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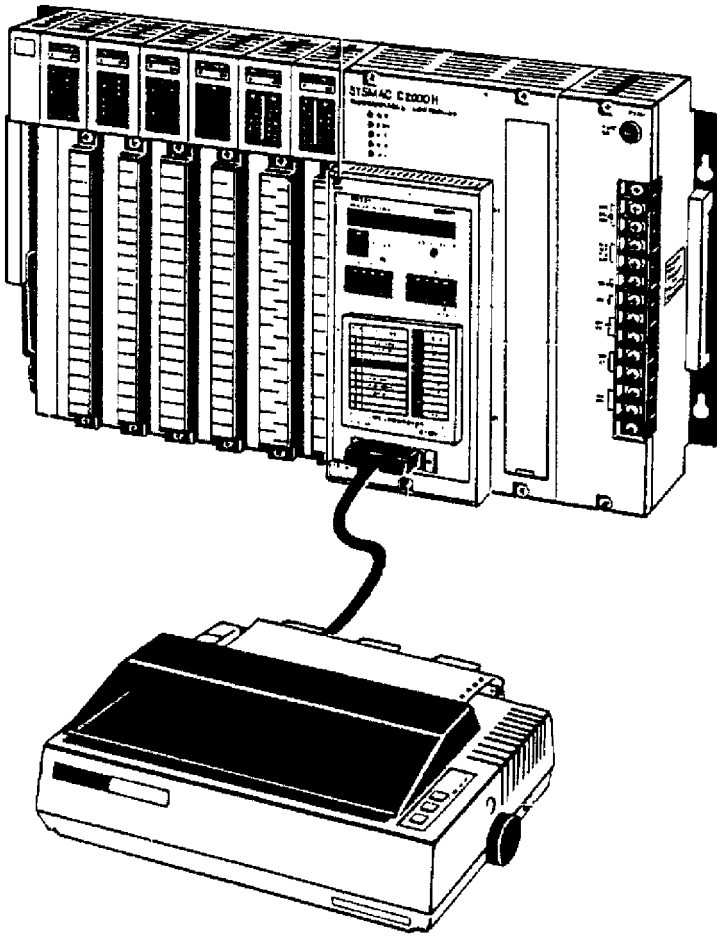
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Printer Interface Unit

Operation Manual

Produced December 1988



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All OMRON products are capitalized in this manual. The word “Unit” is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation “Ch,” which appears in some displays and on some OMRON products, means “word” and is abbreviated “Wd” in documentation.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Note Indicates information of particular interest for efficient and convenient operation of the product.

1, 2, 3... Indicates lists of one sort or another, such as procedures, precautions, etc.

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About this Manual:

The Printer Interface Unit is a peripheral device for the SYSMAC C series PCs. It enables the printing of various lists, including program lists, cross-reference lists, and error lists. The program list and error lists can be printed out in both the mnemonic format and ladder diagram format to facilitate desktop program debugging. I/Os, TIM/CNTs, etc., being used can be determined by printing out the cross-reference list for the program The contents of the DM can be also be printed, greatly assisting the managment and checking of the PC processing operations.

This manual covers the operation of the Printer Interface Unit and the selection of the associated Memory Packs. Please read this manual thoroughly and familiarize yourself whth the functions, characteristics, and operations of this Unit before using it.

OMRON provides three Memory Packs that may be used with the Printer Interface Unit, depending on the PC model. The operations available differ depending on the Memory Pack, and the PC as not all PCs are equipped with equal data areas, functions, etc...

Please keep this in mind while reading this Operation Manual.

Section 1 displays the unit, highlighting its major areas of interest. Dip switch controlled settings are explained in detail. A system configuration diagram is provided to show the positioning of the Printer Interface Unit relative to other equipment and a list of PCs and their associated Memory Packs is detailed.

Section 2 outlines the installation procedures for the Printer Interface Unit including the connection and disconnection of an appropriate Memory Pack. Suitable Printers and Plotters and their interface settings are included. The interface cable pinouts are provided.

Section 3 outlines the operation of the Printer Interface Unit and the functions of each type of Memory Pack. It provides the information necessary to prepare for printing, execute printing, and stop printing in progress, and examples various printing formats.

Section 4 provides information on troubleshooting the system as well as error indications and the appropriate correcting action.

Appendix A contains a list of models referenced within this manual. ***Appendix B*** list the specifications of the Printer Interface Unit and ***Appendix C*** provides a compilation of Ladder Diagram Symbols.

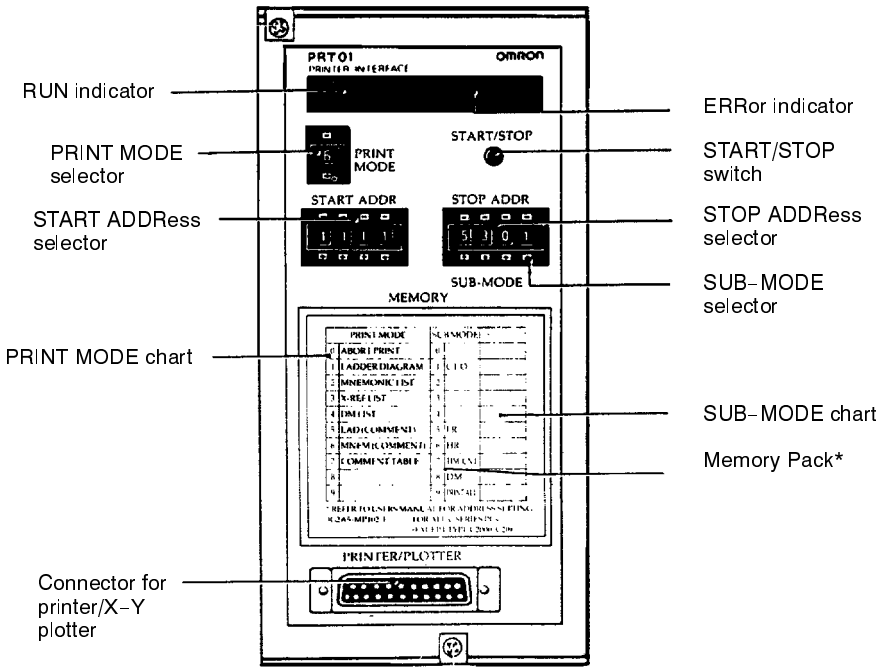
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SECTION 1
Nomenclature and System Configuration

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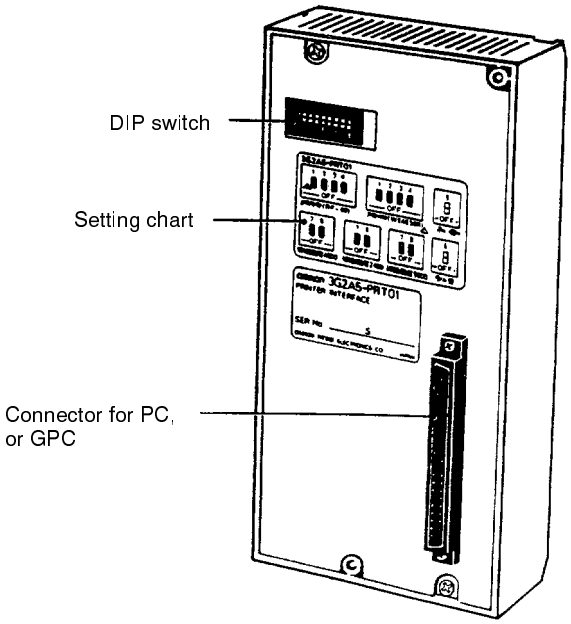
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1–1 Front Panel



*Refer to Appendix B Standard Models

1–2 Back Panel



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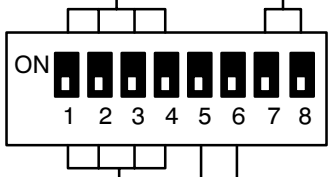
DIP Switch Setting

Printers*

Setting				Printers
1	2	3	4	
OFF	OFF	OFF	OFF	FX–80, MX–80 TYPE II, MX–80F/T TYPE II, MX–80 TYPE III, MX–80F/T TYPE III, RX–80, SX–80T
OFF	OFF	ON	OFF	ASCII character output

Transmission Rate
The transmission speed must be set to match the printer/plotter.

Setting		Rate
7	8	
OFF	OFF	4,800 bps
OFF	ON	2,400 bps
OFF	ON	9,600 bps



Graphic Plotters*

Setting				Plotter
1	2	3	4	
OFF	ON	OFF	ON	WX4731
OFF	OFF	ON	ON	MP1000–01

Page Feeder

Setting	Page Feeder
5	
ON	Not used
OFF	Used

Title Field
(when X–Y plotter is used)

Setting	Title Field
6	
OFF	Printed
ON	Omitted

Perforation Skip
(when printer is used)

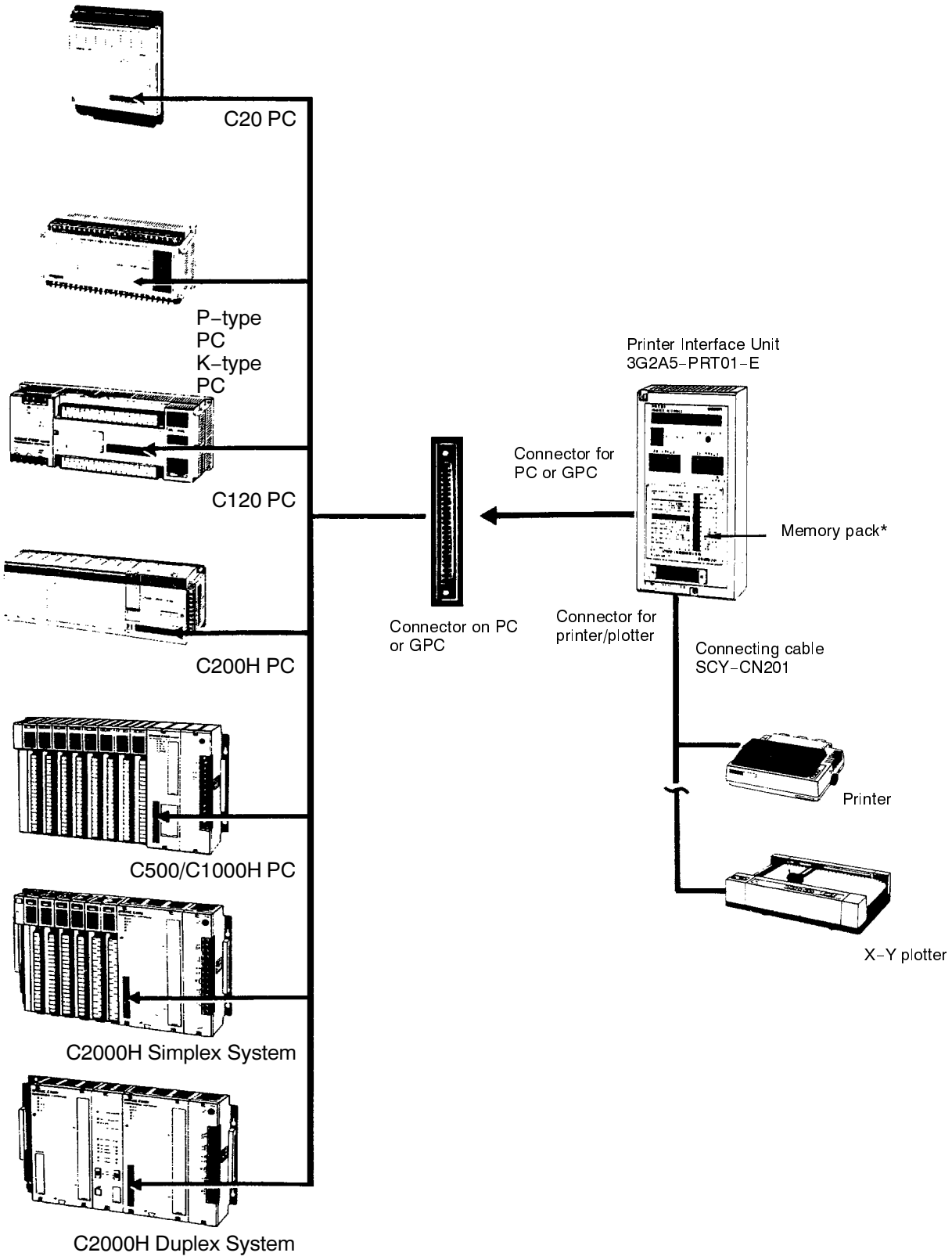
Setting	Perforation
6	
OFF	Skip
ON	No Skip

* Marketed in Japan

Note When the Printer Interface Unit is delivered, all the pins of the DIP switch are turned OFF as a factory–set condition for shipment.

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1–3 System Configuration



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The Printer Interface Unit can be mounted to different C–series PCs depending on which Memory Pack is installed. The table below shows which Memory Packs can be used with each PC model.

Memory Pack	PC
C20–MP009–EV3	C20, P–type, or K–type
C500–MP102–EV3	C120 C500
C2000–MP103–EV3	C200H C1000H C2000H

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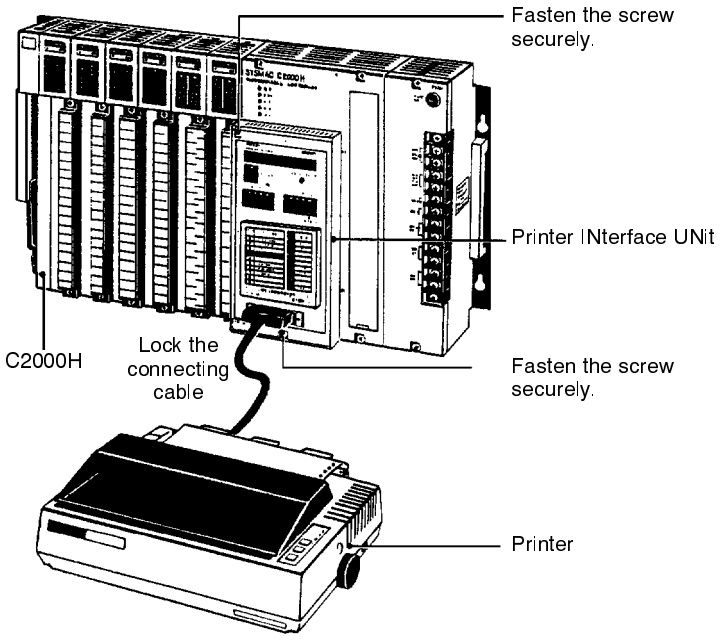
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2–1 Installation

Before installing the Printer Interface Unit, check to be sure that the DIP switches are set properly. When attaching the Unit to the PC or GPC, be sure that all screws are tightly fastened. Lock the SCY–CN201 connecting cable after attaching it. Turn on the power to the PC before the printer. The following figure illustrates the connection of the Printer Interface Unit and a printer to a C2000H PC.



2–2 PC and GPC Settings

PC Settings

When the Printer Interface Unit is mounted directly to the PC, the PC must be set to PROGRAM mode for Memory Pack MP009–EV2/3. Memory Pack MP102–EV2/3 also requires the PC to be set to PROGRAM mode for all operations except printing the DM contents, which can be done in any mode. The PC can be set to any mode for all operations with Memory Pack MP103–EV2/3, with the exception that printing will stop if FILP is executed while printing in either RUN or MONITOR mode.

Note If the PC's mode is changed from PROGRAM to MONITOR or RUN, with Memory Packs MP009–EV2/3 or MP102–EV2/3, any printing in progress is immediately stopped. With the MP103–EV2/3, however, printing can be continued in MONITOR or RUN modes as long as FILP is not executed in the program.

GPC Setting

The GPC must be set differently depending on which Memory Pack and PC are used. These settings are made from the initial screen after the GPC is powered up. When Memory Pack MP102–EV2/3 is used, set the GPC to "9." When Memory Pack MP103–EV2/3 is used, set the GPC to "7" with a C200H PC and to "8" with a C1000H, or C2000H PC.

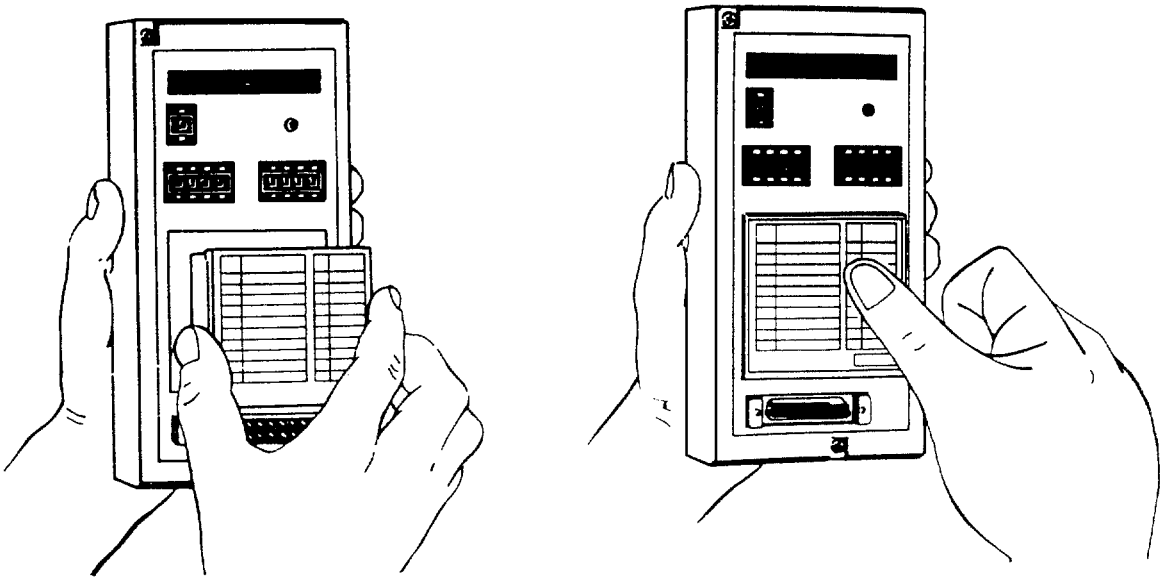
2–3 Memory Pack Connection

The Printer Interface Unit requires a Memory Pack. Refer to *Appendix A Standard Models* to confirm that you have the proper Memory Pack for your PC model.

1, 2, 3... 1. Insert the Memory Pack straight into the Printer Interface Unit.

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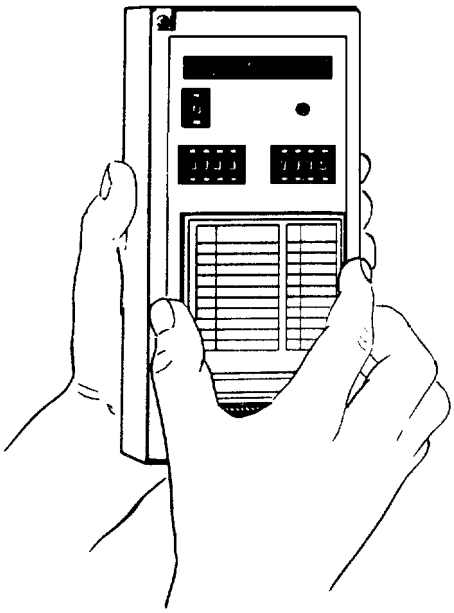
2. When you feel a slight resistance, push the right side of the Memory Pack. The connection will then be made between the Memory Pack and the Printer Interface Unit.



Disconnection

1, 2, 3...

1. Lift the right side of the Memory Pack to disconnect it from the Printer Interface Unit.
2. With the right side of the Memory Pack raised slightly, lift the left side.
3. Alternately lifting the left and right sides, remove the Memory Pack from the Printer Interface Unit.



Caution Never connect/disconnect a Memory Pack to/from a Printer Interface Unit mounted to either the PC or the GPC.

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2–4 Printer and X–Y Plotter Settings

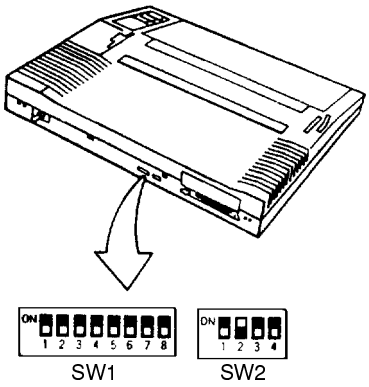
Printer Settings

The Printer Interface Unit can be connected to any of the following Epson printers (marketed in Japan). For each of them a serial interface board is required. VP–500, VP–800, and VP–1000 printers require #8148 or #8149 interface boards. Older models, such as the SX–80T, FX–80, RX–80, MX–80 (Type II), and MX–80 (Type III) can also be used, but require different interface boards. Use interface boards #8143 or #8145 for the first three, and only #8145 for the other two. The serial interface board is available from the manufacturer of the printer.

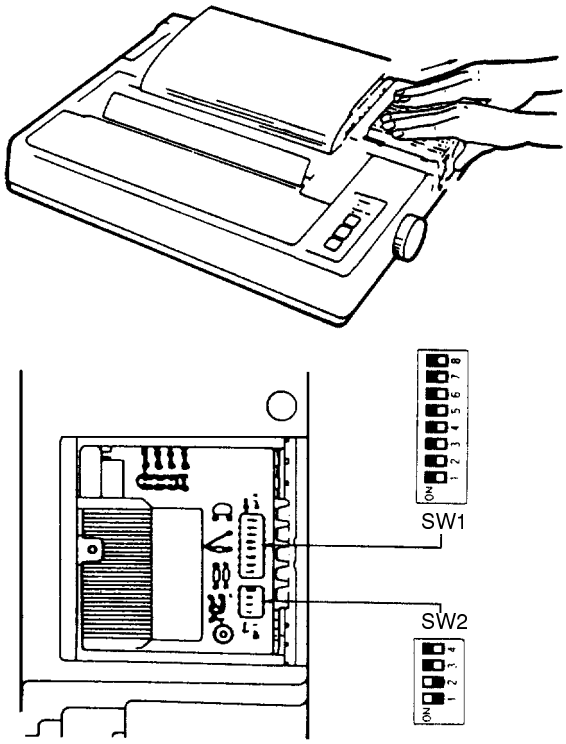
In addition, the new "–EV3" Memory Packs allow ladder diagrams to be printed out in standard ASCII characters, thus making possible the use of other than Epson–compatible printers.

The following figures show the DIP switch settings of some of the printers. Refer to the printer manual for details before printing.

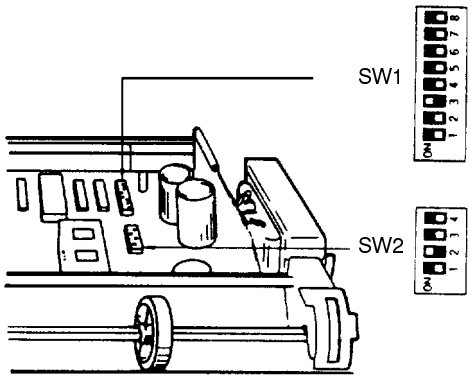
SX–80T



FX–80T



RX–80



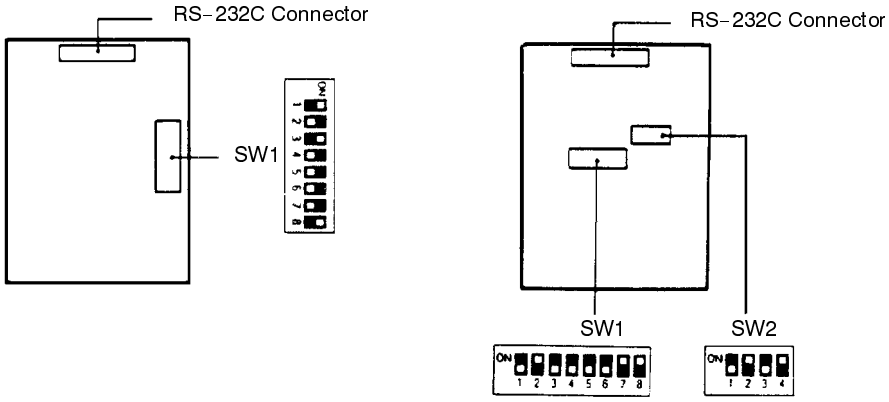
Serial Interface Board Settings

The settings of the serial interface boards are as follows, set for 4800 bps transmission speed, no parity, data length of 8 bits, and 1 stop bit. Except for the pins indicated below as ON, set all pins to OFF.

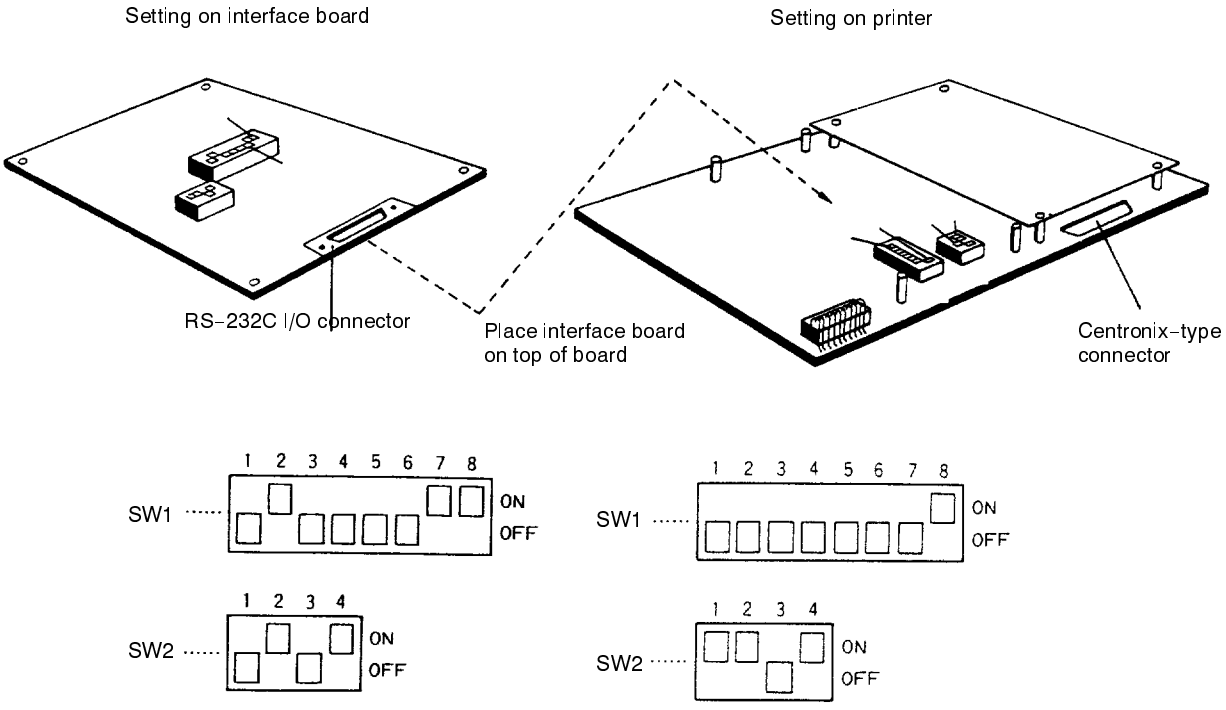
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Model	SW1	SW2
#8143	1,3,8 ON	---
#8145	2,7,8 ON	2,4 ON
#8148	6,8 ON	1,2 ON
#8149	1,2 ON	6,8 ON

The figures below illustrate the settings for the #8143 and #8145 interface boards.



The following figure illustrates the DIP switch settings for the MX–80 TYPE II or TYPE III printers.



With the settings shown above, the printer is set as follows:
Transmission speed: 4,800 bps

Parity: none

Data length: 8 bits

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Paper feed: 1/6 inch

No. of columns per line: 80

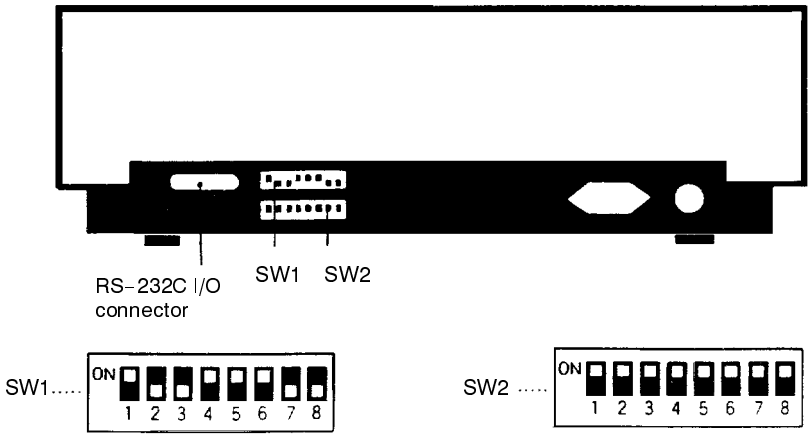
Paper detection: enabled

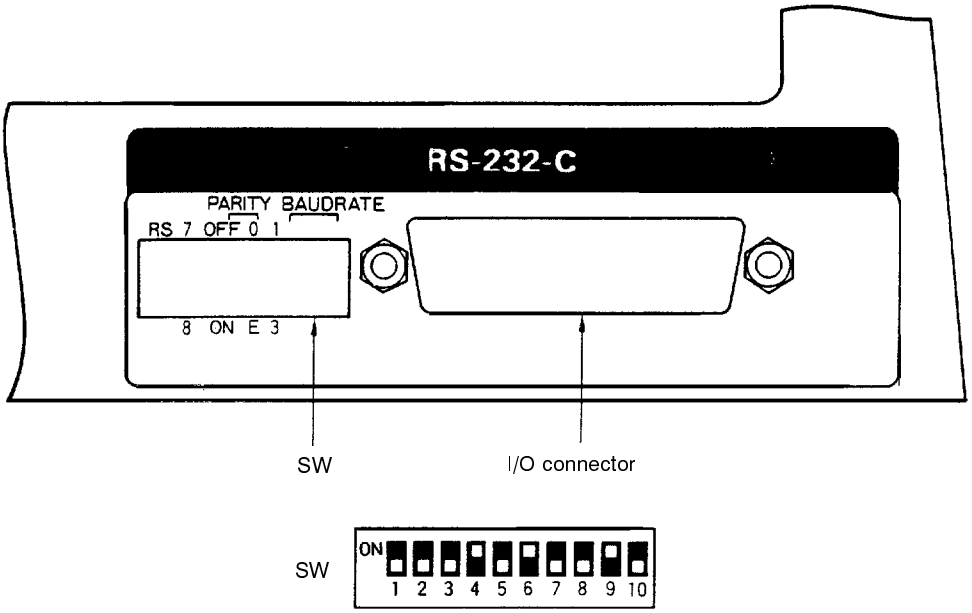
1–inch automatic skip perforation: not enabled

Caution Power the printer up last, after first installing the Printer Interface Unit, connecting all cables, and powering up the PC. If any of these operations are done while the printer is on, data remaining in the printer buffer may be printed.

X–Y Plotter Settings

The Printer Interface Unit can be connected to X–Y plotters from Graphtec (marketed in Japan). The X–Y plotter also requires DIP switch settings. The following figures show the WX4631R and MP1000–01 as examples. Refer to the plotter manual for details before printing.





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With the settings shown above, the plotters are set as follows:

Transmission speed (baud rate): 4800 bps

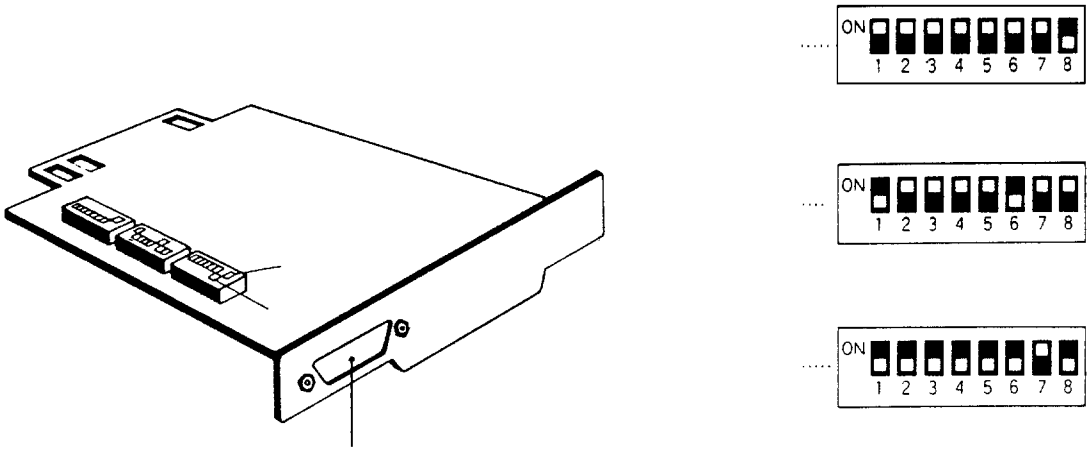
Parity: none

Data length: 8 bits with one stop bit

Paper feed: 40 cm/s

X–Y Plotter Interface Board Settings

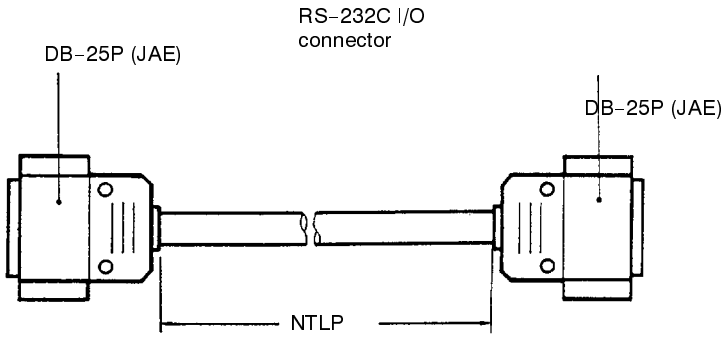
The following figure shows the settings for interface board PC2801. This interface board is used with WX4631R plotters (shown above), as well as with WX4638R, WX4731, and FP5301 plotters.

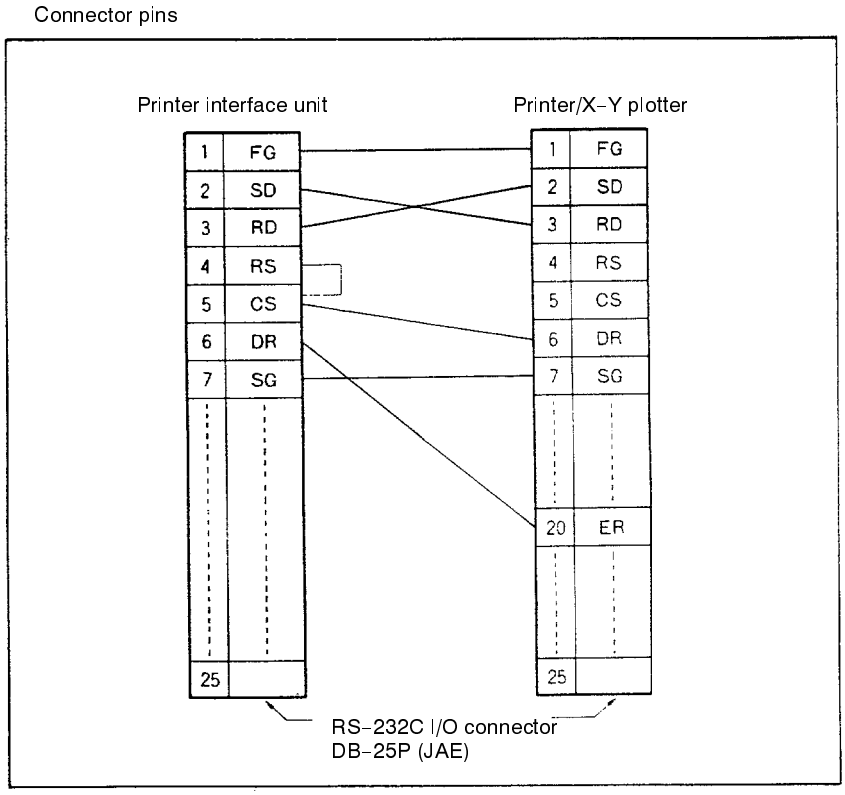


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2–5 Connecting Cable

Use SCY–CN201 Connecting Cable between the Printer Interface Unit and the printer/plotter.





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SECTION 3
Operation

This section describes the operations of the Printer Interface Unit and the functions of each type of Memory Pack. It provides the information necessary to prepare for printing, execute printing, and stop printing in progress, and gives examples of various types of printing formats.

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3–3 Printing Format Examples 23
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3–1 Printing sequence

The basic sequence for printing is as follows:

1, 2, 3...

1. Set the PRINT MODE.
2. Set the START ADDRESS.
3. Set the STOP ADDRESS.
4. Press the START/STOP button.
5. The RUN indicator lights and printing starts.
6. If there are no errors, printing is executed and the RUN indicator goes out when printing is finished. If there is an error, the ERRor indicator lights. If this happens, refer to Section 4 Troubleshooting and Maintenance.

Be certain that the DIP switches on the back panel of the Printer Interface Unit, and those of the printer/plotter are set properly. Also, before continuing, confirm that all connections are made properly and securely and that the printer or plotter is ready.

The operations available differ depending on the Memory Pack and PC. Some operations are common to all of the Memory Packs and PCs, but others are not. Those operations not common can only be performed with certain PCs and Memory Packs, since PCs differ in terms of data area, functions, and so on.

The particular operations available depend also on the PC mode and whether or not a GPC is connected. The following two tables show the operations possible with each Memory Pack. (Refer to 1–3 System Configuration for a listing of the PCs with which each Memory Pack can be used.) The subsequent tables show which of these operations are possible in particular PC modes.

Printing Functions Available with Each Memory Pack

Function	Memory Pack		
	MP009–EV3	MP102–EV3	MP103–EV3
Ladder diagram	YES	YES	YES
Ladder diagram with cross–references	YES	YES	YES
Ladder diagram with IL/JMP	YES	YES	YES
Mnemonic list	YES	YES	YES
Cross–reference list	YES	YES	YES
DM contents	YES	YES	YES
Ladder diagram with comments	YES (*1)	YES	YES
Ladder diagram with comments and cross–reference list	NO	YES	YES
Ladder diagram with comments and IL/JMP	NO	YES	YES
Mnemonic list with comments	NO	YES	YES
Comments table	NO	YES	YES
File Memory list	NO	NO	YES (*2)
GPC screen hard copy	NO	YES	YES

*1. The C20 PC does not have a DM area.

*2. A File Memory list can only be printed out for C1000H and C2000H PCs.

The functions listed above apply to the newer Memory Pack models, i.e., the model numbers ending with the suffix, ”EV3.” The older models (EV2) have many, but not all, of these functions. The following table shows the functions available with the EV2 models.

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Printout	Memory Pack		
	MP009–EV2	MP102–EV2	MP103–EV2
Ladder diagram	YES	YES	YES
Mnemonic list	YES	YES	YES
Cross–reference list	YES	YES	YES
DM contents	YES	YES	YES
Ladder diagram with comments	NO	YES	YES
Mnemonic list with comments	NO	YES	YES
Comments table	NO	YES	YES
File Memory list	NO	NO	YES

MP009–EV2/3 Printing Functions in Each PC Mode

Memory Packs MP009–EV2 and MP009–EV3 can be used with C20, P–type, and K–type PCs. When a program transferred from any of these PCs is printed out by the GPC, Memory Pack MP102–EV2/3 must be used.

The following table shows the printing functions available with Memory Pack MP009–EV2/3 in each of the three PC modes when the Printer Interface Unit is mounted to the PC. Note that two of these functions (ladder diagram with cross–references and ladder diagram with IL/JMP) are available with Memory Pack MP009–EV3 but not with the older MP009–EV2 model.

Printout	RUN	MONITOR	PROGRAM
Ladder diagram	NO	NO	YES
Ladder diagram with cross–references	NO	NO	YES
Ladder diagram with IL/JMP	NO	NO	YES
Mnemonic list	NO	NO	YES
Cross–reference list	NO	NO	YES
DM contents	NO	NO	YES (*)

*The C20 PC does not have a DM area.

MP102–EV2/3 Printing Functions in Each PC Mode

Memory Packs MP102–EV2 and MP102–EV3 can be used with C120, and C500 PCs, or when programs from any of these PCs or from C20, P–type, or K–type PCs are printed out by the GPC. Use Memory Pack MP009–EV2/3 for printing out directly from a C20, P–type, or K–type PC.

The following table shows the printing functions available with Memory Pack MP102–EV2/3 in each of the three PC modes when the Printer Interface Unit is mounted to the PC and those available when it is mounted to the GPC. Note that four of these functions (ladder diagram with cross–references, ladder diagram with IL/JMP, ladder diagram with comments and cross references, and ladder diagram with comments and IL/JMP) are available with Memory Pack MP102–EV3 but not with the older MP102–EV2 model. In addition, if the GPC is used, comments and comment tables can only be printed out with 3G2C5–GPC03–E/04–E GPCs and 3G2C5–MP303–EV1 GPC Memory Packs.

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Function	When Printer Interface Unit is mounted to PC			When Printer Interface Unit is mounted to GPC
	RUN	MONITOR	PROGRAM	
Ladder diagram	NO	NO	YES	YES
Ladder diagram with cross–references	NO	NO	YES	YES
Ladder diagram with IL/JMP	NO	NO	YES	YES
Mnemonic list	NO	NO	YES	YES
Cross–reference list	NO	NO	YES	YES
DM content	YES	YES	YES	YES
Ladder diagram with comments	NO	NO	NO	YES
Ladder diagram with comments and cross–references	NO	NO	NO	YES
Ladder diagram with comments and IL/JMP	NO	NO	NO	YES
Mnemonic list with comments	NO	NO	NO	YES
Comment table	NO	NO	NO	YES
GPC screen hard copy	NO	NO	NO	YES

MP103–EV2/3 Printing Functions in Each PC Mode

Memory Packs MP103–EV2 and MP103–EV3 can be used for printing out either from the GPC or directly from a C200H, C1000H, or C2000H PC.

The following table shows the printing functions available with Memory Pack MP103–EV2/3 in each of the three PC modes when the Printer Interface Unit is mounted to the PC and those available when it is mounted to the GPC. Note that four of these functions (ladder diagram with cross–references, ladder diagram with IL/JMP, ladder diagram with comments and cross references, and ladder diagram with comments and IL/JMP) are available with Memory Pack MP103–EV3 but not with the older MP103–EV2 model. In addition, if the GPC is used, comments and comment tables can only be printed out with 3G2C5–GPC03–E/04–E GPCs and 3G2C5–MP304–EV2/3 GPC Memory Packs. File Memory lists can only be printed out when a File Memory Unit is mounted to a C1000H or C2000H PC.

Function	When Printer Interface Unit is mounted to PC			When Printer Interface Unit is mounted to GPC
	RUN	MONITOR	PROGRAM	
Ladder diagram	YES	YES	YES	YES
Ladder diagram with cross–references	YES	YES	YES	YES
Ladder diagram with IL/JMP	YES	YES	YES	YES
Mnemonic list	YES	YES	YES	YES
Cross–reference list	YES	YES	YES	YES
DM content	YES	YES	YES	YES
Ladder diagram with comments	NO	NO	NO	YES
Ladder diagram with comments and cross–references	NO	NO	NO	YES
Ladder diagram with comments and IL/JMP	NO	NO	NO	YES
Mnemonic list with comments	NO	NO	NO	YES
Comment table	NO	NO	NO	YES
File Memory list	YES	YES	YES	NO
GPC screen hard copy	NO	NO	NO	YES

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3–2 Selector Settings

Regardless of the operation to be performed, the selectors on the front panel of the Printer Interface Unit must first be properly set. It does not matter what order the selectors are set in, as long as all the selectors are set properly before the START/STOP switch is pressed. Refer to the explanations that follow to set each selector, and then press the START/STOP button once to begin printing.

PRINT MODE Selector

This specifies the data to be printed and can also be used to stop the printer in progress. The functions of the settings are as follows:

0: Stop printing

1: Ladder diagram, ladder diagram with cross–references, ladder diagram with IL & JMP status

2: Mnemonic list

3: Cross–reference list

4: DM contents list

5: Ladder diagram with comments, ladder diagram with comments and cross–references, ladder diagram with comments and IL & JMP status

6: Mnemonic list with comments

7: Comment table

8: File Memory list

START ADDRess and STOP ADDRess Selectors

These select the addresses, or channels to begin printing from, and to stop printing at.

Caution The PC models whose program addresses are five digits, are set by the four higher digits. The lowest digit is always 0 for the START ADDRess selector, and 9 for the STOP ADDRess selector. The addresses, or channels for the other PCs are set in all four digits. Particular settings may or may not be necessary, depending on the function and the Memory Pack used.

SUB–MODE Selector

The lowest digit position of the STOP ADDRess selector serves as the SUB–MODE selector when the PRINT MODE selector is set for a cross–reference list. The SUB–MODE selector specifies which cross–reference list is to be printed.

START/STOP Button

This switch starts and stops the printing. Refer to Section 3–3 for details on stopping printing in progress.

3–2–1 Ladder Diagrams With and Without Comments

Ladder diagrams with comments can only be printed out using MP102–EV2/3or MP103–EV2/3 Memory Packs, 3G2C5–GPC03–E/04–E GPCs, and 3G2C5–MP303–EV1 or 3G2C5–MP304–EV3 GPC Memory Packs.

Set the PRINT MODE selector to ”1” for a ladder diagram with no comments; set it at ”5” to print comments.

Set the START ADDRess in four digits when using an MP009–EV2/3 or MP102–EV2/3 Memory Pack. Setting the two lowest digits at ”1” and ”0,” for

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example, would give a setting of ”10.” When using an MP103–EV2/3 Memory Pack, however, the four digits shown are actually the four highest digits of a five–digit number. The lowest digit, which is not shown, always has a value of ”0.” Therefore, setting the two lowest digits shown at ”1” and ”0” would give an actual setting of ”100.”

Set the STOP ADDRess in the same way, except that when the four digits shown are actually the four highest digits of a five–digit number, the digit which is not shown always has a value of ”9.”

A ladder diagram is printed from the START ADDRess to the STOP ADDRess. If the STOP ADDRess is set higher than the final address of the program memory, printing will continue until the final address of the program memory is reached. If the STOP ADDRess is set at 9999, printing will continue until END is reached, or, if there is no END instruction, until the final address.

Any portions of the program consisting of NOP instructions will be skipped over during printing. If the entire program consists of NOP instructions, the message ”NO PROGRAM” will be printed.

If the program contains a circuit that cannot be converted into a ladder diagram symbol, that circuit will be printed as mnemonic, even during a ladder diagram printout.

Program steps between BPRG and BEND are printed in mnemonic form, even during a ladder diagram printout. In this mnemonic portion, an asterisk (*) is prefixed to the addresses of instructions programmable within blocks. Addresses without an asterisk contain instructions that cannot be executed within blocks. Make the appropriate changes in your program to correct it.

3–2–2 Ladder Diagrams with Cross–References

Ladder diagrams with cross–references can be printed out with or without comments. Printing with comments can only be done with the equipment listed in Section 3–1–1.

Set the PRINT MODE selector to ”1” for a ladder diagram with no comments; set it to ”5” to print comments. Set the START ADDRess according to the instructions in Section 3–1–1. Set the STOP ADDRess as follows.

Level 1: 9997

When the STOP ADDRess is set at 9997, the use conditions of the a and b contacts of the channels used for output instructions OUT, OUT–NOT, KEEP, DIFU, TIM, CNT, TIMH, and CNTR (i.e., all except for application instructions) are printed out by step number.

Level 2: 9996

When the STOP ADDRess is set at 9996, the use conditions of (1) the a and b contacts of the channels used for all output instructions including application instructions, (2) output instructions which used bit numbers, and (3) output instructions which use channel numbers are printed out by step number from the START ADDRess to END. If there is no END instruction, printing will continue until the final address.

Any portions of the program consisting of NOP will be skipped over during printing. If the entire program consists of NOP, the message ”NO PROGRAM” will be printed.

If the program contains a circuit that cannot be converted into a ladder diagram symbol, that circuit will be printed as mnemonic, even during a ladder diagram printout.

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Program steps between BPRG and BEND are printed in mnemonic form, even during a ladder diagram printout. In this mnemonic portion, an asterisk (*) is prefixed to the addresses of instructions programmable within blocks. Addresses without an asterisk contain instructions that cannot be executed within blocks. Make the appropriate changes in your program to correct it.

Printing may take longer in cross–reference sections due to the time taken for searching.

3–2–3 Ladder Diagrams with IL/JMP Status

Ladder diagrams with IL/JMP status can be printed out with or without comments. Printing with comments can only be done with the equipment listed in Section 3–1–1.

Set the PRINT MODE selector to ”1” for a ladder diagram with no comments; set it to ”5” to print comments. Set the START ADDRess according to the instructions in Section 3–1–1.

If the STOP ADDRess is set at 9998, the program is printed from the START ADDRess to END. When IL or JMP are used, nesting numbers are printed at each location. When the page is changed, an IL/JMP identifier is printed at the head of the circuit. If there is no END instruction, printing will continue until the last address.

Any portions of the program consisting of NOP will be skipped over during printing. If the entire program consists of NOP, the message ”NO PROGRAM” will be printed.

If the program contains a circuit that cannot be converted into a ladder diagram symbol, that circuit will be printed as mnemonic, even during a ladder diagram printout.

Program steps between BPRG and BEND are printed in mnemonic form, even during a ladder diagram printout. In this mnemonic portion, an asterisk (*) is prefixed to the addresses of instructions programmable within blocks. Addresses without an asterisk contain instructions that cannot be executed within blocks. Make the appropriate changes in your program to correct it.

When JMP to JME is used in C200H, C1000H, or C2000H PCs, there is no particular distinction between JMP no. 00 and numbers other than 00. The total number of JMP to JME sets is indicated. If JME comes before JMP, the nesting numbers are not correctly indicated.

3–2–4 Mnemonic Lists

Mnemonic lists can be printed out with or without comments. Printing with comments can only be done with the equipment listed in Section 3–1–1.

Set the PRINT MODE selector to ”2” for a mnemonic list with no comments; set it to ”6” to print comments. Set the START ADDRess and the STOP ADDRess according to the instructions in Section 3–1–1.

The program between the START ADDRess and the STOP ADDRess is printed out in mnemonic form. If the STOP ADDRess is set higher than the last address in the program memory, printing will continue until the final address and then stop. If the STOP ADDRess is set at 9999, the program print from the START ADDRess to END and then stop.

If a section of the program consists of NOP, that section will be printed as is. Mnemonic printing is unaffected whether SW3 on the Printer Interface Unit is ON or OFF.

3–2–5 Cross–reference Lists

Set the PRINT MODE selector to ”3.” Specify the type of output by setting the SUB–MODE (the right–most digit of the STOP ADDRess) as follows:

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1: I/0 cross–reference list

2: AR cross–reference list

5: LR cross–reference list

6: HR cross–reference list

7: TIM/CNT cross–reference list

8: DM cross–reference list

9: All cross–reference lists

The SUB–MODE can be set at ”2” only when Memory Pack MP103–EV3 is used. It can be set at ”5” with either MP102–EV3 or MP103–EV3.

Set the START ADDRess in four digits for CI/O, AR, LR, HR, orTIM/CNT and when using an MP102–EV3 Memory Pack. Setting the two lowest digits at ”5” and ”1,” for example, would give a setting of ”51.” When using an MP103–EV3 Memory Pack and accessing the DM area, however, the four digits shown are actually the four highest digits of a five–digit number. The lowest digit, which is not shown, always has a value of ”0.” Therefore, setting the two lowest digits shown at ”5” and ”1” would give an actual setting of ”510.”

Set the STOP ADDRess in the same way, but using only the three left–most digits. The right–most digit is reserved for the SUB–MODE. Thus, for example, when using an MP102–EV3 Memory Pack, a four–digit setting of ”2165” would mean that the STOP ADDRess would be set at ”216” and the SUB–MODE would be set at ”5.” When using an MP103–EV3 Memory Pack and accessing the DM area, however, the same setting of ”2165” would mean that the STOP ADDRess would be set at ”2169” and the SUB–MODE would be set at ”5.” This is because the three left–most digits used for setting the STOP ADDRess are actually the three highest digits of a four–digit number. The lowest digit, which is not shown, always has a value of ”9.”

A cross–reference list is printed out between the header address and END for those channel numbers set from the START ADDRess to the STOP ADDRess. If there is no END instruction, the list is printed until the final program address. Setting is unnecessary when Memory Pack MP009–EV3 is used, or when the sub–mode is set at ”9” for all cross–reference lists.

If the channel set as the STOP ADDRess is set beyond the highest I/O channel number, printing will continue until the highest channel number and then stop.

When the SUB–MODE is set at ”9” for all cross–reference lists, CI/O, AR, LR, HR, TIM/CNT, and DM are printed out in order with no relation to the START ADDRess or STOP ADDRess.

For CI/O, AR, LR, and HR, START ADDRess and STOP ADDResses are expressed as channel numbers; TIM/CNT and DM are expressed as bit numbers.

3–2–6 DM Contents

Set the PRINT MODE selector to ”4.” Set the START ADDRess and the STOP ADDRess according to the instructions in Section 3–1–1, except that MP009–EV2/3 Memory Packs cannot be used.

DM contents specified by a START ADDress and a STOP ADDRess are printed out in 4–digit, hexadecimal numbers.

If the DM number set as the STOP ADDRess exceeds the final DM number, printing will continue until the final number and then stop. DM addresses vary, as follows, according to the PC used.

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C120: 000 to 511
C500: 000 to 511
C200H: 000 to 1999
C1000H: 0000 to 4095
C2000H: 0000 to 6655

3–2–7 Comment Tables

Comment tables can only be printed out with the equipment specified in Section 3–1–1. Set the PRINT MODE selector to ”7.”and press the START/STOP button. Only addresses which have comments are printed. It is not necessary to set a START ADDRess and a STOP ADDRess. CI/O, LR, TIM/CNT, HR, and AR comments are printed out in that order.

3–2–8 File Memory Lists

File Memory lists can only be printed out when a Printer Interface Unit and a File Memory Unit are both mounted to a C1000H or C2000H PC.

Set the PRINT MODEselector to ”8.” Set the START ADDRess to specify the starting block and set the STOP ADDRess to specify the final block. File Memory contents from blocks specified by the START ADDRess and STOP ADDRess are printed out in 4–digit, hexadecimal numbers. If the STOP ADDRess is set at 9999, printing will continue from the START ADDRess to the final block in the File Memory and then stop.

Set both the START ADDRess and STOP ADDRess as four–digit numbers. The addresses will be set at exactly the same numbers shown.

If the contents of a File Memory block being printed are either UM (user program) or CM (comments), ”UM READ PROTECTED” or ”CM READ PROTECTED” will be printed and then printing will shift to the next block.

3–2–9 Printing a Hard Copy from the GPC Screen

The contents of the GPC screen can be printed out in any mode with MP303–EV1 and MP304–EV3 GPC Memory Packs and the following Epson printers (marketed in Japan): VP–500, VP–800, VP–1000, SX–80T, FX–80, and RP–80. It cannot be done with other GPC Memory Packs or with X–Y Plotters.

Mount the Printer Interface Unit directly to the GPC and connect the printer to the Printer Interface Unit with SCY–CN201 connecting cable. An MP102–EV3 or MP103–EV3 Memory Pack must be installed in the Printer Interface Unit.

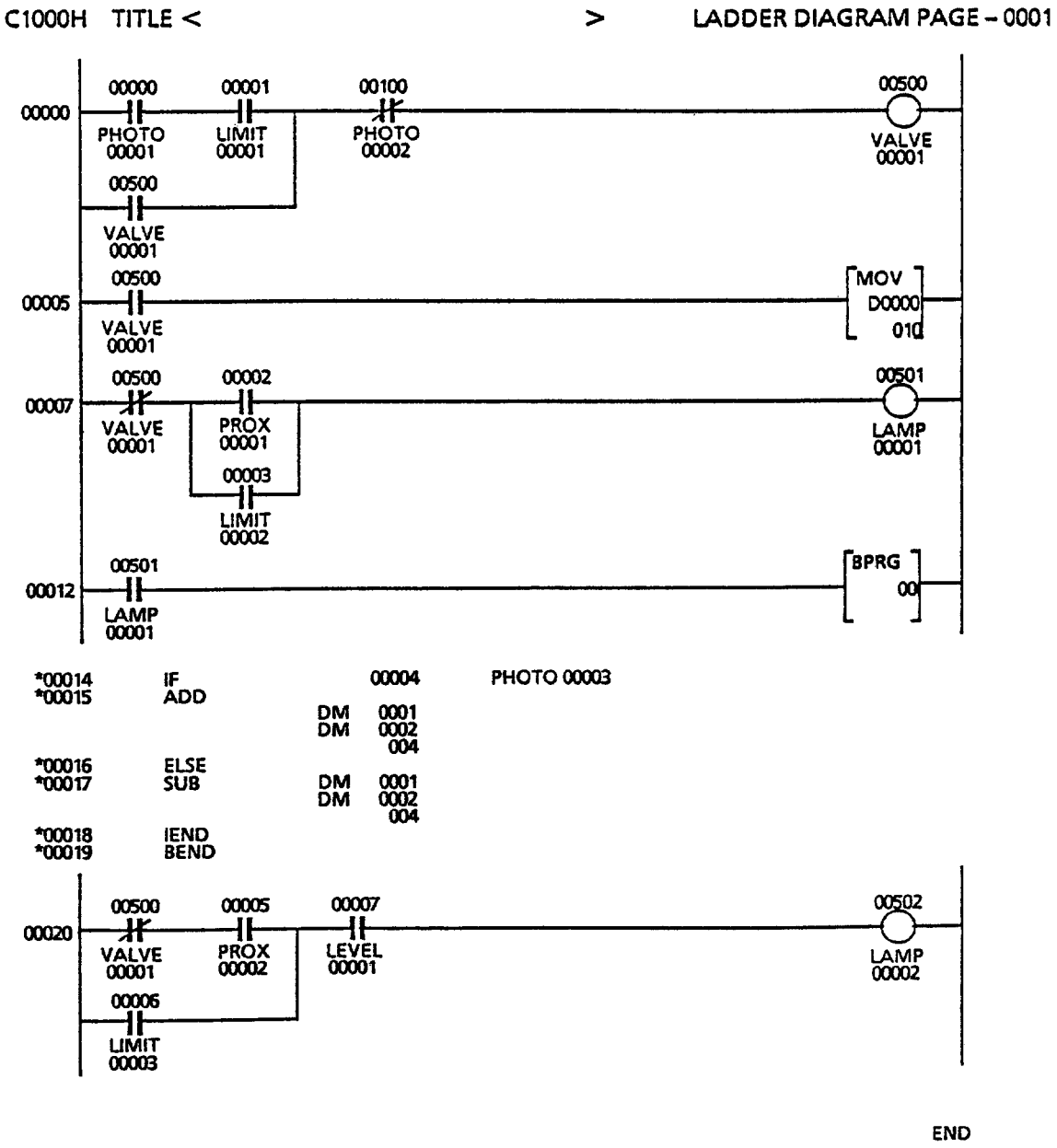
In any mode, press CONTROL and SELECT at the same time to print. Up to seven screens can be printed by pressing these seven consecutive times.

3–3 Printing Format Examples

The examples included in this section are strictly intended to show the format of the printouts with all options included. The actual printing will differ by printer/plotter, and the number of digits, and the options available will differ by PC model.

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Ladder Diagram Printout with a Block and Comments*

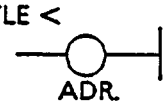


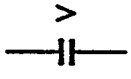
*NOP addresses are automatically skipped when printing. If all addresses are NOP, then ”NO PROGRAM” will be printed.

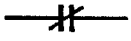
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Cross–Reference List Printout

C1000H TITLE < > I / O CROSS-REFERENCE LIST PAGE – 0001





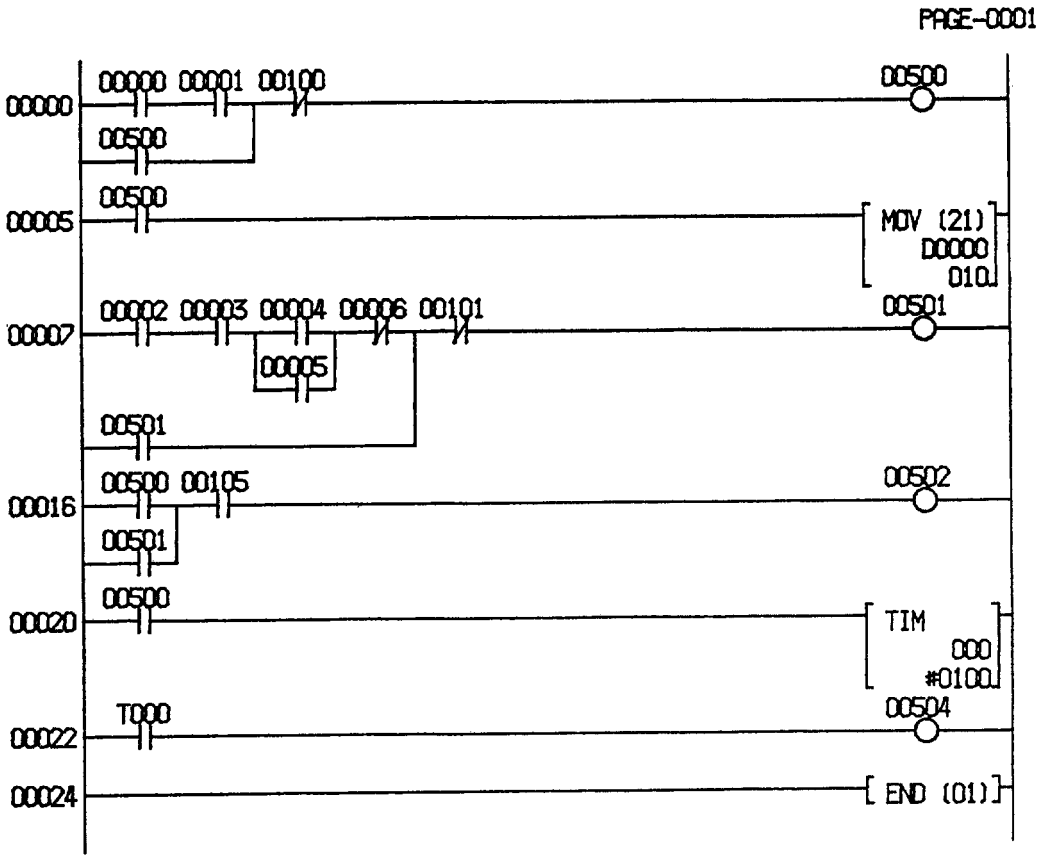


RELAY NO.	ADR.	ADR.	ADR.	CHANNEL ADR.
00000		00000		
00001		00001		
00002		00008		
00003		00009		
00004		00014		
00005		00021		
00006		00022		
00007		00023		
00100			00003	
00400				00015 00017
00500	00004	00002 00005	00007 00020	
00501	00011	00012		
00502	00024			
01000				00006

END

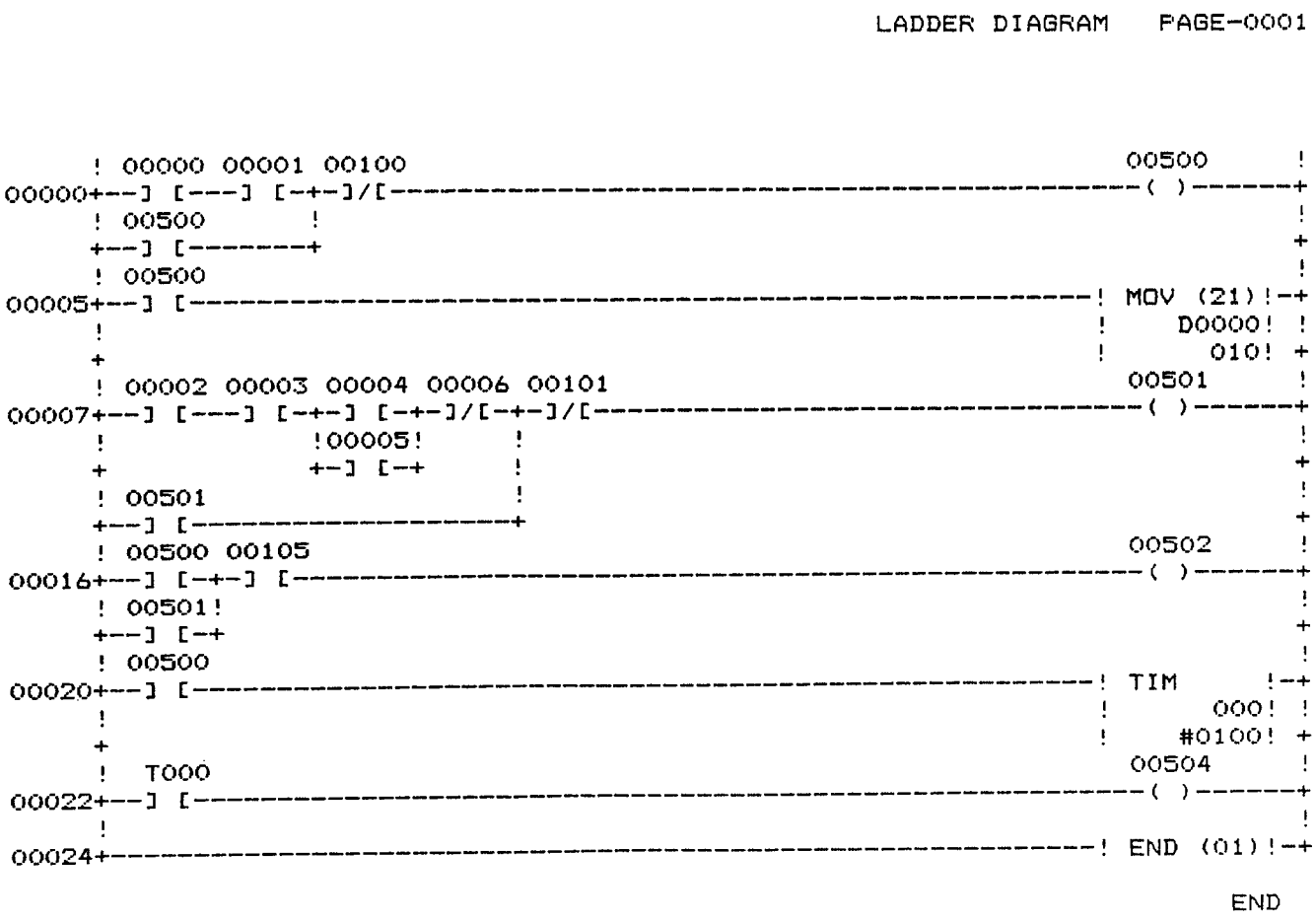
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Ladder Diagram Printout (X–Y Plotter)



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Ladder Diagram Printout (ASCII Output)



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DM Contents Printout

C1000H TITLE < > DATA MEMORY LIST PAGE – 0001

	0	1	2	3	4	5	6	7	8	9
000*	8432	4328	3E54	524E	4323	4324	4BC5	4B52	328F	4224
001*	85F4	5F43	24C4	8768	F431	3F43	8933	3423	43E5	4231
002*	32E5	E542	3243	8765	32E2	1213	285F	2442	9F76	32E2
003*	4324	4C43	F431	8B98	421B	4345	43E5	3024	3653	421B
004*	C432	243F	32E2	3249	5234	3294	424C	3352	B454	5234
005*	43F4	4313	421B	032C	2324	9E52	4324	4E87	2435	439F
006*	3132	2E24	5234	8944	4230	0F45	3F43	6887	3524	7636
007*	E242	21B5	2324	3285	2433	4235	13C8	3285	E876	3453
008*	1B52	2342	4230	F43E	5242	B654	9432	F43E	8876	2949
009*	3423	3244	2433	5424	1343	32E2	439F	5424	58B6	E520
010*	2442	2302	524E	C432	4532	421B	7636	C432	5325	53BC
011*	3024	4335	8768	43F4	949E	5234	5329	43F4	E242	5893
012*	3375	24E8	8765	3132	520F	2324	4213	3132	1B52	2943
013*	24E8	7688	8B98	E242	4542	3285	4345	E242	C589	2134
014*	7688	7658	3249	1B52	35B6	F43E	3294	1565	3294	F454
015*	7658	B983	032C	3423	54E8	5424	9E52	8B98	2134	235B
016*	B983	2490	8943	2442	7688	C442	0F45	3249	3453	6543
017*	2490	32C8	2439	3024	7658	3024	4235	032C	2949	2490
018*	32C8	9432	F756	3332	B985	3352	B654	8963	E520	32C8
019*	9432	439F	434B	439F	F43E	4E87	352E	653B	F342	9432
020*	4392	7636	E636	7365	5424	6887	2421	C589	3244	3285
021*	F763	53BC	53BC	3BC5	C432	658B	B523	3294	2302	F43E
022*	653B	5893	5893	8932	4832	9832	4232	2134	43B9	5424
023*	C589	2942	2421	9423	4903	4903	4423	3453	8324	C432
024*	3294	1343	3434	5B65	2C89	2C89	0243	2944	4354	43F5
025*	2134	4532	5329	4635	4324	4324	3524	3243	24C4	3024
026*	3453	949E	49E5	4213	39F7	39F7	E876	9F79	3243	3352
027*	2949	520F	20F4	4345	6365	6365	8876	E520	F431	4E87
028*	E520	4542	535B	3294	3BC5	3BC5	58B9	F454	9032	6887
029*	F454	35B6	6543	9E52	8932	8932	8324	235B	C894	658B
030*	235B	5435	5487	0F45	9435	9435	9032	6435	3243	9834

END

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Comment Table Printout

C1000H TITLE < > COMMENT DATA PAGE – 0001

RELAY NO.	COMMENT	RELAY NO.	COMMENT
00000	PHOTO 00001		
00001	LIMIT 00001		
00002	PROX 00001		
00003	LIMIT 00002		
00004	PHOTO 00003		
00005	PROX 00002		
00006	LIMIT 00003		
00007	LEVEL 00001		

END

Mnemonic List Printout

MNEMONIC LIST PAGE–0001

ADDRESS	MNEMONIC		OPERAND	COMMENT
00000	LD		00000	
00001	AND		00001	
00002	OR		00500	
00003	AND	NOT	00100	
00004	OUT		00500	
00005	LD		00500	
00006	MOV	(21)		
			DM 0000	
			010	
00007	LD		00002	
00008	LD		00003	
00009	OR		00005	
00010	AND	LD		
00011	AND		00004	
00012	AND	NOT	00006	
00013	OR		00501	
00014	AND	NOT	00101	
00015	OUT		00501	
00016	LD		00500	
00017	OR		00501	
00018	AND		00105	
00019	OUT		00502	
00020	LD		00500	
00021	TIM		000	
			# 0100	
00022	LD		TIM 000	
00023	OUT		00504	
00024	END	(01)		

END

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Printout of File Memory List*

C1000H TITLE < > FILE MEMORY LIST PAGE – 0001

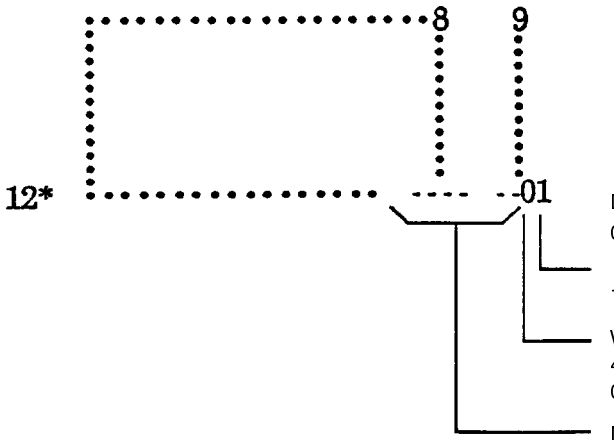
		0	1	2	3	4	5	6	7	8	9
1234-	00*	8432	32C8	3E54	524E	4323	4324	34E8	4B52	3421	423E
	01*	85F4	9432	24C4	3243	F431	0F45	7688	3421	B52C	5424
	02*	32E5	439F	3243	F431	32E2	4235	7658	5658	5893	C432
	03*	4324	7636	F431	32E2	425B	B654	B983	B983	2942	43F5
	04*	C432	53BC	32E2	421B	654E	32E2	2490	2490	1343	3024
	05*	43F4	5893	421B	5234	8768	421B	3243	32C8	4532	3352
	06*	3132	2942	5234	2324	8765	5234	4532	9636	949E	4E87
	07*	E242	1343	2324	4230	8B98	2324	949E	53BC	520F	6887
	08*	1B52	4532	4230	2433	5F43	3285	520F	5893	3423	658B
	09*	3423	949E	2433	3243	E542	F43E	4542	2942	2442	9834
	10*	2442	520F	524E	9F73	4C43	5424	35B6	1343	3024	39F7
	11*	3024	4542	8768	653B	2483	C442	5435	4532	3B98	6365
	12*	3375	35B6	8765	C589	2490	3024	2E24	9443	----	--01
1235-	00*	524E	4333	3243	4B52	423E	34E8	4324	32C8	8436	4323
	01*	3243	2439	9F76	3421	5424	7688	0F45	9432	58B9	F2E2
	02*	F436	F324	3653	5658	C432	7658	4235	4394	3362	425B
	03*	1342	4230	4345	B933	438B	B983	B654	2134	85F4	654E
	04*	3244	2473	3293	653B	9833	2490	32E3	3453	32E5	8768
	05*	2302	653B	653B	C529	653B	3243	653B	2943	42E2	8765
	06*	4333	C532	CC55	4213	C543	4532	C524	65BC	421B	8B98
	07*	2439	4423	3244	4345	9F76	949E	21B5	59E5	5234	5F43
	08*	F733	0248	2302	3294	3665	520F	2342	20F4	2324	E324
	09*	2442	9365	449E	4352	8B93	4542	4C44	5423	4230	8326
	10*	3024	3BC5	520F	0F45	3653	35B6	2658	5B44	2433	58B9
	11*	653B	3244	4542	42C5	BC53	5435	B933	2658	7523	3364
	12*	C589	2304	35B6	3635	653B	2E24	6024	B936	----	--01

END

*Addresses 128 and 129 of each File Memory block signify the following:

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*Addresses 128 and 129 of each File Memory block signify the following:



Data
0: the data is all 0s (the contents of the memory have been cleared)
1: data is stored

Write protect
4: the File Memory is write-protected
0: the File Memory is not write-protected

Management data
Data to control the File Memory

3–4 Stopping Printing in Progress

Printing can be stopped in progress in either of two ways: immediately, or at the end of the current page.

To stop immediately, set the PRINT MODE selector to ”0” and press the START/STOP switch. In this case, the RUN indicator will blink at intervals of 0.1 second for about 1 to 20 seconds. A printer will stop immediately, but an X–Y plotter will continue for a moment after the RUN indicator has turned off.

The printout cannot be stopped immediately when the MP1000–01 X–Y plotter is used. If an attempt is made to stop the printout immediately, the X–Y plotter loses the function to wait for paper changing and the RUN indicator blinks. The blinking can be stopped, and the waiting function recovered, by pressing the START/STOP switch again.

To stop printing at the end of the current page, just press the START/STOP switch. Printing will stop when the current page has been completed. The RUN indicator will blink at intervals of 0.4 second and go off after the page is printed.

To resume printing, press the START/STOP switch again while the RUN indicator is still blinking. Upon pressing the START/STOP switch, the indicator will light continuously, and printing will be resumed.

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SECTION 4
Troubleshooting and Maintenance

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4–2 Maintenance 35

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4–1 Troubleshooting

If an error occurs during an operation, the ERRor indicator lights, and the error message is printed. If this happens, refer to the Table of Errors below to remove the cause of the error, and press the START/STOP switch to alleviate the error state.

Table of Errors

Indicator		Error Message	Print Mode	Possible Cause	Correction
RUN	**ERROR**				
ON	OFF		All	The PRINT MODE and/or SUB–MODE selectors are set wrong.	Correct the settings.
				The printer/plotter selector is set wrong.	Correct the printer/plotter selector (DIP switch).
				Printout of ladder diagram with comments, mnemonic list with comments, or comment list has been specified, but the Printer Interface Unit is not connected to a GPC.	Connect the Printer Interface Unit to a GPC*
ON	OFF	START ADDRESS> MAXIMUM MEMORY SIZE	Ladder diagram, mnemonic list	The start address exceeds the memory capacity of the PC.	Correct the START ADDRess setting.
ON	OFF	START ADDRESS> STOP ADDRESS	Ladder diagram, mnemonic list	The start address exceeds the stop address.	Correct the mistaken setting(s).
ON	OFF	NO PROGRAM	Ladder diagram, mnemonic list	Either there is no program between the specified start and stop addresses or all of the instructions are NOP.	Turn off the power to the PC and mount the RAM or ROM.
ON	OFF	START No.> MAXIMUM No.*	Cross–reference list, DM content list	The start channel exceeds the maximum channel number.	Correct the mistaken setting(s).
ON	OFF	START No.> STOP No.*	Cross–reference list, DM content list	The start channel exceeds the stop channel.	Correct the mistaken setting(s).
ON	OFF	NO FILE MEMORY**	File Memory list	No File Memory Unit is mounted to the PC.	Turn off the power to the PC and mount the File Memory Unit.
OFF	ON	UM READ PROTECTED	File Memory list	The File Memory contains the user program, which is presently “read protected”.	Release the ’read protect’ condition
OFF	ON	CM READ PROTECTED	File Memory list	The File Memory contains the comments, which are presently “read protected”.	Release the ’read protect’ condition

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RUN	ERROR				
ON	OFF	MEMORY CASSETTE DEPENDS ON PC TYPE*	All	The Memory Pack in the Printer Interface Unit does not match the PC.	Connect the correct Memory Pack by referring to the table in Appendix B Standard Models
				When the Printer Interface Unit is connected to a GPC, the Memory Pack of the GPC is not compatible with the Memory Pack of the Printer Interface Unit.	Connect the correct Memory Pack by referring to the table in Appendix B Standard Models
OFF	OFF		All	The Printer Interface Unit is not correctly connected to the printer/plotter, or the printer/plotter is not ready.	Check the Connecting Cable at both ends, and be sure the printer/plotter is ready. Printing will begin as soon as the connections and preparation are complete.

Note *Not applicable to Memory Pack MP009–EV2/3.
**Applicable only to Memory Pack MP103–EV2/3.

Other Troubleshooting

Symptom	Possible Cause	Correction
The Printer Interface Unit does not operate at all. (Neither the RUN, nor the ERRor indicator lights.)	The PC is not in PROGRAM mode.	Set the PC to PROGRAM mode.
The printer/plotter is out of paper.	The printer switches to off–line.	Supply paper, and return the printer to on–line status. Printing will resume.
Only question marks ”????” are printed when a ladder diagram, mnemonic list, ladder diagram with comments, or mnemonic list with comments should be printed.	The Memory Pack of the Printer Interface Unit is not compatible with that of the GPC.	Connect the correct Memory Pack by referring to the table in Appendix B Standard Models.
The data format is irregular. The pen of the X–Y plotter moves irregularly.	The type of printer/plotter specified by the DIP switch of the Printer Interface Unit does not match the printer/plotter actually connected.	Correct the DIP switch setting.

4–2 Maintenance

Although the Printer Interface Unit does not require periodical inspection for maintenance purposes, care must be taken to ensure its long life, and proper operation.

Be careful that no great force is applied to the Unit, especially when it is moved, or transported. Also, avoid stretching or twisting the connecting cable.

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Appendix A
Standard Models

Product name	Description	Model name
Printer Interface Unit	For all C−series PCs	3G2A5−PRT01−E
Memory Pack	For C20, K−type, & P−type	3G2A5−MP009−EV2, C20−MP009−EV3
	For C120, & C500	3G2A5−MP102−EV2, C500−MP102−EV3
	For C200H, C1000H, and C2000H	3G2A5−MP103−EV2, C2000−MP103−EV3
Connecting Cable		SCY−CN201
Graphics Programming Console		3G2C5−GPC03−E, 3G2C5−GPC04−E
GPC Memory Pack		3G2C5−MP303−EV1, 3G2C5−MP304−EV3

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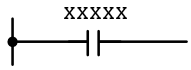
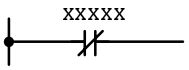
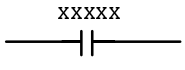
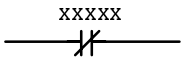
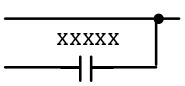
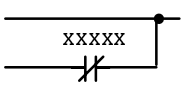
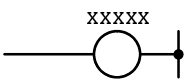
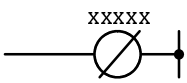
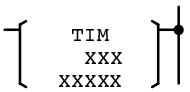
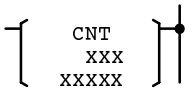
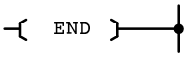
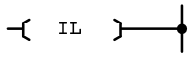
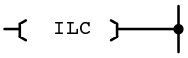
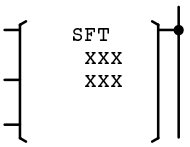
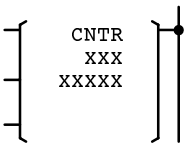
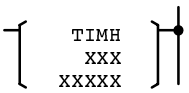
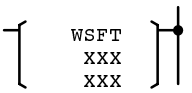
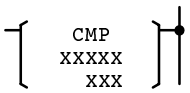
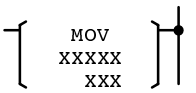
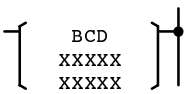
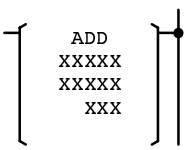
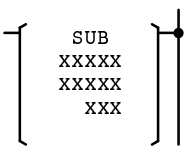
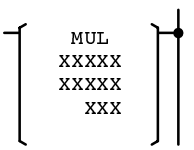
Appendix B
Specifications

Ambient temperature	Operating: 0% to 45%C Storage: –15% to 55%C
Ambient humidity	35% to 85% (without condensation)
Power source	5 VDC 400 mA max. (Power is supplied from PC, or GPC.)
Dimensions	96(W) x 192(H) x 42(D) mm
Weight	540 g max.

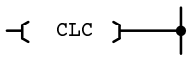
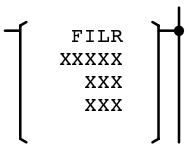
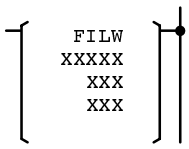
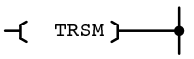
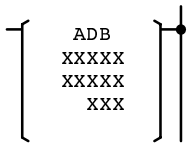
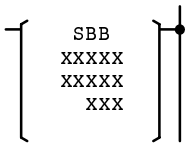
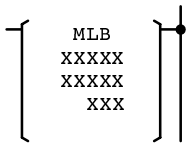
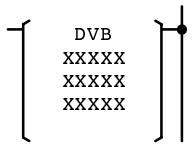
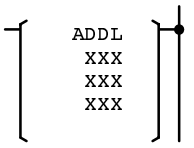
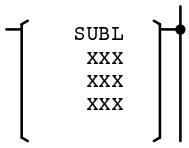
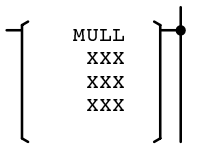
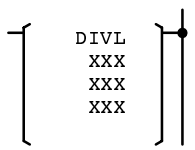
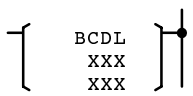
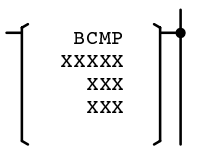
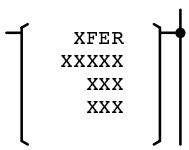
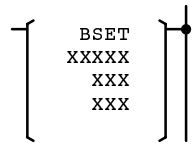
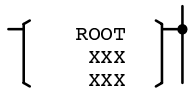
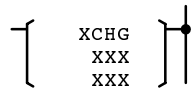
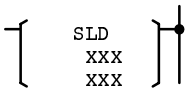
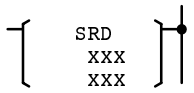
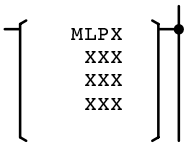
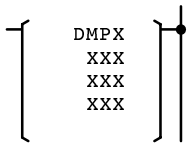
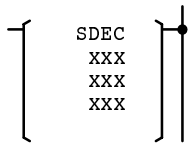
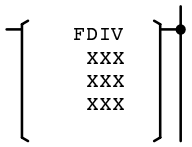
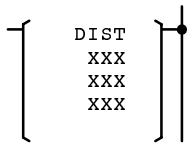
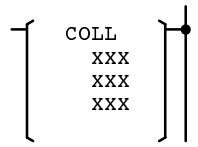
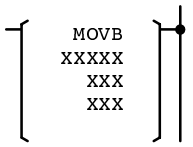
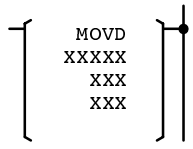
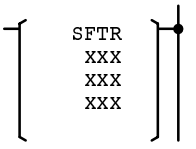
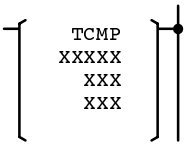
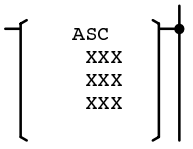
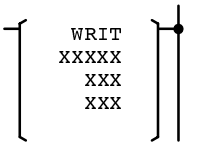
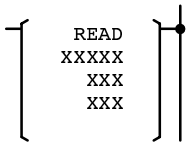
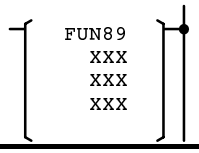
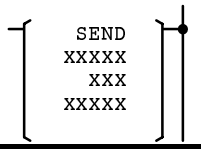
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Appendix C
Ladder Diagram Symbols

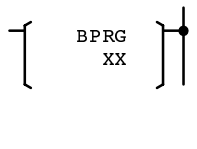
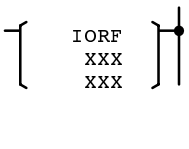
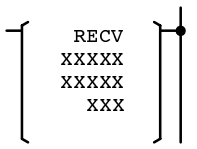
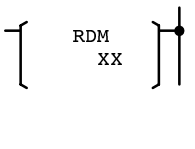
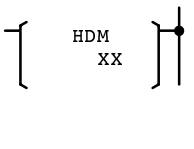
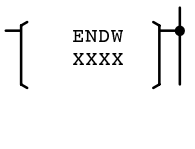
The following symbols are intended to indicate format and are not exact models. The number of digits displayed will differ by PC model.

LOAD	LOAD-NOT	AND	AND-NOT	OR	OR-NOT
					
OUT	**OUT-NOT**	**TIMER**	**COUNTER**	**END**	**INTERLOCK**
					
INTERLOCK CLEAR	**JUMP**	**JUMP END**	**FAL**	**FAL CLEAR**	**FALS**
					
STEP LADDER AREA DEFINE	**STEP LADDER INCREMENT**	**SHIFT REGISTER**	**KEEP**	**UP-DOWN COUNTER**	**DEFFERENTIATION UP**
					
DIFFENTIATION DOWN	**HIGH-SPEED TIMER**	**WORD SHIFT**	**COMPARE**	**MOVE**	**MOVE NOT**
					
BCD TO BIN CONVERSION	**BIN TO BCD CONVERSION**	**ARITHMETIC SHIFT LEFT**	**ARITHMETIC SHIFT RIGHT**	**ROTATE LEFT**	**ROTATE RIGHT**
					
COMPLEMENT	**BCD ADD**	**BCD SUBTRACT**	**BCD MULTIPLY**	**BCD DIVIDE**	**AND WORD**
					
OR WORD	**EXCLUSIVE OR WORD**	**EXCLUSIVE OR NOT WORD**	**INCREMENT**	**DECREMENT**	**SET CARRY**

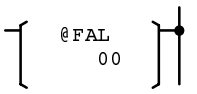
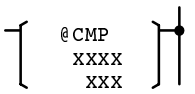
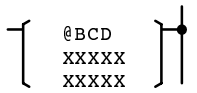
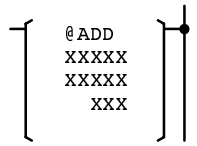
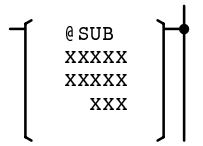
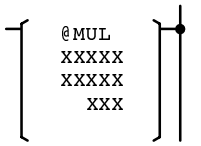
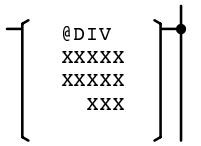
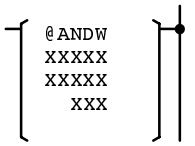
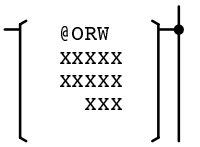
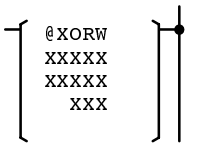
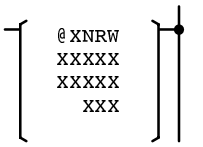
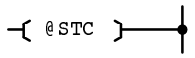
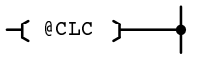
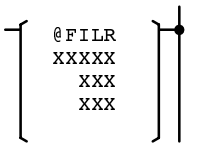
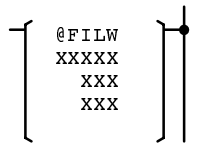
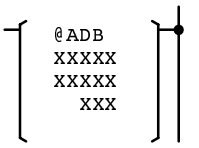
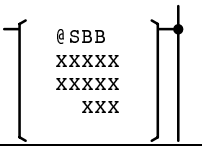
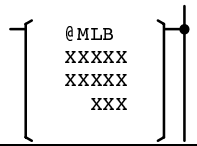
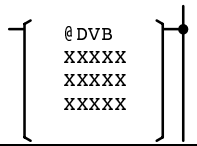
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CLEAR CARRY	FILE MEMORY READ	FILE MEMORY WRITE	EXTERNAL MEMORY READ	TRACE MEMORY SAMPLING	MESSAGE DISPLAY
					
BIN ADD	**BIN SUBTRACT**	**BIN MULTIPLY**	**BIN DIVIDE**	**BCD DOUBLE LENGTH ADD**	**BCD DOUBLE LENGTH SUBTRACT**
					
BCD DOUBLE LENGTH MULTIPLY	**BCD DOUBLE LENGTH DIVIDE**	**DOUBLE LENGTH BCD TO BIN CONVERSION**	**DOUBLE LENGTH BIN TO BCD CONVERSION**	**TABLE COMPARE**	**BLOCK MOVE**
					
BLOCK SET	**SQUARE ROOT**	**DATA EXCHANGE**	**ONE DIGIT SHIFT LEFT**	**ONE DIGIT SHIFT RIGHT**	**4 TO 16 DECODER**
					
16 TO 4 ENCODER	**7 SEGMENT DECODER**	**FLOATING POINT DIVIDE**	**DATA DISTRIBUTION**	**DATA COLLECTION**	**BIT TRANSFER**
					
DIGIT TRANSFER	**LEFT/RIGHT SHIFT REGISTER**	**TABLE COMPARE**	**ASCII CODE CONVERSION**	**INTELLIGENT I/O READ**	**INTELLIGENT I/O WRITE**
					
INTERRUPT CONTROL	**SYSNET TRANSMIT**	**SUBROUTINE CALL**	**SUBROUTINE ENTRY**	**SUBROUTINE RETURN**	**WATCHDOG TIMER SETTING**
					

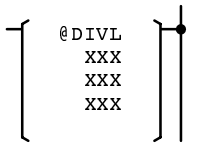
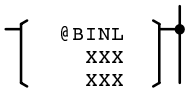
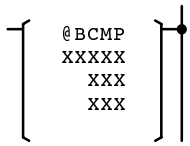
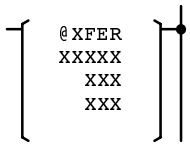
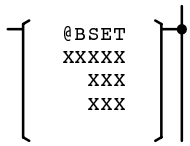
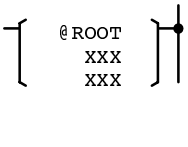
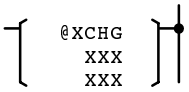
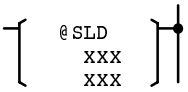
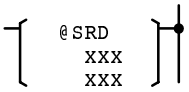
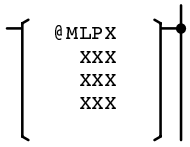
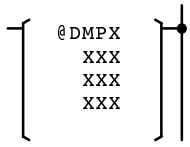
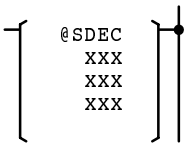
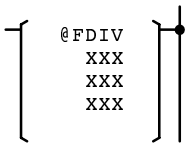
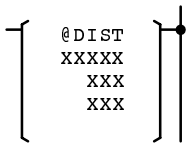
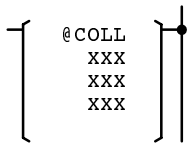
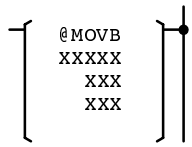
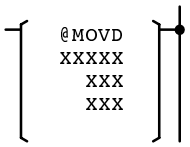
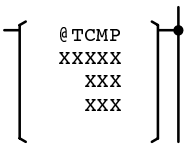
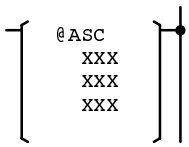
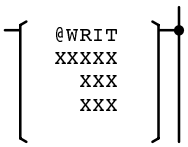
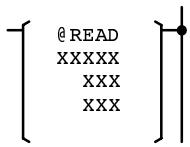
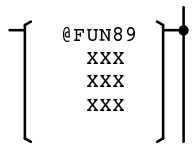
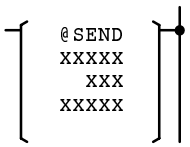
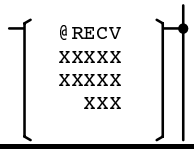
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BLOCK PROGRAM	I/O REFRESH	SYSNET RECEIVE	RDM	HDM	ENDW
					
NETW	–	–	–	–	–
	–	–	–	–	–

Input-Differentiated Instructions

FAL	FAL CLEAR	WORD SHIFT	COMPARE	MOVE	MOVE NOT
					
BCD TO BIN CONVERSION	**BIN TO BCD CONVERSION**	**1 BIT SHIFT LEFT**	**1 BIT SHIFT RIGHT**	**1 BIT ROTATE LEFT**	**1 BIT ROTATE RIGHT**
					
COMPLEMENT	**BCD ADD**	**BCD SUBTRACT**	**BCD MULTIPLY**	**BCD DIVIDE**	**AND WORD**
					
OR WORD	**EXCLUSIVE OR WORD**	**EXCLUSIVE OR NOT WORD**	**INCREMENT**	**DECREMENT**	**SET CARRY**
					
CLEAR CARRY	**FILE MEMORY READ**	**FILE MEMORY WRITE**	**EXTERNAL MEMORY READ**	**MESSAGE DISPLAY**	**BIN ADD**
					
BIN SUBTRACT	**BIN MULTIPLY**	**BIN DIVIDE**	**BCD DOUBLE LENGTH ADD**	**BCD DOUBLE LENGTH SUBTRACT**	**BCD DOUBLE LENGTH MULTIPLY**
					

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BCD DOUBLE LENGTH DIVIDE	BCD TO BIN CONVERSION	BIN TO BCD CONVERSION	TABLE COMPARE	BLOCK MOVE	BLOCK SET
					
SQUARE ROOT	**DATA EXCHANGE**	**1 DIGIT SHIFT LEFT**	**1 DIGIT SHIFT RIGHT**	**4 TO 16 DECODER**	**16 TO 4 DECODER**
					
7 SEGMENT DECODER	**FLOATING POINT DIVIDE**	**DATA DISTRIBUTE**	**DATA COLLECT**	**BIT MOVE**	**DIGIT MOVE**
					
TABLE COMPARE	**ASCII CODE CONVERSION**	**INTELLIGENT I/O READ**	**INTELLIGENT I/.O WRITE**	**INTERRUPT CONTROL**	**SYSNET TRANSMIT**
					
SUBROUTINE CALL	**WATCHDOG TIMER SETTING**	**I/O REFRESH**	**SYSNET RECEIVE**	**–**	**–**
				–	–

Block Instructions

BLOCK PROGRAM END	IF	ELSE	IF END	ONE-SCAN WAIT	CONDITIONAL END
BEND	IF (NOT) XXXXX	ELSE	IEND	WAIT (NOT) XXXXX	EXIT (NOT) XXXXX
CONTACT SET	**CONTACT RESET**	**LOOP**	**LOOP END**	**BLOCK PAUSE**	**BLOCK RESTART**
SET XXXXX	RSET XXXXX	LOOP	LEND (NOT) XXXXX	BPPS XX	BPRS XX
TIMER WAIT	**COUNTER WAIT**	**HIGH-SPEED TIMER WAIT**			
TIMW XX XX	CNTW XXX XXX XXXXX	TMHW XXX XXX			

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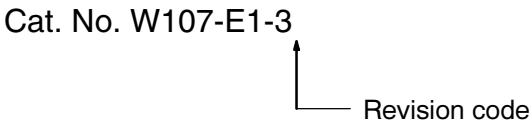
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Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.



The following table outlines the changes made to the manual during each revision. Page numbers refer to previous version.

Revision code	Date	Revised content
3	December 1988	Products changed or explanations added on pages 2, 4, 5, 7, 11, 13 to 15, 17 to 22, 26, 27, 29, 33
	December 1990	Converted manual format. Content remains unchanged.

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