Oxford
E Series

Instruction Manual

Contents

1 Introduction

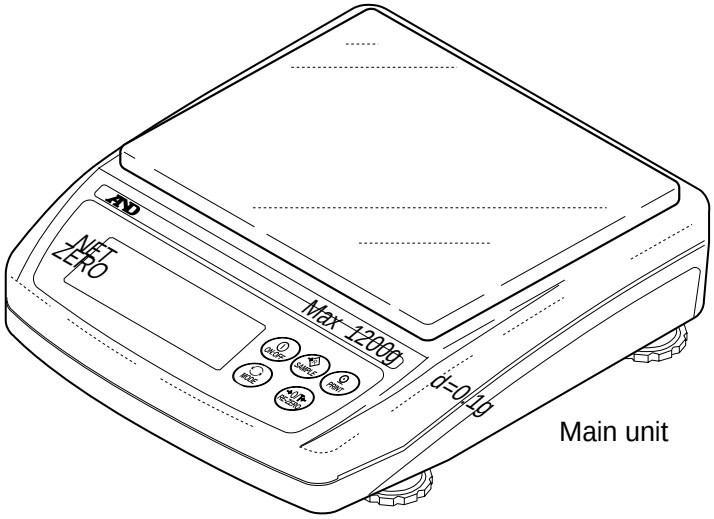
This manual describes how this balance works and how to get the most out of it in terms of performance.

***A*ll *E* series balances have the following features:**

- The E series are high resolution type electronic balances having a resolution of 1/6,000 ~ 1/30,000.

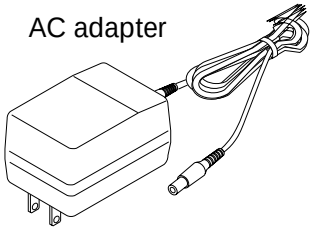
- Both series have almost same functions like counting function, % function and comparator function.
- The backlight LCD will help in low light conditions
- The standard serial interface of RS-232C can be connected with a printer or personal computer.
- Using the serial interface, Good Laboratory Practice (GLP) data can be obtained.
- With the optional rechargeable battery pack (OP-09), the balance can be used for cordless operation.

2 Unpacking



Main unit

AC adapter



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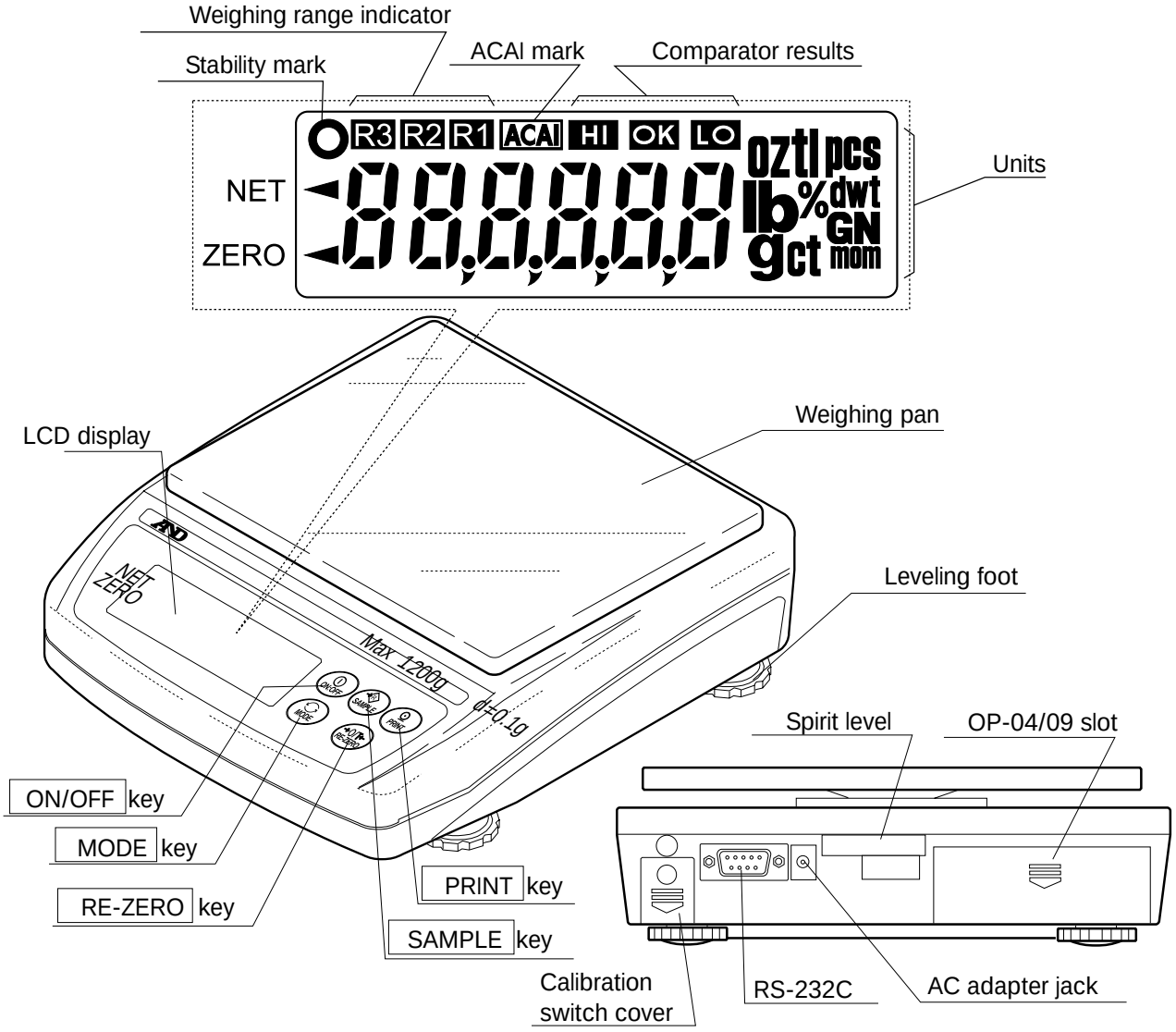
Please confirm that the AC adapter type is correct for your local voltage and receptacle type.

3 Parts name and function



ON:OFF	Used to turn the power on or off.
SAMPLE	Hold down to enter the function setting mode. Weighing mode (EW-*i* only): Changes the weighing range (when `rng 0` is selected). pcs mode: Enters the sample unit weight storing mode. % mode: Enters the 100% weight storing mode.
PRINT	Outputs the weight value to a printer.
MODE	Switches the weighing unit (the weighing mode).
→0/T← RE-ZERO	Clears the display to zero.

4 Setting up

4-1. Setting up your balance

1. Place the weighing pan on the main unit as shown on the previous page.
2. Adjust the level of the balance using the leveling feet. Use the spirit level to confirm. The bubble should be in the center of the circle.
3. Calibrate your balance before use. (See “6. Calibration”)

Balance location

To measure correctly, to keep the balance in good conditions, and to prevent hazards, observe the following

- Do not install the balance in locations that are subject to dust, breeze, vibration, large temperature fluctuations, condensation or that may have a magnetic field.
- Do not install the balance on a surface that is soft or that may cause the balance level to shift.
- Do not install the balance in direct sunshine.
- Do not install the balance near heaters or air conditioners.
- Do not use an unstable AC power source.
- Do not install the balance in a place where combustible or corrosive gases may exist.
- Allow the balance to reach equilibrium with the ambient temperature before use.
- Switch the power ON at least half an hour before use so that the balance can warm up.
- When the balance is installed for the first time, or the balance has been moved, carry out calibration as described in “7. Calibration.”

4-2. Power source

For the power source, the AC adapter or the rechargeable battery pack (OP09-i Optional item) is available.

When using the AC adapter
Use a stable power source. To use the AC adapter, insert the AC adapter plug into the AC adapter jack

When using the rechargeable battery pack (OP-09)
Insert the rechargeable battery pack into the main unit.
The balance can be used continuously for about 9 hours using the battery pack.

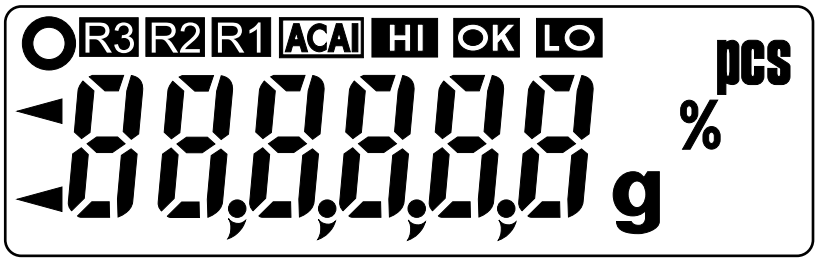
- **If “Lb0” is displayed when using the battery pack, immediately stop using it, and recharge the battery pack or use the AC adapter.**

- **Be sure to charge the battery pack before using it for the first time.**

5 Operation

5-1. Turning the power ON and OFF

1. Press the ON/OFF key to turn the power ON.



All the display symbols are displayed as shown above.
(About units: Only the units available illuminate.)

When the weighing value internally becomes stable, the display turns off except for a weighing unit and a decimal point.

The balance waits for the weighing data to become stable, and zero will be shown with the ZERO mark (power-on zero).

The range for power-on zero is within ±10% of the weighing capacity around the calibrated zero point. If the power is switched ON while there is a load beyond this range, the balance is tared to zero and the NET mark and the ZERO mark turn on.

2. Pressing the ON/OFF key again, and the power will be switched OFF.

- **Auto-power off function**
  It is possible to have the power automatically switched OFF, if zero is displayed for approximately 5 minutes. See “8-5. Function list” and set the function “`poff`”.

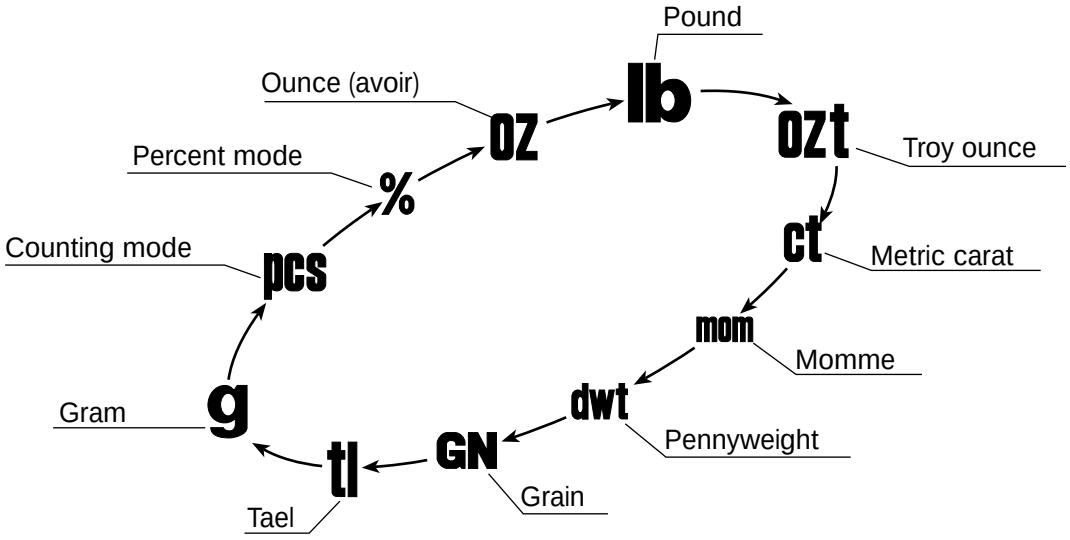
5-2. LCD backlight

The LCD backlight will turn on when the weight value changes more than 4 display digits or any key operation is done. When the weight data becomes and stays stable for some time, it will automatically turn off. There is also a setting that will make the backlight always stay on or off. For details, see the function setting “`Ltup`” of “Function list”.

5-3. Units

The most common unit of weight used around the world is gram, but there is often a need to shift to alternative units specific to the country where the balance is used or to select modes such as counting or percent.

The units and the order they appear in the display are as follows:



Among the units, those available for the user have been set at the factory before shipping.
The unit can be selected in the function setting mode. The order of the units available is the same as above, while skipping the units that are not available.

Some units are not available on different models. For details, see “13. Specifications”

Conversion table

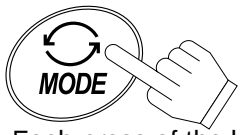
Units	Name	Conversion to gram
oz	Ounce (avoir)	28.349523125 g
lb	Pound (UK)	453.59237 g
ozt	Troy ounce	31.1034768 g
ct	Metric carat	0.2 g
mom	momme	3.75 g
dwt	Pennyweight	1.55517384 g
GN	Grain (UK)	0.06479891 g
tl	tael (Hong Kong general, Singapore)	37.7994 g

- **Note**
  The unit “tl (tael)” is for special version only.

5-4. Selecting a weighing unit

Press the MODE key to select a unit.

The following sections describe about three common units: g (gram mode), pcs (counting mode), and % (percent mode).



Each press of the key switches the units available in the order described on the previous page.

5-5. Basic operation

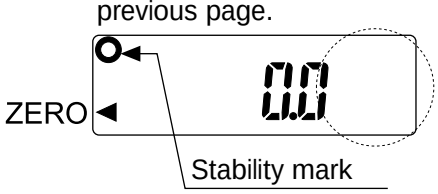
1. Select a weighing unit.

2. When the display doesn't show zero, press the RE-ZERO key to set the display to zero.

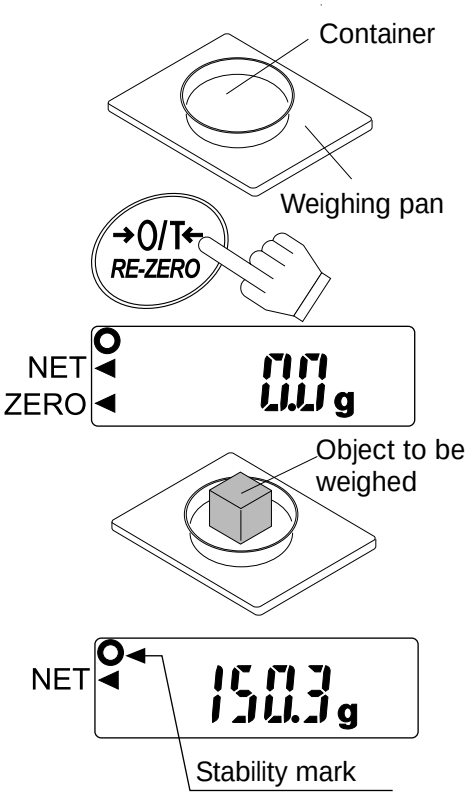
3. When using a tare (container), place the container on the weighing pan, and press the RE-ZERO key to set the display to zero.

4. Place the object to be weighed on the pan or in the container.
   Wait for the stability mark (o) to be displayed and read the value.

5. Remove the object from the pan.



- **Note**
  The RE-ZERO key will zero the balance if the weight is within ±2% of the weighing capacity around the power-on zero point. The ZERO mark ◂ turns on. When the weight exceeds +2% of the weighing capacity, it will be subtracted to zero as a tare weight. In this case the ZERO and NET marks turn on.



Precautions during operation

- **Make sure that the stability mark is on whenever reading or storing a value.**
- **Do not press keys with a sharp implement such as a pencil.**
- **Do not apply a shock load to the balance.**
- **Do not place a load onto the pan that exceeds the rated capacity.**
- **Keep the balance free from foreign objects such as dust or liquid.**
- **Calibrate the balance periodically to maintain weighing accuracy. (See "6. Calibration".)**

5-6. Weighing range for the E series

- The EW-*i* series have three weighing ranges, and the display shows which range the weight value belongs to with the mark R1, R2 or R3.
- There is a function setting to select how the weighing range changes.
- Select from automatic range (rng 1), manual range (rng 0) or fixed range (rng 2 to 4).

Function setting	Operation
rng 1	Automatic range When the weight value exceeds the maximum value of a range, the weighing range changes automatically from a fine to a coarser weighing range. • When there is nothing on the weighing pan and the display shows zero with the ZERO mark, the weighing range changes from the coarse to the fine range. • When the balance is in range 2 or 3 and there is nothing on the weighing pan, press the RE ZERO key to re zero the display. The balance will return to the fine range and gross weight zero will be displayed with the zero mark • When the balance is in the coarse range with an object (container) on the weighing pan press the RE ZERO key to tare the course display. The balance will return to the fine range and net weight zero will be displayed with the zero mark
rng 0	Manual range • Press the SAMPLE key when the display shows a weight value (neither counting nor % display). The weighing range changes to a coarser range at any load. • Press the SAMPLE key to change from a coarser to the fine range, when there is nothing on the weighing pan and the display shows zero with the ZERO mark. • When the RE ZERO key is pressed in a coarse range the object (container) is tared and the display will return to the fine range in a net weighing mode • When in range 2 or 3 and a weight less than 2% of capacity is on the weighing pan the display will be re zero when the RE ZERO key is pressed, remaining in the same range and in gross weighing mode. Press the SAMPLE key to change to the fine range if required.
rng 2 to 4	Fixed range • The weighing range is fixed. Set the function to the weighing range according to the purpose.

5-7. Counting mode (pcs)

Determines the number of objects in a sample. Calculates the reading, using the basic sample unit weight, and determines how many pieces are contained.

Selecting the counting mode

1 Press the MODE key to select **pcs**. (pcs:pieces)

Storing the sample unit

2 Press the SAMPLE key to enter the sample unit weight storing mode.

3 To select the number of samples, press the SAMPLE key. It may be set to 5, 10, 25, 50, or 100.

4 Place a tare container on the weighing pan, and press the RE-ZERO key. Confirm that the right side of the number of samples shows zero.

5 Place the number of samples specified on the pan. In this example, 25 pieces.

6 Press the PRINT key to calculate and store the unit weight. Remove the sample. The balance is set to count objects with this unit weight.

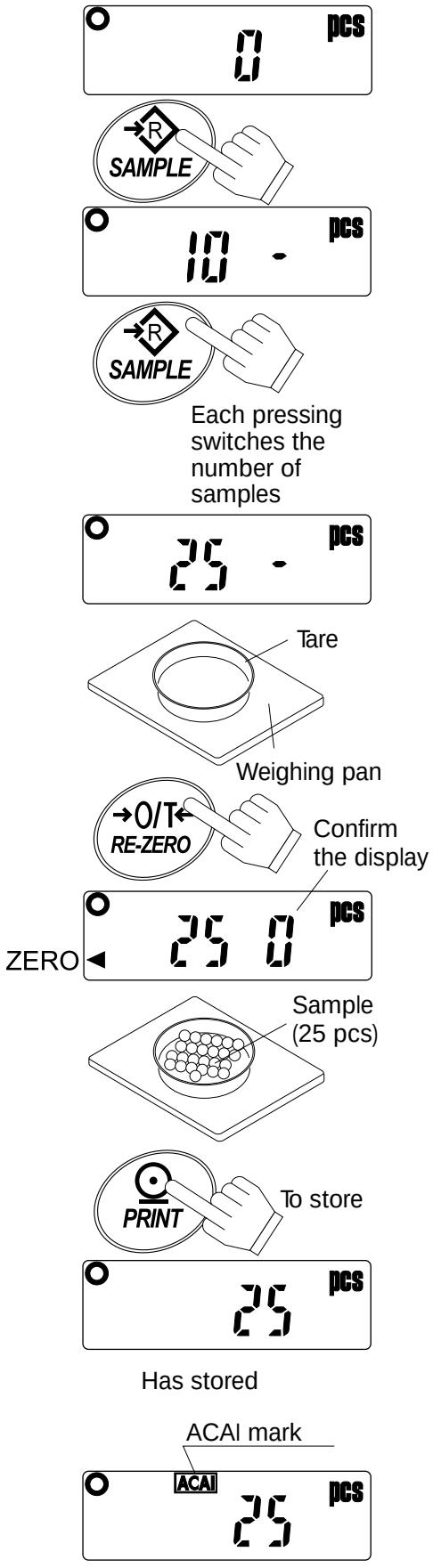
Counting the objects

7 Place the objects to be counted on the pan.

Counting mode using the ACAI function

ACAI™ (Automatic Counting Accuracy Improvement) is a function that improves the accuracy of the unit weight by increasing the number of samples as the counting process proceeds.

8 If a few more samples are added, the ACAI mark illuminates. (To prevent an error, add three or more. The ACAI mark will not illuminate if overloaded.)



9 The balance re-calculates the unit weight while the ACAI mark is blinking. Do not touch the balance or samples on the pan until the ACAI mark turns off.

10 Counting accuracy is improved when the ACAI mark turns off. Each time the above operation is performed, a more accurate unit weight will be obtained. There is no definite upper limit of ACAI range for the number of samples exceeding 100. Try to add the same number of samples as displayed.

5-8. Percent mode (%)

Displays the weighing value in percentage compared to the reference (100%) weight.

Selecting the percent mode

1 Press the MODE key to select %.
(%:percent)

Storing the reference (100%) weight

2 Press the SAMPLE key to enter the reference weight storing mode.

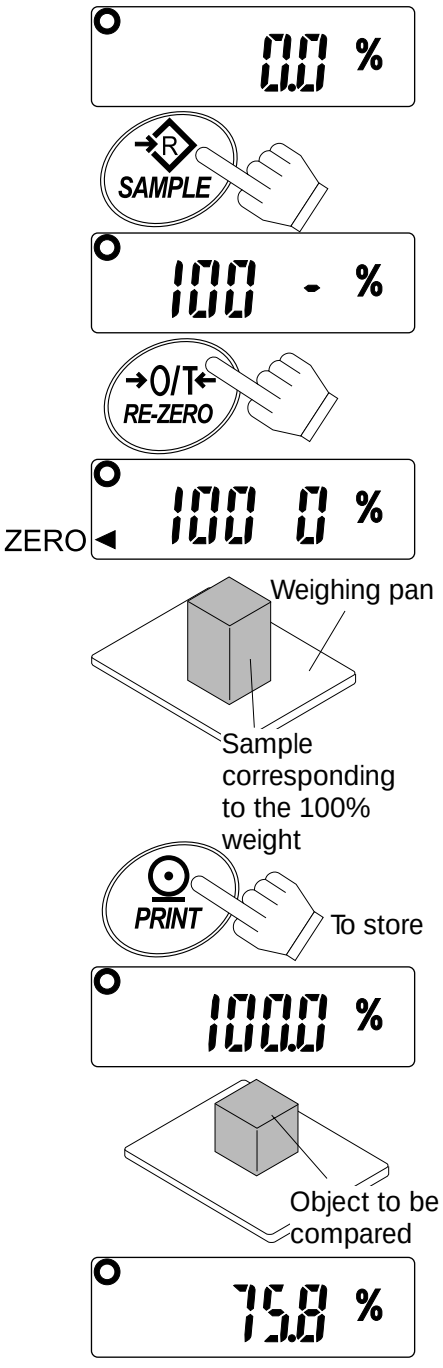
3 Press the RE-ZERO key to display 100 0%.

4 Place the sample to be set as the reference weight on the pan.

5 Press the PRINT key to store the reference weight. Remove the sample.

Reading the percentage

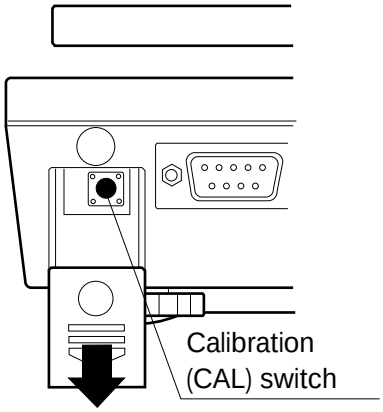
6 Place the object to be compared to the reference weight on the pan. The displayed percentage is based on 100% of the reference weight.



6 Calibration

This function adjusts the balance for accurate weighing. Perform a calibration in the following cases.

- When the balance is first used.
- When the balance has been moved.
- When the ambient environment has changed.
- For regular calibration.



6-1. Calibration using a weight

1 Warm up the balance for at least half an hour with nothing on the pan.

2 Press and hold the calibration (CAL) switch until [Cal] appears, and release the switch.

3 The balance displays [Cal 0] .

To change the calibration weight value, proceed to step 4.

To use the calibration weight value in the balance memory, proceed to step 5.

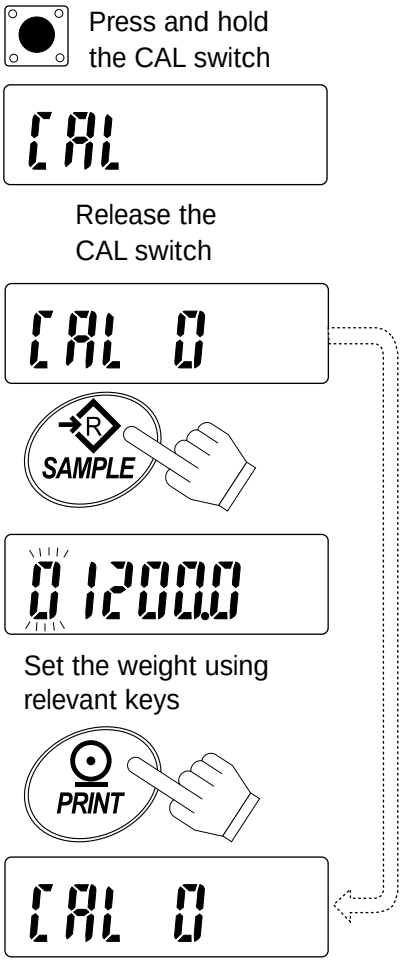
4 Press the [SAMPLE] key. The display shows the calibration weight value in "gram" that is stored in the balance. Use the following keys to change the value.

[SAMPLE] key To select the digit blinking to change.

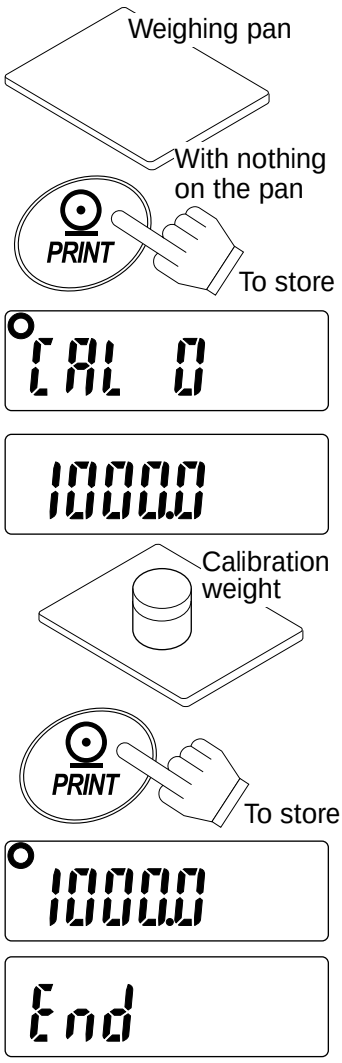
[RE-ZERO] key To set the value of the digit selected.

[PRINT] key To store the value and return to step 3.

[MODE] key To cancel the value and return to step 3.



5 At step 3, pressing the PRINT key weighs the zero-point value. Do not touch the pan during weighing.



6 Place the calibration weight with the same value as displayed on the pan. Press the PRINT key to weigh it. Do not touch the pan during weighing.

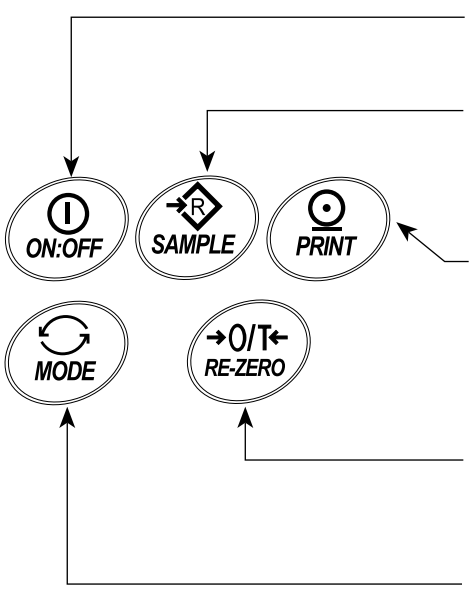
7 end appears.
Remove the weight from the pan, and press the CAL switch or MODE key to return to the weighing mode.

- **Note**
  The value set in step 4 is stored in memory even after the power is switched off.

  If the balance is to be moved to another location, set the gravity acceleration value for the current location and calibrate the balance according to the procedure above. See the next section to set the value.

7 Functions

7-1. Key operation



Cancels an operation and turns off the balance.

Item key
Selects a class and an item.
In the weighing mode, press and hold the key to enter the function setting mode.

Enter key
Proceeds to the selected class.
Stores the settings per class and goes to the next class.

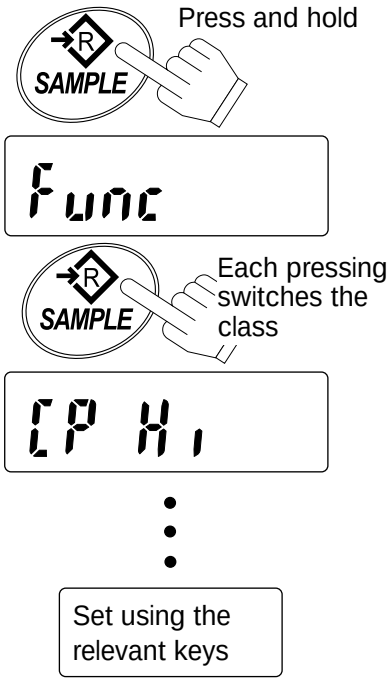
Parameter key
Selects a parameter.

Cancel key
Cancels the operation, and goes to the next class or returns to the weighing mode.

7-2. Entering the function setting mode

In the weighing mode, press and hold the SAMPLE key to enter the function setting mode and display `func` . Each time the SAMPLE key is pressed, the class appears one after another.

Once the class is selected, the set items are available for selection. (See “Function list”.)



Setting example

To set auto power-off function to "Enabled", and the ACAl function to "Disabled".

1 Press and hold the SAMPLE key to display `func`.

2 Press the PRINT key. The balance displays `poff 0`.

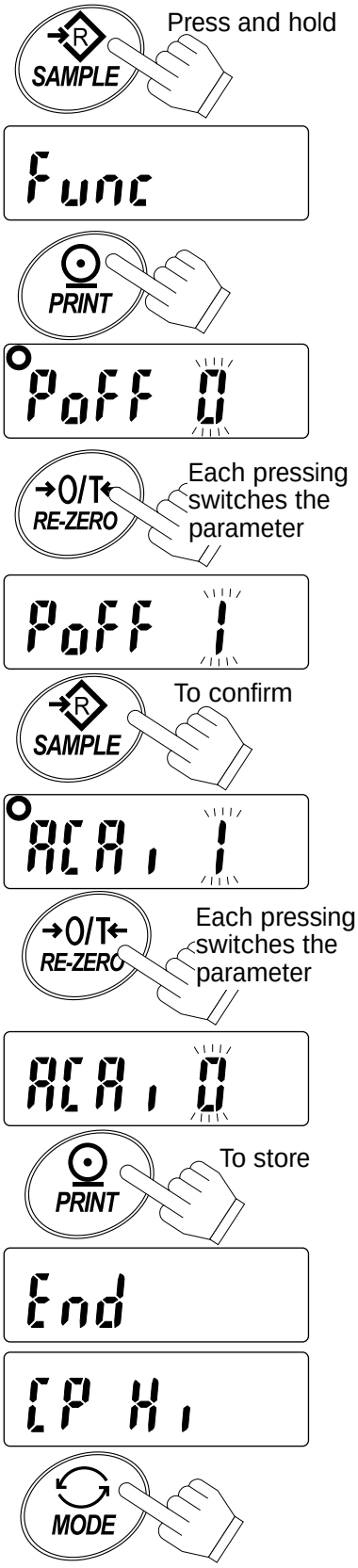
3 Press the RE-ZERO key to display `poff 1`.

4 Press the SAMPLE key several times to display `ACAi 1`.

5 Press the RE-ZERO key to select `ACAi 0`.

6 Press the PRINT key to store the parameters. `Cp Hi` appears after `end`.

7 Press the MODE key to return to the weighing mode.



Storing weighing units

It is possible to store the weighing units that will be actually used from the units available. For the units available, see “5-3. Units”

Select and store the weighing units as described below:

1 Press and hold the SAMPLE key to display `func` .

2 Press the SAMPLE key several times to display `Unit`.

3 Press the PRINT key.

4 Press the SAMPLE key to select a weighing unit.

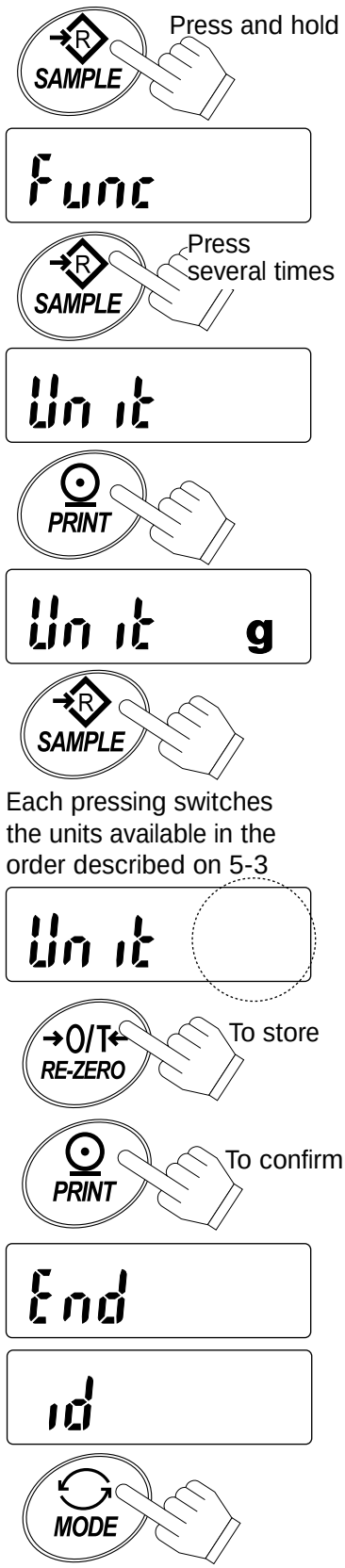
5 Press the RE-ZERO key to store the weighing unit.

6 Repeat steps 4. and 5. to store all weighing units to be used.

7 Press the PRINT key.
`id` appears after `end` .

8 Press the MODE key to return to the weighing mode.

- **Note**
  When the balance is switched on, it starts with the unit that was stored first at step 5.



7-3 Function list

Class	Item	Parameter	Description	
func	poff Auto power-off	• 0	Auto power-off disabled	Automatically power off
		1	Auto power-off enabled	
	rng Range	0	Manual range change	Range change setting for EW-*i* series
		• 1	Automatic range change	
		2	Fixed to the lowest range	
		3	Fixed to the middle range	
		4	Fixed to the highest range	
	Cond Response	0	Fast / sensitive ↕ Slow / stable	Software filtering
		1		
		• 2		
		3		
		4		
	st-b Stability band width	0	Stable when within ± 0.5d/0.5s	Conditions to turn on the stability mark
		• 1	Stable when within ± 1d/0.5s	
		2	Stable when within ± 2d/0.5s	
	trc Zero tracking	0	Disabled	Tracking zero shift
		• 1	Enabled	
	pnt Decimal point	• 0	Point (.)	Decimal separator
		1	Comma (,)	
	Cp Comparator mode	• 0	Comparator disabled	Conditions to compare. d = the minimum display division
		1	Compares all data	
		2	Compares all stable data	
		3	Compares plus data > +4d	
		4	Compare stable plus data > +4d	
		5	Compares data > +4d or < -4d	
		6	Compares stable data > +4d or < -4d	
	bep Buzzer output	• 0	Buzzer does not sound.	Buzzer sounds according to the comparator results
		1	Buzzer sounds at LO.	
		2	Buzzer sounds at OK.	
		3	Buzzer sounds at OK and LO.	
		4	Buzzer sounds at HI.	
		5	Buzzer sounds at HI and LO.	
		6	Buzzer sounds at HI and OK.	
		7	Buzzer sounds at HI, OK and LO.	
	prt Data output mode	0	Command and stream modes	Auto-print A: + data Auto-print B: +/- data
		• 1	Command and PRINT key	
		2	Command, PRINT key and auto-print A	
		3	Command, PRINT key and auto-print B	
	pUse Data output pause	• 0	No pause (general equipment)	Interval between continuous data
		1	1.6 seconds (for AD-8121)	
	info GLP output	• 0	No output	GLP output format
		1	AD-8121 format	
		2	General format	
	bps Baud rate	• 0	2400 bps	
		1	4800 bps	
		2	9600 bps	

• Factory Setting

Class	Item	Parameter	Description	
func	btpr Data and parity	• 0	7 bits, even parity	
		1	7 bits, odd parity	
		2	8 bits, non parity	
	ACAi ACAI function	0	ACAI disabled	If “0” is set, no additional samples required
		• 1	ACAI enabled	
	Umin Minimum unit weight	• 0	1 d	d= the minimum display division
		1	1/8 d	
		2	More than 4d sample weight	
	smpl Sample number	• 0	10 pcs	The number of samples shown first when entered into the unit weight storing mode
		1	25 pcs	
		2	50 pcs	
		3	100 pcs	
		4	5 pcs	
	ldin		not used	
	ltUp LCD Backlight control	0	Always off	To control how the LCD backlight turns off. Weight change or key operation will turn the backlight on.
		1	Turns off after 3 seconds	
		2	Turns off after 10 seconds	
		• 3	Turns off after 30 seconds	
		4	Turns off after 60 seconds	
		5	Always on	
CpHi	Comparator upper limit		Setting the upper limit value	
Cplo	Comparator lower limit		Setting the lower limit value	
Unit	Weighing units to be displayed		Sets to display units	Weighing units”
id	ID number for GLP output		Sets the ID number	NUMBER AND GLP

• Factory Setting

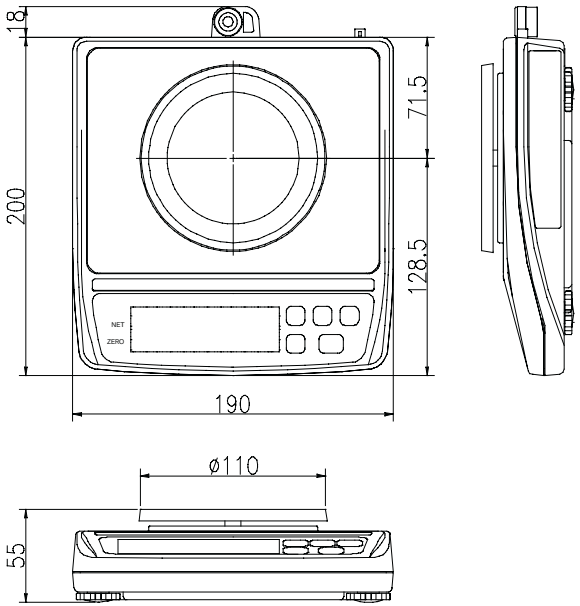
8.1 Specifications

MODEL	E2002	E3002	E12001	E30001	E6000
Capacity	200g	300g	1200g	3000g	6000g
Min display 'd'	0.01g	0.01g	0.1g	0.1g	0.1g
No. of samples	5 , 10 , 25 , 50 or 100 pieces				
Max. count *)	20,000	30,000	12,000	30,000	6,000
Min unit wt *)	0.01g	0.01g	0.1g	0.1g	1g
Min. % display	0.1%				
Min. 100% weight	1g	1g	10g	10g	10g
Repeatability (SD)	0.01g	0.01g	0.1g	0.1g	1g
Linearity	+/-0.01g	+/-0.02g	+/-0.1g	+/-0.2g	+/-1g
Sensitivity drift					
Display	7 seg LCD display with backlight (character ht 16mm)				
Display update	10 times per second				
Operating temp.					
Power supply	AC adapter or optional NiMH battery pack				
Battery operation	Approximately 9 hours (backlight off)				
Pan size	110mm		133mmX170mm		
Weight (approx)	1.1kg		1.5kg		
Cal wt (fact set)	200g	300g	1200g	3000g	6000g

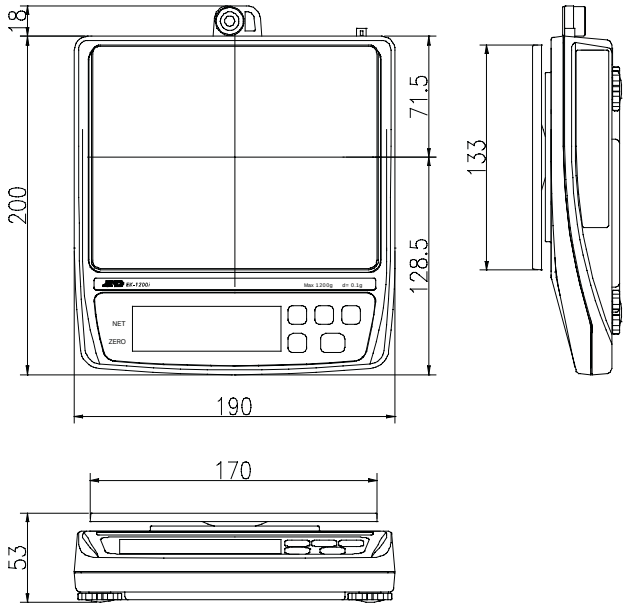
Accessories

OP09-I	Rechargeable battery unit (internal)
AD-8920	External Display
DP-1012	Basic Printer

8-2 Dimensions



E2002 / E3002



E12001 / E30001 / E6000