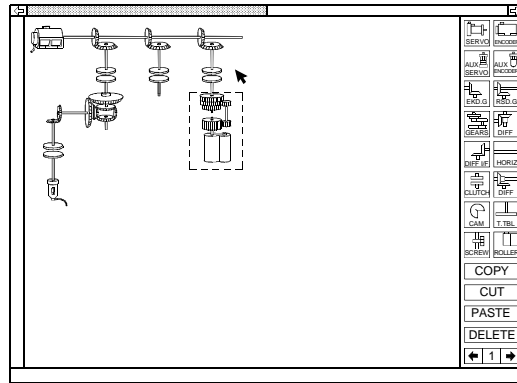
### [Procedure for Pasting Components]



### [Before Operation]



### [After Operation]



(a) Selection from menu-bar

### [Mouse Operation Procedure]

#### Selecting the PASTE function

- 1) Display the menu-bar by clicking the right button at any position on the edit screen.
- 2) While holding down the right button, move the mouse cursor over the "PART EDIT (E)" menu option, and after the pull-down menu is displayed, release the right button at the "PASTE (V)" position.  
The message "Left button to repeat place operation" will be displayed in the system message display line, and the cursor frame for paste positioning will be displayed in the edit screen.

#### Paste ABORT

- 1) To abort a paste operation, click the right button.

#### Paste EXECUTE and END

- 1) Move the cursor frame to the paste position, and then release the left button.  
The cut component (which was stored in the system buffer) will be redisplayed.

(b) Selection from side menu

### [Mouse Operation Procedure]

#### Selecting the PASTE function

- 1) Move the mouse cursor over "PASTE", and left-click.  
The message "Left button to repeat place operation" will be displayed in the system message display line, and the cursor frame awaiting paste positioning will be displayed in the edit screen.

#### Paste ABORT

- 1) To abort a paste operation, click the right button.

#### Paste EXECUTE and END

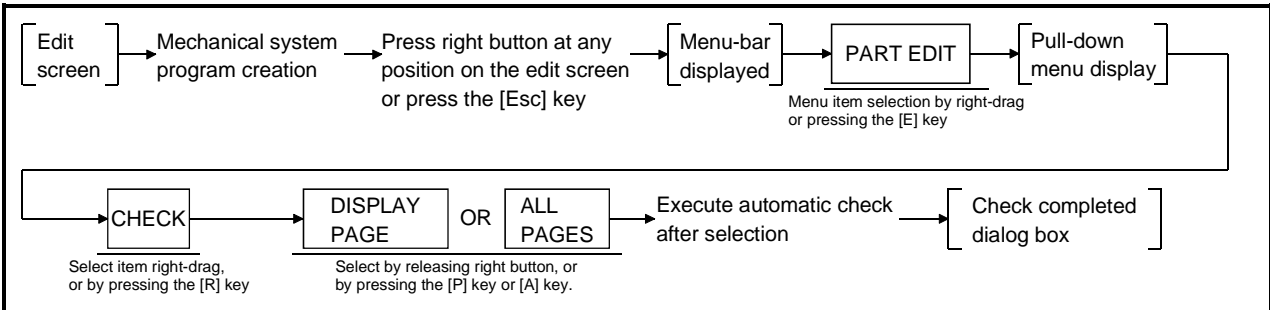
- 1) Move the cursor frame to the paste position, and then release the left button.  
The cut component (which was stored in the system buffer) will be redisplayed.

# 10. MECHANICAL SYSTEM PROGRAMS

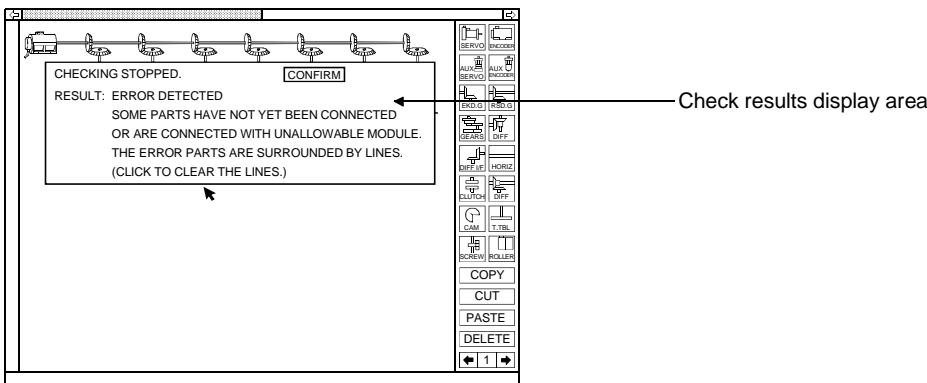
## 10.2.5 Checking

Checks the component connection status after creation of mechanical system program.

### [Procedure For Checking]



### [Check completed dialog box] (Error Found)



### [Display/Setting Content]

**Check results display area** During a normal operation check, the message "ALL PARTS CORRECTLY CONNECTED." will be displayed. If the operation check found an error, the error description is displayed. (See Chapter 20.)

### [Mouse Operation Procedure]

**Dialog box CLOSE** 1) To close the dialog box, left-click "CONFIRM".  
 If an error was found the component for which the error occurred is enclosed in a frame after closing the dialog box.  
 The check is aborted when an error is detected.  
 After correcting the error, execute another check to confirm that no errors remain in any of the checked items

#### POINT

If multiple errors are detected, when a check of all pages is performed, the page with the lowest page number among those for which errors are detected with respect to the items checked is displayed.



## 10. MECHANICAL SYSTEM PROGRAMS

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(1) Error check order

The order in which the items are checked is shown below.

**Display Page Check**

1. Check of number of mechanical modules set on displayed page
2. Component presence/absence
3. Check of unconnected components
4. Check of number of virtual servo motors
5. Check of number of blocks
6. Parameter setting presence/absence
7. Check of mechanical module arrangement
8. Check of number of modules in block
9. Check whether designated amplifier is set as "USE" in the system settings.
10. Check of setting unit

**All-page Check**

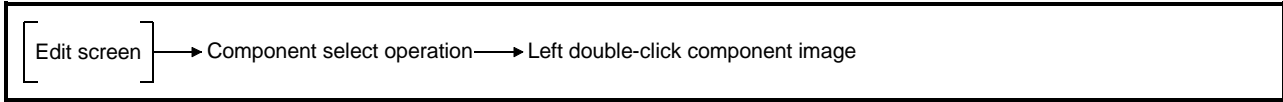
1. Check of number of mechanical modules set in all pages
2. Component presence/absence
3. Check of unconnected components
4. Check of number of virtual servo motors
5. Check of number of blocks
6. Parameter setting presence/absence
7. Check whether designated amplifier is set as "USE" in the system settings.
8. Check of setting unit
9. Check of mechanical module arrangement
10. Check of number of mechanical modules in block
11. Check of utilization source
12. Check of clutch mode, device
13. Check of multiple use of same device
14. Check of sub-system name
15. Check of control mode of cam, cam data

# 10. MECHANICAL SYSTEM PROGRAMS

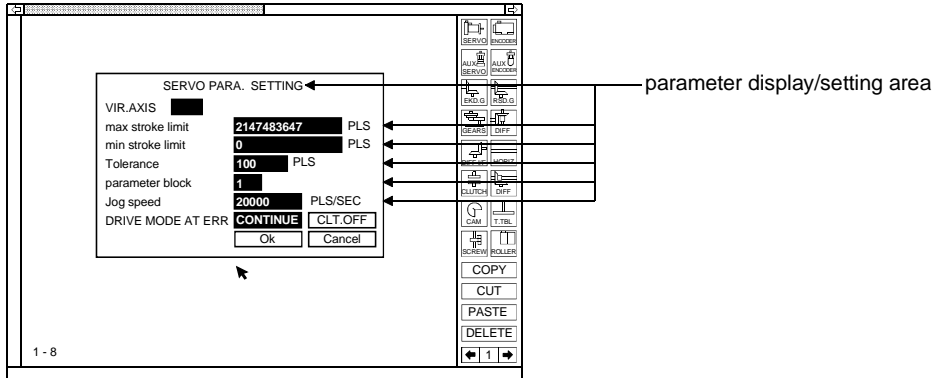
## 10.2.6 Set component parameters

Sets parameters for designated components.

### [Procedure for Component Parameter Setting]



### [Parameter setting dialog box] (For Servo Motor)



### [Display/Setting Content]

**Parameter display/setting area** The default parameter value or the designated parameter value is shown here.

### [Mouse Operating Procedure]

**Setting item selection** 1) Move the mouse cursor to the parameter display or setting area, and left-click. The cursor is displayed to the right of the displayed numeric value or device, and the setting range of the selected item is displayed in the system message display line.

If the numeric value or device is not displayed, the cursor is shown at the left of the parameter display or setting area.

**Parameter setting** 1) Input the parameters using the numeric or character keys, and then either right-click or press the [Enter] key.  
 2) To change the displayed numeric value or device, use the [Back Space] key to delete, and then designate the numeric value or device.  
 3) When a value outside the applicable range is designated, the message "Input out-of-range." will be displayed in the system message display line. In this case, the parameter setting should be redesignated within the prescribed range.

**Setting END** 1) Left-click on the "Ok".  
 The settings are entered, and the system returns to the edit screen. If an error is detected, an error dialog box indicates that an error occurred in the parameter settings. Left-click on "CONFIRM", and redesignate the parameter setting within the prescribed range.

**Setting ABORT** 1) Left-click on "Cancel".  
 The setting content is invalidated, and the system returns to the edit screen.

# 10. MECHANICAL SYSTEM PROGRAMS

---

## POINTS

(1) Clutch parameter setting

The component image (direct clutch or smoothing clutch) display is switched according to the smoothing constant.

Smoothing constant

0: Direct clutch image

Not 0: Smoothing clutch image



Direct  
clutch  
image



Smoothing  
clutch  
image

(2) Components allowing re-use of parameters

The auxiliary servomotor and auxiliary encoder can utilize the parameters of servomotors and synchronized encoders connected to virtual main shafts.

However, if these existing parameters are utilized, the parameter content cannot be confirmed or modified by selecting the auxiliary servo motor or auxiliary encoder.

(3) Components not requiring parameter settings

Differential gears and horizontal shafts do not require a parameter setting.

## 10. MECHANICAL SYSTEM PROGRAMS

### 10.3 Display

Displays edit screen changes and other information.

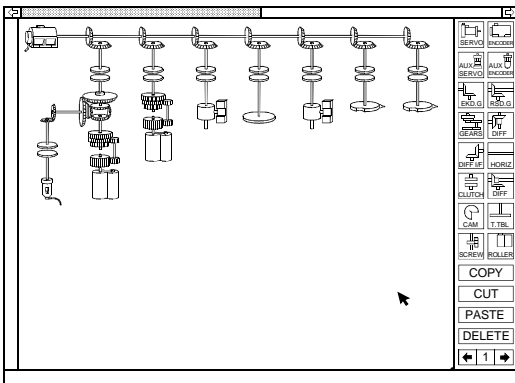
#### 10.3.1 Grid ON/OFF

Turns the grid screen ON/OFF.

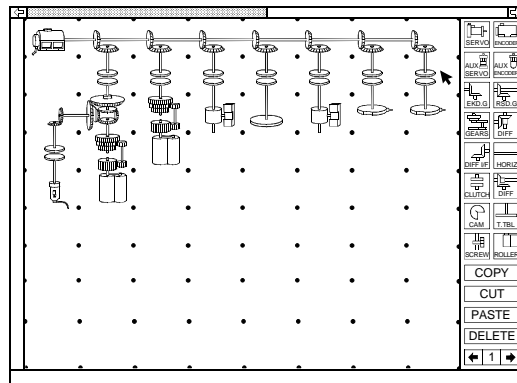
Switching the grid ON before selecting components enables accurate and fast arrangement and connection of components.

Components arranged in desired positions when the grid is OFF are repositioned within the grid when the grid is turned ON.

**[Grid OFF Edit Screen]**



**[Grid ON edit screen]**



#### **[Mouse Operation Procedure]**

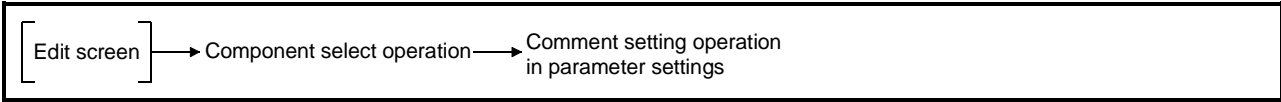
- Switch grid ON or OFF**
- 1) Click the right button at any position on the edit screen to display the menu-bar.
  - 2) Hold down the right button and move the mouse cursor over "DISPLAY (D)", display the pull-down menu, and release the right button on "GRID (G) ON/OFF". The setting toggles between grid ON and grid OFF each time "GRID (G) ON/OFF" is selected.

# 10. MECHANICAL SYSTEM PROGRAMS

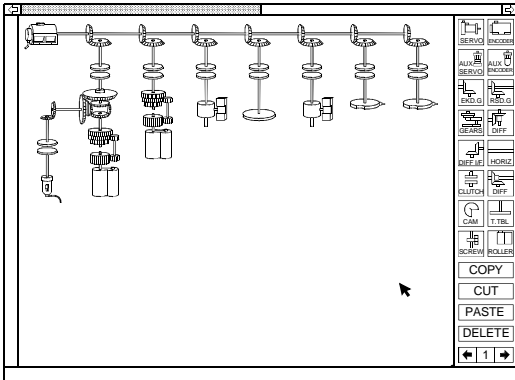
## 10.3.2 Comment display

Switches between displaying or not displaying output components.

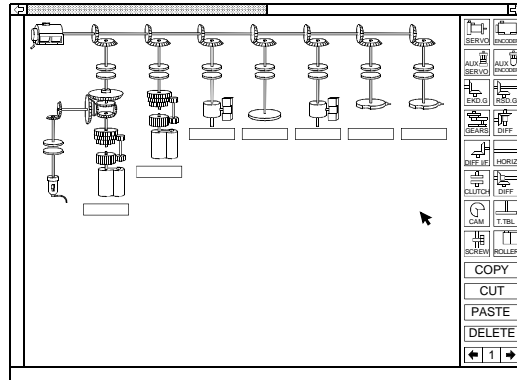
### [Procedures for Comment Display]




### [Before Display]



### [After Display]



(See enlarged figure for  detail.)

### [Mouse Operation Procedure]

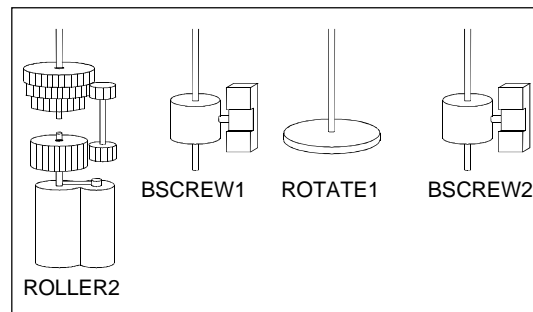
Switches between displaying or not displaying output components

- 1) Press the right button at any position on the edit screen to display the menu-bar.
  - 2) Hold down the right button and move the mouse cursor over "DISPLAY (D)" to display the pull-down menu, and release the right button on "COMMENT DISP. (C) ON/OFF".
- The setting toggles between comment display and comment non-display each time "COMMENT DISP. (C) ON/OFF" is selected.

### REMARKS

- (1) Comments are displayed reduced in size.
- (2) Up to 7 characters are displayed.

### [Enlarged figure]



# 10. MECHANICAL SYSTEM PROGRAMS

## 10.3.3 ID No. display and ID numbering

Switches between ID No. display and other display formats for components on the edit screen.

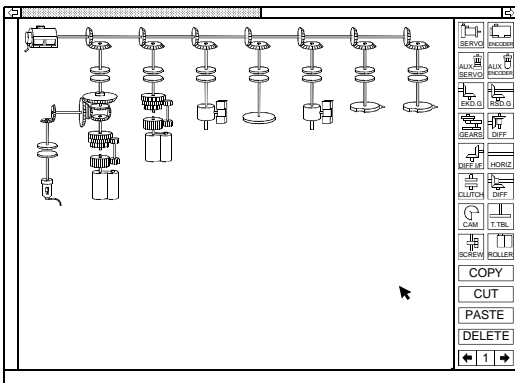
### (1) ID No. display

Switches between displaying or not displaying component ID Nos.

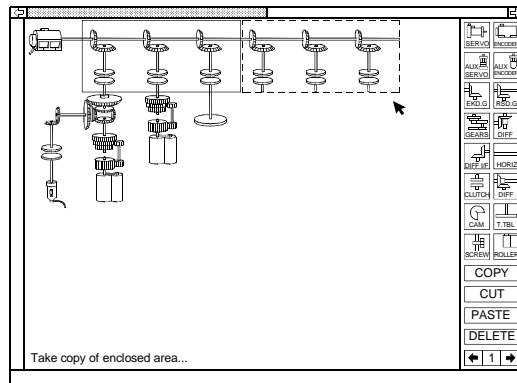
#### [Procedure For ID No. Display]



#### [Before Display]



#### [After Display]



#### [Mouse Operation Procedure]

Switches between displaying or not displaying component ID Nos.

- 1) Press the right button at any position on the edit screen to display the menu bar.
- 2) Hold down the right button and move the mouse cursor over "DISPLAY (D)" to display the pull-down menu, and release the right button on "ID DISPLAY (I) ON/OFF".

The setting toggles between ID No. display and ID No. non-display.

#### REMARK

- (1) The ID Nos. are shown simultaneously on the screen in the order the components were connected.  
If an ID renumber operation was conducted previously, the ID numbers are displayed in the display format designated in the ID renumber operation.

#### POINTS

- (1) The ID Nos. are attached to components when they are selected. Consequently, the component ID No. is removed when a component is deleted or cut. If an ID No. is removed, the number of components on the edit screen is less than the final ID No. number. Therefore, conduct an ID renumber operation (Section 10.3.3(2)) after a component is deleted or cut to make the number of components on the edit screen the same as the ID No. final number.
- (2) On an IBM PC, the ID No. display is color-coded according to parameter setting conditions.
  - When parameter is designated for a component..... Green display
  - When no parameter is designated for a component..... Red display

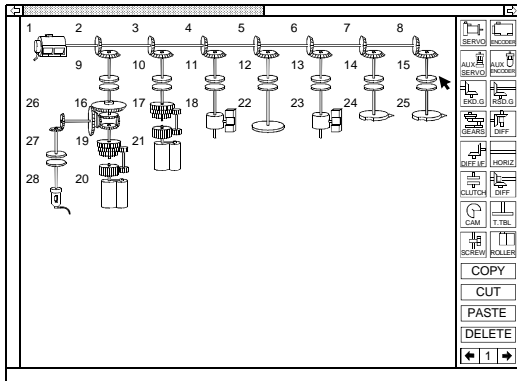
# 10. MECHANICAL SYSTEM PROGRAMS

- (2) ID renumbering  
Switches and rearranges the ID No. display format.

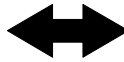
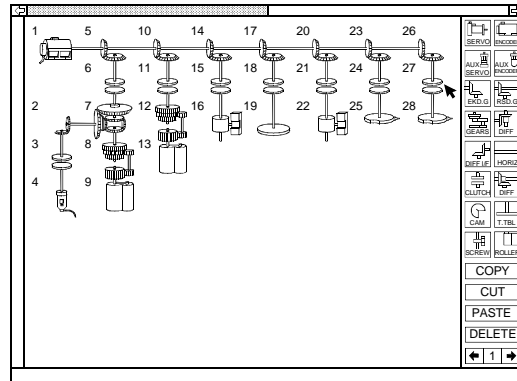
## [Procedure for ID Renumbering]



### [Before Display](in number order)



### [After Display](vertical order)



## [Mouse Operation Procedure]

### ID No. EXECUTE

- 1) Press the right button at any position on the edit screen to display the menu-bar.
- 2) Hold down the right button and move the mouse cursor over "DISPLAY (D)".
- 3) After displaying the pull-down menu, move the mouse cursor over "ID RENUMBER (D)", and the right-hand button at the "NUMBERING (N)" or "VERTICAL (X)" or "HORIZONTAL (Y)" position.

The whole screen simultaneously switches to the designated ID No. display format.

- NUMBERING ..... Renumbers the currently displayed ID Nos. in ascending order starting from 1.
- VERTICAL..... Assigns numbers from the top left of the screen moving downwards in ascending order starting from 1.
- HORIZONTAL ..... Assigns numbers from the top left of the screen moving to the right in ascending order starting from 1.

### POINT

- (1) After executing "VERTICAL" or "HORIZONTAL", ID No. 1 is at the top-left of the first page.

## 10. MECHANICAL SYSTEM PROGRAMS

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### 10.3.4 Screen re-display

Re-display the screen if the edit screen does not return to a clean condition. Operate this function if components are missing from the edit screen display, for example.

#### **[Mouse Operation Procedure]**

#### **Edit screen**

1) Push the right button at any position on the edit screen to display the menu-bar.

#### **Re-display**

2) Hold down the right button and move the mouse cursor over "DISPLAY (D)" to display the pull-down menu, and release the right button at the "SCREEN RE-DISPLAY (R)" position.

The edit screen is re-displayed.

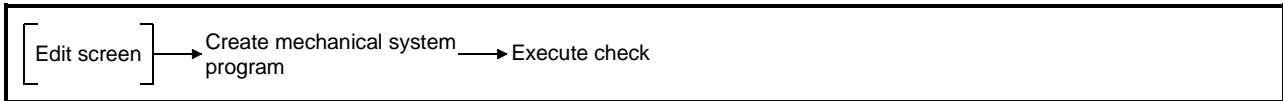


# 10. MECHANICAL SYSTEM PROGRAMS

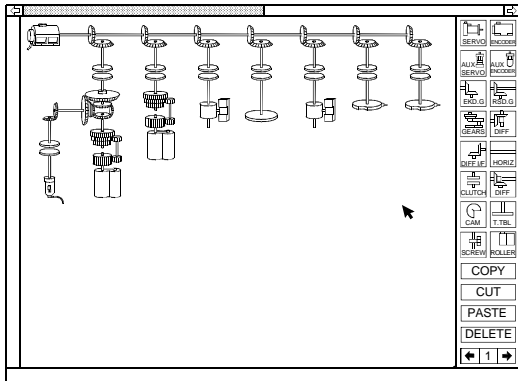
## 10.3.5 Error component highlight display

Switches between highlighting or not highlighting the components where errors were detected if errors are detected by the check function.

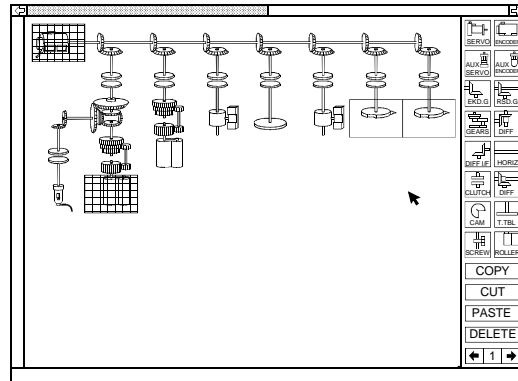
### [Procedure for Highlighting Display of Error Components]



### [Before highlighting display]



### [After highlighting display]



### [Mouse Operation Procedure]

#### Switching between highlighting and not highlighting error components

- 1) Push the right button at any position on the edit screen to display the menu-bar.
  - 2) Hold down the right button and move the mouse cursor over "DISPLAY (D)" to display the pull-down menu, and release the right button at the "ERR. PART REV. (E) ON/OFF" position.
- The setting toggles between highlighting and not highlighting the error component display.

#### POINT

- (1) If the error component highlighting is turned ON before the check function is executed, the error components are highlighted immediately after the check.

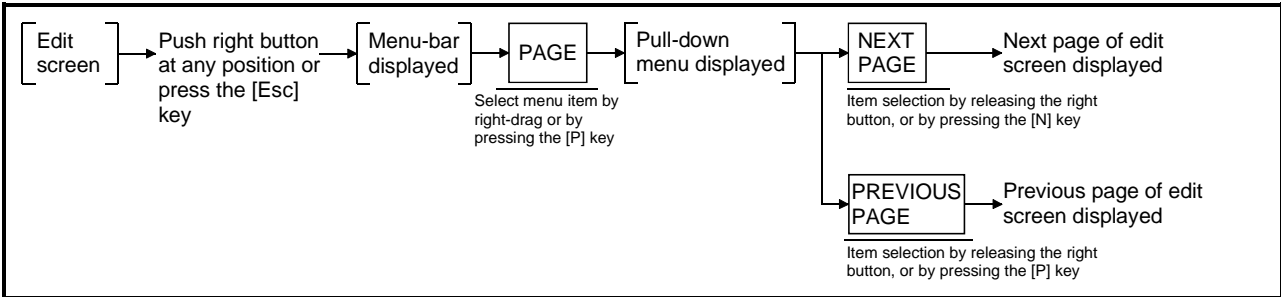
# 10. MECHANICAL SYSTEM PROGRAMS

## 10.4 Switching between Mechanical System Program Pages

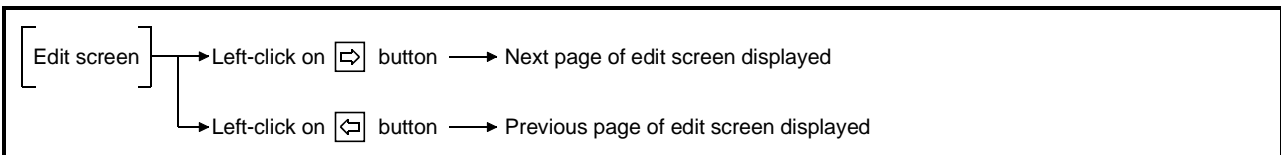
Switches to the next or previous page of the edit screen and allows a desired page to be displayed.

(1) Switching to next page or previous page

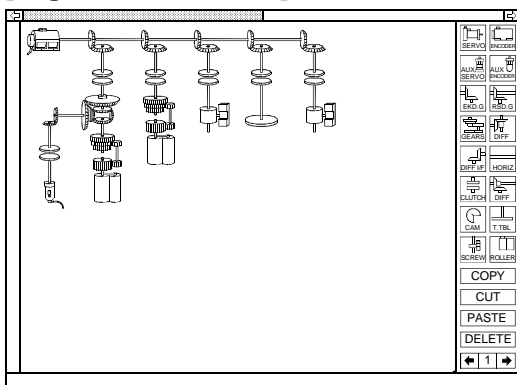
### [Procedure for Switching to Next Page or Previous Page] (Selection from menu-bar)



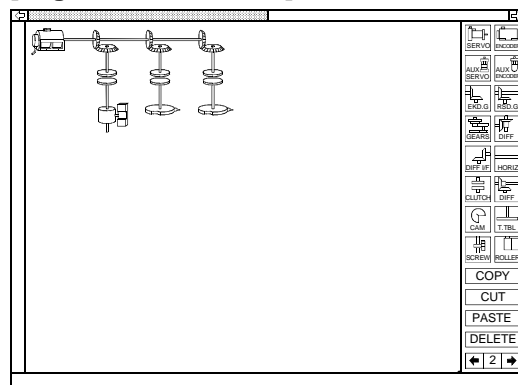
### [Procedure For Next Page/Previous Page Switching] (Selection from side-menu)



### [Page 1 of edit screen]



### [Page 2 of edit screen]



### REMARK

(1) After the page is switched, the number displayed in the page number button under the side-menu switches to the new page number.

# 10. MECHANICAL SYSTEM PROGRAMS

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<b>POINTS</b>		
(1)	Switching to next page If the currently displayed page is the final page, the system switches to the first page.	
(2)	Switching to previous page If the currently displayed page is the first page, the system switches to the final page.	
(3)	Final page number The final page is shown in the table below.	
	<b>A17[ J/A273UH (8-axis specification)</b>	<b>A273UH (32-axis Specification)</b>
Page	8	32

# 10. MECHANICAL SYSTEM PROGRAMS

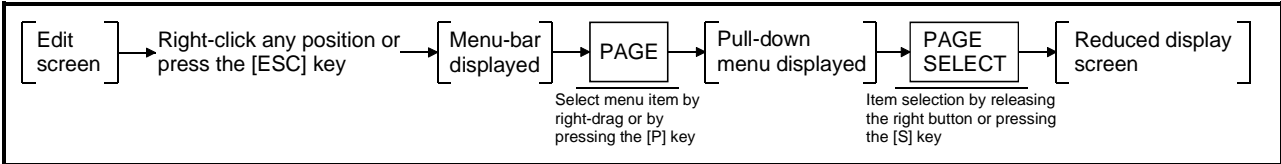
## (2) Page selection switching

### (a) For A17[ ]/A273UHCPU (8-axis specification)

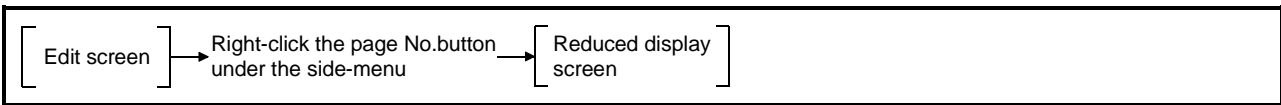
When the page selection function is selected, 8 pages of component connection diagrams are displayed in reduced form.

The pages to be displayed on the reduced display screen can be selected.

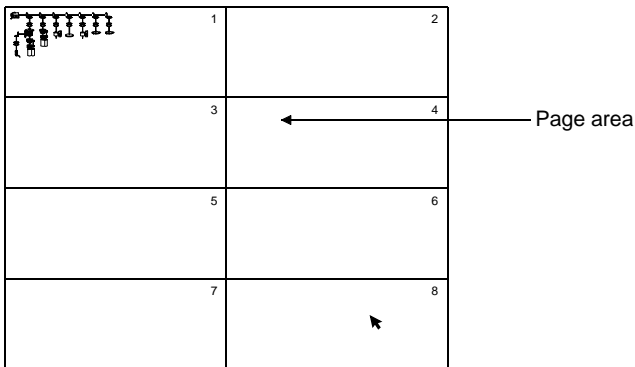
#### [Procedure for Displaying Reduced Display Screen] (Selection from menu-bar)



#### [Procedure for Displaying Reduced Display Screen] (Selection from side-bar)



#### [Reduced display screen]



#### [Display/Setting Content]

**Page area** The reduced screen for each page is shown.

#### [Mouse Operation Procedure]

- Selection of display page**
- 1) Left-click in the page area of the displayed page  
 The edit screen for the selected page is shown.  
 To abort the selection operation, right-click at any position.  
 The system returns to the previously displayed edit screen.

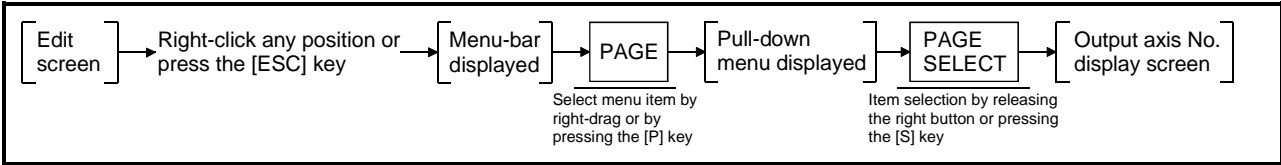
# 10. MECHANICAL SYSTEM PROGRAMS

(b) For A273UHCPU (32-axis specification)

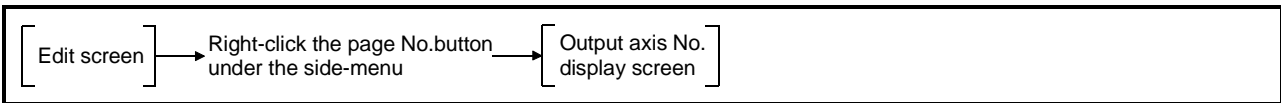
When the page selection function is selected, 32-pages of output shaft numbers are highlighted.

The displayed pages can be selected from the output axis No. display screen.

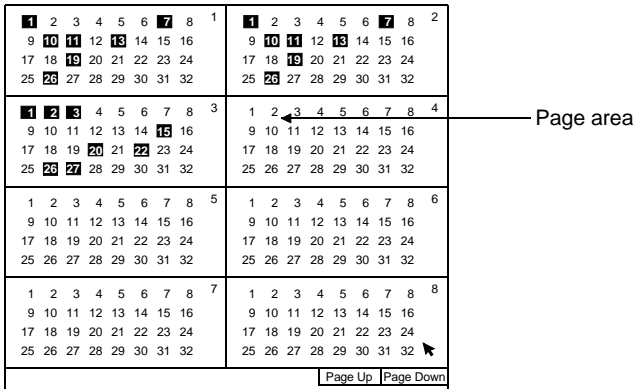
## [Procedure for Displaying Reduced Display Screen] (Selection from menu-bar)



## [Procedure for Displaying Reduced Display Screen] (Selection from side-menu)



## [Output axis No. display screen]



## [Display/Setting Content]

**Page area** The output axis No. designated for each page is highlighted.

## [Mouse Operation Procedure]

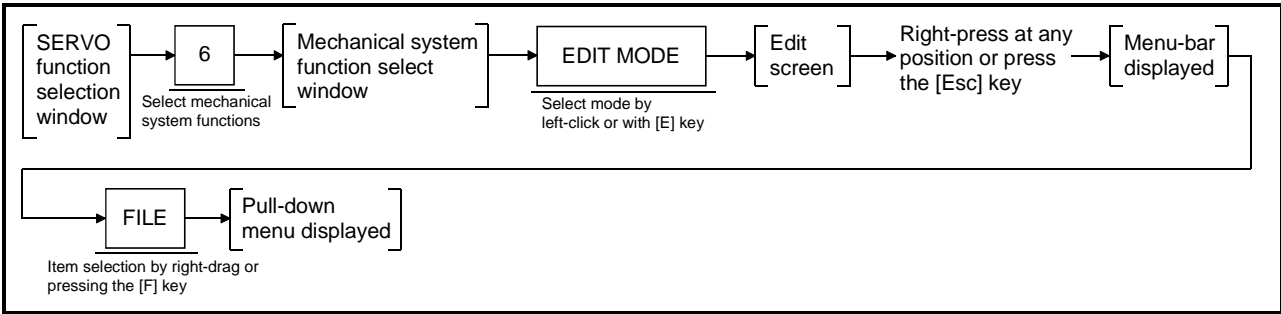
**Selection of display page** 1) Left-click within the page area of the displayed page.  
 The edit screen of the selected page is shown.  
 To abort the selection operation, right-click at any position.  
 The system returns to the previously displayed edit screen.

**Switching displayed pages** 1) To display pages after the page being displayed, left-click on "Page Up".  
 To display pages before the page being displayed, left-click on "Page Down".

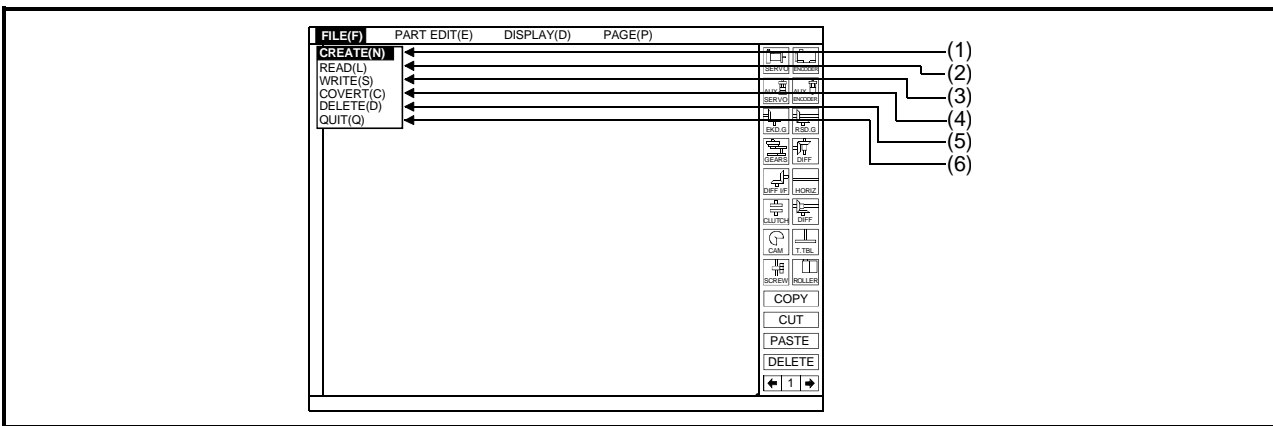
# 10. MECHANICAL SYSTEM PROGRAMS

## 10.5 File Maintenance

Conducts operations on data being edited or already created files.



### [Edit screen]



Function	Operation Description
<b>(1) New</b>	Release the right button on CREATE (N) in the pull-down menu, or press the [N] key. A dialog box prompts whether to clear the edited data from memory. To execute a CLEAR operation, left-click on "Yes". The data is cleared, and the edit screen returns to the initial screen condition. To cancel the CLEAR operation, left-click on "No". The data is not cleared, and the system returns to the edit screen.
<b>(2) Read</b>	Release the right button on READ (L) in the pull-down menu, or press the [L] key. The data written to the file can be read in the edit screen.
<b>(3) Write</b>	Release the right button on WRITE (S) in the pull-down menu, or press the [S] key. Data being edited (in memory) is written to the file. If the file already exists, a dialog box prompts whether to overwrite the file.
<b>(4) Conversion Write</b>	Release the right button on CONVERT (C) in the pull-down menu, or press the [C] key. Data created with the mechanical system editing is converted into data executable in the servo system CPU. (See Section 10.5 (1).) The file created after conversion is "SVMCHPRM.BIN", or "SVCAMPRM.BIN".

## 10. MECHANICAL SYSTEM PROGRAMS

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### (5) Delete

Release the right button on DELETE (D) in the pull-down menu, or press the [D] key.

A dialog box prompts whether to delete the file.

To conduct a DELETE operation, left-click on "Yes".

To cancel the DELETE operation, left-click on "No".

The file is not deleted, and the system returns to the edit screen.

### (6) End

Release the right button on QUIT (Q) in the pull-down menu, or press the [Q] key.

The edit screen is closed, and the system returns to the mechanical system function select window.

If the edit data has not been written, a dialog box prompts whether to clear the edited data from memory.

To execute a CLEAR operation, left-click on "Yes". The data is cleared, and the system returns to the mechanical system function selection window.

To cancel a CLEAR operation, left-click on "No".

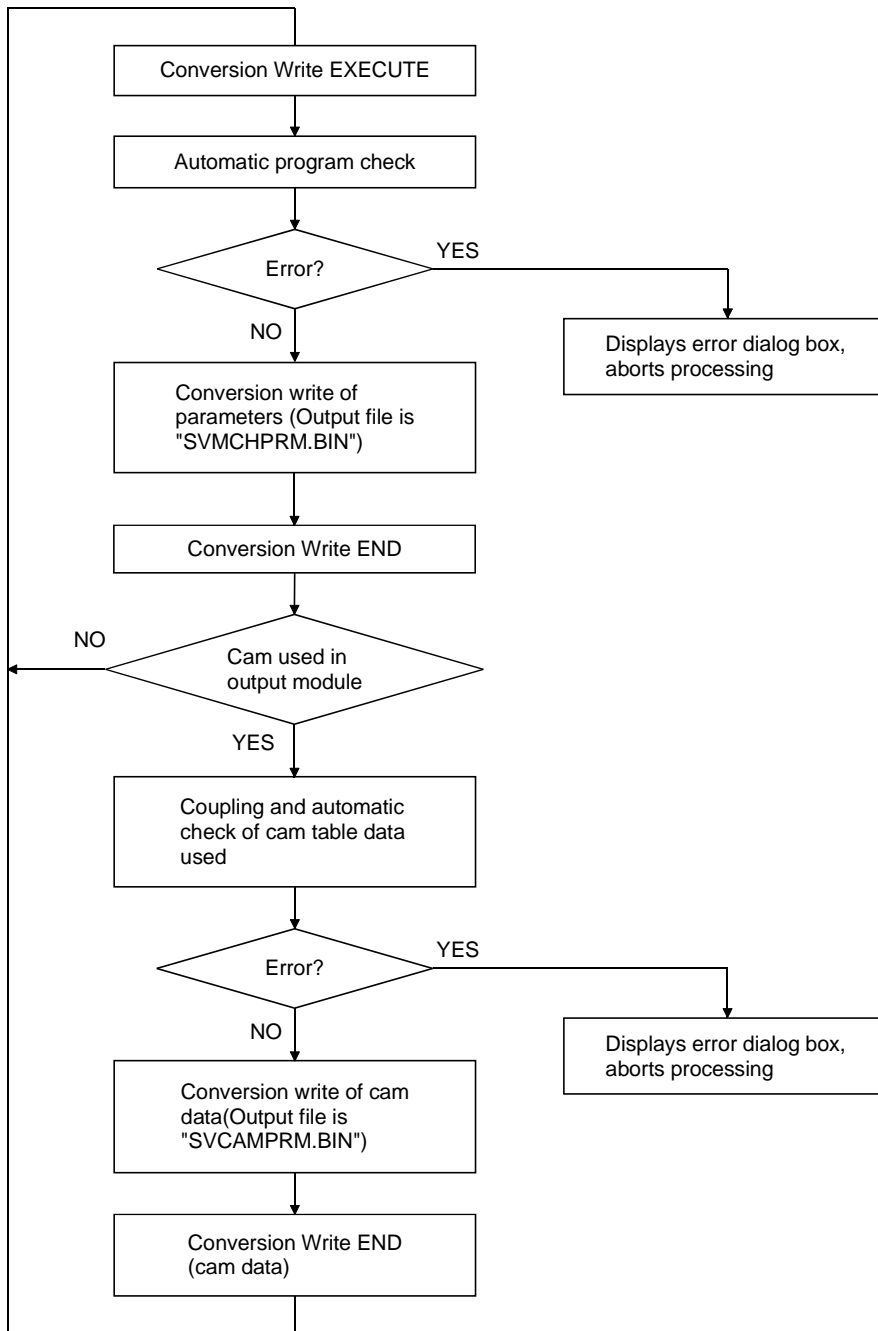
The data is not cleared, and the system returns to the edit screen.

POINT
Mechanical system program checking during a write operation. No mechanical system program check is conducted when a write operation is executed. Check the mechanical system program with the Check function before writing. An automatic check (all-pages) of the mechanical system program is automatically conducted during a conversion write operation.

# 10. MECHANICAL SYSTEM PROGRAMS

## (1) Outline flowchart of conversion write

An outline flowchart of the entire conversion write operation is shown below.





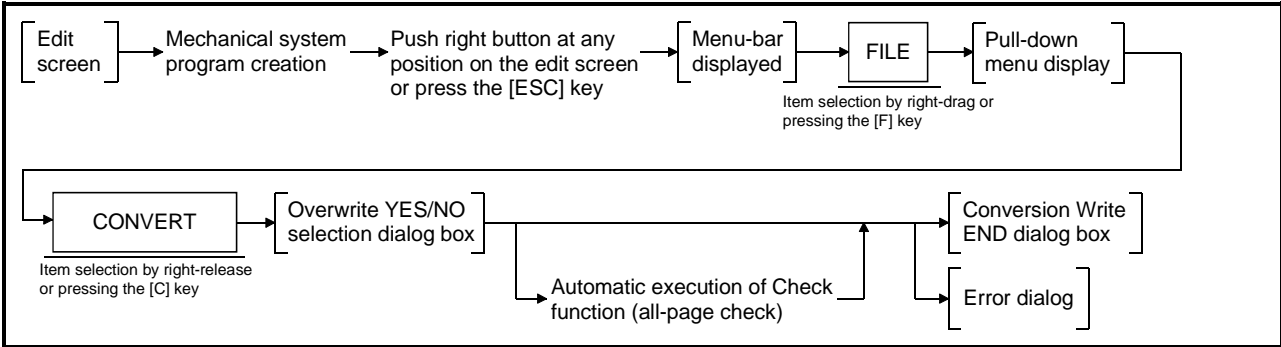
# 10. MECHANICAL SYSTEM PROGRAMS

## (2) Conversion write of mechanical system programs

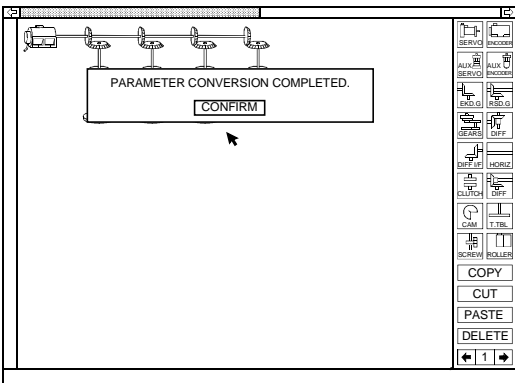
Data created in the mechanical system editing mode is converted to data executable in the servo system CPU.

If a cam is used in the output module, the cam parameters designated in the mechanical system editing mode and the cam data created in CAMPE is coupled, and converted to data executable in the servo system CPU.

### [Procedure for Conversion Write]



### [Conversion Write END dialog box] (During normal operation)



### [Mouse Operation Procedure]

#### Dialog box CLOSE

- 1) To close the dialog box, left-click on "CONFIRM".

If a cam is designated in the output module, after closing the dialog box, a window is displayed to input the cam data name used for the conversion write operation on the cam data.

#### Error dialog box CLOSE

- 1) An error dialog box is displayed if an error is detected during the Conversion Write operation.

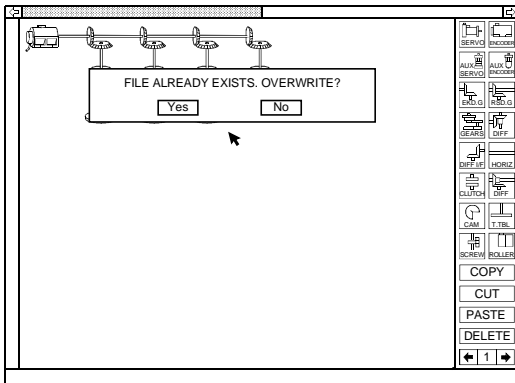
To close the error dialog box, check the error contents, and then left-click on "CONFIRM". (See Chapter 20.)

### POINT

- (1) Conversion write creates a file executable in the servo system CPU (mechanical system parameter file :SVMCHPRM.BIN).

# 10. MECHANICAL SYSTEM PROGRAMS

## When a Mechanical System Parameter File Already Exists [Overwrite YES/NO Dialog Box]



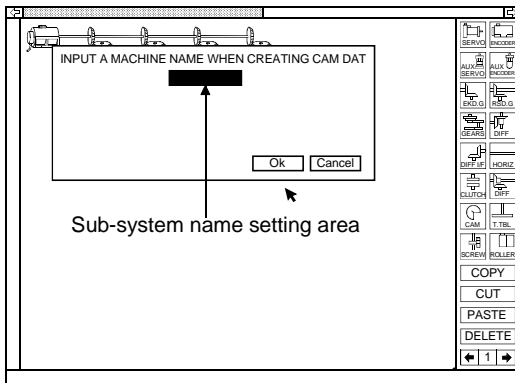
### [Mouse Operation Procedure]

#### Overwriting

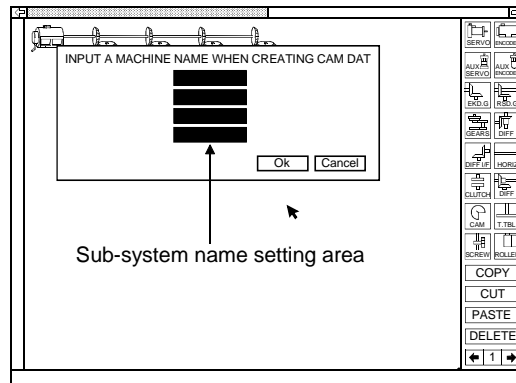
- 1) When executing a Conversion Write, if a mechanical system parameter file (a file created after conversion) already exists, a dialog box prompts whether to overwrite the existing file.  
To overwrite the file, left-click on "Yes".  
The Conversion Write operation is executed.  
To cancel the operation, left-click on "No".  
The Conversion Write operation is cancelled, and the system returns to the edit screen.

## When a Cam is Used in the Output Module

### [Cam Data Name Input Window] (For A171S/A273UHCPU 8-axis specification)



### (When the A273UHCPU (32-axis specification) is used)



### [Display/Setting Content]

#### Sub-system name setting area

The sub-system name is designated for the CAMPE where the cam data designated in the cam parameter (use cam No.) is stored.

### [Mouse Operation Procedure]

#### Setting of sub-system name

- 1) Use either numbers or characters to input the sub-system name for the cam data to use.  
Up to 4 sub-system names can be input for the A273UHCPU (32-axis specification).

#### Selection of cam data Conversion Write EXECUTE

- 1) To execute a cam data Conversion Write, left-click on "Ok".  
In cases where a cam axis data file already exists, the overwrite execute YES/NO dialog box will be displayed.

#### Aborting cam data Conversion Write

- 1) To cancel a cam data Conversion Write operation, left-click on "Cancel".  
The system will return to the edit screen.

## 10. MECHANICAL SYSTEM PROGRAMS

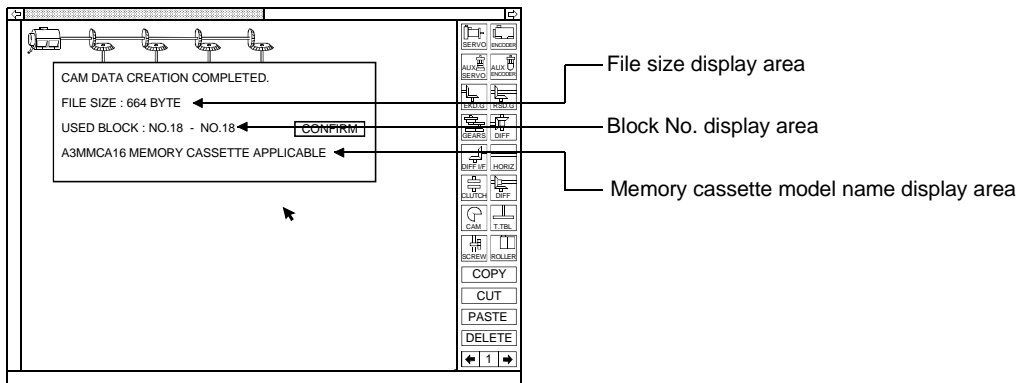
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<b>POINT</b>
--------------

Cam data Conversion Write creates a file executable in the servo system CPU (cam shaft data files: SVCAMPRM.BIN, SVCAMPR2-4.BIN).
---

## 10. MECHANICAL SYSTEM PROGRAMS

### [Cam data Conversion Write END dialog box] (During normal operation)



\*The screen is that for when A273UHCPU is used. When A171SCPU is in use, this dialog box is not displayed.

### [Display/Setting Content]

**File size display area** File size of cam axis data file(files created by conversion) is displayed.

**Block No. display area** The memory cassette block No. necessary for storing the cam data file contents is displayed.  
Data is stored in 16 kbyte units from block Nos. 10 - 12.

**Memory cassette model name display area** Model names of memory cassettes applied in cam axis data file size are displayed.

### [Mouse Operation Procedure]

**Dialog box CLOSE** 1) To close the dialog box, left-click on "CONFIRM".

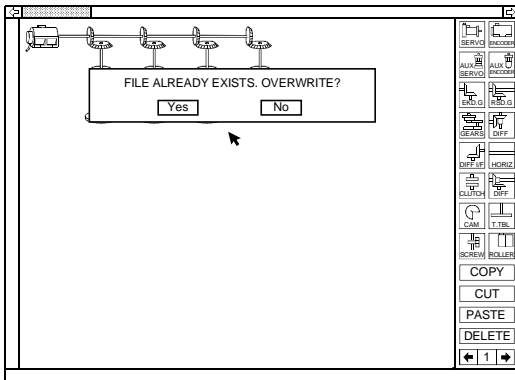
**Error dialog box CLOSE** 1) Automatic checking takes place at time of Conversion Write, and when errors are detected, an error dialog box is displayed.  
To close the error dialog box, check the error contents, and then left-click on "CONFIRM". (See Chapter 20.)

## 10. MECHANICAL SYSTEM PROGRAMS

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### When a Cam Axis Data File Already Exists

#### [Overwrite YES/NO Dialog Box]



#### [Mouse Operation Procedure]

##### Overwriting

- 1) When executing a conversion write, if a cam-shaft data file (a file created after conversion) already exists, a dialog box prompts whether to overwrite the existing file.  
To overwrite the file, left-click on "Yes".  
The conversion write operation is executed.  
To cancel the operation, left-click on "No".  
The conversion write operation is cancelled, and the system returns to the edit screen.

# 11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION

## 11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION

The servo PC mode is a mode to write, read, and verify the data listed below when the servo system CPU is connected to a personal computer.

- All servo data (positioning data, servo programs)
- Positioning data (system set data, axis data, parameter block data, limit switch output data)
- Servo program
- Mechanical system programs
- Cam data

### (1) Function summary

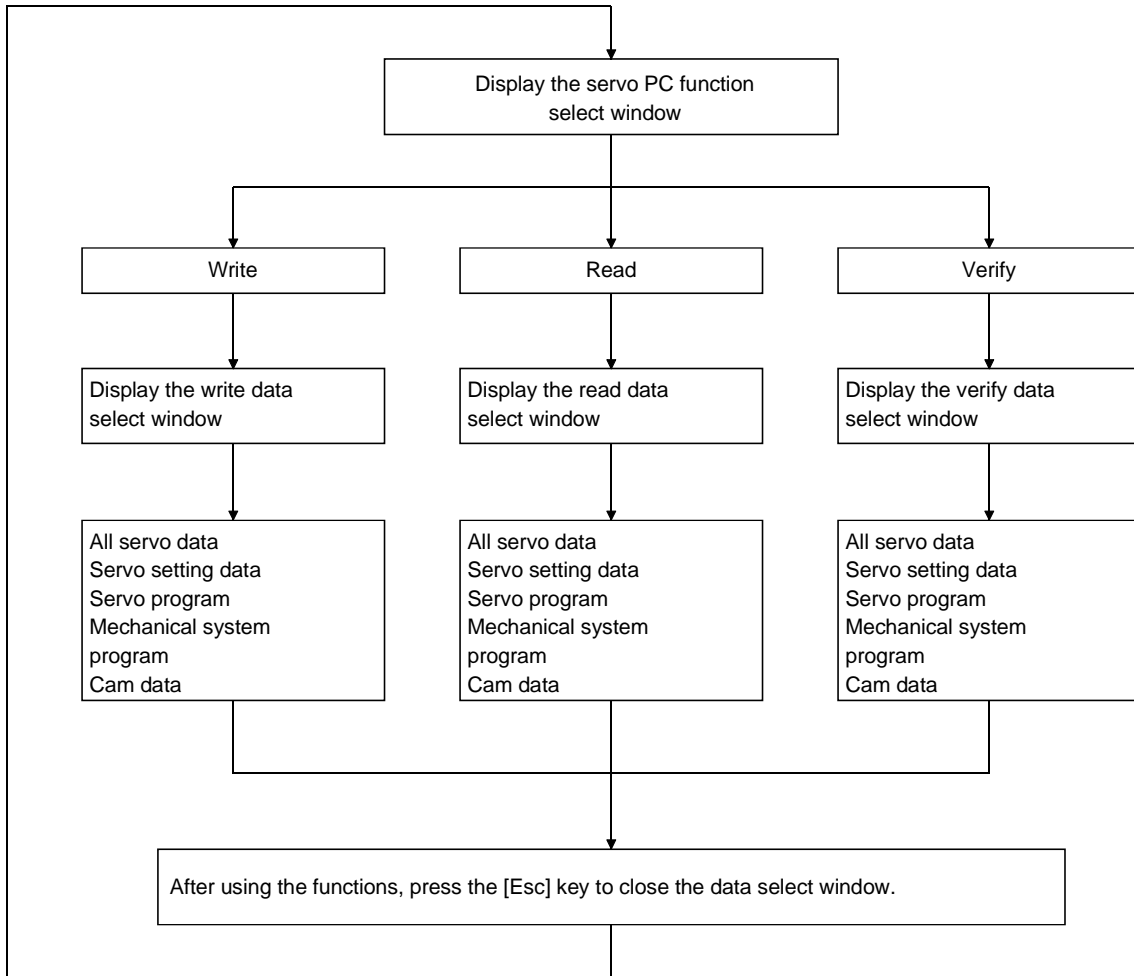
The functions below are offered by the GSV22PE servo PC mode.

Servo PC	Write	Write the computer memory contents to servo system CPU. ....	11.1
		All servo data ..... Write positioning data and servo programs. ....	11.1
		Servo setting data ..... Write positioning data. ....	11.1
		Servo program ..... Write servo programs. ....	11.1
		Mechanical system program ..... Write mechanical system program. ....	11.1
		Cam data ..... Write Cam data. ....	11.1
	Read	Reads the servo system CPU memory contents to computer memory. ....	11.2
		All servo data ..... Read positioning data and servo programs. ....	11.2
		Servo setting data ..... Read positioning data. ....	11.2
		Servo program ..... Read servo programs. ....	11.2
		Mechanical system program ..... Read mechanical system program. ....	11.2
		Cam data ..... Read Cam data. ....	11.2
	Reference/ Verification	Verifies the servo system CPU memory contents and the computer ..... memory contents. ....	11.3
		All servo data ..... Verify positioning data and servo programs. ....	11.3
		Servo setting data ..... Verify positioning data. ....	11.3
		Servo program ..... Verify servo programs. ....	11.3
		Mechanical system program ..... Verify mechanical system program. ....	11.3
		Cam data ..... Verify Cam data. ....	11.3

# 11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION

## (2) Outline flowchart

The procedure is shown below to write, read, and verify the data with the servo system CPU.



## (3) Switching to other functions

Follow the appropriate procedure described below from the servo PC function select window to select a GPP function.

### (a) Program section monitor

Press the [Alt] + [F11] keys. Switches to the ladder monitor.

### (b) PC test

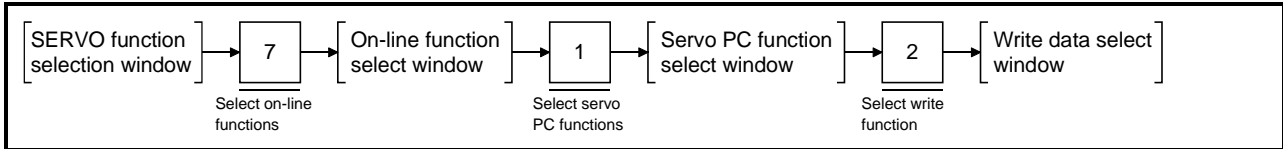
Press the [Ctrl] + [F11] keys. Switches to the PC test.

# 11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION

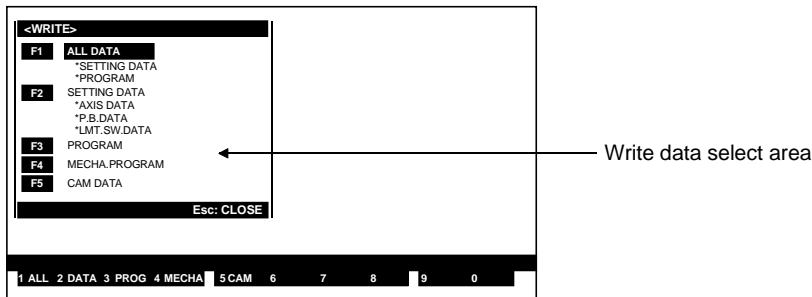
## 11.1 Writing to the Servo System CPU

Writes the computer memory contents to the servo system CPU.

### [Procedure for Displaying the Write Data Select Window]



### [Write Data Select Window]



### [Display/Setting Content]

**Write data select area** The selected data is displayed highlighted.

### [Key Operation]

#### Selecting Data

- 1) Select the data to write by pressing the [F1] to [F5] keys or move the cursor to the data to write by pressing the [↑][↓] keys and press the [Enter] key. A YES/NO dialog box prompts whether to execute the data write operation.


#### Executing Data Write

- 1) To write the data, highlight the word "YES" and press the [Enter] key. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) After the data write operation is successfully completed, a message indicates that the data is written and the system returns to the write data select window.

#### Canceling Data Write

- 1) To cancel the data write operation, press the [→] key to highlight "NO" and press the [Enter] key. The data is not written and the system returns to the write data select window.

### CAUTION

 In some cases the machine may make unpredicted movements after the servo system CPU contents are rewritten. To prevent this problem, check the program and parameters and make the necessary adjustments before operating the machine.

### POINTS

- (1) It is not possible to write data to another station in the data link system.
- (2) Turn OFF the PC ready flag (M2000) when executing the data write operation.  
A message indicates that the data cannot be written if a data write operation is attempted when the PC ready flag (M2000) is ON. If this occurs, turn OFF the PC ready flag (M2000).
- (3) When writing the Cam data, if the memory cassette capacity is smaller than the data to be written, "CHECK MEMORY CASSETTE." will be displayed. Change the memory cassette for one with a larger capacity.

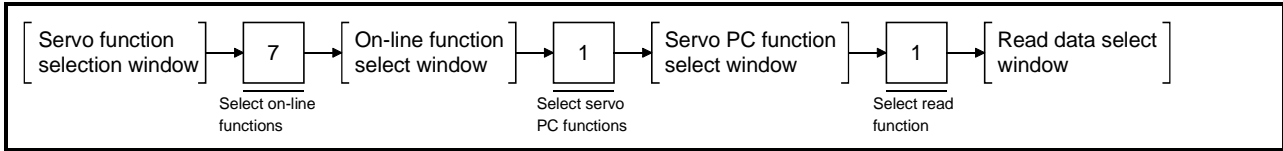


# 11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION

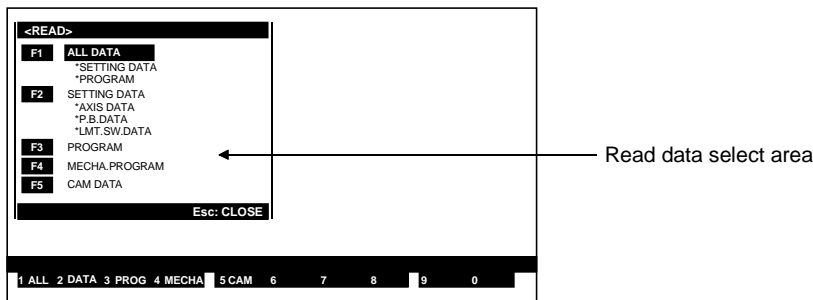
## 11.2 Reading from the Servo System CPU

Reads the servo system CPU memory contents to the computer memory.

### [Procedure for Displaying the Read Data Select Window]



### [Read Data Select Window]



### [Display/Setting Content]

**Read data select area** The selected data is displayed highlighted.

### [Key Operation]

#### Selecting Data

- 1) Select the data to read by pressing the [F1] to [F5] keys or move the cursor to the data to read by pressing the [↑][↓] keys and press the [Enter] key. A YES/NO dialog box prompts whether to execute the data read operation.

#### Executing Data Read

- 1) To read the data, highlight the word "YES" and press the [Enter] key. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) After the data read operation is successfully completed, a message indicates that the data is read and the system returns to the read data select window.

#### Canceling Data Read

- 1) To cancel the data read operation, press the [→] key to highlight "NO" and press the [Enter] key. The data is not read and the system returns to the read data select window.

### POINT

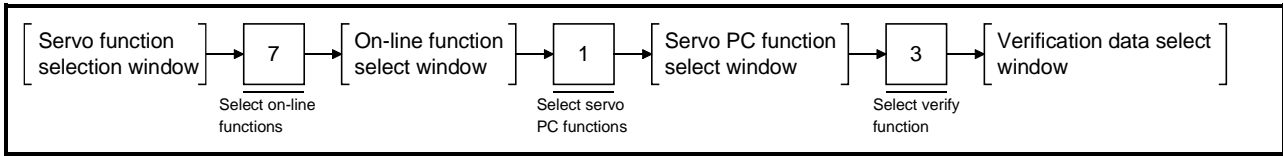
- (1) It is not possible to read data from another station in the data link system.

# 11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION

## 11.3 Verifying the Servo System CPU

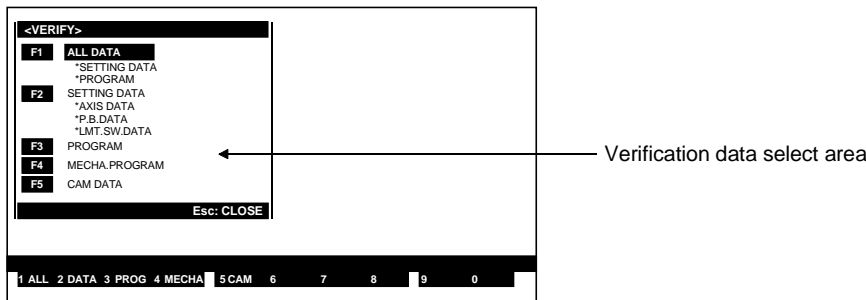
Verifies the servo system CPU memory contents and the computer memory contents.

### [Procedure to Displaying the Verification Data Select Window]



(1) Running the verification

### [Verification data Select Window]



### [Display/Setting Content]

**Verification data select area** The selected data is displayed highlighted.

### [Key Operation]

#### Selecting Data

- 1) Select the verification data by pressing the [F1] to [F5] keys or move the cursor to the verification data by pressing the [↑][↓] keys and press the [Enter] key. A YES/NO dialog box prompts whether to execute the data verification.

#### Executing Data Verification

- 1) To verify the data, highlight the word "YES" and press the [Enter] key. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) After the data verification is successfully completed, a message indicates that the data is verified and the system returns to the verification data select window.

#### Canceling Data Verification

- 1) To cancel the data verification, press the [→] key to highlight "NO" and press the [Enter] key. The data is not verified and the system returns to the verification data select window.

### POINTS

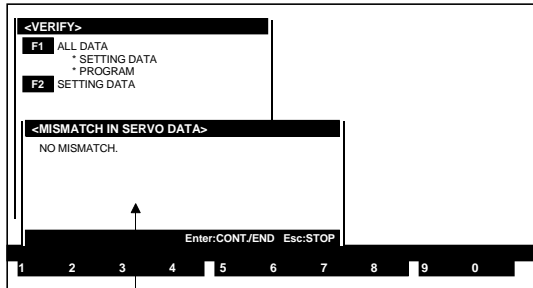
- (1) It is not possible to verify data at another station in the data link system.
- (2) Servo program verification is not run if a discrepancy was found in the servo setting data during verification of all servo data.

# 11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION

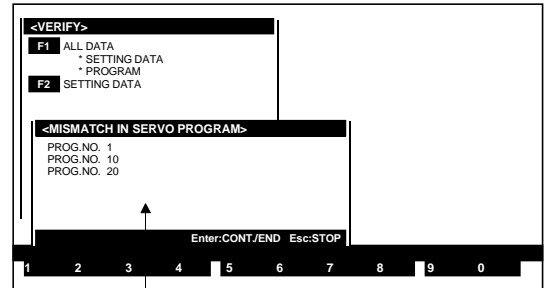
## (2) Checking verification results

### [Verification Results Window]

No discrepancies in servo program verification



Discrepancies in servo program verification



Verification results display area

### [Display/Setting Content]

**Verification results display area** Displays the results after verification.

### [Key Operation]

#### No Discrepancies

##### Window CLOSE

- 1) Press the [Esc] key to close the window and return to the verification data select window.

#### Discrepancies

##### Continuing/Ending Verification

- 1) Details of up to 11 discrepancies can be displayed.  
For error descriptions, see Chapter 20 Error Messages.
- 2) If more than 11 discrepancies exist, press the [Enter] key to display the next page and continue verification.  
The verification continues.
- 3) The verification is completed and the results displayed.

##### Interrupting Verification

- 1) Press the [Esc] key to interrupt verification.  
A YES/NO dialog box prompts whether to interrupt the data verification.
- 2) To interrupt the verification, press the [←] key to highlight "YES" and press the [Enter] key. (The default setting is "NO".)  
A message indicates that the verification is interrupted and the system returns to the verification data select window.
- 3) To cancel interruption of the verification, press the [Enter] key while "NO" is highlighted.  
The verification continues.

##### Window COLSE

- 1) Press the [Esc] key to close the window and return to the verification data select window.

# **SERVO-RELATED INFORMATION**

# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

The GSV22PE SERVO TEST mode is used to execute a test run to check whether the servomotors are operating as designed. The test run is conducted by connecting the servo system CPU to a personal computer.

### (1) Function summary

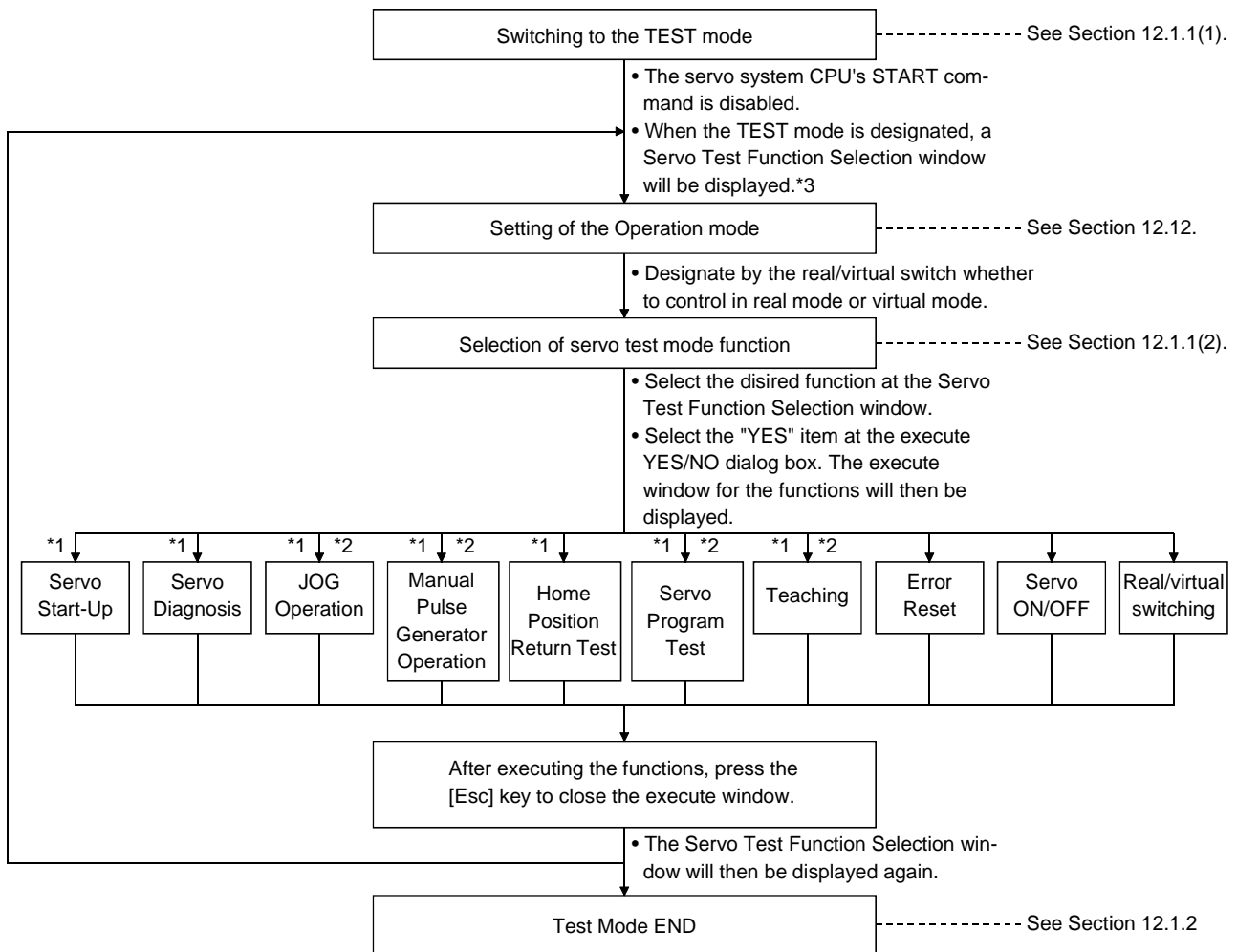
The GSV22PE SERVO TEST mode includes the following functions.

<div style="border: 1px solid black; padding: 2px; width: 50px; text-align: center;">Servo Test</div>	Servo Start-Up	The positioning data transfer operation, the servo system CPU & servo amplifier connection status, and the servomotor operation are checked. .... 12.2	12.2
	Initial check	The connected servo amplifier's status is checked. .... 12.2.1	12.2.1
	Model name check	The servo amplifier and servomotor model names, etc., are checked. .... 12.2.2	12.2.2
	Rotation direction check	The servo motor rotation direction in which the address value increases is checked. .... 12.2.3	12.2.3
	Upper & lower limit LS check	The upper & lower limit switch operation is checked. .... 12.2.4	12.2.4
	RPM check	Check the motor RPM at highest commanded speed. .... 12.2.5	12.2.5
	Servo Diagnosis	Checks whether the speed control gain 1 or position control gain 1 designated in the servo parameter setting mode are suitable for the load connected to the servo motor. .... 12.3	12.3
	Speed control gain 1	When using the ADU, the speed control gain 1 setting is checked to determine if it is appropriate. .... 12.3.1(1)	12.3.1(1)
	Position control gain 1	The position control gain 1 setting is checked to determine if it is appropriate. .... 12.3.2(1)	12.3.2(1)
	JOG Operation	JOG operation is conducted to determine if the servomotor is operating properly. .... 12.4	12.4
	Manual Pulse Generator Operation	Executes a manual pulse generator operation and checks whether the servo motor is operating normally. .... 12.5	12.5
	Home Position Return Test	A home position return test is conducted to check the return direction and the dog position. .... 12.6	12.6
	Servo Program Test	A servo program test operation is conducted to determine if the servomotor is operating in accordance with the program. .... 12.7	12.7
	Individual START	Individual servo program operation is checked. .... 12.7.1	12.7.1
	Sequential START	Sequential operation of multiple registered servo programs is checked. .... 12.7.2	12.7.2
	Teaching	Addresses designated by JOG and manual pulse generator positioning operations are written to the specified servo program. .... 12.8	12.8
	Error Reset	The servo system CPU's error code storage area is cleared, and an error flag reset is executed. .... 12.9	12.9
	Present Position Change	A forced change of the servo system CPU's feed present value is executed. .... 12.10	12.10
		A forced change of present value in one-turn of the cam-axis is executed in the virtual mode. .... 12.13	12.13
	Servo ON/OFF	Servo ON/OFF switching is executed. .... 12.11	12.11
	Real/Virtual Switching	Switches between REAL mode and VIRTUAL mode. .... 12.12	12.12

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### (2) Outline flowchart

A procedural flowchart for the SERVO TEST mode is shown below.



\*1 The [F8] key can be pressed at each of the execute windows in order to switch to the Error Reset function.

\*2 The [F9] key can be pressed at each of the execute windows in order to switch to the Present Value Change function.

\*3 After the Servo Test Function Selection window has been displayed (during TEST mode), press the [Ctrl] + [F11] keys to switch to the TEST function for the GPP function's PC mode.

### POINTS

- (1) All axes rapid stop  
Press the [Back Space] key during a TEST run to execute a rapid stop of all active axes.
- (2) Checking the displayed error code  
Press the [F12] key to display a guidance HELP window for details regarding SERVO TEST mode error codes.

# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12.1. Establishing and Ending the TEST Mode

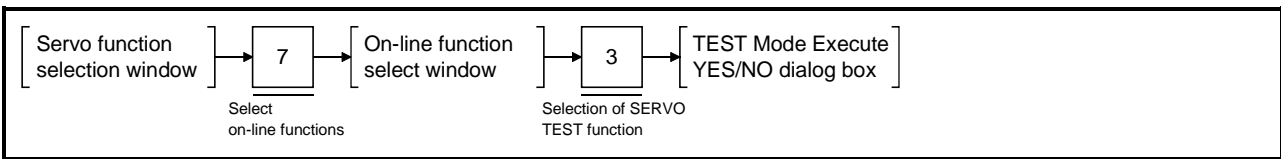
A test run can be executed while the servo system CPU is stopped. However, when it is executed while the servo system CPU is running, the START instructions (DSFRP/SVST) from the sequence program will be ignored. A test run can be conducted.

### 12.1.1 Switching to the TEST mode

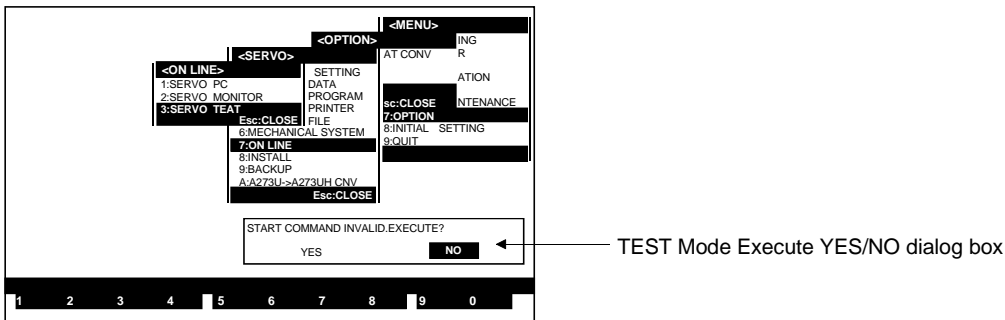
Switch to the TEST mode after control by the servo program has been completed at the servo system CPU, and after all axes have been stopped.

(1) TEST mode execution

#### [Procedure for Displaying the TEST Mode Execute YES/NO Dialog Box]



#### [TEST Mode Execute YES/NO Dialog Box]



#### [Display/Setting Content]

In order to conduct a test run, be sure to select the "YES" item at the "START COMMAND INVALID. EXECUTE?" dialog box. (If "NO" is selected, the test run will not be executed.)

**TEST Mode Execute YES/NO dialog box**      Displayed when the servo test is selected.

#### [Key Operation]

##### Switching to TEST mode

- 1) To switch to the TEST mode, press the [←] key to highlight the "YES" item, then press the [Enter] key. The Servo Test Function Selection window will then be displayed.(The default setting is "NO".)
- 2) If "NO" is selected, the system will return to the Online Function Selection window.

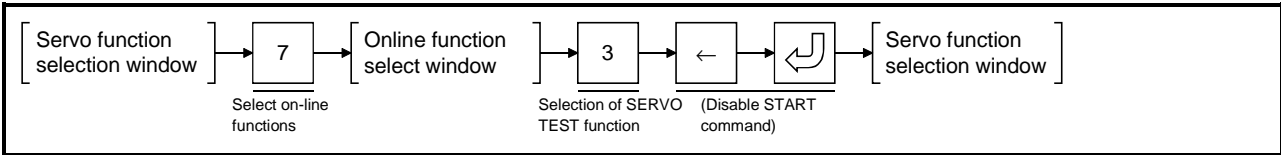
#### ! CAUTION

! If the "CANNOT EXECUTE DURING START" error message is displayed when the above procedure occurs, this indicates that the servomotor is running due to a START command from the servo system CPU. After checking that all axes have stopped, re-designate the SERVO TEST item at the Online Function Selection window in order to execute the TEST mode operation.

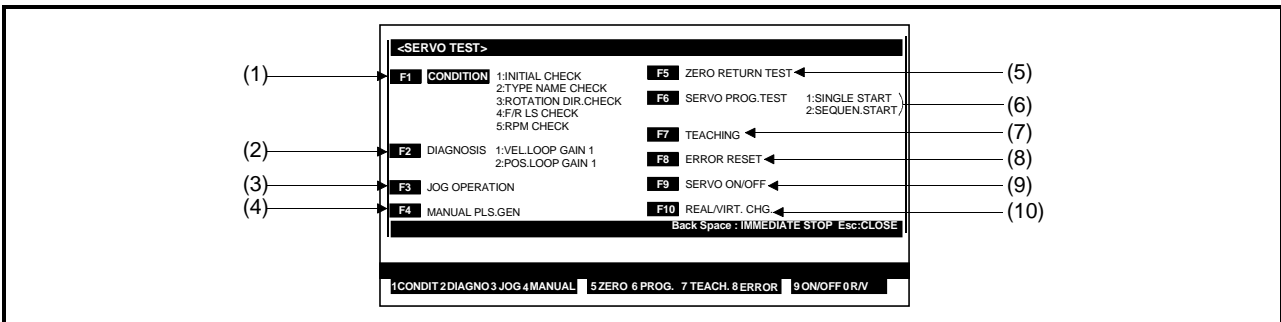
## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- (2) Selection of SERVO TEST function  
 After switching to the TEST mode is completed, the Servo Test Function Selection window will be displayed.  
 Select the servo test function to be executed.

### [Procedure for Displaying the Servo Test Function Selection Window]



### [Servo Test Function Selection Window]



Function	Selection Procedure
<b>(1) Servo Start-Up</b>	Press the [F1] key to execute a servo start-up. The "CONDITION" item will then be highlighted. Use the numeric keys to key in the number of the check function to be executed. If "YES" is then selected at the execute YES/NO dialog box, the execute window for the designated check function will be displayed.
<b>(2) Servo Diagnosis</b>	Press the [F2] key to execute a servo diagnosis. The "DIAGNOSIS" item will then be highlighted. Use the numeric keys to key in the number of the diagnosis function to be executed. If "YES" is then selected at the execute YES/NO dialog box, the execute window for the designated diagnosis function will be displayed.
<b>(3) JOG Operation</b>	Press the [F3] key to execute a JOG operation. If "YES" is then selected at the execute YES/NO dialog box, the execute window for the test run will be displayed.
<b>(4) Manual pulse generator operation</b>	Press the [F4] key to execute a manual pulse generator operation. If "YES" is then selected at the execute YES/NO dialog box, the execute window for the test run will be displayed.
<b>(5) Home Position Return Test</b>	Press the [F5] key to execute a home position return test. If "YES" is then selected at the execute YES/NO dialog box, the execute window for the home position return will be displayed.

POINT
(1) To select a function, use the cursor control keys (arrow keys) to highlight the desired function, then press the [Enter] key.



## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

- (6) Servo Program Test Run** Press the [F6] key to execute a servo program test run. The "SERVO PROG. TEST" item will then be highlighted. Use the numeric keys to key in the number of the servo program test run function to be executed. If "YES" is then selected at the execute YES/NO dialog box, the setting window for the designated test run will be displayed.
- (7) Teaching** Press the [F7] key to execute a teaching operation. If "YES" is then selected at the execute YES/NO dialog box, the setting window for the teaching operation will be displayed.
- (8) Error Reset** Press the [F8] key to execute an error reset. If "YES" is then selected at the execute YES/NO dialog box, the execute window for the error reset function will be displayed.
- (9) Servo ON/OFF switching** Press the [F9] key to execute servo ON/OFF switching. If "YES" is then selected at the execute YES/NO dialog box, the execute window for servo ON/OFF switching will be displayed.
- (10) Real/virtual switching** Press the [F10] key to switch between REAL and VIRT. modes. If "YES" is selected in the execute YES/NO dialog box, the switching execute window will be displayed.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### 12.1.2 TEST mode end

The procedure for ending the TEST mode is described below.

Sequence program START commands are operative while the servo system CPU is running.

The TEST mode can be ended by the following 2 methods:

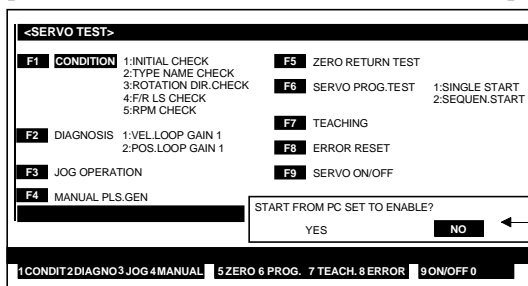
- Ending the TEST mode at the Servo Test Function Selection window
  - Ending the TEST mode at the Check & Test Run Execute windows
- Both methods are explained below.

(1) Ending the TEST mode at the Servo Test Function Selection Window

#### Closing the Servo Test Function Selection Window

The TEST mode will be ended when the Servo Test Function Selection window is closed.

#### [Servo Test Function Selection Window]



End TEST Mode YES/NO dialog box

#### [Key Operation] TEST Mode End

- 1) Press the [Esc] key to end the TEST mode.  
The end TEST mode YES/NO dialog box will then be displayed.
- 2) Press the [←] key to highlight the "YES" item, then press the [Enter] key.  
The SERVO TEST mode will be ended, the Online Function Selection window will be displayed, and the servo system CPU's TEST mode will be canceled.
- 3) If "NO" is selected, or if the [Esc] key is pressed, the Servo Test Function Selection window will be displayed, and the servo system CPU TEST mode will be canceled.

#### Switching to the "PC TEST" Function

The TEST mode can also be canceled by switching to the GPP function's PC TEST function.

#### [Key Operation] Switching to the "PC TEST" Function

- 1) Press the [Ctrl] + [F11] keys to switch to the PC TEST function.  
The end TEST mode YES/NO dialog box will then be displayed.
- 2) Press the [←] key to highlight the "YES" item, then press the [Enter] key.  
The SERVO TEST mode will be ended, the PC TEST function will become operative, and the servo system CPU's TEST mode will be canceled.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### **GPP Function Menu Selection**

The TEST mode can be canceled by selecting the GPP Function Menu at the Menu Selection window.

#### **[Key Operation]**

##### **Switching to GPP function**

- 1) Press the [F11] key to switch to the GPP function.  
The end TEST mode YES/NO dialog box will then be displayed.  
If "NO" is selected, or if the [Esc] key is pressed, the system will return to the original window.
- 2) Press the [←] key to highlight the "YES" item, then press the [Enter] key.  
The menu selection window will then be displayed.  
To return to the original window from the Menu Selection window, press the [Esc] key.
- 3) Use the [↑]/[↓] keys to highlight the desired function name, then press the [Enter] key.  
The SERVO TEST mode will then be ended, the designated GPP function will be established, and the servo system CPU's TEST mode will be canceled.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

(2) Ending the TEST mode at the Check and Test Run Execute Windows

### Switching to the "PC TEST" Function

The TEST mode can also be canceled by switching to the GPP function's PC TEST function.

#### [Type Name Check window]

<SERVO SET-UP> <TYPE CHECK>											
AX IS	BASE	SLOT No.	ENCO No.	AMP. TYPE	ENCO TYPE	MOTOR TYPE	CAPACIT Y(w)	M-SPEED (r/min)	LX SLOT	SGNL No.	
1	BAS.	2	1	A211AM	ABS	HA-FH	50w	3000	0-1	INV.	
2	BAS.	1	1	A211AM	INC	HA-SH2	100w	2000	0-1	1	
3	EXT.	1	1	A211AM	INC	HA-MH	200w	3000	0-1	2	
4	EXT.	2	1	A211AM	ABS	HA-FH	50w	3000	0-1	3	
5		d1		MR-J2	ABS	HC-MF	50w	3000	0-1	4	
6		d2		MR-J2	INC	HC-MF	50w	3000	0-1	5	

LX SLOT:Base No-Slot No

Page Up Page Down      START FROM PC SET TO ENABLE?      YES      NO

MONITOR STARTED.      1      2 ROTAT.3      4      5      6      7      8 ERROR      9      0 CHECK

End TEST mode YES/NO dialog box

#### [Key Operation]

##### Switching to the "PC TEST" function

- 1) Press the [Ctrl] + [F11] key to switch to the PC TEST function. The end TEST mode YES/NO dialog box will then be displayed.
- 2) Press the [←] key to highlight the "YES" item, then press the [Enter] key. The SERVO TEST mode will be ended, the PC TEST function will become operative, and the servo system CPU's TEST mode will be canceled.

### GPP Function Menu Selection

The TEST mode can be canceled by selecting the GPP Function Menu at the Menu Selection window.

#### [Key Operation]

##### Switching to GPP function

- 1) Press the [F11] key to switch to the GPP function. The end TEST mode YES/NO dialog box will then be displayed. If "NO" is selected, or if the [Esc] key is pressed, the system will return to the original window.
- 2) Press the [←] key to highlight the "YES" item, then press the [Enter] key. The menu selection window will then be displayed. To return to the original window from the Menu Selection window, press the [Esc] key.
- 3) Use the [↑]/[↓] keys to highlight the desired function name, then press the [Enter] key. The SERVO TEST mode will then be ended, the designated GPP function will be established, and the servo system CPU's TEST mode will be canceled.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### 12.2 Servo Start-Up

In order to determine if the servomotor is functioning properly, the following items are checked at each axis: the status of connected servo amplifiers, the motor's rotation direction and rotation speed, and limit switch operation, etc.

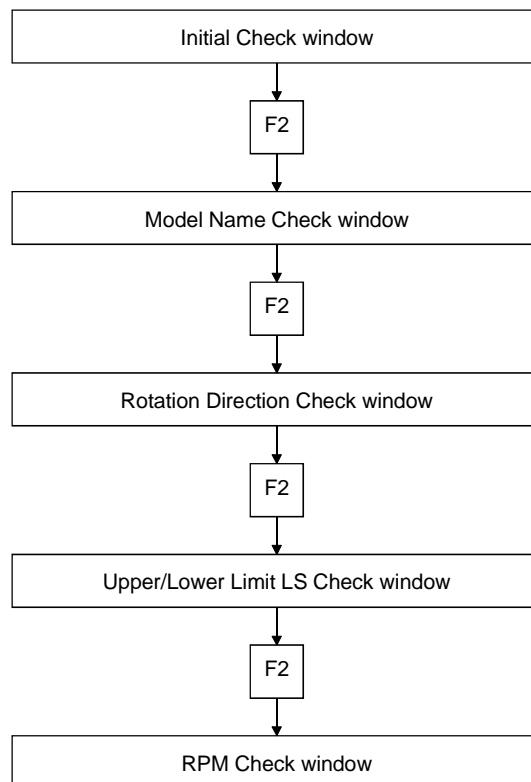
The servo start-up check operation consists of the following 5 functions:

- Initial check
- Model name check
- Rotation direction check
- Upper and lower limit LS check
- RPM check


(1) Execute window transition at servo start-up procedure

The execute window for the desired servo start-up check function is designated at the Servo Test Function Selection window.

Once an execute window is opened, switching to the execute windows for other check functions is possible by pressing the [F2] key (the switching progression is shown below).



### CAUTION

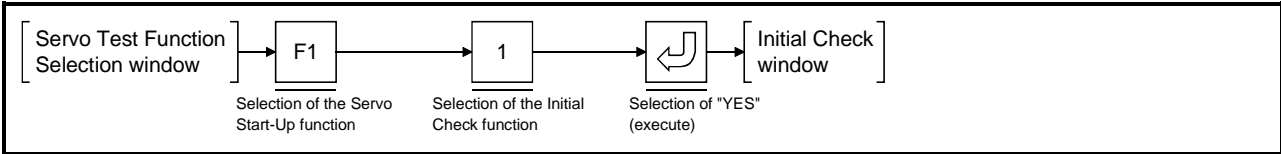
 Always check (and adjust if necessary) the parameter settings before beginning operation. Failure to do so can result in unexpected machine motion.

# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

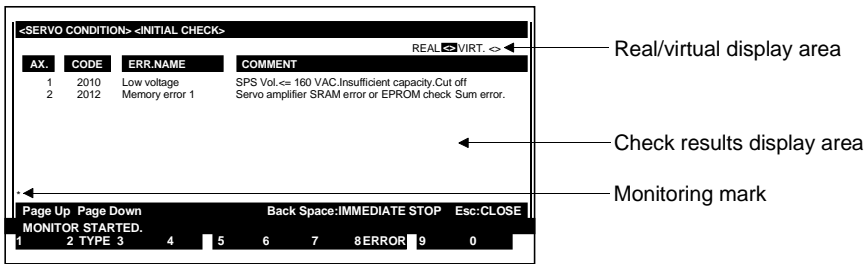
## 12.2.1 Initial check

Active servo amplifier errors are displayed. Check these errors.

### [Procedure for Displaying the Initial Check Window]



### [Initial Check Window]



### [Display/Setting Content]

The statuses of all connected servo amplifiers are checked, and the results displayed. Minor, major, and servo errors (max. of 1 each) are displayed for each axis. (If all axes are free of errors, only the item heading will be displayed.)

- Check results display area**
- 1) AX. .... The number of axis connected to the servo amplifier where an active error exists is displayed here.
  - 2) CODE..... The error code is displayed here.
  - 3) ERR.NAME ..... The servo error name is displayed here.
  - 4) COMMENT ..... The error description is displayed here.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

**Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

### [Key Operation]

**Page change**

- 1) If more than 15 errors have occurred, use the [Page Up]/[Page Down] keys to switch display pages.  
Press the [Page Up] key to show errors after the displayed error.  
Press the [Page Down] key to show errors before the displayed error.

**Comment scroll**

- 1) To view the entire comment, use the [←]/[→] keys to scroll the comment display right and left.

**Switching to the Type Name Check window**

- 1) Press the [F2] key to conduct a type name check.  
The Type Name Check window will then be displayed. (See Section 12.2.2.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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### **Error Reset**

- 1) Press the [F8] key to execute an error reset.  
An Error Reset window will then be displayed. (See Section 12.9.)

### **Window CLOSE**

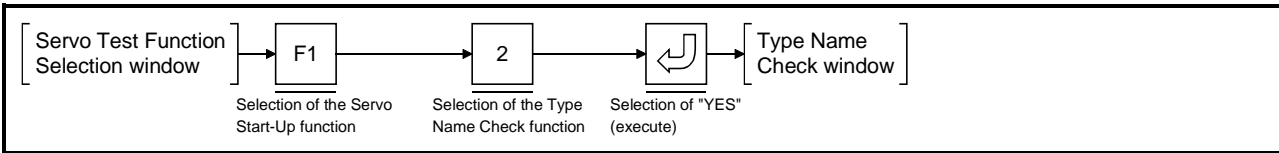
- 1) Press the [Esc] key to close the Initial Check window and return to the Servo Test Function Selection window.

# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12.2.2 Type name check

Lists information such as connected servo amplifiers, servo motor type name, etc. Confirm the model names against those in the design.

### [Procedure for Displaying the Type Name Check Window]



### [Type Name Check Window] (For A273UHCPU)

AXIS	BASE	SLOT No.	ENCO No.	AMP. TYPE	ENCO TYPE	MOTOR TYPE	CAPACITY(w)	M-SPEED (r/min)	LX SLOT	SGNL No.
1	BAS.	2	1	A211AM	ABS	HA-FH	50w	3000	0-1	INV.
2	BAS.	1	1	A211AM	INC	HA-SH2	100w	2000	0-1	1
3	EXT.	1	1	A211AM	INC	HA-MH	200w	3000	0-1	2
4	EXT.	2	1	A211AM	ABS	HA-FH	50w	3000	0-1	3
5		d1		MR-J2	ABS	HC-MF	50w	3000	0-1	4
6		d2		MR-J2	INC	HC-MF	50w	3000	0-1	5

LX SLOT:Base No-Slot No  
<Base No:0-Basis base:1-Ex.base>  
Page Up Page Down Back Space:ALL AXIS STOP Esc:Close

MONITOR STARTED. 1 2ROTAT. 3 4 5 6 7 8ERROR 9 0CHECK

Check results display area (points to table)

Monitoring mark (points to arrow)

### [Display/Setting Content]

When the servo system CPU power is switched ON, the "servo parameter" data written at the servo amplifier is displayed.

The displayed data should be checked against the system design to verify that all connections are correct.

#### Check results display area

- 1) AXIS ..... Corresponds to the axis No. settings designated in the System Setting mode.
- 2) BASE ..... Indicates whether the ADU is installed at a "BAS." or an "EXT.".
- 3) SLOT No. .... Slot numbers which correspond to the axis numbers are displayed here.  
0 to 7: ADU  
d1 to d8: MR-[ ]-B
- 4) ENCO No. .... Indicates the encoder's connection position. (Only when ADU is used.)  
1 motor connectable ADU: 1  
2 motor connectable ADU: 1 (connector for upper encoder)  
2 motor connectable ADU: 2 (connector for lower encoder)
- 5) AMP. TYPE ..... The servo amplifier's type name is displayed.
- 6) ENCO TYPE ..... Indicates the positioning method - "ABS" or "INC".
- 7) MOTOR TYPE ..... Indicates the servomotor type.
- 8) CAPACITY (w) ..... Indicates the motor capacity based on the settings designated in the System Setting mode.
- 9) M-SPEED ..... Indicates the motor speed set based on the settings designated in the System Setting mode.



## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- 10) M-SPEED (r/min) .....Indicates the motor's rpm based on the settings designated in the System Setting mode.
- 11) LX SLOT .....Indicates the servo external signal unit's installation location.  
Base No. – Slot No.  
Base No. 0 : Main base unit  
Base No. 1 : Extension base unit  
Slot No. : 0 to 7
- 12) SGNL No.....Indicates the servo external signal unit's signal numbers which correspond to the axis numbers

**Monitoring mark** Indicates that monitoring is in progress.  
(Not displayed when monitoring is stopped.)

**[Key Operation]**  
**Switching to Rotation Direction Check Window**

- 1) Press the [F2] key to conduct a rotation direction check. The Rotation Direction Check window will then be displayed. (See Section 12.2.3.)

**Error Reset**

- 1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9.)

**Cross check with set data (when MR-J2-B is used)**

- 1) To check if the motor set in the system setting agrees with the actual motor connected to MR-J2-B, press the [F10] key. If the actually connected MR-J2-B motor differs from the setting data written to the controller, the display appears as shown below.

AX No	ACTUALLY-LOADED STATE				CONTROLLER SETTING DATA			
	TYPE	CURR	ROTATION	ENCODE	TYPE	CURR	ROTATION	ENCODE
1	SPEC.	50w	3000	8192	HA-MH	50w	3000	8192
2	SPEC.	100w	3000	8192	HA-FH	50w	3000	8192
3	HC-MF	50w	3000	8192	HA-FF	50w	3000	8192

**Model name check axis switching (for A273UHCPU (8/32-axis specifications))**

- 1) Use the [Page Up]/[Page Down] keys to conduct the model name check at axes subsequent to axis No. 8. Press the [Page Up] key to select the preceding axis No., and the [Page Down] key to select the next axis No.

**Window CLOSE**

- 1) Press the [Esc] key to close the Type Name Check window and return to the Servo Test Function Selection window.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

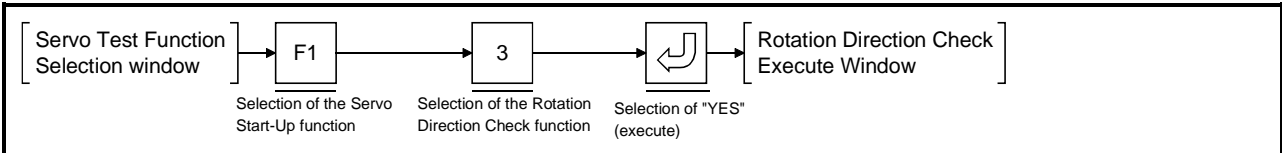
### 12.2.3 Rotation direction check

The servomotor's rotation direction in which the positioning address value increases, or the rotation direction which corresponds to forward JOG operation, is displayed.

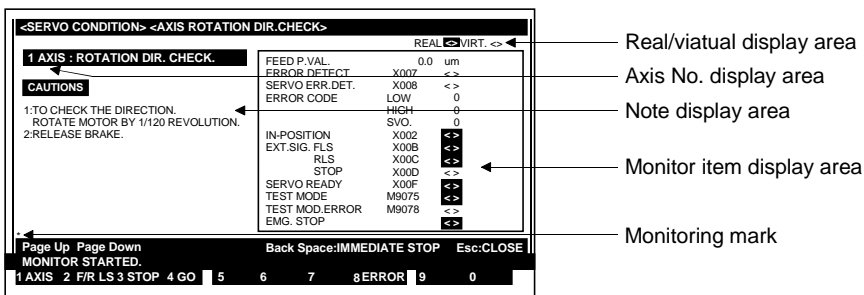
(1) Conducting the rotation direction check

When the START conditions are established, the servomotor at the designated axis is actually rotated 1/120th of a turn to check the motor's rotation direction.

#### [Procedure for Displaying the Rotation Direction Check Execute Window]



#### [Rotation Direction Check Execute Window] (For A273UHCPU)



#### [Display/Setting Content]

The motor shaft rotation direction should be checked at each axis.

Motor shaft rotation will begin only when the START conditions shown below are satisfied.

The rotation direction check should be executed after checking the device ON/OFF statuses (START conditions) shown at the right side of the window (see below).

#### START conditions

ERROR DETECT.	<input type="checkbox"/>	OFF
EXT. SIG. FLS	<input checked="" type="checkbox"/>	ON
RLS	<input checked="" type="checkbox"/>	ON
STOP	<input type="checkbox"/>	OFF
SERVO READY	<input checked="" type="checkbox"/>	ON
TEST MODE	<input checked="" type="checkbox"/>	ON
TEST MOD. ERROR	<input type="checkbox"/>	OFF

If the above conditions are not satisfied, the check will not be executed when the [F4] key is pressed.

The monitor item which fails to satisfy the START conditions will be highlighted, and a "CANNOT EXECUTE" error message will be displayed.

**Real/Virtufal display area** Shows whether current mode is REAL mode or VIRT. mode.

**Axis No. display area** The axis number where the check is to be executed is displayed here.

**Note display area** Remarks relating to the check operation are displayed here.

**Monitor item display area** The feed present value and the device ON/OFF statuses, etc., are displayed here.

**Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

<b>REMARK</b>
---------------

- (1) Monitor Items  
 In the VIRTUAL mode, when "ROLLER" is selected as the output module for the mechanical system program, the "FEED P.VAL" in the above monitor items will be displayed as "peripheral velocity".

**[Key Operation]  
 Executing the  
 check function**

- 1) Press the [F4] key to execute the rotation direction check.  
 The Direction of Rotation Result Display Window will then be displayed.  
 (See Section 12.2.3 (2).)  
 Check the rotation direction.

**Designating the  
 axis No.**

- 1) To change the designated axis number, press the [F1] key.  
 The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed.  
 Enter the number of the axis where a check is to be executed, then press the [Enter] key.  
 After the axis number has been designated, the system will return to the Rotation Direction Check Execute window.  
 To abort the axis designation procedure, press the [Esc] key.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

**Monitor  
 STOP/RESTART**

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

**Upper and lower limit  
 LS check**

- 1) Press the [F2] key to conduct an upper/lower limit LS check.  
 The Upper/Lower Limit LS Check window will then be displayed.  
 (See Section 12.2.4)

**Error Reset**

- 1) Press the [F8] key to execute an error reset.  
 An Error Reset window will then be displayed. (See Section 12.9.)

**Window CLOSE**

- 1) Press the [Esc] key to close the Rotation Direction Check Execute window and return to the Servo Test Function Selection window.

<b>POINT</b>
--------------

- (1) Check disabled when VIRT. mode is selected  
 When VIRT. mode is selected, the direction of rotation check execute window can be opened, but the direction of rotation check cannot be run. However, monitor item devices can be monitored.  
 The error message "CANNOT EXECUTE IN VIRTUAL MODE" displayed after pressing the [F4] key indicates that the VIRT. mode is designated. Run the check after switching to REAL mode.  
 (See Section 12.12.)

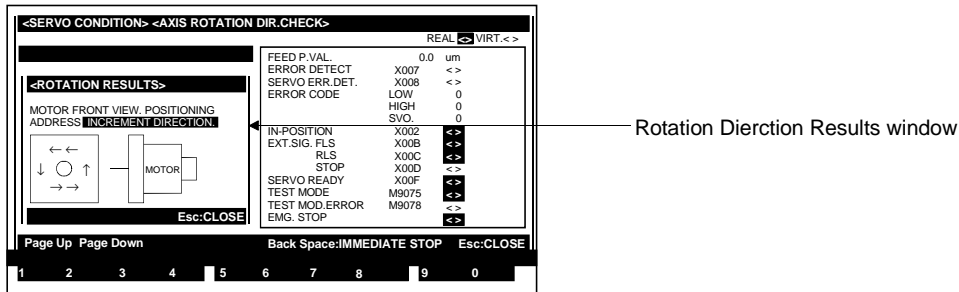
## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### (2) Rotation results display

When a rotation direction check is executed, the servomotor is rotated 1/120th of a turn, and the rotation direction results are displayed.

Check that the rotation direction is correct.

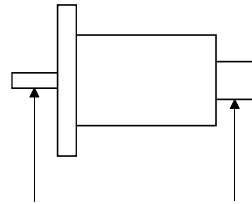
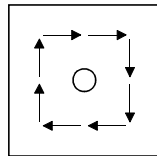
### [Rotation Direction Results Window] (For A273UHCPU)



### [Display/Setting Content]

Viewed from the motor's load side, the motor rotation direction in which the positioning address value increases is indicated by a highlighted display of the CCW (forward) or CW (reverse) item. The direction is also indicated by arrows.

Clockwise (CW) direction



Motor's load side

Encoder

### [Key Operation] Window CLOSE

- 1) Press the [Esc] key to close the Rotation Direction Results window and return to the Rotation Direction Check Execute window.

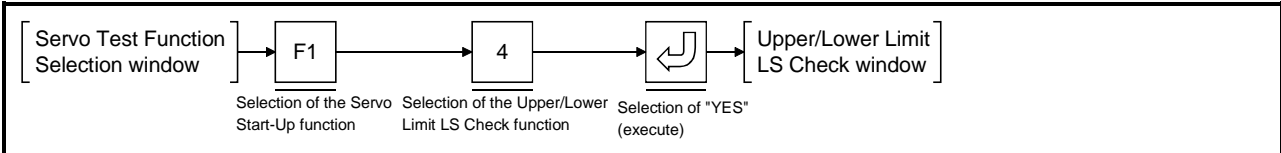
# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12.2.4 Upper and lower limit LS check

Execute forward and reverse JOG operations to determine if the upper limit LS (FLS) and the lower limit LS (RLS) are functioning properly. Be sure to designate the necessary JOG data settings before beginning the JOG operation, designating the settings at the parameter block which is to be used.

(1) Executing the upper/lower limit LS check

### [Procedure for Displaying the Upper/Lower Limit LS Check Window]



### [Upper/Lower Limit LS Check Window] (For A273UHCPU)

### [Display/Setting Content]

Execute forward and reverse JOG operations at each axis, checking that the servomotor stops when the FLS (forward LS) and RLS (reverse LS) switch OFF.

During reverse JOG operation also check that the servomotor stops when RLS turns off.

JOG operation is only possible when the START conditions shown below are satisfied.

Before beginning the upper/lower LS check, check that the START conditions shown at the right side of the window (monitor item display area) are satisfied.

Forward JOG START conditions		Reverse JOG START conditions	
ERROR DETECT	<input type="checkbox"/> OFF	ERROR DETECT	<input type="checkbox"/> OFF
EXT. SIG. FLS	<input checked="" type="checkbox"/> ON	EXT. SIG. RLS	<input checked="" type="checkbox"/> ON
STOP	<input type="checkbox"/> OFF	STOP	<input type="checkbox"/> OFF
SERVO READY	<input checked="" type="checkbox"/> ON	SERVO READY	<input checked="" type="checkbox"/> ON

If the monitoring results indicate that the above START conditions are not satisfied, the JOG operation will not start when the [F5] or [F6] key is pressed.

The monitor item which fails to satisfy the START conditions will be highlighted, and a "CANNOT EXECUTE" error message will be displayed.

**Axis No. display area** The axis number where the check is being executed is displayed here.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRTUAL mode.

**Monitor item display area**

- 1) Feed present value ..... The positioning address/travel value for the axis in question is displayed here. (If a roller is set as the output module in the VIRTUAL mode, the roller peripheral speed is displayed.)
- 2) Error ..... The most recent error which has occurred at the axis in question is displayed here.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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<b>JOG speed display area</b>	The JOG speed designated at the JOG Speed Setting window is displayed here.
<b>Direction display area</b>	The JOG direction (forward or reverse) is indicated here.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>[Key Operation]</b>	
<b>JOG speed setting/change</b>	1) Press the [F4] key to set or change the JOG speed. At the JOG Speed Setting window which is then displayed, designate the desired speed setting. (See Section 12.2.4 (2).)
<b>Executing the Check operation (forward)</b>	1) After designating the JOG speed setting, press and hold down the [F6] key (or [Shift] + [Alt] keys) to execute an upper limit LS check (forward). Check that the motor stops when the monitor item FLS turns off, and then release finger from the [F6] key (or [Shift] + [Alt] keys).
<b>Executing the Check operation (reverse)</b>	1) After designating the JOG speed setting, press and hold down the [F5] key (or [Shift] + [Ctrl] keys) to execute an lower limit LS check (reverse). Check that the motor stops when the monitor item RLS turns off, and then release finger from the [F5] key (or [Shift] + [Ctrl] keys).
<b>Designating the axis No.</b>	1) To change the axis number where the upper/lower limit LS check is to be executed, press the [F1] key. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed. Enter the number of the axis where a check is to be executed, then press the [Enter] key. After the axis number has been designated, the system will return to the Upper/Lower Limit LS Check window. To abort the axis designation procedure, press the [Esc] key. 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.
<b>Monitor STOP/RESTART</b>	1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
<b>Switching to the RPM Check window</b>	1) Press the [F2] key to conduct an RPM check. The RPM Check window will then be displayed. (See Section 12.2.5.)
<b>Error Reset</b>	1) Press the [F8] key to execute an error reset at the Error Reset window which is displayed. An Error Reset window will then be displayed. (See Section 12.9.)
<b>Window CLOSE</b>	1) Press the [Esc] key to close the Upper/Lower Limit LS Check window, and to return to the Servo Test Function Selection window.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

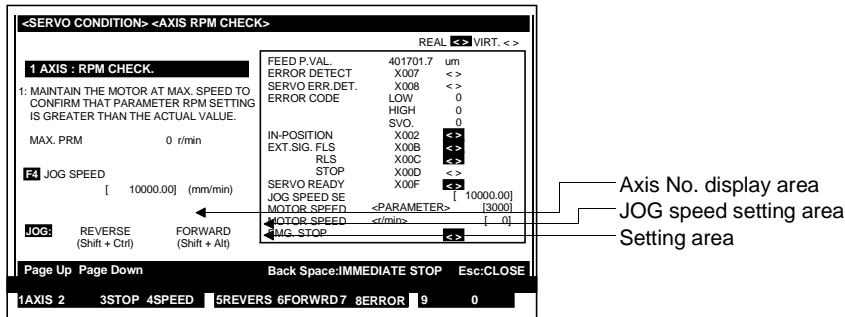
---

POINTS
<p>(1) Operation disabled when VIRT. mode is selected When VIRT. mode is selected, the upper/lower limit LS check window can be opened, but the upper/lower limit LS check cannot be run. However, monitor item devices can be monitored. The error message "CANNOT EXECUTE IN VIRTUAL MODE" displayed after pressing the [F5]/[F6] keys indicates that the VIRT. mode is designated. Run the upper/lower limit LS check after switching to REAL mode. (See Section 12.12.)</p> <p>(2) Operation disabled when A171SENC/A172SENC is not used (For A17[ ]CPU systems) Note that the direction of rotation check cannot be run when no servo input unit A171SENC/A172SENC is designated in the system setting mode.</p> <p>(3) Operation disabled when A278LX is not used (For A273UHCPU systems) Note that the direction of rotation check cannot be run when no servo external signal unit A278LX is designated in the system setting mode.</p> <p>(4) If previously used JOG operation keys ([F6]/[F5]) are held pressed when a personal computer with high processing speed is used, there are cases that JOG operation cannot be executed correctly with a beep keep sounding. Use the following keys to execute JOG operation when using a personal computer with high processing speed.</p> <ul style="list-style-type: none"><li>• Forward rotation ..... [Shift] + [Alt] keys (previously [F6] key was used)</li><li>• Reverse rotation ..... [Shift] + [Ctrl] keys (previously [F5] key was used)</li></ul>

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- (2) Designating the JOG speed setting  
 The JOG operation speed must be designated at the JOG Speed Setting window before executing a JOG operation.

### [JOG Speed Setting Window] (For A273UHCPU)



### [Display/Setting Content]

The designated JOG speed setting must not exceed the JOG speed limit designated at the Servo Data Setting mode.

**Axis No. display area** The axis number where a JOG speed setting is to be executed is displayed here.

**JOG speed setting area** The current JOG speed setting is displayed here.

**Setting area** The JOG speed setting is designated here.

### [Key Operation]

#### Setting the JOG speed

- 1) Use the numeric keys to key in the desired JOG speed setting, then press the [END] key.

The system will then return to the original window. (The designated JOG speed setting will be displayed at the JOG Speed display area.)

If a JOG speed setting which violates the JOG speed limit is designated, an "OUT OF SETTING RANGE." error message will be displayed. If this occurs, re-designate the JOG speed setting within the prescribed range.

#### Setting abort

- 1) To abort the axis designation procedure, press the [Esc] key. The system will then return to the original window.



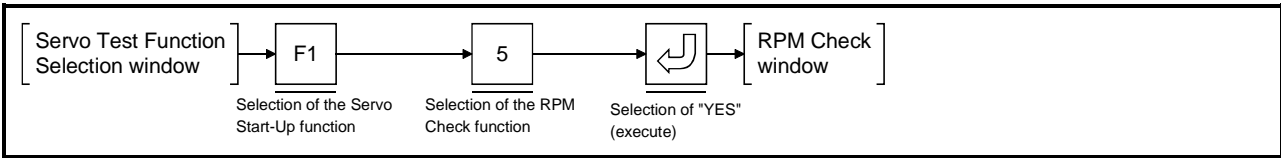
# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12.2.5 RPM check

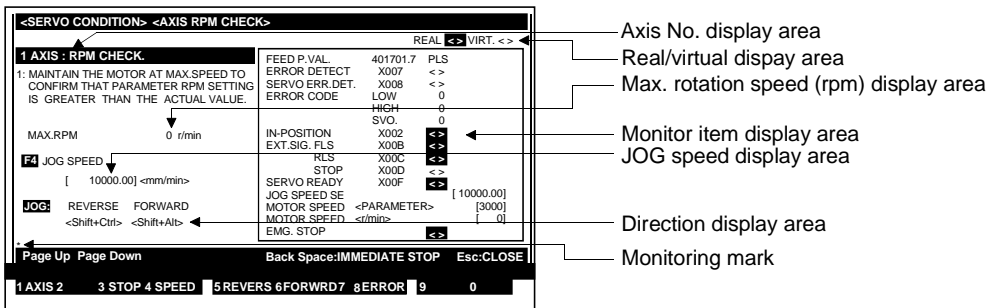
Execute a forward or reverse JOG operation and verify that the servomotor's maximum rotation speed (rpm) doesn't exceed the motor rpm setting designated at the Servo Parameter setting.

Be sure to designate the necessary JOG data settings before beginning the JOG operation, designating the settings at the parameter block which is to be used.

### [Procedure for Displaying the RPM Check Window]



### [RPM Check Window] (For A273UHCPU)



### [Display/Setting Content]

Execute forward and reverse JOG operations at each axis, checking that the servomotor's rotation speed (rpm) doesn't exceed the maximum rpm setting. JOG operation is only possible when the START conditions shown below are satisfied. Check from the monitor items displayed to the right of the window that the start conditions are met before running the check.

Forward JOG START conditions				Reverse JOG START conditions			
EXT. SIG.	FLS	<input checked="" type="checkbox"/>	ON	EXT. SIG.	RLS	<input checked="" type="checkbox"/>	ON
	STOP	<input type="checkbox"/>	OFF		STOP	<input type="checkbox"/>	OFF
SERVO READY		<input checked="" type="checkbox"/>	ON	SERVO READY		<input checked="" type="checkbox"/>	ON

If the monitoring results indicate that the above START conditions are not satisfied, the JOG operation will not start when the [F5] or [F6] key is pressed.

The monitor item which fails to satisfy the START conditions will be highlighted, and a "CANNOT EXECUTE" error message will be displayed.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

**Axis No. display area** The axis number where the check is being executed is displayed here.

**Max. rotation speed (rpm) display area** The motor's maximum JOG rpm is displayed here. (The display continues even if the motor is stopped.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

<b>Monitor item display area</b>	<ol style="list-style-type: none"><li>1) FEED P.VAL ..... The positioning address/travel value for the axis in question is displayed here. (If a roller is set as the output module in the VIRT. mode, the roller peripheral speed is displayed.)</li><li>2) ERROR DETECT..... The most recent error which has occurred at the axis in question is displayed here.</li><li>3) MOTOR SPEED ..... The motor rpm parameter setting is displayed here. (PARAMETER)</li></ol>
<b>JOG speed display area</b>	The JOG speed designated at the JOG Speed Setting window is displayed here.
<b>Direction display area</b>	The JOG direction (forward or reverse) is indicated here.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>[Key Operation]</b>	
<b>Executing the Check operation (forward)</b>	<ol style="list-style-type: none"><li>1) After designating the JOG speed setting, press and hold down the [F6] key (or [Shift] + [Alt] keys) to execute a FORWARD check. After checking the motor's maximum rpm at the "MOTOR SPEED (r/min)" monitor item, release the [F6] key (or [Shift] + [Alt] keys). The motor will then decelerate and stop.</li></ol>
<b>Executing the Check operation (reverse)</b>	<ol style="list-style-type: none"><li>1) After designating the JOG speed setting, press and hold down the [F5] key (or [Shift] + [Ctrl] keys) to execute a REVERSE check. After checking the motor's maximum rpm at the "MOTOR SPEED (r/min)" monitor item, release the [F5] key (or [Shift] + [Ctrl] keys). The motor will then decelerate and stop.</li></ol>
<b>JOG speed setting/change</b>	<ol style="list-style-type: none"><li>1) Press the [F4] key to set or change the JOG speed. At the JOG Speed Setting window which is then displayed, designate the desired speed setting. (See Section 12.2.4(2).) Set the maximum speed used in the servo program as the operating speed.</li></ol>
<b>Designating the axis No.</b>	<ol style="list-style-type: none"><li>1) To change the axis number where an RPM check is to be executed, press the [F1] key. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed. Enter the number of the axis where a check is to be executed, then press the [Enter] key. To abort the axis designation procedure, press the [Esc] key.</li><li>2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.</li></ol>
<b>Monitor STOP/RESTART</b>	<ol style="list-style-type: none"><li>1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.</li></ol>
<b>Error Reset</b>	<ol style="list-style-type: none"><li>1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9.)</li></ol>
<b>Window CLOSE</b>	<ol style="list-style-type: none"><li>1) Press the [Esc] key to close the RPM Check window and return to the Servo Test Function Selection window.</li></ol>

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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POINTS
<p>(1) Operation disabled when VIRT. mode is selected The RPM check window can be opened in VIRT. mode but the rotation speed check cannot be conducted. (The monitor item devices can be monitored.) Press the [F5] or [F6] key. If a message indicates that the operation "CANNOT EXECUTE IN VIRTUAL MODE", the VIRT. mode is currently selected. Switch to the REAL mode before conducting the RPM check. (See Section 12.12.)</p> <p>(2) If previously used JOG operation keys ([F6]/[F5]) are held pressed when a personal computer with high processing speed is used, there are cases that JOG operation cannot be executed correctly with a beep keep sounding. Use the following keys to execute JOG operation when using a personal computer with high processing speed.</p> <ul style="list-style-type: none"><li>• Forward rotation..... [Shift] + [Alt] keys (previously [F6] key was used)</li><li>• Reverse rotation ..... [Shift] + [Ctrl] keys (previously [F5] key was used)</li></ul>

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### 12.3 Servo Diagnosis

A diagnosis function is executed at each axis to determine if the "speed control gain 1" and "position control gain 1" values designated at the Servo Data Setting mode are appropriate for the servomotor load.

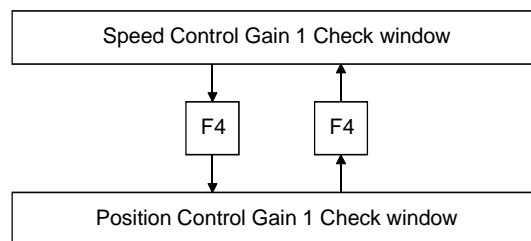
The servo diagnosis procedure consists of the following 2 functions:

- Speed control gain 1 check ..... This occurs only when the ADU is used.
- Position control gain 1 check

(1) "Execute" window transition during servo diagnosis procedure

The execute window for the desired servo diagnosis check function is designated at the Servo Test Function Selection window.

Once an execute window is opened, switching to the execute windows for other check functions is possible by pressing the [F4] key (the switching progression is shown below).



#### POINTS

- (1) Operation disabled when VIRT. mode is selected  
Servo diagnosis cannot be executed when VIRT. mode is selected.  
If a message indicates that the operation cannot be executed in VIRT. mode, when each check is run, the VIRT. mode is currently selected.  
Switch to the REAL mode before conducting the servo diagnosis. (See Section 12.12.)
- (2) Precautions regarding parameter setting changes:  
The speed control gain 1 and position control gain 1 parameter settings can be changed in the servo diagnosis operation.  
If a "CANNOT CHANGE SERVO PARAMETER." error message is displayed, this indicates that the in-position signal is OFF.  
Try again after checking that the in-position signal is ON.
- (3) GSV22PE operation restrictions during a servo diagnosis  
When the Servo Diagnosis Execute window is open, the Menu Selection window will not be displayed when the [F11] key is pressed.  
To display the Menu Selection window, press the [Esc] key to return to the Servo Test Function Selection window, then press the [F11] key.  
The HELP function is inoperative when the Servo Diagnosis Execute window is open.

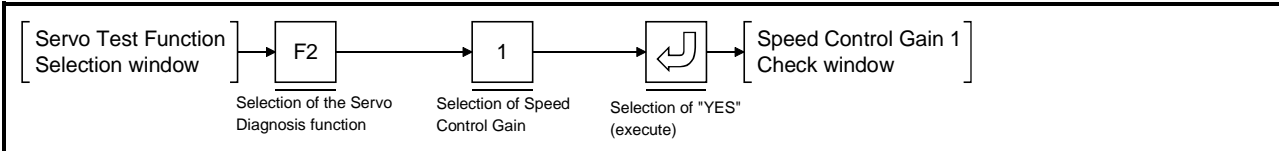
## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### 12.3.1 Speed control gain 1 check

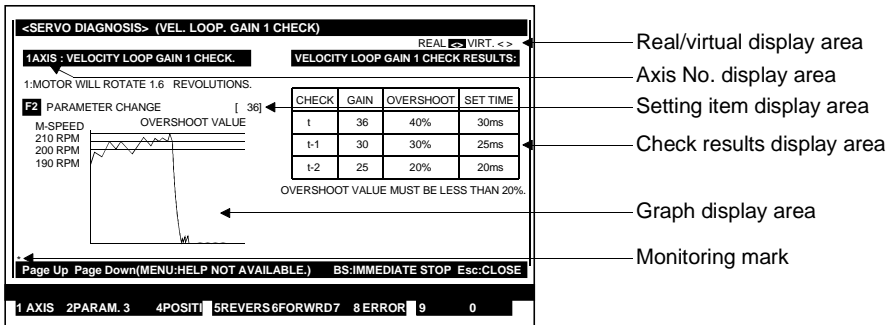
The speed control gain 1 check involves checking the servomotor's responsibility and stability in response to input commands (rpm) from the servo system CPU. The following items should be checked: the response time (settling time on stopping), the overshoot amount, and a vibration check while stopped.

(1) Executing the speed control gain 1 check

#### [Procedure for Displaying the Speed Control Gain 1 Check Window]



#### [Speed Control Gain 1 Check window]



#### [Display/Setting Content]

The servomotor is rotated 1.6 turns (forward/reverse) in accordance with designated setting value, and the results are displayed at the Check Results display area at the right side of the window. (Results for 3 operations are displayed. When more than 3 operations are executed, the results are updated to show the 3 most recent results.)

The rotation speed (rpm) and settling time are shown at the graph.

Verify that the designated speed control gain 1 setting is appropriate.

If the settling time is too long, or if the overshoot amount is excessive, the setting value should be changed.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

**Axis No. display area** The axis number where the check is being executed is displayed here.

#### POINTS

- (1) Servomotor operation during check function  
When a check is executed, the motor is rotated 1.6 turns in one direction, then 1.6 turns in the opposite direction, returning to its original position.
- (2) Results display content  
The overshoot amount and settling time are calculated according to the formulas shown below.  

$$\text{OVERSHOOT} = (\text{Max. motor speed} - 200)(\text{rpm}) / 200 (\text{rpm}) \times 100\%$$

$$\text{SET TIME} : \text{Time for rotation speed to become } 200 \pm 10 \text{ rpm}$$
 The display data is cleared when the TEST mode is established.  
When there is no data for the previous 2 operations, "0" is displayed for those items.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

<b>Setting item display area</b>	The current speed control gain 1 setting value is displayed here.
<b>Check results display area</b>	The overshoot amount, settling time, and speed control gain 1 setting value detected when the motor was stopped are shown in a table format. (Displayed for three operations: the current operation and the two previous operations.)
<b>Graph display area</b>	The overshoot amount and settling time detected when the motor was stopped are indicated here.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>[Key Operation]</b>	
<b>Executing the Check operation (forward)</b>	<ol style="list-style-type: none"><li>1) Press the [F6] key to execute a speed control gain 1 check in the FORWARD direction (rotation direction in which address value increases). At the "MOTOR FORWARD? YES/NO" dialog box which is then displayed, select the "YES" item. The motor will be rotated 1.6 turns in the forward direction, the speed control gain 1 setting will be checked, and the results will be displayed at the window.</li></ol>
<b>Executing the Check operation (reverse)</b>	<ol style="list-style-type: none"><li>1) Press the [F5] key to execute a speed control gain 1 check in the REVERSE direction (rotation direction in which address value decreases). At the "MOTOR REVERSE? YES/NO" dialog box which is then displayed, select the "YES" item. The motor will be rotated 1.6 turns in the reverse direction, the speed control gain 1 setting will be checked, and the results will be displayed at the window.</li></ol>
<b>Changing the parameter setting</b>	<ol style="list-style-type: none"><li>1) Press the [F2] key to change the speed control gain 1 setting value. The Parameter Change window will then be displayed (See Section 12.3.1(1)(b).)</li></ol>
<b>Axis No. setting</b>	<ol style="list-style-type: none"><li>1) To change the axis number where a check is to be executed, press the [F1] key. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed. Enter the number of the axis where a check is to be executed, then press the [Enter] key. After the axis number has been designated, the system will return to the Speed Control Gain 1 Check window. To abort the axis designation procedure, press the [Esc] key.</li><li>2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number (relative to the axis number indicated at the Present Axis Number display area).</li></ol>
<b>Switching to the Position Loop Gain Check window</b>	<ol style="list-style-type: none"><li>1) Press the [F4] key to conduct a position control gain 1 check at the currently selected axis. The Position Control Gain 1 Check window will then be displayed. (See Section 12.3.1(2).)</li></ol>
<b>Error Reset</b>	<ol style="list-style-type: none"><li>1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9.)</li></ol>
<b>Window CLOSE</b>	<ol style="list-style-type: none"><li>1) Press the [Esc] key to close the Speed Control Gain 1 Check window, and return to the Servo Test Function Selection window.</li></ol>

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

POINT
(1) Stroke limit check Press the [F5] or [F6] key. If a message indicates that the operation cannot be started (error code 106), the stroke limit upper or lower limit value set with the "axis data setting" fixed parameter setting function in the servo data setting mode exceeds +19200 or -19200 pulses, respectively, when converted to command pulses. Designate appropriate stroke limit max/min value settings before conducting the speed control gain 1 check.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- (2) Changing the speed control gain 1 setting value  
 If the check results indicate that the speed control gain 1 setting is inappropriate, the setting value can be changed at the Parameter Change window.

### [Speed Control Gain 1 Parameter Change Window]

The screenshot displays the 'Speed Control Gain 1 Parameter Change Window'. It includes a graph showing motor speed (M-SPEED) with an overshoot value of 36. A table titled 'VELOCITY LOOP GAIN 1 CHECK RESULTS' shows the following data:

CHECK	GAIN	OVERSHOOT	SET TIME
t	36	40%	30ms
t-1	30	30%	25ms
t-2	25	20%	20ms

The 'PARAMETER CHANGE' window shows the current setting 'VEL LOOP GAIN1' as 36 and the new value being entered as 36. The window also displays 'CHANGE DATA' and 'End:SET Esc:STOP'.

### [Display/Setting Content]

Change the speed control gain 1 setting value as follows:

If the settling time is too long, increase the speed control gain 1 setting value. If the overshoot amount is excessive, reduce the speed control gain 1 setting value.

**Setting item display area** The current speed control gain 1 setting value is displayed here.

**Data input area** The newly entered speed control gain 1 value is displayed here.

### [Key Operation]

#### Data Setting

- Using the numeric keys, key in the desired setting value, then press the [Enter] key.

#### Setting END

- After the new data has been registered, press the [End] key to close the Parameter Change window.  
 The system will then return to the Speed Control Gain 1 Check window where the newly designated setting will be displayed at the setting value display area.

#### Setting Abort

- To close the Parameter Change window without registering the newly entered data, press the [Esc] key.  
 The system will then return to the Speed Control Gain 1 Check window where the unchanged setting will be displayed at the setting value display area.

### ! CAUTION

! If the speed control gain 1 value is increased by too much when changing the setting, the overshoot amount will become excessive, and the motor will vibrate (abnormal motor noise) while stopped. Set the speed control gain 1 value to an appropriate value, without increasing it too much.



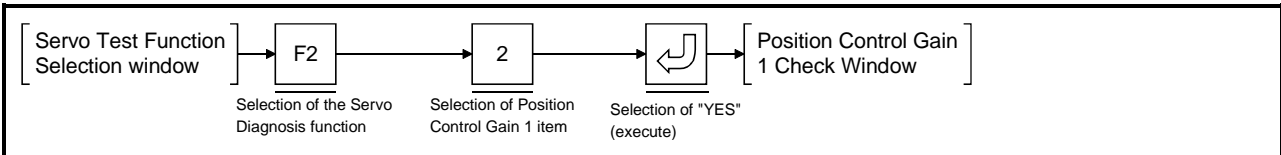
# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12.3.2 Position control gain 1 check

The position control gain 1 check involves checking the servomotor's responsibility and stability in response to input commands (rpm) from the servo system CPU. The following items should be checked: the settling time on stopping, the undershoot amount, and a vibration check while stopped.

(1) Executing the position control gain 1 check

### [Procedure for Displaying the Position Control Gain 1 Check Window]



### [Position Control Gain 1 Check Window]

CHECK	GAIN	OVERSHOOT	SET TIME
t	36	20%	30ms
t-1	34	18%	25ms
t-2	32	16%	20ms

### [Display/Setting Content]

The servomotor is rotated 1.5 turns (forward/reverse) in accordance with designated setting value, and the results are displayed at the CHECK RESULTS display area at the right side of the window. (Results for 3 operations are displayed. When more than 3 operations are executed, the results are updated to show the 3 most recent results.) The rotation speed (rpm) and settling time are shown at the graph. Check that the designated position control gain 1 setting is appropriate. If the settling time is too long, or if the undershoot amount is excessive, the setting value should be changed.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

**Axis No. display area** The axis number where the check is being executed is displayed here.

**Setting item display area** The current speed control gain 1 setting value is displayed here.

POINT
(1) Results display content The undershoot amount and settling time are calculated according to the formulas shown below. UNDERSHOOT: (Max. rpm of reverse rotation when motor is stopped) / 100 (rpm) × 100% SET TIME: Time required from a command value of "0" until motor stops Vibration amplitude : Max. position droop value (deviation from positioned point) The display data is cleared when the TEST mode is established. When there is no data for the previous 2 operations, "0" is displayed for those items.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

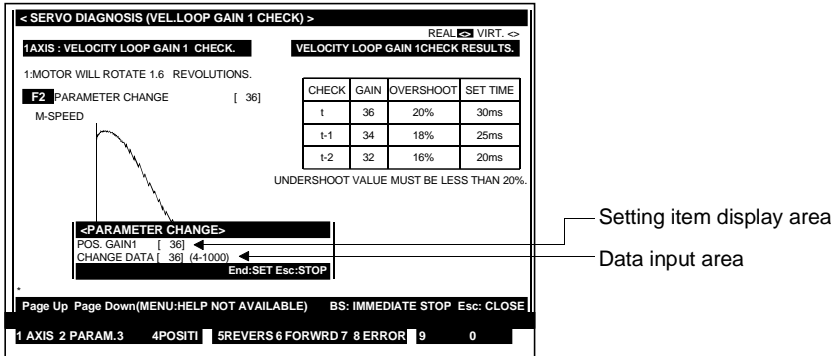
<b>Check results display area</b>	The undershoot amount, settling time, vibration amplitude, and position control gain 1 setting value detected when the motor was stopped are shown in a table format.
<b>Graph display area</b>	The overshoot amount and settling time detected when the motor was stopped are indicated here.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>[Key Operation]</b>	
<b>Executing the Check operation (forward)</b>	<p>1) Press the [F6] key to execute a speed control gain 1 check in the FORWARD direction (rotation direction in which address value increases). At the "MOTOR FORWARD? YES/NO" dialog box which is then displayed, select the "YES" item. The motor will be rotated 1.5 turns in the forward direction, the speed control gain 1 setting will be checked, and the results will be displayed at the window.</p>
<b>Executing the Check operation (reverse)</b>	<p>1) Press the [F5] key to execute a speed control gain 1 check in the REVERSE direction (rotation direction in which address value decreases). At the "MOTOR REVERSE? YES/NO" dialog box which is then displayed, select the "YES" item. The motor will be rotated 1.5 turns in the reverse direction, the speed control gain 1 setting will be checked, and the results will be displayed at the window.</p>
<b>Changing the parameter setting</b>	<p>1) Press the [F2] key to change the speed control gain 1 setting value. The Parameter Change window will then be displayed (See Section 12.3.1(1)(b).)</p>
<b>Axis No. setting</b>	<p>1) To change the axis number where a check is to be executed, press the [F1] key. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed. Enter the number of the axis where a check is to be executed, then press the [Enter] key. After the axis number has been designated, the system will return to the Speed Control Gain 1 Check window. To abort the axis designation procedure, press the [Esc] key.</p> <p>2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number (relative to the axis number indicated at the Present Axis Number display area).</p>
<b>Error Reset</b>	<p>1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9.)</p>
<b>Window CLOSE</b>	<p>1) Press the [Esc] key to close the Speed Control Gain 1 Check window, and return to the Servo Test Function Selection window.</p>

POINT
<p>(1) Stroke limit check Press the [F5] or [F6] key. If a message indicates that the operation cannot be started (error code 106), the stroke limit upper or lower limit value set with the "axis data setting" fixed parameter setting function in the servo data setting mode exceeds +18000 or -18000 pulses, respectively, when converted to command pulses. Designate appropriate stroke limit max/min value settings before conducting the speed control gain 1 check.</p>

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- (2) Changing the position control gain 1 setting  
 If the check results indicate that the position control gain 1 setting is inappropriate, the setting value can be changed at the Parameter Change window.

### [Position Control Gain 1 Parameter Change Window]



### [Display/Setting Content]

Change the position control gain 1 setting value as follows:

If the settling time is too long, increase the speed control gain 1 setting value. If the undershoot amount is excessive, reduce the position control gain 1 setting value.

**Setting item display area** The current speed control gain 1 setting value is displayed here.

**Data input area** The newly entered speed control gain 1 value is displayed here.


### [Key Operation]

**Data setting** 1) Using the numeric keys, key in the desired setting value, then press the [Enter] key.

**Setting END** 1) After the new data has been registered, press the [End] key to close the Parameter Change window.  
 The system will then return to the Position Control Gain 1 Check window where the newly designated setting will be displayed at the setting value display area.

**Setting Abort** 1) To close the Parameter Change window without registering the newly entered data, press the [Esc] key.  
 The system will then return to the Position Control Gain 1 Check window where the unchanged setting will be displayed at the setting value display area.

### CAUTION

 A servo error (excessive error) results during high-speed operation if the position control gain 1 set value is too low. Set the position control gain 1 value to an appropriate value, which is not too low. Be careful not to decrease the speed control gain 1 value excessively.

# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

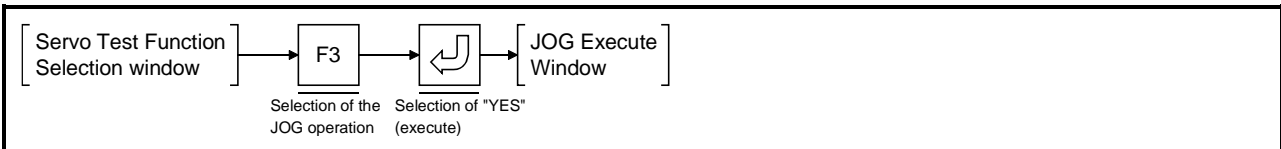
## 12.4 JOG Operation

JOG operation can be executed individually for each axis, based on the designated JOG operation data settings.

The JOG operation of servomotors connected to an ADU or MR-[ ]-B in REAL mode is conducted as a virtual servomotor JOG operation in the VIRT. mode.

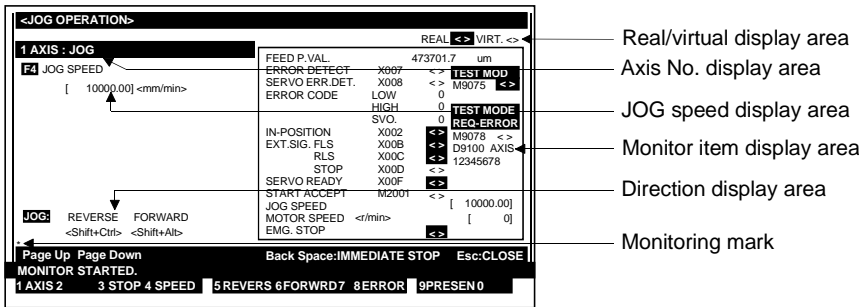
Be sure to designate the necessary JOG data settings before beginning JOG operation, designating the settings at the parameter block which is to be used.

### [Procedure for Displaying the JOG Execute Window]



### For REAL Mode

### [JOG Execute Window] (For A273UHCPU)



### [Display/Setting Content]

Execute forward and reverse JOG operations at each axis after checking that the START conditions shown at the right side of the window (monitor item display area) are satisfied.

Forward JOG START conditions				Reverse JOG START conditions			
ERROR DETECT		<input type="checkbox"/>	OFF	ERROR DETECT		<input type="checkbox"/>	OFF
EXT. SIG.	FLS	<input checked="" type="checkbox"/>	ON	EXT. SIG.	RLS	<input checked="" type="checkbox"/>	ON
	STOP	<input type="checkbox"/>	OFF		STOP	<input type="checkbox"/>	OFF
SERVO READY		<input checked="" type="checkbox"/>	ON	SERVO READY		<input checked="" type="checkbox"/>	ON

If the monitoring results indicate that the above START conditions are not satisfied, the JOG operation will not start when the [F5] or [F6] key is pressed. The monitor item which fails to satisfy the START conditions will be highlighted, and a "CANNOT EXECUTE" error message will be displayed.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

**Axis No. display area** The axis number where the JOG operation is occurring is displayed here.

**JOG speed display area** The JOG speed setting is displayed here.

POINT
(1) REAL mode operation Check from the REAL/VIRT. mode display area that REAL mode is currently selected before executing JOG operation. If VIRT. mode is selected, switch to REAL mode before conducting JOG operation. (See Section 12.12.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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<b>Monitor item display area</b>	Either the feed present value, or the ON/OFF status of the monitored device is displayed here.
<b>Direction display area</b>	The JOG direction (forward or reverse) is indicated here.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>[Key Operation] JOG speed setting/change</b>	1) Press the [F4] key to change the JOG speed setting. At the JOG Speed Setting window which is then displayed, designate the desired speed setting. (See Section 12.2.4(2).)
<b>Executing forward JOG</b>	1) After designating the JOG speed setting, press and hold down the [F6] key (or [Shift] + [Alt] keys) to execute a forward JOG operation. The motor will rotate at the designated JOG speed as long as the [F6] key (or [Shift] + [Alt] keys) remains pressed. When the [F6] key (or [Shift] + [Alt] keys) is released, the motor will decelerate and stop.
<b>Executing reverse JOG</b>	1) After designating the JOG speed setting, press and hold down the [F5] key (or [Shift] + [Ctrl] keys) to execute a reverse JOG operation. The motor will rotate at the designated JOG speed as long as the [F5] key (or [Shift] + [Ctrl] keys) remains pressed. When the [F5] key (or [Shift] + [Ctrl] keys) is released, the motor will decelerate and stop.
<b>Designating the axis No.</b>	1) To change the axis number where a JOG operation is to be executed, press the [F1] key. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed. Enter the number of the axis where a check is to be executed, then press the [Enter] key. After the axis number has been designated, the system will return to the JOG Execute window. To abort the axis designation procedure, press the [Esc] key. 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.
<b>Monitor STOP/RESTART</b>	1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
<b>Error Reset</b>	1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9.)
<b>Present Position Change</b>	1) Press the [F9] key to change the feed present value. The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)
<b>Window CLOSE</b>	1) Press the [Esc] key to close the JOG Execute window and return to the Servo Test Function Selection window.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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<b>POINT</b>
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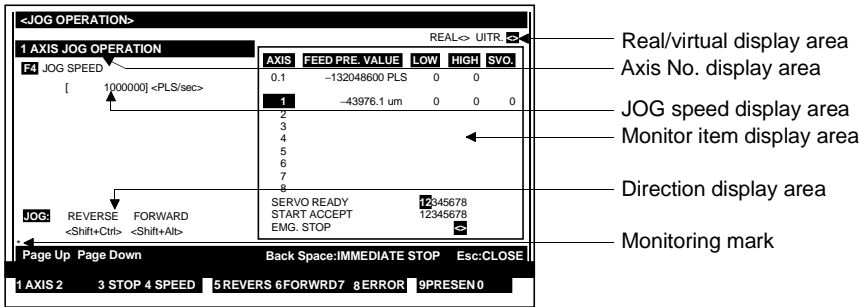
If previously used JOG operation keys ([F6]/[F5]) are held pressed when a personal computer with high processing speed is used, there are cases that JOG operation cannot be executed correctly with a beep keep sounding. Use the following keys to execute JOG operation when using a personal computer with high processing speed.

- Forward rotation..... [Shift] + [Alt] keys  
(previously [F6] key was used)
- Reverse rotation ..... [Shift] + [Ctrl] keys  
(previously [F5] key was used)

# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

**For VIRT. Mode**

## [JOG Execute Window] (For A273UHCPU)



### [Display/Setting Content]

Check from the monitor items displayed to the right of the window that the following start conditions are met before executing forward or reverse JOG operation of the virtual servomotor shafts.

Forward JOG START conditions

START accept	1	2	3	4	5	6	7	8	OFF
--------------	---	---	---	---	---	---	---	---	-----

Reverse JOG START conditions

START accept	1	2	3	4	5	6	7	8	OFF
--------------	---	---	---	---	---	---	---	---	-----

If the monitoring results indicate that the above START conditions are not satisfied, the JOG operation will not start when the [F5] or [F6] key is pressed.

The monitor item which fails to satisfy the START conditions will be highlighted, and a "CANNOT EXECUTE" error message will be displayed.

**Real/virtual display area** Shows that the current mode is VIRT. mode.

**Axis No. display area** Displays the virtual servomotor shaft numbers applicable for JOG operation.

**JOG speed display area** The JOG speed setting is displayed here.

- Monitor item display area**
- 1) AXIS.....Displays the virtual servomotor shaft number for JOG operation.
  - 2) Output module shaft number .....Displays the shaft number (REAL mode motor shaft corresponding to output destination amplifier number of output module) of the output module connected to the virtual servomotor shaft for JOG operation.
  - 3) FEED PRE.VALUE .....Displays the commanded positioning address or travel value to the virtual servomotor shaft or output module shaft.
  - 4) LOW.....Displays the error code of a minor positioning error occurring for the virtual servomotor shaft or output module shaft.
  - 5) HIGH.....Displays the error code of a major positioning error occurring for the virtual servomotor shaft or output module shaft.
  - 6) SVO.....Displays the error code of a servo amplifier error occurring for the output module shaft.

<b>POINT</b>
<p>VIRT. mode operation</p> <p>Check from the REAL/VIRT. mode display area that VIRT. mode is currently selected before executing JOG operation. If REAL mode is selected, switch to VIRT. mode before conducting JOG operation. (See Section 12.12.)</p>

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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<b>Direction display area</b>	The JOG direction (forward or reverse) is indicated here.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>[Key Operation]</b>	
<b>JOG speed setting/change</b>	1) Press the [F4] key to change the JOG speed setting. The JOG operation speed setting window is displayed. (See Section 12.2.4 (2).)
<b>Executing forward JOG</b>	1) After designating the JOG speed setting, press and hold down the [F6] key (or [Shift] + [Alt] keys) to execute a forward JOG operation. The motor will rotate at the designated JOG speed as long as the [F6] key (or [Shift] + [Alt] keys) remains pressed. When the [F6] key (or [Shift] + [Alt] keys) is released, the motor will decelerate and stop.
<b>Executing reverse JOG</b>	1) After designating the JOG speed setting, press and hold down the [F5] key (or [Shift] + [Ctrl] keys) to execute a reverse JOG operation. The motor will rotate at the designated JOG speed as long as the [F5] key (or [Shift] + [Ctrl] keys) remains pressed. When the [F5] key (or [Shift] + [Ctrl] keys) is released, the motor will decelerate and stop.
<b>Designating the axis No.</b>	1) Press the [F1] key designate the axis number and change the virtual servomotor shaft for JOG operation. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed. Enter the number of the axis where a check is to be executed, then press the [Enter] key. After the axis number has been designated, the system will return to the JOG Execute window. To abort the axis designation procedure, press the [Esc] key. 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.
<b>Monitor STOP/RESTART</b>	1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
<b>Error Reset</b>	1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9.)
<b>Present Position Change</b>	1) Press the [F9] key to change the feed present value or the present value in one-turn of the cam-axis in the virtual mode. The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10). To change the present value in one-turn of the cam-axis, press the [F4] key. The present value can be changed in the Present Value (Cam-axis One-turn) window. (See Section 12.13.)



## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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**Switching status display axes (when using A273UHCPU (32-axis specification))**

- 1) Press the [F10] key (Status) to monitor the servo ready signals and start accept signals for more than eight axes.  
The display changes to the previous and subsequent pages of monitored axes.

**Window CLOSE**

- 1) Press the [Esc] key to close the JOG Execute window and return to the Servo Test Function Selection window.

<b>POINT</b>
<p>If previously used JOG operation keys ([F6]/[F5]) are held pressed when a personal computer with high processing speed is used, there are cases that JOG operation cannot be executed correctly with a beep keep sounding. Use the following keys to execute JOG operation when using a personal computer with high processing speed.</p> <ul style="list-style-type: none"><li>• Forward rotation.....[Shift] + [Alt] keys (previously [F6] key was used)</li><li>• Reverse rotation .....[Shift] + [Ctrl] keys (previously [F5] key was used)</li></ul>

# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12.5 Manual Pulse Generator Operation

The designated axis is controlled in accordance with the number of pulse inputs from the manual pulse generator.

The manual pulse generator operation of servomotors connected to an ADU or MR-[ ]-B in REAL mode is conducted as a virtual servomotor manual pulse generator operation in the VIRT. mode.

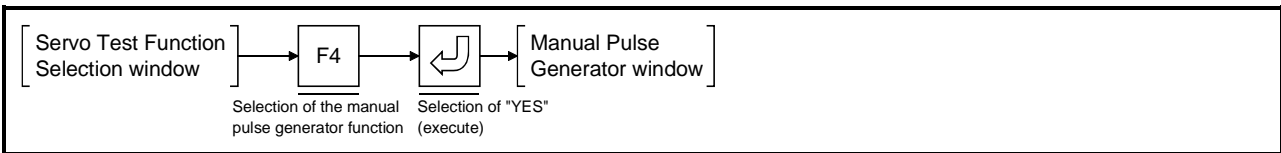
(When in the TEST mode, the simultaneous use of multiple manual pulse generators, or the use of a single manual pulse generator to simultaneously start more than one axis, is prohibited.)

Before executing manual pulse generator operation, the 1. to 6. procedure shown below is required. After the 1. to 6. settings have been designated, execute a test run using the manual pulse generator.

1. Manual pulse generator DISABLE setting
2. Manual pulse generator selection (not for A17[ ])
3. Axis number setting
4. 1-pulse input magnification setting
5. Smoothing magnification setting
6. Manual pulse generator ENABLE setting (writing of manual pulse generator operation data to the servo system CPU)

(1) Executing manual pulse generator operation

### [Procedure to Display The Manual Pulse Generator Execute Window]



### For REAL Mode

### [Manual Pulse Generator Execute Window] (For A273UHCPU)

Labels on the right side of the screenshot:

- Real/virtual display area
- Axis No. display area
- Manual pulse generator display area
- Manual pulse generator enabled/disabled display area
- 1-pulse input magnification display area
- Smoothing magnification display area
- Monitor item display area
- Travel value display area
- Monitoring mark

### POINTS

- (1) REAL mode operation  
Check from the REAL/VIRT. mode display area that REAL mode is currently selected before executing manual pulse generator operation. If VIRT. mode is selected, switch to REAL mode before conducting manual pulse generator operation. (See Section 12. 12.)
- (2) The travel value per manual pulse generator pulse is as shown below.
  - The travel value is calculated by the following formula:  
[Travel value] = [manual pulse generator 1-pulse input magnification] × A
  - The "A" value varies according to the system-of-units being used, as shown below.

System-of-Units	A
μm	0.1
inch	0.00001
degree	0.00001
PULSE	1

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### [Display/Setting Content]

<b>Real/virtual display area</b>	Shows that the current mode is REAL mode.
<b>Axis No. display area</b>	The axis number where the manual pulse generator operation is being executed is displayed here.
<b>Manual pulse generator display area</b>	The manual pulse generator which is being used is indicated here.
<b>Manual pulse generator enabled/disabled display area</b>	Displays if manual pulse generator is enabled or disabled. The current status is highlighted.
<b>1-pulse input magnification display area</b>	The magnification per manual pulse generator pulse input is indicated here.
<b>Smoothing magnification display area</b>	Displays the magnification to smooth leading edges and trailing edges during manual pulse generator operation.
<b>Monitor item display area</b>	Either the feed present value, or the ON/OFF status of the monitored device is indicated here.
<b>Travel value display area</b>	The travel value per manual pulse generator pulse is indicated here.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)



### [Key Operation]

<b>Manual pulse generator DISABLED setting</b>	1) If manual pulse generator operation is enabled, before setting the manual pulse generator operating data (operating axis number, 1-pulse input magnification, smoothing magnification), press the [F5] key to open the manual pulse generator operation ENABLE/DISABLE window and disable manual pulse generator operation.
<b>Selecting the manual pulse generator</b>	1) Press the [F2] key to select the manual pulse generator where operation is to be executed. The selection is made at the Manual Pulse Generator Setting window which will be displayed. (See Section 12.5(2).) (Not for A171S)
<b>Designating the axis No.</b>	1) Press the [F1] key to designate the axis number where manual pulse generator operation is to be executed. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed. Enter the number of the axis where manual pulse generator operation is to be executed, then press the [Enter] key. After the axis number has been designated, the system will return to the Manual Pulse Generator Execute window. To abort the axis designation procedure, press the [Esc] key. 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.
<b>1-pulse input magnification setting</b>	1) Press the [F6] key to designate the 1-pulse input magnification setting at the 1-Pulse Input Magnification Setting window which will then be displayed. (See Section 12.5(3).)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

<b>Smoothing magnification setting</b>	1) Press the [F7] key to designate the smoothing magnification at the Smoothing Magnification Setting window which will then be displayed. (See Section 12.5(4).)
<b>Writing the designated manual pulse generator data settings</b>	1) To write the designated manual pulse generator data settings (axis number, 1-pulse input magnification, smoothing magnification) to the servo system CPU, press the [F5] key to open the Manual Pulse Generator ENABLE/DISABLE window, then select the ENABLE item. The operation data settings will then be written to the servo system CPU.
<b>Monitor STOP/RESTART</b>	1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
<b>Error Reset</b>	1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9.)
<b>Present position change</b>	1) Press the [F9] key to change the feed present value. The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)
<b>Window Close</b>	1) Press the [Esc] key to close the JOG Execute window and return to the Servo Test Function Selection window.

### CAUTION

-  Before executing manual pulse generator operation, always check that "ENABLE" is highlighted at the "PLS. GEN. PERMIT" display area. Failure to do so could result in unexpected machine motion with some machines.
-  After ending a manual pulse generator operation, always disable manual pulse generator operation.  
Failure to do so could result in unexpected machine motion with some machines.

### POINT

Precautions when ending manual pulse generator operation  
Axes where a manual pulse operation has been designated (where ENABLE has been designated at the "PLS. GEN. PERMIT" display area of the Manual Pulse Generator Execute window) can only be started from the manual pulse generator. When manual pulse generator operation is not being executed, the DISABLE setting must be designated.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

For VIRTUAL Mode

### [Manual Pulse Generator Execute Window] (For A273UHCPU)

Labels pointing to the screenshot:

- Real/virtual display area
- Axis No. display area
- Manual pulse generator display area
- Manual pulse generator enabled/disabled display area
- 1-pulse input magnification display area
- Smoothing magnification display area
- Monitor item display area
- Travel value display area
- Monitoring mark

### [Display/Setting Content]

#### Real/virtual display area

Shows that the current mode is VIRT. mode.

#### Axis No. display area

The axis number where the manual pulse generator operation is being executed is displayed here.

#### Manual pulse generator display area

The manual pulse generator which is being used is indicated here.

#### Manual pulse generator enable/disable display area

Displays if manual pulse generator is enabled or disabled. The current status is highlighted.

#### 1-pulse input magnification display area

The magnification per manual pulse generator pulse input is indicated here.

#### Monitor item display area

- 1) AXIS ..... Displays the virtual servomotor shaft number for manual pulse generator operation.
- 2) Output module shaft number ..... Displays the shaft number (REAL mode motor shaft corresponding to output destination amplifier number of output module) of the output module connected to the virtual servomotor shaft for manual pulse generator operation.
- 3) FEED PRE.VALUE ..... Displays the commanded positioning address or travel value to the virtual servomotor shaft or output module shaft.
- 4) LOW ..... Displays the error code of a minor positioning error occurring for the virtual servomotor shaft or output module shaft.
- 5) HIGH ..... Displays the error code of a major positioning error occurring for the virtual servomotor shaft or output module shaft.
- 6) SVO..... Displays the error code of a servo amplifier error occurring for the output module shaft.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

POINTS										
<p>(1) VIRT. mode operation Check from the REAL/VIRT. mode display area that VIRT. mode is currently selected before executing manual pulse generator operation. If REAL mode is selected, switch to VIRT. mode before conducting manual pulse generator operation. (See Section 12.12.)</p> <p>(2) The travel value per manual pulse generator pulse is as shown below.</p> <ul style="list-style-type: none"> <li>• The travel value is calculated by the following formula: [Travel value] = [manual pulse generator 1-pulse input magnification] × A</li> <li>• The "A" value varies according to the system-of-units being used, as shown below.</li> </ul> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">System-of-Units</th> <th style="text-align: center;">A</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">μm</td> <td style="text-align: center;">0.1</td> </tr> <tr> <td style="text-align: center;">inch</td> <td style="text-align: center;">0.00001</td> </tr> <tr> <td style="text-align: center;">degree</td> <td style="text-align: center;">0.00001</td> </tr> <tr> <td style="text-align: center;">PULSE</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>	System-of-Units	A	μm	0.1	inch	0.00001	degree	0.00001	PULSE	1
System-of-Units	A									
μm	0.1									
inch	0.00001									
degree	0.00001									
PULSE	1									

**Smoothing magnification display area**

Displays the magnification to smooth leading edges and trailing edges during manual pulse generator operation.

**Travel value display area**

The travel value per manual pulse generator pulse is indicated here.

**Monitoring mark**

Indicates that monitoring is in progress.  
(Not displayed when monitoring is stopped.)

**[Key Operation]**

**Manual pulse generator DISABLE setting**

1) If manual pulse generator operation is enabled, before setting the manual pulse generator operating data (operating axis number, 1-pulse input magnification, smoothing magnification), press the [F5] key to open the manual pulse generator operation ENABLE/DISABLE window and disable manual pulse generator operation.

**Selecting the manual pulse generator**

1) Press the [F2] key to select the manual pulse generator where operation is to be executed.  
The selection is made at the Manual Pulse Generator Setting window which will be displayed. (See Section 12.5(2).) (Not for A171S)

**Designating the axis No.**

1) Press the [F1] key to designate the axis number where manual pulse generator operation is to be executed.  
The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed.  
Enter the number of the axis where manual pulse generator operation is to be executed, then press the [Enter] key.  
After the axis number has been designated, the system will return to the Manual Pulse Generator Execute window.  
To abort the axis designation procedure, press the [Esc] key.

2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.



**1-pulse input magnification setting**

1) Press the [F6] key to designate the 1-pulse input magnification setting at the 1-Pulse Input Magnification Setting window which will then be displayed.  
(See Section 12.5(3).)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- Smoothing magnification setting** 1) Press the [F7] key to designate the smoothing magnification at the Smoothing Magnification Setting window which will then be displayed.  
(See Section 12.5(4).)
- Writing the designated manual pulse generator data settings** 1) To write the designated manual pulse generator data settings (axis number, 1-pulse input magnification, smoothing magnification) to the servo system CPU, press the [F5] key to open the Manual Pulse Generator ENABLE/DISABLE window, then select the ENABLE item.  
The operation data settings will then be written to the servo system CPU.
- Monitor STOP/RESTART** 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
- Error Reset** 1) Press the [F8] key to execute an error reset.  
An Error Reset window will then be displayed. (See Section 12.9.)
- Present position change** 1) Press the [F9] key to change the feed present value or the present value in one-turn of the cam-axis in the virtual mode.  
The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)  
To change the present value in one-turn of the cam-axis, press the [F4] key.  
The present value can be changed in the Present Value (Cam-axis One-turn) window. (See Section 12.13.)
- Switching status display axes (when using A273UHCPU (32-axis specification))** 1) Press the [F10] key (Status) to monitor the Servo Ready signals and Start Accept signals for more than eight axes.  
The display changes to the previous and subsequent pages of monitored axes.
- Window CLOSE** 1) Press the [Esc] key to close the JOG Execute window and return to the Servo Test Function Selection window.

### CAUTION

-  Before executing manual pulse generator operation, always check that "ENABLE" is highlighted at the "PLS. GEN. PERMIT" display area. Failure to do so could result in unexpected machine motion with some machines.
-  After ending a manual pulse generator operation, always disable manual pulse generator operation.  
Failure to do so could result in unexpected machine motion with some machines.

### POINT

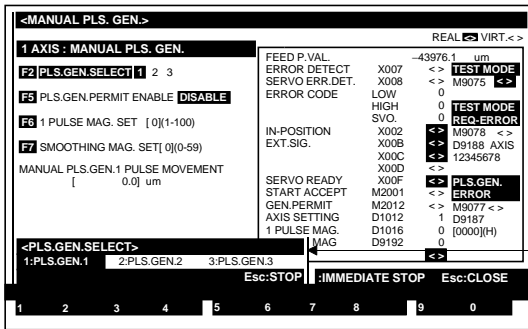
Precautions when ending manual pulse generator operation  
Axes where a manual pulse operation has been designated (where "ENABLE" has been designated at the Manual Pulse Generator ENABLE/DISABLE display area of the Manual Pulse Generator Execute window) can only be started from the manual pulse generator. When manual pulse generator operation is not being executed, the "DISABLE" setting must be designated.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

(2) Manual pulse generator settings (Not for A17[ ])

Designate the manual pulse generator which is to be used as shown below.

### [Manual Pulse Generator Setting Window] (For A273UHCPU)



Manual pulse generator setting window

### [Display/Setting Content]

Designate the desired manual pulse generator from those which are connected to connector SIF2 terminals P1-P3 at the servo input module.

### [Key Operation]

#### Selecting the manual pulse generator

- Use the numeric keys to key in the number of the desired manual pulse generator.  
For the manual pulse generator connected to terminal P1 (manual pulse generator No. 1) ..... Enter [1].  
For the manual pulse generator connected to terminal P2 (manual pulse generator No. 2) ..... Enter [2].  
For the manual pulse generator connected to terminal P3 (manual pulse generator No. 3) ..... Enter [3].  
When a [1] to [3] key is pressed, the system will return to the Manual Pulse Generator Execute window, and the No. of the selected manual pulse generator will be displayed at the Manual Pulse Generator display area.
- The manual pulse generator can also be selected by using the [←]/[→] keys to move the cursor to the desired manual pulse generator position, and then pressing the [Enter] key.  
The system will then return to the Manual Pulse Generator Execute window, and the number of the selected manual pulse generator will be displayed at the Manual Pulse Generator display area.

#### Setting abort

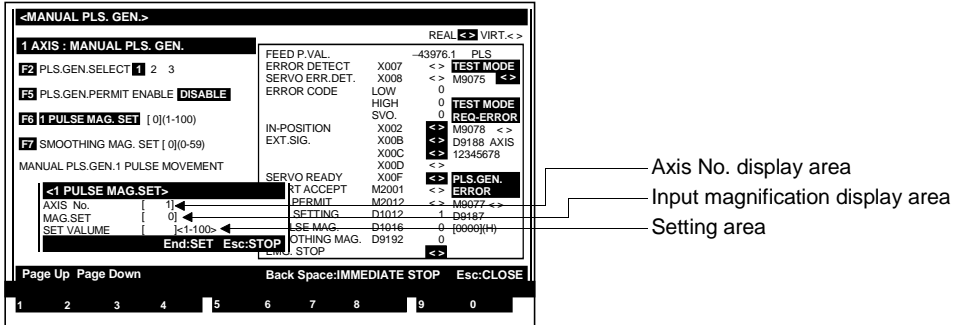
- Press the [Esc] key to abort the manual pulse generator selection procedure.



## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- (3) 1-pulse input magnification setting  
Designate the magnification setting per-pulse input from the manual pulse generator, as shown below.

### [1-Pulse Input Magnification Setting Window] (For A273UHCPU)



### [Display/Setting Content]

- Axis No. display area** The axis number where a magnification setting is to be executed is displayed here.
- Input magnification display area** The previously designated input magnification setting is displayed here.
- Setting area** The input magnification setting is designated here.

### [Key Operation]

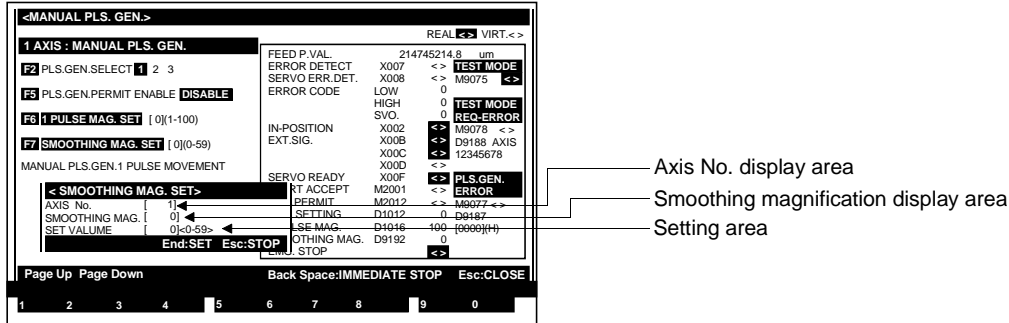
- 1-pulse input magnification setting**
- Using the numeric keys, key in the desired 1-pulse input magnification setting, then press the [End] key.  
The setting operation will be ended, and the system will return to the Manual Pulse Generator Execute window.  
The designated setting value will be displayed at the "1-PULSE MAG.SET" display area.
- Setting abort**
- To abort the axis designation procedure, press the [Esc] key.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### (4) Smoothing magnification setting

Designate a magnification setting which ensures a smooth leading and trailing edge in manual pulse generator operation, as shown below.

#### [Smoothing Magnification Setting Window] (For A273UHCPU)



#### [Display/Setting Content]

**Axis No. display area** The axis number where a magnification setting is to be executed is displayed here.

**Smoothing magnification display area** The previously designated input magnification setting is displayed here.

**Setting area** The input magnification setting is designated here.

#### [Key Operation]

**Smoothing magnification setting**

- Using the numeric keys, key in the desired smoothing magnification setting, then press the [End] key.  
The setting operation will be ended, and the system will return to the Manual Pulse Generator Execute window.  
The designated setting value will be displayed at the "SMOOTHING MAG. SET" display area.

**Setting abort**

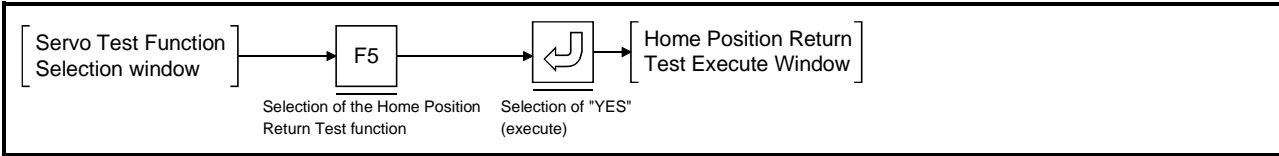
- To abort the axis designation procedure, press the [Esc] key.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

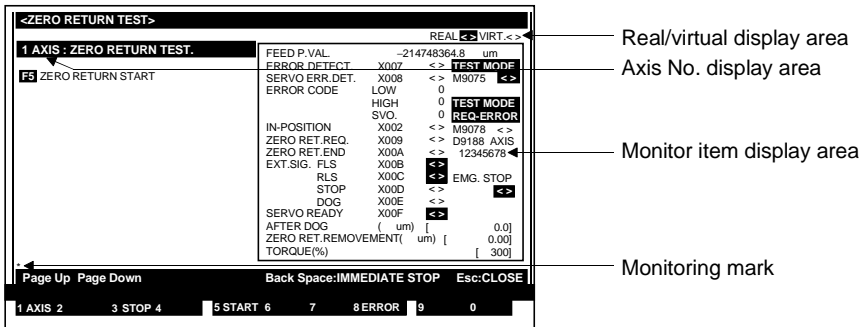
### 12.6 Home Position Return Test

A home position return operation is executed as shown below.

#### [Procedure for Displaying the Home Position Return Test Execute Window]



#### [Home Position Return Test Execute Window] (For 273UHCPU)



#### [Display/Setting Content]

Execute a home position return operation to determine if the home position return data (designated with the Axis Data Setting function of the Servo Data Setting mode) is appropriate.

- Home position return direction
- Home position return format
- Home position address
- Home position return speed
- Creep speed
- Travel value after dog
- Home position return second travel value

**Axis No. display area** The axis number where a home position return is being executed is indicated here.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

- Monitor item display area**
- 1) ZERO RET. REQ. .... Indicates whether or not a home position return is in progress.
  - 2) ZERO RET. END ..... Indicates whether or not a home position return has been executed.
  - 3) EXT. SIG. DOG..... Indicates whether or not the near-zero point dog has switched ON.
  - 4) AFTER DOG ..... Indicates the travel value which occurred after the dog (for "count type" home position returns).
  - 5) ZERO RET. REMOVAL ..... Indicates the travel value that was required to reach the zero-point position after operation was stopped by near-zero dog OFF (at "near-zero point" home position returns).

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

POINT
<p>Home position return can only be executed in REAL mode.            Even when starting the system in VIRT. mode, execute home position return in REAL mode. After checking the home position return request signal is off for all axes, switch to VIRT. mode.            The error message "CANNOT be EXECUTED IN VIRTUAL MODE" displayed after pressing the [F5] key indicates that the VIRT. mode is designated.            Execute the home position return after switching to REAL mode. (See Section 12. 12.)</p>

### Monitoring mark

Indicates that monitoring is in progress.  
 (Not displayed when monitoring is stopped.)

### [Key Operation] Starting the home position return

- 1) To execute the home position return operation, designate the axis number where the operation is to be executed, then press the [F5] key.  
 A home position return will then be executed at the designated axis.  
 For "near-zero point" type, switch the near-zero point dog from ON to OFF.  
 For "count" type, switch the near-zero point dog ON.  
 The home position return operation is completed when the home position return END signal switches ON.

### Designating the axis No.

- 1) Press the [F1] key to designate the axis number where manual pulse generator operation is to be executed.  
 The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed.  
 Enter the number of the axis where a home position return is to be executed, then press the [Enter] key.  
 After the axis number has been designated, the system will return to the Home Position Return Test Execute window.  
 To abort the axis designation procedure, press the [Esc] key.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

### Error Reset

- 1) Press the [F8] key to execute an error reset.  
 An Error Reset window will then be displayed. (See Section 12.9.)

### Window CLOSE

- 1) Press the [Esc] key to close the Home Position Test Execute window and return to the Servo Test Function Selection window.

POINT
<p>Note when operating the system in VIRT. mode</p> <ul style="list-style-type: none"> <li>• Home position return can only be executed in REAL mode.</li> <li>• Even when starting the system in VIRT. mode, execute home position return in REAL mode. After checking the home position return request signal is off for all axes, switch to VIRT. mode.</li> </ul>

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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### 12.7 Servo Program Test

Start the servo program which has been written to the servo system CPU, in order to execute a test run.

The test run can be executed by either of the following 2 methods.

- Individual START

Only the designated servo program (1 type) is started in order to check its operation.

- Sequential START

Sequential operation of multiple servo programs (up to 30) can be started in their registered START order to check their operation.

There are two methods for sequential START: the "continuous START" and "interrupted START" methods described below.

- (a) Continuous START

Following execution of the No. "n" program, the No. "n+1" program is automatically started.

After execution of all designated programs is completed, operation is automatically stopped.

- (b) Interrupted START

Following execution of the No. "n" program, operation is automatically stopped.

In order to start the No. "n + 1" program, the [F5] key must be pressed.

POINTS
(1) Note when starting a REAL mode servo program Servo programs allocated as REAL mode programs when they are created cannot be started in VIRT. mode. Check that the program is for REAL mode use before starting it.
(2) Note when starting a VIRT. mode servo program Servo programs allocated as VIRT. mode programs when they are created cannot be started in REAL mode. Check that the program is for VIRT. mode use before starting it.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

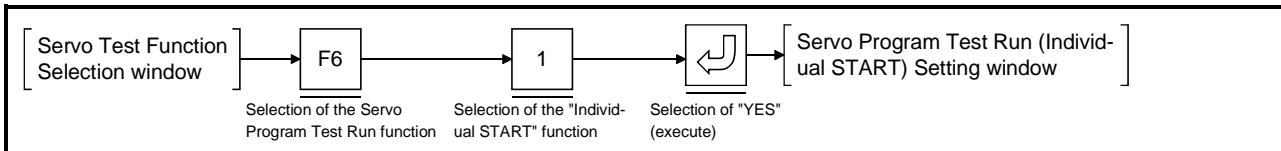
### 12.7.1 Individual START

Only the designated servo program is executed.  
(The designated program will be shown on-screen for confirmation.)

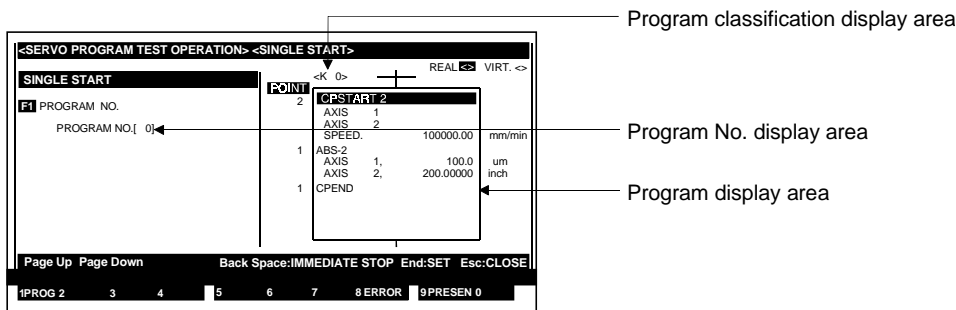
#### (1) Servo program test run (Individual start) setting

The procedure for reading out the test run servo program in order to check it is described below.

#### [Procedure to Display The Servo Program Test Run (Individual START) Setting Window]



#### [Servo Program Test Run (Individual START) Setting Window]



#### [Display/Setting Content]

Designate the servo program No. for which a test run is to be executed.

**Program classification display area** Whether the read servo program is for REAL mode or VIRTUAL mode use is shown here.

**Program No. display area** The program No. read at the Program Readout window is displayed here.

**Program display area** The program which was read is displayed here.

#### [Key Operation]

##### Designating a program readout

- 1) Press the [F1] key to read out the servo program to be started.  
The Program Readout window will then be displayed.
- 2) Using the numeric keys, key in the number of the program to be started, then press the [Enter] key.  
The system will then return to the Servo Program Test Run (Individual START) Setting window where the designated program No. will be displayed at the Program No. display area. The content of that servo program will be displayed at the Program display area.  
If the designated servo program No. doesn't exist, a "PROGRAM NOT FOUND" error message will be displayed. If this occurs, repeat the program readout procedure, designating an existing program No.

##### Checking the program

- 1) Check the servo program by reading the speed-switching instructions and the constant-speed control instructions. If the read servo program cannot be displayed totally in the program display area, use the [Page Up]/[Page Down] keys to scroll the servo program up or down.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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- Setting END** 1) Press the [End] key to end the servo program setting procedure.  
The Servo Program Test Run (Individual START) Execute window will then be displayed. (See Section 12.7.1(2).)
- Setting abort** 1) Press the [Esc] key to abort the servo program test run (individual START) setting operation and return to the Servo Test Function Selection window.
- Error Reset** 1) Press the [F8] key to execute an error reset.  
An Error Reset window will then be displayed. (See Section 12.9.)
- Present position change** 1) Press the [F9] key to change the feed present value.  
The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)

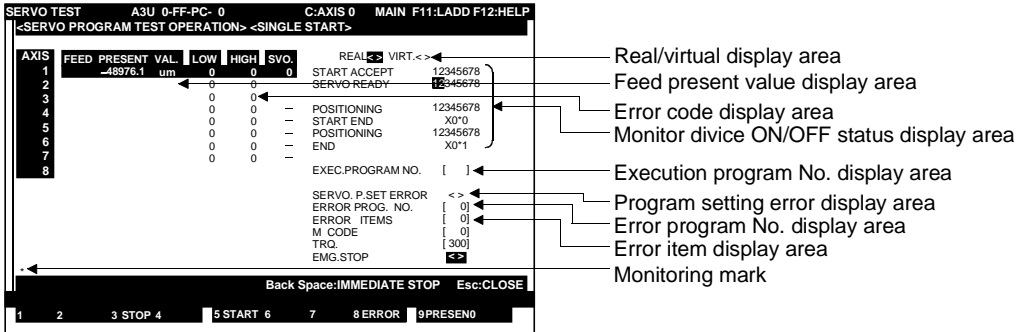
POINT
Checking REAL/VIRT. mode VIRT. mode servo programs cannot be read in REAL mode, and REAL mode programs cannot be read in VIRT. mode. When the error message "PROGRAM NOT FOUND" is displayed, check whether the No. and designated No. are allocated in real or VIRT. mode.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

(2) Executing the servo program test run (Individual START)

For REAL Mode

[Servo Program Test Run (Individual START) Execute Window] (For A273UHCPU)



### [Display/Setting Content]

Check the servo program content by running the program.  
Error checks and feed present value changes can be executed at this time.

- |  |   |
|--|---|
| <b>Real/virtual display area</b>                 | Shows that the programs currently being executed are for REAL mode.   |
| <b>Feed present value display area</b>           | The positioning address and travel value of the operating axis are displayed here.  |
| <b>Error code display area</b>                   | Error codes of minor/major positioning errors which occurred at the operating axis are displayed here.  |
| <b>Monitor device ON/OFF status display area</b> | <ol style="list-style-type: none"> <li>1) START ACCEPT..... The axis number for which the start accept signal is ON is highlighted.</li> <li>2) SERVO READY ..... The axis number for which the servo READY signal is ON is highlighted.</li> <li>3) POSITIONING START END ..... The axis number for which the positioning start completed signal is ON is highlighted.</li> <li>4) POSITIONING END ..... The axis number for which the positioning completed signal is ON is highlighted.</li> </ol> |
| <b>Execution program No. display area</b>        | The program No. which is currently being executed is indicated here.  |
| <b>Program setting error display area</b>        | The servo program setting error flag's ON/OFF status is indicated here.   |
| <b>Error program No. display area</b>            | The servo program No. where a setting error occurred is indicated here.   |
| <b>Error item display area</b>                   | The error code for the servo program setting error is indicated here.   |
| <b>Monitoring mark</b>                           | Indicates that monitoring is in progress.<br>(Not displayed when monitoring is stopped.)  |



## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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### [Key Operation]

#### Program START

- 1) Press the [F5] key to execute a test run operation.

#### Program STOP

- 1) Press the [F6] key to stop a servo program which is in progress. The servomotor will decelerate and stop in accordance with the "deceleration time" setting designated with the Parameter Block Setting function of the Servo Data Setting mode.
- 2) To start the same servo program again, press the [F5] key.
- 3) To change the program No., press the [Esc] key to return to the Servo Program Test Run Setting window, then designate the desired program No.

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Error Reset

- 1) Press the [F8] key to execute an error reset at the Error Reset window which is displayed. (See section 12.9.)

#### Present position change

- 1) Press the [F9] key to change the feed present value. The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)

#### Switching Status Display Axes (when using A273UHCPU (32-axis specification))

- 1) Press the [F10] key (Status) to monitor the servo READY signals and start accept signals for more than eight axes. The display changes to the previous and subsequent pages of monitored axes.
  - START ACCEPT
  - SERVO READY
  - POSITIONING START END
  - POSITIONING END

#### Window CLOSE

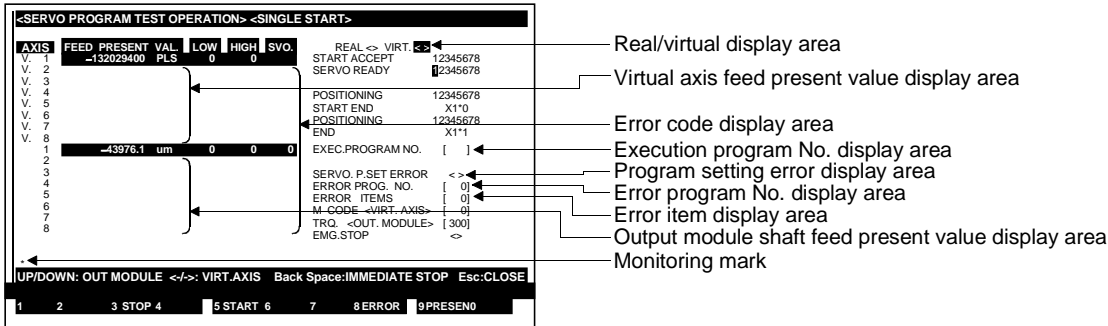
- 1) Press the [Esc] key to close the Servo Program Test Run (Sequential START) Execute window and return to the Servo Program Test Run (Sequential START) Setting window.

POINT
START conditions A servo program operation START is possible only when all axes are stopped.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

For VIRT. Mode

### [Servo Program Test Run (Individual START) Execute Window] (For A273UHCPU)



#### [Display/Setting Content]

Check the servo program content by running the program.  
Error checks and feed present value changes can be executed at this time.

- |   |   |
|---|---|
| <b>Real/virtual display area</b>                          | Shows that the programs currently being executed are for VIRT. mode.  |
| <b>Virtual axis feed present value display area</b>       | Displays the positioning address/travel value for operating virtual servo motor shafts  |
| <b>Error code display area</b>                            | Displays minor, major, and servo error codes occurring in the operating virtual servo motor shaft or output module shaft.   |
| <b>Monitor device ON/OFF status display area</b>          | <ol style="list-style-type: none"> <li>1) START ACCEPT..... Highlights the virtual servo motor shaft No. where the START accept signal is ON.</li> <li>2) SERVO READY ..... Highlights the virtual servo axis No. where the servo READY signal is ON.</li> <li>3) POSITIONING START END..... Highlights the virtual servo motor shaft No. where the positioning start completed signal is ON.</li> <li>4) POSITIONING END..... Highlights the virtual servo motor shaft No. where the positioning complete signal is ON.</li> </ol> |
| <b>Execution program No. display area</b>                 | The program No. which is currently being executed is indicated here.  |
| <b>Program setting error display area</b>                 | The servo program setting error flag's ON/OFF status is indicated here.   |
| <b>Error program No. display area</b>                     | The servo program No. where a setting error occurred is indicated here.   |
| <b>Error item display area</b>                            | The error code for the servo program setting error is indicated here.   |
| <b>Output module axis feed present value display area</b> | Displays the positioning address/travel value for the operating output module axis (REAL mode motor shaft corresponding to output destination No. set in the output module).  |
| <b>Monitoring mark</b>                                    | Indicates that monitoring is in progress.<br>(Not displayed when monitoring is stopped.)  |

#### [Key Operation]

##### Program START

- 1) Press the [F5] key to execute a test run operation.

##### Program STOP

- 1) Press the [F6] key to stop a servo program which is in progress. The servomotor will decelerate and stop in accordance with the "deceleration time" setting designated with the Parameter Block Setting function of the Servo Data Setting mode.
- 2) To start the same servo program again, press the [F5] key.
- 3) To change the program No., press the [Esc] key to return to the Servo Program Test Run Setting window, then designate the desired program No.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- M code CONFIRM** 1) To confirm the M code designated for the VIRT. mode servo motor shaft used during servo program execution, press the [←] [→] keys, to highlight the axis No. of the designated virtual servo motor shaft.  
The M code designated for the designated virtual servo motor shaft is displayed in the M code display area.
- Torque limit value CONFIRM** 1) To confirm the torque limit value set for the VIRT. mode servo motor shaft used during servo program execution, press the [↑] [↓] keys, to highlight the axis No. of the designated output module axis.  
The torque limit value set for the designated output module axis is displayed in the torque limit value display area.
- Monitor STOP/RESTART** 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
- Error Reset** 1) Press the [F8] key to execute an error reset.  
An Error Reset window will then be displayed. (See Section 12.9.)
- Present position change** 1) Press the [F9] key to change the feed present value or the present value in one-turn of the cam-axis in the virtual mode.  
The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)  
To change the present value in one-turn of the cam-axis, press the [F4] key.  
The present value can be changed in the Present Value (Cam-axis One-turn) window. (See Section 12.13.)
- Switching status display axes (when using A273UHCPU (32-axis specification))** 1) Press the [F10] (Status) key to monitor the servo READY signals and start accept signals for more than eight axes.  
The monitored axis will be changed to the previous axis number and next axis number.
- START ACCEPT
  - SERVO READY
  - POSITIONING START END
  - POSITIONING END
- Window CLOSE** 1) Press the [Esc] key to close the Servo Program Test Run (Sequential START) Execute window and return to the Servo Program Test Run (Sequential START) Setting window.

<b>POINT</b>	
	START conditions
	A servo program operation START is possible only when all axes are stopped.

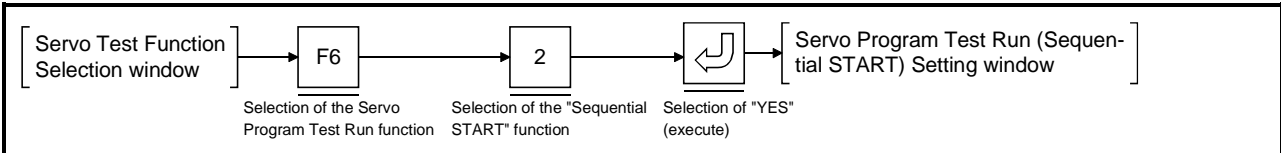
## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### 12.7.2 Sequential START of up to 30 programs

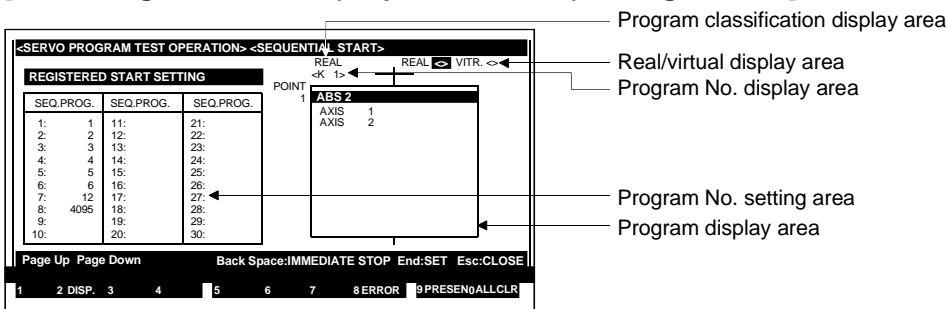
The starting order of the created servo programs is registered, and the programs are then executed consecutively.

(1) Servo program test run (sequential START) setting

#### [Procedure for Displaying the Servo Program Test Run (Sequential START) Setting Window]



#### [Servo Program Test Run (Sequential START) Setting Window]



#### [Display/Setting Content]

Designate the starting No. and the starting order.

**Program classification display area** Whether the servo program is for REAL mode or VIRT. mode is shown here.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

**Program No. display area** The program number of the program content display is indicated here.

**Program No. setting area** The numbers of the programs to be started are entered here.

**Program display area** The contents of the designated program number are displayed here.

#### [Key Operation]

##### Setting the program No.

- 1) Use the cursor control keys (arrow keys) to move the cursor to the desired start sequence position, then use the numeric keys to key in the program number. Use the cursor control keys (arrow keys) to move the cursor to the desired start sequence position, then use the numeric keys to key in the program number for that position.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

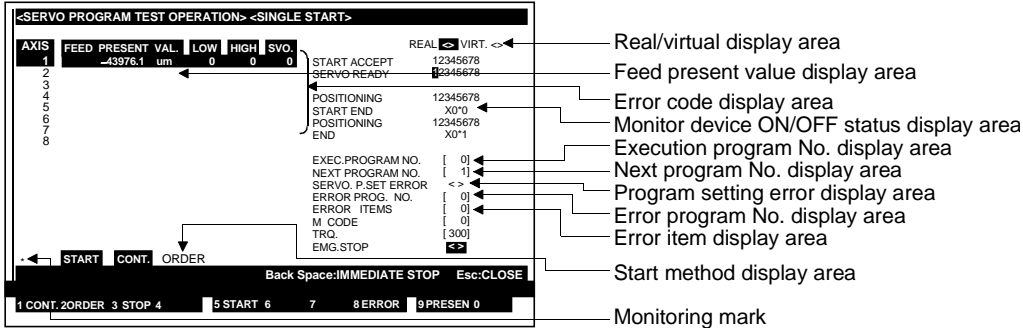
- Displaying the program**
- 1) To check the contents of a servo program, move the cursor to the start sequence position (line) where the program to be checked is located, then press the [F2] key.  
The contents of that program will then be displayed at the Program display area.  
Check the readout of the speed switching and constant speed control instructions. If the servo program contents cannot be contained in the Program display area, use the [Page Up]/[Page Down] keys to scroll up and down.
- Inserting a program No.**
- 1) To insert 1 line in the start sequence list, use the cursor control keys (arrow keys) to move the cursor to the position (line) where an insertion is desired, then press the [F1] key while pressing the [Shift] key.  
1 line will be inserted at the cursor position, and subsequent lines will be moved down accordingly.  
Finally, enter the inserted program No.
- Deleting a program No.**
- 1) To delete a program No. (1 line), use the cursor control keys (arrow keys) to move the cursor to the start sequence line to be deleted, then press the [F2] key while the [Shift] key is pressed.  
The program No. at the cursor position will be deleted, and the subsequent lines will be moved up accordingly.
- Setting data ALL CLEAR**
- 1) Press the [F10] key to clear all servo programs shown at the Program No. display area.
- Setting END**
- 1) Press the [End] key to end the execution program No. setting procedure.  
The Servo Program Test Run (Sequential START) Execute window will then be displayed. (See Section 12.7.2(2).)
- Setting Abort**
- 1) Press the [Esc] key to abort the Servo Program Test Run (Sequential START) Setting operation and return to the Servo Test Function Selection window.
- Error Reset**
- 1) Press the [F8] key to execute an error reset.  
An Error Reset window will then be displayed. (See Section 12.9.)
- Present position change**
- 1) Press the [F9] key to change the feed present value or the present value in one-turn of the cam-axis in the virtual mode.  
The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)  
To change the present value in one-turn of the cam-axis, press the [F4] key.  
The present value can be changed in the Present Value (Cam-axis One-turn) window. (See Section 12.13.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

(2) Executing the servo program test run (sequential START)

For REAL Mode

### [Servo Program Test Run (Sequential START) Execute Window] (For A273UHCPU)



### [Display/Setting Content]

Check the servo program content by running the program.

Error checks and feed present value changes can be executed at this time.

<b>Real/virtual display area</b>	Shows that the programs currently being executed are for REAL mode.
<b>Feed present value display area</b>	The positioning address and travel value of the operating axis are displayed here.
<b>Error code display area</b>	Error codes of minor/major servo errors which occurred at the operating axis are displayed here.
<b>Monitor device ON/OFF status display area</b>	<ol style="list-style-type: none"> <li>1) START ACCEPT..... The axis number for which the start accept signal is ON is highlighted.</li> <li>2) SERVO READY ..... The axis number for which the servo READY signal is ON is highlighted.</li> <li>3) POSITIONING START END ..... The axis number for which the positioning start completed signal is ON is highlighted.</li> <li>4) POSITIONING END ..... The axis number for which the positioning completed signal is ON is highlighted.</li> </ol>
<b>Execution program No. display area</b>	The program No. which is currently being executed is indicated here.
<b>Next program No. display area</b>	The program number to be started following completion of the current program is indicated here.
<b>Program setting error display area</b>	The servo program setting error flag's ON/OFF status is indicated here.
<b>Error program No. display area</b>	The servo program No. where a setting error occurred is indicated here.
<b>Error item display area</b>	The error code for the servo program setting error is indicated here.
<b>Start method display area</b>	The START method (continuous or order) for sequential program operation is indicated by a highlight display. With the continuous method, each successive program is started in a continuous manner without a break. With the order method, a break occurs between successive programs.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### **[Key Operation] START method switching**

- 1) Press the [F2] key to switch from the continuous to the interrupted method, and the [F1] key to switch from the interrupted to the continuous method. (The default setting is "CONT".)  
START method switching can be executed either before or during servo program operation.

### **Program START**

- 1) Press the [F5] key to execute a test run operation.
  - a) For continuous start:  
Servo programs are started in order, beginning from the first program. After all registered programs are completed, the servomotor will stop, and a "COMPLETED." message will be displayed.
  - b) For interrupted start:  
The servomotor will stop after the first program is completed. To start the second program, press the [F5] key again. When all registered programs are completed, a "COMPLETED." message will be displayed.

### **Program STOP**

- 1) Press the [F6] key to stop a servo program which is in progress. The servomotor will decelerate and stop in accordance with the "deceleration time" setting designated at the Parameter Block Setting function of the Servo Data Setting mode.  
To re-start the servo program, press the [Esc] key to return to the Servo Program Test Run Setting window, then designate the desired program No.

### **Monitor STOP/RESTART**

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

### **Error Reset**

- 1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9.)

### **Present position change**

- 1) Press the [F9] key to change the feed present value. The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)

### **Switching status display axes (when using A273UHCPU (32-axis specification))**

- 1) Press the [F10] key (Status) to monitor the servo ready signals and start accept signals for more than eight axes. The monitored axis will be changed to the previous axis number and next axis number.
  - START ACCEPT
  - SERVO READY
  - POSITIONING START END
  - POSITIONING END

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### Window CLOSE

- 1) Press the [Esc] key to close the Servo Program Test Run (Sequential START) Execute window and return to the Servo Program Test Run (Sequential START) Setting window.

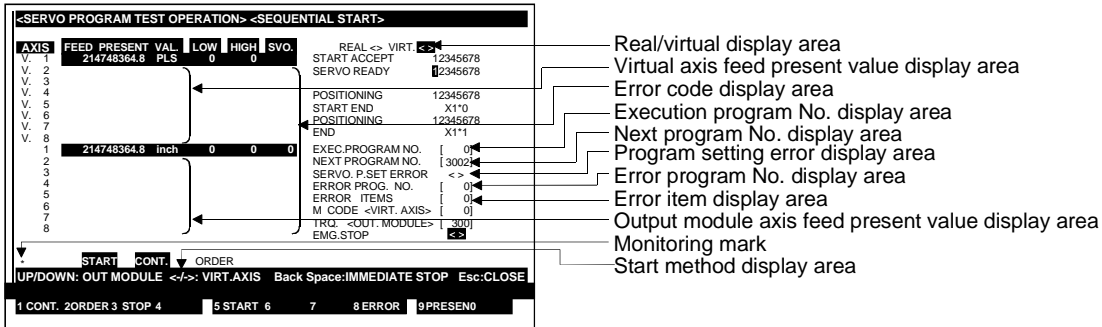
<b>POINT</b>
START conditions A servo program operation START is possible only when all axes are stopped.

**For VIRT. Mode**



## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### [Servo Program Test Run (Sequential START) Execute Window] (For A273UHCPU)



#### [Display/Setting Content]

Check the servo program content by running the program.  
Error checks and feed present value changes can be executed at this time.

- |   |  |
|---|--|
| <b>Real/virtual display area</b>                          | Shows that the programs currently being executed are for VIRT. mode.   |
| <b>Virtual axis feed present value display area</b>       | Displays the positioning address/travel value for operating virtual servo motor shafts.  |
| <b>Error code display area</b>                            | Displays minor, major, and servo error codes occurring in the operating virtual servo motor shaft, or the minor, major, and servo error codes occurring in the output module axis.   |
| <b>Monitor device ON/OFF status display area</b>          | <ol style="list-style-type: none"> <li>1) START ACCEPT..... Virtual axis Nos. where the START accept signal is ON are highlighted.</li> <li>2) SERVO READY ..... Output module Nos. where the servo READY signal is ON are highlighted.</li> <li>3) POSITIONING START END ..... Virtual axis Nos. where the positioning start completion signal is ON are highlighted.</li> <li>4) POSITIONING END..... Virtual axis Nos. where the positioning completed signal is ON are highlighted.</li> </ol> |
| <b>Execution program No. display area</b>                 | The program No. which is currently being executed is indicated here.   |
| <b>Next program No. display area</b>                      | The program number to be started following completion of the current program is indicated here.  |
| <b>Program setting error display area</b>                 | The servo program setting error flag's ON/OFF status is indicated here.  |
| <b>Error program No. display area</b>                     | The servo program No. where a setting error occurred is indicated here.  |
| <b>Error item display area</b>                            | The error code for the servo program setting error is indicated here.  |
| <b>M code display area</b>                                | The M code designated in the executing servo program is shown here.  |
| <b>Torque display area</b>                                | The torque limit value set in the executing servo program is shown here.   |
| <b>Output module axis feed present value display area</b> | The positioning address/travel value for operating output module axis (REAL mode motor shaft corresponding to the output destination amplifier designated in the output module).   |
| <b>Start method display area</b>                          | Whether the registered program is continuously started (CONT.) or intermittently started (ORDER) is highlighted here.  |
| <b>Monitoring mark</b>                                    | Indicates that monitoring is in progress.<br>(Not displayed when monitoring is stopped.)   |

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### **[Key Operation] START method switching**

- 1) Press the [F2] key to switch from the continuous to the order method, and the [F1] key to switch from the interrupted to the continuous method. (The default setting is "CONT".)  
START method switching can be executed either before or during servo program operation.

### **Program START**

- 1) Press the [F5] key to execute a test run operation.
  - a) For continuous start:  
Servo programs are started in order, beginning from the first program. After all registered programs are completed, the servomotor will stop, and an "COMPLETED." message will be displayed.
  - b) For interrupted start:  
The servomotor will stop after the first program is completed. To start the second program, press the [F5] key again. When all registered programs are completed, a "COMPLETED." message will be displayed.

### **Program STOP**

- 1) Press the [F6] key to stop a servo program which is in progress. The servomotor will decelerate and stop in accordance with the "deceleration time" setting designated at the Parameter Block Setting function of the Servo Data Setting mode.  
To re-start the servo program, press the [Esc] key to return to the Servo Program Test Run Setting window, then designate the desired program No.

### **M code CONFIRM**

- 1) To confirm the M code designated for the VIRT. mode servo motor shaft used during servo program execution, press the [←] [→] keys, to highlight the axis No. of the designated virtual servo motor shaft.  
The M code designated for the designated virtual servo motor shaft is displayed in the M code display area.

### **Torque limit value CONFIRM**

- 1) To confirm the torque limit value set for the VIRT. mode servo motor shaft used during servo program execution, press the [↑] [↓] keys, to highlight the axis No. of the designated output module axis.  
The torque limit value set for the designated output module axis is displayed in the torque limit value display area.

### **Monitor STOP/RESTART**

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

### **Error Reset**

- 1) Press the [F8] key to execute an error reset.  
An Error Reset window will then be displayed. (See Section 12.9.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### Present Position Change

- 1) Press the [F9] key to change the feed present value or the present value in one-turn of the cam-axis in the virtual mode.  
The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)  
To change the present value in one-turn of the cam-axis, press the [F4] key.  
The present value can be changed in the Present Value (Cam-axis One-turn) window. (See Section 12.13.)

### Switching status display axes (when using A273UHCPU (32-axis specification))

- 1) Press the [F10] key (Status) to monitor the Servo Ready signals and Start Accept signals for more than eight axes.  
The monitored axis will be changed to the previous axis number and next axis number.
  - START ACCEPT
  - SERVO READY
  - POSITIONING START END
  - POSITIONING END

### Window CLOSE

- 1) Press the [Esc] key to close the Servo Program Test Run (Sequential START) Execute window and return to the Servo Program Test Run (Sequential START) Setting window.

<b>POINT</b>
START conditions A servo program operation START is possible only when all axes are stopped.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

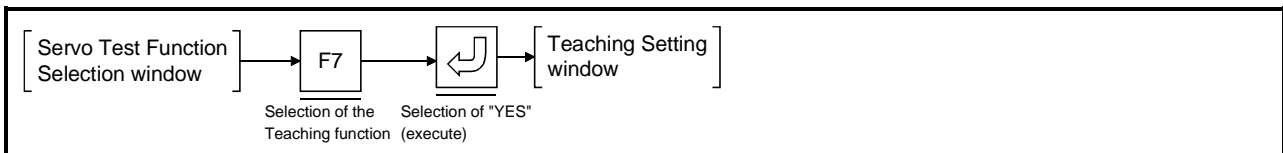
### 12.8 Designating Servo Program Addresses by the Teaching Function

An address reached by a JOG or manual pulse generator operation can be written to a specified servo program.

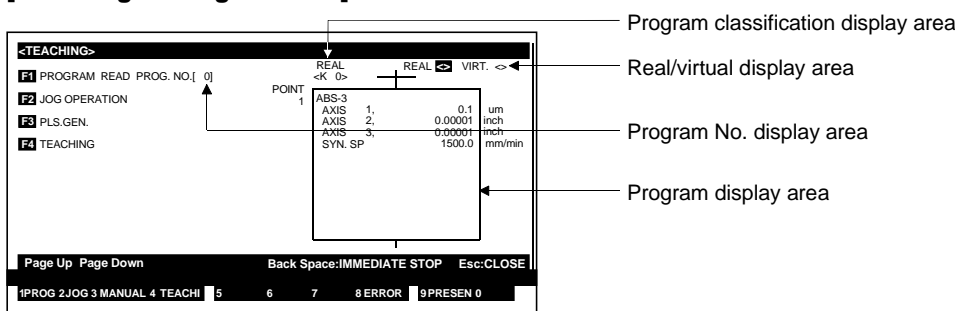
The servo program to be specified must be created in advance in the Servo Programming mode and written to the CPU. (An address of "0", with a rather slow commanded speed is recommended.)

#### (1) Teaching setting

#### [Procedure for Displaying the Teaching Setting Window]



#### [Teaching Setting Window]



#### [Display/Setting Content]

The teaching procedure shown below is required for each operation.

1. Designating a program readout
2. JOG or manual pulse generator operation
3. Present value writing
4. Program registration

**Program classification display area** Whether the servo program is for REAL mode or VIRT. mode is shown here.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

**Program No. display area** The program No. read at the Program Readout window is displayed here.

**Program display area** The program which was read is displayed here.

#### [Key Operation]

##### Designating a program readout

- 1) Press the [F1] key to read out the servo program where an address is to be written.  
The Program Readout window will then be displayed.
- 2) Use the numeric keys to input a servo program number where an address is to be written, and press the [Enter] key.  
The system will then return to the Teaching Setting window where the designated program number will be displayed at the Program No. display area.  
The content of that servo program will be displayed at the Program display area.  
If the designated servo program No. does not exist, a "NO APPLICABLE PROGRAM" error message will be displayed. If this occurs, repeat the program readout procedure, designating an existing program number.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

- |   |  |
|---|--|
| <b>Checking the program</b>                                   | 1) Check the readout of the speed switching and constant speed control instructions. If the servo program contents cannot be contained in the Program display area, use the [Page Up]/[Page Down] keys to scroll up and down.  |
| <b>Switch to the JOG Operation Execute window</b>             | 1) Press the [F2] key to execute a JOG operation in order to reach the feed present value which is to be written to the specified servo program. The JOG operation can be executed when the JOG Execute window is displayed. (See Section 12.8(2).)  |
| <b>Switching to the Manual Pulse Generator Execute Window</b> | 1) Press the [F3] key to execute a manual pulse generator operation in order to reach the feed present value which is to be written to the specified servo program.<br>Execute a manual pulse generator operation at the Manual Pulse Generator Execute Window. (See Section 12.8 (3).)  |
| <b>Switching to the Teaching Execute Window</b>               | 1) Press the [F4] key to execute a JOG/manual pulse generator operation in order to reach the feed present value which is to be written to the specified servo program.<br>The feed present value and the servo program can be registered at the Teaching Execute window which will be displayed. (See Section 12.8(4).)   |
| <b>Error Reset</b>  | 1) Press the [F8] key to execute an error reset.<br>An Error Reset window will then be displayed. (See Section 12.9.)  |
| <b>Present position change</b>                                | 1) Press the [F9] key to change the feed present value or the present value in one-turn of the cam-axis in the virtual mode.<br>The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)<br>To change the present value in one-turn of the cam-axis, press the [F4] key. The present value can be changed in the Present Value (Cam-axis One-turn) window. (See Section 12.13.) |
| <b>Window CLOSE</b>   | 1) Press the [Esc] key to close the Teaching Execute window and return to the Servo Program Test Function Selection window.  |

<b>POINT</b>
--------------

**VIRT./REAL mode CONFIRM**

The teaching of REAL mode servo programs is not possible when the VIRT. mode is selected. Before teaching for a servo program for REAL mode use, check in the real/virtual display area that the REAL mode is selected.

The teaching of VIRT. mode servo programs is not possible when the REAL mode is selected. Before teaching for a servo program for VIRT. mode use, check in the real/virtual display area that the VIRT. mode is selected.

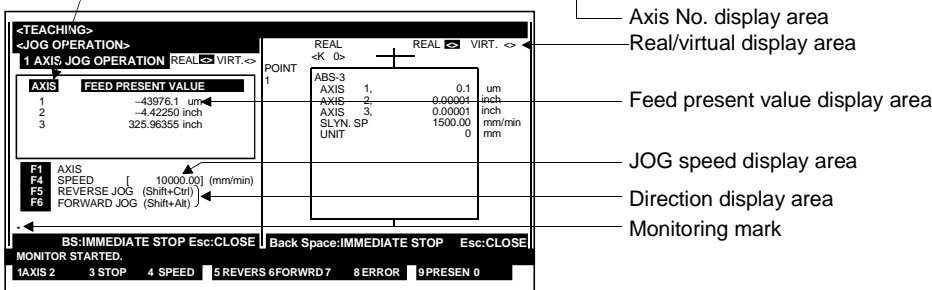
## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### (2) Executing JOG operation

The feed present value to be written to the specified servo program can be reached by executing JOG operation.

Be sure to designate the JOG operation settings at the parameter block to be used before attempting JOG operation.

#### [JOG Execute Window]



#### [Display/Setting Content]

**Axis No. display area** The axis number where the JOG operation is occurring is displayed here.

**Real/virtual display area** Shows whether current mode is REAL mode or VIRT. mode.

**Feed present value display area** The feed present value for the specified operation axis is displayed on the monitor.

**JOG speed display area** The JOG speed setting is displayed here.

**Direction display area** The JOG direction (forward or reverse) is indicated here.

**Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

#### [Key Operation]

**JOG speed setting/change** 1) Press the [F1] key to change the JOG speed setting. At the JOG Speed Setting window which is then displayed, designate the desired speed setting. (See Section 12.2.4(2).)

**Designating the axis No.** 1) Press the [F1] key to select the axis No. for JOG operation from the motor shafts and VIRT. mode servomotor shafts used in the designated servo program. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed.  
2) Enter the number of the axis where JOG operation is to be executed, then press the [Enter] key. After the axis number has been designated, the system will return to the JOG Execute window. To abort the axis designation procedure, press the [Esc] key.

**Executing forward JOG** 1) After designating the JOG speed setting, press and hold down the [F6] key (or [Shift] + [Alt] keys) to execute a forward JOG operation. The motor will rotate at the designated JOG speed as long as the [F6] key (or [Shift] + [Alt] keys) remains pressed. (The feed present value for the designated axis is displayed in the feed present value display area). When the [F6] key (or [Shift] + [Alt] keys) is released, the motor will decelerate and stop.

**Executing reverse JOG** 1) After designating the JOG speed setting, press and hold down the [F5] key (or [Shift] + [Ctrl] keys) to execute reverse JOG operation. The motor will rotate at the designated JOG speed as long as the [F5] key (or [Shift] + [Ctrl] keys) remains pressed. (The feed present value for the designated axis is displayed in the feed present value display area). When the [F5] key (or [Shift] + [Ctrl] key) is released, the motor will decelerate and stop.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

- Error Reset** 1) Press the [F8] key to execute an error reset.  
An Error Reset window will then be displayed. (See Section 12.9.)
- Present position change** 1) Press the [F9] key to change the feed present value or the present value in one-turn of the cam-axis in the virtual mode.  
The feed present value can then be changed at the Present Value Change window which will be displayed. (see Section 12.10.)  
To change the present value in one-turn of the cam-axis, press the [F4] key.  
The present value can be changed in the Present Value (Cam-axis One-turn) window. (See Section 12. 13.)
- Window CLOSE** 1) Press the [Esc] key to close the JOG Execute window and return to the Servo Test Function Selection window.

POINTS																					
(1) JOG operation START conditions																					
If the monitoring results indicate that the START conditions shown below are not satisfied, a "CANNOT EXECUTE" error message will be displayed. Check that the conditions are satisfied, then try the JOG operation again.																					
<table border="0"> <tr> <td colspan="2">Forward JOG START conditions</td> <td colspan="2">Reverse JOG START conditions</td> </tr> <tr> <td>ERROR DETECT</td> <td><input type="checkbox"/> OFF</td> <td>ERROR DETECT</td> <td><input type="checkbox"/> OFF</td> </tr> <tr> <td>EXT. SIG.      FLS</td> <td><input checked="" type="checkbox"/> ON</td> <td>EXT. SIG.      RLS</td> <td><input checked="" type="checkbox"/> ON</td> </tr> <tr> <td></td> <td><input type="checkbox"/> OFF</td> <td>                 STOP</td> <td><input type="checkbox"/> OFF</td> </tr> <tr> <td>SERVO READY</td> <td><input checked="" type="checkbox"/> ON</td> <td>SERVO READY</td> <td><input checked="" type="checkbox"/> ON</td> </tr> </table>		Forward JOG START conditions		Reverse JOG START conditions		ERROR DETECT	<input type="checkbox"/> OFF	ERROR DETECT	<input type="checkbox"/> OFF	EXT. SIG.      FLS	<input checked="" type="checkbox"/> ON	EXT. SIG.      RLS	<input checked="" type="checkbox"/> ON		<input type="checkbox"/> OFF	STOP	<input type="checkbox"/> OFF	SERVO READY	<input checked="" type="checkbox"/> ON	SERVO READY	<input checked="" type="checkbox"/> ON
Forward JOG START conditions		Reverse JOG START conditions																			
ERROR DETECT	<input type="checkbox"/> OFF	ERROR DETECT	<input type="checkbox"/> OFF																		
EXT. SIG.      FLS	<input checked="" type="checkbox"/> ON	EXT. SIG.      RLS	<input checked="" type="checkbox"/> ON																		
	<input type="checkbox"/> OFF	STOP	<input type="checkbox"/> OFF																		
SERVO READY	<input checked="" type="checkbox"/> ON	SERVO READY	<input checked="" type="checkbox"/> ON																		
(2) If previously used JOG operation keys ([F6]/[F5]) are held pressed when a personal computer with high processing speed is used, there are cases that JOG operation cannot be executed correctly with a beep keep sounding. Use the following keys to execute JOG operation when using a personal computer with high processing speed.																					
<ul style="list-style-type: none"> <li>• Forward rotation.....[Shift] + [Alt] keys (previously [F6] key was used)</li> <li>• Reverse rotation .....[Shift] + [Ctrl] keys (previously [F5] key was used)</li> </ul>																					

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

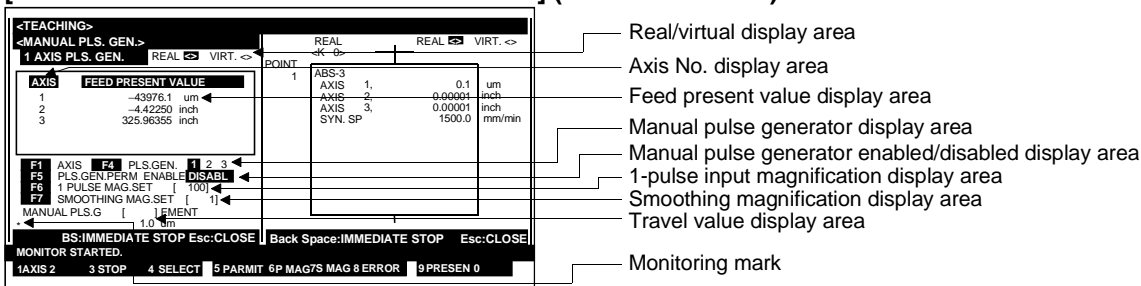
### (3) Executing A Manual Pulse Generator Operation

The feed present value to be written to the specified servo program can be reached by executing a manual pulse generator operation. Before executing manual pulse generator operation, settings 1 to 6 shown below must be designated.

After the 1-6 settings have been designated, execute a test run using the manual pulse generator.

1. Manual pulse generator DISABLE setting
2. Selection of manual pulse generator (not possible for A17[ J])
3. Axis number setting
4. 1-pulse input magnification setting
5. Smoothing magnification setting
6. Manual pulse generator ENABLE setting  
(writing of manual pulse generator operation data to the servo system CPU)

### [Manual Pulse Generator Execute Window] (For A273UHCPU)



### [Display/Setting Content]

- Axis No. display area** The axis number where the manual pulse generator operation is being executed is displayed here.
- Real/virtual display area** Shows whether current mode is REAL mode or VIRTUAL mode.
- Feed present value display area** The feed present value for the specified operation axis is displayed on the monitor.
- Manual pulse generator display area** The manual pulse generator which is being used is indicated here.
- Manual pulse generator enabled/disabled display area** The manual pulse generator ENABLE/DISABLE status is indicated here by a highlight display.
- 1-pulse input magnification display area** The magnification per manual pulse generator pulse input is indicated here.
- Smoothing magnification display area** The magnification which smooths the manual pulse generator's leading and trailing edges is indicated here.
- Travel value display area** The travel value per manual pulse generator pulse is indicated here.
- Monitoring mark** Indicates that monitoring is in progress.  
(Not displayed when monitoring is stopped.)

### [Key Operation]

- Manual pulse generator DISABLE setting**
- 1) If manual pulse generator operation is enabled, before setting the manual pulse generator operating data (operating axis number, 1-pulse input magnification, smoothing magnification), press the [F5] key to open the manual pulse generator operation ENABLED/DISABLE window and disable manual pulse generator operation.
- Selecting the manual pulse generator**
- 1) Press the [F4] key to select the manual pulse generator where operation is to be executed.  
The selection is made at the Manual Pulse Generator Setting window which will be displayed. (See Section 12.5(2).) (Only for A273UH)



## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

POINT											
	<p>The travel value per manual pulse generator pulse is as shown below.</p> <ul style="list-style-type: none"> <li>The travel value is calculated by the following formula:  [Travel value]  = [manual pulse generator 1-pulse input magnification] × A</li> <li>The "A" value varies according to the system-of-units being used, as shown below.</li> </ul>										
	<table border="1"> <thead> <tr> <th>System-of-Units</th> <th>A</th> </tr> </thead> <tbody> <tr> <td>μm</td> <td>0.1</td> </tr> <tr> <td>inch</td> <td>0.00001</td> </tr> <tr> <td>degree</td> <td>0.00001</td> </tr> <tr> <td>PULSE</td> <td>1</td> </tr> </tbody> </table>	System-of-Units	A	μm	0.1	inch	0.00001	degree	0.00001	PULSE	1
System-of-Units	A										
μm	0.1										
inch	0.00001										
degree	0.00001										
PULSE	1										

### Designating the axis No.

- 1) Press the [F1] key to select the manual pulse operation axis No. from the motor shafts of the VIRT. mode motor shafts used in the designated servo program. The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be displayed.
- 2) Enter the number of the axis where JOG operation is to be executed, then press the [Enter] key.  
After the axis number has been designated, the system will return to the Manual Pulse Generator Execute window.  
To abort the axis designation procedure, press the [Esc] key.

### 1-pulse input magnification setting

- 1) Press the [F6] key to designate the 1-pulse input magnification setting at the 1-Pulse Input Magnification Setting window which will then be displayed. (See Section 12.5(3).)

### Smoothing magnification setting

- 1) Press the [F7] key to designate the smoothing magnification at the Smoothing Magnification Setting window which will then be displayed. (See Section 12.5(4).)

### Writing the designated manual pulse generator data settings

- 1) To write the designated data (axis number, 1-pulse input magnification, smoothing magnification) to the servo system CPU, press the [F5] key to open the Manual Pulse Generator ENABLE/DISABLE window, then select the "ENABLE" item.  
The operation data settings will then be written to the servo system CPU.

### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

### Error Reset

- 1) Press the [F8] key to execute an error reset.  
An Error Reset window will then be displayed. (See Section 12.9.)



### Present position change

- 1) Press the [F9] key to change the feed present value or the present value in one-turn of the cam-axis in the virtual mode.  
The feed present value can then be changed at the Present Value Change window which will be displayed. (See Section 12.10.)  
To change the present value in one-turn of the cam-axis, press the [F4] key.  
The present value can be changed in the Present Value (Cam-axis One-turn) window. (See Section 12.13.)

### Window CLOSE

- 1) Press the [Esc] key to close the Manual Pulse Generator Execute window and return to the Servo Test Function Selection window.

### CAUTION

-  Before executing manual pulse generator operation, always check that "ENABLE" is highlighted at the "PLS. GEN. PERMIT" display area. Failure to do so could result in unexpected machine motion with some machines.
-  After ending a manual pulse generator operation, always disable manual pulse generator operation.  
Failure to do so could result in unexpected machine motion with some machines.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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<b>POINT</b>
--------------

Precautions when ending manual pulse generator operation

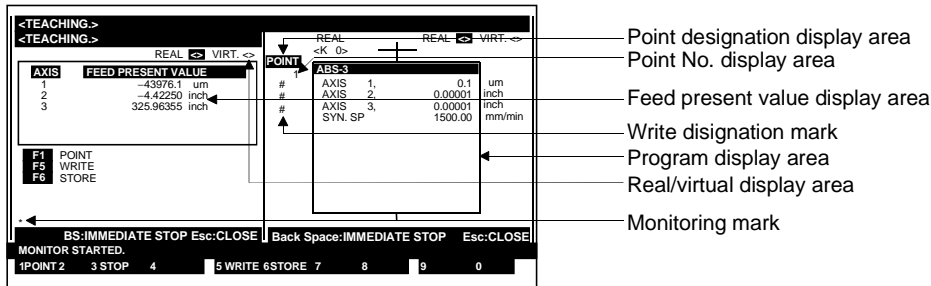
Axes where a manual pulse operation has been designated (where "ENABLE" has been designated at the "PLS. GEN. PERMIT" display area of the Manual Pulse Generator Execute window) can only be started from the manual pulse generator. When manual pulse generator operation is not being executed, the "DISABLE" setting must be designated.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### (4) Executing the Teaching Function

The teaching function is executed to write the feed present value (reached by a JOG or manual pulse generator operation) to the specified servo program.

#### [Teaching Execute Window]



#### [Display/Setting Content]

After designating the axis or point, the feed present value is written to the specified servo program which is then registered in the servo system CPU's internal memory.

- Writing by axis designation  
Writing is executed only for the specified axes within the point range.
- Writing by point designation  
Writing is executed for all axes within the point range.

#### Point designation display area

When the point designation writing format is designated, the "POINT" item is highlighted.

When the axis designation writing format is designated, the "POINT" item is not highlighted.

#### Point No. display area

Switching point numbers for speed switching control, and pass point numbers for constant speed control are displayed here. (The number of points for other servo instructions is indicated by a "1" display.)

#### Real/virtual display area

Shows whether the applicable write servo program is for REAL mode or VIRT. mode use.

#### Write designation mark

This mark is displayed to the left of axes where feed present value writing is being executed. (Axes where this mark is not displayed are not included in the writing operation.)

#### Feed present value display area

The feed present values of axes involved in the JOG or manual pulse generator operation are displayed here.

#### Program display area

The content of the servo program where the feed present value is to be written is displayed here.

#### Monitoring mark

Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### [Key Operation]

#### Selecting the axis designation writing format

- 1) Before designating the axis where writing is to be executed, make sure that the "POINT" display item is not highlighted.  
If it is highlighted, press the [F1] key to cancel the highlight display.
- 2) Use the [↑]/[↓] keys to move the Program display area cursor to the line for the axis where feed present value writing is to be executed.  
A "write mark" (#) will be displayed to the left of the designated axis.

#### Selecting the point designation writing format

- 1) Before designating the axis where writing is to be executed, make sure that the "POINT" display item is highlighted.  
If it is not highlighted, press the [F1] key to highlight it.
- 2) Use the [↑]/[↓] keys to move the Program display area cursor to the lines of the axes included in the feed present value writing operation.  
A "write mark" (#) will be displayed to the left of all axes included in the point range.

#### Write EXECUTE

- 1) After making the axis designation or point designation setting, press the [F5] key to execute writing.  
The feed present value displayed at the Present Value display area will then be written to the specified servo program.

#### Program registration

- 1) When writing to the specified servo program is completed, press the [F6] key to register the program at the servo system CPU.  
When registration is completed, a "COMPLETED". message will be displayed.

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Window CLOSE

- 1) Press the [Esc] key to close the Teaching Execute window and return to the Teaching Setting window.

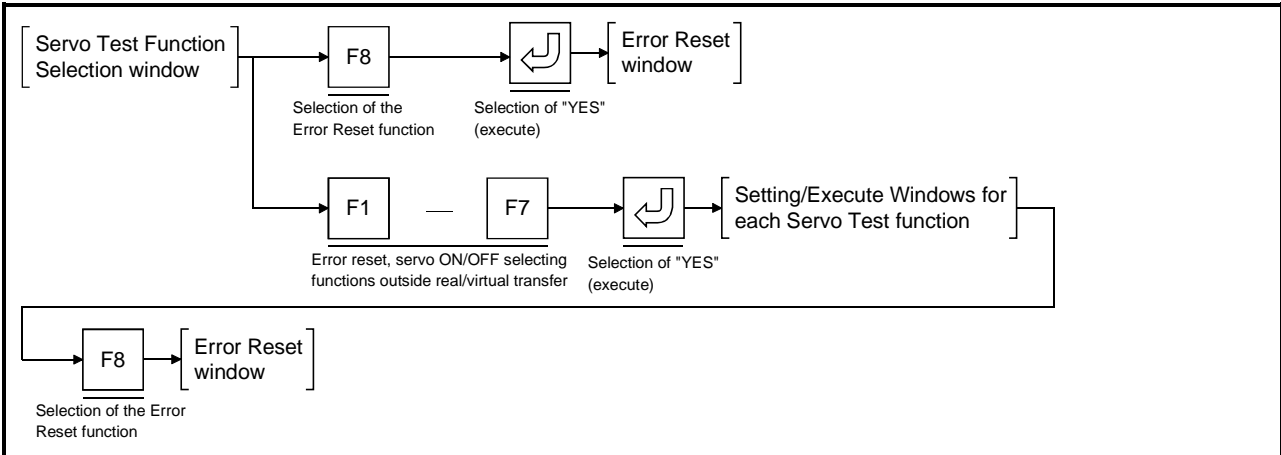
<b>POINT</b>
Programs where writing is prohibited Writing of values shown at the feed present value display area is prohibited when INC[ ] instructions exist.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### 12.9 Error Reset

An error reset can be executed to clear the servo system CPU's error code storage area, and to reset the error flag.  
Execute an error reset after eliminating the error cause.

#### [Procedure for Displaying the Error Reset Window]



#### For REAL Mode

#### [Error Reset Window] (For A273UHCPU)

Labels for the screenshot:

- Real/virtual display area
- Axis No. display area
- Error detection display area
- Servo error detection display area
- Error code display area
- Monitoring mark

#### [Display/Setting Content]

Error information for each axis is displayed.  
After checking the error content and correcting the problem, execute an all-axis error reset.

**Real/Virtual display area** Shows that the current mode is REAL mode.

**Axis No. display area** The axis number is displayed here.

**Error detection display area** A highlight display occurs when minor/major errors are detected.

**Servo error detection display area** A highlight display occurs when a servo amplifier error is detected.

**Error code display area** The error codes of minor/major/servo errors which have occurred are displayed here.

**Monitoring mark** Indicates that monitoring is in progress.  
(Not displayed when monitoring is stopped.)

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### [Key Operation]

#### **Executing an error reset**

- 1) Press the [F5] key to execute an error reset.  
The execute YES/NO dialog box will then be displayed.
- 2) With the "YES" item highlighted, press the [Enter] key.  
An error reset will then occur, the error detection and servo error detection signals will switch OFF, and "0" will be displayed for all items at the "ERROR CODE" display area.

#### **Monitor STOP/RESTART**

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### **Switching the monitored axis (For A273UHCPU 32-axis specification)**

- 1) To display error statuses for axes subsequent to axis No. 8, use the [Shift] + [Page Up]/[Page Down] keys.  
The monitored axis will be changed to the previous axis No. and next axis No.

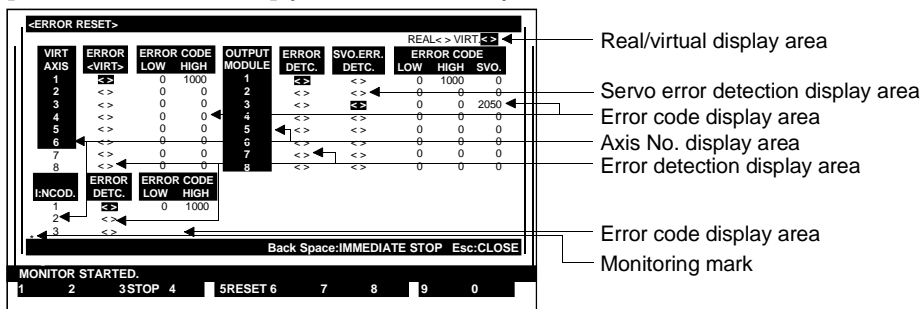
#### **Window CLOSE**

- 1) Press the [Esc] key to close the Teaching Execute window and return to the Teaching Setting window.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

For VIRT. Mode

### [Error Reset Window] (For A273UHCPU)



### [Display/Setting Content]

Displays error information for virtual servo motor axes, synchronous encoder axes, and output module axes (REAL mode motor shafts corresponding to the output destination amplifier Nos. designated for the output module).

After checking the error content and correcting the problem, execute an all-axis error reset.

**Real/Virtual display area** Shows that the current mode is VIRT. mode.

**Servo error detection display area** A highlight display occurs when a servo amplifier error is detected.

**Error code display area** The error codes of minor/major/servo errors which have occurred are displayed here.

**Axis No. display area** The virtual servo motor axis No., synchronous encoder axis No., or output module axis No. where errors occurred are displayed.

**Error detection display area** A highlight display occurs when minor/major errors are detected.

**Monitoring mark** Indicates that monitoring is in progress.  
(Not displayed when monitoring is stopped.)

### [Key Operation]

#### Executing an error reset

- 1) Press the [F5] key to execute an error reset.  
The execute YES/NO dialog box will then be displayed.
- 2) With the "YES" item highlighted, press the [Enter] key.  
An error reset will then occur, the error detection and servo error detection signals will switch "OFF", and "0" will be displayed for all items at the Error Code display area.

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching the monitored virtual axis (For A273UH 32-axis specification)

- 1) To display error statuses at axes subsequent to axis No. 8, use the [Page Up]/[Page Down] keys.  
The monitored axis will be changed to the previous axis No. and next axis No.

#### Switching the monitored synchronous encoder axis (For A273UH 32-axis specification)

- 1) To display error statuses for axes subsequent to axis No. 8, use the [Shift] + [Page Up]/[Page Down] keys.  
The monitored axis will be changed to the previous axis No. and next axis No.

#### Window CLOSE

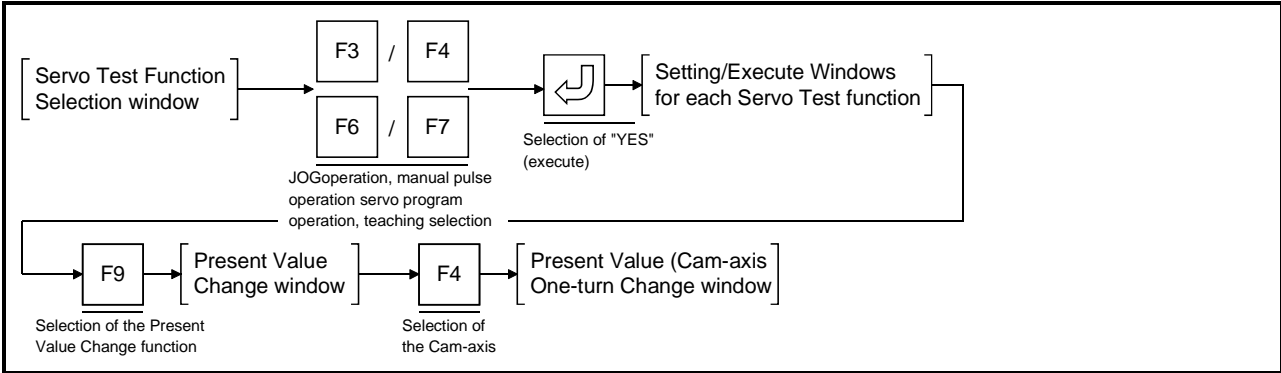
- 1) Press the [Esc] key to close the Teaching Execute window and return to the Teaching Setting window.

# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12.10 Present Position Change

A forced change of the present value sent to the servo system CPU can be executed in the Servo Test mode.

### [Procedure for Displaying the Present Value Change Window]



### For REAL Mode

### [Present Value Change Window] (For A273UHCPU)

AXIS	START ACPT	FEED PRE. VAL.	UNIT	CHANGE VALUE
1	<>	0.0	um	[ 0.0]
2	<<	0.00000	inch	[ 0.00000]
3	<>	0.00000	deg	[ 0.00000]
4	<>	0	PLS	[ 0]
5	<>	0.0	um	[ 0.0]
6	<>	0.00000	inch	[ 0.00000]
7	<>	0.00000	deg	[ 0.00000]
8	<>	0	PLS	[ 0]

Labels in screenshot:  
 - Real/virtual display area  
 - Axis No. display area  
 - START accept ON/OFF display area  
 - Change data input area  
 - Feed present value display area  
 - Setting range display area  
 - Monitoring mark

### [Display/Setting Content]

Designate the axis number where a present value change is desired, then enter the change value.

- Real/virtual display area** Current mode (REAL/VIRT. mode) is shown here. Check that "REAL" is displayed.
- Axis No. display area** The axis number where a feed present value change is to be executed is displayed.
- Start accept ON/OFF display area** The ON/OFF status of the start accept signal is indicated here. If the feed present value is to be changed, make sure that this signal is OFF.
- Change data input area** The change data is entered here.
- Feed present value display area** The feed present value of each axis is displayed here.
- Setting range display area** The setting ranges for each control system-of-units are displayed here.
- Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)



## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### [Key Operation]

#### Designating the axis No.

- 1) Use the [↑]/[↓] keys to move the cursor to the axis number line where the feed present value change is to be executed.

#### Entering the change data

- 1) Move the cursor to the axis for which the present value is changed and press the [Enter] key to display the input cursor in the change data input area. Using the numeric, [.] , and [-] keys, key in the desired change value, then press the [Enter] key.

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching the monitored axis (For A273UHCPU 32-axis specification)

- 1) To display error statuses at axes subsequent to axis No. 8, use the [Page Up]/[Page Down] keys. The monitored axis will be changed to the previous axis No. and next axis No.

#### Window CLOSE

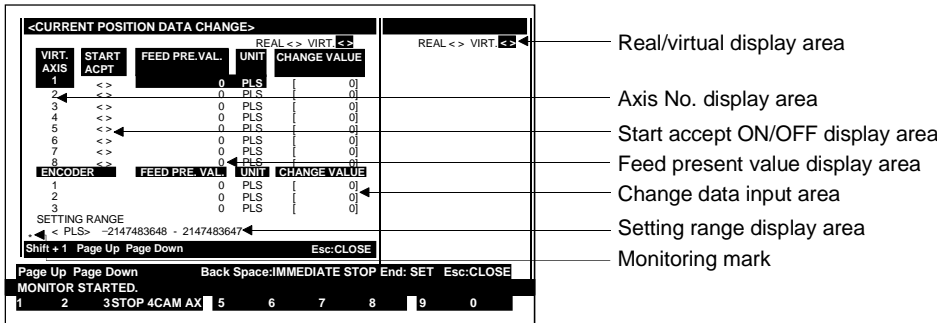
- 1) Press the [Esc] key to close the Present Value Change window and return to the Servo Test Function Setting/Execute window.

POINT
Precautions when changing the feed present value A feed present value change cannot be executed at axes which are operating, or at axes where a servo error is active. Before changing the value, stop the axis or confirm that the servo error signal is OFF.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

For VIRT. Mode

### [Present Value Change Window] (For A273UHCPU)



### [Display/Setting Content]

Designate the axis number where a present value change is desired, then enter the change value.

#### Real/virtual display area

Current mode (REAL/VIRT. mode) is shown here.  
Check that VIRT. mode is displayed.

#### Axis No. display area

Shows the No. of the virtual servo motor axis and the synchronous encoder axis for which the feed present value is changed.

#### Start accept ON/OFF display area

The ON/OFF status of the start accept signal is indicated here.  
If the feed present value is to be changed, make sure that this signal is OFF.

#### Feed present value display area

The feed present value of each axis is displayed here.

#### Change data input area

The change data is entered here.

#### Setting range display area

New data setting range is shown here.

#### Monitoring mark

Indicates that monitoring is in progress.  
(Not displayed when monitoring is stopped.)

### [Key Operation]

#### Designating the axis No.

1) To designate the No. of the axis for which the feed present value is changed, press the [↑]/[↓] keys to move the cursor to the line containing the axis No., and press the [Enter] key.

#### Entering the change data

1) Input the new values with the numeric, [.] , [-] (minus) keys, and then press the [Enter] key.  
The cursor will then move to the next line.

#### Monitor STOP/RESTART

1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching the monitored virtual axis (For A273UHCPU 32-axis specification)

1) To display error statuses at axes subsequent to axis No. 8, use the [Page Up]/[Page Down] keys.  
The monitored axis will be changed to the previous axis No. and next axis No.

### POINT

Precautions when changing the feed present value  
A feed present value change cannot be executed at axes which are operating, or at axes where a servo error is active.  
Before changing the value, stop the axis or confirm that the servo error signal is OFF.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### **Switching to monitored synchronous encoder axis (For A273UHCPU 32-axis specification)**

- 1) To display error statuses at axes subsequent to axis No. 8, use the [Shift] + [Page Up]/[Page Down] keys.  
The monitored axis will be changed to the previous axis No. and next axis No.

### **Changing present value in one-turn of cam-axis**

- 1) Press the [F4] key to display the Present Value (Cam-axis One-turn) window. If the cam-axis has not been set, a "CAM DOES NOT EXIST IN OUTPUT MODULE" is displayed and selection is not allowed. For the operation procedure, see Section 12. 13.

### **Window CLOSE**

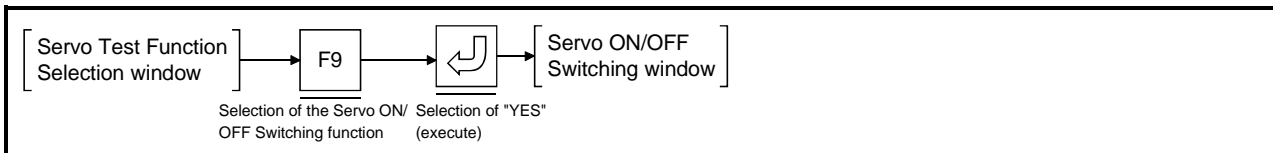
- 1) Press the [Esc] key to close the Present Value Change window and return to the Servo Test Function Setting/Execute window.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

### 12.11 Servo ON/OFF

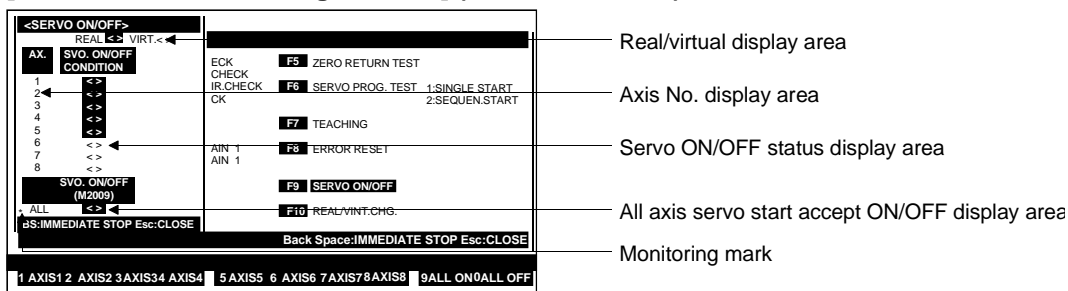
ON/OFF switching can be executed for all axes or for individual axes.

#### [Procedure for Displaying the Servo ON/OFF Switching Window]



#### For REAL Mode

#### [Servo ON/OFF Switching Window] (For A273UHCPU)



#### [Display/Setting Content]

- Real/virtual display area** The current mode (REAL mode/VIRT. mode) is shown here. Check that "REAL" is displayed.
- Axis No. display area** The axis number is displayed here.
- Servo ON/OFF status display area** The Servo Ready signal's ON/OFF status is displayed here.  
When not highlighted: Servo OFF  
When highlighted: Servo ON
- All axis servo START accept ON/OFF display area** This item is highlighted when all servomotors are operative.
- Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

#### [Key Operation]

##### Switching of designated axis using corresponding keys [F1] to [F8] (For A273UHCPU 32-axis specification)

- 1) Press the [Shift] key to switch the servo ON/OFF for designated axes subsequent to axis No.8.  
The axis Nos. corresponding to [F1] to [F8] switch.

##### Designated servo ON/OFF

- 1) First press the [F9] key to set the all axis servo ON status and press the [F1] to [F8] key corresponding to the axis to switch the axis servo status between servo ON/OFF.  
The line of the servo ON/OFF display area that corresponds to the designated axis will be highlighted or be returned to normal display.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

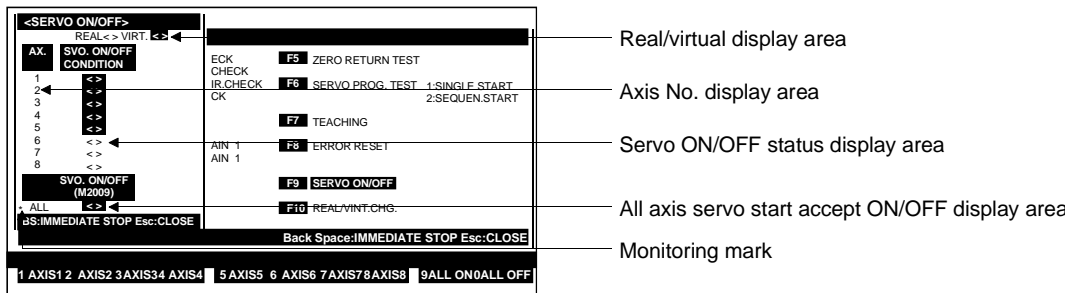
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- All Axis Servo ON**
- 1) Press the [F9] key to set all axes to the servo ON status.  
A highlight display of all Servo ON/OFF items (except those designated as OFF) will switch ON.  
The All Axis Servo START Accept ON/OFF display area will also be highlighted.
- All Axis Servo OFF**
- 1) Press the [F10] key to set all axes to the servo OFF status.  
The highlight display of all Servo ON/OFF items (except those designated as OFF) will switch OFF.  
The All Axis Servo START Accept ON/OFF display area will be displayed un-highlighted.
- Window CLOSE**
- 1) Press the [Esc] key to close the Servo ON/OFF Switching window and return to the Servo Test Function Setting/Execute window.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

For VIRT. Mode

### [Servo ON/OFF Switching Window] (For A273UHCPU)



Real/virtual display area

Axis No. display area

Servo ON/OFF status display area

All axis servo start accept ON/OFF display area

Monitoring mark

### [Display/Setting Content]

#### Real/virtual display area

The current mode (REAL mode/VIRT. mode) is shown here. Check that "VIRT." is displayed.

#### Axis No. display area

Shows the No. of the output module axis (REAL mode motor shaft corresponding to output destination No. set in the output module) for which servo can be switched ON/OFF.

#### Servo ON/OFF status display area

The Servo Ready signal's ON/OFF status is displayed here.

#### All axis servo start accept ON/OFF display area

This item is highlighted when all servomotors are operative.

#### Monitoring mark

Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

### [Key Operation]

#### Switching of designated axis using corresponding keys [F1] to [F8] (For A273UHCPU 32-axis specification)

- 1) Press the [Shift] key to switch the servo ON/OFF for designated axes subsequent to axis No.8. The axis Nos. corresponding to [F1] to [F8] switch.

#### Designated servo ON/OFF

- 1) Press the [F1] to [F8] key corresponding to the axis to switch the axis servo status between servo ON/OFF. The line of the servo ON/OFF display area that corresponds to the designated axis will be highlighted of be returned to normal display.

#### All Axis Servo ON

- 1) Press the [F9] key to set all axes to the servo ON status. A highlight display of all Servo ON/OFF items (except those designated as OFF) will switch ON. The All Axis Servo Start Accept ON/OFF display area will also be highlighted.

#### All Axis Servo OFF

- 1) Press the [F10] key to set all axes to the servo OFF status. The highlight display of all Servo ON/OFF items (except those designated as OFF) will switch OFF. The all axis servo start accept ON/OFF display area will be displayed unhighlighted.

#### Window CLOSE

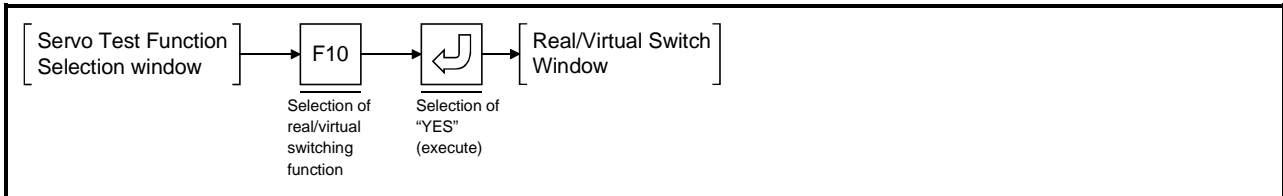
- 1) Press the [Esc] key to close the Servo ON/OFF Switching window and return to the Servo Test Function Setting/Execute window.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

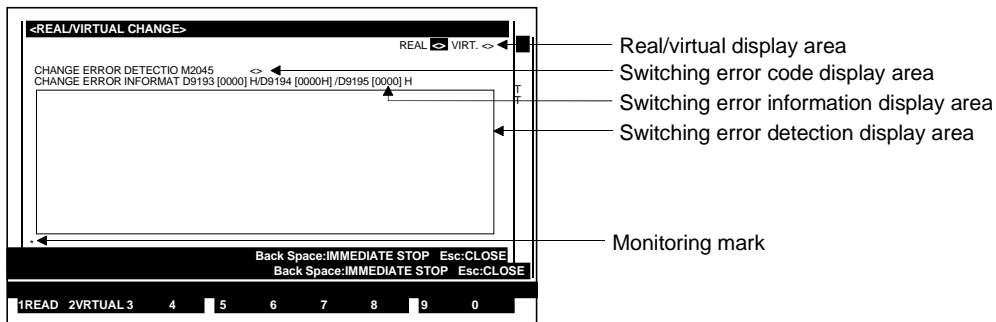
### 12.12 REAL/VIRT. Mode Switching

Switch between REAL mode and VIRT. mode

#### [Procedure for Displaying the Real/Virtual Switching Window]



#### [Real/Virtual Switch Window]



#### [Display/Setting Content]

- |   |  |
|---|--|
| <b>Real/virtual display area</b>                | Shows whether current mode is REAL mode or VIRT. mode.                                   |
| <b>Switching error detection display area</b>   | Monitor display of errors occurring when switching between REAL mode and VIRT. mode.     |
| <b>Switching error information display area</b> | Displays an error description of any switching errors which occur.                       |
| <b>Switching error code display area</b>        | Displays the error codes of any switching errors which occur.                            |
| <b>Monitoring mark</b>                          | Indicates that monitoring is in progress.<br>(Not displayed when monitoring is stopped.) |

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

### [Key Operation]

#### Switching to REAL mode

- 1) Press the [F1] key to switch to REAL mode from VIRT. mode.  
The execute YES/NO dialog box will then be displayed.
- 2) Press the [←] key to highlight the "YES" item, then press the [Enter] key.  
The real area of the real/virtual display area will be highlighted.  
A switching error will occur if any axis is operating.  
Check that all axes are stopped and press the [F1] key again.

#### Switching to VIRT. mode

- 1) Press the [F2] key to switch to VIRT. mode from REAL mode.  
The execute YES/NO dialog box will then be displayed.
- 2) Press the [←] key to highlight the "YES" item, then press the [Enter] key.  
The virtual area of the real/virtual display area will be highlighted.  
The following cases will cause switching errors:
  - Any axis is operating.
  - No mechanical system program is registered.
  - A cam is set as an output module but no cam data is registered.
  - The PC ready signal is OFF or the PCPU ready signal is OFF.
  - A discrepancy exists between the feed present value units set by the fixed parameter setting function, and the units set for the output module.After eliminating causes of errors, press the [F2] key again.

#### Window CLOSE

- 1) Press the [Esc] key to close the Real/Virtual Switch Window, and return to the Servo Test Function Selection Window.

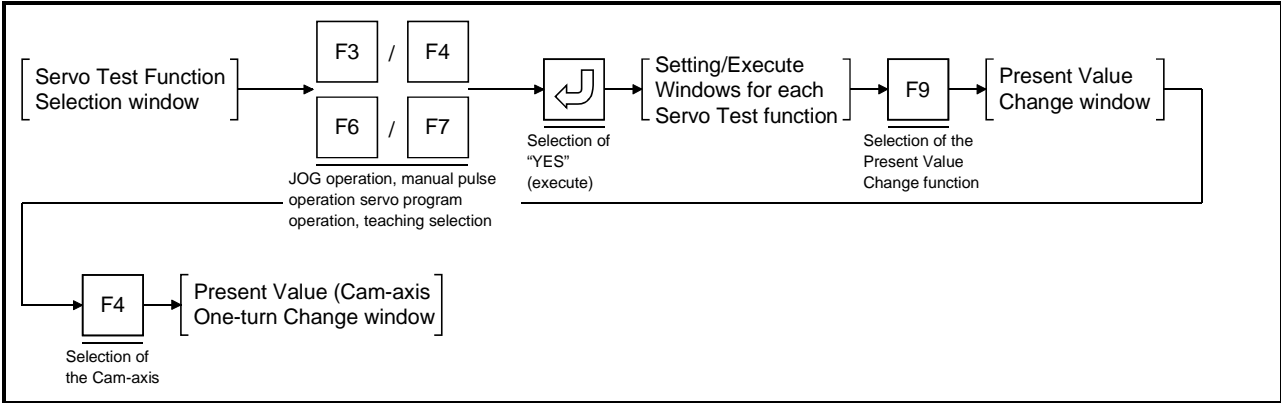


# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

## 12.13 Changing the Present Value in One-turn of Cam-axis

The present value in one-turn of the cam-axis can be forcibly changed in the virtual mode in the servo test mode.

### [Procedure for Displaying the Present Value Change Window]



### [Present Value (Cam-axis One-turn) Change Window] (For A273UHCPU)

### [Display/Setting Content]

Designate the axis for which the present value in one-turn of the cam-axis is desired to be changed, then enter the change value.

The axes for which the cam-axis is set for output axis are displayed.

**Output axis No. display area** The axis number of the output axis for which the present value in one-turn of the cam-axis is desired to be changed is displayed.

**Change data input area** The change data is entered here.

**Present value (one turn) display area** The present value in one turn is displayed for each axis.

**Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

### [Key Operation]

**Entering the change data** 1) Move the cursor to the axis for which the present value is changed and press the [Enter] key to display the input cursor in the change data input area. Using the numeric, [.] , and [-] keys, key in the desired change value, then press the [Enter] key.

**Monitor STOP/RESTART** 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

**Changing the feed present value** 1) Press the [F4] key to display the present value change window. For the operation procedure, see Section 12. 10.

**Window CLOSE** 1) Press the [Esc] key to close the Present Value Change window and return to the Servo Test Function Setting/Execute window.

## 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

---

<b>POINT</b>
--------------

Precautions when changing the present value (cam-axis one turn)

- A present value (cam-axis one turn) change cannot be executed at axes which are operating, or at axes where a servo error is active. Before changing the value, stop the axis or confirm that the servo error signal is OFF.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

The servo monitor mode is a mode to monitor the positioning status, including present values and errors.

### (1) Function summary

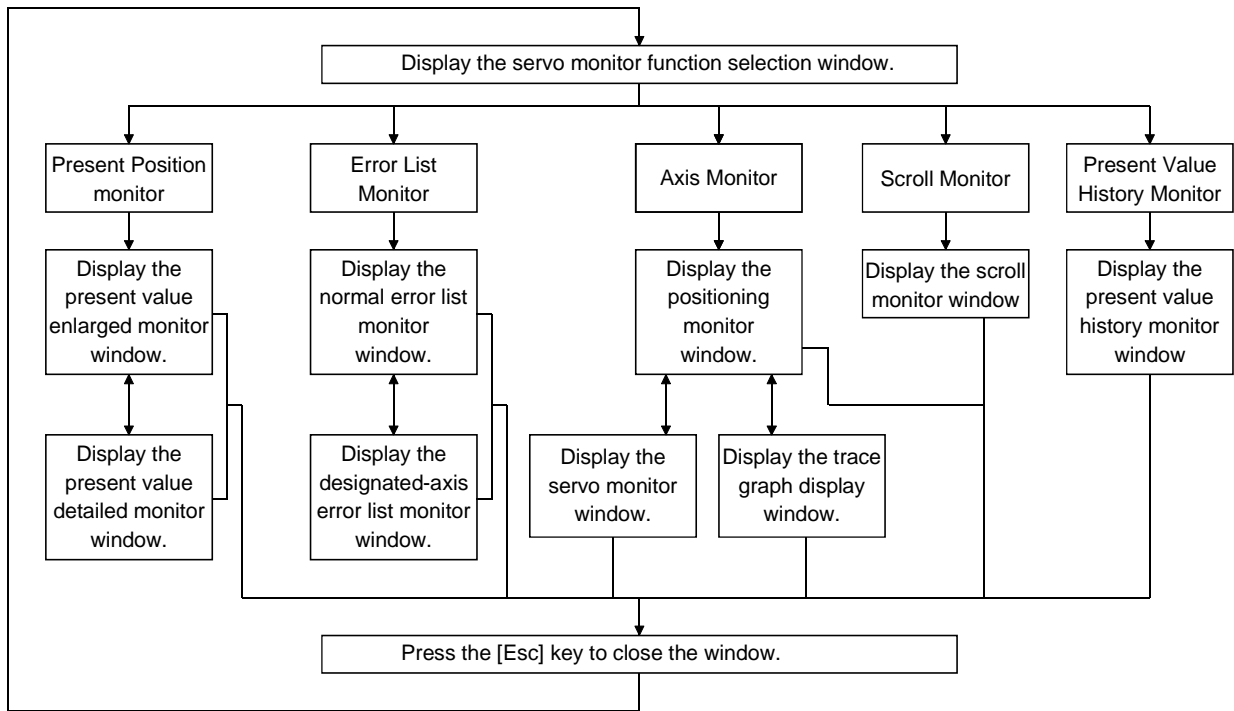
The GSV22PE Servo Monitor mode offers the following functions.

Servo Monitor	Present Position Monitor	Monitors the present values, error codes, etc. for all operated axes. ....	13.1
	Present value enlarged monitor	Monitors the feed present values or actual present values for each axis and whether an error occurred, and displays the results in enlarged characters. ....	13.1.1
	Present value detailed monitor	Monitors and displays the feed present value, actual program number, and error codes, etc. for each axis. ....	13.1.2
	Error List Monitor	Displays a list of up to 15 of the most recent errors. ....	13.2
	Normal monitor	Monitors and displays a list of up to 15 of the most recent error codes. ....	13.2.1
	Designated-axis monitor	Monitors and displays details of error codes from the error list for a designated axis. ....	13.2.2
	Axis Monitor	Monitors in detail the control status of a designated axis. ....	13.3
	Positioning monitor	Monitors in detail data related to positioning. ....	13.3.1
	Servo motor	Monitors servo data or runs the torque trace for the designated axis. ....	13.3.2
	Teace graph	Traces up to 3 of the following data and displays a graph of the results: position command, position droop, motor speed, motor current, and speed command. ....	13.3.3
	Scroll Monitor	Displays a list of up to 15 servo instructions in the order they were executed and reads program details for a servo instruction designated from the list. ....	13.4
	Present Value History Monitor	Monitors and displays a history of the encoder present value/servo command value/monitor present value when the power is switched ON/OFF and when home position return is performed. ....	13.5

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## (2) Outline flowchart

The procedure is shown below use the servo monitor mode.



## (3) Switching to other functions

Press the [Alt] + [F11] keys in the Servo Monitor mode to switch to the ladder monitor function in the GPP Ladder mode, or vice-versa.

Details of this switching are given below.

- (a) If the ladder monitor is selected from the servo monitor, monitoring begins from the first step of the sequence program section.
- (b) If the servo monitor is selected from the ladder monitor, the present value enlarged monitor window is displayed.
- (c) If the ladder monitor is selected from the servo monitor and then the servo monitor is selected again, monitoring starts from the monitor function selected the last time the servo monitor mode was effective.
- (d) If the servo monitor is selected from the ladder monitor and then the ladder monitor is selected again, monitoring begins from the step at which the servo monitor mode was switched.

### POINTS

- (1) Checking the displayed error code  
In the servo monitor mode, the meaning of any error code monitored in a window can be checked by pressing the [F12] key to open the guidance HELP window and checking the error code meaning from there.
- (2) The menu selection window is not displayed from the present value monitor.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### 13.1 Present Value Monitor

Batch monitors the present values and error codes for all operated axes. Use the present value monitor during system operation to check the present values or to determine whether an error has occurred.

(1) Types of Present Value Monitor Function

The present value monitor offers the following two functions:

- Present value enlarged monitor  
Displays the feed present values or actual present values in enlarged characters
- Present value detailed monitor  
Monitors and displays the feed present values and error codes.

(2) Starting the Present Value Enlarged Monitor

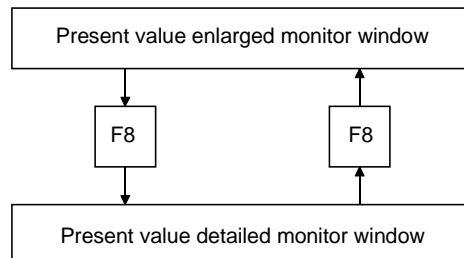
Select "PRE.VALUE MON." from the servo monitor function selection window to display the Present Value Enlarged Monitor window and start monitoring of the feed present values.

(3) Starting the Present Value Detailed Monitor

Press the [F8] key from the present value enlarged monitor window to display the present value detailed monitor window and start monitoring of the feed present values.

(4) Switching Between the Present Value Enlarged Monitor and Present Value Detailed Monitor

When the present value enlarged monitor window or the present value detailed monitor window is displayed, press the [F8] key to switch from the present value enlarged monitor to the present value detailed monitor, or from the present value detailed monitor to the present value enlarged monitor.

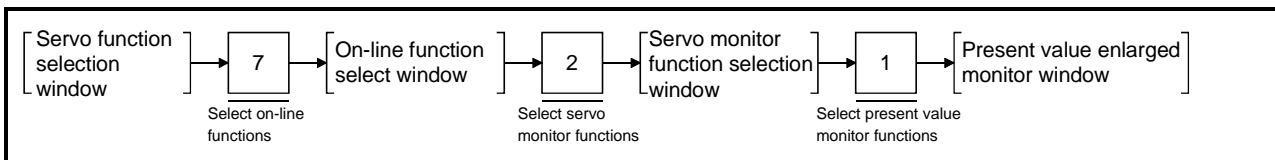


# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.1.1 Present value enlarged monitor

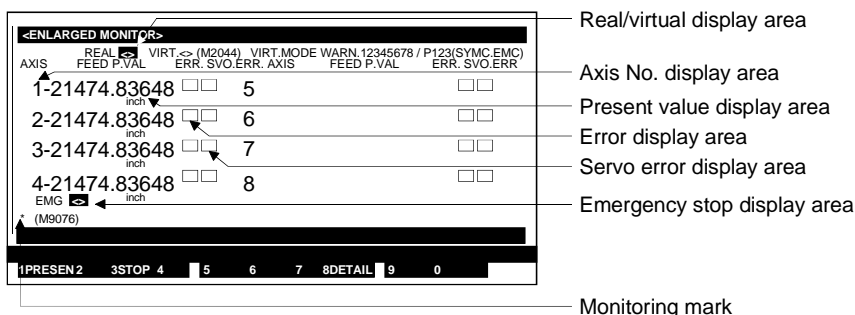
Displays the feed present values or actual present values for all axes in enlarged characters.

### [Procedure for Displaying the Present Value Enlarged Monitor Window]



### In REAL Mode

### [Present Value Enlarged Monitor Window] (For A273UHCPU)



### [Display/Setting Content]

- Real/virtual display area** Indicates that the current mode is the REAL mode.
- Axis No. display area** Displays the operated axis numbers.
- Present value display area** Displays the present value from the servo system CPU to the operated axis, or the feedback present value from the operated axis to the servo system CPU.
- Error display area** Indicates if a minor error or major error occurred in the operated axis.
- Servo error display area** Indicates if a servo error occurred in the operated axis.
- Emergency stop display area** Mark highlighted if an emergency stop was applied to the axis.
- Monitoring mark** Indicates that monitoring is progress. (Not displayed when monitoring is stopped.)

### REMARKS

- (1) If a servomotor is mounted but the servo READY signal is OFF, the display of the corresponding axis number and present value is highlighted.
- (2) If no servomotor is mounted and the servo READY signal is OFF, the display of the corresponding axis number and present value is not highlighted.

### [Key Operation]

- Switching Present Value Display** 1) Press the [F1] key to switch between the feed present value display and the actual present value display.
- Selecting to present value detailed monitor** 1) Press the [F8] key to select the present value detailed monitor and display the present value detailed monitor window. (See Section 13.1.2)

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

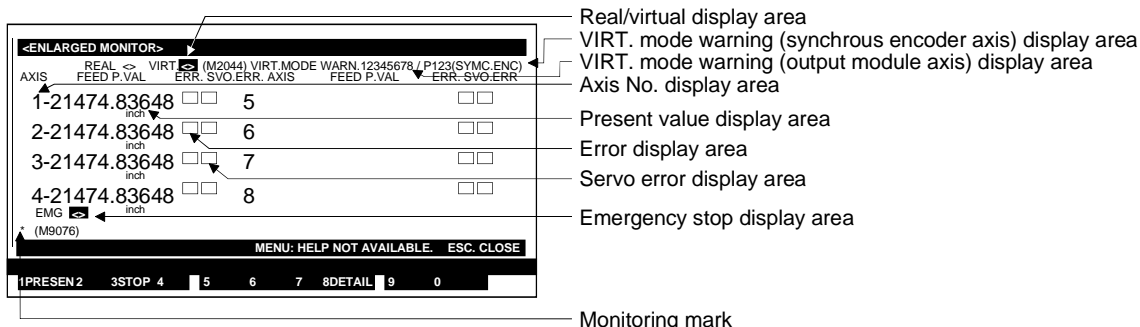
---

- Monitor STOP/RESTART** 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
- Switching Present Value Monitored Axes (when using A273UHCPU (32-axis specifications))** 1) When monitoring more than 8 axes, press the [Page Up] or [Page Down] key. The monitored axis will be changed to the previous axis No. and next axis No.
- Window CLOSE** 1) Press the [Esc] key to close the present value enlarged monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

**In VIRT. Mode**

## [Present Value Enlarged Monitor Window] (For A273UHCPU)



### [Display/Setting Content]

- Real/virtual display area** Indicates that the current mode is the VIRT. mode.
- VIRT. mode warning (synchronous encoder axis) display area** Highlights the synchronous encoder axes which cannot continue operation in the VIRT. mode.
- VIRT. mode warning (output module axis) display area** Highlights the output module axes which cannot continue operation in the VIRT. mode.
- Axis No. display area** Displays the operating output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).
- Present value display area** Displays the feed present value for the output module or the actual present value fed back from the output module.
- Error display area** Indicates whether or not a minor or major error has occurred in the output module axis.
- Servo error display area** Indicates whether or not a servo error has occurred in the output module axis.
- Emergency stop display area** Mark highlighted if an emergency stop was applied to the axis.
- Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

### REMARKS

- If a servomotor is mounted but the servo READY signal is OFF, the display of the corresponding axis number and present value is highlighted.
- If no servomotor is mounted and the servo READY signal is OFF, the display of the corresponding axis number and present value is not highlighted.
- The display changes as follows if a roller is set as the output module:
  - No present value is displayed.
  - The roller peripheral velocity is displayed in the present value display area.

### [Key Operation]

- Switching present value display** 1) Press the [F1] key to switch between the feed present value display and the actual present value display.



## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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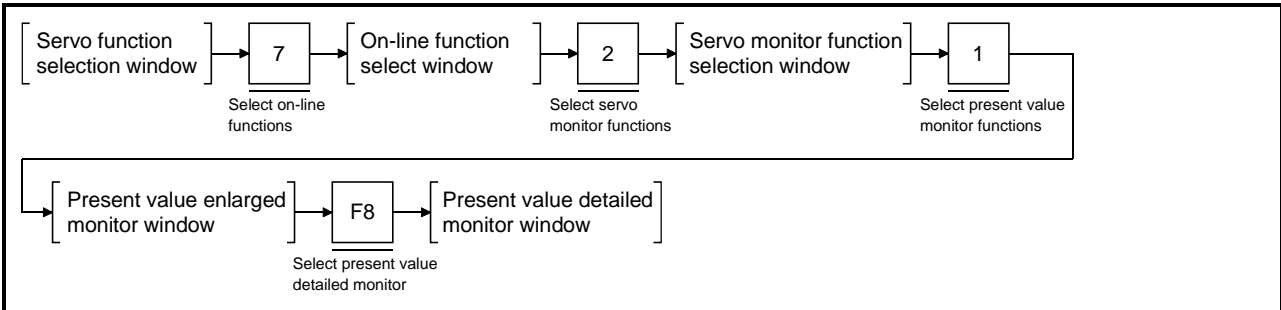
- Selecting to present value detailed monitor** 1) Press the [F8] key to select the present value detailed monitor and display the present value detailed monitor window. (See Section 13.1.2.)
- Monitor STOP/RESTART** 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
- Switching present value monitored axis (using A273UHCPU (32-axis specification))** 1) When monitoring more than 8 axes, press the [Page Up] or [Page Down] key. The monitored axis will be changed to the previous axis No. and next axis No.
- Window CLOSE** 1) Press the [Esc] key to close the present value enlarged monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.1.2 Present value detailed monitor

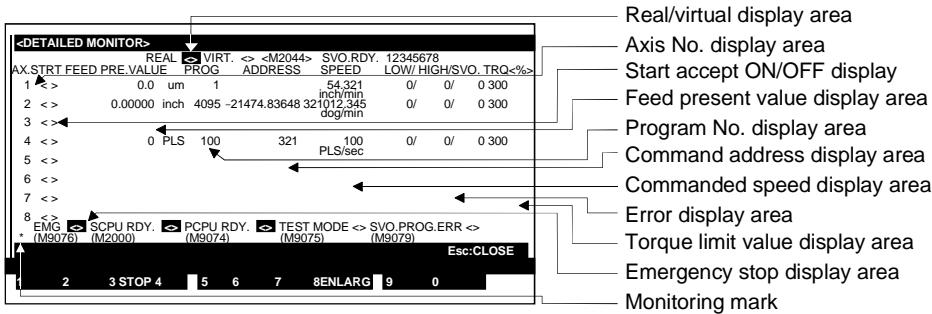
Displays information including the present values, error codes, and executed program number for all operated axes.

### [Procedure for Displaying the Present Value Detailed Monitor Window]



### In REAL Mode

### [Present Value Detailed Monitor Window] (For A273UHCPU)



### [Display/Setting Content]

- Real/virtual display area** Indicates that the current mode is the REAL mode.
- Axis No. display area** The operated axis numbers are highlighted when the servo is OFF.
- Start accept ON/OFF display** Highlighted when the start accept signal is ON.
- Feed present value display area** Displays the present value from the servo system CPU to the operated axis.
- Program No. display area** Displays the executed servo program number.

### REMARK

- (1) During jog operation, manual pulse generator operation, or a test operation, the program number is displayed as listed below:
  - JOG operation..... JOG
  - Manual pulse generator ..... MAN
  - Home position return test operation..... TEST
  - Positioning control Gain 1 check (servo diagnosis) ..... TEST
  - Rotation direction check (servo startup) ..... TEST
  - No positioning control..... Blank

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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<b>Command address display area</b>	Displays the command address output from the servo system CPU to the servo amplifier (actual controlled data after unit conversion).
<b>Commanded speed display area</b>	Displays the commanded speed output from the servo system CPU to the servo amplifier (actual controlled data after unit conversion).
<b>Error display area</b>	Displays the error code of a major or minor error occurring in the operated axis.
<b>Torque limit value display area</b>	Displays the torque limit value.
<b>Emergency stop display area</b>	Mark highlighted if an emergency stop was applied to the axis.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>PC READY ON/OFF display</b>	Highlighted when the PC READY signal (M2000) is ON.
<b>PCPU READY ON/OFF display</b>	Highlighted when the PCPU is normal.
<b>Test mode ON/OFF display</b>	Highlighted during test mode operation.
<b>Program setting error display</b>	Highlighted if an abnormality exists in the positioning data of the currently executing servo program.

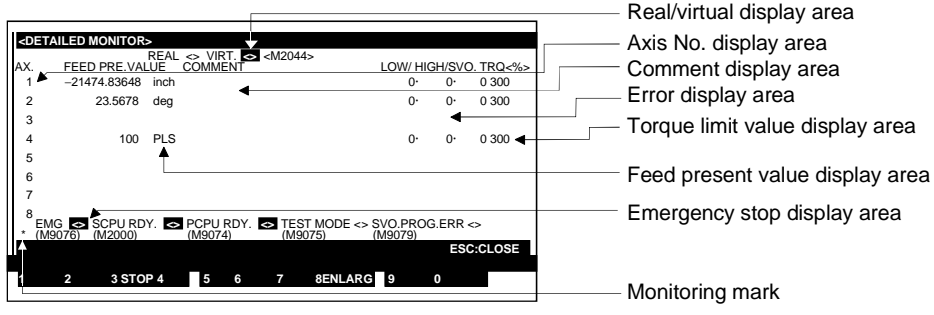
### [Key Operation]

<b>Selecting present value enlarged monitor</b>	1) Press the [F8] key to select the present value enlarged monitor the present value enlarged monitor window is displayed. (See Section 13.1.1.)
<b>Monitor STOP/RESTART</b>	1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.
<b>Switching present value monitored axes (using A273UHCPU (32-axis specification))</b>	1) When monitoring more than 8 axes, press the [Page Up] or [Page Down] key. The monitored axis will be changed to the previous axis No. and next axis No.
<b>Switching Servo Ready Monitored Axes (when using A273UHCPU (32-axis specifications))</b>	1) When monitoring the servo ready signal for more than 8 axes, press the [F10] (servo ready) key. The monitored axis will be changed to the previous axis No. and next axis No.
<b>Window CLOSE</b>	1) Press the [Esc] key to close the present value enlarged monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

In VIRT. Mode

## [Present Value Detailed Monitor Window] (For A273UHCPU)



### [Display/Setting Content]

- Real/virtual display area** Indicates that the current mode is the VIRT. mode.
- Axis No. display area** Displays the operating output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).
- Comment display area** Displays comments for the output module designated in the Mechanical system Program mode.
- Error display area** Displays a minor, major, or servo error which occurred in the output module axis.
- Torque limit value display area** Displays the torque limit value.
- Feed present value display area** Displays the feed present value for the output module.

### REMARKS

(1) If a roller is set as the output module, the roller peripheral velocity is displayed in the present value display area.

- Emergency stop display area** Mark highlighted if an emergency stop was applied to the axis.
- Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
- PC READY ON/OFF display** Highlighted when the PC READY signal (M2000) is ON.
- PCPU READY ON/OFF display** Highlighted when the PCPU is normal.
- Test mode ON/OFF display** Highlighted during test mode operation.
- Program setting error display** Highlighted if an abnormality exists in the positioning data of the currently executed servo program.

### [Key Operation]

- Selecting present value enlarged monitor** 1) Press the [F8] key to select the present value enlarged monitor, the present value enlarged monitor window is displayed. (See Section 13.1.1.)
- Monitor STOP/RESTART** 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

**Switching present  
value monitored axis  
(using A273UHCPU  
(32-axis specification))**

- 1) When monitoring more than 8 axes, press the [Page Up] or [Page Down] key.  
The monitored axis will be changed to the previous axis No. and next axis No.

**Switching Servo Ready  
Monitored Axes (when  
using A273UHCPU  
(32-axis specifications))**

- 1) When monitoring the servo ready signal for more than 8 axes, press the [F10]  
(servo ready) key.  
The monitored axis will be changed to the previous axis No. and next axis No.

**Window CLOSE**

- 1) Press the [Esc] key to close the present value enlarged monitor window and  
revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.2 Displaying the Error Lists

Displays the error codes and error contents for up to 15 of the most recent errors. The error list monitor functions are useful for checking the control status of the servo system CPU and the causes of errors. Check the servo system and correct the positioning data and servo program after referring to the error contents.

(1) Types of error list monitor function

The error list monitor offers the following two functions:

- Normal monitor  
Monitors the errors occurring in all axes
- Designated-axis monitor  
Monitors the errors occurring in designated axes

(2) Starting the normal monitor

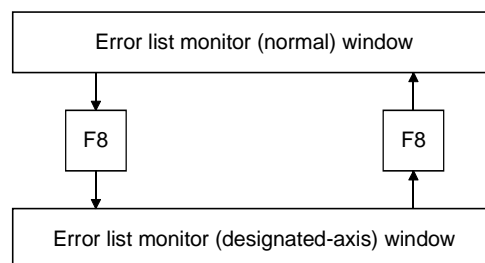
Select "ERROR LIST MON." from the Servo Monitor function select window to display the Error List Monitor (Normal) window and start monitoring the errors occurring in all operated axes.

(3) Starting the designated-axis monitor

Press the [F8] key from the error list monitor (normal) window to display the error list monitor (designated-axis) and monitor the error occurring in Axis 1.

(4) Switching between the normal monitor and designated-axis monitor

When the error list monitor (normal) window or error list monitor (designated-axis) window is displayed, press the [F8] key to switch from the normal monitor to the designated-axis monitor, or from the designated-axis monitor to the normal monitor.



(5) Clearing of the error list

The error list is cleared at the following times:

- On the leading edge of the PC ready (M2000) signal
- When the PC ready signal is OFF and the servo system CPU is switched to test mode  
(The error list is not cleared if the servo system CPU is switched to test mode while the PC ready signal is ON.)

**CAUTION**

⚠ When an error occurs, check the error items described above before resetting it. Some errors can result in unpredictable machine movements.

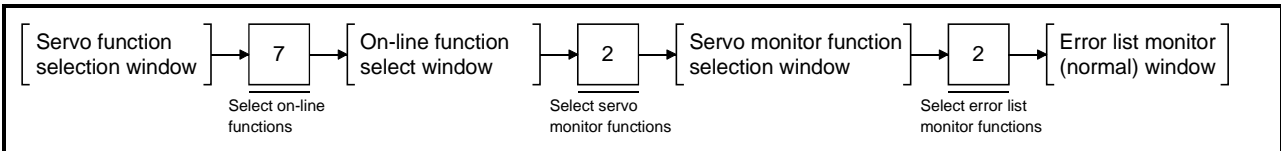
# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.2.1 Error list monitor (normal)

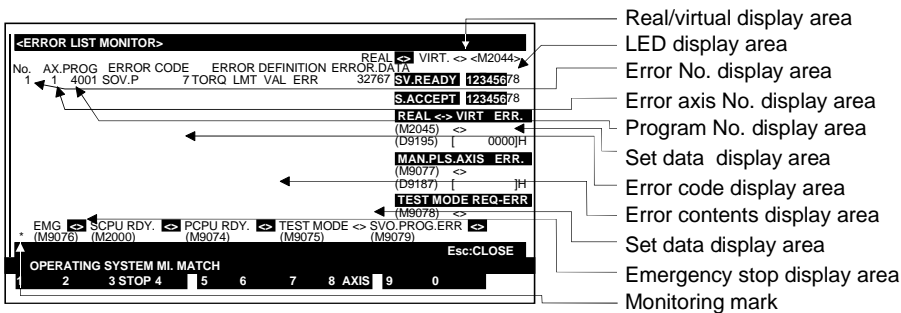
Displays a maximum of 15 of the following errors occurring since the leading edge of the PC READY (M2000):

- Minor error
- Major error
- Servo error
- Servo program setting error

### [Procedure for Displaying the Error List Monitor (Normal) Window]



### [Error List Monitor (Normal) Window] (For A273UHCPU)



### [Display/Setting Content]

- Real/virtual display area** Indicates if the current mode is the REAL mode or the VIRT. Mode.
- Error No. display area** Displays the sequence in which the error occurred. No. 1 is the oldest error and No. 15 the most recent.
- LED display area** An error message is displayed here if an error occurs at the PCPU.
- Error axis No. display area** Displays the number of the axis where the error occurred.

### REMARKS

- (1) If a servo program setting error occurs, the axis number is displayed as shown below.
  - REAL mode..... Blank
  - VIRT. mode..... VIRT.
- (2) The axis No. where a minor, major, or servo error occurred in the VIRTUAL mode is displayed as shown in the table below.

	A171S /A171SH	A172SH /A273UH	A273UH (32-axis Specification)
Virtual servomotor axis No.	VIRT.1 to VIRT.4	VIRT.1 to VIRT.8	VIRT.1 to VIRT.32
Synchronous encoder axis No.	P1	P1 to P3	P1 to P12
Output module axis No.	OUT1 to OUT4	OUT1 to OUT8	OUT1 to OUT32

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

**Program No. display area**      Displays the number of the program running when the error occurred.

**REMARKS**

- (1) The axis number where an error occurred in the REAL mode during jog operation or manual pulse generator operation is displayed as shown below.
  - JOG operation ..... JOG
  - Manual pulse generator ..... MAN
  - Home position return test operation..... TEST
  - Positioning control gain 1 check (servo diagnosis)..... TEST
  - Rotation direction check (servo startup) ..... TEST
  - No positioning control ..... blank
- (2) An error occurring in a virtual servomotor axis or synchronous encoder axis in the VIRT. mode is displayed as shown below.
  - VIRT. mode program execution ..... VIRT.1 to VIRT.4095
  - VIRT. mode jog operation..... V JOG
  - Synchronous encoder axis operation ..... ENC
- (3) An error occurring in an output module axis in the VIRT. mode is displayed as shown below.
  - Output module is roller..... ROLL
  - Output module is ball screw..... SCRW
  - Output module is rotary table..... TTBL
  - Output module is cam..... CAM

**Error code display area**      Displays the type and error code of the error.

- (4) An error occurring in an output module axis in the VIRT. mode is displayed as shown below.  
The error type is displayed as follows:
  - Minor error ..... LOW
  - Major error ..... HIGH
  - Servo error ..... SERVO
  - Servo program setting error..... SVO. P
  - Real/virtual switching error ..... MODE CHG

**Error contents display area**      Displays the contents of the error which occurred.

**Set data display area**      Displays the set data after a data setting error occurs.

**Servo ready ON/OFF display area**      The axis number for which the servo READY signal is ON is highlighted.

**REMARK**

- (1) In the VIRT. mode, the ON/OFF status of the output module axis servo READY signal is displayed.



## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### START accept ON/OFF display area

The axis No. for which the START accept signal is ON is highlighted.

<b>REMARK</b>
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- (1) In the VIRT. mode, the ON/OFF status of the output module axis servo READY signal is displayed.

### Real/virtual switching error

Highlighted if an error occurs when switching from REAL mode to VIRT. mode or from VIRT. mode to REAL mode. The error code is also displayed.

### Manual pulse generator axis setting error display

Highlighted if an abnormality exists in the manual pulse generator operation set data (axis No., manual pulse generator input magnification, etc.).  
The register number containing the abnormal set data is also displayed.

### Test mode request error display

Highlighted if the servo system CPU did not switch to test mode after a test mode request was made at the GSV22PE.

### Emergency stop display area

Mark highlighted if an emergency stop was applied to the axis.

### Monitoring mark

Indicates that monitoring is in progress.  
(Not displayed when monitoring is stopped.)

### PC READY ON/OFF display

Highlighted when the PC READY signal is ON.

### PCPU ready ON/OFF display

Highlighted when the PCPU is normal.

### Test mode ON/OFF display

Highlighted during test mode operation.

### Program setting error display

Highlighted if an abnormality exists in the positioning data of the currently executing servo program.

### [Key Operation]

#### Selecting to Designated-axis Monitor

- 1) Press the [F8] key to select the designated-axis monitor and display the error list monitor (designated-axis) window. (See Section 13.2.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching Status Display Axes (using A273UHCPU (32-axis specification))

- 1) Press the [F10] key (Status) to monitor the servo READY signals and start accept signals for more than eight axes.  
The monitored axis will be changed to the previous axis No. and next axis No.

#### Window CLOSE

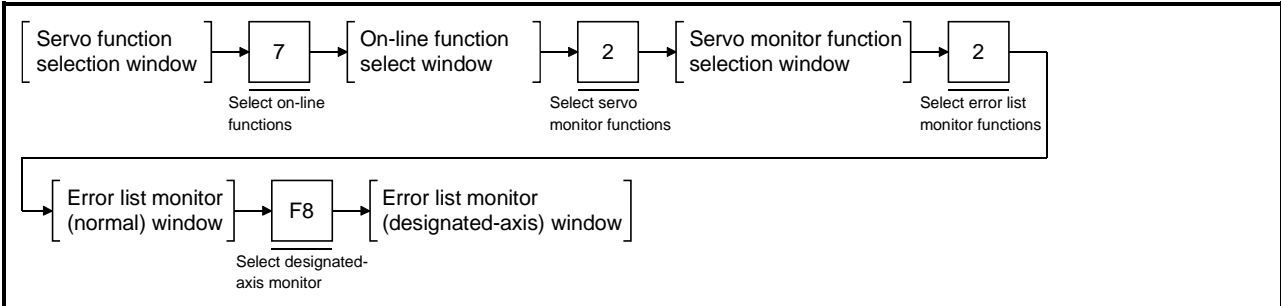
- 1) Press the [Esc] key to close the present value enlarged monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.2.2 Error list monitor (designated-axis)

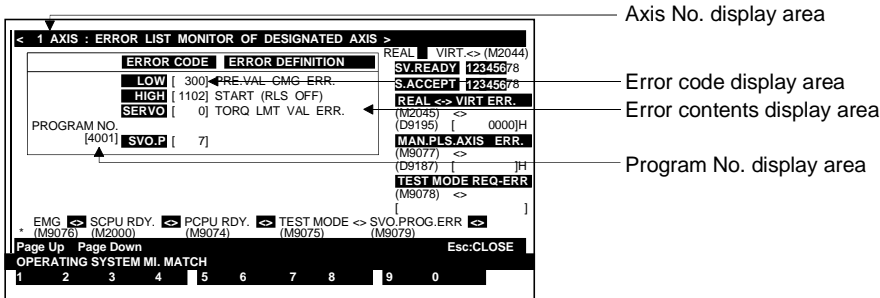
Displays the most recent error which occurred for the designated axis.

### [Procedure to Display the Error List Monitor (Designated-axis) Window]



### In REAL Mode

### [Error List Monitor (Designated-axis) Window] (For A273UHCPU)



### [Display/Setting Content]

- Axis No. display area** Displays the currently monitored axis number.
- Error code display area** Displays the error codes for the current minor error, major error, servo error, or servo program setting error.
- Error contents display area** Displays the contents of the error which occurred.
- Program No. display area** Displays the number of the servo program running when the error occurred.

### REMARKS

- (1) During JOG operation, manual pulse generator operation, or a test operation, the program number is displayed as listed below:
  - JOG operation..... JOG
  - Manual pulse generator ..... MAN
  - Home position return test operation ..... TEST
  - Positioning control gain 1 check (servo diagnosis) ..... TEST
  - Rotation direction check (servo startup) ..... TEST
  - No positioning control..... Blank
- (2) See Section 13.2.1 for any items displayed on the screen but not described in this section.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Switching to normal monitor

- 1) Press the [F8] key to monitor all axes and display the error list monitor (normal) window. (See Section 13.2.1.)

#### Axis No. setting

- 1) Press the [F1] key to change the axis designated for the designated-axis monitor.  
The Axis Designation window will then be displayed.  
The displayed axis number is the next axis number after the currently monitored axis number.  
Input the axis number to be monitored and press the [Enter] key.  
Press the [Enter] key to end axis designation and revert to the Error List Monitor (Designated-axis) window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching to servo ready monitor (when using A273UHCPU (32-axis specification))

- 1) While the Start Accept Monitor is displayed, press the [F10] key to monitor the servo READY signals.  
The display switches from the Start Accept Monitor to the Servo Ready Monitor.
- 2) If the servo READY signals are monitored for more than 8 axes, press the [F10] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to start accept monitor (when using A273UHCPU (32-axis specifications))

- 1) While the Servo Ready Monitor is displayed, press the [F9] key to monitor the start accept signals.  
The display switches from the Servo Ready Monitor to the Start Accept Monitor.
- 2) If the start accept signals are monitored for more than 8 axes, press the [F9] key again to switch between the previous and subsequent pages of monitored axes.

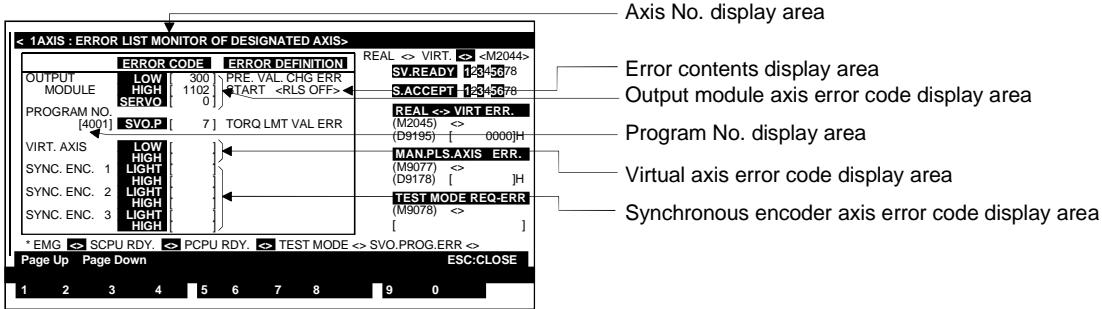
#### Window CLOSE

- 1) Press the [Esc] key to close the error list monitor (designated-axis) window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

In VIRT. Mode

## [Error List Monitor (Designated-axis) Window] (For A273UHCPU)



### [Display/Setting Content]

**Axis No. display area** Displays the monitored output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).

**Error contents display area** Displays the contents of the error which occurred.

**Output module axis error code display area** Displays the error code of a minor, major, or servo error which occurred in the output module axis.

**Program No. display area** Displays the servo program number which was running when the error occurred in the output module axis.

### REMARK

- (1) During JOG operation, manual pulse generator operation, or a test operation, the program number is displayed as listed below:
  - JOG operation ..... JOG
  - During manual pulse generator operation (in Test mode) ..... MAN
  - Positioning control gain 1 check (servo diagnosis) ..... TEST
  - Rotation direction check (servo startup) ..... TEST
  - No positioning control ..... Blank

**Virtual axis error code display area** Displays the error code of a minor or major error which occurred in the virtual servomotor axis (virtual main shaft) with the same axis number as the output module axis number.

**Synchronous encoder axis error code display area** Displays the error code of a minor, major, or servo error which occurred in the synchronous encoder Axis 1 to 3 connected to the designated output module axis.

### REMARK

- (1) See Section 13.2.1 for information on screen display items which are not explained here.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Switching to normal monitor

- 1) Press the [F8] key to monitor all axes and display the error list monitor (normal) window. (See Section 13.2.1.)

#### Axis No. setting

- 1) Press the [F1] key to change the axis designated for the designated-axis monitor.  
The Axis Designation window will then be displayed.  
The displayed axis number is the next axis number after the currently monitored axis number.  
Input the axis number to be monitored and press the [Enter] key.  
Press the [Enter] key to end axis designation and revert to the Error List Monitor (Designated-axis) window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching to servo ready monitor (when using A273UHCPU (32-axis specification))

- 1) While the Start Accept Monitor is displayed, press the [F10] key to monitor the servo READY signals.  
The display switches from the Start Accept Monitor to the Servo Ready Monitor.
- 2) If the servo READY signals are monitored for more than 8 axes, press the [F10] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to start accept monitor (when using A273UHCPU (32-axis specification))

- 1) While the servo READY Monitor is displayed, press the [F9] key to monitor the start accept signals.  
The display switches from the Servo Ready Monitor to the Start Accept Monitor.
- 2) If the start accept signals are monitored for more than 8 axes, press the [F9] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to synchronous encoder monitor (when using A273UHCPU (32-axis specification))

- 1) If more than 8 axes are monitored, press the [Shift] + [Page Up] or [Page Down] key to display the previous and subsequent monitored axes.  
The monitored axis will be changed to the previous axis No. and next axis No.

#### Window CLOSE

- 1) Press the [Esc] key to close the error list monitor (designated-axis) window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.3 Monitoring Designated-Axis Positioning Data

Monitors positioning details for any axis.

Use this monitoring during trial operation and to check an abnormal operation.

By using the torque trace function, this monitoring can also be used to observe the actual load conditions and check the motor capacity selection.

(1) Types of axis monitor function

The axis monitor offers the following three functions:

- Positioning monitor ..... Monitors detailed positioning data
- Servo monitor..... Monitors servo data and runs the torque trace for the designated axis
- Trace graph..... Traces and graphically displays commanded positions, position droop, motor speed, motor current, or speed commands

(2) Starting the positioning monitor

Select the axis monitor from the servo monitor function select window to display the positioning monitor window and start monitoring the positioning data set for Axis 1.

(3) Starting the servo monitor

Press the [F8] key from the positioning window to display the servo monitor window and start monitoring the servo data set for the axis which was monitored in the positioning window.

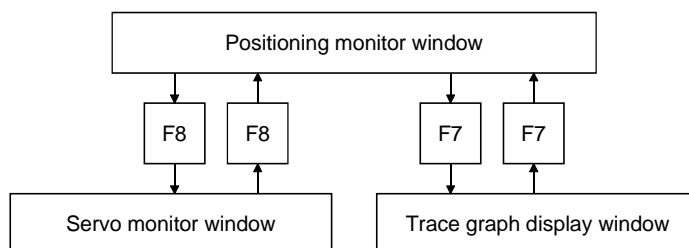
(4) Trace graph display

Press the [F7] key from the positioning window to display the trace graph display window.

Designate the axis and set the trace data, then run the trace to display the trace results as a graph.

(5) Switching between the positioning monitor and the servo monitor or trace

Switch between the positioning monitor and servo monitor or trace graph by pressing the key shown below from the appropriate window.

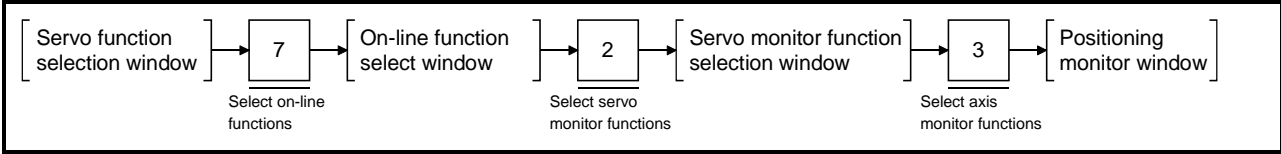


# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.3.1 Positioning monitor

Monitors detailed positioning data set for any axis.

### [Procedure for Displaying the Positioning Monitor Window]



### In REAL Mode

(1) For A17[ ]CPU

(a) Status signal and command signal display

Displays the present PCPU positioning control data and the ON/OFF status of the positioning signals (status and command signals).

### [Positioning Monitor Window] (without signal name display)

Axis No. display area

Real/virtual display area

Positioning signal (output) ON/OFF status display area

Monitored data display area

Positioning signal (input) ON/OFF status display area

Emergency stop display area

Monitoring mark

### [Display/Setting Content]

#### Axis No. display area

Displays the currently monitored axis number.

#### Real/virtual display area

Indicates that the current mode is the REAL mode.

#### Monitored data display area

Displays the positioning data under PCPU control.

- 1) FEED PRESENT VALUE..... Target address output to servo amplifier.
- 2) PRESENT VALUE ..... Present value determined on the basis of actual travel
- 3) DEVIATION VALUE ..... Difference between feed present value and actual present value
- 4) EXECUTION ROGRAM NO. .... Number of executing servo program
- 5) SERVO COMMAND ..... Servo instruction being executed
- 6) ADDRESS..... Actual controlled data after unit conversion (position control)
- 7) SPPED ..... Actual controlled speed after unit conversion (speed control)
- 8) LOW/HIGH/SERVO ..... Error code of most recent minor, major, servo error
- 9) M CODE/TORQUE ..... M code/torque limit value of executing servo program
- 10) PRESENT VALUE ..... Actual present value when external STOP <STOP> signal is input

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

<b>Monitored data display area</b>	<p>11) MOVEMENT CHANGE..... Changed travel value for position control under speed/position switching control</p> <p>12) PRESENT VALUE ..... Feed present value after it is changed CHANGE</p> <p>13) SPPED CHANGE ..... Speed after it is changed</p> <p>14) JOG SPEED CHANGE ..... JOG speed during JOG operation</p> <p>15) DOG/CHANGE ..... Travel value for position control changed externally under speed/position switching control MOVEMENT</p> <p>16) MOVEMENT &lt;DOG ON&gt; ..... Travel value from near-zero point dog until home position return is complete</p> <p>17) REPEAT ZEROING ..... Second travel value from stop position to zero point</p>
<b>Positioning signal (input) ON/OFF status display area</b>	Displays the ON/OFF status of each signal which indicates the control status of each axis.
<b>Positioning signal (output) ON/OFF status display area</b>	Displays the ON/OFF status of the positioning control command signals.
<b>Servo ready ON/OFF display area</b>	The axis number for which the servo READY signal is ON is highlighted.
<b>Start accept ON/OFF display area</b>	The axis number for which the start accept signal is ON is highlighted.
<b>Manual pulse generator enabled/disabled display area</b>	Highlighted during positioning control using inputs from the manual pulse generator.
<b>Jog operation simultaneous start command display area</b>	Highlighted during JOG operation simultaneous start.
<b>Emergency stop display area</b>	Mark highlighted if an emergency stop was applied to the axis.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>PC READY ON/OFF display</b>	Highlighted when the PC READY signal (M2000) is ON.
<b>PCPU READY ON/OFF display</b>	Highlighted when the PCPU is normal.
<b>Test mode ON/OFF display</b>	Highlighted during test mode operation.
<b>Program setting error display</b>	Highlighted if an abnormality exists in the positioning data of the currently executing servo program.



## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Axis No. setting

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the names of the currently monitored status signals and command signals on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the servo monitor functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Window CLOSE

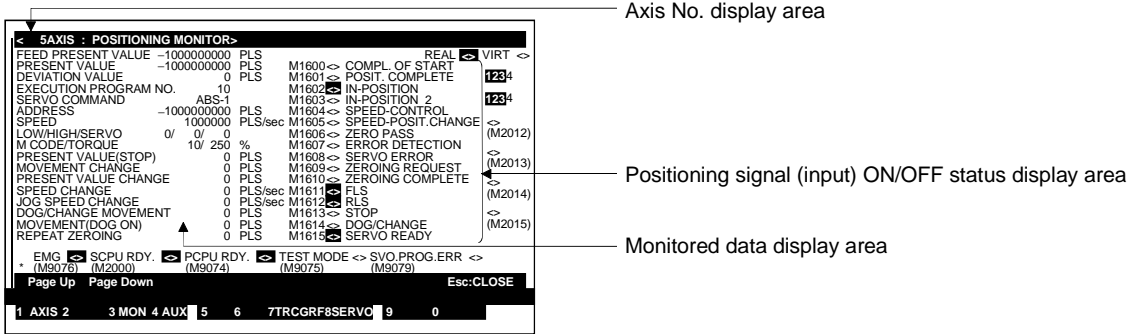
- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## (b) Status signal ON/OFF display (with status names)

Displays the present PCPU positioning control data and the names and ON/OFF status of the signals which indicate the positioning status (status signals).

### [Positioning Monitor Window] (with status name display)



### [Display/Setting Content]

#### Axis No. display area

Displays the currently monitored axis number.

#### Positioning signal (input) ON/OFF status display area

- 1) COMPL.OF START ..... Signal turns ON when positioning control start is completed for the designated axis.
- 2) POSIT.COMPLETE ..... Signal turns ON when positioning control is completed for the designated axis.
- 3) IN-POSITION ..... Signal turns ON if the number of accumulated pulses at the deviation counter is within the in-position range.
- 4) IN-POSITION 2 ..... Signal turns ON if the difference between the command position and feed present value is within the command in-position range.
- 5) SPEED-CONTROL ..... Signal turns ON during speed control.
- 6) SPEED-POSIT.CHANGE ..... Signal turns ON when control switches from speed control to position control.
- 7) ZERO PASS ..... Signal turns ON when the zero point is passed.
- 8) ERROR DETECTION ..... Signal turns ON when a minor or major error is detected.
- 9) SERVO ERROR ..... Signal turns ON when an error is detected in the servo amplifier.
- 10) ZEROING REQUEST ..... Signal turns ON when confirmation of the home position address is required.
- 11) ZEROING COMPLETE ..... Signal turns ON when the home position return is completed normally.
- 12) FLS ..... Signal turns ON when the upper limit switch input turns OFF.
- 13) RLS ..... Signal turns ON when the lower limit switch input turns OFF.
- 14) STOP ..... Signal turns ON when the stop signal turns ON.
- 15) DOG/CHANGE ..... Signal turns ON when the speed/position switching input turns ON.
- 16) SERVO READY ..... Signal turns ON when the designated servo amplifier is in READY status.

#### Monitored data display area

Displays the positioning data under PCPU control.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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<b>REMARK</b>
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- (1) See Section 13.3.1 (1)(a) for any items displayed on the screen but not described in this section.

### [Key Operation]

#### **Designating the axis No.**

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### **Switching status/command signal names**

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key.  
Alternatively, select the name display status with the number keys.  
The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function.  
The positioning monitor window name display status remains unchanged.

#### **Selecting the trace graph functions**

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed.(See Section 13.3.3.)

#### **Selecting The Servo Monitor Functions**

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed.(See Section 13.3.2.)

#### **Monitor STOP/RESTART**

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

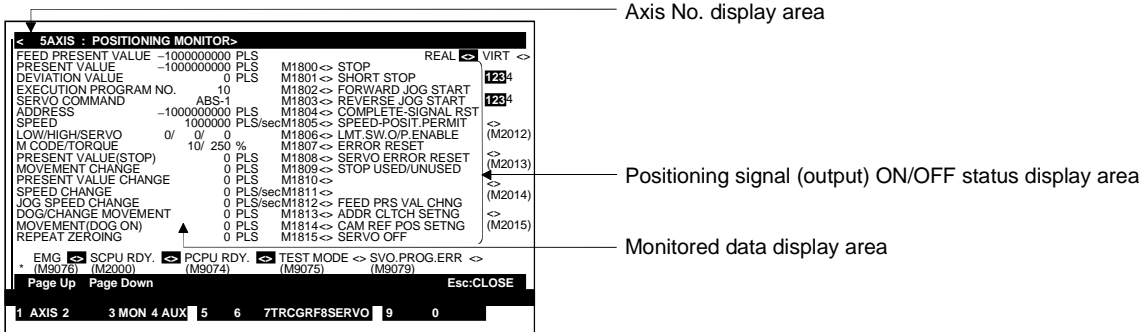
#### **Window CLOSE**

- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

- (c) Command signal ON/OFF display (with signal names)  
Displays the present PCPU positioning control data and the names and ON/OFF status of the positioning signals (command signals).

## [Positioning Monitor Window] (With signal name display)



## [Display/Setting Content]

- |   |  |
|---|--|
| <b>Axis No. display area</b>                                  | Displays the currently monitored axis number.  |
| <b>Positioning signal (output) ON/OFF status display area</b> | <ul style="list-style-type: none"> <li>1) STOP .....An external signal to stop an operated axis</li> <li>2) SHORT STOP.....An external signal for rapid stop of an operated axis</li> <li>3) FORWARD JOG START ..... ON during JOG operation in direction of increasing address</li> <li>4) REVERSE JOG START ..... ON during JOG operation in direction of decreasing address</li> <li>5) COMPLETE-SIGNAL RST..... Signal to turn OFF the positioning start completed signal and positioning completed signal</li> <li>6) SPEED-POSIT.PERMIT ..... External signal to enable switching from speed control to position control</li> <li>7) LMT.SW.O/P.ENABLE ..... Signal to enable the limit switch output</li> <li>8) ERROR RESET ..... Signal to clear the error code storage area for minor/major errors and reset the error detected signal</li> <li>9) SERVO ERROR RESET ..... Signal to clear the error code storage area for servo errors and reset the servo error detected signal</li> <li>10) STOP USED/UNUSED ..... Signal to enable or disable external inputs. Inputs are disabled when this signal is ON and enabled when it is OFF</li> <li>11) FEED PRS VAL CHNG..... Signal to determine whether the feed present values are cleared at the start of operation under speed/position switching control. Present values are not cleared when this signal is ON but are cleared when it is OFF</li> <li>12) ADDR CLTCH SETNG ..... Valid only when the output module is a cam or rotary table with an address mode clutch connected. Sets the reference position "0" of the present value in one virtual shaft revolution.</li> <li>13) CAM REF POS SETNG ..... Valid only when the output module is a cam. Sets the cam reference position.</li> <li>14) SERVO OFF ..... Signal to set a servo motor in the free running state.</li> </ul> |

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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### Monitored data display area

Displays the positioning data under PCPU control.

<b>REMARK</b>
---------------

- (1) See Section 13.3.1 (1)(a) for any items displayed on the screen but not described in this section.

### [Key Operation]

#### Designating the axis No.

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the servo monitor functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop monitoring operation, or to resume the monitoring operation.

#### Window CLOSE

- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

(2) For A273UHCPU

(a) Status signal and command signal display

Displays the present PCPU positioning control data and the ON/OFF status of the positioning signals (status and command signals).

## [Positioning Monitor Window] (Without signal name display)

The screenshot shows a terminal window titled "1 AXIS : POSITIONING MONITOR-". It contains several rows of data with corresponding status indicators. On the right side, there are labels with arrows pointing to specific parts of the window:

- Axis No. display area: Points to the "1" in the title bar.
- Real/virtual display area: Points to the "REAL" and "VIRT" indicators.
- Positioning signal (output) ON/OFF status display area: Points to the "SV\_READY" and "S.ACCEPT" indicators.
- Monitored data display area: Points to the numerical values in the data rows.
- Positioning signal (input) ON/OFF status display area: Points to the "MAN-PLS" indicators.
- Emergency stop display area: Points to the "EMG" indicator.
- Monitoring mark: Points to the "MONITOR STARTED" indicator at the bottom.

## [Display/Setting Content]

**Axis No. display area**

Displays the currently monitored axis number.

**Real/virtual display area**

Indicates that the current mode is the REAL mode.

**Monitored data display area**

Displays the positioning data under PCPU control.

- 1) FEED PRESENT VALUE..... Target address output to servo amplifier.
- 2) PRESENT VALUE ..... Present value determined on the basis of actual travel
- 3) DEVIATION VALUE ..... Difference between feed present value and actual present value
- 4) EXECUTION ..... Number of executing servo program PROGRAM NO.
- 5) SERVO COMMAND ..... Servo instruction being executed
- 6) ADDRESS..... Actual controlled data after unit conversion (position control)
- 7) SPEED ..... Actual controlled speed after unit conversion (speed control)
- 8) LOW/HIGH/SERVO ..... Error code of most recent minor, major, servo error
- 9) M CODE/TORQUE ..... M code/torque limit value of executing servo program
- 10) PRESENT VALUE ..... Actual present value when external stop signal <STOP> is input
- 11) MOVEMENT CHANGE..... Changed travel value for position control under speed/position switching control
- 12) PRESENT VALUE ..... Feed present value after it is changed CHANGE
- 13) SPEED CHANGE ..... Speed after it is changed
- 14) JOG SPEED CHANGE ..... Jog speed during jog operation
- 15) DOG/CHANGE ..... Travel value for position control changed externally under speed/position switching control MOVEMENT
- 16) MOVEMENT <DOG ON> ..... Travel value from near-zero point dog until home position return is complete
- 17) REPEAT ZEROING ..... Second travel value from stop position to zero point

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

<b>Positioning signal (input) ON/OFF status display area</b>	Displays the ON/OFF status of each signal which indicates the control status of each axis.
<b>Positioning signal (output) ON/OFF status display area</b>	Displays the ON/OFF status of the positioning control command signals.
<b>Servo READY ON/OFF display area</b>	The axis number for which the servo READY signal is ON is highlighted.
<b>Start accept ON/OFF display area</b>	The axis number for which the start accept signal is ON is highlighted.
<b>Manual pulse generator enabled/disabled display area</b>	Highlighted during positioning control using inputs from the manual pulse generator 1, 2, or 3.
<b>JOG operation simultaneous start command display area</b>	Highlighted during JOG operation simultaneous start.
<b>Emergency stop display area</b>	Mark highlighted if an emergency stop was applied to the axis.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)
<b>PC READY ON/OFF display</b>	Highlighted when the PC READY signal (M2000) is ON.
<b>PCPU READY ON/OFF display</b>	Highlighted when the PCPU is normal.
<b>Test mode ON/OFF display</b>	Highlighted during test mode operation.
<b>Program setting error display</b>	Highlighted if an abnormality exists in the positioning data of the currently executing servo program.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Axis No. setting

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the names of the currently monitored status signals and command signals on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key.  
Alternatively, select the name display status with the number keys.
- 3) The positioning monitor window changes to the selected name display status. Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function.  
The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the Servo Monitor Functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop monitoring operation, or to resume the monitoring operation.

#### Switching to servo ready monitor(when using A273UHCPU (32-axis specification))

- 1) While the Start Accept Monitor is displayed, press the [F10] key to monitor the servo READY signals.  
The display switches from the Start Accept Monitor to the Servo Ready Monitor.
- 2) If the servo READY signals are monitored for more than 8 axes, press the [F10] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to start accept monitor (when using A273UHCPU (32-axis specification))

- 1) While the Servo Ready Monitor is displayed, press the [F9] key to monitor the Start Accept signals.  
The display switches from the Servo Ready Monitor to the Start Accept Monitor.
- 2) If the start accept signals are monitored for more than 8 axes, press the [F9] key again to switch between the previous and subsequent pages of monitored axes.

#### Window CLOSE

- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.



# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## (b) Status signal ON/OFF display (with status names)

Displays the present PCPU positioning control data and the names and ON/OFF status of the signals which indicate the positioning status (status signals).

### [Positioning Monitor Window] (With status name display)

Axis No. display area

Positioning signal (input) ON/OFF status display area

Monitored data display area

### [Display/Setting Content]

#### Axis No. display area

Displays the currently monitored axis number.

#### Positioning Signal (input) ON/OFF status display area

- 1) COMPL.OF START ..... Signal turns ON when positioning control start is completed for the designated axis.
- 2) POSIT.COMPLETE ..... Signal turns ON when positioning control is completed for the designated axis.
- 3) IN-POSITION ..... Signal turns ON if the number of accumulated pulses at the deviation counter is within the in-position range.
- 4) IN-POSITION 2 ..... Signal turns ON if the difference between the command position and feed present value is within the command in-position range.
- 5) SPEED-CONTROL ..... Signal turns ON during speed control.
- 6) SPEED-POSIT.CHANGE ..... Signal turns ON when control switches from speed control to position control.
- 7) ZERO PASS ..... Signal turns ON when the zero point is passed.
- 8) ERROR DETECTION ..... Signal turns ON when a minor or major error is detected.
- 9) SERVO ERROR ..... Signal turns ON when an error is detected in the servo amplifier.
- 10) ZEROING REQUEST ..... Signal turns ON when confirmation of the home position address is required.
- 11) ZEROING COMPLETE ..... Signal turns ON when the home position return is completed normally.
- 12) EX.SIG.FLS ..... Signal turns ON when the upper limit switch input turns OFF.
- 13) EX.SIG.RLS ..... Signal turns ON when the lower limit switch input turns OFF.
- 14) EX.SIG.STOP ..... Signal turns ON when the stop signal turns ON.
- 15) EX.SIG.DOG ..... Signal turns ON at home position return (near-zero point dog ON).
- 16) EX.SIG.CHANGE ..... Signal turns ON when the speed/position switching input turns ON.
- 17) SERVO READY ..... Signal turns ON when the designated servo amplifier is in READY status.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### Monitored data display area

Displays the positioning data under PCPU control.

<b>REMARK</b>
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- (1) See Section 13.3.1 (2)(a) for any items displayed on the screen but not described in this section.

### [Key Operation]

#### Designating the axis No.

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the servo monitor functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching to servo ready monitor (when using A273UHCPU (32-axis specification))

- 1) While the Start Accept Monitor is displayed, press the [F10] key to monitor the servo READY signals. The display switches from the Start Accept Monitor to the Servo Ready Monitor.
- 2) If the servo READY signals are monitored for more than 8 axes, press the [F10] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to start accept monitor (when using A273UHCPU (32-axis specification))

- 1) While the Servo Ready Monitor is displayed, press the [F9] key to monitor the Start Accept signals. The display switches from the Servo Ready Monitor to the Start Accept Monitor.
- 2) If the start accept signals are monitored for more than 8 axes, press the [F9] key again to switch between the previous and subsequent pages of monitored axes.

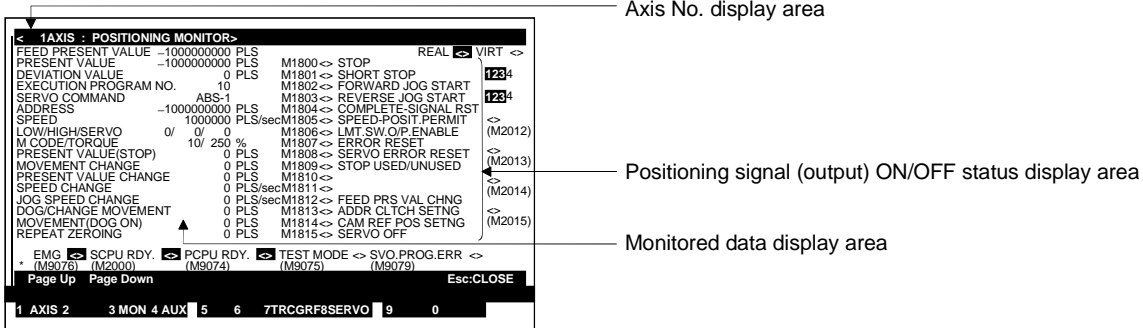
#### Window CLOSE

- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

- (c) Command signal ON/OFF display (with command signal names)  
 Displays the present PCPU positioning control data and the names and ON/OFF status of the positioning signals (command signals).

## [Positioning Monitor Window] (With command signal name display)



## [Display/Setting Content]

- |   |  |
|---|--|
| <b>Axis No. display area</b>                                  | Displays the currently monitored axis number.  |
| <b>Positioning signal (output) ON/OFF status display area</b> | <ul style="list-style-type: none"> <li>1) STOP ..... An external signal to stop an operated axis</li> <li>2) SHORT STOP ..... An external signal for rapid stop of an operated axis</li> <li>3) FORWARD JOG START ..... ON during JOG operation in direction of increasing address</li> <li>4) REVERSE JOG START ..... ON during JOG operation in direction of decreasing address</li> <li>5) COMPLETE-SIGNAL RST ..... Signal to turn OFF the positioning start completed signal and positioning completed signal</li> <li>6) SPEED-POSIT.PERMIT ..... External signal to enable switching from speed control to position control</li> <li>7) LMT.SW.O/P.ENABLE ..... Signal to enable the limit switch output</li> <li>8) ERROR RESET ..... Signal to clear the error code storage area for minor/major errors and reset the error detected signal</li> <li>9) SERVO ERROR RESET ..... Signal to clear the error code storage area for servo errors and reset the servo error detected signal</li> <li>10) STOP USED/UNUSED ..... Signal to enable or disable external inputs. Inputs are disabled when this signal is ON and enabled when it is OFF</li> <li>11) FEED PRS VAL CHNG ..... Signal to determine whether the feed present values are cleared at the start of operation under speed/position switching control. Present values are not cleared when this signal is ON but are cleared when it is OFF.</li> <li>12) ADDR CLTCH SETNG ..... Valid only when the output module is a cam or rotary table with an address mode clutch connected. Sets the reference position "0" of the present value in one virtual shaft revolution.</li> <li>13) CAM REF POS SENG ..... Valid only when the output module is a cam. Sets the cam reference position.</li> <li>14) SERVO OFF ..... Signal to set a servo motor in the free running state</li> </ul> |

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### Monitored data display area

Displays the positioning data under PCPU control.

#### REMARK

- (1) See Section 13.3.1 (2)(a) for any items displayed on the screen but not described in this section.

### [Key Operation]

#### Designating the axis No.

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the servo monitor functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop monitoring operation, or to resume the monitoring operation.

#### Switching to servo ready monitor (when using A273UHCPU (32-axis specification))

- 1) While the Start Accept Monitor is displayed, press the [F10] key to monitor the servo READY signals. The display switches from the Start Accept Monitor to the Servo Ready Monitor.
- 2) If the servo READY signals are monitored for more than 8 axes, press the [F10] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to start accept monitor (when using A273UHCPU (32-axis specification))

- 1) While the Servo Ready Monitor is displayed, press the [F9] key to monitor the start accept signals. The display switches from the Servo Ready Monitor to the Start Accept Monitor.
- 2) If the start accept signals are monitored for more than 8 axes, press the [F9] key again to switch between the previous and subsequent pages of monitored axes.

#### Window CLOSE

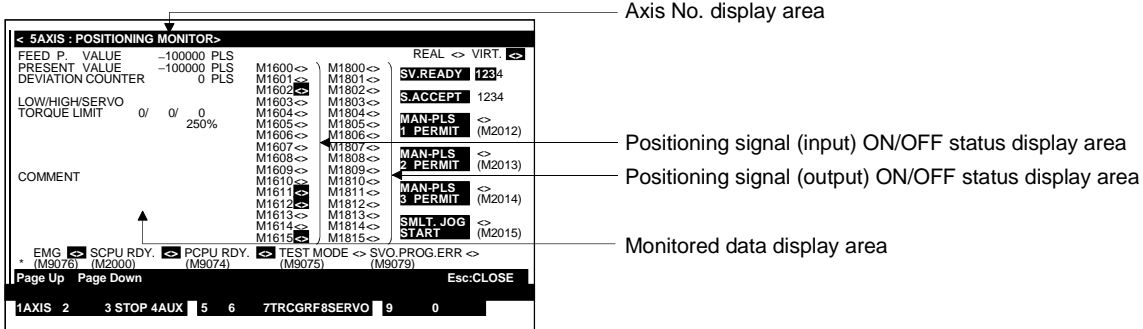
- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

In VIRT. Mode

- (1) For A17[ ]CPU
  - (a) Status signal and command signal display  
Displays the present PCPU positioning control data and the ON/OFF status of the positioning signals (status and command signals).

## [Positioning Monitor Window] (without signal name display)



## [Display/Setting Content]

**Axis No. display area** Displays the monitored output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).

**Positioning signal (input) ON/OFF status display area** Displays the ON/OFF status of the positioning control command signals.

**Positioning signal (output) ON/OFF status display area** Displays the ON/OFF status of the signals indicating the control status of each output module axis.

**Monitored data display area** Displays the positioning data under PCPU control.

- 1) FEED P. VALUE ..... Target address output to servo amplifier  
(If a roller is set as the output module, the roller peripheral speed is displayed in the present value display area.)
- 2) PRESENT VALUE ..... Present value determined on the basis of actual travel  
(Blank if output module is selected as roller)
- 3) DEVIATION COUNTER..... Difference between feed present value and actual present value
- 4) LOW/HIGH/SERVO ..... Displays the error code of the latest major, minor, or servo error which occurred for the designated axis.
- 5) TORQUE LIMIT ..... Current commanded torque limit value to the amplifier unit or servo amplifier
- 6) Executing cam number ..... Operating cam number, if a cam is set as the output module
- 7) Executing stroke amount ..... Operating cam stroke amount, if a cam is set as the output module
- 8) Position data in 1 cam-shaft axis revolution  
..... Present value required for one output module shaft rotation, if a cam is set as the output module
- 9) COMMENT ..... Displays comments for the output module connected to the designated output module shaft.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

<b>REMARK</b>
---------------

- (1) See Section 13.3.1(1) (a) for any items displayed on the screen but not described in this section.

### **[Key Operation]**

#### **Designating the axis No.**

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### **Switching status/command signal names**

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### **Selecting the trace graph functions**

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### **Selecting the servo monitor functions**

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### **Monitor STOP/RESTART**

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

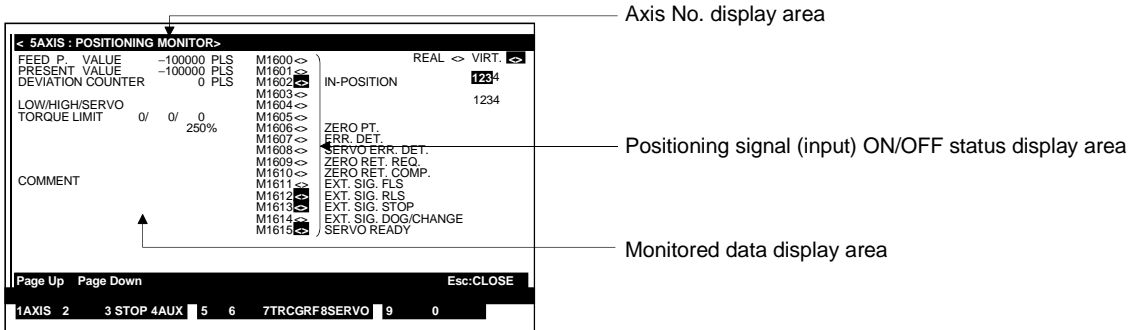
#### **Window CLOSE**

- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

- (b) Status signal ON/OFF display (with status names)  
 Displays the present PCPU positioning control data and the names and ON/OFF status of the signals which indicate the positioning status (status signals).

## [Positioning Monitor Window] (With status name display)



## [Display/Setting Content]

**Axis No. display area** Displays the monitored output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).

- Positioning signal (input) ON/OFF status display area**
- 1) IN-POSITION ..... Signal turns ON if the number of accumulated pulses at the deviation counter is within the in-position range.
  - 2) ZERO PT. .... Signal turns ON when the zero point is passed.
  - 3) ERR. DET. .... Signal turns ON when a minor or major error is detected.
  - 4) SERVO ERR. DET..... Signal turns ON when an error is detected in the servo amplifier.
  - 5) ZERO RET. REQ..... Signal turns ON when confirmation of the home position address is required.
  - 6) ZERO RET. COMP..... Signal turns ON when the home position return is completed normally.
  - 7) EXT. SIG. FLS ..... Signal turns ON when the upper limit switch input turns OFF.
  - 8) EXT. SIG. RLS..... Signal turns ON when the lower limit switch input turns OFF.
  - 9) EXT. SIG. STOP ..... Signal turns ON when the stop signal turns ON.
  - 10) EXT. SIG. DOG/CHANGE ..... Signal turns ON when the speed/position switching input turns ON.
  - 11) SERVO READY ..... Signal turns ON when the designated servo amplifier is in READY status.

**Monitored data display area** Displays the positioning data under PCPU control.

### REMARK

- (1) See section 13.3.1(1) (a) for any items displayed on the screen but not described in this section.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Designating the axis No.

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the servo monitor functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Window CLOSE

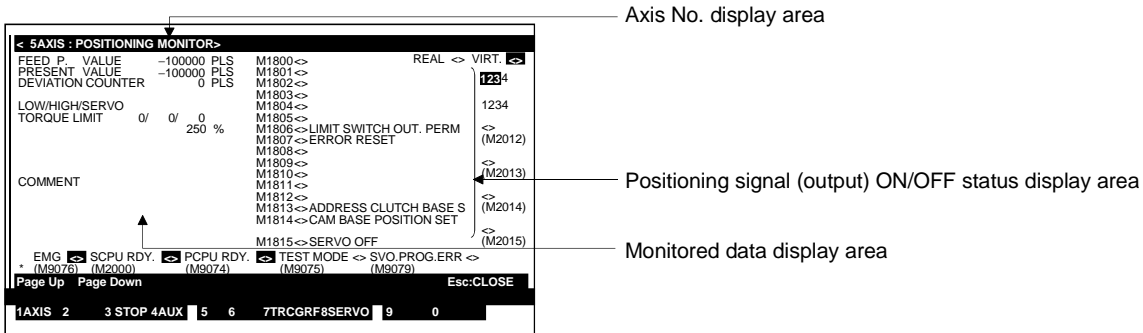
- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.



# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

- (c) Command signal ON/OFF display (with command signal names)  
Displays the present PCPU positioning control data and the names and ON/OFF status of the positioning signals (command signals).

## [Positioning Monitor Window] (With command signal name display)



## [Display/Setting Content]

**Axis No. display area** Displays the monitored output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).

- Positioning signal (output) ON/OFF status display area**
- 1) LIMIT SWITCH OUT.PERM ..... Signal to enable the limit switch output (Blank if output module is selected as roller)
  - 2) ERROR RESET ..... Signal to clear the error code storage area for minor/major errors and reset the error detected signal
  - 3) ADDRESS CLUTCH BASE ..... Valid only when the output module is a rotary table with the address mode clutch connected. Sets the reference position "0" of the present value for one virtual axis revolution.
  - 4) CAM BASE POSITION SET ..... Valid only when the output module is a cam. This signal sets the cam bottom dead-center position.
  - 5) SERVO OFF ..... Signal to set a servo motor in the free RUN state

**Monitored data display area** Displays the positioning data under PCPU control.

### REMARK

- (1) See Section 13.3.1(1) (a) for any items displayed on the screen but not described in this section.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Designating the axis No.

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the servo monitor functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Window CLOSE

- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

(2) Using ADU (A273UHCPU)

(a) Status signal and command signal display

Displays the present PCPU positioning control data and the ON/OFF status of the positioning signals (status and command signals).

## [Positioning Monitor Window] (without signal name display)

The screenshot shows a terminal window titled "5 AXIS : POSITIONING MONITOR-". It displays a grid of data for five axes (X040 to X04F). The left side shows feed, present, and deviation values, along with torque limits and comments. The right side shows the ON/OFF status of various positioning signals like SV\_READY, S\_ACCEPT, MAN-PLS, and SMLT\_JOG. A status bar at the bottom shows "1AXIS 2 3 STOP 4AUX 5 6 7TRCGRF8SERVO 9 0".

Axis No. display area

Positioning signal (input) ON/OFF status display area

Positioning signal (output) ON/OFF status display area

Monitored data display area

## [Display/Setting Content]

### Axis No. display area

Displays the monitored output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).

### Positioning signal (input) ON/OFF status display area

Displays the ON/OFF status of the positioning control command signals.

### Positioning signal (output) ON/OFF status display area

Displays the ON/OFF status of the signals indicating the control status of each output module axis.

### Monitored data display area

Displays the positioning data under PCPU control.

- 1) FEED P.VALUE ..... Target address output to servo amplifier (If a roller is set as the output module, the roller peripheral velocity is displayed in the present value display area.)
- 2) PRESENT VALUE ..... Present value determined on the basis of actual travel (Blank if output module is selected as roller)
- 3) DEVIATION COUNTER..... Difference between feed present value and actual present value
- 4) LOW/HIGH/SERVO ..... Displays the error code of the latest major, minor, or servo error which occurred for the designated axis.
- 5) TORQUE LIMIT ..... Current commanded torque limit value to the amplifier unit or servo amplifier
- 6) Executing cam number ..... Effective cam number, if a cam is set as the output module
- 7) Executing stroke amount ..... Effective cam stroke, if a cam is set as the output module
- 8) Position data in 1 cam-shaft axis revolution ..... Present value required for one output module shaft rotation, if a cam is set as the output module
- 9) COMMENT ..... Displays comments for the output module connected to the designated output module shaft.

## REMARK

- (1) See Section 13.3.1(2) (a) for any items displayed on the screen but not described in this section.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Designating the axis No.

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching Status/Command Signal Names

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the Trace Graph Functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the Servo Monitor Functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching to servo Ready Monitor (when using A273UHCPU (32-axis specification))

- 1) While the Start Accept Monitor is displayed, press the [F10] key to monitor the Servo READY signals. The display switches from the Start Accept Monitor to the Servo Ready Monitor.
- 2) If the Servo READY signals are monitored for more than 8 axes, press the [F10] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to Start Accept Monitor (when using A273UHCPU (32-axis specification))

- 1) While the Servo Ready Monitor is displayed, press the [F9] key to monitor the Start Accept signals. The display switches from the Servo Ready Monitor to the Start Accept Monitor.
- 2) If the Start Accept signals are monitored for more than 8 axes, press the [F9] key again to switch between the previous and subsequent pages of monitored axes.

#### Window CLOSE

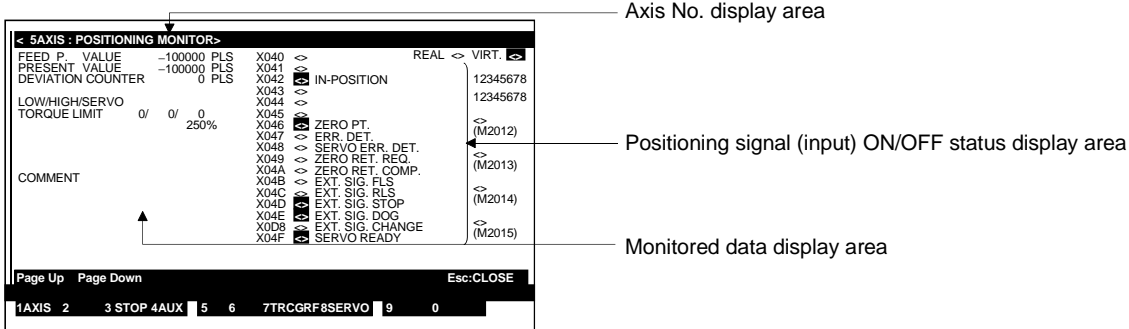
- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

(b) Status signal ON/OFF display (with status names)

Displays the present PCPU positioning control data and the names and ON/OFF status of the signals which indicate the positioning status (status signals).

## [Positioning Monitor Window] (With status name display)



## [Display/Setting Content]

**Axis No. display area** Displays the monitored output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).

- Positioning signal (input) ON/OFF status display area**
- 1) IN-POSITION ..... Signal turns ON if the number of droop pulses at the deviation counter is within the in-position range.
  - 2) ZERO PT. .... Signal turns ON when the zero point is passed.
  - 3) ERR. DET. .... Signal turns ON when a minor or major error is detected.
  - 4) SERVO ERR. DET..... Signal turns ON when an error is detected in the servo amplifier.
  - 5) ZERO RET. REQ. .... Signal turns ON when confirmation of the home position address is required.
  - 6) ZERO RET. COMP. .... Signal turns ON when the home position return is completed normally.
  - 7) EXT. SIG. FLS ..... Signal turns ON when the upper limit switch input turns OFF.
  - 8) EXT. SIG. RLS..... Signal turns ON when the lower limit switch input turns OFF.
  - 9) EXT. SIG. STOP ..... Signal turns ON when the stop signal turns ON.
  - 10) EXT. SIG. DOG ..... Signal turns ON at home position return (near-zero point dog ON).
  - 11) EXT. SIG. CHANGE ..... Signal turns ON when the speed/position switching input turns ON.
  - 12) SERVO READY ..... Signal turns ON when the designated servo amplifier is in READY status.

**Monitored data display area** Displays the positioning data under PCPU control.

### REMARK

- (1) See Section 13.3.1(2) (a) for any items displayed on the screen but not described in this section.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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### [Key Operation]

#### Designating the axis No.

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the servo monitor functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching to servo Ready Monitor (when using A273UHCPU (32-axis specification))

- 1) While the Start Accept Monitor is displayed, press the [F10] key to monitor the Servo Ready signals. The display switches from the Start Accept Monitor to the Servo Ready Monitor.
- 2) If the Servo Ready signals are monitored for more than 8 axes, press the [F10] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to start Accept Monitor (when using A273UHCPU (32-axis specification))

- 1) While the Servo Ready Monitor is displayed, press the [F9] key to monitor the Start Accept signals. The display switches from the Servo Ready Monitor to the Start Accept Monitor.
- 2) If the Start Accept signals are monitored for more than 8 axes, press the [F9] key again to switch between the previous and subsequent pages of monitored axes.

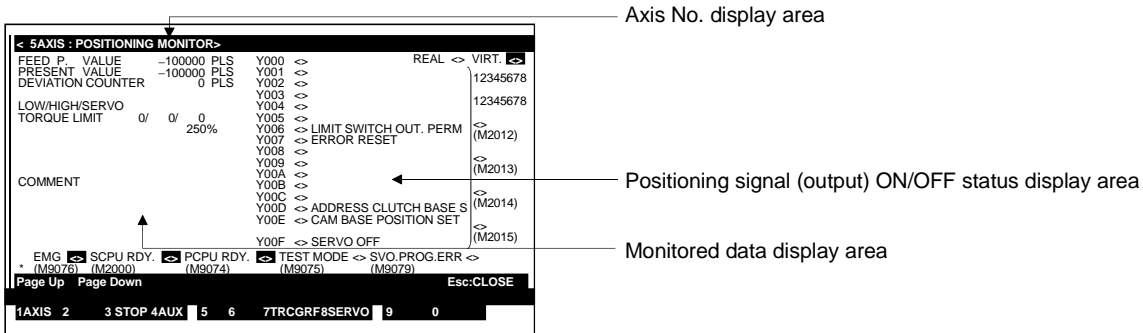
#### Window CLOSE

- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

- (c) Command signal ON/OFF display (with command signal names)  
Displays the present PCPU positioning control data and the names and ON/OFF status of the positioning signals (command signals).

## [Positioning Monitor Window] (With command signal name display)



### [Display/Setting Content]

**Axis No. display area** Displays the monitored output module axis number (REAL mode motor shaft corresponding to output destination amplifier number of output module).

- Positioning signal (output) ON/OFF status display area**
- 1) LIMIT SWITCH OUT.PERM ..... Signal to enable the limit switch output (Blank if output module is selected as roller)
  - 2) ERROR RESET ..... Signal to clear the error code storage area for minor/major errors and reset the error detected signal
  - 3) ADDRESS CLUTCH BASE ..... Valid only when the output module is a rotary table with an address mode clutch connected. Sets the reference position "0" of the present value for one virtual axis revolution.
  - 4) CAM BASE POSITION SET ..... Valid only when the output module is a cam. This signal sets the cam bottom dead-center position.
  - 5) Servo OFF ..... Signal to set a servo motor in the free RUN state

**Monitored data display area** Displays the positioning data under PCPU control.

### REMARK

- (1) See Section 13.3.1(2) (a) for any items displayed on the screen but not described in this section.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Designating the axis No.

- 1) Press the [F1] key to change the axis designated for the positioning monitor. The Axis Designation window will then be displayed. (The displayed axis number is the next axis number after the currently monitored axis number.) Input the axis number to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
- 2) Use the [Page Up]/[Page Down] keys to switch to the previous axis number or the next axis number at the Present Axis No. display area.

#### Switching status/command signal names

- 1) To display the command signal ON/OFF status and the names on the screen, first press the [F4] key to display the auxiliary function selection window.
- 2) Select the name display status with the [←]/[→] keys and press the [Enter] key. Alternatively, select the name display status with the number keys. The positioning monitor window changes to the selected name display status.
- 3) Press the [Esc] key to close the auxiliary function selection window without selecting an auxiliary function. The positioning monitor window name display status remains unchanged.

#### Selecting the trace graph functions

- 1) Press the [F7] key to run the data trace or display the trace results. The trace graph display window is displayed. (See Section 13.3.3.)

#### Selecting the servo monitor functions

- 1) Press the [F8] key to use the servo monitor or run the torque trace. The servo monitor window is displayed. (See Section 13.3.2.)

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching to servo Ready Monitor (when using A273UHCPU (32-axis specification))

- 1) While the Start Accept Monitor is displayed, press the [F10] key to monitor the Servo Ready signals. The display switches from the Start Accept Monitor to the Servo Ready Monitor.
- 2) If the Servo Ready signals are monitored for more than 8 axes, press the [F10] key again to switch between the previous and subsequent pages of monitored axes.

#### Switching to start Accept Monitor (when using A273UHCPU (32-axis specification))

- 1) While the Servo Ready Monitor is displayed, press the [F9] key to monitor the Start Accept signals. The display switches from the Servo Ready Monitor to the Start Accept Monitor.
- 2) If the Start Accept signals are monitored for more than 8 axes, press the [F9] key again to switch between the previous and subsequent pages of monitored axes.

#### Window CLOSE

- 1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

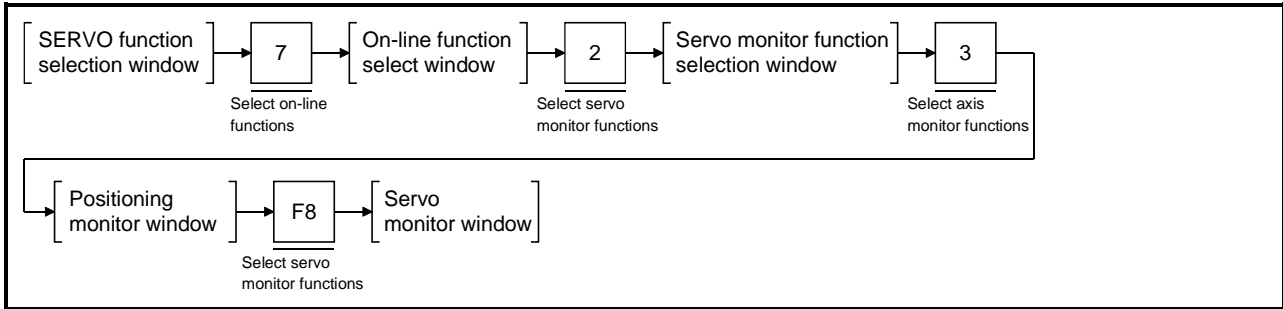


# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

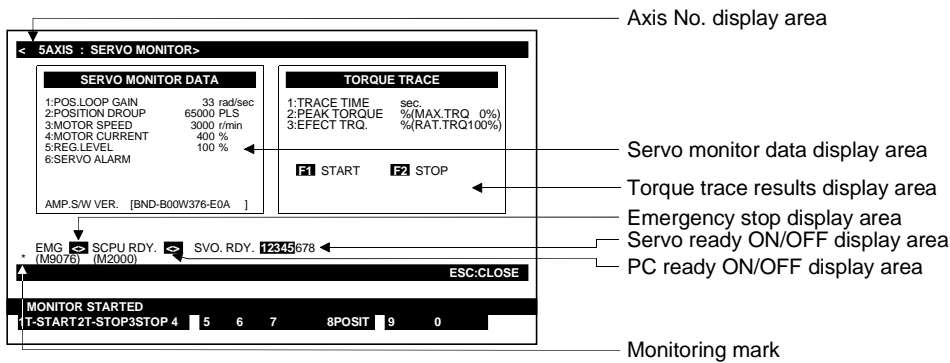
## 13.3.2 Servo monitor

Monitors the servo motor designated in the positioning monitor window.  
 Also runs the torque trace and displays the results.  
 Change the monitored axis number from the positioning monitor window.

### [Procedure for Displaying the Servo Monitor Window]



### [Servo Monitor Window] (when using ADU)



### [Display/Setting Content]

- Axis No. display area** Displays the axis number designated in the positioning monitor window.
- Servo monitor data display area** Displays data about the servo motors and servo amplifiers.
  - 1) POS. LOOP GAIN..... Control response speed for position control
  - 2) POSITION DROOP ..... Error in actual present value with respect to feed present value
  - 3) MOTOR SPEED ..... Actual rotational speed of the servo motor
  - 4) MOTOR CURRENT ..... Motor current as a percentage of the rated current
  - 5) REG. LEVEL ..... Data for monitoring the regenerative resistor load
  - 6) SERVO ALARM ..... Alarms detected in the servo amplifier (max. 2 alarms)
  - 7) MOTOR RATED CURRENT ..... Rated current value (A) of motor (only when MR-J2-B amplifier is used)
  - 8) AMP. S/W VER. .... Servo amplifier software version
- Torque trace results display area** 3) EFECT TRQ..... The effective torque during the torque trace as a percentage of the rated torque
- Emergency stop display area** Mark highlighted if an emergency stop was applied to the axis.
- Servo ready ON/OFF display area** Highlights the motor numbers for which the servo READY signal is ON.

### 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

**PC Ready ON/OFF display**      Highlighted when the PC ready signal (M2000) is ON.

**Monitoring mark**      Indicates that monitoring is in progress.  
(Not displayed when monitoring is stopped.)

**[Key Operation]**

**Running torque trace**

- 1) Press the [F1] key to start the torque trace.  
The message "EXECUTING." will be displayed in the message area.
- 2) Press the [F2] key to stop the torque trace.  
The message "COMPLETED." is displayed in the message area and the trace results are displayed in the torque trace display area.

**Selecting the positioning monitor functions**

- 1) Press the [F8] key to select the positioning monitor and revert to the positioning monitor window.

**Monitor STOP/RESTART**

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

**Switching servo ready monitored axes (when using A273UHCPU (32-axis specification))**

- 1) When monitoring the servo ready signal for more than 8 axes, press the [F10] (servo ready) key.  
The monitored axis will be changed to the previous axis No. and next axis No.

**Window CLOSE**

- 1) Press the [Esc] key to close the servo monitor window and revert to the servo monitor function selection window.

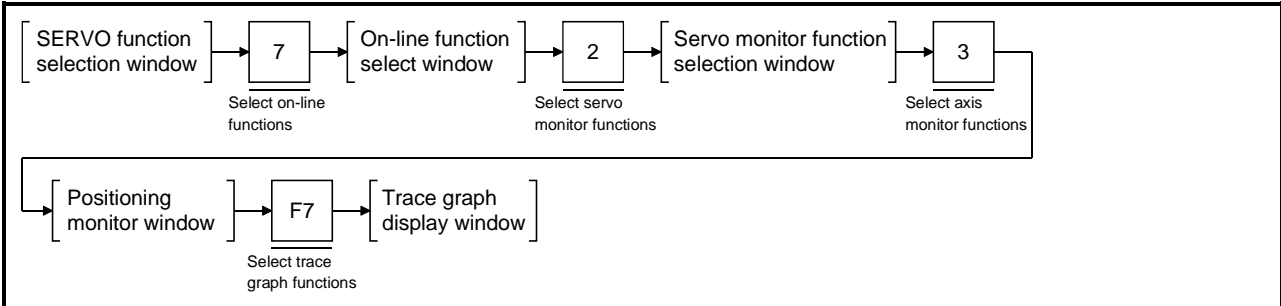
POINTS
<p>(1) Stopping torque trace</p> <ul style="list-style-type: none"> <li>• Other functions cannot be executed while the torque trace is running. Before executing any other function, press the [F2] key to stop the torque trace.</li> </ul> <p>(2) Torque trace time</p> <ul style="list-style-type: none"> <li>• The maximum permitted torque trace time is 1 hour 2 minutes 8 seconds.</li> <li>• If the torque trace time exceeds 1 hour 2 minutes 8 seconds, the torque trace stops automatically, even if it is not stopped by pressing the [F2] key.</li> </ul> <p>(3) Checking that the servo READY signal is ON</p> <ul style="list-style-type: none"> <li>• Before running the torque trace, check in the servo ready ON/OFF display area that the servo READY signal is ON for the monitored axis. If the [F1] key is pressed to start the torque trace while the servo ready signal is OFF, the torque trace does not start and a message indicates that the servo READY signal is OFF.</li> </ul>

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.3.3 Trace graph

Traces up to three of the following data and displays a graph of the results: position command, position droop, motor speed, motor current, and speed command.

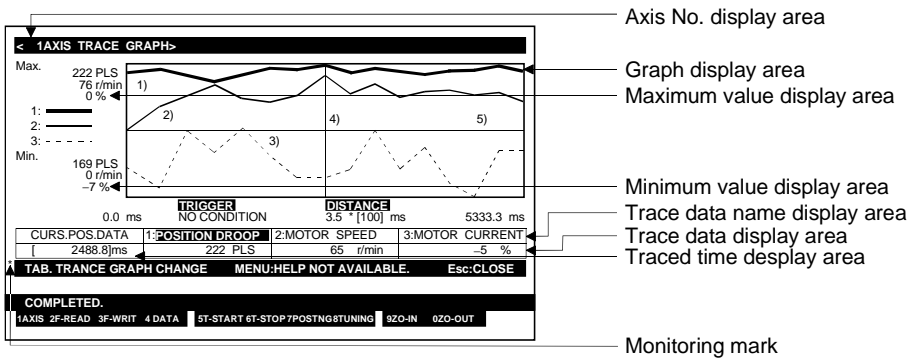
### [Procedure for Displaying the Trace Graph Display Window]



#### (1) Trace graph display

This section describes data trace execution and the graph displaying the trace results.

### [Trace Graph Display Window]



### [Display/Setting Content]

**Axis No. display area** Displays the axis number for which the data trace is executed.

**Graph display area** Displays the designated trace data as a graph.

- 1) Data 1..... The trace graph for the data name displayed in the left-hand trace data name display area.
- 2) Data 2..... The trace graph for the data name displayed in the center trace data name display area.
- 3) Data 3..... The trace graph for the data name displayed in the right-hand trace data name display area.
- 4) Vertical cursor ..... Indicates the data pick-up point.
- 5) Horizontal cursor ..... Indicates the zero value for the data.

**Maximum value display area** The maximum values of Data 1, Data 2, and Data 3 during the data trace.

**Minimum value display area** The minimum values of Data 1, Data 2, and Data 3 during the data trace.

**Trace data name display area** Displays the names of the data (Data 1, Data 2, and Data 3) selected to be traced from the trace data setting window.  
The highlighted data name indicates that the data graph can be vertically scrolled.

**Trigger condition display area** Displays the start conditions to start the data trace.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

<b>Trace interval display area</b>	Displays the number of milliseconds (ms) between traces.
<b>Trace time display area</b>	Displays the times at which the start and end of the graph displayed in the graph display area were traced.
<b>Trace data display area</b>	Displays the data values picked up by the vertical cursor.
<b>Traced time display area</b>	Displays the time at which the trace data is picked up from the graphs by the vertical cursor, between the trace start and trace end times.
<b>Monitoring mark</b>	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

### [Key Operation]

<b>Axis No. setting</b>	<ol style="list-style-type: none"><li>1) Press the [F1] key to change the axis designated for the data trace. (The axis number set is the axis number that was designated in the positioning monitor window when the trace graph window was opened from the positioning monitor window.) The Axis Designation window will then be displayed, and the axis number which follows the currently designated axis number will be indicated. Input the axis number for the data trace and press the [Enter] key to end axis designation and revert to the trace graph display window.</li></ol>
<b>Setting trace data</b>	<ol style="list-style-type: none"><li>1) To set the type of trace data, trace start conditions, and trace interval, press the [F4] key to display the trace data setting window. (See Section 13.3.3 (2).)</li></ol>
<b>Starting the data trace</b>	<ol style="list-style-type: none"><li>1) Press the [F5] key to start the data trace. A YES/NO dialog box prompts whether to start the data trace.</li><li>2) To start the data trace, press the [←] key to highlight "YES" then press the [Enter] key. The data trace is started, based on the data set in the trace data setting window.</li><li>3) The cancel the data trace, press the [Enter] key while "NO" is highlighted.</li></ol>
<b>Stopping the data trace</b>	<ol style="list-style-type: none"><li>1) Press the [F6] key to stop the data trace. The data trace stops and the trace results are displayed graphically in the graph display area.</li></ol>
<b>Writing to a File</b>	<ol style="list-style-type: none"><li>1) Press the [F3] key to write the trace results to a file. A YES/NO dialog box prompts whether to execute the data write operation.</li><li>2) With the "YES" item highlighted, press the [Enter] key. The trace results from the trace graph display window are written to the file and the display reverts to the trace graph display window.</li><li>3) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.</li></ol>
<b>Reading a File</b>	<ol style="list-style-type: none"><li>1) If trace results have been written to a file, press the [F2] key to read the trace results from the file and display them graphically. A YES/NO dialog box prompts whether to execute the data read operation.</li><li>2) With the "YES" item highlighted, press the [Enter] key. The display reverts to the trace graph display window with the trace results from the file displayed.</li><li>3) To cancel reading from the file, press the [→] key to highlight "NO" then press the [Enter] key.</li></ol>

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## Data Pick-up (Moving the Vertical Cursor)

- 1) To display in the trace data display area the data values from the displayed graphs at a particular time, press the [←]/[→] keys to move the vertical cursor to the required time in the trace time range.  
The trace data from the points of intersection of the vertical cursor with the graphs is displayed in the trace data display areas.
- 2) The screen scrolls horizontally when the vertical cursor is moved to the left or right edge of the graph display area.

## Scrolling the Screen Horizontally

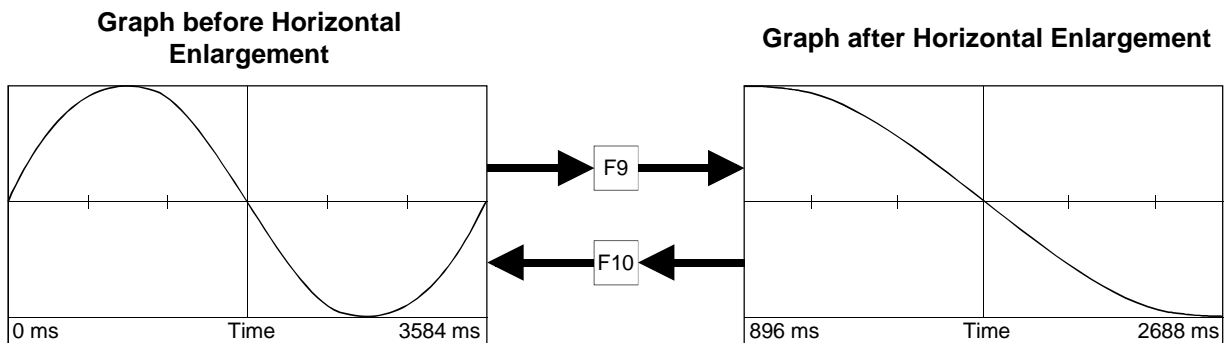
- 1) Hold down the [Shift] key and press the [←]/[→] keys to scroll the displayed graphs to the left or right.

## Scrolling the Screen Vertically (Moving the Horizontal Cursor)

- 1) Press the [Tab] key to select which of the data in the graph display area (Data 1, Data 2, Data 3) is to be scrolled vertically.
- 2) Each time the [Tab] key is pressed, the highlighting moves one position to the right.  
The data graph with the highlighted data name can be vertically scrolled.
- 3) Press the [↑]/[↓] keys to vertically scroll the selected graph.  
Only the selected graph scrolls vertically; the other graphs do not move.

## Changing the Graph Display Format (Horizontal Enlargement and Reduction)

- 1) Press the [F9] key to enlarge the currently displayed graphs by a factor of two horizontally.  
The graph is enlarged horizontally by a factor of two each time the [F9] key is pressed.  
However, the display cannot be enlarged to produce a trace time range less than 0 to 7 ms.
- 2) Press the [F10] key to horizontally reduce by a factor of 1/2 a graph which has been enlarged horizontally by a factor of two using the [F9] key.  
The graph is reduced horizontally by a factor of 1/2 each time the [F10] key is pressed.  
However, the display cannot be reduced to display times outside the trace time range.



## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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### Changing the Graph Display Format (Vertical Enlargement and Reduction)

- 1) Hold down the [Shift] key and press the [F9] key to enlarge the currently displayed graphs by a factor of two vertically.  
The graph is enlarged vertically by a factor of two each time the [F9] key is pressed while the [Shift] key is held down.
- 2) Hold down the [Shift] key and press the [F10] key to vertically reduce by a factor of 1/2 a graph which has been enlarged vertically by a factor of two using the [Shift] + [F9] keys.  
The graph is reduced vertically by a factor of 1/2 each time the [F10] key is pressed while the [Shift] key is held down.  
However, the display cannot be reduced to display values outside the applicable display range of the data axis.

### Selecting the Tuning Function

- 1) If the data trace results indicate that any of the following servo parameters need to be changed, press the [F8] key to select the tuning function:
  - Position control gain 1
  - Speed control gain 1
  - Speed integral compensation
  - Feed forward coefficientThe tuning window is displayed. (See Section 13.3.3 (3).)  
Change the set values as required.

### Selecting the Positioning Monitor Functions

- 1) Press the [F7] key to select the positioning monitor.  
The positioning monitor window (without signal name display) is displayed and monitoring starts for the axis selected in the trace graph display window. (See Section 13.3.1.)

### Window CLOSE

- 1) Press the [Esc] key to close the trace graph display window and revert to the servo monitor function selection window.

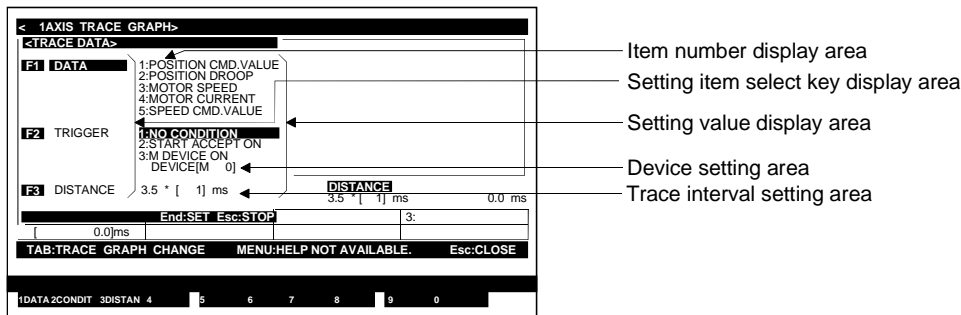
POINTS
<ol style="list-style-type: none"><li>(1) Saving trace results<ul style="list-style-type: none"><li>• When the trace graph display window is closed, all results from the data trace run from that window are lost.</li><li>• To save these trace results, use file write from the trace graph functions to write the data to file before closing the trace graph display window.</li></ul></li><li>(2) Restrictions while trace graph display window is open<ul style="list-style-type: none"><li>• The menu selection window is not displayed if the [F11] key is pressed.</li><li>• The help functions are not available.</li></ul></li><li>(3) Stopping data trace<ul style="list-style-type: none"><li>• Other functions cannot be executed while the data trace is running. Before executing any other function, press the [F6] key to stop the data trace.</li></ul></li></ol>

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

### (2) Setting trace data

This section describes how to set the type of trace data, trace start conditions, and trace interval.

#### [Trace Data Setting Window]



#### [Display/Setting Content]

##### Item number display area

Displays the number for each setting item.

##### Setting item select key display area

Displays the keys to select the setting item numbers.

##### Setting value display area

Displays the data settings required to run the data trace.

##### Device setting area

If the leading edge of an M device is designated as the trigger to start the data trace, set the device number in this area.

##### Trace interval setting area

Sets the interval between running data traces.

#### [Key Operation]

##### Setting Data Type

- 1) Press the [F1] key to set the type of data to be traced. "DATA" and "1" in the selected item display area are highlighted.
- 2) Press the [↑]/[↓] keys to highlight the item number of the required trace data name and press the [Enter] key. The data name corresponding to the selected item number is highlighted.
- 3) Repeat step 2) until all the data names to be traced are highlighted. Up to three data names can be highlighted.
- 4) Set other items or press the [End] key to enter the conditions and close the trace data setting window.
- 5) To cancel the data trace setting of any selected item, press the [↑]/[↓] keys to highlight the item number and press the [Enter] key. The highlighted data name reverts to a normal display and the setting is cleared.

##### Setting the Trigger Condition

- 1) Press the [F2] key to set to the condition to start the data trace. "TRIGGER" and "1" in the item number display area are highlighted.
- 2) Press the [↑]/[↓] keys to highlight the required condition to start the data trace.
  - Set "NO CONDITION" as the trigger condition to start the data trace using "START" from the trace graph display functions.
  - Select "START ACCEPT ON" to start the data trace when the start accept signal turns ON.
  - Select "M DEVICE ON" to start the data trace on the leading edge of a designated device.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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- 3) Press the [Enter] key to select "Designated M device ON" as the trigger condition.

A cursor is displayed in the device setting area.

Input the required device number and press the [Enter] key.

- 4) Set other items or press the [End] key to enter the conditions and close the trace data setting window.

### **Setting the Trace Interval**

- 1) Press the [F3] key to set the data trace interval.  
"DISTANCE" is highlighted and a cursor appears in the trace interval setting area.

- 2) The trace interval is set in multiples of 3.5 ms.

Enter the number of multiples between 1 to 256 and press the [Enter] key.

### **Setting END**

- 1) Press the [End] key to write the set data and close the trace data setting window.

The display reverts to the trace graph display window with the set data displayed in the trace data name display area, trigger condition display area, and trace interval display area.

### **Setting Abort**

- 1) Press the [Esc] key to close the trace data setting window.  
The display reverts to the trace graph display window.



# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## (3) Tuning

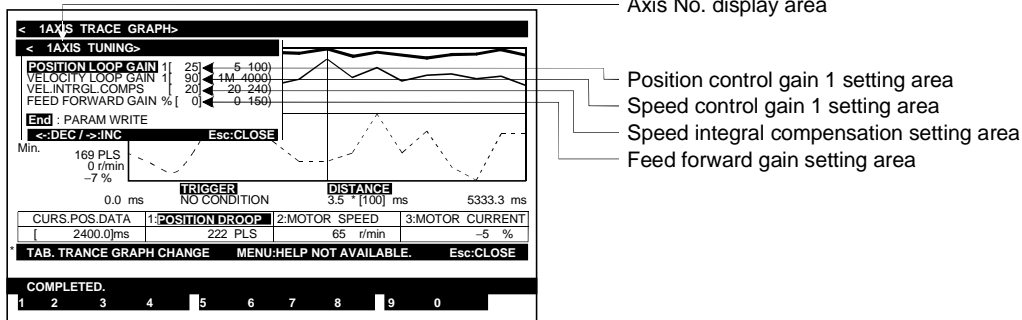
### (a) When ADU is used

The following servo parameters can be changed:

- Position control gain 1 value
- Speed control gain 1 value
- Speed integral compensation value
- Feed forward gain

If the data trace results indicate that any of the set values need to be changed, use the tuning function to make the required changes.

### [Tuning Window]



Axis No. display area

Position control gain 1 setting area

Speed control gain 1 setting area

Speed integral compensation setting area

Feed forward gain setting area

### [Display/Setting Content]

- Axis No. display area** Displays the axis number for which the servo parameters are to be changed. (Axis number set in the trace graph display window.)
- Position control gain 1 setting area** Displays the position control gain 1 value set in the ADU or the changed position control gain 1.
- Speed control gain 1 setting area** Displays the speed control gain 1 value set in the ADU or the changed speed control gain 1.
- Speed integral compensation setting area** Displays the speed integral compensation value set in the ADU or the changed speed integral compensation.
- Feed forward gain setting area** Displays the feed forward gain value set in the ADU or the changed feed forward gain.

POINTS	
(1) Servo parameter setting ranges The servo parameter setting ranges are shown in the table below.	
Amplifier Type	A273UHCPU
Servo Parameters	ADU
Position control gain 1	1 to 9999 (5 to 500)
Speed control gain 1	1 to 9999 (20 to 5000)
Speed integral compensation	2 to 240 (2 to 240)
Feed forward gain	0 to 150 (0 to 150)
* The values in parentheses show the valid range. A servo error occurs if a value is set outside the valid range.	
(2) Feed forward gain setting and display Set the feed forward gain in the tuning window in multiples of 1%. If the feed forward gain was set as multiples of 0.1% in the servo data setting mode, it is displayed rounded down to the nearest 1%.	

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

### [Key Operation]

#### Changing Data

- 1) Press the [↑]/[↓] keys to highlight the item for which the setting is to be changed.
- 2) Enter the data with the numeric keys or press the [←]/[→] keys to increase or decrease the set value in steps of 1.
- 3) Repeat steps 1) and 2) until all the required setting changes are made, then press the [Enter] key.  
A range check is conducted on all the settings.  
If the check ends normally, the changed data is written for the appropriate axis to the ADU or MR-[ ]-B.  
The message indicates when the data has been written and the tuning window closes.  
A message "OUT OF SETTING RANGE." is displayed if any of the settings is out of range.  
Correct the settings if this occurs.

#### Writing parameters

- 1) If the data trace results are satisfactory after the settings are changed, press the [F8] key to open the tuning window.
- 2) Press the [End] key to write the changed data to the servo system CPU internal memory.  
A message indicates when the data has been written and the display reverts to the data trace graph display window.  
If there is a problem with the servo system CPU internal memory, the message "WRITE-IN ERROR" is displayed to indicate that a write error occurred.  
The message "CANNOT EXECUTE, PC READY ON." is displayed if the data could not be written because the PC ready (M2000) signal was ON. Turn OFF the PC ready signal and try again.

#### Window CLOSE

- 1) Press the [Esc] key to close the tuning window and revert to the data trace graph display window without changing the set values.

#### POINTS

- (1) Not writing parameters  
After set values have been changed in the tuning window, follow the procedure below to cancel the changes and not write the changed data to the servo system CPU internal memory.
  - Turn on the servo system CPU power supply.
  - Turn ON the PC ready (M2000) signal.
  - Servo error reset
  - Select the test mode with the PC ready signal (M2000) OFF.To operate the designated axis using the changed data, the data changed in the tuning window must be written to the servo system CPU internal memory.
- (2) Writing parameters  
Make sure that the PC ready (M2000) signal is OFF when writing the changed data to the servo system CPU internal memory.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

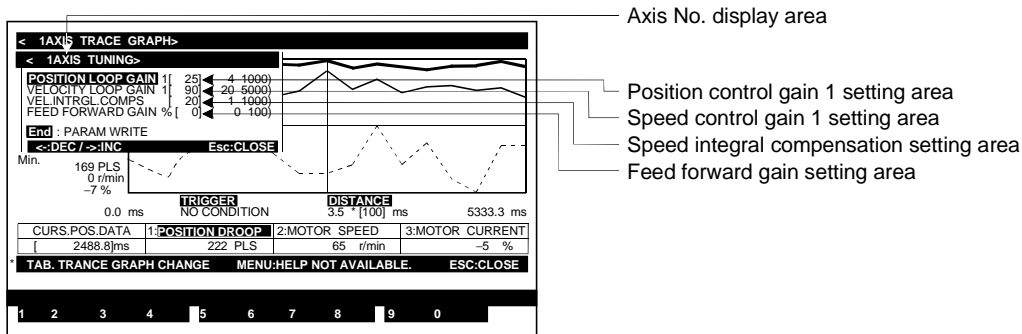
(b) When MR-[ ]-B is used

The following servo parameters can be changed:

- Position control gain 1 value
- Speed control gain 1 value
- Speed integral compensation value
- Feed forward gain

If the data trace results indicate that any of the set values need to be changed, use the tuning function to make the required changes.

## [Tuning Window]



## [Display/Setting Content]

- Axis No. display area** Displays the axis number for which the servo parameters are to be changed. (Axis number set in the trace graph display window.)
- Position control gain 1 setting area** Displays the position control gain 1 value set for the MR-[ ]-B or the changed position control gain 1.
- Speed control gain 1 setting area** Displays the speed control gain 1 value set for the MR-[ ]-B or the changed speed control gain 1.
- Speed integral compensation setting area** Displays the speed integral compensation value set for the MR-[ ]-B or the changed speed integral compensation.
- Feed forward gain setting area** Displays the feed forward gain value set for the MR-[ ]-B or the changed feed forward gain.

POINT	
(1) Servo parameter setting ranges The servo parameter setting ranges are shown in the table below.	
Servo Parameters	MR-[ ]-B
Position control gain 1	1 to 9999 (4 to 1000)
Speed control gain 1	1 to 9999 (20 to 5000)
Speed integral compensation	1 to 9999 (1 to 1000)
Feed forward gain	0 to 100

\* The values in parenthesis show the valid range.  
A servo error occurs if a value is set outside the valid range.

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

### [Key Operation]

#### Changing data

- 1) Press the [↑]/[↓] keys to highlight the item for which the setting is to be changed.
- 2) Enter the data with the numeric keys or press the [←]/[→] keys to increase or decrease the set value in steps of 1.
- 3) Repeat steps 1) and 2) until all the required setting changes are made, then press the [Enter] key.  
A range check is conducted on all the settings.  
If the check ends normally, the changed data is written for the appropriate axis to the ADU or MR-[ ]-B.  
A message indicates when the data has been written and the tuning window closes.  
The message "OUT OF SETTING RANGE." is displayed if any of the settings is out of range.  
Correct the settings if this occurs.

#### Writing parameters

- 1) If the data trace results are satisfactory after the settings are changed, press the [F8] key to open the tuning window.
- 2) Press the [End] key to write the changed data to the servo system CPU internal memory.  
A message indicates when the data has been written and the display reverts to the data trace graph display window.  
If there is a problem with the servo system CPU internal memory, the message "WRITE-IN ERROR" is displayed to indicate that a write error occurred.  
The message "CANNOT EXECUTE, PC READY ON." is displayed if the data could not be written because the PC READY (M2000) signal was ON. Turn OFF the PC ready signal and try again.

#### Window CLOSE

- 1) Press the [Esc] key to close the tuning window and revert to the data trace graph display window without changing the set values.

#### POINTS

- (1) Not writing parameters  
After set values have been changed in the tuning window, follow the procedure below to cancel the changes and not write the changed data to the servo system CPU internal memory.
  - Turn on the servo system CPU power supply.
  - Turn ON the PC ready (M2000) signal.
  - Servo error reset
  - Select the test mode with the PC ready signal (M2000) OFF.To operate the designated axis using the changed data, the data changed in the tuning window must be written to the servo system CPU internal memory.
- (2) Writing parameters  
Make sure that the PC ready (M2000) signal is OFF when writing the changed data to the servo system CPU internal memory.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.4 Scroll Monitor

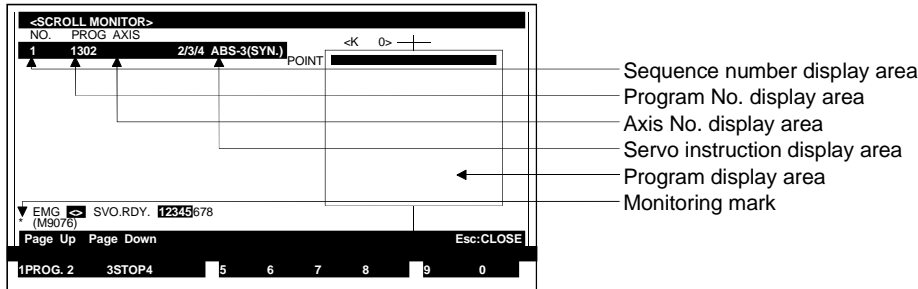
Displays a sequential list of up to 15 servo instructions, down to the currently executing servo program.

When a servo program is run, the servo instruction is displayed in the last line and all the previously executed servo programs move up one line.

If the maximum of 15 servo programs is displayed, the servo program on the top line is deleted from the screen.

The scroll monitor is run by selecting the scroll monitor item from the servo monitor function selection window.

### [Scroll Monitor Window] (For A273UHCPU)



### [Display/Setting Content]

- Sequence number display area** Displays the order in which the monitored servo programs were executed. The largest number corresponds to the most recent servo program.
- Program No. display area** Displays the number of the executed servo program.
- Axis No. display area** Displays the axis number used by the servo instruction displayed to the right. This display area is blank during the START instruction.
- Servo instruction display area** Displays the servo instruction used by the executed servo program. "TEST" is displayed for home position return test operation and the position control gain 1 check in the servo test mode.
- Program display area** Displays the positioning data for the servo instruction selected from the displayed servo program list.
- Monitoring mark** Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

### [Key Operation]

#### Designating a program readout

- 1) Press the [F1] key to read the contents of an executed servo program which is displayed in the list.  
Monitoring stops and the monitoring mark disappears from the window.
- 2) Press the [↑]/[↓] keys to select the servo program to be read from the list and press the [Enter] key.  
The contents of the selected servo program are read to the program display area.  
If the entire servo program cannot be displayed in the program display area, press the [Page Up] or [Page Down] key to scroll through the servo program.
- 3) If the START instruction was selected with the [↑]/[↓] keys, press the [←]/[→] keys to select the servo program number to be read and press the [Enter] key.  
The contents of the selected servo program are read to the program display area.
- 4) Repeat steps 2) and 3) to read the contents of another servo program.  
When the [Enter] key is pressed, the displayed servo program contents are cleared and the selected servo program is displayed.

#### Monitor STOP/RESTART

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### Switching Servo Ready Monitored Axes (when using A273UHCPU (32-axis specification))

- 1) When monitoring the servo ready signal for more than 8 axes, press the [F10] (servo ready) key.  
The monitored axis will be changed to the previous axis No. and next axis No.

#### Window CLOSE

- 1) Press the [Esc] key to close the scroll monitor window and revert to the servo monitor function selection window.

# 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

## 13.5 Present Value History Monitor

For absolute axes, displays a history of the encoder present value/servo command value/monitor present value when the servo amplifier power is switched ON/OFF and when home position return is performed.

Since the time display is based on the programmable controller's clock (D9025, D9026, D9027), set M9028 when the programmable controller is in the RUN state. When an incremental axis is designated, all of the data are undefined.

### [Present Value History Monitor Window]

The screenshot shows a terminal window with the following content:

ITEM	MM/DD HH:MM	ENCODER VALUE SERVO			MON VAL	ALARM
ZERO DATA		MUL ROT/SGL ROT	DRCT VAL			
ZERO DATA	9/16 0:21	0000H/00000000H	000186A0H		0	----
MON VAL	9/16 0:21	0000H/00000000H	0001A017H	6519.000000	----	----
N PWR ON 1	9/16 0:21	0000H/0000396H	00000000H	0.000000	----	0
E PWR OFF 1	9/15 23:54	0000H/00000000H	0013EE6BH	-1.000000	----	----
W PWR ON 2	9/15 23:54	0000H/0000152BH	00000000H	0.000000	----	0
PWR OFF 2	9/15 22:59	0000H/00000000H	0001AA58H	9145.000000	----	----
O PWR ON 3	9/15 22:59	0000H/00000000H	00000000H	0.000000	----	0
L PWR OFF 3	9/15 17:01	0000H/00000000H	00000000H	0.000000	----	----
D PWR ON 4	9/15 17:01	0000H/FFFFEAD1H	00000000H	0.000000	----	0

Below the table, there is an alarm message:

```
<ALARM> REAL VIRTUAL
1201 12010 BACKUP DATA ERROR ON SERVO AMP.POWER ON
1202 12020 ENCODER COM. ERROR ON SERVO AMP.POWER ON
901 9010 POWER OFF TBAVELLING EXCEEDED ON SERVO AMP.POWER ON
```

At the bottom, there are navigation controls: Page Up, Page Down, MONITOR STARTED, ESC: CLOSE, and a status bar showing 1 AXIS 2 3 STOP4 5 6 7 8 9 0.

### [Display/Setting Content]

- Axis No. display area** Displays the axis number currently being monitored.
- Servo amplifier type display area** Displays the servo amplifier type currently being monitored.
- Monitor value at home position return display area** Displays the following items:
  - 1) Time of completion of home position return
  - 2) Encoder present value
    - Multiple revolution data in the absolute position reference point data
    - Position within one revolution in the absolute position reference point data
  - 3) Servo command value
  - 4) Monitor present value
- Present monitor value display area** Displays the following items:
  - 1) Present time
  - 2) Encoder present value
    - Present multiple revolution data of the encoder present value
    - Present position within one revolution of the encoder present value
  - 3) Present servo command value
  - 4) Present monitor present value
- Monitor value at servo amplifier power ON/OFF display area** Displays the present values for an absolute axis at the last four times that the servo amplifier power was switched ON/OFF.
 

[When power switched ON]

  - 1) Time when power switched ON
  - 2) Encoder present value
    - Encoder's initial multiple revolution data
    - Encoder's initial 1-revolution data
  - 3) Servo command value after reset
  - 4) Monitor present value after reset
  - 5) Information on alarm occurrence on present value reset (error code for minor/major errors)

## 13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

---

[When power switched OFF]

- 1) Time immediately before servo amplifier power switched OFF
- 2) Encoder present value
  - Encoder's initial multiple revolution data immediately before servo amplifier power switched OFF
  - Encoder's initial 1-revolution data immediately before servo amplifier power switched OFF
- 3) Servo command value immediately before servo amplifier power switched OFF
- 4) Monitor present value immediately before servo amplifier power switched OFF

**Error contents display area** Displays details of errors indicated by error codes displayed when the power is switched ON.

### [Key Operation]

#### **Axis No. change**

- 1) To change the axis number subject to present value history monitoring by designating an axis number, press the [F1] key.  
The axis designation window will be displayed. (When this window is displayed, the axis number following that of the axis for which present value history monitoring is currently being conducted is displayed.)  
Enter the axis number to be subject to monitoring and press the [Enter] key.  
On completing this axis designation, the present value history monitor window will reappear.
- 2) Press the [Page Up]/[Page Down] keys to display, respectively, the axis numbers preceding and following the axis No. currently displayed in the axis number display area.

#### **Monitor STOP/RESTART**

- 1) Press the [F3] key to stop the monitoring operation, or to resume the monitoring operation.

#### **Window CLOSE**

- 1) Press the [Esc] key to close the scroll monitor window and revert to the servo monitor function selection window.



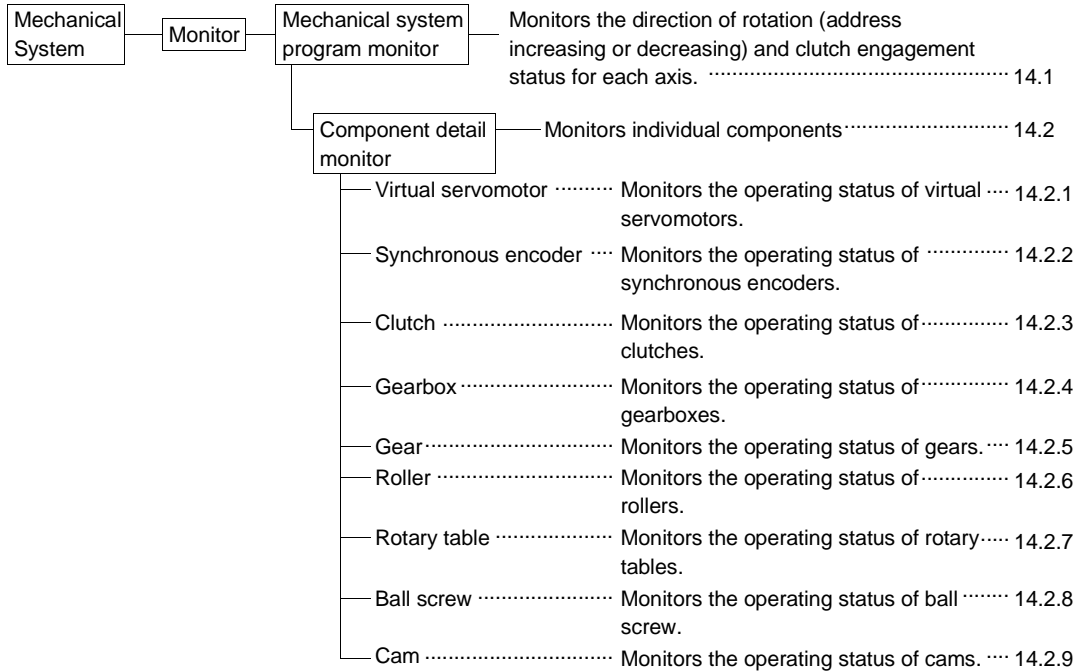
# 14. MECHANICAL SYSTEM PROGRAM MONITOR

## 14. MECHANICAL SYSTEM PROGRAM MONITOR

The monitor mode for the mechanical system mode displays the mechanical system component connection diagram for the mechanical system program which was written to the servo system CPU. This mode monitors the operating status of individual components and the direction of rotation of the virtual main shaft, auxiliary shafts, and connection shafts.

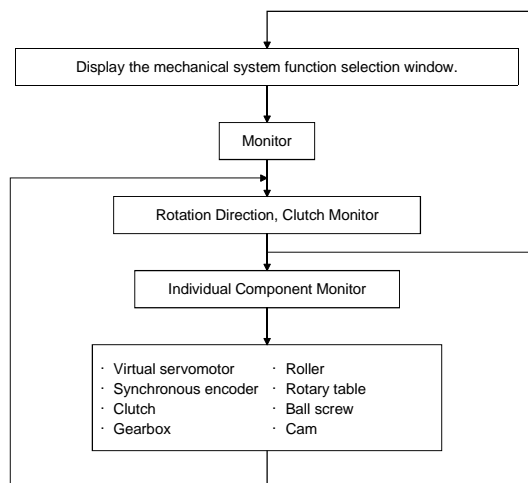
### (1) Function summary

The monitor mode for the mechanical system mode offers the following functions.



### (2) Outline flowchart

The procedure for using the monitor mode is shown below.



#### POINT

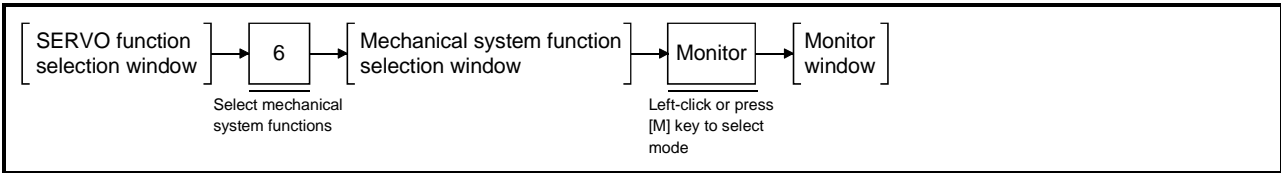
- (1) Switch the servo system CPU to VIRT. mode before running monitoring. If monitoring is attempted in the REAL mode, an error message is displayed and no monitoring is conducted.

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

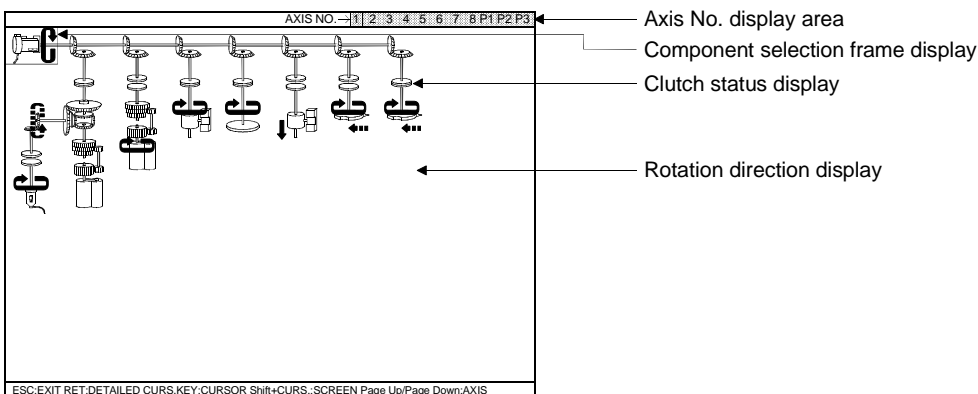
## 14.1 Mechanical System Program Monitor

Monitors the direction of rotation and clutch engagement status for each axis.

### [Procedure for Displaying the Monitor Window]



### [Monitor Window]

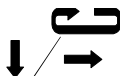



### [Display/Setting Content]

**Axis No. display area** A frame is displayed around the currently monitored virtual main shaft number.





**Component selection frame display** A frame is displayed to select the component to monitor.

**Rotation direction display (address up/down)** An arrow indicates whether address is increasing or decreasing.

- Solid line display  Shaft rotation in direction of increasing address  
Output module movement in direction of increasing address
- Broken line display  Shaft rotation in direction of decreasing address  
Output module movement in direction of decreasing address

No arrow is displayed if address is not increasing or decreasing.

**Clutch status display** Clutch engagement status is displayed using changing clutch images.

	Disengaged	Engaged
Direct clutch		
Smoothing clutch		

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

**[Key Operation]**

**Virtual main shaft switching**

- 1) Press the [Page Up] key to increase the currently displayed virtual main shaft by + 1.  
Press the [Page Down] key to decrease the currently displayed virtual main shaft by -1.

**Scrolling Left or Right**

- 1) Press the [Shift] + [←] or [→] key to scroll the display to the left or right.

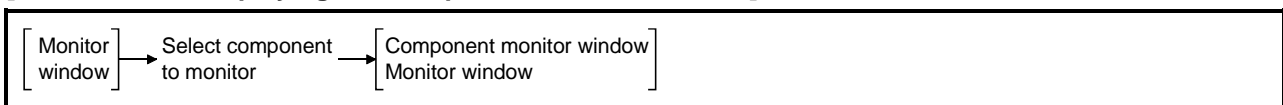
**Ending Monitoring**

- 1) Press the [Esc] key to close the monitor window and revert to the mechanical system function selection window.

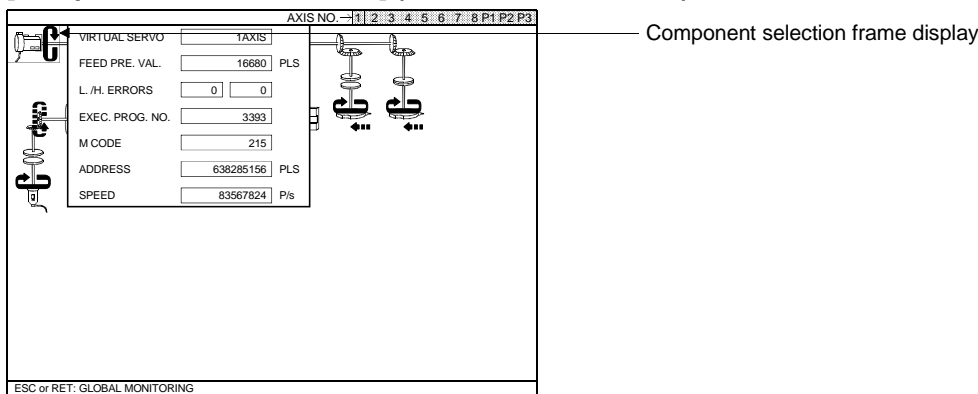
## 14.2 Component Detail Monitor

Monitors the designated component operating status.

**[Procedure for Displaying the Component Monitor Window]**



**[Component Monitor Window] (for virtual servomotor)**



**[Display/Setting Content]**

**Component selection frame display**

A frame is displayed to select the component to monitor.

**[Key Operation]**

**Running Component Monitor**

- 1) Press the arrow keys to move the component selection frame over the image of the component to be monitored and press the [Enter] key.  
A component monitor display window is displayed for the selected component. (See 14.2.1 to 14.2.8.)

**Ending Monitoring**

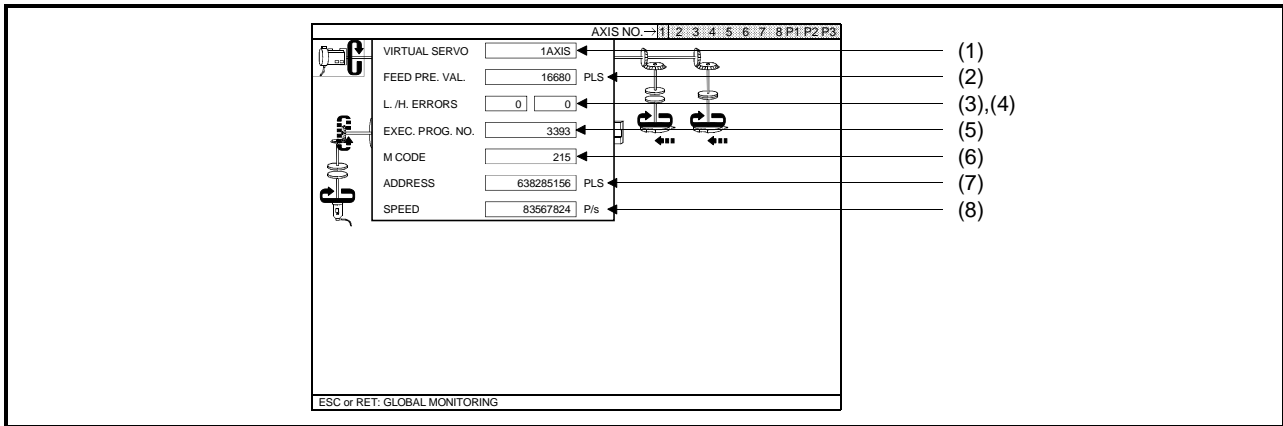
- 1) Press the [Esc] key to close the component monitor window and revert to the monitor window.

**REMARKS**

- (1) Only a single component can be selected at any one time.
- (2) Rotation direction and clutch operating status monitoring are suspended when the component monitor screen is displayed. (See 14.1.)  
Rotation direction and clutch operating status monitoring restart when the component monitor window is closed and the display reverts to the monitor window.

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

## 14.2.1 Virtual servomotor monitor



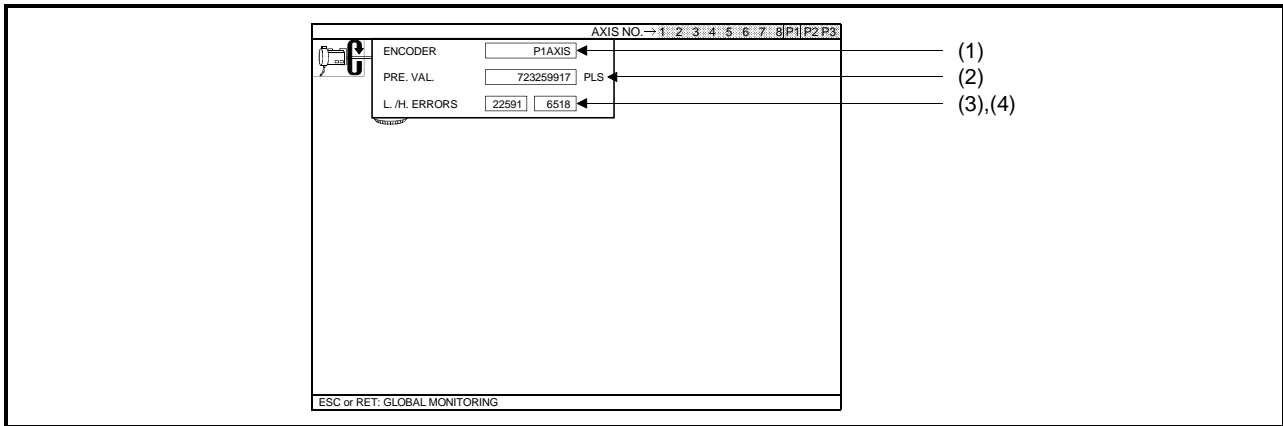
Display Item	Description
(1) Virtual servomotor	Displays the axis number of the designated virtual servomotor.
(2) Feed present value	Displays the address output to the virtual servomotor based on the positioning address and travel value designated by the executing servo program.
(3) Minor error	Displays the error code of a minor error occurring in the designated virtual servomotor.
(4) Major error	Displays the error code of a major error occurring in the designated virtual servomotor.
(5) Execution program number	Displays the number of the currently executing servo program.
(6) M-code	Displays the M-code designated for the currently executing servo program.
(7) Command address	Displays the positioning address designated for the currently executing servo program.
(8) Commanded speed	Displays the positioning speed designated for the currently executing servo program.

### REMARK

- (1) See the following manual for information on major and minor error codes:
- Motion Controller (SV22) Programming Manual (VIRTUAL Mode)

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

## 14.2.2 Synchronous encoder monitor



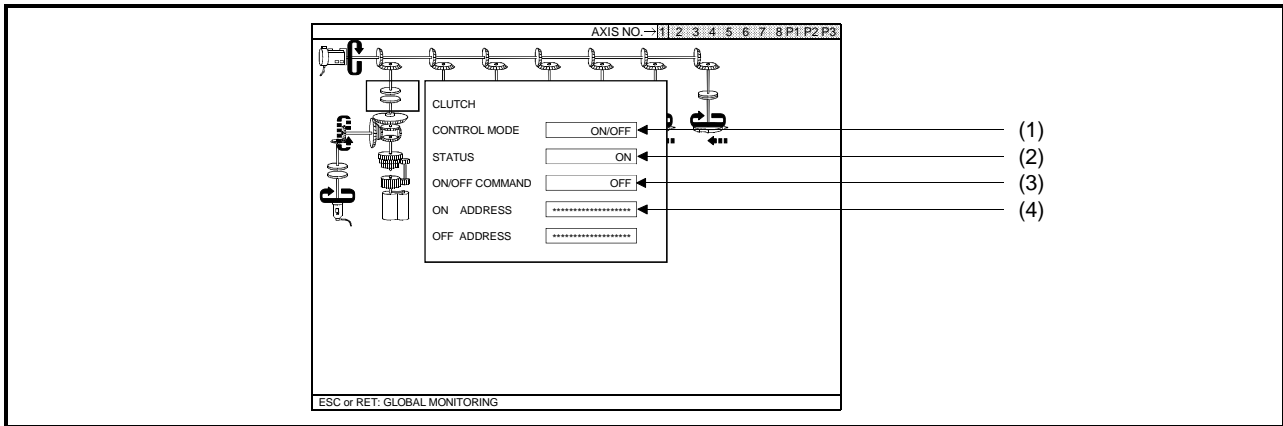
Display Item	Description
<b>(1) Encoder</b>	Displays the synchronous encoder axis number set for the designated synchronous encoder.
<b>(2) Present value</b>	Displays the feed present value corresponding to the number of pulses input from the synchronous encoder.
<b>(3) Minor error</b>	Displays the error code of a minor error occurring in the designated synchronous encoder.
<b>(4) Major error</b>	Displays the error code of a major error occurring in the designated synchronous encoder.

### REMARK

- (1) See the following manual for information on major and minor error codes:
- Motion Controller (SV22) Programming Manual (VIRTUAL Mode)

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

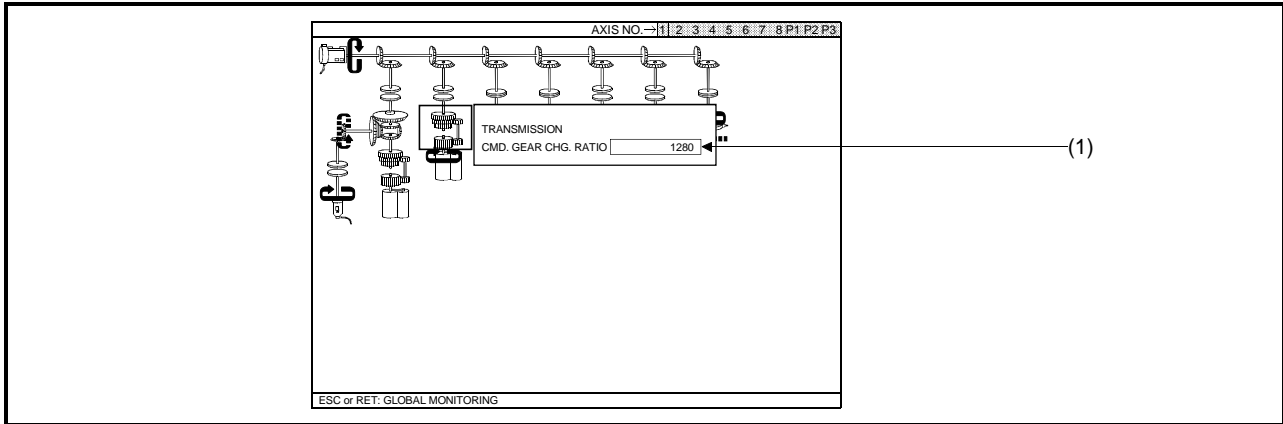
## 14.2.3 Clutch monitor



Display Item	Description
<b>(1) Control mode</b>	Displays the control mode of the designated clutch (ON/OFF mode, address mode, external input mode).
<b>(2) Status</b>	Displays the ON/OFF status of the status storage device which shows the clutch ON/OFF status.
<b>(3) ON/OFF command</b>	Displays the ON/OFF status of the clutch ON/OFF device which commands the clutch to turn on or off.
<b>(4) ON, OFF address</b>	Display the feed present value of the virtual main shaft or auxiliary shaft when the clutch turns on or off, respectively. The ON and OFF addresses are displayed only if the control mode is set to address mode.

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

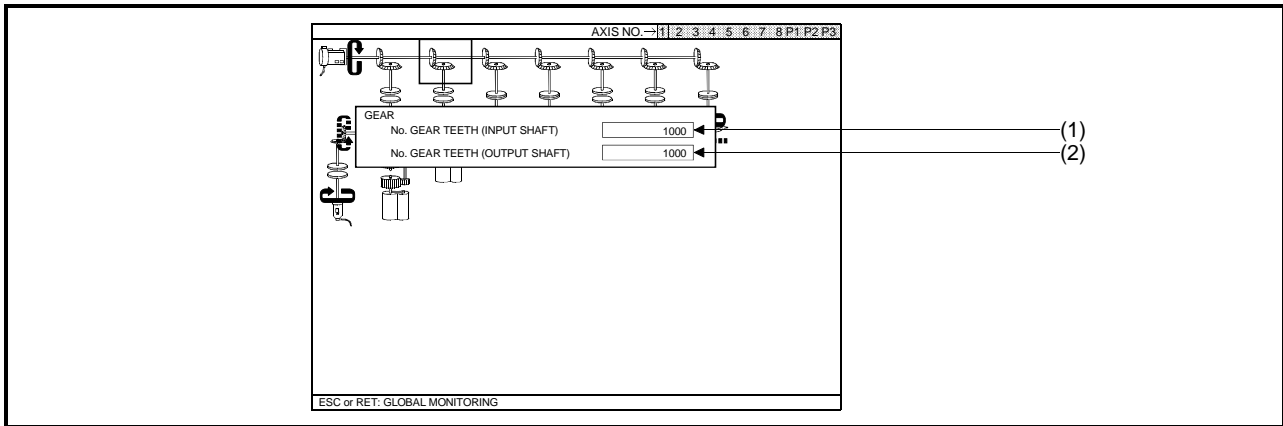
## 14.2.4 Speed change gear monitor



Display Item	Description
(1) Command gear ratio	Displays the gear ratio applied to the speed input from the input shaft.

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

## 14.2.5 Gear monitor

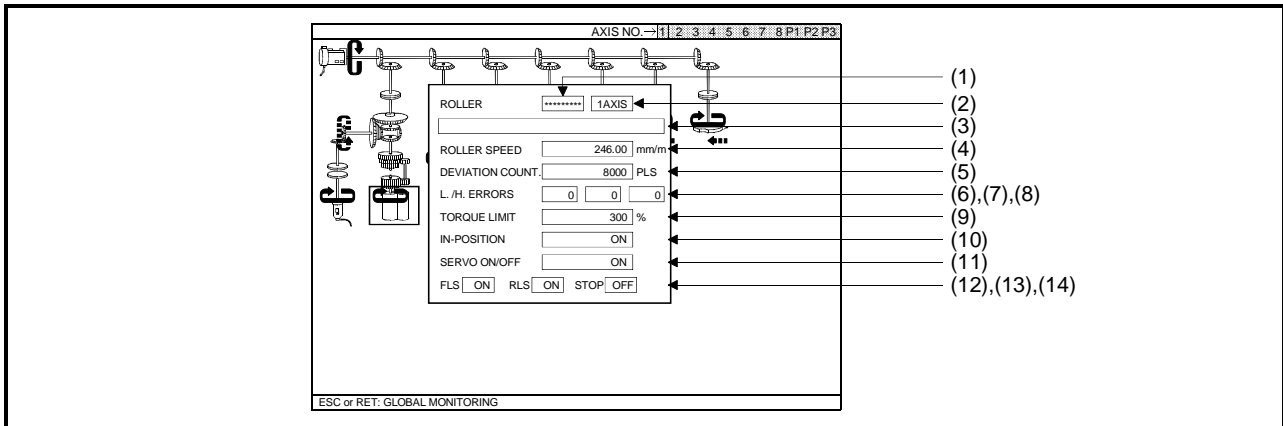


Display Item	Description
(1) No. of gear teeth (input shaft)	Displays the number of teeth of the gear on the input shaft.
(2) No. of gear teeth (output shaft)	Displays the number of teeth of the gear on the output shaft.



# 14. MECHANICAL SYSTEM PROGRAM MONITOR

## 14.2.6 Roller monitor



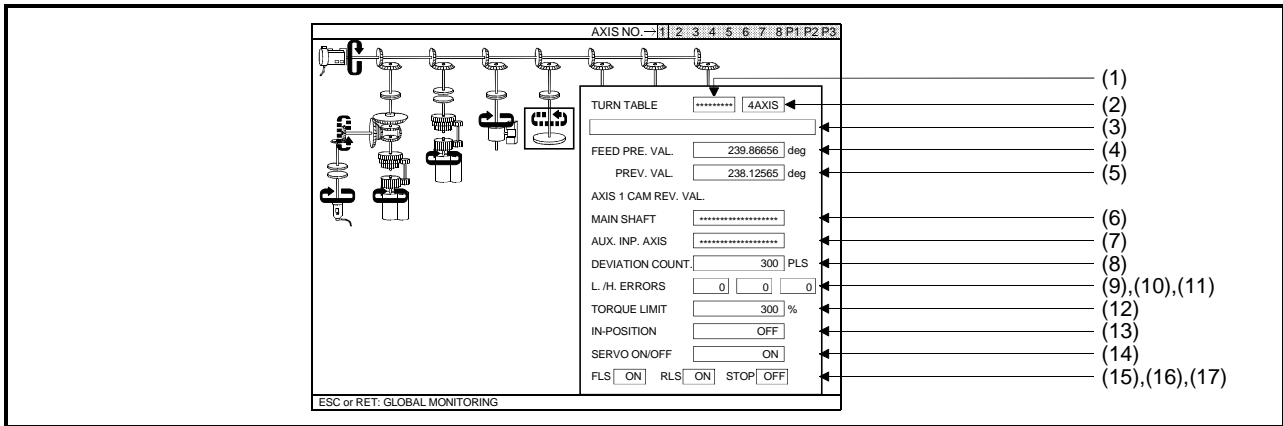
Display Item	Description
(1) Output shaft number	Displays the output shaft number set in the parameters for the designated roller.
(2) Axis No.	Displays the actual axis number corresponding to the output shaft number.
(3) Comment	Displays the comment set in the parameters for the designated roller.
(4) Peripheral velocity	Displays the roller travel value calculated by the servo system CPU.
(5) Deviation counter value	Displays the number of pulses sent to the deviation counter.
(6) Minor error	Displays the error code of a minor error occurring in the designated roller.
(7) Major error	Displays the error code of a major error occurring in the designated roller.
(8) Servo error	Displays the error code of an error detected by the servo amplifier.
(9) Torque limit value	Displays the torque limit value commanded to the amplifier unit or servo amplifier.
(10) In-position	Displays the ON/OFF status of the In-position signal.
(11) Servo ON/OFF	Displays the servo ON/OFF status of the servomotor controlled by the designated roller parameters.
(12) FLS	Displays the ON/OFF status of the Upper Limit Switch signal.
(13) RLS	Displays the ON/OFF status of the Lower Limit Switch signal.
(14) STOP	Displays the ON/OFF status of the Stop signal.

### REMARK

- (1) See the following manual for information on major, minor, and servo error codes:
- Motion Controller (SV22) Programming Manual (VIRTUAL Mode)

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

## 14.2.7 Rotary table monitor



Display Item	Description
(1) Output shaft number	Displays the output shaft number set in the parameters for the designated rotary table.
(2) Axis No.	Displays the actual axis number corresponding to the output shaft number.
(3) Comment	Displays the comment set in the parameters for the designated rotary table.
(4) Feed present value	Displays the feed present value output to the amplifier unit or servo amplifier based on the number of pulses input to the designated rotary table.
(5) Actual present value	Displays the actual servomotor present value read from the amplifier unit or servo amplifier.
(6) Main shaft	Displays the present value in one virtual shaft revolution set for the main shaft.
(7) Auxiliary shaft	Displays the present value in one virtual shaft revolution set for the auxiliary shaft.
(8) Deviation counter value	Displays the number of pulses sent to the deviation counter.
(9) Minor error	Displays the error code of a minor error occurring in the designated rotary table.
(10) Major error	Displays the error code of a major error occurring in the designated rotary table.
(11) Servo error	Displays the error code of an error detected by the servo amplifier.
(12) Torque limit value	Displays the torque limit value commanded to the amplifier unit or servo amplifier.
(13) In-position	Displays the ON/OFF status of the in-position signal.
(14) Servo ON/OFF	Displays the servo ON/OFF status of the servomotor controlled by the designated rotary table parameters.
(15) FLS	Displays the ON/OFF status of the upper limit switch signal.
(16) RLS	Displays the ON/OFF status of the lower limit switch signal.

## 14. MECHANICAL SYSTEM PROGRAM MONITOR

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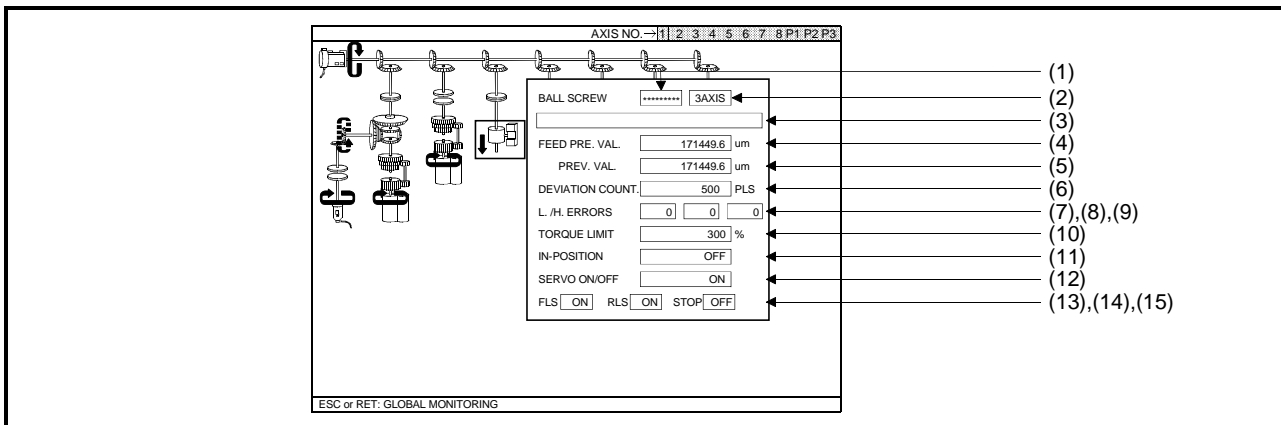
Display Item	Description
(17) STOP	Displays the ON/OFF status of the Stop signal.

### REMARK

- (1) See the following manual for information on major, minor, and servo error codes:
  - Motion Controller (SV22) Programming Manual (VIRTUAL Mode)

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

## 14.2.8 Ball screw monitor



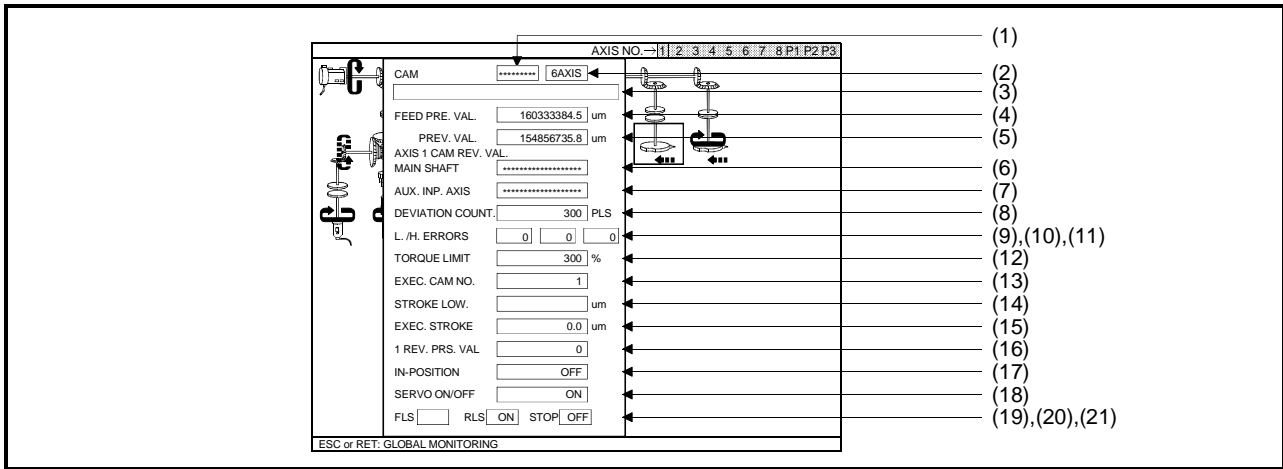
Display Item	Description
(1) Output shaft number	Displays the output shaft number set in the parameters for the designated ball screw.
(2) Axis No.	Displays the actual axis number corresponding to the output shaft number.
(3) Comment	Displays the comment set in the parameters for the designated ball screw.
(4) Feed present value	Displays the feed present value output to the amplifier unit or servo amplifier based on the number of pulses input to the designated ball screw.
(5) Actual present value	Displays the actual servomotor present value read from the amplifier unit or servo amplifier.
(6) Deviation counter value	Displays the number of pulses sent to the deviation counter.
(7) Minor error	Displays the error code of a minor error occurring in the designated ball screw.
(8) Major error	Displays the error code of a major error occurring in the designated ball screw.
(9) Servo error	Displays the error code of an error detected by the servo amplifier.
(10) Torque limit value	Displays the torque limit value commanded to the amplifier unit or servo amplifier.
(11) In-position	Displays the ON/OFF status of the In-position signal.
(12) Servo ON/OFF	Displays the servo ON/OFF status of the servomotor controlled by the designated ball screw parameters.
(13) FLS	Displays the ON/OFF status of the Upper Limit Switch signal.
(14) RLS	Displays the ON/OFF status of the Lower Limit Switch signal.
(15) STOP	Displays the ON/OFF status of the Stop signal.

### REMARK

- (1) See the following manual for information on major, minor, and servo error codes:
  - Motion Controller (SV22) Programming Manual (VIRTUAL Mode)

# 14. MECHANICAL SYSTEM PROGRAM MONITOR

## 14.2.9 Cam monitor



Display Item	Description
(1) Output shaft number	Displays the output shaft number set in the parameters for the designated cam.
(2) Axis No.	Displays the actual axis number corresponding to the output shaft number.
(3) Comment	Displays the comment set in the parameters for the designated cam.
(4) Feed present value	Displays the feed present value output to the amplifier unit or servo amplifier based on the number of pulses input to the designated cam.
(5) Actual present value	Displays the actual servomotor present value read from the amplifier unit or servo amplifier.
(6) Main shaft	Displays the present value in one virtual shaft revolution set for the main shaft.
(7) Auxiliary shaft	Displays the present value in one virtual shaft revolution set for the auxiliary shaft.
(8) Deviation counter value	Displays the number of pulses sent to the deviation counter.
(9) Minor error	Displays the error code of a minor error occurring in the designated cam.
(10) Major error	Displays the error code of a major error occurring in the designated cam.
(11) Servo error	Displays the error code of an error detected by the servo amplifier.
(12) Torque limit value	Displays the torque limit value commanded to the amplifier unit or servo amplifier.
(13) Actual cam No.	Displays the number of the operating cam.
(14) Stroke lower limit	Displays the stroke lower limit value commanded to the amplifier unit or servo amplifier.
(15) Actual stroke	Displays the stroke of the operating cam.

## 14. MECHANICAL SYSTEM PROGRAM MONITOR

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Display Item	Description
(16) Present value for one revolution	Displays the present value in one cam shaft revolution.
(17) In-position	Displays the ON/OFF status of the in-position signal.
(18) Servo ON/OFF	Displays the servo ON/OFF status of the servomotor controlled by the designated cam.
(19) FLS	Displays the ON/OFF status of the upper limit switch signal.
(20) RLS	Displays the ON/OFF status of the lower limit switch signal.
(21) STOP	Displays the ON/OFF status of the stop signal.

### REMARK

- (1) See the following manual for information on major, minor, and servo error codes:
  - Motion Controller (SV22) Programming Manual (VIRTUAL Mode)

# 15. FILE MAINTENANCE

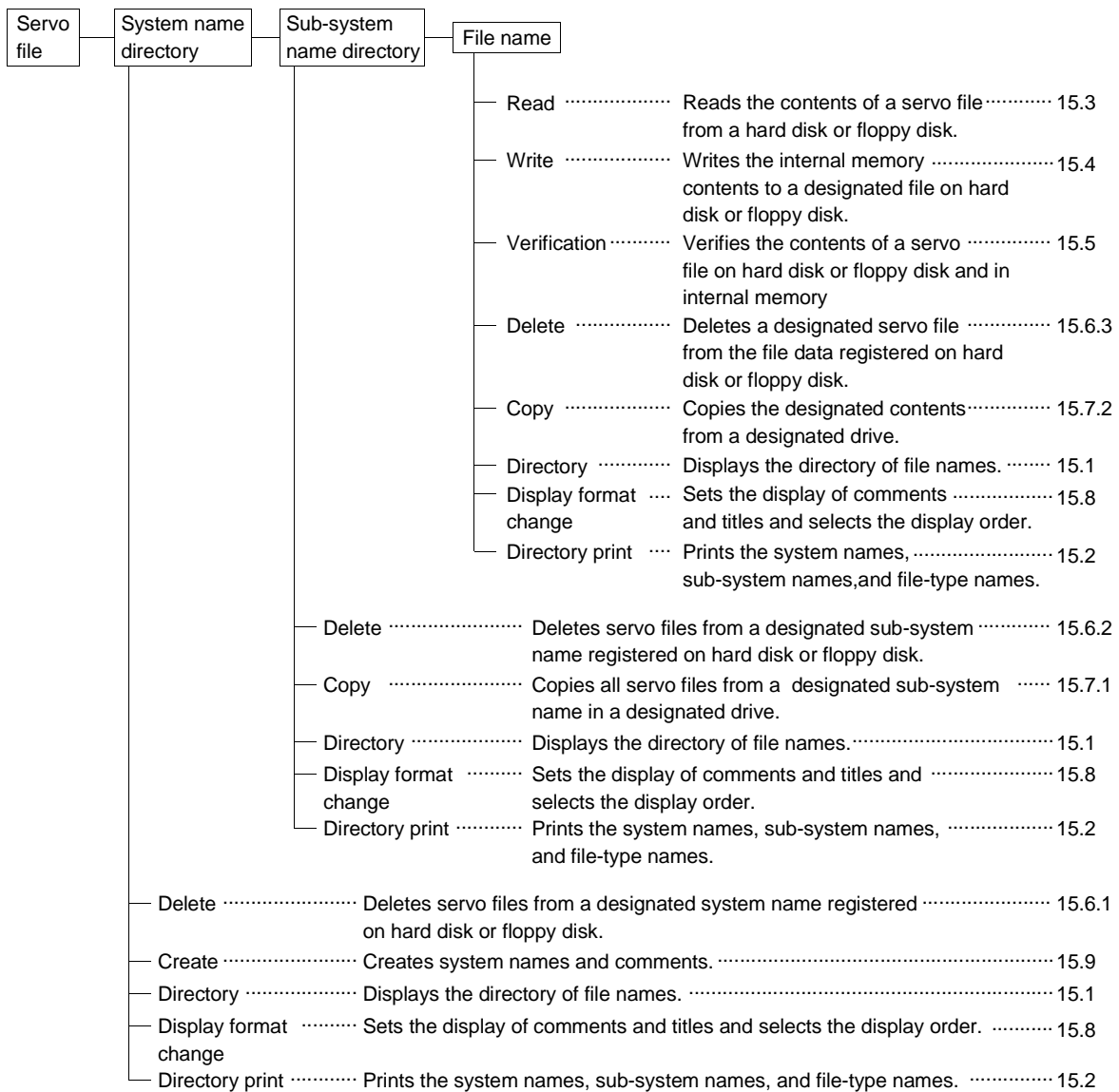
## 15. FILE MAINTENANCE

The Servo File mode is a mode to read and write servo files containing the following data to and from hard disks (HD) and floppy disks (FD):

- Servo data
- Servo program
- Mechanical system edited data
- Mechanical system parameters
- Cam data

### (1) Function summary

The functions below are offered by the GSV22PE servo file mode.



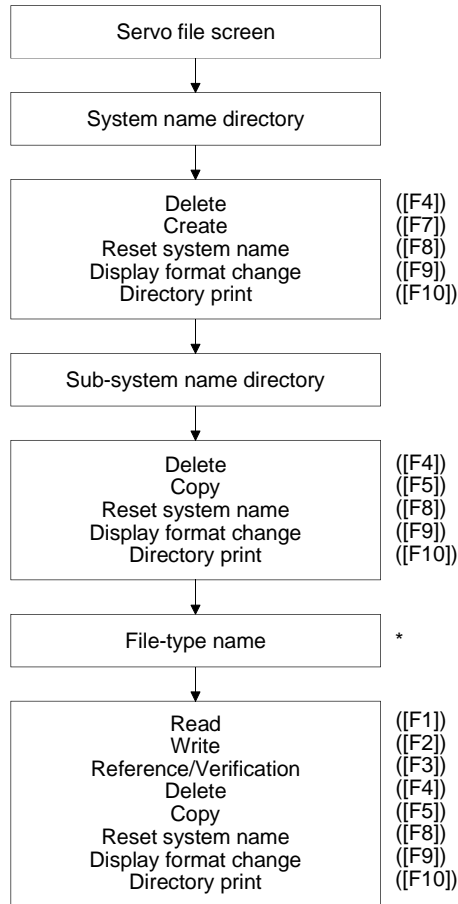
**POINT**

(1) When writing files to a floppy disk, a formatted floppy disk must be used.

# 15. FILE MAINTENANCE

(2) Outline flowchart

The procedure to use the servo monitor mode is shown below.



\* : Select the file type, then perform the required operation.

**POINT**

- (1) The following five file types can be selected:
- Servo data
  - Servo program
  - Mechanical system edited data
  - Mechanical system parameters
  - Cam data



# 15. FILE MAINTENANCE

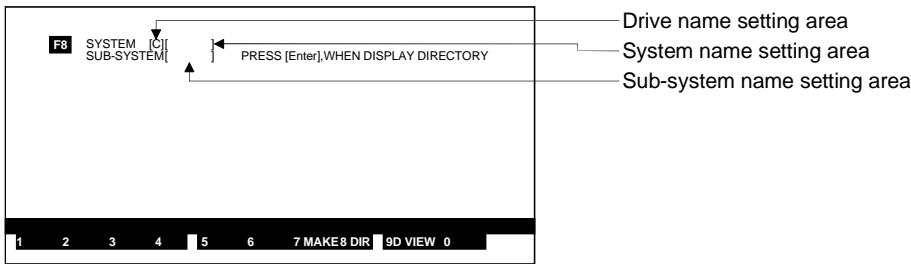
## 15.1 Directory Display

Displays on the screen a list of file names stored in the hard disk or floppy disk.

### [Procedure to Display the Servo File Screen]



### [Servo File Screen]



### [Display/Setting Content]

- Drive name setting area** Displays the current drive name or the set drive name.
- System name setting area** Displays the set system name.
- Sub-system name setting area** Displays the set sub-system name.

### [Key Operation]

#### Directory of System Names

- Setting Drive**
- 1) Set the drive name for which the directory is to be displayed. Make sure that the cursor is in the drive name setting area. Enter the drive name A, C, or D (see Section 5.1) and press the [Enter] key. If the drive name for which the directory is to be displayed already appears in the drive name setting area, just press the [Enter] key.
  - 2) The cursor moves to the system name setting area.
- Displaying the Directory**
- 1) To display the directory of system names, make sure that the cursor is in the system name setting area and press the [Enter] key.
  - 2) The system names in the designated drive are displayed in the system name directory window.
- Switching the System Name Display**
- 1) If the designated drive contains more than 13 system names, press the [Page Up] or [Page Down] key to display the other system names. The [Page Up] key displays the system names before the currently displayed system names. The [Page Down] key displays the system names after the currently displayed system names.

## 15. FILE MAINTENANCE

---

### Directory of Sub-system Names

- Setting System Name**
- 1) Set the system name for which the sub-system name directory is to be displayed.
  - 2) Press the [↑] [↓] keys to highlight the system name in the system name directory window or directly key in the system name.
  - 3) Press the [Enter] key to display the designated system name in the system name setting area and move the cursor to the sub-system name setting area.
- Displaying the Directory**
- 1) To display the directory of sub-system names, make sure that the cursor is in the sub-system name setting area and press the [Enter] key.
  - 2) The sub-system names under the designated system name are displayed in the sub-system name directory window.
- Switching the Sub-System Name Display**
- 1) If the designated system name contains more than 13 sub-system names, press the [Page Up] or [Page Down] key to display the other sub-system names.  
The [Page Up] key displays the sub-system names before the currently displayed sub-system names.  
The [Page Down] key displays the sub-system names after the currently displayed sub-system names.
- Reset System Name**
- 1) Press the [F8] key to reset the system name.  
Select the system name from the displayed system name directory, or directly key in the system name.

### POINT

- (1) Directory display using wildcard characters  
Wildcard characters can be used to specify and display a system name or sub-system name directory.  
The wildcard characters ? and \* represent one or more other characters, respectively.  
Using these wildcard characters simplifies file designation.  
\* ..... Replaces a character string.  
? ..... Replaces a single character.

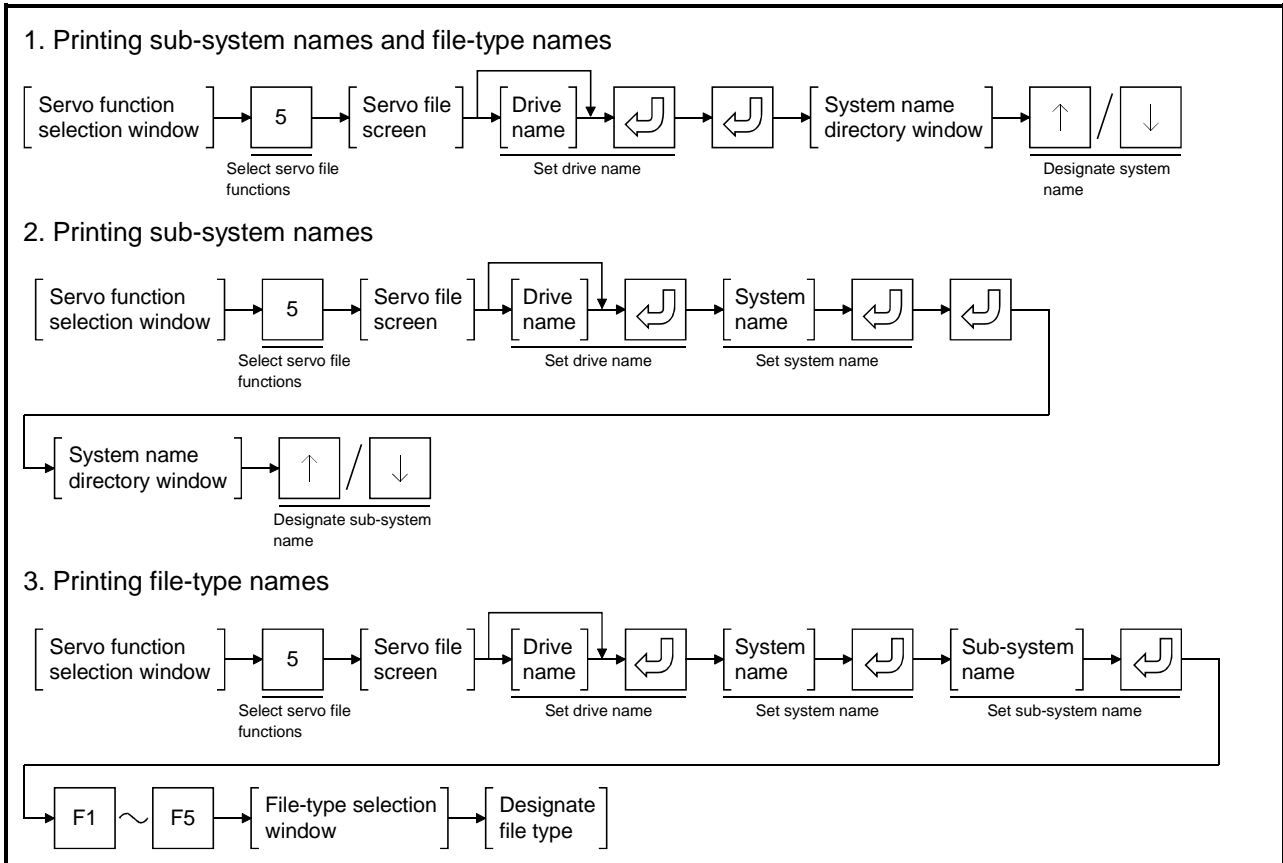
# 15. FILE MAINTENANCE

## 15.2 Directory Print

Prints designated system names, sub-system names, and file-type names. The following three types of print directory operation are available:

- Print sub-system names and file-type names
- Print sub-system names
- Print file-type names

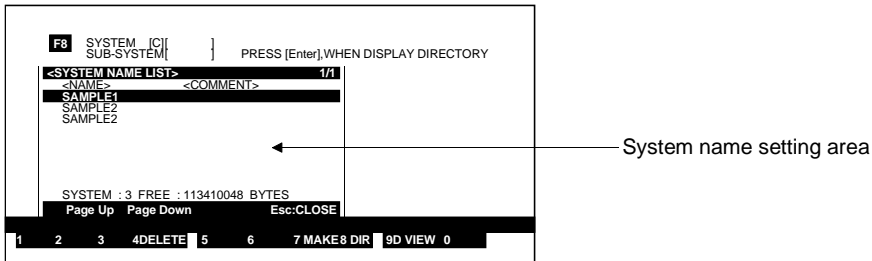
### [Procedure for Printing Directories]



## 15. FILE MAINTENANCE

---

### [System Name Directory Window]



### [Display/Setting Content]

**System name setting area** Highlighted display of the set system name.

### [Key Operation]

**Selecting System Name**

- 1) Press the [↑] [↓] keys to highlight the required system name.

**Selecting Printing**

- 1) Press the [F10] key. A YES/NO dialog box prompts whether to start printing.

**Starting Printing**

- 1) Press the [Enter] key while "YES" is highlighted to start printing. (The default display is "YES".)
- 2) The message "COMPLETED" is displayed when the printing is complete.

**Canceling Printing**

- 1) To cancel printing, press the [→] key to highlight "NO", then press the [Enter] key.

**Interrupting Printing**

- 1) Press the [Esc] key to interrupt printing. A YES/NO dialog box prompts whether to cancel or restart printing.  
"YES": cancel printing  
"NO": restart printing

# 15. FILE MAINTENANCE

---

## Printing All Sub-system Names and File-type Names

If printing is started when the system name directory is displayed, the sub-system names and file name types under the designated system name are printed.

### [Example Print-out]

```
*** SUB-SYSTEM NAME + TYPE NAME LIST ***
[SYSTEM] SAMPLE1 [SERVO FILE ]
  [SUB-SYSTEM] TEST1 (A3U) [SAMPLE PROGRAM ]
  [TYPE]          SERVO DATA [A-1 ]
                SERVO PROGRAM
  [SUB-SYSTEM] TEST2 (A3U) [SAMPLE PROGRAM ]
  [TYPE]          MECHA.SYSTEM EDIT. [A-2 ]
                SERVO PROGRAM
                MECHA.SYSTEM PAR.
  [SUB-SYSTEM] TEST3 (A3U) [SAMPLE PROGRAM ]
  [TYPE]          SERVO DATA [A-3 ]
                SERVO PROGRAM
```

## Printing All Sub-system Names

If printing is started when the sub-system name directory is displayed, all file name types under the designated sub-system name are printed.

### [Example Print-out]

```
*** SUB-SYSTEM NAME LIST ***
[SYSTEM] SAMPLE1 [SERVO FILE ]
  [SUB-SYSTEM] TEST1 (A3U) [SAMPLE PROGRAM ]
  [SUB-SYSTEM] TEST2 (A3U) [SAMPLE PROGRAM ]
  [SUB-SYSTEM] TEST3 (A3U) [SAMPLE PROGRAM ]
  [SUB-SYSTEM] TEST3 (A3U) [SAMPLE PROGRAM ]
```

## Printing All File-type Names

If printing is started when the file-type selection window is displayed, a file-type directory is printed.

### [Example Print-out]

```
*** TYPE NAME LIST ***
[SYSTEM] SAMPLE1 [SERVO FILE ]
  [SUB-SYSTEM] TEST1 (A3U) [SAMPLE PROGRAM ]
  [TYPE]          SERVO DATA [A-1 ]
                SERVO PROGRAM
```

# 15. FILE MAINTENANCE

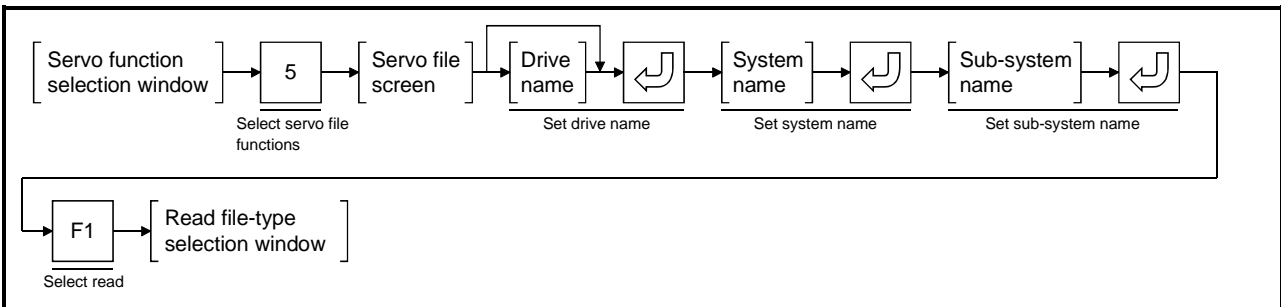
## 15.3 Reading Data from Hard Disk or Floppy Disk

Reads data of the designated file type from the files stored in the hard disk or floppy disk to internal memory.

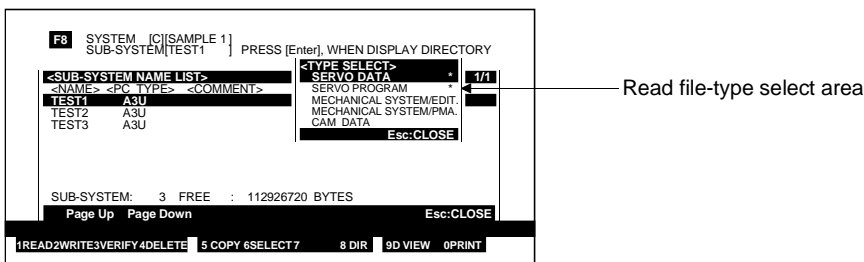
The following five file types can be selected:

- Servo data
- Servo program
- Mechanical system edited data
- Mechanical system parameters
- Cam data

### [Procedure for Displaying the Read File-Type Selection Window]



### [Read File-Type Selection Window]



### [Display/Setting Content]

**Read file-type select area**

Highlighted display of the selected file type. (File types containing data are marked with an asterisk "\*").

### [Key Operation]

**Selecting File Type**

- 1) Press the [↑] [↓] keys to highlight the file type to be read. Press the [Enter] key. A YES/NO dialog box prompts whether to execute the data read operation.

### REMARK

- (1) Mechanical system data  
 If mechanical system edited data is selected, the mechanical system parameters are also selected simultaneously.  
 If mechanical system parameters are selected, the mechanical system edited data is also selected simultaneously.

## 15. FILE MAINTENANCE

---

- Executing Data Read**
- 1) To read the data, highlight the word "YES" and press the [Enter] key.  
(The default display is "YES".)
  - 2) The message "COMPLETED" indicates when the data has been read and the system returns to the read file-type selection window.
- Canceling Reading**
- 1) To cancel the data read operation, press the [→] key to highlight "NO" and press the [Enter] key.  
The data is not read and the system returns to the read file-type selection window.

<b>POINTS</b>										
<p>(1) Designating multiple file types to read Data can be read from designated multiple file types, as follows.</p> <p>(a) To designate multiple file types, press the [↑] [↓] keys to highlight the file type to be read. Press the [F6] key. The * by the file type changes to a #.</p> <p>(b) The YES/NO dialog box is displayed when the [Enter] key is pressed.</p> <p>(2) Reading with different CPU types The possibility of reading with different CPU types is shown in the following table.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="width: 50%; text-align: center; padding: 5px;">File Type</th> <th style="width: 50%; text-align: center; padding: 5px;">Reading Possible/Not Possible</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Servo data</td> <td style="padding: 5px;">Reading not possible with all CPU types</td> </tr> <tr> <td style="padding: 5px;">Servo program</td> <td style="padding: 5px;">Reading possible with all CPU types</td> </tr> <tr> <td style="padding: 5px;">Mechanical system edited data Mechanical system parameters</td> <td style="padding: 5px;">Reading possible between A273UH (8-axis specification)/(32-axis specification) modules</td> </tr> <tr> <td style="padding: 5px;">Cam data</td> <td style="padding: 5px;"></td> </tr> </tbody> </table> <p>(3) Servo programs created using the SW1SRX-GSV22PE can be read using this function: other programs cannot. Other servo programs cannot be read.</p>	File Type	Reading Possible/Not Possible	Servo data	Reading not possible with all CPU types	Servo program	Reading possible with all CPU types	Mechanical system edited data Mechanical system parameters	Reading possible between A273UH (8-axis specification)/(32-axis specification) modules	Cam data	
File Type	Reading Possible/Not Possible									
Servo data	Reading not possible with all CPU types									
Servo program	Reading possible with all CPU types									
Mechanical system edited data Mechanical system parameters	Reading possible between A273UH (8-axis specification)/(32-axis specification) modules									
Cam data										

# 15. FILE MAINTENANCE

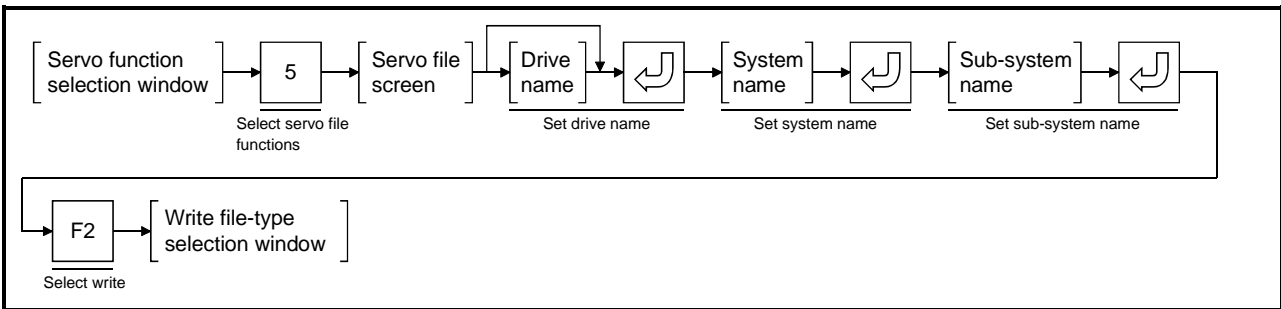
## 15.4 Writing Data to Hard Disk or Floppy Disk

Writes data of the designated file type from internal memory to the hard disk or floppy disk.

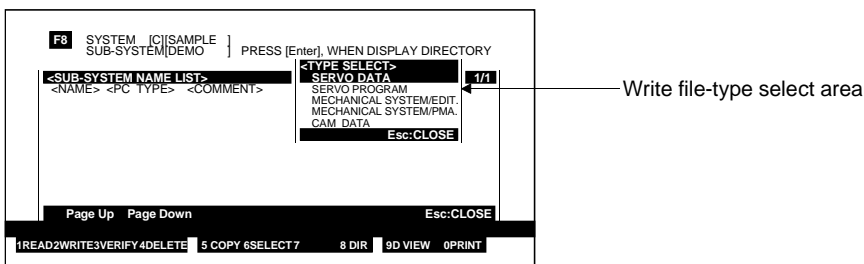
The following five file types can be selected:

- Servo data
- Servo program
- Mechanical system edited data
- Mechanical system parameters
- Cam data

### [Procedure for Displaying the Write File-Type Selection Window]



### [Write File-Type Selection Window]



### [Display/Setting Content]

#### Write file-type select area

Highlighted display of the selected file type. (File types containing data are marked with an asterisk "\*\*").

### [Key Operation]

#### Selecting File Type

- 1) Press the [↑] [↓] keys to highlight the file type to write. Press the [Enter] key. The file write window is displayed.

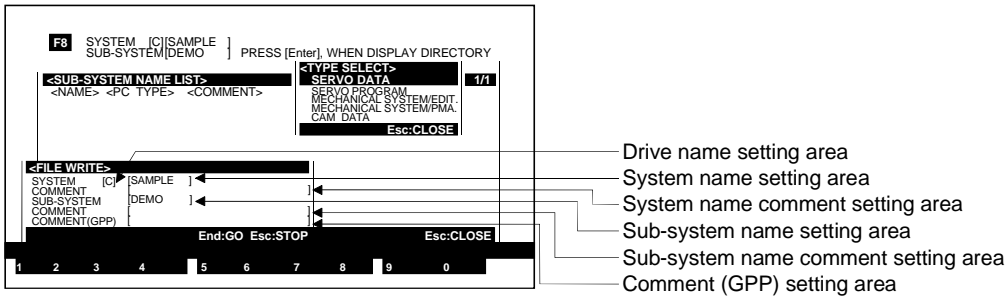
### REMARK

- (1) Mechanical system data  
If mechanical system edited data is selected, the mechanical system parameters are also selected simultaneously.  
If mechanical system parameters are selected, the mechanical system edited data is also selected simultaneously.



# 15. FILE MAINTENANCE

## [File Write Window]



## [Display/Setting Content]

- Drive name setting area** The currently designated drive name is displayed.
- System name setting area** The currently designated system name is displayed.
- System name comment setting area** The currently designated system name comment is displayed.
- Sub-system name setting area** The currently designated sub-system name is displayed.
- Sub-system name comment setting area** The currently designated sub-system name comment is displayed.
- Comment (GPP) setting area** The currently designated comment (GPP) is displayed.

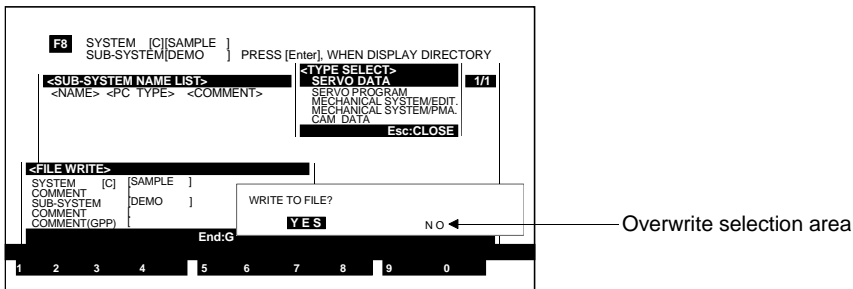
## [Key Operation]

- Setting System Name Comment**
  - 1) To set or change the system name comment, make sure that the cursor is in the system name comment setting area.
  - 2) Key in the new or changed comment and press the [Enter] key.  
If the displayed comment is to be used as is, press the [Enter] key.  
The cursor moves and flashes in the sub-system name comment setting area.
- Setting Sub-system Name Comment**
  - 1) To set or change the sub-system name comment, make sure that the cursor is in the sub-system name comment setting area.  
The cursor can be returned to the system name comment setting area by pressing the [↑] key.
  - 2) Key in the new or changed comment and press the [Enter] key.  
If the displayed comment is to be used as is, press the [Enter] key.  
The cursor will then move to the sub-system name comment setting area and will begin to flash.
- Comment (GPP) setting**
  - 1) To set or change the title, make sure that the cursor is in the title setting area.  
The cursor can be returned to the sub-system name comment setting area by pressing the [↑] key.
  - 2) Key in the new or changed title and press the [Enter] key.  
If the displayed comment is to be used as is, press the [Enter] key.  
The file write YES/NO dialog box will then be displayed.
- Executing Data Write**
  - 1) To write the data, highlight the word "YES" and press the [Enter] key.  
(The default display is "YES".)
  - 2) The message "COMPLETED" indicates when the data has been written and the system returns to the write file-type selection window.
- Canceling Data Write**
  - 1) To cancel the data write operation, press the [→] key to highlight "NO" and press the [Enter] key.  
The data is not written and the system returns to the file write window.

# 15. FILE MAINTENANCE

## If the Sub-system Name Already Exists

### [Overwrite File YES/NO Dialog Box]



### [Display/Setting Content]

**Overwrite confirm area** A YES/NO dialog box is displayed prompting whether to overwrite the existing file.

### [Key Operation]

#### Overwriting

- 1) Press the [Enter] key while "YES" is highlighted to overwrite the sub-system name. (The default display is "YES".)
- 2) The message "COMPLETED" indicates when the data has been overwritten and the system returns to the write file-type selection window.

#### Canceling Overwriting

- 1) To cancel overwriting the sub-system name, press the [→] key to highlight "NO", then press the [Enter] key. The data is not overwritten and the system returns to the file write window.

### POINTS

- (1) Designating multiple file types to write  
Data can be written to designated multiple file types, as follows.
  - (a) To designate multiple file types, press the [↑] [↓] keys to highlight the file type to be written. Press the [F6] key. The \* by the file type changes to a #.
  - (b) The YES/NO dialog box is displayed when the [Enter] key is pressed.
- (2) Inputting new system name or sub-system name for writing  
If a new system name and sub-system name are input from the directory, the new system name and sub-system name are created, and the file is written to the new sub-system name.
- (3) Writing with different CPU types  
The possibility of writing to file with different CPU types is shown in the following table.

File Type	Writing Possible/Not Possible
Servo data	Writing not possible with all CPU types
Servo program	Writing possible with all CPU types
Mechanical system edited data Mechanical system parameters	Writing possible between A273UH (8-axis specification)/(32-axis specification) modules
Cam data	

# 15. FILE MAINTENANCE

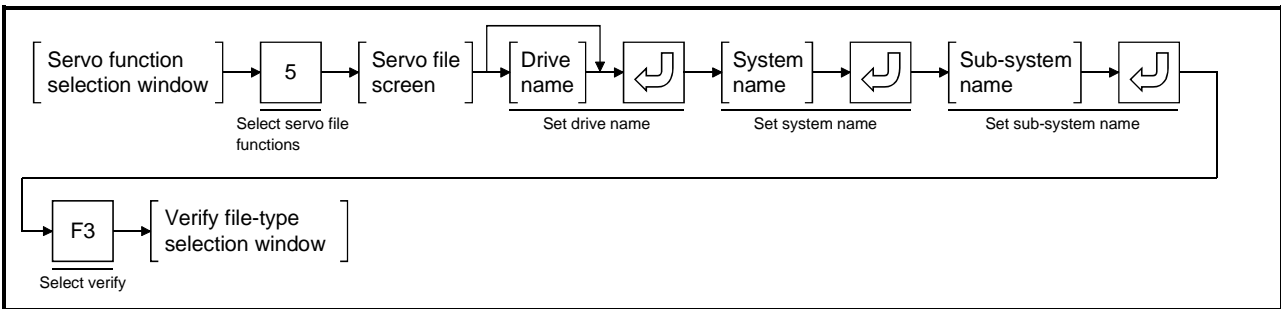
## 15.5 Verifying Data on Hard Disk or Floppy Disk

Verifies data in a designated file type in internal memory with the contents of a hard disk or floppy disk.

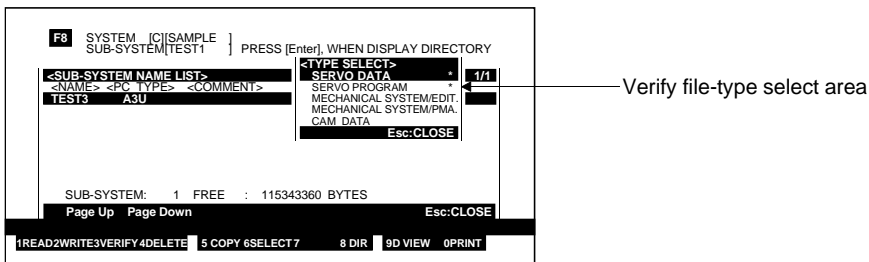
The following five file types can be designated:

- Servo data
- Servo program
- Mechanical system edited data
- Mechanical system parameters
- Cam data

### [Procedure for Displaying the Verify File-Type Selection Window]



### [Verify File-Type Selection Window]



### [Display/Setting Content]

**Verify file-type select area** Highlighted display of the selected file type (File types containing data are marked with an asterisk "\*".)

### [Key Operation]

#### Selecting File Type

- 1) Press the [↑] [↓] keys to highlight the file type to verify. Press the [Enter] key. A YES/NO dialog box prompts whether to execute the data verification.

#### Executing Data Verification

- 1) To verify the data, highlight the word "YES" and press the [Enter] key. (The default display is "YES".)
- 2) The verification is continued and the results displayed.

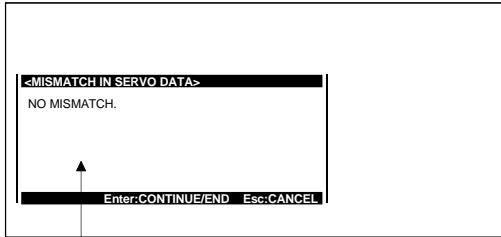
#### Canceling Data Verification

- 1) To cancel the data verification, press the [→] key to highlight "NO" and press the [Enter] key. The data is not verified and the system returns to the verify file-type selection window.

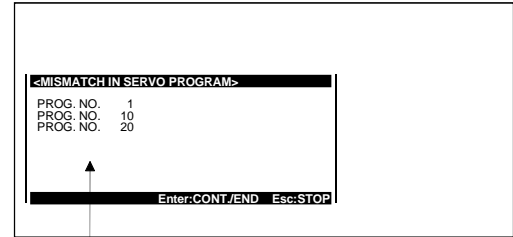
# 15. FILE MAINTENANCE

## [Verification Results Window]

No discrepancies in servo program verification



Discrepancies in servo program verification



Verify file-type select area

## [Display/Setting Content]

**Verification results display area** Displays the results after verification.

### [Key Operation]

#### No Discrepancies

##### Window CLOSE

- 1) Press the [Esc] key to close the window and revert to the verify file-type selection window.

#### Discrepancies

##### Continuing/Ending Verification

- 1) Details of up to 11 discrepancies can be displayed. (For error descriptions, refer to Section 19. Error Messages.)
- 2) If more than 11 discrepancies exist, press the [Enter] key to display the next page and continue verification. The verification continues.
- 3) The verification is continued and the results displayed.

##### Interrupting Verification

- 1) Press the [Esc] key to interrupt verification.  
A YES/NO dialog box prompts whether to interrupt the data verification.
- 2) To interrupt the verification, press the [←] key to highlight "YES" and press the [Enter] key. (The default setting is "NO".)  
A message indicates that verification has been interrupted and the system returns to the verify file-type selection window.
- 3) To cancel interruption of the verification, press the [Enter] key while "No" is highlighted.  
The verification continues.

##### Window CLOSE

- 1) Press the [Esc] key to close the window and revert to the verify file-type selection window.

## 15. FILE MAINTENANCE

---

### POINTS

- (1) Verification with different CPU types  
The possibility of verification of files with different CPU types is shown in the following table.

File Type	Verification Possible/Not Possible
Servo data	Verification not possible with all CPU types
Servo program	Verification possible with all CPU types
Mechanical system edited data Mechanical system parameters	Verification possible between A273UH (8-axis specification)/(32-axis specification) modules
Cam data	

- (2) Servo programs created with SW1SRX-GSV22PE can be verified.  
Other servo programs cannot be verified.

# 15. FILE MAINTENANCE

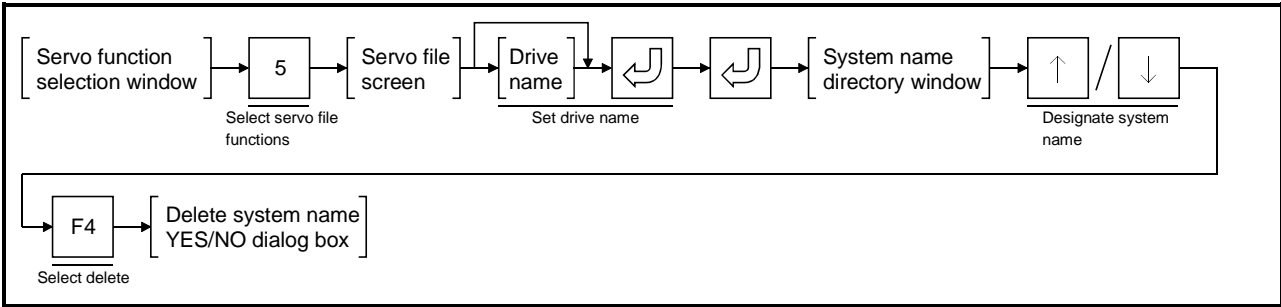
## 15.6 Deleting Hard Disk or Floppy Disk Data

Deletes unnecessary files from hard disk or floppy disk.

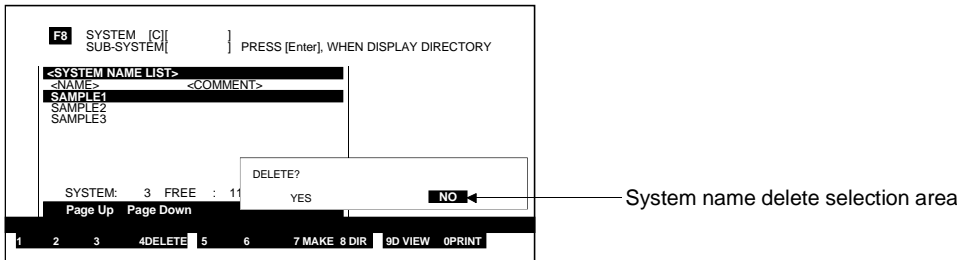
### 15.6.1 Deleting designated system names

Deletes a system name designated from the system name directory window.

#### [Procedure for Displaying the Delete System Name YES/NO Dialog Box]



#### [Delete System Name YES/NO Dialog Box]



#### [Display/Setting Content]

**System Name Delete Selection Area** A YES/NO dialog box is displayed prompting whether to delete the system name.

#### [Key Operation]

##### Deleting

- 1) To delete the data, press the [→] key to highlight "YES" and press the [Enter] key. (The default setting is "NO".)
- 2) The message "COMPLETED" indicates when the data has been deleted and the system returns to the system name directory window.

##### Canceling Delete

- 1) To cancel the delete, press the [Enter] key while "NO" is highlighted. The data is not deleted and the system returns to the system name directory window.

#### POINT

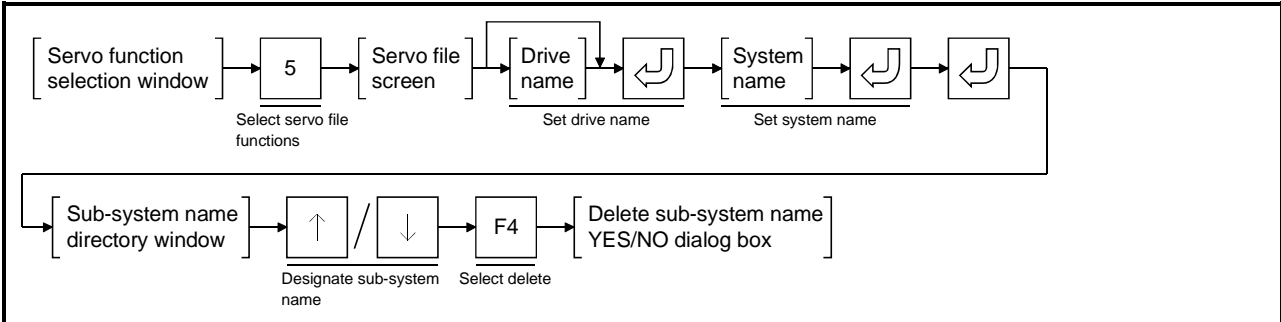
- (1) Conditions for deleting a system name  
 A system name can only be deleted if all sub-system names under the system name have already been deleted.  
 The message "CANNOT DELETE SYSTEM NAME HAVING SUB-SYSTEM NAME" is displayed if sub-system names exist under the system name.  
 Delete all sub-system names under the system name.  
 (See Section 15.6.2.)

# 15. FILE MAINTENANCE

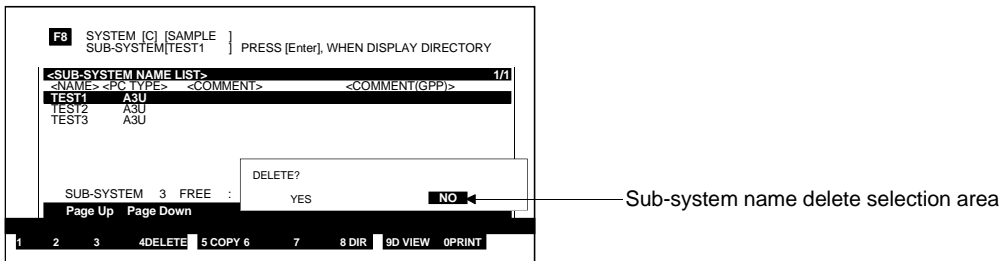
## 15.6.2 Deleting designated sub-system names

Deletes a sub-system name designated from the sub-system name directory window and deletes all data registered for the sub-system name.

### [Procedure for Displaying the Delete Sub-System Name YES/NO Dialog Box]



### [Delete Sub-System Name YES/NO Dialog Box]



### [Display/Setting Content]

**Sub-system Name** A YES/NO dialog box is displayed prompting whether to delete the sub-system name.

**Delete Selection Area**

### [Key Operation]

#### Deleting

- 1) To delete the data, press the [←] key to highlight "YES" and press the [Enter] key. (The default setting is "NO".)
- 2) A message indicates when the data has been deleted and the system returns to the sub-system name directory window.

#### Canceling Delete

- 1) To cancel the deletion, press the [Enter] key while "NO" is highlighted. The data is not deleted and the system returns to the sub-system name directory window.

### POINT

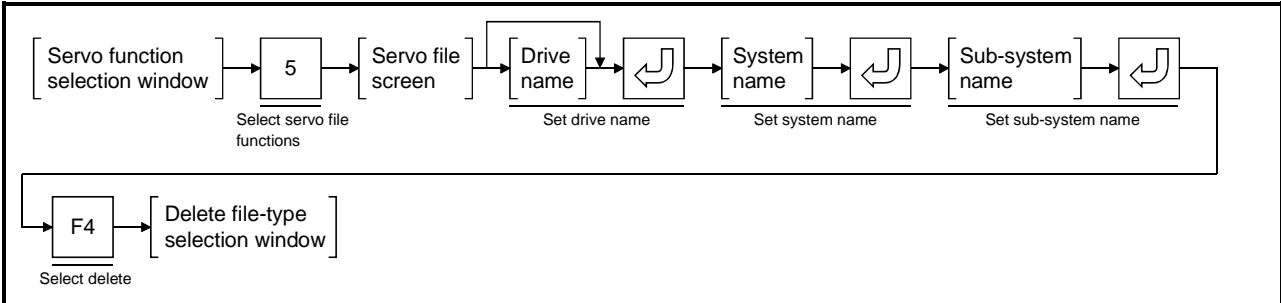
- (1) Caution when deleting a sub-system name  
When a sub-system name is deleted, all data stored under the sub-system name is also deleted.

# 15. FILE MAINTENANCE

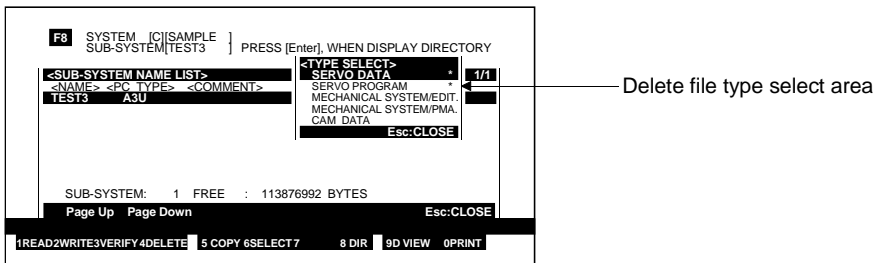
## 15.6.3 Deleting designated file-type names

Deletes all files of the file-type name which is designated from the file-type selection window for a designated sub-system name.

### [Procedure for Displaying the Delete File-Type Selection Window]



### [Delete File-Type Selection Window]



### [Display/Setting Content]

**Delete file type select area** Highlighted display of the selected file type. (File types containing data are marked with an asterisk "\*\*".)

### REMARK

- (1) Mechanical system data  
If mechanical system edited data is selected, the mechanical system parameters are also selected simultaneously.  
If mechanical system parameters are selected, the mechanical system edited data is also selected simultaneously.

### [Key Operation]

#### Selecting File Type

- 1) Press the [↑] [↓] keys to highlight the file type to be deleted. Press the [Enter] key.  
A YES/NO dialog box prompts whether to execute the data deletion.

#### Deleting

- 1) To delete the data, press the [←] key to highlight "YES" and press the [Enter] key. (The default setting is "NO".)
- 2) The message "COMPLETED" is displayed when the data has been deleted and the system returns to the delete file-type selection window.

#### Canceling Delete

- 1) To cancel the delete, press the [Enter] key while "NO" is highlighted.  
The data is not deleted and the system returns to the delete file-type selection window.



## 15. FILE MAINTENANCE

---

### POINTS

- (1) Designating multiple file types to delete  
Data can be deleted from designated multiple file types, as follows.
  - (a) Press the [↑] [↓] keys to highlight the file type to be deleted. Press the [F6] key.  
The \* by the file type changes to a #.
  - (b) The YES/NO dialog box is displayed when the [Enter] key is pressed.
- (2) Deleting with different CPU types  
The possibility of deleting files if the CPU type differs from the edited CPU type is shown in the following table.

File Type	Delete Possible/Not Possible
Servo data	Delete not possible with all CPU types
Servo program	Delete possible with all CPU types
Mechanical system edited data Mechanical system parameters	Delete possible between A273UH (8-axis specification)/(32-axis specification) modules
Cam data	

# 15. FILE MAINTENANCE

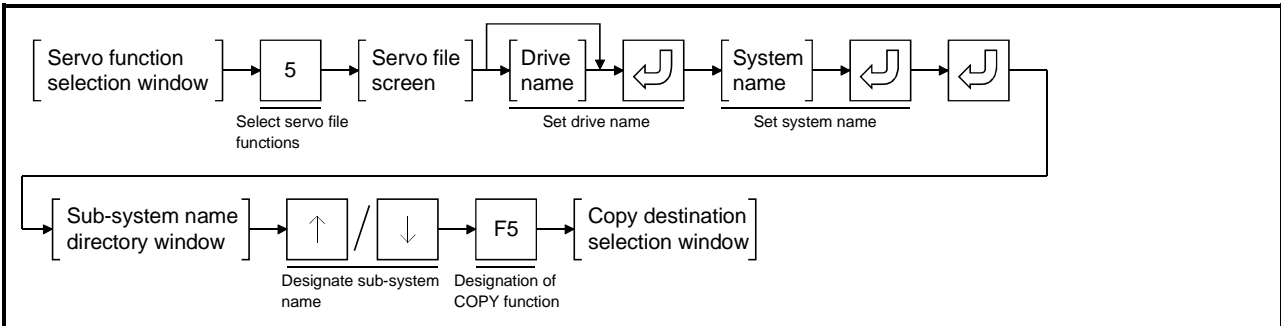
## 15.7 Copying Hard Disk or Floppy Disk Data

Copies files from a designated hard disk or floppy disk to a designated hard disk or floppy disk.

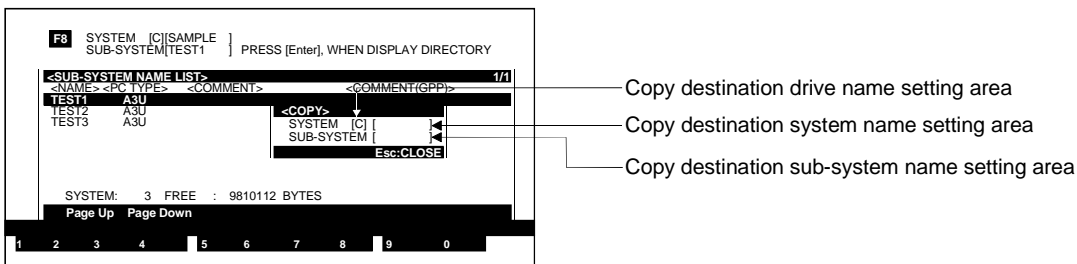
### 15.7.1 Copying sub-system names

Copies all files with the same sub-system name from the designated HD/FD to another designated HD/FD.

#### [Procedure for Displaying the Copy Destination Selection Window]



#### [Copy Destination Selection Window]



#### [Display/Setting Content]

**Copy destination drive name setting area** Displays the current drive name or the set drive name.

**Copy destination system name setting area** Displays the set system name.

**Copy destination sub-system name setting area** Displays the set sub-system name.

#### [Key Operation]

##### Setting the Copy Destination Drive

- 1) Set the copy destination drive name.  
Make sure that the cursor is in the copy destination drive name setting area. Enter the drive name A, C, or D (see Section 5.1) and press the [Enter] key. If the copy destination drive name already appears in the copy destination drive name setting area, just press the [Enter] key.
- 2) The cursor moves to the copy destination system name setting area.

##### Setting the Copy Destination System Name

- 1) Set the copy destination system name.  
Make sure that the cursor is in the copy destination system name setting area. Enter the copy destination system name and press the [Enter] key. The cursor moves to the copy destination sub-system name setting area.

# 15. FILE MAINTENANCE

## Setting the Copy Destination Sub-System Name

- 1) Set the copy destination sub-system name.  
Make sure that the cursor is in the copy destination sub-system name setting area. Enter the copy destination sub-system name and press the [Enter] key. A YES/NO dialog box prompts whether to copy the data.

## Copy EXECUTE

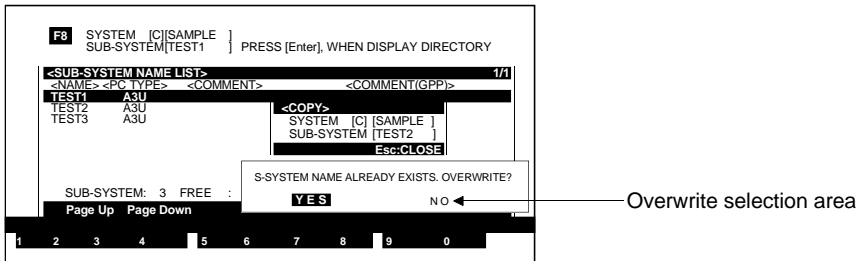
- 1) Press the [Enter] key while "YES" is highlighted to copy the data. (The default display is "YES".)
- 2) The message "COMPLETED" is displayed when the data has been copied and the system returns to the sub-system name directory window.

## Copy CANCEL

- 1) To cancel copying, press the [→] key to highlight "NO", then press the [Enter] key.  
The data is not copied and the system returns to the copy destination selection window.

### If the Sub-System Name Already Exists

#### [Overwrite File YES/NO Dialog Box]



#### [Display/Setting Content]

### Overwrite Selection Area

- A YES/NO dialog box is displayed prompting whether to overwrite the existing file.

#### [Key Operation]

### Overwrite EXECUTE

- 1) Press the [Enter] key while "YES" is highlighted to overwrite the sub-system name. (The default display is "YES".)
- 2) The message "COMPLETED" is displayed when the data has been overwritten and the system returns to the sub-system name directory window.

### Canceling Overwriting

- 1) To cancel overwriting the sub-system name, press the [→] key to highlight "NO", then press the [Enter] key.  
The data is not overwritten and the system returns to the copy destination selection window.

### POINTS

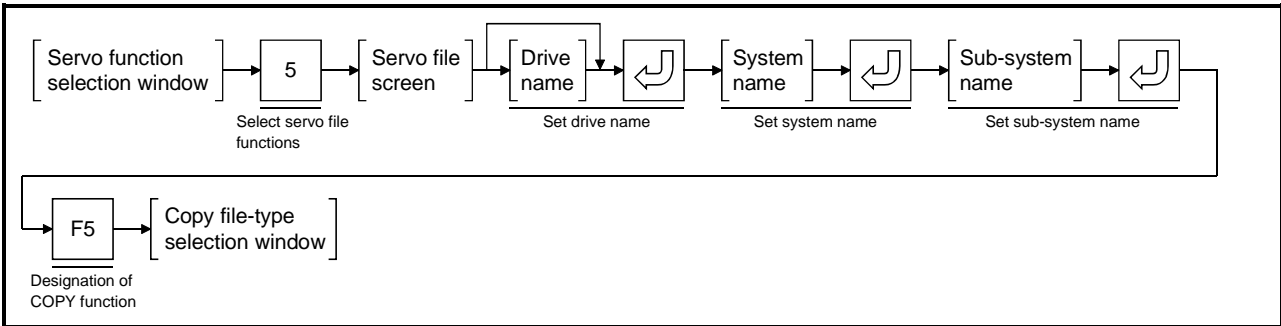
- (1) Inputting a new system name for copying  
If a new copy destination system name is input from the directory, the new system name is created and all files under the duplicated sub-system name are copied to it.
- (2) Checking copy source and copy destination  
Copying is not possible if the copy source and copy destination have the same drive name, system name, and sub-system name. Change the drive name, system name, and sub-system name.

# 15. FILE MAINTENANCE

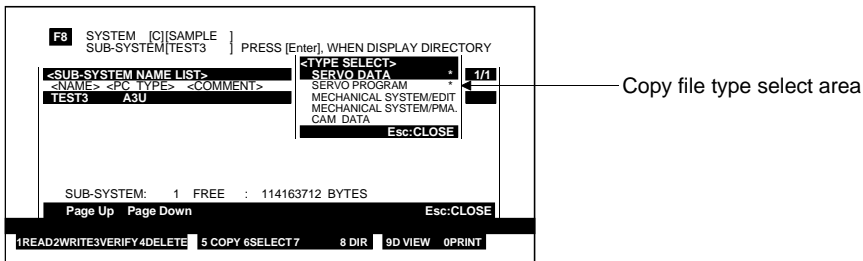
## 15.7.2 Copying designated file-type names

Copies all files of the file-type name which is designated from the file-type selection window for a designated sub-system name.

### [Procedure for Displaying the Copy File-Type Selection Window]



### [Copy File-Type Selection Window]



### [Display/Setting Content]

**Copy file type select area** Highlighted display of the selected file type (File types containing data are marked with an asterisk " \* ".)

### [Key Operation]

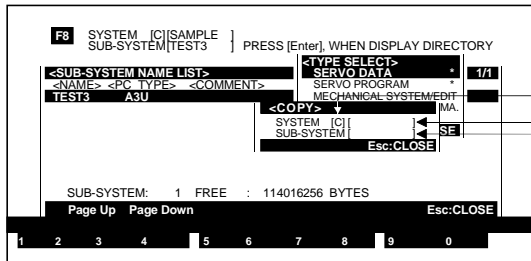
**Selecting File Type** 1) Press the [↑] [↓] keys to highlight the file type to be copied. Press the [Enter] key.  
The copy destination selection window is displayed.

### REMARK

- (1) Mechanical-system data  
If mechanical system edited data is selected, the mechanical system parameters are also selected simultaneously.  
If mechanical system parameters are selected, the mechanical system edited data is also selected simultaneously.

# 15. FILE MAINTENANCE

## [Copy Destination Selection Window]



Copy destination drive name setting area  
 Copy destination system name setting area  
 Copy destination sub-system name setting area

## [Display/Setting Content]

**Copy destination drive name setting area** Displays the current drive name or the set drive name.

**Copy destination system name setting area** Displays the set system name.

**Copy destination sub-system name setting area** Displays the set sub-system name.

## [Key Operation]

### Setting the Copy Destination Drive

- 1) Set the copy destination drive name. Enter the drive name A, C, or D (see Section 5.1) and press the [Enter] key.  
If the copy destination drive name already appears in the copy destination drive name setting area, just press the [Enter] key.
- 2) The cursor moves to the copy destination system name setting area.

### Setting the Copy Destination System Name

- 1) Make sure that the cursor is in the copy destination system name setting area. Enter the copy destination system name and press the [Enter] key.  
The cursor moves to the copy destination sub-system name setting area.

### Setting the Copy Destination Sub-System Name

- 1) Make sure that the cursor is in the copy destination sub-system name setting area. Enter the copy destination sub-system name and press the [Enter] key.  
A YES/NO dialog box prompts whether to copy the data.

### Copy EXECUTE

- 1) Press the [Enter] key while "YES" is highlighted to copy the data. (The default display is "YES".)
- 2) The message "COMPLETED" is displayed when the data has been copied and the system returns to the copy file-type selection window.

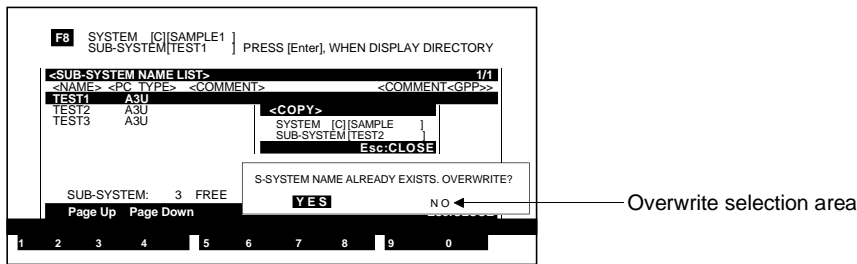
### Copy CANCEL

- 1) To cancel copying, press the [→] key to highlight "NO", then press the [Enter] key.  
The data is not copied and the system returns to the copy destination selection window.

# 15. FILE MAINTENANCE

## If the File Already Exists

### [Overwrite File YES/NO Dialog Box]



### [Display/Setting Content]

**Overwrite Selection Area** A YES/NO dialog box is displayed prompting whether to overwrite the existing file.

### [Key Operation]

#### Overwriting

- 1) Press the [Enter] key while "YES" is highlighted to overwrite the sub-system name. (The default display is "YES".)
- 2) A message indicates that the data has been overwritten and the system returns to the copy file-type selection window.

#### Canceling Overwriting

- 1) To cancel overwriting the sub-system name, press the [→] key to highlight "NO", then press the [Enter] key. The data is not overwritten and the system returns to the copy destination selection window.

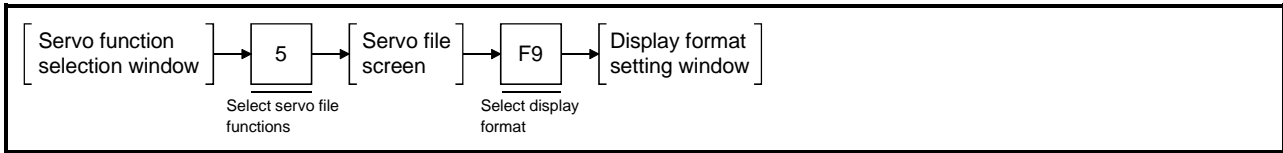
<b>POINTS</b>											
(1)	<b>Copying to the same drive</b> The copy source and copy destination system name and sub-system name must be different when copying a file to the drive it already exists on. The message "CANNOT SET." is displayed if the source and destination system names and sub-system names are the same. Copy the file using different source and destination system names and sub-system names.										
(2)	<b>Inputting a new system name and sub-system name for copying</b> If a new copy destination system name and sub-system name are input when designating a copy, the new system name and sub-system name are created and the file is copied to the new sub-system name.										
(3)	<b>Copying with different CPU types</b> The possibility of copying files with different CPU types is shown in the following table.										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; padding: 5px;">File Type</th> <th style="width: 50%; padding: 5px;">Copying Possible/Not Possible</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Servo data</td> <td style="padding: 5px;">Copy not possible with all CPU types</td> </tr> <tr> <td style="padding: 5px;">Servo program</td> <td style="padding: 5px;">Copy possible with all CPU types</td> </tr> <tr> <td style="padding: 5px;">Mechanical system edited data Mechanical system parameters</td> <td style="padding: 5px;">Copy possible between A273UH (8-axis specification)/(32-axis specification) modules</td> </tr> <tr> <td style="padding: 5px;">Cam data</td> <td style="padding: 5px;"></td> </tr> </tbody> </table>		File Type	Copying Possible/Not Possible	Servo data	Copy not possible with all CPU types	Servo program	Copy possible with all CPU types	Mechanical system edited data Mechanical system parameters	Copy possible between A273UH (8-axis specification)/(32-axis specification) modules	Cam data	
File Type	Copying Possible/Not Possible										
Servo data	Copy not possible with all CPU types										
Servo program	Copy possible with all CPU types										
Mechanical system edited data Mechanical system parameters	Copy possible between A273UH (8-axis specification)/(32-axis specification) modules										
Cam data											

# 15. FILE MAINTENANCE

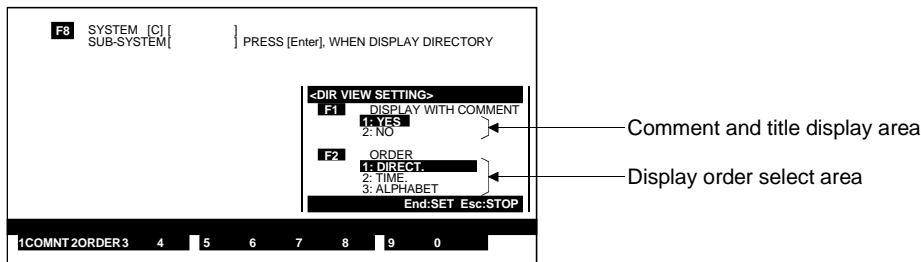
## 15.8 Display Format

Sets whether comments and titles are displayed in the directory and selects the directory display order.

### [Procedure for Displaying the Display Format Setting Window]



### [Display Format Setting Window]



### [Display/Setting Content]

**Comment and title display area** The set item is highlighted.

**Display order select area** The set item is highlighted.

### [Key Operation]

#### Setting the Comment and Title Display

**Selecting Setting Item** 1) Press the [F1] key to set whether the comments and titles are displayed in the directory.

2) The "COMMENTS AND TITLES" item is highlighted.

#### Making the Setting

1) To display the comments and titles, press the [1] key or the [Enter] key to select the item: "1. YES." (The default display is "1. YES. ")

For no display of the comments and titles, press the [2] key or the [↓] key to highlight "2. NO." then press the [Enter] key.

2) The cursor moves to the display order setting area and the "ORDER" item is highlighted.

#### Setting END

1) Press the [End] key to complete the setting operation.

The settings are entered and the system returns to the servo file screen.

2) The directory is displayed. Check that the display format matches the settings.

#### Setting Abort

1) Press the [Esc] key to interrupt the settings and revert to the servo file screen.

## 15. FILE MAINTENANCE

---

### Setting the Display Order

- Selecting Setting Item**
- 1) Press the [F2] key to set the display order.
  - 2) The "ORDER" item is highlighted.
- Making the Setting**
- 1) For directory display in the order of registration, press the [1] key or the [Enter] key to select "DIRECTORY." (The default display is "DIRECTORY".)  
For display in the order of date, press the [2] key or the [↑] [↓] keys to highlight "2. DATE", then press the [Enter] key.  
For display in alphabetical order, press the [3] key or the [↑] [↓] keys to highlight "3. ALPHABET", then press the [Enter] key.
  - 2) The selected display order is highlighted.
- Setting END**
- 1) Press the [End] key to complete the setting operation.  
The settings are entered and the system returns to the servo file screen.
  - 2) The directory is displayed. Check that the display format matches the settings.
- Setting Abort**
- 1) Press the [Esc] key to interrupt the settings and revert to the servo file screen.

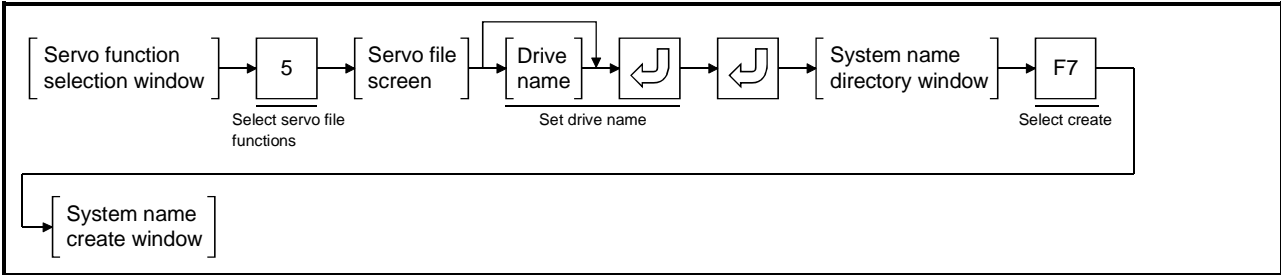


# 15. FILE MAINTENANCE

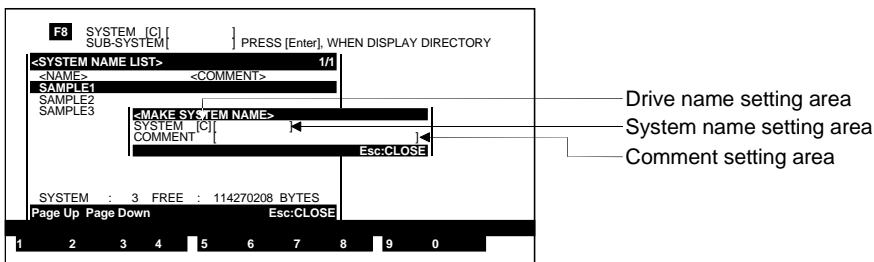
## 15.9 Creating New System Names

Creates new system names in a hard disk or floppy disk.

### [Procedure for Displaying the System Name Create Window]



### [System Name Create Window]



Drive name setting area  
System name setting area  
Comment setting area

### [Display/Setting Content]

**Drive name setting area** Displays the current drive name or the set drive name.

**System name setting area** Displays the set system name.

**Comment setting area** Displays the set comment.

### [Key Operation]

#### Setting Drive

- 1) Set the drive name in which the system name is to be created. Make sure that the cursor is in the drive name setting area. Enter the drive name A, C, or D (see Section 5.1) and press the [Enter] key. If the drive name in which the system name is to be created already appears in the drive name setting area, just press the [Enter] key.
- 2) The cursor moves to the system name setting area.

#### Setting a New System Name

- 1) Set the new system name. Make sure that the cursor is in the system name setting area. Enter the system name and press the [Enter] key. The cursor moves to the comment setting area.

#### Setting System Name Comment

- 1) To set the system name comment, make sure that the cursor is in the comment setting area.
- 2) Enter the comment and press the [Enter] key. If no comment is required, just press the [Enter] key. A YES/NO dialog box prompts whether to create the system name.

## 15. FILE MAINTENANCE

---

### Creating System Name

- 1) Press the [Enter] key while "YES" is highlighted to create the system name. (The default display is "YES".)
- 2) The message "COMPLETED." indicates when the system name has been created and the system returns to the system name directory window.

### Canceling Creating System Name

- 1) To cancel system name creation, press the [→] key to highlight "NO", then press the [Enter] key.  
The system name is not created and the system returns to the system name create window.

POINT
(1) Same system name already exists The message "SYSTEM NAME ALREADY EXISTS" indicates if the system name already exists when the system name is input. If this happens, set the system name again.

# 16. PRINTING

## 16. PRINTING

The servo printer mode is a mode to print out servo programs, positioning data, mechanical system programs, and system setting data set at the GSV22PE.

### (1) Function summary

The functions below are offered by the GSV22PE servo printer mode.

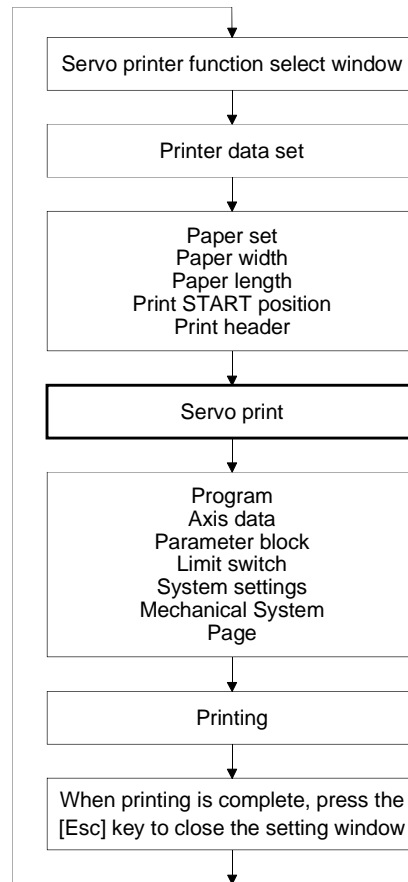
Servo Printer	Printer Data Set	Sets the print format. ....	16.1
		Paper Set ..... Sets the type of paper used for printing. ....	16.1
		— Continuous form	
		— Cut-form (A3 portrait)	
		— Cut-form (A4 portrait)	
		Paper Width ..... Sets the width of the paper used for printing. ....	16.1
		— 8 inch	
		— 11 inch	
		Paper Length ..... Sets the length of the paper used for printing. ....	16.1
		— 8 inch (60 lines)	
		— 11 inch (82 lines)	
		— 16 inch (120 lines)	
		Print START ..... Set the width from the paper edge to the print start ..... Position position as a number of characters between 0 and 16.	16.1
		Print Header ..... Sets whether the header is printed. ....	16.1
		— OFF	
		— Yes	
	Servo Print	Prints servo programs, positioning data, mechanical system programs, ..... and system settings data.	16.2
		Program ..... Prints out the programs used list of created programs ..... or the created programs themselves.	16.2
		— OFF	
		— Program list	
		— All programs	
		— Set range	
		Axis Data ..... Prints out fixed parameters, servo parameters, home ..... position return data, and JOG operation data.	16.2
		— OFF	
		— All data	
		— Set range	
		Parameter Block ..... Prints out parameter block data for 16 blocks. ....	16.2
		— OFF	
		— All data	
		Limit Switch ..... Prints out limit switch output data. ....	16.2
		— OFF	
		— All data	
		— Set range	
		Mechanical system .... Prints out created mechanical system programs. ....	16.2
		— OFF	
		— All data	
		System settings ..... Prints out system setting data. ....	16.2
		— OFF	
		— All data	
		Page ..... Sets whether the page numbers are printed. ....	16.2
		— OFF	
		— Yes	

## 16. PRINTING

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(2) Outline flowchart

The printing procedure is shown below.



# 16. PRINTING

## 16.1 Printer Data Set

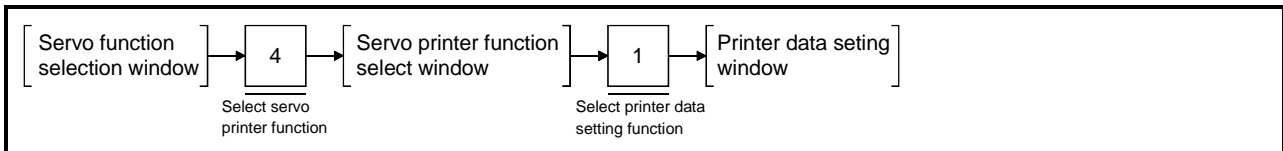
Sets the print format, including paper setting, paper width, paper length, margin, and headers.

The valid settings depend on the type of paper used, as shown in the table below.

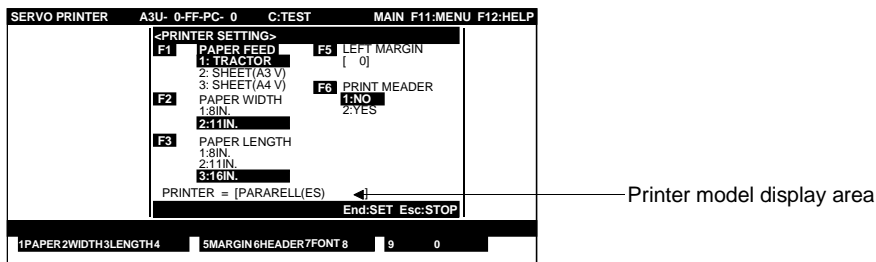
Paper Set	Setting Possible (O: Possible, —: Not Possible)			
	Paper Width	Paper Length	Print START Position	Print Header
Continuous form	○	○	○	○
Cut-form (A3, portrait)	—	—	○	○
Cut-form (A4, portrait)	—	—	○	○

(Paper width and paper length settings are ignored if cut-form paper is selected.)

### [Procedure for Displaying the Printer Data Setting Window]



### [Printer Data Setting Window]



### [Display/Setting Content]

**Printer model display area** Displays the model name of the printer selected with the basic utilities.

### [Key Operation]

#### Setting Paper

- 1) Press the [F1] key to set the type of paper for printing. Enter the paper type with the numeric keys or press the [↑]/[↓] keys to move the cursor to select the paper type, then press the [Enter] key.

#### Setting Paper Width

- 1) Press the [F2] key to set the paper width. Enter the paper width with the numeric keys or press the [↑]/[↓] keys to move the cursor to select the paper width, then press the [Enter] key.

#### Setting Paper Length

- 1) Press the [F3] key to set the paper length. Enter the paper length with the numeric keys or press the [↑]/[↓] keys to move the cursor to select the paper length, then press the [Enter] key.

## 16. PRINTING

---

- Setting the Margin** 1) Press the [F5] key to set the print margin.  
Enter the margin as a value between 0 and 16 characters with the numeric keys.
- Setting the Print Header** 1) Press the [F6] key to set the print header.  
Press the [↑]/[↓] keys to move the cursor to select "YES" (print headers) or "NO" (do not print headers), then press the [Enter] key.
- Ending Printer Data Settings** 1) Press the [End] key to print out using the set printer data.  
The file write YES/NO dialog box will then be displayed.
- File Write EXECUTE** 1) Press the [Enter] key while "YES" is highlighted to write the set printer data to internal memory.  
(If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)  
2) The system returns to the servo printer function select window when the file is written.  
The set printer data is used when the GSV22PE is subsequently started up.
- File Write CANCEL** 1) If file writing is not desired, press the [→] key to move the highlight to the "NO" item, then press the [Enter] key.  
The set printer data is not written to internal memory and the display reverts to the servo printer function select window.
- Interrupting Printer Data Settings** 1) Press the [Esc] key to interrupt the printer data settings and clear the set printer data.  
The printer data reverts to the previous settings and the display reverts to the servo printer function select window.

<b>POINT</b>
--------------

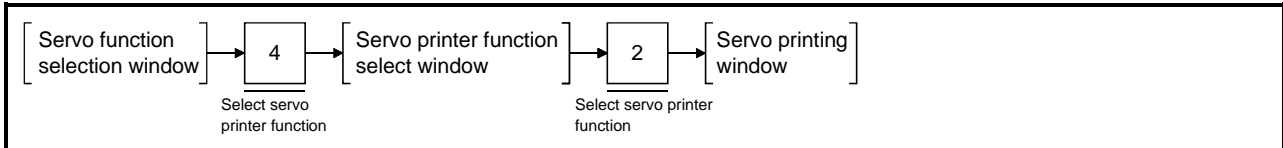
Set the paper width and paper length only if continuous-form paper is selected.
---

# 16. PRINTING

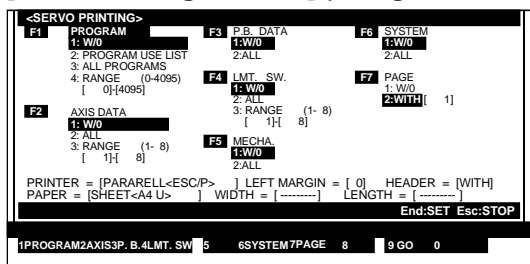
## 16.2 Printing Out

Prints out servo programs created in the servo programming mode, positioning data (axis data, parameter block data, limit switch output data) set in the servo data setting mode, mechanical-system programs created in the mechanical-system mode, and system setting data set in the system setting mode.

### [Procedure for Displaying the Servo Printing Window]



### [Servo Printing Window] (Using A273UHCPU)



### [Display/Setting Content]

**Printing format display area**

Displays the printer name and the print format set by the printer data setting functions.

### [Key Operation]

**Setting the Printed Data**

- 1) Set the printed data type from the following types:
  - Servo program
  - Axis data
  - Parameter block data
  - Limit switch output data
  - System setting data
  - Mechanical system program
- 2) If multiple data types are selected, they are printed out in the sequence: servo programs, axis data, parameter block data, limit switch output data, mechanical system program, and system settings data.
- 3) Set the print condition for each data type with the numeric keys or press the [↑]/[↓] keys to highlight the required setting.

# 16. PRINTING

## <Servo program>

Prints out the programs used/unused lists for the created servo programs or the servo programs themselves.

- Press the [F1] key to select the program data item. This item can be set to "W/O", "PROGRAMS USE LIST", "ALL PROGRAMS," or "RANGE".
  - W/O ..... No print out
  - PROGRAMS USE LIST ..... Prints out the program No. of the servo program used.
  - ALL PROGRAMS ..... Prints out all the created servo programs.
  - RANGE ..... Prints out the created servo programs in the designated program number range.

*** PROGRAM USED LIST ***									
USED PROGRAMS	2048/4096								
USED STEPS	8192/13312								
LEDT STEPS	5120								
VIRTUAL MODE	1000-1500								
<REAL MODE>									
0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39

*** PROGRAM USED ***									
VIRTUAL									
<K 0>									
POINT	1	2	3	4	5	6	7	8	9
ABS.2	1.	1000	( PLS)						
AXIS	2.	2500	( PLS)						
SVN. SPEED		5000	( PLS/sec)						
M CODE		2							
									PROGRAM STEPS 6

## <Axis data>

Prints out fixed parameters, servo parameters, home position return data, and JOG operation data.

- Press the [F2] key to select the axis data item. This item can be set to "W/O", "ALL", or "RANGE".
  - W/O ..... No print out
  - ALL ..... Prints out data for all axes with data set.
  - RANGE ..... Prints out the data for the designated axis range.

1AXIS FIXED PARAMETER		
ITEM	SETTING DATA	
1	UNIT SETTING	3: PULSE
2	PULSE/TURN(AP)	20000 ( PLS)
3	MOVEMENT/TURN(AL)	20000 ( PLS)
4	UNIT MAG.(AM)	
5	BACKLASH	0 ( PLS)
6	STROKE LIMIT MAX.	2147483647 ( PLS)
7	STROKE LIMIT MIN.	0 ( PLS)
8	CMO. IN-POS. RANGE	100 ( PLS)
9	LMT SW. OUTPUT	0: NO

1AXIS SERVO PARAM. (STD.)		
ITEM	SETTING DATA	
1	AMP. SETTING	0: MR-H INC
2	RESISTANCE	0: STANDARD
3	OUT DYNAMIC UNIT	0: NO
4	MOTOR TYPE	3: HA-FH

## <Parameter block>

Prints out parameter block data for 16 blocks.

- Press the [F3] key to select the parameter block data item. This item can be set to "W/O" or "ALL".
  - W/O ..... No print out
  - ALL ..... Prints out 16 blocks of parameter data.

*** P.B.BLK. DATA ***					
		NO. 1	NO. 2	NO. 3	NO. 4
1	CONTROL UNIT	3: PULSE	3: PULSE	3: PULSE	3: PULSE
2	SPEED RESTRICTIO	200000	200000	200000	200000
3	ACCELERATION TIM	1000	1000	1000	1000
4	DECELERATION TIM	1000	1000	1000	1000
5	SHORT STOP TIME	1000	1000	1000	1000
6	S RATIO	0	0	0	0
7	TORQUE LIMIT	300	300	300	300
8	STOP METHOD	0: DECEL	0: DECEL	0: DECEL	0: DECEL
9	CIRCULAR ERROR R	100	100	100	100



# 16. PRINTING

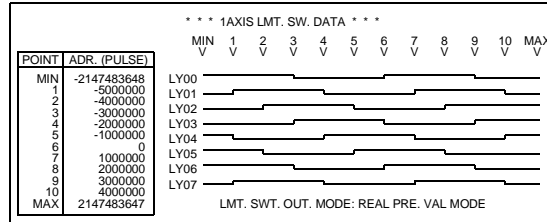
## <Limit switch output data>

Prints out the limit switch output data.

1) Press the [F4] key to select the limit switch item. This item can be set to "W/O", "ALL", or "RANGE".

- W/O .....No print out
- ALL .....Prints out data for all axes with data set.
- RANGE.....Prints out the data for the designated axis range.

(Using A273UH)

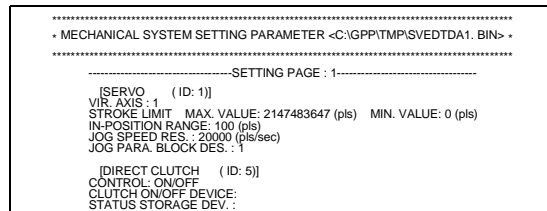


## <Mechanical system program>

Prints out mechanical system programs.

1) Press the [F5] key to select the mechanical system item. This item can be set to "WO" or "ALL"

- W/O .....No print out
- ALL .....Prints out data for all axes with data set.



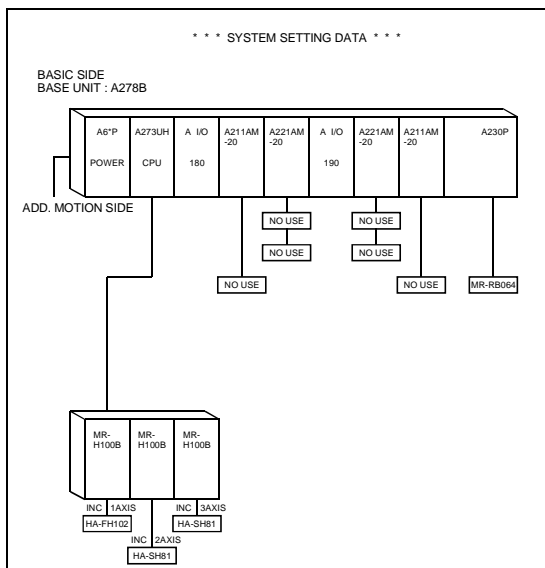
## <System setting data>

Prints out the system setting data.

Prints out the I/O allocation data if a PC I/O Unit is set.

1) Press the [F6] key to select the system setting item. This item can be set to "W/O" or "ALL".

- W/O .....No print out
- ALL .....Prints out data for all axes with data set.



I/O ALLOCATION		
SLOT	KIND	POINT
BASIC BASE I/O 0	INPUT UNIT	16
BASIC BASE I/O 3	INPUT UNIT	16
ADDITIONAL MOTION BASE I/O 0	INPUT UNIT	16

## 16. PRINTING

---

### <Page>

Sets whether the page numbers are added to the data print-outs.

- 1) Press the [F7] key to select the system setting item. This item can be set to "W/O" or "WITH" .
  - W/O.....No page numbers on print-out.
  - WITH..... Page numbers added to print-out, sequentially from 1 to 9999.

### Selecting Printing

- 1) Press the [F9] key. A YES/NO dialog box prompts whether to print.

### Printing

- 1) Press the [Enter] key while "YES" is highlighted to make the print out. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item.)
- 2) The message "CANNOT PRINT." indicates that the printer is not ready if no printer is connected. A YES/NO dialog box prompts whether to interrupt printing.  
Select "YES" to interrupt printing or "NO" to continue printing, then press the [Enter] key.
- 3) A message indicates that printing is complete.

### Canceling Printing

- 1) To cancel printing, press the [→] key to highlight "NO", then press the [Enter] key.  
A message indicates that printing was interrupted.

### Interrupting Printing

- 1) Press the [Esc] key to interrupt a printing operation.  
A YES/NO dialog box prompts whether to interrupt printing.
- 2) Select "YES" to interrupt printing or "NO" to continue printing, then press the [Enter] key.

### Ending Printed Data Setting

- 1) After writing the set printed data, press the [End] key to close the servo printing window and revert to the servo printer function select window.  
The printer data reverts to the previous settings and the display reverts to the servo printer function select window.

### Interrupting Printed Data Setting

- 1) Press the [Esc] key to clear the set printed data. The printed data reverts to the previous settings.  
The printer data reverts to the previous settings and the display reverts to the servo printer function select window.

# 16. PRINTING

## 16.3 Sample Print-Outs

Sample print-outs of servo programs, positioning data, mechanical system programs, and system settings data are shown below.

- (1) Sample servo program print-out (Printer: ESC/P; Paper: cut-form)
  - Servo programs used list

\*\*\* PROGRAM USED LIST \*\*\*

USED PROGRAMS	2048 / 4096
USED STEPS	8192 / 13312
LEFT STEPS	5120
VIRTUAL MODE	1000 - 1500

<REAL MODE>

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
230	231	232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249
250	251	252	253	254	255	256	257	258	259
260	261	262	263	264	265	266	267	268	269
270	271	272	273	274	275	276	277	278	279
280	281	282	283	284	285	286	287	288	289
290	291	292	293	294	295	296	297	298	299
300	301	302	303	304	305	306	307	308	309
310	311	312	313	314	315	316	317	318	319
320	321	322	323	324	325	326	327	328	329
330	331	332	333	334	335	336	337	338	339
340	341	342	343	344	345	346	347	348	349
350	351	352	353	354	355	356	357	358	359
360	361	362	363	364	365	366	367	368	369
370	371	372	373	374	375	376	377	378	379
380	381	382	383	384	385	386	387	388	389
390	391	392	393	394	395	396	397	398	399
400	401	402	403	404	405	406	407	408	409
410	411	412	413	414	415	416	417	418	419
420	421	422	423	424	425	426	427	428	429
430	431	432	433	434	435	436	437	438	439
440	441	442	443	444	445	446	447	448	449
450	451	452	453	454	455	456	457	458	459
460	461	462	463	464	465	466	467	468	469
470	471	472	473	474	475	476	477	478	479
480	481	482	483	484	485	486	487	488	489
490	491	492	493	494	495	496	497	498	499
500	501	502	503	504	505	506	507	508	509
510	511	512	513	514	515	516	517	518	519
520	521	522	523	524	525	526	527	528	529
530	531	532	533	534	535	536	537	538	539
540	541	542	543	544	545	546	547	548	549
550	551	552	553	554	555	556	557	558	559
560	561	562	563	564	565	566	567	568	569
570	571	572	573	574	575	576	577	578	579
580	581	582	583	584	585	586	587	588	589
590	591	592	593	594	595	596	597	598	599

NO:	DATE:	REV. DATE:	PC : A3U
REV. NO:	DESIGNER:	NAME:	PAGE : 1

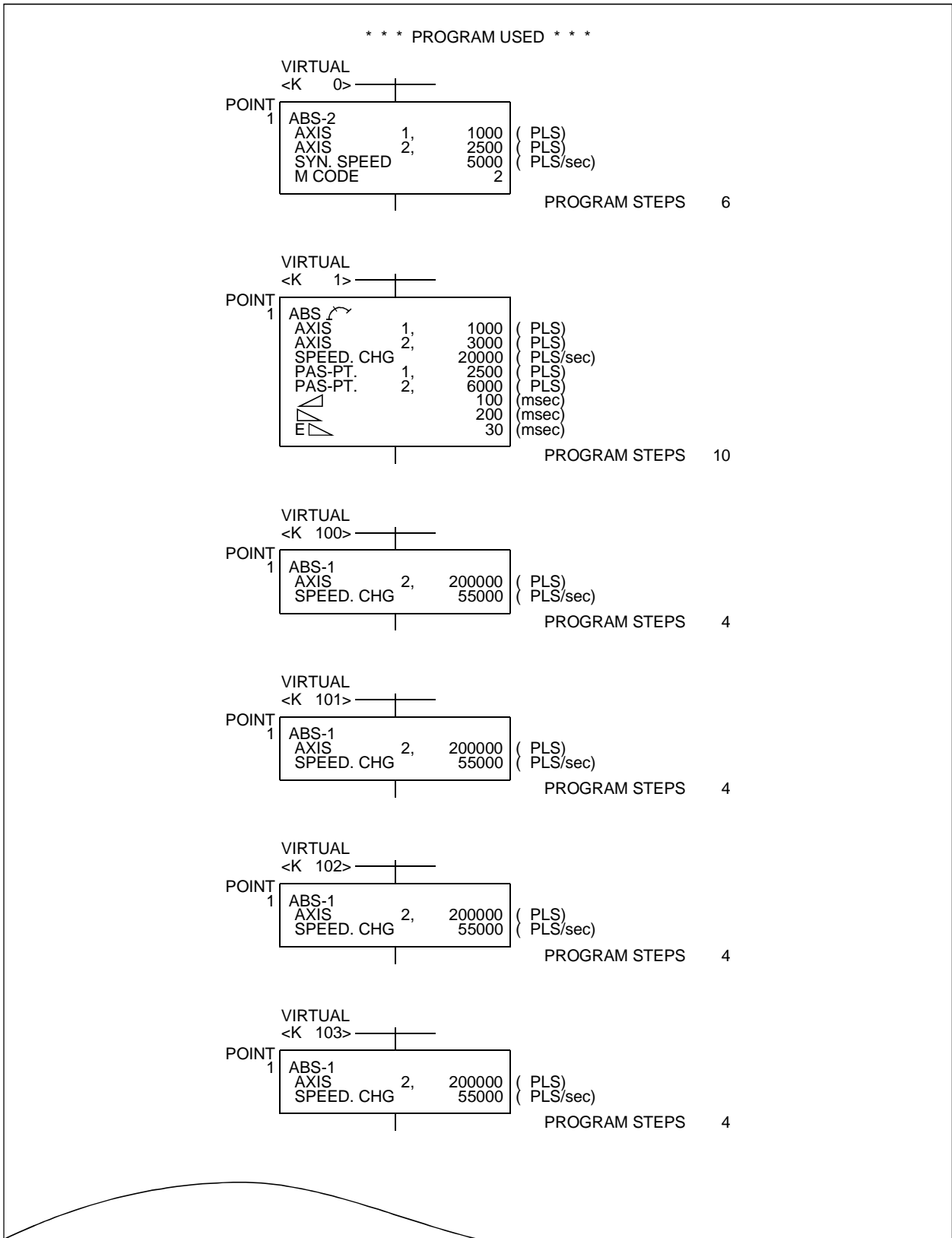
\* When the printer header is created by selecting "4: DOCUMENTATION" of the GPP function.

**POINT**

The servo program list prints created program numbers only.  
 Uncreated program numbers are not printed out.

# 16. PRINTING

- Servo program



## 16. PRINTING

- (2) Sample axis data print-out  
 (a) Using ADU (using A273UH)

### 1AXIS FIXED PARAMETER

	ITEM	SETTING DATA
1	UNIT SETTING	3: PULSE
2	PULSE/TURN(AP)	20000 ( PLS)
3	MOVEMENT/TURN(AL)	20000 ( PLS)
4	UNIT MAG. (AM)	
5	BACKLASH	0 ( PLS)
6	STROKE LIMIT MAX.	2147483647 ( PLS)
7	STROLE LIMIT MIN.	0 ( PLS)
8	CMD. IN-POS. RANGE	100 ( PLS)
9	LMT. SW. OUTPUT	0: NO

### 1AXIS SERVO PARAMETER

	ITEM	SETTING DATA
1	AMP. SETTING	0: ADU_INC
2	RESISTANCE	
3	OUT DYNAMIC UNIT	
4	MOTOR TYPE	0: HA-FH
5	CAPACITY	0.05 (Kw)
6	MOTER RAT. SPEED	3000 (r/min)
7	FEEDBACK PULSE(N)	8192 (ENCODER PULSE)*4
8	TURN DIRECTION	0: FOR. (ccw)
9	AUTO-TUNING	1: POS. & VEL.
10	SERVO RESPONSE	1
11	LOAD INERTIA RATIO	3.0 (RATIO)
12	POSITION LOOP GAIN 1	70 (rad/sec)
13	VELOCITY LOOP GAIN 1	1200 (rad/sec)
14	POSITION LOOP GAIN 2	25 (rad/sec)
15	VELOCITY LOOP GAIN 2	600 (rad/sec)
16	VEL. INTERGL. COMPS.	20 (msec)
17	NOTCH FILTER	
18	FEED FORWARD GAIN	0.0 (%)
19	IN-POSITION RANGE	100 ( PLS)
20	SOLENOID BRAKE OUT	

### 1AXIS ZERO PARAMETER

	ITEM	SETTING DATA
1	DIRECTION	0: REVERSE(cw)
2	METHOD	0: DOG
3	ADDRESS	0 ( PLS)
4	SPEED	1 ( PLS/sec)
5	CREEP SPEED	1 ( PLS/sec)
6	MOVEMENT AFTER DOG	
7	P. B. NO.	1

### 1AXIS JOG DATA

	ITEM	SETTING DATA
1	JOG SPEED LIMIT	20000 ( PLS/sec)
2	P. B. NO.	1

## 16. PRINTING

(b) When MR-[ ]-B is used

### 1AXIS FIXED PARAMETER

	ITEM	SETTING DATA
1	UNIT SETTING	3: PULSE
2	PULSE/TURN(AP)	20000 ( PLS)
3	MOVEMENT/TURN(AL)	20000 ( PLS)
4	UNIT MAG. (AM)	
5	BACKLASH	0 ( PLS)
6	STROKE LIMIT MAX.	2147483647 ( PLS)
7	STROKE LIMIT MIN.	0 ( PLS)
8	CMD. IN-POS. RANGE	100 ( PLS)
9	LMT. SW. OUTPUT	0: NO

### 1AXIS SERVO PARAM. (STD.)

	ITEM	SETTING DATA
1	AMP. SETTING	0: MR-H_INC
2	RESISTANCE	0: STANDARD
3	OUT DYNAMIC UNIT	0: NO
4	MOTOR TYPE	3: HA-FH
5	CAPACITY	0.05 (Kw)
6	REVOLUTION(R)	3000 (r/min)
7	FEEDBACK PULSE	8192 (ENCODER PULSE)*4
8	TURN DIRECTION	0: FOR. (ccw)
9	AUTO TUNING	1: POS. & VEL.
10	SERVO RESPONSE	1

### 1AXIS SERVO PARAM. (ADJ.)

	ITEM	SETTING DATA
1	LOAD INERTIA RATIO	3.0 (RATIO)
2	POSITION LOOP GAIN 1	70 (rad/sec)
3	VELOCITY LOOP GAIN 1	1200 (rad/sec)
4	POSITION LOOP GAIN 2	25 (rad/sec)
5	VELOCITY LOOP GAIN 2	600 (rad/sec)
6	VEL. INTERGAL. COMPS.	20 (msec)
7	NOTCH FILTER	0: NO
8	FEED FORWARD GAIN	0 (%)
9	IN-POSITION RANGE	100 ( PLS)
10	SOLENOID BRAKE OUT	100 (msec)
11	MON.OUT.MODE(MON.1)	0: VEL(+)
12	MON.OUT.MODE(MON.2)	1: TRQ(+)
13	OPTIONAL FUNCTION 1 (CARRIER SELECT)	0: 2.25
14	OPTIONAL FUNCTION 2 (NON MOTOR SELECT) (SOLENOID BRAKE INTERLOCK TIMING)	0: NO  0

# 16. PRINTING

## (3) Sample parameter block data print-out

\* \* \* P. B. BLK. DATA \* \* \*

		NO.1	NO.2	NO.3	NO.4
1	CONTROL UNIT	3: PULSE	3: PULSE	3: PULSE	3: PULSE
2	SPEED RESTRICTIO	200000	200000	200000	200000
3	ACCELERATION TIM	1000	1000	1000	1000
4	DECELERATION TIM	1000	1000	1000	1000
5	SHORT STOP TIME	1000	1000	1000	1000
6	S RATIO	0	0	0	0
7	TORQUE LIMIT	300	300	300	300
8	STOP METHOD	0: DECEL.	0: DECEL.	0: DECEL.	0: DECEL.
9	CIRCULAR ERROR R	100	100	100	100

		NO.5	NO.6	NO.7	NO.8
1	CONTROL UNIT	3: PULSE	3: PULSE	3: PULSE	3: PULSE
2	SPEED RESTRICTIO	200000	200000	200000	200000
3	ACCELERATION TIM	1000	1000	1000	1000
4	DECELERATION TIM	1000	1000	1000	1000
5	SHORT STOP TIME	1000	1000	1000	1000
6	S RATIO	0	0	0	0
7	TORQUE LIMIT	300	300	300	300
8	STOP METHOD	0: DECEL.	0: DECEL.	0: DECEL.	0: DECEL.
9	CIRCULAR ERROR R	100	100	100	100

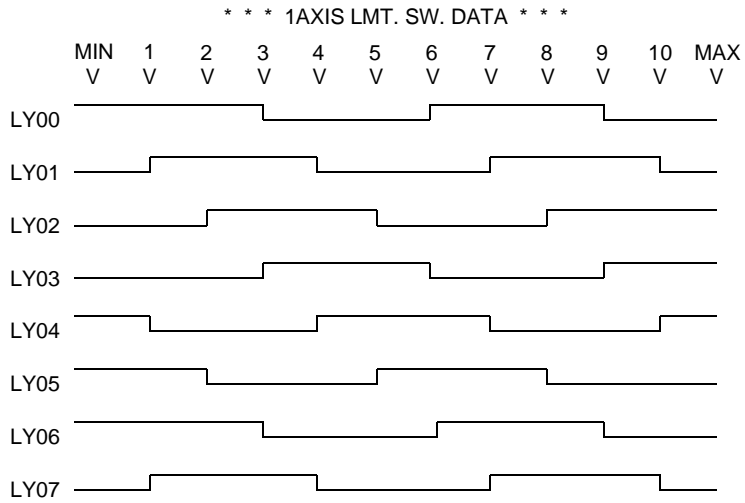
		NO.9	NO.10	NO.11	NO.12
1	CONTROL UNIT	3: PULSE	3: PULSE	3: PULSE	3: PULSE
2	SPEED RESTRICTIO	200000	200000	200000	200000
3	ACCELERATION TIM	1000	1000	1000	1000
4	DECELERATION TIM	1000	1000	1000	1000
5	SHORT STOP TIME	1000	1000	1000	1000
6	S RATIO	0	0	0	0
7	TORQUE LIMIT	300	300	300	300
8	STOP METHOD	0: DECEL.	0: DECEL.	0: DECEL.	0: DECEL.
9	CIRCULAR ERROR R	100	100	100	100

		NO.13	NO.14	NO.15	NO.16
1	CONTROL UNIT	3: PULSE	3: PULSE	3: PULSE	3: PULSE
2	SPEED RESTRICTIO	200000	200000	200000	200000
3	ACCELERATION TIM	1000	1000	1000	1000
4	DECELERATION TIM	1000	1000	1000	1000
5	SHORT STOP TIME	1000	1000	1000	1000
6	S RATIO	0	0	0	0
7	TORQUE LIMIT	300	300	300	300
8	STOP METHOD	0: DECEL.	0: DECEL.	0: DECEL.	0: DECEL.
9	CIRCULAR ERROR R	100	100	100	100

# 16. PRINTING

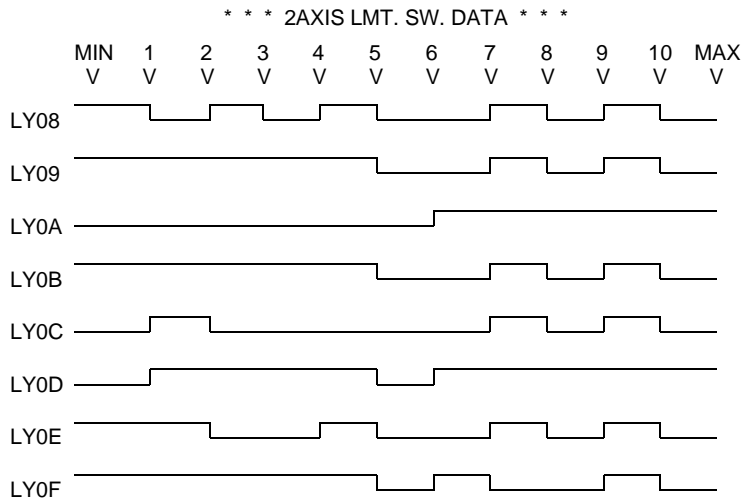
(4) Sample limit switch output data print-out (using A17[, A273UH)

POINT	ADR. (PULSE)
MIN	-2147483648
1	-500000
2	-400000
3	-300000
4	-200000
5	-100000
6	0
7	100000
8	200000
9	300000
10	400000
MAX	2147483647



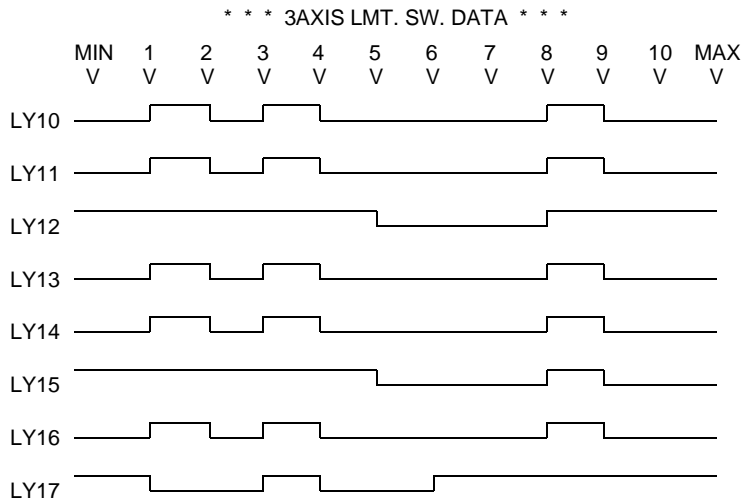
LMT. SWT. OUT. MODE: REAL PRE. VAL MODE

POINT	ADR. (PULSE)
MIN	-2147483648
1	-2000000000
2	-1000000000
3	-2000000000
4	-1000000000
5	0
6	1000000000
7	2000000000
8	5000000000
9	10000000000
10	20000000000
MAX	2147483647



LMT. SWT. OUT. MODE: REAL PRE. VAL MODE

POINT	ADR. (PULSE)
MIN	0.00000
1	10.00000
2	20.00000
3	30.00000
4	40.00000
5	50.00000
6	60.00000
7	70.00000
8	80.00000
9	90.00000
10	100.00000
MAX	359.99999



LMT. SWT. OUT. MODE: REAL PRE. VAL MODE



# 16. PRINTING

## (5) Sample mechanical system program print-out

```

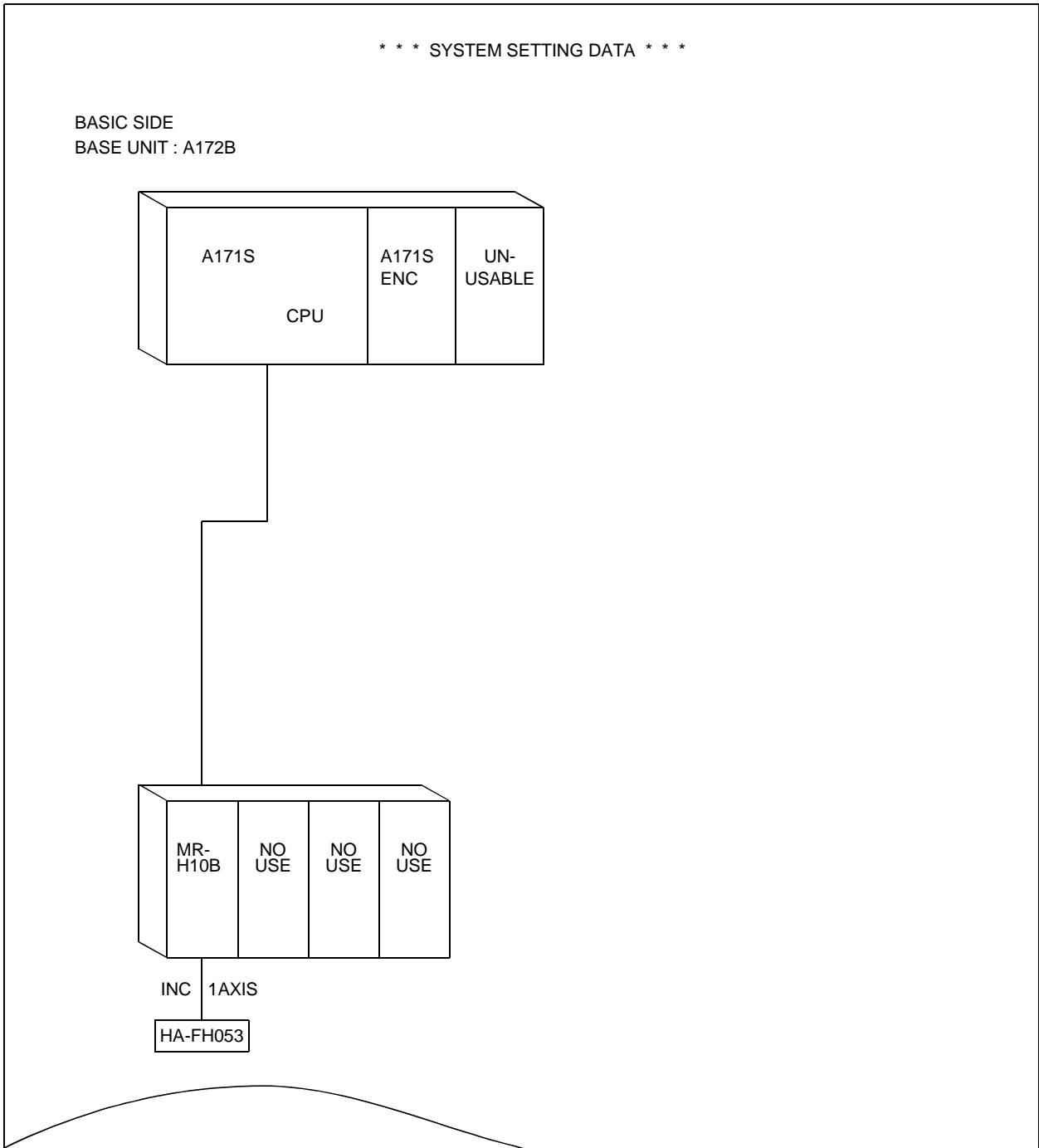
*****
*   MACHANICAL SYSTEM SETTING PARAMETER<C:\GPP\TMP\SVEDTDA1.BIN>   *
*****
-----SETTING PAGE : 1-----
  [SERVO      (ID: 1)]
VIR. AXIS : 1
STROKE LIMIT  MAX. VALUE: 2147483647 (pls)  MIN. VALUE: 0 (pls)
IN-POSITION RANGE: 100 (pls)
JOG SPEED RES.: 20000 (pls/sec)
JOG PARA. BLOCK DES.: 1
  [DIRECT CLUTCH (ID: 5)]
COTROL: ON/OFF
CLUTCH ON/OFF DEVICE:
STATUS STORAGE DEV.:
  [AUX. GEAR  (ID: 11)]
INP. AXIS GEAR: 1
OUT. AXIS GEAR: 1
OUT. GEAR ROTA.: FOR.
  [CONT. GEAR  (ID: 16)]
INP. AXIS GEAR: 1
OUT. AXIS GEAR: 1
OUT. GEAR ROTA.: FOR.
  [CONT. GEAR  (ID: 17)]
INP. AXIS GEAR: 1
OUT. AXIS GEAR: 1
OUT. GEAR ROTA.: FOR.
  [AUXILIARY SERVO (ID: 15)]
INPUT FROM [2] AXIS.
  [DIRECT CLUTCH (ID: 7)]
CONTROL: ON/OFF
CLUTCH ON/OFF DEVICE: M0
STATUS STORAGE DEV. : M10
  [GEARS (ID: 4)]
INP. AXIS GEAR: 1
OUT. AXIS GEAR: 1
OUT. GEAR ROTA. : FOR.
  [BALL SCREW  (ID: 18)]
Output Axis NO. : 1
UNIT SET: (mm)
SCREW PITCH: 1000 x 10E-4 (mm)
SCREW: PULSE/TURN: 1 (pls)
ALLOW: PULSE: 65535 (pls)
STROKE LIMIT UP: 214748.3647 x 10E-4 (mm)  LOW: 0 x 10E-4 (mm)
SPEED LIMIT: 10.000000 (mm/min)
LIMIT SWITCH: NO USE
TORQ. LIMIT SET DEV. : NO USE
COM. : test-gsv21p
  [CAM (ID: 12)]
Output Axis NO. : 4
CAM: PULSE/TURN: 2
USED CAM No. : 4
CAM NO. SET DEVICE: W0
ALLOW. PULSE: 65535 (pls)
UNIT SET: (pls)
STROKE LIMIT MIN. DEV. : D200
STROKE SET DEVICE: D202
LIMIT SWITCH: NO USE
TORQ. LIMIT SET DEV. : NO USE
COM. : cam-test
  [CONT.GEAR (ID: 2)]
INP. AXIS GEAR: 1
OUT. AXIS GEAR: 1

```

			PC : A3U
			PAGE : 4

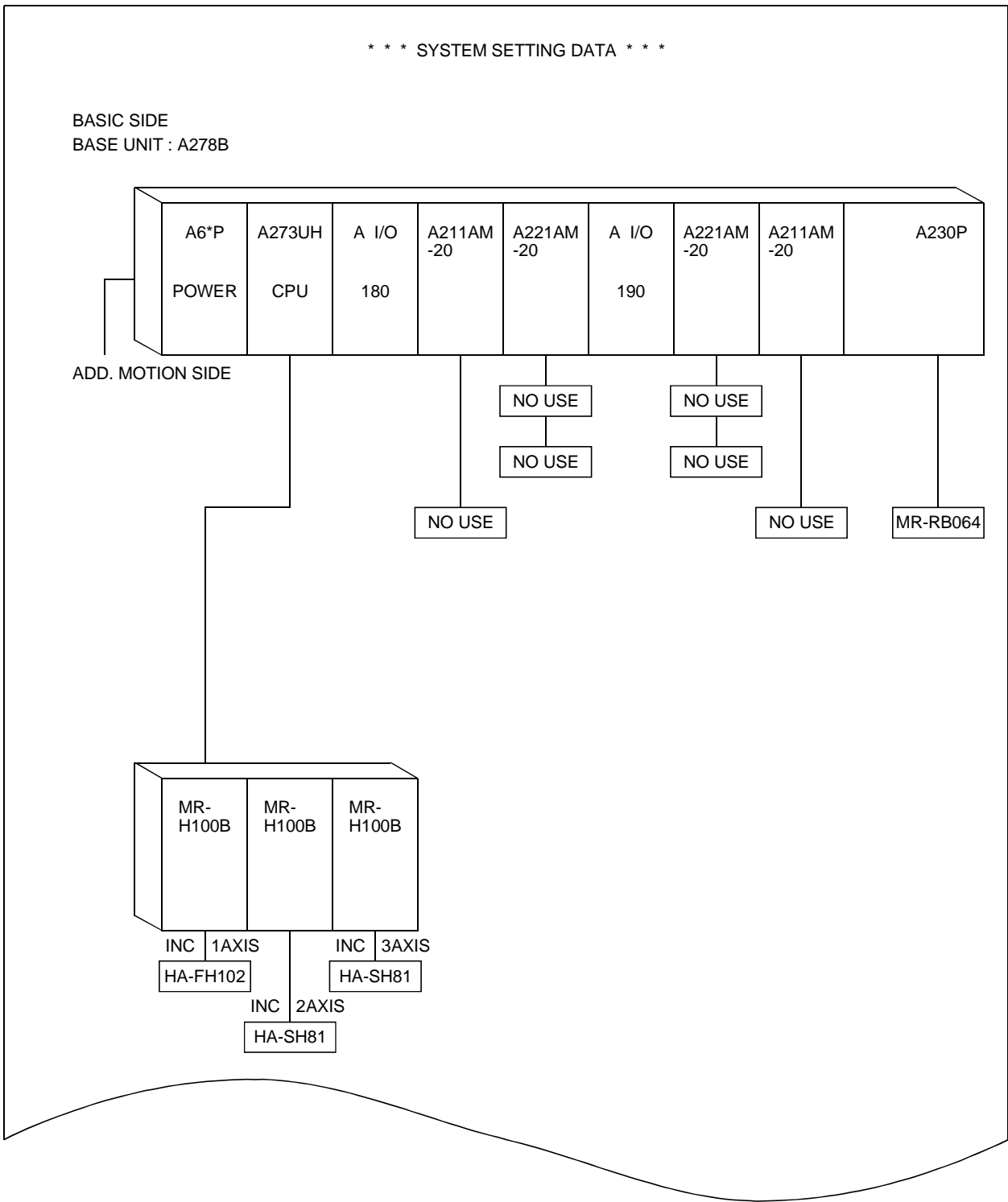
# 16. PRINTING

(6) Sample system setting data print-out  
(a) For A17[ ]CPU

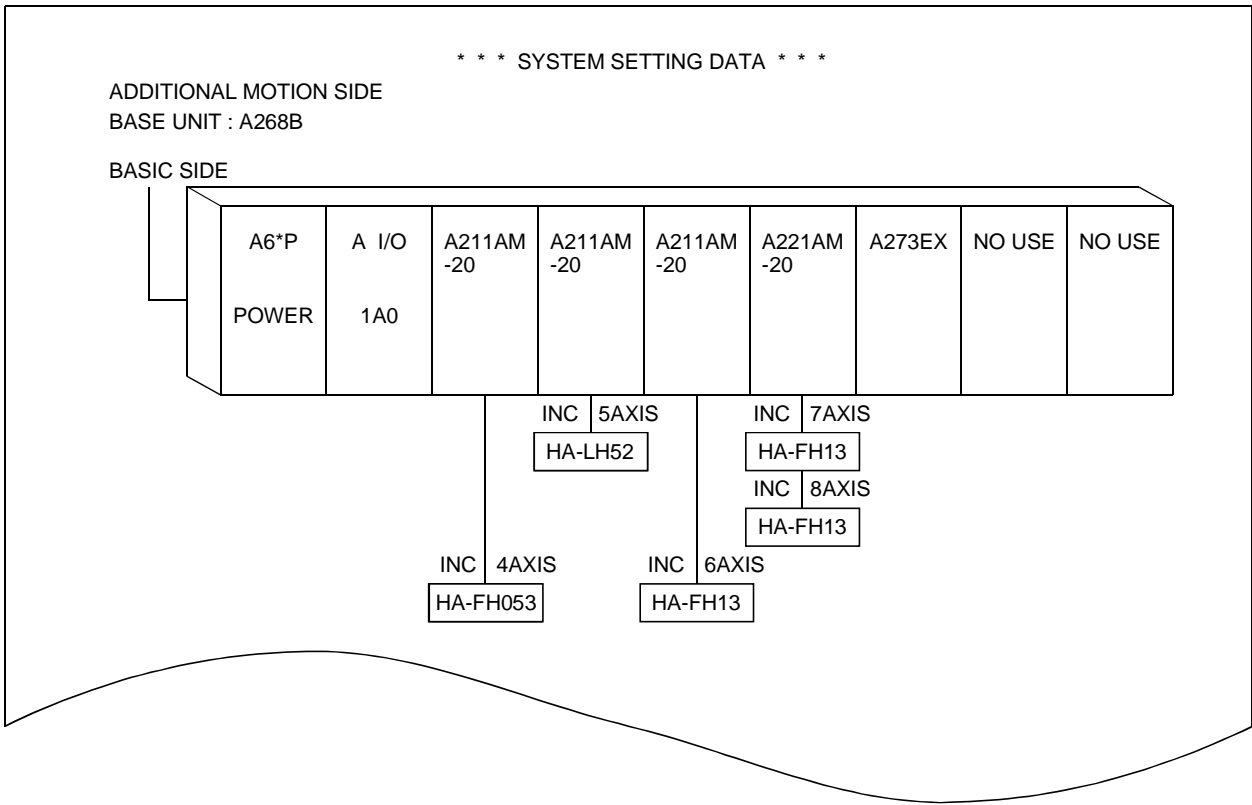


# 16. PRINTING

(b) For A273UHCPU



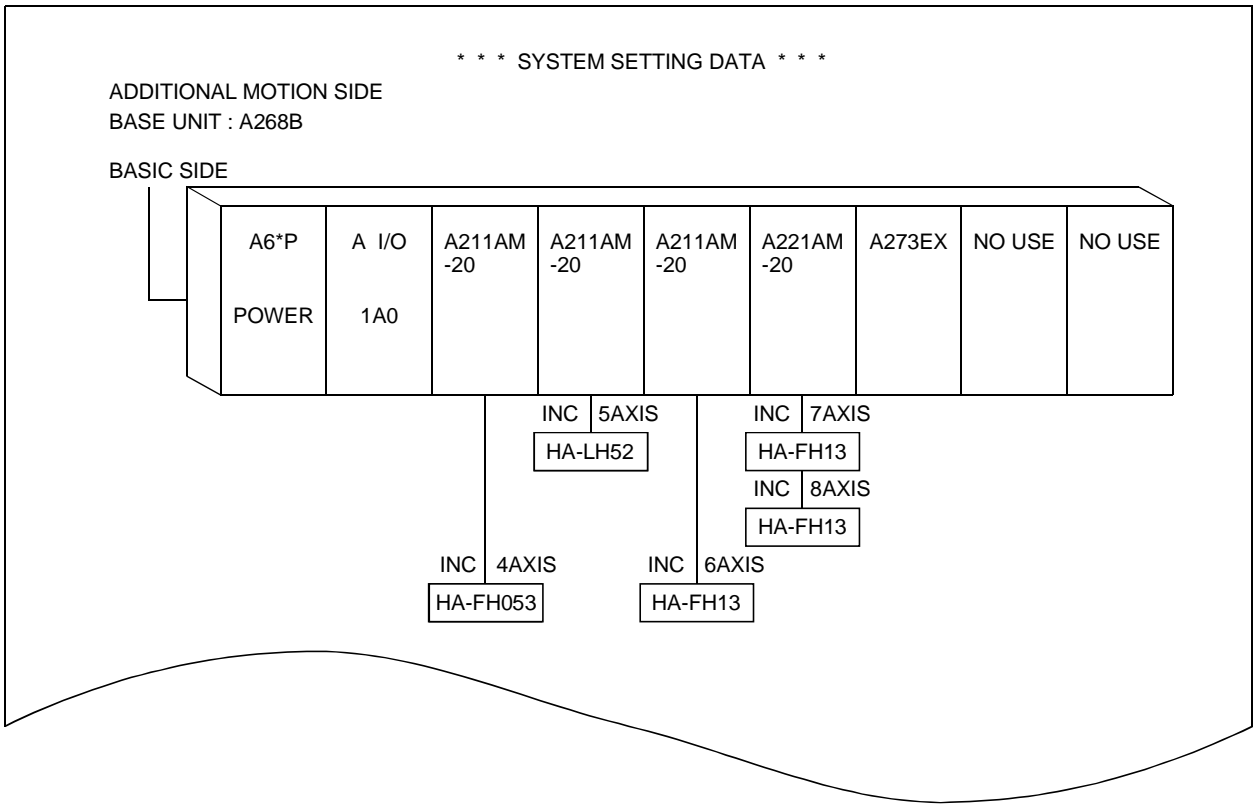
# 16. PRINTING



I/O ALLOCATION

SLOT	KIND	POINT
BASIC BASE I/O 0	INPUT UNIT	16
BASIC BASE I/O 3	INPUT UNIT	16
ADDITIONAL MOTION BASE I/O 0	INPUT UNIT	16

# 16. PRINTING



I/O ALLOCATION

SLOT	KIND	POINT
BASIC BASE I/O 0	INPUT UNIT	16
BASIC BASE I/O 3	INPUT UNIT	16
ADDITIONAL MOTION BASE I/O 0	INPUT UNIT	16

# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

## 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

The internal positioning OS (operating system) of the servo system CPU can be written or rewritten from a personal computer.

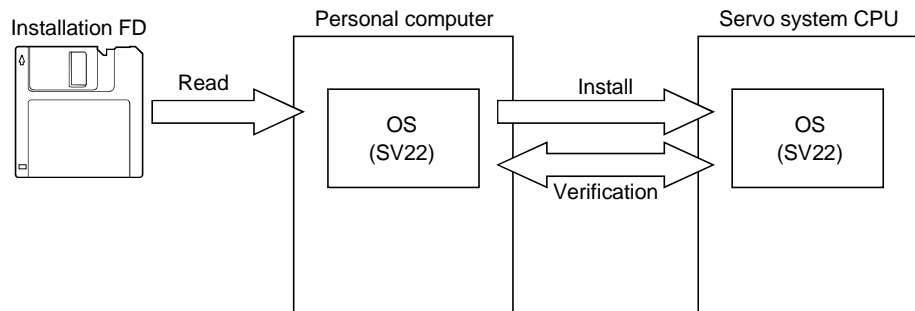
The positioning OS is stored in the installation FD.

"Installation" and "verification" of the OS are possible using a personal computer running the GSV22PE software.

- "Installation" means writing the positioning OS from the personal computer to the servo system CPU.

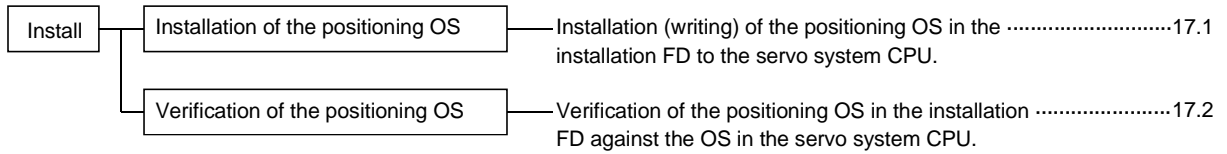
The servo system CPU executes positioning control in accordance with the installed positioning OS.

- "Verification" means checking the positioning OS against the positioning OS installed in the servo system CPU.



### (1) Function summary

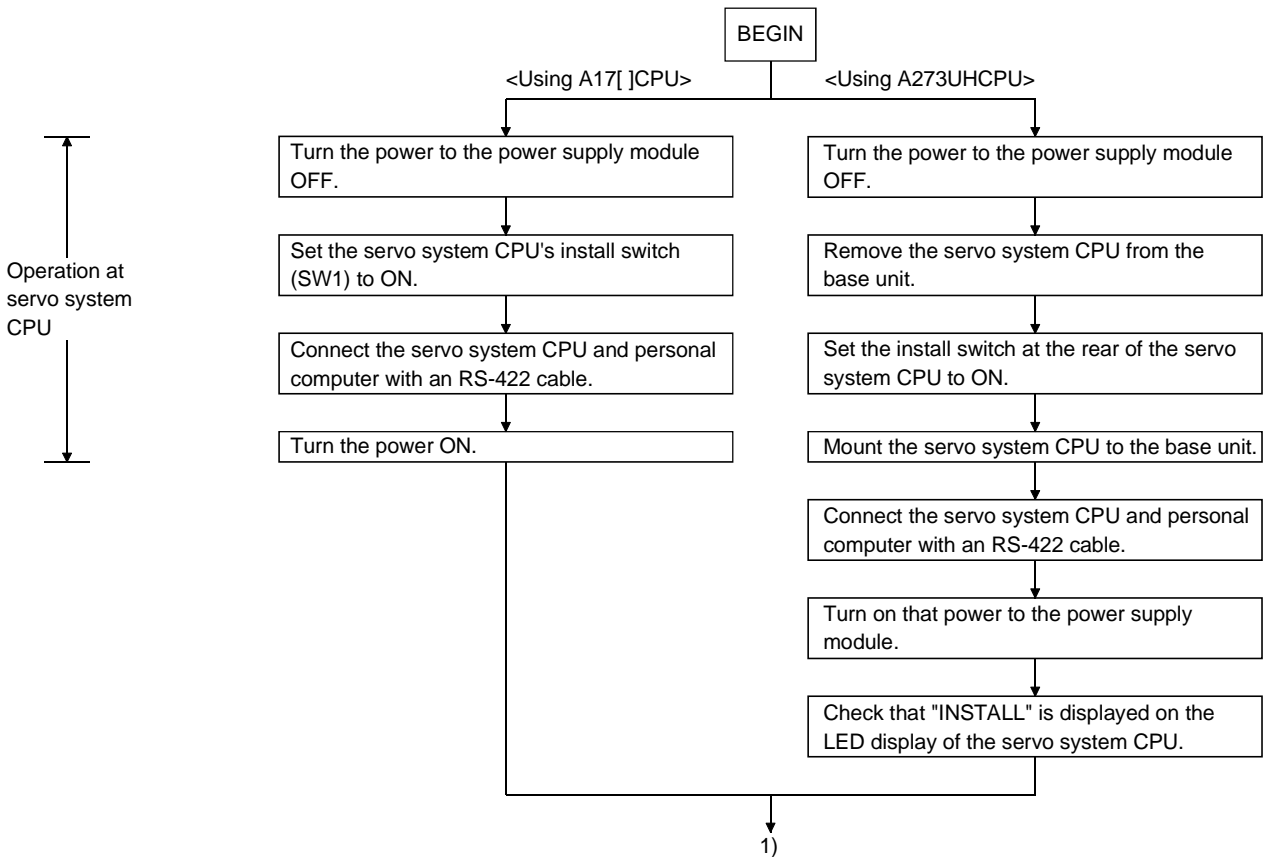
The following functions are available in the Install mode of the GSV22PE software package.



# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

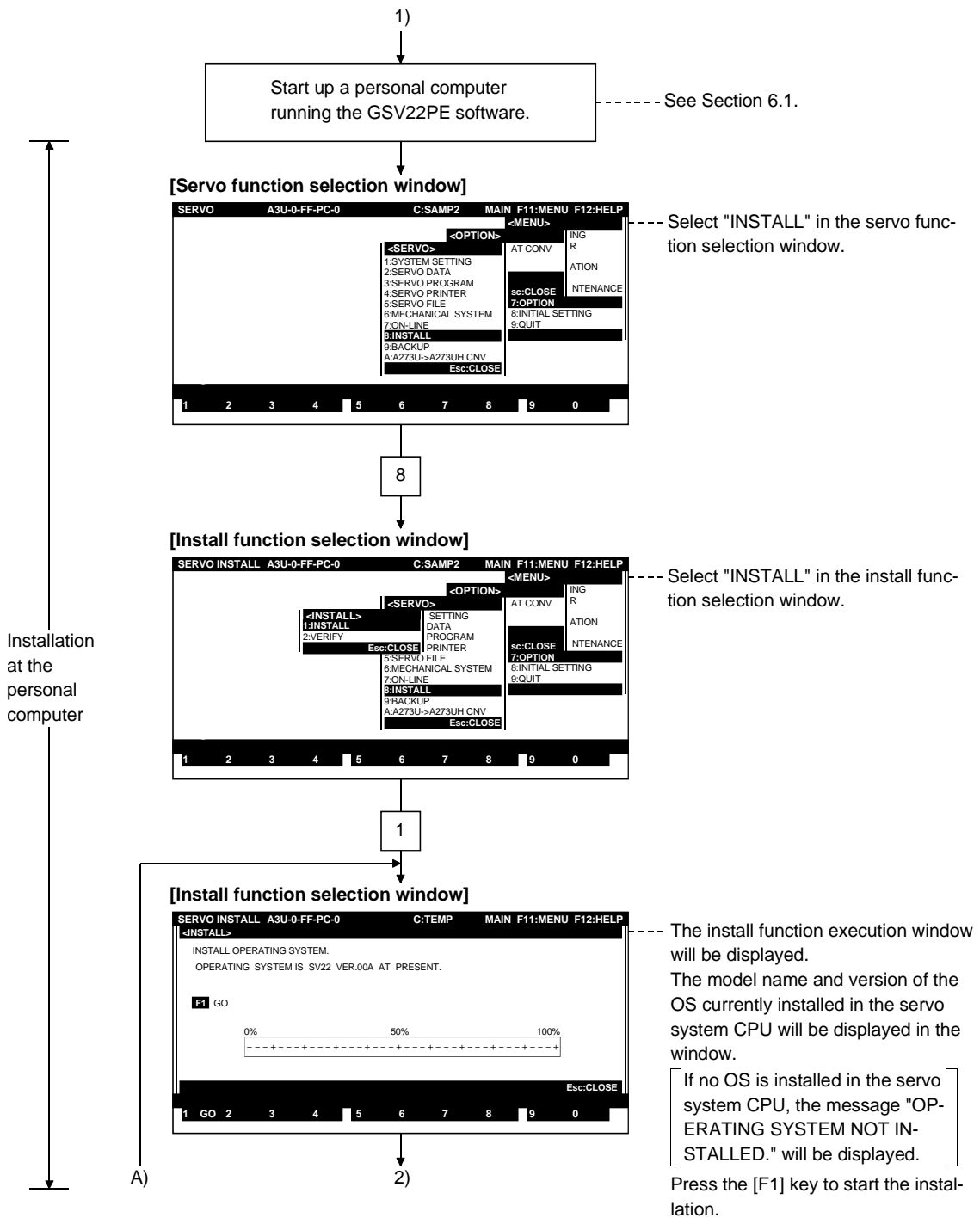
## 17.1 Installation of the Positioning OS

- (1) Installation is conducted for the following reasons:
  - To change the positioning OS installed in the servo system CPU to a different positioning OS model type;
  - To install a new version of positioning OS to upgrade the positioning OS.
- (2) Procedure for installation  
 The procedure for installing the positioning OS in the servo system CPU is indicated below.



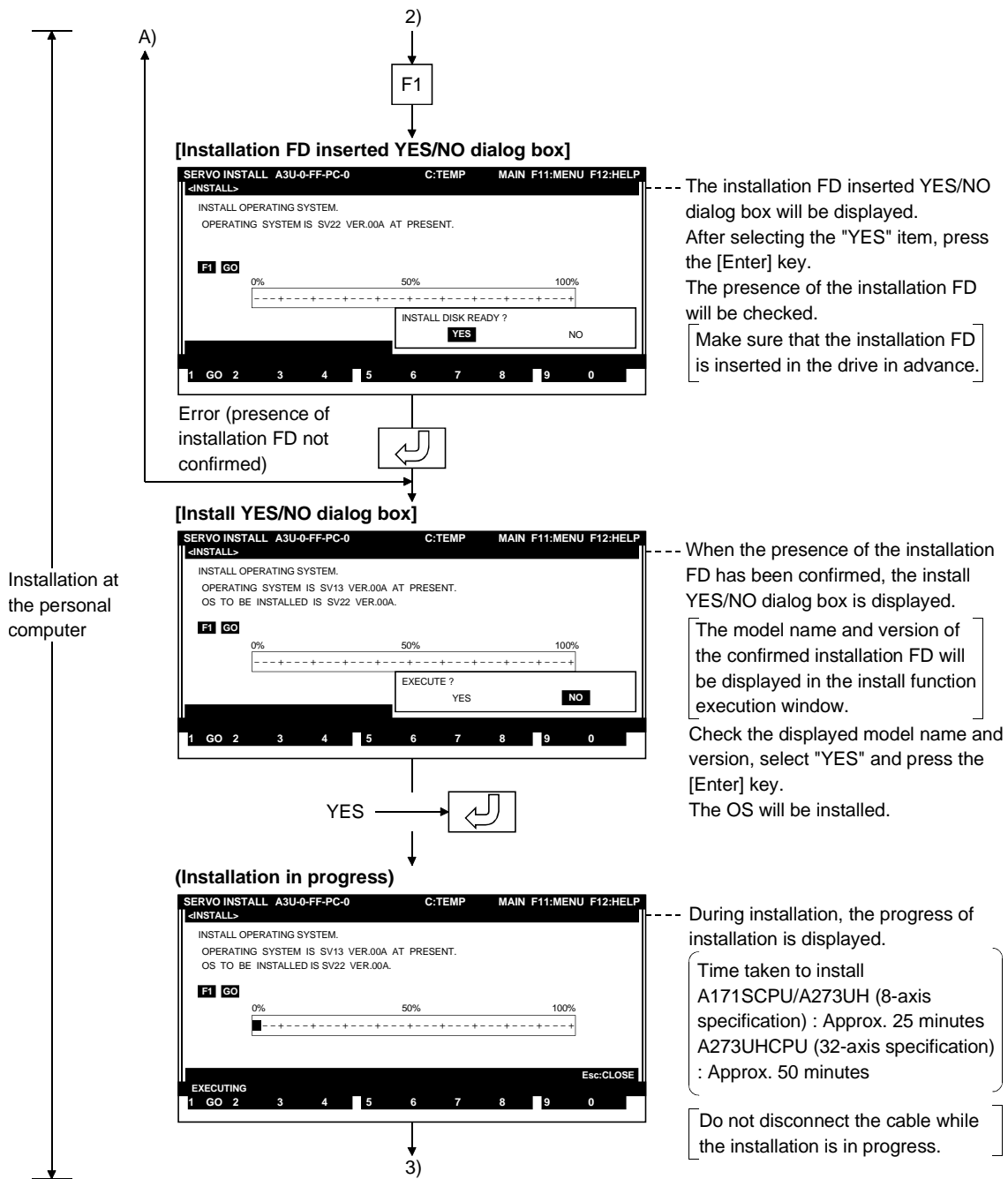
POINTS
<p>(1) The servo system CPU is shipped with the positioning OS already installed.                      Check the model name and version of the positioning OS installed in the servo system CPU before installing another positioning OS.</p> <p>(2) Installing a positioning OS does not cause the positioning data and servo programs written in the servo system CPU to be rewritten.</p> <p>(3) Install switch settings</p>
<p>(Using A17[ ]CPU)</p>
<p>(Using A273UHCPU)</p>

# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

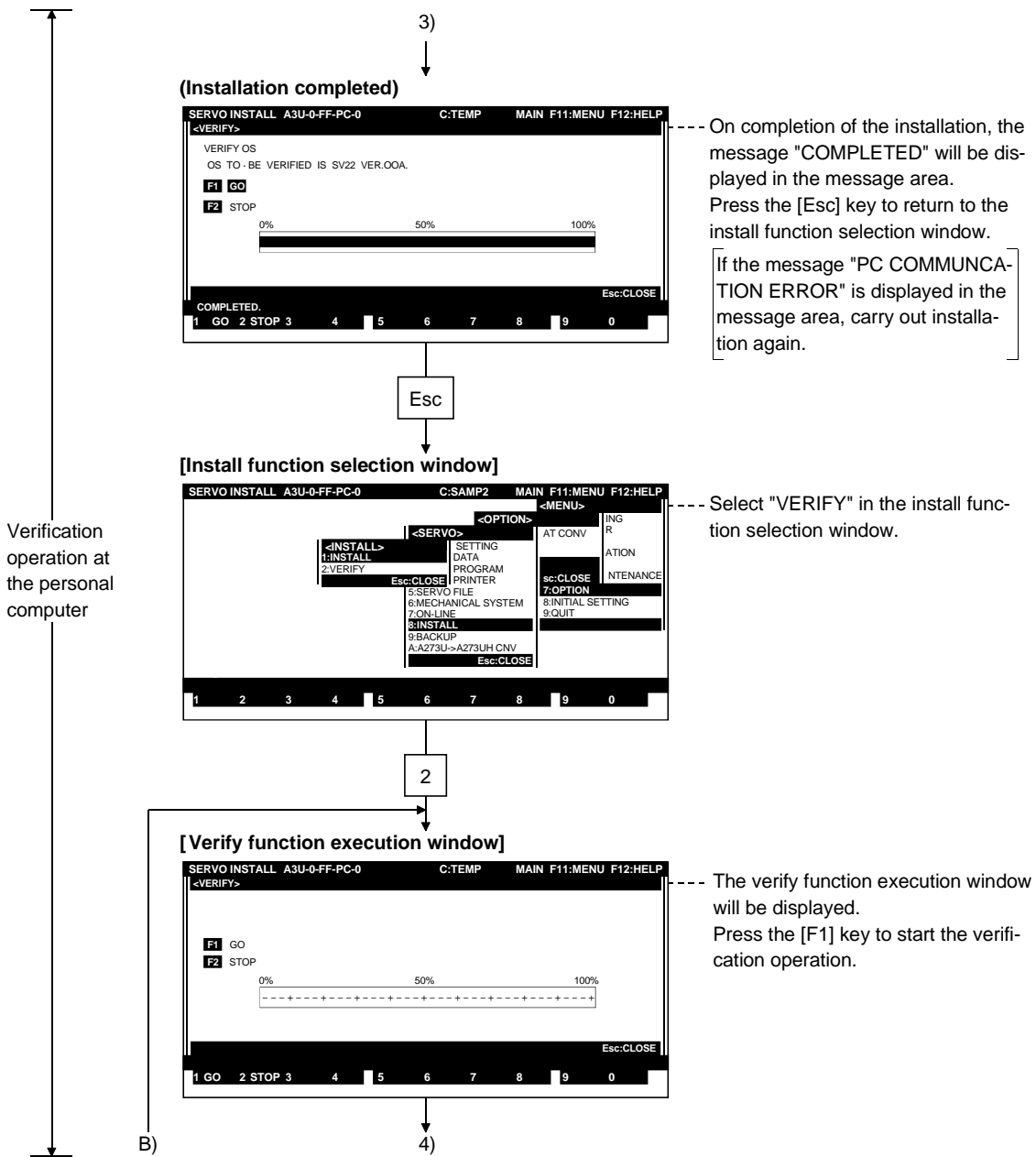




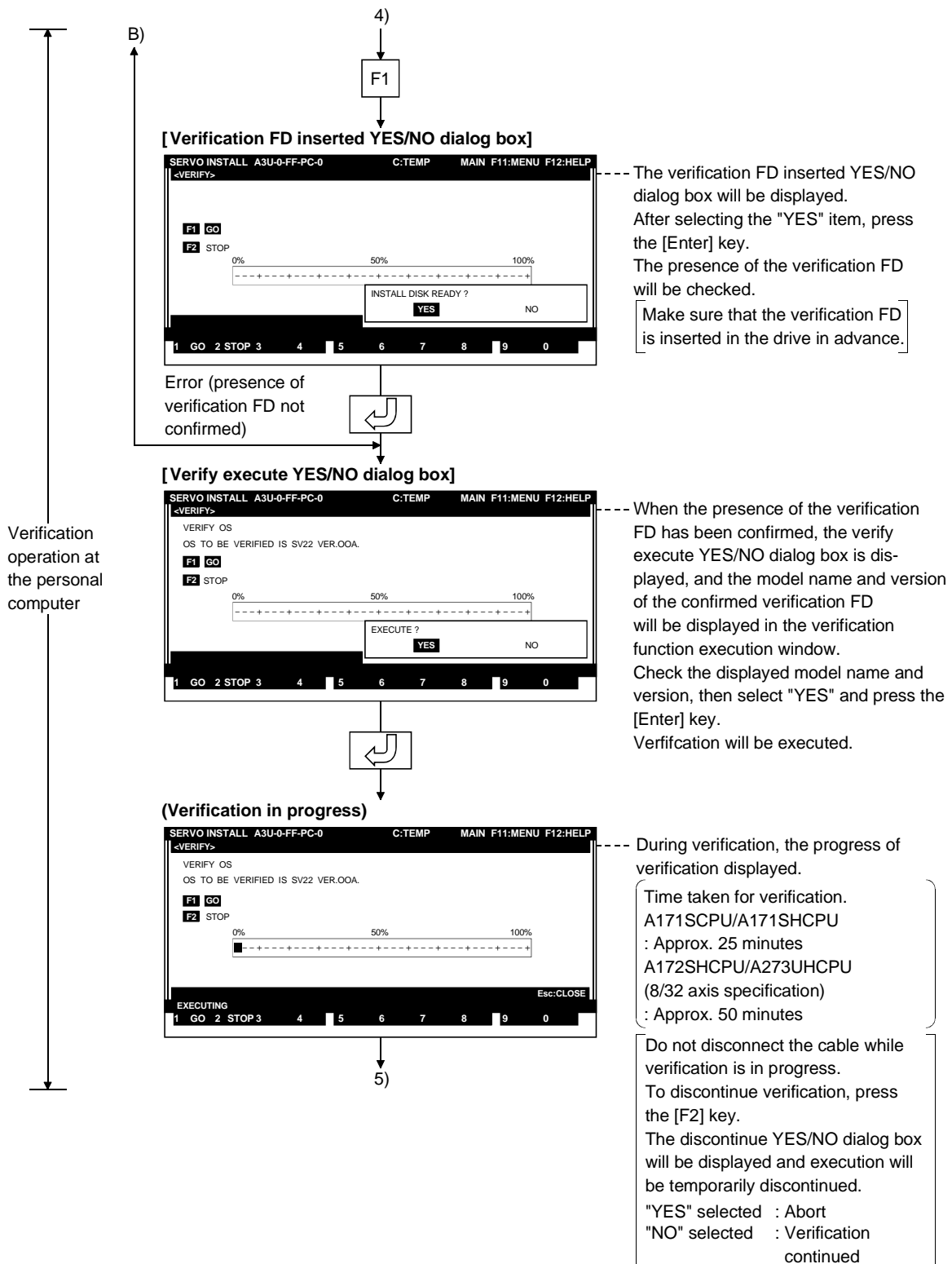
# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS



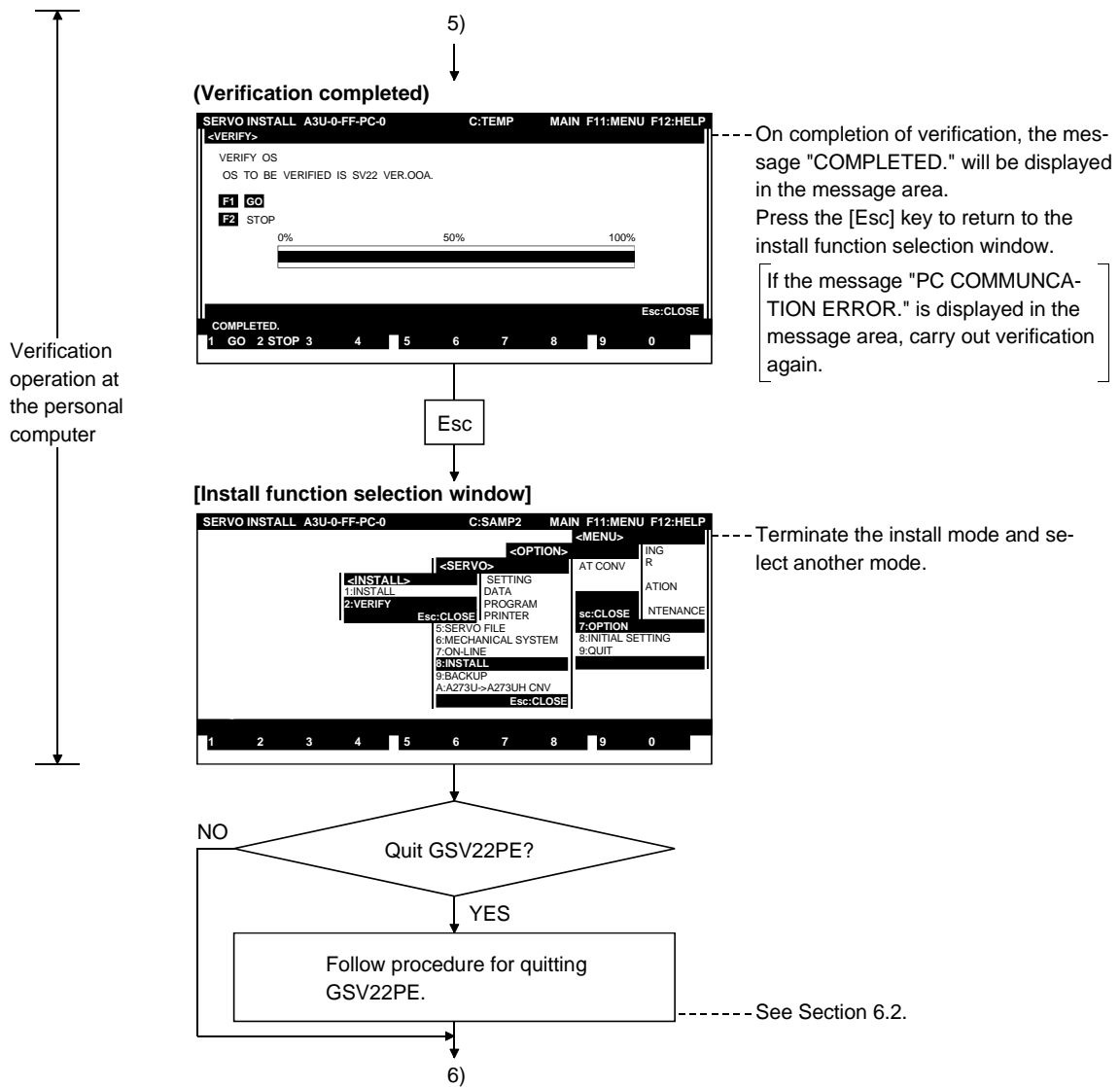
# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS



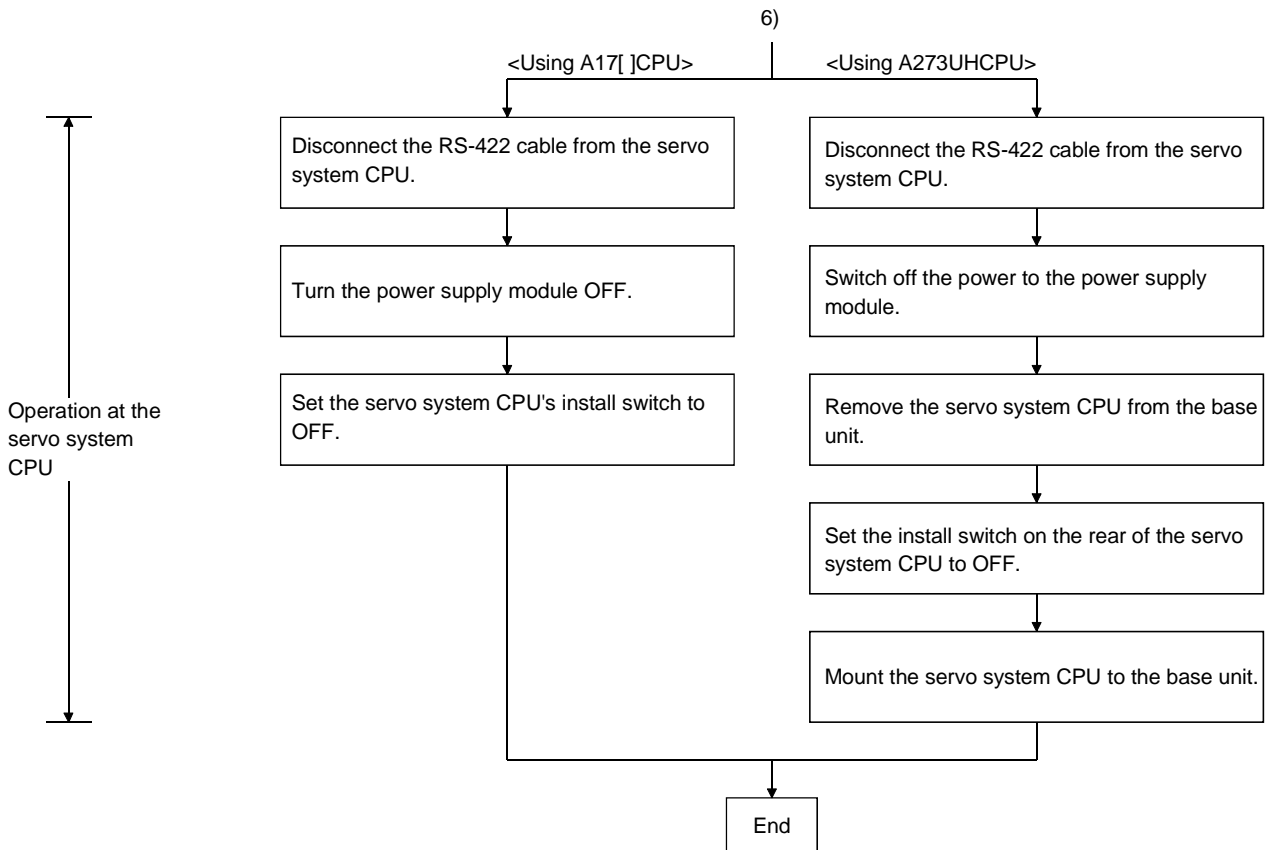
# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS



# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS



# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS



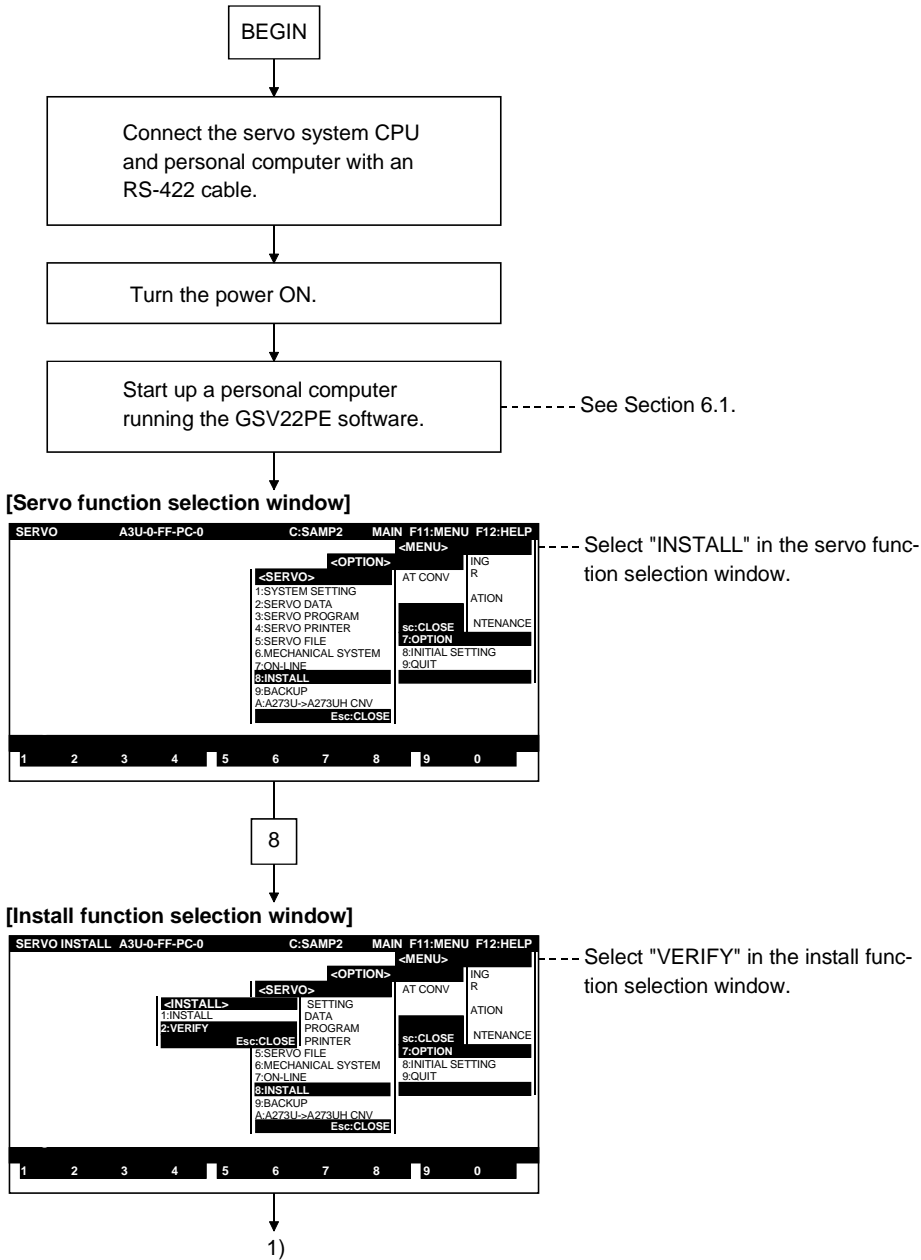
# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

## 17.2 Verification of the Positioning OS

The procedure for verification is described below.

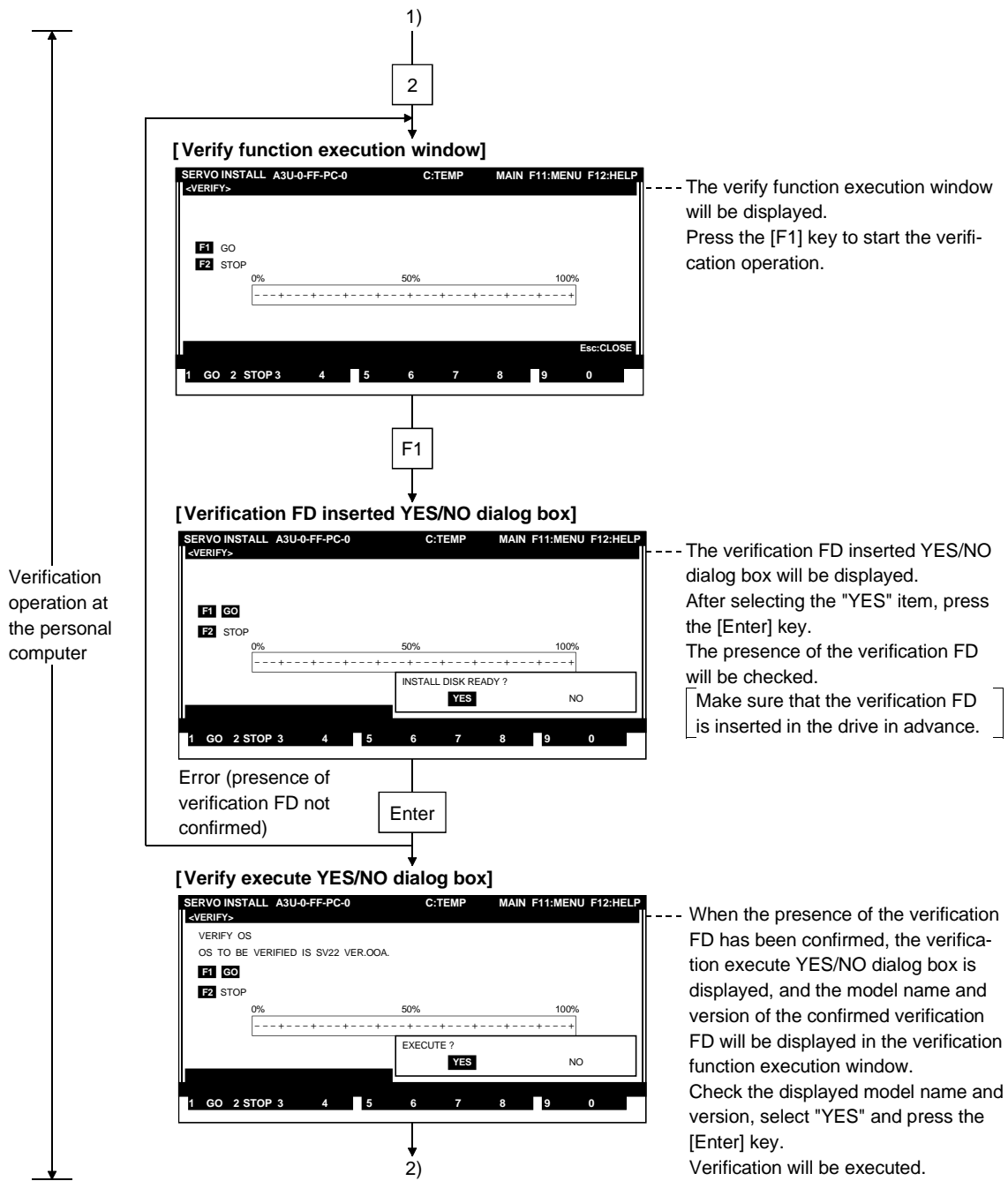
(1) Procedure for verification

The procedure for verifying the positioning OS installed in the servo system CPU against the positioning OS at the personal computer is as follows.

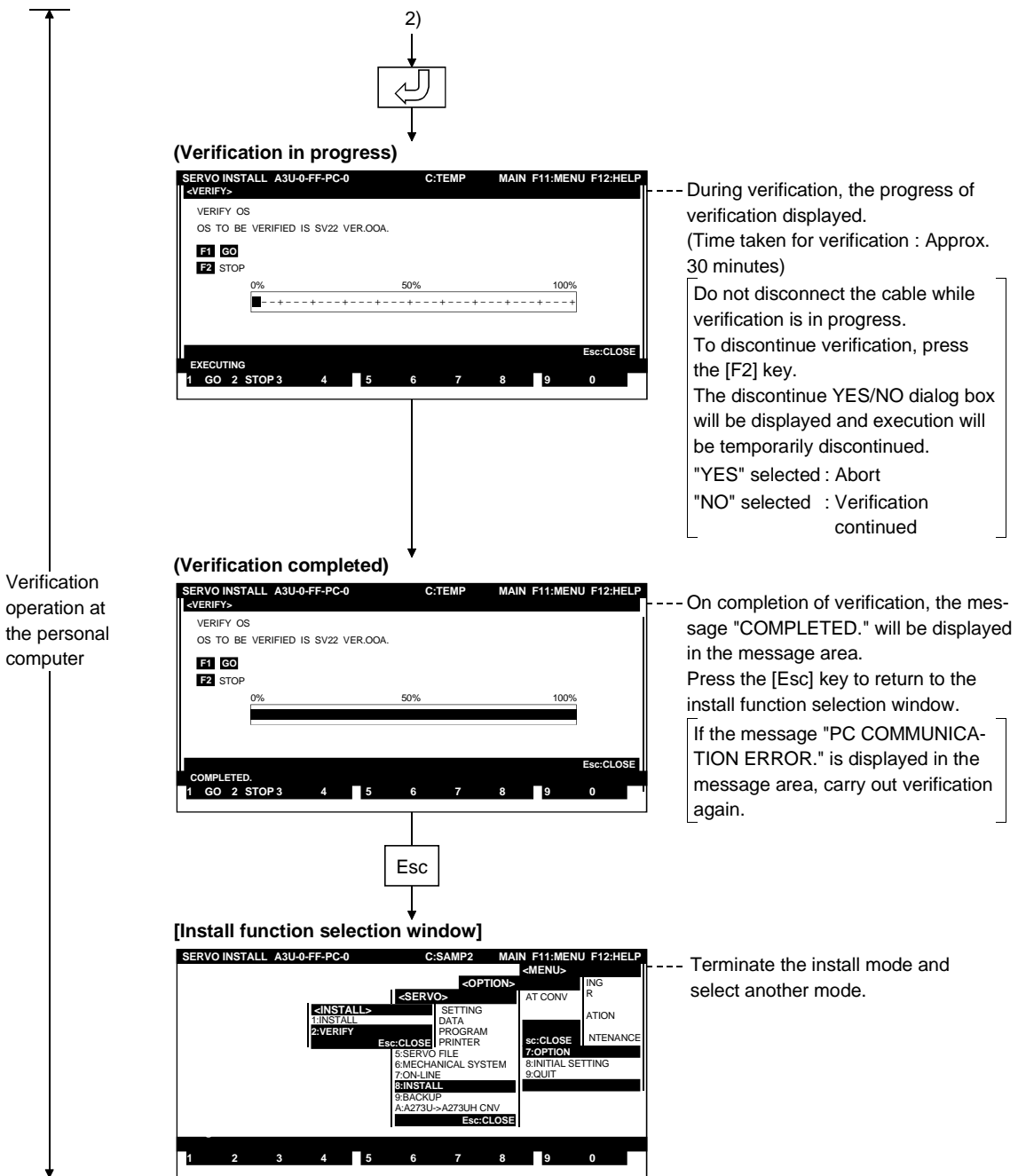


POINTS
(1) Verification of the positioning OS is possible regardless of the ON/OFF position of the servo system CPU's install switch.
(2) If the message "OPERATING SYSTEM MISMATCH." is displayed in the message area, verification is not possible.

# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS



# 17. INSTALLATION AND VERIFICATION OF THE POSITIONING OS



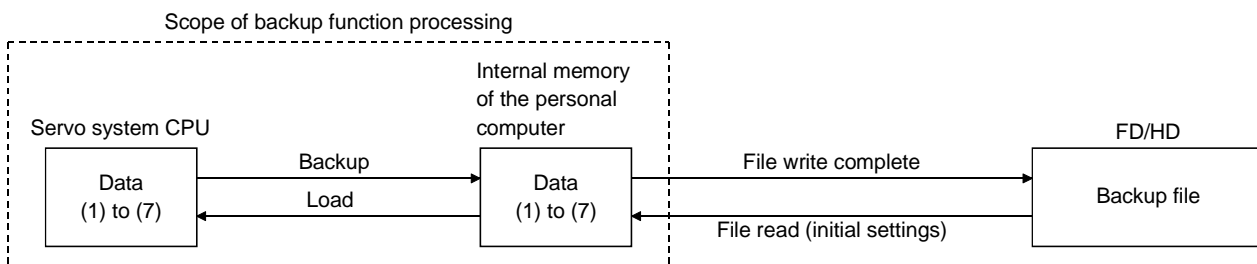


## 18. BACKUP FUNCTION

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### 18. BACKUP FUNCTION

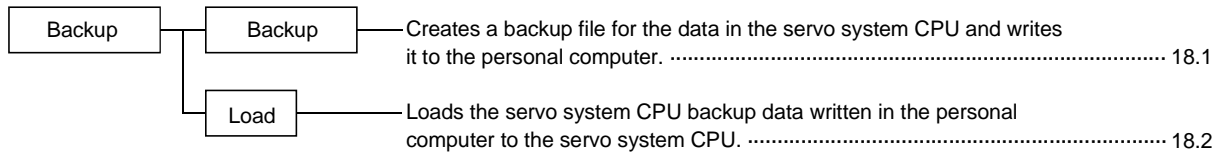
- (1) The backup function is a function where by the following data in the servo system CPU is backed up by being read to the internal memory of the personal computer and is then loaded (written) again to the servo system CPU.
  - (a) System settings data
  - (b) Positioning data
  - (c) Servo program data
  - (d) Mechanical system program data
  - (e) Servo system CPU device data
  - (f) Data required for home position return in the servo system CPU
  - (g) Virtual mode monitoring data for servo system CPU
  
- (2) The backup function is used when replacing the servo system CPU. Before replacing the servo system CPU, the data (1) to (7) currently in the servo system CPU can be read to a computer in the backup mode. After the servo system CPU has been replaced, the data can be written from the computer back to the servo system CPU in the load mode. After the data has been written to the servo system CPU, reset the servo system CPU or switch the power OFF and back ON (normal operation cannot be guaranteed if this is not done).
  - (a) With an absolute position system, use of the backup function makes startup operations such as home position return unnecessary after replacement.
  - (b) With a system which is not an absolute system, the backup function can be used to batch write data (1) to (4). Data (5) to (7) are cleared. In this case it is essential to execute a home position return after replacement.
  
- (3) Backup files cannot be created from the back-up function screen. The data read from the servo system CPU to the internal memory of the personal computer is stored in the FD/hard disk as a backup file when "file write quit" is executed. The backup file data is read using the GSV22PE start-up initial settings (see Section 6.1) when "file read" is executed.



# 18. BACKUP FUNCTION

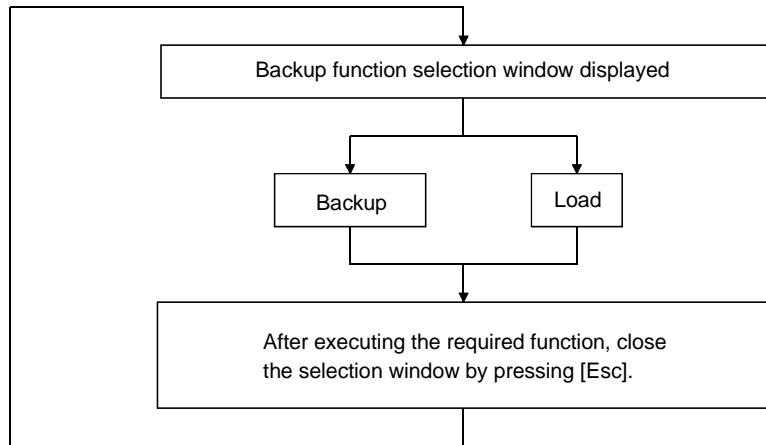
## (4) Function summary

The following functions are available in the GSV22PE backup functions.



## (5) Outline flowchart

A summary of the procedure for executing backup/load is presented below.



POINTS
(1) The backup function can be used when replacing the servo system CPU to load the servo system CPU backup data to the new servo system CPU so as to maintain the same data after replacement.
(2) The servo system CPU data backup file is stored in the file SVBACKUP.BIN in \GPP\USR\system name\sub-system name.

# 18. BACKUP FUNCTION

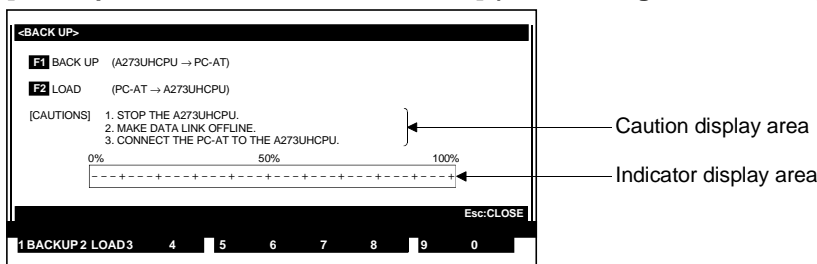
## 18.1 Servo System CPU Backup

The current system settings data, positioning data, servo program data, and mechanical system setting data written to the servo system CPU, and the servo system CPU current device information, data required for home position return, and virtual mode monitoring data is backed up and written to the computer.

### [Procedure for Displaying the Backup Function Execution Window]



### [Backup Function Execution Window] (When using A273UHCPU)



Caution display area

Indicator display area

### [Display/Setting Content]

**Caution display area** Cautions relating to execution of backup/load are displayed here.

**Indicator display area** The progress of the backup/load operation is displayed here by the indicator.

### [Key Operation]

#### Selecting backup

- 1) Press the [F1] key to select backup.  
The backup execution YES/NO dialog box will be displayed.

#### Selecting backup execution

- 1) To execute the backup operation, check the displayed backup cautions, then press the [Enter] key while "YES" is highlighted. (If "NO" is highlighted press the [Enter] key to highlight "YES".)
- 2) Backup will be executed and the message "EXECUTING" will be displayed.
- 3) Carry out verification when the indicator has reached 100%.

#### Canceling backup

- 1) To cancel the backup, press the [→] key to highlight "NO," then press the [Enter] key.  
The system will return to the backup function execution window without executing backup.

#### Window CLOSE

- 1) To close the backup function execution window, press the [Esc] key.  
The system will then return to the servo function selection window.

# 18. BACKUP FUNCTION

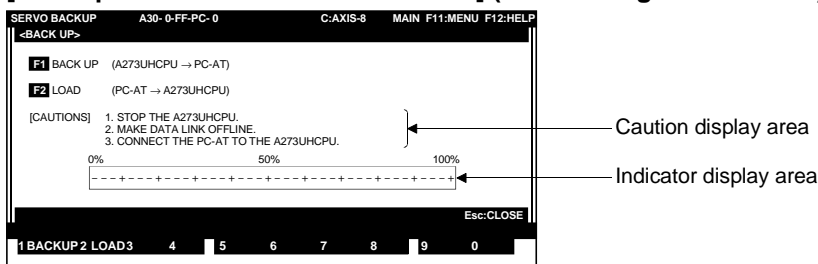
## 18.2 Loading Backup Data to the Servo System CPU

The backed-up servo system CPU data written to the computer (current system settings data, positioning data, servo program data, and mechanical system setting data written to the servo system CPU, and the servo system CPU current device information, data required for home position return, and virtual mode monitoring data) is loaded into the servo system CPU.

### [Procedure for Displaying the Backup Function Execution Window]



### [Backup Function Execution Window] (When using A273UHCPU)



#### [Display/Setting Content]

**Caution display area** Cautions relating to execution of backup/load are displayed here.

**Indicator display area** The progress of the backup/load operation is displayed here by the indicator.

#### [Key Operation]

##### Selecting load

- 1) Press the [F2] key to select load.  
The load execution YES/NO dialog box will be displayed.

##### Selecting load execution

- 1) To execute the load operation, first check the cautions to be observed when executing load, then press the [Enter] key while "YES" is highlighted.  
(If NO is highlighted, press the [←] key to move the highlight to the YES item.)
- 2) Load will be executed and the message "EXECUTING" will be displayed.
- 3) Carry out verification when the indicator has reached 100%.

##### Canceling load

- 1) To cancel the load operation, press the [→] key to highlight "NO," then press the [Enter] key.  
The system will return to the backup function execution window without executing load.

##### Window CLOSE

- 1) To close the backup function execution window, press the [Esc] key.  
The system will then return to the servo function selection window.

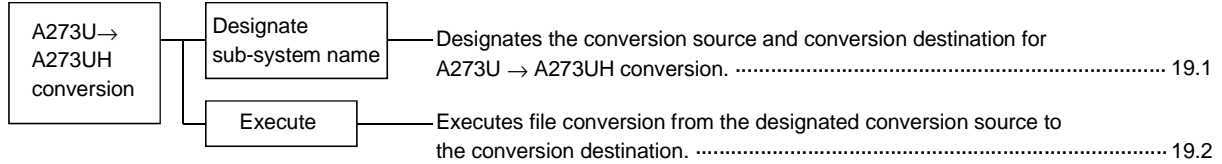
# 19. A273U → A273UH FILE CONVERSION

## 19. A273U → A273UH FILE CONVERSION

The A273U → A273UH conversion mode is a mode for converting A273UCPU files for use by A273UHCPU.

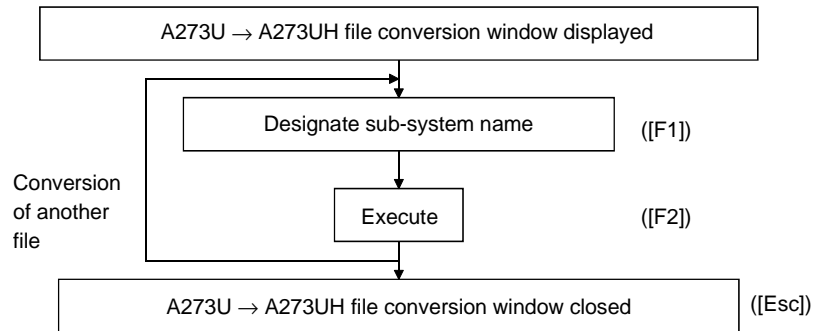
### (1) Function summary

The following functions are available with the A273U → A273UH conversion mode of the GSV22PE.



### (2) Outline flowchart

A summary of the procedure for executing A273U → A273UH file conversion is presented below.



\* The user files that are applicable for "A273U → A273UH" file conversion" and the conversion details are indicated below.

	Conversion Source File for A273U	Conversion Destination File for A273UH (8-axis specifications)	Conversion Details
PC Type	GSV.CNF	GSVP.CNF	<ul style="list-style-type: none"> <li>Converted to A273UH (8-axis specifications) PC type.</li> </ul>
System setting servo data	SVDATA.BIN	SVSYSTEM.BIN	<ul style="list-style-type: none"> <li>"System setting" data made compatible with A273UHCPU.</li> </ul>
		SVDATA.BIN	<ul style="list-style-type: none"> <li>The parameters added for A273UHCPU are set to their initial values.</li> <li>The servo parameters added for the ADU axis are set to the default. If necessary, set other values.</li> </ul>
Servo program	SVPROG.BIN	SVPROG.BIN	<ul style="list-style-type: none"> <li>Only the file size is changed. The program contents remain unchanged.</li> </ul>
File for editing mechanical program	SVEDTDA.BIN	SVEDTDA1.BIN	<ul style="list-style-type: none"> <li>Only the file name is changed. The contents of the edited file remain unchanged.</li> </ul>

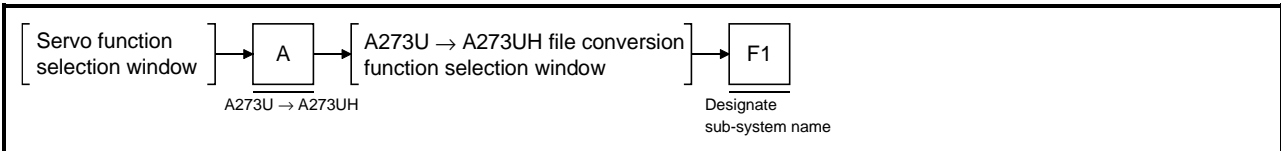
# 19. A273U → A273UH FILE CONVERSION

## 19.1 Designate Sub-System Name

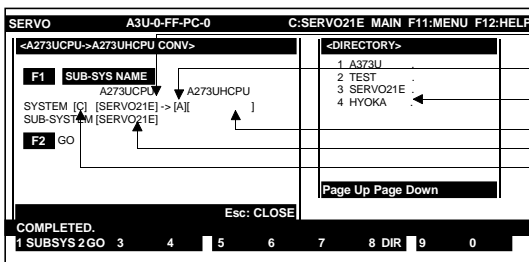
This function is used to designate the drive name, system name, and sub-system name for the conversion source, and the drive name and system name for the conversion destination.

When designating the system name or drive name for a conversion source/conversion destination, it is possible to display a list of the system names under the designated drive name or of the sub-system names under the designated system name for reference.

### [Procedure for Executing the Sub-system Name Designation Function]



### [A273U → A273UH File Conversion Function Selection Window]



- Conversion destination system name setting area
- Conversion destination drive name setting area
- Directory display area
- Conversion source drive name setting area
- Conversion source sub-system name setting area
- Conversion source system name setting area

### [Display/Setting Content]

#### Conversion destination system name setting area

The system name currently being read is displayed here. Set the conversion source system name.

#### Conversion destination drive name setting area

Set the drive name in which the A273U → A273UH converted file is to be stored here. ("A" is set as the default.)

#### Directory display area

A list of the system names under the designated drive name, or a list of sub-system names under the designated system name is displayed here.

#### Conversion source drive name setting area

Set the system name in which the A273U → A273UH converted file is to be stored here.

#### Conversion source sub-system name setting area

The sub-system name currently being read is displayed here. Set the conversion source sub-system name.

#### Conversion source system name setting area

The drive name currently being read is displayed here. Set the conversion source drive name.

### [Key Operation]

#### Setting the conversion source drive name

- 1) Set the drive name in which the file to be converted is stored. Make sure that the cursor is located at the conversion source drive name setting area, input the drive name (A, C, or D: see Section 5.1), then press the [Enter] key. (If the conversion source drive name is displayed in the conversion source drive name setting area, just press the [Enter] key.) The cursor will move to the conversion source system name setting area.

### POINT

- (1) Selecting the sub-system name designation function  
When the A273U → A273UH file conversion execution window is open, the sub-system name designation function is selected as a default. There is therefore no need to select it. To select the sub-system name function again after having quit it, press the [F1] key.

## 19. A273U → A273UH FILE CONVERSION

- 2) To view the conversion source system names that can be set, make sure that the cursor is in the conversion source drive name setting area or conversion source system name setting area, then press the [F8] key.  
A list of the system names under the set drive name will be displayed.

### Setting the conversion source system name

- 1) Set the system name in which the file to be converted is stored.  
Make sure that the cursor is located in the conversion source system name setting area, input the system name for the conversion source, then press the [Enter] key. (If the conversion source system name is displayed in the conversion source system name setting area, just press the [Enter] key.)  
The cursor will move to the conversion source sub-system name setting area.
- 2) To view the conversion source system names that can be set, make sure that the cursor is in the conversion source drive name setting area or conversion source system name setting area, then press the [F8] key.  
A list of the system names under the set drive name will be displayed.

### Setting the conversion source sub-system name

- 1) Set the sub-system name in which the file to be converted is stored.  
Make sure that the cursor is located in the conversion source sub-system name setting area, input the sub-system name for the conversion source, then press the [Enter] key. (If the conversion source sub-system name is displayed in the conversion source sub-system name setting area, just press the [Enter] key.)  
The cursor will move to the conversion source sub-system name setting area.
- 2) To view the conversion source sub-system names that can be set, make sure that the cursor is in the conversion source sub-system name setting area, then press the [F8] key.  
A list of the sub-system names under the set system name will be displayed.

### Setting the conversion destination drive name

- 1) Set the drive name in which the file to be converted is to be stored.  
Make sure that the cursor is located in the conversion destination drive name setting area, input the drive name for the conversion destination, then press the [Enter] key. (If the conversion destination drive name is displayed in the conversion destination drive name setting area, just press the [Enter] key.)  
The cursor will move to the conversion destination system name setting area.
- 2) To view the conversion destination drive names that can be set, make sure that the cursor is located in the conversion destination drive name setting area or conversion destination system name setting area, then press the [F8] key.  
A list of the system names under the set drive name will be displayed.

### Setting the conversion destination system name (quitting the sub-system name designation function)

- 1) Set the system name in which the converted file is to be stored.  
Make sure that the cursor is located in the conversion destination system name setting area, input the system name of the conversion destination, then press the [Enter] key.  
The sub-system name designation function will be quit, and the conversion execution function will be selected.

POINTS
<ol style="list-style-type: none"><li>(1) Cursor motion when selecting the sub-system name designation function With the exception of the conversion destination drive name, it is possible to return to the previous setting area by using the [↑]/[←] keys after making each setting.</li><li>(2) When setting the conversion destination drive name/system name It is not possible to set the same drive name or system name for the destination as was set for the source. If conversion is attempted with the same drive name and system name set for source and destination, the message "PC SELECTION ERROR." will be displayed and the conversion will not be executed.</li></ol>

# 19. A273U → A273UH FILE CONVERSION

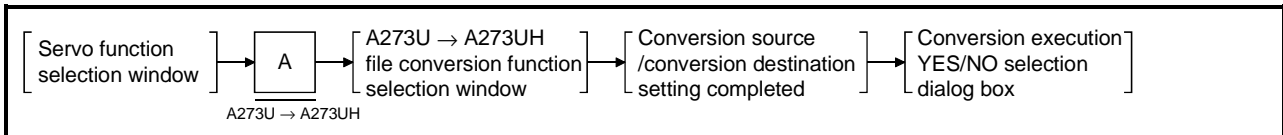
## 19.2 Executing Conversion

This is the procedure for converting the designated conversion source A273UCPU data to data for A273UHCPU use, and storing it in the conversion destination file.

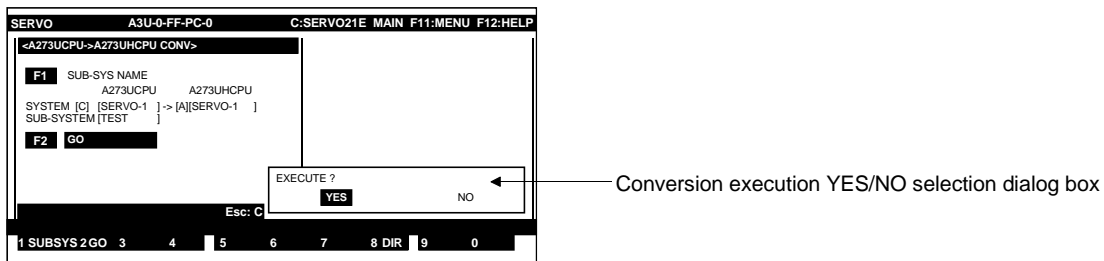
Set the conversion source/conversion destination in advance using the sub-system name designation function.

The conversion execution function cannot be selected if these settings have not been made.

### [Procedure for Displaying the Conversion Execution YES/NO Dialog Box]



### [Conversion Execution YES/NO Dialog Box]



### [Display/Setting Content]

When the conversion destination system name has been set using the sub-system name setting function, the conversion execution function is selected, and the conversion execution YES/NO dialog box is displayed.

### [Key Operation]

#### Executing conversion

- 1) To execute conversion, select "YES" and press the [Enter] key. ("YES" is set as the default.)  
The message "EXECUTING" will be displayed and file conversion will start.
- 2) When "COMPLETED" is displayed, the file converted for use with A273UH is stored under the designated conversion destination system name, under the same sub-system name as the designated conversion source system name.
- 3) If the error message "PC SELECTION ERROR" is displayed, the set conversion source file does not exist.  
In this case, change the drive name or the system name.
- 4) If the error message "FILE NOT FOUND" is displayed, the set conversion source file does not exist.  
Re-set the drive name/system name/sub-system name for the conversion source.
- 5) If the same sub-system name as the designated conversion source sub-system name exists under the designated conversion destination system name, and the same file name exists, servo program files will be overwritten: care is required.

#### Canceling conversion

- 1) To cancel conversion, press the [→] key to highlight "No", then press the [Enter] key.  
Execution will be discontinued.



## 19. A273U → A273UH FILE CONVERSION

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### **Selecting the sub-system name designation function**

- 1) To execute conversion again, press the [F1] key to select the sub-system name designation function, and set the conversion source and conversion destination.
- 2) In the same way, if an error message is displayed when conversion is executed, press the [F1] key and repeat setting of the sub-system name and other settings.

### **Quitting the A273U → A273UH file conversion function**

- 1) Press the [Esc] key. (If the directory has been displayed, press the [Esc] key twice.)  
The system will then return to the servo function selection window.

## 20. ERROR MESSAGES DURING GSV22PE OPERATION

### 20. ERROR MESSAGES DURING GSV22PE OPERATION

This section describes the error messages which can occur during GSV22PE operation, descriptions of the errors, and the appropriate corrective action. The cause of the error and the corrective action can be displayed in the troubleshooting help window by pressing the [Shift] + [F12] keys when an error message is displayed. (See Section 5.8.)

#### (1) Troubleshooting tables

Error Message	Description	Corrective Action
Amplifier discrepancy	Different copy source and copy destination amplifiers during axis data copy in servo data setting mode.	Copy between axes of the same amplifier.
Cannot print	Printer not turned on. Defective connection to printer.	Check printer connections and cables.
Install switch OFF	CPU install switch was off during installation.	Turn on the install switch.
Could not install	Installation was unsuccessful.	Install again.
An error was discovered. Max. total gears is 16.	An attempt was made to set more than 16 gears.	Set not more than 16 gears in total.
An error was discovered. An illegal module is connected. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	Incorrect module connection.	Correctly connect the modules (see 10.1(4)).
An error was discovered. Max. total clutches is 8.	An attempt was made to set more than 8 clutches (using A171SH/A171S).	Set not more than 8 clutches in total.
An error was discovered. Max. total clutches is 16.	An attempt was made to set more than 16 clutches (using A273UH (8-axis specification)).	Set not more than 16 clutches in total.
An error was discovered. Max. total clutches is 64.	An attempt was made to set more than 64 clutches (using A273UH (32-axis specification)).	Set not more than 64 clutches in total.
An error was discovered. Only one servomotor or encoder in total per page.	An attempt was made to set 2 or more main servo motors or encoders on one page.	Only one servomotor or encoder can be set on one page. Change the page to set more than one.
An error was discovered. Only 4 servomotors or encoders in total per page.	An attempt was made to set more than 4 main servo motors or encoders on one page (using A171SH/A171S).	Do not set more than 4 servomotors or encoders in total on one page.
An error was discovered. Only 8 servomotors or encoders in total per page.	An attempt was made to set more than 8 main servo motors or encoders on one page (using A172SH/A273UH (8-axis specification)).	Do not set more than 8 servomotors or encoders in total on one page.
An error was discovered. Only 32 servomotors or encoders in total per page.	An attempt was made to set more than 32 main servo motors or encoders on one page (using A273UH (32-axis specification)).	Do not set more than 32 servomotors or encoders in total on one page.
An error was discovered. External input mode cannot be selected for servomotor clutch. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	An external input mode clutch was connected to a servomotor but connection or this clutch mode to servomotors is not permitted.	Connect to the servomotor a clutch which is not an external input mode clutch.
An error was discovered. No cam data is set for an operating cam. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	No cam data exists for one of the cam numbers used in the mechanical-system cam parameters.	Set the missing cam data.

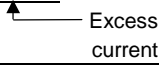
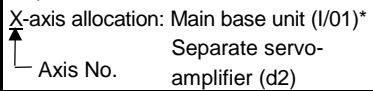
## 20. ERROR MESSAGES DURING GSV22PE OPERATION

Error Message	Description	Corrective Action
An error was discovered. Wrong control mode set for an operating cam. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	Wrong cam mode set in the mechanical-system cam parameters for one cam.	Use the same mode for all cam data for one cam.
An error was discovered. Too many main shafts (servomotors). Maximum 4 main shafts.	More than 4 main shafts were set (using A171SH/A171S).	Do not set more than 4 main shafts.
An error was discovered. Too many main shafts (servomotors). Maximum 8 main shafts.	More than 8 main shafts were set (using A172SH/A273UH (8-axis specification)).	Do not set more than 8 main shafts.
An error was discovered. Too many main shafts (servomotors). Maximum 32 main shafts.	More than 32 main shafts were set (using A273UH (32-axis specification)).	Do not set more than 32 main shafts.
An error was discovered. Max. total output modules is 4.	An attempt was made to set more than 4 output modules (using A171SH/A171S)	Set not more than 4 output modules in total.
An error was discovered. Max. total output modules is 8.	An attempt was made to set more than 8 output modules (using A172SH/A273UH (8-axis specification)).	Set not more than 8 output modules in total.
An error was discovered. Max. total output modules is 32.	An attempt was made to set more than 32 output modules (using A273UH (32-axis specification)).	Set not more than 32 output modules in total.
An error was discovered. Component not connected or illegal component connected. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	Module connection is not complete or a module has been connected which should not be connected. (Note that if the grid is enabled, the module may appear connected.)	Check the module connections.
An error was discovered. The designated amplifier is set as not used in the system settings. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	The amplifier set for an output shaft number of an output module is set as not used in the system settings.	Change the output shaft number or set the system settings to use the amplifier.
An error was discovered. Units differ from units designated in fixed parameters. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	The units designated in the servomotor setting mode for an amplifier set for an output shaft number of an output module differ from the units of the output module.	Set the output module units the same as the amplifier units.
An error was discovered. Clutches connected to a single encoder are set to the external input mode and another mode. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	An external input clutch and another mode clutch were connected to an encoder.	If an external input mode clutch is used with an encoder, do not connect another mode clutch to the same encoder.
An error was discovered. The ON/OFF devices are not the same for external input clutches connected to a single encoder. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	If multiple external input clutches are connected to a single encoder, the ON/OFF devices must be the same.	Set the ON/OFF devices the same if multiple external input clutches are connected to a single encoder.
An error was discovered. The same device is set in more than one place. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	The same device was set in more than one place. (This does not apply to external input clutches ON/OFF devices.)	Change the devices.
An error was discovered. No parameters set for a component. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	No parameters are set for a module.	Set the parameters.

## 20. ERROR MESSAGES DURING GSV22PE OPERATION

Error Message	Description	Corrective Action
An error was discovered. Too many modules connected in block. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	Too many modules are connected in a block.	Check the connected modules (see 10.1(4)).
An error was discovered. Too many auxiliary shafts. Maximum 4 auxiliary shafts.	More than 4 auxiliary shafts were set (using A171SH/A171S).	Do not set more than 4 auxiliary shafts.
An error was discovered. Too many auxiliary shafts. Maximum 8 auxiliary shafts.	More than 8 auxiliary shafts were set (using A172SH/A273UH (8-axis specification)).	Do not set more than 8 auxiliary shafts.
An error was discovered. Too many auxiliary shafts. Maximum 32 auxiliary shafts.	More than 32 auxiliary shafts were set (using A273UH (32-axis specification)).	Do not set more than 32 auxiliary shafts.
An error was discovered. No utilization source available when utilizing a servomotor or encoder. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	No utilization source available when using the parameters of an auxiliary shaft input servomotor or encoder as the motor for another main shaft or auxiliary shaft.	Stop utilization from elsewhere or set a utilization source.
Operating system not installed	Operating system is not installed in the servo system CPU.	Use the install functions to install and verify the operating system.
Operating system discrepancy	The model name or version of the operating system installed in the servo system CPU did not match the operating system it was compared with.	Conduct verification between operating systems with the same model and version.
File does not exist	The designated file is not available.	Check the file name.
Program does not exist	The designated program does not exist. The [F7] key was pressed to display the previous program number while program #0 was displayed. The [F8] key was pressed to display the next program number while program #4095 was displayed.	Check the program number.
A write error occurred	Data could not be written to the program memory in the servo PC.	Faulty E <sup>2</sup> ROM Replace the E <sup>2</sup> ROM
Cannot execute in virtual mode.	An attempt was made to run the servo test in the virtual mode. (Servo monitoring can be run.)	Select the real mode and run the test again.
Failed to create cam data.	Could not link to cam data file.	Check that free space exists on the hard disk and that the cam data file is normal.
Incorrect indirect device setting	An inappropriate device was set as the indirect device in the servo program.	Correctly set the indirect device.
Incorrect sub-system name	An attempt was made to copy files using the same drive and sub-system name.	Change the copy destination sub-system name.
	Sub-system name is incorrect.	Set a correct sub-system name.
Sub-system name XXXXXXXX does not exist	The designated sub-system name XXXXXXXX is not set.	Set sub-system name XXXXXXXX.
No control power supply module set at main base unit	No control power supply module was set at the main base during system set-up.	Set a control power supply module for the main base unit in system set-up.
No battery unit (MR-JBAT-[ ]) set at the main base unit	When an ABS servomotor or ABS synchronous encoder was set during system set-up, no battery unit was set at the main base.	Set a battery unit when ABS servomotors or ABS synchronous encoders are used.
Cannot set present values	An attempt was made to set a present value in some position which is not a positioning address.	Set the present value for a positioning address.
Cannot place here. Select a new position or cancel with right button.	During mechanical-system editing, an attempt was made to place a component where another component already exists.	Make sure no other component exists where the component is placed.

## 20. ERROR MESSAGES DURING GSV22PE OPERATION

Error Message	Description	Corrective Action
Cannot place here. Select a new position.	During mechanical-system editing, an attempt was made to place multiple components where another component already exists.	Place in a position where no other component exists.
Amplifier number is already used.	The output shaft number set for use by an output module is already used by another output module.	Change the output shaft number.
Virtual axis number is already used.	The virtual axis number set for use by a servomotor or encoder is already in use.	Change the shaft number.
No parameter settings required for this component.	An attempt was made to set parameters for a component which does not need parameters settings.	Do not set parameters.
Component not in editing screen.	A component which is not entirely contained in the editing screen was clicked.	Move the screen until the component is displayed inside it and try again.
Detailed monitor not available for this component.	An attempt was made to use detailed monitoring for a component on which it cannot be used.	Use detailed monitoring on a different component.
No servo power supply module set	No control power supply module unit was set at the main base unit during system set-up.	Use a servo power supply module when using the ADU.
No external regenerative resistor set for servo power supply module	No external regenerative resistor was set for the servo power supply MODULE during system set-up.	Set an external regenerative resistor for the servo power supply module.
Cannot change servo parameters	When an attempt was made to change the servo parameters for the servo system CPU, the servo system CPU status did not allow changes (in-position signal: ON).	Turn the in-position signal ON to set the servo system CPU to the status in which changes are possible and change the servo system parameters.
Total servomotor rated current exceeds the servo power supply module capacity by <u>XXXX A.</u> 	The total of the rated currents of the servomotors connected to the ADU exceeded the servo power supply module capacity at system set-up.	Connect servomotors within the capacity of the servomotor power supply module.
Servo Ready is OFF. Cannot run.	During servo test, a start command was issued to an axis with the Servo Ready signal OFF. When the servo monitor torque trace was started, Servo READY was OFF for the axis.	Turn ON the Servo READY signal before issuing the start command. Turn ON the Servo Ready signal to start monitoring with the torque trace.
Servo Ready is ON. Cannot run.	An attempt was made to write data in the servo PC mode while the Servo Ready signal was ON.	Turn OFF the Servo Ready signal before writing data.
Cannot delete	When deleting a servo program, the [F3] key or [Shift] + [F2] keys were pressed with the cursor at a required item position.	Check the item before deleting it.
Item already set	When editing a servo program, the designated additional setting item has already been set.	Duplicate settings of the same item are not permitted.
Duplicated axis number. 	An axis number was duplicated during system set-up.	Check the axis numbers.
Axis number not set	No axis number set for any axis during system set-up.	An axis number must be set for at least one axis.
Axis number out-of-range	The designated axis number is out-of-range. Or, the same axis number is already set.	Check the set axis numbers.
Total PC I/O module I/O points exceeds 256	The total number of PC I/O unit I/O points exceeded 256 at system set-up.	Set the data within the setting ranges.
Duplicata PC I/O module I/O numbers <u>Main base (I/00)/motion expansion base (I/07)*</u>	PC I/O Unit I/O numbers were duplicated at system set-up.	Check the I/O numbers.
PC Ready (M2000) is ON. Cannot run.	An attempt was made to write data in the servo PC mode while the PC Ready signal (M2000) was ON.	Turn OFF the PC Ready signal (M2000) before writing data.

## 20. ERROR MESSAGES DURING GSV22PE OPERATION

Error Message	Description	Corrective Action
Incorrect execution position	A function was executed in an inappropriate position.	Execute the function in an appropriate position.
No system settings set	The servo data setting mode was selected before data was set in the system setting mode. Or, an error occurred during the system setting relative check.	Set the system settings before setting the servo data settings. Or run the relative check after setting the system settings and check that no error occurs.
Incorrect setting range	Copy source range set with the start number greater than the end number.	Designate the correct range.
	The designated setting is outside the applicable range.	
Duplicated START axes	During servo programming, start axes are duplicated in the programs (K0 to K4095) set for the simultaneous start (START) instruction. Interpolation controls start axes duplicated.	Check the start axes.
Cannot execute during operation	During servo test, a start command was issued to a moving axis.	Stop the axis and repeat.
Cannot start: XX ↑ Error code	For details, see Table (b) in the section "Error Codes Displayed When Axis Does Not Start."	
No end-point instruction	No end instruction for the servo programming speed-switching instruction (VSTART).	Set the end instruction.
Multiple end-point instructions	Multiple end-point instructions used for the servo programming speed-switching instruction (VSTART).	Check the end instructions.
Incorrect end-point instruction position	The end instruction (ABS-1 to ABS-3, INC-1 to INC-3) is not set in the correct position for a servo programming speed-switching instruction (VSTART). Or, no end instruction exists.	Place the end instruction after the speed-switching instruction. Or, check the end instruction.
Upper stroke limit/lower stroke limit relative check error	The upper stroke limit was set less than the lower stroke limit in the ballscrew parameters.	Set the upper stroke limit equal or greater than the lower stroke limit.
Stroke limit range violation	During servo programming, the positioning address (end address for circular interpolation) for an absolute data method instruction (ABS [ ]) was outside the range between the fixed parameter stroke upper and lower limits.	Set the address inside the stroke limit range.
All axes unused. Stopping printing.	Printing was attempted although no data was set during system set-up.	Set up the system before printing out the axis data.
Connected PC different from set PC	An attempt was made to read, write, verify, or install data when the connected CPU was not the servo system CPU.	Connect the servo system CPU.
Setting out-of-range	The designated setting is outside the applicable range.	Set the data within the setting ranges.
Capacity of set battery unit too small	The capacity of the currently set battery pack is insufficient for the total number of ABS servo motors and ABS synchronization encoders during system set-up.	Check the capacity of the battery pack against the ABS servomotors.
Incorrect setting data	Data was set out-of-range.	Set the data within the setting ranges.
Cannot set	An attempt was made to set data which cannot be set.	Check whether or not the data item requires setting.
Setting not required	An attempt was made to set a parameter which does not require setting.	Cannot set
Cannot select	An attempt was made to select an item which cannot be selected.	Select the correct item.
Sorting required	When setting the limit switch for servo data setting, an attempt was made to execute the ON/OFF setting before the point addresses were sorted.	Sort the point address before running the ON/OFF point setting.

## 20. ERROR MESSAGES DURING GSV22PE OPERATION

Error Message	Description	Corrective Action
Servo external signal module (A278LX) required to use dynamic brake module (A240DY)	A dynamic brake module (A240DY) was set in the system settings, but no servo external signal module (A278LX) was set (A273UHCPU only).	Always set a servo external signal module (A278LX) when using a dynamic brake module (A240DY).
Press correct key	An invalid key was pressed.	Press correct key
Units discrepancy	Servo program control units do not match the axis units.	Modify the servo program additional items "Units" and "P.B." such that the servo program control units match for at least one axis.
Communications error! Cannot continue.	Communications could not be started when the mechanical monitor mode was started-up.	Check the cables and connections.
Detailed monitor not possible due to communications error. Cannot continue.	An error occurred when an attempt was made to run the communications monitor.	Check the cables and connections.
No data	GSV22PE incorrectly installed. An attempt was made to print before printed data was set in the servo printer mode.	Correctly install the GSV22PE. Set the printed data before printing.
Data error	Back-up data is abnormal and cannot be loaded.	Back-up the data again.
Data discrepancy	Data discrepancy during servo file verification.	Check the servo data and servo program data.
Cannot cancel test mode	An attempt was made to cancel the test mode after axis operation started.	Stop the axis before canceling the test mode.
Device number out-of-range	When a servo program was read, a device number was designated outside the ranges: D0 to D1023/D8191 and W0000 to W3FF/W1FFF. When reading a program with the servo on-line, an attempt was made to read a non-existent servo program.	Set the correct device number. Designated servo program does not exist.
Drive error	Abnormal hard disk drive.	Check the hard disk. (This error should not normally occur.)
Drive not ready	No hard disk or floppy disk drive.	Check the hard disk or floppy disk drive. (This error should not normally occur.)
Cannot run torque trace	During servo monitoring, the torque trace could not be run because of a trace from a peripheral device.	Run the torque trace after the other trace is complete.
Input out-of-range	The input value exceeded the limit range.	Check the limit range and repeat the input.
Incorrect input order	The Page key was pressed before the servo program data was read.	Read the servo program data before pressing the Page key.
Incorrect parameter setting.	Parameter setting was ended although no parameters were set.	Set parameters or cancel the setting operation.
No component	No component existed when a connection check or conversion write was attempted.	Set one or more components before running the connection check or conversion write.
Cannot open file	A file could not be opened when writing the file.	Check the free space on the hard disk.
Incorrect component data	A conversion error occurred during a conversion write.	Check the component data.
Incorrect component connection. A component is not completely connected or an illegal component is connected. Component where error occurred is shown in the frame. (Click mouse button to hide frame.)	Incorrect or incomplete component connection during mechanical-system editing.	Check and correct component connections.
Printer not ready	Cannot print because the printer is not ready.	Set up the printer.
Wrong program mode	During servo programming, both real-mode and virtual-mode programs are designated for the simultaneous start (START) instruction.	Designate either real-mode or virtual-mode programs for the simultaneous start (START) instruction.
Program number out-of-range	A program number was out of the range 0 to 4095 for the simultaneous start (START) instruction.	Correctly set the program number.

## 20. ERROR MESSAGES DURING GSV22PE OPERATION

Error Message	Description	Corrective Action
Incorrect syntax: NO. = XXX ↑ Program No.	Syntax error, e.g. for use of repeat instructions, in servo programming.	Correct the program.
No component to paste	No data existed in the cut buffer when an attempt was made to paste during mechanical-system editing.	Store the data to paste in the cut buffer.
No edit file	When an attempt was made to read a mechanical system edit file but no file existed.	Cannot read because no file exists.
Axis not used	An axis which is not used was designated in the system settings.	An axis with no amplifier cannot be selected. The amplifier power was turned off during servo monitoring or test operation. Turn on the amplifier power supply.
Instruction code error	A set instruction code was not a normal instruction code and could not be deciphered during servo programming.	Set the correct instruction code.
	A servo program read from the servo system CPU contained an illegal instruction during the servo test.	Correct the servo program and rewrite it to the servo system CPU.
Incorrect instruction input form	An error was found in a set item during the servo program check.	Correctly set the item.
No mechanical system set. Cannot continue.	An attempt was made to read the mechanical system data when the mechanical-system monitor mode was started up, but no data was set.	Create mechanical system edit data in the mechanical system editing mode and run conversion write.
Not mechanical system data	An error exists in the file SVEDTDAT.BIN.	This SVEDTDAT.BIN file cannot be used.
Not mechanical system file	The file designated to read or delete during mechanical system editing is not a mechanical system file.	Check, and set a correct file name.
Wrong memory cassette	When writing cam data with a servo PC, no block existed in the memory cassette after extension R, Block 10. Or, the memory cassette was too small to write the cam data.	Replace with a large-capacity memory cassette with blocks after extension R, Block 10.
Check the memory cassette	Data could not be written to the servo system CPU memory when writing data to the servo system CPU. Or, abnormal E <sup>2</sup> ROM.	Defective E <sup>2</sup> ROM. Replace.
Insufficient memory. Cannot continue.	Monitoring not possible due to insufficient memory when the mechanical system monitor mode was started up.	Shut down GSV22PE, then re-start. (This error should not normally appear.)
Insufficient memory. Cannot add components.	Cannot add new component in the mechanical system editing mode due to insufficient heap area.	Delete unwanted components.
Insufficient memory to renumber in this mode.	Renumbering was not possible due to insufficient memory.	Delete unwanted components.
Insufficient memory for check.	Checking was not possible due to insufficient memory.	Delete unwanted components.
File read failed due to insufficient memory.	The file could not be read due to insufficient memory.	Shut down GSV22PE, then re-start. (This error should not normally appear.)
Insufficient memory to add, cut copy, or paste components.	Components could not be added, cut, copied, or pasted due to insufficient memory.	Delete unwanted components.
Insufficient memory for editing. Cannot continue.	Mechanical system data could not be edited due to insufficient memory.	Shut down GSV22PE, then re-start. (This error should not normally appear.)
Disk full. Cannot write.	Cannot write to the disk because it is full.	Replace the disk.
List handling error	An error occurred during a mechanical system list structure operation.	This error does not occur during normal operation. If it occurs, immediately stop GSV22PE operation, re-start the system, and correct the editing.
Write protect switch ON. Cannot write.	An attempt was made to write to a write-protected floppy disk.	Set the switch to enable writing to the floppy disk.



## 20. ERROR MESSAGES DURING GSV22PE OPERATION

Error Message	Description	Corrective Action
Press Enter key when Drive A is ready.	The disk was not ready to read or write a file.	Insert a floppy disk into Drive A and press the [Enter] key.
CPU not in virtual mode. Cannot continue.	The servo system CPU is not in virtual mode.	Set the servo system CPU in virtual mode.
Cannot connect <u>HA-LH52*</u> to <u>A221 AM (main base I/03)</u> .	During system set-up, the wrong motor type was connected to an amplifier. (For A273UHCPU only)	Check the amplifier and motor types.
No END command	No End instruction (CPEND, VEND) with constant-speed or speed-switching control.	Set the END instruction.
Incorrect END instruction position	Instruction exists after the END instruction (CPEND, VEND).	Delete any instructions after the END instruction.
Incorrect FOR-NEXT instruction	Incorrect use of repeat instructions (FOR-ON, FOR-OFF, FOR-TIMES, NEXT) for constant-speed or speed-switching control. Instructions are nested or only one exists.	Correctly set the repeat instructions.
ABS motor cannot be used with <u>MR-H100B-S70 (separate servo amplifier d1)</u>	A motor that cannot be connected to MR-H[ ]B-S70 by the system setting is connected.	An ABS motor cannot be connected MR-H[ ]B-S70 (full-closed system amplifier). Check the motor and amplifier types.
No PC communications	An error occurred in communications with the servo system CPU.	Check the servo system CPU connections and cables.
	Data reading, writing, or verification was attempted with no servo system CPU connected.	
	Defective connection to servo system CPU.	
	Monitor data cannot be correctly read.	Key in again and retry. Unit defective if error occurs again. Module defective if error occurs again.
	A time-over error occurred during the servo test.	Check that the servo system CPU is operating correctly.
PC running. Cannot write.	The servo system PC was running when writing was attempted with the servo PC. Back-up was executed while the servo system CPU was running.	Stop the servo system CPU, then write.
START instruction designated	During servo programming, a START instruction was designated in the programs (K0 to K4095) set for the simultaneous start (START) instruction.	Set program numbers for simultaneous start which do not contain a START instruction.

\*: Underlined display messages differ according to the settings.

## 20. ERROR MESSAGES DURING GSV22PE OPERATION

### (2) Error codes displayed when axis does not start

Error Code	Description	Corrective Action
1	Cannot start because the servo error detected signal is ON.	Eliminate the cause of the servo error, and start the operation again.
2	Cannot start because the in-position signal is OFF.	Move the motor inside its designated movement range and start the operation again.
3 *1	Cannot start because the external FLS signal is OFF.	Start the operation again after the external FLS signal turns ON.
4 *1	Cannot start because the external RLS signal is OFF.	Start the operation again after the external RLS signal turns ON.
5 *1	Cannot start because the external STOP signal is ON.	Start the operation again after the external STOP signal turns OFF.
6	Cannot start because the servo ready signal is OFF.	Start the operation again after the servo ready signal turns ON.
7	Cannot start because no MR-H-B/MR-J-B or ADU is mounted.	Amplifier is not turned on or an unused axis is set. Turn on the amplifier and check which axis is set.
8	Cannot start because fixed parameter upper or lower limits are exceeded.	Set the data such that the upper or lower limits are not exceeded and start the operation again.
9	An attempt was made to use the dog or count method of home position return with no A278LX present.	Home position return is not possible.
10	Cannot start because the start accept signal is ON.	Start the operation again after the motor stops.
11	Cannot start because the test mode signal (M9075) is OFF.	Re-enter the test mode, and start the operation again after the test mode signal (M9075) turns ON.
12	Cannot start because the test mode request error signal (M9078) is ON.	Eliminate the cause of the test mode request error, and start the operation again.
13	Cannot start because a torque trace is being executed.	Start the operation again after the torque trace stops.
14 *2	A forward jog operation was attempted using the teaching functions before the following signal conditions had been met: STOP = OFF, FLS = ON, servo error = OFF, servo ready = ON.	Start the operation again after all the signal conditions have been met.
15 *3	A reverse jog operation was attempted using the teaching functions before the following signal conditions had been met: STOP = OFF, RLS = ON, servo error = OFF, servo ready = ON.	Start the operation again after all the signal conditions have been met.
16	Jog operation or manual pulse generator operation was attempted using the teaching functions, but operation cannot start because no axis is designated.	Start the operation again after designating an axis.

\*1 :Error occurs only if A278LX is used.

\*2 :FLS and STOP are checked only if A278LX is used.

\*3 :RLS and STOP are checked only if A278LX is used.

# **CAM DATA SETTING**

## 21. STARTING-UP AND ENDING CAMPE

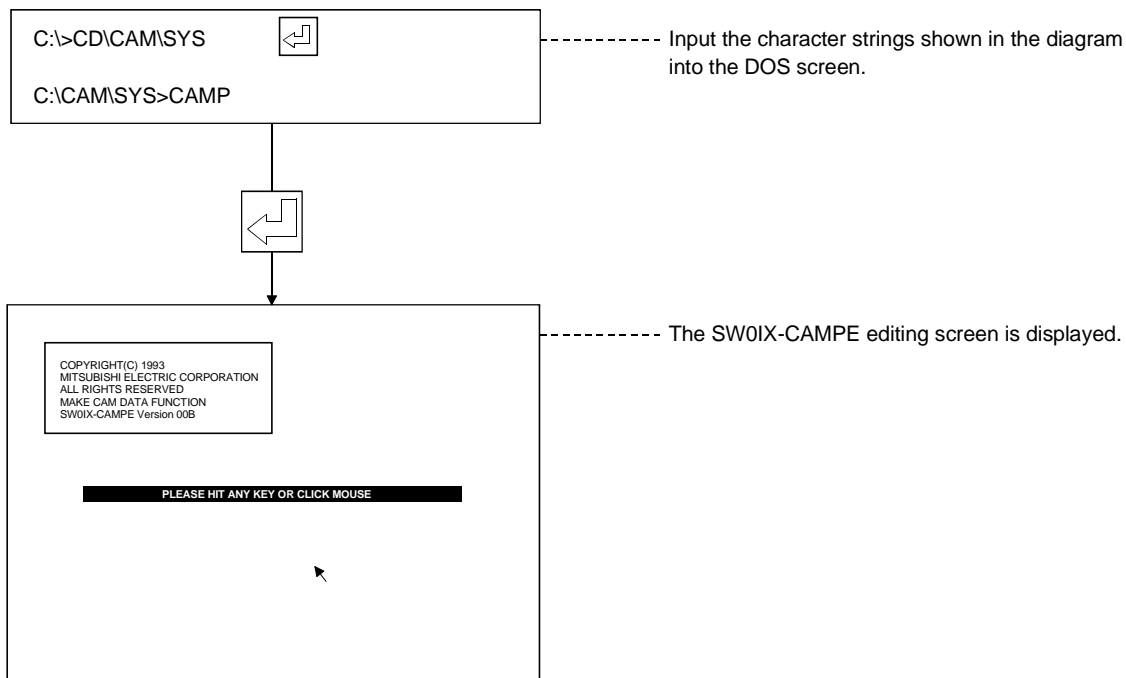
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### 21. STARTING-UP AND ENDING CAMPE

#### 21.1 Start-Up Procedure

The procedure for starting up CAMPE registered in the computer and displaying the editing screen is described below.

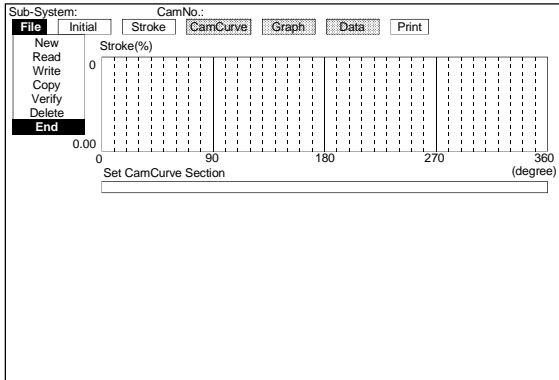
##### 21.1.1 Starting up using IBM PC



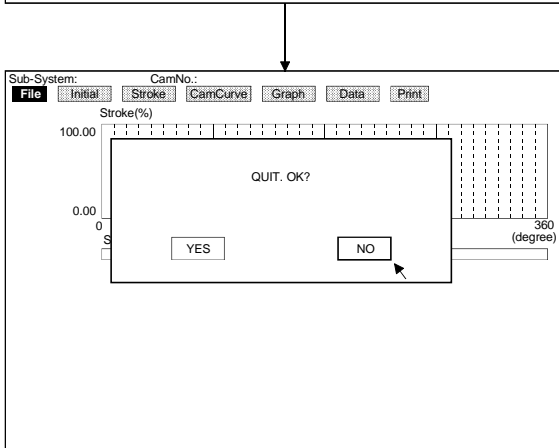
# 21. STARTING-UP AND ENDING CAMPE

## 21.2 Ending CAMPE Operation

The procedure for ending CAMPE operation and reverting to the DOS screen is described below.



Select "End" from the File menu.  
Write created data to a file using "Write" from the File menu.  
If "End" is selected without saving the data to file, a window is displayed to confirm whether the forced end is required.

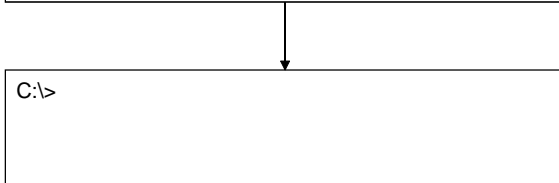


End confirmation window is displayed.

- Select "Yes" to end CAMPE operation.
- Select "No" to revert to the editing screen.

If the forced end confirmation window is displayed

- Select "Yes" to end CAMPE operation without writing the created data to file.
- Select "No" to revert to the editing screen.



The DOS screen will be displayed.

## 22. CREATING CAM DATA

### 22. CREATING CAM DATA

Cam data is created to form mechanical systems using cams.

The cam data can be displayed using characteristic-value graphs or data lists, and file editing is possible.

#### (1) Function summary

The following functions are available to create CAMPE cam data.

Cam Data	Cam Data Create	Creates the data for one cam cycle (1 revolution) .....	22.1
	Initial setting .....	Initial settings of the created cam data. ....	22.1.1
	Stroke setting .....	Set stroke data (start angle, end angle, stroke ratio, etc.) and create stroke curves. ....	22.1.2
	Cam curve selection .....	Allocates cam curves to stroke curves created with the stroke settings. ....	22.1.3
	Graph Display	Displays characteristic-value graphs of the set cam data. ....	22.2
	All graphs .....	Displays stroke-ratio graph, speed graph, acceleration graph, and rate of acceleration change graph together. ....	22.2.1
	Comparative graph .....	Displays the stroke-ratio graph with the speed graph, acceleration graph, or rate of acceleration change graph. ....	22.2.2
	Individual graph .....	Displays the stroke-ratio graph, speed graph, acceleration graph, or rate of acceleration change graph. ....	22.2.3
	Data Display	Lists the cam data calculation results. ....	22.3
	File	File operations and ending CAMPE operation. ....	22.4
	New setting .....	Clears edited cam data for new data to be created. ....	22.4.1
	Read .....	Reads cam data from the hard disk. ....	22.4.2
	Write .....	Writes created cam data to the hard disk. ....	22.4.3
	Copy .....	Copies or backs-up cam data from hard disk to floppy disk, copies or backs-up cam data from floppy disk to hard disk. ....	22.4.4
	Verify .....	Verifies the cam data in the hard disk against the cam data in internal memory. ....	22.4.5
	Delete .....	Deletes cam data from the hard disk. ....	22.4.6
	End .....	Ends CAMPE operation. ....	21.2

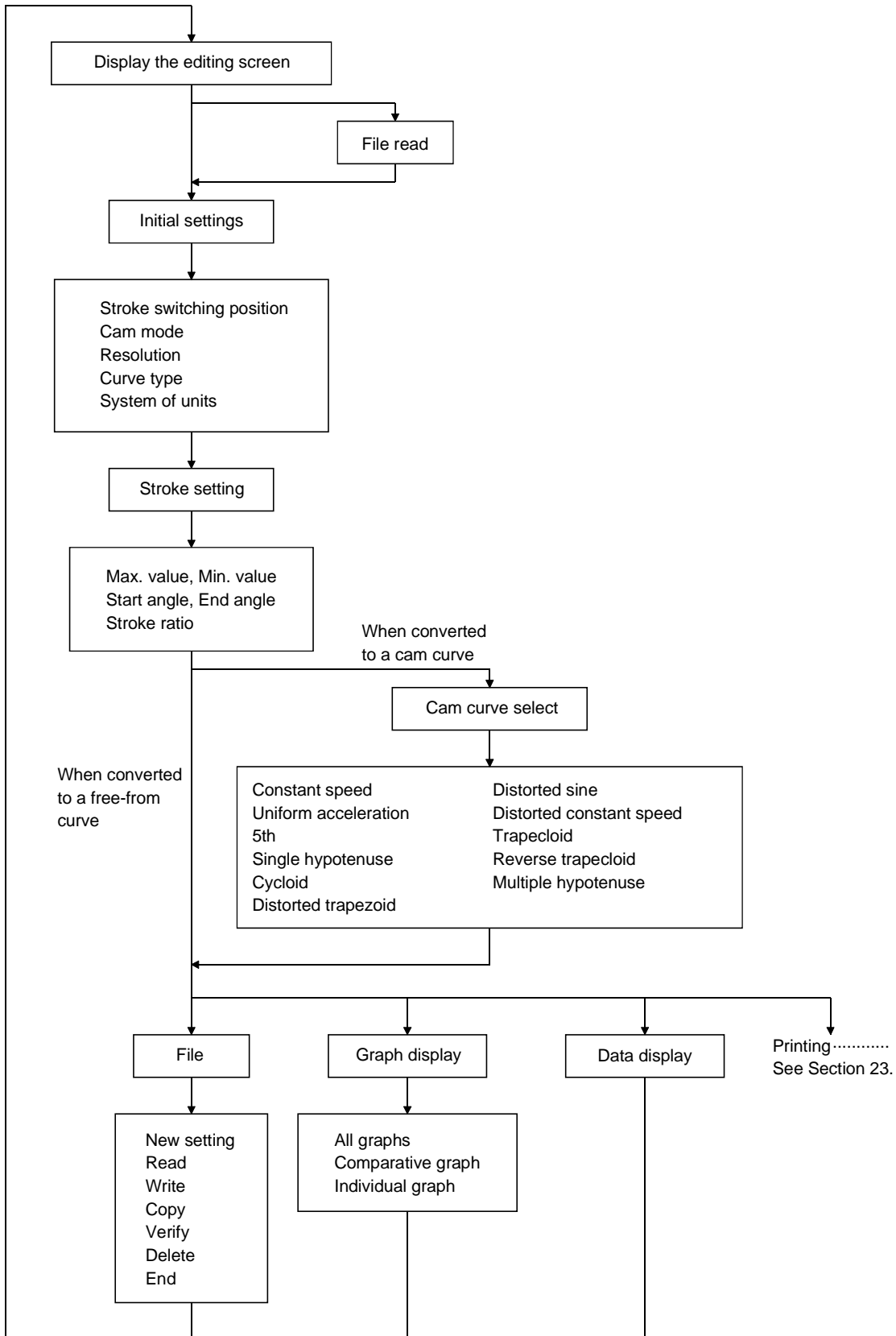
#### POINT

- (1) Cam data must be created if cam is set as the output module in the mechanical system mode.

## 22. CREATING CAM DATA

### (2) Outline flowchart

The outline flowchart for creating cam data is shown below.



## 22. CREATING CAM DATA

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(3) Cautions when selecting menus

Some menu items cannot be selected under certain conditions, as shown below.

(a) No stroke data is set

- 1) Cam curve select
- 2) Graph display
- 3) Data display
- 4) Cam data printing

(b) If the cam type is set to cam curve during initial settings and stroke data is created but has not been allocated as cam data

- 1) Graph display
- 2) Data display
- 3) Cam data printing

(c) If the cam type is set to free-form curve during initial settings

- 1) Cam curve select



## 22. CREATING CAM DATA

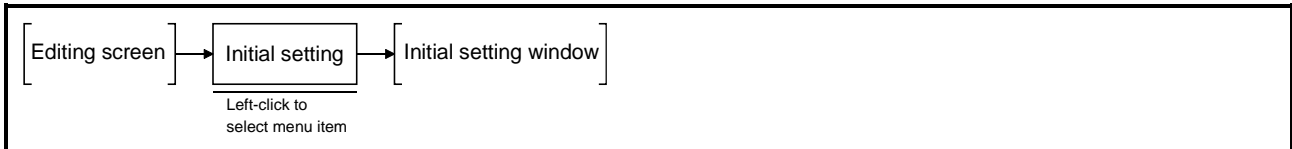
### 22.1 Creating Cam Data

Creates the stroke data for one cam cycle (1 revolution) and converts the set stroke data to a free-form curve or cam curve.

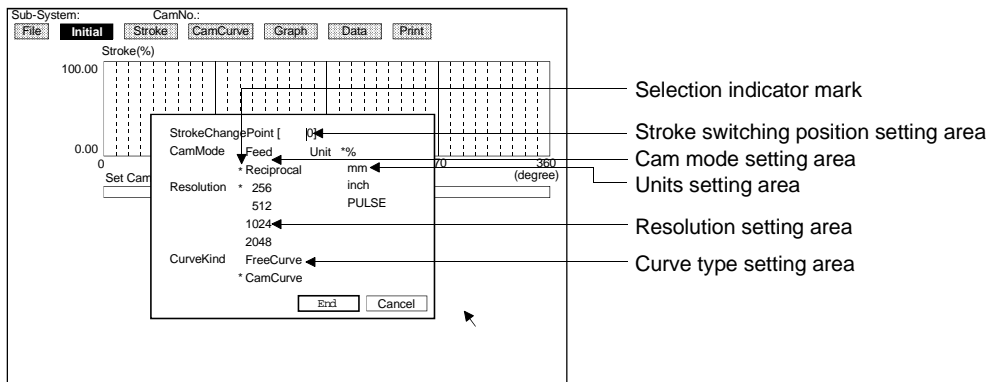
#### 22.1.1 Initial settings

Makes the initial settings for the set stroke data.

#### [Procedure for Displaying the Initial Setting Window Editing Screen]



#### [Initial Setting Window]



#### [Display/Setting Content]

- Stroke switching position setting area** Sets the position (point) where the stroke is switched.
- Cam mode setting area** Sets the cam operating mode.
- Resolution setting area** Set the resolution (number of points) for one cycle.
- Curve type setting area** Sets the curve type of the stroke data.
- Units setting area** Sets the units used for the stroke.
- Selection indicator mark** Displays items which have been set.

#### [Mouse Operation Procedure]

- Setting stroke switching position** 1) Use the numeric keys to input the stroke switching position between 0 and (resolution - 1). To input another value after other items have been set, left-click in the stroke switching position setting area to allow numbers to be input there.
- Setting items** 1) To set the cam mode, resolution, curve type, and units, left-click in the required setting value. The selection indicator mark is displayed next to the selected value.
- Setting END** 1) Left-click "End". The settings are entered and the display reverts to the editing screen.

## 22. CREATING CAM DATA

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### Setting ABORT

1) Left-click "Cancel" to abort the settings.

A YES/NO dialog box prompts whether to abort the settings. Left-click "YES" to abort the settings. The settings previously made are ignored and the display reverts to the editing screen.

Left-click "NO" to continue the settings and revert to the initial settings window.

POINTS
(1) Units are from millimeters to inches and from inches to millimeters using 1 inch = 25.4 mm.
(2) After stroke settings are complete, if this curve type is changed from cam curve to free-form curve in the initial settings, it is converted to free-form curve data after initial settings are complete.

## 22. CREATING CAM DATA

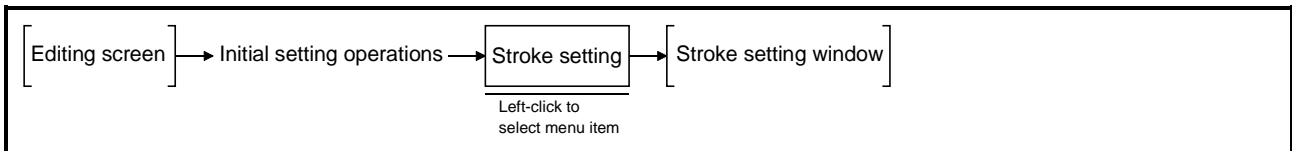
### 22.1.2 Stroke settings

Sets stroke data (start angle, end angle, stroke ratio, etc.), creates stroke curves, and converts stroke curves to free-form curves.

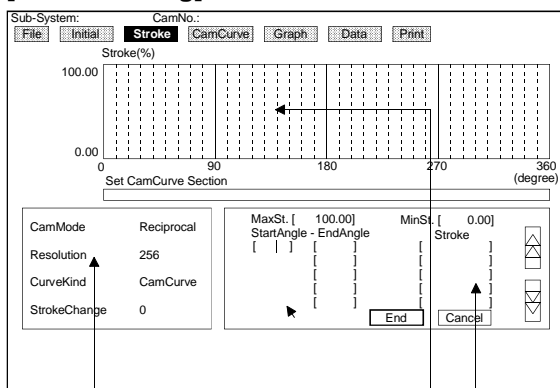
#### (1) Setting stroke conditions

The operation to set stroke data is described below.

#### [Procedure for Displaying the Stroke Setting Window]



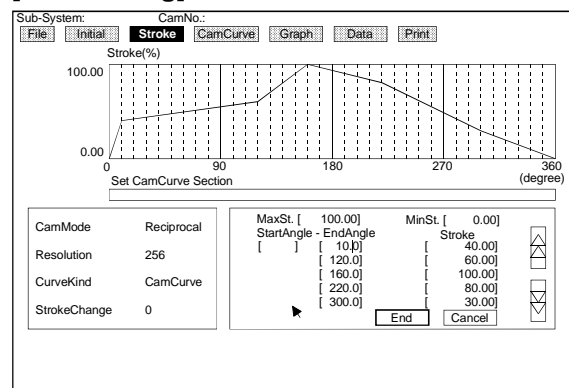
#### [Before setting]



Initial setting display area

Stroke data setting area  
Stroke curve display area

#### [After setting]



#### [Display/Setting Content]

**Initial setting display area** Displays the settings made in the initial settings.

**Stroke data setting area** Sets the stroke data (start angle, end angle, stroke ratio).

**Stroke curve display area** Displays the set stroke data.

#### [Mouse Operation Procedure]

**Setting maximum and minimum values**

- 1) Enter the maximum value with the numeric keys and left-click on the minimum value setting area. The maximum value displayed in the stroke curve display area changes and the cursor moves to the minimum value setting area.
- 2) Enter the minimum value with the numeric keys and left-click on the start angle setting area. The minimum value displayed in the stroke curve display area changes and the cursor moves to the start angle setting area.

**Setting the start angle**

- 1) Enter the start angle value with the numeric keys and left-click on the end angle setting area. The cursor moves to the end angle setting area.

**Setting the end angle**

- 1) Enter the end angle value with the numeric keys and left-click on the stroke ratio setting area. The cursor moves to the stroke ratio setting area. (If 360 degrees is entered, the display shows 0 degrees.)

## 22. CREATING CAM DATA

### Setting the stroke ratio

- 1) Enter the stroke ratio with the numeric keys. The graph is displayed in the stroke curve display area.  
Left-click on the next end angle setting area and continue entering the remaining stroke data.

### Setting END

- 1) Left-click "End".  
If cam curve was selected in the initial settings, the display reverts to the editing screen.  
If free-form curve was selected in the initial settings, a dialog box prompts whether to convert to a free-form curve

### Converting stroke curve to free-form curve

- 1) Left-click "CONFIRM" to convert the stroke curve to a free-form curve. When conversion to a free-form curve is complete, a dialog box appears showing the maximum and minimum values of the stroke.  
Check the displayed settings and left-click "CONFIRM."  
The display reverts to the editing screen.

### Automatic setting of unset zones

- 1) When settings are complete, a window is displayed to automatically set unset areas if a 360-degree end angle (viewed from the start angle) and stroke ratio have not been set.  
Left-click "YES" to automatically set the end angle data. The display reverts to the editing screen after the automatic setting is complete.  
Left-click "NO" to cancel automatic setting of the end angle data. The data is not set and the display reverts to the editing screen.

#### (2) Stroke data setting ranges

The ranges for each stroke condition setting item are shown in the table below.

Stroke condition	Setting Range
Stroke max. value	% 100.00 (fixed)
	mm stroke min. value < x ≤ 214747364.7
	inch stroke min. value < x ≤ 21474.83647
	PULSE stroke min. value < x ≤ 2147483647
Stroke min. value	% 0.00 (fixed)
	mm -214748364.8 ≤ x < stroke max. value
	inch -21474.83648 ≤ x < stroke max. value
	PULSE -2147483648 ≤ x < stroke max. value
Start angle	0 ≤ x ≤ 360 (°) The stroke ratio at the start angle is set at "0".
End angle	0 ≤ x ≤ 360 (°)
Stroke ratio	0 ≤ x ≤ 100 (%)

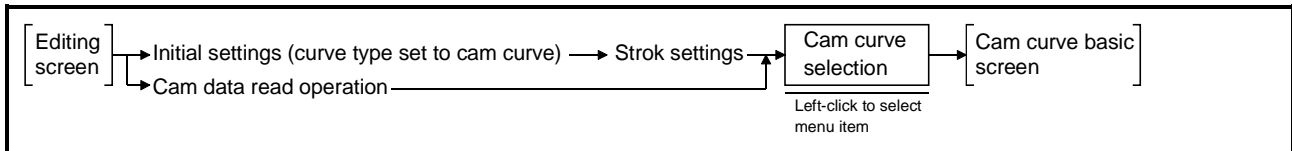
## 22. CREATING CAM DATA

### 22.1.3 Cam curve selection

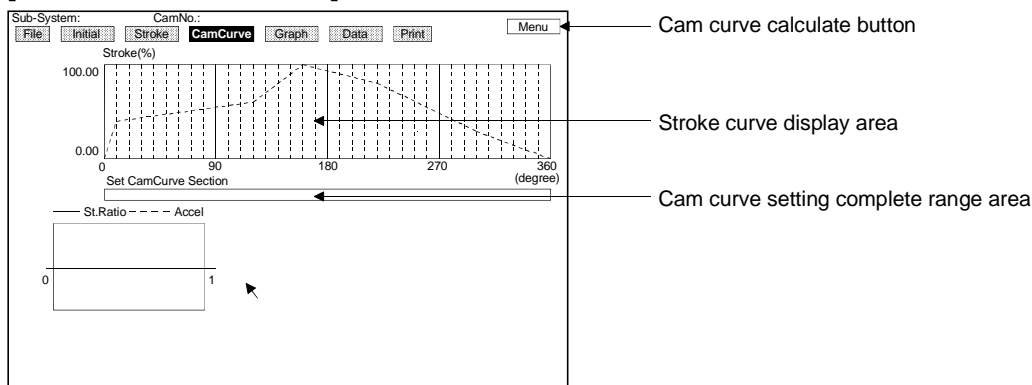
Allocates cam curves to the stroke curves.

(1) Cam curve basic screen

#### [Procedure for Displaying Cam Curve Basic Screen]



#### [Cam Curve Basic Screen]



Cam curve calculate button

Stroke curve display area

Cam curve setting complete range area

#### [Display/Setting Content]

**Cam curve calculate button** Calculates the set data and ends cam curve selection.

**Stroke curve display area** Displays the stroke curve set with the stroke settings.

**Cam curve setting complete range area** Displays the end of the cam curve setting range.

#### [Mouse Operation Procedure]

- Setting stroke curve range for cam curve allocation**
- 1) Sets the stroke curve range for cam curve allocation.
    - Left-click in the stroke curve display area displaying the part of the stroke curve for which the range is to be set, or left-click in the appropriate cam curve setting complete range area.
    - The display of the designated part of the stroke curve changes to a solid line and the cam curve selection window or the stroke data table window is displayed.
      - Cam curve selection window : If a stroke curve of 10 degrees or more was designated
      - Stroke data table window : If a stroke curve less than 10 degrees was designated

**Allocating cam curves** 1) From the cam curve selection window, allocate a cam curve to the designated part of the stroke curve (see 22.1.3(2)).

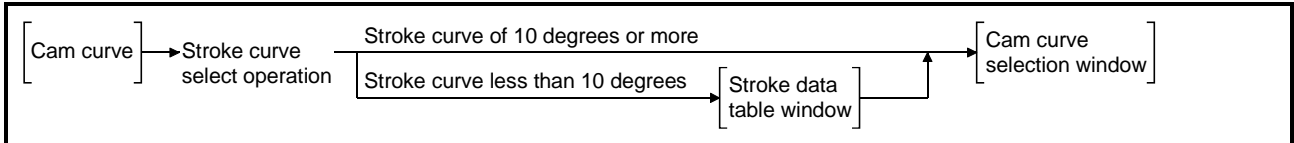
## 22. CREATING CAM DATA

### Calculating cam curves

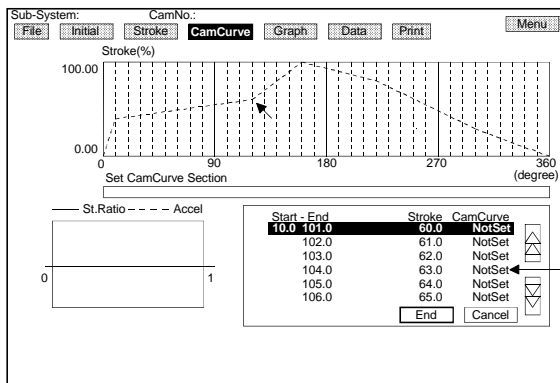
- 1) After cam curves are allocated to the entire stroke curve, left-click "MENU."  
The cam curve calculation is run and the display reverts to the editing screen.  
If cam curves are not allocated to the entire stroke curve, an error message window indicates that insufficient data is set.  
Left-click on "CONFIRM."  
The cam curve calculation is not run and the display reverts to the editing screen.

- (2) Stroke data table window and cam curve selection window

### [Procedure for Displaying Stroke Data Table Window and Cam Curve Selection Window]



### [Stroke Data Table Window]



Cam curve setting status display area

### [Display/Setting Content]

#### Cam curve setting status display area

Displays the cam curve names set for the stroke data.

### [Mouse Operation Procedure]

#### Designating stroke data

- 1) Left-click the stroke data line. The designated stroke data line is highlighted.

#### Setting END

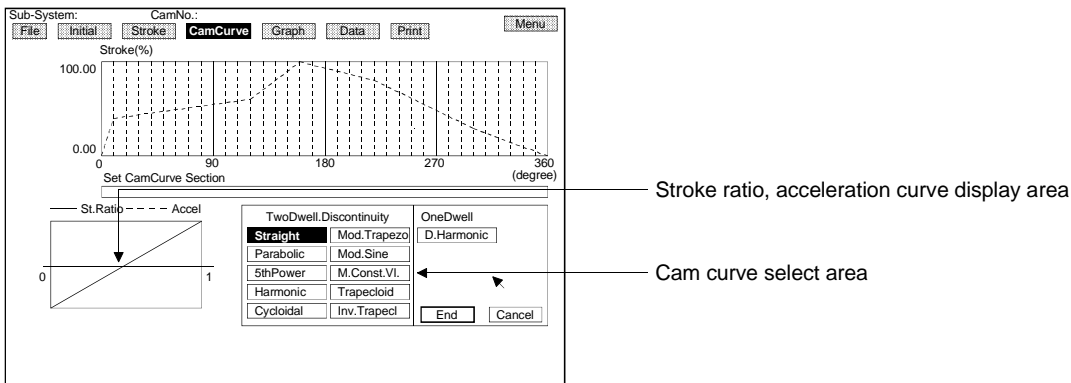
- 1) Left-click "End". The settings are entered and the display reverts to the cam curve selection window.

#### Setting ABORT

- 1) Left-click "Cancel" to abort the settings. The settings previously made are ignored and the display reverts to the cam curve basic screen.

## 22. CREATING CAM DATA

### [Cam Curve Selection Window]



### [Display/Setting Content]

#### Stroke ratio, acceleration curve display area

Displays the stroke ratio and acceleration curve for the selected cam curve.

#### Cam curve select area

Displays 11 types of both-side stationary and one-side stationary cam curves.

### [Mouse Operation Procedure]

#### Selecting cam curve

1) Left-click the cam curve name. The stroke ratio and acceleration curve for the selected cam curve are displayed in the stroke ratio, acceleration curve display area.

#### Setting END

1) Left-click "End". The settings are entered and the display changes to either the range setting window or coefficient setting window, according to the type of cam curve selected.

- Range setting window if the cam curve selected requires no coefficient settings
- Coefficient setting window if the cam curve selected requires coefficient settings

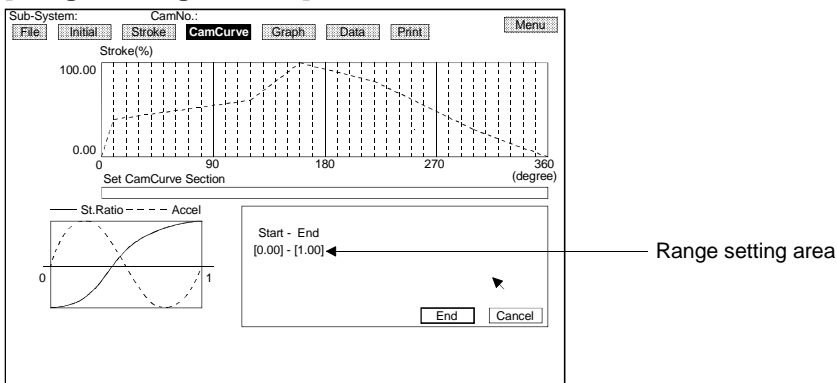
#### Setting ABORT

1) Left-click "Cancel" to abort the settings. The settings previously made are ignored and the display reverts to the cam curve basic screen.

## 22. CREATING CAM DATA

### If the Designated Cam Curve Requires No Coefficient Settings

#### [Range Setting Window]



#### [Display/Setting Content]

**Range setting area** Sets the range (start point and end point) of the acceleration curve allocated to the stroke curve.

#### [Mouse Operation Procedure]

- Setting the range**
- 1) Use the numeric keys to input the start point in the range specified below, then left-click in the end point setting area. (The default value of the start point is 0.00.)  
Setting range:  $0.00 \leq \text{start point} < \text{end point}$   
The cursor moves to the end point setting area.
  - 2) Use the numeric keys to input the end point in the range specified below. (The default value of the start point is 1.00.)  
Setting range:  $\text{start point} < \text{end point} \leq 1.00$

**Setting END**

- 1) Left-click "End". The settings are entered and the display reverts to the cam curve basic screen.

**Setting ABORT**

- 1) Left-click "Cancel" to abort the settings. The settings previously made are ignored and the display reverts to the cam curve selection window.

#### POINT

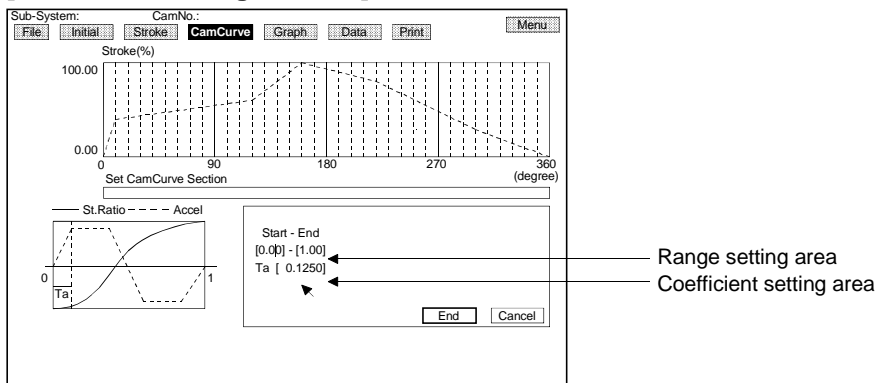
- (1) The following cam curves require no coefficient settings.
  - Constant speed curve
  - Uniform acceleration curve
  - 5th curve
  - Single hypotenuse curve
  - Cycloid curve
  - Multiple hypotenuse curve



## 22. CREATING CAM DATA

### If the Designated Cam Curve Requires Coefficient Settings

#### [Coefficient Setting Window]



#### [Display/Setting Content]

**Range setting area** Sets the range (start point and end point) of the acceleration curve allocated to the stroke curve.

**Coefficient setting area** Sets coefficients for each area.

#### [Mouse Operation Procedure]

**Setting the range**

- 1) Use the numeric keys to input the start point in the range specified below, then left-click in the end point setting area. (The default value of the start point is 0.00.)  
Setting range:  $0.00 \leq \text{start point} < \text{end point}$   
The cursor moves to the end point setting area.
- 2) Use the numeric keys to input the end point in the range specified below. (The default value of the start point is 1.00.)  
Setting range:  $\text{start point} < \text{end point} \leq 1.00$   
The cursor moves to the coefficient setting area.

**Setting the coefficient** 1) Use the numeric keys to input the coefficient.

**Setting END** 1) After inputting the coefficient, press the [Enter] key or left-click "End". The settings are entered and the display reverts to the cam curve basic screen.

**Setting ABORT** 1) Left-click "Cancel" to abort the settings. The settings previously made are ignored and the display reverts to the cam curve selection window.

#### POINT

- (1) The following cam curves require coefficient settings.
  - Distorted trapezoid curve
  - Distorted sine curve
  - Distorted constant speed curve
  - Trapecloid curve
  - Reverse trapecloid curve

## 22. CREATING CAM DATA

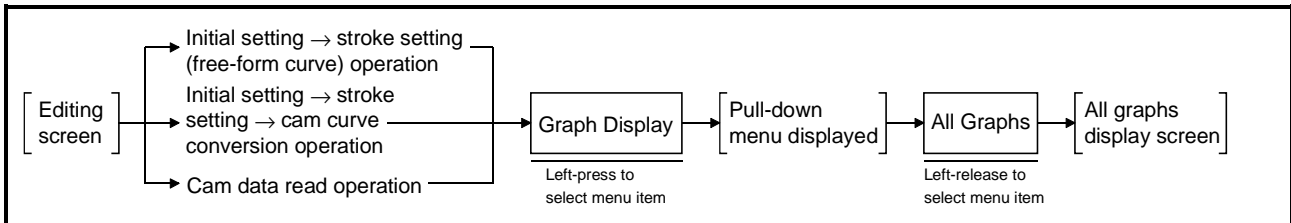
### 22.2 Cam Data Graphic Display

Displays characteristic-value graphs of the set cam data.

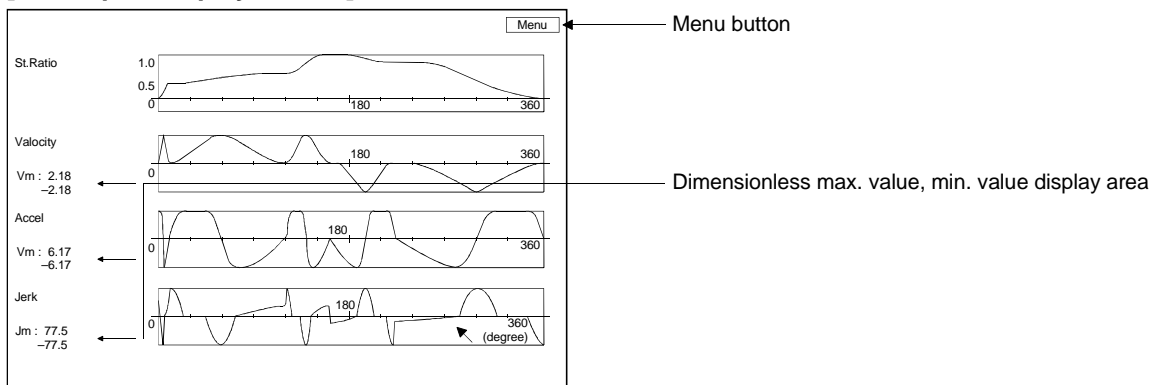
#### 22.2.1 All graphs display

Displays all characteristic-value graphs together.

#### [Procedure for Displaying the All Graphs Display Screen]



#### [All Graphs Display Screen]



#### [Display/Setting Content]

**Menu button** Reverts the display to the editing screen.

**Dimensionless max. value, min. value display area** Dimensionless display of all characteristic-value graphs.

#### [Mouse Operation Procedure]

**Ending graph display** 1) Left-click "MENU" to end the graph display. The display reverts to the editing screen.

#### REMARKS

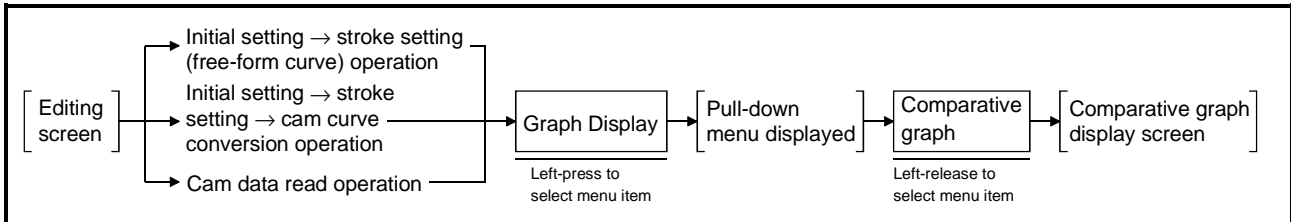
- (1) Dimensionless maximum and minimum values
  - Dimensionless max. value : maximum value expressed as a fluctuation between 0 and 1.
  - Dimensionless min. value : minimum value expressed as a fluctuation between 0 and 1.
- (2) Rate of acceleration change graph
  - Rate of acceleration change graph: Graph of the acceleration differentiated again with respect to time. (The graph shows the rate of change of acceleration.)

## 22. CREATING CAM DATA

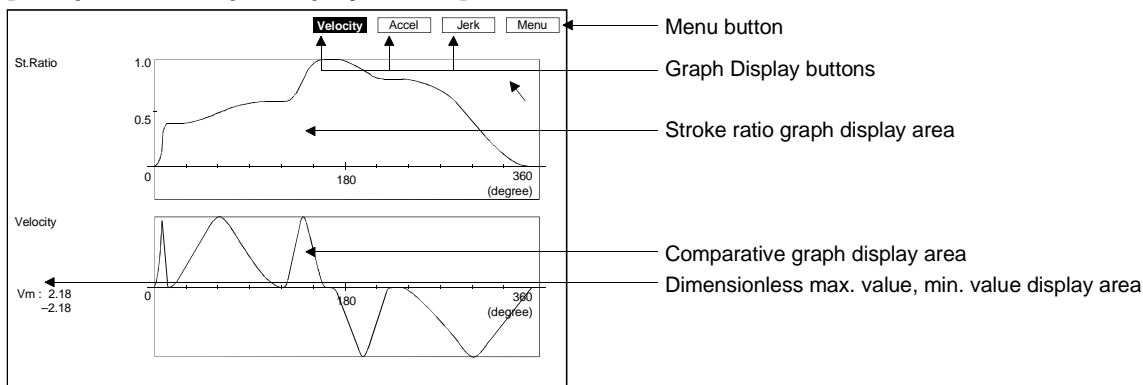
### 22.2.2 Comparative graph display

Displays the stroke-ratio graph and the speed graph, acceleration graph, or rate of acceleration change graph.

#### [Procedure for Displaying the Comparative Graph Display Screen]



#### [Comparative Graph Display Screen]



#### [Display/Setting Content]

- |  |   |
|--|---|
| <b>Menu button</b>                                       | Reverts the display to the editing screen.  |
| <b>Graph Display buttons</b>                             | Display the graph in the comparative graph display area                                       |
| <b>Stroke ratio graph display area</b>                   | Displays the stroke ratio graph   |
| <b>Comparative graph display area</b>                    | Displays the designated characteristic-value graph (the speed graph is displayed by default). |
| <b>Dimensionless max. value, min. value display area</b> | Dimensionless display of all characteristic-value graphs.                                     |

#### [Mouse Operation Procedure]

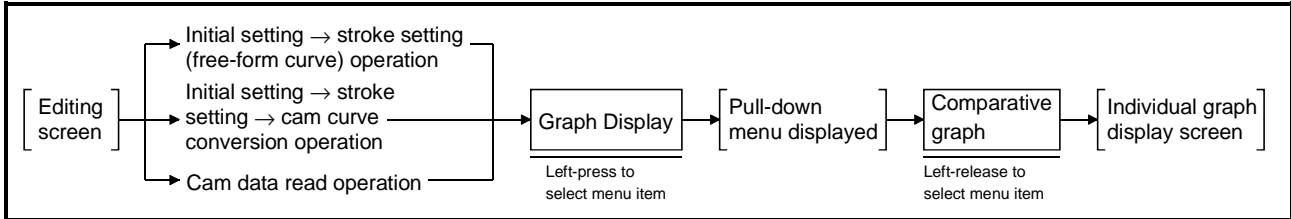
- |                                     |   |
|-------------------------------------|---|
| <b>Displaying comparative graph</b> | 1) Left-click the Graph Display button corresponding to which graph is to be displayed (speed graph, acceleration graph, or rate of acceleration change graph).<br>The selected graph is displayed in the comparative graph display area. |
| <b>Ending graph display</b>         | 1) Left-click "MENU" to end the graph display. The display reverts to the editing screen.   |

## 22. CREATING CAM DATA

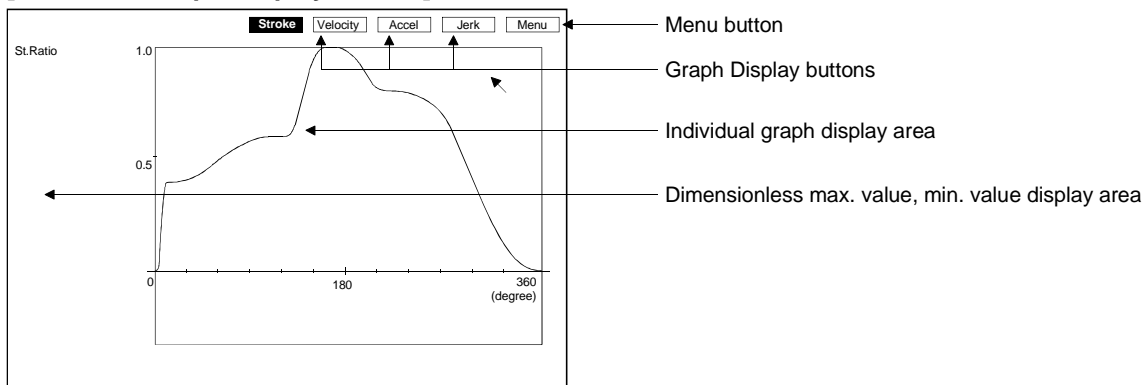
### 22.2.3 Individual graph display

Displays individual characteristic-value graphs.

#### [Procedure for Displaying the Individual Graph Display Screen]



#### [Individual Graph Display Screen]



#### [Display/Setting Content]

- |  |   |
|--|---|
| <b>Menu button</b>                                       | Reverts the display to the editing screen.  |
| <b>Graph Display buttons</b>                             | Display the graph in the individual graph display area  |
| <b>Individual graph display area</b>                     | Displays the designated characteristic-value graph (the stroke-ratio graph is displayed by default).                        |
| <b>Dimensionless max. value, min. value display area</b> | Dimensionless display of all characteristic-value graphs. (Displayed for speed, acceleration, rate of acceleration change.) |

#### [Mouse Operation Procedure]

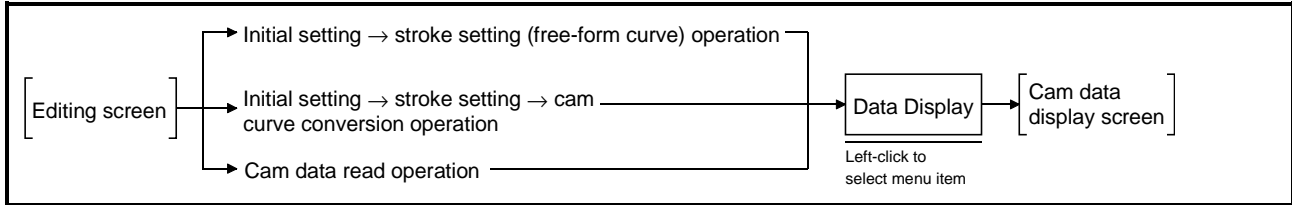
- |                                    |   |
|------------------------------------|---|
| <b>Displaying individual graph</b> | 1) Left-click the Graph Display button corresponding to which graph is to be displayed (stroke-ratio graph, speed graph, acceleration graph, or rate of acceleration change graph). The selected graph is displayed in the individual graph display area. |
| <b>Ending graph display</b>        | 1) Left-click "MENU" to end the graph display. The display reverts to the editing screen.   |

## 22. CREATING CAM DATA

### 22.3 Cam Data Display

Lists the cam data calculation results.

#### [Procedure for Displaying the Cam Data Display Screen]



#### [Cam Data Display Screen]

No.	Angle	St.Ratio	Velocity	Accel	Jerk	CamCurve
1	0.00	0.00000	0.00	0.00	77.5	Trapezoid
2	1.41	0.01229	0.59	6.17	0.0	Trapezoid
3	2.81	0.06974	1.46	6.17	0.0	Trapezoid
4	4.22	0.17431	2.16	1.73	-74.4	Trapezoid
5	5.63	0.28939	1.73	-6.15	-6.8	Trapezoid
6	7.03	0.36297	0.90	-5.45	10.5	Trapezoid
7	8.44	0.39437	0.27	-3.33	19.0	Trapezoid
8	9.84	0.39999	0.00	-0.35	22.5	Trapezoid
9	11.25	0.40000	0.00	0.88	76.8	Trapezoid
10	12.66	0.40004	0.02	1.84	74.0	Trapezoid
11	14.06	0.40013	0.05	2.76	69.3	Trapezoid
12	15.47	0.40031	0.09	3.61	62.9	Trapezoid
13	16.88	0.40061	0.14	4.36	54.8	Trapezoid
14	18.28	0.40105	0.20	5.00	45.4	Trapezoid
15	19.69	0.40166	0.27	5.52	34.7	Trapezoid
16	21.09	0.40245	0.34	5.89	23.2	Trapezoid
17	22.50	0.40342	0.42	6.11	11.0	Trapezoid
18	23.91	0.40460	0.50	6.17	0.0	Trapezoid
19	25.31	0.40598	0.58	6.17	0.0	Trapezoid

Jump No. [ 1 ] ←

UpArrow:UpScroll DownArrow:DownScroll PageUp:Previous PageDown:Next Esc:End

First table No. display/setting area

Cam data display area

#### [Display/Setting Content]

**First table No. display/setting area** Shows the first table number in the data displayed on the screen. A new table number to be displayed in the first line can be set in this area.

**Cam data display area** Displays a list of data for each table (resolution point).

#### [Mouse Operation Procedure]

**Switching display screens by table number designation** 1) Use the numeric keys to input the first table number to be displayed in the first table No. display/setting area.  
Data is displayed starting from the designated table number.

**Switching display screens one table number at a time** 1) Press the [↑]/[↓] keys to move the displayed data up or down by one table number at a time.  

- Press the [↑] key to scroll the display up to the previous table number.
- Press the [↓] key to scroll the display down to the next table number.

**Switching display one screen at a time** 1) Press the [Page Up]/[Page Down] key to scroll the display one screen at a time.  

- Press the [Page Up] key to scroll the display up to the previous screen.
- Press the [Page Down] key to scroll the display down to the next screen.

**Ending data display** 1) Press the [Esc] key to end the data display. The display reverts to the editing screen.

## 22. CREATING CAM DATA

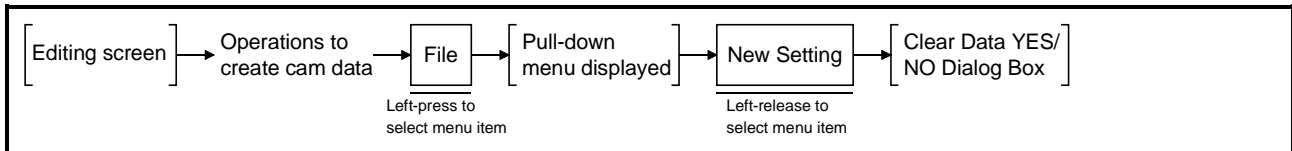
### 22.4 File Maintenance

Reads and writes cam data and copies it to hard disk or floppy disk.

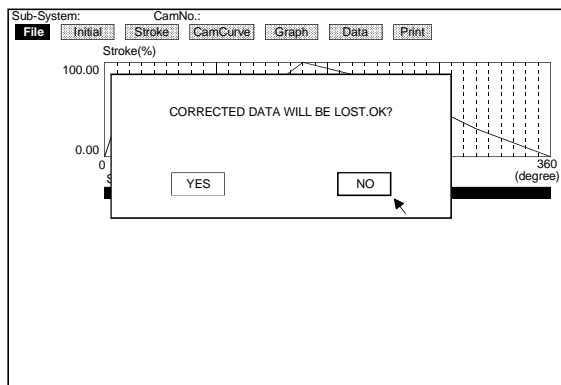
#### 22.4.1 New setting

Deletes edited cam data for new data to be created.

#### [Procedure for Displaying the Clear Data YES/NO Dialog Box]



#### [Clear Data YES/NO Dialog Box]



#### [Mouse Operation Procedure]

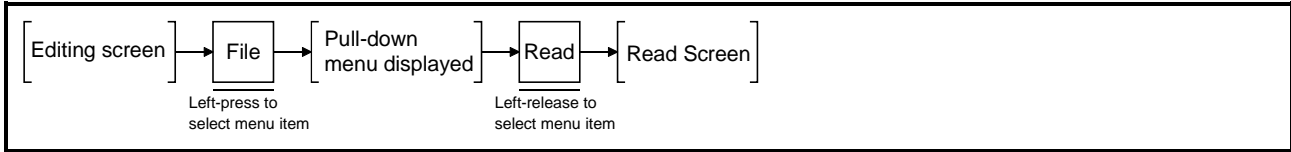
- Executing data clear** 1) Left-click "YES" in the dialog box to clear the data. The data is cleared from the editing screen, ready to create new data.
- Aborting data clear** 1) Left-click "NO" in the dialog box to abort the data clearing operation. The data remains unchanged and the display reverts to the editing screen.

## 22. CREATING CAM DATA

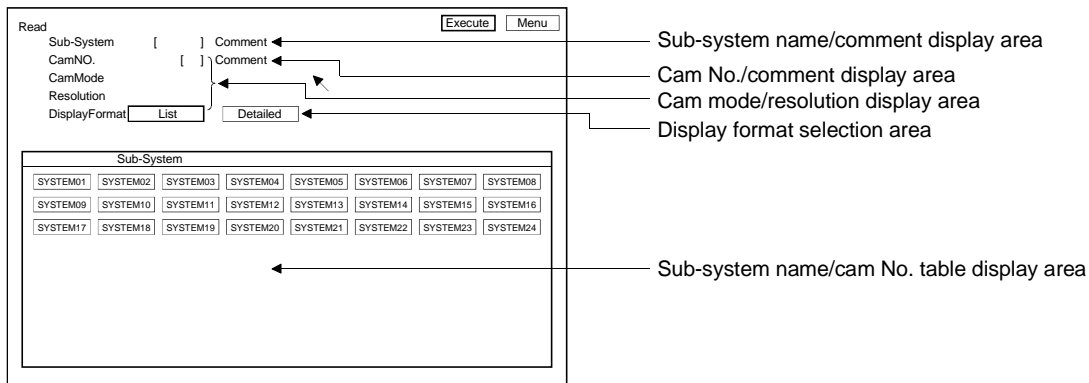
### 22.4.2 Reading cam data

Reads cam data from the hard disk to the editing screen.

#### [Procedure for Displaying the Read Screen]



#### [Read Screen]



#### [Display/Setting Content]

**Sub-system name/comment display area** Displays the sub-system name and comment selected from the sub-system name/cam No. table display area.

**Cam No./comment display area** Displays the cam number and comment selected from the sub-system name/cam No. table display area.

**Cam mode/resolution display area** Displays the cam mode and resolution of the cam number to be read. (When a cam number is set, the cam mode and resolution for the set cam number are displayed.)

**Display format selection area** Selects the display format for displaying the sub-system name and cam number in the sub-system name/cam No. table display area.  
 List : display sub-system names and cam numbers  
 Detailed : display sub-system names and cam numbers with added comments

**Sub-system name/cam No. table display area** Displays a table of sub-system names and cam numbers in the hard disk.

#### [Mouse Operation Procedure]

**Selecting a sub-system name** 1) Left-click the required sub-system name from the sub-system name/cam No. table display area. The designated sub-system name appears in the sub-system name/comment display area.  
 After the sub-system name is selected, the cam numbers for the designated sub-system name are displayed in the sub-system name/cam No. table display area.

**Selecting cam number** 1) Left-click the required cam number from the sub-system name/cam No. table display area. The designated cam number appears in the cam No./comment display area.

**Executing data read** 1) Left-click "EXECUTE" to read the data. The display reverts to the editing screen when the reading operation is complete.

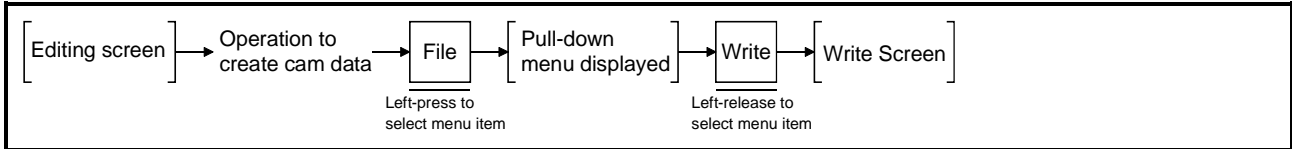
**Aborting data clear** 1) Left-click "MENU" to abort the data reading operation. The data is not read and the display reverts to the editing screen.

## 22. CREATING CAM DATA

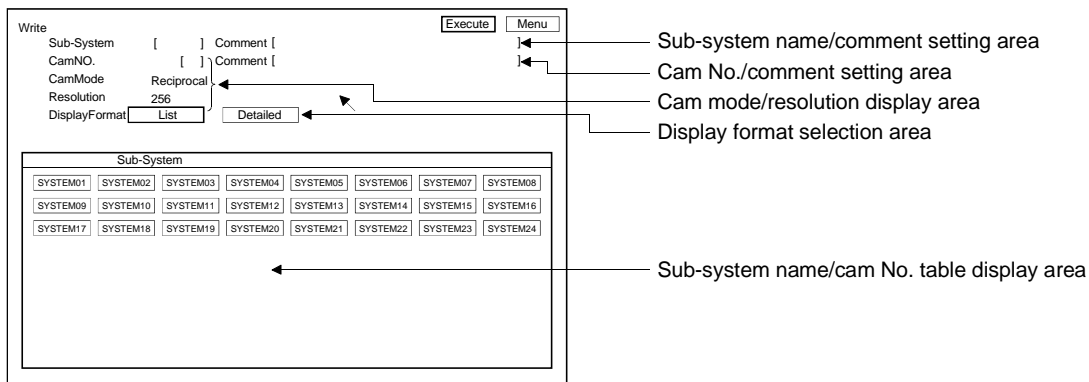
### 22.4.3 Writing cam data

Writes created cam data to the hard disk.

#### [Procedure for Displaying the Write Screen]



#### [Write Screen]



#### [Display/Setting Content]

- Sub-system name/comment setting area** Sets the Sub-system name and comment.
- Cam No./comment setting area** Sets the cam number and comment.
- Cam mode/resolution display area** Displays the cam mode and resolution set with the initial settings.
- Display format selection area** Selects the display format for displaying the sub-system name and cam number in the sub-system name/cam No. table display area.  
 List : display sub-system names and cam numbers  
 Detailed : display sub-system names and cam numbers with added comments
- Sub-system name/cam No. table display area** Displays a table of sub-system names and cam numbers in the hard disk.

#### [Mouse Operation Procedure]

- Setting sub-system name and comment**
- 1) Use the alphanumeric keys to input the sub-system name, then left-click the comment setting area. The sub-system name is entered and the cursor moves to the comment setting area.
  - 2) Use the alphanumeric keys to input the comment, then left-click the cam number setting area. The comment is entered for the sub-system name and the cursor moves to the comment setting area.
- Setting cam number and comment**
- 1) Use the numeric keys to input the cam number, then left-click the comment setting area. The cam number is entered and the cursor moves to the comment setting area.
  - 2) Use the alphanumeric keys to input the comment.
- Executing data write**
- 1) Left-click "EXECUTE" to write the data.
  - 2) The display reverts to the editing screen when the writing operation is complete. If the designated sub-system name or cam number already exists, a YES/NO dialog box prompts whether to overwrite the existing file.



## 22. CREATING CAM DATA

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- Aborting data clear**
- 1) Left-click "MENU" to abort the data writing operation. The data is not written and the display reverts to the editing screen.

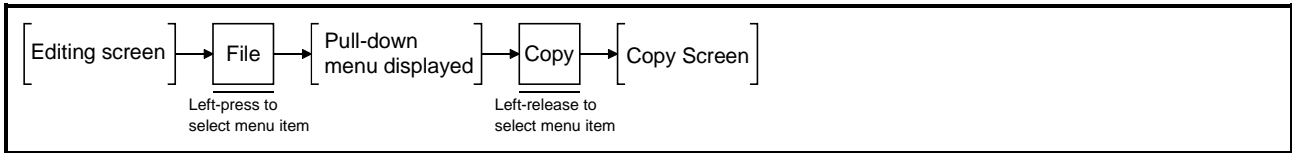
POINTS
(1) The sub-system name or cam number can also be input by clicking a sub-system name or cam number displayed in the sub-system name/cam No. table display area. This is a convenient method to create data under an existing sub-system name or to overwrite data.
(2) Press the cursor keys to move the cursor between the setting areas.

## 22. CREATING CAM DATA

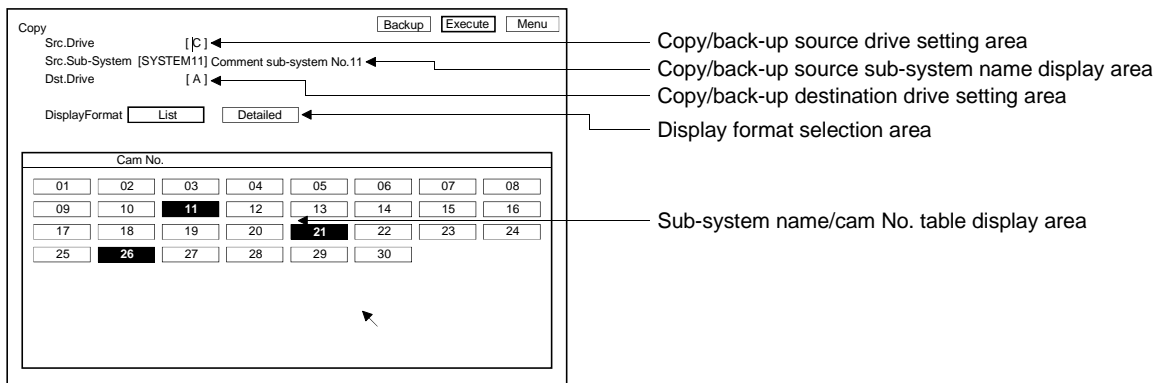
### 22.4.4 Copying cam data

Copies or backs-up cam data in a hard disk or floppy disk to a floppy disk or hard disk.

#### [Procedure for Displaying the Copy Screen]



#### [Copy Screen]



#### [Display/Setting Content]

##### Copy/back-up source drive setting area

Designate the drive name where the copy source data exists.

##### Copy/back-up source sub-system name display area

Displays the copy source sub-system name selected from the sub-system name/cam No. table display area.

##### Copy/back-up destination drive setting area

Designate the copy destination drive name. The same drive name as the copy source cannot be set.

##### Display format selection area

Selects the display format for displaying the sub-system name and cam number in the sub-system name/cam No. table display area

List : display sub-system names and cam numbers

Detailed : display sub-system names and cam numbers with added comments

##### Sub-system name/cam No. table display area

Displays a table of sub-system names and cam numbers in the hard disk or floppy disk.

#### [Mouse Operation Procedure]

##### Setting the copy/back-up source drive

1) Use the alphanumeric keys to input the copy/back-up source drive name.

##### Setting the copy/back-up source sub-system name

1) Left-click the required sub-system name from the sub-system name/cam No. table display area. The designated sub-system name appears in the copy/back-up source sub-system name display area. After the sub-system name is selected, the cam numbers for the designated sub-system name are displayed in the sub-system name/cam No. table display area.

## 22. CREATING CAM DATA

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### Selecting copy source cam number

- 1) Left-click the required cam number from the sub-system name/cam No. table display area. The designated cam number appears in the cam No./comment display area. The selected cam number is highlighted.  
After highlighting the cam number, left-click the copy/back-up destination drive setting area. The cursor moves into the copy/back-up destination drive setting area.  
When making a back-up, it is not necessary to select the cam number.

### Setting the copy/back-up destination drive

- 1) Use the alphanumeric keys to input the copy/back-up destination drive name.

### Executing copy

- 1) Left-click on "EXECUTE" to copy the data. A dialog box is displayed during the copy operation and the display reverts to the editing screen when the copying operation is complete.  
If the designated sub-system name or cam number already exists at the copy destination, a YES/NO dialog box prompts whether to overwrite the existing data. Left-click "YES" to overwrite the data, or left-click "NO" to not overwrite the data.
- 2) To stop the copy operation, left-click on "STOP" in the dialog box. The copying is stopped and the display reverts to the editing screen.

### Executing back-up

- 1) Left-click on "BACKUP" to back-up the data. A dialog box is displayed to prompt whether to execute the back-up.  
Left-click "EXECUTE" to execute the back-up. A range selection window is displayed.  
To stop the back-up operation, left-click on "STOP" in the dialog box. The back-up dialog box is closed and the display reverts to the copy screen.
- 2) Left-click on "1-32" or "33-64," according to the cam number. A dialog box is displayed during the back-up operation and the display reverts to the editing screen when the back-up operation is complete.  
To stop the back-up operation, left-click on "STOP" in the dialog box.  
The back-up is stopped and the display reverts to the copy screen.

### Aborting copy back-up

- 1) Left-click "MENU" to abort the copy or back-up operation. The copy or back-up is not executed and the display reverts to the editing screen.

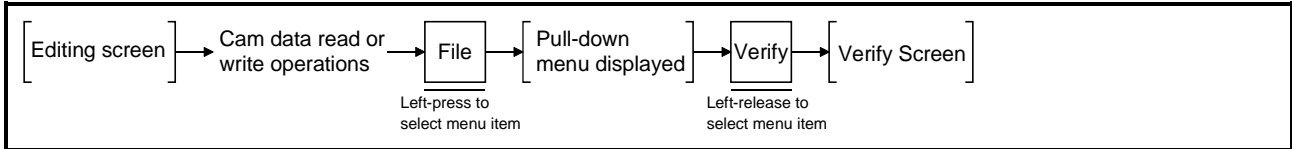
POINT
(1) The destination sub-system name and cam number for a copy or back-up operation is the same as the source sub-system name and cam number, so copy and back-up operations are not possible using a single drive.

## 22. CREATING CAM DATA

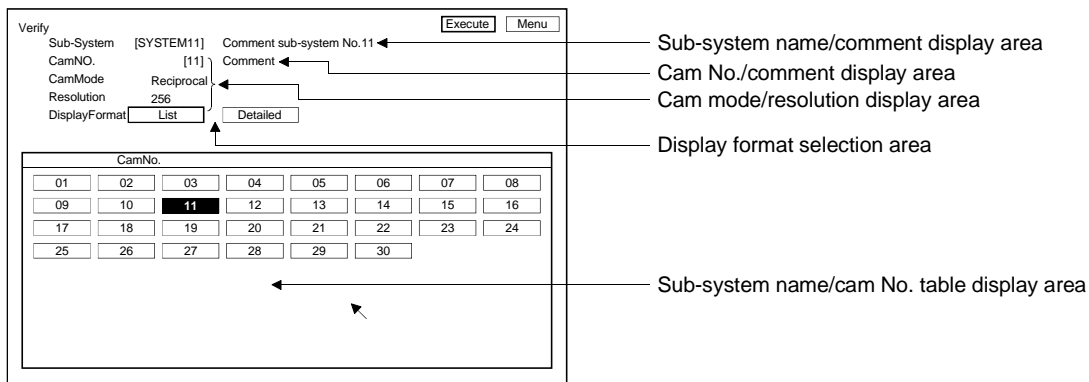
### 22.4.5 Verifying cam data

Verifies cam data in the editing screen against cam data in the hard disk.

#### [Procedure for Displaying the Verify Screen]



#### [Verify Screen]



#### [Display/Setting Content]

- Sub-system name/comment display area** Displays the sub-system name in the hard disk selected from the sub-system name/cam No. table display area.
- Cam No./comment display area** Displays the cam number for the sub-system name in hard disk which is selected from the sub-system name/cam No. table display area.
- Cam mode/resolution display area** Displays the cam mode and resolution set by the data above.
- Display format selection area** Selects the display format for displaying the sub-system name and cam number in the sub-system name/cam No. table display area.  
 List : display sub-system names and cam numbers  
 Detailed : display sub-system names and cam numbers with added comments
- Sub-system name/cam No. table display area** Displays a table of sub-system names and cam numbers in the hard disk.

#### [Mouse Operation Procedure]

- Selecting a sub-system name** 1) Left-click the required sub-system name from the sub-system name/cam No. table display area. The designated sub-system name appears in the sub-system name/comment display area.  
 After the sub-system name is selected, the cam numbers for the designated sub-system name are displayed in the sub-system name/cam No. table display area.
- Selecting cam number** 1) Left-click the required cam number from the sub-system name/cam No. table display area. The designated cam number appears in the cam No./comment display area.
- Executing verification** 1) Left-click "EXECUTE" to verify the data. An alert box shows the results when the verification is complete.
- Aborting verification** 1) Left-click "MENU" to abort the data verification. The data is not verified and the display reverts to the editing screen.

## 22. CREATING CAM DATA

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### **Checking the verification results alert box**

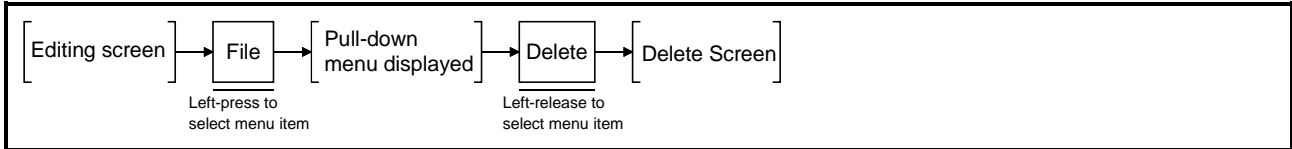
- 1) A message indicates that no problems exist if no discrepancies were discovered during the verification. Left-click "CONFIRM" to revert to the editing screen.
- 2) A message indicates that problems do exist if any discrepancies were discovered during the verification. Left-click "CONFIRM" to revert to the editing screen.

## 22. CREATING CAM DATA

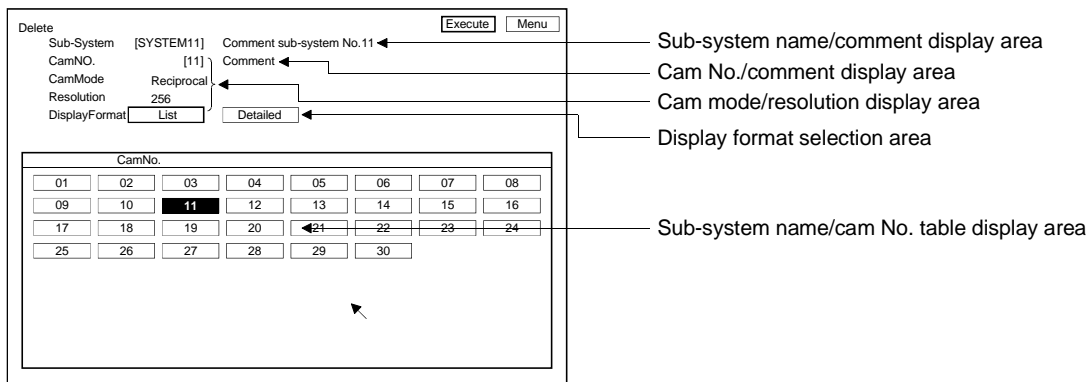
### 22.4.6 Deleting cam data

Deletes cam data from the hard disk.

#### [Procedure for Displaying the Delete Screen]



#### [Delete Screen]



#### [Display/Setting Content]

**Sub-system name/comment display area** Displays the sub-system name and comment selected from the sub-system name/cam No. table display area.

**Cam No./comment display area** Displays the cam number and comment selected from the sub-system name/cam No. table display area.

**Cam mode/resolution display area** Displays the cam mode and resolution set in the initial settings.

**Display format selection area** Selects the display format for displaying the sub-system name and cam number in the sub-system name/cam No. table display area.  
 List : display sub-system names and cam numbers  
 Detailed : display sub-system names and cam numbers with added comments

**Sub-system name/cam No. table display area** Displays a table of sub-system names and cam numbers in the hard disk.

#### [Mouse Operation Procedure]

**Selecting a sub-system name** 1) Left-click the required sub-system name from the sub-system name/cam No. table display area. The designated sub-system name appears in the sub-system name/comment display area.  
 After the sub-system name is selected, the cam numbers for the designated sub-system name are displayed in the sub-system name/cam No. table display area.

**Selecting cam number** 1) Left-click the required cam number from the sub-system name/cam No. table display area. The designated cam number appears in the cam No./comment display area.

## 22. CREATING CAM DATA

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- Executing data delete**
- 1) Left-click "EXECUTE" to delete the data. A YES/NO dialog box prompts whether to delete the data.
  - 2) Left-click "YES" to delete the data. The display reverts to the editing screen after the data is deleted.  
Left-click "NO" to not delete the data. The YES/NO dialog box is closed and the display reverts to the delete screen.
- Aborting data delete**
- 1) Left-click "MENU" to abort the delete operation. The delete operation is not executed and the display reverts to the editing screen.

POINTS
(1) The delete operation cannot be stopped after it is started. (2) If only a sub-system name is selected for the delete operation, all cam data for the sub-system name is deleted.

## 23. PRINTING

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### 23. PRINTING

Prints the cam data calculation results, sub-system names, and cam numbers.

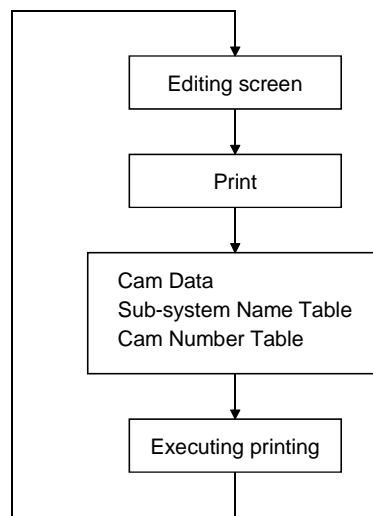
#### (1) Function summary

CAMPE offers the following printing functions.

Printing	Cam Data	Prints the cam data (calculated results) on the editing screen (i.e., in the memory). .....	23.1
	Sub-system Name Table	Prints the sub-system names and comments in the hard disk. ....	23.2
	Cam Number Table	Prints the cam numbers and comments in the hard disk. ....	23.3

#### (2) Outline flowchart

The outline flowchart for printing is shown below.



#### POINTS

- (1) Only an ESC/P-compatible printer can be used with an IBM PC.
- (2) Cam data cannot be printed before stroke data setting and calculations are complete. Printing cannot be selected from the menu unless printing is possible.

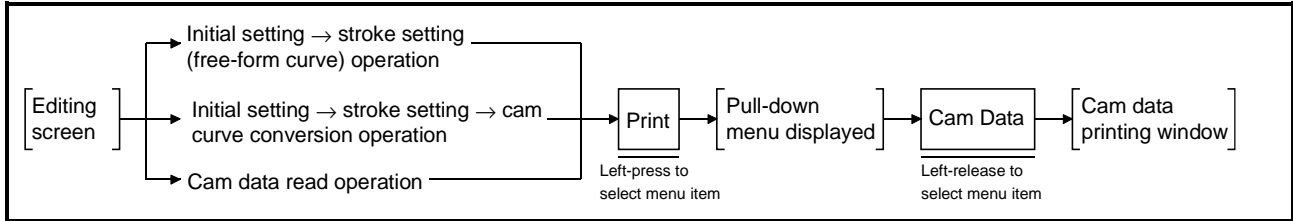


## 23. PRINTING

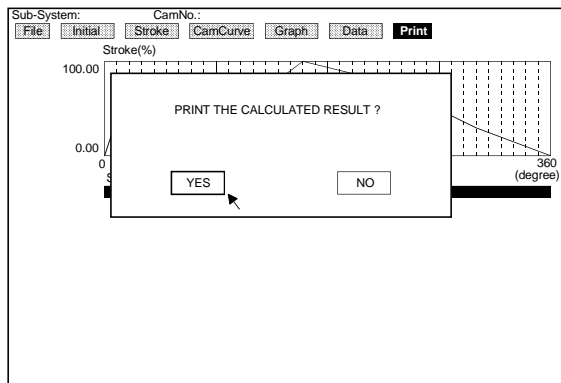
### 23.1 Printing Cam Data

Prints the cam data (calculated results) on the editing screen.

#### [Procedure for Displaying the Cam Data Print YES/NO Dialog Box]



#### [Cam Data Print YES/NO Dialog Box]



#### [Mouse Operation Procedure]

##### Selecting printing

- 1) Left-click "YES" to print the data. A dialog box is displayed during printing and the display reverts to the editing screen when printing is complete.

##### Stopping printing

- 1) To stop the printing after it has started, left-click on "STOP" in the dialog box. The printing is stopped and the display reverts to the editing screen.

##### Aborting printing

- 1) Left-click "NO" to abort printing. No printing is executed and the display reverts to the editing screen.

#### [Example Print-Out]

<Cam Data List>

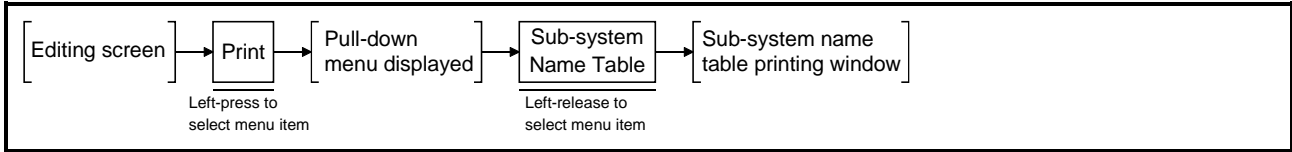
No.	Angle	St. Ratio	Velocity	Accel	Jerk	CamCurve
1	0.00	0.00000	0.00	0.00	77.5	Trapecloid
2	0.70	0.00000	0.00	0.30	77.4	Trapecloid
3	1.41	0.00001	0.00	0.60	77.2	Trapecloid
4	2.11	0.00002	0.01	0.91	76.7	Trapecloid
5	2.81	0.00005	0.01	1.20	76.1	Trapecloid
6	3.52	0.00010	0.01	1.50	75.2	Trapecloid
7	4.22	0.00017	0.02	1.79	74.2	Trapecloid
8	4.92	0.00026	0.03	2.08	73.0	Trapecloid
9	5.63	0.00039	0.04	2.36	71.6	Trapecloid
10	6.33	0.00056	0.05	2.64	70.1	Trapecloid

# 23. PRINTING

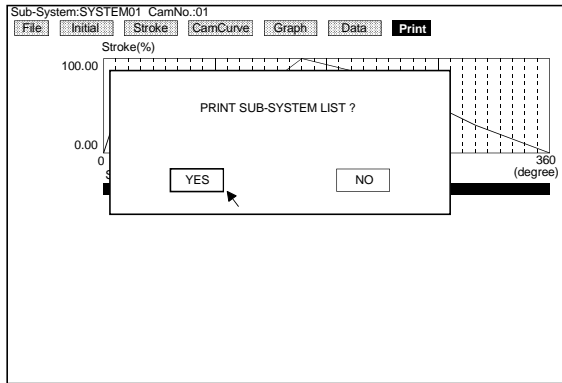
## 23.2 Printing Sub-System Names

Prints the sub-system names in the hard disk.

### [Procedure for Displaying the Sub-system Name Table Print YES/NO Dialog Box]



### [Sub-system Name Table Print YES/NO Dialog Box]



### [Mouse Operation Procedure]

#### Selecting printing

- 1) Left-click "YES" to print the data. A dialog box is displayed during printing and the display reverts to the editing screen when printing is complete.

#### Stopping printing

- 1) To stop the printing after it has started, left-click on "STOP" in the dialog box. The printing is stopped and the display reverts to the editing screen.

#### Aborting printing

- 1) Left-click "NO" to abort printing. No printing is executed and the display reverts to the editing screen.

### [Example Print-Out]

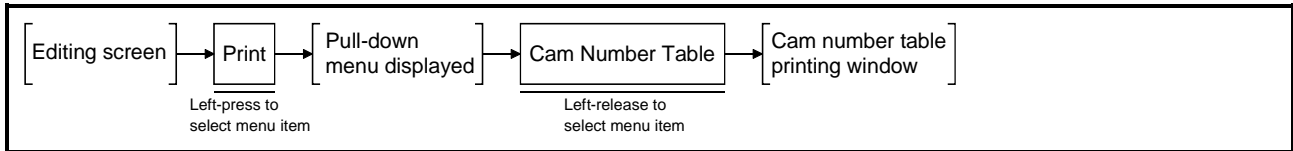
<Sub-system list>	
Sub-system	Comment
SYSTEM01	Sample data 1
SYSTEM02	Sample data 2
SYSTEM03	Sample data 3
SYSTEM04	Sample data 4

## 23. PRINTING

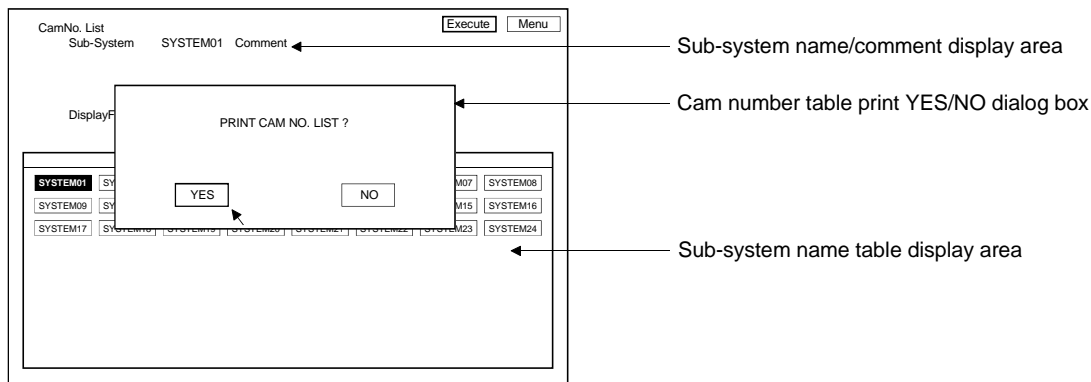
### 23.3 Printing Cam Numbers

Prints the cam numbers in the hard disk for the designated sub-system name.

#### [Procedure for Displaying the Cam Number Table Print Window]



#### [Cam Number Table Print Window]



#### [Display/Setting Content]

**Sub-system name/comment display area** Displays the sub-system name selected from the sub-system name table display area

**Sub-system name table display area** Displays a table of the sub-system names in the hard disk.

#### [Mouse Operation Procedure]

**Selecting a sub-system name** 1) Left-click the required sub-system name from the sub-system name table display area. The designated sub-system name appears in the sub-system name/comment display area.

**Selecting printing** 1) Left-click "EXECUTE" to execute printing. A YES/NO dialog box prompts whether to print the cam number data.

- Left-click "YES" to print the data. A dialog box is displayed during printing and the display reverts to the editing screen when printing is complete.
- Left-click "NO" to cancel printing. No data is printed and the display reverts to the editing screen.

**Stopping printing** 1) To stop the printing after it has started, left-click on "STOP" in the dialog box. The printing is stopped and the display reverts to the editing screen.

**Aborting printing** 1) Left-click "MENU" to abort printing. No printing is executed and the display reverts to the editing screen.

## 23. PRINTING

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### [Example Print-Out]

<CamNo. List>

CamNo.	Comment
10	Sample data 1-10
63	Sample data 1-63
64	Sample data 1-64

## 24. CAMPE ERROR MESSAGES

### 24. CAMPE ERROR MESSAGES

This section describes the error messages which can occur during CAMPE operation, descriptions of the errors, and the appropriate corrective action.

Error Message	Description	Corrective Action
Cannot write	Error in write destination hard disk or floppy disk.	Check for hard disk or floppy disk defects.
	File attributes are read-only.	Use DOS to check the file attributes and change if necessary.
Cam table data exceeds 32 kbytes	Cam table data exceeds 32 kbytes.	Delete unnecessary cam data.
Cam mode is two-way	Cam mode is two-way but the final end angle stroke is not the stroke minimum value.	Set the final end angle stroke data to the stroke minimum value.
Cam mode is feed	Cam mode is feed but the final end angle stroke is not the stroke maximum value.	Set the final end angle stroke data to the stroke maximum value.
Calculation error	Incorrect setting data.	Set data which matches the conditions.
Max. and min. value are fixed	An attempt was made to input max. and min. values while units are set to %.	The max. and min. values cannot be change if units are set to %.
Cannot delete	A file could not be deleted.	Use DOS to check and change the file attributes, then delete.
Free-form curve data needs 4 points min.	Insufficient input data.	Insert at least 4 points of free-form curve data.
Incorrect end angle data	End angle exceeded 360 degrees (viewed from start angle)	Check the end angle data.
Inapplicable stroke data	Inapplicable stroke data is set.	Set data applicable for the designated stroke data.
Incorrect stroke max. value	None of the set stroke amounts was equal to the stroke maximum value.	Set at least one of the set stroke amounts to the stroke maximum value.
Incorrect setting data	Data was set out-of-range.	Set the data within the setting ranges.
Incorrect drive setting	Incorrect drive designation. The same drive was set as the copy source and copy destination.	Set the drives correctly.
No data exists	An operation was selected before any data was input.	Input the data required for the operation.
Incorrect data	An error existed in the read data.	Designate correct data. Check for hard disk defects.
Drive <input type="checkbox"/> not ready	The designated drive was not a floppy disk drive.	Designate a floppy disk drive.
	The floppy disk in the designated drive is unformatted.	Check that a formatted floppy disk is in the drive.
Cannot open file	Cannot open a file.	Check for floppy disk or hard disk defects.
Printer not ready	Printer is not connected. Printer is not ready.	Connect the printer. Check the printer settings.
Mouse cannot be used	Mouse driver is not installed.	Install the mouse driver.
	Mouse was not connected as start up.	Connect mouse.
Insufficient memory	Insufficient memory to operate.	Stop using unnecessary device drivers, and re-start.
Write protection is ON	An attempt was made to write to a write-protected floppy disk.	Cancel the write protection.
Insufficient disk capacity (FD or HD)	Data could not be written because the floppy disk or hard disk is full.	Delete unnecessary files.



# **MITSUBISHI ELECTRIC CORPORATION**

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