

AD-8120

Thermal Printer

INSTRUCTION MANUAL

users-AD-8120-v.00.a 10.09.90

THERMAL PRINTER

AND

A&D Company, Limited

Warranty

Warranty rights vary from country to country but it is the general intention of A&D Co., Ltd., to offer customers a one year warranty on this product from the day it is purchased. In some countries consumer protection legislation states that your dealer is responsible for offering a warranty and under these circumstances please refer to your local dealer.

In the U.S.A. the product (if defective) should be returned, freight prepaid by the customer, to A&D Engineering Inc. in California and in Europe the product can be returned freight prepaid to A&D Instruments GmbH in Frankfurt, West Germany. Elsewhere the product can be returned to A&D Co., Ltd. in Japan. In any event please contact your nearest A&D office, before shipping, to confirm that the product is covered by this warranty. Simple repairs can be carried out by your local dealer under warranty and this may be the fastest method of solving your problem.

This warranty only applies to product failures due to defective materials and/or workmanship. This warranty will be rendered invalid if, upon inspection, it is found that the product was: Abused; used for a purpose for which it was not designed; mishandled; placed in a hostile environment; repaired by unauthorized personnel; improperly installed or not adjusted in accordance with instructions given in this manual.

If repair under warranty is confirmed by A&D, then the product will be repaired (or replaced, at the discretion of A&D) and then returned to the customer at no extra cost.

Compliance with FCC Rules

Please note that this equipment generates, uses and can radiate radio frequency energy. This equipment has been tested and has been found to comply with the limits of a Class A computing device pursuant to Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against interference when equipment is operated in a commercial environment. If this unit is operated in a residential area it might cause some interference and under these circumstances the user would be required to take, at his own expense, whatever measures are necessary to eliminate the interference.

(FCC = Federal Communications Commission in the U.S.A.)



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1 SAFETY INSTRUCTIONS

To use your printer safely and correctly:

Using the printer

- Use the AC adapter provided to connect the 120 VAC (60 Hz) power supply or 220 VAC (50 Hz) according to your adapter specification.
- Do not drop or bump the printer.
- Do not install the printer in very hot or cold places, in direct sunlight, in places with electromagnetic field or corrosive gases, or in dusty places.
- Do not turn off power unless printhead is in home position (at leftmost).
- Disconnect AC adapter from power supply outlet, when printer is not in use.
- Do not take printer apart or attempt to repair it yourself.

Handling thermal paper

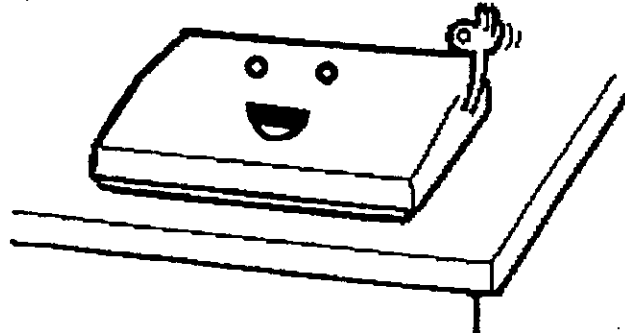
- Store thermal paper in a cool, dry, dark place.
- Do not rub paper with hard objects.
- Do not leave paper near organic solvents.
- Do not allow PVC film, erasers, or adhesive tape to touch the paper for long periods.
- Do not stack it with diazo copies immediately after copying or with wet-type copies.
- Do not use chemical glue.
- Always use specified thermal paper:

WP: PP-123

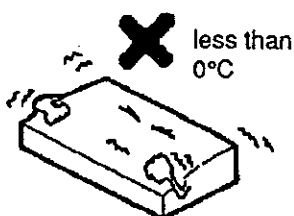
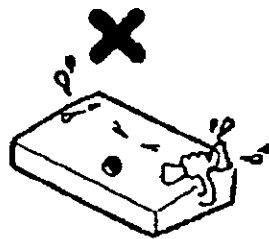
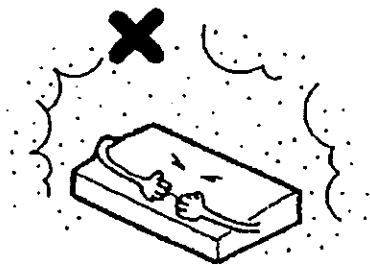
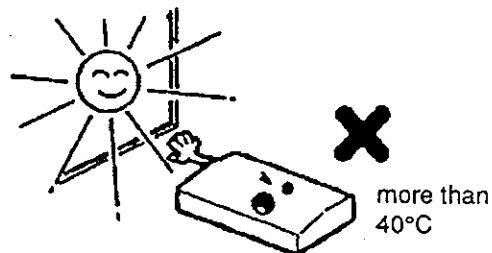
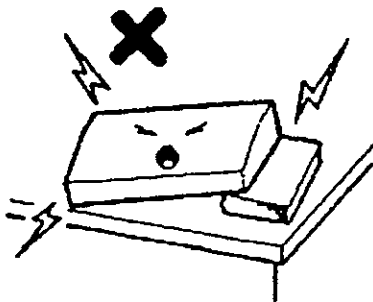
Installing

To install the printer:

- Install it in a flat, stable place.



- Do NOT install it in the following places:
 - Non-level places
 - Places with strong vibration
 - In direct sunlight
 - Dusty places
 - Hot or cold places (outside 0°C to 40°C)
 - Humid places (outside 30% RH to 80% RH)



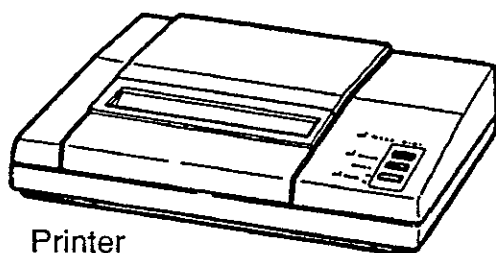


2 PREPARATIONS

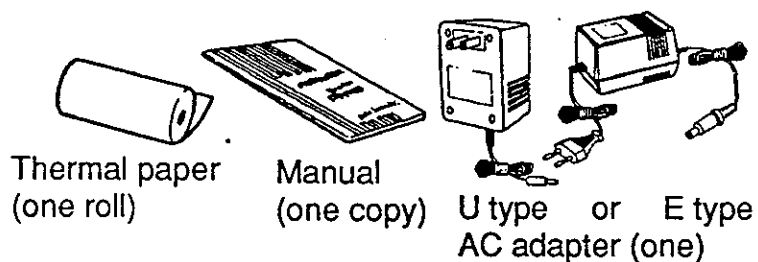


2.1 Unpacking

Once you have opened the carton, check that the printer and all accessories are there.



Printer



Thermal paper
(one roll)

Manual
(one copy)

U type or E type
AC adapter (one)



IMPORTANT:

Check the four-character "TYPE" code on the bottom of the printer to ensure that the printer is the one that you ordered.

Example: TYPE 21BU

AC adapter spec.

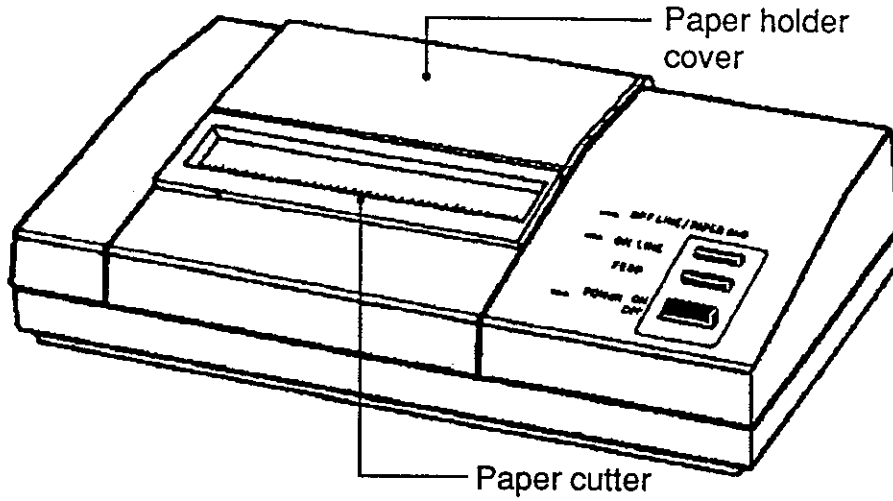
U: 120V 60Hz

E: 220V 50Hz

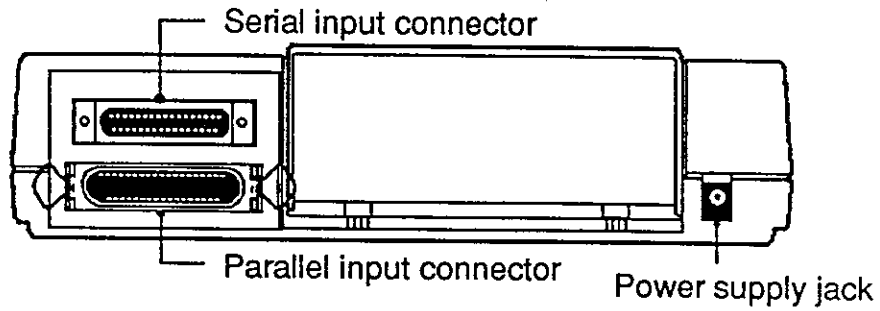


2.2 Nomenclature

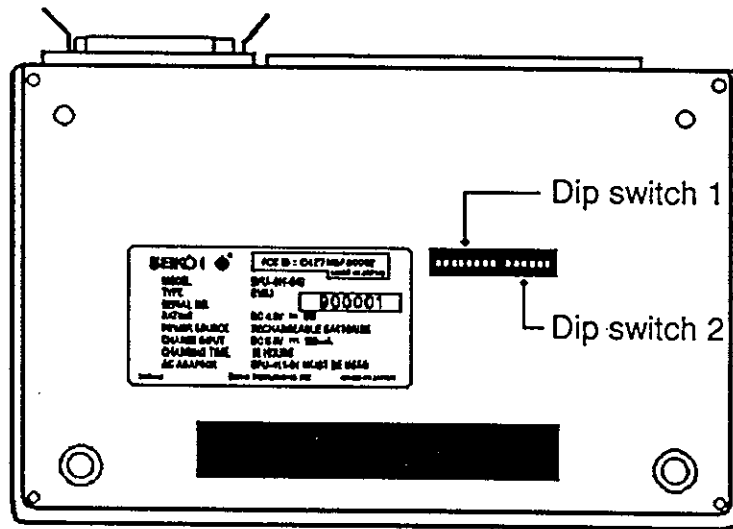
Front



Back



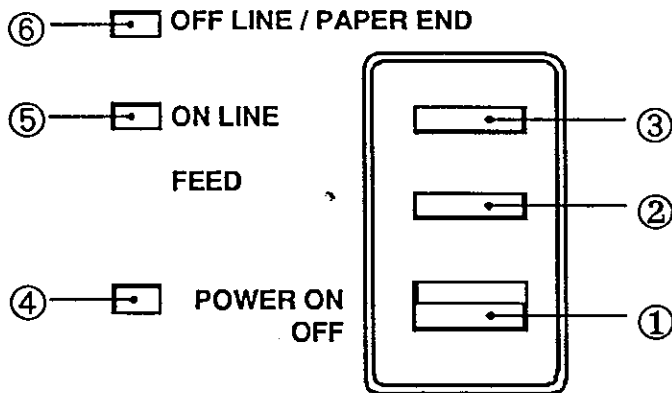
Bottom



Note: The FCC label and FCC No. are attached to the SIU version printer.



2.3 Operation Panel



- ① Power switch Slide the power switch to turn the power on (on-line) or off
- ② Paper feed switch When the printer is off-line, paper is fed while the paper feed switch is pressed. (See the Operator's Note below)
- ③ On-line switch Press the on-line switch to turn the printer on-line or off-line.
- ④ Power lamp The power lamp lights when the power is on.
- ⑤ On-line lamp The on-line lamp lights when the printer is on-line. The lamp flashes when data remains in the buffer memory when the printer is off-line.
- ⑥ Off-line lamp The off-line lamp lights when the printer is off-line. If the paper is not set or has run out, the lamp flashes.

When an error occurs, both the on-line and off-line lamps light.



Note:

Be sure that the head is in the home position (at leftmost) before turning off the power switch. If it is left away from the home position for a long time, the print quality might deteriorate.



* Operator's Note

On-line:

Set the printer on-line to print from the computer.

Off-line:





Set the printer off-line to feed paper with the paper feed switch or to stop printing.

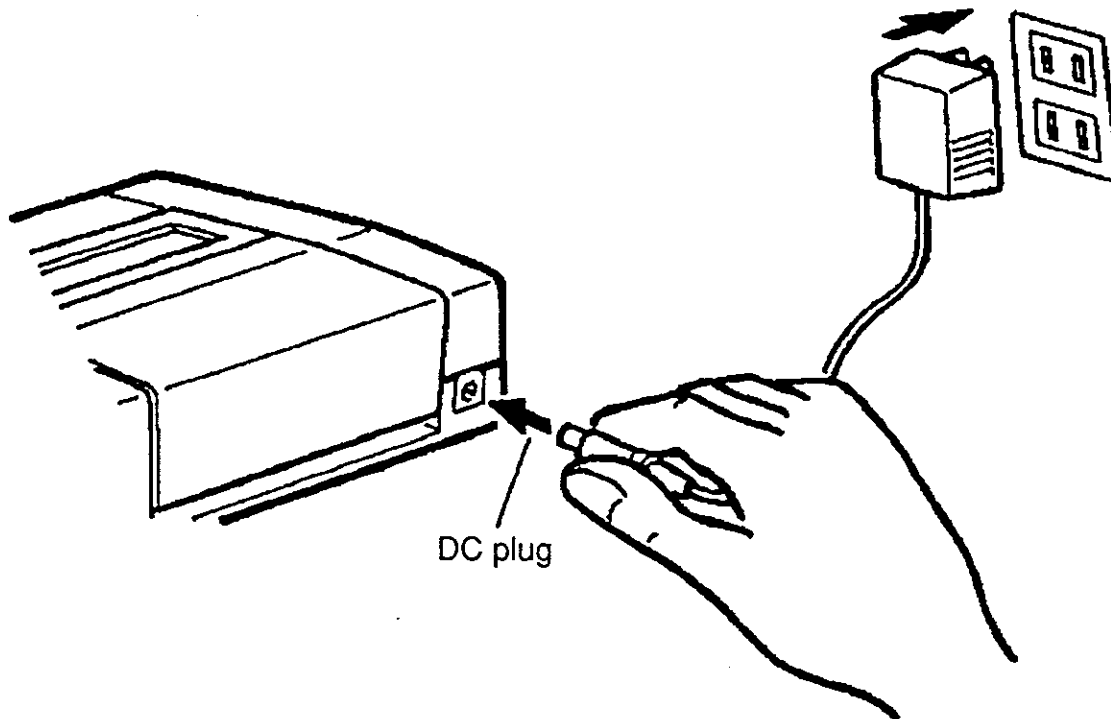


3 OPERATION



3.1 AC Adapter Connection

-  Steps 1 Turn off power switch.
-  Steps 2 Plug-in DC plug on the AC adapter into the power supply jack on the printer.
-  Steps 3 Plug the AC adapter into an outlet.
-  Steps 4 Turn on the power switch.



Note: Do NOT touch the DC plug pins.

To remove the AC adapter, first turn off the power switch, then unplug the AC adapter and the DC plug.



3.2 Paper Loading

Opening the paper holder



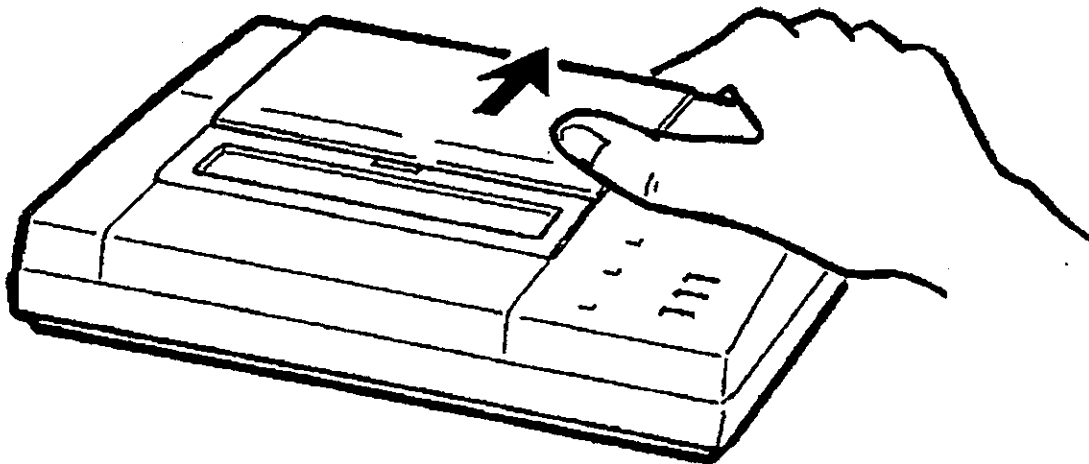
Steps 1

Using your thumb, pull paper holder cover towards back of the printer. (Unlock it.)



Steps 2

Lift cover upwards.



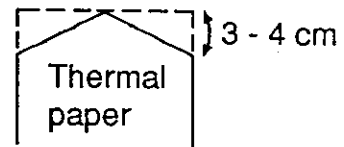
When closing and locking the paper holder cover, follow the above instructions in reverse.

Loading a thermal paper



Steps 1

Turn on power switch.



Steps 2

Cut top of paper in an inverted V (see figure at right)



Steps 3

Open paper holder cover.

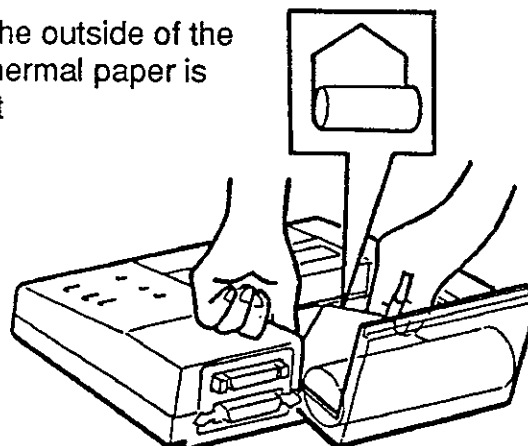


Steps 4

Push top of paper into inlet, and feed it by hand until you can see top of paper from paper cutter.

* The paper is easier to feed if placed on the cover.

The outside of the thermal paper is at



Steps 5

Keep pressing the paper feed switch until the paper feeds straight and smoothly.

- * When the paper is correctly set, the off-line lamp stops flashing and stays lit instead.
- * Red lines appear on both sides of the paper when paper is about to run out.



3.3 Dip switches Setting

Use the dip switches on the bottom of the printer to set the initial state of the printer and the input method, as follows:



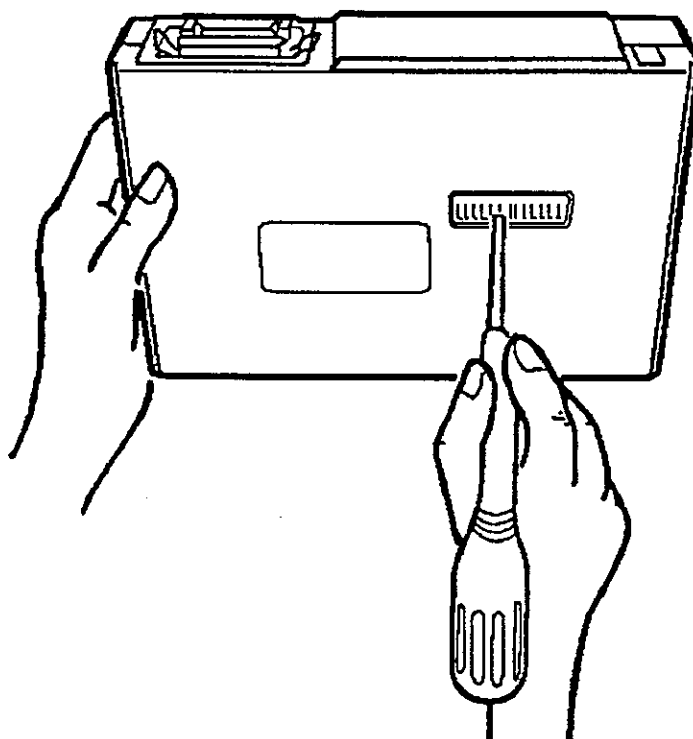
Steps 1

Turn off power switch.

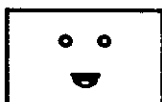


Steps 2

Set dip switches.



Note: The dip switches can be read when the power is on. Always turn off power before changing the settings.



* Operator's Note

Initial state:

Later you can change the initial state with a control code. Here, the initial state may be setting of printing mode, special characters, international characters, or zero font.

Dip switch 1

indicates factory settings.

Switch no.	Function	ON	OFF
SW1	Input method setting	Parallel	Serial
SW2	CR function setting	Carriage return and line feed	Carriage return
SW3	Print mode setting	Normal printing (40 columns)	Condensed printing (80 columns)
SW4	Character-set setting	Ordinary characters	Special characters
SW5	Zero font setting	0	ø
SW6 to SW8	International character setting	See the table below	

Language \ Switch no.	SW6	SW7	SW8
Japanese	ON	ON	ON
American	OFF	ON	ON
German	ON	OFF	ON
English	OFF	OFF	ON
French	ON	ON	OFF
Spanish	OFF	ON	OFF
Italian	ON	OFF	OFF
Swedish	OFF	OFF	OFF

See Section 5.2 for details of the international characters and Selection 6 for the special characters.

Dip switch 2

Dip switch 2 is valid only for serial input (when SW1 of dip switch 1 is off).

Switch no.	Function	ON	OFF
SW1	Data bit length setting	Eight bits	Seven bits
SW2	Parity permission setting	Without	With
SW3	Parity condition setting	Odd	Even
SW4 to SW6	Baud rate setting	See the table below	

Baud rate \ Switch no.	SW4	SW5	SW6
75 bps	ON	ON	ON
150 bps	ON	ON	OFF
300 bps	ON	OFF	ON
600 bps	ON	OFF	OFF
1200 bps	OFF	ON	ON
2400 bps	OFF	ON	OFF
4800 bps	OFF	OFF	ON
9600 bps	OFF	OFF	OFF



3.4 Computer Connection

Connection



Steps 1

Turn off printer power switch and computer power supply.



Steps 2

Connect printer and computer with interface cable.



Steps 3

Parallel: Secure with veil lock.

Serial: Secure with screws.



Steps 4

Set printer dip switches to match input method.



Steps 5

Turn on printer power supply switch and computer power supply.



CAUTIONS

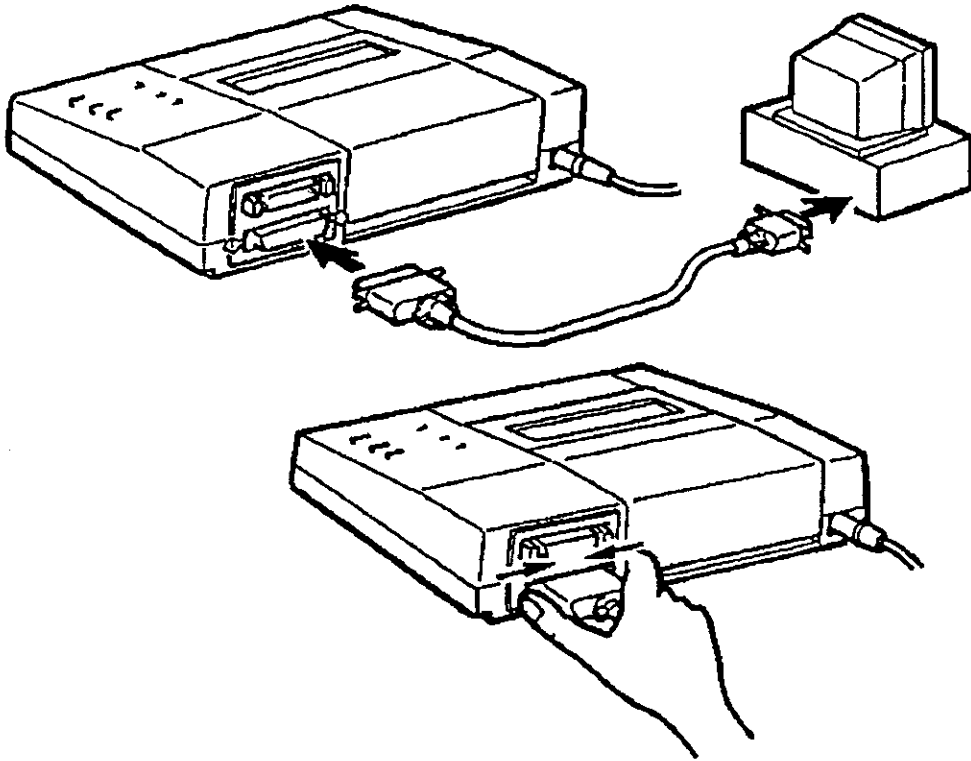
- Use interface cable to connect printer and computer. Choose correct interface cable for type of input (parallel or serial).
- Use a shielded cable no more than two meters long.

Connection check

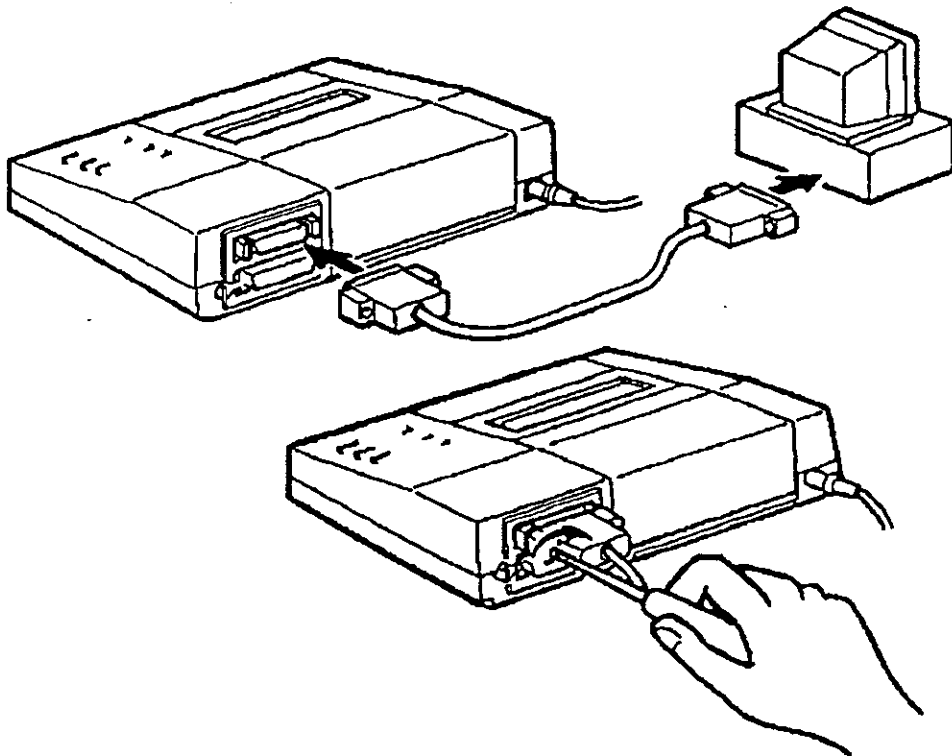
Print as described in Section 3.7. Connection is complete if printing is correct.

If the printer does not print, see Section 8.

Parallel



Serial





3.5 Self-Test

In the self-test, printer fonts from 2016 to FE16 are printed in sequence of condensed, ordinary and double-width printing modes, followed by 10 lines of checkered printing. The dip switch and lamp functions are also printed. International and special characters and zero are printed according to the setting mode of the dip switches.



Steps 1 Turn off power switch.

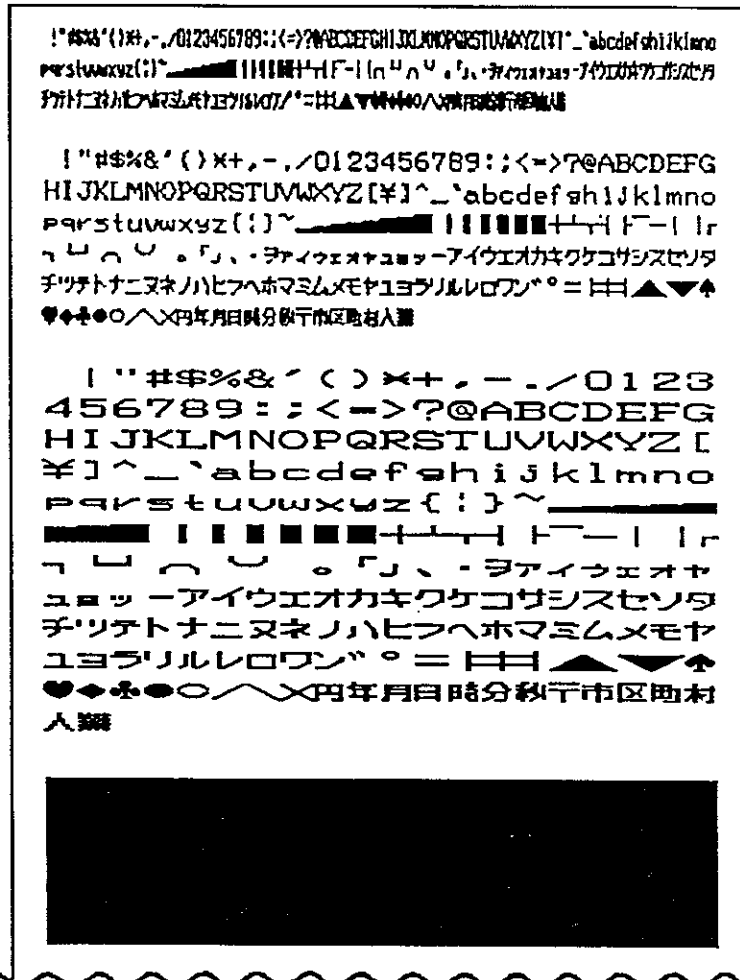


Steps 2 Turn on power switch while pressing paper feed switch, and self-test starts.



Steps 3 Release paper feed switch.

Print sample



! CAUTION

DO NOT turn power off during printing. The printer automatically stops after self-test.



3.6 HEX dump print

Data input from the computer is printed in hexa-decimal codes and in characters. This function checks if data has been input correctly from the computer.



Steps 1 Turn off power switch.



Steps 2 While pressing paper feed switch, turn on power switch.



Steps 3 If off-line lamp lights (self-test may have already started), press on-line switch.
The printer enters HEX dump mode, when [HEX DUMP MODE] is printed.



Steps 4 Input data. When 16 bytes or more of data have been input, data is printed, as below.

[HEX DUMP MODE]		
Print sample	00000000	00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
	00000010	10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F
	00000020	20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D 2E 2F !"#\$%&'()*+,-./
	00000030	30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D 3E 3F 0123456789:;<=>?
	Number of input code (Hex.)	Character code (Hex.)
		Character font



Steps 5 To release HEX dump mode, turn off power switch.

- * Data is dump-printed and the printer goes off-line when it is switched off-line without 16 bytes per line of data input.
- * The on-line lamp flashes if there is still data in the buffer memory when the printer is set off-line.



3.7 Printing



Steps 1

Turn on printer power switch and computer power supply.



Steps 2

Check that on-line lamp lights.

The off-line lamp flashes when the paper is not set. When the paper is loaded, the off-line lamp lights. Press the on-line switch so that the printer goes on-line.



Steps 3

Send a print command from the computer to the printer.

Example:

Printing ABC in parallel input using BASIC



Steps 1

Turn on SW1 of dip switch 1.



Steps 2

Enter LPRINT "ABC" on computer, then press return key. The printer will print ABC.

If the printer does not print, see Section 8.



* Operator's Note

Some forms of BASIC use the PRINT#statement or the PR# rather than the LPRINT statement.



3.8 Buffer Memory

The buffer memory accepts and stores data input at high speed, shortening the time that the computer cannot be used when it outputs to the printer. It's capacitance is about 7400 characters (about 7.2KB).

When the printer is on-line, data can be input during printing until the buffer memory becomes full.

If the printer is turned off-line when there is still data in the buffer memory, the on-line lamp will flash. Printing resumes when the printer is turned on-line.



3.9 Rechargeable Battery (for 21BU or 21BE)

If fully recharged, the printer can print about 1500 lines (20 columns of "8") without using the AC adapter.

The printer can also be used with the AC adapter.

The battery discharges when not used for a long time, therefore, recharge the battery immediately after purchase or after long periods of storage.

Charging



Steps 1 Turn off power switch.



Steps 2 Connect AC adapter and leave it for 10 hours.



Steps 3 When battery has finished charging, unplug AC adapter.

CAUTION

Follow the instructions below to prevent the battery performance from deteriorating.

- DO NOT charge continuously for more than 24 hours.
- Charge only between 5°C and 40°C.

If the battery runs out during printing:

The printer will go off-line. Without turning off power, connect AC adapter as quickly as possible. If there is data left in the buffer memory, the on-line lamp will flash. Set the printer on-line to print remaining data.



Notes on use

- When using the rechargeable battery: Turn off power switch after use.
- When using the AC adapter: The battery gradually recharges once the power switch is turned on. If you are not using the AC adapter, turn off power switch, and unplug the AC adapter.
- Recharge the battery every one or two months, even if it is not used for a long time. They will keep its life span.



4 PRINTER FUNCTION



4.1 Buffer Full Printing

AD-8120 has a line buffer to receive data in one-line units.

If data with more columns than one line is received, printing will start, even if there is no print command.

This is called "*Buffer full printing.*"



4.2 Interval Home Return

To protect the printer, the head automatically returns to the home position (at leftmost) when;

- data is not sent from the computer
- the on-line switch is pressed to set the printer off-line



4.3 Errors

Both the on-line and the off-line lamps light when an error occurs.

Data input and paper feed are disabled.

There are three types of errors:

- A When the head does not return to the home position even when the power is turned on
- B When the head does not return to the home position at interval home return
- C When printing is attempted at very low temperatures

If an error appears:



Steps 1

Turn off power switch.



Steps 2

Remove cause.

For A and B, remove any foreign objects.

For C, operate printer at 0°C to 40°C.



Steps 3

Turn on power switch.



4.4 Paper-empty Detection

When paper runs out, the printer goes off-line and the off-line lamp flashes. The printer cannot be set on-line while the off-line lamp is flashing. When paper has been loaded, the off-line lamp stops flashing, and stays lit. Press the on-line switch to print.

If paper runs out during printing, the printer will go off-line. Load new paper and press on-line switch to resume printing.

5 CHARACTER CODE TABLE

● IBM character set

Upper four bits		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Lower four bits		0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000			SP	0	@	P	'	p	Ç	É	á		L	1101	1110	1111
1	0001			!	1	A	Q	a	q	ü	æ	í		⊥	1101	1110	1111
2	0010		DC2	"	2	B	R	b	r	é	Æ	ó		T	1101	1110	1111
3	0011			#	3	C	S	c	s	â	ô	ú		⊥	1101	1110	1111
4	0100		DC4	\$	4	D	T	d	t	ã	ö	ñ		⊥	1101	1110	1111
5	0101			%	5	E	U	e	u	à	ò	Ñ		+	1101	1110	1111
6	0110			&	6	F	V	f	v	á	ú	æ		⊥	1101	1110	1111
7	0111			'	7	G	W	g	w	ç	û	Ω		⊥	1101	1110	1111
8	1000	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿		⊥	1101	1110	1111
9	1001	HT		)	9	I	Y	i	y	ë	Ö	⌒		⊥	1101	1110	1111
A	1010	LF		*	:	J	Z	j	z	è	Ü	⌒		⊥	1101	1110	1111
B	1011		ESC	+	;	K	[	k	{	ï	ø	½		⊥	1101	1110	1111
C	1100	FF		,	<	L	\	l	|	î	£	¼		⊥	1101	1110	1111
D	1101	CR		-	=	M	]	m	}	ï	¥	ı		⊥	1101	1110	1111
E	1110	SO		.	>	N	^	n	~	Ä	Pt	«		⊥	1101	1110	1111
F	1111	SI		/	?	O	_	o	DEL	À	f	»		⊥	1101	1110	1111

- Code table for "0", and American.
- SP denotes space.
- Blank codes are ignored.
- Function codes are enclosed in thick lines.

()

● Japanese character set

Upper four bits		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Lower four bits		0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000			SP	0	@	P	'	p	—	┘	SP					
1	0001			l	1	A	Q	a	q	▬	T	。					
2	0010		DC2	"	2	B	R	b	r	▬	┘						
3	0011			#	3	C	S	c	s	▬	┘						
4	0100		DC4	\$	4	D	T	d	t	▬	—						
5	0101			%	5	E	U	e	u	▬	—						π
6	0110			&	6	F	V	f	v	▬	┘						
7	0111			'	7	G	W	g	w	▬	┘						
8	1000	BS	CAN	(	8	H	X	h	x	▬	┘						+
9	1001	HT		)	9	I	Y	i	y	▬	┘						Σ
A	1010	LF		*	:	J	Z	j	z	▬	┘						μ
B	1011		ESC	+	;	K	[	k	{	▬	┘						Ω
C	1100	FF		,	<	L	\	l	|	▬	┘						π
D	1101	CR		-	=	M	]	m	}	▬	┘						σ
E	1110	SO		.	>	N	^	n	~	▬	┘						°C
F	1111	SI		/	?	O	_	o	DEL	+	┘						

● Code table for "0".

● SP denotes space.

● Blank codes are ignored.

● Function codes are enclosed in thick lines.



6 SPECIFICATIONS



6.1 General Specifications

Printer specifications

Printing method	:	Thermal serial dot
Character mode:		
Character matrix	:	9 dot high x 8 dot wide
Columns	:	40
Printing direction	:	Unidirectional or bidirectional logical seek
Bit-image graphics mode:		
Total number of dots	:	8 x 320 dots/line
Printing direction	:	Unidirectional logical seek
Printing width	:	89.6 mm
Printing speed	:	37.5 cps
External dimensions	:	162mm x 240mm x 58.5mm
Mainframe weight	:	950 g
Life	:	MCBF 500,000 lines (continuous printing of 40 columns of "8")

Operating conditions

Temperature	:	0°C to 40°C
Humidity	:	30% RH to 80% RH

Thermal paper specifications

Product No.	:	WP:PP-123
Width	:	112 mm
Outer diameter	:	48 mm
Roll length	:	25 m

AC adapter specifications

Item	U type	E type
Product No.	DPU- 411-01	DPU- 411-02
Input	120 V, 60 Hz	220 V, 50 Hz
Output	6 VDC, 2.0 A	6 VDC, 1.6 A
Dimensions	82 x 60 x 49 mm Cord length:1.8 m	100 x 69 x 60.5 mm Cord length: 1.8 m
Weight	510 g	740 g



6.2 Interface Specifications

Parallel

(1) Specifications

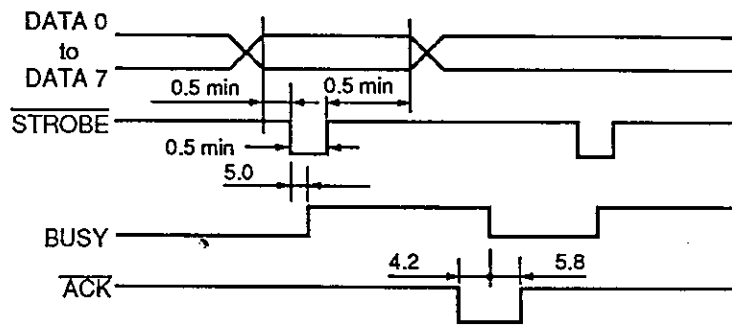
Data input: Eight-bit simple Centronics

Handshake: $\overline{\text{STROBE}}$, BUSY , and $\overline{\text{ACK}}$

(2) Connector signal description

Pin no.	Signal	I/O	Function
1	$\overline{\text{STROBE}}$	Input	Data strobe
2 to 9	DATA 0 to 7	Input	Carries the input data 1 when high and 0 when low
10	$\overline{\text{ACK}}$	Output	Signal showing that data is received
11	BUSY	Output	Signal showing that data cannot be received
12	PE	Output	Signal showing that there is no paper
13	SLCT	Output	Signal showing that the printer is on-line
14	$\overline{\text{AUTO.LF}}$	Input	When this signal is low at power-on, one line feed is performed at carriage return
15	NC	-	Not used
16	GND	-	Ground
17 and 18	NC	-	Not used
19 to 30	GND	-	Twist, pair, and return ground
31	$\overline{\text{INIT}}$	Input	Initialize
32	$\overline{\text{ERROR}}$	Output	Signal showing that there is an error
33	GND	-	Ground
34	NC	-	Not used
35 and 36	+5V	-	Normally, pulled up at 1.2 k Ω at high

(3) Data input timing (unit: μs , type.)



(4) I/O signal conditions

Item	Standard			Unit
	Min.	Type.	Max.	
Input: Low level voltage	0.0	-	0.9	V
Input: High level voltage	3.5	-	5.0	V
Output: Low level voltage	-	-	0.5	V
Output: High level voltage	3.5	-	-	V

Serial

(1) Specifications

Data input : RS-232C
Data control : BUSY

(2) Connector signal description

Pin.no.	Signal	I/O	Function
1	GND	-	Ground
2	DATA	Input	Data
3 and 4	NC	-	Not used
5	BUSY	Output	Signal showing that data cannot be received
6	-	-	Connected to pin 20
7	GND	-	Ground
8 to 19	NC	-	Not used
20	-	-	Connected to pin 6
21 to 25	NC	-	Not used

Computer connections

Computer	AD-8120	Computer	AD-8120
GND	1 GND	CTS	5 BUSY
TxD	2 DATA	DSR	6 Connected to 20
RxD	3 NC	GND	7 GND
RTS	4 NC	DTR	20 Connected to 6

(3) Error processing

The following characters are printed when an error occurs.

? (3F16) : Framing error

! (2116) : Parity error

Turn power off and check computer and AD-8120 dip switch settings.

(4) I/O signal conditions

Item	Standard			Unit
	Min.	Type	Max.	
Input: Low level voltage	- 15.0	-	- 3.0	V
Input: High level voltage	3.0	-	15.0	V
Output: Low level voltage	-	- 12.0	-	V
Output: High level voltage	-	12.0	-	V



7 TROUBLE-SHOOTING

Check the following points if your printer has malfunctioned or does not operate at all. If it has still problems, call your A&D I representative or the branch office serving your locality.

If the power does not turn on (the power lamp is off)

Checkpoint	Action	Reference page
Is the power switch on ?	Turn on power switch.	-
Is the AC adapter connected correctly ?	See Section 3.1.	6
Is the battery recharged ? (21BU or 21BE)	See Section 3.9.	16
Is power being supplied from the outlet ?	Plug other electrical appliances into the outlet to check that it is working.	-

If the paper does not feed

Checkpoint	Action	Reference page
Is the paper loaded correctly ?	See Section 3.2.	7
Is there foreign matter in the paper inlet ?	Remove any foreign objects.	-
Are on-line and off-line lamps on ?	An error appears. See Section 4.3.	17
Is on-line lamp off ?	Set printer on-line.	-
Is off-line lamp on ?	An error appears. See Section 4.3.	17

If the printer does not print or stops during printing

Checkpoint	Action	Reference page
Is off-line lamp flashing?	If it is, paper has run out. Load more paper.	7
Are on-line and off-line lamps on?	An error appears. See Section 4.3.	17
Is off-line lamp on?	Set printer on-line. If you cannot set it on-line, the battery has discharged. Connect AC adapter. (21BU or 21BE)	6
Is on-line lamp flashing?	Connect AC adapter and set the printer on-line.	6
Are dipswitches set correctly?	Set them according to the input method.	9
Is interface cable connected correctly?	See Section 3.4.	11
Are you using specified paper: WP:PP-123	Use the specified paper.	-
Are you using back of paper?	The outside is the front. See Section 3.2.	7
Is program correct?	Check the program. The LPRINT statement in BASIC is usually used, but some machines use the PRINT# or the PR# statement.	-
Does printer execute self-test?	If it does not execute self-test, contact your A&D I representative or the branch office serving your locality.	13

If the printer prints wrong characters

Checkpoint	Action	Reference page
Is interface cable connected correctly?	See Section 3.4.	11
Are dip switches set correctly?	Set dip switches according to input method. In serial input, "1" will be printed if SW3 of dip switch 2 is set incorrectly and "?" will be printed if SW1 and SW2 of dip switch 2 are set incorrectly. Set them according to the computer communications method.	9
Is program correct?	Check program. Unless " ; " is input following LPRINT Statement in BASIC, usually CR and LF are automatically output.	-

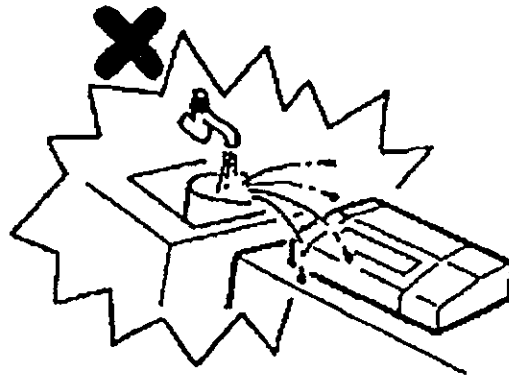
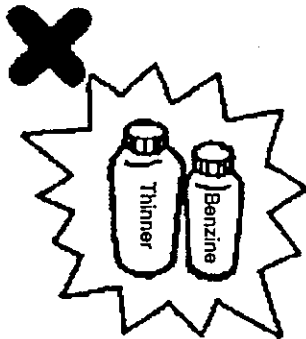
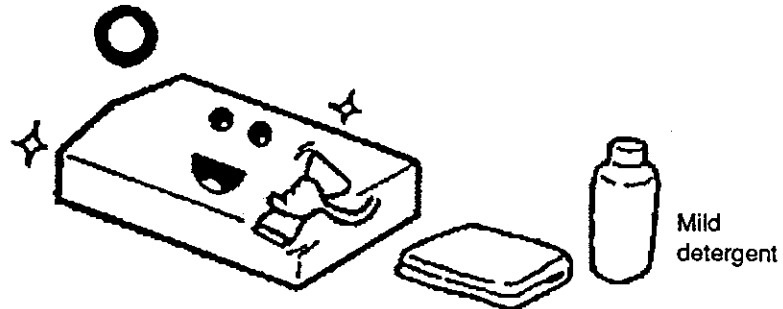
If the printing is light or dark

Checkpoint	Action	Reference page
Is temperature very high or low?	Use printer at 0°C to 40°C	-
Are you using specified paper: WP: PP-123	Use specified paper.	-



8 CARE OF THE AD-8120 PRINTER

If the outside of your printer gets dirty, wipe it with a soft, dry cloth. If it gets very dirty, wet a soft cloth with mild detergent diluted with water, squeeze it well, and clean the printer.



! CAUTION

- Do NOT use thinner, benzine, or other volatile chemicals.
- Do NOT allow water to get inside the printer.

