M055-E017

SHIMADZU

Shimadzu Electronic Printer Instruction Manual

EP-90

READ AND UNDERSTAND THIS MANUAL BEFORE OPERATION. SAVE THIS MANUAL.

SHIMADZU CORPORATION
ANALYTICAL & MEASURING INSTRUMENTS DIVISION
KYOTO, JAPAN

Note

This instruction manual uses the following notation conventions to indicate Safety Precautions and additional information.

Caution	Indicates a potentially hazardous situation that may result in injury to personnel or equipment damage.
Note	Provides additional information needed to properly use the balance.

Safety Precautions

Caution

To ensure safe and proper operation of the Printer, observe the following precautions.

- **Do not use the Printer in hazardous areas.**
  This includes areas where the balance is expose to dust or flammable gases and liquids.
- **Use the AC adapter specified by Shimadzu.**
  To prevent electric shock, never disassemble the AC adapter.
  The AC adapter is designed for indoor use only. Do not use the AC adapter in exterior environments or where it may be splashed by water.
  Ensure that the power supply voltage meets the indicated range of the AC adapter.
- **Handle the printer carefully.**
  This printer is a precision instrument.
- **Do not disassemble the printer.**

CE Declaration Of Conformity

Shimadzu Corporation declares that the following product:

EP-90 Electronic Printer

conforms to the following directives.

Directives
EMC directive 89/336/EEC amended by 92/31/EEC, 93/68/EEC
EN55022: 1994 / A1: 1995 / A2: 1997 (Class B)
EN55024: 1998
EN61000-3-2: 1995 /A1: 1998 /A2: 1998, EN61000-3-3: 1995
Low Voltage directive 73/23/EEC amended by 93/68/EEC
EN60950: 1992 /A1: 1993 /A2: 1993

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Contents

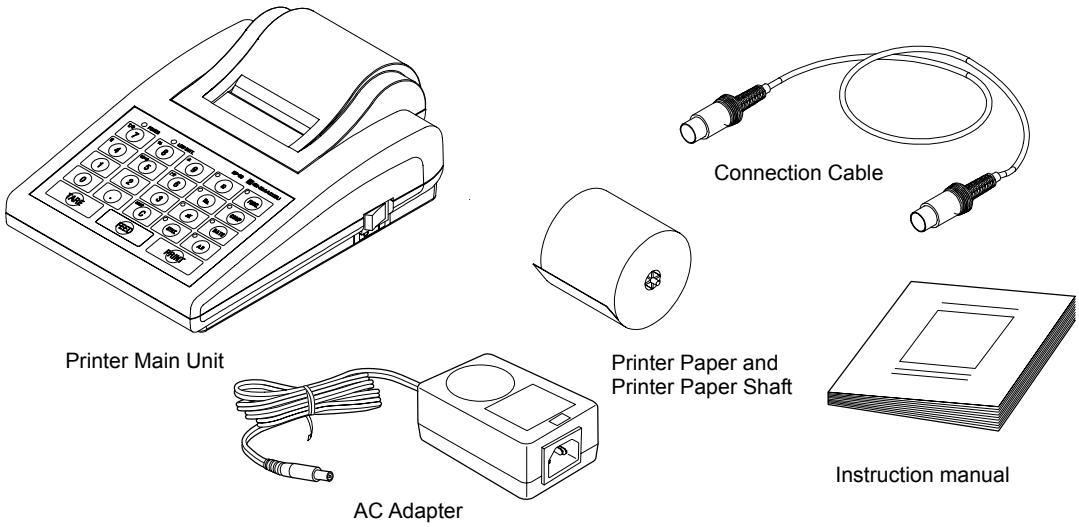
1. Introduction

Shimadzu Electronic Printer EP-90 is designed to be used with Shimadzu Electronic Balances. It is easy to operate and useful for a wide range of applications and measurement administration. Capability of battery operation is convenient for field use and transportation. Printing method is impact dot on normal paper, which is suitable for long-term storage. Commands for printing, taring, auto print and other balance functions can be sent to the balance with the EP-90 printer keys. ID number, sample number, date and time can be input when printing the measurement results. Statistic calculation function allows up to 1000 samples to be calculated and prints out the results.

2. Packing List and Component Names

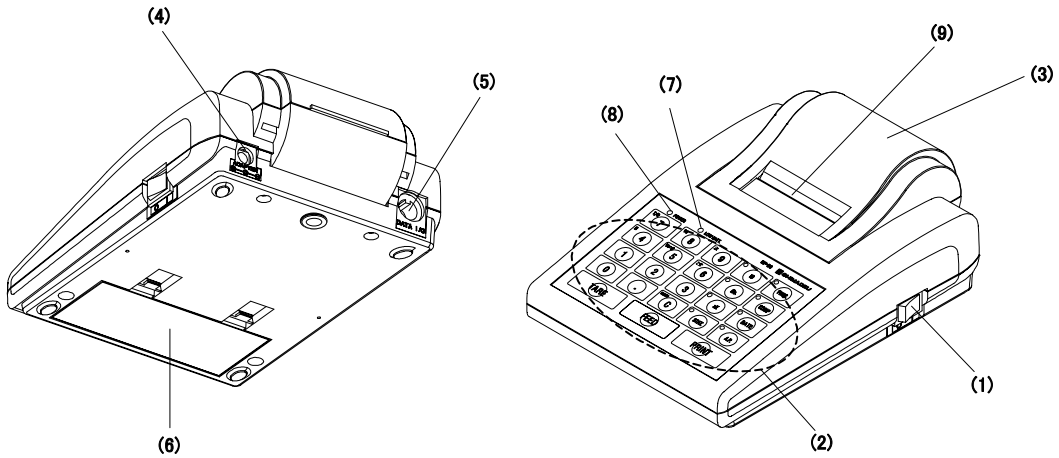
2.1 Packing list

Unpack and verify that the following standard packed items (one each) are present.



The shape of the supplied AC adapter may differ from the figure above.

2.2 Main unit components



(1) Power switch (2) Key switches (Number keys and command keys)* (3) Printer paper cover
(4) Power connector (5) Data I/O connector (6) Battery cover (7) LOW BATT lamp
(8) Power indication lamp (9) Cutter

*Refer to “4.1 Key Switches and Functions” for the names and functions of key switches.

3. Installation

3.1 Installation Site

Caution

For safe and proper operation, avoid sites where EP-90 is exposed to the following:

- Corrosive or flammable gasses
- Dust, wind, electromagnetic waves, or magnetic fields
- Direct sunlight
- Extreme temperature, temperature changes or humidity

3.2 Power

EP-90 can be operated either with AC adapter or with batteries.

(When using AC Adapter)

Choose a site where the standard AC adapter can be used.

Make certain the supplied power voltage meets the AC adapter's specification.

Remove batteries when using AC adapter.

(When using batteries)

Use alkaline batteries only.

Disconnect AC adapter when using batteries.

Make certain to turn power switch off after use.

Replace with new batteries promptly when LOW BATT lamp is illuminated.

Caution

Observe the following instructions about handling batteries.

1. Load batteries observing the polarity.
2. Do not mix new and used batteries.
3. Do not mix batteries of different kinds.
4. Do not use any rechargeable batteries.
5. Remove and dispose of used batteries as soon as LOW BATT lamp is illuminated.
6. Remove batteries when printer is not in use for a long period.

Caution

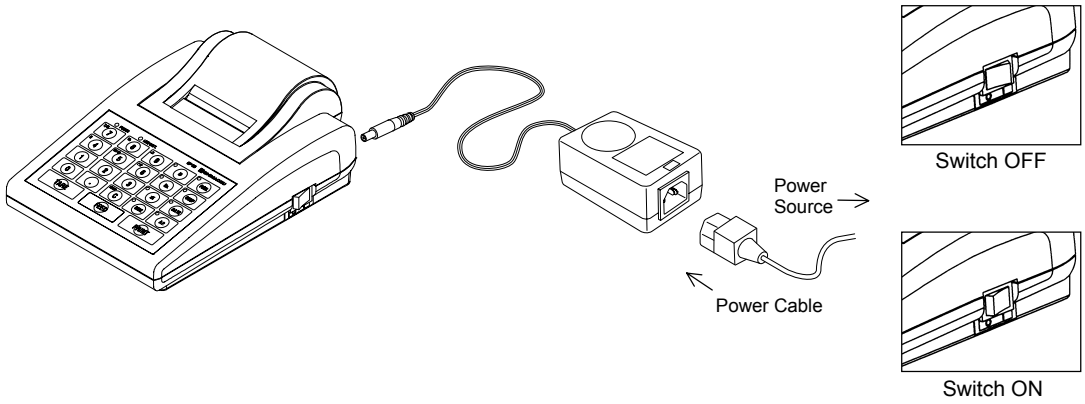
Use the AC adapter supplied by Shimadzu representative only. (DC 9V-12V, 2A) Using other adapters may cause failure. When EP-90 is not in use, disconnect AC adapter from power source.

3.3 Installation

3.3.1 Connecting to power (when using AC adapter)

Verify power switch is off.

Connect AC adapter to EP-90. Connect AC adapter to designated power source.

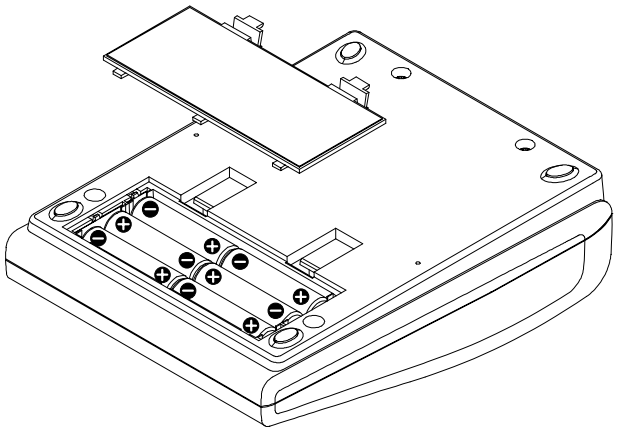


The shape of the supplied AC adapter may differ from the figure above.

3.3.2 Loading batteries (when using batteries)

Disconnect AC adapter. Turn power switch OFF.

Turn over the printer main unit and remove battery cover. Load batteries as shown in the figure.



Load batteries correctly observing the polarity shown in the figure. Use alkaline batteries only.

3.3.3 Loading printer paper

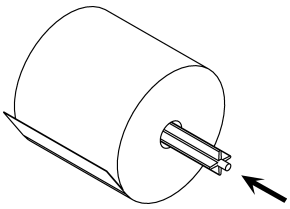
Connect AC adapter or load batteries.
Remove printer paper cover.

(How to remove printer paper cover)

Lift rear of printer as shown in the figure.
(When replacing, take out the remaining roll and pull out printer paper shaft.)

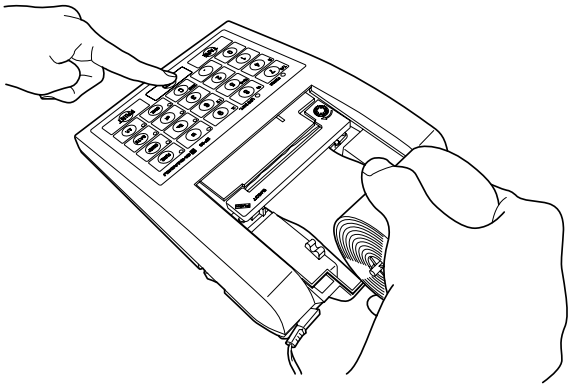
Verify there are no bends or folds in the paper end.

Insert printer paper shaft to the center of the paper roll as shown in the figure. (Printer paper shaft is inserted when EP-90 is delivered)

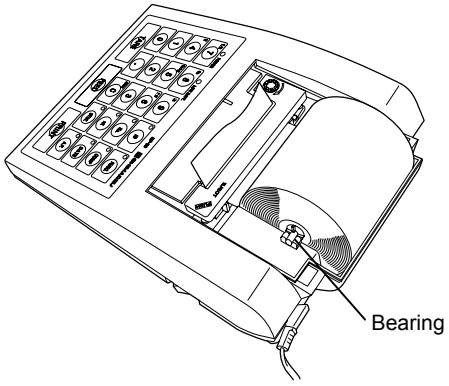


Turn power switch ON.

Keep pressing FEED key while inserting the printer paper end into the slot of the printer mechanism as shown in the figure. Feed the paper until its end comes out.

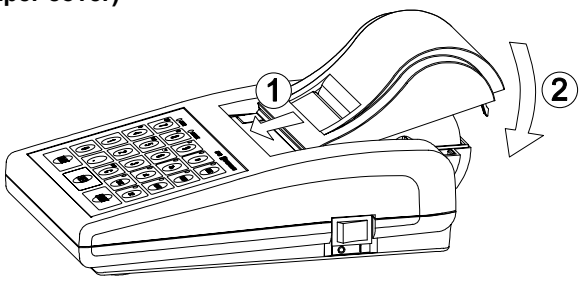


Place printer paper shaft on the bearings and tension the paper.



Close printer paper cover.

(How to fit printer paper cover)



Slide printer paper cover forward as shown in the figure, then lower the rear to close it.

3.4 Connecting the Balance

Cable connection

Turn OFF the balance and EP-90.

Firmly attach connection cable to the I/O connectors of the balance and EP-90.

Turning power ON/OFF

Follow the sequence below when turning ON/OFF.

(1) When turning ON

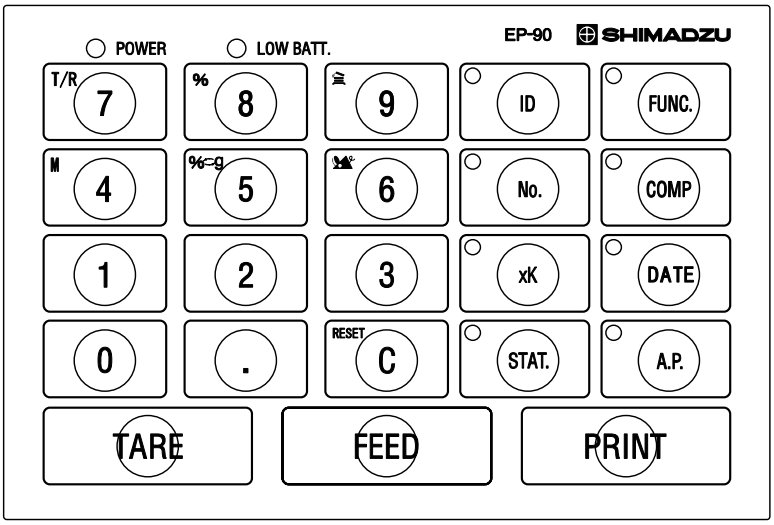
Turn ON the balance first and then EP-90.

(2) When turning OFF

Turn OFF EP-90 first and then the balance.

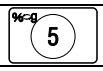
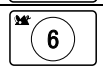
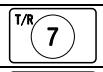
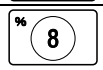
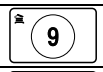
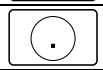
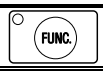
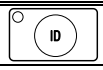
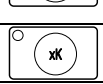
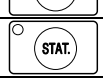
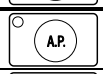
4. Functions and Operation

4.1 Key Switches and Functions



Basic operation requires keys and functions marked by bold frame only.

Key / Name	Key category / Name of attached lamp	Function		Description
		Main Function (when Function lamp is OFF)	Sub Function (When Function lamp is ON) (*1)	Command code sent to the balance (*2)
PRINT PRINT (Refer to 4.2)	Command key	Command the balance to send data. (*7)		D05
FEED FEED (Refer to 4.2)	Command key	Feed printer paper.		None
TARE TARE (Refer to 4.2)	Command key	Command the balance tare the display. (*8)		T
0 0	Number key	Numeral 0	None	None
1 1	Number key	Numeral 1	None	None
2 2	Number key	Numeral 2	None	None
3 3	Number key	Numeral 3	None	None
M 4 4	Number key	Numeral 4	Turn ON the balance's formulation mode. (Ignored if the balance doesn't have formulation mode)	M (*6)

Key / Name	Key category / Name of attached lamp	Function		Description
		Main Function (when Function lamp is OFF)	Sub Function (When Function lamp is ON) (*1)	Command code sent to the balance (*2)
 5	Number key	Numeral 5	Unit switching on the balance between % and gram	G (*6)
 6	Number key	Numeral 6	Turn On the balance's animal weighing mode (Ignored if the balance doesn't have animal weighing mode)	A (*6)
 7	Number key	Numeral 7	Turn OFF the balance's application mode (formulation, animal weighing, add-on, etc.)	R (*6)
 8	Number key	Numeral 8	Setting the balance's per cent display mode (Switching the unit to % and setting the current load as 100 %)	% (*6)
 9	Number key	Numeral 9	Turn On the balance's Add-on mode (Ignored if the balance doesn't have Add-on mode)	+ (*6)
 . (decimal point)	Number key	Numeral decimal point	None	None
 C (Reset)	Number key	Clear numeral input	Clears the numerical values set by ID Number, Sample Number, Comparator, and xK functions of EP-90. Also clears the above four functions and date output. (When in statistic calculation mode, prints the results.)	None
 FUNC	Command key / Function lamp	Assign sub functions to part of number keys (*1)		None
 ID (Refer to 4.3)	Command key / ID lamp	Store the set number as the ID and prints it with the weighed result. Maximum 10 digits.		None
 No. (Refer to 4.4)	Command key / No. lamp	Store the set number as the Sample number and print it with the mass data (weighed result). Sample number is counted up at each data output. Maximum 10 digits. (0000000001 to 9999999999)		None
 xK (Refer to 4.5)	Command key / xK lamp	Store the set number as constant K and print the mass value multiplied by K. K: up to 8 digits including decimal point.		None
 STAT. (Refer to 4.6)	Command key / STAT. lamp	Enter statistic calculation mode.		None
 COMP (Refer to 4.7)	Command key / COMP lamp	Enter comparator (checkweighing) mode. (*5)		None
 A.P. (Refer to 4.8)	Command key / Auto Print lamp	Turn ON/OFF the balance's auto print function (*3)		D06 / D09
 DATE (Refer to 4.9)	Command key / DATE lamp	Receive date and time from the balance and print them. (*4)		TIME

(*1) Function lamp is turned ON and OFF every time FUNC key is pressed. Sub function is assigned to number key, only when Function lamp is ON.

(*2) Pressing the indicated key of EP-90 is equivalent to sending the command code here from a computer to the balance. For further information on command codes, refer to the balance's instruction manual. When the connected balance is not equipped with the concerned function, the command is not recognized.

(*3) This key on EP-90 only turns it ON/OFF. With balance series for which detailed conditions of auto print function can be selected (UW/UX, BW-K/BX-K etc.), the current settings on the balance remain valid. Refer to the balance's instruction manual for the details. Auto print is activated even with the series for which auto print cannot be set on the balance (BL, EL/ELB etc.). As soon as stability is resumed after sample is loaded at zero display, the mass value is automatically printed out.

(*4) Only with the balances equipped with built-in clock. Refer to the balance's instruction manual for details of built-in clock.

(*5) Receives the mass data from the balance, then EP-90 processes it and print out the checkweighing result. This function works separately from the checkweighing functions of UW/UX series, BW-K/BX-K series, etc. Works with any balance connected to EP-90.

(*6) Command code is output only when Function lamp is ON.

(*7) Equivalent to pressing the PRINT key of the balance

(*8) Equivalent to pressing the TARE or O/T key of the balance

Combined use of functions of EP-90 printer

X indicates available combination for simultaneous use.

ID number	X					
Sample number	X	X				
xK Mode	X	X	X			
Comparator	X	X	X			
Auto Print	X	X	X	X	X	
Statistic calculation						X
	Date output	ID number	Sample number	xK Mode	Comparator	Auto Print

Combined use of functions of EP-90 printer and functions of the balance

Date output, ID number, Sample number, xK Mode of EP-90 printer can be simultaneously used with any function of the balance that involves data output. At every mass data output, these EP-90's functions operate the same way as when mass data is output by pressing the print key.

(e.g.) While formulation mode of the balance is used, if ID number and Sample number functions are ON, lines of ID/Sample numbers are inserted before each component mass value. Turn off EP-90's functions if they are not desired for each component.

4.2 Basic Operation

While weighed result is displayed on the balance, if PRINT key of EP-90 or PRINT key of the balance is pressed, the displayed value will be printed out with an indication of the weighing unit.

Depending on the balance series, additional data apart from weighed results such as calibration report, application measurement results, date and time may also be output to EP-90 for printing. The PRINT key of the balance or the balance's function menu should be used to output such items. Refer to the balance's operation manual for instructions.

4.3 ID Number

4.3.1 Setting ID number

The ID number is a 10 digit character string which can consist of both numerals and decimal points.
When fewer than 10 digits are entered, zeros fill in to the left of the entered numbers to total 10 digits.
If entering more than 10 digits is attempted, an error message “ERR” is printed out.

[setting procedure]
Verify function lamp [FUNC.] is off. If not, press FUNC key [FUNC.] to turn it off.
Verify ID lamp [ID] is off. If not, press ID key [ID] to turn it off.

	(example)
(1) Press Reset key [RESET C].	[RESET C]
(2) Key in ID number.	[1] [2] [·] [3] [4] [·] [5] [6]
(3) Press ID key [ID].	Print-out `ID:12.34.56`

4.3.2 Printing of ID number

While ID number lamp [ID] is on, upon printing mass data, ID number is automatically printed as a line before mass data.
Toggle ID key [ID] to turn ID number lamp on/off.

(example)

```
ID:12.34.56
                    99.94g
```

In order to print the currently set ID number, press ID key [ID] when ID number lamp is off.

4.4 Sample Number

4.4.1 Setting sample number

Sample number is counted up at each data output.
The sample number is a 10 digit integer that cannot include a decimal point.
When an integer of fewer than 10 digits is entered, zeros fill from the left to total 10 digits.
If entering an integer of more than 10 digits or a decimal point is attempted, an error message “ERR” is printed out.

[setting procedure]
Verify function lamp [FUNC.] is off. If not, press FUNC key [FUNC.] to turn it off.
Verify sample number lamp [No.] is off. If not, press No. key [No.] to turn it off.

	(example)
(1) Press Reset key [C].	[C]
(2) Key in sample number.	[1] [2] [3] [4] [5] [6] [7] [8]
(3) Press No. key [No.].	Print-out `NO.0012345678`

4.4.2 Printing of sample number

While sample number lamp [No.] is on, upon printing mass data, sample number is automatically printed as a line before mass data.
Sample number is counted up at each data output.
Toggle No. key [No.] to turn sample number lamp on/off.

(example)

```
NO.0012345678
                  49.97g
NO.0012345679
                  49.97g
```

In order to print the currently set sample number, press No. key [No.] when sample number lamp is off.

4.5 xK Mode

4.5.1 Setting constant K

The constant K is a positive number of 8 or fewer digits including one decimal point.

[setting procedure]

Verify function lamp [FUNC] is off. If not, press FUNC key [FUNC] to turn it off.
Verify xK lamp [xK] is off. If not, press xK key [xK] to turn it off.

	(example)
(1) Press Reset key [C].	[C]
(2) Key in constant K.	[0] [.] [5]
(3) Press xK key [xK].	Print-out K= 0.5

4.5.2 Printing of the result of multiplication by constant

While xK lamp [xK] is on, the mass value from the balance is multiplied by the constant K and printed.
Toggle xK key [xK] to turn xK lamp on/off.

(example)

```
K=          0.5
*K        24.98
```

In order to print the currently set constant K value, press xK key [xK] without setting numeral when xK lamp is off.

4.6 Statistic Calculation Mode

While STAT. Lamp [STAT.] is on, EP-90 collects each mass value that is printed from the balance and performs statistical calculations on these values when each set is complete.

4.6.1 Setting statistical calculation mode

Press STAT key [STAT.] when STAT. lamp [STAT.] is off.
STAT. lamp turns on and statistical calculation mode is entered.

(example)

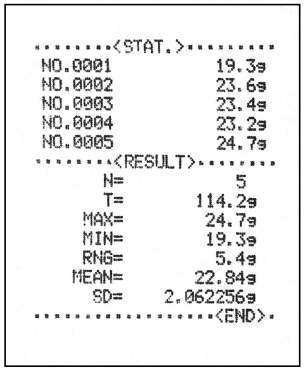
(1) Press STAT key [STAT.].
(2) Place a container on the balance.
(3) Press TARE key [TARE].
(4) Place the sample into the container to weigh it.
(5) Print the weighed result by pressing PRINT key [PRINT] and unload the balance.
(6) Repeat (2) through (5) for the rest of samples in a set. The samples are automatically numbered in sequence.
(7) When all the samples have been weighed, press STAT key [STAT.] to print out the result of statistical calculations for the set of samples. STAT. lamp goes off.

The results of statistic calculation are printed out in the following order.

Order in print out	Statistics	Symbol in print out	Description
1	Number of samples	N	
2	Total	T	
3	Maximum	MAX	
4	Minimum	MIN	
5	Range	RNG	= MAX – MIN
6	Mean	MEAN	= T / N
7	Standard deviation	SD	$\sqrt{\frac{\sum(\mathrm{Xi}-\mathrm{MEAN})^2}{\mathrm{N}-1}}$

- Statistics of up to 1,000 samples can be calculated. When the number of samples reaches 1,000, statistic calculation will be automatically performed, the results will be printed out, and the printer will exit statistic calculation mode.
- Once the results of statistic calculation have been printed out and the statistic calculation mode has been exited, the data that has been obtained up to that point can no longer be recalled.
  The number of significant figures is 7 in EP-90. The calculated values may contain errors due to the smaller number of digits of weighing data depending on the balance model.

(Example of print out)



4.7 Comparator Mode (checkweighing)

When COMP lamp [COMP] is on and mass value from the balance is printed, checkweighing result "LOW", "OK" or "HIGH" will be attached to each mass value. Checkweighing is performed according to the two preset thresholds as below.

HIGH (over)
HIGH threshold
OK (pass)
LOW threshold
LOW (under)

4.7.1 Setting comparator thresholds

[setting procedure]
Verify function lamp [FUNC.] is off. If not, press FUNC key [FUNC.] to turn it off.
Verify COMP lamp [COMP] is off. If not, press COMP key [COMP] to turn it off.
Set HIGH threshold and LOW threshold in this order as the following.

Note

After HIGH threshold has been set, it is stand-by for the LOW threshold setting.
At this time, key operations except for [COMP], [TARE], and [FEED] are invalid.

	(example)
(1) Press Reset key [C].	[C]
(2) Key in HIGH threshold.	1 0 0 · 5
(3) Press COMP key [COMP].	Print-out HIGH= 100.5
(4) Key in LOW threshold.	9 9 · 5
(5) Press COMP key [COMP].	Print-out LOW = 99.5

Note

A comparator threshold must be a positive value of not more than 10 digits.

4.7.2 Turning comparator mode on

Press COMP key [COMP] when COMP. lamp [COMP] is off.
COMP. lamp turns on and comparator mode will be entered. The currently set thresholds are printed out.

4.7.3 Turning comparator mode off

Press COMP key [COMP] when COMP. lamp [COMP] is on.
COMP. lamp turns off and comparator mode will be terminated.

(example)

```
HIGH=   100.5
LOW =    99.5
C.LOW             99.49g
C.HIGH           100.58g
C.OK             100.47g
```

4.8 Auto Print Mode

Auto print function prints out the weighed result automatically as a sample is placed on the balance pan and the display stabilizes. Productivity is enhanced as the operator doesn't have to press any key.

(1) Press A.P. key [A.P.]. The auto print function of the balance is activated and Auto Print lamp [A.P.] of EP-90 will be illuminated.
(2) Press TARE key or O/T key of the balance or EP-90. The balance display will be zeroed.
(3) Place the sample on the balance pan. The weighed result will be automatically printed out when the display stabilizes.
(4) Press A.P. key [A.P.] while Auto Print lamp is illuminated to turn off the auto print function.

Notes

Conditions for data output in auto print mode vary depending on the balance series. Refer to the balance instruction manual for UW/UX series, BW/BX series, BW-K/BX-K series and AUW-D/AUW/AUX/AUY series. A.P. key of EP-90 only turns it ON/OFF. With balance series for which detailed conditions of auto print function can be selected (UW/UX, BW-K/BX-K etc.), the current settings on the balance remain valid. Refer to the balance's instruction manual for the details. Auto print is activated even with the balance series for which auto print cannot be set on the balance (BL, EL/ELB etc.). Upon stability is resumed after sample is loaded at zero display, the mass value is automatically printed out.

4.9 Date Output

Press DATE key [DATE]. Command is sent to the balance to receive date and time from the balance's built-in clock. Date and time are then printed out using one line each.
Every time DATE key [DATE] is pressed, DATE lamp [DATE] will be turned on/off. While DATE lamp is on, date and time are printed for each mass value that is printed.

Note

Date output function of EP-90 is not available with a balance that is not equipped with built-in clock.

4.10 Combined Use of Functions

Combined use of functions of EP-90 printer

X indicates available combination for simultaneous use.

ID number	X					
Sample number	X	X				
xK Mode	X	X	X			
Comparator	X	X	X			
Auto Print	X	X	X	X	X	
Statistic calculation						X
	Date output	ID number	Sample number	xK Mode	Comparator	Auto Print

Order of print-out

Date output, ID number and Sample number are printed out in this order using one line each before each mass data to be printed. An item set to be off is skipped.

Combined use of functions of EP-90 printer and functions of the balance

Balance that involves data output. At every mass data output, these EP-90's functions operate the same way as when mass data is output by pressing the print key.

(e.g.) While formulation mode of the balance is used, if ID number and Sample number functions are ON, lines of ID/Sample numbers are inserted before each component mass value. Turn off EP-90's functions if they are not desired for each component.

4.11 Print-out Examples by Function

Printing position

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

1. Basic Data Print

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

```
                              0.00g
                           1000.00g
```

2. Print-out at Setting Date and Time

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

```
DATE  2006-02-10
TIME  15.55.33
                              0.00g
```

3. ID Number Print-out

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

```
ID:1234567890
                              0.00g
```

4. Sample Number Print-out

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

```
No.0000000001
                              0.01g
No.0000000002
                              0.01g
No.0000000003
                              0.01g
No.0000000004
                              0.02g
No.0000000005
                              0.03g
```

5. Comparator Print-out

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

```
C.HIGH                     200.000g
C.OK                       100.000g
C.LOW                        5.000g
```

6. xK Print-out

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
K=                1.56
*K                   86.82804
```

7. Statistical Calculation Print-out

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
........<STAT.>.........
No.0001              49.8167g
No.0002              49.8167g
No.0003              49.8167g
No.0004              49.8166g
No.0005              49.8167g
........<RESULT>........
          N=                 5
          T=         249.0034g
        MAX=           49.8167g
        MIN=           49.8166g
        RNG=            0.0001g
       MEAN=         49.81668g
         SD=      0.0000447g
..................<END>.
```

8. Date, Time and ID Number Print-out

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
DATE  2006-02-10
TIME     15.55.33
ID:1234567890
                              0.00g
```

9. Date, Time, ID Number and Sample Number Print-out

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
DATE  2006-02-10
TIME     15.55.33
ID:1234567890
No.0000000001
                              0.00g
```

10. Date, Time, ID Number and xK Print-out

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

```
DATE  2006-02-10
TIME     15.55.33
ID:    12345678
K=              12.3
*K                          0
```

11. Date, Time, ID Number and Comparator Print-out

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

```
DATE  2006-02-10
TIME     15.55.33
ID:1234567890
C.LOW                     0.00g
```

12. Date, Time and Statistical Calculation Print-out
(Date and time can be printed only prior to entering statistical calculation mode.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

```
DATE  2006-02-10
TIME     15.55.33
........<STAT.>.........
No.0001            49.81677g
No.0002            49.81677g
No.0003            49.81677g
No.0004            49.81666g
No.0005            49.81677g
........<RESULT>........
          N=                5
          T=       249.0034g
        MAX=         49.81677g
        MIN=         49.81666g
        RNG=          0.0001g
       MEAN=       49.816688g
         SD=     0.0000447g
..................<END>.
```

13. Date, Time, ID Number and Statistical Calculation Print-out
(ID number can be printed only prior to entering statistical calculation mode.)

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
DATE  2006-02-10
TIME     15.55.33
ID:1234567890
........<STAT.>.........
No.0001              49.81677g
No.0002              49.81677g
No.0003              49.81677g
No.0004              49.81666g
No.0005              49.81677g
........<RESULT>........
          N=                 5
          T=         249.00344g
        MAX=           49.81677g
        MIN=           49.81666g
        RNG=            0.00011g
       MEAN=         49.816688g
         SD=       0.0000447g
..................<END>.
```

14. Print-out at Setting ID Number

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
ID:1234567890
```

15. Print-out at Setting Sample Number

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
No.1234567890
```

16. Print-out at Setting Constant K

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
K=               1.34
```

17. Print-out at Setting Comparator Thresholds

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
HIGH=     200.000
LOW  =       5.000
```

5. Communication and Other Settings

In EP-90 electronic printer, five settings including three communication settings can be selected with the DIP switches. The default setting of the three communication settings are Shimadzu electronic balance standard settings. Therefore, the communication settings do not have to be changed to communicate with the balance. If any settings have been altered after the delivery, set them to meet the balance's communication settings.

When using EP-90 simultaneously with the balance's WindowsDirect function.

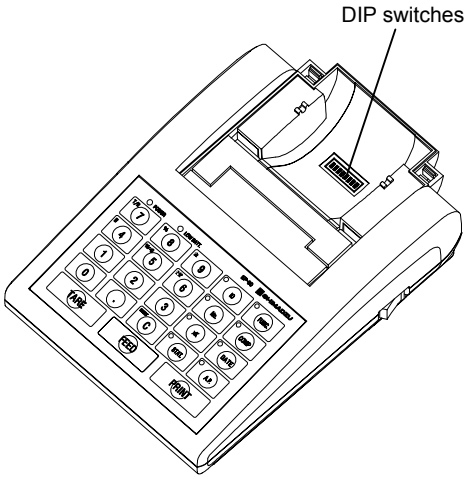
- Set the baud rate at 300.
- Command keys of EP-90 are not valid.
- Date output function of EP-90 is not available.

5.1 DIP Switches

DIP Switches are mounted on the floor of the printer paper holder part. (See the figure) Remove the printer paper. Turn the power OFF before operating DIP switches. The new settings will be made effective when turning the power ON.

Caution

Turn the power OFF before operating DIP switches.



5.2 Settings

There are 8 DIP switches numbered from 1 to 8. 5 items including 3 communication settings can be set by DIP switches. Settings are listed in the following. * indicates the default settings.

5.2.1 Communication Setting 1 (Baud rate)

DIP switch number	1	2	3	Baud rate
Settings	OFF	OFF	OFF	300
	ON	OFF	OFF	600
	OFF*	ON*	OFF*	1200*
	ON	ON	OFF	2400
	OFF	OFF	ON	4800
	ON	OFF	ON	9600
	OFF	ON	ON	19200
	ON	ON	ON	38400

5.2.2 Communication Setting 2 (Parity)

DIP switch number	4	5	Parity
Settings	OFF*	OFF*	No*
	ON	OFF	No
	OFF	ON	Even
	ON	ON	Odd

5.2.3 Communication Setting 3 (Delimiter)

DIP switch number	6	Delimiter
Setting	OFF*	CR*
	ON	LF

5.2.4 English / Japanese

Switches between English and Japanese for statistic calculation print out.

DIP switch number	7	Language
Setting	OFF*	English*
	ON	Japanese

5.2.5 Buzzer ON/OFF

Switches buzzer sounding upon key operations

DIP switch number	8	Buzzer
Setting	ON*	ON*
	OFF	OFF

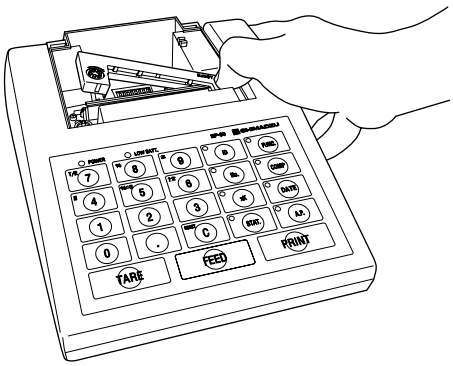
6. Maintenance

6.1 Refilling Printer Paper

The red lines marked on the printer paper indicate the paper is running short. Replace with a new roll soon. For replacement, move printer paper shaft to the new roll from the old one. Refer to **3.3.3. Loading printer paper**.

6.2 Replacing Ink Ribbon Cartridge

Replace ink ribbon cartridge when print becomes faint. Open printer paper cover. Take out ink ribbon cartridge by pressing the right end of it as shown in the figure.



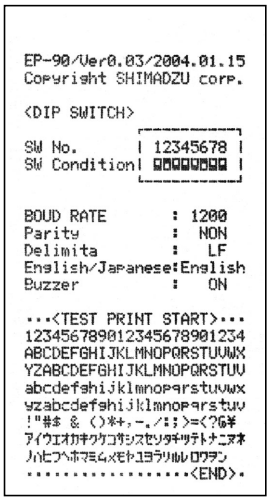
Insert the new cartridge from straight above.

6.3 Replacing Batteries

The illumination of LOW BATT lamp indicates batteries need replacement. Replace with new batteries soon. For replacement, refer to 3.3.2 Loading batteries.

7. Troubleshooting

Check the following points before calling for servicing.

Symptom	Cause (→ remedy)
The power lamp does not light up when the power switch is turned ON.	• AC adapter is not connected. • AC adapter is not receiving power. • The batteries are out.
No data can be received from the balance.	• The connection cable is disconnected. (→ Switch off EP-90 and the balance, then connect the cable properly.) • The balance is not active for sending data, e.g., the balance is displaying a menu. • DIP switch settings have not been made effective. (→ Set DIP switch while power is off, then turn the power on.) • Sequence of switching power of EP-90 and the balance was wrong. (→ See 3.4 Connecting the Balance)
The printed characters deviate. No paper feed occurs.	• Paper jam is occurring. (→ Reload printer paper.)
No key entry can be made.	• Printout is in progress. • Data is being received from the balance.
No key switch on the balance works.	• There is a data I/O error. (→ Switch off once, then switch on again.)
The following data has been printed out.  EP-90/Ver0.03/2004.01.15 Copyright SHIMADZU corp. <DIP SWITCH> SW No. | 12345678 | SW Condition| ■■■■■■■■ | BOUD RATE : 1200 Parity : NON Delimita : LF English/Japanese:English Buzzer : ON ...<TEST PRINT START>... 1234567890123456789012345 ABCDEFGHIJKLMNOPQRSTUVWX YZABCDEFGHIJKLMNOPQRSTUV abcdefghijklmnopqrstuvwx yzabcdefghijklmnopqrstuv !"#$ & ()*+,-./:;><?@¥ ｱｲｳｴｵｶｷｸｹｺｻｼｽｾｿﾀﾁﾂﾃﾄﾅﾆﾇﾈ ﾉﾊﾋﾌﾍﾎﾏﾐﾑﾒﾓﾔﾕﾖﾗﾘﾙﾚﾛﾜﾝ .....<END>	• The test program for servicing is running. If the power switch is turned on with FEED key held down, the test program is initiated.

8. Parts List

Standard Items

Item	Part No.	Remarks
AC adapter	321-62688	INPUT:AC 100-240V
Connection cable	321-62686-01	60 cm
Printer paper (1 roll)	321-62685-01	Roll 60mm dia.
Ink ribbon cartridge	321-61111-05	Standard type, black ink

Consumables

Item	Part No.	Remarks
Printer paper (20 rolls)	321-62685-02	
Ink ribbon cartridge (5 pieces)	321-61111-06	Standard type, black ink
Ink ribbon cartridge (5 pieces)	321-61111-08	Long life type, black ink

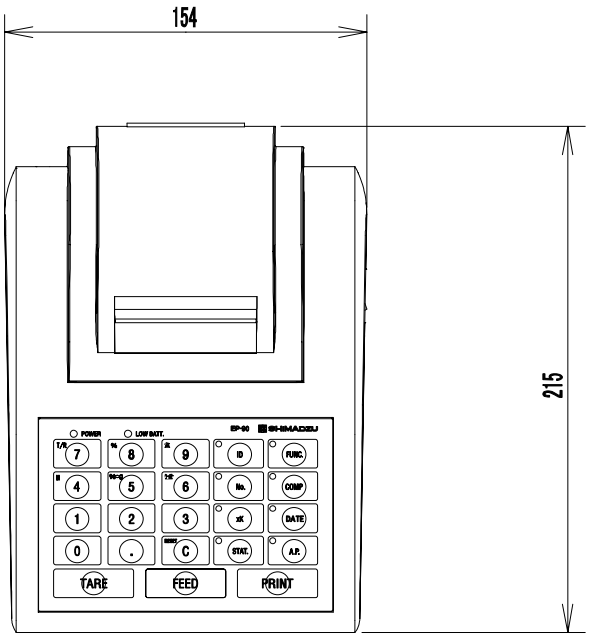
Maintenance parts

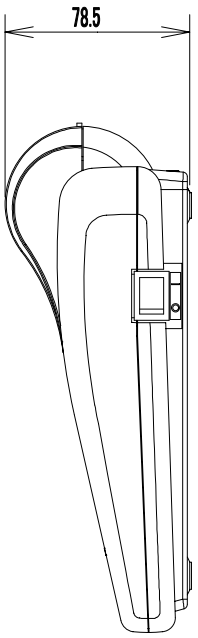
Item	Part No.	Remarks
Printer paper cover	321-62714	
Battery cover	321-62718	

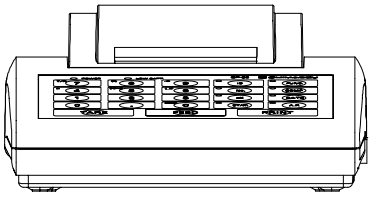
9. Specifications

Printing	Print method	Impact dot
	Inking	Ink ribbon
	Print format	24 digits / line (5 × 7 dot matrix)
	Printing speed	2.7 lines / sec. (approx.)
	Character size	1.7mm (W) × 2.6mm (H)
	Printer paper	Normal paper 57.5mm width
	Printer mechanism durability	1.5 million lines
Operation temperature range		5-40°C
Power source	AC	AC adapter (Output : DC 9 - 12V 2A)
	Battery operation	Dry batteries (Alkaline only) R6 (size AA) × 6pcs (not provided) Battery life: 10 hours approx. (when prints 1 line / 5 seconds continuously at 20°C)
Interface		Serial I/O, TTL level
Physical dimensions		154 (W) × 78.5 (H) × 215 (D) mm approx.
Weight		630g approx.
Functions		Statistical calculations, Date and time print-out (with balance's built-in clock), ID number, Sample number print-out, xK data output, Comparator print-out, Auto print, Commands to set on balance's application functions (Formulation, Add-on, Animal weighing, Percentage display)

10. Dimensions







(mm)