

AD-8121B

Compact Printer

INSTRUCTION MANUAL



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CONTENTS

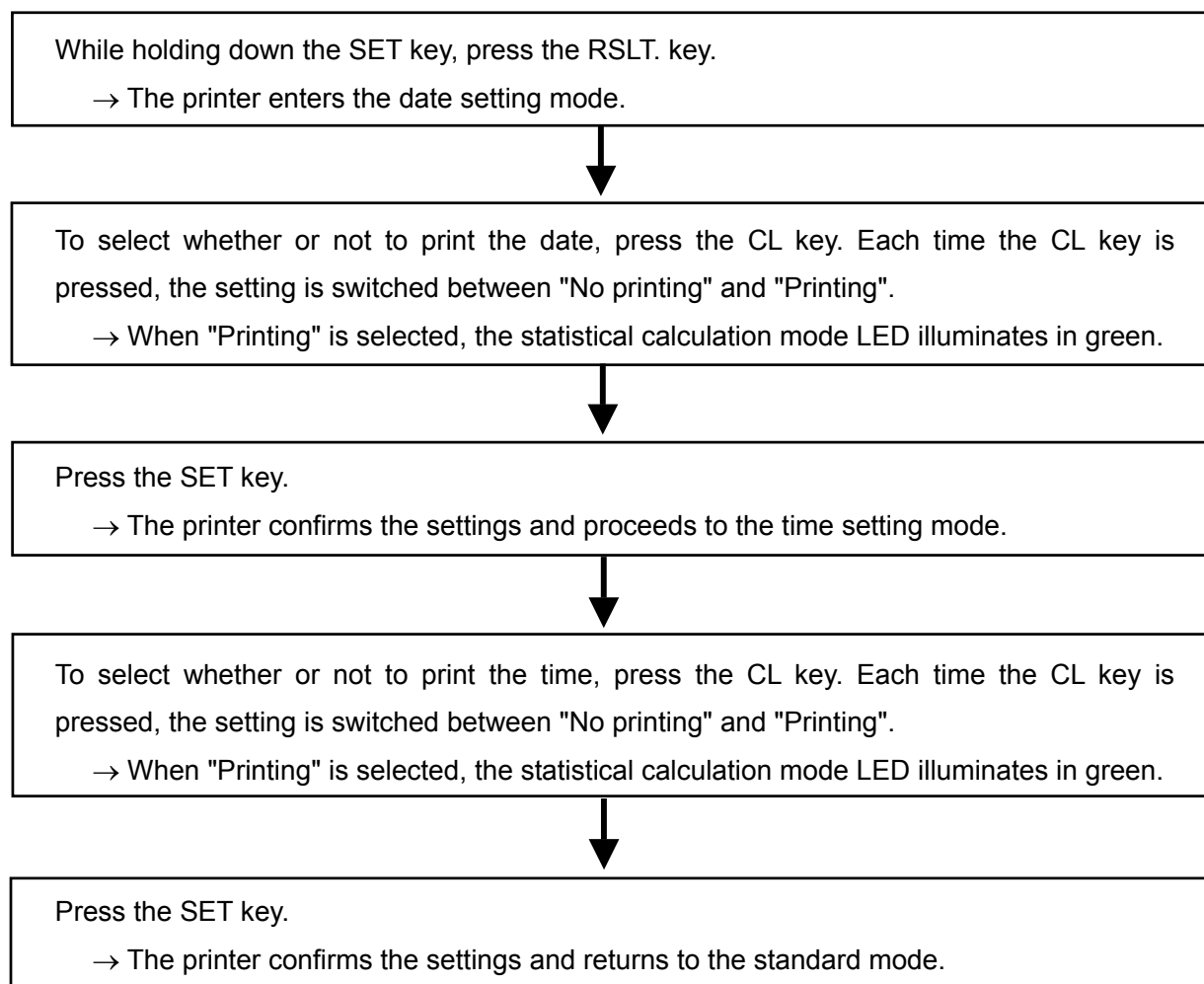
BEFORE USING THE PRINTER	2
1. INTRODUCTION	3
1-1 Features	3
1-2 Compliance.....	3
2. UNPACKING YOUR AD-8121B	4
2-1 Items Supplied.....	4
2-2 Accessories (Sold separately)/Option	4
3. PRECAUTIONS	5
4. EXTERNAL VIEW	6
5. INSTALLING THE BATTERY	7
6. INSTALLING THE INK RIBBON/PRINTER PAPER	8
6-1 Installing the Ink Ribbon Cassette.....	8
6-2 Installing the Printer Paper	10
7. SETUP.....	12
8. POWER SUPPLY	13
8-1 Battery Operation	13
9. CONTROL FUNCTIONS	14
9-1 DIP Switches	14
9-2 Example of Each Mode Setting	16
9-3 Keyboard	17
9-4 Printing Format	19
10. CALENDAR/CLOCK FUNCTION	20
10-1 Setting the Date/Time	20
10-2 Date/Time Setting Procedure	22
11 INTERVAL PRINTING/CHART PRINTING.....	24
11-1 Interval Printing Procedure	24
11-2 Chart Printing Procedure	25
12. STATISTICAL CALCULATION MODE.....	27
12-1 Selection of Standard Mode or Statistical Calculation Mode	27
12-2 Printing in the Statistical Calculation Mode	28
13. DUMP PRINT MODE.....	29
13-1 Printing in Dump Print Mode	29
13-2 Online/Offline.....	30
14. SPECIFICATIONS.....	31
14-1 General Specifications.....	31
14-2 Input Specifications.....	31
14-3 Statistical Calculation Specifications	31

BEFORE USING THE PRINTER

The compact printer, AD-8121B, is equipped with a built-in calendar/clock and can print the date and time. Before using the printer, follow the procedure below to confirm the date and time settings. When printing, whether or not to print the date and time can be selected.

The date and time setting procedure

For details on the date and time setting procedure, see "10. CALENDAR/CLOCK FUNCTION".



1. INTRODUCTION

This manual describes how the compact printer, AD-8121B, works and how to get the most out of it in terms of performance.

Read this manual thoroughly before using the printer and keep it at hand for future reference.

1-1 Features

- Impact dot matrix printer for superior readability and long storage
- Date and time printing with the built-in calendar/clock
- Interval printing with the built-in timer: 5 s, 10 s, 30 s, 1 min, 5 min, 10 min and 30 min
- Charting function with the built-in timer to print changes in the measurement data with time in graph format
- Statistical calculation function: minimum, maximum, average, standard deviation, coefficient of variation and range.
- Battery operation permits use anywhere
- Clock, calendar and preset functions are stored in non-volatile memory
- Compact and lightweight
- Accepts RS-232C and current loop input from A&D's electronic balances, scales, indicators, the moisture analyzer, viscometer and other instruments produced by A&D that specify the AD-8121B as the printer of choice. Hereafter, these will be referred to as "the instrument".

1-2 Compliance

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.)

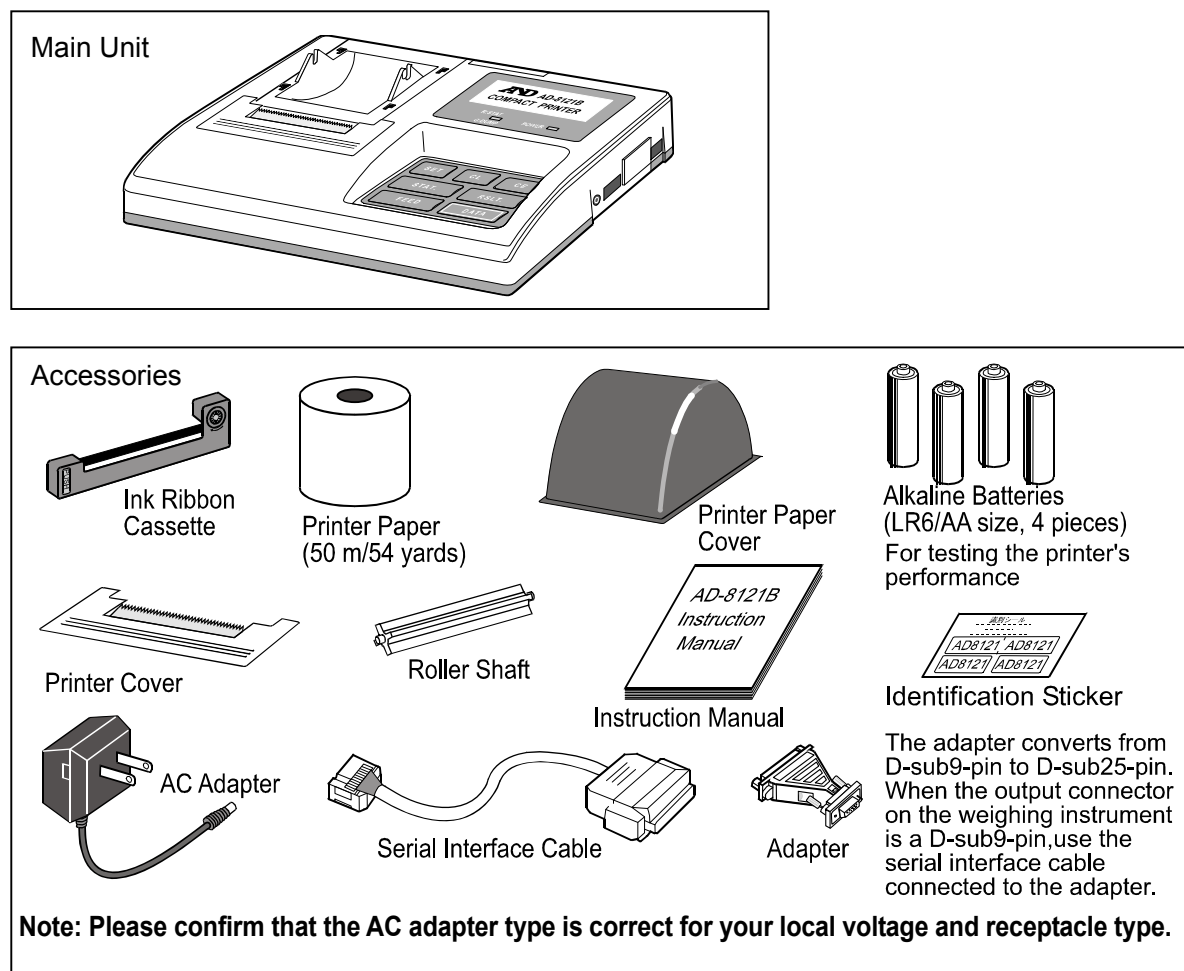
Compliance with EMC Directives



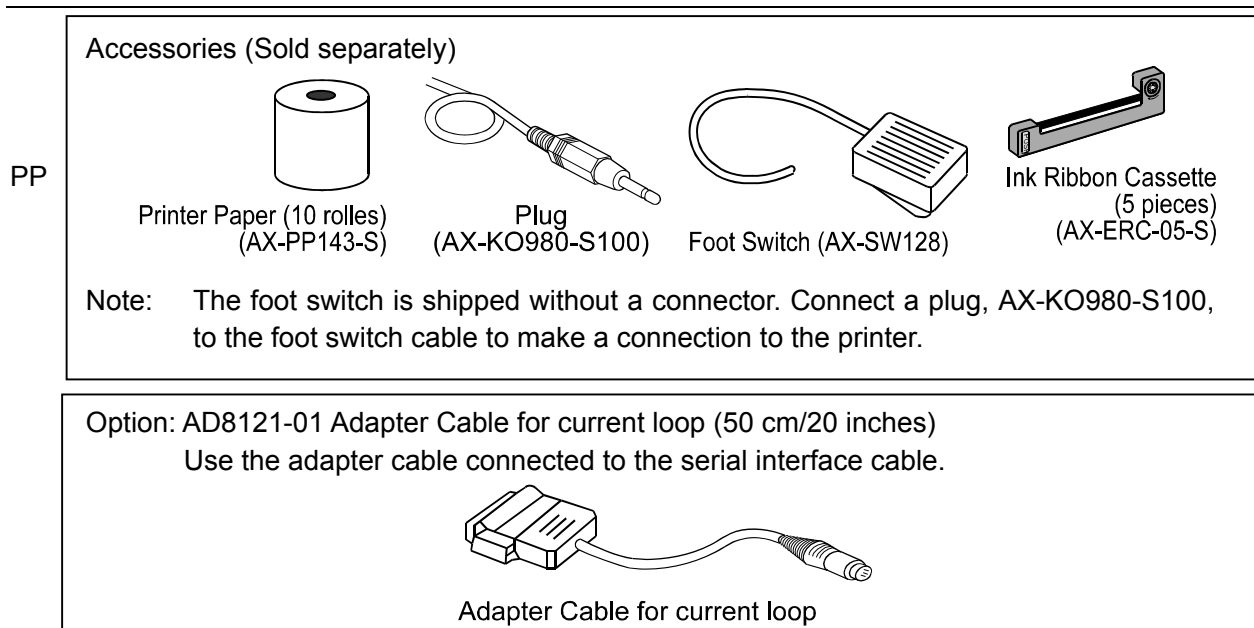
This device features radio interference suppression in compliance with valid EC Regulation 89/336/EEC.

2. UNPACKING YOUR AD-8121B

2-1 Items Supplied



2-2 Accessories (Sold separately)/Option



3. PRECAUTIONS

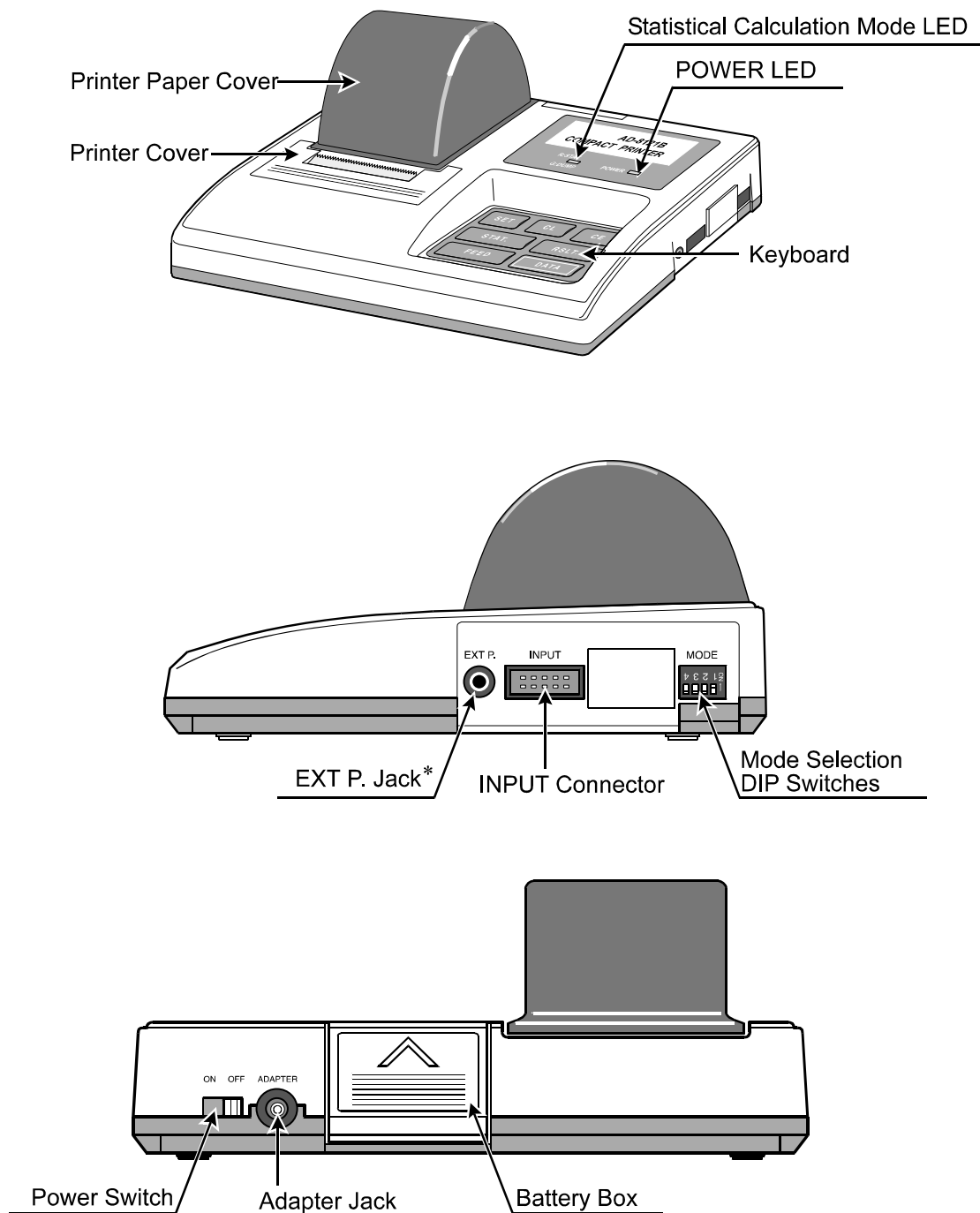
In order to obtain the best possible performance from the AD-8121B, read this instruction manual thoroughly before operation.

Use care when handling the printer because it is a high-precision electronic device.

Note the following:

- Foreign matter in the printer section may cause the printer to jam. Use the printer where it will not be subjected to dirt, dust, water, or oil, and where it will not be subjected to direct sunlight, high temperature or high humidity.
- In order to protect the high-precision mechanism and electrical circuits of the AD-8121B from being damaged, prevent the printer from being struck or having an excessive force applied to it during its operation. Do not attempt to disassemble it.
- Be sure to connect/disconnect the cables only when the power is OFF.
- Only use the specified printer paper and AC adapter. Use the identification sticker to identify the AC adapter to be used for the printer.
- Only use alkaline batteries.
- Remove the batteries when not using the printer for a long time to prevent potential damage from battery leakage.
- Wait at least two seconds to switch on again after turning off the power switch.
- When the exterior of the printer has stains, lightly wipe them off using a cloth dampened in neutral detergent. Do not use an organic solvent for cleaning.
- If a malfunction occurs, refer to this manual to check the power supply, switch operations, and cable connections.

4. EXTERNAL VIEW



* For data acquisition by pressing the foot switch, connect the plug to the foot switch, and then insert the plug into the EXT P. jack. The foot switch will function in the same way as the DATA key on the printer keyboard.

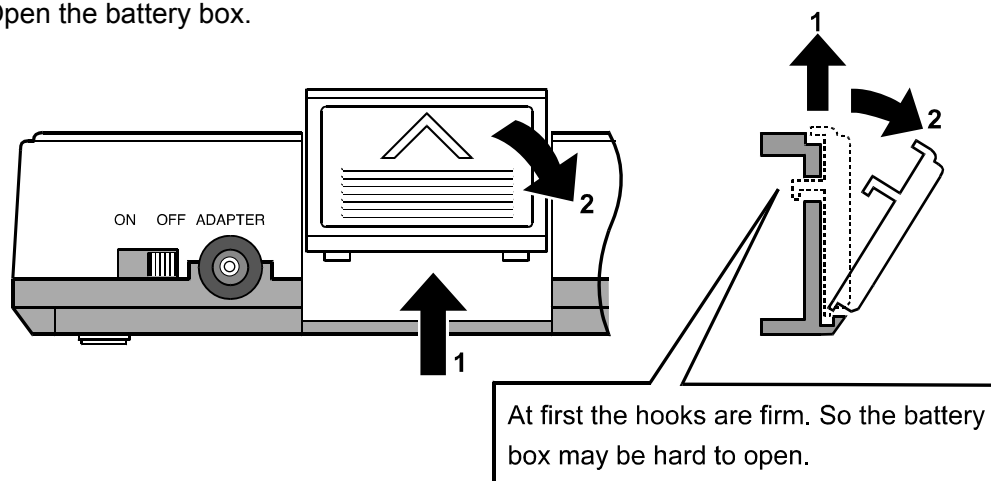
(Plug: AX-KO980-S100, Foot Switch: AX-SW128)

5. INSTALLING THE BATTERY

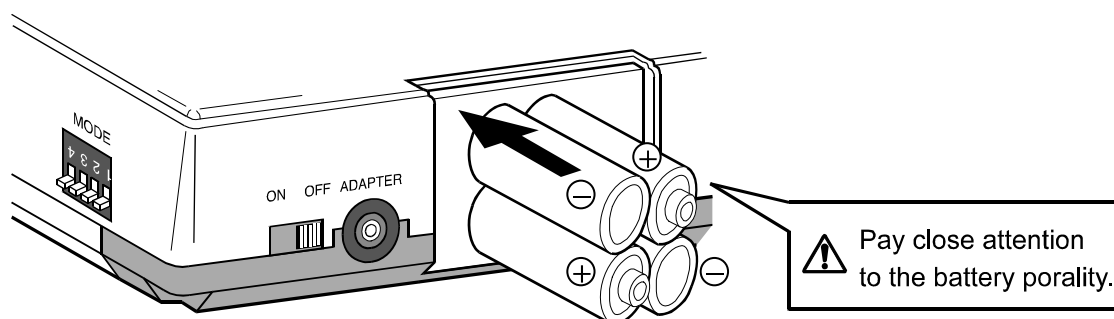
Notes: When the printer is to be operated using the AC adapter, the batteries need not be installed.

The batteries provided with the printer are for testing the printer's performance and may have a shorter life.

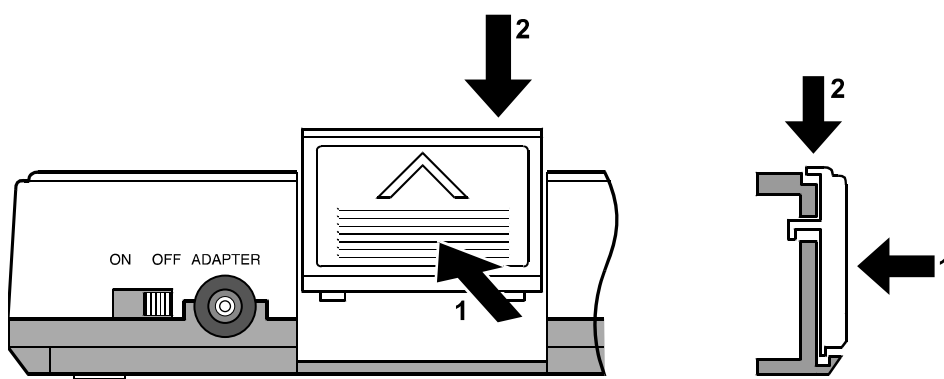
Step 1. Open the battery box.



Step 2. Install the batteries.



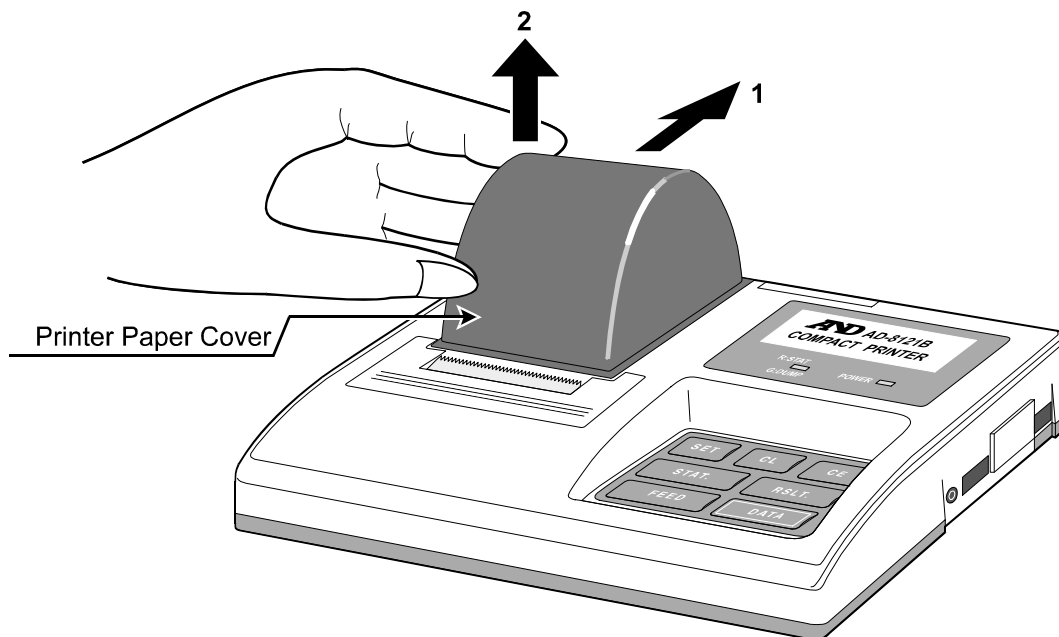
Step 3. Close the battery box.



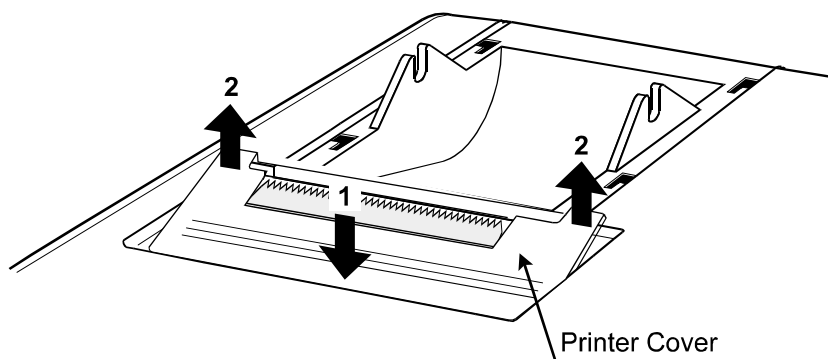
6. INSTALLING THE INK RIBBON/PRINTER PAPER

6-1 Installing the Ink Ribbon Cassette

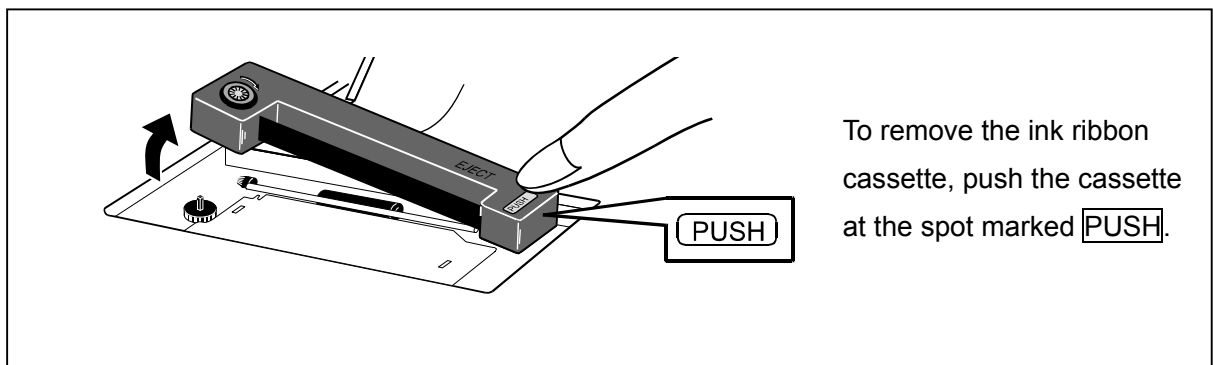
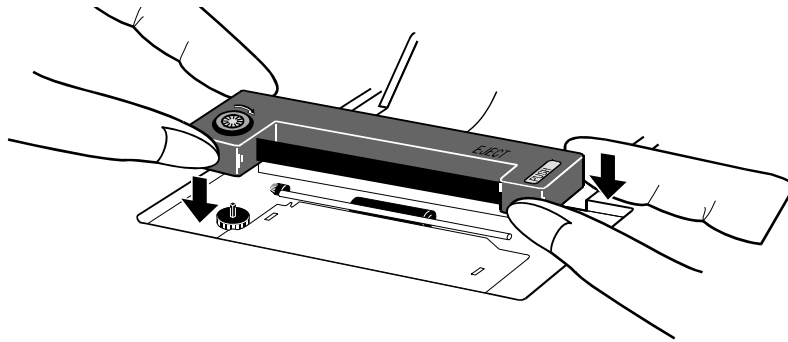
Step 1. Slide the printer paper cover in the direction of the arrow (1), then remove it in the upward direction (2).



Step 2. Push the printer cover at the spot marked by the arrow (1). Remove the printer cover (2).



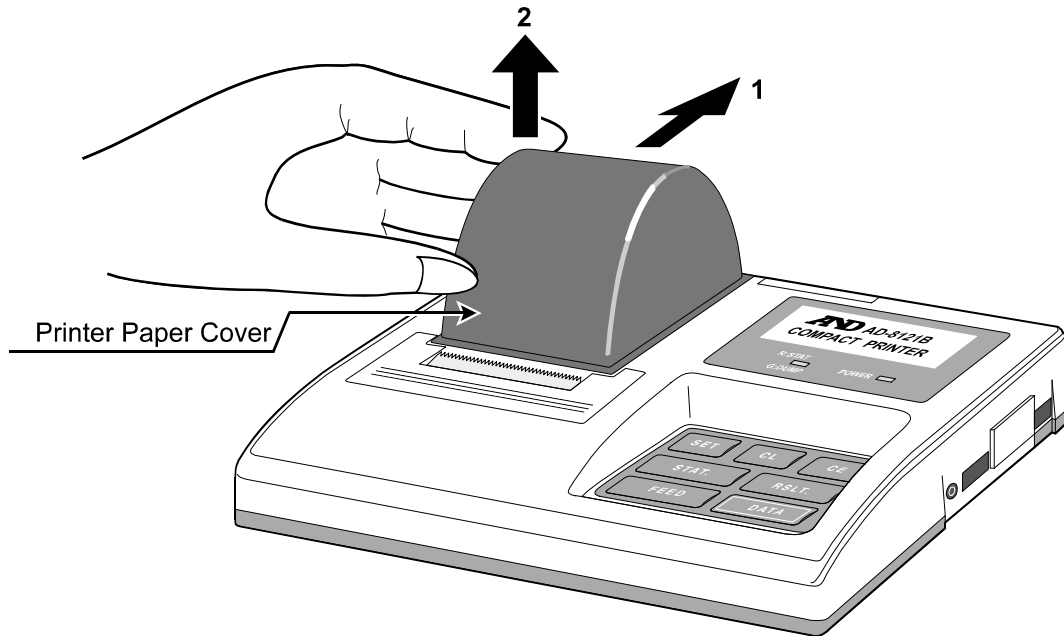
Step 3. Install the ink ribbon cassette supplied with your printer.



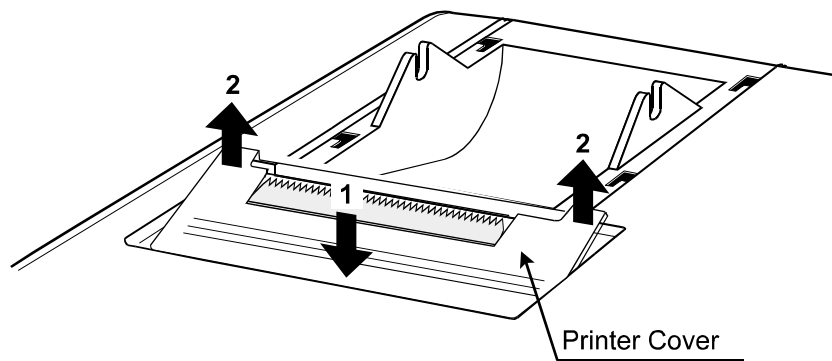
Step 4. Replace the printer cover and printer paper cover in the reverse order of their removal.

6-2 Installing the Printer Paper

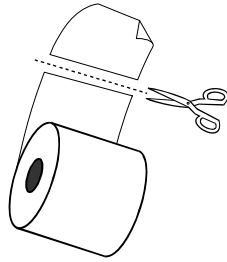
Step 1. Slide the printer paper cover in the direction of the arrow (1), then remove it in the upward direction (2).



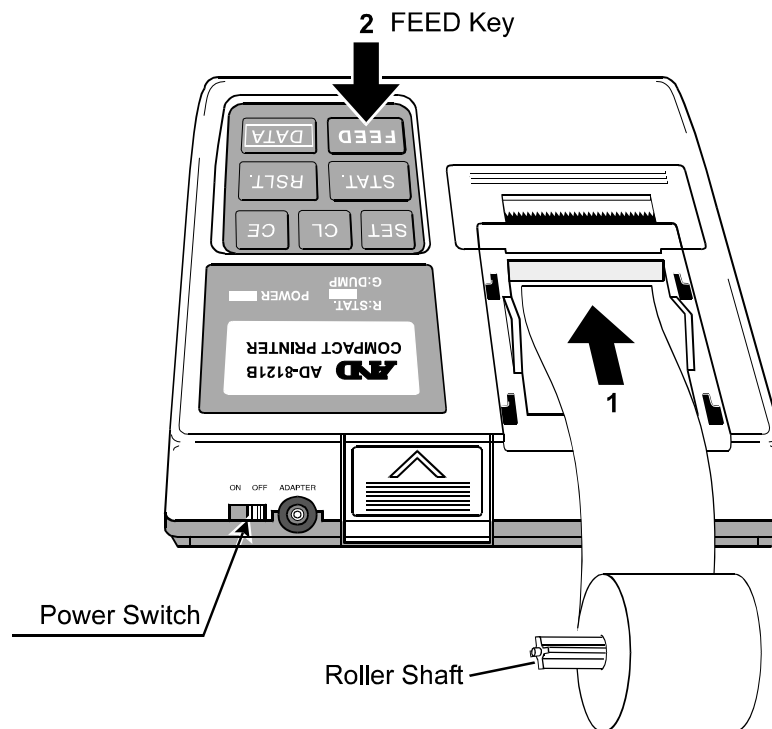
Step 2. Push the printer cover at the spot marked by the arrow (1). Remove the printer cover (2).



- Step 3 Cut the leading edge of the printer paper at a right angle to the feeding direction and remove wrinkles and folds from the paper if there are any.



- Step 4 Turn on the power. Press the FEED key while lightly feeding the printer paper edge into the paper inlet until it comes out of the outlet an appropriate length. Insert the supplied roller shaft into the printer paper core, then set the shaft onto the bearings of the printer.



7. SETUP



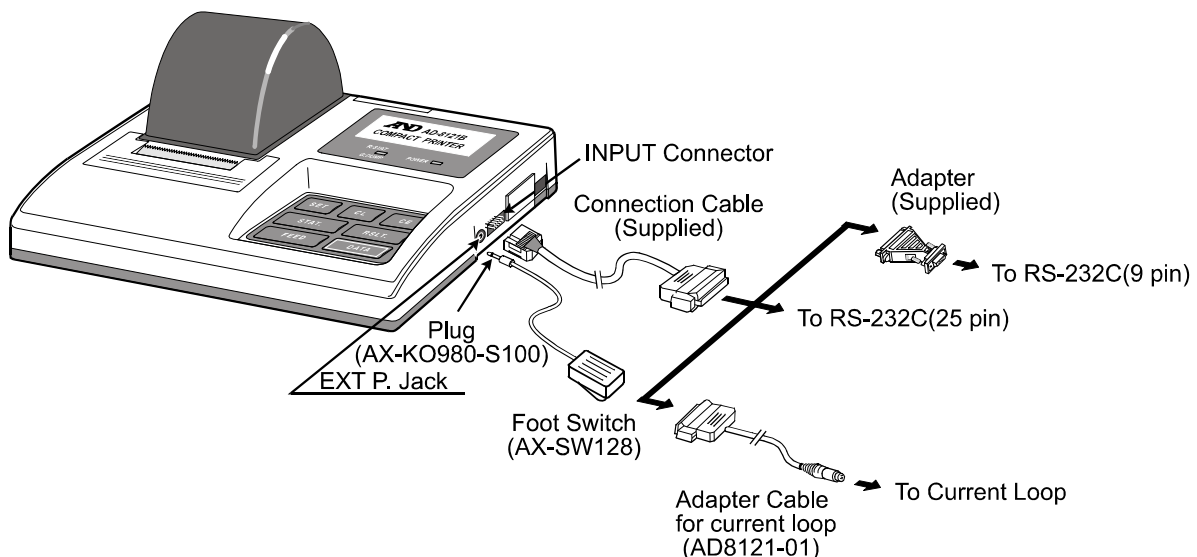
Verify that power of both the AD-8121B and the instrument are turned off before connecting them together.

1. Connecting to the instrument

For data supply from an RS-232C interface, plug the 25-pin connector at the end of the connection cable into the output connector of the instrument and plug the smaller connector into the printer INPUT connector.

For data supply by current loop, use the AD8121-01 adapter cable and the connection cable. Set the DIP switch No.4 ON (current loop). See "9-1 DIP Switches" for details.

(Set the baud rate of the instrument to 2400 bps.)



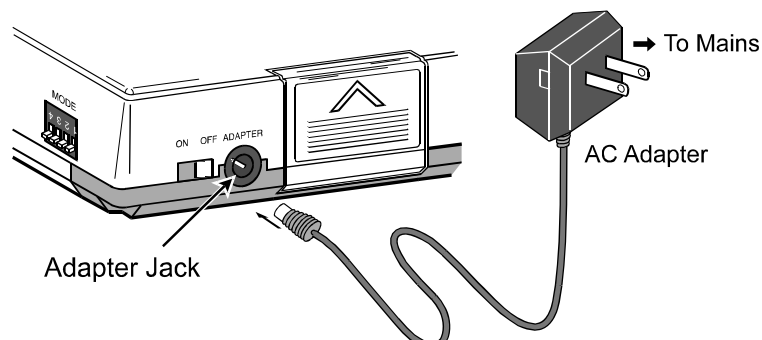
2. Connecting the specified foot switch (AX-SW128)

For data acquisition by pressing the foot switch, connect the plug to the foot switch, and then insert the plug into the EXT P. jack. The foot switch will function in the same way as the DATA key on the printer keyboard.

(Plug: AX-KO980-S100, Foot Switch: AX-SW128)

3. Connecting the specified AC Adapter

For AC operation, connect the AC Adapter to the adapter jack on the printer.



8. POWER SUPPLY

The power supplied for the printer is either from the AC Adapter or the alkaline batteries. When the AC adapter is used while the alkaline batteries are installed, the power will be supplied from the AC adapter.



When the power to the printer is turned off, all the statistical calculation data stored in memory will be erased. Also, if the AC adapter is connected/disconnected while the printer is operating (disregarding whether the printer is operated by the AC adapter or the batteries), the data accumulated may be erased.

8-1 Battery Operation

- Pay close attention to the battery polarity. (See "5. INSTALLING THE BATTERY" for details.)
- Only use alkaline batteries. Manganese batteries offer inadequate power to operate the printer.
- A new battery will last about 3500 data operations under the following conditions.

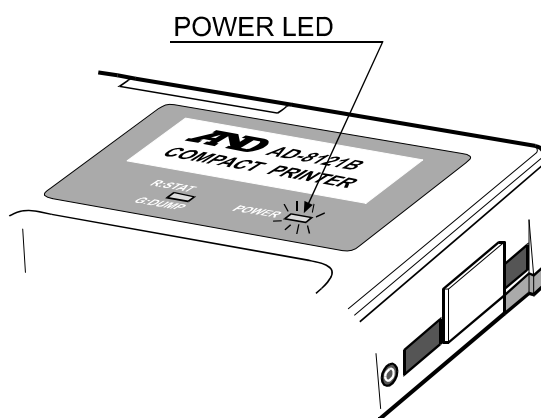
Temperature conditions	25°C/77°F
Printing conditions	Prints "WT 8888.888 g" every five seconds in the standard mode (MODE 1) with the time set to be printed. Inputs data via the RS-232C interface.



When not using the printer for a long time, be sure to remove the batteries to prevent potential damage from battery leakage.

The batteries provided with the printer are for testing the printer's performance and may have a shorter life.

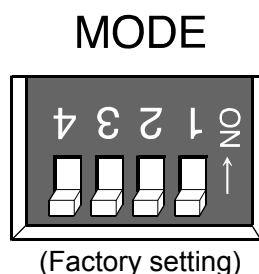
- When the batteries are depleted, the POWER LED blinks. Replace with new alkaline batteries or use the AC adapter.



9. CONTROL FUNCTIONS

9-1 DIP Switches

The DIP switches located on the side of the printer are used to set the printing mode, how to handle unstable data and data input specifications.



DIP Switch No.	Item	OFF	ON
No.1	Mode selection	MODE 1	MODE 2
No.2	Mode selection	MODE 1/MODE 2	MODE 3
No.3	Handling unstable data	No printing	Printing
No.4	Data input specifications	RS-232C	Current loop

DIP switches No.1 and No.2 (Mode selection)

	MODE 1	MODE 2	MODE 3
Printing condition	Prints data when data is received.	Prints data in conjunction with the DATA key or interval setting.	Prints data received as it is.
Data output mode for the connected instrument (See Note 1.)	Key mode Auto print mode	Stream mode	Key mode Auto print mode
Statistical calculation (See Note 2.)	Yes	Yes	No
Interval printing Chart printing	No	Yes	No
Printing mode	Using the STAT. key, the standard mode, the statistical calculation mode or the dump print mode can be selected. (See Note 3.)	When printing using the DATA key or interval printing using the built-in timer, the STAT. key allows to select the standard mode or the statistical calculation mode. The chart mode using the built-in timer is also available.	Only the dump print mode is available. Using the DATA key, online or offline can be selected.

Note 1: Key mode ... Data is output by pressing the key on the instrument.

Auto print mode ... When stabilized, the instrument outputs the data automatically.

Stream mode ... Data is output continuously.

Note 2: For details on statistical calculation, see "12. STATISTICAL CALCULATION MODE".

Note 3: When data other than measurement data, such as GLP, GMP, and ISO compliant report, is to be printed during statistical calculation, use the STAT. key to select the dump print mode to perform printing. After printing, use the STAT. key to return the printer to the statistical calculation mode. During this operation, the statistical calculation data is maintained in memory.

Description of each printing mode

Printing mode	Statistical calculation mode LED	Performance	Applicable format
Standard mode	OFF	Eliminates leading zeros and commas, and prints data type, measurement data and the unit used. Unstable data is handled according to the DIP switch No.3 setting. Prints "*" when "over".	Select A&D standard format for the connected instrument.
Statistical calculation mode	Red	Besides printing in the standard mode, perform statistical calculation of the measurement data. Unstable data is handled according to the DIP switch No.3 setting. No statistical calculation when "over".	
Chart mode	OFF	Takes in continuously input measurement data at a certain time interval, and prints in graph format.	
Dump print mode	Green	Prints measurement data as it is.	Select an appropriate format for the connected instrument as necessary.

DIP switch No.3 (Handling unstable data)

In the standard mode and the statistical calculation mode, how to handle unstable data depends on the setting of the DIP switch No.3.

- When "No printing" is selected (with DIP switch No.3 set to the OFF position):
 - (Both modes) Unstable data will be printed as asterisks (*).
 - (Statistical calculation mode) Unstable data will be excluded from statistical calculation.
- When "Printing" is selected (with DIP switch No.3 set to the ON position):
 - (Both modes) Unstable data will be printed in the same way as stable data.
 - (Statistical calculation mode) Unstable data will be included in statistical calculation.

DIP switch No.4 (Data input specifications)

This switch is used to select the RS-232C interface or current loop.

When current loop is selected and a cable for current loop is not available, use the current loop adapter cable (AD8121-01) and the connection cable supplied.

See "7. SETUP" for details.

Communication protocol setting on the connected instrument.

Set communication protocol on the connected instrument as follows: (Factory setting for almost all the instruments)

Item	Setting
Baud rate	2400 bps
Data bit length	7 bits
Parity	Even
Stop bits	1 or 2 bits
Terminator	<CR><LF> (0Dh, 0Ah)

9-2 Example of Each Mode Setting

Described below are example settings of the standard, statistical calculation and dump print mode. For interval printing and chart printing function using the built-in timer, see "11. INTERVAL PRINTING/CHART PRINTING".

- (1) Set the printer DIP switches No.1 and No.2, according to the instrument output mode and the printing mode.

Output mode (See Note 1)	DIP switch No.1	DIP switch No.2	Mode selection	Printer Printing mode (See Note 2)
Key mode or Auto print mode	OFF	OFF	MODE 1	Standard mode Statistical calculation mode or Dump print mode (See Note 3)
Stream mode	ON	OFF	MODE 2	Standard mode or Statistical calculation mode

Note 1: key mode ... Data is output by pressing the key on the instrument.

Auto print mode ... When stabilized, the instrument outputs the data automatically.

Stream mode ... Data is output continuously.

Note 2: In the standard mode or the statistical calculation mode, select A&D standard format for the instrument output format.

Note 3: In the dump print mode using MODE 3 (DIP switch No.2 ON), the DATA key is available for switching between online and offline. In the dump print mode using MODE1, switching between online and offline is not available.

When only input data is to be printed, setting the printer to MODE 3 is recommended.

- (2) Use the STAT. key to change the printing mode as necessary. The printing mode can be identified by the status of the statistical calculation mode LED.

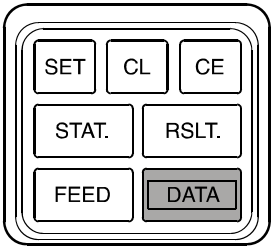
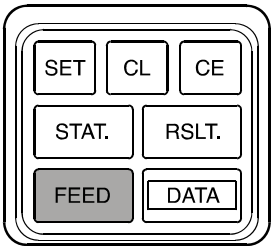
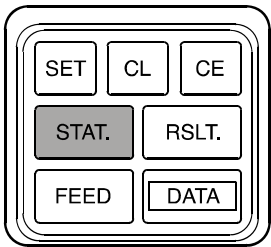
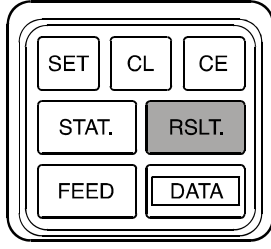
Printing mode	Status of the statistical calculation mode LED
Standard mode	OFF
Statistical calculation mode	Red
Dump print mode (Only MODE 1 is available.)	Green

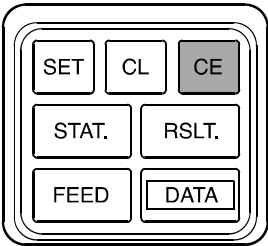
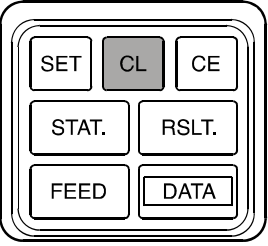
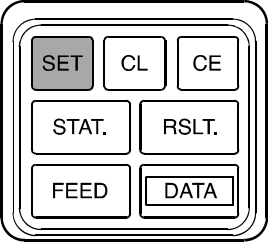
- (3) When the printer is set to MODE 2, press the DATA key on the printer to print. Otherwise, use the key on the instrument to print.

- (4) When the printing mode is statistical calculation, press the RSLT. key to print number of operations and total weight data. Press the RSLT. key again to print the maximum value, minimum value, average value, standard deviation, coefficient of variation ((standard deviation/average)*100), and range (difference between maximum and minimum).

See "12-2 Printing in the Statistical Calculation Mode" for details.

9-3 Keyboard

 A diagram of a 3x3 grid of keyboard buttons. The buttons are labeled: SET, CL, CE in the top row; STAT., RSLT. in the middle row; and FEED, DATA in the bottom row. The DATA button in the bottom right corner is highlighted with a grey background.	• DATA (Data key) (1) MODE 2 Press the DATA key to print when "print using the DATA key" is selected. (2) MODE 3 Selects online or offline. (When online, the statistical calculation mode LED illuminates in green.)
 A diagram of a 3x3 grid of keyboard buttons. The buttons are labeled: SET, CL, CE in the top row; STAT., RSLT. in the middle row; and FEED, DATA in the bottom row. The FEED button in the bottom left corner is highlighted with a grey background.	• FEED (Feed key) Press the FEED key to feed one line. If you hold this key down, the printer paper is fed continuously.
 A diagram of a 3x3 grid of keyboard buttons. The buttons are labeled: SET, CL, CE in the top row; STAT., RSLT. in the middle row; and FEED, DATA in the bottom row. The STAT. button in the middle left position is highlighted with a grey background.	• STAT. (Statistical data selection key) (1) MODE 1 Selects the standard mode, the statistical calculation mode or the dump print mode. (2) Printing using the DATA key or interval printing using the built-in timer in MODE 2 Selects the standard mode or the statistical calculation mode
 A diagram of a 3x3 grid of keyboard buttons. The buttons are labeled: SET, CL, CE in the top row; STAT., RSLT. in the middle row; and FEED, DATA in the bottom row. The RSLT. button in the middle right position is highlighted with a grey background.	• RSLT. (Result key) Prints the statistical calculation results.

	• CE (Cancel key) Clears the last data entry in the statistical calculation mode.
	• CL (Clear key) Clears all the data in memory in the statistical calculation mode.
	• SET (Set key) Cancels the chart printing and interval printing. Used with other keys as follows: (1) In MODE 2, hold down the SET key and press the FEED key to activate the interval setting mode. (2) In MODE 2, hold down the SET key and press the STAT. key to activate the target digits setting mode for chart printing. (3) Hold down the SET key and press the RSLT. key to activate the date/time setting mode.

9-4 Printing Format

In the standard, statistical calculation and chart mode, the AD-8121B prints data only in the specified output format, that is, A&D standard format set on the connected instrument.

In the standard and statistical calculation mode, the AD-8121B prints data as shown below.

(To print data as it is output, use the STAT. key to select the dump print mode in MODE 1, or set DIP switch No.2 to the ON position to select MODE 3. See "13. DUMP PRINT MODE" for details.)

Printing example in the standard mode and the statistical calculation mode (when unstable data is to be printed: DIP switch No.3 ON)

Input data	Data status			Printing example															
	Data	Polarity	Unit	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
"ST, +00012.34 g"	Stable	Plus	Gram	W	T									1	2	.	3	4	g
"ST, +00000.00 g"	Stable	Zero	Gram	W	T									0	.	0	0		g
"US, -00023.45 g"	Unstable	Minus	Gram	W	T									-	2	3	.	4	5 g
"QT, +00004567 PC"	Stable	Plus	Counting	Q	T									4	5	6	7	P	C
"US, -00005678 PC"	Unstable	Minus	Counting	Q	T									-	5	6	7	8	P C
"ST, GS, +0043.21kg"	Stable	Plus	Kilogram (Gross)	G	S									4	3	.	2	1	k g
"US, NT, +0031.97kg"	Unstable	Plus	Kilogram (Net)	N	T									3	1	.	9	7	k g
"ST, TR, +0011.24kg"	Stable	Plus	Kilogram (Tare)	T	R									1	1	.	2	4	k g

Note: Before shipment, the printer has been set to print stable data only (DIP switch No. 3 OFF).
Unstable data is output as "*".

Error messages

If an error occurs, one of the messages listed in the table below will be printed.

Error message	Probable causes
*	(1) Unstable or "over" data was input (2) Data which is different from the specified format was input.
C ERROR	(1) Improper cable connection (2) Baud rate do not match. (All should be set to 2400 bps.) (3) No power for the instrument (4) No data input in MODE 2
F ERROR	(1) Printer malfunction due to noise
NO DATA	(1) No data received from the instrument

10. CALENDAR/CLOCK FUNCTION

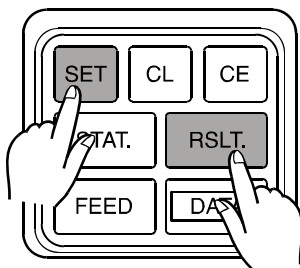
The AD-8121B has a built-in calendar/clock backed up by a lithium battery. The calendar/clock continues to operate with the power turned off.

The date and time have been adjusted before shipment. If they are not correct, they can be adjusted by key operation. See "10-1 Setting the Date/Time " for details.

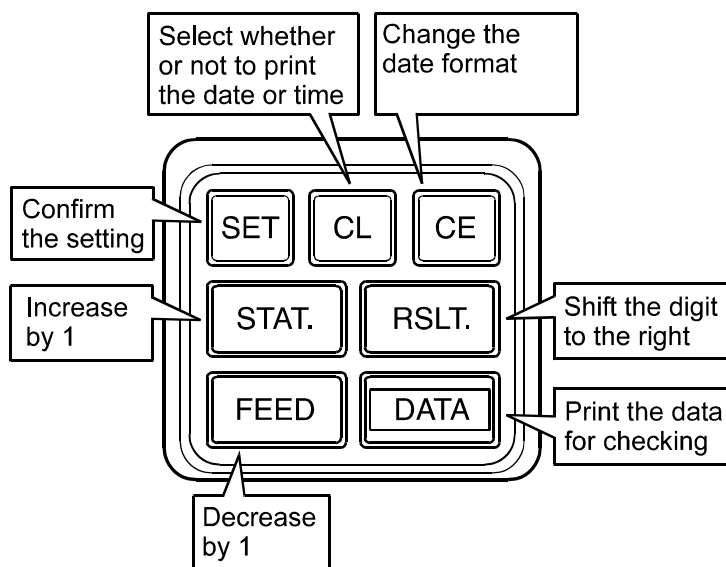
- Three types of date formats are available: Year/Month/Day, Month/Day/Year, Day/Month/Year
The time is set in 24 hours mode. (00:00:00 to 23:59:59)
- Whether or not to print the date and time can be selected. The date and time will be printed on separate lines.
In the statistical calculation mode, the date is printed before printing the statistical calculation results.
- In the dump print mode, the date and time can be printed by using control codes sent from the data source.
- Use the keys to set the date and time. The setting can be checked by printing it out.
- Whether or not to print the date and the time can be set independently.
- Leap years are automatically considered.

10-1 Setting the Date/Time

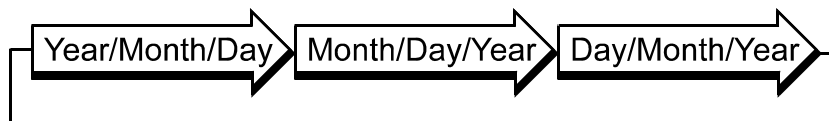
1. Press the RSLT. key while holding down the SET key to enter the date/time setting mode.



2. In the date/time setting mode, the keys function as follows:

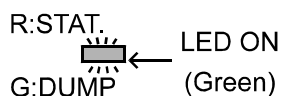


- **DATA** (Data key) Prints the data set for checking. The digit marked with "^" is the target digit to change using the STAT. key or the FEED key.
- **CE** (Cancel key) Selects the date format in the date setting mode as follows:



- **RSLT.** (Result key) Each time this key is pressed, the target digit is shifted to the right. The upper two digits for the year can not be selected. The "seconds" digits can not be selected. After specifying the changes using the SET key, the "seconds" digits are set to zero.
- **STAT.** (Statistical data selection key) Each time this key is pressed, the target digit of the setting value is increased by one. See Note 1.
- **FEED** (Feed key) Each time this key is pressed, the target digit of the setting value is decreased by one. See Note 1.
- **CL** (Clear key) Selects whether or not to print the date and time.

During "Printing" status, the green LED on the panel will illuminate.

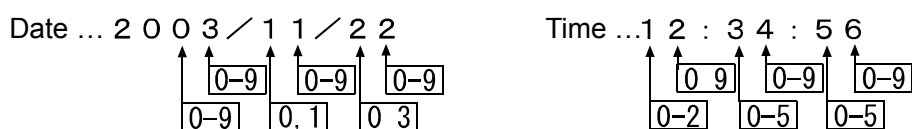


- **SET** (Set key) Confirms the setting and prints the setting status of whether or not to print the date and time

[Printing] *DATE PRINT ON* *TIME PRINT ON*
 [No printing] *DATE PRINT OFF* *TIME PRINT OFF*

After the date setting is confirmed, enters the time setting mode.
 After the time setting is confirmed, prints the specified date and time.
 See Note 2.

Note 1: The setting range is as follows: (Example 12:34:56, November 22, 2003)



Note 2: When a non-existing date or time is specified, the printer prints *DATE SET ERROR* or *TIME SET ERROR* and returns to the date/time setting mode.

10-2 Date/Time Setting Procedure

Described below is an example of the date and time setting procedure.

Setting item		Before	After
Date	Printing order	"Year / Month / Day"	"Month / Day / Year "
	Setting value	November 22, 2003	December 21, 2003
	Printing	Yes	No
Time	Setting value	10 : 06 : 32	13 : 57
	Printing	No	Yes

	Operation	Printout	Statistical calculation mode LED
Date setting	While holding down the SET key, press the RSLT. key. (To enter the date/time setting mode)	Y/M/D 2003/11/22 ^	R:STAT.  LED ON G:DUMP (Green)
	Press the CE key. (To change the printing order)	(M/D/Y 11/22/2003) ^	
	Press the DATA key. (To print data for checking)	M/D/Y 11/22/2003 ^	
	Press the RSLT. key. (To shift ^ 1 digit to the right)	(M/D/Y 11/22/2003) ^	
	Press the STAT. key. (To increase the digit by 1)	(M/D/Y 12/22/2003) ^	
	Press the DATA key. (To print data for checking)	M/D/Y 12/22/2003 ^	
	Press the RSLT. key. (To shift ^ 1 digit to the right)	(M/D/Y 12/22/2003) ^	
	Press the RSLT. key. (To shift ^ 1 digit to the right)	(M/D/Y 12/22/2003) ^	
	Press the FEED key. (To decrease the digit by 1)	(M/D/Y 12/21/2003) ^	
	Press the DATA key. (To print data for checking)	M/D/Y 12/21/2003 ^	
	Press the CL key. (Not to print the date)		R:STAT.  LED OFF G:DUMP
	Press the SET key. (To confirm the date)	*DATE PRINT OFF*	

Continued

Continued

	Operation	Printout	Statistical calculation mode LED
Time setting	(Prints the current time)	10:06:32 ^	R:STAT.  ← LED OFF G:DUMP
	Press the RSLT. key. (To shift ^ 1 digit to the right)	(10:06:32) ^	
	Press the STAT. key three times. (To increase the digit by 3)	(13:06:32) ^	
	Press the DATA key. (To print data for checking)	13:06:32 ^	
	Press the RSLT. key. (To shift ^ 1 digit to the right)	(13:06:32) ^	
	Press the FEED key. (To decrease the digit by 1)	(13:56:32) ^	
	Press the DATA key. (To print data for checking)	13:56:32 ^	
	Press the RSLT. key. (To shift ^ 1 digit to the right)	(13:56:32) ^	
	Press the STAT. key. (To increase the digit by 1)	(13:57:32) ^	
	Press the DATA key. (To print data for checking)	13:57:32 ^	
	Press the CL key. (To print the time)		R:STAT.  ← LED ON G:DUMP (Green)
	Press the SET key. (To confirm the time)	*TIME PRINT ON*	
	(Prints the date and time set)	12/21/2003 13:57	

Note: The data enclosed within the parentheses in the Printout column is what is to be printed when the DATA key is pressed.

11. INTERVAL PRINTING/CHART PRINTING

The AD-8121B can print input data at constant intervals using the built-in timer function. An interval of 5, 10 or 30 seconds, and 1, 5, 10 or 30 minutes can be set.

A chart can also be printed to automatically record changes in data with time using the built-in timer function. In chart printing, 2-digit data values, which are selected from the measurement data, are marked in a 50-division scale (00-99). When the number of data reaches 50, the printer prints the scale and the time elapsed. In chart printing, unstable data is printed regardless of DIP switch No.3 setting.

Interval printing and chart printing can be done in MODE 2

11-1 Interval Printing Procedure

Described below is an example of the interval printing procedure with the date set to be printed.

Step	Operation	Printout																								
1	Set the printer to MODE 2 (DIP switch No.1 ON, No.2 OFF).	*MODE-2*																								
2	Set the instrument data output mode to "stream mode" (Continuous output) and data format to "A&D standard format".																									
3	While holding down the SET key, press the STAT. key.	*CHART MODE*																								
4	Press the CE key to turn the chart printing function off.	*CHART OFF*																								
5	While holding down the SET key, press the FEED key.	*INTERVAL TIME*																								
6	Set the time interval using the following keys: <table border="1"> <thead> <tr> <th>Time interval</th><th>Key</th><th>Printout</th></tr> </thead> <tbody> <tr> <td>5 seconds</td><td>FEED</td><td>5 SEC.</td></tr> <tr> <td>10 seconds</td><td>DATA</td><td>10 SEC.</td></tr> <tr> <td>30 seconds</td><td>STAT.</td><td>30 SEC.</td></tr> <tr> <td>1 minute</td><td>RSLT.</td><td>1 MIN.</td></tr> <tr> <td>5 minutes</td><td>SET</td><td>5 MIN.</td></tr> <tr> <td>10 minutes</td><td>CL</td><td>10 MIN.</td></tr> <tr> <td>30 minutes</td><td>CE</td><td>30 MIN.</td></tr> </tbody> </table>	Time interval	Key	Printout	5 seconds	FEED	5 SEC.	10 seconds	DATA	10 SEC.	30 seconds	STAT.	30 SEC.	1 minute	RSLT.	1 MIN.	5 minutes	SET	5 MIN.	10 minutes	CL	10 MIN.	30 minutes	CE	30 MIN.	10 SEC. (Example when the DATA key is pressed.)
Time interval	Key	Printout																								
5 seconds	FEED	5 SEC.																								
10 seconds	DATA	10 SEC.																								
30 seconds	STAT.	30 SEC.																								
1 minute	RSLT.	1 MIN.																								
5 minutes	SET	5 MIN.																								
10 minutes	CL	10 MIN.																								
30 minutes	CE	30 MIN.																								
7	Press the DATA key to start interval printing.	TIME 15:31:46 WT 12.34 g																								
8	To stop interval printing, press the SET key.	*INTERVAL OFF*																								
9	To resume interval printing, repeat the procedure starting with step 5.																									

11-2 Chart Printing Procedure

Step	Operation	Printout																								
1	Set the printer to MODE 2 (DIP switch No.1 ON, No.2 OFF).	*MODE-2*																								
2	Set the instrument data output mode to "stream mode" (Continuous output) and data format to "A&D standard format".																									
3	While holding down the SET key, press the STAT. key.	*CHART MODE*																								
4	Select the target digits for chart printing using the following keys. <table border="1"> <thead> <tr> <th>Target digits</th><th>Key</th><th>Printout</th></tr> </thead> <tbody> <tr> <td>$10^1 - 10^0$</td><td>CL</td><td>6543210 ^^</td></tr> <tr> <td>$10^2 - 10^1$</td><td>SET</td><td>6543210 ^^</td></tr> <tr> <td>$10^3 - 10^2$</td><td>RSLT.</td><td>6543210 ^^</td></tr> <tr> <td>$10^4 - 10^3$</td><td>STAT.</td><td>6543210 ^^</td></tr> <tr> <td>$10^5 - 10^4$</td><td>DATA</td><td>6543210 ^^</td></tr> <tr> <td>$10^6 - 10^5$</td><td>FEED</td><td>6543210 ^^</td></tr> </tbody> </table>	Target digits	Key	Printout	$10^1 - 10^0$	CL	6543210 ^^	$10^2 - 10^1$	SET	6543210 ^^	$10^3 - 10^2$	RSLT.	6543210 ^^	$10^4 - 10^3$	STAT.	6543210 ^^	$10^5 - 10^4$	DATA	6543210 ^^	$10^6 - 10^5$	FEED	6543210 ^^	6543210 ^^ (Example when the CL key is pressed.)			
Target digits	Key	Printout																								
$10^1 - 10^0$	CL	6543210 ^^																								
$10^2 - 10^1$	SET	6543210 ^^																								
$10^3 - 10^2$	RSLT.	6543210 ^^																								
$10^4 - 10^3$	STAT.	6543210 ^^																								
$10^5 - 10^4$	DATA	6543210 ^^																								
$10^6 - 10^5$	FEED	6543210 ^^																								
5	While holding down the SET key, press the FEED key.	*INTERVAL TIME*																								
6	Set the time interval using the following keys: <table border="1"> <thead> <tr> <th>Time interval</th><th>Key</th><th>Printout</th></tr> </thead> <tbody> <tr> <td>5 seconds</td><td>FEED</td><td>5 SEC.</td></tr> <tr> <td>10 seconds</td><td>DATA</td><td>10 SEC.</td></tr> <tr> <td>30 seconds</td><td>STAT.</td><td>30 SEC.</td></tr> <tr> <td>1 minute</td><td>RSLT.</td><td>1 MIN.</td></tr> <tr> <td>5 minutes</td><td>SET</td><td>5 MIN.</td></tr> <tr> <td>10 minutes</td><td>CL</td><td>10 MIN.</td></tr> <tr> <td>30 minutes</td><td>CE</td><td>30 MIN.</td></tr> </tbody> </table>	Time interval	Key	Printout	5 seconds	FEED	5 SEC.	10 seconds	DATA	10 SEC.	30 seconds	STAT.	30 SEC.	1 minute	RSLT.	1 MIN.	5 minutes	SET	5 MIN.	10 minutes	CL	10 MIN.	30 minutes	CE	30 MIN.	5 SEC. (Example when the FEED key is pressed.)
Time interval	Key	Printout																								
5 seconds	FEED	5 SEC.																								
10 seconds	DATA	10 SEC.																								
30 seconds	STAT.	30 SEC.																								
1 minute	RSLT.	1 MIN.																								
5 minutes	SET	5 MIN.																								
10 minutes	CL	10 MIN.																								
30 minutes	CE	30 MIN.																								
7	Press the DATA key to start chart printing. See Note 1.	DATE 2003/11/22 TIME 15:31:46 WT 8335.11 g ^^																								
8	To stop chart printing temporarily, press the SET key. See Note 2.	STOP 12:40:08 WT 8335.14 g ^^																								
9	To resume chart printing, press the DATA key.																									
	To exit chart printing, press the CE key or CL key. To resume chart printing, repeat the procedure starting with step 3.	*CHART OFF*																								
	Press the STAT. key to exit chart printing and go to the statistical calculation mode.	*CHART OFF*																								
	To change the time interval, repeat the procedure starting with step 5.																									

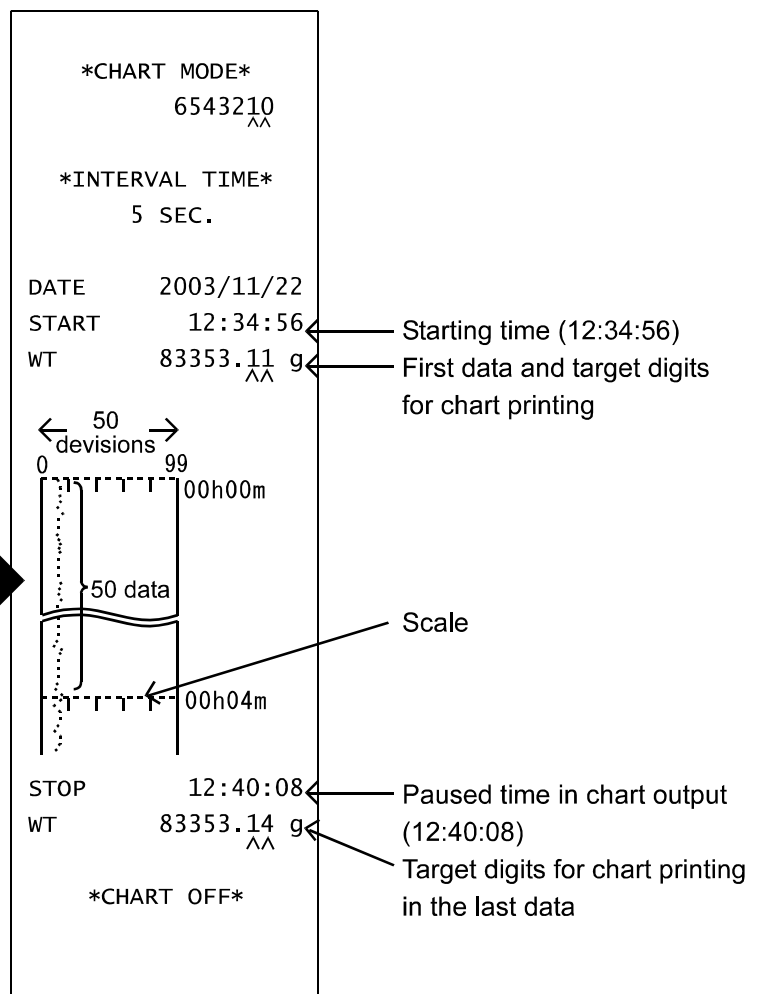
Note 1: When no data is sent, the printer waits for the data to be sent.

Note 2: When no data is sent, "*NO DATA*" is printed.

Printing Example

The below is a printing example in the chart printing mode.

Printing in the chart mode:
The scale is divided into 50 and marked; leftmost for 0 and rightmost for 99, with two-digit data.
When there are 50 measurement data, the scale and elapsed time are printed.



12. STATISTICAL CALCULATION MODE



Statistical calculations will be available only in MODE 1 and MODE 2. Be sure to set the DIP switches No.1 and No.2.

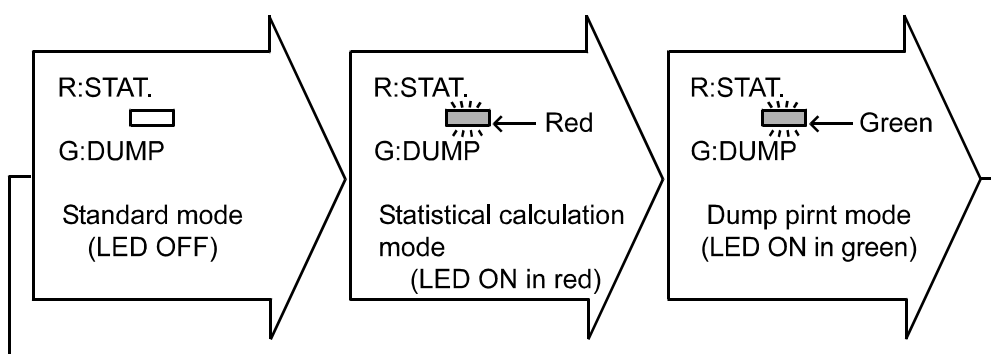
The AD-8121B provides the results of statistical calculation as well as printing weight data, percentage data or counting data.

Additionally, time can be printed for each data.

12-1 Selection of Standard Mode or Statistical Calculation Mode

- To select the standard mode or statistical calculation mode (for weight data or counting data), press the STAT. key. In MODE 1, the dump print mode is also available for selection.

The selected mode is indicated by the LED status as shown below.



When the date is set to be printed, the date will be printed when the printer is set from the standard mode to the statistical calculation mode.

12-2 Printing in the Statistical Calculation Mode

- To clear the statistical calculation data, press the CL key.
When the data is cleared, the printer will print *CLEAR*..... (1)
- When data is input, a sample number is added automatically and printed. When the time is set to be printed, the time will be printed after the sample number. (Note that the date will not be printed for each data.) (2)
- If there is a change in the weight unit (e.g., lb, oz, ozt, g, kg, t, dwt, ct, mm, TL, GN, %, PC) or in the data type, such data will be printed but excluded from statistical calculations..... (3)
- If an error occurs, the entry may be cleared by pressing the CE key. *CANCEL* is then printed. The last data is excluded from statistical calculations..... (4)
- Press the RSLT. key to obtain the calculation results. The number of data (N) and the total value (TOTAL) are then printed. (5)
When the date is set to be printed, the date will be printed on the line preceding that of the number of data (N).
- To continue calculation, input the next data.....(6)
- Press the RSLT. key again to print the maximum value (MAX), minimum value (MIN), average value ($\bar{X}$), standard deviation (σ), coefficient of variation (CV) and difference between maximum and minimum value(R). (7)
Coefficient of variation (CV) = $\frac{\text{Standard deviation (} \sigma \text{)}}{\text{Average (} \bar{X} \text{)}} \times 100 (\%)$
- The maximum number of data entries possible is 999. If the 999th entry is made, the printer will automatically make a full printout of all the statistical information for the preceding entries, erase its memory and then start again by handling the 1,000th entry as entry number one.

- Printing example -

```

(1)      * CLEAR *

(2)      No.   1  10:09:52
          WT    178.632 g

(3)      TIME   10:10:07
          WT     22.481 kg
          No.   2  10:10:23
          WT    178.668 g
          No.   3  10:10:38
          WT    178.654 g

(3)      TIME   10:10:54
          WT   178653 mg
          No.   4  10:11:09
          WT    178.596 g

(4)      * CANCEL *
          No.   4  10:11:44
          WT    178.640 g
          No.   5  10:11:59
          WT    178.599 g

(5)      DATE   2003/11/22

          N              5
          TOTAL
                   893.193 g

(6)      No.   6  10:12:30
          WT    178.623 g
          No.   7  10:12:45
          WT    178.647 g

(5)      DATE   2003/11/22

          N              7
          TOTAL
                   1250.463 g

(7)      MAX    178.668 g
          MIN    178.559 g
           $\bar{X}$      178.638 g
           $\sigma$     0.0224 g
          CV      0.01 %
          R       0.069 g
  
```

13. DUMP PRINT MODE

13-1 Printing in Dump Print Mode

There are two ways to select the dump print mode:

- In MODE 1 (DIP switches No.1 and No.2 OFF), press the STAT. key.
- Select MODE 3 (DIP switch No.2 ON)

In the dump print mode, the received data is printed as it is.

The data consists of ASCII code 20 (H) to 7F (H) and characters shown below can be printed.

		** CHARACTER **															
		Second digit															
First digit		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
	2xH	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/	
	3xH	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
	4xH	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	5xH	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
	6xH	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
	7xH	p	q	r	s	t	u	v	w	x	y	z	{		}	~	*

The specified code is processed as follows.

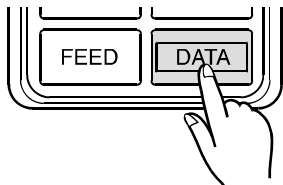
- 1B (H) 44 (H) <CR><LF> Prints the date.
1B (H) 54 (H) <CR><LF> Prints the time.

Up to 16 characters can be printed per line. For 17 or more characters, a line is generated after 16 characters are printed, but the remaining characters are ignored.

To print the whole data with more than 16 characters, set an interval of 1.6 seconds or more between the first data (consisting of one line) and the next data.

13-2 Online/Offline

In the dump print mode of MODE 3, the received data is printed as it is. The printer can also be set not to print even when data is received.



Whether or not to print data is selected alternately each time the DATA key is pressed in MODE 3.

"Online" denotes printable status when data is received, and "offline" denotes non-printable status when data is received.

The green LED on the printer goes on or off accordingly.

MODE 3 (DIP switch No.2 ON)	
Prints received data.	R:STAT. G:DUMP  LED ON (Green)
Does not print received data	R:STAT. G:DUMP  LED OFF

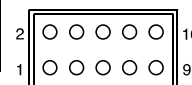
14. SPECIFICATIONS

14-1 General Specifications

Model	AD-8121B	Printer Paper	PP143
Printer Type	Impact dot matrix printer	Paper Quality	Fine
Character Size	5 x 7 dots 2.5 (H) x 1.8 (W) mm 0.1(H) x 0.7 (W) inches	Paper Thickness	0.07 mm
Printing Speed	Approx. 1 line per second	Paper Width	44.5 mm
Paper Feed Speed	Approx. 1 line per second	Length	Approx. 50 m
Number of Characters	16 characters per line	Maximum Rolled Diameter	65 mm
Power Supply	AC Adapter Alkaline batteries		
Lithium Battery Life	Approx. 5 years		
Battery operation time	Approx. 3500 data		
Printer Head Life	Approx. 500,000 lines		
Operating Temperature Range	0°C to 40°C / 32°F to 104°F		
Operating Humidity Range	80%RH or less (No condensation)		
Storage Temperature Range	-10°C to 50°C / 14°F to 122°F		
Data Input Section	RS-232C or current loop		
External Control	Printing only		
Dimensions	180 (W) x 160 (D) x 80.5 (H) mm 7.1 (W) x 6.3 (D) x 3.2 (H) inches		
Weight (Main unit)	Approx. 400g / 0.88lb (Without paper or batteries)		

14-2 Input Specifications

Communication Method	RS-232C or current loop	Pin No	Signal
Baud Rate	2400 bps	3	RXD (Received data)
Data Bit Length	7 bits	4	To be internally connected to pin 5
Parity Bit	EVEN	5	To be internally connected to pin 4
Stop Bits	1 bit or 2 bits	7	SG (Signal ground)
Code	ASCII	9	Current loop
Terminator	<CR><LF> (0Dh, 0Ah)	10	Current loop
Input Connector	XG4C-T0003 (Omron)		



14-3 Statistical Calculation Specifications

N	:	Number of data (Max. 999)
TOTAL	:	Total value
MAX	:	Maximum value
MIN	:	Minimum value
$\bar{X}$	:	Average value
σ	:	Standard deviation
CV	:	Coefficient of variation
R	:	Range (Difference between maximum and minimum)

$$\sigma = \sqrt{\frac{N \cdot \sum (X_i)^2 - (\sum X_i)^2}{N \cdot (N - 1)}}$$

$$CV = \frac{\sigma}{\bar{X}} \times 100 (\%)$$

Note: Specifications are subject to change for improvement without notice.

MEMO

[illegible]