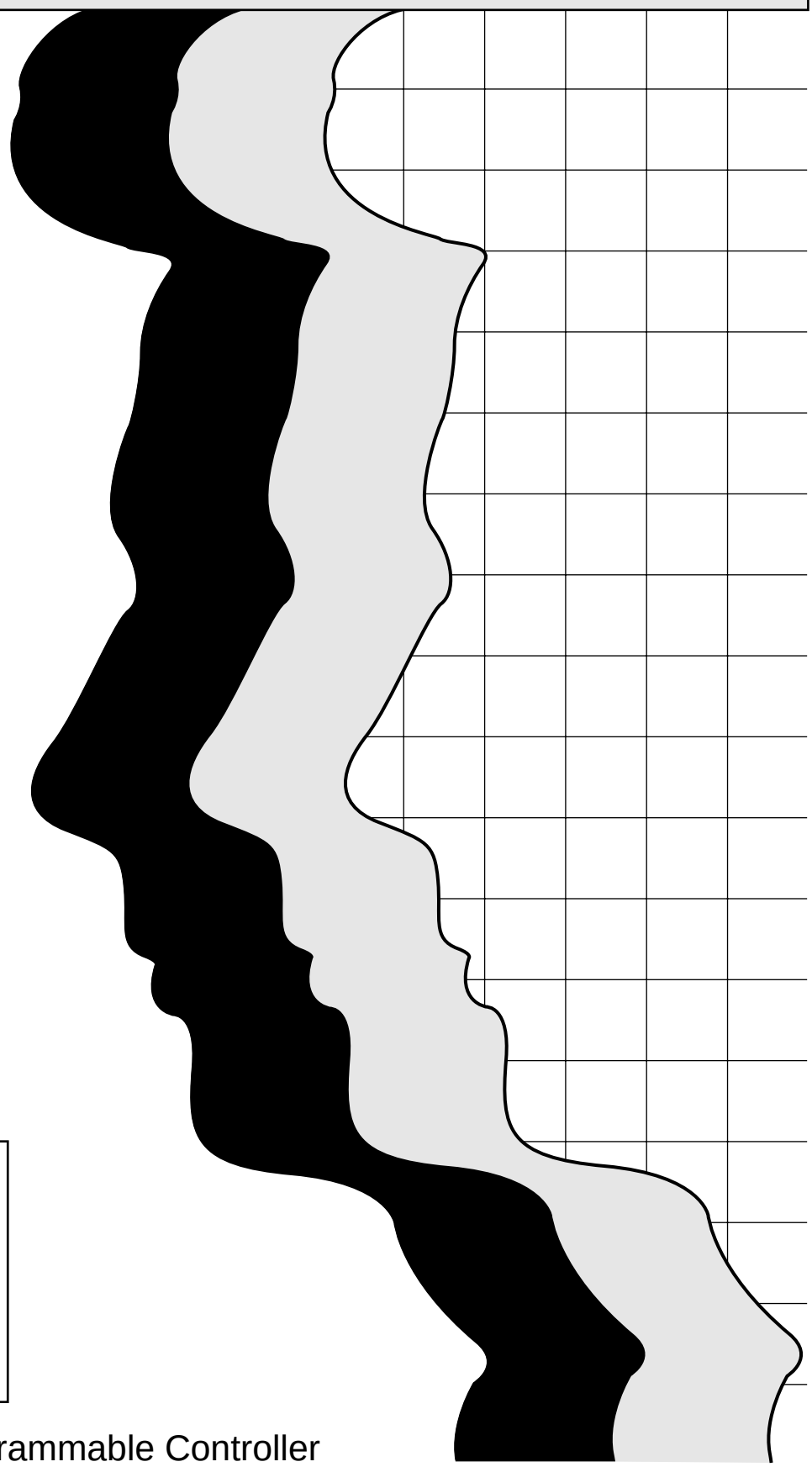
MITSUBISHI

Programming unit type A7PUS

Operating Manual



A

MELSEC

Mitsubishi Programmable Controller

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the PC system safety precautions.

These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".

⚠DANGER	**Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.**
⚠CAUTION	**Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.**

Depending on circumstances, procedures indicated by ⚠**CAUTION** may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

⚠DANGER

- When performing the control of the PC in operation (especially changing data and program), configure an interlock circuit in a sequence program so the safety of the overall system is always maintained.

⚠CAUTION

- Do not bunch the communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100mm (3.94 in.) or more from each other.
  Failure to do so could result in noise that would cause erroneous operation.

[INSTALLATION PRECAUTIONS]

⚠DANGER

- The A7PUS consumption power (DC5V, 0.4A) is supplied from the power module of the CPU module to which the A7PUS is connected.
- Before connecting the A7PUS, make sure the power module will output sufficient current.
  If the output current is insufficient, the PC will stop operating, and all output will be turned off.

[INSTALLATION AND HANDLING PRECAUTIONS]

⚠CAUTION
• Use the PC in the environment given in the general specification of this manual. Using the PC outside the range of the general specifications may result in electric shock, fire or erroneous operation or may damage or degrade the product. • When an add-on-system connection is used, make sure the connector is securely installed and the A7PUS fixing screws are securely tightened. When a hand-held-system connection is used, make sure the RS-422 cable is securely installed in its connector and the fixing screws of the connector are securely tightened. Defective contact may cause malfunctioning.

[WIRING PRECAUTIONS]

⚠CAUTION
• Be sure to secure communication cable connected to the module is fixed with cramps. Failure to do so may cause a damage to the module or cables due to dangling, shifting or inadvertent handling of cables, or misoperation because of bad cable contacts. • Do not grab on the cable when removing the communication cable connected to the module. When removing the cable with a connector, hold the connector on the side that is connected to the module. Pulling the cable that is still connected to the module may cause a damage to the module or cable, or misoperation due to bad cable contacts.

[STARTING AND MAINTENANCE PRECAUTIONS]

⚠CAUTION
• Before conducting operations such as changing the program while the module is operating, force output, etc., be sure to thoroughly read the manual and take due consideration for safety. Incorrect operation could damage the machinery and cause accident. • Do not disassemble or renovate the A7PUS. Doing so could cause trouble, erroneous operation, injury, or fire.

[DISPOSAL PRECAUTIONS]

⚠CAUTION
• When disposing of this product, treat it as industrial waste.

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Manual Name : A7PUS OPERATING IB(NA)66362-A

Section	Manual Page No.	V. P. DATA Floppy		DESIGNER DATA FILE NAME
		File name	Floppy No.	
	REVISION	REV.CHP	1	
	CONTENTS	CONTENTS.CHP		
	IMPORTANT	END.CHP		
	FILELIST	FILE.CHP		
1	1-1 to 1-2	010000AC.CHP		010100
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4	4-1 to 4-5	040000AC.CHP		P4D2, 040300
5	5-1 to 5-5	050000AC.CHP	2	050101, 050101-2, 050102, 050102B,050102B, 55A
5	5-6 to 5-12	050104AC.CHP		510A
5	5-13 to 5-19	050300AC.CHP		050301A, N050301B,N050302B, 513C, 514B, 514C, 514X, 515C, 515D, 516A, 516B, 516C, 517C, 519C
6	6-1 to 6-3	060000AC.CHP	3	62A, 62B, 62D, 62E
6	6-4 to 6-7	060200AC.CHP		64A, 64B, 626B, 65B, 66A, 66B, 67A
6	6-8 to 6-13	060202AC.CHP		68A, 69A, 69B, 610A, 611A, 612A
6	6-14 to 6-16	060203AC.CHP		68A, 64B, 615A, 615B, 616A
6	6-17 to 6-22	060300AC.CHP	4	617A, 617B, 617C, 618A, 619B, 619C, 620A, 621A, 619W
6	6-23 to 6-25	060303AC.CHP		617A, 623B, 623C, 624A, 620A, 625BB
6	6-26 to 6-29	060400AC.CHP		617A, 617B, 627A, 627B, 628B, 628C
6	6-30 to 6-32	060402AC.CHP		060202, 617A, 617B, 628B, 632B
6	6-33 to 6-38	060500AC.CHP		617A, 633B, 634B, 635A, 636B, 636C, 637C, 637A, 638A
6	6-39 to 6-45	060503AC.CHP	5	617A, 639B, 639C, 640B,641A, 642C, 643A, 643B, 643C, 644A, 645A
6	6-46 to 6-52	060505AC.CHP		617A, 633B, 647A, 648A, 649A, 649B, 650A, 650C, 652A
6	6-53 to 6-58	060602AC.CHP	6	649A, 653B, 653C, 654A, 654C, 655A, 656A, 656C, 657A, 657C, 658Z
6	6-59 to 6-63	060604AC.CHP		649A, 659C, 660A, 660B, 661A, 661B, 661C, 662B, 662C, 663A
6	6-64 to 6-66	060606AC.CHP		664A, 664B, 665A, 665B, 666A
6	6-67 to 6-71	060700AC.CHP	7	667A, 667C, 668A, 670A, 671A, 671B
6	6-72 to 6-76	060702AC.CHP		673A, 673B, 673C, 673D, 673E, 673F, 673H, 673I, 673K, 674A, 674B, 675B, 676A, 676B
6	6-77 to 6-80	0607A2AC.CHP		673F, 677A, 677B, 677C, 678A, 679C, 680A
6	6-81 to 6-85	0607B2AC.CHP		673K, 681A, 682A, 682B, 683A
7	7- 1 to 7-2	070000AC.CHP	8	
7	7- 3 to 7-8	070200AC.CHP		
APP	APP-1 to APP3	A00000AC.CHP		F010000.DRW (F010000A.WMF, F010000B.WMF), F020000.DRW(F020000A.WMF)
APP	APP-4 to APP-5	A40000AC.CHP		

1. GENERAL INFORMATION

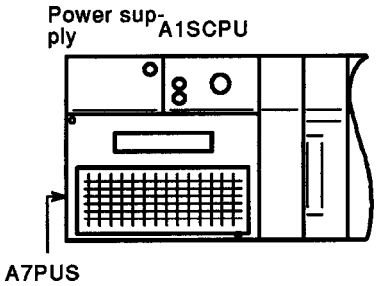
This manual explains the specifications, handling, and operations of the A7PUS programming module (hereafter referred to as the A7PUS).

The A7PUS is a peripheral that is used with the MELSEC-A series of general purpose programmable controllers. It can read from and write to a sequence program in a MELSEC-A series PC CPU. The A7PUS is also used for monitoring and testing devices. Follow the procedures in this manual when using the A7PUS to perform program I/O, as well as inspection and maintenance.

1.1 Features

(1) Compact size

The external dimensions of the A7PUS are: 102 mm (4.02 in) (H) x 109 mm (4.29 in) (W) x 35.5 mm (1.40 in) (D). Because of its compact size, the A7PUS can be directly connected to an A1SCPU.



(When directly connected to an A1SCPU)

(2) It can be used with a variety of MELSEC-A series PC CPUs.

In addition to an A1SCPU, the A7PUS can be connected to the following PC CPUs (see Section 2.2):

A0J2H

A1(N), A2(N), A3(N)

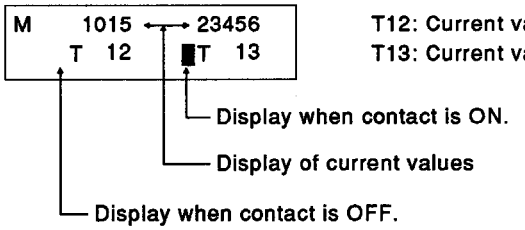
A2A, A3A (Extension devices and the extension part of an index qualification cannot be used. See Section 3.1.)

(3) Easy maintenance of parameters and sequence programs.

It is easy to check, change, revise, and add on PC CPU parameters and sequence programs.

LD		X0	Change	LD		X0	
OUT		Y20	⟶	MOV		D0	D1
LD	to	X1		LD	to	X1	

In addition, a PC CPU's device memory can be easily checked.



1.2 Necessary Parts

After buying the A7PUS, make sure that package contains the following items:

Model Name	Type of Product	Quantity	Remarks
A7PUS	Programming module	1	—
—	Protective cap for RS-422 connector	1	Placed on the connector at the factory.

In this manual, the following terms and abbreviations are used:

(1) A7PUS

A7PUS Programming Module

(2) ACPU

The A series PC CPUs to which the A7PUS can be connected (see Section 2.2).

(3) < > CPU

PC CPUs that have MELSECNET link functions as well.

(Also includes A1CPU → A1CPUP21/A1CPUR21)

(4) Peripheral devices

The following MELSEC-A series peripheral devices:

A6GPP Intelligent GPP

A6PHP Plasma handy graphic programmer

A6HGP Handy graphic programmer

2. SYSTEM CONFIGURATIONS

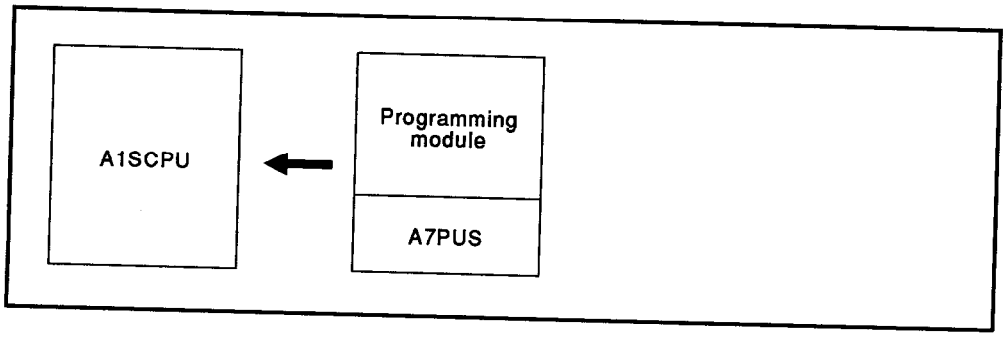
This section shows the system configurations and components used with the A7PUS.

2.1 System Configurations

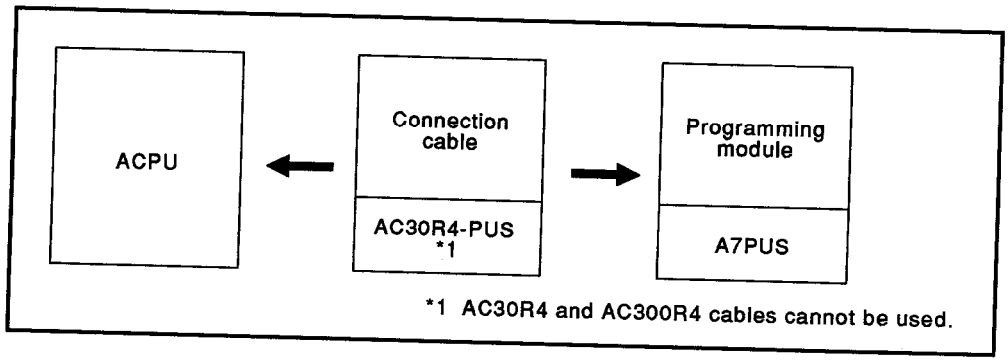
As shown below, the A7PUS can be connected to an ACPU by either the add-on or hand-held method.

Method	Connection
Add-on	The A7PUS is directly connected to an ACPU.
Hand-held	The A7PUS is indirectly connected to an ACPU via an AC30R4-PUS cable.

(1) Add-on method



(2) Hand-held method



POINT

- Section 2.2 gives connectable ACPUs.
- When using the add-on method, the A7PUS can be connected to ACPUs other than an A1SCPU. However, the A7PUS can only be screwed onto an A1SCPU.

  Mitsubishi recommends using the hand-held method to connect the A7PUS to an ACPU.

  When using the add-on method, if the A7PUS must be connected to an ACPU other than an A1SCPU, always remove the A7PUS from the ACPU after completing the operation.

2.2 Connectable ACPUs

The ACPUs to which the A7PUS can be connected are shown below:

< > P21/R21 modules which have the MELSECNET link functions are also included.

(For instance, if an A1CPU is used, the A7PUS can be connected to either an A1CPUP21 or A1CPUR21.)

Connectable ACPUs	PC Model	Called in This Manual
A0J2CPU	A0J2CPU	A0J2CPU
A0J2HCPU	A0J2HCPU	A0J2HCPU
A1CPU, A1NCPU	A1CPU	A1CPU
A1SCPU	A1SCPU	A1SCPU
A2CPU(-S1), A2NCPU(-S1)	A2CPU	A2CPU
A2CCPU	A2CCPU	A2CCPU
A2ACPU(-S1)	A2ACPU	A2ACPU
A3CPU, A3NCPU	A3CPU	A3CPU
A3ACPU	A3ACPU	A3ACPU
A3HCPU	A3HCPU	A3HCPU
A3MCPU	A3HCPU	A3MCPU
A3VCPU	A3CPU	A3VCPU
A73CPU	A3CPU	A73CPU

POINT

The A7PUS uses power from the ACPU to which it is connected.

The current consumption of the A7PUS is 5 VDC and 0.4 A. The power supply and the capacity of the total internal current consumption of the ACPU must be taken into consideration when the A7PUS is connected.

2.3 System Equipment

The equipment needed to use the A7PUS is given below.

Model Name	Description	Remarks
A7PUS	Programming unit	Programming unit with an LCD and programming function.
AC30R4-PUS	RS-422 cable	Cable for connecting the A7PUS to an ACPU Length: 3m Only used with the hand-held method.

3. SPECIFICATIONS

3.1 List of Functions

Table 3.1 List of Functions

Mode (Mode Display)	Function	Purpose	Reference Sections
—	PC memory all clear	To clear key words, parameters, and programs	6.1
Write (W)	Continuous writing of NOP instructions	To write NOP to the designated range of a program	6.2.1
	Change/add to programs; writes new programs	To write new programs as well as change and/or add to existing ones.	6.2.2
	Change the and C set values in ACPU RUN	To change the T (timer) and the C (counter) set values (direct designations) when an ACPU is in the RUN state.	6.2.3
Read (R)	Reads programs	To designate step numbers, instructions or devices, as well as read program instructions.	6.3
Insertion/ Deletion (I)	Insert in a program	To insert a ladder in a program.	6.4.1
	Delete from a program	To delete a unit instruction from a program	6.4.2
Monitor (M)	Bit device monitoring	To confirm the state of a bit device.	6.5.1
	Word device monitoring	To confirm the value in a word device.	6.5.2
	T and C monitoring	To confirm the current values in the timer (T) and counter (C) as well as the state of the contacts.	6.5.3
	Continuity check	To confirm the ON/OFF and current value states of a ladder	6.5.4
	Offline switch monitoring	To confirm the set state of a bit device's offline switch.	6.5.5
Test (T)	Bit device set/reset	To set (ON) or reset (OFF) a bit device.	6.6.1
	Word device current value change	To change the current value in a word device.	6.6.2
	Offline switch set/cancel	To execute separation of a designated bit device in an ACPU; or to cancel the separation operation.	6.6.3
	Program check	To check the following items in a program: Is a duplex coil used? Is there an instruction code? Is there an END instruction?	6.6.4
	Error check	To confirm the error step and error code when an error occurs.	6.6.5
	Read/write from/to memory using machine language.	To use machine language to read from or write to memory.	6.6.6
Parameter (P)	Clear all parameters.	To only clear parameters	6.7.1
	Set/change parameters and key words	To set all parameters and key words; or to change set parameter and key word values	6.7.2

	A0J2	A0J2H	A1 A1N	A1S	A2 A2N (S1)	A2C	A2A *2	A3 A3N Models *1	A3H A3M	A3A *2
	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	O	O	O	O	O	O	O	O	O	O
	O	O	O	O	O	O	O	O	O	O
	O	O	O	O	O	O	O	O	O	O
	O	O	O	O	O	O	O	O	O	O
	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	O	O	O	O	O	O	O	O	O	O
	O	O	O	O	O	O	O	O	O	O
	O	O	O	O	O	O	O	O	O	O
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	O	O	O	O	O	O	O	O	O	O
	—	O	O	O	O	O	—	O	—	—
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	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

O : Operable when the ACPU is in the RUN state.
▲ : Only operable when the ACPU is in the STOP state.
— : Not operable

*1 Refers to the following PC CPUs:

A3CPU, A3NCPU, A3VCPU, A73CPU

*2 Device settings in an A2ACPU and A3ACPU are restricted to the same range as an A3HCPU.

The extension devices and the extension part of an index qualification in an A3HCPU cannot be used.

Use devices X and Y in the following ranges:

A2ACPU: 0 to 1FF (-S1 is 3FF), A3ACPU: 0 to 7FF

3.2 General Specifications

Table 3.2 A7PUS General Specifications

Item	Specifications					
Ambient temperature	Operating	0 to 40°C				
	Storage	−10 to 50°C				
Ambient humidity	Operating	10 to 85 %RH or less (no condensation)				
	Storage	10 to 90 %RH or less (no condensation)				
Vibration resistance	Conforms to *JIS C0911.		Frequency	Acceleration	Amplitude	Sweep count
			10 to 55 Hz	—	0.075 mm	10 times (1 octave/ minute)
			55 to 150 Hz	1 g	—	
Shock resistance	Conforms to JIS C0912. (10 g, 3 times in each of X, Y, and Z directions)					
Operating ambience	There should be no corrosive gases and dust should be minimum.					
Cooling system	Self-cooling					

*JIS: Japanese Industrial Standard

3.3 Performance Specifications

Table 3.3 A7PUS Performance Specifications

Item	Specifications	
Connected module	ACPU (See Section 2.2)	
Power, current consumption	Power supplied from connected ACPU (5 VDC, 0.4 A)	
Connection method	Add-on	Attached to ACPU directly. (The A7PUS can only be screwed onto an A1SCPU)
	Hand-held	Connected using AC30R4-PUS cable (3 m, 0.5 kg).
Display method	Display of 16 characters x 2 lines (with cursor) liquid crystal display Equipped with illumination for the display	
Keyboard	Consists of 54 keys (covered with polyurethane film)	
Key operation check	Buzzer	
Life of display	80000 hours or more (when using the unit at 20°C ambient temperature)	
Life of Keypad	1000000 times	
External dimensions (mm) (in)	102 (4.02) (H) x 109 (4.29) (W) x 35.5 (1.40) (D) When installed to ACPU, depth is 28 (1.10).	
Weight (kg) (lb)	0.5 (1.1) or less	

4. PART NAMES AND HANDLING

This section explains the part names and handling of the A7PUS

4.1 Precautions When Handling the A7PUS

The following precautions should be taken when handling the A7PUS:

(1) Since the case is made of plastic, do not drop the A7PUS or subject it to severe shocks.

(2) Do not disassemble the case. (This can cause a malfunction.)

(3) When the A7PUS is not being used, always keep the protective cap on the connector.

(4) Do not touch the RS-422 connector pins of the A7PUS.

(This can cause a malfunction.)

(5) Do not remove the cover of the A7PUS.

Do not loosen the anchor screws that hold the cover.

(This can cause a malfunction.)

(6) Before removing the A7PUS from an ACPU, always input the [CL] key.

(7) Since the keyboard is covered with polyester film, never use a cleaning agent such as thinner, alcohol, or freon.

(8) Only use fingers to press keys. Using a sharp instrument can cause a malfunction.

Since the A7PUS beeps when a key is pressed, key operation can be confirmed by the sound.

IMPORTANT

(1) When designing the system, to protect the PC, provide a safety circuit outside the system.

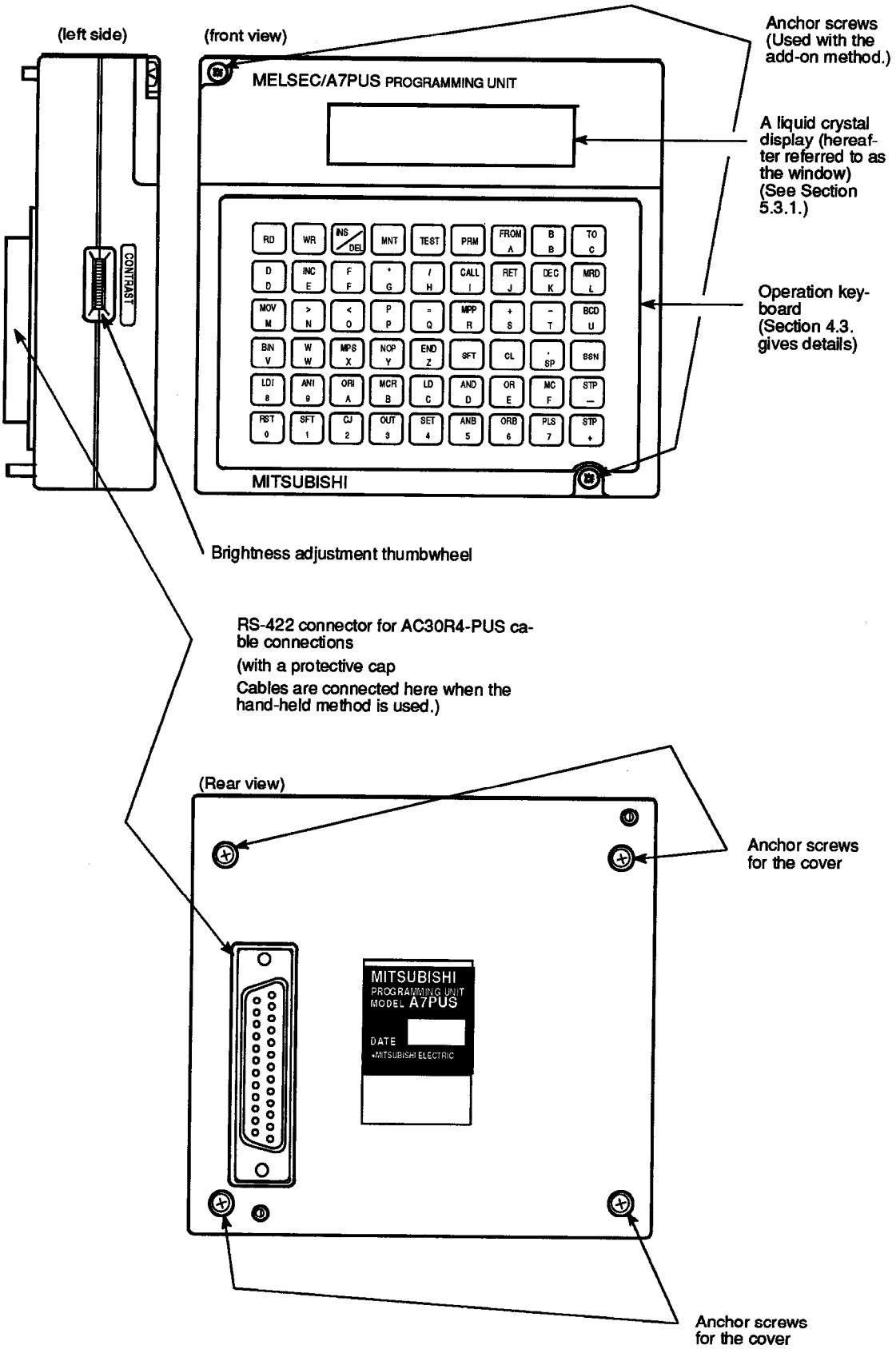
(2) Since the electronic parts on the printed circuit board are particularly susceptible to static electricity, the following precautions must be taken when handling the board:

1) Ground the human body or a work bench.

2) Do not touch parts through which electricity runs or any related parts.

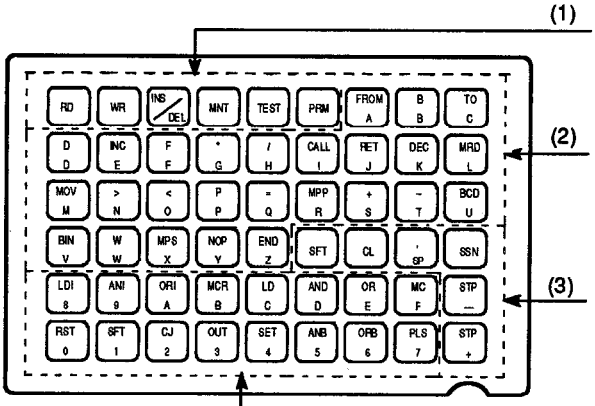
4.2 Part Names

The part names of the A7PUS are shown below:



4.3 Keyboard Layout and List of Key Functions

This section gives (a) the layout of the A7PUS operation keyboard, and (b) the keys and their functions.



(1) Mode keys
(Keys used to select the operating mode)

(2) Instruction keys
(Instruction indicated on top)
Device keys
(Code indicated on the bottom)

(3) Control keys

(4) Instruction keys
(Instruction indicated on top)
Device number/constant setting keys
(0 to F on the bottom)

No.	Type	Keys	Function	Reference Sections
(1)	Mode keys	RD to PRM	These keys are used to select the mode when the PROGRAMMING function or the DURING RUN PROGRAMMING function is used	5.1.4
(2)	Instruction keys Device keys	FROM A to END Z	These keys are used to input K/H, when an instruction, device name, or constant is input These keys are only used when switching the mode between "instruction" (top) and "device" (bottom). The mode is switched by pressing the [SFT] (shift) key.	5.3.3 5.3.2
(3)	Control keys	SFT	This key is used to switch the mode when an "instruction or device/constant" key has been input. The mode setting can be confirmed by displaying the window and checking the right side.	5.3.2 5.3.1
		CL	In all modes but the parameter mode: When the [CL] key is pressed, the A7PUS returns to the mode selection state. (Any input instructions or device numbers will be cleared, but not the mode.) If the wrong key is input, press the [CL] key and then press the correct key.	5.3.4
			In the parameter mode: Press this key to interrupt processing. After processing is restarted, continue the operation as before.	—
		SSN	This key declares the start of inputting a step number. When this key is pressed, the valid key display on the right side of the window changes.	5.3.2
		SP	Key used when "," or a blank space is input	6
		STP + STP -	These keys are used after inputting a series of keys to execute an operation. Press one of these keys after confirming the input on the window of the A7PUS. (In this manual, [STP±] means that either the [STP+] or [STP–] key can be pressed.)	
(4)	Instruction keys Device number/ constant setting keys	RST 0 to MC F	These keys are used to input instructions, device numbers, or constants. These key are only used when switching the mode between "instruction" (top) and "device/constant" (bottom). The mode is switched by pressing the [SFT] (shift) key.	5.3.3 5.3.2

In this manual, A7PUS key operations are abbreviated as follows:

(1) [Key 1] → [Key 2] →... [Key n]:

This means all keys between [key 1] and [key n] are pressed in order.

(2) [Key 1] + [Key 2]:

This means that both [Key 1] and [Key 2] are simultaneously pressed.

(3) Keys such as [RST 0] and [MOV M] keys which are used for two purposes (instruction and device/constant input), and the control keys of the A7PUS are referred to as follows:

(a) The instruction symbol or alphanumeric character which corresponds to the purpose of those keys (instruction keys, device keys, and device number/constant setting keys).

(Example:
[RST 0] →[RST] or [0], [MOV M] → [MOV] or [M])

When an instruction input is explained, the explanation uses only the instruction symbol. (The alphanumeric character is omitted.)

When an alphanumeric character input is explained, the explanation uses only the alphanumeric character. (The instruction name is omitted.)

(Example:
When the [MOV M] key is referred to:
When an instruction input is explained ..... [MOV]
When an alphanumeric character input is explained ..... [M])

(b) Control keys

In the examples in this manual, as shown below, control keys are indicated by wide keys.

(Example: [CL] →[CL])

(Example: [SP] →[,] or [SP])

As mentioned above, [STP ±] means that either the [STP+] or [STP–] can be pressed.

4.4 Maintenance

Except for the brightness control, the A7PUS has no special components which require inspection or replacement.

Rules for storing the A7PUS:

(1) Do not store the A7PUS in the following environments:

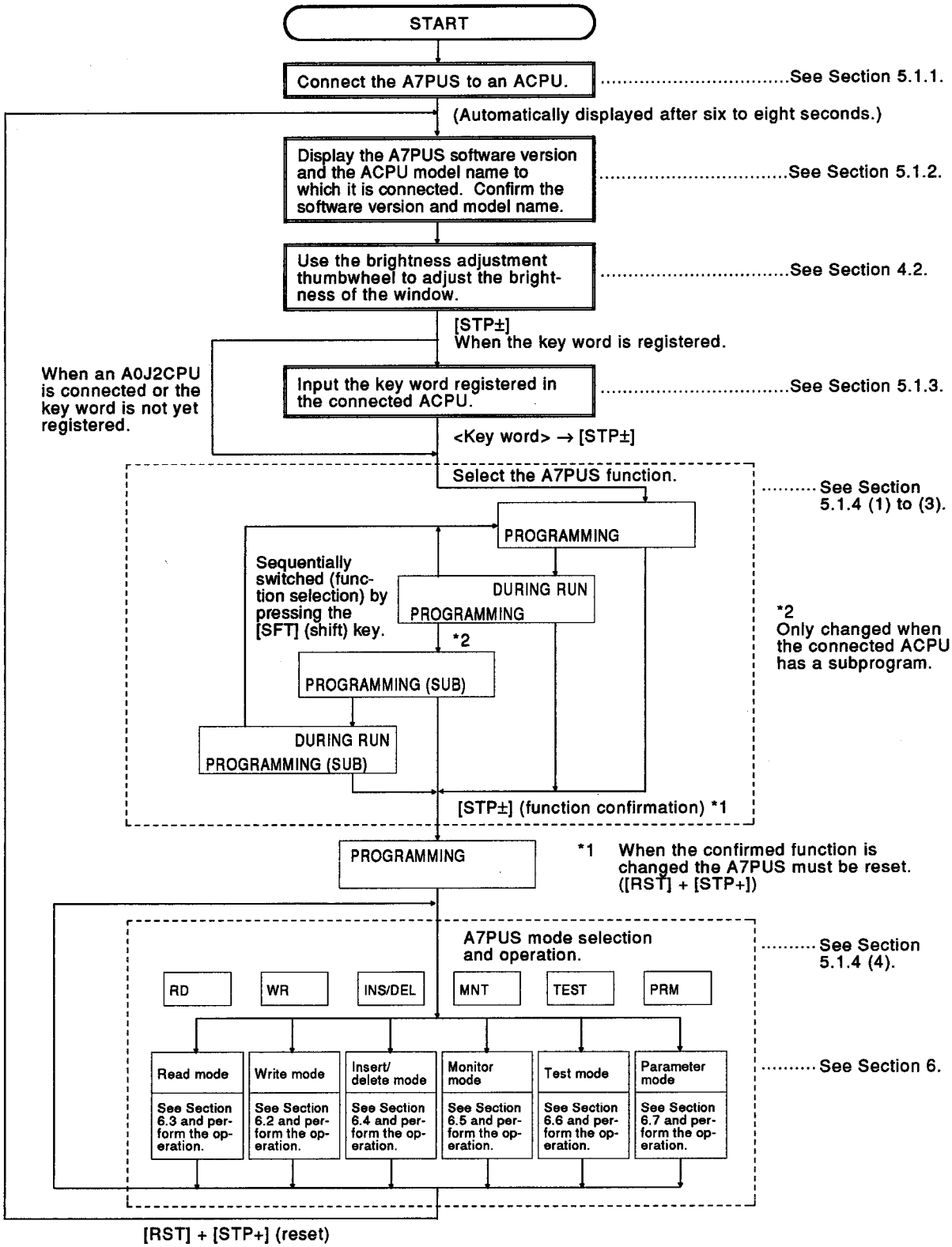
- Where ambient temperature is outside the range of –10°C to 50°C.
- Where ambient humidity is outside the range of 10 to 90% RH.
- Where condensation occurs due to sudden temperature changes.
- Anywhere that the A7PUS might be exposed to wind, rain, or the direct rays of the sun.
- Anywhere that there are excessive amounts of conductive powders (such as dust, dirt, and iron filings) or corrosive gases, oil mist, and salt.

(2) Make sure the protective cap is on the RS-422 connector.

5. OPERATING PROCEDURES

This section explains the operating procedures from the time the A7PUS is connected to an ACPU until it is disconnected, as well as related window displays and basic operations.

5.1 Procedure From the Beginning to the End of the Operation

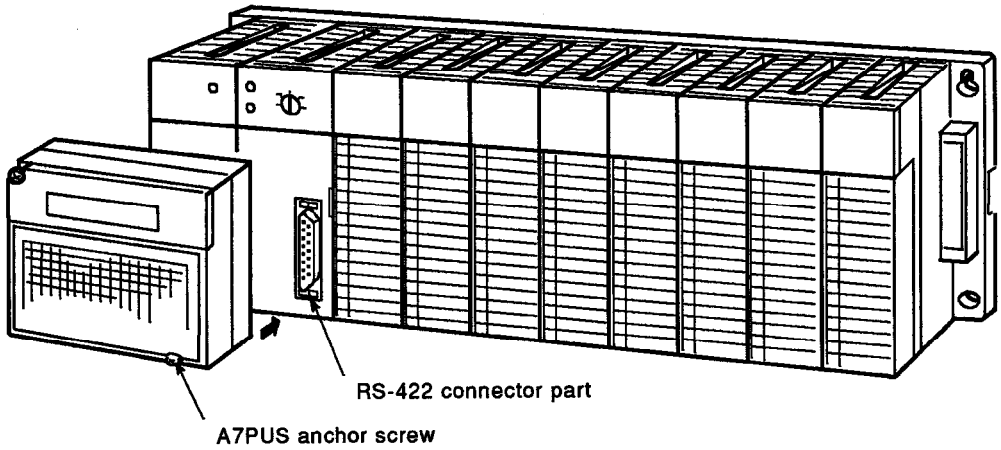


5.1.1 Connecting the A7PUS to an ACPU

Although the A7PUS can be connected to an ACPU even while it is running, Mitsubishi recommends connecting the A7PUS to an ACPU while it is in the STOP state. If it must be connected while in the RUN state, make sure to insert the connector properly.

(1) Connection using the add-on method

In this method, the A7PUS is installed directly onto the ACPU module.



The connection procedure is as follows:

(a) Remove the cover of the ACPU's RS-422 connector.

(b) Remove the RS-422 connector protection cap from the rear of the A7PUS. Put the protection cap in a safe place.

(c) Carefully connect the A7PUS to the RS-422 connector as indicated above. However, the A7PUS must be connected upside down to an A2CCPU. When using an A2CCPU, connect the A7PUS by the hand-held method shown on the next page.

(d) When the A7PUS is connected to an A1SCPU, firmly tighten the A7PUS' anchor screw.

(e) Six to eight seconds after the connection is completed, both the A7PUS software version and the ACPU model name will be displayed. Then, perform the necessary operation.

POINT

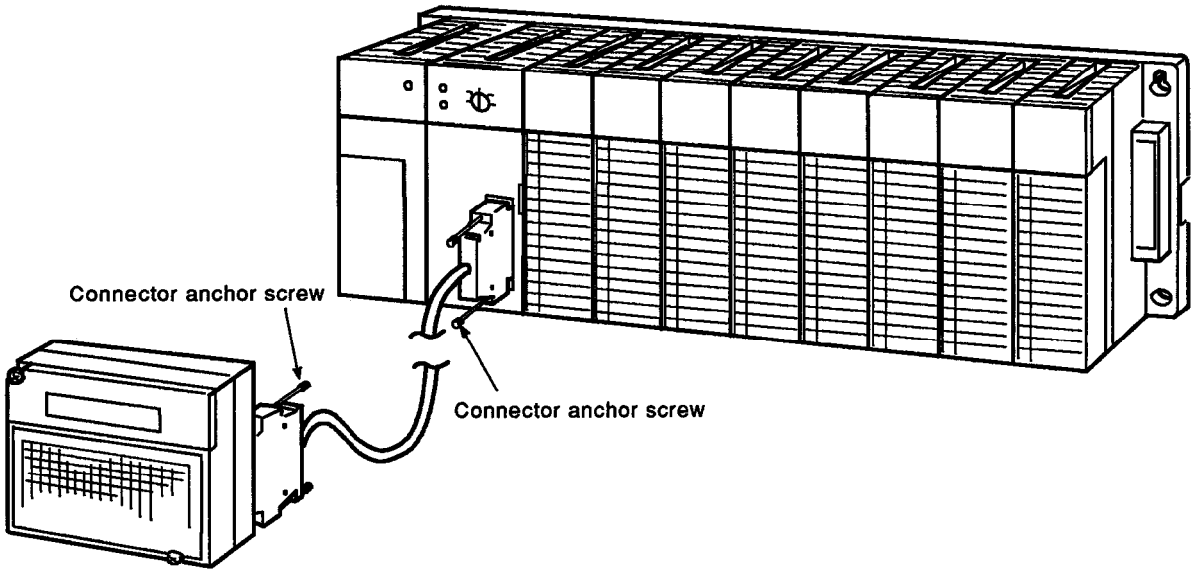
- Section 2.2 gives the model names of connectable ACPUs.
- The A7PUS can be connected to any ACPU (including an A1SCPU) using the add-on method. The screw can be used for installation only when connecting to an A1SCPU.

  Except for an A1SCPU, the A7PUS should be connected to an ACPU using the hand-held method.

  When the A7PUS must be connected to and operated with any ACPU other than an A1SCPU using the add-on method, disconnect the ACPU from the A7PUS after completing the operation.

(2) Connection using the hand-held method

Connect the A7PUS to an ACPU by using the AC30R4-PUS cable.



The connection procedure is as follows:

(a) Remove the cover of the ACPU's RS-422 connector.

(b) Remove the RS-422 connector protection cap from the rear of the A7PUS. Put the protection cap in a safe place.

(c) Carefully connect the A7PUS to the ACPU using the AC30R4-PUS cable. Firmly tighten the connector anchor screw.

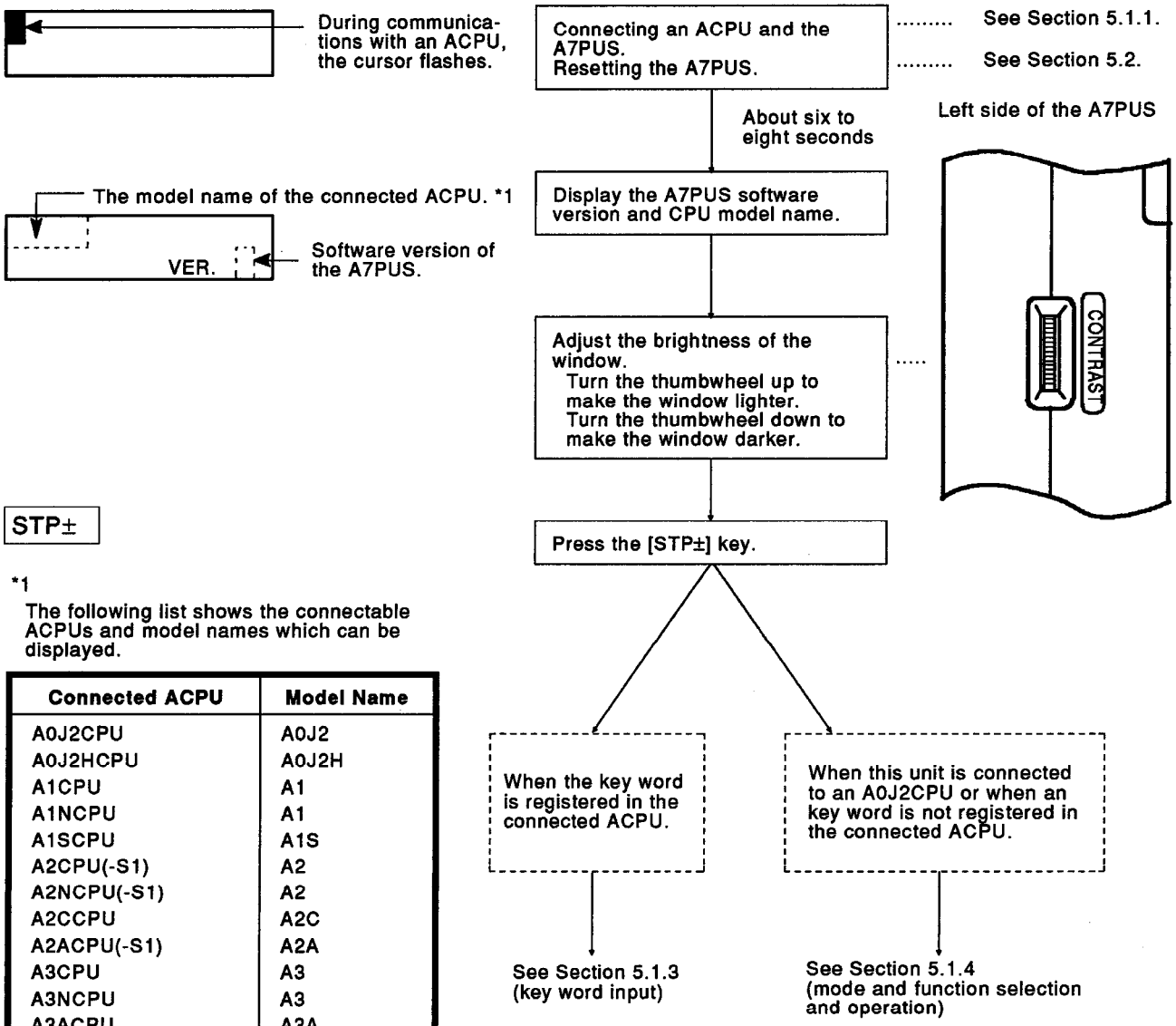
(d) Six to eight seconds after the connection is completed, both the A7PUS software version and the model name of the connected ACPU will be displayed.

Then, perform the necessary operation.

5.1.2 A7PUS software version and CPU model name display

After (a) completing the connection with an ACPU, or (b) resetting ([RST] + [STP+]) the A7PUS, the A7PUS software version and CPU model name are displayed in the window of the A7PUS.

As indicated below, confirm the display contents, adjust the brightness of the A7PUS' window, and then press the [STP±] key.



*1
The following list shows the connectable ACPUs and model names which can be displayed.

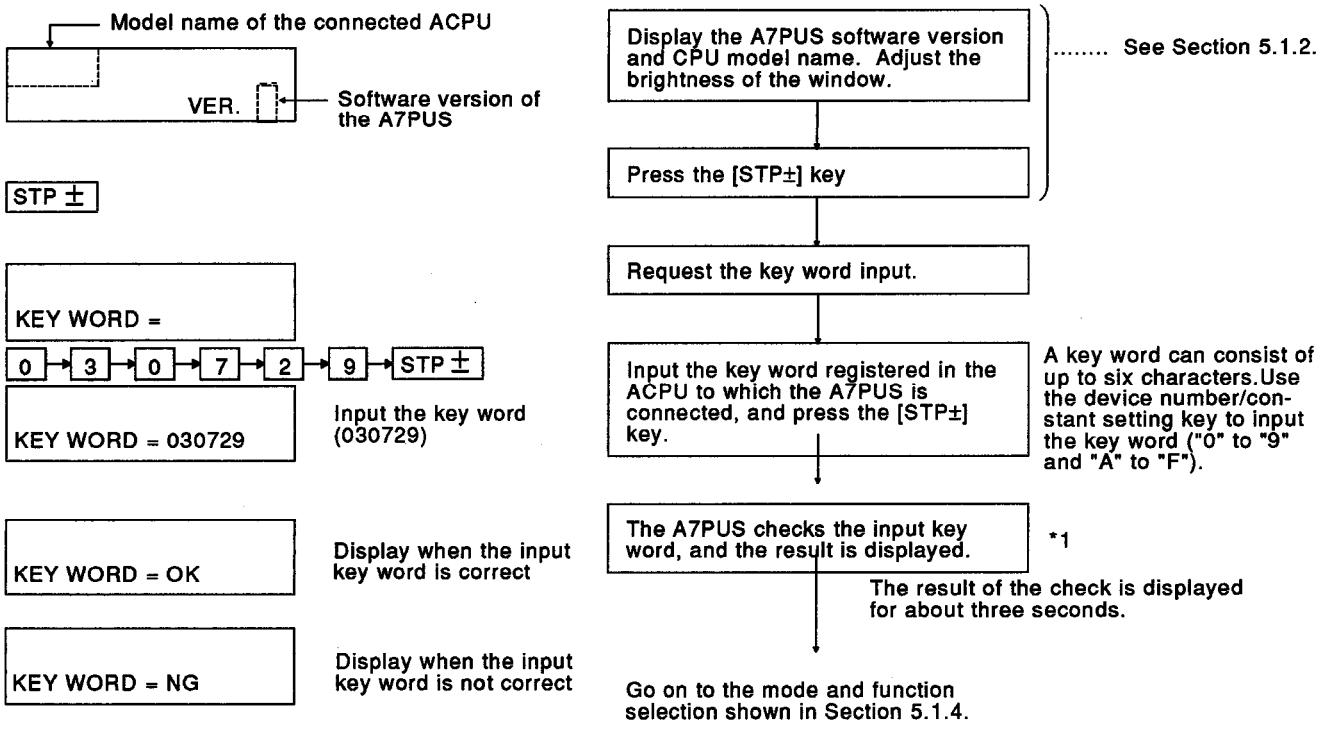
Connected ACPU	Model Name
A0J2CPU	A0J2
A0J2HCPU	A0J2H
A1CPU	A1
A1NCPU	A1
A1SCPU	A1S
A2CPU(-S1)	A2
A2NCPU(-S1)	A2
A2CCPU	A2C
A2ACPU(-S1)	A2A
A3CPU	A3
A3NCPU	A3
A3ACPU	A3A
A3HCPU	A3H
A3MCPU	A3M
A3VCPU	A3
A73CPU	A3

5.1.3 Key word input

When a key word is registered in an ACPU, the A7PUS requests a key word input followed by a display of the A7PUS software version and CPU model name.

Input the key word registered in the ACPU. Then, press the [STP±] key.

If the key word is not registered in the ACPU or the A7PUS is connected to an A0J2CPU, the operation shown in this section is unnecessary. (The A7PUS automatically goes on to the mode and function selection shown in Section 5.1.4.)



*1 When the key word which was input does not correspond with the key word registered in the ACPU, only the following operations can be done (as shown in Section 6):

- Monitor mode
  - Bit device monitoring ..... See Section 6.5.1.
  - Word device monitoring..... See Section 6.5.2.
  - T and C monitoring..... See Section 6.5.3.
  - Offline switch monitoring..... See Section 6.5.5.
- Test mode
  - Bit device set and reset..... See Section 6.6.1.
  - Offline switch set and release..... See Section 6.6.3.
  - Error check..... See Section 6.6.5.

POINT

- If the key word registered in the ACPU is unknown,see the "PC memory all clear" operation shown in Section 6.1.

  And then, clear (delete) the unknown registered key word.

  When "PC memory all clear" is executed, all user data (such as the sequence program) will also be cleared.
- Section 6.7.2 gives details about when (a) the key word registered in an ACPU is changed, or (b) a new key word is registered.

5.1.4 Mode and function selection and operation

After displaying the CPU model name and version and executing the key word input operation, perform the A7PUS function and mode selection to prepare for the operations shown in Section 6. Perform mode selection followed by function selection in accordance with the operation enable conditions in the various modes and the table in item (5) below.

(1) To select afunction when a write during RUN is not executed

Select PROGRAMMING.

When a main program operation is performed, press the [STP±] key when the following is displayed:

```
PROGRAMMING
```

When a sub-program operation is performed, press the [STP±] key when the following is displayed:

```
PROGRAMMING(SUB)
```

Displayed only if the ACPU to which the A7PUS is connected has a sub-program.

(2) To select a function when a write during RUN is executed

Select DURING RUN PROGRAMMING.

When a main program operation is performed, press the [STP±] key when the following is displayed:

```
        DURING RUN
PROGRAMMING
```

When a sub-program operation is performed, press the [STP±] key when the following is displayed:

```
        DURING RUN
PROGRAMMING(SUB)
```

Displayed only if the ACPU to which the A7PUS is connected has a sub-program.

(3) To change functions

When a window display shown in items (1) or (2) appears (before the [STP±] key is pressed), press the [SFT] key to change the function.

However, by pressing the [STP±] key, the function to be used is decided.

In this case, to change the function, reset the A7PUS using the [RST] + [STP+] keys (see Section 5.2).

Therefore, be careful when selecting functions.

After the [STP±] key is pressed, the following is displayed:

(Whichever function is selected, the same window is displayed.)

```
PROGRAMMING
```

POINT

In this manual, the main program/sub-program operations shown in item (1) are referred to as the programming function.

The main program/sub-program operations shown in item (2) are referred to as the during run programming function.

(4) To do selections using the mode key, and change the mode.

When the [STP±] key is pressed to select the mode as shown in items (1) to (3), the function to be used is decided, and the mode can be selected.

To select the mode, press the corresponding mode key. Then, operations can be performed in the selected mode as shown in Section 6.

When the operations shown in Sections 6.2 to 6.7 are executed, the mode can be freely changed.

Therefore, the operation that is executed cannot be interrupted, and the mode can be changed. *1

The relationship between mode keys, modes and their corresponding sections in this manual is shown below:

[RD].....Read mode.....Section 6.3
[WR].....Write mode.....Section 6.2
[INS/DEL]..Insert/delete mode.....Section 6.4
[MNT].....Monitor mode.....Section 6.5
[TEST].....Test mode.....Section 6.6
[PRM].....Parameter mode.....Section 6.7

*1 Pressing the mode key is always valid.

Input data except the step number is cleared by pressing the mode key. The input mode returns to the initial state.

(5) To operate in all modes

The operations shown in Section 6 are enabled by the mode selected in (4) and the function selected in item (1) and (2).

Because the operating methods in Section 6 are explained by using names corresponding to the purposes of the various modes, perform operations in accordance with these explanations. When an error message is displayed during operations, see Section 7.

The following page shows the modes, functions, and operating formats (RAM/EEPROM/ROM) of the connected ACPU, as well as the combinations of these which enable operations.

REMARK

The DURING RUN and DURING STOP states of the ACPU to which the A7PUS is connected are:
DURING RUN : RUN state, STEP RUN state, or PAUSE state
DURING STOP : STOP state

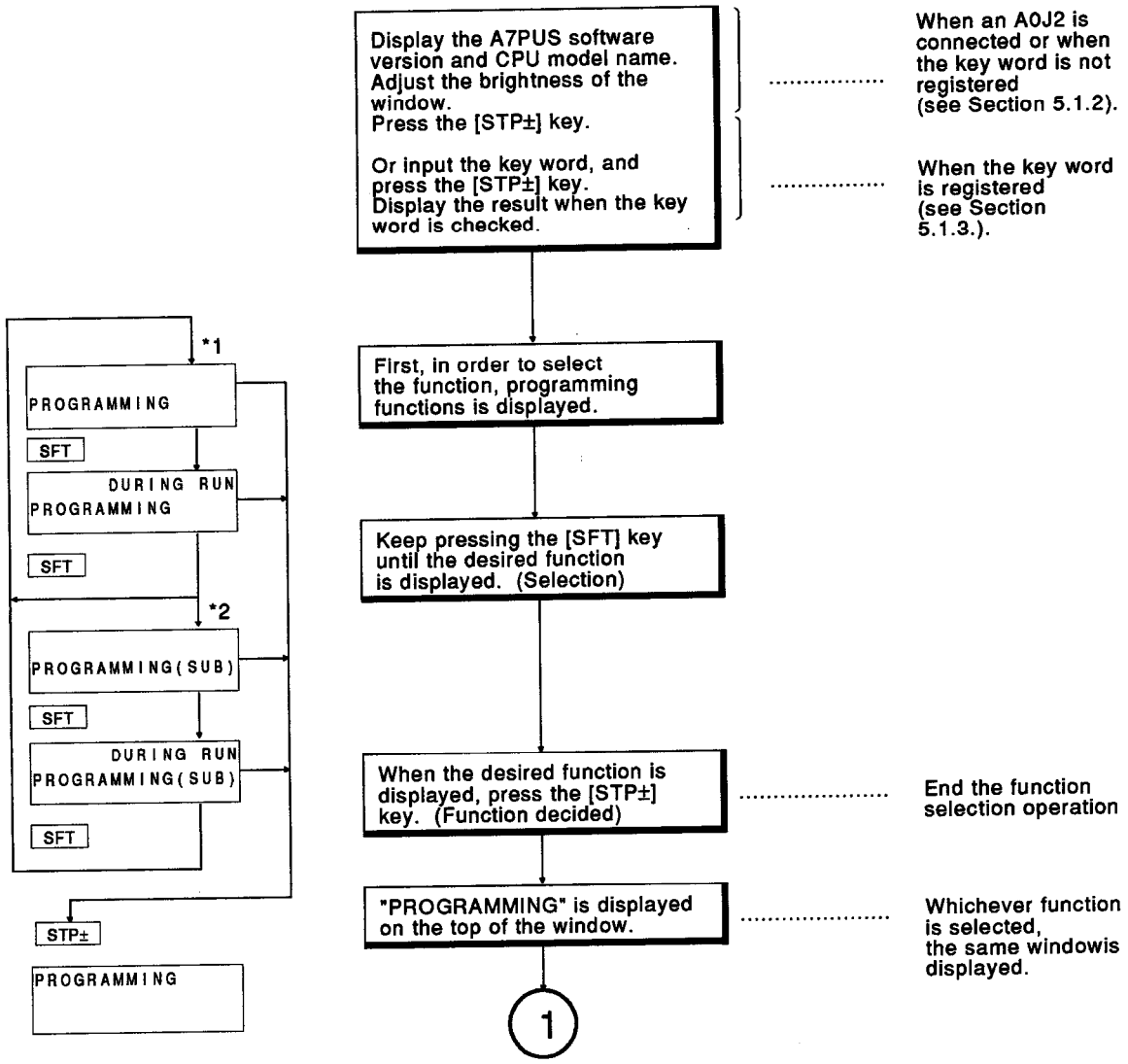
Mode (Mode Display)	Operating Format of the Connected ACPU / Function	When the Connected ACPU is in the RUN State			When the Connected ACPU is in the STOP State			Section Reference
		RAM	EEP ROM	ROM	RAM	EEP ROM	ROM	
—	PC memory all clear	X	X	X	O	O	X	6.1
Write (W)	Continuous writing of NOP	▲	X	X	O	O	X	6.2.1
	Writing/adding to/changing the program	▲	X	X	O	O	X	6.2.2
	When the ACPU is in the RUN state, specified T and C values change	▲	X	X	O	O	X *1	6.2.3
Read (R)	Program read	O	O	O	O	O	O	6.3
Insert/ Delete (I)	Program insert	X	X	X	O	O	X	6.4.1
	Program delete	X	X	X	O	O	X	6.4.2
Monitor (M)	Bit device monitoring	O	O	O	O	O	O	6.5.1
	Word device monitoring	O	O	O	O	O	O	6.5.2
	T and C monitoring	O	O	O	O	O	O	6.5.3
	Continuity check	O	O	O	O	O	O	6.5.4
	Offline switch monitoring	O	O	O	O	O	O	6.5.5
Test (T)	Bit device set and reset	O	O	O	O	O	O	6.6.1
	Word device current value change	O	O	O	O	O	O	6.6.2
	Offline switch setting/cancellation	O	O	O	O	O	O	6.6.3
	Program check	O	O	O	O	O	O	6.6.4
	Error check	O	O	O	O	O	O	6.6.5
	Read from the memory using machine language.	O	O	O	O	O	O	6.6.6
	Write to the memory using the machine language.	▲	X	X	O	O	X	6.6.6
Parameter (P)	Parameter all clear	X	X	X	O	O	X	6.7.1
	Parameter/Key word setting/change	X	X	X	O	O	X	6.7.2

Symbol explanations:

O : Can be executed independently of the selected function of the A7PUS.
▲ : Can be executed when the A7PUS DURING CPU RUN programming function is selected
X : Can be executed independently of the selected function of the A7PUS.

*1 When the specified T and C set values are indirectly designated, this can be executed in the test mode by changing the current values of the indirectly designated devices.

(6) Function and mode selection procedure

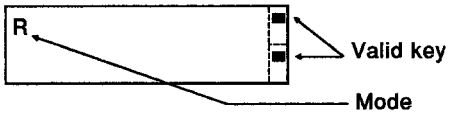


*1 The functions shown in the above diagram correspond to the following:

- Programming function (for the main program)
- The CPU RUN programming function (for the main program)
- Programming function (for the subprogram)
- The CPU RUN programming function (for the subprogram)

*2 When the memory capacity for the subprogram is set by parameters of the connected ACPU, the A7PUS enters this state.

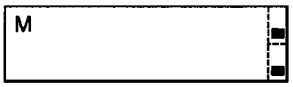
When the [RD] key is pressed *1



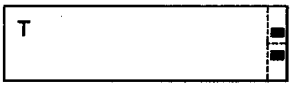
When the [WR] key is pressed

When the [INS/DEL] key is pressed

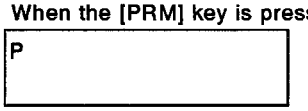
When the [MNT] key is pressed



When the [TEST] key is pressed

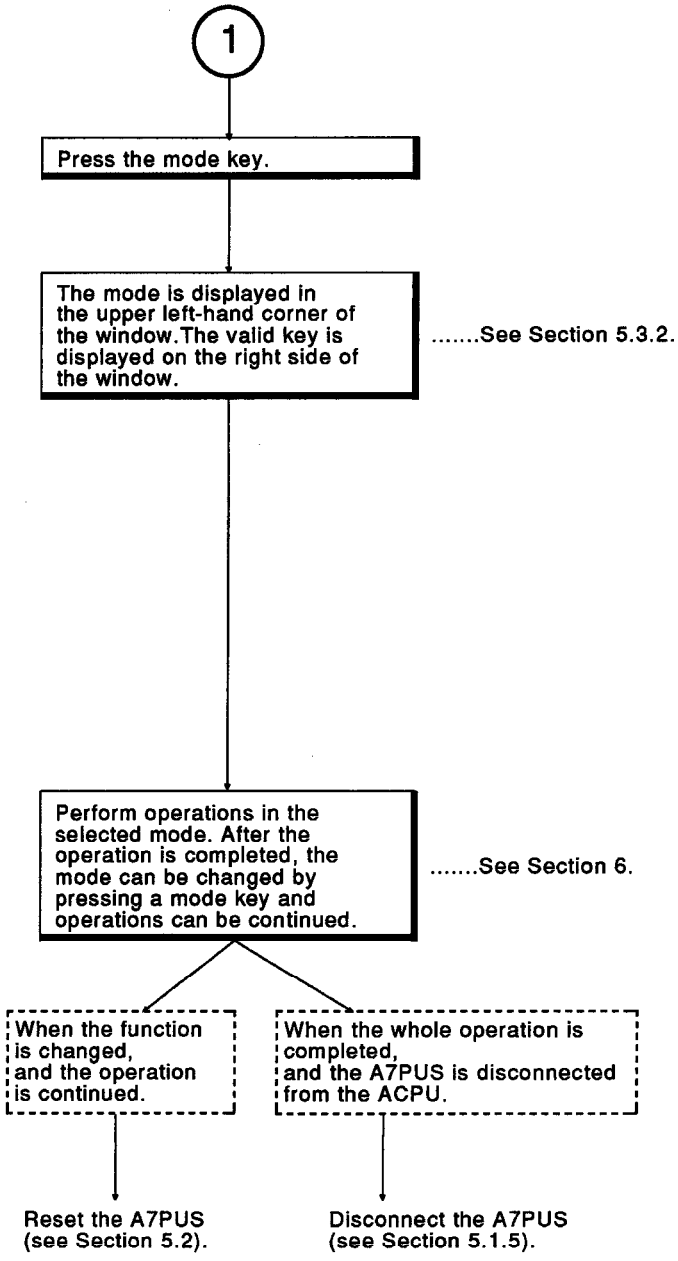


When the [PRM] key is pressed



*1 Details about these key functions are given in the following sections:

- Read mode..... Section 6.3
- Write mode..... Section 6.2
- Insert/delete mode.... Section 6.4
- Monitor mode..... Section 6.5
- Test mode ..... Section 6.6
- Parameter mode..... Section 6.7



5.1.5 Disconnecting the A7PUS from an ACPU

(1) Disconnection when the add-on method is used.

The disconnection procedure is shown below.

(a) Press the [CL] key.

(b) When the A7PUS is disconnected from an A1SCPU, unscrew the A7PUS anchor screw.

(c) Disconnect the A7PUS from the ACPU.

(d) Put the stored protection cap back on the RS-422 connector in the rear of the A7PUS.

(e) Put the cover on the RS-422 connector of the ACPU.

(f) Store the A7PUS carefully.

(2) Disconnection when the hand-held method is used.

The disconnection procedure is shown below.

(a) Press the [CL] key.

(b) Unscrew the connector anchor screw of the ACPU, and take the AC30R4-PUS cable from the ACPU.

(c) Put the cover on the RS-422 connector of the ACPU.

(d) Unscrew the connector anchor screw of the A7PUS, and take the AC30R4-PUS cable from the A7PUS.

(e) Put the stored protection cap on the RS-422 connector in the rear of the A7PUS.

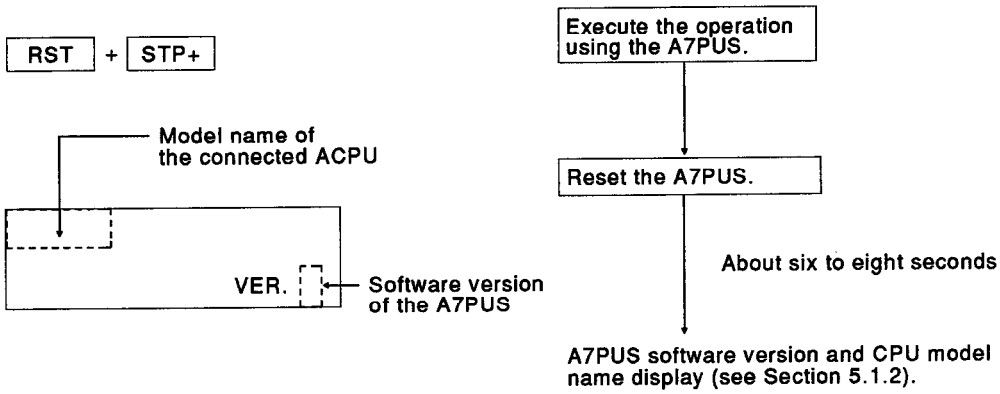
(f) Store the A7PUS and AC30R4-PUS cable carefully.

5.2 How to Reset the A7PUS

This section tells how to reset the A7PUS during anoperation.

When a function of the A7PUS is changed, the A7PUS must be reset.

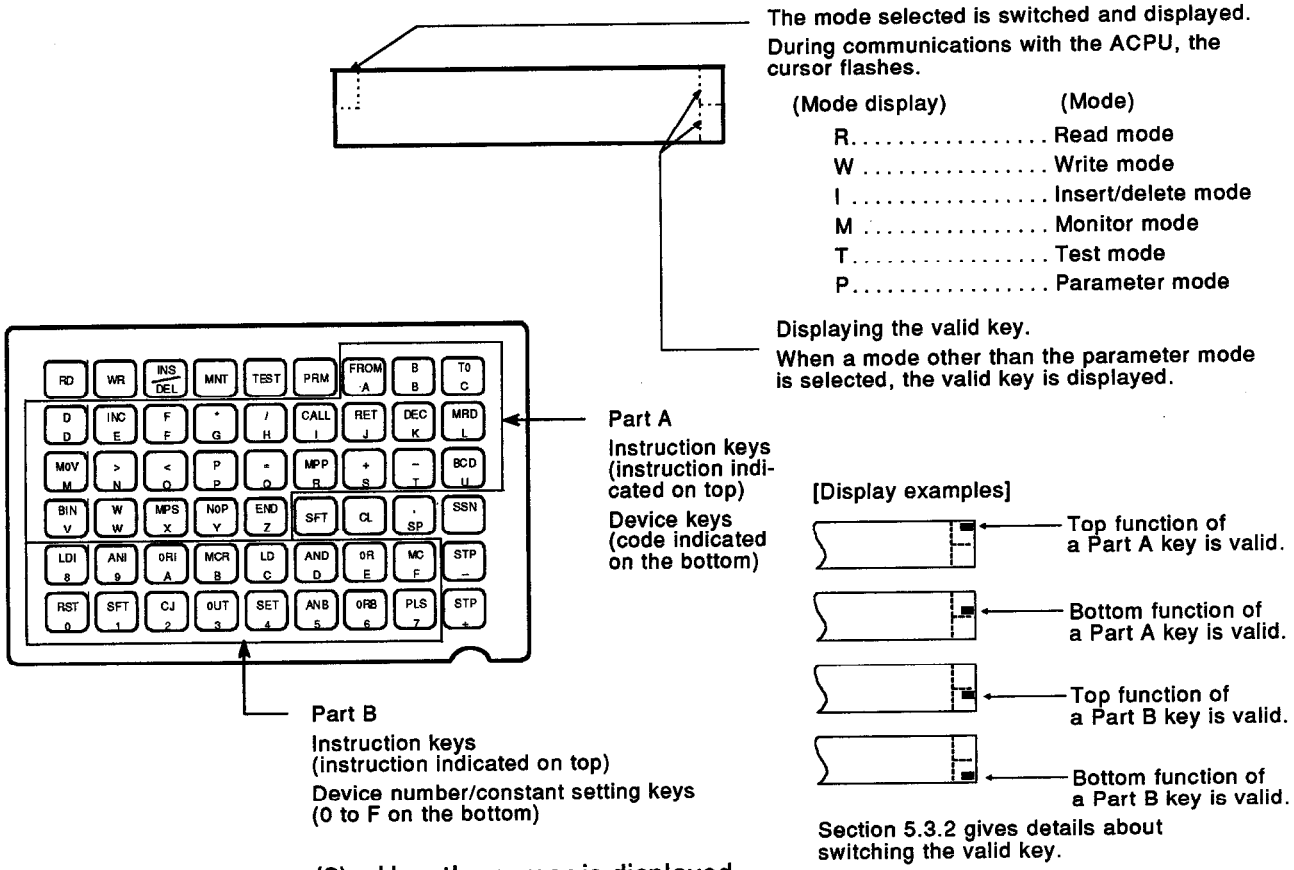
After resetting the A7PUS, resume operations according to Section 5.1.2 (CPU model name and version display).



5.3 Window Displays and Basic Operations

5.3.1 Window display format

(1) Mode and valid key display.



Section 5.3.2 gives details about switching the valid key.

(2) How the cursor is displayed

The A7PUS controls the cursor display.

The cursor appears in the ■ and □ positions.

Every 0.5 seconds the cursor flashes.

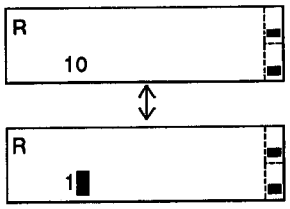
In this manual, the □ mark indicates where the cursor is currently located.

(3) Keyed-in data display

Keyed-in data is displayed on the left side of the cursor.

So, the input data appears to the left of the ■ cursor.

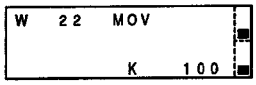
Example: When [1] → [0] is input



(4) Numerical character display

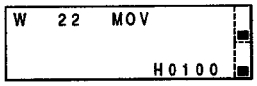
When a decimal number is displayed, the zero is suppressed.

Example: When [K]→[1]→[0]→[0] is input.



When a hexadecimal number is displayed, four digits are displayed without suppressing the zero.

Example: When [H]→[1]→[0]→[0] is input.



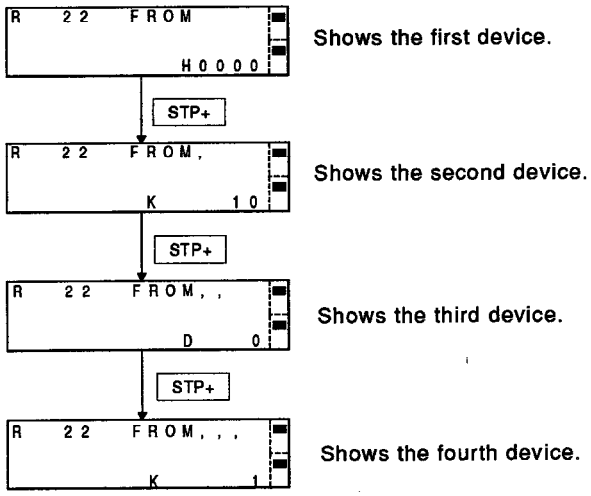
(5) Device display

When a basic or application instruction is accompanied by two or more devices, commas are placed after the instruction to identify each device as shown below:

Example:

in this case:

FROM	H0	K10	D0	K1



Shows the first device.

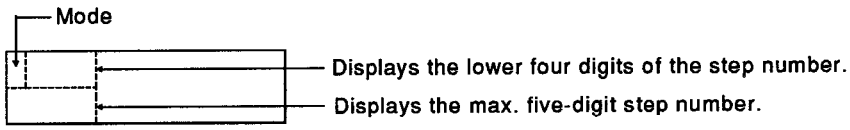
Shows the second device.

Shows the third device.

Shows the fourth device.

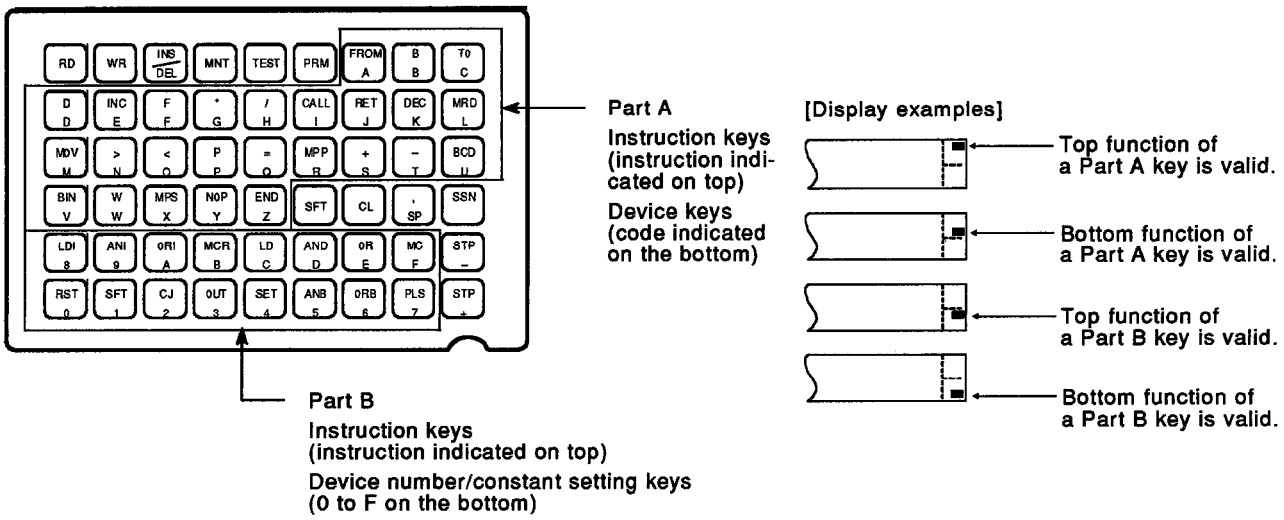
(6) Step number display

The step number is displayed in decimal. The display format on the top is different from that on the bottom as indicated:



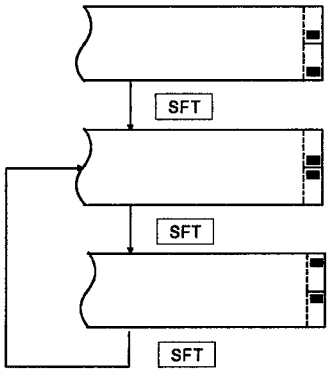
5.3.2 Switching between the top and bottom of a valid key

When starting A7PUS operations, the valid (top/bottom) instruction or control key is displayed on the right side of the window.



The A7PUS automatically switches/displays the valid key.

The valid key can only be manually switched by using the [SFT] key.



REMARK

When the [SSN] key is pressed, the valid key is displayed as shown below:

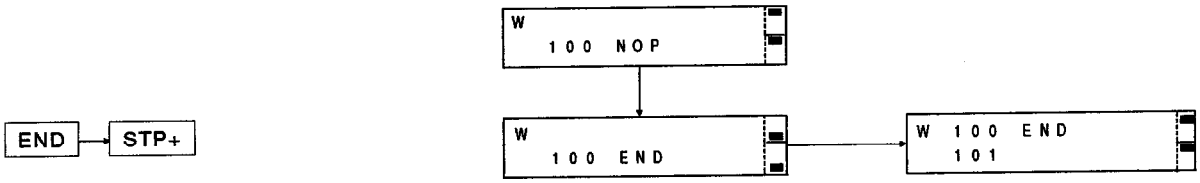
5.3.3 How to input an instruction

This section tells how to input an instruction to the A7PUS. To input an instruction, switch the valid key, and input the instruction by using one of the [A] to [Z] keys.

If the instruction to be input corresponds to one of the instruction keys, that instruction can be input by pressing the corresponding instruction key.

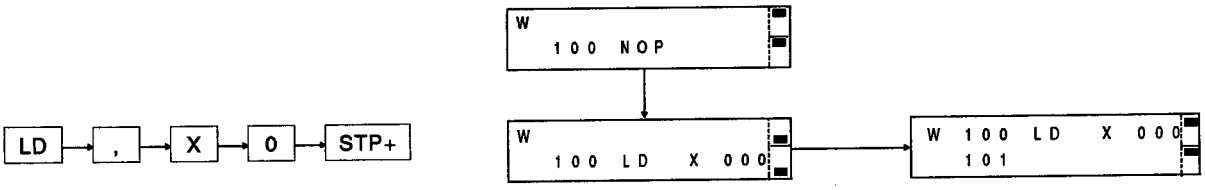
(1) When only an instruction code is input
<Instruction>→[STP±]

Example: When END is input



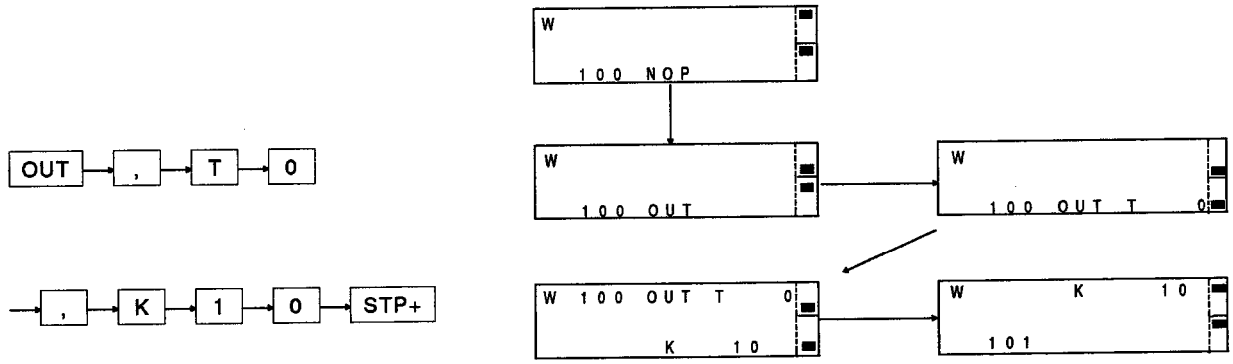
(2) When an instruction code along with a device is input:
Pressing the [,] key can be omitted.
<Instruction>→[,]→<Device>→<Device number>→[STP±]

Example: When LD X0 is input

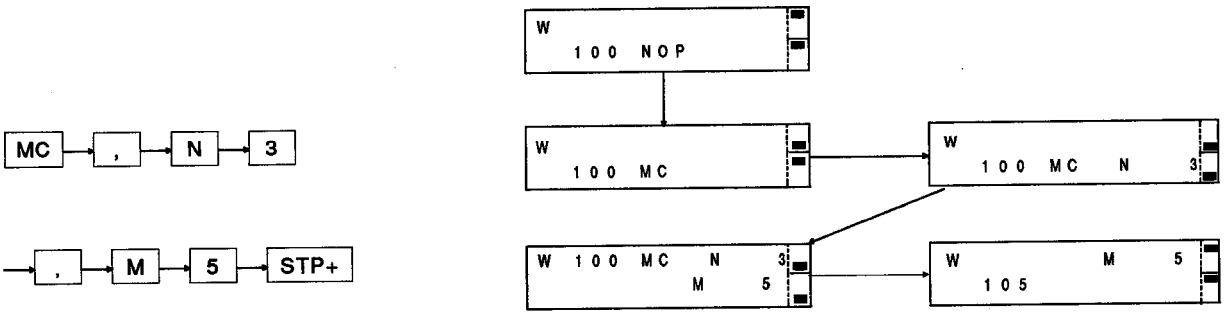


(3) When OUT T or OUT C instructions and an MC instruction are input:
Pressing the [,] key can be omitted.
<Instruction>→[,]→<Device>→<Device number>→[,]→[K]→
<Set value>→[STP±]

Example 1: When OUT T0 K10 is input



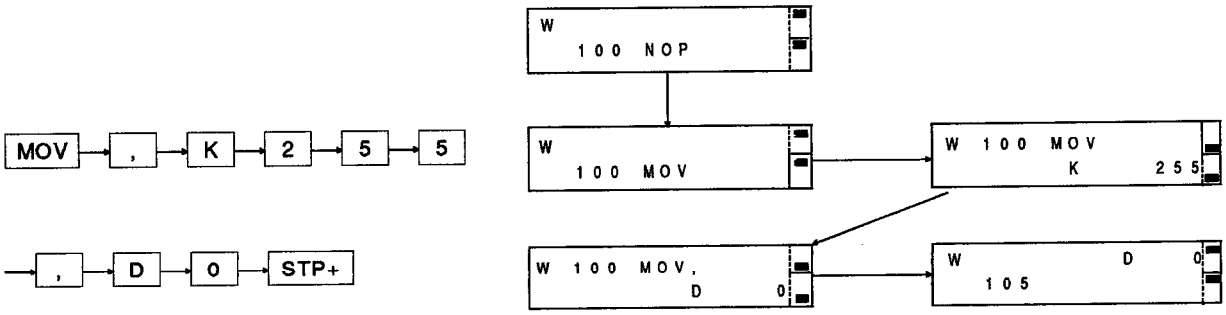
Example 2: When MC N3 M5 is input



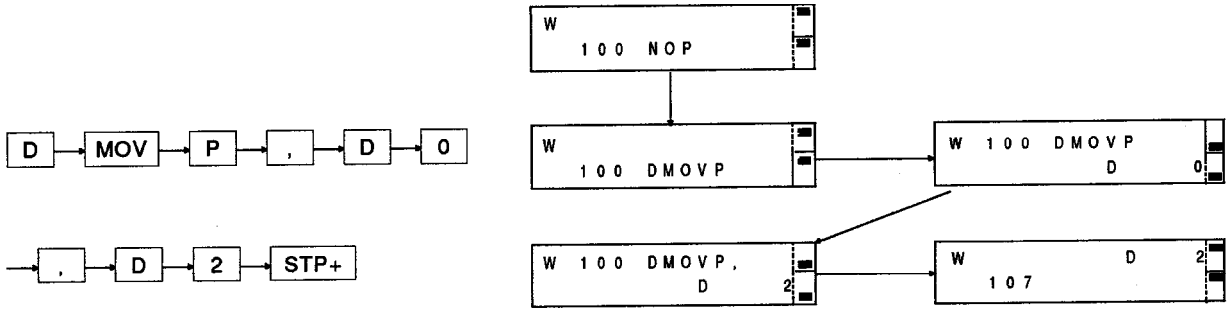
(4) In the case of an instruction other than the above.

Put commas (by pressing the [,] key) between the instruction, the device, source data, and destination data.

Example 1: When MOV K255 D0 is input

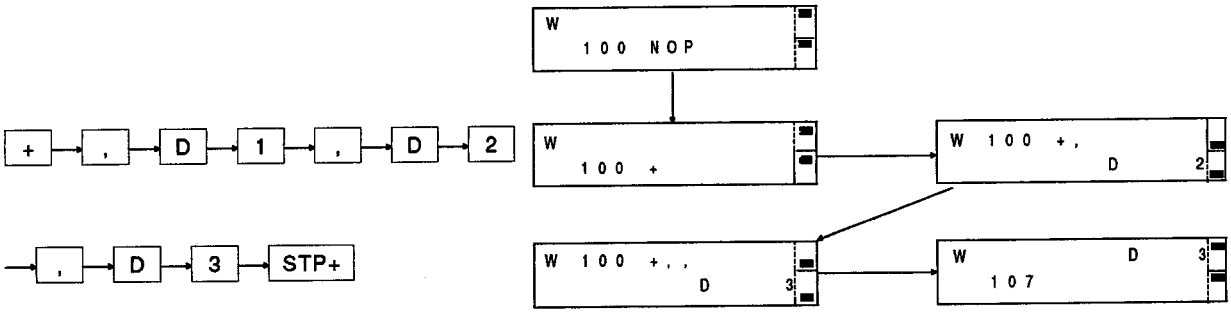


Example 2: When DMOVP D0 D2 is input



[SFT]→[D]→[M]→[O]→[V]→[P]→[,]→[D]→[0]→[,]→[D]→[2] →[STP+] can also be input.

Example 3: When +D1 D2 D3 is input



(5) How to input ASCII characters

When an ASCII character string contains a space code, the space code can be inserted by pressing the [SFT] key.

(6) Handling devices M and L

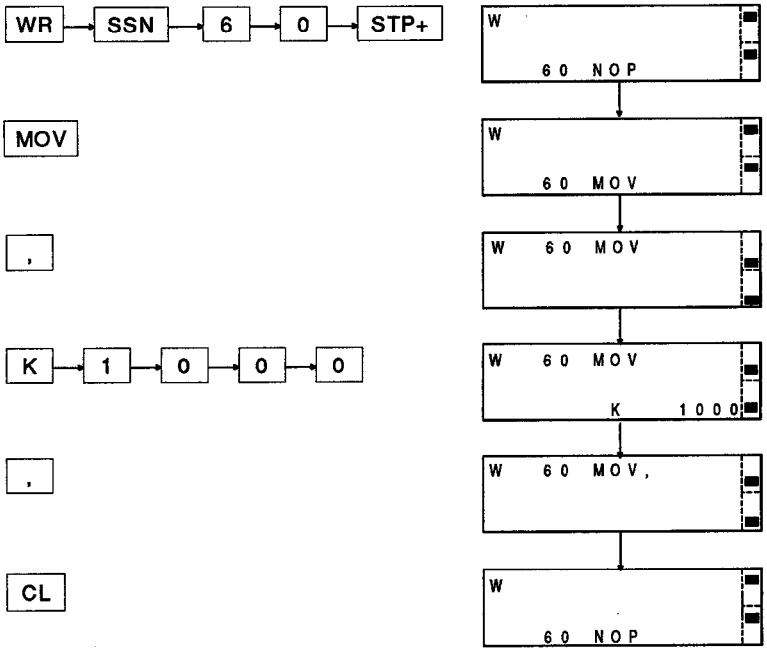
For devices M and L, in the test, monitor, write, and insert modes, the display varies according to the contents set by parameters.

For example, if LD and L0 input when the parameter settings are M0 to 999 and L1000 to L2047, LD and M0 will be displayed.

5.3.4 Corrective action when wrong keys are pressed

When wrong keys are pressed on the A7PUS in any other mode but parameter, press the [CL] key before pressing the [STP±] key. Pressing the [CL] key clears the previously-input instruction and its device number, and the A7PUS write mode will return to the previous state. Then, the operation can be retried.

Example: If MOV K100 D0 should have been input and K1000 was input by mistake, take the following corrective action:



REMARK

If the [CL] key is pressed while the A7PUS is in the parameter mode, processing stops. Pressing the nest desired key restarts the operation.

5.3.5 ACPU RUN/STOP key operation

While performing operations shown in Section 6, when doing (a) or (b) below using a sequence program written to an ACPU, do not switch the RUN/STOP keyswitch of the ACPU from STOP to RUN.

This operation can destroy the program in the ACPU.

If the operation of RUN/STOP keyswitch is necessary, do so after pressing the A7PUS' [CL] key.

(a) Write/clear of a program

(b) Overwrite/insert/delete of an instruction

6. HOW EACH FUNCTION OPERATES

This section uses the following format to explain how each function operates after the A7PUS is started up.

[Function] : What the operation does is explained in this part.

[Basic Operation] : The keys used for the operation and the order of window display contents (procedure 1, procedure 2, ... procedure n) are explained in this part.

Section 4.3 gives details about key operations.
Section 5.3 gives details about window displays.

[Point] : Information needed for executing the operation is explained in this part.

[Remarks] : Corresponding reference sections and their contents are given in this part.

[Sample Operation] : An example of the operation procedure that begins with the mode selection is given in this part. When necessary, circuit diagrams are also given.

[Instruction Input Method]:

The operation for inputting instructions is given in this part.

Section 5.3.3 gives details about the relationship between instruction inputs and window displays.

The following points apply to all operation explanations:

(1) All explanations assume that the A7PUS is connected to an A1SCPU.

(2) < > in an input explanation shows an item (not a key) that the user designates.

Examples:

<Step number> This designates 0 to n.

<Instruction> This designates instructions such as LD instructions and MOV instructions, devices, and device numbers.

<Device> This designates device names such as X, Y, M, D, W and R.

<Device number> This designates the number of the device designated above. (For example, 100 of D100 is designated.)

(3) [Basic Operation] means explaining the operation after selecting the A7PUS' function and mode.

Section 5.1.4 gives details about mode and function selection.

When doing each operation, also read the basic explanation for window displays and operations in Section 5.3.

(4) Refer to the following manuals of the connected ACPU:

- Programming Manual
- User's Manual

6.1 Clearing Key Words, Parameters, and Programs (PC Memory All Clear)

[Function]

This operation erases all contents of the memory (and the memory cassette) of a connected ACPU and returns the ACPU to the initial state.

Use this operation if the key word registered in the ACPU has been forgotten.

[Basic Operation]

(Procedure 1) Display the window that contains the CPU model name and the software version

After connecting an A7PUS according to Section 5.1.1 or resetting an A7PUS according to Section 5.2, display the window containing the CPU model name and the software version.

By using the reset operation, the window changes into the display of the figure to the left.

RST + STP +

(Procedure 2) Display the CPU model name and the software version

Section 5.1.2 gives details about display contents.

```
A1S
            VER.A
```

(Procedure 3) Set the ACPU to STOP

Set the connected ACPU to the STOP state.

(Procedure 4) Display the key word input window

STP±

```
KEY WORD=
```

(Procedure 5) Clear all the PC memory contents

Input "ALLCLR", and then press the [STP±] key.

The window changes into the display of the figure to the left when the [STP+] key is pressed.

A → L → L → C → L → R → STP +

(Procedure 6) Display the PC memory all clear processing

When clear processing by the A7PUS begins, the window changes into the display of the figure to the left. The line of "*" marks and the total number of bytes change as the processing continues.

```
          ALL CLR
20        **********
```

The number of "*" marks corresponds to the memory capacity to be cleared (up to 10 marks per each clear processing operation).
The "*" marks go out one by one during clear processing.
(It takes 3.3 seconds to erase one "*".)
"*" corresponds to 0.5K steps.

The capacity (the total number of bytes) of the memory to be cleared is shown in K bytes.
This number decreases during clear processing.

(Procedure 7) Completion of the PC memory all clear processing

When clear processing by the A7PUS is completed, a buzzer sounds. The window changes into the display of the figure to the left.

(This is the state before A7PUS function selection.)

PROGRAMMING

(Procedure 8) Start the next operations

Select the function and mode according to Section 5.1.4, and start the next operations:

[Point]

- The operation that clears a key word, a parameter and a program is possible only when the key word is already registered in the ACPU.

  When clearing a parameter or a program when the key word is not registered, follow the steps given below.

  Parameter : Section 6.7.1

  Program : Section 6.2.1

- Set the ACPU to STOP.

  Execute this operation after setting the ACPU to STOP (if it is not already in the STOP state).

- When this operation is completed, all sequence programs on the ACPU side are cleared, and parameters are switched to the default value.

  And, devices return to the initial state (0 or OFF).

  Parameters and a sequence program must be written to the ACPU.

[Remarks]

- When a key word registered in the ACPU not been forgotten, Section 6.7.2 gives details about changing or clearing that key word.

6.2 Operations in the Write Mode (W)

This is the operation that writes, modifies, changes, or adds to a program in the ACPU.

Section 6.6.6 gives details about microcomputer programs.

6.2.1 Designating a range in the program to NOP (Continuous writing of NOP)

[Function]

This operation sets a designated range of a sequence program written to an ACPU with NOP instructions.

[Basic Operation]

Even if this operation is done when the ACPU is in the RUN state by using the "programming function during CPU RUN of the A7PUS", an operating error will not occur.

However, do the operation as shown below using the "programming function" of the A7PUS to make the execution result of the ACPU certain.

(Procedure 1) Set the ACPU to STOP

Put the connected ACPU in the STOP state.

(Procedure 2) Select the "programming function of the A7PUS in CPU RUN"

Sections 5.1.1 to 5.1.4 tell how to select the "programming function of the A7PUS in CPU RUN".

If the "programming function", is already set, this procedure is unnecessary.

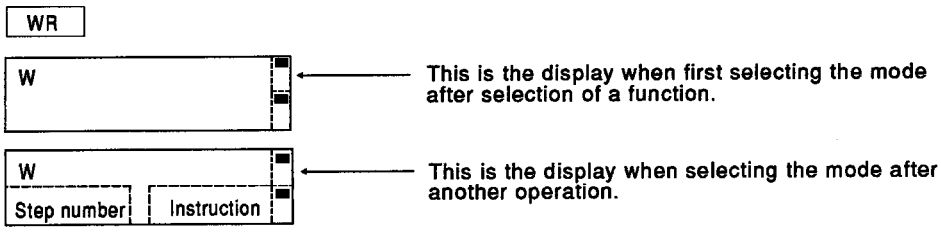
(Procedure 3) Check the step numbers of the range that is set to NOP

Use the read mode explained in Section 6.3 to confirm the step numbers in the program range that is set to NOP by this operation.

If the step numbers are known for certain, this procedure is unnecessary.

(Procedure 4) Select the write mode

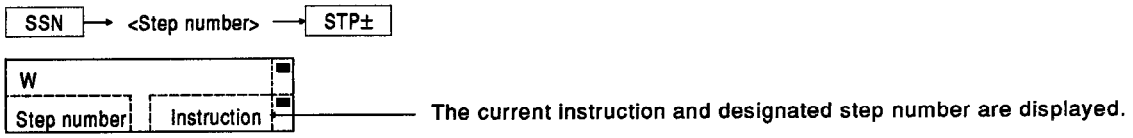
Press the [WR] key. The A7PUS is switched to the write mode.



(Procedure 5) Input the head step number of the range that is set to NOP instructions

Do the key operation in the order shown in the figure to the left. This step number is the head step number of the range that is set to NOP instructions.

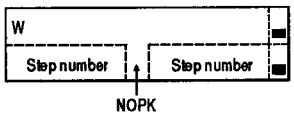
If the head step number is already displayed by any other operation, this procedure is unnecessary.



(Procedure 6) Input the final step number of the range to be set to NOP and write NOP instructions

Do the key operation in the order shown in the figure to the left.

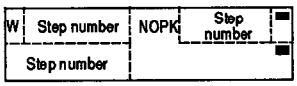
This step number is the final step number of the range that is set to NOP instructions.



(Procedure 7) Completion of NOP write processing

When continuous NOP write processing by the A7PUS is completed, the window changes into the display of the figure to the left.

Continuous writing of NOP to 1K steps takes seven seconds.



(Procedure 8) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the write mode, start according to the explanation in "After the write mode is selected".

[Point]

- Start this operation after setting the ACPU to the STOP state and setting the A7PUS to the "programming function".
- If the head step number that was designated is in the middle of an instruction, the head step of the instruction is automatically designated...see Sample Operation (3).

  Assuming that the last step of an instruction was automatically designated, when the final step number that was designated in the middle of an instruction...see Sample Operation (3).
- Even though "CODE ERROR" is sometimes displayed when the [STP±] key is pressed, continue the operation.

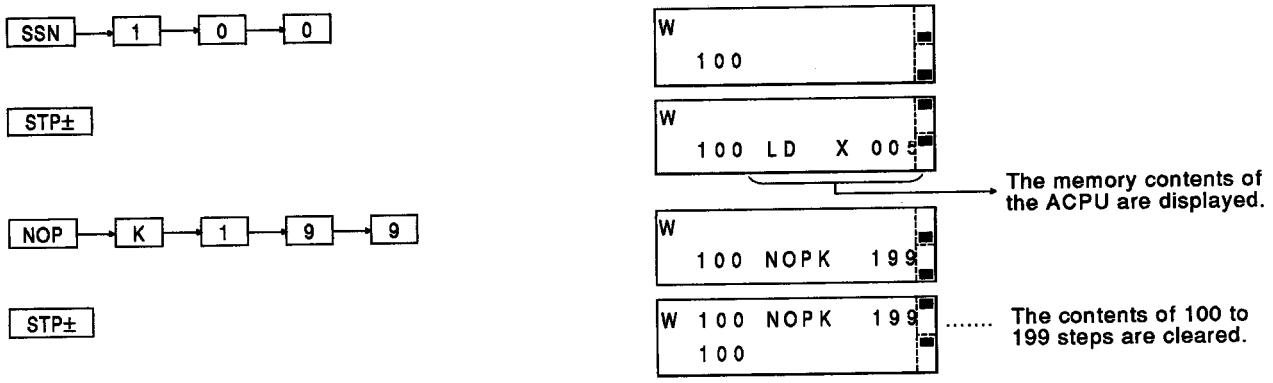
[Remarks]

- Section 6.6.6 gives details about writing a microcomputer program.

[Sample Operation]

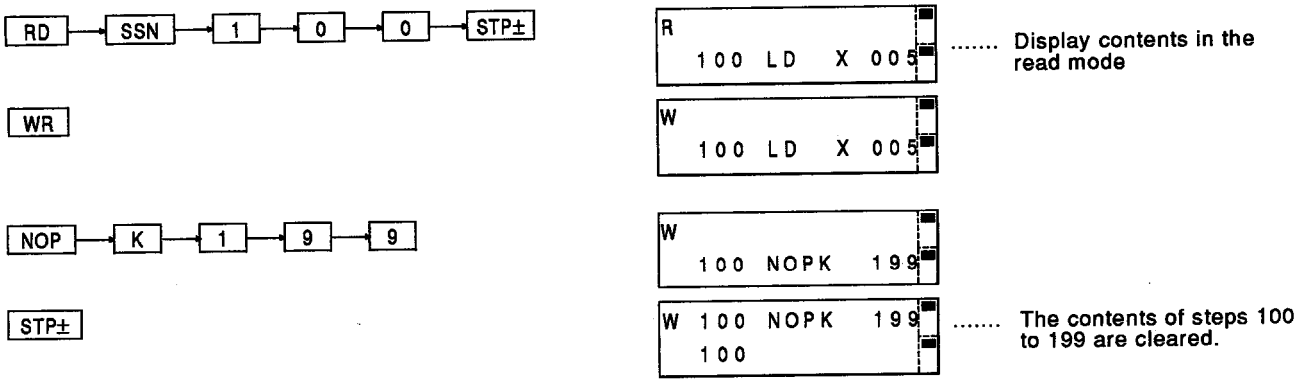
(1) If the instruction of step numbers 100 to 199 is set to NOP.

This operation starts from Basic Operation (Procedure 5).



(2) When the instruction of step numbers 100 to 199 is set to NOP after operating in the read, insert/delete, or monitor mode. (The figure below shows the Sample Operation using the read mode.)

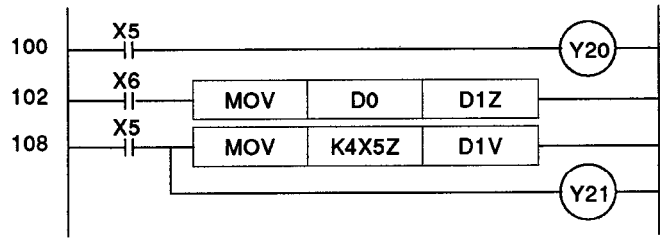
This operation starts from Basic Operation (Procedure 3).



(3) When a step number in the middle of an instruction is designated

This operation starts from Basic Operation (Procedure 5).

(Ladder example)

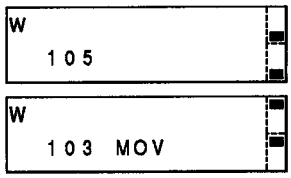


SSN → 1 → 0 → 5

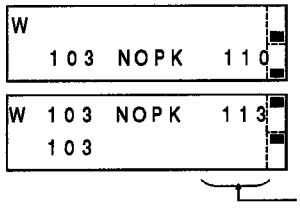
STP±

NOP → K → 1 → 1 → 0

STP±



Because a set step number exists in the middle of an instruction, the step number changes to the head step (103) of the instruction.



Because a set final step exists in the middle of an instruction, steps are cleared to the last step (113, MOV K4X5Z D1V) of the instruction.

6.2.2 When creating, modifying, changing, or adding to a program (Write/change/addition to a program)

[Function]

This operation is used (a) when a sequence program is written to an ACPU, and (b) if that sequence program is changed or added to.

[Basic Operation]

Even if this operation is done when the ACPU is in the RUN state by using the "programming function during CPU RUN of the A7PUS", when the following condition is satisfied, an operating error will not occur.

However, do this operation as shown below using the "programming function" of the A7PUS to make the execution result of the ACPU certain.

(1) The number of instruction steps before writing is the same as the number of steps of the instruction to be written.

(2) The instruction before writing and the instruction that is written are neither P nor I instruction.

When modifying or changing a program when the ACPU is in the RUN state by using the "programming function during CPU RUN" of the A7PUS with the above conditions, start from (Procedure 3).

(Set the A7PUS to the "programming function during CPU RUN".)

(Procedure 1) Set the ACPU to STOP

Put the connected ACPU in the STOP state.

(Procedure 2) Select the "programming function of the A7PUS in CPU RUN"

Sections 5.1.1 to 5.1.4 tell how to select the "programming function of the A7PUS in CPU RUN". If the "programming function", is already set, this procedure is unnecessary.

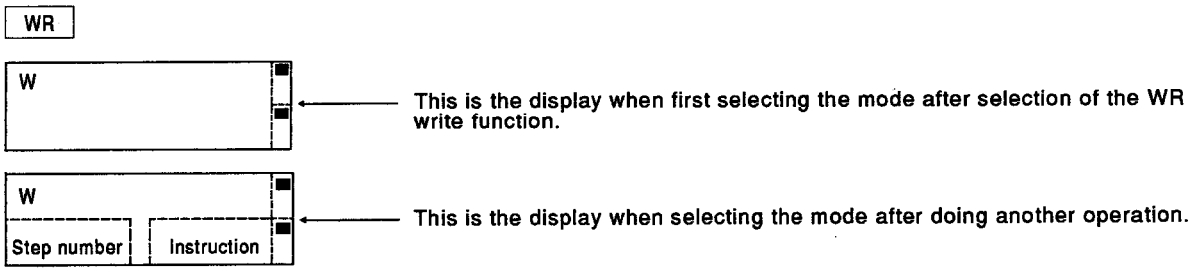
(Procedure 3) Check the step number to be modified

Use the read mode explained in Section 6.3 to confirm the step number of the program that is modified by this operation. If the step number is known for certain, this procedure is unnecessary.

(Procedure 4) Select the write mode

Press the [WR] key.

The A7PUS is switched to the write mode.

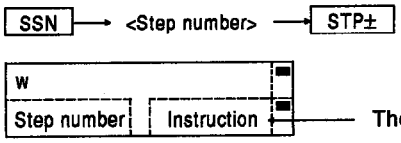


(Procedure 5) Input the step number to be modified

Input it in the order shown in the figure to the left.

This step number is the step number to modify an instruction currently in the program.

If the modified step number is displayed by any other operation ends, this procedure is unnecessary.

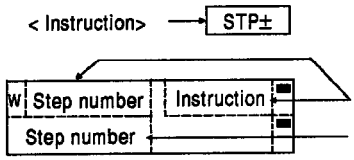


The current instruction and designated step number are displayed.

(Procedure 6) Write the instruction

Input a modified instruction and press the [STP±] key. *1

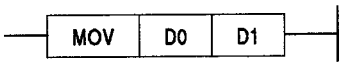
Modified contents are written to the ACPU as with a normal completion, and the following step number is displayed.



The instruction and previously modified step number corrected are displayed.

The next step number to be added is displayed.

Example:



Do not input MOV, D0, and D1 separately. Input MOV, D0, and D1 together as one unit (See the Sample Operation).

(Procedure 7) Operation to continue writing instructions

When adding to a program (insertion image) after an instruction in a modified step, repeat (Procedure 6) the same number of times as the number of additions to the program.

(Procedure 8) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

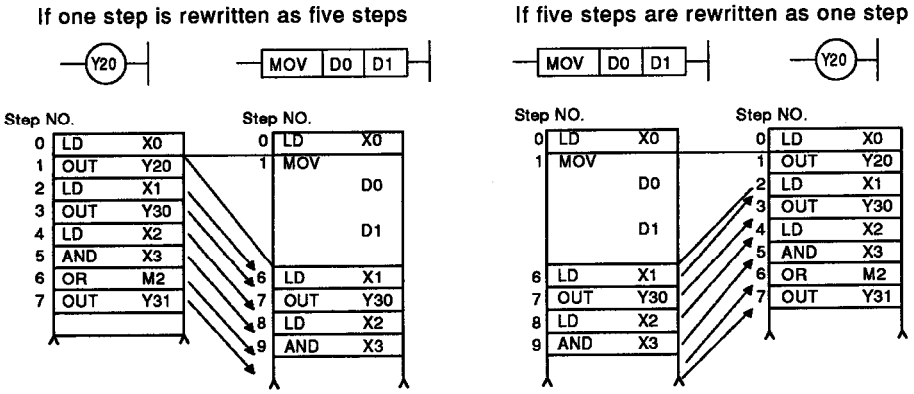
When continuing operations in the write mode, start according to the explanation in "After the write mode is selected".

[Point]

- Do this operation after setting the ACPU to the STOP state and setting the A7PUS to the programming function.
- If the designated head step is in the middle of an instruction, processing is executed assuming that the head step of the instruction is designated.
- When an instruction written to the ACPU is replaced by another instruction, if the previous number of steps is different from the current number of steps, the step numbers of the latter are automatically shifted.

  In addition, when operations are continued after a modification, the step numbers of latter program are also shifted.

  (Processing example when there is a difference between the number of instruction steps written to the ACPU and that to be currently written)



If a program is created that uses all the program capacity set by parameters in the ACPU, writing a subsequent operation will exceed the program capacity. Always keep this point in mind.

- Be sure to write an END instruction on the end of the program.
- When doing this operation when the ACPU is in the RUN state using the "programming function during CPU RUN", the following conditions must be satisfied:

  The number of instruction steps before writing is the same as the number of steps of the instruction to is written.

  The instruction before writing and the instruction that is written are neither P nor I instructions.

[Remarks]

- The same coil is not checked in the write mode.

  When a check of the same coil is necessary, execute a test mode program check (see Section 6.6.4).

- The number of steps that can be used when setting a sequence program capacity to the nK step is as follows:

  0 to the (n x 1024 – 2) step

  Example: Case of a 2K step

  0 to 2 x 1024 – 2 = 0 to 2046 (2047 steps)

  If a microcomputer program capacity is set at mK bytes by an A0J2CPU, the range becomes 0 to the [(7 – m/2) x 1024 – 1] step.

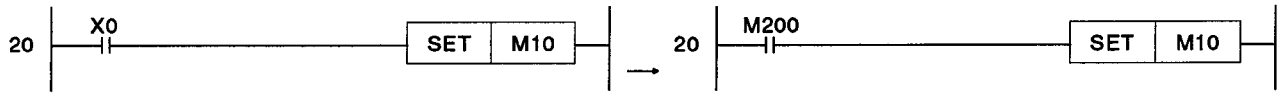
  Example: If the microcomputer program capacity is set at 2K bytes

  0 to [(7 – 2/2) x 1024 – 1] = 0 to 6143 (6144 steps)

[Sample Operation]

(1) When changing LD X0 of step number 20 to LD M200

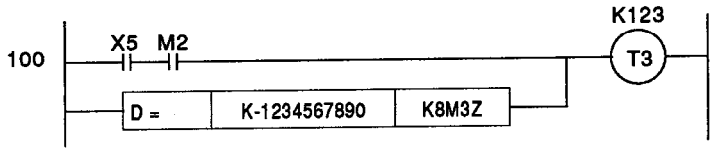
This operation starts from Basic Operation (Procedure 3).



RD → SSN → 2 → 0 → STP±	R 20 LD X 000 ..... Display contents in the read mode
WR → LD	W 20 LD ..... Selection of the write mode
M → 2 → 0 → 0	W 20 LD M 200 ..... X0 is changed to M200.
STP±	W 20 LD M 200 21 ..... LD M200 is written to the memory of the ACPU.
RD → SSN → 2 → 0 → STP±	R 20 LD M 200 ..... Changed contents are confirmed in the read mode.

(2) When adding the following ladder after step number 100 (currently NOP)

This operation starts from Basic Operation (Procedure 5).

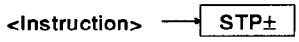


SSN → 1 → 0 → 0	W 100	
STP+	W 100 NOP	..... The contents of step 100 are displayed. (NOP in this example)
LD → , → X → 5	W 100 LD X 005	
STP+	W 100 LD X 005 101	..... Step 100 is written and step 101's instruction is in the input wait state.
AND → M → 2 → STP+	W 101 AND M 2 102	
OR → SFT → D → =	W 101 AND M 2 102 ORD=	..... Press key [D] -- the bottom function of a Part A key (see Section 5.3.1).
,	W 102 ORD=	..... Pressing the [,] key changes the display.
K → - → 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 0	W 102 ORD= K-1234567890	..... Independently of the valid key display, the key next to [K] is considered as [-].
,	W 102 ORD=,	
K → 8 → M → 3 → Z	W 102 ORD=, K8 M 3Z	
STP+	W K8 M 3Z 113	
OUT → T → 3 → ,	W 113 OUT T 3	
K → 1 → 2 → 3 → STP+	W K 123 114	

[Input Instruction Method]

Section 5.3.3 gives details.

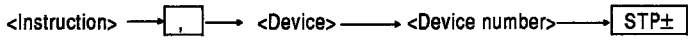
(1) For only an instruction code



Example: When inputting END..... END → STP+

(2) For an instruction code and a device (1)

The key inputting can be abbreviated.



Example: When inputting LD X0..... LD → , → X → 0 → STP+

(3) For OUT T and C instructions and an MC instruction

The key inputting can be abbreviated.

Example: When inputting OUT T0 K10..... OUT → , → T → 0 → , → K → 1 → 0 → STP+

Example: When inputting MC N3 M5..... MC → , → N → 3 → , → M → 5 → STP+

(4) For an instruction other than those above

The [,] key is pressed between the instruction, device, source data, and destination data.

Example: When inputting MOV K255 D0..... MOV → , → K → 2 → 5 → 5 → , → D → 0 → STP+

Example: When inputting + D1 D2 D3..... + → , → D → 1 → , → D → 2 → , → D → 3 → STP+

Example: When inputting DMOVP D0 D2..... D → MOV → P → , → D → 0 → , → D → 2 → STP+ or

SFT → D → M → O → V → P → , → D → 0 → , → D → 2 → STP+

Example: When inputting T0 H2 K10 D0 K5..... T0 → , → H → 2 → , → K → 1 → 0 → , → D → 0 → , → K → 5 → STP+

(5) How to input ASCII characters

When the ASCII character string contains a space code, the space code can be inserted by pressing the [SFT] key.

> When an instruction is input, the instruction can be input with an [A] to [Z] key by switching the valid key. But if it is an instruction indicated by an instruction key, it can be input with an instruction key (see Appendix 3).

6.2.3 Changing the set values of T and C when the ACPU is in the RUN state (Changing timer and counter set values)

[Function]

This operation changes the set values (the designated constants) of T (timer) and C (counter) when the connected ACPU is in the RUN state.

It is executed by using "the programming function of the A7PUS in CPU RUN".

In addition, when the indirectly designated set values of T and C (designated by device D) are changed, changing these set values follows changing the test mode current value (see Section 6.6.2).

[Basic Operation]

This operation starts from Basic Operation (Procedure 3) "the programming function of the A7PUS in CPU RUN" when the ACPU is in the RUN state.

(Procedure 1) Set the ACPU to RUN

Put the connected ACPU in the RUN state

(Procedure 2) Select the "programming function of the A7PUS in CPU RUN"

Sections 5.1.1 to 5.1.4 tell how to select the "programming function of the A7PUS in CPU RUN".

If the "programming function of the A7PUS in CPU RUN", is already set, this procedure is unnecessary.

(Procedure 3) Step number confirmation operation when a set value is changed

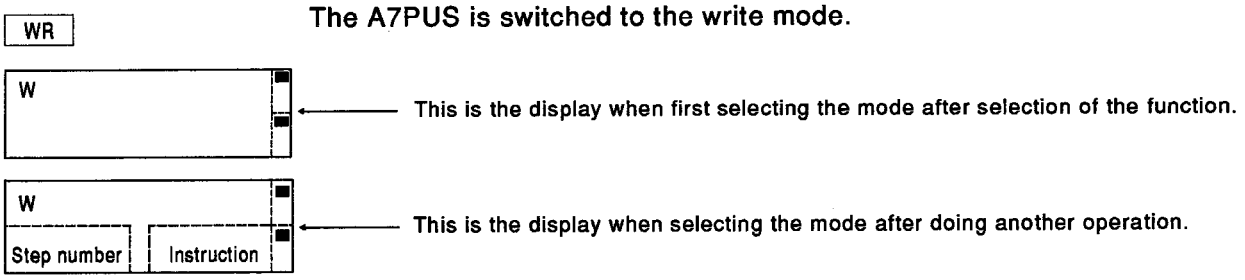
Use the read mode explained in Section 6.3 to confirm the step number of a program whose set value is changed by this operation by the read mode.

If the step numbers are known for certain, this procedure is unnecessary.

(Procedure 4) Select the write mode

Press the [WR] key.

The A7PUS is switched to the write mode.

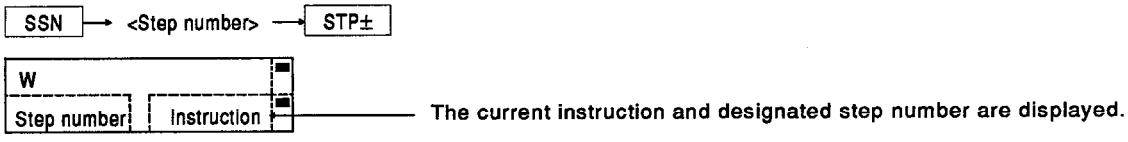


(Procedure 5) Input the step number to be changed

Input it in the order shown to the left.

This step number is the step number to change an instruction currently in the program.

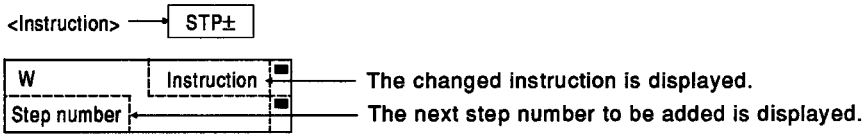
If the changed step number is displayed by any other operation, this procedure is unnecessary.



(Procedure 6) Changing the designated value (Writing)

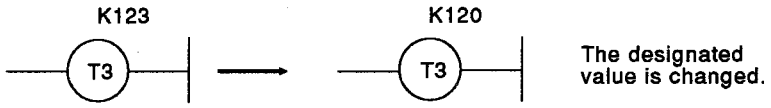
Input the changed instruction and press the [STP±] key. *1

Changed contents are written to the ACPU as with a normal completion, and the following step number is displayed.



*1 Do not input instructions part by part. The entire instruction must be input as one unit.

Example:

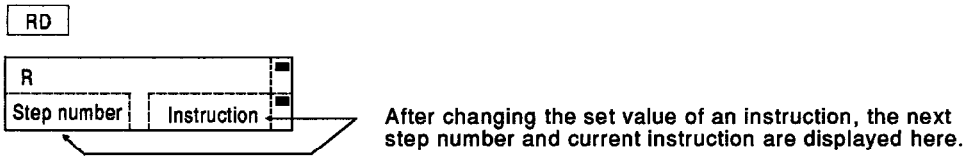


OUT T3, and K120 are not written part by part. OUT T3 and K120 are written as one unit (see the Sample Operation).

(Procedure 7) Mode changing operation to confirm change contents

Press the [RD] key

The A7PUS goes into the read mode.



(Procedure 8) Changed contents confirmation operation

STP−

Press the [STP−] key.

An instruction whose previous set value was changed is displayed.

Confirm the changed contents.

If the changed contents are correct, go on to (Procedure 9).

If the changed contents are not correct, restart operations from (Procedure 4).

(Procedure 9) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the write mode, start according to an explanation in "After the write mode is selected".

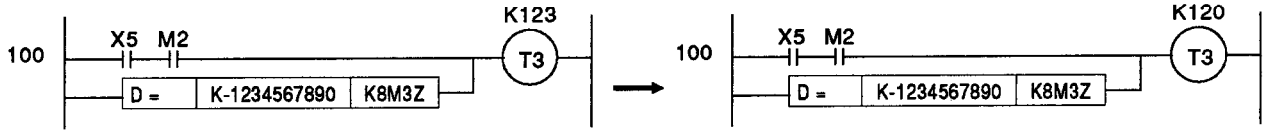
When changing a function and continuing operations, select a function according to Sections 5.1.4 (1) to (3), and start the next operation.

[Remarks]

This operation changes the set values of T and C when the ACPU is in the RUN state. For operations other than changing the set values of T and C, see Section 6.2.2.

[Sample Operation]

If the T3 set value of the following program is changed to K120, start the operation from Basic Operation (Procedure 3).



RD → SSN → 1 → 1 → 3 → STP+	R 113 OUT T 3	..... The memory contents of the ACPU are displayed.
STP+	R 113 OUT T 3 K 123	
WR	W 113 OUT T 3	..... Write mode
OUT	W 113 OUT	..... For changing designated values, write sequentially from OUT.
T → 3	W 113 OUT T 3	
,	W 113 OUT T 3	
K → 1 → 2 → 0	W 113 OUT T 3 K 120	..... Changed designated values are input.
STP+	W K 120 114	
RD	R 114 LD T 3	..... Changed contents are confirmed.
STP−	R 114 OUT T 3 K 120	..... Read mode

6.3 Read Mode (R) Operations

This operation designates step numbers, instructions, or devices and reads programs written to the ACPU.

Section 6.6.6 gives details about reading microcomputer programs.

6.3.1 Reading the instruction of a designation step number in a program (Instruction read by using a step number designation)

[Function]

This operation designates the step numbers of sequence programs written to an ACPU and reads step number instructions.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

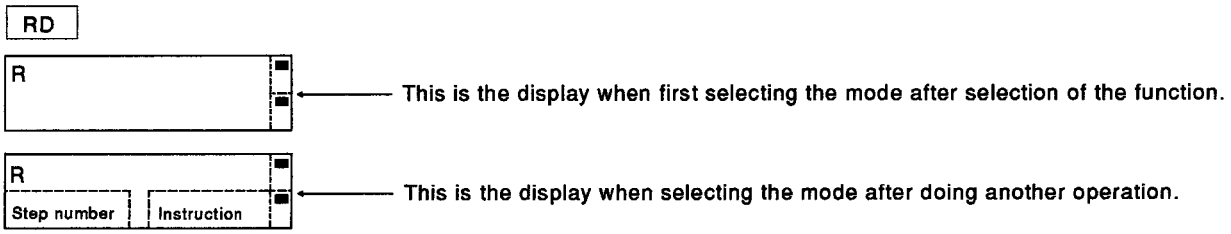
This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the read mode

Press the [RD] key.

The A7PUS goes into the read mode.

When doing another operation and displaying the current step number, the current instruction is displayed on the right side of the window.



(Procedure 2) Step number input operation

Perform key operations in the order shown on the left.

The step number is a step number in the program written to the ACPU.

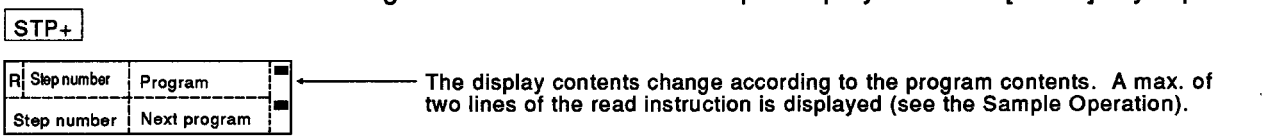
(Procedure 3) Confirmation operations for the previous and next programs

Press the [STP–] or [STP+] key to display the program just before or immediately after the currently displayed step number.

[STP–] : Previous program (The next 0 step and the last step instruction are displayed.)

[STP+] : Next program (The last step and the next 0 step instruction are displayed.)

The figure on the left shows a sample display when the [STP+] key is pressed.



(Procedure 4) Operations when continuing read operations

When reading the contents of a program sequentially, repeat Basic Operation (Procedure 3). When designating and reading other step numbers, start operations from Basic Operation (Procedure 2).

(Procedure 5) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

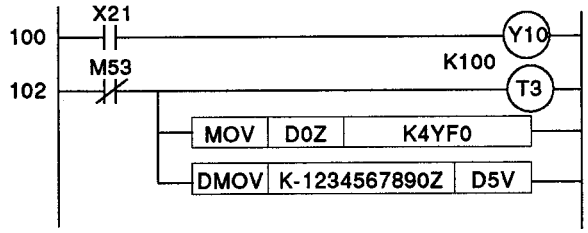
When continuing operations in the read mode, start according to the explanation in "After the read mode is selected".

[Point]

- When the ACPU is in the RUN state (as compared with the STOP state) operations sometimes take longer. Therefore, wait until the read instruction is displayed. (The time is proportional to the number of steps in the program.)
- Assuming that the head step of an instruction is automatically designated, if the designated step number is in the middle of an instruction, processing takes place.

[Sample Operation]

When reading an instruction after step number 100 of the following program



RD → SSN → 1 → 0 → 0 → STP+	R 100 LD X021
STP+	R 100 LD X021 101 OUT Y010
STP+	R 101 OUT Y010 102 LDI M53
STP+	R 102 LDI M53 103 OUT T3
STP+	R 103 OUT T3 K100
STP+	R K100 104 MOV
STP+	R 104 MOV D0Z
STP+	R 104 MOV, K4Y0F0
STP−	R 104 MOV D0Z

..... The ACPU's memory contents are displayed sequentially.

6.3.2 Reading a designated instruction in a program (Instruction read by using the instruction designation)

[Function]

This operation designates an instruction in a sequence program written to an ACPU and reads the existing instruction at a step number.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the read mode

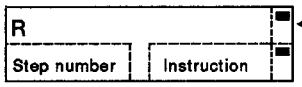
Press the [RD] key.

The A7PUS goes into the read mode.

When doing another operation and displaying the current step number, the current instruction is displayed on the right side of the window.

[RD]

← This is the display when first selecting the mode after selection of the function.



← This is the display when selecting the mode after performing another operation.

(Procedure 2) Instruction input operation

Do the key operation in the order shown on the left.

The instruction is an instruction to be read in a program written to an ACPU.

The method for inputting instructions is shown in the Sample Operation part of this section.

(1) When designating and reading a device and device number

<Instructions> → [,] →<Device> →<Device number>→ [STP±]

(Before the [STP+] or [STP–] is pressed, the screen is displayed as shown on the left.)

The case of an instruction on the right side.

LD	OR	AND	SET	PLS	SFT	SFTP	OUT	MC
LDI	ORI	ANI	RST					MCR

(2) When only an instruction is designated and read

<Instructions> → [STP±]

(The figure on the left shows the window before the [STP+] or [STP–] key is pressed.)

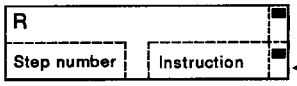
In the case of an instruction other than shown in (1) above.

However, P and I instructions cannot be read by this operation (see Section 6.3.3).

(Procedure 3) Read instruction confirmation

When (Procedure 2) is executed, the A7PUS searches for the designated instruction from step 0 of the ACPU program and displays it if detected.

If it is undetected, even after searching to the END instruction, CANT FIND is displayed.



Display when a designated instruction is detected.

Display when a designated instruction is not detected.

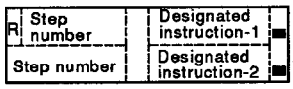
(Procedure 4) Confirmation operation of the next step inwhich the designated instruction is used

After confirming the designated instruction in (Procedure 3), press the [STP+] or [STP–] key to read the step number of the designated instruction in (Procedure 2).

The detected step is displayed just before it is switched.

This operation can be repeated until CANT FIND is displayed.

STP±



Display when a designated instruction is detected.

Display when a designated instruction is not detected.

(Procedure 5) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

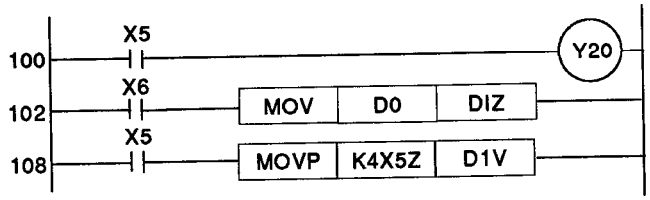
When continuing operations in the read mode, start according to the explanation in "After the read mode is selected".

[Point]

- When the ACPU is in the RUN state (as compared with the STOP state) operations sometimes take longer. Therefore, wait until the read instruction is displayed. (The time is proportional to the number of steps in the program.)

[Sample Operation]

Operation to search for the step numbers where LD X5 and MOV instructions appear.



RD → LD → , → X → 5	R LD X 005
STP+	R 100 LD X 005
STP+	R 100 LD X 005 108 LD X 005
STP+	R 108 LD X 005 CANT FIND
MOV	R MOV
STP+	R 103 MOV
STP+	R 103 MOV 109 MOVP
STP+	R 109 MOVP CANT FIND

..... When the MOV instruction is designated, the MOVP instruction also becomes applicable (see the Input Instruction Method).

[Input Instruction Method]

(1) This section shows how to input a designated instruction.

(a) Use a device and device number to designate the following instructions:

LD	OR	AND	SET	PLS	SFT	SFTP	OUT	MC
LDI	ORI	ANI	RST					MCR

Designate the OUT and MC instructions to the first device.

Example:

```
LD X5
OUT T123    ( OUT T123 K123 cannot be done. )
MC N3       ( MC N3 M1023 cannot be done.   )
```

(b) P and I instructions cannot be read by this operation (see Section 6.3.3).

(c) In the instructions shown above, only the instruction can be designated.

(2) Additional explanations of compare instructions and pulse instructions (<Instruction>P).

In this operation, by using the designated instruction, the next related instruction can be read. When determining an instruction to be read, designate all instructions (for example, LD=, LDD=, etc.).

(a) Compare instructions

Designated Instructions	Instructions to be Read		
=	LD=	,AND=	,OR=
D=	LDD=	,ANDD=	,ORD=
<>	LD<>	,AND<>	,OR<>
D<>	LDD<>	,ANDD<>	,ORD<>
>	LD>	,AND>	,OR>
D>	LDD>	,ANDD>	,ORD>
<=	LD<=	,AND<=	,OR<=
D<=	LDD<=	,ANDD<=	,ORD<=
<	LD<	,AND<	,OR<
D<	LDD<	,ANDD<	,ORD<
>=	LD>=	,AND>=	,OR>=
D>=	LDD>=	,ANDD>=	,ORD>=

(b) Pulse instructions

Designated Instructions	Instructions to be Read	Examples
<Instruction>	<Instruction>, <Instruction> P	MOV, MOVP
<Instruction> P	<Instruction> P	MOVP

(3) Showing changes of input data

Before the [STP+] or [STP–] key is input, data can be changed by the operation shown below.

- Correct data is reentered after pressing the [CL] key.
- When changing an <instruction>, that instruction is reentered after pressing the [SFT] key.
- When changing a <device> and <device number>, correct data is reentered.

6.3.3 Designating a device used in the program and reading an instruction (Instruction read by using the device designation)

[Function]

This operation designates a device and device number used in a sequence program written to an ACPU and reads the instruction of the step number for which the device is used.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

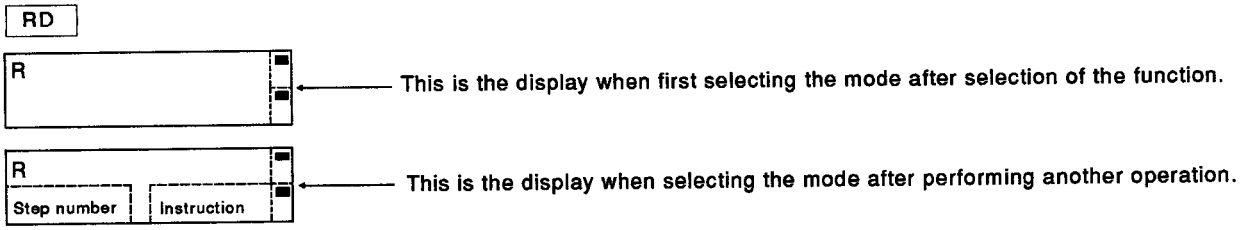
This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the read mode

Press the [RD] key.

The A7PUS goes into the read mode.

When doing another operation and displaying the current step number, the current instruction is displayed on the right side of the window.

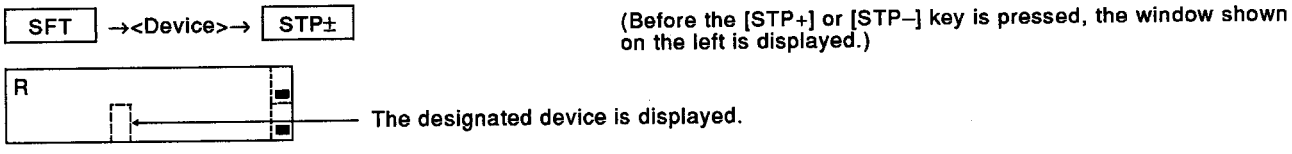


(Procedure 2) Device input operation

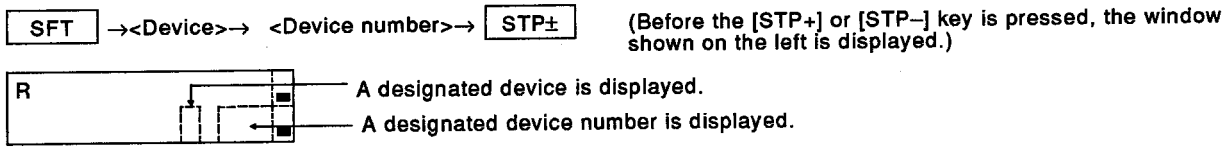
Do the key operation in the order shown on the left.

Only use devices and device numbers which are used in the program written to the ACPU as designated devices. Do not use devices and device numbers which are not written to the program.

(1) When designating Z and V as devices



(2) When designating X, Y, D or W (any other than Z and V) as devices.



* Showing changes of input data

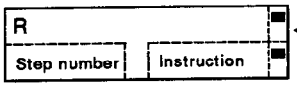
Before the [STP+] or [STP–] key is input, data can be changed by the operation shown below.

- Correct data is reentered after pressing the [CL] key.
- When changing a <device> and <device number>, correct data is reentered.

(Procedure 3) Read instruction confirmation

When (Procedure 2) is executed, the A7PUS searches for the designated device and device number from step 0 of the ACPU program and displays it if detected.

If undetected, even after searching to the END instruction, CANT FIND is displayed.



← Display when a designated instruction is detected.

← Display when a designated instruction is not detected.

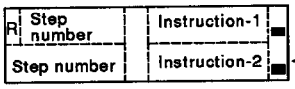
(Procedure 4) Confirmation operation of the next step in which the designated device and device number are used

After confirming the designated device and device number in (Procedure 3), press the [STP+] or [STP–] key to read the step number of the designated device and device number in (Procedure 2).

The detected step is displayed just before it is switched.

This operation can be repeated until CANT FIND is displayed.

STP±



← Display when a designated device or device number is detected.

← Display when a designated device or device number is not detected.

(Procedure 5) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

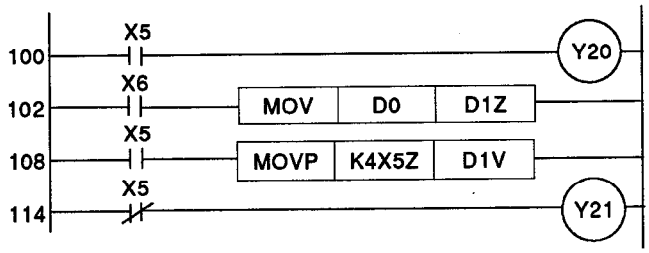
When continuing operations in the read mode, start according to the explanation in "After the read mode is selected".

[Point]

- A read by this operation (compared with the read operation that is shown in other items), takes slightly more time.
  When the ACPU is in the RUN state (as compared with the STOP state) operations sometimes take longer. Therefore, wait until the read instruction is displayed. (The time is proportional to the number of steps in the program.)

[Sample Operation]

Operation to search for the step numbers where devices X5 and Z appear.



RD → SFT → X → 5	R X 005 ..... Read of an instruction in which X5 is used.
STP+	R 100 LD X 005
STP+	R 100 LD X 005 108 LD X 005
STP+	R 109 MOVP K4 X 005Z
STP+	R K4 X 005Z 114 LDI X 005
STP+	R 114 LDI X 005 CANT FIND
SFT → Z	R Z ..... Read of an instruction in which Z is used.
STP+	R 102 MOV D 1Z
STP+	R 109 MOV K4 X 005Z

6.4 Operations in the Insert/Delete Mode (I)

This section shows how to change a program in an ACPU by inserting new instructions and deleting existing ones.

6.4.1 Inserting an instruction in a program (Program insertion)

[Function]

This operation inserts a new instruction in a program written to an ACPU.

[Basic Operation]

(Procedure 1) Set the ACPU to STOP

Put the connected ACPU in the STOP state.

(Procedure 2) Select the "programming function of the A7PUS in CPU RUN"

Sections 5.1.1 to 5.1.4 tell how to select the "programming function of the A7PUS in CPU RUN".

If the "programming function", is already set, this procedure is unnecessary.

(Procedure 3) Check the step numbers of the range where the instruction will be inserted

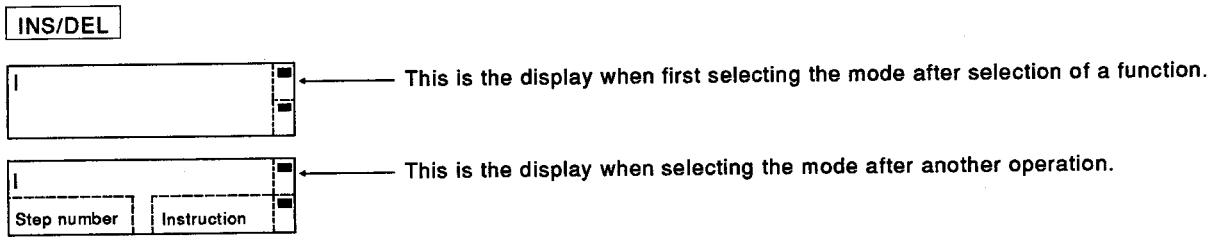
Use the read mode explained in Section 6.3 to confirm the step numbers in the program range that is set for instruction insertion by this operation.

If the step numbers are known for certain, this procedure is unnecessary.

(Procedure 4) Select the insert/delete mode

Press the [INS/DEL] key.

The A7PUS is switched to the insert/delete mode.

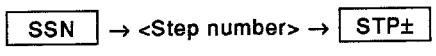


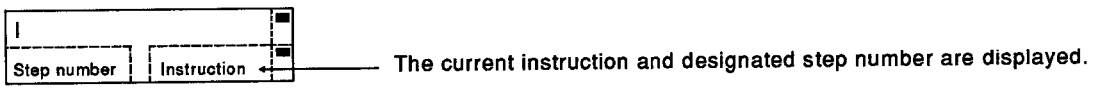
(Procedure 5) Inputting the head step number during insertion

Do the key operation in the order shown in the figure to the left.

This step number is the step number of the inserted instruction.

If the step number is already displayed by any other operation, this procedure is unnecessary.

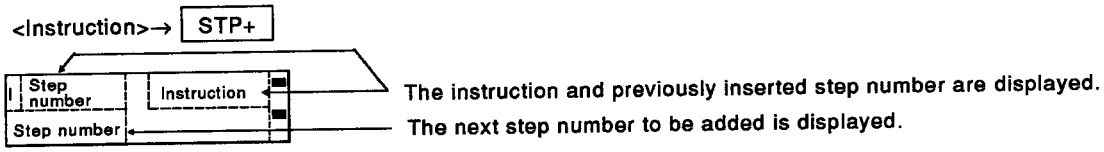




(Procedure 6) Write the instruction to be inserted

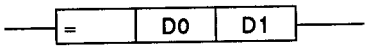
Input an instruction to be inserted and the press the [STP+] key. *1

Inserted contents are written to the ACPU as with a normal completion, and the following step numbers are displayed.



*1 Do not insert instructions part by part.
The entire instruction must be inserted as one unit.

Example:



AND=, D0, and D1 are not inserted separately. AND=, D0, and D1 are inserted together (see the Input Instruction Method).

(Procedure 7) Operation to continue inserting instructions

In order to continue inserting instructions, repeat the steps in (Procedure 6) as often as necessary.

(Procedure 8) Program confirmation operation

By using the read mode in Section 6.3, confirm the program contents before and after the part where an instruction was inserted.

(Procedure 9) Start the next operation

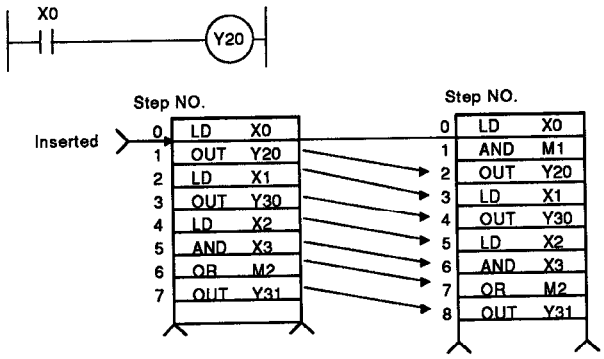
When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the insert/delete mode, start according to the explanation in "After the insert/delete mode is selected".

[Point]

- For this operation, put the ACPU in the STOP state.
  After completing operations, confirm that insertion was done in the read mode.
- Assuming that the head step of an instruction is automatically designated, if the designated step number is in the middle of an instruction, processing takes place.
- When instructions are inserted in existing programs, step numbers are automatically shifted.

(1) When AND M1 is inserted



If an already-created program uses all the program capacity registered in the parameters of the ACPU, be careful not to exceed this capacity by carrying out an insertion operation.

[Remarks]

- The same coil cannot be checked in the insert/delete mode. When a check of the same coil is necessary, execute a test mode program check (see Section 6.6.4).
- The number of steps that can be used when setting a sequence program capacity to the nK step is as follows:

  0 to the (n x 1024 – 2) step

  Example: Case of a 2K step

  0 to 2 x 1024 – 2 = 0 to 2046 (2047 steps)

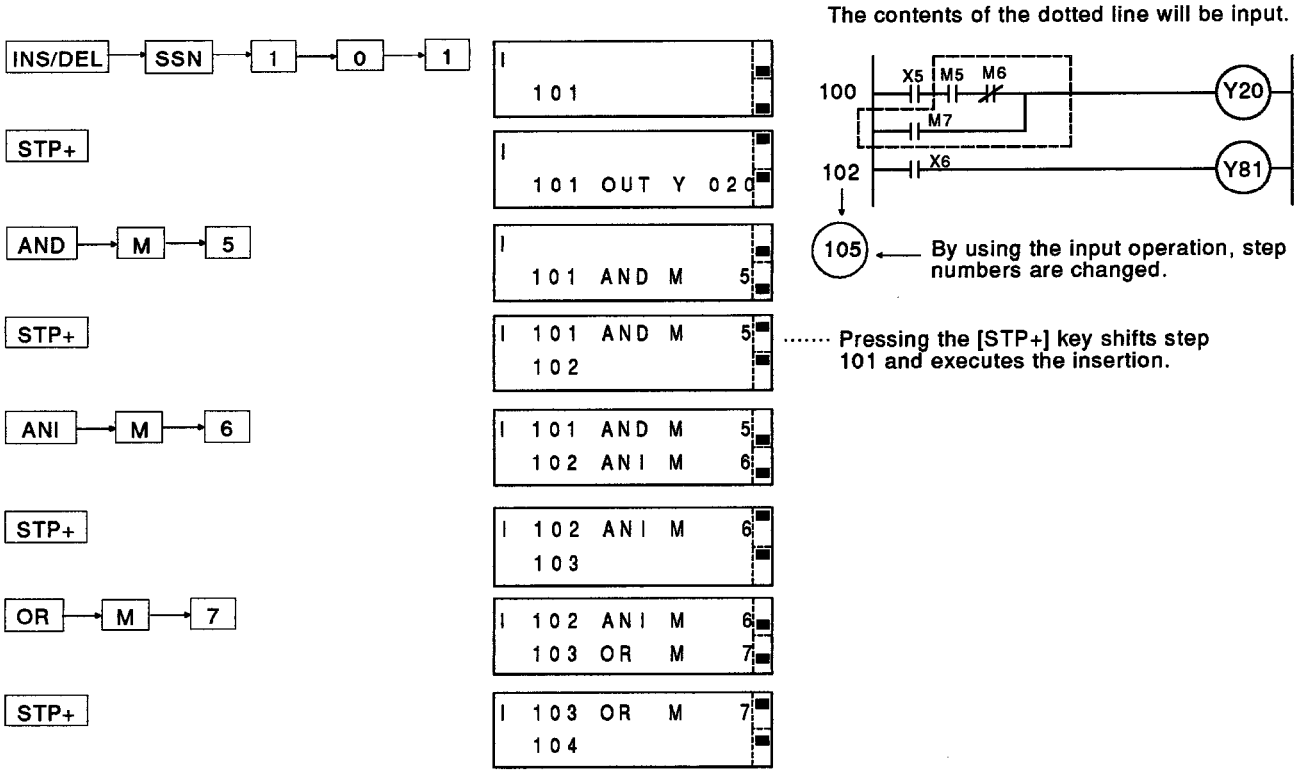
If a microcomputer program capacity is set at mK bytes by an A0J2CPU, the range becomes 0 to the [(7 – m/2) x 1024 – 1] step.

Example: If the microcomputer program capacity is set at 2K bytes

0 to [(7 – 2/2) x 1024 – 1] = 0 to 6143 (6144 steps)

[Sample Operation]

When the parts in the dotted line are input in the program, follow the procedure given below.



[Input Instruction Method]

Section 5.3.3 gives details.

(1) For only an instruction code.

<Instruction>→ [STPæ]

Example: When END is input ..... [END] → [STP+]

(2) For an instruction code and a device (1)
Key inputting can be abbreviated.

<Instruction>→ [,] →<Device>→ <Device number>→ [STP±]

Example: When inputting LD X0..... [LD] → [,] → [X] → [0] → [STP+]

(3) For an OUT T or C instruction and an MC instruction
Key inputting can be abbreviated.

<Instruction>→ [,] →<Device>→ <Device number>→ [,] → [K] →<Set value>→ [STP±]

Example: When inputting OUT T0 K10 ..... [OUT] → [,] → [T] → [0] → [,] → [K] → [1] → [0] → [STP+]

Example: When inputting MC N3 M5..... [MC] → [,] → [N] → [3] → [,] → [M] → [5] → [STP+]

(4) For an instruction other than those above

The comma key is pressed between the instruction, device, source data, and destination data.

Example: When inputting MOV K255 D0..... [MOV] → [,] → [K] → [2] → [5] → [5] → [,] → [D] → [0] → [STP+]

Example: When inputting + D1 D2 D3..... [+] → [,] → [D] → [1] → [,] → [D] → [2] → [,] → [D] → [3] → [STP+]

Example: When inputting DMOVP D0 D2.... [D] → [MOV] → [P] → [,] → [D] → [0] → [,] → [D] → [2] → [STP+] or

[SFT] → [D] → [M] → [O] → [V] → [P] → [,] → [D] → [0] → [,] → [D] → [2] → [STP+]

Example: When inputting T0 H2 K10 D0 K5.. [T0] → [,] → [H] → [2] → [,] → [K] → [1] → [0] → [,] → [D] → [0] → [,] → [K] → [5] → [STP+]

(5) How to input ASCII characters

When the ASCII character string contains a space code, the space code can be inserted by pressing the [SFT] key.

When an instruction is input, the instruction can be input with an [A] to [Z] key by switching the valid key. But if it is an instruction indicated by an instruction key, it can be input with an instruction key (see Appendix 3).

6.4.2 Deleting an instruction in a program (Program deletion)

[Function]

This operation deletes an instruction in a program written to an ACPU.

[Basic Operation]

(Procedure 1) Set the ACPU to STOP

Put the connected ACPU in the STOP state.

(Procedure 2) Select the "programming function of the A7PUS in CPU RUN"

Sections 5.1.1 to 5.1.4 tell how to select the "programming function of the A7PUS in CPU RUN".

If the "programming function", is already set, this procedure is unnecessary.

(Procedure 3) Check the step number to be deleted

Use the read mode explained in Section 6.3 to confirm the step number of the program that is deleted by this operation.

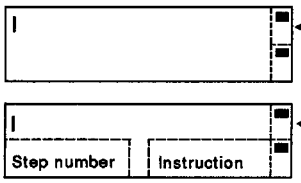
If the step number is known for certain, this procedure is unnecessary.

(Procedure 4) Select the insert/delete mode

Press the [INS/DEL] key.

The A7PUS is switched to the insert/delete mode.

INS/DEL



This is the display when first selecting the mode after selection of the function.

This is the display when selecting the mode after doing another operation.

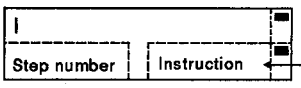
(Procedure 5) Input the step number to be deleted

Input it in the order shown in the figure to the left.

This step number is the step number to delete an instruction currently in the program.

If the deletion step number is displayed by any other operation ends, this procedure is unnecessary.

SSN → <Step number> → STP±



The current instruction and designated step number are displayed.

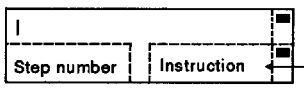
(Procedure 6) Operation of the deletion instruction

Press the [STP–] key. *1

Changed contents are written to the ACPU as with a normal completion, and the following step number is displayed.

(The subsequent step numbers are renumbered in accordance with the number of steps which were deleted.)

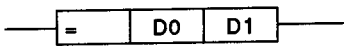
STP–



The next instruction and the same step number are displayed.

*1 Do not delete instructions part by part.
The entire instruction must be deleted as one unit.

Example:



Do not delete AND=, D0, and D1 separately here.
Delete AND=, D0 and D1 together as one unit.

(Procedure 7) Operation to continue deleting instructions

In order to continue deleting instructions, repeat the steps in (Procedure 6) as often as necessary.

(Procedure 8) Program confirmation operation

By using the read mode in Section 6.3, confirm the program contents before and after the part where an instruction was deleted.

(Procedure 9) Start the next operation

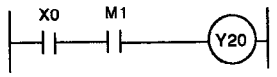
When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

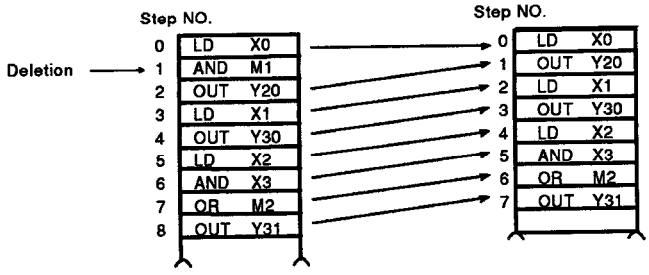
When continuing operations in the insert/delete mode, start according to the explanation in "After the insert/delete mode is selected".

[Point]

- For this operation, put the ACPU in the STOP state.
  After completing operations, confirm that deletion was done in the read mode.
- Assuming that the head step of an instruction is automatically designated, if the designated step number is in the middle of an instruction, processing takes place.
- When instructions are deleted from existing programs, step numbers are automatically shifted.

(1) When AND M1 is deleted





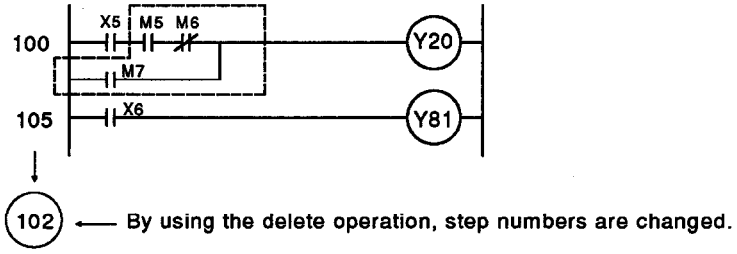
[Remarks]

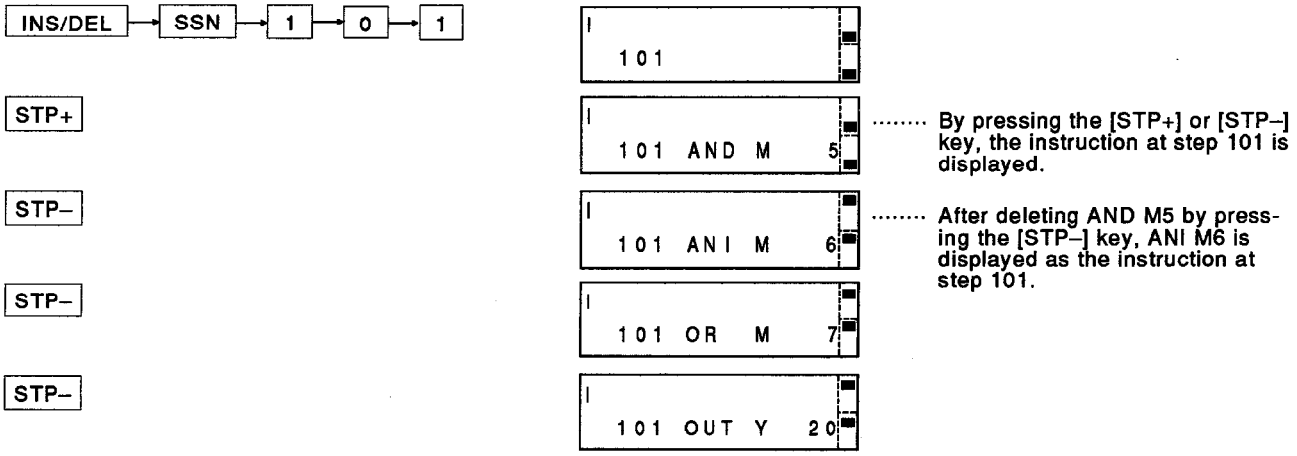
- Section 6.2.1 gives details about designating a range in a program to NOP instructions.
- Section 6.1 gives details about executing all clear for key words, parameters, and programs.

[Sample Operation]

When the parts in the dotted line are deleted from the program, follow the procedure given below.

The contents of the dotted line will be deleted.





6.5 Operations in the Monitor Mode (M)

This operation confirms the operating conditions of a program in an ACPU.

The following can be confirmed:

- ON/OFF state of a bit device and T or C contact state
- Current value of a word device
- Conductivity state of a sequence program
- Set state of an offline switch

6.5.1 Confirming the state of X, Y, M, L, B, and F (Monitoring of a bit device)

[Function]

This operation designates a device and device number and confirms the current ON/OFF state.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

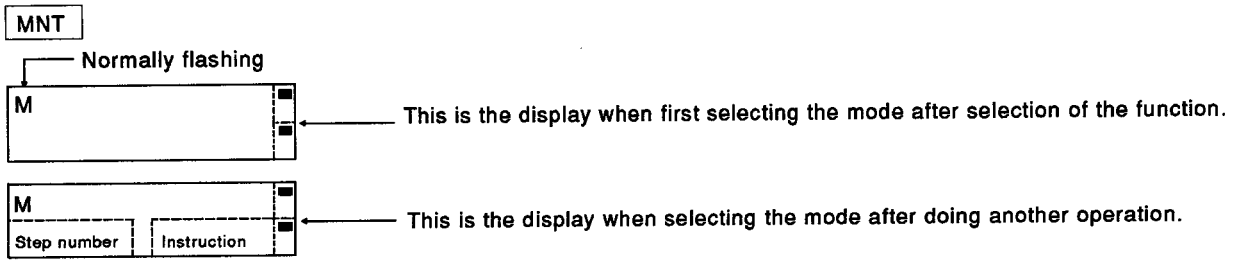
This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the monitor mode

Press the [MNT] key.

The A7PUS goes into the monitor mode.

When doing another operation and displaying the current step number, the current instruction is displayed on the right hand side of the window.



(Procedure 2) Step number input operation

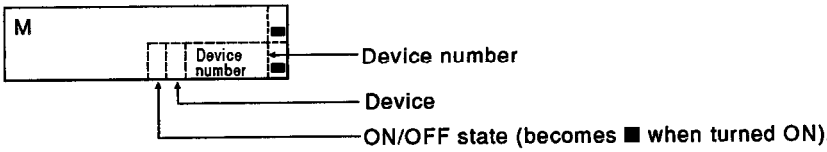
Perform key operations in the order shown on the left.

The device and the device number display the ON/OFF state of the bit devices, and any of the following can be designated.

X, Y, M, L, B, F (for T and C, see Section 6.5.3.)

<Device> → <Device number> → STP±

The designated device, device number, and ON/OFF state are displayed.



*A device not used in the program can also be designated.

(Procedure 3) Inputting the next monitored device

When a monitored device is designated, operations can be executed by either (1) or (2) below.

The display changes (moves) sequentially as shown below.

(1) When a device immediately before or after a previously designated device is designated.

STP±

Repeatedly press the [STP+] or [STP–] key.

[STP+] : The device immediately after is designated.
(After designating the last number, the head number is displayed)

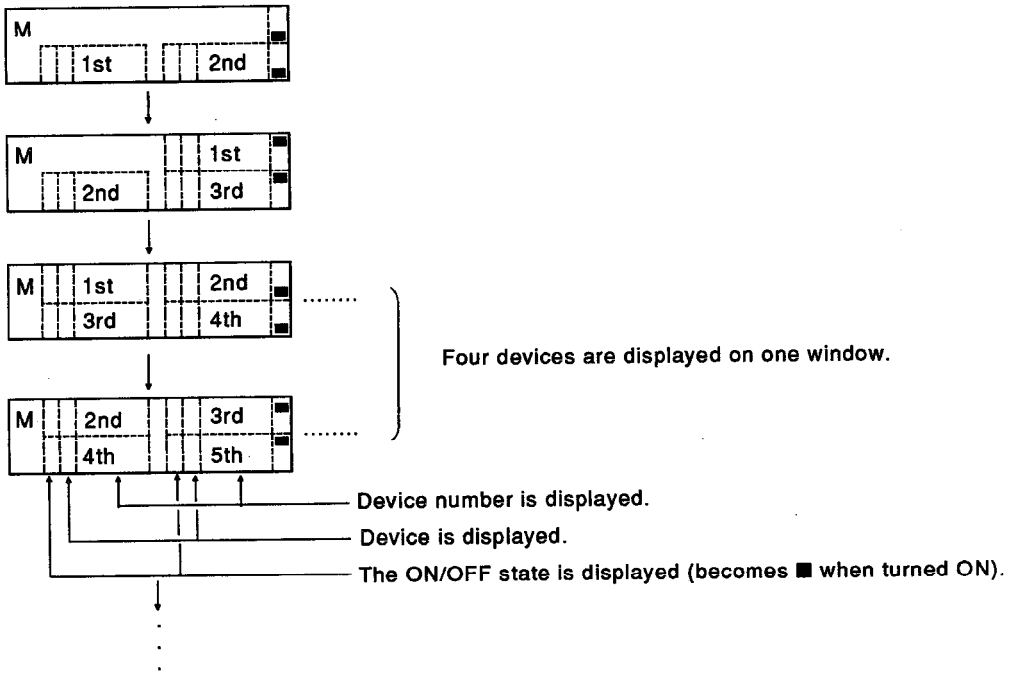
[STP–] : The device immediately before is designated.
(After designating the head number, the last number is displayed)

(2) If another device is designated

Repeat the operation from (Procedure 2).

(When keys are input, monitoring is interrupted.)

<Device> → <Device number> → STP±



(Procedure 4) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the monitor mode, start according to the explanation in "After the monitor mode is selected".

[Point]

- Section 6.5.3 gives details about confirming the ON/OFF state of the contacts of the timer (T) and counter (C).

- If the [SFT] key is input in this operation, it shifts to offline switch monitoring operation given in Section 6.5.5.

  This operation cannot be done with A0J2CPU and A3HCPU models (see Section 2.2).

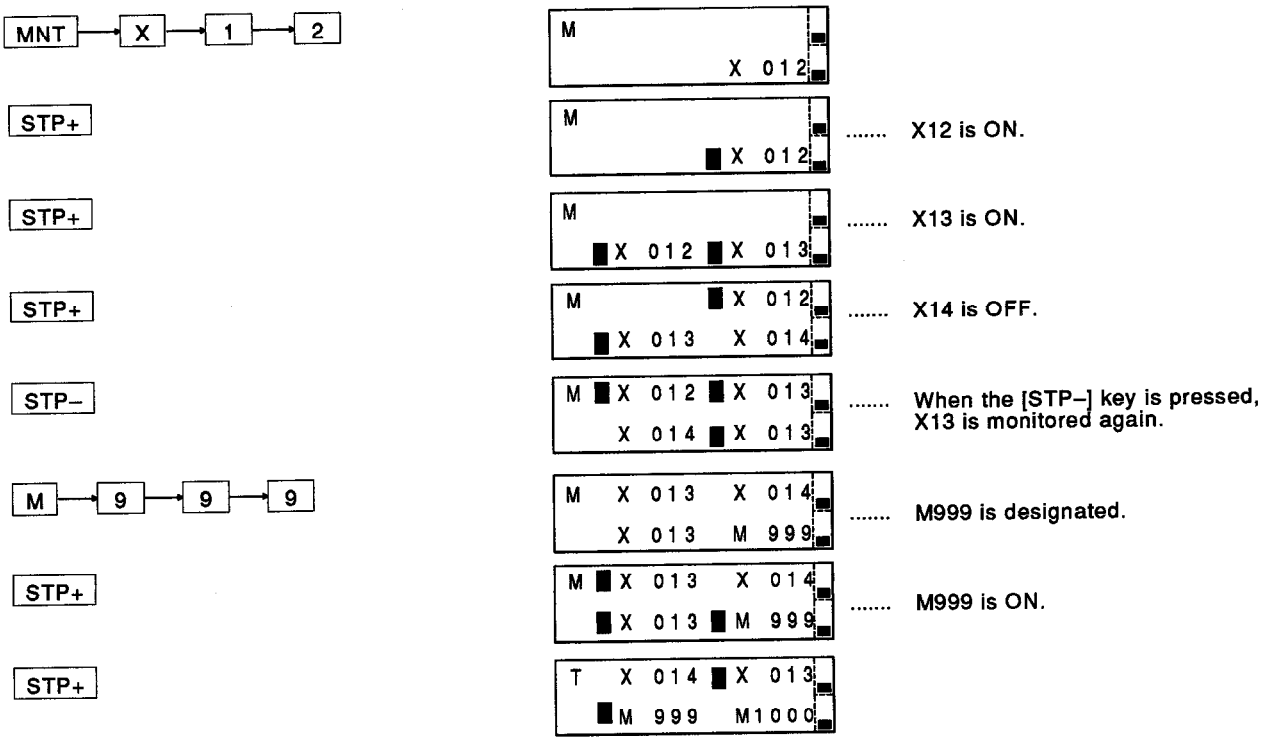
  To return to this operation, press the [SFT] key again.

  However, the display contents will not be returned to then original state.

  To redisplay the original contents, do this operation again.

[Sample Operation]

In this sample operation, the ON/OFF state of M999 (following X12 to X14) is confirmed.



6.5.2 Confirming the current value of D, W, R, A, Z, and V (Monitoring of a word device)

[Function]

This operation designates a device and a device number and confirms current values.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

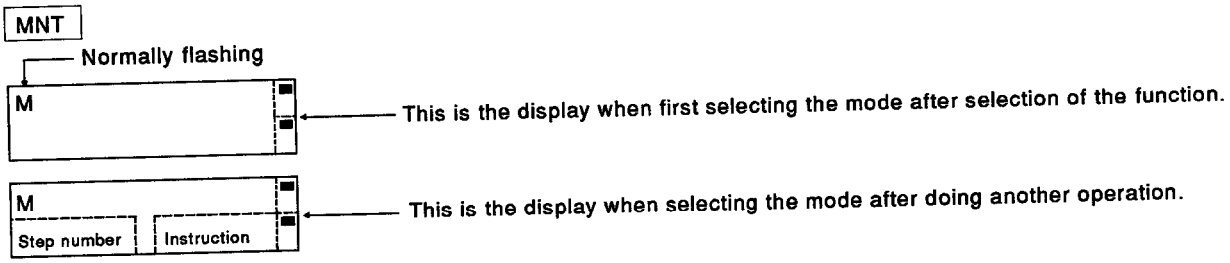
This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the monitor mode

Press the [MNT] key.

The A7PUS goes into the monitor mode.

When doing another operation and displaying the current step number, the current instruction is displayed on the right hand side of the window.



(Procedure 2) Step number input operation

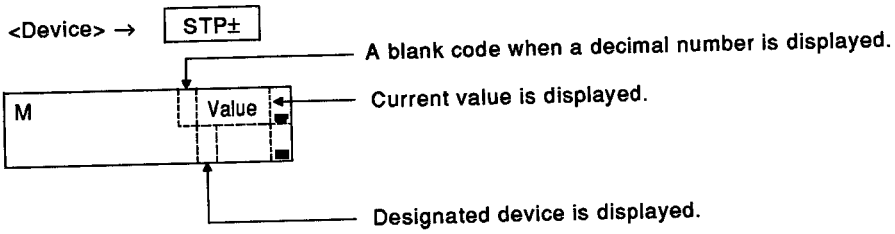
Perform key operations in the order shown on the left.

The device and the device number are the word devices that display the current value.

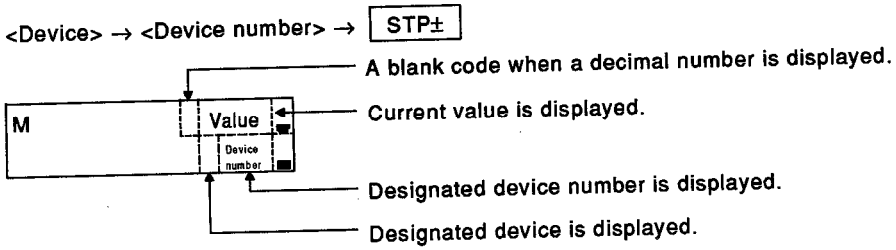
Any of the following devices can be designated.

D, W, R, A, Z, V (for T and C, see Section 6.5.3).

(1) When designating Z or V as a device



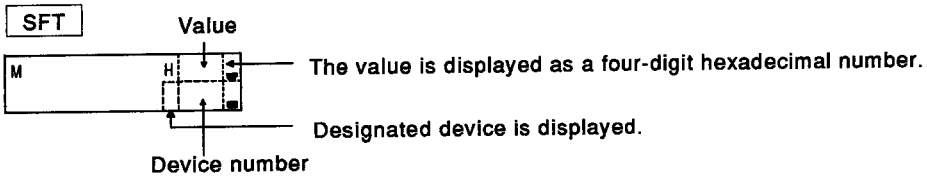
(2) When designating D, W, R and A as a device



(Procedure 3) Switching between decimal/hexadecimal display

Press the [SFT] key to switch decimal/hexadecimal displays.

The following figure shows a hexadecimal display.



(Procedure 4) Inputting the next monitored device

When a monitored device is designated, operations can be executed by either (1) or (2) below.

The display changes (moves) sequentially as shown below.

(1) In order to designate a device whose device number is D, W, R, or A immediately before or after the previously designated device.

Repeatedly press the [STP+] or [STP–] key

STP±

[STP+] : The device number immediately after is designated. (After designating the last number, the head number is displayed)

[STP–] : The device immediately before is designated. (After designating the head number, the last number is displayed)

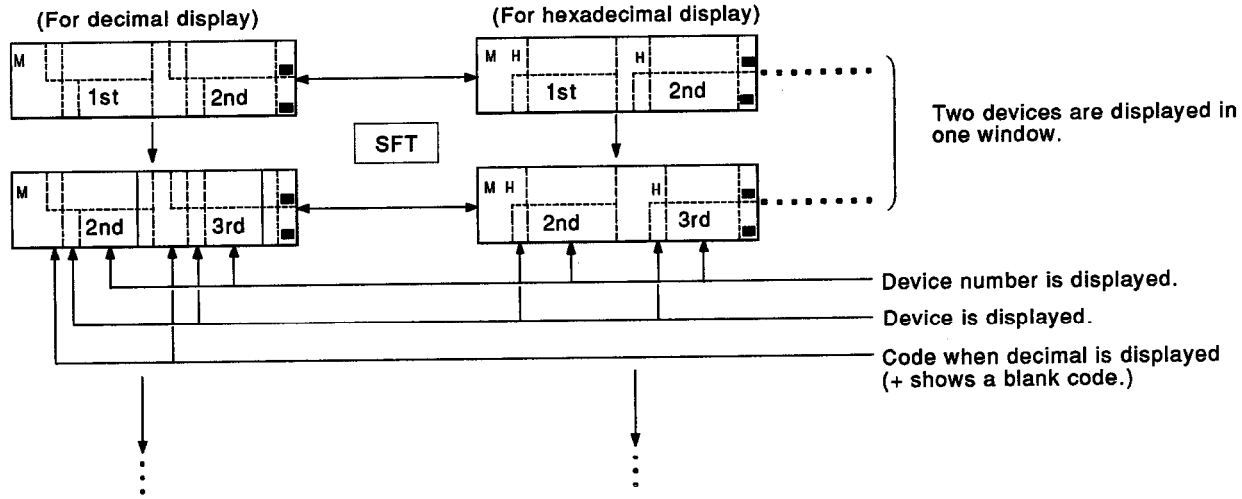
(2) If another device is designated

Repeat the operation from (Procedure 2).

(When keys are input, monitoring is interruped.)

The key operation when D, W, R or A is designated is as follows:

<Device> → <Device number> → STP±



(Procedure 5) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the monitor mode, start according to the explanation in "After the monitor mode is selected".

[Point]

- Section 6.5.3 gives details about confirming the current values of the timer (T) and counter (C).
- When performing an operation using a 32-bit instruction, the following must be done:

  The A7PUS displays data as a 16-bit unit.

  Therefore, to read a 32-bit instruction, the operator must treat the contents of two 16-bit units displayed in hexadecimal as one 32-bit unit.

Example:

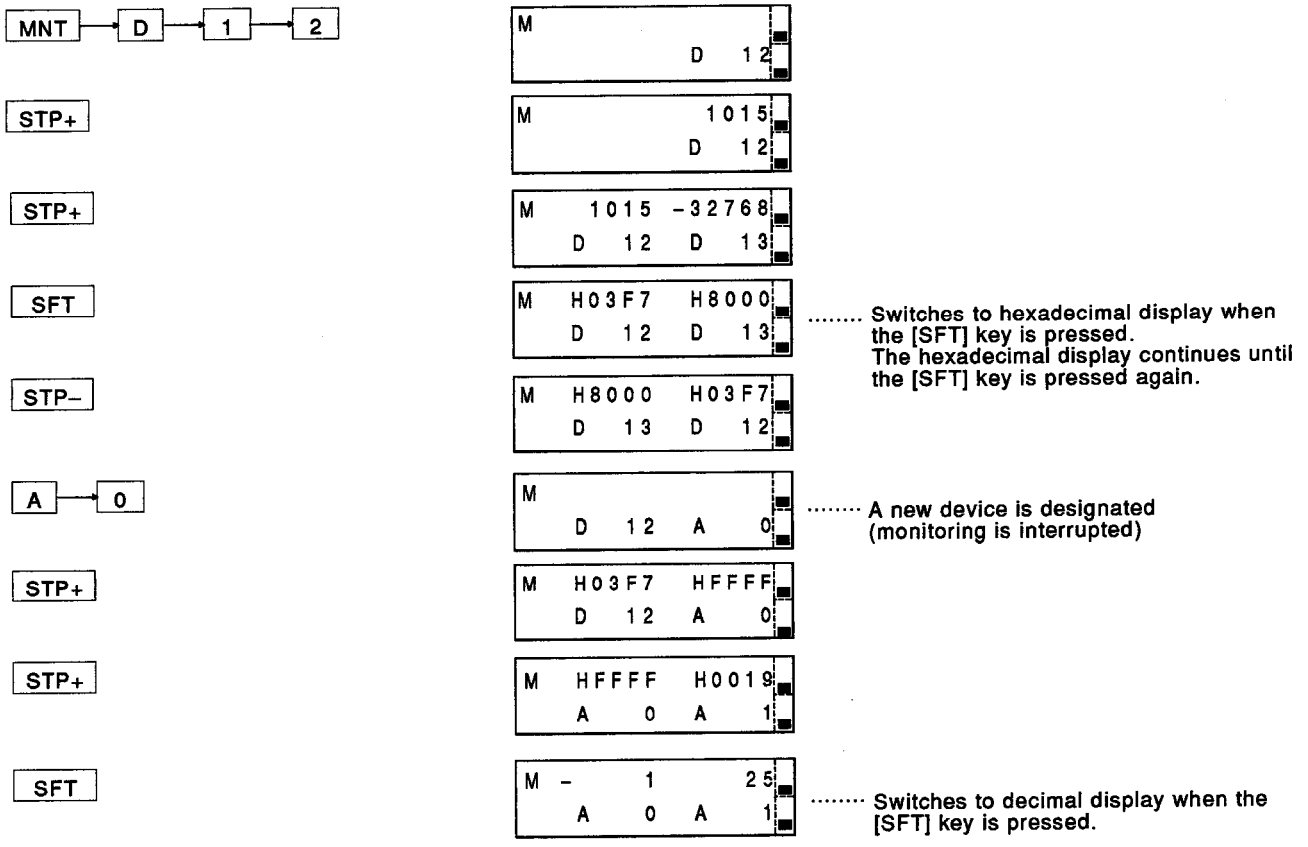
Register the contents after execution of DMOV K305432864 D0

	Decimal monitoring	Hexadecimal monitoring
D0 =	−30432	8920
D1 =	4660	1234

Becomes H12348920 in hexadecimal.

[Sample Operation]

This sample operation shows the confirming of the current values of A0 to A1 following D12 to D13



6.5.3 Confirming the states of the current values and contacts of the timer (T) and counter (C) (Monitoring of T and C)

[Function]

This operation designates a device (T or C) and device number and confirms the ON/OFF states of the current values and contacts.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

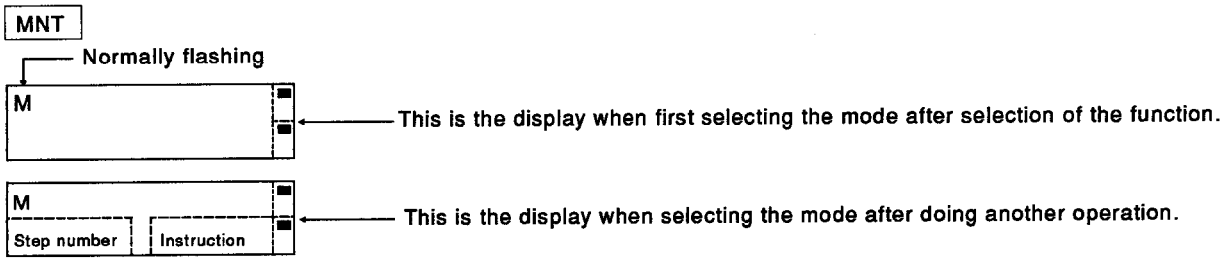
This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the monitor mode

Press the [MNT] key.

The A7PUS goes into the monitor mode.

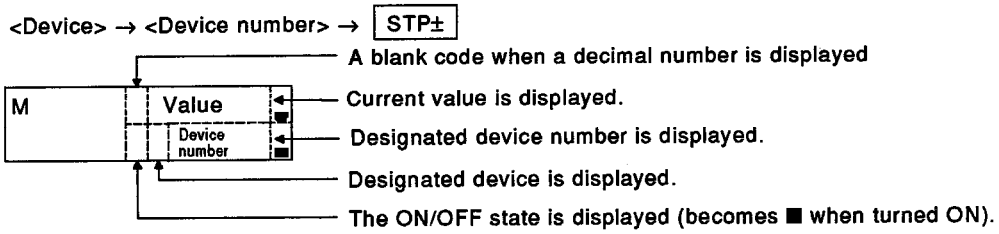
When doing another operation and displaying the current step number, the current instruction is displayed on the right hand side of the window.



(Procedure 2) Monitored device input operation

Perform key operations in the order shown on the left.

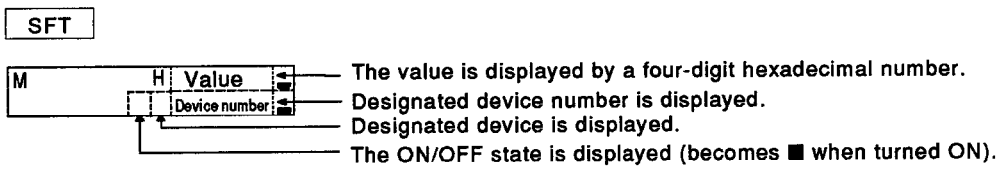
The device and the device number should be T (timer) or C (counter) and their device numbers for monitoring current value and contact states.



(Procedure 3) Switching between decimal/hexadecimal display

Press the [SFT] key to switch decimal/hexadecimal displays.

The following figure shows a hexadecimal display.



(Procedure 4) Inputting the next monitored device

When a monitored device is designated, operations can be executed by either (1) or (2) below.

The display changes (moves) sequentially as shown below.

(1) If a device before or after a previously designated device is designated.

STP±

Repeatedly press the [STP+] or [STP–] key.

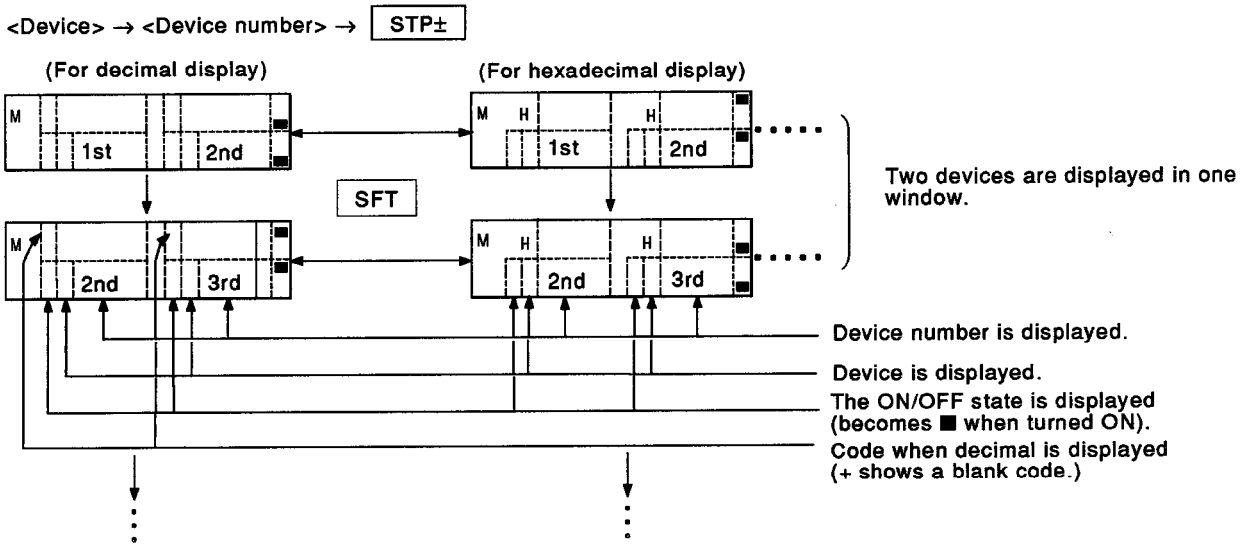
[STP+] : The device immediately after is designated. (After designating the last number, the head number is displayed).

[STP–] : The device immediately before is designated. (After designating the head number, the last number is displayed)

(2) If another device is designated

Repeat the operation from (Procedure 2).

(When keys are input, monitoring is interruped.)



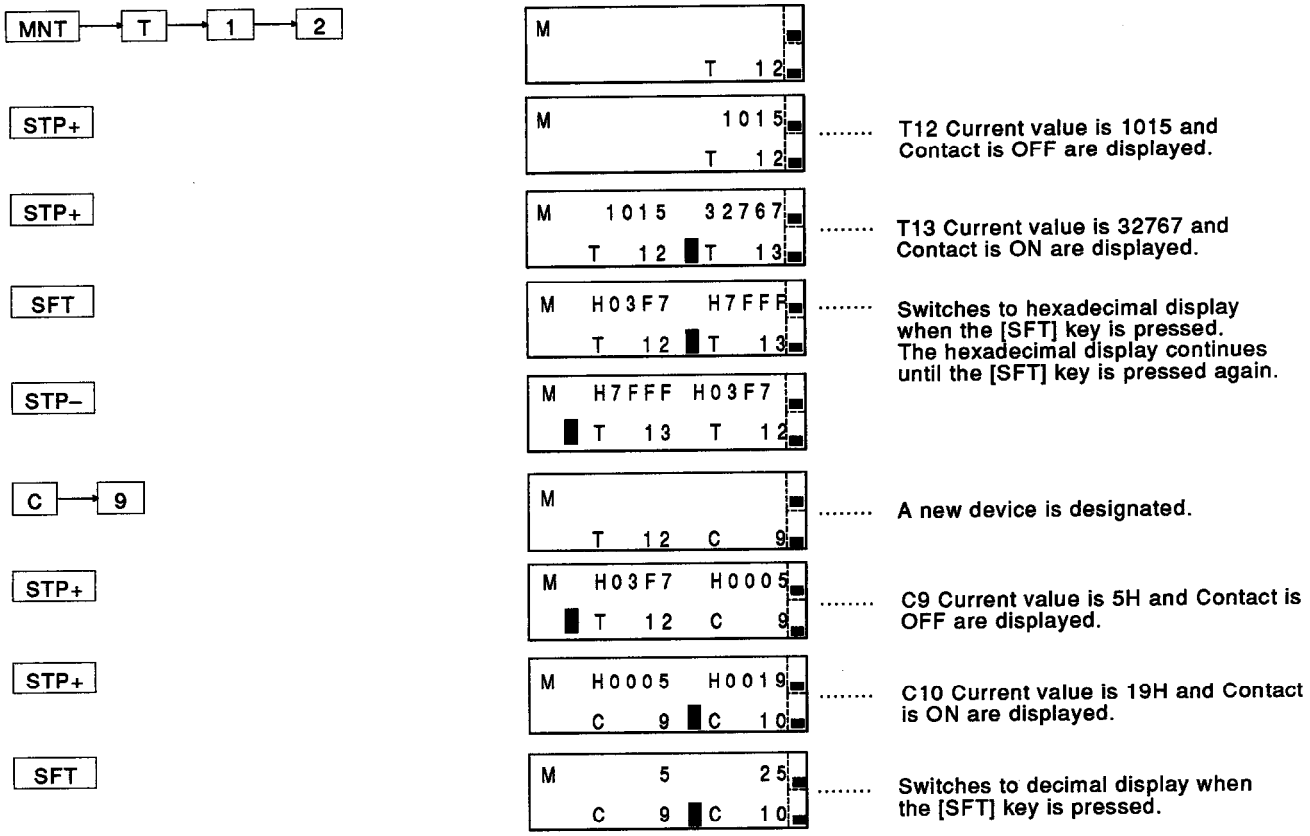
(Procedure 5) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the monitor mode, start according to the explanation in "After the monitor mode is selected".

[Sample Operation]

This sample operation shows the confirming of the states of the current values and contacts of C9 to C10 following T12 to T13



6.5.4 Confirming the conductivity of a ladder (Continuity check)

[Function]

This operation confirms the conductivity by designating the step number of a sequence program written in an ACPU.

Conductivity is determined by the active or inactive state.

In addition, the ON/OFF state and current value of a device used in an instruction designated by this operation can also be confirmed.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

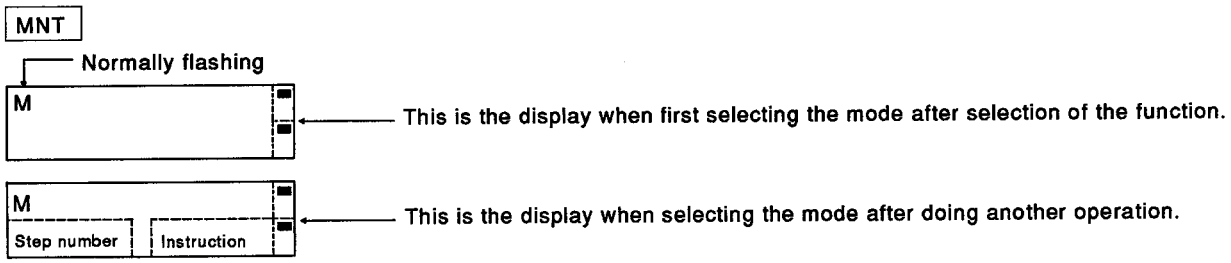
This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the monitor mode

Press the [MNT] key.

The A7PUS goes into the monitor mode.

When doing another operation and displaying the current step number, the current instruction is displayed on the right side of the window.



(Procedure 2) Step number input operation to do a conductivity check

Perform key operations in the order shown below.

The step number is the step number that confirms conductivity.

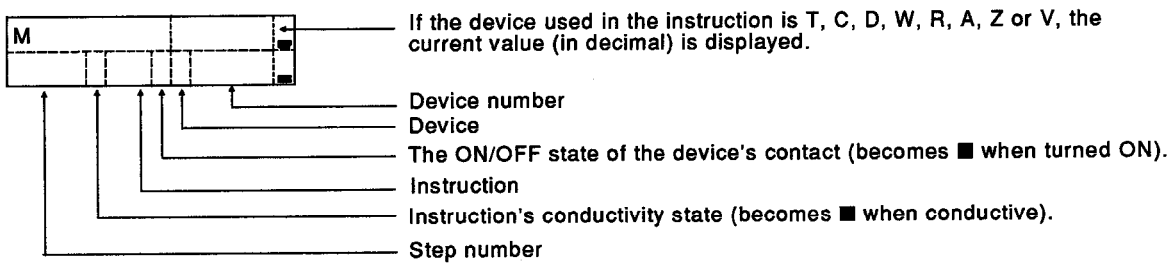
If the step number for confirmation is currently displayed by another operation, (Procedure 2) is unnecessary.

SSN → <Step number> → STP±

(Procedure 3) Confirming the conductivity state

The current conductivity state is displayed by the instruction of the step number that was designated in (Procedure 2).

(1) When a sequence instruction (contact, output, or shift instruction, etc.) is designated, the following data is displayed:

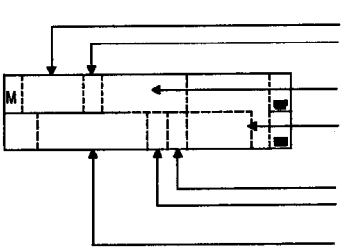


(2) When designating a basic instruction or an application instruction

Basic instructions : Comparisons, arithmetical operations, switch and transfer instructions

Application instructions : Logical operations, rotation and data processing instructions

The following data is displayed.



Step number (lower four digits)
Conductivity state instruction (becomes ■ when conductive).
Instruction
Device number
Device
The ON/OFF state of the contact (becomes ■ when turned ON) if the device used in the instruction is X, Y, M, L, B, F, T or C.
The current value (displayed in decimal) *1 if the device used in the instruction is T, C, D, W, R, A, Z or V.

*1 When a device used in the instruction has digit qualification or index qualification, the original device number becomes applicable.

Example:

D0Z : The current value of D0 is displayed. (This is not D [0+Z].)

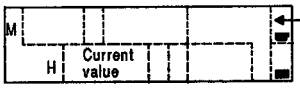
K2X0 : The ON/OFF state of X0 is displayed. (This is not X0 to X7.)

(Procedure 4) Switching the current value between decimal/hexadecimal display

Press the [SFT] key to switch decimal/hexadecimal displays.

The following figure shows the display when switching the current value display in a basic or application instruction to a hexadecimal display.

SFT



A display other than the current value is the same as the display of the above figure.

(Procedure 5) Input operation of the next step number to be checked for continuity

When there is an instruction that should be conductivity-checked, use either (1) or (2) below.

The figure below is a display example when pressing the [STP+] key when the instruction of a step has more than one line.

(1) When a device immediately before or after a previously designated device is designated.

Repeatedly press the [STP+] or [STP–] key.

STP±

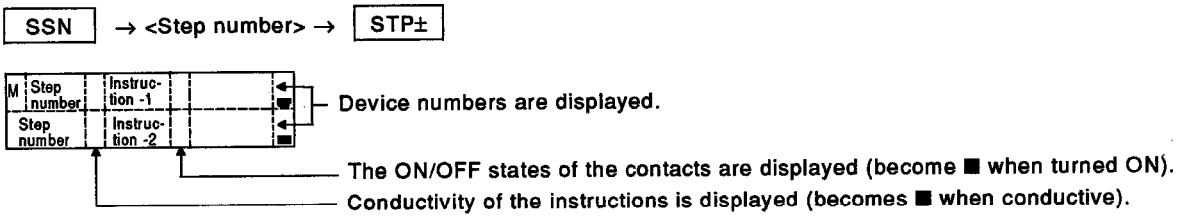
[STP–] : The step just before (the last step of the instruction is displayed after the 0 step.)

[STP+] : The step just after (the 0 step of the instruction is displayed after the last step.)

When the currently displayed instruction consists of several steps, a comma (,) is put on the right side of the instruction, and the instruction is displayed in succession (see the Sample Operation in this section.)

(2) When another device is designated

Repeat the operation from (Procedure 2).



(Procedure 4) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the monitor mode, start according to the explanation in "After the monitor mode is selected".

[Point]

- The conductivity state after the execution of the instruction is displayed.

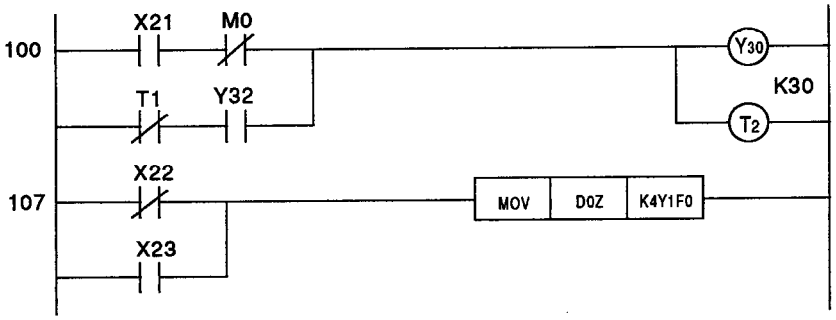
  If the connected ACPU is an A0J2CPU or A3HCPU model, conductivity is not displayed.

- If the connected ACPU is in the STOP state, the state when the sequence program stops executing is displayed.

  The input state at continuity check is displayed for device X and output Y is displayed as OFF (at the PAUSE state, the current state is displayed).

[Sample Operation]

This sample operation shows a conductivity check of the next program

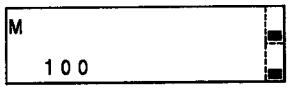


Key operations are shown on the next page.

Consider the following when observing the window display contents:

Conductivity	: Displayed on the left side of the instruction (Not displayed when an A0J2 or A3HCPU is the connected ACPU).
ON/OFF state of a device	: Displayed on the left side of the device.
Current value	: With a sequence instruction, the upper T/C number is displayed. With a basic instruction or application instruction, it is displayed on the left side of the device number. The display can be switched from decimal to hexadecimal by pressing the [SFT] key.

MNT → SSN → 1 → 0 → 0



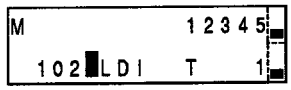
STP+

····· Step 100 is conductive and X21 is ON

STP+

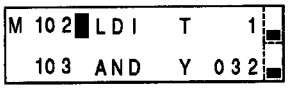
····· Step 101 is conductive and M0 is OFF

STP+



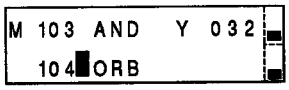
····· Step 102 is conductive and T1 is OFF
The current value of T1 is 12345
(T1 before time out.)

STP+



····· Step 103 is non-conductive and Y32 is OFF

STP+

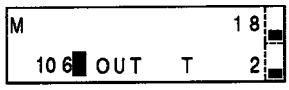


····· Step 104 is conductive
(The state of the ORB instruction is conductive.)

STP+

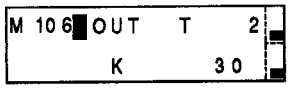
····· Step 105 is conductive and Y30 is ON

STP+



····· Step 106 is conductive and T2 is OFF
The current value of T2 is 18
(The state of the T2 coil is conductive before time out.)

STP+



····· Step 106 is conductive and T2 is OFF
The designated value of T2 is 30

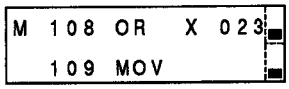
STP+

····· Step 1 07 is non-conductive and X22 is ON

STP+

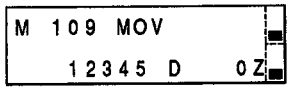
····· Step 108 is non-conductive and X23 is OFF

STP+



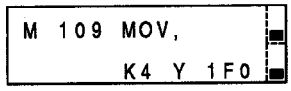
····· Step 109 is non-conductive

STP+



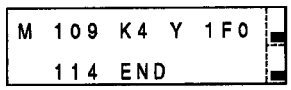
····· Step 109 is non-conductive
The current value of D0 is 12345
(The contents of D0 are displayed independently of the contents of Z.)

STP+



····· Step 109 is non-conductive and Y1F0 is OFF
(The contents of Y1F0 are displayed independently of the digit designation.)

STP+



6.5.5 Confirming the set state of the offline switch of Y, M, L, B, and F (Monitoring of an offline switch)

[Function]

This operation confirms the set state of the offline switch that separates devices (Y, M, L, B, F) used in the OUT instruction from the operation processing of the sequence program.

If the connected ACPU is an A0J2CPU or A3HCPU model, this operation cannot be done.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

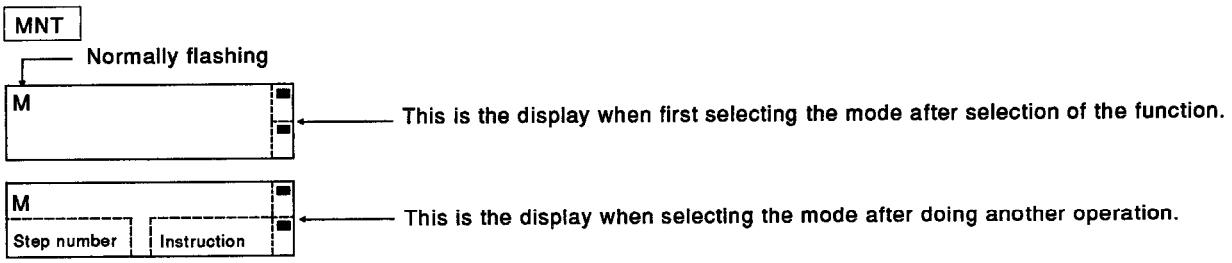
This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the monitor mode

Press the [MNT] key.

The A7PUS goes into the monitor mode.

When doing another operation and displaying the current step number, the current instruction is displayed on the right side of the window.



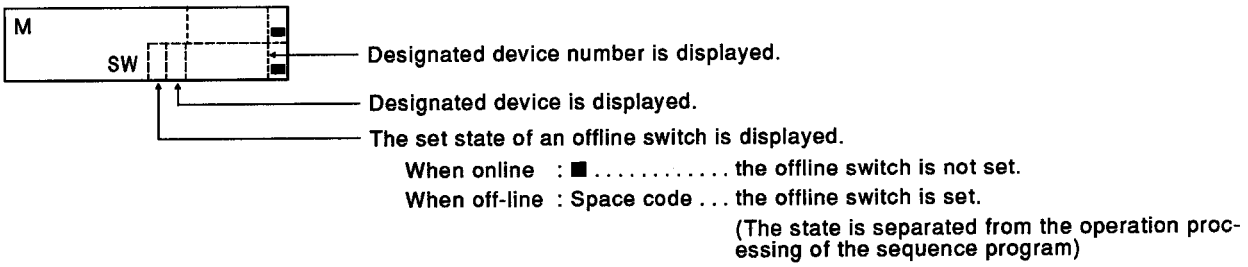
(Procedure 2) Step number input operation to do a conductivity check

Perform key operations in the order shown below.

The device and the device number display the set state of the bit devices, and any of the following can be designated.

Y, M, L, B, F (X, T and C cannot be designated.)

<Device> → SFT →<Device number> → STP±



* A device not used in the program can also be designated.

(Procedure 3) The next device input operation

When the device that confirms the set state is designated, operations can be executed by either (1) or (2) below.

The display changes (moves) sequentially as shown below.

(1) When a device immediately before or after a previously designated device is designated

Repeatedly press the [STP+] or [STP–] key.

STP±

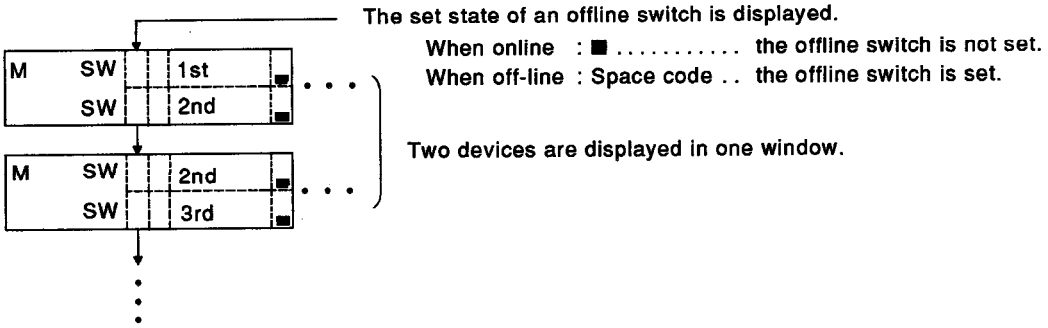
[STP+] : The device immediately after is designated.
(After designating the last number, the head number is displayed)

[STP–] : The device immediately before is designated.
(After designating the head number, the last number is displayed)

(2) If another device is designated

Repeat the key operation in the order shown below. (When keys are input, monitoring is interrupted.)

<Device> → <Device number> → STP±



(Procedure 4) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

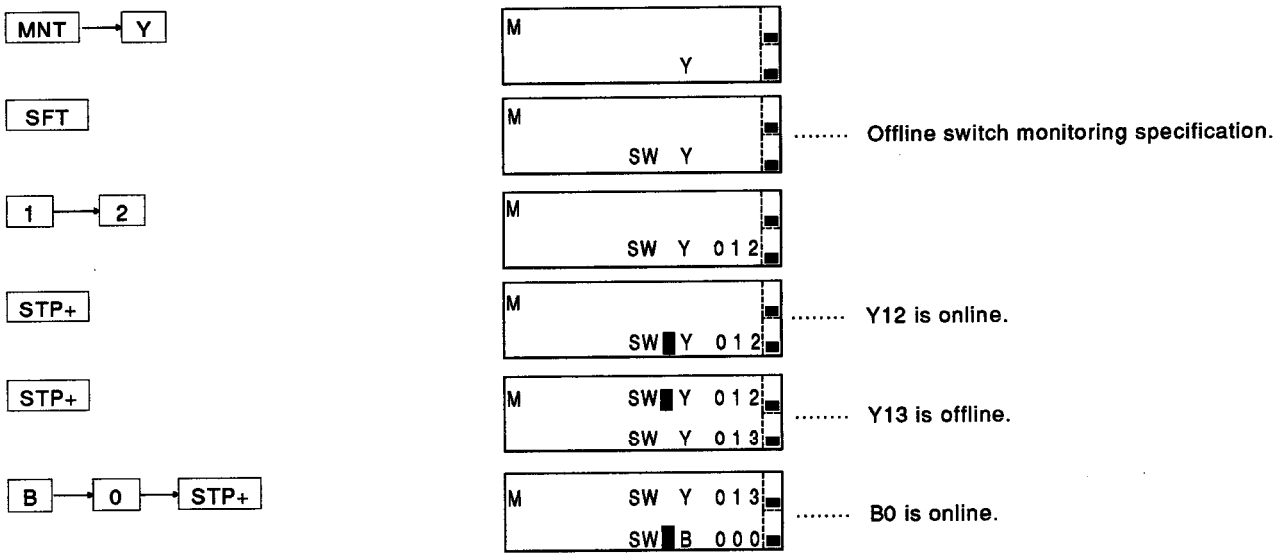
When continuing operations in the monitor mode, start according to the explanation in "After the monitor mode is selected".

[Remarks]

- If the [SFT] key is input in this operation (Procedure 3), it shifts to the bit device monitoring operation shown in Section 6.5.1.
- Section 6.6.3 gives details about offline switch setting/cancellation.

[Sample Operation]

This sample operation shows the confirming of the set states of offline switches Y12 to Y13 and B0



6.6 Operations in the Test Mode (T)

This section discusses operations for testing ACPU program operations, error steps when errors occur, and the reading of error descriptions.

The following operations are possible:

- Set/reset of X, Y, M, L, B, and F
- Changing the current value of T, C, D, W, R, A, Z, and V.
- Set/reset of the offline switches of Y, M, L, B, and F
- Program checks (Duplex coils, instruction codes, and END instructions)
- Reading error steps and error descriptions
- Reading/writing machine language

6.6.1 Set/reset of X, Y, M, L, B, and F (Set/reset of a bit device)

[Function]

This operation designates a device and a device number and forcibly sets (ON) and resets (OFF) bit devices.

[Basic Operation]

This operation is possible when the connected ACPU is in either the STOP or RUN state.

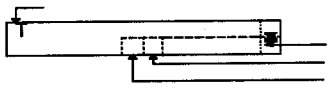
This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the test mode

Press the [TEST] key.

The A7PUS goes into the test mode.

TEST



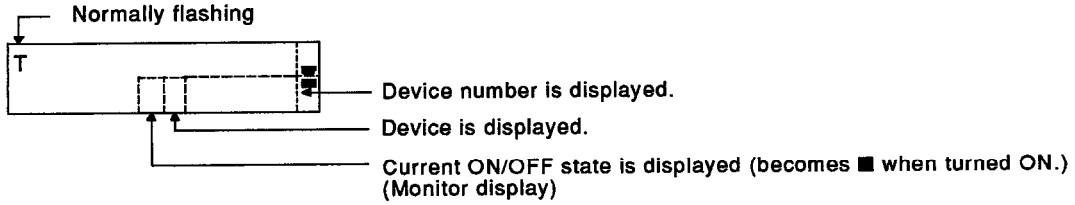
(Procedure 2) Device input operation for setting/resetting

Execute key operations in the order shown below.

The device and the device number display the set/reset state of the bit devices, and any of the following can be designated.

X, Y, M, L, B, F (T and C cannot be designated.)

<Device> → <Device number> → STP±

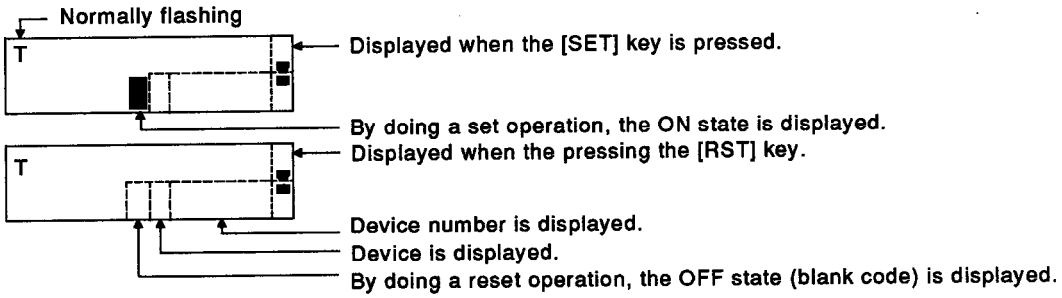


* A device not used in the program can also be designated.

(Procedure 3) Set/reset input operation

When a device has been designated following (Procedure 2), it can be set (ON) by pressing the [SET] key, or reset (OFF) by pressing the [RST] key.

SET or RST



(Procedure 4) Input operation of the next device to be set or reset

When a device to be set or to be reset is designated, operations can be executed by either (1) or (2) below.

The display changes (moves) sequentially as shown below.

(1) When a device immediately before or after a previously designated device is designated

Press the [STP±] key and go to (Procedure 3).

STP± → SET / RST

[STP+] : The device immediately after is designated. (After designating the last number, the head number is displayed)

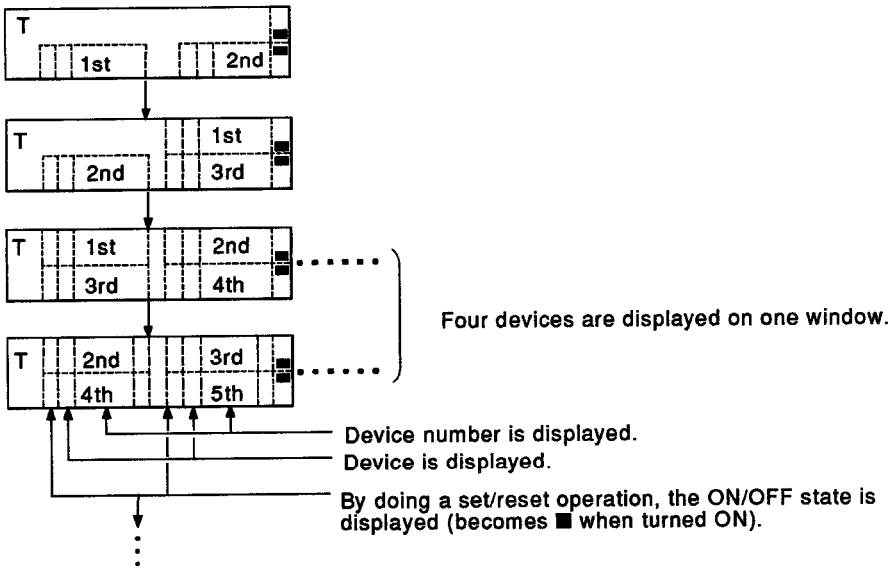
[STP–] : The device immediately before is designated. (After designating the head number, the last number is displayed)

(2) If another device is designated

Repeat the operation from (Procedure 2).

(When keys are input, monitoring is interruped.)

<Device> → <Device number> → STP± → SET / RST



(Procedure 5) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the test mode, start according to the explanation in "After the test mode is selected".

IMPORTANT

When a device has been set by this operation, be sure to reset it before performing an input operation.

Batch reset can be executed by using the reset switch on the CPU module.

[Point]

- As for forcible setting or resetting when the ACPU is in the RUN state, program execution has the priority.

  If forcible setting or resetting is done when an instruction using a correspondent device is the execution state, the state instantly changes and immediately returns to the original state.
- When input X is forcibly set, even if the process input is OFF, operation processing is executed as if the ACPU were ON.

  Even if the input (X) is forcibly reset, when the process input goes ON, operation processing is executed as if the PC CPU were ON.

  (The same also applies to X in a data link system.)

  If input X has been set, be sure to reset it after completing the test operation.
- Some of the Y numbers used with a special-function module cannot be set or reset.
- Special relay (M) is controlled by the OS of the CPU's main body.

  The User's Manual of the connected ACPU gives details about confirming and operating set/reset of special relays.

[Remarks]

- If the [SFT] key is input in this operation, it shifts to the offline switch setting/cancellation operation given in Section 6.6.3.

  This operation cannot be done with A0J2CPU and A3HCPU models (see Section 2.2).

  To return to this operation, press the [SFT] key.
- Timers and counters cannot be set or reset in this operation.

  The processing example shown below tell how to set/reset timer and counter contacts.

(1) T setting

Set the current value of the applicable T higher then the set value (see Section 6.6.2).

(2) T resetting

In the case of a 10 msec or 100 msec timer, make the starting condition of T in the ladder so that it will not be established.

In the case of a retentive timer, make the condition to reset a T in the ladder established.

(3) C setting

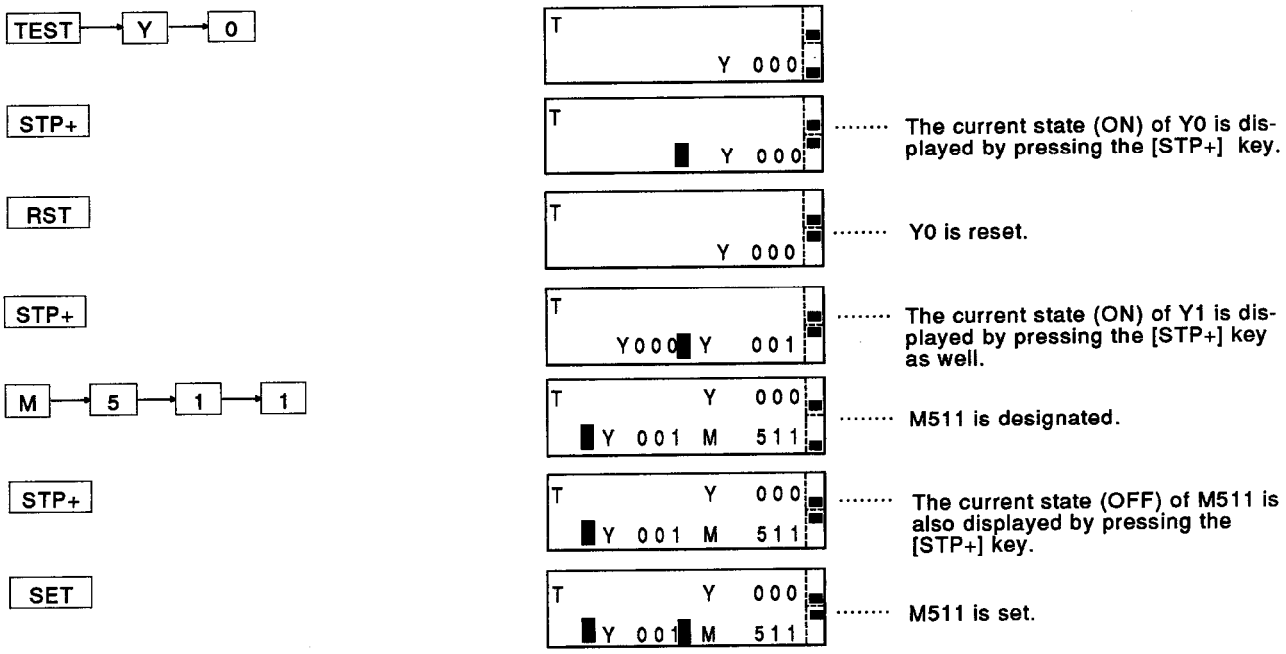
Set the current value of the applicable counter lower than the set value (see Section 6.6.2), then start up the count input condition of the counter in the ladder.

(4) C resetting

Make the condition for resetting the C in the ladder is established.

[Sample Operation]

This sample operation shows the resetting of Y0 and the setting of M511.



6.6.2 Changing the current values of T, C, D, W, R, A, Z, and V (Current value change of a word device)

[Function]

This operation designates a device and device number and forcibly changes the current value of a word device.

[Basic Operation]

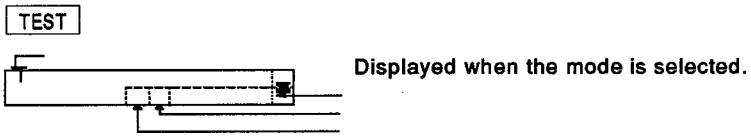
This operation is possible when the connected ACPU is in either the STOP or RUN state.

This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the test mode

Press the [TEST] key.

The A7PUS goes into the test mode.



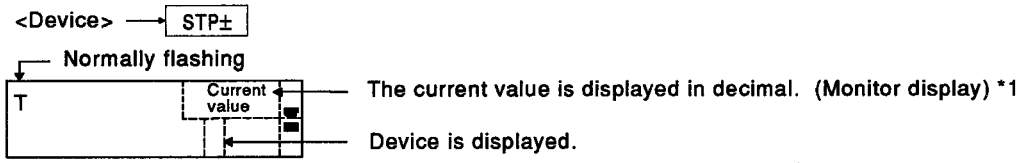
(Procedure 2) Device input operation for changing current values

Execute key operations in the order shown below.

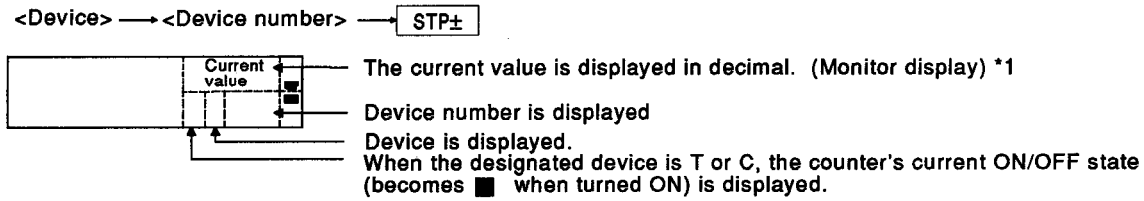
The device and the device number display the word devices whose current value is to be changed, and any of the following can be designated.

T, C, D, W, R, A, Z, V

(1) When Z or V is designated as a device



(2) When T, C, D, W, R, or A is designated as a device



*1 Pressing the [SFT] key switches the current value display from decimal to hexadecimal.

When the display is switched, the current value is displayed in the same format until the [SFT] key is pressed again.

(Procedure 3) Value changing input operation

Perform key operations in the order shown below.

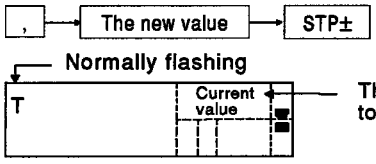
(When keys are input, monitoring is interrupted.)

Values can be changed using either decimal or hexadecimal. *2

When decimal numbers are input:
Only input the value to be changed (for example...4096).

When hexadecimal numbers are input:
After inputting "H", input the value to be changed (for example...H1000).

When changing a current value is unnecessary, go directly to (Procedure 5).



*2 When changing values, use the [0] to [9] and [A] to [F] keys on the bottom of the keyboard.

(Procedure 4) New value re-entry operation

When it is necessary to re-enter (change again) a new value input by using (Procedure 3), execute the operation in (Procedure 3) once more.

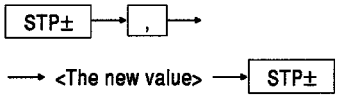
(Procedure 5) Input operation for the next device whose current value will be changed

When a device whose current value is changed is designated, operations can be executed by either (1) or (2) below.

The display changes (moves) sequentially as shown below.

(1) When a device immediately before or after a previously designated device (T, C, D, W, R, A) is designated

Press the [STP±] key and go to (Procedure 3)



[STP+]: The device immediately after is designated.

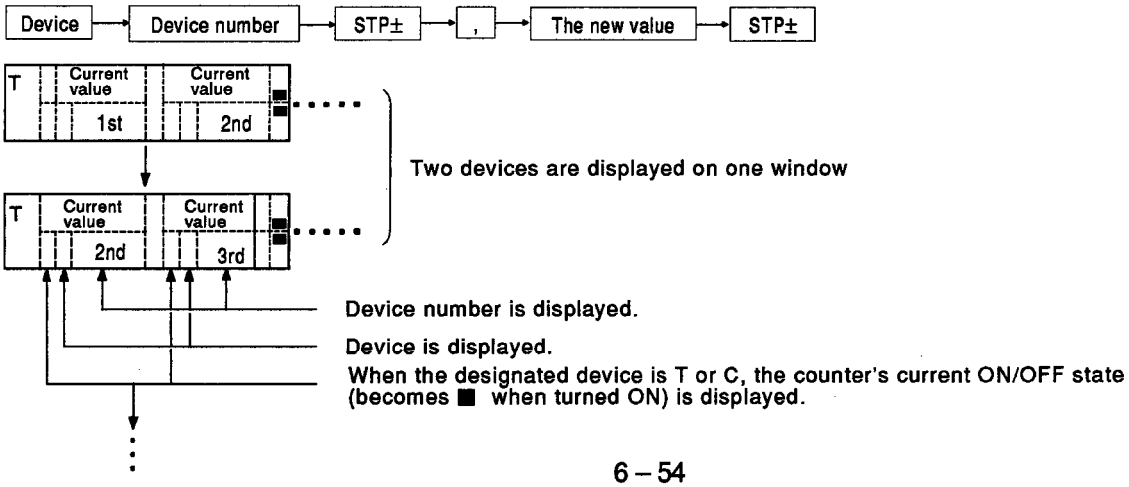
(After designating the final number, the head number is displayed)

[STP–]: The device immediately before is designated.

(After designating the head number, the final number is displayed)

(2) If another device is designated

Repeat the operation from (Procedure 2).



(Procedure 6) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the test mode, start according to the explanation in "After the test mode is selected".

[Point]

- Section 6.2.3 gives details about changing set values of T (timer) and C (counter).
- When "0" is written as a new value of T (timer) and C (counter), the contacts are also reset.
- When the ACPU is in the RUN state, the current value of a device changes depending on the contents of the sequence program being processed.
- Special registers are controlled by the OS of the CPU's main body.

  When changing the current value of a special register, begin operations after checking the User's Manual of the connected ACPU.
- When performing a current value change operation using a 32-bit instruction, the following must be done:

  The A7PUS can only display data about changing current values as a 16-bit unit.

  Therefore, to read a 32-bit instruction, the operator must treat the contents of two 16-bit units displayed in hexadecimal as one 32-bit unit.

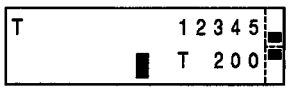
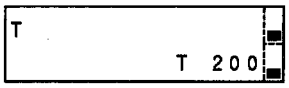
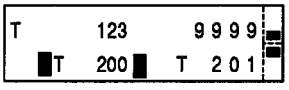
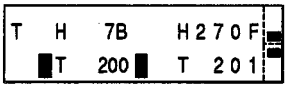
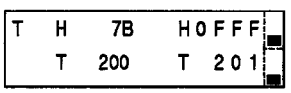
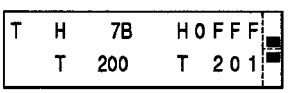
  Example:

  To put K305432864 into D0 and D1 (H12348920)

  Put H8920 in D0 and H1234 in D1.

[Sample Operation]

Inputting T200 in decimal and T201 in hexadecimal when changing current values.

TEST → T → 2 → 0 → 0		
STP+		..... Current value and contact states of T200 are displayed. (Current value is 12345 and contact is ON)
.		..... Inputting the [.] key interrupts monitoring. (Current value display is interrupted.)
1 → 2 → 3		..... Input a new value (123) of T200 in decimal.
STP+		..... Current value change is completed, and the monitor display restarts.
STP+		..... Current value of the next device is displayed.
SFT		..... Switch the current value display to a hexadecimal number.
. → H → F → F → F		..... Input a new value (4095= FFFH) of T201 in hexadecimal. (It is not necessary to match the display format and input format.)
STP+		..... Current value change is completed, and the monitor display restarts.

6.6.3 Setting or canceling the offline switches of Y, M, L, B, and F (Setting/cancellation of offline switches)

[Function]

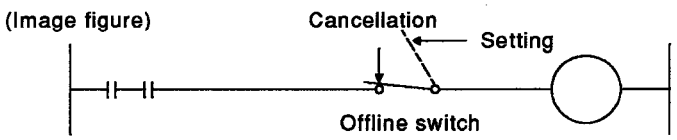
This operation sets or cancels the offline switches of devices (Y, M, L, B, F) used in the OUT instruction in order to separate these devices from the sequence program's operation processing.

The device of the device number whose offline switch has been set is separated from the sequence program's operation processing.

By using this setting, bit device ON/OFF setting/resetting operations (see Section 6.6.1) can be done as desired.

Offline switch setting separated from the sequence program's operation processing.

Offline switch cancellation processing done in accordance with sequence program operations.



This operation cannot be done with A0J2CPU and A3HCPU models

[Basic Operation]

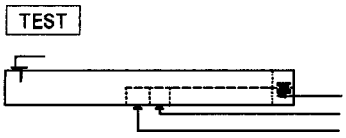
This operation is possible when the connected ACPU is in either the STOP or RUN state.

This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the test mode

Press the [TEST] key.

The A7PUS goes into the test mode.



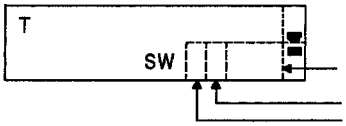
(Procedure 2) Device input operation for setting/canceling offline switches

Execute key operations in the order shown below.

The device and the device number display the bit devices whose offline switches are to be set or canceled, and any of the following can be designated.

Y, M, L, B, F (X, T and C cannot be designated.)

<Device> → SFT → <Device number> → STP±



Designated device number is displayed.

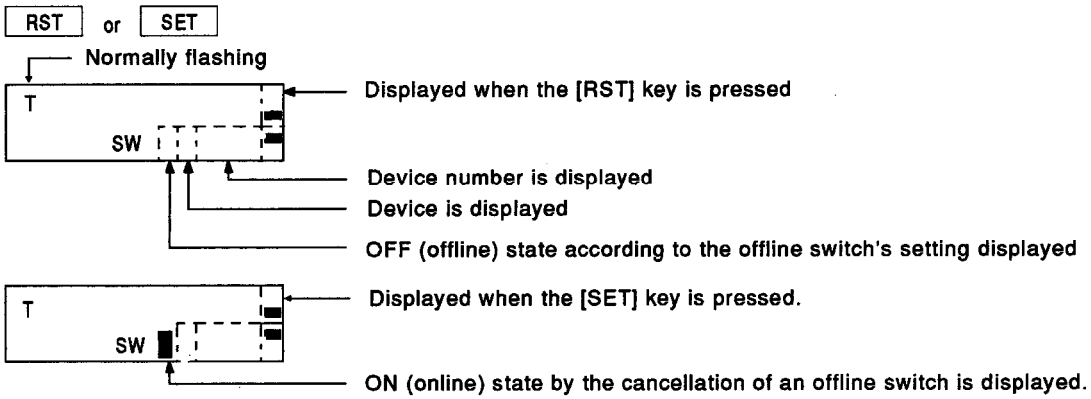
Designated device is displayed.
The set state of an offline switch is displayed.
When online : ■ ...the offline switch is not set.
When off-line : □ ...the offline switch is set.
(The state is separated from the operation processing of the sequence program)

*A device not used in the program can also be designated.

(Procedure 3) Operation for setting/canceling an offline switch

To set (offline), press the [RST] key..... (offline state)

To cancel (online) press the [SET] key ... (online state)



(Procedure 4) Input operation to set/cancel the offline switch of the next device

When a device whose offline switch will be set or canceled is designated, operations can be executed by either (1) or (2) below.

The display changes (moves) sequentially as shown below.

(1) When a device immediately before or after a previously designated device is designated

STP± → SET / RST

Press the [STP±] key and go to (Procedure 3).

[STP+]: The device immediately after is designated.

(After designating the final number, the head number is displayed)

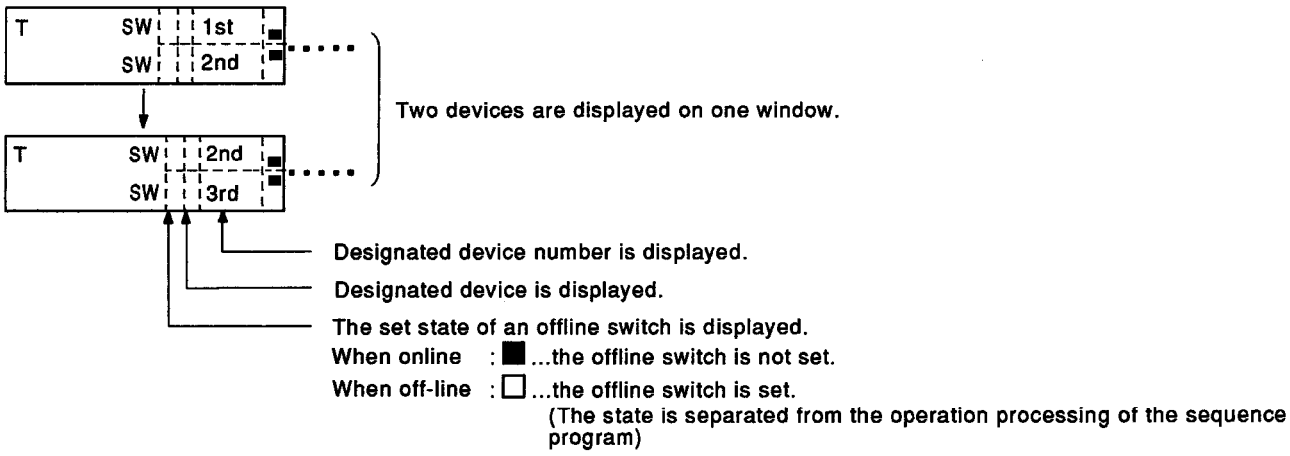
[STP–]: The device immediately before is designated.

(After designating the head number, the final number is displayed)

(2) If another device is designated

Repeat the operation from (Procedure 2). (When keys are input, monitoring is interruped.)

<De- → <Device number> → STP± → SET / RST



(Procedure 5) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the test mode, start according to the explanation in "After the test mode is selected".

[Point]

- The sum of the Y numbers of special-function module cannot be set or canceled for offline switches. Pay attention.

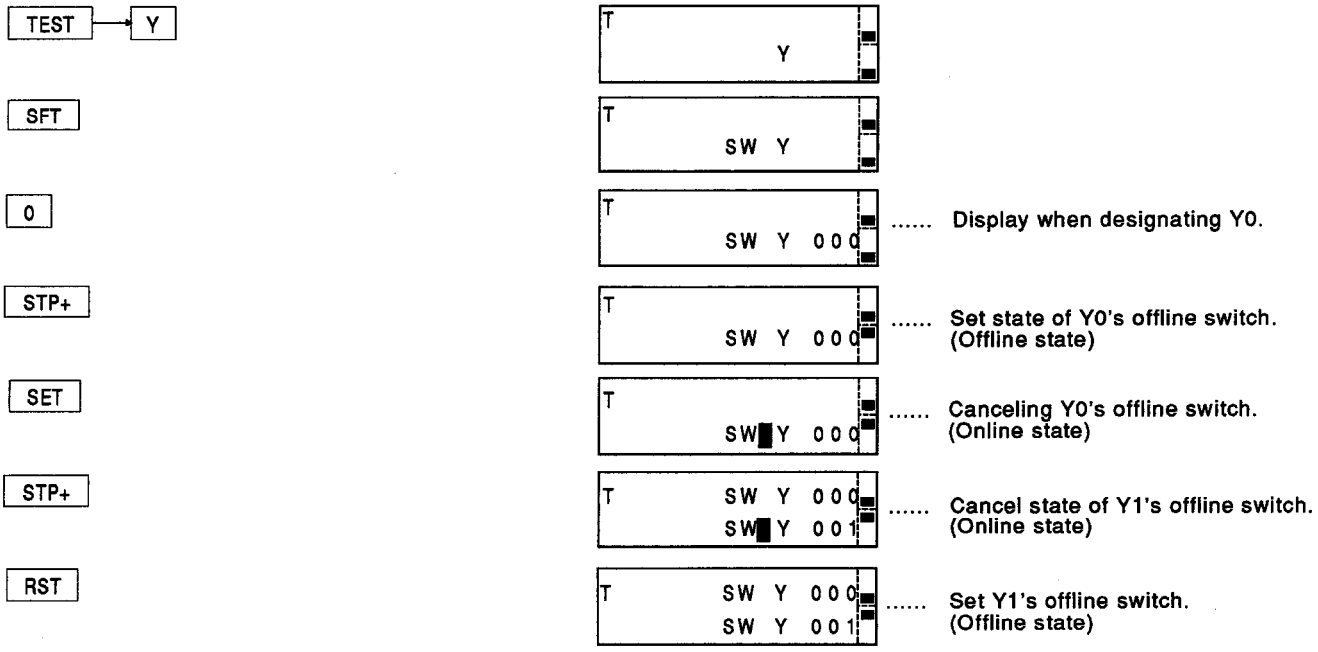
[Remarks]

- If the [SFT] key is input after (Procedure 3) of this operation, the operation moves to the bit device set/reset operation shown in Section 6.6.1.

  Press the [SFT] key again to return to this operation.

[Sample Operation]

When setting or canceling offline switches of Y0 and Y1



6.6.4 Checking a program (Program check)

[Function]

This operation does the following checks of sequence programs written to an ACPU.

(1) A dual coil check:

This examines whether the device (Y, M, L, B, F, T, C) used in a sequence instruction (OUT, SET, SFT, PLS, MC, PLF) is a dual coil.

(2) Instruction code check:

This examines whether or not there is an error in the instruction codes (memory contents) of a sequence program.

(3) END instruction check:

This checks whether or not there is an END instruction in the sequence program.

[Basic Operation]

Even if this operation is done with the ACPU in the RUN state, an operating error will not occur.

But put the ACPU in the STOP state and perform this operation.

This operation can be done by the "programming function" or the "programming function in CPU RUN".

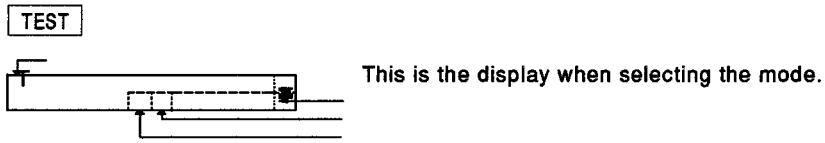
(Procedure 1) ACPU operations in the STOP state

Put the connected ACPU in the STOP state.

(Procedure 2) Select the test mode

Press the [TEST] key.

The A7PUS goes into the test mode.

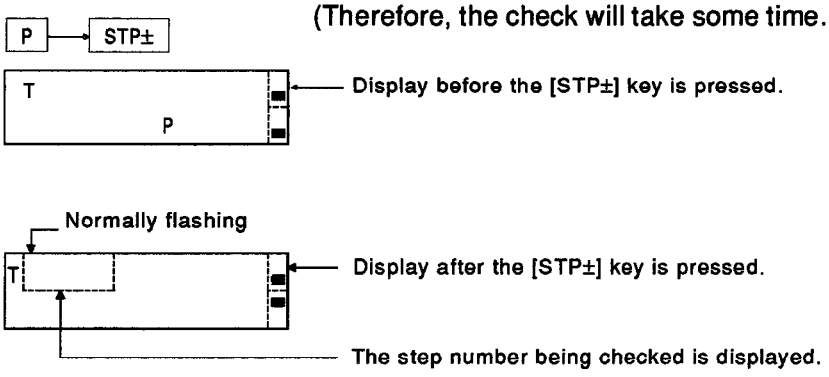


(Procedure 3) Program check start operation

Press the [STP±] key after pressing the [P] key.

The A7PUS starts the program check and checks all instructions from the 0 step to the END instruction of a sequence program written to the ACPU.

(Therefore, the check will take some time. 80 steps per second is the standard)



(Procedure 4) Operations to confirm check results

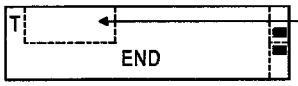
One of the figures shown below will be displayed.

According to the display contents, do one of the following operations:

(1) When there is no error or abnormality

The figure shown below is displayed.

Go to (Procedure 6).



The step number of the END instruction is displayed.

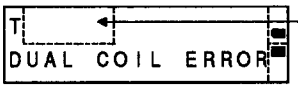
(2) When there is an error or abnormality

When there is an error or abnormality, one of the following messages will be displayed.

Record the above display and keep pressing an [STP±] key until the contents shown in (1) above are displayed (excluding (c)).

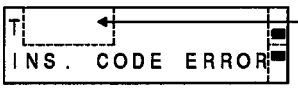
STP±

(a) When a dual coil is designated



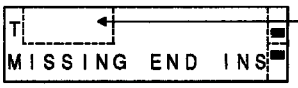
The step number of the designated dual coil is displayed.

(b) When there is an instruction code error



The step number of an instruction code error is displayed.

(c) When there is no END instruction



The final step number set by parameters is displayed.

(Procedure 5) Operation when there is an error or abnormality in the check results

When an error occurs, change the mode of the A7PUS, and check the sequence program using the error or abnormality display, and correct it when necessary.

After correcting, use this operation to recheck the program.

(Procedure 6) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the test mode, start according to the explanation in "After the test mode is selected".

[Point]

- When an error or abnormality occurs, check the sequence program as indicated above and correct the error.

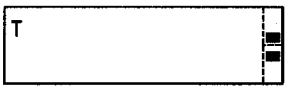
  Designated dual coil : when necessary, correct the program.
  Instruction code error : overwrite the instruction which has an instruction code error.
  END instruction missing : add an END instruction.

- After a program check is started, key operations will be ignored until one of the messages shown in (Procedure 4) above will be displayed.

[Sample Operations]

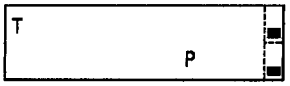
(1) When there is no error or abnormality

TEST



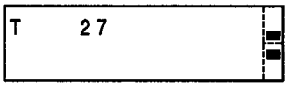
..... Select the test mode.

P



..... Select the program check.

STP+

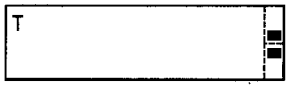


..... Program check starts.
(Step number being checked is 27.)

..... END instruction is stored at step 1999.
Go on to the next operation.

(2) When there is a designated dual coil or instruction code error

TEST

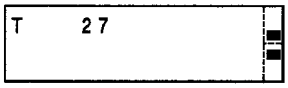


..... Select the test mode.

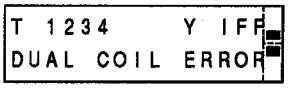
P

..... Select the program check.

STP+

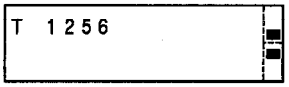


..... Program check starts.
(Step number being checked is 27.)



..... Device at step 1234 is the designated dual coil. (Correct if necessary.)
After recording the display contents, press the [STP±] key.

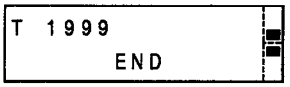
STP+



..... Program check starts again.
(Step number being checked is 1256.)

..... Step 1413 shows an instruction code error. (If necessary, correct by over-writing)
Record the display contents and press the [STP±] key.

STP+



..... END instruction is stored at step 1999. (*1)
Correct the program on the basis of the display record.

*1 When there is no END instruction, the following display shows the final step number of the steps set by parameter.

Add an END instruction.

6.6.5 Confirming the error step/error code when an error occurs (Error check)

[Function]

This operation confirms the error step number/error code of an error in the ACPU.

[Basic Operation]

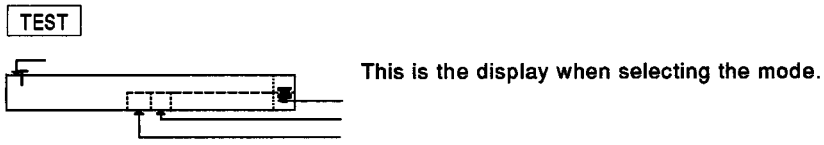
This operation is possible when the connected ACPU is in the STOP or RUN state (even though flashing of the ACPU's RUN LED is enabled).

This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) Selecting the test mode

Press the [TEST] key.

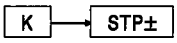
The A7PUS goes into the test mode.



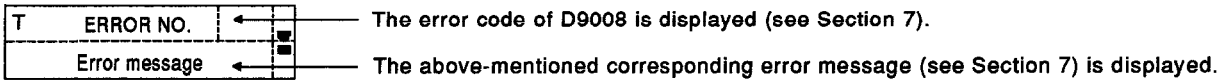
(Procedure 2) Error step/error code confirmation operation

Press the [STP±] key after pressing the [K] key.

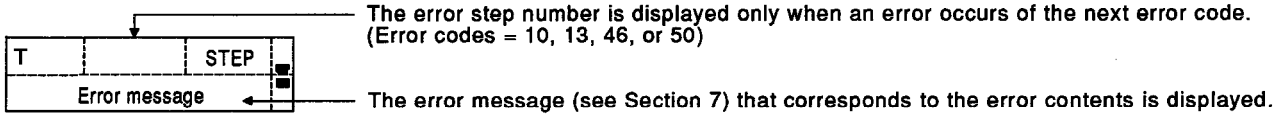
The A7PUS reads D9008 of ACPU, and one of the following error messages will be displayed.



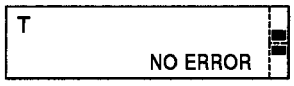
(1) When displaying an error code



(2) When displaying an error step number



(3) When an error does not occur



(Procedure 3) Operation when an error step number/error code is displayed

Change the mode of the A7PUS, check a sequence program by using the display contents, and correct when necessary.

After correcting, check the program (see Section 6.6.4) and then execute it.

* When an error code is not displayed, switch the mode of the A7PUS, confirm the error codes of D9008 and D9091 (AnACPU only) in accordance with Section 6.6.2, and correct the program if necessary.

(Procedure 4) Start the next operation

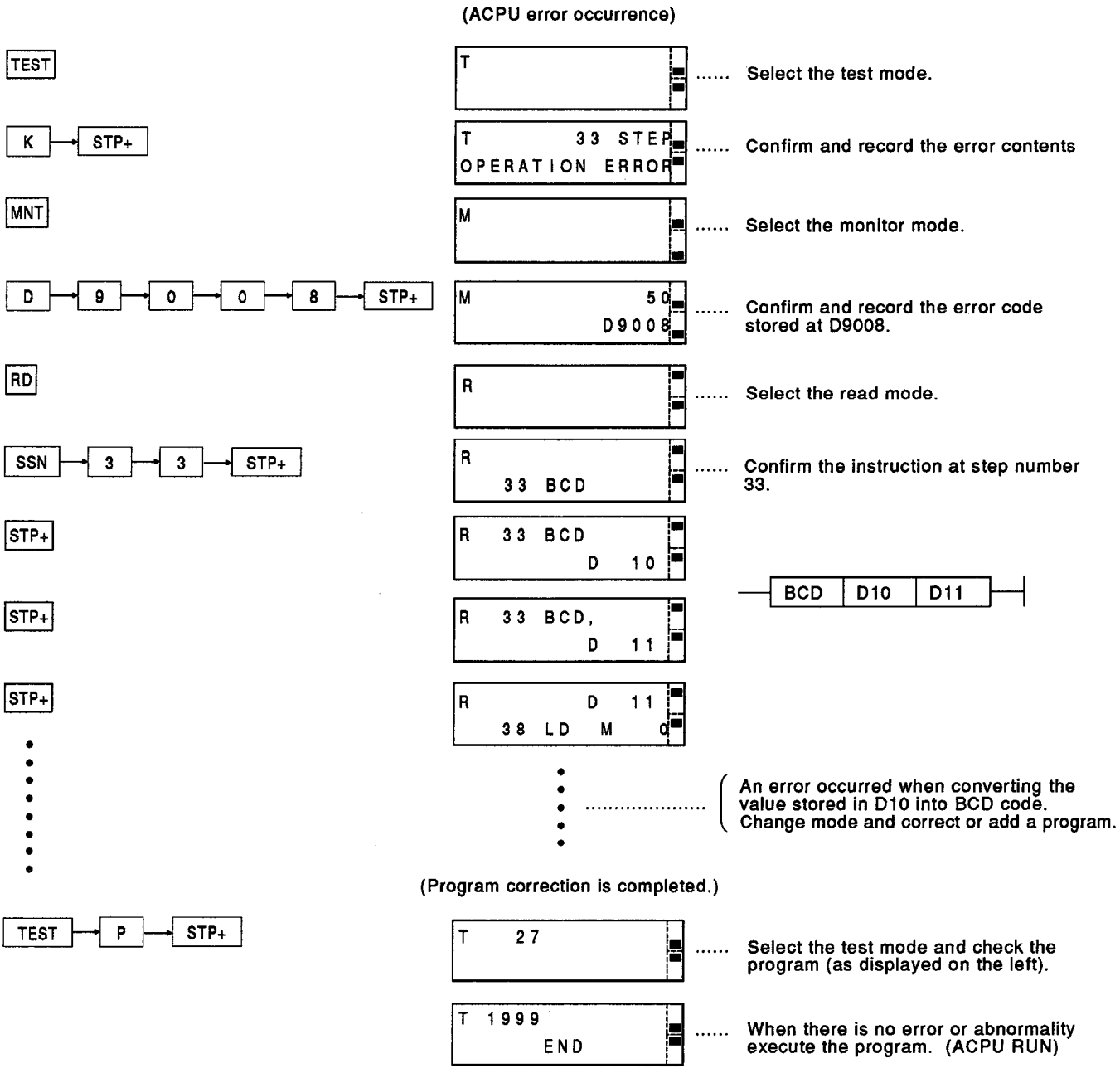
When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the test mode, start according to the explanation in "After the test mode is selected".

[Point]

- After correcting a program where an error occurred, check the program (see Section 6.6.4) and execute it.

[Sample Operation]



6.6.6 Reading or writing memory contents using a machine language (Machine language read/write)

[Function]

This operation reads memory contents and writes memory machine language (code) by designating memory addresses (absolute addresses) of the ACPU.

When reading and writing the user's microcomputer program to the ACPU, use this function.

[Basic Operation]

By using the operation contents, the ACPU can be put into the following states when necessary.

This operation can be done by the "programming function" or the "programming function in CPU RUN".

(1) When writing to the memory

Do this operation after putting the ACPU in the STOP state.

Follow (Procedure 1) below.

(2) When not writing to the memory

This operation is possible even if the ACPU is in the STOP or RUN state.

Follow (Procedure 2) below.

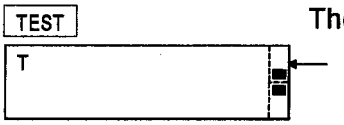
(Procedure 1) ACPU operations in the STOP state

Put the connected ACPU in the STOP state.

(Procedure 2) Selecting the test mode

Press the [TEST] key.

The A7PUS goes into the test mode.



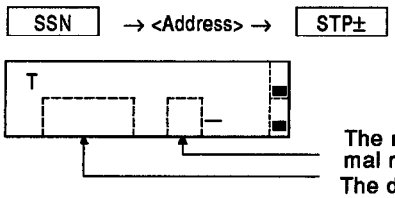
This is the display when selecting the mode.

(Procedure 3) Memory contents read operation

Perform key operations in the order shown below.

This address is the memory address (absolute address) for reading the memory contents of the ACPU.

Input a hexadecimal number (max. five digits). (Use the [0] to [9] and [A] to [F] keys on the bottom of the keyboard.)



The machine language (code) read from the ACPU is displayed as a two-digit hexadecimal number.
The designated memory address is displayed as a five-digit hexadecimal number.
(This is the memory address where the above-mentioned machine language (code) is stored.)

(Procedure 4) Input operation of a machine language (code) to be written to the memory

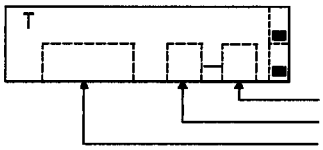
Input a machine language (code) to be written to the memory at the memory address currently displayed as a two-digit hexadecimal number.

(Use the [0] to [9] and [A] to [F] keys on the bottom of the keyboard.)

When not writing to the memory, this operation is unnecessary.

<Machine language (code)>

* When a wrong entry has been made, input the correct key immediately after the wrong key has been pressed.



The input machine language (code) is displayed.
Designated address' current machine language (code).
The memory address where the above-mentioned machine language (code) is written and stored.

(Procedure 5) Operation for writing to the memory and the next address

Press the [STP±] key.

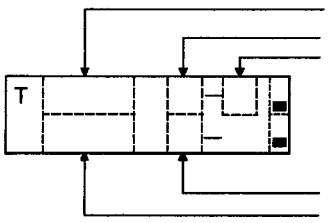
[STP+] : Designates the immediately following address. (Moves to the head address following the final address.)

[STP–] : Designates the immediately preceding address. (Moves to the head address preceding the final address.)

By using the key operation, the next memory address and memory contents in the designation direction are displayed.

In addition, when machine language (code) is to be written to the memory (Procedure 4), it is written to the memory by inputting the [STP±] key.

STP±



This is an applicable memory address of the immediately preceding operation.
This is the machine language (code) stored in the applicable memory address of the immediately preceding operation.
This is the machine language (code) written to the applicable memory address of the immediately preceding operation.

The machine language (code) read from the memory address following the immediately preceding operation is displayed as a two-digit hexadecimal number.
A memory address following the immediately preceding operation is displayed as a five-digit hexadecimal number.

(Procedure 6) Continuation of a memory read/write operation

When continuing operations with memory addresses before or after the immediately preceding one, repeat (Procedure 4) and (Procedure 5) as often as necessary.

When continuing operations with other memory addresses, go to (Procedure 3).

(Procedure 7) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the test mode, start according to the explanation in "After the test mode is selected".

[Point]

When machine language (code) is written, execute writing according to what the memory will be used for so that the ACPU can operate normally.

If unnecessary writing is done, the ACPU sometimes malfunctions.

[Sample Operation]

When writing machine language (code) to memory address 8400H and thereafter.

TEST → SSN	T	....	The test mode is selected, and the beginning of memory address inputting is set.
8 → 4 → 0 → 0	T 08400	....	Memory address is input.
STP+	T 08400 AB-	....	Current machine language (code) is displayed. (Nothing changes)
STP+	T 08400 AB- 08401 23-	....	Next address and current machine language (code) are displayed.
1 → 0	T 08400 AB- 08401 23-10	....	To change the current machine language (code) from 23H to 10H, input 10.
STP+	T 08401 23-10 08402 7F-	....	10H is written to memory address 8401H, and the next address and current machine language (code) are displayed.

6.7 Operations in the Parameter Mode (P)

This operation does all clear parameter setting and sets and changes parameters such as the memory capacity of a program and the file register capacity.

6.7.1 All clear is executed for a parameter (Clears all parameters)

[Function]

This operation clears all parameters written to the connected ACPU.

[Basic Operation]

This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Procedure 1) ACPU operation in the STOP state

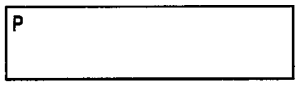
Put the connected ACPU in the STOP state.

(Procedure 2) Selection of parameter mode

Press the [PRM] key.

The A7PUS goes into the parameter mode.

[PRM]



(Procedure 3) Start parameter operations

Press the [STP±] key.

[STP±]

(Procedure 4) Selection of operations by whether or not a key word is registered

If a key word is registered in the ACPU, start operations from (Procedure 5).

If a key word is not registered in the ACPU, start operations from (Procedure 7).

(Procedure 5) Window selection operations for canceling (deleting) the set key word

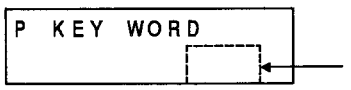
Press the [STP±] key until the window shown below is displayed.

When [STP+]: Press this 13 times.

When [STP–]: Press this 2 times.

When connected to an A1SCPU

[STP±] x n times



The key word currently registered in the ACPU is displayed.

(Procedure 6) Operation to cancel (delete) the set key word

Perform key operations in the order shown below.

[,]

```
P KEY WORD
```

← The displayed key word is deleted.

[STP+]

```
P IF OK
  KEY IN "END"
```

← [END] key input request is displayed.

[END]

```
P IF OK →STP
  IF NOT →CL
```

* When the [CL] key is input, the immediately preceding window is displayed.

[STP±]

← Flashes during writing.

```
P RUN(PARAMETER)
```

(each * means 1K byte.)

← A line of "" which corresponds to the total number of bytes of a parameter to be written to the ACPU is displayed.

The total number of bytes (in units of K bytes) of a parameter to be written to the ACPU is displayed.

Writing of the parameter to the ACPU starts. (Processing time: about four seconds.)

```
P RUN(PARAMETER)
  COMPLETION
```

← This is the display when completed normally.

The key word registered in the ACPU is canceled (deleted).

When the model is an A0J2H, A1S, A2, A2A, A2C, A3, A3A, A3HCPU if the allocation of a memory cassette is changed by parameter writing, data corresponding to the new allocation in the memory cassette is shifted automatically.

[STP±]

```
P PARAMETER
    NOT CLEAR
```

← A window that is the same the one shown in (Procedure 3) is displayed.

(Procedure 7) Parameter all clear operation

Do key operations in the order shown below.

SFT

```
P PARAMETER
        CLEAR
```
← "NOT" in the bottom line is erased.

STP±

```
P IF OK
  KEY IN "END"
```
← [END] key input request is displayed.

END

```
P IF OK → STP
  IF NOT → CL
```
* When the [CL] key is pressed, the immediately preceding window is displayed.

STP±

Flashes during writing.

```
P RUN(PARAMETER)
```
(each * means 1K byte.)
A line of "*" which corresponds to the total number of bytes of a parameter to be written to the ACPU is displayed.
The total number of bytes (in units of K bytes) of a parameter to be written to the ACPU is displayed.

Writing of the parameter to the ACPU starts. (Processing time: about four seconds.)

```
P RUN(PARAMETER)
  COMPLETION
```
← This is the display when completed normally.
The set value of the parameter written to the ACPU returns to the default value.
The default value (initial value) of each parameter can be read and confirmed by the User's Manual of the connected ACPU.

(Procedure 8) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the test mode, start according to the explanation in "After the test mode is selected".

[Point]

When the key word is registered in the ACPU, doing only a parameter all clear is not possible.

It is necessary to begin with the key word cancellation operation shown in the [Basic Operation] section.

[Sample Operation]

(1) When a key word is not registered

PRM	P	....	Select the parameter mode.
STP+	P PARAMETER NOT CLEAR	....	Start of parameter operations.
SFT	P PARAMETER CLEAR	....	Parameter all clear designation.
STP+	P IF OK KEY IN "END"	....	[END] key input request is displayed.
END	P IF OK →STP NOT →CL	....	[STP±] key input request is displayed.
STP+	P RUN(PARAMETER) 1 *	....	Default value of each parameter is written to the ACPU.
	P RUN(PARAMETER) COMPLETION	....	This is the display when completed normally.

(2) When registering a key word

PRM

```
P
```
.... Select the parameter mode.

```
P PARAMETER
    NOT CLEAR
```
.... Start of parameter operations.

STP+

STP+ ..... Press this n times.

(The number of times this key is pressed differs with the model of the connected ACPU.)

```
P KEY WORD
          002345
```
.... Window for key word setting/canceling is displayed.

,

```
P KEY WORD
```
.... Displayed key word is deleted.

STP+

```
P IF OK
  KEY IN "END"
```
.... [END] key input request is displayed.

END

```
P IF OK →STP
    NOT →CL
```
.... [STP±] key input request is displayed.

STP+

```
P RUN(PARAMETER)
   1          *
```
.... Key word registered in the ACPU is cancelled.

```
P RUN(PARAMETER)
  COMPLETION
```
.... This is the display when completed normally.

STP+

```
P PARAMETER
    NOT CLEAR
```
.... Start of parameter operations.

SFT

```
P PARAMETER
          CLEAR
```
.... Parameter all clear designation.

STP+

```
P IF OK
  KEY IN "END"
```
.... [END] key input request is displayed.

END

```
P IF OK →STP
    NOT →CL
```
.... [STP±] key input request is displayed.

STP+

```
P RUN(PARAMETER)
   1          *
```
.... Default value of each parameter is written to the ACPU.

```
P RUN(PARAMETER)
  COMPLETION
```
.... This is the display when completed normally.

6.7.2 Setting, changing, and deleting parameters and key words (Setting and changing parameters and key words)

[Function]

This operation sets (writes) parameters such as those shown below and key words to a connected ACPU and changes/deletes the parameters and key word already written in the connected ACPU.

Parameters other than those shown below cannot be handled by the A7PUS. Use the GPP function of the MELSEC-A series peripheral device.

The possible A7PUS parameter operations are as follows:

- Setting/changing program memory capacity (main and sub programs)
- Setting/changing file register capacity
- Setting/changing the M and L ranges
- Setting/changing the timer ranges
- Setting/changing latch ranges (B, T, C, D, W)
- Setting/changing the watchdog timer (WDT)
- Setting/changing the I/O control method

The table on the next page gives details about allowable operations for all connectable ACPUs.

The User's Manual of the connected ACPU gives details about the allowable setting ranges of parameters.

[Basic Operation]

Switching of the window of the A7PUS differs depending on the model of the connected ACPU.

Switching of a window is given on the following page, and operation procedures are given on subsequent pages.

This operation can be done by the "programming function" or the "programming function in CPU RUN".

(Explanation of the following table.)

Operation..... Shows the sequence of operations when executing parameter and key word operations.

Procedure Number..... This gives the number of the procedure where the corresponding operation listed under "Operation" is explained

Window Display..... This shows the window displayed first when the corresponding operation listed under "Operation" is selected.

Connectable PC CPU..... This shows the operations which can or cannot be executed by different connectable ACPUs as indicated by the following symbols:

o : This shows that the ACPU in that column can execute this operation. When the operation listed under "Item" is completed, operations begin for the next operation identified by a o symbol.

– : This shows that the ACPU in that column cannot execute this operation.
The window for this operation is not displayed.
It is passed over.

Operation	Procedure Number	Window Display (Window displayed when selection is made)	Connectable PC CPU									
			A0J2	A0J2H	A1 A1N	A1S	A2C	A2 A2N (S1) A2A	A3 A3N A3A A73	A3H A3M	A3V
Parameter mode selection	(Procedure 2)	P	O	O	O	O	O	O	O	O	O
Start of parameter operations	(Procedure 3)	P PARAMETER NOT CLEAR	O	O	O	O	O	O	O	O	O
Setting/changing the main program memory capacity	(Procedure 4)	P PROGRAM MEMORY K STEP	–	O	O	O		O	O	O	O
Setting/changing the subprogram memory capacity	(Procedure 5)	P PROGRAM MEMORY SUB K STEP	–	–	–	–	–	–	O	O	O
Setting/changing the file register capacity	(Procedure 6)	P FILE REGISTER K	–	O	–	O	O	O	O	O	O
Setting/changing the M and L ranges	(Procedure 7)	P M,L SETTING MO L S	–	O	O	O	O	O	O	O	O
Setting/changing timer ranges	(Procedure 8)	P TIMER SETTING LTO HT IT	–	O	O	O	O	O	O	O	O
Setting/changing latch ranges (B, T, C, D, W)	(Procedure 9)	*1 P LATCH SETTING B —	O	O	O	O	O	O	O	O	O
Setting/changing the watchdog timer (WDT)	(Procedure 10)	P WDT SETTING mS	–	O	O	O	O	O	O	–	O
Setting/changing the I/O control method	(Procedure 11)	P I/O CONTROL /	–	–	–	–	–	–	–	O	–
Setting/changing/deleting (cancellation setting) of a key word	(Procedure 12)	P KEY WORD	–	O	O	O	O	O	O	O	O
Setting completion	(Procedure 13)	P IF OK KEY IN "END"	O	O	O	O	O	O	O	O	O
Writing parameters and key words	(Procedure 14)	P IF OK →STP IF NOT →CL	O	O	O	O	O	O	O	O	O
(Writing completion)	(Procedure 14)	P RUN(PARAMETER) COMPLETION	O	O	O	O	O	O	O	O	O

*1: Other than A0J2CPU

(Procedure 1) ACPU operation in the STOP state

Put the connected ACPU in the STOP state.

(Procedure 2) Parameter mode selection operation

Press the [PRM] parameter key.

The A7PUS goes into the parameter mode.

PRM

(Procedure 3) Start of parameter operations

When the [STP±] key is pressed, the window shown below is displayed.

STP±

Press one of the following keys:

[STP+] : The window changes to the next executable operation.

[STP–] : The window changes to the previous executable operation.

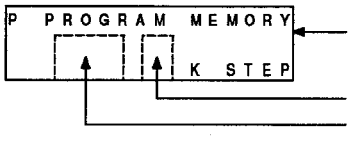
[END] : The window changes to a window shown in (Procedure 14).

(Procedure 4) Setting/changing the main program memory capacity

When the window shown below is displayed, the program memory capacity for the next program can be set or changed.

A3/A3A/A3H/A3VCPU : Main sequence program capacity

Any ACPU (except those listed above and an A0J2CPU): Sequence program capacity



This window is displayed when setting/changing the main program memory capacity. (Not displayed when an A0J2CPU is connected.)

The current set value is displayed.

When the connected ACPU is an A3/A3A/A3H/A3VCPU, "MAIN" is displayed.

<Capacity> STP+

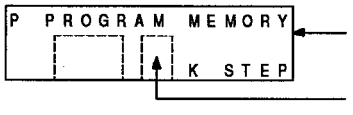
<Capacity> STP–

or

<Capacity> END

When the program memory capacity is set or changed, press the [STP+], [STP–], or [END] key after inputting the capacity (in units of 1K steps).

When the program memory capacity is not set or changed, only press the [STP+], [STP–], or [END] key.



This is displayed before the [STP+], [STP–] or [END] key is pressed.

Setting or new value is displayed

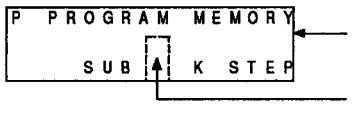
[STP+] : The window changes to the next executable operation.

[STP–] : The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

(Procedure 5) Setting/changing the subprogram memory capacity

When the window shown below is displayed, the program memory capacity of a subprogram can be set or changed.

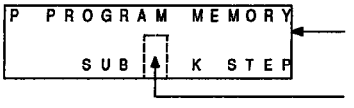


This window is displayed when setting/changing the subprogram memory capacity.
(When an A3/A3A/A3H/A3VCPU is connected, this is displayed.
When any other ACPU is connected, this is not displayed.)
The current set value is displayed.

<Capacity> STP+
<Capacity> STP–
or
<Capacity> END

When the program memory capacity is set or changed, press the [STP+], [STP–], or [END] key after inputting the capacity (in units of 1K steps).

When the program memory capacity is not set or changed, only press the [STP+], [STP–], or [END] key.



This is displayed before the [STP+], [STP–] or [END] key is pressed.

Setting or new value is displayed.

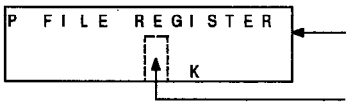
[STP+] : The window changes to the next executable operation.

[STP–] : The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

(Procedure 6) Setting/changing the file register capacity

When the window shown below is displayed, the file register capacity can be set or changed.



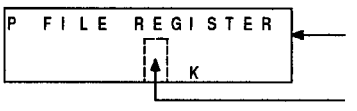
This window is displayed when setting/changing the file register capacity.
(Not displayed when an A0J2/A1CPU is connected.)

The current set value is displayed.

<Capacity> STP+
<Capacity> STP–
or
<Capacity> END

When the file register capacity is set or changed, press the [STP+], [STP–], or [END] key after inputting the capacity (in units of 1K steps).

When the file register capacity is not set or changed, only press the [STP+], [STP–], or [END] key.



This is displayed before the [STP+], [STP–] or [END] key is pressed.

Setting or new value is displayed.

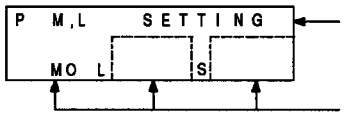
[STP+] : The window changes to the next executable operation.

[STP–] : The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

(Procedure 7) Setting/changing the M and L ranges

When the window shown below is displayed, the ranges of M (internal relay) and L (latch relay) can be set or changed.



This window is displayed when setting/changing M and L ranges.
(Not displayed when an A0J2CPU is connected.)

The current set values (head numbers) of M, L, and S are displayed.

In this operation, only the L range can be set or changed under the following conditions:

- Inputting is necessary to achieve the following condition: head number of M ≤ head number of L ≤ head number of S
- When M is not needed, input 0 as the head number of L.
- When L is not needed, input the head number of L equal to the head number of S.

<Head number of L> → STP+

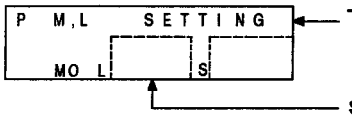
<Head number of L> → STP−

or

<Head number of L> → END

When the M and L ranges are set or are changed, press the [STP+], [STP−], or [END] key after inputting of the head number of L under the condition shown above.

When the M and L ranges are not set or changed, only press the [STP+], [STP−], or [END] key.



This is displayed before the [STP+], [STP−] or [END] key is pressed.

Setting or new value is displayed.

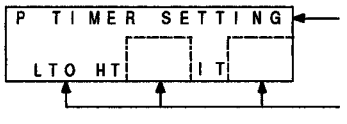
[STP+] : The window changes to the next executable operation.

[STP−] : The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

(Procedure 8) Setting/changing timer ranges

When the window shown below is displayed, timer ranges (high-speed timer and retentive timer) can be set or changed.



This window is displayed when setting/changing timer ranges.
(Not displayed when an A0J2CPU is connected.)

Current set values (head number) of speed,high speed and retentive timers are displayed.

In this operation, the ranges of the high-speed timer and retentive timer can be set or changed under the following conditions:

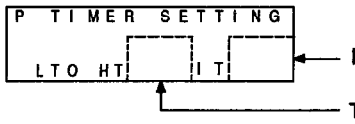
- The low-speed timer's (LT) head number ≤ the high-speed timer's head number ≤ the retentive timer's head number.
- When the low-speed timer (LT) is not needed, input 0 as the high-speed timer's head number.
- When the high-speed timer (HT) is not needed, input the high speed timer's head number equal to the retentive timer's head number.
- When the retentive timer (IT) is not needed, input 256 as the retentive timer's head number.
- Input a number which is divisible by eight as each timer's head number.

When setting/changing timer ranges, after inputting each timer's head number (as shown above) under the above-mentioned conditions, press the [STP+], [STP–], or [END] key.

When timer ranges are not set or changed, only press the [STP+], [STP–], or [END] key.

(1) Setting/changing the high-speed timer range

<High-speed timer's head number> → [SFT] ....Key operation when setting/changing the high-speed timer's (HT) range
or
[SFT] .....Key operation when setting/changing the high-speed timer's (HT) range



Pressing the [SFT] key moves the cursor to the retentive timer (IT) display area.

The high-speed timer's (HT) set/new range value is displayed.

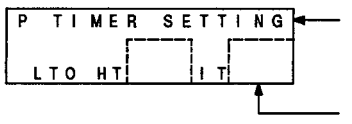
(2) Setting/changing the retentive timer range

<Retentive timer's head number> → [STP+]
<Retentive timer's head number> → [STP–]

Pressing the [STP]+, [STP–], or [END] key changes the window to the next (following) one.

<Retentive timer's head number> → [END]
<Retentive timer's head number> → [SFT]
or
[SFT]

Pressing the [SFT] key moves the cursor to the high-speed timer (HT) display area.



This is displayed before the [STP+], [STP–] or [END] key is pressed.

The set value or a new value is displayed.

[STP+]: The window changes to the next executable operation.

[STP–]: The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

(Procedure 9) Setting/changing latch ranges

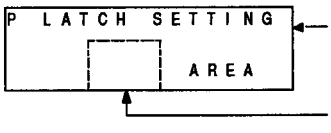
The window display contents and operating methods differ according to the connected ACPU.

When an A0J2CPU is connected, operate it as indicated below.

When any ACPU other than an A0J2CPU is connected, operate it as indicated on the next page.

Operations when an A0J2CPU is connected

When the window shown below is displayed, setting or changing the following device latch ranges can be started.



This is the window that is displayed first when setting/changing latch ranges.

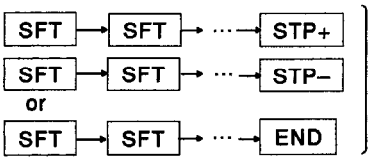
The current set contents are displayed.

When setting/changing latch ranges, beginning with the current set contents, by pressing the [SFT] key the window displays are changed in the order shown below.

When the intended window is displayed, press the [STP+], [STP–], or [END] key.

Number	Window Display Contents	Setting Contents	Latch Ranges	Non-Latch Ranges
1	P LATCH SETTING NO AREA	Nothing is latched (Not latched)	—	M0 to M2047 (M0 to M1535, S1536 to S2047)* T0 to T127 C0 to C127 D0 to D511 B0 to B3FF
2	P LATCH SETTING HALF AREA	The latter half is latched (1/2 latch)	L1024 to L2047 (L1024 to L1535, S1536 to S2047) * T40 to T79/T100 to T119/T124 to T127 C64 to C157 D256 to D511 B200 to B3FF W200 to W3FF	M0 to 1023 T0 to T39/T80 to T99/T120 to T123 C0 to C63 D0 to D255 B0 to B1FF W0 to W1FF
3	P LATCH SETTING ALL AREA	The entire range is latched.	L0 to L2047 (L0 to L1535, S1536 to S2047)* T0 to T127 C0 to C127 D0 to D511 B0 to B3FF W0 to W3FF	—

* When a step relay is set, these show the ranges of M, L, and S.



Pressing the [STP+], [STP–], or [END] key gives the following window displays:

[STP+]: The window changes to the next executable operation.

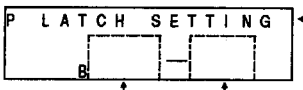
[STP–]: The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

Operations when an ACPU other than an A0J2CPU is connected

When the window shown below is displayed, operation of setting/changing the latch ranges of B, T, C, D, and W can be started.

B: Link relay, LT: Low-speed timer, C : Counter
HT: High-speed timer, D : Data register
IT : Retentive timer, W: Link register



This window is displayed first when setting/changing the latch range.
This is the window for setting/changing the latch range of B.

The set value (head number to final number) of the current latch range of B is displayed.

Each device latch range can be set or changed by this operation, if the following condition has been met:

• Head number of the latch range ≤ final number

The latch range setting/changing operation windows are displayed in the following order: B ↔ LT ↔ HT ↔ IT ↔ C ↔ D ↔ W.

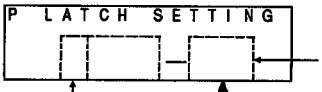
Therefore, do each individual key operation in the following way.

(1) When setting or changing the latch range of the device displayed on a window input the head and final numbers to the order indicated above, and last, press the [STP+], [STP–], or [END] key.

When latch ranges are not set or changed, only press the [STP+], [STP–], or [END] key.

(a) Setting/changing the head number

<Head number> → SFT .....Key operation when setting/changing the head number
or
SFT .....Key operation when setting/changing the head number



Pressing the [SFT] key moves the cursor to the final number display area.

The head number setting or new value in the latch range of the device named on the left is displayed.

The name of the device that is set or changed is displayed.

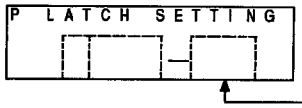
(b) Setting/changing the final number

<Final number> → STP+
<Final number> → STP–
<Final number> → END

Pressing the [STP+], [STP–], or [END] key changes the window to the next (following) one.

<Final number> → SFT
or
SFT

Pressing the [SFT] key moves the cursor to the head number display area.



This is displayed before the [STP+], [STP–] or [END] key is pressed.

The set or new value is displayed.

[STP+]: The window changes to the latch range operation window or any executable operation immediately after.

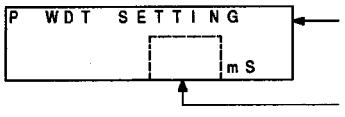
[STP–]: The window changes to the latch range operation window or any executable operation immediately before.

[END] : The window changes to the window shown in (Procedure 14).

(2) The displayed head and final numbers can be cleared by Pressing the [,] key when setting/changing latch ranges.

(Procedure 10) Setting/changing the watchdog timer (WDT)

When the window shown below is displayed, the ACPU's watchdog timer value can be set or changed.



This window is displayed when setting/changing the watchdog timer.
(Not displayed when an A0J2 or A3HCPU is connected.)

The current set value is displayed.

When setting or changing the watchdog timer changed, input the new timer value (in units of 10 msec), and press the [STP+], [STP–], or [END] key.

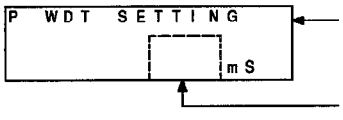
When the watchdog timer is not set or changed, only press the [STP+], [STP–], or [END] key.

<Watchdog timer value> → STP+

<Watchdog timer value> → STP–

or

<Watchdog timer value> → END



This is displayed before the [STP+], [STP–], or [END] key is pressed.

The set or new value is displayed.

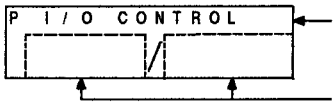
[STP+]: The window changes to the next executable operation.

[STP–]: The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

(Procedure 11) Setting/changing the I/O control method

When the window shown below is displayed, the I/O control method can be set or changed.



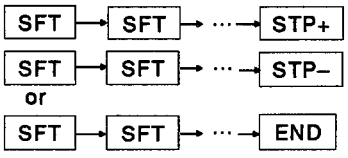
This is the window for setting/changing the I/O control method.
(Not displayed when an ACPU other than an A3HCPU is connected.)

The current set method is displayed.

When setting/changing I/O methods, beginning with the current set contents, by pressing the [SFT] key the window displays are changed in the order shown below.

When the intended window is displayed, press the [STP+], [STP–], or [END] key.

Number	Window Display Contents	Setting Contents
1	P I/O CONTROL REFRESH/REFRESH	Input : Refresh Output : Refresh
2	P I/O CONTROL REFRESH/DIRECT	Input : Refresh Output : Direct
3	P I/O CONTROL DIRECT/REFRESH	Input : Direct Output : Refresh
4	P I/O CONTROL DIRECT/DIRECT	Input : Direct Output : Direct



Pressing the [STP+], [STP–], or [END] key gives the following window displays:

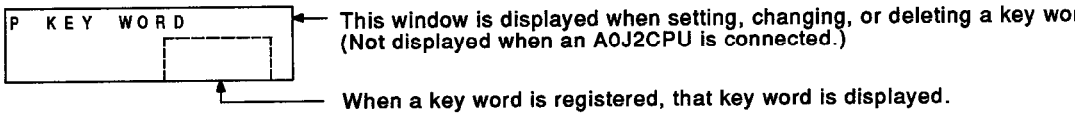
[STP+]: The window changes to the next executable operation.

[STP–]: The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

(Procedure 12) Setting/changing/deleting (cancellation setting) of a key word

When the window shown below is displayed, a key word can be set, changed or deleted (cancellation setting).



A key word can be registered under the following conditions:

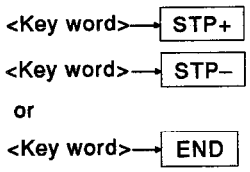
- It can be registered as a six-digit hexadecimal number.
  Therefore, use the "0" to "9" and "A" to "F" characters.
- It can be registered if the ACPU is other than an A0J2CPU.

When a key word is set/changed/deleted, execute the key inputs indicated below for each operation.

When a key word is not set, changed, or deleted, only press the [STP+], [STP–], or [END] key.

It changes into the next (following) window.

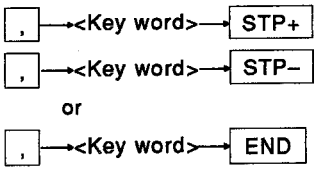
(1) When setting a key word:



Do the key operations in the order shown on the left.

The key word is set (registered) in the ACPU.

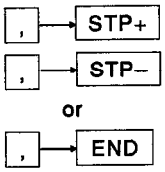
(2) When changing a key word



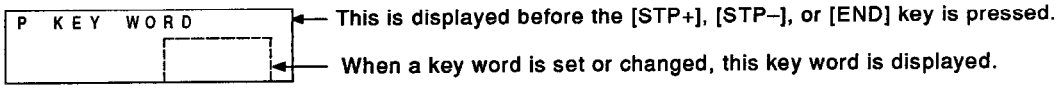
Do the key operations in the order shown on the left.

The key word is reset (re-registered) in the ACPU.

(3) When deleting (cancellation setting) a key word



Do the key operations in the order shown on the left.



[STP+]: The window changes to the next executable operation.

[STP–]: The window changes to the previous executable operation.

[END] : The window changes to the window shown in (Procedure 14).

(Procedure 13) Setting completion

When the setting/changing/delting of one type of parameter or key word has been completed, the window shown below is displayed.

```
P I F OK

   KEY IN 'END'
```

Press the [END], [STP+], or [STP–] key under the following conditions:

(1) When the entire setting, change, or deletion has been completed

[END]

Press the [END] key.

[END]: The window changes to the window shown in (Procedure 14).

(2) When something else is to be set, changed, or deleted

[STP+] or [STP–]

Press the [STP+] or [STP–] key.

The window changes to the window shown next.

[STP+]: The window changes to the window shown in (Procedure 3).

[STP–]: The window changes to the window of the operation item that was possible immediately before (differs with the ACPU used).

(Procedure 14) Writing parameters and key words

When setting/changing/deleting of parameters or key words has been completed or when the [END] key is pressed in (Procedure 3) to (Procedure 13), the window shown on the left is displayed.

```
P I F OK → STP

   I F NOT→ CL
```

Press the [STP+], [STP–], or [CL] (clear) key under the following conditions:

(1) When a parameter or key word is written to the ACPU

Press the [STP+] or [STP–] key.
The window shown below is displayed.

[STP±]

```
P RUN( PARAMETER)
```

Flashes during writing.

A line of "*" which corresponds to the total number of bytes of a parameter to be written to the ACPU is displayed. (each * means 1K byte.)

The total number of bytes (in units of K bytes) of a parameter to be written to the ACPU is displayed.

Writing of the parameter to the ACPU starts.
(Processing time: about four seconds.)

```
P RUN( PARAMETER)

   COMPLETION
```

This is the display when completed normally.
When the ACPU is an A0J2H, A1S, A2, A2A, A2C, A3, A3A, A3HCPU, if the allocation of a memory cassette changes as a result of parameter writing, corresponding to a new allocation, data in the memory cassette is shifted automatically.

(2) When a parameter and key word are not written to an ACPU

[CL]

Press the [CL] key.

It changes into the immediately preceding window displayed when the [END] key was pressed.

A parameter or key word can be set, changed, or deleted again.

(Procedure 15) Start the next operation

When changing to other modes and continuing operations, select the mode according to Section 5.1.4 (4), and start the next operation.

When continuing operations in the parameter mode, continue according to ther explanation in "After the parameter mode is selected".

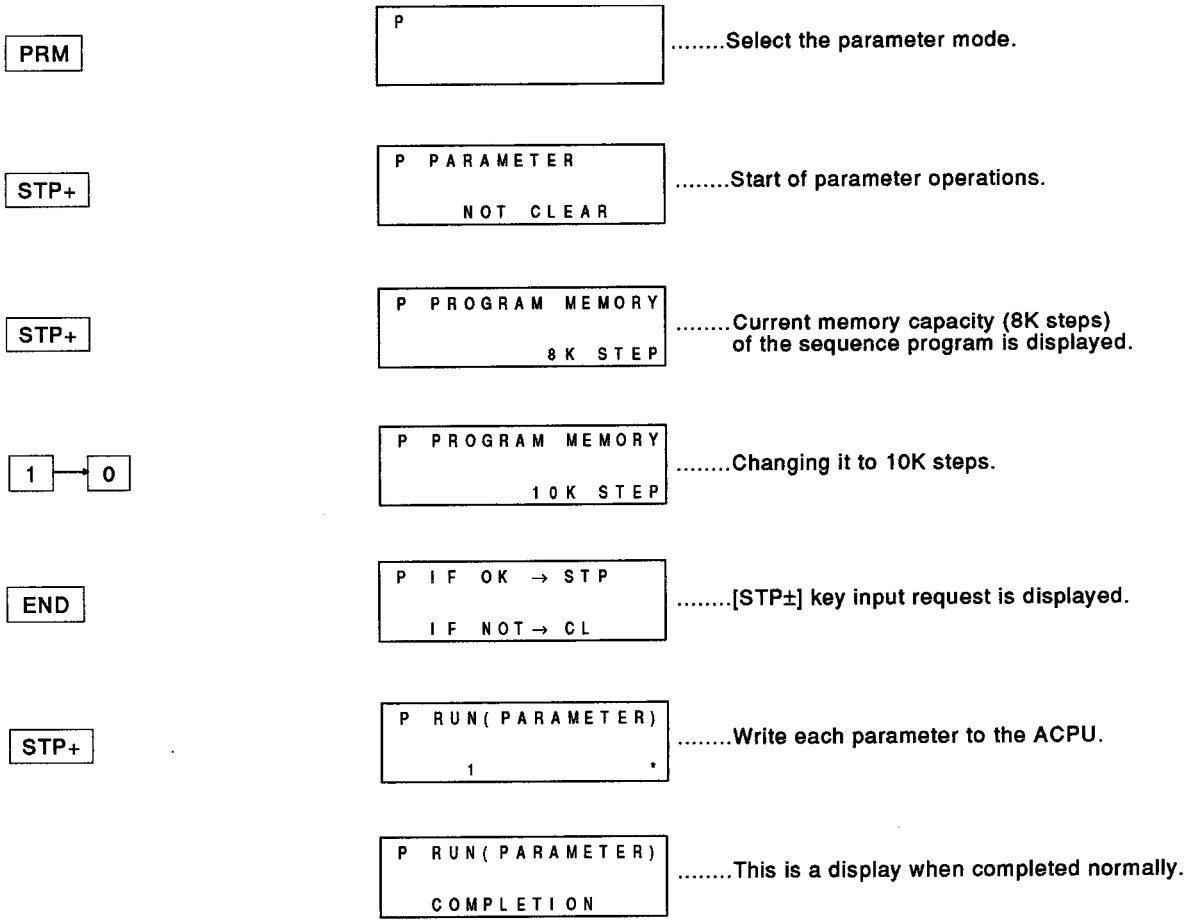
[Point]

- The User's Manual of the connected ACPU gives details about setting parameter ranges.
- Setting/changing cannot be done in the A7PUS other than to parameters shown in (Procedure 4) to (Procedure 11).

  Use the GPP function of the MELSEC- A series peripheral device.

[Sample Operations]

(1) Changing only the memory capacity of a sequence program when connected to an A1SCPU



(2) Setting or changing the memory capacity of a sequence program, the latch ranges of B and D, and the key word when connected to an A1CPU.

PRM	P	.....Select the parameter mode.
STP+	P PARAMETER NOT CLEAR	.....Start of parameter operations.
STP+	P PROGRAM MEMORY 8K STEP	..... Current memory capacity (8K steps) of the sequence program is displayed.
1 → 0	P PROGRAM MEMORY 10K STEP	.....Changing it to 10K steps.
STP+	P FILE REGISTER 3K	..... Current capacity (3K points) of the file register is displayed.
STP+ → STP+ → STP+	P LATCH SETTING B -	..... Window for latch range setting/ changing is displayed.
A → 0 → SFT → F → F	P LATCH SETTING B 0A0- OFF	.....Set BA0 to BFF to the latch range.
STP+	P LATCH SETTING LT -	.....Next window that can be operated is displayed.
STP+ → STP+ → STP+ → STP+	P LATCH SETTING D -	..... Window used for data register is displayed.
2 → 0 → 0 → SFT → 2 → 1 → 0	P LATCH SETTING D 200- 210	.....Set D200 to D210 to the latch range.
STP+ → STP+ → STP+	P KEY WORD	..... Window for key word setting/ changing is displayed.
2 → 3 → 4 → 5	P KEY WORD 002345	.....Set "2345" as the key word.
END	P IF OK →STP IF NOT→CL	.....[STP±] key input request is displayed.
STP+	P RUN(PARAMETER) 1 *	.....Write each parameter to the ACPU.
	P RUN(PARAMETER) COMPLETION	..... This is the display when completed normally.

7. ERROR MESSAGES

This section gives the error messages, displays, and corrective actions to take when operating the A7PUS.

7.1 Programming Function Error Messages (A7PUS error detection)

The following table lists the error messages, displays, and corrective actions to take when the A7PUS detects an error.

If, after taking corrective action and removing the cause of the error occurrence, the error message is still displayed, retry the mode key input operation.

No.	Error Message	Display Condition	Corrective Action(s)
1	ACPU RUN	Write, insert/delete mode or another mode has been attempted during CPU RUN.	Either set the CPU to STOP, or start up the CPU using the "programming function during CPU RUN" (see Section 5.1.4 (5)).
2	CANT FIND	Searched target data cannot be found.	—
3	CANT OPERATE	Although the correct key word was entered, an impossible mode or operation was selected.	Reset the A7PUS and input the correct key word. (Section 5.1.3 gives details about operations with a mismatched key word.)
4	CODE ERROR	When read, a correct instruction cannot be converted.	When the CPU has detected an error, change the CPU state from RUN to STOP and reset the CPU. Then check the instructions before and after the step where the error occurred and write a correct instruction.
5	DEVICE ERROR	The set device symbol is wrong. The device number is outside the specified range.	Reset the device number.
6	DUAL COIL ERROR	The same coil already exists in the sequence program.	Write a correct program if the program is wrong.
7	INS. SET ERROR	The instruction set in the read, write, or insert mode is not correct.	Reset the instruction.
8	MODE SET ERROR	During mode selection an other key was pressed.	Operate the A7PUS after selecting the mode.
9	OPERATION ERROR	An operation mistake was made. Data was written to the CPU ROM or EEPROM.	Press the correct key. When the CPU is in the STOP state, write data to the EEPROM. Do not write data to the ROM.
10	PARAMETER ERROR	The memory allocation set by parameters has exceeded the capacity of the memory cassette.	Correct the memory allocation.
11	PC NOT RESPOND	Communications cannot be made with the CPU.	Perform the operation again. If the A7PUS cannot communicate with the CPU, check the following: (The A7PUS Cable connections The CPU
12	PC WRITE ERROR	Data could not be written correctly to the CPU in the write and insert modes.	Check the RAM/ROM settings. Check the RAM installation. Check the CPU's memory protect switch.
13	SETTING ERROR	Invalid parameter setting	Set the correct parameter.

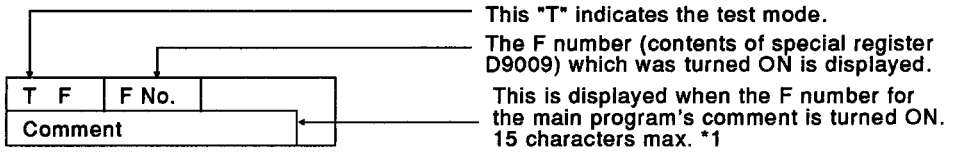
No.	Error Message	Display Condition	Corrective Action(s)
14	STEP OVER ERROR	The set step number is larger than the maximum step number.	Set the correct step number.
15	WR. ADDR. ERROR	Write-in access has been attempted to a write-forbidden area.	Set the correct address.
16	MEMORY PROTECT	The memory protect switch in the memory cassette is ON when writing is attempted in the write or insert/delete modes.	Set the memory protect switch to OFF.
17	CASSETTE ERROR	During communications with the CPU in key word clear or parameter write modes, the memory cassette is either faulty or improperly installed.	Install the memory cassette correctly. Replace the memory cassette.

7.2 Error Codes and Messages When an Error Occurs in a PC CPU

The following table shows the error codes (BIN value of special register D9008), error messages, CPU states, error contents and causes, and corrective action(s) displayed in the test mode by the error step/error code confirmation operation (see Section 6.6.5) when a PC CPU error occurs.

In addition, the following is displayed by the error step/error code confirmation operation when the PC CPU is in the following states:

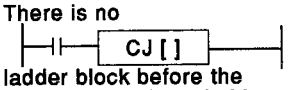
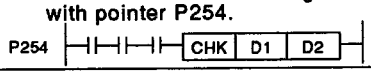
- No error (special register D9008 is 0).
- Either F number of the annunciator is turned ON (special relay M9009 goes ON).



*1

- The A7PUS cannot display 2-byte characters.
- If the comment is not used, nothing appears in the comment display area.

Error Code	Error Message	CPU State	Error Contents and Causes	Corrective Action(s)
10	INS. CODE ERROR When each instruction is executed	STOP	An instruction code which cannot be decoded by the CPU is included in the program. (1) A ROM which has an instruction code which cannot be decoded has been installed. (2) The contents of memory have changed for some reason and an instruction code which cannot be decoded has been included.	(1) Read the error step by special registers D9010 and D9011 and correct the program at that step. (2) When the cause of the trouble is the ROM, rewrite or change the contents.
11	PARAMETER ERROR • When the power supply is turned ON or the PC CPU is reset. • When switching the state to [RUN or STEP-RUN] from [STOP or PAUSE]	STOP	(1) The parameter contents of the CPU memory have changed due to noise or improper installation of the memory. (2) A write larger than the CPU memory capacity was attempted.	(1) Install the CPU memory correctly. (2) Read the parameter contents of the CPU memory, check and modify them, and write them to the memory again.
12	MISSING END INS • When M9056 or M9057 goes ON. • When switching the state to [RUN or STEP-RUN] from [STOP or PAUSE]	STOP	(1) There is no a END(FEND) instruction in the program. (2) When the subprogram was set in the parameter, the subprogram did not have an END instruction.	(1) Write END at the end of the program.
13	CAN'T EXECUTE • [CJ] [SCJ] [JMP] [CALLP] When executing a [FOR – NEXT] instruction • When switching the state to [RUN or STEP – RUN] from [STOP or PAUSE]	STOP	(1) There is no jump destination or there are several jump destinations specified for [CJ], [SCJ], [CALL], [CALLP], or [JMP] instructions. (2) There is a [CHG] instruction but no subprogram setting. (3) Although there is no a [CALL] instruction, a [RET] instruction is in the program and has been executed. (4) The jump destination of a [CJ], [SCJ], [CALL], [CALLP], or [JMP] instruction is in the program and has been executed. (5) The [FOR] and [NEXT] instruction numbers do not match. (6) A JMP instruction was inserted between [FOR – NEXT], and execution of the program jumped out between [FOR – NEXT]. (7) Before executing the [RET] instruction, the [JMP] instruction switched the execution of the program out of a subroutine. (8) Execution of the program is either jumped to a step between [FOR – NEXT] or a subroutine by the [JMP] instruction.	(1) Read the error step using special registers D9010 and D9011 and correct the program at that step. (Insert a jump destination or set a jump destination.)

Error Code	Error Message	CPU State	Error Contents and Causes	Corrective Action(s)
14	CHK FORMAT ERR • When switching the state to [RUN or STEP – RUN] from [STOP or PAUSE]	STOP	(1) There is an instruction (containing [NOP]) other than LDX, LDIX, ANDX and ANIX in the [CHK] instruction's ladder block. (2) There are multiple [CHK] instructions. (3) The number of contacts on the [CHK] instruction's ladder block exceeds 150. (4) The device number of X in the [CHK] instruction's ladder block exceeds the specified range in a connected ACPU. (5) There is no  ladder block before the [CHK] instruction's ladder block. (6) The device number of DI in the [CHK/D1/D2] instruction is not the same as the device number of the contact before [CJ[ ]]. (7) The [CHK] instruction's ladder block does not begin with pointer P254. 	(1) Check if any item from (1) to (7) on the left is missing from the program of the [CHK] instruction's ladder block. If so, correct the error, and redo the operation. (2) This error code is valid only when the I/O control method is the direct mode,
15	CAN'T EXECUTE • When an interruption occurs • When switching the state to [RUN or STEP – RUN] from [STOP or PAUSE].	STOP	(1) Although an interruption unit is used, either the interruption pointer I does not exist for that unit in the program, or there are multiple occurrences. (2) An [IRET] instruction is not included in the interruption program. (3) There is an [IRET] instruction somewhere outside the interruption program	(1) Check if there is an interruption program which corresponds to the interruption unit, or reduce the occurrences of I to one. (2) Check if there is an [IRET] instruction in the interruption program. (3) If there is an [IRET] instruction somewhere outside the interruption program, delete it.
16	CASSETTE ERROR • When turning ON or resetting the power supply	STOP	There is no memory cassette installed.	Install a memory cassette and reset.
17	ROM ERROR • When turning ON or resetting the power supply	STOP	(1) A parameter and sequence program have not been written to a properly-installed ROM. (2) The ROM has been damaged.	(1) Rewrite data to the ROM.
18	PROTECT ERROR • When turning ON or resetting the power supply	STOP	(1) The memory protect switch is set to ON when the ROM is operating.	(1) Set the memory protect switch to OFF.
20	RAM ERROR • When turning ON or resetting the power supply • When M9084 is ON in the STOP state	STOP	(1) After checking if the CPU can perform write and/or read operation to and/or from the data memory area of CPU, either or both could not be performed.	The cause is a hardware error, consult your nearest Mitsubishi sales representative.
21	OPE.CIRCUIT ERR • When turning ON or resetting the power supply	STOP	(1) The operation circuit, which performs sequence processing inside the CPU, does not work properly.	

Error Code	Error Message	CPU State	Error Contents and Causes	Corrective Action(s)
22	WDT ERROR When executing the END instruction	STOP	Scan time has exceeded the WDT error supervising time. (1) The scan time of the user's program is sometimes exceeded depending on unidentified conditions (2) An instantaneous power failure occurred during the scan and the scan time increases.	(1) Calculate and check the scan time of the user program and reduce the scan time by using a [CJ] instruction, etc. (2) Monitor the content of special register D9005. When it is not 0, check the power and reduce the voltage variations because the voltage power is unstable.
23	SUB-CPU ERROR Always check	STOP	The sub-CPU has malfunctioned.	The cause is a hardware fault. Consult your nearest Mitsubishi representative.
24	END NOT EXECUTE When executing the END instruction	STOP	(1) When the END instruction is executed, another instruction code has been read due to noise, etc. (2) For some reason, the END instruction has changed to another instruction code.	(1) Reset and run the CPU again. If the same error occurs, the cause is a hardware fault. Consult your nearest Mitsubishi representative.
25	WDT ERROR Always check	STOP	CJ instruction puts the sequence program's execution in a loop state, and the END instruction cannot be executed.	Confirm the endless loop state of the program and correct it.
26	SUB-CPU ERROR When turning ON or re-setting the power supply.	STOP	The sub-CPU has malfunctioned.	The cause is a hardware fault. Consult your nearest Mitsubishi representative.
31	UNIT VERIFY ERR • When executing the END instruction (However, if M9084 or M9094 goes ON, it is not checked.)	STOP (Operation)	I/O unit data is different from that when the power was turned ON. (1) I/O unit was removed during the operation or a different unit was installed. (2) The above occurred during STOP and the CPU has been set in the RUN state.	(1) Since the bit of special registers D9116 to D9123 which corresponds to the unit where a verification error has occurred, is 1, monitor the special registers by the PU and change the relevant unit. (2) If the present unit arrangement is OK, reset using the reset switch.
32	FUSE BREAK OFF • When executing the END instruction (However, if M9084 or M9094 goes ON, it is not checked.)	Operation (STOP)	A fuse has blown in an output unit.	(1) Check the fuse blow indicator LED of the output unit. (2) Monitor special registers D9100 to D9107 and change the fuse of the unit corresponding to the special register whose bit is 1.
40	CONTROL BUS ERR When executing a FROM/TO instruction	STOP	FROM/TO instructions cannot be executed. (1) Control bus error with respect to a special unit.	(1) Replace the special-function module, CPU module, or base unit hardware fault and check it. If the error persists, the cause is a hardware fault, Consult your nearest Mitsubishi representative.

Error Code	Error Message	CPU State	Error Contents and Causes	Corrective Action(s)
41	SP UNIT DOWN When executing a FROM/TO instruction	STOP	When a FROM/TO instruction is executed, access was made to a special-function module which has not responded. (1) The accessed special-function module has not responded.	The cause is a hardware fault in the special-function module, CPU, or base unit. Consult your nearest Mitsubishi representative.
42	LINK UNIT ERROR • When turning ON or resetting the power supply. • When switching the state from [STOP/PAUSE] to [RUN/STEP-RUN]	STOP	An AJ71(A)R22 or AJ71(A)P22 is installed in the master station.	Remove the AJ71(A)R22 or AJ71(A)P22 from the master station. Only one of these should be installed in the local station. Reset after correcting and restart.
43	I/O INT. ERROR When an interruption occurs	STOP	An interruption has occurred without the interrupt unit being installed.	Since there is a hardware fault in one of the modules, replace the module and check it. If the error still persists, the cause is a hardware error. Consult your nearest Mitsubishi representative.
44	SP UNIT LAY ERR • When turning ON or resetting the power supply. • When switching the state from [STOP/PAUSE] to [RUN/STEP-RUN]	STOP	(1) Three or more special-function modules are installed to one CPU. (2) Two or more AJ71(A)P22s or AJ71(A)R22s are installed. (3) Two or more interruption units are installed. (4) A special-function module was allocated in place of an I/O module in the I/O allocation of parameter setting by a peripheral device. Or the opposite allocation is done.	(1) The number of special-function modules must be equal to or less than the allowable number. (2) Only one AJ71(A)P22 or AJ71(A)R22 is allowed. (3) Only one interrupt unit is allowed. (4) Reset the I/O allocation of a parameter by using a peripheral device according to the special-function module loading state.
46	SP UNIT ERROR When executing a FROM/TO instruction	STOP (Operation)	Access (execution of FROM/TO instruction has been made to a location with no special-function module.	Read the error step by using special registers D9010 and D9011 and check and correct the contents of the FROM/TO instruction
47	LINK PARA ERROR • When turning ON or resetting the power supply. • When switching the state from [STOP/PAUSE] to [RUN/STEP-RUN]	Operation	(1) Link parameters are not written (2) Link parameters are wrong.	(1) When an error occurs in the master station, write a parameter. If an error occurs in the local station, set the station number in the range of 01 to 64. (2) Rewrite and check the parameter again. If an error is displayed again, the hardware is faulty. Consult your nearest Mitsubishi representative.
50	OPERATION ERROR When executing each instruction	Operation (STOP)	(1) The result of BCD conversion has exceeded the specified range (9999 or 99999999). (2) A setting has been performed exceeding the specified device range and the operation cannot be performed. (3) The capacity of a file register is not set, and a file register is used with a program.	(1) Read an error step by using special registers D9010 and D9011, and check and correct the program at that step. (Check and correct the device setting range, BCD conversion value, etc.).

Error Code	Error Message	CPU State	Error Contents and Causes	Corrective Action(s)
70	BATTERY ERROR Always check However, M90840 is not checked.	Operation	(1) The battery voltage is reduced. (2) The battery is disconnected.	(1) Change the battery (2) When RAM memory or power failure compensation is necessary, connect the battery.
80	SFC PARA. ERROR	Operation	(1) The contents of the work area for the SFC program are insufficient (2) The memory cassette is A3(N)MCA-0. (3) A work area for the SFC program or a step trace area is designated to the memory protect range.	(1) Correct the contents of each area by a parameter to be able to secure a 4K byte non-useful memory cassette area. (2) Replace the memory cassette with a memory cassette with enough (3) capacity. Remove the work area for the SFC program or a step trace area from the memory protect range.
81	SFC CODE ERROR	STOP	There is erroneous data in the SFC program.	Rewrite the SFC program by using a peripheral device.
82	SFC STEP OVER	STOP	The number of steps that is executed simultaneously in the SFC program has exceeded 1024.	Correct the SFC program, and set the number of steps that is executed simultaneously to 1024 or less.
83	SFC EXE. ERROR	STOP	A start request was executed again for an already started block.	Correct the SFC program, and set an interlock so that a start request cannot be executed while a correspondent block starts.
84	SFC OPE. ERROR	Operation (STOP) *1	An operation error occurred in the transfer state of the SFC program or the operation output of each step.	Confirm where the error occurred by using special registers D9051 to 9054, and correct the transfer state and the operation output that caused the error.

*1 The operating state of a CPU when an SFC. OPE. ERROR occurred can be selected by using the operation mode setting when there is a parameter setting error.

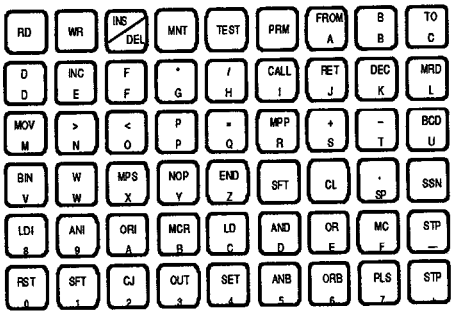
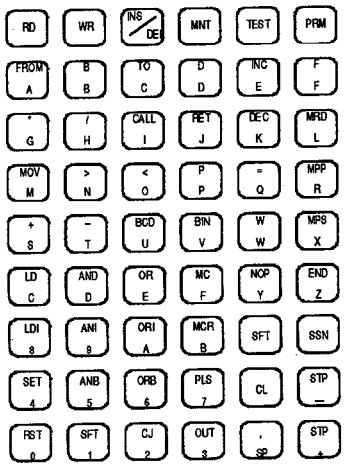
(The initial state is set to continuation.)

See the parameter setting of the GPP function of the peripheral device used to input the SFC program about parameter setting details.

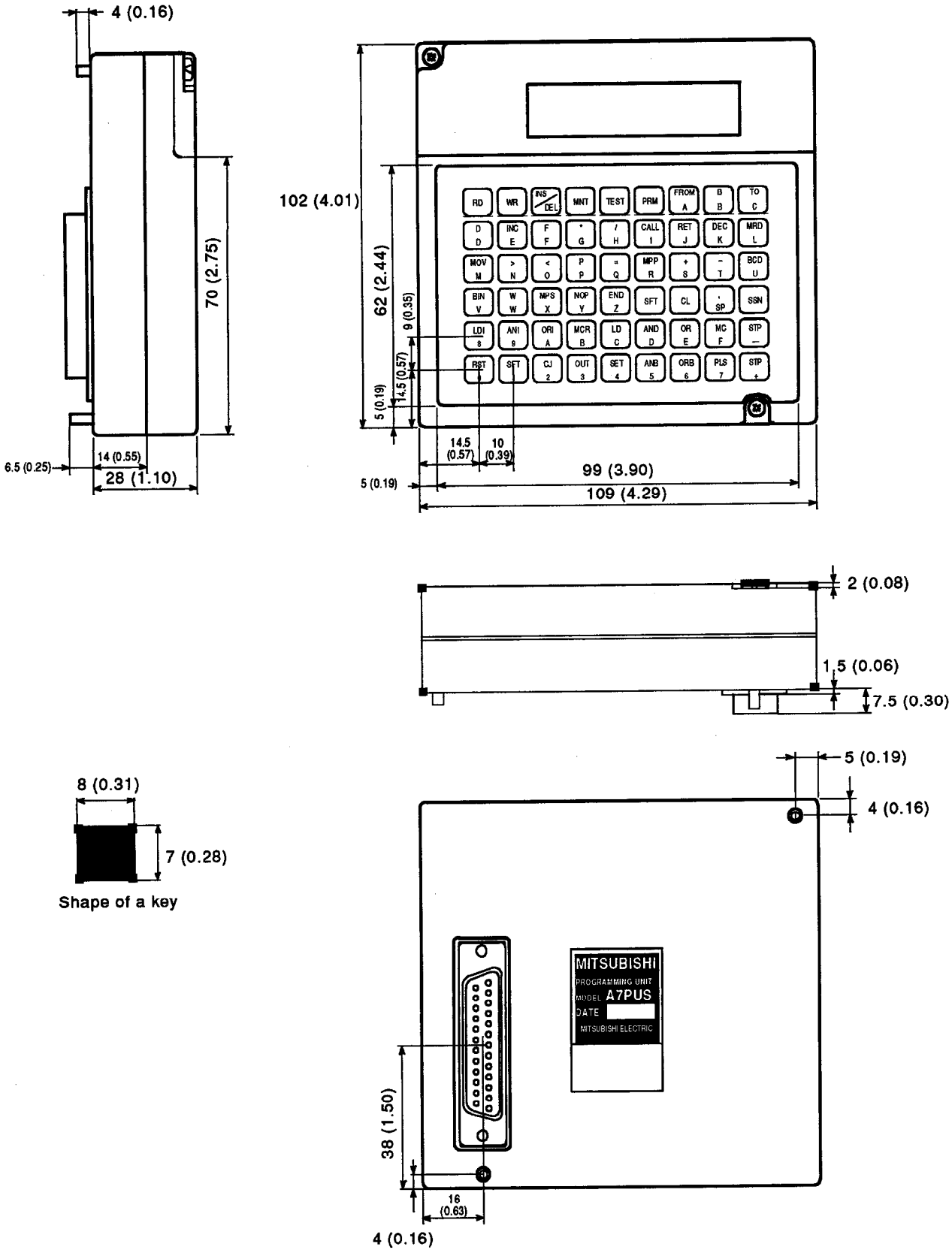
APPENDICES

APPENDIX 1 COMPARISON OF A7PU AND A7PUS FUNCTIONS

The following gives a comparison of the functions of the A7PU programming unit and the A7PUS.

Comparison Item \ Model	A7PUS	A7PU
Outside dimensions (mm)(in)	102 (4.02)(H) x 109 (4.29)(W) x 35.5 (1.40)(D)	188 (7.40)(H) x 79 (3.11)(W) x 44.5 (1.75)(D)
Connecting method with a CPU using the hand-held system.	Connect using AC30R4-PUS cables. The dedicated RS-422 connector is not provided. Use a connector with the add-on system.	Connect with four cables per AC30R4. (Use the dedicated RS-422 connector.)
Installation method with the add-on system.	Set screws with a screwdriver. (Only A1SCPU can be set with a screw.)	Fix a screw with a screwdriver or by hand.
Key arrangement		
Key sheet materials	Polyester	Polyurethane
LCD	DMC-16205LY	DMC-16250
Audio cassette function	Not provided (Interface is not provided.)	Provided (The interface is provided.)
Comment display of annunciator F	The confirmation operation of the error step/error code of the test mode enables the display.	Impossible

APPENDIX 2 A7PUS OUTSIDE DIMENSIONS

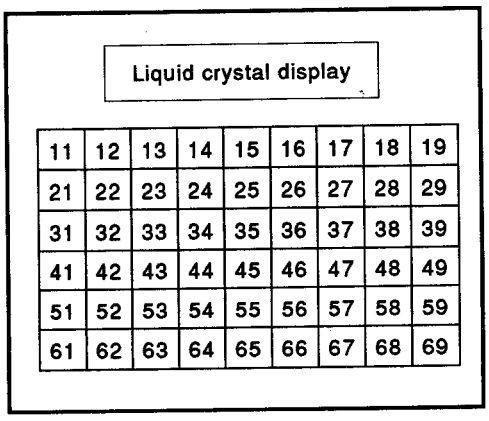


Unit: mm (in)

APPENDIX 3 POSITIONS OF INSTRUCTION KEYS

The following indicates the positions of the keys of the A7PUS which correspond to sequence program. instructions.Numbers shown on the right side in the table correspond to the following key numbers.

Instruction	Key Number	Instruction	Key Number	Instruction	Key Number	Instruction	Key Number
A		F		N		T	
ANB	66	F	23	NOP	44	TO	19
AND	56	FROM	17				
ANI	52			O		W	
		I		OR	57	W	42
B		INC	22	ORB	67		
B	18			ORI	53	Symbol	
BCD	39	L		OUT	64	+	37
BIN	41	LD	55			−	38
		LDI	51	P		*	24
C				P	34	/	25
CALL	26	M		PLS	68	>	32
CJ	63	MC	58			<	33
		MCR	54	R		=	35
D		MOV	31	RET	27		
D	21	MPP	36	RST	61		
DEC	28	MPS	43				
		MRD	29	S			
E				SET	65		
END	45			SFT	62		



APPENDIX 4 LIST OF KEY INPUT METHODS FOR EACH OPERATION

*** is limited. See the Explanation Sections

Operation Contents		Key Operation Order (Basic Operation)	A7PUS		ACPU		Explanation Sections
			P	RUN-P	RUN	STOP	
Resetting the A7PUS		[RST]+[STP+]	O	O	O	O	5.2
Entry code input when starting up		<Entry code>→[STP±]	–	–	O	O	5.1.3
Function selection		[SFT]→[SFT]→...[STP±]	–	–	O	O	5.1.4
Mode selection		<Mode key> ([RD], [WR], [INS/DEL], etc.)	O	O	O	O	5.1.4
Separation from ACPU		[CL]	O	O	O	O	5.1.5
Switching of a valid key		[SFT]	O	O	O	O	5.3.2
Corrective action when a wrong entry is made		[CL] or <mode key>	O	O	O	O	5.3.4
Instruction code input	Only instruction code	<Instruction>→[STP±]	O	O	O	O	5.3.3
	Instruction code and device	<Instruction>→[,]→<Device>→<Device number>→[STP±]					
	OUT T/C	[OUT]→[,]→<Device>→<Device number>→[,]→[K]→<Set value>→[STP±]					
	MC instruction	[MC]→[,]→[N]→<Number>→[,]→[M]→<Number>→[STP±]					
	Other than above	Input [,] between an instruction, a device, source data, and a destination.					
	Blank ASCII character	[SFT]					
PC memory all clear		When starting up the A7PUS, input the key word as follows. [A]→[L]→[L]→[C]→[L]→[R]→[STP±]	–	–	X	O	6.1
Write mode	Continuous writing of NOP	[SSN]→<Step number>→[STP±]→[NOP]→[K]→<Step number>→[STP±]	O	O	O*	O	6.2.1
	Writing/correction (change and addition) of a program	[SSN]→<Step number>→[STP±]→<Instruction>→[STP±] (→<Step number>)	O	O	O*	O	6.2.2
	Change of the TC set value during RUN	[SSN]→<Step number>→[STP±]→<Instruction>→[STP±]	X	O	O	–	6.2.3
Read mode	Read of an instruction by designating a step number	[SSN]→<Step number>→[STP±] (→<Step number>)	O	O	O	O	6.3.1
	Read of an instruction by designating an instruction	<Instruction>→[,]→<Device>→<Device number>→[STP±] (→<Instruction>) P/I is done as follows.	O	O	O	O	6.3.2
	Read of an instruction by designating a device	[SFT]→<Device>→<Device number>→[STP±] (→<Device>)	O	O	O	O	6.3.3
The insertion and deletion mode	Insertion of a program	[SSN]→<Step number>→[STP±]→<Instruction>→[STP+] (→<Step number>)	O	O	X	O	6.4.1
	Deletion of a program	[SSN]→<Step number>→[STP±]→[STP–] (→<Step number>)	O	O	X	O	6.4.2
Monitor mode	Monitoring of a bit device	<Device>→<Device number>→[STP±] (→<Device number>) T·C is done as follows.	O	O	O	O	6.5.1
	Monitoring of a word device (current value)	<Device>→<Device number>→[STP±]→[SFT]→[STP±] (→<Device number>) Display switching	O	O	O	O	6.5.2
	Monitoring of T·C	<Device>→<Device number>→[STP±]→[SFT]→[STP±] (→<Device number>)	O	O	O	O	6.5.3
	Continuity check of a ladder	[SSN]→<Step number>→[STP±]→[SFT] (→<Step number>)	O	O	O	O	6.5.4
	Monitoring of an offline switch	<Device>→[SFT]→<Device number>→[STP±]→<Device> (→<Device number>)	O	O	O	O	6.5.5

"*" is limited. See the Explanation Sections

	Operation Contents	Key Operation Order (Basic Operation)	A7PUS P	A7PUS RUN-P	ACPU RUN	ACPU STOP	Explanation Sections
Test mode	Set/reset of a bit device	<Device>→<Device number>→[STP±]→[SET]→[RST]	O	O	O	O	6.6.1
	Current value change of word device	<Device>→<Device number>→[STP±]→[SFT]→[,]→<Changed value>→[STP±] (Display change)	O	O	O	O	6.6.2
	Setting/release of an offline switch	<Device>→[SFT]→<Device number>→[STP±]→[RST]→[SET]→→<Device>	O	O	O	O	6.6.3
	Program check	[P]→[STP±]	O	O	O*	O	6.6.4
	Error check	[K]→[STP±]	O	O	O	O	6.6.5
	Read and writing of machine language	[SSN]→<Address>→[STP±]→<Machine language (code)>	O	O	O*	O	6.6.6
Parameter mode	All clearing of a parameter	When registering a key word / Key word display: [STP±]→[STP±]→... → [STP±]→[,]→[STP+]→[END]; When not registering a key word: [STP±] ←(Writing of a parameter and display of a completion); [SFT]→[STP±]→[END]→[STP±]	O	O	X	O	6.7.1
	Setting and change of a parameter and a key word	The order differs according to the connected ACPU. Neglect the part of the item which is not displayed.	O	O	X	O	6.7.2
	(Item to be set and to be changed)	[STP±]→					
	• Program memory capacity	→<Capacity>→[STP±]→(For main, Input unit : 1K steps) →<Capacity>→[STP±]→(For sub, Input unit : 1K steps)					
	• File register capacity	→<Capacity>→[STP±]→(Input unit: 1K points)					
	• M.L range	→<Head number of L>→[STP±]→ (Only the head number of L can be inputted.)					
	• Timer range	→<Head number of a high-speed timer>→[SFT]→<Head number of an addition timer>→[STP±]→					
	• Latched range (A0J2)	→[SFT]→[SFT]→...[STP±]→					
	(Other than above)	→<Head number>→[SFT]→<Last number>→[STP±]→					
	• Watchdog timer	→<Watchdog timer value>→[STP±]→(Input unit : 10 msec)					
	• I/O control method	→[SFT]→[SFT]→...[STP±]→					
	• Key word	→[,]→<Key word>→[STP±]→(Max. six digits by hexadecimal number)					
	• Writing of setting completion	→[END]→[STP±] ←(Writing and display of a completion) END key input requirement display					

Programming unit type A7PUS

Operating Manual

MODEL	A7PUS-O-E
MODEL CODE	13JF01
IB(NA)66362-A(9709)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100-8310 TELEX : J24532 CABLE MELCO TOKYO
NAGOYA WORKS : 1-14 , YADA-MINAMI 5 , HIGASHI-KU, NAGOYA , JAPAN

When exported from Japan, this manual does not require application to the Ministry of International Trade and Industry for service transaction permission.

Specifications subject to change without notice.