MITSUBISHI

MOTION CONTROLLER

Operating Manual

type SW2SRX-GSV13PE

MITSUBISHI
ELECTRIC

INTORODUCTION

Thank you for purchasing the Mitsubishi Motion Controller/Personal Machine Controller. This instruction manual describes the handling and precautions of this unit. Incorrect handing 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.

<table>
<tr><td>◇! WARNING</td><td>When a dangerous situation may occur if handling is mistaken leading to fatal or major injuries.</td></tr>
<tr><td>⚠ CAUTION</td><td>When a dangerous situation may occur if handling is mistaken leading to medium or minor injuries, or physical damage.</td></tr>
</table>

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 Sate 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	Condition	
	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.

(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.
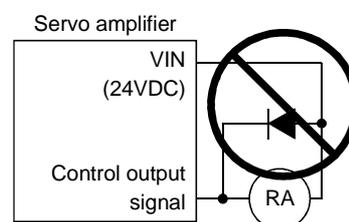
(5) Trial operation and adjustment

⚠ 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.

⚠ When using the absolute position system function, on starting up, and when the controller or absolute value motor has been replaced, always perform a home position return.
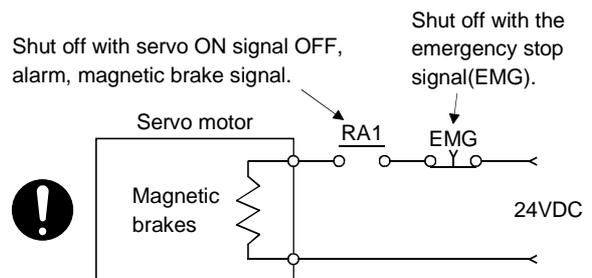
(6) Usage methods

⚠ 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 or 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.)

Shut off with servo ON signal OFF, alarm, magnetic brake signal.

Shut off with the emergency stop signal(EMG).

Servo motor

Magnetic brakes

RA1   EMG

24VDC

(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**
⚠ Do not touch the lead sections such as ICs or the connector contacts.
⚠ Do not place the control unit or servo amplifier on metal that may cause a power leakage or wood, plastic or vinyl that may cause static electricity buildup.
⚠ Do not perform a megger test (insulation resistance measurement) during inspection.
⚠ When replacing the control unit or servo amplifier, always set the new unit settings correctly.
⚠ When the controller or absolute value motor has been replaced, carry out a home position return operation using one of the following methods, otherwise position displacement could occur.
1) After writing the servo data to the PC using peripheral device software, switch on the power again, then perform a home position return operation.
2) Using the backup function of the peripheral device software, 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 the instruction manual.

Revisions

CONTENTS

1. GENERAL DESCRIPTION

(1) This manual describes the procedures for operating the two software packages used to create the programs and designate the settings required for positioning control by the motion controller.
The software packages are as follows: SW2SRX-GSV13PE software package (hereafter referred to as "GSV13PE"). SW[ ]SRX-SV13[ ] INSTALL floppy disk package (hereafter referred to as "SV1 [ ]").

⚠ **CAUTION**

⚠ All settings and control procedures should be executed within the ranges specified in this manual.
⚠ In order to prevent servo system CPU problems, an external safety circuit should be installed.
⚠ 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.

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(2) When any of the following devices are started using the software packages, the functions shown below will be operative:
- IBM PC/AT or 100 % compatible machine personal computer with PC-DOS 5.0 or higher.

Operative Functions (hereafter, the above hardware will be referred to simply as "personal computer"):

```
For SCPU          ── · Parameter setting
(GPP function)
                  ── · Sequence program creation

                  ── · Monitoring

                  ── · Test,etc.


For PCPU          ── · Data settings for positioning

                  ── · Servo program creation

                  ── · Positioning function monitor

                  ── · Test run,etc.
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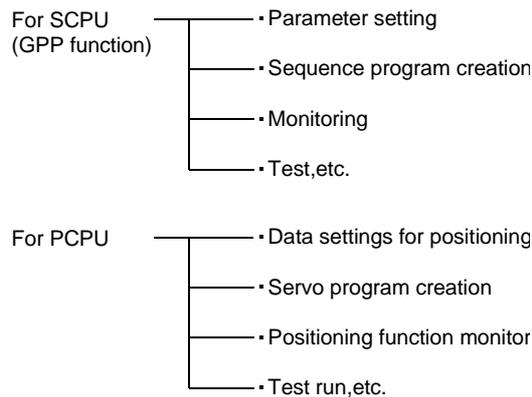
IBM is a registered trademark of International Business Machines Corporation.

(3) 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

(4) The software package and INSTALL floppy disk package described in this manual are shown below.

Peripheral Device	Software Package Name	INSTALL Floppy Disk Package Name	CPU					
			A172SHCPU	A171SHCPU	A171SCPU		A273UHCPU	
			Teaching Function	Teaching Function	Teaching Function		Teaching Function	
					Without	With	Without	With
IBM PC	SW2SRX-GSV13PE software package	SW0SRX-SV13M				○		
		SW0SRX-SV13L			○			
		SW2SRX-SV13J					○ (8-axis specs.)	
		SW2SRX-SV13K						○ (8-axis specs.)
		SW2SRX-SV13U					○ (32-axis specs.)	
		SW2SRX-SV13V						○ (32-axis specs.)
		SW0SRX-SV13D	○					
		SW0SRX-SV13G		○				

(5) Detailed explanations of the GPP and SFC functions which are included in the GSV13PE package are not given in this manual. For details regarding these functions, refer to the operating manuals shown below.

Function	Manual Name	IB No.
GPP	SW0IX-GPPAE operating Manual	IB-66314
SFC	SW0IX-SAP2E Operating Manual	IB-66313

(6) Unless otherwise stated, the GSV13PE display screens shown in this manual are those displayed when the A273UHCPU (8-axis specs.) is used.

1. GENERAL DESCRIPTION

IMPORTANT

(1) The GSV13PE software package is exclusively for the servo system CPU.

(2) Personal computers started up with GSV13PE can communicate only with the servo system CPU where an SV13 positioning OS is registered.

(3) Before conducting GV13PE ONLINE mode operation, verify the name of the positioning OS registered at the servo system CPU. When conducting this check, press the LED reset switch on the front of the servo system CPU.

(When A273UHCPU is used)
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 SV13 registered:

S	V	1	3			V	E	R	.	0	0	A

        OS name   Version

(When A171SCPU/A171SHCPU/A172SHCPU is used)
Turn the A171SCPU/A171SHCPU/A172SHCPU "install" switch ON. (Refer to the A171SCPU User's Manual IB-67276 A172SHCPU/A171SHCPU User's Manual IB-67395) Use the GSV13PE to execute the install function.

```
┌ SERVO function ┐ → [ 7 ] → ┌ INSTALL function ┐ → [ 1 ] ┐
  selection window              selection window
```

The name and version of the positioning OS registered at the servo system CPU will be displayed on-screen.

(4) 12MB of space is required to install the GSV13PE at the hard disk. Therefore, be sure to verify that the hard disk's remaining memory capacity exceeds 12MB.

Shipping Container Contents

The following items are shipped together with the GSV13PE package.

Item	Name
Software package	SW2SRX-GSV13PE 1-9

1. GENERAL DESCRIPTION

(1) The abbreviations used in this manual are shown in the table below.

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

1. GENERAL DESCRIPTION

1.1 Features

The GSV13PE features are described below.

(1) A maximum of 32 axes can be controlled (with A273UHCPU).
Servo motor control for up to 32 axes is possible when an A273UHCPU is used with a 32-axis OS.

(2) Sequence programs can be created using the SFC ladder diagram.
The SFC program can be used to create a program which starts the servo program. (Files created at the SW1SRX-GSV12PE cannot be directly read out at the SW2SRX-GSV13PE. Refer to Section 10.2.6 for details.)

(3) 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.

(4) S-curve ratio settings are possible.
An S-curve ratio can be designated for gentler acceleration/deceleration processing than that provided by trapezoidal acceleration/deceleration processing.

(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 while in the servo test mode. This makes wiring checks and debugging of the new sequence program possible while watching the test run results.

(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.

(9) Teaching is possible.
The A30TU teaching module makes address & program teaching possible.

1. GENERAL DESCRIPTION

1.2 Upgraded Functions

The functions newly added or upgraded from the previous version are described below. For details of each function, refer to the Programming Manual.

(1) 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.

(2) 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.

(3) 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.

(4) Addition of high-speed oscillation function
   The control of reciprocating movement in sine wave form using a single axis is made possible.

(5) Compatibility with MR-J2-B servo amplifiers

(6) Improved management of present value when using an absolute encoder (see Section 1.2.1).

1. GENERAL DESCRIPTION

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 Procedural Flowchart to System Start

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

Flowchart	Reference
BEGIN	
Design the system	
Select the required units · Select units which are compatible with system.	When using the A171SCPU, refer to the Motion Controller(A171SCPU) User's Manual IB-67276. When using the A172SHCPU/A171SH CPU, refer to the Motion Controller (A172SHCPU/A171SHCPU) User's Manual IB-67395 When using the A273UHCPU, refer to the Motion Controller(A273UH-CPU) User's Manual IB-67262.
Determine the positioning data to be used · Select positioning data which is compatible with the system	Refer to the Motion Controller (SV13/22)(Real Mode) Programming Manual IB-67265.
Determine the servo program · Create a servo program which comforms to the system motion.	
Determine the sequence program · Create a sequence program to be used for starting the servo program,etc.	Refer to the ACPU Programming Manuals(IB-66249,IB-66250).
Build the system	When using the A171SCPU, refer to the Motion Controller(A171SCPU) User's Manual IB-67276. When using the A172SHCPU/A171SH CPU refer to the Motion Controller (A172SHCPU/A171SHCPU) User's Manual IB- When using the A273UHCPU, refer to the Motion Controller(A273UH-CPU) User's Manual IB-67262.
Designate the positioning data & servo program setting · Designate the positioning data & servo program settings at the personal computer started up with GSV13PE.	Refer to Section 1.2.1.
Create the sequence program · Use the GPP function to create the sequence program.	Refer to the Operating Manual for the SW0IX-GPPAE type GPP function software package.
Register the sequence program · Write the created sequence program to the servo system CPU.	
①	

1. GENERAL DESCRIPTION

```
        ( 1 )
          │
          ▼
┌─────────────────────────┐
│ Register the positioning data & │ ----------------------------- Refer to Section 1.2.1.
│ servo program           │
└─────────────────────────┘
          │       · At the personal computer started up with GSV13PE,
          │         write the positioning data & servo program to the servo
          │         system CPU.
          │
          ▼
┌─────────────────────────┐
│ Servo start-up & servo program │ ---------------------------- Refer to Section 1.2.1.
│ check                   │
└─────────────────────────┘
          │       · At the personal computer started up with GSV13PE,
          │         designate the TEST mode to start the servo and to
          │         check the servo program.
          │
          ▼
┌─────────────────────────┐
│ Check the sequence program │
└─────────────────────────┘
          │       · Check the sequence program by using it to execute the
          │         servo program.
          │
          ▼
┌─────────────────────────┐
│ Check to see how the system per- │
│ forms during automatic operation. │
└─────────────────────────┘
          │
          ▼
      ( END )
```

┌───┐
│ **POINT** │
├───┤
│ (1) Positioning Control program │
│   The program used for positioning control Can be created in the GPP │
│   function's programming SFC mode. │
│   For details regarding use of the SFC program to create the program │
│   which starts the servo program, refer to Section 10, and to the Motion │
│   Controller (SV13/22) (Real Mode) Programming Manual. │
└───┘

1. GENERAL DESCRIPTION

1.3.1 Procedural flowchart for the GSV13PE

The main GSV13PE related procedures are shown in the following flowchart.

```
        ( BEGIN )
            │
            ▼
┌──────────────────────────┐
│ GSV13PE registration &   │----------------------------  Refer to Sections 4 and 6
│ start-up                 │
└──────────────────────────┘
            │
            ▼
┌──────────────────────────┐
│ System settings          │----------------------------  Refer to Section 7
└──────────────────────────┘
     · Based on the devices used in the system configuration,
       designate the settings for the base unit, axis No., motor,
       and amplifier.
            │
            ▼
┌──────────────────────────┐
│ Positioning data settings│----------------------------  Refer to Section 8
└──────────────────────────┘
     · Designate the parameter settings which determine
       the operation of the servo motors and servo amplifiers.
            │
            ▼
┌──────────────────────────┐
│ Servo program creation   │----------------------------  Refer to Section 9
└──────────────────────────┘
     · Create a program which designates each motor's positioning
       control format and positioning data settings.
            │
            ▼
┌──────────────────────────┐
│ Register the positioning │----------------------------  Refer to Section 11
│ data & servo program     │
└──────────────────────────┘
     · Write the positioning data settings (designated at
       GSV13PE) and the servo program to the servo system.
            │
            ▼
┌──────────────────────────┐
│ Start the servo          │----------------------------  Refer to Section 12.2
└──────────────────────────┘
     · Check the following: initial status, model name, rotation direction,
       upper limit LS & lower limit LS, and rotation speed.
            │
            ▼
┌──────────────────────────┐
│ Conduct a servo diagnosis│----------------------------  Refer to Section 12.3
└──────────────────────────┘
     · Verify that the speed control gain 1 (only when ADU is
       used) and the position control gain 1 are appropriate.
            │
            ▼
┌──────────────────────────────┐
│ Test the JOG, manual pulse   │------------------------  Refer to Section 12.4
│ generator, and home position │                          to 12.6
│ return operations            │
└──────────────────────────────┘
     · Check the stroke limit and emergency stop effectiveness,
       Check for vibration and hunting.
       Check the home position return direction and the near-zero
       point dog position.
            │
            ▼
┌──────────────────────────────┐
│ Conduct a servo program test │------------------------  Refer to Section 12.7
│ operation                    │
└──────────────────────────────┘
     · Run the servo program which has been created and check
       its operation.
            │
            ▼
          ( 1 )
```

```
      ( 1 )
        │
        ▼
┌─────────────────────────┐
│   Monitor the servo     │------------------------------------------------- Refer to Section 13.3.2
└─────────────────────────┘
        │         · Use the torque trace function to check the peak torque
        │           and the effective torque.
        ▼
     ( END )
```

2. SYSTEM CONFIGURATION

This section describes the system configuration required for GSV13PE operation.

2.1 System Configuration

2.1.1 System configuration when IBM PC is used

The system configuration for GSV13PE operation using an IBM PC is shown below.
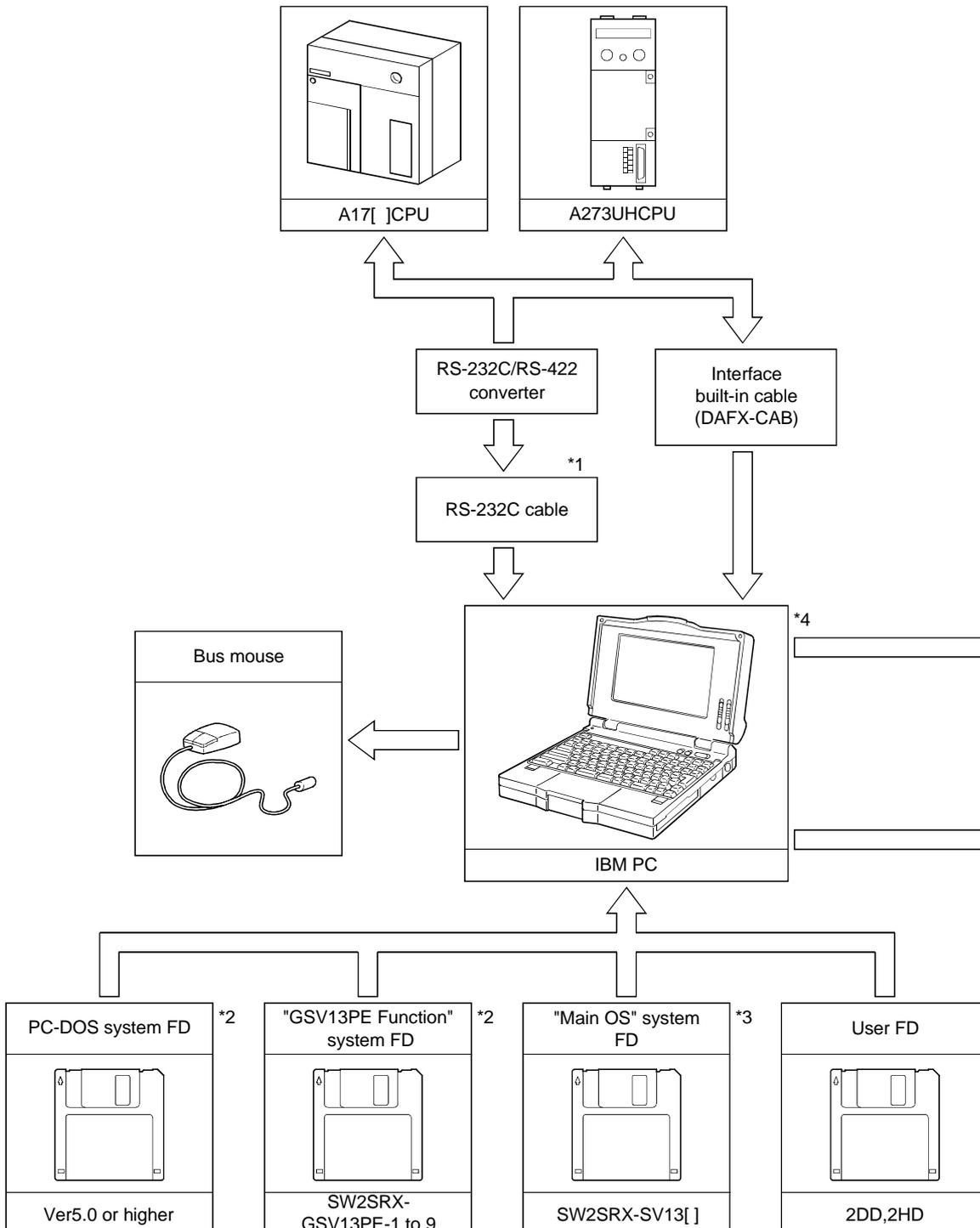
2. SYSTEM CONFIGURATION

> **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 "GSV13PE 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 GSV13PE, the hard disk must have at least 1 MB free area.

*1

Serial mouse

Parallel interface cable

AC30PIO-25P

Parallel interface printer

See Section 2.2.3
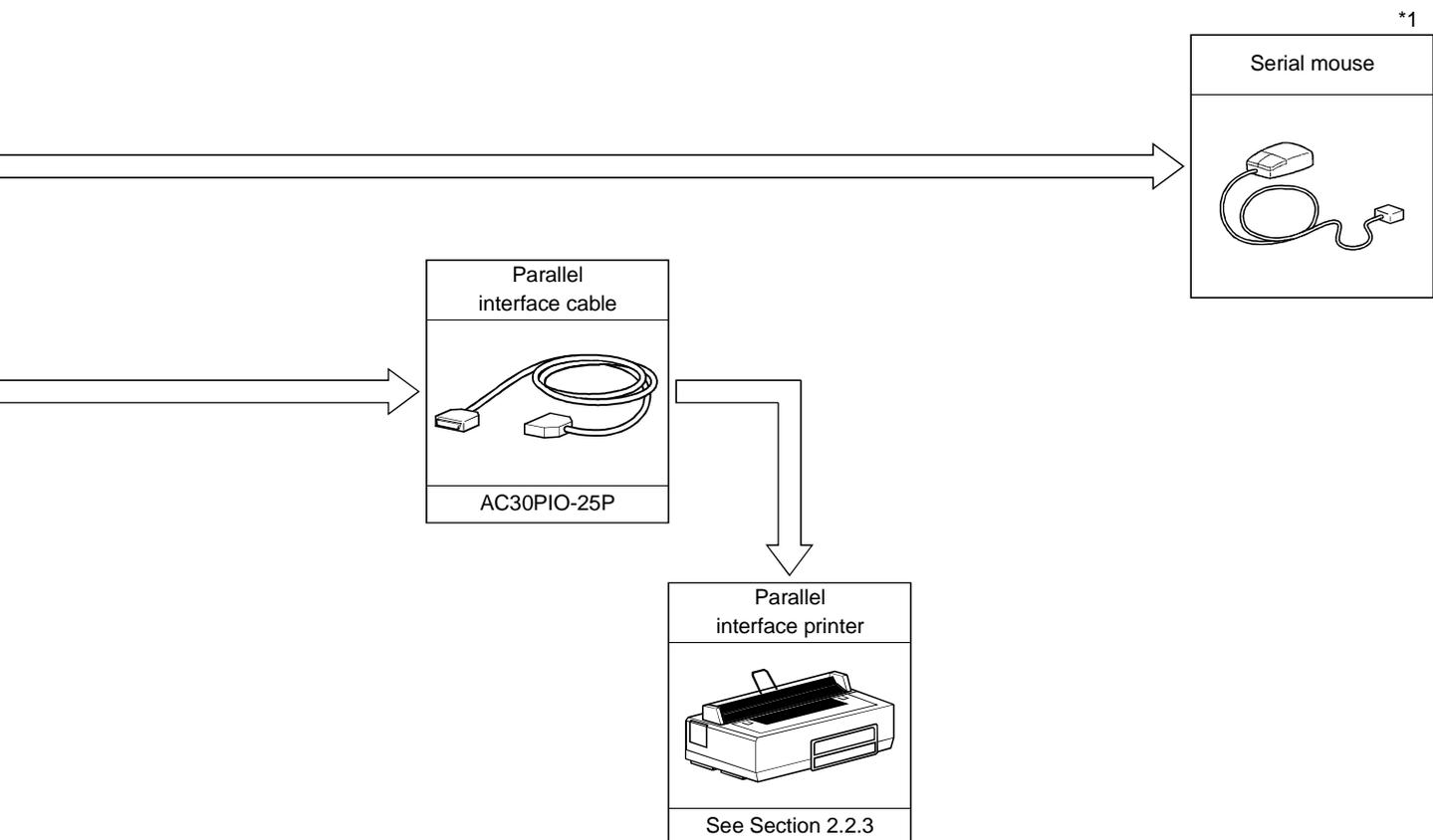
2. SYSTEM CONFIGURATION

2.2 Further Information Regarding The System Configuration

Further information regarding the system configuration for GSV13PE operation is given below.

2.2.1 Applicable CPU

The following CPUs are compatible with GSV13PE:
- A171SCPU
- A171SHCPU
- A172SHCPU
- A273UHCPU

2.2.2 Personal computer & servo system CPU connection method

(1) IBM-PC & servo system CPU connection method
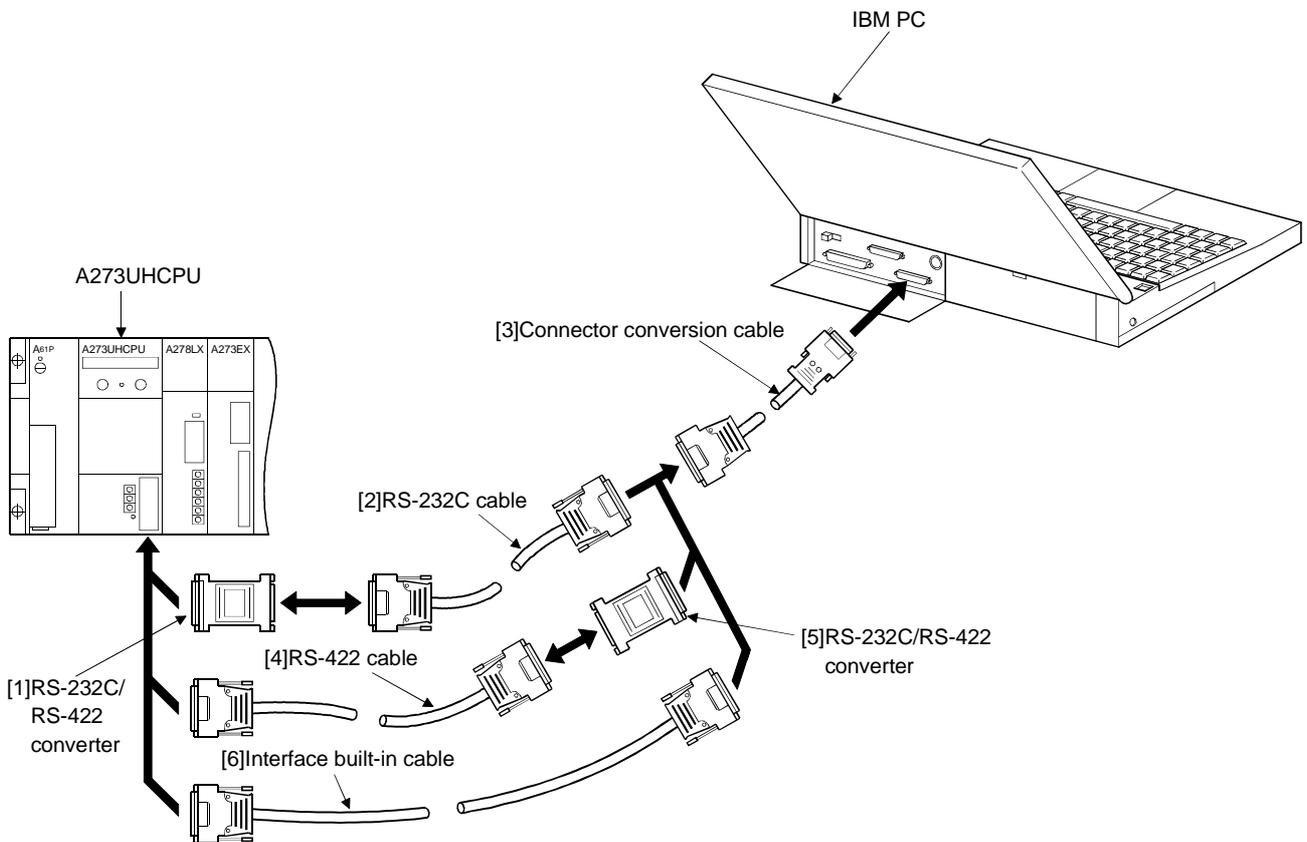
2. SYSTEM CONFIGURATION

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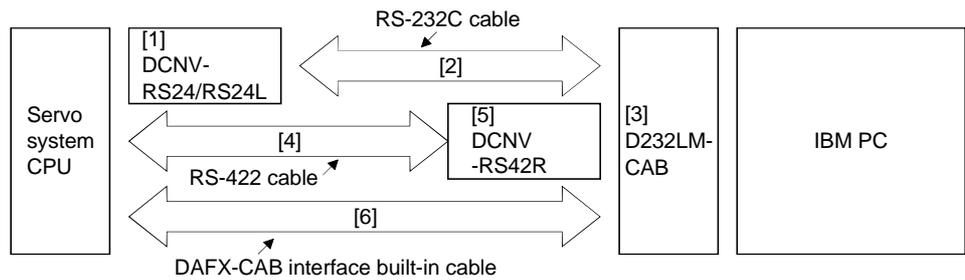
2.2.3 Printer

A parallel printer (ESC/P 24-J84) is usable.

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.

2 – 4

3. FUNCTION LIST

The GSV13PE functions are listed below.

SW2SRX-GSV13PE	System Settings	System	HELP	5.7
			Relative Check	7.1.5
			Unit/Module Information	7.1.6
			System Initialize	7.1.7
			END	7.1.8
		Unit/Module Edit	Cancel	7.1.3(2)
			Copy	7.1.3(2)
			Cut	7.1.3(2)
			Paste	7.1.3(2)
			Delete	7.1.3(2)
		Unit/Module Set	Base Unit Selection	7.1.2
			Module Allocation	7.1.3(1)
			Axis No. Set	7.1.4
			High-speed Data Read Set	7.1.8
	Servo Data Set	Axis Data Set	Fixed Parameters	8.1.1
			Servo Parameters	8.1.2
			Home Position Return	8.1.3
			JOG Operation Data	8.1.4
		Parameter Block Set		8.1.5
		Limit Switch		8.1.6
		Auxiliary Functions	Axis Data Copy	8.2.1
			Parameter Block Copy	8.2.2
			Axis Data List	8.3.1
			Parameter Block List	8.3.2
			Parameter Block Clear	8.5.1
			Limit Switch Clear	8.5.2
			Axis Data Clear	8.5.3
			Axis Data Check	8.4.1
			Parameter Block Check	8.4.2
			File Write	8.6
	Programming	Edit		9.2
		Read	Program No.	9.1.1
			Axis No.	9.1.2
			Servo Instruction	9.1.3
			Indirect Device	9.1.4
			Final Program	9.1.5
		Delete		9.2.3
		Auxiliary Functions	Program List	9.3
			Sort	9.4
			Copy	9.5
			Batch Change	9.6
			All Clear	9.7
			File Write	9.8
			PC Write Set	9.9

(1)

3. FUNCTION LIST

(1)

```
── Servo Printer ─┬─ Printer Data Set ──┬─ Paper Set              15.1
                  │                      ├─ Paper Width            15.1
                  │                      ├─ Paper Length           15.1
                  │                      ├─ Print START Position   15.1
                  │                      └─ Print Header           15.1
                  │
                  └─ Servo Print ──┬─ Program                      15.2
                                   ├─ Axis Data                    15.2
                                   ├─ Parameter Block              15.2
                                   ├─ Limit Switch                 15.2
                                   ├─ System Settings              15.2
                                   └─ Page                         15.2

── Servo File ──┬─ Read                          14.3
                ├─ Write                         14.4
                ├─ Reference/Verification        14.5
                ├─ Delete                        14.6
                ├─ Copy                          14.7
                ├─ System Name Creation          14.9
                ├─ Display Format Change         14.8
                └─ Directory Print               14.2

── Online ─┬─ Servo PC ──┬─ Read                         11.2
           │             ├─ Write                        11.1
           │             └─ Reference/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 Position Change     12.10
                           └─ Servo ON/OFF                12.11

── Install ──┬─ Install Function     16.1
             └─ Verify Function      16.2
```

(2)

3 – 2

3. FUNCTION LIST

REMARK

(1) The GSV13PE package includes the GPP and SFC functions.
For details regarding these functions, see Section 10.

4. REGISTERING GSV13PE AT THE PERSONAL COMPUTER

The procedure for registering (installing) GSV13PE at the hard disk is shown below.

4.1 Registering GSV13PE at an IBM-PC

(1) Registration procedure
The procedure described below assumes a hardware configuration like the one shown below.

Drive C
(hard disk)

Drive A

4. REGISTERING GSV13PE AT THE PERSONAL COMPUTER

Switch the IBM-PC power ON	······For an IBM-PC, one of the following operating systems is required: PC-DOS (Ver5.0 or higher).
C>▨	······"Waiting for DOS command" status.
Insert system disk No.1 into the designated drive.	······The drive varies according to the system being used.
A>INSTHD	······Change to the drive where system disk No.1 is inserted, and enter "INSTHD" as shown at left.
Select drive	························Select the drive where GSV13PE is to be installed.
Display type selection	······Select the desired display type.(1:color 2:Black & white)
1 / 2	
Verify that system disk No.1 has been inserted	······Verify that system disk No.1 has been inserted into the appropriate drive.
Enter	
(System disk installation START)	······If the hard disk's available space is insufficient, the message shown below will be displayed, and the install operation will be aborted.

```
Insufficient hard disk capacity.
Install aborted.
Press any key
```

(1)

4. REGISTERING GSV13PE AT THE PERSONAL COMPUTER

(1)

```
┌─────────────────────────────────┐
│ Install the system disk data    │  ······Continue with the installation of the remaining system disk data
│ according to the on-screen      │           in accordance with the on-screen guidance messages.
│ guidance messages.              │
└─────────────────────────────────┘

        (System disk install completed)

┌─────────────────────────────────┐
│ Start-up environment(CONFIG.SYS) change │
└─────────────────────────────────┘

          ╭───────────────────────╮
          │         END           │  ······After changing the CONFIG.SYS, restart the system, then start
          ╰───────────────────────╯           the GSV13PE function.
```

(2) Personal Computer specifications
   The specifications of the personal computer that can be used are as follows:
   CPU   : 80386 or better
   EMS   : 1 MB or greater
   Available hard disk area
         (at installation)   : 12 MB or greater
         (while running)   : 1 MB or great
   Available main memory
   area when running the package : 560KB or greater

(3) Startup environment settings
   In order to start up GSV13PE, environment settings must be made in the
   CONFIG.SYS file.
   The settings that must be made in the CONFIG.SYS file are indicated below.

   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-CFFF D=64 FRAME=D000
DEVICEHIGH=C:\DOS\SETVER.EXE
DEVICEHIGH=C:\DOS\ANSI.SYS /X
```

4. REGISTERING GSV13PE AT THE PERSONAL COMPUTER

(a) Batch file
In order to start up the GSV13PE function, GSV13PE2.BAT is copied to the root directory, with the following data contents, as the batch file. The system re-writes the drive name as the drive name designated at installation.

```
ECHO OFF
MOUSE
CLS
CD\GPP\2GSV
GSV13P
CD\
```

5.   COMMON ITEMS

This section describes items which are common to all GSV13PE operations.

5.1   Common File Management Items

Procedures common to all GSV13PE file management operations are described here.

5.1.1   System name

GSV13PE utilizes the hierarchical directory shown below.
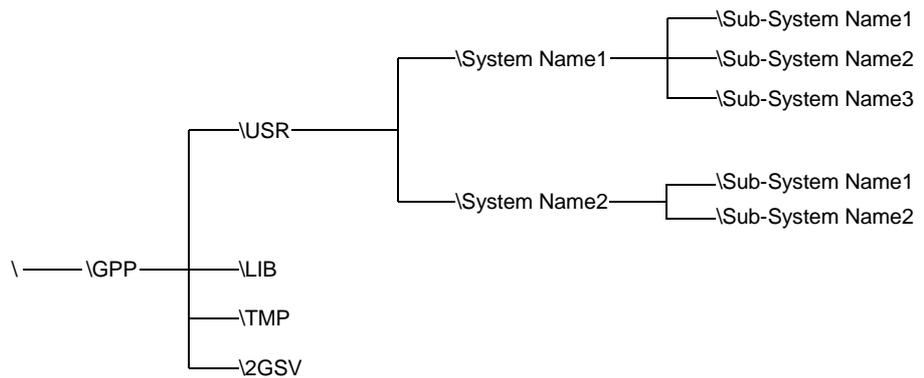
Fig. 5.1 System Names & Sub-System Names

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. COMMON ITEMS

5.1.2 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.

POINT

(1) Comment & Comment GPP
- A "comment" is a comment related to the system name or the sub-system name. A comment which indicates the program content or the creation date, etc., is useful when conducting data searches.
  A maximum of 32 alphanumeric characters and special symbols may be used in the comment.
- A "comment GPP" is a comment which enables interchangeability with A6GPP file comments. These comments are added to program files created by the GPP function, and which have been converted for A6GPP use. These comments are displayed in the "comment" column when a directory display is executed at the A6GPP.
  A maximum of 20 alphanumeric characters and special symbols may be used in the comment GPP.

---

5. COMMON ITEMS

5.2 File Configuration

The GSV13PE file configuration is shown below.

(1) GSV13PE file configuration

(File Name)

```
\ ──┬── \GPP ──┬── \USR ──┬── \System Name1 ──┬── \Sub-System Name1 ──┬── PARAM.BIN
   │          │          │                    │                       ├── MSEQUENC.BIN
   │          │          │                    │                       ├── KANACOM.BIN
   │          │          │                    │                       ├── KANJICOM.BIN
   │          │          │   \System Name2     │                       ⋮        ⋮
   │          │          │                    │                       └──
   │          │          │                    ├── \Sub-System Name2 ──┬── PARAM.BIN
   │          │          │                    │                       ├── MSEQUENC.BIN
   │          │          │                    │                       ├── KANACOM.BIN
   │          │          │                    │                       ├── KANJICOM.BIN
   │          │          │                    │                       ⋮        ⋮
   │          │          │                    └── \Sub-System Name3 ──┘
   │          │          └── \System Name3
   │          ├── \LIB
   │          ├── \TMP
   │          └── \2GSV
   └── GSV13PE2.BAT
```
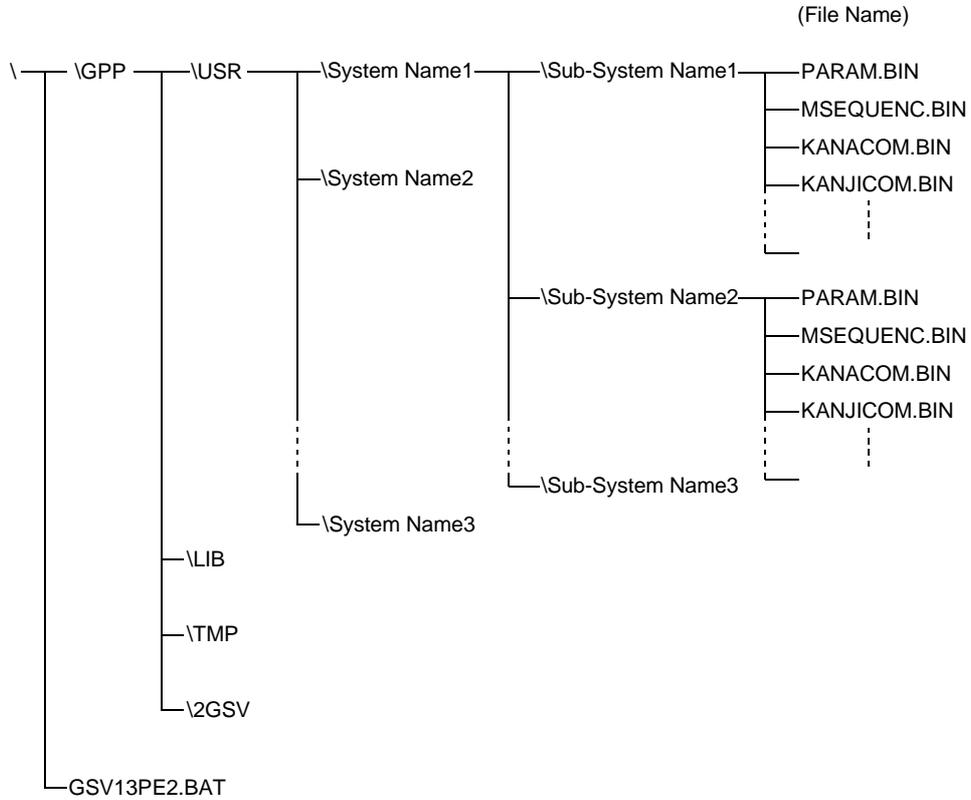
5. COMMON ITEMS

(2) File name
Files are created under the GSV13PE sub-system names according to the data content.

(File Name)

1.	Parameter	PARAM.BIN
2.	Main sequence (includes T/C setting value)	MSEQUENC.BIN
3.	Sub-sequence (includes T/C setting value)	SSEQUENC.BIN
4.	SFC block title	SFCBTTL.BIN
5.	SFC step comment	SFCn.BIN (n=0-255)
6.	Step trace	STPTRACE.BIN
7.	Main microcomputer	MMICRO.BIN
8.	Sub microcomputer	SMICRO.BIN
9.	Comment 1	KANACOM.BIN
10.	Comment 2	KANJICOM.BIN
11.	Main statement	MSTATEM.BIN
12.	Sub statement	SSTATEM.BIN
13.	Main note	MNOTE.BIN
14.	Sub note	SNOTE.BIN

File name is fixed

15.	Sampling trace	[Data name].STR
16.	Status latch	[Data name].SLT
17.	Device memory	[Data name].DEV

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

18.	System information (PC type, commnent, printer information)	GPPA.CNF
19.	PC type (for PCPU)	GSVP.CNF
20.	Print header	PHEADER.BIN
21.	Extension comment	NEWCOM.BIN
22.	System settings data	SVSYSTEM.BIN
23.	Servo data	SVDATA.BIN
24.	Servo program	SVPROG.BIN
25.	Trace graph data	SVTRACEn.BIN (n=01-31)
26.	Backup data	SVBACKUP.BIN

File name is fixed

5. COMMON ITEMS

5.3 Common Display Format

The display layout and content which are common to all GSV13PE operations are described here.
(1) Display items common to all GSV13PE operations
  (a) Display items when in any mode other than "System Settings"
    The display items common to all modes other than the "system settings" mode are described below.
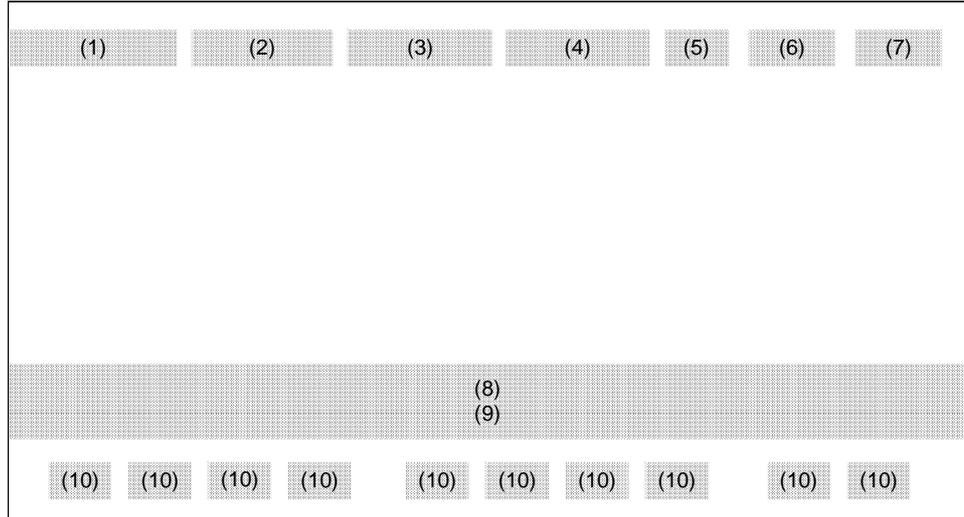
No.	Name	Description
(1)	Mode/Function Display Area	The mode or function which is currently active is displayed.
(2)	PC Type - PC No. - Monitor Destination Display Area	The following items designated by the initial settings are displayed here: PC type, channel No., PC No., monitor destination (PC, DM (device memory), SL (status latch)), and network No.
(3)	Memory Status Display Area (number of steps used & remaining number of steps)	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: MENU (when the [F11] function key is pressed, the menu selection window is displayed.)
(7)	[F12] Function Display Area	F12: HELP (when the [F12] function key is pressed, the HELP window is displayed.)
(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)
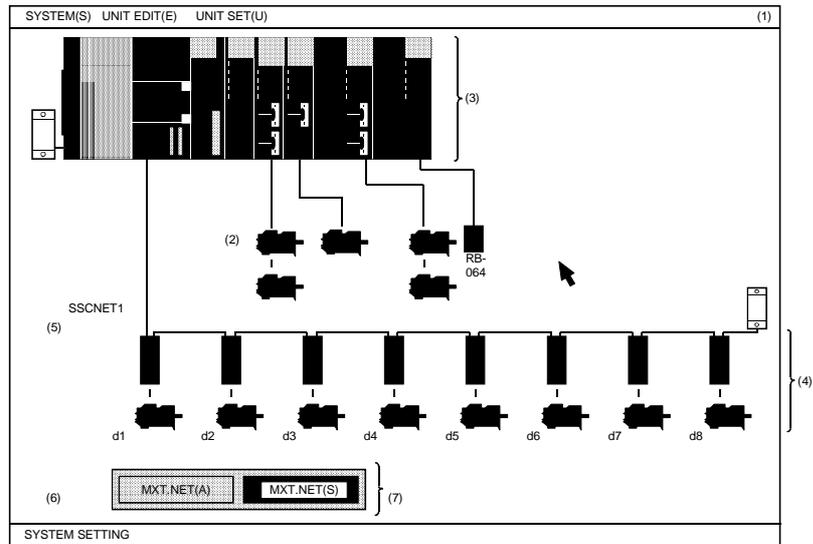
No.	Name	Description
(1)	Menu bar display area	The menu bar is displayed when the right mouse button or the [ESC] key is pressed.
(2)	System setting area	This entire window is for system settings. Unit allocations, etc., are designated here.
(3)	Base unit display area	The designated base unit and the module mounting status are displayed here.
(4)	Servo amplifier display area	The operation status of servo amplifiers d1 to d4 are displayed (at A171SCPU).
		The operation status of servo amplifiers d1 to d8 are displayed (at A273UHCPU (8/32 axis specification)).
(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

5.4 Windows/Guidance

GSV13PE operations include the following 6 types of windows & guidance messages.

- 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

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, etc., by using the cursor control keys to move the cursor to that item, and then 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.

Function selection by mouse is only possible in the GSV13PE's SYSTEM SETTINGS mode.

5. COMMON ITEMS

5.4.1 Menu selection window

The menu selection window can be used for all operation selections related to the GPP function. Except when in the GSV13PE's INITIAL SETTINGS or SYSTEM SETTINGS modes, the menu selection window can be displayed during any operation by pressing the [F11] function key.
The INITIAL SETTINGS or SYSTEM SETTINGS mode must be canceled in order to display the menu selection window.

```
<MENU>
1:PROGRAMMING                    ───── Window title
2:PARAMETER
3:ON-LINE
4:DOCUMENTATION
5:PRINTER
6:FILE MAINTENANCE               ───── Menu items
7:OPTION
8:INITIAL SETTING
9:QUIT
```

[Key Operation]

```
F11 ──→ [ Numeral ] ──────────────→ [ Next window ]
           │                    ↑
           └──→ [↑] / [↓] ──→ Enter ──┘
              ────────────────────
                 Menu selection
```

5 – 8
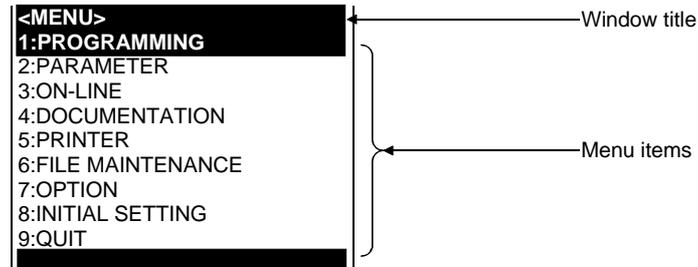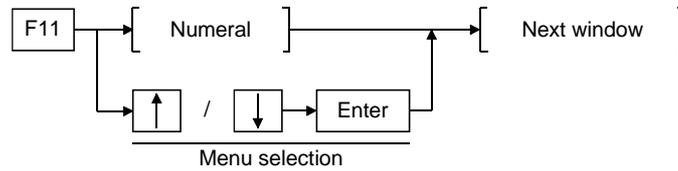
5. COMMON ITEMS

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.

[Key Operation]
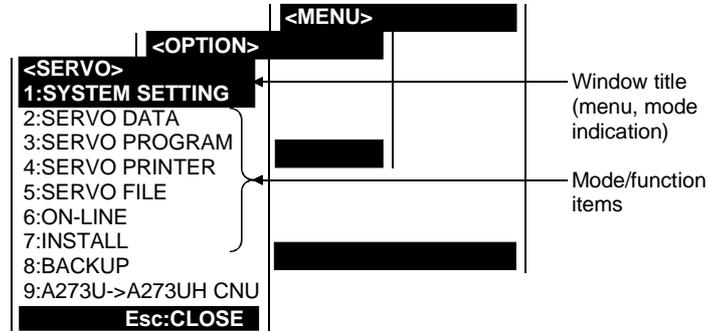
Mode/function selection
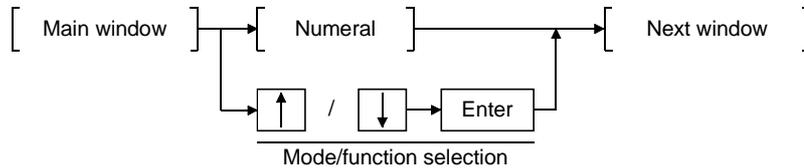
- Press the [ESC] key to return to the main window.

5.4.3 Function selection sub-window

When a mode/function is selected, function selection sub-windows are provided when additional selection items exist.
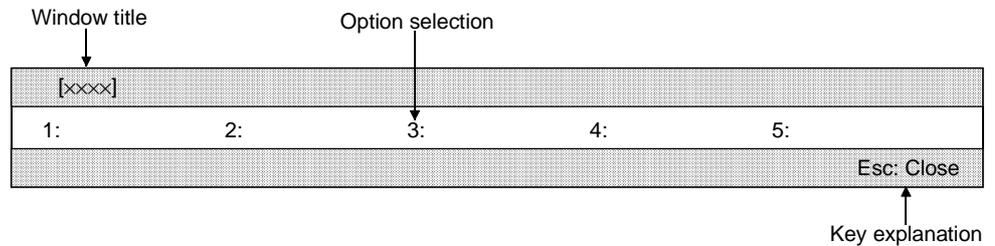
[Key Operation]
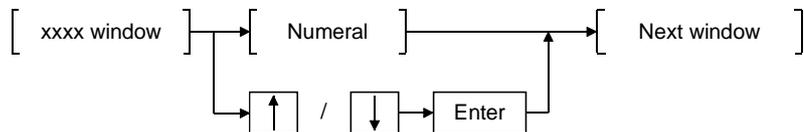
- Press the [ESC] key to return to the main window.

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.

Window title   EXECUTE/SET data

```
[xxxx]





Page up Page down          END:Setting End    ESC:Abort  ◄──── Key explanation
```

[Key Operation]

┌─ xxxx window ─┐ ──► ┌─ Data setting ─┐ ──► ┌ End ┐
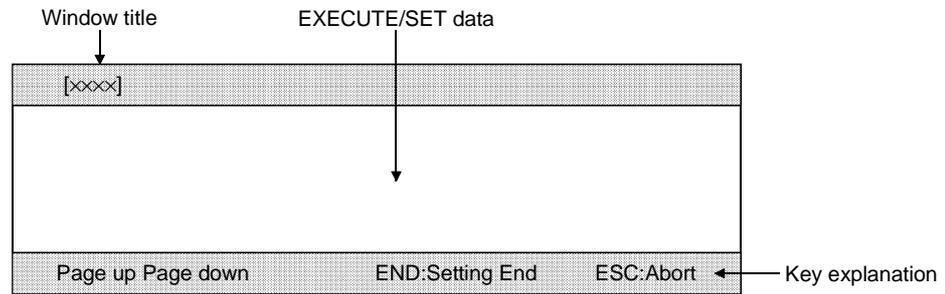
- Press the [ESC] key to return to the main window.
- When multiple EXECUTE/SET windows exist, use the [PAGE UP] key to display the previous page, and the [PAGE DOWN] key to display the next page.

5.4.5 Check dialog box

The check dialog box is used for the following:
- Error message is displayed when the error prevents further operation.
- Processing confirmation messages are displayed.

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]

```
REL.CHK.
    AXIS NO.   IS OVERLAP.              ◄──── Error message/
    ZAXIS ALLOC:EX.SERVO AMP.(d1)            confirmation message
                EX.SERVO AMP.(d2)

             CONF  ◄──────────────────────── CONFIRM button
```
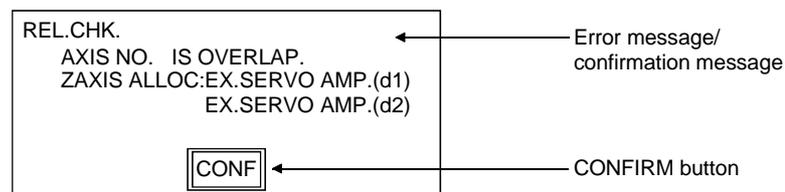
[Key/Mouse Operation]
- Error message check

┌─ Confirmation dialog box ─┐ ──► ┌─ "CONFIRM" Left-click ─┐

                              ──► │ Enter │   Key input

                              ──► │ Esc │   Key input

5 – 10
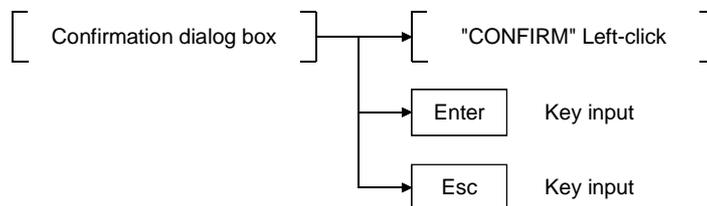
5.4.6 Option selection dialog box

Questions, messages, and setting options are displayed at the option selection dialog box.
The two types of dialog box are shown below. Each type features question, message, and YES/NO, OK/CANCEL option displays.
In response to the questions and messages, the desired YES/NO or OK/CANCEL option can be selected by using the mouse or by moving the cursor to the desired item.

[YES/NO Selection Dialog Box]

```
┌─────────────────────────────────┐
│ ┌─────────────────────────────┐ │
│ │  Base unit will be changed. ◀──────── Question/message
│ │  Initialize system?         │ │
│ │                             │ │
│ │   ┌─────┐      ┌─────┐      │ │
│ │   │ YES │      │ NO  │      │ │
│ │   └─────┘      └─────┘      │ │
│ └──────▲────────────▲─────────┘ │
└────────┼────────────┼───────────┘
         │            └──────────────── YES/NO buttons
         └────────────┘
```

[Key/Mouse Operation]

```
┌                          ┐        ┌───┐   ┌───┐
  YES/NO selection dialog box  ───▶  │ Y │ / │ N │  Key input
└                          ┘        └───┘   └───┘
                                    ┌                  ┐
                                ───▶  YES/NO left-click
                                    └                  ┘
```

[OK/CANCEL Selection Dialog Box]

```
┌───────────────────────────────────────────┐
│                                           │
│   AXIS No. SETTING                        │
│                                           │
│    0:NOT USED    3:AXIS 3    6:AXIS 6 ⎫   │
│    *1:AXIS 1     4:AXIS 4    7:AXIS 7 ⎬────── Setting data
│    2:AXIS 2      5:AXIS 5    8:AXIS 8 ⎭   │
│                                           │
│  ┌──────┐  ┌──────┐  ┌────┐    ┌────────┐ │
│  │ <-(Z)│  │ (Z)->│  │ OK │    │ CANCEL │ │
│  └──────┘  └──────┘  └──▲─┘    └───▲────┘ │
└─────────────────────────┼──────────┼──────┘
                          │          └────────── OK/CANCEL buttons
                          └──────────┘
```
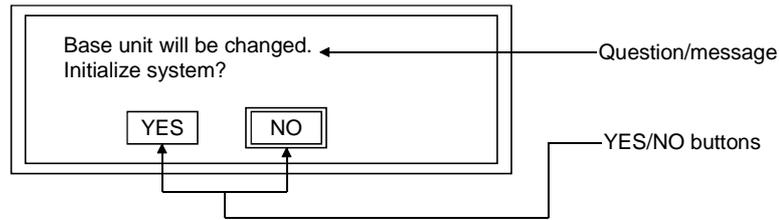
[Key/Mouse Operation]

```
┌                             ┐      ┌                        ┐
  OK/CANCEL selection dialog box ──▶   OK/CANCEL Left-click
└                             ┘      └                        ┘
                                     ┌───────┐
                                 ──▶ │ Enter │    Key input
                                     └───────┘
                                     ┌───────┐
                                 ──▶ │  Esc  │    Key input
                                     └───────┘
```
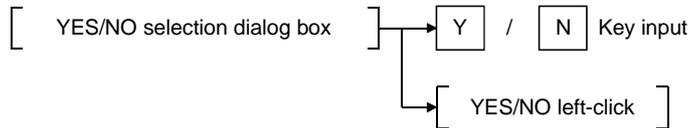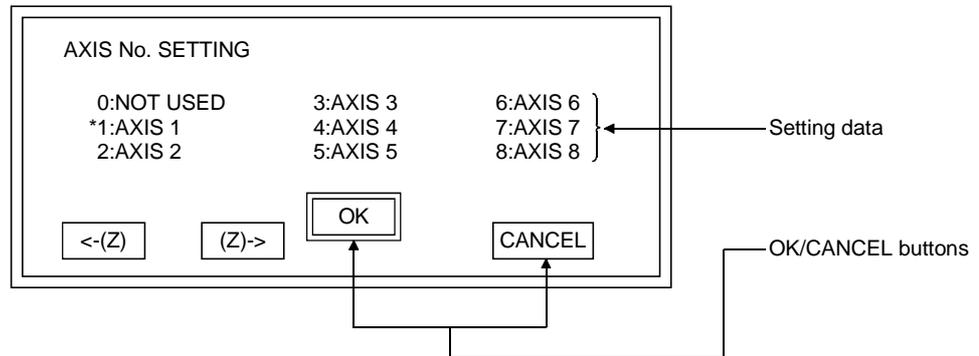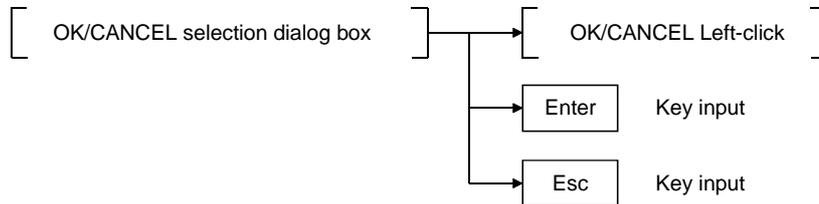
5.5　Basic Mouse Operation

The basic procedures for using the mouse in GSV13PE operations are described here.

(1) Mouse appearance & mouse cursor

[Mouse Appearance]
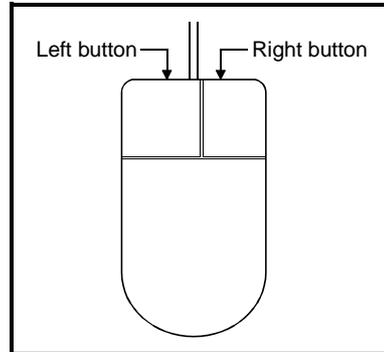
As shown at left, the mouse is equipped with left and right buttons.

Left button — Right button

[Mouse Cursor]

SYSTEM(S)　　　UNIT EDIT(E)　　　UNIT SET(U)

HELP(H)
RELATIVE CHECK(R)
UNIT INFO.(U)
SYSTEM INIT.
END(Q)

RB-
064
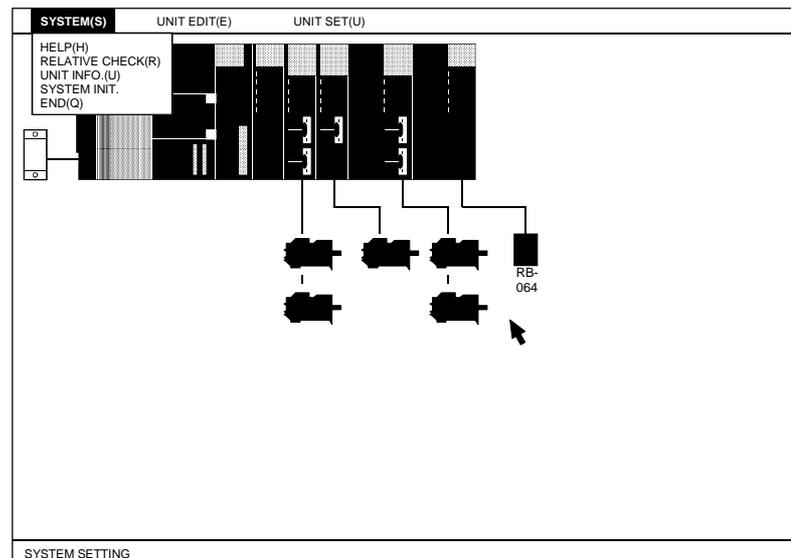
SYSTEM SETTING

The mouse cursor is used to select functions and items, and to designate settings. The mouse cursor is displayed in the SYSTEM SETTINGS mode.

(2) Mouse operation & functions
  (a) Button press (ON)
     Pressing the right-side button is referred to as a "right-press".

     Right-Press

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

(b) Button Release (OFF)
Lifting the finger from the pressed button to release it is referred to as a "right-release".

| Left-Release | • Designates drag destination position
Dragging of a selected item ends at the position where a left-release occurs. |

| Right-Release | • Designates a menu item selection
After dragging the cursor to the desired pull-down menu item, a right-release is executed to select that item. (Refer to item(e) below for details regarding "drag" operations.) |

(c) Click
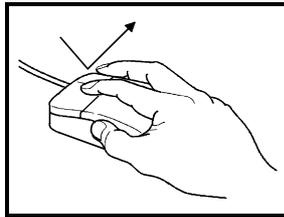
Pressing and immediately releasing the left-button is referred to as "left-click".

| Left-Click | • Function selection & execution
Move the mouse cursor to the desired item, then execute a left-click to select and execute the function. |

(d) Double-Click
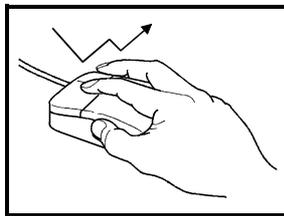
A double-click is two left-clicks in rapid succession.

| Left Double-Click | • Dialog box display for unit/module data setting
Move the mouse cursor to the unit/module where data settings are to be designated, then execute a left double-click to display the dialog boxes. |

5. COMMON ITEMS

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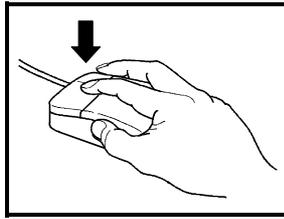
Moving the mouse body to a desired position while the left or right button is pressed is referred to as a "drag" operation. Mouse movement with the left-button pressed is referred to as a "left-drag".
Mouse movement with the right-button pressed is referred to as a "right-drag".

| Left-Drag |

- Moving a selected item
  A left-drag is executed to move a selected item.
  When the desired position is reached, execute a left-release.

| Right-Drag |

- Selection of menu bar & pull-down menu items
  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

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The keyboard layouts and key applications used with the GSV13PE package are shown below.

5.6.1 For IBM-PC

The IBM-PC keyboard layout is shown below.
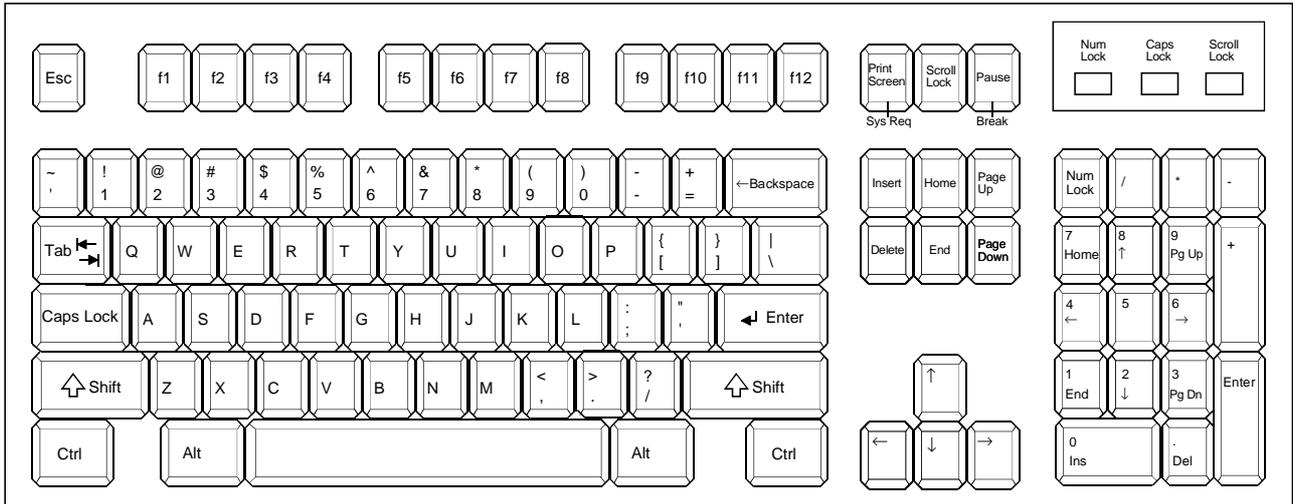
5. COMMON ITEMS

5.6.2   Common keys

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The keys and key applications common to all GSV13PE operations are described below.

(1) For and 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. (Refer to item (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 1 character to the left of the cursor position. During the TEST mode, this key executes an rapid stop of all axes.
↵ (Enter)	Registers an input or item selection.
Page Up	Displays the previous page for ladder, list, HELP, and SFC diagrams, etc. This key is also used for axis No. switching (−1) during servo monitor and servo test operations, etc.
Page Down	Displays the next page for ladder, list, HELP, and SFC diagrams, etc. 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 as [PAGE UP] key).
+C	Displays the next page (same 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 between servo programming and SFC program editing. Switches from ladder monitoring to servo programming. Switches from SFC monitoring to servo programming. Switches from servo PC / servo monitoring to PC TEST. Switches between SERVO TEST and PC TEST.
Alt+F11	Switches from servo PC to ladder monitoring. Switches between servo monitoring and ladder monitoring. Switches between servo PC / servo monitoring and SFC 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) When the [Ctrl] + [F1] keys are pressed, a <"Write to file? YES/NO> dialog (confirmation) message will be displayed. 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 GSV13PE 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 Type		
	Guidance HELP	Troubleshooting HELP	HELP Menu
System setting	○	——	——
Servo data setting	○	○	○
Servo programming	○	○	○
Servo printer	○	○	○
Servo file	○	○	○
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 Section 4.)
An example of the guidance HELP window is shown below.

[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    Write END instruction.
 is displayed.
 A servo program which does not contain neither VEND      Write VEND or CPEND instruction at the end of
 nor CPEND instruction is displayed.                      servo program.




                                      Page Up:Previous   Page Down:Next        Esc:Close
 NO 'END' COMMAND.
 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
                                         Enter:OPEN  Esc:COLSE
 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.

Ending the HELP menu display — Press the [ESC] key to end the HELP menu display.

POINT

(1) 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.
   • HELP table of contents window
     An example of the HELP table of contents window is shown below.

```
CONT
      SELECT BASE UNIT AND EXECUTE UNIT
      LINE, NUMBER OF UNIT,AXIS NO.,
      AND MOTOR SETTING.
      FOLLOWING ITEMS SHOW DETAILS.


   (A)UNIT SET          (D)EX.SERVO AMP.SET

   (B)MOTOR SE          (E)REL.CHK.

   (C)AXNO.SET          (F)HI-SPEED DATA READ SET

                                       Esc:CANCEL
```
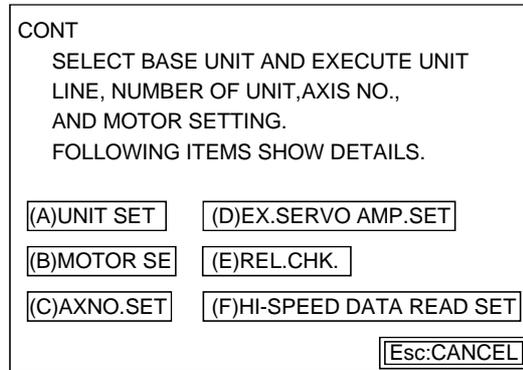
[Key Operation]

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.
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.

```
UNIT SET
 UNIT TYPE,NUMBER OF UNIT,BASE SLOT LOCATION SETTING.

 •CONNECT EX.REGENERATIVE RESISTANCE TO POWER UNIT.
 •EX.SIGNAL UNIT IS NECESSARRY TO USE DYNAMIC.
  BRAKE
 •CAN SET 256PT. I/O SUM(IN-OUT UNIT)IN MOTION
  IN MOTION UNIT.
 •IF USE ABS MOTOR(ADU) OR ABS SYNC.ENCORDER
  BATTERY UNIT IS NECESARRY(BASE UNIT).


   <--(Z)   (X)-->        (H)HELP CONT.      Esc:CANCEL
```
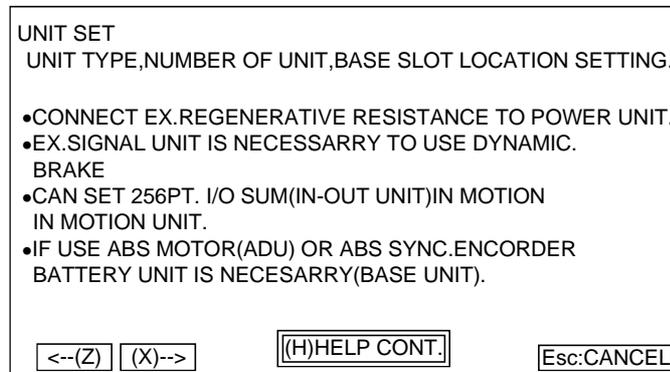
[Key Operation]

Page changes	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) To HELP Table of Contents" 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 GSV13PE, 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.

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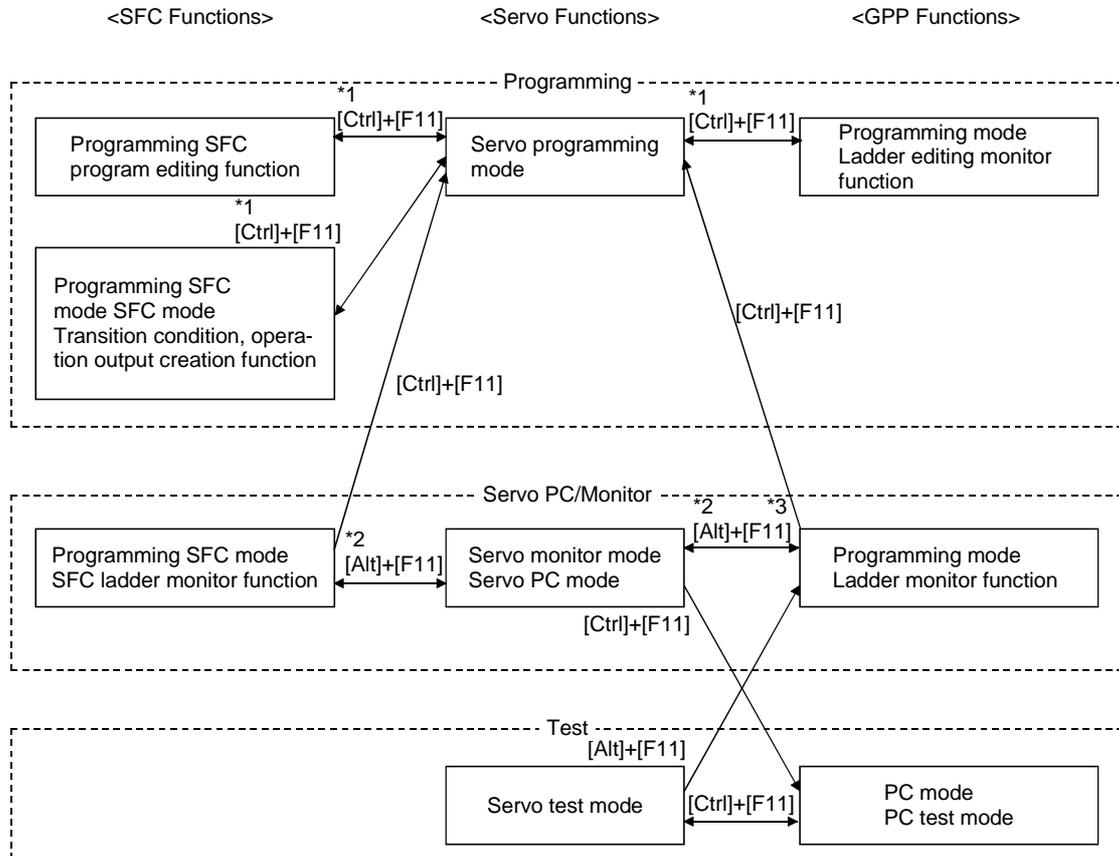
*1 If [Ctrl] + [F11] is pressed in the servo programming mode without first having entered the SFC mode/ladder mode at least once, the system will switch to the ladder mode.

*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.

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6. STARTING & QUITTING GSV13PE

6.1 Start-Up Procedure

This section describes the procedure for displaying the GPP function's initial screen after starting the personal computer where GSV13PE has been registered (installed).

6.1.1 Start-up procedure at IBM-PC

```
C>GSV13P
```

.........Enter "GSV13P" at the DOS screen as shown at left.

Enter

```
INITIAL SETTING                                    F12: HELP

   COPYRIGHT(C)  1995
   MITSUBISHI ELECTRIC CORPORATION
   ALL RIGHTS RESERVED
                    GPP+PC SERVO
   SW2SRX-GSV13P      Version 00A
                    <INITIAL SETTING>
                    1 :  CREATE
                    2 :  FILE READ
                    3 :  PC READ
                            Esc:CLOSE

  1    2    3    4    5    6    7    8    9    0
```

.........SW2RX-GSV13PE will then be started and the GPP functions's initial screen will be displayed. Initial setting should be designated here. (For details regarding initial settings, refer to the operating manual for the SW1SRX-GPPEA type GPP function.)

```
INITIAL SETTING      A3U- 0+FF-PC-0       C:TEMP  MAIN F11: MENU F12: HELP
                                        <MENU>
                                        1: PROGRAMMING
                                        2: PARAMETER
                                        3: ON-LINE
                                        4: DOCUMENTATION
                                        5: PRINTER
                                        6: FILE MAINTENANCE
                                        7: OPTION
                                        8: INITIAL SETTING
                                        9: QUIT

  SELECT MODE.
  1    2    3    4    5    6    7    8    9    0
```

.........The menu selection window will then be displayed. At this window, select the "OPTION" item.

7

```
INITIAL SETTING      A3U- 0+FF-PC-0       C:TEMP  MAIN F11: MENU F12: HELP
                                     <MENU>
                               <OPTION>        MING
                               1:A6GPP< >AT CONV R
                               2:ROM
                               3:SERVO            ATION
                               4:DOS
                                     Esc:CLOSE  ENANCE
                               7: OPTION
                               8: INITIAL SETTING
                               9: QUIT

  1    2    3    4    5    6    7    8    9    0
```

.........The OPTION function's selection window will then be displayed. At this window, select the "SERVO" item The servo function will then be started.

3

1)

6. STARTING & QUITTING GSV13PE

1)

INITIAL SETTING	A3U- 0+FF-PC-0	C:TEMP	MAIN F11: MENU F12: HELP

<MENU>

<OPTION>

<SERVO>

1:SYSTEM SETTING
2:SERVO DATA
3:SERVO PROGRAM
4:SERVO PRINTER
5:SERVO FILE
6:ON-LINE
7:INSTALL
8:BACKUP
9:A273U->A273UH_CNV

Esc:CLOSE

P<>AT CONV

Esc:CLOSE

7: OPTION
8: INITIAL SETTING
9: QUIT

VING
R

ATION

ENANCE

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | |

.........The servo function's selection window will then be displayed.

6. STARTING & QUITTING GSV13PE

6.2 Ending GSV13PE Operation

The procedure for ending GSV13PE operation and returning to the DOS screen is described below.

Either press the [ESC] key to close the data setting windows and sub-function selection windows, or press the [F11] function key to display the menu selection window.

INITIAL SETTING	A3U- 0+FF-PC-0	C:TEMP MAIN F11: MENU F12: HELP

```
<MENU>
1: PROGRAMMING
2: PARAMETER
3: ON-LINE
4: DOCUMENTATION
5: PRINTER
6: FILE MAINTENANCE
7: OPTION
8: INITIAL SETTING
9: QUIT
```

SELECT MODE.

`1    2    3    4    5    6    7    8    9    0`
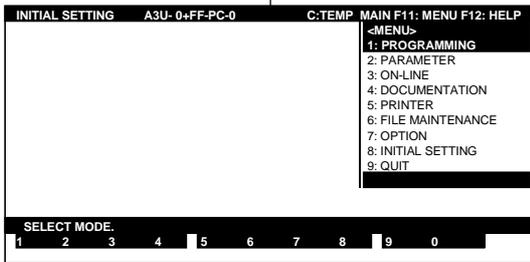
.... The menu selection window is displayed.
To end GSV13PE operation, select the "QUIT" item

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INITIAL SETTING	A3U- 0+FF-PC-0	C:TEMP MAIN F11: MENU F12: HELP

```
<MENU>
<QUIT>                  AMMING
1:SAVE & QUIT           TER
2:ABORT
        Esc:CLOSE  ENTATION
           5: PRINTER
           6: FILE MAINTENANCE
           7: OPTION
           8: INITIAL SETTING
           9: QUIT
```

`1    2    3    4    5    6    7    8    9    0`
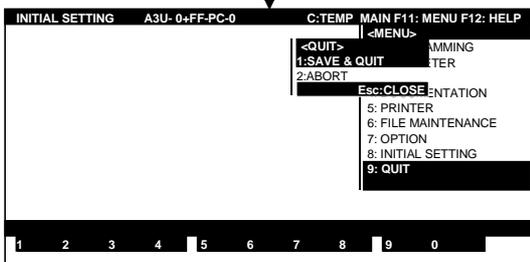
.... The QUIT menu window will then be displayed.
At this window, select the manner in which operation is to be ended.
• @Enter [1] to designated "SAVE & QUIT".
Operation will be ended after the designated servo data has been written to the file.
• @Enter [2] to designated "ABORT".
Operation will be ended without writing the designated servo data to the file.

1 or 2

```
C:\>
```
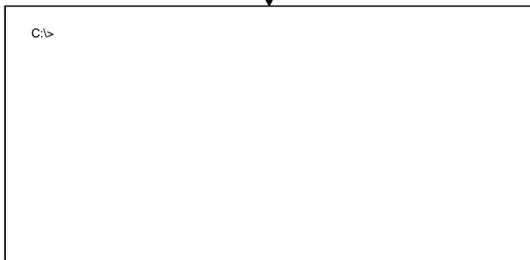
.... For IBM-PC computers, operation ends at the DOS DOS screen.

POINT

(1) "End after file writing" 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 SETTING

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 Setting

(1) Function summary
The following functions are available in the SYSTEM SETTING mode.
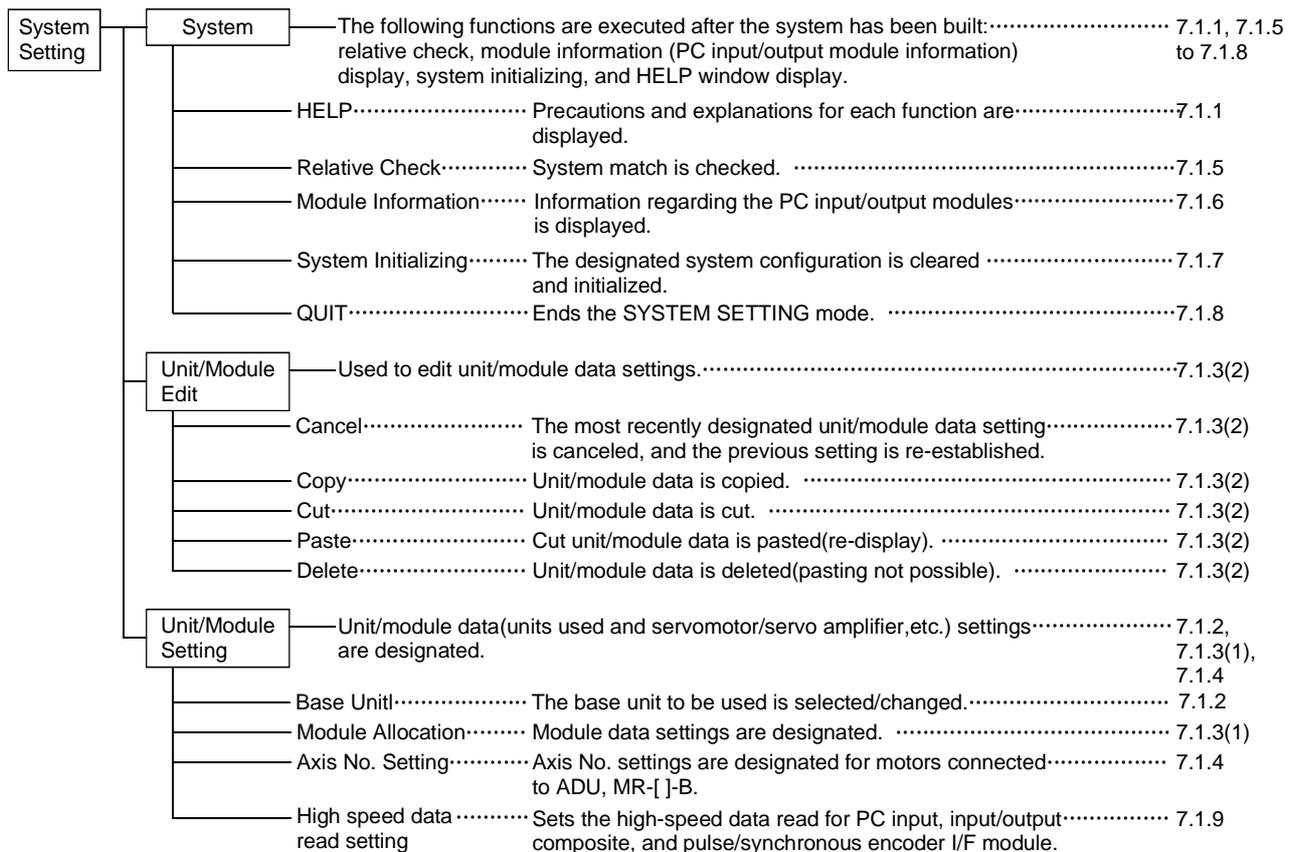
7. SYSTEM SETTING

(2) Outline flowchart
The basic procedures for the SYSTEM SETTING mode are shown in the following flowchart.

```
┌─────────────────────────────────┐
│  Base unit setting              │········· When the base unit is designated at
└─────────────────────────────────┘          the base unit selection dialog box, the
              │                               base unit default configuration will be
              ▼                               displayed at the SYSTEM SETTING
┌─────────────────────────────────┐          screen.
│  SYSTEM SETTING screen display  │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│  Unit/Module setting            │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│  Module allocation, axis No. setting │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│  Unit/Module edit               │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│         Cancel,                 │
│          copy,                  │
│          cut,                   │
│          paste,                 │
│          delete                 │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│         System                  │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│         HELP,                   │
│       relative check,           │
│    unit/module information,     │
│      system initializing,       │
│         QUIT                    │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│  The SYSTEM SETTING screen display │
│  is ended by selecting "QUIT" at the │
│  pull-down menu.                │
└─────────────────────────────────┘
```

7. SYSTEM SETTING

7.1.1 Common items

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

(1) Menu selection
   (a) Selection by mouse and key inputs
      Menu items can be selected by using the mouse or by key inputs.
      Both methods are described below.

Selection By Mouse   Selection By Key Input

Right-button ON

| | Menu bar display | Press the [ESC] key |

Move the mouse cursor to the desired item

| | Menu bar item selection | Use the [←],[→] keys and function keys |

| | Pull-down menu display | |

| | Pull-down menu item selection | Use the [↑],[↓] keys and function keys |

* When an item is selected using a function key, it will automatically be executed when selected.

Right-button OFF

| | Execution of selected item | Press the [Enter] key |

   (b) Function key allocation
      The character keys used in menu selection procedures are shown in
      parentheses below.

SYSTEM SETTING ── System(S) ─────── HELP(H)
                                     Relative Check(R)
                                     Unit/Module Information(U)
                                     System Initializing
                                     QUIT(Q)

                 Unit/Module Edit(E) ─── Cancel(Z)
                                     Copy(C)
                                     Cut(X)
                                     Paste(V)
                                     Delete(D)

                 Unit/Module Setting(U) ── Base unit selection(B)
                                     Unit/Module allocation(U)
                                     Axis No.setting(N)
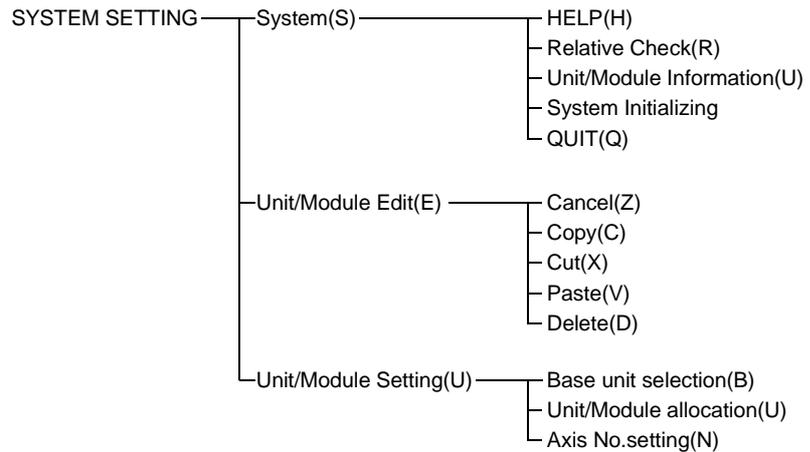
(2) Terminology used in this section
   (a) Unit/module frame ..... Frame which indicates that a module or unit selection has been determined.

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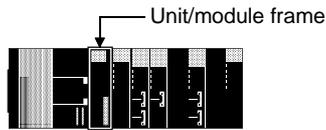
(3) HELP function
   In the SYSTEM SETTING mode, the HELP function displays precautions and explanations for each of the functions. (Refer to section 5.8(4)).

(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]
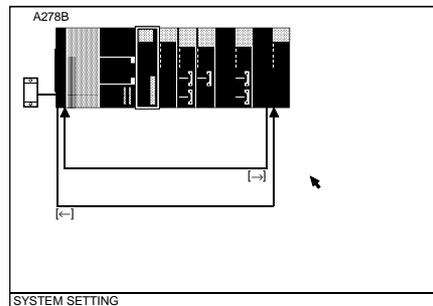
         If the [←] key is pressed when the frame is at the left-most module position, the frame will move to the right-most module position.
         If the [→] key is pressed when the frame is at the right-most module position, the frame will move to the left-most module position.
      2) Module selection by mouse

         | Mouse click |

         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]
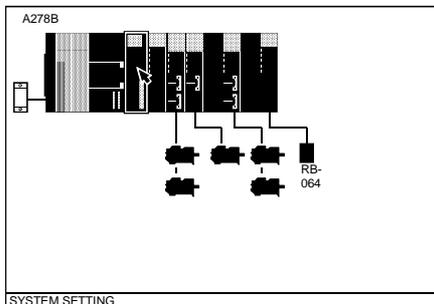
[Selection (by click) END Screen]

7 – 4
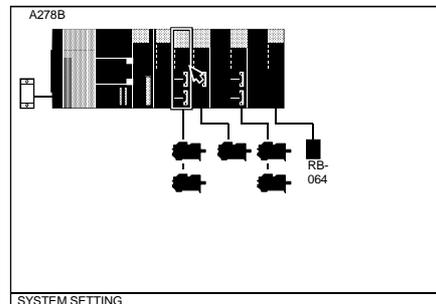
7. SYSTEM SETTING

7.1.2 Base unit setting

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]
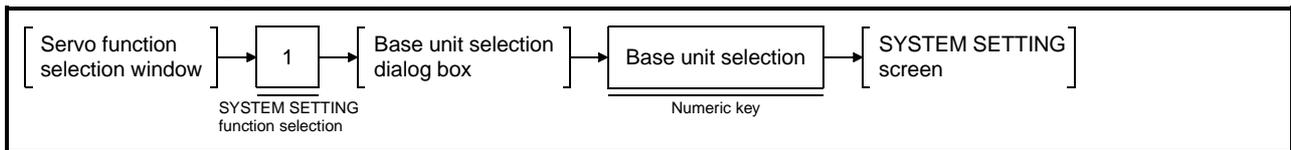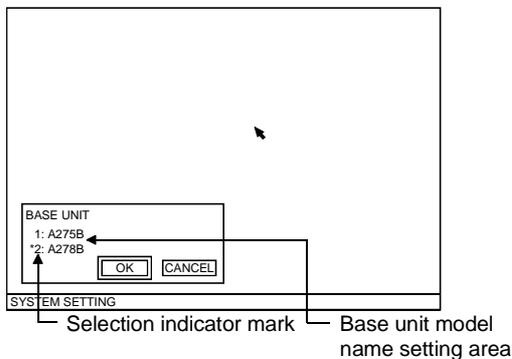
[Base Unit Setting Dialog Box]   **[SYSTEM SETTING Screen]**
(When A257B is selected)
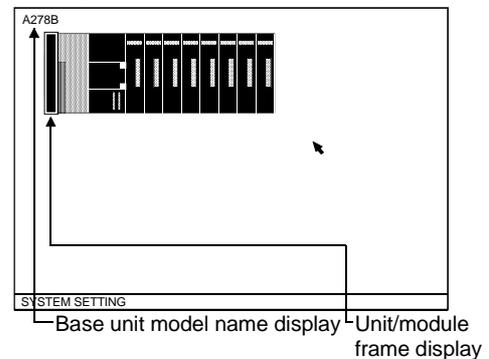
[Display/Setting Content]

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) 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 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.

(2) Changing the base unit setting

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

[Base Unit Change Procedure]
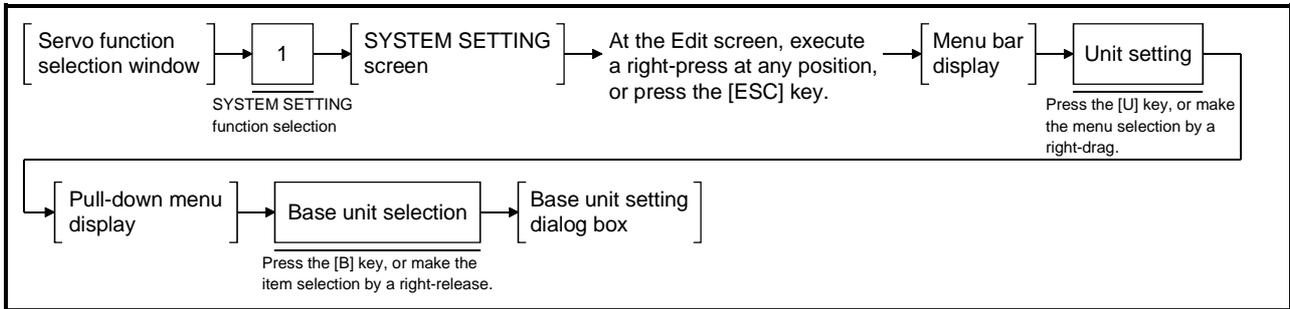
[Base Unit Setting Dialog Box]
(When A257B is selected)
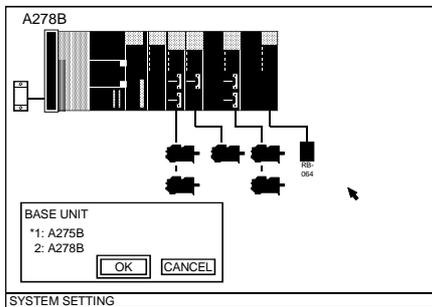
[Base Unit Initialize YES/NO Dialog Box]
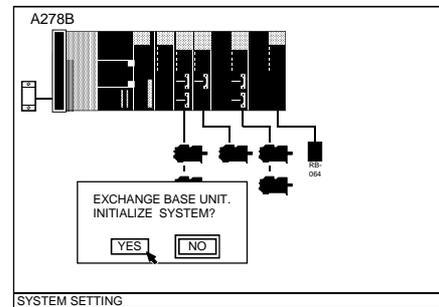
[Mouse Operation Procedure]

Base unit change

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 SETTING (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) To end the setting operation after the new base unit setting 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 SETTING

7.1.3 Designation of system modules and 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 and 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]

| Base unit display screen | → | Move the unit/module frame to the module to be designated | → | Execute left double-click inside the unit/module frame/press the [Enter] key/menu item(module allocation)selection |
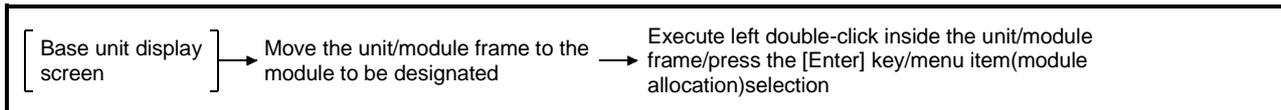
1) Motion extension base unit and battery setting
(for A273UHCPU (8/32 axis specification) only)

[Motion Extension Base Unit and Battery Setting Dialog Box]
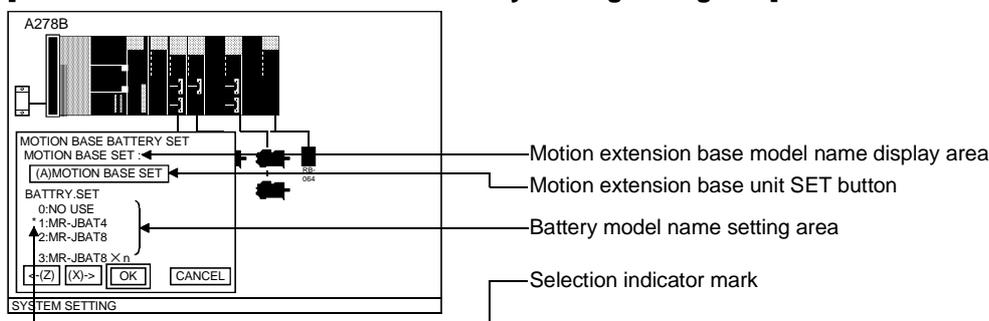
— Motion extension base model name display area
— Motion extension base unit SET button
— Battery model name setting area
— Selection indicator mark

[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 extension base SET button, or press the [A] key. The motion extension base setting dialog box will then be displayed.
Battery model name setting	1) Move the mouse cursor to the model name to be selected and execute a left-click, or enter the number shown at the left of the 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) To end the setting operation, 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 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 SETTING

| To Use A Motion Extension Base Unit |

[Motion Extension Base Unit Dialog Box]

Motion extension base unit model name setting area

Selection indicator mark

[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 1) Move the mouse cursor to the name to be selected 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.

Setting END 1) To end the setting operation, 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 and 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 and battery setting dialog box.

7. SYSTEM SETTING

2) Selecting separate servo amplifiers

[Separate Servo Amplifier Setting Dialog Box]

Separate servo amplifier USE/NO USE setting area

[Display/Setting Content]

Separate servo amplifier USED/NOT USED setting area   The USE/NO USE setting is designated here for the separate servo amplifier.

[Mouse Operation Procedure]

Separate servo amplifier USED/NOT USED 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 item.

Setting END

1) To end the setting operation, 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 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)
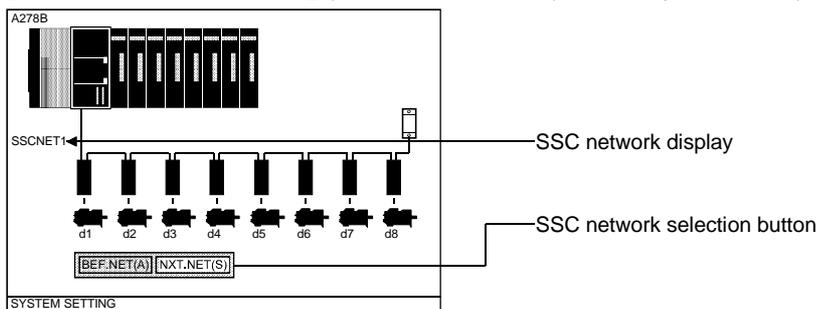
SSC network display

SSC network selection button

* 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].
   The SSC network No. will change accordingly.

7. SYSTEM SETTING

3) I/O slot setting

[I/O Slot Setting Dialog Box]

Module model name display area
Module "NO USE" setting area
Module type SET button
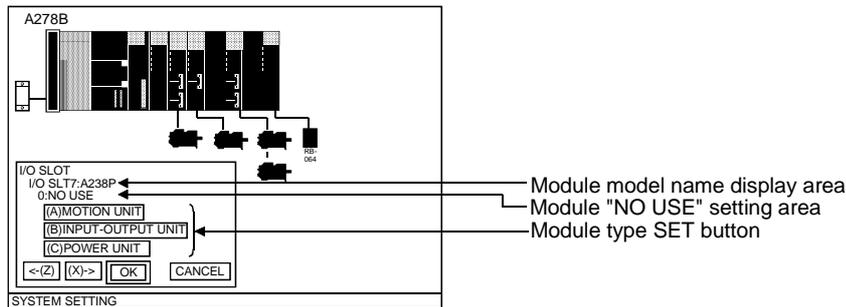
[Display/Setting Content]

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 selection area	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) To end the setting operation, 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 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 the 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.

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7. SYSTEM SETTING

To Install A Motion Module

[Motion Module Setting Dialog Box]
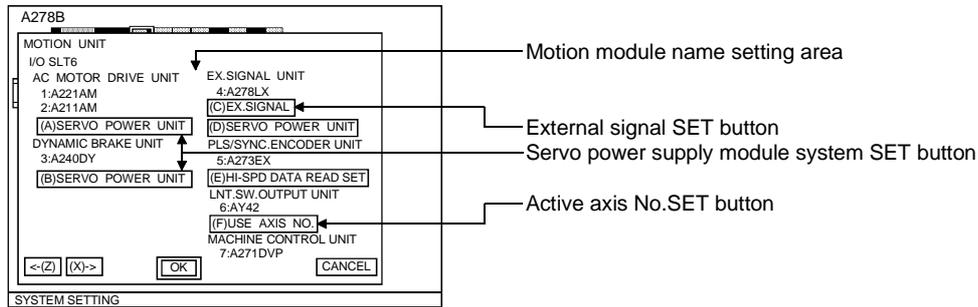
* The screen shown above is the A273UHCPU (32-axis specification) screen.

[Display/Setting Content]

Motion module model name setting area	The selectable motion module names and types are displayed here.
External signal setting 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 AC motor drive module / dynamic brake module / servo external signal module.)
HI-SPD 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 and active axis No. settings apply only for the A273UHCPU (32-axis specification) module.
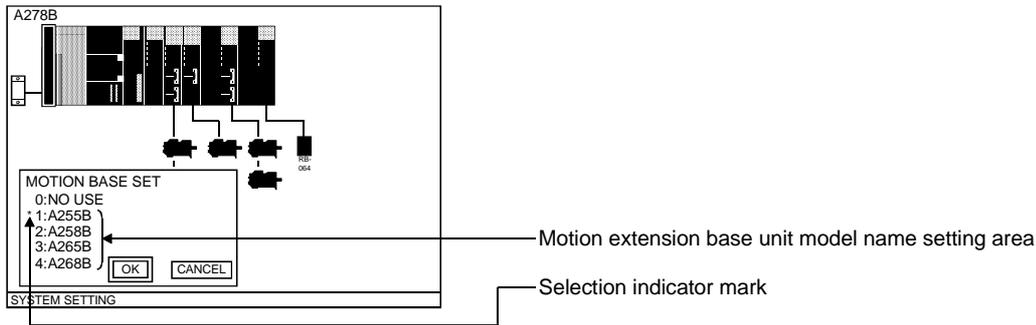
Setting END

1) To end the setting operation, 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 at the A273UHCPU (32-axis specification) module.

7. SYSTEM SETTING

[External Signal Setting Dialog Box]

Axis No.setting area

Motor brake or dynamic brake setting area
DOG signal setting area

Selection indicator mark

[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 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
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.
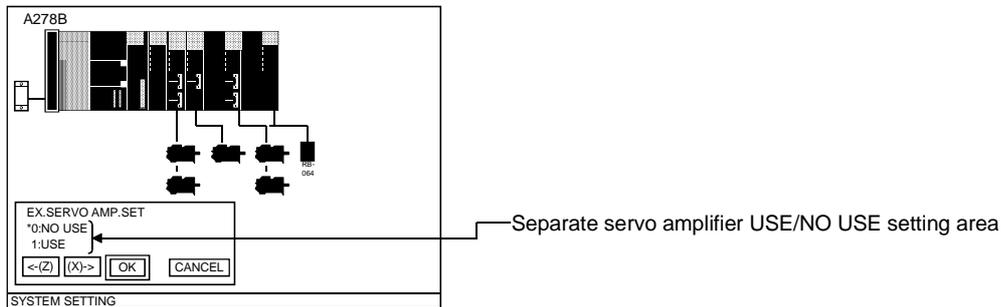   The selection indicator mark will move to the selected item.

Setting END
1) To end the setting operation, 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.
For details of signals, see the Programming Manual.

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7. SYSTEM SETTING

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

Servo power supply module system

Servo power supply module system designation area
Setting area for separate amplifier
Selection indicator mark
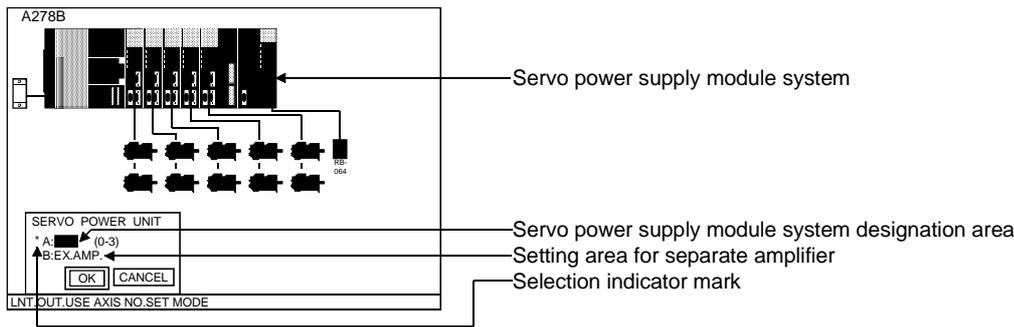
* The above screen is the A273UHCPU (32-axis specification) screen.

[Display/Setting Content]

Servo power supply module system	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.
Servo power supply module system setting area	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.
Setting area for separate amplifier*	A setting is designated when a dynamic brake is used for the separate amplifier.
Selection indicator mark*	Indicates the selected item.

[Mouse Operation Procedure]

Servo power supply module system designation	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. A cursor is displayed at the servo power supply module system designation area. (When a "dynamic brake module" is selected, a selection indicator mark is displayed.)
Servo power supply module system No. change	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. 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.
Setting area for separate amplifier*	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.
Setting END	1) To end the setting operation, 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.

* 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.

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7. SYSTEM SETTING

[High-speed Data Read Setting Dialog Box]

High-speed data read setting area

Setting indicator mark
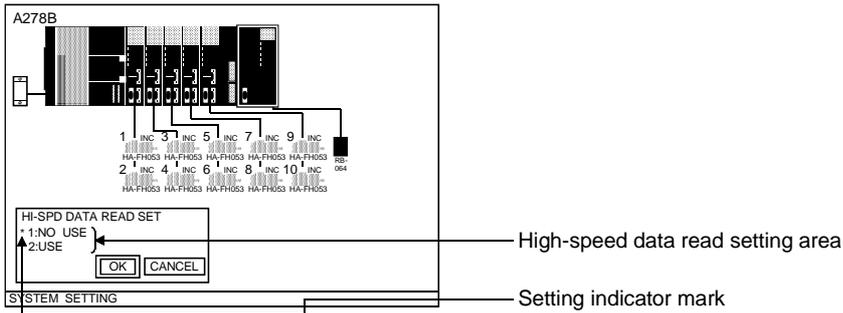
[Display/Setting Content]

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

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

Axis No. setting area

* 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 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 desired signal No. A cursor is displayed in the axis No. setting area.

Axis No. change 1) To change the displayed axis No. setting, press the [BACK SPACE] key, key-in the desired axis No., then execute a left-click outside the axis No. setting area, or press the [Enter] key.
2) If a No. outside the permissible range is designated, an error message will be displayed at the system message display line.
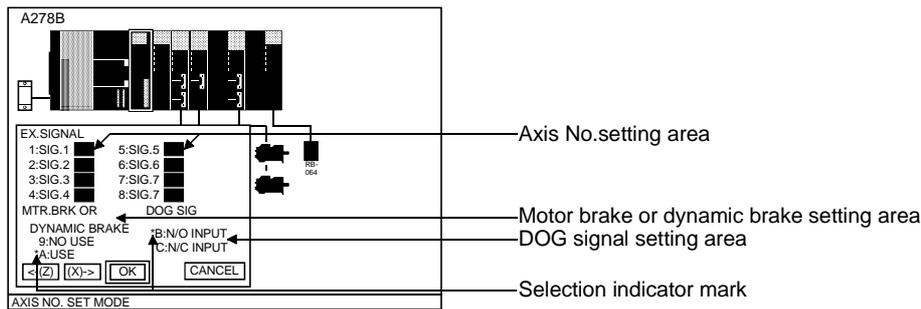In this case, re-designate the axis No. setting.

Setting END 1) To end the setting operation, 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 SETTING

Installing PC Input/Output Modules

[PC Input/Output Module Setting Dialog Box]

```
A278B
┌─────────────────────────────────┐
│ IN-OUT UNIT SET                  │
│ I/O SLOT                         │
│                                  │
│  INPUT         MIX               │
│ *1:16PT.      7:64PT.            │
│  2:32PT.                         │
│  3:64PT.                         │
│                                  │
│  OUTPUT                          │
│  4:16PT.                         │
│  5:32PT.          RB-            │
│  6:64PT.          064            │
│                                  │
│ HD IN-OUT NO.SET                 │
│ A: 180                           │
│ (B)HI-SPD DATA READ SET          │
│                                  │
│ <-(Z)  (X)->  OK    CANCEL       │
└─────────────────────────────────┘
 SYSTEM SETTING
```

— PC input/output module setting area

— Head I/O No. setting area

— Selection indicator mark

[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.

HI-SPD data read SET button
Open 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 PC input/output module setting area and execute a left-click, or key-in the number shown at the left of the number of points.
   A cursor will be displayed in the PC input/output module setting area.

Head I/O No. setting area change
1) Move the mouse cursor to the "head input/output No." setting area and execute a left-click, or key-in the [A] key.
   A cursor will be displayed in the "head input/output No." setting area.
2) Key-in the desired head input/output No., then execute a left-click outside the "head input/output No." 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 "head input/output No." setting.

Setting END
1) To end the setting operation, 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 I/O slot 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 I/O slot dialog box.

7. SYSTEM SETTING

Installing Servo Power Supply Modules

[Servo Power Supply Module Setting Dialog Box]
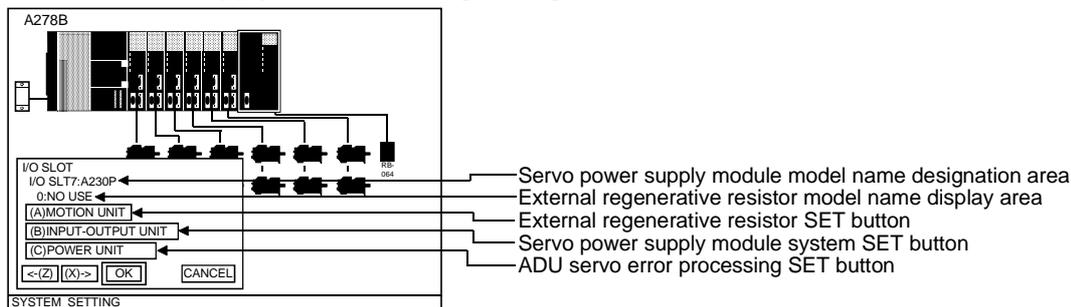
Servo power supply module model name designation area
External regenerative resistor model name display area
External regenerative resistor SET button
Servo power supply module system SET button
ADU servo error processing SET button

* 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 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) Move the mouse cursor to the desired name and execute a left-click, or key-in the number shown at the left of the desired name.
The selection indicator mark will be displayed at the selected 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) To end the setting operation, 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 I/O slot 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 I/O slot 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])

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7. SYSTEM SETTING

[External Regenerative Resistor Setting Dialog Box]

External regenerative resistor model name designation area

Selection indicator mark

[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) Move the mouse cursor to the desired name and execute a left-click, or key-in the number shown at the left of the desired name.
   The selection indicator mark will move to the selected name position.

Setting END

1) To end the setting operation, 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 SETTING

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

ADU servo error processing items setting area
Selection indicator mark
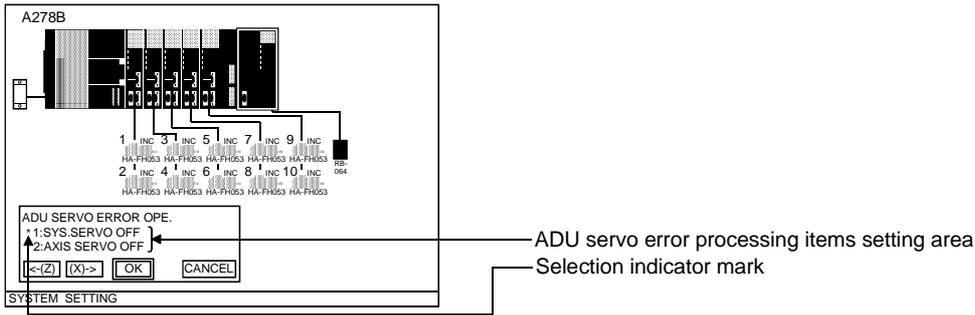
[Display/Setting Content]

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) To end the setting operation, 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.

4) Manual pulse generator setting

Base unit display screen	→	Position the unit/module frame at the "manual pulse generator" item (upper item at "manual pulse generator/synchronous encoder I/F unit")	→	Execute a left-click inside the unit/module frame, or press the [Enter] key	→	Manual pulse generator/ synchronous encoder setting dialog box

[Manual Pulse Generator/Synchronous Encoder Setting Dialog Box]

Manual pulse generator setting area

[Display/Setting Content]

Manual pulse generator setting　　　Designate whether or not the manual pulse generator is to be used.

[Mouse Operation Procedure]

Manual pulse generator setting
1) Move the mouse to the NO USE or MAN-PLS. position and execute a left-click, or key-in the number shown at the left of the NO USE or MAN-PLS. item. The selection indicator mark will move to the selected item position.
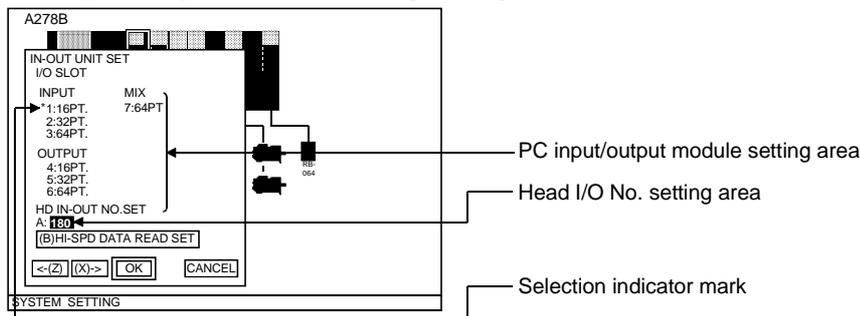
Setting END
1) To end the setting operation, execute a left-click at the "OK" item, or press the [Enter] key.
The entered settings will be confirmed and the system will return to the base unit display screen.

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.

(b) Servomotor setting

[Procedure For Displaying The Servomotor Setting Dialog Box]
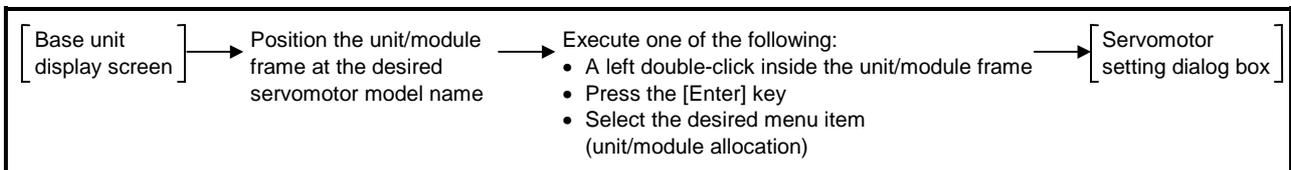
Base unit display screen	→	Position the unit/module frame at the desired servomotor model name	→	Execute one of the following: • A left double-click inside the unit/module frame • Press the [Enter] key • Select the desired menu item (unit/module allocation)	→	Servomotor setting dialog box

7. SYSTEM SETTING

[Servomotor Setting Dialog Box]

- MOTOR model name display area
- Servomotor model name display area
- Servomotor type SET button
- Allowable travel during power OFF setting area
- Encoder type setting area
- Selection indicator mark

[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.) The allowable travel during power OFF setting is only valid when an absolute encoder is used.
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 position.
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 check the setting.
Setting END	1) To end the setting operation, 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 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**
>
> Set the allowable travel during power OFF within the range indicated below.
> $0 \leq$ POWER OF ALLOWED TRAVELLING POINTS ≤ 16383
>   (Number of revolutions)

7. SYSTEM SETTING

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

Servomotor model name designation area

Selection indicator mark

[Display/Setting Content]

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

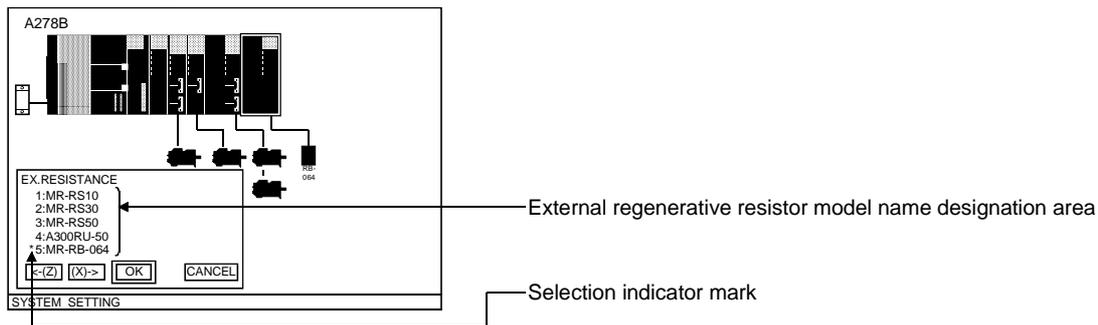**Selection indicator mark**   Indicates the selected model name.

[Mouse Operation Procedure]

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

Setting END
1) To end the setting operation, 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                                                         │
├─────────────────────────────────────────────────────────────┤
│  (1)  The unit/module frame can be moved to the servomotor    │
│       position by the following 2 methods:                     │
│       a)  By Key Operation                                      │
│           • Press the [↓] key to move the unit/module frame    │
│             from the "CPU module/control power supply module"  │
│             item to the "servomotor" item, 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.)                    │
│       b)  By mouse operation                                   │
│           • Move the mouse cursor to the desired servomotor    │
│             and execute a left-click.                          │
└─────────────────────────────────────────────────────────────┘
```

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

[Procedure For Displaying The Separate Servo Amplifier Setting Dialog Box]

| Base unit display screen | → | Position the unit/module frame at the MR-[ ]-B position where a setting is desired | → | Execute one of the following:
• A left double-click inside the unit/module frame
• Press the [Enter] key
• Select the desired menu item (unit/module allocation) |

[Separate Servo Amplifier Setting Dialog Box]

- MR-[ ]-B model name display area
- MR-[ ]-B SET button
- Servomotor model name display area
- Servomotor type SET button
- Allowable travel during power OFF setting area
- Dynamic brake setting area
- Amplifier type setting area

[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 name of the selected servomotor is displayed here.
Servomotor type SET button	Opens the servomotor model name setting 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.) The allowable travel during power OFF setting is only valid when an absolute encoder is used.

POINTS

(1) The unit/module frame can be moved to the MR-[ ]-B items by the following 2 methods:
  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.)
  b) By mouse operation
   • Move the mouse cursor to the desired MR-[ ]-B item and execute a left-click.
(2) Set the allowable travel during power OFF within the range indicated below.
  0 ≤ POWER OF ALLOWED TRAVELLING POINTS ≤ 16383
    (Number of revolutions)

7. SYSTEM SETTING

Dynamic brake setting area   Designates whether or not the dynamic brake is to be operative.

Amplifier type setting area   Designates whether the servo motor is an absolute data method or incremental method type.

[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] for details)

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.

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 massage is displayed, check the setting.

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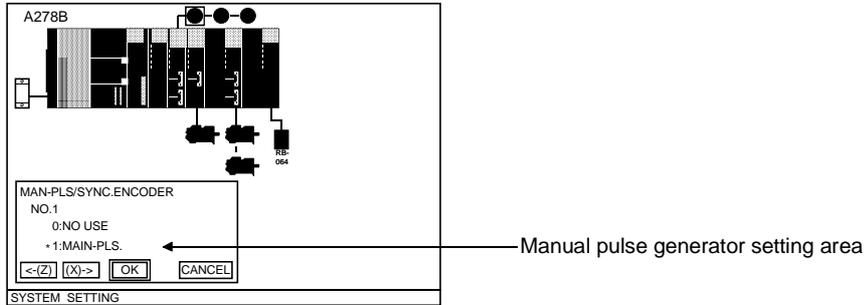
Setting Abort   1) To abort the setting operation, execute a left-click at the "CANCEL" item, or press the [ESC] key.
The entered settings will be canceled, and the system will return to the separate servo amplifier setting dialog box.

1) MR-[ ]-B model name setting

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

7 – 24
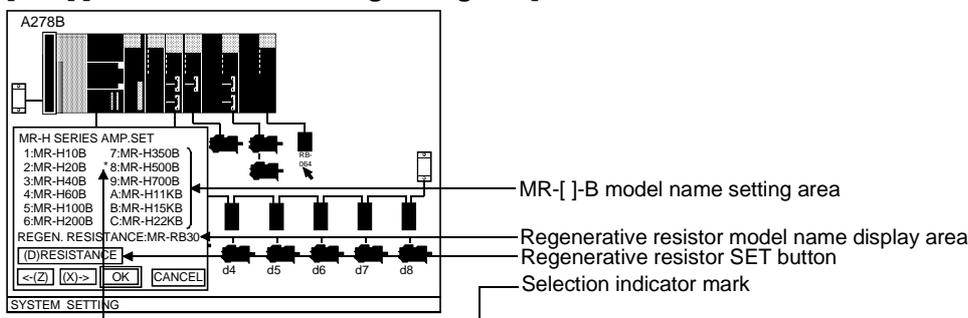
7. SYSTEM SETTING

[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 designated 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 designated 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) To end the setting operation, 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.
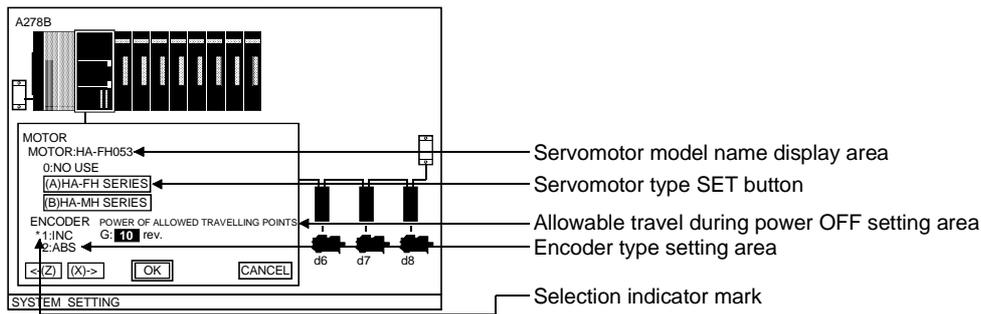The entered settings will be canceled, and the system will return to the separate servo amplifier setting dialog box.

[Regenerative Resistor Setting Dialog Box]

Regenerative resistor model name setting area

Selection indicator mark
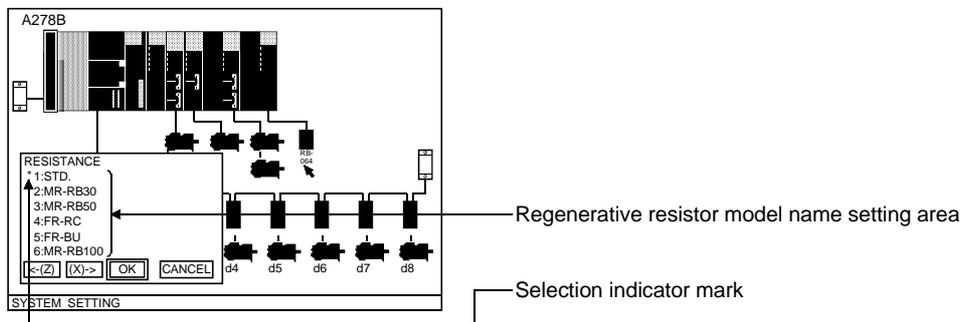
[Display/Setting Content]

Regenerative resistor model name setting area	The selectable regenerative resistor names are displayed here.
Selection indicator mark	Indicates the designated model name.

[Mouse Operation Procedure]

Regenerative resistor model name setting
1) Move the mouse cursor to the desired 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 designated name.

Setting END
1) To end the setting operation, 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 SETTING

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

[Servomotor Model Name Setting Dialog Box]

Servomotor model name designation area

Selection indicator mark

[Display/Setting Content]

Servomotor model name setting area	The selectable servo motor names are displayed.
Selection indicator mark	Indicates the selected model name.

[Mouse Operation Procedure]

Servomotor model name setting	1) Move the mouse cursor to the desired 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 designated name.
Setting END	1) To end the setting operation, 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

(1) 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 7.1.3 (1)(c)[3] for details.)

---

7. SYSTEM SETTING

3) Designating a battery setting when an MR-J-B ABS motor setting is designated (for A273UHCPU (8/32 axis specification) only)

[Procedure For Displaying The Battery Setting Dialog Box When An MR-J-B ABS Motor Is Used]
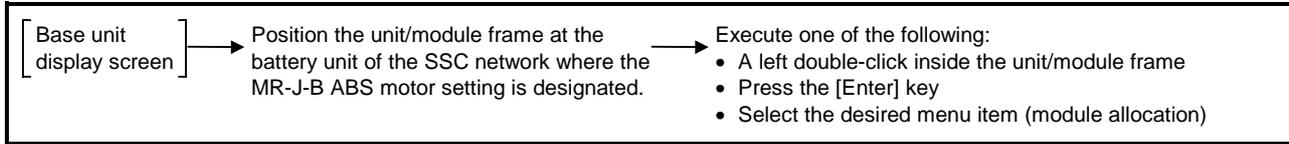
| Base unit display screen | → | Position the unit/module frame at the battery unit of the SSC network where the MR-J-B ABS motor setting is designated. | → | Execute one of the following:
• A left double-click inside the unit/module frame
• Press the [Enter] key
• Select the desired menu item (module allocation) |
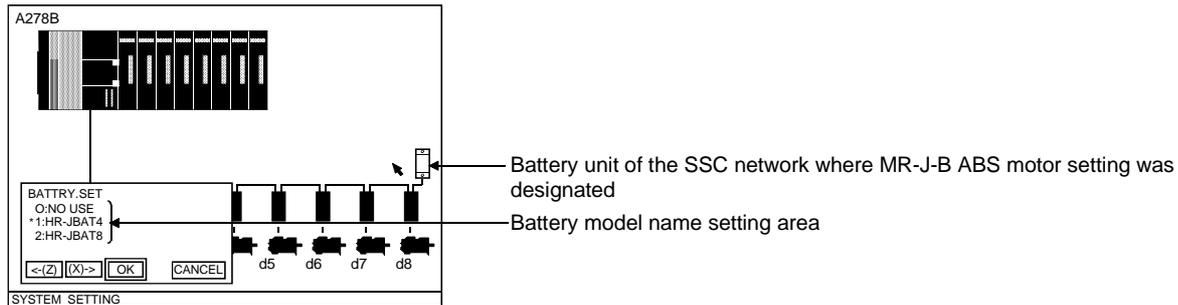
[Battery Setting Dialog Box]

Battery unit of the SSC network where MR-J-B ABS motor setting was designated

Battery model name setting area

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

[Display/Setting Content]

Battery model name setting area   The selectable battery unit~names are displayed here.

[Mouse Operation Procedure]

Battery model name setting
1) Move the mouse cursor to the desired 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 designated 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) To end the setting operation, 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 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.
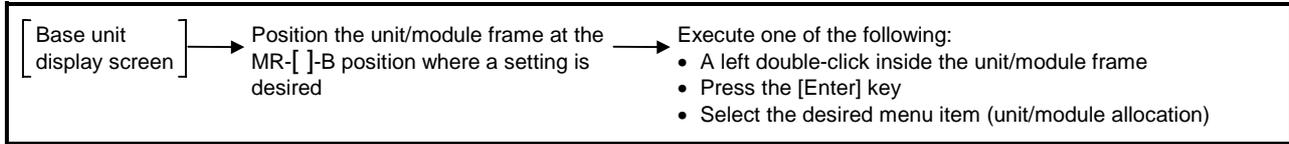The entered settings will be canceled, and the system will return to the base unit display screen.

(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]

Base unit display screen ──────► Unit/module data setting operation.

[Before Data Setting]
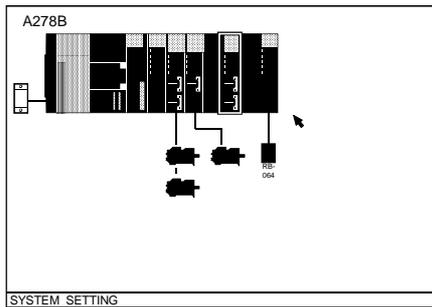
Data setting

──────►
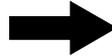
Execution of
CANCEL
function

◄──────

[After Data Setting]
(ADU setting at slots 4 and 5)
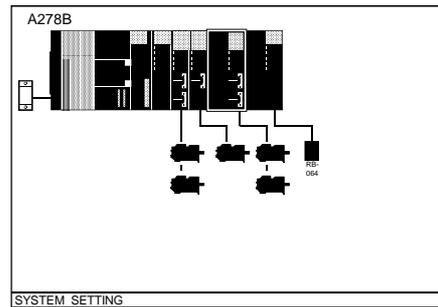
[Mouse Operation Procedure]

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

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

(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]

$\begin{bmatrix} \text{Base unit} \\ \text{display screen} \end{bmatrix}$ ⟶ Position the unit/module frame at the copy source unit/module, servomotor or MR-[ ]-B.

<table>
<tr><th>[Before Operation]</th><th>[After Operation]</th></tr>
<tr><td></td><td></td></tr>
</table>
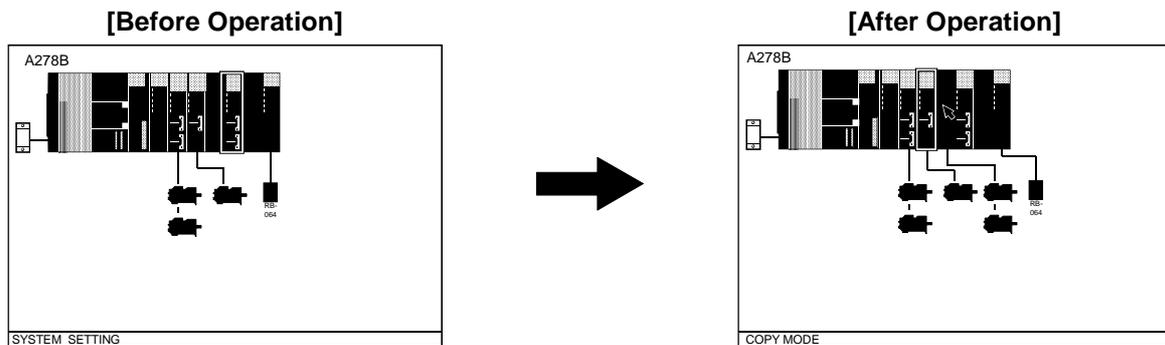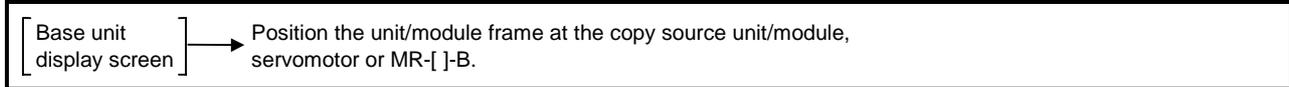
[Mouse Operation Procedure]

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.
   At this time, "COPY MODE" will be displayed at the system message line indicating that the copy function is operative. (▾ / ▴ / ◂ marks are displayed)

Designating the COPY destination and 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 [▾]/[▴]/[◂] marks to the COPY destination, then press the [Enter] key.

Ending and 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.

┌───┐
│ **POINTS**

(1) When copying is executed, all setting data for the motor connected to the module is also copied in addition to the module model name.

(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) Copying is possible for the following devices:
Motion modules, PC input/output modules, servomotors, MR-[ ]-B, and manual pulse generators. However, copying is impossible for certain motion modules, and restrictions apply to some modules as shown below.

<A17[ ]CPU>

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

<A273UHCPU (8-axis specification)>

Motion module	Limit input and brake output module (A278LX)	COPY impossible
	Manual pulse generator and 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 and brake output module (A278LX)	4 or less
	Manual pulse generator and synchronous encoder I/F module (A273EX)	COPY impossible
	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 and 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.
└───┘

(c) Editing by CUT and 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]

| Base unit display screen | → Position the unit/module frame at the unit/module or MR-☐-B where cutting is to occur. |

[Before Operation]   **[After Operation]**
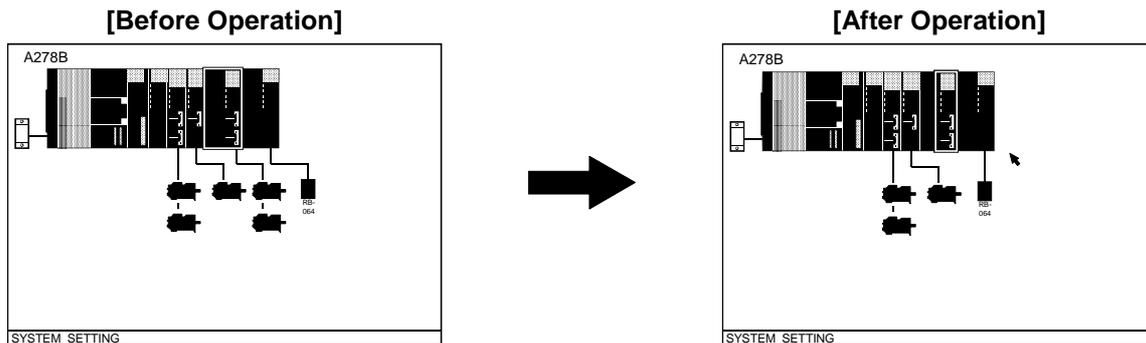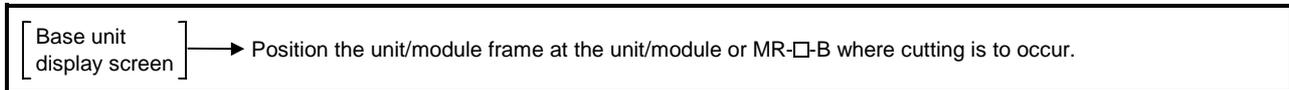
[Mouse Operation Procedure]

Selecting, executing, and ending the CUT 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 "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 CUT function is operative for the following units/modules:
motion extension base units, battery connector information, MR-[ ]-B connection information, motion modules, PC input/output modules, servomotors, MR-[ ]-B, and manual pulse generators.
The location where a CUT has occurred will be designated as "NOT USED".

(4) Regarding CUTS 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.

(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.

---

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]

⌈ Base unit display screen ⌉ ──► Cut execution ──► Position the unit/module frame at the unit/module where pasting is required.

[Before Operation]   **[After Operation]**
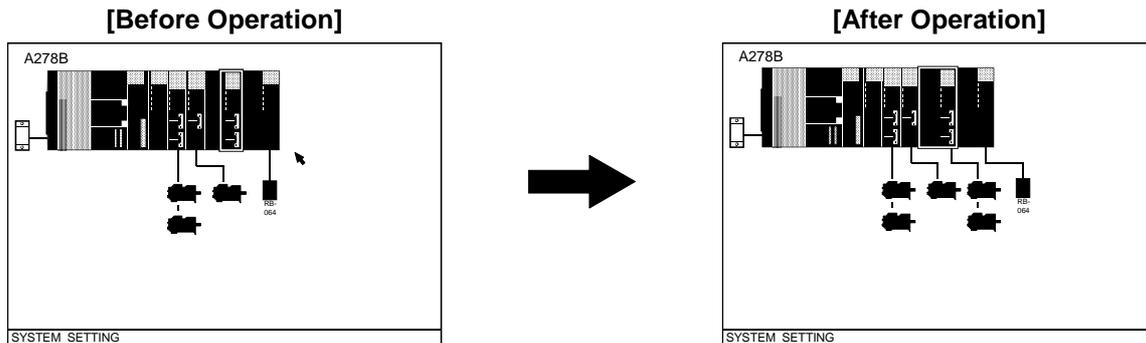
[Mouse Operation Procedure]

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 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 of previous data is impossible at the I/O slot.) │
│ (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 PASTE function is operative for the following units/modules: 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. │
└───┘

(d) Unit/module data delete

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

[Unit/Module Data Delete Procedure]

| Base unit display screen | → Position the unit/module frame at the unit/module or MR-□-B data to be deleted. |

[Before Operation]   **[After Operation]**
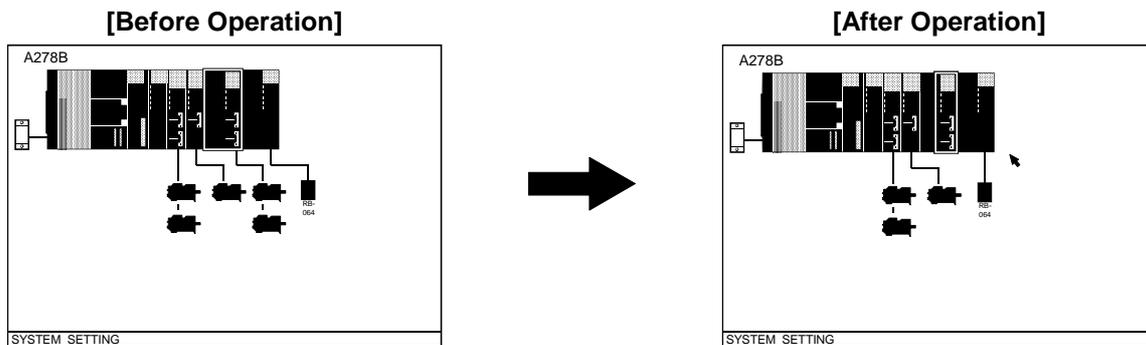
[Mouse Operation Procedure]

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 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 DELETE function is operative for the following units/modules: motion extension bases, battery connector information, MR-[ ]-B connection information, motion modules, PC input/output modules, servomotors, MR-[ ]-B, and manual pulse generators.
   A "NO USE" status will be designated at the location where data has been deleted.
(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.

7.1.4 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]

Base unit display screen → Unit/module data setting operation → At any point on the base unit display screen, execute a right-press, or press the [ESC] key → Menu bar display → Unit setting

Menu item selection by right-drag, or by pressing the [U] key

↓

Pull-down menu display → Axis No. setting → Axis No. setting dialog box

Item selection by right-release, or by pressing the [N] key

[Axis No. Setting Dialog Box]

```
A278B

AXIS NO.
0:NO USE    3:3AX    6:6AX          Axis No.setting area
1:1AX       4:4AX    7:7AX          Selection indicator mark
2:2AX       5:5AX    8:8AX          Axis No.range selector buttons
BF(A) NX(S)
<-(Z)  (X)->  OK  CANCEL     d5  d6  d7  d8
AXIS NO. SET MODE
```

* 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) To change the displayed axis No. range, execute a left-click at the "BF or NX" item, or press the [A] or [S] key.

Setting END   1) To end the setting operation, execute a left-click at the "OK" item, or press the [Enter] key. This will confirm the setting 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 Setting occurs only when using A273UHCPU (32-axis specification).

7.1.5 Relative check

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

[Relative Check Procedure]

```
┌ EDIT screen ┐ → ┌ Base unit ┐ → ┌ Base unit ┐ → System construc-    At any point on the base unit
│             │   │ selection │   │ display screen │  tion according to  display screen, execute a right-
└             ┘   └           ┘   └             ┘    base unit settings  press, or press the [ESC] key

  ┌ Menu bar ┐ →  ┌ System ┐ → ┌ Pull-down ┐ → ┌ Relative check ┐ → Check occurs → ┌ "Check completed" ┐
  │ display  │    │        │   │ menu display │ │                │   automatically  │ dialog box        │
  └          ┘    └        ┘   └           ┘    └              ┘    after selection  └                 ┘
                  Menu item selection            Item selection by right-
                  by right-drag, or by           release, or by pressing
                  pressing the [S] key           the [R] key
```

When Operation Was Error-Free

[Check Completed Dialog Box]

Message display area
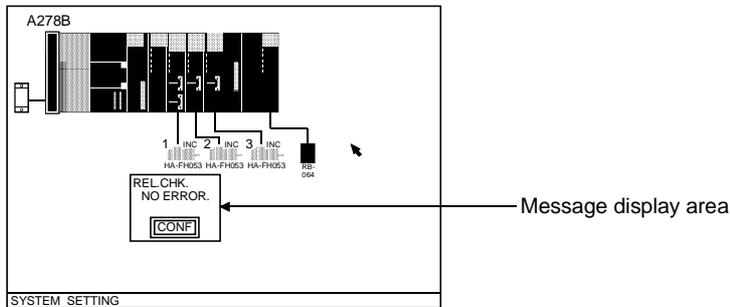
[Display/Setting Content]
 Message display area   "NO ERROR." is displayed.

[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]

Message display area
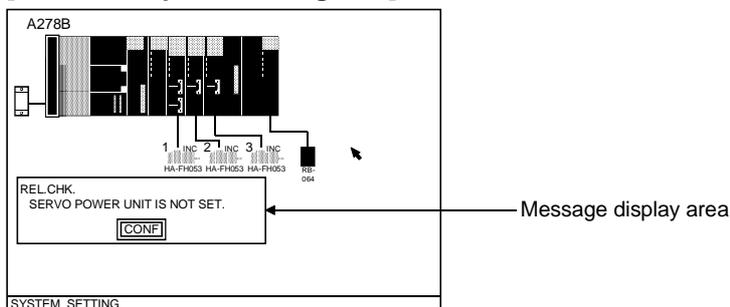
[Display/Setting Content]
 Message display area   Error description for each check item is displayed.

[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 SETTING

7.1.6 Unit/module information

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

[Procedure For Displaying The Unit/Module Information]

```
┌─────────────┐   ┌──────────────┐   ┌──────────────────────┐   ┌──────────┐   ┌──────────┐
│ Base unit   │→  │ Unit/module  │→  │ At any point on the  │→  │ Menu bar │→  │ System   │──┐
│ display     │   │ data setting │   │ base unit display    │   │ display  │   │          │  │
│ screen      │   │ operation    │   │ screen, execute a    │   └──────────┘   └──────────┘  │
└─────────────┘   └──────────────┘   │ right-press, or press│                 Menu item selection │
                                     │ the [ESC] key        │                 by right-drag, or by │
                                     └──────────────────────┘                 pressing the [S] key │

   ┌──────────────┐   ┌──────────────┐   ┌──────────────────────┐
→  │ Pull-down    │→  │ Unit/module  │→  │ Unit/module information│
   │ menu display │   │ information  │   │ dialog box           │
   └──────────────┘   └──────────────┘   └──────────────────────┘
                      Item selection by right-
                      release, or by pressing
                      the [U] key
```

[Unit/Module Information Dialog Box]
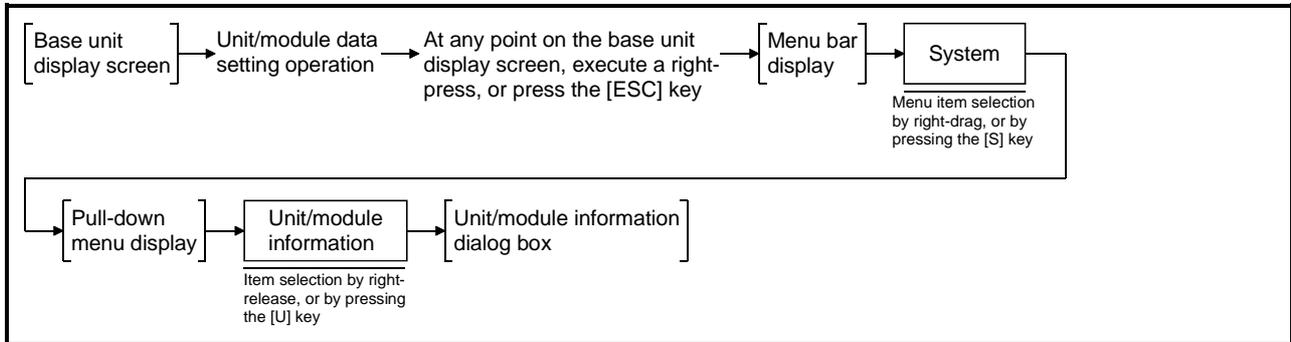
Unit/module information display area
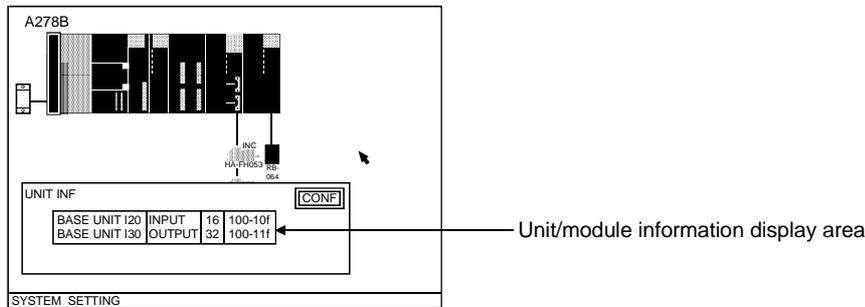
[Display/Setting Content]

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 SETTING

7.1.7 System data initialize

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

[System Data Initialize Procedure]

```
┌─────────────┐    ┌──────────────┐    ┌──────────────────┐    ┌──────────┐    ┌──────────┐
│ Base unit   │ →  │ Unit/module  │ →  │ At any point on  │ →  │ Menu bar │ →  │ System   │
│ display     │    │ data setting │    │ the base unit    │    │ display  │    │          │
│ screen      │    │ operation    │    │ display screen,  │    └──────────┘    └──────────┘
└─────────────┘    └──────────────┘    │ execute a right- │                    Menu item selection
                                       │ press, or press  │                    by right-drag, or by
                                       │ the [ESC] key    │                    pressing the [S] key
                                       └──────────────────┘

   ┌──────────────┐    ┌──────────────────┐    ┌──────────────────────┐
→  │ Pull-down    │ →  │ System initialize│ →  │ "SYSTEM INITIALIZE?  │
   │ menu display │    │                  │    │ YES/NO" selection    │
   └──────────────┘    └──────────────────┘    │ dialog box           │
                        Item selection by right-└──────────────────────┘
                        release
```
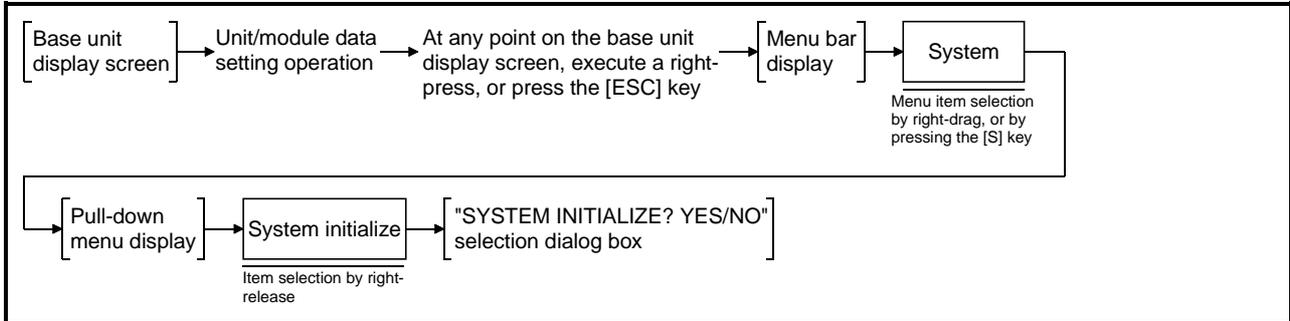
[SYSTEM INITIALIZE YES/NO Selection Dialog Box]
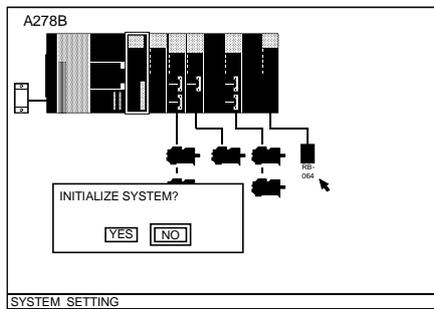
[Mouse Operation Procedure]

For YES (initialize) selection
To initialize the system, execute a left-click at the YES item, or press the [Y] key. The base unit setting dialog box will then be displayed. Select the desired base unit.

For NO (do not initialize) selection
1) If system initializing is not desired, execute a left-click at the NO item, or press the [ESC]/[Enter] key.
Initializing will not occur, and the system will return to the base unit display screen.

POINT

(1) If the system data initialization is executed, the high-speed data read setting is also initialized and cannot be recovered.

---

7. SYSTEM SETTING

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 "QUIT (Q)" position.
   The system setting operation will be ended, and the system will return to the servo function selection window.

System Setting END When An Error Exists

[Warning Dialog Box]

Warning message display
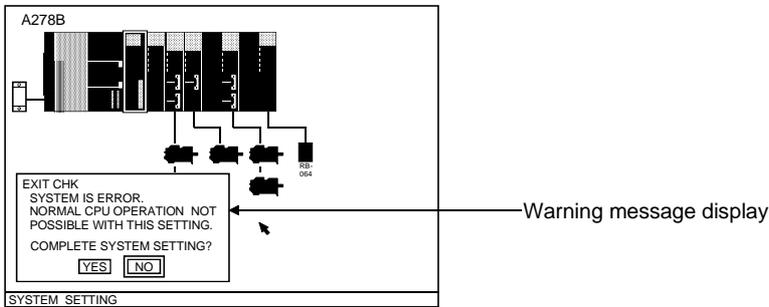
[Display/Setting Content]

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 will then be closed. Execute the relative check function to determine the error cause, then make the necessary corrections.

To end system setting
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 SETTING

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]

Pulser/synchronous encoder I/F module setting area
Setting clear button
PC input module setting area
Axis No. setting area
Data item selection area
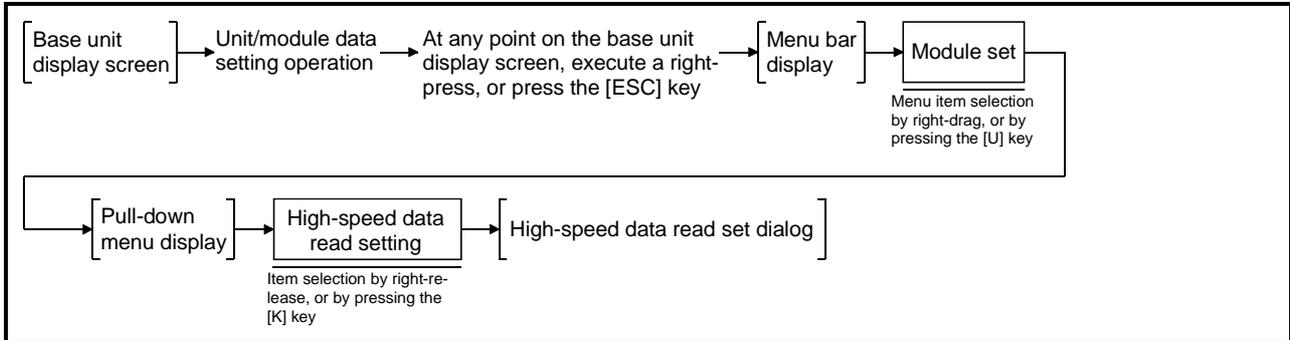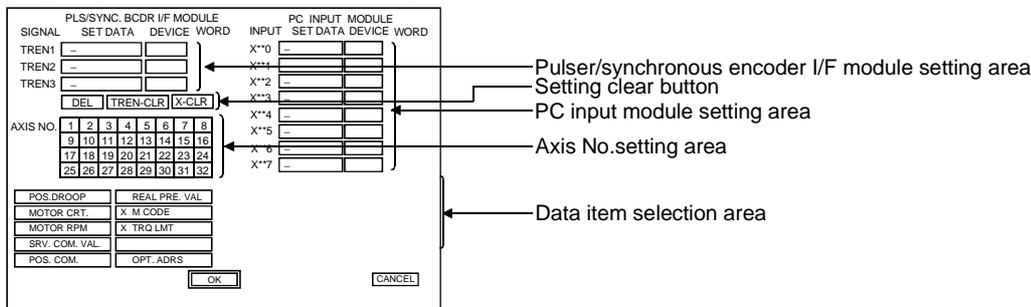
* The display is for A273UHCPU (32-axis specifications)

[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 sigal.

[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 SETTING

DEVICE setting
1) Execute left-click at the DEVICE area of the TREN signal or input signal to be set.
   The DEVICE/ADDRESS WINDOW is displayed.
2) Set the device in the DEVICE/ADDRESS WINDOW.
   The procedure is described.

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.

TREN-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
(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 GSV13PE. (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.

7. SYSTEM SETTING

[DEVICE/ADDRESS WINDOW]

Setting content display area

Number selection button

Device selection button
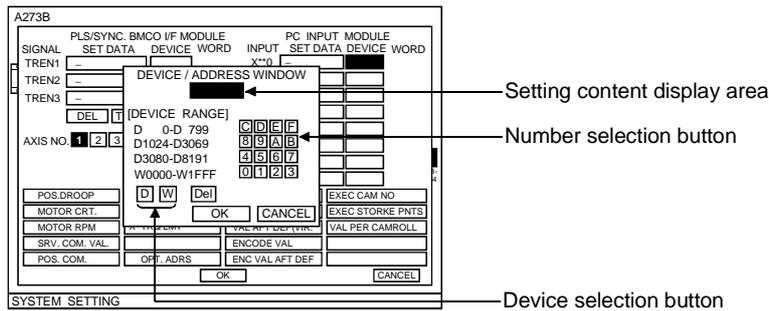
[Mouse Operation Procedure]

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.

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 SETTING FOR POSITIONING

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

(1) Function summary
The GSV13PE 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 list 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 SETTING FOR POSITIONING

(2) Procedure outline
An outline of the procedure for designating positioning data settings is shown below.

```
┌──────────────────────────────────────────────────────────────┐
│         Servo data setting function selection window display   │
└──────────────────────────────────────────────────────────────┘
    │                │                │                │
┌──────────┐  ┌──────────┐  ┌──────────┐  ┌──────────┐
│Axis data │  │Parameter │  │Limit     │  │Auxiliary │
│setting   │  │block     │  │switch    │  │functions │
│          │  │setting   │  │setting   │  │          │
└──────────┘  └──────────┘  └──────────┘  └──────────┘
    │                                          │
┌──────────────┐                    ┌─────────────────────────┐
│Fixed parameters│                   │Axis data COPY           │
│Servo parameters│                   │Parameter block COPY     │
│Home position   │                   │Axis data LIST           │
│Return data     │                   │Parameter block LIST     │
│JOG operation data│                 │Axis data CLEAR          │
└──────────────┘                    │Parameter block CLEAR    │
                                    │Limit switch CLEAR       │
                                    │Axis data CHECK          │
                                    │Parameter block CHECK    │
                                    │File WRITE               │
                                    └─────────────────────────┘

         ┌──────────────────────────────────────────┐
         │ After executing the desired function, press │
         │ the [ESC] key to close the setting window.  │
         └──────────────────────────────────────────┘
```

⚠ **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 "UNUSED AXIS." axis during system settings, an "axis not used" error message will be displayed.

8. DATA SETTING FOR POSITIONING

8.1 Designating the Positioning Data Settings

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]


```
┌ Servo function  ┐      ┌───┐    ┌ Servo data setting ┐     ┌───┐    ┌ Axis data setting ┐     ┌───┐    ┌ Fixed parameters ┐
│ selection window │ ──▶ │ 2 │ ──▶│ function selection  │──▶ │ 1 │ ──▶│ function selection │──▶ │ 1 │ ──▶│ setting window   │
└                  ┘      └───┘    │ window              │     └───┘    │ window            │     └───┘    └                  ┘
                       Selection of                           Selection of axis          Selection of fixed
                       servo data                             data setting               parameter setting
                       setting function                       function                   function
```
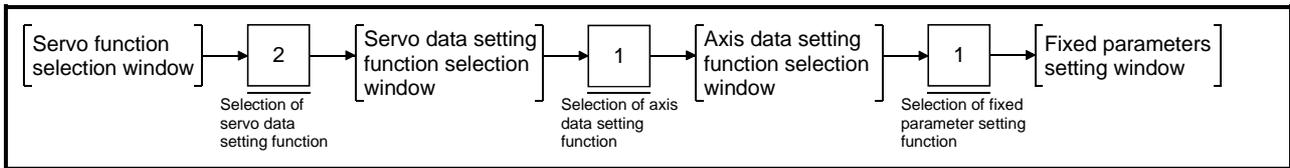
[Fixed Parameters Setting Window]


```
FIXED PARAMETERS

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

                                    End:SET      Esc:STOP

1    2    3    4   5    6    7    8   9    0 AXIS
```

— Setting data area
— Setting range area
— Relative error display error

[Display/Setting Contents]

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 system-of-units) when an error is detected by the relative check function.

[Mouse Operation Procedure]

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 SETTING FOR POSITIONING

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 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.

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.
   A dialog box containing the message "File Write YES/NO" will then 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 setting range shown at the setting range display area varies according to the "system-of-units" designation.
(2) The backlash compensation amount, stroke upper/lower limits, and command in-position ranges will change in accordance with changes made at the "number of pulses per revolution", "travel distance per revolution", and "unit magnification" settings. If "degrees" is the designated system-of-units, the stroke upper/lower limit values will not change.

8. DATA SETTING FOR POSITIONING

8.1.2 Servo 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]
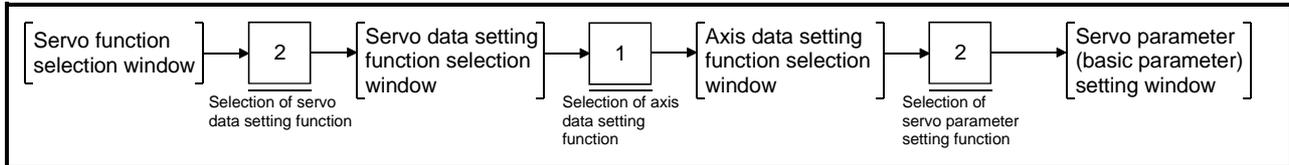
(1) When ADU is used
(a) Setting the basic parameters

[Servo Parameter (Basic Parameter) Setting Window]

[Display/Setting Contents]

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 displayed 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 Operations]

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 SETTING FOR POSITIONING

Setting the servo parameters (adjustment parameter)

1) To set the servo parameters (adjustment parameter), 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 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.

File WRITE

1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.
   A dialog box containing the message "File Write YES/NO" will then 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 (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.

(2) The setting range for servo parameter (basic parameter) data varies according to the system-of-units designated with the Fixed Parameter Setting function.

---

8. DATA SETTING FOR POSITIONING

(b) Setting the adjustment parameters

[Servo Parameter (Adjustment Parameter) Setting Window]

```
<SERVO PARAMETER (ADJUSTMENT PARAMETER)>
 1AXIS   <PULSE>        SET DATA         SETTING RANGE
A LOAD INERTIA RATIO        1.0     0.1  -    20.0    (RATIO)          Setting
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.INTERGAL.COMPS.       20       2   -    248    (msec)
G NOTCH FILTER                                                        Setting range area
H FEED FORWARD GAIN        0.0     0.0  -   150.0    (%)
I IN-POSITION RANGE        100       1   -  32767    (PLS)
J SOLENOID BRAKE OUT                                                  Relative error display area

                                          End:SET   Esc:STOP
1 ADJ.PA 2    3    4   5    6    7    8   9    0 AXIS
```

[Display/Setting Contents]

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 displayed 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 Operations]

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 parameter)	1) To set the servo parameters (basic parameter), 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 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][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 again.

8. DATA SETTING FOR POSITIONING

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.

File WRITE

1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.
   A dialog box containing the message "File Write YES/NO" will then 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) For items not highlighted at the servo parameter (adjustment parameter) setting window, the values are displayed based on data designated by the System Setting function. For these items, setting is not possible by the Servo Parameter (adjustment Parameter) Setting function. Data setting is allowed only for the highlighted items.
(2) The setting range for servo parameter (adjustment parameters) data varies according to the system-of-units designated with the Fixed Parameter Setting function.

8. DATA SETTING FOR POSITIONING

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

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

[Display/Setting Contents]

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 displayed 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 Operations]

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 (adjustment parameter) setting	1)To designate the servo parameter (adjustment parameter) 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 SETTING FOR POSITIONING

Servo parameter
(expansion parameter)
setting

1) To designate the servo parameter (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 parameters) 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
(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 Parameters) Setting function. Data settings can only be designated at the highlighted items.
(2) The setting range for servo parameter (basic parameters) data varies according to the system-of-units designated with the Fixed Parameter Setting function.

8. DATA SETTING FOR POSITIONING

File WRITE

1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.
A dialog box containing the message "File Write YES/NO" will then 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 Parameters) Setting Window] (For MR-H-B)


```
<SERVO PARAMETER (ADJUSTMENT PARAMETER)>
  1AXIS    <PULSE>       SET DATA            SETTING RANGE
A LOAD INERTIA RATIO        3.0        0.1  -      100.0   (RATIO)          ── Setting data area
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     ── Setting range area
                                   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)
                                                                            ── 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 Contents]

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 displayed 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 Operations]

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 parameter) 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 Parameter) 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 SETTING FOR POSITIONING

Servo parameter (expansion parameter) setting

1) To designate the servo parameter (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 (adjustment parameters) setting ranges.
   • A relative check of the fixed parameter data and servo parameter (adjustment 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.

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
(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.
(2) The setting range for servo parameter (adjustment parameters) data varies according to the system-of-units designated with the Fixed Parameter Setting function.

8. DATA SETTING FOR POSITIONING

File WRITE

1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.
   A dialog box containing the message "File Write YES/NO" will then 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 Parameters) Setting Window] (For MR-H-B)

```
<SERVO PARAMETER (EXPANEDED PARAMETER 1/2)>
  1AXIS    <PULSE>        SET DATA           SETTING RANGE
A MON.OUT.1 OFFSET            0        -9999   -    9999        (mV)     ───── Setting data area
B MON.OUT 2 OFFSET            0        -9999   -    9999        (mV)
C BEF.ALRM.DATA SELECT
  (SAMPLING TIME SEL.)        0      0:1.77   1:3.55   2:7.11   3:14.2   4:28.4(ms)
  (DATA SEL.1)                0      0:VEL.(←) 1:TRQ.(←) 2:VEL.(+) 3:TRQ(+)
  (DATA SEL.2)                1      4:CUR.CMD.OUT      5:CMD.F##T
                                     6:DEV.PULS1/1      7:DEV.PULS1/4    ───── Setting range area
                                     8:DEV.PULS1/16     9:DEV.PULS1/32
D ZERO SPEED              10000          0     -   10000        (r/min)
E EX.ERROR ALARM LEVEL       80          1     -    1000        (Kpulse)
F OPTIONAL FUNCTION 5
  (PI-PID CTRL.CHG.)          0      0:NONE
                                     1:CAN CHG. BY DROOP WHEN POS.CTRL.
                                     2:VEL.AMP.CTRL
  (DYNAMIC BRAKE)
  (SERVO READ LANG)                  0:JAPANESE 1:ENGLISH
                                              End:SET    Esc:STOP         ───── Relative error display area
1 STD.PA 2 ADJ.PA  3 NEXT 4   5     6    7     8    9     0 AXIS
```

[Display/Setting Contents]

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 displayed 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 Operations]

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 parameter) 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 SETTING FOR POSITIONING

Servo parameter (adjustment parameter) setting

1) 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

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

(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.

(2) The setting range for servo parameter (expansion parameters) data varies according to the system-of-units designated with the Fixed Parameter Setting function.

8. DATA SETTING FOR POSITIONING

File WRITE

1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.
   A dialog box containing the message "File Write YES/NO" will then 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 SETTING FOR POSITIONING

8.1.3 Home position return data (axis data) setting

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

[Procedure For Displaying The Home Position Return Setting Window]

Servo function selection window	→	2	→	Servo data setting function selection window	→	1	→	Axis data setting function selection window	→	3	→	Home position return setting window
		Selection of servo data setting function				Selection of axis data setting function				Selection of home position return setting function		

[Home Position Return Setting Window] (For A171S/A273UHCPU)

```
ZERO POINT DATA
   1AXIS    <mm>        SET DATA         SETTING RANGE
A DIRECTION                   0        0:REVERSE(cw)   1:FORWARD(ccw)          ──── Setting data area
B METHOD                      0        0:DOG      1:COUNT      2:DATA SET
C ADDRESS                    0.0       -214748364.8  -  214748364.7 (##)       ──── Setting range area
D SPEED                     0.01       0.01   -   6000000.00(mm/min)
E CREEP SPEED               0.01       0.01   -   6000000.00(mm/min)
F MOVEMENT AFTER DOG         ___
G P.B. NO.                    1         1    -     16

                                                                                ──── Relative error display area




                                   End:SET      Esc:STOP
1    2    3    4    5   6    7    8    9    0 AXIS
```

[Display/Setting Contents]

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 system-of-units) when an error is detected by the relative check function.

[Key Operations]

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 SETTING 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.
A dialog box containing the message "File Write YES/NO" will then 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 system- │
│       of-units designated with the Fixed Parameter Setting function.            │
│  (2)  Items for which settings can be designated will vary according to the     │
│       home position return method which is used.                                │
│       1) Dog type      : Settings can be designated for items A-E, and G. No     │
│                          setting can be designated for item F.                   │
│       2) Count type    : Settings can be designated for all items.               │
│       3) Data set type : Settings can be designated for items A, B, C only.      │
│                          Settings cannot be designated for any other items.      │
└─────────────────────────────────────────────────────────────────────┘
```

8. DATA SETTING 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]

```
┌─────────────┐      ┌───┐   ┌─────────────┐    ┌───┐   ┌─────────────┐    ┌───┐   ┌─────────────┐
│Servo function│  →  │ 2 │ → │Servo data setting│ → │ 1 │ → │Axis data setting │ → │ 4 │ → │JOG operation │
│selection window│    └───┘   │function selection│   └───┘   │function selection│   └───┘   │data setting  │
└─────────────┘              │window       │          │window       │          │window       │
                              └─────────────┘          └─────────────┘          └─────────────┘
              Selection of            Selection of axis          Selection of JOG
              servo data              data setting               operation data
              setting function        function                   setting function
```
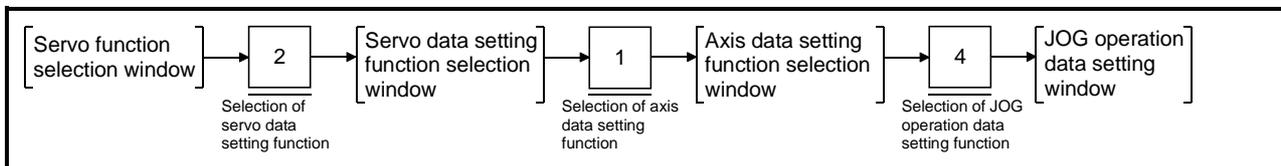
[JOG Operation Data Setting Window] (For A171S/A273UHCPU)

```
┌──────────────────────────────────────────────────┐
│ ZERO POINT DATA                                    │
│   1AXIS    <mm>      SET DATA      SETTING RANGE    │
│ A JOG SPEED ##        200.00  0.01   -  6000000.00(mm/min)│ ──── Setting data area
│ B P.B.No.                  1  1      -         16   │ ──── Setting range area
│                                                    │
│                                                    │
│                                                    │
│                                                    │
│                           End:SET      Esc:STOP    │
│ 1    2    3    4  ▌5    6    7    8  ▌9    0 AXIS   │
└──────────────────────────────────────────────────┘
```

[Display/Setting Contents]

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 Operations]

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.

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, an "OUT OF SETTING RANGE" error message will be displayed. After checking the setting data, make the necessary corrections then press the [END] key again.

8. DATA SETTING FOR POSITIONING

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.
   A dialog box containing the message "File Write YES/NO" will then 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.

POINT

(1) The setting range for JOG operation data varies according to the system-of-units designated with the Fixed Parameter Setting function.

---

8. DATA SETTING 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]

```
┌──────────────┐      ┌───┐      ┌──────────────────┐      ┌───┐      ┌──────────────┐
│ Servo function│ ──→ │ 2 │ ──→ │ Servo data setting│ ──→ │ 2 │ ──→ │ Parameter block│
│ selection window│    └───┘      │ function selection│    └───┘      │ setting window│
└──────────────┘                 │ window            │                └──────────────┘
                   Selection of   └──────────────────┘    Selection of
                   servo data                              parameter block
                   setting function                        setting function
```
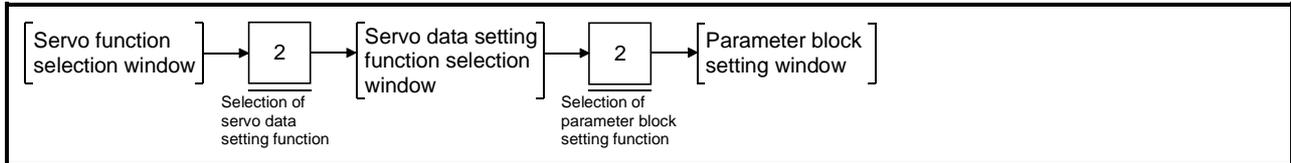
[Parameter Block No. Setting Window] (For A17[ ]S/A273UHCPU)

```
P.B DATA  SETTING
      BLOCK            SET DATA        SETTING RANGE




PARA BLOCK NO. SETTING
BLOCK NO.? [ 1] (1-14) ◄ ─────────────── Parameter block No.display area
                                  └────── Parameter block No.setting area
              Esc:CLOSE
Page Up  Page Down                    End:SET    Esc:STOP
1    2     3     4   5    6    7    8   9     0 AXIS
```

[Display/Setting Contents]

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

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

[Key Operations]

Parameter block No. setting

1) Using the numeric keys, key in the block No. where a parameter block data setting is to be designated, then 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

1) 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 SETTING FOR POSITIONING

[Parameter Block Setting Window]

<P.B. DATA SETTING>			
BLOCK 1	SET DATA	SETTING RANGE	
A CONTRO UNIT	0	0:mm 1:inch 2:degree 3:PULSE	
B SPEED RESTRICTION	2000.00	0.01 - 6000000.00 (mm/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	
I CIRCULAR ERROR RANGE	10.0	0.0 - 10000.0 (##)	
Page Up Page Down		End:SET Esc:STOP	
1 2 3 4 5 6 7 8 9 0 AXIS			

— Setting data area

— Setting range area

— Relative error display area

[Display/Setting Contents]

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 displayed 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 Operations]

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.
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 DOWN] key reduces the current block No. by 1. The [PAGE UP] 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**
>
> (1) The parameter block setting range varies according to the system-of-units designated with the Fixed Parameter Setting function.
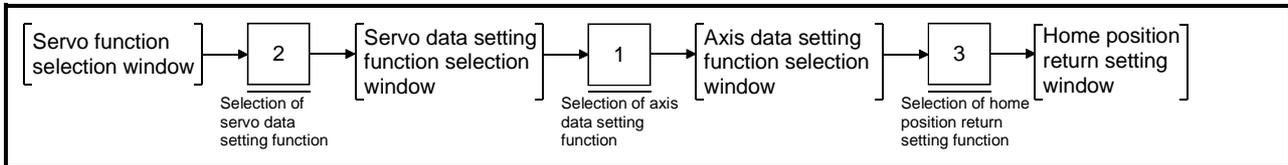
8. DATA SETTING FOR POSITIONING

File WRITE

1) To write the setting data to a file, press the [F1] key while the [Ctrl] key is pressed.
   A dialog box containing the message "File Write YES/NO" will then 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 SETTING 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]
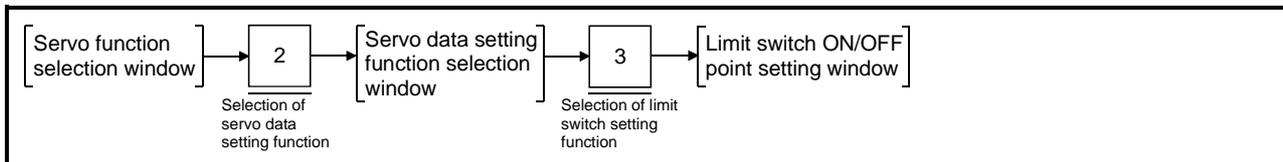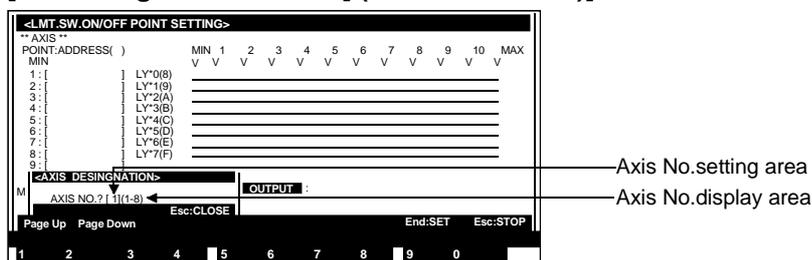
```
┌──────────────┐       ┌──────────────────┐       ┌──────────────────┐
│Servo function│  →  2 │Servo data setting│  →  3 │Limit switch ON/OFF│
│selection     │       │function selection│       │point setting     │
│window        │       │window            │       │window            │
└──────────────┘       └──────────────────┘       └──────────────────┘
        Selection of              Selection of limit
        servo data                switch setting
        setting function          function
```

[Axis Designation Window] (For A273UHCPU)]

```
<LMT.SW.ON/OFF POINT SETTING>
** AXIS **
POINT:ADDRESS( )           MIN  1   2   3   4   5   6   7   8   9  10  MAX
MIN                             V   V   V   V   V   V   V   V   V   V   V
 1 : [              ]  LY*0(8)  ─────────────────────────────────────────
 2 : [              ]  LY*1(9)  ─────────────────────────────────────────
 3 : [              ]  LY*2(A)  ─────────────────────────────────────────
 4 : [              ]  LY*3(B)  ─────────────────────────────────────────
 5 : [              ]  LY*4(C)  ─────────────────────────────────────────
 6 : [              ]  LY*5(D)  ─────────────────────────────────────────
 7 : [              ]  LY*6(E)  ─────────────────────────────────────────
 8 : [              ]  LY*7(F)  ─────────────────────────────────────────
 9 : [
   <AXIS DESINGNATION>                                          ─── Axis No.setting area
M                                                               ─── Axis No.display area
     AXIS NO.? [ 1](1-8)           OUTPUT  :
                         Esc:CLOSE
Page Up   Page Down                                    End:SET    Esc:STOP

  1       2       3       4     5     6     7     8    9     0
```

[Display/Setting Contents]

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

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

[Key Operations]

Axis No. setting
1) 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
1) 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 SETTING FOR POSITIONING

[Limit Switch ON/OFF Point Setting Window]

Function display area
Adress setting area
ON/OFF setting area
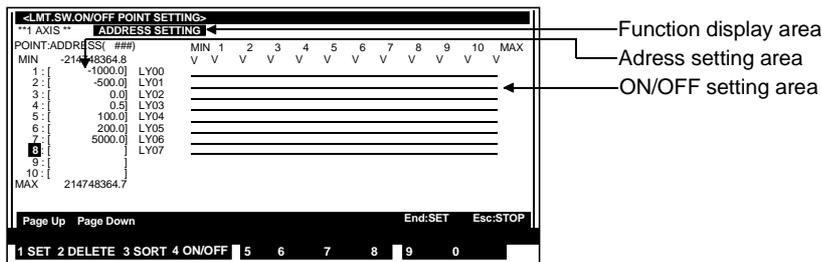
[Display/Setting Contents]

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 Operations]

Selecting the "Address Setting" Function of Limit Switch ON/OFF Point

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. Be sure that the address is within the MIN to MAX range. 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 deletion 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 SETTING 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 No.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.
   A dialog box containing the message "File Write YES/NO" will then 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 SETTING 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]
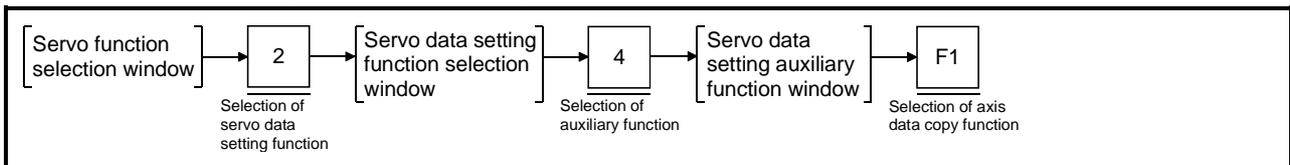
[Servo Data Setting Auxiliary Function Window] (For A273UHCPU)

Copy source axis No. seeting area
Copy destination axis No. seeting area
Axis No. display area
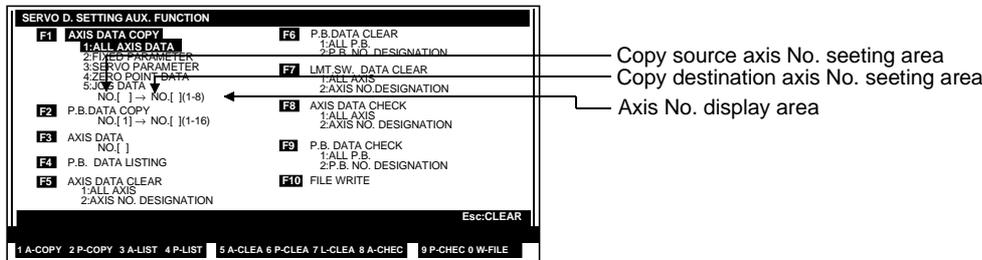
[Display/Setting Contents]

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 Operations]

Selecting the axis data to be copied	1) 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.	1) 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.
	2) 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 SETTING FOR POSITIONING

Designating 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.
   A dialog box containing the message "AXIS DATA COPY YES/NO" will then be displayed.

Copy EXECUTE

1) To execute the axis data copy operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.)

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 SETTING FOR POSITIONING

8.2.2 Parameter block data COPY

The procedure for copying parameter block data to another parameter block is described below.
The parameter block data COPY operation is designated from the Servo Data Setting Auxiliary Function window.

[Parameter Block COPY Designation Procedure]

```
┌─────────────┐     ┌───┐     ┌─────────────┐     ┌───┐     ┌─────────────┐     ┌───┐
│Servo function│ ──▶ │ 2 │ ──▶ │Servo data   │ ──▶ │ 4 │ ──▶ │Servo data   │ ──▶ │F2 │
│selection    │     │   │     │setting      │     │   │     │setting      │     │   │
│window       │     │   │     │function     │     │   │     │auxiliary    │     │   │
│             │     │   │     │selection    │     │   │     │function     │     │   │
│             │     │   │     │window       │     │   │     │window       │     │   │
└─────────────┘     └───┘     └─────────────┘     └───┘     └─────────────┘     └───┘
                  Selection of                  Selection of                Selection of
                  servo data                    auxiliary                   parameter block
                  setting function              function                    copy function
```

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

```
SERVO D. SETTING AUX. FUNCTION
 F1  AXIS DATA COPY                    F6  P.B.DATA CLEAR
     1:ALL AXIS DATA                        1:ALL P.B.
     2:FIXED PARAMETER                       2:P.B. NO. DESIGNATION
     3:SERVO PARAMETER                 F7  LMT.SW.  DATA CLEAR
     4:ZERO POINT DATA                      1:ALL AXIS
     5:JOG DATA                             2:AXIS NO.DESIGNATION
       NO.[ ] → NO.[ ](1-8)
 F2  P.B.DATA COPY                     F8  AXIS DATA CHECK
       NO.[ 1] → NO.[ ](1-16)               1:ALL AXIS
                                            2:AXIS NO. DESIGNATION
 F3  AXIS DATA                         F9  P.B. DATA CHECK
       NO.[ ]                              1:ALL P.B.
 F4  P.B. DATA LISTING                      2:P.B. NO. DESIGNATION
 F5  AXIS DATA CLEAR                   F10 FILE WRITE
     1:ALL AXIS
     2:AXIS NO. DESIGNATION
                                                         Esc:CLOSE
 1 A-COPY  2 P-COPY  3 A-LIST  4 P-LIST   5 A-CLEA 6 P-CLEA 7 L-CLEA 8 A-CHEC   9 P-CHEC 0 W-FILE
```

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

[Display/Setting Contents]

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 selectable parameter block Nos. is displayed here.

[Key Operations]

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 SETTING FOR POSITIONING

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 parameter block 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 dialog box containing the message "PARAMETER BLOCK DATA COPY YES/NO" will then be displayed.

Copy EXECUTE

1) To execute the parameter block data copy operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.)

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 SETTING 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 LIST operation is designated from the Servo Data Setting Auxiliary Function window.

[Procedure For Displaying The Axis Data LIST]
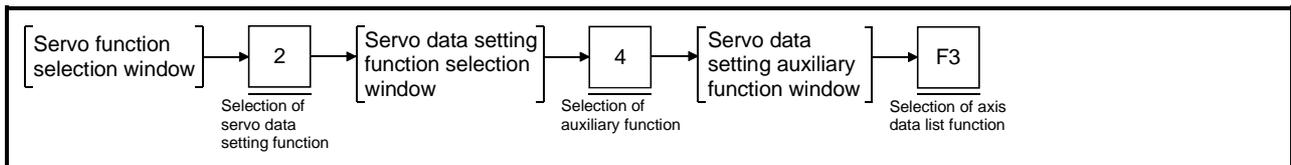
[Servo Data Setting Auxiliary Function Window] (For A273UHCPU)
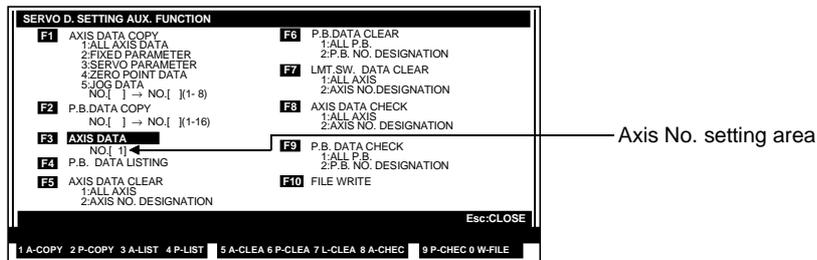
[Display/Setting Contents]

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

[Key Operations]

Designating the axis No.

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 SETTING FOR POSITIONING

(1) When ADU is used

[Axis Data LIST Window]

```
<AXIS DATA LIST DISPLAY 1 ** AXIS **>
        FIXED PARAMETER              SERVO PARAMETER(STANDARD)
1 UNIT SETTING            :PULSE     1 AMP.SETTING              1:ADU_ABS
2 PULSE/TURN(AP)          20000      2 RESISTANCE
3 MOVEMENT/TURN(AL)       20000      3 EXT.DYNAMIC BRAKE
4 UNIT MAG.(AM)                      4 MOTOR TYPE                 3:HA-LH
5 BACKLASH COMPENSATION       0      5 MOTOR CAPACITY(kw)          0.50
6 STROKE LIMIT MAX.    2147483647    6 MOTOR SPEED(r/min)          2000
7 STROKE LIMIT MIN.                  7 FEEDBACK PULS(N)           16304
8 CMD.IN-POS.RANGE          100      8 SPIN DIRECTION          0:FOR.(ccw)
9 LMT.SW.OUTPUT            0:NO      9 AUTO-TUNING               2:NONE
                                    10 SERVO RESPONSE               1
        ZERO POSITION DATA
1 DIRECTION         0:REVERSE(cw)         JOG OPERATION DATA
2 METHOD                 0:DOG       1 JOG SPEED RESTRICTION     20000
3 ADDRESS                   0        2 P.B. NO.                     1
4 SPEED                     1
5 CREEP SPEED               1
6 MOVEMENT AFTER DOG
7 P.B. NO.                  1
                                                      Esc:CANCEL
COMPLETED.
1 NEXT  2      3      4     5    6     7     8     9     0
```

← Axis data display area

[Display/Setting Contents]

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

[Key Operations]

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 LIST DISPLAY 1 ** AXIS **>
        FIXED PARAMETER              SERVO PARAMETER(STANDARD)
1 UNIT SETTING            :PULSE     1 AMP.SETTING             0:MR-H_INC
2 PULSE/TURN(AP)          20000      2 RESISTANCE             0:STANDARD
3 MOVEMENT/TURN(AL)       20000      3 EXT.DYNAMIC BRAKE          0:NO
4 UNIT MAG.(AM)               1      4 MOTOR TYPE               3:HA-H
5 BACKLASH COMPENSATION       0      5 MOTOR CAPACITY(kw)          0.05
6 STROKE LIMIT MAX.    2147483647    6 MOTOR SPEED(r/min)          3000
7 STROKE LIMIT MIN.           0      7 FEEDBACK PULS(N)            8192
8 CMD.IN-POS.RANGE          100      8 SPIN DIRECTION          0:FOR.(ccw)
9 LMT.SW.OUTPUT            0:NO      9 AUTO-TUNING            1:POS.&VEL.
                                    10 SERVO RESPONSE               1
        ZERO POSITION DATA
1 DIRECTION         0:REVERSE(cw)         JOG OPERATION DATA
2 METHOD                 0:DOG       1 JOG SPEED RESTRICTION     20000
3 ADDRESS                   0        2 P.B. NO.                     1
4 SPEED                     1
5 CREEP SPEED               1
6 MOVEMENT AFTER DOG
7 P.B. NO.                  1
                                                      Esc:CANCEL
COMPLETED.
1 NEXT  2      3      4     5    6     7     8     9     0
```

← Axis data display area

[Display/Setting Contents]

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

[Key Operations]

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 changes
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 SETTING FOR POSITIONING

8.3.2 Parameter block LIST

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

[Procedure For Displaying The Parameter Block List]

Servo function selection window	→	2	→	Servo data setting function selection window	→	4	→	Servo data setting auxiliary function window	→	F4	→	Parameter block list window
		Selection of servo data setting function				Selection of auxiliary function				Selection of parameter block list function		
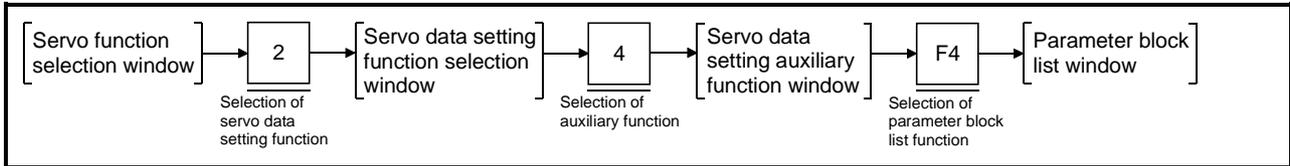
[Parameter Block LIST Window] (For A273UHCPU)

```
<PARAMETER BLOCK LIST DISPLAY>
P.B.NO.  CONTROL  SPEED      ACCEL.  DECEL.  SHORT   TORQUE  S
         UNIT     RESTRIC.   TIME    TIME    TIME    LIMIT   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)  (%)     (%)
< >.DISP ITEM CHO.                                   Esc:STOP
COMPLETED.
1        2        3        4        5   6    7    8    9    0
```

← Parameter block data display area

← System-of-units display area

[Display/Setting Contents]

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 Operations]

Highlight display of setting items & 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 SETTING 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

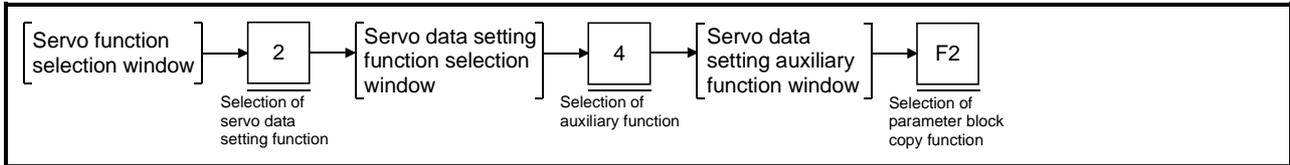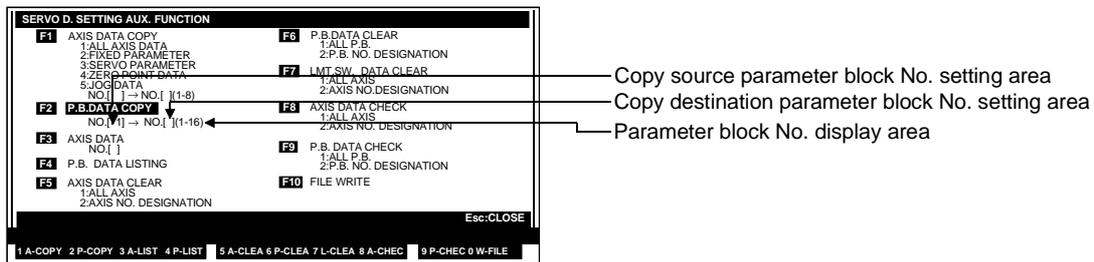A relative check of the designated axis No. data (fixed parameters, servo parameters, home position return data, JOG operation data) and parameter block setting data is executed to check for errors.
The axis data check operation is designated from the Servo Data Setting Auxiliary Function window.

[Axis Data Check Designation Procedure]

Servo function selection window	→	2	→	Servo data setting function selection window	→	4	→	Servo data setting auxiliary function window	→	F8
		Selection of servo data setting function				Selection of auxiliary function				Selection of axis data check function

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

```
SERVO D. SETTING AUX. FUNCTION
 F1  AXIS DATA COPY                    F6  P.B.DATA CLEAR
        1:ALL AXIS DATA                        1:ALL P.B.
        2:FIXED PARAMETER                     2:P.B. NO. DESIGNATION
        3:SERVO PARAMETER
        4:ZERO POINT DATA              F7  LMT.SW.  DATA CLEAR
        5:JOG DATA                             1:ALL AXIS
           NO.[  ] → NO.[  ](1- 8)             2:AXIS NO.DESIGNATION
 F2  P.B.DATA COPY                     F8  AXIS DATA CHECK
        NO.[  ] → NO.[  ](1-16)                1:ALL AXIS
                                               2:AXIS NO. DESIGNATION    ◄──── Axis data check selection area
 F3  AXIS DATA
        NO.[  ]                        F9  P.B. DATA CHECK
                                               1:ALL P.B.
 F4  P.B.  DATA LISTING                        2:P.B. NO. DESIGNATION

 F5  AXIS DATA CLEAR                   F10 FILE WRITE
        1:ALL AXIS
        2:AXIS NO. DESIGNATION
                                                              Esc:CLOSE

 1 A-COPY  2 P-COPY  3 A-LIST  4 P-LIST   5 A-CLEA 6 P-CLEA 7 L-CLEA 8 A-CHEC   9 P-CHEC 0 W-FILE
```

[Display/Setting Contents]

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

[Key Operations]

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. A dialog box containing the message "ALL AXES CHECK? YES/NO" will then be displayed.
All axes check EXECUTE	1) To execute the "all axes check" operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 2) When the "all axes check" operation is completed, the Axis Data Error window will be displayed.
All axes 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 SETTING 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) To refer to the error codes for the previous/next page axis data, use the [PAGE UP] / [PAGE DOWN] keys. Press the [PAGE UP] key to display the previous error code page. Press the [PAGE DOWN] key to display the next error code page. (For the A273UHCPU (32-axis specs), error codes for 1-32 axes are displayed.)
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. A dialog box containing the message "DESIGNATED AXIS CHECK? YES/NO" will then be displayed.
Designated axis check EXECUTE	1) To execute the "designated axis check" operation press the [→] key with "YES" highlighted. (If "NO" is highlighted, press the [Enter] key to move the highlight to the "YES" position.) 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 SETTING FOR POSITIONING

[Axis Data Error Window] (For A273UHCPU)
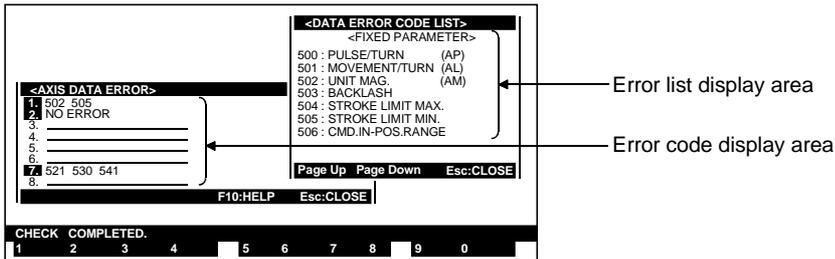
[Display/Setting Contents]

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 contents is displayed here.

[Key Operations]

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 error code list page.
   Press the [PAGE DOWN] key to display the next page of the error code 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.

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8. DATA SETTING 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 function is designated from the Servo Data Setting Auxiliary Function window.

[Parameter Block Check Designation Procedure]

```
┌─────────────┐      ┌───┐    ┌─────────────────┐      ┌───┐    ┌─────────────┐      ┌────┐
│Servo function│  →   │ 2 │ →  │Servo data setting│  →   │ 4 │ →  │Servo data    │  →   │ F9 │
│selection window│    └───┘    │function selection│     └───┘    │setting auxiliary│    └────┘
└─────────────┘               │window           │              │function window│
                  Selection of └─────────────────┘   Selection of └─────────────┘   Selection of
                  servo data                          auxiliary function              parameter block
                  setting function                                                    check function
```

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

```
SERVO D. SETTING AUX. FUNCTION
 F1  AXIS DATA COPY                    F6  P.B.DATA CLEAR
        1:ALL AXIS DATA                       1:ALL P.B.
        2:FIXED PARAMETER                     2:P.B. NO. DESIGNATION
        3:SERVO PARAMETER
        4:ZERO POINT DATA             F7  LMT.SW.  DATA CLEAR
        5:JOG DATA                            1:ALL AXIS
          NO.[  ] → NO.[  ](1- 8)            2:AXIS NO.DESIGNATION
 F2  P.B.DATA COPY                     F8  AXIS DATA CHECK
          NO.[  ] → NO.[  ](1-16)            1:ALL AXIS
                                             2:AXIS NO. DESIGNATION
 F3  AXIS DATA                         F9  P.B. DATA CHECK
        NO.[  ]                               1:ALL P.B.
 F4  P.B. DATA LISTING                         2:P.B. NO. DESIGNATION
 F5  AXIS DATA CLEAR                  F10  FILE WRITE
        1:ALL AXIS
        2:AXIS NO. DESIGNATION
                                                          Esc:CLOSE

1 A-COPY  2 P-COPY  3 A-LIST  4 P-LIST    5 A-CLEA 6 P-CLEA 7 L-CLEA 8 A-CHEC   9 P-CHEC 0 W-FILE
```

← Parameter block data check selection area

[Display/Setting Contents]

Parameter block data check selection area	"All blocks" or "designated blocks" is selected here.

[Key Operations]

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. A dialog box containing the message "ALL BLOCKS CHECK YES/NO" will then be displayed.
All blocks check EXECUTE	1) To execute the "all blocks check" operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 2) When the "all blocks check" is completed, the Parameter Block Data Error window will be displayed.
All blocks check CANCEL	1) To cancel the "all 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 blocks check" operation.

8. DATA SETTING FOR POSITIONING

Designated Blocks Check	
Selecting the "designated blocks" item	1) Select the "designated blocks" 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 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 blocks can be designated for the parameter block data check. 2) To refer to the error codes for the previous/next page axis data, use the [PAGE UP] / [PAGE DOWN] keys. Press the [PAGE UP] key to display the previous error code page. Press the [PAGE DOWN] key to display the next error code page. (For the A273UHCPU (32-axis specification), error codes for parameter block Nos. 1-64 are displayed.)
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 block No. (Nos.) has been designated for the parameter block data check operation, press the [END] key. A dialog box containing the message "DESIGNATED BLOCK CHECK YES/NO" will then be displayed.
Designated parameter block check EXECUTE	1) To execute the "designated block check" operation press the [↵] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 2) When the "designated block check" is completed, the Parameter Block Data Error window will be displayed.
Designated parameter block check CANCEL	1) To cancel the "designated block 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 block check" operation.

8. DATA SETTING FOR POSITIONING

[Parameter Block Error Window]

<PARAM. BLOCK ERROR>		<PARA BLOCK ERROR LIST>
BLOCK 1	541 542 543 544	<FIXED PARAMETER>
BLOCK 2	NO ERROR	
BLOCK 3		500 : PULSE/TURN (AP)
BLOCK 4		501 : MOVEMENT/TURN (AL)
BLOCK 5		502 : UNIT MAG. (AM)
BLOCK 6		503 : BACKLASH
BLOCK 7		504 : STROKE LIMIT MAX.
BLOCK 8		505 : STROKE LIMIT MIN.
BLOCK 9		506 : CMO IN-POS-RANGE
BLOCK10	543 546	
BLOCK11		
BLOCK12		
BLOCK13		Page Up Page Down Esc:CLOSE
BLOCK14		
BLOCK15		
BLOCK16		
	F10:HELP Esc:CLOSE	

— Error list display area

— Error code display area

1 2 3 4 5 6 7 8 9 0

[Display/Setting Contents]

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.

[Key Operations]

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 SETTING FOR POSITIONING

8.5 Positioning Data CLEAR

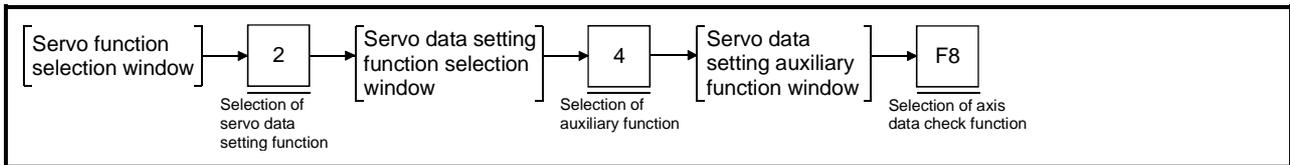The procedure for clearing positioning data (restoring the default values) is described below.

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 CLEAR function is designated from the Servo Data Setting Auxiliary Function window.

[Axis Data CLEAR Designation Procedure]
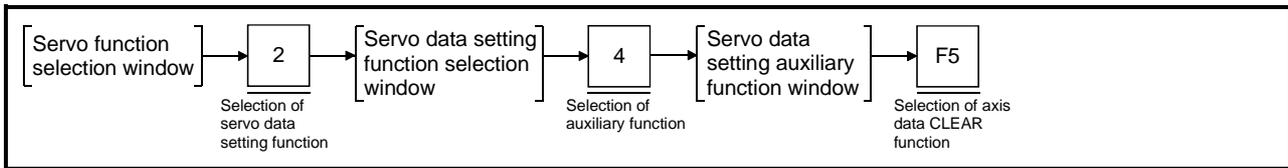
| Servo function selection window | → | 2 | → | Servo data setting function selection window | → | 4 | → | Servo data setting auxiliary function window | → | F5 |
| | | Selection of servo data setting function | | | | Selection of auxiliary function | | | | Selection of axis data CLEAR function |

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

Axis data CLEAR selection area
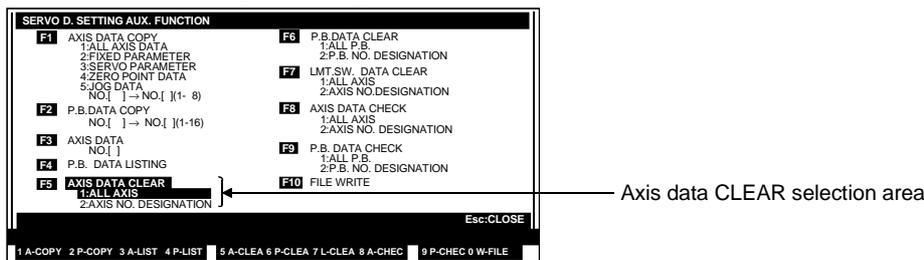
[Display/Setting Contents]

Axis data CLEAR selection area "All axes" or "designated axis" is selected here.

[Key Operations]

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.
A dialog box containing the message "ALL AXES DATA CLEAR? YES/NO" will then be displayed.

All axes CLEAR EXECUTE
1) To execute the "all axes CLEAR" operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.)
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 SETTING FOR POSITIONING

Designated Axis CLEAR	
Selecting the "designated blocks" item	1) Select the "ALL AXIS" 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 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 axes can be designated for the axis data CLEAR operation.
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 axis No. (Nos.) has been designated for the axis data CLEAR operation, press the [END] key. A dialog box containing the message "DESIGNATED AXIS DATA CLEAR? YES/NO" will then be displayed.
Designated axis CLEAR EXECUTE	1) To execute the "designated axis CLEAR" operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 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 SETTING FOR POSITIONING

8.5.2 Parameter block CLEAR

Data at the designated parameter block No. is cleared, and the default values are restored.
The Parameter Block CLEAR function is designated from the Servo Data Setting Auxiliary Function window.

[Parameter Block CLEAR Designation Procedure]

```
┌──────────────┐     ┌───┐     ┌──────────────┐     ┌───┐     ┌──────────────┐     ┌────┐
│Servo function│ ──▶ │ 2 │ ──▶ │Servo data    │ ──▶ │ 4 │ ──▶ │Servo data    │ ──▶ │ F6 │
│selection     │     │   │     │setting       │     │   │     │setting       │     │    │
│window        │     └───┘     │function      │     └───┘     │auxiliary     │     └────┘
└──────────────┘    Selection  │selection     │    Selection  │function      │    Selection of
                    of         │window        │    of         │window        │    parameter block
                    servo data └──────────────┘    auxiliary  └──────────────┘    CLEAR function
                    setting                         function
                    function
```

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

```
SERVO D. SETTING AUX. FUNCTION
  F1  AXIS DATA COPY                 F6  P.B.DATA CLEAR
      1:ALL AXIS DATA                    1:ALL P.B.
      2:FIXED PARAMETER                  2:P.B. NO. DESIGNATION
      3:SERVO PARAMETER
      4:ZERO POINT DATA              F7  LMT.SW.  DATA CLEAR
      5:JOG DATA                         1:ALL AXIS
         NO.[   ] → NO.[   ](1- 8)       2:AXIS NO.DESIGNATION
  F2  P.B.DATA COPY                  F8  AXIS DATA CHECK
         NO.[   ] → NO.[   ](1-16)       1:ALL AXIS
                                         2:AXIS NO. DESIGNATION
  F3  AXIS DATA
         NO.[ ]                      F9  P.B. DATA CHECK
                                         1:ALL P.B.
  F4  P.B.  DATA LISTING                 2:P.B. NO. DESIGNATION
  F5  AXIS DATA CLEAR               F10  FILE WRITE
      1:ALL AXIS
      2:AXIS NO. DESIGNATION
                                                          Esc:CLOSE
1 A-COPY  2 P-COPY  3 A-LIST  4 P-LIST │ 5 A-CLEA 6 P-CLEA 7 L-CLEA 8 A-CHEC │ 9 P-CHEC 0 W-FILE
```

← Parameter block data CLEAR selection area

[Display/Setting Contents]

Parameter block data CLEAR selection area	"All blocks" or "designated blocks" is selected here.

[Key Operations]

All Blocks CLEAR

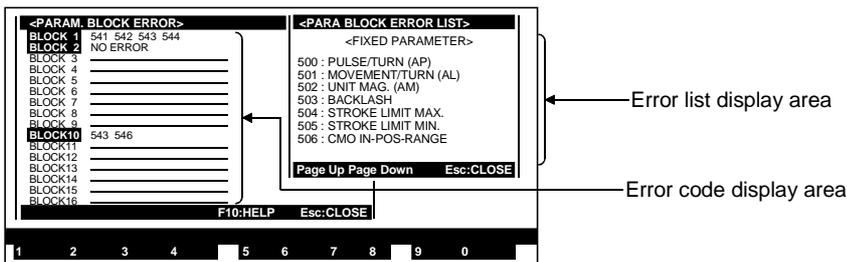|	
Selecting "all blocks CLEAR"	1) Select the "ALL P.B." item by pressing the [1] key or by using the [↑]/[↓] keys, then press the [Enter] key. A dialog box containing the message "ALL BLOCKS DATA CLEAR? YES/ NO" will then be displayed.
All blocks CLEAR EXECUTE	1) To execute the "all blocks CLEAR" operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 2) When the "all blocks CLEAR" operation 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 SETTING FOR POSITIONING

Designated Blocks CLEAR	
Selecting the "designated blocks" item	1) Select the "designated blocks" 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 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 then 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. A dialog box containing the message "DESIGNATED BLOCK DATA CLEAR? YES/NO" will then be displayed.
Designated parameter block data CLEAR EXECUTE	1) To execute the "designated block CLEAR" operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 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 block CLEAR" operation.

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 function is designated from the Servo Data Setting Auxiliary Function window.

[Limit Switch Output Data CLEAR Designation Procedure]

Servo function selection window	→	2	→	Servo data setting function selection window	→	4	→	Servo data setting auxiliary function window	→	F7
		Selection of servo data setting function				Selection of auxiliary function				Selection of limit switch CLEAR function

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

```
SERVO D. SETTING AUX. FUNCTION
 F1  AXIS DATA COPY              F6  P.B.DATA CLEAR
     1:ALL AXIS DATA                 1:ALL P.B.
     2:FIXED PARAMETER               2:P.B. NO. DESIGNATION
     3:SERVO PARAMETER           F7  LMT.SW. DATA CLEAR
     4:ZERO POINT DATA               1:ALL AXIS
     5:JOG DATA                      2:AXIS NO.DESIGNATION
       NO.[  ] → NO.[  ](1- 8)
 F2  P.B.DATA COPY              F8  AXIS DATA CHECK
       NO.[  ] → NO.[  ](1-16)        1:ALL AXIS
                                     2:AXIS NO. DESIGNATION
 F3  AXIS DATA                  F9  P.B. DATA CHECK
       NO.[ ]                         1:ALL P.B.
                                     2:P.B. NO. DESIGNATION
 F4  P.B. DATA LISTING         F10  FILE WRITE
 F5  AXIS DATA CLEAR
     1:ALL AXIS
     2:AXIS NO. DESIGNATION
                                                Esc:CLOSE

1 A-COPY  2 P-COPY  3 A-LIST  4 P-LIST   5 A-CLEA 6 P-CLEA 7 L-CLEA 8 A-CHEC   9 P-CHEC 0 W-FILE
```

————Limit switch CLEAR selection area

[Display/Setting Contents]

Limit switch CLEAR selection area	"All axes" or "designated axis" is selected here.

[Key Operations]

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. A dialog box containing the message "ALL AXES LIMIT SWITCH OUTPUT DATA CLEAR? YES/NO" will then be displayed.
All axes limit switch output data CLEAR EXECUTE	1) To execute the "all axes limit switch output data CLEAR" operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 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 SETTING FOR POSITIONING

Designated Axis Limit Switch Output Data CLEAR

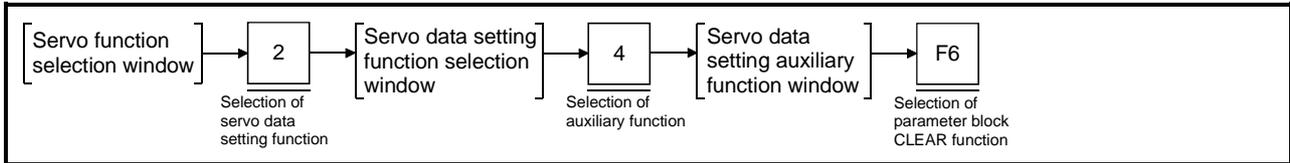|	
Selecting the "designated axis" item	1) Select the "designated axis" item by pressing the [2] key or by using the [↑]/[↓] keys, then press the [Enter] key. The Axis No. Designation window will then be displayed.
Designating the axis No.	1) Use the cursor control keys (arrow keys) to move the cursor 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 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. A dialog box containing the message "DESIGNATED AXIS LIMIT SWITCH OUTPUT DATA CLEAR? YES/NO" will then be displayed.
Designated axis limit switch output data CLEAR EXECUTE	1) To execute the "designated axis limit switch output data CLEAR" operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 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 SETTING 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. This File WRITE function is designated from the Servo Data Setting Auxiliary Function window.

[File WRITE Designation Procedure]

Servo function selection window → 2 → Servo data setting function selection window → 4 → Servo data setting auxiliary function window → F10 → Fire WRITE window

Selection of servo data setting function

Selection of auxiliary function

Selection of File WRITE function
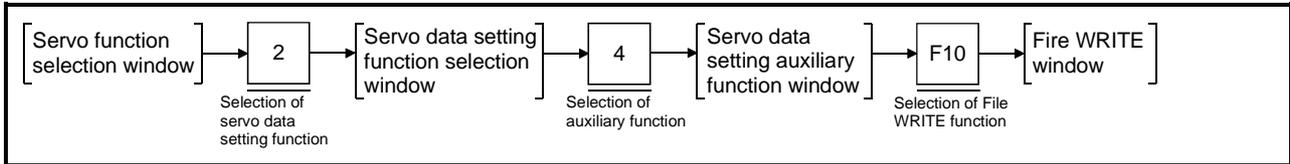
[File WRITE window] (For A273UHCPU)

```
SERVO D. SETTING AUX. FUNCTION
F1  AXIS DATA COPY          F6  P.B.DATA CLEAR
    1:ALL AXIS DATA             1:ALL P.B.
    2:FIXED PARAMETER          2:P.B. NO. DESIGNATION
    3:SERVO PARAMETER      F7  LMT.SW.  DATA CLEAR
    4:ZERO POINT DATA          1:ALL AXIS
    5:JOG DATA                 2:AXIS NO.DESIGNATION
       NO.[  ] → NO.[  ](1- 8)
F2  P.B.DATA COPY           F8  AXIS DATA CHECK
    NO.[  ] → NO.[  ](1-16)     1:ALL AXIS
                               2:AXIS NO. DESIGNATION
F3  AXIS DATA               F9  P.B. DATA CHECK
    NO.[ ]                      L.P.B.
FILE WRITE                      B. NO. DESIGNATION
SYSTEM      [   ]
COMMENT     [          ]
SUB-SYSTEM  [                    ]    WRITE
COMMENT     [
COMMENT(GPP)[
                                    Esc:CLOSE
1 A-COPY 2 P-COPY 3 A-LIST 4 P-LIST  5 A-CLEA 6 P-CLEA 7 L-CLEA 8 A-CHEC  9 P-CHEC 0 W-FILE
```

- Drive name setting area
- System name setting area
- System name comment setting area
- Sub-system name setting area
- Sub-system name comment setting area
- Comment (GPP) setting area

[Display/Setting Contents]

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 Operations]

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.

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8. DATA SETTING FOR POSITIONING

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 (GPP) is to be used as is, press the [Enter] key.
   A dialog box containing the message "FILE WRITE? YES/NO" will then be displayed.

File Write EXECUTE

1) To execute the File WRITE operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.)
2) When the File WRITE operation is completed, the Servo Data Setting Auxiliary Function window will be displayed.

File Write CANCEL

1) To cancel the File WRITE operation, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.
   The system will then return to the File WRITE window without executing the File WRITE operation.

POINT
(1) The drive name, system name, and sub-system name settings are fixed and cannot be re-designated.

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) Outline of functions
    The GSV13PE PROGRAMMING mode consists of the following functions.

(2) Procedural flowchart
The procedural flowchart for the SERVO PROGRAMMING mode is shown below.

```
                                                                    *2
                                              ┌─────────────────────────┐
                                              │ SERVO PROGRAMMING        │
                                              │ screen display           │
                                              └─────────────────────────┘
                                                          │
                          ┌───────────────────────────────┼──────────────────────┐
                          │                               ▼                        │
                          │                  ┌─────────────────────┐        ┌──────────┐
                          │                  │ Program No. designation │ ([F7]/[F8])  │ Read │ ([F2])
                          │                  └─────────────────────┘        └──────────┘
                          │                               │
                          │                           *1  ▼
    ┌──────────┐          │        ┌──────────────┐  ┌──────────────────┐  ┌────────┐
    │ SVST axis │ ([F5])   │        │ Instruction  │([F1]) │ Auxiliary function │ ([F4])  │ Delete │ ([F3]/[Shift]+[F2])
    └──────────┘          │        └──────────────┘  └──────────────────┘  └────────┘
                          │                                      │
                          │                          ┌────────────────────────┐
                          │                          │ Program use list        │
                          │                          │ Sort                    │
                          │                          │ Copy                    │
                          │                          │ Batch change            │
                          │                          │ All clear               │
                          │                          │ File write              │
                          │                          │ PC write set            │
                          │                          └────────────────────────┘
                          │                               │
                          │                        ┌──────────┐
                          │                        │ Store    │ ([F10])
                          │                        └──────────┘
                          │                               │
                   YES    │                          ◇ Error? ◇
                   ◄──────┤                               │ NO
                          │                        ┌────────────────┐
                          │                        │ Program check  │ ([End])
                          │                        └────────────────┘
                          │                               │
                   YES    │                          ◇ Error? ◇
                   ◄──────┤                               │ NO
                          └───────────────────────────────┘
```
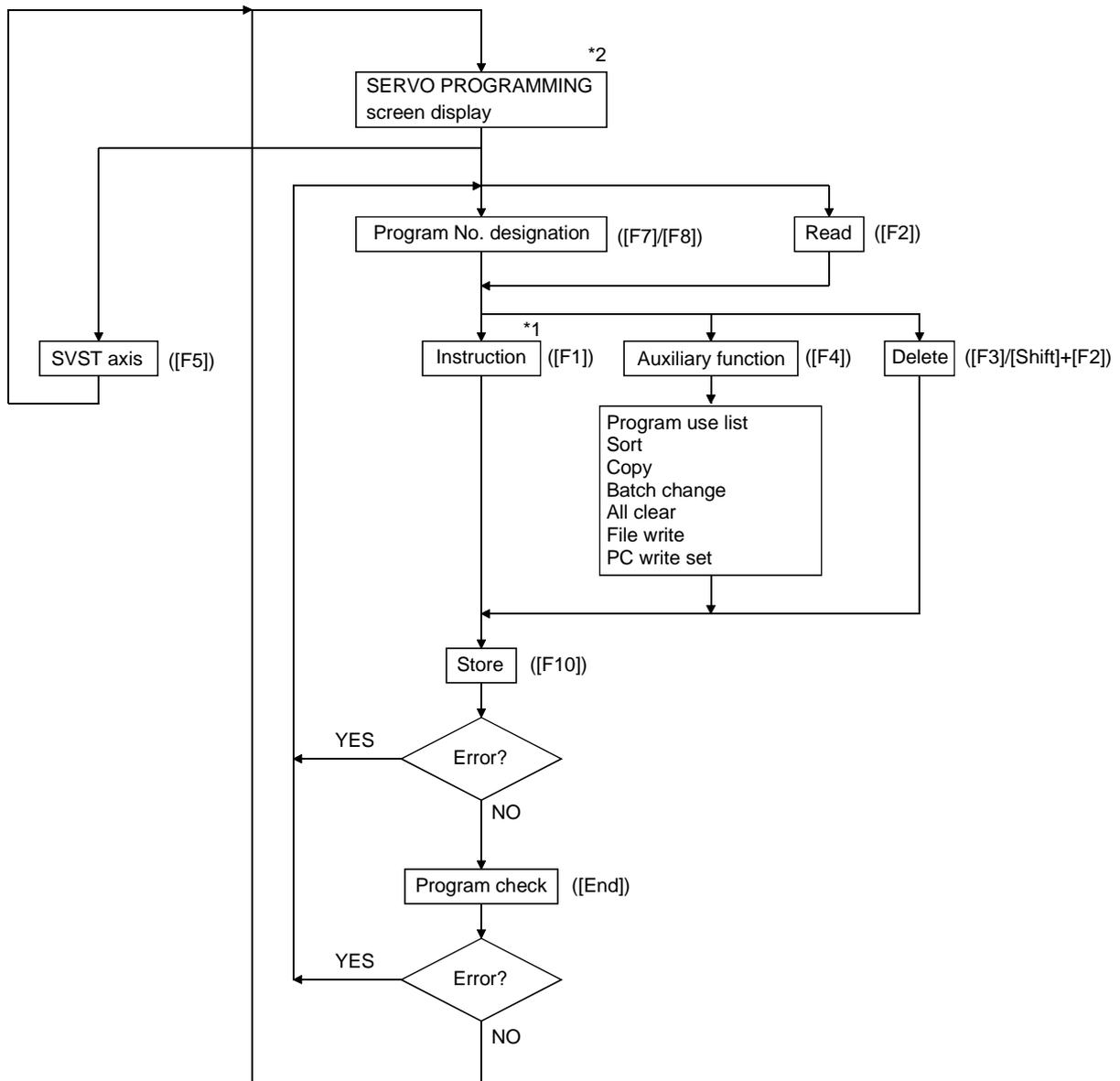
*1. At the instruction selection window, select the instruction type and the servo instruction, then execute the EDIT function.

*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
4 : VVR

5) Speed/Position Switching Control
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
1 :OSC

B) Home Position Return
1 :ZERO

C) Simultanous Start
1: START

9. SERVO PROGRAM CREATION/MODIFICATION

9.1 Servo Program READ

Existing servo programs can be read from the personal computer's memory and displayed on-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.

POINT
Program No. designation at servo program creation 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]
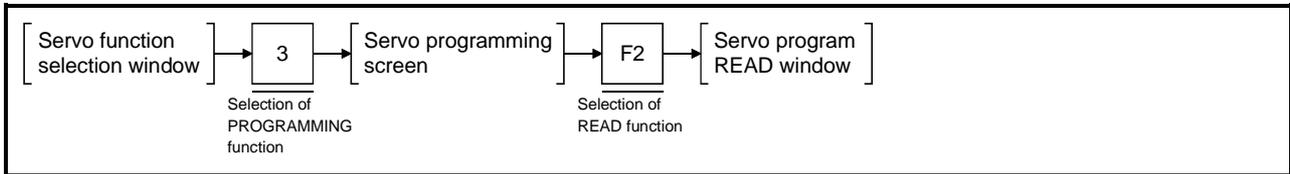
```
┌──────────────┐     ┌───┐     ┌──────────────────┐     ┌────┐     ┌──────────────┐
│ Servo function│ ──▶ │ 3 │ ──▶ │ Servo programming│ ──▶ │ F2 │ ──▶ │ Servo program│
│ selection     │     │   │     │ screen           │     │    │     │ READ window  │
│ window        │     └───┘     └──────────────────┘     └────┘     └──────────────┘
└──────────────┘   Selection of                       Selection of
                   PROGRAMMING                         READ function
                   function
```

[Servo Program READ Window] (For A273UHCPU)

```
ITME SET
F1 COMMAND SELECT   1:DWELL        <K 0>
                    2:M CODE POINT
                    3:TORQE      1          ABS-1
                    4:P.B.                  AXIS        1,    300000 (PLS)
                    5:UNIT                  SPEED.CHG          4000 (PLS/sec)
                    6:S.R.
                    7: ⊿
                    8: ⊾
<READ>
 F1  PROG. NO.   [    0]<0-4095>
 F2  AXIS NO.    [    ]<1-8>
 F3  SERVO CMD   [    ]                                              Program No. setting area
 F4  INDIRCT DEV [    ]<D0-8191,W0-1FFF>
 F5  END PROGRAM                          PROGRAM STEPS         4
Page Up  Page Down          Esc: CLOSE    USED PROGRAMS 11/4096

1 NO. 2 AXIS 3 COMMND 4 INDRCT  5 END  6    7    8    9    0
```
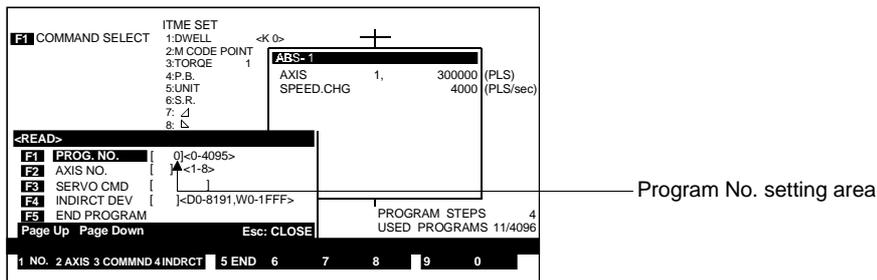
[Display/Setting Contents]

Program No. setting area	Either the No. of the program currently being read, or the designated program No. is displayed here.

[Key Operations]

Designating a readout by program No.	1) Press the [F1] key. The "PROG. 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 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.
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 function  │ →  │ 3 │ →  │ Servo programming│ →  │ F2 │ →  │ Servo program    │
│ selection window│    │   │    │ screen           │    │    │    │ READ window      │
└─────────────────┘    └───┘    └──────────────────┘    └────┘    └──────────────────┘
                   Selection of                      Selection of
                   PROGRAMMING                       READ function
                   function
```

[Servo Program READ Window] (For A273UHCPU)

Axis No. setting area
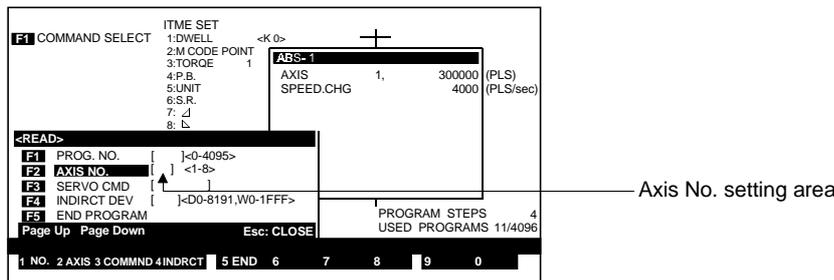
[Display/Setting Contents]
Axis No. setting area   The designated axis No. is displayed here.

[Key Operations]

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.
Designating the axis No.	1) Using the numeric keys, key-in the axis No. of the servo program to be read, 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 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.
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 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/MODIFICATON

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 function│ →  │ 3 │ →  │Servo programming│ → │ F2 │ → │Servo program │ → │ F3 │ → │Servo instruction│
│selection window│  └───┘    │screen        │    └────┘    │READ window   │    └────┘    │selection window│
└─────────────┘             └──────────────┘             └──────────────┘             └──────────────┘
               Selection of              Selection of              Selection of servo
               PROGRAMMING              READ function             instruction
               function
```

[Servo Instruction Selection Window] (For A273UHCPU)

```
<COMMAND SELECT>
F1  CMD-CLASS       SERVO CMD
    1 : POSIT.      1 : ABS-1    9 : INC-1
    2 : CIRCLE      2 : ABS-2    A : INC-2
    3 : FEED        3 : ABS-3    B : INC-3
    4 : SPEED       4 : ABS-4    C : INC-4
    5 : SPEED.POS
    6 : SPEED.CHG                           00000  <PLS>
    7 : CP                                  4000   <PLS/sec>
    8 : POS. FOLLOW
   *9 : HELICAL
    A : H-SPD OSC.
    B : ZERO
    C : START
                                        Esc:CLOSE
F4  INDIRCT DEV [    ] <D0-8191,W0-1FFF>
F5  END PROGRAM
Page Up    Page Down          Esc: CLOSE      PROGRAM STEPS    4
                                              USED PROGRAMS  11/4096
1 NO. 2 AXIS 3 COMMND 4 INDRCT  5 END   6     7     8     9     0
```

⟵ Servo instruction setting area

[Display/Setting Contents]

Servo instruction setting area   The selectable servo instructions are displayed here.

[Key Operations]

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.

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 W3FF/W1FFF) is used.

[Procedure For Displaying The Servo Program READ Window]

```
┌─────────────┐     ┌───┐     ┌──────────────┐     ┌────┐     ┌──────────────┐
│Servo function│ ──▶ │ 3 │ ──▶ │Servo programming│ ──▶ │ F2 │ ──▶ │Servo program │
│selection window│   └───┘     │screen        │     └────┘     │READ window   │
└─────────────┘                └──────────────┘                └──────────────┘
                 Selection of                      Selection of
                 PROGRAMMING                        READ function
                 function
```

[Servo Program READ Window] (For A273UHCPU)

```
                  ITME SET
 F1 COMMAND SELECT  1:DWELL        <K 0>              +
                  2:M CODE POINT
                  3:TORQE      1    ABS-1
                  4:P.B.             AXIS       1,      300000  (PLS)
                  5:UNIT             SPEED.CHG           4000   (PLS/sec)
                  6:S.R.
                  7: ⌐
                  8: ⌐
 <READ>
  F1  PROG. NO.    [    ]<0-4095>
  F2  AXIS NO.     [  ] <1-8>
  F3  SERVO CMD    [      ]
  F4  INDIRCT DEV  [      ]<D0-8191,W0-1FFF>
  F5  END PROGRAM  ▲                        PROGRAM  STEPS        4  ──── Indirect device setting area
 Page Up  Page Down          Esc: CLOSE     USED  PROGRAMS  11/4096

 1 NO. 2 AXIS 3 COMMND 4 INDRCT  5 END  6     7     8     9     0
```

[Display/Setting Contents]
Indirect device setting area   The designated device is displayed.

[Key Operations]

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 conduct a search of servo programs where the designated device is used. 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) Press the [D] or [W] key to designate the device name 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 name (D/W) is used will be displayed at the right side of the screen.

Program search
1) Use the [PAGE UP]/[PAGE DOWN] keys to conduct a search of servo programs where the designated device is used.
Press the [PAGE UP] key to search for, and display, the servoprogram for the previously designated device name.
Press the [PAGE DOWN] key to search for, and display, the servo program for the subsequently designated device name.

Readout of servo programs where the 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.

CPU Register	A171S A171SH A172SH	A273UH(S1/S3)
Data register (D)	D0 to D1023*	D0 to D8191*
Link register (W)	W0 to W3FF	W0 to W1FFF

*: 800-1023 are used by 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
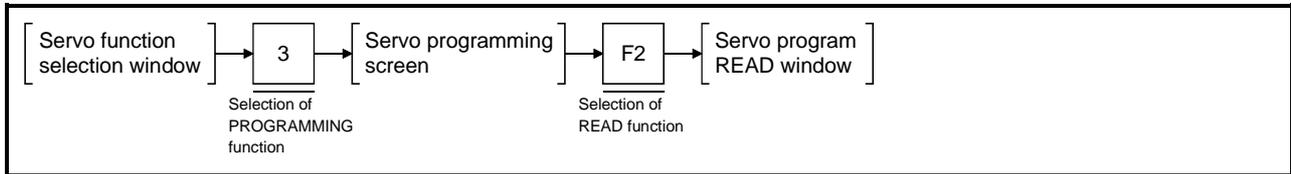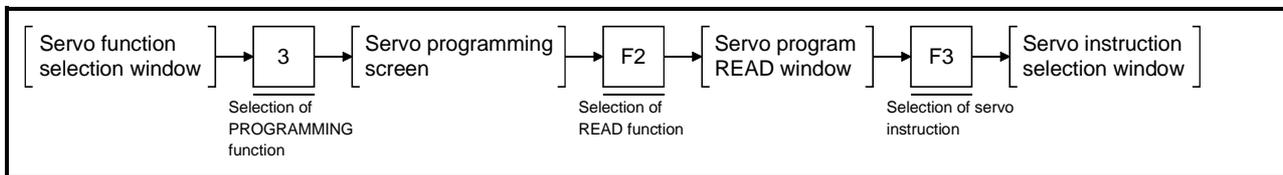1) Use the [PAGE UP]/[PAGE DOWN] keys to conduct a search of servo programs where the designated device is used.
Press the [PAGE UP] key to search for, and display, the servoprogram for the previously designated device No.
Press the [PAGE DOWN] key to search for, and display, the servo program for the subsequently designated device No.
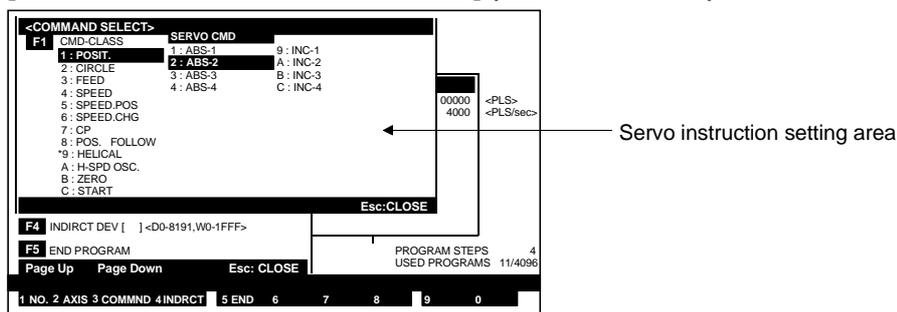
9. SERVO PROGRAM CREATION/MODIFICATION

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 function │ → │ 3 │ → │ Servo programming │ → │ F2 │ → │ Servo program │
│ selection window │   └───┘   │ screen         │   └────┘   │ READ window    │
└─────────────┘            └───────────────┘            └───────────────┘
              Selection of                    Selection of
              PROGRAMMING                      READ function
              function
```

[Servo Program READ Window] (For A273UHCPU)

```
                ITME SET
F1 COMMAND SELECT  1:DWELL        <K 0>
                2:M CODE POINT
                3:TORQE      1      ABS-1
                4:P.B.             AXIS        1,      100000 (PLS)
                5:UNIT             SPEED.CHG           3000 (PLS/sec)
                6:S.R.
                7: �
                8: ⌐
<READ>
  F1  PROG. NO.    [    ]<0-4095>
  F2  AXIS NO.     [  ] <1-8>
  F3  SERVO CMD    [      ]
  F4  INDIRCT DEV  [    ]<D0-8191,W0-1FFF>
  F5  END PROGRAM  ◄              PROGRAM  STEPS       4           ── Final program setting area
Page Up  Page Down          Esc: CLOSE    USED  PROGRAMS 11/4096

1 NO.  2 AXIS 3 COMMND 4 INDRCT  5 END  6    7    8    9    0
```
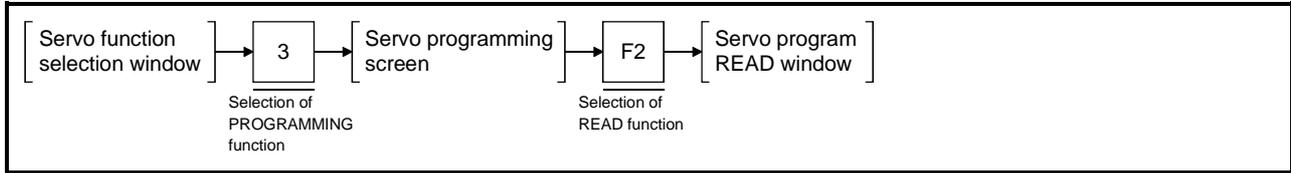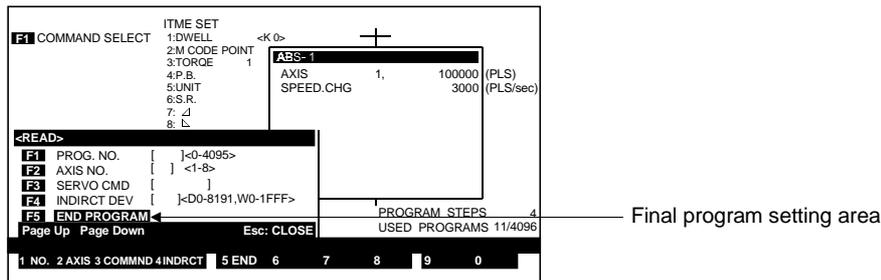
[Display/Setting Contents]

Final program setting area   The "final program" readout function is selected here.

[Key Operations]

Selecting the "final 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.
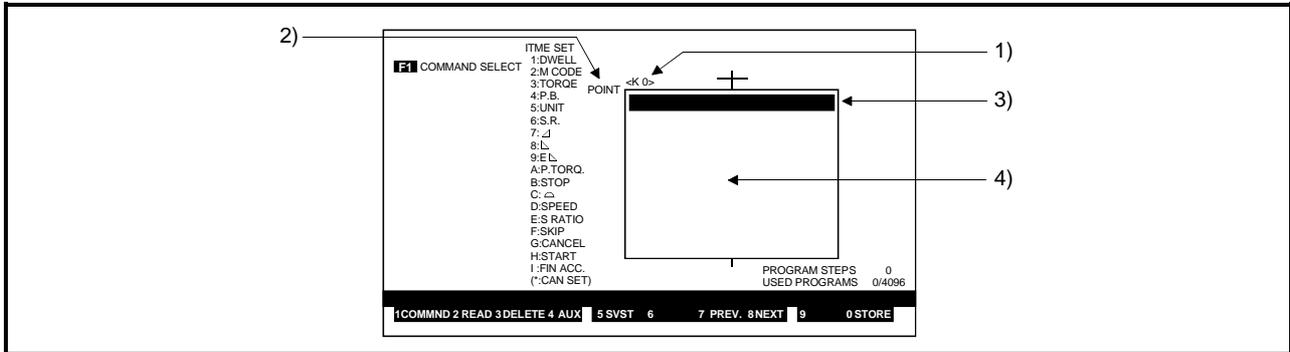
Display Item	Description
1) Program No. display area	The program No. is displayed here.
2) Point No. display area	Either the designated positioning point No., or the number of points in the servo program is displayed here. Point No. .... Switching point for speed switching control. Pass-point for constant speed control. Number of points .... Total number of points for speed switching and constant speed control. (During control other than speed switching and constant speed control, "1" is normally displayed.)
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.

⚠ **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.

POINT

Designating a position follow-up instruction
At the A171S/A273UHCPU units, the indirect device designation at the servo program's positioning address must be an even-numbered device.
If an odd-numbered device is designated, error "141" will be activated when peration is started, and operation will be disabled.

9. SERVO PROGRAM CREATION/MODIFICATON

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]

- Instruction category selection area
- Servo instruction selection area
- Speed type selection window
- Program display area
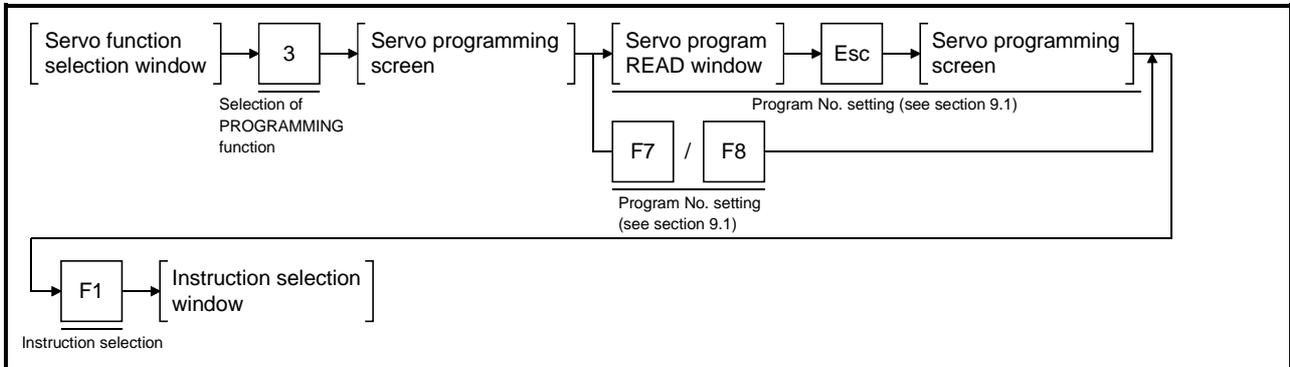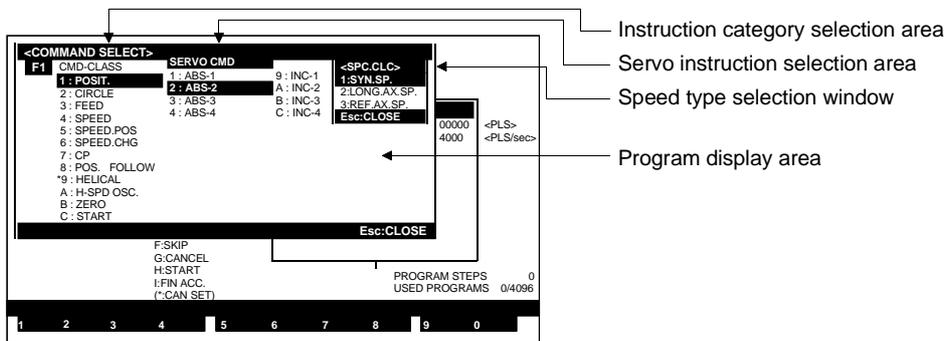
[Display/Setting Contents]

Instruction category selection area	The servo instruction categories are displayed here.
Servo instruction selection area	The servo instructions in the selected instruction category are displayed here.
Speed type selection window	For 2 to 4 axes linear interpolation setting operations, the selectable positioning speed types 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 used.)

[Key Operations]
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.

> **POINT**
>
> Selection of "*9: HELICAL" in the instruction category is not possible.

9. SERVO PROGRAM CREATION/MODIFICATION

Selecting 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.)

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.

POINT

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]

Additional item display area

Servo instruction display area

Setting value display area

Setting item display area

Program check display area
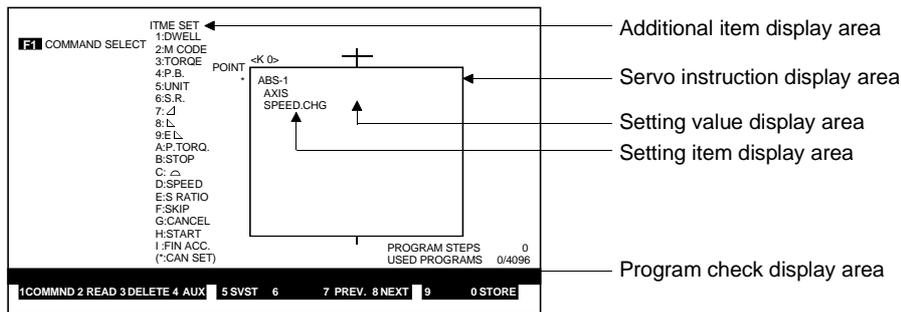
[Display Explanations]

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 values, then press either the [Enter] or [↓] key to register the setting. The cursor will then move to the next line.

9. SERVO PROGRAM CREATION/MODIFICATION

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" 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 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.
Batch check of all programs	1) Press the [END] key to execute a batch check of all servo programs (refer to 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, a dialog box containing the message "FILE WRITE? YES/NO" will be displayed.
	2) To execute the File WRITE operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.)
	3) If file writing is not desired, press the [→] key to move the highlight to the "NO" position, 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.

POINT
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 function selection window → 3 → Servo programming screen → Servo program READ window → Esc → Servo programming screen

Selection of PROGRAMMING function

(Refer to section 9.1)

[Servo Programming Screen]
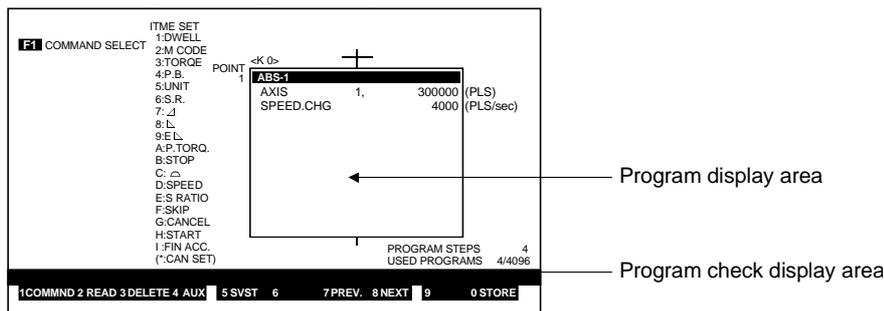
Program display area

Program check display area

[Display/Setting Contents]

Program display area The program which was read is displayed here.

Program check display area When an error is detected by the program check function, an error message is displayed here.

[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" 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 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.

9. SERVO PROGRAM CREATION/MODIFICATION

Batch check of all programs

1) Press the [END] key to execute a batch check of all servo programs (refer to 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, a dialog box containing the message "FILE WRITE? YES/NO" will be displayed.
2) To execute the File WRITE operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.)
3) If file writing is not desired, press the [→] key to move the highlight to the "NO" position, 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? YES/NO" 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 procedure
(This procedure is not required if an entire block was deleted)

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" 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 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.

9. SERVO PROGRAM CREATION/MODIFICATION

Batch check of all programs	1) Press the [END] key to execute a batch check of all servo programs (refer to 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, a dialog box containing the message "FILE WRITE? YES/NO" will be displayed. 2) To execute the File WRITE operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.) 3) If file writing is not desired, press the [→] key to move the highlight to the "NO" position, 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.

Cursor Position	Deleted Data
First instruction line	1 program
Speed switching and constant speed servo instruction point line	1 point
Setting item line	Setting item

(2) When the cursor is at the setting data position of the setting item line, the setting 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]

- Program-to-be-deleted display area
- Program delete YES/NO selection area
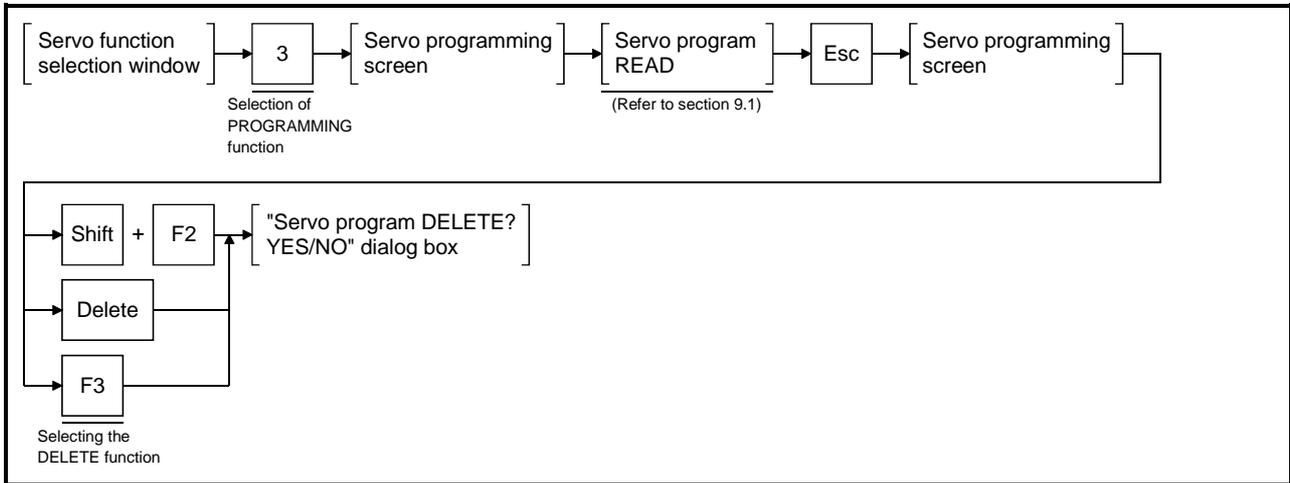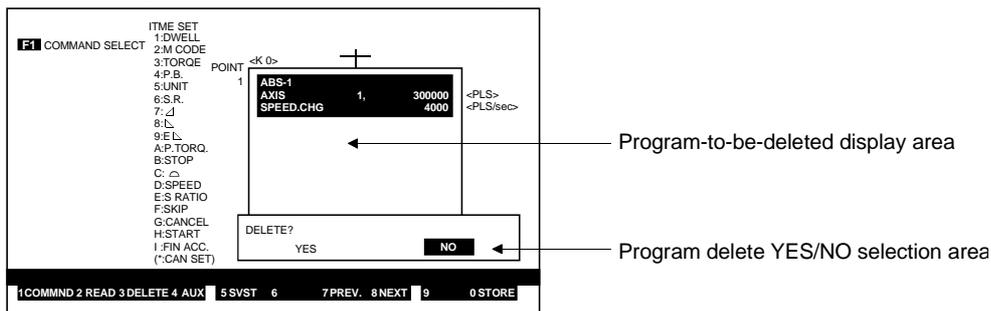
[Display/Setting Contents]

Program-to-be-deleted display area
The program which has been read out for deletion is displayed here.

Program delete YES/NO selection area
The program deletion YES/NO selection is designated here.

[Key Operations]

Servo Program Delete EXECUTE
1) To delete the servo program, press the [←] key to highlight the YES item, the press the [Enter] key. (The default setting is "NO".)
When servo program deletion is completed, the highlighted content will be deleted.

9. SERVO PROGRAM CREATION/MODIFICATION

Servo Program Delete CANCEL

1) To cancel the program deletion operation, 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.)
   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 (refer to 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, a dialog box containing the message "FILE WRITE? YES/NO" will be displayed.
2) To execute the File WRITE operation press the [Enter] key with "YES" highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" position.)
3) If file writing is not desired, press the [→] key to move the highlight to the "NO" position, then press the [Enter] key.

Servo programming END

1) To end the servo programming operation, press the [SHIFT] + [F1] keys.
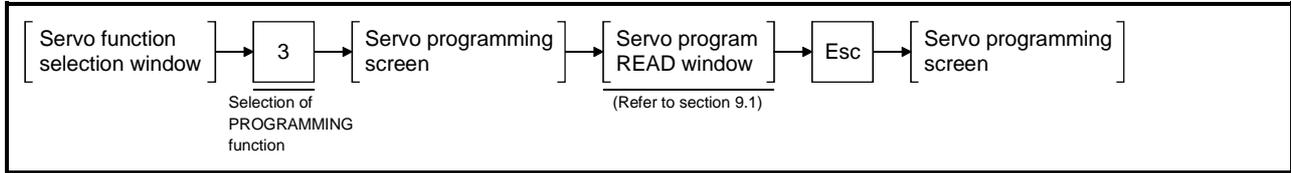   The system will then return to the Servo Function Selection window.

```
┌─────────────┐
│ POINTS      │
├─────────────┴──────────────────────────────────────────────────────┐
│ (1)  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/MODIFICATON

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.
• Control units
• Speed limit value
• Acceleration time
• Deceleration time
• Rapid stop deceleration time
• Parameter and torque limit value
• Deceleration processing at STOP input
• Allowable error range for circular interpolation
• Constant speed control and 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. use 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. Use List Setting Window]
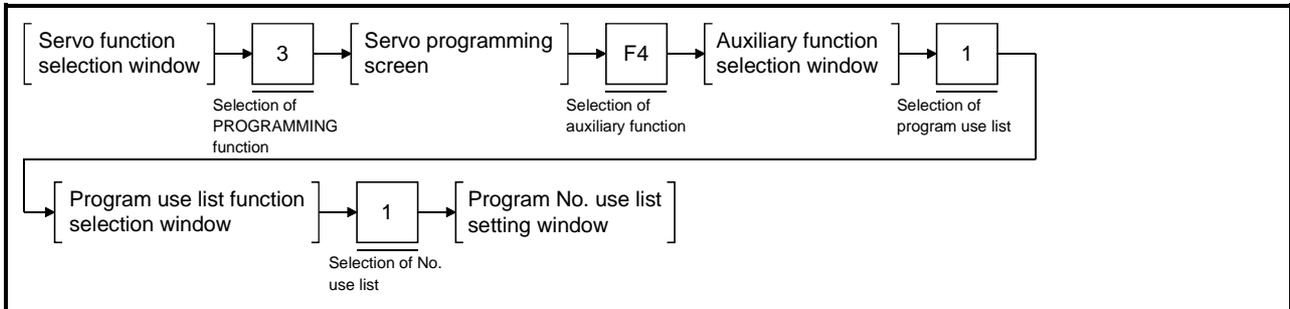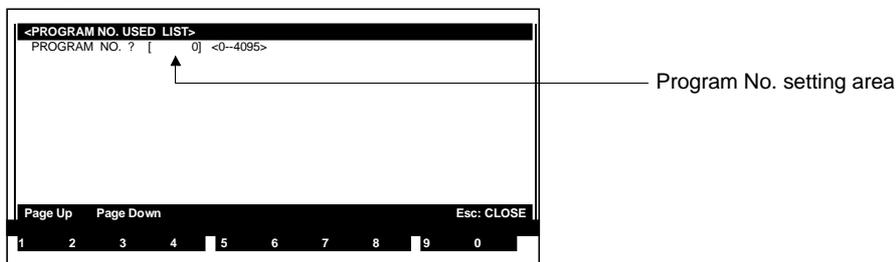
```
┌─────────────┐     ┌───┐     ┌─────────────┐     ┌───┐     ┌─────────────┐     ┌───┐
│ Servo       │ →   │ 3 │ →   │ Servo       │ →   │F4 │ →   │ Auxiliary   │ →   │ 1 │
│ function    │     │   │     │ programming │     │   │     │ function    │     │   │
│ selection   │     └───┘     │ screen      │     └───┘     │ selection   │     └───┘
│ window      │               └─────────────┘               │ window      │
└─────────────┘   Selection of                 Selection of └─────────────┘  Selection of
                  PROGRAMMING                   auxiliary function            program use list
                  function

     ┌─────────────────┐     ┌───┐     ┌─────────────┐
  →  │ Program use list│ →   │ 1 │ →   │ Program No. │
     │ function        │     │   │     │ use list    │
     │ selection window│     └───┘     │ setting     │
     └─────────────────┘   Selection of│ window      │
                           No.         └─────────────┘
                           use list
```

[Program No. Use List Setting Window]

```
<PROGRAM NO. USED LIST>
  PROGRAM NO. ?  [      0]  <0--4095>

                                              Program No. setting area

Page Up   Page Down                               Esc: CLOSE
1    2    3    4    5    6    7    8    9    0
```

[Display/Setting Contents]

Program No. setting area   Either the default value or the designated program No. is displayed here.

[Key Operations]

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 prescribed No. range is designated, an "OUT OF SETTING RANGE" error message will be displayed.
   If this occurs, re-designate a No. 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.
   - "USE" .... program Nos. will be highlighted.
   - "NO USE"......... program Nos. will not be highlighted (normal display).

Page switching

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]

```
┌──────────────┐   ┌───┐   ┌──────────────┐   ┌───┐   ┌──────────────┐   ┌───┐
│Servo function│ → │ 3 │ → │Servo         │ → │F4 │ → │Auxiliary     │ → │ 1 │─┐
│selection     │   │   │   │programming   │   │   │   │function      │   │   │ │
│window        │   │   │   │screen        │   │   │   │selection     │   │   │ │
└──────────────┘   └───┘   └──────────────┘   └───┘   │window        │   └───┘ │
                  Selection of               Selection of └──────────┘      Selection of
                  PROGRAMMING                auxiliary function            program use list
                  function

  ┌──────────────────┐   ┌───┐   ┌──────────────┐
┌→│Program use list  │ → │ 2 │ → │Additional    │
│ │function          │   │   │   │item setting  │
│ │selection window  │   │   │   │window        │
│ └──────────────────┘   └───┘   └──────────────┘
│                     Selection of
│                     program list
```

[Additional Item Setting Window]
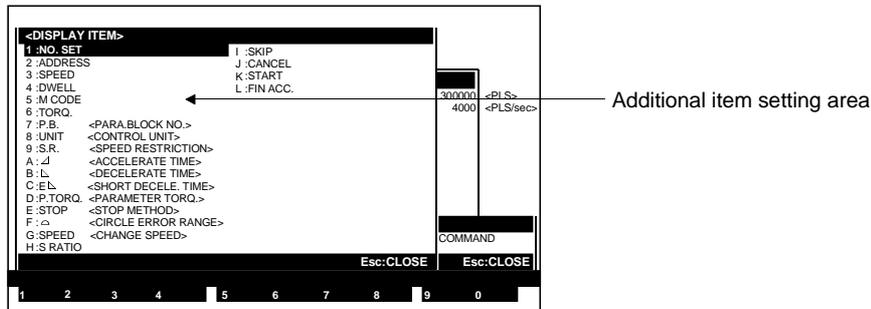
Additional item setting area

[Display/Setting Contents]

Additional item setting area The designated additional item is displayed here.

[Key Operations]

Designating the additional item

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]
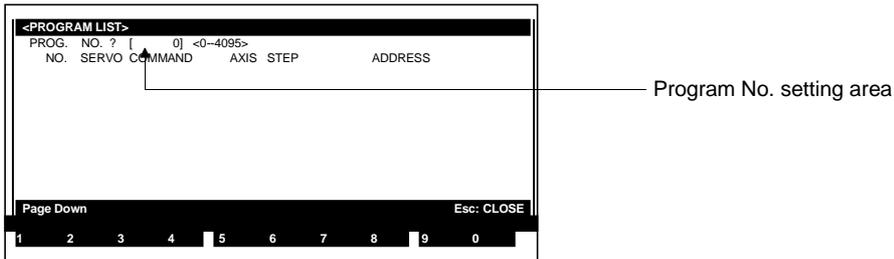
```
<PROGRAM LIST>
PROG.  NO. ?  [      0]  <0--4095>
   NO.  SERVO COMMAND      AXIS  STEP        ADDRESS




Page Down                                     Esc: CLOSE
1      2      3      4      5      6      7      8      9      0
```
—————— Program No. setting area

[Display/Setting Contents]

Program No. setting area   Either the default value or the designated program No. is displayed here.

[Key Operations]

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 prescribed No. range is designated, an "OUT OF SETTING RANGE" error message will be displayed.
   If this occurs, re-designate a No. within the prescribed range.
2) A program list will then be displayed, beginning with the program No. which was designated above.
3) The Program List contains 18 lines per screen.

Displaying the next screen

1) Press the [PAGE DOWN] key to display the remainder of the list.
   When the program list readout is completed, a "COMPLETED" message will be displayed.

9. SERVO PROGRAM CREATION/MODIFICATION

9.3.3 Axis No. designation

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]
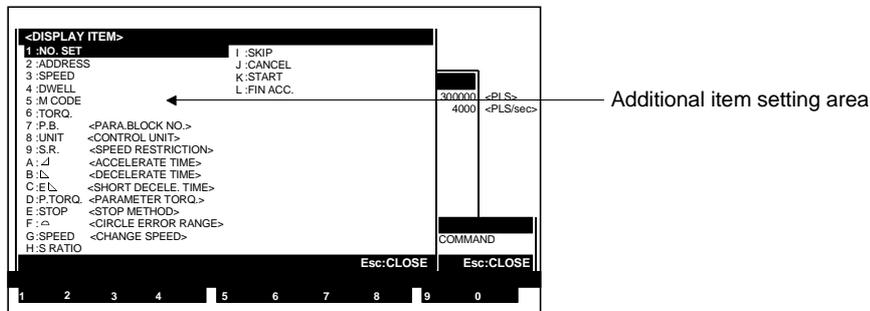
```
[ Servo function    ]     [ 3 ]     [ Servo programming ]     [ F4 ]     [ Auxiliary function ]     [ 1 ]
[ selection window  ] --->         [ screen            ] --->          [ selection window   ] --->
                        Selection of                     Selection of                        Selection of
                        PROGRAMMING                      auxiliary function                  program use list
                        function

    [ Program use list function ]     [ 3 ]     [ Additional item setting ]
    [ selection window          ] --->         [ window                  ]
                                   Selection of axis
                                   No. designation
```

[Additional Item Setting Window]

```
<DISPLAY ITEM>
1 :NO. SET              I :SKIP
2 :ADDRESS             J :CANCEL
3 :SPEED               K :START
4 :DWELL               L :FIN ACC.
5 :M CODE
6 :TORQ.                                   300000  <PLS>          <----- Additional item setting area
7 :P.B.    <PARA.BLOCK NO.>                  4000  <PLS/sec>
8 :UNIT    <CONTROL UNIT>
9 :S.R.    <SPEED RESTRICTION>
A :⌐      <ACCELERATE TIME>
B :⌐      <DECELERATE TIME>
C :E⌐     <SHORT DECELE. TIME>
D :P.TORQ. <PARAMETER TORQ.>
E :STOP    <STOP METHOD>
F :⌐      <CIRCLE ERROR RANGE>
G:SPEED    <CHANGE SPEED>                  COMMAND
H :S RATIO
                           Esc:CLOSE        Esc:CLOSE
 1    2    3    4    5    6    7    8    9    0
```

[Display/Setting Contents]

Additional item setting area The designated additional item is displayed here.

[Key Operations]

Designating the additional item

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]
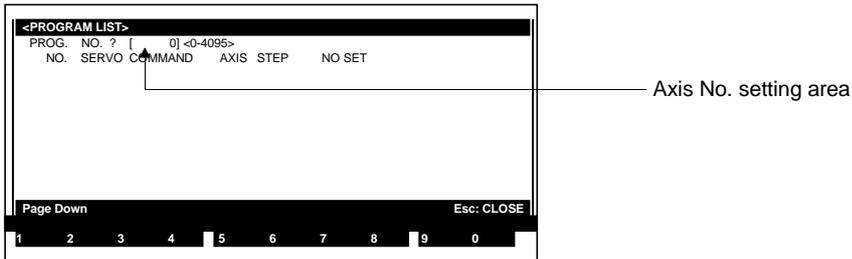
```
<PROGRAM LIST>
 PROG. NO. ? [      0] <0-4095>
   NO.  SERVO COMMAND    AXIS  STEP     NO SET




 Page Down                              Esc: CLOSE
  1      2     3     4     5     6     7     8     9     0
```
───── Axis No. setting area

[Display/Setting Contents]

Axis No. setting area   The designated axis No. is displayed here.

[Key Operations]

Designating the axis   1) Use the numeric keys to select the desired axis No., then press the [Enter]
No.   key.
                                 If an axis No. outside the prescribed No. range is designated, an "OUT OF
                                 SETTING RANGE" error message will be displayed.
                                 If this occurs, re-designate a No. within the prescribed range.
                              2) A list of servo programs where the designated axis No. is used will then be
                                 displayed, beginning 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   1) Press the [PAGE DOWN] key to display the remainder of the list.
screen   When the program list readout is completed, a "COMPLETED" message will
                                 be displayed.

9. SERVO PROGRAM CREATION/MODIFICATION

9.3.4 Servo instruction designation

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]
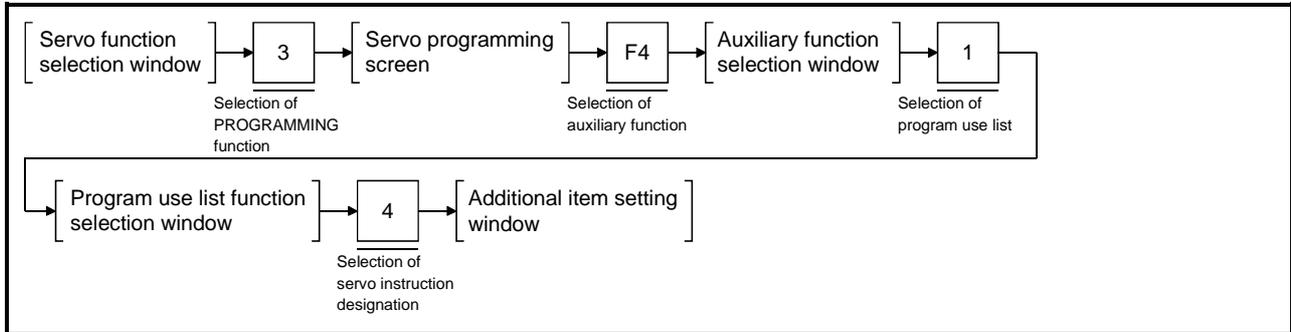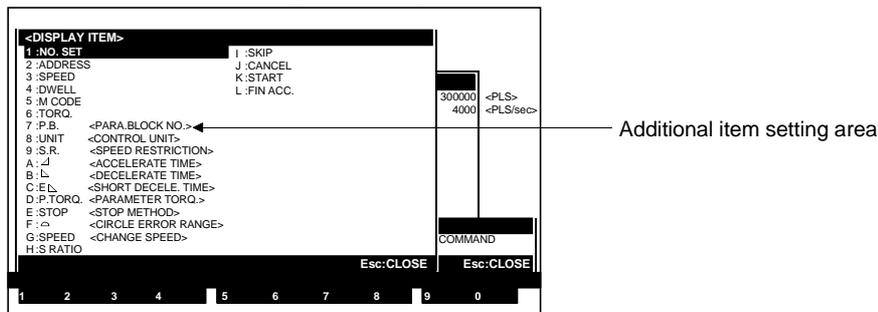
[Additional Item Setting Window]

[Display/Setting Contents]

Additional item setting area The designated additional item is displayed here.

[Key Operations]

Designating the additional item
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 Servo Instruction Designation window will be displayed.

9. SERVO PROGRAM CREATION/MODIFICATION

[Servo Instruction Designation Window]
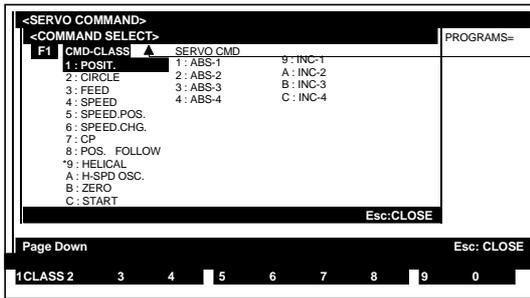
```
<SERVO COMMAND>
 <COMMAND SELECT>                              PROGRAMS=
  F1  CMD-CLASS  ▲   SERVO CMD
     1 : POSIT.        1 : ABS-1        9 : INC-1
     2 : CIRCLE        2 : ABS-2        A : INC-2
     3 : FEED          3 : ABS-3        B : INC-3
     4 : SPEED         4 : ABS-4        C : INC-4
     5 : SPEED.POS.
     6 : SPEED.CHG.
     7 : CP
     8 : POS.  FOLLOW
    *9 : HELICAL
     A : H-SPD OSC.
     B : ZERO
     C : START
                                     Esc:CLOSE

 Page Down                           Esc: CLOSE

1CLASS 2    3    4    5    6    7    8    9    0
```

———— Servo instruction display area

[Display/Setting Contents]

Servo instruction display area
The servo instruction selected at the Servo Instruction Selection window is displayed here.

[Key Operations]

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.
When an instruction category is selected, that category is highlighted, and the cursor moves to the servo instruction display area.
The servo instructions in each servo instruction category are displayed in the servo instruction display area.

Selecting servo instructions
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 a servo instruction is selected, the Servo Instruction Selection window will be closed, and a list of servo programs where the designation servo instruction is used will be displayed, beginning 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) Press the [PAGE DOWN] key to display the remainder of the list. When the program list readout is completed, a "COMPLETED" message will be displayed.

9. SERVO PROGRAM CREATION/MODIFICATION

9.3.5 Indirect device designation

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.
- Display of servo programs where the designated device No. is used.
  (D0 to D1023/D8191, W0 to W3FF/W1FFF).

[Procedure For Displaying The Indirect Device Designation Window]

Servo function selection window	→	3	→	Servo programming screen	→	F4	→	Auxiliary function selection window	→	1
		Selection of PROGRAMMING function				Selection of auxiliary function				Selection of program use list

Program use list function selection window	→	5	→	Indirect device designation window
		Seletion of insdirect device designation		

[Indirect Device Designation Window]

```
<INDIRECT DEVICE>
INDIRECT DEV.[    ]                                         USED ITEM=
  NO. SERVO COMMAND        AXIS   STEP   ITEM    DEVICE NO.(*:2 WORDS)


                                                                        ──── Device setting area



 Page Up  Page Down                                          Esc: CLOSE
 1      2 VIRT. 3      4      5      6      7      8      9      0
```
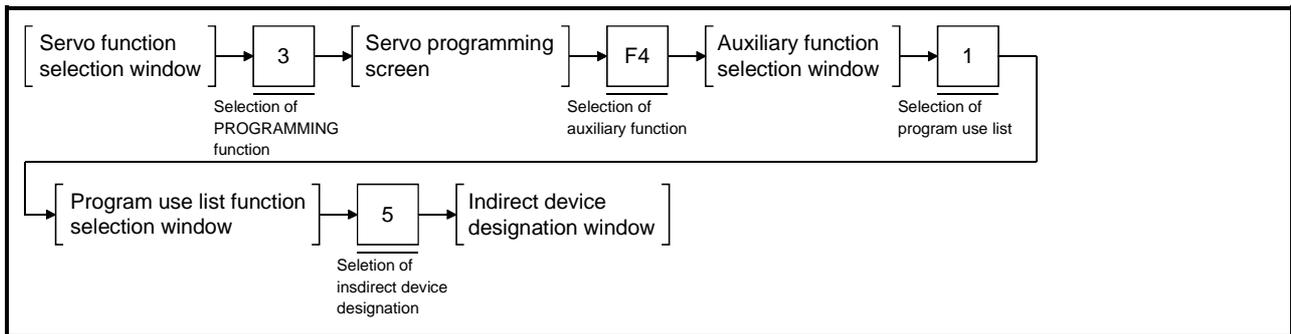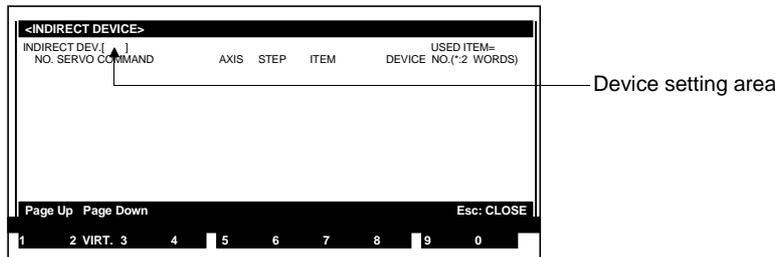
[Display/Setting Contents]
 Device setting area   The designated device is displayed here.

[Key Operations]

To display all servo programs where the indirect device is used

"All devices" (D/W) designation
1) Press the [Enter] key at the Indirect Device Designation window to display a list of all servo programs (in ascending program No. order) where indirect devices (D/W) are used.
   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

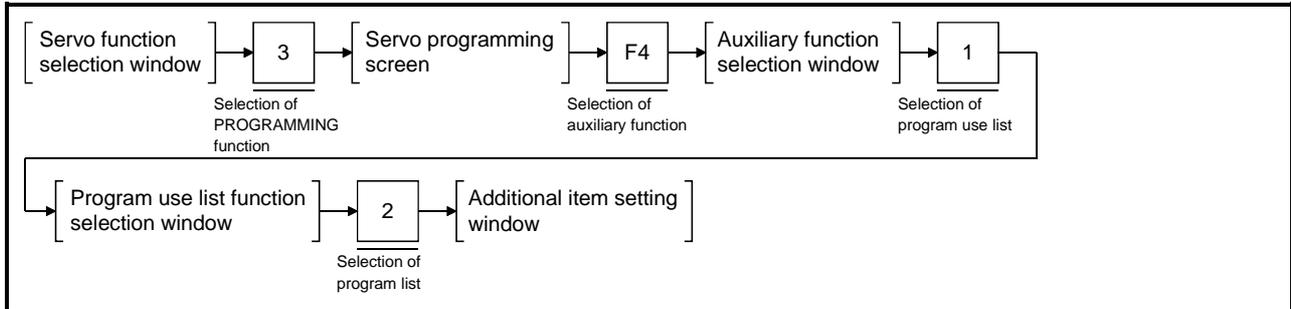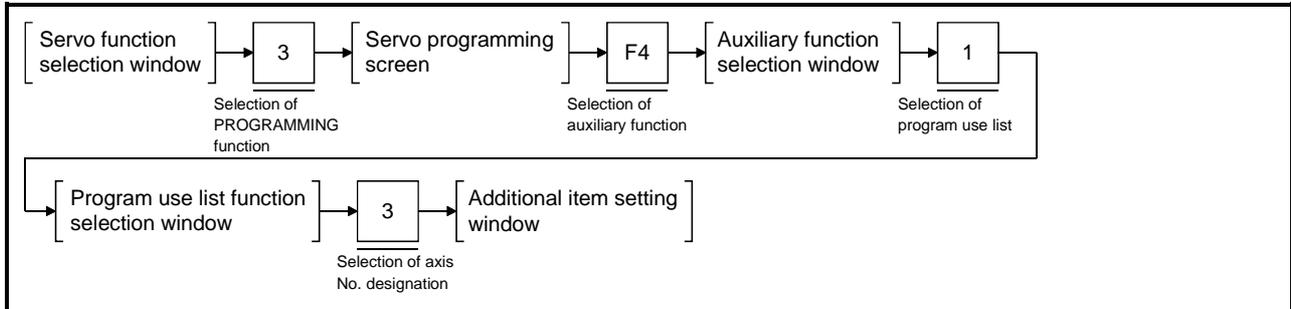|	
Page switching	1) Use the [PAGE UP]/[PAGE DOWN] keys to switch display pages. Press the [PAGE UP] key to display the previous 18 programs. Press the [PAGE DOWN] key to display the next 18 programs. When the program list readout is completed, a "COMPLETED" message will be displayed.

To display servo programs where the designated device name (D/W) is used

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 switching	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.

To display servo programs where the designated device No. (D0 to D1023/D8191, W0 to W3FF/W1FFF) is used

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 number setting range is shown below.

Register CPU	A171S	A273UH(8/32-axis specification)
Data register (D)	D0 to D1023	D0 to D8191*
Link register (W)	W0 to W3FF	W0 to W1FFF

*: The following device numbers are used by the servo system CPU:
  A273UH 8-axis specification   :D800 to D1023
  A273UH 32-axis specification   :D0 to D799

5) If a device No. outside the prescribed range is designated, an "DEVICE NUMBER OUT OF RANGE" error message will be displayed.
If this occurs, re-designate the device No. setting within the prescribed range.

|	
Page switching	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 and 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.

9.4 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]
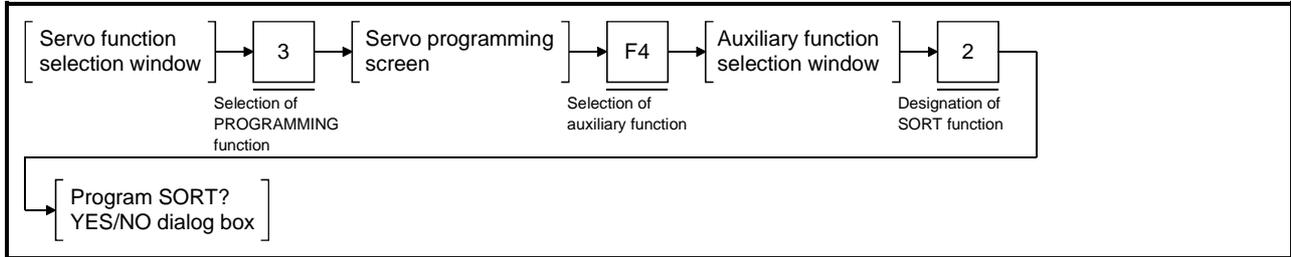
[Program SORT? YES/NO Dialog Box]

Program SORT YES/NO selection area
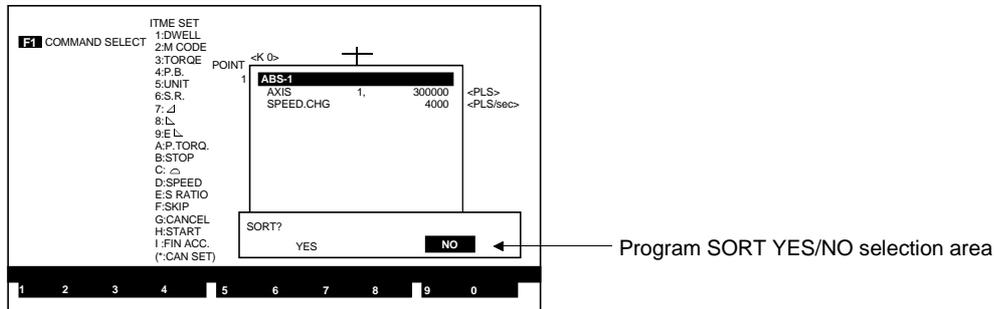
[Display/Setting Contents]

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 Operations]

Program Sort
EXECUTE

1) To execute the program SORT function, press the [←] key to highlight the "YES" item, the 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 the program SORT function, press the [Enter] key with the "NO" item highlighted. (If YES is highlighted, press the [→] key to highlight NO, then press the [Enter] key.)
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]

```
┌────────────┐     ┌───┐     ┌─────────────┐     ┌────┐     ┌──────────────┐     ┌───┐     ┌────────────┐
│Servo function│ →  │ 3 │  →  │Servo programming│ → │ F4 │ → │Auxiliary function│ → │ 3 │ → │Program COPY│
│selection window│   └───┘     │screen        │     └────┘     │selection window│     └───┘     │setting window│
└────────────┘                └─────────────┘                └──────────────┘                 └────────────┘
              Selection of                   Selection of                    Designation of
              PROGRAMMING                     auxiliary function               COPY function
              function
```

[Program COPY Setting Window]

```
                    ITME SET
 F1 COMMAND SELECT  1:DWELL          <K 0>              ┼
                    2:M CODE POINT
                    3:TORQE     1    ┌ABS-1──────────────────┐
                    4:P.B.           │ AXIS       1,    300000 (PLS)
                    5:UNIT           │ SPEED.CHG        4000 (PLS/sec)
                    6:S.R.           │
                    7: ⊿             │
                    8: ⊾             │
                    9:E⊾             │
                    A:P.TORQ.        │
                    B:STOP           │
 <PROGRAM COPY>                      │
 SOURCE      [ ▼ ]-[ ▼ ]             │
 DESTINATION [ ▲ ]                   │
                                     │    PROGRAM  STEPS        4
        Esc: CLOSE                   │    USED PROGRAMS     20/4096
 ▌1    2    3    4  ▌ 5    6    7    8  ▌9    0  ▌
```

───── Copy source FIRST program No. setting area

───── Copy source LAST program No. setting area

───── Copy destination FIRST program No. setting area

[Display/Setting Contents]

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.

[Key Operations]

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.]

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.
   A dialog box containing the message "PROGRAM COPY? YES/NO" will then be displayed.

   Copy destination program No. setting conditions:
   - [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 COPY function, press the [Enter] key with the "YES" item highlighted. (If NO is highlighted, press the [←] key to highlight YES, then press the [Enter] key.)
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]
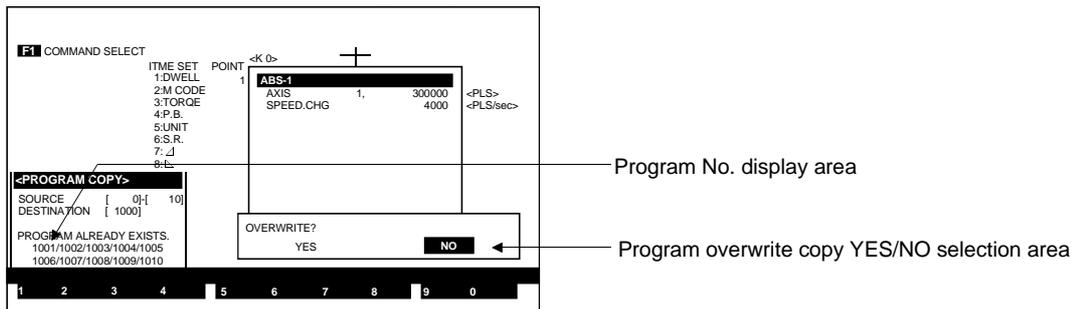
Program No. display area

Program overwrite copy YES/NO selection area

[Display/Setting Contents]

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 Operations]

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 then 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]

FIRST program No. setting area
LAST program No. setting area
Pre-change axis No. setting area
Post-change axis No. setting area
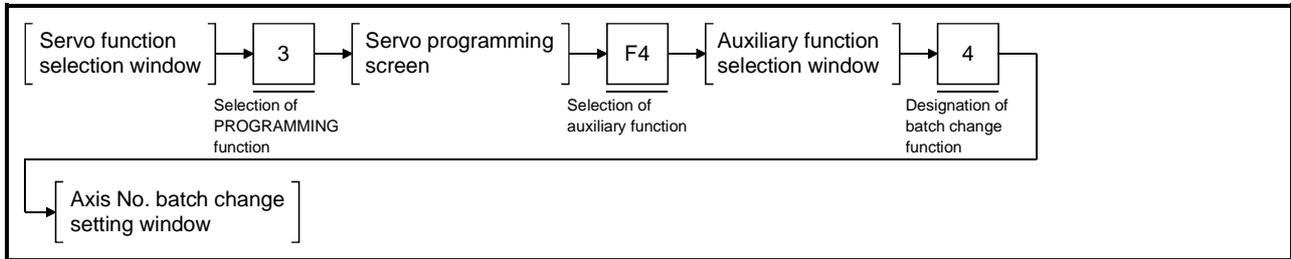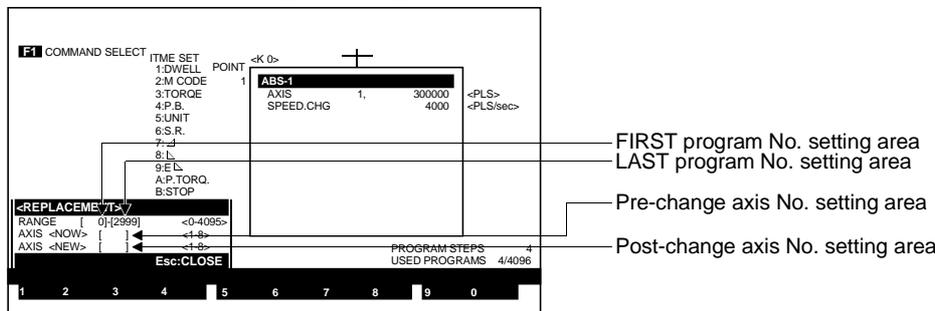
[Display/Setting Contents]

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.

[Key Operations]

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.]
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

Designating the post-change axis No.	1) Using the numeric keys, key-in the post-change axis No., then press the [Enter] key. A dialog box containing the message "BATCH CHANGE? YES/NO" will then be displayed. Axis No. setting condition: • [Pre-change axis No.] ≠ [Post-change axis No.]
Batch Change EXECUTE	1) To execute the batch change, press the [Enter] key while the YES item is highlighted. (If "NO" is highlighted, press the [←] key to move the highlight to the "YES" item, then press the [Enter] key.) 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.

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]
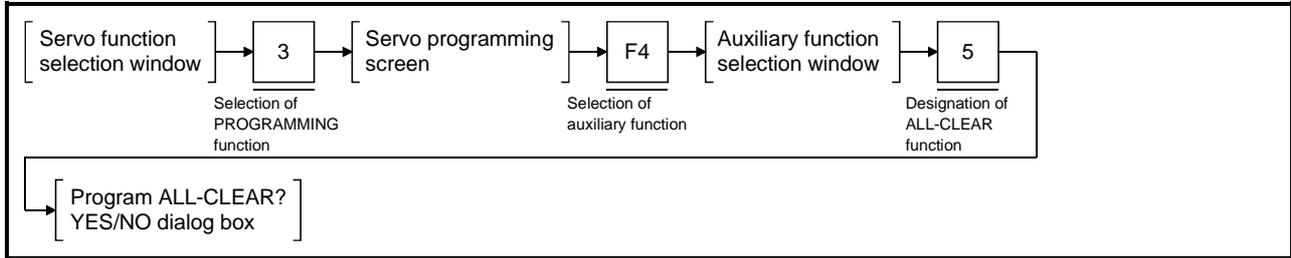
Program all-clear YES/NO selection area
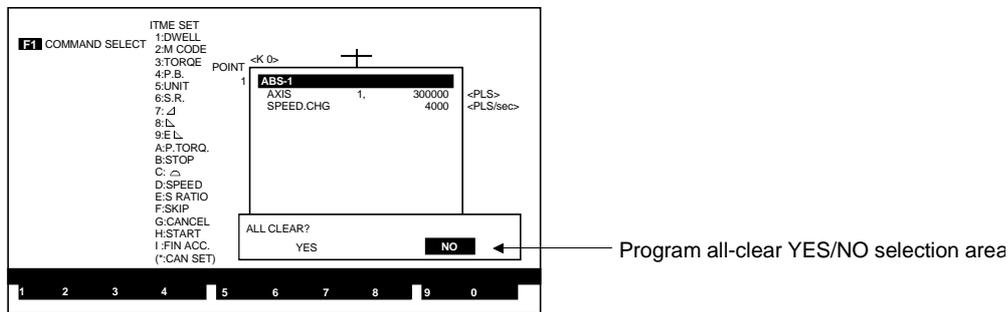
[Display/Setting Contents]

Program all-clear	The all-clear YES/NO dialog box is displayed here.
YES/NO selection area	This setting determines whether or not the all-clear function is executed.

[Key Operations]

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.
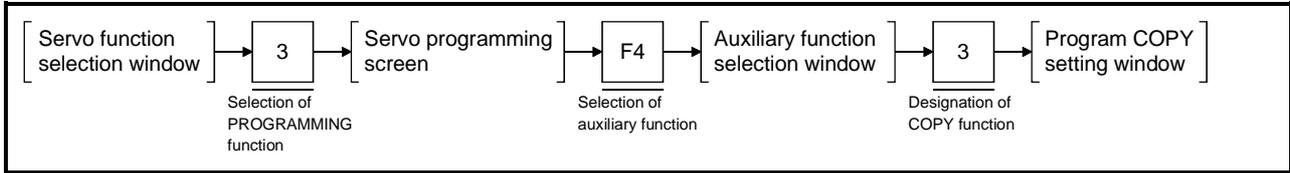
All-Clear CANCEL
1) To cancel the all-clear function, press the [Enter] key while the "NO" item is highlighted. (If "YES" is highlighted, press the [→] to move the highlight to the "NO" position, then press the [Enter] key.)
The system will then return to the Auxiliary Function Selection window without the all-clear function being executed.
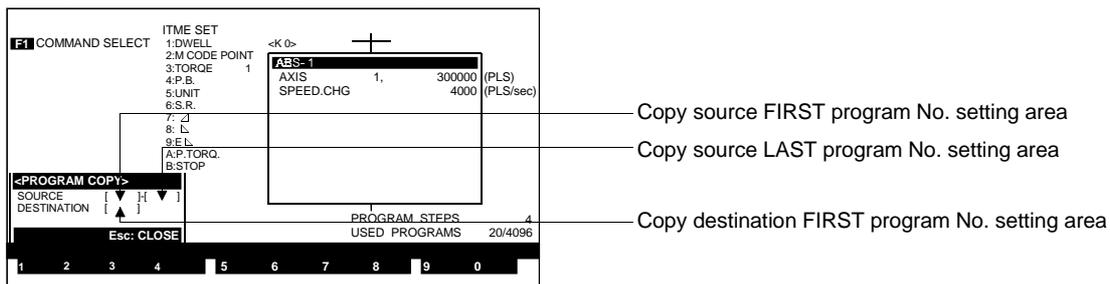
9. SERVO PROGRAM CREATION/MODIFICATON

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]

```
[ Servo function    ]  →  [ 3 ]  →  [ Servo programming ]  →  [ F4 ]  →  [ Auxiliary function ]  →  [ 6 ]  →  [ File WRITE      ]
[ selection window  ]           [ screen            ]                [ selection window  ]           [ setting window  ]

                          Selection of                       Selection of                     Designation of file
                          PROGRAMMING                         auxiliary function               WRITE function
                          function
```

[File WRITE Setting Window]

```
          ITME SET
 F1 COMMAND SELECT  1:DWELL     <K 0>
          2:M CODE  POINT        ┼
          3:TORQE       1  ABS-1
          4:P.B.            AXIS         1,      300000    <PLS>
          5:UNIT           SPEED.CHG            4000       <PLS/sec>     ──── Drive name setting area
          6:S.R.
          7: ⏋
          8: ⌐
          9:E ⌐
          A:P.TORQ.
          B:STOP
          C: ⌐
 <FILE WRITE>                                                           ──── System name setting area
 SYSTEM    [ C ][SAMPLE ]                                               ──── System name comment setting area
 COMMENT        [                  ]                                    ──── Sub-system name setting area
 SUB-SYSTEM    [TEST                                                    ──── Sub-system name comment setting area
 COMMENT        [                  ]        PROGRAM STEPS        4
 COMMENT(GPP) [                 ]           USED PROGRAMS  20/4096      ──── Comment (GPP) setting area
               Esc:SET  Esc:STOP
  1    2    3    4    5    6    7    8    9    0
```

[Display/Setting Contents]

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 Operations]

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 no setting or change is required, simply 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 confirmation 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]

| Servo function selection window | → | 3 (Selection of PROGRAMMING function) | → | Servo programming screen | → | F4 (Selection of auxiliary function) | → | Auxiliary function selection window | → | 7 (Designation of PC WRITE setting) | → | PC WRITE setting window |

[PC WRITE Setting Window]


```
        ITME SET
F1 COMMAND SELECT  1:DWELL
        2:M CODE
        3:TORQE   POINT <K 0>
        4:P.B.       1
        5:UNIT
        6:S.R.           ABS-1
        7:⊿              AXIS       1,     300000   <PLS>
        8:⊾              SPEED.CHG         4000     <PLS/sec>
        9:E⊾
        A:P.TORQ.
        B:STOP
        C:⌒
        D:SPEED
        E:S RATIO
<PROGRAM COPY>
PC AUTO. WRITE?  [N]<Y or N>  >
Enter/End:SET  Esc:STOP              PROGRAM STEPS      4
                                     USED PROGRAMS  20/4096
 1    2    3    4    5    6    7    8    9    0
```

———— Automatic WRITE setting area
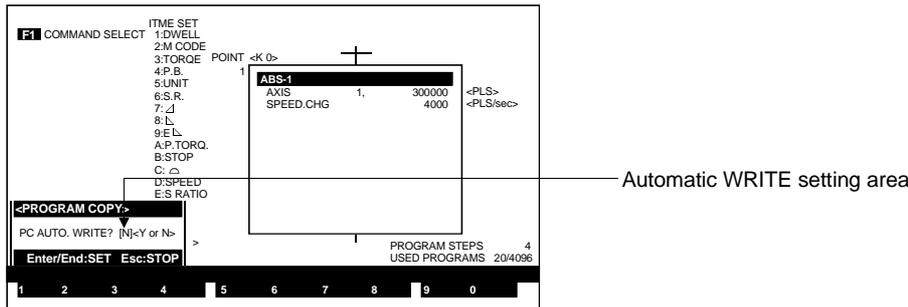
[Display/Setting Contents]

Automatic WRITE setting area — Either the default value or the previously designated setting value is displayed here.
When the automatic WRITE function is on, "Y" is displayed; when off, "N" is displayed.

[Key Operations]

Automatic WRITE "ON" (Y) setting

1) To turn the PC automatic writing function ON, press the [Y] key, then press the [Enter] or [END] key. (The default setting is "N".)
After the PC automatic write function is turned ON, the system will return to the Servo Programming screen where "A" will be displayed after the mode name. When the PC automatic write function is ON, created/modified servo programs will automatically be written to the servo system CPU when the [F10] key is pressed (following a program check).

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

Never turn the programmable controller READY signal ON while automatic writing is in progress.
If the READY signal is turned ON at this time, the contents of the program memory may be lost.

POINT

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.

---

9. SERVO PROGRAM CREATION/MODIFICATION

9.10 Program Check

After servo program creation/modification, a batch check of all servo programs is executed.

[Batch Check Procedure]

```
[ Servo function    ]  →  ┌───┐  →  [ Servo programming ]  →  [ Servo program        ]  →  ┌─────┐
[ selection window  ]     │ 3 │     [ screen            ]     [ creation/modification ]     │ End │
                          └───┘                                                             └─────┘
                        Selection of                                                      Program check
                        PROGRAMMING                                                        executed
                        function
```
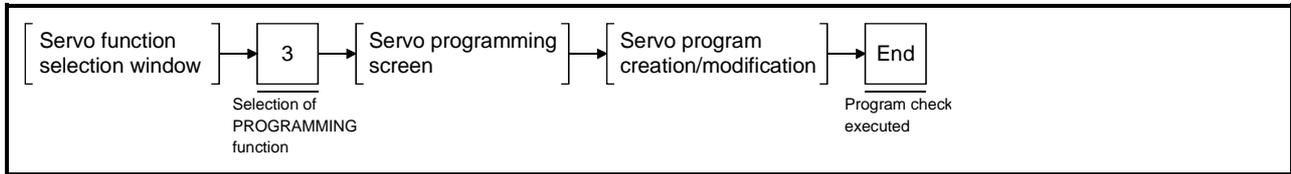
[Error Program and List Display Window]

```
<EROR PROGRAM LIST>
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              2, 3
          4 ABS-2                AXIS  BEYOND STROKE LIMIT RANGE.


Page Down                                              Esc: CLOSE
CHECK COMPLETED.
 1     2     3     4     5     6     7     8     9     0
```
←────── Error display area
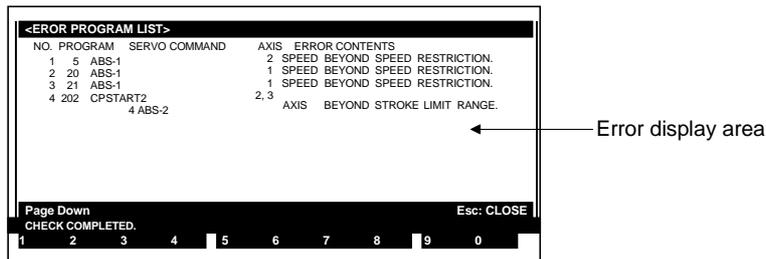
[Display/Setting Contents]

Error display area   When an error is detected by the program check function, an error message is displayed here.

[Key Operations]

Next page display   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.

> **POINT**
>
> If an error is found at a displayed servo program, that error will be displayed, and other programs will not be checked.
> The program check function should be executed again after correcting the displayed program error.

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9. SERVO PROGRAM CREATION/MODIFICATION

[Program Check Content]

Error Item	Error Cause
Instruction code error	• An improper instruction code which cannot be read was designated.
Program No. outside applicable range	• At the simultaneous start instruction, the designated program No. is outside the 0 to 4095 range.
Program doesn't exist	• At the simultaneous start instruction, the designated program (K0 to K4095) has not yet been created. • The "previous No." [F7] key was pressed when program No.0 was displayed. • The "next No." [F8] key was pressed when program No.4095 was displayed.
START instruction designated	• At the simultaneous start instruction, the designated program (K0 to K4095) is a start instruction.
Duplicated START axes	• There is duplication among the axes to be started in the programs (K0 to K4095) designated in the simultaneous START instruction. • Duplication of interpolation control START axes.
Incorrect end-point instruction position	• At the speed change instruction (VSTART), the end-point instruction (ABS-1 to ABS-4, INC-1 to INC-3) is at an incorrect position. (Should be positioned just after VSTART.)
No end-point instruction	• At the speed change instruction (VSTART), there is no end-point instruction.
Multiple end-point instructions	• At the speed change instruction (VSTART), there is more than one end-point instruction.
Incorrect FOR-NEXT instruction	• 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.)
Axis No. outside applicable range	• The designated axis No. is outside the applicable range. • The same axis No. has been designated at multiple locations.
Interpolation control units mismatch	• 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.
No END command	• At the speed change instruction (VSTART), there is no END instruction (VEND). • At the constant speed instruction (CPSTART), there is no END instruction (CPEND).
Incorrect setting data	• The designated setting is outside the applicable range.
Stroke limit range violation	• 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.
Speed control value over	• The speed setting value exceeds the speed limit value specified in the relevant parameter block
Incorrect indirect device setting	• The indirect setting value is outside the applicable range for the designated device. The setting ranges are as shown below. For A17[ ]CPU.. D0 to D1023, W0 to W3FF For A273UHCPU (8/32 axis specs).......... D0 to D8191, W0 to W1FFF • The following device settings are used for 2-word data items: For A17[ ]CPU.. D1023, W3FF For A273UHCPU (8/32 axis specs).......... D8191, W1FFF • At the speed/position instruction (VPF,VPR), the travel value is other than that at the indirect device travel value change register.

⚠ **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

9.11   Batch Copy of SVST Instruction

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 of The SVST Instruction Is Possible]

```
┌ Servo function    ┐ → ┌─────┐ → ┌ Servo programming ┐
└ selection window  ┘   │  3  │   └ screen            ┘
                        └─────┘
                      Selection of
                      PROGRAMMING
                      function
```

[Servo Programming Screen]

```
                    ITME SET
  F1 COMMAND SELECT  1:DWELL
                    2:M CODE
                    3:TORQE   POINT  <K 0>         ┼
                    4:P.B.
                    5:UNIT
                    6:S.R.
                    7:⊿
                    8:◟
                    9:E ◟
                    A:P.TORQ.
                    B:STOP
                    C:◠
                    D:SPEED
                    E:S RATIO
                    F:SKIP
                    G:CANCEL
                    H:START
                    I:FIN ACC.
                    (*:CAN SET)        PROGRAM STEPS      0
                                       USED PROGRAMS   0/4096

  1 COMMND 2 READ 3 DELETE 4 AUX   5 SVST  6    7 PREV.  8 NEXT  9    0 STORE
```
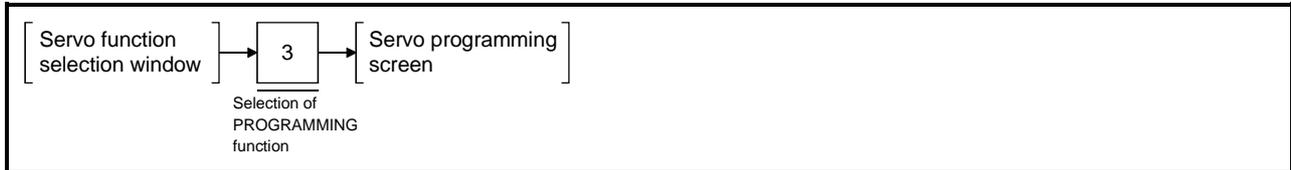
[Key Operations]
Executing the batch copy

1) At the Programming screen, press the [F5] (SVST AXIS) key.
2) If there is no motion program or sequence program, an error message will be displayed.
   If there is no motion program, a "PROGRAM NOT FOUND" message is displayed.
   If there is no sequence program, a "PC PROGRAM NOT FOUND" message is displayed.
3) A message indicates that the batch copy to the SVST instruction has been successfully completed.

[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. GPP FUNCTIONS AND SFC FUNCTIONS

10.   GPP FUNCTIONS AND SFC FUNCTIONS

The GSV13PE incorporates both GPP functions and SFC functions.
See the SW0IX-GPPAE Operating Manual (IB-66314) on the GPP functions.

See the following manual for information on the SFC functions:
    SW0IX-SAP2E(MELSAP-II) Operating Manual IB-66313
However, the GSV13PE GPP functions and SFC functions differ somewhat from those of the SW0IX-GPPAE GPP function software package and the SW0IX-SAP2E software package.
These differences are described below.
Information on system configuration and GSV13PE registration is not presented in the manuals listed above. Refer to Sections 2 and 4 of this manual for details.

10.1   GPP Functions

10.1.1   Additional servo function to SW0IX-GPPAE

The servo instructions listed below can be edited and monitored in the GPP programming mode or printed in the GPP printer mode.
- DSFRP instruction .... start request instruction for 1- to 3-axis servo programs *1
- DSFLP instruction........ present value change, speed change instructions
- SVST instruction.......... start request instruction for 1- to 4-axis servo programs *1
- CHGA instruction......... present value change instruction
- CHGV instruction......... speed value change instruction

These instructions can be used with both the ladder and list programming languages.
The example below shows the procedure for writing an SVST instruction in a ladder program.
*1 This becomes the GPP wordshift instruction when using an A273UH (32-axis specification).

[Procedure to Display Ladder Program Editing Screen]

[Ladder Program Editing Screen]

10. GPP FUNCTIONS AND SFC FUNCTIONS

[Key Operations]

Writing an SVST instruction

1) Input the SVST instruction execution command (condition part) and press the [Enter] key.
2) Input the instruction part and press the [Enter] key.
   Follow the procedure below to input the instruction part.
   [F8] (┤ ├) → [S] → [V] → [S] → [T] → [SP] →
                             [J + start axis No.] → [SP] → [servo program No.]
   Replace the 'start axis number' in the procedure above by the numbers of all axes to be started. A maximum of eight axes can be input.
   Alternatively, the axis designation area may be left blank.
   The servo program number can be set using either direct designation or indirect designation.
   After pressing the [Enter] key to write the instruction part, the ladder block is displayed as shown in the example below.
   (Setting Example)
       Axis 1, Axis 2, and Axis 4 started by servo program No. 10
       (Servo program number set by direct designation)

```
  ┤├────╢────────────────────────────────[ SVST  J1J2J4      K       ]
                                                             10
```

Writing a CHGA instruction (present value change)

1) Input the CHGA instruction execution command (condition part) and press the [Enter] key.
2) Input the instruction part and press the [Enter] key.
   Follow the procedure below to input the instruction part.
   [F8] (┤ ├) → [C] → [H] → [G] → [A] → [SP] →
                    [J + present value change axis No.] → [SP] → [changed value]
   The 'changed value' can be set using either direct designation or indirect designation.
   After pressing the [Enter] key to write the instruction part, the ladder block is displayed as shown in the example below.
   (Setting Example)
       Axis 4 changed to a present value of 100.
       (Servo program number set by direct designation)

```
  ┤├────╢────────────────────────────────[ CHGA  J4          K       ]
                                                             100
```

Note: The present value change can be applied to only one axis number per instruction.

Writing a CHGV instruction (speed change)

1) Input the CHGV instruction execution command (condition part) and press the [Enter] key.
2) Input the instruction part and press the [Enter] key.
   Follow the procedure below to input the instruction part.
   [F8] (┤ ├) → [C] → [H] → [G] → [V] → [SP] →
                    [J +speed change axis No.] → [SP] → [changed speed]
   The changed speed can be set using either direct designation or indirect designation.
   After pressing the [Enter] key to write the instruction part, the ladder block is displayed as shown in the example below.
   (Setting Example)
       Axis 4 changed to a speed of 10.
       (Servo program number set by direct designation)

```
  ┤├────╢────────────────────────────────[ CHGV  J4          K       ]
                                                             10
```

Note: The speed change can be applied to only one axis number per instruction.

10. GPP FUNCTIONS AND SFC FUNCTIONS

Conversion

1) Press the [Shift] + [F4] keys to convert a ladder program after it is written.
After conversion is successfully completed, a message indicates "that the step number has changed".

[Ladder Program Editing Screen]

[Servo Programming Screen]

Selecting the servo programming function

1) During editing of a ladder program, the servo programming function allows one-touch selection for viewing or editing the servo program started by the servo instruction. This function is not available for editing list programs.
Move the cursor to the position of the ladder block where the start instruction for the servo program to be viewed or edited was created.

2) Hold down the [Ctrl] key and press the [F11] key.
The servo programming function is selected.
If the servo program to be started was directly designated in the servo instruction, the designated servo program is displayed.
However, if the servo program to be started was indirectly designated in the servo instruction, servo program No. 0 is displayed.
The servo program can now be viewed or edited.

3) To switch back from the servo programming function to ladder program editing, hold down the [Ctrl] key and press the [F11] key.
The system returns to the ladder program editing screen, displaying the same ladder program which was displayed before the servo programming function was selected.

10. GPP FUNCTIONS AND SFC FUNCTIONS

10.1.2 Axis No. batch copy to SVST instruction

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

[Procedure to Display Ladder Program Editing Screen]

```
┌─────────┐      ┌───┐    ┌─────────────────┐    ┌───┐    ┌─────────────┐
│Menu select│ ──→ │ 1 │ ──→│Programming function│ ──→│ 1 │ ──→│Ladder program│
│window   │      └───┘    │select window    │    └───┘    │editing screen│
└─────────┘               └─────────────────┘            └─────────────┘
         Select programming              Select ladder
         function                        mode function
```

[Ladder Program Editing Screen]

```
0 ┤



  │


  │

  │


1WRITE 2 READ 3 MON  4 AUX    5 ─┤├─  6 ─┤╫├─  7 ─┤  ├─  8 ─[ ]─   9 ──── 0
```
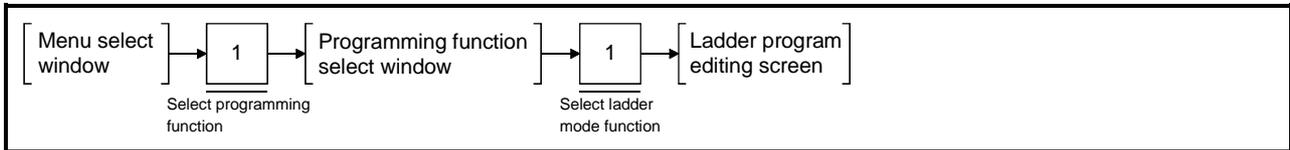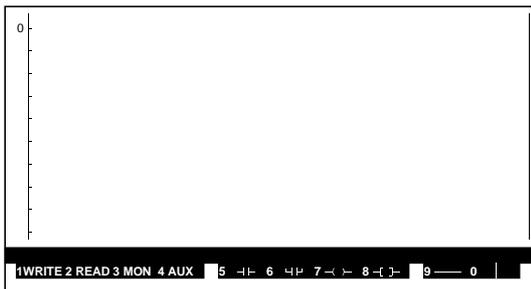
[Display/Setting Contents]

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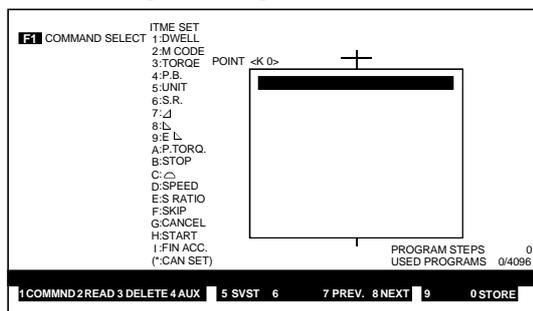1) Press the [Shift] + [F7] (SVST axis) keys from the ladder program editing screen.
2) If no motion program or sequence program exists, the error message "PROGRAM NOT FOUND" is displayed.
3) A message indicates that the batch copy to the SVST instruction has been "successfully completed".

[Cautions]
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 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.
4) Copying to a sub-program is not possible during editing of the main program.
5) This function can be executed only in the readout function. Execution is not possible in other functions such as write and insert.

10. GPP FUNCTIONS AND SFC FUNCTIONS

10.2 SFC Functions

Servo program start conditions can be set in the SFC program to control the system.

10.2.1 Table of differences with SW0IX-SAP2E

The differences between the GSV13PE SFC functions and the SFC functions in the SW0IX-SAP2E software package are listed in the table below.
The GSV13PE offers the following additional functions.

Modes with Added Functions	Additional Function	Description
SFC program editing function	Servo-dedicated SFC diagram symbol editing function	Permits editing of the servo program start symbol ⌷SV⌷ .
	Servo instructions to create transition condition and operation output programs.	Permits editing of sequence programs using the DSFRP*, DSFLP*, and SVST instructions.
	Transition condition automatic insertion and deletion functions.	Automatic insertion and deletion of interlock conditions during editing of DSFRP*, DSFLP*, and SVST instructions.
	Switching to servo programming function.	Permits switching to/from servo programming functions during editing of operation output and transition condition ladder blocks.
SFC monitor function	Monitor function for servo instructions set in transition condition and operation output programs.	Permits monitoring of DSFRP*, DSFLP*, and SVST instructions.
	Servo program display during SFC diagram monitoring.	Permits viewing of the running servo program during SFC diagram monitoring.
SFC printing function	Servo-dedicated SFC diagram symbol printing function.	Permits printing of the servo program start symbol ⌷SV⌷ .
	Printing function for servo instructions to create transition condition and operation output programs.	Permits printing of the DSFRP*, DSFLP*, and SVST instructions.

*This becomes the GPP wordshift instruction when using an A273UH (32-axis specification).

10. GPP FUNCTIONS AND SFC FUNCTIONS

10.2.2 Servo-dedicated SFC diagram symbol

The SFC diagram symbols shown in the table below can be used as step symbols.

(1) Servo-dedicated symbols

Class	Name	Symbol	Quantity	Allocated Function Key	Application
Step	Servo program start step	SV i	Max. 254 (i=1 to 254) per block including other steps	F9	Inserts into a sequence program the servo program start SVST instruction.

(2) Creating a sequence program to start a servo program using SFC programming.
The diagram below shows the procedure from the SFC program editing screen to create a sequence program which starts a servo program.

[Procedure to Write a Servo Program Start Step]

Menu select window → 1 → Programming function select window → 4 → SFC program editing screen → F1 → Create SFC program

Select programming function

Select SFC program editing screen

Select write function
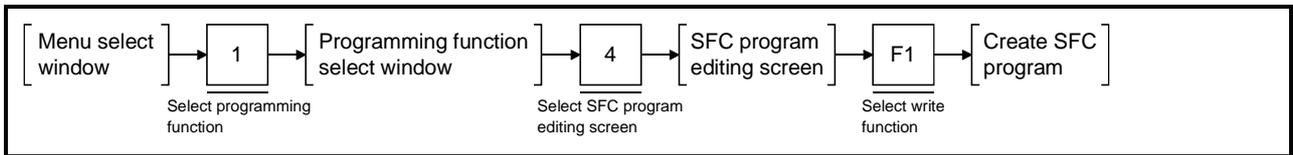
[SFC Program Editing Screen]
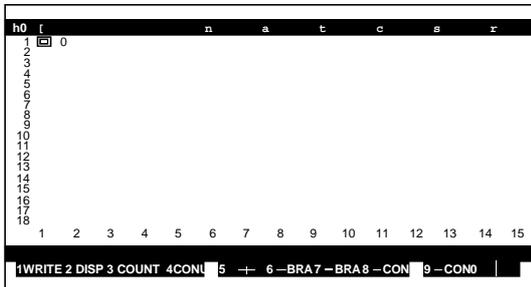
[Display/Setting Contents]
Make sure that the SFC program in which the servo program start step is to be written is displayed on the SFC program editing screen.
Alternatively, create a new SFC program.

[Key Operations]

Writing servo program start step
1) When writing the servo program start step, check that the write function is selected.
If it isn't, press the [F1] key to select the write function.
2) Move the cursor to the position where the servo program start step is to be written.
3) Press the [F9] key.
The servo program start symbol " SV " is displayed on the screen with the step number to the right. This symbol indicates that the sequence program to start the servo program is not yet created.

Conversion
1) Press the [F4] key to convert the step after it is written.
After conversion is successfully completed, the block conversion setting window is displayed.

10. GPP FUNCTIONS AND SFC FUNCTIONS

[Servo Program Select Window]

Servo program number setting area
Axis number setting area
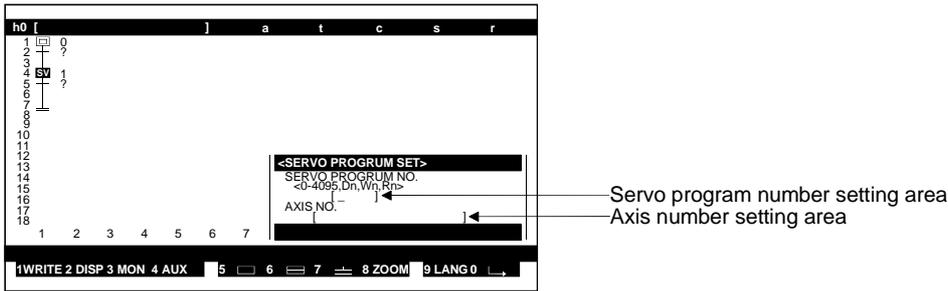
[Display/Setting Contents]

Servo program number setting area	Sets the servo program number to be started by the designated servo program start step.
Axis number setting area	Set the axis number to be started by the designated servo program start step.

Creating the sequence program to start the servo program
(Servo program number and axis number settings.)

1) When creating a sequence program to start a servo program with a written servo program start step, check that the display function is selected.
   If the write function is selected, press the [F2] key to switch to the display function.
2) Move the cursor to the position of the servo program start symbol " SV " for which the servo program number and axis number are to be designated.
3) Press the [F8] key to display the servo program select window. Move the cursor to the servo program number setting area.
4) Input the number of the servo program to start, and press the [Enter] key.
   The servo program number setting range is between 0 and 4095, and indirect designation can be used.
   Move the cursor to the axis number setting area.
5) Input the numbers of the axes to be started. (Eight axes maximum can be designated, in the range between 1 and 32.)
   (Setting Example)
   Enter the following in the axis number setting area to start Axis 1, Axis 2, and Axis 4.
   Axis No.
   [J1J2J4]

Ending settings

1) Press the [End] key to write the set servo program number and axis number data and close the servo program select window.
   The servo instruction is automatically created from the set servo program number and axis number data, and the system returns to the SFC program editing screen.
   (Servo Instruction Example)
   If servo program number 1 and Axis 1, Axis 2, and Axis 4 are set, the following sequence program is created.

The designated " SV " display changes to " SV ".
2) Press the [F8] key to check the set data.
   The automatically created sequence program is displayed on the screen.
3) The "Incorrect set data" message is displayed if the servo program number was set outside the setting range. Correct the set data.

10. GPP FUNCTIONS AND SFC FUNCTIONS

Quitting settings

1) Press the [Esc] key to close the servo program select window without writing the set servo program number and axis number data.
The system returns to the SFC program editing screen but no sequence program to start the servo program is created.

Modifying the sequence program to start the servo program

1) When modifying a sequence program to start a servo program, check that the display function is selected from the SFC program editing screen.
If the write function is selected, press the [F2] key to switch to the display function.
2) Move the cursor to the servo program start step to be modified and press the [F8] key.
The sequence program editing screen is displayed.
3) Press the [F1] key to select the write function. Modify the start axis number and servo program and press the [Enter] key.
Follow the input procedure below.
[F8] (–[ ]–) → [S] → [V] → [S] → [T] → [SP]
              → [J + start axis No.] → [SP] → [servo program No.]
4) Hold down the [Shift] key and press the [F4] key to run the conversion.
After conversion is successfully completed, a message indicates that the step number has changed.
5) After modification is complete, press the F4 key to return to the SFC program editing screen.

[SFC Program Editing Screen]   **[Servo Programming Screen]**
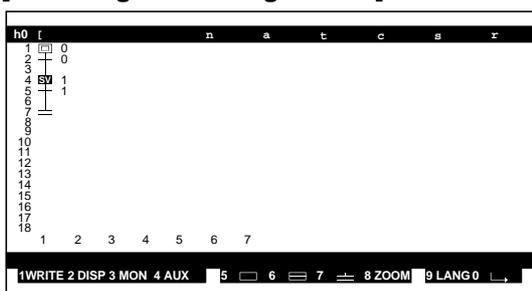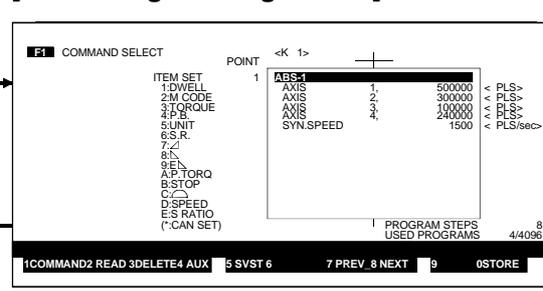
Selecting the servo programming function

1) The servo programming function allows one-touch selection for viewing or editing the servo program started by the servo instruction.
Before selecting the servo program function, check that the display function is selected.
If another function is selected, press the [F2] key to switch to the display function.
2) Move the cursor to the position of the servo program start step symbol where the start instruction was created for the servo program to be viewed or edited.
3) Hold down the [Ctrl] key and press the [F11] key.
The servo programming function is selected.
The servo program designated in the start instruction is displayed.
The servo program can now be viewed or edited.
4) To switch back from the servo programming function to SFC program editing, hold down the [Ctrl] key and press the [F11] key.
The system returns to the same SFC program editing screen that was displayed before the servo programming function was selected.

10. GPP FUNCTIONS AND SFC FUNCTIONS

10.2.3 Servo instructions to create transition condition and operation output programs

The editing of the following servo instructions is possible at each step of the created SFC program, when creating a transition condition and operation output program.
- DSFRP instruction*...... start request instruction for 1- to 3-axis servo programs
- DSFLP instruction* ...... present value change, speed change instructions
- SVST instruction.......... start request instruction for 1- to 4-axis servo programs
- CHGA instruction .... present value change instruction
- CHGV instruction......... speed value change instruction

The example below shows the procedure for writing an SVST instruction in a ladder program.

*This becomes the GPP wordshift instruction when using an A273UH (32-axis specification).

[Procedure to Select the Ladder Program]

SFC program editing screen display	→	F2	→	F9	→	Programming select window	→	1	→	SFC program editing screen
		Select display function		Select language-setting function				Ladder block select		
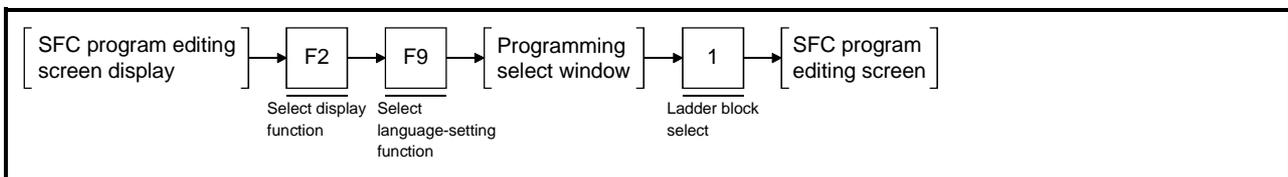
*The ladder program is selected in the default programming language if this operation is omitted.

[Sequence Program Editing Screen]

```
SFC            DISPLAY A30- 0-FF-PC-  0   772/ 5372 C:AXIS-8   MAIN F11:MON  F12:HELP
h0      [                        ]          a        t        c        s        r
  1  □  0
  2     0
  3
  4  ▓  1
  5     1
  6
  7     1
LADDER    WRITE    BLOCK 0    STEP  0      0/ 255 [                              ]
     X0100  X0200                                                        K
0    ─┤├───┤/├──                                   ─[ SVST  J1 J2 J3 J4  10 ]─


1WRITE 2 READ 3 TRM  4 END    5 ─┤├─ 6 ─┤↑├ 7 ─( )─ 8 ─[ ]─    9 ───   0
```
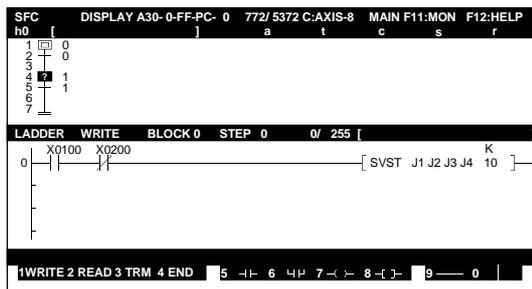
[Display/Setting Contents]

Make sure that the SFC program in which the servo instruction is to be written is displayed on the SFC program editing screen.

Alternatively, create a new SFC program.

[Key Operations]

Designating step to write a servo instruction

1) When writing the servo program start step, check that the display function is selected.
   If it isn't, press the [F2] key to select the display function.
2) Move the cursor to the position where the servo instruction is to be written.
3) Press the [F8] key to display the sequence program editing screen.

Writing the servo instruction

1) Input the SVST instruction execution commands (condition part) and press the [Enter] key.
2) Input the instruction part and press the [Enter] key.
   Follow the procedure below to input the instruction part.
   [F8] (–[ ]–) → [S] → [V] → [S] → [T] → [SP]
   → [J + start axis No.] → [SP] → [servo program No.]
   Input the numbers of all axes to be started. A maximum of eight axes can be input. Alternatively, the axis designation area may be left blank.

The servo program number can be set using either direct designation or indirect designation.

After pressing the [Enter] key to write the instruction part, the program section is displayed as shown in the example below.

(Setting Example)

Axis 1, Axis 2, Axis 3, and Axis 4 started by servo program No. 10

(Servo program number set by direct designation)

```
                                                                K
 ─┤├──────┤╱├─────────────────────────────[ SVST  J1J2J3J4    10  ]─
```

Writing a CHGA instruction (present value change)

1) Input the CHGA instruction execution command (condition part) and press the [Enter] key.

2) Input the instruction part and press the [Enter] key.

Follow the procedure below to input the instruction part.

[F8] (─[ ]─) → [C] → [H] → [G] → [A] → [SP]
                              → [J + present value change axis No.] → [SP] → [changed value]

The 'changed value' can be set using either direct designation or indirect designation.

After pressing the [Enter] key to write the instruction part, the ladder block is displayed as shown in the example below.

(Setting Example)

Axis 4 changed to a present value of 100.

(Servo program number set by direct designation)

```
                                                                K
 ─┤├──────┤╱├─────────────────────────────[ CHGA  J4          100 ]─
```

Note: The present value change can be applied to only one axis number per instruction.

Writing a CHGV instruction (speed change)

1) Input the CHGV instruction execution command (condition part) and press the [Enter] key.

2) Input the instruction part and press the [Enter] key.

Follow the procedure below to input the instruction part.

[F8] (─[ ]─) → [C] → [H] → [G] → [V] → [SP]
                              → [J +speed change axis No.] → [SP] → [changed speed]

The changed speed can be set using either direct designation or indirect designation.

After pressing the [Enter] key to write the instruction part, the ladder block is displayed as shown in the example below.

(Setting Example)

Axis 4 changed to a speed of 10.

(Servo program number set by direct designation)

```
                                                                K
 ─┤├──────┤╱├─────────────────────────────[ CHGV  J4          10  ]─
```

Note: The speed change can be applied to only one axis number per instruction.

Conversion

1) Press the [Shift]+[F4] keys to convert a ladder program after it is written.

After conversion is successfully completed, a message indicates that the step number has changed.

Ending sequence program creation

1) After sequence program creation is complete for the designated step, press the [F4] key to return to the SFC program editing screen.

10. GPP FUNCTIONS AND SFC FUNCTIONS

[Sequence Program Editing Screen]

[Servo Programming Screen]

Selecting the servo programming function

1) During editing of a ladder program, the servo programming function allows one-touch selection for viewing or editing the servo program started by the servo instruction. This function is not available for editing list programs.
Move the cursor to the position of the ladder block where the start instruction for the servo program to be viewed or edited was created.

2) Hold down the [Ctrl] key and press the [F11] key.
The servo programming function is selected.
If the servo program to be started was directly designated in the servo instruction, the designated servo program is displayed.
However, if the servo program to be started was indirectly designated in the servo instruction, servo program No. 0 is displayed.
The servo program can now be viewed or edited.

3) To switch back from the servo programming function to SFC program editing, hold down the [Ctrl] key and press the [F11] key.
The system returns to the sequence program editing screen, displaying the same SFC program which was displayed before the servo programming function was selected.

10. GPP FUNCTIONS AND SFC FUNCTIONS

10.2.4 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	Start accept bits for axes used	M2001 to M2008	M2001 to M2032
SVST			
DSFLP*/CHGV	Speed change flags	M2021 to M2028	M2061 to M2092

*: Used only as a normal sequence instruction flag for the A273UH (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 conditions 1 and 2.

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

  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 1, interlock signals are automatically inserted in transition conditions 1, 2, and 3.
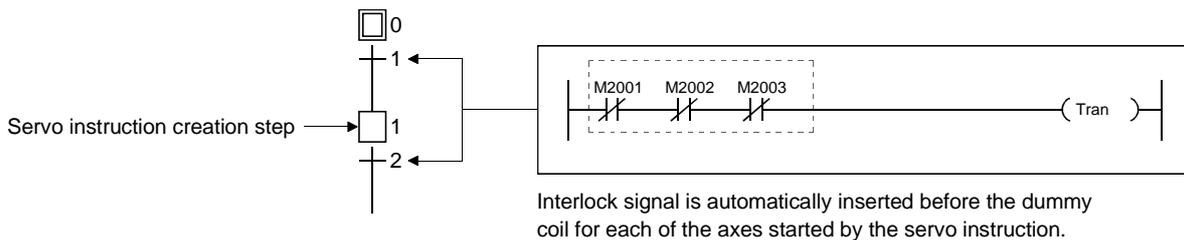
Interlock signal is automatically inserted before the dummy coil for each of the axes started by the servo instruction.

POINT

(1) 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.

---

3) Parallel coupling
    a) 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.
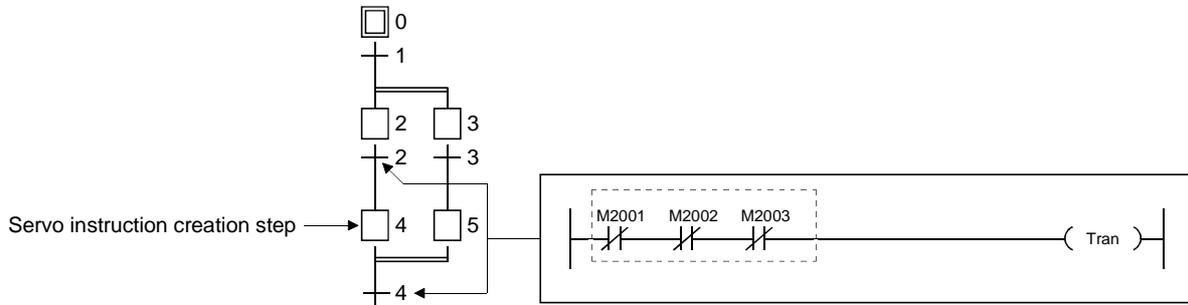
Interlock signal is automatically inserted before the dummy coil for each of the axes started by the servo instruction.

    b) 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.
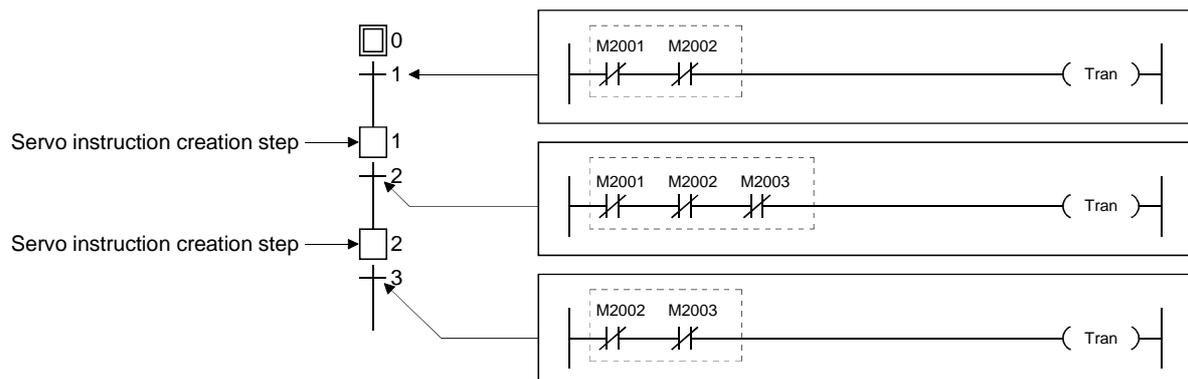
10. GPP FUNCTIONS AND SFC FUNCTIONS

(b) During Editing of DSFLP*/CHGV Instructions
   (DSFLP* for (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.

Servo instruction creation step →

M2021 M2022 M2023   (Tran)

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

   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 1, interlock signals are automatically inserted in transition conditions 1, 2, and 3.

Servo instruction creation step →

M2021 M2022 M2023   (Tran)
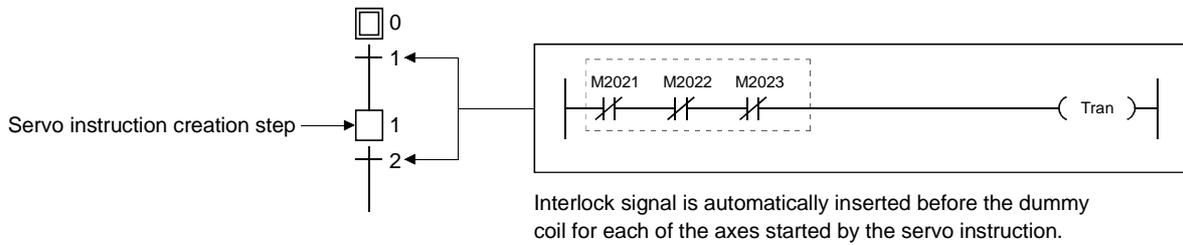
Interlock signal is automatically inserted before the dummy coil for each of the axes started by the servo instruction.
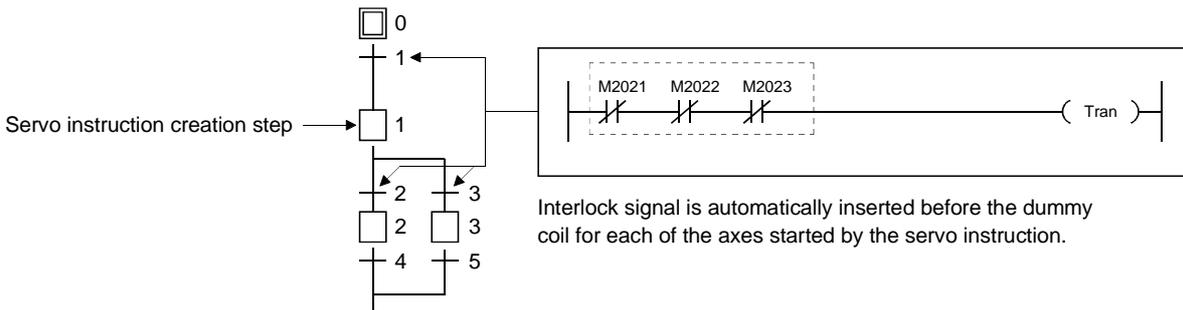
   3) Parallel coupling
      a) If the servo instruction is created in one of the queued steps in a parallel coupling.
         (Example)
            If Axis 1, Axis 2, and Axis 3 are used at Step 4, interlock signals are automatically inserted in transition conditions 2 and 4.

Servo instruction creation step →

M2021 M2022 M2023   (Tran)

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

b) If a servo instruction is 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.

Servo instruction creation step

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.

Servo instruction creation step

Servo instruction creation step

(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.

Deleted servo instruction
creation step
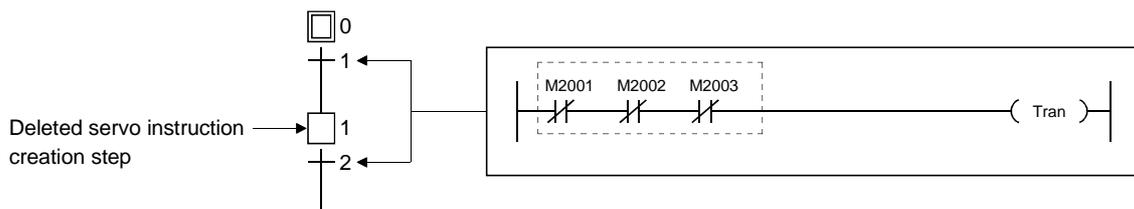
10. GPP FUNCTIONS AND SFC FUNCTIONS

10.2.5   Axis No. batch copy to SVST instruction

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

[Procedure to Display the Operation Output Ladder Monitor Screen for Servo Program Start Steps]

SFS program editingscreen display	→	F2	→	F3	→	SFC diagram monitor screen	→	Move cursor	→	F8	→	Transition condition, operation output ladder monitor screen
		Select display function		Select monitor function				Designate servo program start step for ladder monitoring		Select zoom function		

[Transition Condition, Operation Output Ladder Monitor Screen]

```
SFC     MONITOR A3U- 0-FF-PC-  0    808/ 1240 C:T     MAIN F11:MON  RF12:HELP
h0   [                    ]         a      t          c     s        r
   1 ▢ 0
   2   0
   3
   4 ■ 1
   5   1
   6
   7

     [ ]    MONITOR  BLOCK 0    STEP  0      14/ 241 [                        ]

                                                            K
0 ─────────────────────────────────────[ SVST  J1 J2 J3 J4  1 ]─



<SCANTIME   0 ms> * <STATUS  STOP   > MAIN
    MONITOR STARTED.
1WRITE 2ENL/DI 3MON  4TERM    5 SET  6 RST  7 AUTO 8      9 ENTRY 0 HEX
```
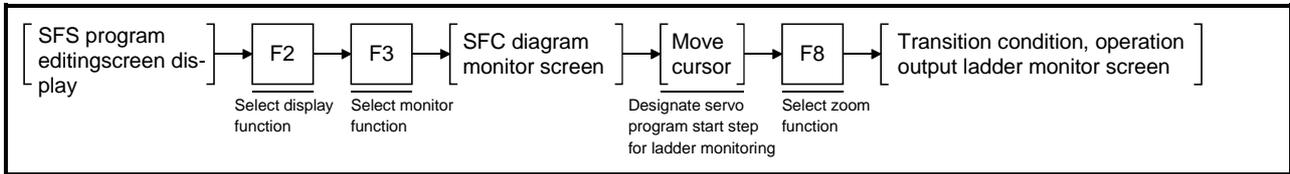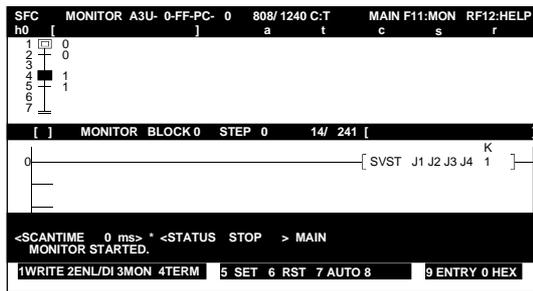
[Key Operations]

Running batch copy

1) Press the [Shift]+[F7] (SVST axis) keys from the programming screen.
2) If no motion program or sequence program exists, the error messages "PROGRAM NOT FOUND"is displayed.
3) A message indicates that the batch copy to the SVST instruction has been successfully completed.

[Cautions]

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 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.
4) Copying to a sub-program is not possible during editing of the main program.
5) This function can be executed only in the readout function. Execution is not possible in other functions such as write and insert.

10. GPP FUNCTIONS AND SFC FUNCTIONS

10.2.6 Reading an SFC program file created with SW1SRX-GSV13PE

An SFC program file created with a SW1SRX-GSV13PE cannot be directly read with SW2SRX-GSV13PE.

The procedure for reading an SFC program file created with SW1SRX-GSV13PE is shown below.

[Procedure to Display the Read Screen]

```
┌──────────────┐   ┌───┐   ┌──────────────────┐   ┌───┐   ┌────────────────────────┐   ┌────┐
│ Menu select  │──▶│ 6 │──▶│ File maintenance │──▶│ 1 │──▶│ Select drive, system   │──▶│ F1 │
│ window       │   │   │   │ function select  │   │   │   │ name, and machine name │   │    │
└──────────────┘   └───┘   │ window           │   └───┘   └────────────────────────┘   └────┘
                           └──────────────────┘
                     Select file                  Select directory               Select read
                     maintenance                  function                       function
                     function
```

[Read Screen]

```
F8  SYSTEM    [ C ] [ABC      ]
    SUB-SYSTEM [XYZ       ]      PRESS [Enter].WHEN DISPLAY DIRECTORY
─────────────────────────────────────────────────────────────────────
<SUB-SYSTEM NAME LIST>                                            1/1
   <NAME> <PC TYPE>   <COMMENT>   <TYPE SELECT>
   XYZ    A3U                   *  PARAMETER
                                   NETWORK PARAMETER
                                *  SEQUENCE    [M S1 S2 S3]
                                *  MICRO COM   [M S]
                                *  COMMENT1
                                *  COMMENT2
                                *  EX.COMMENT[1  2  3  4]
                                *  STATEMENT  [M S1 S2 S3]
                                *  NOTE       [M S1 S2 S3]
                                   S-TRACE
                                   M-TRACE
                                   STATUS LATCH
                                   DEVICE MEM
   SUB-SYSTEM:  1FREE :   546816
   Page Up   Page Down                       Esc:CLOSE
                                             Esc:RE-SELECT
─────────────────────────────────────────────────────────────────────
1READ2WRITE3VERIFY4DELETE  5 COPY 6SELECT 7ALTY 8 DIR  9D  VIEW 0PRINT
```

[Key Operations]

1) Press the [↑]/[↓] keys to move the cursor to "Microcomputer".
2) Press the [F6] key to display the "microcomputer" select window.
3) Press the [↑]/[↓] keys to move the cursor to "Main program/Sub-program", and press the [F6] (Select) key.
   The " * " on the screen changes to " # ".
4) Press the [Enter] key to execute the read operation.
5) A message indicates that the read operation has been successfully completed.

> **REMARK**
>
> See the SW0IX-GPPAE Operating Manual for details about the file maintenance functions available from the menu.

10. GPP FUNCTIONS AND SFC FUNCTIONS

10.2.7 Differences between SFC monitor functions

The points of difference between the monitor functions and those of the SW0IX-SAP2E are as follows:
- Monitoring of servo program start steps created in an SFC program;
- Monitoring of servo instructions created during creation of a transition condition and operation output program;
- Servo program display during transition condition and operation output monitoring.

(1) Monitoring of servo program start steps
   Selecting the SFC diagram monitor function allows the servo program start steps created in an SFC program to be monitored.
   When a servo program start step is active it is displayed highlighted in the same way as other steps, and the servo program start step operation output ladder monitor can be run.

[Procedure to Display the Operation Output Ladder Monitor Screen for Servo Program Start Steps]
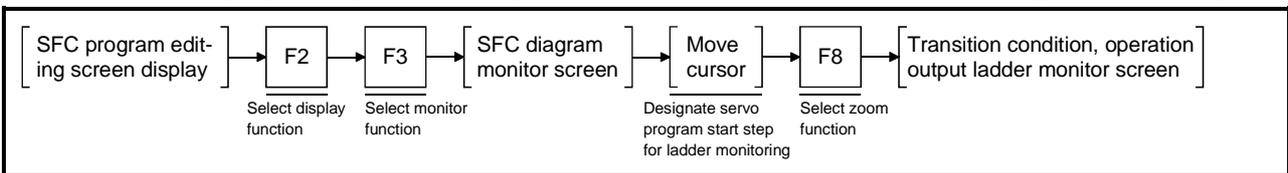
[Transition Condition, Output Ladder Monitor Screen]
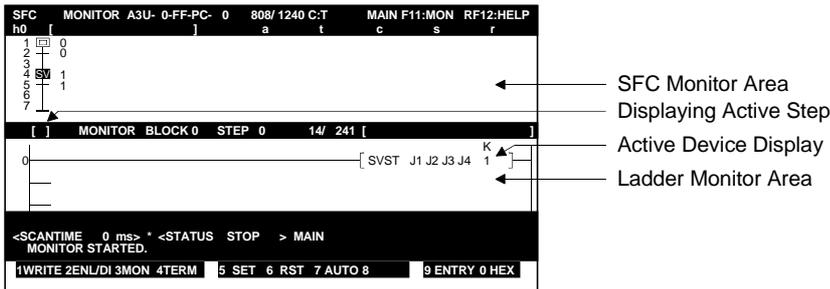
[Display/Setting Contents]

Displaying active step   The servo program start step presently monitored by the ladder monitor function is displayed as ON ■ when active and OFF □ when inactive.

Active device display   The device presently monitored by the ladder monitor function is displayed as ON(┤■├)when active and OFF (┤ ├) when inactive.

SFC monitor area   Displays the SFC diagram.

Ladder monitor area   Runs the ladder monitor for the designated transition condition and operation output.

[Key Operations]

Start monitoring   1) Press the [F3] key to start the ladder monitor.

End monitoring   1) Press the [F4] key to end the ladder monitor and return to the SFC diagram screen.

10. GPP FUNCTIONS AND SFC FUNCTIONS

[Transition Condition, Operation Output Monitor Ladder Monitor Screen]

[Servo Programming Screen]

```
SFC    MONITOR A3U- 0-FF-PC- 0   808/ 1240 C:T    MAIN F11:MON  RF12:HELP
h0  [                        ]    a      t      c     s      r
 1 □ 0
 2 □ 0
 3
 4 SV 1
 5    1
 6
 7
     [ ]   MONITOR  BLOCK 0   STEP  0    14/ 241 [                    ]
                                                        K
 0                                   ─[ SVST  J1 J2 J3 J4  1 ]─

 <SCANTIME    0  ms> * <STATUS   STOP  > MAIN
    MONITOR STARTED.
1WRITE 2ENL/DI 3MON 4TERM   5 SET  6 RST  7 AUTO 8       9 ENTRY 0 HEX
```

```
F1  COMMAND SELECT              POINT      <K  10>       ┼
                                       1  ABS-1
                         ITEM SET          AXIS      1,      420000  < PLS>
                         1:DWELL           AXIS      2,      900000  < PLS>
                         2:M CODE          AXIS      3,      164000  < PLS>
                         3:TORQUE          AXIS      4,       23000  < PLS>
                         4:P.B.            SYN.SPEED            5000  < PLS/sec>
                         5:UNIT
                         6:S.R.
                         7:⟋
                         8:⟍
                         9:⟋⟍
                         A:P.TORQ
                         B:STOP
                         C:⟍⟋
                         D:SPEED
                         E:S RATIO
                         (*:CAN SET)                    PROGRAM STEPS       8
                                                        USED PROGRAMS   4/4096
1COMMND 2 READ 3DELETE 4 AUX   5 SVST 6       7 PREV_8 NEXT   9       0STORE
```

Ctrl + F11

Ctrl + F11

Selecting the servo programming function

1) During SVST instruction monitoring, the servo programming function can be selected for viewing or editing of the designated servo program.
   However, monitoring of the servo program is not possible.
   Hold down the [Ctrl] key and press the [F11] key to view the servo program.
   If the servo program to be started was directly designated in the SVST instruction, the designated servo program is displayed.
   However, if the servo program to be started was indirectly designated in the SVST instruction, servo program No. 0 is displayed.
   The servo program can now be viewed or edited.

2) To switch back from the servo programming function to the transition condition and operation output monitor, hold down the [Ctrl] key and press the [F11] key.
   The system returns to the ladder monitor screen which was displayed before the servo programming function was selected.

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10. GPP FUNCTIONS AND SFC FUNCTIONS

(2) Servo instruction monitor

Monitoring of servo instruction creation steps is possible during transition condition and operation output monitoring.

The following servo instructions can be monitored.

- DSFRP*
- DSFLP*
- SVST
- CHGV
- CHGA

*This becomes the GPP wordshift instruction when using an A273UHCPU (32-axis specification).

[Procedure to Display the Operation Output Ladder Monitor Screen for Servo Instruction Creation Steps]
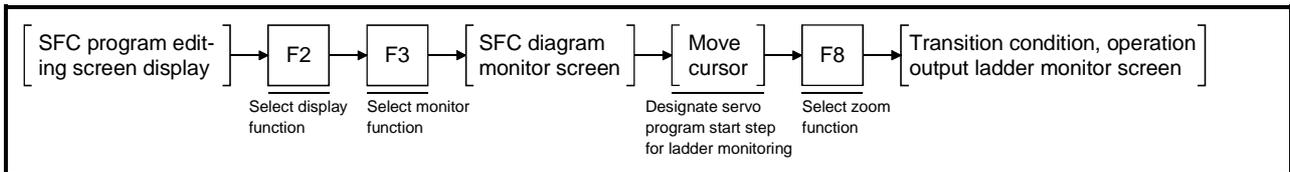
[Transition Condition, Operation Output Ladder Monitor Screen]
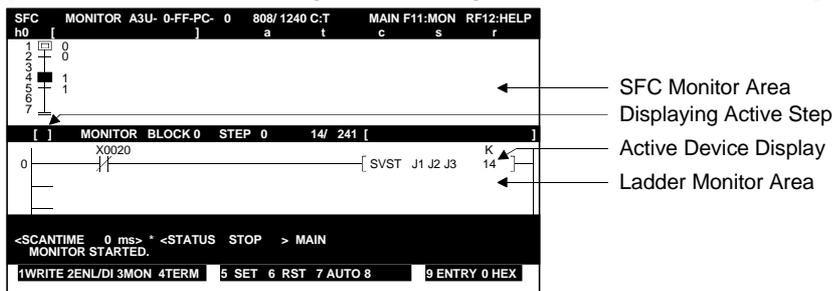
[Display/Setting Contents]

Displaying active step   The step presently monitored by the ladder monitor function is displayed as ON ■ when active and OFF □ when inactive.

Active device display   The device presently monitored by the ladder monitor function is displayed as ON(─█ ├─) when active and OFF (─[├─) when inactive.

SFC monitor area   Displays the SFC diagram.

Ladder monitor area   Runs the ladder monitor for the designated transition condition and operation output.

[Key Operations]

Start monitoring   1) Press the [F3] key to start the ladder monitor.

End monitoring   1) Press the [F4] key to end the ladder monitor and return to the SFC diagram screen.

10. GPP FUNCTIONS AND SFC FUNCTIONS

[Transition Condition, Operation Output Monitor Ladder Monitor Screen]　　　　　　**[Servo Programming Screen]**

```
SFC    MONITOR A3U- 0-FF-PC- 0   808/ 1240 C:T      MAIN F11:MON  RF12:HELP
h0  [                          ]        a    t      c    s     r
1  □  0
2  ┬  0
3  │
4  ┴  1
5  □  1
6
7
[ ]     MONITOR  BLOCK 0    STEP 0     14/ 241 [                    ]
           X0020                                            K
0   ──┤ ├──────────────────────────[ SVST  J1 J2 J3      14 ]
     ──┴──

<SCANTIME   0  ms> * <STATUS   STOP   > MAIN
   MONITOR STARTED.
1WRITE 2ENL/DI 3MON 4TERM   5 SET  6 RST  7 AUTO 8       9 ENTRY 0 HEX
```

```
F1  COMMAND SELECT                <K  14>         ┼
                          POINT          1
                   ITEM SET        ABS-1
                   1:DWELL          AXIS      1,      420000   < PLS>
                   2:M CODE         AXIS      2,      900000   < PLS>
                   3:TORQUE         AXIS      3,      164000   < PLS>
                   4:P.B.           SYN.SPEED          3000    < PLS/sec>
                   5:UNIT
                   6:S.R.
                   7:⊿
                   8:△
                   9:E
                   A:P.TORQ
                   B:STOP
                   C:◿
                   D:SPEED
                   E:S RATIO
                   (*:CAN SET)                    PROGRAM STEPS           8
                                                  USED PROGRAMS       4/4096
1COMMND 2 READ 3DELETE 4 AUX  5 SVST 6      7 PREV_8 NEXT  9      0STORE
```

Ctrl + F11

Ctrl + F11

Selecting the servo programming function

1) During DSFRP* or SVST instruction monitoring, the servo programming function can be selected for viewing or editing of the designated servo program.
   However, monitoring of the servo program is not possible.
   Hold down the [Ctrl] key and press the [F11] key to view the servo program.
   If the servo program to be started was directly designated in the DSFRP* or SVST instruction, the designated servo program is displayed.
   However, if the servo program to be started was indirectly designated in the DSFRP* or SVST instruction, servo program No. 0 is displayed.
   The servo program can now be viewed or edited.

2) To switch back from the servo programming function to the transition condition and operation output monitor, hold down the [Ctrl] key and press the [F11] key.
   The system returns to the ladder monitor screen which was displayed before the servo programming function was selected.
   *When using an A273UHCPU (32-axis specification), this becomes the GPP word shift instruction.

10. GPP FUNCTIONS AND SFC FUNCTIONS

10.2.8 Differences with SFC printing functions

SW0IX-SAP2E printing functions have the following differences:
- Printing of the servo program start step symbol, as shown:

□ v2
Step No.

- Printing of the DSFRP, DSFLP, SVST, CHGV, and CHGA servo instructions. Some sample print-outs are shown below.

(1) Sample print-out with operation outputs and transition conditions (using dedicated symbols)
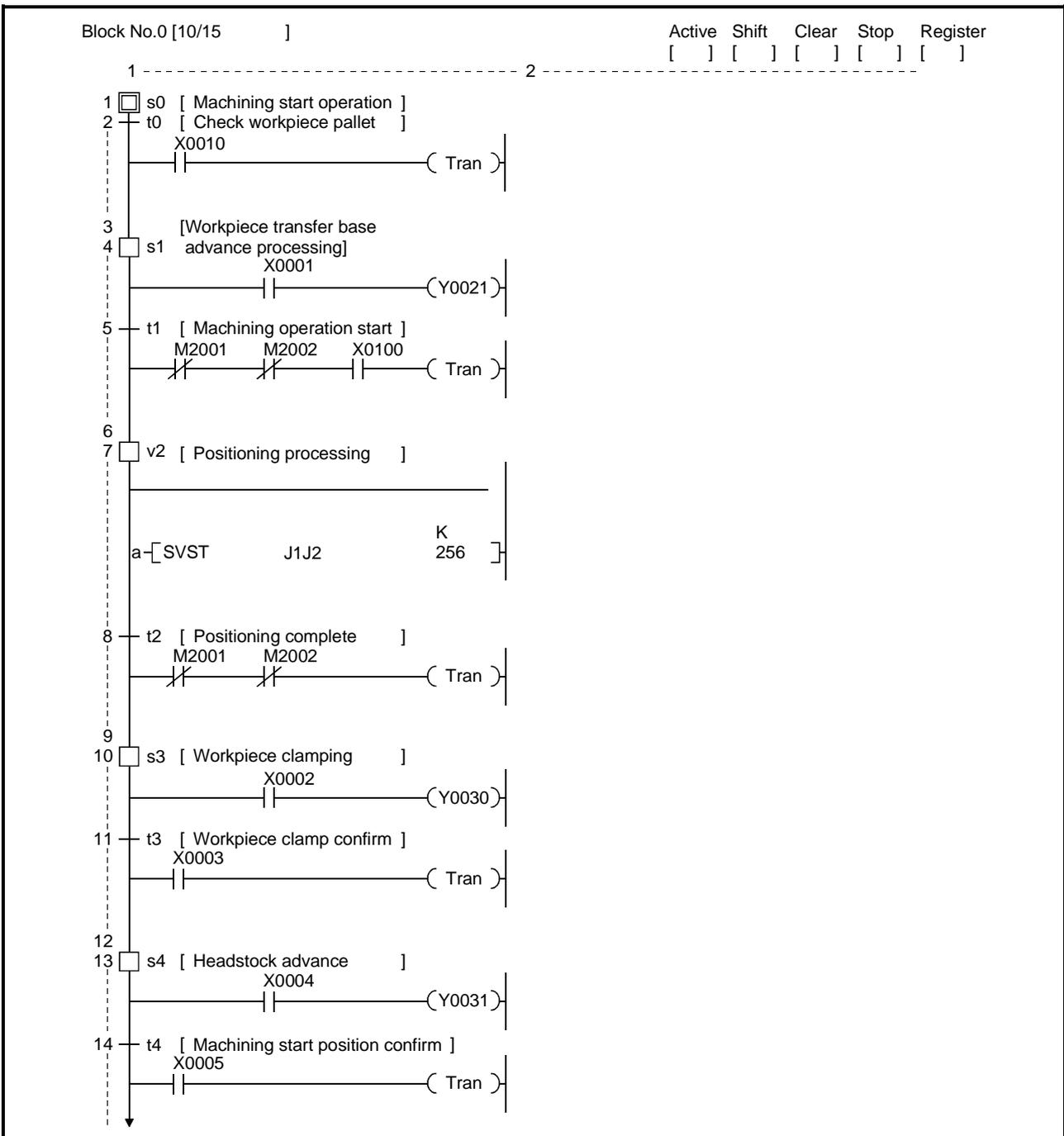
10. GPP FUNCTIONS AND SFC FUNCTIONS

(2) Sample print-out with SFC comments

Block No.0 [10/15   ]

Active Shift Clear Stop Register
[   ] [   ] [   ] [   ] [   ]

1 ------------- 2 ------------- 3 ------------- 4 -------------

1 s0   Machining start operation
2 t0   Workpiece pallet confirm
3
4 s1   Workpiece transfer base advance processing
5 t1   Machining operation start
6
7 v2   Positioning processing
8 t2   Positioning complete
9
10 s3   Workpiece clamping
11 t3   Workpiece clamp confirm
12
13 s4   Headstock advance
14 t4   Machining start position confirm
15
16 s5   Headstock low-speed advance
17 t5   Machining complete confirm
18
19 s6   Headstock retract
20
21 t6   Machining end position confirm   t7
22 s7   Spindle rotation stop   s8   Workpiece unclamp
23 t8   Headstock retract confirm   t9   Workpiece unclamp confirm
24
25 s9   Headstock stop and processing flag reset   s10 Synchronous processing

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10. GPP FUNCTIONS AND SFC FUNCTIONS

(3) Sample print-out with right-justified SFC comments

| Block No.0 [10/15   ] | Active [   ] | Shift [   ] | Clear [   ] | Stop [   ] | Register [   ] |

```
    1---2--3--4--5--6--7--8--9--10--11--12--13--14--15--16--17--18--19--20--21---22
 1  □ 0                                                                    s0  Machining start operation
 2  + 0                                                                    t0  Workpiece pallet cinfirm
 3
 4  □ 1                                                                    s1  Workpiece transfer base
                                                                               advance processing
 5  + 1                                                                    t1  Machining operation start
 6
 7  □ 2                                                                    v2  Positioning processing
 8  + 2                                                                    t2  Positioning complete
 9
10  □ 3                                                                    s3  Workpiece clamping
11  + 3                                                                    t3  Workpiece clamp confirm
12
13  □ 4                                                                    s4  Headstock advance
14  + 4                                                                    t4  Machining start position
15                                                                             confirm
16  □ 5                                                                    s5  Headstock low-speed
                                                                               advance
17  + 5                                                                    t5  Machining complete
18                                                                             confirm
19  □ 6                                                                    s6  Headstock retract
20
21  + 6 + 7                                                                t6  Machining end position
                                                                               confirm
22  □ 7 □ 8                                                                t7
                                                                          s7  Spindle rotation stop
23  + 8 + 9                                                                s8  Workpiece unclamp
24                                                                        t8  Headstock retract confirm
25  □ 9 □ 10                                                               t9  Workpiece unclamp
                                                                               confirm
                                                                          s9  Headstock stop and
                                                                               processing flag reset
26  +10 + 11                                                              s10 Synchronous processing
27                                                                        t10
28  □ 11                                                                   t11
29  + 12                                                                  s11 Synchronous processing
30 ▼                                                                       t12
```

10. GPP FUNCTIONS AND SFC FUNCTIONS

(4) Sample print-out of SFC diagram only

Block No.0 [10/15   ]   Active [   ]   Shift [   ]   Clear [   ]   Stop [   ]   Register [   ]

```
        1---2 --3 -- 4 -- 5 -- 6 -- 7 -- 8 -- 9 --10--11- 12 --13-- 14 --15--16- 17 --18 --19-- 20 --21---22
  1    ▣ s0
  2    ┼ t0
  3
  4    ☐ s1
  5    ┼ t1
  6
  7    ☐ v2
  8    ┼ t2
  9
 10    ☐ s3
 11    ┼ t3
 12
 13    ☐ s4
 14    ┼ t4
 15
 16    ☐ s5
 17    ┼ t5
 18
 19    ☐ s6
 20   ┌──────┐
 21    ┼ t6  ┼ t7
 22    ☐ s7  ☐ s8
 23    ┼ t8  ┼ t9
 24
 25    ☐ s9  ☐s10
 26    ┼ t10 ┼ t11
 27
 28   ☐s11 ☐s12
 29    ┼t12  ┼ t13
 30
 31   ☐s13
 32    ┼ t14
 33
 34   ☐s14
 35    ┼ t15
 36
 37   ☐s15
 38    ┼ t16
 39
 40   ☐s16
 41  ┌──────┐
 42    ┼ t17 ┼ t18
 43   ☐s17 ☐s18
 44    ┼t19  ┼ t20
 45
 46   ☐s19 ☐ s20
 47    ┼ t21 ┼ t22
 48  └──────┘
 49    ═
```
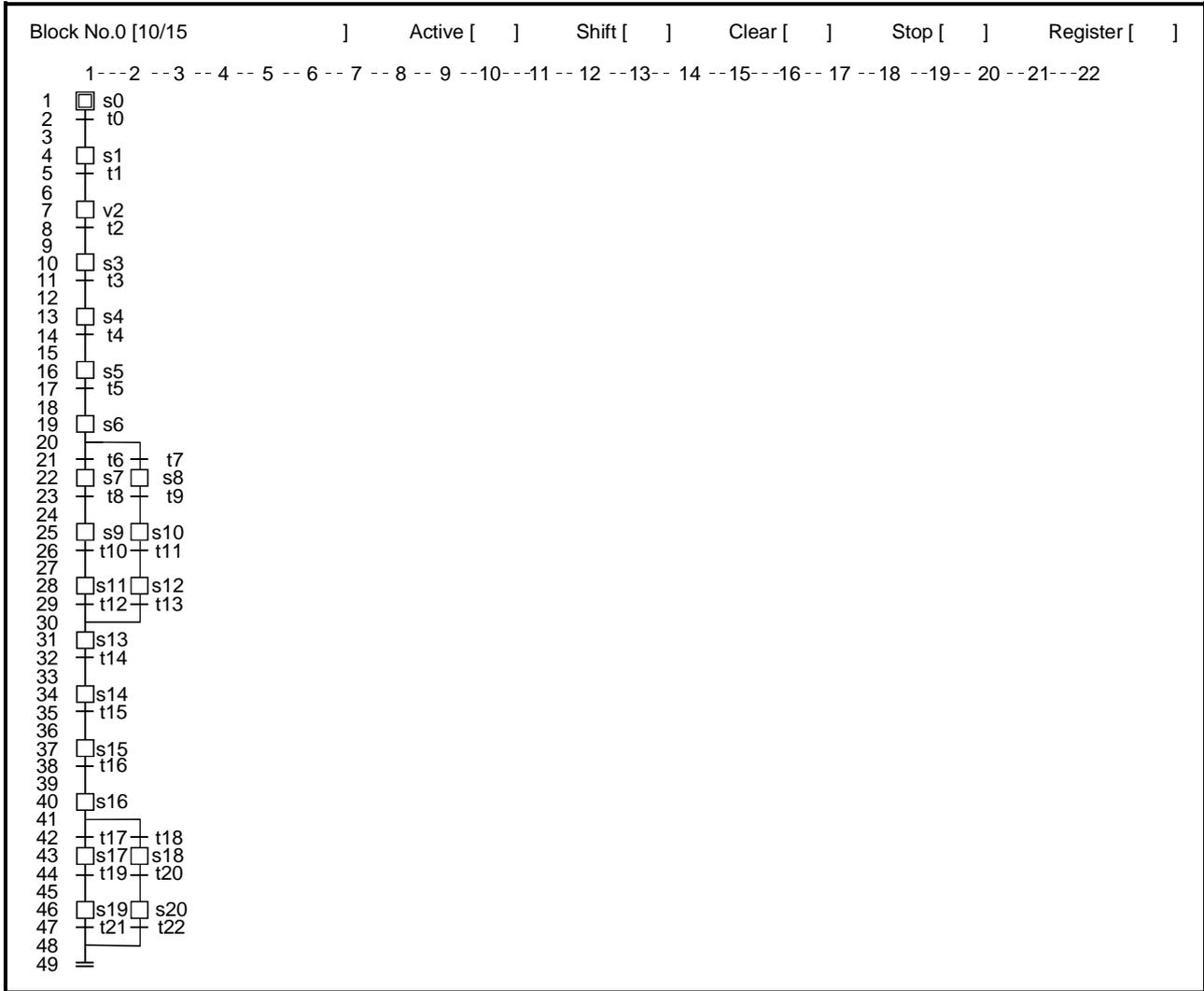
(5) Operation output print-out
Only the operation output ladder blocks of the designated block are printed out in order of step number.

```
Block No.0 [              ]      Active [   ]     Shift [   ]     Clear [   ]     Stop [   ]     Register [   ]

   s0 [              ]
         X0000                                                                      K
   0    ┤ ├──────────────────────────────────────────[ SYST  J1J2      10 ]
        Start switch


   s1 [              ]
         X0000                                                                      K
   0    ┤ ├──────────────────────────────────────────[ SYST  J1J2J3J4  11 ]
        Start switch
```
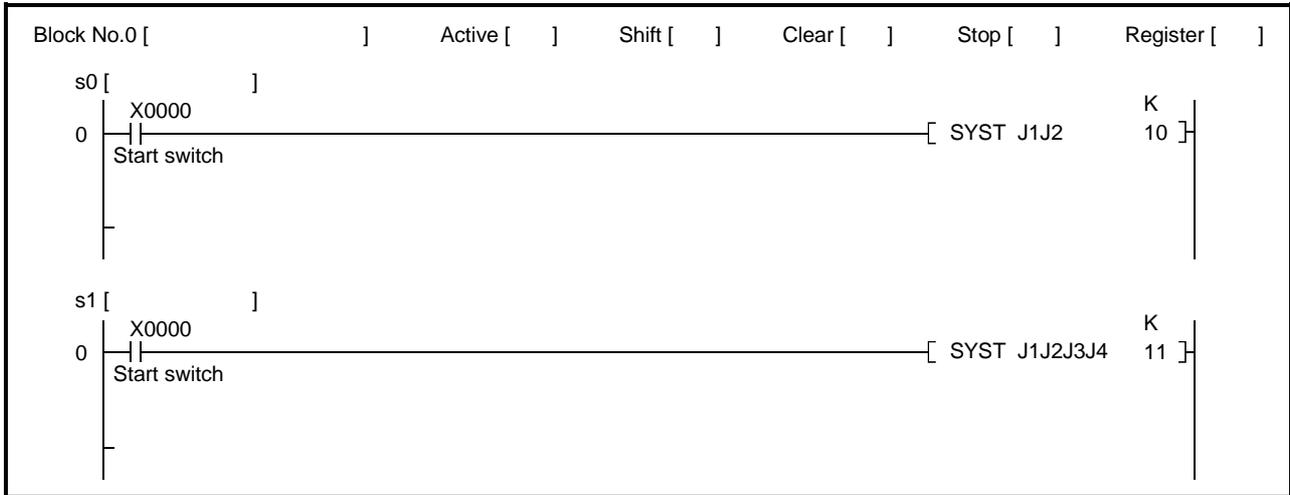
(6) Transition condition print-out
Only the transition condition ladder blocks of the designated block are printed out in order of step number.

```
Block No.0 [              ]      Active [   ]     Shift [   ]     Clear [   ]     Stop [   ]     Register [   ]

   t0 [              ]
         X0000   M2001  M2002
   0    ┤ ├──┤/├──┤/├────────────────────────────────────────────( Tran )


   t1 [              ]
         X0000   M2001  M2002  M2003  M2004
   0    ┤ ├──┤/├──┤/├──┤/├──┤/├──────────────────────────────────( Tran )
```
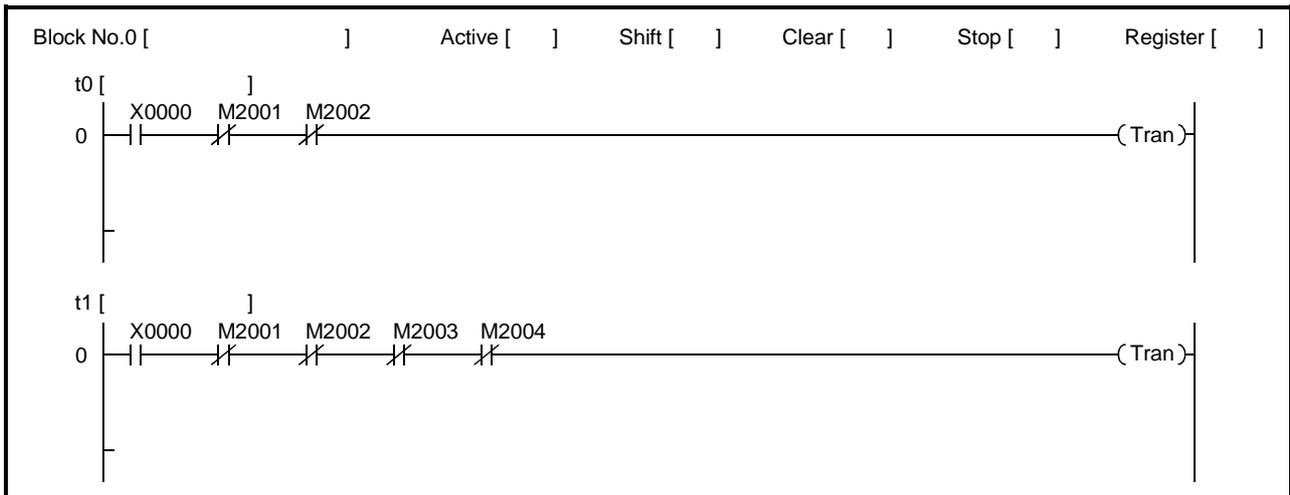
(7) Operation output + transition condition print-out
The operation output ladder blocks and transition condition ladder blocks of the designated block are printed out in their order in the SFC diagram.

Block No.0 [   ]   Active [   ]   Shift [   ]   Clear [   ]   Stop [   ]   Register [   ]

s0 [   ]

```
     X0000                                                                K
0   ─┤├──────────────────────────────────────────────[  SYST  J1J2      10  ]─
    Start switch
```

t0 [   ]

```
     X0000   M2001  M2002
0   ─┤├────┤/├────┤/├─────────────────────────────────────────────( Tran )─
```

s1 [   ]

```
     X0000                                                                K
0   ─┤├──────────────────────────────────────────────[  SYST  J1J2J3J4  11  ]─
    Start switch
```

t1 [   ]

```
     X0000   M2001  M2002  M2003  M2004
0   ─┤├────┤/├────┤/├────┤/├────┤/├────────────────────────────────( Tran )─
```

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11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION (SERVO PC MODE)

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 (servo setting data, servo programs);
- Servo setting data (system setting data, axis data, parameter block data, limit switch output data)
- Servo programs.

(1) Outline of the functions
The functions below are offered by the GSV13PE servo PC mode.

11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION (SERVO PC MODE)

(2) Outline of the procedure
   The procedure is shown below to write, read, and verify the data with the servo system CPU.

```
                    ┌──────────────────────────────────┐
                    │   Display the servo PC function   │
                    │          select window            │
                    └──────────────────────────────────┘
                                     │
        ┌────────────────────────────┼────────────────────────────┐
        ▼                            ▼                            ▼
 ┌─────────────┐            ┌─────────────┐            ┌─────────────┐
 │    Write    │            │    Read     │            │   Verify    │
 └─────────────┘            └─────────────┘            └─────────────┘
        │                          │                          │
        ▼                          ▼                          ▼
 ┌─────────────────┐      ┌─────────────────┐      ┌─────────────────────┐
 │ Display the write│      │ Display the read│      │ Display the verification│
 │ data select window│     │ data select window│    │ data select window  │
 └─────────────────┘      └─────────────────┘      └─────────────────────┘
        │                          │                          │
        ▼                          ▼                          ▼
 ┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
 │ All servo data  │      │ All servo data  │      │ All servo data  │
 │ Servo setting data│    │ Servo setting data│    │ Servo setting data│
 │ Servo programs  │      │ Servo programs  │      │ Servo programs  │
 └─────────────────┘      └─────────────────┘      └─────────────────┘
        │                          │                          │
        └──────────────────────────┼──────────────────────────┘
                                    ▼
        ┌────────────────────────────────────────────────────────┐
        │ After using the functions, press the [Esc] key to close │
        │ the data select window.                                 │
        └────────────────────────────────────────────────────────┘
```

(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 to select the program section monitor.

   (b) PC test
      Press the [Ctrl] + [F11] keys to select the PC test.

11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION (SERVO PC MODE)

11.1 Writing to the Servo System CPU

Write the computer memory contents to the servo system CP.

[Procedure to Display the Write Data Select Window]

Servo function select window → 6 → On-line function select window → 1 → Servo PC function select window → 2 → Write data select window

Select on-line functions

Select servo PC functions

Select write function

[Write Data Select Window]
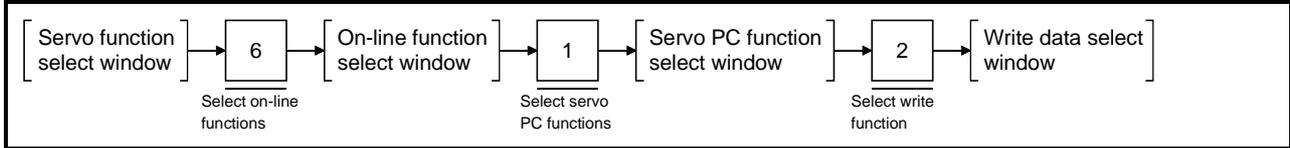
Write data select area
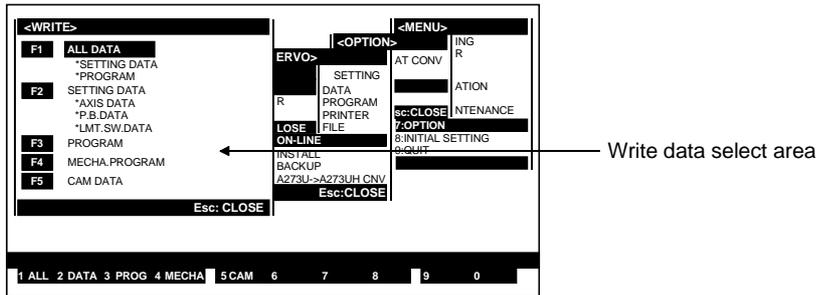
[Display/Setting Contents]

Write data select area   The selected data is displayed highlighted.

[Key Operations]

Selecting data
1) Select the data to write by pressing the [F1] to [F3] 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 highlight "YES".
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.

Cancelling 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).

11 − 3

11. SERVO SYSTEM CPU WRITING, READING, AND VERIFICATION (SERVO PC MODE)

11.2 Reading from the Servo System CPU

Read the servo system CPU memory contents to the computer memory.

[Procedure to Display the Read Data Select Window]

Servo function select window → 6 → On-line function select window → 1 → Servo PC function select window → 1 → Read data select window

Select on-line functions / Select servo PC functions / Select read function

[Read Data Select Window]

Read data select area

[Display/Setting Contents]

Verification data select window   The selected data is displayed highlighted.

[Key Operations]

Selecting data

1) Select the verification data by pressing the [F1] to [F3] 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 highlight "YES".
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.

Cancelling 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.

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 (SERVO PC MODE)

11.3 Verifying the Servo System CPU

Verifies the servo system CPU memory contents and the computer memory contents.

[Procedure to Display the Verification Data Select Window]

```
┌─────────────┐      ┌───┐      ┌─────────────┐      ┌───┐      ┌─────────────┐      ┌───┐      ┌─────────────────┐
│ Servo function │ ───→ │ 6 │ ───→ │ On-line function │ ───→ │ 1 │ ───→ │ Servo PC function │ ───→ │ 3 │ ───→ │ Verification data select │
│ select window  │      └───┘      │ select window   │      └───┘      │ select window    │      └───┘      │ window              │
└─────────────┘                  └─────────────┘                  └─────────────┘                  └─────────────────┘
              Select on-line                  Select servo                  Select verify
              functions                        PC functions                 function
```
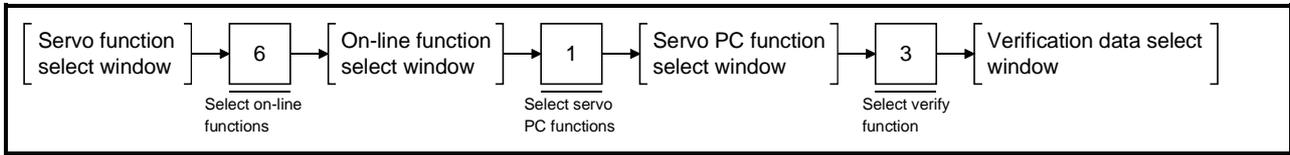
(1) Running the verification

[Verification data Select Window]

Verification data select area

[Display/Setting Contents]

Verification data select window	The selected data is displayed highlighted.

[Key Operations]

Selecting data
1) Select the verification data by pressing the [F1] to [F3] 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 highlight "YES".
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.

Cancelling 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 (SERVO PC MODE)

(2) Checking verification results

[Verification Results Window]

No discrepancies in servo program verification
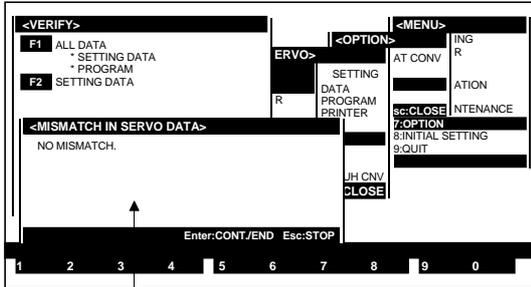
Discrepancies in servo program verification
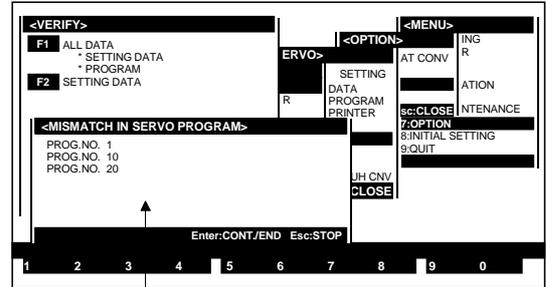
Verification results display area

[Display/Setting Contents]

Verification results display area	Displays the results after verification.

[Key Operations]

No Discrepancies	
Closing window	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 on one page. (For more details, see Section 19 Error Messages). 2) After 11 discrepancies are found, press the [Enter] key to display the next page and continue the verification. 3) The verification is continued and the results displayed.
Interrupting verification	1) Press the [Esc] key to interrupt a verification operation. 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.
Closing window	1) Press the [Esc] key to close the window and return to the verification data select window.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

The GSV13PE 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) Outline of functions
    The GSV13PE SERVO TEST mode includes the following functions.

Servo Test		
	Servo start-up	The positioning data transfer operation, the servo system CPU & servo ········· 12.2 amplifier connection status, and the servomotor operation are checked.
	Initial check	The connected servo amplifier's status is checked. ········· 12.2.1
	Model name check	The servo amplifier and servomotor model names, etc., ········· 12.2.2 are checked.
	Rotation direction check	The servo motor rotation direction in which the address ········· 12.2.3 value increases is checked.
	Upper & lower limit LS check	The upper & lower limit switch operation is checked. ········· 12.2.4
	RPM check	The motor rotation speed at the high-speed command is ········· 12.2.5 checked.
	Servo diagnosis	The speed control gain 1 and position control gain 1 values designated in ········· 12.3 the Servo Parameter Set mode are checked to determine if they are appropriate for the servomotor load.
	Speed control gain 1	When using the ADU, the speed control gain 1 setting ········· 12.3.1(1) is checked to determine if it is appropriate.
	Position control gain 1	The position control gain 1 setting is checked to ········· 12.3.2(1) determine if it is appropriate.
	JOG operation	JOG operation is conducted to determine if the servomotor is operating ········· 12.4 properly.
	Manual pulse generator operation	Manual pulse generator operation is conducted to determine if the ········· 12.5 servomotor is operating properly.
	Home position return test	A home position return test is conducted to check the return direction and ········· 12.6 the dog position.
	Servo program test operation	A servo program test operation is conducted to determine if the ········· 12.7 servomotor is operating in accordance with the program.
	Individual START	Individual servo program operation is checked. ········· 12.7.1
	Sequential START	Sequential operation of multiple registered servo ········· 12.7.2 programs is checked.
	Teaching	Addresses designated by JOG and manual pulse generator positioning ········· 12.8 operations are written to the specified servo program.
	Error reset	The servo system CPU's error code storage area is cleared, and an error ········· 12.9 flag reset is executed.
	Present value change	A forced change of the servo system CPU's feed present value is ········· 12.10 executed.
	Servo ON/OFF	Servo ON/OFF switching is executed. ········· 12.11

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

(2) Procedual flowchart

A procedual flowchart for the SERVO TEST mode is shown below.

| Switching to the TEST mode | - - - - - - - - - See Section 12.1.1(1) |

- The servo system CPU's START command is disabled.
- When the TEST mode is designated, a Servo Test Function Selection window will be displayed.*3

| Selecting SERVO TEST made functions | - - - - - - - - - See Section 12.1.1(2) |

- Select the disired function at the Servo Test Function Selection window.
- Select the "YES" item at the Execute YES/NO? dialog box. The execute window for the functions will then be displayed.

*1	*1	*1	*2	*1	*2	*1	*1	*2	*1	*2		
Servo start-up	Servo diagnosis	JOG operation		Manual pulse generator operation		Home position return test	Servo program test run		Teaching		Error reset	Servo ON/OFF

| After executing the functions, press the [Esc] key to close the execute window. |

- The Servo Test Function Selection window will then be displayed again.

| Test Mode END | - - - - - - - - - See Section 12.1.2 |

*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 node), 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 conducted when the servo system CPU is stopped or when it is running.
However, when it is executed while the servo system CPU is running, the START instructions (DSFRP/SVST) from the sequence program will be ignored.

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 to Display The TEST Mode Execute YES/NO Dialog Box]
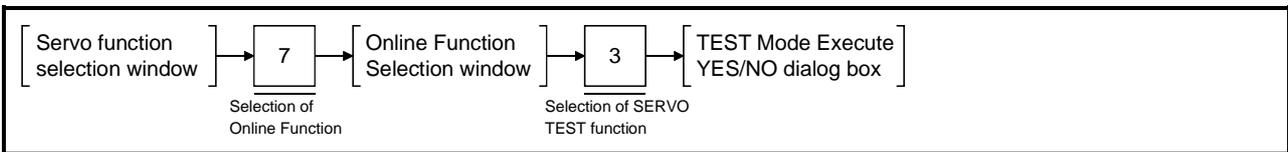
[TEST Mode Execute YES/NO Dialog Box]
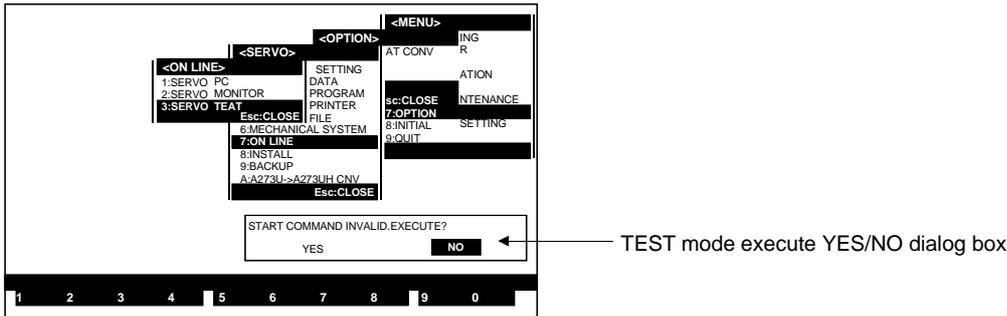
[Display/Setting Contents]

In order to conduct a test run, be sure to select the "YES" item at the "START COMMAND WILL BE DISABLED. OK?" dialog box. (If "NO" is selected, the test run will not be executed.)

[Key Operations]

Designating the 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 selection 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) Selecting the servo test function
   After switching to the TEST mode is completed, the Servo Test Function Selection window will be displayed.
   Designate the desired function at this window.

[Procedure to Display The Servo Test Function Selection Window]

Servo Function Selection window	→	6	→	Online Function Selection window	→	3	→	←	→	Enter	→	Servo Function Selection window
		Selection of Online Function				Selection of SERVO TEST function		Disable START command				

[Servo Test Function Selection Window]


```
<SERVO TEST>
F1  CONDITION  1:INITIAL CHECK          F5  ZERO RETURN TEST
               2:TYPE NAME CHECK
               3:ROTATION DIR.CHECK     F6  SERVO PROG.TEST   1:SINGLE START
               4:F/R LS CHECK                                 2:SEQUEN.START/
               5:RPM CHECK
                                        F7  TEACHING
F2  DIAGNOSIS  1:VEL.LOOP GAIN 1
               2:POS.LOOP GAIN 1        F8  ERROR RESET
F3  JOG OPERATION                       F9  SERVO ON/OFF
F4  MANUAL PLS.GEN
                                            REAL/VIRT. CHG
                                        Back Space : IMMEDIATE STOP  Esc:CLOSE

1 CONDIT 2 DIAGNO 3 JOG 4 MANUAL   5 ZERO 6 PROG.  7 TEACH. 8 ERROR   9 ON/OFF 0
```

1) CONDITION
2) DIAGNOSIS
3) JOG OPERATION
4) MANUAL PLS.GEN
5) ZERO RETURN TEST
6) SERVO PROG.TEST
7) TEACHING
8) ERROR RESET
9) SERVO ON/OFF

Function	Selection Procedure
1) Servo start-up	Press the [F1] key to execute a servo start-up. The "CONDITION" item will then be highlighted. Use the numeric key 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.
2) Servo diagnosis	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.
3) Jog operation	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.
4) Manual pulse generator operation	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.
5) Home position return test	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)

Function	Selection Procedure
6) Servo program test run	Press the [F6] key to execute a servo program test run. The "Servo Program Test Run" 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.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

12.1.2 Ending the TEST mode

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]

```
<SERVO TEST>
  F1  CONDITION  1:INITIAL CHECK         F5   ZERO RETURN TEST
                 2:TYPE NAME CHECK
                 3:ROTATION DIR.CHECK     F6   SERVO PROG.TEST   1:SINGLE START
                 4:F/R LS CHECK                                  2:SEQUEN.START
                 5:RPM CHECK
                                          F7   TEACHING
  F2  DIAGNOSIS  1:VEL.LOOP GAIN 1
                 2:POS.LOOP GAIN 1        F8   ERROR RESET

  F3  JOG OPERATION                       F9   SERVO ON/OFF

  F4  MANUAL PLS.GEN
                              START FROM PC SET TO ENABLE?
                                   YES              NO        ◄────  "END TEST MODE? YES/NO" dialog box

 1CONDIT 2DIAGNO 3 JOG 4MANUAL   5 ZERO 6 PROG.  7 TEACH. 8 ERROR   9 ON/OFF 0
```
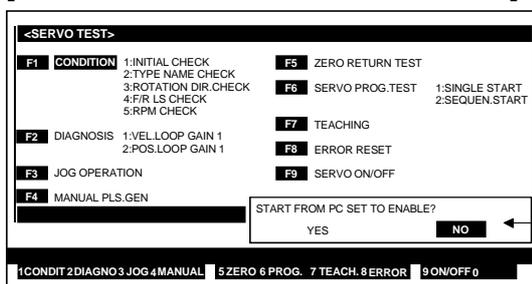
[Key Operations]

Ending the TEST mode

1) Press the [Esc] key to end the TEST mode.
   An "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 Operations]

Switching to PC TEST function

1) Press the [Ctrl] + [F11] keys to switch to the PC TEST function.
   An "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 Operations]

**Switching to GPP
function**

1) Press the [F11] key to switch to the GPP function.
   An "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 & 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.

[Model 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

Page Up   Page Down   START FROM PC SET TO ENABLE? ←   "END TEST MODE? YES/NO" dialog box

YES   **NO**

MONITOR STARTED.
1   2 VIRT. 3   4   5   6   7   8ERROR 9   0CHECK

[Key Operations]

Switching to PC TEST function

1) Press the [Ctrl]+[F11] keys to switch to the PC TEST function.
   An "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 Operations]

Switching to GPP function

1) Press the [F11] key to switch to the GPP function.
   An "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/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<MDNM> 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).

```
┌─────────────────────────────────┐
│     "Initial Check" window      │
└─────────────────────────────────┘
                │
              ┌────┐
              │ F2 │
              └────┘
                │
┌─────────────────────────────────┐
│   "Model Name Check" window     │
└─────────────────────────────────┘
                │
              ┌────┐
              │ F2 │
              └────┘
                │
┌─────────────────────────────────┐
│ "Rotation Direction Check" window │
└─────────────────────────────────┘
                │
              ┌────┐
              │ F2 │
              └────┘
                │
┌─────────────────────────────────┐
│ "Upper/Lower Limit LS Check" window │
└─────────────────────────────────┘
                │
              ┌────┐
              │ F2 │
              └────┘
                │
┌─────────────────────────────────┐
│      "RPM Check" window          │
└─────────────────────────────────┘
```
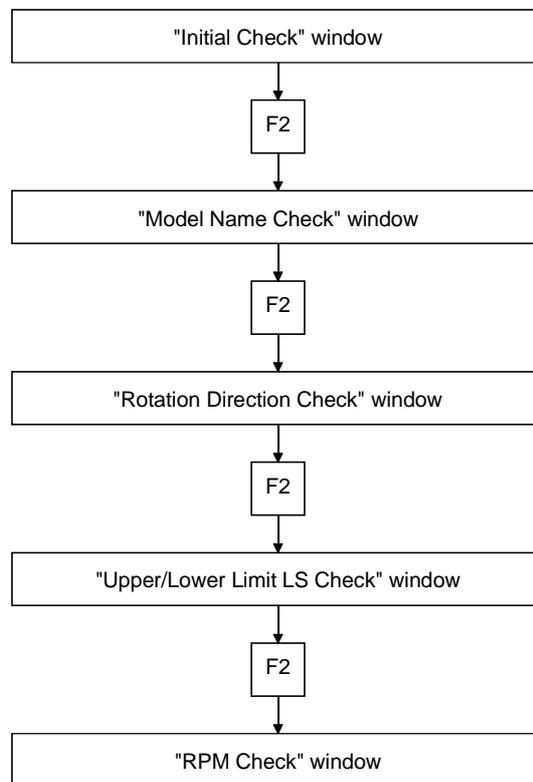
⚠ **CAUTION**

⚠ 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 to Display The Initial Check Window]

Servo Test Function Selection window → F1 → 1 → Enter → Initial Check window

Selection of the Servo Start-Up function

Selection of the Initial Check function

Selection of "YES" (execute)

[Initial Check Window]

<SERVO CONDITION> <INITIAL CHECK>

AX.	CODE	FRR.NAME	COMMENT
1	2010	Low voltage	SPS Vol.<= 160 VAC.Insufficient capacity.Cut off
2	2012	Memory error 1	Servo amplifier SRAM error or EPROM check Sum error.

Check results display area

Monitoring mark

Page Up Page Down   Back Space:IMMEDIATE STOP   Esc:CLOSE
MONITOR STARTED.
1   2 TYPE 3   4   5   6   7   8ERROR 9   0

[Display/Setting Contents]

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.)

[Key Operations]

Check results display area	1) Error axis................ The number of axis connected to the servo amplifier where an active error exists is displayed.
	2) Error code .... The error code is displayed.
	3) Error name .... The servo error name is displayed.
	4) Error comment ...... The error description is displayed.
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

[Key Operations]

Page switching	1) If more than 15 errors have occurred, use the [PAGE UP]/[PAGE DOWN] keys to switch display pages. Press the [PAGE DOWN] key to display subsequent errors, and the [PAGE UP] key to display preceding errors.
Comment scroll	1) To view the entire comment, use the [←]/[→] keys to scroll the comment display right and left.
Switching to the Model Name Check window	1) Press the [F2] key to conduct a model name check. The Model Name Check window will then be displayed. (See Section 12.2.2)
Error reset	1) Press the [F8] key to execute an error reset. An Error Reset window will then be displayed. (See Section 12.9)
Closing the Initial Check window	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 Model name check

A list of connected servo amplifier and servomotor model names is displayed.
Verify that the names conform to the system design.

[Procedure to Display The Model Name Check Window]

Servo Test Function Selection window → F1 → 2 → Enter → Model Name Check window

Selection of the Servo Start-Up function

Selection of the Model Name Check function

Selection of "YES" (execute)

[Model 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:IMMEDIATE STOP   Esc:Close

MONITOR STARTED.
1   2   3   4   5   6   7   8ERROR 9   0CHECK

— Check results display area

— Monitoring mark

[Display/Setting Contents]

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 No............................Corresponds to the axis No. settings designated in the System Setting mode.

2) Base type ....Indicates whether the ADU is installed at a "main base unit" or an "extension base unit".

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.)
   Number of connectable motors [1] ADU: 1
   Number of connectable motors [2] ADU:
   1 (connector for upper encoder)
   2 (connector for lower encoder)

5) Amplifier model name .....The servo amplifier's model name is displayed.

6) ENCO setting ....Indicates the positioning method -- "absolute" or "incremental".

7) Motor type ....Indicates the servomotor type.

8) Motor capacity.................Indicates the motor capacity based on the settings designated in the System Setting mode.

9) Motor rpm........................Indicates the motor's rpm based on the settings designated in the System Setting mode.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

10) 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
11) Signal 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 Operations]

Switching to the 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.
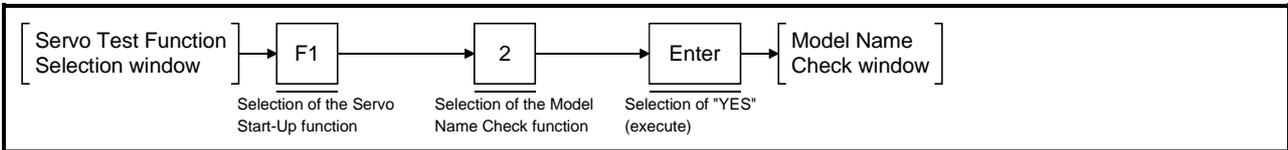An Error Reset window will then be displayed. (See Section 12.9)

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 there is a discrepancy between the actually connected MR-J2-B motor and 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

1	2	3	4	5	6	7	8	9	0

Axis switching at the model name check
(For A273UHCPU 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.

Closing the Model Name Check window

1) Press the [Esc] key to close the Model 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 to Display The Rotation Direction Check Execute Window]

Servo Test Function Selection window	→	F1	→	3	→	Enter	→	Rotation Direction Check Execute Window
		Selection of the Servo Start-Up function		Selection of the Rotation Direction Check function		Selection of "YES" (execute)		

[Rotation Direction Check Execute Window] (For A273UHCPU)

Axis No. display area
Note display area
Monitor item display area
Monitoring mark
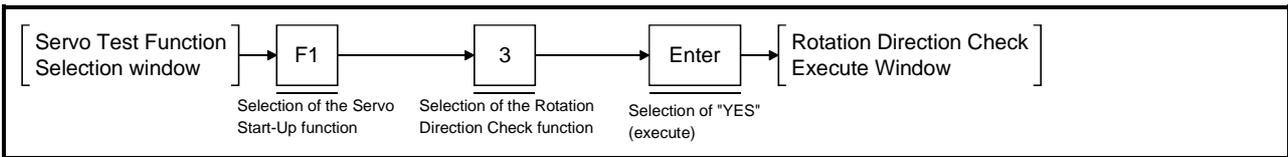
[Display/Setting Contents]

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

Servo error detection		☐	OFF
External signal	FLS	■	ON
	RLS	■	ON
	STOP	☐	OFF
Servo READY		■	ON
TEST mode		■	ON
TEST mode request error		☐	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 START" error message will be displayed.

Monitor item display area	The feed present value and the device ON/OFF statuses, etc., are displayed here.
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.
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

[Key Operations]

Executing the check function

1) Press the [F4] key to execute the rotation direction check.
   A Rotation Results window will then be displayed. (See Section 12.2.3).
   Check the rotation direction.

Designating the axis number

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.

Switching to the Upper/Lower Limit LS Check window

1) Press the [F1] 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 at the Error Reset window which is displayed. (See Section 12.9)

Closing the window

1) Press the [Esc] key to close the Rotation Direction Check Execute window and return to the Servo Test Function Selection window.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

(2) Rotation results display
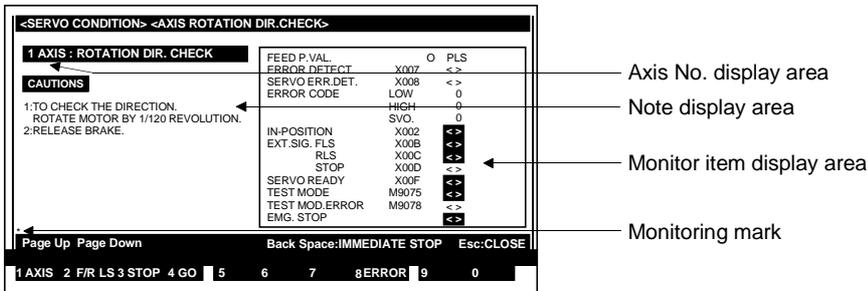When a rotation direction check is executed, the servomotor is rotated 1/120th of a turn, and the rotation direction results are displayed.
Check that the rotation direction is correct.

[Rotation Direction Results Window] (For A273UHCPU)

Rotation Dierction Results window
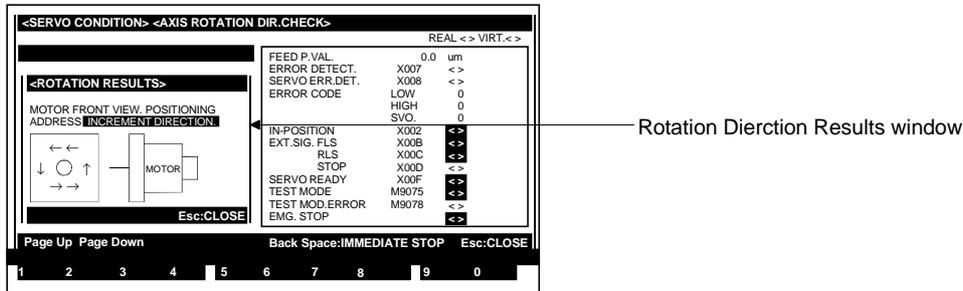
[Display/Setting Contents]

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
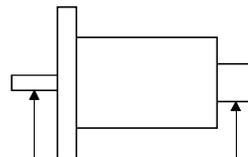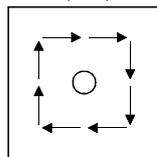
Motor's load side   Encoder

[Key Operations]

Closing the window   1) Press the [Esc] key to close the Rotation Direction Results window and return to the Rotation Direction Check Execute window.

12.2.4 Upper/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 to Display The Upper/Lower Limit LS Check Window]
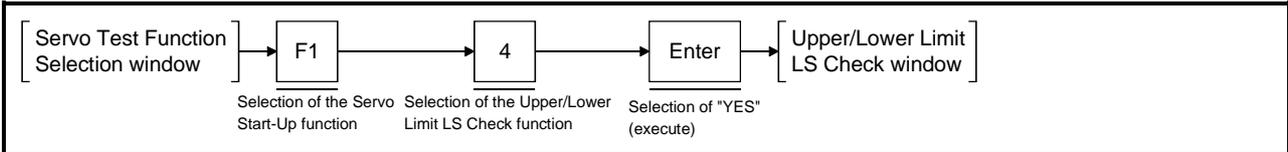
[Upper/Lower Limit LS Check Window] (For A273UHCPU)
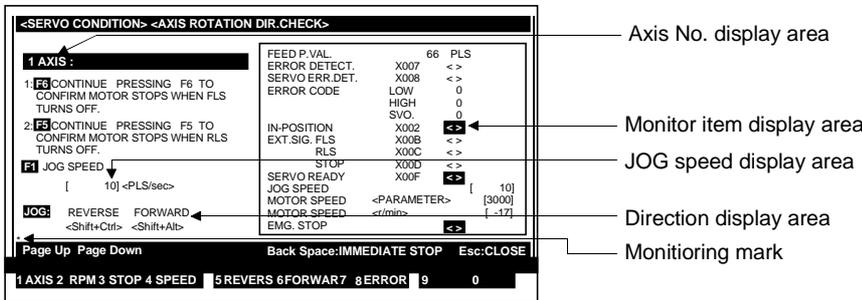
[Display/Setting Contents]

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.
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		
Servo error detection	□	OFF
External signal	FLS	■ ON
	STOP	□ OFF
Servo READY	■	ON

Reverse JOG START conditions		
Servo error detection	□	OFF
External signal	RLS	■ ON
	STOP	□ OFF
Servo READY	■	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 START" error message will be displayed.

Monitor Item display area
1). Feed present value .... The positioning address/travel value for the axis in question is displayed here.
2). Error .... The most recent error which has occurred at the axis in question is displayed here.

Axis No. display area
The axis number where the check is being executed is displayed here.

JOG speed display area
The JOG speed designated at the JOG Speed Setting window is displayed here.

Direction display area
The JOG direction (forward or reverse) is indicated here.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

[Key Operations]

|	
JOG speed setting/change	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))
Executing the Check operation (forward)	1) After designating the JOG speed setting, press and hold down the [F6] key (or [Shift] + [Alt] key) to execute an upper limit LS check (forward). After checking that the motor stops when the FLS monitor item goes OFF, release the [F6] key (or [Shift] + [Alt] key).
Executing the Check operation (reverse)	1) After designating the JOG speed setting, press and hold down the [F5] key (or [Shift] + [Ctrl] key) to execute an lower limit LS check (reverse). After checking that the motor stops when the RLS monitor item goes OFF, release the [F5] key (or [Shift] + [Ctrl] key).
Designating the axis number	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 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 (relative to the axis number indicated 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 the RPM Check window	1) Press the [F2] key to conduct an RPM check. The RPM Check window will then be displayed. (See Section 12.2.5)
Error reset	1) Press the [F8] key to execute an error reset at the Error Reset window which is displayed. (See Section 12.9)
Closing the window	1) Press the [Esc] key to close the Upper/Lower Limit LS Check window, and to return to the Servo Test Function Selection window.

POINT

If previously used JOG operation keys ([F6]/[F5]) are held pressed when a personal computer with high processing speed, there are cases that JOG operation cannot e 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)

---

(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)

```
<SERVO CONDITION> <AXIS ROTATION DIR.CHECK>
                                        REAL < > VIRT. < >
                              FEED P.VAL.         66.6  um
 1 AXIS :                     ERROR DETECT.       X007   < >
                              SERVO ERR.DET.      X008   < >
 1: F6 CONTINUE  PRESSING  F6 TO   ERROR CODE     LOW     0
    CONFIRM MOTOR STOPS WHEN FLS                  HIGH    0
    TURNS OFF.                                    SVO.    0
 2: F5 CONTINUE  PRESSING  F5 TO   IN-POSITION    X002   < >
    CONFIRM MOTOR STOPS WHEN RLS   EXT.SIG. FLS   X00B   < >
    TURNS OFF.                         RLS        X00C   < >
 F1 JOG SPEED                         STOP        X00D   < >
                              SERVO READY         X00F   < >
   < JOG SPEED SETTING>       EED                        [    10]
   AXIS No.          1]       SPEED  <PARAMETER>         [3000]
   JOG SPEED       [  10]<PLS/sec>   SPEED  <r/min>      [  -17]
JOG: SET VALUE    [     ]<PLS/sec>   OP                  < >
              End:SET  Esc:CLOSE

 Page Up Page Down            Back Space:IMMEDIATE STOP   Esc:CLOSE

 1    2    3    4     5    6    7    8     9    0
```

Axis No. display area
JOG speed display area
JOG speed setting area

[Display/Setting Contents]

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 No. where a JOG speed setting is to be executed is displayed here.
JOG speed display area	The current JOG speed setting is displayed here.
JOG speed setting area	The JOG speed setting is designated here.

[Key Operations]

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) Press the [Esc] key to abort the setting procedure. The system will then return to the original window.

```
+-------------------------------------------------------------+
|  POINTS                                                     |
|                                                             |
|  (1)  Operation disabled when A171SENC is not used          |
|       (For A171SCPU systems)                                |
|       • The upper/lower limit LS check cannot be performed  |
|         if the A171SENC servo input module is designated    |
|         as "not used" in the System Setting mode.           |
|  (2)  Operation disabled when A278LX is not used            |
|       (For A273UHCPU systems)                               |
|       • The upper/lower limit LS check cannot be performed  |
|         if the A278LX servo external signal module is       |
|         designated as "not used" in the System Setting mode.|
+-------------------------------------------------------------+
```

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 to Display The RPM Check Window]
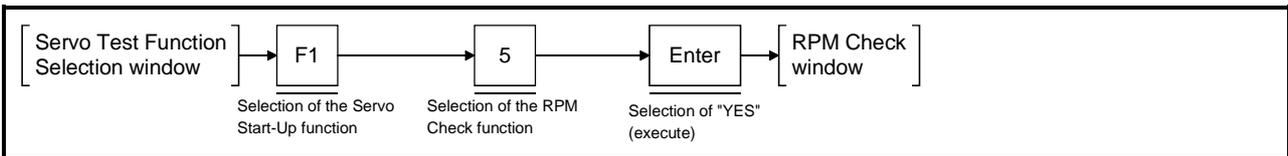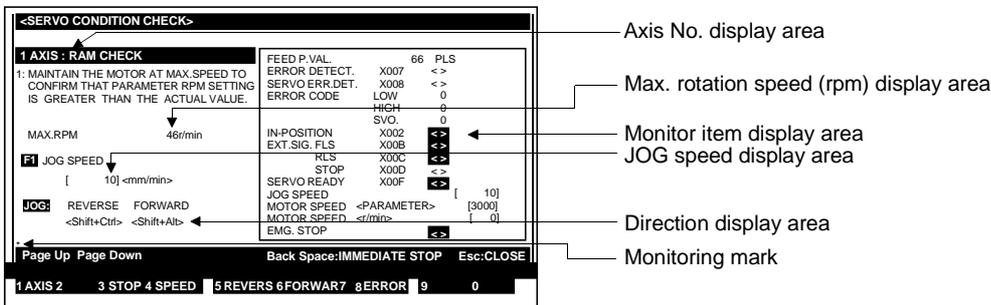
```
┌─────────────┐      ┌────┐      ┌───┐      ┌──────────┐      ┌──────────┐
│ Servo Test  │      │    │      │   │      │          │      │ RPM Check│
│ Function    │ ───► │ F1 │ ───► │ 5 │ ───► │  Enter   │ ───► │ window   │
│ Selection   │      │    │      │   │      │          │      │          │
│ window      │      └────┘      └───┘      └──────────┘      └──────────┘
└─────────────┘   Selection of    Selection of    Selection of "YES"
                  the Servo        the RPM         (execute)
                  Start-Up         Check function
                  function
```

[RPM Check Window] (For A273UHCPU)

- Axis No. display area
- Max. rotation speed (rpm) display area
- Monitor item display area
- JOG speed display area
- Direction display area
- Monitoring mark

[Display/Setting Contents]

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.
Before beginning the RPM check, check that the START conditions shown at the right side of the window (monitor item display area) are satisfied.

Forward JOG START conditions		
External signal	FLS	■ ON
	STOP	□ OFF
Servo READY		■ ON

Reverse JOG START conditions		
External signal	RLS	■ ON
	STOP	□ OFF
Servo READY		■ 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 START" error message will be displayed.

Monitor Item display area	1) Feed present value	The positioning address/travel value for the axis in question is displayed here.
	2) Error	The most recent error which has occurred at the axis in question is displayed here.
	3) Motor rpm (parameter)...............	The motor rpm parameter setting is displayed here.
Axis No. display area	The axis number where the check is being executed is displayed here.	
Max. rpm display area	The motor's maximum JOG rpm is displayed here. (The display continues even if the motor is stopped.)	
JOG speed display area	The JOG speed designated at the JOG Speed Setting window is displayed here.	

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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 Operations]

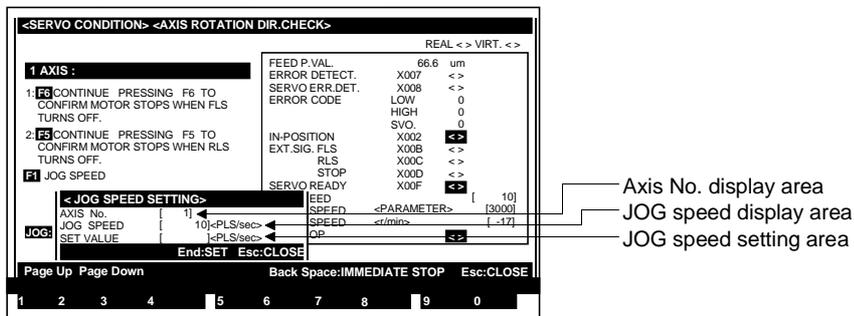|	
Executing the Check operation (forward)	1) After designating the JOG speed setting, press and hold down the [F6] key (or [Shift] + [Alt] key) to execute a FORWARD check. After checking the motor's maximum rpm at the "MOTOR RPM (R/MIN)" monitor item, release the [F6] key(or [Shift] + [Alt] key). The motor will then decelerate and stop.
Executing the Check operation (reverse)	1) After designating the JOG speed setting, press and hold down the [F5] key (or [Shift] + [Alt] key) to execute a REVERSE check. After checking the motor's maximum rpm at the "MOTOR RPM (R/MIN)" monitor item, release the [F5] key (or [Shift] + [Ctrl] key). The motor will then decelerate and stop.
JOG speed setting/change	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 created servo program as the operating speed.
Designating the axis number	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 indicated. 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 RPM 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 (relative to the axis number indicated at the Present Axis Number 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 at the Error Reset window which is displayed. (See Section 12.9)
Closing the window	1) Press the [Esc] key to close the RPM Check window and return to the Servo Test Function Selection window.

POINT

If previously used JOG operation keys ([F6]/[F5]) are held pressed when a personal computer with high processing speed, 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 [F6] key was used)

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:

1) Speed control gain 1 check

   This occurs only when the ADU is used.

2) 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).

```
┌─────────────────────────────────────────────┐
│        Speed Control Gain 1 Check window      │
└─────────────────────────────────────────────┘
              │                    ▲
           ┌─────┐            ┌─────┐
           │ F4  │            │ F4  │
           └─────┘            └─────┘
              │                    ▲
              ▼                    │
┌─────────────────────────────────────────────┐
│       Position Control Gain 1 Check window    │
└─────────────────────────────────────────────┘
```
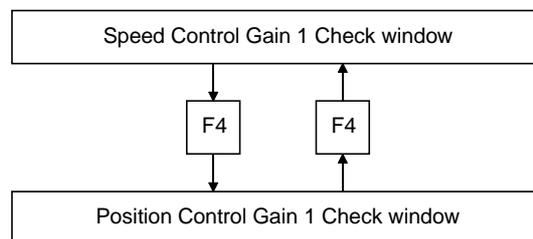
┌───┐
│ **POINTS**   │
│   │
│ (1) Conditions for servo diagnosis execution   │
│   • A servo diagnosis can only be conducted when the Servo   │
│   READY signal is ON.   │
│   If a "CANNOT EXECUTE, SERVO READY ON." error message is │
│   displayed, try again after checking that the Servo   │
│   READY signal is ON.   │
│ (2) Precautions regarding parameter setting changes   │
│   • The speed control gain 1 & 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) GSV13PE 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 to Display The Speed Loop Gain Check Window]
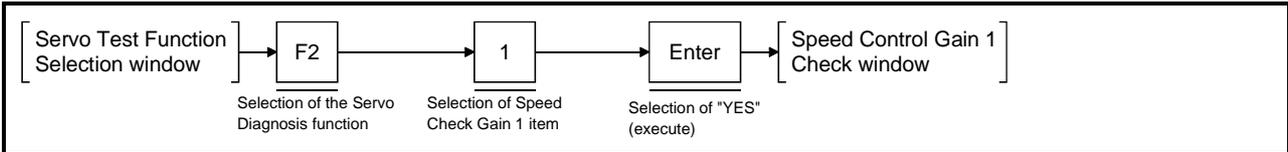
[Speed Control Gain 1 Check Window]
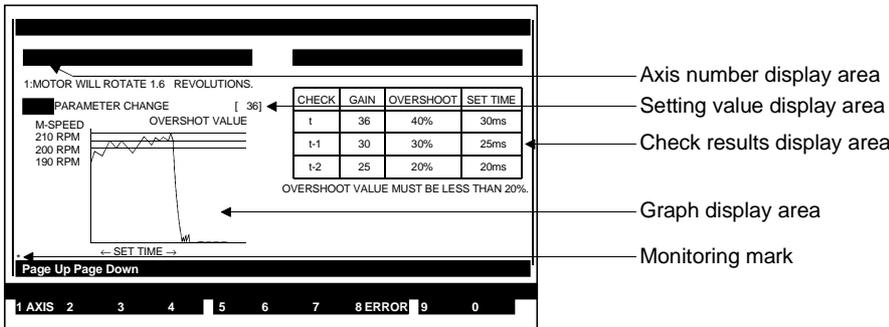
[Display/Setting Contents]

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.

Axis number display area	The axis number where the check is to be executed is displayed here.
Setting value display area	The current speed control gain 1 setting value is displayed here.
Graph display area	The overshoot amount and settling time detected when the motor was stopped are indicated here.
Check results display area	The overshoot amount, settling time, and speed control gain 1 setting value detected when the motor was stopped are shown in a table format.
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

> **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.
>   Overshoot amount   :[Max. rpm − 200 rpm]/[200 rpm × 100%]
>   Setting time   :Time required until rpm is 200 rpm × 10 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.

[Key Operations]

Executing the Check operation (forward)

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.

Executing the Check operation (reverse)

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.

Changing the parameter setting

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)).

Changing the axis number

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.
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).

Switching to the Position Loop Gain Check window

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)).

Error reset

1) Press the [F8] key to execute an error reset at the Error Reset window which is displayed. (See Section 12.9)

Closing the window

1) Press the [Esc] key to close the Speed Control Gain 1 Check window, and return to the Servo Test Function Selection window.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

> **POINT**
>
> Stroke limit check
> - If a "CANNOT START" (error code: 106) error message is displayed when the [F6] or [F5] key is pressed, this indicates that the stroke limit max/min values designated with the Fixed Parameter Setting function of the "Axis Data Setting" item in the Servo Data Setting mode either exceed +19200PLS or fall below -19200PLS in the command pulse conversion operation.
> - Designate appropriate stroke limit max/min value settings before conducting the speed control gain 1 check.

(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]

Setting value display area
Data input area

[Display/Setting Contents]

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 value 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 Operations]

Data SET	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 Speed 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 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. Use care to prevent increasing the speed control gain 1 value excessively.

---

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 to Display The Position Control Gain 1 Check Window]

Servo Test Function Selection window	→	F2	→	2	→	Enter	→	Position Control Gain 1 Check Window
		Selection of the Servo Diagnosis function		Selection of Position Control Gain 1 item		Selection of "YES" (execute)		

[Position Control Gain 1 Check Window]

```
<SERVO DIAGNOSIS> (VOL.LOOP GAIN 1 CHECK)

1AXIS VELACITY LOOP GAIN 1 CHECK        VELACITY LOOP GAIN 1 CHECK RESULTS

1:MOTOR WILL ROTATE 1.5 REVOLUTIONS.
                                    CHECK GAIN UNDERSHO. SET TIME VIBEAT
F2 PARAMETER CHANGE         [ 36]     t    36    20%      35ms    3PLS
   M-SPEED                            t-1   34    18%      31ms    3PLS
                                      t-2   32    16%      25ms    2PLS
                                    UNDERSHOOT VALUE MUST BE LESS THAN 5%.

              UNDERSHOOT VALUE

Page Up  Page Down              MENU HELP NOT AVAILABLE   Esc:CLOSE

1 AXIS 2 PARAM 3      4      5 REVERS 6 FORWED 7  8 ERROR 9      0
```

- Axis number display area
- Setting value display area
- Check results display area
- Graph display area
- Monitoring mark

[Display/Setting Contents]

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.

Axis number display area	The axis number where the check is to be executed is displayed here.
Setting value display area	The current position control gain 1 setting value is displayed here.
Graph display area	The overshoot amount and settling time detected when the motor was stopped are indicated here.
Check results display area	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.
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

> ### POINT
>
> Contents of results display
> - The undershoot amount and settling time are calculated according to the formulas shown below.
>
>   Undershoot amount   : Max. rpm of reverse rotation when motor is stopped / [100rpm $\times$ 100%]
>
>   Setting 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.

[Key Operations]

Executing the Check operation (forward)	1) Press the [F6] key to execute a position 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 position control gain 1 setting will be checked, and the results will be displayed at the window.
Executing the Check operation (reverse)	1) Press the [F5] key to execute a position 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 position control gain 1 setting will be checked, and the results will be displayed at the window.
Changing the parameter setting	1) Press the [F2] key to change the position control gain 1 setting value. The Parameter Change window will then be displayed (See Section 12.3.2(1)).
Changing the axis number	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 indicated. 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 Position Control Gain 1 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 (relative to the axis number indicated at the Present Axis Number display area).
Error reset	1) Press the [F8] key to execute an error reset at the Error Reset window which is displayed. (See Section 12.9)
Closing the window	1) Press the [Esc] key to close the Position Control Gain 1 Check window, and return to the Servo Test Function Selection window.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

POINT
Stroke limit check
• If a "CANNOT START" (error code: 106) error message is displayed when the [F6] or [F5] key is pressed, this indicates that the stroke limit max/min values designated with the Fixed Parameter Setting function of the "Axis Data Setting" item in the Servo Data Setting mode either exceed +18000PLS or fall below -18000PLS at the command pulse conversion operation.
• Designate appropriate stroke limit max/min value settings before conducting the position control gain 1 check.

(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]
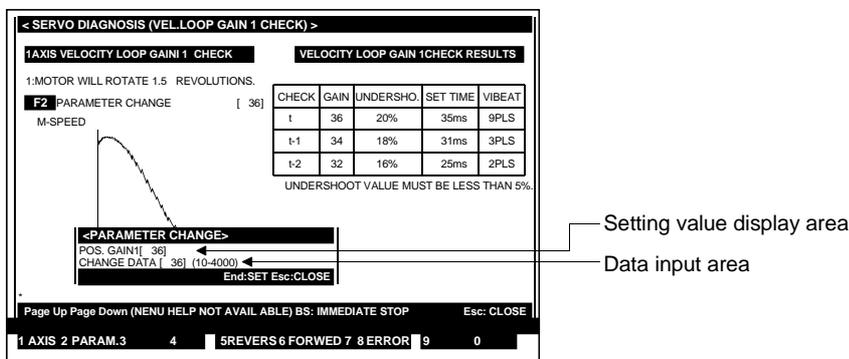
[Display/Setting Contents]

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 value display area	The current position control gain 1 setting value is displayed here.
Data input area	The newly entered position control gain 1 value is displayed here.

[Key Operations]

Data SET	1) Using the numeric keys, key in the desired setting value, then press the [Enter] key. The setting range is shown below.
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**

⚠ If the position control gain 1 setting value is decreased by too much, a servo error will occur during high-speed operation. 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.
JOG operation can also be executed at the servomotors connected to an ADU or MR-[ ]-B.
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 to Display The JOG Execute Window]

```
┌ Servo Test Function ┐      ┌──────┐      ┌───────┐      ┌ JOG Execute ┐
│ Selection window    │  →   │  F3  │  →   │ Enter │  →   │ Window      │
└                     ┘      └──────┘      └───────┘      └             ┘
                          Selection of the   Selection of "YES"
                          JOG operation      (execute)
```

[JOG Execute Window] (For A273UHCPU)

[Display/Setting Contents]

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		
Servo error		☐ OFF
External signal	FLS	■ ON
	STOP	☐ OFF
Servo READY		■ ON

Reverse JOG START conditions		
Servo error		☐ OFF
External signal	RLS	■ ON
	STOP	☐ OFF
Servo READY		■ ON

If the monitoring results indicate that the above START conditions are not satisfied, the JOG operation will not occur when the [F5] or [F6] key is pressed.
The monitor item which fails to satisfy the START conditions will be highlighted, and a "CANNOT START" error message will be displayed.

Monitor Item display area	Either the feed present value, or the ON/OFF status of the monitored device is displayed here.
Axis number 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.
Direction display area	The JOG direction (forward or reverse) is indicated here (highlight display).
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

[Key Operations]

JOG speed setting/change

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))

Executing forward JOG

1) After designating the JOG speed setting, press and hold down the [F6] key (or [Shift] + [Alt] key) to execute a forward JOG operation.
   The motor will rotate at the designated JOG speed as long as the [F6] key (or [Shift] + [Alt] key) remains pressed.
   When the [F6] key (or [Shift] + [Alt] key) 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] key) to execute a reverse JOG operation.
   The motor will rotate at the designated JOG speed as long as the [F5] key (or [Shift] + [Ctrl] key) remains pressed.
   When the [F5] key (or [Shift] + [Ctrl] key) is released, the motor will decelerate and stop.

Designating the axis number

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 indicated. Enter the number of the axis where a 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.
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).

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)

Changing the present value

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).

Closing the window

1) Press the [Esc] key to close the JOG Execute window and return to the Servo Test Function Selection window.

> **POINT**
>
> If previously used JOG operation keys ([F6]/[F5])are held pressed when a personal computer with high processing speed, 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)

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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.

Manual pulse generator inputs can also be used to operate servomotors connected to an ADU or MR-H-B/MR-J-B.

(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 1-6 procedure shown below is required. After the 1-6 settings have been designated, execute a test run using the manual pulse generator.

1. Manual pulse generator DISABLE setting
2. Manual pulse generator selection (A171SCPU selection impossible)
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]
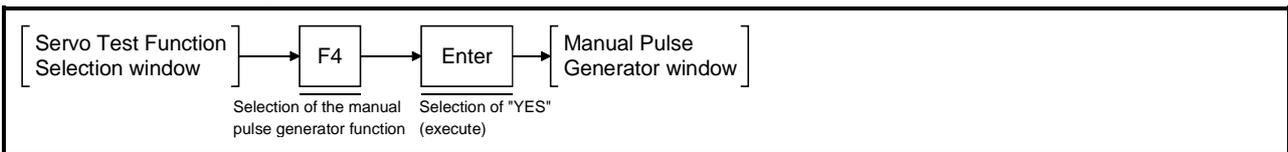
| Servo Test Function Selection window | → | F4 | → | Enter | → | Manual Pulse Generator window |

Selection of the manual pulse generator function

Selection of "YES" (execute)

[Manual Pulse Generator Execute Window] (For A273UHCPU)

- Real virtual display area
- Axis number display area
- Manual pulse gnerator 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

POINT

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] $\times$ [A]
- The "A" value varies according to the system-of-units being used, as shown below.= [manual pulse generator 1-pulse input magnification] $\times$ [A]

System-Of-Units	A
μm	0.1
inch	0.00001
degree	0.00001
PULSE	2

[Display/Setting Contents]

Monitor Item display area   Either the feed present value, or the ON/OFF status of the monitored device is indicated here.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

Axis number 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 Enabled/Disabled display area	The manual pulse generator which is being used is indicated here.
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 display area	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

[Key Operations]

Designating a manual pulse generator DISABLED setting	1) If a manual pulse generator ENABLED setting is in effect when designating the manual pulse generator's operation data settings (axis number, 1-pulse input magnification, smoothing magnification), press the [F5] key to open the Manual Pulse Generator ENABLED/DISABLED window, select the DISABLED item, then designate the manual pulse generator's operation data settings.
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 possible with A17[ ]CPU).
Selecting the axis number	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 indicated. 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 (relative to the axis number indicated at the Present Axis number display area).
Designating the 1-pulse input magnification	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)

Designating the smoothing magnification

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 (registering) the manual pulse generator data

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 ENABLED/DISABLED window, then select the ENABLED 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 at the Error Reset window which is displayed. (See Section 12.9)

Changing the present value

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).

Closing the window

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 confirm that "ENABLE" is highlighted at the Manual Pulse Generator Enabled/Disabled display area.

⚠ When manual pulse generator operation is completed, be sure to change the ENABLE status to DISABLE. Failure to do so could result in unexpected machine motion at certain machine models.

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 Enabled/Disabled 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 setting (Does not apply when using A17[ ]CPU)Designate the manual pulse generator which is to be used as shown below.

[Manual Pulse Generator Setting Window) (For A273UHCPU)
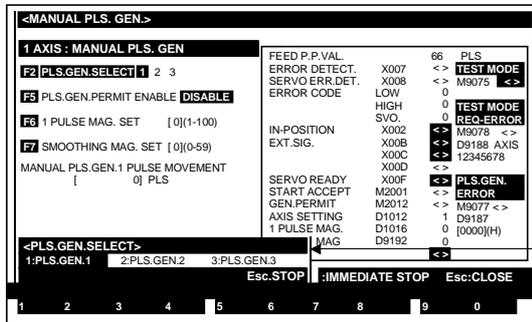
Manual pulse generator setting window

[Display/Setting Contents]

Designate the desired manual pulse generator from those which are connected to connector SIF2 terminals P1-P3 at the servo input module.

[Key Operations]

Selecting the manual pulse generator	1) 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. 2) 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	1) 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)
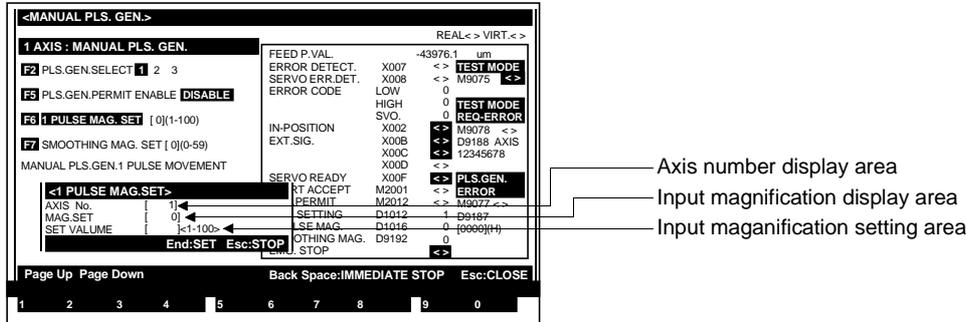
Axis number display area
Input magnification display area
Input maganification setting area

[Display/Setting Contents]

Axis number 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.
Input magnification setting area	The input magnification setting is designated here.

[Key Operations]

Designating the 1-pulse input magnification setting	1) 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 Input Magnification display area.
Setting ABORT	1) Press the [Esc] key to abort the setting operation.

(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)
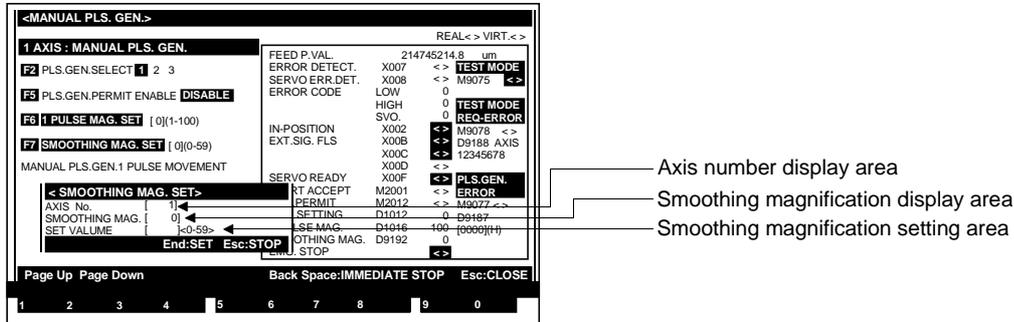
Axis number display area
Smoothing magnification display area
Smoothing magnification setting area

[Display/Setting Contents]

Axis number display area	The axis number where a magnification setting is to be executed is displayed here.
Smoothing magnification display area	The previously designated smoothing magnification setting is displayed here.
Smoothing magnification setting area	The smoothing magnification setting is designated here.

[Key Operations]

Designating the smoothing magnification setting	1) 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 Magnification display area.
Setting ABORT	1) Press the [Esc] key to abort the setting operation.

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 to Display The Home Position Return Test Execute Window]

```
┌──────────────────┐          ┌────┐          ┌───────┐          ┌─────────────────────┐
│ Servo Test Function │ ───────→ │ F5 │ ───────→ │ Enter │ ───────→ │ Home Position Return │
│ Selection window  │          └────┘          └───────┘          │ Test Execute Window │
└──────────────────┘                                              └─────────────────────┘
                          Selection of the Home Position    Selection of "YES"
                          Return Test function              (execute)
```
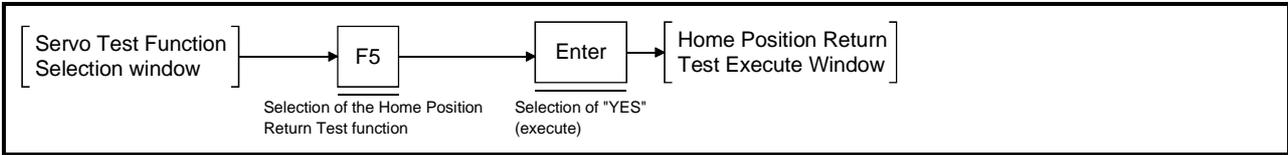
[Home Position Return Test Execute Window] (For 273UHCPU)

```
<ZERO RETURN TEST>
                                        REAL< > VIRT.< >              ────── Real/Virtual display area
1 AXIS : ZERO RETURN TEST    FEED P.VAL.      -214748364.8   um
                             ERROR DETECT.   X007   < >  TEST MODE    ────── Axis number display area
F5 ZERO RETURN START         SERVO ERR.DET.  X008   < >  M9075  < >
                             ERROR CODE     LOW        0
                                            HIGH       0  TEST MODE
                                            SVO.       0  REQ-ERROR
                             IN-POSITION     X002   < >  M9078  < >
                             ZERO RET.REQ.   X009   < >  D9188 AXIS
                             ZERO RET.END    X00A   < >  12345678       ────── Monitor item display area
                             EXT.SIG. FLS    X00B   < >
                                     RLS     X00C   < >  EMG. STOP
                                     STOP    X00D   < >         < >
                                     DOG     X00E   < >
                             SERVO READY     X00F   < >
                             AFTER DOG      (  um) [      0.0]
                             ZERO RET.REMOVEMENT(PLS)  [     0]
                             TORQUE(%)                 [   300]
                                                                       ────── Monitoring mark
 Page Up  Page Down          Back Space:IMMEDIATE STOP   Esc:CLOSE
 MONITOR STARTED.
1 AXIS 2     3 STOP 4   5 START 6    7    8 ERROR 9     0
```

[Display/Setting Contents]

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

Monitor Item display area	1) Home position return request	Indicates whether or not a home position return is in progress.
	2) Home position return END	Indicates whether or not a home position return has been executed.
	3) External signal dog	Indicates whether or not the near-zero point dog has switched ON.
	4) Travel value after dog	Indicates the travel value which occurred after the dog (for "count type" home position returns).
	5) Home position return second travel value	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).
Axis number display area		The axis number where a home position return is being executed is indicated here.
Monitoring mark		Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

[Key Operations]

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" formats, switch the near-zero point dog from ON to OFF.
   - For "count" formats, switch the near-zero point dog ON.

   The home position return operation is completed when the home position return END signal switches ON.

Selecting the axis number

1) Press the [F1] key to designate the axis number where a home position return 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 indicated. 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 (relative to the axis number indicated at the Present Axis number 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 at the Error Reset window which is displayed. (See Section 12.9)

Closing the window

1) Press the [Esc] key to close the Home Position Test Execute window and return to the Servo Test Function Selection window.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

12.7 Servo Program Test Operation

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.

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]
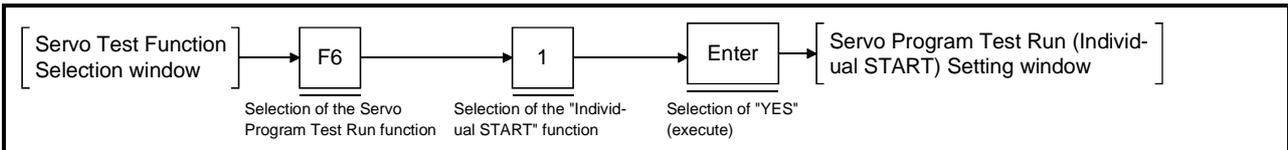
```
┌ Servo Test Function ┐      ┌────┐      ┌───┐      ┌───────┐      ┌ Servo Program Test Run (Individ- ┐
│ Selection window    │ ───► │ F6 │ ───► │ 1 │ ───► │ Enter │ ───► │ ual START) Setting window        │
└                     ┘      └────┘      └───┘      └───────┘      └                                  ┘
                          Selection of the Servo   Selection of the "Individ-   Selection of "YES"
                          Program Test Run function  ual START" function        (execute)
```

[Servo Program Test Run (Individual START) Setting Window]

```
┌──────────────────────────────────────────────────────────┐
│ <SERVO PROGRAM TEST OPERATION> <SINGLE START>              │
│                                                            │
│ ┌──────────────┐       POINT   <K  0>                      │
│ │ SINGLE START │        1   ┌──────────────┐               │
│ └──────────────┘            │ ABS- 2       │               │
│ █F1█ PROGRAM  NO.           │ AXIS   1.  200000  (PLS)     │
│                             │ AXIS   2.  100000  (PLS)     │
│      PROGRAM NO.[  0]◄      │ SYN.SPEED   30000  (PLS/sec) │
│                             │                              │
│                             │                              │
│                             │                              │
│                             └──────────────┘               │
│                                                            │
│ Page Up  Page Down    Back Space:IMMEDIATE STOP End:SET  Esc:CLOSE │
│ COMPLETED.                                                  │
│ 1PROG 2    3    4    █5    6    7    8ERROR █9PRESEN 0      │
└──────────────────────────────────────────────────────────┘
```

→ Program No. display area

→ Program display area
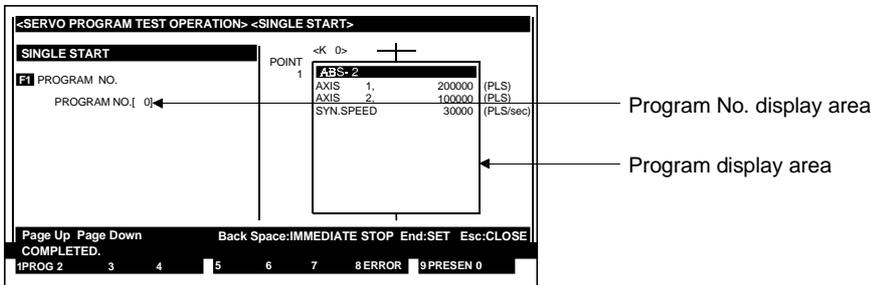
[Display/Setting Contents]

Designate the servo program No. for which a test run is to be executed.

Program No. display area	The program No. read at the Program Readout window is displayed here.
Program display area	The servo program which was read out is displayed here.

[Key Operations]

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 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.
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)), and an "SINGLE START COMPLETED" message will be displayed at that window's message area.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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. The Servo Program Test run (Individual START)Execute Reset window is displayed. (See 12.7.1(2)).

Error reset

1) Press the [F8] key to execute an error reset at the Error Reset window which is displayed. (See Section 12.9)

Changing the present value

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).

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

(2) Executing the servo program test run (Individual START)

[Servo Program Test Run (Individual START) Execute Window] (For A273UHCPU)


```
<SERVO PROGRAM TEST OPERATION> <SINGLE START>

AXIS  FEED PRESENT VAL. LOW  HIGH  SVO.     REAL<-> VIRT.< >
 1      200000   PLS    0     0    2306   START ACCEPT      12345678 ┐
 2     1999994   PLS    0     0     0     SERVO READY       12345678 │
 3     1999994   PLS    0     0           POSITIONING       12345678 │
 4     1999994   PLS    0     0     0     START END         X0*0     │
 5     1999994   PLS                      POSITIONING       12345678 │
 6                                        END               X0*1    ┘
 7
 8                                        EXEC.PROGRAM NO.  [   ]

                                          SERVO. P.SET ERROR  < >
                                          ERROR PROG. NO.   [   0]
                                          ERROR  ITEMS      [   0]
                                          M CODE            [   0]
                                          TRQ.              [ 300]
                                          EMG.STOP          < >

                            Back Space:IMMEDIATE STOP   Esc:CLOSE
 1    2    3 STOP 4   5 START 6    7    8 ERROR  9 PRESEN0
```

Feed present value display area
Error code display area
Monitor device ON/OFF status display area
Execution program No. display area
Program setting error display area
Error program No. display area
Error item display area
Monitoring mark

[Display/Setting Contents]

Check the servo program content by running the program.
Error checks and feed present value changes can be executed at this time.

Feed present value display area	The positioning address and travel value of the operating axis are displayed here.
Error Code display area	Error codes of minor/major positioning errors which occurred at the operating axis are displayed here.
Monitor Device ON/OFF Status display area	1) START accept............................The axis number for which the START accept signal is ON is highlighted. 2) Servo READY ....The axis number for which the servo READY signal is ON is highlighted. 3) Positioning START ....The axis number for which the positioning completed START completed signal is ON is highlighted. 4) Positioning completed................The axis number for which the positioning completed signal is ON is highlighted.
Execution Program No. display area	The program No. which is currently being executed is indicated here.
Program Setting Error display area	The servo program setting error flag's ON/OFF status is indicated here.
Error Program No. display area	The servo program No. where a setting error occurred is indicated here.
Error Item display area	The error code for the servo program setting error is indicated here.
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

[Key Operations]

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)

Changing the present value
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 the axis where status monitoring is executed (For A273UHCPU, 32-axis specifications)
1) To monitor the signals shown below at axes subsequent to axis No. 8, press the [F10] (status) key.
The monitored axis will be changed to the previous axis No. and next axis No.
- START accept
- Servo READY
- Positioning START completed
- Positioning completed

Closing the window
1) Press the [Esc] key to close the Servo Program Test Run (Individual START) Execute window and return to the Servo Program Test Run (Individual 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)

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 to Display The Servo Program Test Run (Sequential START) Setting Window]


```
┌─────────────────┐     ┌──────┐     ┌──────┐     ┌──────────┐     ┌─────────────────────┐
│ Servo Test      │ ──> │  F6  │ ──> │  2   │ ──> │  Enter   │ ──> │ Servo Program Test  │
│ Function        │     │      │     │      │     │          │     │ Run (Sequential     │
│ Selection window│     └──────┘     └──────┘     └──────────┘     │ START) Setting window│
└─────────────────┘                                                └─────────────────────┘
   Selection of the Servo    Selection of the "Sequential   Selection of "YES"
   Program Test Run function  START" function               (execute)
```

[Servo Program Test Run (Sequential START) Setting Window]

[Display/Setting Contents]

The numbers of the programs to be started, and their start sequence must be designated.

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.
Program No. display area	The program number of the program content display is indicated here.

[Key Operations]

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 for that position.
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.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

**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 [F8] 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 at the Error Reset window which is displayed. (See Section 12.9)
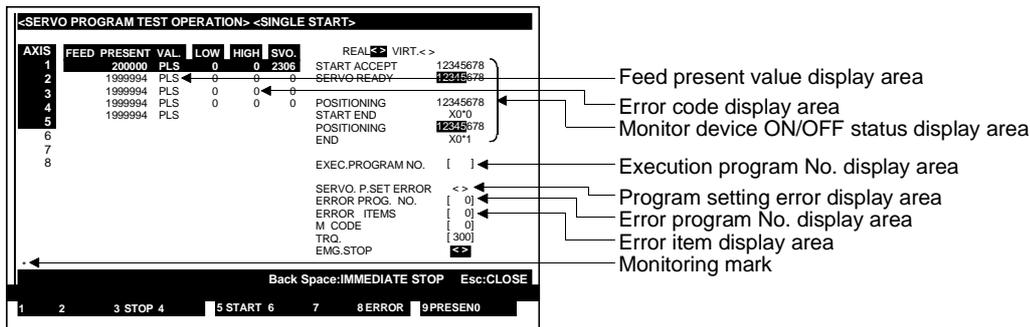
**Changing the
present value**

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).

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

(2) Executing the servo program test run (Sequential START)

[Servo Program Test Run (Sequential START) Execute Window] (For A273UHCPU)

- Feed present value display area
- Error code display area
- Monitor divice ON/OFF status display area
- Execution program No. display area
- Next program error display area
- Program setting error display area
- Error program No. display area
- Error item display area
- Start method display area
- Monitoring mark

[Display/Setting Contents]

Check the servo program content by running the program.
Error checks and feed present value changes can be executed at this time.

Feed present value display area	The positioning address and travel value of the operating axis are displayed here.
Error Code display area	Error codes of minor/major servo errors which occurred at the operating axis are displayed here.
Monitor Device ON/OFF Status display area	1) START accept............................The axis number for which the START accept signal is ON is highlighted. 2) Servo READY ....The axis number for which the servo READY signal is ON is highlighted. 3) Positioning START ....The axis number for which the positioning completed START completed signal is ON is highlighted. 4) Positioning completed................The axis number for which the positioning completed signal is ON is highlighted.
Execution Program No. display area	The program number which is currently being executed is indicated here.
Next Program No. display area	The program number to be started following completion of the current program is indicated here.
Program Setting Error display area	The servo program setting error flag's ON/OFF status is indicated here.
Error Program No. display area	The servo program number where a setting error occurred is indicated here.
Error Item display area	The error code for the servo program setting error is indicated here.
Start Method display area	The START method ("CONTINUOUS" or "INTERRUPTED") 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 "INTERRUPTED" method, a break occurs between successive programs.
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

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12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

[Key Operations]

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 "CONTINUOUS".) START method switching can be executed either before or during servo program operation.
Program START	1) Press the [F5] key to execute the 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 at the Error Reset window which is displayed. (See Section 12.9)
Changing the present value	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 the axis where status monitoring is executed (For A273UHCPU, 32-axis specifications)	1) To monitor the signals shown below at axes subsequent to axis No. 8, press the [F10] (status) key. The monitored axis will be changed to the previous axis number and next axis number. • START accept • Servo READY • Positioning START completed • Positioning completed
Closing the window	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.

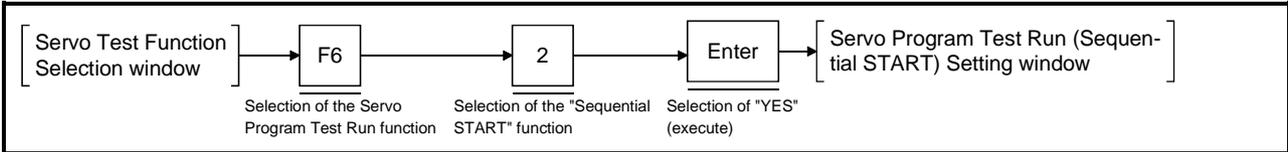| **POINT** |
|---|
| START conditions
• A servo program operation START is possible only when all axes are stopped. |

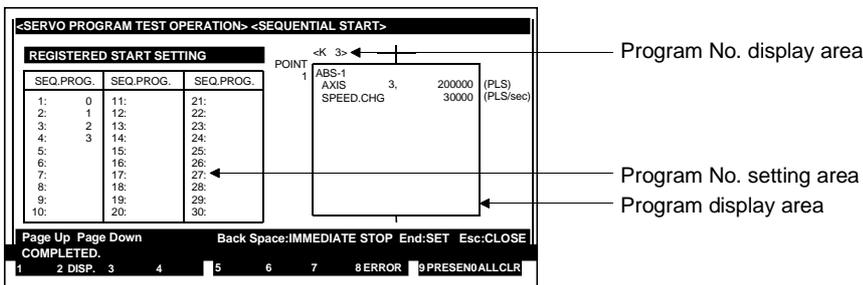# 12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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 to Display The Teaching Setting Window]

Servo Test Function Selection window → F7 → Enter → Teaching Setting window

Selection of the Teaching function (under F7)

Selection of "YES" (execute)

[Teaching Setting Window]

```
TEACHING.
F1 PROGRAM READ PROG. NO.[ 0]      <K  0>
                         POINT
F2 JOG OPERATION           1    ABS-1
F3 PLS.GEN.                      AXIS    1,        200000  (PLS)
F4 TEACHING                      SPEED.CHG.         30000  (PLS/sec)




Page Up  Page Down            Back Space:IMMEDIATE STOP   Esc:CLOSE
1PROG 2JOG 3 MANUAL 4 TEACHI  5      6      7      8 ERROR 9 PRESEN 0
```

Program No. display area

Program display area
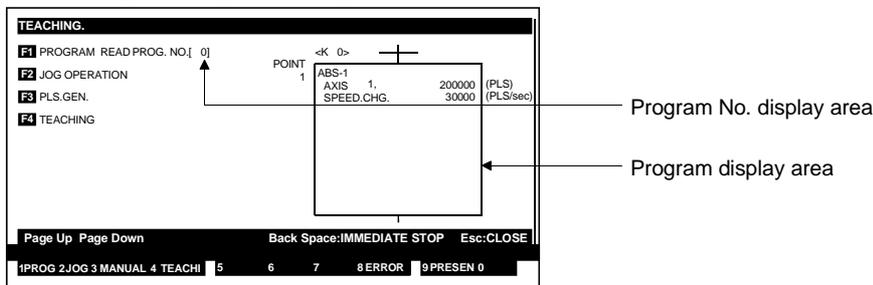
[Display/Setting Contents]

The teaching procedure shown below is required for each operation.
1. Program readout
2. JOG or manual pulse generator operation
3. Present value writing
4. Program registration

Program No. display area	The number of the program which was read out at the Program Readout window is displayed here.
Program display area	The content of the readout servo program is displayed here.

[Key Operations]

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) Using the numeric keys, key in the number of the servo program where an address is to written, then 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. doesn't exist, a "PROGRAM NOT FOUND" 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)

Checking the program

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.

Switching to the JOG Execute Window

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)).

Switching to the Manual Pulse Generator Execute Window

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.
The manual pulse generator operation can be executed when the Manual Pulse Generator Execute window is displayed (see Section 12.8(3)).

Switching to the Teaching Execute Window

1) Press the [F4] key to write the feed present value reached by a JOG or manual pulse generator operation to the specified servo program.
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)).

Error reset

1) Press the [F8] key to execute an error reset at the Error Reset window which is displayed. (See Section 12.9)

Changing the present value

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).

Closing the window

1) Press the [Esc] key to close the Teaching Execute window and return to the Servo Program Test Function Selection window.

(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]

```
TEACHING.
<JOG OPERATION>
1 AXIS JOG OPERATION          POINT    <K  0>              ──────── Axis number display area
                                    1   ABS-1
   AXIS    FEED PRESENT VALUE            AXIS   1,      200000  (PLS)   ──── Feed present value display area
     1         200000 PLS  ◄             SPEED.CHG          30000  (PLS/sec)

                                                              ──────── JOG speed display area
   F1   AXIS
   F5   SPEED   [      10] (PLS/sec)                          ──────── Direction display area
   JOG   REVERSE    FORWARD                                   ──────── Monitoring mark
         <Shift+Ctrl>  <Shift+Alt>   ◄
   BS:IMMEDIATE STOP Esc:CLOSE   Back Space:IMMEDIATE STOP   Esc:CLOSE
MONITOR STARTED.
1AXIS 2    3 STOP    4 SPEED   5 REVERS 6FORWAR 7   8 ERROR  9 PRESEN 0
```

[Display/Setting Contents]

Feed present value display area	The feed present value of the monitored axis is displayed here.
Axis number display area	The axis number where the JOG operation is being executed is displayed here.
JOG speed display area	The JOG speed setting is displayed here.
Direction display area	The JOG direction (forward or reverse) is indicated here (highlight display).
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

[Key Operations]

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 number	1) Press the [F1] key to select the axis number where the JOG 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 indicated.
	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] key) to execute forward JOG operation. The motor will rotate at the designated JOG speed as long as the [F6] key (or [Shift] + [Alt] key) remains pressed. When the [F6] key (or [Shift] + [Alt] key) 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] key) to execute reverse JOG operation. The motor will rotate at the designated JOG speed as long as the [F5] key (or [Shift] + [Ctrl] key) remains pressed. 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 at the Error Reset window which is displayed. (See Section 12.9)

Changing the present value
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).

Closing the window
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 condition
   - If the monitoring results indicate that the START conditions shown below are not satisfied, a "CANNOT START" error message will be displayed. Check that the conditions are satisfied, then try the JOG operation again.

   Forward JOG START conditions

Servo error		☐ OFF
External signal	FLS	■ ON
	STOP	☐ OFF
Servo READY		■ ON

   Reverse JOG START conditions

Servo error		☐ OFF
External signal	RLS	■ ON
	STOP	☐ OFF
Servo READY		■ ON

2) If previously used JOG operation keys ([F6]/[F5]) are held pressed when a personal computer with high processing speed, 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)

(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 settings have been designated, execute a test run using the manual pulse generator.
1. Manual pulse generator DISABLE setting
2. Manual pulse generator selection (A171SCPU selection impossible)
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)

- Axis number display area
- Feed present value display area
- Manual pulse generator display area
- Manual pulse generator enabled/disabled display area
- 1-pulse input magnification display area
- Smoothing magnifiction display area
- Travel value display area
- Monitoring mark

[Display/Setting Contents]

Feed present value	The feed present value of the monitored axis is displayed here.
Axis number 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.
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.
Manual Pulse Generator Enabled/Disabled display area	The manual pulse generator ENABLED/DISABLED status is indicated here by a highlight display.
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.)

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

> **POINT**
>
> 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 | 2 |

[Key Operations]

Designating a manual pulse generator DISABLED setting

1) If a manual pulse generator ENABLED setting is in effect when designating the manual pulse generator's operation data settings (axis number, 1-pulse input magnification, smoothing magnification), press the [F5] key to open the Manual Pulse Generator ENABLED/DISABLED window, select the DISABLED item, then designate the manual pulse generator's operation data settings.

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)) (Not possible with A17[ ]CPU).

Selecting the axis number

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 indicated.
2) 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.

Designating the 1-pulse input magnification

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))

Designating the smoothing magnification

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 (registering) the manual pulse generator data

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 ENABLED/DISABLED window, then select the ENABLED 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 at the Error Reset window which is displayed. (See Section 12.9)

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

Changing the present value

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).

Closing the window

1) Press the [Esc] key to close the Manual Pulse Generator Execute window and return to the Servo Test Function Selection window.
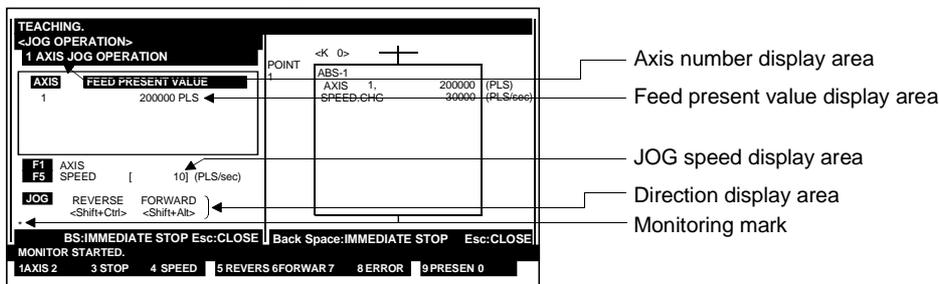

⚠ **CAUTION**

⚠ Before executing manual pulse generator operation, always check that "ENABLE" is highlighted at the Manual Pulse Generator Enabled/Disabled display area.

⚠ When manual pulse generator operation is completed, be sure to change the ENABLE status to DISABLE. 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 Enabled/Disabled 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.

(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]
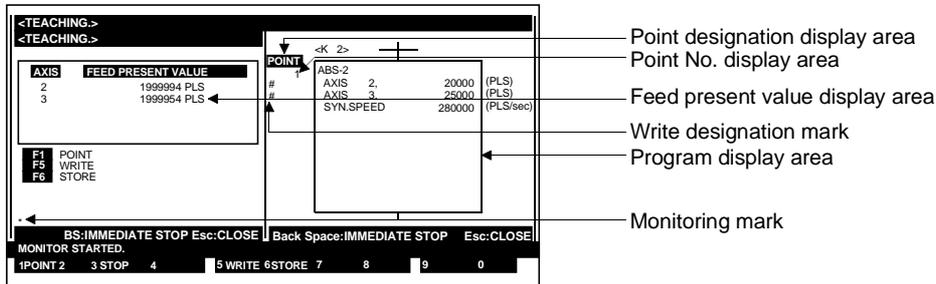
[Display/Setting Contents]

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.

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.
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.)
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.)
Monitoring mark	Indicates that monitoring is in progress. (Not displayed when monitoring is stopped.)

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

[Key Operations]

Selecting the axis designation writing format	1) Before designating the axis where writing is to be executed, make sure that the "Point Designation" 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 Designation" 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.
Registering the program	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.
Closing the window	1) Press the [Esc] key to close the Teaching Execute window and return to the Teaching Setting window.

POINT

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 to Display The Error Reset Window]
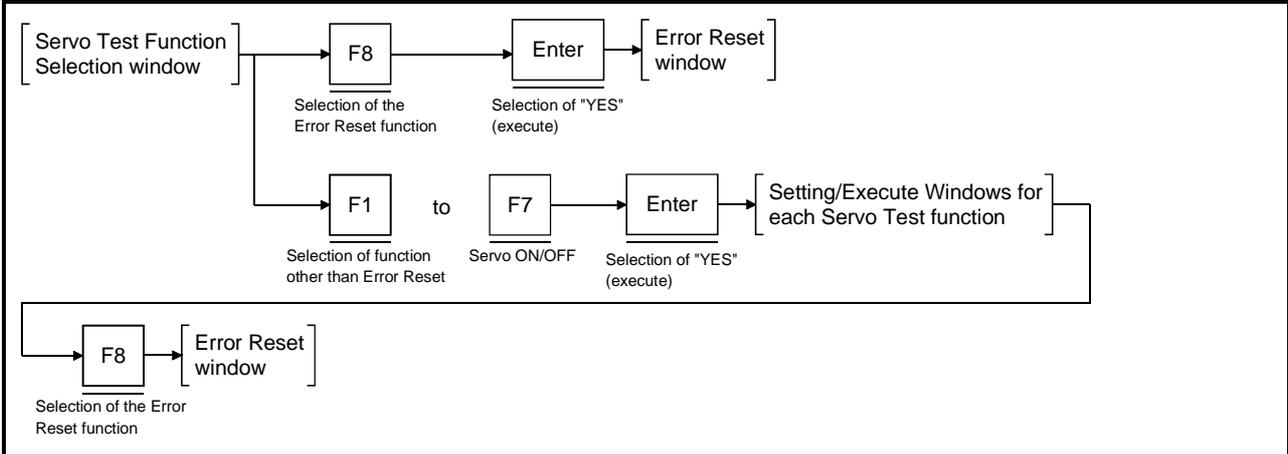
[Error Reset Window] (For A273UHCPU)

- Axis number display area
- Error detection display area
- Servo error detetion display area
- Error code display area
- Monitoring mark

[Display/Setting Contents]

Error information for each axis is displayed.
After checking the error content and correcting the problem, execute an all-axis error reset.

Axis number 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 Operations]

Executing an error reset	1) Press the [F5] key to execute an error reset. An "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 specs)**	1) To display error statuses at axes subsequent to axis No. 8, use the [PAGE UP]/[PAGE DOWN] keys. The monitored axis will change to the previous or next axis No. accordingly.
Closing the window	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 Changing The Present Value

A forced change of the present value sent to the servo system CPU can be executed in the Servo Test mode.

[Procedure to Display The Present Value Change Window]

Servo Test Function Selection window → F3 / F4 or F6 / F7

Selection of the JOG, manual pulse generator, servo program test run, or teaching function

→ Enter

Selection of "YES" (execute)

→ Servo Test function's Setting/Execute Windows

F9 → Present Value Change window

Selection of the Present Value Change function
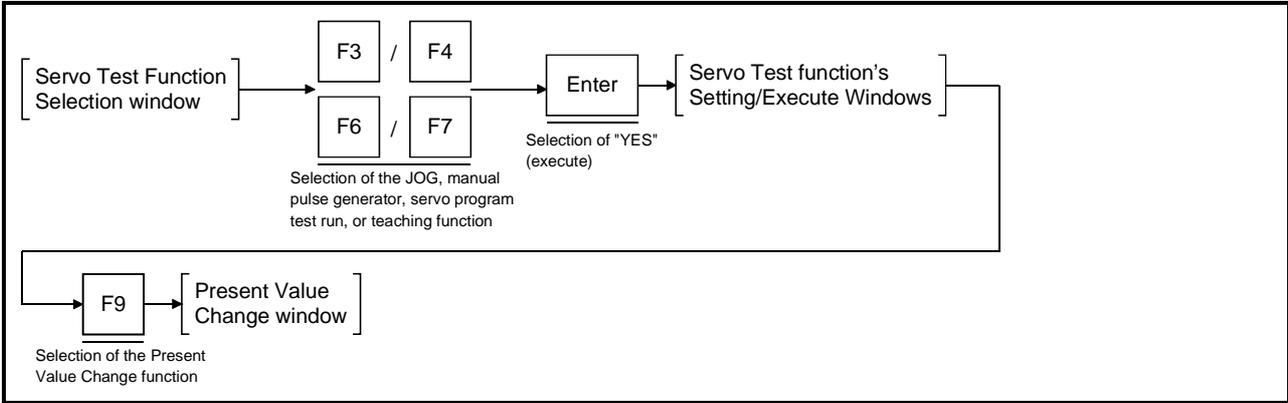
[Present Value Change Window] (For A273UHCPU)

Axis number 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 Contents]

Designate the axis number where a present value change is desired, then enter the change value.

Axis number 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.
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	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.)

[Key Operations]

Designating the axis number	1) Use the [↑]/[↓] keys to move the cursor to the axis number line where the feed present value change is to be executed.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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 A273UHCU 32-axis specifications)

1) To display error statuses at axes subsequent to axis No. 8, use the [PAGE UP]/[PAGE DOWN] keys. The monitored axis will change to the previous or next axis number accordingly.

Closing the window

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)

12.11 Servo ON/OFF

ON/OFF switching can be executed for all axes or for individual axes.

[Procedure to Display The Servo ON/OFF Switching Window]

```
┌─────────────────┐     ┌────┐     ┌───────┐     ┌──────────────┐
│ Servo Test Function │ → │ F9 │ → │ Enter │ → │ Servo ON/OFF   │
│ Selection window    │   └────┘     └───────┘     │ Switching window │
└─────────────────┘                              └──────────────┘
```
Selection of the Servo ON/   Selection of "YES"
OFF Switching function   (execute)
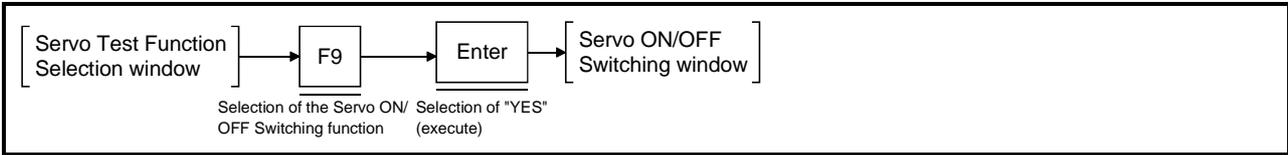
[Servo ON/OFF Switching Window] (For A273UHCPU)

```
<SERVO ON/OFF>

AXIS  SVO. ON/OFF
      CONDITION
 1        < >                ECK        F5   ZERO RETURN TEST
 2        < >                CHECK
 3        < >                IB.CHECK   F6   SERVO PROG. TEST  1:SINGLE START
 4        < >                CK                                2:SEQUEN.START
 5        < >
 6        < >                           F7   TEACHING
 7        < >
 8        < >                AIN 1      F8   ERROR RESET
                            AIN 1
      SVO. ON/OFF
      (M2009)                           F9   SERVO ON/OFF
 ALL     < >
                                        F10  REAL/VIRT.CHG.
BS:IMMEDIATE STOP Esc:CLOSE
                                        Back Space:IMMEDIATE STOP Esc:CLOSE
MONITOR STARTED.
1 AXIS1 2 AXIS2 3 AXIS34 AXIS4  5 AXIS5 6 AXIS6 7 AXIS78 AXIS8  9ALL ON0ALL OFF
```

- Axis No. display area
- Servo ON/OFF status display area
- All axis servo START accept ON/OFF display area
- Monitoring mark

[Display/Setting Contents]

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 Servomotors 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 Operations]

[F1]-[F8] axis setting keys (For A273UHCPU 32-axis specifications)	1) To execute servo ON/OFF switching at axes subsequent to axis No. 8, press the corresponding [F1]-[F8] axis key while the [SHIFT] key is pressed. The highlight display of the Servo ON/OFF item (at the specified axis line of the Servo ON/OFF display area) will switch ON and OFF according to the servo ON/OFF setting.
Designated axis Servo ON/OFF	1) To change the servo ON/OFF status of a designated axis, first press the [F9] key to set the all axis servo ON status and press the key among [F1] to [F8] that corresponds to that axis. The servo ON/OFF display area of the line for the designated axis No. will switch between highlighted and 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.

12. SERVO SYSTEM CPU TEST (SERVO TEST MODE)

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 highlight display at the All Axis Servo START Accept ON/OFF display area will also be switched OFF.

Closing the window 1) Press the 5 key to close the Servo ON/OFF Switching window and return to the Servo Test Function Selection window.

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) Outline of the functions
The functions below are offered by the GSV13PE servo monitor mode.

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

(2) Outline of the procedure
The procedure is shown below use the servo monitor mode.

```
┌──────────────────────────────────────────────────────────────────┐
│                                                                    │
│              ┌──────────────────────────────────────────┐         │
│              │ Display the servo monitor function selection window. │
│              └──────────────────────────────────────────┘         │
│                                                                    │
│  ┌───────────┐  ┌───────────┐  ┌───────────┐  ┌───────────┐  ┌──────────────┐ │
│  │ Present value │ │ Error list │ │ Axis monitor │ │ Scroll monitor │ │ Present value │
│  │   monitor   │ │  monitor   │ │            │ │            │ │ history monitor │
│  └───────────┘  └───────────┘  └───────────┘  └───────────┘  └──────────────┘
```

Present value monitor	Error list monitor	Axis monitor	Scroll monitor	Present value history monitor
Display the present value enlarged monitor window.	Display the normal error list monitor window.	Display the positioning monitor window.	Display the scroll monitor window	Present value history monitor window display
Display the present value detailed monitor window.	Display the designated-axis error list monitor window.	Display the servo monitor window. / Display the trace graph display window.		

Press the [Esc] key to close the window.

(3) Switching to other functions
Press the [Alt] + [F11] keys to switch between the servo monitor mode and the "ladder monitor" in the ladder mode of the GPP functions.
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 during the previous servo monitor mode.

(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 meaning of displayed error codes
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.
However, the guidance HELP window cannot be displayed from the present value enlarged monitor.

(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 .... Displays details about the feed
                                                 present values and error codes

(2) Starting the present value enlarged monitor
   Select the present value enlarged monitor 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.

```
┌──────────────────────────────────────────┐
│     Present value enlarged monitor window  │
└──────────────────────────────────────────┘
       │                          ▲
    ┌─────┐                  ┌─────┐
    │ F8  │                  │ F8  │
    └─────┘                  └─────┘
       │                          ▲
       ▼                          │
┌──────────────────────────────────────────┐
│     Present value detailed monitor window  │
└──────────────────────────────────────────┘
```
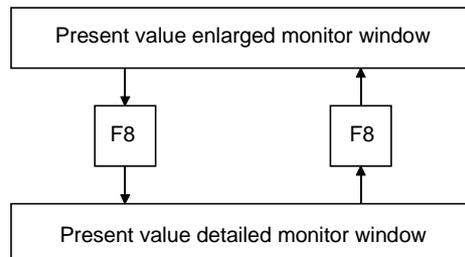
13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

13.1.1 Present value enlarged monitor

Displays the feed present values or actual present values for all axes in enlarged characters.

[Procedure to Display the Present Value Enlarged Monitor Window]

[Present Value Enlarged Monitor Window] (A273UHCPU)

[Display/Setting Contents]

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 being carried out. 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 Operations]

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)

Stopping and Restarting Monitoring

1) Press the [F3] key to stop monitoring or to restart monitoring.

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 to switch to the previous or subsequent page of monitored axes.

Closing the Window

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 to Display the Present Value Detailed Monitor Window]
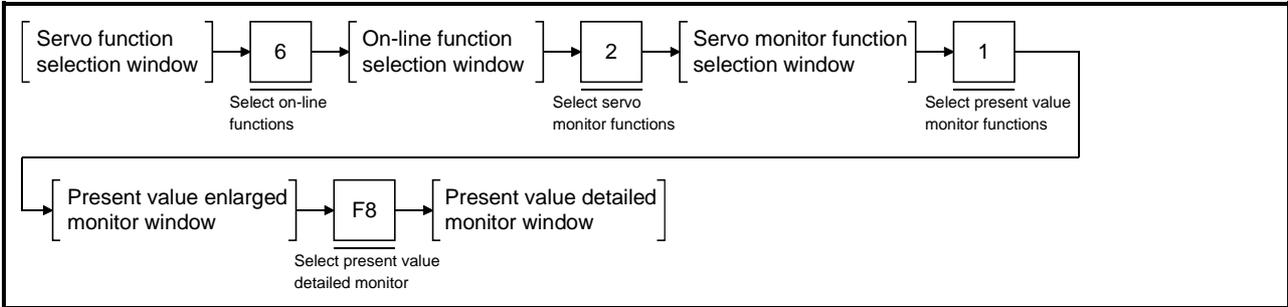
[Present Value Detailed Monitor Window] (A273UHCPU)

Axis No. display area
Start accept ON/OFF display
Feed present value display area
Program No. display area
Command address display area
Commanded speed display area
Error display area
Torque limit value display area
Emergency stop display area
Monitoring mark

[Display/Setting Contents]

Axis No. display area	The operated axis Nos. 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 are	Displays the executed servo program No.

> **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

Command address display area	Displays the command address output from the servo system CPU to the servo amplifier (actual controlled data after unit conversion).
Commanded speed display area	Displays the commanded speed output from the servo system CPU to the servo amplifier (actual controlled data after unit conversion).

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

Error display area	Displays the error code of a major or minor error occurring in the operated axis.
Torque limit value display area	Displays the torque limit value.
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 executing servo program.
Emergency stop display area	Mark highlighted if an emergency stop was applied to the axis.
Monitoring mark	Indicates that monitoring is being carried out. (Not displayed when monitoring is stopped.)

[Key Operations]

Selecting Present Value Enlarged Monitor	1) Press the [F8] key to select the present value enlarged monitor and display the present value enlarged monitor window. (See Section 13.1.1.)
Stopping and Restarting Monitoring	1) Press the [F3] key to stop monitoring or to restart monitoring.
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 to switch to the previous or subsequent page of monitored axes.
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 to switch between the previous or subsequent pages of monitored axes.
Closing the Window	1) Press the [Esc] key to close the present value detailed monitor window and revert to the servo monitor function selection window.

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 the error list monitor from the servo monitor function selection 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.

```
          ┌─────────────────────────────────────────┐
          │   Error list monitor (normal) window     │
          └─────────────────────────────────────────┘
                │                              ↑
                ↓                              │
            ┌──────┐                      ┌──────┐
            │  F8  │                      │  F8  │
            └──────┘                      └──────┘
                │                              ↑
                ↓                              │
          ┌─────────────────────────────────────────┐
          │ Error list monitor (designated-axis) window │
          └─────────────────────────────────────────┘
```
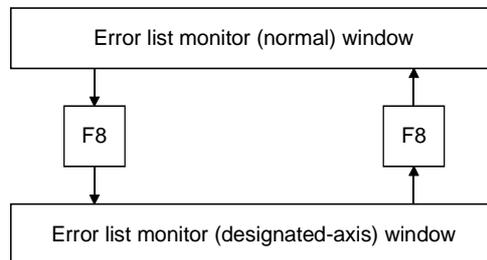
(5) Clearing of the error list
   The error list is cleared at the following times:
   - On the leading edge of the PC ready (M2000) signal
   - When the PC ready signal is OFF and the servo system CPU is switched to test mode
     (The error list is not cleared if the servo system CPU is switched to test mode while the PC ready signal is ON.)

⚠ CAUTION

⚠ If an error occurs, check the error contents and remedy the error as described in this manual.
Some errors can result in unpredicted 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 to Display the Error List Monitor (Normal) Wind]

```
┌─────────────┐    ┌───┐   ┌──────────────┐    ┌───┐   ┌──────────────────┐    ┌───┐   ┌────────────────┐
│ Servo function│ → │ 6 │ → │ On-line function│ → │ 2 │ → │ Servo monitor function│ → │ 2 │ → │ Error list monitor│
│ selection window│   └───┘   │ selection window│   └───┘   │ selection window │   └───┘   │ (normal) window │
└─────────────┘           └──────────────┘           └──────────────────┘           └────────────────┘
                  Select on-line            Select servo              Select error list
                  functions                 monitor functions         monitor functions
```
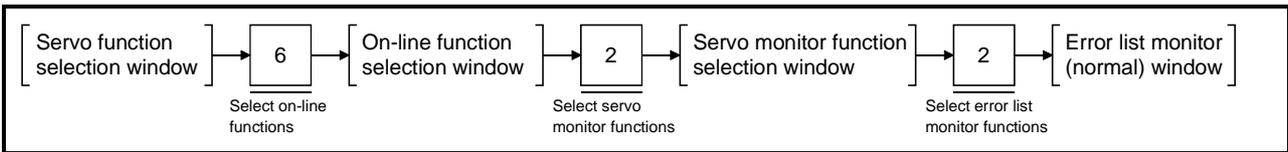
[Error List Monitor (Normal) Window] (A273UHCPU)

```
<ERROR LIST MONITOR>                                              ─── LED display area
No. AX.PROG  ERROR CODE   ERROR DEFINITION ERROR.DATA [        ]   ─── Error No. display area
 1    4001 SERVOP    7 TORQ LMT VAL ERR    32767 SV.READY 12345678 ─── Error axis No. display area
                                                 S.ACCEPT 12345678 ─── Program No. display area

                                           MAN.PLS.AXIS  ERR.
                                           (M9077)  <>
                                           (D9187)  [       ]H     ─── Error code display area
                                           TEST MODE REQ-ERR       ─── Set data display area
                                           (M9078)  <>
  EMG ⟷ SCPU RDY. ⟷ PCPU RDY. ⟷ TEST MODE <> SVO.PROG.ERR ⟷       ─── Error contents display area
* (M9076) (M2000)    (M9074)     (M9075)       (M9079)            ─── Emergency stop display area
                                                    Esc:CLOSE
┌                                                                 ─── Monitoring mark
│    2     3 STOP 4    5    6     7    8 AXIS 9    0
```

[Display/Setting Contents]

LED display area — An error message is displayed here if an error occurs at the PCPU.

Error No. display area — Displays the sequence in which the error occurred. No. 1 is the oldest error and No. 15 the most recent.

Error axis No. display area — Displays the No. of the axis where the error occurred.

Program No. display area — Displays the No. of the servo program running when the error occurred.

> **REMARK**
>
> (1) If the error occurs during JOG operation, manual pulse generator operation, or a test operation, the error 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

Error code display area — Displays the type and error code of the error.

> **REMARK**
>
> (1) The error is type is displayed as follows:
> - Minor error .... LOW
> - Major error .... HIGH
> - Servo error .... SERVO
> - Servo program setting error.. SVO.P

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13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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	Highlights the motor Nos. for which the servo ready is ON.
Start accept ON/OFF display area	Highlights the motor Nos. for which the start accept signal is ON.
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 No. 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 GSV13PE.
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 executing servo program.
Emergency stop display area	Mark highlighted if an emergency stop was applied to the axis.
Monitoring mark	Indicates that monitoring is being carried out. Not displayed when monitoring is stopped.

[Key Operations]

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.)
Stopping and Restarting Monitoring	1) Press the [F3] key to stop monitoring or to restart monitoring.
Switching Status Display Axes (when using A273UHCPU (32-axis specifications))	1) When monitoring the servo ready signal for more than 8 axes, press the [F10] (status) key to switch between the previous or subsequent pages of monitored axes.
Closing the Window	1) Press the [Esc] key to close the error list monitor (normal) 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]
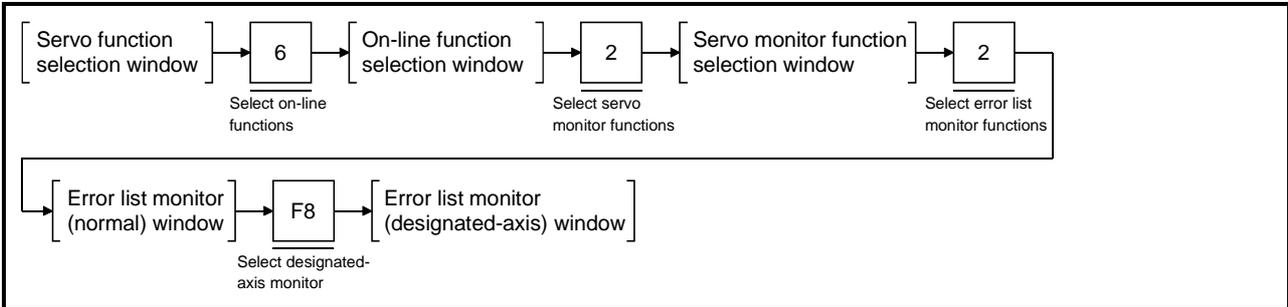
[Error List Monitor (Designated-axis) Window] (A273UHCPU)
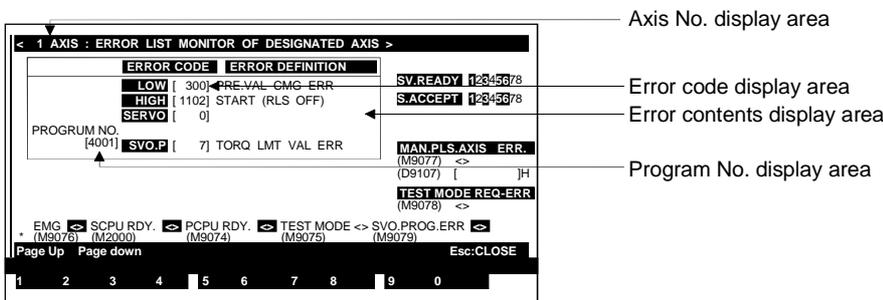
[Display/Setting Contents]

**Axis No.
display area**

Displays the currently monitored axis No.

**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 No. of the program which was executing when the error occurred.

REMARKS

(1) If the error occurs during JOG operation, manual pulse generator operation, or a test operation, the error 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 Operations]

Selecting 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.)
Changing Axis No.	1) Press the [F1] key to change the axis designated for the designated-axis monitor. A window is displayed to designate the axis. (The displayed axis No. is the next axis No. after the currently monitored axis No.) Input the axis No. to be monitored and press the [Enter] key to end axis designation and revert to the error list monitor (designated-axis) window. 2) Press the [Page Up] or [Page Down] key to display the axis No. before or after the axis No. displayed in the axis No. display area.
Stopping and Restarting Monitoring	1) Press the [F3] key to stop monitoring or to restart monitoring.
Switching to Servo Ready Monitor **(when using A273UHCPU (32-axis specifications))**	1) When the start accept monitor is displayed, press the [F10] key to display the servo ready monitor. 2) When monitoring the servo ready signal for more than 8 axes, press the [F10] key again to switch between the previous or subsequent pages of monitored axes.
Switching to Start Accept Monitor **(when using A273UHCPU (32-axis specifications))**	1) When the servo ready monitor is displayed, press the [F9] key to display the start accept monitor. 2) When monitoring the start accept signal for more than 8 axes, press the [F9] key again to switch between the previous or subsequent pages of monitored axes.
Closing the Window	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.
The torque trace is used to view the actual load status when checking motor 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 position commands, position droop, motor speed, motor current, or speed commands

(2) Starting the positioning monitor
Select the axis monitor from the servo monitor function selection 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 graph
Switch between the positioning monitor and servo monitor or trace graph by pressing the key shown below from the appropriate window.

```
                  ┌──────────────────────────────┐
                  │   Psitioning monitor window  │
                  └──────────────────────────────┘
                   ↓↑   ↓↑            ↓↑    ↓↑
                  ┌────┐┌────┐      ┌────┐┌────┐
                  │ F8 ││ F8 │      │ F7 ││ F7 │
                  └────┘└────┘      └────┘└────┘
                   ↓       ↑         ↓       ↑
           ┌──────────────────────┐ ┌──────────────────────────┐
           │  Servo monitor window│ │ Trace graph desplay window│
           └──────────────────────┘ └──────────────────────────┘
```
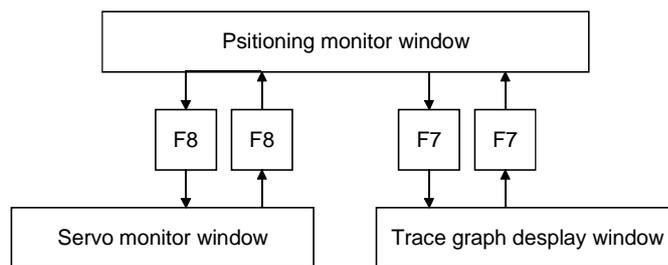
13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

13.3.1 Positioning monitor

Monitors detailed positioning data set for any axis.

[Procedure to Display the Positioning Monitor Window]

```
┌─────────────┐    ┌───┐  ┌─────────────┐    ┌───┐  ┌─────────────┐    ┌───┐  ┌─────────────┐
│ Servo       │ →  │ 6 │→ │ On-line     │ →  │ 2 │→ │ Servo       │ →  │ 3 │→ │ Positioning │
│ function    │    └───┘  │ function    │    └───┘  │ monitor     │    └───┘  │ monitor     │
│ selection   │           │ selection   │           │ function    │           │ window      │
│ window      │           │ window      │           │ selection   │           │             │
└─────────────┘           └─────────────┘           │ window      │           └─────────────┘
                   Select on-line      Select servo  └─────────────┘  Select axis
                   functions           monitor functions               monitor functions
```
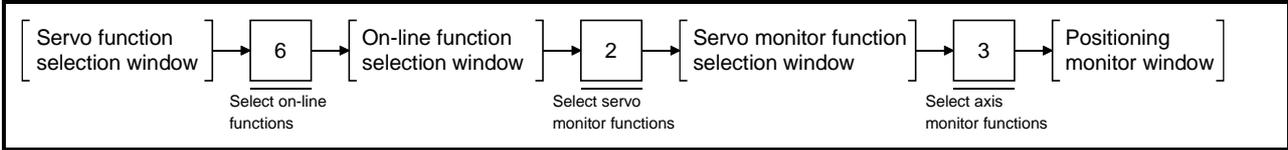
(1) Using A17□
    (a) Status signal and command signal display
        Displays the present PCPU positioning control data and the ON/OFF status
        of the positioning signals (status and command signals).

[Positioning Monitor Window] (without signal name display)

```
                                                    ─── Axis No. display area
<ERROR LIST MONITOR>
FEED PRESENT VALUE  -1000000000  PLS
PRESENT VALUE       -1000000000  PLS    M1600<> M1800<>
DEVIATION VALUE              0   PLS    M1601    M1801<>   SV.READY  1234  ─── Positioning signal (output) ON/OFF status display area
EXECUTION PROGRAM NO.       10          M1602    M1802<>   S.ACCEPT  1234
SERVO COMMAND            ABS-1          M1603<> M1803<>    NAN-PLS   <>
ADDRESS             -1000000000  PLS    M1604<> M1804<>    1 PERMIT  (M2012)  ─── Monitored data display area
SPEED                  1000000  PLS/sec M1605<> M1805<>
LOW/HIGH/SERVO      0/  0/  0   PLS      M1606<> M1806<>    NAN-PLS   <>       ─── Positioning signal (input) ON/OFF status display area
M CODE/TORQUE          10/ 250  %        M1607<> M1807<>    2 PERMIT  (M2013)
PRESENT VALUE(STOP)          0   PLS    M1608<> M1808<>
MOVEMENT CHANGE              0   PLS    M1609<> M1809<>    NAN-PLS   <>
PRESENT VALUE CHANGE         0   PLS    M1610<> M1810<>    3 PERMIT  (M2014)
SPEED CHANGE                 0   PLS/sec M1611    M1811<>
JOG SPEED CHANGE             0   PLS/sec M1612    M1812<>   SMLT.JOG  <>
DOG/CHANGE MOVEMENT          0   PLS    M1613<> M1813<>    START     (M2015)
MOVEMENT(DOG ON)             0   PLS    M1614<> M1814<>
REPEAT ZEROING               0   PLS    M1615    M1815<>

EMG     SCPU RDY.     PCPU RDY.    TEST MODE <> SVO.PROG.ERR      ─── Emergency stop display area
*  (M9076) (M2000)       (M9074)        (M9075)     (M9079)
▲ Page up  Page down                                    Esc:CLOSE
1  AXIS 2     3 MON 4 AUX  5    6    7TRCGRF8SERVO 9    0
                                                    ─── Monitoring mark
```

[Display/Setting Contents]

Axis No. display area	Displays the currently monitored axis No.
Monitored data display area	Displays the positioning data under PCPU control.

    1) Feed present value .... Target address output to servo amplifier.
    2) Actual present value................... Present value determined on the basis of actual travel
    3) Deviation counter value.............. Difference between feed present value and actual present value
    4) Execution program No. .... Number of executing servo program
    5) Actual servo instruction.............. Servo instruction being executed
    6) Command address .... Actual controlled data after unit conversion (position control)
    7) Command speed........................ Actual controlled speed after unit conversion (speed control)
    8) Error code .... Error code of most recent minor, major, servo error
    9) M code/torque limit value .... M code/torque limit value of executing servo program
    10) Actual present value .... Actual present value when external stop signal
        (STOP) is input
    11) Changed travel value .... Changed travel value for position control under speed/position switching control
    12) Changed present value.......... Feed present value after it is changed
    13) Changed speed...................... Speed after it is changed

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

14) JOG speed	JOG speed during JOG operation
15) DOG/CHANGE travel value	Travel value for position control changed externally under speed/position switching control
16) SV from dog ON	Travel value from near-zero point dog until home position return is complete
17) Home position return second travel value	Second travel value from stop position to zero point

Positioning signal (input) ON/OFF status display area
Displays the ON/OFF status of each signal which indicates the control status of each axis.

Positioning signal (output) ON/OFF status display area
Displays the ON/OFF status of the positioning control command signals.

Servo ready ON/OFF display area
Highlights the motor Nos. for which the servo ready is ON.

Start accept ON/OFF display area
Highlights the motor Nos. for which the start accept signal is ON.

Manual pulse generator enabled display area
Highlighted during positioning control using inputs from the manual pulse generator.

Jog operation simultaneous start command display area
Highlighted during jog operation simultaneous start.

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 executing servo program.

Emergency stop display area
Mark highlighted if an emergency stop was applied to the axis.

Monitoring mark
Indicates that monitoring is being carried out.
Not displayed when monitoring is stopped.

[Key Operations]

Changing Axis No.
1) Press the [F1] key to change the axis designated for the positioning monitor. A window is displayed to designate the axis. (The displayed axis No. is the next axis No. after the currently monitored axis No.)
Input the axis No. to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
2) Press the [Page Up] or [Page Down] key to display the axis No. before or after the axis No. displayed in the axis No. display area.

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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).

Stopping and Restarting Monitoring

1) Press the [F3] key to stop monitoring or to restart monitoring.

Closing the Window

1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

(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 Contents]

Axis No. display area	Displays the currently monitored axis No.
Monitored data display area	Displays the positioning data under PCPU control.

Positioning Signal (input) ON/OFF status display area

1) Positioning start completed........Signal turns ON when positioning control start is completed for the designated axis.

2) Positioning completed................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) Command in-position ....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/position switching latch...........Signal turns ON when control switches from speed control to position control.

7) Zero point passed ....Signal turns ON when the zero point is passed.

8) Error detected ....Signal turns ON when a minor or major error is detected.

9) Servo error detected ....Signal turns ON when an error is detected in the servo amplifier.

10) Home position return request ....Signal turns ON when confirmation of the home position address is required.

11) Home position return complete ....Signal turns ON when the home position return is completed normally.

12) External signal FLS..................Signal turns ON when the upper limit switch input turns OFF.

13) External signal RLS ....Signal turns ON when the lower limit switch input turns OFF.

14) External signal STOP...............Signal turns ON when the stop signal turns ON.

15) External signal DOG/CHANGE........................Signal turns ON when the speed/position switching input turns ON.

16) PC ready ....Signal turns ON when the designated servo amplifier is in READY status.

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

[Key Operations]

Changing the Axis No.

1) Press the [F1] key to change the axis designated for the positioning monitor. A window is displayed to designate the axis. (The displayed axis No. is the next axis No. after the currently monitored axis No.) Input the axis No. to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
2) Press the [Page Up] or [Page Down] key to display the axis No. before or after the axis No. displayed in the 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).

Stopping and Restarting Monitoring

1) Press the [F3] key to stop monitoring or to restart monitoring.

Closing the Window

1) Press the [Esc] key to close the positioning monitor window and revert to the servo monitor function selection window.

(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)

Axis No. display area

Positioning signal (output) ON/OFF status display area

Monitored data display area

[Display/Setting Contents]

Axis No. display area	Displays the currently monitored axis No.
Monitored data display area	Displays the positioning data under PCPU control.
Positioning signal (output) ON/OFF status display area	1) Stop command............................An external signal to stop an operated axis
	2) Rapid stop command..................An external signal for rapid stop of an operated axis
	3) Forward JOG start ....ON during JOG operation in direction of increasing address
	4) Reverse JOG start ....ON during JOG operation in direction of decreasing address
	5) Completion signal OFF ....Signal to turn OFF the positioning start command completed signal and positioning completed signal.
	6) Speed/position switching ....External signal to enable switching from enable speed control to position control.
	7) Limit switch output enable..........Signal to enable the limit switch output.
	8) Error reset ....Signal to clear the error code storage area for minor/major errors and reset the error detected signal.
	9) Servo error reset ....Signal to clear the error code storage area for servo errors and reset the servo error detected signal.
	10) STOP input valid/invalid...........Signal to enable or disable external inputs. Inputs are disabled when this signal is ON and enabled when it is OFF.
	11) Feed present value modify ......Signal to determine whether the feed present command 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.
	12) Servo OFF ....Signal to set a servo motor in the free running state.

REMARK

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 Operations]

Changing the Axis No.	1) Press the [F1] key to change the axis designated for the positioning monitor. A window is displayed to designate the axis. (The displayed axis No. is the next axis No. after the currently monitored axis No.) Input the axis No. to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
	2) Press the [Page Up] or [Page Down] key to display the axis No. before or after the axis No. displayed in the 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).
Stopping and Restarting Monitoring	1) Press the [F3] key to stop monitoring or to restart monitoring.
Closing the Window	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 A273UHCPU (8/32-axis specifications)
    (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, using A273UHCPU (8-axis specifications))
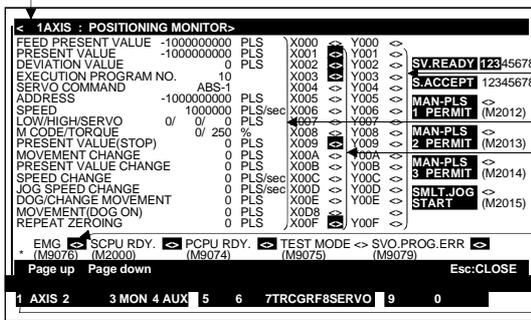
- Axis No. display area
- Positioning signal (output) ON/OFF status display area
- Monitored data display area
- Positioning signal (input) ON/OFF status display area
- Emergency stop display area
- Monitoring mark

[Display/Setting Contents]

Axis No. display area	Displays the currently monitored axis number.
Monitored data display area	Displays the positioning data under PCPU control.

  1) Feed present value ....Target address output to servo amplifier.
  2) Actual present value...................Present value determined on the basis of actual travel
  3) Deviation counter value..............Difference between feed present value and actual present value
  4) Execution program No. ....Number of executing servo program
  5) Actual servo instruction..............Executing servo instruction
  6) Command address ....Actual controlled data after unit conversion (position control)
  7) Command speed........................Actual controlled speed after unit conversion (speed control)
  8) Error code ....Error code of most recent minor, major, servo error
  9) M code/torque limit value ....M code/torque limit value of executing servo program
  10) Actual present value ....Actual present value when external stop signal
      (STOP)   is input
  11) Changed travel value ....Changed travel value for position control under speed/position switching control
  12) Changed present value............Feed present value after it is changed
  13) Changed speed.......................Speed after it is changed
  14) JOG speed..............................JOG speed during JOG operation
  15) DOG/CHANGE travel...............Travel value for position control changed
       value   externally under speed/position switching control
  16) SV from dog ON ....Travel value from near-zero point dog until home position return is complete
  17) Home position return................Second travel value from stop position to zero
       second travel value   point

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

Positioning signal (input) ON/OFF status display area	Displays the ON/OFF status of each signal which indicates the control status of each axis.
Positioning signal (output) ON/OFF status display area	Displays the ON/OFF status of the positioning control command signals.
Servo ready ON/OFF display area	Highlights the motor numbers for which the servo ready is ON.
Start accept ON/OFF display area	Highlights the motor numbers for which the start accept signal is ON.
Manual pulse generator enabled display area	Highlighted during positioning control using inputs from the manual pulse generator 1, 2, or 3.
Jog operation simultaneous start command display area	Highlighted during jog operation simultaneous start.
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 executing servo program.
Emergency stop display area	Mark highlighted if an emergency stop was applied to the axis.
Monitoring mark	Indicates that monitoring is being carried out. Not displayed when monitoring is stopped.

[Key Operations]

Changing Axis No.	1) Press the [F1] key to change the axis designated for the positioning monitor. A window is displayed to designate the axis. (The displayed axis No. is the next axis No. after the currently monitored axis No.) Input the axis No. to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window. 2) Press the [Page Up] or [Page Down] key to display the axis No. before or after the axis No. displayed in the axis No. display area.

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13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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).

Stopping and Restarting Monitoring

1) Press the [F3] key to stop monitoring or to restart monitoring.

Switching to Servo Ready Monitor
(when using A273UHCPU (32-axis specifications))

1) When the start accept monitor is displayed, press the [F10] key to display the servo ready monitor.
2) When monitoring the servo ready signal for more than 8 axes, press the [F10] key again to switch between the previous or subsequent pages of monitored axes.

Switching to Start Accept Monitor
(when using 273UHCPU (32-axis specifications))

1) When the servo ready monitor is displayed, press the [F9] key to display the start accept monitor.
2) When monitoring the start accept signal for more than 8 axes, press the [F9] key again to switch between the previous or subsequent pages of monitored axes.
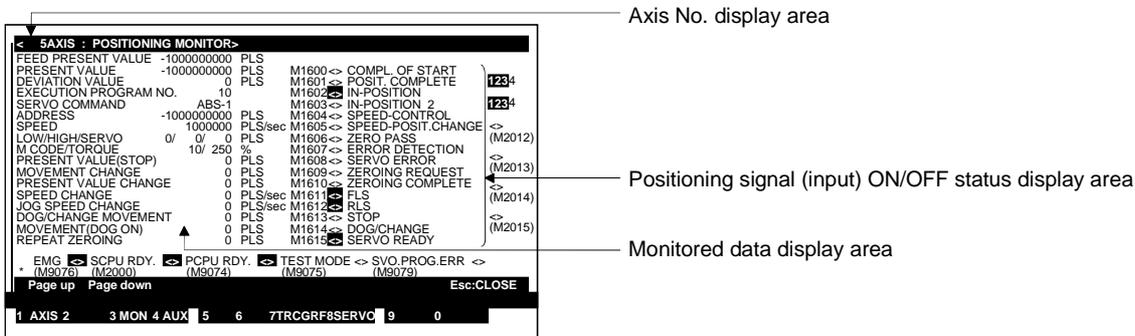
Closing the Window

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, using A273UHCPU (8-axis specifications))

Axis No. display area

```
<  1AXIS : POSITIONING MONITOR>
FEED PRESENT VALUE   -1000000000 PLS      X000      COMPL. OF START
PRESENT VALUE        -1000000000 PLS      X001      POSIT.COMPLETE
DEVIATION VALUE                0 PLS      X002      IN-POSOTOPN        12345678
EXECUTION PROGRAM NO.         10          X003      IN-POSOTOPN  2
SERVO COMMAND              ABS-1          X004      SPEED-CONTROL      12345678
ADDRESS              -1000000000 PLS      X005      SPEED-POSIT.CHANGE
SPEED                    1000000 PLS/sec  X006  <>  ZERO PASS          <>
LOW/HIGH/SERVO         0/    0/   0 PLS   X007  <>  ERROR DETECTION    (M2012)
M CODE/TORQUE            10/ 250 %        X008      SERVO ERROR
PRESENT VALUE(STOP)            0 PLS      X009      ZEROING REQUEST    <>
MOVEMENT CHANGE                0 PLS      X00A <>   ZEROING COMPLETE   (M2013)
PRESENT VALUE CHANGE           0 PLS      X00B <>   EX. SIG. FLS       <>
SPEED CHANGE                   0 PLS/sec  X00C <>   EX. SIG. RLS       (M2014)
JOG SPEED CHANGE               0 PLS/sec  X00D <>   EX. SIG. STOP
DOG/CHANGE MOVEMENT            0 PLS      X00E <>   EX. SIG. DOG
MOVEMENT(DOG ON)               0 PLS      X0D8      EX. SIG. CHANGE    <>
REPEAT ZEROING                 0 PLS      X00F      SERVO READY        (M2015)

     EMG     SCPU RDY.  <>  PCPU RDY.  <>  TEST MODE <> SVO.PROG.ERR.  <>
  * (M9076)  (M2000)        (M9074)        (M9075)      (M9079)
 Page up  Page down                                   Esc:CLOSE

 1 AXIS 2    3 MON 4 AUX  5    6    7TRCGRF8SERVO 9    0
```

Positioning signal (input) ON/OFF status display area

Monitored data display area

[Display/Setting Contents]

Axis No. display area
Displays the currently monitored axis No.

Monitored data display area
Displays the positioning data under PCPU control.

Positioning Signal (input) ON/OFF status display area

1) Positioning start completed........Signal turns ON when positioning control start is completed for the designated axis.

2) Positioning completed................Signal turns ON when positioning control is completed for the designated axis.

3) In-position.................................Signal turns ON if the number of accumulated pulses in the deviation counter is within the in-position range.

4) Command in-position.................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/position switching............Signal turns ON when control switches from latch speed control to position control.

7) Zero point passed ....Signal turns ON when the zero point is passed.

8) Error detected ....Signal turns ON when a minor or major error is detected.

9) Servo error detected ....Signal turns ON when an error is detected in the servo amplifier.

10) Home position return................Signal turns ON when confirmation of the request home position address is required.

11) Home position return................Signal turns ON when the home position complete return is completed normally.

12) External signal FLS..................Signal turns ON when the upper limit switch input turns OFF.

13) External signal RLS ....Signal turns ON when the lower limit switch input turns OFF.

14) External signal STOP...............Signal turns ON when the stop signal turns ON.

15) External signal DOG ....Signal turns ON at home position return (near-zero point dog ON).

16) External signal CHANGE ....Signal turns ON when the speed/position switching input turns ON.
17) PC ready ....Signal turns ON when the designated servo amplifier is in READY status.

REMARK

(1) See Section 13.3.1 (2)(a) for any items displayed on the screen but not described in this section.

[Key Operations]

Changing the Axis No.

1) Press the [F1] key to change the axis designated for the positioning monitor. A window is displayed to designate the axis. (The displayed axis No. is the next axis No. after the currently monitored axis No.) Input the axis No. to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window.
2) Press the [Page Up] or [Page Down] key to display the axis No. before or after the axis No. displayed in the 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).

Stopping and Restarting Monitoring

1) Press the [F3] key to stop monitoring or to restart monitoring.

Closing the Window

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, using A273UHCPU (8-axis specifications))

Axis No. display area

Positioning signal (output) ON/OFF status display area

Monitored data display area

[Display/Setting Contents]

Axis No. display area

Displays the currently monitored axis number.

Monitored data display area

Displays the positioning data under PCPU control.

Positioning signal (output) ON/OFF status display area

1) Stop command .... An external signal to stop an operated axis

2) Rapid stop command .... An external signal for rapid stop of an operated axis

3) Forward JOG start .... ON during JOG operation in direction of increasing address

4) Reverse JOG start .... ON during JOG operation in direction of decreasing address

5) Completion signal OFF command .... Signal to turn OFF the positioning start completed signal and positioning completed signal.

6) Speed/position switching enable .... External signal to enable switching from speed control to position control.

7) Limit switch output enable .... Signal to enable the limit switch output.

8) Error reset .... Signal to clear the error code storage area for minor/major errors and reset the error detected signal.

9) Servo error reset .... Signal to clear the error code storage area for servo errors and reset the servo error detected signal.

10) STOP input valid/invalid .... Signal to enable or disable external inputs. Inputs are disabled when this signal is ON and enabled when it is OFF.

11) Feed present value modify command .... 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.

12) Servo OFF .... Signal to set a servo motor in the free running state.

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 Operations]

Changing the Axis No.	1) Press the [F1] key to change the axis designated for the positioning monitor. A window is displayed to designate the axis. (The displayed axis No. is the next axis No. after the currently monitored axis No.) Input the axis No. to be monitored and press the [Enter] key to end axis designation and revert to the positioning monitor window. 2) Press the [Page Up] or [Page Down] key to display the axis No. before or after the axis No. displayed in the 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 No. 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).
Stopping and Restarting Monitoring	1) Press the [F3] key to stop monitoring or to restart monitoring.
Closing the Window	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 No. from the positioning monitor window.

[Procedure to Display the Servo Monitor Window]

| Servo function selection window | → | 6 | → | On-line function selection window | → | 2 | → | Servo monitor function selection window | → | 3 |

Select on-line functions / Select servo monitor functions / Select axis monitor functions

| Positioning monitor window | → | F8 | → | Servo monitor window |

Select servo monitor functions
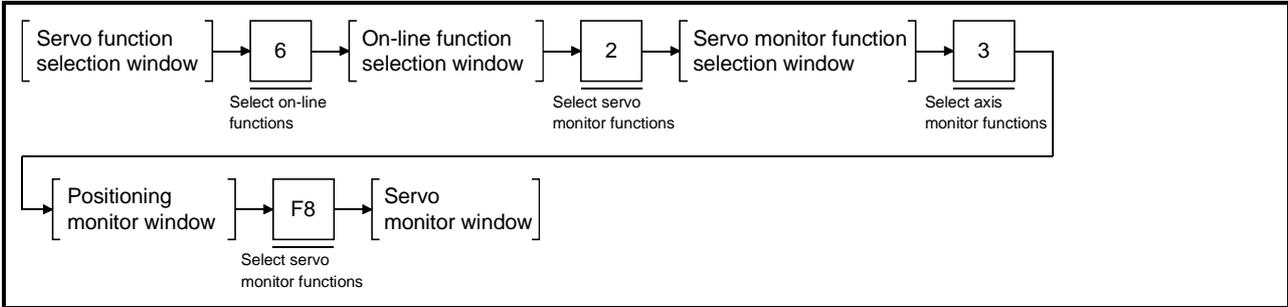
[Servo Monitor Window] (when using ADU)

Axis No. display area
Servo monitor data display area
Torque trace results display area
Emergency stop display area
Servo ready ON/OFF display area
PC ready ON/OFF desplay area
Monitoring mark
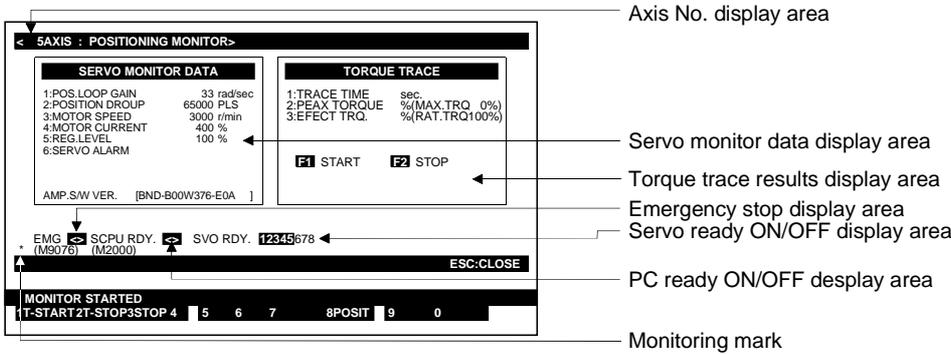
[Display/Setting Contents]

Axis No. display area   Displays the axis No. designated in the positioning monitor window.

Servo monitor data display area   Displays data about the servo motors and servo amplifiers.
1) Position control gain 1 .... 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) Regenerative 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 version .... Servo amplifier software version

Torque trace results display area   The torque trace results are displayed after actual operation is started.
Use the results to check the actual servo amplifier load status.
1) Trace time...................................... The time from the start of the trace to the end.
2) Peak torque .... The maximum torque during the torque trace as a percentage of the rated torque.
3) Effective torque............................. The effective torque during the torque trace as a percentage of the rated torque.

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13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

PC Ready ON/OFF display — Highlighted when the PC ready signal (M2000) is ON.

Servo ready ON/OFF display area — Highlights the motor numbers for which the servo ready is ON.

Emergency stop display area — Mark highlighted if an emergency stop was applied to the axis.

Monitoring mark — Indicates that monitoring is being carried out. Not displayed when monitoring is stopped.

[Key Operations]

Running Torque Trace
1) Press the [F1] key to start the torque trace.
   A message in the message area indicates that the torque trace is running.
2) Press the [F2] key to stop the torque trace.
   A message in the message area indicates that the torque trace is complete 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.

Stopping and Restarting Monitoring
1) Press the [F3] key to stop monitoring or to restart monitoring.

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 to switch between the previous or subsequent pages of monitored axes.

Closing the Window
1) Press the [Esc] key to close the servo monitor window and revert to the servo monitor function selection window.

POINTS

(1) Stopping torque trace
   - 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.
(2) Torque trace time
   - The maximum permitted torque trace time is 1 hour 2 minutes 8 seconds.
   - 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.
(3) Checking that the servo ready signal is ON
   - 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.

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 to Display the Trace Graph Display Window]
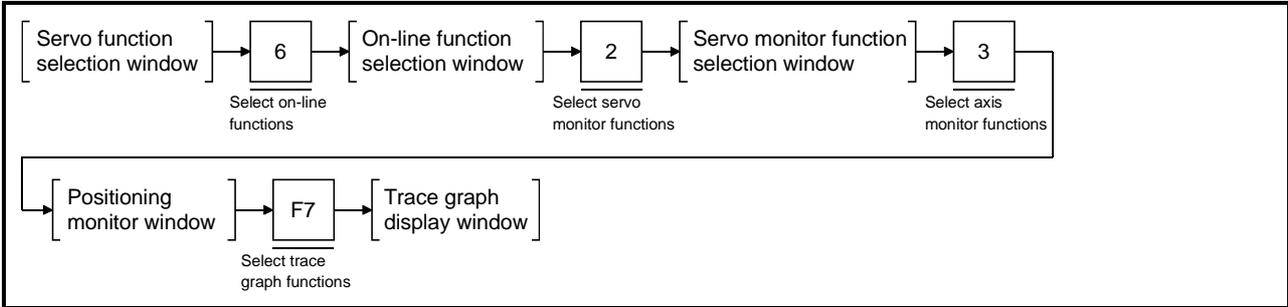
(1) Displaying the trace graphs
This section describes data trace execution and the graph displaying the trace results.

[Trace Graph Display Window]
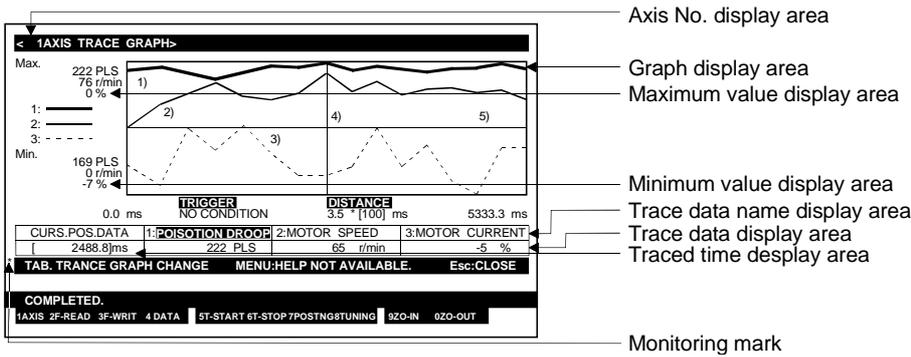
[Display/Setting Contents]

Axis No. display area	Displays the axis No. 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.

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

Traced time display area	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.
Trace data display area	Displays the data values picked up by the vertical cursor.
Trigger condition display area	Displays the start conditions to start the data trace.
Trace interval display area	Displays the number of milliseconds (ms) between traces.
Trace time display area	Displays the times at which the start and end of the graph displayed in the graph display area were traced.
Monitoring mark	Indicates that monitoring is being carried out. Not displayed when monitoring is stopped.

[Key Operations]

Changing the Axis No.	1) Press the [F1] key to change the axis designated for the data trace. (The axis No. set is the axis No. that was designated in the positioning monitor window when the trace graph window was opened from the positioning monitor window.) A window is displayed to designate the axis. (The displayed axis No. is the axis No. after the currently designated axis No.) Input the axis No. for the data trace and press the [Enter] key to end axis designation and revert to the trace graph display window.
Setting Trace Data	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)).
Starting The Data Trace	1) Press the [F5] key to start the data trace. A YES/NO dialog box prompts whether to start the data trace. 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. 3) The cancel the data trace, press the [Enter] key while "NO" is highlighted.
Stopping the Data Trace	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.
Writing to a File	1) Press the [F3] key to write the trace results to a file. A YES/NO dialog box prompts whether to write the data. 2) Press the [Enter] key while "YES" is highlighted. The trace results from the trace graph display window are written to the file and the display reverts to the trace graph display window. 3) To cancel writing to the file, press the [→] key to highlight "NO" then press the [Enter] key.

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

Reading a File

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 read the data.
2) Press the [Enter] key while "YES" is highlighted.
The display reverts to the trace graph display window with the trace results from the file displayed.
3) To cancel reading from the file, press the [→] key to highlight "NO" then press the [Enter] key.

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.

[Graph before horizontal enlargement]   **[Graph after horizontal enlargement]**
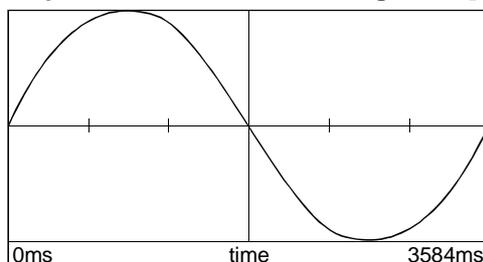
F9

F10

0ms   time   3584ms   896ms   time   2688ms
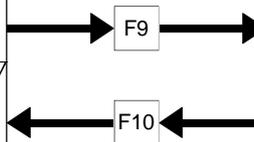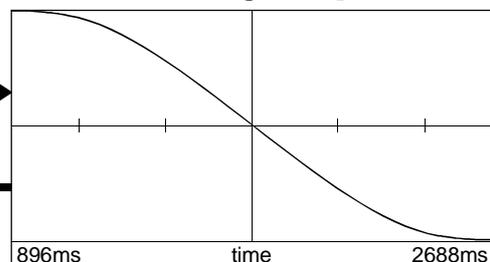
13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

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 coefficient

   The tuning window is displayed (see Section 13.3.3(3)).
   Change the set values as required.

Selecting the Positioning Monitor Function

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).

Closing the Window

1) Press the [Esc] key to close the trace graph display window and revert to the servo monitor function selection window.

POINTS

(1) Saving trace results
- When the trace graph display window is closed, all results from the data trace run from that window are lost.
- 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.

(2) Restrictions while trace graph display window is open
- The menu selection window is not displayed if the [F11] key is pressed.
- The help functions are not available.

(3) Stopping data trace
- 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.

(2) Setting the trace data
This section describes how to set the type of trace data, trace start conditions, and trace interval.

[Trace Data Setting Window]

```
< 1AXIS TRACE GRAPH>
(TRACE DATA)
  F1  DATA      1:POSITION CMD.VALUE
                2:POSITION DROOP
                3:MOTOR SPEED
                4:MOTOR CURRENT
                5:SPEED CMD.VALUE
  F2  TRIGGER   1:MO CONDITION
                2:START ACCEPT    ON
                3:M DEVICE ON
                  DEVICE[M   0]
  F3  DISTANCE  3.5 * [  1] ms         DISTANCE
                                       3.5 * [  1] ms        0.0  ms
                      End:SET Esc:STOP          3:
  [       0.0]ms
  TAB:TRACE GRAPH CHANGE      MENU:HELP NOT AVAILABLE.      Esc:CLOSE

1DATA 2CONDIT 3DISTAN 4    5    6    7    8    9    0
```

Setting item No. display area
Setting item select key display area
Setting item display area
Device setting area
Trace interval setting area

[Display/Setting Contents]

Setting item select key display area	Displays the keys to select the setting item numbers.
Setting item display area	Displays the data settings required to run the data trace.
Item No. display area	Displays the No. for each setting item.
Item display area	Displays the selections for each setting item.
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 Operations]

Setting Data Type

1) Press the [F1] key to set the type of data to be traced.
"Trace data" and "1" in the selected item display area are highlighted.
2) Press the [↑]/[↓] keys to highlight the item No. of the required trace data name and press the [Enter] key.
The data name corresponding to the selected item No. 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 No. and press the [Enter] key.
The highlighted data name reverts to a normal display and the setting is cleared.

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

Setting the Trigger Condition

1) Press the [F2] key to set to the condition to start the data trace.
"Trigger condition" and "1" in the item No. display area are highlighted.
2) Press the [↑]/[↓] keys to highlight the required condition to start the data trace, and press the [Enter] key.
   - Set "NO CONDITION" as the trigger condition to start the data trace using trace 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.
3) Press the [Enter] key to select "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 and 256 and press the [Enter] key.

Ending the Settings

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.

Canceling the Settings

1) Press the [Esc] key to close the trace data setting window and revert to the trace graph display window without writing the set data.

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

(3) Tuning
    (a) If 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
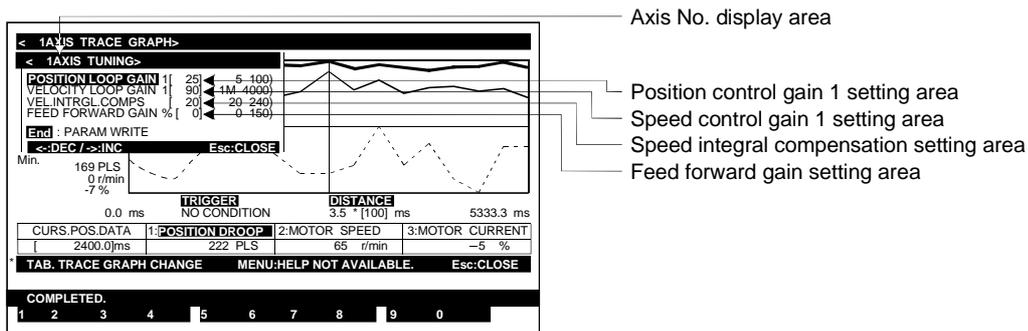
[Display/Setting Contents]

Axis No. display area	Displays the axis No. for which the servo parameters are to be changed. This axis No. is 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 sped 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.

CPU	A273UH
Amplifier Type **Servo Parameter**	**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 parenthesis 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 Operations]

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.
   A message indicates if any of the settings is out of range.
   Correct the settings if this occurs.

Parameter WRITE

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 Internal memory in the servo system CPU.
   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 Internal memory in the servo system CPU, a message indicates that a write error occurred.
   A message indicates that the data could not be written because the PC ready (M2000) signal was ON.
   Turn OFF the PC ready signal and try again

Closing the Window

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 executing parameter write
    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 internal memory in the servo system CPU.
    • Turn on the servo system CPU power supply. OFF → ON
    • Turn ON the PC ready (M2000) signal. OFF → ON
    • 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 internal memory in the servo system CPU.

(2) Executing parameter write
    Make sure that the PC ready (M2000) signal is OFF when writing the changed data to the Internal memory in the servo system CPU.

(b) If 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]

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 Contents]

Axis No. display area	Displays the axis No. for which the servo parameters are to be changed. This axis No. is 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

Servo parameter setting ranges
The servo parameter setting ranges are shown in the table below.

Servo Parameter	Amplifier Type 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.

[Key Operations]

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.
   A message indicates if any of the settings is out of range.
   Correct the settings if this occurs.

Parameter WRITE

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 Internal memory in the servo system CPU.
   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 Internal memory in the servo system CPU, a message indicates that a write error occurred.
   A message indicates that the data could not be written because the PC ready (M2000) signal was ON.
   Turn OFF the PC ready signal and try again.

Closing the Window

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 executing parameter write

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 Internal memory in the servo system CPU.
- Turn on the servo system CPU power supply. OFF → ON
- Turn ON the PC ready (M2000) signal. OFF → ON
- 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 Internal memory in the servo system CPU.

(2) Executing parameter write

Make sure that the PC ready (M2000) signal is OFF when writing the changed data to the Internal memory in the servo system CPU.

---

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] (A273UHCPU)
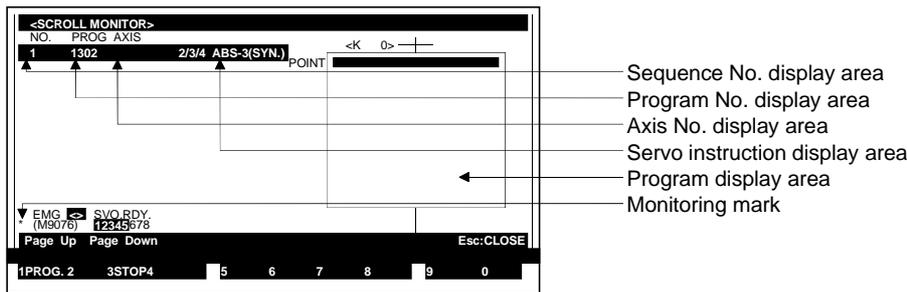
Sequence No. display area
Program No. display area
Axis No. display area
Servo instruction display area
Program display area
Monitoring mark

[Display/Setting Contents]

Sequence No. 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 No. 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 being carried out. Not displayed when monitoring is stopped.

13. POSITIONING STATUS MONITOR (SERVO MONITOR MODE)

[Key Operations]

Reading Programs

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.
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.

Stopping and Restarting Monitoring

1) Press the [F3] key to stop monitoring or to restart monitoring.

Switching Servo Ready Monitor 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 to switch between the previous or subsequent pages of monitored axes.

Closing the Window

1) Press the [Esc] key to close the scroll monitor 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]

Axis No. display area
Servo amplifier type display area
Monitor value at home position return display area
Present monitor value display area

Monitor value at servo amplifier power ON/OFF display area

Error contents display area

[Display/Setting Contents]

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 Procedure]

Axis No. change

1) To change the axis No. subject to present value history monitoring by designating an axis No., press the [F1] key.
   The axis designation window will be displayed. (When this window is displayed, the axis No. following that of the axis for which present value history monitoring is currently being conducted is displayed.)
   Enter the axis No. 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 Nos. preceding and following the axis No. currently displayed in the axis No. display area.

Monitor stop/redisplay

1) To stop monitoring, or redisplay the monitor data, press the [F3] key.

Window close

1) To close the present value history monitor window, press the [ESC] key.
   The servo monitor function selection window will be redisplayed.

14. 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

(1) Outline of the functions
The functions below are offered by the GSV13PE servo file mode.

```
┌──────┐ ┌─────────────┐ ┌─────────────┐ ┌──────────┐
│Servo │ │System name  │ │Sub-system   │ │File name │
│file  │ │directory    │ │name directory│ │          │
└──────┘ └─────────────┘ └─────────────┘ └──────────┘
```

─ Read	Reads the contents of a servo file from a hard disk or floppy disk.	14.3
─ Write	Writes the internal memory contents to a designated file on hard disk or floppy disk.	14.4
─ Verify	Verifies the contents of a servo file on hard disk or floppy disk and in internal memory	14.5
─ Delete	Deletes a designated servo file from the file data registered on hard disk or floppy disk.	14.6.3
─ Copy	Copies the designated contents from a designated drive.	14.7.2
─ Directory	Displays the directory of file names.	14.1
─ Change display format	Sets the display of comments and titles and selects the display order.	14.8
─ Print directory	Prints the system names, sub-system names,and file-type names.	14.2

─ Delete	Deletes servo files from a designated sub-system name registered on hard disk or floppy disk.	14.6.2
─ Copy	Copies all servo files from a designated sub-system name in a designated drive.	14.7.1
─ Directory	Displays the directory of file names.	14.1
─ Change display format	Sets the display of comments and titles and selects the display order.	14.8
─ Print directory	Prints the system names, sub-system names, and file-type names.	14.2

─ Delete	Deletes servo files from a designated system name registered on hard disk or floppy disk.	14.6.1
─ Create	Creates system names and comments.	14.9
─ Directory	Displays the directory of file names.	14.1
─ Change display format	Sets the display of comments and titles and selects the display order.	14.8
─ Print directory	Prints the system names, sub-system names, and file-type names.	14.2

POINT
When writing files to a floppy disk, a formatted floppy disk must be used.

(2) Outline of the procedure
   The procedure to use the servo monitor mode is shown below.

```
          ┌─────────────────────────────────┐
          │        Servo file screen        │
          └─────────────────────────────────┘
                           │
                           ▼
          ┌─────────────────────────────────┐
          │     System name directory       │
          └─────────────────────────────────┘
                           │
                           ▼
          ┌─────────────────────────────────┐
          │  Delete                         │   ([F4])
          │  Create                         │   ([F7])
          │  Reset system name              │   ([F8])
          │  Change display format          │   ([F9])
          │  Print directory                │   ([F10])
          └─────────────────────────────────┘
                           │
                           ▼
          ┌─────────────────────────────────┐
          │    Sub-system name directory    │
          └─────────────────────────────────┘
                           │
                           ▼
          ┌─────────────────────────────────┐
          │  Delete                         │   ([F4])
          │  Copy                           │   ([F5])
          │  Reset system name              │   ([F8])
          │  Change display format          │   ([F9])
          │  Print directory                │   ([F10])
          └─────────────────────────────────┘
                           │
                           ▼
          ┌─────────────────────────────────┐
          │        File-type name           │   *
          └─────────────────────────────────┘
                           │
                           ▼
          ┌─────────────────────────────────┐
          │  Read                           │   ([F1])
          │  Write                          │   ([F2])
          │  Verify                         │   ([F3])
          │  Delete                         │   ([F4])
          │  Copy                           │   ([F5])
          │  Reset system name              │   ([F8])
          │  Change display format          │   ([F9])
          │  Print directory                │   ([F10])
          └─────────────────────────────────┘
```
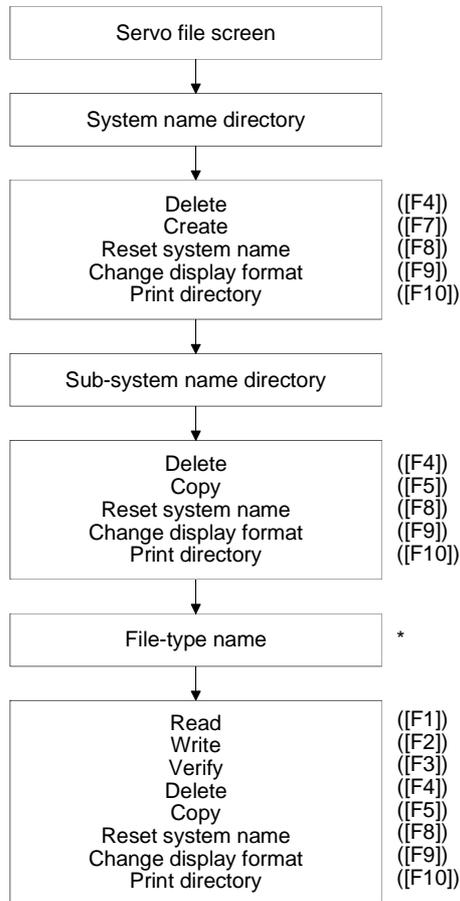
* : Select file type before selecting the operation.

POINT

The following two file types can be selected:
- Servo data
- Servo program

---

14. FILE MAINTENANCE

14.1 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 function selection window → 5 → Servo file screen
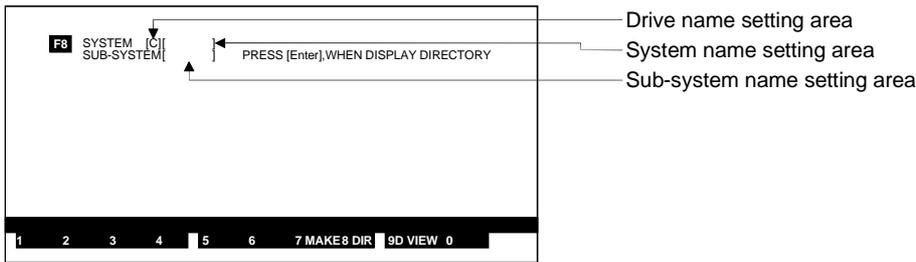
Select servo file functions

[Servo File Screen]

F8 SYSTEM [C][
SUB-SYSTEM[PRESS [Enter],WHEN DISPLAY DIRECTORY

— Drive name setting area
— System name setting area
— Sub-system name setting area

1   2   3   4   5   6   7 MAKE 8 DIR   9D VIEW 0

[Display/Setting Contents]

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 Operations]

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.

14 – 3

14. 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.

Resetting the 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

14.2 Printing Directories

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 to Print Directories]

1. Printing sub-system names and file-type names

Servo function selection window	→	5	→	Servo file screen	→	Drive name	→	Enter	→	Enter	→	System name directory window	→	↑ / ↓
		Select servo file functions				Set drive name								Designate system name

2. Printing sub-system names

Servo function selection window	→	5	→	Servo file screen	→	Drive name	→	Enter	→	System name	→	Enter	→	Enter
		Select servo file functions				Set drive name				Set system name			

Sub-system name directory window	→	↑ / ↓
		Designate sub-system name

3. Printing file-type names

Servo function selection window	→	5	→	Servo file screen	→	Drive name	→	Enter	→	System name	→	Enter	→	Sub-system name	→	Enter
		Select servo file functions				Set drive name				Set system name				Set sub-system name		

F1 ~ F5	→	File-type selection window	→	Designate file type

14. FILE MAINTENANCE

[System Name Directory Window]

```
 F8  SYSTEM   [C][      ]
     SUB-SYSTEM[        ]       PRESS [Enter],WHEN DISPLAY DIRECTORY
 <SYSTEM NAME LIST>                          1/1
    <NAME>            <COMMENT>
    SAMPLE1
    SAMPLE2
    SAMPLE2




    SYSTEM: 3 FREE  : 9818112 BYTES
    Page Up  Page Down        Esc:CLOSE

 1    2    3    4 DELETE 5    6    7 MAKE 8 DIR  9 D VIEW  0
```

————— System name setting area
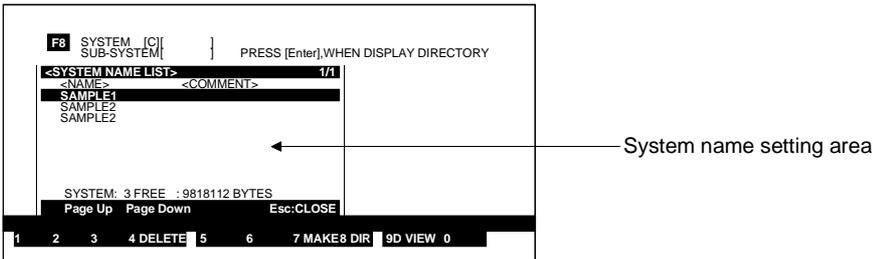
[Display/Setting Contents]

System name setting area   Highlighted display of the set system name.

[Key Operations]

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) A message indicates 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

14. 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                 ]
                                          [A-1               ]
        [TYPE]          SERVO DATA
                        SERVO PROGRAM

        [SUB-SYSTEM]    TEST2     (A3U)   [SAMPLE PROGRAM                 ]
                                          [A-2               ]
        [TYPE]          SERVO DATA
                        SERVO PROGRAM

        [SUB-SYSTEM]    TEST3     (A3U)   [SAMPLE PROGRAM                 ]
                                          [A-3               ]
        [TYPE]          SERVO DATA
                        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 NAME LIST * * *

[SYSTEM] SAMPLE1 [SERVO FILE                        ]

        [SUB-SYSTEM]    TEST1     (A3U)   [SAMPLE PROGRAM                 ]
                                          [A-1               ]

        [SUB-SYSTEM]    TEST2     (A3U)   [SAMPLE PROGRAM                 ]
                                          [A-2               ]

        [SUB-SYSTEM]    TEST3     (A3U)   [SAMPLE PROGRAM                 ]
                                          [A-3               ]
```

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                 ]
                                          [A-1               ]
        [TYPE]          SERVO DATA
                        SERVO PROGRAM
```

14. FILE MAINTENANCE

14.3 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 two file types can be selected:
- Servo data
- Servo program

[Procedure to Display the Read File-type Selection window]

[Read File-type Selection window]
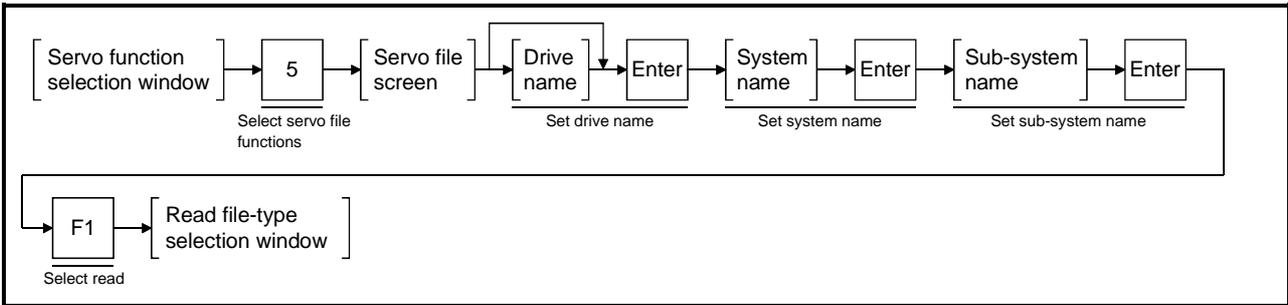
Read file-type select area
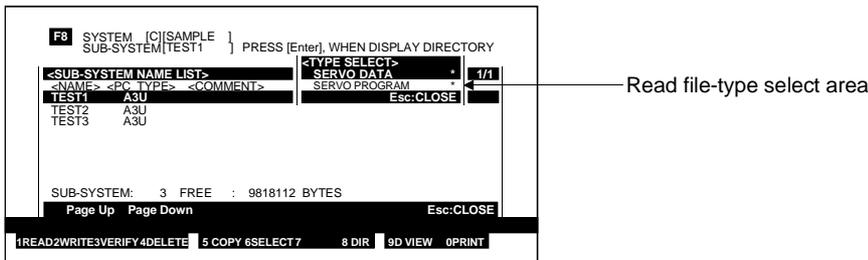
[Display/Setting Contents]

Read file-type select area	Highlighted display of the selected file type. (File types containing data are marked with an asterisk "*".)

[Key Operations]

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 read the data.
Reading	1) Press the [Enter] key while "YES" is highlighted to read the data. (The default display is "YES".) 2) A message indicates when the data has been read and the system returns to the read file-type selection window.
Canceling Reading	1) To cancel reading, press the [→] key to highlight "NO", then press the [Enter] key. The data is not read and the system returns to the read file-type selection window.

POINTS

(1) Designating multiple file types to read
    Data can be read from designated multiple file types, as follows.
    1) 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 "#".
    2) The YES/NO dialog box is displayed when the [Enter] key is pressed.
(2) Reading with different CPU types
    The possibility of reading with different CPU types is shown in the following table.

File Type	Reading Possible/Not Possible
Servo data	Reading not possible with all CPU types
Servo program	Reading possible with all CPU types

(3) Servo programs created with SW1SRX-GSV13PE can be "read".
    Other servo programs cannot be read.

14. FILE MAINTENANCE

14.4 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 two file types can be selected:
- Servo data
- Servo program

[Procedure to Display the Write File-type Selection window]

[Write File-type Selection window]
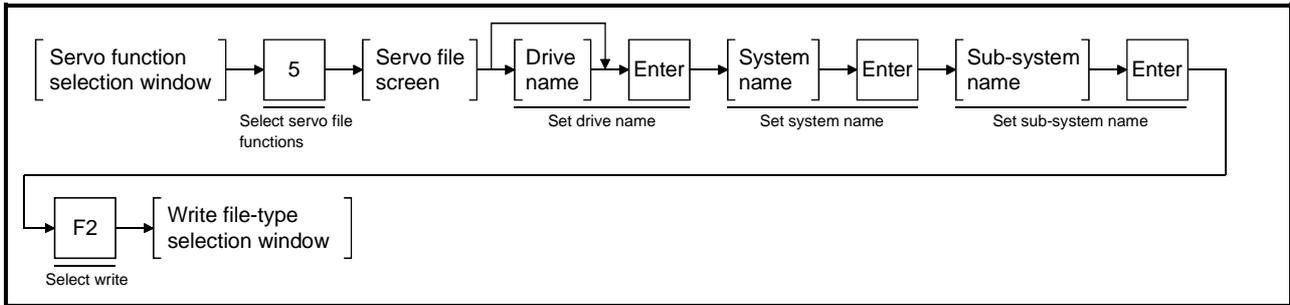
Write file-type select area
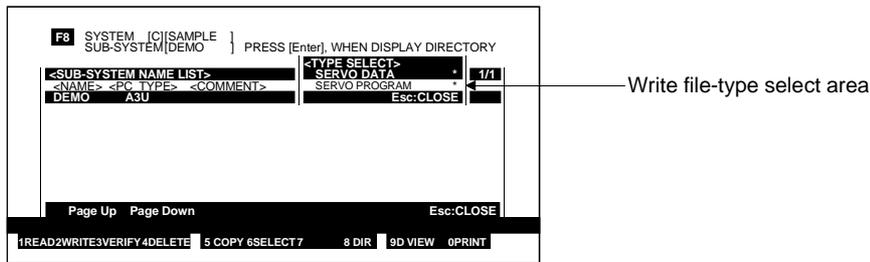
[Display/Setting Contents]

Write file-type select area	Highlighted display of the selected file type. (File types containing data are marked with an asterisk "*".)

[Key Operations]

Selecting File Type	1) Press the [↑]/[↓] keys to highlight the file type to write. Press the [Enter] key. The file write window is displayed.

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[File Write Window]

Drive name setting area
System name setting area
System name comment setting area
Sub-system name setting area
Sub-system name comment setting area
Title setting area
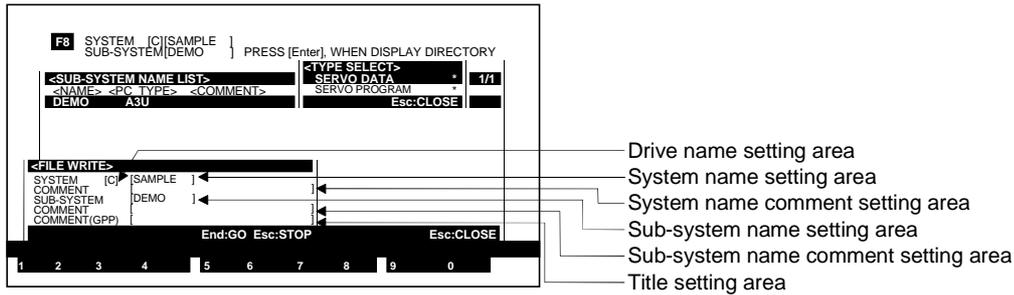
[Display/Setting Contents]

Drive name setting area	Displays the currently set drive name.
System name setting area	Displays the currently set system name.
System name comment setting area	Displays the currently set system name comment.
Sub-system name setting area	Displays the currently set sub-system name.
Sub-system name comment setting area	Displays the currently set sub-system name comment.
Title setting area	Displays the currently set title.

[Key Operations]

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.
   Just press the [Enter] key to leave the system name comment unchanged.
   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.
   Just press the [Enter] key to leave the sub-system name comment unchanged.
   The cursor moves and flashes in the title comment setting area.

Setting Title

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.
   Just press the [Enter] key to leave the title unchanged.
   A YES/NO dialog box prompts whether to write the file.

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Writing

1) Press the [Enter] key while "YES" is highlighted to write the data. (The default display is "YES".)
2) A message indicates when the data has been written and the system returns to the write file-type selection window.

Canceling Writing

1) To cancel writing, press the [→] key to highlight "NO", then press the [Enter] key.
   The data is not written and the system returns to the file write window.

| If the Sub-system Name Already Exists |

[Overwrite File YES/NO Dialog Box]

[Display/Setting Contents]

If the designated sub-system name already exists when the file is written, a YES/NO dialog box prompts whether to overwrite the existing file.

[Key Operations]

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 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.
   1) 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 "#".
   2) 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 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

14. FILE MAINTENANCE

14.5 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 two file types can be designated:
- Servo data
- Servo program

[Procedure to Display the Verify File-type Selection window]

[Verify File-type Selection window]
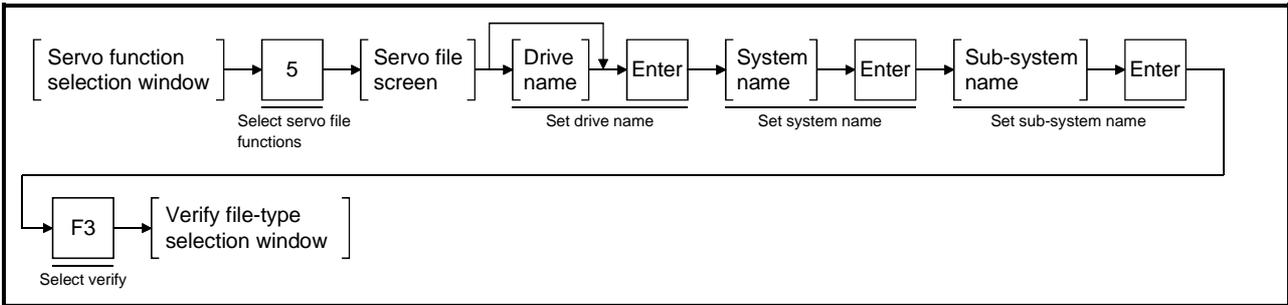
Verify file-type select area
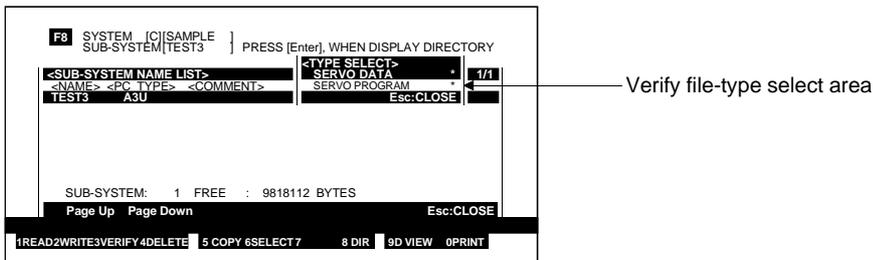
[Display/Setting Contents]

Verify file-type select area	Highlighted display of the selected file type (File types containing data are marked with an asterisk "*".)

[Key Operations]

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 verify the data.
Verifying	1) Press the [Enter] key while "YES" is highlighted to verify the data. (The default display is "YES".)
	2) When verification is complete, a message indicates the results.
Canceling Verification	1) To cancel verification, press the [→] key to highlight "NO", then press the [Enter] key. The data is not verified and the system returns to the verify file-type selection window.

[Verify Results Display Window]

If Servo Program Matches   If Discrepancy Found in Servo Program
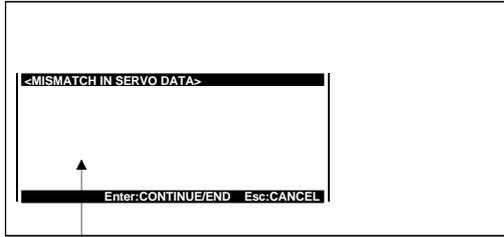
```
┌──────────────────────────────────────┐      ┌──────────────────────────────────────┐
│                                      │      │                                      │
│ <MISMATCH IN SERVO DATA>             │      │ <MISMATCH IN SERVO PROGRAM>          │
│                                      │      │     PROG. NO.    1                   │
│                                      │      │     PROG. NO.   10                   │
│                                      │      │     PROG. NO.   20                   │
│                                      │      │                                      │
│         ▲                            │      │             ▲                        │
│                                      │      │                                      │
│       Enter:CONTINUE/END  Esc:CANCEL │      │          Enter:CONT./END   Esc:STOP  │
└──────────────────────────────────────┘      └──────────────────────────────────────┘
```
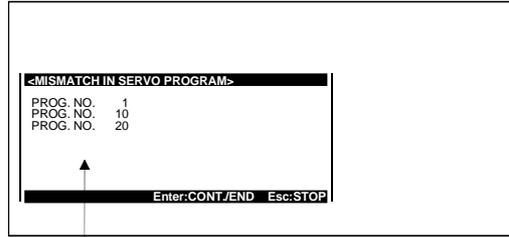
Verify Results Display Area

[Display/Setting Contents]

Verify results display area   Displays the results after verification is complete.

[Key Operations]

If Servo Program Matches

Closing the Window   1) Press the [Esc] key to close the window and revert to the verify file-type selection window.

If Discrepancy Found in Servo Program

Continuing and 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.
3) The results are displayed when verification is complete.

Interrupting Verification
1) Press the [Esc] key to interrupt verification.
   A YES/NO dialog box prompts whether to cancel or continue verification.
2) To cancel verification, press the [←] key to highlight "YES", then press the [Enter] key. (The default display is "NO".)
   A message indicates that verification has been interrupted and the system returns to the verify file-type selection window.
3) Press the [Enter] key while "NO" is highlighted to continue verification.
   The verification continues.

Closing the Window
1) Press the [Esc] key to close the window and revert to the verify file-type selection window.

```
┌───────────────────────────────────────────────────────────────────┐
│ ┌──────────┐                                                      │
│ │ POINTS   │                                                      │
│ └──────────┘                                                      │
│ (1)  Verification with different CPU types                        │
│      The possibility of verification of files with different CPU   │
│      types is shown in the following table.                       │
│ (2)  Servo programs created with SW1SRX-GSV13PE can be verified.   │
│      Other servo programs cannot be verified.                     │
│                                                                   │
│   ┌──────────────────┬──────────────────────────────────────┐    │
│   │ File Type        │ Verification Possible/Not Possible    │    │
│   ├──────────────────┼──────────────────────────────────────┤    │
│   │ Servo data       │ Verification not possible with all CPU│    │
│   │                  │ types                                 │    │
│   │ Servo program    │ Verification possible with all CPU    │    │
│   │                  │ types                                 │    │
│   └──────────────────┴──────────────────────────────────────┘    │
└───────────────────────────────────────────────────────────────────┘
```

File Type	Verification Possible/Not Possible
Servo data	Verification not possible with all CPU types
Servo program	Verification possible with all CPU types

14. FILE MAINTENANCE

14.6 Deleting Hard Disk or Floppy Disk Data

Deletes unnecessary files from hard disk or floppy disk.

14.6.1 Deleting designated system names

Deletes a system name designated from the system name directory window.

[Procedure to Display the Delete System Name YES/NO Dialog box]
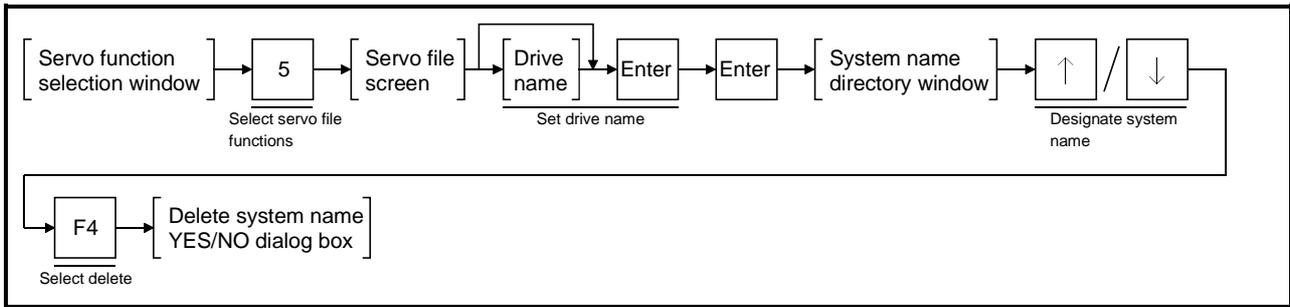
[Delete System Name YES/NO Dialog box]
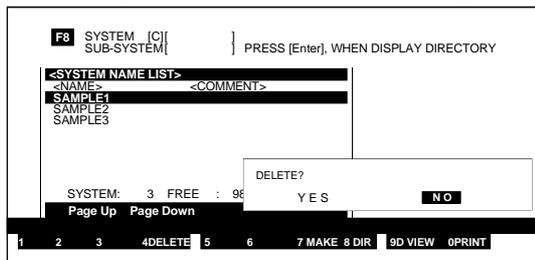
[Key Operations]

Deleting
1) To delete the data, press the [←] key to highlight "YES" and press the [Enter] key. (The default display is "NO".)
2) A message 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

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.
A message indicates that sub-system names exist under the system name.
Delete all sub-system names under the system name. (See Section 14.6.2.)

---

14. FILE MAINTENANCE

14.6.2 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 to Display the Delete Sub-system Name YES/NO Dialog box]
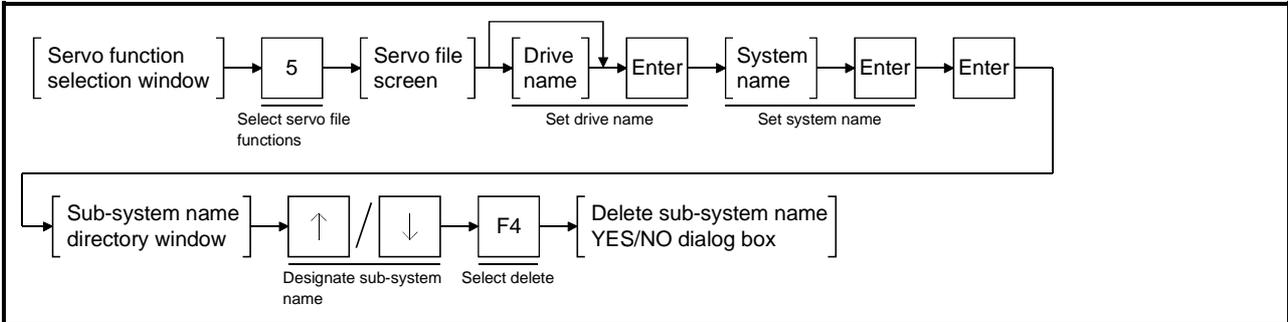
[Delete Sub-system Name YES/NO Dialog box]
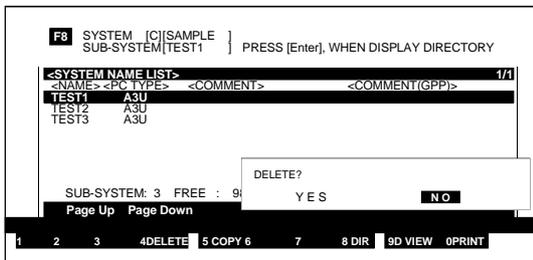
[Key Operations]

Deleting
1) To delete the data, press the [←] key to highlight "YES" and press the [Enter] key. (The default display 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 delete, 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
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.

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14.6.3 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 to Display the Delete File-type Selection window]

[Delete File-type Selection window]
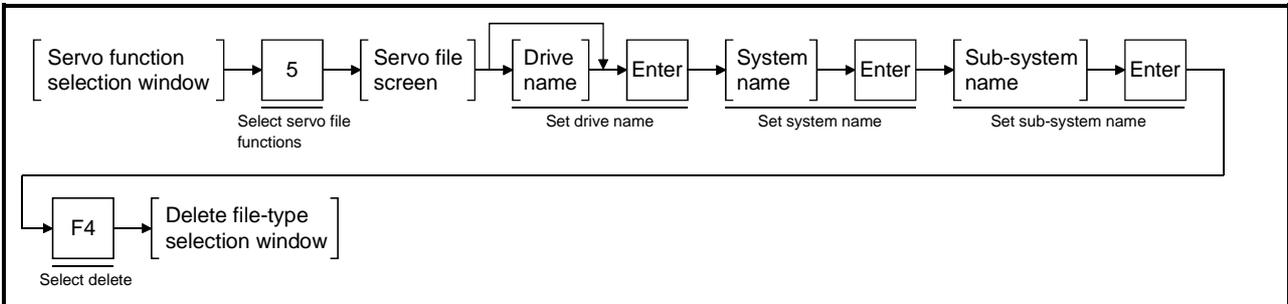
Delete file type select area
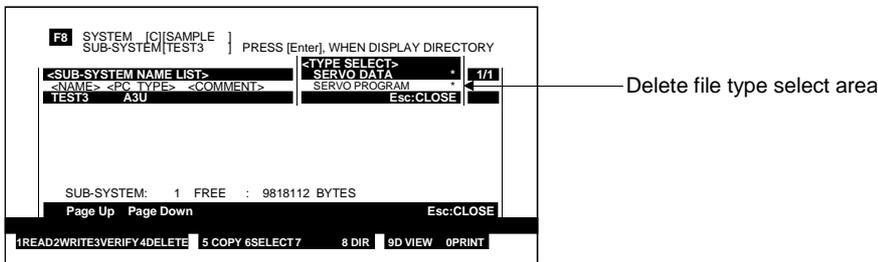
[Display/Setting Contents]

Delete file type select area	Highlighted display of the selected file type. (File types containing data are marked with an asterisk "*".)

[Key Operations]

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 delete the data.
Deleting	1) To delete the data, press the [←] key to highlight "YES" and press the [Enter] key. (The default display is "NO".) 2) A message indicates 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.

POINTS

(1) Designating multiple file types to delete

Data can be deleted from designated multiple file types, as follows.

1) Press the [↑]/[↓] keys to highlight the file type to be deleted.

Press the [F6] key.

The "*" by the file type changes to a "#".

2) 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

14. FILE MAINTENANCE

14.7 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.

14.7.1 Copying sub-system names

Copies all files under a sub-system name from a designated hard disk or floppy disk to a designated hard disk or floppy disk.

[Procedure to Display the Copy Destination Selection Window]
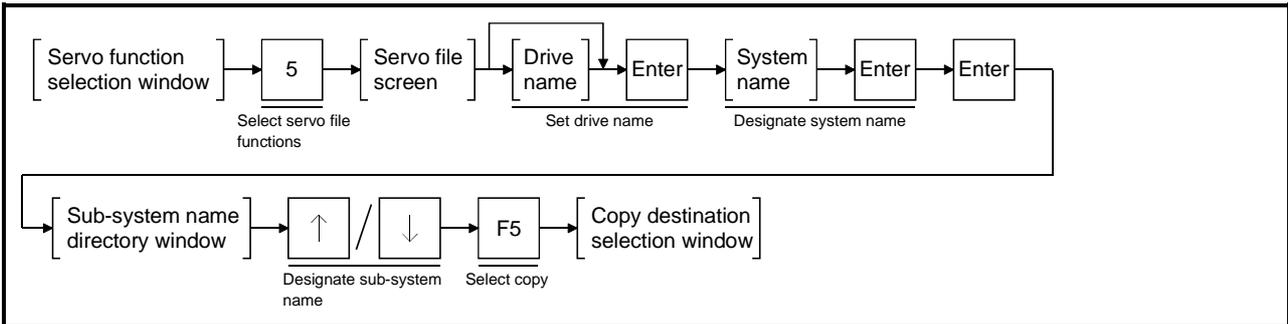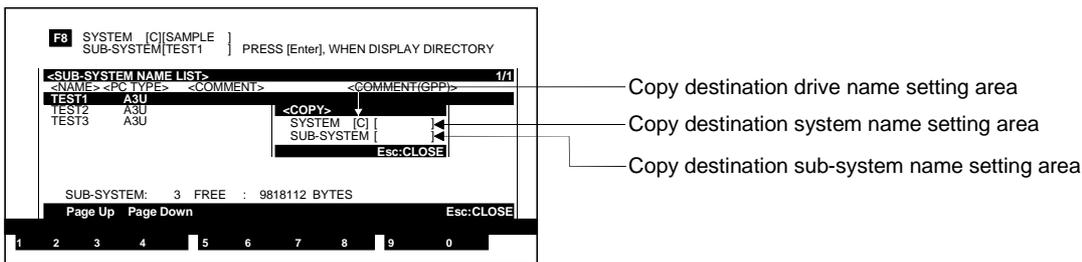
[Copy Destination Selection Window]

- Copy destination drive name setting area
- Copy destination system name setting area
- Copy destination sub-system name setting area

[Display/Setting Contents]

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 Operations]

Setting the Copy Destination Drive

1) The cursor moves to the copy destination sub-system name setting area. 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.

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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.
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.
Copying	1) Press the [Enter] key while "YES" is highlighted to copy the data. The default display is "YES". 2) A message indicates that the data has been copied and the system returns to the sub-system name directory window.
Canceling Copying	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]


```
F8  SYSTEM    [C][SAMPLE    ]
    SUB-SYSTEM[TEST1    ]   PRESS [Enter], WHEN DISPLAY DIRECTORY

<SUB-SYSTEM NAME LIST>                                        1/1
<NAME> <PC TYPE>   <COMMENT>              <COMMENT(GPP)>
TEST1    A3U
TEST2    A3U              <COPY>
TEST3    A3U              SYSTEM   [C] [SAMPLE   ]
                         SUB-SYSTEM [TEST2    ]
                                        Esc:CLOSE

                  S-SYSTEM NAME ALREADY EXISTS. OVERWRITE?
SUB-SYSTEM:  3  FREE : 9
                         Y E S          N O
   Page Up  Page Down

1   2    3    4    5   6    7    8   9    0
```

[Display/Setting Contents]
If the designated sub-system name already exists when the file is copied, a YES/NO dialog box prompts whether to overwrite the existing file.

[Key Operations]

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 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.

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14.7.2 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 to Display the Copy File-type Selection Window]

[Copy File-type Selection Window]
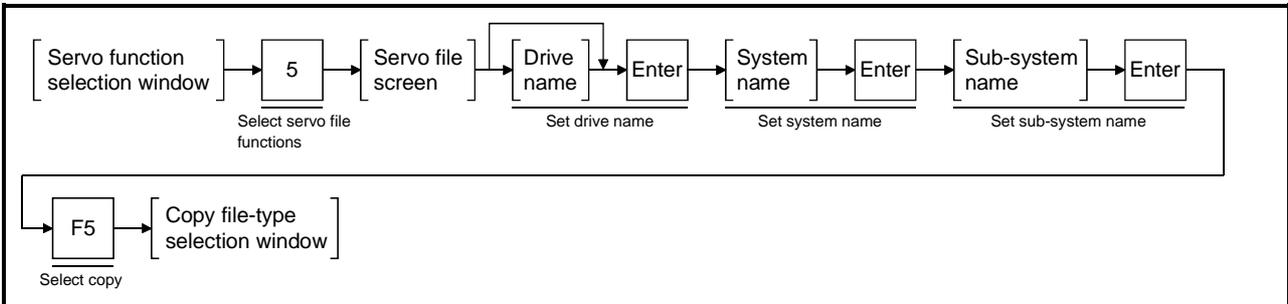
Copy file-type selection window
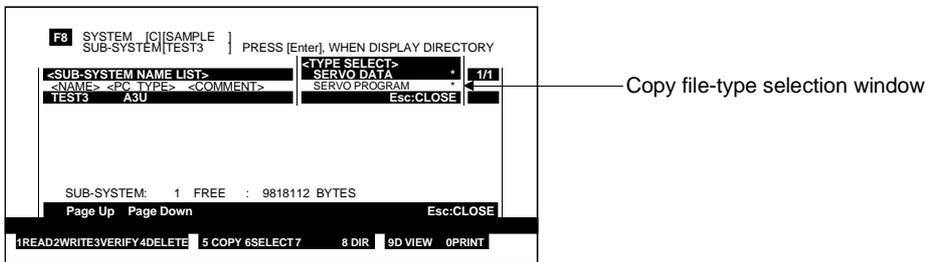
[Display/Setting Contents]

Copy file type select area
Highlighted display of the selected file type (File types containing data are marked with an asterisk " * ".)

[Key Operations]

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.

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[Copy Destination Selection Window]
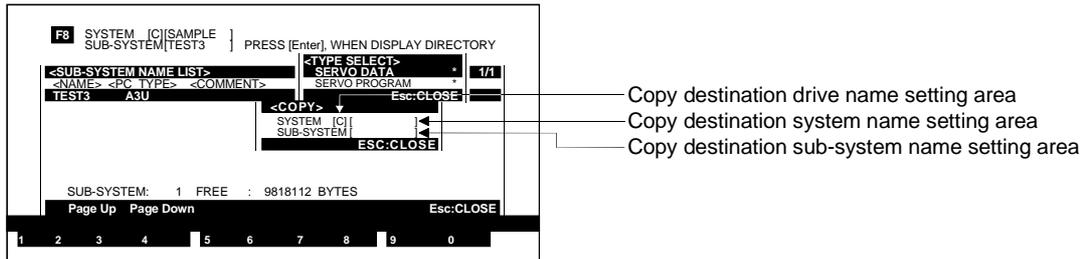
Copy destination drive name setting area
Copy destination system name setting area
Copy destination sub-system name setting area

[Display/Setting Contents]

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 Operations]

Setting the Copy Destination Drive	1) 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) 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.
Copying	1) Press the [Enter] key while "YES" is highlighted to copy the data. The default display is "YES". 2) A message indicates when the data has been copied and the system returns to the copy file-type selection window.
Canceling Copying	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.

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| If the File Already Exists |

[Overwrite File YES/NO Dialog Box]
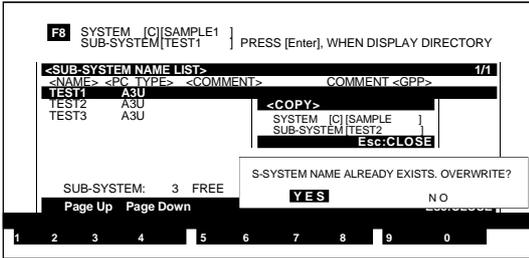
[Display/Setting Contents]

If the file designated as the copy destination file already exists when the file is copied, a YES/NO dialog box prompts whether to overwrite the existing file.

[Key Operations]

Overwriting
1) Press the [Enter] key while "YES" is highlighted to overwrite the file. 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 file, 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) Copying to the same drive
> 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. A message 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) Inputting a new system name and sub-system name for copying
> 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) Copying with different CPU types
> The possibility of copying files with different CPU types is shown in the following table.
>
> | File Type | Copying Possible/Not Possible |
> |---|---|
> | Servo data | Copy not possible with all CPU types |
> | Servo program | Copy possible with all CPU types |

14. FILE MAINTENANCE

14.8 Display Format

Sets whether comments and titles are displayed in the directory and selects the directory display order.

[Procedure to Display the Display Format Setting Window]

```
┌─────────────┐    ┌───┐    ┌─────────┐    ┌───┐    ┌──────────────┐
│Servo function│ → │ 5 │ → │Servo file│ → │F9 │ → │Display format│
│selection     │    │   │    │screen   │    │   │    │setting window│
│window        │    └───┘    └─────────┘    └───┘    └──────────────┘
└─────────────┘  Select servo file     Select diaplay
                 functions             format
```

[Display Format Setting Window]

Comment and title display area
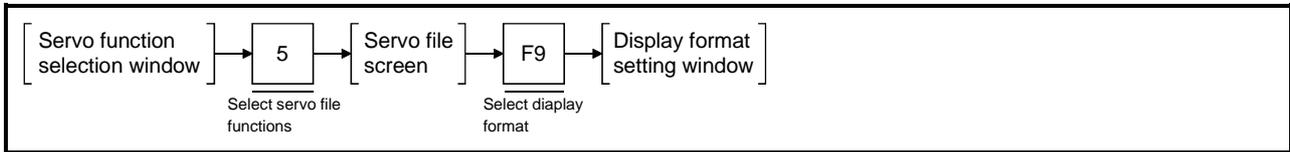
Display order select area
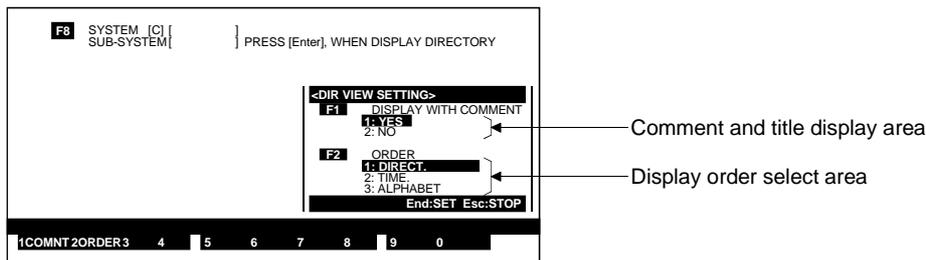
[Display/Setting Contents]

Comment and title display area	The set item is highlighted.
Display order select area	The set item is highlighted.

[Key Operations]

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 "DISPLAY WITH COMMENT" 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.
Completing the Setting	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.
Interrupting Settings	1) Press the [Esc] key to interrupt the settings and revert to the servo file screen.

14. 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 "DIRECT.". The default display is "DIRECT.".
For display in the order of date, press the [2] key or the [↑]/[↓] keys to select "TIME", then press the [Enter] key.
For display in alphabetical order, press the [3] key or the [↑]/[↓] keys to select "ALPHABET", then press the [Enter] key.
2) The selected display order is highlighted.

Completing the Setting 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.

Interrupting Settings 1) Press the [Esc] key to interrupt the settings and revert to the servo file screen.

14. FILE MAINTENANCE

14.9 Creating New System Names

Creates new system names in a hard disk or floppy disk.

[Procedure to Display the System Name Create Window]
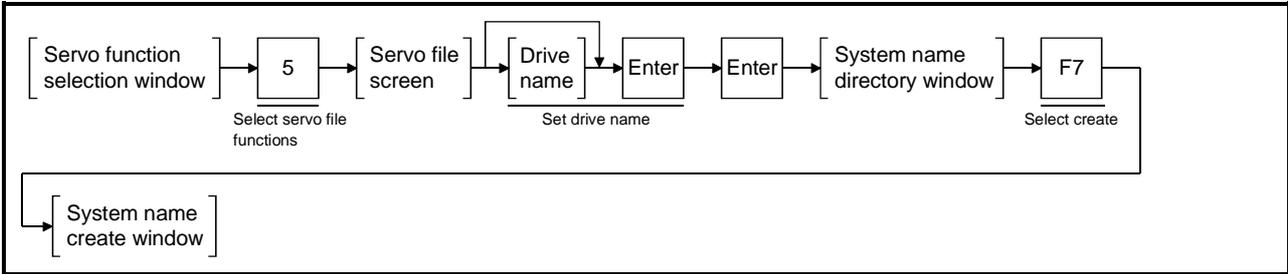
[System Name Create Window]
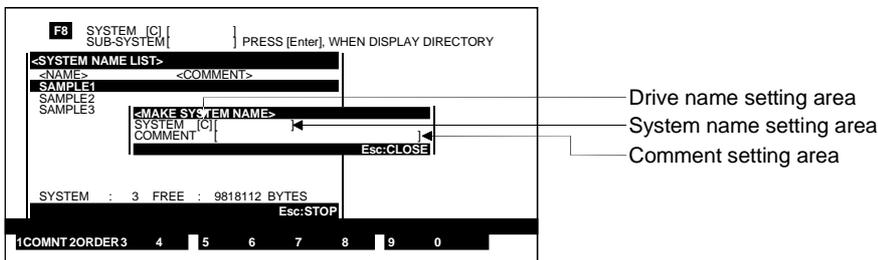
[Display/Setting Contents]

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 Operations]

Setting the 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.

14. FILE MAINTENANCE

Creating System Name
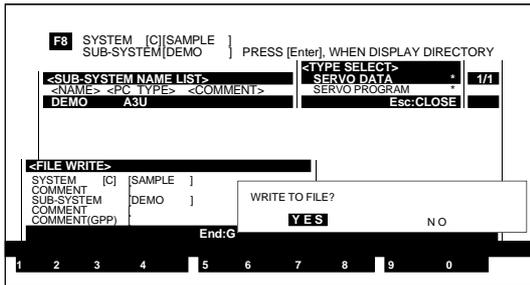
1) Press the [Enter] key while "YES" is highlighted to create the system name. The default display is "YES".
2) A message indicates that the system name has been created and the system returns to the system name directory window.

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
If the system name already exists. If the system name input already exists, the message "SYSTEM NAME ALREADY EXISTS" will be displayed. If this happens, set another system name.

15. PRINTING

The servo printer mode is a mode to print out servo programs, positioning data, and system setting data set with the GSV13PE.

(1) Outline of the functions
The functions below are offered by the GSV13PE servo printer mode.

```
Servo    ── Set Printer ── Sets the print for at. ································································· 15.1
printer      Data
                            Set Paper ··················· Sets the type of paper used for printing. ································ 15.1
                            ├─ Continuous form
                            ├─ Cut-form (A3 portrait)
                            └─ Cut-form (A4 portrait)
                            Paper width ·············· Sets the width of paper used for printing. ····························· 15.1
                            ├─ 8 inch
                            └─ 11 inch
                            Paper length ············· Sets the length of paper used for printing. ··························· 15.1
                            ├─ 8 inch (60 lines)
                            ├─ 11 inch (82 lines)
                            └─ 16 inch (120 lines)
                            Margin ························ Sets the width from the paper edge to the print start ············· 15.1
                                                         position as a number of characters between 0 and 16.
                            Print header ··············· Sets whether the header is printed. ······························· 15.1
                            ├─ No
                            └─ YES
          ── Servo Print ── Prints servo programs, positioning data, and system setting data. ················· 15.2
                            Program ····················· Prints out the programs used list of created programs ·············· 15.2
                                                          of the created programs themselves.
                            ├─ None
                            ├─ Programs used list
                            ├─ All programs
                            └─ Set range
                            Axis Data ··················· Prints out fixed parameters, servo parameters, home·············· 15.2
                                                          position return data, and JOG operation data.
                            ├─ None
                            ├─ All data
                            └─ Set range
                            Parameter block ········· Prints out parameter block data for 16blocks. ···························· 15.2
                            ├─ None
                            └─ All data
                            Limit switch ··············· Prints out limit switch output data. ··································· 15.2
                            ├─ None
                            ├─ All data
                            └─ Set range
                            System setting ············ Prints out system setting data. ······································ 15.2
                            ├─ None
                            └─ All data
                            Page ·························· Sets whether the page numbers are printed. ························· 15.2
                            ├─ No
                            └─ YES
```

(2) Outline of the procedure
    The printing procedure is shown below.

```
          ┌─────────────────────────────────────┐
          │  Servo printer function select window │
          └─────────────────────────────────────┘
                          │
          ┌─────────────────────────────────────┐
          │          Set printer data            │
          └─────────────────────────────────────┘
                          │
          ┌─────────────────────────────────────┐
          │             Set paper                │
          │           Paper width                │
          │           Paper length               │
          │              Margin                  │
          │           Print header               │
          └─────────────────────────────────────┘
                          │
          ┌─────────────────────────────────────┐
          │            Servo print               │
          └─────────────────────────────────────┘
                          │
          ┌─────────────────────────────────────┐
          │             Program                  │
          │            Axis data                 │
          │          Parameter block             │
          │           Limit switch               │
          │          System setting              │
          │              Page                    │
          └─────────────────────────────────────┘
                          │
          ┌─────────────────────────────────────┐
          │            Print out                 │
          └─────────────────────────────────────┘
                          │
          ┌─────────────────────────────────────┐
          │ When printing is complete, press the │
          │ [Esc] key to close the setting window│
          └─────────────────────────────────────┘
```
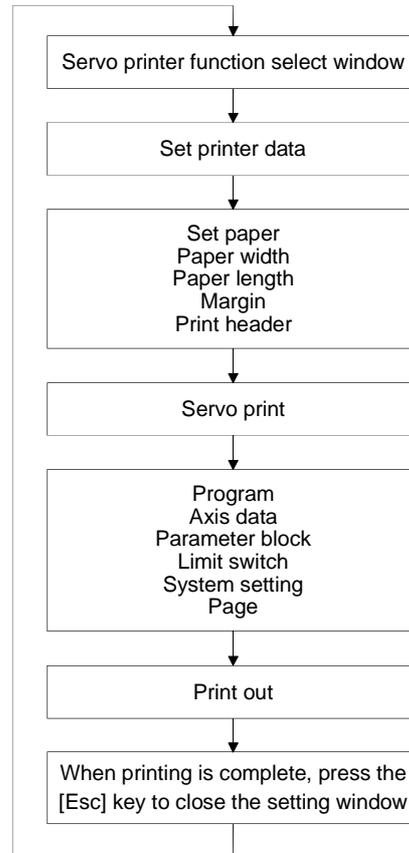
(3) Types of printer
    The following types of printer can be used with GSV13PE.
    • General ESC/P-compatible printer

15. PRINTING

15.1 Setting Printer Data

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 Setting	Valid Setting (○: Valid, —: Invalid)			
	Paper Width	Paper Length	Margin	Headers
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 to Display the Printer Data Setting Window]

[Printer Data Setting Window]
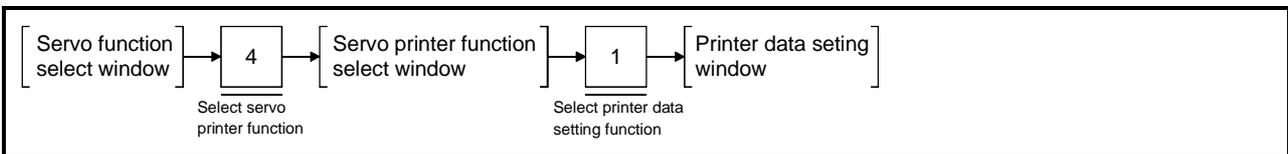
Printer function display area
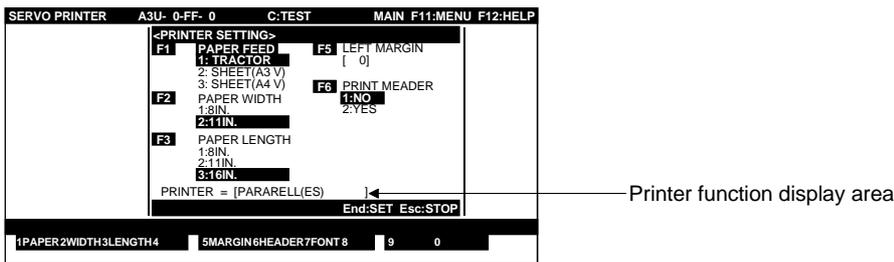
[Display/Setting Contents]

Printer function display area   Displays the model name of the printer selected with the basic utilities.

[Key Operations]

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 Width1
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.

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.

15. PRINTING

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.
A YES/NO dialog box prompts whether to write the file.

Writing File

1) Press the [Enter] key while "YES" is highlighted to write the set printer data to internal memory.
If "NO" is highlighted, press the [Enter] key to highlight "YES".

2) The system returns to the servo printer function select window when the file is written.
The set printer data is used when the GSV1[ ]PE is subsequently started up.

Canceling Writing File

1) To cancel writing the file, press the [→] key to highlight "NO", 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.

POINT
Set the paper width and paper length only if continuous-form paper is selected.

15. PRINTING

15.2 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, and system setting data set in the system setting mode.

[Procedure to Display the Servo Printing Window]

```
┌──────────────┐      ┌───┐   ┌──────────────────┐      ┌───┐   ┌──────────────┐
│ Servo function │ ──→  │ 4 │ → │ Servo printer function │ ──→  │ 2 │ → │ Servo printer │
│ select window  │      └───┘   │ select window      │      └───┘   │ window        │
└──────────────┘              └──────────────────┘              └──────────────┘
                 Select servo                      Select servo printer
                 printer function                  function
```
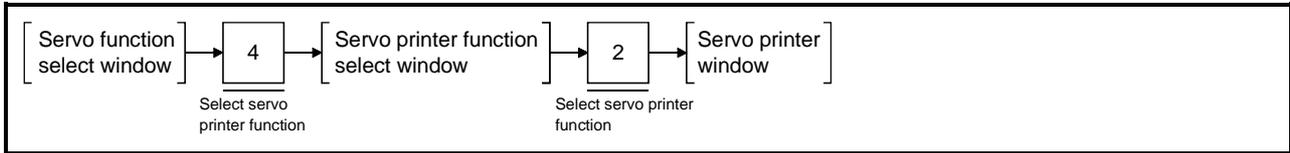
[Servo Printer Window] (A273UHCPU)

```
<SERVO PRINTING>
 F1   PROGRAM              F3   P.B.  DATA        F6   SYSTEM
      1: W/0                    1:W/0                  1:W/0
      2: PROGRAM USE LIST       2:ALL                  2:ALL
      3: ALL PROGRAMS
      4: RANGE     (0-4095)  F4   LMT.  SW.        F7   PAGE
          [    0]-[4095]          1: W/0                 1: W/0
                                  2: ALL                 2:WITH[     1]
 F2   AXIS DATA                3: RANGE     (1- 8)
      1: W/0                       [   1]-[    8]
      2: ALL
      3: RANGE     (1- 8)
          [   1]-[    8]

 PRINTER = [PARARELL(ES)    ] LEFT MARGIN = [ 0]    HEADER = [W/0  ]
 PAPER = [TRACTOR       ]  WIDTH = [11IN   ]    LENGTH = [16IN.     ]
                                                        End:SET  Esc:STOP

1PROGRM2 AXIS3 P.B. 4LMT.SW 5       6SYSTEM 7 PAGE 8       9 GO    0
```
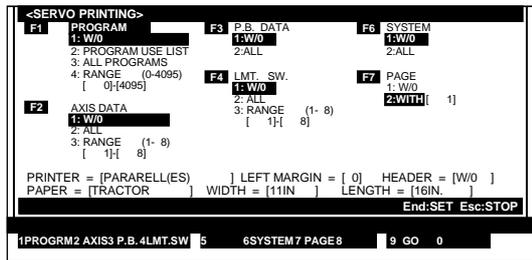
[Display/Setting Contents]

Printing format
display area

Displays the printer name and the print format set by the printer data setting functions.

[Key Operations]

Setting the Printed
Data

1) Set the printed data type from the following types:
   - Servo programs
   - Axis data
   - Parameter block data
   - Limit switch output data
   - System setting data
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, and system setting data.
3) Set the print condition for each data type with the numeric keys or press the [↑]/[↓] keys to highlight the required setting.

15. PRINTING

<Servo Program>

Prints out the programs used/unused lists for the created servo programs or the servo programs themselves.

1) Press the [F1] key to select the program data item. This item can be set to "W/O, PROGRAMS USED LIST, ALL PROGRAMS," or "RANGE".

- W/O..No print out
- PROGRAMS USED LIST.......Prints out the programs used/unused list.
- 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   │ 4096/4096    │
│ USED STEPS      │ 13312/13312  │
│ LEDT STEPS      │        0     │
└─────────────────┴──────────────┘

1000  1001  1002  1003  1004  1005  1006  1007  1008  1009
1010  1011  1012  1013  1014  1015  1016  1017  1018  1019
1020  1021  1022  1023  1024  1025  1026  1027  1028  1029
1030  1031  1032  1033  1034  1035  1036  1037  1038  1039
```
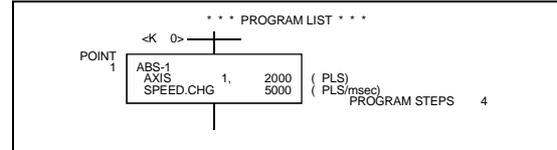
```
* * *  PROGRAM LIST  * * *

              <K   0>
POINT
  1      ABS-1
         AXIS        1,    2000    ( PLS)
         SPEED.CHG        5000    ( PLS/msec)
                                  PROGRAM STEPS    4
```

<Axis Data>

Prints out fixed parameters, servo parameters, home position return data, and JOG operation data.

1) 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: PLUSE                  │
│ 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 PARAMETER

┌───┬──────────────────────┬──────────────────────────┐
│   │  ITEM                │      SETTING DATA         │
├───┼──────────────────────┼──────────────────────────┤
│ 1 │ AMP. SETTING         │ 0: ADU_INC                │
└───┴──────────────────────┴──────────────────────────┘
```

<Parameter Block>

Prints out parameter block data for 16 blocks.

1) 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

\<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.

\<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.

\<Page\>
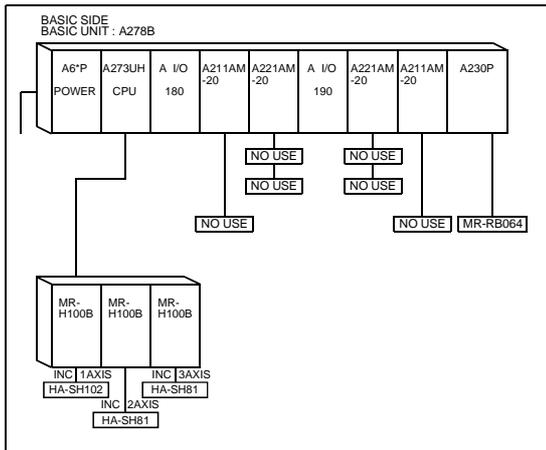
Sets whether the page numbers are added to the data print-outs.

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.

15. PRINTING

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 highlight "YES".
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.

Interrupting Printed Data Setting
1) Press the [Esc] key to clear the set printed data. The printed data reverts to the previous settings.
   The servo printing window closes and the system returns to the servo printer function select window.

15. PRINTING

15.3 Sample Print-Outs

Sample print-outs of servo programs, positioning data, and system setting 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

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

NO	DATE	REV. DATE	PC: A3U
REV. NO	DESIGNER	NAME	PAGE: 1

POINT

The servo program list prints created program numbers only.
Uncreated program numbers are not printed out.

• Servo program

```
                        * * * PROGRAM LIST * * *

              <K     0> ────────┬────
         POINT            ┌──────┴──────────────┐
             1            │ ABS-2               │
                          │  AXIS        1,  1000│ ( PLS)
                          │  AXIS        2,  2500│ ( PLS)
                          │  SYN. SPEED      5000│ ( PLS/sec)
                          │  M CODE             2│
                          │                     │
                          └──────┬──────────────┘    PROGRAM STEPS    6
                                 │


              <K     1> ────────┬────
         POINT            ┌──────┴──────────────┐
             1            │ ABS ⌒               │
                          │  AXIS        1,  1000│ ( PLS)
                          │  AXIS        2,  3000│ ( PLS)
                          │  SPEED. CHG    20000│ ( PLS/sec)
                          │  PAS-PT      1,  2500│ ( PLS)
                          │  PAS-PT      2,  6000│ ( PLS)
                          │  ◁            100│ (msec)
                          │  ◁            200│ (msec)
                          │ E◁             30│ (msec)
                          └──────┬──────────────┘    PROGRAM STEPS    10
                                 │


              <K   100> ────────┬────
         POINT            ┌──────┴──────────────┐
             1            │ ABS-1               │
                          │  AXIS        2,200000│ ( PLS)
                          │  SPEED. CHG    55000│ ( PLS/sec)
                          └──────┬──────────────┘    PROGRAM STEPS    4
                                 │


              <K   101> ────────┬────
         POINT            ┌──────┴──────────────┐
             1            │ ABS-1               │
                          │  AXIS        2,200000│ ( PLS)
                          │  SPEED. CHG    55000│ ( PLS/sec)
                          └──────┬──────────────┘    PROGRAM STEPS    4
                                 │


              <K   102> ────────┬────
         POINT            ┌──────┴──────────────┐
             1            │ ABS-1               │
                          │  AXIS        2,200000│ ( PLS)
                          │  SPEED. CHG    55000│ ( PLS/sec)
                          └──────┬──────────────┘    PROGRAM STEPS    4
                                 │


              <K   103> ────────┬────
         POINT            ┌──────┴──────────────┐
             1            │ ABS-1               │
                          │  AXIS        2,200000│ ( PLS)
                          │  SPEED. CHG    55000│ ( PLS/sec)
                          └──────┬──────────────┘    PROGRAM STEPS    4
```

15. PRINTING

(2) Sample axis data print-out
   (a) Using ADU(A273UHCPU)

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 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	MOTOR RAT. SPEED	3000 (r/min)
7	FEEDBACK PULSE(N)	8192 (ENCORDER PULSE)*4
8	TURN DIRECTION	0: FOR. (ccw)
9	AUTO-TUNING	1: POS. & VEL.
10	SERVO RESPONCE	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. INTERGAL. 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. S. NO.	1

1AXIS JOG DATA

	ITEM	SETTING DATA
1	JOG SPEED LIMIT	20000 (PLS/sec)
2	P. B. NO.	1

15. PRINTING

(b) Using MR-[ ]-B

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 (ENCORDER PULSE)*4
8	TURN DIRECTION	0: FOR. (ccw)
9	AUTO-TUNING	1: POS. & VEL.
10	SERVO RESPONCE	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	0.0 (%)
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 INTERROCK TIMING)	0: NO 0

15. PRINTING

1AXIS SERVO PARAM. (EXP.)

	ITEM	SETTING DATA
1	MON. OUT. 1 OFFSET	0 (mV)
2	MON. OUT. 2 OFFSET	0 (mV)
3	BEF. ALRM. DATA SELECT	
	(SAMPLING TIME SEL.)	0: 1.77
	(DATA SEL. 1)	0: VEL(+–)
	(DATA SEL. 2)	0: VEL(+–)
4	ZERO. SPEED	10000 (r/min)
5	EX. ERROR ALARM LEVEL	80 (Kpulse)
6	OPTIONAL FUNCTION 5	
	(PI-PID CTRL. CHG.)	0: NONE
	(DYNAMIC BRAKE)	....
	(SERVO READ LANG)	0: JAPANESE
7	P-PID CHANGE	
	POSITION DROOP	0 (pulse)
8	TORQUE COMPS.FACTOR	0
9	VELOCITY DIFF. COMPS.	980

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

15. 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

15. PRINTING

(4) Sample limit switch output data print-out

* * * 1AXIS LMT. SW. DATA * * *

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
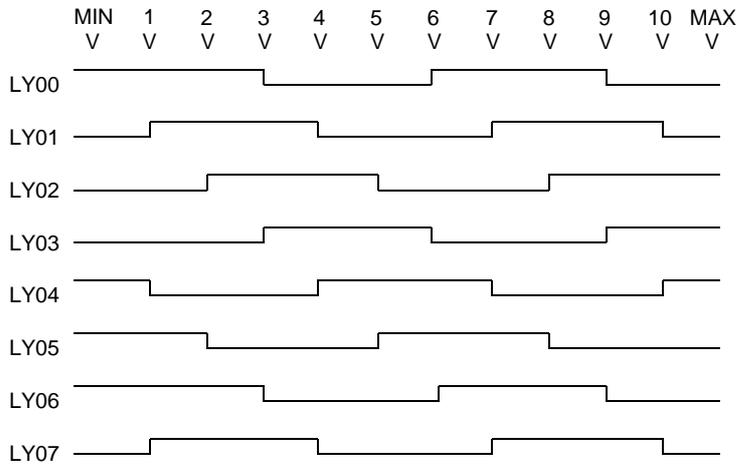
* * * 2AXIS LMT. SW. DATA * * *

POINT	ADR. (PULSE)
MIN	−2147483648
1	−2000000000
2	−1000000000
3	−200000000
4	−100000000
5	0
6	100000000
7	200000000
8	500000000
9	1000000000
10	2000000000
MAX	2147483647
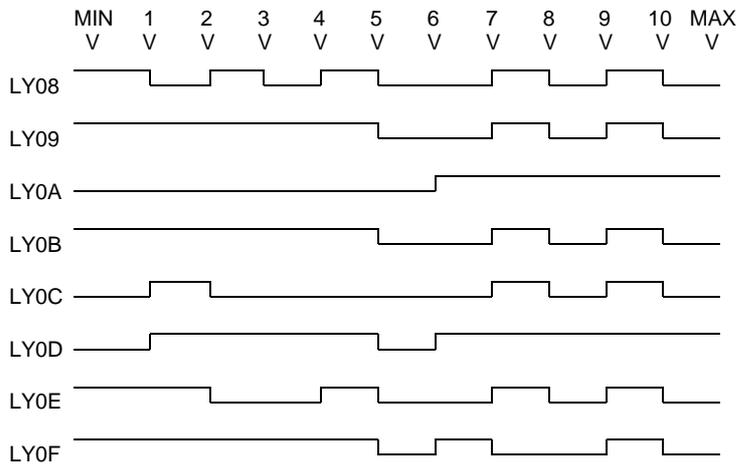
* * * 3AXIS LMT. SW. DATA * * *

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

15 − 15
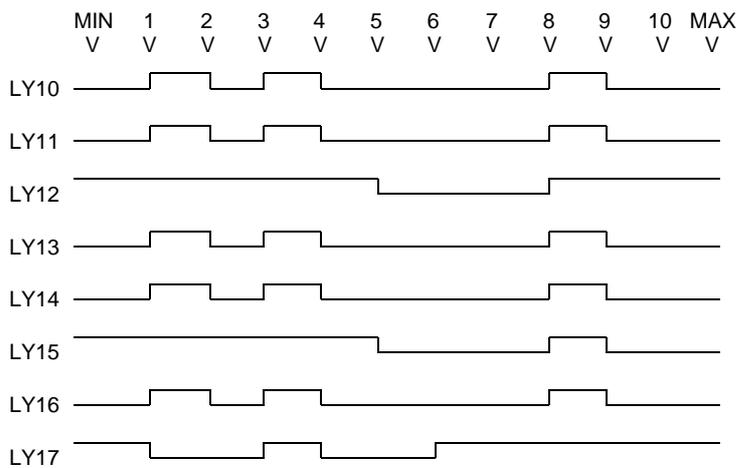
15. PRINTING

(5) Sample system setting data print-out
    (a) Using A17[ ]CPU

```
* * * SYSTEM SETTING DATA * * *


BASIC SIDE
BASE UNIT : A172B

        ┌──────────────────────────────────────┐
        │  A171S          │ A171S  │ UN-        │
        │                 │ ENC    │ USABLE     │
        │         CPU     │        │            │
        └──────────────────────────────────────┘
                │
                │
                │
                │
                │
        ┌──────────────────────────────────────┐
        │ MR-    │ NO     │ NO     │ NO         │
        │ H10B   │ USE    │ USE    │ USE        │
        └──────────────────────────────────────┘
          │
       INC │ 1AXIS
       ┌─────────┐
       │ HA-FH053│
       └─────────┘
```
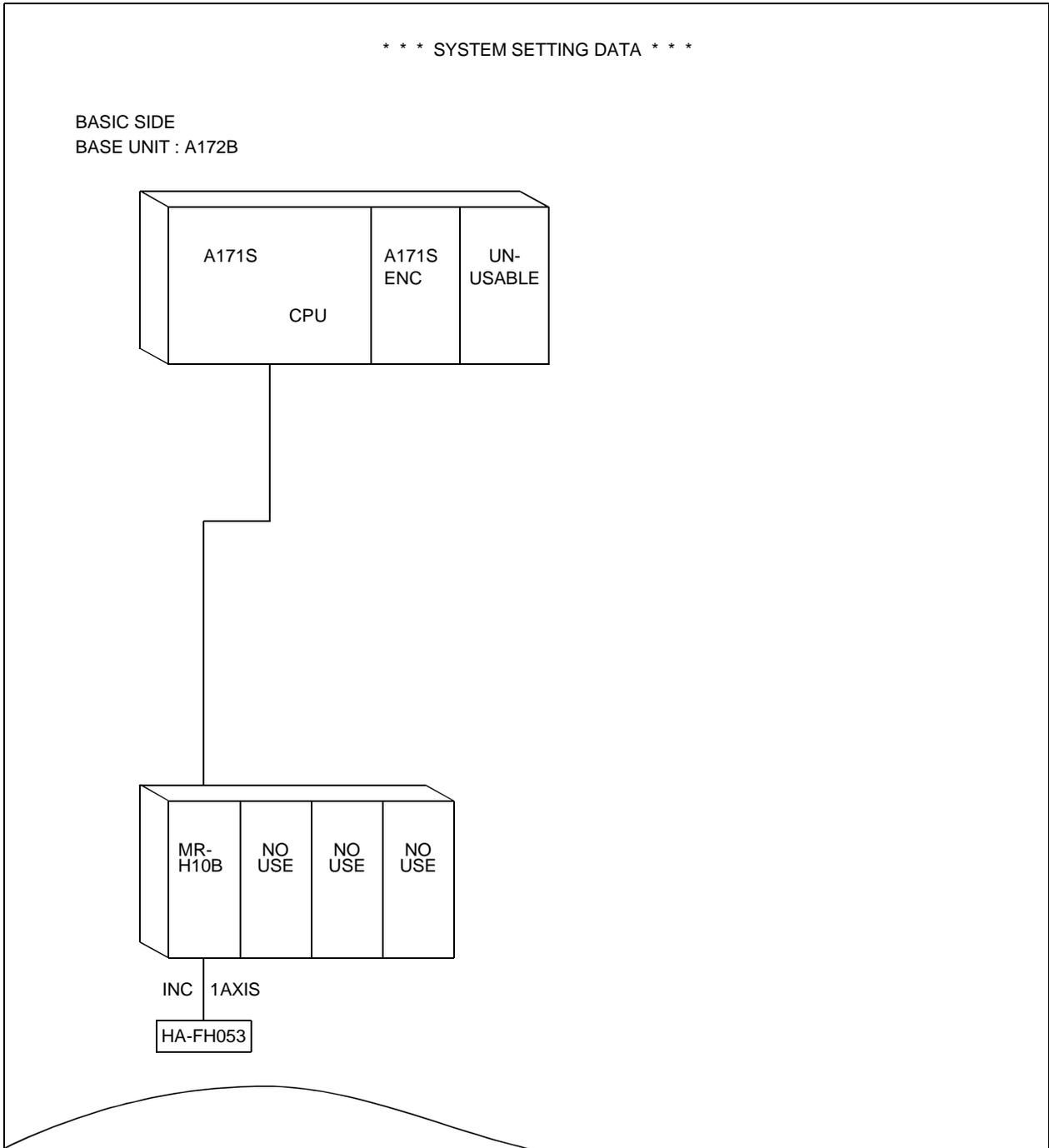
15. PRINTING

(b) Using A273UHCPU

* * * SYSTEM SETTING DATA * * *

BASIC SIDE
BASE UNIT : A278B

A6*P POWER	A273UH CPU	A I/O 180	A211AM -20	A221AM -20	A I/O 190	A221AM -20	A211AM -20	A230P

ADD. MOTION SIDE

NO USE — NO USE

NO USE — NO USE

NO USE   NO USE   MR-RB064

MR- H100B	MR- H100B	MR- H100B

INC | 1AXIS   INC | 3AXIS
HA-SH102   HA-SH81

INC | 2AXIS
HA-SH81
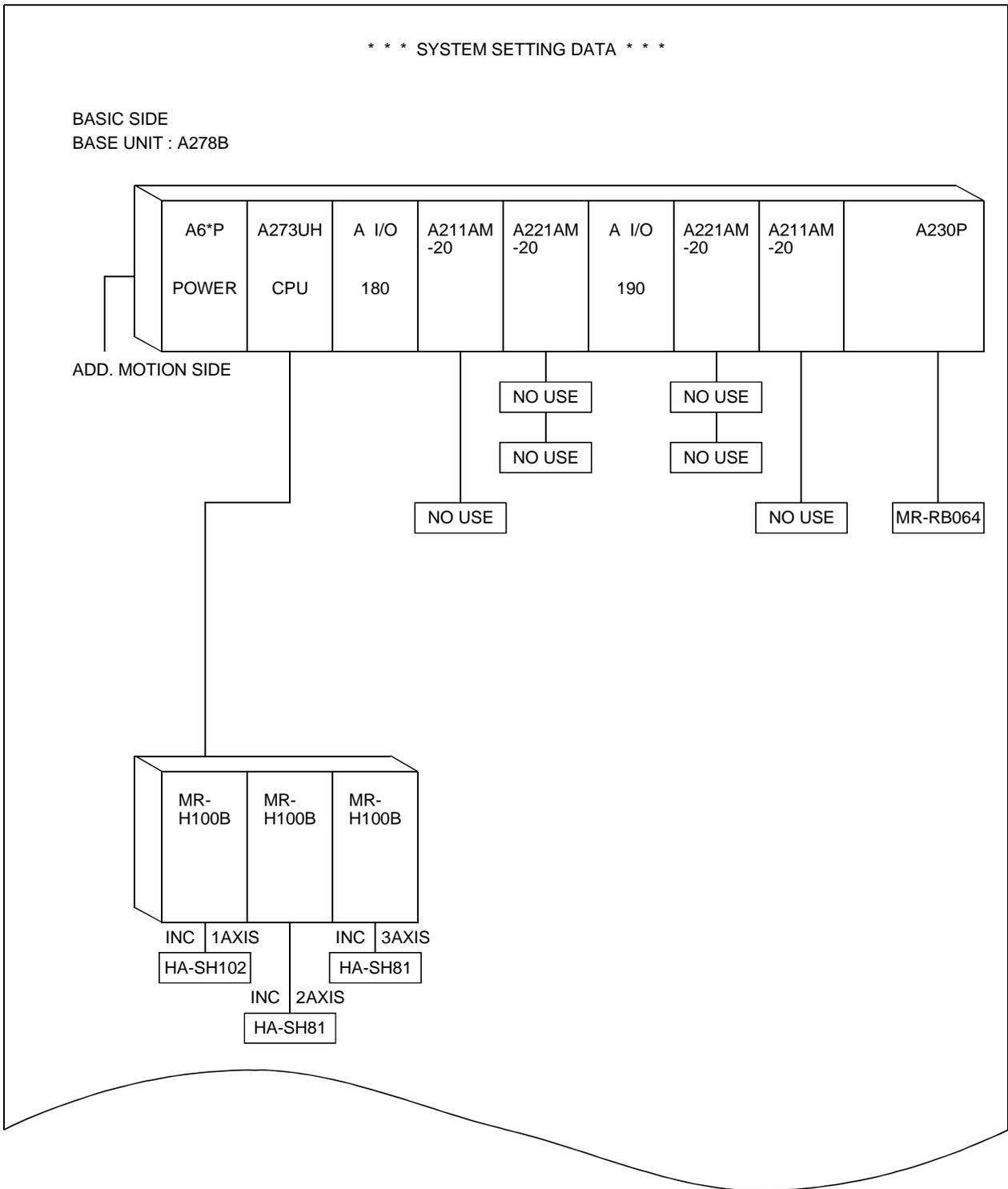
15. PRINTING

```
                      * * *  SYSTEM SETTING DATA  * * *

ADDITIONAL MOTION SIDE
BASE UNIT : A268B
```

A6*P POWER	A I/O 1A0	A211AM -20	A211AM -20	A211AM -20	A221AM -20	A273EX	NO USE	NO USE

```
                                   INC  5AXIS        INC  7AXIS
                                   HA-LH52           HA-FH13
                                                     INC  8AXIS
                                                     HA-FH13

               INC  4AXIS          INC  6AXIS
               HA-FH053            HA-FH13
```
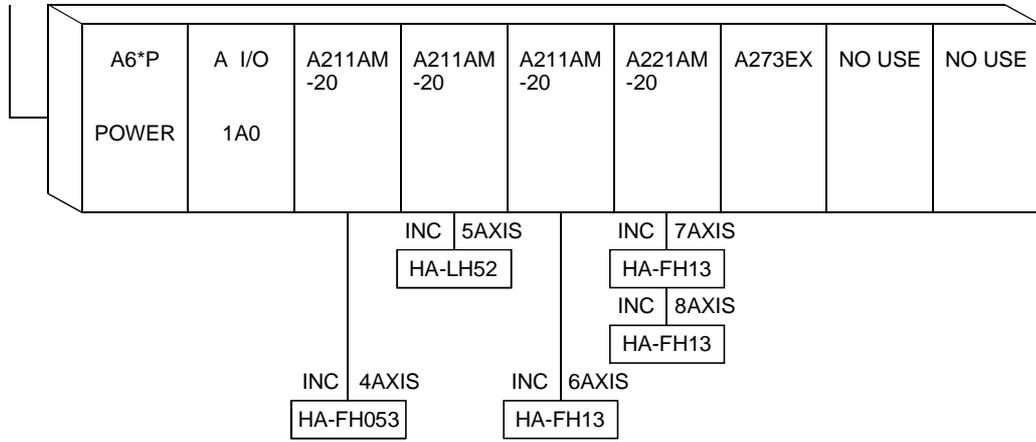
I/O ALLOCATION

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

15. PRINTING

Pulse/Synchronous Encoder Interface Module : A273EX

Signal Name	Data	Device	Number of Words
TREN 1	5 - Servo command value	W000	2
TREN 2	3 - Position droop	W034	2
TREN 3	6 - Motor Speed	D 0	2

PC I/O Module

Signal Name	Data	Device	Number of Words
X**0			
X**1			
X**2			
X**3			
X**4			
X**5			
X**6			
X**7			

16. 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 GSV13PE 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.
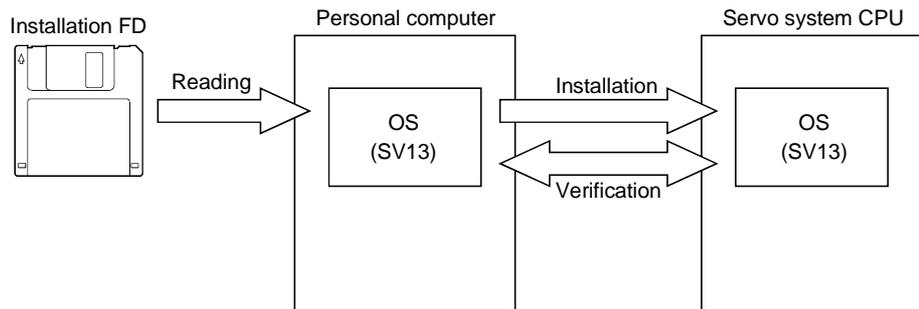
(1) Outline of the functions

The following functions are available in the Install mode of the GSV13PE software package.

16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

16.1 Installation of the OS for Positioning

(1) The OS is installed in the following cases:
- To change the positioning OS installed in the servo system CPU to one with a different model name.
- To change to the new version of the positioning OS when there has been a version upgrade.

(2) Procedure for installation
The procedure for installing the positioning OS in the servo system CPU is indicated below.

<div align="center">16 – 2</div>

16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

1)

Start up a personal computer running the GSV13PE software.

------ See Section 6.1.

[Servo function selection window]

```
SERVO          A3U-0-FF-PC-0              C:SAMP2      MAIN  F11:MENU  F12:HELP
                                          <OPTION>          <MENU>        ING
                                                                         R
                              <SERVO>                AT CONV
                              1:SYSTEM SETTING                            ATION
                              2:SERVO DATA
                              3:SERVO PROGRAM                             NTENANCE
                              4:SERVO PRINTER               sc:CLOSE
                              5:SERVO FILE                  7:OPTION
                              6:MECHANICAL SYSTEM           8:INITIAL SETTING
                              7:ON-LINE                     9:QUIT
                              8:INSTALL
                              9:BACKUP
                              A:A273U->A273UH CNV
                                          Esc:CLOSE

  1     2     3     4     5     6     7     8     9     0
```

---- Select "INSTALL" in the servo function selection window.

7

[Install function selection window]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:SAMP2      MAIN  F11:MENU  F12:HELP
                                          <OPTION>          <MENU>        ING
                              <SERVO>                                     R
                <INSTALL>                 SETTING    AT CONV
                1:INSTALL                 DATA                            ATION
                2:VERIFY                  PROGRAM
                    Esc:CLOSE             PRINTER          sc:CLOSE       NTENANCE
                              5:SERVO FILE              7:OPTION
                              6:MECHANICAL SYSTEM       8:INITIAL SETTING
                              7:ON-LINE                 9:QUIT
                              8:INSTALL
                              9:BACKUP
                              A:A273U->A273UH CNV
                                          Esc:CLOSE

  1     2     3     4     5     6     7     8     9     0
```

---- Select "INSTALL" in the install function selection window.

1

[Install function execution window]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:TEMP       MAIN  F11:MENU  F12:HELP
<INSTALL>

    INSTALL OPERATING SYSTEM.

     OPERATING SYSTEM IS SV22 VER.00A AT PRESENT.


  F1  GO

           0%              50%              100%

           --- - + --- - + --- - + --- - + --- - + ---

                                                          Esc:CLOSE

  1  GO  2     3     4     5     6     7     8     9     0
```

---- The install function execution window will be displayed.
The model name and version of the OS currently installed in the servo system CPU will be displayed in the window.

> If no OS is installed in the servo system CPU, the message "OPERATION SYSTEM NOT INSTALLED" will be displayed.

Press the [F1] key to start the installation.

Installation at the personal computer

A)

2)

16 – 3

16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

2)

A)

F1

[Installation FD inserted YES/NO dialog box]

```
SERVO INSTALL  A3U-0-FF-PC-0        C:TEMP      MAIN F11:MENU F12:HELP
<INSTALL>
   INSTALL OPERATING SYSTEM.
   OPERATING SYSTEM IS SV22 VER.00A AT PRESENT.


  F1 GO
      0%              50%            100%
      --- + --- + --- + --- + --- + --- + --- + --- + --- +
                        INSTALL DISK READY ?
                           YES          NO


  1  GO 2     3     4     5     6     7     8     9     0
```

The installation FD inserted YES/NO
dialog box will be displayed.
Select "YES" and press the [Enter]
key.
The presence of the installation FD
will be checked.

Make sure that the installation FD
is inserted in the drive in advance.

Error (presence of
installation FD not
confirmed)

Enter

[Install execution YES/NO dialog box]

```
SERVO INSTALL  A3U-0-FF-PC-0        C:TEMP      MAIN F11:MENU F12:HELP
<INSTALL>
   INSTALL OPERATING SYSTEM.
   OPERATING SYSTEM IS SV22 VER.00A AT PRESENT.
   OS TO BE INSTALLED IS SV13 VER.OOA.

  F1 GO
      0%              50%            100%
      --- + --- + --- + --- + --- + --- + --- + --- + --- +
                        EXECUTE ?
                           YES          NO


  1  GO 2     3     4     5     6     7     8     9     0
```

When the presence of the installation
FD has been confirmed, the install
execution YES/NO dialog box is dis-
played.

The model name and version of
the confirmed installation FD will
be displayed in the install function
execution window.

Check the displayed model name and
version, select "YES" and press the
[Enter] key.
The OS will be installed.

Select "YES".   Enter

[Installation in progress]

```
SERVO INSTALL  A3U-0-FF-PC-0        C:TEMP      MAIN F11:MENU F12:HELP
<INSTALL>
   INSTALL OPERATING SYSTEM.
   OPERATING SYSTEM IS SV22 VER.00A AT PRESENT.
   OS TO BE INSTALLED IS SV13 VER.OOA.

  F1 GO
      0%              50%            100%
      ■ - + --- + --- + --- + --- + --- + --- + --- + --- +


                                               Esc:CLOSE
  EXECUTING
  1  GO 2     3     4     5     6     7     8     9     0
```

During installation, the progress of
installation is displayed.

Time taken to install
A171SCPU/A171SHCPU
: Approx. 25 minutes
A172SHCPU/A273UHCPU
: Approx. 50 minutes
  (8/32 axis specification)

Do not disconnect the cable while
the installation is in progress.

Installation
operation at
the personal
computer

3)

16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

3)

[Installation completed]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:TEMP      MAIN  F11:MENU  F12:HELP
<INSTALL>
  INSTALL OPERATING SYSTEM.
   OPERATING SYSTEM IS SV22 VER.00A AT PRESENT.
   OS TO BE INSTALLED IS SV13 VER.OOA.

  F1  GO
        0%                  50%                 100%


                                                        Esc:CLOSE
  COMPLETED.
1  GO  2      3      4      5      6      7      8      9      0
```

- - - On completion of the installation, the message "COMPLETED" will be displayed in the message area.
Press the [Esc] key to return to the install function selection window.

If the message "PC COMMUNICATION ERROR" is displayed in the message area, carry out installation again.

Esc

[Install function selection window]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:SAMP2      MAIN  F11:MENU  F12:HELP
                                            <MENU>
                            <OPTION>          ING
                 <SERVO>              AT CONV  R
         <INSTALL>      SETTING                ATION
         1:INSTALL      DATA
         2:VERIFY       PROGRAM               NTENANCE
         Esc:CLOSE      PRINTER    sc:CLOSE
                 5:SERVO FILE       7:OPTION
                 6:ON-LINE          8:INITIAL SETTING
                 7:INSTALL          9:QUIT
                 8:BACKUP
                 9:A273U->A273UH CNV
                            Esc:CLOSE


1      2      3      4      5      6      7      8      9      0
```

- - - Select "VERIFY" in the install function selection window.

2

[Verify function execution window]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:TEMP       MAIN  F11:MENU  F12:HELP
<VERIFY>


  F1  GO
  F2  STOP
        0%                  50%                 100%
        - - -+- - -+- - -+- - -+- - -+- - -+- - -+- - -+


                                                        Esc:CLOSE
1 GO   2 STOP 3      4      5      6      7      8      9      0
```

- - - The verify function execution window will be displayed.
Press the [F1] key to start the verification operation.

Verification operation at the personal computer

B)

4)

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16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

4)

↓

F1

↓

[Verification FD inserted YES/NO dialog box]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:TEMP      MAIN  F11:MENU F12:HELP
<VERIFY>



   F1  GO
   F2  STOP
                      0%              50%              100%
                      - - - + - - - + - - - + - - - + - - - + - - - + - - - +
                         INSTALL DISK READY ?
                              YES              NO


   1  GO  2 STOP 3      4      5      6      7      8      9      0
```

- - - The verification FD inserted YES/NO dialog box will be displayed.
Select "YES" and press the [Enter] key.
The presence of the verification FD will be checked.

> Make sure that the verification FD is inserted in the drive in advance.

B)

Error (presence of verification FD not confirmed)

Enter

[Verify execute YES/NO dialog box]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:TEMP      MAIN  F11:MENU F12:HELP
<VERIFY>
   VERIFY OS
   OS  TO  BE  INSTALLED  IS  SV13  VER.OOA.
   F1  GO
   F2  STOP
                      0%              50%              100%
                      - - - + - - - + - - - + - - - + - - - + - - - + - - - +
                         EXECUTE ?
                              YES              NO

   1  GO  2      3      4      5      6      7      8      9      0
```

- - - When the presence of the verification FD has been confirmed, the verify execute YES/NO dialog box is displayed, and the model name and version of the confirmed verification FD will be displayed in the verification function execution window.
Check the displayed model name and version, select "YES" and press the [Enter] key.
Verification will be executed.

Verification operation at the personal computer

Enter

[Verification in progress]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:TEMP      MAIN  F11:MENU F12:HELP
<VERIFY>
   VERIFY OS
   OS  TO  BE  INSTALLED  IS  SV13  VER.OOA.
   F1  GO
   F2  STOP
                      0%              50%              100%
                      ■ - - + - - - + - - - + - - - + - - - + - - - + - - - +

                                                             Esc:CLOSE
   EXECUTING
   1  GO  2 STOP 3      4      5      6      7      8      9      0
```

- - - During verification, the progress of verification displayed.

> Time taken for verification
> A171SCPU/A171SHCPU
> : Approx. 25 minutes
> A172SHCPU/A273UHCPU
> : Approx. 50 minutes
> (8/32 axis specification)

> Do not disconnect the cable while verification is in progress.
> To discontinue verification, press the [F2] key.
> The discontinue YES/NO dialog box will be displayed and execution will be temporarily discontinued.
> "YES" selected : Verification discontinued
> "NO" selected : Verification continued

5)

16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

5)

[Verification completed]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:TEMP      MAIN F11:MENU F12:HELP
<VERIFY>

  VERIFY OS
    OS TO BE  VERIFIED  IS  SV13 VER.OOA.

  F1  GO
  F1  STOP
           0%                50%               100%



                                                                Esc:CLOSE
  COMPLETED.
 1  GO  2      3      4    5    6      7      8    9      0
```

On completion of verification, the message "COMPLETED" will be displayed in the message area.
Press the [Esc] key to return to the install function selection window.

If the message "PC COMMUNICA-TION ERROR" is displayed in the message area, carry out installation again.

Esc

[Install function selection window]

```
SERVO INSTALL  A3U-0-FF-PC-0              C:SAMP2     MAIN F11:MENU F12:HELP
                                              <MENU>
                                  <OPTION>        ING
                                                  R
                        <SERVO>      AT CONV
  <INSTALL>         SETTING                       ATION
  1:INSTALL         DATA
  2:VERIFY          PROGRAM
              Esc:CLOSE  PRINTER      sc:CLOSE    NTENANCE
              5:SERVO FILE            7:OPTION
              6:MECHANICAL SYSTEM     8:INITIAL SETTING
              7:ON-LINE               9:QUIT
              8:INSTALL
              9:BACKUP
              A:A273U->A273UH CNV
                          Esc:CLOSE

 1      2      3      4    5    6      7      8    9      0
```

Terminate the install mode and select another mode.

NO   ◇ Quit GSV13PE?

YES

Follow procedure for quitting GSV13PE.   See Section 6.2.

Verification operation at the personal computer

6)

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6)

<For A17☐CPU>	<For A273UHCPU>

Operation at the servo system CPU

<For A17☐CPU>

Disconnect the RS-422 cable from the servo system CPU.

Turn the power supply module OFF.

Set the servo system CPU's install switch to OFF.

<For A273UHCPU>

Disconnect the RS-422 cable from the servo system CPU.

Switch off the power to the power supply module.

Remove the servo system CPU from the base unit.

Set the install switch on the rear of the servo system CPU to OFF.

Load the servo system CPU to the base unit.

End

16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

16.2 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.

```
          ┌─────────┐
          │  Start  │
          └─────────┘
               │
               ▼
   ┌───────────────────────────┐
   │ Connect the servo system  │
   │ CPU and personal computer │
   │ with an RS-422 cable.     │
   └───────────────────────────┘
               │
               ▼
   ┌───────────────────────────┐
   │ Turn the power ON.        │
   └───────────────────────────┘
               │
               ▼
   ┌───────────────────────────┐
   │ Start up a personal       │----- See Section 6.1.
   │ computer with the GSV13PE │
   │ software.                 │
   └───────────────────────────┘
               │
               ▼
```

[Servo function selection window]

```
SERVO        A3U-0-FF-PC-0          C:SAMP2    MAIN F11:MENU F12:HELP
                                        <MENU>
                           <OPTION>            ING
                                               R
            <SERVO>              AT CONV
            1:SYSTEM SETTING                   ATION
            2:SERVO DATA
            3:SERVO PROGRAM                    NTENANCE
            4:SERVO PRINTER       sc:CLOSE
            5:SERVO FILE          7:OPTION
            6:ON-LINE             8:INITIAL SETTING
            7:INSTALL             9:QUIT
            8:BACKUP
            9:A273U->A273UH CNV
                        Esc:CLOSE

  1    2    3    4    5    6    7    8    9    0
```
----- Select "INSTALL" in the servo func-
      tion selection window.

```
               │
               ▼
          ┌─────────┐
          │    7    │
          └─────────┘
               │
               ▼
```

[Install function selection window]

```
SERVO INSTALL  A3U-0-FF-PC-0       C:SAMP2    MAIN F11:MENU F12:HELP
                                        <MENU>
                           <OPTION>            ING
                                               R
            <SERVO>         SETTING   AT CONV
            1:INSTALL       DATA                ATION
            2:VERIFY        PROGRAM
                  Esc:CLOSE PRINTER   sc:CLOSE  NTENANCE
            5:SERVO FILE              7:OPTION
            6:ON-LINE                 8:INITIAL SETTING
            7:INSTALL                 9:QUIT
            8:BACKUP
            9:A273U->A273UH CNV
                        Esc:CLOSE

  1    2    3    4    5    6    7    8    9    0
```
----- Select "VERIFY" in the install func-
      tion selection window.

```
               │
               ▼
          ┌─────────┐
          │   1)    │
          └─────────┘
```

┌───┐
│ **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.   │
└───┘

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16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

1)

2

[Verification function execution window]

```
SERVO INSTALL  A3U-0-FF-PC-0          C:TEMP      MAIN  F11:MENU  F12:HELP
<VERIFY>


F1  GO
F2  STOP
              0%                50%                100%
              ---+----+----+----+----+----+----+----+----+----+


                                                           Esc:CLOSE
1   GO  2 STOP 3      4      5      6      7      8      9      0
```

- - - - The verification function execution window will be displayed. Press the [F1] key to start the verification operation.

F1

[Verification FD inserted YES/NO dialog box]

```
SERVO INSTALL  A3U-0-FF-PC-0          C:TEMP      MAIN  F11:MENU  F12:HELP
<VERIFY>


F1  GO
F2  STOP
              0%                50%                100%
              ---+----+----+----+----+----+----+----+----+----+
                        INSTALL DISK READY ?
                        YES              NO

1   GO  2 STOP 3      4      5      6      7      8      9      0
```

- - - - The verification FD inserted YES/NO dialog box will be displayed. Select "YES" and press the [Enter] key. The presence of the verification FD will be checked.

Make sure that the verification FD is inserted in the drive in advance.

Error (presence of verification FD not confirmed)

Enter

[Verification execute YES/NO dialog box]

```
SERVO INSTALL  A3U-0-FF-PC-0          C:TEMP      MAIN  F11:MENU  F12:HELP
<VERIFY>
VERIFY  OS
OS  TO  BE  VERIFIED  IS  SV13  VER.OOA.
F1  GO
F2  STOP
              0%                50%                100%
              ---+----+----+----+----+----+----+----+----+----+
                        EXECUTE ?
                        YES              NO

1   GO  2 STOP 3      4      5      6      7      8      9      0
```

- - - - When the presence of the verification FD has been confirmed, the verification execute YES/NO dialog box is displayed, and the model name and version of the confirmed verification FD will be displayed in the verification function execution window. Check the displayed moled name and version, select "YES" and press the [Enter] key. Verification will be executed.

2)

Verification operation at the personal computer

16. INSTALLATION AND VERIFICATION OF THE POSITIONING OS

2)

```
┌─────────┐
│  Enter  │
└─────────┘
```

[Verification in progress]

```
┌──────────────────────────────────────────────────────────┐
│ SERVO INSTALL  A3U-0-FF-PC-0       C:TEMP    MAIN F11:MENU F12:HELP │
│ <VERIFY>                                                    │
│ VERIFY OS                                                   │
│ OS TO BE VERIFIED IS SV13 VER.OOA.                          │
│ F1 GO                                                       │
│ F2 STOP                                                     │
│     0%              50%                100%                  │
│     ■─+───+───+───+───+───+───+───+───+───+                 │
│                                              Esc:CLOSE      │
│ EXECUTING                                                   │
│ 1  GO 2 STOP 3    4    5    6    7    8    9    0            │
└──────────────────────────────────────────────────────────┘
```

During verification, the progress of verification is displayed.
(Time taken for verification : Approx. 30 minutes)

Do not disconnect the cable while verification is in progress.
To discontinue verification, press the [F2] key.
The discontinue YES/NO dialog box will be displayed and execution will be temporarily discontinued.
"YES" selected : Verification discontinued
"NO" selected : Verification continued

[Verification completed]

```
┌──────────────────────────────────────────────────────────┐
│ SERVO INSTALL  A3U-0-FF-PC-0       C:TEMP    MAIN F11:MENU F12:HELP │
│ <VERIFY>                                                    │
│ VERIFY OS                                                   │
│ OS TO BE VERIFIED IS SV13 VER.OOA.                          │
│ F1 GO                                                       │
│ F2 STOP                                                     │
│     0%              50%                100%                  │
│     ████████████████████████████████████                   │
│                                              Esc:CLOSE      │
│ COMPLETED.                                                  │
│ 1  GO 2     3    4    5    6    7    8    9    0             │
└──────────────────────────────────────────────────────────┘
```

On completion of verification, the message "COMPLETED" will be displayed in the message area.
Press the [Esc] key to return to the install function selection window.

If the message "PC COMMUNICATION ERROR" is displayed in the message area, carry out verification again.

Verification operation at the personal computer

```
┌─────────┐
│   Esc   │
└─────────┘
```

[Install function selection window]

```
┌──────────────────────────────────────────────────────────┐
│ SERVO INSTALL  A3U-0-FF-PC-0       C:SAMP2   MAIN F11:MENU F12:HELP │
│                                    <MENU>                    │
│                         <OPTION>         ING                │
│                <SERVO>            AT CONV R                  │
│ <INSTALL>       SETTING                   ATION             │
│ 1:INSTALL       DATA                                        │
│ 2:VERIFY        PROGRAM                   NTENANCE          │
│ Esc:CLOSE       PRINTER                                     │
│                 5:SERVO FILE      sc:CLOSE                  │
│                 6:MECHANICAL SYSTEM 7:OPTION                │
│                 7:ON-LINE         8:INITIAL SETTING         │
│                 8:INSTALL         9:QUIT                    │
│                 9:BACKUP                                    │
│                 A:A273U->A273UH CNV                         │
│                          Esc:CLOSE                         │
│                                                             │
│ 1    2    3    4    5    6    7    8    9    0               │
└──────────────────────────────────────────────────────────┘
```

Terminate the install mode and select another mode.
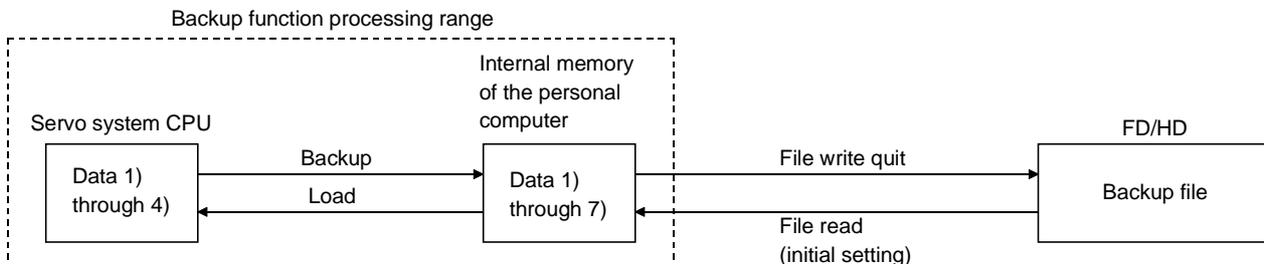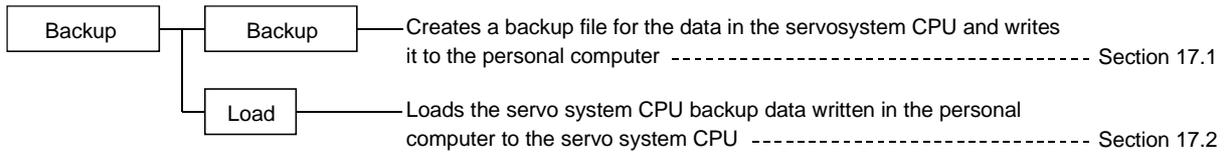
17. BACKUP FUNCTION

(1) The backup function is a function whereby the following data in the servo system CPU is <u>backed up by being read to the internal memory of the personal computer and is then loaded (written) again to the servo system CPU.</u>
  1) System setting data
  2) Positioning data
  3) Servo program data
  4) Data required for home position return in the servo system CPU

(2) The backup function is used when replacing the servo system CPU.
  It is possible to read the data indicated in 1) to 4) in (1) above into the current servo system CPU in the backup mode before replacement, then, in the load mode, write the data in the personal computer to the servo system CPU after replacement.
  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).
  1) With an absolute position system, use of the backup function makes startup operations such as home position return unnecessary after replacement.
  2) With systems other than an absolute position system, this function can be used to batch write data 1) to 3) in (1) above (data 4) is cleared).
     <u>In this case it is essential to execute a home position return after replacement.</u>

(3) The backup function <u>does not create a backup file.</u>
  The data read from the servo system CPU to the internal memory of the personal computer is stored in the FD/HD as a backup file when "SAVE AND QUIT" is executed.
  The data in the backup file is read by selecting " file read" in the initial settings (see Section 6.1) when the GSV13PE is started up.
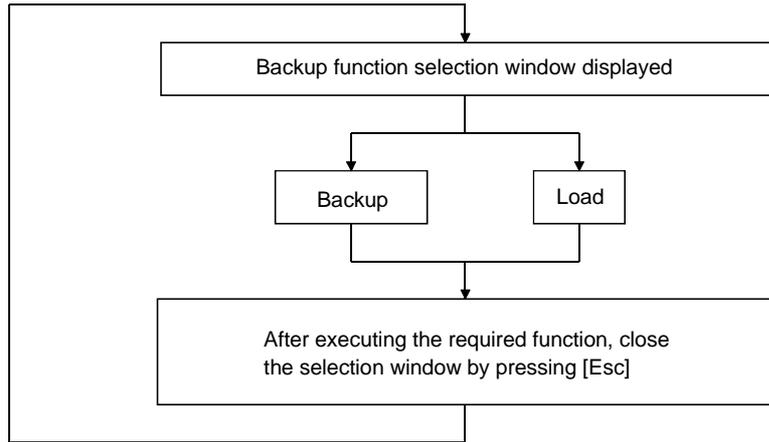

Backup function processing range

Servo system CPU — Data 1) through 4)

Internal memory of the personal computer — Data 1) through 7)

Backup / Load

File write quit / File read (initial setting)

FD/HD — Backup file

17. BACKUP FUNCTION

(4) Outline of functions
The following functions are available in the GSV13PE backup functions.

```
Backup ─── Backup ─── Creates a backup file for the data in the servosystem CPU and writes
                      it to the personal computer ------------------------------- Section 17.1
         └── Load ─── Loads the servo system CPU backup data written in the personal
                      computer to the servo system CPU ---------------------------- Section 17.2
```

(5) Summary of procedure
A summary of the procedure for executing backup/load is presented below.

```
┌─────────────────────────────────────────┐
│   Backup function selection window displayed │
└─────────────────────────────────────────┘
         ┌──────────┐      ┌──────────┐
         │  Backup  │      │   Load   │
         └──────────┘      └──────────┘
┌─────────────────────────────────────────┐
│  After executing the required function, close │
│  the selection window by pressing [Esc]   │
└─────────────────────────────────────────┘
```

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.

17. BACKUP FUNCTION

17.1 Servo System CPU Backup

This function creates a backup of the system setting data, positioning data and servo program data currently written in the servo system CPU, and of the current device data, data required for home position return, etc., of the servo system CPU, and writes it to a personal computer.

[Procedure to Display the Backup Function Execution Window]

```
┌─────────────────┐        ┌───┐      ┌──────────────────┐
│ Servo function  │   ───► │ 8 │ ───► │ Backup function  │
│ selection window│        └───┘      │ execution window │
└─────────────────┘          │        └──────────────────┘
                         Selection of
                       backup function
```

[Backup Function Execution Window] (When using A273UHCPU)

```
<BACK UP>

 F1  BACK UP   (A273UHCPU → PC-AT)

 F2  LOAD      (PC-AT → A273UHCPU)

[CAUTIONS]   1. STOP THE A273UHCPU.
             2. MAKE DATA LINK OFFLINE.          ◄──────  Caution display area
             3. CONNECT THE PC-AT TO THE A273UHCPU.
          0%            50%            100%
          --- + --- + --- + --- + --- + --- + --- +      ◄──────  Indicator display area

                                        Esc:CLOSE
1 BACKUP 2 LOAD 3     4     5     6     7     8    9    0
```
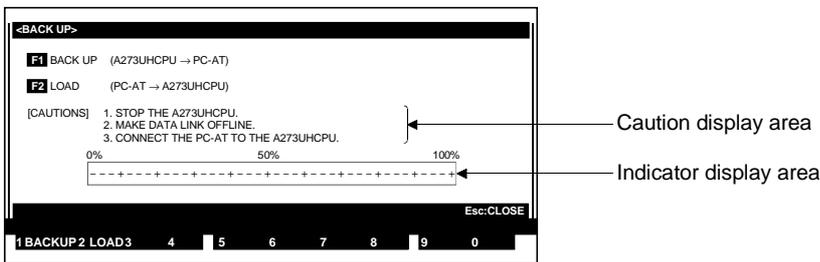
[Display/Setting Contents]

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 Operations]

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, first check the cautions to be observed when executing backup, then press the [Enter] key while "YES" is highlighted.
(If "NO" is highlighted, press the [←] 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 operation, highlight "NO" by pressing the [→] key, then press the [Enter] key.
The system will return to the backup function execution window without executing backup.
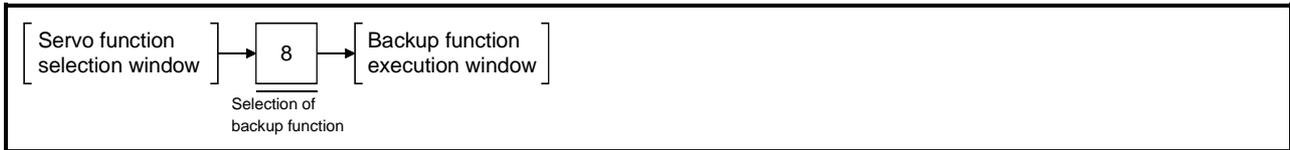
Closing the window 1) To close the backup function execution window, press the [Esc] key.
The system will return to the servo function selection window.
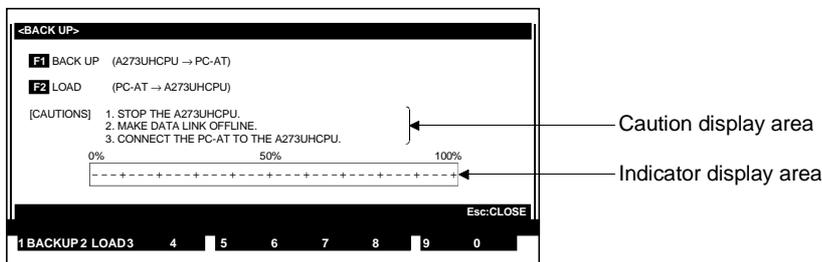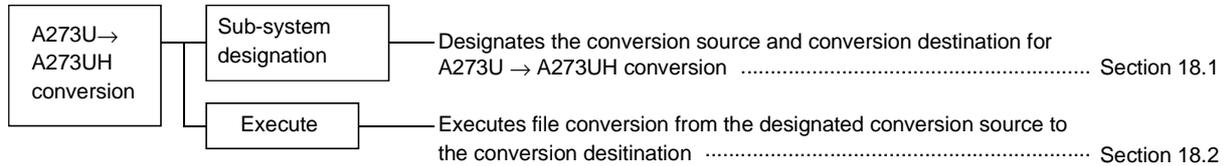
17. BACKUP FUNCTION

17.2 Loading Backup Data to the Servo System CPU

This function loads the servo system CPU backup data currently written in the personal computer (backup of system setting data, positioning data and servo program data currently written in the servo system CPU, and of the current device data, data required for home position return, etc., of the servo system CPU) to the servo system CPU.

[Procedure to Display the Backup Function Execution Window]

```
┌ Servo function    ┐      ┌───┐      ┌ Backup function    ┐
│ selection window  │ ───→ │ 8 │ ───→ │ execution window   │
└                   ┘      └───┘      └                    ┘
                         Selection of
                        backup function
```

[Backup Function Execution Window] (When using A273UHCPU)

```
<BACK UP>

  [F1] BACK UP   (A273UHCPU → PC-AT)

  [F2] LOAD      (PC-AT → A273UHCPU)

  [CAUTIONS]   1. STOP THE A273UHCPU.
               2. MAKE DATA LINK OFFLINE.          ──────←  Caution display area
               3. CONNECT THE PC-AT TO THE A273UHCPU.
     0%               50%              100%
     --- +--- +--- +--- +--- +--- +--- +--- +      ──────←  Indicator display area

                                        Esc:CLOSE

1 BACKUP 2 LOAD 3      4     5     6     7     8     9     0
```

[Display/Setting Contents]

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 Operations]

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 highlight "YES".)
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, highlight "NO" by pressing the [→] key, then press the [Enter] key.
   The system will return to the backup function execution window without executing load.

Closing the window
1) To close the backup function execution window, press the [Esc] key.
   The system will return to the servo function selection window.

18.　A273U → A273UH FILE CONVERSION

The A273U → A273UH conversion mode is the mode in which files created for use with A273UCPU are converted for use with A273UHCPU (8-axis specifications).

(1) Outline of functions
The following functions are available with the A273U → A273UH conversion mode of the GSV13PE.

A273U→ A273UH conversion	Sub-system designation	— Designates the conversion source and conversion destination for A273U → A273UH conversion .... Section 18.1
	Execute	— Executes file conversion from the designated conversion source to the conversion desitination .... Section 18.2

(2) Summary of procedure
A summary of the procedure for executing A273U → A273UH file conversion is presented below.

```
        ┌─────────────────────────────────────────────────────────────┐
        │     A273U → A273UH file conversion window displayed          │
        └─────────────────────────────────────────────────────────────┘
                              │
                              ▼
                ┌──────────────────────────────────┐
                │   Sub-system name designation     │   ([F1])
                └──────────────────────────────────┘
  Conversion                 │
  of another                 ▼
  file            ┌────────────────────┐
                  │      Execute        │            ([F2])
                  └────────────────────┘
                              │
        ┌─────────────────────────────────────────────────────────────┐
        │   Close A273U → A273UH file conversion window                │   ([Esc])
        └─────────────────────────────────────────────────────────────┘
```
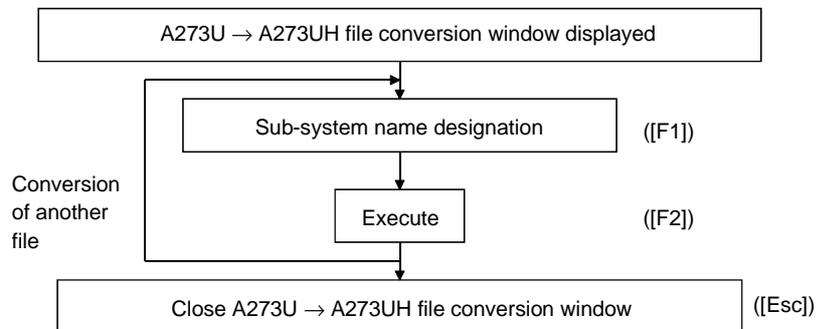
* The user files that are applicable for "A273U → A273UH" file conversion" and the conversion details are indicated below.

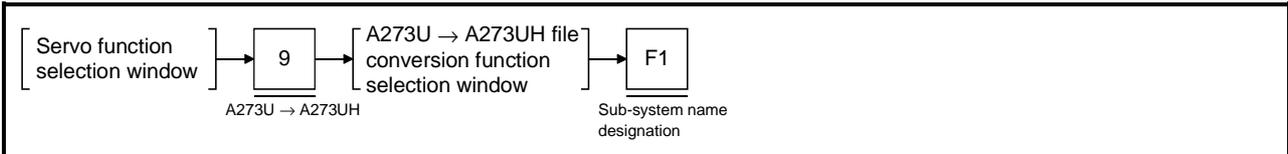|	Conversion Source File for A273U	Conversion Destination File for A273UH (8-axis specifications)	Conversion Details
PC Type	GSV.CNF	GSVP.CNF	Converted to A273UH (8-axis specifications) PC type.
System setting servo data	SVDATA.BIN	SVSYSTEM.BIN	"System setting" data made compatible with A273UHCPU
		SVDATA.BIN	• The parameters added for A273UHCPU are set to their initial values. • The servo parameters added for the ADU axis are set to the default. If necessary, set other values.
Servo program	SVPROG.BIN	SVPROG.BIN	• Only the file size is changed. • The program contents remain unchanged.

18. A273U → A273UH FILE CONVERSION

18.1 Sub-System Name Designation

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 to Execute the Sub-System Name Designation Function]

[A273U → A273UH File Conversion Function Selection Window]
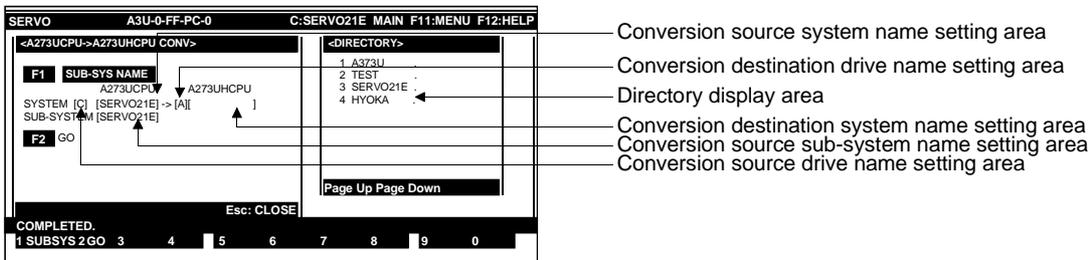
[Display/Setting Contents]

Conversion source drive name setting area	The drive name currently being read is displayed here. Set the conversion source drive name.
Conversion source system name setting area	The system name currently being read is displayed here. Set the conversion source system name.
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 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.)
Conversion destination system name setting area	Set the system name in which the A273U → A273UH converted file is to be stored here.
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.

POINT

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.

---

18. A273U → A273UH FILE CONVERSION

[Key Operations]

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.
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 subsystem 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.

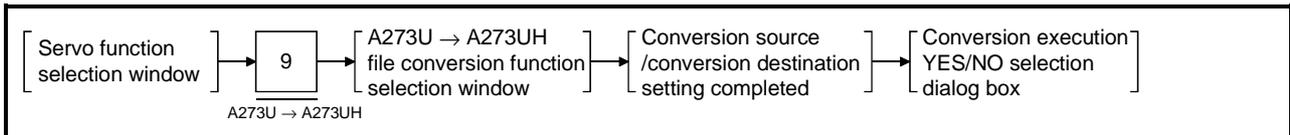| POINTS |
| --- |
| (1) Cursor motion when selecting the sub-system name designation function
With the exception of the conversion destination drive name, it is possible to return to the previous setting area by using the [↑]/[←] keys after making each setting.
(2) When setting the conversion destination 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. |

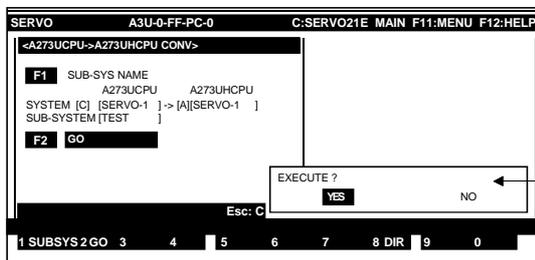# 18. A273U → A273UH FILE CONVERSION

18.2 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 to Display the Conversion Execution YES/NO Dialog Box]

```
┌──────────────┐     ┌───┐     ┌─A273U → A273UH──┐     ┌─Conversion source──┐     ┌─Conversion execution─┐
│Servo function│ ──▶ │ 9 │ ──▶ │file conversion   │ ──▶ │/conversion destination│ ──▶ │YES/NO selection      │
│selection     │     └───┘     │function          │     │setting completed    │     │dialog box            │
│window        │   A273U →      │selection window │     └────────────────────┘     └─────────────────────┘
└──────────────┘   A273UH       └─────────────────┘
```

[Conversion Execution YES/NO Dialog Box]

```
SERVO          A3U-0-FF-PC-0              C:SERVO21E  MAIN  F11:MENU  F12:HELP
 ┌──────────────────────────────────────────────────────────────────────┐
 │<A273UCPU->A273UHCPU CONV>                                              │
 │  ┌──┐                                                                  │
 │  │F1│  SUB-SYS NAME                                                    │
 │  └──┘     A273UCPU         A273UHCPU                                   │
 │  SYSTEM [C] [SERVO-1  ] -> [A][SERVO-1  ]                              │
 │  SUB-SYSTEM [TEST     ]                                                │
 │  ┌──┐                                                                  │
 │  │F2│  GO                                                              │
 │  └──┘                                                                  │
 │                      ┌─────────────────────────┐                      │
 │                      │ EXECUTE ?          ◀─────┼──── Conversion execution YES/NO selection dialog box
 │                      │     YES        NO        │
 │                      └─────────────────────────┘
 │                       Esc: C                                           │
 └──────────────────────────────────────────────────────────────────────┘
 1 SUBSYS 2 GO  3       4       5       6       7       8 DIR  9      0
```

[Display/Setting Contents]
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 Operations]

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 drive name and system name are the same as the drive name and system name for the conversion destination. 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 execution of conversion, press the [→] key to highlight "No", then press the [Enter] key.
   Execution will be discontinued.

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18. A273U → A273UH FILE CONVERSION

**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 returns to the servo function selection window.

19. ERROR MESSAGES DURING GSV13PE OPERATION

This section describes the error messages which can occur during GSV13P operation, the error contents, and appropriate remedies.
The cause of the error and remedy 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	Remedy
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.
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 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 number 0 was displayed. The [F8] key was pressed to display the next program number while program number 4095 was displayed. The copy source program does not exist.	Check the program number.
A write error occurred	Data could not be written to the program memory in the servo PC.	Defective internal memory of CPU. Replace.
Two-byte characters not allowed	A two-byte character was used where it is not permitted.	Use one-byte characters.
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	Although ABS servomotors have been set during system set-up, no battery unit was set at the main base unit.	Set a battery unit when ABS servomotors 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.
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.

19. ERROR MESSAGES DURING GSV13PE OPERATION

Error Message	Description	Remedy
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: OFF).	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</u> A. ▲—Excess current	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.	Turn ON the Servo Ready signal before issuing the start command.
	When the servo monitor torque trace was started, Servo Ready was OFF for the axis.	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.	Make sure that the item is an additional item before attempting to delete it. Alternatively, delete the entire program.
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. X-axis allocation: <u>Main base (I/01)</u>* <u>Separate servo-amplifier (d2)</u> ▲ └— 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.
Duplicate PC I/O module I/O numbers. <u>Main base (I/00)</u>/ <u>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.
Incorrect execution position	A function was executed in an inappropriate position.	Execute the function in an appropriate position.
System not set up	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 up the system before setting the servo data. Or run the relative check after setting up the system and check that no error occurs.

*: Underlined display messages differ according to the settings.

19. ERROR MESSAGES DURING GSV13PE OPERATION

Error Message	Description	Remedy
Incorrect setting range	Copy source range set with the start number greater than the end number. Or, the copy source and copy destination ranges overlap.	Designate the correct range.
	An attempt was made to set data out-of-range.	
Duplicate start axes	During servo programming, duplicate start axes existed in the programs (K0 to K4095) set for the simultaneous start (START) instruction.	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 (2) in the section "Error Codes Displayed When Axis Does Not Start."	
No end instruction	No end instruction for the servo programming speed-switching instruction (VSTART).	Set the end instruction.
Duplicate end instructions	Duplicated end instructions for the servo programming speed-switching instruction (VSTART).	Check the end instructions.
Incorrect end 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.
Outside stroke limit range	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	An attempt was made to set data out-of-range.	Set the data inside the setting range.
Capacity of set battery unit too small	During system set-up, the capacity of the currently set battery pack was insufficient for the total number of ABS servo motors and ABS synchronization encoders.	Check the capacity of the battery pack against the ABS servomotors.
Incorrect set data	Data was set out-of-range.	Set data inside the setting range.
Cannot set	An attempt was made to set data although data cannot be set.	Check whether or not data item requires setting.
Setting not required	An attempt was made to set a parameter which does not require setting.	Do not set the parameter.
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.
	During servo programming, insufficient free space to store.	Sort to secure sufficient free space.

19. ERROR MESSAGES DURING GSV13PE OPERATION

Error Message	Description	Remedy
Servo external signal unit (A278LX) required to use dynamic brake unit (A240DY)	The dynamic brake unit (A240DY) was set during system set-up, but no servo external signal unit (A278LX) was set.	Always set the servo external signal unit (A278LX) when using the dynamic brake unit (A240DY).
Press correct key	An invalid key was pressed.	Press the 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.
No data	GSV13PE incorrectly installed.	Correctly install the GSV13PE.
	An attempt was made to print before printed data was set in the servo printer mode.	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 W000 to W3FF/W1FFF.	Set the correct device number.
	When reading a program with the servo on-line, an attempt was made to read a non-existent servo program.	Designate the correct servo program number.
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 exceeded the limit value.	Check the limit value 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.
Cannot open file	A file could not be opened when writing the file.	Check the free space on the hard disk.
Printer not ready	Cannot print because the printer is not ready.	Set up the printer.
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.
Incorrect syntax: No. = XXX ↑ Program number	A syntax error occurred with the use of repeated operation instructions during servo programming.	Correct the program.
Axis not used	An axis which is not used was designated at system set-up.	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.

19. ERROR MESSAGES DURING GSV13PE OPERATION

Error Message	Description	Remedy
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.
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^{2}ROM.	Defective Internal memory of CPU. Replace.
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.
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.
Cannot connect HA-LH52 *to A221AM (main base I/03). (For A273UHCPU only)	During system set-up, the wrong motor type was connected to an amplifier.	Check the amplifier and motor types.
No END instruction	No End instruction (CPEND, VEND) with constant-speed or speed-switching control.	Set the END instruction.
Incorrect END instruction position	Instructions exist after the END instruction (CPEND, VEND) in a servo program.	Delete any instructions after the END instruction.
Incorrect FOR-NEXT instructions	Incorrect use of repeated operation 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 repeated operation instructions.
ABS motor cannot be used with MR-H100B-S70 (separate servo amplifier d1)	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. 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.

19. ERROR MESSAGES DURING GSV13PE OPERATION

(2) Error codes displayed when axis does not start

Error Code		Description	Remedy
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 reception 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.

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