

GX-AE SERIES

GX-A / GF-A SERIES

GX-AWP / GF-AWP SERIES

Multi-Function Balances

[Balance Software Version 1.500 or Later]

INSTRUCTION MANUAL

GX-AE Series

GX-124AE / GX-224AE / GX-324AE

GX-A Series

GX-124A / GX-224A / GX-324A

GX-203A / GX-303A / GX-403A / GX-603A / GX-1003A / GX-1603A

GX-2002A / GX-3002A / GX-4002A / GX-6002A / GX-10002A

GX-6001A / GX-10001A

GF-A Series

GF-124A / GF-224A / GF-324A

GF-123A / GF-203A / GF-303A / GF-403A / GF-603A / GF-1003A / GF-1603A

GF-1202A / GF-2002A / GF-3002A / GF-4002A

GF-6002A / GF-10002A / GF-6001A / GF-10001A

GX-AWP Series

GX-203AWP / GX-403AWP / GX-603AWP

GX-2002AWP / GX-4002AWP / GX-6002AWP

GX-6001AWP

GF-AWP Series

GF-203AWP / GF-403AWP / GF-603AWP

GF-2002AWP / GF-4002AWP / GF-6002AWP


GF-6001AWP







A&D Company, Ltd.

Notation of Safety and Usage Information

Warning indicators

 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in injury or damage to the instrument.
--	--

Graphic symbols

	Indicates prohibited actions. Specific prohibitions are shown inside or near the  symbol using text or illustrations. Example: The symbol on the left indicates "Do not subject to impact".
	Indicates mandatory actions. Specific instructions are shown inside or near the  symbol using text or illustrations. Example: The symbol on the left indicates a general mandatory action.

Other labels

CAUTION	Provides important precautions for proper use of the device.
Tip	Offers guidance for avoiding common handling errors or general advice for using the product effectively.
Note	Provides helpful information related to device operation.

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Contents

1. Introduction	8
1-1. About the models	8
1-2. Features	9
1-3. Compliance	11
1-4. About the GX-AE series	12
2. Part Names, Installation and Precautions.....	13
2-1. GX-AE series (0.0001 g models)	14
2-1-1. Unpacking	14
2-1-2. Assembly and installation	15
2-2. GX-A / GF-A series (0.0001 g models).....	18
2-2-1. Unpacking	18
2-2-2. Assembly and installation	19
2-3. GX-A / GF-A series (0.001 g models).....	21
2-3-1. Unpacking	21
2-3-2. Assembly and installation	22
2-4. GX-A / GF-A series (0.01 g / 0.1 g models)	24
2-4-1. Unpacking	24
2-4-2. Assembly and installation	25
2-5. GX-AWP / GF-AWP series (0.001 g models).....	27
2-5-1. Unpacking	27
2-5-2. Assembly and installation	28
2-6. GX-AWP / GF-AWP series (0.01 g / 0.1 g models).....	31
2-6-1. Unpacking	31
2-6-2. Assembly and installation	32
2-7. Precautions before use (Installation conditions and preparation).....	34
2-8. How to adjust the level of the balance	36
2-9. Precautions during use for more accurate weighing.....	37
2-10. Precautions after weighing (Maintenance of the balance).....	39
2-11. Precautions regarding power supply.....	39
3. Basic Display and Key Operations	40
4. Weighing	42
4-1. Units of measure	42
4-1-1. Units	42
4-1-2. Programmable unit.....	46
4-2. Basic operation.....	49
4-2-1. Zero-point, tare, and weighing range.....	49
4-3. Counting mode (PCS)	54
4-4. Percent mode (Percentage weighing mode).....	60
4-5. Ionizer (GX-AE series only).....	62
5. Impact Shock Detection (ISD) Function.....	65
5-1. Recording impact history.....	65
5-2. Output impact history	66

6.	Response Adjustment / Self-Check Function Using ECL	68
6-1.	Response adjustment.....	68
6-2.	Self-check function / Automatic minimum weight (reference value) setting using ECL	70
7.	Sensitivity Adjustment / Calibration Test.....	77
7-1.	Automatic sensitivity adjustment (GX-AE / GX-A / GX-AWP series only).....	80
7-1-1.	Inputting the set time.....	81
7-1-2.	Clearing the set time	83
7-1-3.	Setting the interval time	85
7-2.	Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only).....	88
7-3.	Sensitivity adjustment using an external weight	90
7-4.	Setting the value of the weight.....	92
7-5.	Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only).....	94
7-5-1.	Correcting the internal weight value - AUTO (GX-AE/GX-A/GX-AWP series only)	96
7-5-2.	Correcting the internal weight value - MANUAL (GX-AE/GX-A/GX-AWP series only)	98
7-6.	Calibration test using the internal weight (GX-AE / GX-A series 0.0001 g models only)	102
7-7.	Calibration test using an external weight	104
8.	Function Selection Switch and Initialization.....	107
8-1.	Function selection switch	107
8-2.	Initialization.....	110
8-2-1.	Initialization for software version 1.502 or earlier	110
8-2-2.	Initialization (all items) for software version 1.503 or later.....	112
8-2-3.	Initialization (function table only) for software version 1.503 or later.....	114
9.	Function Table.....	116
9-1.	How to set the function table.....	116
9-2.	Function table list	119
9-2-1.	Outputting the function table information	130
9-3.	Environment, Display overview	133
9-4.	Clock and calendar function.....	138
9-5.	Comparator function overview	143
9-5-1.	Comparator setting examples.....	145
9-5-2.	Selecting the comparator (3-stage / 5-stage)	156
9-5-3.	Buzzer activation based on comparison results	158
9-5-4.	Adding comparison results.....	160
9-5-5.	Enlarged comparator display function	162
9-6.	Data output overview.....	165
9-6-1.	Data output mode	165
9-6-2.	Data output settings	168
9-6-3.	Weighing data format.....	169
9-6-4.	Output examples of weighing data format	175
9-7.	Application overview.....	178
9-7-1.	Normal weighing mode	178
9-7-2.	Capacity indicator	178
9-7-3.	Statistical calculation function.....	178
9-7-4.	Flow rate display (FRD) mode	178
9-7-5.	Gross, net, tare mode	178

9-8. Unit storing overview	179
10. GLP Report and ID Number	183
10-1. Main objectives	183
10-2. Setting the ID number	184
10-3. GLP output	186
11. Data Memory	196
11-1. Storing unit weights	197
11-1-1. Preparing the data memory function for unit weights	197
11-1-2. Registering unit weight data	199
11-1-3. Reading unit weight data	202
11-2. Storing the weighing data / sensitivity adjustment history	203
11-2-1. Preparing the data memory function for weighing values and sensitivity adjustment history	203
11-2-2. Storing (registering) weighing data	205
11-2-3. Displaying and outputting weighing data	207
11-2-4. Bulk output of stored weighing data	208
11-2-5. Bulk deletion of stored weighing data	210
11-2-6. Storing and outputting sensitivity adjustment history	211
11-2-7. Deleting sensitivity adjustment history	213
11-3. Storing comparator setting values	214
11-3-1. Preparing the data memory function for comparator settings	214
11-3-2. Registering comparator data	216
11-3-3. Quick access to upper and lower limits (Simple Selection Mode)	220
11-4. Storing tare values	221
11-4-1. Preparations for data memory function (tare value)	221
11-4-2. Registering tare value	223
11-4-3. Quick access to tare value (Simple Selection Mode)	227
11-4-4. Canceling tare data	228
12. Statistical Calculation Function	229
12-1. Preparations for statistical calculation function	230
12-2. Using the statistical calculation function	233
12-3. Example use of statistical calculation (for formulation)	238
13. Flow Rate Display (FRD) Function	245
13-1. Flow rate calculation method	247
13-1-1. Examples of manual setting for flow rate calculation time (Ct)	248
13-2. Preparations for flow rate display (FRD) function	250
13-3. Example usage of flow rate display (FRD) function	264
13-3-1. Using comparator with flow rate display (FRD)	265
13-3-2. Using analog voltage output	270
13-4. Commands used in the flow rate display (FRD) function	273
14. Gross / Net / Tare Function	275
14-1. Preparations for gross / net / tare function	275
14-2. Example use of gross / net / tare function	279
15. Minimum Weight Alert Function	281

15-1. Preparations for minimum weight alert function	282
15-2. Inputting and outputting minimum weight.....	284
15-2-1. Inputting minimum weight	284
15-2-2. Checking and changing the minimum weight	293
15-2-3. Outputting the setting values in bulk	294
15-2-4. Bulk output example for the set minimum weight	296
15-3. Data output when minimum weight is not reached	298
16. Underhook.....	300
17. Density (Specific Gravity) Measurement	301
17-1. Preparations before measurement.....	302
17-2. How to measure the density (specific gravity) of a solid	308
17-3. How to measure the density (specific gravity) of a liquid	313
18. Password Lock Function.....	317
18-1. Preparations for password lock function	319
18-2. Password entry at the start of weighing	321
18-3. Logging out.....	325
18-4. Registering (changing) the password.....	325
18-5. Deleting user passwords (users only).....	329
18-6. If the password is forgotten	330
19. Repeatability Check Function (GX-AE / GX-A / GX-AWP Series Only)	331
20. Interface Specification.....	333
20-1. RS-232C.....	333
20-2. USB	334
21. Connection with Peripheral Devices	335
21-1. Cables required to connect to peripheral devices	335
21-2. Data output settings	336
21-3. Examples of connecting multiple peripheral devices simultaneously	338
22. Printing Weighing Value Data on a Printer.....	346
22-1. When using the AD-8127 / AD-8129TH	346
23. Connecting to a PC.....	348
23-1. RS-232C.....	348
23-2. Quick USB mode.....	349
23-3. Virtual COM mode.....	352
23-4. WinCT: Data communication software	357
23-5. WinCT-ParamSet: Windows communication tools for parameter setting	358
23-6. WinCT-GXA-Filter: Windows GX-AE / GX-A / GF-A filter setting tools	359
23-7. Commands	360
23-7-1. Control commands.....	360
23-7-2. <AK> code and error codes	364
23-7-3. Command usage examples	365
23-8. UFC function	373
23-8-1. UFC program commands.....	373

23-8-2.	Examples of UFC program command creation.....	375
23-9.	Key lock function	376
23-9-1.	Locking all key switches.....	376
23-9-2.	Locking specified key switches	376
24.	Checking the Software Version of the Balance.....	377
25.	Maintenance.....	378
25-1.	Treatment of the balance	378
26.	Troubleshooting	386
26-1.	Checking balance operation, environment, and measurement method	386
26-2.	Error displays (error codes).....	388
26-3.	Asking for repair	391
27.	Specifications	392
27-1.	Common specifications	392
27-1-1.	Function	392
27-1-2.	Size / weight.....	392
27-2.	Individual specifications	393
27-2-1.	0.0001 g model	393
27-2-2.	0.001 g model	394
27-2-3.	0.01 g model	395
27-2-4.	0.1 g model	396
28.	External dimensions.....	397
29.	Dedicated options and peripheral devices.....	400
29-1.	Dedicated options.....	400
29-1-1.	Expansion options.....	400
29-1-2.	Other dedicated options.....	402
29-2.	Peripheral devices.....	403
30.	Terms	406

1. Introduction

Thank you for purchasing A&D's electronic balance.

This instruction manual is intended for the GX-AE, GX-A, GF-A, GX-AWP, and GF-AWP series balances (software version 1.500 or later).

Please read this instruction manual carefully to understand and make full use of the balance.

CAUTION

- Operations may differ depending on the software version of your balance.
For confirmation of the software version of the balance, refer to "[24. Checking the Software Version of the Balance](#)".

1-1. About the models

This series includes a variety of models with different combinations of weighing capacity and readability. In this manual, the models are classified by readability, as shown in the table below.

Classification	Readability	Model		
		Internal adjustment type, with ionizer ^{*1}	Internal adjustment type ^{*1}	External adjustment type ^{*2}
0.0001 g model	0.0001 g	GX-124AE GX-224AE GX-324AE	GX-124A GX-224A GX-324A	GF-124A GF-224A GF-324A
0.001 g model	0.001 g		GX-203A GX-303A GX-403A GX-603A GX-1003A GX-1603A	GF-123A GF-203A GF-303A GF-403A GF-603A GF-1003A GF-1603A
			GX-203AWP ^{*3} GX-403AWP ^{*3} GX-603AWP ^{*3}	GF-203AWP ^{*3} GF-403AWP ^{*3} GF-603AWP ^{*3}
0.01 g model	0.01 g		GX-2002A GX-3002A GX-4002A GX-6002A GX-10002A	GF-1202A GF-2002A GF-3002A GF-4002A GF-6002A GF-10002A
			GX-2002AWP ^{*3} GX-4002AWP ^{*3} GX-6002AWP ^{*3}	GF-2002AWP ^{*3} GF-4002AWP ^{*3} GF-6002AWP ^{*3}
0.1 g model	0.1 g		GX-6001A GX-10001A	GF-6001A GF-10001A
			GX-6001AWP ^{*3}	GF-6001AWP ^{*3}

^{*1} The GX-AE, GX-A, and GX-AWP series balances are equipped with an internal weight for sensitivity adjustment.

^{*2} The GF-A and GF-AWP series balances do not have an internal weight for sensitivity adjustment. To perform a sensitivity adjustment on these models, an external weight must be prepared separately.

^{*3} The GX-AWP and GF-AWP series balances are protected against dust and water (IP65 compliant).

1-2. Features

Main unit

- ❑ A backlit LCD for easy viewing of the weighing display.
(Refer to "3. Basic Display and Key Operations" for details.)
 - ❑ Easy-to-turn leveling feet for level adjustment.
(Refer to "2-8. How to adjust the level of the balance" for details.)
 - ❑ An underhook for underhook weighing.
(Refer to "16. Underhook" for details.)
 - ❑ One-touch adjustment using the internal weight for sensitivity adjustment.
(Refer to "7-2. Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)" for details.)
 - ❑ Sensitivity adjustment using an external weight.
(Refer to "7-3. Sensitivity adjustment using an external weight" for details.)
 - ❑ A small breeze break is included with the 0.001 g models.
(Refer to "2-3-1. Unpacking" for details.)
 - ❑ A large glass breeze break is included with the 0.0001 g models of the GX-A and GF-A series.
(Refer to "2-2-1. Unpacking" for details.)
 - ❑ The GX-AE series balance includes a glass breeze break with a built-in ionizer and an external IR switch for ionizer control.
(Refer to "2-1-1. Unpacking" for details.)
 - ❑ Models in the GX-AWP and GF-AWP series are IP65-compliant, offering dustproof and waterproof performance suitable for weighing powders and liquids.
By connecting the optional waterproof RS-232C cable (AX-KO2737-500), the balance maintains its dustproof and waterproof performance even during data communication. ^{*1}
- ^{*1} When using the GXA-09 (battery) or GXA-27 (Bluetooth®) expansion options, the IP65-compliant dustproof and waterproof performance is maintained.

Features available with factory settings

- ❑ Counting mode for measuring quantities.
(Refer to "4-3. Counting mode (PCS)" for details.)
- ❑ Percent mode for displaying the weighing value as a percentage.
(Refer to "4-4. Percent mode (Percentage weighing mode)" for details.)
- ❑ Self-check function for automatically evaluating repeatability performance using an Electronically Controlled Load (ECL), without the need for external weights.
(Refer to "6-2. Self-check function / Automatic minimum weight (reference value) setting using ECL" for details.)
- ❑ Impact Shock Detection (ISD) function for detecting impact shocks to the mass sensor and displaying and storing the impact level.
(Refer to "5. Impact Shock Detection (ISD) Function" for details.)
- ❑ Automatic sensitivity adjustment (GX-AE, GX-A, and GX-AWP series only), enabling the balance to perform sensitivity calibration automatically using the internal weight.
The execution conditions (temperature change, specific time, intervals) can be modified by changing the function table of the balance.
(Refer to "7-1. Automatic sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)" for details.)

Features available by configuring the function table

- ❑ Auto display-ON function: When the AC adapter is connected, the display automatically turns on and enters weighing mode. There is no need to press the [ON:OFF] key.
(Refer to "9-3. Environment, Display overview" for details.)
- ❑ Auto display-OFF function: Automatically turns off the display after a period of inactivity (approximately 10 minutes) while keeping the power on.
(Refer to "9-3. Environment, Display overview" for details.)
- ❑ Data memory function: Stores the following weighing data.
 - Unit weight (for counting mode): Up to 50 entries
 - Weighing value: Up to 200 entries
 - Sensitivity adjustment history: Most recent 50 entries
 - Comparator settings (upper and lower limits only): Up to 20 sets
 - Tare value: Up to 20 entries(Refer to "11. Data Memory" for details.)
- ❑ GLP / GMP support: Outputs maintenance reports compliant with GLP and GMP standards, etc.
GLP: Good Laboratory Practice, standards for implementing safety tests for drugs and medicines.
GMP: Good Manufacturing Practice, rules for manufacturing and quality control.
(Refer to "10-3. GLP output" for details.)
- ❑ Built-in clock / calendar: Enables the output of weighing values with the date and time.
(Refer to "9-4. Clock and calendar function" for details.)
The clock settings can be restricted so that only the Administrator can change them. (Password lock)
- ❑ Comparator function: Compares the weighing value with preset upper and lower limits and displays the result in 3 stages: HI, OK, or LO.
This feature can be used for pass / fail judgment or ranking. (5-stage comparison is also available depending on the settings.)
(Refer to "9-5. Comparator function overview" for details.)
- ❑ Capacity indicator function: Displays the relationship between the applied load and the balance's weighing capacity as a percentage.
(Refer to "9-7-2. Capacity indicator" for details.)
- ❑ Statistical calculation function: Aggregates weighing data for statistical analysis.
(Refer to "12. Statistical Calculation Function" for details.)
- ❑ Flow rate display (FRD) function: Calculates, displays, and outputs continuous changes in weighing values as a flow rate.
(Refer to "13. Flow Rate Display (FRD) Function" for details.)
- ❑ Gross / net / tare function: Outputs net weight, gross weight, and tare weight.
(Refer to "14. Gross / Net / Tare Function" for details.)
- ❑ Minimum weight alert function: Facilitates easy judgment of whether the sample amount to be weighed meets the set minimum weight.
(Refer to "15. Minimum Weight Alert Function" for details.)
- ❑ Hold function: Enables stable measurement of moving samples such as animals.
(Refer to "9-3. Environment, Display overview" for details.)
- ❑ Password lock function: Restricts the use and functions of the balance.
(Refer to "18. Password Lock Function" for details.)

Communication

- ❑ RS-232C (D-Sub9P, male) interface: A standard feature of the balance for outputting weighing values and data.
(Refer to "[20-1. RS-232C](#)" for details.)
- ❑ USB (Mini-B type) interface: A standard feature of the balance for outputting the weighing values and data.
(Refer to "[20-2. USB](#)" for details.)
- ❑ The key switches on the balance can be locked by sending a specified command to the balance.
(Refer to "[23-9. Key lock function](#)" for details.)
- ❑ The Universal Flex Coms (UFC) function enables the output of desired content when outputting weighing data.
(Refer to "[23-8. UFC function](#)" for details.)

Options and peripherals

- ❑ A variety of optional accessories (sold separately) are available for the balance.
(Refer to "[29. Dedicated options and peripheral devices](#)" for details.)
- ❑ AD-8127 multi-functional compact printer (sold separately) or AD-8129TH compact thermal printer (sold separately): Allows printing of the output from the balance.
(Refer to "[22. Printing Weighing Value Data on a Printer](#)" for details.)
- ❑ AD-8920A remote display or AD-8922A remote controller (both sold separately): Allows the weighing value to be checked remotely.
(Refer to "[21. Connection with Peripheral Devices](#)" for details.)
- ❑ GXA-13 density determination kit (for the 0.001 g models, sold separately) or GXA-14 density determination kit (for the 0.0001 g models, sold separately): Allows density (specific gravity) measurement.^{*2}
(Refer to "[17. Density \(Specific Gravity\) Measurement](#)" for details.)

^{*2} Density (specific gravity) measurement requires configuration of the balance's function table.

1-3. Compliance

Compliance with FCC rules

Please note that this equipment generates, uses and can radiate radio frequency energy. This equipment has been tested and has been found to comply with the limits of Class A digital devices pursuant to Part 15 of FCC rules. These rules are designed to provide reasonable protection against interference when equipment is operated in a commercial environment. If this unit is operated in a residential area, it may cause some interference and under these circumstances the user would be required to take, at his own expense, whatever measures are necessary to eliminate the interference.

(FCC = Federal Communications Commission in the U.S.A.)

1-4. About the GX-AE series

Features

- ❑ A fanless ionizer is built into the glass breeze break. It neutralizes static electricity on charged samples before weighing, helping to reduce measurement errors. (Static is eliminated by irradiating the sample with bipolar ions generated through direct-current corona discharge.)
- ❑ For instructions on using the ionizer and the external IR switch, refer to "4-5. Ionizer (GX-AE series only)" in this manual, or download the GXA-17 (Large glass breeze break with built-in ionizer) Instruction Manual from the A&D website: <https://www.aandd.jp>.
- ❑ The ionizer's discharge electrode unit is removable, allowing for easy cleaning and replacement.
- ❑ The ionizer is equipped with an external IR switch (a non-contact infrared sensor), allowing contactless activation of static elimination.
- ❑ The ionizer is powered directly by the balance, eliminating the need for a separate AC adapter.
- ❑ The optional foot switches (AX-SW137-PRINT or AX-SW137-REZERO) can be used to operate the PRINT, RE-ZERO, or ionizer static elimination functions.
- ❑ A removable large glass breeze break is included as standard equipment.
- ❑ An option board is pre-installed. As a result, additional expansion options such as GXA-03, GXA-04, GXA-06, GXA-09, GXA-17, GXA-23, GXA-24, GXA-25, GXA-26, FXi-08, and GXA-27 cannot be used.

Effects of static electricity

- ❑ When the ambient humidity falls below 45% RH, insulating materials such as powders, filters, weighing paper, and plastics are more likely to become electrostatically charged. This can result in weighing errors of several milligrams. Using an ionizer (static eliminator) effectively neutralizes static charges and helps ensure accurate measurements.

2. Part Names, Installation and Precautions

- This product is a precision instrument, and it should be carefully unpacked.
The contents of the package vary depending on the product. Refer to the illustration of the packing contents and make sure that everything is included.
- If factory-installed options are included with the balance, the corresponding accessories for the options may also be packed with the unit.
It is advisable to keep the original packaging materials, as they may be needed for transporting the balance in the event of repair or relocation.

CAUTION

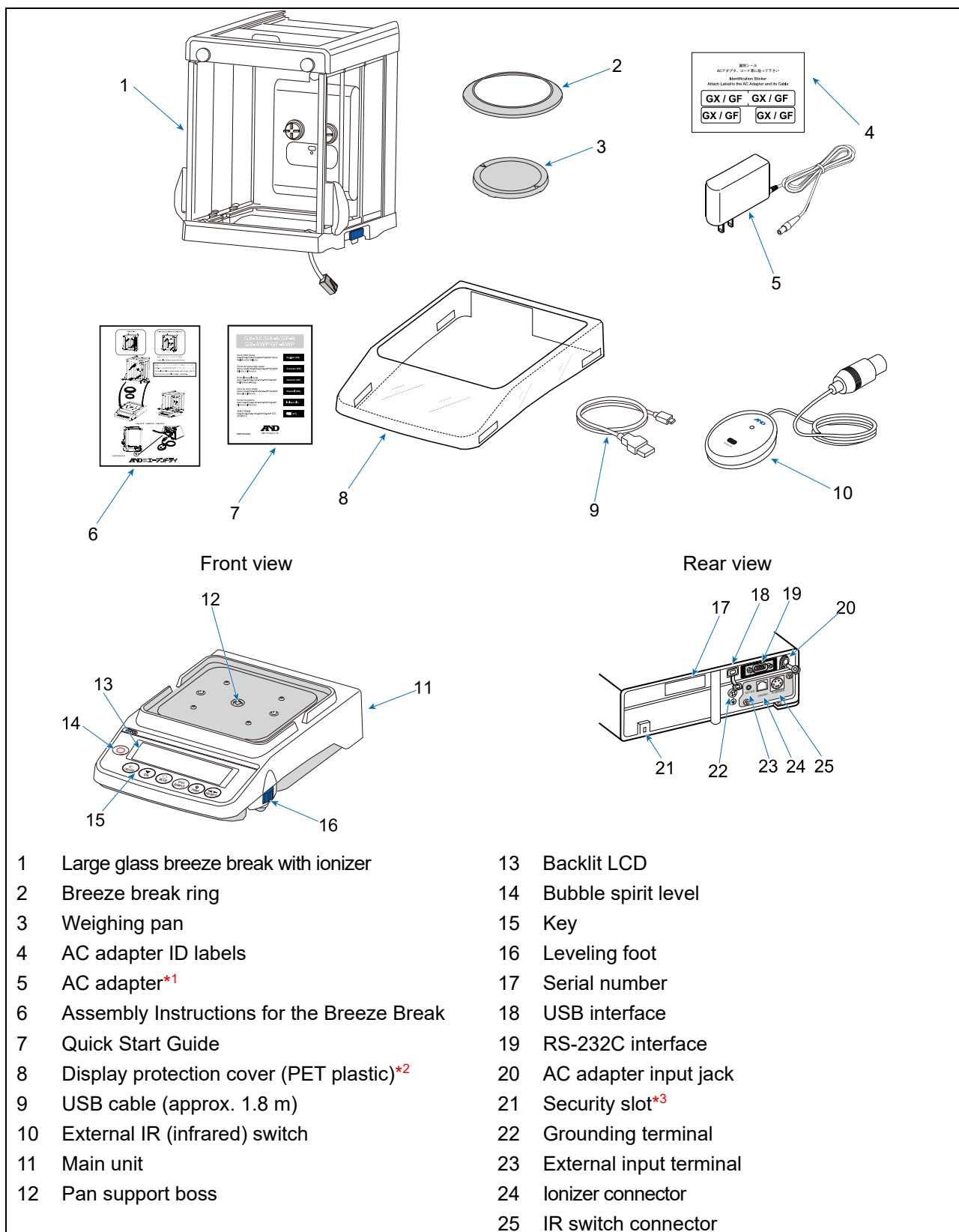
- Packaging materials and contents are subject to change without notice.
- For details on assembling and installing the balance, refer to "Assembly and Installation" later in this manual.

GX-AE series (0.0001 g models)	Refer to " 2-1-2. Assembly and installation ".
GX-A / GF-A series (0.0001 g models)	Refer to " 2-2-2. Assembly and installation ".
GX-A / GF-A series (0.001 g models)	Refer to " 2-3-2. Assembly and installation ".
GX-A / GF-A series (0.01 g / 0.1 g models)	Refer to " 2-4-2. Assembly and installation ".
GX-AWP / GF-AWP series (0.001 g models)	Refer to " 2-5-2. Assembly and installation ".
GX-AWP / GF-AWP series (0.01 g / 0.1 g models)	Refer to " 2-6-2. Assembly and installation ".

- Before installing the balance, refer to "[2-7. Precautions before use \(Installation conditions and preparation\)](#)" for guidance on the installation location.
- Refer to "[2-8. How to adjust the level of the balance](#)", and rotate the leveling feet to ensure the bubble is within the red circle of the bubble spirit level.

2-1. GX-AE series (0.0001 g models)

2-1-1. Unpacking



^{*1} Accessories vary depending on the destination region.

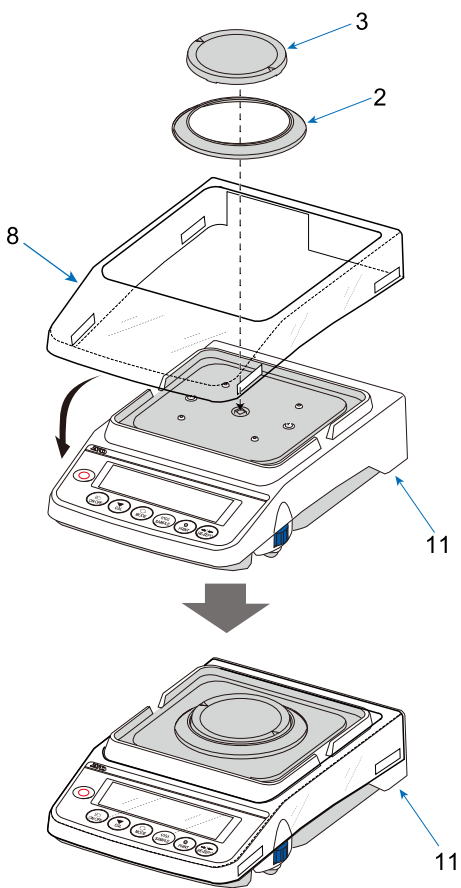
^{*2} Attached to the main unit.

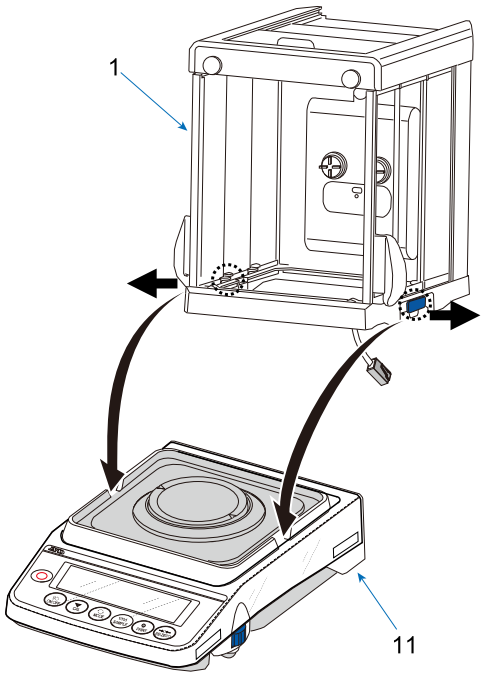
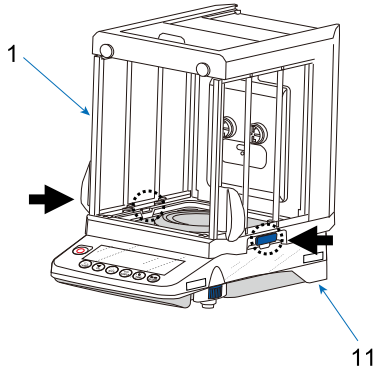
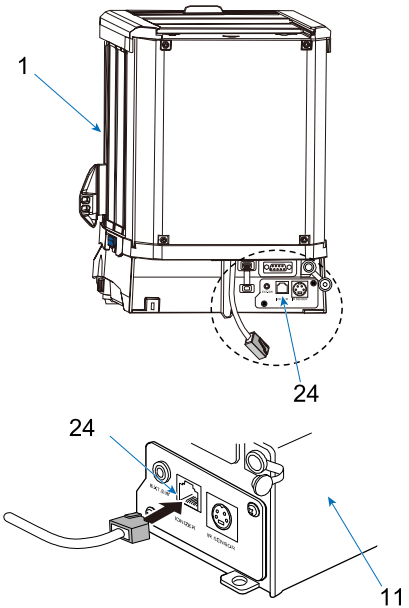
^{*3} Please prepare the security cable separately.

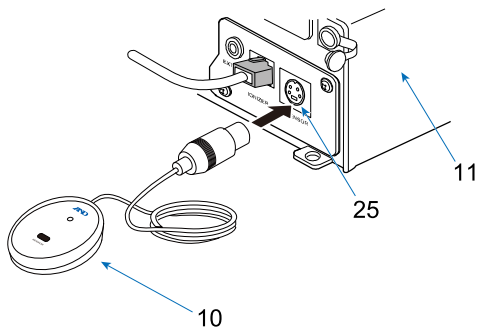
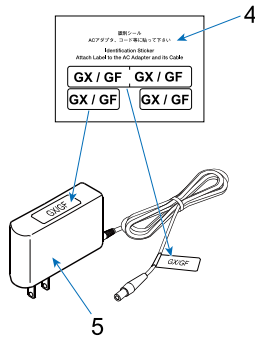
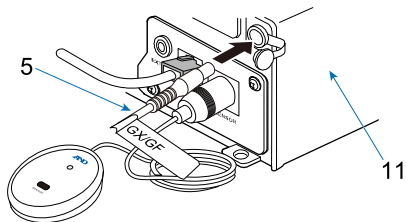
2-1-2. Assembly and installation

CAUTION

- Perform the following steps with the AC adapter removed from the main unit.

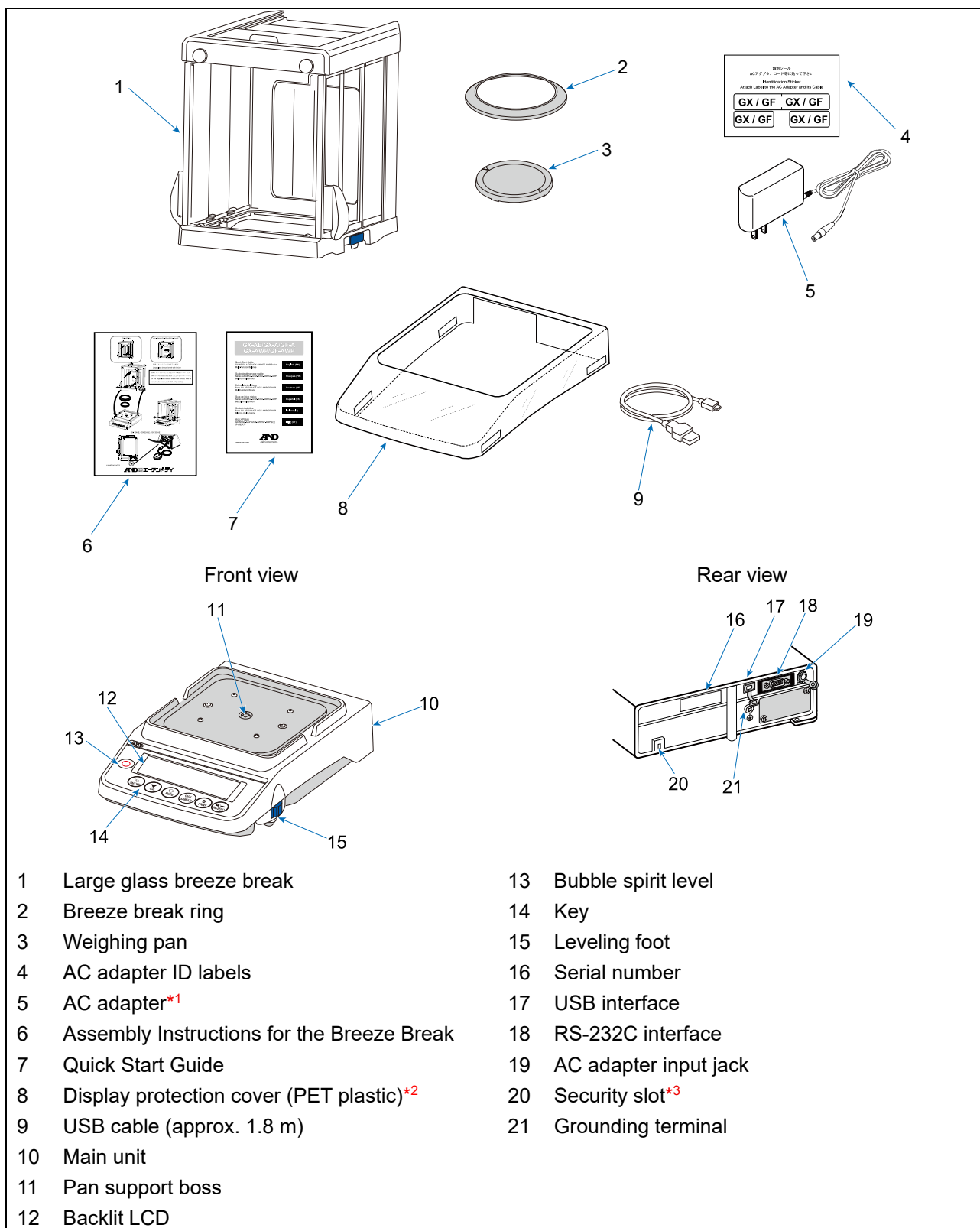
Step	Description	Parts diagram
1.	<p>Attach the weighing pan (3), breeze break ring (2), and display protection cover (8)*¹ to the main unit (11).</p> <p>*¹ If necessary, apply double-sided tape to prevent unintentional removal.</p>	 <p>The diagram illustrates the assembly process in two stages. The top stage shows the components being attached: a weighing pan (3) is placed on top of a breeze break ring (2), which is then positioned over the weighing pan of the main unit (11). A display protection cover (8) is shown being placed over the unit's display. A curved arrow indicates the cover is to be folded down. The bottom stage shows the completed assembly with all three components (3, 2, and 8) attached to the main unit (11). A large downward arrow connects the two stages.</p>

Step	Description	Parts diagram
2.	Pull out the locking handles on both sides of the large glass breeze break with ionizer (1) and attach it to the main unit (11).	
3.	Push the locking handles back in to secure the large glass breeze break with ionizer (1) to the main unit (11).	
4.	Connect the cable extending from the large glass breeze break with ionizer (1) to the ionizer connector (24) located on the rear of the main unit (11).	

Step	Description	Parts diagram
5.	Connect the external IR (infrared) switch (10) to the IR switch connector (25) located on the rear of the main unit (11).	
6.	<p>Affix the AC adapter ID labels (4) to the AC adapter (5).</p> <p>⚠ CAUTION</p> <ul style="list-style-type: none"> Confirm that the AC adapter type is correct for the local voltage and power receptacle type. To prevent the use of an incorrect AC adapter, be sure to affix the AC adapter ID labels. Use the dedicated AC adapter specified for the balance. Do not connect the included AC adapter to other devices. 	
7.	<p>Insert the AC adapter (5), with the affixed ID labels (4), into the AC adapter input jack (20) on the back of the main unit (11). Then plug the other end into a power outlet.</p> <p>CAUTION</p> <ul style="list-style-type: none"> Be sure to warm up the balance for at least 1 hour before use. If the balance has been assembled and installed correctly, the LED located at the center of the large glass breeze break with ionizer (1) will blink for a short time when the AC adapter (5) is plugged into an outlet. Likewise, if assembly and installation are correct, the LED on the external IR (infrared) switch (10) will also blink. 	

2-2. GX-A / GF-A series (0.0001 g models)

2-2-1. Unpacking

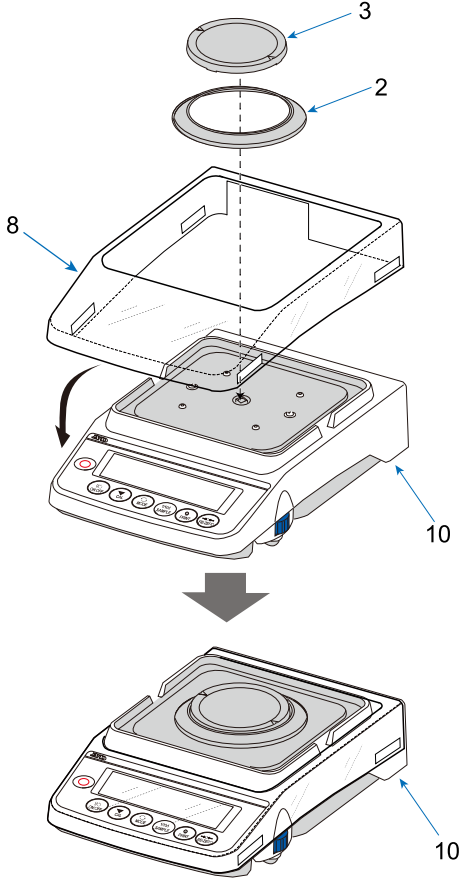
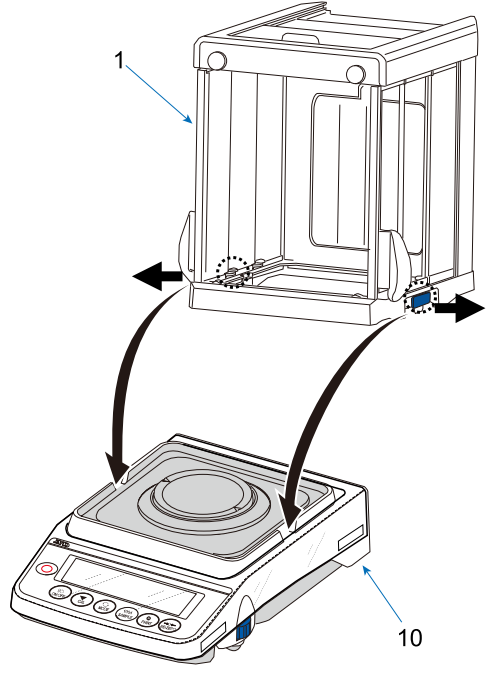


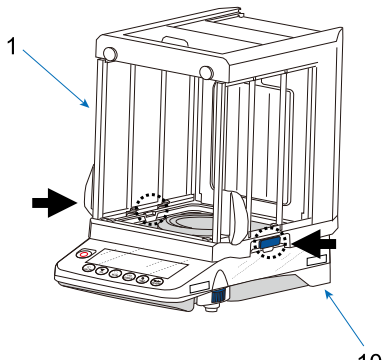
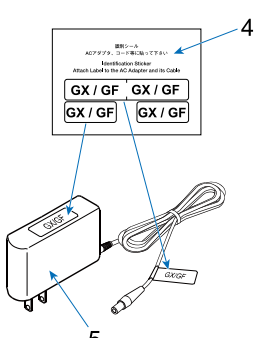
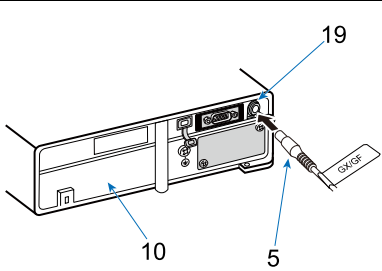
^{*1} Accessories vary depending on the destination region.

^{*2} Attached to the main unit.

^{*3} Please prepare the security cable separately.

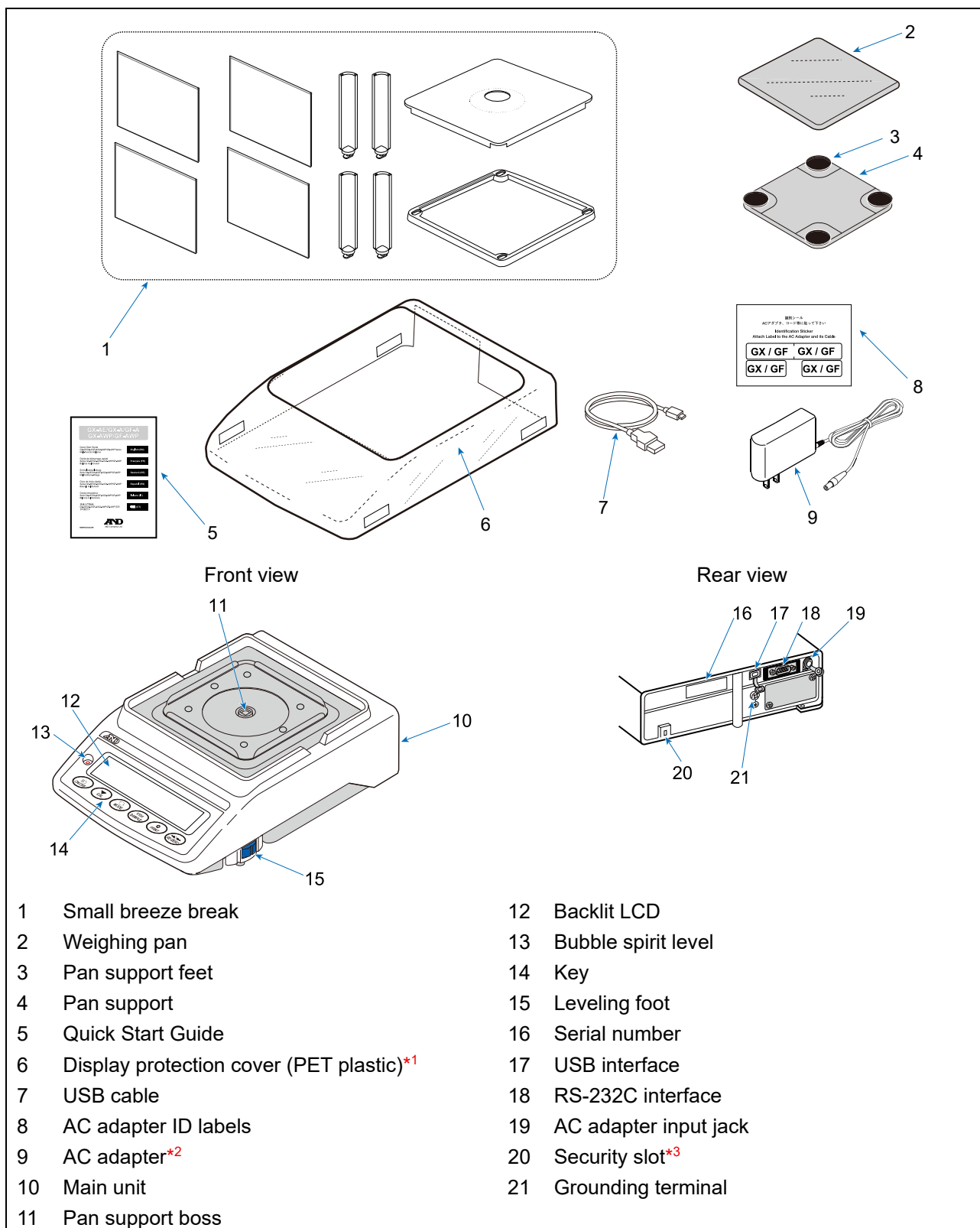
2-2-2. Assembly and installation

Step	Description	Parts diagram
1.	<p>Attach the weighing pan (3), breeze break ring (2), and display protection cover (8)*¹ to the main unit (10).</p> <p>^{*1} If necessary, apply double-sided tape to prevent unintentional removal.</p>	 <p>The diagram illustrates the assembly of the main unit (10). It shows three components being attached: the weighing pan (3), the breeze break ring (2), and the display protection cover (8). The components are shown being placed onto the main unit, which is shown in two states: with the cover open and with the cover closed. A large downward arrow indicates the transition from the open state to the closed state.</p>
2.	<p>Pull out the locking handles on both sides of the large glass breeze break (1) and attach it to the main unit (10).</p>	 <p>The diagram illustrates the attachment of the large glass breeze break (1) to the main unit (10). It shows the breeze break being pulled out from its storage position and then attached to the main unit. The main unit is shown in two states: with the breeze break being pulled out and with the breeze break attached. Arrows indicate the movement of the breeze break from its storage position to the main unit.</p>

Step	Description	Parts diagram
3.	Push the locking handles back in to secure the large glass breeze break (1) to the main unit (10).	
6.	<p>Affix the AC adapter ID labels (4) to the AC adapter (5).</p> <p>⚠ CAUTION</p> <ul style="list-style-type: none"> Confirm that the AC adapter type is correct for the local voltage and power receptacle type. To prevent the use of an incorrect AC adapter, be sure to affix the AC adapter ID labels. Use the dedicated AC adapter specified for the balance. Do not connect the included AC adapter to other devices. 	
7.	<p>Insert the AC adapter (5), with the affixed ID labels (4), into the AC adapter input jack (19) on the back of the main unit (10). Then plug the other end into a power outlet.</p> <p>CAUTION</p> <ul style="list-style-type: none"> Be sure to warm up the balance for at least 1 hour before use. 	

2-3. GX-A / GF-A series (0.001 g models)

2-3-1. Unpacking

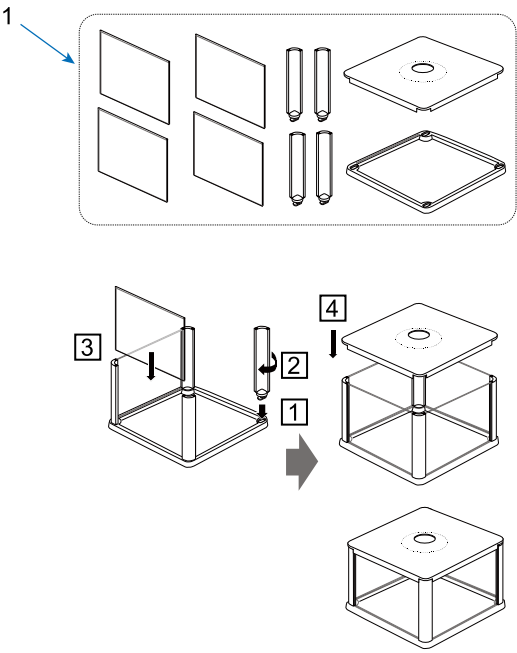
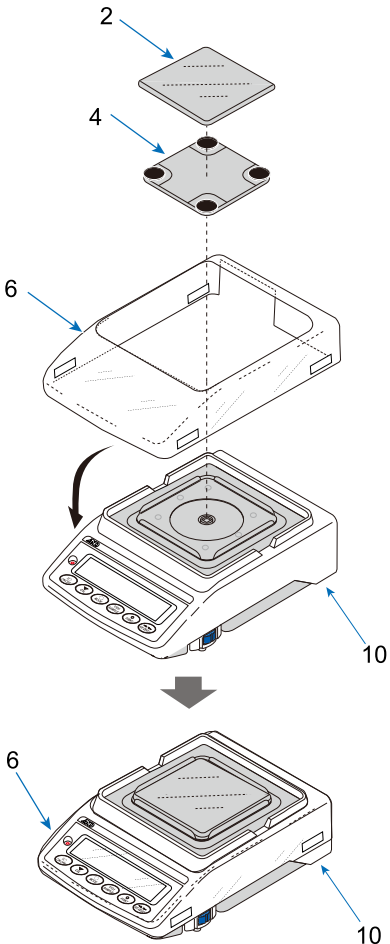


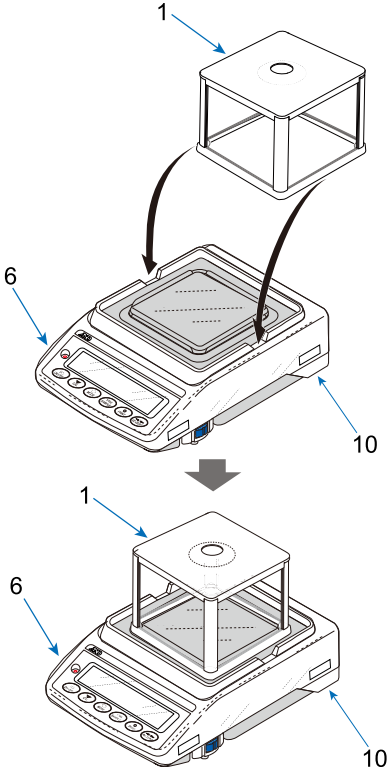
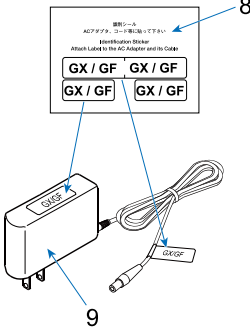
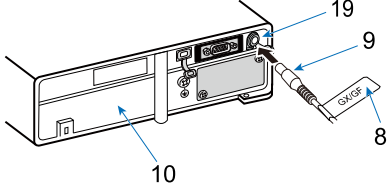
*1 Attached to the main unit.

*2 Accessories vary depending on the destination region.

*3 Please prepare the security cable separately.

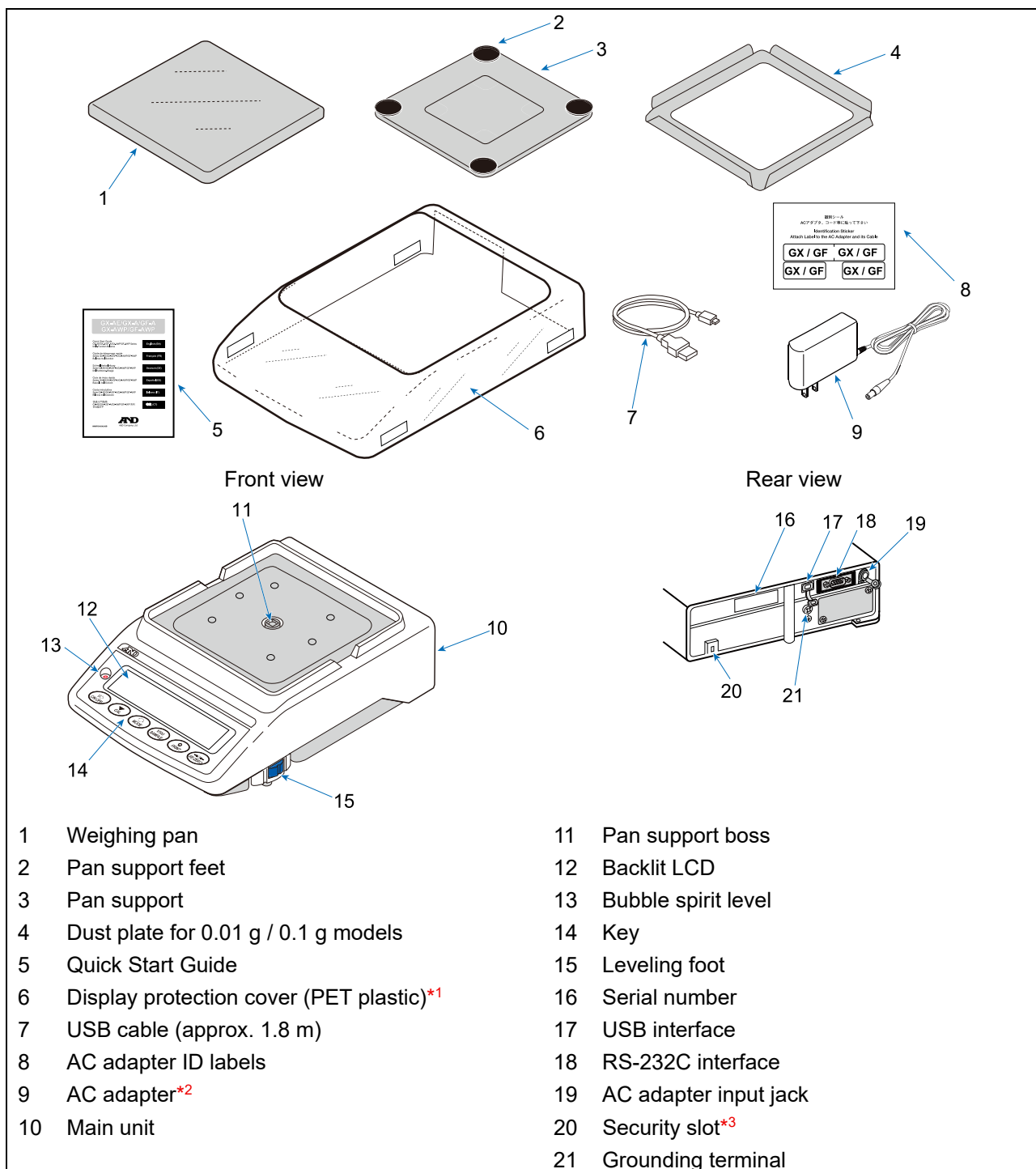
2-3-2. Assembly and installation

Step	Description	Parts diagram
1.	Assemble the small breeze break (1) in the order of steps 1 through 4 .	
2.	Attach the weighing pan (2), pan support (4), and display protection cover (6)* ¹ to the main unit (10). ^{*1} If necessary, apply double-sided tape to prevent unintentional removal.	

Step	Description	Parts diagram
3.	<p>Attach the small breeze break (1), assembled in step 1, to the main unit (10) with the display protection cover (6) already installed.</p>	
4.	<p>Affix the AC adapter ID labels (8) to the AC adapter (9).</p> <p>⚠ CAUTION</p> <ul style="list-style-type: none"> ❑ Confirm that the AC adapter type is correct for the local voltage and power receptacle type. ❑ To prevent the use of an incorrect AC adapter, be sure to affix the AC adapter ID labels. ❑ Use the dedicated AC adapter specified for the balance. ❑ Do not connect the included AC adapter to other devices. 	
5.	<p>Insert the AC adapter (9), with the affixed ID labels (8), into the AC adapter input jack (19) on the back of the main unit (10). Then plug the other end into a power outlet.</p> <p>CAUTION</p> <ul style="list-style-type: none"> ❑ Warm up the balance for at least 30 minutes before use, with the AC adapter connected to a power supply. 	

2-4. GX-A / GF-A series (0.01 g / 0.1 g models)

2-4-1. Unpacking

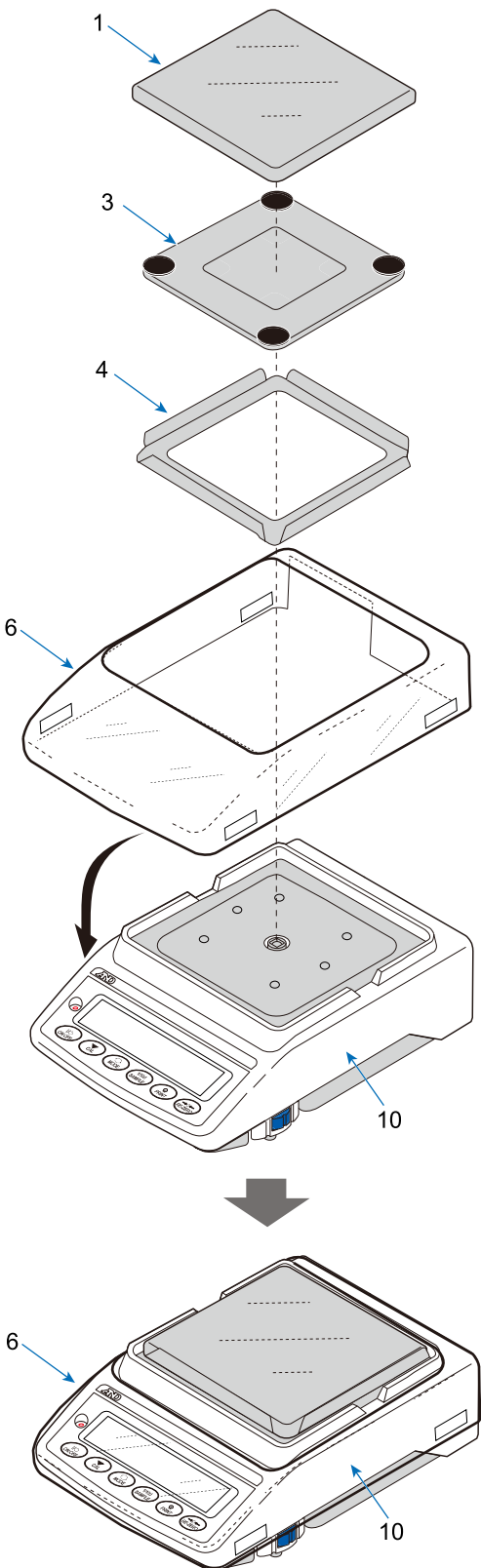


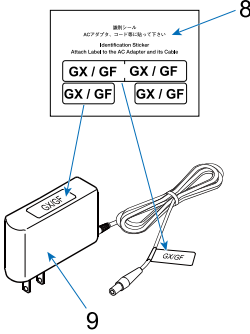
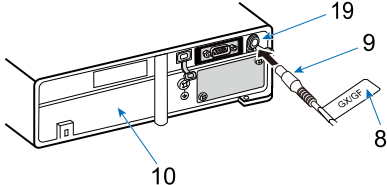
*1 Attached to the main unit.

*2 Accessories vary depending on the destination region.

*3 Please prepare the security cable separately.

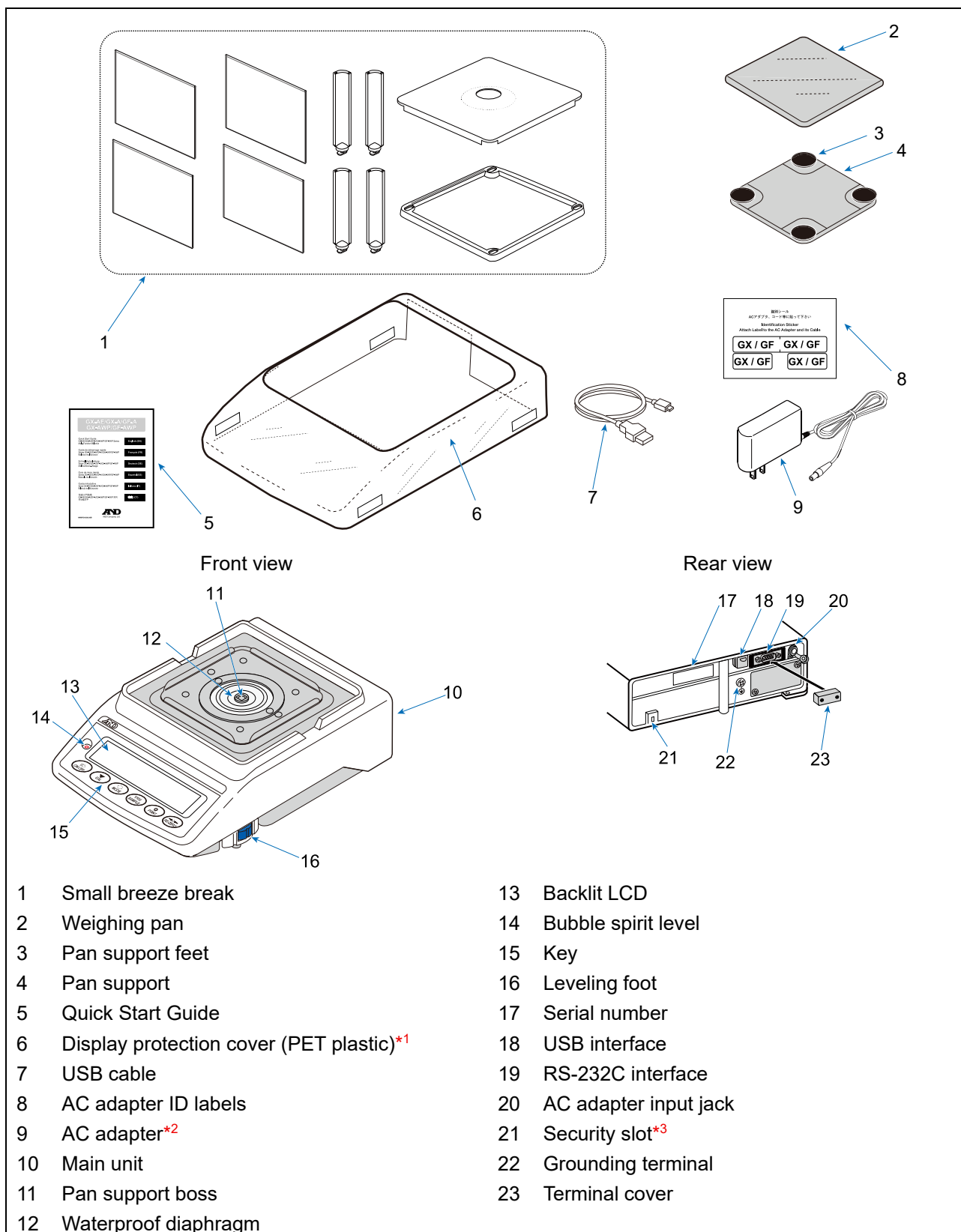
2-4-2. Assembly and installation

Step	Description	Parts diagram
1.	<p>Attach the weighing pan (1), pan support (3), dust plate for 0.01 g / 0.1 g models (4), and display protection cover (6)^{*1} to the main unit (10).</p> <p>^{*1} If necessary, apply double-sided tape to prevent unintentional removal.</p>	 <p>The parts diagram illustrates the assembly process in five stages. Stage 1 shows the weighing pan (1) and pan support (3) being aligned. Stage 2 shows the dust plate (4) being placed on the pan support. Stage 3 shows the display protection cover (6) being placed on the dust plate. Stage 4 shows the assembled components being lowered onto the main unit (10). Stage 5 shows the final assembled unit with the weighing pan (1), pan support (3), dust plate (4), and display protection cover (6) attached to the main unit (10).</p>

Step	Description	Parts diagram
2.	<p>Affix the AC adapter ID labels (8) to the AC adapter (9).</p> <p>⚠ CAUTION</p> <ul style="list-style-type: none"> Confirm that the AC adapter type is correct for the local voltage and power receptacle type. To prevent the use of an incorrect AC adapter, be sure to affix the AC adapter ID labels. Use the dedicated AC adapter specified for the balance. Do not connect the included AC adapter to other devices. 	
3.	<p>Insert the AC adapter (9), with the affixed ID labels (8), into the AC adapter input jack (19) on the back of the main unit (10). Then plug the other end into a power outlet.</p> <p>CAUTION</p> <ul style="list-style-type: none"> Warm up the balance for at least 30 minutes before use, with the AC adapter connected to a power supply. 	

2-5. GX-AWP / GF-AWP series (0.001 g models)

2-5-1. Unpacking

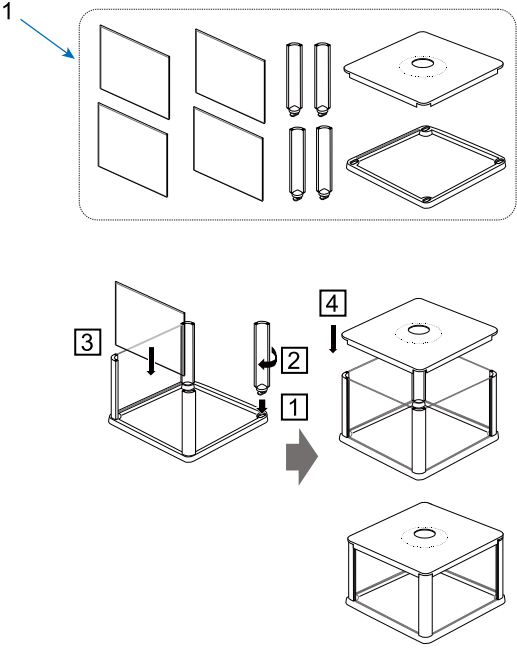

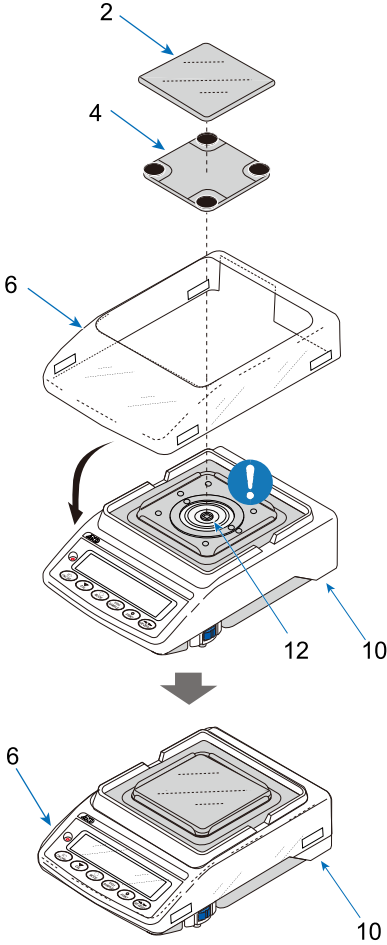


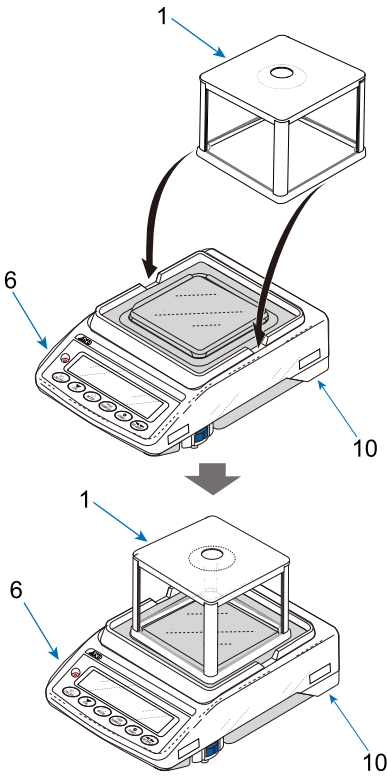
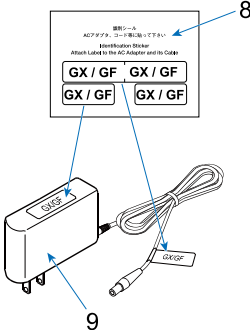
*1 Attached to the main unit.

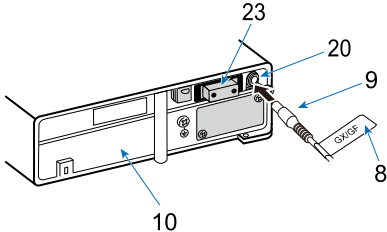
*2 Accessories vary depending on the destination region.

*3 Please prepare the security cable separately.

2-5-2. Assembly and installation

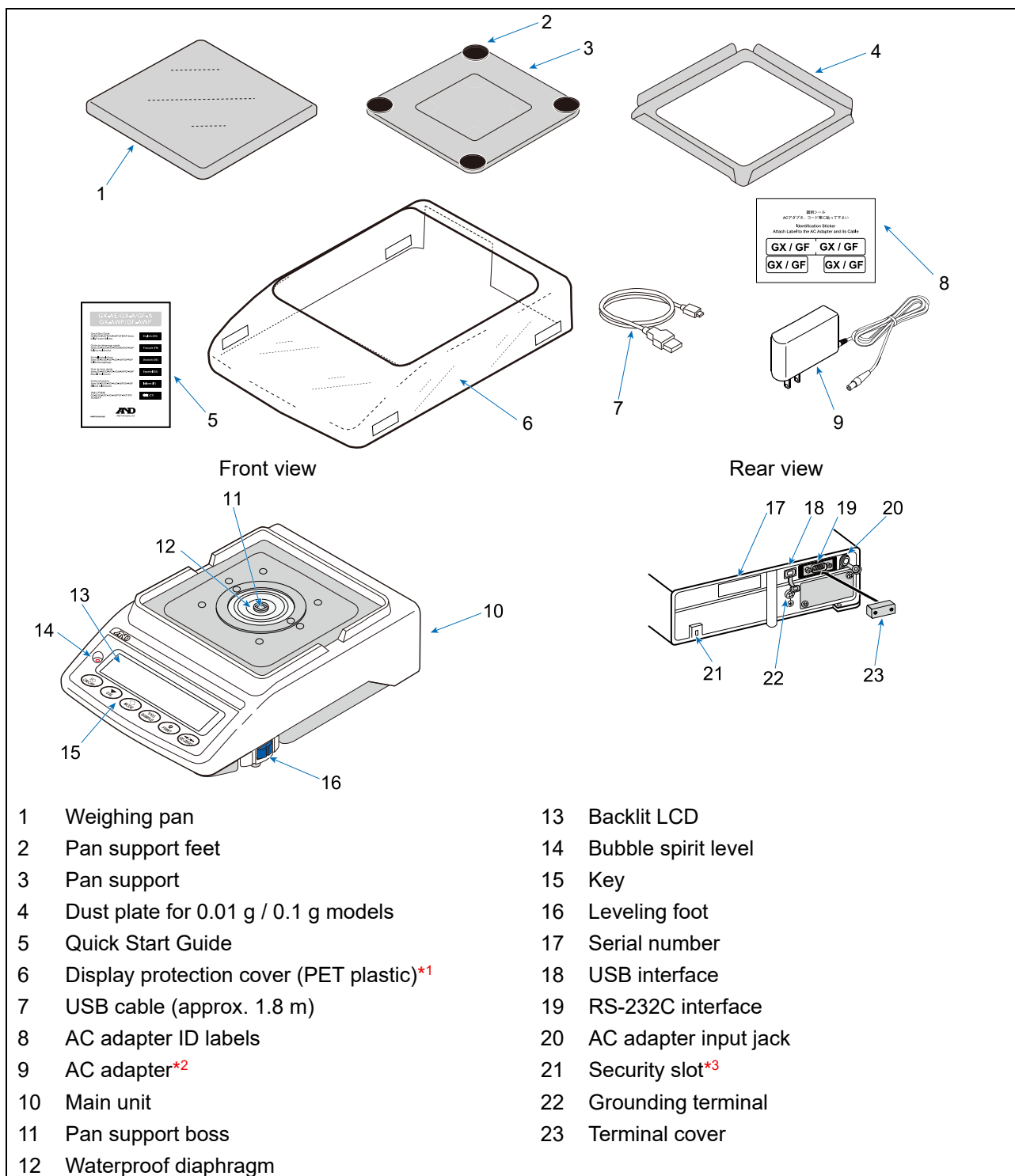
Step	Description	Parts diagram
1.	<p>Assemble the small breeze break (1) in the order of steps 1 through 4.</p>	
2.	<p>Attach the weighing pan (2), pan support (4), and display protection cover (6)*¹ to the main unit (10).</p> <p>^{*1} If necessary, apply double-sided tape to prevent unintentional removal.</p> <p> When installing the pan support (3), take care not to deform the waterproof diaphragm (12).</p>	

Step	Description	Parts diagram
3.	<p>Attach the small breeze break (1), assembled in step 1, to the main unit (10) with the display protection cover (6) already installed.</p>	
4.	<p>Affix the AC adapter ID labels (8) to the AC adapter (9).</p> <p>⚠ CAUTION</p> <ul style="list-style-type: none"> ❑ Confirm that the AC adapter type is correct for the local voltage and power receptacle type. ❑ To prevent the use of an incorrect AC adapter, be sure to affix the AC adapter ID labels. ❑ Use the dedicated AC adapter specified for the balance. ❑ Do not connect the included AC adapter to other devices. 	

Step	Description	Parts diagram
5.	<p>Insert the AC adapter (9), with the affixed ID labels (8), fully into the AC adapter input jack (20) on the back of the main unit (10). Then plug the other end into a power outlet.</p> <p>If the adapter is not inserted completely, water or debris may enter the unit.</p> <p>To maintain dust- and water-resistant performance, attach either the terminal cover (23) or the waterproof RS-232C cable (AX-KO2737-500).</p> <p>The USB interface maintains its dust- and water-resistant performance even when the included USB cable is connected.</p> <p>CAUTION</p> <p>❑ Warm up the balance for at least 30 minutes before use, with the AC adapter connected to a power supply.</p>	 <p>The diagram illustrates the back of the main unit (10). It shows the AC adapter input jack (20) where the AC adapter (9) is plugged in. The AC adapter (9) has ID labels (8) attached to it. A terminal cover (23) is also shown, which can be attached to the unit.</p>

2-6. GX-AWP / GF-AWP series (0.01 g / 0.1 g models)

2-6-1. Unpacking

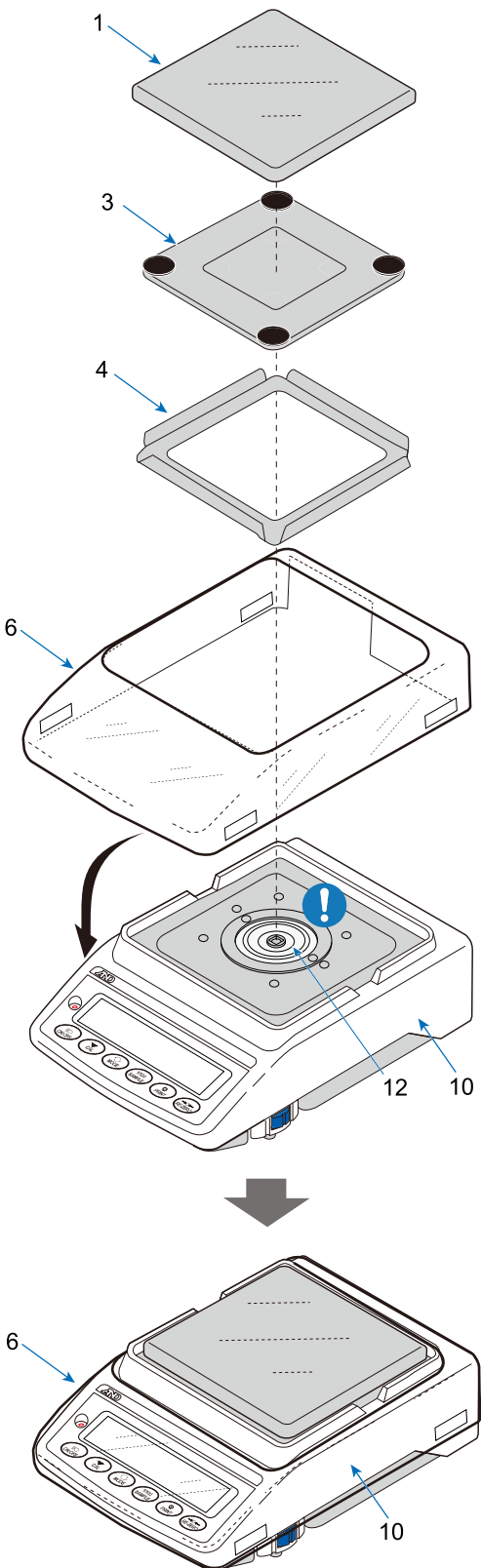


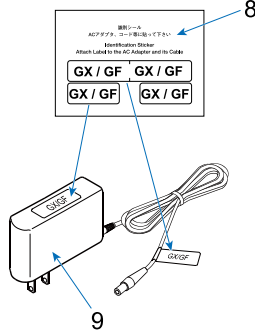
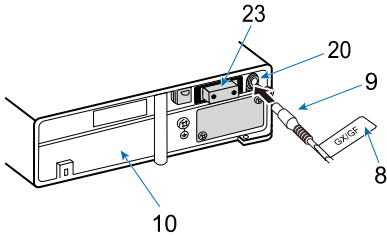
*1 Attached to the main unit.

*2 Accessories vary depending on the destination region.

*3 Please prepare the security cable separately.

2-6-2. Assembly and installation

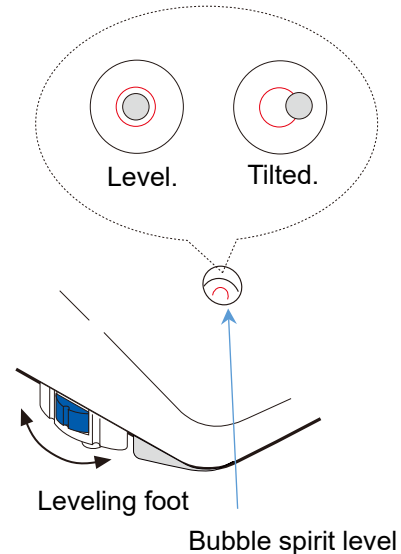
Step	Description	Parts diagram
1.	<p>Attach the weighing pan (1), pan support (3), dust plate for 0.01 g / 0.1 g models (4), and display protection cover (6)^{*1} to the main unit (10).</p> <p>^{*1} If necessary, apply double-sided tape to prevent unintentional removal.</p> <p>! When installing the pan support (3), take care not to deform the waterproof diaphragm (12).</p>	 <p>The parts diagram illustrates the assembly process. It shows the weighing pan (1), pan support (3), dust plate (4), and display protection cover (6) being attached to the main unit (10). The pan support (3) is shown being placed on the main unit, with a warning icon indicating that the waterproof diaphragm (12) should not be deformed. The final assembly shows the weighing pan (1) on the pan support (3), the dust plate (4) on top, and the display protection cover (6) on the main unit (10).</p>

Step	Description	Parts diagram
2.	<p>Affix the AC adapter ID labels (8) to the AC adapter (9).</p> <p>⚠ CAUTION</p> <ul style="list-style-type: none"> ❑ Confirm that the AC adapter type is correct for the local voltage and power receptacle type. ❑ To prevent the use of an incorrect AC adapter, be sure to affix the AC adapter ID labels. ❑ Use the dedicated AC adapter specified for the balance. ❑ Do not connect the included AC adapter to other devices. 	
3.	<p>Insert the AC adapter (9), with the affixed ID labels (8), fully into the AC adapter input jack (20) on the back of the main unit (10). Then plug the other end into a power outlet.</p> <p>If the adapter is not inserted completely, water or debris may enter the unit.</p> <p>To maintain dust- and water-resistant performance, attach either the terminal cover (23) or the waterproof RS-232C cable (AX-KO2737-500).</p> <p>The USB interface maintains its dust- and water-resistant performance even when the included USB cable is connected.</p> <p>CAUTION</p> <ul style="list-style-type: none"> ❑ Warm up the balance for at least 30 minutes before use, with the AC adapter connected to a power supply. 	

2-7. Precautions before use (Installation conditions and preparation)

Prepare the following installation conditions in order to bring out the full performance of the balance.

- ❑ Install the balance in an environment where the temperature and humidity are not excessive. The best operating temperature is about $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ at about 45% to 60% RH relative humidity.
- ❑ Install the balance in a dust-free environment.
- ❑ The weighing table should be solid. An anti-vibration table or stone table is ideal.
- ❑ Install the balance in a stable location, avoiding areas with vibration and shock. Corners of rooms on the first floor are best, as they are less prone to vibration.
- ❑ Avoid installing the balance in locations where it will be directly exposed to airflow from equipment such as heaters or air conditioners.
- ❑ Ensure the balance is not exposed to direct sunlight.
- ❑ Keep the balance away from equipment that produces magnetic fields.
- ❑ Level the balance by adjusting the leveling feet so that the bubble of the bubble spirit level is centered in the red circle. Refer to ["2-8. How to adjust the level of the balance"](#).
- ❑ Warm up the balance for at least 30 minutes before use (at least 1 hour for 0.0001 g models), with the AC adapter connected to a power supply.
- ❑ Adjust the sensitivity of the balance before using it for the first time or after having moved it to another location so that accurate weighing can be performed. Refer to ["7. Sensitivity Adjustment / Calibration Test"](#).



CAUTION

- ❑ Do not install the balance in areas where flammable or corrosive gases are present.

Errors caused by moving the weighing system

- ❑ This product's performance is guaranteed only when used in a stationary condition. If the balance is integrated into a system that involves movement, be sure to conduct thorough pre-operation checks with attention to the following points:
 - Moving the balance may cause damage due to shock or impact. Additionally, weighing values may be unstable immediately after movement. Avoid sudden movements, abrupt stops, or impacts. Allow sufficient time for the weighing values to stabilize before recording measurements.
 - The moving system must be designed to maintain the balance in a level position. If the level is disturbed, zero-point drift or sensitivity errors may occur. In such cases, perform a re-zero operation or sensitivity adjustment.
 - To minimize the effects of vibration, the moving platform should be designed to reduce play in moving parts and otherwise resist external vibrations.

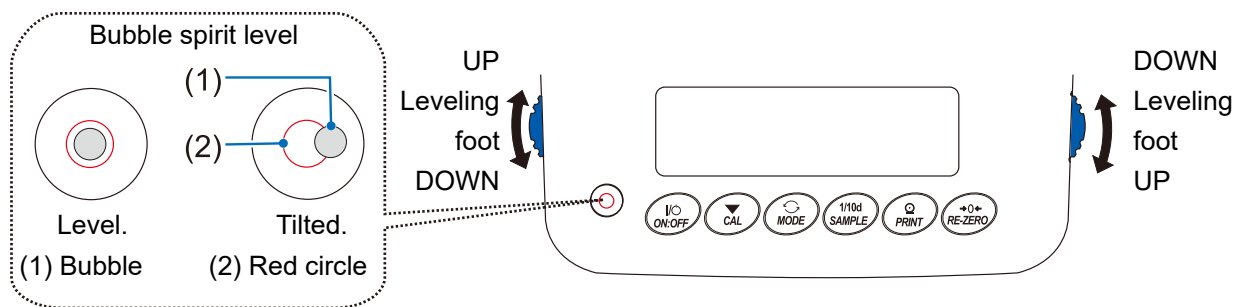
GX-AWP / GF-AWP series

- ❑ The GX-AWP / GF-AWP series balances are rated IP65 for dust and water resistance. The second digit "5" indicates protection against water jets, meaning the device is not adversely affected by direct exposure to water sprayed from any direction. However, cleaning with high-pressure water or submerging the unit in water may allow water to enter the balance and cause malfunctions.

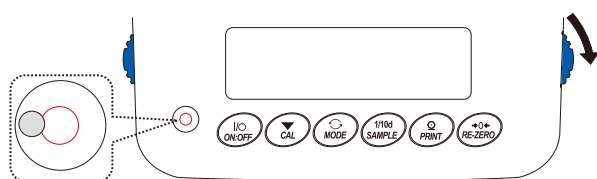
- When cleaning with hot water, condensation may form inside the balance, potentially leading to deterioration of internal components.
Ensure that water vapor does not enter the interior of the balance.
- When installing and using the balance in environments requiring dust- and water-resistant performance, ensure the following conditions are met:
 - The AC adapter plug is fully and securely inserted into the AC adapter input jack.
 - A terminal cover is installed on the RS-232C interface, or a waterproof RS-232C cable (AX-KO2737-500) is connected.
 - The USB interface (Mini-B type) is either covered with its protective cap or has the included USB cable fully inserted.
- If the RS-232C terminal cover or USB protective cap is removed, or if the waterproof RS-232C cable (AX-KO2737-500) is not used, the balance will no longer have dust- and water-resistant performance.

2-8. How to adjust the level of the balance

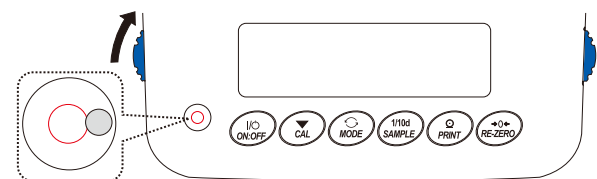
Level the balance by turning the leveling feet until the bubble (1) in the bubble spirit level is centered within the red circle (2).



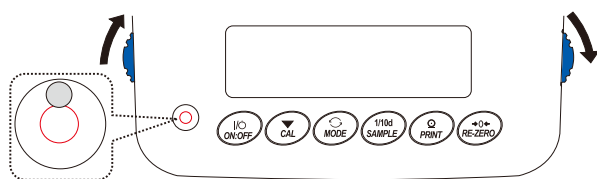
When the bubble is off to the left:
Turn the leveling foot on the front right clockwise.



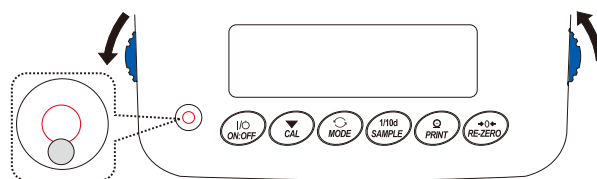
When the bubble is off to the right:
Turn the leveling foot on the front left clockwise.



When the bubble is off to the back:
Turn both leveling feet on the front clockwise simultaneously.



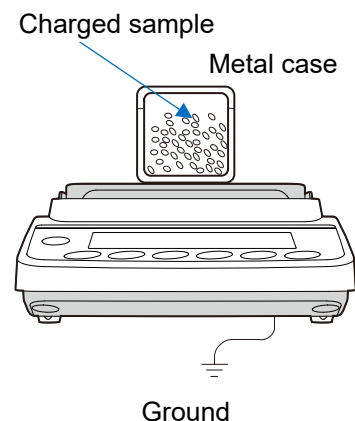
When the bubble is off to the front:
Turn both leveling feet on the front counterclockwise simultaneously.



2-9. Precautions during use for more accurate weighing

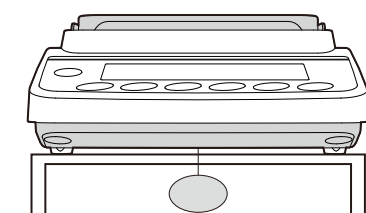
For precise and accurate weighing, please take notice of the following.

- Weighing errors may occur due to the influence of static electricity. Note that if the ambient humidity drops below 45%RH, insulators such as plastics are liable to have static electricity. Ground the balance and perform the following as needed. Additionally, use the grounding terminal to ground the balance.
 - The GX-AE series balance includes a glass breeze break with a built-in ionizer.
 - Use the GXA-25 external fanless ionizer (sold separately) to eliminate static electricity from the sample.
 - Increase the relative humidity at the place where the balance is installed.
 - Weigh the sample in a conductive metal container or the like.
 - Wipe off charged materials such as plastic with a damp cloth to suppress static electricity.



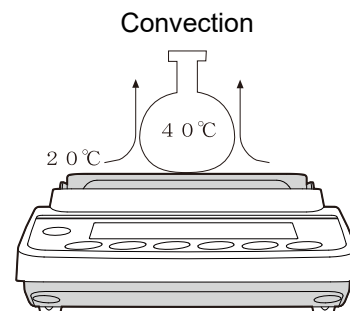
- On models equipped with a small breeze break, the breeze break components may retain static electricity for a short time after unpacking, or under low humidity conditions. If weighing values are unstable or repeatability is poor, try removing the small breeze break and measuring again. To eliminate static charge, wipe the transparent panels with a damp cloth. This typically resolves issues caused by electrostatic buildup. For further static elimination, use the optional GXA-25 ionizer or apply a commercially available antistatic agent.

- Influence of magnetism may cause weighing errors. When measuring magnetic materials (iron, etc.), keep the sample away from the balance main body by means such as underhook weighing.



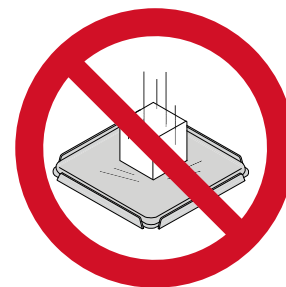
Magnetic material

- Weighing errors may occur if there is a difference between the ambient temperature and temperature of the sample (and the container). For example, when the room temperature is 20 °C, convection occurs around a flask that is 40 °C, causing the balance to display a weight lighter than the actual weight. Before weighing the sample and the container, try to acclimatize them to the ambient temperature.



- Perform the weighing operation carefully and quickly. If the measurement takes a long time, error-inducing factors will increase due to evaporation or moisture absorption by the sample.

- ❑ When placing a sample on the weighing pan, do not drop it or place a sample that exceeds the balance's weighing capacity. Place the sample in the center of the weighing pan.
- ❑ Do not leave the sample on the weighing pan for an extended period of time. If a sample is left on the weighing pan for a long time, the measured value will change due to deviation from the zero point caused by environmental changes or due to creep phenomenon.
- ❑ When pressing keys, press the center of the key with your finger. Do not use a sharp object such as a pen.



DON'T



DO



DON'T

- ❑ Be sure to press the [RE-ZERO] key before weighing in order to eliminate measurement errors.
- ❑ Measurement results include error from air buoyancy. The buoyancy of air varies depending on the sample volume, atmospheric pressure, temperature, and humidity. Correct the buoyancy for the most precise measurement.
- ❑ To prevent foreign substances such as powders, liquids, or metal fragments from entering the balance, it is advisable to use the included display protection cover.

GX-AWP / GF-AWP series

- ❑ The balance is designed to be dustproof and waterproof (compliant with IP65), and features a highly airtight enclosure. As a result, minor pressure fluctuations inside the chamber, such as those caused by opening or closing the door, may lead to temporary instability in the display. Allow the internal pressure to stabilize before performing any weighing.
- ❑ If water droplets or powder remain on the waterproof diaphragm or the pan support boss, the balance's performance may be affected. Before use, clean the unit. Refer to "[Cleaning procedure for GX-AWP / GF-AWP series \(0.001 g model\)](#)", or "[Cleaning procedure for GX-AWP / GF-AWP series \(0.01 g / 0.1 g model\)](#)".
- ❑ If the waterproof diaphragm becomes deformed due to overloading or similar causes, weighing values may remain unstable until the deformation has fully resolved.

2-10. Precautions after weighing (Maintenance of the balance)

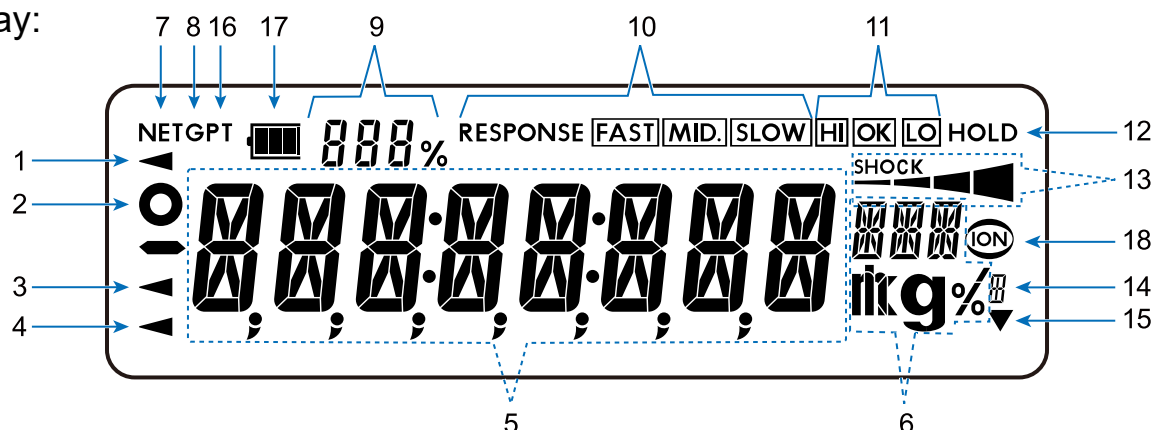
- ❑ Refer to "[25. Maintenance](#)" for details on maintenance.
- ❑ Avoid exposing the balance to mechanical shocks or dropping it.
- ❑ Do not disassemble the balance.
- ❑ Do not use organic solvents or chemical cleaning cloths to clean the balance. Clean the balance with a lint-free cloth moistened with a mild detergent.
- ❑ When cleaning the weighing pan, be careful not to injure your hands on the edges.
- ❑ The breeze break components are treated with an anti-static coating. Wipe them with a soft, lint-free cloth. Repeated cleaning with a cloth dampened with neutral detergent or water, or rinsing with water, may reduce the antistatic effect.

2-11. Precautions regarding power supply

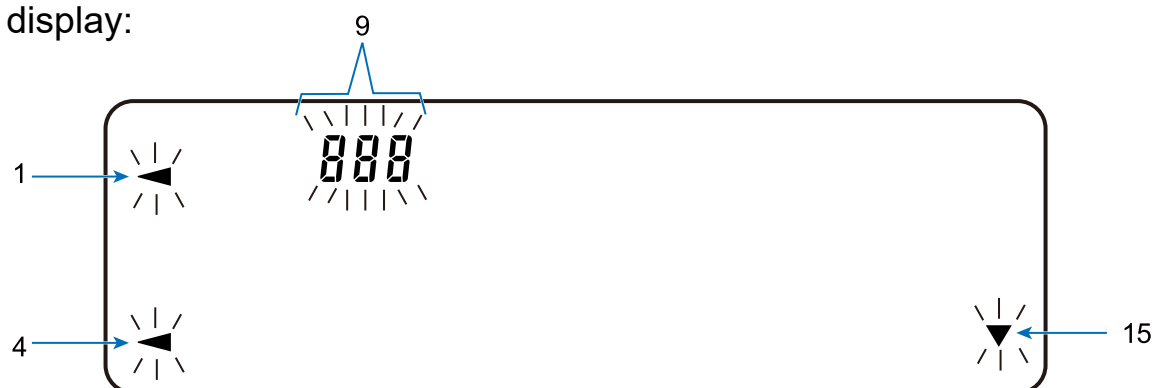
- ❑ The balance is constantly provided with power if the AC adapter is connected.
This does not adversely affect the balance.
For accurate weighing, it is advisable to warm up the balance for at least 30 minutes before use (at least 1 hour for 0.0001 g models), with the AC adapter connected to a power supply.

3. Basic Display and Key Operations

Lit display:

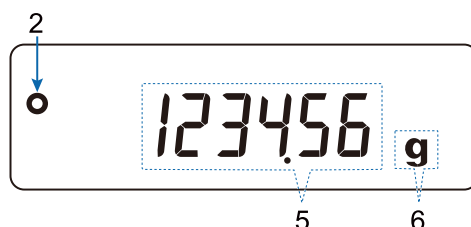


Blinking display:



Example of display

0.01 g model







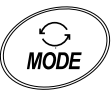



- | | |
|--|---|
| 1 Processing indicator | 10 Response indicator
(Lights up for approximately 30 seconds after the start of weighing) |
| 2 Stabilization indicator | 11 Comparator indicators |
| 3 USB connection indicator | 12 Animal weighing indicator |
| 4 When lit: Standby indicator
When blinking: Automatic sensitivity adjustment notice | 13 Shock indicator |
| 5 Displays weighing value and items | 14 Gross zero indicator |
| 6 Unit display | 15 When lit: Interval output standby mode
When blinking: Interval output mode |
| 7 Net indicator | 16 Preset tare indicator |
| 8 Gross indicator | 17 Battery indicator (displayed only when the GXA-09 is installed) |
| 9 When lit: Indicates the number of statistical data sets (Statistical calculation function)
When lit: Displays the relationship between the applied load and the balance's capacity as a percentage. (Capacity indicator)
When blinking: Displays the function table setting value. | 18 ION indicator (displayed only on GX-AE models or when the GXA-25 is installed) |

Key operations

Key operations affect how the balance functions.

Normal key operation during measurement is "Press and release the key immediately" or "Press and hold the key (for 2 seconds)".

Please do not "Press and hold the key (for 2 seconds)" unless required.

Key	When pressed and released	When pressed and held (for 2 seconds)
	 <p>Turns the display on or off. When the display is off, only the standby indicator is shown. When the display is on, the balance is ready for weighing. If the password lock function is enabled, a password entry display will appear. (Refer to "18-2. Password entry at the start of weighing" for details.) The [ON:OFF] key is active at any time, and pressing this key during operation always turns off the display.*1</p>	
	<p>Initiates the sensitivity adjustment mode using the internal weight. (Applicable to GX-AE / GX-A / GX-AWP series) When the function table menu is displayed, cancels the operation.</p>	<p>Displays the menu related to sensitivity adjustment.</p>
	<p>Switches the weighing units stored in the function table.</p>	<p>Enters the self-check mode. (Refer to "6-2. Self-check function / Automatic minimum weight (reference value) setting using ECL".)</p>
	<p>In weighing mode, pressing the key turns the digit for readability on and off. In counting or percent mode, pressing the key causes the balance to enter the sample storing mode.</p>	<ul style="list-style-type: none"> □ Displays the function table menu. (Refer to "9. Function Table".) □ Runs the repeatability check function when pressed and held for another 2 seconds after the function table menu is displayed. (GX-AE / GX-A / GX-AWP series only) (Refer to "19. Repeatability Check Function (GX-AE / GX-A / GX-AWP Series Only)".)
	<p>At factory settings, outputs the weighing value when stable. During function table configuration, confirms the operation.</p>	<p>At factory settings, no function is assigned. By configuring the function table ("9. Function Table"), the following functions can be assigned.</p> <ul style="list-style-type: none"> □ Outputs "Title block" and "End block" for GLP / GMP report. (Refer to "10-3. GLP output".) □ Displays the data memory menu. (Refer to "11. Data Memory".) □ Enters the mode to read out the density memory slot for flow rate measurement. (Refer to "13. Flow Rate Display (FRD) Function".) □ Enters the mode to change the unit weight registration number in counting mode. (Refer to "4-3. Counting mode (PCS)".)
	<p>Sets the displayed value to zero.</p>	

*1 When the Gross / Net / Tare function is enabled, the display turns off by pressing and holding the key (for 2 seconds). (Refer to "14. Gross / Net / Tare Function".)

4. Weighing

4-1. Units of measure

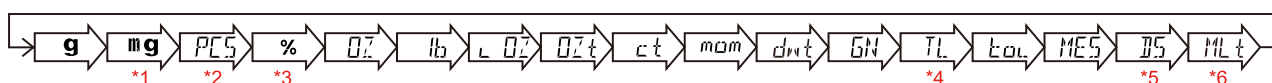
4-1-1. Units

The GX-AE, GX-A, and GF-A series balances support the units and modes of measurement shown below.

The availability of units and modes can be configured via the (Unit) setting in the function table ("9. Function Table").

Units or modes not selected in this setting will be hidden from the unit selection sequence. To select a unit or mode, press the [MODE] key while in weighing mode and choose from the displayed sequence.

The units to be displayed, as well as their display order, can be registered in advance using the function table. (For details, refer to "9-8. Unit storing overview")




*1 **mg** (milligram) is only available for 0.0001g models.

*2 Counting mode. (For details, refer to "4-3. Counting mode (PCS)")

*3 Percent mode. (For details, refer to "4-4. Percent mode (Percentage weighing mode)")

*4 For "tael", one of four types can be selected at factory settings.


*5 Density mode. (For details, refer to "17. Density (Specific Gravity) Measurement".)

To enable this mode, **DS** must be stored via the (Unit) setting in the function table ("9. Function Table"). In this mode, **d - H** appears in the upper-left corner, and the  indicator blinks with the unit **g** displayed.


*6 Programmable unit. (For details, refer to "4-1-2. Programmable unit")

The table below shows details on the units (weighing mode) available.

Units and weighing mode details

Unit / weighing mode name	Abbrev.	Display	Function table (Storing mode)	Conversion factor 1 g =
Gram	g	g	g	1 g
Milligram	mg	mg	mg	0.001 g
Counting mode	PCS	<i>PCS</i>	<i>PCS</i>	_____
Percent mode	%	%	%	_____
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	<i>L</i> OZ	<i>L</i> <i>OZ</i>	<i>LO</i>	1Lb=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
Mesghal	MES	<i>MES</i>	<i>MES</i>	4.6875 g
Density mode	DS	 <i>DS</i> is used to show the density.	<i>DS</i>	_____
Programmable unit (Multi-unit)	MLT	<i>MLt</i>	<i>MLt</i>	_____

Note

- Density mode is active if *d-H* is lit, **g** is displayed, and the  blinks.

The following tables show the weighing capacity and the readability for each unit, depending on the balance model.

0.0001 g model

Unit	GX-124AE	GX-224AE	GX-324AE	Readability
	GX-124A	GX-224A	GX-324A	
	GF-124A	GF-224A	GF-324A	
	Capacity			
Gram	122	220	320	0.0001
Milligram	122000	220000	320000	0.1
Ounce (Avoir.)	4.30	7.76	11.29	0.00001
Troy Ounce	3.92	7.07	10.29	0.00001
Metric Carat	610	1100	1600	0.001
Momme	32.5	58.7	85.3	0.0001
Pennyweight	78.4	141.5	205.8	0.0001
Grain (UK)	1882	3395	4938	0.002
Tael (HK general, Singapore)	3.22	5.82	8.47	0.00001
Tael (HK jewelry)	3.25	5.88	8.55	0.00001
Tael (Taiwan)	3.25	5.87	8.53	0.00001
Tael (China)	3.90	7.04	10.24	0.00001
Tola (India)	10.4	18.86	27.44	0.00001
Mesghal	26.0	46.9	68.3	0.0001

0.001 g model

Unit		GX-203A GX-203AWP	GX-303A	GX-403A GX-403AWP	GX-603A GX-603AWP	GX-1003A	GX-1603A	Readability
	GF-123A	GF-203A GF-203AWP	GF-303A	GF-403A GF-403AWP	GF-603A GF-603AWP	GF-1003A	GF-1603A	
	Capacity							
Gram	122	220	320	420	620	1100	1620	0.001
Ounce (Avoir.)	4.30	7.76	11.28	14.81	21.86	38.80	57.14	0.00005
Pound	0.268	0.485	0.705	0.925	1.366	2.425	3.571	0.000005
Pound/Ounce	0Lb 4.30oz	0Lb 7.76oz	0Lb 11.28oz	0Lb 14.81oz	1Lb 5.86oz	2Lb 6.80oz	3Lb 9.14oz	0.01oz
Troy Ounce	3.92	7.07	10.28	13.50	19.93	35.36	52.08	0.00005
Metric Carat	610	1100	1600	2100	3100	5500	8100	0.005
Momme	32.5	58.6	85.3	112.0	165.3	293.3	432.0	0.0005
Pennyweight	78.4	141	205	270	398	707	1041	0.001
Grain (UK)	1882	3395	4938	6481	9568	16975	25000	0.02
Tael (HK general, Singapore)	3.22	5.82	8.46	11.11	16.40	29.10	42.85	0.00005
Tael (HK jewelry)	3.25	5.87	8.54	11.22	16.56	29.38	43.28	0.00005
Tael (Taiwan)	3.25	5.86	8.53	11.20	16.53	29.33	43.20	0.00005
Tael (China)	3.90	7.04	10.24	13.44	19.84	35.20	51.84	0.00005
Tola (India)	10.4	18.8	27.4	36.0	53.1	94.3	138.8	0.0001
Mesghal	26.0	46.9	68.2	89.6	132.2	234.6	345.6	0.0005

0.01 g model

Unit		GX-2002A GX-2002AWP	GX-3002A	GX-4002A GX-4002AWP	GX-6002A GX-6002AWP	GX-10002A	Readability
	GF-1202A	GF-2002A GF-2002AWP	GF-3002A	GF-4002A GF-4002AWP	GF-6002A GF-6002AWP	GF-10002A	
	Capacity						
Gram	1220	2200	3200	4200	6200	10200	0.01
Ounce (Avoir.)	43.0	77.6	112.8	148.1	218.6	359.7	0.0005
Pound	2.68	4.85	7.05	9.25	13.66	22.48	0.00005
Pound/Ounce	2Lb 11.03oz	4Lb 13.60oz	7Lb 0.87oz	9Lb 4.15oz	13Lb 10.69oz	22Lb 7.79oz	0.01oz
Troy Ounce	39.2	70.7	102.8	135.0	199.3	327.9	0.0005
Metric Carat	6100	11000	16000	21000	31000	51000	0.05
Momme	325	586	853	1120	1653	2720	0.005
Pennyweight	784	1414	2057	2700	3986	6558	0.01
Grain (UK)	18827	33951	49383	64815	95680	157410	0.2
Tael (HK general, Singapore)	32.2	58.2	84.6	111.1	164.0	269.8	0.0005
Tael (HK jewelry)	32.5	58.7	85.4	112.2	165.6	272.5	0.0005
Tael (Taiwan)	32.5	58.6	85.3	112.0	165.3	272.0	0.0005
Tael (China)	39.0	70.4	102.4	134.4	198.4	326.4	0.0005
Tola (India)	104	188	274	360	531	874	0.001
Mesghal	260	469	682	896	1322	2176	0.005

0.1 g model



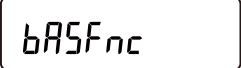




Unit	GX-6001A GX-6001AWP	GX-10001A	Readability
	GF-6001A GF-6001AWP	GF-10001A	
	Capacity		
Gram	6200	10200	0.1
Ounce (Avoir.)	218	359	0.005
Pound	13.6	22.4	0.0005
Pound / Ounce	13Lb 10.69oz	22Lb 7.79oz	0.01oz
Troy Ounce	199	327	0.005
Metric Carat	31000	51000	0.5
Momme	1653	2720	0.05
Pennyweight	3986	6558	0.1
Grain (UK)	95680	157410	2
Tael (HK general, Singapore)	164.0	269.0	0.005
Tael (HK jewelry)	165.0	272.0	0.005
Tael (Taiwan)	165.0	272.0	0.005
Tael (China)	198.0	326.0	0.005
Tola (India)	531.0	874.0	0.01
Mesghal	1322	2176	0.05

4-1-2. Programmable unit

The programmable-unit function enables the balance to calculate and display a conversion result by multiplying the weighing value in grams by a coefficient configured via the function table. The coefficient must fall within the minimum and maximum range specified below. If the entered value is outside this range, an error message will appear, and the balance will return to setting mode, prompting entry of a valid coefficient. The factory default coefficient is 1.

Model	Minimum coefficient	Maximum coefficient
GX-124AE / GX-224AE / GX-324AE GX-124A / GX-224A / GX-324A GF-124A / GF-224A / GF-324A	0.000001	10000
GX-203A / GX-303A / GX-403A / GX-603A / GX-1003A / GX-1603A GF-123A / GF-203A / GF-303A / GF-403A / GF-603A / GF-1003A / GF-1603A GX-203AWP / GX-303AWP / GX-403AWP / GX-603AWP GF-203AWP / GF-303AWP / GF-403AWP / GF-603AWP		1000
GX-2002A / GX-3002A / GX-4002A / GX-6002A / GX-10002A GF-1202A / GF-2002A / GF-3002A / GF-4002A / GF-6002A / GF-10002A GX-2002AWP / GX-3002AWP / GX-4002AWP / GX-6002AWP GF-2002AWP / GF-3002AWP / GF-4002AWP / GF-6002AWP		100
GX-6001A / GX-10001A GF-6001A / GF-10001A GX-6001AWP GF-6001AWP		10

Operation

Step	Description	Display and key operation
1.	On the weighing display, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table ").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times to display the display shown on the right.	 Press several times 
3.	Press the [PRINT] key to display the display shown on the right.	 

Confirming the coefficient

Step	Description	Display and key operation
4.	<p>The current coefficient is displayed with the first digit blinking.</p> <p>Use the following keys to set the desired coefficient.</p> <p>[SAMPLE] key Selects a digit to change the value. The selected digit blinks.</p> <p>[RE-ZERO] key Increases the value by one.</p> <p>[MODE] key Changes the decimal point position.*1</p> <p>*1 Each time the [MODE] key is pressed, the decimal point position changes as follows:</p> <p>$1.0000000 \rightarrow 10.000000 \dots 1000000.0 \rightarrow 10000000$</p>	
5.	<p>Press the [PRINT] key to register.</p> <p>(To cancel, press the [CAL] key.)</p>	

Quitting the operation

Step	Description	Display and key operation
6.	Press the [CAL] key to return to weighing mode.	

Using the function

Step	Description	Display and key operation
7.	<p>Press the [MODE] key to select the programmable unit (t).</p> <p>Perform weighing as described in “4-2. Basic operation”. After weighing, the balance displays the result (weighing data in grams × coefficient).</p>	<p>Press several times</p>

4-2. Basic operation

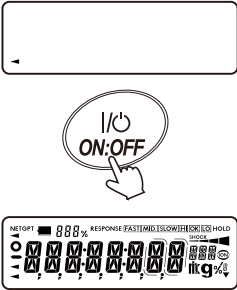
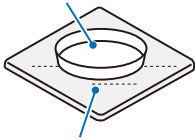

4-2-1. Zero-point, tare, and weighing range

Entering the weighing mode

The balance determines the reference zero point when the [ON:OFF] key is pressed and enters weighing mode.

Depending on the load condition at that time, the balance automatically judges whether to set the zero-point or to tare.

The condition for determining which is used is "power-on zero range", and when power-on zero range is exceeded, the tare operation is performed. (Refer to "[Weighing range](#)" for details.)



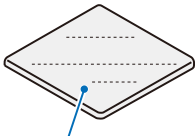
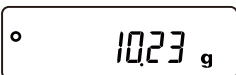

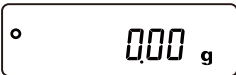
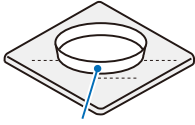


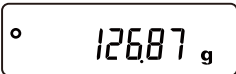


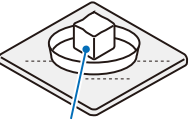

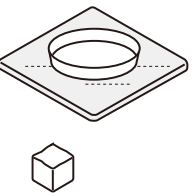
Step	Description	Display and key operations	Weighing operation
1.	With the container (tare) placed on the weighing pan, press the [ON:OFF] key to start weighing.		Container (tare)  Weighing pan
2.	When zero is displayed, begin weighing.		

Re-zero operation

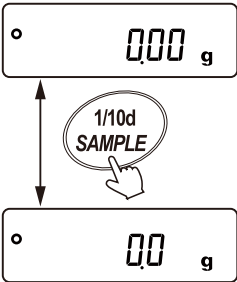
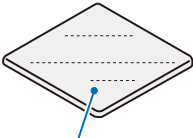
By pressing the [RE-ZERO] key, the displayed value can be set to zero.

The re-zero operation with the [RE-ZERO] key will automatically judge whether to set the zero-point or to tare.

The condition for determining which is used is "zero range", and when zero range is exceeded, the tare operation is performed. (Refer to "[Weighing range](#)" for details.)

Step	Description	Display and key operations	Weighing operation
1.	Press the [MODE] key to select a unit of measure. Here, g (grams) is selected as an example.	 	 Weighing pan
2.	If necessary, place a container, etc. on the weighing pan. Then press the [RE-ZERO] key to zero the display to 0.00 g. (This is an example for a 0.01 g model. The decimal separator position depends on the balance model.)	  	 Container (tare)
3.	Place the sample on the pan or in the container. Wait for  (the stabilization indicator) to appear. Read the displayed value. To output the weighing value, press the [PRINT] key while  (the stabilization indicator) is displayed.*1 *1 A printer, PC, or optional peripheral device is required. PC output example (WinCT, RsCom) A&D standard format <div style="border: 1px solid black; padding: 2px; display: inline-block;">ST, +00126.87 _ _ g<TERM></div> _: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah	   Data output	 Sample
4.	Remove the sample and container from the weighing pan.		

Turning on / off the readability digit

Step	Description	Display and key operations	Weighing operation
1.	<p>In weighing mode, press the [SAMPLE] key to turn the readability digit on or off.</p> <p>Note</p> <p>□ To turn off the readability digit at the start of weighing, set 1 (Hide readability digit) for readability (Readability digit) under <code>bASFnC</code> (Environment, Display) in the function table ("9. Function Table").</p>		 <p>Weighing pan</p>

Weighing range

The weight range that the balance can weigh and display varies depending on the model. When the gross weight^{*1} exceeds the maximum display for the model, E is displayed to indicate that

the weighing range is exceeded. When exceeded in the negative direction, -E is displayed.

^{*1} Gross weight = Net weight (weighing value after tare operation) + Tare weight

Weighing range

Model		Power-on zero range*2	Zero range*3	-E display range
GX-124AE GX-124A	GF-124A	Approx. ±30 g	Approx. -30 g to +2 g	Approx. less than -30 g
GX-224AE GX-224AE	GF-224A		Approx. -30 g to +4 g	
GX-324AE GX-324A	GF-324A		Approx. -30 g to +6 g	
	GF-123A	Approx. ±100 g	Approx. -100 g to +2 g	Approx. less than -100 g
GX-203A GX-203AWP	GF-203A GF-203AWP		Approx. -100 g to +4 g	
GX-303A	GF-303A		Approx. -100 g to +6 g	
GX-403A GX-403AWP	GF-403A GF-403AWP		Approx. -100 g to +8 g	
GX-603A GX-603AWP	GF-603A GF-603AWP		Approx. -100 g to +12 g	
GX-1003A	GF-1003A		Approx. -100 g to +20 g	
GX-1603A	GF-1603A		Approx. -100 g to +32 g	
	GF-1202A		Approx. ±1 g		Approx. -1 kg to +20 g	Approx. less than -1 kg
GX-2002A GX-2002AWP	GF-2002A GF-2002AWP	Approx. -1 kg to +40 g		
GX-3002A	GF-3002A	Approx. -1 kg to +60 g		
GX-4002A GX-4002AWP	GF-4002A GF-4002AWP	Approx. -1 kg to +80 g		
GX-6002A GX-6002AWP	GF-6002A GF-6002AWP	Approx. -1 kg to +120 g		
GX-10002A	GF-10002A	Approx. -1 kg to +200 g		
GX-6001A GX-6001AWP	GF-6001A GF-6001AWP	Approx. ±1 g		Approx. -1 kg to +120 g	Approx. less than -1 kg
GX-10001A	GF-10001A		Approx. -1 kg to +200 g	

^{*2} Power-on zero refers to the zero point set when the power is turned on.

The power-on zero range is the range within which the zero point is set, based on the zero point during sensitivity adjustment. If the weighing value exceeds the power-on zero range, it is subtracted as the tare weight.

Weighing can be performed from the zero point up to the maximum capacity, but after subtracting the tare weight, weighing can only be performed up to the maximum capacity minus the tare weight.

*3 The zero range is the range within which the zero point is set, based on the power-on zero point. When the [RE-ZERO] key is pressed and the weighing value is within the range, the zero point is set. If the weighing value exceeds the range, it is subtracted as the tare weight. Weighing can be performed from the zero point up to the maximum capacity, but after subtracting the tare weight, weighing can only be performed up to the maximum capacity minus the tare weight.

4-3. Counting mode (PCS)

This is the mode to determine the number of objects in a sample. Based on the reference sample unit weight (weight per piece), the balance calculates and displays how many pieces the sample weight corresponds to. The smaller the variation in the unit weight of sample pieces is, the more accurate the count will be. The balance is equipped with the Automatic Counting Accuracy Improvement (ACAI) function to improve the counting accuracy.

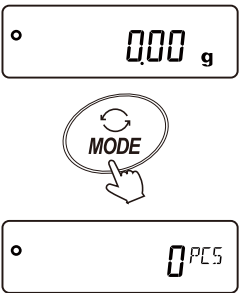
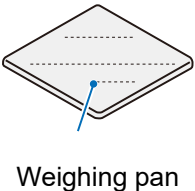
CAUTION

- ❑ For counting mode, it is advisable that the unit weight (weight of a single item) be at least 10 times the balance's readability. For example, if using a model with a readability of 0.01 g, the recommended unit weight of the sample is 0.1 g or more.
- ❑ If there is significant variation in the unit weight of sample pieces, accurate counting may not be possible.
- ❑ If large errors occur during counting, try methods such as performing ACAI frequently or measuring multiple times.

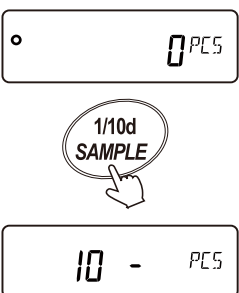
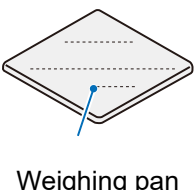
Tip


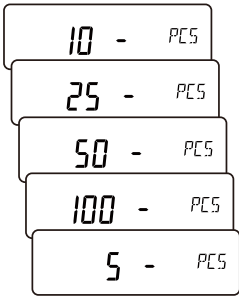
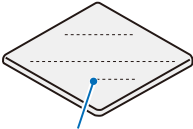
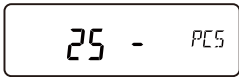
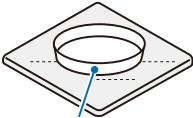

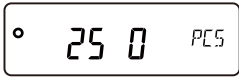
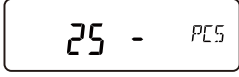
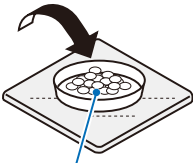
- ❑ The stored unit weight can be output with the "?UW" command and changed with the "UW: " command.
- ❑ For details on the "?UW" command, refer to "23-7. Commands".




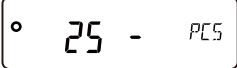

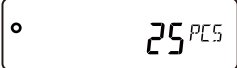
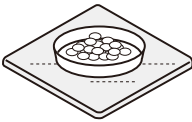
Selecting the counting mode

Step	Description	Display and key operations	Weighing operation
1.	Press the [MODE] key to select <i>PCS</i> . (<i>PCS</i> = pieces)		 Weighing pan






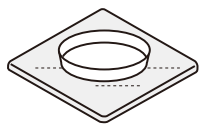
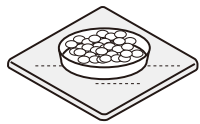
Storing a unit weight

Step	Description	Display and key operations	Weighing operation
2.	Press the [SAMPLE] key to enter the unit weight registration mode*1. *1 Even in the registration mode, pressing the [MODE] key switches to the next mode.		 Weighing pan

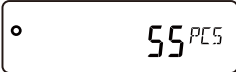
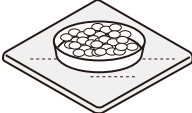

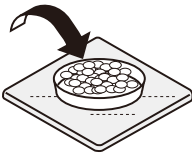

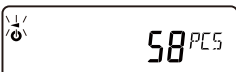

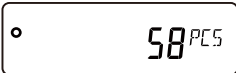



Step	Description	Display and key operations	Weighing operation
3.	<p>Each time the [SAMPLE] key is pressed, the number of sample pieces changes. (10 pcs, 25 pcs, 50 pcs, 100 pcs, 5 pcs)*²</p> <p>^{*2} The sample unit weight may vary slightly. Using a greater number of sample pieces when storing the unit weight will yield more accurate counting results.</p>	 <p>Press several times</p>  <p>The display repeats in this cycle.</p>	 <p>Weighing pan</p>
4.	If necessary, place a container, etc. on the weighing pan.		 <p>Container</p>
5.	Press the [RE-ZERO] key to show the display shown on the right. (In this example, 25 pcs.)	 	
6.	Place the displayed number of sample pieces on the weighing pan / container.		 <p>Sample</p>

Step	Description	Display and key operations	Weighing operation
7.	<p>After  (the stabilization indicator) lights up, press the [PRINT] key to register the unit weight calculated from the weighing value and display the count.</p> <p>( is displayed when 25 is set.)*3, *4, *5</p> <p>*3 If the balance determines that the loaded sample is too light (resulting in a large counting error), it will prompt the addition of more sample pieces. Add sample pieces until the displayed number is reached, then press the [PRINT] key again. When the unit weight is stored correctly, the balance displays the count.</p> <p>*4 If the balance judges that the sample is too light to be stored as the unit weight, it displays . The sample cannot be used.</p> <p>For example, when using a 0.01 g readability model, if the total weight of 10 sample pieces is 0.05 g, this can be registered as the weight of 100 pieces. By multiplying the displayed count by 10, the approximate number of pieces can be estimated.</p> <p>*5 The stored unit weight is retained in the balance's nonvolatile memory even when the power is turned off.</p>	<div></div> <div></div> <div></div>	

Counting mode

Step	Description	Display and key operations	Weighing operation
8.	<p>Counting operation is enabled.</p> <p>To output the weighing value (count), press the [PRINT] key while  (the stabilization indicator) is displayed.*¹</p> <p>*¹ A printer, PC, or optional peripheral device is required.</p> <p>PC output example (WinCT, RsCom)</p> <p>A&D standard format</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">QT, +00000055 PC<TERM></div> <p>␣: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	<div style="border: 1px solid black; padding: 5px; display: inline-block;">  0 PCS </div> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;">  55 PCS </div> <div style="text-align: center; margin-top: 10px;">   </div> <p>Counting data output</p>	 

Automatic Counting Accuracy Improvement (ACAI)

Step	Description	Display and key operations	Weighing operation
9.	<p>The ACAI function automatically improves counting accuracy by increasing the number of sample pieces. This reduces errors by averaging the variations in sample weight.</p> <p>After storing the unit weight in step 7, proceed to step 10 below.</p> <p>CAUTION</p> <p>❑ The ACAI function does not operate when the unit weight is set using the "UW:" command.</p>		
10.	<p>Add a few sample pieces. ◀ (the processing indicator) will then appear. (Three or more pieces are required in order to prevent errors. The processing indicator does not turn on if overloaded. Add approximately the same number of sample pieces as displayed.)</p>		
11.	<p>Do not touch or move the sample pieces while the  processing indicator is blinking. (The accuracy is being updated.)</p>		
12.	<p>The accuracy is updated after the ◀ processing indicator turns off. Each time this process is repeated, the counting accuracy will improve further. The range of ACAI after exceeding 100 is not predetermined. Add approximately the same number of sample pieces as displayed.</p>		
13.	<p>Remove all the sample pieces used with ACAI from the weighing pan and start counting work.</p> <p>CAUTION</p> <p>❑ Do not change units during ACAI processing.</p>		

Storing unit weights

By using the data memory function, up to 50 unit weights can be stored.



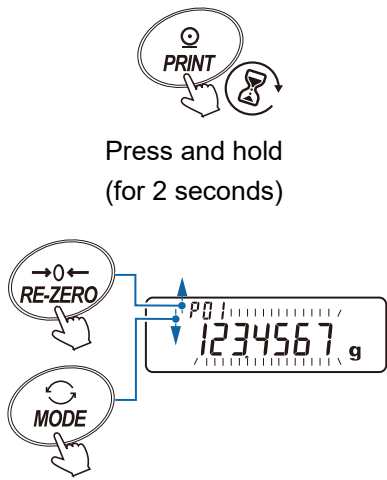
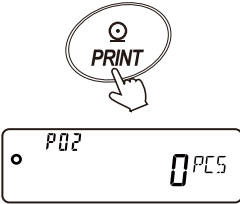
(Refer to "11. Data Memory" for details.)

CAUTION

- The ACAI function does not work for the read unit weight.

Tip

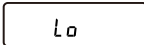
- The unit weight can be read using the "UN:mm" command.
(mm ranges from 01 to 50 and corresponds to *PG1* to *PG50*.)
- For details on commands, refer to "23-7. Commands".
- The read unit weight can be output with the "?UW" command and changed with the "UW:" command.

Step	Description	Display and key operations
1.	In advance, refer to "Enabling the data memory function (changing the function table configuration)" and set <i>1</i> (Stores unit weight values) for <i>DATA</i> (Data memory) in the function table ("9. Function Table").	
2.	The selected registration number for the stored unit weight is displayed as <i>PG**</i> .	
3.	Press and hold the [PRINT] key (for 2 seconds) to enter the mode for changing the unit weight registration number. [RE-ZERO] key Increases the registration number. [MODE] key Decreases the registration number.	
4.	Press the [PRINT] key to store the displayed registration number. (To cancel, press the [CAL] key.)	
5.	Store the unit weight as necessary. ("Storing unit weights") Multiple unit weights can be stored by assigning individual unit weight registration numbers.	

4-4. Percent mode (Percentage weighing mode)

The percent mode displays the weighing value in a percentage compared with a reference mass as 100%. This is useful for target weighing or sample variance checks.

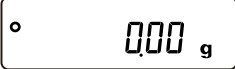

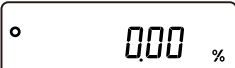
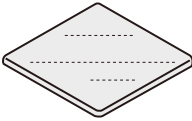
CAUTION

-  appears if the balance judges that the sample is too light to be stored as the 100% reference mass.
- The decimal separator position varies according to the 100% reference mass.



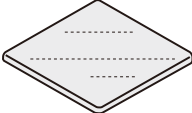


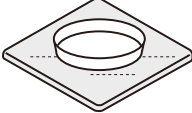
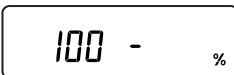
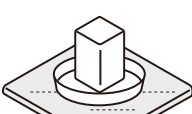


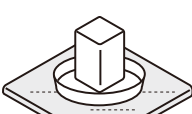
Decimal separator position for 100% reference mass display

Model	100% reference mass	Decimal separator position
0.0001 g model	0.0100 g to 0.0999 g	1 %
	0.1000 g to 0.9999 g	0.1 %
	1.0000 g or more	0.01 %
0.001 g model	0.100 g to 0.999 g	1 %
	1.000 g to 9.999 g	0.1 %
	10.000 g or more	0.01 %
0.01 g model	1.00 g to 9.99 g	1 %
	10.00 g to 99.99 g	0.1 %
	100.00 g or more	0.01 %
0.1 g model	1.0 g to 9.9 g	1 %
	10.0 g to 99.9 g	0.1 %
	100.0 g or more	0.01 %

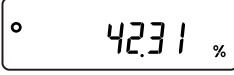


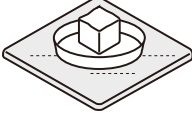
Selecting the percent mode

Step	Description	Display and key operations	Weighing operation
1.	Press the [MODE] key several times to select the unit %.	  Press several times 	

Storing a 100% mass

Step	Description	Display and key operations	Weighing operation
2.	Press the [SAMPLE] key to enter the 100% reference mass registration mode. ^{*1} ^{*1} Even in the registration mode, pressing the [MODE] key switches to the next mode.	 	
3.	If necessary, place a container, etc. on the weighing pan. Press the [RE-ZERO] key to show the display shown on the right.	 	
4.	Place a sample for the 100% reference mass on the weighing pan / container.		
5.	Press the [PRINT] key to store the 100% reference mass. The balance will then display the percentage value. The stored 100% reference mass is retained in the balance's nonvolatile memory even when the power is turned off.	 	

Percentage weighing

Step	Description	Display and key operations	Weighing operation
6.	Perform a percentage weighing operation. To output the weighing value, press the [PRINT] key while ● (the stabilization indicator) is displayed. ^{*1} ^{*1} A printer, PC, or optional peripheral device is required. PC output example (WinCT, RsCom) A&D standard format <div>ST,+00042.31 _ %<TERM></div> _: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah	   Percentage data output	

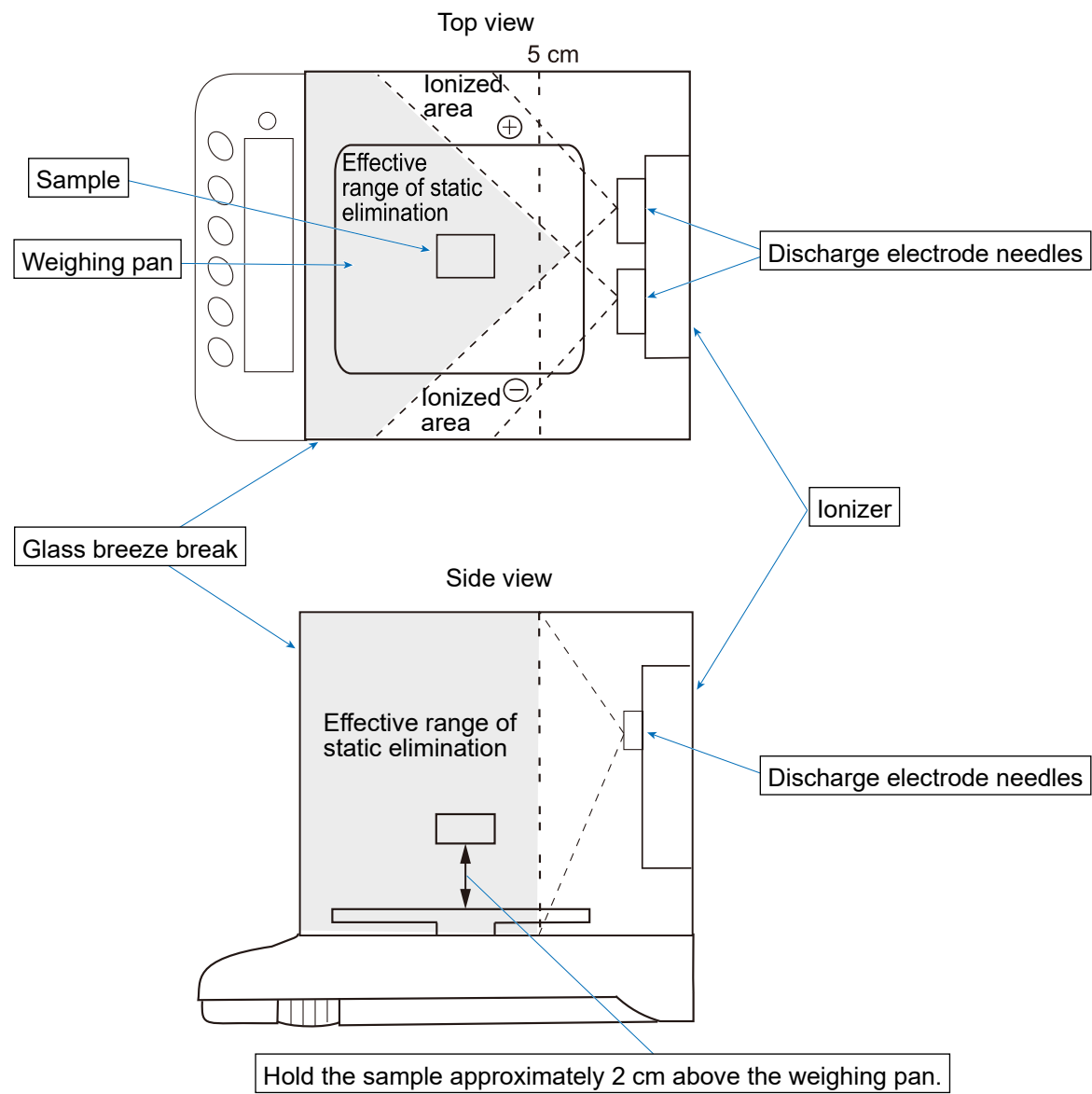
4-5. Ionizer (GX-AE series only)

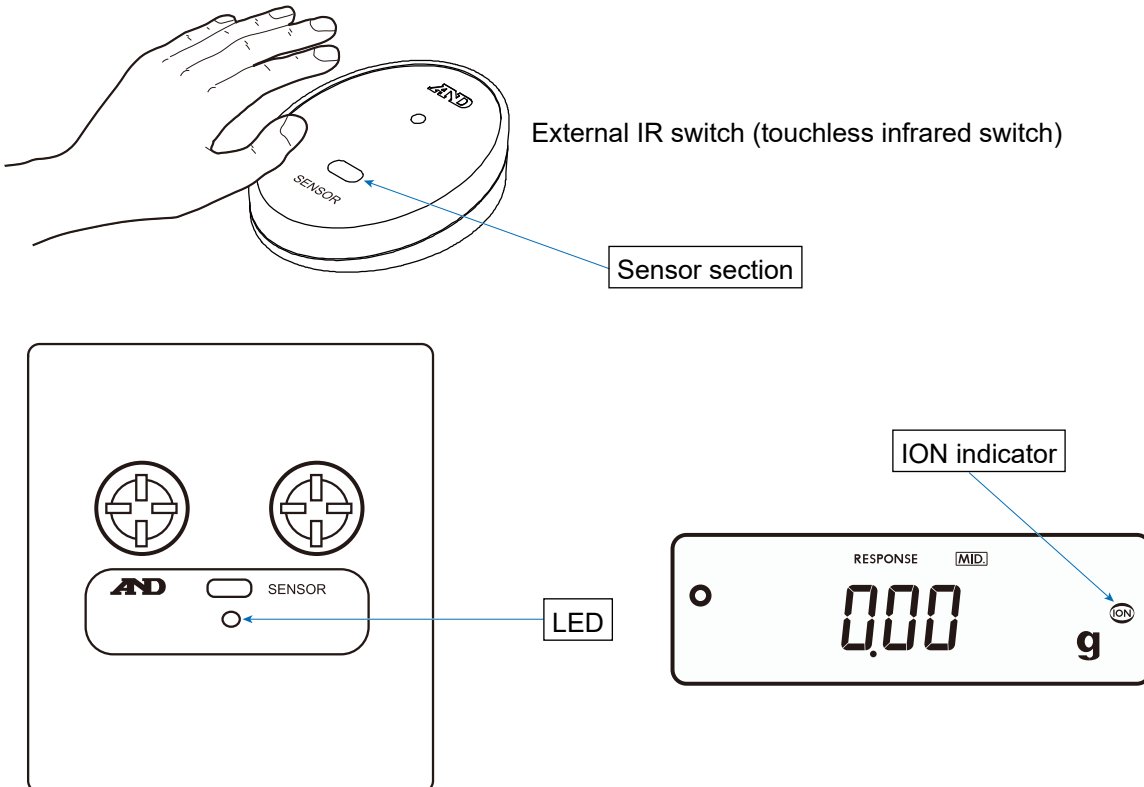
CAUTION

- ❑ Do not place the sample too close to the discharge electrode needles during static elimination. Doing so may cause the sample to become electrically charged.
- ❑ Ensure there are no obstacles between the ionizer and the sample.
- ❑ Do not perform static elimination while the sample is on the weighing pan. Doing so may prevent effective neutralization of static charge.
- ❑ Do not touch the discharge electrode needles with tweezers or other tools during operation.
- ❑ When the external IR switch is connected, the built-in ionizer's IR switch will be disabled.
- ❑ As a general rule, use the external IR switch and keep the built-in ionizer's IR switch disabled. This prevents accidental activation of static elimination during weighing.
- ❑ While the ionizer is active, the balance temporarily switches to a readability of 0.01 g. After static elimination is complete, the display will return to the previous weighing mode after a short delay.
- ❑ During static elimination, always lift the sample off the weighing pan and continue the process until the ionizer's LED turns off. Incomplete static elimination may result in measurement errors.
- ❑ The static elimination duration (default: 3 seconds) can be adjusted via the balance's function table. Refer to "9. Function Table".
- ❑ If the IR switch remains on after static elimination is complete, the ionizer's LED will blink to indicate a warning.

Additionally, a buzzer will sound intermittently ("beep-beep") to alert the user. Check for any obstructions in front of the IR switch. In rare cases, the sensor may respond to light sources such as a desk lamp. If the external IR switch is not connected, connecting it may resolve the issue.
- ❑ When the static elimination duration is set to "Manual", the ionizer can only be operated via external controls (external IR switch or optional foot switch). The maximum duration for manual static elimination is 10 minutes.
- ❑ If the external IR switch is not connected, the built-in IR switch remains active. However, depending on the sample material, it may not respond reliably. Using the external IR switch is recommended for consistent performance.
- ❑ Do not perform static elimination or operate the foot switch (AX-SW137-PRINT or AX-SW137-REZERO) while the balance is outputting non-weighing data (e.g., GLP data, statistical results, or data memory output). Doing so may cause the display to temporarily stop updating. If the display does not update, disconnect and reconnect the AC adapter to reset the balance.

Using the Ionizer

Step	Description
1.	<p>Open the breeze break door and hold the sample above the center of the weighing pan to begin static elimination.</p> <p>Important: Do not place the sample on the weighing pan during this process, as static charge may not be fully neutralized. Doing so may prevent effective neutralization of static charge.</p> <div>  <p>The diagram illustrates the correct setup for static elimination using an ionizer. It consists of two views: a top view and a side view.</p> <p>Top view: Shows a rectangular weighing pan with a sample placed in the center. A dashed line indicates the 'Effective range of static elimination' around the sample. The ionizer is positioned to the right of the pan, with 'Discharge electrode needles' extending towards the sample. The 'Ionized area' is shown as a shaded region. A 'Glass breeze break' is located to the left of the pan. A dimension of '5 cm' is indicated between the sample and the ionizer.</p> <p>Side view: Shows the weighing pan from the side. The sample is held approximately 2 cm above the weighing pan. The 'Effective range of static elimination' is shown as a shaded area. The 'Discharge electrode needles' are positioned to the right of the sample. The 'Ionizer' is shown to the right of the pan.</p> <p>Labels in the diagram include: Sample, Weighing pan, Glass breeze break, Ionized area, Effective range of static elimination, Discharge electrode needles, Ionizer, and a note: 'Hold the sample approximately 2 cm above the weighing pan.'</p> </div>

Step	Description
2.	<p>Activate the ionizer by moving your hand near the external IR (infrared) switch.</p> <p>The sensor detects motion within approximately 5 cm.</p> <p>When triggered, the balance's buzzer sounds, the ionizer's LED lights up, and the "ION" indicator appears on the display. This indicates that static elimination has started.</p> 
3.	<p>Static elimination will automatically stop after the duration set in the function table (default: 3 seconds).</p> <p>The buzzer will sound again and the ionizer's LED will turn off, signaling the end of the process.</p> <p>Ensure that static elimination continues until the LED turns off.</p> <p>CAUTION</p> <p>❑ If the ionizer is stopped before the LED turns off, static charge may remain on the sample, potentially causing weighing errors.</p>




5. Impact Shock Detection (ISD) Function


The balance has the Impact Shock Detection (ISD) function to detect impact shocks to the mass sensor section, displaying 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 or similar setups, the impact level should be minimized as much as possible while monitoring the shock indicator.

CAUTION

- Impact on the weighing sensor is not only that applied to the weighing pan when loaded, but also may be impact applied from the table on which the balance is installed. The impact detection function also works for impact coming from the table.

The shock indicator has 5 levels from level 0 to level 4.

Impact level display			
Impact level	Shock indicator	Buzzer	Content
0	No indicator	No beeps	Safe
1	SHOCK	No beeps	Caution
2	SHOCK 	No beeps	Caution: Alleviate impact shocks.
3	SHOCK 	One beep	Warning: Do not apply any more impact shocks.
4	SHOCK 	Two beeps	Danger: Sensor may be damaged.

Impact shock detection can be turned off by setting  (OFF) for **ISD** (Impact shock detection) under

bR5FnC

(Environment, Display) in the function table ("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.

5-1. Recording impact history

Impacts of level 3 or higher are automatically stored on the balance with date and time (up to 50 entries).

If the password lock function is enabled [ (On: Restricts weighing operation) or  (On: Allows basic

weighing operation) is set for **LOCK** (Lock function) under **PR55wd** (Password lock) in the function table ("9. Function Table")], login user information is added when outputting the impact history.






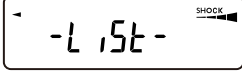



CAUTION

- If the number of data entries exceed 50, the stored data with the lowest impact level will be 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 key operation.

Output by key operation

Step	Description	Display and key operations
1.	Press the [ON:OFF] key to turn off the display.	  
2.	With the display turned off, press and hold the [MODE] key and press the [ON:OFF] key.	 While pressing and holding + 
3.	The display shown on the right appears, and the stored impact data is output in bulk. (For output examples, refer to " Impact history output example ".)	  Data output  

Output by command

The stored impact data will be output in bulk by sending a "?SA" command to the balance.
(For output examples, refer to "[Impact history output example](#)".)

Impact history output example

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

Output example (WinCT, RsCom)

```
2023/04/28,14:11:55,SHOCK_LV,4,--,      <TERM>
2023/04/28,14:13:13,SHOCK_LV,4,00,ADMIN<TERM>
2023/04/28,14:13:16,SHOCK_LV,3,01,USER_<TERM>
2023/04/28,14:14:07,SHOCK_LV,4,10,USER_<TERM>
2023/04/28,14:17:33,SHOCK_LV,3,--,GUEST<TERM>
```

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

Date Time Impact level Login user information

The login user information varies depending on the setting for the login user and the setting for *Lock* (Lock function) under PRSSwd (Password lock) in the function table ("9. Function Table") when receiving impact.

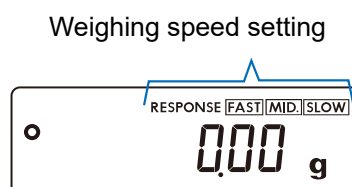
Function table (PRSSwd)	Output	Description
<i>Lock</i> = 0, <i>Lock</i> = 1, <i>Lock</i> = 2	,--,	No login user
<i>Lock</i> = 1	,00,ADMIN	Administrator
<i>Lock</i> = 1	,01~10,USER	User
<i>Lock</i> = 2	,--,GUEST	Guest

6. Response Adjustment / Self-Check Function Using ECL

6-1. Response adjustment

Disturbances such as drafts and vibrations at the installation site can affect the balance's weighing performance. In the response adjustment settings, three levels of the response characteristics are available for the balance to accommodate these disturbances.

Display	Response characteristic	Weighing speed	Stability
FAST	$L_{ond} = 0$	Fast response	Lower stability (More susceptible to disturbances.)
MID.	$L_{ond} = 1$	↑	↓
SLOW	$L_{ond} = 2$	Slow response	More stable display



CAUTION




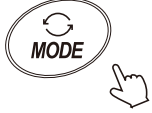







- When the response characteristics setting is configured, L_{ond} (Response characteristics), SP_d (Display refresh rate), and $St-b$ (Stability band width) under $bRSFnC$ (Environment, Display) in the function table ("9. Function Table") are changed as shown below.

Display	Response characteristic	Display refresh rate	Stability band width
FAST	$L_{ond} = 0$	$SP_d = 2$ (Approx. 20 times per second)	$St-b = 2$
MID.	$L_{ond} = 1$	$SP_d = 0$ (Approx. 5 times per second)	$St-b = 1$
SLOW	$L_{ond} = 2$	$SP_d = 0$ (Approx. 5 times per second)	$St-b = 1$

To use in a combination other than the above, set individually in the function table ("9. Function Table").

To change response adjustment, follow the procedure below.

Setting method

Step	Description	Operation
1.	Press and hold the [MODE] key (for 2 seconds) until RESPONSE appears.	  Press and hold (for 2 seconds)
2.	When RESPONSE is displayed, release your finger from the key.	  Release
3.	Press the [MODE] key to select the desired setting. (FAST, MID., or SLOW can be selected.) CAUTION <input type="checkbox"/> If RESPONSE is displayed and the [MODE] key is not pressed, the balance will automatically enter self-check mode. (For details, refer to "6-2. Self-check function / Automatic minimum weight (reference value) setting using ECL".)	   
4.	Press the [PRINT] key or wait for a moment to complete the process.	 
5.	The balance returns to weighing mode and displays the updated response indicator for a moment.	

6-2. Self-check function / Automatic minimum weight (reference value) setting using ECL





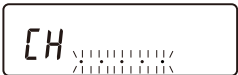
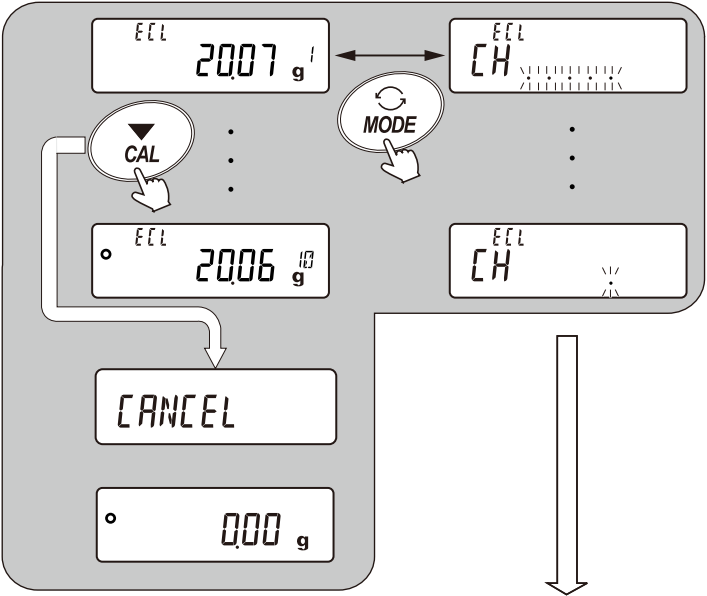


The self-check function performs failure diagnostics and verifies repeatability using the Electronically Controlled Load (ECL) system. This allows for a quick assessment of whether the balance is operating with the expected performance.

Repeatability data can also be used to display and store the minimum weight (reference value).

CAUTION

- The minimum weight defined by the United States Pharmacopeia (USP) is based on repeatability measurements using a weight. Therefore, values calculated using ECL should be treated as reference only.
- For more information on minimum weight, refer to "[What Is Minimum Weight and How Accurate Weighing Can Be Ensured](https://www.aandd.jp)" on the A&D website (<https://www.aandd.jp>).

Operating procedure

Step	Description	Operation
1.	Press and hold the [MODE] key (for 2 seconds) until RESPONSE begins blinking.	  Press and hold (for 2 seconds)
2.	Release the key once RESPONSE is blinking. While RESPONSE is blinking, wait without pressing any keys.	  Release
3.	The balance will show the display shown on the right and begin the self-check process.	
4.	When EEL appears in the upper-left corner of the display, the balance will start measuring repeatability using ECL. The following key operations are available: [MODE] key Switches the display [CAL] key Cancels the current measurement and returns to weighing mode.	
5.	Once the measurement is complete, the check results will be displayed. Refer to " Key operations when measurement results are displayed ".	 

Key operations when measurement results are displayed

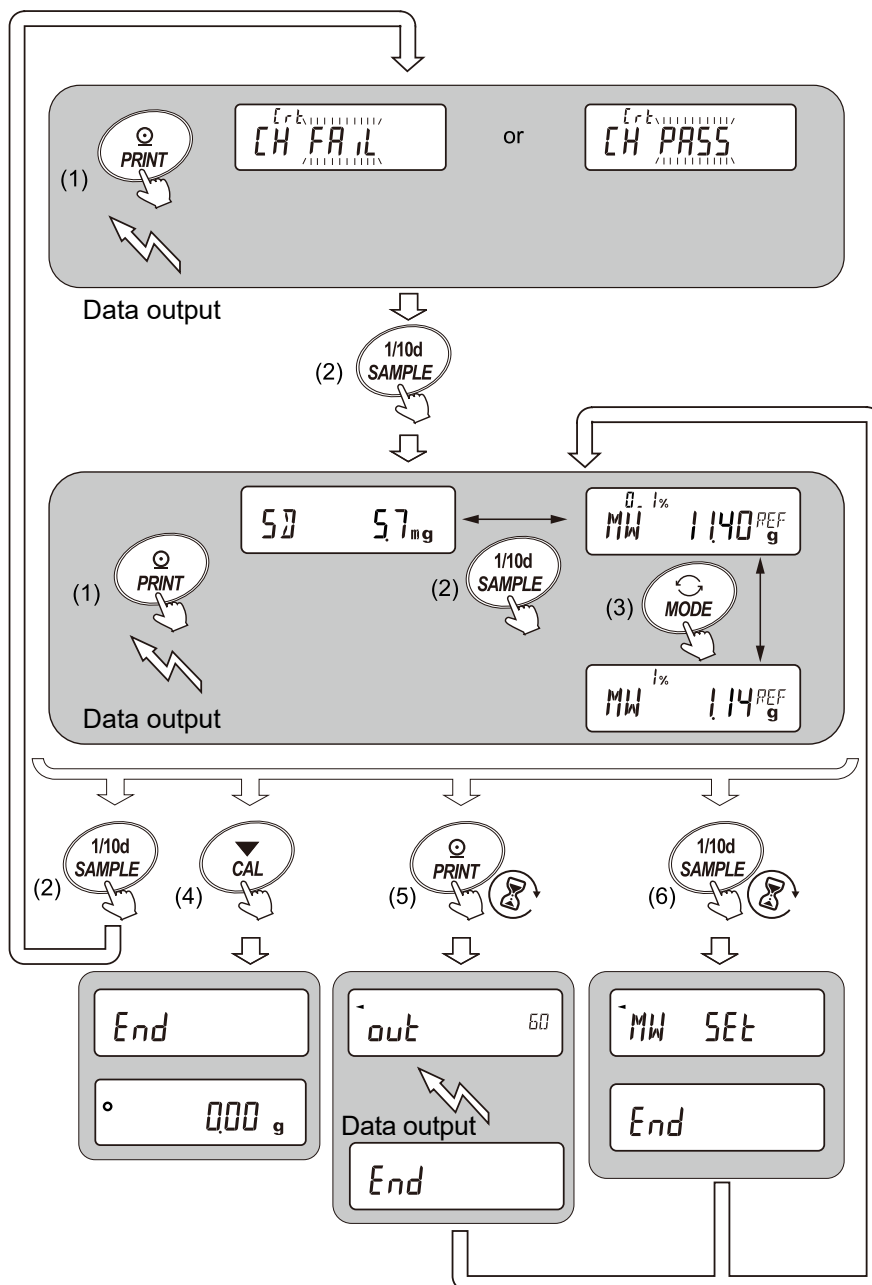
Supplement to step 5 of "[Operating procedure](#)":

CAUTION

- If no key operation is performed for approximately 1 minute, the balance will automatically return to weighing mode.

The following key operations are available:


No.	Description
(1)	[PRINT] key····· Outputs the data being displayed. (Refer to " Output examples for check results ".)
(2)	[SAMPLE] key ····· Switches the display between <i>CH PASS / CH FAIL</i> (Self-check result), <i>MW</i> (Minimum weight), and <i>S</i> (Repeatability).
(3)	[MODE] key····· Switches between 0.1% and 1% (measurement tolerance) while displaying <i>MW</i> (Minimum weight).
(4)	[CAL] key····· The balance returns to weighing mode.
(5)	Pressing and holding the [PRINT] key (for 2 seconds) ····· Outputs the measurement results in bulk. (Refer to " Output examples for check results ".)
(6)	Pressing and holding the [SAMPLE] key (for 2 seconds) ··· Stores the minimum weight.




Output examples for check results

When a check result is displayed, pressing the [PRINT] key outputs the data.

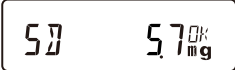
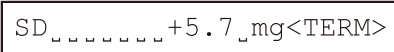
Example of check result output (No abnormalities)

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

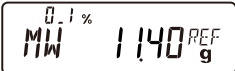
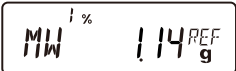

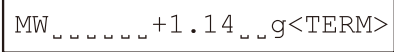
Example of check result output (Abnormalities detected)

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


Example of repeatability output

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

Example of minimum weight (reference) output

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

Bulk output example: Minimum weight (reference value) using ECL

Description	
Display <div>  </div>	
Output	
<pre> -MINIMUM_WEIGHT-<TERM> <TERM> .....A_&_D<TERM> MODEL_GX-10002A<TERM> S/N.....T2000112<TERM> ID_LAB-012345678<TERM> DATE_2019/01/22<TERM> TIME_12:51:55<TERM> <TERM> ECL.....<TERM> <TERM> RESULT _1.....+20.07_g<TERM> _2.....+20.06_g<TERM> _3.....+20.06_g<TERM> _4.....+20.06_g<TERM> _5.....+20.05_g<TERM> _6.....+20.06_g<TERM> _7.....+20.05_g<TERM> _8.....+20.06_g<TERM> _9.....+20.06_g<TERM> 10.....+20.06_g<TERM> <TERM> SD.....5.7_mg<TERM> <TERM> TOLERANCE<TERM> .....0.10_%<TERM> MINIMUM_WEIGHT_<TERM> .....11.40_g<TERM> <TERM> <TERM> REMARKS<TERM> <TERM> <TERM> <TERM> SIGNATURE<TERM> <TERM> <TERM> -----<TERM> </pre>	<div> 1 Manufacturer 2 Model 3 Serial number 4 ID number 5 Date 6 Time 7 Weighing method 8 ECL measurement results 9 Repeatability (standard deviation) 10 measurement tolerance 11 Minimum weight (reference) 12 Remarks 13 Signature </div> <div> _ : Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah </div>

7. Sensitivity Adjustment / Calibration Test

- Due to the high resolution of the balance, weighing values may be affected by gravity and daily environmental changes.
To ensure consistent weighing values despite changes in gravity or the environment, it is necessary to perform sensitivity adjustment using a weight. It is advisable to perform sensitivity adjustment when the balance is newly installed or relocated, or if significant deviations in weighing values are observed during daily checks.
- Sensitivity adjustment involves fine-tuning the balance's weighing values using a reference weight or the internal weight.
- Calibration test^{*1} is to weigh with a reference weight and compare how much the result deviates from the reference value.

^{*1} Sensitivity adjustment is not performed.

Sensitivity adjustment

Automatic sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)	.....	Automatically adjusts the sensitivity of the balance using the internal weight based on ambient temperature changes, set times, or intervals.
Sensitivity adjustment using the internal weight (GX-AE / GX-A / GX-AWP series only)	.....	Adjusts the balance with a single touch using the internal weight.
Sensitivity adjustment using an external weight	.....	Adjusts the balance using an external weight.

Calibration test^{*1}

Calibration test using an external weight	.....	Checks the accuracy of weighing using an external weight and outputs the result. ^{*1} Sensitivity adjustment is not performed.
Calibration test using the internal weight (GX-AE / GX-A series 0.0001 g models only)	.....	Checks the accuracy of weighing using the internal weight and outputs the result. ^{*1} Sensitivity adjustment is not performed.

Caution for sensitivity adjustment / calibration test

- Do not allow vibration or drafts to affect the balance during sensitivity adjustment or calibration tests.
- The GLP / GMP (etc.) compliant maintenance report can be output in sensitivity adjustment / calibration tests. To output the GLP / GMP compliant maintenance report, set 1 (ON: Internal clock data) or 2 (ON: External device clock data) for $mF0$ (GLP output) under data (Data output) in the function table ("9. Function Table"). A PC or optional printer is required for GLP output. A timestamp (clock and calendar) is available for the GLP output using the balance's clock function. If the date and time are incorrect, refer to "9-4. Clock and calendar function" in "9. Function Table" and adjust the clock. The calibration test using an external weight is a function that is available only when the output setting for GLP / GMP (etc.) compliant report is set.

- ☐ By setting τ (Stores weighing data / sensitivity adjustment history) for $dRtR$ (Data memory) under $dout$ (Data output) in the function table ("[9. Function Table](#)"), sensitivity adjustment records and calibration test records can be stored in the data memory.

Caution when using an external weight

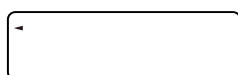
- The accuracy of the weight used in sensitivity adjustment affects the accuracy of the balance after sensitivity adjustment.
- For sensitivity adjustment or calibration tests using your own weights, select weights from the table below.

Weights usable for sensitivity adjustment and calibration tests

Model		Usable weight	Adjustable range
GX-124AE GX-124A	GF-124A	■100 g, 50 g	-0.9999 g to +0.9999 g
GX-224AE GX-224A	GF-224A	■200 g, 100 g, 50 g	
GX-324AE GX-324A	GF-324A	300 g, ■200 g, 100 g, 50 g	
	GF-123A	■100 g, 50 g	-9.999 g to +9.999 g
GX-203A GX-203AWP	GF-203A GF-203AWP	■200 g, 100 g, 50 g	
GX-303A	GF-303A	300 g, ■200 g, 100 g, 50 g	
GX-403A GX-403AWP	GF-403A GF-403AWP	■400 g, 300 g, 200 g, 100 g, 50 g	
GX-603A GX-603AWP	GF-603A GF-603AWP	600 g, ■500 g, 400 g, 300 g, 200 g, 100 g, 50 g	
GX-1003A	GF-1003A	■1000 g, 900 g, 800 g, 700 g, 600 g, 500 g, 400 g, 300 g, 200 g, 100 g, 50 g	
GX-1603A	GF-1603A	1600 g, 1500 g, 1400 g, 1300 g, 1200 g, 1100 g, ■1000 g, 900 g, 800 g, 700 g, 600 g, 500 g, 400 g, 300 g, 200 g, 100 g, 50 g	
	GF-1202A	■1000 g, 500 g	-99.99 g to +99.99 g
GX-2002A GX-2002AWP	GF-2002A GF-2002AWP	■2000 g, 1000 g, 500 g	
GX-3002A	GF-3002A	3000 g, ■2000 g, 1000 g, 500 g	
GX-4002A GX-4002AWP	GF-4002A GF-4002AWP	■4000 g, 3000 g, 2000 g, 1000 g, 500 g	
GX-6002A GX-6002AWP	GF-6002A GF-6002AWP	6000 g, ■5000 g, 4000 g, 3000 g, 2000 g, 1000 g, 500 g	
GX-10002A	GF-10002A	■10000 g, 9000 g, 8000 g, 7000g, 6000 g, 5000 g, 4000 g, 3000 g, 2000 g, 1000 g, 500 g	
GX-6001A GX-6001AWP	GF-6001A GF-6001AWP	6000 g, ■5000 g, 4000 g, 3000 g, 2000 g, 1000 g, 500 g	-99.9 g to +99.9 g
GX-10001A	GF-10001A	■10000 g, 9000 g, 8000 g, 7000g, 6000 g, 5000 g, 4000 g, 3000 g, 2000 g, 1000 g, 500 g	

■ Factory setting

Display



The ◀ indicator in the upper left corner of the display shows that the balance is acquiring data for sensitivity adjustment or a calibration test.

While this indicator is displayed, avoid subjecting the balance to vibration, drafts, or other disturbances.

7-1. Automatic sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)

This function automatically adjusts the sensitivity of the balance according to ambient temperature change, set time or intervals using the internal weight. It works even when the display is off. If GLP output is set, a sensitivity adjustment record is output after the adjustment.



- The execution conditions for the automatic sensitivity adjustment mode can be selected from \square (Temperature change), \square (Set time), or \square (Interval time), for \square (Sensitivity adjustment mode) under \square (Automatic sensitivity adjustment) in the function table ("9. Function Table").
(Default setting: \square (Temperature change)).
- For the set time, \square (Set time 1), \square (Set time 2), and \square (Set time 3) can be set under \square (Automatic sensitivity adjustment) in the function table ("9. Function Table").
- The interval time can be set between \square (0.5 h) and \square (24 h), for \square (Sensitivity adjustment Intervals) under \square (Automatic sensitivity adjustment) in the function table ("9. Function Table").

CAUTION

- 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.

Criteria for performing automatic sensitivity adjustment

0.0001 g model	0.001 g model	0.01 g model	0.1 g model
Less than 0.5 g	Less than 2 g	Less than 20 g	Less than 20 g

	The automatic sensitivity adjustment notice (the \square indicator blinking) indicates that the automatic sensitivity adjustment will start. 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.)
	The balance is currently capturing sensitivity adjustment data. Do not allow vibration or drafts to affect the balance while this indicator is displayed. Upon completion, the balance automatically returns to the original display.

Tip



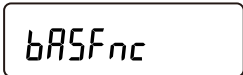

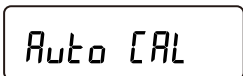

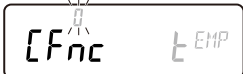

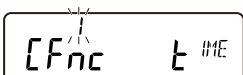


- Although it is possible to continue using the balance even while the \square indicator is blinking, use after sensitivity adjustment is completed is advisable in order to maintain the weighing accuracy.
- "Prohibit automatic sensitivity adjustment" or "Allow automatic sensitivity adjustment" can be selected in the setting described in "8. Function Selection Switch and Initialization".

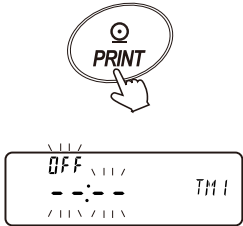
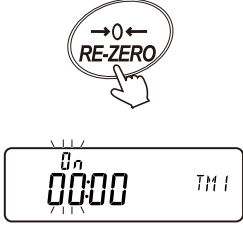
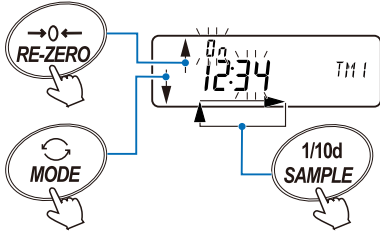



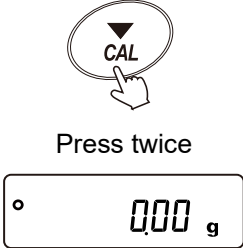
7-1-1. Inputting the set time

The method for inputting the set time is the same for t_{ME1} (Set time 1), t_{ME2} (Set time 2), and t_{ME3} (Set time 3).

Below is an example of setting t_{ME1} (Set time 1).

To set t_{ME2} (Set time 2) or t_{ME3} (Set time 3), press the [SAMPLE] key several times in step 5 to select the desired time, then repeat steps 6 to 10.

Step	Description	Operation
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key to display t_{FnC} (Sensitivity adjustment mode).	 
4.	Press the [RE-ZERO] key several times to set the parameter to 1 (Set time 1).	 Press several times 
5.	Press the [SAMPLE] key to show the display shown on the right.	 

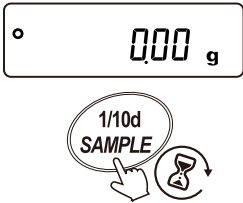
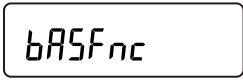







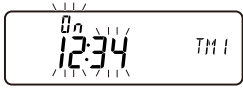
Step	Description	Operation
6.	Press the [PRINT] key to enter the set time 1 setting mode.	
7.	Press [RE-ZERO] key.	
8.	<p>Using the following keys, set the time (in 24-hour format) to perform automatic sensitivity adjustment.</p> <p>[RE-ZERO] key Increases the value of the blinking digit.</p> <p>[MODE] key Decreases the value of the blinking digit.</p> <p>[SAMPLE] key Selects the digit to blink.</p>	
9.	<p>Press the [PRINT] key to register the time.</p> <p>(To cancel, press the [CAL] key.)</p>	  
10.	To return to weighing mode, press the [CAL] key twice.	



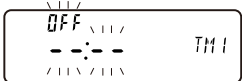
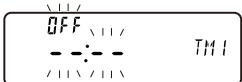





7-1-2. Clearing the set time

The method for clearing the set time is the same for $\llcorner t_{ME1}$ (Set time 1), $\llcorner t_{ME2}$ (Set time 2), and $\llcorner t_{ME3}$ (Set time 3).



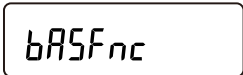

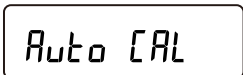

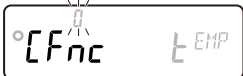

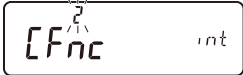

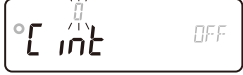
Below is an example of clearing $\llcorner t_{ME1}$ (Set time 1).


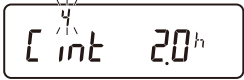


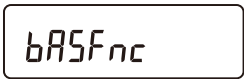

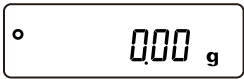
To clear $\llcorner t_{ME2}$ (Set time 2) or $\llcorner t_{ME3}$ (Set time 3), press the [SAMPLE] key several times in step 4 to select the time to be cleared, then repeat steps 5 to 7.

Step	Description	Operation
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>Press and hold (for 2 seconds)</p> 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 <p>Press several times</p> 
3.	Press the [PRINT] key to display $\llcorner F_{nc}$ (Sensitivity adjustment mode).	 
4.	Press the [SAMPLE] key to show the display shown on the right.	 
5.	Press the [PRINT] key to enter the set time 1 setting mode.	 

Step	Description	Operation
6.	Press the [MODE] key to show the display shown on the right.	  
7.	Press the [PRINT] key to complete the process.	   
8.	To return to weighing mode, press the [CAL] key twice.	 Press twice 

7-1-3. Setting the interval time

Step	Description	Operation
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key to display ϵF_{nc} (Sensitivity adjustment mode).	 
4.	Press the [RE-ZERO] key several times to set the parameter to ? (Interval time).	 Press several times 
5.	Press the [SAMPLE] key several times to display ϵint (Sensitivity adjustment intervals).	 Press several times 

Step	Description	Operation
6.	<p>Press the [RE-ZERO] key several times to set the interval time from 1/2 (0.5 hours) to 24 (24 hours) for automatic sensitivity adjustment.</p> <p>For details on the parameter and interval time, refer to the "Correspondence table for automatic sensitivity adjustment intervals".</p>	 <p>Press several times</p> 
7.	Press the [PRINT] key to complete the process.	  
8.	To return to weighing mode, press the [CAL] key.	 

Correspondence table for automatic sensitivity adjustment intervals

Item	Parameter	Description
[int Sensitivity adjustment intervals	0	OFF
	1	0.5-hour interval time
	2	1.5-hour interval time
	3	1.0-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. Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)

The balance can use its internal weight for sensitivity adjustment, enabling one-touch adjustment.
(Internal sensitivity adjustment is not available on GF-A / GF-AWP series models.)


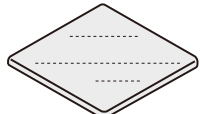




CAUTION


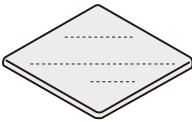
- Refer to "2-8. How to adjust the level of the balance", and rotate the leveling feet to ensure the bubble is within the red circle of the bubble spirit level. Insufficient leveling may cause errors in the sensitivity adjustment results.

About the internal weight

- The value of the internal weight may change due to factors such as the operating environment and aging.
If correction is needed, refer to "7-5-1. Correcting the internal weight value - AUTO (GX-AE/GX-A/GX-AWP series only)" or "7-5-2. Correcting the internal weight value - MANUAL (GX-AE/GX-A/GX-AWP series only)" and proceed with the correction.
The internal weight is approximately 200 g. As the weighing capacity increases, the potential deviation may also increase.
For more precise weighing management, it is advisable to regularly perform sensitivity adjustments using an external weight, as described in "7-3. Sensitivity adjustment using an external weight".

Operation method


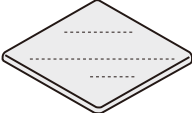

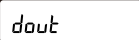
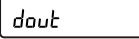

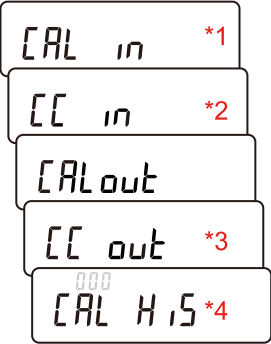
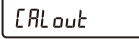


Step	Description	Display and key operations	Weighing operation
1.	Be sure to warm up the balance with nothing on the weighing pan for at least 30 minutes, or at least 1 hour for 0.0001 g models.		
2.	Press the [CAL] key to show the displays shown on the right. The balance will automatically start sensitivity adjustment using the internal weight. Avoid areas with drafts or vibrations. CAUTION For 0.0001 g and 0.001 g models, always perform this procedure with the included breeze break properly attached.	   	

Step	Description	Display and key operations	Weighing operation
3.	<p>If GLP output is set, a sensitivity adjustment record is output or stored in the data memory after the adjustment. (Refer to "9. Function Table" for <i>inFa</i> (GLP output) and <i>dAtA</i> (Data memory) under <i>dout</i> (Data output).)</p> <p>For output examples, refer to "Output of sensitivity adjustment using the internal weight".</p>	<div>End</div> <div>GLP</div>  <p>GLP output (Only when <i>inFa</i> (GLP output) is set (“9. Function Table”))</p> <div>End</div>	
4.	The balance automatically returns to weighing mode after sensitivity adjustment is complete.	<div>° 000 g</div>	

7-3. Sensitivity adjustment using an external weight

An external weight is used to adjust the sensitivity.

Operation method


Step	Description	Display and key operations	Weighing operation
1.	Be sure to warm up the balance with nothing on the weighing pan for at least 30 minutes, or at least 1 hour for 0.0001 g models.		
2.	<p>Press and hold the [CAL] key until  appears.</p> <p>Pressing and holding the key switches the display every 2 seconds.</p> <p>*1 Displayed only on GX-AE, GX-A, and GX-AWP series. (Refer to "7-2. Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)" for details.)</p> <p>*2 Displayed only on GX-AE and GX-A series 0.0001 g models. (For details, refer to "7-6. Calibration test using the internal weight (GX-AE / GX-A series 0.0001 g models only)".)</p> <p>*3 Displayed only when \downarrow (ON: Internal clock data) or \uparrow (ON: External device clock data) is set for INF (GLP output) under  (Data output) in the function table ("9. Function Table"). (Refer to "7-7. Calibration test using an external weight" for details.)</p> <p>*4 Displayed only when \uparrow (Stores weighing data / sensitivity adjustment history) is set for dM (Data memory) under  (Data output) in the function table ("9. Function Table"). (Refer to "11-2-6. Storing and outputting sensitivity adjustment history" for details.)</p>	 <p>Press and hold (The display cycles every 2 seconds.)</p> 	
3.	When  is displayed, release your finger from the [CAL] key.	  <p>Release</p>	

Step	Description	Display and key operations	Weighing operation
4.	The zero point for sensitivity adjustment is displayed. To change the weight value, refer to "7-4. Setting the value of the weight". If no change is needed, proceed to step 5.		
5.	Make sure that nothing is on the weighing pan, and then press the [PRINT] key.	 	
6.	The balance weighs the zero point. Do not apply vibration and the like to the balance.		
7.	The weight value for sensitivity adjustment will be displayed. Place the external weight on the weighing pan and press the [PRINT] key to measure it.	 	
8.	The balance weighs the weight. Do not apply vibration and the like to the balance.		
9.	Remove the external weight from the weighing pan.		
10.	If GLP output is set, the sensitivity adjustment record will be output or stored in the data memory after completion. (Refer to "9. Function Table" for <i>INF</i> (GLP output) and <i>DATA</i> (Data memory) under <i>dout</i> (Data output)). For output examples, refer to "Output of sensitivity adjustment using an external weight".	 GLP output 	
11.	The balance automatically returns to weighing mode.		
12.	Place the external weight on the weighing pan again to check if it is within the parameter ± 2 d.*1 If it is not within the range, start over from the first step of this procedure in the appropriate ambient conditions. *1 "d" represents scale division.		

7-4. Setting the value of the weight

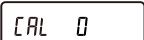
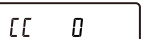













For sensitivity adjustment or calibration tests, the value of the external weight in use can be set.

Refer to "[Weights usable for sensitivity adjustment and calibration tests](#)" for weights that can be used.

Follow the procedure after the  display in "[7-3. Sensitivity adjustment using an external weight](#)",

or after the  display in "[7-7. Calibration test using an external weight](#)".

Operation method

Step	Description	Display and key operations
1.	With  (Sensitivity adjustment using an external weight) or  (Calibration test using an external weight) displayed, press the [SAMPLE] key.	 or  
2.	Use the [RE-ZERO] key to change the external weight (when all digits are blinking). Refer to " Weights usable for sensitivity adjustment and calibration tests " for weights that can be used.	  
3.	Use the following keys to set the value of the weight. [SAMPLE] key Switches the display between "all digits blinking" (weight selection mode) and "last four digits blinking" (instrumental error adjustment mode). [RE-ZERO] key Increases the value of instrumental error. (" -9999 d" appears after "+9999 d".) [MODE] key Decreases the value of instrumental error. (" +9999 d" appears after "-9999 d".)	 ↑  ↓  ↑  ↓ 
4.	Press the [PRINT] key to save the updated weight value. The stored value is retained in the balance's nonvolatile memory even when the power is turned off. (To cancel without saving the weight value, press the [CAL] key.)	 

Step	Description	Display and key operations
5.	<p>The display will return to CAL 0 (Sensitivity adjustment using an external weight) or CC 0 (Calibration test using an external weight)).</p> <p>Refer to step 5 and onwards of "7-3. Sensitivity adjustment using an external weight" or "7-7. Calibration test using an external weight".</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;">CAL 0</div> <p>or</p> <div style="border: 1px solid black; padding: 5px; text-align: center;">CC 0</div>

7-5. Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)

The internal weight value can be corrected using 0.5 in in the function table ("9. Function Table").

The balance supports two correction methods:


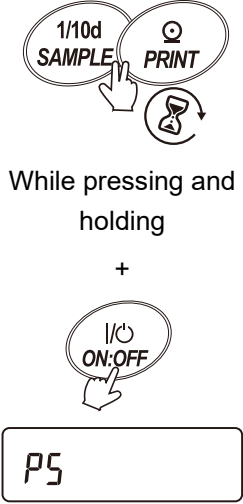


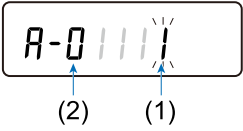
Auto Automatically adjusts the internal weight value based on the external reference weight.


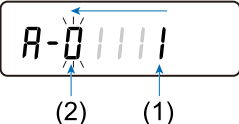

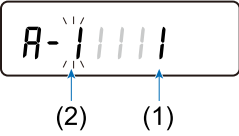




MANUAL Adjusts the internal weight value by manually entering the reference value (converted from the internal weight).

CAUTION

- ❑ Correction of the internal weight value is disabled by default factory settings.
To change the function selection switch settings ("8-1. Function selection switch") and enable correction of the internal weight value, follow the procedure below or refer to "8. Function Selection Switch and Initialization"

Setting method

Step	Description	Display and key operations
1.	Press the [ON:OFF] key to turn the display off.	
2.	While pressing and holding the [PRINT] and [SAMPLE] keys, press the [ON:OFF] key to show the display shown on the right.	 <p>While pressing and holding</p> <p>+</p>  <p>PS</p>
3.	Press the [PRINT] key to display the function selection switch. (1) Function table switch (factory setting: 1) (2) Internal weight value adjustment switch (factory setting: 0)	 

Step	Description	Display and key operations
4.	Press the [SAMPLE] key several times until the switch (2) is blinking.	 <p>1/10d SAMPLE</p> <p>Press several times</p> 
5.	Press the [RE-ZERO] key to change the switch (2) to $\frac{1}{1}$.	 <p>→0← RE-ZERO</p> 
6.	Press the [PRINT] key to save the setting. The balance will return to weighing mode.	 <p>PRINT</p>   

7-5-1. Correcting the internal weight value - AUTO (GX-AE/GX-A/GX-AWP series only)



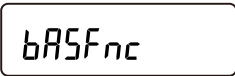
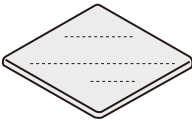
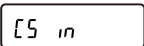
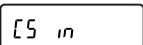

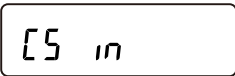


This method corrects the value of the balance's internal weight (used for sensitivity adjustment) based on an external reference weight.


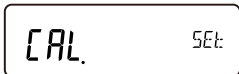

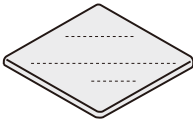
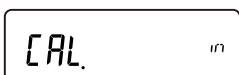
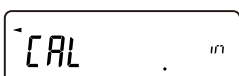



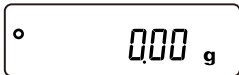

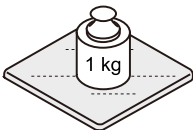
Refer to "[7-3. Sensitivity adjustment using an external weight](#)" and perform the sensitivity adjustment in advance.

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

The corrected value is stored in nonvolatile memory and will be retained even if the AC adapter is disconnected.

Operation method

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. Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only) " to enable changes to the settings described in " 8-1. Function selection switch " and to correct the internal weight value.		
2.	Perform the sensitivity adjustment in advance by referring to " 7-3. Sensitivity adjustment using an external weight ".		
3.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu (" 9. Function Table ").	  Press and hold (for 2 seconds) 	
4.	Press the [SAMPLE] key several times until  appears. If  does not appear, follow the instructions in step 1 to set it.	 Press several times 	
5.	Press the [PRINT] key to show the display shown on the right.	 	

Step	Description	Display and key operations	Weighing operation
6.	<p>Ensure there is no external disturbance, then press the [PRINT] key.</p> <p>The displays shown on the right appear, and the correction of the internal weight value starts automatically.</p>	  	
7.	<p>When the adjustment of the internal weight value is completed, the displays shown on the right appear, and the sensitivity adjustment with the adjusted internal weight starts automatically.</p>	 	
8.	<p>When the sensitivity adjustment is completed, the displays shown on the right appear.</p>	 	
9.	<p>To return to weighing mode, press the [CAL] key twice.</p>	 <p>Press twice</p> 	
10.	<p>Place the external weight used in step 2 back on the weighing pan to confirm that the value has been correctly adjusted. Ensure that the result falls within the value specified for "Accuracy after internal sensitivity adjustment" in "27-2. Individual specifications".</p> <p>If it is not correctly adjusted, repeat the process from step 2. (Ensure there are no external disturbances during the correction of the internal weight value.)</p> <p>CAUTION</p> <p>Due to the high precision of 0.0001 g models, physical phenomena caused by environmental factors can easily affect the weighing results. Therefore, for analytical balances with a readability of 0.0001 g or finer, A&D does not provide a specified accuracy after adjustment using the internal weight.</p>		

7-5-2. Correcting the internal weight value - MANUAL (GX-AE/GX-A/GX-AWP series only)

This method manually corrects the value of the balance's internal weight (used for sensitivity adjustment) based on an external reference weight.

First, perform sensitivity adjustment using the internal weight as described in "7-2. [Internal sensitivity adjustment \(GX-AE / GX-A / GX-AWP series only\)](#)".

Next, place the external weight on the weighing pan to determine the correction value, then enter this value into the balance manually.

The corrected value is stored in nonvolatile memory and will be retained even if the AC adapter is disconnected.

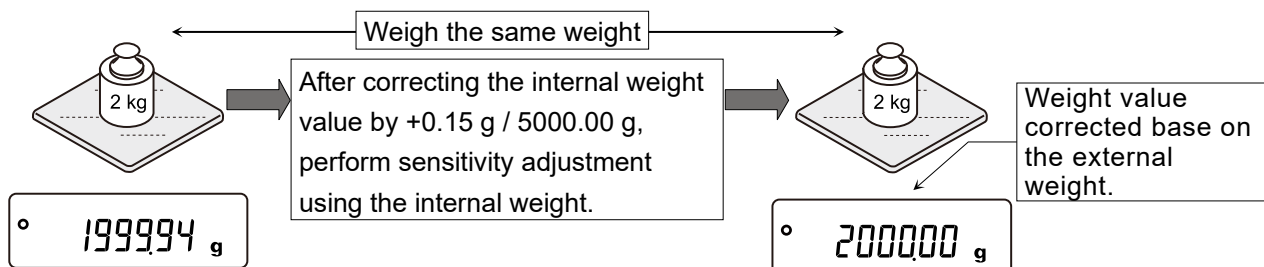
The table below shows the reference values and the allowable correction range.

Internal weight correction reference (converted internal weight value) and adjustable range



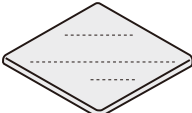



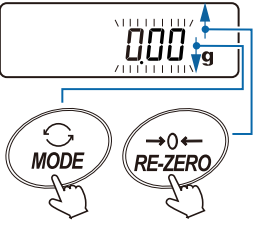






Model	Correction reference value	Adjustable range
GX-124AE GX-124A	100.0000 g	±0.9999 g
GX-224AE GX-224A	200.0000 g	
GX-324AE GX-324A		
GX-203A GX-203AWP	200.000 g	±9.999 g
GX-303A		
GX-403A GX-403AWP		
GX-603A GX-603AWP	500.000 g	
GX-1003A	1000.000 g	
GX-1603A		
GX-2002A GX-2002AWP	2000.00 g	±99.99 g
GX-3002A		
GX-4002A GX-4002AWP		
GX-6002A GX-6002AWP	5000.00 g	
GX-10002A		
GX-6001A GX-6001AWP	5000.0 g	±99.9 g
GX-10001A		





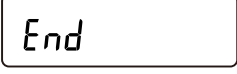
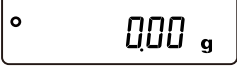
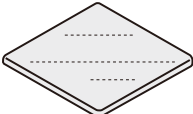


Setting method

In this example using the GX-6002A, an external weight of 2000.00 g shows a deviation of -0.06 g. The standard correction value for the GX-6002A is 5000.00 g, so if your weight is 2000.00 g and you want to correct it by $+0.06$ g, the correction amount to enter into the balance is $+0.15$ g ($+0.06$ g \times 5000.00 g / 2000.00 g).



Step	Description	Display and key operations	Weighing operation
1.	Correction of the internal weight value cannot be performed at factory settings. Refer to "7-5-2. Correcting the internal weight value - MANUAL (GX-AE/GX-A/GX-AWP series only)" to enable changes to the settings described in "8-1. Function selection switch" and to correct the internal weight value.		
2.	First, perform sensitivity adjustment using the internal weight as described in "7-2. Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)".		
3.	Place the external weight and confirm the value to be corrected.		
4.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 Press and hold (for 2 seconds) 	
5.	Press the [SAMPLE] key several times until appears. 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 [PRINT] key to show the display shown on the right.	 	
7.	Press the [SAMPLE] key to show the display shown on the right.	 	
8	<p>Press the [PRINT] key, then use the following keys to enter the correction value.</p> <p>[RE-ZERO] key Increases the correction value. ("-9999 d" appears after "+9999 d".)</p> <p>[MODE] key Decreases the correction value. ("+9999 d" appears after "-9999 d".)</p>	 	
9.	<p>Press the [PRINT] key to save the updated weight value.</p> <p>The stored value is retained in the balance's nonvolatile memory even when the power is turned off.</p> <p>(To cancel without saving the weight value, press the [CAL] key.)</p>	  	
10.	When the display shown on the right appears, press the [CAL] key twice to return to weighing mode.	  Press twice 	

Step	Description	Display and key operations	Weighing operation
11.	Press the [CAL] key to perform sensitivity adjustment using the internal weight.	     	
12.	<p>Place the external weight on the weighing pan to confirm that the value has been correctly adjusted. Ensure that the result falls within the value specified for "Accuracy after internal sensitivity adjustment" in "27-2. Individual specifications". If the value has not been corrected properly, readjust the correction value.</p> <p>CAUTION</p> <p>□ Due to the high precision of 0.0001 g models, physical phenomena caused by environmental factors can easily affect the weighing results. Therefore, for analytical balances with a readability of 0.0001 g or finer, A&D does not provide a specified accuracy after adjustment using the internal weight.</p>		

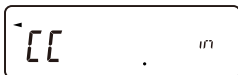
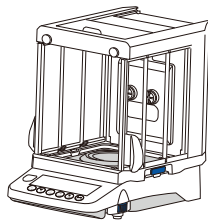






7-6. Calibration test using the internal weight (GX-AE / GX-A series 0.0001 g models only)

This function checks the weighing accuracy using the internal weight. Note that the balance will output the result but will not perform sensitivity adjustment.

This function is available on high-precision analytical balances with 0.0001 g readability.

Operation method

Step	Description	Display and key operations	Weighing operation
1.	Be sure to warm up the balance with nothing on the weighing pan for at least 1 hour.		
2.	<p>Press and hold the [CAL] key (for 2 seconds) to display .</p> <p>Pressing and holding the key switches the display every 2 seconds.</p> <p>*1 Displayed only when \downarrow (ON: Internal clock data) or \downarrow (ON: External device clock data) is set for inF0 (GLP output) under (Data output) in the function table ("9. Function Table"). (Refer to "7-7. Calibration test using an external weight)" for details.)</p> <p>*2 Displayed only when \downarrow (Stores weighing data / sensitivity adjustment history) is set for dAtA (Data memory) under (Data output) in the function table ("9. Function Table"). (Refer to "11-2-6. Storing and outputting sensitivity adjustment history" for details.)</p>	<p></p> <p>Press and hold (The display cycles every 2 seconds.)</p> <p>The display repeats in this cycle.</p>	
3.	When is displayed, release your finger from the [CAL] key.	 Release 	
4.	The balance checks the zero point. Do not apply vibration and the like to the balance.		
5.	The checked value of the zero point is displayed.		


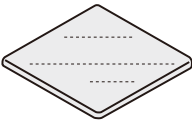

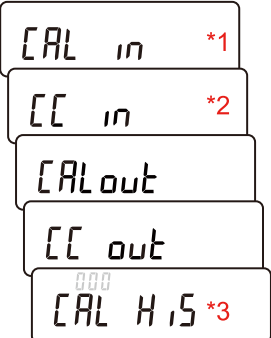
Step	Description	Display and key operations	Weighing operation													
6.	The balance checks the full-scale point. Do not apply vibration and the like to the balance.															
7.	<p>The checked value of the full-scale point is displayed. The reference values are shown below. When the displayed full-scale point value is within the normal range, it means that the sensitivity adjustment was performed correctly with the internal weight.</p> <table><tr><th>Model</th><th>Full-scale point</th><th>Normal range</th></tr><tr><td>GX-124AE</td><td rowspan="2">100.0000 g</td><td rowspan="6">± 0.0002 g</td></tr><tr><td>GX-124A</td></tr><tr><td>GX-224AE</td><td colspan="2" rowspan="4">200.0000 g</td></tr><tr><td>GX-224A</td></tr><tr><td>GX-324AE</td></tr><tr><td>GX-324A</td></tr></table>	Model		Full-scale point	Normal range	GX-124AE	100.0000 g	± 0.0002 g	GX-124A	GX-224AE	200.0000 g		GX-224A	GX-324AE	GX-324A	
Model	Full-scale point	Normal range														
GX-124AE	100.0000 g	± 0.0002 g														
GX-124A																
GX-224AE	200.0000 g															
GX-224A																
GX-324AE																
GX-324A																
8.	<p>If GLP output is set, the calibration test record will be output after completion.</p> <p>Refer to "Output of calibration test using the internal weight" for the output results.</p> <p>When using data memory storage, the results will be stored in the balance.</p> <p>(Refer to "11-2-6. Storing and outputting sensitivity adjustment history" for details.)</p>	<div></div> <div></div> <div></div> <div>GLP output</div> <div></div>														
9.	The balance automatically returns to weighing mode.															



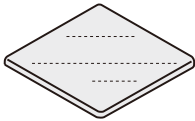

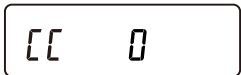

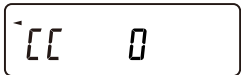

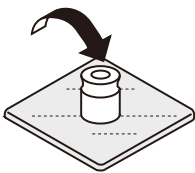




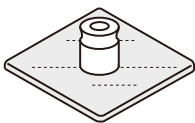

7-7. Calibration test using an external weight


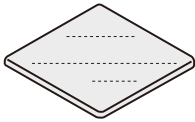

This function checks the accuracy of weighing using an external weight and outputs the result. (Note that sensitivity adjustment is not performed.)

This function is active only when either 1 (ON: Internal clock data) or 2 (ON: External device clock data) is set for inF_{\square} (GLP output) under $dout$ (Data output) in the function table ("9. Function Table").

Operation method

Step	Description	Display and key operations	Weighing operation
1.	Before proceeding, refer to "10-3. GLP output" and set either 1 (ON: Internal clock data) or 2 (ON: External device clock data) for inF_{\square} (GLP output) under $dout$ (Data output) in the function table ("9. Function Table").		
2.	Be sure to warm up the balance with nothing on the weighing pan for at least 30 minutes, or at least 1 hour for 0.0001 g models.		
3.	<p>Press and hold the [CAL] key until $[[out]$ appears.</p> <p>Pressing and holding the key switches the display every 2 seconds.</p> <p>*1 Displayed only on GX-AE, GX-A, and GX-AWP series. (Refer to "7-2. Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)" for details.)</p> <p>*2 Displayed only on GX-AE / GX-A series 0.0001 g models. (For details, refer to "7-6. Calibration test using the internal weight (GX-AE / GX-A series 0.0001 g models only)".)</p> <p>*3 Displayed only when 2 (Stores weighing data / sensitivity adjustment history) is set for $dAtH$ (Data memory) under $dout$ (Data output) in the function table ("9. Function Table"). (Refer to "11-2-6. Storing and outputting sensitivity adjustment history" for details.)</p>	 <p>Press and hold (The display cycles every 2 seconds.)</p>  <p>The display repeats in this cycle.</p>	

Step	Description	Display and key operations	Weighing operation
4.	When [[out is displayed, release your finger from the key.	 	
5.	The zero point for calibration test is displayed. To change the weight value, refer to "7-4. Setting the value of the weight". If no change is needed, proceed to step 6.		
6.	Make sure that nothing is on the weighing pan, and then press the [PRINT] key.	 	
7.	The balance weighs the zero point. Do not apply vibration and the like to the balance.		
8.	The measured value is displayed for a few seconds.		
9.	Place the external weight on the weighing pan and press the [PRINT] key.	 	
10.	The balance weighs the external weight. Do not apply vibration and the like to the balance.		
11.	The measured value is displayed for a few seconds.		
12.	Remove the external weight from the weighing pan.		

13.	<p>The calibration test record will be output after completion.</p> <p>Refer to "Output of calibration test using an external weight" for the output results.</p> <p>When using data memory storage, the results will be stored in the balance.</p> <p>(Refer to "11-2-6. Storing and outputting sensitivity adjustment history" for details.)</p>	 <p>GLP</p> <p>GLP output</p> <p>End</p>	
14.	<p>The balance automatically returns to weighing mode.</p>	 <p>0.000 g</p>	

8. Function Selection Switch and Initialization

8-1. Function selection switch

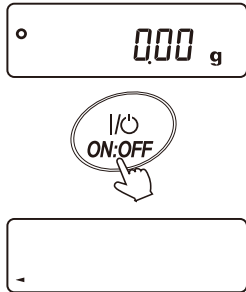
The balance stores data that must not be changed unintentionally (such as adjustment data for accurate weighing, data for adapting to the usage environment, data to control the communications interface, etc.). In order to protect such data, "Function selection switch" is provided and either "prohibit changes " or "allow changes / use" can be selected.

When "prohibit changes" is set, inadvertent data change can be prevented because the function cannot be activated.

The "function selection switch" involves the following functions:

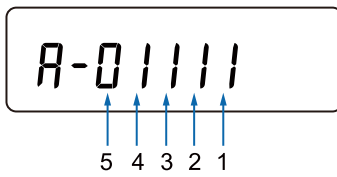
Item	GX-AE / GX-A / GX-AWP series	GF-A / GF-AWP series
Function selection switch	<ul style="list-style-type: none"> - Function table - Sensitivity adjustment using the internal weight - Sensitivity adjustment using an external weight - Internal weight value correction 	<ul style="list-style-type: none"> - Function table - Sensitivity adjustment using an external weight

Setting method

Step	Description	Display and key operations
1.	Press the [ON:OFF] key to turn the display off.	

Function selection switch

(Factory settings display for GX-AE / GX-A / GX-AWP series)

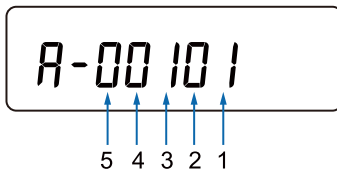


No.	Name	Parameter	Description
1	Function table	0	Prohibit changes to the function table.
		1	Allow changes to the function table.
2	Sensitivity adjustment using the internal weight	0	Prohibit sensitivity adjustment using the internal weight.*1
		1	Allow sensitivity adjustment using the internal weight.
3	Sensitivity adjustment using an external weight	0	Prohibit sensitivity adjustment using an external weight.*1
		1	Allow sensitivity adjustment using an external weight.
4	Automatic sensitivity adjustment	0	Prohibit automatic sensitivity adjustment.
		1	Allow automatic sensitivity adjustment.
5	Internal weight value correction	0	Prohibit internal weight value correction.
		1	Allow internal weight value correction.

■ Factory setting

*1 If *Lock* is set to 1 or 2 for the password lock function, the logged-in Administrator (*ADM^{IN}*) can use it.
A logged-in User (*USER*) or Guest (*GUEST*) cannot use it.
(Refer to "18. Password Lock Function".)

(Factory settings display for GX-AE / GX-A / GX-AWP series)



No.	Name	Parameter	Description
1	Function table	0	Prohibit changes to the function table.
		1	Allow changes to the function table.
2	No function	0	No function.
3	Sensitivity adjustment using an external weight	0	Prohibit sensitivity adjustment using an external weight.*1
		1	Allow sensitivity adjustment using an external weight.
4	No function	0	No function.
5	No function	0	No function.

■ Factory setting

*1 If *Lock* is set to 1 or 2 for the password lock function, the logged-in Administrator (*ADM^{IN}*) can use it.
A logged-in User (*USER*) or Guest (*GUEST*) cannot use it.
(Refer to "18. Password Lock Function".)

8-2. Initialization

This function restores all balance parameters to their factory settings.

8-2-1. Initialization for software version 1.502 or earlier

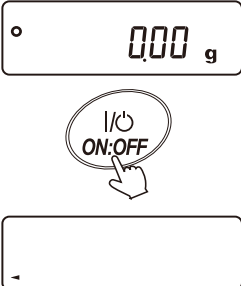
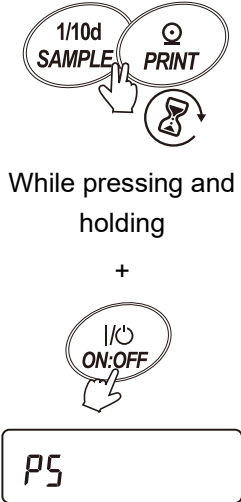
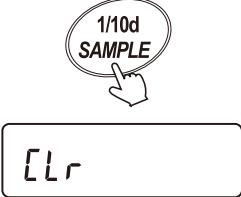
The following data will be reset during initialization:









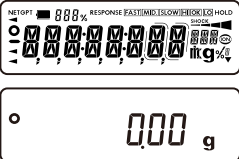
- ☐ Sensitivity adjustment data
- ☐ Function table (excluding password lock function)
- ☐ Unit weight value (for counting mode), 100% reference mass value (for percent mode)
- ☐ Data stored via the data memory function
- ☐ External weight value
- ☐ Function selection switch settings
- ☐ Internal weight correction value (GX-AE / GX-A / GX-AWP series only)

CAUTION

- ☐ After initialization, be sure to perform sensitivity adjustment.
- ☐ After initialization, the order of the year, month, and day may change.

Setting method

Step	Description	Display and key operations
1.	Press the [ON:OFF] key to turn the display off.	
2.	While pressing and holding the [PRINT] and [SAMPLE] keys, press the [ON:OFF] key to show the display shown on the right.	
3.	Press the [SAMPLE] key to show the display shown on the right.	

Step	Description	Display and key operations
4.	Press the [PRINT] key. (To cancel, press the [CAL] key.)	 
5.	Press the [RE-ZERO] key to switch between N_0 and G_0 .	  
6.	Press the [PRINT] key while G_0 is blinking to perform initialization.	 
7.	Upon completion, the balance will automatically return to weighing mode.	 

8-2-2. Initialization (all items) for software version 1.503 or later

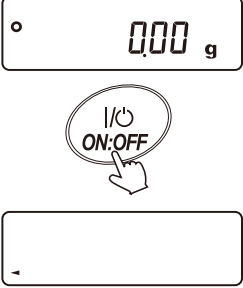
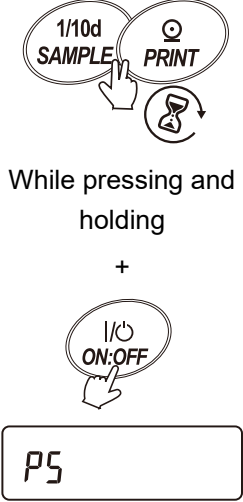
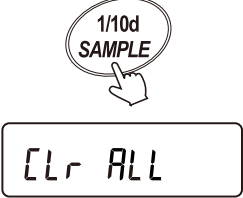
The following data will be reset during initialization:



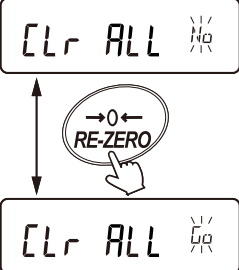





- ☐ Sensitivity adjustment data
- ☐ Function table (excluding password lock function)
- ☐ Unit weight value (for counting mode), 100% reference mass value (for percent mode)
- ☐ External weight value
- ☐ Function selection switch settings
- ☐ Statistical calculation data
- ☐ Internal weight correction value (GX-AE / GX-A / GX-AWP series only)

CAUTION

- ☐ After initialization, be sure to perform sensitivity adjustment.
- ☐ After initialization, the order of the year, month, and day may change.

Setting method

Step	Description	Display and key operations
1.	Press the [ON:OFF] key to turn the display off.	
2.	While pressing and holding the [PRINT] and [SAMPLE] keys, press the [ON:OFF] key to show the display shown on the right.	
3.	Press the [SAMPLE] key to show the display shown on the right.	

Step	Description	Display and key operations
4.	Press the [PRINT] key. (To cancel, press the [CAL] key.)	 
5.	Press the [RE-ZERO] key to switch between N_0 and G_0 .	
6.	Press the [PRINT] key while G_0 is blinking to perform initialization.	 
7.	Upon completion, the balance will automatically return to weighing mode.	  

8-2-3. Initialization (function table only) for software version 1.503 or later











The following data will be reset during initialization:

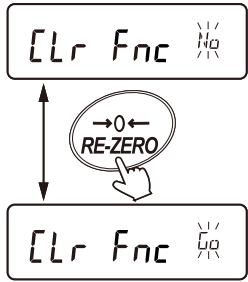
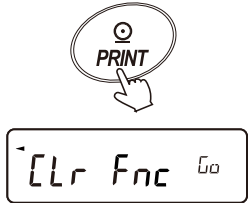
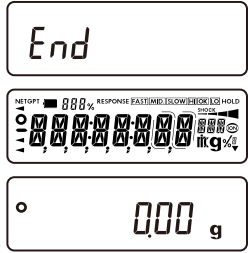
- ☐ Function table (excluding password lock function)
- ☐ Function selection switch settings
- ☐ Statistical calculation data

CAUTION

- ☐ After initialization, the order of the year, month, and day may change.

Setting method

Step	Description	Display and key operations
1.	Press the [ON:OFF] key to turn the display off.	  
2.	While pressing and holding the [PRINT] and [SAMPLE] keys, press the [ON:OFF] key to show the display shown on the right.	 <p>While pressing and holding</p> <p>+</p>  
3.	Press the [SAMPLE] key twice to show the display shown on the right.	 <p>Press twice</p> 
4.	Press the [PRINT] key. (To cancel, press the [CAL] key.)	 

Step	Description	Display and key operations
5.	Press the [RE-ZERO] key to switch between $\overset{\text{N}}{\underset{\text{O}}{\text{O}}}$ and $\overset{\text{U}}{\underset{\text{O}}{\text{O}}}$.	
6.	Press the [PRINT] key while $\overset{\text{U}}{\underset{\text{O}}{\text{O}}}$ is blinking to perform initialization.	
7.	Upon completion, the balance will automatically return to weighing mode.	

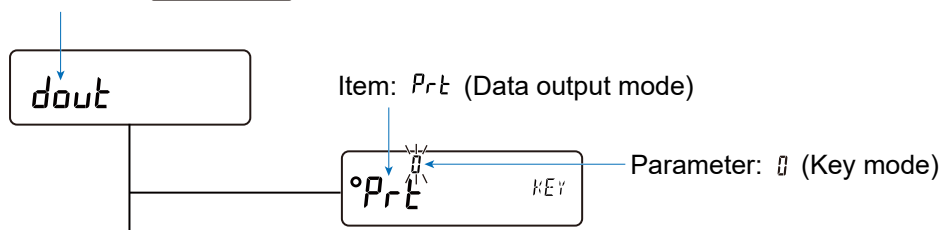
9. Function Table

The function table allows configuration and modification of the balance's operational functions and communication settings.

Set parameters are retained in nonvolatile memory even when the AC adapter is disconnected.

The menu structure of the function table consists of two layers: classes and items. Each item has one parameter assigned to it. The parameter that becomes active for each item is the last one displayed. The updated parameter is applied to the balance operation after pressing the [PRINT] key.

(Example) Class: dout (Data output)





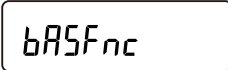

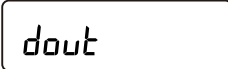

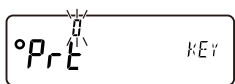

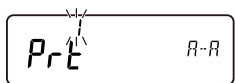
9-1. How to set the function table




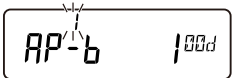




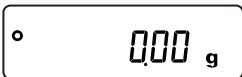
Display and key operation for the function table

	The indicator is displayed with the currently enabled parameter.
	In item setting mode, cancels the setting and advances to the next class. In class setting mode, exits the function table and returns to weighing mode.
	Selects a class / item. In class setting mode, returns to the previous class. In item setting mode, advances to the next item.
	In weighing mode, pressing and holding this key (for 2 seconds) activates the function table menu. (The balance enters the class setting mode.) Selects a class / item. In class setting mode, advances to the next class. In item setting mode, advances to the next item.
	In class setting mode, activates item setting mode. Stores the parameter and advances to the next class.
	In item setting mode, changes the parameter. The last displayed parameter is applied.



Setting method

Example of setting Prt (Data output mode) to I (Auto print mode A) and $RP-b$ (Auto print band width) to $100d$.

Step	Description	Class	Item
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds)  "Environment, Display"	
2.	Press the [SAMPLE] key several times to select the class.	 Press several times  "Data output"	
3.	Press the [PRINT] key to enter the selected class and display the items.		 "Data output mode" "Key mode"
4.	Press the [RE-ZERO] key to change the parameter of the selected item.		 "Data output mode" "Auto print mode A"

Step	Description	Class	Item
5.	Press the [SAMPLE] key several times to select the item.		 <p>Press several times</p>  <p>"Auto print band width" "10 d"</p>
6.	<p>To continue changing settings for other items within the same class, repeat steps 4 and 5.</p> <p>To complete the setting changes for the current class, proceed to step 7.</p>		  <p>"Auto print band width" "100 d"</p>
7.	<p>To store the setting changes, press the [PRINT] key. The display shown on the right will appear, followed by the next class.</p> <p>(To cancel the setting changes, press the [CAL] key to display the next class. The parameters will remain unchanged.)</p>	 <p>"Serial interface"</p>	 
8.	<p>To change settings in a different class, start from step 2.</p> <p>To complete the setting changes and return to weighing mode, press the [CAL] key.</p>	 	

9-2. Function table list

Class	Item	Parameter	Description	
<div> <div> <div></div> <div> <div>bRSFnc</div> <div>Environment, Display</div> <div>[00]</div> </div> </div> </div>	[and Response characteristics	0	Fast response, sensitive value	Can also be changed by manual environment setting.
		■ 1		
		2	Slow response, stable value	
	St-b Stability band width	0	Strict judgment (readability digit ± 1)	If the fluctuation range of the weighing display over a certain period is less than the set parameter value, the value is judged to be stable.
		■ 1		
		2	Lenient judgment (readability digit ± 3)	
	Hold* ¹ Hold function (for 1.502 or earlier)	■ 0	OFF	For weighing animals, etc. Holds display when stable.
		1	ON	
	Hold* ¹ Hold function (for 1.503 or later)	■ 0	OFF	Mode A: For weighing animals, etc. Holds display for 5 seconds after unloading. Mode B: Holds display when stable. Holds display for 5 seconds after unloading.
		1	Mode A (Average hold)	
		2	Mode B (Hold when stable)	
	trc Zero tracking	0	OFF	Keeps zero display by tracking zero drift.
		■ 1	Normal	
		2	Slightly strong	
		3	Strong	
	SPd Display refresh rate	■ 0	Approx. 5 times per second (5.2 Hz)	Updates the display.
		1	Approx. 10 times per second (10.4 Hz)	
		2	Approx. 20 times per second (20.8 Hz)	

■ Factory setting

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

*¹ This function's settings vary depending on the software version.

Class	Item	Parameter	Description	
Environment, Display (continued) [00]	P_{nt} Decimal separator	■ 0	Period (.)	Sets the symbol used as a decimal separator for display and output.
		1	Comma (,)	
	P_{-on} Auto display-ON	■ 0	OFF	Turns on the weighing mode display when the AC adapter is connected.
		1	ON	
	P_{-off} Auto display-OFF	■ 0	OFF	Turns off the display after 10 minutes of inactivity.
		1	Enabled (10 minutes)	
	r_{nd} Readability digit	■ 0	Show readability digit	Displayed at the start of weighing
		1	Hide readability digit	
	<div>$bEEP$</div> Buzzer	0	OFF	The buzzer sounds when keys or other operations are performed.
		■ 1	ON	
	P_{-ZERO} Display when power turned on	■ 0	Off: Displays zero when power is turned on	
		1	On: Displays the last measured value when power is turned on	
	$d_{ISP-LED}$ Backlight brightness	0 to 9	10 % to 100 %	
		■ 5	60 % (factory default)	
$LV-LED$ Bubble spirit level LED	0	OFF	LED for the bubble spirit level	
	■ 1	ON		
i_{SD} Impact shock detection	0	OFF	Impact level display	
	■ 1	ON		
<div>$CL Adj$</div> Clock [01]	Refer to "9-4. Clock and calendar function".			Confirms and sets the time and date. The time and date are added to output data.

■ Factory setting

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

Class	Item	Parameter	Description		
<div><div>CP Fnc</div><div>Comparator</div><div>[02]</div></div>	[P Comparator mode	■ 0	No comparison (Comparator function disabled)		
		1	Compares when stable or overloaded		
		2	Continuous comparison		
	[P-t Number of comparator stages	■ 0	3-stage comparator	HI, OK, LO	
		1	5-stage comparator	HH, HI, OK, LO, LL	
	[P-z Near zero	0	Comparison including near zero		
		1	Comparison excluding ±5 d		
		■ 2	Comparison excluding ±10 d		
		3	Comparison excluding ±20 d		
		4	Comparison excluding ±50 d		
		5	Comparison excluding ±100 d		
	[P-P Polarity	0	Positive only		
		1	Negative only		
		■ 2	Bipolar		
	[P-R Comparison results	■ 0	OFF	Comparison results can be added to output data. Use this mode with A&D standard format (0 for tYPE under 5 iF).	
		1	ON		
	[P-in Input method	■ 0	Sets upper and lower limits: Digital input	[P HH, [P H i, [P L o, and [P LL under [P bEEP are available.	
		1	Sets upper and lower limits: Input by load		
		2	Sets reference value: Digital input	[P rEF, [P LMt, and [P LMt2 under [P bEEP are available.	
		3	Sets reference value: Input by load		
	[P-Frd Flow comparator	■ 0	Compares by flow rate		
		1	Compares by weighing value (in grams)		
	[P-b Enlarged comparator display	■ 0	OFF	When enabled, the comparator status (LO, OK, or HI) is prominently displayed on the weighing value display.	
		1	ON		

■ Factory setting

"d" represents scale division.

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

Class	Item	Parameter	Description
<div>CP VALUE</div> Comparator value [03]	CP HH Second upper limit	Refer to "9-5. Comparator function overview".	Available when 0 or 1 is set for CP _{in} under CP Fnc .
	CP HI Upper limit		
	CP LO Lower limit		CP HH and CP LL are available when 1 is set for CP-t under CP Fnc .
	CP LL Second lower limit		
	CP rEF Reference value		Available when 2 or 3 is set for CP _{in} under CP Fnc .
	CP LMt Tolerance value		CP LMt2 is available when 1 is set for CP-t under CP Fnc .
	CP LMt2 Second tolerance value		
<div>CP bEEP</div> Comparator buzzer*2 [04]	bEP HH HH buzzer	0 OFF	Available when 1 is set for CP-t under CP Fnc .
		1 ON	
	bEP HI HI buzzer	0 OFF	
		1 ON	
	bEP OK OK buzzer	0 OFF	
		1 ON	
	bEP LO LO buzzer	0 OFF	
		1 ON	
	bEP LL LL buzzer	0 OFF	Available when 1 is set for CP-t under CP Fnc .
		1 ON	

■ Factory setting

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

*2 Built-in buzzer: Approx. 40 dB at a distance of 1 m

GXA-04 board buzzer (when the GXA-04 comparator output is installed): Approx. 56 dB at a distance of 1 m)

Class	Item	Parameter	Description	
<div> <div>dout</div> Data output [05] </div>	<div> Print Data output mode </div>	<div> <div>1</div> </div>	Key mode	Outputs data with the [PRINT] key when the weighing value is stable.
		<div> <div>1</div> </div>	Auto print mode A: (Reference = zero)	Outputs data when the weighing value is stable and exceeds the range from the zero point to the values set for $RP-P$ and $RP-b$ under <div>dout</div> .
		<div> <div>2</div> </div>	Auto print mode B: (Reference = the latest stable value)	Outputs data when the weighing value is stable and exceeds the range from the latest stable value to the values set for $RP-P$ and $RP-b$ under <div>dout</div> .
		<div> <div>3</div> </div>	Stream mode	Outputs data at the specified display refresh rate.
		<div> <div>4</div> </div>	Key mode B: Immediate output	Outputs data with the [PRINT] key regardless of whether the weighing value is stable or not.
		<div> <div>5</div> </div>	Key mode C: Outputs when stable	If the weighing value is stable, outputs data immediately with the [PRINT] key. If the weighing value is not stable, outputs data once it has stabilized.
		<div> <div>6</div> </div>	Interval output mode	Outputs data periodically as set for int under <div>dout</div> .
		<div> <div>7</div> </div>	Auto print mode C: When the comparison result is OK	Outputs data when the comparison result is OK, and the value is stable and exceeds the range from the zero point to the values set for $RP-P$ and $RP-b$ under <div>dout</div> .

■ Factory setting

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. [Outputting the function table information](#)".

Class	Item	Parameter	Description	
<div>dout</div> Data output [05] (continued)	<i>RP-P</i> Auto print polarity	<div> <div>0</div> Positive only </div>	If greater than the reference.	
		<div> <div>1</div> Negative only </div>	If less than the reference.	
		<div> <div>2</div> Bipolar </div>	Regardless of whether greater or less than the reference.	
	<i>RP-b</i> Auto print band width	<div> <div>0</div> 10 d </div>	Select difference from the reference.	
		<div> <div>1</div> 100 d </div>		
		<div> <div>2</div> 1000 d </div>		
	<i>dAtA</i> Data memory	<div> <div>0</div> OFF </div>	Refer to "11. Data Memory".	
		<div> <div>1</div> Stores unit weight values </div>		
		<div> <div>2</div> Stores weighing data / sensitivity adjustment history </div>		
		<div> <div>3</div> Stores comparator setting values </div>		
		<div> <div>4</div> Stores tare values </div>		
	<i>int</i> Interval time	<div> <div>0</div> Display refresh rate </div>	Used when <i>b</i> is set for <i>Prt</i> under <div>dout</div> .	
		<div> <div>1</div> Every 2 seconds </div>		
		<div> <div>2</div> Every 5 seconds </div>		
		<div> <div>3</div> Every 10 seconds </div>		
		<div> <div>4</div> Every 30 seconds </div>		
		<div> <div>5</div> Every 1 minute </div>		
		<div> <div>6</div> Every 2 minutes </div>		
		<div> <div>7</div> Every 5 minutes </div>		
		<div> <div>8</div> Every 10 minutes </div>		
	<i>d-na</i> Data number	<div> <div>0</div> No output </div>	Used when <i>2</i> is set for <i>dAtA</i> under <div>dout</div> .	
		<div> <div>1</div> Outputs data number </div>		
	<i>5-td</i> Time / date output	<div> <div>0</div> No output </div>	Refer to "9-4. Clock and calendar function" for the settings of the output time and date.	
		<div> <div>1</div> Outputs time </div>		
		<div> <div>2</div> Outputs date </div>		
	<i>5-id</i> ID number output	<div> <div>0</div> No output </div>	Select the output of the ID number during data output.	
		<div> <div>1</div> Outputs ID number </div>		

■ Factory setting

"d" represents scale division.

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

Class	Item	Parameter	Description	
<div>dout</div> Data output [05] (continued)	<i>PUSE</i> Data output pause	<div> <div>■</div> <div>0</div> </div>	OFF	Sets a pause until data output.
		<div> <div></div> <div>1</div> </div>	ON (Adds 1.6 seconds)	
	<i>RL-F</i> Auto feed	<div> <div>■</div> <div>0</div> </div>	OFF	Sets a line feed after data output.
		<div> <div></div> <div>1</div> </div>	ON (Adds one line)	
	<div>inFa</div> GLP output	<div> <div>■</div> <div>0</div> </div>	OFF	(Refer to "10-3. GLP output".)
		<div> <div></div> <div>1</div> </div>	ON: Internal clock data	
		<div> <div></div> <div>2</div> </div>	ON: External device clock data	
	<i>RR-d</i> Auto re-zero after data output	<div> <div>■</div> <div>0</div> </div>	OFF	Function to automatically set to zero after data output.
		<div> <div></div> <div>1</div> </div>	ON	
	<i>UFC</i> UFC function	<div> <div>■</div> <div>0</div> </div>	OFF	Refer to "23-8. UFC function".
		<div> <div></div> <div>1</div> </div>	ON	
<div>5,IF</div> Serial interface [06]	<i>ModE</i> Connection	<div> <div>■</div> <div>0</div> </div>	PC	
		<div> <div></div> <div>1</div> </div>	Printer	Available when 0 or 1 is set for <i>TYPE</i> under <div>5,IF</div> .
		<div> <div></div> <div>2</div> </div>	Remote display	Stream output is enabled when 0 (A&D standard format) is set for <i>TYPE</i> under <div>5,IF</div> .
	<div>bPS</div> Baud rate	<div> <div></div> <div>0</div> </div>	600 bps	
		<div> <div></div> <div>1</div> </div>	1200 bps	
		<div> <div>■</div> <div>2</div> </div>	2400 bps	
		<div> <div></div> <div>3</div> </div>	4800 bps	
		<div> <div></div> <div>4</div> </div>	9600 bps	
		<div> <div></div> <div>5</div> </div>	19200 bps	
		<div> <div></div> <div>6</div> </div>	38400 bps	
	<div>bLPr</div> Data bit, parity bit	<div> <div>■</div> <div>0</div> </div>	7 bits, even	
		<div> <div></div> <div>1</div> </div>	7 bits, odd	
		<div> <div></div> <div>2</div> </div>	8 bits, none	
	<div>CrLF</div> Terminator	<div> <div>■</div> <div>0</div> </div>	CR LF	CR: Carriage return (ASCII 0Dh) LF: Line feed (ASCII 0Ah)
		<div> <div></div> <div>1</div> </div>	CR	

■ Factory setting

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

Class	Item	Parameter	Description	
<div>5 iF</div> Serial interface [06] (continued)	TYPE Data format	0	A&D standard format	Refer to "9-6-3. 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 Command timeout	0	No limit	The wait time to receive a command.
		1	Limits to one second	
ErrCd AK, Error code	0	OFF	AK: Acknowledgement (ASCII 06h)	
	1	ON		
<div>U5b</div> USB interface [07]	UFnc USB function mode	0	Quick USB	Refer to "23-2. Quick USB mode".
		1	Bidirectional USB virtual COM	Refer to "23-3. Virtual COM mode".
	U-TP USB data format*3	0	A&D standard format	Refer to "9-6-3. Weighing data format".
		1	NU format	
		2	CSV format	
		3	TAB format	
		4	NU2 format	
<div>aP-5 iF</div> Optional serial interface [08]		Available only when GXA-03 (RS-232C interface, isolated type) is installed. (For details, refer to the GXA-03 / GXA-04 / GXA-06 Instruction Manual .)		
<div>Rout</div> Analog output [09]		Available only when GXA-06 (analog voltage output) is installed. (For details, refer to the GXA-03 / GXA-04 / GXA-06 Instruction Manual .)		

■ Factory setting

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

*3 The available formats for Quick USB mode depend on the software version.

For software versions 1.502 and earlier, the format set in the USB data format setting is used. For software versions 1.503 and later, the format is fixed to NU2.

Class	Item	Parameter	Description	
<div>Application</div> <div>[10]</div>	<div>APPF</div> <div>Application mode</div>	<div>■</div> <div>0</div>	Normal weighing mode	
		1	Capacity indicator mode	
		2	Statistical calculation mode	
		3	Flow rate display (FRD) mode	
		4	Gross, net, tare mode	
	<div>SEAF</div> <div>Statistical function mode output items</div>	<div>■</div> <div>0</div>	Number of data instances, sum	
		1	Number of data instances, sum, max, min, range (max-min), mean	
		2	Number of data instances, sum, max, min, range (max-min), mean, standard deviation, coefficient of variation	
		3	Number of data instances, sum, max, min, range (max-min), mean, standard deviation, coefficient of variation, relative error	
	<div>FRD Unit</div> <div>Unit of flow rate</div>	<div>■</div> <div>0</div>	g/s: grams per second	Refer to "13. Flow Rate Display (FRD) Function".
		1	g/m: grams per minute	
		2	g/h: grams per hour	
		3	mL/s: milliliters per second	
		4	mL/m: milliliters per minute	
		5	mL/h: milliliters per hour	
	<div>Auto</div> <div>Automatic calculation time setting</div>	<div>■</div> <div>0</div>	OFF	
		1	ON	
<div>Minimum weight alert function</div> <div>[11]</div>	<div>MW-CP</div> <div>Minimum weight comparison</div>	<div>■</div> <div>0</div>	No comparison	Disables the minimum weight alert function.
		1	Enables comparison	Excluding near zero.
		2	Enables comparison	Including near zero.
	<div>MW</div> <div>Minimum weight input</div>	Refer to "15. Minimum Weight Alert Function".		
	<div>Min out</div> <div>Data output when minimum weight is not reached.</div>	0	OFF	Refer to "15. Minimum Weight Alert Function".
		<div>■</div> <div>1</div>	ON	

■ Factory setting

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

Class	Item	Parameter	Description	
Unit Unit [12]			Refer to "9-8. Unit storing overview".	
d5 Fnc Density measurement function [13]	Ld in Liquid density input	■ 0	Water temperature input	Displayed only when density mode is registered under Unit. Refer to "17. Density (Specific Gravity) Measurement".
		1	Density input	
	d5 Density measurement mode	■ 0	Solids	
		1	Liquids	
MLL Programmable unit (Multi-unit) [14]		Sets an arbitrary coefficient. Refer to "4-1-2. Programmable unit".		Displayed only when programmable unit is registered under Unit.
id ID number setting [15]			Refer to "10-2. Setting the ID number".	
PASSwd Password lock [16]	Lock Lock function	■ 0	OFF	Refer to "18. Password Lock Function".
		1	On: Restricts weighing operation	
		2	On: Allows basic weighing operation	
	PASS Na Password registration	ADMIN	Administrator password entry	
		USER 01 to USER 10	User 01 password entry to User 10 password entry	

■ Factory setting

The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

Class	Item	Parameter	Description	
<div>Auto CAL</div> <div>Automatic sensitivity adjustment [17]</div>	[Fnc] Sensitivity adjustment mode	■ 0	Temperature change	Refer to "7-1. Automatic sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)".
		1	Set time	
		2	Interval time	
	[t ME 1] Set time 1	Refer to "7-1. Automatic sensitivity adjustment (GX-AE / GX-A / GX-AWP series only)".		
[t ME 2] Set time 2				
[t ME 3] Set time 3				
[int] Sensitivity adjustment intervals	Refer to "Correspondence table for automatic sensitivity adjustment intervals".			
<div>ErFnc</div> <div>Extensions</div>		This setting is available only when the extension is enabled in WinCT-GXA-Filter. (For details, refer to the WinCT-GXA-Filter Instruction Manual.)		
<div>IonFnc</div> <div>Ionizer*4 [20]</div>	ion Static elimination duration	■ 0	1 second	
		1	3 seconds	
		2	10 seconds	
		3	Manual: up to 10 minutes (Only external control is enabled.) (IR switch on the main unit is disabled.)	
	Ex SW External input function	0	[ION] key (IR switch on the main unit is disabled.)	
		■ 1	[PRINT] key (when AX-SW137-PRINT is connected) [RE-ZERO] key (when AX-SW137-REZERO is connected)	
<div>Ex SW</div> <div>External IR switch [21]</div>		Available only when GXA-26 (external IR switch) is installed. (For details, refer to the GXA-26 Instruction Manual .)		
<div>[5 in]</div> <div>Internal weight correction*5 [18]</div>	Auto	Automatic input	Refer to "7-5-1. Correcting the internal weight value - AUTO (GX-AE/GX-A/GX-AWP series only)".	
	MANUAL	Digital input of correction value	Refer to "7-5-2. Correcting the internal weight value - MANUAL (GX-AE/GX-A/GX-AWP series only)".	

■ Factory setting

*4 Available only on the GX-AE series.

*5 Displayed only on GX-AE, GX-A, and GX-AWP series.



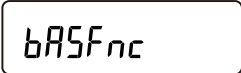

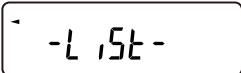


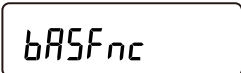
The number in [] is the classification number. It is output as an identifier when outputting function table information in bulk. Refer to "9-2-1. Outputting the function table information".

9-2-1. Outputting the function table information

The function table allows configuration of the balance's operation to suit the intended usage.

In the menu structure of the function table, items are included in each class, and a parameter is stored for each item. The function table information can be output in bulk by the following operation so that the settings when the balance is used can be recorded.

Bulk output of the function table information

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press and hold the [PRINT] key (for 2 seconds). The display on the right will appear, and the current function table information will be output in bulk.	 Press and hold (for 2 seconds)   Data output  

Output example (AD-8127, dump print mode)

<pre> A & D ← 1 MODEL GX-6002A ← 2 S/N T2000112 ← 3 ID LAB-012345678 ← 4 DATE 2019/01/22 ← 5 TIME 16:29:35 ← 6 ----- 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:LV-LEd 01 00:iSd 01 : : : : ----- 10:APF 00 10:StAF 00 10:Frd Unit 00 10:Ct AUto 00 ----- 11:MW-CP 00 11:MW 00000.00 g 11:Min out 01 ----- 16:Lock 00 ----- 17:CFnc 00 17:Cint 00 ----- END </pre>	<p>1 Manufacturer</p> <p>2 Model</p> <p>3 Serial number</p> <p>4 ID</p> <p>5 Date</p> <p>6 Time</p> <p>7 Classification number (2 characters)</p> <p>8 Item (8 characters)</p> <p>9 Parameter (2 or 12 characters)</p> <p>5, 6: Clock of the balance</p> <p>7, 8, 9: Separated by commas.</p> <p>For details on the class number, item, and parameter, refer to "9-2. Function table list" in "9. Function Table".</p>
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Output example 1. Outputting the function table information to a printer

Use an AD-8127 multi-functional compact printer or AD-8129TH compact thermal printer.

Step	Description
1.	Connect the balance and the printer. When using the AD-8127 or AD-8129TH, set the print mode to <code>DUMP</code> . For details on the settings and print modes, refer to the instruction manual of the printer. For details on connecting the balance and the printer, refer to " 21. Connection with Peripheral Devices ".
2.	Ensure that communication between the balance and the printer is established, then perform the output operation according to the procedure described in the previous section, " Bulk output of the function table information ".


Output example 2. Outputting the function table information to a PC

For details on USB settings and WinCT, refer to "[21. Connection with Peripheral Devices](#)" and "[23. Connecting to a PC](#)", or the separate WinCT Instruction Manual available on the A&D website (<https://www.aandd.jp>).

Step	Description
1.	Connect the balance and the PC using the supplied USB cable or RS-232C cable (sold separately) CAUTION <input type="checkbox"/> When using USB, be sure to use Virtual COM mode. Output is not possible in Quick USB mode.
2.	Install WinCT software on the PC. WinCT is available for download from the A&D website (https://www.aandd.jp).
3.	Start RSCom and match the communication settings such as COM port and baud rate with the balance. Clicking the [Start] button enables communication.
4.	Ensure that communication between the balance and the PC is established, then perform the output operation according to the procedure described in the previous section, " Bulk output of the function table information ".

9-3. Environment, Display overview

[*and*] (Condition): Description


$[and] = 0$	Sensitive response to fluctuation of a weighing value For powder or liquid target weighing, weighing a very light sample, or when work efficiency is required rather than display stability, set the parameter to be a small value. ^{*1} When set, FAST is displayed.
	
$[and] = 2$	Slow response to fluctuation of a weighing value. If the weighing value tends to be unstable due to environmental factors, increase the parameter value. When set, SLOW is displayed. ^{*1}

^{*1} Note that this setting is also used to set the averaging time if "Hold function" is set to ON.

St-b (Stability band width): Description

This item is to control the width to regard a weighing value as a stable value. When the fluctuation range of the weighing value within a certain period falls below the set parameter, the balance displays the stabilization indicator and outputs the weighing value. This setting influences "auto print mode". The readability being displayed is 1 d.

Example: For the GX-6002A, if 0.1 g display is selected with the [SAMPLE] key, 0.1 g is 1 d.


$St-b = 0$ (± 1 d)	The stabilization indicator will not appear unless the weighing value is sufficiently stable, and even slight fluctuations will cause it to disappear. To apply stricter stability judgment, decrease the parameter value. ^{*2}
	
$St-b = 2$ (± 3 d)	The stabilization indicator becomes less responsive to minor load fluctuations. If the weighing value tends to be unstable due to environmental factors, increase the parameter value. ^{*2}

^{*2} Note that this setting is also used to set the averaging time if "Hold function" is set to ON.

HOLD (Hold function), animal weighing mode: Description [Software version 1.502 or earlier]

This function is used to weigh moving objects such as live animals.*3

When the weighing value exceeds the animal weighing range from zero and the fluctuation is within the stability band width over the averaging time, the balance displays the processing indicator and then the average value fixed as the weighing result. After the animal is removed from the weighing pan, the display automatically returns to zero. This function operates only when the parameter is set to 1 (ON) and a unit / mode other than counting mode is selected. (Animal weighing indicator "HOLD" is lit.) The averaging time and stability band can be configured via Land (Response characteristics) and St-b (Stability band width) in the function table ("9. Function Table").

Animal weighing range		Averaging time		Stability band width	
0.0001 g model	0.0200 g or more	$\text{Land} = 0$	2 seconds (Optimized for faster response)	$\text{St-b} = 0$	Small 6.25%
0.001 g model	0.200 g or more	$\text{Land} = 1$	4 seconds	$\text{St-b} = 1$	 12.5%
0.01 g model	2.00 g or more	$\text{Land} = 2$	8 seconds (Optimized for higher accuracy)	$\text{St-b} = 2$	Large 16.7%
0.1 g model	20.0 g or more				


*3 The GXA-12 (animal weighing bowl kit) can be installed on all models except for 0.0001 g models, GX-203A, GF-203A, and GF-123A.

HOLD (Hold function), animal weighing mode: Description [Software version 1.503 or later]

Mode A (Average hold, animal weighing)

This function is used to weigh moving objects such as live animals.*3

When the weighing value exceeds the animal weighing range from zero and the fluctuation is within the stability band width over the averaging time, the balance displays the processing indicator and then the average value as the weighing result. After the animal or sample is removed from the weighing pan, the display holds the value for 5 seconds before automatically returning to zero*4. This function operates only when the parameter is set to 1 (ON) and a unit / mode other than counting mode is selected. (Animal weighing indicator "HOLD" is lit.) The averaging time and stability band can be configured via \bar{L}_{and} (Response characteristics) and $St-b$ (Stability band width) under $bASFnC$ (Environment, Display) in the function table ("9. Function Table").

Animal weighing range		Averaging time		Stability band width	
0.0001 g model	0.0200 g or more	$\bar{L}_{and} = 0$	2 seconds (Optimized for faster response)	$St-b = 0$	Small 6.25%
0.001 g model	0.200 g or more	$\bar{L}_{and} = 1$	4 seconds	$St-b = 1$	 12.5%
0.01 g model	2.00 g or more	$\bar{L}_{and} = 2$	8 seconds (Optimized for higher accuracy)	$St-b = 2$	Large 16.7%
0.1 g model	20.0 g or more				

*3 The GXA-12 (animal weighing bowl kit) can be installed on all models except for 0.0001 g models, GX-203A, GF-203A, and GF-123A.

Mode B (Hold when stable) [Software version 1.503 or later]

When the weighing value exceeds the same weighing range from zero as Mode A, the balance displays the stability indicator and locks the weighing value display.

After the object is removed from the weighing pan, the display holds the value for 5 seconds before automatically returning to zero*4. This function operates only when a unit / mode other than counting mode is selected.

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

CAUTION

- ❑ This function cannot be used in conjunction with the flow rate display (FRD) function.
- ❑ This function cannot be used if \bar{V} (Store Tare Value) is set for $dMEm$ (Data memory) under $dout$ (Data output).

Zero (Zero tracking): Description

This function tracks zero point drift caused by changes in the environment and stabilizes the zero point.

The degree of tracking can be selected from three levels.

If zero is not stable, increase the parameter.

To check weighing values that are only a few "d" from the zero point, disable zero tracking.

"d" represents scale division.

Zero set to 0 : Tracking function is not used.

Zero set to 1 : Normal zero tracking is used. (± 1 d / 1 second)

Zero set to 2 : Slightly strong zero tracking is used. (± 1 d / 0.5 seconds)

Zero set to 3 : Strong zero tracking is used. (± 1 d / 0.2 seconds)

SPd (Display refresh rate): Description

The periodic time to refresh the display.

This timing also applies to data output. This parameter influences "baud rate", "data output pause" and the data output rate of "stream mode". It is automatically selected based on changes in weighing speed.

Pnt (Decimal separator): Description

A symbol used as a decimal separator (point / comma) can be selected.

P-on (Auto display-ON): Description

When the AC adapter is plugged in, the display is automatically turned on without pressing the [ON:OFF] key and the balance enters weighing mode. This function is used when the balance is built into an automated system. However, for accurate weighing, the balance must be powered on for at least 30 minutes before use (at least one hour for 0.0001 g models).

P-off (Auto display-OFF): Description

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

rd (Readability digit): Description

The readability digit can be hidden without key operation for lower resolution weighing. This feature is especially useful when the balance is integrated into automated systems.

bEEP (Buzzer): Description

Selects the on / off setting for the built-in buzzer that sounds when a key is operated or the state changes.

P-zero (Display when power turned on): Description

The balance starts from the previous weighing value without automatically zeroing the display when the power is turned on. This is useful when a hopper or other device is attached to the weighing pan and the power must be turned off during discharge weighing.

dSP-LEd (Backlight brightness): Description

Selects the brightness level of the LCD display's backlight.

LV-LED (Bubble spirit level LED): Description

Selects the on / off setting for the LED that illuminates the bubble spirit level.

ISd (Impact shock detection): Description

Selects the on / off setting for the impact level display function.

Even when this function is turned off, impact events are still recorded internally by the balance.

9-4. Clock and calendar function

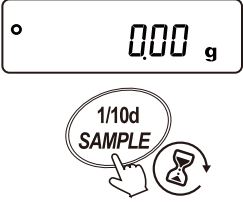
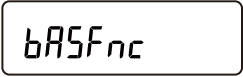




The balance is equipped with a built-in clock and calendar function. This mode allows for checking and setting the date and time. To add the time and date to the output of the weighing value, set 1 (Outputs time), 2 (Outputs date), or 3 (Outputs time and date) for 5-td (Time / date output) under dout (Data output) in the function table ("9. Function Table"). To add the time and date to "GLP report", "title block", and "end block", set 1 (ON: Internal clock data) or 2 (ON: External device clock data) for inFd (GLP output) under dout (Data output).

CAUTION



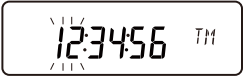



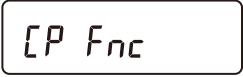
- ❑ Do not enter invalid values such as a non-existing date when setting the time and date.
The balance displays rtc Pf when the clock backup battery has been depleted.
Battery replacement will be repaired by your local A&D dealer. Even if the backup battery of the clock runs out, it does not affect the functions other than the clock and calendar function. The clock and calendar function works normally if the balance is powered with the AC adapter.
Press any key to set the time and date.

The time and date can be checked / changed by the following operations.

Entering time / date confirmation mode

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>Press and hold (for 2 seconds)</p> 
2.	Press the [SAMPLE] key to show the display shown on the right.	 
3.	Press the [PRINT] key to check the time.	 









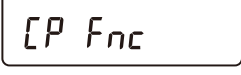
Checking the time

Step	Description	Display and key operations
4.	<p>The current time is displayed. (All digits blinking)</p> <p>Use the following key operations as needed:</p> <ul style="list-style-type: none"> To change the time, press the [RE-ZERO] key. Proceed to step 5, "Setting the time". To check the date, press the [SAMPLE] key. Proceed to step 7, "Checking the date". To complete the setting, press the [CAL] key. Proceed to step 10, "Finishing checking / setting". 	   To " Setting the time "   To " Checking the date "   To " Finishing checking / setting "

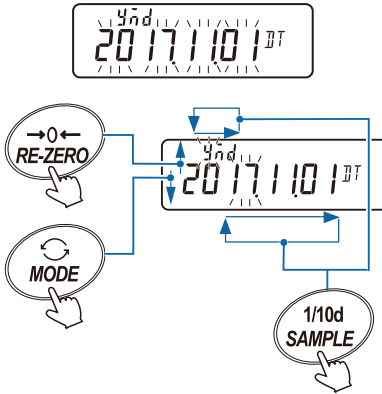
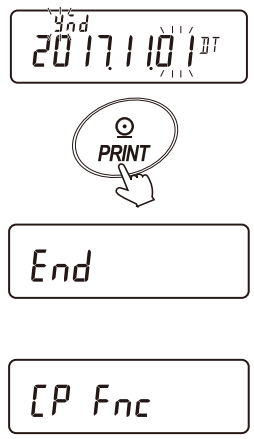
Setting the time

Step	Description	Display and key operations
5.	<p>Set the time using the following keys. (24-hour format)</p> <p>[RE-ZERO] key..... Changes the value of the blinking digit. (+1)</p> <p>[MODE] key Changes the value of the blinking digit. (-1)</p> <p>[SAMPLE] key Selects the digit to blink.</p>	
6.	<p>Press the [PRINT] key to save the updated time. (To cancel, press the [CAL] key.)</p> <p>Proceed to step 7, "Checking the date".</p>	

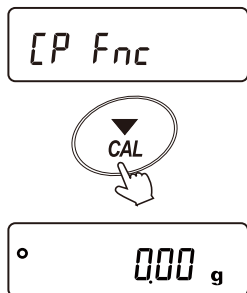
Checking the date

Step	Description	Display and key operations
7.	<p>The current date is displayed. (All digits blinking)</p> <p>Use the following key operations as needed:</p> <ul style="list-style-type: none"> To change the order of year [last two digits] (\bar{y}), month (\bar{n}) and day (\bar{d}), press the [MODE] key. <p>The date will be output in the specified order.</p>	  <p>Each press changes the display.</p>  <p>The display repeats in this cycle.</p>
	<ul style="list-style-type: none"> To change the date, press the [RE-ZERO] key. <p>Proceed to step 8, "Setting the date".</p>	  <p>To "Setting the date"</p>
	<ul style="list-style-type: none"> To confirm the time again, press the [SAMPLE] key. <p>Proceed to step 4, "Checking the time".</p>	  <p>To "Checking the time"</p>
	<ul style="list-style-type: none"> To complete the setting, press the [CAL] key. <p>Proceed to step 10, "Finishing checking / setting".</p>	  <p>To "Finishing checking / setting"</p>

Setting the date

Step	Description	Display and key operations
8.	<p>Set the date using the following keys.</p> <p>(The year is set with the last 2 digits of the year as per Western calendar)</p> <p>[RE-ZERO] key Changes the value of the blinking digit. (+1)</p> <p>[MODE] key Changes the value of the blinking digit. (-1)</p> <p>[SAMPLE] key Selects the digit to blink.</p>	
9.	<p>Press the [PRINT] key to save the updated time. (To cancel, press the [CAL] key.)</p> <p>Proceed to step 10, "Finishing checking / setting".</p>	 <p>To "Finishing checking / setting"</p>

Finishing checking / setting

Step	Description	Display and key operations
10.	<p>The next item in the function table, [P Fnc], will be displayed.</p> <p>Press the [CAL] key to return to weighing mode.</p>	

9-5. Comparator function overview

By setting the judgment threshold and comparison conditions in the function table of the balance, the weighing value can be compared in 3 or 5 stage comparator.

With the GXA-04 (Comparator output, sold separately), the comparison results can be output to the contact.

CAUTION

- When $\overline{3}$ (Flow rate display (FRD) mode) is set for \overline{APP} (Application mode) under $\overline{APP Fnc}$ (Application) in the function table ("9. Function Table"), the comparator function compares the flow rate value at the factory settings. If $\overline{1}$ (Compares by weighing value in grams) is set for $\overline{CP-Frd}$ (Flow comparator) under $\overline{CP Fnc}$ (Comparator) in the function table ("9. Function Table"), comparisons by weighing value with g unit can be performed even in FRD mode.

Enabling the comparator function

Step	Description
1.	<p>Select the comparator range for \overline{CP} (Comparator mode) under $\overline{CP Fnc}$ (Comparator) in the function table ("9. Function Table").</p> <ul style="list-style-type: none"> □ \overline{CP} set to $\overline{0}$ (No comparison) □ \overline{CP} set to $\overline{1}$ (Compares when stable or overloaded) □ \overline{CP} set to $\overline{2}$ (Continuous comparison)
2.	<p>Set the comparison conditions for each item under $\overline{CP Fnc}$ (Comparator) in the function table ("9. Function Table").</p> <p>(Refer to $\overline{CP Fnc}$ in "9-2. Function table list" for details.)</p>
3.	<p>Set the comparator threshold values under $\overline{CP VALUE}$ (Comparator value) in the function table ("9. Function Table").</p> <p>CAUTION</p> <ul style="list-style-type: none"> □ The items displayed under $\overline{CP VALUE}$ (Comparator value) vary depending on the configuration of $\overline{CP-t}$ (Number of comparator stages) and $\overline{CP in}$ (Input method) under $\overline{CP Fnc}$ (Comparator).
4.	<p>Set the comparator buzzer settings under $\overline{CP bEEP}$ (Comparator buzzer) in the function table ("9. Function Table"), as needed.*¹</p> <p>CAUTION</p> <ul style="list-style-type: none"> □ The items displayed under $\overline{CP bEEP}$ (Comparator buzzer) vary depending on the configuration of $\overline{CP-t}$ (Number of comparator stages) under $\overline{CP Fnc}$ (Comparator). <p>*¹ Built-in buzzer: Approx. 40 dB at a distance of 1 m GXA-04 board buzzer (when the GXA-04 comparator output is installed): Approx. 56 dB at a distance of 1 m)</p>

Step	Description
5.	<p>For detailed setting examples, refer to the following descriptions in "9-5-1. Comparator setting examples":</p> <p>Example 1 (Digitally inputting upper and lower limit values)</p> <p>Example 2 (Digitally inputting reference value / tolerance range)</p> <p>Example 3 (Inputting upper / lower limit values by load)</p>

9-5-1. Comparator setting examples

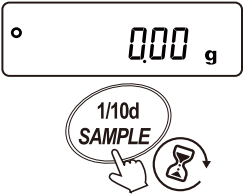
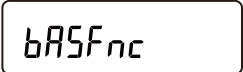



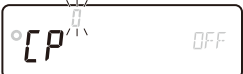

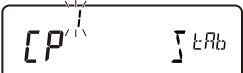



Example 1 (Digitally inputting upper and lower limit values)

Settings



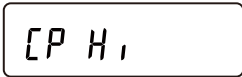


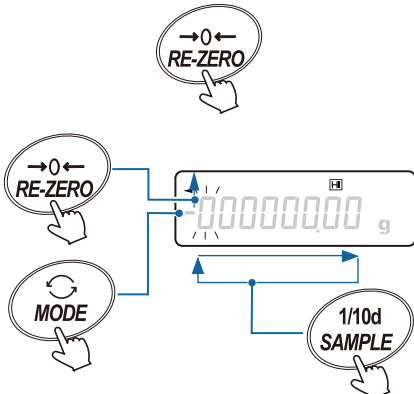



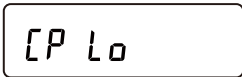


- ☐ 3-stage comparator (factory setting)
- ☐ Comparison excluding near zero ± 10 d (factory setting)*1
- ☐ Comparison when stable or overloaded
- ☐ Upper limit value: 1000.50 g
- ☐ Lower limit value: 999.50 g

*1 "d" represents scale division.

Selecting a comparison method (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>Press and hold (for 2 seconds)</p> 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 
3.	Press the [PRINT] key.	 
4.	Press the [RE-ZERO] key several times until  (Comparison when stable or overloaded) appears for [P (Comparator mode).	
5.	Press the [PRINT] key to store the selected setting.	  

Inputting upper / lower limit values (changing the function table configuration)

Step	Description	Display and key operations
6.	When the display shown on the right appears, press the [PRINT] key.	 
7.	<div>CP H, appears.</div> <div>(If 1 is set for CP-L, CP HH appears.)</div> <div>Press the [PRINT] key.</div>	 
8.	<div>The currently set upper limit value is displayed (with all digits blinking).</div> <div>(The measurement unit used will be the one most recently displayed.)</div>	
9.	<div>To change a parameter, press the [RE-ZERO] key, then use the following keys.</div> <div>[SAMPLE] key Selects the digit to blink.</div> <div>[RE-ZERO] key Changes the value of the blinking digit.</div> <div>[MODE] key Reverses (+ / -) the polarity.</div>	
10.	<div>Press the [PRINT] key to store the parameter.</div> <div>(To cancel without saving the parameter, press the [CAL] key.)</div> <div>The display shown on the right appears.</div>	   
11.	<div>Press the [PRINT] key.</div> <div>The currently set lower limit value is displayed (with all digits blinking).</div> <div>(The measurement unit used will be the one most recently displayed.)</div>	 

Step	Description	Display and key operations
12.	<p>To change a parameter, press the [RE-ZERO] key, then use the following keys.</p> <p>[SAMPLE] key Selects the digit to blink.</p> <p>[RE-ZERO] key Changes the value of the blinking digit.</p> <p>[MODE] key Reverses (+ / -) the polarity.</p>	
13.	<p>Press the [PRINT] key to store the parameter. (To cancel without saving the parameter, press the [CAL] key.)</p> <p>The display shown on the right appears.</p>	
14.	<p>To return to weighing mode, press the [CAL] key twice.</p>	



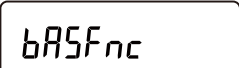

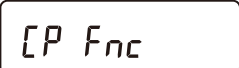





Example 2 (Digitally inputting reference value / tolerance range)


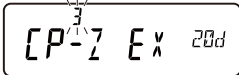



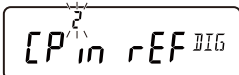



Settings

- ☐ 3-stage comparator (factory setting)
- ☐ Comparison excluding near zero ± 20 d^{*1}
- ☐ Continuous comparison
- ☐ Upper limit value: 1100.00 g
- ☐ Lower limit value: 990.00 g

^{*1} "d" represents scale division.

Selecting a comparison method (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 
3.	Press the [PRINT] key.	 
4.	Press the [RE-ZERO] key several times until \pm (Continuous comparison) appears for [P (Comparator mode).	
5.	Press the [SAMPLE] key several times until [P- \pm (Near zero) appears.	 

Step	Description	Display and key operations
6.	Press the [RE-ZERO] key several times until \pm (Comparison excluding ± 20 d) appears for $[P-Z]$ (Near zero).	 
7.	Press the [SAMPLE] key several times until $[P_{in}]$ (Input method) appears.	 
8.	Press the [RE-ZERO] key several times until \pm (Sets reference value: Digital input) appears for $[P_{in}]$ (Input method).	 
9.	Press the [PRINT] key to store the selected setting.	  

Inputting reference value / tolerance range (changing the function table configuration)

Step	Description	Display and key operations
10.	When the display shown on the right appears, press the [PRINT] key.	
11.	When the display shown on the right appears, press the [PRINT] key. The currently set upper limit value is displayed (with all digits blinking). (The measurement unit used will be the one most recently displayed.)	
12.	To change a parameter, press the [RE-ZERO] key, then use the following keys. [SAMPLE] key Selects the digit to blink. [RE-ZERO] key Changes the value of the blinking digit. [MODE] key Reverses (+ / -) the polarity.	
13.	Press the [PRINT] key to store the parameter. (To cancel without saving the parameter, press the [CAL] key.)	
14.	When the display shown on the right appears, press the [PRINT] key. The currently set value is displayed (with all digits blinking).	

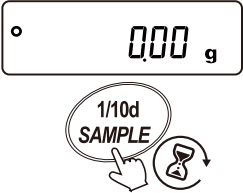
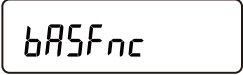







Step	Description	Display and key operations
15.	<p>To change a parameter, press the [RE-ZERO] key, then use the following keys.</p> <p>[SAMPLE] key Selects the digit to blink.</p> <p>[RE-ZERO] key Increases the value of the blinking digit.</p> <p>[MODE] key Decreases the value of the blinking digit.</p>	
16.	<p>Press the [PRINT] key to store the parameter.</p> <p>(To cancel without saving the parameter, press the [CAL] key.)</p>	
17.	<p>To return to weighing mode, press the [CAL] key twice.</p>	


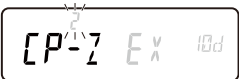

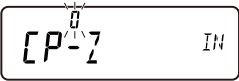



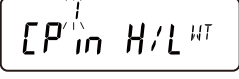


Example 3 (Inputting upper / lower limit values by load)

Settings

- ☐ 3-stage comparator (factory setting)
- ☐ Including near zero
- ☐ Comparison when stable or overloaded
- ☐ Upper limit value input by load: 1000.08 g
- ☐ Lower limit value input by load: 300.08 g

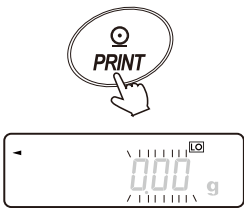
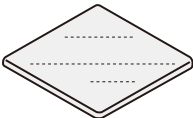
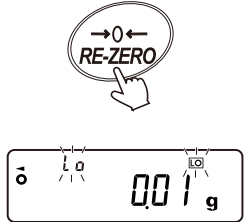
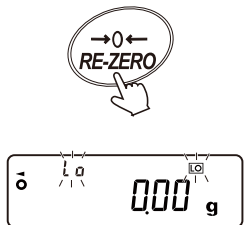
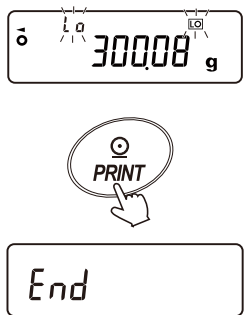
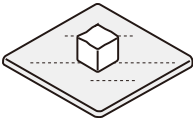
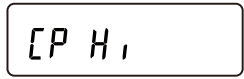
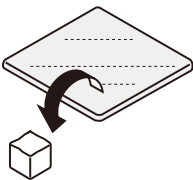
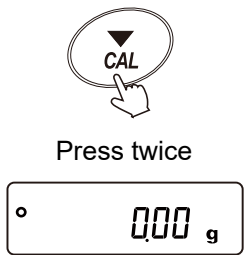
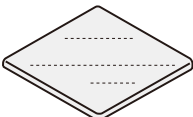
Selecting a comparison method (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>Press and hold (for 2 seconds)</p> 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 <p>Press several times</p> 
3.	Press the [PRINT] key.	 
4.	Press the [RE-ZERO] key several times until  (Compares when stable or overloaded) appears for [P (Comparator mode).	 <p>Press several times</p> 

Step	Description	Display and key operations
5.	Press the [SAMPLE] key several times until $\overline{P-Z}$ (Near zero) appears.	 <p>Press several times</p> 
6.	Press the [RE-ZERO] key several times until $\overline{0}$ (Comparison including near zero) appears for $\overline{P-Z}$ (Near zero).	 <p>Press several times</p> 
7.	Press the [SAMPLE] key several times until $\overline{P_{in}}$ (Input method) appears.	 <p>Press several times</p> 
8.	Press the [RE-ZERO] key several times until $\overline{1}$ (Sets upper and lower limits: Input by load) appears for $\overline{P_{in}}$ (Input method).	 
9.	Press the [PRINT] key to store the selected setting.	 <p>End</p> 

Inputting upper / lower limit values by load (changing the function table configuration)

Step	Description	Display and key operations	Weighing operation
10.	When the display shown on the right appears, press the [PRINT] key.		
11.	When the display shown on the right appears, press the [PRINT] key. (Upper limit value input) The currently set upper limit value is displayed (with all digits blinking). ^{*1} ^{*1} The measurement unit used will be the one most recently selected in weighing mode.		
12.	To change a parameter, press the [RE-ZERO] key and proceed to step 13. (Input by load mode) (If there is no need to change the parameter, press the [CAL] key and proceed to step 15 to input the lower limit value.)		
13.	Press the [RE-ZERO] key to set the display to zero.		
14.	Place a sample of the upper limit weight on the weighing pan, then press the [PRINT] key. (The upper limit value is stored.)		
15.	When completed, the display shown on the right appears. (Lower limit value input) Remove the sample of the upper limit weight from the weighing pan.		

Step	Description	Display and key operations	Weighing operation
16.	<p>Press the [PRINT] key.</p> <p>The currently set lower limit value is displayed (with all digits blinking).^{*1}</p> <p>^{*1} The measurement unit used will be the one most recently selected in weighing mode.</p>		
17.	<p>To change a parameter, press the [RE-ZERO] key and proceed to step 18. (Input by load mode)</p> <p>(To cancel without changing the parameter, press the [CAL] key.)</p>		
18.	Press the [RE-ZERO] key to set the display to zero.		
19.	Place a sample of the lower limit weight on the weighing pan, then press the [PRINT] key. (The lower limit value is stored.)		
20.	<p>When completed, the display shown on the right appears.</p> <p>Remove the sample of the lower limit weight from the weighing pan.</p>		
21.	To return to weighing mode, press the [CAL] key twice.		

9-5-2. Selecting the comparator (3-stage / 5-stage)

When \square (3-stage comparator) is set for $\square P \text{--} \square$ (Number of comparator stages) under $\square P \text{ Fnc}$ (Comparator) in the function table ("9. Function Table"), the HI / OK / LO indicator will light up according to the comparison result.

3-stage comparison results

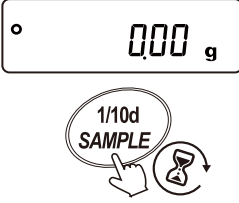
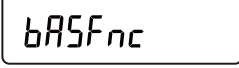

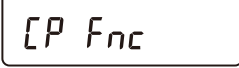
Judgment formula	Judgment	Lit display:	Blinking display:	Buzzer control
Upper limit < Weighing value	HI	HI		bEEP HI
Lower limit \leq Weighing value \leq Upper limit	OK	OK		bEEP OK
Weighing value < Lower limit	LO	LO		bEEP LO

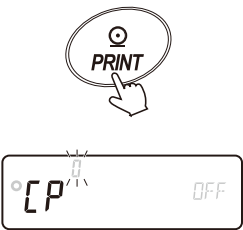
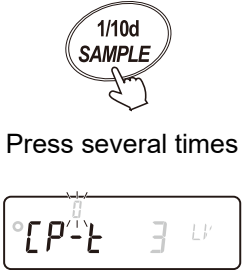
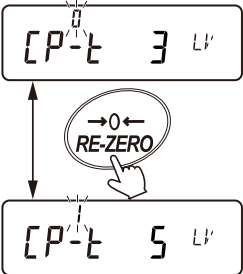
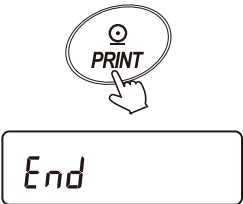

When \square (5-stage comparator) is set for $\square P \text{--} \square$ (Number of comparator stages) under $\square P \text{ Fnc}$ (Comparator) in the function table ("9. Function Table"), the HI / OK / LO indicators will light up according to the comparison result. In addition, HH will be indicated by a blinking HI, and LL will be indicated by a blinking LO.

5-stage comparison results

Judgment formula	Judgment	Lit display:	Blinking display:	Buzzer control
2nd upper limit < Weighing value	HH		HI	bEEP HH
Upper limit < Weighing value \leq 2nd upper limit	HI	HI		bEEP HI
Lower limit \leq Weighing value \leq Upper limit	OK	OK		bEEP OK
2nd lower limit \leq Weighing value < Lower limit	LO	LO		bEEP LO
Weighing value < 2nd lower limit	LL		LO	bEEP LL

Setting method (changing the function table configuration)

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

Step	Description	Display and key operations
3.	Press the [PRINT] key to display \bar{P} (Comparator mode). CAUTION □ Before proceeding, set \bar{P} (Comparator mode) to either $\bar{1}$ (Compares when stable or overloaded) or $\bar{2}$ (Continuous comparison) to enable the comparator function.	
4.	Press the [SAMPLE] key several times until $\bar{P}-t$ (Number of comparator stages) appears.	 <p>Press several times</p>
5.	Press the [RE-ZERO] key to select either $\bar{3}$ (3-stage comparator) or $\bar{5}$ (5-stage comparator).	
6.	Press the [PRINT] key to store the setting.	
7.	Press the [CAL] key to return to weighing mode.	

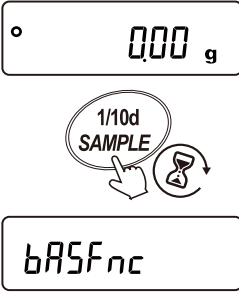



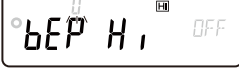

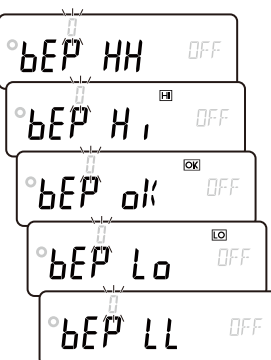
9-5-3. Buzzer activation based on comparison results

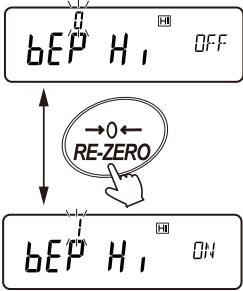
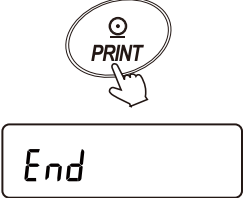
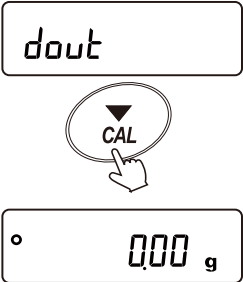
The buzzer can be configured to sound when specific comparison results are detected.*1

*1 Built-in buzzer: Approx. 40 dB at a distance of 1 m

GXA-04 board buzzer (when the GXA-04 comparator output is installed): Approx. 56 dB at a distance of 1 m)

Setting method (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key.	 
4.	Press the [SAMPLE] key several times to select the comparison result for which the buzzer will sound. Three options for the 3-stage comparator*2: bEP H, , bEP oK, and bEP Lo. Five options for the 5-stage comparator*3: bEP HH, bEP H, , bEP oK, bEP Lo, and bEP LL. *2,*3 Refer to "9-5-2. Selecting the comparator (3-stage / 5-stage)" for the settings of CP-t (Number of comparator stages).	 Press several times  The display repeats in this cycle.

Step	Description	Display and key operations
5.	Press the [RE-ZERO] key to select I (ON) or O (OFF) for the Buzzer setting.	
6.	Press the [PRINT] key to store the setting.	
7.	To return to weighing mode, press the [CAL] key.	

9-5-4. Adding comparison results

To include comparison results in the output data via the RS-232C or USB interface, set I (ON) for $CP-R$ (Comparator results) under CP_Fnc (Comparator) in the function table ("[9. Function Table](#)"). For output format, use the A&D standard format by setting 0 for $TYPE$ under SIF (Serial interface), or 0 for UP under USB (USB interface).

The comparison results will be appended after the header in the A&D standard format.

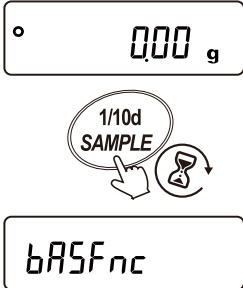

Comparison result	
S	T
,	O
K	,
+	0
1	2
3	4
.	5
6	_
_	g
C _R	L _F

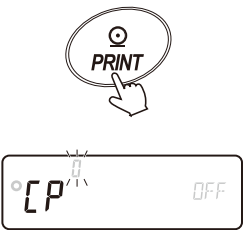
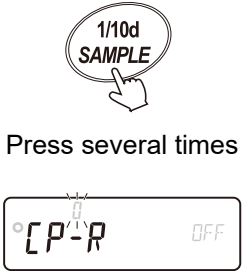
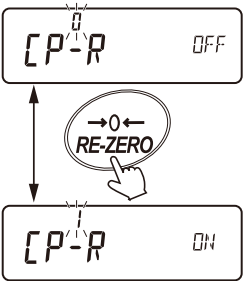
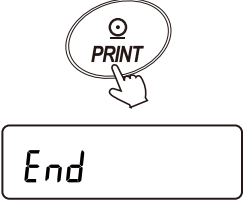

H	H	Judged as HH
H	I	Judged as HI
O	K	Judged as OK
L	O	Judged as LO
L	L	Judged as LL
-	-	No comparison

CAUTION

- ❑ This function cannot be used in conjunction with the gross / net / tare function setting (that is, when *RPF* is set to 4 under *RPF_FUNC* in the function table ("9. Function Table")).

Adding comparison results (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>The diagram shows the initial display of '0.000 g'. Below it, a hand is shown pressing the [SAMPLE] key, which is labeled '1/10d SAMPLE'. To the right of the key is a circular arrow icon. Below the key press, the display shows 'bASFnC'.</p>
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 <p>The diagram shows a hand pressing the [SAMPLE] key, which is labeled '1/10d SAMPLE'. Below the key press, the display shows 'CP Fnc'.</p>

Step	Description	Display and key operations
3.	Press the [PRINT] key to display \overline{CP} (Comparator mode). CAUTION <input type="checkbox"/> Before proceeding, set \overline{CP} (Comparator mode) to either $\overline{1}$ (Compares when stable or overloaded) or $\overline{2}$ (Continuous comparison) to enable the comparator function.	
4.	Press the [SAMPLE] key several times until $\overline{CP-R}$ (Comparison results) appears.	 <p>Press several times</p>
5.	Press the [RE-ZERO] key to select $\overline{1}$ (ON) or $\overline{0}$ (OFF) for the comparison results setting.	
6.	Press the [PRINT] key to store the setting.	
7.	Press the [CAL] key to return to weighing mode.	

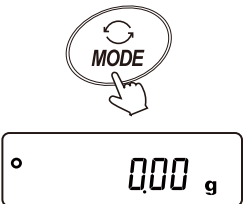
9-5-5. Enlarged comparator display function

To enlarge the display of the comparator's comparison results to make it easier to read, set I (ON) for EP-b (Enlarged comparator display) under EP Fnc (Comparator) in the function table ("9. Function Table").

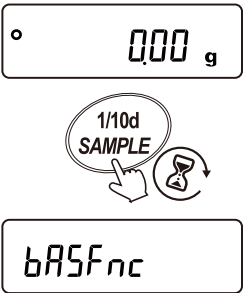
CAUTION




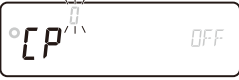


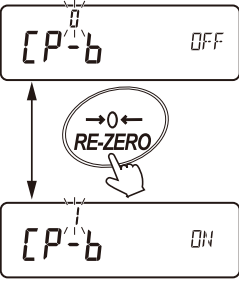





- ❑ The processing indicator $\sqrt{\quad}$ illuminates while the enlarged comparator display is active.
- ❑ If the weighing value is near zero or unstable and not being compared, the balance will display the weighing value even while the enlarged comparator display is active.
- ❑ Re-zeroing and data output are available while the enlarged comparator display is active. However, statistical calculation results cannot be output when in this mode.
- ❑ Only units that were set (selected) prior to activating the enlarged display function can be used.
- ❑ This function cannot be used in conjunction with the data memory function (comparator setting values).
- ❑ To deactivate the enlarged display function, refer to "Switching to the enlarged comparator display function (changing the function table configuration)" and change EP-b (Enlarged comparator display) from I (ON) to O (OFF).
- ❑ This function cannot be used in conjunction with the minimum weight alert function.
- ❑ This function cannot be used in conjunction with density (specific gravity) measurement.

Selecting the measurement unit

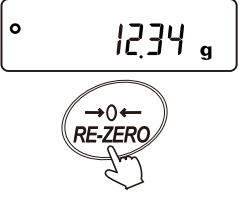
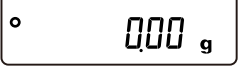
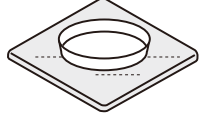

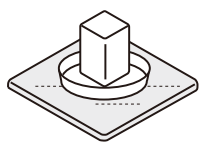



Step	Description	Display and key operations
1.	Before proceeding, press the [MODE] key to select the unit to be used with the comparator. CAUTION ❑ Unit selection using the [MODE] key is not available while the enlarged comparator display function is active.	

Switching to the enlarged comparator display function (changing the function table configuration)

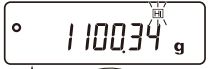





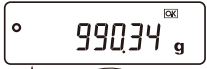








Step	Description	Display and key operations
2.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	

Step	Description	Display and key operations
3.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
4.	Press the [PRINT] key to display [P (Comparator mode). CAUTION <input type="checkbox"/> Before proceeding, set [P (Comparator Mode) to either 1 (Compares when stable or overloaded) or 2 (Continuous comparison) to enable the comparator function.	 
5.	Press the [SAMPLE] key several times until [P-b (Enlarged comparator display) appears.	 Press several times 
6.	Press the [RE-ZERO] key to select 1 (ON) or 0 (OFF) for the enlarged comparator display setting.	
7.	Press the [PRINT] key to store the setting.	 
8.	Press the [CAL] key to return to weighing mode.	  

Using the enlarged comparator display function

Step	Description	Display and key operations	Weighing operation
1.	If necessary, place a container, etc. on the weighing pan and press the [RE-ZERO] key to zero the display.	 	
2.	Place the sample to be judged by the comparator on the weighing pan. Based on the preset comparator values, the balance will evaluate the result and display HI, OK, or LO.		
3.	Each time the [MODE] key is pressed, the display toggles between the standard display and the enlarged comparator display.	<p>Standard display</p>    <p>Comparator Enlarged display</p>	

Enlarged comparator display examples

  	  	  	  	  
Second upper limit	Upper limit	OK value	Lower limit	Second lower limit

9-6. Data output overview

9-6-1. Data output mode

The data output timing of the balance can be changed by using P_{rt} (Data output mode) under

d_{out} (Data output) in the function table ("9. Function Table").

Key mode

Function table d_{out} , $P_{rt} = 0$

Pressing the [PRINT] key when \bullet (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 d_{out} , $P_{rt} = 1$

If the weighing value exceeds the range from the reference "zero display" to the values set for $RP-P$ (Auto print polarity) and $RP-b$ (Auto print band width) under d_{out} (Data output) in the function table ("9. Function Table") and \bullet (the stabilization indicator) is displayed, the weighing value will be output once. In addition, pressing the [PRINT] key when \bullet (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.

Usage example:

Automatically outputting the weighing value each time a sample is weighed.

Required function table settings

d_{out} , $P_{rt} = 1$ (Auto print mode A)

d_{out} , $RP-P$ (Auto print polarity)

d_{out} , $RP-b$ (Auto print band width)

Auto print mode B

Function table d_{out} , $P_{rt} = 2$

If the weighing value exceeds the range from the latest stable value to the values set for $RP-P$ (Auto print polarity) and $RP-b$ (Auto print band width) under d_{out} (Data output) in the function table ("9. Function Table") and \bullet (the stabilization indicator) is displayed, the weighing value will be output once. In addition, pressing the [PRINT] key when \bullet (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.

Usage example:

Automatically outputting the weighing value while adding samples.

Required function table settings


d_{out} , $P_{rt} = 2$ (Auto print mode B)

d_{out} , $RP-P$ (Auto print polarity)

d_{out} , $RP-b$ (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 SPd (Display refresh rate) under bRSFnc (Environment, Display) in the function table ("9. [Function Table](#)"). The display does not blink during output.

CAUTION

- Depending on the display refresh rate and baud rate, data may not be fully transmitted. Increase the baud rate if necessary.

Usage example:

Continuously monitoring the weighing value on a PC.

Required function table settings


dout, $Prt = 3$ (Stream mode)

bRSFnc, SPd (Display refresh rate)

5, f, $bP5$ (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  (stabilization indicator) status, the weighing value is output at intervals set for int (Interval time) under dout (Data output) in the function table ("9. [Function Table](#)"). Output begins when the [PRINT] key is pressed and stops when the [PRINT] key is pressed again during output.

CAUTION

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

Usage example:

Outputting the weighing value at regular intervals.

Required function table settings

dout, $Prt = 6$ (Interval output mode)

dout, int (Interval time)

Auto print mode C

Function table dout, $Prt = 1$

If the weighing value exceeds the range from the reference "zero display" to the values set for $RP-P$ (Auto print polarity) and $RP-b$ (Auto print band width), and the comparator result is OK with \bullet (the stabilization indicator) displayed, the weighing value will be output once.

In addition, pressing the [PRINT] key when \bullet (the stabilization indicator) is displayed will output the weighing value once.

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

Usage example:

To output and record weighing values when they fall within a specified range.

Required function table settings

dout, $Prt = 1$ (Auto print mode C)

dout, $RP-P$ (Auto print polarity)

dout, $RP-b$ (Auto print band width)

CP Func, $CP = 1$ or 2 (Comparator mode)

CP VALUE, $CP H_1$ (Upper limit)

CP VALUE, $CP L_0$ (Lower limit)

9-6-2. Data output settings

RS-232C settings can be configured using *ModE* (Connection) under (Serial interface) in the function table ("9. Function Table") to enable exceptional operation modes that accommodate connected peripheral devices.

Functions of *ModE* (Connection) setting

Class	Item	Parameter	Description		
			Device	Data output mode	Data format
<input type="text" value="5 ,F"/>	<i>ModE</i> Devices connected via RS-232C	0	PC, PLC, etc. General-purpose devices	Determined by the <i>Prt</i> setting under <input type="text" value="dout"/> .	Determined by the <i>TYPE</i> setting under <input type="text" value="5 ,F"/> .
		1	Printer	Determined by the <i>Prt</i> setting under <input type="text" value="dout"/> .	Determined by <i>TYPE</i> setting under <input type="text" value="5 ,F"/> . (A&D Standard or DP format only)
		2	Remote display, etc.	Stream mode is enabled regardless of <i>Prt</i> setting under <input type="text" value="dout"/> .	<i>TYPE</i> setting under <input type="text" value="5 ,F"/> is fixed to A&D Standard format.

*1 Only weighing values are output continuously.

Time / date (*5-td*) and ID number (*5-id*) are not included.

Functions *Prt* (Data output mode), *PUSE* (Data output pause), *Alt-F* (Auto feed), and *inFd* (GLP output) under (Data output) in the function table ("9. Function Table") are disabled.

9-6-3. Weighing data format

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

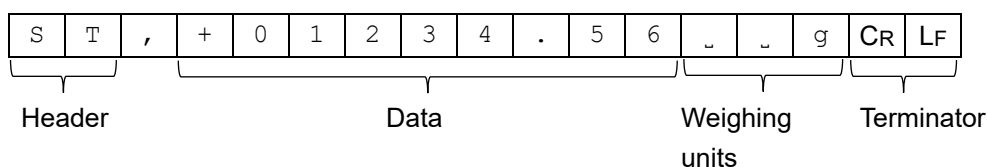
CAUTION

- The available format for Quick USB mode depends on the software version.
For software versions 1.502 and earlier, the format set in the USB data format settings is used. For software versions 1.503 and later, the format is fixed to NU2.

A&D standard format RS-232C connection: Function table , *TYPE* = 0

USB connection: Function table , *U-EP* = 0

- This is the standard format for sending data to peripheral devices.
- The data consists of 15 characters (excluding the terminator).
- A two-character header indicates the status 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 stable

When overloaded

CR: Carriage return, ASCII 0Dh
 LF: Line feed, ASCII 0Ah
 : Space, ASCII 20h

- In the external key print mode (*EXT.KEY*) of the AD-8127 multi-functional compact printer or AD-8129TH compact thermal printer, a received A&D standard format is printed as shown on the right.

WT 1234.56 g

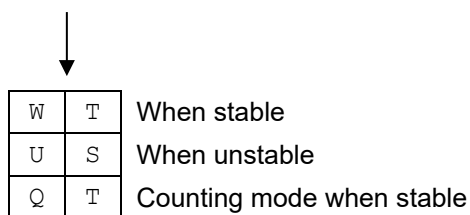
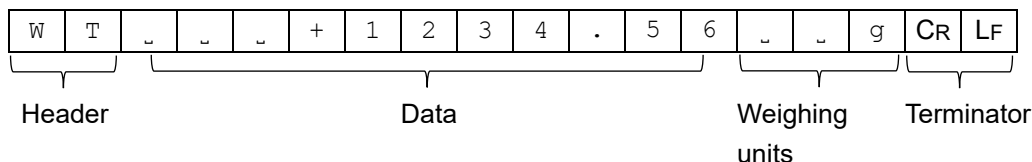
DP format (dump print) RS-232C connection: Function table

5	F
---	---

, *TYPE* = 1

USB connection: No function

- ☐ This format is suitable for dump printing.
- ☐ The data consists of 16 characters (excluding the terminator).
- ☐ A two-character header indicates the status 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.



CR: Carriage return, ASCII 0Dh

LF: Line feed, ASCII 0Ah

 : Space, ASCII 20h

KF format

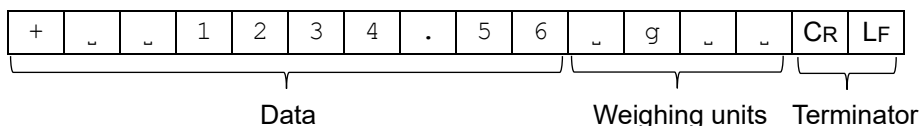
RS-232C connection: Function table

5	F
---	---

, *TYPE* = 2

USB connection: No function

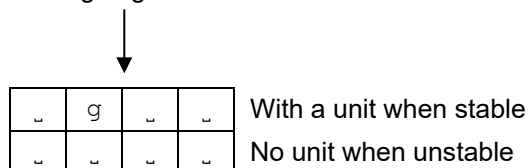
- ☐ This is the Karl-Fischer moisture meter format.
- ☐ The data consists of 14 characters (excluding the terminator).
- ☐ There are no headers.
- ☐ The polarity sign is added to the first character if it is not an overload or zero.
- ☐ The data is zero-suppressed, meaning leading zeros are replaced with spaces.
- ☐ When stable, the unit is output. When not stable, the unit is not output.



CR: Carriage return, ASCII 0Dh

LF: Line feed, ASCII 0Ah

 : Space, ASCII 20h

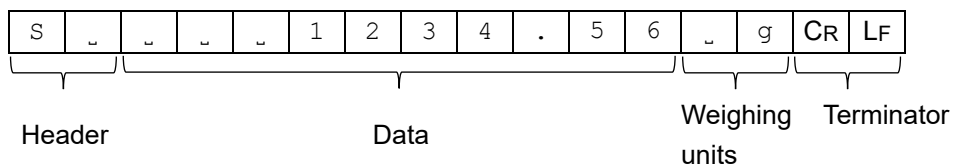


MT format

RS-232C connection: Function table 5 rF, $TYPE = 3$

USB 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
_	_	When stable (Output with the [PRINT] key)
_	D	When unstable (Output with the [PRINT] key)

CR: Carriage return, ASCII 0Dh

LF: Line feed, ASCII 0Ah

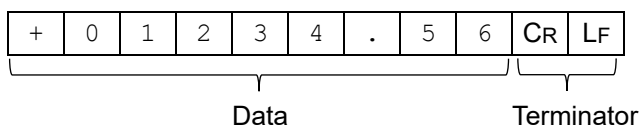
_ : Space, ASCII 20h

NU format

RS-232C connection: Function table 5 rF, $TYPE = 4$

USB connection: Function table U5b, $U-EP = 1$

- ❑ Only numerical data of the weighing value is output.
- ❑ The data consists of 9 characters (excluding the terminator).
- ❑ 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, $TYPE = 5$

USB connection: Function table USB, $UTP = 2$

- This is a format in which the data section and unit section of the A&D standard format are separated by a comma (",").
- The unit is output when overloaded.
- If \downarrow (Comma [,]) is set for Pnt (Decimal separator) under bRSFnC (Environment, Display) in the function table ("9. Function Table"), the separator is a semicolon (";").

S	T	,	+	0	1	2	3	4	.	5	6	,	_	_	g	CR	LF
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

- 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:

SAMPLE-0123-4, No, 012, 2017/07/01, 12:34:56, ST, +01234.56, _ _g																	
ID number						Data number			Date			Time			Weighing value		

NU2 format

RS-232C connection: Function table 5,F, $TYPE = 6$

USB connection: Function table USB, $UTP = 4$

- Only numerical data of the weighing value is output.
- If the data is zero or positive, no polarity is added.

1	2	3	4	.	5	6	CR	LF
Data						Terminator		

TAB format

RS-232C connection: Function table 5,F, $TYPE = 7$

USB connection: Function table USB, $UTP = 3$

- This format uses a horizontal tab instead of a comma as is used in the CSV format.

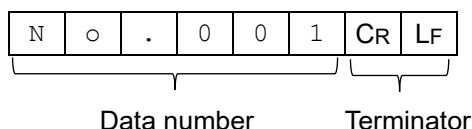
S	T	TAB	+	0	1	2	3	4	.	5	6	TAB	_	_	g	CR	LF
												Horizontal tab ASCII 09Ah					

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.

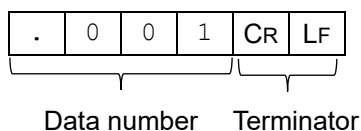
Data number Function table dout, $d-na = 1$

- ❑ 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, only periods (".") and numeric characters are output when the NU or NU2 format is selected.



Quick USB connection (for outputting numerical values only)

Function table USb, $UFnc = 0$ and $U-tp = 1$ or 4

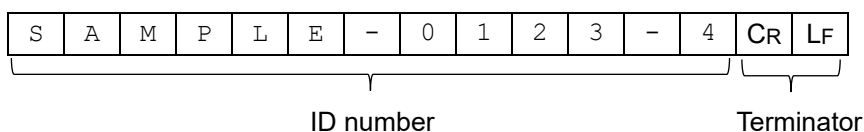


CAUTION

- ❑ The available format for Quick USB mode depends on the software version.
For software versions 1.502 and earlier, the format set in the USB data format settings is used. For software versions 1.503 and later, the format is fixed to NU2.

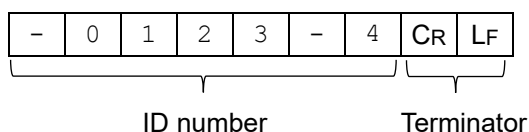
ID number Function table dout, $S-id = 1$

- ❑ The ID number stored in the balance is output.
- ❑ The data consists of 13 characters (excluding the terminator).
- ❑ In Quick USB mode, only hyphens ("-") and numeric characters are output when the NU or NU2 format is selected.



Quick USB connection (for outputting numerical values only)

Function table USb, $UFnc = 0$ and $U-tp = 1$ or 4



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, slashes ("/") are converted to dots (".") and output when the NU or NU2 format is selected.

2	0	2	3	/	0	6	/	3	0	CR	LF
Date										Terminator	

Quick USB connection (for outputting numerical values only)

Function table USb, UFnC = 0 and U-tP = 1 or 4

2	0	2	3	.	0	6	.	3	0	CR	LF
---	---	---	---	---	---	---	---	---	---	----	----

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, colons (":") are converted to dots (".") and output when the NU or NU2 format is selected.

1	2	:	3	4	:	5	6	CR	LF
Time								Terminator	

Quick USB connection (for outputting numerical values only)

Function table USb, UFnC = 0 and U-tP = 1 or 4

1	2	.	3	4	.	5	6	CR	LF
---	---	---	---	---	---	---	---	----	----

9-6-4. Output examples of weighing data format

When stable

° 314206 g

A&D	S	T	,	+	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	3	1	4	2	.	0	6	CR	LF							
CSV	S	T	,	+	0	3	1	4	2	.	0	6	,	␣	␣	g	CR	LF
NU2	3	1	4	2	.	0	6	CR	LF									
TAB	S	T	TAB	+	0	3	1	4	2	.	0	6	TAB	␣	␣	g	CR	LF

When unstable

-29587 g

A&D	U	S	,	-	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	2	9	5	.	8	7	CR	LF							
CSV	U	S	,	-	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	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	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	CR	LF										
CSV	O	L	,	+	9	9	9	9	9	9	9	E	+	1	9	,	_	_	g	CR	LF
NU2	+	9	9	9	9	9	9	9	9	CR	LF										
TAB	O	L	TAB	+	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	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	CR	LF									
CSV	O	L	,	-	9	9	9	9	9	9	E	+	1	9	,	_	_	g	CR	LF
NU2	-	9	9	9	9	9	9	9	9	CR	LF									
TAB	O	L	TAB	-	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

Units code

		A&D CSV TAB	DP	KF	MT
Gram	g	<div> g </div>	<div> g </div>	<div> g </div>	<div> g </div>
Milligram	mg	<div> mg </div>	<div> mg </div>	<div> mg </div>	<div> mg </div>
Counting mode	PCS	<div> PCS </div>	<div> PCS </div>	<div> PCS </div>	<div> PCS </div>
Percent mode	%	<div> % </div>	<div> % </div>	<div> % </div>	<div> % </div>
Ounce (Avoir.)	oz	<div> oz </div>	<div> oz </div>	<div> oz </div>	<div> oz </div>
Pound	lb	<div> lb </div>	<div> lb </div>	<div> lb </div>	<div> lb </div>
Pound ounce	LOZ	<div> oz </div>	<div> oz </div>	<div> oz </div>	<div> oz </div>
Troy ounce	ozt	<div> ozt </div>	<div> ozt </div>	<div> ozt </div>	<div> ozt </div>
Metric carat	ct	<div> ct </div>	<div> ct </div>	<div> ct </div>	<div> ct </div>
Momme	mom	<div> mom </div>	<div> mom </div>	<div> mom </div>	<div> mom </div>
Pennyweight	dwt	<div> dwt </div>	<div> dwt </div>	<div> dwt </div>	<div> dwt </div>
Grain	GN	<div> GN </div>	<div> GN </div>	<div> GN </div>	<div> GN </div>
Tael (HK general, Singapore)	TL	<div> TL </div>	<div> TL </div>	<div> TL </div>	<div> TL </div>
Tael (HK, jewelry)	TL	<div> TL </div>	<div> TL </div>	<div> TL </div>	<div> TL </div>
Tael (Taiwan)	TL	<div> TL </div>	<div> TL </div>	<div> TL </div>	<div> TL </div>
Tael (China)	TL	<div> TL </div>	<div> TL </div>	<div> TL </div>	<div> TL </div>
Tola (India)	TOU	<div> TOU </div>	<div> TOU </div>	<div> TOU </div>	<div> TOU </div>
Mesghal	MES	<div> MES </div>	<div> MES </div>	<div> MES </div>	<div> MES </div>
Density mode	DS	<div> DS </div>	<div> DS </div>	<div> DS </div>	<div> DS </div>
Programmable unit (Multi-unit)	MLT	<div> MLT </div>	<div> MLT </div>	<div> MLT </div>	<div> MLT </div>

 : Space, ASCII 20h

Note

- When "pound ounce" is selected, data is output in ounces (oz).

9-7. Application overview

APP (Application mode) under APP Fnc (Application) in the function table ("9. Function Table") allows switching between application functions.

9-7-1. Normal weighing mode

This is the standard mode for general weighing operations. It is enabled by default at the factory setting.
Required function table settings:

APP Fnc, *APP* = 0 (Normal weighing mode)

9-7-2. Capacity indicator

This function displays the relationship between the load and weighing capacity as a percentage.
(Zero load: 0%, Weighing capacity: 100%)

Required function table settings:

APP Fnc, *APP* = 1 (Capacity indicator mode)

CAUTION

- This function cannot be used in conjunction with the data memory function setting (*DATA* = 1 to 4 under dout in the function table ("9. Function Table")).
- This function cannot be used in conjunction with density (specific gravity) measurement.

9-7-3. Statistical calculation function

This function processes weighing values statistically and displays / outputs the result.

Required function table settings:

APP Fnc, *APP* = 2 (Statistical calculation mode)

(Refer to "12. Statistical Calculation Function" for details.)

9-7-4. Flow rate display (FRD) mode

This function calculates the flow rate (the change in weighing values over time).

Required function table settings:

APP Fnc, *APP* = 3 (FRD mode)

(Refer to "13. Flow Rate Display (FRD) Function" for details.)

9-7-5. Gross, net, tare mode

This function allows zero setting and tare operations to be performed independently. It enables output of the following weight data in sequence: net weight, gross weight, and tare weight.

Required function table settings:

APP Fnc, *APP* = 4 (Gross, net, tare mode)

(Refer to "14. Gross / Net / Tare Function" for details.)

9-8. Unit storing overview



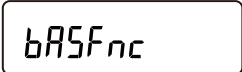

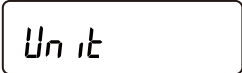
To configure Unit (Unit) in the function table ("9. Function Table"), use the following procedure.


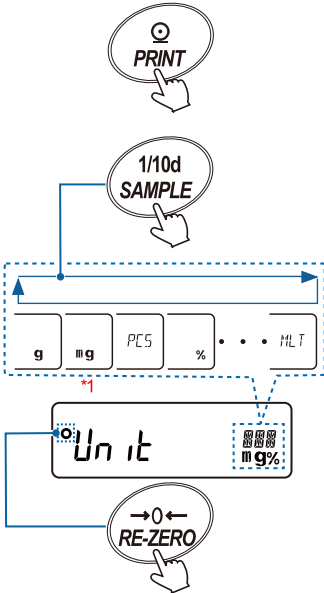
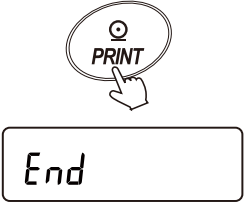

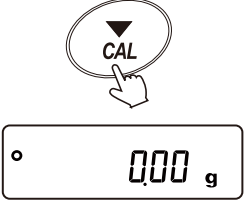
This setting is used to customize the unit display sequence, showing only units that are in use.

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



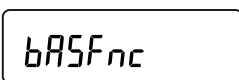

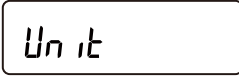

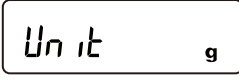


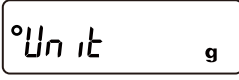

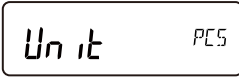


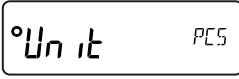
Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	<div></div> <div></div> <div>Press and hold (for 2 seconds)</div> <div></div>
2.	Press the [SAMPLE] key several times until the display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






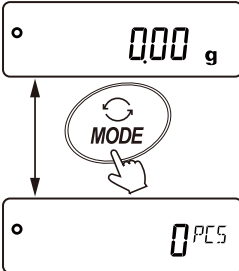
Step	Description	Display and key operations
3.	<p>Press the [PRINT] key.</p> <p>Use the following keys to specify the units to be displayed, in the desired order:</p> <p>[SAMPLE] key Selects a unit.</p> <p>[RE-ZERO] key Activates the  (stabilization indicator) for the currently selected unit. If the indicator is already on for the selected unit, pressing the key will turn it off.</p> <p>*1 The mg unit is available only on 0.0001 g models.</p> <p>(For details on units, refer to “4-1. Units of measure”.)</p>	
4.	Press the [PRINT] key to store the setting.	
5.	The next class in the function table is displayed.	
6.	<p>Press the [CAL] key to return to weighing mode.</p> <p>The unit specified first will be displayed in weighing mode.</p>	

Tip

- The balance will apply the unit specified first in step 4 above when it is powered 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 [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key.	 
4.	Press the [RE-ZERO] key to select the g unit and confirm that  (the stability indicator) is displayed.	 
5.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
6.	Press the [RE-ZERO] key to select the PCS unit and confirm that  (the stability indicator) is displayed.	 

Step	Description	Display and key operations
7.	Press the [PRINT] key to register the specified units.	 
8.	The next class in the function table is displayed.	
9.	To return to weighing mode, press the [CAL] key. The g 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 g → <i>PCS</i> .	

10. GLP Report and ID Number

10-1. Main objectives

To output data compliant with GLP / GMP from the balance to a printer or PC, set \downarrow (ON: Internal clock data) or \uparrow (ON: External device clock data) for INF_{D} (GLP output) under data (Data output) in the function table ("[9. Function Table](#)").

GLP: Good Laboratory Practice, standards for implementing safety tests for drugs and medicines.

GMP: Good Manufacturing Practice, rules for manufacturing and quality control.

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.

The balance can output the following GLP / GMP compliant reports via the RS-232C or USB.

- 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 the internal weight or an external weight)
- Breaks ("Title block" and "End block") for easy management of a series of weighing data

By changing the function table ("[9. Function Table](#)"), sensitivity adjustment results and calibration test results can be stored in the data memory and later output collectively. (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 stored in non-volatile memory, even if the AC adapter is removed, and it is valid until a new registration is made.
- ☐ For checking and adjusting the time and date, refer to "[9-4. Clock and calendar function](#)".
- ☐ When printing a GLP compliant report with an AD-8127 multi-functional compact printer or AD-8129TH compact thermal printer connected to the balance, the clock function of the printer can be used to print the time and date. (\uparrow set for INF_{D} under data ("[9. Function Table](#)").)



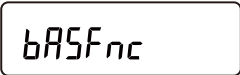


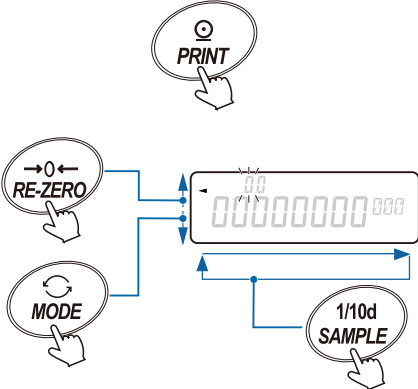
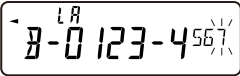





This is effective for centrally managing the prevention of time and date tampering using the password lock function on the AD-8127 or AD-8129TH.

Tip

- ☐ To output GLP / GMP compliant reports, set the print mode of the AD-8127 / AD-8129TH to the dump print mode (DUMP). If the external key print mode (EXT.KEY) is set for weighing value printing, press and hold the ENT
SAVE button on the AD-8127 / AD-8129TH (for 2 seconds) to switch between the external key print mode and dump print mode.

10-2. Setting the ID number

Setting method (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key. Set the ID number using the following keys. [SAMPLE] key Selects the digit to blink. [RE-ZERO] key Changes the character of the blinking digit. (+) [MODE] key Changes the character of the blinking digit. (-)	
4.	Press the [PRINT] key to store the setting. (To cancel without saving changes, press the [CAL] key.)	   
5.	To return to weighing mode, press the [CAL] key.	 

10-3. GLP output




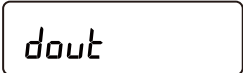
To output data compliant with GLP / GMP to the AD-8127 multi-functional printer / AD-8129TH thermal printer, or a PC, set \downarrow (ON: Internal clock data) or \uparrow (ON: External device clock data) for inF_d (GLP output) under dout (Data output) in the function table ("9. Function Table").







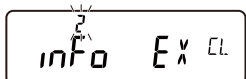





When outputting data compliant with GLP / GMP, setting inF_d to \uparrow enables the use of clock data from external devices such as a PC or printer, instead of the balance's internal clock. This setting is used when clock data needs to be unified based on that of an external device.

CAUTION

- ❑ When outputting the balance's internal clock data (\downarrow set for inF_d), if the date and time are incorrect, adjust the date and time using CL Adj (Clock) in the function table ("9. Function Table").
- ❑ The clock data output from an external device can be used with a device that has a clock function and that can output the date and time in response to <ESC>D, <ESC>T.*¹
(AD-8127 multi-functional compact printer, AD-8129TH compact thermal printer, RsCom [WinCT] data communication software, etc.)
^{*1} <ESC> is the escape code (ASCII 1Bh).
- ❑ When storing the sensitivity adjustment history with the data memory function, the internal clock data of the balance is stored even if inF_d is set to \uparrow .
- ❑ To output data to the AD-8127 multi-functional printer or the AD-8129TH thermal printer, set the print mode to **DUMP** (dump print mode).
- ❑ This function cannot be used in conjunction with the flow rate display (FRD) function.

Setting method (changing the function table configuration)

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

Step	Description	Display and key operations
3.	Press the [PRINT] key.	 
4.	Press the [SAMPLE] key several times to display <i>info</i> (GLP output).	 Press several times 
5.	Press the [RE-ZERO] key several times to set <i>info</i> to 1 (ON: Internal clock data) or 2 (ON: External device clock data).	 Press several times  or 
6.	Press the [PRINT] key to store the setting.	  
7.	Press the [CAL] key to return to weighing mode.	 

Output of sensitivity adjustment using the internal weight

The forms in which GLP data is output when the sensitivity of the balance is adjusted using the internal weight are shown below.

Output example 1

When ☐ (ON: Internal clock data) is set for *inF0* (GLP output) under (Data output) in the function table ("9. Function Table")

Printer format (AD-8127)

A & D

MODEL GX-10002A

S/N 12345678

ID LAB-0123-4567

DATE 2017/12/31

TIME 12:34:56

CALIBRATED(INT.)

REMARKS

SIGNATURE

PC output (WinCT, RsCom)

.....A_&_D<TERM>

MODEL_ _GX-10002A<TERM>

S/N_ _ _ _12345678<TERM>

ID_ LAB-0123-4567<TERM>

DATE_ _2017/12/31<TERM>

TIME_ _ _12:34:56<TERM>

CALIBRATED (INT.) <TERM>

REMARKS<TERM>

<TERM>

<TERM>

SIGNATURE<TERM>

<TERM>

<TERM>

-----<TERM>

<TERM>

<TERM>

*1

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

- 1 Manufacturer

2 Model

3 Serial number

4 ID

5 Date
- 6 Time

7 Sensitivity adjustment using the internal weight

8 Remarks

9 Signature

*1 The output order of the year, month, and day varies depending on the destination region.

Output example 2

When φ (ON: External device clock data) is set for inF_0 (GLP output) under dout (Data output) in the function table ("9. Function Table")

Printer format (AD-8127)

```

                                A & D
MODEL  GX-10002A
S/N    12345678
ID LAB-0123-4567
DATE 2017/12/31
TIME 12:34:56
CALIBRATED(INT.)
REMARKS

SIGNATURE
-----

```

PC output (WinCT, RsCom)

← 1 →	.....A_&_D<TERM>	
← 2 →	MODEL_ GX-10002A<TERM>	
← 3 →	S/N_.....12345678<TERM>	
← 4 →	ID_ LAB-0123-4567<TERM>	
← 5 →	2017-12-31<TERM>	*1
← 6 →	12:34:56<TERM>	
← 7 →	CALIBRATED (INT.) <TERM>	
← 8 →	REMARKS<TERM>	
	<TERM>	
	<TERM>	
← 9 →	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

- | | |
|---------------------------------------|--|
| 1 Manufacturer | 6 Time (external device's clock data) |
| 2 Model | 7 Sensitivity adjustment using the internal weight |
| 3 Serial number | 8 Remarks |
| 4 ID | 9 Signature |
| 5 Date (external device's clock data) | |

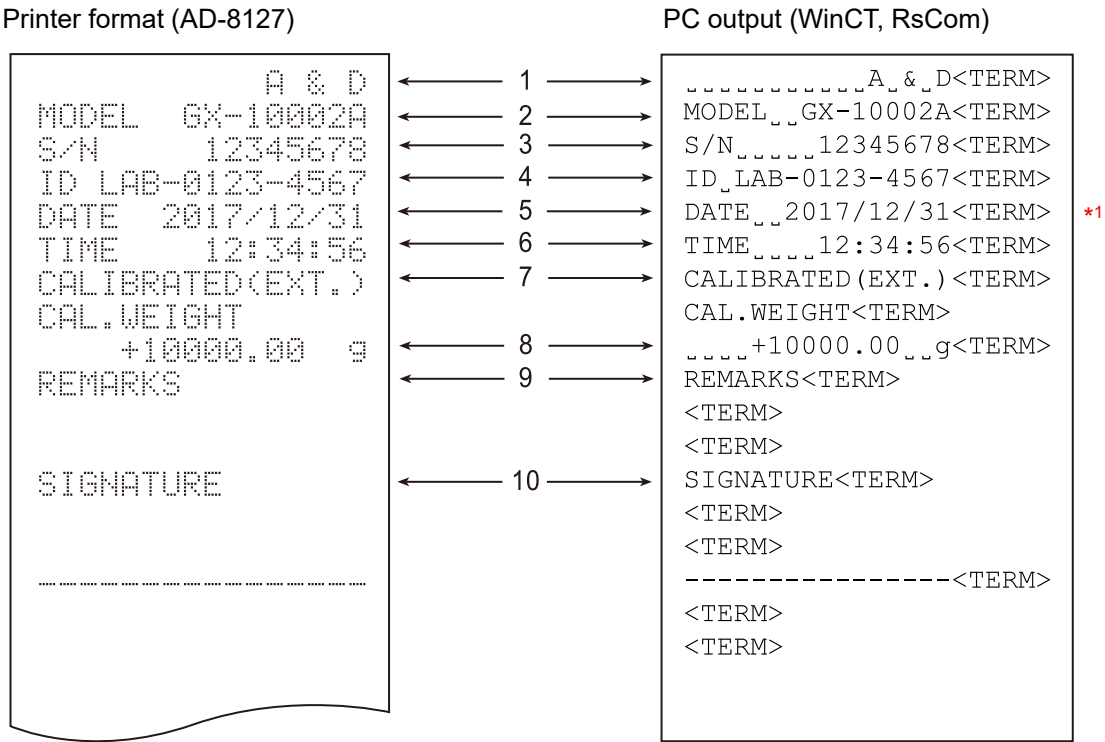
*1 The output order of the year, month, and day varies depending on the destination region.

Output of sensitivity adjustment using an external weight

The GLP output forms when the sensitivity of the balance is adjusted using an external weight are shown below.

Output example

When \downarrow (ON: Internal clock data) is set for INF (GLP output) under dout (Data output) in the function table ("9. Function Table")



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

- 1 Manufacturer

2 Model

3 Serial number

4 ID

5 Date

6 Time

7 Sensitivity adjustment using an external weight

8 Weight value

9 Remarks

10 Signature

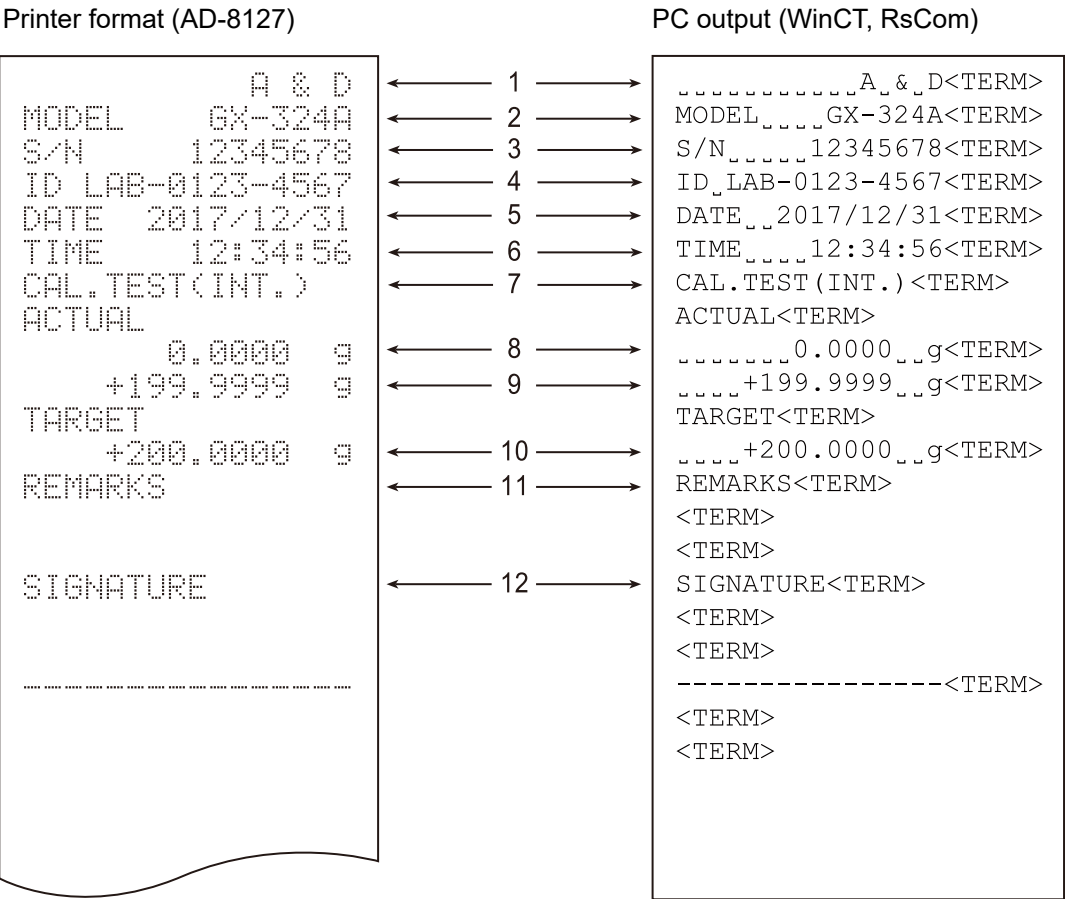
*1 The output order of the year, month, and day varies depending on the destination region.

Output of calibration test using the internal weight

- This is the GLP-compliant output when the weighing accuracy of the balance is verified using the internal weight. (Sensitivity adjustment is not performed.)
This output is available only on 0.0001 g models.

Output example

When **I** (ON: Internal clock data) is set for **mF0** (GLP output) under **dout** (Data output) in the function table ("9. Function Table")



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

- | | |
|-----------------|------------------------|
| 1 Manufacturer | 7 Calibration test |
| 2 Model | 8 Zero point result |
| 3 Serial number | 9 Loaded weight result |
| 4 ID | 10 Target weight used |
| 5 Date | 11 Remarks |
| 6 Time | 12 Signature |

*1 The output order of the year, month, and day varies depending on the destination region.

Output of calibration test using an external weight

The GLP output forms when the weighing accuracy of the balance is checked using the internal weight are shown below. (Note that sensitivity adjustment is not performed.)

Output example

When **1** (ON: Internal clock data) is set for **inFd** (GLP output) under **dout** (Data output) in the function table ("9. Function Table")

Printer format (AD-8127)		PC output (WinCT, RsCom)
MODEL GX-10002A	1	.....A_&_D<TERM>
S/N 12345678	2	MODEL_ _GX-10002A<TERM>
ID LAB-0123-4567	3	S/N_ _ _ _12345678<TERM>
DATE 2017/12/31	4	ID_ LAB-0123-4567<TERM>
TIME 12:34:56	5	DATE_ _2017/12/31<TERM>
CAL.TEST(EXT.)	6	TIME_ _ _ _12:34:56<TERM>
ACTUAL	7	CAL.TEST (EXT.) <TERM>
0.00 g	8	ACTUAL<TERM>
+9999.95 g	9	.....0.00_ _g<TERM>
TARGET	10	.....+9999.95_ _g<TERM>
+10000.00 g	11	TARGET<TERM>
REMARKS		.....+10000.00_ _g<TERM>
		REMARKS<TERM>
		<TERM>
		<TERM>
SIGNATURE	12	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

- 1

Manufacturer
- 2

Model
- 3

Serial number
- 4

ID
- 5

Date
- 6

Time
- 7

Calibration test
- 8

Zero point result
- 9

Loaded weight result
- 10

Target weight used
- 11

Remarks
- 12

Signature

*1 The output order of the year, month, and day varies depending on the destination region.

Title block and End block

Application / Operation

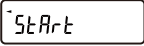


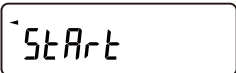


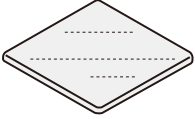
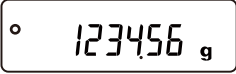


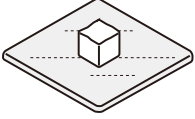
A "Title block" and "End block" can be added before and after a series of weighing values for data management.



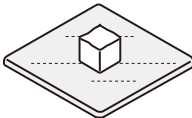
Pressing and holding the [PRINT] key (for 2 seconds) outputs the "Title block" and "End block" alternately.

CAUTION

- If the data memory function is used, the Title block and End block cannot be output.

Output method using the keys

Step	Description	Display and key operations	Weighing operation
1.	In weighing mode, press and hold the [PRINT] key (for 2 seconds) to display  . The balance outputs the "Title block".	  Press and hold (for 2 seconds)   "Title block" is output. 	
2.	Press the [PRINT] key to output the "weighing value". The output method depends on the setting of the data output mode.	   "Weighing value" is output.	

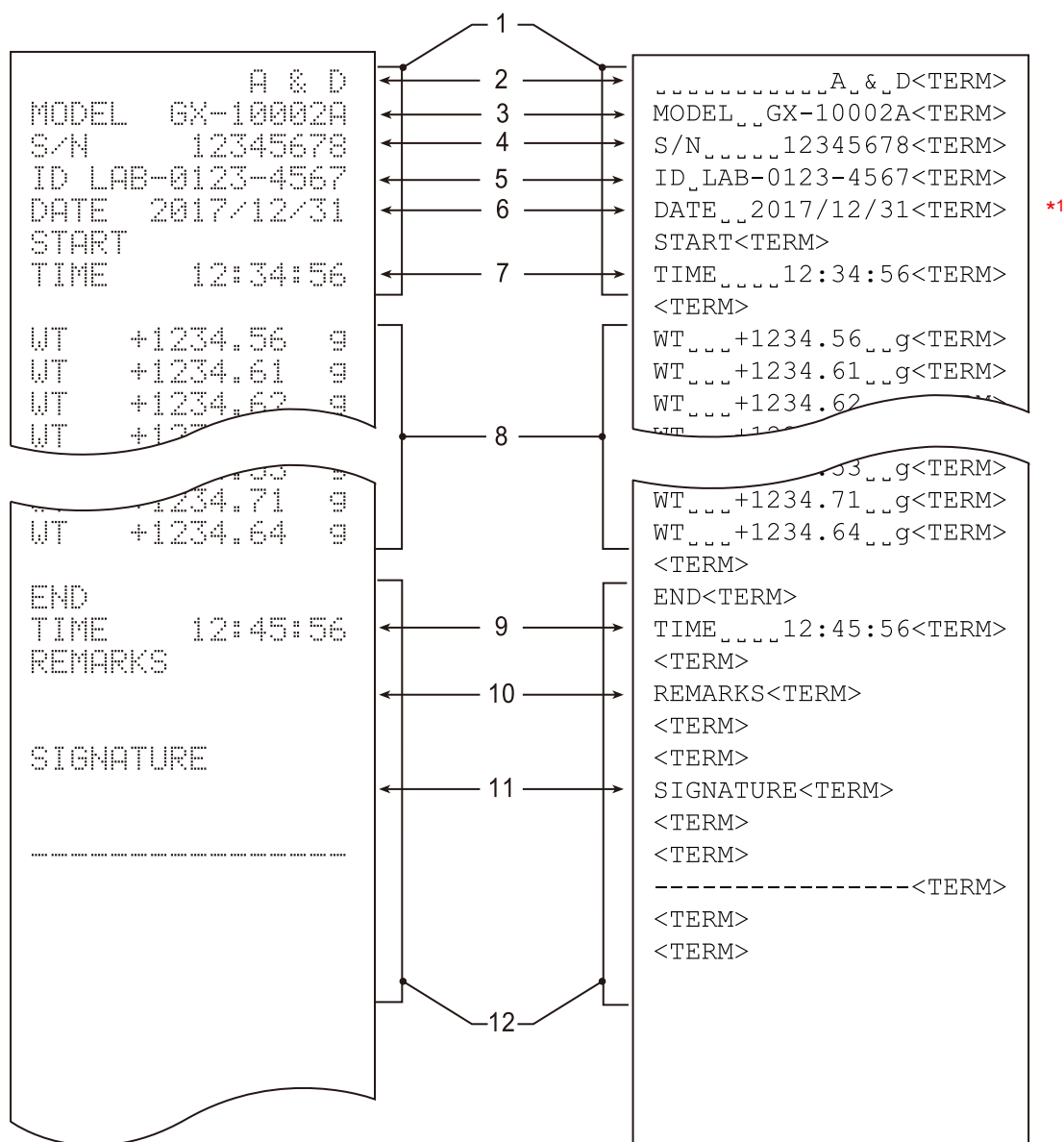
Step	Description	Display and key operations	Weighing operation
3.	Press and hold the [PRINT] key (for 2 seconds) to display rEcEnd . The balance outputs the "End block".	 <p>Press and hold (for 2 seconds)</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">rEcEnd</div>  <p>"End block" is output.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">End</div>	

Output example

When **I** (ON: Internal clock data) is set for **INF0** (GLP output) under **dout** (Data output) in the function table ("9. Function Table")

Printer format (AD-8127)

PC output (WinCT, RsCom)



_ : Space, ASCII 20h

<TERM>: Terminator, CR LF or CR

CR: Carriage return, ASCII 0Dh

LF: Line feed, ASCII 0Ah

1 "Title block"

2 Manufacturer

3 Model

4 Serial number

5 ID

6 Date

7 Start time

8 "Weighing value"

9 End time

10 Remarks

11 Signature

12 "End block"

*1 The output order of the year, month, and day varies depending on the destination region.

11. Data Memory

The data memory function stores unit weights for counting, weighing values, sensitivity adjustment history, and other data in the balance. This enables verification and bulk output of data at a later time.

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

CAUTION

- The data memory function cannot be used in conjunction with the following features: capacity indicator function, gross / net / tare function, statistical calculation function, minimum weight alert function, and flow rate display function.

The following types of data can be stored.

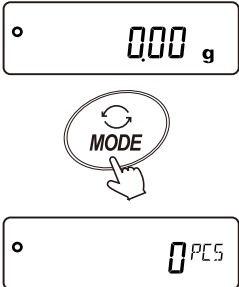
Function table	Description	Number of stored data entries
<i>dAtA</i> set to 1	Unit weight (counting mode)	Up to 50 entries
<i>dAtA</i> set to 2	Weighing value Sensitivity adjustment history <ul style="list-style-type: none"> • Report of the sensitivity adjustment with the internal weight (GX-AE / GX-A / GX-AWP series only) • Report of the calibration test with the internal weight (GX-AE / GX-A series 0.0001 g models only) • Report of the sensitivity adjustment with an external weight • Report of the calibration test with an external weight 	Up to 200 entries Latest 50 entries
<i>dAtA</i> set to 3	Comparator settings (upper and lower limits only)	Up to 20 sets
<i>dAtA</i> set to 4	Tare weight value	Up to 20 entries

11-1. Storing unit weights

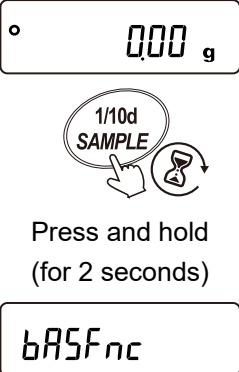
- ❑ Up to 50 unit weight entries can be stored for counting mode.
- ❑ $P01$ represents the first unit weight entry and serves as the standard memory in normal counting mode. An additional 49 unit weights can be stored.
- ❑ The stored unit weight is retained in the balance's nonvolatile memory even when 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).




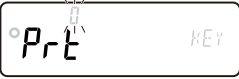

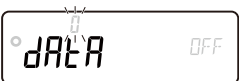







11-1-1. Preparing the data memory function for unit weights

Changing the weighing unit

Step	Description	Display and key operations
1.	Press the [MODE] key to select the unit PES (counting mode). CAUTION ❑ To display PES , ensure it is included in the units set in the function table beforehand. (Refer to "9-8. Unit storing overview".)	

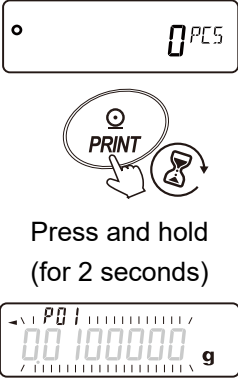
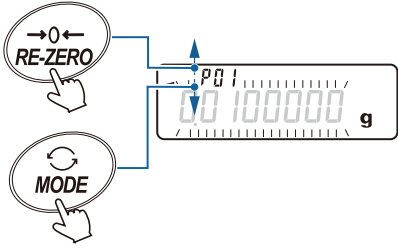
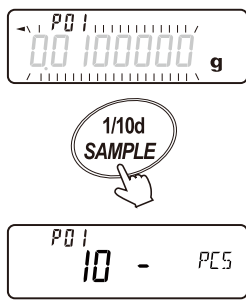
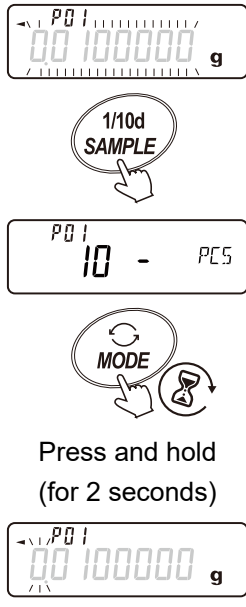
Enabling the data memory function (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	

Step	Description	Display and key operations
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 <p>Press several times</p> 
3.	Press the [PRINT] key.	 
4.	Press the [SAMPLE] key several times until <i>dAtA</i> (Data memory) appears.	 <p>Press several times</p> 
5.	Press the [RE-ZERO] key to display <i>!</i> (Stores unit weight values) for <i>dAtA</i> .	 
6.	Press the [PRINT] key to store the setting.	  
7.	Press the [CAL] key to return to weighing mode.	 

11-1-2. Registering unit weight data

To register (store) 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: *PG 1* to *PG 9*.

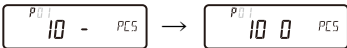
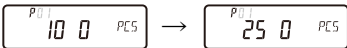
Step	Description	Display and key operations
1.	<p>Press and hold the [PRINT] key (for 2 seconds) to enter confirmation mode.</p> <p>The unit weight data, including the unit weight number and blinking unit weight, is displayed.</p> <p>The unit weight value most recently selected or registered is shown.</p>	 <p>Press and hold (for 2 seconds)</p>
2.	<p>Use the following keys to select the unit weight number to register.</p> <p>[RE-ZERO] key .....Increases the unit weight number by one.</p> <p>[MODE] key.....Decreases the unit weight number by one.</p>	
3.	<p><input type="checkbox"/> To use "Load registration mode" for registration, press the [SAMPLE] key.</p>	 <p>To "Load registration mode"</p>
	<p><input type="checkbox"/> To use "Digital registration mode" for registration, press the [SAMPLE] key. Then, press and hold the [MODE] key to enter "Digital registration mode".</p>	 <p>Press and hold (for 2 seconds)</p> <p>To "Digital registration mode"</p>

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, ACAI is available after registering the unit weight. (Refer to "4-3. Counting mode (PCS)".)

Use the following keys to register the actual weight.

Step	Description
1.	<p>[RE-ZERO] key..... Sets the displayed value to zero.</p> <div style="text-align: center;">  </div> <p>[SAMPLE] key Changes the number of samples to be used for registration.</p> <div style="text-align: center;">  </div> <p>[PRINT] key Place the sample on the weighing pan and press the [PRINT] key. The unit weight will be registered (stored) in the data memory. The balance will then return to the state described in step 1 of "11-1-2. Registering unit weight data".</p> <p>For details on how to register unit weights, refer to "4-3. Counting mode (PCS)".</p> <p>[CAL] key..... Returns the balance to the state described in step 1 of "11-1-2. Registering unit weight data".</p> <p>Pressing and holding the [MODE] 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, ACAI cannot be applied after registering the unit weight. (Refer to "4-3. Counting mode (PCS)")
- ❑ Up to the last two digits 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>[SAMPLE] key Changes the setting digit.</p> <p>[RE-ZERO] key Increases the setting value.</p> <p>[MODE] key Changes the position of the decimal separator.</p>	
	<p>Pressing and holding the [MODE] key (for 2 seconds) Enters "Load registration mode".</p>	<p>Press and hold (for 2 seconds)</p> <p>To "Load registration mode"</p>
2.	<p>Press the [PRINT] key to register (store) the unit weight in data memory.</p> <p>(To cancel, press the [CAL] key.)</p> <p>The balance returns to the state described in step 1 of "11-1-2. Registering unit weight data".</p>	<p>To step 1 in "11-1-2. Registering unit weight data".</p>

Note

- ❑ Use "UW:" command to change the unit weight.
(Refer to "23-7. Commands".)

11-1-3. Reading unit weight data

CAUTION

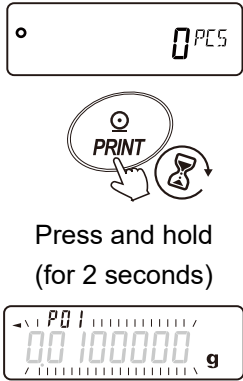
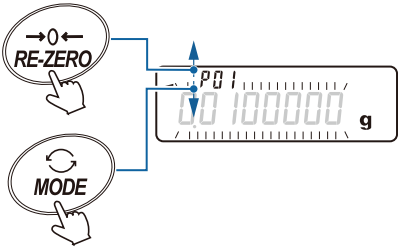
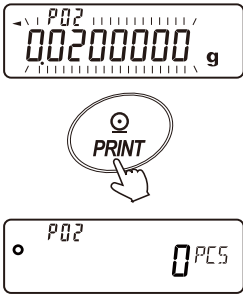
- If the set value is less than the setting range, Error 2 is displayed.

For details on minimum unit weight, refer to "27-2. 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 can be read and output using the `"?UW"` command.

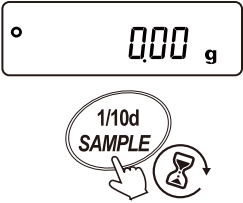
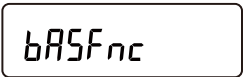

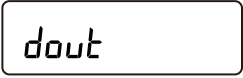

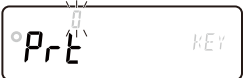
Step	Description	Display and key operations
1.	<p>Press and hold the [PRINT] key (for 2 seconds) to enter confirmation mode.</p> <p>The unit weight data, including the unit weight number and blinking unit weight, is displayed.</p> <p>The unit weight value most recently selected or registered is shown.</p>	 <p>Press and hold (for 2 seconds)</p>
2.	<p>Select the unit weight number to use with the following keys.</p> <p>[RE-ZERO] key Increases the unit weight number by one.</p> <p>[MODE] key..... Decreases the unit weight number by one.</p>	
3.	<p>Press the [PRINT] key to set the unit weight to use. (To cancel, press the [CAL] key.)</p> <p>The balance returns to weighing mode (count display).</p>	


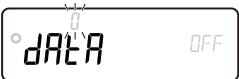







11-2. Storing the weighing data / sensitivity adjustment history

- ❑ Weighing results and sensitivity adjustment history can be stored in the internal memory of the balance.
- ❑ Storing weighing results in the balance enables continuous weighing operations without a connected printer or PC.
- ❑ Storing weighing results in the balance prevents prolonged occupation of a connected printer or PC during weighing operations.
- ❑ Stored data can be reviewed on the balance display as needed.
- ❑ Stored data can be output in bulk to a printer or PC. By presetting the function table, the output can include a data number, time, date, and ID number, in a selected weighing data format.
- ❑ The balance can store up to 200 entries of weighing data with time and date, along with the latest 50 entries of sensitivity adjustment history.

11-2-1. Preparing the data memory function for weighing values and sensitivity adjustment history

Enabling the data memory function (changing the function table configuration)

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

Step	Description	Display and key operations
4.	Press the [SAMPLE] key several times until <i>dAtA</i> (Data memory) appears.	 Press several times 
5.	Press the [RE-ZERO] key several times to display <i>2</i> (Stores weighing data / sensitivity adjustment history) for <i>dAtA</i> .	 
6.	Press the [PRINT] key to store the setting.	  
7.	Press the [CAL] key to return to weighing mode.	 

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

By presetting the function table, the output can be configured to include data number, time / date, and ID number. Refer to the table below for the output selection.

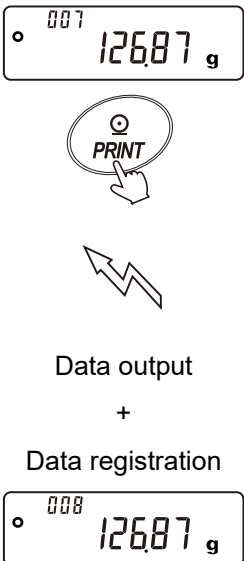
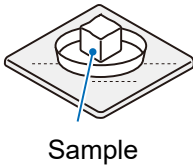
Output selection for data number, ID number, and time / date

Data number	No output	<i>d-na</i> = 0	Time / date	No output	<i>S-td</i> = 0	-
	Output	<i>d-na</i> = 1		Outputs time	<i>S-td</i> = 1	Up to 200 entries of data can be stored.
ID number	No output	<i>S-id</i> = 0		Outputs date	<i>S-td</i> = 2	
	Output	<i>S-id</i> = 1		Outputs time and date	<i>S-td</i> = 3	

Tip

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

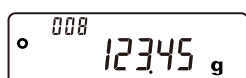
11-2-2. Storing (registering) weighing data

Step	Description	Display and key operations	Weighing operation
1.	Pressing the [PRINT] 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.		

Display and indicator

Weighing display

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



When the maximum storage capacity for weighing data is reached, \overline{FUL} \longleftrightarrow \overline{dRt} indicators 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 / USB.
- ❑ \overline{FUL} indicates that the memory is full. Additional weighing data cannot be stored unless existing data is deleted.
- ❑ Automatic sensitivity adjustment due to temperature changes is disabled while the interval output mode is active.
- ❑ The statistical calculation function is unavailable when the data memory function is in use.
- ❑ When P_{rE} is set to 3 (Stream mode), data may not be stored correctly.

The method for storing weighing values depends on the operation of P_{rt} (Data output mode) under d_{out} (Data output) in the function table ("9. Function Table").





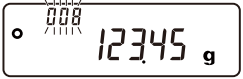
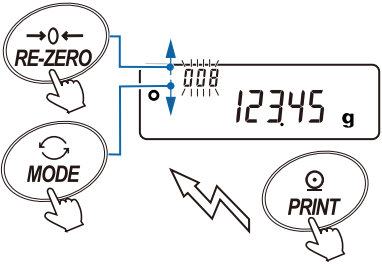


Combination of operation methods and function table settings

Mode \ Item	Data output mode	Auto print polarity and band width	Data memory	Intervals
Key mode	$P_{rt} = 0$	N/A	$dRtR = 2$	N/A
Auto print mode A	$P_{rt} = 1$	$RP-P: 0 \text{ to } 2$		
Auto print mode B	$P_{rt} = 2$	$RP-b: 0 \text{ to } 2$		
Key mode B (immediate output)	$P_{rt} = 4$	N/A		
Key mode C (output when stable)	$P_{rt} = 5$			
Interval output mode	$P_{rt} = 6$			$int: 0 \text{ to } 8$
Auto print mode C	$P_{rt} = 7$	$RP-P: 0 \text{ to } 2$ $RP-b: 0 \text{ to } 2$		N/A

11-2-3. Displaying and outputting weighing data

CAUTION

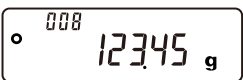







- Ensure that \bar{d} (Stores weighing data / sensitivity adjustment history)" is set for *dAtA* (Data memory) under dout (Data out) in the function table ("9. Function Table").
- When there is no stored data, No dAtA will be displayed.








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

11-2-4. Bulk output of stored weighing data


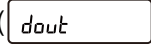
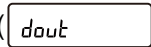
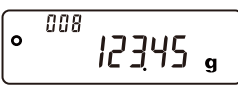











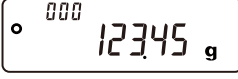
CAUTION

- To perform bulk output, first configure the (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 "21. Connection with Peripheral Devices".

Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the [PRINT] key (for 2 seconds).</p> <p>-d- or d-t is displayed at the top left of the <input type="text" value="RECALL"/> display.*1</p> <p>-d-: Without time / date setting <input type="text" value="dout"/>, S-t-d set to 0)</p> <p>d-t: With time / date setting <input type="text" value="dout"/>, S-t-d set to 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.	Press the [SAMPLE] key.	 
3.	Press the [PRINT] key.	 
4.	Press the [RE-ZERO] key to switch between No and Go.	 

Step	Description	Display and key operations
5.	Press the [PRINT] key while  is blinking. The balance outputs all stored data via RS-232C / USB.	  Bulk output  
6.	Press the [CAL] key to return to weighing mode.	 

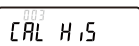


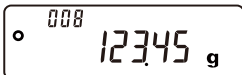

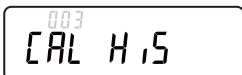







11-2-5. Bulk deletion of stored weighing data









Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the [PRINT] key (for 2 seconds).</p> <p>-d- or d-t is displayed at the top left of the  display.*1</p> <p>-d-: Without time / date setting , 5-t-d set to 0)</p> <p>d-t: With time / date setting , 5-t-d set to 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 [SAMPLE] key several times.	 Press several times 
3.	Press the [PRINT] key.	 
4.	Press the [RE-ZERO] key to switch between No and Go.	 
5.	<p>Press the [PRINT] key.</p> <p>The balance deletes all stored data.</p>	  
6.	<p>The balance returns automatically to weighing mode.</p> <p>Data number 000 will be displayed.</p>	

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

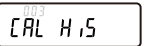


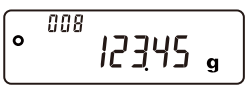

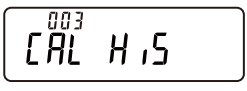


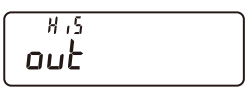







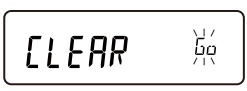



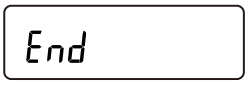

- ❑ The balance can store records of sensitivity adjustments (using the internal weight or an external weight) and calibration test results in its internal memory.
- ❑ These records can be output in bulk to a printer or PC.
- ❑ Up to the most recent 50 entries of sensitivity adjustment and calibration test results can be stored. When the number of entries exceeds 50, the display blinks alternately.

Outputting the sensitivity adjustment history

Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the [CAL] key until  appears.</p> <p>(While pressing and holding the [CAL] key, the item display will switch every 2 seconds.)</p> <p>CAUTION</p> <ul style="list-style-type: none"> ❑ If the   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.	<p>Release your finger from the [CAL] key.</p> <p>CAUTION</p> <ul style="list-style-type: none"> ❑ If there is no sensitivity adjustment history,  is displayed, then the balance returns to weighing mode. 	 Release 
3.	<p>Press the [PRINT] key.</p>	 
4.	<p>Press the [RE-ZERO] key to switch between <i>No</i> and <i>Go</i>.</p>	 

Step	Description	Display and key operations
5.	<p>Press the [PRINT] key while  is blinking.</p> <p>The balance outputs all stored history data via RS-232C / USB.</p>	   <p>Bulk output</p>  
6.	<p>Press the [CAL] key to return to weighing mode.</p>	 

11-2-7. Deleting sensitivity adjustment history

Step	Description	Display and key operations
1.	<p>In weighing mode, press and hold the [CAL] key until  appears. (While pressing and holding the [CAL] key, the item display will switch every 2 seconds.)</p> <p>CAUTION</p> <p>□ If the   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>	  Press and hold 
2.	<p>Release your finger from the [CAL] key.</p> <p>CAUTION</p> <p>□ If there is no sensitivity adjustment history,  is displayed, then the balance returns to weighing mode.</p>	 Release 
3.	Press the [SAMPLE] key.	 
4.	Press the [PRINT] key.	 
5.	Press the [RE-ZERO] key to switch between  and  .	 
6.	<p>Press the [PRINT] key while  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. Storing comparator setting values

- ❑ Up to 20 sets of upper and lower limit values can be stored for comparator mode.
- ❑ By reading the stored limit values, weighing can be performed without re-registering them each time. Stored values can be easily accessed using the [MODE] key (Simple Selection Mode).
- ❑ The stored upper and lower limit values can be changed after reading.
- ❑ The read upper and lower limit values can be changed in "Digital registration mode" (method of inputting the upper and lower limit values digitally) or "Load registration mode" (method of placing samples on the weighing pan to register the upper and lower limit values).

CAUTION

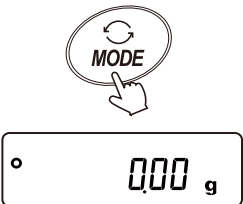
- ❑ Only the upper and lower limit values can be stored. Reference values and tolerance ranges cannot be stored in the data memory.

11-3-1. Preparing the data memory function for comparator settings

CAUTION






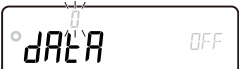







- ❑ Unit selection using the [MODE] key is not available while the data memory function is active.

Changing the weighing unit

Step	Description	Display and key operations
1.	Press the [MODE] key to preselect the unit for registration.	

Enabling the data memory function (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	

Step	Description	Display and key operations
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key.	 
4.	Press the [SAMPLE] key several times until <i>dAtA</i> (Data memory) appears.	 Press several times 
5.	Press the [RE-ZERO] key several times until $\rightarrow 0 \leftarrow$ (Stores comparator setting values) for <i>dAtA</i> appears.	 
6.	Press the [PRINT] key to store the setting.	  
7.	Press the [CAL] key to return to weighing mode.	 

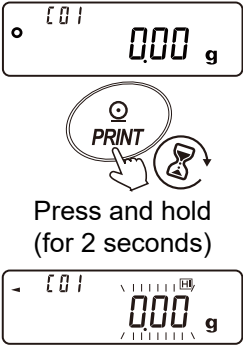
CAUTION

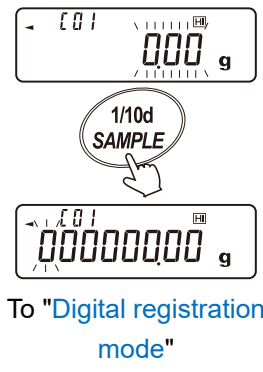
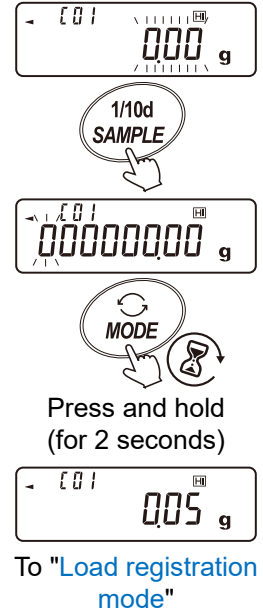
- To enable the comparator function, refer to "9-5. [Comparator function overview](#)". Once enabled, upper and lower limit values for the comparator can be registered (stored).

11-3-2. Registering comparator data

To register (store) a new upper / lower limit value, select the desired comparator number (comparator data) and register it using either "Digital registration mode" or "Load registration mode".

Comparator number: 001 to 020.

Step	Description	Display and key operations
1.	<p>Press and hold the [PRINT] key (for 2 seconds) to enter confirmation mode.</p> <p>The upper limit data, including the comparator number (001 to 020) and the blinking upper limit value, is displayed.</p> <p>The upper limit value of the most recently selected comparator is shown.</p>	 <p>Press and hold (for 2 seconds)</p>
2.	<p>Use the following keys to select the comparator number to use. (Available comparator numbers: 001 to 020.)</p> <p>[RE-ZERO] key..... Increases the comparator number by one.</p> <p>[MODE] key..... Decreases the comparator number by one.</p> <p>By performing the key operations described above, the HI and LO indicators will switch in the following sequence: 001 HI (lit) ⇔ 001 LO (lit) ⇔ 002 HI (lit) ⇔ 002 LO (lit) ⇔ ...</p> <p>In the case of 5-stage comparison, the indicators will switch in the following sequence: 001 HI (blinking) ⇔ 001 HI (lit) ⇔ 001 LO (lit) ⇔ 001 LO (blinking) ⇔ 002 HI (blinking) ⇔ ...</p>	

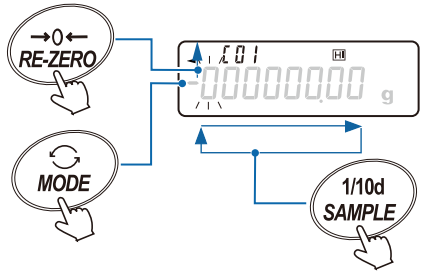
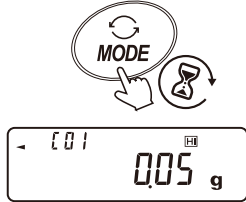
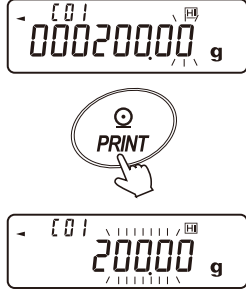
<p>3.</p>	<p>❑ To use "Digital registration mode" for registration, press the [SAMPLE] key.</p>	 <p>To "Digital registration mode"</p>
	<p>❑ To use "Load registration mode" for registration, press the [SAMPLE] key. Then, press and hold the [MODE] key (for 2 seconds) to enter "Load registration mode".</p>	 <p>To "Load registration mode"</p>

Digital registration mode

Digital registration mode is used to input the comparator's upper and lower limit values as numerical data.

In Digital registration mode, the digit to change blinks.

Perform registration using the following keys.

Step	Description	Display and key operations
1.	<p>[SAMPLE] key Changes the setting digit.</p> <p>[RE-ZERO] key Changes the setting value.</p> <p>[MODE] key Reverses the polarity.</p>	
	<p>Pressing and holding the [MODE] key (for 2 seconds) Enters "Load registration mode".</p>	
2.	<p>Press the [PRINT] key to register (store) the upper / lower limit value in data memory.</p> <p>(To cancel, press the [CAL] key.)</p> <p>Returns the balance to the state described in step 1 of "11-3-2. Registering comparator data".</p>	

Note


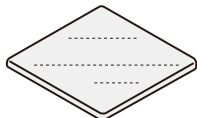


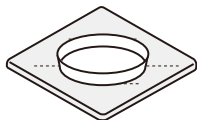
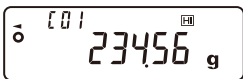
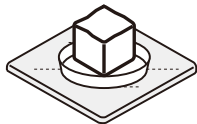


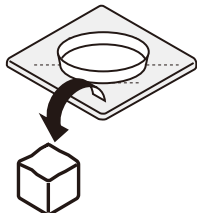

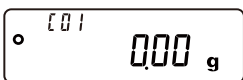
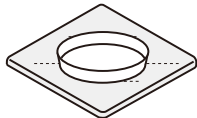
- The upper limit value can be modified using the "HI:" command, and the lower limit value using the "LO:" command.
(Refer to "[23-7. Commands](#)" for details.)

Load registration mode

Load registration mode allows the comparator's upper and lower limit values to be set by weighing samples that correspond to the desired limits.

Note

- Pressing the [CAL] key during operation returns the balance to the state described in step 1 of "11-3-2. Registering comparator data".
- To switch to [Digital registration mode](#), press and hold the [MODE] key (for 2 seconds).

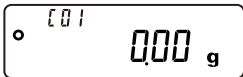



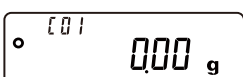
Step	Description	Display and key operations	Weighing operation
1.	When entering Load registration mode, the HI indicator on the display lights up, and the registered comparator number along with the current weight value are shown. The display shown on the right shows an example display when the $\overline{[0]}$ HI indicator is lit, indicating that the upper limit is selected. (When the 2nd upper limit is selected, the HI indicator blinks.)		
2.	If necessary, place a container, etc. on the weighing pan, then press the [RE-ZERO] key. The display is set to zero.	 	
3.	Place a sample corresponding to the comparator's upper limit on the weighing pan.		
4.	Press the [PRINT] key. The balance stores the comparator's upper limit value in the $\overline{[0]}$ data memory.	 	
5.	Remove the sample from the weighing pan.		
6.	Press the [CAL] key. The balance returns to weighing mode.	 	

11-3-3. Quick access to upper and lower limits (Simple Selection Mode)

This is a simple method for reading the comparator's upper and lower limit values stored in data memory. This operation allows immediate reading and use of the stored upper and lower limit values.

CAUTION

- Ensure that \int (Stores comparator setting values) is set for $dAtA$ (Data memory) under $dout$ in the function table ("9. Function Table").
- This method cannot be used when $\int P-b$ (Enlarged comparator display) under $\int P Fnc$ (Comparator) is set to \int (ON).

Step	Description	Display and key operations
1.	In weighing mode, press the [MODE] key to enter Simple Selection Mode for preset values. When Simple Selection Mode is activated, the comparator upper limit value (blinking) and the comparator number are displayed. The setting value most recently selected is shown.	 
2.	Press the [MODE] key several times to select the value. Each time the key is pressed, the setting will switch in the following sequence: $\int 01$ HI (lit) \Rightarrow $\int 01$ LO (lit) \Rightarrow $\int 02$ HI (lit) \Rightarrow $\int 02$ LO (lit) \Rightarrow ... In the case of 5-stage comparison, the indicators will switch in the following sequence: $\int 01$ HI (blinking) \Rightarrow $\int 01$ HI (lit) \Rightarrow $\int 01$ LO (lit) \Rightarrow $\int 01$ LO (blinking) \Rightarrow $\int 02$ HI (blinking) \Rightarrow ...	 
3.	When the desired setting value is displayed (e.g., $\int 02$ in the example shown on the right), press the [PRINT] key to confirm the selection and switch to weighing mode. Weighing can now be performed using the upper and lower limit values registered for $\int 02$. CAUTION □ Pressing the [CAL] key returns the display to weighing mode without confirming any settings.	

Note

- The comparator upper / lower limit value can be read using the "CN:mm" command.
 mm ranges from 01 to 20 and corresponds to $\int 01$ to $\int 20$.
- The read upper limit value can be output using the "?HI" command, and the lower limit value 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, weighing can be performed without re-registering it each time.
Stored values can be easily accessed using the [MODE] key (Simple Selection Mode).
- Stored tare values can be recalled and modified.

Note

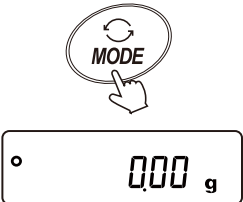
- The recalled tare value can be changed using either "Digital registration mode" (method of inputting the tare value digitally) or "Load registration mode" (method of placing the container on the weighing pan to register its weight).
- During tare operation, the **NET** and **PT** indicators will light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

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

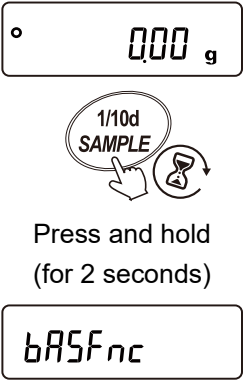
CAUTION














- Pressing the [RE-ZERO] key with nothing on the weighing pan resets the display to zero. The **NET** and **PT** indicators will not be shown.
- $\frac{1}{10d}$ indicates that tare subtraction is not being performed using a tare value stored in the data memory.
- Unit selection using the [MODE] key is not available while the data memory function is active.

Changing the weighing unit

Step	Description	Display and key operations
1.	In weighing mode, press the [MODE] key to preselect the unit for registration.	



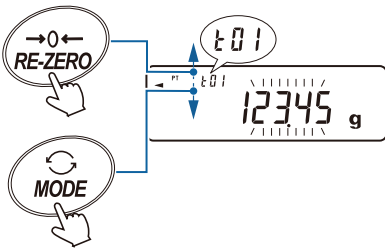
Enabling the data memory function (changing the function table configuration)

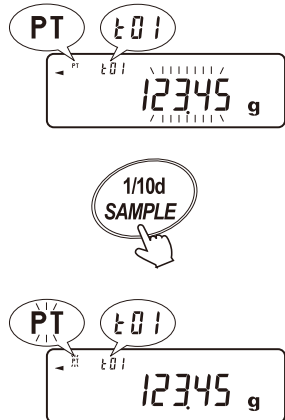
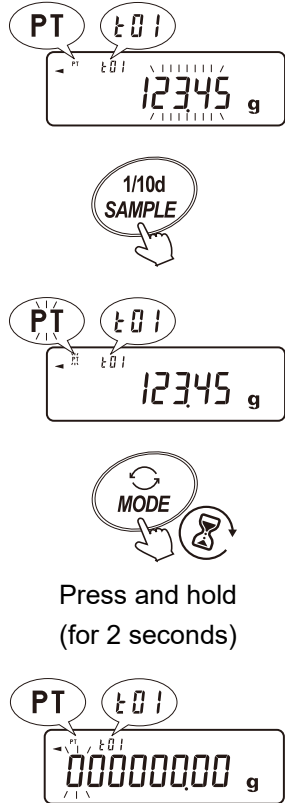
Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>Press and hold (for 2 seconds)</p>

Step	Description	Display and key operations
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times <div>  </div>
3.	Press the [PRINT] key.	 <div>  </div>
4.	Press the [SAMPLE] key several times until <i>dAtA</i> (Data memory) appears.	 Press several times <div>  </div>
5.	Press the [RE-ZERO] key several times until ∇ (Stores tare values) for <i>dAtA</i> appears.	 <div>  </div>
6.	Press the [PRINT] key to store the setting.	 <div>  </div> <div>  </div>
7.	Press the [CAL] key to return to weighing mode.	 <div>  </div>

11-4-2. Registering 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 [PRINT] key (for 2 seconds) to enter confirmation mode.</p> <p>The tare value data, including the tare value number and blinking tare value, is displayed.</p> <p>The tare value most recently selected or registered is shown.</p>	 <p>Press and hold (for 2 seconds)</p> 
2.	<p>Use the following keys to select the tare value number to be used. (Available comparator numbers: $t01$ to $t20$.)</p> <p>[RE-ZERO] key Increases the tare value number by one.</p> <p>[MODE] key Decreases the tare value number by one</p> <p>By performing the key operations described above, indicators will switch in the following sequence: $t01 \Leftrightarrow t02 \Leftrightarrow \dots \Leftrightarrow t20 \Leftrightarrow t01 \Leftrightarrow \dots$</p>	

Step	Description	Display and key operations
3.	<p>□ To use "Load registration mode" for registration, press the [SAMPLE] key.</p>	 <p>To "Load registration mode"</p>
	<p>□ To use "Digital registration mode" for registration, press the [SAMPLE] key. Then, press and hold the [MODE] key to enter "Digital registration mode".</p>	 <p>Press and hold (for 2 seconds)</p> <p>To "Digital registration mode"</p>

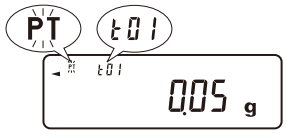
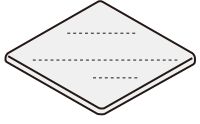
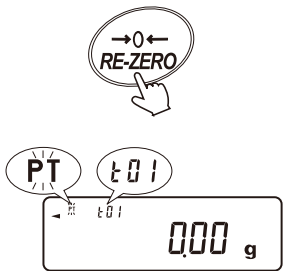
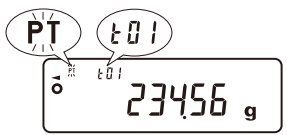
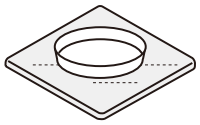
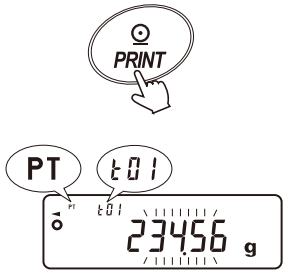
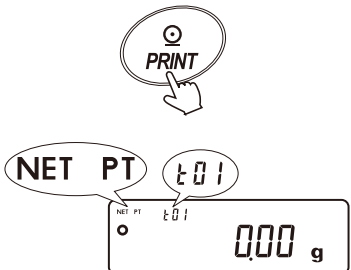
Load registration mode

In load registration mode, the tare value is registered by placing the container on the weighing pan.

CAUTION

- Pressing the [CAL] key during operation returns the balance to the state described in step 1 of "11-4-2. Registering tare value".

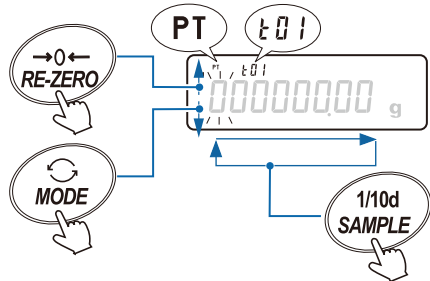
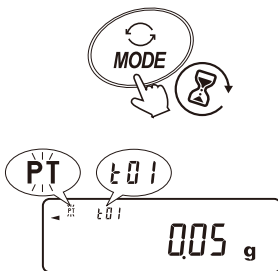
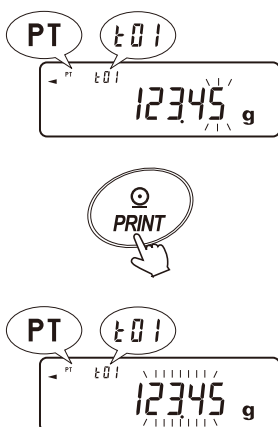
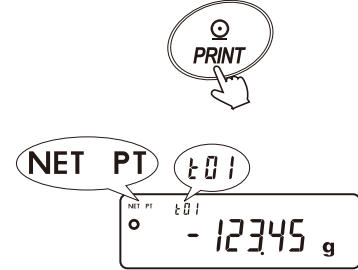
To switch to [Digital registration mode](#), press and hold the [MODE] key.

Step	Description	Display and key operations	Weighing operation
1.	When Load registration mode is activated, the PT section of the display blinks, and the tare value number along with the current weight are shown.		
2.	Press the [RE-ZERO] key to set the display to zero.		
3.	Place the container on the weighing pan.		
4.	Press the [PRINT] key to store the tare value.		
5.	Press the [PRINT] key to return to weighing mode. The NET and PT indicators illuminate to show that tare subtraction is being performed.		

Digital registration mode

Digital registration mode is used to input the tare value as numerical data. In Digital registration mode, the digit to change blinks.

Perform registration using the following keys.

Step	Description	Display and key operations
1.	<p>[SAMPLE] key Changes the setting digit.</p> <p>[RE-ZERO] key Increases the setting value.</p> <p>[MODE] key Decreases the setting value.</p> <p>Pressing and holding the [MODE] key (for 2 seconds) Enters "Load registration mode".</p>	  <p>To "Load registration mode"</p>
2.	<p>Press the [PRINT] key to register (store) the tare value in data memory.</p> <p>(To cancel, press the [CAL] key.)</p> <p>The balance returns to the state described in step 1 of "11-4-2. Registering tare value".</p>	
3.	<p>Press the [PRINT] key to return to weighing mode.</p> <p>The NET and PT indicators illuminate to show that tare subtraction is being performed.</p>	

Note

- The tare value can be changed using the "PT:" command. (Refer to "23-7. Commands".)

11-4-3. Quick access to tare value (Simple Selection Mode)

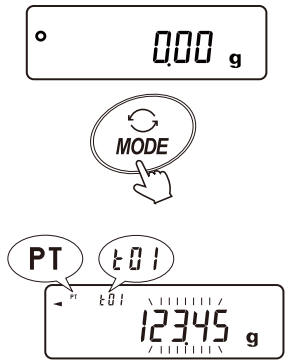
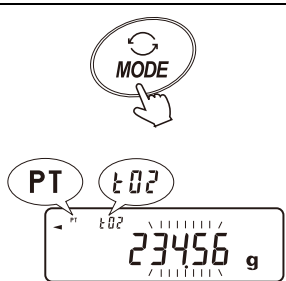
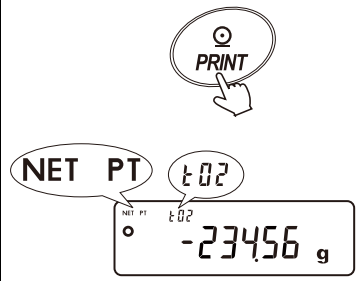
This is a simple method for reading the tare value stored in data memory. This operation enables quick access to and use of the stored tare value.

Note

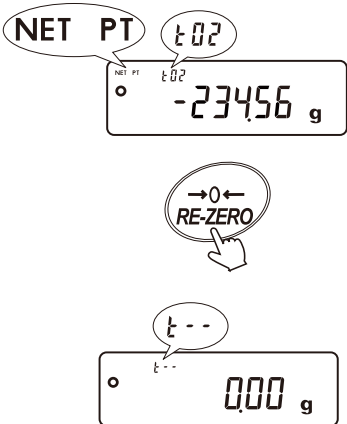
- The tare value can be read using the "PN:mm" command.
mm ranges from 01 to 20 and corresponds to $t01$ to $t20$.
- The tare value read using the "?PT" command will be output.

CAUTION

- Ensure that 4 (Stores tare values) is set for $dAtA$ (Data memory) under dout (Data out) in the function table ("9. Function Table").
- This method cannot be used when $CP-b$ (Enlarged comparator display) under CP Fnc (Comparator) is set to 1 (ON).

Step	Description	Display and key operations
1.	Press the [MODE] key to enter Simple Selection Mode for preset values. When Simple Selection Mode is activated, the tare value (blinking), the PT indicator, and the tare value number ($t01$ to $t20$) are displayed. The setting value most recently selected is shown.	
2.	Press the [MODE] key to select the desired setting value. Each time the key is pressed, the setting will switch in the following sequence: $t01 \Rightarrow t02 \Rightarrow t03 \Rightarrow \dots \Rightarrow t20 \Rightarrow t01 \Rightarrow$	
3.	When the desired setting value is displayed (e.g., $t02$ setting as shown on the right), press the [PRINT] key to confirm the selection and switch to weighing mode. Weighing can now be performed using the tare value registered for $t02$. CAUTION □ Pressing the [CAL] key cancels the selection and returns the display to weighing mode without applying any changes.	

11-4-4. Canceling tare data

Step	Description	Display and key operations
1.	<p>To cancel the tare value data, remove the object from the weighing pan and press the [RE-ZERO] key.</p> <p>The read tare value will be canceled.</p>	 <p>The diagram illustrates the process of canceling tare data. It shows two states of the weighing scale's display. In the initial state, the display shows 'NET PT' and 't 0.2' (with a small 't 0.2' below it), and the main display shows '-234.56 g'. A hand is shown pressing the 'RE-ZERO' key, which is labeled '→0← RE-ZERO'. In the final state, the display shows 't --' (with a small 't --' below it), and the main display shows '0.00 g'.</p>

12. Statistical Calculation Function

- This function processes weighing values statistically and displays / outputs the result. To use this function, set Σ (Statistical calculation mode) for $APPF$ (Application mode) under $APP Fnc$ (Application) in the function table ("9. Function Table"). To return to normal weighing mode (factory default), set $APPF$ (Application mode) to \square (Normal weighing mode).
- The calculation items available for display and output include: number of data instances, sum, maximum, minimum, range (maximum - minimum), mean, standard deviation, coefficient of variation, relative error of the maximum value, and relative error of the minimum value. You can select from four output levels using $SLHF$ (Statistical function mode output items) under $APP Fnc$ (Application) in the Function Table ("9. Function Table").
- Incorrect data input can be canceled using a key operation, provided it is done immediately after entry.
- Statistical results are initialized when the power is turned off. (They are not initialized by pressing the [ON/OFF] key.)
- The standard deviation, coefficient of variation, relative error of the maximum value, and relative error of the minimum value are obtained by the equation below:

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

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

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



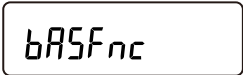

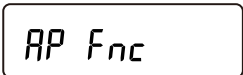

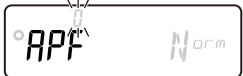

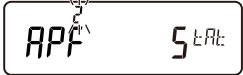
$$\text{Relative error of the minimum value (MIN\%)} = \frac{\text{Minimum value} - \text{Mean}}{\text{Mean}} \times 100 (\%)$$

CAUTION







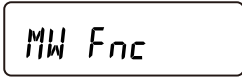

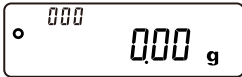
- If any data has the readability digit disabled, the calculation result is also displayed with the readability digit disabled.
(The readability digit is rounded off)
- The statistical calculation function cannot be used in conjunction with the data memory function setting: $dout$, $dRtR = 1 - 4$ ("9. Function Table").
- The statistical calculation function cannot be used in conjunction with the data memory function, minimum weight alert function, or density (specific gravity) measurement.
- If the total (SUM) exceeds the display digit capacity, the result will not be displayed correctly.

12-1. Preparations for statistical calculation function

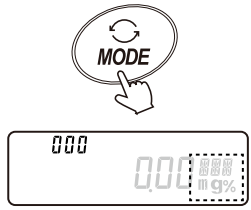
Enabling the statistical calculation function (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key.	 
4.	Press the [RE-ZERO] key several times to set \bar{x} for APF.	 Press several times 
5.	To select output items for statistical calculation, proceed to step 6 of " Selecting output items for statistical calculation ". To retain the current setting, proceed to step 8 of " Selecting output items for statistical calculation ". To disable the statistical calculation function, press the [RE-ZERO] key several times until the APF setting returns to 0.	

Selecting output items for statistical calculation

Step	Description	Display and key operations										
6.	Press the [SAMPLE] key.	<div></div> <div></div>										
7.	<p>Press the [RE-ZERO] key to configure the 5tAF setting to the desired value.</p> <p>In the example display, the selected output items are: number of data instances, sum, maximum, minimum, range (maximum – minimum), and mean.</p> <table><thead><tr><th>Parameter (5tAF)</th><th>Content</th></tr></thead><tbody><tr><td>0</td><td>Number of data instances, sum</td></tr><tr><td>1</td><td>Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean</td></tr><tr><td>2</td><td>Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean, standard deviation, coefficient of variation</td></tr><tr><td>3</td><td>Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean, standard deviation, coefficient of variation, relative error of the maximum value, relative error of the minimum value</td></tr></tbody></table> <p>■ Factory setting</p>	Parameter (5tAF)	Content	0	Number of data instances, sum	1	Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean	2	Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean, standard deviation, coefficient of variation	3	Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean, standard deviation, coefficient of variation, relative error of the maximum value, relative error of the minimum value	<div></div> <p>Press several times</p>
Parameter (5tAF)	Content											
0	Number of data instances, sum											
1	Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean											
2	Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean, standard deviation, coefficient of variation											
3	Number of data instances, sum, maximum, minimum, range (maximum – minimum), mean, standard deviation, coefficient of variation, relative error of the maximum value, relative error of the minimum value											
8.	Press the [PRINT] key to store the setting.	<div></div> <div></div> <div></div> <div></div>										
9.	To return to weighing mode, press the [CAL] key.	<div></div> <div></div>										




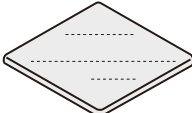

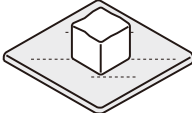
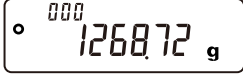

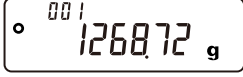
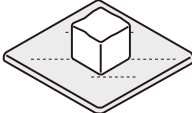
Selecting the weighing unit

Step	Description	Display and key operations
10.	<p>Use the [MODE] key to select the unit for statistical calculation.</p> <p>CAUTION</p> <ul style="list-style-type: none"> Once data has been entered, the unit cannot be changed using the [MODE] key. In this case, first clear all data by following the instructions in "Clearing statistical data", then select the desired unit using the [MODE] key. <p>Tip</p> <ul style="list-style-type: none"> To display the unit to be used for statistical calculations when the balance is powered on, configure the unit in advance using <input type="text" value="Unit"/> (Unit) in the function table ("9. Function Table"). 	 <p>The diagram illustrates the process of selecting the weighing unit. It shows a hand pressing the [MODE] key, which is labeled 'MODE' with a circular arrow icon. Below this, a digital display is shown with '000' on the left and 'mg%' on the right, indicating the selected unit.</p>

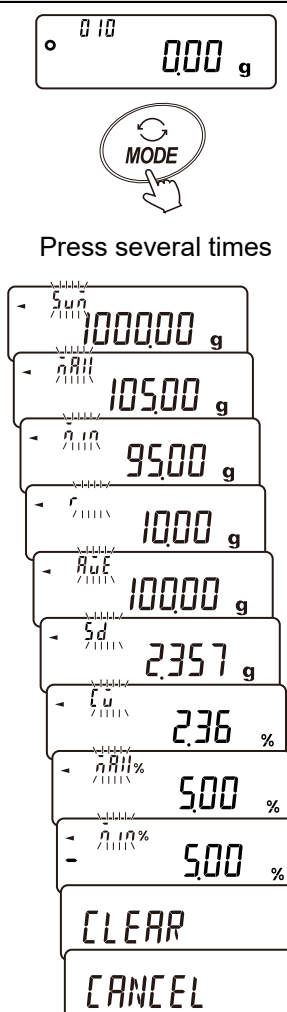
12-2. Using the statistical calculation function

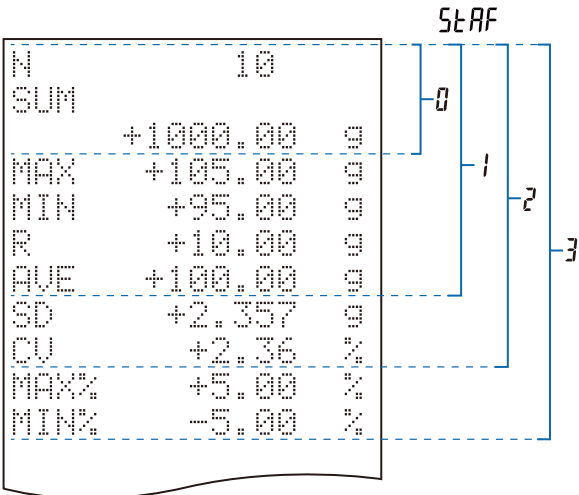



In the statistical calculation function, the data number of the weighing value used for the calculation is displayed in the upper-left corner of the balance display.

Sampling weighing data

Step	Description	Display and key operations	Weighing operation
1.	Press the [RE-ZERO] key to set the display to zero.	  	
2.	Place a sample on the weighing pan.		
3.	<p>Press the [PRINT] key when the stabilization indicator is lit.</p> <p>The displayed weighing value will be added to the statistical calculation, and the data count in the upper-left corner of the display will increase by one.</p> <p>Note</p> <p><input type="checkbox"/> If an external device is connected, the data will be output.</p> <p>Output example (AD-8127, dump print mode)</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <pre>No. 1 ST,+00005.63 g</pre> </div>	  	
4.	Repeat steps 1 to 3 for each weighing.		

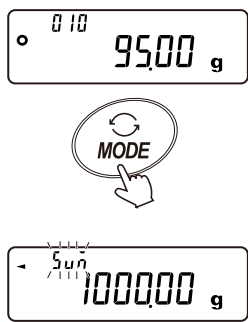

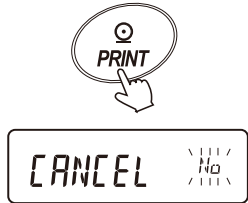


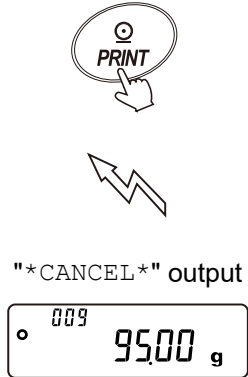
Display and output of statistical results (when one or more data instances are available)

Step	Description	Display and key operations																									
1.	<p>Each press of the [MODE] key sequentially displays the statistical results configured for $\Sigma\Delta RF$ (Statistical function mode output items), followed by CLEAR and CANCEL.</p> <p>To return to weighing mode, press the [CAL] key.</p> <p>Note</p> <ul style="list-style-type: none"> If there is only one data instance, ----- % is displayed for the coefficient of variation and relative error. If the mean is zero, ----- % is displayed for the coefficient of variation. <p>The symbol in the upper-left corner of the display indicates which statistical item is currently being shown.</p> <table border="1"> <thead> <tr> <th>Symbol</th><th>Calculation item</th><th>Parameter in the function table ($\Sigma\Delta RF$)</th></tr> </thead> <tbody> <tr> <td>$\Sigma\Delta n$</td><td>Sum</td><td>0</td></tr> <tr> <td>ΔRH</td><td>Maximum</td><td rowspan="3">1</td></tr> <tr> <td>Δn</td><td>Minimum</td></tr> <tr> <td>r</td><td>Range (maximum-minimum)</td></tr> <tr> <td>ΔuE</td><td>Mean</td><td rowspan="2">2</td></tr> <tr> <td>Σd</td><td>Standard deviation</td></tr> <tr> <td>Δu</td><td>Coefficient of variation</td><td rowspan="3">3</td></tr> <tr> <td>$\Delta RH\%$</td><td>Relative error of the maximum value</td></tr> <tr> <td>$\Delta n\%$</td><td>Relative error of the minimum value</td></tr> </tbody> </table>	Symbol	Calculation item	Parameter in the function table ($\Sigma\Delta RF$)	$\Sigma\Delta n$	Sum	0	ΔRH	Maximum	1	Δn	Minimum	r	Range (maximum-minimum)	ΔuE	Mean	2	Σd	Standard deviation	Δu	Coefficient of variation	3	$\Delta RH\%$	Relative error of the maximum value	$\Delta n\%$	Relative error of the minimum value	 <p>Press several times</p> <p>The display repeats in this cycle.</p>
Symbol	Calculation item	Parameter in the function table ($\Sigma\Delta RF$)																									
$\Sigma\Delta n$	Sum	0																									
ΔRH	Maximum	1																									
Δn	Minimum																										
r	Range (maximum-minimum)																										
ΔuE	Mean	2																									
Σd	Standard deviation																										
Δu	Coefficient of variation	3																									
$\Delta RH\%$	Relative error of the maximum value																										
$\Delta n\%$	Relative error of the minimum value																										

Step	Description	Display and key operations
2.	<p>To output the statistical results, press the [PRINT] key when a statistical result is displayed.</p> <p>Output example (AD-8127, dump print mode)</p> 	   <p>Statistical results output</p>

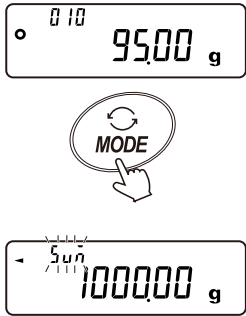
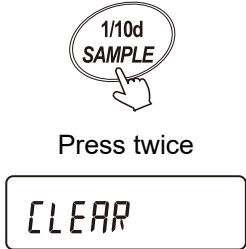


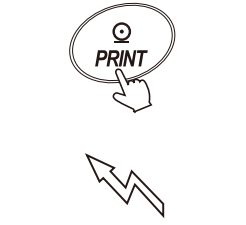
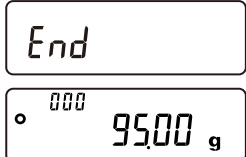
Deleting the latest data

If incorrect data is entered, it can be excluded from the statistical calculation by deleting it. Only the most recently entered data can be deleted. Data entered earlier cannot be removed.

Step	Description	Display and key operations
1.	In weighing mode, press the [MODE] key. The statistical calculation result will be displayed.	
2.	Press the [SAMPLE] key. The menu for deleting the latest data will be displayed.	
3.	Press the [PRINT] key. The options for deleting the latest data will be displayed.	
4.	Press [RE-ZERO] key. Pressing the [RE-ZERO] key toggles between No and Go.	
5.	Press the [PRINT] key while  is blinking. The latest data is excluded from the statistical calculation, and the data count displayed with the weighing value decreases by one. The balance outputs a character string indicating that the latest data has been deleted. Output example (AD-8127, dump print mode) <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> *CANCEL* </div>	

Clearing statistical data

All statistical data will be deleted, and the data count will be reset to zero.

Step	Description	Display and key operations
1.	In weighing mode, press the [MODE] key. The statistical calculation result will be displayed.	
2.	Press the [SAMPLE] key twice. The menu for clearing the statistical data will be displayed.	 <p>Press twice</p>
3.	Press the [PRINT] key. The options for clearing the statistical data will be displayed.	
4.	Press the [RE-ZERO] key. Pressing the [RE-ZERO] key toggles between No and Go.	
5.	Press the [PRINT] key while $\frac{No}{Go}$ is blinking. The statistical data is initialized, and the data count displayed with the weighing value is reset to zero. The balance outputs a character string indicating that the data has been deleted. Output example (AD-8127, dump print mode)	 <p>"*CLEAR*" output</p> 





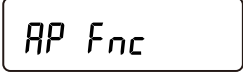



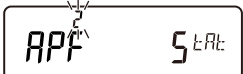
CLEAR



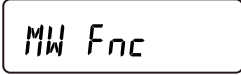
12-3. Example use of statistical calculation (for formulation)

This section demonstrates how to use the statistical calculation function when preparing a formulation involving multiple components, such as pharmaceutical ingredients. The balance and printer are used together to record the compounding process.


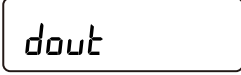

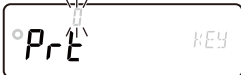

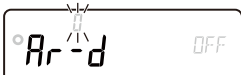

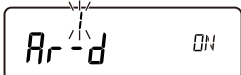
In this example, a GX-6002A balance and an AD-8127 printer (in dump print mode) are connected via the RS-232C serial interface.




Enabling the statistical calculation function (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key to display <i>APF</i> (Application mode).	 
4.	Press the [RE-ZERO] key several times until \bar{z} (Statistical calculation mode) appears for <i>APF</i> (Application mode).	 Press several times 




Step	Description	Display and key operations
5.	Press the [PRINT] key to confirm the change.	  

Enabling "Auto re-zero after data output" (changing the function table configuration)


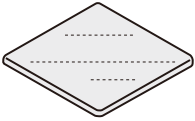

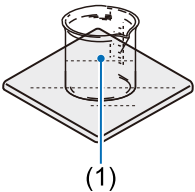
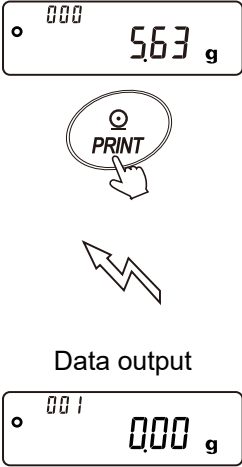

Step	Description	Display and key operations
6.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
7.	Press the [PRINT] key.	 
8.	Press the [SAMPLE] key several times to display $\overline{Ar-d}$ (Auto re-zero after data output).	 Press several times 
9.	Press the [RE-ZERO] key several times to display 1 (ON) for $\overline{Ar-d}$ (Auto re-zero after data output).	 Press several times 


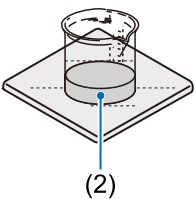




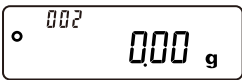
Step	Description	Display and key operations
10.	Press the [PRINT] key to confirm the change.	  

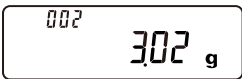
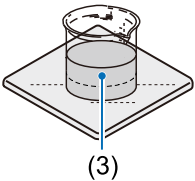

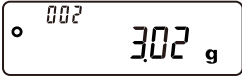



Returning to weighing mode


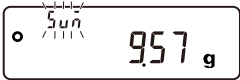
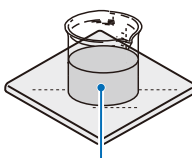


Step	Description	Display and key operations
11.	Press the [CAL] key to return to weighing mode.	  

Operation method

Step	Description	Display and key operations	
1.	Press the [RE-ZERO] key to set the display to zero.		
2.	Place a container, etc. (1) on the weighing pan.		
3.	<p>Make sure the stabilization indicator ● is lit, and then press the [PRINT] key.</p> <p>(The tare weight is stored.)</p> <p>The auto re-zero function automatically sets the display to 0.00 g.</p> <p>If an external output device is connected, the data will be output.</p> <p>Output example (AD-8127, dump print mode)</p> <div> <pre>No. 1 ST, +00005.63 g</pre> <p>(1) ←</p> </div> <p>(1) Container (Tare value)</p>	 <p>Data output</p> 	

Step	Description	Display and key operations	
4.	Put formula ingredient 1 (2) in the container (1).		
5.	<p>Make sure the stabilization indicator  is lit, and then press the [PRINT] key.</p> <p>(The weight of formula ingredient 1 is stored.)</p> <p>The auto re-zero function automatically sets the display to 0.00 g.</p> <p>If an external output device is connected, the data will be output.</p> <p>Output example (AD-8127, dump print mode)</p> <div> <pre> No. 1 ST, +000005.63 g ← (1) No. 2 ST, +000001.92 g ← (2) </pre> </div> <p>(1) Container (Tare value) (2) Formula ingredient 1</p>	   <p>Data output</p> 	

Step	Description	Display and key operations	
6.	Put formula ingredient 2 (3) in the container (1).		
7.	<p>Make sure the stabilization indicator  is lit, and then press the [PRINT] key.</p> <p>(The weight of formula ingredient 2 is stored.)</p> <p>The auto re-zero function automatically sets the display to 0.00 g.</p> <p>If an external output device is connected, the data will be output.</p> <p>Output example (AD-8127, dump print mode)</p> <div> <pre> No. 1 ST, +000005.63 g ← (1) No. 2 ST, +000001.92 g ← (2) No. 3 ST, +000003.02 g ← (3) </pre> </div> <p>(1) Container (Tare value) (2) Formula ingredient 1 (3) Formula ingredient 2</p>	   <p>Data output</p> 	
8.	<p>When there are more formula ingredients to mix, repeat step 4.</p> <p>To finish mixing, proceed to step 9.</p>		

Step	Description	Display and key operations	
9.	After mixing is completed, press the [MODE] key to display the statistical result.	 	 (2)+(3)
10.	<p>Press the [PRINT] key to output the total data (number of stored data instances and the total weight) including the tare value to the external output device.</p> <p>Output example (AD-8127, dump print mode)</p> <div> <pre> No. 1 ST, +00005.63 g ← (1) No. 2 ST, +00001.92 g ← (2) No. 3 ST, +00003.02 g ← (3) N 3 SUM +9.57 g ← (4) </pre> </div> <p>(1) Container (Tare value) (2) Formula ingredient 1 (3) Formula ingredient 2 (4) Gross weight</p>	  Total data output	

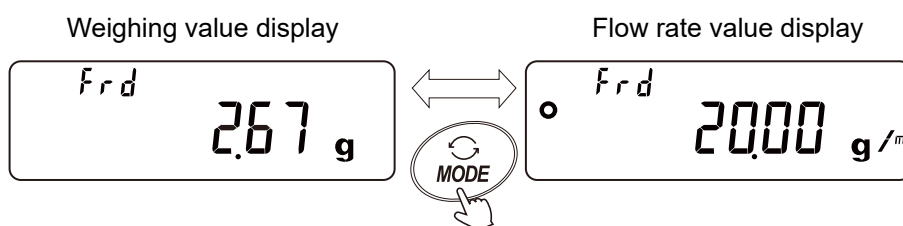
13. Flow Rate Display (FRD) Function

The balance has a flow rate display (FRD) function to calculate the amount of change in weighing values per unit of time.

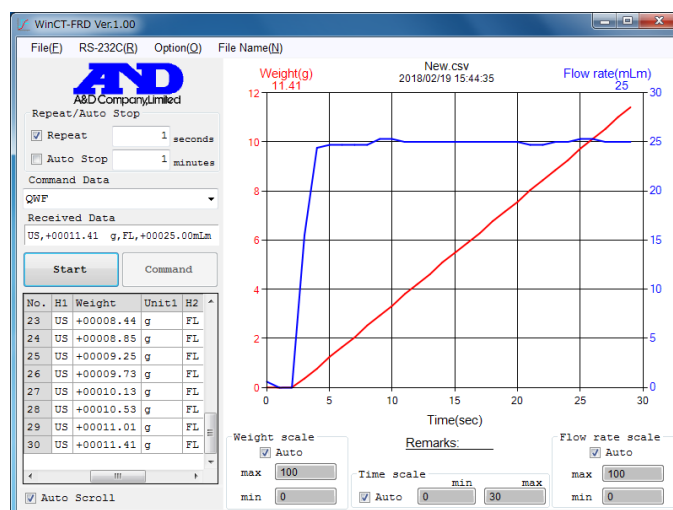
- ☐ Based on the change in weighing values, the balance automatically calculates and displays the flow rate per unit of time.
- ☐ Flow rate measurement is possible during both filling and discharging operations.
- ☐ When the sample density is set, the balance can also calculate and display the volume flow rate (mL).



- ☐ The display can be switched between the weighing value and the flow rate value using the [MODE] key, allowing confirmation of the total amount during or after filling.



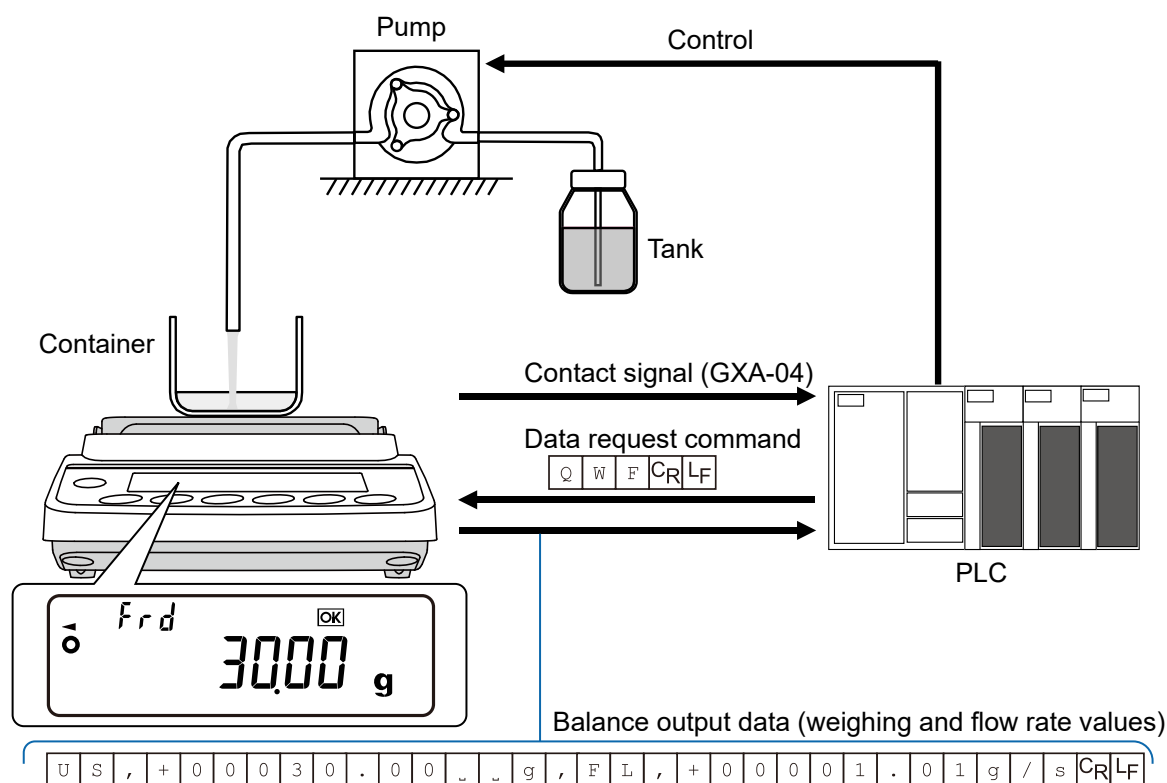
- ☐ When the balance is connected to a PC and operated with the Windows software WinCT-FRD, real-time changes in weight and flow rate are graphically displayed and recorded on the PC. WinCT-FRD is available for download from the [Software](#) page on the A&D website (<https://www.aandd.jp>). To download, fill in the required user information on the application page.



- Weighing and flow rate values can be output simultaneously to external devices using the "QWF" command. (For details, refer to "13-4. Commands used in the flow rate display (FRD) function".) This feature facilitates the design of external devices such as PLCs when constructing dispensing systems. Additionally, by using the optional GXA-04 (comparator relay output), a contact signal can be transmitted when the weighing value reaches a specified threshold.

CAUTION

- This function cannot be used in conjunction with the hold function.
- This function cannot be used in conjunction with density (specific gravity) measurement.



13-1. Flow rate calculation method

The flow rate is calculated using the following formula:

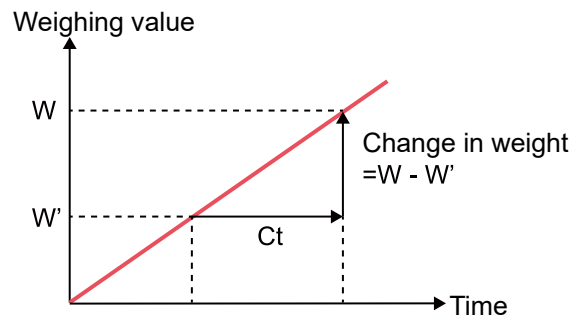
$$Q = \frac{|W - W'|}{Ct}$$

Q: Flow rate

Ct: Flow rate calculation time

W: Current weight

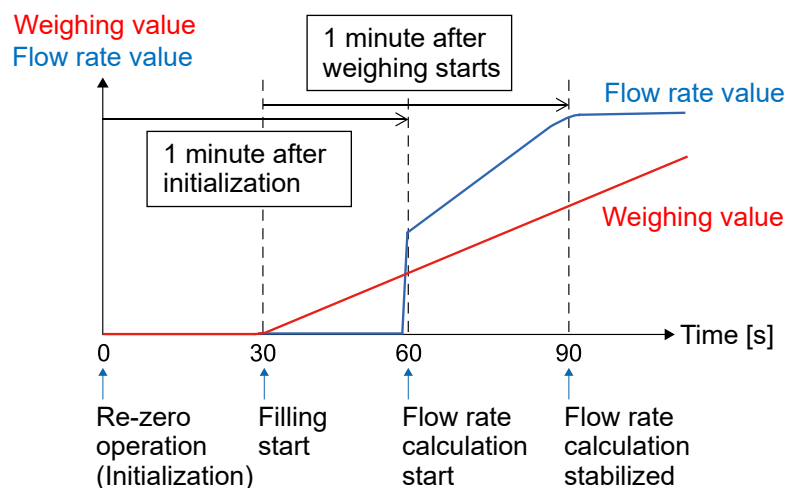
W': Weight before flow rate calculation time



The flow rate display (FRD) function stores weighing data in the balance and calculates the flow rate value.

- Turning off the power or pressing the [RE-ZERO] key initializes the stored weighing data. After initializing the weighing data or switching to FRD mode from another mode, the flow rate value will be displayed as "0" during the preset flow rate calculation time.
- A stable flow rate value cannot be calculated until the preset flow rate calculation time has elapsed after weighing starts.
- Flow rate values can be calculated during both filling (increasing weight) and discharging (decreasing weight) operations. Even when the weight decreases, the flow rate is calculated as a positive value.
Note: The variation in the calculated flow rate may change depending on the flow rate calculation time setting. (For details, refer to "[13-1-1. Examples of manual setting for flow rate calculation time \(Ct\)](#)".)

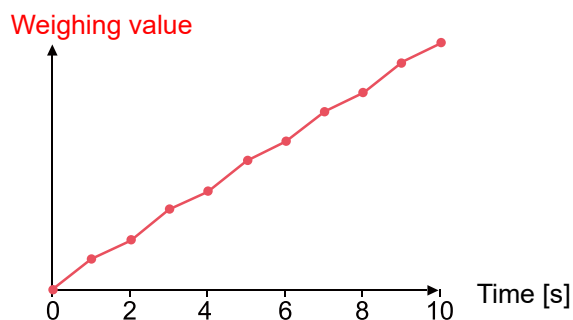
Example) When the flow rate calculation time is one minute:



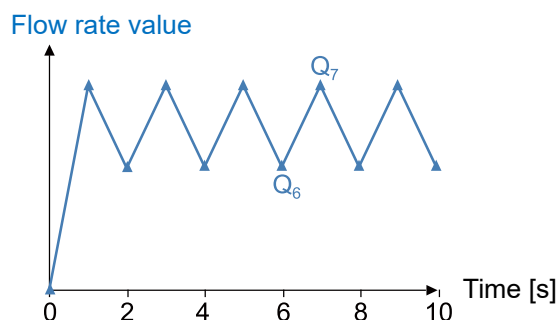
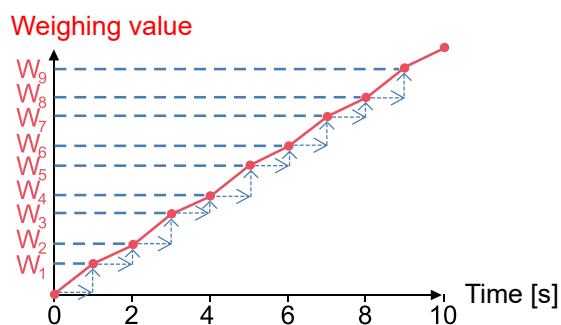
13-1-1. Examples of manual setting for flow rate calculation time (Ct)

This section provides examples illustrating how the flow rate value is affected by the flow rate calculation time setting.

When the flow rate is not constant



- Flow rate calculation time = 1 second

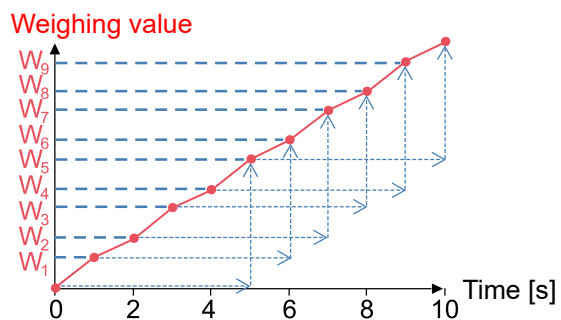


$$\text{Flow rate } Q_6 = \frac{W_6 - W_5}{1}$$

$$Q_7 = \frac{W_7 - W_6}{1}$$

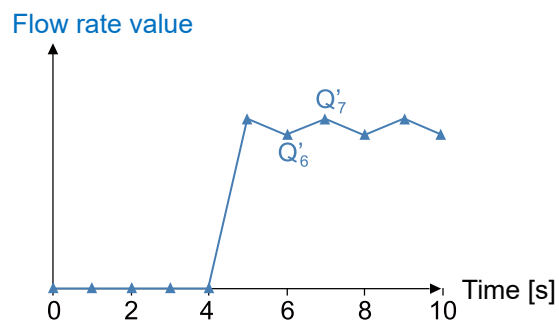
The change in weight over one second is used as the flow rate value. Therefore, if the weighing value fluctuates significantly, the flow rate value will also vary accordingly.

- Flow rate calculation time = 5 seconds



Flow rate $Q'_6 = \frac{W_6 - W_1}{5}$

$Q'_7 = \frac{W_7 - W_2}{5}$



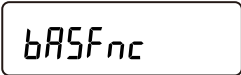

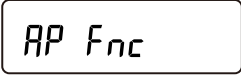

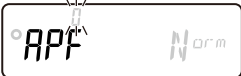

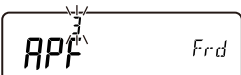


The flow rate per second is calculated based on the change in weight over a 5-second period.^{*1}
Compared to a 1-second calculation time, this setting reduces variation in the flow rate value.

- ^{*1} When the flow rate calculation time is set to 5 seconds, the flow rate is displayed as \square for the first 5 seconds after weighing begins.

13-2. Preparations for flow rate display (FRD) function

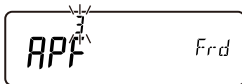

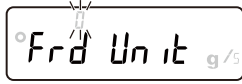


Switching to FRD mode (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key to display <i>APF</i> (Application mode).	 
4.	Press the [RE-ZERO] key several times until \int (Flow rate display (FRD) mode) appears for <i>APF</i> (Application mode).	 Press several times 
5.	To change the flow rate unit, proceed to step 6 of " Changing flow rate units ". To change the setting of flow rate calculation time, proceed to " Setting flow rate calculation time (Ct) ". To complete the settings, proceed to step 13.	

Changing flow rate units

By default, the flow rate unit is set to "g/s".

To change the setting, follow the procedure from step 5 of "[Switching to FRD mode \(changing the function table configuration\)](#)".

Step	Description	Display and key operations														
6.	Continued from step 5 of " Switching to FRD mode (changing the function table configuration) ".															
7.	Press the [SAMPLE] key to display <i>Frd Unit</i> (Unit of flow rate).	 														
8.	Press the [RE-ZERO] key several times to configure the setting to the desired parameter. <table><thead><tr><th>Parameter (<i>Frd Unit</i>)</th><th>Content</th></tr></thead><tbody><tr><td>0</td><td>g/s: grams per second</td></tr><tr><td>1</td><td>g/m: grams per minute</td></tr><tr><td>2</td><td>g/h: grams per hour</td></tr><tr><td>3</td><td>mL/s: milliliters per second</td></tr><tr><td>4</td><td>mL/m: milliliters per minute</td></tr><tr><td>5</td><td>mL/h: milliliters per hour</td></tr></tbody></table> <p style="text-align: right;">■ Factory setting</p>	Parameter (<i>Frd Unit</i>)	Content	0	g/s: grams per second	1	g/m: grams per minute	2	g/h: grams per hour	3	mL/s: milliliters per second	4	mL/m: milliliters per minute	5	mL/h: milliliters per hour	 Press several times 
Parameter (<i>Frd Unit</i>)	Content															
0	g/s: grams per second															
1	g/m: grams per minute															
2	g/h: grams per hour															
3	mL/s: milliliters per second															
4	mL/m: milliliters per minute															
5	mL/h: milliliters per hour															
9.	To change the setting method of flow rate calculation time (Ct), proceed to step 10 of " Setting flow rate calculation time (Ct) ". If "mL/s", "mL/m", or "mL/h" is selected, the density can be changed. (The initial value is 1.0000 g/cm³.) To change the density, proceed to " Entering and setting density ". To retain the current setting, proceed to step 13 of " Setting flow rate calculation time (Ct) ".															









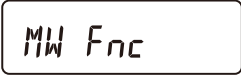


Setting flow rate calculation time (Ct)

There are two ways to set the flow rate calculation time:

- Manual setting: Selects a fixed time manually.
- Automatic setting: Sets the time automatically by the balance according to the flow rate value.

In the factory settings, $Ct\ Auto$ (Automatic calculation time setting) is set to OFF (OFF), allowing manual input for flow rate calculation time.

To switch between manual and automatic settings, follow the procedure from step 5 of "[Switching to FRD mode \(changing the function table configuration\)](#)".

Step	Description	Display and key operations
10.	Continued from step 5 of " Switching to FRD mode (changing the function table configuration) ".	
11.	Press the [SAMPLE] key several times to display $Ct\ Auto$ (Automatic calculation time setting).	 
12.	Press the [RE-ZERO] key to switch between ON and OFF .	  
13.	Press the [PRINT] key to store the parameter.	 
14.	The next class in the function table is displayed. Press the [CAL] key to return to the weighing value display.	  

Step	Description	Display and key operations
15.	<p>If Ct AUTO (Automatic calculation time setting) is set to 0 (OFF), set the flow rate calculation time while referring to "(1) Manual setting".</p> <p>If Ct AUTO (Automatic calculation time setting) is set to 1 (ON), set the flow rate calculation accuracy while referring to "(2) Automatic setting".</p>	

(1) Manual setting

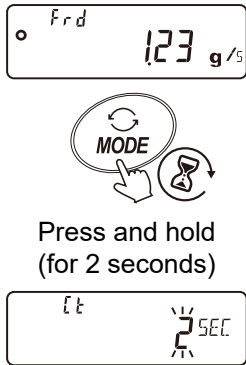
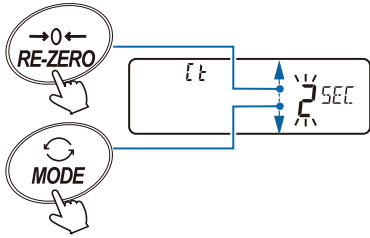
When the manual setting is selected for the flow rate calculation time (Ct), the values shown in the table below can be set.




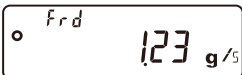

Flow rate calculation time (Ct) available for manual setting

Flow rate calculation time (Ct)		
Second(s) [s]	Minute(s) [m]	Hour(s) [h]
1	1	1
2	2	
5	5	
10	10	
20	20	
30	30	

Selecting the flow rate calculation time (Ct)

The flow rate calculation time can be changed by the following procedure:

Step	Description	Display and key operations
1.	<p>While the weighing value display or the flow rate value display is active, press and hold the [MODE] key (for 2 seconds) until the display shown on the right appears.</p> <p>(The figure is an example of the flow rate value display.)</p>	 <p>Press and hold (for 2 seconds)</p>
2.	<p>Use the following keys to change the flow rate calculation time (Ct):</p> <p>[RE-ZERO] key Increases the flow rate calculation time (Ct).</p> <p>[MODE] key Decreases the flow rate calculation time (Ct).</p>	

Step	Description	Display and key operations
3.	Press the [PRINT] key to store the setting. (To cancel without saving the setting, press the [CAL] key.)	 
	When the flow rate unit is in grams (g/*), the balance returns to the weighing value display or the flow rate value display. (The figure is an example of the flow rate value display.)	 
	When the flow rate unit is milliliters (mL/*), the density setting display appears. Refer to "Entering and setting density" .	

General settings

General standards of the flow rate value by model

Classification	Range of flow rate value (mL/min)
0.0001 g model	0.001 to 10
0.001 g model	0.01 to 100
0.01 g model	0.1 to 1000
0.1 g model	1 to 5000

General standard settings of flow rate value and flow rate calculation time by model

The area marked in grey (■) in each table below shows the standard settings of the flow rate calculation time for various flow rates (mL/min).

If the flow rate value does not stabilize with the settings of each table, set a longer flow rate calculation time.

When the 0.0001 g model is used

Flow rate (mL/min)	Priority to response ←				Ct setting			→ Priority to accuracy		
	1 sec	2 sec	5 sec	10 sec	20 sec	30 sec	1 min	2 min	5 min	10 min
0.001										■
0.002									■	■
0.005								■	■	■
0.01							■	■	■	
0.02						■	■	■	■	
0.05					■	■	■	■		
0.1				■	■	■	■			
0.2			■	■	■	■				
0.5		■	■	■	■					
1	■	■	■	■						
2	■	■	■							
5	■	■								
10	■									

Example) When measuring a flow rate of 0.02 mL/min, set the flow rate calculation time to a value between 30 seconds and 5 minutes.

When the 0.001 g model is used

Flow rate (mL/min)	Priority to response ←				Ct setting			→ Priority to accuracy		
	1 sec	2 sec	5 sec	10 sec	20 sec	30 sec	1 min	2 min	5 min	10 min
0.01										
0.02										
0.05										
0.1										
0.2										
0.5										
1										
2										
5										
10										
20										
50										
100										

Example) When measuring a flow rate of 0.02 mL/min, set the flow rate calculation time to 5 minutes or longer.

When the 0.01 g model is used

Flow rate (mL/min)	Priority to response ←				Ct setting			→ Priority to accuracy		
	1 sec	2 sec	5 sec	10 sec	20 sec	30 sec	1 min	2 min	5 min	10 min
0.1										
0.2										
0.5										
1										
2										
5										
10										
20										
50										
100										
200										
500										
1000										

Example) When measuring a flow rate of 20 mL/min, set the flow rate calculation time to a value between 5 and 30 seconds.

When the 0.1 g model is used

Flow rate (mL/min)	Priority to response ←				Ct setting			→ Priority to accuracy		
	1 sec	2 sec	5 sec	10 sec	20 sec	30 sec	1 min	2 min	5 min	10 min
1										
2										
5										
10										
20										
50										
100										
200										
500										
1000										
2000										
5000										

Example) When measuring a flow rate of 2000 mL/min, set the flow rate calculation time to a value between 1 and 5 seconds.

(2) Automatic setting

Flow rate measurement can be performed without manually selecting the flow rate calculation time (Ct).

The calculation time is automatically determined based on the measured flow rate, within a range of 1 to 60 seconds.

When using automatic setting, the flow rate can be calculated starting 1 second after weighing begins, once any stored data has been initialized.*1

The flow rate calculation accuracy can be selected. Three options are available: Accuracy priority (resolution: 500), Standard setting (resolution: 200), and Response priority (resolution: 50).




*1 If the flow rate value does not stabilize within 1 minute after weighing starts, either set the accuracy to Accuracy priority (resolution: 500), or disable [t AUTO] (Automatic calculation time setting) by setting it to [OFF] , and manually set the flow rate calculation time to 2 minutes or longer.

Selecting flow rate calculation accuracy

Follow the procedure below to change the flow rate calculation accuracy.

Follow the procedure below to change the flow rate calculation accuracy.

Step	Description	Display and key operations								
1.	<p>While the weighing value display or the flow rate value display is active, press and hold the [MODE] key (for 2 seconds) until the display shown on the right appears.</p> <p>(The figure is an example of the flow rate value display.)</p>	<div><div><div><div><div></div><div><div><div>Fr d</div><div>123</div><div>g/s</div></div></div></div></div></div></div> <div><div><div><div></div><div></div><div></div></div><div><div></div><div>MODE</div><div></div></div><div><div></div><div></div><div></div></div></div><div><div></div><div></div><div></div></div></div> <div>Press and hold (for 2 seconds)</div> <div><div><div><div></div><div><div><div>°Fr</div><div>RES</div><div>200</div></div></div></div></div></div>								
2.	<p>Press the [RE-ZERO] key several times to select the desired parameter.</p> <table><tr><th>Parameter (Fr RES)</th><th>Content</th></tr><tr><td><div></div></td><td>Accuracy priority (resolution: 500)</td></tr><tr><td><div>■ 1</div></td><td>Standard setting (resolution: 200)</td></tr><tr><td><div>2</div></td><td>Response priority (resolution: 50)</td></tr></table> <div>■ Factory setting</div>	Parameter (Fr RES)	Content	<div></div>	Accuracy priority (resolution: 500)	<div>■ 1</div>	Standard setting (resolution: 200)	<div>2</div>	Response priority (resolution: 50)	<div><div><div><div></div><div><div><div>→0←</div><div>RE-ZERO</div></div></div></div></div></div> <div>Press several times</div> <div><div><div><div></div><div><div><div>Fr</div><div>RES</div><div>500</div></div></div></div></div></div>
Parameter (Fr RES)	Content									
<div></div>	Accuracy priority (resolution: 500)									
<div>■ 1</div>	Standard setting (resolution: 200)									
<div>2</div>	Response priority (resolution: 50)									
3.	<p>Press the [PRINT] key to store the setting.</p>	<div><div><div><div></div><div><div><div></div><div>PRINT</div></div></div></div></div></div> <div><div><div><div></div><div><div><div>Fr</div><div>RES</div><div>500</div></div></div></div></div></div>								

Step	Description	Display and key operations
4.	When the flow rate unit is in grams (g/*), the balance returns to the weighing value display or the flow rate value display. (The figure is an example of the flow rate value display.)	 
	When the flow rate unit is milliliters (mL/*), the density setting display appears. Refer to step 3 of " Entering and setting density ".	

Flow rate display update timing

Display update timing refers to the interval at which the flow rate value shown on the balance is refreshed. Output timing can be configured as desired.

(1) When the flow rate calculation time is set to automatic:

The flow rate display is updated at intervals of either 1 second or 2 seconds.

(2) When the flow rate calculation time is set manually:

The relationship between the flow rate calculation time and the display update timing is as follows:

Flow rate calculation time and display update timing

Flow rate calculation time (Ct)	Display update timing
1 second	1 second
2 seconds	1 second
5 seconds	1 second
10 seconds	1 second
20 seconds	1 second
30 seconds	1 second
1 minute	1 second
2 minutes	1 second
5 minutes	3 seconds
10 minutes	5 seconds
20 minutes	10 seconds
30 minutes	15 seconds
1 hour	30 seconds

Entering and setting density

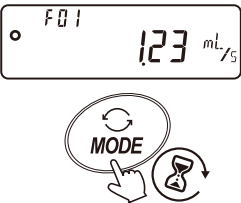
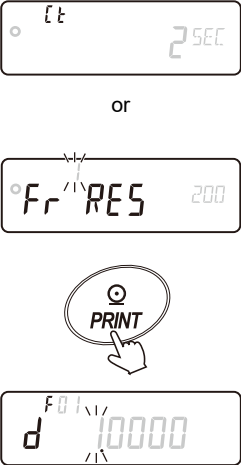
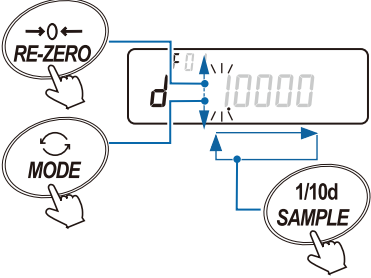
When the flow rate unit is set to "mL/s", "mL/m", or "mL/h" (by setting 3, 4, or 5 for $Frd Unit$ under

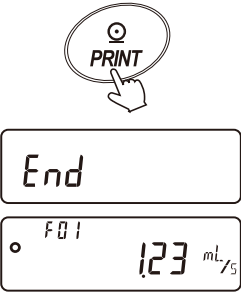
$RP Fnc$ in the function table ("9. Function Table")), density input becomes available. Entering a density allows the balance to convert mass to volume and calculate the flow rate in milliliters (mL).

Up to 10 density values can be stored using density memory slots $F01$ to $F10$. By pre-registering these values, the appropriate density can be easily selected according to the measurement sample.

Density input

Density can be entered after setting either the flow rate calculation time or the flow rate calculation accuracy. The setting for the selected density memory slot can be changed. Regardless of the slot, the initial value is 1.0000 g/cm³.

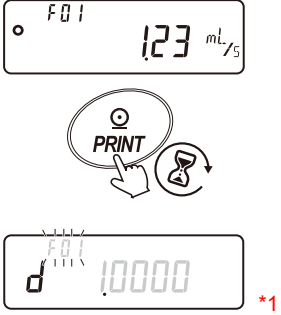
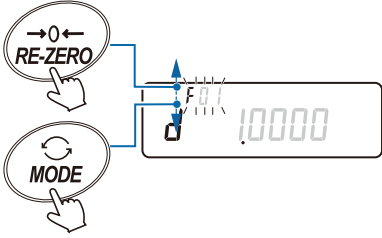
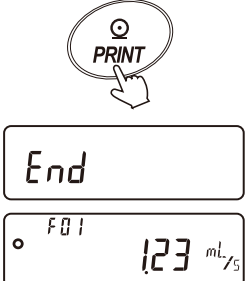
Step	Description	Display and key operations
1.	While the flow rate value display or the weighing value display is active, press and hold the [MODE] key (for 2 seconds).	
2.	Select the flow rate calculation time or flow rate calculation accuracy, then press the [PRINT] key to confirm the setting.	
3.	Use the following keys to change the density setting. [RE-ZERO] key Increases the value of the blinking digit. [MODE] key Decreases the value of the blinking digit. [SAMPLE] key Selects the digit to blink.	

Step	Description	Display and key operations
4.	<p>Press the [PRINT] key to store the setting. (To cancel without saving the setting, press the [CAL] key.)</p> <p>The balance automatically returns to the flow rate value display or the weighing value display.</p>	 <p>The diagram illustrates the action of pressing the [PRINT] key. A hand icon is shown pressing a button labeled 'PRINT' which has a small circle icon above it. Below this, a rectangular display box shows the word 'End'. Below that, another rectangular display box shows a small circle icon, the text 'F01', and the value '123' followed by the unit 'mL/5'.</p>

Selecting a density memory slot

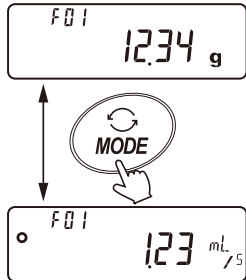
Up to 10 density values can be registered when the flow rate unit is set to "mL/s", "mL/m", or "mL/h".

To register a new density, select an unused density memory slot, then follow the density input procedure to complete the registration.

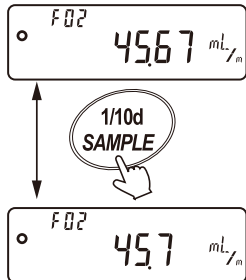
Step	Description	Display and key operations
1.	<p>While the weighing value display or the flow rate value display is active, press and hold the [PRINT] key (for 2 seconds).</p> <p>*1 ρ ** indicates the selected density memory slot. ρ *.**** indicates the registered density value.</p>	
2.	<p>Use the following keys to change the density memory slot.</p> <p>[RE-ZERO] key Increases the value of the blinking digit.</p> <p>[MODE] key Decreases the value of the blinking digit.</p>	
3.	<p>Press the [PRINT] key to store the setting. (To cancel without saving the setting, press the [CAL] key.)</p> <p>The balance automatically returns to the flow rate value display or the weighing value display.</p>	

Switching displays

Switching between flow rate value and weighing value displays

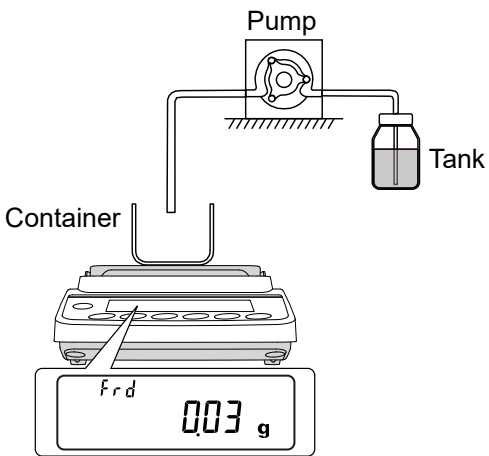
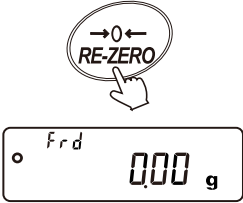
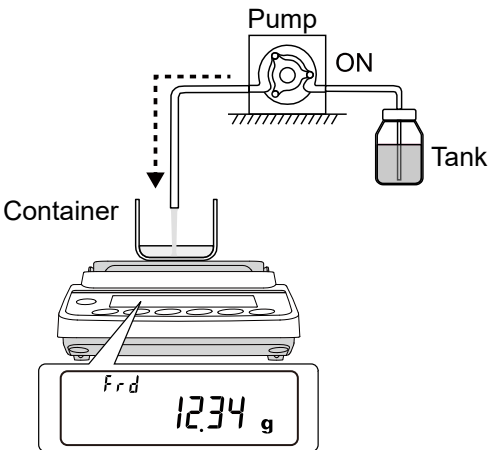
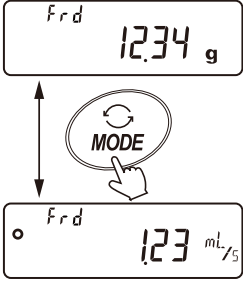
Step	Description	Display and key operations
1.	<p>When the balance is in FRD mode (indicated by F_{rd} or F^{**} in the upper-left corner of the display), pressing the [MODE] key toggles between the flow rate value display and the weighing value display.*1</p> <p>The weighing value display uses grams (g) as the fixed unit.</p> <p>*1 F^{**} indicates the selected density memory slot.</p> <p>Example: F_{01} to F_{10}</p>	<p>Weighing value display</p>  <p>Flow rate value display</p>

Readability digit ON / OFF

Step	Description	Display and key operations
1.	<p>Press the [SAMPLE] key to toggle the readability digit on or off.</p> <p>Turning off one digit can help reduce fluctuations in the flow rate display.</p> <p>Tip</p> <p><input type="checkbox"/> To reduce fluctuations in flow rate values without changing the readability setting, adjust the flow rate calculation time.</p>	

13-3. Example usage of flow rate display (FRD) function

Flow rate measurement using a pump

Step	Description	Display and key operations
1.	Prepare the required equipment, including the pump, sample fluid, and container. Ensure that the balance is set to FRD mode.	
2.	Press the [RE-ZERO] key to set the weighing value to zero.	
3.	Turn on the pump to begin measurement.	
4.	<p>To check the flow rate and weighing values, press the [MODE] key to switch the display.</p> <p>If the flow rate values are unstable, either turn off the readability digit using the [SAMPLE] key or increase the flow rate calculation time (Ct).</p>	<p>Weighing value display</p>  <p>Flow rate value display</p>

13-3-1. Using comparator with flow rate display (FRD)

When the flow rate display (FRD) function is used with the comparator function, comparison can be performed based on either the weighing value (in grams) or the flow rate value.

This setting can be configured using [P-Frd] (Flow comparator) under [P Fnc] in the function table ("9. Function Table").

By default, the comparator is set to [F] (Compares by flow rate) in the factory settings.

If using the optional GXA-04 comparator relay output (sold separately), comparison results can be output via contact signals.

For details on the comparator function, refer to "9-5. Comparator function overview".

Example: Using the comparator function

This example demonstrates filling 100 g using a pump and the contact output of the GXA-04.

(When the weighing value reaches 100 g, the balance outputs a HI contact signal, which stops the pump.)


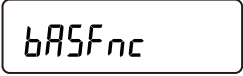

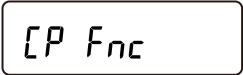

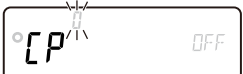
Connect the HI output of the GXA-04 to the pump's stop signal line.


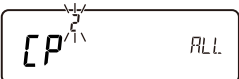

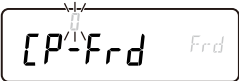

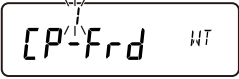





Refer to the instruction manuals for both the GXA-04 and the pump for proper cable wiring procedures.

CAUTION




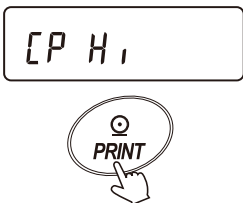

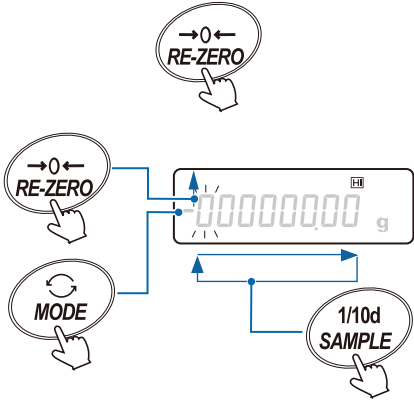
- Ensure that the pump supports contact input.









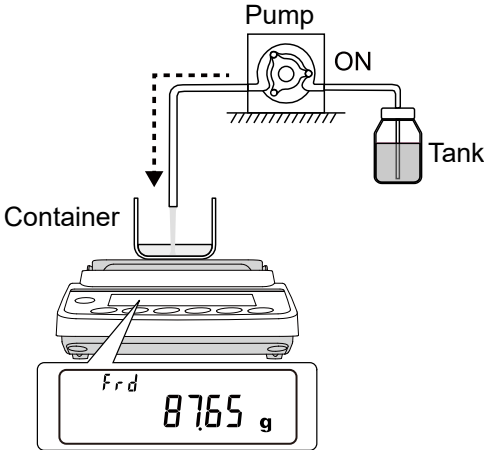
Changing the function table configuration

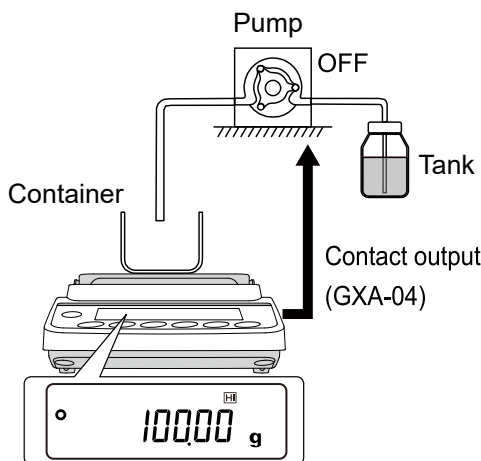
Step	Description	Display and key operations
1.	While the weighing value display is active, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 
2.	Press the [SAMPLE] key several times.	 Press several times 
3	Press the [PRINT] key.	 

Step	Description	Display and key operations
4	Press the [RE-ZERO] key several times until $\rightarrow 0 \leftarrow$ (Continuous comparison) appears for $\overline{[P]}$ (Comparator mode).	 <p>Press several times</p> 
5.	Press the [SAMPLE] key several times.	 <p>Press several times</p> 
6.	Press the [RE-ZERO] key several times until \downarrow (Compare by weighing value [g unit]) appears for $\overline{[P-Frd]}$ (Flow comparator).	 
7.	Press the [PRINT] key to store the setting.	  
8.	To return to the weighing value display, press the [CAL] key.	 

Inputting the HI value

Step	Description	Display and key operations
9.	While the weighing value display is active, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>The display shows "Frd 003 g". A hand presses and holds the "1/10d SAMPLE" key for 2 seconds, indicated by a clock icon. The display then changes to "bASFnc".</p>
10.	Press the [SAMPLE] key several times.	 <p>The display shows "1/10d SAMPLE". A hand presses the key several times, indicated by the text "Press several times". The display then changes to "CP VALUE".</p>
11.	Press the [PRINT] key.	 <p>A hand presses the "PRINT" key.</p>
12.	When the display shown on the right appears, press the [PRINT] key.	 <p>The display shows "CP H1". A hand presses the "PRINT" key.</p>
13.	The currently set value is displayed.	 <p>The display shows "000 g".</p>
14.	To change the setting, press the [RE-ZERO] key, then use the following keys: [SAMPLE] key Selects the digit to blink. [RE-ZERO] key Changes the value of the blinking digit. [MODE] key Toggles the polarity (+ / -).	 <p>The diagram shows a sequence of key presses: "RE-ZERO" (with a "0" and arrows), "MODE", and "1/10d SAMPLE". The display shows "00000000 g".</p>

Step	Description	Display and key operations
15.	Press the [PRINT] key to store the setting. (To cancel, press the [CAL] key.)	   
16.	To return to the weighing value display, press the [CAL] key twice.	 Press twice 
17.	Press the [RE-ZERO] key to set the weighing value to zero. Turn on the pump to begin measurement.	  

Step	Description	Display and key operations
18.	<p>When the weighing value reaches 100 g, the balance equipped with the GXA-04 outputs a contact signal to stop the pump.</p> <p>CAUTION</p> <p>□ If the balance enters the function table menu ("9. Function Table") or the display is turned off while in this state, the contact output will be disabled, and the pump may restart.</p> <p>Be sure to turn off the pump before proceeding to the next step.</p> <p>Tip</p> <p>□ Depending on the configuration of the balance and pump, the value may exceed the setting value. If this occurs, adjust the setting value to a slightly lower setting.</p>	 <p>The diagram illustrates the pump control system. A balance scale is shown with a digital display reading "100.00 g". A container is placed on the scale pan. A tube connects the container to a pump. The pump is labeled "Pump" and "OFF". A tank is connected to the pump. A contact output (GXA-04) is shown as a line connecting the balance to the pump.</p>

13-3-2. Using analog voltage output

For the GX-A, GF-A, GX-AWP, and GF-AWP series, the optional GXA-06 (analog voltage output, sold separately) allows the flow rate value to be output as an analog voltage signal.

In FRD mode, the balance operates differently than in normal weighing mode.

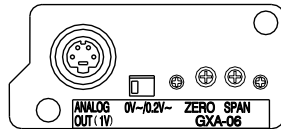
- ❑ Only the flow rate value can be output as an analog voltage.
- ❑ Under Rout^{*1} (Analog output) in the function table ("9. Function Table"), the R_n (Analog output mode) setting supports only $\bar{2}$ (2-digit output mode) and $\bar{1}$ (3-digit output mode).

If $\bar{2}$ (Net full scale output) or $\bar{3}$ (Gross full scale output) is selected, the analog voltage output will remain at 0 V.


^{*1} The balance displays Rout only when the GXA-06 is installed.






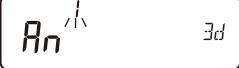



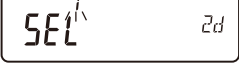


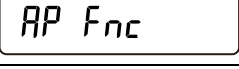
For detailed information on analog voltage output settings, refer to the separate "[GXA-03 / GXA-04 / GXA-06 Instruction Manual](#)".


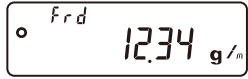
Example: Using analog voltage output

Step	Description	Option
1.	Install the GXA-06 on the balance, referring to the GXA-03 / GXA-04 / GXA-06 Instruction Manual .	
2.	Use the slide switch on the GXA-06 panel to select the desired voltage output range. (either 0-1 V or 0.2-1 V)	
3.	Perform fine adjustment of the voltage output if necessary.	

Changing the function table configuration (for 3-digit output mode with the second digit as the readability digit)

Step	Description	Display and key operations
1.	While the flow rate value display or the weighing value display is active, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> $\bar{0}$ \bar{Frd} 123 g/m </div> <div style="text-align: center;">  </div> <p>Press and hold (for 2 seconds)</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> $\bar{bR5FnC}$ </div>

Step	Description	Display and key operations
2.	Press the [SAMPLE] key several times.	 Press several times 
3.	Press the [PRINT] key to display R_n (Analog output mode).	 
4.	Press the [RE-ZERO] key several times until $\frac{1}{10}$ (3-digit output mode) appears for R_n (Analog output mode).	 Press several times 
5.	Press the [SAMPLE] key to display SEL (Output digit selection).	 
6.	Press the [RE-ZERO] key several times until $\frac{1}{10}$ (Second digit) appears for SEL (Output digit selection).	 Press several times 
7.	Press the [PRINT] key to store the setting. (To cancel, press the [CAL] key.)	  

Step	Description	Display and key operations
8.	To return to the flow rate value display or the weighing value display, press the [CAL] key.	
9.	When the flow rate value is 12.34 g/m, the voltage output is as follows: 0.123 V (0–1 V) 0.298 V (0.2–1 V)	

13-4. Commands used in the flow rate display (FRD) function

- Specific commands sent from a PC allow the balance to perform operations such as requesting weighing data, simulating key presses, and changing parameter settings. When sending a command to the balance, be sure to include a terminator at the end of the command string. For the terminator, set LF (<CR><LF>) or CR (<CR>) for rLF (Terminator) under SIF (Serial interface) in the function table ("9. Function Table").
- This section lists the commands available for use with the FRD function.
For additional commands, refer to "23-7. Commands".

Commands for requesting weighing data and flow rate data

Command string	Description / Example response
Q	Requests the weighing data currently displayed on the balance immediately. Example response: $\text{ST},+000000.09\text{g}$ or $\text{FL},+000010.00\text{g/s}$
QW	Requests the weighing data immediately. Example response: $\text{ST},+000010.00\text{g}$
QF	Requests the flow rate data immediately. Example response: $\text{FL},+000010.00\text{g/s}$
QWF	Requests both weighing data and flow rate data immediately. Example response: $\text{US},+000000.02\text{g},\text{FL},+000000.01\text{g/s}$

- * If the flow rate is too high, the output may not be accurate. In that case, change the flow rate unit and reduce the number of displayed digits.
_: Space, ASCII 20h

Commands to set each parameter (Enter a value in place of *)

Command string	Description / Example command
CT:**S *1	Changes the flow rate calculation time (Ct). Example command to set the time to 5 seconds: $\text{CT}:05\text{s}$ 30 minutes: $\text{CT}:30\text{m}$, 1 hour: $\text{CT}:01\text{h}$
FN:**	Changes the density memory slot. For "**", enter a number from 01 to 10. Example command to change the density memory slot to 05: $\text{FN}:05$
FD:* . ****	Sets the density value of the currently selected memory slot. Example command to set the density to 0.9969 g/cm ³ : $\text{FD}:0.9969$
FD:○○;*. ****	Sets the density value of a specified density memory slot. Example command to set the density of memory slot 03 to 0.9971 g/cm ³ : $\text{FD}:03;0.9971$
FA:**	Sets the flow rate calculation accuracy used when flow rate calculation time (Ct) is set automatically. Example command to set the flow rate calculation accuracy to "Response priority": $\text{FA}:02$

- *1 CT:**s The following numeric values can be entered in place of **: 01, 02, 05, 10, 20, 30

Commands to check each parameter

Command string	Description / Example response
?CT	Requests the flow rate calculation time (Ct). Example response: <code>CT,10min</code> The flow rate calculation time (Ct) is 10 minutes.
?FN	Requests the currently selected density memory slot. Example response: <code>FD,05</code> The density memory slot is 05.
?FD	Requests the density value of the currently selected memory slot. Example response: <code>FD,1.0000</code> The density is 1.0000 g/cm ³ .
?FD**	Requests the density value of a specified memory slot. For "**", enter a number from 01 to 10. Example response: <code>FD,05;1.0000</code> The density of memory slot 05 is 1.0000 g/cm ³ .
?FA	Requests the flow rate calculation accuracy used when flow rate calculation time (Ct) is set automatically. Example response: <code>FA,01</code> The flow rate calculation accuracy is set to standard.

14. Gross / Net / Tare Function

This function allows zero setting and tare operations to be performed independently. It enables output of the following weight data in sequence: net weight, gross weight, and tare weight.

When the gross / net / tare function is enabled, the key operations are redefined as follows:

Key operations with gross / net / tare function

Key	Operation
[ON:OFF] key	Performs zero setting (functions as the [ZERO] key).
[RE-ZERO] key	Performs tare operation (functions as the [TARE] key).

14-1. Preparations for gross / net / tare function

To use the gross / net / tare function, set Ψ (Gross, net, tare mode) for APF (Application mode) under

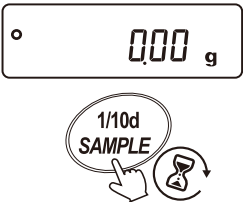


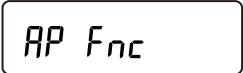


$AP F_{nc}$ (Application) in the function table ("9. Function Table").


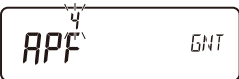


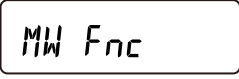


To return to normal weighing mode (factory default), set APF (Application mode) to Φ (Normal weighing mode) in the function table ("9. Function Table").

CAUTION

- This function cannot be used in conjunction with the minimum weight alert function.

Switching to Gross, net, tare mode (changing the function table configuration)



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

Step	Description	Display and key operations
4.	Press the [RE-ZERO] key several times until the display shown on the right appears.	 <p>Press several times</p> 
5.	Press the [PRINT] key to store the setting.	 
6.	<p>The next class in the function table is displayed.</p> <p>Press the [CAL] 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 ^{*1}	Updates the zero point and clears the tare value.
		Outside the zero range ^{*1}	Does not update the zero point. The tare value is not cleared.
	Tare (TARE)	Positive value	Performs a tare operation and updates the tare value.
		Gross zero ^{*2} (when the gross zero indicator is lit)	Clears the tare value.
		Negative value	No tare operation.

^{*1} For the zero range of each model, refer to "Weighing range".

^{*2} "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 when 4 (Gross, net, tare mode) is selected for *RPF* (Application mode) under RP F_{nc} (Application) in the function table ("9. Function Table"), press and hold the [ON:OFF] key (for 2 seconds).

Display



Indicators for the net / gross / tare function in use

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.NET
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.

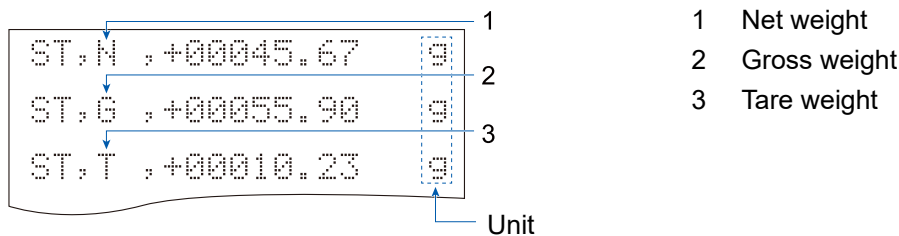
Weighing data formats for gross / net / tare function

Function table <div>5,F</div> (Serial interface)	Function table <div>USB</div> (USB interface)*1	Weighing data format
TYPE = 0	U-TP = 0, 1	A&D standard format
TYPE = 1		DP format
TYPE = 5	U-TP = 2	CSV format

CAUTION

- The available format for Quick USB mode depends on the software version.
For software versions 1.502 and earlier, the format set in the USB data format settings is used.
For software versions 1.503 and later, the format is fixed to NU2.

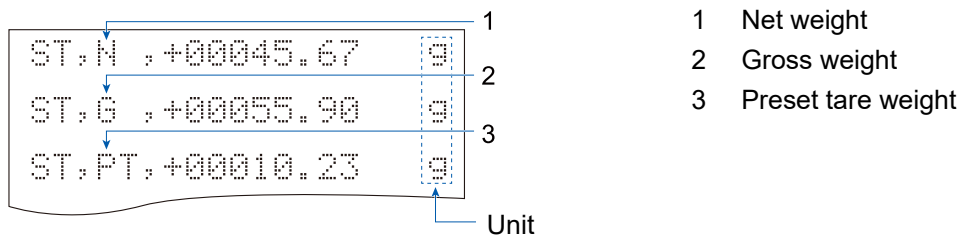
Output example (A&D standard format)



Unit:

When the balance unit setting is "P[5]" (counting mode) or "%" (percent mode), the unit output for gross weight, tare weight, and preset tare weight will be in the "g" unit.

Output example when preset tare is set (A&D standard format)

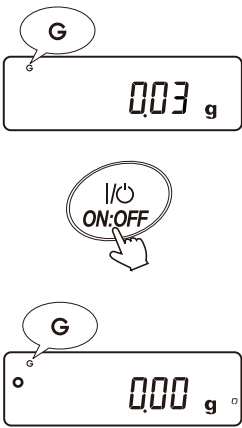
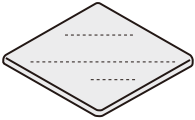

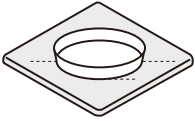
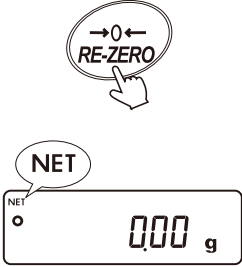

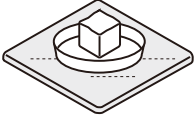
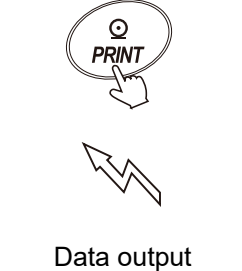


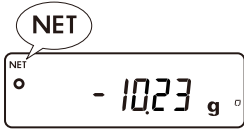
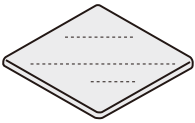
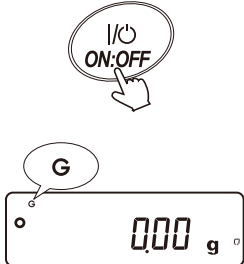
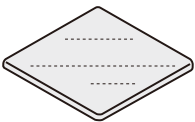
Note

- The output content and sequence can be customized using the UFC function.
For details on the UFC function, refer to "23-8. UFC function".

14-2. Example use of gross / net / tare function

Operation method

Step	Description	Display and key operations	Weighing operation
1.	Enable the gross / net / tare function by referring to " 14-1. Preparations for gross / net / tare function ".		
2.	Press the [ON:OFF] (ZERO) key with nothing on the weighing pan.		
3.	Place an empty container to be used on the weighing pan.		
4.	Press the [TARE] key to display NET. The tare value is set (updated).		
5.	Place the sample to be weighed.		
6.	Pressing the [PRINT] key outputs data in the following order: net weight, gross weight, and tare weight. Refer to " Output example (A&D standard format) ".		

Step	Description	Display and key operations	Weighing operation
7.	Remove the sample and container from the weighing pan.		
8.	<p>Press the [ON:OFF] (ZERO) key to update the zero point and clear the tare weight. The balance returns to the same state as step 1.</p> <p>To continue weighing with the same tare value, remove only the sample and place the next sample, and then press the [PRINT] key to output the data.</p>		

15. 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 supports easy confirmation of whether the sample amount meets the specified minimum weight.
- This function is available only when the unit mode is set to **g**.
- When the sample amount is less than the set minimum weight, the **MW** indicator blinks above the unit display. Once the sample amount meets or exceeds the minimum weight, the **MW** indicator turns off.
- The minimum weight can be changed in the function table. The factory default is 0 g.

If the minimum weight is set to 0 g, the alert will not be displayed even if the minimum weight alert function is turned ON (that is, when **1** (Enables comparison: Excluding near zero) or **2** (Enables comparison: Including near zero) is set for **MW-CP** (Minimum weight comparison) under **MW Fnc** (Minimum weight alert function) in the function table ("9. Function Table"). Note that values exceeding the weighing capacity cannot be set as the minimum weight.





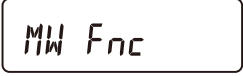





- There are two types of alert displays for **MW-CP** (Minimum weight comparison):
 - 1** (Enables comparison: Excluding near zero)
 - 2** (Enables comparison: Including near zero)
 Near zero is within ± 10 d of 0 g.



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. As a result, the unit cannot be changed using the [MODE] key. (The unit remains fixed to the one last used.)
- To change the unit, disable the minimum weight alert function.
- To turn off the minimum weight alert function, refer to the steps in "15-1. Preparations for minimum weight alert function" and set **MW-CP** (Minimum weight comparison) to **0** (No comparison).
- This function cannot be used in conjunction with the statistical calculation function, data memory function, or density (specific gravity) measurement.

15-1. Preparations for minimum weight alert function

Enabling the minimum weight alert function (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key to display $MW-CP$ (Minimum weight comparison).	 
4.	Press the [RE-ZERO] key several times to set $MW-CP$ (Minimum weight comparison) to \neq (Enables comparison: Excluding near zero) or \approx (Enables comparison: Including near zero).	 Press several times  or 

Step	Description	Display and key operations
5.	<p>To input the minimum weight, press the [SAMPLE] key to switch to the MW display. To register the minimum weight via direct key input, proceed to step 4 of the procedure for direct key input ("15-2-1. Inputting minimum weight"). Alternatively, to register the minimum weight based on the repeatability of an external weight, proceed to step 4 of the procedure for input using repeatability with an external weight.</p> <p>To complete the setting, press the [PRINT] key without pressing the [SAMPLE] key. When Unit is displayed, press the [CAL] key to return to the weighing display.</p>	 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">End</div>
6.	<p>The next class in the function table is displayed.</p> <p>Press the [CAL] key to return to weighing mode.</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">Unit</div>  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">° 000 g</div>



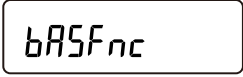

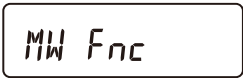





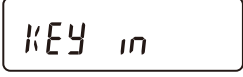
15-2. Inputting and outputting minimum weight

15-2-1. Inputting minimum weight

Use the following methods to set a minimum weight:



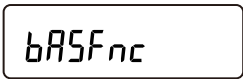
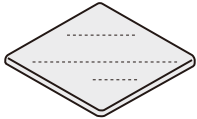

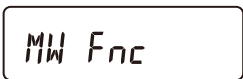





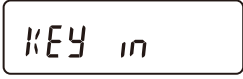


- Direct key input
- Input using repeatability obtained from 10 measurements with an external weight







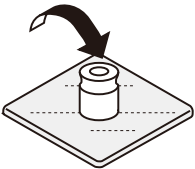


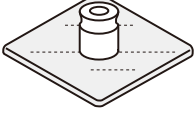


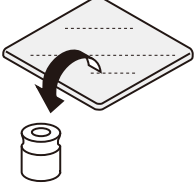


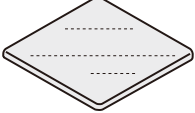
Direct key input (Entering minimum weight directly)



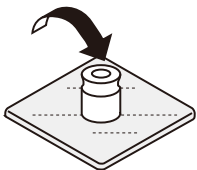



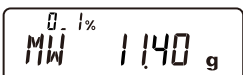
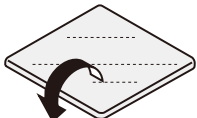

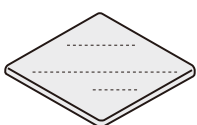
Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several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



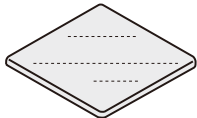

Step	Description	Display and key operations
6.	<p>Press the [PRINT] key to set the minimum weight.</p> <p>Use the following keys to input a minimum weight:</p> <p>[RE-ZERO] key Increases the value of the blinking digit.</p> <p>[MODE] key Decreases the value of the blinking digit.</p> <p>[SAMPLE] key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



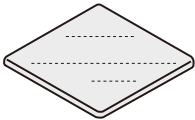


Input using repeatability with an external weight

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

Step	Description	Display and key operations	Weighing operation
7.	Press the [PRINT] key. The display transitions as shown on 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 on the right appears, remove the weight from the weighing pan.		
12.	When the weight is removed, the balance displays ◀ (the processing indicator).	 	

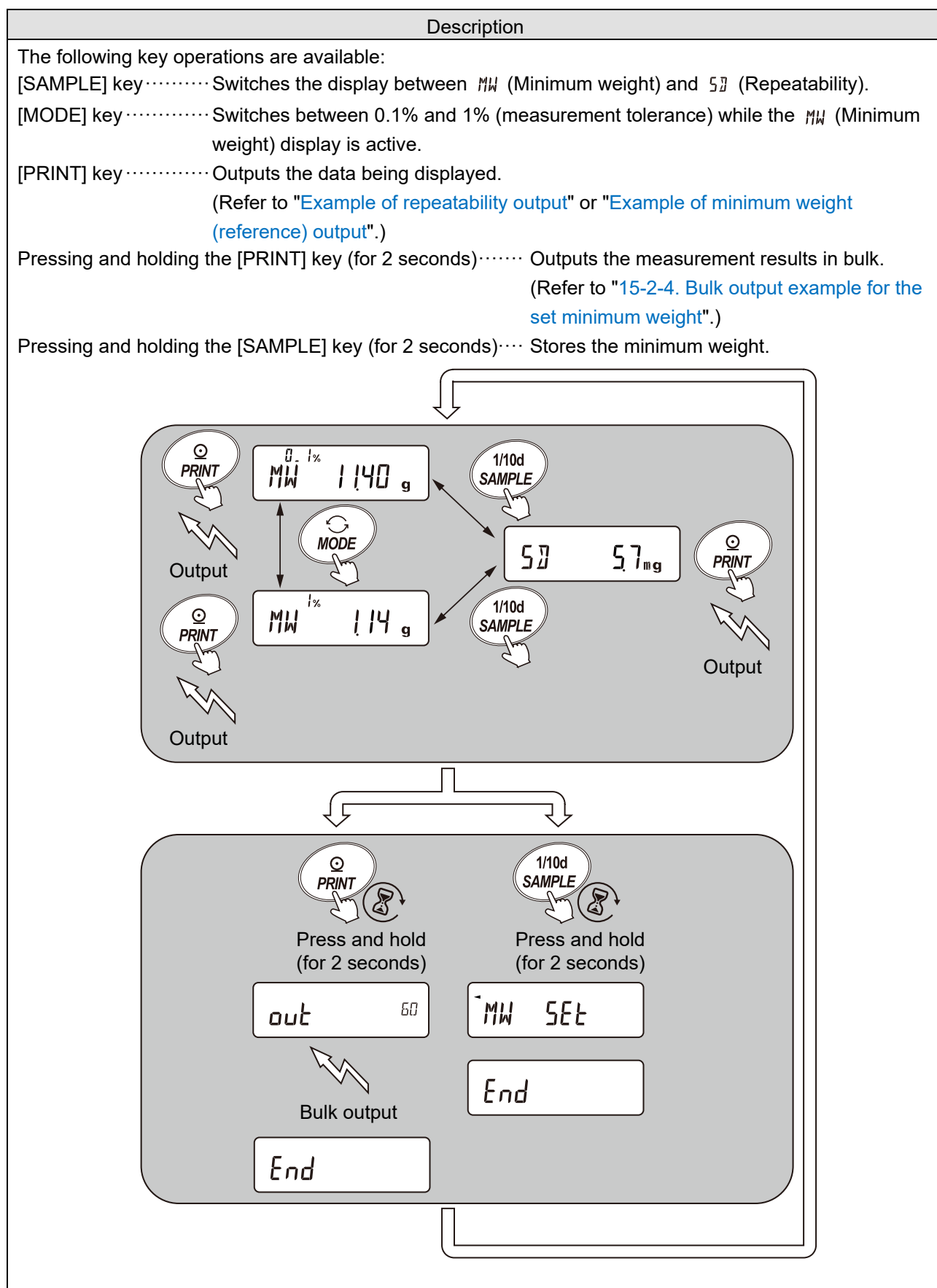
Step	Description	Display and key operations	Weighing operation
13.	Each time the display prompts for the next load, repeat steps 8 through 12 until 10 cycles are completed.	  Repeat steps 8 to 12.	
14.	<p>After completing the 10th measurement, the result (minimum weight) is displayed.</p> <p>CAUTION</p> <p>□ 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>Available operations while measurement results are displayed:</p> <ul style="list-style-type: none"> • Display and output <i>MW</i> (Minimum weight) or <i>S</i> (Repeatability). • Switch the tolerance setting in <i>MW</i> (Minimum weight) mode. • Output all measurement results in bulk. (step 15) • Set the minimum weight calculated from the measurement results. (step 16) <p>(For details, refer to "Key operations when measurement results are displayed".)</p>	   	  

Step	Description	Display and key operations	Weighing operation
15.	<p>To output the measurement results in bulk, press and hold the [PRINT] key (for 2 seconds).</p> <p>For output examples, refer to "Bulk output example for minimum weight based on repeatability using an external weight".</p>	 <p>Press and hold (for 2 seconds)</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">out 60</div>  <p>Bulk output</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">End</div> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <small>0.1%</small> MW 1140 g </div>	
16.	<p>Press and hold the [SAMPLE] key (for 2 seconds) to set the minimum weight.</p> <p>If <i>MW-CP</i> is set to 0 (No comparison), the parameter is automatically changed to 1 (Enables comparison: Excluding near zero), and the minimum weight comparison function is enabled.</p>	 <p>Press and hold (for 2 seconds)</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">MW SEt</div> <div style="border: 1px solid black; padding: 5px; display: inline-block;">End</div> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <small>0.1%</small> MW 1140 g </div>	

Step	Description	Display and key operations	Weighing operation
17.	Press the [CAL] key to complete the process.	 	
18.	Press the [CAL] key to return to weighing mode.	 	

Key operations when measurement results are displayed

This is a supplementary explanation for step 14 of "Input using repeatability with an external weight".



Error display

E g

Load exceeding the capacity is applied.

$-E$ g

Not enough load is applied.

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

Error 1

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

After Error 1 is displayed, the repeatability measurement is forcibly terminated and the balance returns to function table mode.

Example of repeatability output

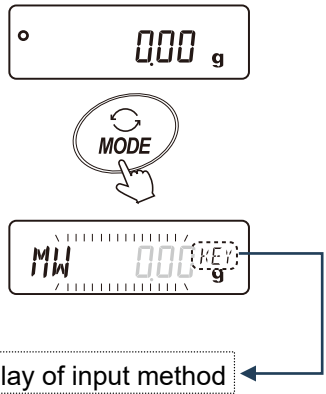
Description
<p>Display</p> <p>SD 5.7 mg</p> <p>Output</p> <p>SD _____+5.7 mg<TERM></p> <p>_: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>

Example of minimum weight (reference) output

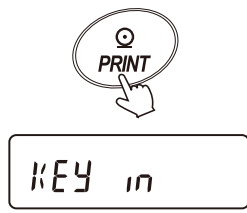
Description
<p>Display</p> <p>MW 0.1% 1140 g or MW 1% 114 g</p> <p>Output</p> <p>MW _____+11.40 ____g<TERM> MW _____+1.14 ____g<TERM></p> <p>_: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>

15-2-2. Checking and changing the minimum weight

Checking the minimum weight

Step	Description	Display and key operations
1.	In weighing mode, press the [MODE] key. The current minimum weight will be displayed.	 <p>Display of input method</p> <p> (KEY) Value entered manually. (EXT) Value entered using repeatability of an external weight. (ECL) Value entered using ECL (by pressing and holding the [MODE] key). Refer to "6-2. Self-check function / Automatic minimum weight (reference value) setting using ECL". </p>










Changing the minimum weight






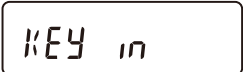

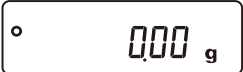
Step	Description	Display and key operations
1.	Press the [PRINT] key to show the display shown on the right.	
2.	<p>To enter the minimum weight using key input, refer to step 6 and onwards of "Direct key input (Entering minimum weight directly)".</p> <hr/> <p>To enter the minimum weight using repeatability with an external weight, refer to step 6 and onwards of "Direct key input (Entering minimum weight directly)".</p>	

15-2-3. 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 [MODE] key. The current minimum weight will be displayed.	  
2.	Press the [PRINT] key to show the display shown on the right.	 
3.	Press and hold the [PRINT] key (for 2 seconds).	 Press and hold (for 2 seconds) 
4.	Press the [RE-ZERO] key to switch between No and Go.	 

Step	Description	Display and key operations
5.	<p>Press the [PRINT] key while  is blinking to output in bulk.</p> <p>For output examples, refer to "15-2-4. Bulk output example for the set minimum weight".</p>	   Bulk output  
6.	Press the [CAL] key to return to weighing mode.	 

15-2-4. Bulk output example for the set minimum weight

The output content depends on the minimum weight setting method.

Bulk output example when direct key input is used

Output

```
-MINIMUM_WEIGHT-<TERM>
<TERM>
.....A_&_D<TERM>
MODEL_ _GX-10002A<TERM>
S/N_ _ _ _T2000112<TERM>
ID_ LAB-012345678<TERM>
DATE_ _2019/01/22<TERM>
TIME_ _ _ _12:12:34<TERM>
<TERM>
KEY_ INPUT_ _ _ _ _<TERM>
<TERM>
MINIMUM_WEIGHT_ _<TERM>
.....11.40_ _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 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

Bulk output example for minimum weight based on repeatability using an external weight

Output

```

-MINIMUM_WEIGHT-<TERM>
<TERM>
.....A_&_D<TERM>
MODEL_ _GX-10002A<TERM>
S/N_.....T2000112<TERM>
ID_LAB-012345678<TERM>
DATE_ _2019/01/22<TERM>
TIME_ _ _12:51:55<TERM>
<TERM>
EXTERNAL_MASS_ _ _<TERM>
<TERM>
RESULT<TERM>
_1_.....+200.08_ _g<TERM>
_2_.....+200.07_ _g<TERM>
_3_.....+200.07_ _g<TERM>
_4_.....+200.07_ _g<TERM>
_5_.....+200.06_ _g<TERM>
_6_.....+200.07_ _g<TERM>
_7_.....+200.06_ _g<TERM>
_8_.....+200.07_ _g<TERM>
_9_.....+200.07_ _g<TERM>
10_.....+200.07_ _g<TERM>
<TERM>
SD_.....5.7_ _mg<TERM>
<TERM>
TOLERANCE_.....<TERM>
.....0.10_ _%<TERM>
MINIMUM_WEIGHT_ _<TERM>
.....11.40_ _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

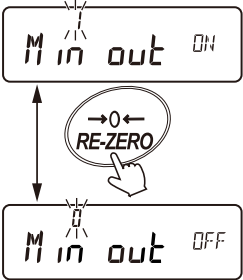
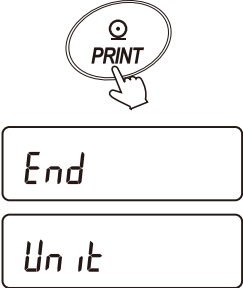
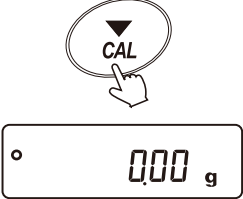
LF: Line feed, ASCII 0Ah

15-3. Data output when minimum weight is not reached

The setting for *M in out* (Data output when minimum weight is not reached) under *MW Fnc* (Minimum weight alert function) in the function table ("9. Function Table") allows switching the data output on / off when the value is below the minimum weight.

Setting method

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key.	 
4.	Press the [SAMPLE] key several times until <i>M in out</i> (Data output when minimum weight is not reached) is displayed.	 

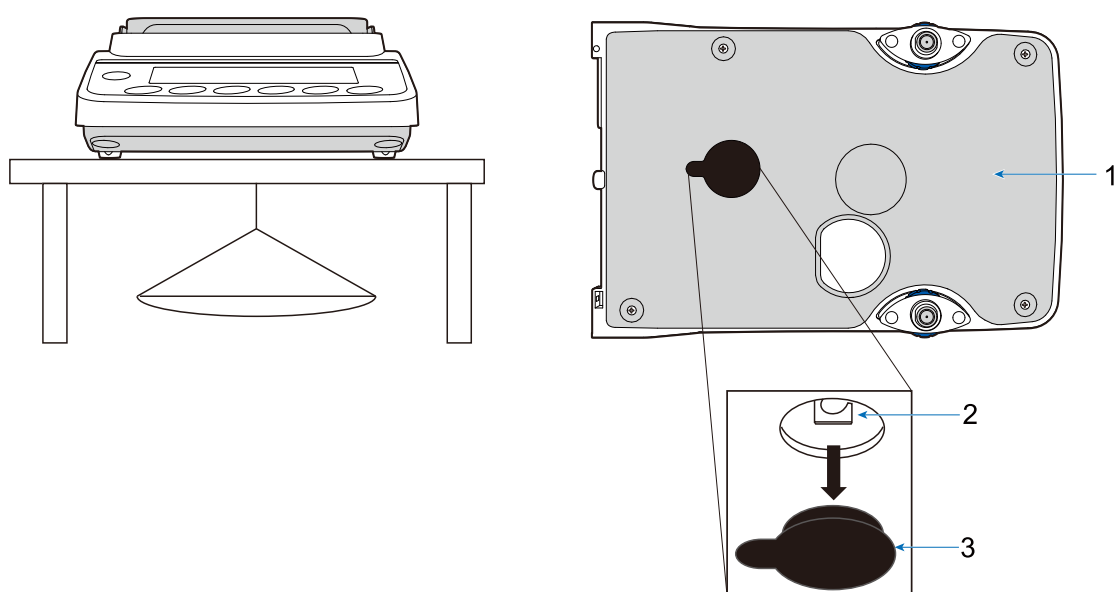
Step	Description	Display and key operations
5.	Press the [RE-ZERO] key to select I (ON) or O (OFF).	 <p>The diagram illustrates the process of toggling the 'Min out' setting. At the top, the display shows 'Min out ON'. A vertical double-headed arrow points down to the bottom display, which shows 'Min out OFF'. A hand icon is shown pressing the 'RE-ZERO' key, which is represented by a circle containing a zero with arrows pointing left and right.</p>
6.	Press the [PRINT] key to store the setting.	 <p>The diagram shows the 'PRINT' key being pressed, indicated by a hand icon and a circle around the key. Below this, the display shows 'End' and then 'Unit' in separate boxes.</p>
7.	Press the [CAL] key to return to weighing mode.	 <p>The diagram shows the 'CAL' key being pressed, indicated by a hand icon and a circle around the key. Below this, the display shows the weighing mode: '° 0.00 g'.</p>

16. Underhook

The built-in underhook is used for underhook weighing, such as measuring magnetic materials. To use the underhook, open the cover on the bottom of the balance.

CAUTION

- ❑ Do not apply excessive force to the underhook.
- ❑ To prevent dust intrusion, do not open the cover unless necessary.
- ❑ The underhook is designed for downward (tensile) loading only.
- ❑ Tilting the balance greatly may cause the weighing pan or other attached parts to come off. Remove them before performing any operation.
- ❑ Removing the underhook cover can expose the balance to drafts, which may inadvertently affect measurement results.



- 1 Bottom of the balance
- 2 Underhook (Hole diameter: approx. 4 mm)
- 3 Cover

17. Density (Specific Gravity) Measurement

The balance is equipped with a density mode that calculates the density of a solid based on its weight in air and in liquid.

For measurement, use of the optional GXA-13 or GXA-14 density determination kit is recommended.

For assembly and installation instructions, refer to the instruction manual for the [GXA-13](#) or [GXA-14](#) density determination kit.

CAUTION

- ❑ The GXA-13 density determination kit is compatible only with 0.001 g models.
- ❑ The GXA-14 density determination kit is compatible only with 0.0001 g models.
- ❑ $\overline{17.5}$ (Density mode) is disabled in the factory default settings. To enable it, register $\overline{17.5}$ (Density mode) under \overline{Unit} (Unit) in the function table ("9. Function Table"). For details on unit registration, refer to "9-8. Unit storing overview". For details on units, refer to "4-1. Units of measure".
- ❑ If $\overline{17.5}$ (density mode) is not registered for \overline{Unit} (Unit), $\overline{d5 Fnc}$ (Density measurement function) will not appear in the function table ("9. Function Table"). After unit registration, it will appear immediately after \overline{Unit} (Unit). For operation of the function table ("9. Function Table"), refer to "17-1. Preparations before measurement".
- ❑ In density mode, the readability of the weighing value is fixed.
- ❑ This function cannot be used in conjunction with the gross / net / tare function setting (that is, when \overline{RPF} is set to $\overline{4}$ under $\overline{RP Fnc}$ in the function table ("9. Function Table")).
- ❑ This function cannot be used in conjunction with the following features: comparator function, capacity indicator, statistical calculation function, flow rate display (FRD) function, minimum weight alert function, and data memory function.

Density formula

- ❑ Density of a solid

The density can be obtained from the weight of the sample in air, the weight in liquid, and the density of the liquid.

$$\rho = \frac{A}{A-B} \times \rho_0$$

ρ : Density of sample	A : Weight of sample in air	
ρ_0 : Density of liquid	B : Weight of sample in liquid	

- ❑ Density of liquid

The density of a liquid can be obtained from the weight of the sinker in air, the weight of the sinker in a liquid, and the known volume of the sinker.

$$\rho = \frac{A-B}{V}$$

ρ : Density of sample	A : Weight of sinker in air	
V : Volume of sinker	B : Weight of sinker in liquid	

17-1. Preparations before measurement

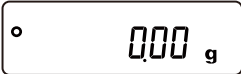

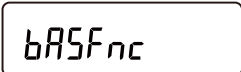

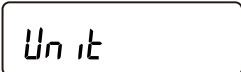

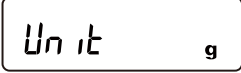


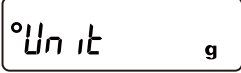
Prior to density (or specific gravity) measurement, change the function table of the balance as follows.








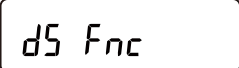




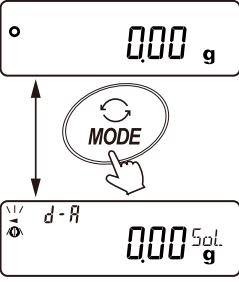
Registering $\frac{1}{10}d$ (Density mode) for "Unit"

Register (store) $\frac{1}{10}d$ (Density mode) for Unit (Unit) in the function table ("9. [Function Table](#)").

The example below shows how to register the units in the order: **g** (gram) followed by $\frac{1}{10}d$ (Density mode).

Registration method (changing the function table configuration)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table ").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key to show the display shown on the right.	 
4.	Press the [RE-ZERO] key to select the unit and confirm that  (the stabilization indicator) is displayed.	 



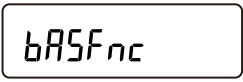

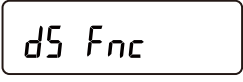




Step	Description	Display and key operations
5.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
6.	Press the [RE-ZERO] key to select the unit and confirm that  (the stabilization indicator) is displayed.	 
7.	Press the [PRINT] key to store the specified unit.	  
8.	To return to weighing mode, press the [CAL] key.	 
9.	<p>Each time the [MODE] key is pressed, the unit switches in the specified order.</p> <p>g → DS^{*1}</p> <p>^{*1} In density mode, the DS unit is displayed when density is calculated.</p> <p>During weight measurement in air ( blinking, d - A lit on the top left) and in liquid ( lit, d - b lit on the top left), the unit displayed is g.</p>	

Sample selection

Select whether the sample to be measured is a solid or a liquid.

This can be set using $d5$ (Density measurement mode) under $d5 Fnc$ (Density measurement function) in the function table ("9. Function Table").

Selection method



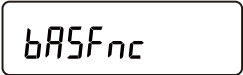

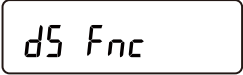

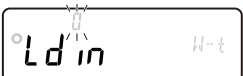
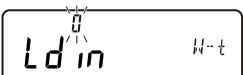


Step	Description	Display and key operations
10.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
11.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
12.	Press the [PRINT] key.	 
13.	Press the [SAMPLE] key to display $d5$ (Density measurement mode).	 






Step	Description	Display and key operations
14.	Press the [RE-ZERO] key to select either \square (Solids) or L (Liquids) for $d5$ (Density measurement mode).	
15.	Press the [PRINT] key to store the setting.	
16.	Press the [CAL] key to return to weighing mode. The subsequent operations will vary depending on the parameter set in step 14.	
17.	When $d5$ is set to \square (Solids): Proceed to step 18 of 'Selecting "Liquid density input" for solid density (specific gravity) measurement'. <hr/> When $d5$ is set to L (Liquids): Measurement preparation is complete. Proceed to "17-3. How to measure the density (specific gravity) of a liquid".	

Selecting "Liquid density input" for solid density (specific gravity) measurement

Continued from step 17 of "Sample selection".

Selection method

Step	Description	Display and key operations
18.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
19.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
20.	Press the [PRINT] key.	 
21	Press the [RE-ZERO] key to select either \varnothing (Water temperature input) or ρ (Density input) for $Ld\ in$ (Liquid density input).	  

Step	Description	Display and key operations
22.	Press the [PRINT] key to store the setting.	  
23.	Press the [CAL] key to return to weighing mode. Proceed to "17-2. How to measure the density (specific gravity) of a solid".	 

17-2. How to measure the density (specific gravity) of a solid

The following describes the operation when \bar{d} (Solids) is set for $d5$ (Density measurement mode) under

$d5$ Fnc

(Density measurement function) in the function table ("9. Function Table"). For the setting method, refer to "17-1. Preparations before measurement".

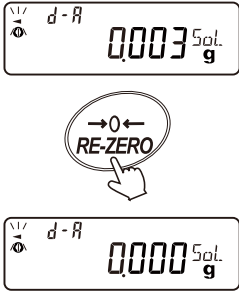
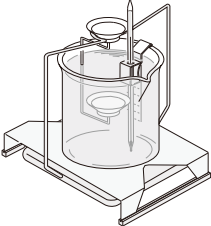
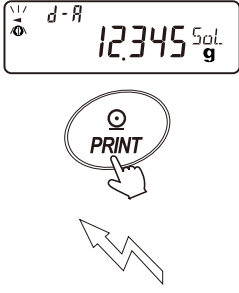
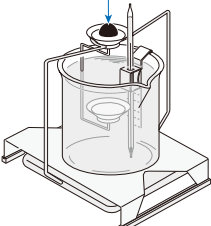
CAUTION

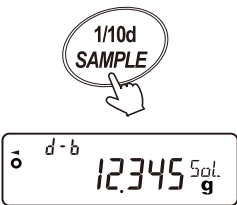
- ❑ The number of digits after the decimal point in the density (specific gravity) display is fixed at three (or four for 0.0001 g models).
The readability cannot be changed using the [SAMPLE] key.
- ❑ In density (specific gravity) measurement, the density is fixed and displayed according to weight in air measurement and weight in liquid measurement.

Measurement procedure

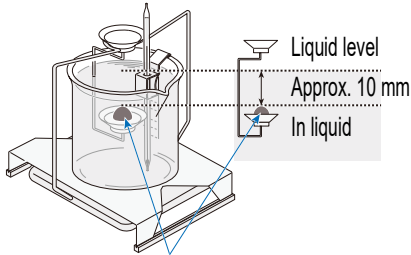

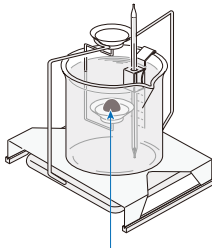




The following example uses the GX-1603A balance and the GXA-13 density determination kit.

Weight in air measurement mode

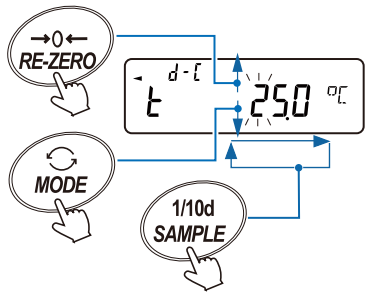
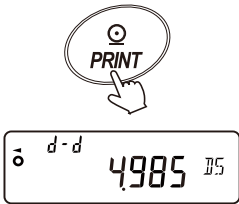
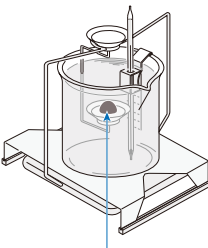
Step	Description	Display and key operations	Weighing operation
1.	<p>Confirm the weight in air measurement mode ($d - \bar{d}$ lit, \bar{d} blinking):</p> <p>Press the [RE-ZERO] key with nothing on the weighing pan in air to set the display to zero.</p>		
2.	<p>Place a sample on the weighing pan in air and wait for the display to stabilize.</p> <p>To output the sample weight, press the [PRINT] key.</p> <p>PC output example (RsCom): Weight in air A&D standard format</p> <p>ST, +0012.345 _ _ g <TERM></p> <p>_ : Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	 <p>Weighing data output</p>	<p>Sample in air</p> 

Step	Description	Display and key operations	Weighing operation
3.	<p>Press the [SAMPLE] key to confirm the weight in air and switch to "Weight in liquid measurement mode" ($d - b$ lit, \blacktriangleleft lit).</p> <p>CAUTION</p> <p><input type="checkbox"/> The [SAMPLE] key is disabled when E (Overload error) is displayed.</p>	 <p>The diagram illustrates the transition to liquid measurement mode. It shows a hand pressing the [SAMPLE] key, which is labeled '1/10d SAMPLE'. Below this, a digital display shows the weight '12.345 g' with 'd-b' and 'Sol.' indicators, signifying the mode change.</p>	

Weight in liquid measurement mode

Step	Description	Display and key operations	Weighing operation
4.	<p>Transfer the sample from the weighing pan in air to the weighing pan in liquid, and wait for the display to stabilize. ($d - b$ lit, \blacktriangleleft lit)</p> <p>At this time, adjust so that the sample is about 10 mm below the liquid level.</p>  <p style="text-align: center;">Sample in liquid</p>		 <p style="text-align: center;">Sample in liquid</p>
5.	<p>To output the sample weight, press the [PRINT] key.</p> <p>PC output example (RsCom): Weight in liquid A&D standard format</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">ST, +0009.876 _ _ g <TERM></div> <p>_: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	   <p style="text-align: center;">Weighing data output</p>	
6.	<p>Press the [SAMPLE] key to confirm the weight in liquid and proceed to the liquid density input mode ($d - \text{lit}$, \blacktriangleleft lit).</p> <p>Liquid density input mode varies depending on the setting of Ld_{in} (Liquid density input) under <div style="border: 1px solid black; padding: 2px; display: inline-block;">$d5 F_{nc}$</div> (Density measurement function) in the function table ("9. Function Table").</p> <p>CAUTION</p> <p><input type="checkbox"/> The [SAMPLE] key is disabled when <div style="border: 1px solid black; padding: 2px; display: inline-block;">E</div> (Overload error) is displayed.</p>		

Liquid density input mode




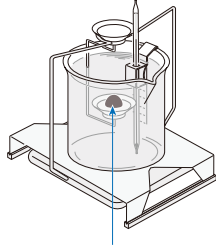


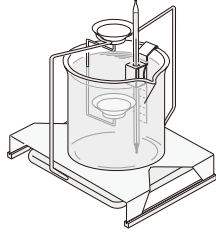


Step	Description	Display and key operations	Weighing operation
7.	<p>When $L_{d\text{in}} = 0$ (Water temperature input):</p> <p>The currently set water temperature is displayed. (The factory default water temperature is 25.0 °C) For relationship between water temperature and water density, refer to "Water temperature and density correspondence table". The setting range is from 0.0 °C to 99.9 °C, with increments of 0.1 °C.</p> <p>[RE-ZERO] key Increases the water temperature. ("0" reappears after "9".)</p> <p>[MODE] key Decreases the water temperature. ("9" reappears after "0".)</p> <p>[SAMPLE] key Selects the digit to blink.</p> <hr/> <p>When $L_{d\text{in}} = 1$ (Density input):</p> <p>The currently set density value is displayed. (The factory default density is 1.000 g/cm³). Use the keys below to change the density setting value. The setting range is from 0.000 to 1.999 g/cm³.</p> <p>[RE-ZERO] key Increases the value of the blinking digit. ("0" reappears after "9".)</p> <p>[MODE] key Decreases the value of the blinking digit. ("9" reappears after "0".)</p> <p>[SAMPLE] key Selects the digit to blink.</p>		
8.	<p>Press the [PRINT] key to switch to "Solid density display mode". ($d - d$ lit, \triangleleft lit)</p>		 <p>Sample in liquid</p>

Water temperature and density correspondence table

°C	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
0	0.99984	0.99990	0.99994	0.99996	0.99997	0.99996	0.99994	0.99990	0.99985	0.99978
10	0.99970	0.99961	0.99949	0.99938	0.99924	0.99910	0.99894	0.99877	0.99860	0.99841
20	0.99820	0.99799	0.99777	0.99754	0.99730	0.99704	0.99678	0.99651	0.99623	0.99594
30	0.99565	0.99534	0.99503	0.99470	0.99437	0.99403	0.99368	0.99333	0.99297	0.99259
40	0.99222	0.99183	0.99144	0.99104	0.99063	0.99021	0.98979	0.98936	0.98893	0.98849

g/cm³

Solid density display mode

Step	Description	Display and key operations	Weighing operation
9.	<p>When the density is displayed, pressing the [PRINT] key outputs the density.</p> <p>The density (specific gravity) unit is $\frac{g}{cm^3}$.</p> <p>PC output example (RsCom): Density (specific gravity)</p> <p>A&D standard format (Factory default)</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">ST, +0004.985_DS<TERM></div> <p>└: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	   <p>Weighing data output</p>	 <p>Sample in liquid</p>
10.	<p>To measure a different sample, press the [SAMPLE] key and begin from step 1 in "Weight in air measurement mode" ($d - \rho$ lit, $\frac{g}{cm^3}$ blinking).</p>	 	
11.	<p>If the liquid temperature changes during measurement or if the type of liquid is changed, re-enter the liquid density as needed with "Liquid density input mode".</p>		
12.	<p>To switch to weighing mode, press the [MODE] key.</p>	 	

17-3. How to measure the density (specific gravity) of a liquid


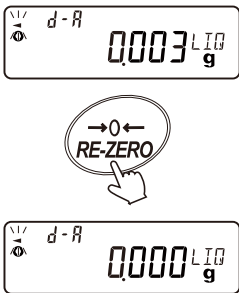
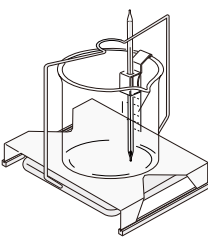
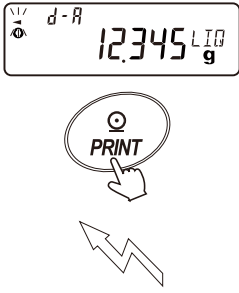
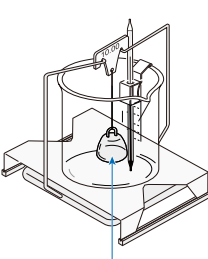

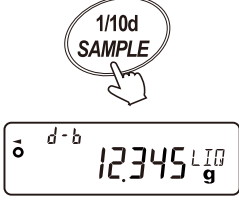
The following describes the operation when ρ (Liquids) is set for $d5$ (Density measurement mode) under

$d5$ Fnc (Density measurement function) in the function table ("9. Function Table"). For the setting method, refer to "17-1. Preparations before measurement".

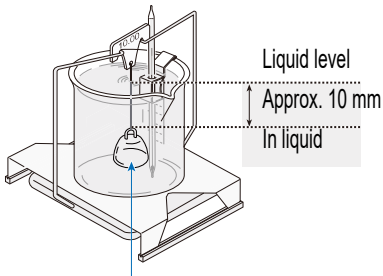

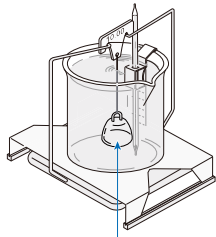




CAUTION

- The number of digits after the decimal point in the density (specific gravity) display is fixed at three (or four for 0.0001 g models).
The readability cannot be changed using the [SAMPLE] key.
- In density (specific gravity) measurement, the density is fixed and displayed according to weight in air measurement and weight in liquid measurement.

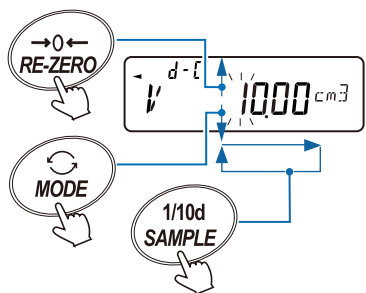
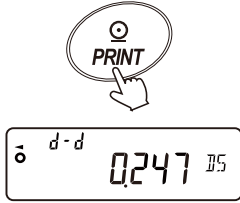
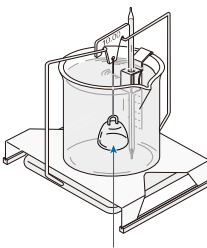
Weight in air measurement mode

Step	Description	Display and key operations	Weighing operation
1.	<p>Confirm the weight in air measurement mode ($d - A$ lit,  blinking):</p> <p>Press the [RE-ZERO] key with no load to set the display to zero.</p>		
2.	<p>Place a sinker and wait for the display to stabilize.</p> <p>To output the sinker weight, press the [PRINT] key.</p> <p>PC output example (RsCom): Weight in air A&D standard format</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">ST, +0012.345 _g<TERM></div> <p>_: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	 <p>Weighing data output</p>	 <p>Sinker in air</p>
3.	<p>Press the [SAMPLE] key to confirm the weight in air and switch to "Weight in liquid measurement mode" ($d - b$ lit,  lit).</p> <p>CAUTION</p> <ul style="list-style-type: none"> □ The [SAMPLE] key is disabled when a negative value or E (Overload error) is displayed. 		




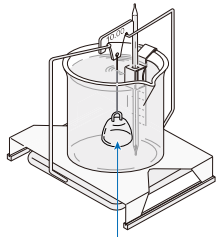


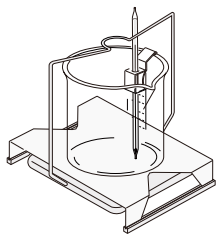


Weight in liquid measurement mode

Step	Description	Display and key operations	Weighing operation
4.	<p>For density measurement, put the liquid in the beaker and sink the sinker. ($d - b$ lit, \blacktriangleleft lit)</p> <p>At this time, adjust so that the sinker is about 10 mm below the liquid level.</p>  <p>Sinker in liquid</p>		 <p>Sinker in liquid</p>
5.	<p>Wait for the display to stabilize. To output the sample weight, press the [PRINT] key.</p> <p>PC output example (RsCom): Weight in liquid A&D standard format</p> <pre>ST, +0009.876 _ _ g <TERM></pre> <p>_: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	   <p>Weighing data output</p>	
6.	<p>Press the [SAMPLE] key to confirm the weight in liquid and switch to "Sinker volume input mode" ($d - f$ lit, \blacktriangleleft lit).</p> <p>CAUTION</p> <p>□ The [SAMPLE] key is disabled when a negative value or ϵ (Overload error) is displayed.</p>		

Sinker volume input mode

Step	Description	Display and key operations	
7.	<p>Input the volume of the sinker:</p> <p>The currently set volume of the sinker is displayed. (Factory setting for volume: 10.00 cm³).</p> <p>The parameter can be changed with the key operations explained below.</p> <p>The setting range is from 0.01 cm³ to 99.99 cm³, with increments of 0.01 cm³.</p> <p>[RE-ZERO] key .....Increases the volume. ("0" reappears after "9".)</p> <p>[MODE] key .....Decreases the volume. ("9" reappears after "0".)</p> <p>[SAMPLE] key .....Selects the digit to blink.</p>		
8.	<p>Press the [PRINT] key to switch to "Liquid density display mode" ($d - d$ lit, \triangle lit).</p>		

Liquid density display mode

Step	Description	Display and key operations	Weighing operation
9.	<p>When the density is displayed, pressing the [PRINT] key outputs the density.</p> <p>PC output example (RsCom): Density (specific gravity) A&D standard format</p> <pre>ST,+0000.247_DS<TERM></pre> <p>└: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	   <p>Weighing data output</p>	
10.	<p>To measure a different sample, press the [SAMPLE] key and begin from "Weight in air measurement mode"</p> <p>($d - \rho$ lit, $\frac{1}{10d}$ blinking).</p>	 	
12.	<p>To switch to weighing mode, press the [MODE] key.</p>	 	

18. Password Lock Function

The password lock function can restrict access to the balance and limit its available functions.

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

Enter a 4-digit password using the four keys.

256 combinations are available ($4 \times 4 \times 4 \times 4 = 256$)

Four keys: [MODE], [SAMPLE], [PRINT], [RE-ZERO]

The password function is disabled by default at the factory settings.

To enable or disable the password function, or to register a password, configure the function table settings ("9. Function Table").

Three types of settings are available for *Lock* (Lock function) under PASSWD (Password lock) in the function table ("9. Function Table").

Parameter	Function
<i>Lock</i> = 0	Password lock function disabled
<i>Lock</i> = 1	Password required to start weighing operations
<i>Lock</i> = 2	Administrator login required to change settings

Lock setting: 0 (Password lock disabled)

- ☐ The password lock function is turned off.
- ☐ Anyone can perform weighing operations.
- ☐ All functions are accessible.
- ☐ Settings can be changed without restrictions.

Lock setting: 1 (Password required to start weighing operations)

- ☐ The Administrator (*ADM^{IN}*) can restrict access by assigning individual passwords.
The factory default Administrator (*ADM^{IN}*) password is set to 1111, entered by pressing the [RE-ZERO] key four times.
- ☐ A password is required to start weighing operations using the [ON:OFF] key.
- ☐ The balance will not enter weighing mode unless the correct password is entered.
- ☐ Two login levels are available: Administrator (*ADM^{IN}*) and User (*USER⁰¹* to *USER¹⁰*).

Login level	Description
Administrator (<i>ADM^{IN}</i>)	Full access to all functions and settings.
	Individual passwords can be set for up to 10 users.
User (<i>USER⁰¹</i> to <i>USER¹⁰</i>)	Access to settings can be restricted (including time and date settings). Initialization and password lock functions are restricted.
No password	The balance cannot be operated without a valid password.

Lock setting: 2 (Administrator login required for setting changes)

- Weighing operations can be performed by anyone. Initialization and setting changes (including time and date) can be restricted.
(No password is required to start weighing operations using the [ON:OFF] key.)
- Two login levels are available: Administrator (ADM^{IN}) and Guest (GUEST)

Login level	Description
Administrator (ADM ^{IN})	Full access to all functions and settings.
	Individual passwords can be set for up to 10 users.
Guest (GUE ST) No password required*1	Initialization and setting changes (including time and date) are restricted.

*1 When the display is off, pressing the [ON:OFF] key while holding down the [CAL] key to start weighing operations will prompt the balance to request the Administrator (ADM^{IN}) password.

Item availability by login level

Login level	Weighing		
	Password entry (at start of weighing)	Sensitivity adjustment	Setting changes*2
Administrator (ADM ^{IN})	Required	Available	Available
User (USER ⁰¹ to USER ¹⁰)		Available or not available*3	Not available
Guest (GUE ST)	Not required		



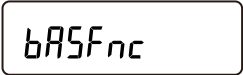

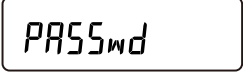

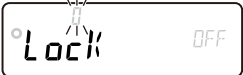


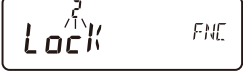
*2 Response characteristic adjustment, function selection switch and initialization, "9. Function Table" (including clock and calendar settings)






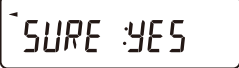




*3 These items are generally available but can be disabled for Users (USER⁰¹ to USER¹⁰) and Guests (GUEST) if the Administrator (ADM^{IN}) sets them to "Prohibit" in the function selection switch settings ("8-1. Function selection switch").

18-1. Preparations for password lock function

Lock (Lock function) under **PASSWD** (Password lock) in the function table ("9. Function Table") allows switching between **0** (OFF) and **1** (On: Restricts weighing operation) or **2** (On: Allows basic weighing operation).

Enabling the password function (Changing the function table configuration)


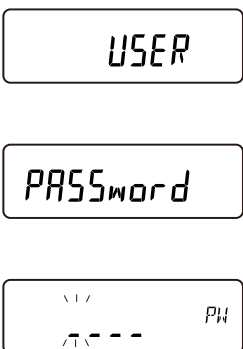
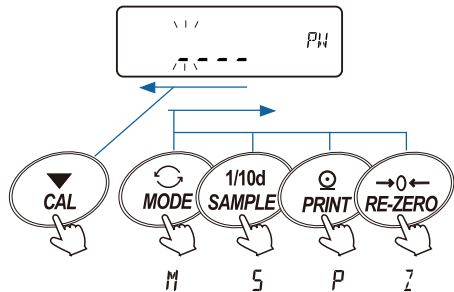
Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	  Press and hold (for 2 seconds) 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key to display Lock (Lock function). (To cancel, press the [CAL] key.)	 
4.	Press the [RE-ZERO] key to display 1 (On: Restricts weighing operation) or 2 (On: Allows basic weighing operation).	 Press several times  or 

Step	Description	Display and key operations
5.	Press the [PRINT] key to show the display shown on the right. (\overline{No} blinks when No is selected.)	 
6.	Use the [RE-ZERO] key to toggle between YES and No . Set \overline{YES} to blink.	 
7.	Press the [PRINT] key while \overline{YES} is blinking to enable the password function.	  
8.	The display shown on the right appears. To return to weighing mode without registering (changing) a password, press the [CAL] key twice. To register (change) the password, proceed to step 5 of " 18-4. Registering (changing) the password ".	  Press twice 

18-2. Password entry at the start of weighing

When logging in as an administrator (ADM^{IH}) or user ($USER^{01}$ to $USER^{10}$)


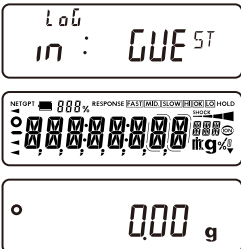
If I (On: Restricts weighing operations) is set for $LOCK$ (Lock function) under $PASS_{word}$ (Password lock) in the function table ("9. Function Table"), the balance will prompt for a password at the start of weighing.

Step	Description	Display and key operations
1.	With the display turned off, press the [ON:OFF] key.	
2.	The display will prompt for password entry.	
3.	<p>Enter a 4-digit password using the following keys. Note that If no key is pressed for 10 minutes, the display will automatically turn off.</p> <p>[MODE] key M Input [SAMPLE] key S Input [PRINT] key P Input [RE-ZERO] key Z Input [CAL] key Backspace</p> <p>After 10 minutes of inactivity Display turns off.</p>	


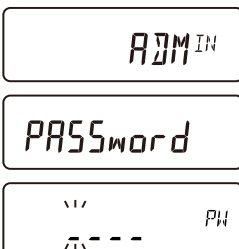
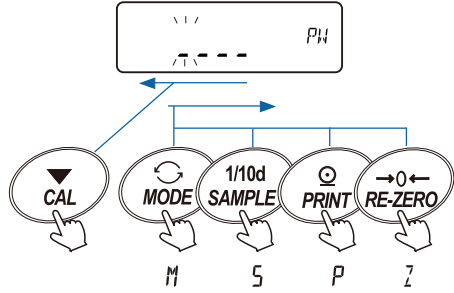
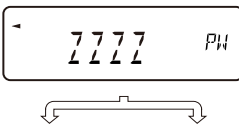
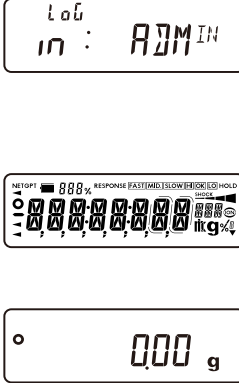
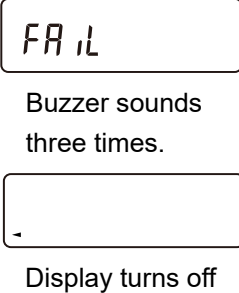
Step	Description	Display and key operations
4.	<p>When the correct password is entered, the login level is displayed, followed by all segments / indicators, and then the weighing display.</p> <p>Administrator login is enabled when the Administrator password is entered.</p> <p>The factory default Administrator password is set to 7777, entered by pressing the [RE-ZERO] key four times.</p> <p>If the password is incorrect, the buzzer sounds three times with FAIL displayed, and then the display turns off.</p>	<div style="text-align: center;"> </div> <p>Correct password Incorrect password</p> <p>Buzzer sounds three times.</p> <p>Display turns off</p> <p>Weighing display</p>

Logging in as a guest (GUEST)


If 2 (On: On: Allows basic weighing operation) is set for *Lock* (Lock function) under PASSWD (Password lock) in the function table ("9. Function Table"), password entry is not required at the start of weighing.

Step	Description	Display and key operations
1.	With the display turned off, press the [ON:OFF] key.	
2.	The balance will show the displays shown on the right and enter weighing mode.	

Logging in as the administrator (ADM^{IN})

Step	Description	Display and key operations
1.	With the display turned off, press and hold the [CAL] key and press the [ON:OFF] 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 If no key is pressed for 10 minutes, the display will automatically turn off.</p> <p>[MODE] key M Input [SAMPLE] key S Input [PRINT] key P Input [RE-ZERO] key Z Input [CAL] key Backspace</p> <p>After 10 minutes of inactivity Display turns 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>Administrator login is enabled when the Administrator password is entered.</p> <p>The factory default Administrator password is set to 1111, entered by pressing the [RE-ZERO] key four times.</p> <p>If the password is incorrect, the buzzer sounds three times with F A I L displayed, and then the display turns off.</p>	 <p>Correct password Incorrect password</p> <div style="display: flex; justify-content: space-around;"> <div>  <p>Weighing display</p> </div> <div>  <p>Buzzer sounds three times.</p> <p>Display turns off</p> </div> </div>

18-3. Logging out

Step	Description	Display and key operations
1.	Pressing the [ON:OFF] key turns off the display and logs out the user. If <i>Lock</i> is set to 1, the balance will prompt for password re-entry when transitioning from display-off to weighing mode.	

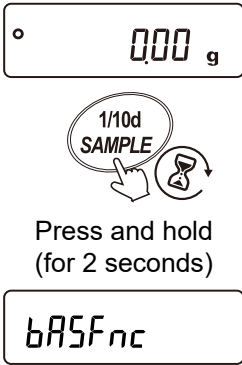
18-4. Registering (changing) the password


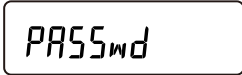

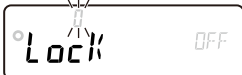



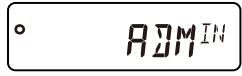

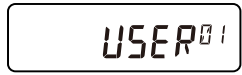




The *PASS No* (Password registration) setting under *PASSmd* (Password lock) in the function table ("9. Function Table") allows for registering (changing) the password.

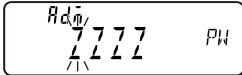
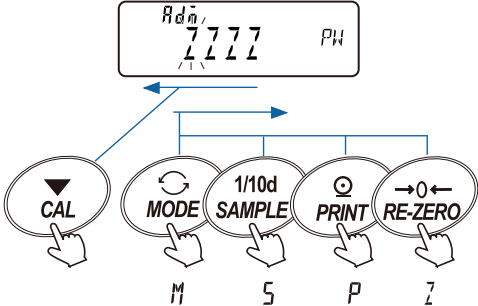

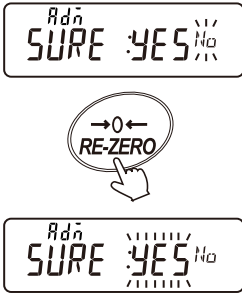
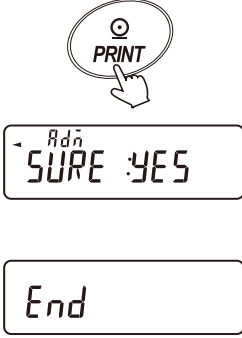

CAUTION



- ❑ Pressing the [ON:OFF] key turns off the display and logs out the user.
- ❑ When *Lock* is set to 2, the balance will prompt for the administrator (*ADMIN*) password when logging in as the administrator. Password registration for users (*USER 01* to *USER 09*) 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 09*) cannot register a password that is already registered for the administrator (*ADMIN*).
- ❑ For instructions on deleting a password, refer to "18-5. Deleting user passwords (users only)".

Method for registering (changing)

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	

Step	Description	Display and key operations
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 Press several times 
3.	Press the [PRINT] key to display Lock (Lock function).	 
4.	Press the [SAMPLE] key.	 
5.	Press the [PRINT] key to display the login level (° ADMIN).	 
6.	<p>Press the [SAMPLE] key to display the login level to be changed.</p> <p>In this example, ADMIN (Administrator) is displayed.</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>	 Press several times  to  
7.	<p>With the desired login level displayed, press the [PRINT] key.</p> <p>This example explains how to change the password for the Administrator (ADMIN).</p>	 

Step	Description	Display and key operations
8.	The current password will be displayed. (The factory default Administrator (ADM^{TH}) password is set to 1111 , entered by pressing the [RE-ZERO] key four times.)	
9.	Enter a 4-digit password using the following keys. Note that If no key is pressed for 10 minutes, the display will automatically turn off. [MODE] key M Input [SAMPLE] key S Input [PRINT] key P Input [RE-ZERO] key 1 Input [CAL] key Backspace After 10 minutes of inactivity Display turns off	
10.	After entering the four digits with the keys, the new password will be displayed.	
11.	Use the [RE-ZERO] key to toggle between YES and No . Set YES to blink.	
12.	Press the [PRINT] key while YES is blinking to register the new password.	
13.	Once the new password has been set, the next login level will be displayed. To continue configuration, proceed from step 6.	

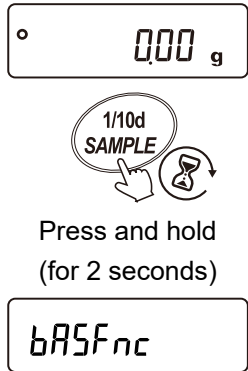
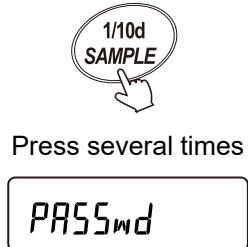
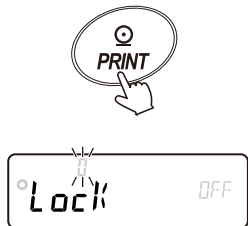
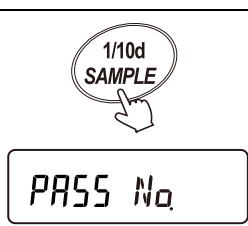
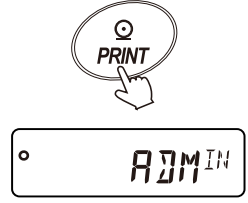
Step	Description	Display and key operations
14.	To exit setting mode and return to weighing mode, press the [CAL] key three times.	 <p>Press three times</p> 














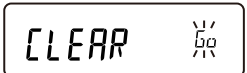




18-5. Deleting user passwords (users only)

CAUTION

- The administrator (ADM^{IN}) password cannot be deleted. Refer to "18-4. Registering (changing) the password" to change it to a new password.

Deleting method

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>Press and hold (for 2 seconds)</p>
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 <p>Press several times</p>
3.	Press the [PRINT] key to display $LOCK$ (Lock function).	
4.	Press the [SAMPLE] key to show the display shown on the right.	
5.	Press the [PRINT] key to display the login level (ADM^{IN}).	

Step	Description	Display and key operations
6.	<p>Press the [SAMPLE] key to display the login level to be changed.</p> <p>In this example,  (User 01) is displayed.</p> <p>When a password is registered for the login level,  (the stability indicator) will be displayed.</p>	 <p>Press several times</p> 
7.	<p>Press the [PRINT] key.</p> <p>The current password will be displayed.</p>	 
8.	<p>Press and hold the [CAL] key (for 2 seconds) until the display shown on the right appears.</p>	 <p>Press and hold (for 2 seconds)</p> 
9.	<p>Press the [PRINT] key to show the display shown on the right.</p>	 
10.	<p>Press the [RE-ZERO] key to switch between  and .</p>	 
11.	<p>Press the [PRINT] key while  is blinking to delete the password.</p>	  

18-6. If the password is forgotten

Forgetting the password will result in loss of access to the balance.

To reset the password, the unit must be sent to the manufacturer for service. Please contact your local A&D dealer to request repair.



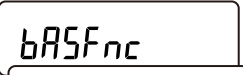
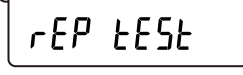
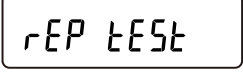

19. Repeatability Check Function (GX-AE / GX-A / GX-AWP Series Only)







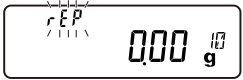
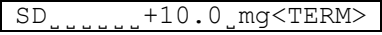




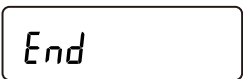

- Repeatability is an index of variation in measured values when the same mass is repeatedly loaded and unloaded, and is usually expressed as the standard deviation (σ_{n-1}). The GX-AE, GX-A, and GX-AWP series balances are equipped with an internal weight for sensitivity adjustment.
- The repeatability check function performs 10 measurements using the internal weight and displays the resulting standard deviation. This function can be used to verify the repeatability of the balance in the environment where it is installed.

Example: "Standard deviation = 10.0 mg" shows that the results of repeated measurements of the same sample fall within the range of ± 10.0 mg with a frequency of about 68%.

CAUTION

- The result of this function uses the internal weight of the balance (approximately 200 g). Since this differs from the repeatability conditions in "27-2. Individual specifications", please treat it as a reference value.
- This function is not available on models GX-124A and GX-124AE.
- To ensure accurate data measurement, avoid applying vibration or drafts while collecting data.
- If the password lock function is enabled, this function is only available to the Administrator (ADMTH).

Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key for approximately 4 seconds until the display transitions as shown on the right.	  Press and hold (for approx. 4 seconds)  
2.	When the display shown on the right appears, release your finger from the [SAMPLE] key.	 

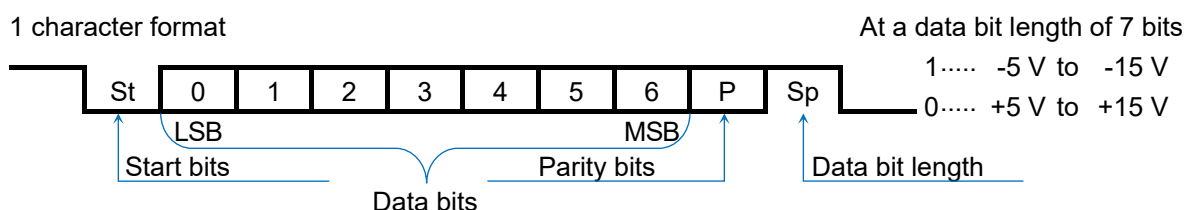
Step	Description	Display and key operations
3.	<p>After  is displayed, the display transitions as shown on the right, and data collection begins automatically.</p> <p>While data is being collected,  blinks on the display.</p> <p>To cancel the process, press the [CAL] key.</p> <p> appears and the balance returns to weighing mode.</p>	   <p>⋮</p> <p>Repeats 10 times</p> 
4.	<p>When data collection is completed, the repeatability (standard deviation) is displayed.</p> <p>To output the result, press the [PRINT] key.</p> <p>The repeatability will be output.</p> <p>PC output example (WinCT, RsCom)</p> <p></p> <p>␣: Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	   <p>Data output</p>
5.	<p>Press the [CAL] key to return to weighing mode.</p>	  

20. Interface Specification

20-1. RS-232C

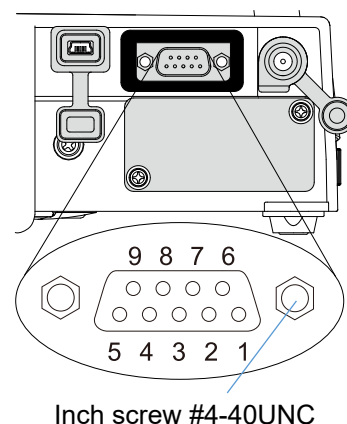
Connector	D-Sub 9-pin (male)		
Transmission system	EIA RS-232C		
Transmission form	Asynchronous, bi-directional		
Transmission rate	Approx. 5 times/second (5.21 Hz), approx. 10 times/second (10.42 Hz), approx. 20 times/second (20.83 Hz) (Linked with $5P_d$ under $bRSF_{nc}$ in the function table ("9. 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	(At a data bit length of 7 bits)
		NONE	(At a data bit length of 8 bits)
	Data bit length	1 bit	
	Code	ASCII	

1 character format



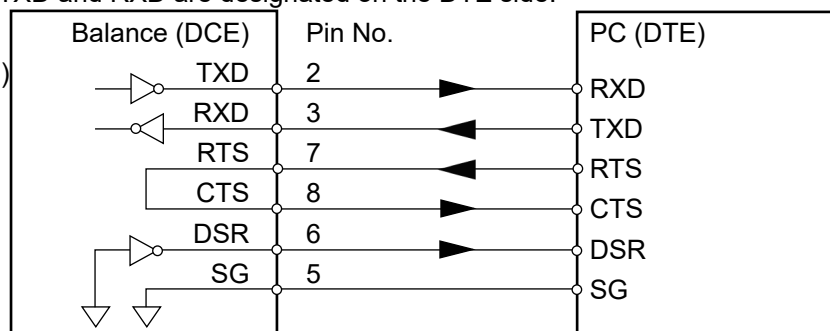
D-Sub 9-pin assignments

Pin No.	Signal name	Direction	Description
1	-	-	Same potential as SG ^{*1}
2	TXD	Output	Transmit data
3	RXD	Input	Receive data
4	-	-	N.C. (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)



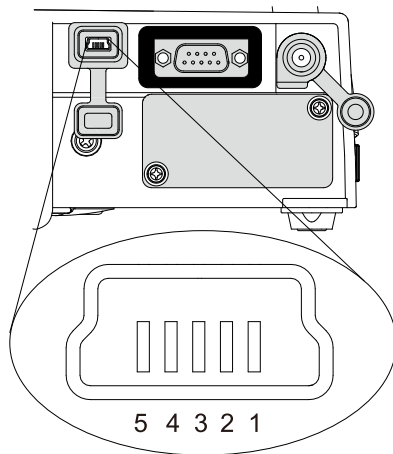
^{*1} Used with certain A&D peripheral devices. Do not connect cables when connecting to devices from other manufacturers that output power. Using an incorrect cable may damage the device.

20-2. USB

Connector	Mini-B (female)
Specification	USB 2.0
Device class	Human Interface Device (HID): Quick USB Communications Device Class (CDC): Virtual COM

Mini-B pin assignment

Pin No.	Signal name	Direction	Description
1	VBUS	Input	Power supply
2	D-	-	Transmit / receive data
3	D+	-	Transmit / receive data
4	ID	-	N.C. (No connection)
5	GND	-	Signal ground



21. Connection with Peripheral Devices

The balance is equipped with an RS-232C connector and a USB mini-B connector, allowing connection to peripherals, PCs, PLCs, and other devices.

21-1. Cables required to connect to peripheral devices

The connection cables compatible with the interface used for peripheral devices are listed in the peripheral and connection cable compatibility table below.

Peripheral and connection cable compatibility table

Peripheral devices		Communication interface used	Connection cable		Note
Product name	Model		Standard / optional accessories	Cable model	
Multi-functional compact printer	AD-8127	RS-232C or isolated RS-232C interface	[Standard accessory] RS-232C cable for connecting the printer	AX-KO2741-100	*1 *5
Thermal printer	AD-8129TH				
Remote display	AD-8920A		[Standard accessory] RS-232C cable for connecting the remote display or remote controller	AX-KO3412-100	*2 *5
Remote controller	AD-8922A			AX-KO2466-200	*2 *5
Expansion controller for weighing lines	AD-8923-BCD		[Sold separately]	AX-KO2466-200	*5
	AD-8923-CC				
PLC					*3 *4 *5
PC		USB	[Standard accessory] USB cable for connecting the balance	AX-KO5465-180	

*1 When using the AD-8529PR-W (Bluetooth® converter, sold separately), the RS-232C cable included with the printer is not required.

*2 Optional 5 m and 10 m cables are available.

*3 Check the interface specifications of the balance and the PLC, and prepare a compatible cable.

*4 The balance can be connected to a PC using an AX-USB-9P, AD-8529PC-W, AD-1688, or AD-8527. The connection cables included with these products can be used for data transfer.

*5 To use the GX-AWP / GF-AWP series with dustproof and waterproof performance, attach the waterproof RS-232C cable (AX-KO2737-500).

21-2. Data output settings

The balance's operation can be configured by adjusting the function table settings to meet specific usage requirements.

For details on the function table, refer to "9. Function Table".

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

The data output mode can be specified using $P_{r}t$ (Data output mode) under $dout$ (Data output) in the function table ("9. Function Table").

Data output mode

Class	Item	Parameter	Description	
$dout$	$P_{r}t$ Data output mode	0	Key mode	Outputs data with the [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 [PRINT] key, whether stable or not.
		5	Key mode C	Outputs data immediately with the [PRINT] key if stable; otherwise, outputs once stabilized.
		6	Interval output mode	Starts with the [PRINT] key and outputs data at set intervals.
		7	Auto print mode C	Outputs data when the comparison result is OK, and the value is stable and exceeds the range from the zero point to the values set for $RP-P$ and $RP-b$.

(2) Precautions for simultaneous connection of multiple peripheral devices

Peripheral devices such as the remote display, remote controller, and expansion controller for weighing lines (see "Peripheral and connection cable compatibility table") display weighing values in real time. Therefore, the balance is typically operated in continuous output mode (stream mode).

However, when connecting peripheral devices such as a printer, PLC, or PC, operating the balance in stream mode (continuous output of weighing values) may reduce usability.

To support simultaneous connection of devices that require stream mode and those that do not, the RS-232C interface can be configured for exceptional operation based on the connected device. This is done using the *ModE* (Connection) setting under or *1 in the function table ("9. Function Table").

ModE in the function table

Class	Item	Parameter	Description	Data output mode	Data format
<input type="text" value="5 iF"/> or <input type="text" value="aP-5 iF"/> *1	<i>ModE</i> Devices connected via RS-232C	0	PC, PLC, etc. General-purpose devices		Determined by the <i>tYPE</i> setting under <input type="text" value="5 iF"/> or <input type="text" value="aP-5 iF"/> *1.
		1	Printer	Determined by the <i>Prt</i> setting under <input type="text" value="dout"/> .	Determined by the <i>tYPE</i> setting under <input type="text" value="5 iF"/> or <input type="text" value="aP-5 iF"/> *1. Only the A&D standard format or DP format can be selected.
		2	Remote display, etc.	Activates stream mode regardless of the <i>Prt</i> setting under <input type="text" value="dout"/> .	Outputs data in the A&D standard format, regardless of the <i>tYPE</i> setting under <input type="text" value="5 iF"/> or <input type="text" value="aP-5 iF"/> *2.

*1 can only be selected when the optional GXA-03 (isolated RS-232C interface) is installed on the balance.

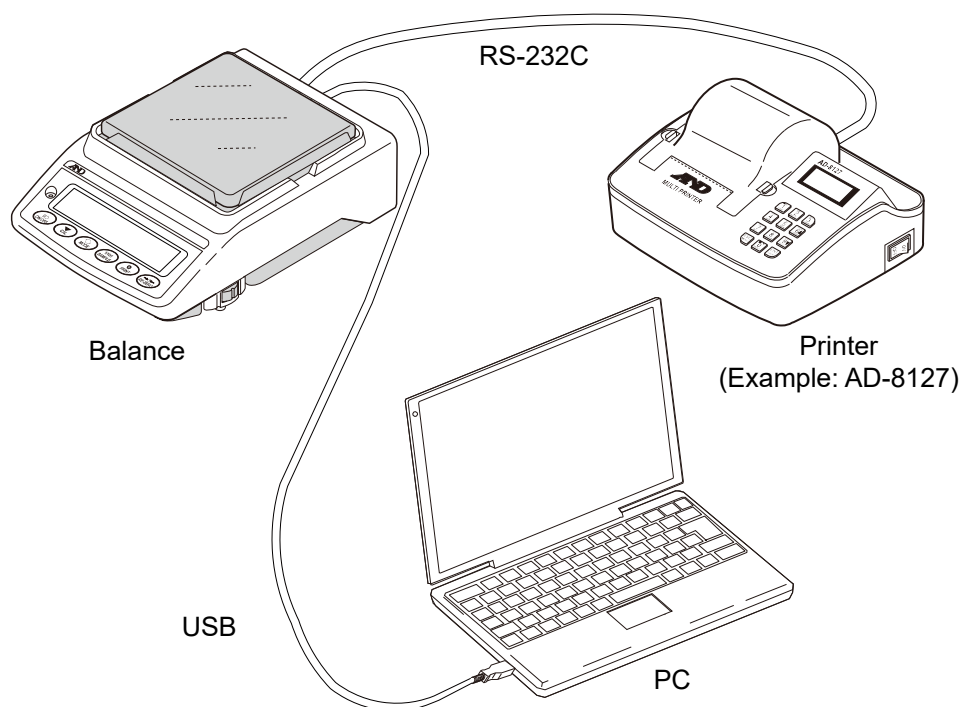
*2 Only weighing values are output continuously.

The following functions under are disabled: *5-t d* (Time / date output), *5- i d* (ID number output), *PUSE* (Data output pause), *Rt -F* (Auto feed), and *inF d* (GLP output).

21-3. Examples of connecting multiple peripheral devices simultaneously

(1) Connecting a printer and a PC

Usage example: Print the weighing value on a printer while simultaneously logging the data on a PC.

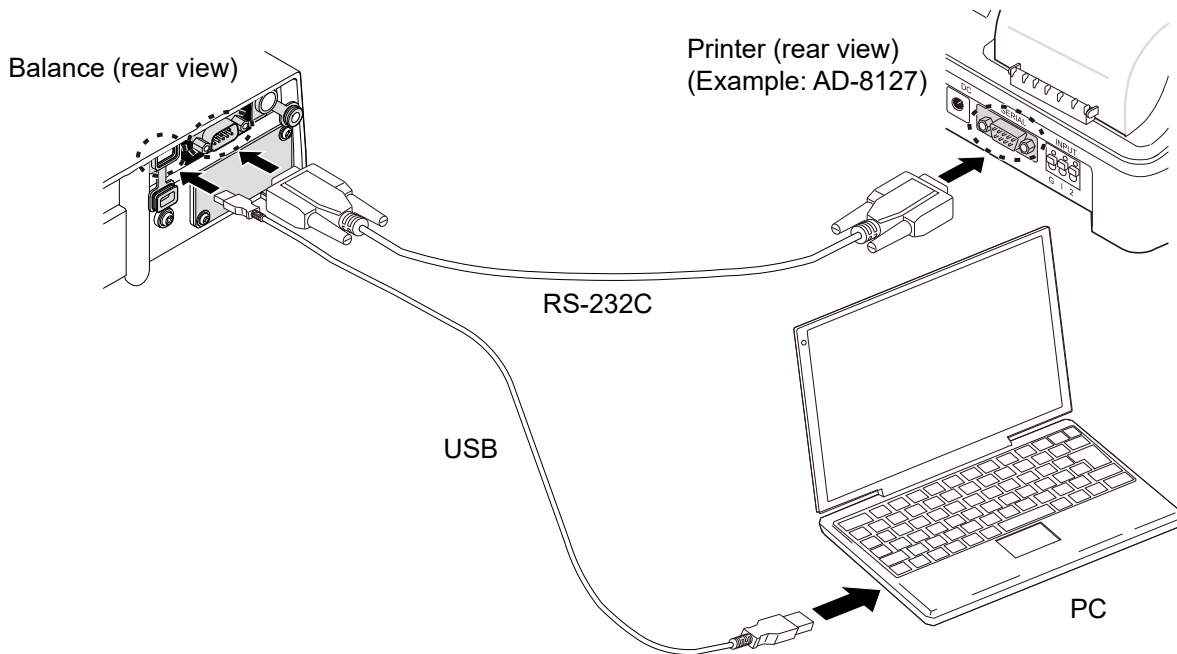


Simultaneous connection example 1: Printer and PC

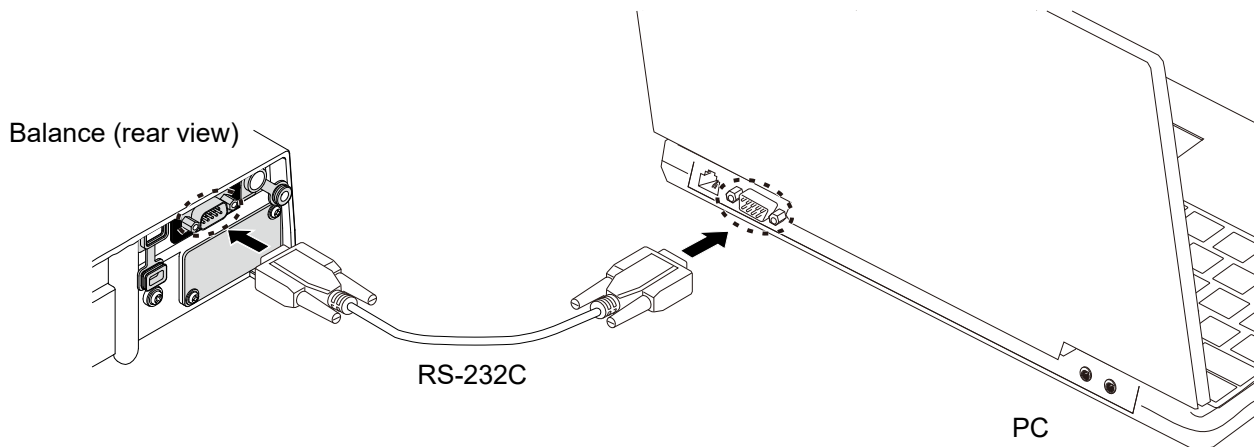
Connection method		Connection interface			
Interface	Device	Class	Item	Parameter	Description
(Common setting)		<input type="text" value="dout"/>	Prt	0 to 7	Select the data output mode that is suitable for the printer / PC settings and applications.
RS-232C	Printer	<input type="text" value="5, F"/>	ModE	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
GXA-03 (isolated RS-232C interface)					

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

Dedicated printers for balances include the AD-8127 (multi-functional printer) and AD-8129TH (thermal printer).



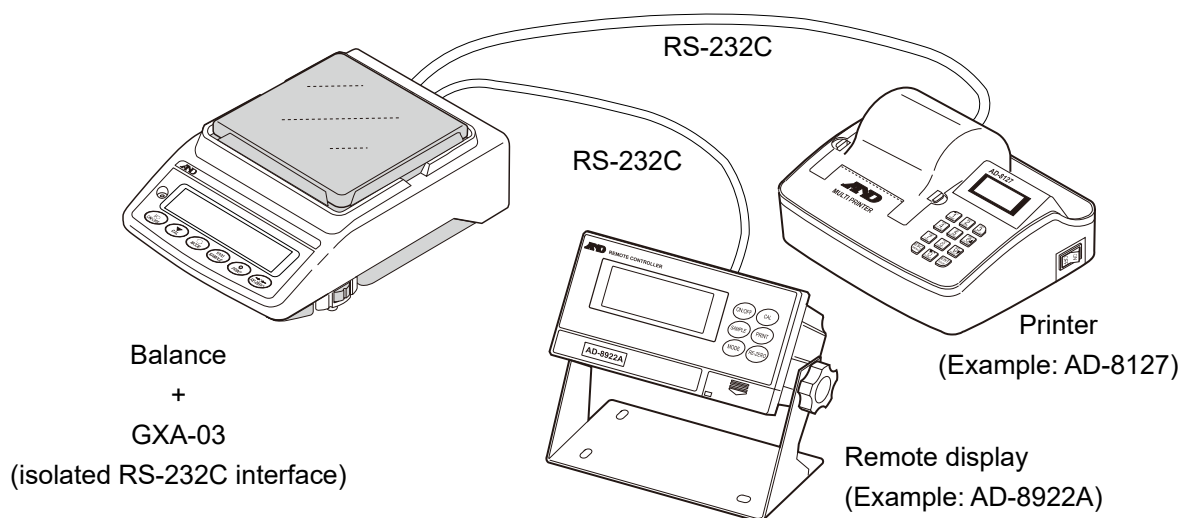
When connecting only the balance and the PC, either a USB cable or an RS-232C cable can be used.



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

(2) Connecting a printer and a remote display

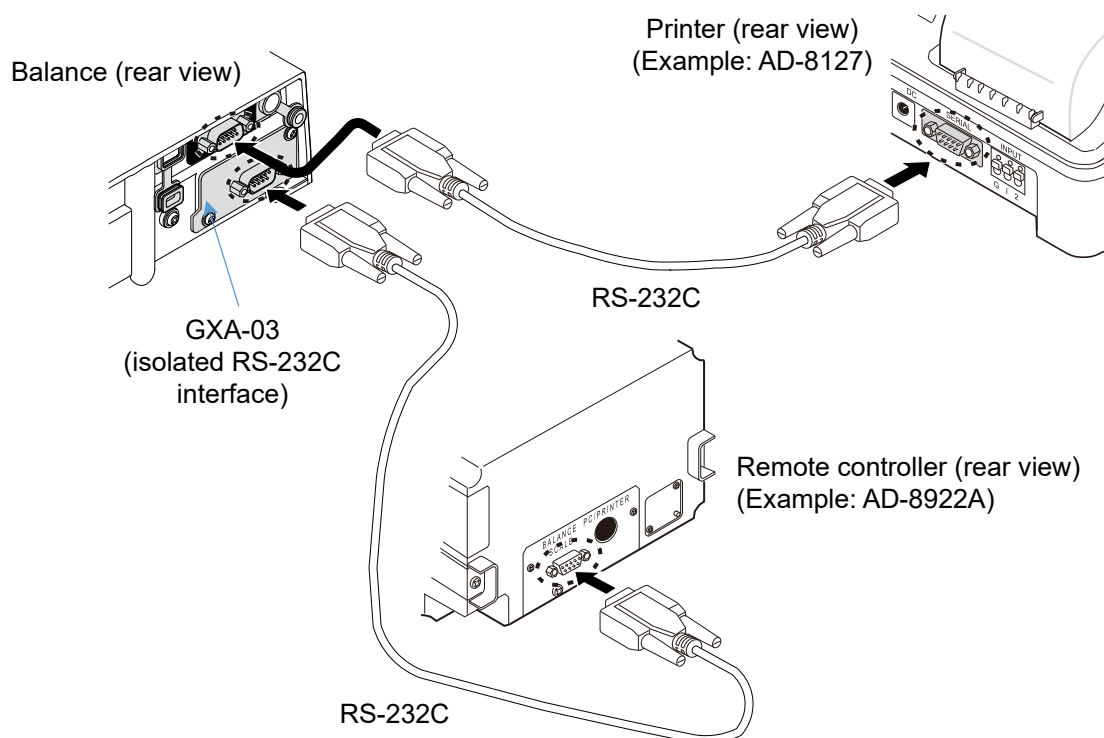
Usage example: Display the weighing value on a remote display while simultaneously printing it on a printer.



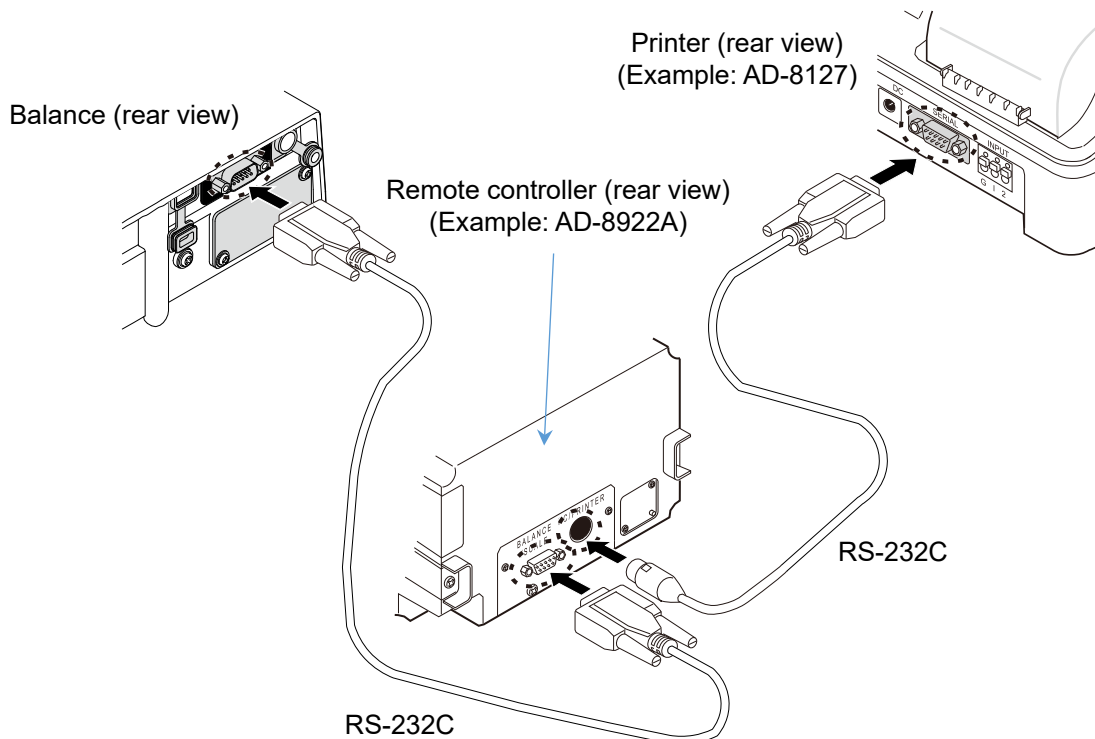
Simultaneous connection example 2: Printer and remote display

Connection method		Connection interface			
Interface	Device	Class	Item	Parameter	Description
RS-232C	Printer	<div>dout</div>	Prt	0 to 7	Select the data output mode that is suitable for the printer settings and applications.
		<div>S iF</div>	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					
GXA-03 (isolated RS-232C interface)	Remote display	<div>oP-S iF</div>	ModE	2	Continuously outputs weighing values to the remote display in A&D standard format.

To check weighing values or perform key operations from a location away from the balance, connect a remote display dedicated for the balance. The dedicated remote displays for balances are the AD-8920A remote display (display only) and the AD-8922A (remote controller).

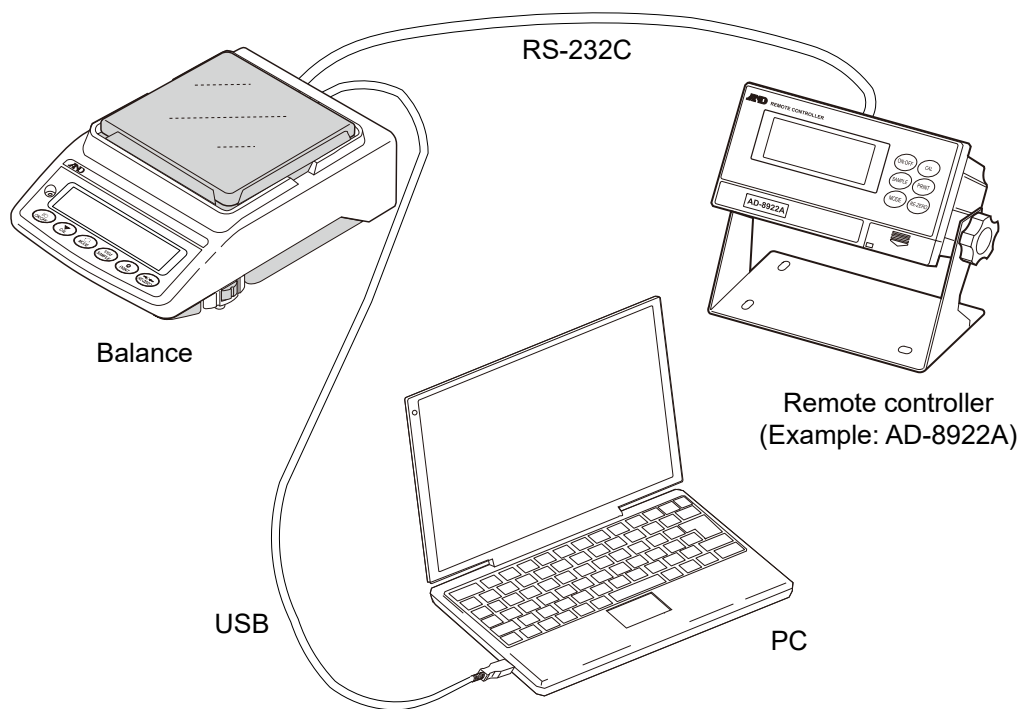


A printer can also be connected to the remote controller (AD-8922A). For details, refer to the [AD-8922A Instruction Manual](#).



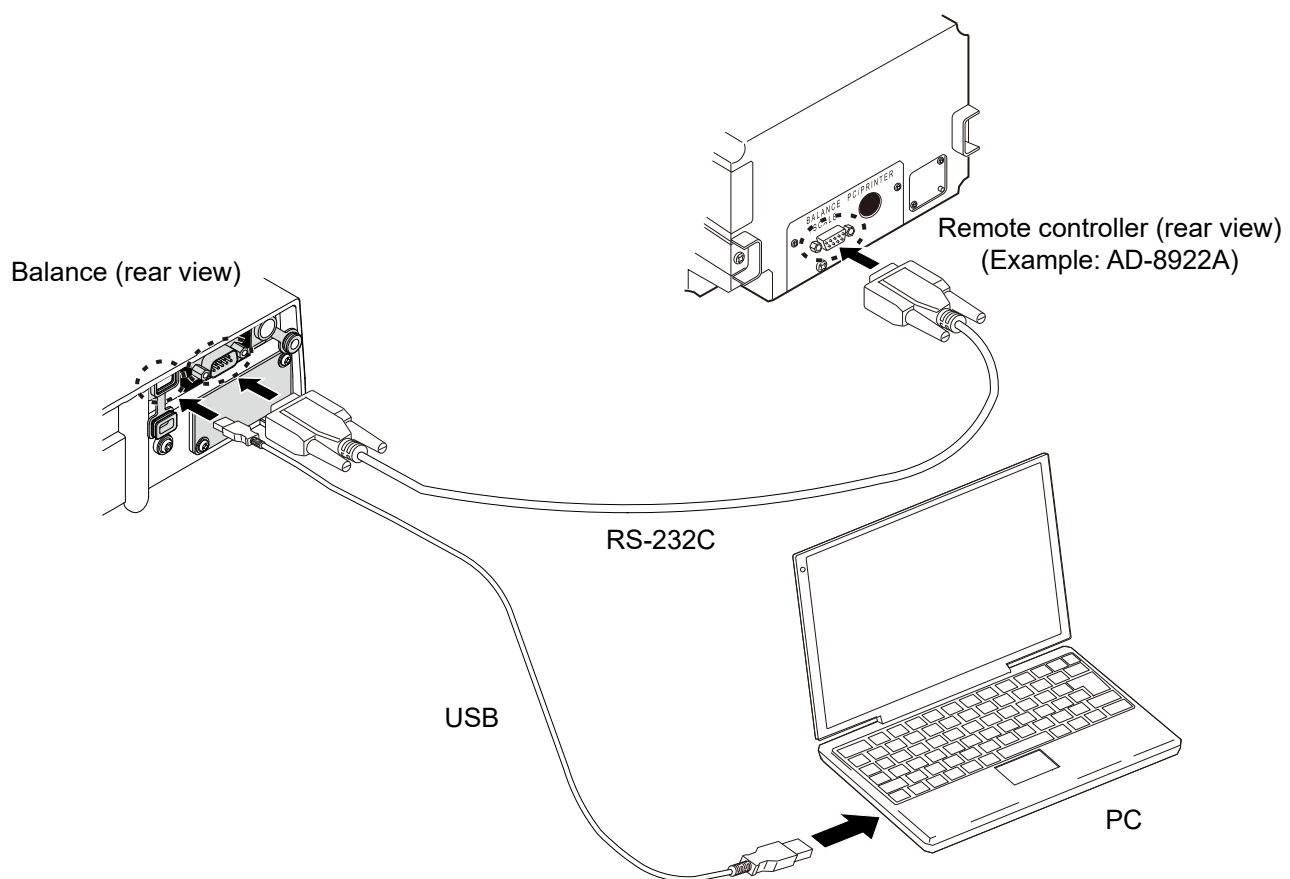
(3) Connecting a remote display and a PC

Usage example: Display the weighing value on a remote display while simultaneously logging the data on a PC.



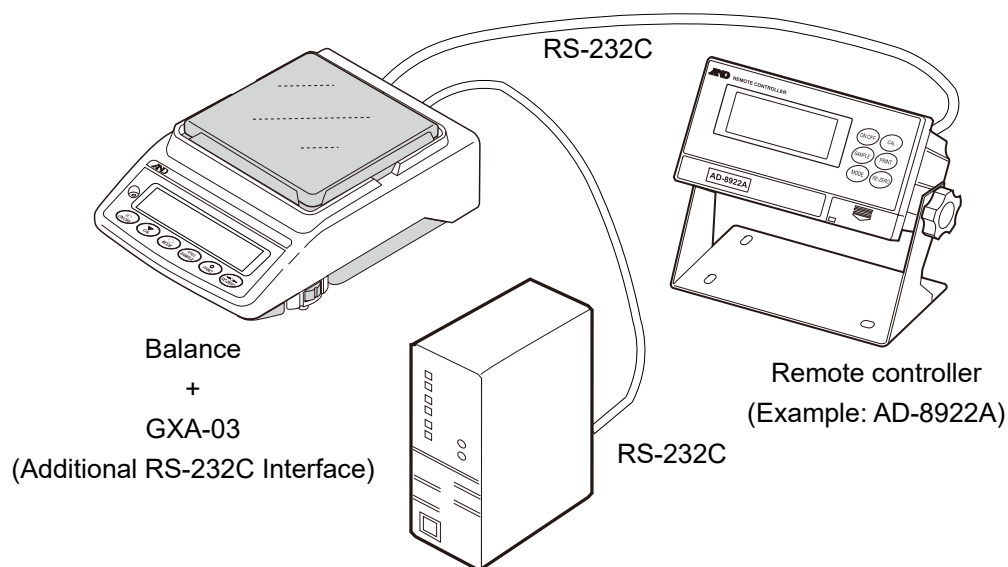
Simultaneous connection example 3: Remote display and PC

Connection method		Connection interface			
Interface	Device	Class	Item	Parameter	Description
RS-232C	Remote display	<input type="text" value="S i F"/>	ModE	2	Continuously outputs weighing values to the remote display in A&D standard format.
USB	PC	<input type="text" value="dout"/>	Pr t	0 to 7	Select the data output mode suitable for PC logging.
		<input type="text" value="USb"/>	U-tP	0 to 4	Select an output format optimal for PC.
GXA-03 (isolated RS-232C interface)					



(4) Connecting remote display or remote controller and PLC

Usage example: Display the weighing value on a remote controller while simultaneously logging the data on a PLC.

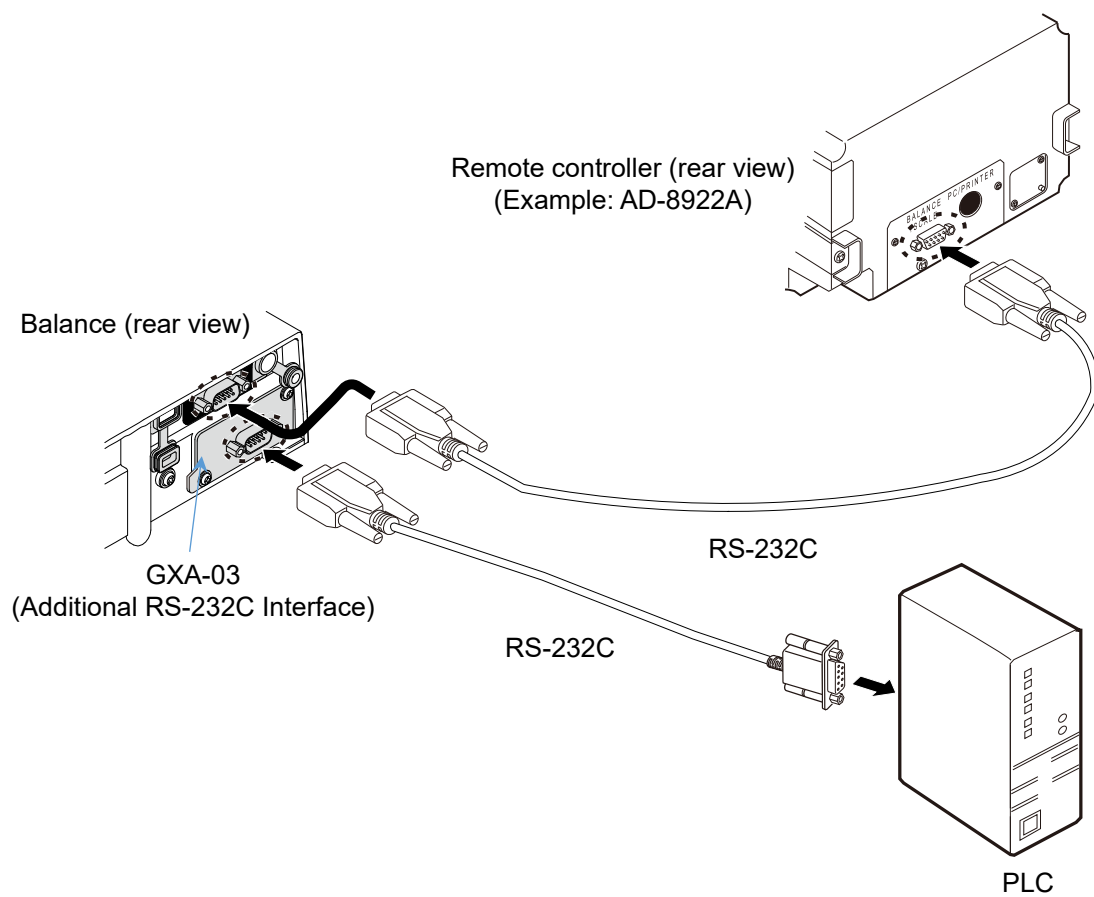


Simultaneous connection example 4: Remote display or remote controller and PLC

Connection method		Connection interface			
Interface	Device	Class	Item	Parameter	Description
RS-232C	Remote controller	<input type="text" value="5 iF"/>	ModE	?	Continuously outputs weighing values to the remote controller in A&D standard format.
USB					
GXA-03 (isolated RS-232C interface)	PLC	<input type="text" value="dout"/>	PrE	0 to 7	Select the data output mode that is suitable for the PLC settings and applications.
		<input type="text" value="oP-5 iF"/>	ModE tYPE	0 0 to 7	Select an output format optimal for PLC.

When connecting a remote display or remote controller and a PLC to the balance, each device must be connected via an RS-232C interface.

Connect the remote display or remote controller using the standard RS-232C interface. To connect the PLC, install the optional GXA-03 (isolated RS-232C interface) dedicated for the balance and use its isolated RS-232C port.



22. Printing Weighing Value Data on a Printer

Examples of the balance function table and printer configurations corresponding to the printer type and the print format for weighing values are shown below.

22-1. When using the AD-8127 / AD-8129TH

To print only the weighing values.

Common balance settings for printing only weighing values with the AD-8127 or AD-8129TH

Class	Item	Parameter	Description
<div>5, F</div> Serial interface	Mode Connection	1	Printer connection
	TYPE Data format	0	A&D standard format

Settings for printing only weighing values with the AD-8127 or AD-8129TH

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

*1 Unstable data is also output.

To set the AD-8127 or AD-8129TH to a mode other than dump print mode and also print unstable data, change the setting to "Unstable data, Printed out ("US PRN", "PRINT")" in the function table of the AD-8127 or AD-8129TH.

Printing weighing value data with the ID number and timestamp using the clock / calendar function of the balance

Common balance settings for printing weighing values and other information with the AD-8127 / AD-8129TH

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

Settings for printing weighing values and other information with the AD-8127 / AD-8129TH

Printing method	Balance function table			Printer function table	
	Class Item	Parameter	Description	PRN. MODE	Description
Press the [PRINT] 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.


Printing information other than weighing value data

To print sensitivity adjustment or calibration test reports (GLP-compliant output), or to output statistical calculation results calculated by the balance, set the printer to dump print mode.

AD-8127 / AD-8129TH function table for printing information other than weighing values

Printer function table	
PRN. MODE	Description
DUMP	Dump print mode

- Switching the print mode (PRN. MODE) of the AD-8127 / AD-8129TH

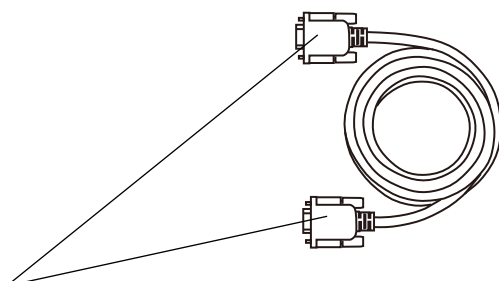
Press and hold the  key on the AD-8127 or AD-8129TH to toggle between EXT.KEY (external key print mode) and DUMP (dump print mode) without entering the printer's function table.

This operation is useful when temporarily switching the printer to dump print mode for GLP output, etc.

23. Connecting to a PC

23-1. 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

23-2. Quick USB mode

Quick USB mode enables direct input of balance data into PC software such as Excel or Word via a USB connection. Supported operating systems are Windows XP or later.

Because the Windows standard driver (HID) is used, no dedicated driver installation is required.

Communication is established simply by connecting the devices.

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.
- ❑ For software versions 1.502 and earlier, the format set in the $\bar{U}-tP$ (USB data format) settings is used. For software versions 1.503 and later, the data format is fixed to NU2. The data format is fixed to NU2 regardless of the $\bar{U}-tP$ (USB data format) setting.

USB data format

- ❑ When using USB, select a data format using $\bar{U}-tP$ (USB data format) under U5b (USB interface) in the function table ("9. Function Table").

Function table	Output example																		
$U-tP = 0$	A&D standard format <table><tr><td>S</td><td>T</td><td>,</td><td>+</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>.</td><td>4</td><td>5</td><td></td><td></td><td>g</td><td>CR</td><td>LF</td></tr></table>	S	T	,	+	0	0	1	2	3	.	4	5			g	CR	LF	
S	T	,	+	0	0	1	2	3	.	4	5			g	CR	LF			
$U-tP = 1$	NU format <table><tr><td>+</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>.</td><td>4</td><td>5</td><td>CR</td><td>LF</td></tr></table>	+	0	0	1	2	3	.	4	5	CR	LF							
+	0	0	1	2	3	.	4	5	CR	LF									
$U-tP = 2$	CSV format <table><tr><td>S</td><td>T</td><td>,</td><td>+</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>.</td><td>4</td><td>5</td><td>,</td><td></td><td></td><td>g</td><td>CR</td><td>LF</td></tr></table>	S	T	,	+	0	0	1	2	3	.	4	5	,			g	CR	LF
S	T	,	+	0	0	1	2	3	.	4	5	,			g	CR	LF		
$U-tP = 3$	TAB format <table><tr><td>S</td><td>T</td><td>TAB</td><td>+</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>.</td><td>4</td><td>5</td><td>TAB</td><td></td><td></td><td>g</td><td>CR</td><td>LF</td></tr></table>	S	T	TAB	+	0	0	1	2	3	.	4	5	TAB			g	CR	LF
S	T	TAB	+	0	0	1	2	3	.	4	5	TAB			g	CR	LF		
$U-tP = 4$	NU2 format <table><tr><td>1</td><td>2</td><td>3</td><td>.</td><td>4</td><td>5</td><td>CR</td><td>LF</td></tr></table>	1	2	3	.	4	5	CR	LF										
1	2	3	.	4	5	CR	LF												

: Space, ASCII 20h

<TERM>: Terminator, CR LF or CR

CR: Carriage return, ASCII 0Dh

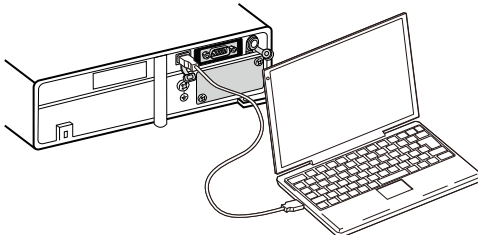
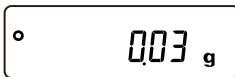
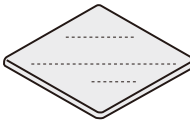
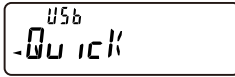


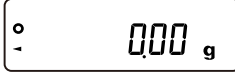
LF: Line feed, ASCII 0Ah

TAB: Horizontal tab, ASCII 09h

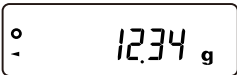
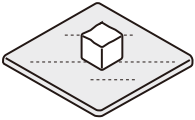
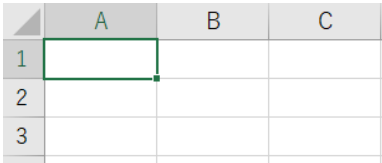
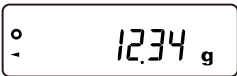
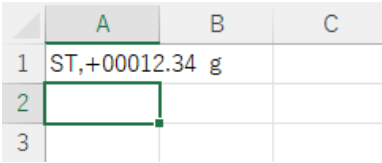


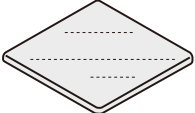
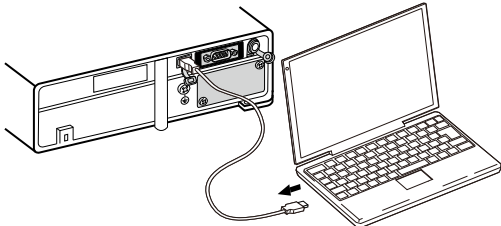



- ❑ For details on the output format, refer to "9-6-3. Weighing data format".

How to use

The following example explains how to output weighing data from the balance using the [PRINT] key.

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> <div></div> <p>When the balance is connected to the PC for the first time, the PC will automatically begin installing the driver.</p>	<div></div>	<div></div>	
2.	<p>When connected, the Quick USB connection display (shown on the right) appears for approximately 2 seconds, and the balance automatically returns to weighing mode.^{*1}</p> <p>The USB connection indicator ◀ lights up while the USB connection is active.</p>	<div></div> <p>Displayed for approx. 2 seconds</p> <div></div>		
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.)			
5.	Press the [RE-ZERO] key to set the display to zero.	<div></div> <div></div>		

^{*1} If the indicator is not displayed, check that the parameter for UF_{nc} (USB function mode) is set to 0 (Quick USB) in the function table.

Step	Description	Display and key operations	Weighing operation
6.	Place a sample on the weighing pan.		
7.	Position the cursor in the cell where weighing data is to be entered. 		
8.	Press the [PRINT] key to send the weighing data from the balance. The data will be entered at the cursor position. 	  Data output	
9.	To end the data transmission, disconnect the USB cable. 		
10.	When disconnected, the USB disconnection display appears (as shown on the right) for approximately 2 seconds, and the balance automatically returns to weighing mode. The USB connection indicator ◀ turns off.	 Displayed for approx. 2 seconds 	

23-3. Virtual COM mode

Virtual COM mode enables bidirectional communication between the balance and a PC via the included USB cable, creating a COM port on the PC. Supported operating systems are Windows XP or later. On Windows 10 and Windows 11, the driver is installed automatically. If it is not installed automatically, please refer to the PDF file in the [driver for Virtual COM mode](https://www.aandd.jp) on the A&D website (<https://www.aandd.jp>).

Communication equivalent to RS-232C is possible by selecting the COM port in data communication software such as WinCT.

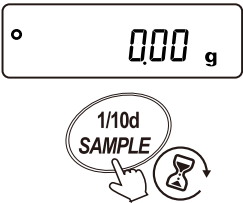




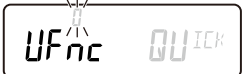
In Virtual COM mode, configuration of baud rate, data bits, parity, and stop bits is not required.

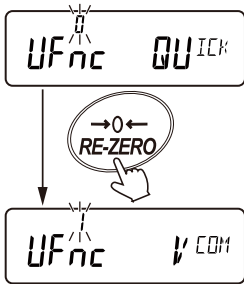
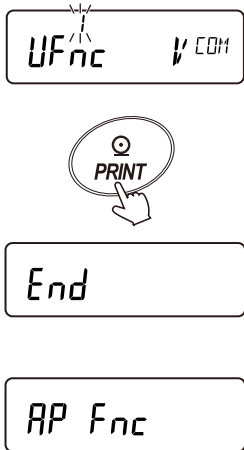
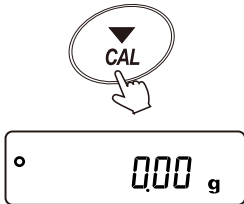
CAUTION

- Installing the driver for Virtual COM mode for the first time may take some time.

Enabling Virtual COM mode (changing the function table configuration)

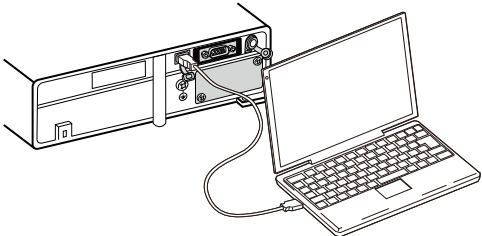

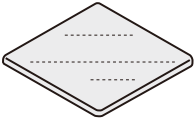
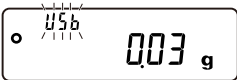

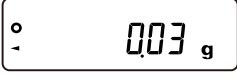
Switch from Quick USB mode (unidirectional communication) to Virtual COM mode (bidirectional communication).

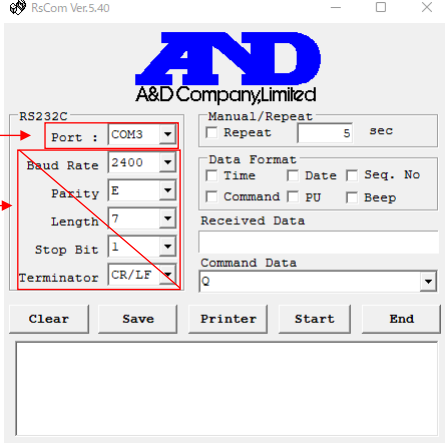
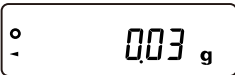
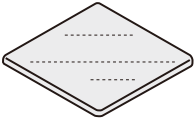



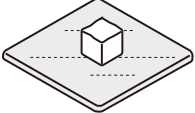


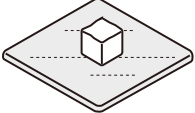
Step	Description	Display and key operations
1.	In weighing mode, press and hold the [SAMPLE] key (for 2 seconds) to display the function table menu ("9. Function Table").	 <p>Press and hold (for 2 seconds)</p> 
2.	Press the [SAMPLE] key several times until the display shown on the right appears.	 <p>Press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

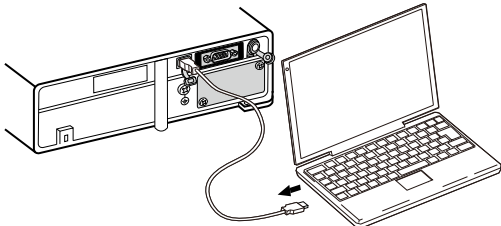
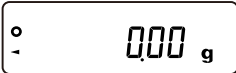
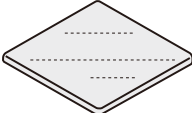
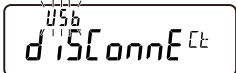
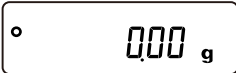
Step	Description	Display and key operations
4.	Use the [RE-ZERO] key to switch the parameter for UF_{nc} (USB function mode) to \overleftrightarrow{U} (Quick USB) or \overleftrightarrow{I} (Bidirectional USB virtual COM).	 <p>The diagram shows two display states. The top display shows UF_{nc} and $QUICK$. An arrow points down to the bottom display, which shows UF_{nc} and $VCOM$. A hand icon is shown pressing a key labeled $\rightarrow 0 \leftarrow$ RE-ZERO.</p>
5.	When the display shown on the right appears, press the [PRINT] key to store the setting.	 <p>The diagram shows a sequence of three displays. The first display shows UF_{nc} and $VCOM$. The second display shows a hand icon pressing a key labeled \odot PRINT. The third display shows End. The fourth display shows $AP F_{nc}$.</p>
6.	Press the [CAL] key to return to weighing mode.	 <p>The diagram shows a display with $AP F_{nc}$. A hand icon is shown pressing a key labeled ∇ CAL. The resulting display shows $^{\circ}$ and 0.000 g.</p>

How to use

The following example shows how to output weighing data from the balance using either 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>On Windows 10 or Windows 11, the PC will automatically begin installing the driver the first time the balance is connected.</p> <p>For operating systems other than Windows 10 and Windows 11, install the driver manually.</p> <p>Refer to the PDF file in the driver for Virtual COM mode on the A&D website (https://www.aandd.jp) for instructions on how to install the driver.</p>		
8.	<p>When the balance is connected to the PC, the USB display will blink as shown on the right.</p> <p>(This indicates that communication with the PC is being established.)</p>		
9.	<p>When communication with the PC is established, the Virtual COM connection display appears (as shown on the right) for approximately 2 seconds, and the balance automatically returns to weighing mode.</p> <p>The USB connection indicator ◀ lights up while the USB connection is active.</p>	 <p>Displayed for approx. 2 seconds</p> 	
10.	<p>Launch the software (e.g., WinCT) used for transmitting weighing data on the PC.</p>		

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&D website (https://www.aandd.jp).</p> <p>Example: RsCom</p> 		
12.	Press the [RE-ZERO] 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 [PRINT] 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&D standard format</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">ST, +00012.34 _ _g<TERM></div> <p>_ : Space, ASCII 20h <TERM>: Terminator, CR LF or CR CR: Carriage return, ASCII 0Dh LF: Line feed, ASCII 0Ah</p>	 <p>or</p> <p>send a data request command from the PC</p>  <p>Data output</p>	

Step	Description	Display and key operations	Weighing operation
15.	<p>To end the data transmission, disconnect the USB cable.</p> 		
16.	<p>When disconnected, the USB disconnection display appears (as shown on the right) for approximately 2 seconds, and the balance automatically returns to weighing mode.</p> <p>The USB connection indicator ◀ turns off.</p>	 <p>Displayed for approx. 2 seconds</p> 	

23-4. WinCT: Data communication software

- ❑ WinCT is Windows-compatible data communication software used to receive weighing data from the balance on a PC. The PC's communication settings use RS-232C.
- ❑ WinCT is available for download from the [Software](https://www.aandd.jp) page on the A&D website (<https://www.aandd.jp>). For installation and setup instructions, refer to the [relevant manuals](#) available on our website, such as the Setup Manual and Instruction Manual for WinCT.
- ❑ WinCT includes three applications: RsCom, RsKey, and RsWeight.

RsCom

- ❑ Controls the balance by sending commands.
- ❑ 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

- ❑ Inputs weighing data from the balance directly into other applications.
- ❑ Compatible with any application that accepts keyboard input, such as Word or Excel.
- ❑ Inputs GLP output data from the balance.
- ❑ Uses the test display function to enable the PC to function as a remote display for the balance. (In stream mode)

RsWeight

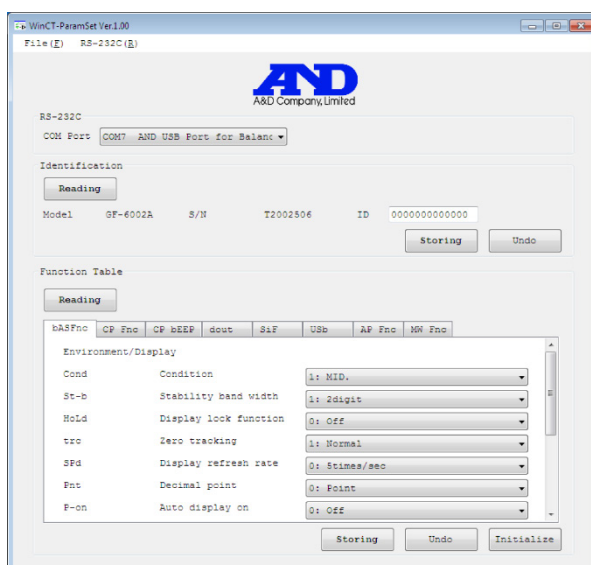
- ❑ Graphs received data in real-time.
- ❑ Calculates and displays the maximum, minimum, average, standard deviation, and coefficient of variation of the received data.

23-5. WinCT-ParamSet: Windows communication tools for parameter setting

- WinCT-ParamSet is Windows-compatible data communication software used to change the balance's function table from a PC. Communication with the PC uses either USB or RS-232C.

CAUTION

- To connect via USB, refer to "Enabling Virtual COM mode (changing the function table configuration)" and set I (Bidirectional USB virtual COM) for UF_{nc} (USB function mode) under $U5b$ (USB interface) in the function table ("9. Function Table").
- To connect via RS-232C, a separate cable is required to connect the PC and the balance. (e.g., USB conversion cable AX-USB-9P)
- WinCT-ParamSet is available for download from the [Software](https://www.aandd.jp) page on the A&D website (<https://www.aandd.jp>).
For installation and setup instructions, download the software from the [Software](https://www.aandd.jp) 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"
(File names vary depending on the software version of WinCT-ParamSet. Asterisks (*) represent digits from 0 to 9.)
- Reads and changes the ID number and function table data from the balance in bulk.
- Saves settings in CSV file format.
- Loads saved CSV files 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 lock function is enabled, this software cannot be used. Additionally, the software cannot be used to enable the function when it is disabled. To configure the password lock 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 target balance.

23-6. WinCT-GXA-Filter: Windows GX-AE / GX-A / GF-A filter setting tools

WinCT-GXA-Filter is data communication software that enables adjustment of the balance's weighing speed settings.

WinCT-GXA-Filter is available for download from the [Software](#) page on the A&D website (<https://www.aandd.jp>). To download, fill in the required user information on the application page.

Features

- ☐ Reads setting data from the balance and allows bulk modifications.
- ☐ Saves settings in CSV file format.
- ☐ Loads saved CSV files and writes the settings to the balance.
- ☐ Enables or disables the extended function (detailed filter settings).

23-7. Commands

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 `<CR><LF>` (Terminator) under `S,F` (Serial interface) in the function table ("9. Function Table").

23-7-1. 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 [ON:OFF] key.	
ON	Turns the display on.	
OFF	Turns the display off.	
CAL	Same as the [CAL] key. · Internal sensitivity adjustment (GX-AE / GX-A / GX-AWP series) · External sensitivity adjustment (GF-A / GF-AWP series)	
EXC	External sensitivity adjustment (GX-AE / GX-A / GX-AWP series)	
U	Same as the [MODE] key.	[Unit switching]
SMP	Same as the [SAMPLE] key.	[Readability switching]
PRT	Same as the [PRINT] key.	[Data output]
R	Same as the [RE-ZERO] key.	[Zero display]
Z		
<ESC>T		
T	Tare	[Zero display]
TR		
ZR ^{*1}	Zero	
TST	Calibration test using the internal weight (GX-AE / GX-A series 0.0001 g models)	

- The "R", "Z", and "<ESC>T" commands perform the same function.
- The "T" and "TR" commands perform the same function.
- <ESC>: Escape code, ASCII 1Bh

^{*1} If the load is within $\pm 2\%$ of the capacity from the initial zero point, the zero point is updated, the tare value is cleared, and the display is set to zero. If the load exceeds $\pm 2\%$, no processing is performed.

Command	Content [Functions in weighing mode]
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
LK:*****	Locks the specified key. The value ***** represents a number ranging from 00000 to 00063. Refer to "23-9-2. Locking specified key switches".
?LK	Request the status of the specified locked key. Refer to "23-9-2. Locking specified key switches".

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, use the A&D standard format (3 characters). If the display unit is PCS or percent (%), set the value in grams. To set the preset tare to 1234.56 g, the input is "PT:1234.56 _ _g"
?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, use the A&D standard format (3 characters). To set the unit weight to 1.23 g, the input is "UW:1.23 _ _g".
?UW	Requests the unit weight value.

"_" represents a space.

Commands to control the comparator function

Command	Content
HI:****.***g	Sets the upper limit value.
HH:****.***g	Sets the second upper limit value.
LO:****.***g	Sets the lower limit value.
LL:****.***g	Sets the second lower limit value.
	<input type="checkbox"/> For the unit, use the A&D standard format (3 characters). <input type="checkbox"/> To set the upper limit value to 567.89 g, the input is "HI:567.89g" <input type="checkbox"/> Values exceeding the weighing capacity cannot be set.
?HI	Requests the upper limit value.
?HH	Requests the second upper limit value.
?LO	Requests the lower limit value.
?LL	Requests the second lower limit value.

"_" represents a space.

- ☐ To use comparator commands, set $\bar{0}$ or $\bar{1}$ for $[P_{in}]$ (Input method) under $[P_{Fnc}]$ (Comparator) in the function table ("9. Function Table").

Commands to control the data memory function (Function table: $[dout]$, $dAtA = 1$)

Command	Content
UN:mm	Changes the unit weight registration number. For "mm", 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: $[dout]$, $dAtA = 2$)

Command	Content
?MA	Requests all stored weighing data.
?MQnnn	Requests the weighing data stored with data number "nnn". For "nnn", 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", enter a number from 001 to 200.
MCL	Deletes all stored weighing data.

Commands to control the data memory function (Function table: $[dout]$, $dAtA = 3$)

Command	Content
CN:mm	For "mm", enter a number from 01 to 20.
?CN	Requests the currently selected comparator registration number.

Commands to control the data memory function (Function table: $[dout]$, $dAtA = 4$)

Command	Content
PN:mm	Reads the stored tare values. For "mm", enter a number from 01 to 20.
?PN	Requests the currently selected tare weight 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 "TM:12:34:56".												
DT:**/**/**	Sets date. (Do not set non-existing date values.) The command varies depending on the date display order. Example: When setting the date to April 23, 2025 <table><tr><th>Display</th><th>Order</th><th>Command</th></tr><tr><td><div><div>y m d</div><div>20250423</div><div>DT</div></div></td><td>Year/Month/Day</td><td><div>D T : 2 5 / 0 4 / 2 3</div></td></tr><tr><td><div><div>m d y</div><div>04232025</div><div>DT</div></div></td><td>Month/Day/Year</td><td><div>D T : 0 4 / 2 3 / 2 5</div></td></tr><tr><td><div><div>d m y</div><div>23042025</div><div>DT</div></div></td><td>Day/Month/Year</td><td><div>D T : 2 3 / 0 4 / 2 5</div></td></tr></table>	Display	Order	Command	<div><div>y m d</div><div>20250423</div><div>DT</div></div>	Year/Month/Day	<div>D T : 2 5 / 0 4 / 2 3</div>	<div><div>m d y</div><div>04232025</div><div>DT</div></div>	Month/Day/Year	<div>D T : 0 4 / 2 3 / 2 5</div>	<div><div>d m y</div><div>23042025</div><div>DT</div></div>	Day/Month/Year	<div>D T : 2 3 / 0 4 / 2 5</div>
Display	Order	Command											
<div><div>y m d</div><div>20250423</div><div>DT</div></div>	Year/Month/Day	<div>D T : 2 5 / 0 4 / 2 3</div>											
<div><div>m d y</div><div>04232025</div><div>DT</div></div>	Month/Day/Year	<div>D T : 0 4 / 2 3 / 2 5</div>											
<div><div>d m y</div><div>23042025</div><div>DT</div></div>	Day/Month/Year	<div>D T : 2 3 / 0 4 / 2 5</div>											
?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 PT or T command will be output. The header will be "PT" when the preset tare value is set with the PT command, and "T" when the tare value is set with the [TARE] key or the T or TR 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.

23-7-2. <AK> code and error codes

When I (ON) is set for $Errd$ (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 $Errd$ (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, Exx). 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, Exx). 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, Exx). 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	[RE-ZERO] key
T / TR command	Tare
ZR command	Zero ^{*1}
CAL command	Internal sensitivity adjustment (GX-A / GX-AE / GX-AWP series) External sensitivity adjustment (GF-A series)
EXC command	External sensitivity adjustment (GX-A / GX-AE / GX-AWP series)

^{*1} If the load is within $\pm 2\%$ of the capacity from the initial zero point, the zero point is updated, the tare value is cleared, and the display is set to zero. If the load exceeds $\pm 2\%$, no processing is performed.

23-7-3. Command usage examples

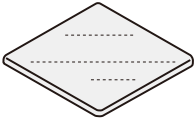

This example demonstrates the setting where `! (ON)` is set for `ErrCd` (AK, Error code) under `5 LF` in the function table to output an <AK> code.

ASCII symbols

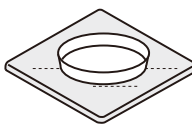
CR: Carriage return (ASCII 0Dh)
 _ : Space (ASCII 20h)

LF: Line feed (ASCII 0Ah)
 AK: Acknowledgement (ASCII 06h)

Example of ON command (Turning the display on)

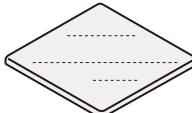
Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	ON command <div> <div>O</div> <div>N</div> <div>CR</div> <div>LF</div> </div>	<div> <div>AK</div> <div>CR</div> <div>LF</div> </div> Reception confirmation	<div> <div> <div></div> </div> Display off </div>	
2.		<div> <div>AK</div> <div>CR</div> <div>LF</div> </div> Completion confirmation	<div>  <div> <div>.</div> <div>g</div> </div> Power-on zero stabilizing (Processing) </div> <div> <div> <div>°</div> <div>000 g</div> </div> </div>	

Example of the R command (Re-zero)

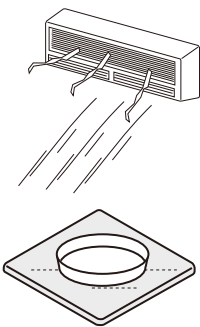
Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	R command <div>R</div> <div>C_R</div> <div>L_F</div>	<div>AK</div> <div>C_R</div> <div>L_F</div> Reception confirmation	<div>° 10.12 g</div> Before execution	 Place the container on the weighing pan.
2.		<div>AK</div> <div>C_R</div> <div>L_F</div> Completion confirmation	<div>. g</div> Re-zero stabilizing (Processing)	
3.			<div>° 000 g</div> Zero display	

Example of the CAL command

(Internal sensitivity adjustment: GX-AE / GX-A / GX-AWP series)

Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	CAL command <div>C</div> <div>A</div> <div>L</div> <div>CR</div> <div>LF</div>	<div>AK</div> <div>CR</div> <div>LF</div> Reception confirmation	<div>° 000 g</div> Before execution	 Nothing on the weighing pan.
2.		<div>AK</div> <div>CR</div> <div>LF</div> Completion confirmation	<div>CAL in</div> <div>CAL. in</div> Processing <div>End</div> <div>. g</div> Re-zero stabilizing (Processing)	
3.			<div>° 000 g</div> Zero display	

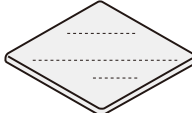
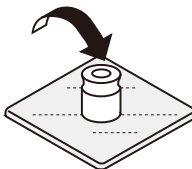
Example of the R command for error code output (Re-zero)

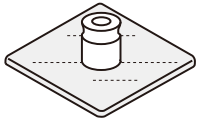
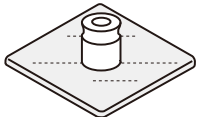
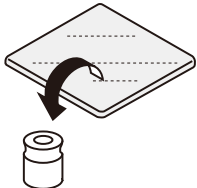
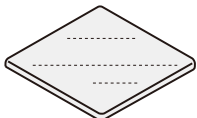
Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	R command <div>R</div> <div>C_R</div> <div>LF</div>	<div>AK</div> <div>C_R</div> <div>LF</div> Reception confirmation	<div>10.12 g</div> Before execution	 Place the container on the weighing pan.
2.		<div>E</div> <div>C</div> <div>,</div> <div>E</div> <div>1</div> <div>1</div> <div>C_R</div> <div>LF</div> Error code output	<div>.</div> <div>g</div> Re-zero stabilizing (Processing) Timeout due to instability <div>Error 1</div> Display	
3.	CAL command or Wait for approx. 5 seconds <div>C</div> <div>A</div> <div>L</div> <div>C_R</div> <div>LF</div>		<div>1023 g</div> Weighing display	

Example of EXC command
(External sensitivity adjustment: GX-AE / GX-A / GX-AWP series)

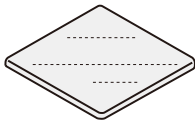

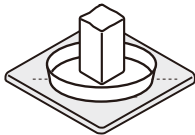
CAUTION

- On the GX-AE and GF-AWP series, the CAL command performs the same function as the EXC command.

Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
1.	EXC command <div>E</div> <div>X</div> <div>C</div> <div>CR</div> <div>LF</div>	<div>AK</div> <div>CR</div> <div>LF</div> Reception confirmation	<div>° 000 g</div> Before execution	 Nothing on the weighing pan.
2.			<div>CAL 0</div> Waiting for zero setting	
3.	PRT command <div>P</div> <div>R</div> <div>T</div> <div>CR</div> <div>LF</div>	<div>AK</div> <div>CR</div> <div>LF</div> Reception confirmation		
4.		<div>AK</div> <div>CR</div> <div>LF</div> Process completed	<div>CAL 0</div> Setting the zero (Processing)	
5.			<div>2000</div> Waiting for the specified weight to be loaded	 Place the weight

Step	PC side	Balance side		
	Command	Response	Display	Weighing operation
6.	PRT command <div>P R T C_R L_F</div>	<div>AKC_R L_F</div> Reception confirmation		
7.		<div>AKC_R L_F</div> Process completed	<div>2000</div> Weighing the weight (Processing)	
8.			<div>End</div> Waiting for unloading	
9.				 Remove the weight
10.		<div>AKC_R L_F</div> Process completed	<div>. g</div> Re-zero stabilizing (Processing)	
11.			<div>° 000 g</div> Zero display	

Example of T command

Step	PC side		Balance side		
	Command		Response	Display	Weighing operation
1.	R command <div>R C_R L_F</div>		<div>AK C_R L_F</div> Reception confirmation	<div>° 0.12 g</div> Before execution	
2.				<div>. g</div> Re-zero stabilizing (Processing)	
			<div>AK C_R L_F</div> Completion confirmation		
3.				<div>° 0.00 g</div> Zero display	
4.	T command <div>T C_R L_F</div>		<div>AK C_R L_F</div> Reception confirmation	<div>° 12345 g</div>	
				<div>. g</div>	
			<div>AK C_R L_F</div> Completion confirmation	<div>° 0.00 g</div>	
5.				<div>° 100000 g</div>	

Step	PC side		Balance side																						
	Command		Response	Display	Weighing operation																				
6.	S command	→																							
	<table><tr><td>S</td><td>C_R</td><td>L_F</td></tr></table>	S	C _R	L _F	←	<table><tr><td>S</td><td>T</td><td>,</td><td>+</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>.</td><td>0</td><td>0</td><td>_</td><td>_</td><td>g</td><td>C_R</td><td>L_F</td></tr></table>		S	T	,	+	0	1	0	0	0	.	0	0	_	_	g	C _R	L _F	
S	C _R	L _F																							
S	T	,	+	0	1	0	0	0	.	0	0	_	_	g	C _R	L _F									
7.	?PT command	→																							
	<table><tr><td>?</td><td>P</td><td>T</td><td>C_R</td><td>L_F</td></tr></table>	?	P	T	C _R	L _F	←	<table><tr><td>P</td><td>T</td><td>,</td><td>+</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>.</td><td>4</td><td>5</td><td>_</td><td>_</td><td>g</td><td>C_R</td><td>L_F</td></tr></table>		P	T	,	+	0	0	1	2	3	.	4	5	_	_	g	C _R
?	P	T	C _R	L _F																					
P	T	,	+	0	0	1	2	3	.	4	5	_	_	g	C _R	L _F									
			Net weight value																						
			Tare weight value																						

"_" represents a space.

23-8. UFC function

The Universal Flex Coms (UFC) function enables output of customized content when weighing data is transmitted. Character strings for barcode printing with a label printer or similar device can also be output. To use the UFC function, set 1 (ON) for *UFC* (UFC function) under dout (Data output) in the function table ("9. Function Table").

23-8-1. UFC program commands

The desired output format can be stored in the balance by sending program commands from the PC. The stored output format is retained even when the balance 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,	UFC command header (Add this to the beginning of the program command.)																
\$MN	Manufacturer name	_	_	_	_	_	_	_	A	_	&	_	D				
\$TY	Model	_	_	_	G	X	-	1	0	0	0	2	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	1	8	/	1	2	/	3	1						
\$TM	Time	1	2	:	3	4	:	5	6								
\$WT	Weighing data	_	_	_	+	1	2	3	4	.	5	6	_	_	g		
\$GR	Gross data (gross weight)	_	_	_	+	1	2	3	4	.	5	6	_	_	g		
\$NT	Net data (net weight)	_	_	_	_	+	2	3	4	.	5	6	_	_	g		
\$TR	Tare data (tare weight)	_	_	_	+	1	0	0	0	.	0	0	_	_	g		
\$PC	Counting data	_	_	_	_	_	+	1	2	3	4	_	P	C			
\$UW	Unit weight data	_	_	_	_	_	+	0	.	1	2	_	_	g			
\$CP	Comparison 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-defined ASCII string in single quotation marks ('). The string may include alphanumeric characters and symbols.

Example: To output the string `SAMPLE-12`, enter `'SAMPLE-12'`.

To include a single quotation mark within the string, represent it using two consecutive single quotation marks (").

Example: To output the string `A 'BC 'D`, enter `'A"BC"D'`.

- ❑ To output an ASCII control code, enter # followed by two hexadecimal characters.

Example: To output the control code End of Transmission (`<EOT>`, `04h`), enter `#04`.

- ❑ To repeat space (`$SP`), carriage return (`$CR`), line feed (`$LF`), or tab (`$HT`) characters, append * followed by a number (up to two digits) after the command.

Example: To output 12 spaces, enter `$SP*12`. To output 9 carriage returns, enter `$CR*9`.

- ❑ When sending program commands that are composed of multiple lines, append an ampersand (&) to the end of each line to indicate that the command continues on the next line. (RS-232C only)

- ❑ After receiving a program command, the balance returns an `<AK>` code (ASCII `06h`) if the command is executed successfully. If an error occurs, an error code is returned instead.

- ❑ Windows Communication Tools for UFC (WinCT-UFC) is software used to create program commands. WinCT-UFC is available for download from the [Software](#) page on the A&D website (<https://www.aandd.jp>). To download, fill in the required user information on the application page.

23-8-2. Examples of UFC program command creation

CAUTION

- The terminator (newline) in the UFC format is not sent automatically.
Add the terminator code at the end of the character data as needed.

Output example 1

<div>NET<CR><LF> ← 1 +2000.00_g<CR><LF> ← 2 TARE<CR><LF> ← 3 +345.67_g<CR><LF> ← 4 GROSS<CR><LF> ← 5 +2345.67_g<CR><LF> ← 6</div>		
No.	Content	Program command example
1	PF, Command, String "NET", Newline	PF, ' NET' , \$CR, \$LF, &
2	Space x 5, Net Data, Newline	\$SP*5, \$NT, \$CR, \$LF, &
3	String "TARE", Newline	' TARE' , \$CR, \$LF, &
4	Space x 6, Tare data, Newline	\$SP*6, \$TR, \$CR, \$LF, &
5	String "GROSS", Newline	' GROSS' , \$CR, \$LF, &
6	Space x 5, Gross data	\$SP*5, \$GR, \$CR, \$LF

"_" represents a space.

Output example 2

<div>2017/01/23_12:34:56<CR><LF> ← 1 SAMPLE_____ABC-123<CR><LF> ← 2 WEIGHT_+3456.78_g<CR><LF> ← 3</div>		
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	' WEIGHT_' , \$WT, \$CR, \$LF

"_" represents a space.

23-9. Key lock function

The key switches on the balance can be locked by sending a specified command to the balance.

This function is useful when the balance is to be controlled exclusively by an external device such as a PC.

- Even in the key lock state, key operations can be performed using key control commands.
For details on key operation commands, refer to "23-7. Commands".
- The key lock state can be checked by sending a status check command to the balance.
- The key lock remains active until a release command is sent to the balance or the power is turned off by unplugging the AC adapter.

23-9-1. Locking all key switches

All the 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 The lock state of all keys
KL:***	Replace *** with either 000 or 001. KL:000 All keys unlocked. KL:001 The lock setting of all keys

23-9-2. 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.

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

Example 1: Locking all key switches except the [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

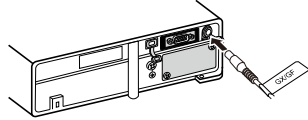



Command string	Content
?LK	Requests the status of the specified key locks. Example 1: When the key switches other than the [PRINT] key are locked. LK, 00047 Example 2: When all key switches are unlocked. LK, 00000
LK:*****	Locks the specified keys. A number from 00000 to 00063 is entered in place of *****. 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

24. Checking the Software Version of the Balance

Specifications may vary depending on the balance software version.

Check the software version as follows.

Checking method

Step	Description	Display and key operations
1.	Disconnect and reconnect the AC adapter to the balance.	
2.	The  display blinks.	
3.	The software version, represented as <i>P-*.***</i> , is displayed for approximately 1 second. The number in place of <i>*.***</i> indicates the software version.	

25. Maintenance

25-1. Treatment of the balance

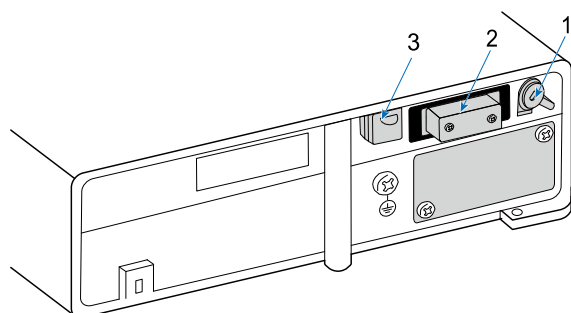
Cleaning the balance

- ❑ Do not use organic solvents, alcohol, or chemical cleaning cloths.
- ❑ Do not disassemble the balance.
- ❑ When transporting the balance, use the packing materials and box that the balance was originally packed in when purchased.

Main unit	Clean the balance with a lint-free cloth moistened with a mild detergent.
Breeze break	The breeze break components are treated with an anti-static coating. Wipe them with a soft, lint-free cloth. Repeated cleaning with a cloth dampened with neutral detergent or water, or rinsing with water, may reduce the antistatic effect.
Weighing pan	When cleaning the weighing pan, be careful not to injure your hands on the edges.

Dustproof and waterproof specifications of the GX-AWP / GF-AWP series


- ❑ The GX-AWP and GF-AWP series balances feature dustproof and waterproof performance compliant with the IP65 standard. This allows the weighing pan to be washed with water while installed under normal operating conditions. Do not submerge the balance or expose the underside of the main unit to water pressure as this may result in water ingress.
- ❑ Before washing the balance, ensure the following:
 - Attach the terminal cover to the RS-232C interface, or use the waterproof RS-232C cable (AX-KO-2737-500).
 - Close the lid of the AC adapter input jack and the USB port cover.
 - Confirm that the underhook cap is securely closed.



- 1 AC adapter input jack
Keep the lid closed when the AC adapter is not connected.
- 2 Terminal cover
Attach the terminal cover included with the RS-232C interface, or connect the waterproof RS-232C cable (AX-KO2737-500).
- 3 USB port cover
Keep the cover closed when the USB cable is not connected.

- ❑ If water or other liquids accumulate around the waterproof diaphragm, the weighing results may become unstable. Clean the area carefully, taking care not to deform the diaphragm.
- ❑ When cleaning with hot water, condensation may form inside the balance, which may lead to deterioration of internal components.
Ensure that water vapor does not enter the interior of the balance.

Cleaning procedure for GX-AE series (0.0001 g model)

Step	Description	Parts diagram
1.	Disconnect the AC adapter plug (1) from the balance main unit (8).	
2.	Disconnect the ionizer cable (2) from the main unit (8).	
3.	Pull the handles of the large glass breeze break with ionizer (3) and remove it from the main unit (8).	
4.	Remove the weighing pan (4) and breeze break ring (5), then clean the top surface of the main unit (8).	
5.	During cleaning, avoid touching the pan support boss (7), and take care to prevent dust or debris from entering via the boss area.	
6.	If necessary, remove the dust plate (6) for cleaning.  Do not remove or damage any labels affixed to the balance during cleaning.	
7.	After cleaning, refer to section " 2-1-2. Assembly and installation " to reassemble and install the balance.	

- 1 AC adapter plug
- 2 Ionizer cable
- 3 Large glass breeze break with ionizer
- 4 Weighing pan
- 5 Breeze break ring
- 6 Dust plate
- 7 Pan support boss
- 8 Main unit

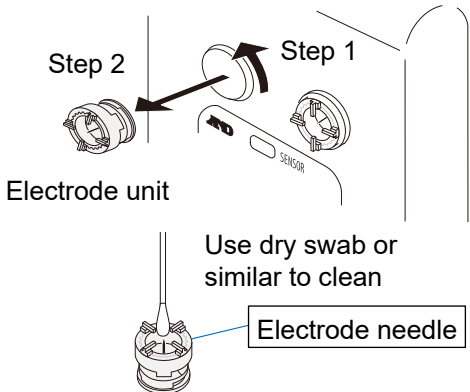
Discharge electrode units for the ionizer

- Prolonged use of the ionizer may cause dust or organic matter to accumulate on the discharge electrode needles, reducing static elimination performance. To maintain optimal performance, clean the electrode needles regularly using a dry cotton swab or similar tool.
- If the needle tips are worn and cleaning does not restore performance, replace both discharge electrode units with new ones (sold separately). The typical service life of a discharge electrode unit is approximately 10,000 hours.

Replacement procedure

CAUTION

- To avoid the risk of electric shock, do not replace, remove, or clean the discharge electrode units while the ionizer is operating. Replace the unit only after disconnecting the balance from its power source or unplugging the connection cable.


Step	Description	Parts diagram
1.	Rotate each discharge electrode unit 45° counterclockwise and pull to remove it from the ionizer.	 <p>Step 2</p> <p>Step 1</p> <p>Electrode unit</p> <p>SENSOR</p> <p>Use dry swab or similar to clean</p> <p>Electrode needle</p>
2.	Insert two new discharge electrode units.	
3.	Rotate each unit 45° clockwise to secure it in place.	

Cleaning procedure for GX-A / GF-A series (0.0001 g model)

Step	Description	Parts diagram
1.	Disconnect the AC adapter plug (1) from the balance main unit (7).	
2.	Pull the handles of the large glass breeze break (1) and remove it from the main unit (7).	
3.	Remove the weighing pan (3) and breeze break ring (4), then clean the top surface of the main unit (7).	
4.	During cleaning, avoid touching the pan support boss (6), and take care to prevent dust or debris from entering via the boss area.	
5.	If necessary, remove the dust plate (5) for cleaning. ! Do not remove or damage any labels affixed to the balance during cleaning.	
6.	After cleaning, refer to section "2-2-2. Assembly and installation " to reassemble and install the balance.	

- 1 AC adapter plug
- 2 Large glass breeze break
- 3 Weighing pan
- 4 Breeze break ring
- 5 Dust plate
- 6 Pan support boss
- 7 Main unit

Cleaning procedure for GX-A / GF-A series (0.001 g model)

Step	Description	Parts diagram
1.	Disconnect the AC adapter plug (1) from the main unit (6).	
2.	Remove the small breeze break (2) from the main unit (6).	
3.	Remove the weighing pan with the pan support (3), and clean the top surface of the main unit (6).	
4.	During cleaning, avoid touching the pan support boss (5), and take care to prevent dust or debris from entering via the boss area.	
5.	If necessary, remove the dust plate (4) for cleaning.  Do not remove or damage any labels affixed to the balance during cleaning.	
6.	After cleaning, refer to section " 2-3-2. Assembly and installation " to reassemble and install the balance.	

- 1 AC adapter plug
- 2 Small breeze break
- 3 Weighing pan with the pan support
- 4 Dust plate
- 5 Pan support boss
- 6 Main unit

Cleaning procedure for GX-A / GF-A series (0.01 g / 0.1 g model)

Step	Description	Parts diagram
1.	Disconnect the AC adapter plug (1) from the main unit (6).	
3.	Remove the weighing pan with the pan support (2), and clean the top surface of the main unit (6).	
4.	During cleaning, avoid touching the pan support boss (5), and take care to prevent dust or debris from entering via the boss area.	
5.	If necessary, remove the dust plate (4) for cleaning. ! Do not remove or damage any labels affixed to the balance during cleaning.	
6.	After cleaning, refer to section " 2-4-2. Assembly and installation " to reassemble and install the balance.	

- 1 AC adapter plug
- 2 Weighing pan with the pan support
- 3 Dust plate for 0.01 g / 0.1 g models
- 4 Dust plate
- 5 Pan support boss
- 6 Main unit

Cleaning procedure for GX-AWP / GF-AWP series (0.001 g model)

Step	Description	Parts diagram
1.	Disconnect the AC adapter plug (1) from the main unit (6).	
2.	Remove the small breeze break (2) from the main unit (6).	
3.	Remove the weighing pan with the pan support (3), and clean the top surface of the main unit (6).	
4.	During cleaning, take care not to touch the pan support boss (5) or damage the waterproof diaphragm (7). ! Do not remove the screws securing the waterproof diaphragm (7).	
5.	If necessary, remove the dust plate (4) for cleaning. ! Do not remove or damage any labels affixed to the balance during cleaning.	
6.	After cleaning, refer to section "2-5-2. Assembly and installation" to reassemble and install the balance.	

- 1 AC adapter plug
- 2 Small breeze break
- 3 Weighing pan with the pan support
- 4 Dust plate
- 5 Pan support boss
- 6 Main unit
- 7 Waterproof diaphragm

Cleaning procedure for GX-AWP / GF-AWP series (0.01 g / 0.1 g model)

Step	Description	Parts diagram
1.	Disconnect the AC adapter plug (1) from the main unit (6).	
3.	Remove the weighing pan with the pan support (2), and clean the top surface of the main unit (6).	
4.	During cleaning, take care not to touch the pan support boss (5) or damage the waterproof diaphragm (7). ! Do not remove the screws securing the waterproof diaphragm (7).	
5.	If necessary, remove the dust plate (4) for cleaning. ! Do not remove or damage any labels affixed to the balance during cleaning.	
6.	After cleaning, refer to section "2-6-2. Assembly and installation" to reassemble and install the balance.	

- 1 AC adapter plug
- 2 Weighing pan with the pan support
- 3 Dust plate for 0.01 g / 0.1 g models
- 4 Dust plate
- 5 Pan support boss
- 6 Main unit
- 7 Waterproof diaphragm

26. Troubleshooting

26-1. Checking balance operation, environment, and measurement method

Since the balance is a precision instrument, incorrect measurement values may result from unsuitable environmental conditions or improper measurement methods. If repeatability is poor when loading and unloading the sample multiple times, or if the balance appears to be malfunctioning, please check the following items. If the issue persists after checking each item, contact your local A&D dealer for repair. Please also visit the [Frequently Asked Questions](https://www.aandd.jp) page on the website (<https://www.aandd.jp>) for additional information.

1. Verifying proper balance operation

- Method 1 Use the self-check function to verify balance operation.
Refer to "[6-2. Self-check function / Automatic minimum weight \(reference value\) setting using ECL](#)".
Critical errors will be displayed as messages.
- Method 2 As a simple test, check repeatability using an external weight. When performing the check, make sure to place the weight at the center of the weighing pan.
- Method 3 For a more precise test, use a weight with a known value to check repeatability, linearity, and weighing accuracy.

2. Verifying the measurement environment and method

Please check each of the following items:

Operating environment

- ☐ Is the table where the balance is installed stable? (Especially for 0.0001 g models.)
- ☐ Is the balance properly leveled? Refer to "[2-8. How to adjust the level of the balance](#)".
- ☐ Is the environment free from drafts and vibrations?
- ☐ Have you installed the small breeze break (included) for the 0.001 g model and the large breeze break (included) for the 0.0001 g model?
- ☐ Are there no strong sources of electrical or magnetic noise (e.g., motors) near the balance?

Balance operation

- ☐ Is the weighing pan free from contact with the breeze break or other surrounding components? (Is it properly installed?)
- ☐ Do you always press the [RE-ZERO] key before placing the sample on the weighing pan?
- ☐ Is the sample placed at the center of the weighing pan?
- ☐ Have you performed sensitivity adjustment before weighing?
- ☐ Before weighing, did you connect the balance to the power supply and allow it to warm up for at least 30 minutes (at least 1 hour for 0.0001 g models)?

Sample and container

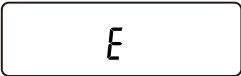
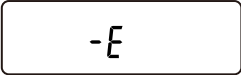
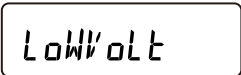
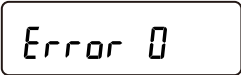

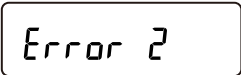

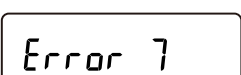
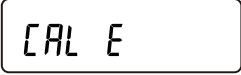
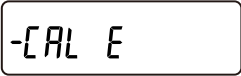
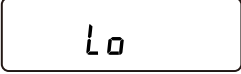
- ☐ Is the sample free from moisture absorption or evaporation due to ambient temperature and humidity?
- ☐ Has the container holding the sample acclimated to the ambient temperature? Refer to "[2-9. Precautions during use for more accurate weighing](#)".
- ☐ Is the sample free from static charge? Refer to "[2-9. Precautions during use for more accurate weighing](#)".

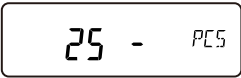
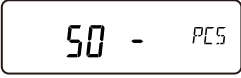


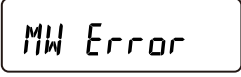
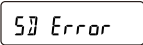

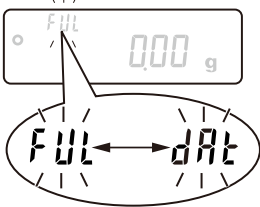
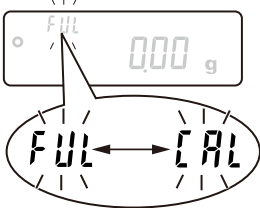
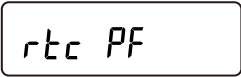
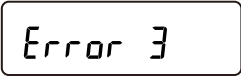
Note: 0.0001 g and 0.001 g models are particularly sensitive to static electricity under low relative humidity.

- Is the sample made of magnetic material (e.g., iron)?

Special care is required when weighing magnetic materials. Refer to "[2-9. Precautions during use for more accurate weighing](#)".

26-2. Error displays (error codes)

Display	Error code	Description and possible countermeasure
		Overload error The weighing value exceeds the balance's weighing capacity. Remove the object from the pan.
		Weighing pan error The weighing value is too light. The weighing pan is not installed correctly. Set the weighing pan correctly. Perform a sensitivity adjustment.
		Power supply voltage fault The voltage supplied from the AC adapter is abnormal. Check that the AC adapter is the one supplied with the balance.
		Internal error If this error continues to be displayed, repair is necessary.
	EC, E11	Stability error Due to the unstable weighing value, functions such as "zero display" and "sensitivity adjustment" cannot be executed. Check around the pan. Refer to "2-9. Precautions during use for more accurate weighing". Improve the environment of the installation location (vibration, drafts, static electricity, etc.). To return to weighing mode, press the [CAL] key.
		Entry value error The value to be set exceeds the setting range. Enter a value within the range.
	EC, E16	Internal weight error (GX-AE / GX-A / GX-AWP series only) 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 weighing pan and perform the operation from the beginning. If this error continues to be displayed, repair is necessary.
	EC, E17	Internal weight error (GX-AE / GX-A / GX-AWP series only) 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	Sensitivity adjustment weight error (Positive value) The sensitivity adjustment weight is too heavy. Check around the pan. Check the mass of the weight. To return to weighing mode, press the [CAL] key.
	EC, E21	Sensitivity adjustment weight error (Negative value) The sensitivity adjustment weight is too light. Check around the pan. Check the mass of the weight. To return to weighing mode, press the [CAL] key.
		Sample mass error The sample is too light to be stored as a sample mass for the counting mode or percent mode. The sample cannot be used.

Display	Error code	Description and possible countermeasure
  		Unit weight error 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 [PRINT] key. Pressing the [PRINT] key without adding samples will still put the balance in counting mode, but for accurate counting, ensure samples are added.
 		ECL repeatability error The self-check function using the electronically controlled load (ECL) has detected that the standard deviation (SD) of repeatability exceeds 50 d.* ¹ Review the installation environment of the balance. <ul style="list-style-type: none"> <input type="checkbox"/>  Displayed when showing repeatability using ECL. <input type="checkbox"/>  Displayed when showing repeatability using ECL. Refer to "6-2. Self-check function / Automatic minimum weight (reference value) setting using ECL". <p>*¹ "d" represents scale division.</p>
 Alternating blinking		Full memory 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".
 Alternating blinking		Full memory 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".
		Clock battery error 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 occurs frequently, please contact your local A&D dealer for repair.
		Malfunction of the internal memory element of the balance If this error continues to be displayed, repair is necessary.

Display	Error code	Description and possible countermeasure
Error 5		Mass sensor error If this error continues to be displayed, repair is necessary.
-Error 5		Mass sensor error Set the weighing pan correctly. If this error continues to be displayed, repair is necessary.
Error 8		Abnormality in the internal memory data of the balance If this error continues to be displayed, repair is necessary.
Error 9		Abnormality in the internal memory data of the balance If this error continues to be displayed, repair is necessary.
	EC, E00	Communications error A protocol error occurred in communication. Check the format, baud rate, etc.
	EC, E01	Undefined command error An undefined command was found. Check the transmitted command.
	EC, E02	Not ready 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	Timeout error When t (Limits to one second) is set for $t-UP$ (Command timeout) under S,F (Serial interface) in the function table ("9. Function Table"), a wait time of approximately 1 second or more occurred while receiving command characters. Check the communication.
	EC, E04	Character length error The number of characters in the received command has exceeded the limit. Check the command to transmit.
	EC, E06	Format error 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	Parameter setting error The value of the received command has exceeded the allowed value. Check the setting range of the numerical value of the command.

Display	Error code	Description and possible countermeasure
Other error displays		If the errors described above cannot be released or other errors are displayed, please contact your local A&D dealer.

26-3. 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 and pan support from the main unit before transporting.

27. Specifications

27-1. Common specifications

27-1-1. Function

Internal weight		Built into GX-A, GX-AE, and GX-AWP series models (approx. 200 g) ^{*1}
Ionizer (static eliminator)		Built into GX-AE series models
Sensitivity drift (10 °C to 30 °C)		±2 ppm/°C (when automatic sensitivity adjustment is OFF)
Operating temperature and humidity		5 °C to 40 °C; 85% RH or lower (no condensation)
Display refresh rate		5, 10, or 20 times per second
Counting mode	Number of sample pieces to store	5, 10, 25, 50 or 100 pieces
Percent mode	Readability	0.01%, 0.1%, 1% (Automatically changed by 100% reference mass)
Communication		RS-232C and 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 12 V, approx. 0.3 A (excluding AC adapter and optional accessories)

^{*1} The internal weight may change in mass due to the usage environment and deterioration over time.

27-1-2. Size / weight

	0.0001 g model	0.001 g model	0.01 g model	0.1 g model
Weighing pan size	φ90 mm	128 × 128 mm	165 × 165 mm	
Net weight	Approx. 7 kg	Approx. 5 kg	Approx. 5 kg	
External dimensions	259 (W) × 358 (D) × 332 (H) mm (with large glass breeze break)	212(W)× 317(D)× 171(H) mm (with small breeze break) GX-AWP / GF-AWP series only 212(W)× 326(D)× 171(H) mm	212(W)× 317(D)× 93(H) mm GX-AWP / GF-AWP series only 212(W)× 326(D)× 171(H) mm	

27-2. Individual specifications

27-2-1. 0.0001 g model

		GX-124AE GX-124A GF-124A	GX-224AE GX-224A GF-224A	GX-324AE GX-324A GF-324A
Weighing capacity		122 g	220 g	320 g
Maximum display		122.0084 g	220.0084 g	320.0084 g
Readability		0.0001 g		
Repeatability (standard deviation)		0.0001 g		0.0002 g (300 g) 0.0001 g (200 g)
Linearity		± 0.0002 g		± 0.0003 g
Stabilization time (FAST setting, optimal conditions)		Approx. 1.5 secs (100 g)	Approx. 2 secs (200 g) Approx. 1.5 secs (100 g)	Approx. 2 secs (300 g) Approx. 1.5 secs (100 g)
Counting mode	Minimum unit weight	0.0001 g		
Percent mode	Minimum 100% reference mass	0.0100 g		
Weights usable for sensitivity adjustment		100 g (factory setting) 100 g 50 g	200 g (factory setting) 200 g 100 g 50 g	200 g (factory setting) 300 g 200 g 100 g 50 g

27-2-2. 0.001 g model

	GF-123A	GX-203A GF-203A GX-203AWP ^{*2} GF-203AWP ^{*2}	GX-303A GF-303A	GX-403A GF-403A GX-403AWP ^{*2} GF-403AWP ^{*2}	GX-603A GF-603A GX-603AWP ^{*2} GF-603AWP ^{*2}	GX-1003A GF-1003A	GX-1603A GF-1603A
Weighing capacity	122 g	220 g	320 g	420 g	620 g	1100 g	1620 g
Maximum display	122.084 g	220.084 g	320.084 g	420.084 g	620.084 g	1100.084 g	1620.084 g
Readability	0.001 g						
Repeatability (Standard deviation)	0.001 g						0.002 g (1600 g) 0.001 g (1000 g)
Linearity	±0.002 g					±0.003 g	
Stabilization time (FAST setting, good environment)	Approx. 1 sec Approx. 0.8 secs (5 g)						Approx. 1.5 secs Approx. 0.8 secs (5 g)
Accuracy after internal sensitivity adjustment ^{*1}	±0.010 g						±0.010 g (1000 g)
Counting mode	Minimum unit weight	0.001 g					
Percent mode	Minimum 100% reference mass	0.100 g					
Weights usable for sensitivity adjustment	100 g (factory setting)	200 g (factory setting)	200 g (factory setting)	400 g (factory setting)	500 g (factory setting)	1000 g (factory setting)	1000 g (factory setting)
	50 g	200 g	300 g ~ 100 g (in 100 g increments)	400 g ~ 100 g (in 100 g increments)	600 g ~ 100 g (in 100 g increments)	1000 g ~ 100 g (in 100 g increments)	1600 g ~ 100 g (in 100 g increments)
		100 g					
		50 g	50 g	50 g	50 g	50 g	50 g

^{*1} The operating environment must be free from sudden changes in temperature or humidity, vibration, wind, magnetic fields, and static electricity.

^{*2} Compliant with IP65.

27-2-3. 0.01 g model

		GF-1202A	GX-2002A GF-2002A GX-2002AWP*2 GF-2002AWP*2	GX-3002A GF-3002A	GX-4002A GF-4002A GX-4002AWP*2 GF-4002AWP*2	GX-6002A GF-6002A GX-6002AWP*2 GF-6002AWP*2	GX-10002A GF-10002A	
Weighing capacity		1220 g	2200 g	3200 g	4200 g	6200 g	10200 g	
Maximum display		1220.84 g	2200.84 g	3200.84 g	4200.84 g	6200.84 g	10200.84 g	
Readability		0.01 g						
Repeatability (Standard deviation)		0.01 g						0.02 g (10000 g) 0.01 g (5000 g)
Linearity		±0.02 g				±0.03 g		
Stabilization time (FAST setting, good environment)		Approx. 1 sec Approx. 0.8 secs (50 g)						Approx. 1.5 secs (10 kg) Approx. 0.8 secs (50 g)
Accuracy after internal sensitivity adjustment*1		±0.10 g		±0.15 g		±0.15 g (5000 g)		
Counting mode	Minimum unit weight	0.01 g						
Percent mode	Minimum 100% reference mass	1.00 g						
Weights usable for sensitivity adjustment			2000 g (factory setting)	2000 g (factory setting)	4000 g (factory setting)	5000 g (factory setting)	10000 g (factory setting)	
		1000 g (factory setting)	2000 g	3000 g ~ 1000 g (in 1000 g increments)	4000 g ~ 1000 g (in 1000 g increments)	6000 g ~ 1000 g (in 1000 g increments)	10000 g ~ 1000 g (in 1000 g increments)	
		500 g	1000 g					
		500 g	500 g	500 g	500 g	500 g	500 g	

*1 The operating environment must be free from sudden changes in temperature or humidity, vibration, wind, magnetic fields, and static electricity.

*2 Compliant with IP65.

27-2-4. 0.1 g model

		GX-6001A GF-6001A GX-6001AWP ^{*2} GF-6001AWP ^{*2}	GX-10001A GF-10001A
Weighing capacity		6200 g	10200 g
Maximum display		6208.4 g	10208.4 g
Readability		0.1 g	
Repeatability (standard deviation)		0.1 g	
Linearity		±0.1 g	
Stabilization time (FAST setting, good environment)		(Approx.) 1 sec (Approx.) 0.8 secs (500 g)	
Accuracy after internal sensitivity adjustment ^{*1}		±0.5 g (5000 g)	
Counting mode	Minimum unit weight	0.1 g	
Percent mode	Minimum 100% reference mass	10.0 g	
Weights usable for sensitivity adjustment		5000 g (factory setting) 6000 g to 1000 g (in 1000 g increments) 500 g	10000 g (factory setting) 10000 g to 1000 g (in 1000 g increments) 500 g

^{*1} The operating environment must be free from sudden changes in temperature or humidity, vibration, wind, magnetic fields, and static electricity.

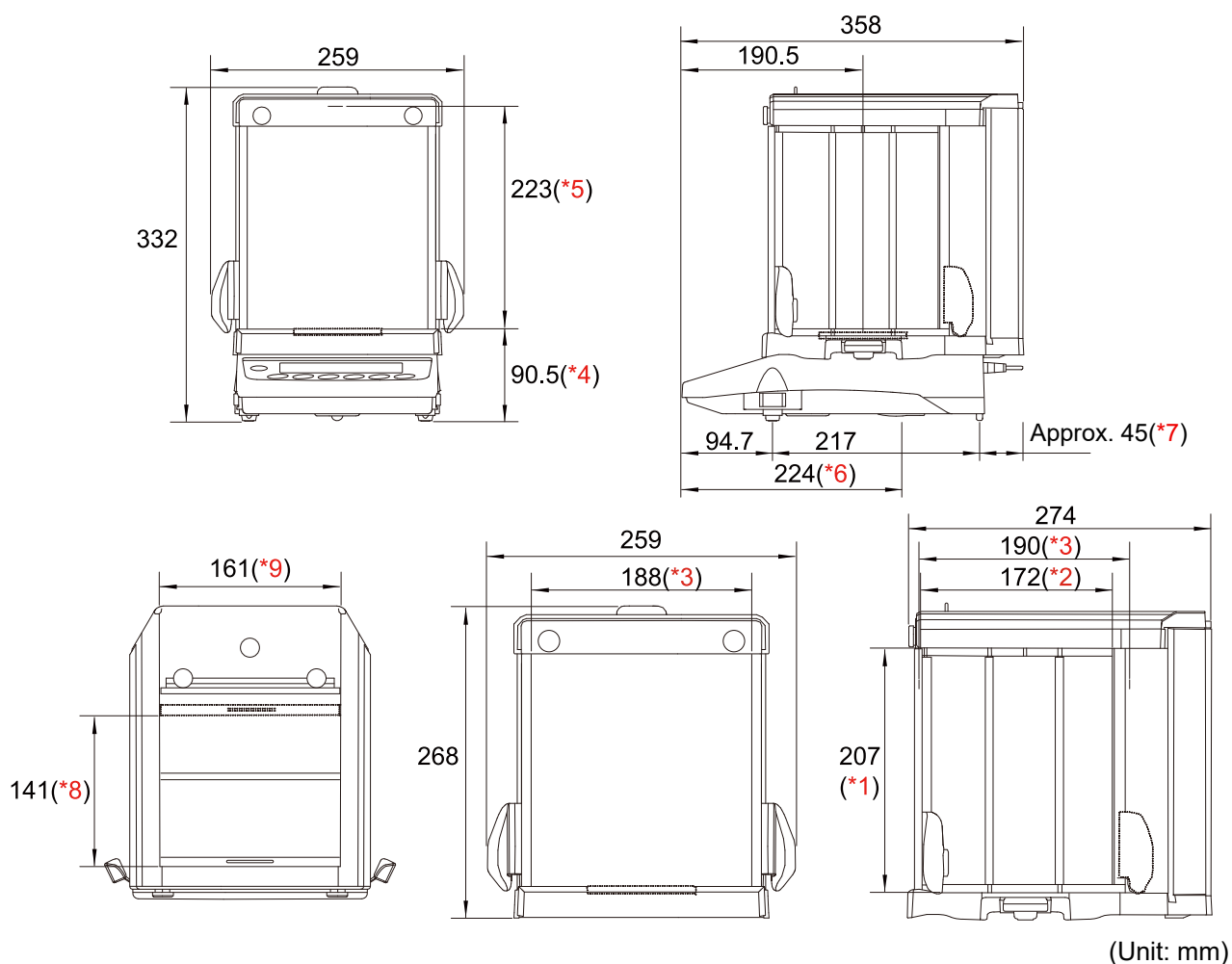
^{*2} Compliant with IP65.

28. External dimensions

GX-124AE / GX-224AE / GX-324AE

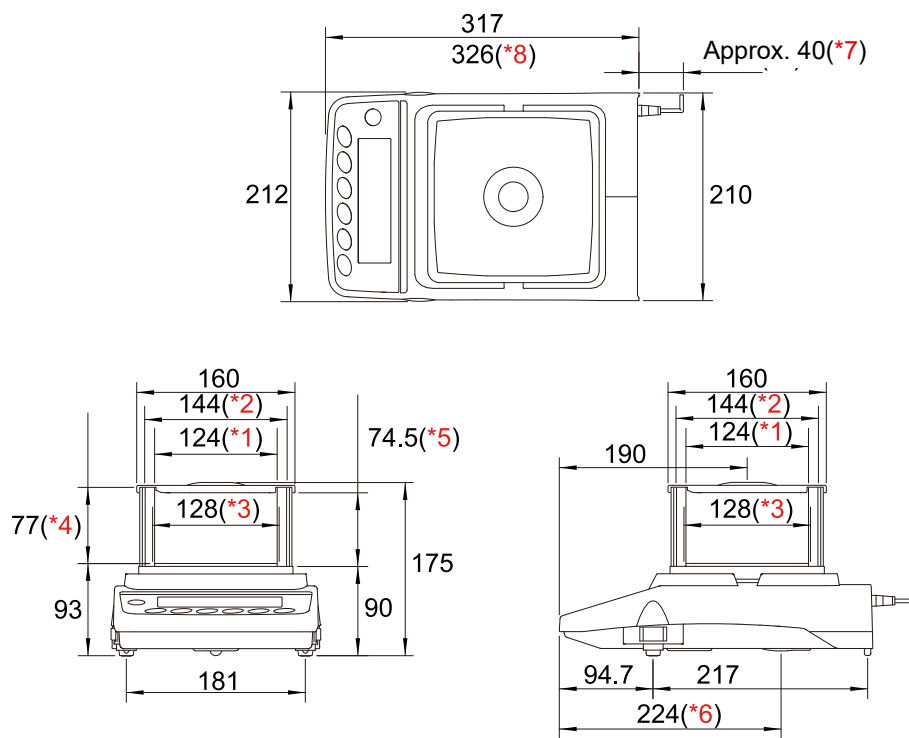
GX-124A / GX-224A / GX-324A

GF-124A / GF-224A / GF-324A



- *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 Front-to-underhook length
- *7 AC adapter DC jack protrusion
- *8 Top sliding door maximum opening length
- *9 Top sliding door opening width

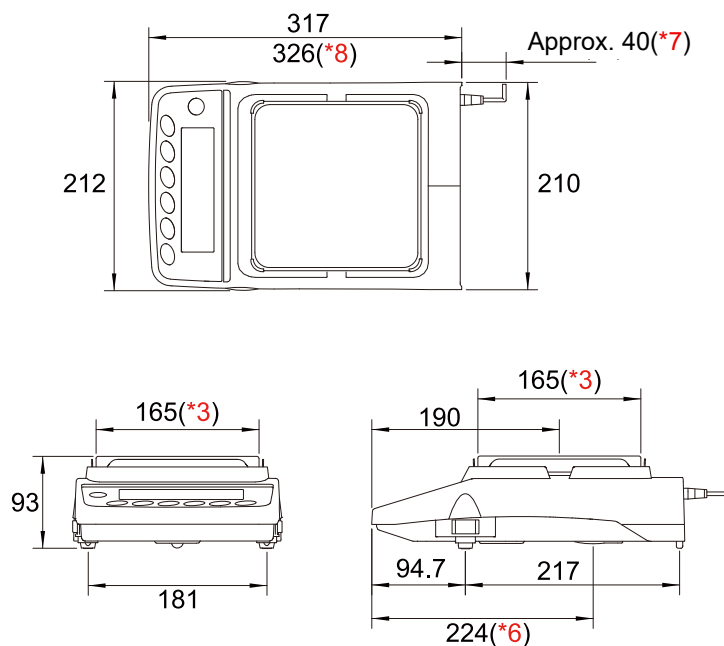
GX-203A / GX-303A / GX-403A / GX-603A / GX-1003A / GX-1603A
 GF-123A / GF-203A / GF-303A / GF-403A / GF-603A / GF-1003A / GF-1603A
 GX-203AWP / GX-403AWP / GX-603AWP
 GF-203AWP / GF-403AWP / GF-603AWP



(Unit: mm)

- *1 Opening width when transparent plate is removed
- *2 Internal width
- *3 Weighing pan size
- *4 Height from weighing pan to lid of breeze break
- *5 Opening height when transparent plate is removed
- *6 Front-to-underhook length
- *7 AC adapter DC jack protrusion
- *8 Depth with terminal cover attached (GX-AWP / GF-AWP series only)

GX-2002A / GX-3002A / GX-4002A / GX-6002A / GX-10002A/ GX-6001A / GX-10001A
 GF-1202A / GF-2002A / GF-3002A / GF-4002A / GF-6002A / GF-10002A/ GF-6001A / GF-10001A
 GX-2002AWP / GX-4002AWP / GX-6002AWP / GX-6001AWP
 GF-2002AWP / GF-4002AWP / GF-6002AWP / GF-6001AWP



(Unit: mm)

- *3 Weighing pan size
- *6 Front-to-underhook length
- *7 AC adapter DC jack protrusion
- *8 Depth with terminal cover attached (GX-AWP / GF-AWP series only)

29. Dedicated options and peripheral devices

A variety of options ("[29-1. Dedicated options](#)") and peripheral devices ("[29-2. Peripheral devices](#)"), both sold separately, are available for the balance.

29-1. Dedicated options

A range of dedicated options (sold separately) are available for the balance.

(For details, refer to "[29-1-1. Expansion options](#)" and "[29-1-2. Other dedicated options](#)".)

29-1-1. Expansion options

The following expansion options are compatible with the GX-A, GF-A, GF-AWP, and GX-AWP series.

For details, refer to the instruction manual provided with each expansion option.

CAUTION

- ❑ The following options cannot be used simultaneously: GXA-03, GXA-04, GXA-06, FXi-08, GXA-09, GXA-23-PRINT, GXA-23-REZERO, GXA-23-PLUG, GXA-24, GXA-25, GXA-26, GXA-17, and GXA-27.
- ❑ The GX-AE series comes standard with the GXA-17 (large glass breeze break with ionizer), so the above expansion options cannot be installed.
- ❑ When using the GX-AWP or GF-AWP series with any of the following options: GXA-03, GXA-04, GXA-06, FXi-08, GXA-23-PRINT, GXA-23-REZERO, GXA-23-PLUG, GXA-24, GXA-25, GXA-26, or GXA-17, the balance will no longer meet dustproof or waterproof specifications.

GXA-03: Isolated RS-232C interface

This is an additional, isolated type, RS-232C interface.

(For details, refer to the [GXA-03 / GXA-04 / GXA-06 Instruction Manual](#).)

GXA-04: Comparator relay output, buzzer, and external key input interface

Outputs comparator results.

(For details, refer to the [GXA-03 / GXA-04 / GXA-06 Instruction Manual](#).)

GXA-06: Analog voltage output interface (0-1 V / 0.2-1 V)

Outputs the balance's weighing value as a voltage signal of either 0 to 1 V or 0.2 to 1 V.

(For details, refer to the [GXA-03 / GXA-04 / GXA-06 Instruction Manual](#).)

FXi-08: Ethernet interface

Enables the balance to communicate with PCs over a LAN.

A single PC can control multiple balances connected to the same network.

(For details, refer to the [FXi-08 Instruction Manual](#).)

GXA-09: Built-in rechargeable battery (10-hour charge, approx. 14-hour operation) (available only as a factory-installed option)

Allows the balance to be used in environments where an AC adapter cannot be used.

When installed in the GX-AWP or GF-AWP series, dustproof and waterproof performance (IP65 compliant) is maintained.

(For details, refer to the [GXA-09 Instruction Manual](#).)

GXA-17: Large glass breeze break with ionizer (compatible with all models)

This is a large glass breeze break equipped with a built-in ionizer (static eliminator).

(For details, refer to the [GXA-17 Instruction Manual](#).)

GXA-23-PRINT: External key input interface with AX-SW137-PRINT foot switch

Equipped with an external contact input terminal that allows operation of the [PRINT] and [RE-ZERO] functions.

(For details, refer to the [GXA-23 / GXA-26 Instruction Manual](#).)

GXA-23-REZERO: External key input interface with AX-SW137-REZERO foot switch

Equipped with an external contact input terminal that allows operation of the [PRINT] and [RE-ZERO] functions.

(For details, refer to the [GXA-23 / GXA-26 Instruction Manual](#).)

GXA-23-PLUG: Contact input for interface board (includes 3 stereo plugs)

Equipped with an external contact input terminal that allows operation of the [PRINT] and [RE-ZERO] functions.

To use this option, the included stereo plugs must be soldered to a user-supplied switch.

(For details, refer to the [GXA-23 / GXA-26 Instruction Manual](#).)

GXA-24A: USB host interface (available only as a factory-installed option)

Allows weighing data to be saved directly to a USB memory device.

(For details, refer to the [GXA-24A Instruction Manual](#).)

GXA-25: Ionizer

This static eliminator is designed for use near the balance.

(For details, refer to the [GXA-25 Instruction Manual](#).)

GXA-26: External IR (infrared) switch

Equipped with a non-contact external switch that allows operation of the [PRINT] and [RE-ZERO] functions.

(For details, refer to the [GXA-23 / GXA-26 Instruction Manual](#).)

GXA-27: Bluetooth® communication interface

Enables wireless communication via Bluetooth® by pairing with devices such as PCs, tablets, or smartphones.

When installed on GX-AWP or GF-AWP series balances, communication is possible while maintaining dustproof and waterproof performance (IP65 compliant).

(For details, refer to the [GXA-27 Instruction Manual](#).)

By using the PC connection dongle AD8541-PC, wireless command-based communication with a PC is possible.

With the A&D WeiV app for iOS and Android™, command-based communication via Bluetooth® is possible with tablets and smartphones.

CAUTION

Please contact your local A&D representative to confirm whether the GXA-27 is certified for Bluetooth® communication in accordance with regulations in your country.

29-1-2. Other dedicated options

The following dedicated options are compatible with GX-AE, GX-A, GF-A, GX-AWP, and GF-AWP series balances.

For details, refer to the instruction manual provided with each expansion option.

GXA-10: Large glass breeze break (compatible with all models)

This breeze break unit is equipped with glass doors.

(For details, refer to the [GXA-10 Instruction Manual](#).)

GXA-12: Animal weighing bowl kit (not compatible with 0.0001 g models, GX-203A, GF-203A, and GF-123A)

This deep container is designed to prevent animals from escaping during weighing.

(For details, refer to the [GXA-12 Instruction Manual](#).)

GXA-13: Density determination kit (for 0.001 g models)

This unit allows easy weighing of a sample's weight in air and in water.

(For details, refer to the [GXA-13 Instruction Manual](#).)

GXA-14: Density determination kit (for 0.0001 g models)

This unit allows easy weighing of a sample's weight in air and in water.

(For details, refer to the [GXA-14 Instruction Manual](#).)

AX-GXA-31: Display protection cover (set of 5)

These are standard protective covers for the main unit.

29-2. Peripheral devices

The following peripheral devices are compatible with GX-AE, GX-A, GF-A, GX-AWP, and GF-AWP series balances.

For details, refer to the instruction manual provided with each peripheral device.

AD-8920A: Remote display

Connects to the balance via the RS-232C interface to display the weighing value.

(For details, refer to the [AD-8920A Instruction Manual](#).)

AD-8922A: Remote controller

Connects to the balance via the RS-232C interface to display the weighing value. Performs the balance's key operations.

(For details, refer to the [AD-8922A Instruction Manual](#).)

AD-8127: Multi-functional compact printer

A small dot impact printer that connects to the balance via the RS-232C interface.

Multiple features available, including date / time printing, statistical calculation, interval mode, and chart mode.

(For details, refer to the [AD-8127 Instruction Manual](#).)

AD-8129TH: Compact thermal printer

A small direct thermal printer that connects to the balance via the RS-232C interface.

Multiple features available, including date/time printing, statistical calculation, interval mode, and chart mode.

(For details, refer to the [AD-8129TH Instruction Manual](#).)

AD-1683A: Ionizer

Prevents weighing errors caused by static charges on the sample.

Ideal for precise weighing of powders and the like using the DC method to generate a high volume of ions without airflow.

The ionizer is equipped with an IR sensor, allowing contactless activation of static elimination.

(For details, refer to the [AD-1683A Instruction Manual](#).)

AD-1684A: Electrostatic field meter

Measures the electrostatic charge of measured objects or peripheral devices such as containers or breeze breaks for the balance (on automated measuring lines and similar setups) and displays the measurement results. For elimination of charged static electricity, use the AD-1683A ionizer.

AD-1687: Weighing environment logger

Records environmental data independently using built-in sensors for temperature, humidity, barometric pressure, and vibration.

Allows recording of environmental data along with weighing data when connected to the balance via the RS-232C interface.

(For details, refer to the [AD-1687 Instruction Manual](#).)

AD-1688: Weighing data logger

Connects to the balance via the RS-232C interface to log weighing data.

Ideal for recording data in locations where using a PC is not possible.

(For details, refer to the [AD-1688 Instruction Manual](#).)

AD-1689: Tweezers for calibration weight

A pair of tweezers ideally suited for holding weights of 1 g to 500 g.

AX-USB-9P: USB converter

Converts the balance's RS-232C interface to USB.

Driver installation is required.

AD-8529PC-W: Bluetooth® converter (for connecting balances / scales to a PC)*1

Enables wireless (Bluetooth®) communication between a balance and a PC at distances of up to 10 meters.

Driver installation is required.

(For details, refer to the [AD-8529PC-W Instruction Manual](#).)

AD-8529PR-W: Bluetooth® converter (for connecting balances / scales to a printer)*1

Enables wireless (Bluetooth®) communication between a balance and a printer at distances of up to 10 meters.

(For details, refer to the [AD-8529PR-W Instruction Manual](#).)

AX-SW137-PRINT: Foot switch with plug (for PRINT)

Functions as the [PRINT] key when used with the GXA-23 series.

Included with the GXA-23-PRINT (External key input interface for [PRINT]).

AX-SW137-REZERO: Foot switch with plug (for RE-ZERO)

Functions as the [RE-ZERO] key when used with the GXA-23 series.

Included with the GXA-23-REZERO (External key input interface for [RE-ZERO]).

AX-BM-NEEDLESET: Discharge electrode unit for ionizer (set of 4)

These are replacement discharge electrodes for the ionizer.

When replacing, please replace the two electrodes at the same time.

(For details, refer to the [GXA-17 Instruction Manual](#).)

AX-KO2737-500: Waterproof RS-232C cable (5 m, D-Sub 9-pin female to female)

Length: 5 m. D-Sub 9-pin (female) to D-Sub 9-pin (female).

Only the 9-pin connector on the balance side is waterproof. Compatible devices: PC, PLC, etc.

AX-KO7695-500: Waterproof RS-232C cable (5 m, D-Sub 9-pin female to male)

Length: 5 m. D-Sub 9-pin (female) to D-Sub 9-pin (male).

Only the 9-pin connector on the balance side is waterproof. Compatible devices: AD-1688, AD-8527, etc.

AD-8541-PC: Bluetooth® dongle for PC^{*1}

Enables bi-directional communication via COM port between an A&D balance (equipped with GXA-27 or AD-8541-SCALE) and a PC using Bluetooth®.

Maximum communication distance: approx. 10 m.

(For details, refer to the [AD-8541-PC Instruction Manual](#).)

AD-8541-SCALE: RS-232C to Bluetooth® converter^{*1}

Allows A&D balances / scales with an RS-232C (D-Sub 9-pin) interface to wirelessly communicate via Bluetooth® with compatible devices such as smartphones, tablets, PCs, the AD-8931 wireless remote display, or the AD-8541-PC dongle.

Maximum communication distance: approx. 10 m.

(For details, refer to the [AD-8541-SCALE Instruction Manual](#).)

^{*1} Please contact your local A&D representative to confirm whether the product is certified for Bluetooth® communication in accordance with regulations in your country.

30. 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, standards for implementing safety tests for drugs and medicines.
GMP	Good Manufacturing Practice, rules for manufacturing and quality control.
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 d. This means that the measured values fall within ± 1 d approximately 68% of the time.
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/°C, if a load is 300 g and the temperature changes by 10°C, the displayed value changes by: $0.0002 \text{ } \%/^{\circ}\text{C} \times 10 \text{ } ^{\circ}\text{C} \times 300 \text{ g} = 6 \text{ mg}$.
Dustproof and waterproof rating (IP65 compliant)	The device is fully protected against dust ingress. It is also protected against low-pressure water jets from any direction when installed properly. However, this rating does not indicate that the device can withstand high-pressure jets or submersion.

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