OXFORD

G SERIES TOP PAN

INSTRUCTION MANUAL

OXFORD ELECTRONIC BALANCES
ANALYTICAL PRODUCTS LTD
OXFORD . OX3 8ST. ENGLAND

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Basic Operation

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1. INTRODUCTION

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

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

1-1 About This Manual

This manual consists of the following five parts:

Basic operation ..... Describes precautions on handling the balance, balance construction and basic balance operation.

Adapting to the environment ..... Describes response adjustment, calibration and calibration test.

Functions ..... Describes various functions of the balance.

Maintenance ..... Describes maintenance, error codes, troubleshooting, specifications and options.

1-2 Features

- Built-in Calibration Weight (hereinafter referred to as internal mass), allows easy calibration, adjustment and maintenance of the balance.
- Automatic Self Calibration, using the internal mass, adapting to changes in temperature.
- Self Check Function, provided to self-check the balance using the internal mass.
- Automatic Response Adjustment, adapting to vibration and drafts in the environment.
- Stabilization time of one second. When FAST is selected for the response rate, a stabilization time of one second, to read a displayed value after a sample is placed on the pan, has been achieved.
- Data Memory Function, storing weighing data, calibration data or unit mass in the counting
- mode. (About weighing data, 200 sets of data can be stored.) Interval Memory Mode is provided to weigh a sample and store the weighing data periodically.
- Good Laboratory Practice (GLP) data output using the standard RS-232C serial interface.
- Clock and Calendar Function, adding the time and date to the output data.
- Comparator Indicators, displaying the comparison results.
- Capacity Indicator, displaying the weight value in percentage relative to the weighing capacity.
- Hold Function, provided for weighing a moving object such as an animal.
- Underhook, for measuring density and weighing magnetic materials.
- Density Mode, for calculating the density of a solid.
- Multiple Weighing Units, with most of the common units used around the world.
- Reference Card, provided for a quick reference to the balance operation.
- Breeze Break, provided for G4103, for more accurate weighing.

1-3 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

CE

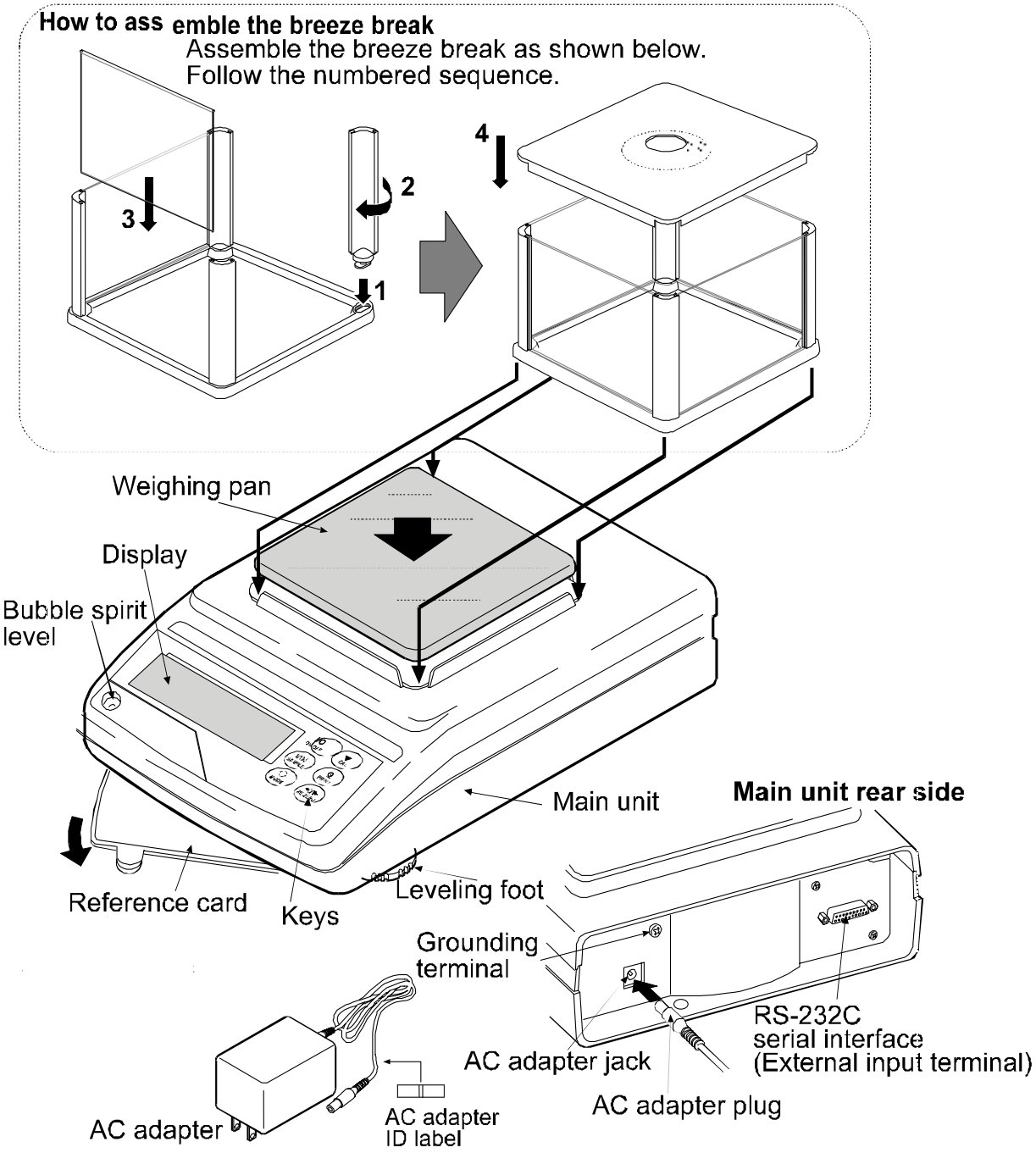
This device features radio interference suppression in compliance with valid EC Regulation 89/336/EEC.

2. UNPACKING THE BALANCE

2-1 Unpacking

- The balance is a precision instrument. Unpack the balance carefully. Keep the packing material to be used for transporting the balance in the future.
- The packing contents depend on the balance model. See the illustrations to confirm that everything is contained.

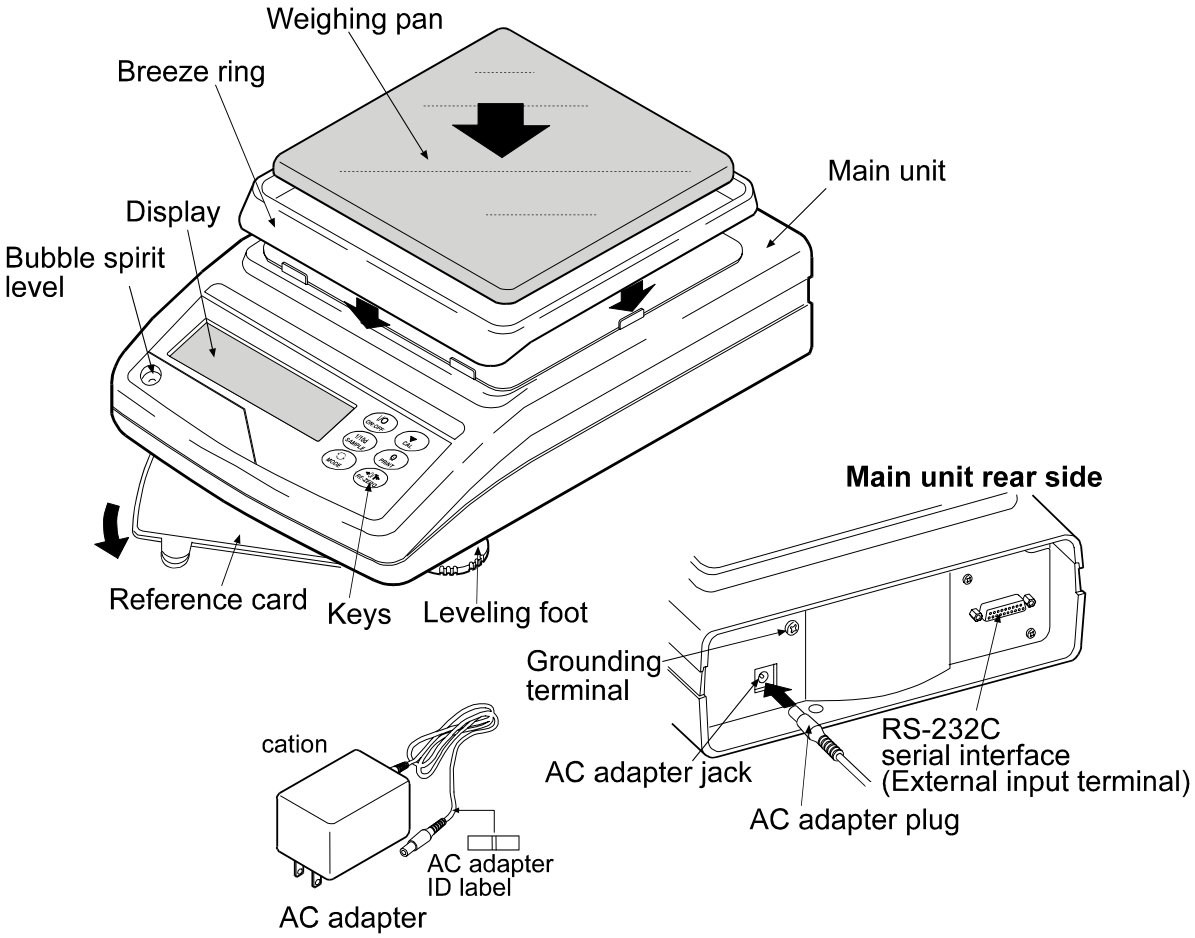
G4103



Note

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

G21002/G41002/G81001



Note

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

2-2 Installing the Balance

Install the balance as follows:

1. Refer to “3. PRECAUTIONS” for installing the balance. Place the balance on a solid weighing table.
2. G4103
   Assemble the breeze break on the balance as shown in the illustration above.

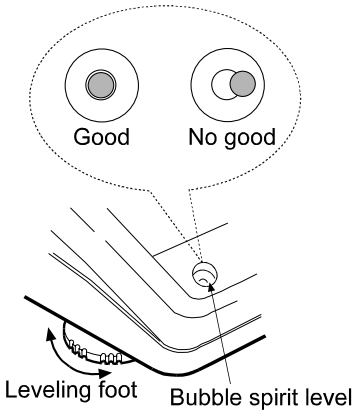
   G21002/G41002/G81001
   Assemble the breeze ring and weighing pan on the balance as shown in the illustration above.
3. Adjust the leveling feet to level the balance. Confirm it using the bubble spirit level.
4. Confirm that the adapter type is correct for the local voltage and power receptacle type.
5. Connect the AC adapter to the balance. Warm up the balance for at least 30 minutes with nothing on the weighing pan.

3. PRECAUTIONS

To get the optimum performance from the balance and acquire accurate weighing data, note the following:

3-1 Before Use

- Install the balance in an environment where the temperature and humidity are not excessive. The best operating temperature is about 20°C / 68°F at about 50% relative humidity.
- Install the balance where it is not exposed to direct sunlight and it is not affected by heaters or air conditioners.
- Install the balance where it is free of dust.
- Install the balance away from equipment which produces magnetic fields.
- Install the balance in a stable place avoiding vibration and shock. Corners of rooms on the first floor are best, as they are less prone to vibration.
- The weighing table should be solid and free from vibration, drafts and as level as possible.
- Level the balance by adjusting the leveling feet and confirm it using the bubble spirit level.
- Ensure a stable power source when using the AC adapter.
- Warm up the balance for at least 30 minutes. Plug in the AC adapter as usual.
- Calibrate the balance before use or after having moved it to another location.

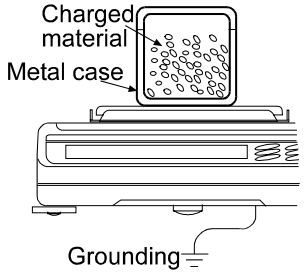


Caution

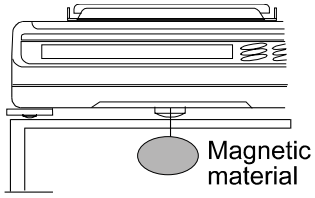
Do not install the balance where flammable or corrosive gas is present.

3-2 During Use

- Discharge static electricity from the material to be weighed (hereinafter referred to as sample). When a sample could have a static charge, the weighing data is influenced. Try to keep the ambient humidity above 45%RH or use the metal shield case.



- This balance uses a strong magnet as part of the balance assembly, so please use caution when weighing magnetic materials such as iron. If there is a problem, use the underhook on the bottom of the balance to suspend the material away from the influence of the magnet.



- Cancel the temperature difference between a sample and the environment. When a sample is warmer (cooler) than the ambient temperature, the sample will be lighter (heavier) than the true weight. This error is due to a rising (falling) draft around the sample.
- Make each weighing gently and quickly to avoid errors due to changes in the environmental conditions.
- Do not drop things upon the weighing pan, or place a sample on the pan that is beyond the balance weighing capacity. Place a sample in the center of the weighing pan.
- Do not use a sharp instrument such as a pencil to press the keys. Use your finger only.
- Press the RE-ZERO key before each weighing to prevent possible errors.
- Calibrate the balance periodically so as to cancel possible errors.
- Take into consideration the affect of air buoyancy on a sample when more accuracy is required.
- Keep the balance interior free of dust and foreign materials.
- The breeze break (G4103 only) and the clear cover are provided as accessories. They may be charged with static electricity when they are unpacked or when the humidity is low. If the weighing value is unstable or the balance has a problem with repeatability, remove the breeze break or the clear cover. Or wipe the clear cover with a moistened cloth or apply an anti-static spray.

3-3 After Use

- Avoid mechanical shock to the balance.
- Do not disassemble the balance. Contact the local A&D dealer if the balance needs service or repair.
- Do not use organic solvents to clean the balance. Clean the balance with a lint free cloth that is moistened with warm water and a mild detergent.
- Avoid dust and water so that the balance weighs correctly. Protect the internal parts from liquid spills and excessive dust.

3-4 Power Supply

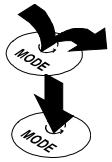
- When the AC adapter is connected, the balance is in the standby mode if the standby indicator is on (refer to “3-5 Display Symbols and Key Operation”). This is a normal state and does not harm the balance. For accurate weighing, warm up the balance for at least 30 minutes before use.

3-5 Display Symbols and Key Operation

Key operation

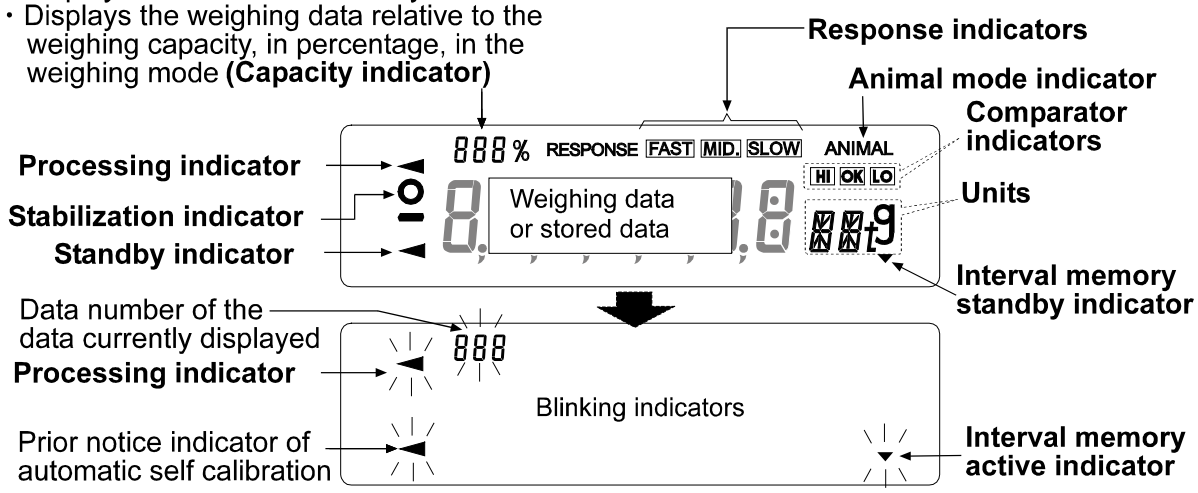
Key operation affects how the balance functions. The basic key operations are:

- "Press and release the key immediately" or "Press the key"
  = normal key operation during measurement
- "Press and hold the key"



Display symbols

・Displays data stored in memory
・Displays the weighing data relative to the weighing capacity, in percentage, in the weighing mode **(Capacity indicator)**



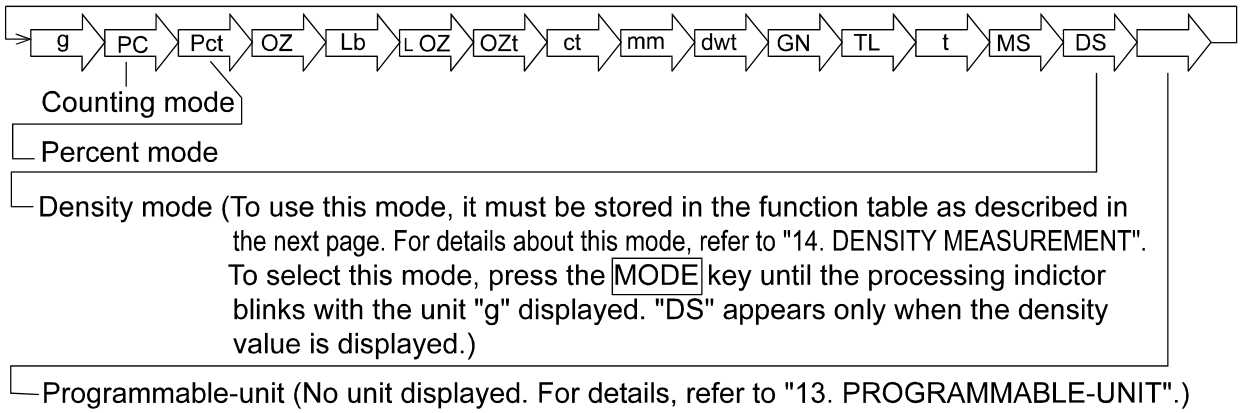
Each key, when pressed or when pressed and held, functions as follows:

Key	When pressed	When pressed and held
I/⏻ ON:OFF	Turns the display ON and OFF. The standby indicator is displayed when the display is turned off. The weighing mode is enabled when the display is turned on. This key is available anytime. Pressing the key during operation will interrupt the operation and turn the display OFF.	
1/10d SAMPLE	In the weighing mode, turns the minimum weighing value ON and OFF. In the counting or percent mode, enters the sample storing mode.	Enters the function table mode. Refer to "9. FUNCTION TABLE".
MODE	Switches the weighing units stored in the function table. Refer to "4. WEIGHING UNITS".	Performs response adjustment and self check.
▼ CAL	Performs calibration of the balance using the internal mass.	Displays other items of the calibration menu.
⊙ PRINT	Stores the weighing data in memory or outputs to a printer or personal computer using the RS-232C interface (Factory setting), depending on the function table settings.	No function at the factory setting By changing the function table: Outputs "Title block" and "End block" for GLP report. Displays the data memory menu.
→0/T← RE-ZERO	Sets the display to zero.	

4. WEIGHING UNITS

4-1 Units

With the G series balance, the following weighing units and weighing modes are available :



A unit or mode can be selected and stored in the function table as described in the next page.
If a weighing mode (or unit of weight) has been turned off, that mode or unit will be missing in the sequence. Tael has four varieties, one of which can be selected and installed at the factory.

To select a unit or mode for weighing, press the MODE key.

For details about the units and modes, see the table below:

Name (unit, mode)	Abbrev.	Display	Function table (Storing mode)	Conversion factor 1 g =
Gram	g	g	g	1 g
Counting mode	PC	PC	PC	——
Percent mode	Pct	Pct	Pct	——
Ounce (Avoir)	OZ	OZ	OZ	28.349523125 g
Pound	Lb	Lb	Lb	453.59237 g
Pound/Ounce	L OZ	L OZ	10	1Lb=16 oz, 1 oz=28.349523125 g
Troy Ounce	OZt	OZt	OZt	31.1034768 g
Metric Carat	ct	ct	ct	0.2 g
Momme	mm	mm	mm	3.75 g
Pennyweight	dwt	dwt	dwt	1.55517384 g
Grain (UK)	GN	GN	GN	0.06479891 g
Tael (HK general, Singapore)	TL	TL	TL	37.7994 g
Tael (HK jewelry)				37.429 g
Tael (Taiwan)				37.5 g
Tael (China)				31.25 g
Tola (India)	t	t	t	11.6638038 g
Messghal	MS	MS	MS	4.6875 g
Density mode (See note below)	DS	g DS is used to show the density.	DS	——
Programmable-unit (Multi-unit)	Mlt	——	MLt	——

Note: The blinking processing indicator with "g" indicates that the density mode is selected.

4-2 Storing Units

The units or modes can be selected and stored in the function table. The sequence of displaying the units or modes can be arranged so as to fit the frequency of use in the function table.

Select a unit or mode and arrange the sequence of display as follows:

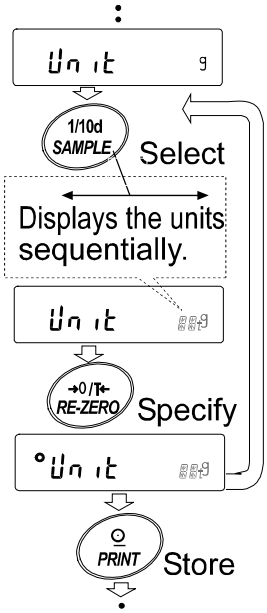
1 Press and hold the SAMPLE key until ba5fnc of the function table is displayed.

2 Press the SAMPLE key several times to display Unit .

3 Press the PRINT key to enter the unit selection mode.

4 Specify a unit or mode in the order to be displayed using the following keys.

SAMPLE key	To sequentially display the units.
RE-ZERO key	To specify a unit or mode. The stabilization indicator appears when the displayed unit or mode is specified.



5 Press the PRINT key to store the units or modes. The balance displays end and then displays the next menu of the function table.

6 Press the CAL key to exit the function table. Then the balance returns to the weighing mode with the selected unit.

7 To select other unit or mode for weighing, press the MODE key.

5. WEIGHING

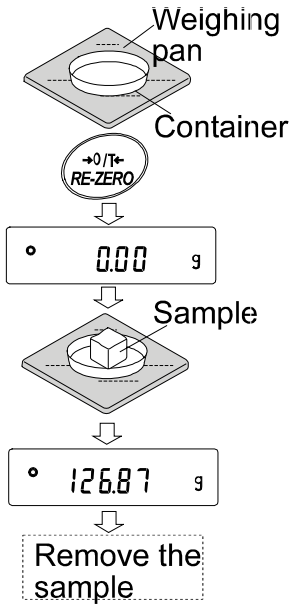
5-1 Basic Operation (Gram Mode)

1 Place a container on the weighing pan, if necessary. Press the RE-ZERO key to cancel the weight (tare). The balance displays 0.00 g. (The decimal point position depends on the balance model.)

2 Place a sample on the pan or in the container.

3 Wait for the stabilization indicator to be displayed. Read the value.

4 Remove the sample and container from the pan.



Notes

To use other units, press the MODE key and select an appropriate unit.

Press the SAMPLE key to turn on or off the minimum weighing value.

The weighing data can be stored in memory. For details, refer to "11. DATA MEMORY".

5-2 Counting Mode (PC)

This is the mode to determine the number of objects in a sample based on the standard sample unit mass. Unit mass means the mass of one sample. The smaller the variables in each sample unit mass is, the more accurate the counting will be. The G series balance is equipped with the Automatic Counting Accuracy Improvement (ACAI) function to improve the counting accuracy.

Note

If the sample unit mass variable is too large, it may cause a counting error.

Selecting the counting mode

1 Press the MODE key to select pC (counting mode).

Storing a sample unit mass

2 Press the SAMPLE key to enter the sample unit mass storing mode.
Even in the storing mode, pressing the MODE key will switch to the next mode.

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

Note

A greater number of samples will yield more accurate counting result.

4 Place a container on the weighing pan, if necessary. Press the RE-ZERO key to cancel the weight (tare). The number specified in step 3 appears.
e.g.: 25 0 pC is displayed if 25 is selected in step 3.

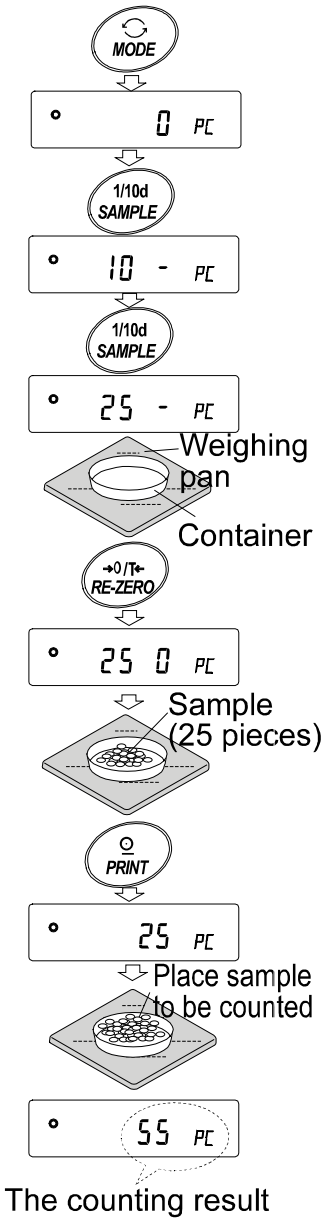
5 Place the number of samples specified on the pan. In this example, 25 pieces.

6 Wait for the stabilization indicator to come on. Press the PRINT key to calculate and store the unit mass. The balance displays 25 pC (counting mode) and is set to count samples with this unit mass. (The sample unit mass stored, even if the AC adapter is removed, is maintained in non-volatile memory.)

To improve the accuracy of the unit mass, proceed to step 8.

Notes

If the balance judges that the mass of the samples is too light and is not adequate to be used as the unit mass, it displays lo. Do not use the samples.



If the balance judges that the mass of the samples is too light to aquire accurate weighing, it displays an error requiring the addition of more samples to the specified number. In the example above, 50- pC appears, requiring 25 more samples. Add 25 samples and press the PRINT key. When the unit mass is stored correctly, the balance proceeds to the counting mode.

Counting operation

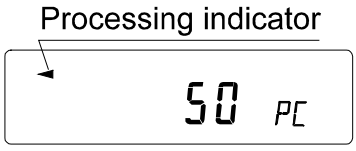
7 Place the samples to be counted on the pan.

Note

Up to 20 unit masses can be stored in memory for the multiple sample. For details, refer to "11. DATA MEMORY".

Counting mode using the ACAI function

The ACAI is a function that improves the accuracy of the unit mass automatically by increasing the number of samples as the counting process proceeds.



8 If a few more samples are added, the processing indicator turns on. To prevent an error, add three or more. The processing indicator does not turn on if overloaded. Try to add the same number of samples as displayed.

9 The balance re-calculates the unit mass while the processing indicator is blinking. Do not touch the balance or samples on the pan until the processing indicator turns off.

10 Counting accuracy is improved when the processing indicator turns off.

Each time the above operation is performed, a more accurate unit mass 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.

11 Remove all the samples used in ACAI and proceed with the counting operation using the improved unit mass.

5-3 Percent Mode (Pct)

This is the mode to display the weight value in percentage compared to a 100% reference mass and is used for target weighing or checking the sample variable.

Selecting the percent mode

1 Press the MODE key to select pct (percent mode). If the percent mode can not be selected, refer to "4. WEIGHING UNITS".

Storing the 100% reference mass

2 Press the SAMPLE key to enter the 100% reference mass storing mode.

Even in the storing mode, pressing the MODE key will switch to the next mode.

3 Place a container on the weighing pan, if necessary. Press the RE-ZERO key to cancel the weight (tare). The balance displays 100 0 pct.

4 Place the sample to be set as the 100% reference mass on the pan or in the container.

5 Press the PRINT key to store the reference mass. The balance displays 100.00 pct. (The decimal point position depends on the reference value. The reference mass stored, even if the AC adapter is removed, is maintained in non-volatile memory.)

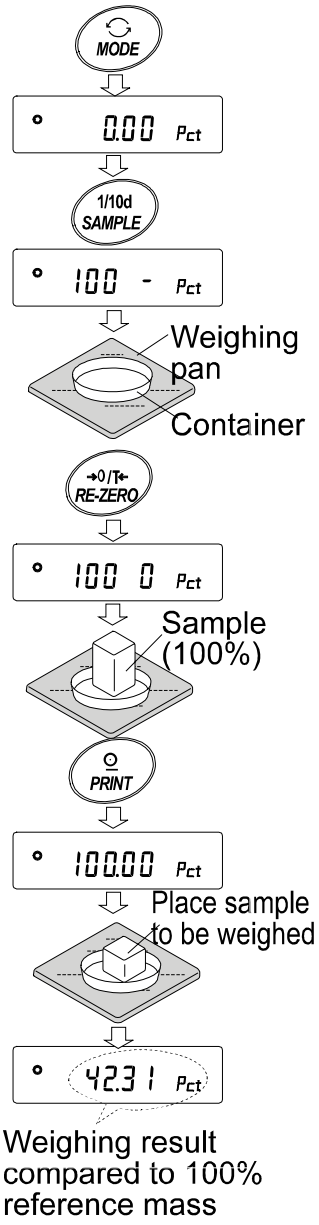
Note

If the balance judges that the mass of the sample is too light to be used as a reference, it displays lo. Do not use the sample.

6 Remove the sample.

Reading the percentage

7 Place a sample to be compared to the reference mass on the pan. The displayed percentage is based on the 100% reference mass.

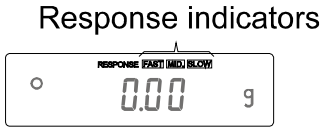


6. RESPONSE ADJUSTMENT / SELF CHECK FUNCTION

This function detects the influence on weighing that is caused by drafts and/or vibration at the place where the balance is installed and sets the response characteristic automatically. When this function is selected, the balance self-checks the performance at the same time.

Two modes of response adjustment are available: automatic and manual.

The function has three rates as follows:



Changing the response rate changes the display refresh rate.

Indicator	Parameter	Response characteristic	Display refresh rate
FAST	Cond 0	Fast response, Sensitive value	If the response rate is changed as follows:
MID.	Cond 1	⬆ ⬇	MID. or SLOW→FAST =10 times/second
SLOW	Cond 2	Slow response, Stable value	FAST→MID. or SLOW = 5 times/second

Note

To set the refresh rate of 5 times/second when the response rate is FAST or 10 times/second when the response rate is MID. or SLOW, change the "Display refresh rate (5pd)" parameter of "Environment, Display (ba5fnc)" in the function table. For details, refer to "9. FUNCTION TABLE".

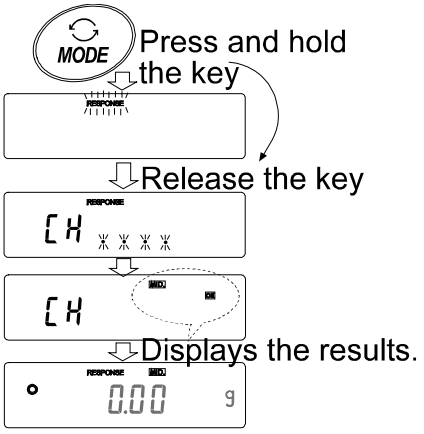
6-1 Automatic Response Adjustment / Self Check Function

This function automatically updates the response adjustment by analyzing the influence of the environment on the weighing data and also self-checks the balance performance using the internal mass.

Operation

1 Press and hold the MODE key until RESPONSE is displayed.

2 The balance automatically starts to check the balance performance and sets the response characteristic.



Caution

Do not allow vibration or drafts to affect the balance during adjustment.

3 After automatic adjustment, the balance displays the updated response indicator and returns to the weighing mode. The response indicator remains displayed for a while.

e.g. " MID. OK "

The example above indicates that the result of the self check is good and MID. is selected as the response rate.

Notes

If improper performance is found in the self check, the balance displays CH no. Contact the local A&D dealer for repair.

If the automatic response adjustment fails, the balance displays CH ng. Check the ambient conditions such as breeze and vibration, also check the weigning pan. Then, perform the adjustment again. To return to the weighing mode, press the CAL key.

If the automatic response adjustment is awkward, try to refine it using the manual response adjustment.

6-2 Manual Response Adjustment

This function manually updates the response adjustment.

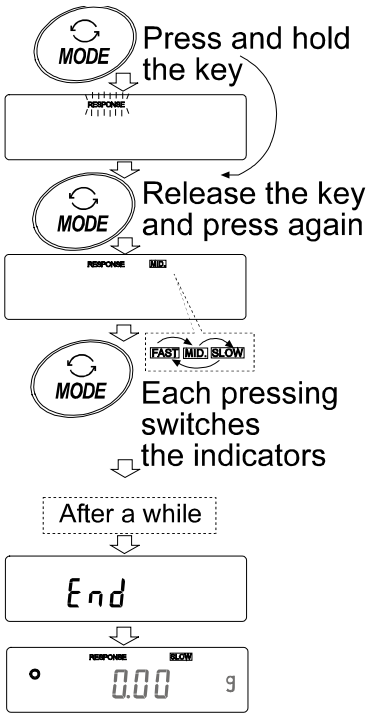
Operation

1 Press and hold the MODE key until RESPONSE is displayed.

And then, press the MODE key again quickly.

2 Press the MODE key to select a rate of the response adjustment. Either FAST, MID. or SLOW can be selected.

3 After a few seconds of inactivity the balance displays end. Then, it returns to the weighing mode and displays the updated response indicator. The response indicator remains displayed for a while.



Note

The response adjustment can be changed at "Condition (Cond)" of "Environment, Display (ba5fnc)" in the function table. For details, refer to "9. FUNCTION TABLE".

7. CALIBRATION

7-1 Calibration Group

The G series balance has the following modes as a calibration group.

Calibration	● Automatic self calibration (calibration due to changes in temperature) ● Calibration using the internal mass (one-touch calibration) ● Calibration using an external weight
Calibration test	● Calibration test using an external weight (Calibration test does not perform calibration.)

Terms

The following terms are defined as follows:

Internal mass	=	Built-in calibration weight
External weight	=	A weight that you have. Referred to as a calibration weight when used for calibration.
Calibration weight	=	A weight used for calibration
Target weight	=	An external weight used for calibration test

Caution

- Calibration adjusts the balance for accurate weighing.
  Besides periodic calibration and before each use, perform calibration when:
  • the balance is installed for the first time.
  • the balance has been moved.
  • the ambient environment has changed.
- Do not allow vibration or drafts to affect the balance during calibration.
- To output the data for GLP using the RS-232C interface, set “GLP output (`info`)” of “Data output (`dout`)”. For details, refer to “9. FUNCTION TABLE”. Time and date are added to GLP report. If the time or date is not correct, adjust them. For details, refer to “9-9 Clock and Calendar Function”.
- Calibration test is available only when “GLP output (`info`)” of “Data output (`dout`)” is set to “`1`” or “`2`”,
- The calibration and calibration test data can be stored in memory. To store them, set “Data memory (`data`)” to “`3`”. For details, refer to “11. DATA MEMORY”.

Caution on using an external weight

- The accuracy of an external weight can influence the accuracy of weighing. Select an appropriate weight as listed below:

Model	Usable calibration weight	Adjustable range
G4103	**400 g,** 300 g, 200 g	-0.015 g to +0.015 g
G21002	**2000 g**, 1000 g	-0.15 g to +0.15 g
G41002	**4000 g**, 3000 g, 2000 g	
G81001	8000 g, 7000 g, 6000 g, **5000 g**, 4000 g	-1.5 to +1.5 g

The calibration weight in bold type: factory setting
The calibration weight value can be adjusted within the range above.

Display

- This indicator means “the balance is measuring calibration data”. Do not allow vibration or drafts to affect the balance while this indicator is displayed.

7-2 Automatic Self Calibration (Calibration due to changes in temperature)

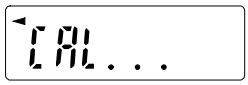
This function automatically calibrates the balance when the balance detects an ambient temperature change. If GLP output is selected in the function table, the balance outputs the calibration report or stores the data in memory. Automatic self calibration functions even if the display is turned off (standby state).

Caution

If something is on the weighing pan, the balance judges that it is in use and does not perform automatic self calibration. To maintain the calibrated state, keep the weighing pan clear while not in use.

The displays shown below are related to the automatic self calibration.

Indicates that the balance detects a change in ambient temperature and automatic self calibration will start. If the balance is not used for a few minutes with this indicator blinking, the balance performs automatic self calibration. The blinking duration depends on the environment.



Indicates that the balance is measuring calibration data. Do not allow vibration or drafts to affect the balance while this indicator is displayed. After calibration, the balance returns to indicate the previous display.

Note: The balance can be used while the indicator blinks. But, it is recommended that to maintain the accuracy, stop using the balance and confirm that there is nothing on the pan and allow the balance to perform self calibration.

7-3 Calibration Using the Internal mass (One-Touch Calibration)

This function calibrates the balance using the internal mass. The only operation required is to press the CAL key.

Operation

1 Connect the AC adapter and warm up the balance for at least 30 minutes with nothing on the weighing pan.

2 Press the CAL key.

3 The balance displays `Calin` and performs calibration using the internal mass. Do not allow vibration or drafts to affect the balance.

4 The balance displays `end` after calibration. If the “GLP output (`info`)” parameter of the function table is set to “`1`” or “`2`”, the balance displays `glp` and outputs “Calibration Report” using the RS-232C interface or stores the data in memory. For details on the calibration report format, refer to “10-2 GLP Report”.

5 The balance will automatically return to the weighing mode after calibration.

About the internal mass

The mass of the internal mass (approximately 500 g) may change due to corrosion or other damage caused by the operating environment, or due to aging. Check the internal mass periodically. Correct the internal mass value as necessary. For details, refer to “7-6 Correcting the internal mass value”.

To maintain the weighing accuracy, perform the calibration using an external weight periodically, as described below.

7-4 Calibration Using an External Weight

This function calibrates the balance using an external weight.

Operation

1 Connect the AC adapter and warm up the balance for at least 30 minutes with nothing on the pan.

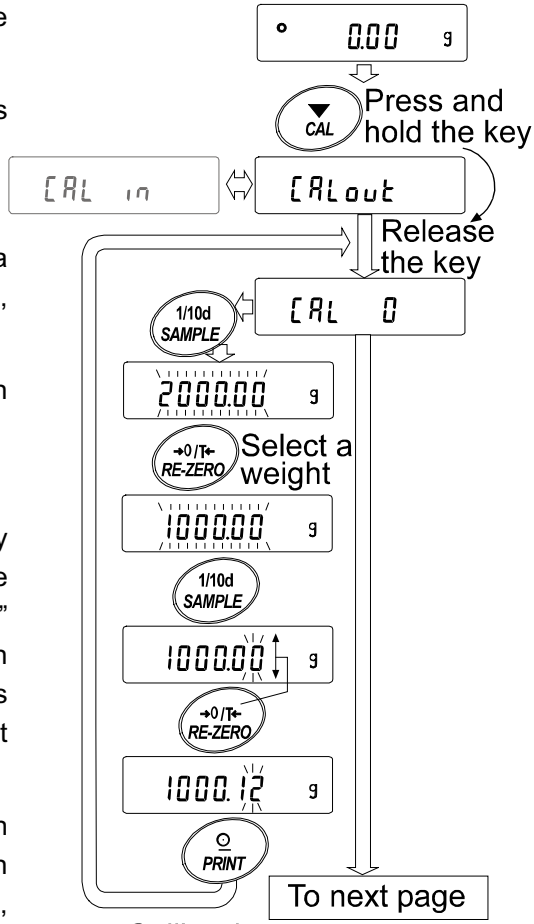
2 Press and hold the CAL key until Calout is displayed, and then release the key.

3 The balance displays Cal 0.

- If you want to change the calibration weight (a list of usable weights is shown on page 17), press the SAMPLE key and proceed to step 4.
- If you use the calibration weight value stored in the balance, proceed to step 5.

4 Specify the calibration weight value as follows:

SAMPLE key	To switch the display condition to: “All of the segments blinking” (calibration weight selection mode) or “The last two digits blinking” (value adjustment mode).
RE-ZERO key	To select the calibration weight or adjust the value. In the value adjustment mode, -15 digits appear after +15 digits.



e.g. Calibration weight value
1000.12 g

PRINT key	To store the new weight value. Even if the AC adapter is removed, the data is maintained in non-volatile memory.
CAL key	To cancel the operation and return to Cal 0.

Note
Digit, when used for the G series balance, indicates a unit of minimum weighing value.

5 Confirm that there is nothing on the pan and press the PRINT key. The balance measures the zero point. Do not allow vibration or drafts to affect the balance.

The balance displays the calibration weight value.

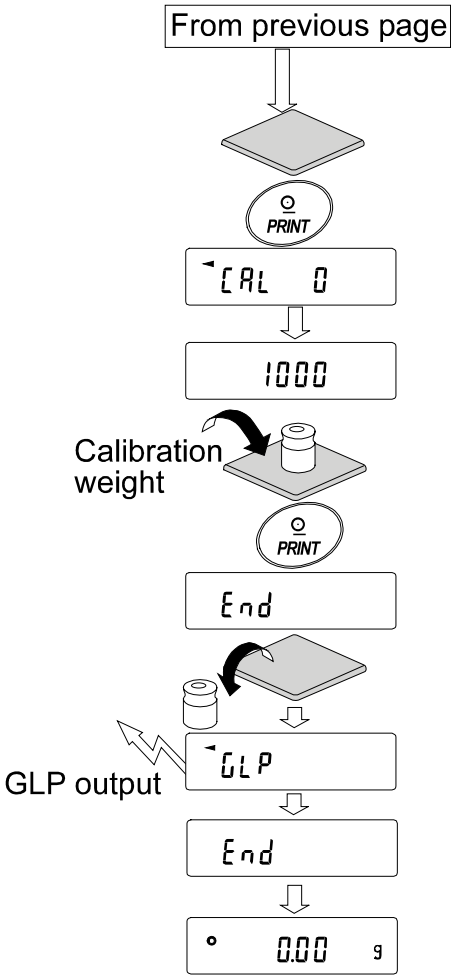
6 Place the displayed calibration weight on the pan and press the PRINT key. The balance measures the calibration weight. Do not allow vibration or drafts to affect the balance.

7 The balance displays end. Remove the weight from the pan.

8 If the "GLP output (info)" parameter, of the function table, is set to "1" or "2", the balance displays glp and outputs "Calibration Report" using the RS-232C interface or stores the data in memory. For details on the calibration report format, refer to "10-2 GLP Report".

9 The balance will automatically return to the weighing mode.

10 Place the calibration weight on the pan and confirm that the value displayed is within ±2 digits of the specified value. If it is not within the range, check the ambient conditions such as breeze and vibration, also check the weighing pan. Then, repeat steps 1 to 10.



7-5 Calibration Test Using an External Weight

This function tests the balance weighing accuracy using an external mass and outputs the result. This is available only when the "GLP output (`info`)" parameter is set to "`1`" or "`2`". (Calibration test does not perform calibration.)

Operation

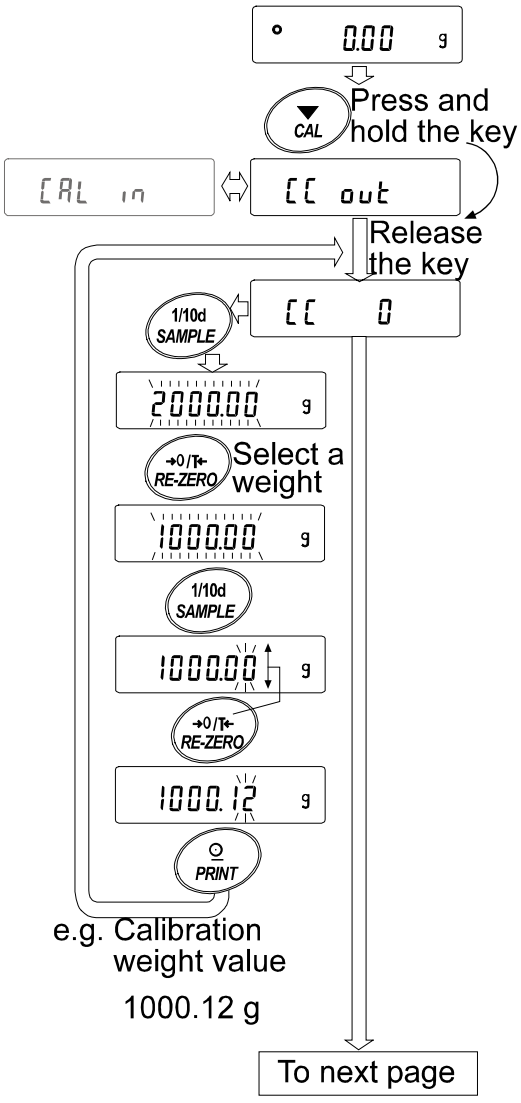
1 Connect the AC adapter and warm up the balance for at least 30 minutes with nothing on the pan.

2 Press and hold the CAL key until `CCout` is displayed, and then release the key.

3 The balance displays `CC 0`.
- If you want to change the target weight (a list of usable weights is shown on page 17), press the SAMPLE key and proceed to step 4.
- If you use the target weight value stored in the balance, proceed to step 5.

4 Specify the target weight value as follows:

SAMPLE key	To switch the display condition to: "All of the segments blinking" (target weight selection mode) or "The last two digits blinking" (value adjustment mode).
RE-ZERO key	To select the target weight or adjust the value. In the value adjustment mode, -15 digits appear after +15 digits.
PRINT key	To store the new weight value. Even if the AC adapter is removed, the data is maintained in non-volatile memory.
CAL key	To cancel the operation and return to `CC 0`.



Note

Digit, when used for the G series balance, indicates a unit of minimum weighing value.

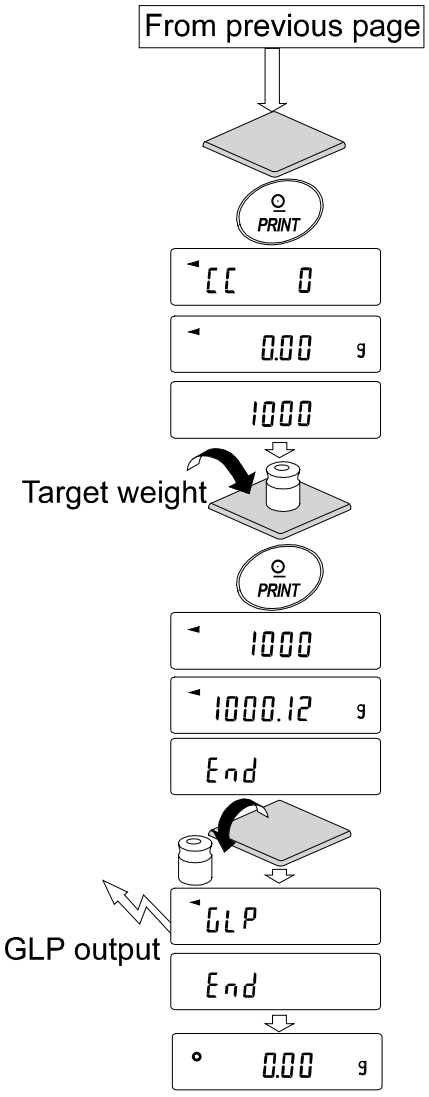
5 Confirm that there is nothing on the pan and press the PRINT key. The balance measures the zero point and displays the measured value. Do not allow vibration or drafts to affect the balance.
The balance displays the target weight value.

6 Place the displayed target weight on the pan and press the PRINT key. The balance measures the target weight and displays the measured value. Do not allow vibration or drafts to affect the balance.

7 The balance displays end. Remove the weight from the pan.

8 The balance displays glp and outputs “Calibration Test Report” using the RS-232C interface or stores the calibration test data in memory. For details on the calibration test report format, refer to “10-2 GLP Report”.

9 The balance will automatically return to the weighing mode.

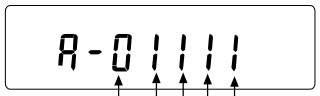


8. FUNCTION SWITCH AND INITIALIZATION

8-1 Permit or Inhibit

The balance stores parameters that must not be changed carelessly (e.g. Calibration data for accurate weighing, Data for adapting to the operating environment, Control data for the RS-232C interface). There are five switches for the purpose of protecting these parameters. Each switch can select either “permit” or “inhibit”. The “inhibit” protects parameters against careless operations.

Switches



(The display shown left indicates the factory settings.)

Function table
- 0 To inhibit changes to the function table
- 1 To permit changes to the function table

Calibration using the internal mass (One-touch calibration)
- 0 To inhibit calibration using the internal mass
- 1 To permit calibration using the internal mass

Calibration using an external weight
- 0 To inhibit calibration using an external weight
- 1 To permit calibration using an external weight

Automatic self calibration (Calibration due to changes in temperature)
- 0 To inhibit automatic self calibration
- 1 To permit automatic self calibration

Internal mass correction
- 0 To inhibit correction
- 1 To permit correction

Operation

1 Press the ON:OFF key to turn off the display.

2 While pressing and holding the PRINT key and the SAMPLE key, press the ON:OFF key. The balance displays p5 .

3 Press the PRINT key. Then the balance displays the function switches.

4 Set the switches using the following keys.

SAMPLE key	To select the switch to change the parameter.
RE-ZERO key	To change the parameter of the switch selected.
	0:To inhibit changes. 1:To permit changes
PRINT key	To store the new parameter and return to the weighing mode.
CAL key	To cancel the operation and return to the weighing mode.

8-2 Initializing the Balance

This function returns the following parameters to factory settings.

- Calibration data
- Function table
- The sample unit mass value (counting mode), 100% reference mass value (percent mode)
- The data that is stored in the balance using the data memory function
- External calibration weight and target weight value
- Function switch settings
- Liqiuid density and temperature in the density mode

Note
Be sure to calibrate the balance after initialization.

Operation

1 Press the ON:OFF key to turn off the display.

2 While pressing and holding the PRINT key and the SAMPLE key, press the ON:OFF key. The balance displays p5 .

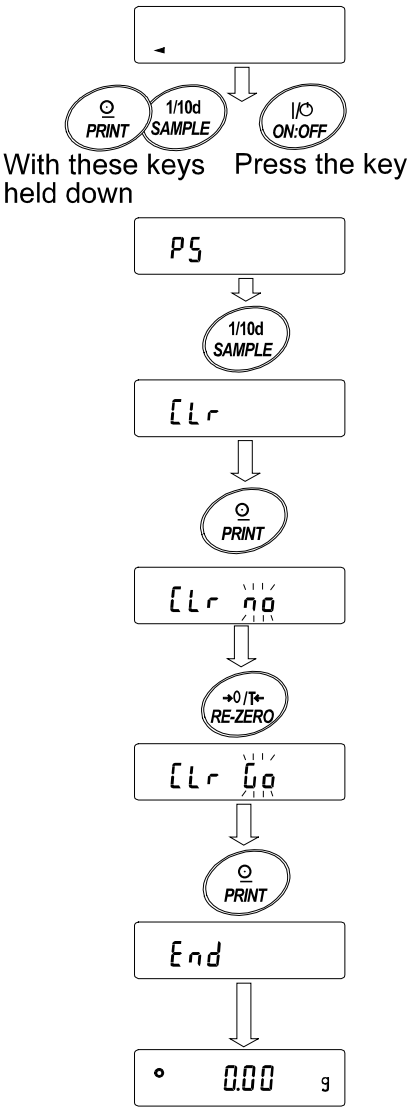
3 Press the SAMPLE key to display Clr .

4 Press the PRINT key.
To cancel this operation, press the CAL key.

5 Press the RE-ZERO key.

6 Press the PRINT key to initialize the balance.

The balance will automatically return to the weighing mode.



9. FUNCTION TABLE

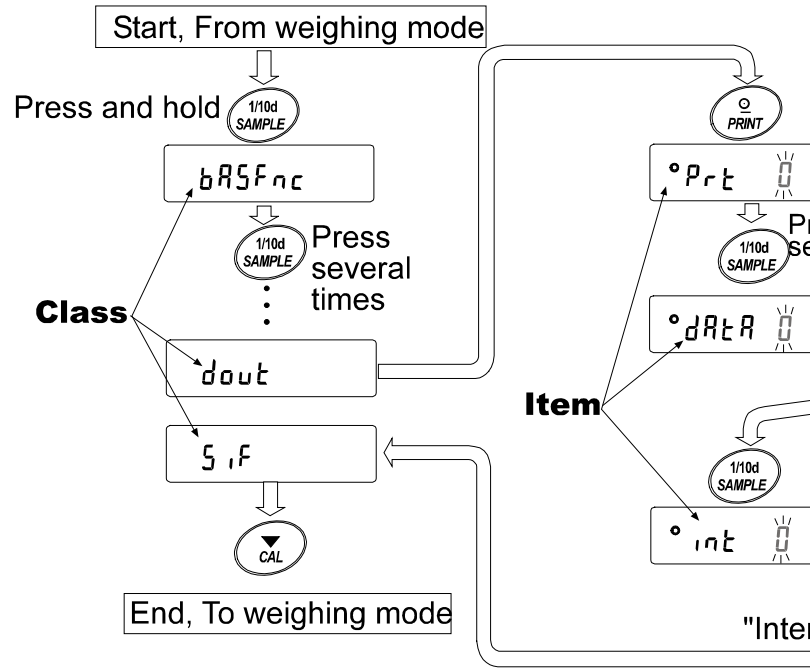
The function table reads or rewrites the parameters that are stored in the balance. These parameters stored, even if the AC adapter is removed, are maintained in non-volatile memory.

9-1 Structure and Sequence of the Function Table

The function table menu consists of two layers. The first layer is the “Class” and the second layer is the “Item”. Each item stores a parameter.

Example

This example sets “Stores weighing data” for “Data memory” and “Every 1 minute” for “Interval time”.



9-2 Display and Keys

Display/Key	Description
°	The symbol “O” indicates that the parameter displayed is in effect.
1/10d SAMPLE	When pressed and held in the weighing mode, enters the function table mode. Selects the class or item in the function table mode.
→0/T← RE-ZERO	Changes the parameter.
PRINT	When a class is displayed, moves to an item in the class. When an item is displayed, stores the new parameter and displays the next class.
CAL	When an item is displayed, cancels the new parameter and displays the next class. When a class is displayed, exits the function table mode and returns to the weighing mode.

9-3 Details of the Function Table

Class	Item	Param-eter	Description	
bASFnc Environment Display	Cond Condition	0	Fast response, sensitive value FAST	Can be changed by response adjustment. With "HoLd 1", sets the averaging time.
		■ 1	MID.	
		2	Slow response, stable value SLOW	
	St-b Stability band width	0	Stable when within ±1 digit	The stabilization indicator illuminates with the display fluctuation within the range. With "HoLd 1", sets the stabilization range.
		■ 1		
		2	Stable when within ±3 digits	
	HoLd Hold function	■ 0	OFF	Holds the display when stable in animal mode. With "HoLd 1", ANIMAL turns on.
		1	ON	
	trc Zero tracking	0	OFF	Keeps zero display by tracking zero drift.
		■ 1	ON	
	SPd Display refresh rate	■ 0	5 times/second	Period to refresh the display
		1	10 times/second	
	Pnt Decimal point	■ 0	Point (.)	Decimal point format
		1	Comma (,)	
	P-on Auto display-ON	■ 0	OFF	Turns on the weighing mode display when AC adapter is connected.
		1	ON	
	PoFF Auto display-OFF	■ 0	OFF	Turns off the display after 10 minutes of inactivity.
		1	ON (10 minutes)	
	GS1 Capacity indicator	■ 0	OFF	Capacity indicator. Zero: 0% Maximum capacity: 100%
		1	ON	
CL AdJ Clock		See "9-9 Clock and Calendar Function"		Confirms and sets the time and date.The time and date are added to output data.
CP Fnc Comparator	CP Comparator mode	■ 0	No comparison	
		1	Comparison, excluding "near zero" when stable value or overloaded	
		2	Comparison, including "near zero" when stable value or overloaded	
		3	Continuous comparison, excluding "near zero"	
		4	Continuous comparison, including "near zero"	
	CP in Input method	■ 0	Digital input, upper/lower limits	CP Hi, CP Lo can be selected.
		1	Weighing input, upper/lower limits	
		2	Digital input, reference value	CP rEF, CP Lnt can be selected.
		3	Weighing input, reference value	
CP Hi Upper limit		See "9-10 Comparator Function"		Displayed when CP in 0 or CP in 1 is selected.
CP Lo Lower limit				
CP rEF Reference value		See "9-10 Comparator Function"		Displayed when CP in 2 or CP in 3 is selected.
CP L t Tolerance				

■ Factory setting **Note: "Digit" is a unit of miminum weighing value.**

Class	Item	Param-eter	Description	
dout Data output	PrE Data output mode	■ 0	Key mode	Accepts the PRINT key only when the display is stable.
		1	Auto print mode A (Reference = zero)	Outputs data when the dispaly is stable and conditions of AP-P, AP-b and the reference value are met.
		2	Auto print mode B (Reference = last stable value)	
		3	Stream mode / Interval memory mode	With dAtA 0, outputs data continuously; with dAtA 2, uses interval memory.
	AP-P Auto print polarity	■ 0	Plus only	Displayed value>Reference
		1	Minus only	Displayed value<Reference
		2	Both	Regardless of displayed value
	AP-b Auto print difference	■ 0	10 digits	Difference between reference value and displayed value
		1	100 digits	
		2	1000 digits	
	dAtA Data memory	■ 0	Not used	Related items: PrE, int, d-no, S-td, inFo
		1	Stores unit mass in counting mode	
		2	Stores weighing data	
		3	Stores calibration data	
	int Interval time	■ 0	Every measurement	Interval time in the interval memory mode (with PrE 3, dAtA 2)
		1	Every 2 seconds	
		2	Every 5 seconds	
		3	Every 10 seconds	
		4	Every 30 seconds	
		5	Every 1 minute	
		6	Every 2 minutes	
		7	Every 5 minutes	
		8	Every 10 minutes	
	d-no Data number output	■ 0	No output	See "11 DATA MEMORY".
		1	Output	
	S-td Time/Date output	■ 0	No output	Selects whether or not the time or date is added to the weighing data. For details, refer to "9-9 Clock and Calendar Function".
		1	Time only	
		2	Date only	
		3	Time and date	
	S-id ID number output	■ 0	No output	Selects whether or not the ID number is output.
		1	Output	
	PUSE Data output pause	■ 0	No pause	Selects the data output interval.
		1	Pause (1.6 seconds)	
	At-F Auto feed	■ 0	Not used	Selects whether or not auto feed is performed.
		1	Used	
	inFo GLP output	■ 0	No output	Selects GLP output method. For how to set time and date to be added, refer to "9-9 Clock and Calendar Function".
		1	AD-8121 format	
		2	General data format	
	Ar-d Zero after output	■ 0	Not used	Adjusts zero automatically after data is output.
		1	Used	

■ Factory setting

Caution

The balance may not transmit the data completely at the specified refresh rate, depending on the baud rate or data added to the weighing data such as time, date and ID number.

Class	Item	Param-eter	Description	
SIF Serial interface	bPS Baud rate	0	600 bps	
		1	1200 bps	
		■ 2	2400 bps	
		3	4800 bps	
		4	9600 bps	
	btPr Data bit, parity bit	■ 0	7 bits, even	
		1	7 bits, odd	
		2	8 bits, none	
	CrLF Terminator	■ 0	CR LF	CR: ASCII code 0Dh LF: ASCII code 0Ah
		1	CR	
	tYPE Data format	■ 0	A&D standard format	See "9-6 Description of Item "Data Format".
		1	DP format	
		2	KF format	
		3	MT format	
		4	NU format	
		5	CSV format	
	t-UP Timeout	0	No limit	Selects the wait time to receive a command.
		■ 1	1 second	
	ErCd AK, Error code	■ 0	No output	AK: ASCII code 06h
		1	Output	
	CtS CTS, RTS control	■ 0	Not used	Controls CTS and RTS.
		1	Used	
dS FnC Density function	Ldin Liquid density input	■ 0	Water temperature	Available only when density mode is selected. See "14. DENSITY MEASUREMENT".
		1	Liquid density	
nLt Programmable-unit (Multi-unit)		Sets an arbitrary coefficient.		Available only when programmable-unit mode is selected.
Unit Unit		See "4. WEIGHING UNITS".		
CS in Internal mass value correction		See "7. CALIBRATION".		Displayed only when the internal mass value correction switch is set to 1.
id ID number setting		See "10. ID NUMBER AND GLP REPORT".		

■ Factory setting

9-4 Description of the Class “Environment, Display”

Condition (Cond)

Cond 0 ⇕ Cond 2

This parameter is for sensitive response to the fluctuation of a weight value. Used for powder target weighing, weighing a very light sample or when quick response weighing is required.
After setting, the balance displays FAST.

This parameter is for stable weighing with slow response. Used to prevent a weight value from drifting due to vibration or drafts.
After setting, the balance displays SLOW.

Notes
In automatic response adjustment, the response rate is selected automatically.

With “Hold function (Hold)” set to “ON (1)”, this item is used to set the averaging time.

Stability band width (5t-b)

This item controls the width to regard a weight value as a stable value. When the fluctuation per second is less than the parameter, the balance displays the stabilization indicator and outputs or stores the data. The parameter influences the “Auto print mode”

5t-b 0 ⇕ 5t-b 2

This parameter is for sensitive response of the stabilization indicator. Used for exact weighing.

This parameter ignores slight fluctuation of a weight value. Used to prevent a weight value from drifting due to vibration or drafts.

Note
With “Hold function (Hold)” set to “ON (1)”, this item is used to set the stabilization range.

Hold function (Hold) (Animal weighing mode)

This function is used to weigh a moving object such as an animal.
When the weighing data is over the weighing range from zero and the display fluctuation is within the stabilization range for a fixed period of averaging time, the processing indicator illuminates and the balance displays the average weight of the animal. When the animal is removed from the weighing pan, the display returns to zero automatically.
This function is available only when the hold function parameter is set to “1” (the animal mode indicator ANIMAL illuminates) and any weighing unit other than the counting mode is selected.

The stabilization range and averaging time are set in “Condition (Cond)” and “Stability band width (5t-b)”.

Weighing range		Averaging time		Stabilization range	
G4103	0.200 g or over	Cond 0	2 seconds Faster 4 seconds | 8 seconds More accurate	5t-b 0	Small | Big
G21002/G41002	2.00 g or over	Cond 1		5t-b 1	
G81001	10.0 g or over	Cond 2		5t-b 2	

Zero tracking (trc)

This function tracks zero point drift caused by changes in the environment and stabilizes the zero point. When the weighing data is only a few digits, turn the function off for accurate weighing.

Note

Digit, when used for the GX series balance, indicates a unit of minimum weighing value.

trc 0	The tracking function is not used. Used for weighing a very light sample.
trc 1	The tracking function is used.

Display refresh rate (5pd)

Period to refresh the display. This parameter influences “Baud rate”, “Data output pause” and “Stream mode”.

Note

This item is selected automatically in the automatic response adjustment.

Decimal point (pnt)

The decimal point format can be selected.

Auto display-ON (p-on)

When the AC adapter is connected, the display is automatically turned on without the ON:OFF key operation, to display the weighing mode. Used when the balance is built into an automated system. 30-minute warm up is necessary for accurate weighing.

Auto display-OFF (poff)

When the AC adapter is connected and no operation is performed (inactivity state) for 10 minutes, the display is automatically turned off and the standby indicator is illuminated.

Capacity indicator (g5i)

In the weighing mode, the indicator displays the weighing data relative to the weighing capacity in percentage. (Zero = 0%, maximum capacity = 100%)

When the “Data memory (data)” parameter is set to “1” (to store unit mass in the counting mode) or to “2” (to store the weighing data), the indicator displays the information stored in memory, such as the amount of memory data or data number.

9-5 Clock and Calendar Function

The balance is equipped with a clock and calendar function. When the "GLP output (info)" parameter is set to "1" or "2" and the "Time/Date output (5-td)" parameter is set to "1", "2" or "3", the time and date are added to the output data. Set or confirm the time and date as follows:

Operation

1 Press and hold the SAMPLE key until ba5fnc of the function table is displayed.

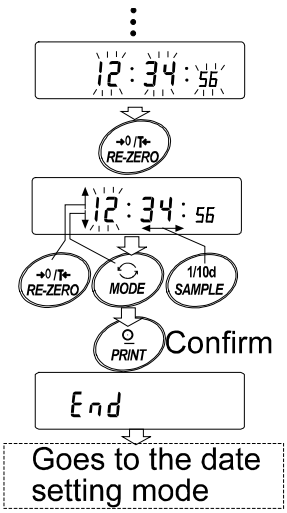
2 Press the SAMPLE key several times to display Cl adj.

3 Press the PRINT key. The balance enters the mode to confirm or set the time and date.

Confirming the time

4 The current time is displayed with all the digits blinking.

- When the time is correct and the date does not need to be confirmed, press the CAL key and proceed to step 8.
- When the time is correct and the date is to be confirmed, press the SAMPLE key and proceed to step 6.
- When the time is not correct and is to be changed, press the RE-ZERO key and proceed to step 5.



Setting the time (with part of the digits blinking)

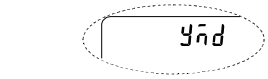
5 Set the time in 24-hour format using the following keys.

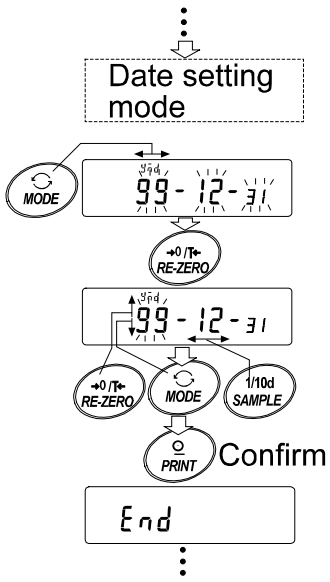
SAMPLE key	To select the digits to change the value. The selected digits blink.
RE-ZERO key	To increase the value by one.
MODE key	To decrease the value by one.
PRINT key	To store the new setting, display end and go to step 6.
CAL key	To cancel the new setting and go to step 6.

Confirming the date

6 The current date is displayed with all the digits blinking.

- To change the display order of year (y), month (n) and day (d), press the MODE key. The date is output in the order as specified.
- When the date is correct and the operation is to be finished, press the CAL key and proceed to step 8.
- When the time is to be confirmed again, press the SAMPLE key and go back to step 4.
- When the date is not correct and is to be changed, press the RE-ZERO key and proceed to step 7.





Note

The year is expressed using a two-digit format. For example, the year 2000 is expressed as "00".

Setting the date (with part of the digits blinking)

7 Set the date using the following keys.

SAMPLE key	To select the digits to change the value. The selected digits blink.
RE-ZERO key	To increase the value by one.
MODE key	To decrease the value by one.
PRINT key	To store the new setting, display end and go to step 8.
CAL key	To cancel the new setting and go to step 8.

Quitting the operation

8 The balance displays the next menu of the function table. Press the CAL key to exit the clock and calendar function and return to the weighing mode.

Notes

Do not enter invalid values such as a non-existing date when setting the time and date.

When the clock backup battery has been depleted, the balance displays rtc pf. Under this condition, press any key and set the time and date. The dead battery only affects the clock and calendar function. Even so, the function works normally as long as the AC adapter is connected to the balance.

9-6 Comparator Function

The results of the comparison are indicated by HI OK LO on the display.

Operating conditions:
- No comparison
- Comparison when the weighing data is stable or overloaded, excluding “near zero”
- Comparison when the weighing data is stable or overloaded, including “near zero”
- Continuous comparison, excluding “near zero”
- Continuous comparison, including “near zero”

To compare, use:
- Upper limit value and lower limit value
- Reference value and tolerance value

Input method:
- Digital input
- Weighing input

For the description of “Comparator mode (Cp fnc)”, refer to “9-3 Details of the Function Table”.

Setting example 1

(Continuous comparison, excluding “near zero”, reference value and tolerance value, digital input)

Selecting a comparator mode

1 Press and hold the SAMPLE key until ba5fnc of the function table is displayed.

2 Press the SAMPLE key several times to display Cp fnc.

3 Press the PRINT key.

4 Press the RE-ZERO key several times to display Cp 3.

5 Press the SAMPLE key several times to display Cp in.

6 Press the RE-ZERO key several times to display Cp in 2.

7 Press the PRINT key to store the selected mode.

Entering the reference and tolerance values

8 With Cp ref displayed, press the PRINT key. The current setting is displayed with all the digits blinking.

- When the current setting is not to be changed, press the PRINT or CAL key to proceed to step 9.
- When the current setting is to be changed, press the RE-ZERO key. Change the setting using the following keys.

SAMPLE key	To select the digit to change the value.
RE-ZERO key	To change the value of the digit selected.
MODE key	To switch the polarity.
PRINT key	To store the new setting and go to step 9.
CAL key	To cancel the new setting and go to step 9.

9 With Cp lnt displayed, press the PRINT key. The current setting is displayed. When the current setting is to be changed, change the setting using the following keys. Enter the tolerance value in percentage to the reference value as 100%.

SAMPLE key	To select the digit to change the value.
RE-ZERO key	To change the value of the digit selected.
PRINT key	To store the new setting and go to step 10.
CAL key	To cancel the new setting and go to step 10.

10 Press the CAL key to exit the comparator function and return to the weighing mode.

Setting example 2

(Comparison when the weighing data is stable or overloaded, including “near zero”, upper limit and lower limit, weighing input)

Selecting a comparator mode

1 Press and hold the SAMPLE key until ba5fnc of the function table is displayed.

2 Press the SAMPLE key several times to display Cp fnc.

3 Press the PRINT key.

4 Press the RE-ZERO key several times to display Cp 2.

5 Press the SAMPLE key several times to display Cp in.

6 Press the RE-ZERO key several times to display Cp in 1.

7 Press the PRINT key to store the selected mode.

Entering the upper and lower limit values

8 With Cp Hi displayed, press the PRINT key. The current setting is displayed with all of the digits blinking. Press the RE-ZERO key to enter the weighing input mode.

9 Press the RE-ZERO key. The balance displays 0.00g. Place a sample whose mass corresponds to the upper limit value on the pan. Press the PRINT key to store the upper limit value. Remove the sample. The balance displays Cp lo.

10 With Cp lo displayed, press the PRINT key. The current setting is displayed with all of the digits blinking. Press the RE-ZERO key to enter the weighing input mode.

11 Press the RE-ZERO key. The balance displays 0.00g. Place a sample whose mass corresponds to the lower limit value on the pan. Press the PRINT key to store the lower limit value. Remove the sample.

12 Press the CAL key to exit the comparator function and return to the weighing mode.

Notes

When Pound/Ounce is selected as a weighing unit, enter the values in ounces for comparison.

In the density mode, comparison is performed to the density obtained.

10. ID NUMBER AND GLP REPORT

- The ID number is used to identify the balance when Good Laboratory Practice (GLP) is used.
- The ID number is maintained in non-volatile memory even if the AC adapter is removed.
- The GLP output format is selected at “GLP output (`info`)” of the function table and can be output to a personal computer or printer using the RS-232C serial interface.
- The GLP output format includes the balance manufacturer, model, serial number, ID number, date, time and space for signature for weighing data, and the weight used and results for calibration or calibration test data.
- The balance can output the following reports for GLP.

  “Calibration report” of the calibration, using the internal mass (Calibration due to changes in temperature and one-touch calibration.)

  “Calibration report” of the calibration, using an external weight.

  “Calibration test report” of the calibration test, using an external weight.

  “Title block” and “End block” for the weighing data.
- Calibration and calibration test data can be stored in memory to output several reports at the same time. Refer to “11. DATA MEMORY” for details.
- For details on confirming and setting the time and date, refer to “9-9 Clock and Calendar Function”.

10-1 Setting the ID Number

1 Press and hold the SAMPLE key until `ba5fnc` of the function table is displayed.

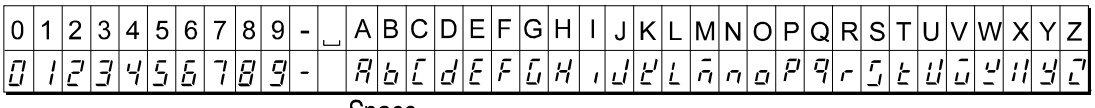
2 Press the SAMPLE key several times to display `id`.

3 Press the PRINT key. Set the ID number using the following keys.

RE-ZERO key	To set the character of the digit selected. Refer to the display character set shown below.
SAMPLE key	To select the digit to change the value.
PRINT key	To store the new ID number and display `ba5fnc`.
CAL key	To cancel the new ID number and display `ba5fnc`.

4 With `ba5fnc` displayed, press the CAL key to return to the weighing mode.

Display character set



10-2 GLP Report

Set the following parameters to output the report.

- To print the report, set the “GLP output (`info`)” parameter to “`1`” and use MODE 3 of the AD-8121. For details on using the printer, refer to “16-1 Connection to the AD-8121 Printer”.
- To output the report to a personal computer using the RS-232C interface, set the “GLP output (`info`)” parameter to “`2`”.
- If the time and date are not correct, set the correct time and date in “Clock (`Cl adj`)” of the function table.

Note
For operational details about calibration and calibration test, refer to “7. CALIBRATION”.

Calibration report using the internal mass

When the setting is “`info 1`”:

AD-8121 format

```
MODEL     G     00
S/N      01234567
ID         ABCDEFG
DATE   1999/12/31
TIME     12:34:56
CALIBRATED(INT.)
SIGNATURE


- - - - - - - -
```

When the setting is “`info 2`”:

General data format

```
␣␣␣␣␣␣␣␣␣␣␣␣ ␣ ␣ <TERM>
MODEL␣␣␣␣G -  00<TERM>
S/N␣␣␣␣␣01234567<TERM>
ID␣␣␣␣␣␣␣ABCDEFG<TERM>
DATE<TERM>
␣␣␣␣␣␣1999/12/31<TERM>
TIME<TERM>
␣␣␣␣␣␣␣12:34:56<TERM>
CALIBRATED(INT.)<TERM>
SIGNATURE<TERM>
<TERM>
<TERM>
----------------<TERM>
<TERM>
<TERM>
```

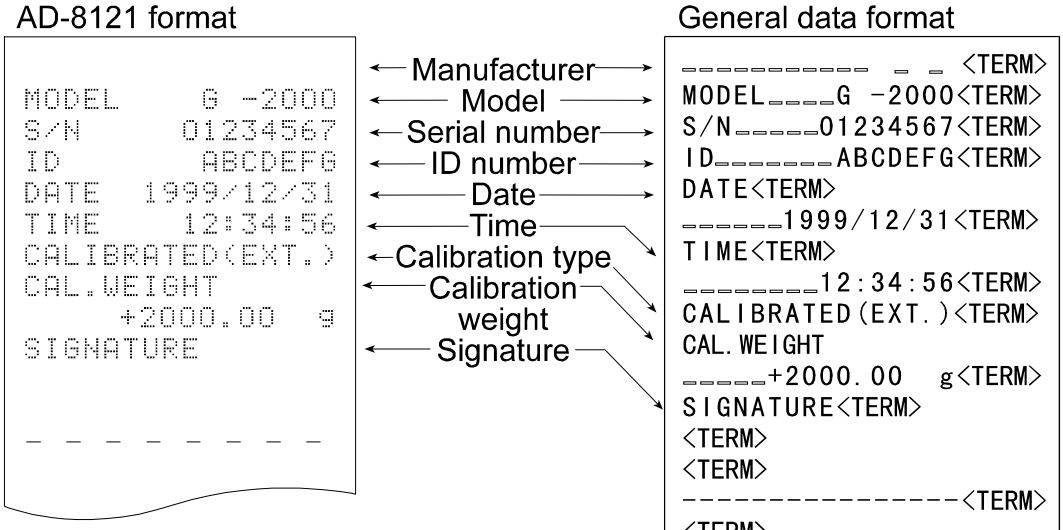
Manufacturer
Model
Serial number
ID number
Date
Time
Calibration type
Signature

␣ Space, ASCII 20h
<TERM> Terminator, C_R, L_F or C_R
C_R Carriage return, ASCII 0Dh
L_F Line feed, ASCII 0Ah

Calibration report using an external weight

When the setting is "info 1":

When the setting is "info 2":



␣ Space, ASCII 20h

<TERM> Terminator, C_R, L_F or C_R

C_R Carriage return, ASCII 0Dh

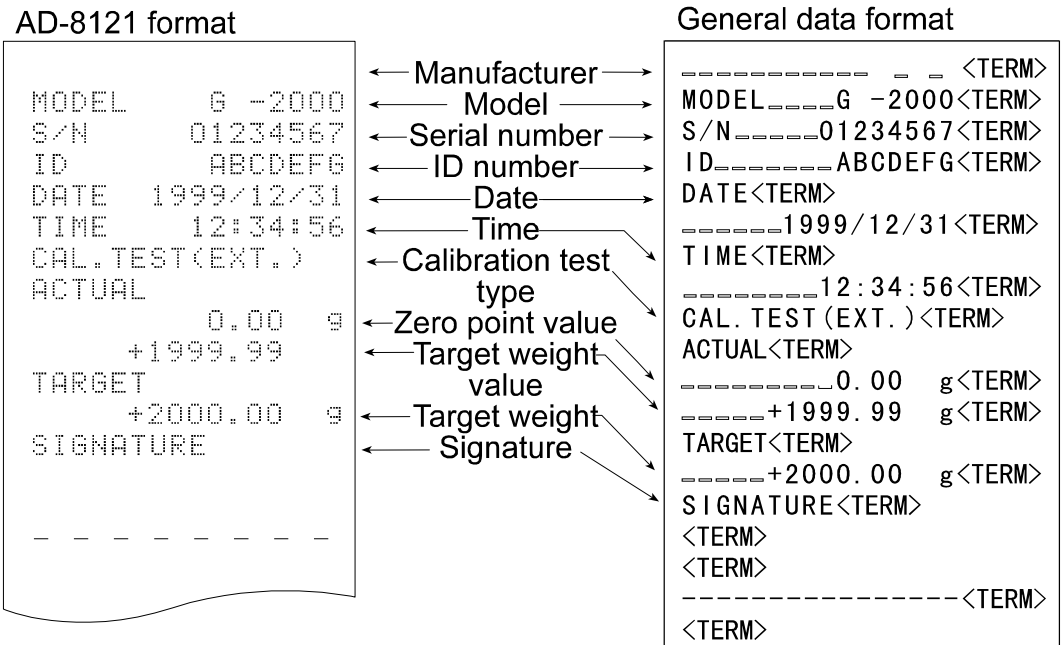
L_F Line feed, ASCII 0Ah

Calibration test report using an external weight

(Calibration test does not perform calibration.)

When the setting is "info 1":

When the setting is "info 2":



␣ Space, ASCII 20h

<TERM> Terminator, C_R, L_F or C_R

C_R Carriage return, ASCII 0Dh

L_F Line feed, ASCII 0Ah

Title block and end block

When a weight value is recorded as the GLP data, “Title block” and “End block” are inserted at the beginning and at the end of a group of weight values, in the GLP report.

Note

To output the report to an AD-8121 , use MODE 3 of the AD-8121.

Caution

If the data memory function is used, the “Title block” and “End block” can not be output.

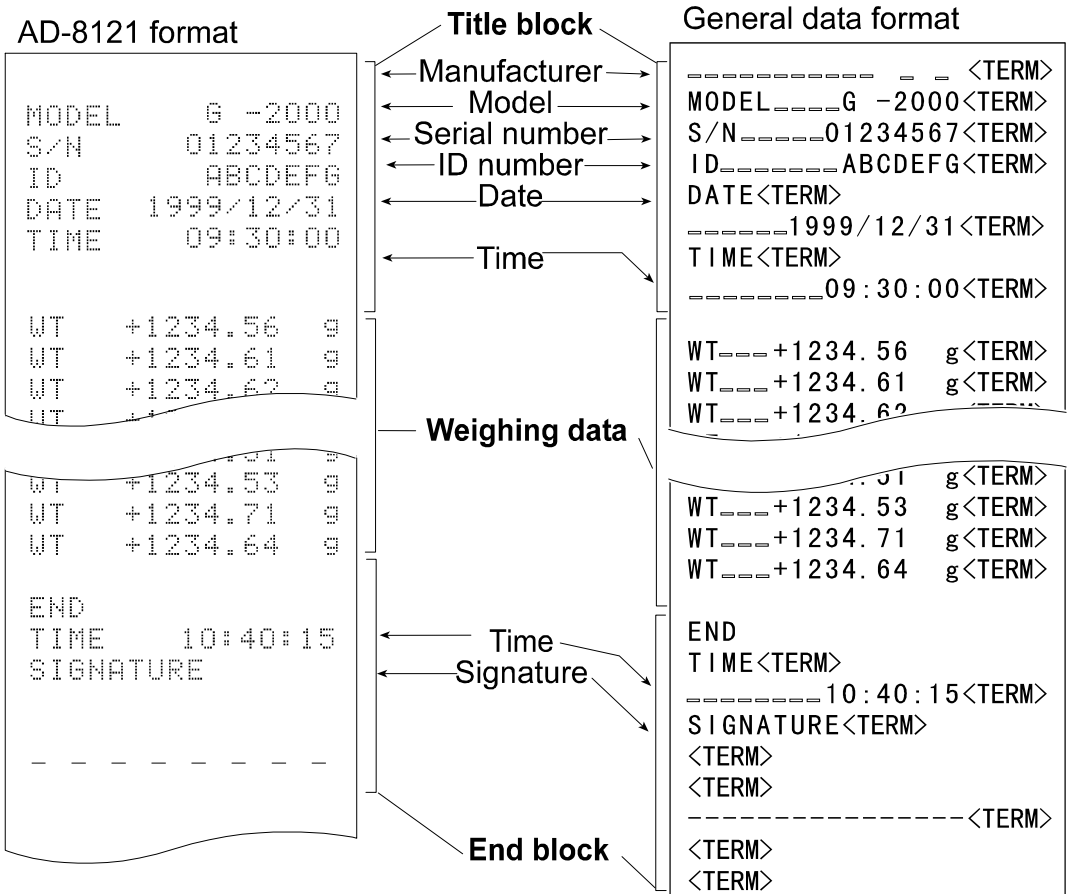
Operation

1 With the weighing data displayed, press and hold the PRINT key until S5tart is displayed. The “Title block” is output.

2 The weighing data is output according to the parameter setting of the data output mode.

3 Press and hold the PRINT key until recend. The “End block” is output.

When the setting is “info 1”:



When the setting is “info 2”:

␣ Space, ASCII 20h

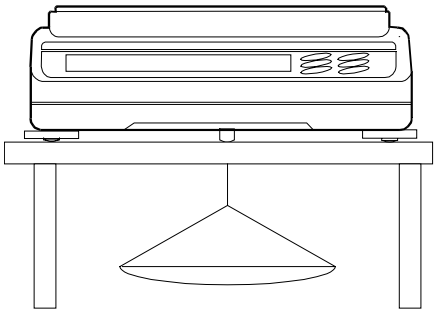
<TERM> Terminator, C_R , L_F or C_R

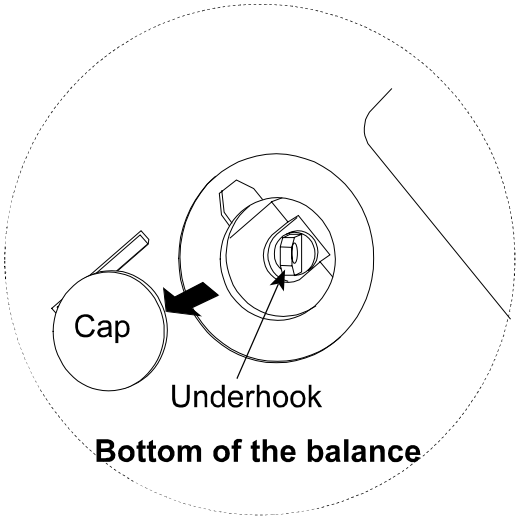
C_R Carriage return, ASCII 0Dh

L_F Line feed, ASCII 0Ah

11. UNDERHOOK

The underhook can be used for weighing large samples, magnetic materials or for measuring density. The built-in underhook is revealed by removing the plastic cap on the bottom of the balance. Use the underhook as shown below.





Caution

Do not apply excessive force to the underhook.

When not in use, attach the plastic cap to prevent dust from getting into the balance.

12. SPECIFICATIONS

Weighing capacity		**G4103**	**G21002**
Maximum Display		410g	21
Minimum weighing value (1 digit)		0.001 g	0.01 g
Repeatability (Standard deviation)		0.001 g	0.01 g
Linearity		±0.002 g	±0.02 g
Stabilization time (typical at FAST)		Approx. 1 second	
Sensitivity drift (10°C-30°C/50°F-86°F)		±2 ppm/°C (When automatic self calibration is not used)	
Accuracy right after calibration using the internal mass. See notes below		±0.010 g	±0.10 g
		The value above is to the weighing capacity.	
Counting mode	Minimum unit mass	0.001 g	0.01 g
	Number of samples	10, 25, 50 or 100 pieces	
Percent mode	Minimum 100% reference mass	0.100 g	1.00 g
	Minimum 100% display	0.01%, 0.1%, 1% (Depends on the reference mass stored.)	
External calibration weight		400 g, 300 g, 200 g	2000 g 1000 g
Weighing pan		128 x 128 mm	165 x 165 mm
Net weight		Approx. 4.6 kg	Approx. 5.1 kg

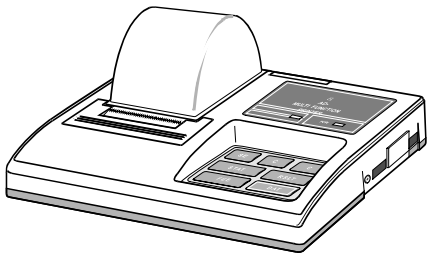
		G41002	**G81001**
Weighing capacity		4100 g	8100 g
Maximum display		4100.84 g	8108.4 g
Minimum weighing value (1 digit)		0.01 g	0.1 g
Repeatability (Standard deviation)		0.01 g	0.1 g
Linearity		±0.02 g	±0.1 g
Stabilization time (typical at FAST)		Approx.1.5s	Approx.1 s
Sensitivity drift (10°C-30°C/50°F-86°F)		±2 ppm/°C (auto-self calibration OFF)	±5 ppm/°C (auto-self calibration OFF)
Accuracy right after calibration using the internal mass. See notes below.		±0.15 g	±0.5 g
		The value above is to the weighing capacity.	
Counting mode	Minimum unit mass	0.01 g	0.1 g
	Number of samples	10, 25, 50 or 100 pieces	
Percent mode	Minimum 100% reference mass	1.00 g	10.0 g
	Minimum 100% display	0.01%, 0.1%, 1% (Depends on the reference mass stored.)	
External calibration weight		4000 g, 3000 g 2000 g	8000 g, 7000 g 6000 g, 5000 g 4000 g
Weighing pan		165 x 165 mm	
Net weight		Approx. 5.1 kg	

Specifications common for any model	
Display refresh rate	5 times/second or 10 times/second
Operating environment	5°C to 40°C (41°F to 104°F), 85%RH or less (No condensation)
External dimensions	210 (W) x 317 (D) x 86 (H) mm
AC adapter	Confirm that the adapter type is correct for the local voltage and power receptacle type
Power consumption	Approx. 11VA (supplied to the AC adapter)
Interface (Provided as standard)	RS-232C

13. OPTIONS

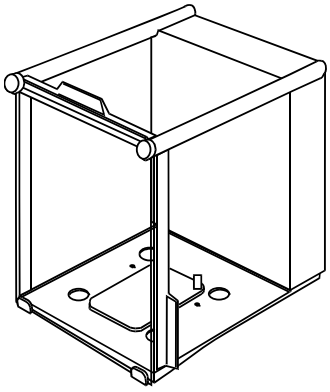
AD-8121 Printer

- Compact thermal dot-matrix printer
- Statistical function, clock and calendar function, interval print function, graphic print function, terminal mode
- 5 x 7 dots, 16 characters per line
- Print paper (AX-PP143, 45 (W) x 50 (L) mm , ø65 mm)
- AC adapter or alkaline battery.



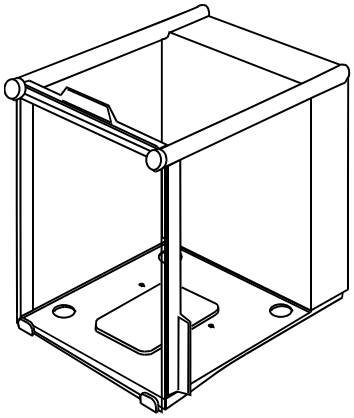
Glass Breeze Break (G-10)

For G4103



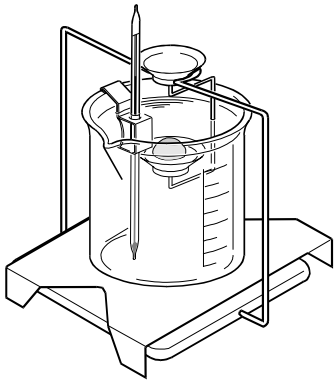
Glass Breeze Break (G-11)

For G21002/G41002/G81001



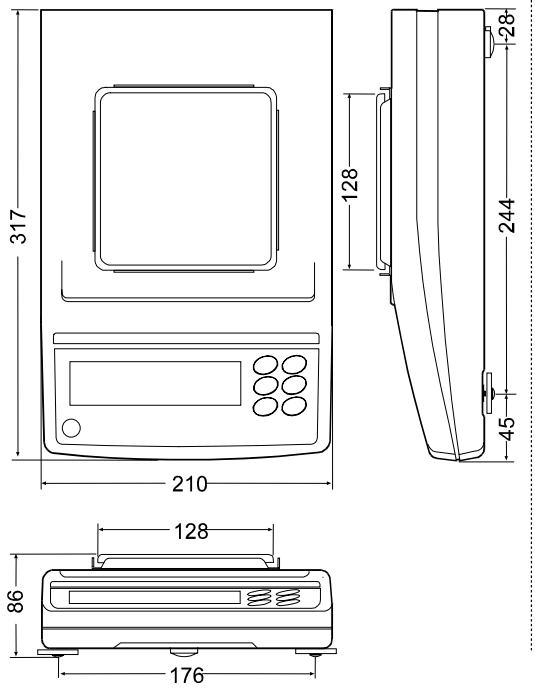
Density Determination Kit (AD-1653)

Only for G4103



14. EXTERNAL DIMENSIONS

G4103



G 21002 / 41002 / 81001