

# **MC-A Series**

## **Mass Comparator**


# INSTRUCTION MANUAL

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# Warning Definition

The warnings described in this manual have the following meanings:

 <b>CAUTION</b>	A potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to the instrument.
<b>CAUTION</b>	Cautions to use the device correctly.
<b>Note</b>	Information or cautions to use the device correctly.

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# 1. Introduction

Thank you for purchasing an A&D electronic balance. Please read this instruction manual carefully before using the MC-A series top-loading electronic balance to fully understand and utilize it.

## 1-1 Features

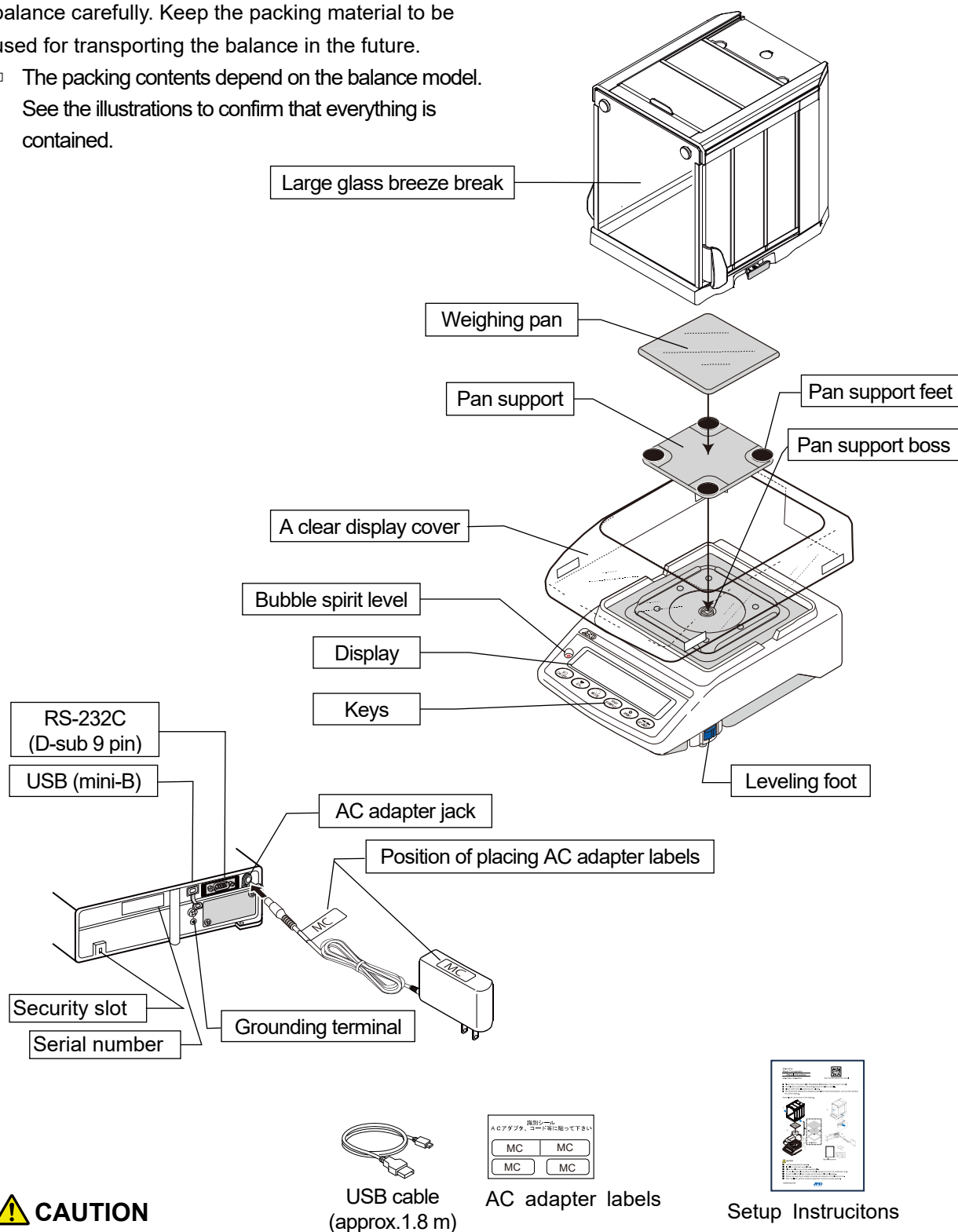
- It can display one digit finer than the minimum display of conventional general-purpose balances, making it suitable for managing OIML F1 class weights.
- It can measure small amounts of powder or liquid even with a heavy tare.
- When used as a mass comparator, the accessory center of gravity adjustment plate can be used to reduce eccentric error, allowing for more precise measurements.
- It is equipped with a self-check function that automatically evaluates repeatability performance without using weights. (Electronic Controlled Load: ECL)
- It can detect shocks applied to the balance's mass sensor, display the shock level, and store it. (Impact Detection Function: ISD)
- It is equipped with a data memory function that can store weighing values, sensitivity adjustment results, and multiple unit masses (mass per sample in count mode). (Up to 200 weighing values can be stored)
- The MC-A series can automatically adjust sensitivity with built-in weights (automatic sensitivity adjustment). (Temperature changes, specific times, at regular intervals)
- It can output sensitivity adjustments and other data in compliance with GLP/GMP standards.  
The results of sensitivity adjustments can be recorded using an optional printer.  
GLP stands for "Good Laboratory Practice," which is a standard for conducting safety tests on pharmaceuticals.  
GMP stands for "Good Manufacturing Practice," which is a regulation for manufacturing and quality control.
- The balance has a built-in clock function, allowing weighing values to be output with date and time. (Clock settings can be restricted to administrators only with a password function)
- Pre-set upper/lower limits can be compared with weighing values, and the comparison results can be displayed as **HI**, **OK**, or **LO**, making it useful for pass/fail judgments and ranking. (Five-level comparison is also possible with settings)
- It is equipped with a weighing indicator function that shows the remaining capacity relative to the balance's weighing capacity.
- It has a display hold function that can be used for animal weighing.
- It comes standard with an underfloor weighing hook for magnetic material measurements.
- The password function can restrict users and changes to internal settings.
- The key lock function disables key operations on the balance, allowing it to be operated only by commands from external devices.
- It is equipped with standard RS-232C and USB interfaces for outputting weighing values and data. Additionally, data communication with Windows PCs is easy using the WinCT software.  
The latest version of WinCT can be downloaded from our website.  
Windows is a registered trademark or trademark of Microsoft Corporation in the United States and other countries.

## 2. Product Configuration (Names of Each Part), Installation and Precautions

### 2-1 MC-1104A

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.



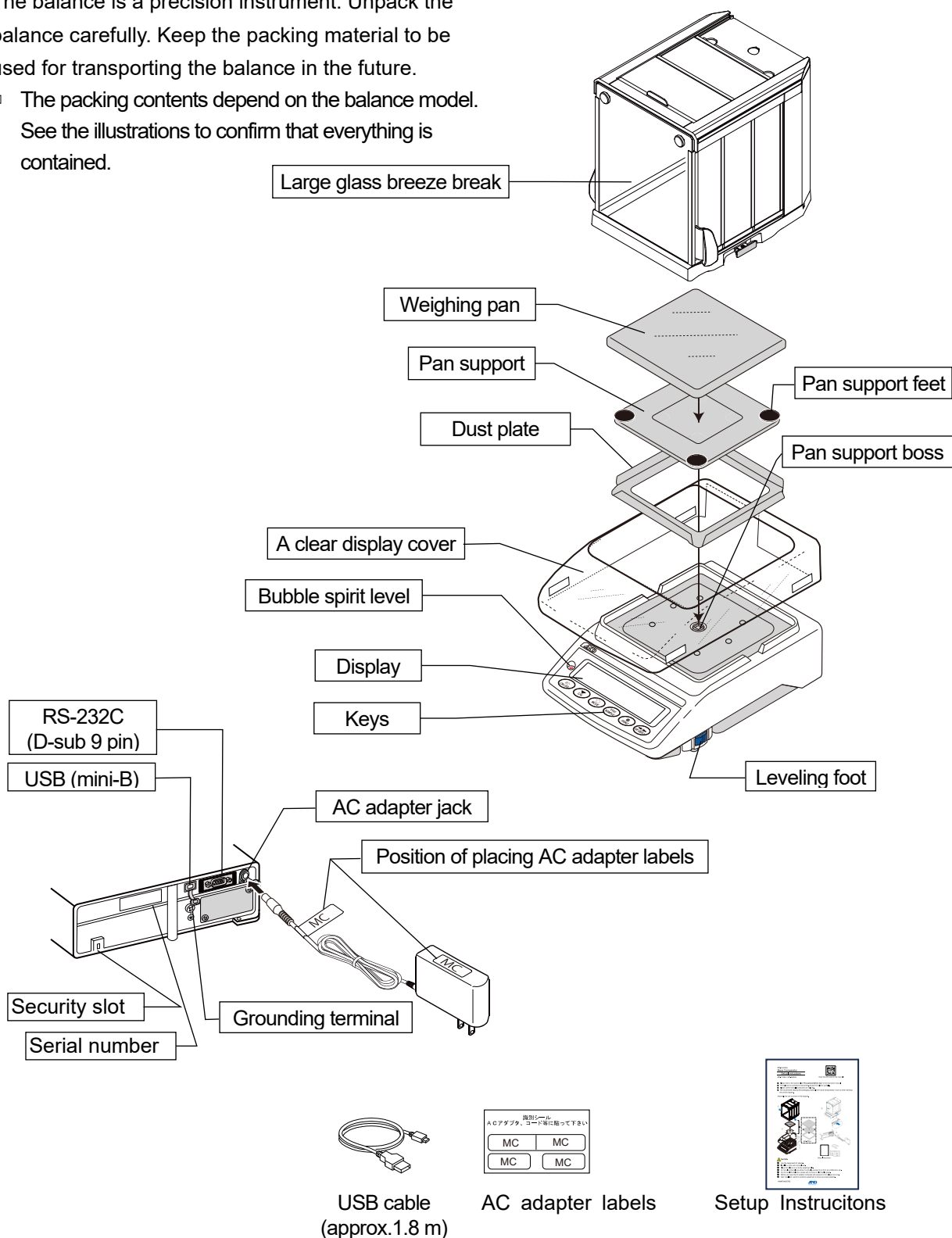
#### **CAUTION**

- Use the specified dedicated AC adapter for the balance.
- Do not connect the included AC adapter to other devices.
- Using the wrong AC adapter may cause the balance and other devices to malfunction.

## 2-2 MC-6203A

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.



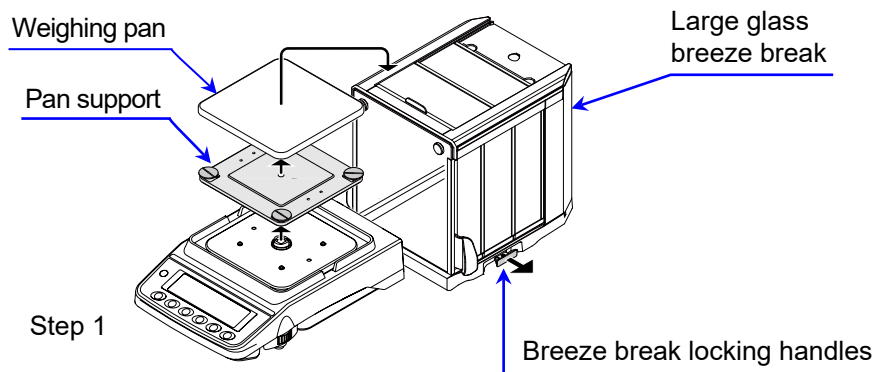
### **CAUTION**

- Use the specified dedicated AC adapter for the balance.
- Do not connect the included AC adapter to other devices.
- Using the wrong AC adapter may cause the balance and other devices to malfunction.

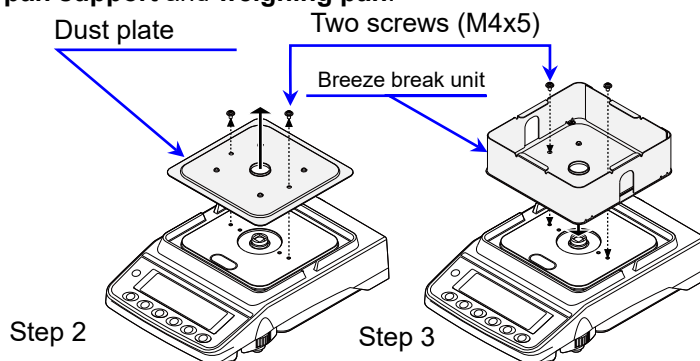
## 2-2-1 How to Attach the Center of Gravity Adjustment Plate (AX-MC1104APAN / MC6203APAN)

**⚠ CAUTION** During installation, do not to apply excessive force to the balance.

- ❑ When used as a mass comparator, the accessory center of gravity adjustment plate can be used to reduce eccentric error, allowing for more precise measurements.
- ❑ When the weighing pan is replaced with a center-of-gravity adjustment pan, be sure to perform sensitivity adjustment.

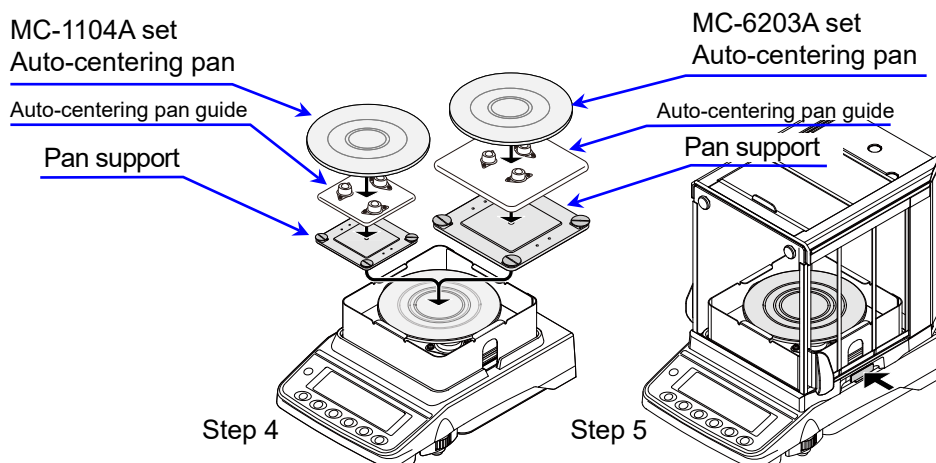


- Step 1 Pull both **breeze break locking handles** to remove the **large glass breeze break**. Remove the **pan support** and **weighing pan**.



- Step 2 Remove the **two screws** (M4x5) that secure the dust plate and remove the **dust plate** from the balance.

- Step 3 Install the **breeze break unit** using the **two screws** (M4x5) removed at step 2.



- Step 4 Place the **pan support** on the balance, place the **auto-centering pan guide** on the pan support, and then place the **auto-centering pan** on that. While tilting (forward, backward, left and right) the **auto-centering pan guide** of the MC-6203A, put it on the **pan support**.
- Step 5 To install the **large glass breeze break**, place it on the balance and push in both **breeze break locking handles**.





## 2-4 Precautions Before Use

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

- The maximum resolution of the precision balance is one million counts. Therefore, there are tendencies to be influenced by temperature change, air pressure change, vibration and drafts where the balance is placed.
- Install the balance in an environment where the temperature and humidity are not excessive. The best operating temperature is about  $20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  and 45-60% 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 that 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.
- Connect the AC adapter and warm up the balance for at least an hour.
- When the balance is installed for the first time or has been moved, warm up the balance for at least 6 hours to allow the balance to reach equilibrium with the ambient temperature, and then perform sensitivity adjustment before use.
- Errors due to moving the weighing system:  
The performance of this product is guaranteed when it is used in a stationary condition. If the balance is incorporated into a system that moves the balance, you must carefully perform checks in advance while paying attention to the following.
  - If the balance is moved, it may be damaged by impact shocks. In addition, the weighing value will be unstable immediately after the balance is moved. Avoid sudden movements, stops, or impact shocks, and provide a sufficient waiting time for the weighing value to stabilize when acquiring weighing data.
  - The moving device should have a structure where the balance can be kept level. If the level is shifted, the zero point or sensitivity will be shifted, so perform re-zero operation or sensitivity adjustment.
  - In order to avoid the influence of vibration, the moving platform should have a structure not easily susceptible to vibration by means such as reducing the play of moving parts.



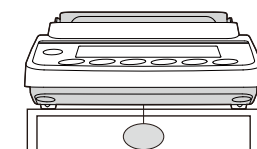
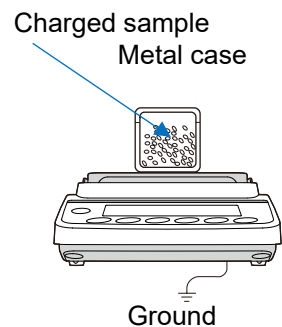
### CAUTION

- **Do not install the balance where flammable or corrosive gas is present.**
- **Please use the dedicated AC adapter specified for the balance.**
- **If you use the wrong AC adapter, the balance and other equipment may not operate properly.**

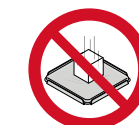
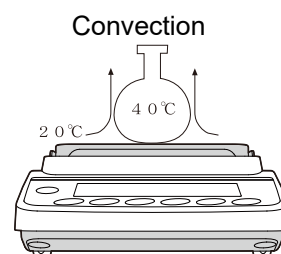
## 2-5 Precautions during use for more accurate weighing

To perform accurate weighing, please pay attention to the following points.

- Discharge static electricity from the weighing material. When weighing sample (plastics, insulator, etc.) could have a static charge, the weighing value is influenced. Ground the balance by using the grounding terminal. For the location of the grounding terminal, refer to "2. Product Configuration (Names of Each Part), Installation and Precautions".
  - Eliminate the static electricity by AD-1683A as an accessory.
  - Or try to keep the ambient humidity above 45%RH at the room.
  - Or use the metal shield case.
  - Or wipe a charged material (plastic sample etc.) with the wet cloth.
- 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.
- Eliminate any temperature difference between the 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 the 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 eliminate possible errors.
- Take into consideration the affect of air buoyancy on a sample when more accuracy is required.
- Prevent foreign matter, such as powder, liquid and metal, from invading the area around the weighing pan.



Magnetic material



DON'T



DO



DON'T

## 2-6 Precautions after weighing (maintenance of the balance)

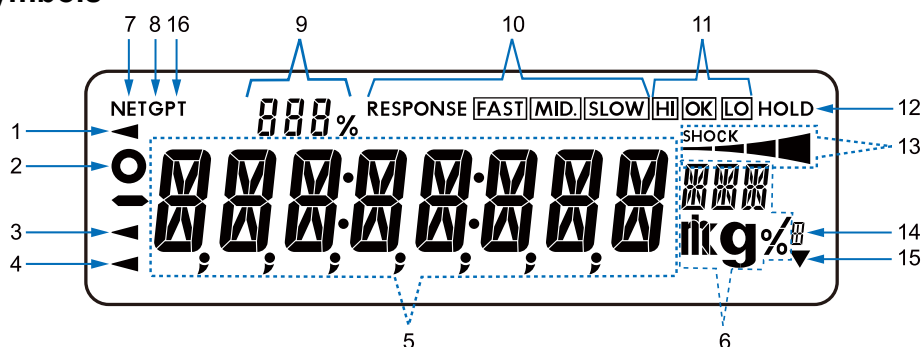
- Avoid mechanical shock to the balance.
- Do not disassemble the balance. Contact the local A&D dealer if the balance needs service or repair.
- Do not use organic solvents to clean the balance. Clean the balance with a lint free cloth that is moistened with warm water and a mild detergent.
- The weighing pan, pan support and large glass breeze break can be removed for cleaning the balance.

## 2-7 Precautions regarding power supply

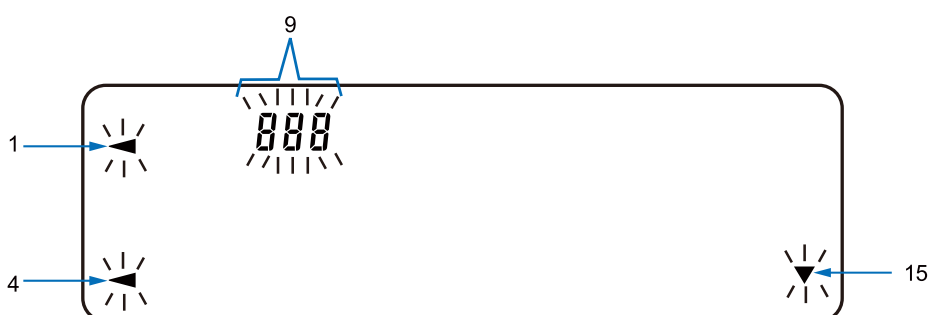
- Do not remove the AC adapter while the internal mass is in motion, for example, right after the AC adapter is connected, or during sensitivity adjustment using the internal mass.  
If the AC adapter is removed under the conditions described above, the internal mass will be left unsecured, that may cause mechanical damage when the balance is moved.  
Before removing the AC adapter, press the **ON:OFF** key and confirm that zero is displayed.
- When the AC adapter is connected, the balance is in the standby mode if the standby indicator is on. This is a normal state and does not harm the balance. For accurate weighing, keep the AC adapter connected to the balance and AC power unless the balance is not to be used for a long period of time.

### 3. Display Symbols and Key Operation

#### Display symbols



#### Blinking Display

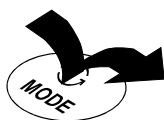


No.	Name
1	Processing Mark
2	Weighing Value Stability Mark
3	USB Connection Mark
4	Lit: Power Standby Indicator Blinking: Automatic Sensitivity Adjustment Notice
5	Displays Weighing Values, Stored Data, and Setting Item Names
6	Unit Display
7	Net Mark
8	Gross Mark
9	Number of Statistical Data (Statistical Calculation Function) Data Memory Number Displays the Relationship Between Load and Weighing Capacity as a Percentage (Weighing Capacity Indicator) Displays Internal Setting Values
10	Response Characteristic Setting State (Lit for About 30 Seconds After Weighing Starts)
11	Comparator Display
12	Display Hold Mark
13	ISD Shock Indicator
14	Gross Zero Mark
15	Lit: Interval Output Standby Blinking: Interval Output Active
16	Preset Tare Mark

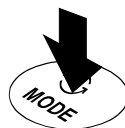
## Key operation

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



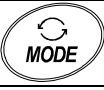

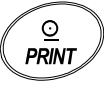

- "Press and release the key immediately" or "Press the key"  
= normal key operation during measurement
- "Press and hold the key"



Press the key  
(press and release the key immediately).



Press and hold the key  
(for 2 seconds).

Key	When pressed	When pressed and held (for 2 seconds)
	Turns the display <b>ON:OFF</b> . The standby indicator is displayed when the display is turned off. The weighing mode is enabled when the display is turned on. When password function is enable, password input display will be displayed. Refer to <a href="#">"15-2 How to Input the Password at the Start of Weighing"</a> This <b>ON:OFF</b> key is available anytime. Pressing the <b>ON:OFF</b> key during operation will interrupt operation and turn the display OFF. *	
	Performs sensitivity adjustment of the balance using the internal mass.	Displays other items of the sensitivity adjustment menu.
	Switches the weighing units stored in the function table. Refer to <a href="#">"4. Weighing"</a> .	Enters mode of the Self-Check Function.
	In the weighing mode, pressing this button turns on/off the readability digit. In the counting or percent mode, enters the sample storing mode.	<ul style="list-style-type: none"> <li>• Enters the function table mode. Please refer to <a href="#">"9. Function Table"</a>.</li> <li>• Run the repeatability check function. Please refer to <a href="#">"16. Repeatability Check Function"</a>.</li> </ul>
	Stores the weighing data in memory or outputs to a printer or personal computer depending on the function table settings. (Factory setting = output)	Enters mode to change the unit mass registration number in counting mode. By changing the function table: <ul style="list-style-type: none"> <li>• Outputs "Title block" and "End block" for GLP, GMP report.</li> <li>• Displays the data memory menu.</li> <li>• Enters mode for reading density number in flow measurement.</li> </ul>
	Sets the display to zero.	

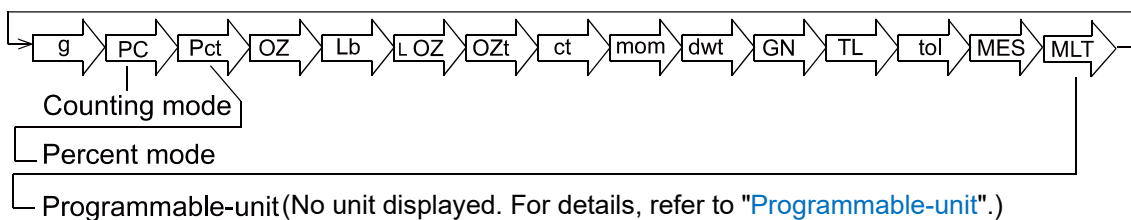
\* When the "Gross net tare function" is selected, the display is turned off by pressing and holding (for 2 seconds). Please refer to ["13. Gross Net Tare Function"](#).

## 4. Weighing

### 4-1 Units

With the balance, only the unit “g” (gram) was set at the factory.

The following weighing units and weighing modes are available for selection:



A unit or mode can be selected and stored in the function table as described in "9. Function Table". 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	<b>g</b>	<b>g</b>	1 g
Counting mode	PCS	<i>PCS</i>	<i>PCS</i>	—
Percent mode	%	<b>%</b>	<b>%</b>	—
Ounce (Avoir)	OZ	<i>OZ</i>	<i>OZ</i>	28.349523125 g
Pound	Lb	<i>Lb</i>	<i>Lb</i>	453.59237 g
Pound/Ounce	L OZ	<i>L OZ</i>	<i>LO</i>	1 Lb=16 oz, 1 oz=28.349523125 g
Troy Ounce	OZt	<i>OZt</i>	<i>OZt</i>	31.1034768 g
Metric Carat	ct	<i>ct</i>	<i>ct</i>	0.2 g
Momme	mom	<i>mom</i>	<i>mom</i>	3.75 g
Pennyweight	dwt	<i>dwt</i>	<i>dwt</i>	1.55517384 g
Grain (UK)	GN	<i>GN</i>	<i>GN</i>	0.06479891 g
Tael (HK general, Singapore)	TL	<i>TL</i>	<i>TL</i>	37.7994 g
Tael (HK jewelry)				37.429 g
Tael (Taiwan)				37.5 g
Tael (China)				31.25 g
Tola (India)	tol	<i>tol</i>	<i>tol</i>	11.6638038 g
Messghal	MES	<i>MES</i>	<i>MES</i>	4.6875 g
Programmable-unit (Multi-unit)	MLT	<i>MLt</i>	<i>MLt</i>	—

- The tables below indicate the weighing capacity and the readability for each unit, depending on the balance model.
- When a measurement unit other than gram is used, it is not possible to weight up to capacity of the balance because the display does not have sufficient digits.  
Use the MC series balance within the values shown in the tables below.

Unit		MC-1104A	
		Capacity	Minimum display
Gram	g	1100	0.0001
Ounce (Avoir)	oz	38.8	0.000005
Pound	Lb	2.425	0.0000005
Pound/Ounce	L oz	2Lb 6.80oz	0.01oz
Troy Ounce	Ozt	35.36	0.000005
Metric Carat	ct	5500	0.0005
Momme	mom	293.3	0.00005
Pennyweight	dwt	707	0.0001
Grain (UK)	GN	16975	0.002
Tael (HK general, Singapore)	TL	29.1	0.000005
Tael (HK jewelry)	TL	29.38	0.000005
Tael (Taiwan)	TL	29.33	0.000005
Tael (China)	TL	35.2	0.000005
Tola (India)	Tol	94.3	0.00001
Messghal	Mes	234.6	0.00005

Unit		MC-6203A	
		Capacity	Minimum display
Gram	g	6200	0.001
Ounce (Avoir)	oz	218.6	0.00005
Pound	Lb	13.66	0.000005
Pound/Ounce	L oz	13Lb 10.39oz	0.01 oz
Troy Ounce	Ozt	199.3	0.00005
Metric Carat	ct	31000	0.005
Momme	mom	1653	0.0005
Pennyweight	dwt	3986	0.001
Grain (UK)	GN	95680	0.02
Tael (HK general, Singapore)	TL	164	0.00005
Tael (HK jewelry)	TL	165.6	0.00005
Tael (Taiwan)	TL	165.3	0.00005
Tael (China)	TL	198.4	0.00005
Tola (India)	Tol	531	0.0001
Messghal	Mes	1322	0.0005

## Programmable-unit

Programmable-unit is a function for conversion. This function multiplies the weighing value in grams by the coefficient that can be set in the function table and displays the result.

The coefficient must be within the range between the minimum and maximum shown below. If the coefficient set is beyond the range, an error is displayed, and the balance returns to the coefficient setting mode, prompting to enter an appropriate value. "1" is set as the default coefficient at factory settings.

Model	Minimum coefficient	Maximum coefficient
MC-1104A	0.000001	10000
MC-6203A		1000

## Operation

1. Press and hold the **[SAMPLE]** key until **bASFnC** of the function table is displayed.
2. Press the **[SAMPLE]** key several times to display **MLt**.
3. Press the **[PRINT]** key. The balance enters the mode to confirm or set the coefficient.

## Confirming the coefficient

4. The current coefficient is displayed with the first digit blinking.
  - When it is not to be changed, press the **[CAL]** key and go to step 6.
  - When it is to be changed, press the **[RE-ZERO]** key and go to step 5.

## Setting the coefficient

5. Set the coefficient using the following keys.

**[SAMPLE]** key ..... To select a digit to change the value.

The selected digit blinks.

**[RE-ZERO]** key ..... To change the value.

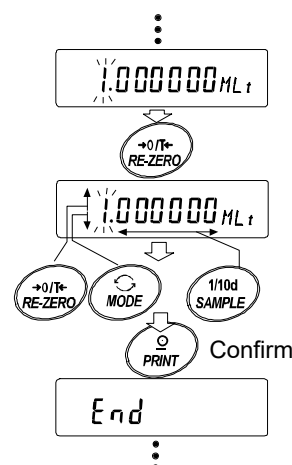
**[MODE]** key ..... To change the decimal point position.

Each time the switch is pressed, the decimal point position changes as follows:

→ 0.000001 → 00.00001 → ... → 000000.1 → 0000001 →

**[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.



## Quitting the operation

6. The balance displays **Unit**. Press the **[CAL]** key to exit the programmable-unit function and return to the weighing mode.

## Using the function

Press the **[MODE]** key to select the programmable-unit (no display on the unit section). Perform weighing as described in "4-2 Basic operation". After weighing, the balance displays the result (weighing data in grams x coefficient).



## 4-2 Basic operation


1. Press the **MODE** key to select the unit.


Here, select **g** as an example.

### Note

- The unit "**g**" (gram) was set at the factory.  
To use other units, select and store units and displaying order in the function setting of "Unit".  
For details on weighing unit storing procedure, refer to "[9-7 Description of Unit](#)".

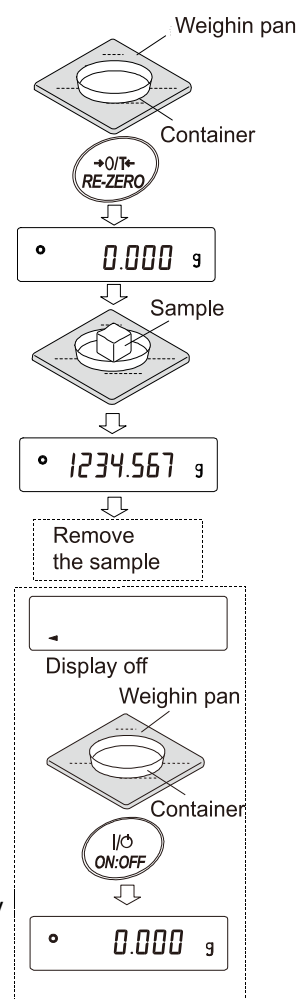
2. Place a container if necessary, and press the **RE-ZERO** key to display

 0.000 g (The decimal point position varies by model).

3. Place the weighing object, and read the weighing value after the stability mark  is displayed.

4. After weighing, remove the objects from the weighing pan.

- Pressing the **SAMPLE** key toggles the smallest display digit on/off.
- By changing the internal settings, weighing values can be stored in the data memory. Refer to "[11. Data Memory](#)" for details.
- When starting weighing with a container placed, pressing the **ON:OFF** key will automatically tare and start from zero.



#### About the operation when the power is turned on

The balance will decide the reference zero-point when the power is turned on with the **ON:OFF** key. Depending on the load condition at that time, the balance will automatically judge whether to perform zeroing (power on zero) or tare subtraction operation. The condition for determining power on zero is used is "power on zero range" by making the zero point during sensitivity adjustment a standard. When power on zero range is exceeded, the tare subtraction operation is performed by making the zero point during sensitivity adjustment a standard.

#### About re-zero operation

By pressing the **RE-ZERO** key, the display can be changed to zero. Re-zero with the **RE-ZERO** key will automatically determine whether zero or tare operation is performed. The condition for determining zero is used is "zero range" by making the zero point (power on zero) at the start of weighing a standard. When zero range is exceeded, the tare subtraction operation is performed by making power on zero a standard.

#### About measurement range

For the balance, the range that can be weighed is determined by model. The total amount (net amount + tare quantity) up to the maximum display of each model is displayed, and when the maximum display is exceeded, **E** is displayed to indicate that the weighing range is exceeded. When in excess in negative, **-E** is displayed.

Model	Power-on Zero Range	Zero Range	-E display range
MC-1104A	Approx. $\pm 600$ g	Approx. -600 g to +20 g	Less than -600 g
MC-6203A	Approx. $\pm 1$ kg	Approx. -1 kg to +120 g	Less than -1kg

### 4-2-1 For More Stable Weighing

- To reduce the effects of wind and vibration, set the "Response Characteristics ( *bRSFnc* )" in the internal settings "Environment/Display ( *End* )" to "( MID )." <sup>\*1</sup>

#### Function table

Classification Item	Setting Item	Parameter	Content / Purpose
<i>bRSFnc</i> Environment / Display	<i>End</i> Response Characteristics	/	Slow response, stable display <sup>*2</sup>

<sup>\*1</sup> The factory setting is / (MID) .

<sup>\*2</sup> Refer to "9-3 Description of the Class "Environment, Display"".

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#### 4-2-2 When Using as a Mass Comparator

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- To avoid the effects of eccentric error, place the weighing object in the center of the pan.  
Alternatively, it is recommended to use the center of gravity adjustment plate (AX-MC1104A / 6203APAN).  
Using the optional external controller AD-8922A allows you to perform "CAL," "RE-ZERO," etc., with the AD-8922A key operations. Refer to the AD-8922A instruction manual for the connection method between the balance and AD-8922A.
- Perform weighing operations in a stable environment, paying attention to error factors such as temperature changes, pressure fluctuations, vibrations, wind, and static electricity at the installation location.
- The table below shows the recommended weight class and measurement range for each model. The measurement range in this table assumes the balance's repeatability is within 1/3 of the allowable error for each weight class.

Weight class and recommended measuring range

		M C - 1 1 0 4 A				M C - 6 2 0 3 A			
Model		F 1	F 2	M 1	M 2	F 1	F 2	M 1	M 2
Class									
Weight (Displayed value)	5kg					↕	↕	↕	↕
	2kg					↕	↕	↕	↕
	1kg	↕	↕	↕	↕		↕	↕	↕
	500g	↕	↕	↕	↕			↕	↕
	200g		↕	↕	↕			↕	↕
	100g		↕	↕	↕				↕
	50g		↕	↕	↕				↕
	20g			↕	↕				
	10g			↕	↕				
	5g				↕				
	2g				↕				
	1g				↕				
	500mg				↕				
	200mg				↕				
	100mg				↕				

F 1  F 2  M 1  M 2

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#### 4-2-3 When Using as Part of a System

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- When designing a dedicated pan, design it within the weighing capacity. To prevent the effects of static electricity and magnetism, it is recommended to design the dedicated pan with materials other than resin or magnetic materials (such as iron).
- There is a function to remember the previous weighing value even when the power is turned off. Setting "Display at Power On (P-ZERO)" in the internal settings "Environment/Display (bR5FnC)" to "I" will display the previous weighing value after turning the power off and on again. Refer to ["9-3 Description of the Class "Environment, Display" for details on the power-on explanation.](#)

## 4-3 Counting Mode (PCS)

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. This series balance is equipped with the Automatic Counting Accuracy Improvement (ACAI) function to improve the counting accuracy.

### Note

- For counting, use samples that have a unit mass at least ten times greater than that of the readability in grams.
- If the sample unit mass variable is too large, it may cause a counting error.
- To improve the counting performance, use the ACAI function frequently or divide the samples into several groups and count each group.

### Selecting the counting mode

1. Press the **MODE** key to select **PCS** (**PCS** = unit)

### Storing a sample unit mass

2. Press the **SAMPLE** key to enter the sample unit mass storing mode.
3. To select the number of samples, press the **SAMPLE** key several times. It may be set to 5, 10, 25, 50 or 100.

### Note

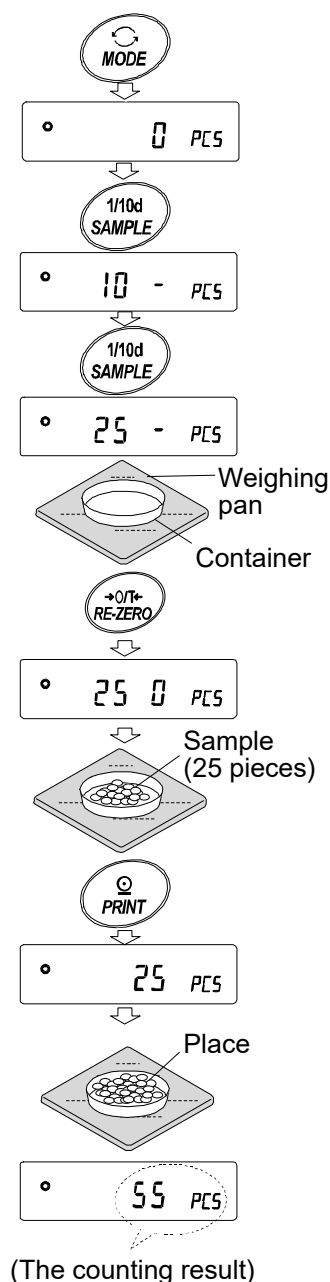
- A greater number of samples will yield more accurate counting result. Place a container on the weighing pan, if necessary. Press the **RE-ZERO** key to cancel the weight (tare). The number specified in step 3 appears. **25.0** is displayed if 25 is selected in "3".
4. Place the number of samples specified on the pan.  
In this example, 25 pieces.
  5. When **PRINT** key pressed, unit mass is stored and changes the count display. (Ex: when the number is 25, **25 PCS** is displayed.

### Note

- If the balance judges that the mass of the samples is too light to acquire accurate weighing, it displays an error requiring the addition of more samples to the specified number and press the **PRINT** key. When the unit mass is stored correctly, the balance proceeds to the counting mode.
- 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**.
- Registered unit mass is remembered even when the power is turned off.

### Number mode (counting mode)

6. Counting is possible.



## counting Mode Using the ACAI Function

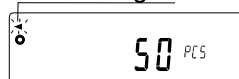
The ACAI is a function that improves the accuracy of the unit mass automatically by increasing the number of samples as the counting process.

ACAI: Automatic Counting Accuracy Improvement

After registering unit mass of "5", proceed to the following "7".CAI (Automatic Counting Accuracy Improvement)

7. 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.
8. 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.
9. Counting accuracy is improved when the processing indicator turns off.
10. 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.

Processing mark



### Note

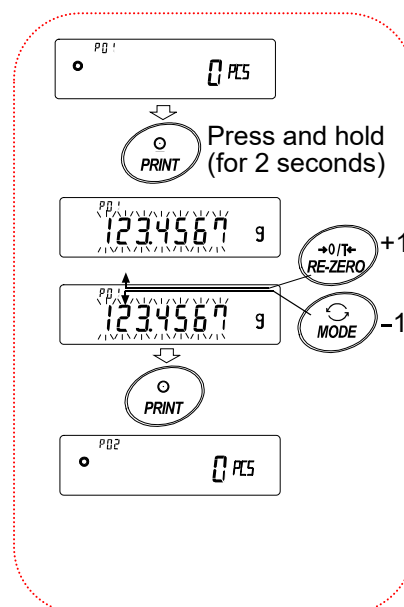
- Do not change units during the ACAI processing.
- ACAI can be used up to 30,000 pieces.

## Storing the unit mass

By using the data memory function, 50 instances of storing a sample unit mass can be stored.

Refer to "11. Data Memory".

1. Set the function setting item "Data memory function (DATA)" to "Stores unit mass in counting (DATA 1)".  
Refer to "9. Function Table".
2. The displayed "P \*\*" is the selected unit mass registration number.
3. Press and hold the [PRINT] key (for 2 seconds) to switch to the mode to change the unit mass registration number.  
[RE-ZERO] key ..... Changes the registration number(+).  
[MODE] key ..... Changes the registration number (-).  
[PRINT] key ..... Decides on the displayed registration number.  
[CAL] key ..... Cancel the displayed registration number.
4. Multiple unit masses can be stored by registering them with different unit mass registration numbers.



### Note

- P \*\*: The unit weight registration number is entered.
- Unit weight can be read by "UN:mm" command.  
(mm corresponds to P01 to P50 with 01 to 50.)
- The read unit mass can output by "?UW" command and can be changed by "UW" command.
- ACAI cannot be used for the read unit mass.

## 4-4 Percent Mode (%)

The percent mode displays the weighting value in percentage compared to a 100% reference mass and is used for target weighing or checking the sample variance.

### Selecting the Percent Mode

1. Press the **[MODE]** key to select the unit % (Percent mode).

### 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 %**.
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 %**. (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**.
- The displayed percentage is based on the 100% reference mass.

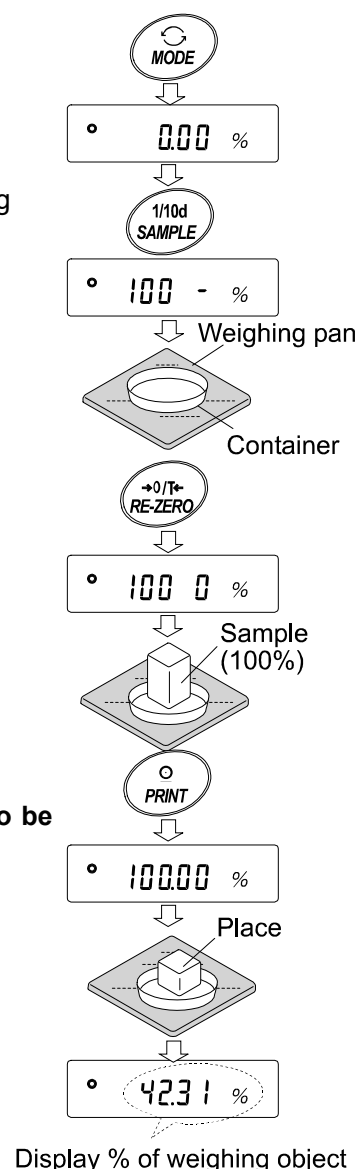
Model	100% mass	Decimal point position
MC-1104A	0.1000 g to 0.9999 g	1%
	1.0000 g to 9.9999 g	0.1%
	10.0000 g or more	0.01%
MC-6203A	1.000 g to 9.999 g	1%
	10.000 g to 99.999 g	0.1%
	100.000 g or more	0.01%

- Registered values are stored even when the power is turned off.

6. Remove the sample

### Reading the percentage





7. Please a sample to be compared to the reference mass on the pan.  
The displayed percentage is based on the 100% reference mass.  
The stored value is retained in the balance's nonvolatile memory even when the power is turned off.



## 5. Impact Shock Detection Function (ISD)

MC series has a function to detect impact to the mass sensor section and to display the impact level. By lowering the impact level at the time of loading, it is possible not only to alleviate variation in the weighing value but also to reduce the risk of failure of the mass sensor section. Especially when incorporating the balance in a production line, etc. and weighing by means such as an automated system, impact to the sensor may be applied greater than expected. When designing automatic systems and the like, it is recommended that you minimize the impact level as much as possible while checking the shock indicator.

Impact level display is from level 0 to level 4, 5 levels.

Impact level	Shock indicator	Buzzer	Contents
0	No indicator	No beep	Safe
1	SHOCK 	No beep	Caution
2	SHOCK 	No beep	Caution: Consider impact mitigation
3	SHOCK 	One beep	Warning: Do not apply greater impact
4	SHOCK 	Two beeps	Danger: Sensor may be damaged

You can turn off the impact level display by setting " (Impact shock detection) " to " (off) " in "bASFc /ISd 0 " in "9. Function Table".

Even if the impact shock detection function is turned off, a record is kept in the balance when there is a shock impact.

### Note

- Impact on the weighing sensor may be applied to the weighing pan at time of loading, or it may be applied from the table on which the balance is installed.  
The impact shock detection function (ISD) also works for impact applied from the table.

## 5-1 Recording Impact History

Impacts of impact level 3 or higher are stored on the balance with data and time included (maximum 50 data instances).

When the password function is on ( *Lock 1* or *Lock 2* ), the login user information is added when outputting the impact history.

### Note

- If 50 data instances are exceeded, the data with the lowest impact level is overwritten.
- The stored impact history cannot be deleted.
- Impact data where the balance is not energized (during transport, etc.) is not stored.

## 5-2 Output Impact History

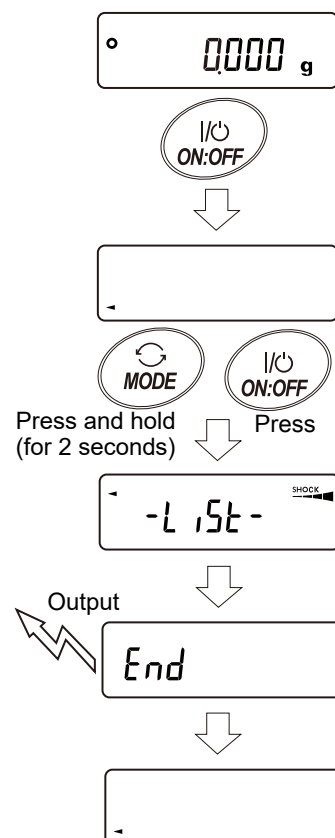
The stored impact history can be output by sending a specified command to the balance or performing a key operation.

### Output by command

The stored impact data will be output all at once by sending a ?SA command to the balance.

### Output by key operation

1. Press the **ON:OFF** key to turn off the display.
2. With the display off, press the **ON:OFF** key while holding down the **MODE** key.
3. **-L 15t-** is displayed, and the stored impact data is output all at once.



### Impact history output example

Date, time, impact level, login and login user information are output together on one line.

The login user information varies by the setting of the login user and the setting of Function table *Lack* when receiving impact.

Output	Login user	Function table <i>Lack</i>
, --,	No login user	0, 1, 2
,00, ADMIN	Administrator	1
,01~10,USER	User	1
, --,GUEST	Guest	2

#### Output example

2018/05/29,11:08:18,SHOCK	LV,3,--,
2018/05/29,11:12:27,SHOCK	LV,4,00,ADMIN
2018/05/29,11:13:38,SHOCK	LV,3,01,USER
2018/05/29,11:17:04,SHOCK	LV,4,--,GUEST



## 6. Environmental Settings/Self-Check Function Using Electronically Controlled Load (ECL)

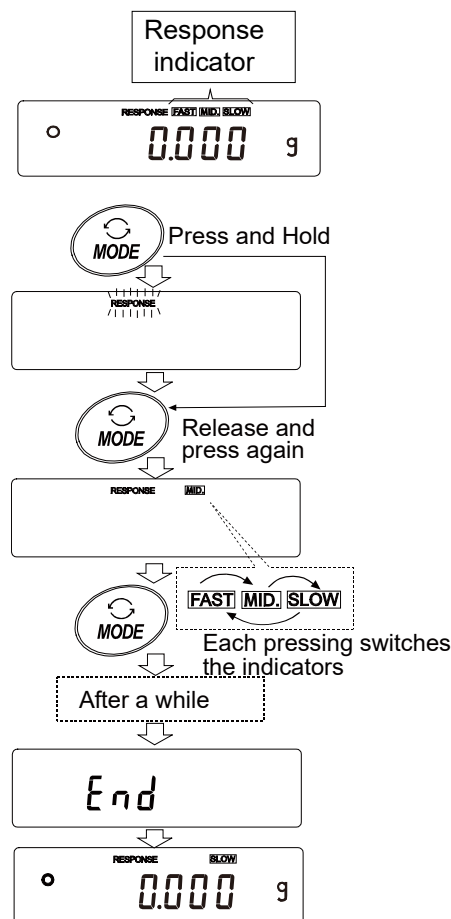
### 6-1 Environmental Settings

This function stabilizes the weight value, reducing the influence on weighing that is caused by drafts and/or vibration at the place where the balance is installed. This function adjusts by automatically analyzing the environment or by hand-operation. The function has three stages as follows : Changing the weighing speed changes the display refresh rate.

Display	Function setting	Response characteristic	
FAST	[ond 0]	Fast response,	Sensitive value
MID.	[ond 1]	↑	↓
SLOW	[ond 2]	Slow response,	Stable value

Response adjustment can be changed by the following method.

1. Press and hold the [MODE] key (for 2 seconds) until [RESPONSE] is displayed, and then release the key.
2. Press the [MODE] key to select a weighing speed.  
Either [FAST], [MID] or [SLOW] can be selected.
3. After a few seconds of inactivity the balance displays [End].
4. Then, it returns to the weighing mode and displays the updated response indicator. The response indicator remains displayed for a while.



#### Note

- When the response adjustment is set, "Condition ([ond])" and "Display refresh rate (SPd)" and "Stability band width (St-b)" in the 9. Function Table "Environment display (bR5FnC)" are changed as below.

Display	[ond (Condition)	SPd (Display refresh rate)	St-b (Stability bad width)
FAST	0	2	2
MID.	1	0	1
SLOW	2	0	1

When using a combination other than the above, please set individually as shown in "9. Function Table".

#### Note

- If [RESPONSE] is displayed and you leave without pressing the [MODE] key, the "Self-check function" is activated. Please refer to "6-2 Self-Check-Function/Automatic Setting of Minimum Weight". For the setting method, refer to "9. Function Table".

## 6-2 Self-Check-Function/Automatic Setting of Minimum Weight

The self-check function can easily check about whether proper performances are satisfied for the balance by checking and displaying repeatability in addition to malfunction check. In addition, it can also display and store minimum weight (reference value) using data of the repeatability.

### Note

- The USP (Pharmacopoeia of the United States of America) defines minimum measured value as the repeatability measurement using a weight. Please note that repeatability and minimum measured value calculated by the ECL (Electronically Controlled Load) should be used as a reference value only.
- Refer to "Balance information" on the A&D web site (<https://www.aandd.jp/>) for details of the minimum weight.

### Setting procedure (Refer to the setting flow chart on next page as well)

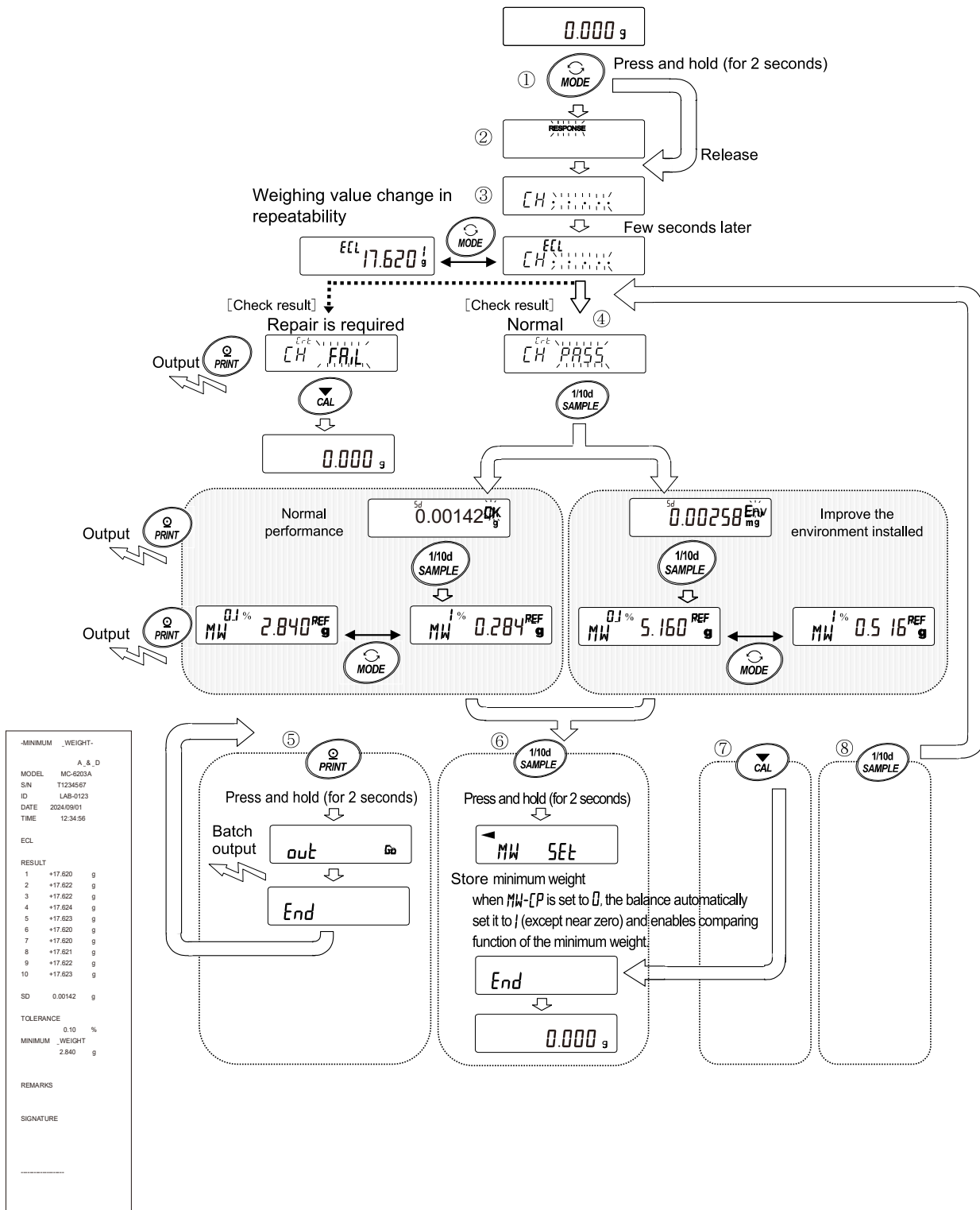
1. Press and hold the **MODE** key (for 2 seconds) in weighing mode.
2. Release the key after displaying **RESPONSE**.
3. Display shows **CH** and self-check function is started.  
After few seconds, display shows "ECL".  
Press the **MODE** key while **CH** is displayed to observe changes in the weighing value of the repeatability using electronic control load (ECL).
4. Display shows a check result after check. When there is no error in the balance, display shows **CH PASS** in blinking. When display shows **CH FAIL** in blinking, there is a possibility that serious malfunctions occur in the balance. In such case, the balance requires repair.  
**SAMPLE** key ..... Switches a display among check result, repeatability and minimum weight (reference value).  
**PRINT** key ..... Outputs currently displayed contents  
At repeatability display, display shows "OK" if it is satisfied for catalog spec.  
However, if it is not satisfied for catalog spec, display requests an improvement in an environment for the balance installed by blinking "Err".  
**MODE** key ..... Switches an allowable measurement error of the minimum weight (reference value).

Use the following keys while the minimum weight (reference value) is displayed to perform each operation.

5. Outputting data of the minimum weight at once  
Press and hold the **PRINT** key (for 2 seconds) to display **Out**. After outputting at once, **End** is displayed.
6. Storing as minimum weight (reference value) of "14. Minimum weight alert function"  
Press and hold the **SAMPLE** key (for 2 seconds) to display **MW 5Et**. Minimum weight (reference value) is stored. After storing, display shows **End** and returns to weighing mode.
7. When not storing  
Press the **CAL** key to return to weighing mode after displaying **End**.
8. To return to check result display  
Press the **SAMPLE** key to return to check result display in Step 4.

\* Refer to "14. Minimum weight alert function" for warning function of minimum weight.

## Setting flow chart



## 7. Sensitivity Adjustment/Calibration Test

Since the balance's resolution is high, weighing values may change due to gravity and daily environmental changes. It is necessary to perform sensitivity adjustment with the weight in order to keep the weighing values from changing even if gravity or the environment changes.

It is recommended that you calibrate if the balance is installed for the first time or relocated, or when the weighing values change significantly in daily inspection, etc.

Adjustment means to adjust the weighing value of the balance using the reference weight or internal mass. Sensitivity adjustment is to weigh with the reference weight and compare how much the result deviates from the reference value. (Adjustment is not performed in sensitivity adjustment.)

### Sensitivity adjustment

Automatic sensitivity adjustment.....	Automatically adjust the balance using the internal mass depending on the temperature change of the operating environment or the set time and interval time.
Sensitivity adjustment using the internal mass .....	Using the internal mass, adjust the balance with a single touch.
Sensitivity adjustment using an external weight .....	Using an external mass, adjust the balance with an external mass.

### Calibration test

Calibration test with an external weight.....	Output the result of checking the accuracy of weighing using your own weight.
---	---

\* **No adjustment is made.**

#### Note

- Do not allow vibration or drafts to affect the balance during sensitivity adjustment.
- To output the data for GLP/GMP using the RS-232C interface, set "GLP/GMP output ( $INFD$ )" of "Data output ( $dOUT$ )". Refer to "9. Function Table". The time and date can be added to the GLP/GMP report. If the time or date is not correct, adjust them. Refer to "9-4 Clock and Calendar Function".
- The sensitivity adjustment and calibration test data can be stored in memory. To store them, set "Data memory ( $dMtr$ )".

#### Caution when using your external weight

- The accuracy of the weight used in sensitivity adjustment affects the accuracy of the balance after sensitivity adjustment.
- Select the mass to be used for sensitivity adjustment and calibration tests from the table below.

Model	Usable sensitivity adjustment weight	Factory setting	Adjustable range
MC-1104A	1000 g, 900 g, 800 g, 700 g, 600 g, 500 g, 400 g, 300 g, 200 g, 100 g, 50 g	1000 g	±9.999
MC-6203A	6000 g, 5000 g, 4000 g, 3000 g, 2000 g, 1000 g, 500 g	5000 g	±99.99

## Display



This indicator means "In process of measuring sensitivity adjustment data".

Do not allow vibration or drafts to affect the balance while the indicator is displayed.

## 7-1 Automatic Sensitivity Adjustment

This function automatically calibrates the balance using the internal weight due to a temperature change in the ambient environment, time set or interval time. It can function even when the balance's display is in off. If GLP output in function table is selected, the balance outputs the sensitivity adjustment report or store the data in memory after sensitivity adjustment.

In the automatic sensitivity adjustment mode, either the temperature change ( $[Fnc\ 0]$ ), the setting time ( $[Fnc\ 1]$ ), or the interval time ( $[Fnc\ 2]$ ) can be set with the function setting  $[Fnc]$ .

For the setting time, the three function setting of  $[t\ ME1]$ ,  $[t\ ME2]$  and  $[t\ ME3]$  can be set.

Interval time can be set from 0.5h to 24h with function setting  $[int]$ .

### CAUTIONS

- If the balance detects a load on the weighing pan, it will determine that it is in use and will not perform automatic sensitivity adjustment. The criteria for performing automatic sensitivity adjustment are as follows.

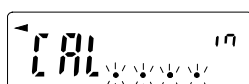
The criteria for performing automatic sensitivity adjustment

MC-1104A	MC-6203A
Less than 2 g	Less than 20 g

- To maintain the calibrated state, keep the weighing pan clear while not in use.



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



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

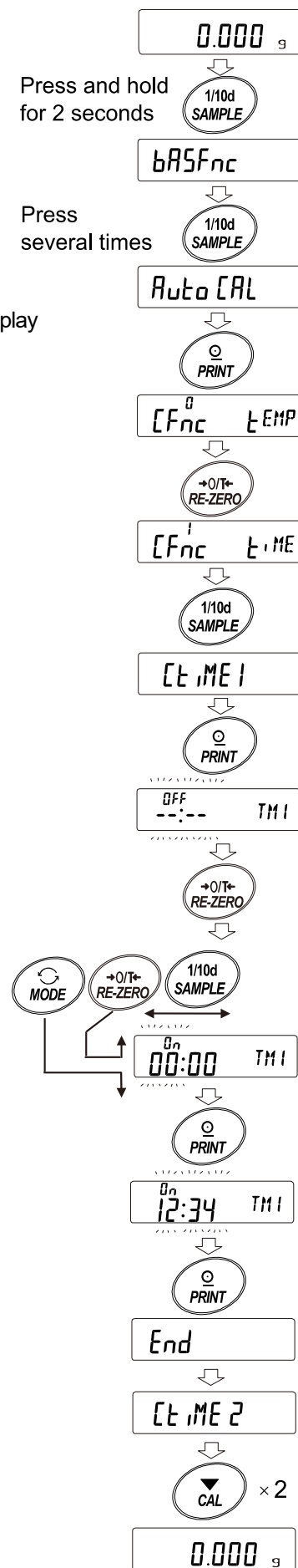
### Note

- 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 sensitivity adjustment.

Depending on the setting of "8. Function Switch and Initialization", "change prohibited" or "changeable (usable)" can be selected.

## 7-1-1 Inputting the set time

- Press and hold the **[SAMPLE]** key for 2 seconds to display **bASFnC**.
- Press the **[SAMPLE]** key several times to display **Auto CAL**.
- Press the **[PRINT]** key to display **[FnC]**.
- With **[FnC]** displayed, press the **[RE-ZERO]** key several times to display **[FnC] t.ME**.
- Press the **[SAMPLE]** key to display **[t.ME]**.
- Press the **[PRINT]** key to enter the set time 1 setting mode.
- With **OFF --:-- TM1** displayed, press the **[RE-ZERO]** key. The currently set time is displayed.
- Using the following keys, set the time (in 24-hour format) to perform sensitivity adjustment.
  - [RE-ZERO](+)** key.....Changes the value of the blinking digit.
  - [MODE](-)** key .....Changes the value of the blinking digit.
  - [SAMPLE]** key .....Selects the digit to blink.
  - [PRINT]** key .....Stores the new time setting.
  - [CAL]** key .....Cancels the new time setting.
- Press the **[PRINT]** key to display **End**.
- To set the set time 2, display the set time 2 and repeat the steps 6 to 9.
- To return to weighing mode, press the **[CAL]** key twice.



## 7-1-2 Clearing the set time

12. Refer to steps 1 to 5 in "7-1-1 Inputting the set time" to display **CLME1**.

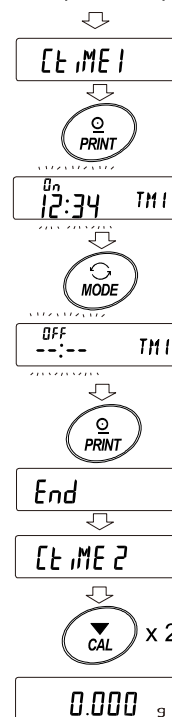
13. Press the **PRINT** key to display the currently set time.

14. Press the **MODE** key to display **OFF** **TM1**.

15. Press the **PRINT** key to display **End**.

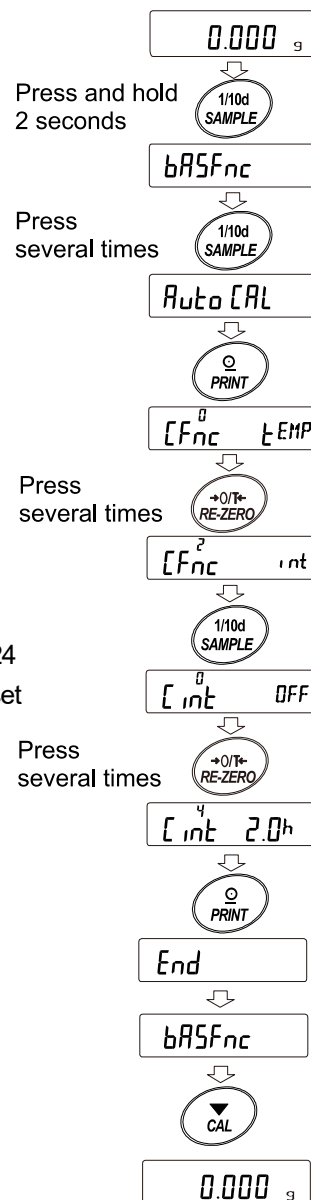
16. Press the **CAL** key twice to return to weighing mode.

Refer to steps 1 to 5 on the previous page



### 7-1-3 Setting the interval time

1. Press and hold the **[SAMPLE]** key for 2 seconds to display **bASFnC**.
2. Press the **[SAMPLE]** key several times to display **OFF** **TM**.
3. Press the **[PRINT]** key to display **[FnC]**.
4. With **[FnC]** displayed, press the **[RE-ZERO]** key several times to display **[FnC<sup>2</sup> int]**.
5. Press the **[SAMPLE]** key to display **[int]**.
6. Press the **[RE-ZERO]** key several times to set the interval time (0.5 hours to 24 hours) to perform sensitivity adjustment. For the correspondence between the set value and interval time, refer to the correspondence table on the next page.
7. Press the **[PRINT]** key to display **End**.
8. Press the **[CAL]** key to return to weighing mode.





Correspondence table between the set value and interval time of the item  $\boxed{[int]}$ .

Item	Parameter	Description
$[int]$	■ 0	Off
	1	0.5-hour interval time
	2	1.0-hour interval time
	3	1.5-hour interval time
	4	2.0-hour interval time
	5	2.5-hour interval time
	6	3.0-hour interval time
	7	3.5-hour interval time
	8	4.0-hour interval time
	9	4.5-hour interval time
	10	5.0-hour interval time
	11	5.5-hour interval time
	12	6.0-hour interval time
	13	7.0-hour interval time
	14	8.0-hour interval time
	15	9.0-hour interval time
	16	10.0-hour interval time
	17	11.0-hour interval time
	18	12.0-hour interval time
	19	14.0-hour interval time
	20	16.0-hour interval time
	21	18.0-hour interval time
	22	20.0-hour interval time
	23	22.0-hour interval time
	24	24.0-hour interval time

■ Factory setting

## 7-2 Sensitivity Adjustment Using the Internal Mass

Sensitivity adjustment using the internal mass can be performed with one key press.

1. Connect the AC adapter and warm up the balance for at least an hour with nothing on the weighing pan.
2. Press the **CAL** key. The balance displays **[HL in]**.
3. The balance performs sensitivity adjustment using the internal mass. Do not allow vibration or drafts to affect the balance.
4. After sensitivity adjustment, if GLP output (**inF<sub>0</sub>**) is set, a "sensitivity adjustment report" is output or stored to data memory.
5. The balance returns automatically to weighing mode.

### About the internal mass

The value of the internal mass may change due to factors such as the operating environment and aging. Correct the internal mass value as necessary. Refer to ["7-5 Correcting the Internal Mass Value"](#).

Since the internal mass is about 850 g, the possibility of error may increase as the weighing value increases.

To maintain the weighing accuracy, perform the sensitivity adjustment using an external weight periodically, as described in ["7-3 Sensitivity Adjustment Using an External Weight"](#).

## 7-3 Sensitivity Adjustment Using an External Weight

This function performs sensitivity adjustment of the balance using your external weight.

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

2. Press and hold the **[CAL]** key (for 2 seconds) until **[CAL out]** is displayed, then release the key.

3. Make sure that nothing is on the weighing pan and press the **[PRINT]** key to weigh the zero point. Do not apply vibration, etc.

4. Place the external weight on the weighing pan and press the **[PRINT]** key.  
Do not apply vibration etc.

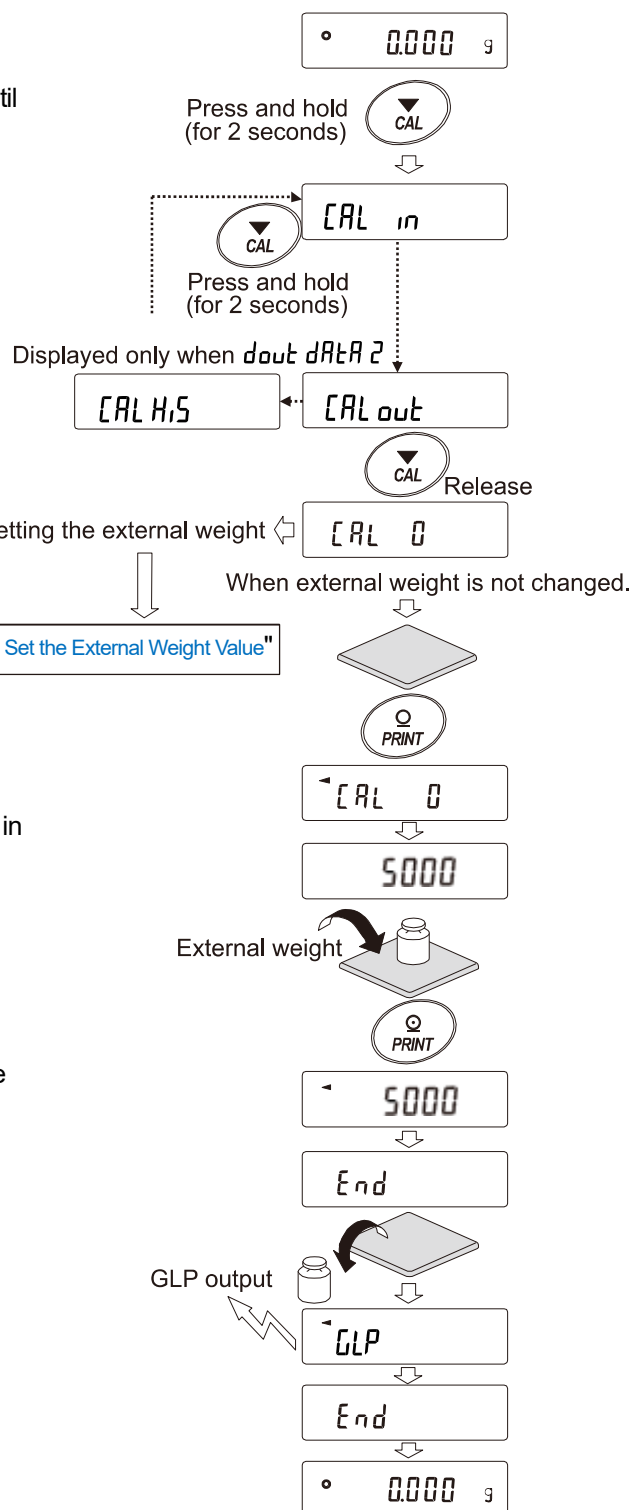
5. Remove the external weight from the weighing pan.

6. After sensitivity adjustment, if GLP output is set, "sensitivity adjustment report" is output or stored in data memory.

7. The display automatically returns to weighing display.

8. Place the external weight again and check that the set value is  $\pm 2$  d. \*  
If it is out of range, pay attention to the surrounding environment and start from "1".

\* "d" is a unit of readability.

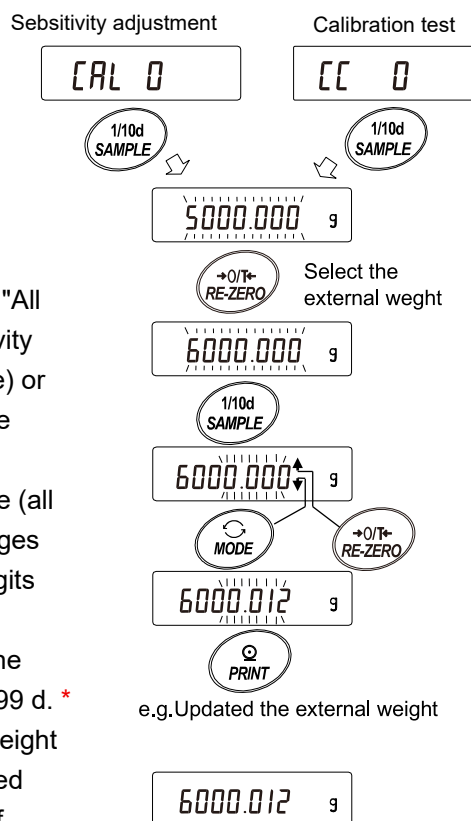


## 7-4 How to Set the External Weight Value

When calibrating the balance or performing a calibration test, the external weight you have on hand can be set. (Refer to "Usable sensitivity adjustment weight" on page 33.)

After **CAL 0** is displayed, the external weight value can be set as shown in "7-3 Sensitivity Adjustment Using an External Weight". Or, after **CC 0** is displayed, the external weight value can be set as shown in "7-6 Calibration Test Using an External Weight".

1. After displayed **CAL 0**, or after displayed **CC 0**, press the **SAMPLE** key.
2. Press the **RE-ZERO** key at all digits blinking to change the weight to be used.
3. Specify the sensitivity adjustment weight value as follows.
  - SAMPLE** key ..... Switches the display condition to: "All of the segments blinking" (sensitivity adjustment weight selection mode) or "The last four digits blinking" (value adjustment mode).
  - RE-ZERO** key ..... Changes the external weight value (all of the segments blinking) or changes the adjustment range (last four digits blinking).
  - MODE** key ..... In the adjustment range setting, the value becomes -9999 d after +9999 d. \*
  - PRINT** key ..... Registers the changed external weight value. Registered values are stored even when the power is turned off.
  - CAL** key ..... Suspends setting. (Returns to **CAL 0** or **CC 0**.)



\* "d" is a unit of readability.

## 7-5 Correcting the Internal Mass Value

Internal mass value can be corrected with function setting **[PS]**. There is one correction method as follows.

AUTO: This is a method of correcting the internal mass weight value based on an external weight.

### Note

- Correction of internal mass value cannot be executed at factory setting.

Refer to "**8. Function Switch and Initialization**" or the following setting method, and enable changing of the function setting and correction the internal mass value.

### Setting procedure

- Press the **[ON:OFF]** key to turn off the display.
- Hold down the **[PRINT]** and **[SAMPLE]** keys, and press the **[ON:OFF]** key to display **[PS]**.
- Press the **[PRINT]** key and set the "internal mass correction switch" and "function setting switch" to "1" with the next key.
 

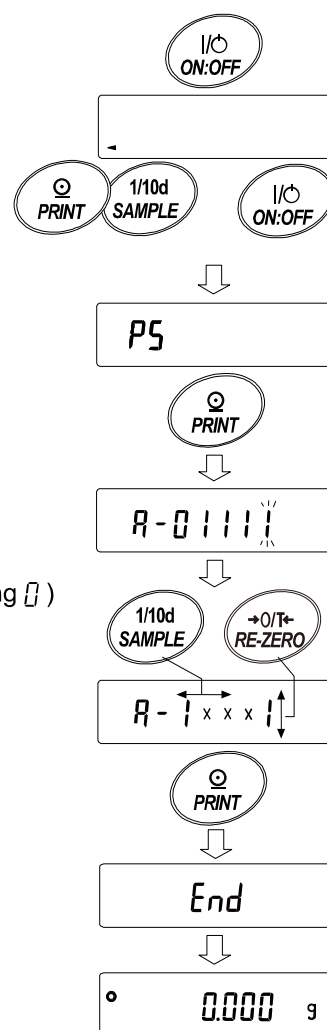
**[SAMPLE]** key ..... Select the switch (blinking digit).

**[RE-ZERO]** key ..... Change the value of the blinking switch.

**R - 1** x x x 1

← Internal setting switch (Factory setting 1)

← Internal mass correcting switch (Factory setting 0)
- Press the **[PRINT]** key to register and display the weighing display.



## 7-5-1 Correcting the Internal Mass Value (AUTO)

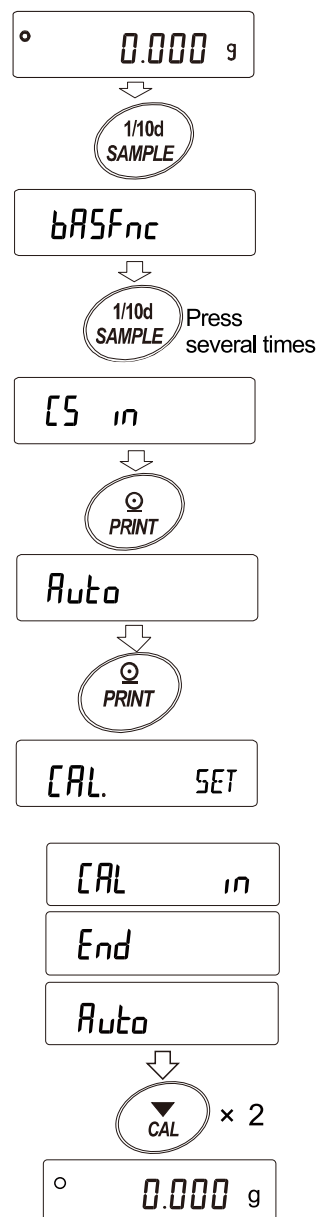
This is a method of correcting the internal mass weight value based on an external weight.

After sensitivity adjustment with the external mass, the balance automatically loads and unloads the internal mass and corrects the internal mass value.

### Setting procedure

The internal mass value cannot be corrected at factory settings. Refer to "7-5 Correcting the Internal Mass Value" and enable changing of the function setting and correction the internal mass value

1. In weighing mode, press and hold (for 2 seconds) the **[SAMPLE]** key to display **bASFnC**.
2. Press the **[SAMPLE]** key several times until **[5 in]** appears. If **[5 in]** does not display, perform "1".
3. Press the **[PRINT]** key to display **Auto**.
4. When preparation is completed, press the **[PRINT]** key.
5. **[CAL SET]** is displayed and the internal mass value is automatically corrected.
6. When adjustment of the internal mass value is completed, **[CAL in]** is displayed and sensitivity adjustment is performed automatically with the adjusted internal weight.
7. When sensitivity adjustment is completed, **Auto** is displayed.
8. Press the **[CAL]** key twice to return to weighing mode.
9. Place the external weight used for sensitivity adjustment on the balance to check whether the balance was corrected. If it is not corrected properly, return to "2".



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## 7-5-2 Correcting the Internal Mass Value (MANUAL)

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This is a method for manually correcting the value of the internal mass (a weight built into the balance used for sensitivity adjustment) using a weight you have as a reference.

Refer to "7-2" Sensitivity Adjustment Using the Internal Mass Place your own weight on the balance to determine the correction amount, and then enter the correction amount numerically into the balance.

The corrected value will be stored even if the AC adapter is unplugged.

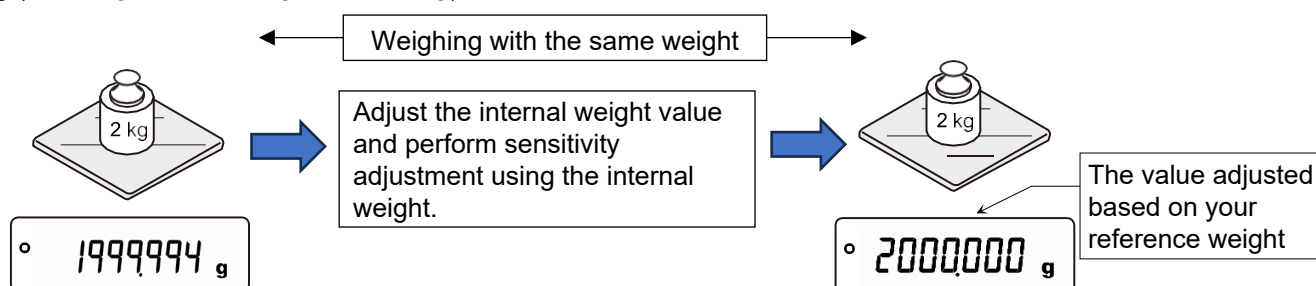
The standard values for correction and the range of correction are as shown in the table below.

**Internal Mass correction standard (internal Mass equivalent value) and correction range**

Model	Correction reference value	Correctable range
MC1104A	1000.0000 g	$\pm 0.9999$ g
MC6203A	5000.000 g	$\pm 9.999$ g



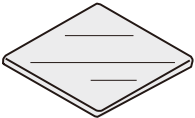



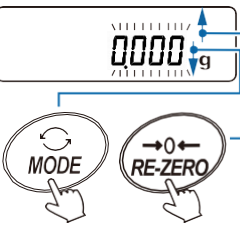



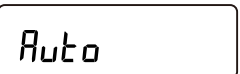


## Operation Method







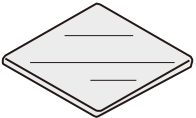


In this example, the MC-6203A indicates a deviation of -0.006 g with your 2000.000 g reference weight. Since the reference calibration value for the MC-6203A is 5000.000 g, if you perform a correction of +0.006 g using an external weight 2000.000 g, the correction amount to be entered into the balance will be **+0.015 g** ( $+0.006 \text{ g} \times 5000.000 \text{ g} / 2000.000 \text{ g}$ ).



Step	Description	Display and key operations	Weighing operation
1.	Correction of the internal weight value cannot be performed at factory settings. Refer to “7-5 Correcting the Internal Mass Value” to enable changes to the settings described in “8-1 Permit or Inhibit” and to correct the internal weight value.		
2.	Perform the sensitivity adjustment in advance by referring to “7-2 Sensitivity Adjustment Using the Internal Mass”.		
3.	Place the reference weight on the balance and verify the adjusted value.		
4.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu (“9. Function Table”).	  Press and hold the key (for 2 seconds) 	
5.	Press the <b>SAMPLE</b> key several times to display  . If  does not appear, follow the instructions in step 1 to set it.	 Press several times 	



Step	Description	Display and key operations	Weighing operation
6.	Press the <b>PRINT</b> key to show the display shown to the right.	 	
7.	Press the <b>SAMPLE</b> key to show the display shown to the right.	 	
8	Press the <b>PRINT</b> key, then use the following keys to set the correction value.  <b>RE -ZERO</b> key: Modify the correction value.(+) (After +9999 d, it will switch to -9999 d.)  <b>MODE</b> key: Modify the correction value.(-) (After -9999 d, it will switch to +9999 d.)	 	
9.	Press the <b>PRINT</b> key to register the modified weight value. The registered value will be retained even after the power is turned off.  (If you do not want to register the modified weight value, press the <b>CAL</b> key to cancel.)	  	
10.	Press the <b>CAL</b> key twice on the diagram screen to return to the weighing display.	  	

Step	Description	Display and key operations	Weighing operation
11.	Press the <b>CAL</b> key to perform sensitivity adjustment using the internal weight.	     	
12.	Place your external weight on the balance and verify that the correction has been properly applied. (Refer to “ <a href="#">28-2 Individual specifications</a> ”) If the correction is not accurate, adjust the correction value again.		

## 7-6 Calibration Test Using an External Weight

This function tests the weighing accuracy using an external weight and outputs the result. This is available only when the GLP / GMP output parameter is set to "dout info 1 or 2".

(Calibration test does not perform sensitivity adjustment.)

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

0.000 g

Press and hold (for 2 seconds)

2. Press and hold the **CAL** key (for 2 seconds) until **[[ out** is displayed and release the key.

Displayed only when *dout data 2*

CAL H.S

Displayed only on GX-M series

CAL in

Press and hold (for 2 seconds)

3. Make sure that nothing is on the weighing pan and press the **PRINT** key and weigh the zero point.  
Do not apply vibration etc.

[[ out

CAL out

Release

[[ 0

When external weight is not changed.

When setting the external weight

4. The weighing value of zero point is displayed for several seconds. Place the external weight on the weighing pan and press the **PRINT** key. Weigh the external weight. Do not apply vibration, etc

Refer to

"7-4 How to Set the External Weight Value"

PRINT

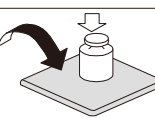
[[ 0

0.000 g

5000

5. Weighing value of the external weight is displayed for several seconds.

External weight



6. Remove the external weight from the weighing pan.

PRINT

5000

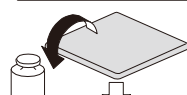
7. The sensitivity calibration status is output or stored in the data memory.

5000.012 g

End

8. It automatically returns to the weighing display.

GLP output



GLP

End

0.000 g

## 8. Function Switch and Initialization

### 8-1 Permit or Inhibit

The balance stores parameters that must not be changed unintentionally adjustment data for accurately weighing, data for adapting to the usage environment, data to control the communications interface, etc. "A function selection switch" is provided to protect those parameters and it can be used to select "change prohibited" or "changeable (usable)". By setting to "change prohibited", that function cannot be entered, so inadvertent change.

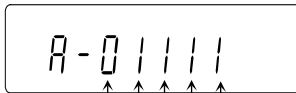
"Switch for function selection" has the following five.

"Function table", "Sensitivity adjustment using the internal mass", "Sensitivity adjustment using the external weight", "Automatic sensitivity adjustment", "Internal mass correction".

#### Setting procedure

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 to display **P5**.
3. Press the **PRINT** key. Then the balance displays the function switches.
  - SAMPLE** key ..... To select a switch to change the parameter. The selected switch blinks.
  - RE-ZERO** key ..... To change the parameter of the switch selected.
    - 0** To inhibit changes. (Cannot be used.)
    - 1** To permit changes. (Can be used.)
  - PRINT** key ..... To store the new parameter and return to the weighing mode.
  - CAL** key ..... To cancel the operation (display **LLr**) . Press the **CAL** key and return to the weighing mode

### Example of MC-A series



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.

Sensitivity adjustment using the internal mass

0 To inhibit sensitivity adjustment using the internal mass.

1 To permit sensitivity adjustment using the internal mass.

Sensitivity adjustment using an external weight

0 To inhibit sensitivity adjustment using an external weight.

1 To permit sensitivity adjustment using an external weight.

Automatic sensitivity adjustment (Sensitivity adjustment due to changes in temperature)

0 To inhibit automatic sensitivity adjustment.

1 To permit automatic sensitivity adjustment.

Internal mass correction

0 To inhibit correction

1 To permit correction

## 8-2 Initializing the Balance

This function returns the following parameters to factory settings.

### 8-2-1 Initialization (all items)

The data to be initialized are as follows.

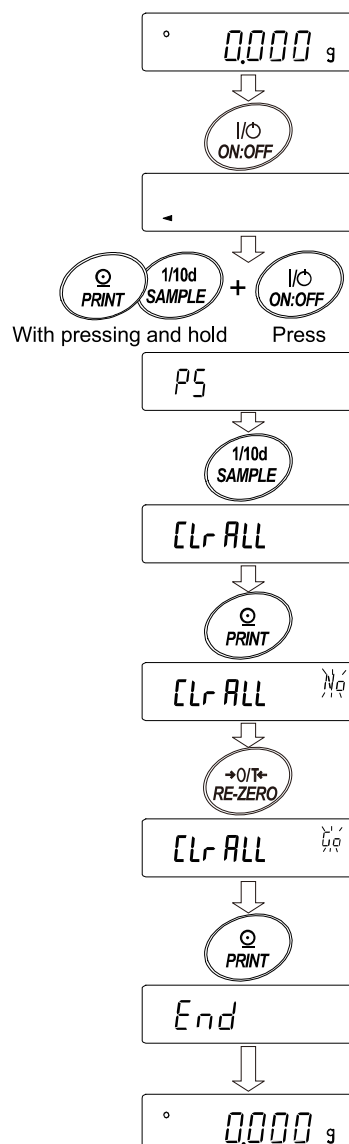
- ☐ Sensitivity adjustment data
- ☐ Function table (excluding password function)
- ☐ Unit weight value (counting mode), 100% reference mass value (percent mode)
- ☐ External weight value
- ☐ Function selection switch settings
- ☐ Statistical calculation mode
- ☐ Correction value for the internal weight

#### Note

**Be sure to perform sensitivity adjustment with the balance after initialization.**

#### Setting procedure

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 to display **PS**.
3. Press the **SAMPLE** key to display **CLr ALL**.
4. Press the **PRINT** key.  
To cancel this operation, press the **CAL** key.
5. Press the **RE-ZERO** key to change **No / Go**.
6. With displaying **CLr ALL Go** press the **PRINT** key to initialize the balance. The balance will automatically return to the weighing mode.

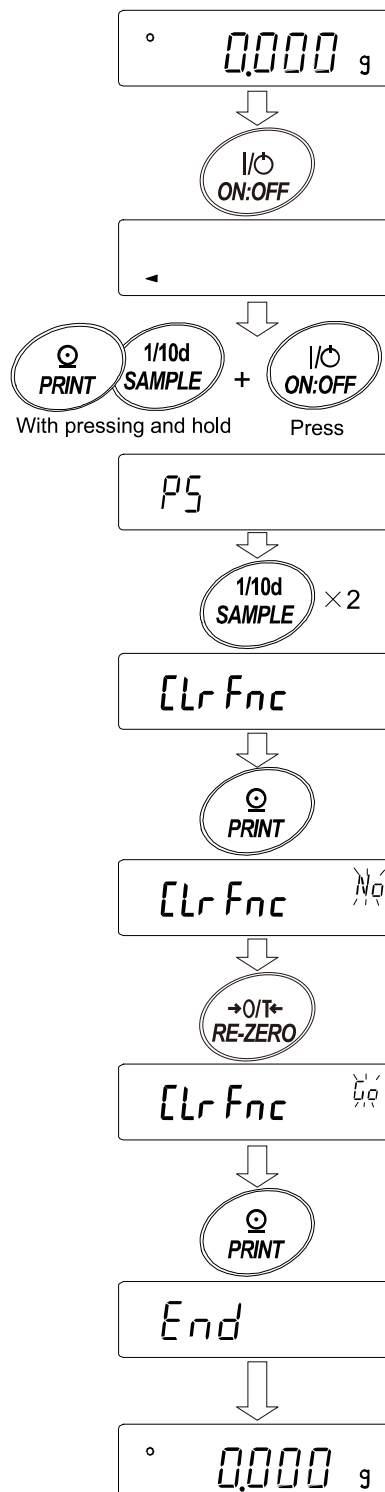


## 8-2-2 Initialization (function table only)

The data to be initialized are as follows.

- ☐ Function table (excluding password function)
- ☐ Function selection switch settings
- ☐ Statistical calculation mode

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 to display **P5**.
3. Press the **SAMPLE** key twice to display **CLr ALL**.
4. Press the **PRINT** key.  
To cancel this operation, press the **CAL** key.
5. Press the **RE-ZERO** key to change **No / Go**.
6. With displaying **CLr ALL Go** 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 are maintained in non-volatile memory, even if the AC adapter is removed. The function table menu consists of two layers. The first layer is the "Class" and the second layer is the "Item".

### 9-1 Setting the Function Table

#### Display symbol and keys

	The symbol "●" shows effective parameter.
	When pressing and holding the key (for 2 seconds) in the weighing mode, the balance enters the function table mode. The key to select the class or item in the function table mode.
	The key to change the parameter.
	The key to change the parameter.
	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.
	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.

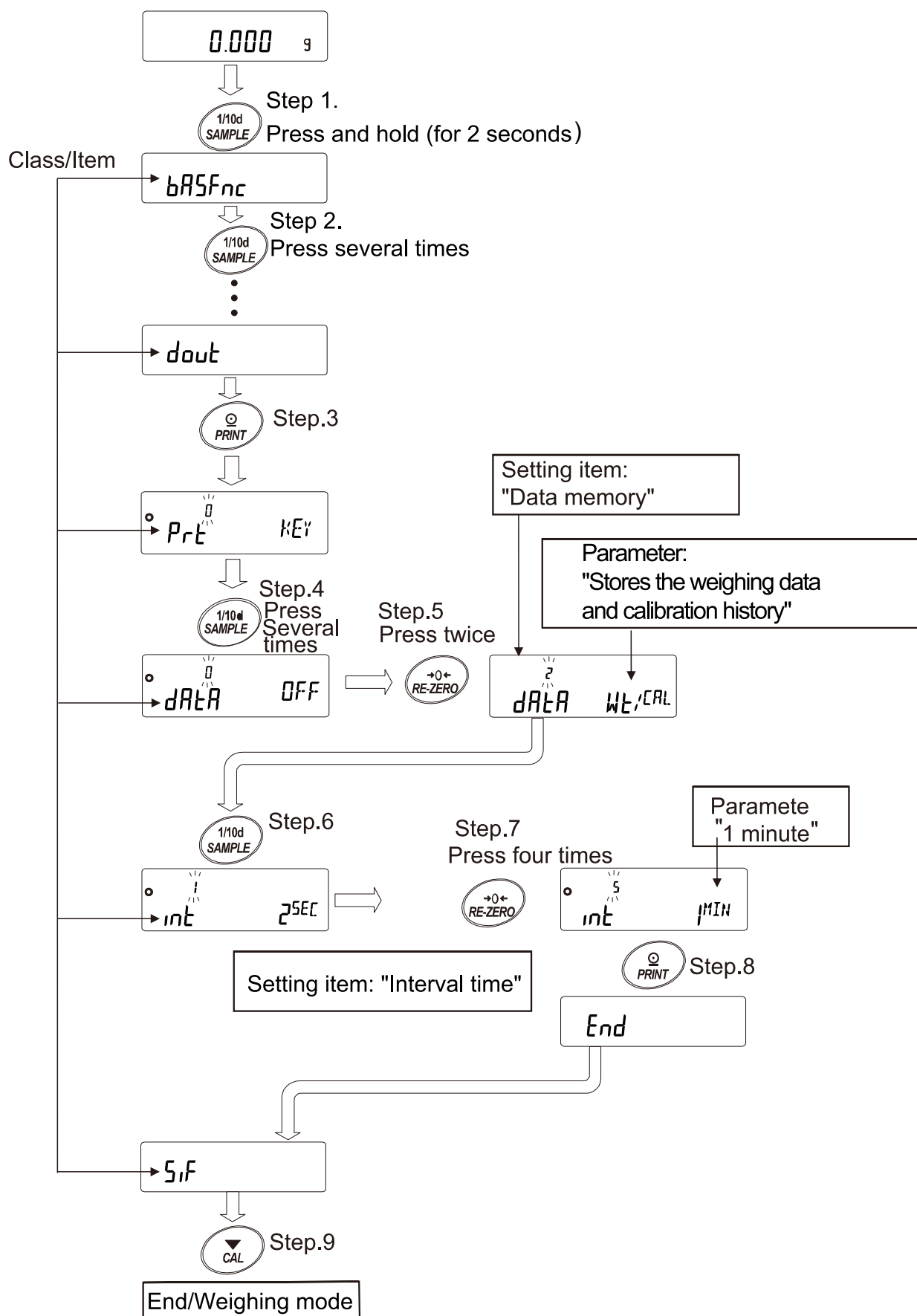
#### Setting procedure

1. Press and hold the **SAMPLE** key (for 2 seconds) until **bASFnC** of the function table is displayed in the weighing mode, then release the key
2. Press the **SAMPLE** key to select a class.
3. Press the **PRINT** key to enter the class
4. Press the **SAMPLE** key to select a item.
5. Press the **RE-ZERO** key to select a parameter for the selected item.
6. To change another (multiple) item with the same class, repeat "4" and "5". To end the setting change of the same class, proceed to "7".
7. If storing parameters of the selected class, press the **PRINT** key.  
Then the next class is displayed.  
If canceling the current operation, press the **CAL** key. Then the next class is displayed.
8. When specifying parameters for another class, proceed to "2".  
When finishing the setting, press the **CAL** key twice to return to weighing mode.



## Setting Example

This example sets "Stores weighing data (*data 2*)" for "Data memory (*data*)" and "1 minute (*int 5*)" for "Interval time (*int*)".



## 9-2 Details of the Function Table

Class	Item	Parameter	Description	
<b>bA5Fnc</b> [00] (Basic Function) Environment Display	<b>Cond</b> (Condition) Condition	0	Fast response, sensitive value	Can be changed by response adjustment.
		1	Slow response, stable value	
		2		
	<b>St-b</b> (Stability band width) Stability band width	0	Stable when within $\pm 1$ d	The stabilization indicator illuminates with the display fluctuation within the range.
		1	Stable when within $\pm 3$ d	
		2		
	<b>Hold</b> (Hold) Hold function	0	OFF	A mode; Holds the display when unstable in animal mode. B mode; Holds the display when stable. After the object is removed, the display remains fixed for 5 seconds in either mode.
		1	A mode (Averaging hold function)	
		2	B mode (Stable hold function)	
	<b>trc</b> (Tracking) Zero tracking	0	OFF	Keeps zero display by tracking zero drift.
		1	Normal	
		2	Strong	
		3	Very strong	
	<b>SPd</b> (Speed) Display refresh rate	0	5 times/second	Output frequency approx. 5.2 Hz
		1	10 times/second	Output frequency approx. 10.4 Hz
		2	20 times/second	Output frequency approx. 10.4 Hz
	<b>Pnt</b> (Point) Decimal point	0	Point ( . )	Decimal point format
		1	Comma ( , )	
	<b>P-on</b> (Power On) Auto display-ON	0	OFF	Turns on the weighing mode display when AC adapter is connected.
		1	ON	
	<b>P-off</b> (Power Off) Auto display-OFF	0	OFF	Turns off the display after 10 minutes of inactivity.
		1	ON	
	<b>rng</b> (Range) Readability	0	Display readability	Display at weighing start.
		1	Not display readability	
	<b>bEEP</b> (Beep) Buzzer	0	OFF	Buzzer sound such as key operation
		1	ON	
	<b>P-Zero</b> (Power On Zero) Display when power-on	0	OFF Zero indication at power on	
		1	ON Previous time weighing indication at power on	

■ Factory setting.

**Note: "d" is a unit of readability.**

\* A number shown in [ ] is class number and output as identification sign when outputting the function setting information at once. Refer to "9-2-1 Outputting the Function Setting Information".

Class	Item	Parameter	Description	
bASFunc [00] (Basic Function) Environment Display	dISP-LED (Display LED) Backlight brightness	0 to 9	10% to 100%	
		■ 5	Factory setting 60%	
	LV-LED (Level LED) Bubble spirit level LED	0	OFF	LED for the bubble spirit level
		■ 1	ON	
	ISd (Impact Shock Detection) Impact Shock Detection	0	OFF	Impact shock detection function
		■ 1	ON	
EL Adj [01] (Clock Adjustment) Clock		Refer to "9-4 Clock and Calendar Function".		Confirms and sets the time and date. The time and date are added to output data.
CP Func [02] (Comparator Function) Comparator	CP (Comparator) Comparator mode	■ 0	No comparison (Do not use the comparator function)	
		1	Comparison when stable value or overloaded	
		2	Continuous comparison	
	CP-t (Comparator Type) Number of comparator stages	■ 0	3 stage comparator	HI, OK, LO
		1	5 stage comparator	HH, HI, OK, LO, LL
	CP-z (Comparator zero) Near zero	0	Compare near zero as well	
		1	±5 d are not compared	
		■ 2	±10 d are not compared	
		3	±20 d are not compared	
		4	±50 d are not compared	
		5	±100 d are not compared	
	CP-P (Comparator Polarity) Polarity	0	Plus only	
		1	Minus only	
		■ 2	Bipolarity	
	CP-R (Comparator Result) Comparator result adding	■ 0	OFF	Comparator results can be added to output data. Use this mode with A&D standard format (5, F, TYPE 0).
		1	ON	
	CP-in (Comparator input method) Input method	■ 0	Digital input, upper/lower limits	CP HH, CP HI, CP LO, and CP LL can be selected.
		1	Weighing input, upper/lower limits	
		2	Digital input, reference value	CP rEF, CP LME, and CP LME2 can be selected.
		3	Weighing input, reference value	
	CP-b (Comparator) Expanding display function	■ 0	OFF	HI, OK, and LO can be displayed largely at the weighing display when using comparator mode.
		1	ON	

■ Factory setting

Note: "d" is a unit of readability.

Class	Item	Parameter		Description
<b>CP VALUE[03]</b> (Comparator Value) Comparator Value	<b>CP HH</b> (Comparator HH) Second upper limit	Refer to "9-5 Comparator Function".		Displayed only when <b>CP in</b> is set to 0 or 1.  <b>CP HH</b> and <b>CP LL</b> are displayed only when 5 step comparator is set.
	<b>CP HI</b> (Comparator HI) Upper limit			
	<b>CP LO</b> (Comparator LO) Lower limit			
	<b>CP LL</b> (Comparator LL) Second lower limit			
	<b>CP rEF</b> (Comparator Reference) Reference value	Refer to "9-5 Comparator Function".		Displayed only when <b>CP in</b> is set to 2 or 3. <b>CP LME2</b> is displayed only when 5 step comparator is set.
	<b>CP LME</b> (Comparator Limit) Tolerance value			
	<b>CP LME2</b> (Comparator limit2) Second tolerance value			
<b>CP BEEP[04]</b> (Comparator Beep) Comparator buzzer	<b>bEP HH</b> (Beep HH) HH buzzer	■ 0	OFF	Displayed only when 5 step comparator is set.
		1	ON	
	<b>bEP HI</b> (Beep HI) HI buzzer	■ 0	OFF	
		1	ON	
	<b>bEP OK</b> (Beep OK) OK buzzer	■ 0	OFF	
		1	ON	
	<b>bEP LO</b> (Beep LO) LO buzzer	■ 0	OFF	
		1	ON	
	<b>bEP LL</b> (Beep LL) LL buzzer	■ 0	OFF	Displayed only when 5 step comparator is set.
		1	ON	

■ Factory setting

Note: "d" is a unit of readability.

Class	Item	Parameter	Description	
<b>dout</b> [05] (Data Out) Data output	<b>Prt</b> (Print) Data output mode	0	Key mode	Accepts the <b>PRINT</b> key only when the display is stable.
		1	Auto print mode A (Reference = zero)	Outputs data when the weighing value stabilizes beyond the range from <b>RP-P</b> to <b>RP-b</b> from the zero point.
		2	Auto print mode B (Reference = last stable value)	Outputs data when the weighing value stabilizes beyond the range from <b>RP-P</b> to <b>RP-b</b> from last stable value.
		3	Stream mode	Outputs data at the specified display refresh rate.
		4	Key mode B (Immediately)	Accepts the <b>PRINT</b>
		5	Key mode C (When stable)	key regardless of the display condition.
		6	Interval output mode	Outputs data for each time set by <b>int</b> .
		7	Auto print C mode (When comparator result is OK)	Outputs data when the comparison result is OK, and the display is stable beyond the range from <b>RP-P</b> to <b>RP-b</b> from the zero point.
	<b>RP-P</b> (Auto Print Polarity) Auto print polarity	0	Plus only	Displayed value > Reference
		1	Minus only	Displayed value < Reference
		2	Bipolarity	Regardless of displayed value
	<b>RP-b</b> (Auto Print Band Width) Auto print difference	0	10 d	Difference between reference value and displayed value
		1	100 d	
		2	1000 d	
	<b>dMtr</b> (Data Memory) Data memory	0	OFF	Refer to "11. Data Memory".
		1	Stores unit mass in counting mode	
		2	Stores the weighing data and calibration history	
		3	Stores comparator setting values	
		4	Stores tare values	
	<b>int</b> (Interval Time) Interval time	0	Every measurement	Interval time in the interval memory mode when using <b>Prt</b> 6.
		1	2 seconds	
		2	5 seconds	
		3	10 seconds	
		4	30 seconds	
		5	1 minute	
		6	2 minutes	
		7	5 minutes	
		8	10 minutes	

■ Factory setting

Note: "d" is a unit of readability.

Class	Item	Parameter	Description	
<b>dout</b> [05] (Data Out) Data output mode	<b>d-no</b> (Data No.) Data number	■ 0	No output	Valid when data memory function is ON.
		1	Output	
	<b>5-td</b> (Send Time Date) Time/date output	■ 0	No output	Refer to "9-4 Clock and Calendar Function".
		1	Time only	
		2	Date only	
		3	Time and date	
	<b>5-id</b> (Send ID) ID number output	■ 0	No output ID number	When outputting data, select whether to output the ID number.
		1	Output ID number	
	<b>PUSE</b> (Pause) Data output pause	■ 0	OFF	Selects the data output interval.
		1	ON after 1.6 seconds	
	<b>RE-F</b> (Auto Feed) Auto feed	■ 0	OFF	Selects whether or not automatic feed is performed.
		1	ON after 1 line	
	<b>inFo</b> (Information) GLP output	■ 0	OFF	Refer to "10-3 GLP Report".
		1	ON	
		2	ON (output clock of external device clock)	
	<b>RR-d</b> (Auto Re-zero After Data Output) Auto re-zero after output	■ 0	OFF	Function to apply re-zero after outputting data.
		1	ON	
	<b>UFC</b> (Universal Flex Coms) UFC function	■ 0	OFF	Refer to "23.UFC Function".
		1	ON	
<b>5iF</b> [06] (Serial Interface) Serial interface	<b>Mode</b> (Mode) Access port	■ 0	PC	All communication setting are possible.
		1	Printer	Only <b>TYPE 0</b> , <b>1</b> can be selected.
		2	External indicator	Selects stream with <b>TYPE 0</b> .
	<b>bPS</b> (Bits Per Second) Baud rate	0	600 bps	
		1	1200 bps	
		■ 2	2400 bps	
		3	4800 bps	
		4	9600 bps	
		5	19200 bps	
		6	38400 bps	

■ Factory setting

Note: "d" is a unit of readability.

Class	Item	Parameter	Description	
5.F [06] (Serial Interface) Serial interface	bPr (Bits Parity) Data bit, parity bit	■ 0	7 bit EVEN	
		1	7 bit ODD	
		2	8 bit NONE	
	rLF (Carriage Return, Line Feed) Terminator	■ 0	CRLF	CR: ASCII 0Dh LF: ASCII 0Ah
		1	CR	
	tYPE (Type) Data format	■ 0	A&D standard format	Refer to "21-2.Weighing data format".
		1	DP format	
		2	KF format	
		3	MT format	
		4	NU format	
		5	CSV format	
		6	NU2 format	
		7	TAB format	
	t-UP (Time Up) Command time out	0	Not limited	Selects wait time during command reception
		■ 1	Limited for one second	
	ErEd (Error Code) AK, error code	■ 0	OFF	AK:ASCII 06h
		1	ON	
USB [07] (Universal Serial Bus) USB interface *1	UFnc (USB Function) USB function mode	■ 0	Quick USB	Refer to "20. Connecting to a PC".
		1	Bidirectional USB virtual COM	
	U-tP (USB Type) USB data format	■ 0	A&D standard format	Refer to "21-2. Weighing data format".
		1	NU format	
		2	CSV format	
		3	TAB format	
AP Fnc [10] (Application Function) Application function	APF (Application Function) Application mode	■ 0	Normal weighing mode	Refer to "9-6 Description of Application".
		1	Capacity indicator	
		2	Statistical calculation mode	
		3	Flow measurement mode	

■ Factory setting

**Note: "d" is a unit of readability.**

\*1 In Quick USB mode, the USB data format is fixed to the NU2 format.

Class	Item	Parameter	Description	
<b>AP Fnc [10]</b> ( <b>Application Function</b> ) Application function	<b>STATF</b> ( <b>Statistical Function</b> ) Statistical function mode output items	■ 0	Number of data, sum	
			Number of data, sum, max, min, range (max-min), average	
		2	Number of data, sum, max, min, range (max-min), average, standard deviation, coefficient of variation	
		3	Number of data, sum, max, min, range (max-min), average, standard deviation, coefficient of variation, relative error	
<b>MW Fnc [11]</b> ( <b>Minimum Weight Function</b> ) Minimum weighing warning function	<b>MW-CP</b> ( <b>Minimum Weight Comparison</b> ) Minimum weighing comparison	■ 0	No comparison. Do not use Minimum weighing warning function.	
			Comparison without near zero.	
		2	Comparison including near zero.	
	<b>MW</b> ( <b>Minimum Weight</b> ) Minimum weight input	Refer to "14. Minimum weight alert function".		
	<b>M in out</b> ( <b>Minimum Weight Out</b> ) Minimum weight output	0	OFF	Refer to "14. Minimum weight alert function".
		■	ON	
<b>Unit [12]</b> ( <b>Unit</b> ) Unit		Refer to "9-7 Description of Unit".		

■ Factory setting

**Note: "d" is a unit of readability.**



Class	Item	Parameter		Description
MLt 【14】 Programmable-unit (Multi-unit)		Sets an arbitrary coefficient. Refer to "Programmable-unit" of "4-1 Units".		Available only when programmable-unit mode is selected
id 【15】 (ID) ID number setting		Refer to "10-2 Setting the ID Number".		
PASSwd 【16】 (Password) Password	Lock (Lock) Lock function	■ 0	OFF	Refer to "15. Password Function".
		1	ON (Limit weighing operation)	
		2	ON (Basic weighing is possible)	
	PASS No. (Password No.) Password registration	ADMIN	Administrator password input	
		USER 01 to USER 10	User 1 password input User 10 password input	
【17】 (Auto Calibration) Auto calibration	CFnc (Calibration Function) Calibration mode	■ 0	Setting temperature	
		1	Setting time	
		2	Interval time	
	TIME1 (Calibration Time1) Setting time 1	Refer to "7-1 Automatic Sensitivity Adjustment".		
	TIME2 (Calibration Time2) Setting time 2			
	TIME3 (Calibration Time3) Setting time 3			
	Int (Calibration interval) Interval time			
CS in 【18】 (Calibration Set Internal) Correction of internal mass value		Auto (Auto)	Automatic input	Refer to "7-5-1 Correcting the Internal Mass Value (AUTO)".

■ Factory setting

**Note:** "d" is a unit of readability.

## 9-2-1 Outputting the Function Setting Information

Function setting can set the balance to appropriate operations for your needs. The function table menu consists of two layers. The first layer is the "Class" and the second layer is the "Item".

By performing the following procedure, the function setting status can be output at once, so settings of balance being used can be recorded.

### Outputting the function setting information at once

1. Press and hold the **[SAMPLE]** key (for 2 seconds)  
in weighing mode

2. **bASFnC** is displayed.

3. Press and hold the **[PRINT]** key (for 2 seconds)  
to display **-L,5t-**. A current function setting  
information is output at once.

[Output example]

```
MODEL    A & D  
MC-6203A  
S/N      T1234567  
ID        LAB-0123  
DATE     2024/09/01  
TIME     12:34:56
```

Model  
Serial number  
ID  
Date  
Time } Output a data and time for the balance

#### Function Table

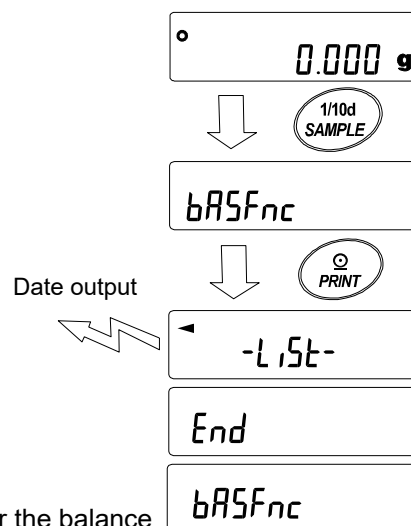
```
00,Cond ,01  
00,St-b ,01  
00,HoLd ,00  
00,trc ,01  
00,SPd ,00  
00,Pnt ,00  
00,P-on ,00  
00,P-off ,00  
00,rnG ,00  
00,bEEP ,01  
00,P-Zero ,00  
00,diSP-LEd ,05  
00,iSd ,01
```

```
10,APF ,00  
10,StAF ,00  
-----  
11,MW-CP ,00  
11,MW ,+0000.000 g  
11,Min out ,01  
-----  
16,Lock ,00  
-----  
17,CFnc ,00  
17,Cint ,00  
-----  
END
```

- ① Class (2 characters)
- ② Item (8 characters)
- ③ Parameter (1 character) or (12 characters)

\* Each one is divided using comma.

\* Refer to "9-2 Details of the Function Table" in "9.Function Table" for details of class, item and parameter.



### Use example 1    Outputting the function setting information to a printer

Use AD-8129TH compact thermal printer.

1. Connect the printer to the balance.  
When using AD-8129TH, set the print mode to “DUMP”.  
Refer to instruction manual of the printer for details of the settings or print mode.  
Refer to “19. Printing Weighing Value Data on a Printer” in this manual of the connection method between the balance and printer.
2. Confirm that the communication can be made between the balance and printer and output an information using “Outputting the function setting information at once” described on previous page.

### Use example 2    Outputting the function setting information to a PC

Refer to “20. Connecting to a PC” in this manual and “WinCT manual” on A&D web site (<https://www.aandd.jp/>) for details of the USB setting or WinCT.

1. Connect between the PC and balance using the provided USB cable or sold separately RS-232C cable.  
\* Use the USB at virtual COM mode.  
It cannot be output using quick USB.
2. Install the WinCT to a PC to be used.  
Download WinCT software from A&D web site (<https://www.aandd.jp/>).
3. Start up RSCom and match communication settings such as COM port or baud rate to settings of the balance.  
Press the [Start] button to enable the communication.
4. Confirm that the communication can be made between the balance and PC and output an information using “Outputting the function setting information at once” described on previous page.

## 9-3 Description of the Class "Environment, Display"

### Condition (Cond)

Cond 0



Cond 2

This parameter is for sensitive response to the fluctuation of a mass value. Used for powder target mass, 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 mass value from drifting due to vibration or drafts. After setting, the balance displays **SLOW**.

### Stability band width (St-b)

This item controls the width to regard a mass 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 by function setting (doubt, dRtR, etc.) The parameter influences the "Auto print mode". Also, the readability being displayed is 1 d.

Ex. If 0.001 g display is selected by pressing the **SAMPLE** key on the MC-6203A, 0.001 g is 1 d.

St-b 0



St-b 2

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

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

### Hold function (Hold)

#### A Mode (averaging hold, Animal weighing mode)

This function is used to weigh a moving object such as an animal.\*1 When the weighing data is over the weighing range from zero display 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 or sample is removed from the weighing pan, the display returns to zero\*2 automatically. This function is available only when the hold function parameter is set to "2" (the animal mode indicator **HOLD** 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 (St-b)".

Weighing range	
MC-1104A	0.2000 g or more
MC-6203A	2.000 g or more

Averaging time	
Cond 0	2 sec. (Efficiency priority)
Cond 1	4 sec.
Cond 2	8 sec. (Exact priority)

Stabilization range		
St-b 0	Lesser	6.25%
St-b 1		12.5%
St-b 2	Greater	16.7%

\*1 Animal container kit (GXA-12) can be installed.

#### B mode (stable hold function)

When the weighing value exceeds a certain range from zero (same weighing range as in A Mode) and the stability indicator is lit, the value is held on the display.

After the object is removed from the weighing pan, the displayed value remains for 5 seconds before automatically switching to zero.\*2.

This function is available only when the unit is set to a mode other than counting mode.

\*2 If the value is within the zero range, the zero point is updated. If it exceeds the zero range, tare is performed.

### **Zero tracking (*t r c*)**

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 d, turn the function off for accurate weighing.

*t r c* 0 The tracking function is not used. Used for weighing a very light sample.

*t r c* 1 The normal tracking function is used. ( $\pm 1$  d / 1 second)

*t r c* 2 The strong tracking function is used. ( $\pm 1$  d / 0.5 second)

*t r c* 3 The very strong tracking function is used. ( $\pm 1$  d / 0.2 second)

\* "d" is a unit of readability.

### **Display refresh rate (*5 P d*)**

The periodic time to refresh the display. This parameter influences "Baud rate", "Data output pause" and the data output rate of "Stream mode".

### **Decimal point (*P n t*)**

The decimal point format can be selected.

### **Auto display-ON (*P - o n*)**

When the AC adapter is plugged in, 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. an hour warm up is necessary for accurate weighing.

### **Auto power-OFF (*P - o f f*)**

This is a function to turn off only the display automatically when there is no operation made for a certain amount of time (approximately 10 minutes) while the power is on.

### **Readability (*r n d*)**

When weighing with rough precision, the readability can be turned off without key operation. This is useful when built into an automated system.

### **Buzzer (*b e e p*)**

Select ON/OFF for the built-in buzzer that sounds when a key is operated or the status changes.

### **Display when power-on (*P - i E r o*)**

After turning on the power supply, the display will not be automatically set to zero, and it will start from the previous weighing value. This is useful when a hopper, etc. is attached to the weighing pan and the power needs to be turned off while weighing discharge.

### **Backlight brightness (*d i s P - L E d*)**

Select the brightness of the backlight of the LCD display.

### **Bubble sprit level lighting (*L i v - L E d*)**

Select ON / OFF for the LED that illuminates the bubble sprit level.

### **Impact shock detection (*i s d*)**

Select ON/OFF for the impact shock detection.

## 9-4 Clock and Calendar Function

The balance is equipped with a clock and calendar function. When the Clock and Calendar function ( *clock, 5-td* ) is set, 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 (for 2 seconds) until **bASFnC** of the function table is displayed in the weighing mode, then release the key.
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

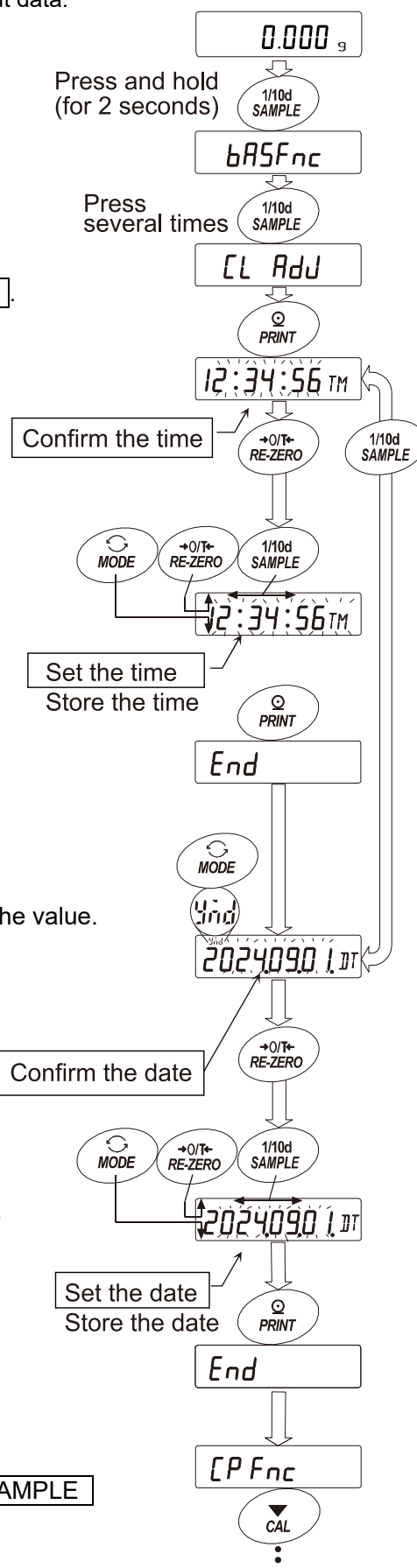
4. The current time is displayed with all the digits blinking.
  - When the time is not correct and is to be changed, press the **[RE-ZERO]** key and go to "5".
  - When the time is correct and the date is to be confirmed, press the **[SAMPLE]** key and go to "6".
  - When the time is correct and the date does not need to be confirmed, press the **[CAL]** key and go to "8".

### Setting the time

5. Set the time in 24-hour format using the following keys.
  - [RE-ZERO]** (+) key ..... To increase the value by one.
  - [MODE]** (-) key ..... To decrease the value by one.
  - [SAMPLE]** key ..... To select the digits to change the value.  
The selected digits blink.
  - [PRINT]** key ..... To store the new setting, display
  - [End]** and go to "6".
  - [CAL]** key ..... To cancel the new setting and go to "6".

### Confirming the date

6. The current date is displayed with all the digits blinking.
  - To change the display order of year (*y*), month (*m*) and day (*d*), press the **[MODE]** key. The date is output in the order as specified.
  - When the date is not correct and is to be changed, press the **[RE-ZERO]** key and go to "7".
  - When the date is correct and the operation is to be finished, press the **[CAL]** key and go to "8".
  - When the time is to be confirmed again, press the **[SAMPLE]** key and go back to "4".



## Setting the date

7. Set the date using the following keys. (The year is set with the last 2 digits of the Christian era)

**RE-ZERO** (+) key..... To increase the value by one.

**MODE** (-) key..... To decrease the value by one.

**SAMPLE** key..... To select the digits to change the value. The selected digits blink.

**PRINT** key..... To store the new setting, display **End** and go to "8".

**CAL** key ..... To cancel the new setting and go to "8".

## Quitting the operation

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

### Note

- **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**. When a replacement of the battery is necessary, please contact your local A&D dealer. 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.**

## 9-5 Comparator Function

The comparison of comparators can select 3-steps or 5-steps ( $[P Fnc]$ ,  $[P-t]$ ), and it is set to 3-steps at the factory setting. When 3-step comparator is set, the results of the comparison are indicated by  $[HI]$   $[OK]$   $[LO]$  on the display. When 5-step comparator is set, HH is indicated by  $[HI]$  blinking and LL by  $[LO]$  blinking. By using GXM-04, it is possible to output the comparison result at the contact point.

There are three types of scope that can be selected as follows.

- No comparison
- Comparison when the weight data is stable or overloaded
- Continuous comparison

The conditions for comparing near zero are in six levels from "including near zero" to " $\pm 100 d$ ".

"Upper limit value and lower limit value" and "reference value and tolerance range" are the comparison standards.

There are "Digital input" and "Input by sample load" as input method for each value.

Refer to the function setting  $[P Fnc]$ .

By setting the function setting  $[P bEEP]$ , it is also possible to sound an internal buzzer depending on the result of the comparison.

### 3-step comparison result

Weighing value		3-step comparison - display			
Threshold value	Judgment formula	Judgment result	Lit display	Blinking display	Buzzer control
Upper limit	Upper limit value < Weighing value	HI	$[HI]$		bEEP HI
Lower limit	Lower limit value $\leq$ Weighing value $\leq$ Upper limit value	OK	$[OK]$		bEEP OK
	Weighing value < Lower limit value	LO	$[LO]$		bEEP LO

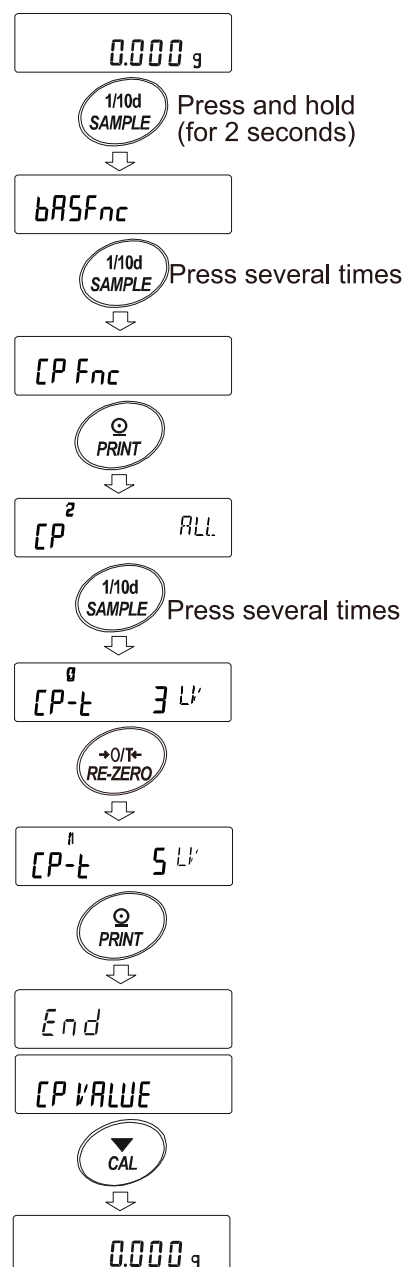
### 5-step comparison result

Weighing value		5-step comparison - display			
Threshold value	Judgment formula	Judgment result	Lit display	Blinking display	Buzzer control
2nd Upper limit	2nd Upper limit value < Weighing value	HH		$[HI]$	bEEP HH
Upper limit	Upper limit value < Weighing value $\leq$ 2nd Upper limit value	HI	$[HI]$		bEEP HI
Lower limit	Lower limit value $\leq$ Weighing value $\leq$ Upper limit value	OK	$[OK]$		bEEP OK
2nd Lower limit	2nd Lower limit value $\leq$ Weighing value < Lower limit value	LO	$[LO]$		bEEP LO
	Weighing value < 2nd Lower limit value	LL		$[LO]$	bEEP LL



## Selecting the comparator stage (3 stages/5 stages)

1. Press and hold the **[SAMPLE]** key (for 2 seconds) to display **bASFnC** of function settings.
2. Press the **[SAMPLE]** key several times to display **[P Fnc]**.
3. Press the **[PRINT]** key.
4. Press the **[SAMPLE]** key several time to display **[P-t]**.
5. Press the **[RE-ZERO]** key to select “0” of 3 stages or “|” of 5 stages.  
Press the **[PRINT]** key to confirm.
6. Press the **[CAL]** key to return to weighing mode



## Setting example 1.

### Comparison when stable or overloaded. Upper/lower limits digital input.

Selecting a comparison method (operating range, comparison criteria, and value input) (setup procedures starting from the factory default setting) (with the 3-stage comparator, comparison when stable or overloaded excluding near zero  $\pm 10$  d, upper limit 60000.500 g, lower limit 6000.500 g)

1. Press and hold the **SAMPLE** key (for 2 seconds) to display **bASFnC** of function settings.

0.000 g



Press and hold (for 2 seconds)

2. Press the **SAMPLE** key several times to display **[P]FnC**.

bASFnC



Press several times

3. Press the **PRINT** key.

[P]FnC



4. Press the **RE-ZERO** key several times to display **[P]tAb** ("I" always compare).

°[P]tAb OFF



Press several times

5. Press the **PRINT** key to store the selected method.

[P]tAb



End

CP VALUE

## Entering the values

6. With **[CP VALUE]** displayed, press the **[PRINT]** key.

7. Display **[CP H<sub>1</sub>]**.

8. Press the **[PRINT]** key.

9. The current setting value is displayed with all of the digits blinking.

When the current setting is not to be changed, press the **[PRINT]** or **[CAL]** key to go to "10".

When the current setting is to be changed, press the **[RE-ZERO]** key and store the following keys.

**[SAMPLE]** key ..... Move the blinking digit.

**[RE-ZERO]** key ..... Change the value of the blinking digit.

**[MODE]** key ..... Switch the polarity.

**[PRINT]** key ..... Store the new setting and go to "10".

**[CAL]** key ..... Cancel the new setting and go to "10".

10. Display **[CP Lo]**.

11. Press the **[PRINT]** key.

12. The current setting value is displayed with all of the digits blinking. When the current setting is not to be changed, press the **[PRINT]** or **[CAL]** key to go to "13".

When the current setting is to be changed, press the **[RE-ZERO]** key and store the following keys.

**[SAMPLE]** key ..... Move the blinking digit.

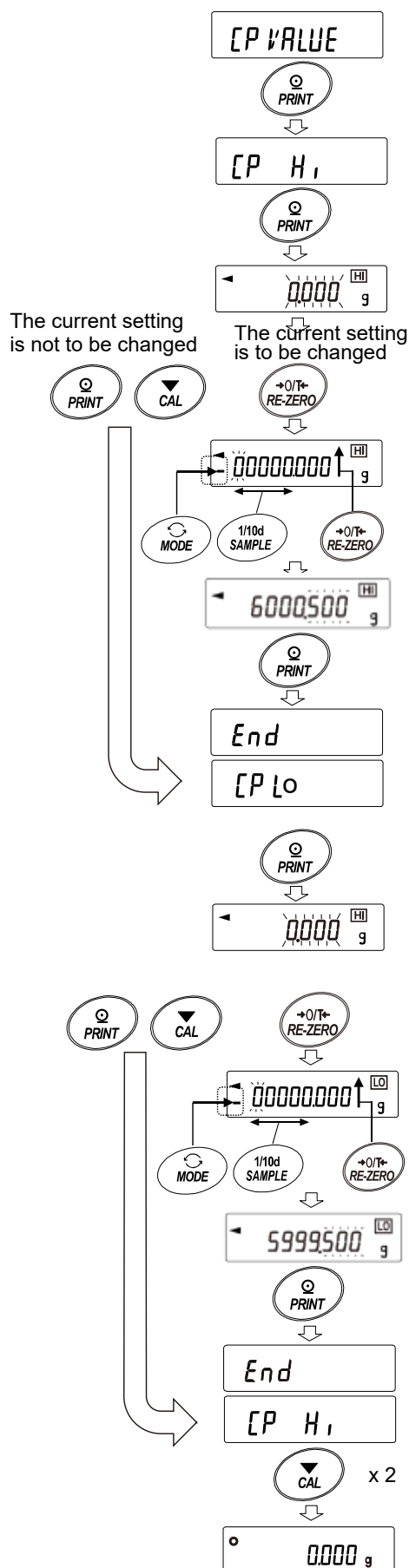
**[RE-ZERO] (+)** key ... Change the value of the blinking digit.

**[MODE] (-)** key ..... Switch the polarity.

**[PRINT]** key ..... Register and go to "13".

**[CAL]** key ..... Cancel and go to "13".

13. Press the **[CAL]** key twice to return to the weighing display.



## Setting example 2.

### Continuous comparison except near zero $\pm 20$ d. Reference / tolerance digital input.

Selecting a comparison method (operating range, comparison criteria, and value input)

1. Press and hold the **[SAMPLE]** key (for 2 seconds) until **bASFnC** of the function table is displayed, then release the key.

2. Press the **[SAMPLE]** key several times to display **[P Fnc]**.

3. Press the **[PRINT]** key.

4. Press the **[RE-ZERO]** key several times to display **[P ALL]** ("**2**" always compare).

5. Press the **[SAMPLE]** key several times to display **[P-2]**.

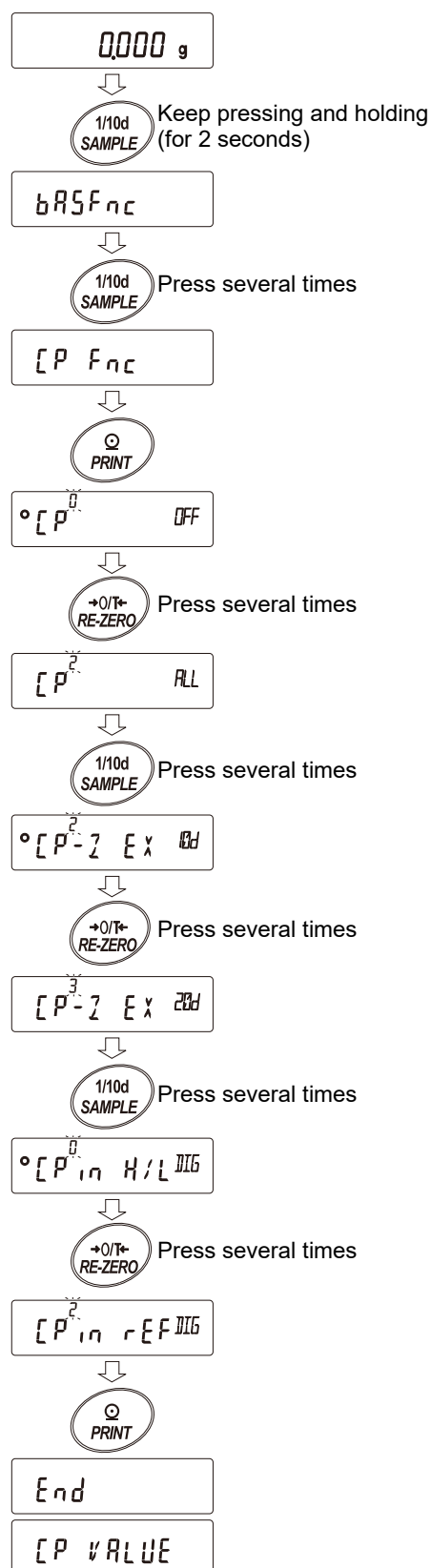
6. Press the **[RE-ZERO]** key several times to display **[P-2 EX 20d]** ("**2**"  $\pm 20$  d is not compared.)

7. Press the **[SAMPLE]** key several times to move to **[P in]**.

8. Press the **[RE-ZERO]** key several times to display **[P in rFE DIG]** ("**2**" reference value is set. digital input)

9. Press the **[PRINT]** key to store the selected method.

\* "d" is a unit of readability.



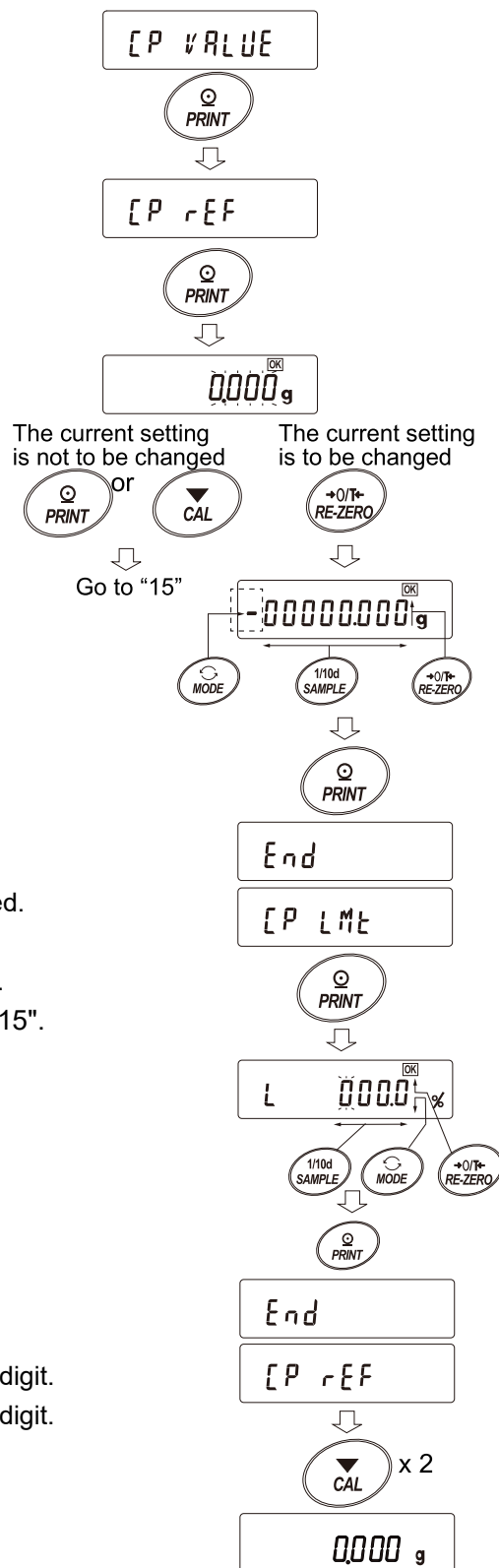
## Entering the values

10. With **CP VALUE** displayed, press the **PRINT** key.
11. Display **CP rEF**.
12. Press the **PRINT** key.
13. The current setting value is displayed with all of the digits blinking.
14. When the current setting is not to be changed, press the **PRINT** or **CAL** key to go to "15".

When the current setting is to be changed, press the **RE-ZERO** key and store the following keys.

- SAMPLE** key ..... Select the digit to change the value.
- RE-ZERO** key ... Change the value of the digit selected.
- MODE** key ..... Switch the polarity.
- PRINT** key ..... Store the new setting and go to "15".
- CAL** key ..... Cancel the new setting and go to "15".

15. When **CP LME** is displayed, pressing the **PRINT** key will display the currently set value.  
If changing the setting value, it can be registered the tolerance value with the following keys.  
For tolerance value, enter the value with the reference value set to 100%.  
  - SAMPLE** key ..... Move the blinking digit.
  - RE-ZERO** (+) key ... Change the value of the blinking digit.
  - MODE** (-) key ..... Change the value of the blinking digit.
  - PRINT** key ..... Register and go to "16"
  - CAL** key ..... Cancel and go to "16"
16. Press the **CAL** key twice to return to the weighing display.

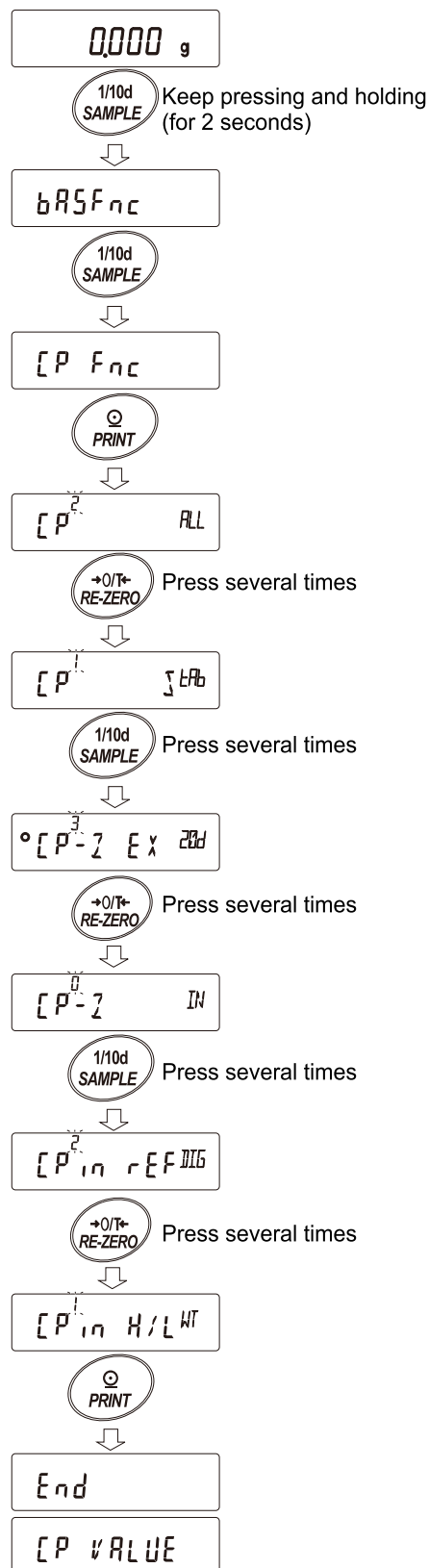


### Setting example 3.

Comparison when stable or overloaded including near zero. Upper/lower limits.  
Weighing input.

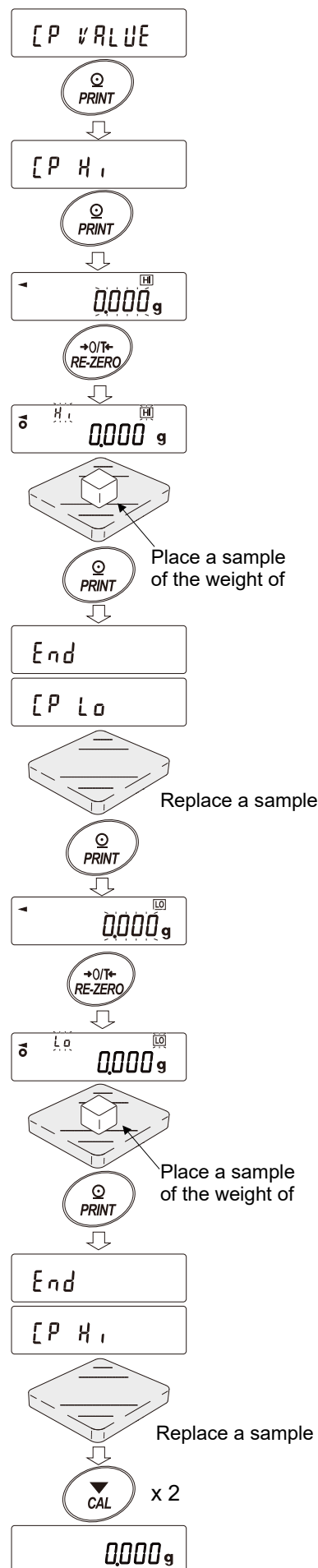
Selecting a comparison method (operating range, comparison criteria, and value input)

1. Press and hold the **[SAMPLE]** (for 2 seconds) key until **bASFnC** of the function table is displayed, then release the key.
2. Press the **[SAMPLE]** key several times to display **[P Fnc]**.
3. Press the **[PRINT]** key.
4. Press the **[RE-ZERO]** key several times to display **[P<sup>2</sup>]**. ("I" compared when stable and over)
5. Press the **[SAMPLE]** key several times to display **[P-2]**.
6. Press the **[RE-ZERO]** key several times to display **[P-2 IN]**. ("0" near zero is also compared.)
7. Press the **[SAMPLE]** key several times to display **[P in]**.
8. Press the **[RE-ZERO]** key several times to display **[P in H/L HT]**. ("I" upper-lower limit is set. Input by loaded.)
9. Press the **[PRINT]** key to store the new setting.



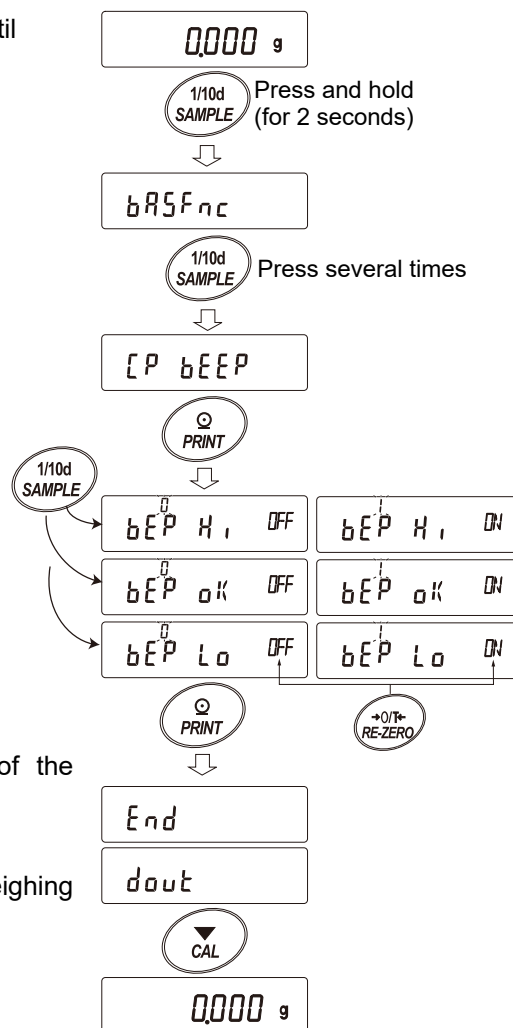
## Entering the reference and tolerance values

10. When **[CP VALUE]** is displayed, press the **[PRINT]** key.  
**[CP H<sub>i</sub>]** will be displayed.
11. When **[CP H<sub>i</sub>]** is displayed, press the **[PRINT]** key to check the currently set value (all blinking).
12. Press the **[RE-ZERO]** key to enter the load input mode.  
**[0.00 g]** is displayed.  
Place a sample of the weight of the upper limit on the balance and press the **[PRINT]** key. (Register the upper limit value.)
13. When finished, **[CP Lo]** is displayed. (Replace a sample of the weight of the upper limit from the balance.)
14. When **[CP Lo]** is displayed, press the **[PRINT]** key to check the currently set value (all blinking).  
Press the **[RE-ZERO]** key to enter the load input mode.
15. Press the **[RE-ZERO]** key, **[0.00 g]** is displayed.
16. Place a sample of the weight of the lower limit on the balance and press the **[PRINT]** key. (Register the lower limit value.)
17. When finished, **[CP H<sub>i</sub>]** is displayed. (Replace a sample of the weight of the lower limit from the balance.)
18. Press the **[CAL]** key twice to return to the weighing display.



## Sound the built-in buzzer corresponding to the comparison result

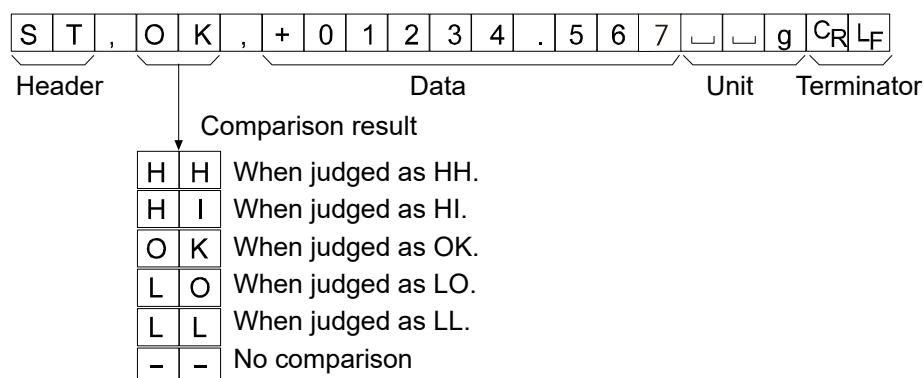
1. Press and hold the **[SAMPLE]** key (for 2 seconds) until **bRSFnc** of the function table is displayed.
2. Press the **[SAMPLE]** key several times to display **CP bEEP**.
3. Press the **[PRINT]** key.
4. Press the **[SAMPLE]** key to set the buzzer sound setting "ON/OFF" of the comparison result.  
When 3-step comparator is set, the display can be selected from the following 3 kinds.  
**bEP H, bEP oK bEP Lo**  
When 5-step comparator is set, the display can be selected from the following 5 kinds.  
**bEP HH bEP H, bEP oK bEP Lo bEP LL**  
**[SAMPLE]** key ..... Select the comparison result.  
**[RE-ZERO]** key ..... Set the buzzer sound setting of the comparison result "ON/OFF"  
**[PRINT]** key ..... Store the setting.  
**[CAL]** key ..... Cancel and return to the weighing display.



\*For setting the comparator level (CP-L), please refer to "Selecting the comparator stage (3 stages/5 stages)" on page 69.

## Adding the Comparison Results

By setting the "Comparison results (CP-R)" of the function table to "I", the comparison results can be added to the data output using the RS-232C serial interface or USB interface. Use A&D standard format (TYPE D). The comparison results are added after the header in A&D standard format as below.



### Note

- While the gross net tare function is in use, the above is not available.



## Main Display Comparison Function

The main display comparison function displays the comparison results in a magnified way, on the main portion of the display in place of the weight value.

### Selecting a unit

Step 1 Press the **MODE** key to select a unit to be used for comparison.

**Note** While the main display comparison function is in use, unit selection using the **MODE** key is not available.

### Setting the function table

Step 2 Press and hold the **SAMPLE** key (for 2 seconds) until **bASFnC** of the function table is displayed, then release the key.

Step 3 Press the **SAMPLE** key several times to display **LPFnC**.

Step 4 Press the **PRINT** key.

Step 5 Press the **SAMPLE** key several times to display **LP-b OFF**.

Step 6 Press the **RE-ZERO** key to display **LP-b ON**.

**Note** To disable the main display comparison function, set the "Main display comparison (LP-b)" parameter to "0".

Step 7 Press the **PRINT** key to store the setting.

Step 8 Press the **CAL** key to return to the weighing mode.

### Setting the comparator values

Setting the comparator values as described in the previous section.

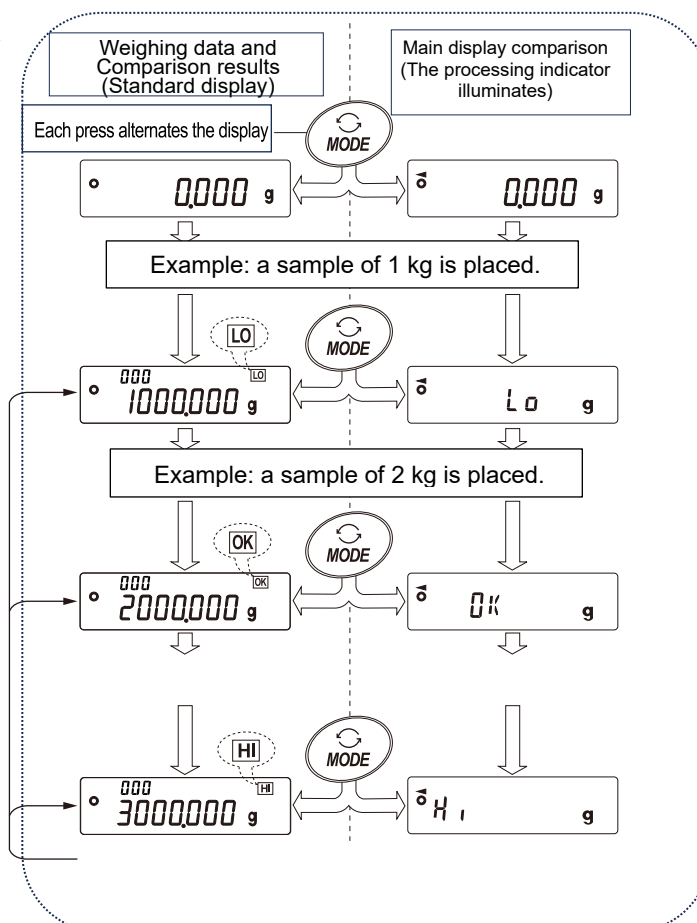
This example uses **LP3** (Continuous comparison, excluding "near zero").

### Using the main display comparison function


Step 1 Press the **RE-ZERO** key to set the display to zero.

Step 2 Place a sample on the pan. The balance performs a comparison using the specified comparison values and displays the comparison results, **HI**, **OK** or **LO**.

Step 3 Each time the **MODE** key is pressed, the balance switches between the standard display and the main display comparison. Note that "LO" appears for **OK**.



## Note

- While the main display comparison function is in use, the processing indicator  illuminates as shown in the illustration.
- If the comparison is not performed, for example, because the weight value is near zero or unstable, the balance displays the weight value even when the main display comparison function is used.
- Even while the main display comparison function is in use, the balance re-zeroing and data output are possible.
- Only the unit selected before this function can be used.
- While the main display comparison function is in use, the data memory function is not available.
- To disable the main display comparison function, set the "Main display comparison (LP-b)" parameter to "0".

## 9-6 Description of Application

To switch application modes, use the "APF (Application Function)" setting found under "AP Fnc (Application Mode)" in the function table. ("[9. Function Table](#)")

### 9-6-1 Description of the normal weighing mode

The normal weighing mode of the factory setting.

Required function table settings

AP Fnc       $APF = 0$       Normal weighing mode

### 9-6-2 Description of the weighing indicator mode

The weighing indicator displays the relation between load and weighing capacity in percent in normal weighing.

(Zero  $0\%$ , weighing capacity  $100\%$  )

Required function table settings

AP Fnc       $APF = 1$       Weighing indicator

#### Note

- It cannot be used with the data memory in the function table ("[9. Function Table](#)")

$dAtA = 1 \text{ to } 4$  )

### 9-6-3 Description of the statistical calculation mode

This is a function to statistically calculate the weighing value and to display and output the result.

Required function table settings

AP Fnc       $APF = 2$       Statistical calculation mode

Refer to "[12. Statistical Calculation Mode](#)"

### 9-6-4 Description of the gross net tare mode

Zero setting and tare operations can be performed separately. Data can be output in the order of net weight, gross weight, and tare weight.

Required function table settings

AP Fnc       $APF = 4$       Gross net tare mode

Refer to "[13. Gross Net Tare Function](#)".

## 9-7 Description of Unit



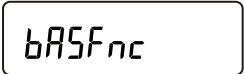


To configure (Unit) Unit in the function table ("9. Function Table"), use the following procedure.

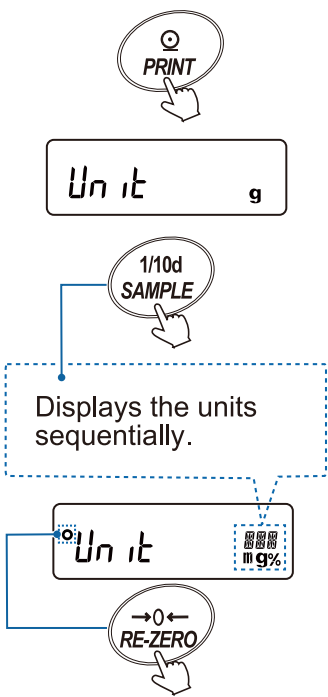
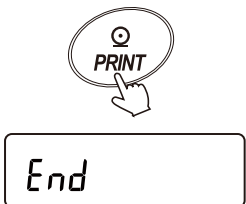


This setting is used when changing the order of units or hiding unnecessary units.

Units (modes) can be selected using the MODE key in weighing mode.

Stored units are retained in nonvolatile memory even when the AC adapter is disconnected, and they are valid until rewritten.

### Setting procedure



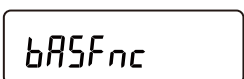

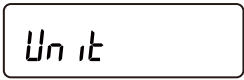



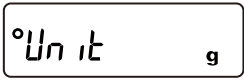

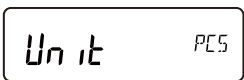

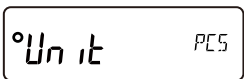

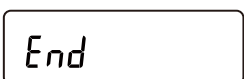
Step	Description	Display and key operations
1.	In weighing mode, press and hold the <span style="border: 1px solid black; padding: 0 5px;">SAMPLE</span> key (for 2 seconds) to display the menu of the function table ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the <span style="border: 1px solid black; padding: 0 5px;">SAMPLE</span> key several times until the display shown to the right appears.	 Press several times 

Step	Description	Display and key operations
3.	<p>Press the <b>PRINT</b> key.</p> <p>Use the following keys to specify the desired units to be displayed in the specified order.</p> <p><b>SAMPLE</b> key.....Cycles through the units.</p> <p><b>RE-ZERO</b> key .....Displays "●" (the stabilization indicator) for the unit to be selected. When the unit is selected and displayed with the indicator, pressing the key turns off t "●"(the stability indicator).</p>	 <p>Displays the units sequentially.</p>
4.	Press the <b>PRINT</b> key to store the setting.	
5.	The next class in the function table is displayed.	
6.	<p>Press the <b>CAL</b> key to return to weighing mode.</p> <p>The unit specified first will be displayed in weighing mode.</p>	

#### Tips

- ❑ The first unit stored in step 4 above will be the unit when the power is turned on.

Example: Registering units in the order of "g" (grams) → "PCS" (counting mode)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the menu of the function table ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 
3.	Press the <b>PRINT</b> key.	 
4.	Press the <b>RE-ZERO</b> key to specify the "g" unit and display "0" (the stability indicator).	 
5.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 
6.	Press the <b>RE-ZERO</b> key to specify the "PCS" unit and display "0" (the stability indicator).	 
7.	Press the <b>[PRINT]</b> key to register the specified unit.	 

Step	Description	Display and key operations
8.	The next class in the function table is displayed.	
9.	To return to weighing mode, press the <b>CAL</b> key. The <b>g</b> unit specified first will be displayed in weighing mode.	 
10.	Each time the [MODE] key is pressed, the units will switch in the order of " <b>g</b> " → " <b>PES</b> ".	  

## 10. GLP Report and ID Number

### 10-1 Main Objectives

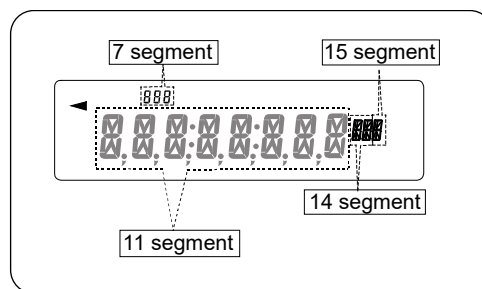
- The data output compatible with "GLP/GMP" can be output to a personal computer or printer using the RS-232C serial interface.
- The GLP/GMP compliant report includes the balance manufacturer (A&D), model name, serial number, ID number, date, time, and space for signature. For a sensitivity adjustment or calibration test, the result and the weight used are also included.
- Sensitivity adjustment report (Output for sensitivity adjustment using the internal weight, sensitivity adjustment using an external weight)
- Calibration test report (Output for calibration test using an external weight)
- Breaks ("title block" and "end block") for easy management of a series of weighing data
- By changing the function table, you can store sensitivity adjustment results and calibration test results in the data memory and output them in bulk. Refer to "[11. Data Memory](#)" for details.
- The ID number can be used as an identification number for the balance during maintenance of the balance.
- The ID number is maintained in non-volatile memory even if the AC adapter is removed, and it is valid until a new registration is made.
- For details on confirming and setting the time and date. Refer to "[9-4 Clock and Calendar Function](#)".
- By setting "Fn 2" in the Function Table, the balance will not output its internal clock data. Instead, it allows the use of time data from an external device such as a printer.



## 10-2 Setting the ID Number

1. Press and hold the **[SAMPLE]** key (for 2 seconds) until **bASFnC** of the function table is displayed, then release the key.
2. Press the **[SAMPLE]** key several times to display **id**.
3. Press the **[PRINT]** key. Set the ID number using the following keys.
  - [SAMPLE]** key ..... To select the digit to change the value.
  - [RE-ZERO]** key, **[MODE]** key ..... To set the character of the digit selected.  
Refer to the display character set shown below.
  - [PRINT]** key ..... To store the new ID number and display **PASSwd**.
  - [CAL]** key ..... To cancel the new ID number and display **PASSwd**.
4. With **PASSwd** displayed, press the **[CAL]** key to return to the weighing mode.

**Note** The display segment of the balance is divided into 4 types. For each segment display, refer to the "Display correspondence table" in the next page.



### Display correspondence table

#### 11 segments

0	1	2	3	4	5	6	7	8	9	-	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	1	2	3	4	5	6	7	8	9	-	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

␣ Space

#### 7 segments

0	1	2	3	4	5	6	7	8	9	-	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	1	2	3	4	5	6	7	8	9	-	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

␣ Space

#### 14 segments

0	1	2	3	4	5	6	7	8	9	-	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	1	2	3	4	5	6	7	8	9	-	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

␣ Space

#### 15 segments

0	1	2	3	4	5	6	7	8	9	-	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	1	2	3	4	5	6	7	8	9	-	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

␣ Space

# 10-3 GLP Report

Set the function setting to " *INF* 1 " (use data of clock built in to the balance) or " *INF* 2 " (use clock data of external equipment) to output the GLP / GMP data with the AD-8129TH (compact thermal printer) or a personal computer.

**Note**

- In case of outputting clock data built in the balance (*INF* 1), if the date/time is incorrect, adjust the date/time referring to "9-4 Clock and Calendar Function" in "9. Function Table".

## Examples of sensitivity adjustment report using the internal weight

This is the GLP report when the balance is adjusted using the internal weight.

### Output the clock data of built in balance (*INF* 1)

Printer format (AD-8129TH)

A & D

MODEL    MC-6203A

S/N      T1234567

ID       LAB-0123

DATE    2024/09/01

TIME    12:34:56

CALIBRATED<INT.>

REMARKS

SIGNATURE

-----

PC format (RsCom)

.....A\_&\_D<TERM>

MODEL\_..MC-6203A<TERM>

S/N.....T1234567<TERM>

ID.....LAB-0123<TERM>

DATE\_..2024/09/01<TERM>

TIME\_...12:34:56<TERM>

CALIBRATED (INT.) <TERM>

REMARKS<TERM>

<TERM>

<TERM>

SIGNATURE<TERM>

<TERM>

<TERM>

-----<TERM>

<TERM>

<TERM>

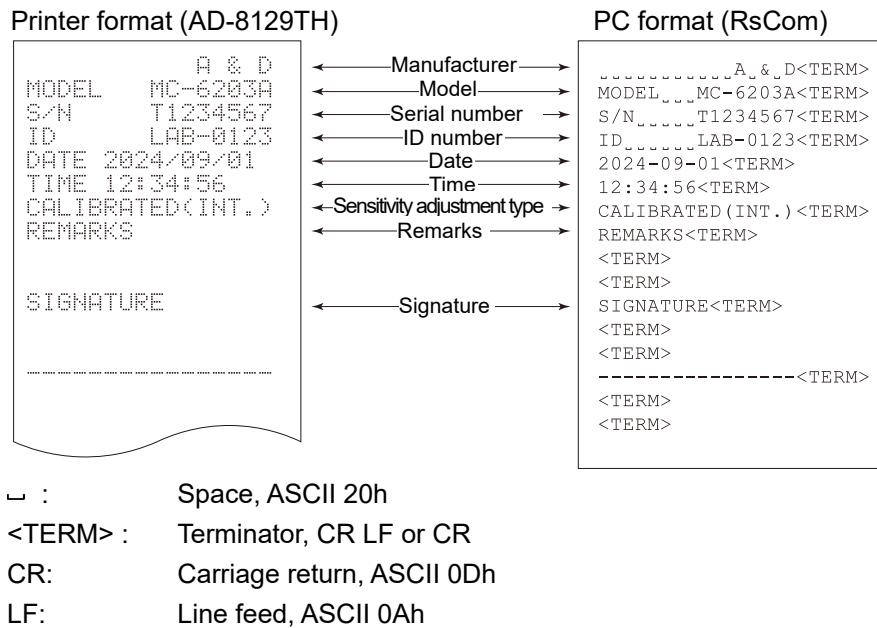
- :            Space, ASCII 20h
- <TERM> :    Terminator, CR LF or CR
- CR:           Carriage return, ASCII 0Dh
- LF:           Line feed, ASCII 0Ah

## Output the clock data of external device (INF 2)

By setting the function table "INF 2" for outputting data such as GLP / GMP, the clock data of the external device such as PC or printer can be used without using the clock data of the balance.

### Note

- Clock data output from external device is for devices that have a clock function and can receive date and time data by receiving <ESC>D, <ESC>T. (Ex. AD-8129TH compact thermal printer, RsCom WinCT etc.)
- When saving the sensitivity adjustment history of the data memory function, the built in clock data is saved even if it is set to "INF 2".



Examples of sensitivity adjustment report using an external weight

This is the GLP report when the balance is adjusted using the external weight.

Printer format (AD-8129TH)

```

      A & D
MODEL  MC-6203A
S/N    T1234567
ID     LAB-0123
DATE   2024/09/01
TIME   12:34:56
CALIBRATED(EXT.)
CAL.WEIGHT
      +5000.000 g
REMARKS

SIGNATURE
-----

```

PC format (RsCom)

```

.....A_&_D<TERM>
MODEL_..MC-6203A<TERM>
S/N_....T1234567<TERM>
ID_.....LAB-0123<TERM>
DATE_..2024/09/01<TERM>
TIME_...12:34:56<TERM>
CALIBRATED(EXT.)<TERM>
CAL.WEIGHT<TERM>
.....+5000.000_g<TERM>
REMARKS<TERM>
<TERM>
<TERM>
SIGNATURE<TERM>
<TERM>
<TERM>
-----<TERM>
<TERM>
<TERM>

```

\_ : Space, ASCII 20h
<TERM> : Terminator, CR LF or CR
CR: Carriage return, ASCII 0Dh
LF: Line feed, ASCII 0Ah

Calibration test report using an external weight

This is the GLP report when checking the weighing accuracy of the balance with the external weight. (Adjustment is not performed)

Setting of *inFa I*  
Printer format (AD-8129TH)

```

      A & D
MODEL  MC-6203A
S/N    T1234567
ID     LAB-0123
DATE   2024/09/01
TIME   12:34:56
CAL.TEST(EXT.)
ACTUAL
      0.000 g
      +4999.994 g
TARGET
      +5000.000 g
REMARKS

SIGNATURE
-----

```

Setting of *inFa I*  
PC format (RsCom)

```

.....A_&_D<TERM>
MODEL_..MC-6203A<TERM>
S/N_....T1234567<TERM>
ID_.....LAB-0123<TERM>
DATE_..2024/09/01<TERM>
TIME_...12:34:56<TERM>
CAL.TEST(EXT.)<TERM>
ACTUAL<TERM>
.....0.000_g<TERM>
.....+4999.994_g<TERM>
TARGET<TERM>
.....+5000.000_g<TERM>
REMARKS<TERM>
<TERM>
<TERM>
SIGNATURE<TERM>
<TERM>
<TERM>
-----<TERM>
<TERM>
<TERM>

```

\_ : Space, ASCII 20h
<TERM> : Terminator, CR LF or CR
CR: Carriage return, ASCII 0Dh
LF: Line feed, ASCII 0Ah<TERM> :

## Heading and ending output

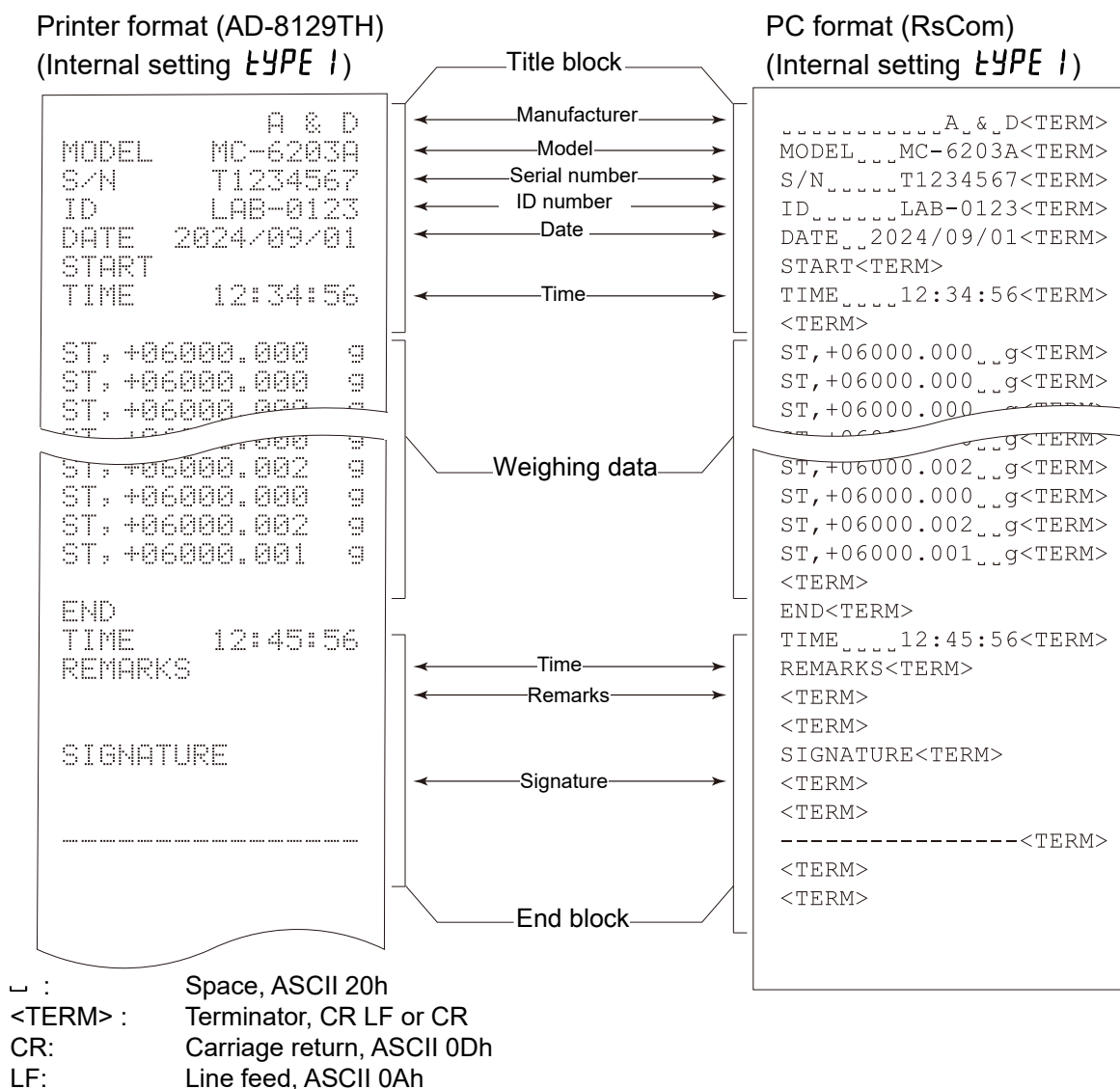
As a method of managing weighing values, add "Heading" and "End" parts before and after the weighing value. By pressing and holding the **PRINT** key (for 2 seconds), "Heading" and "End" are output in turn.

### Note

- If the data memory function is used (except when **DATA 0**), heading and end cannot be output.

## Key output method

1. While displaying the weighing value, hold down the **PRINT** key (for 2 seconds) and display **Start** to output "Heading".
2. Output the weighing value. The output method depends on the setting of the data output mode.
3. Press and hold the **PRINT** key (for 2 seconds) to display **End**, "End" is output.



# 11. Data Memory

Data memory is a function to store weighing data and sensitivity adjustment data in memory. The data stored in memory are available for outputting at one time to a printer or personal computer.

To configure the data memory function, use "dAtA" (Data memory) under dout (Data output) in the function table ("9. Function Table").

## CAUTION

- Cannot be used together with the capacity indicator mode, statistical calculation function, gross net tare function, or minimum weight alert function.
- "Heading and ending output" of GPL output is not possible.

The following five types of data can be stored.

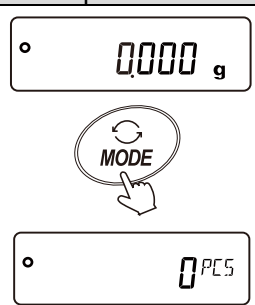
Function table	Description	Number of Stored data
dAtA = 1	Unit weights (Counting mode)	Up to 50 sets
dAtA = 2	Weighing values	Up to 200 sets
	Sensitivity adjustment history Internal weight sensitivity adjustment report External weight sensitivity adjustment report Calibration test report External weight calibration test report	Last 50 sets
dAtA = 3	Comparator settings Upper limit and lower limit only	Up to 20 sets
dAtA = 4	Tare values	Up to 20 sets

## 11-1 Storing unit weights



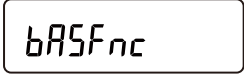

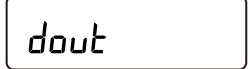









- Up to 50 entries can be stored for "unit weight" in the counting mode.
- $P\bar{0}1$  is the first unit weight data and serves as the standard memory in normal counting mode. 49 additional unit weights can be stored.
- The stored unit weight is retained in the balance's nonvolatile memory even when the power is turned off.
- By reading the stored unit weight, the counting operation can be performed without registering the unit weight each time.
- The read unit weight can be changed in "Load registration mode" (method of registering the unit weight by placing a specified number of samples) or "Digital registration mode" (method of inputting the unit weight digitally).

### 11-1-1 Preparations for the data memory function (unit weight)

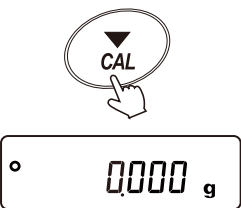
#### Changing the weighing unit

Step	Description	Display and key operations
1.	Press the <span style="border: 1px solid black; padding: 0 2px;">MODE</span> key to select the unit "PCS" (counting mode).  <b>CAUTION</b> □ <b>To display "PCS", ensure it is included in the units set in the function table beforehand.</b> Refer to " <a href="#">9-7 Description of Unit</a> "	

# Enabling the data memory function (Changing the function table)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the menu of the function table ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 
3.	Press the <b>PRINT</b> key.	 
4.	Press the <b>SAMPLE</b> key several times until " (Data memory function) "is displayed. dAtA	 Press several times 
5.	Press the <b>RE-ZERO</b> key to display " 1 to 4 " (Stores the unit weight) for "dAtA". (The display shown to the right is " 1 " for "dAtA".)	 
6.	Press the <b>PRINT</b> key to store the setting.	  



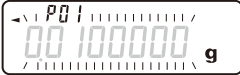
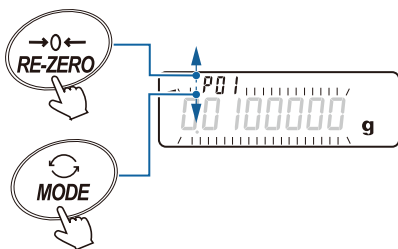
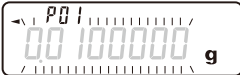


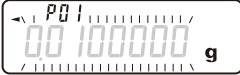

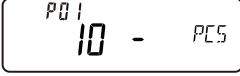




Step	Description	Display and key operations
7.	Press the <span style="border: 1px solid black; padding: 0 2px;">CAL</span> key to return to weighing mode.	

## 11-1-2 Registering unit weight data

To register a new unit weight, select the desired unit weight number (unit weight data) and register it using either "Load registration mode" or "Digital registration mode".

Unit weight number: P01 to P50.




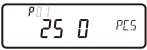
Step	Description	Display and key operations
1.	Press and hold the <b>PRINT</b> key (for 2 seconds) to enter confirmation mode. The unit weight data (the unit weight number and blinking display of unit weight) is read. The latest unit weight data selected or registered is displayed.	  Press and hold (for 2 seconds) 
2.	Use the following keys to select the unit weight number to register. <b>RE-ZERO</b> key .....Increases the unit weight number by one. <b>MODE</b> key .....Decreases the unit weight number by one.	
3.	<p>□ To use "Load registration mode" for registration, press the <b>SAMPLE</b> key.</p> <p>□ To use the "Digital registration mode" for registration, press the <b>SAMPLE</b> key. Then, press and hold the <b>MODE</b> key to enter "Digital registration mode".</p>	   To "Load registration mode" <hr/>     Press and hold (for 2 seconds)  To "Digital registration mode"

## Load registration mode

Load registration mode is a mode in which the specified number of samples are placed on the weighing pan and the unit weight is registered.

In Load registration mode, you can use ACAI after registering the unit weight. (Refer to "[4-3 Counting Mode \(PCS\)](#)")

Register the actual weight using the following keys.

Step	Description
1.	<p><b>RE-ZERO</b> key ..... Sets the displayed value to zero.</p> <p> → </p> <p><b>SAMPLE</b> key ..... Changes the number of samples used for registration.</p> <p> →  → ...</p> <p><b>PRINT</b> key ..... Place the sample and press the [PRINT] key to register the unit weight in the data memory. This will return the balance to the state described in step 3 of confirmation mode in "<a href="#">11-1-2 Registering unit weight data</a>".</p> <p>For details on how to register unit weight, refer to "<a href="#">4-3 Counting Mode (PCS)</a>"</p> <p><b>CAL</b> key ..... Returns the balance to the state described in step 1 of "<a href="#">11-1-2 Registering unit weight data</a>".</p> <p>Press and hold the <b>MODE</b> key (for 2 seconds). Enters "Digital registration mode".</p>

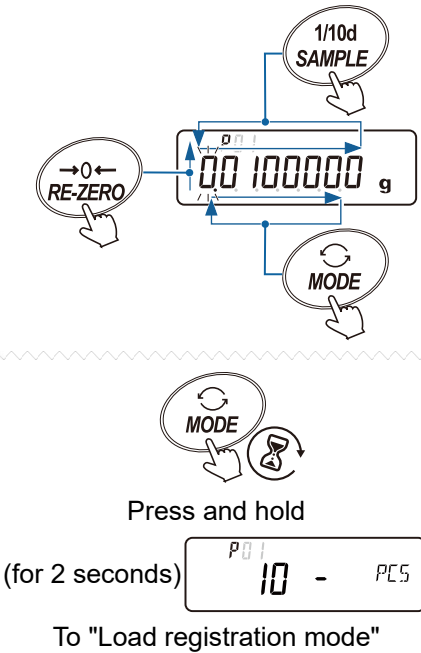
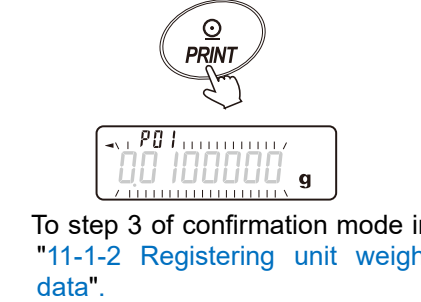
## Digital registration mode

Digital registration mode is a mode in which the unit weight of a sample is input digitally (as a numerical value) when the unit weight of the sample (weight of one sample) is known in advance. In Digital registration mode, the digit to change blinks.

### CAUTION

- In digital registration mode, ACal cannot be applied after registering the unit weight. (Refer to "4-3 Counting Mode (PCS)")
- Up to the last one digit of the readability can be registered. Any digits beyond that will be truncated.

Perform digital registration using the following keys.

Step	Description	Display and key operations
1.	<p><b>SAMPLE</b> key ..... Changes the setting digit</p> <p><b>RE-ZERO</b> key ..... Changes the setting value. (+)</p> <p><b>MODE</b> key ..... Changes the position of the decimal separator.</p> <hr/> <p>Press and hold the <b>MODE</b> key (for 2 seconds). ..... Enters "Load registration mode".</p>	 <p>Press and hold (for 2 seconds) <b>MODE</b> To "Load registration mode"</p>
2.	<p>Press the <b>PRINT</b> key to register (store) the unit weight in data memory. (To cancel, press the <b>CAL</b> key.)</p> <p>This will return the balance to the state described in step 3 of Confirmation mode in "11-1-2 Registering unit weight data".</p>	 <p>To step 3 of confirmation mode in "11-1-2 Registering unit weight data".</p>

### Note

- Use "UW: " command to change the unit weight.  
(Refer to "22. Command".)

## 11-1-3 Reading the unit weight data

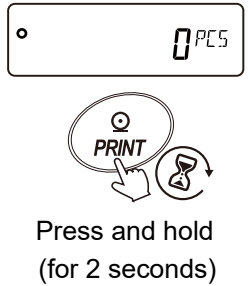
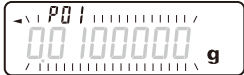
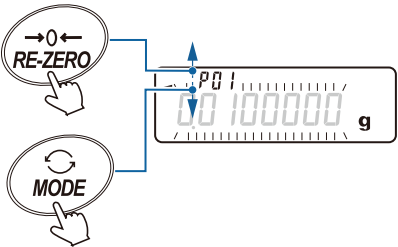



### CAUTION

- If the set value is less than the setting range, " Error 2 " is displayed.  
For details on minimum unit weight, refer to "[28-2 Individual specifications](#)".
- ACAI cannot be applied to the read unit weight.

### Note

- The unit weight can be read using the UN:mm command.  
mm ranges from 01 to 50.
- The unit weight read by the "␣W:" command can be output.

### Confirmation mode


Step	Description	Display and key operations
1.	The unit weight data (the unit weight number and blinking display of unit weight) is read. The latest unit weight data selected or registered is displayed.	 <p>Press and hold (for 2 seconds)</p> 
2.	Following steps 1 through 3 " <a href="#">11-1-1 Preparations for the data memory function (unit weight)</a> " will activate the confirmation mode.	
3.	Select the unit weight number to use with the following keys. <span style="border: 1px solid black; padding: 2px;">RE-ZERO</span> key.....Increases the unit weight number by one. <span style="border: 1px solid black; padding: 2px;">MODE</span> key .....Decreases the unit weight number by one.	
4.	Press the <span style="border: 1px solid black; padding: 2px;">PRINT</span> key to set the unit weight to use. (To cancel, press the <span style="border: 1px solid black; padding: 2px;">CAL</span> key.) The balance returns to weighing mode (count display).	  

## 11-2 Storing the weighing data/sensitivity adjustment history.

- Weighing results and sensitivity adjustment history can be stored in the internal memory of the balance.
- The balance can store weighing results so that you can continue weighing work without a printer or a PC connected.
- The balance can store weighing results so that you can perform weighing work without occupying a printer or PC for a long time.
- Stored data can be displayed on the balance as needed for confirmation.
- Stored data can be output in bulk (to a printer or PC). The output format and whether to add a data number, time/date, and ID number can be selected with the function table.
- The balance can store up to 200 entries of weighing data with time/date, along with the latest 50 entries of sensitivity adjustment history.

### 11-2-1 Preparations for data memory function (weighing data and sensitivity adjustment history)

Enabling the data memory function (Changing the function table)

Step	Description	Display and key operations
1.	Refer to "Enabling the data memory function (Changing the function table)" in 11-1-1 Preparations for the data memory function (unit weight), and set "dAtA" under <input type="text" value="dout"/> in section 9, Function Table, to "2" (to store weighing data and sensitivity adjustment history).	

Adding a data number, time/date, and ID number

The function table allows you to configure the output selection for data number, time/date, and ID number. Refer to the table below for the output selection.

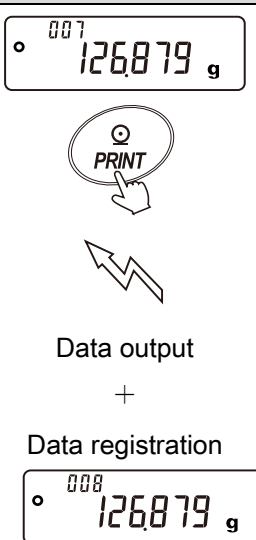
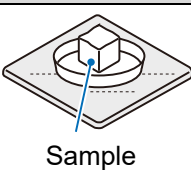
Output selection for data number, ID number, and time/date

Data number	No output	d-no = 0	Time/date	No output	S-td = 0
	Output	d-no = 1		Outputs the time	S-td = 1
ID number	No output	S-id = 0		Outputs the date	S-td = 2
	Output	S-id = 1		Time and date output	S-td = 3

#### Tips

The data number, time/date, and ID number can be changed after the weighing values are stored.

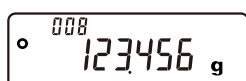
## 11-2-2 Storing (registering) weighing data


Step	Description	Display and key operations	Weighing operation
1.	Pressing the <b>PRINT</b> key in weighing mode outputs the weighing value. Simultaneously, the data memory function stores the weighing data. The number of stored data entries is updated at the top left of the display.	 <p>007 126.879 g</p> <p><b>PRINT</b></p> <p>Data output + Data registration</p> <p>008 126.879 g</p>	 <p>Sample</p>

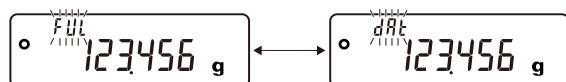
Display and indicator

Weighing display

The number of stored data entries is updated at the top left of the display.



When the storage capacity for weighing values is reached, "FUL" will blink alternately. 



Stored data display

The data number of the displayed weighing value blinks.



### CAUTION

- The weighing value is stored and simultaneously output via RS-232C and USB.
- **FUL** indicates that the memory capacity has been reached. More data cannot be stored unless the stored data is deleted.
- Automatic sensitivity adjustment due to temperature changes is disabled while the interval mode is active.
- The statistical calculation function cannot be used while the data memory function is active.
- When "3" is set for "Prt" (Stream mode), data may not be stored correctly.

The method for storing weighing values depends on the operation of "Prt" (Data output mode) under (Data output "dout") in the function table ("9. Function Table").

Combination of operation methods and function table settings

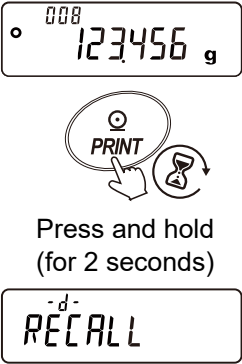
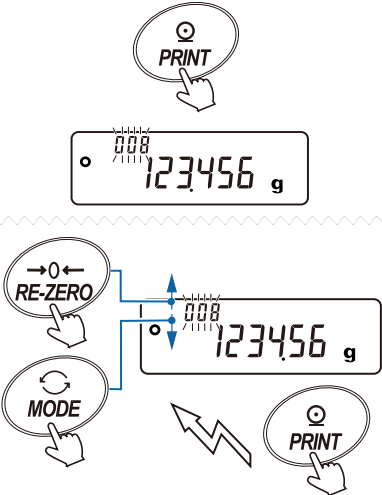

Mode \ Item	Data output mode	Auto print polarity, difference	Data memory function	Interval time
Key mode	$Prt = 0$	Not used	$dMn = 2$	Not used
Auto print mode A	$Prt = 1$	$AP-P = 0 \text{ to } 2$ $AP-b = 0 \text{ to } 2$		
Auto print mode B	$Prt = 2$			
Key mode B (immediate)	$Prt = 4$	Not used		
Key mode C (stable)	$Prt = 5$			
Interval output mode	$Prt = 6$			$int = 0 \text{ to } 8$
Auto print mode C	$Prt = 7$	$AP-P = 0 \text{ to } 2$ $AP-b = 0 \text{ to } 2$		Not used



## 11-2-3 Displaying and outputting the stored weighing data

### CAUTION

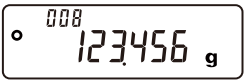








- Ensure that "2" (Stores the weighing data/sensitivity adjustment history)" is set for the "dAtA" (Data memory) under (Data out) in the function table ("9. Function Table" dout).
- When there is no stored data, "No dAtA" will be displayed.




Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the <span style="border: 1px solid black; padding: 0 5px;">PRINT</span> key (for 2 seconds).</p> <p><span style="border: 1px solid black; padding: 0 5px;">RECALL</span> "-d-" or "d-t" is displayed at the top left of the display. *1</p> <p>-d-: Without time/date setting  <span style="border: 1px solid black; padding: 0 5px;">dout</span> &gt; 5-td = 0 )</p> <p>d-t: With time/date setting  <span style="border: 1px solid black; padding: 0 5px;">dout</span> &gt; 5-td = 1 to 3 )</p> <p>*1 The time and date output settings can be changed after the weighing values are stored.</p>	 <p>Press and hold (for 2 seconds)</p>
2.	<p>Press the <span style="border: 1px solid black; padding: 0 5px;">PRINT</span> key.</p> <p>The balance enters the memory recall mode.</p> <p>Operate the following keys.</p> <p><span style="border: 1px solid black; padding: 0 5px;">RE-ZERO</span> key ..... Displays the next data set.</p> <p><span style="border: 1px solid black; padding: 0 5px;">MODE</span> key ..... Displays the previous data set.</p> <p><span style="border: 1px solid black; padding: 0 5px;">PRINT</span> key ..... Outputs the displayed data via RS-232C or USB.</p>	 <p>Output</p>
3.	<p>To return to weighing mode, press the <span style="border: 1px solid black; padding: 0 5px;">CAL</span> key twice.</p>	 <p>Press twice</p>

## 11-2-4 Outputting the stored weighing results in bulk.






### CAUTION

- To perform bulk output, you need to pre-configure the S,F (Serial interface) settings in the function table ("9. Function Table") to match the communication settings of the connected peripheral devices. Refer to "9. Function Table" and "18. Connection with Peripheral Devices".

Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the <span style="border: 1px solid black; padding: 0 5px;">PRINT</span> key (for 2 seconds).</p> <p><span style="border: 1px solid black; padding: 0 5px;">RECALL</span> "-d-" or "d-t" is displayed at the top left of the display. *1</p> <p>-d-: Without time/date setting  <span style="border: 1px solid black; padding: 0 5px;">dout</span> &gt; S-t d = 0 )</p> <p>d-t: With time/date setting  <span style="border: 1px solid black; padding: 0 5px;">dout</span> &gt; S-t d = 1 to 3 )</p> <p>*1 The time and date output settings can be changed after the weighing values are stored.</p>	  Press and hold (for 2 seconds) 
2.	Press the <span style="border: 1px solid black; padding: 0 5px;">SAMPLE</span> key.	 
3.	Press the <span style="border: 1px solid black; padding: 0 5px;">PRINT</span> key.	 
4.	Use the <span style="border: 1px solid black; padding: 0 5px;">RE-ZERO</span> key to switch between "No" / "Go".	 

Step	Description	Display and key operations
5.	Press the <b>PRINT</b> key while " $\frac{1}{100}$ " is blinking. The balance outputs all stored data via RS-232C/USB.	  Bulk output <div style="border: 1px solid black; padding: 2px; display: inline-block;">End</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">-d- CLEAR</div>
6.	Press the <b>CAL</b> key to return to weighing mode.	 <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <math>\frac{000}{\circ}</math> 123456 g </div>

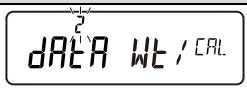
## 11-2-5 Deleting the stored weighing results in bulk.

Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the <b>PRINT</b> key (for 2 seconds).</p> <p>"-d-" or "d-t" is displayed at the top left of the display</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">-d- RECALL</div> <p>-d-: Without time/date setting ( <div style="border: 1px solid black; padding: 2px; display: inline-block;">dout</div> &gt; 5-t d = 0 )</p> <p>d-t : With time/date setting ( <div style="border: 1px solid black; padding: 2px; display: inline-block;">dout</div> &gt; 5-t d = 1 to 3 )</p> <p><span style="color: red;">*1</span> The time and date output settings can be changed after the weighing values are stored.</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <div>000 123456 g</div>  <p>Press and hold (for 2 seconds)</p> <div style="border: 1px solid black; padding: 5px; text-align: center;">-d- RECALL</div> </div>
2.	Press the <b>SAMPLE</b> key several times.	<div style="border: 1px solid black; padding: 5px; text-align: center;">  <p>Press several times</p> <div style="border: 1px solid black; padding: 5px; text-align: center;">-d- CLEAR</div> </div>
3.	Press the <b>PRINT</b> key.	<div style="border: 1px solid black; padding: 5px; text-align: center;">  <div style="border: 1px solid black; padding: 5px; text-align: center;">-d- CLEAR</div> </div>
4.	Use the <b>RE-ZERO</b> key to switch between "No" and "Go".	<div style="border: 1px solid black; padding: 5px; text-align: center;">  <div style="border: 1px solid black; padding: 5px; text-align: center;">-d- CLEAR</div> </div>
5.	Press the <b>PRINT</b> key. The balance deletes all stored data.	<div style="border: 1px solid black; padding: 5px; text-align: center;">  <div style="border: 1px solid black; padding: 5px; text-align: center;">-d- CLEAR</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">End</div> </div>
6.	The balance returns automatically to weighing mode. Data number " 000 " will be displayed.	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <div>000 123456 g</div> </div>

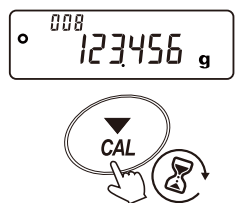
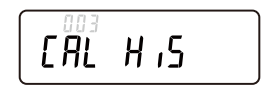
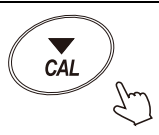
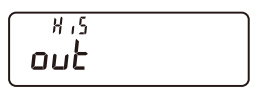


## 11-2-6 Storing and outputting sensitivity adjustment history






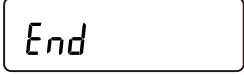



- The histories of sensitivity adjustment (with the internal weight/with an external weight) and the results of calibration test can be stored in the internal memory of the balance.
- The stored results can be output in bulk (to a printer or PC).
- The balance can store the results of the last 50 sensitivity adjustments/calibration tests.
- When data entries exceed 50, the display will blink alternately.

### Enabling the data memory function (Changing the function table)

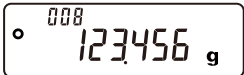
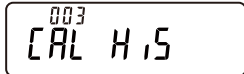












Step	Description	Display and key operations
1.	Refer to "11-2-1 Preparations for data memory function (weighing data and sensitivity adjustment history)" and set "dAtA" under " <div>dout</div> " in the function table ("9. Function Table"), to "2" (to store weighing data and sensitivity adjustment history).	
2.	In this state, performing a standard sensitivity adjustment or calibration test will automatically store the data.	

### Outputting the sensitivity adjustment history

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <div>CAL</div> key until <div>CAL H 15</div> is displayed. (While pressing and holding the <div>CAL</div> key, the item display will switch every 2 seconds.)  <b>CAUTION</b> □ If the "FUL" and "CAL" displays are blinking alternately in weighing mode, it indicates that the memory capacity of 50 data entries has been reached. If a new result is saved in this state, the oldest data will be overwritten. Delete some of the data stored in memory.	 Press and hold 
2.	Release your finger from the <div>CAL</div> key.  <b>CAUTION</b> □ If there is no sensitivity adjustment history, "No dAtA" is displayed, then the balance returns to weighing mode.	 Release 
3.	Press the <div>PRINT</div> key.	 

Step	Description	Display and key operations
4.	Use the <b>RE-ZERO</b> key to switch between " $\frac{M}{g}$ / $\frac{g}{M}$ ".	 
5.	Press the <b>PRINT</b> key while " $\frac{M}{g}$ " is blinking. The balance outputs all stored history data via RS-232C/USB.	   Bulk output  
6.	Press the <b>CAL</b> key to return to weighing mode.	 

## 11-2-7 Deleting the sensitivity adjustment history

Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the <b>CAL</b> key until <b>CAL H 15</b> is displayed.</p> <p>(While pressing and holding the <b>CAL</b> key, the item display will switch every 2 seconds.)</p> <p><b>CAUTION</b></p> <p>□ If the "<b>FUL</b>" and "<b>CAL</b>" displays are blinking alternately in weighing mode, it indicates that the memory capacity of 50 data entries has been reached. If a new result is saved in this state, the oldest data will be overwritten. Delete some of the data stored in memory.</p>	 <p>Press and hold</p> 
2.	<p>Release your finger from the <b>CAL</b> key.</p> <p><b>CAUTION</b></p> <p>□ If there is no sensitivity adjustment history, "<b>No dAtA</b>" is displayed, then the balance returns to weighing mode.</p>	 <p>Release</p> 
3.	Press the <b>SAMPLE</b> key.	 
4.	Press the <b>PRINT</b> key.	 
5.	Use the <b>RE-ZERO</b> key to switch between "No / Go".	 
6.	<p>Press the <b>PRINT</b> key while "<b>Go</b>" is blinking.</p> <p>The balance deletes all stored history.</p>	 
7.	When bulk deletion is completed, the balance automatically returns to weighing mode.	 

## 11-3 Data Memory for Comparator Settings

- The data memory function can store 20 sets of upper and lower limit values for the comparator mode.
- By recalling the stored upper and lower limit values, weighing can be performed without having to register them each time.  
In addition, the stored values can be easily recalled using the **MODE** key (Simple Selection Mode).
- The stored upper and lower limit values can be recalled and modified as needed.
- The recalled upper and lower limit values can be modified using either the "Digital registration mode" (for entering limits manually via numeric input) or the "Load registration mode" (for setting limits by placing actual samples on the pan).

### CAUTION

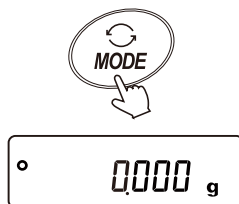
- **Only the upper and lower limit values can be stored; reference values and tolerance ranges cannot be saved.**

### 11-3-1 Preparation for Using the Data Memory Function with Comparator Setting


#### CAUTION

- **Unit selection using the **MODE** key is not available while data memory is in use.**

Changing the weighing unit

Step	Description	Display and key operations
1.	Press the <b>MODE</b> key to select the unit to be used for registration in advance.	

Enabling the data memory function (Changing the function table)

Step	Description	Display and key operations
2.	Refer to "Enabling the data memory function (Changing the function table)" and set "dAtA (Data Memory Function)" under <b>dout</b> the function table "9. Function Table to" } (Comparator Setting Value Storage)".	












### CAUTION

- **By referring to "9-5 Comparator Function", you can enable the comparator function to register (store) the upper and lower limit values of the comparator.**



## 11-3-2 How to Register Comparator Data

To register (store) new upper and lower limit values for the comparator, select the desired comparator number (comparator data), then register the values using either "Digital registration mode" or "Load registration mode." The comparator numbers range from C01 to C20.

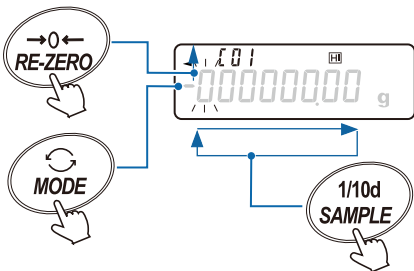
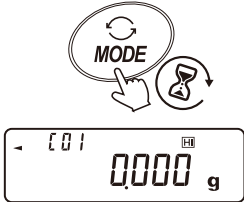


Step	Description	Display and key operations
1.	<p>Press and hold the <b>PRINT</b> key (for 2 seconds) to enter confirmation mode.</p> <p>The upper limit data of the comparator (comparator number [C01 to C20] and the upper limit mass [blinking display]) will be recalled.</p> <p>The displayed value corresponds to the upper limit of the last selected comparator.</p>	  <p>Press and hold (for 2 seconds)</p> 
2.	<p>Select the comparator number to be used in the next key operation. (Selectable from C01 to C20)</p> <p><b>RE-ZERO</b> key.....Increases the comparator number by 1.</p> <p><b>MODE</b> key.....Decreases the comparator number by 1.</p> <p>By operating the keys as described above, the display toggles alternately between upper (HI) and lower (LO) limits, such as: C01 HI (lit) ⇔ C01 LO (lit) ⇔ C02 HI (lit) ⇔ C02 LO (lit) ⇔ ...</p> <p>In the case of 5-step comparison, the display switches in the following sequence: HI (blinking) ⇔ C01 HI (lit) ⇔ C01 LO (lit) ⇔ C01 LO (blinking) ⇔ C02 HI (blinking) LO (lit) ⇔ ...</p>	
3.	<p>To change the settings using digital input, press the <b>SAMPLE</b> key to enter "Digital registration mode."</p> <p><input type="checkbox"/> To use "Load registration mode" for registration, press the <b>SAMPLE</b> key. Then, press and hold the <b>MODE</b> key to enter "Load registration mode".</p>	   <p>To "Digital registration mode"</p> <hr/>     <p>Press and hold (for 2 seconds)</p>  <p>To "Load registration mode"</p>

## Digital registration mode

Digital registration mode allows you to enter the upper and lower limit values for the comparator using numeric input.

In Digital registration mode, the digit to change blinks.

Perform registration using the following keys.

Step	Description	Display and key operations
1.	<p><b>SAMPLE</b> key..... Changes the setting digit.</p> <p><b>RE-ZERO</b> key ..... Changes the setting value.</p> <p><b>MODE</b> key ..... Changes the polarity.</p> <p>Press and hold the <b>MODE</b> key (for 2 seconds). .....Enters "<a href="#">Load registration mode</a>".</p>	 
2.	<p>Press the <b>PRINT</b> key to store the upper and lower limit values into the data memory. (To cancel, press the <b>CAL</b> key.)</p> <p>Returns to the state described in Step 3 of "<a href="#">11-3-2 How to Register Comparator Data</a>"</p>	 

## Note

- To change the upper limit value, use the "HI:" command. To change the lower limit value, use the "LO:" command.  
For details, refer to "[22 Command](#)"

## Load registration mode

Load registration mode allows you to register the upper and lower limit values by placing sample weights corresponding to those limits on the weighing pan.

### Note

- If the **CAL** key is pressed during operation, the process returns to the state described in Step 1 of "11-3-2 How to Register Comparator Data"
- To enter Digital registration mode, press and hold the **MODE** key for approximately 2 seconds.

Step	Description	Display and key operations	Weighing operation
1.	When entering load registration mode, the "HI" indicator lights up on the display, and the registered comparator number along with the current weight value is shown. The example on the right shows the display when $\overline{001}$ HI (upper limit) is selected and lit. (When the second upper limit is selected, the "HI" indicator blinks.)		
2.	If necessary, place a container on the weighing pan. Press the <b>RE-ZERO</b> key. Sets the displayed value to zero.	 	
3.	Place a sample corresponding to the upper limit value of the comparator on the weighing pan.		
4.	Press the <b>PRINT</b> key. The upper limit value of the comparator is stored in the data memory for $\overline{001}$ .	 	
5.	Remove the sample from the weighing pan.		
6.	Press the <b>CAL</b> key. The balance returns to weighing mode.	 	










### 11-3-3 Simple Method for Recalling Comparator Upper and Lower Limit Values (Simple Selection Mode)

This function allows you to easily recall the upper and lower limit values of the comparator stored in the data memory.

With this operation, the stored limit values can be quickly retrieved and used immediately.

#### CAUTION

- Ensure that "3" (Storing Comparator Settings) is set for the "dAtA" (Data memory) under dout in the function table ("9. Function Table").

Step	Description	Display and key operations
1.	In the weighing display, press the <span style="border: 1px solid black; padding: 2px;">MODE</span> key to enter Simple Selection Mode for setting values. When entering Simple Selection Mode, the comparator upper limit value (blinking) and the comparator number are displayed. The displayed values correspond to the last selected settings.	  
2.	Press the <span style="border: 1px solid black; padding: 2px;">MODE</span> key several times to select the value.  Each time the key is pressed, the setting toggles in the following sequence: [01] HI (lit) ⇒ [01] LO (lit) ⇒ [02] HI (lit) ⇒ [02] LO (lit) ⇒ ...  In the case of 5-step comparison, the sequence is as follows: [01] HI (blinking) ⇒ [01] HI (lit) ⇒ [01] LO (lit) ⇒ [01] LO (blinking) ⇒ [02] HI (blinking) ⇒ ...	   
3.	When the desired setting value is displayed (for example, "[02]" in the figure on the right), press the <span style="border: 1px solid black; padding: 2px;">PRINT</span> key to confirm the selection. The balance will then switch to weighing mode. You can perform weighing operations using the upper and lower limit values set in comparator mode "[02]".  <b>CAUTION</b> □ Pressing the <span style="border: 1px solid black; padding: 2px;">CAL</span> key returns the display to weighing mode without confirming any setting.	 

#### Note

- The upper and lower limit values of the comparator can be read using the "CN:mm" command. mm ranges from 01 to 20, corresponding to [01] to [20].
- The upper limit value can be output using the "?HI" command, and the lower limit value can be output using the "?LO" command.

## 11-4 Storing tare values

- Up to 20 tare values used for weighing can be stored in memory.
- By reading the stored value, the weighing operation can be performed without registering the tare each time. The stored tare values can be easily recalled using the **MODE** key (Simple Selection Mode).
- Stored tare values can be recalled and modified.

### Note

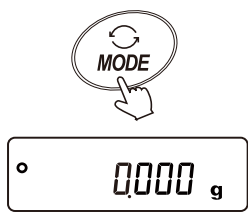
- The recalled tare value can be modified using either **Digital registration mode** (entering the tare value digitally) or **Load registration mode** (placing the tare weight on the pan to register the tare value).
- During tare operation, the "NET" and "PT" indicators will light up.

### 11-4-1 Preparations for the data memory function (tare value)


#### CAUTION

- When the **RE-ZERO** key is pressed with nothing on the weighing pan, the display will reset to zero, and the "NET" and "PT" indicators will not be shown.
- The "t - -" symbol indicates that tare subtraction is not being performed using a tare value stored in the data memory.
- While using the data memory, unit selection with the **MODE** key is not available.

#### Changing the weighing unit

Step	Description	Display and key operations
1.	In weighing mode, press the MODE key to select the preset unit to be used for registration.	

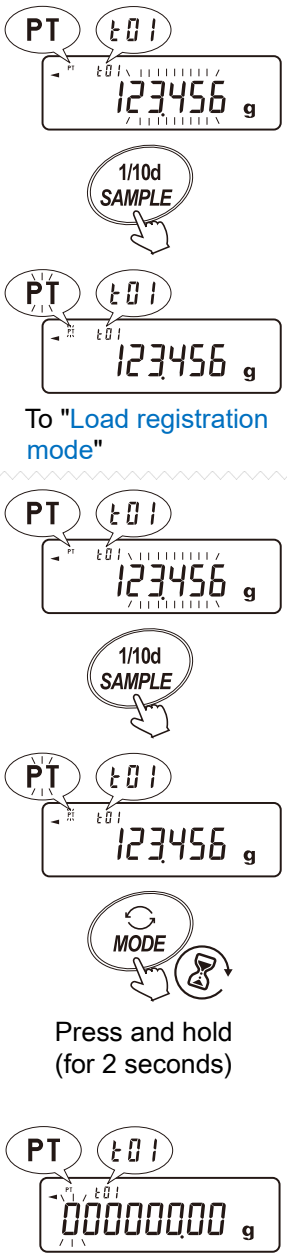
#### Enabling the data memory function (Changing the function table)

Step	Description	Display and key operations
2.	Refer to "Enabling the data memory function (Changing the function table)" and set "dAtA (Data Memory Function)" under <b>dout</b> in the function "9. Function Table" to "t (Tare Value Memory)".	

## 11-4-2 How to Register Tare Value

To register a new tare value, select the desired tare value number (tare value data) and register it using either "Digital registration mode" or "Load registration mode". Tare value number: "t01" to "t20".

Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the <b>PRINT</b> key (for 2 seconds) to enter confirmation mode.</p> <p>The tare value data (the tare value number and blinking display of tare value) is read.</p> <p>The latest value selected or registered is displayed.</p>	<p>Press and hold (for 2 seconds)</p>
2.	<p>Select the tare value number to use with the following keys. (You can change the setting from t01 to t20.)</p> <p><b>RE-ZERO</b> key.....Increases the tare value number by 1.</p> <p><b>MODE</b> key .....Decreases the tare value number by 1.</p> <p>By using the above key operations, the display cycles through the tare value numbers as follows:</p> <p>t01 ⇔ t02 ⇔ ... ⇔ t20 ⇔ t01 ⇔ ...</p>	

Step	Description	Display and key operations
3.	<p>□ To use "Load registration mode" for registration, press the <b>SAMPLE</b> key.</p> <p>□ To use the "Digital registration mode" for registration, press the <b>SAMPLE</b> key. Then, press and hold the <b>MODE</b> key to enter "Digital registration mode".</p>	 <p>PT t 0 1</p> <p>1/10d SAMPLE</p> <p>PT t 0 1</p> <p>123456 g</p> <p>To "Load registration mode"</p> <p>PT t 0 1</p> <p>1/10d SAMPLE</p> <p>PT t 0 1</p> <p>123456 g</p> <p>MODE</p> <p>Press and hold (for 2 seconds)</p> <p>PT t 0 1</p> <p>00000000 g</p> <p>To "Digital registration mode"</p>

## Load registration mode

Load registration mode is a mode in which the tare value is registered by placing the tare object on the weighing pan.

### CAUTION

- If the **CAL** key is pressed during operation, the process will return to Step 2 of "11-4-2 How to Register Tare Value"

To switch to Digital Registration Mode, press and hold the **MODE** key.

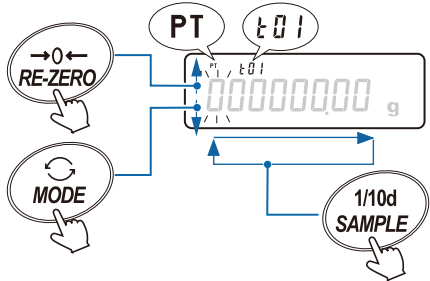
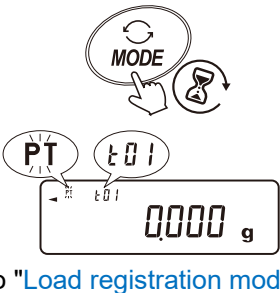
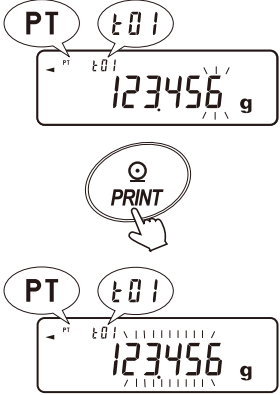
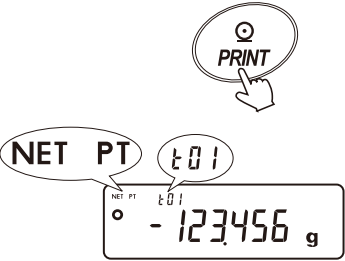
Step	Description	Display and key operations	Weighing operation
1.	When entering Load Registration Mode, the "PT" indicator on the display will start blinking, and the tare value number along with the current weight value will be shown.		
2.	If necessary, press the <b>RE-ZERO</b> key to set the display to zero.		
3.	Place the tare weight on the weighing pan.		
4.	Press the <b>PRINT</b> key to store the tare value.		
5.	Press the <b>PRINT</b> key to return to weighing mode. The "NET" and "PT" indicators will light up to indicate that tare subtraction is being performed.		



## Digital registration mode

Digital registration mode is a mode in which the tare value is entered digitally (as a numerical value). In Digital registration mode, the digit to change blinks.

Perform registration using the following keys.

Step	Description	Display and key operations
1.	<p><b>SAMPLE</b> key.....Changes the setting digit.</p> <p><b>RE-ZERO</b> key .....Changes the setting value. (+)</p> <p><b>MODE</b> key.....Changes the setting value. (-)</p> <p>Press and hold the <b>MODE</b> key (for 2 seconds). .....Enters "<a href="#">Load registration mode</a>".</p>	 
2.	<p>Press the <b>PRINT</b> key to register (store) the tare value in data memory. (To cancel, press the <b>CAL</b> key.)</p> <p>Returns to the state described in Step 3 of "<a href="#">11-4-2 How to Register Tare Value</a>"</p>	
3.	<p>Press the <b>PRINT</b> key to return to weighing mode.</p> <p>The " <b>NET</b> " and " <b>PT</b> " indicators light up to indicate that tare subtraction is in progress.</p>	

### Note

- The "**PT**": "command allows you to read the upper and lower limit values of the comparator.  
(For details, refer to "[22. Command](#)")

### 11-4-3 How to Easily Recall the Tare Value (Simple Selection Mode)"

This procedure enables quick retrieval of the tare value stored in the data memory. Once recalled, the tare value can be immediately applied for weighing operations.

#### Note

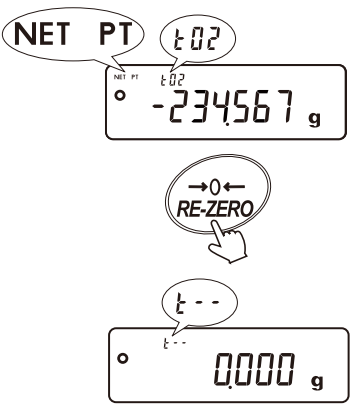
- The tare value can be read using the "PN:mm" command.  
mm ranges from 01 to 20 and corresponds to "t 01" to "t 20".

#### CAUTION

- Ensure that "4" (Tare value memory) is set for the "dAtA" (Data memory) under dout (Data out) in the function table ("9. Function Table").

Step	Description	Display and key operations
1.	Press the <span style="border: 1px solid black; padding: 2px;">MODE</span> key to enter the Simple Selection Mode for preset values.  When entering Simple Selection Mode, the tare value (blinking), the "PT" indicator, and the tare value number (t 01 to t 20) are displayed. The latest value selected is displayed.	
2.	Press the <span style="border: 1px solid black; padding: 2px;">MODE</span> key to select the desired setting value.  Each time the key is pressed, the setting value cycles as follows: t 01 ⇒ t 02 ⇒ t 03 - ... ⇒ t 20 ⇒ t 01.	
3.	When the desired setting value is displayed (e.g., t 02 in the example on the right), press the <span style="border: 1px solid black; padding: 2px;">PRINT</span> key to confirm the selection. The balance will then switch to weighing mode using the selected setting.  You can perform weighing using the tare value set in t 02.  <b>CAUTION</b> □ Pressing the <span style="border: 1px solid black; padding: 2px;">CAL</span> key will cancel the selection and return the display to weighing display without applying any settings."	

## How to Cancel the Tare Value Data

Step	Description	Display and key operations
1.	To cancel the tare value data, remove any objects from the weighing pan and press the <b>RE-ZERO</b> key. The recalled tare value will be cleared.	 <p>The diagram illustrates the process of canceling tare value data. The top display shows 'NET PT' and a tare value of 't 0.2' with a negative weight of '-234567 g'. A hand presses the 'RE-ZERO' key, which is labeled with '→0←' and 'RE-ZERO'. The bottom display shows the tare value cleared to 't ---' and the weight reset to '0000 g'.</p>

## 12. Statistical Calculation Mode

- The statistical calculation mode statistically calculates the weight data, and displays or outputs the results. To use the statistical calculation mode, set the "Application function (APF)" parameter of "  (Application)" in "9. Function Table" to " 2 ", as described below. To return to the normal weighing mode (factory setting), set "Application mode (APF)" in "9. Function Table" to " 0 ".
- Statistical items available are number of data, sum, maximum, minimum, range (maximum-minimum), average, standard deviation and coefficient of variation. What statistical items to output can be selected from the four modes of "  (Application)" in "9. Function Table" to "  "
- The wrong data input can be canceled by the key operation, if immediately after the input.
- Turning the balance off will delete the statistical data. (The  key does not initialize the settings.)
- The standard deviation and coefficient of variation are obtained by the equation below:

$$\text{Standard deviation} = \sqrt{\frac{N \cdot \sum (X_i)^2 - (\sum X_i)^2}{N \cdot (N-1)}} \quad \text{where } X_i \text{ is the } i\text{-th weight data,} \\ N \text{ is number of data.}$$

$$\text{Coefficient of variation (CV)} = \frac{\text{Standard deviation}}{\text{Average}} \times 100 (\%)$$

$$\text{Relative error of maximum value} = \frac{\text{Maximum value} - \text{Average}}{\text{Average}} \times 100 (\%)$$



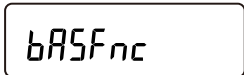

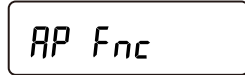

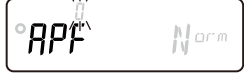

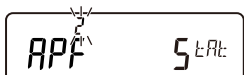
$$\text{Relative error of minimum value} = \frac{\text{Minimum value} - \text{Average}}{\text{Average}} \times 100 (\%)$$

### Note

- When there is data with a readability off, the calculation result is displayed with the readability off. (Readability is rounded off.)
- When the data memory function "  dAtA" in "1" to "4" in "9. Function Table" is in use, the statistical calculation function cannot be used.
- When registering the warning function of the minimum weight, the statistical calculation function cannot be used.
- When the density measurement is in use, the statistical calculation function cannot be used.
- If the total (SUM) is more than the digits, it will not be displayed correctly.

## 12-1 Preparations for statistical calculation mode

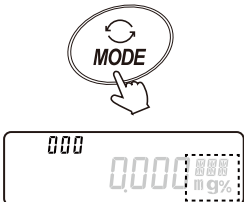
Enabling the statistical calculation mode (Changing the function table)  
(Changing The Function Table)

Step	Description	Display and key operations
1.	Press and hold the <b>SAMPLE</b> key (for 2 seconds) until <b>bASFnC</b> of the "9. Function Table" is displayed, then release the key.	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears..	 Press several times 
3.	Press the <b>PRINT</b> key.	 
4.	Press the <b>RE-ZERO</b> key several times to display $APF = \bar{x}$ .	 Press several times 
5.	To select the statistical items to output, proceed to Step 6 of "Selecting the statistical items to output." To save the current settings as they are, proceed to Step 8 of "Selecting the statistical Items to output." To disable the statistical calculation mode, press the <b>RE-ZERO</b> key several times until "APF = $\bar{u}$ " is displayed.	

## Selecting the statistical items to output

Step	Description	Display and key operations										
6.	Press the <div>SAMPLE</div> key.	<div><div>1/10d SAMPLE</div><div><div>StAF</div><div>Sum</div></div></div>										
7.	<p>Press the <div>RE-ZERO</div> key to select the output items <i>StAF</i>. In the example, output the number of data, sum, maximum, minimum, range (maximum-minimum) and average are selected.</p> <table><tr><th>Parameter ( <i>StAF</i> )</th><th>Description</th></tr><tr><td>0</td><td>Number of data, sum</td></tr><tr><td>1</td><td>Number of data, sum Maximum, minimum, range (maximum – minimum), average</td></tr><tr><td>2</td><td>Number of data, sum Maximum, minimum, range (maximum – minimum), average, standard deviation, coefficient of variation</td></tr><tr><td>3</td><td>Number of data, sum Maximum, minimum, range (maximum – minimum), average, standard deviation, coefficient of variation Relative error of maximum value, relative error of minimum value</td></tr></table> <div>■ Factory setting</div>	Parameter ( <i>StAF</i> )	Description	0	Number of data, sum	1	Number of data, sum Maximum, minimum, range (maximum – minimum), average	2	Number of data, sum Maximum, minimum, range (maximum – minimum), average, standard deviation, coefficient of variation	3	Number of data, sum Maximum, minimum, range (maximum – minimum), average, standard deviation, coefficient of variation Relative error of maximum value, relative error of minimum value	<div><div>→0← RE-ZERO</div><div>Press several times</div></div>
Parameter ( <i>StAF</i> )	Description											
0	Number of data, sum											
1	Number of data, sum Maximum, minimum, range (maximum – minimum), average											
2	Number of data, sum Maximum, minimum, range (maximum – minimum), average, standard deviation, coefficient of variation											
3	Number of data, sum Maximum, minimum, range (maximum – minimum), average, standard deviation, coefficient of variation Relative error of maximum value, relative error of minimum value											
8.	Press the <div>PRINT</div> key to store the setting.	<div><div><div>StAF</div><div>AVE</div></div><div><div>PRINT</div></div><div><div>End</div></div><div><div>MW Fnc</div></div></div>										
9.	Press the <div>CAL</div> key to return to the weighing mode.	<div><div><div>▼ CAL</div></div><div><div>000</div><div>0000 g</div></div></div>										




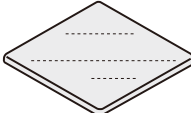
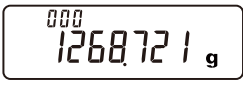
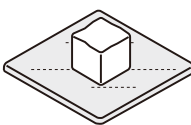
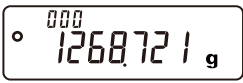


## Selecting the unit

Step	Description	Display and key operations
10.	<p>Press the <b>MODE</b> key to select the unit to be used for the statistical calculation mode.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>□ Selecting the unit using the <b>MODE</b> key is not available after the data is entered. In this case, clear the data as described on page "<a href="#">Clearing the statistical data</a>" and select the unit using the <b>MODE</b> key.</li> <li>□ When the unit used for the statistical calculation mode is to be enabled upon power-on, select the unit in "<b>Unit</b>" of "<a href="#">9. Function Table</a>" beforehand.</li> </ul>	 <p>The diagram illustrates the process of selecting a unit. It shows a hand pressing the <b>MODE</b> key, which is circled. Below this, a calculator display is shown with '000' on the top line and '0000 mg%' on the bottom line. The 'mg%' unit is highlighted with a dashed box.</p>

## 12-2 How to Use the Statistical Calculation Mode

In the statistical calculation mode, the data number of the measured value used for the calculation is shown in the upper left corner of the display.

### Sampling Procedure for Weighing Data

Step	Description	Display and key operations	Weighing operation
1.	Press the <b>RE-ZERO</b> key to set the display to zero.	  	
2.	Place the sample on the weighing pan.		
3.	Press the <b>PRINT</b> key to add the data displayed to statistical calculation. The number of data on the upper left of the display increases by 1.	  	
4.	Repeat steps 1 to 3 for each weighing.		



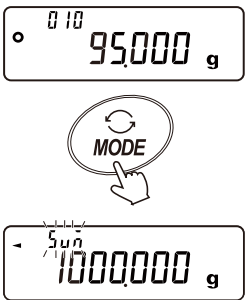
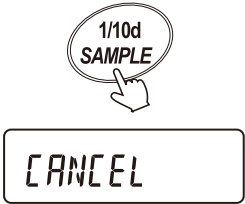
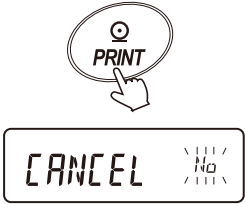

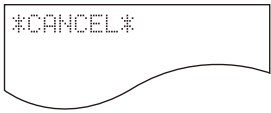
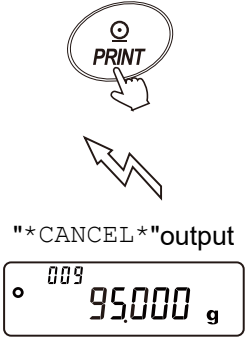
"Display and Output of Statistical Results (When Number of Data is 1 or more.)"

Step	Description	Display and key operations																									
1.	<p>Each time the <b>MODE</b> key is pressed, the display changes: the results as selected in "Statistical function mode output items (SEARF)", and <b>CLEAR</b>, <b>CANCEL</b>. When pressing the <b>SAMPLE</b> key, the previous item is displayed.</p> <p>□ When the number of data is 1, the coefficient of variation and relative error is displayed as <math>\frac{\sigma}{\bar{x}} \times 100\%</math>.</p> <p>□ When the average is 0, the coefficient of variation and relative error is displayed as <math>\frac{\sigma}{0} \times 100\%</math>.</p> <p>Statistical items are indicated on the upper left of the display using the following symbols.</p> <table border="1"> <thead> <tr> <th>Symbol</th><th>Statistical item</th><th>Function table parameter (SEARF)</th></tr> </thead> <tbody> <tr> <td><math>\sum \tilde{x}</math></td><td>Sum</td><td>0</td></tr> <tr> <td><math>\tilde{x} \max</math></td><td>Maximum</td><td rowspan="3">1</td></tr> <tr> <td><math>\tilde{x} \min</math></td><td>Minimum</td></tr> <tr> <td><math>r</math></td><td>Range (Maximum – minimum)</td></tr> <tr> <td><math>\bar{x}</math></td><td>Average</td><td rowspan="3">2</td></tr> <tr> <td><math>\sigma_d</math></td><td>Standard deviation</td></tr> <tr> <td><math>\sigma_v</math></td><td>Coefficient of variation</td></tr> <tr> <td><math>\tilde{x} \max\%</math></td><td>Relative error of maximum value</td><td rowspan="2">3</td></tr> <tr> <td><math>\tilde{x} \min\%</math></td><td>Relative error of minimum value</td></tr> </tbody> </table>	Symbol	Statistical item	Function table parameter (SEARF)	$\sum \tilde{x}$	Sum	0	$\tilde{x} \max$	Maximum	1	$\tilde{x} \min$	Minimum	$r$	Range (Maximum – minimum)	$\bar{x}$	Average	2	$\sigma_d$	Standard deviation	$\sigma_v$	Coefficient of variation	$\tilde{x} \max\%$	Relative error of maximum value	3	$\tilde{x} \min\%$	Relative error of minimum value	<p>Press several times</p> <p>Displaying Statistical Results as Configured in the Function Table</p> <p>1/10d SAMPLE</p> <p>CLEAR</p> <p>CANCEL</p> <p>MODE</p> <p>CAL</p> <p>Return</p>
Symbol	Statistical item	Function table parameter (SEARF)																									
$\sum \tilde{x}$	Sum	0																									
$\tilde{x} \max$	Maximum	1																									
$\tilde{x} \min$	Minimum																										
$r$	Range (Maximum – minimum)																										
$\bar{x}$	Average	2																									
$\sigma_d$	Standard deviation																										
$\sigma_v$	Coefficient of variation																										
$\tilde{x} \max\%$	Relative error of maximum value	3																									
$\tilde{x} \min\%$	Relative error of minimum value																										

Step	Description	Display and key operations
2.	<p>When pressing the <b>PRINT</b> key while displaying the statistical result, the statistical result is output.</p> <p>Output example (Dump print mode of AD-8129TH)</p> <div style="display: flex; align-items: center;"> <div style="border: 1px dashed black; padding: 5px; margin-right: 10px;"> <pre> N          10 SUM +1000.000 g MAX +105.000 g MIN +95.000 g R   +10.000 g AVE +100.000 g SD  +2.3571 g CV  +2.36 % MAX% +5.00 % MIN% -5.00 % </pre> </div> <div style="text-align: center;"> <p>5tRF</p> </div> </div>	<div style="text-align: center;"> </div> <div style="text-align: center; margin-top: 10px;"> </div> <div style="text-align: center; margin-top: 10px;"> <p>Output of Statistical Results</p> </div>

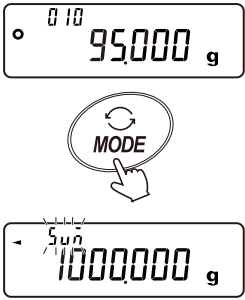



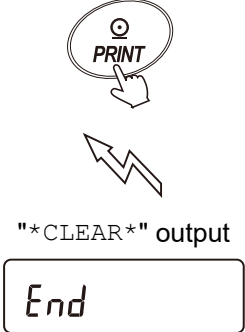
## Deleting the latest data

When the wrong data is entered, it can be deleted and excluded from statistical calculation. Only the latest data can be deleted.

Step	Description	Display and key operations
1.	In the weighing mode, press the <b>MODE</b> key. The statistical calculation results are displayed.	
2.	Press the <b>PRINT</b> key to display <b>CANCEL</b> . Displays the option to delete the most recent data.	
3.	Press the <b>PRINT</b> key. Displays whether or not to delete the latest data.	
4.	Press the <b>RE-ZERO</b> key. Switches between "No" and "Go" options.	
5.	Press the <b>PRINT</b> key while "Go" is blinking. The latest data entry is excluded from the statistical processing, reducing the total number of data entries displayed. The balance outputs a message indicating that the most recent data has been deleted.  Output example (AD-8129TH, dump print mode) 	

# Clearing the statistical data

All the statistical data will be deleted and the number of data will be 0 (zero).

Step	Description	Display and key operations
1.	In the weighing mode, press the <b>MODE</b> key several times. To Displays the statistical data.	
2.	Press the <b>SAMPLE</b> key twice. Displays the option to clear statistical data.	
3.	Press the <b>PRINT</b> key. Displays whether the statistical data has been cleared.	
4.	Press the <b>RE-ZERO</b> key to switch No / Go .	
5.	Press the <b>PRINT</b> key while "Go" is blinking. The latest data is excluded from the statistical calculation, and the number of data in weighing mode is reduced by one. A message indicating the deletion of the latest data is output from the balance. Output example (AD-8129TH, dump print mode) <div data-bbox="274 1556 545 1662" style="border: 1px solid black; padding: 5px; margin-top: 10px;">             *CLEAR*           </div>	

## 13. Gross Net Tare Function

Zero setting and taring can be operated separately, and data output for Gross (total amount), Net (net amount), Tare (tare quantity) becomes possible.

When the gross net tare function is selected, the key operation is changed as follows.

Key	Operation
<b>ON:OFF</b> key	Zero setting (Operate as the <b>ZERO</b> key)
<b>RE-ZERO</b> key	Tare (Operate as the <b>TARE</b> key)

### 13-1 Preparation of Gross Net Tare Function

To use the gross net tare function, set "4" (gross net tare mode) for "RPF" (application function mode) under " **RP Fnc** " (application) in the function table ("9. Function Table").

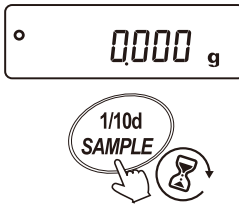
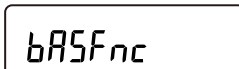

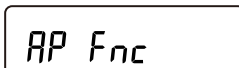


To return to the standard weighing mode (factory default setting), set





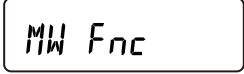


" **RP Fnc** (Application Mode) " in the function table ("9. Function Table") to " **0** (Standard Weighing Mode). "

#### CAUTION

- ❑ **Cannot be used in conjunction with the minimum weight warning function.**

Switching to gross/net/tare mode (changing the function table)



Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>Press and hold (for 2 seconds)</p> 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 <p>Press several times</p> 
3.	Press the <b>PRINT</b> key to display "RPF" (application function mode).	 

Step	Description	Display and key operations
4.	Press the <b>RE-ZERO</b> key several times until the display shown to the right appears.	 <p>Press several times</p> 
5.	Press the <b>PRINT</b> key to store the setting.	 
6.	<p>The next class in the function table is displayed.</p> <p>Press the <b>CAL</b> key to return to weighing mode.</p>	  

## Key operations

The following describes the key functions for the weighing value (gross) state.

### Key operations for the weighing value (gross) state

Key	Function	Weighing value (gross)	Operation
	Zero setting (ZERO)	Within the zero range <sup>*1</sup>	Updates the zero point and clears the tare value.
		Exceeding the zero range <sup>*1</sup>	The zero point will not be updated. The tare (container weight) will also not be cleared.
	Tare (TARE)	Positive value	Performs tare operation and updates the tare value.
		Gross zero <sup>*2</sup> (Gross zero indicator displayed)	Clears the tare value.
		Negative value	No tare operation.

<sup>\*1</sup> For the zero range of each model, refer to "Weighing range".


<sup>\*2</sup> "Gross zero" indicates that the minimum division of the gross weight is within the zero range when the unit is grams (g).  
(The state in which the gross zero indicator is lit.)

## CAUTION

- To turn off the balance display while "APF (Application Function)" under AP Fnc ("Application") in the function table ("9. Function Table") is set to " Gross/Net/Tare Mode," press and hold the ON/OFF key for approximately 2 seconds.

## Display



No.	Indicator	Description
1	NET	Lights up when the tare value is not zero.
2	G	Lights up when the tare value is zero.
3	PT	Lights up along with the NET indicator when the preset tare is set using the PT: command.
4		Lights up when the minimum division of the gross weight is in the zero range in grams.

## Output

Pressing the **PRINT** key outputs data in the following order: net weight, gross weight, and tare weight.

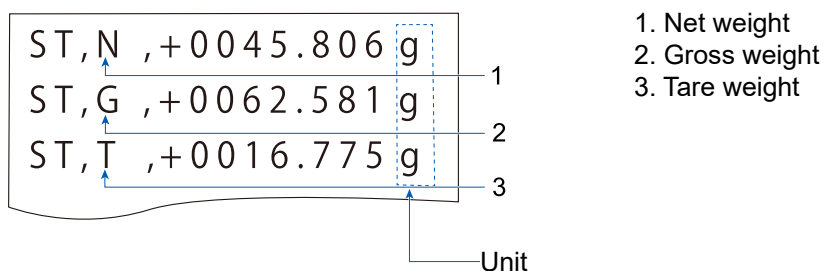
The supported weighing data formats are as follows.

Weighing data formats for the gross/net/tare function

Function table (Serial interface)	Function table (USB interface) *1	Weighing data format
TYPE = 0	U-EP = 0, 1	A&D standard format
TYPE = 1		DP format
TYPE = 5	U-EP = 2	CSV format

\*1 This section explains the weighing data format settings for Virtual COM mode. When outputting in Quick USB mode, the weighing data format is set to NU2 format.

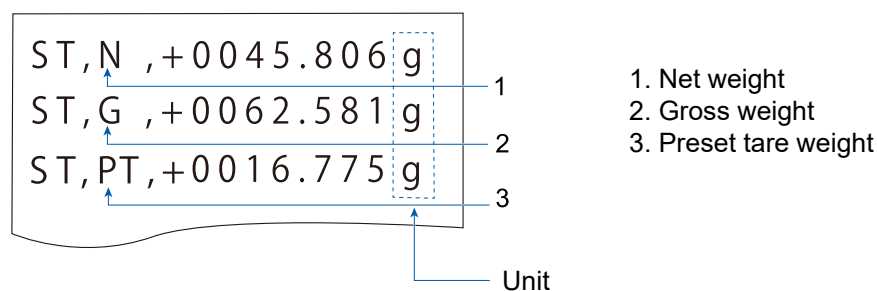
### Output example(A&D standard format)



## Unit

When the balance unit setting is "PCS" (counting mode) or "%" (percent mode), the unit output for gross weight, tare weight, and preset tare weight will be in the "g" unit.

### Example of tare output when preset tare is set (A&D standard format)



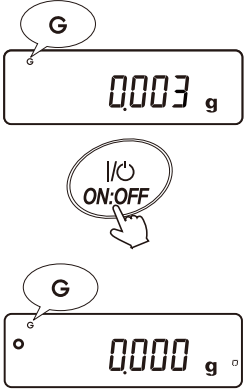
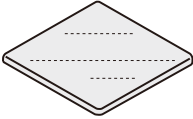

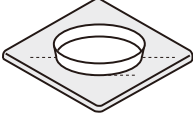
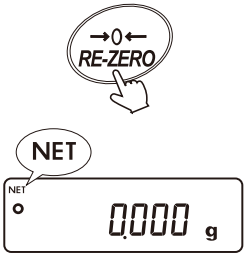

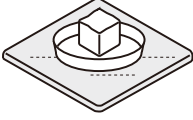
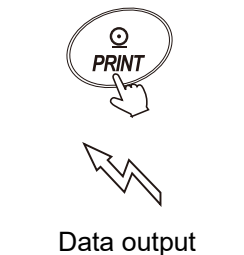
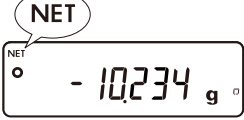
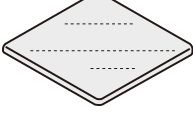
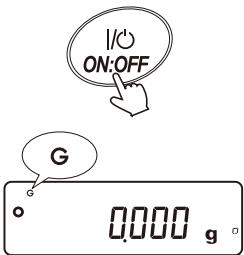
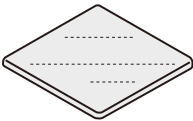
## Note

- The output content and order can be configured using the UFC function. For the UFC function, refer to "23. UFC Function".



## 13-2 Using the gross/net/tare function (example)

### Operation method

Step	Description	Display and key operations	Weighing operation
1.	Refer to "13. Gross Net Tare Function" to enable the gross/net/tare function.		
2.	Press the <b>ON:OFF</b> (ZERO) key with nothing on the weighing pan.		
3.	Place an empty container to be used on the weighing pan.		
4.	Press the <b>TARE</b> key to display "NET". The tare value is set (updated).		
5.	Place the sample to be weighed.		
6.	Pressing the <b>PRINT</b> key outputs data in the following order: net weight, gross weight, and tare weight. Refer to "Output example(A&D standard format)".		
7.	Remove the sample and container from the weighing pan.		
8.	Press the <b>ON:OFF</b> (ZERO) key to update the zero point and clear the tare weight. The balance returns to the same state as Step 1. To continue weighing with the same tare value, remove only the sample and place the next sample, and then press the <b>PRINT</b> key to output the data.		

## 14. Minimum weight alert function



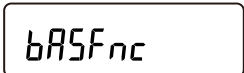

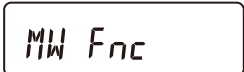

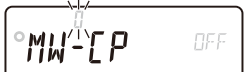





- Minimum weight is the minimum sample weight required to perform correct quantitative analysis taking the measurement error of the balance used into account. If the sample amount is too small, the proportion of measurement error in the measured value increases, and the reliability of the analysis result thus may drop.
- The minimum weight alert function allows you to quickly determine if the sample amount meets the set minimum weight.
- This function can be used when the unit mode is "g".
- With this function, "M d" displays blinking at the top of the unit when the sample amount is less than the set minimum weight. When the sample amount exceeds the set minimum weight, "M d" is hidden.
- The minimum weight can be changed in the function table. The factory setting is 0 g.  
 When the setting value is 0 g, the minimum weight alert function will not display an alert, even if it is set to "1" (Enables comparison excluding near zero) or "2" (Enables comparison including near zero) for "MW-CP" (Minimum weight comparison) under "MW Fnc" (Minimum weight alert function) in the function table ("9. Function Table"). Values above the weighing capacity cannot be set as a minimum weight.
- There are two types of alert displays for "MW-CP" (Minimum weight comparison):  
 "1" (Enables comparison excluding near zero)  
 "2" (Enables comparison including near zero)  
 Near zero is within  $\pm 10$  d of 0 g.

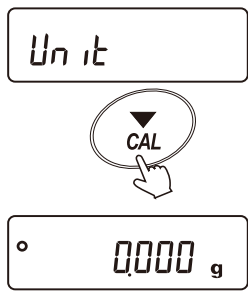
### CAUTION

- When a parameter other than "0" (No comparison) is set for "MW-CP" (Minimum weight comparison), the **MODE** key is assigned to the minimum weight setting, and the unit cannot be changed with the **MODE** key.  
 Therefore, unit conversion using the **MODE** key is no longer possible.  
 (The previously used unit remains fixed.)
- To change the unit, disable the minimum weight alert function.
- To turn off the minimum weight alert function for the minimum weighing value, refer to the steps in "14-1 Preparations for minimum weight alert function" and set the parameter for "MW-CP" (comparison of minimum weighing value) to "0" (No comparison).
- The minimum weight alert function cannot be used with statistical calculation mode and data memory function.

## 14-1 Preparations for minimum weight alert function

Enabling the minimum weight alert function (Changing the function table)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 
3.	Press the <b>PRINT</b> key to display "MW-CP" (Minimum weight comparison).	 
4.	Press the <b>RE-ZERO</b> key several times to set "1" (Enables comparison excluding near zero) or "2" (Enables comparison including near zero) for "MW-CP" (Minimum weight comparison).	 Press several times  or 
5.	<p>To input the minimum weighing value, press the <b>SAMPLE</b> key to switch to the "MW" display. If you want to register the minimum weight by direct key input, proceed to step 4 of "14-2-1 Inputting minimum weight". Alternatively, if you want to register the minimum weighing value based on the repeatability of your weights, proceed to step 4 in "14-2-1 Inputting minimum weight" under "Input using repeatability with an external weight."</p> <p>To complete the setting, press the <b>PRINT</b> key without pressing the <b>SAMPLE</b> key. When <b>UNIT</b> is displayed, press the <b>CAL</b> key to return to the weighing display.</p>	 

Step	Description	Display and key operations
6.	<p>The next class in the function table is displayed.</p> <p>Press the <span style="border: 1px solid black; padding: 0 5px;">CAL</span> key to return to weighing mode.</p>	



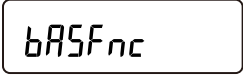

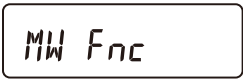





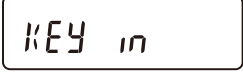
## 14-2 Inputting and outputting minimum weight

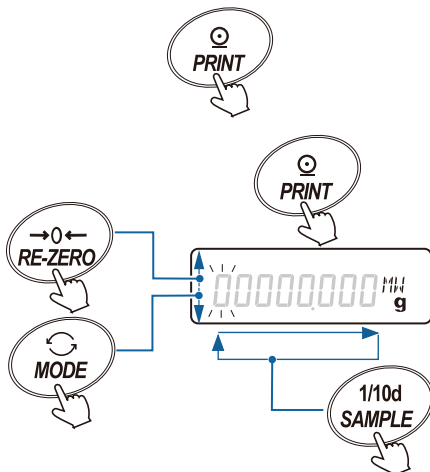
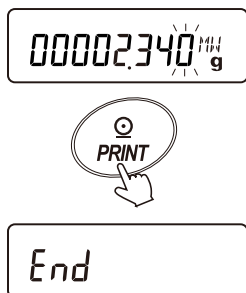
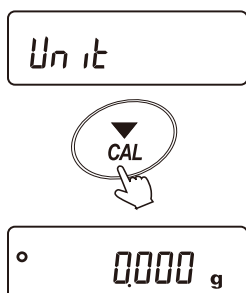
### 14-2-1 Inputting minimum weight

Use the following methods to set a minimum weight:



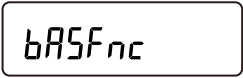
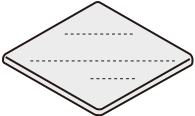

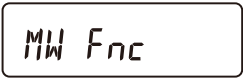





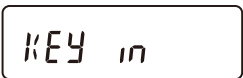


- Direct key input
- Input using repeatability obtained from 10 measurements with an external weight





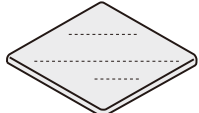

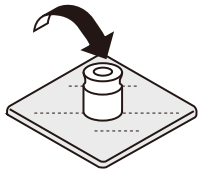


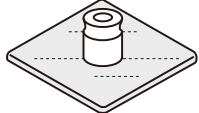


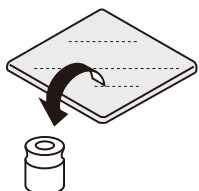


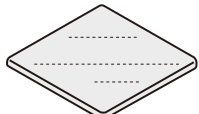



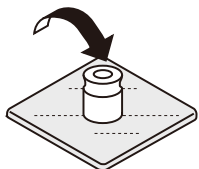
Direct key input (Entering minimum weight directly)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 
3.	Press the <b>PRINT</b> key to display "MW-CP" (Minimum weight comparison).	 
4.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 
5.	Press the <b>PRINT</b> key to show the display shown to the right.	 




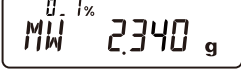
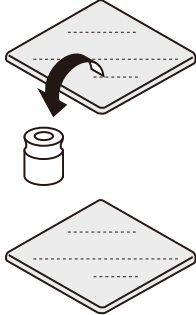



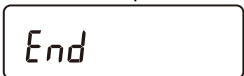
Step	Description	Display and key operations
6.	<p>Press the <b>PRINT</b> key to set the minimum weight.</p> <p>Use the following keys to input a minimum weight:</p> <p><b>RE-ZERO</b> key ..... Changes the value of the blinking digit (+)</p> <p><b>MODE</b> key ..... Changes the value of the blinking digit (-)</p> <p><b>SAMPLE</b> key ..... Selects the digits to blink.</p>	
7	<p>Press the <b>PRINT</b> key to store the setting.</p> <p>If "MW-[P" is set to "0" (No comparison), the parameter is automatically changed to "1" (Excluding near zero), and the minimum weight comparison function is enabled.</p> <p>(To cancel without saving the setting, press the <b>CAL</b> key.)</p>	
8.	<p>The next class in the function table is displayed.</p> <p>Press the <b>CAL</b> key to return to weighing mode.</p>	

# Input using repeatability with an external weight

Step	Description	Display and key operations	Weighing operation
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 	
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 	
3.	Press the <b>PRINT</b> key to display "MW-CP" (Minimum weight comparison).	 	
4.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 	
5.	Press the <b>PRINT</b> key to show the display shown to the right.	 	
6.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 	

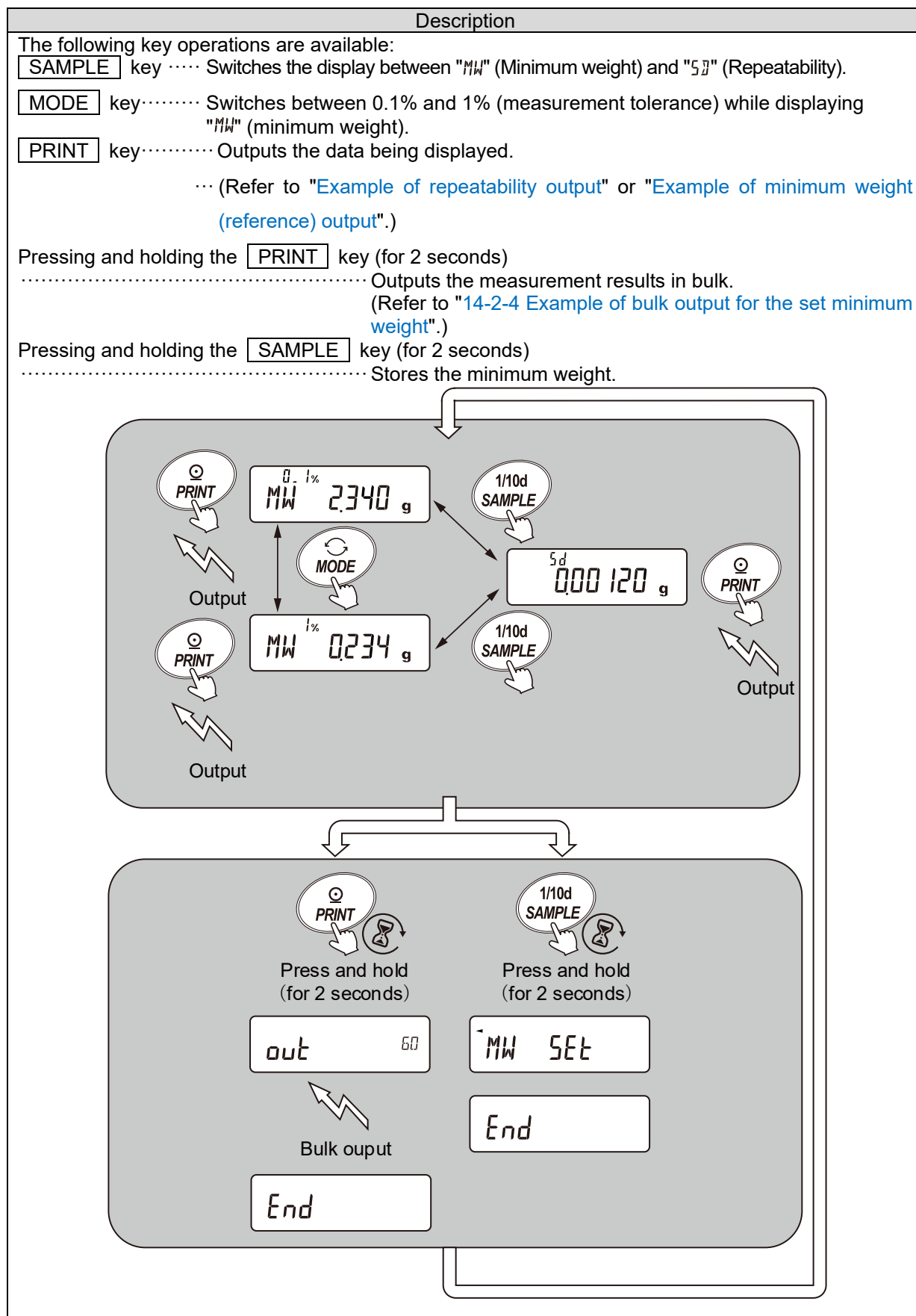
Step	Description	Display and key operations	Weighing operation
7.	Press the <b>PRINT</b> key. The display transitions as shown to the right.	   	
8.	When the display shown on the right appears, place the weight on the weighing pan.		
9.	With the weight placed, the balance displays "◀" (the processing indicator).	 	
10.	When "◀" (the processing indicator) starts blinking and then remains stable for 2 seconds, the weighing value is displayed.		
11.	When the display shown to the right appears, remove the weight from the weighing pan.		
12.	When the weight is removed, the balance displays "◀" (the processing indicator).	 	
13.	Each time the display requests the next load, repeat steps 8 to 12 until you have completed 10 cycles.  From this point onward, repeat the weighing process from steps 8 to 12 up to the 10th time.	   Repeat steps 8 to 12.	



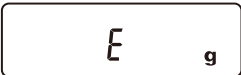
Step	Description	Display and key operations	Weighing operation
14.	<p>After completing the 10th measurement, the result (minimum weight) is displayed.</p> <p><b>CAUTION</b>  <input type="checkbox"/> If there is no key operation for approximately 2 minutes, the minimum weight will not be registered, and the display will automatically move to the next item in the function table.</p> <p>While the measurement result is displayed, the following operations can be performed:  For details, refer to "<a href="#">Key operations when measurement results are displayed</a>".</p> <ul style="list-style-type: none"> <li>• Select and output the display of "MW" (Minimum weight) / "5.7" (Repeatability).</li> <li>• Switch the fixed tolerance in the "MW" (Minimum weight) display.</li> <li>• Outputs the measurement results in bulk. (Step 15)</li> <li>• Set the minimum weight calculated from the measurement results. (Step 16)</li> </ul>	   	
15.	<p>To output the measurement results in bulk, press and hold the <b>PRINT</b> key (for 2 seconds).</p> <p>For output examples, refer to "<a href="#">Example of bulk output for minimum weighing value when repeatability with an external weight is used.</a>"</p>	 Press and hold (for 2 seconds)   Bulk output 	

## Key operations when measurement results are displayed

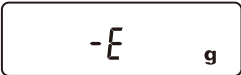
For additional information on step 14 in "Input using repeatability with an external weight", refer to the following.



Error display



Load exceeding the capacity is applied.



Not enough load is applied.

The balance resumes repeatability measurement once the error is resolved in either case.



Weighing value unstable (for approx. 20 seconds) during repeatability measurement.







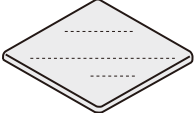

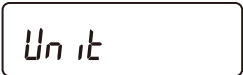


After this error is displayed, the balance forcibly ends the repeatability measurement and returns to function table mode.

Example of repeatability output

Description
Display
Output
_ : Space, ASCII 20h
<TERM> : Terminator, CR LF or CR
CR : Carriage return, ASCII 0Dh
LF : Line feed, ASCII 0Ah

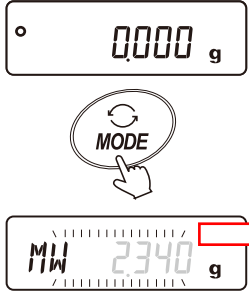
Example of minimum weight (reference) output

Description
Display
or
Output
_ : Space, ASCII 20h
<TERM> : Terminator, CR LF or CR
CR : Carriage return, ASCII 0Dh
LF : Line feed, ASCII 0Ah

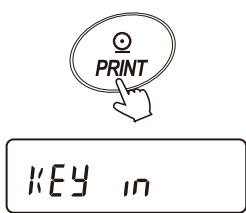
Step	Description	Display and key operations	Weighing operation
16.	<p>Press and hold the <b>SAMPLE</b> key (for 2 seconds) to set the minimum weight.</p> <p>Note that if "MW-CP" is set to "0" (No comparison), the parameter is automatically changed to "1" (Excluding near zero), and the minimum weight comparison function is enabled. MW-CP 1</p>	 <p>Press and hold (for 2 seconds)</p>   	
17.	Press the <b>CAL</b> key to complete the process.	 	
18.	Press the <b>CAL</b> key to return to weighing mode.	 	

## 14-2-2 Checking and changing the minimum weight

### Checking minimum weight

Step	Description	Display and key operations
1.	In weighing mode, press the <b>MODE</b> key. The current minimum weight is displayed.	 <p>The diagram shows a top display with '0000 g' and a bottom display with 'MW 2340 g'. A hand is shown pressing the 'MODE' key, which is circled. A red line connects the 'MODE' key to the 'KEY in' display in the next step.</p>

### Changing minimum weight

Step	Description	Display and key operations
1.	Press the <b>PRINT</b> key to show the display shown to the right.	 <p>The diagram shows a hand pressing the 'PRINT' key, which is circled. Below it, the display shows 'KEY in'. A red line connects the 'PRINT' key to the 'KEY in' display.</p>
2.	To enter the minimum weight using key input, refer to step 6 and onwards of " <a href="#">14-2-1 Inputting minimum weight</a> ".  To enter the minimum weight using repeatability with an external weight, refer to step 6 and onwards of "Input using repeatability with an external weight".	

Display the setting history above the unit indication. ←

**KEY**

Enter the setting value.

**Ext**

Enter the setting value based on the repeatability of external weight

**ECL**


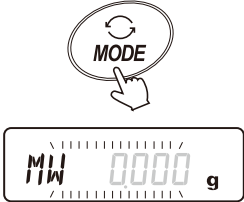
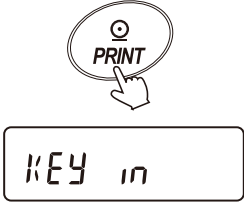
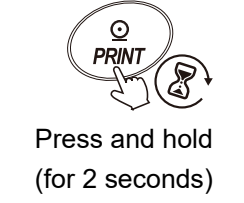
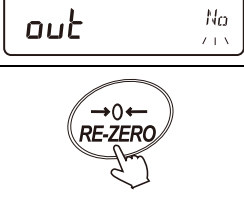
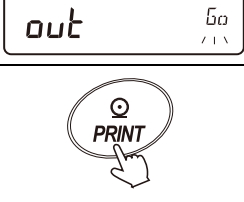



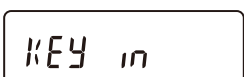
Enter via ECL (Press and hold the MODE key).


Refer to "[6-2 Self-Check-Function/Automatic Setting of Minimum Weight](#)"

### 14-2-3 Outputting the setting values in bulk

The set minimum weight and repeatability results can be output in bulk.

Setting method

Step	Description	Display and key operations
1.	In weighing mode, press the <b>MODE</b> key. The current minimum weight is displayed.	 
2.	Press the <b>PRINT</b> key to show the display shown to the right.	
3.	Press and hold the <b>PRINT</b> key (for 2 seconds).	 <p>Press and hold (for 2 seconds)</p>
4.	Use the <b>RE-ZERO</b> key to switch between "No / Go".	
5.	Press the <b>PRINT</b> key while "Go" is blinking to output in bulk.  For output examples, refer to " <a href="#">14-2-4 Example of bulk output for the set minimum weight</a> ".	   <p>Bulk output</p>  

Step	Description	Display and key operations
6.	Press the <span style="border: 1px solid black; padding: 0 2px;">CAL</span> key to return to weighing mode.	

#### 14-2-4 Example of bulk output for the set minimum weight

The output content depends on the minimum weight setting method.

Example of bulk output when direct key input is used

##### Output

```

-MINIMUM_WEIGHT-<TERM>
<TERM>
.....A_&_D<TERM>
MODEL_..MC-6203A<TERM>
S/N.....T1234567<TERM>
ID.....LAB-0123<TERM>
DATE_..2024/09/01<TERM>
TIME_...12:34:56<TERM>
<TERM>
KEY_INPUT.....<TERM>
<TERM>
MINIMUM_WEIGHT_..<TERM>
.....2.340_..g<TERM>
<TERM>
REMARKS<TERM>
<TERM>
<TERM>
<TERM>
SIGNATURE<TERM>
<TERM>
<TERM>
-----<TERM>
<TERM>
<TERM>
<TERM>
<TERM>

```

- 1 Manufacturer
- 2 Model
- 3 Serial number
- 4 ID number
- 5 Date
- 6 Time
- 7 Input method (Direct key input)
- 8 Parameter
- 9 Remarks
- 10 Signature

\_ : Space, ASCII 20h  
 <TERM> : Terminator, CR LF or CR  
 CR : Carriage return, ASCII 0Dh  
 LF : Line feed, ASCII 0Ah

Example of bulk output for minimum weighing value when repeatability with an external weight is used.

#### Output

```

-MINIMUM_WEIGHT-<TERM>
<TERM>
.....A_&_D<TERM>
MODEL_...MC-6203A<TERM>
S/N.....T1234567<TERM>
ID.....LAB-0123<TERM>
DATE_...2024/09/01<TERM>
TIME_...12:34:56<TERM>
<TERM>
EXTERNAL_MASS_...<TERM>
<TERM>
RESULT.....<TERM>
_1...+500.006_g<TERM>
_2...+500.006_g<TERM>
_3...+500.005_g<TERM>
_4...+500.006_g<TERM>
_5...+500.005_g<TERM>
_6...+500.008_g<TERM>
_7...+500.004_g<TERM>
_8...+500.004_g<TERM>
_9...+500.006_g<TERM>
10...+500.006_g<TERM>
<TERM>
SD.....0.00117_g<TERM>
<TERM>
TOLERANCE.....<TERM>
.....0.10_%<TERM>
MINIMUM_WEIGHT_...<TERM>
.....2.340_g<TERM>
<TERM>
<TERM>
REMARKS<TERM>
<TERM>
<TERM>
<TERM>
SIGNATURE<TERM>
<TERM>
<TERM>
-----<TERM>
<TERM>
<TERM>
<TERM>
<TERM>

```

- 1 Manufacturer
- 2 Model
- 3 Serial number
- 4 ID number
- 5 Date
- 6 Time
- 7 Measurement method (External weight)
- 8 Weighing results
- 9 Repeatability
- 10 measurement tolerance
- 11 Minimum weight (reference)
- 12 Remarks
- 13 Signature



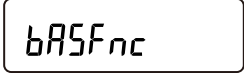

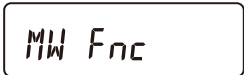



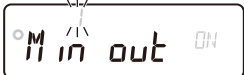
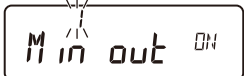

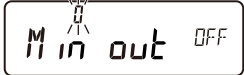
\_ : Space, ASCII 20h  
 <TERM> : Terminator, CR LF or CR  
 CR : Carriage return, ASCII 0Dh  
 LF : Line feed, ASCII 0Ah



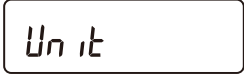




## 14-3 Data output when minimum weight is not reached.

In the function table ("9. Function Table"), the " **MW Fnc** " (Minimum Weight Warning Function) allows you to toggle data output on/off when below the minimum weighing value through the " **M in out** " (Data output when minimum weight is not reached) setting.

Setting method

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 
3.	Press the <b>PRINT</b> key.	 
4.	Press the <b>SAMPLE</b> key several times until " <b>M in out</b> " (Data output when minimum weight is not reached) is displayed.	 
5.	Press the <b>RE-ZERO</b> key to select " <b>I</b> " (data output ON) or " <b>0</b> " (data output OFF).	  

Step	Description	Display and key operations
6.	Press the <b>PRINT</b> key to store the setting.	  
7.	Press the <b>CAL</b> key to return to weighing mode.	 

# 15. Password Function

By using the password function, it is possible to limit the usage and functions of the balance.

It is effective in preventing falsification of date and time settings or preventing changes in the function table by the user.

The password is set with four keys **MODE**, **SAMPLE**, **PRINT** and **RE-ZERO** keys in four digits ( $4 \times 4 \times 4 \times 4 = 256$  outcomes).

At factory setting, the password function is disabled. Enabling/disabling the password function and registering the password are performed in the [9. Function Table](#). Three types of settings are possible depending on the "Lock" setting of the Function Table "Password ( **PSWD** )".

Parameter	Function
Lock = 0	No password function
Lock = 1	Request password input at the start of weighing
Lock = 2	To change the setting, login is required with the administrator's password.

## Lock = 0 No password function

- The password function is not used.
- The balance can be used for weighing operations by anyone.
- All functions can be used.
- Setting changes are also possible.

## Lock = 1 Request password input at the start of weighing

- An administrator (**ADM<sup>IN</sup>**) can limit the users of the balance by setting individual passwords.  
The factory default administrator password ("**ADM<sup>IN</sup>**") is input by pressing the **RE-ZERO** key four times ("**1111**").
- The password input is required at the start of weighing with the **ON:OFF** key.
- The balance cannot be in weighing state unless you enter the correct password.正
- There are two login levels: Administrator (**ADM<sup>IN</sup>**) and user (**USER<sup>01</sup>** to **USER<sup>10</sup>**).

Login level	Description
Administrator ( <b>ADM<sup>IN</sup></b> )	All functions and settings can be used. Passwords for 10 users can be set individually.
User ( <b>USER<sup>01</sup></b> to <b>USER<sup>10</sup></b> )	Initialization and setting changes are restricted (including clock). Restrictions apply to initialization and password functions.
No password	The balance cannot be used.

**Lock = 2** To change the setting, login is required with the administrator's password.

- Anyone can perform weighing work, and initialization and setting changes can be restricted (including clock).

(Password input is not requested when weighing starts with the **ON/OFF** key.)

- here are two levels of login level: Administrator (**ADM<sup>IN</sup>**) and user (**GUE<sup>ST</sup>**)

Login level	Description
Administrator ( <b>ADM<sup>IN</sup></b> )	All functions and settings can be used. Passwords for 10 users can be set individually.
Guest ( <b>GUE<sup>ST</sup></b> ) No password <b>*1</b>	Initialization and setting changes are restricted (including clock).

**\*1** When weighing is started with the **ON:OFF** key while pressing the **CAL** key when the display is off, the password of the administrator ("**ADM<sup>IN</sup>**") is requested.

Usage availability by login level

Login level	Weighing		
	Password input at weighing start	Sensitivity adjustment	Change the function setting <b>*2</b>
Administrator ( <b>ADM<sup>IN</sup></b> )	Necessary	Possible	Possible
User ( <b>USER<sup>01</sup></b> to <b>USER<sup>10</sup></b> )		Possible or Impossible <b>*3</b>	Impossible
Guest ( <b>GUE<sup>ST</sup></b> )	Unnecessary		



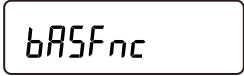

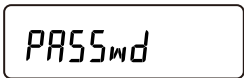


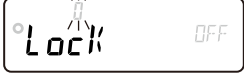

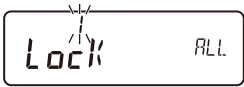
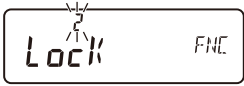


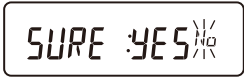
**\*2** Changing response characteristics, function selection, and initialization in the function table ("[9. Function Table](#)") (time and date settings, etc.).









**\*3** Normally, usage is allowed, but the administrator ("**ADM<sup>IN</sup>**") can restrict access for users (**USER<sup>01</sup>** to **USER<sup>10</sup>**) and guests ("**GUE<sup>ST</sup>**") by setting to inhibit usage ("[8-1 Permit or Inhibit](#)").

## 15-1 Preparing the Password Function

By the password function ( **PASS<sub>wd</sub>** ) of the "9. Function Table", the password function can be switched between "Invalid ( **Lock** = 0 ) / Valid ( **Lock** = 1 or 2 )".

Enabling the password function (changing internal settings)



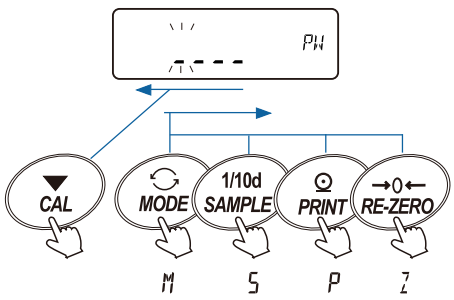
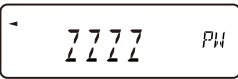




Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 
3.	Press the <b>PRINT</b> key to display  <b>Lock</b> OFF. (To cancel, press the <b>CAL</b> key.)	 
4.	Press the <b>RE-ZERO</b> key to display "1" (ON: Limit weighing operation) or "2" (ON: Basic weighing is possible).	 Press several times  or 
5.	Press the <b>PRINT</b> key to show the display shown to the right. (  blinks when "No" is selected.)	 

Step	Description	Display and key operations
6.	Press the <b>RE-ZERO</b> key to switch between <i>YES</i> / <i>No</i> and set <i>YES</i> to blink.	 
7.	Press the <b>PRINT</b> key while " <i>YES</i> " is blinking to enable the password function.	  
8.	<p>The display shown on the right appears.</p> <p>To return to weighing mode without registering (changing) a password, press the <b>CAL</b> key twice.</p> <p>To register (change) the password, proceed to "5" on the "<a href="#">15-4 Registering (changing) the password</a>".</p>	  <p>Press twice</p> 

## 15-2 How to Input the Password at the Start of Weighing






When logging in as an administrator ("ADM<sup>IN</sup>") or a user ("USER<sup>01</sup>" to "USER<sup>10</sup>")

When "LOCK" (Lock Function) under PASSWORD (Password) in the function ("9. Function Table") is set to LOCK "1" (ON: Limit weighing operation), password entry is required at the start of weighing.

Step	Description	Display and key operations
1.	With the display turned off, press the <b>ON:OFF</b> key.	
2.	The display will prompt for password entry.	
3.	Enter a 4-digit password using the following keys. Note that the display will automatically turn off after 10 minutes of inactivity.	
4.	When the correct password is entered, the login level is displayed, followed by all segments/indicators, and then the weighing display.	
	Entering the Administrator password will log you in as the administrator.	
	The Administrator password at the factory default setting has been set to "7777" (four presses of the <b>RE-ZERO</b> key).	
	If the password is incorrect, the buzzer sounds three times with "FAL" displayed, and then the display turns off.	
		

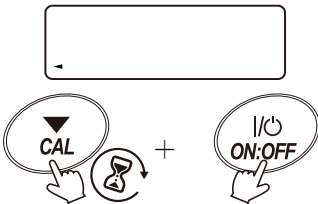

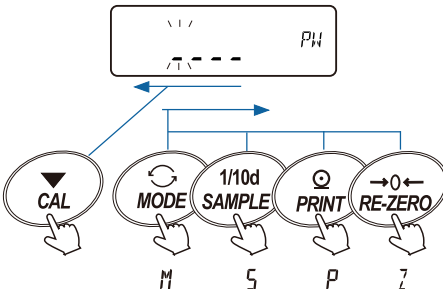
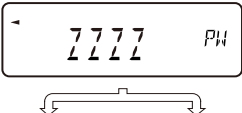





When logging in as a guest ("*GUE<sup>ST</sup>*")

When "LOCK" (Lock Function) under " PASSWD " (Password) in the function ("[9. Function Table](#)") is set to LOCK "2" (ON: Basic weighing is possible), password entry is not required at the start of weighing.

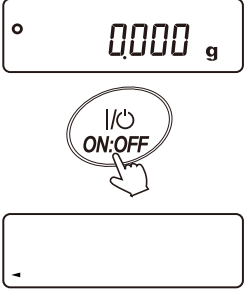
Step	Description	Display and key operations
1.	With the display turned off, press the <b>ON:OFF</b> key.	 
2.	The balance will show the displays shown to the right and enter weighing mode.	  



When logging in as an administrator ("  $ADM^{IN}$  ").

Step	Description	Display and key operations
1.	With the display turned off, press and hold the <b>MODE</b> key and press the <b>ON:OFF</b> key.	 <p>While pressing and holding</p>
2.	The display will prompt for password entry.	
3.	<p>Enter a 4-digit password using the following keys.</p> <p>Note that the display will automatically turn off after 10 minutes of inactivity.</p> <p><b>MODE</b> key ..... <i>M</i> Input  <b>SAMPLE</b> key ..... <i>S</i> Input  <b>PRINT</b> key ..... <i>P</i> Input  <b>RE-ZERO</b> key ..... <i>Z</i> Input  <b>CAL</b> key ..... Back key</p> <p>10 minutes of inactivity Display off</p>	
4.	<p>When the correct password is entered, the login level is displayed, followed by all segments/indicators, and then the weighing display.</p> <p>Entering the Administrator password will log you in as the administrator.</p> <p>The Administrator password at the factory default setting has been set to "1111" (four presses of the <b>RE-ZERO</b> key).</p> <p>If the password is incorrect, the buzzer sounds three times with " <b>FAIL</b> " displayed, and then the display turns off.</p>	 <p>Correct password      Incorrect password</p> <div style="display: flex; justify-content: space-around;"> <div>  </div> <div>  </div> </div> <p>Buzzer sounds three times.</p> <div style="display: flex; justify-content: space-around;"> <div>  </div> <div>  </div> </div> <p>Display off</p>  <p>Weighing display</p>

## 15-3 Logging out

Step	Description	Display and key operations
1.	Pressing the <b>ON:OFF</b> key turns off the display and logs out the user. When $Lock = 1$ , a password must be entered again when transitioning from the display-off state to the weighing display.	

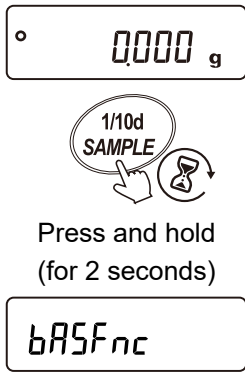
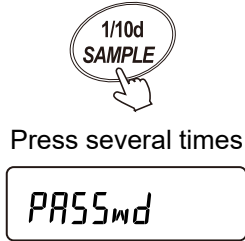
## 15-4 Registering (changing) the password

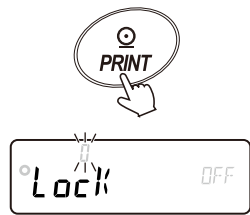

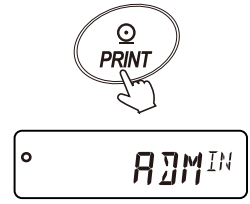

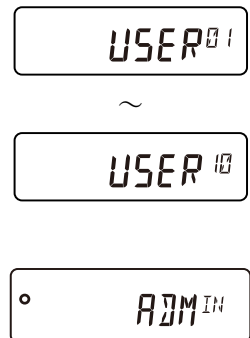
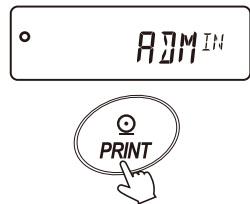
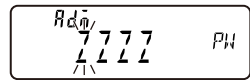
In the "9. Function Table," the " **PASSwd** " (Password) section allows password registration or modification through " **PASS Na** " (Password Registration).

### CAUTION

- Pressing the **ON:OFF** key turns off the display and logs out the user.
- When  $Lock = 2$ , logging in as an administrator (" **ADM<sup>IN</sup>** ") requires entering the administrator password. However, password registration for users (" **USER 01** " to " **USER 08** ") is not required.
- If the password is lost or forgotten, the balance will become unusable. Be sure to record, save and manage the registered passwords.
- Users ( **USER 01** to **USER 08** ) cannot register a password that is already registered for the Administrator ( **ADM<sup>IN</sup>** ).
- For instructions on deleting a password, refer to "15-5 How to Delete a Password (For Users Only)."

Method for registering (changing)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table").	
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	

Step	Description	Display and key operations
3.	Press the <b>PRINT</b> key to display the "Lock" (Lock Function) option.	
4.	Press the <b>SAMPLE</b> key.	
5.	Press the PRINT key to display the login level (" ADMIN ").	
6.	<p>Press the <b>SAMPLE</b> key to display the login level you want to change.</p> <p>In this example, " ADMIN " (Administrator) is displayed.</p> <p>ADMIN</p> <p>When a password is registered for the login level, "●" (the stability indicator) will be displayed.</p> <p>The password can be changed.</p>	 <p>Press several times</p> 
7.	<p>With the desired login type displayed, press the <b>PRINT</b> key.</p> <p>This example explains how to change the password for the Administrator (ADMIN).</p>	
8.	<p>The current password is displayed.</p> <p>(The factory default password for the Administrator (ADMIN) is set to '7777', which is entered by pressing the <b>RE-ZERO</b> key four times.)</p>	



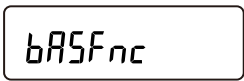

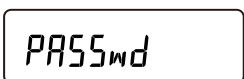








Step	Description	Display and key operations
9.	<p>Enter a 4-digit password using the following keys.</p> <p>Note that the display will automatically turn off after 10 minutes of inactivity.</p> <p><b>MODE</b> key..... <i>M</i> Input  <b>SAMPLE</b> key..... <i>5</i> Input  <b>PRINT</b> key..... <i>P</i> Input  <b>RE-ZERO</b> key ..... <i>Z</i> Input  <b>CAL</b> key ..... Back key</p> <p>10 minutes of inactivity Display off</p>	
10.	After entering the four digits with the keys, the new password will be displayed.	
11.	Use the <b>RE-ZERO</b> key to toggle between "YES" and "No". Set "YES" to blink.	
12.	Press the <b>PRINT</b> key while "YES" is blinking to register the password.	<p>End</p>
13.	Once settings configuration is complete, the next login level will be displayed. To continue the configuration, follow the steps from Step 6.	
14.	To exit the setting mode and return to weighing mode, press the <b>CAL</b> key three times.	<p>Press three times</p>












## 15-5 How to Delete a Password (For Users Only).

### CAUTION

- ❑ The administrator ("ADM<sup>IN</sup>") password cannot be deleted. Refer to "15-4 Registering (changing) the password" to change it to a password of your choice.

Deleting method

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table")	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown on the right appears.	 Press several times 
3.	Press the <b>PRINT</b> key to display the "Lock" (Lock Function) option.	 
4.	Press the <b>SAMPLE</b> key to show the display shown to the right.	 
5.	Press the <b>PRINT</b> key to display the login level ("° ADM <sup>IN</sup> ").	 
6.	Press the <b>SAMPLE</b> key to display the login level you want to change. In this example, "USER 01" (User 01) is displayed.  When a password is registered for the login level, "°" (the stability indicator) will be displayed.	 Press several times 

Step	Description	Display and key operations
7.	Press the <b>PRINT</b> key. The current password is displayed.	 
8.	Press and hold the <b>CAL</b> key (for 2 seconds) until the display shown to the right is displayed.	 Press and hold (for 2 seconds) 
9.	Press the <b>PRINT</b> key to show the display shown to the right.	 
10.	Use the <b>RE-ZERO</b> key to switch between "0 / No".	 
11.	Press the <b>PRINT</b> key while "0 / No" is blinking to delete the password.	  

## 15-6 Forgot Password

If the correct password has been forgotten, the balance cannot be used.

Password reset must be done at the manufacturer. Please request repair.



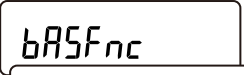
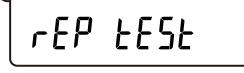
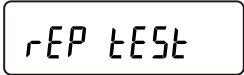



## 16. Repeatability Check Function










- Repeatability is an indicator of variations in measured values when the same weight is repeatedly loaded and unloaded, and it is usually expressed in terms of standard deviation ( $\sigma_{n-1}$ ).
- With the repeatability check function, the balance obtains 10 measurement data using the built-in weight and displays its standard deviation. By installing the balance and using this function, it is possible to check repeatability in the environment where the balance is installed.

Eg. "Standard deviation = 0.001 g " means that the result of repeated measurements of the same weighing material falls within the range  $\pm 0.001$  g at a frequency of about 68%.

### CAUTION

- The results of this function differ from the repeatability conditions of "28-2 Individual specifications" because they use the balance's internal weight (about 200 g), so treat the value as a reference value.
- To ensure accurate data measurement, avoid applying vibration or drafts while collecting data.
- If the password function is enabled, this function is only available to the Administrator (ADM<sup>IN</sup>).

Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key for 4 seconds until the display transitions as shown to the right.	  Press and hold (for 4 seconds)  
2.	When the display shown to the right appears, release your finger from the <b>SAMPLE</b> key.	 
3.	When  is displayed, the screen transitions as shown in the diagram, and data collection begins automatically. "rEP tESt" is blinking while data is being collected.	

Step	Description	Display and key operations
	<p>To cancel the process, press the <b>CAL</b> key.</p> <p>" <b>CANCEL</b> " appears and the balance returns to weighing mode.</p>	  <p>Repeated 10 times</p> 
4.	<p>When data collection is completed, the repeatability (standard deviation) is displayed.</p> <p>To output the result, press the <b>PRINT</b> key.</p> <p>The repeatability will be output.</p> <p>PC output example (WinCT, RsCom)</p> <p>SD_____+1.17_mg&lt;TERM&gt;</p> <p>      : Space, ASCII 20h        &lt;TERM&gt; : Terminator, CR LF or CR              CR : Carriage return, ASCII 0Dh              LF : Line feed, ASCII 0Ah</p>	   <p>Data output</p>
5.	<p>Press the <b>CAL</b> key to return to weighing mode.</p>	  

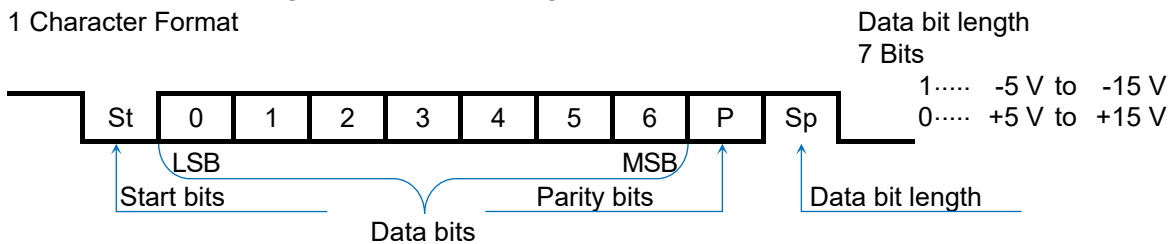


# 17. Interface Specification

## 17-1 RS-232C

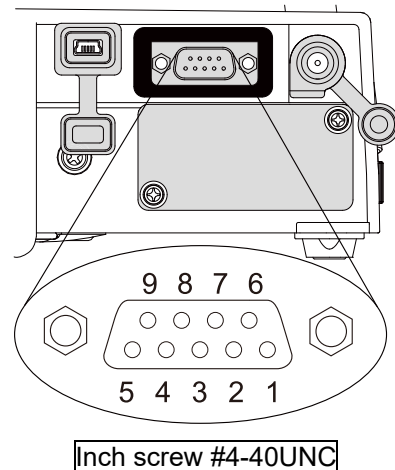
Connector	D-Sub 9-pin (male)		
Transmission system	EIA RS-232C		
Transmission form	Asynchronous, bi-directional		
Transmission rate	Approximately 5 times/sec (5.21 Hz), approximately 10 times/sec (10.42 Hz), approximately 20 times/sec (20.83 Hz).		
	Linked with $5P_d$ of $bR5Fnc$ in the function table ("9. Function Table").		
Signal format	Baud rate	600, 1200, 2400, 4800, 9600, 19200, 38400 bps	
	Data bits	7 bits or 8 bits	
	Parity	EVEN or ODD	(Data bit length: 7 Bits)
		NONE	(Data bit length: 8 Bits)
	Data bit length	1 bit	
	Code	ASCII	

### 1 Character Format



D-Sub 9-pin assignments

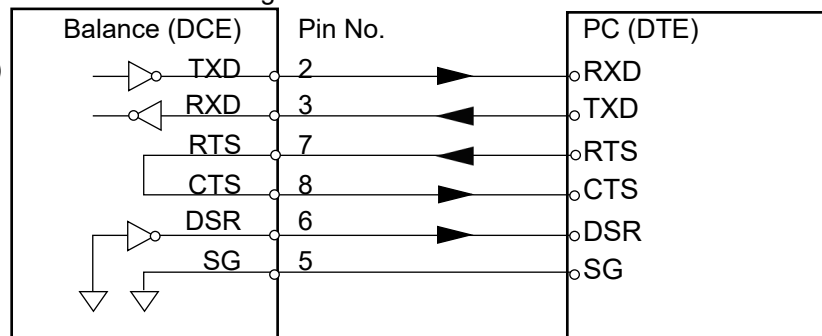
Pin No.	Signal name	Direction	Description
1	-	-	Same potential as SG *1
2	TXD	Output	Transmit data
3	RXD	Input	Receive data
4	-	-	No connection
5	SG	-	Signal ground
6	DSR	Output	Data set ready
7	RTS	Input	Request to send
8	CTS	Output	Clear to send
9	-	Output	12 V output *1



Signal names other than TXD and RXD are designated on the DTE side.

### Wiring diagram

(when connected to a PC)



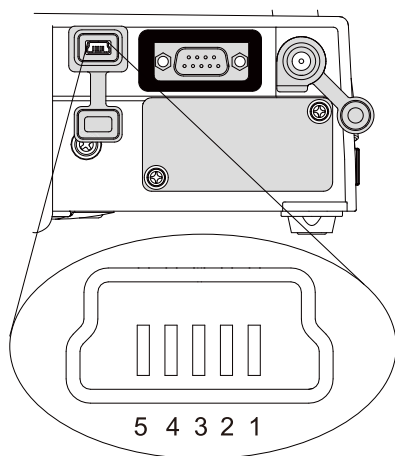
\*1 Used with some A&D peripherals. Do not connect to devices from other manufacturers that output power. Ensure a compatible cable is used, as using the wrong connection cable may damage the device.

## 17-2 USB

Connector	Mini B (Female)
Specification	USB 2.0
Device class	Human Interface Device (HID): Quick USB CDC (communication device class):Virtual COM port

### Mini-B Pin Configuration

Pin No.	Signal name	Direction	Description
1	VBUS	Input	Power supply
2	D-	-	Transmission and Reception data
3	D+	-	Transmission and Reception data
4	ID	-	No connection
5	GND	-	Signal ground



## 18. Connection with Peripheral Devices

You can connect peripheral devices, PCs, or PLCs using the RS-232C connector and USB mini-B connector, which are standard equipment on the balance.

### 18-1 Cables required to connect to peripheral devices

The connection cables compatible with the peripheral devices and interfaces used are as follows.

Connection Cables for Peripheral Devices

Product name	Model	Communication Interface used	Connection cable		Note
			Standard accessory / Optional	Cable model	
Thermal printer	AD-8129TH	RS-232C	[Standard accessory] RS-232C cable included with the printer	AX-KO2741-100	*1
Remote display	AD-8920A	RS-232C	[Standard accessory] Communication Cable for External Display or External Controller	AX-KO3412-100	*2
Remote controller	AD-8922A			AX-KO2466-200	*2
Extension Controller for Weighing Line	AD-8923-BCD		【Optional】	AX-KO2466-200	
	AD-8923-CC				
PLC			【Optional】		*3
PC		RS-232C	【Optional】		*4
		USB	[Standard accessory] USB cable included with the balance	AX-KO5465-180	

#### Note

- \*1 If you use the optional AD-8529PR-W (Bluetooth® Converter), the RS-232C cable included with the printer will not be used.
- \*2 Optional cables in 5m and 10m lengths are also available.
- \*3 Please check the interface specifications of the MC and the PLC you are using, and prepare a compatible cable accordingly.
- \*4 You can connect to a PC using AX-USB-9P, AD-8529PC-W, AD-1688, and AD-8527. For data transfer, the connection cables included with these products can be used.

## 18-2 Data output method

You can adjust the operation of the balance by changing the function table settings to match the intended use.

For details on internal settings, please refer to "9. Function Table."

### (1) Output method for weighing data via the RS-232C/USB interface

You can specify it in "PrL (Data Output Mode)" under " (Data Output)" in the function table ("9. Function Table").

#### Data output mode

Class	Item	Parameter	Description	
<input type="text" value="dout"/>	PrL Data output mode	0	Key mode	Outputs data with the <input type="text" value="PRINT"/> key when stable.
		1	Auto print mode A	Automatically outputs data when stable (Reference = zero)
		2	Auto print mode B	Automatically outputs data when stable (Reference = the latest stable value)
		3	Stream mode	Continuous output
		4	Key mode B	Outputs data immediately with the <input type="text" value="PRINT"/> key, whether stable or not.
		5	Key mode C	Outputs data immediately with the <input type="text" value="PRINT"/> key if stable; otherwise, outputs once stabilized.
		6	Interval output mode	Starts with the <input type="text" value="PRINT"/> key and outputs data at set intervals.
		7	Auto print mode C	Data output occurs when the comparison result is OK and stable, exceeding the $RP-P$ and $RP-b$ range from zero display.

## (2) Precautions when connecting multiple peripheral devices simultaneously

Peripheral devices such as external displays, external controllers, and extended controllers for weighing lines (18. Connection Cables for Peripheral Devices) are used to display weighing values in real time. To achieve this, the balance typically operates in continuous output mode (stream mode) for measurement data.

On the other hand, when connecting peripheral devices such as printers, PLCs, and PCs, if the balance is set to stream mode (continuous output of weighing values), usability may be negatively affected.

To accommodate the simultaneous connection of peripheral devices operating in stream mode and other peripheral devices, the RS-232C allows exceptional operation based on the connected peripheral devices.  *ModE* (Connection Destination) in the function table ("9. Function Table") enables this.

Function table ( *ModE* )

Class	Item	Parameter	Description	Data output mode	Data format
<input type="text" value="5 iF"/>	<i>ModE</i> Devices Connected to RS-232C	0	General-purpose Devices (e.g., PCs, PLCs, etc.)	Follow the <input type="text" value="dout"/> <i>Prt</i> setting	<input type="text" value="5 iF"/> <i>TYPE</i>
		1	Printer		<input type="text" value="5 iF"/> <i>TYPE</i> Setting (Only A&D Standard Format and DP Format can be selected.)
		2	External Display Devices, etc.	Operates in stream mode regardless of the <input type="text" value="dout"/> <i>Prt</i> <b>setting.</b>	Output is in A&D Standard Format regardless of the <input type="text" value="5 iF"/> <i>TYPE</i> <b>setting. *1</b>

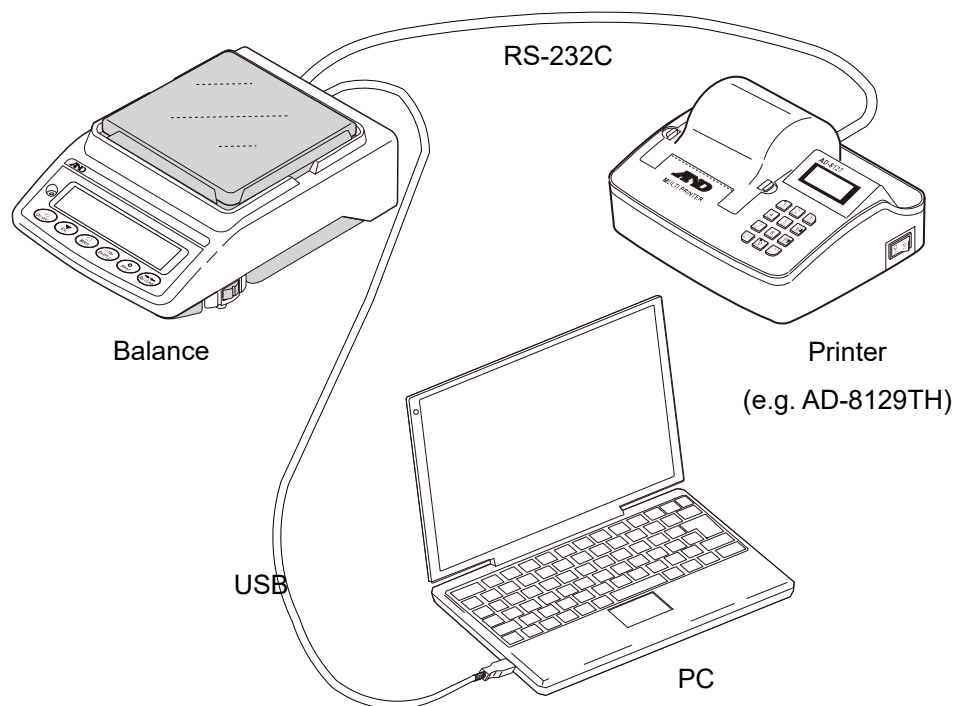
\*1 Only weighing values are output continuously.

The functions of *5-t d* (**Date, Time**), *5- i d* (**ID Number**), *PUSE* (**Data Output Interval**), *Alt-F* (**Auto Feed**), and *inF d* (**GLP Output**) in  are disabled.

## 18-3 Examples: Connecting multiple peripheral devices simultaneously

### (1) Printer and PC connection

Example of use Printing the weighing value on a printer and simultaneously capturing the weighing value on a PC.

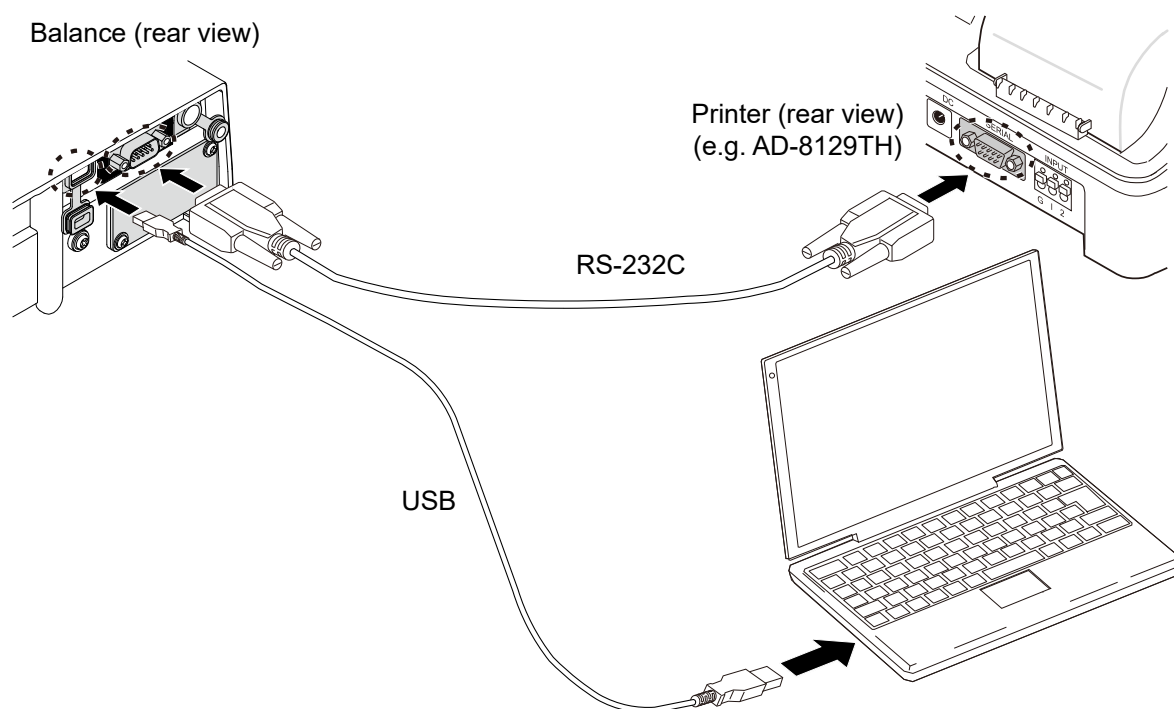


Simultaneous connection example 1: Printer and PC

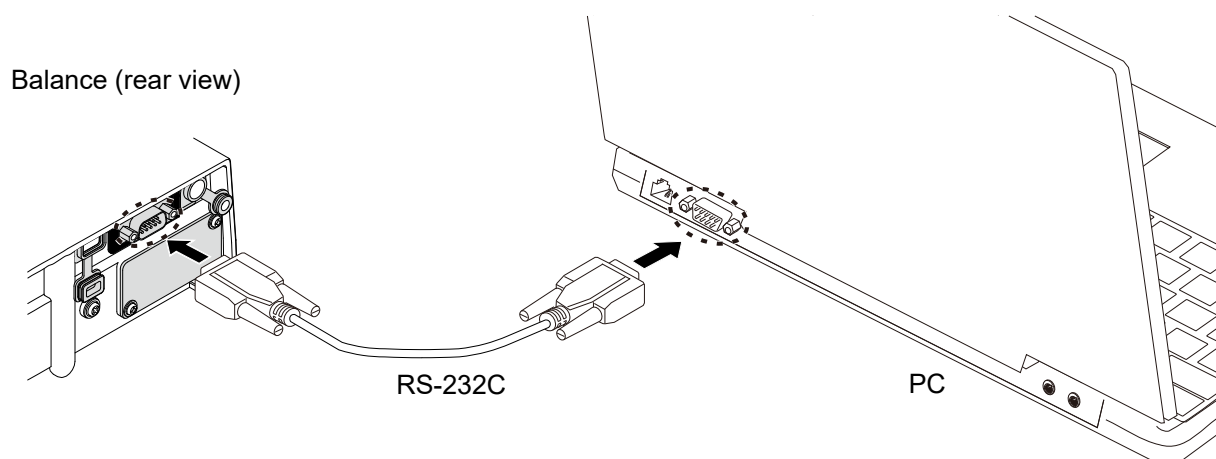
Connection method		Connection interface			
Interface	Device	Class	Item	Parameter	Description
(Common setting)		<input type="text" value="dout"/>	Prt	0 to 7	Select the data output mode that is suitable for the printer/PC settings and applications. <b>*1</b>
RS-232C	Printer	<input type="text" value="51F"/>	ModE	1	Select the weighing format that is suitable for the printer settings and applications. (A&D standard format, DP format)
			tYPE	0, 1	
USB	PC	<input type="text" value="USB"/>	U-tP	0 to 4	Output format optimal for PC

**\*1** The data output mode is a common setting for both the printer and the PC. The weighing value is output simultaneously.

The dedicated balance printers include **AD-8129TH (Compact Thermal Printer)**.



To connect only the balance and the PC, you can use either a USB cable or an RS-232C cable.



If the PC does not have an RS-232C interface (COM port), the USB converter (AX-USB-9P) can be used.

## (2) Connecting printers and external display devices

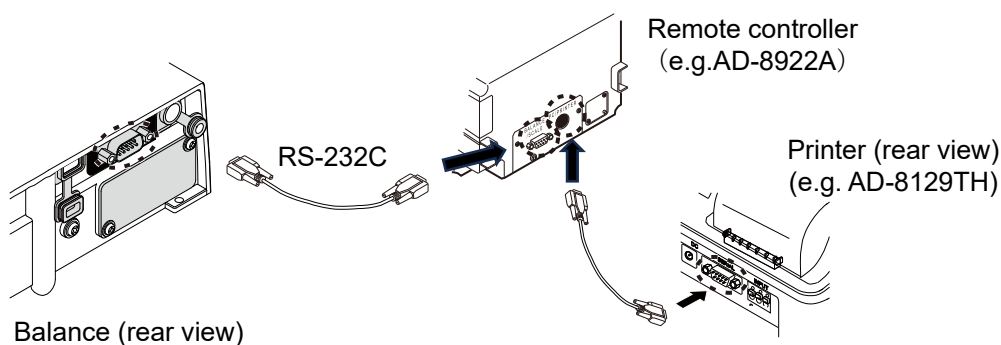
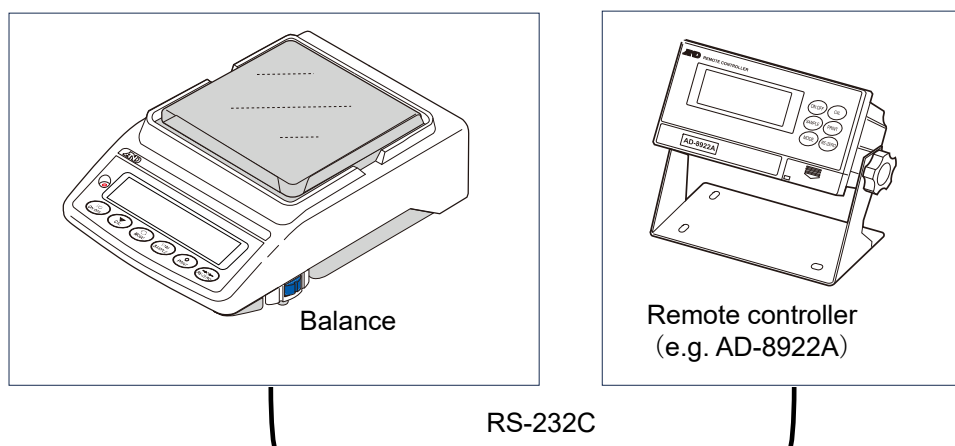
Example of Use: While displaying the weighing values on an external display device, the printer also prints the weighing values simultaneously.

### Example of Simultaneous Connection [2]: "Printers and External Display Devices"

Connection method		Connection interface			
Interface	Device	Class	Item	Parameter	Description
RS-232C	Printer	<input type="text" value="dout"/>	<i>Prt</i>	0 to 7	Select the data output mode that suits the printer's usage and settings.
		<input type="text" value="5, f"/>	<i>ModE</i>	1	Select the weighing format that is suitable for the printer settings and applications. (A&D standard format, DP format)
			<i>tYPE</i>	0, 1	
USB	[None]				

When checking weighing values or performing key operations away from the balance unit, connect a dedicated external display device.

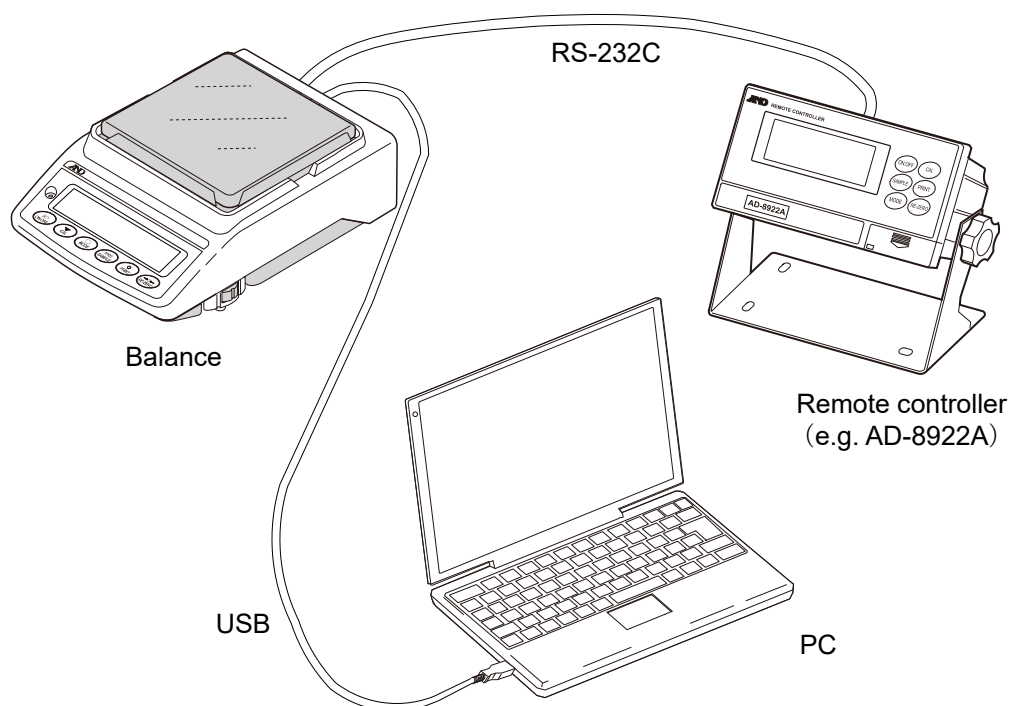
The dedicated external display devices for the balance are AD-8920A (External Display: Display Only) and AD-8922A (External Controller).





### (3) Connecting external display devices and PCs

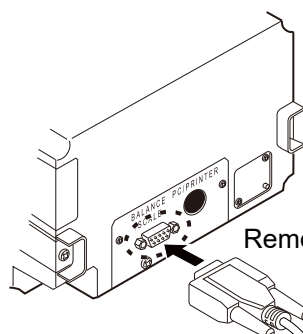
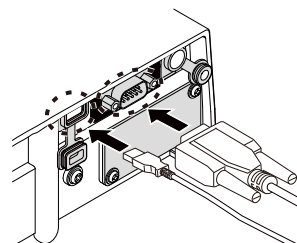
Example of Use: While displaying the weighing value on an external display device, the PC captures the weighing value simultaneously.



Example of Simultaneous Connection [3]: "External Display Devices and PCs"

Connection method		Connection interface			
Interface	Device	Class	Item	Parameter	Description
RS-232C	Remote display	<input type="text" value="5, F"/>	ModE	2	The external display device continuously outputs weighing values in A&D Standard Format.
USB	PC	<input type="text" value="dout"/>	Pr t	0 to 7	Select the data output mode that suits the PC's logging method.
		<input type="text" value="USB"/>	U-tP	0 to 4	Select the output format that is easy for the PC to process.

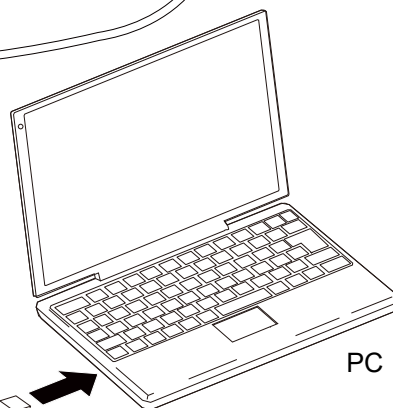
Balance (rear view)



Remote controller(rear view)  
(e.g. AD-8922A)

RS-232C

USB



PC

# 19. Printing Weighing Value Data on a Printer

Refer to the following examples for printer settings and the balance's function table, based on the type of printer used and the method of printing weighing data.

## 19-1 With AD-8129TH

### 19-1-1 Printing only weighing value data

Common Balance Settings When Printing Only Weighing Values on AD-8129TH

Class	Item	Parameter	Description
<div>5 iF</div> Serial interface	ModE Connection destination	1	Printer connection
	TYPE Data format	0	A&D standard format

Settings for Printing Only Weighing Values on AD-8129TH

Printing method	Balance function table			AD-8129 <sup>TH</sup> Funtion table	
	Class Item	Parameter	Description	PRN.MODE	Description
Press the <div>PRINT</div> key on the balance to print the weighing value.	<div>dout</div> Data output  <div>Prnt</div> Data output Mode	0	Key mode	EXT.KEY	External key print mode
		4	Key mode B (Immediate output) *1		
		5	Key mode C (Output when stable)		
		1	Auto print mode A (Reference = zero)		
Automatically prints weighing value data based on weighing value change.		2	Auto print mode B (Reference = the latest stable value)	MANUAL	Manual print mode
Prints weighing value data at regular intervals		7	Auto print mode C		
		6	Interval output mode *1		
Press the <div>PRINT</div> key on the printer to print the weighing value.		3	Stream mode *1	CHART	Chart print mode
Prints weighing value data in chart format.					

\*1 Unstable data is also output.

If AD-8129TH is set to a mode other than dump print mode and unstable data needs to be printed, change the internal setting of AD-8129TH to "Print Unstable Data" (US PRN / PRINT).

## 19-1-2 Printing weighing value data with the ID number and timestamp using the clock/calendar function of the balance

Common balance settings when printing weighing values with additional information on AD-8129TH

Class	Item	Parameter	Description
<div>5, F</div> Serial interface	ModE Connection destination	/	Printer connection
	TYPE Data format	/	DP format

Settings for printing weighing values with additional Information on AD-8129TH

Printing method	Balance function table			AD-8129TH Function table	
	Class Item	Parameter	Description	PRN.MODE	Description
Press the <div>PRINT</div> key on the balance to print the weighing value.	<div>dout</div>	0	Key mode	DUMP	Dump print mode *2
		4	Key mode B (Immediate output) *1		
		5	Key mode C (Output when stable)		
Automatically prints weighing value data based on weighing value change.	Data output	1	Auto print mode A (Reference = zero)		
	Print Data output Mode	2	Auto print mode B (Reference = the latest stable value)		
		7	Auto print mode C		
Prints weighing value data at regular intervals		6	Interval output mode *1		

\*1 Unstable data is also output.

\*2 Printing using the printer's keys or in chart format is not possible.

## 19-1-3 Printing information other than weighing value data

When printing maintenance records of sensitivity adjustment/calibration tests (GLP output) or when the balance outputs statistical calculation results, change the printer to dump print mode.

AD-8129TH Function Table for Printing Information Other Than Weighing Values

AD-8129TH Function table	
PRN.MODE	Description
DUMP	Dump print mode

Switching AD-8129TH Print Mode (PRN.MODE)

- Press and hold the 

ENT  
SAVE

 key on the printer to toggle between EXT.KEY (External Key Print Mode) and DUMP (Dump Print Mode) without entering the function table of AD-8129TH.

This is useful when temporarily switching AD-8129TH to Dump Print Mode for GLP output, etc.

## 20. Connecting to a PC

### 20-1 Quick USB mode

Quick USB mode allows you to connect the balance to a PC using a USB cable and directly input the balance's output into PC software, such as Excel or Word. The supported operating systems are Windows XP or later. Since the Windows standard driver (HID) is used, there is no need to install a dedicated driver. Communication with the PC is enabled simply by connecting.

#### CAUTION

- **Quick USB provides one-way communication from the balance to the PC. Commands to control the balance cannot be sent from the PC.**
- **Turn off the screen saver and standby mode on the PC.**
- **Do not use Quick USB when the data output mode of the balance is set to stream mode. In stream mode, the balance continuously outputs weighing data to the PC, which may cause unintended operations on the PC.**

#### USB data format

- When using USB, the data format follows the NU2 format.  
Regardless of the *U-tP* (USB Data Format) setting value, the format is fixed to NU2 format.

Function table	Output example									
	NU2 format <table><tr><td>1</td><td>2</td><td>3</td><td>.</td><td>4</td><td>5</td><td>6</td><td>CR</td><td>LF</td></tr></table>	1	2	3	.	4	5	6	CR	LF
1	2	3	.	4	5	6	CR	LF		

  : Space, ASCII 20h

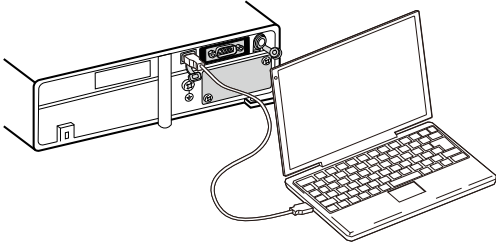

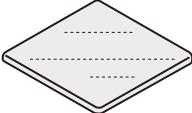


<TERM> : Terminator, CR LF or CR

CR : Carriage return, ASCII 0Dh

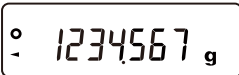
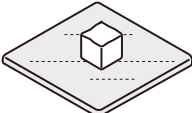
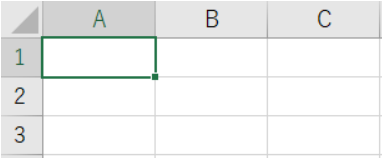
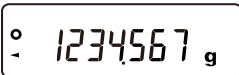
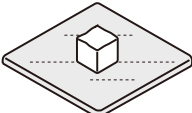
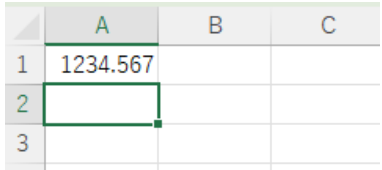


LF : Line feed, ASCII 0Ah

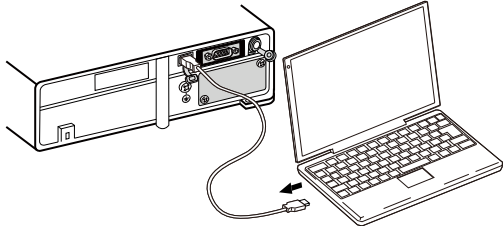

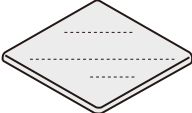


TAB : Horizontal Tab, ASCII 09h

- When additional data such as time is present, the separator between the weighing data and the additional data is TAB (Horizontal Tab).  
Refer to the Quick USB Output Example in "[21-2 Weighing data format](#)" for more details.

Step	Description	Display and key operations	Weighing operation
1.	<p>Connect the balance to the PC using the USB cable included with the balance.</p>  <p>When the balance is connected to the PC for the first time, the PC will automatically begin installing the driver.</p>		
2.	<p>Once communication between the balance and the PC is established, the balance display will show a Quick USB connection indicator (for 2 seconds), as shown on the right, and then automatically return to weighing mode. *</p> <p>During the USB connection, "◀" (the USB connection indicator) will be displayed.</p>	 <p>Displayed for 2 seconds</p>	
3.	Launch the software (e.g. Excel) used for transmitting weighing data on the PC.		
4.	Be sure to set the keyboard to single-byte input mode. (Data cannot be entered correctly in the double-byte input mode.)		

\* If the indicator is not displayed, check that "UFnc (USB Operation Mode)" in the function table ("9. Function Table") is set to "Q (Quick USB)".

Step	Description	Display and key operations	Weighing operation
5.	Place a sample on the weighing pan.		
6.	<p>Place the cursor where you want to enter the weighing data.</p> 		
7.	<p>Press the <b>PRINT</b> key to send the weighing data from the balance. The data will be entered at the cursor position.</p> 	  <p>Data output</p>	

Step	Description	Display and key operations	Weighing operation
8.	<p>To end the data transmission, disconnect the USB cable.</p> 		
9.	<p>When the balance is disconnected from the PC, the display will show a USB disconnection indicator (for 2 seconds) as shown on the right, and then automatically return to weighing mode.</p> <p>"◀" (the USB disconnection indicator) turns off.</p>	 <p>Displayed for 2 seconds</p> 	

## 20-2 Virtual COM mode

Virtual COM mode is a function that allows a balance to connect to a PC using the included USB cable, creating a COM port on the PC for bidirectional communication. The supported operating systems are Windows XP or later. On Windows 10 and Windows 11, the driver will be installed automatically. If it is not installed automatically, please refer to the PDF file in the [driver for Virtual COM mode](#) \*1 on the A&D website (<https://www.aandd.jp>).

\*1 User information must be entered in order to download the driver.

Communication equivalent to RS-232C is possible by selecting the COM port with the Windows Communication Tools Software (WinCT).



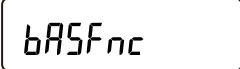




Virtual COM mode requires no configuration of the baud rate, data bits, parity, or stop bits in the data communication software.

### CAUTION

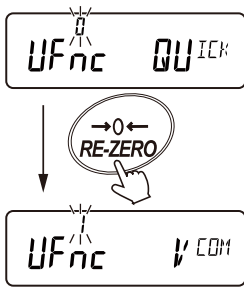
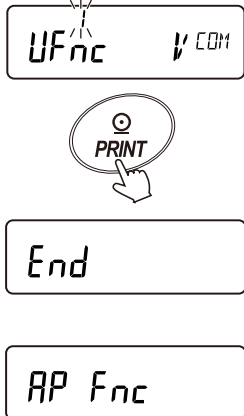

- ❑ **When installing the driver for Virtual COM mode for the first time, the installation process may take some time.**

Enabling the Virtual COM mode (Changing the function table)

Switching between Quick USB mode (unidirectional communication) and Virtual COM mode (bidirectional communication)

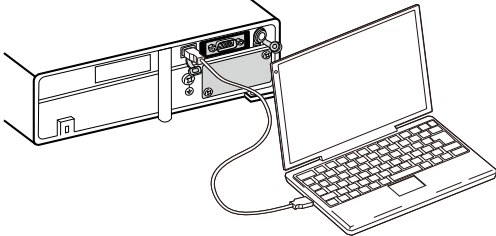

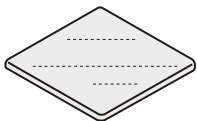



Step	Description	Display and key operations
1.	In weighing mode, press and hold the <b>SAMPLE</b> key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the <b>SAMPLE</b> key several times until the display shown to the right appears.	 Press several times 
3.	Press the <b>PRINT</b> key.	 

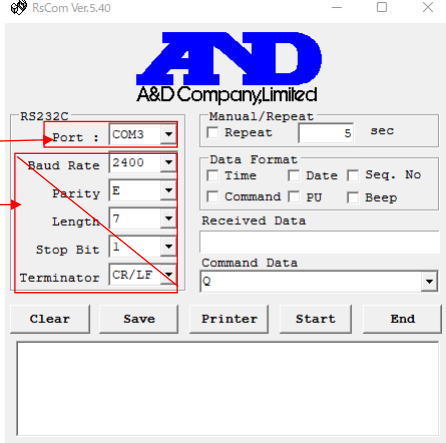

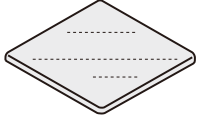


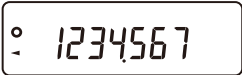


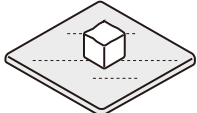


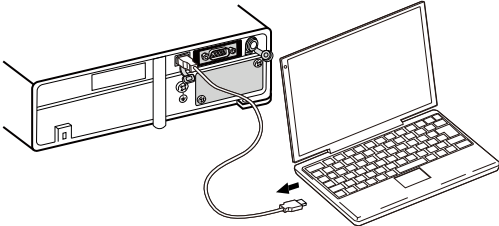

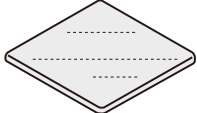


Step	Description	Display and key operations
4.	Use the <b>RE-ZERO</b> key to switch the parameter for "UFnc" (USB function mode) from "Q" (Quick USB) to "I" (Virtual COM mode).	 <p>The diagram shows two display states. The top display shows "UFnc" and "Q". An arrow points down to the bottom display, which shows "UFnc" and "I". A hand icon is shown pressing a key labeled "RE-ZERO" with a double-headed arrow above it.</p>
5.	When the display shown on the right appears, press the <b>PRINT</b> key to store the setting.	 <p>The diagram shows the display "UFnc" and "I". Below it, a hand icon is shown pressing a key labeled "PRINT" with a circular arrow above it. Below the key press, there are two rectangular boxes: the first contains "End" and the second contains "AP Fnc".</p>
6.	Press the <b>CAL</b> key to return to weighing mode.	 <p>The diagram shows a hand icon pressing a key labeled "CAL" with a downward arrow above it. Below the key press, there is a rectangular box containing "°" and "0000 g".</p>

## Usage

The following example explains how to output weighing data from the balance using the **PRINT** key or a data request command from the PC.

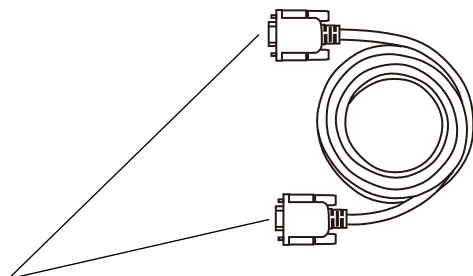
Step	Description	Display and key operations	Weighing operation
7.	<p>Connect the balance to the PC using the USB cable included with the balance.</p>  <p>When connecting for the first time on Windows 10 or Windows 11, the PC will automatically start installing the driver.</p> <p>For operating systems other than Windows 10 and Windows 11, you need to install the driver manually.</p> <p>Refer to the PDF file in the <a href="https://www.aandd.jp">driver for Virtual COM mode</a> on the A&amp;D website (<a href="https://www.aandd.jp">https://www.aandd.jp</a>) for instructions on how to install the driver.</p>		
8.	When the balance is connected to the PC, the "USB" will blink on the balance display, as shown to the right (while establishing communication with the PC)		
9.	<p>Once communication between the balance and the PC is established, the balance display will show a Virtual COM connection indicator (for 2 seconds), as shown on the right, and then automatically return to weighing mode.</p> <p>During the USB connection, "◀" (the USB connection indicator) will be displayed.</p>	 <p>Displayed for 2 seconds</p> 	
10.	Launch the software (e.g. WinCT) used for transmitting weighing data on the PC.		

Step	Description	Display and key operations	Weighing operation
11.	<p>Communication equivalent to RS-232C is possible by selecting the COM port). Virtual COM mode requires no configuration of the baud rate, data bits, parity, or stop bits in the data communication software.</p> <p>For instructions on using WinCT, please download the necessary manuals from the Software page on the A&amp;D website (<a href="https://www.aandd.jp">https://www.aandd.jp</a>).</p> <p>Example: RsCom</p>  <p>COM port</p> <p>No</p>		
12.	Press the <b>RE-ZERO</b> key to set the display to zero.	 	
13.	Place a sample on the weighing pan.		
14.	<p>The following example explains how to output weighing data from the balance using either the <b>PRINT</b> key or a data request command from the PC.</p> <p>The balance will output the weighing data.</p> <p>Output example</p> <p>A&amp;D standard format</p> <p>ST,+01234.567 g&lt;TERM&gt;</p> <p>    : Space, ASCII 20h</p> <p>&lt;TERM&gt; : Terminator, CR LF or CR</p> <p>    CR : Carriage return, ASCII 0Dh</p> <p>    LF : Line feed, ASCII 0Ah</p>	 <p>or, send a data request command from the PC</p>  <p>Data output</p>	

Step	Description	Display and key operations	Weighing operation
15.	To end the data transmission, disconnect the USB cable. 		
16.	When the balance is disconnected from the PC, the display will show a USB disconnection indicator (for 2 seconds) as shown on the right, and then automatically return to weighing mode. "←" (the USB disconnection indicator) turns off.	 <p>Displayed for 2 seconds</p> 	

## 20-3 RS-232C

The RS-232C interface of the balance is a Data Communication Equipment (DCE) that can be connected to a PC. The RS-232C cable to be connected is a straight type. If the PC does not have an RS-232C connector, use the USB Virtual COM mode for connection.



D-Sub 9-pin female with inch screws

## 20-4 WinCT WinCT: Data communication software

- WinCT is Windows-based data communication software designed for easily receiving weighing data from the balance on your PC. The PC communication settings use RS-232C.
- Please download WinCT from the [Software page](https://www.aandd.jp) on the A&D website (<https://www.aandd.jp>).  
For installation and setup instructions, refer to the [Setup Manual](#) and [Instruction Manual](#) available on the A&D website.
- WinCT includes three applications: "RsCom," "RsKey," and "RsWeight."

### RsCom

- Allows you to control the balance by sending commands to the balance.
- Displays received data and saves it as a text file (.txt).
- Enables communication with multiple balances by running multiple instances.
- Can be run simultaneously with other applications. (Does not monopolize the PC.)
- Receives GLP output data from the balance.

### RsKey

- Directly inputs weighing data from the balance into other applications.
- Compatible with any application that allows keyboard input, such as Word or Excel.
- Inputs GLP output from the balance.
- Uses the test display function to make the PC an external display for the balance.  
(in stream mode)

### RsWeight

- Graphs received data in real-time.
- Calculates and displays maximum, minimum, average, standard deviation, and coefficient of variation of received data.

## 20-5 WinCT-ParamSet: Windows communication tools for parameter setting

- WinCT-ParamSet is Windows-based data communication software that allows you to change the balance's function table from your PC. Communication with the PC uses either USB or RS-232C.

### CAUTION

- To connect via USB, refer to "[Enabling the Virtual COM mode \(Changing the function table\)](#)" and set the parameter to "I" (Virtual COM mode) for "UFnc" (USB function mode) under USB (USB Interface) in the function table ("[9. Function Table](#)").

- To connect via RS-232C, you need a separate cable to connect the PC and the balance. (e.g. USB conversion cable AX-USB-9P)

- Please download WinCT-ParamSet from the [Software page](#) on the A&D website (<https://www.aandd.jp>).

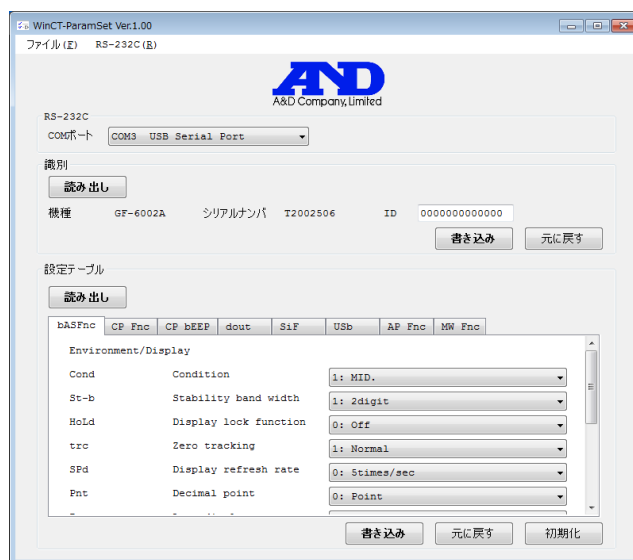
For installation and setup instructions, download the software from the [Software page](#) on the A&D website (<https://www.aandd.jp>) and refer to the following:

"WinCT-ParamSet\_Setup\_EN\_Ver.1.\*\*.pdf"

"WinCT-ParamSet\_Instruction\_Manual\_EN\_Ver.1.\*\*.pdf"

(The file names vary depending on the software version of WinCT-ParamSet, with asterisks (\*) representing digits 0-9.)

- Reads and changes the ID number and function table data from the balance in bulk.
- Saves the settings as a CSV file.
- Loads the saved CSV file and writes the settings to the balance.



### CAUTION

- Except for ID settings, settings that involve numerical input (e.g., unit weight settings for counting mode) cannot be configured using this software. To configure, use the balance's key operations.
- If the balance's password function is enabled, this software cannot be used.

Additionally, this software cannot enable the setting if it is disabled. To set the password function, use the balance's key operations.

When writing settings from a saved CSV file, the software version of the balance recorded in the CSV file must match the software version of the balance to which you are writing.

## 20-6 Balance weighing speed adjustment software WinCT-GXA-Filter

WinCT-GXA-Filter is data communication software that allows adjustment of the balance weighing speed. WinCT-GXA-Filter can be downloaded from the A&D website (<https://www.aandd.jp>) by entering user information on the "Software Download [[WinCT-GXA-Filter](#)] Application" page.

### Features

- Reads setting data from the balance and modifies it collectively.
- Saves the settings as a CSV file.
- Loads a saved CSV file and writes the settings to the balance.
- Toggles the extension function (detailed filter settings) on/off.

# 21. Data Output

## 21-1 Data output mode

The data output timing of the balance can be changed by using "Prt" (Data output mode) under  (Data output mode) in the function table ("9. Function Table").

### Key mode

Function table:  *Prt* 0

In addition, pressing the  key when "●" (the stabilization indicator) is displayed will output the weighing value once.

At this time, the weighing value display will blink once to show that it has been output.

### Auto print mode A

Function table:  *Prt* 1

If the weighing value exceeds the range from the reference "zero display" to the parameters set for "RP-P" (Auto print polarity) and "RP-b" (Auto print band width) under  (Data output) in the function table ("9. Function Table") and "●" (the stabilization indicator) is displayed, the weighing value will be output once. In addition, pressing the  key when "●" (the stabilization indicator) is displayed will output the weighing value once. At this time, the weighing value display will blink once to show that it has been output.

### Example of use

Automatically outputting the weighing value each time a sample is weighed

### Required function table settings

<input type="text" value="dout"/>	<i>Prt</i> = 1	A mode
<input type="text" value="dout"/>	<i>RP-P</i>	Auto print polarity
<input type="text" value="dout"/>	<i>RP-b</i>	Auto print band width

### Auto print mode B

Function table:  *Prt* 2

If the weighing value exceeds the range from the latest stable value to the parameters set for "RP-P" (Auto print polarity) and "RP-b" (Auto print band width) under  (Data output) in the function table ("9. Function Table") and "●" (the stabilization indicator) is displayed, the weighing value will be output once. In addition, pressing the  key when "●" (the stabilization indicator) is displayed will output the weighing value once. At this time, the weighing value display will blink once to show that it has been output.

### Example of use

Automatically outputting the weighing value while adding samples

### Required function table settings

<input type="text" value="dout"/>	<i>Prt</i> = 2	B mode
<input type="text" value="dout"/>	<i>RP-P</i>	Auto print polarity
<input type="text" value="dout"/>	<i>RP-b</i>	Auto print band width



## Stream mode

Function table: 

dout
------

 Prt 3

Regardless of the "●" (stabilization indicator) status, the weighing value is output at the display refresh rate set for "5Pd" (Display refresh rate) under 

bR5Fnc
--------

 (Environment, Display) in the function table ("9. Function Table"). The display does not blink during this.

### CAUTION

- ❑ **Depending on the display refresh rate and baud rate, not all data may be transmitted. Increase the baud rate.**

#### Example of use

Continuously monitoring the weighing value on a PC and displaying the weighing value on a remote display.

#### Required function table settings

<div>dout</div>	Prt = 3	Stream mode
<div>bR5Fnc</div>	5Pd	Display refresh rate
<div>51F</div>	bP5	Baud rate

## Key mode B

Function table: 

dout
------

 Prt 4

Regardless of the "●" (stabilization indicator) status, the weighing value is output once when the 

PRINT
-------

 key is pressed.

## Key mode C

Function table: 

dout
------

 Prt 5

When the 

PRINT
-------

 key is pressed while "●" (the stabilization indicator) is displayed, the weighing value will be output once.

If "●" (the stabilization indicator) is not displayed, pressing the 

PRINT
-------

 key will output the weighing value once the indicator appears.

At this time, the weighing value display will blink once to show that it has been output.

## Interval output mode

Function table: 

dout
------

 Prt 6

Regardless of the presence of "●" (the stabilization indicator), the weighing value is output at intervals set for "int" (Interval time) under 

dout
------

 (Data output) in the function table ("9. Function Table").

Pressing the 

PRINT
-------

 key will start output. Pressing the 

PRINT
-------

 key again during output will stop it.

Pressing the 

PRINT
-------

 key again during output will stop it.

### CAUTION

- ❑ **In some combinations of interval time and baud rate, not all data may be transmitted unless the baud rate is increased.**

## Example of use

Outputting the weighing value at regular intervals.

### Required function table settings

<input type="text" value="dout"/>	$Prt = 5$	Interval output mode
<input type="text" value="dout"/>	int	Interval time

Auto print C mode Function table:   $Prt 1$

When the weighing value exceeds the range specified by  $RP-P$  (Auto Print Polarity) and  $RP-b$  (Auto Print Width) from zero display, and the comparator result is OK while displaying the "●" (the stabilization indicator), the weighing value is output once.

Additionally, when the "●" (the stabilization indicator) is displayed, pressing the  key outputs the weighing value once.

At this time, the display blinks once to indicate that the output has been completed.

## Example of use

Outputting and recording the weighing value when it falls within a certain range.

### Required function table settings

<input type="text" value="dout"/>	$Prt = 1$	C mode
<input type="text" value="dout"/>	$RP-P$	Auto print polarity
<input type="text" value="dout"/>	$RP-b$	Auto print band width
<input type="text" value="CP Fnc"/>	$CP = 1$ to $2$	Comparator mode
<input type="text" value="CP VALUE"/>	$CP H1$	Setting the upper limit value
<input type="text" value="CP VALUE"/>	$CP Lo$	Setting the lower limit value

## 21-1-1 Data output method

RS-232C can be configured in "**ModE (Connection Destination)**" under  in the function table ("**9. Function Table**") to enable exceptional operations according to the connected peripheral device.

Function of the Setting Item "**ModE (Connection Destination)**"

Class	Item	Parameter	Description		
			Device	Data output mode	Data format
<input type="text" value="5, F"/>	ModE Devices Connected to RS-232C	0	General-Purpose Devices Such as PC and PLC	Follow the <input type="text" value="dout"/> <i>Prt</i> Settings	Follow the <input type="text" value="5, F"/> <i>tYPE</i> Settings
		1	Printer	Follow the <input type="text" value="dout"/> <i>Prt</i> Settings	Follow the <input type="text" value="5, F"/> <i>tYPE</i> Settings (Only A&D standard and DP format can be selected)
		2	External Display Devices, etc.	Stream Mode is enabled regardless of the <input type="text" value="dout"/> <i>Prt</i> Settings <b>*1</b>	<input type="text" value="5, F"/> <i>tYPE</i> settings are fixed to A&D standard format

**\*1** Only the weighing value is continuously output  
Time/Date (*5-t d*) and ID Number (*5- id*) are not added.

- The functions in "**9. Function Table**" " (**Data Output**)", including "**Prt (Data Output Mode)**", "**PUSE (Data Output Interval)**", "**Alt-F (Auto Feed)**", and "**inFa (GLP Output)**", are also disabled.

## 21-2 Weighing data format

The data output format of the balance can be changed by using "TYPE" (Data format) under  (Serial interface) for RS-232C and "U-TP" (USB data format) under  (USB interface) for USB in the "9. Function Table".

### CAUTION

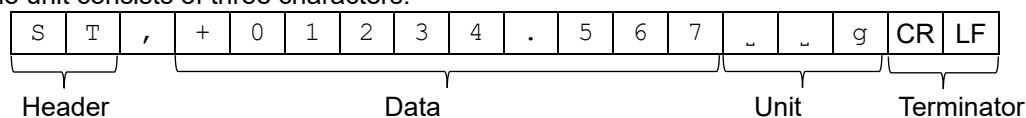
**The Quick USB data format is NU2 format regardless of the internal settings.**

### A&D standard format

RS-232 connection: Function table  TYPE = 0

For Virtual COM mode connection: Function table  U-TP = 0

- This is the standard format for sending data to peripheral devices.
- The data consists of 16 characters (excluding the terminator).
  - This differs from the 15-character A&D standard format used by other balances and scales.
- A 2-character header indicates the condition of the data.
- The data is padded with polarity and zeros (filling the higher order surplus part with zeros).
- When the data is zero, the polarity is positive.
- The unit consists of three characters.



S	T
U	S
Q	T
O	L

When stable

When unstable

Counting mode when

When overloaded

CR : Carriage return,

LF : Line feed

: Space

ASCII 0Dh

ASCII 0Ah

ASCII 20h

- In external key print mode "EXT.KEY", AD-8129TH compact thermal printer prints the received A&D standard format as shown to the right.

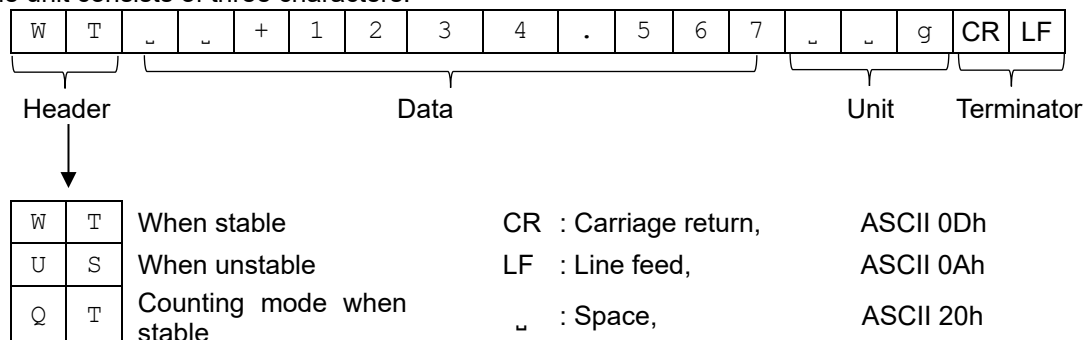
UT	1234.567	g
----	----------	---

## DP format (dump print)

RS-232C connection: Function table 5, F TYPE = 1

For Virtual COM mode connection: No function

- This format is suitable for dump printing.
- The data consists of 16 characters (excluding the terminator).
- A 2-character header indicates the condition of the data.
- The polarity sign is added right before the value if it is not an overload or zero.
- The data is zero-suppressed, meaning leading zeros are replaced with spaces.
- The unit consists of three characters.

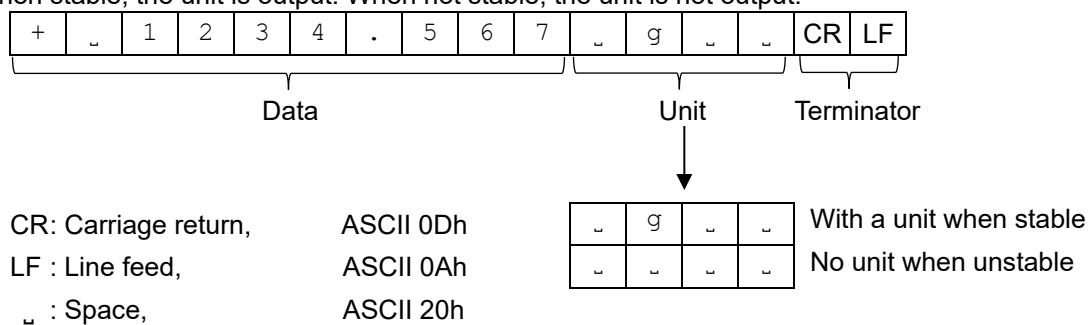


## KF format

RS-232C connection: Function table 5, F TYPE = 2

For Virtual COM mode connection: No function

- This is the Karl-Fischer moisture meter format.
- The data consists of 16 characters (excluding the terminator).
- There are no headers.
- The polarity sign is added to the first character if it is not an overload or zero.
- The data is zero-suppressed, meaning leading zeros are replaced with spaces.
- When stable, the unit is output. When not stable, the unit is not output.

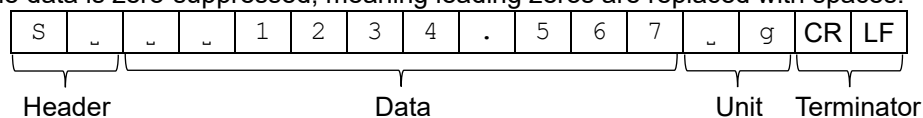


## MT format

RS-232C connection: Function table 5 , F TYPE = 3

For Virtual COM mode connection: No function

- Used when connecting to devices manufactured by other companies. Note that there is no guarantee of compatibility.
- The length of data depends on the length of the unit.
- Has a two-character header.
- The data is zero-suppressed, meaning leading zeros are replaced with spaces.



S	_	When stable (Output with a command)	
S	D	When unstable (Output with a command)	
S	I	When overloaded	CR: Carriage return, ASCII 0Dh
_	_	When stable (Output with the <span style="border: 1px solid black; padding: 2px;">PRINT</span> key)	LF: Line feed, ASCII 0Ah
_	D	When unstable (Output with the <span style="border: 1px solid black; padding: 2px;">PRINT</span> key)	_ : Space, ASCII 20h

## NU format

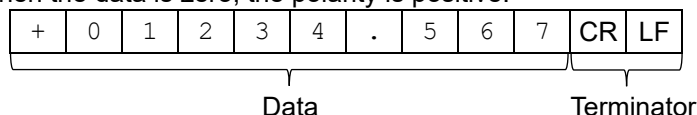
RS-232C connection: Function table

5 , F TYPE = 4

For Virtual COM mode connection: Function table

U5b U-TYPE = 1

- Only numerical data of the weighing value is output.
- The data consists of 10 characters (excluding the terminator).  
This differs from the 9-character NU format used by other balances and scales.
- The data is padded with polarity and zeros (filling the higher order surplus part with zeros).
- When the data is zero, the polarity is positive.



## CSV format

RS-232C connection: Function table

5 , F TYPE = 5

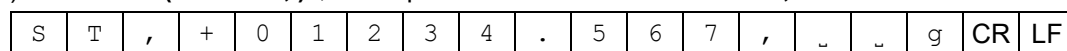
For Virtual COM mode connection: Function table

U5b U-TYPE = 2

- The **A&D standard format** separates the **weighing data section** and **unit section** using the **separator**.

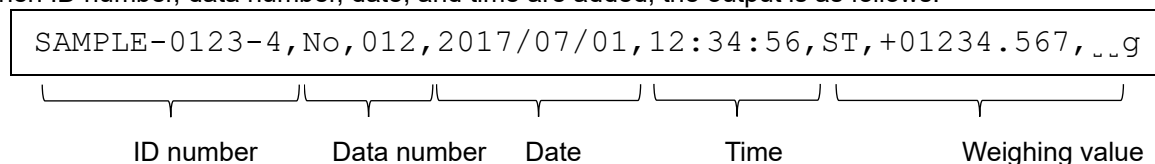
- The unit is output when overloaded.

If "prt (Decimal Point)" under "bASFnC (Environment/Display)" in the function table ("9. Function Table") is set to " / (Comma ',)'", the separator becomes a **semicolon ';'.**



- If additional output data is appended to the weighing value, all data is output in a single line.

When ID number, data number, date, and time are added, the output is as follows:



## NU2 format

RS-232C connection: Function table 

S,F
-----

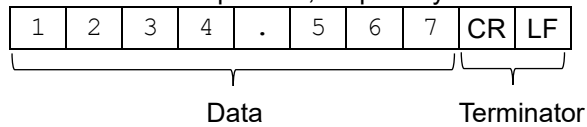
 TYPE = 6

For Virtual COM mode connection: Function table 

USB
-----

 U-TP = 4

- Only numerical data of the weighing value is output.
- If the data is zero or positive, no polarity is added.



## TAB format

RS-232C connection: Function table 

S,F
-----

 TYPE = 7

For Virtual COM mode connection: Function table 

USB
-----

 U-TP = 3

- This is a format, in which the separator of the CSV format is changed from comma to TAB.



## Other data formats

In addition to weighing data, various other data can be added. As needed, toggle the desired settings ON or OFF in the function table.

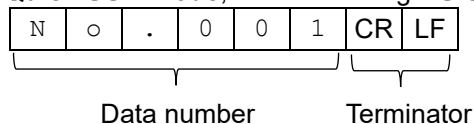
## Data number

Function table

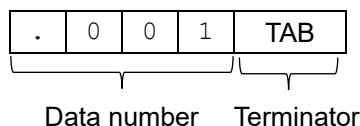
dout
------

 d-no = 1

- When the data memory function is used, the data number is output.
- The data consists of 6 characters (excluding the terminator).
- In **Quick USB mode**, when selecting **NU** or **NU2 format**, only dots "." and **numbers** are output.



## Quick USB connection (numeric output only): No function table required



## ID number

## Function table

dout

S-id = 1

- The ID number stored in the balance is output.
- The data consists of 13 characters (excluding the terminator).
- In Quick USB mode, when selecting NU or NU2 format, only hyphens "-" and numbers are output.

S	A	M	P	L	E	-	0	1	2	3	-	4	CR	LF
---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

ID number
Terminator

Quick USB connection (numeric output only): No Function table required

-	0	1	2	3	-	4	TAB
---	---	---	---	---	---	---	-----

ID number
Terminator

## Date

## Function table

dout

S-td = 2 or 3

- The date is output from the clock data of the balance.
- The YYYY/MM/DD order setting can be changed.
- The data consists of 10 characters (excluding the terminator).
- In Quick USB mode, when selecting NU or NU2 format, slashes "/" are converted to dots (".") in the output.

2	0	2	5	/	0	6	/	3	0	CR	LF
---	---	---	---	---	---	---	---	---	---	----	----

Date
Terminator

Quick USB connection (numeric output only): No Function table required

2	0	2	5	.	0	6	.	3	0	TAB
---	---	---	---	---	---	---	---	---	---	-----

## Time

## Function table

dout

S-td = 1 or 3

- The time is output from the clock data of the balance.
- 24-hour format.
- The data consists of 8 characters (excluding the terminator).
- In **Quick USB mode**, when selecting **NU or NU2 format**, colons ":" are converted to dots "." in the output.

1	2	:	3	4	:	5	6	CR	LF
---	---	---	---	---	---	---	---	----	----

Time
Terminator

Quick USB connection (numeric output only): No Function table required

1	2	.	3	4	.	5	6	TAB
---	---	---	---	---	---	---	---	-----



## 21-3 Weighing data format output example

When stable

° 314206 g

A&D	S	T	,	+	0	0	3	1	4	.	2	0	6	_	_	g	CR	LF	
DP	W	T	_	_	_	+	3	1	4	.	2	0	6	_	_	g	CR	LF	
KF	+	_	_	3	1	4	.	2	0	6	_	g	_	_	CR	LF			
MT	S	_	_	_	_	3	1	4	.	2	0	6	_	g	CR	LF			
NU	+	0	0	3	1	4	.	2	0	6	CR	LF							
CSV	S	T	,	+	0	0	3	1	4	.	2	0	6	,	_	_	g	CR	LF
NU2	3	1	4	.	2	0	6	CR	LF										
TAB	S	T	TAB	+	0	0	3	1	4	.	2	0	6	TAB	_	_	g	CR	LF

When unstable

-29587 g

A&D	U	S	,	-	0	0	0	2	9	.	5	8	7	u	u	g	CR	LF	
DP	U	S	u	u	u	u	-	2	9	.	5	8	7	u	u	g	CR	LF	
KF	-	u	u	u	2	9	.	5	8	7	u	u	u	u	CR	LF			
MT	S	D	u	u	u	-	2	9	.	5	8	7	u	g	CR	LF			
NU	-	0	0	0	2	9	.	5	8	7	CR	LF							
CSV	U	S	,	-	0	0	0	2	9	.	5	8	7	,	u	u	g	CR	LF
NU2	-	2	9	.	5	8	7	CR	LF										
TAB	U	S	TAB	-	0	0	0	2	9	.	5	8	7	TAB	u	u	g	CR	LF

When overloaded (positive)

E g

A&D	O	L	,	+	9	9	9	9	9	9	9	9	E	+	1	9	CR	LF				
DP	␣	␣	␣	␣	␣	␣	␣	␣	E	␣	␣	␣	␣	␣	␣	␣	CR	LF				
KF	␣	␣	␣	␣	␣	␣	H	␣	␣	␣	␣	␣	␣	␣	␣	CR	LF					
MT	S	I	+	CR	LF																	
NU	+	9	9	9	9	9	9	9	9	9	9	CR	LF									
CSV	O	L	,	+	9	9	9	9	9	9	9	9	E	+	1	9	,	␣	␣	g	CR	LF
NU2	+	9	9	9	9	9	9	9	9	9	9	CR	LF									
TAB	O	L	TAB	+	9	9	9	9	9	9	9	9	E	+	1	9	TAB	␣	␣	g	CR	LF

ASCII symbols

CR : Carriage return, ASCII 0Dh

LF : Line feed, ASCII 0Ah

: Space, ASCII 20h

TAB : Horizontal tab, ASCII 09h

When  
overloaded  
(negative)

-E	g
----	---

A&D	O	L	,	-	9	9	9	9	9	9	9	9	E	+	1	9	CR	LF				
DP	␣	␣	␣	␣	␣	␣	␣	-	E	␣	␣	␣	␣	␣	␣	␣	CR	LF				
KF	␣	␣	␣	␣	␣	-	L	␣	␣	␣	␣	␣	␣	␣	␣	␣	CR	LF				
MT	S	I	-	CR	LF																	
NU	-	9	9	9	9	9	9	9	9	9	9	CR	LF									
CSV	O	L	,	-	9	9	9	9	9	9	9	9	E	+	1	9	,	␣	␣	g	CR	LF
NU2	-	9	9	9	9	9	9	9	9	9	9	CR	LF									
TAB	O	L	TAB	-	9	9	9	9	9	9	9	9	E	+	1	9	TAB	␣	␣	g	CR	LF

ASCII symbols

CR : Carriage return,      ASCII 0Dh  
 LF : Line feed,            ASCII 0Ah  
 ␣ : Space,                ASCII 20h  
 TAB : Horizontal tab,      ASCII 09h

# Unit code

		A&D	DP	KF	MT
g	<b>g</b>	<input type="text"/> <input type="text"/> g	<input type="text"/> <input type="text"/> g	<input type="text"/> g <input type="text"/> <input type="text"/>	<input type="text"/> g
Counting mode	<i>PCS</i>	<input type="text"/> P <input type="text"/> C	<input type="text"/> P <input type="text"/> C	<input type="text"/> p <input type="text"/> c <input type="text"/> s	<input type="text"/> P <input type="text"/> C <input type="text"/> S
Percent mode	%	<input type="text"/> <input type="text"/> %	<input type="text"/> <input type="text"/> %	<input type="text"/> % <input type="text"/> <input type="text"/>	<input type="text"/> %
Ounce (Avoir)	<i>oz</i>	<input type="text"/> o <input type="text"/> z	<input type="text"/> o <input type="text"/> z	<input type="text"/> o <input type="text"/> z <input type="text"/>	<input type="text"/> o <input type="text"/> z
Pound	<i>lb</i>	<input type="text"/> l <input type="text"/> b	<input type="text"/> l <input type="text"/> b	<input type="text"/> l <input type="text"/> b <input type="text"/>	<input type="text"/> l <input type="text"/> b
Pound Ounce	<i>L oz</i>	<input type="text"/> o <input type="text"/> z	<input type="text"/> o <input type="text"/> z	<input type="text"/> o <input type="text"/> z <input type="text"/>	<input type="text"/> o <input type="text"/> z
Troy Ounce	<i>ozt</i>	<input type="text"/> o <input type="text"/> z <input type="text"/> t	<input type="text"/> o <input type="text"/> z <input type="text"/> t	<input type="text"/> o <input type="text"/> z <input type="text"/> t	<input type="text"/> o <input type="text"/> z <input type="text"/> t
Metric Carat	<i>ct</i>	<input type="text"/> c <input type="text"/> t	<input type="text"/> c <input type="text"/> t	<input type="text"/> c <input type="text"/> t <input type="text"/>	<input type="text"/> c <input type="text"/> t
Momme	<i>mom</i>	<input type="text"/> m <input type="text"/> o <input type="text"/> m	<input type="text"/> m <input type="text"/> o <input type="text"/> m	<input type="text"/> m <input type="text"/> o <input type="text"/> m	<input type="text"/> m <input type="text"/> o
Pennyweight	<i>dwt</i>	<input type="text"/> d <input type="text"/> w <input type="text"/> t	<input type="text"/> d <input type="text"/> w <input type="text"/> t	<input type="text"/> d <input type="text"/> w <input type="text"/> t	<input type="text"/> d <input type="text"/> w <input type="text"/> t
Grain	<i>GN</i>	<input type="text"/> G <input type="text"/> N	<input type="text"/> G <input type="text"/> N	<input type="text"/> g <input type="text"/> r <input type="text"/>	<input type="text"/> G <input type="text"/> N
Tael (HK general, Singapore)	<i>TL</i>	<input type="text"/> t <input type="text"/> l	<input type="text"/> t <input type="text"/> l	<input type="text"/> t <input type="text"/> l <input type="text"/> s	<input type="text"/> t <input type="text"/> l
Tael (HK, jewelry)	<i>TL</i>	<input type="text"/> t <input type="text"/> l	<input type="text"/> t <input type="text"/> l	<input type="text"/> t <input type="text"/> l <input type="text"/> h	<input type="text"/> t <input type="text"/> l
Tael (Taiwan)	<i>TL</i>	<input type="text"/> t <input type="text"/> l	<input type="text"/> t <input type="text"/> l	<input type="text"/> t <input type="text"/> l <input type="text"/> t	<input type="text"/> t <input type="text"/> l
Tael (China)	<i>TL</i>	<input type="text"/> t <input type="text"/> l	<input type="text"/> t <input type="text"/> l	<input type="text"/> t <input type="text"/> l <input type="text"/> c	<input type="text"/> t <input type="text"/> l
Tola (India)	<i>tol</i>	<input type="text"/> <input type="text"/> <input type="text"/> t	<input type="text"/> <input type="text"/> <input type="text"/> t	<input type="text"/> t <input type="text"/> o <input type="text"/> l	<input type="text"/> t
Messghal	<i>MES</i>	<input type="text"/> m <input type="text"/> e <input type="text"/> s	<input type="text"/> m <input type="text"/> e <input type="text"/> s	<input type="text"/> M <input type="text"/> S <input type="text"/>	<input type="text"/> m
Multi	<i>MLT</i>	<input type="text"/> M <input type="text"/> L <input type="text"/> T	<input type="text"/> M <input type="text"/> L <input type="text"/> T	<input type="text"/> M <input type="text"/> L <input type="text"/> T	<input type="text"/> M <input type="text"/> L <input type="text"/> T

## ASCII symbols

CR	: Carriage return,	ASCII 0Dh
LF	: Line feed,	ASCII 0Ah
	: Space,	ASCII 20h
TAB	: Horizontal tab,	ASCII 09h

## Note

When "Pound Ounce" is selected, the data is output with the unit of ounce (oz).

## 22. Command

By sending specified commands from a PC or a programmable logic controller (PLC) to the balance, you can control the balance to request weighing data, perform key operations, change parameters, and more. To send a command to the balance, append the terminator <CR><LF> or <CR> to the command string by using "[LF]" (Terminator) under 5,F (Serial interface) in the function table ("9. Function Table").

### 22-1 Control commands

Commands to query weighing data

Command	Content
Q	Requests the weighing data immediately.
RW	Requests the weighing data immediately.
SI	Requests the weighing data immediately.
S	Requests the weighing data when stabilized.
<ESC>P	Requests the weighing data when stabilized.
SIR	Requests the weighing data continuously. (Stream output)
C	Cancels the "S", "ESC P", or "SIR" command.

- The "Q", and "SI" commands perform the same function.
- The "S" and "<ESC>P" commands perform the same function.
- <ESC>: Escape code, ASCII 1Bh

Key control commands

Command	Content	[Functions in weighing mode]
P	Same as the <span style="border: 1px solid black; padding: 0 5px;">ON:OFF</span> key.	
ON	Turns the display on.	
OFF	Turns the display off.	
CAL	Same as the <span style="border: 1px solid black; padding: 0 5px;">CAL</span> key. • Sensitivity adjustment with the internal weight • Sensitivity adjustment with an external weight	
EXC	Sensitivity adjustment with an external weight	
U	Same as the <span style="border: 1px solid black; padding: 0 5px;">MODE</span> key.	[Unit switching]
SMP	Same as the <span style="border: 1px solid black; padding: 0 5px;">SAMPLE</span> key.	[Readability switching]
PRT	Same as the <span style="border: 1px solid black; padding: 0 5px;">PRINT</span> key.	[Data output]
R	Same as the <span style="border: 1px solid black; padding: 0 5px;">RE-ZERO</span> key.	[Zero display]
Z		
<ESC>T		
T	Tare	[Zero display]
TR		
ZR *1	Zero	
KL:***	Changes the key lock status. KL:000 Unlock all keys. KL:001 Lock all keys.	
?KL	Requests the key lock status. KL,000 All keys unlocked KL,001 All keys locked	

\*1 If the displayed value is within the zero range based on the power-on zero point, the balance resets to zero and clears the tare. If it exceeds the range, no action is taken.

Command	Content [Functions in weighing mode]
LK:*****	Locks the specified key. The value ***** represents a number ranging from 00000 to 00063. Refer to "24-2 Locking specified key switches".
?LK	Request the status of the specified locked key. Refer to "24-2 Locking specified key switches".

- The "R", "RZ", and "<ESC>T" commands perform the same function.
- The "T" and "TR" commands perform the same function.
- <ESC>: Escape code, ASCII 1Bh

#### Commands to preset the tare value

Command	Content
PT:****. ** _ g	Set the preset tare value. Values exceeding the weighing capacity cannot be set. Negative values cannot be set. For the unit, you need to use the A&D standard format (3 characters). If the display unit is PCS or percent (%), you need to set the value in grams. To set the preset tare to 1234.567 g, the input is <span style="border: 1px solid black; padding: 2px;">PT:1234.567 _ g</span> .
?PT	Requests the tare value. The tare value set by the PT command will be output.

"\_" represents a space.

#### Commands to control the data memory function

Command	Content
UW:*. ** _ g	Set the unit weight value (weight per piece). Values exceeding the weighing capacity cannot be set. Negative values cannot be set. For the unit, you need to use the A&D standard format (3 characters). To set the unit weight to 12.345 g, the input is <span style="border: 1px solid black; padding: 2px;">UW:12.345 _ g</span> .
?UW	Requests the unit weight value.

"\_" represents a space.

#### Commands for controlling the comparator function

Command	Content
HI:****. ** _ g	Set the upper limit value
HH:****. ** _ g	Set the second upper limit value
LO:****. ** _ g	Set the lower limit value
LL:****. ** _ g	Set the second lower limit value
	<input type="checkbox"/> Add the Unit in the A&D Standard Format (3 Characters) <input type="checkbox"/> When setting the upper limit value to 456.789 g, it will be displayed as <span style="border: 1px solid black; padding: 2px;">HI:456.789 _ g</span> . <input type="checkbox"/> Values exceeding the weighing capacity cannot be set.
?HI	Request the upper limit value
?HH	Request the second upper limit value
?LO	Request the lower limit value
?LL	Request the second lower limit value

"\_" represents a space.

- When using the comparator commands, set "[P<sub>in</sub> (Data Input Method)]" under "[P<sub>Fnc</sub> (Comparator)]" in the function table ("9. Function Table") to "0" or "1".

Commands to control the data memory function (Function table:  dAtA = 1)

Command	Content
UN : mm	Changes the unit weight registration number. For "mm", you need to enter a number from 01 to 50.
?UN	Requests the currently selected unit weight registration number.

Commands to control the data memory function (Function table:  dAtA = 2)

Command	Content
?MA	Requests all stored weighing data.
?MQnnn	Requests the weighing data stored with data number "nnn". For "nnn", you need to enter a number from 001 to 200.
?MX	Requests the number of stored data.
MD : nnn	Deletes the weighing data stored with data number "nnn". For "nnn", you need to enter a number from 001 to 200.
MCL	Deletes all stored weighing data.

Commands to control the data memory function (Function table:  dAtA = 3)

Command	Content
CN : mm	Enter a number between 01 and 20 for "mm" .
?CN	Request the currently selected comparator registration number.

Commands to control the data memory function (Function table:  dAtA = 4)

Command	Content
PN : mm	Retrieve the stored tare value. Enter a number between 01 and 20 for "mm" .
?PN	Request the currently selected tare value registration number.

Commands to set time and date

Command	Content
TM : **: **: **	Sets time. (Do not set non-existing time values.) To set the time to "twelve thirty-four fifty-six seconds", the input is <input type="text" value="TM:12:34:56"/> .
DT : **/ **/ **	Sets date. (Do not set non-existing date values.) When setting the date to September 1, 2024, the input is <input type="text" value="DT:24/09/01"/> .
?TM	Requests the time.
?DT	Requests the date.

## Commands to request other data

Command	Content
?T	Requests the tare value. The tare value set by the <code>PT</code> or <code>T</code> command will be output. The header will be "PT" when the preset tare value is set with the <code>PT</code> command, and "T" when the tare value is set with the <code>TARE</code> key or the <code>T</code> or <code>TR</code> command.
?ID	Requests the ID number.
?SN	Requests the serial number.
?TN	Requests the device name.
?SA	The stored impact data will be output in bulk.

## 22-2 <AK> code and error codes

When "I" (On) is set for "Err" (AK, Error code) under `SIF` (Serial interface) in the function table ("9. Function Table"), the balance will always respond to all commands received from a PC or PLC. Verifying the response code improves communication reliability.

By setting "I" (On) for "Err" (AK, Error code), the following responses will be performed.

- When the balance receives a command requesting data: If the balance cannot output the data, it sends an error code (EC, `Err`). If the balance can output the data, it sends the requested data.
- When the balance receives a command to control it: If the balance cannot execute the command, it sends an error code (EC, `Err`). If the balance can execute the command, it sends an <AK> code. The <AK> code is ASCII 06h.
- The following commands are processed by the balance, and the balance sends an <AK> command not only when the command is received but also upon completion of the processing. If the processing does not complete successfully, the balance sends an error code (EC, `Err`). In this case, use the CAL command to clear the error.

Command	Content
ON command	Turns the display on.
"P" command	Turns the display on/off. (Only when the display is on.)
"R" / "RZ" command	<code>RE-ZERO</code> key
T/TR command	Tare
"ZR" command	Zero *1
CAL command	Sensitivity adjustment with the internal weight
EXC command	Sensitivity adjustment with an external weight

\*1 If within the zero range, the zero point is updated, the tare value is cleared, and the display is set to zero. If outside the zero range, no processing is performed. Refer to "Weighing Range" for the zero range of each model.

- Refer to "27-2 Error display (error code)" for Error Codes.

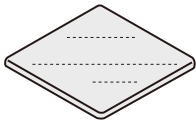

## 22-3 Command usage examples

This example demonstrates the setting where "I" (ON) is set for "ErLd" (AK, Error code) under 5 ,F in the function table to output an <AK> code.

### ASCII symbols

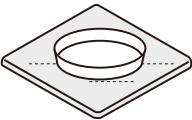
CR : Carriage return (ASCII 0Dh)      LF : Line feed (ASCII 0Ah)  
 : Space (ASCII 20h)      AK : Acknowledgement (ASCII 06h)

### Example of ON command (Turning the display on)

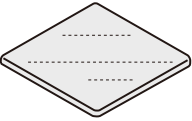
Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	ON command <div style="border: 1px solid black; display: inline-block; padding: 2px;">O N C<sub>R</sub> L<sub>F</sub></div>	<div style="border: 1px solid black; display: inline-block; padding: 2px;">A K C<sub>R</sub> L<sub>F</sub></div> Reception confirmation	<div style="border: 1px solid black; padding: 5px; text-align: center;">             -              Display off           </div>	
2.		<div style="border: 1px solid black; display: inline-block; padding: 2px;">A K C<sub>R</sub> L<sub>F</sub></div> Completion confirmation	<div style="border: 1px solid black; padding: 5px;">   <div style="border: 1px solid black; padding: 5px; text-align: center;">             . g              Power-on zero              Stabilizing              (Processing)           </div> <div style="border: 1px solid black; padding: 5px; text-align: center;">             o 0000 g           </div> </div>	



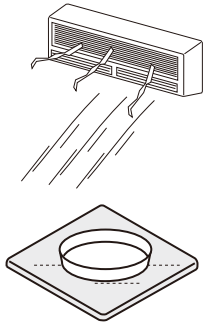
Example of the R command (Re-zero)

Step	PC side		Balance side		
	Command		Response	Display	Weighing operation
1.	R command			<div>° 30.123 g</div> <div>Before execution</div>	<div></div> <div>Place a sample on the weighing pan.</div>
	<div>R</div> <div>C<sub>R</sub></div> <div>L<sub>F</sub></div>		<div>AK</div> <div>C<sub>R</sub></div> <div>L<sub>F</sub></div> <div>Reception confirmation</div>		
2.			<div>AK</div> <div>C<sub>R</sub></div> <div>L<sub>F</sub></div> <div>Completion confirmation</div>	<div>.</div> <div>g</div> <div>Re-zero stabilizing (Processing)</div>	
3.				<div>° 0000 g</div> <div>Zero display</div>	

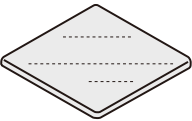
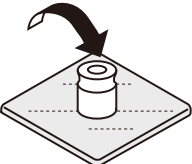
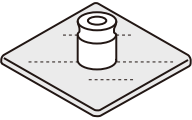
Example of the CAL command  
(Sensitivity adjustment using the internal weight)

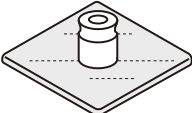
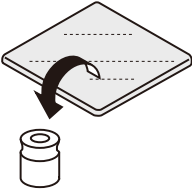
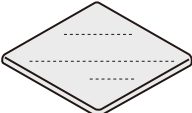
Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	CAL command <div> <div>C</div> <div>A</div> <div>L</div> <div>C<sub>R</sub></div> <div>L<sub>F</sub></div> </div>	<div> <div>A</div> <div>K</div> <div>C<sub>R</sub></div> <div>L<sub>F</sub></div> </div> Reception confirmation	<div> <div>°</div> <div>0000</div> <div>g</div> </div> Before execution	 Nothing on the weighing pan.
2.		<div> <div>A</div> <div>K</div> <div>C<sub>R</sub></div> <div>L<sub>F</sub></div> </div> Completion confirmation	<div> <div>[CAL</div> <div>in</div> </div> <div> <div>[CAL.</div> <div>in</div> </div> Processing <div> <div>End</div> </div> <div> <div>.</div> <div>g</div> </div> Re-zero stabilizing (Processing)	
3.			<div> <div>°</div> <div>0000</div> <div>g</div> </div> Zero display	

Example of the R command for error code output (Re-zero)

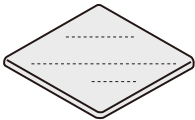
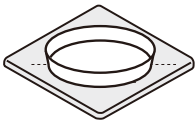
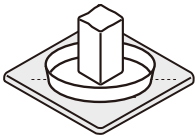
Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	R command <div>R C<sub>R</sub> L<sub>F</sub></div>	<div>AK C<sub>R</sub> L<sub>F</sub></div> Reception confirmation	<div>30.123 g</div> Before execution	
2.		<div>E C , E 1 1 C<sub>R</sub> L<sub>F</sub></div> Error code output	<div>. g</div> Re-zero stabilizing (Processing) Timeout due to instability  <div>Error 1</div> Display	Place a sample on the weighing pan.
3.	CAL command or Wait for approx. 5 seconds <div>C A L C<sub>R</sub> L<sub>F</sub></div>		<div>30.123 g</div> Weighing display	

Example of EXC command  
(Sensitivity adjustment using external weight)

Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	EXC command E X C C <sub>R</sub> L <sub>F</sub>	AK C <sub>R</sub> L <sub>F</sub> Reception confirmation	° 0000 g Before execution	 Nothing on the weighing pan.
2.			CAL 0 Waiting for zero setting	
3.	PRT command P R T C <sub>R</sub> L <sub>F</sub>	AK C <sub>R</sub> L <sub>F</sub> Reception confirmation		
4.		AK C <sub>R</sub> L <sub>F</sub> Process completed	CAL 0 Setting the zero (Processing)	
5.			5000 specified weight to be loaded	 Place the weight
6.	PRT command P R T C <sub>R</sub> L <sub>F</sub>	AK C <sub>R</sub> L <sub>F</sub> Reception confirmation		
7.		AK C <sub>R</sub> L <sub>F</sub> Process completed	5000 Weighing the weight (Processing)	

Step	PC side		Balance side		
	Command		Response	Display	Weighing operation
8.				<div>End</div> Waiting for unloading	
9.					 Remove the weight
10.			<div>AKCR LF</div> Process completed	<div>. g</div> Re-zero stabilizing (Processing)	
11.				<div>° 0000 g</div> Zero display	

# Example of the T command

Step	PC side		Balance side		
	Command		Response	Display	Weighing operation
1.	R command R C <sub>R</sub> L <sub>F</sub>		AK C <sub>R</sub> L <sub>F</sub> Reception confirmation	° 0.123 g Before execution	
2.			AK C <sub>R</sub> L <sub>F</sub> Completion confirmation	. g Re-zero stabilizing (Processing)	
3.				° 0.000 g Zero display	
4.	T command T C <sub>R</sub> L <sub>F</sub>		AK C <sub>R</sub> L <sub>F</sub> Reception confirmation	° 123456 g	
			AK C <sub>R</sub> L <sub>F</sub> Completion confirmation	. g ° 0.000 g	
5.				° 5000000 g	
6.	S command S C <sub>R</sub> L <sub>F</sub>		S T , + 0 5 0 0 0 . 0 0 _ _ g C <sub>R</sub> L <sub>F</sub> Net weight value		
7.	?PT command ? P T C <sub>R</sub> L <sub>F</sub>		P T , + 0 0 1 2 3 . 4 5 6 _ _ g C <sub>R</sub> L <sub>F</sub> Tare weight value		

"\_" represents a space.

## 23. UFC Function

By using the Universal Flex Coms (UFC) function, you can output customized content when outputting weighing data. You can also output character strings for barcode printing with a label printer or similar device.

To use the UFC function, set "I" (ON) for "UFL" (UFC function) under dout (Data output) in the function table ("9. Function Table").

### 23-1 UFC program commands

The desired output format can be stored in the balance by sending a program command from the PC. The stored output format is retained in the balance's nonvolatile memory even when the power is turned off.

#### Creating program commands

- The maximum length for a program command is 512 characters.  
Begin with the "PF," command.
- Program commands can be combined using comma or space delimiters, which can be omitted to reduce character count.  
The comma after the PF command, however, cannot be omitted.

#### Program command list

Command	Content	Output example
PF,	FC command header (Add this to the beginning of the program command.)	
\$MN	Manufacturer name	_ _ _ _ _ _ _ A _ & _ D
\$TY	Model	_ _ _ _ M C - 6 2 0 3 A
\$SN	Serial number	_ _ _ _ T 1 2 3 4 5 6 7
\$ID	ID number	S A M P L E - 1 2 3 4 - 5
\$DT	Date	2 0 2 5 / 0 7 / 0 1
\$TM	Time	1 4 : 2 6 : 4 9
\$WT	Weighing data	_ _ + 5 0 0 0 . 1 0 4 _ _ g
\$GR	Gross data (gross weight)	_ _ + 6 0 1 3 . 0 5 4 _ _ g
\$NT	Net data (net weight)	_ _ _ 5 0 0 0 . 1 0 4 _ _ g
\$TR	Tare data (tare weight)	_ _ _ 1 0 1 2 . 9 5 0 _ _ g
\$PC	Counting data	_ _ _ _ _ + 1 2 4 9 _ P C
\$UW	Unit weight data	_ _ _ _ _ + 0 . 0 0 1 _ _ g
\$CP	Comparator result	H I
\$CM	Comma	,
\$SP	Space	ASCII 20h
\$CR	<CR>Carriage return	ASCII 0Dh
\$LF	<LF> Line feed	ASCII 0Ah
\$HT	<TAB> Horizontal tab	ASCII 09h

- Enclose any user-specified ASCII string in single quotation marks (' '). The output string can include alphanumeric characters and symbols.

Example: To output the string "SAMPLE-12", enter 'SAMPLE-12'.

To represent a single quotation mark itself, use two single quotation marks (' ').

Example: To output the string "A'BC'D", enter 'A"BC"D'.

- To output an ASCII control code, enter "# + 2 hexadecimal characters".

Example: To output "End of Transmission, EOT (04h)", enter #04.

- By adding ' \* and a number (up to 2 characters)' after the command, space (\$SP), CR (\$CR), LF (\$LF), and TAB (\$HT) can be repeated as many times as the number entered.

Example: To output 12 spaces, enter \$SP\*12.

To output 9 carriage returns, enter \$CR\*9.

- When sending two or more lines of program commands, add "&" to the end of a line that the command continues on the next line. (RS-232C only)
- After receiving a program command, the balance sends an <AK> code if the command is executed successfully; otherwise, it sends an error code. The <AK> code is ASCII 06h.
- Windows Communication Tools for UFC (WinCT-UFC) is software designed for creating program commands.

You can download WinCT-UFC from the Software page on the A&D website (<https://www.aandd.jp>) by filling out the necessary form

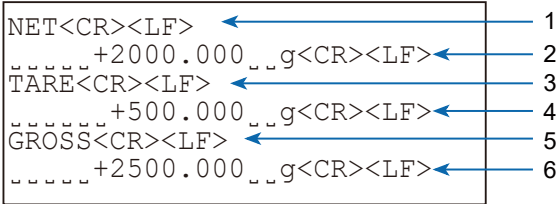


## 23-2 Examples of UFC program command creation

### CAUTION

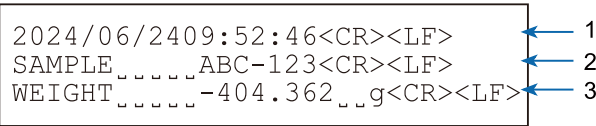
- The terminator (newline) in the UFC format is not automatically sent.  
Add the terminator code at the end of the character data as needed.

#### Output example 1

		
No.	Content	Program command example
1	PF, Command, String "NET", Newline	PF, 'NET', \$CR, \$LF, &
2	Space×3, Net data "NET", Newline	\$SP*3, \$NT, \$CR, \$LF, &
3	String "TARE", Newline	'TARE', \$CR, \$LF, &
4	Space×3, Tare data "TARE", Newline	\$SP*3, \$TR, \$CR, \$LF, &
5	String "GROSS", Newline	'GROSS', \$CR, \$LF, &
6	Space×3, Gross data "GROSS", Newline	\$SP*3, \$GR, \$CR, \$LF

"\_" represents a space.

#### Output example 2

		
No.	Content	Program command example
1	PF, Command, Date, Time, Newline	PF, \$DT, ' _ ', \$TM, \$CR, \$LF, &
2	String "SAMPLE _ _ _ _ _ABC-123", Newline	'SAMPLE _ _ _ _ _ABC-123', \$CR, \$LF, &
3	String "WEIGHT _ _", Weight data, Newline	'WEIGHT _ _', \$WT, \$CR, \$LF

"\_" represents a space.

## 24. Key Lock Function

The key switches of the balance can be locked by sending a specified command to the balance. This function is useful when you want to control the balance exclusively with an external device such as a PC.

- Even in the key lock state, it is possible to operate the keys using key control commands.  
For commands to perform key operations, refer to "22. Command".
- The key lock state can be checked by sending a status check command to the balance.
- The key lock is maintained until a release command is sent to the balance or the power is turned off by unplugging the AC adapter.

### 24-1 Locking all key switches

All key switches of the balance can be disabled by sending a KL command to the balance.

Command string	Content
?KL	Requests the lock state of all keys. KL,000 All keys unlocked. KL,001 All keys locked.
KL:***	Replace *** with either 000 or 001. KL:000 All keys unlocked. KL:001 Lock all keys.

### 24-2 Locking specified key switches

Any key switches can be enabled or disabled by the numerical value (\*\*\*\*) specified by the LK command.

The numerical value (\*\*\*\*) is the sum of the decimal numbers converted from the bit values assigned to each key switch, as shown below.

Example 1 Locking all key switches except the

Bit	Decimal number	Key
0	1	ON:OFF key
1	2	CAL key
2	4	MODE key
3	8	SAMPLE key
4	16	PRINT key
5	32	RE-ZERO key

PRINT key. Add the decimal numbers corresponding to the keys to be locked:

ON:OFF key:	1 × 1 (locked)	+
CAL key:	2 × 1 (locked)	+
MODE key:	4 × 1 (locked)	+
SAMPLE key:	8 × 1 (locked)	+
PRINT key:	16 × 0 (enabled)	+
RE-ZERO key:	32 × 1 (locked)	= 47

Command string	Content
?LK	Requests the status of the specified key locks. Example 1 When the key switches other than the PRINT key are locked. LK,00047 Example 2 When all key switches are unlocked. LK,00000
LK:****	Locks the specified keys. A number from 00000 to 00063 is entered in place of (****). This sends the LK: command to the balance. Example 1 When locking the key switches other than the PRINT key. LK:00047 Example 2 When unlocking all key switches. LK:00000

## 25. Checking the Software Version of the Balance

Specifications may vary depending on the balance software version.

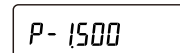
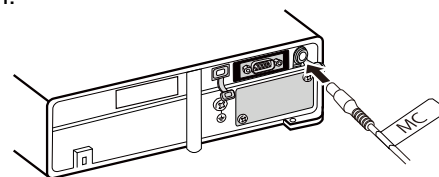
Check the software version as follows.

1. Unplug the AC adapter of the balance and then plug it in again.

2.  indication blinks.

3.  is displayed for 1 second.

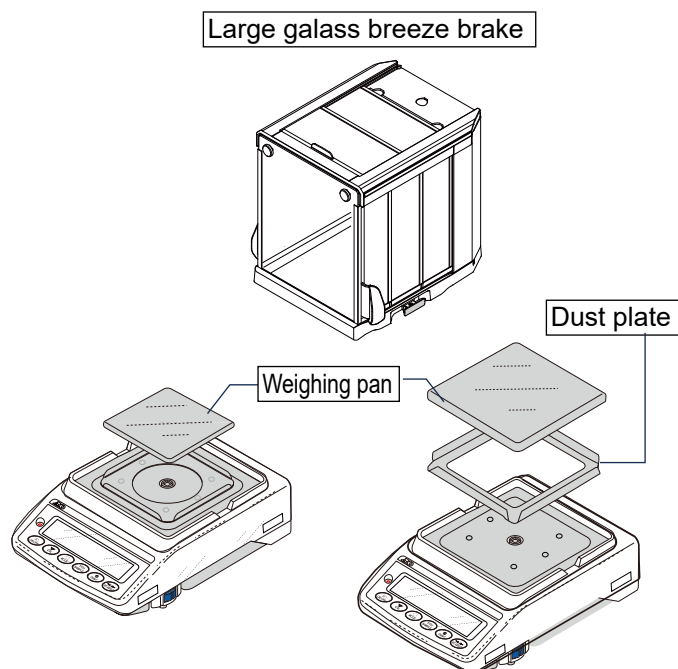
In place of \*.\*\*\*, the software version is displayed.



## 26. Maintenance

### 26-1 Cleaning the balance

- Clean the balance with a lint free cloth that is moistened with warm water and a mild detergent.
- Do not use organic solvents to clean the balance.
- Do not disassemble the balance.
- Use the original packing material for transportation.



Balance main body	To clean the unit, use a soft, lint-free cloth dampened with a mild detergent.
Breeze break	The windshield parts are anti-static. Wipe them clean with a soft, dust-free cloth. Repeated cleaning with a cloth dampened with neutral detergent or water, or washing with water, may reduce the anti-static effect.
Weighing pan	When cleaning the weighing pan, be careful not to injure your hands on the edge.

## 27. Troubleshooting

### 27-1 Checking the balance performance and environment

Since the balance is a precision instrument, in some cases it may not be able to measure correct values due to adverse effects of the measurement environment or measurement method.

If repeatability is poor when the sample is loaded and unloaded several times, or if the balance seems to be operating abnormally, check the following items.

If the problem persists after checking each item, contact your local A&D dealer for repair. "Frequently Asked Questions" and answers to them are also posted on the A&D website (<https://www.aandd.jp>).

#### 1. Checking that the balance works properly.

- Check the balance performance using the self-check function as described in "6-2 Self-Check-Function/Automatic Setting of Minimum Weight". An error display appears when a malfunction is found.
- Check the balance repeatability using an external weight. Be sure to place the weight in the center of the weighing pan.
- As a precise test, check the repeatability, linearity, weighing value, etc. with a weight of a known weight.

#### 2. Checking that the measurement environment and method are appropriate.

##### Operating environment

- Is the table on which the balance is placed sturdy?
- Is the balance level? Refer to "2-4 Precautions Before Use".
- Is the operating environment free from vibration and drafts?
- Is there any strong electrical or magnetic noise source such as a motor near the balance?

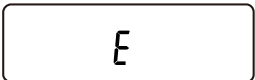
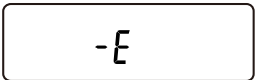
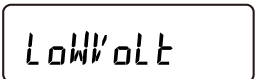
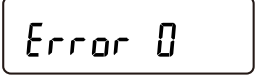
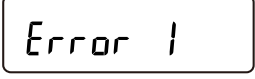

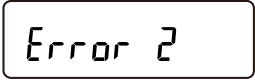

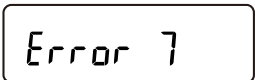
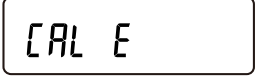

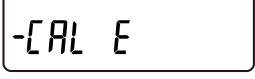

##### Weighing method


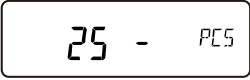




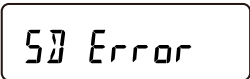
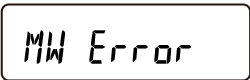
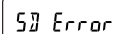
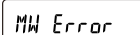
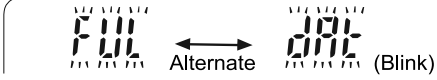


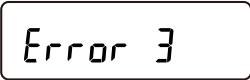
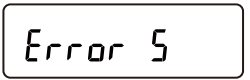
- Is the weighing pan set so that it does not touch other parts, such as the breeze break or dust plate frame? (Is it installed correctly?)
- Do you always press the RE-ZERO key before placing your sample on the weighing pan?
- Do you place your sample in the center of the weighing pan?
- Did you perform a sensitivity adjustment before weighing?
- Did you warm up the balance before weighing for at least an hour with the AC adapter connected to the power supply?

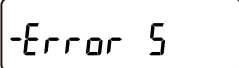
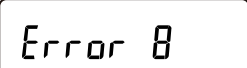
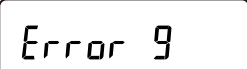

##### Sample and container

- Is the sample free from moisture absorption or evaporation due to the influence of ambient temperature and humidity?
- Is the temperature of the container of the sample acclimatized to the ambient temperature? Refer to "2-5 Precautions during use for more accurate weighing".
- Is the sample free of static electricity? Refer to "2-5 Precautions during use for more accurate weighing".
- Is the sample made of a magnetic material, such as iron? Care must be taken when weighing magnetic materials. Refer to "2-5 Precautions during use for more accurate weighing".

## 27-2 Error display (error code)

Display	Error code	Description and possible countermeasure
		<b>Overload error</b> The weighing value exceeds the balance's weighing capacity. Remove the object from the pan. If the issue is not resolved, repair is necessary.
		<b>Weighing pan error</b> The weighing value is too light. The weighing pan is not installed correctly. Set the weighing pan correctly. Perform a sensitivity adjustment.
		<b>Power supply voltage fault</b> The voltage supplied from the AC adapter is abnormal. Check that the AC adapter is the one supplied with the balance.
		<b>Internal error</b> If this error persists, please contact your local A&D dealer for repair.
	EC, E11	<b>Stability error</b> Due to the unstable weighing value, functions such as "zero display" and "sensitivity adjustment" cannot be executed. Check around the pan. Refer to <a href="#">"2-5 Precautions during use for more accurate weighing"</a> . Improve the environment of the installation location (vibration, drafts, static electricity, etc.). To return to weighing mode, press the  key.
		<b>Entry value error</b> The value entered exceeds the setting range. Enter a value within the setting range.
	EC, E16	<b>Internal weight error</b> Raising and lowering the internal weight does not yield a change in the mass value greater than that specified. Confirm that there is nothing on the pan and perform the operation from the beginning. If this error continues to be displayed, repair is necessary.
	EC, E17	<b>Internal weight error</b> The internal weight application mechanism does not function properly. Perform the operation from the beginning. If this error continues to be displayed, repair is necessary.
	EC, E20	<b>Calibration weight error (Positive value)</b> The sensitivity adjustment weight is too heavy. Check around the pan. Check the calibration mass value. To return to weighing mode, press the  key.
	EC, E21	<b>Calibration weight error (Negative value)</b> The calibration weight is too light. Check around the pan. Check the calibration mass value. To return to weighing mode, press the  key.

Display	Error code	Description and possible countermeasure
		<b>Sample mass error</b> The sample is too light to be stored as a sample mass for the counting mode or percent mode. The sample cannot be used.
  		<b>Unit weight error</b> The sample mass for the counting mode is too light. Storing and using it for counting may cause a counting error. Add samples until the specified number is reached, then press the  key. Pressing the  key without adding samples will still put the balance in counting mode, but for accurate counting, ensure samples are added.
 		<b>Repeatability error</b> In the self-check function, the standard deviation (SD) of repeatability using electronically controlled load (ECL) has exceeded 50 d. <sup>*1</sup> Review the installation environment of the balance. <ul style="list-style-type: none"> <li><input type="checkbox"/>   Displayed when showing repeatability using ECL.</li> <li><input type="checkbox"/>   Displayed when showing the minimum weighing value (reference value) using ECL.  Refer to "6-2 Self-Check-Function/Automatic Setting of Minimum Weight".</li> </ul> <sup>*1</sup> "d" represents scale division.
		<b>Full memory</b> The number of stored weighing values has reached the upper limit. In order to store a new weighing value, it is necessary to delete data. Refer to "11. Data Memory".
		<b>Full memory</b> The stored sensitivity adjustment / calibration test history has reached 50 results. In order to store a new result, the oldest history will be deleted. Refer to "11. Data Memory".
		<b>Clock battery error</b> The clock backup battery has been depleted. Press any key and set the time and date. Even if the clock backup battery is depleted, the clock and calendar function works normally as long as the balance is powered with the AC adapter. If this error appears frequently, contact your local A&D dealer for repair.
		<b>Malfunction of the internal memory element of the balance</b> If this error continues to be displayed, repair is necessary.
		<b>Mass sensor error</b> If this error continues to be displayed, repair is necessary.

Display	Error code	Description and possible countermeasure
		<b>Mass sensor error</b> Set the weighing pan correctly. If this error continues to be displayed, repair is necessary.
		<b>Abnormality in the internal memory data of the balance</b> If this error continues to be displayed, repair is necessary.
		<b>Abnormality in the internal memory data of the balance</b> If this error continues to be displayed, repair is necessary.
	EC, E00	<b>Communications error</b> A protocol error occurred in communication. Check the format, baud rate, etc.
	EC, E01	<b>Undefined command error</b> An undefined command was found. Check the transmitted command.
	EC, E02	<b>Not ready</b> The received command cannot be executed. Example: The Q command was received when not in weighing mode. Example: The Q command was received while re-zeroing. Adjust the delay time for transmitting a command.
	EC, E03	<b>Timeout error</b> When  is set, a waiting time of approximately 1 second or more occurred while receiving command characters. Check the communication.
	EC, E04	<b>Character length error</b> The number of characters in the received command has exceeded the limit. Check the command to transmit.
	EC, E06	<b>Format error</b> The description of the received command is incorrect. Example: The number of digits in the numerical values is incorrect. Example: Alphabet characters are present among the numerical values. Check the transmitted command.
	EC, E07	<b>Parameter setting error</b> The value of the received command has exceeded the allowed value. Check the setting range of the numerical value of the command.
	Other error displays	If any other error displays appear, or if the above errors cannot be resolved, please contact your local A&D dealer for repair.

**Note:** "d" represents scale division.



Automatic sensitivity adjustment notification mark ( ◀ mark blinking)  
If the balance is not used for a certain period of time with this indicator blinking, the balance automatically performs sensitivity adjustment using the internal weight.  
(The blinking period depends on the operating environment.)

#### Tips

The balance can be used while this indicator is blinking. We recommend that you perform automatic self calibration for precision weighing.



## 27-3 Asking for repair

If any issues occur after verifying the balance's operation, or if error displays requiring repair appear, please contact your local A&D dealer.

The balance is a precision instrument. Handle it with care during transportation.

- When transporting the balance, use the packing materials and box that the balance was originally packed in when purchased.
- Remove the weighing pan, pan support, breeze break ring and dust plate from the main unit.

## 28. Specifications

### 28-1 Common specifications

#### 28-1-1 Function

Internal weight		Built-in function <sup>*1</sup>
Time and clock function		Built-in function
Operating environmen		5°C to 40°C (41°F to 104°F), 85%RH or less (No condensation)
Display refresh rate		5 times/second or 10 times/second or 20 times/second
Counting mode	Number of sample pieces to store	5, 10, 25, 50 or 100 pieces
Percent mode	Readability	0.01%, 0.1%, 1% (Depends on the reference mass stored.)
Communication		RS-232C、USB
Power (AC adapter)		AC adapter Confirm that the adapter type is correct for the local voltage and power receptacle type. Power consumption: Approx. 30 VA (supplied to the AC adapter).
Power consumption		DC 12V Approx. 0.2A (excluding AC adapter and options)

<sup>\*1</sup> The mass of the built-in weight may change depending on the usage environment or deterioration over time.

#### 28-1-2 Size/weight

	MC-1104A	MC-6203A
Weighing pan size	128 × 128 mm	165 × 165 mm
Main body weight	Approx. 7 kg	
External dimensions	259(W) × 358(D) × 332(H) mm (with a large glass breeze break)	

## 28-2 Individual specifications

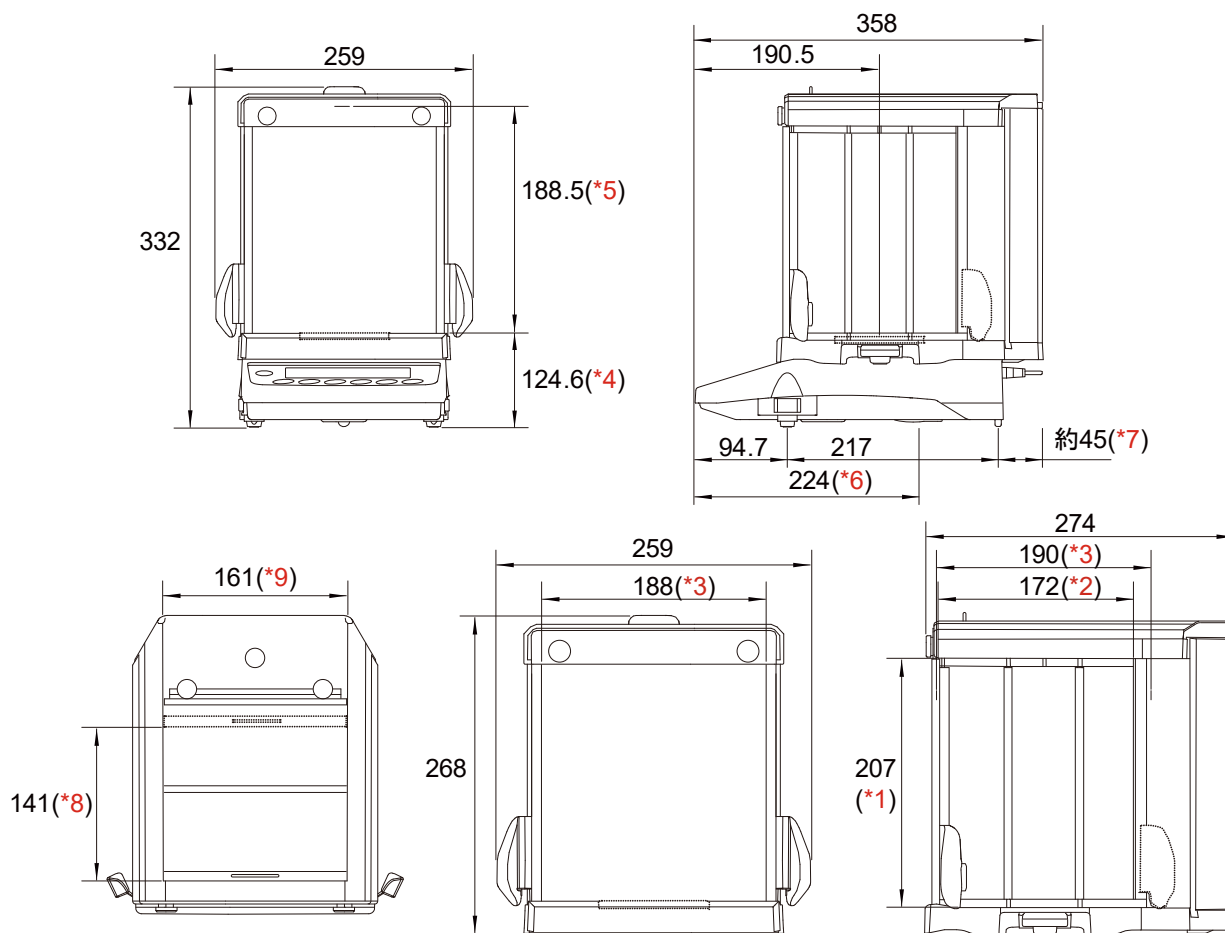
		MC-1104A	MC-6203A
Weighing capacity		1100 g	6200 g
Maximum display		1100.0084 g	6200.084 g
Readability		0.0001g	0.001 g
Repeatability <sup>*1</sup> (Standard deviation)		0.00035 g	0.0035 g / 2000 g to 5000 g 0.0015 g / 2000 g less than
Linearity		±0.003 g	±0.03 g
Accuracy after sensitivity adjustment using the internal weight <sup>*2</sup>		±0.0100 g	±0.150 g
Counting mode	Minimum unit weight	0.0001 g	0.001 g
Percent mode	Minimum 100% Reference mass	0.1000 g	1.000 g
Applicable weights for sensitivity adjustment		1000 g (factory setting)  1000 g to 100 g (100 g interval)  50 g	5000 g (factory setting)  6000 g to 1000 g (1000 g interval)  500 g

<sup>\*1</sup> When the auto-centering pan is used or when loading and unloading are performed at the same place using the automatic loading machine under good ambient conditions.

<sup>\*2</sup> Accuracy right after calibration using the internal mass under good ambient conditions (within the temperature range of 10 °C to 30 °C (50 F to 86 F) with no abrupt changes in temperature or humidity, no drafts, no effect by magnetic fields or static electricity).

The value of the internal mass may change due to corrosion or other damage caused by the operating environment, or due to aging. Check the internal mass using an external weight periodically.

## 29. External dimensions



(Unit: mm)

- \*1 Side sliding door opening height
- \*2 Side sliding door maximum opening width
- \*3 Internal width
- \*4 Weighing pan height
- \*5 Height from weighing pan to top sliding door of glass breeze break
- \*6 Area under the floor weighing platform
- \*7 AC adapter DC jack protrusion
- \*8 Top sliding door maximum opening length
- \*9 Top sliding door opening width

## 30. Options / Peripheral Devices

The balance is available with a variety of optional items such as "[30-1 Options](#)" and "[30-2 Peripheral devices](#)".

### 30-1 Options

A variety of dedicated options, sold separately, are available for the balance.

(For details, refer to "[30-1-1 Dedicated options](#)" and "[30-1-2 Other dedicated options](#)").

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#### 30-1-1 Dedicated options

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For details, please refer to the instruction manual for each expansion option.

##### CAUTION

- **GXA-03, GXA-04, GXA-06, FXi-08, GXA-09, GXA-23-PRINT, GXA-23-REZERO, GXA-23-PLUG, GXA-24A, GXA-25, GXA-26, GXA-17, and GXA-27 cannot be used at the same time.**

##### **GXA-03: 2nd RS-232C interface**

Expands an RS-232C interface of insulation type.

(For details, refer to "[GXA-03 / GXA-04 / GXA-06 Instruction manual](#)".)

##### **GXA-04: Comparator relay output / buzzer / external key input interface**

Outputs comparator results.

(For details, refer to "[GXA-03 / GXA-04 / GXA-06 Instruction manual](#)".)

##### **GXA-06: Analog (0-1/0.2-1 V) output interface**

Outputs a voltage of 0 to1V, or 0.2 to1V.

(For details, refer to "[GXA-03 / GXA-04 / GXA-06 Instruction manual](#)".)

##### **FXi-08: Ethernet interface**

Enables the balance to communicate with computers on a network.

Multiple balances on a network can be controlled by one computer.

(For details, refer to "[FXi-08 Instruction manual](#)".)

##### **GXA-09: Built-in rechargeable battery (10 hours of charging for 14 hours of operation) (only factory-installed / dealer option)**

Enables the balance to be used in an environment where the AC adapter cannot be used.

(For details, refer to "[GXA-09 Instruction manual](#)".)

**GXA-17: Large glass breeze break with ionizer (common for all models)**

Large glass breeze break with a built-in ionizer (static eliminator)

(For details, refer to "[GXA-17 Instruction manual](#)".)

**GXA-23-PRINT: External key input interface + the AX-SW137-PRINT foot switch**

External contact input terminal that can operate "PRINT" and "RE-ZERO" key

(For details, refer to "[GXA-23 / GXA-26 Instruction manual](#)".)

**GXA-23-REZERO: External key input interface + the AX-SW137-REZERO foot switch**

External contact input terminal that can operate "PRINT" and "RE-ZERO" key

(For details, refer to "[GXA-23 / GXA-26 Instruction manual](#)".)

**GXA-23-PLUG: For interface board contact input (3 stereo plugs included)**

External contact input terminal that can operate "PRINT" and "RE-ZERO" key

In order to use, it is necessary to solder the attached plug and the switch prepared by the customer.

(For details, refer to "[GXA-23 / GXA-26 Instruction manual](#)".)

**GXA-24A: USB host / USB memory interface (only factory-installed / dealer option)**

Stores the weighing value in the USB memory.

(For details, refer to "[GXA-24A Instruction manual](#)".)

**GXA-25: Ionizer**

Ionizer (static eliminator) that can be installed near the balance

(For details, refer to "[GXA-25 Instruction manual](#)".)

**GXA-26: External IR switch (infrared rays switch)**

External touchless switch that can operate "PRINT" and "RE-ZERO" key

(For details, refer to "[GXA-23 / GXA-26 Instruction manual](#)".)

**GXA-27: Bluetooth® interface**

By pairing with a terminal like a computer, tablet, or smartphone, it enables wireless (Bluetooth®) communication.

(For details, refer to "[GXA-27 Instruction manual](#)".)

**Note**

- **Please contact your local A&D representative to find out whether GXA-27 is certified for compliance with Bluetooth® communication laws in your country.**

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## 30-1-2 Other dedicated options

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For details, please refer to the instruction manual for each expansion option.

**GXA-10: Large glass breeze break (common for all models)**

Breeze break unit with a glass door.

(For details, refer to "[GXA-10 Instruction manual](#)".)

**GXA-12: Animal weighing pan**

Container with depth to make it difficult for animals to escape

(For details, refer to "[GXA-12 Instruction manual](#)".)

**AX-GXA-31: Main unit cover (5 pieces)**

A main unit protective cover, which is the same with the standard accessory

## 30-2 Peripheral devices

For details, please refer to the instruction manual for each peripheral device.

### **AD-8920A: Remote Display**

By connecting to the balance through RS-232C interface, displays the weighing data of the balance.  
(For details, refer to "[AD-8920A Instruction manual](#)".)

### **AD-8922A: Remote controller**

By connecting to the balance through RS-232C interface, displays the weighing data of the balance and controls the balance remotely.  
(For details, refer to "[AD-8922A Instruction manual](#)".)

### **AD-8129H: Thermal printer**

This is a small direct thermal type printer that connects to the balance through an RS-232C interface and has various functions such as clock printing, statistical calculation printing, interval printing, and chart printing.  
(For details, refer to "[AD-8129TH Instruction manual](#)".)

### **AD-1683A: Ionizer**

This is a static eliminator that prevents error which can be caused when weighing samples are electrically charged.  
It is direct-current system and plentiful ion content enable weighing without breeze, which is ideally suited for precisely measuring powder and such.  
The built-in IR Sensor enables removal of static electricity in a touchless way.  
(For details, refer to "[AD-1683A Instruction manual](#)".)

### **AD-1684A: Electrostatic field meter**

An indicator that measures how much the balance's peripheral devices (e.g., automatic weighing line) such as weighing samples, tare, and breeze break are electrically charged and shows the result.  
When electric charge is observed, it can be eliminated with AD-1683A (Ionizer).

### **AD-1687: Weighing Environment logger**

Functions as a data logger along with sensors for temperature, humidity, barometric pressure, and vibration that can measure and store environmental data.  
When connected to the RS-232C interface of the balance, the AD-1687 can store environmental data along with weighing data.  
(For details, refer to "[AD-1687 Instruction manual](#)".)

### **AD-1688: Weighing data logger**

By connecting to the balance through RS-232C interface, the AD-1688 can store weighing data and is handy in an environment where a PC cannot be used.  
(For details, refer to "[AD-1688 Instruction manual](#)".)



**AD-1689:      Tweezers for sensitivity adjustment weight**

A pair of tweezers ideally suited for holding sensitivity adjustment weights of 1g to 500g.

**AX-USB-9P:   Serial / USB Converter**

Converts the balance's RS-232C interface to USB.

A USB driver is necessary to be installed.

**AX-SW137-PRINT:                      Foot switch for print**

Functions in the same way as the PRINT key when in combination with GXA-23 series.

This is an accompanying foot switch of GXA-23-PRINT.

**AX-SW137-REZERO:                      Foot switch for re-zero**

Functions in the same way as the RE-ZERO key when in combination with GXA-23 series.

This is an accompanying foot switch of GXA-23-REZERO.

**AX-BM-NEEDLESET:                      Electrode units for the ionizer (4 pieces)**

Replacement electrode units for ionizer

When replacing, replace both units at the same time.

**AD-8541-PC:              Bluetooth® dongle for PC**

Allows bi-directional communication (via COM port) with a PC.

Enables wireless communication between an A&D balance (with the GXA-27 installed) and a PC via Bluetooth up to 10 m.

(For details, refer to "[AD-8541-PC Instruction manual](#)".)

**AD-8541-SCALE:      RS-232C to Bluetooth® Converter**

Enables A&D balances/scales with an RS-232C (D-Sub 9-pin) interface to wirelessly communicate with a Bluetooth-equipped device such as a smartphone/tablet, PC, or the AD-8931 remote display. Maximum communication distance: 10 m (line of sight).

(For details, refer to "[AD-8541-SCALE Instruction manual](#)".)

**Note**

- **Please contact your local A&D representative to find out whether AD-8541-SCALE: is certified for compliance with Bluetooth® communication laws in your country.**

## 31. Terms

Terms	Description
Stable display	The weighing value when the stabilization indicator is displayed.
Environment	Ambient conditions such as vibration, drafts, temperature changes, static electricity, magnetic fields, and other factors that affect the weighing operation.
Sensitivity adjustment	Adjustment of the balance to ensure accurate weighing.
Zero point	A weighing reference point. Refers to the weighing value displayed when nothing is on the weighing pan (the reference value). Normally, the reference value is displayed as zero.
d	Scale division, a unit of digital resolution. Represents the readability that the balance can display as one unit.
Tare	To cancel the weight of a container, paper, etc., that is placed on the weighing pan and is not to be weighed.
Re-zero	To set the display to zero.
GLP	Good Laboratory Practice. (Good Laboratory Practice)
GMP	Good Manufacturing Practice. (Good Manufacturing Practice)
Repeatability	Variation in measured values obtained when the same weight is placed and removed repeatedly. Usually expressed as a standard deviation. Example: Standard deviation = 1 digit: This means that measured values, obtained when the same sample is placed and removed repetitively, fall within $\pm 1$ digit in the frequency of about 68%
Stabilization time	The time required for the stabilization indicator to be displayed with the weighing value after placing a sample on the weighing pan.
Sensitivity drift	The effect of temperature changes on the weighing data, expressed as a temperature coefficient. Example: At temperature coefficient = 2 ppm/ $^{\circ}\text{C}$ , if a load is 300 g and the temperature changes by $10^{\circ}\text{C}$ , the displayed value changes by: $0.0002\ \%/^{\circ}\text{C} \times 10^{\circ}\text{C} \times 300\text{ g} = 6\text{ mg}$

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