High-Precision Advanced Tuning Fork Balance

GAL Series

Operation Manual

IMPORTANT

To ensure safe and proper use of the balance, please read this manual carefully.

After reading this manual, store it in a safe place near the balance, so you can review it as needed.

450003M01

Preface

Thank you very much for having purchased our Tuning-Fork high precision electronic balance GAL series.

This document describes how to operate the product.

Instructions

- Please note that product improvement or modification may cause partial discrepancy between the product and the description of this document.
- The description of this document is subject to change without notice.
- This document has been created carefully. In case that, however, any error or imperfection is found by any chance, please let us know.
- Documents of which pages are missing or irregularly bound will be exchanged. Please inform the store where you purchased the product.
- Trouble related to the product or system will be dealt with in accordance with the individual maintenance contract. Please note, however, that we will not take responsibility for consequential trouble such as discontinuation of operation caused by the product trouble.
- Microsoft, Windows are either trademarks or registered trademarks of Microsoft Corporation in the Unites States and/or other countries.

Important Notice

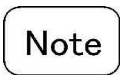
WARNING	• It should be known that this product contains potential danger. And so please be sure to observe this document when installing, operating or servicing this product. • We will not take any responsibility for any injury or damage caused by the non-observance of this document or misuse or unauthorized modification of this product.

- Potential dangers are increasing in the industrial equipment industries due to the advent of new materials and processing methods, and speeding up of machines. It is impossible to foresee all situations related to these dangers. In addition, there are so many “impossible” and “don’ts” and so writing all of them in the operation manual is impossible. Therefore, it is safe to think that what is not written in the operation manual “cannot be performed” unless the operation manual positively writes “it is possible.” When performing installation, operation, maintenance or inspection of this product, not only observe what is written or indicated in this document or on the product surface but also pay adequate consideration to safety measures.
- For any question or further information concerning this document, please contact the store where you purchased the product or with its model (type) name and serial number informed.

How to use this document

■Symbols used in this document

Understand the meaning of the following symbols and observe the instructions of this document.

Symbols	Meaning
	Used for the situation that invites an imminent risk of death or severe injury unless avoided.
	Used for the situation that invites a risk of death or serious injury unless avoided.
	Used for the situation that damages device/equipment, or destructs, deletes or overtypes data unless avoided.
	Used for the situation in which special care should be taken or specific information is emphasized
	Used for reference information on operation
	Used for “Prohibition” items
	Used for “Mandatory” items requiring positive action
	Used for prohibition items to avoid “Electrical shock”.
	This symbol indicates the operation of the type approved balance for legal metrology.

This product/ The product/The balance	Refers to the product.
[On/Off] key	The name of an operation key located in front of the main unit is represented in square brackets “[ ]”.
<message>	A message on the display is represented in angle brackets “< >”.
<<F1>>	“Free key” or “Shortcut” is represented in double angle brackets “<< >>”.
Push the key	Signifies pushing lightly an operation key once.
Push the key long	Signifies keeping pushing an operation key until the designated indication appears.

■About how to read this document

This document consists of the following contents:

1 Prior to use	Describes about operating precautions, names and functions of each section, etc. Please be sure to read this section when using this product for the first time.
2 Basic usage	Describes about basic usage related to weighing such as how to turn on and off the power in addition to the setting procedures to set various functions.
3 Functions related to the operation	Describes about setting items to change the operation of the scale.
4 Functions related to the performance	Describes about setting items related to the indication stability and the response speed of the scale.
5 User information setting	Describes about setting items related to the upper and lower limits and preset tare weight.
6 External input/output functions	Describes about setting items related to the specifications and conditions in regard to the external communication.
7 Functions related ti the lock	Describes about setting items related to change prohibitions and invalid keystrokes on each menu item.
8 Controlling and adjustment functions	Describes about setting items related to the product administrator.
9 Troubleshooting	Describes about methods of troubleshooting this product such as how to respond to errors and when you are in need of help.
10 How to maintain	Describes how to maintain this product.
Appendix	Provides necessary data such as the specifications of this product.

Contents

1 Prior to use

1-1 Operating precautions

DANGER

	**■Do not wet the AC adapter.** That may cause an electric shock, short-circuiting or failure.
	■Do not handle the balance with wet hands. That may cause short-circuiting or failure.
	■Do not use the balance in a wet location. That may cause an electric shock, short-circuiting or failure.
	■Do not connect to the AC adapter cord or communication cable with its connector or jack being wet. That may cause an electric shock, short-circuiting or failure.
	**■Do not use the balance in a dusty location.** That may cause dust explosion or fire. That may cause short-circuit or malfunction of the balance.
	■Do not use the balance in explosive atmosphere. That may cause explosion or fire. Please order our explosive-proof balances to weigh in such a hazardous area.
	■Never disassemble or modify the batteries. Make sure you insert batteries with the positive and negative poles correctly inserted, and be careful of short circuits. Such mishandling could damage the batteries, or cause the balance to fail.
	**■Obey the MSDS.** Measuring dangerous materials such as flammable liquid could cause an explosion or fire.

WARNING

	■Do not disassemble or modify the product. Doing so could result in injury, electric shock, fire and other accidents or failures. For inspection and adjustment, contact the retailer from whom the product was purchased.
	■Do not move the product with a sample to be weighed set on the balance. That may cause the sample to fall from the weighing pan, leading to a bodily injury or destruction of the sample.
	■Do not route the AC cord across passages. The cord could be tripped on by a passerby and the balance could fall down and break or injure someone.
	**■Do not use the product on an unstable table or a place that is subject to vibration.** That may cause the sample to fall from the weighing pan, leading to a bodily injury or destruction of the sample. Besides inaccurate weighing may result.
	■Do not place an unstable sample on the weighing pan. The sample may fall down, giving rise to a danger. Put an unstable sample in a container (tare) before weighing it.
	■Only use the specified power supply. Using any power supply other than that specified could cause overheating, fire or failure.
	■Do not bring the scale by holding the windshield. The main body could drop and break down or injury someone. Make sure to hold the main body to bring the scale.

WARNING

	■Do not use the product in an abnormal condition. If it should happen that an abnormal event such as smoking or unusual odor occurs, ask the store where you purchased the product or our sales department for repair. Keeping using the product may result in an electric shock or fire. In addition, do not ever try to repair it for yourself, or very dangerous situation is likely to occur.
	■Only use the dedicated AC adapter. Use of other types of power or adapters may result in heat generation or malfunction of the balance.

CAUTION

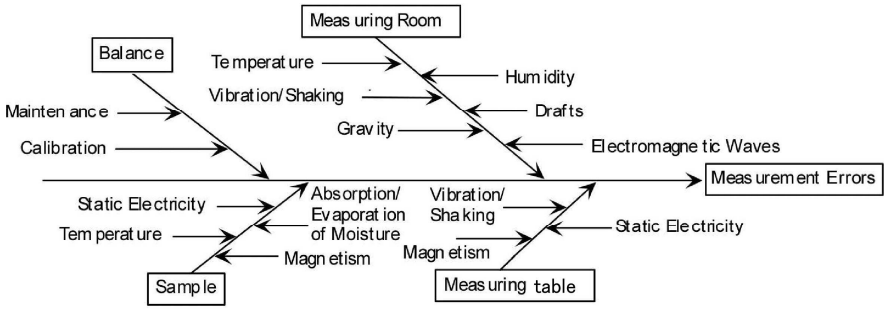
	■Do not mix old and new batteries, or batteries of different types or manufacturers.
	■Do not use the batteries that leak.
	■Do not apply excessive force to or impact the balance. Doing so could damage or result in failure of the balance. Carefully place samples on the balance.
	■Do not use volatile solvents. The main unit could deform. Wipe the main unit using dry cloth or a cloth moistened with a small amount of neutral detergent.
	■ Dispose of batteries in accordance with local regulations.
	■ If the balance is not going to be used for a long time, store it with the batteries removed.
	■Observe the precautions printed on the batteries used.

Note

	■Do not install the balance in a place where it is directly exposed to airflow from air-conditioning or heating equipment. Due to changes in the ambient temperature, the balance could fail to accurately weigh samples.
	■Do not install the balance in a place exposed to direct sunlight. The internal temperature of the balance could rise and the balance could fail to accurately weigh samples.
	■Do not install the balance where the floor is soft. When a sample is placed on the balance, the balance could slant and fail to accurately weigh samples.
	■Do not install the balance in a place where the ambient temperature or humidity change significantly. The balance could fail to accurately weigh samples.
	■Adjust (calibrate) the balance when it is installed or relocated. Failure to do so might result in measurement errors. To ensure accurate measurements be sure to adjust (calibrate) the balance.
	■Check for an error periodically. Use environment and chronological change cause an error in measured value, leading to an inaccurate measurement.
	■Unplug the AC adapter from the receptacle when the balance is not going to be used for a long period of time. Unplug the balance from the receptacle to save energy and prevent degradation.
	■Always adjust the level of the balance before use. A tilted balance generates errors which might cause inaccurate weighting.
	■For proper disposal This product including accessories may not be disposed of in domestic waste in conformance with the specific requirements in your country, such as the Ethiopian Directive 2012/19/EU on waste electrical and electronic equipment(WEEE). When you dispose of this product, please contact your local authorities or dealer and ask for the correct method of disposal.

1-2 For more accurate measurement

To make more accurate measurement, it is necessary to lessen error-causing factors in measurement to the extent possible. Error-causing factors include not only an instrument error and performance of the scale itself but also the nature and condition of a specimen, measuring environment (vibration, temperature, humidity, etc.) and the like. These factors will directly affect measurement result in the case of a balance with high resolution capability.



Meas urement Errors

1-2-1 Precautions related to measuring environment

Temperature/ humidity/ atmospheric pressure	→	Try to keep the room temperature constant to the extent possible in order to avoid condensation and indication drift due to change in temperature. → Low humidity is likely to cause generation of static electricity, resulting in inaccurate measurement.
Vibration/shaking	→	It is preferable to locate a measuring room on the first floor or the basement. The higher the room is, the larger the vibration and shaking become. Therefore, a highly located room is not suitable for measurement. Rooms near the railway or road side should also be avoided.
Air draft	→	Places directly exposed to air current from an air-conditioner or to direct sun generate abrupt temperature change and resultantly cause unstable weight indication, and therefore, should be avoided.
Gravity	→	The latitude and altitude of a measuring location differentiate the gravity that affects a specimen, giving a different weight indication to the same specimen.
Electromagnetic wave	→	At a location where a strong electromagnetic wave generating object is in the proximity of a scale, the scale is affected by the electromagnetic wave, making the scale unable to indicate accurate weight, and therefore, such a location should be avoided.

1-2-2 Precautions related to measuring table

Vibration/shaking	→	Vibrations during measurement destabilizes the indication of measurement value, leading to inability to make accurate measurement. And so use of a measurement table that is robust and hardly affected by vibration is required (a vibration-proof structured table or concrete or stone-made table is suitable). In addition, placing a sheet of soft cloth or paper under the scale causes shaking or makes keeping horizontal attitude difficult, and therefore should be avoided. → The measurement table should be installed in a position free from vibration to the extent possible. A corner rather than the center of a room is less affected by vibration and therefore more suitable for installation of the scale.
Magnetism/Static electricity	→	Use of the scale on the table that is subject to magnetism or static electricity should be avoided.

1-2-3 Precautions related to a specimen

Static electricity	→ In general, synthetic resin- and glass-made specimens are high in electric insulation, and so easily charged electrically. Weighing an electrically charged specimen makes the indication value unstable, reducing the reproducibility of the test result. Therefore, neutralize an electrically charged specimen before measurement.
Magnetism	→ Specimens affected by magnetism show different weight in a different position of the weighing pan, reducing the reproducibility. When weighing a magnetized specimen, either eliminate the magnetism from the specimen or place a setting plate on the weighing pan to distance the specimen from the weighing mechanism of the scale so that the mechanism may not be affected by the magnetism.
Moisture absorption/ Evaporation	→ Measuring a moist or evaporating (vaporizing) specimen increases or decreases the indication value of the scale continuously. When this is the case, put the specimen in a container equipped with a small mouth and closely seal the mouth before measurement.
Specimen temperature	→ Difference in temperature between the specimen and the windshield interior generates convection flow within the windshield, causing a measurement error. When the specimen temperature is excessively high or low, allow the specimen temperature to stabilize at the room temperature before measurement. Also, to prevent the convection flow from arising within the windshield, make the windshield interior temperature equal to the room temperature before measurement. → Measurer's body temperature also affects measurement result. Handle a specimen with tweezers instead of directly holding it with fingers and refrain from putting your hands directly in the windshield during measuring operation.

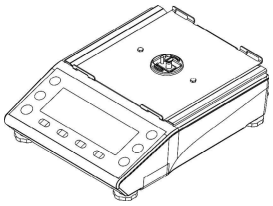
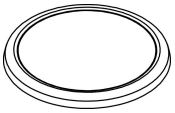
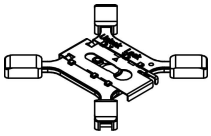
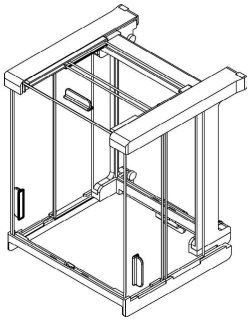
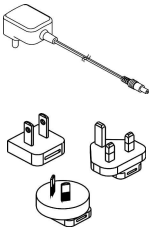
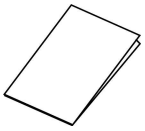
1-2-4 Precautions related to the main unit of a scale

Operating precautions	→ A dust cover, if equipped, for the scale may possibly make the weight indication unstable due to static electricity charged on the cover at a low humidity. When this is the case, wipe the cover with wet cloth or use antistatic agent or use the scale with the cover removed. → For more stable measurement, it is recommended to energize the scale for longer than 30 minutes and load the scale a few times with a weight equivalent to the weighing capacity before measurement.
Adjustment	→ Calibrate the scale periodically with an external adjustment weight or internal adjustment weight. For the sake of precise calibration, use an external adjustment weight weighing nearly equal to the weighing capacity of the scale. → Energize the scale for longer than 30 minutes and load the scale a few times with a weight equivalent to the weighing capacity before measurement → Adjustment is also needed in the following cases: When using the scale for the first time, When using the scale after a long period of non-use, When changing a place of installation, and When there was a large change in temperature, humidity or atmospheric pressure.
Maintenance	→ Attachment of dirt such as powder or liquid to the weighing pan or pan base will cause measurement error or unstable weight indication. For that reason, frequent cleaning of the scale is required. In cleaning the scale, take care for the dust or liquid not to enter into the scale (mechanism).

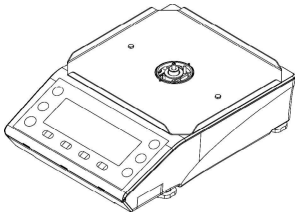
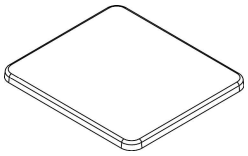
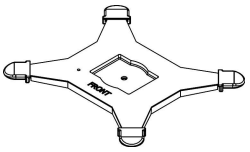
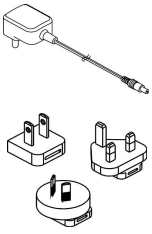
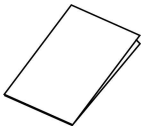
1-3 Check for the articles contained in the box

The package box contains the following;
If anything missing or broken should be found, please inform the store where you purchased the product.

Round pan type (Max 220–1200g)

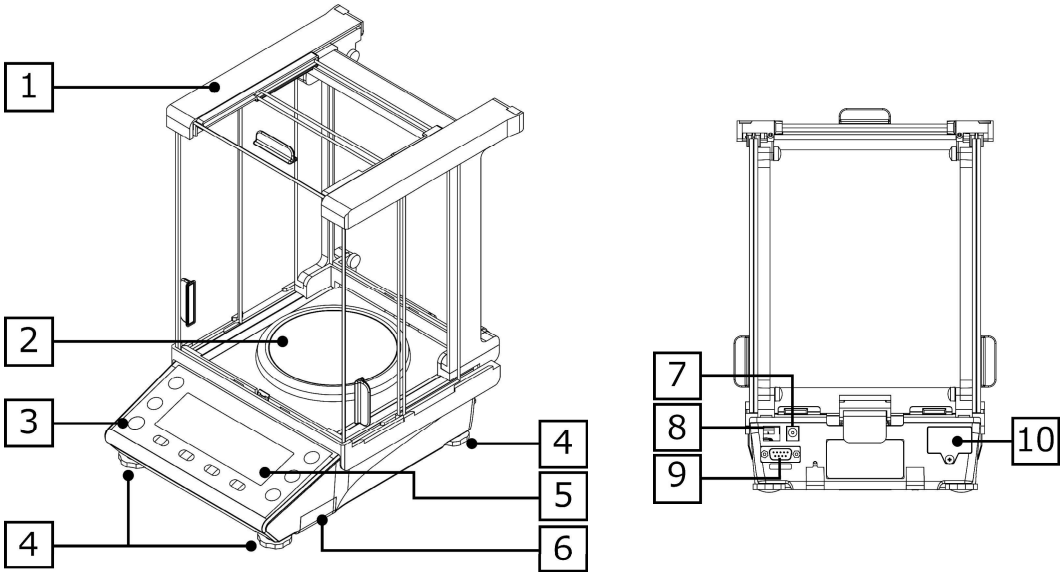
□ Main unit (Round): 1 	□ Round pan: 1 	□ Pan base (Round): 1 
□ Windshield (Assembly type): 1 (Refer to “Windshield assembly instructions”) 	□ AC adapter: 1 AC adapter plug set: 1 	□ Operation manual: 1 Windshield assembly instructions: 1 

Square pan type (Max 1500–15000g)

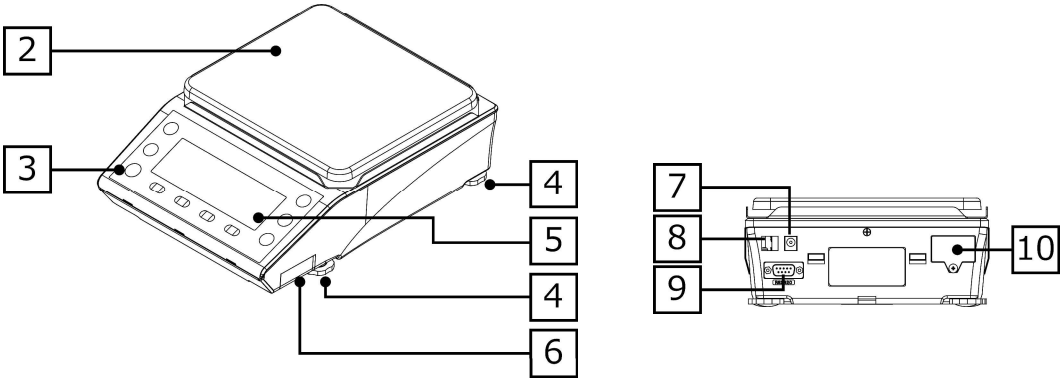
□ Main unit (Square): 1 	□ Square pan: 1 	□ Pan base (Square): 1 
□ Pan base screw: 1 	□ AC adapter: 1 AC adapter plug set: 1 	□ Operation manual: 1 

1-4 Name and function of each section

Round pan type (Max 220–1200g)



Square pan type (Max 1500–15000g)



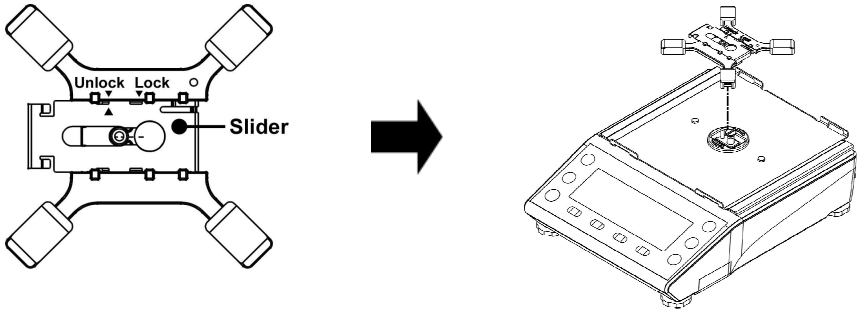
1	Windshield	2	Weighing pan
3	Level	4	Adjuster
5	Display	6	Battery case
7	AC adapter jack	8	USB connector (Type B)
9	RS-232C connector (D-sub 9 pin male)	10	Option slot

1-5 Assembling and installation of the product

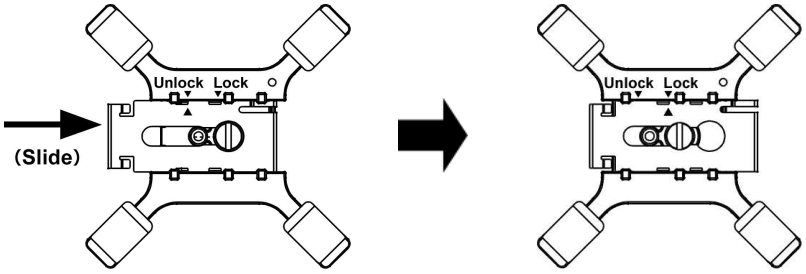
1-5-1 Assembling the balance (Round pan type Max 220–1200g)

1 **(1) "Slider" to check that in the "Unlock" side.**

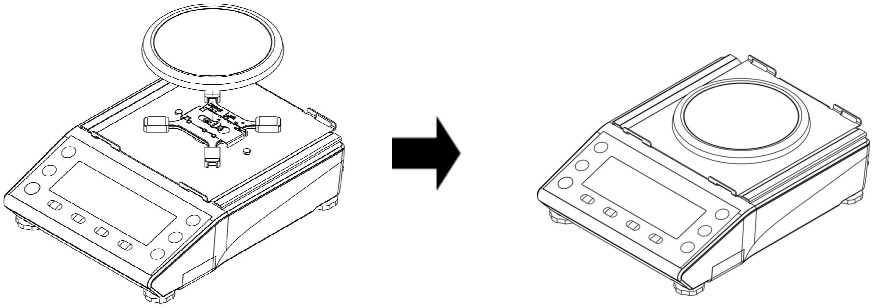
(2) Attach to the balance.



2 **Move the "Slider" to "Lock" side.**



3 **Mount the weighing pan.**

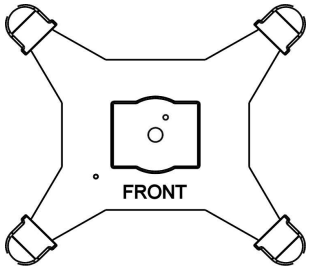


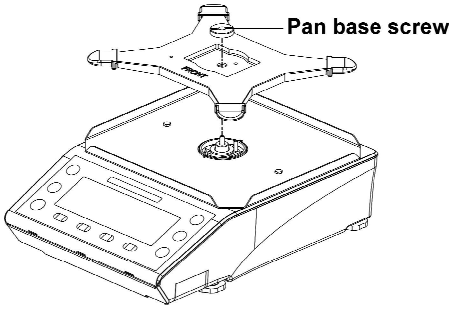
4 **Assemble the windshield.**

Refer to “Windshield assembly instructions” to assemble the windshield.

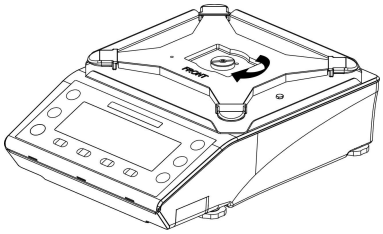
1-5-2 Assembling the balance (Square pan type Max 1500–15000g)

1 **(1) Direct "FRONT" to the display side.**
(2) Attach to the balance.
(3) Turn the “Pan base screw” to fix.

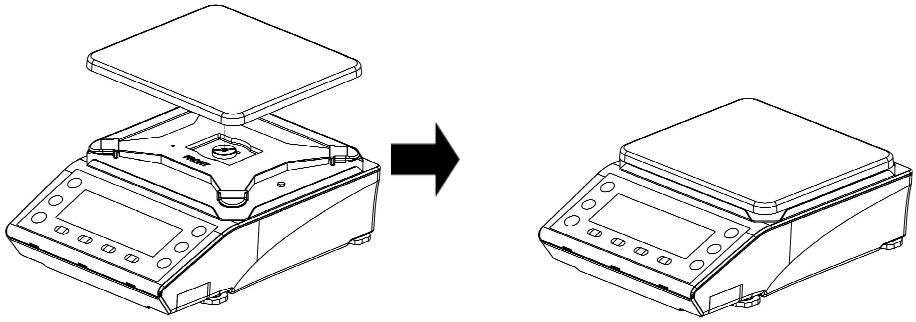




2 **Tighten the “Pan base screw” firmly.**

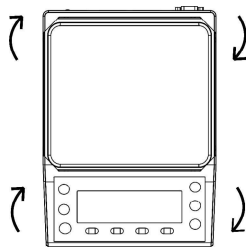


3 **Mount the weighing pan.**



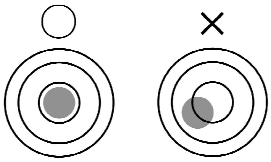
1-5-3 Level

1 **Release the transportation lock of the adjuster.**



At the time of shipment, the adjusters provided at the four corners of the bottom are locked. Turn them in the direction shown in the figure on the left to loosen them.

2 **Level the scale.**



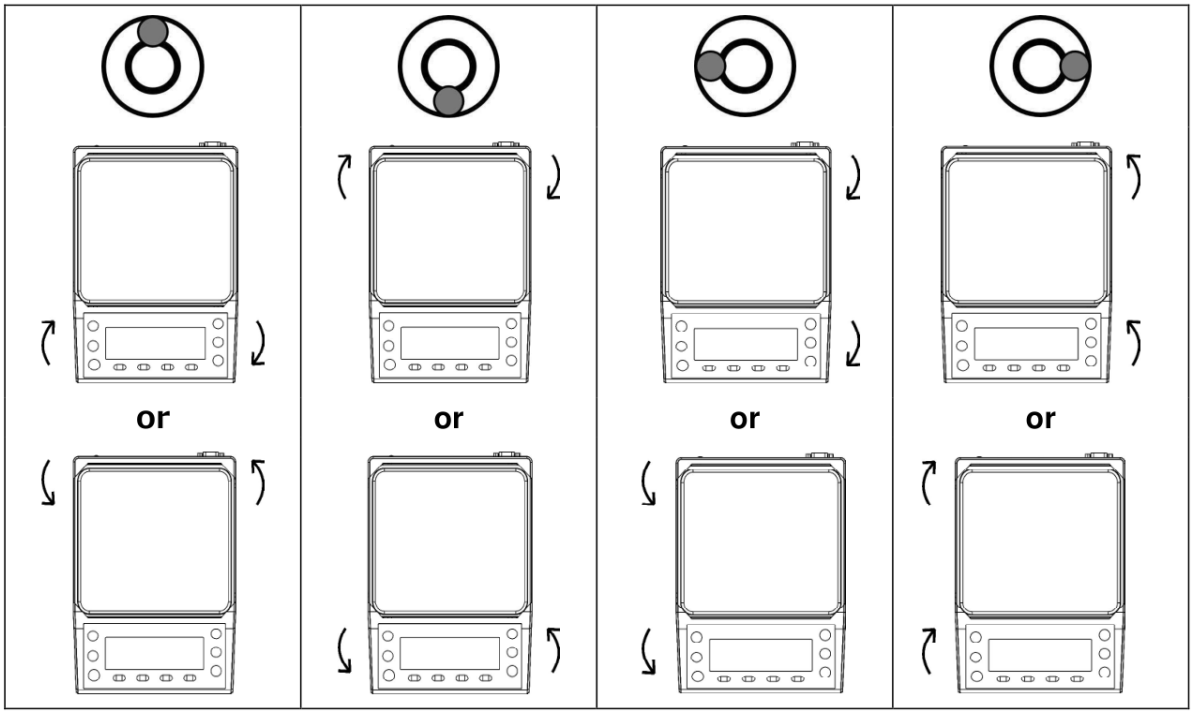
Turn the adjusters so that the bubble enters in the center circle

(1) While watching the level, turn the adjusters provided on the bottom to level the main unit.

(2) Bring the bubble enters in the center circle as shown in the figure on the left.

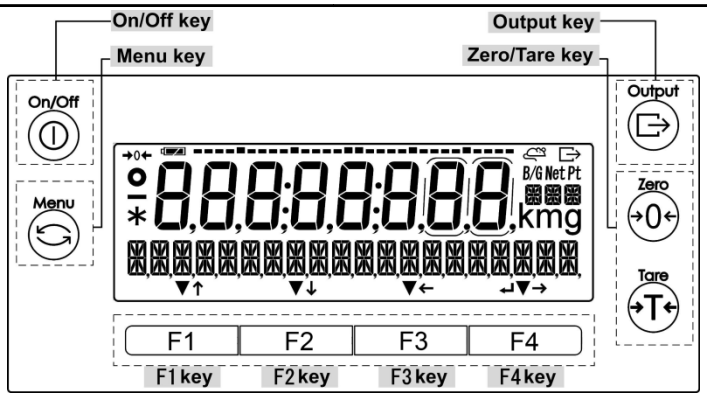
(3) When having leveled the main unit, slightly push the four corners of the scale to make sure that there is no rattle.

Turn the adjusters as shown below depending on the position of the bubble in the level.



1-6 Description of the operation keys

1-6-1 Basic

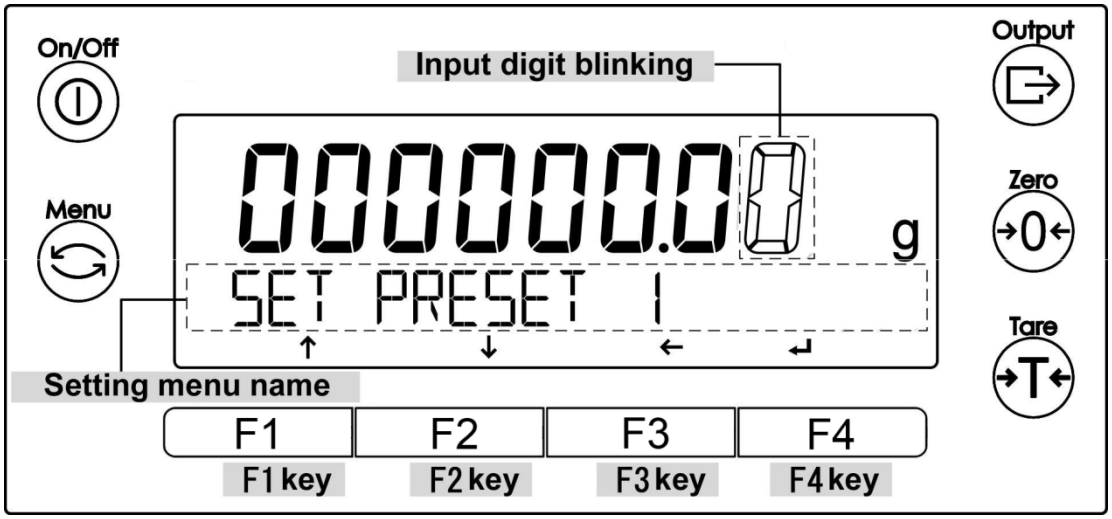


No	Key	Name of key	Performance
1	On/Off	[On/Off]	Turns on and off the power for the balance. On: Push the key, Off: Push the key long
2	Menu	[Menu]	Used for calling/exiting the setting menu. Used for canceling the setting value selection and going back to the measuring mode.
3	Output	[Output]	Use for data outputting. Use for data importing in the Statistics/Formulation mode.
4	Tare	[Tare]	Use for tare subtraction.
5	Zero	[Zero]	Use for zero-point adjustment.
6	F1	[F1] ([F] key)	< ▼ > : Use for selecting the mode, function and item. < ↑ > : Use for moving up to the menu/item selections, or use for incrementing the numeric values.
7	F2	[F2] ([F] key)	< ▼ > : Use for selecting the mode, function and item. < ↓ > : Use for moving down to the menu/item selections, or use for decrementing the numeric value.
8	F3	[F3] ([F] key)	< ▼ > : Use for selecting the mode, function and item. < ← > : Use for moving to the upper menu layer, or use for selecting the digit to change.
9	F4	[F4] ([F] key)	< ▼ > : Use for selecting the mode, function and item. < → > : Use for moving to the lower menu layer, or use for selecting the digit to change. < ↵ > : Use for entering/executing the selected menu/item/value, or use for returning to the setting menu/weighing mode.

The [F] keys on which <↑>, <↓>, <→>, <←>, <↵> or <▼> are displayed above are valid.

Reference

1-6-2 Setting value and numeric value inputting

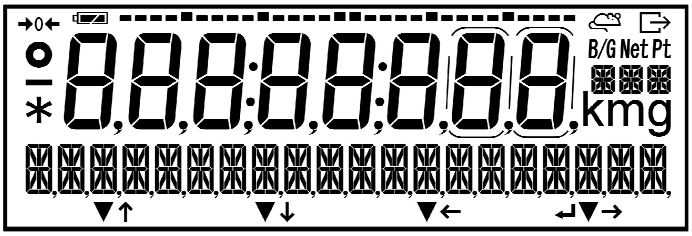


No	Key	Name of key	Performance
1	Menu	[Menu]	Cancel the input value and go back to the setting menu.
2	Tare	[Tare]	Input a decimal point < . > in the “Multiplied by Coefficient mode”.
3	Zero	[Zero]	Use for changing polarity <+/->.
4	F1	[F1] ([F] key)	< ↑ > : Use for incrementing the numeric values. <0 → 1 → 2 →…→ 9 → 0>
5	F2	[F2] ([F] key)	< ↓ > : Use for decrementing the numeric values. <0 → 9 → 8 →…→ 1 → 0>
6	F3	[F3] ([F] key)	< ← > : Use for selecting the digit to change.
7	F4	[F4] ([F] key)	< ↵ > : Use for entering the value.

Reference The [F] keys on which < ↑ >, < ↓ >, < → >, < ← >, < ↵ > or < ▼ > are displayed above are available.

1-7 How to interpret the display

1-7-1 Description of segment.



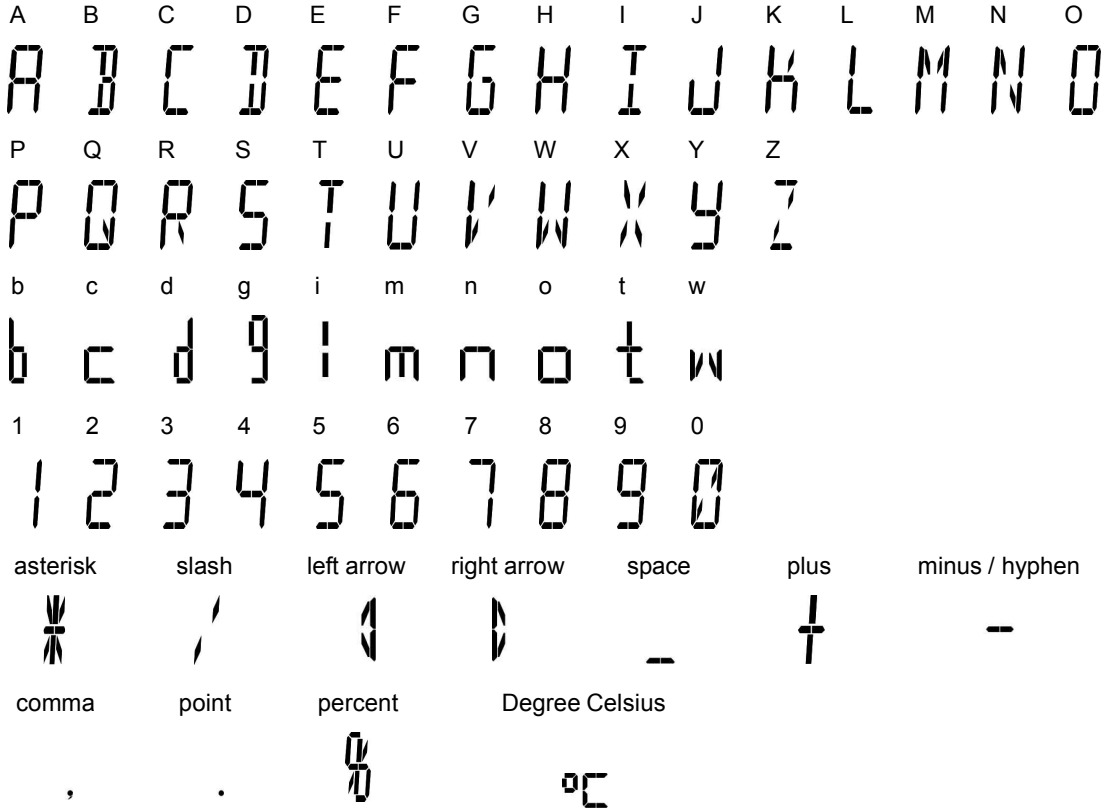
No	Mark	Name	Description
1		Animal weighing mode	Displayed when the animal weighing mode.
2		Minus	Indicates the negative weight value and numeric.
3		Stable mark	- When displayed: The balance is in the stable condition. - When not displayed: The balance is not in the stable condition.
4	→0←	Zero point	Indicates the zero point.
5		7 segment	- Indicates the weight value - Indicates the simplified character.
6		Battery mark	Display when the balance is powered by batteries.
7		Output	Displayed when data are being output to external devices.
8	B/G	Gross weight	Indicates gross weight.
9	Net	Net weight	- Indicates that the tare weight is being subtracted. - Indicates the preset tare weight.
10	Pt	Preset tare weight	Indicates the preset tare weight.
11	g	Gram	Indicates the gram unit.
12	mg	Milligram	Indicates the milligram unit.
13		16 segment message 16 segment unit	- Displays various messages. - Indicates the various units.
14	↑ ↓ → ← ↵ ▼	Operation of the [F] key	Displayed when the [F1] – [F4] keys are effective.
15	:	Colon	Displayed when the date and time display.
16	*	Asterisk	- Lights in the standby status. - Indicates addition available status when the adding function is used.
17		Bar graph	- Indicates the present total amount relative to the weighing capacity defined as 100%. - Indicates the state of span adjustment / calibration with internal weight.
18		Auxiliary scale interval	Lights up only when the auxiliary scale interval is displayed.

Legal Metrology Nos.1,12,18: Not indicated.

1-7-2 LCD character font

■7-segment

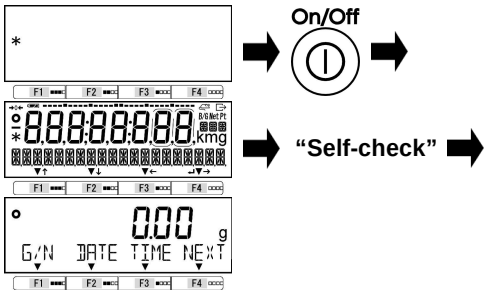
■16-segment



2 Basic usage

2-1 Turning on/off the power, and checking for the operation

1 **Turn on the power for the balance.**

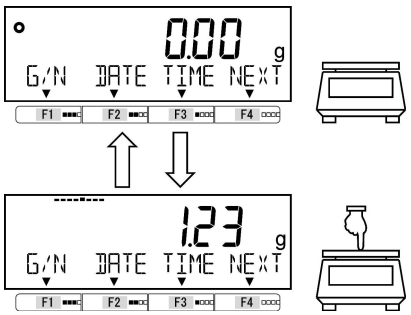


Connect the included AC adapter to the balance.
When the AC adapter is plugged in, the balance enters the standby state and an asterisk <✻> appears.
Push [On/Off] key.

All displays on the main and sub LCDs light, followed by the self-check of the scale. During the self-check, the LCD displays automatically change.
Completion of the self-check is followed by the weight mode.

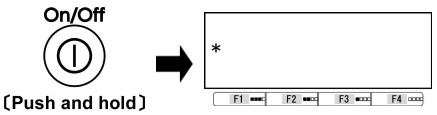
CAUTION	Do not push any key during the self-check.

2 **Balance operation check.**



Press the weighing pan lightly to check if the indication changes.

3 **Turn off the power for the balance.**



Push and hold [On/Off] key (About 2 seconds)

Reference	(1) Pushing and holding [On/Off] key obtains the standby status from any operation status. (2) When battery driven, the balance on/shutdown without standby status. (3) The balance starts up in the last measuring mode before it was switched off.

Legal Metrology	(3) The balance always starts up in weighing mode.

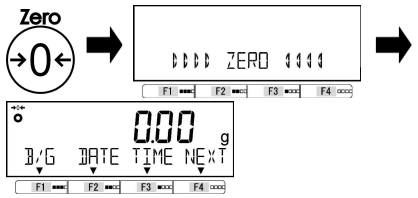
2-2 Zero-point adjustment

Adjusting the indication to zero is called "Zero-point adjustment".

1 **Check the weighing pan.**

Make sure that nothing is placed on the weighing pan.

2 **Execute "Zero-point adjustment".**



Push [Zero] key.

Displays become zero and the symbol "→0←" lights.

Reference

(1) Zero-point adjustment cannot not be performed when a sample whose weight is over the "Zero-point adjustment range" is placed on the weighing pan. In that case, make the "tare" referring to the "2-3 Weighing a sample placed on a container (tare)"

(2) Stability waiting during the Zero-point adjustment can be set using the Setting menu <17 Stability waiting>.

Legal Metrology

(2) The setting of <17 WT STABLE> is not changeable and the balance always wait stability during the tare weight subtraction.

2-2-1 Zero-point adjustment range

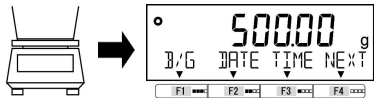
There is a Zero-point adjustment range (limit) in this product. When the weighing load (gross) exceeds the upper or lower limit, "Zero-point adjustment" cannot be executed.

Model	Lower limit (g)	Upper limit (g)
GAL620	-9.300	9.300
GAL6200	-93.00	93.00
GAL15000	-225.0	225.0

2-3 Weighing a sample placed on a container (tare)

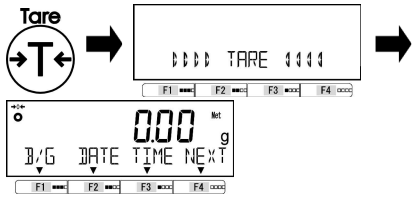
When weighing a sample to be weighed with the object placed on a container (tare), the weight of the container must be subtracted from the total weight to get the actual weight of the object to be weighed. This is called "tare subtraction" or "tare".

1 **Place a container on the weighing pan.**



The weight of the container is displayed.

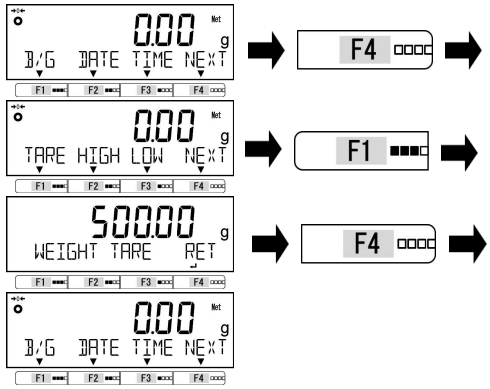
2 **Perform the tare.**



Push [Tare] key.

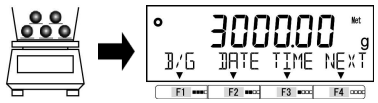
The indication changes to zero and the < **Net** > symbol lights.

3 **Check the tare weight.**



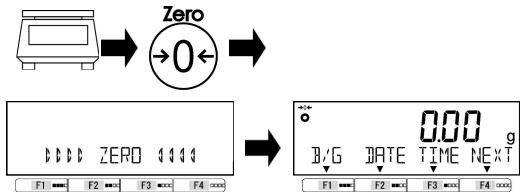
The tare weight can be checked by operating "Free keys" if the <TARE> is assigned to the Free key.
Refer to "8 Controlling and adjustment functions" for setting the Free keys.
Push [F4] key to switch the menu bar and push [F1-F3] key on which <TARE>is displayed above.
The tare weight is displayed on the display, then push [F4] < ↵ > key to return to the measuring mode.

4 **Put the sample on the tare.**



The net weight of the sample is displayed.

5 **Clear the tare weight data.**



Remove the sample and tare on the weighing pan, then push [Zero] key.
Therefore, the indication becomes zero and <**Net**> indication disappears.

Reference

(1) Performing the tare narrows the weighing range as much as the amount of the tare weight mass (tare weight).
Weighable range = weighing capacity - tare weight
(2) Stability waiting during the tare can be set using the Setting menu <17 WT STABLE>.
(3) When using a tare whose tare weight is already known, the tare can be performed in advance by inputting its tare weight (preset tare). For its setting method, refer to "5 User information setting".
(4) When turning on the power placing a tare that exceeds the zero adjustment range at the time of power supply, the tare subtraction is executed.
(5) Tare weight can be output at "3 Check the tare weight" by pushing [Output] key.
Check "External input/output functions" to refer the output setting.

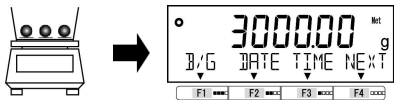
Legal Metrology

(2) The setting of <17 WT STABLE> is not changeable and the balance always wait stability during the tare weight subtraction.
(4) This operation is not valid.

2-4 Weighing the additional sample

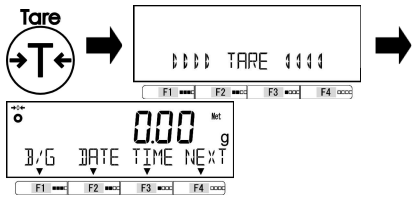
Weigh the first sample and the additional sample separately.

1 **Place a sample to be weighed.**



The mass of the sample to be weighed placed is indicated.

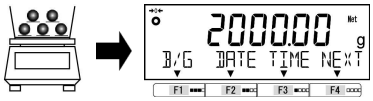
2 **Perform the tare.**



Push [Tare] key.

The indication changes to zero and the < Net > symbol appears.

3 **Place an additional sample to be weighed.**

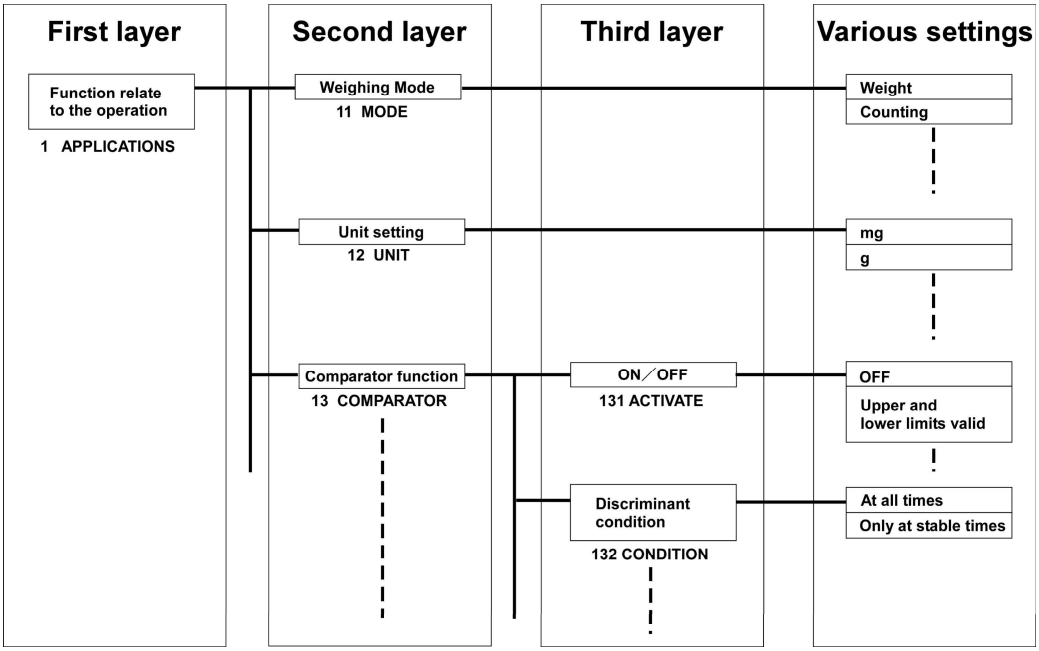


The mass of the added sample alone is indicated.

2-5 Basic operation

2-5-1 Hierarchy of a setting menu

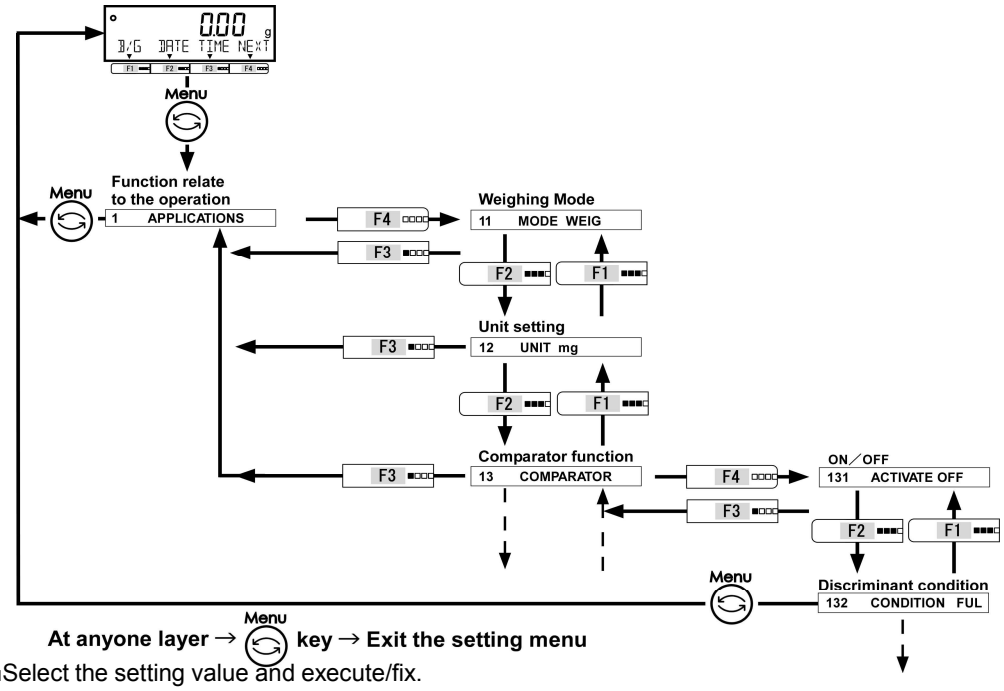
The setting menu of this product is divided into four, from the first layer to the third layer and for various settings.



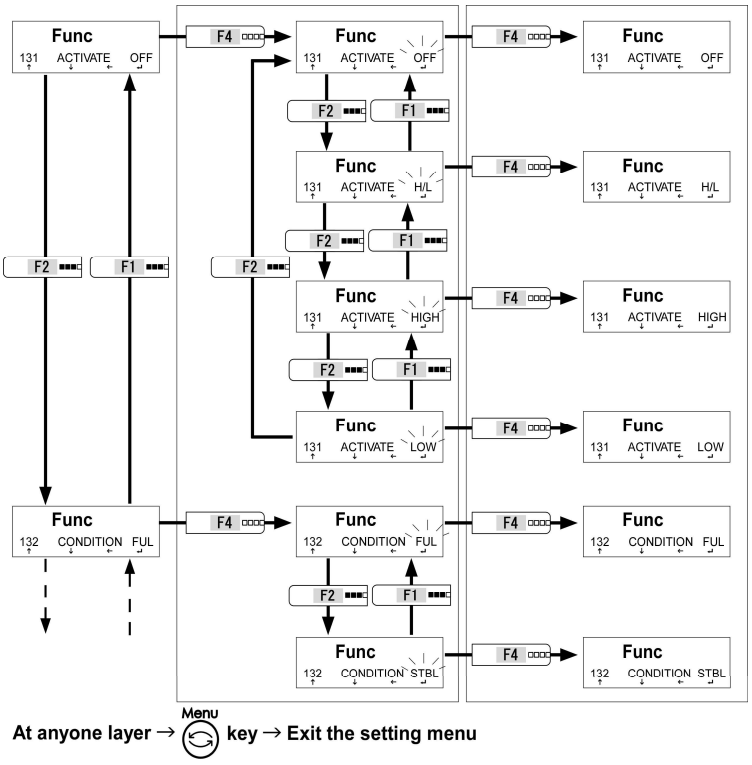
2-5-2 Operation of the setting menu

To perform settings for various functions from the state of weighing, chiefly execute the following procedure.

■Go to the menu item to set



■Select the setting value and execute/fix.



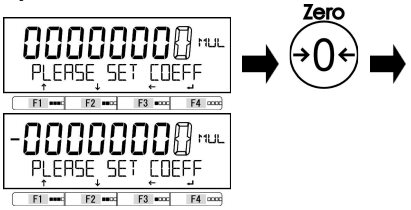
2-5-3 Numeric value input

Input upper/lower limit, reference weight, unit weight, preset tare weight, coefficient, date/time and ID/password at each mode.

> **Reference** Numeric value inputting is limited to eight digits at a maximum.

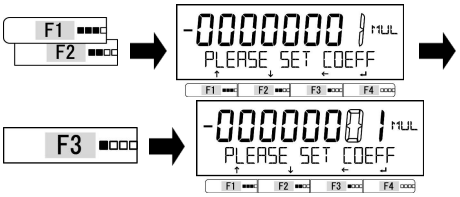
Ex) When inputting “-5.4321” in “Multiplied by Coefficient mode”.

1 **Input “– “.**



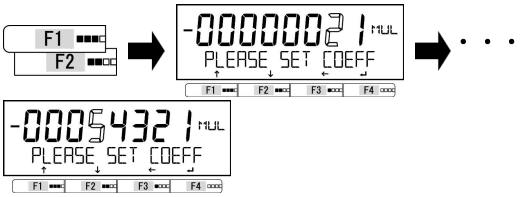
Push [Zero] key to change the polarity to “-”.

2 **Input “1 “.**



The digit for inputting is blinking.
Push [F1, F2] key to increment/decrement the digit to “1”.
Push [F3] key to input the next digit.

3 **Input “2, 3, 4, 5 “.**



Input “2, 3, 4, 5” by the procedure above.

4 **Input “.”.**

Push [Tare] key to input “.” on the immediately right of the blinking digit.

5 **Fix the input value.**

Push [F4] key to fix the input value.
The coefficient “-5.4321” is saved on the balance.

> **Reference** “-” and “ . ” cannot be input in ID or Password setting.
> Ex) “8-5-1 Scale ID setting”

2-5-4 [F] key switching at each measuring mode

You can switch the measuring mode, or select and set the function, by operating the [F] keys at each measuring mode.
This chapter shows the [F] keys switching by pushing the [F4] key.
Refer to “3 Function related to the operation” for the [F1-F3] keys operation.

Reference

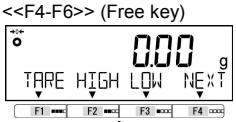
(1) In weighing mode, <<F1-F6>> (Free keys) are assigned to [F] keys as described follow; <<F1>> and <<F4>>: [F1] key, <<F2>> and <<F5>>: [F2] key, <<F3>> and <<F4>>: [F3] key. Please take care not to confuse <<F1-F4>> to [F1-F4] keys.

(2) Refer to “8 Controlling and adjustment functions” for assigning “Free keys” and “Modes” to [F] keys.

Weighing mode

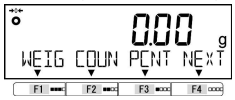
<<F1-F3>> (Free key)

<<F4-F6>> (Free key)



Comparator setting menu

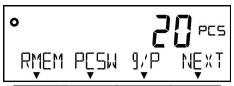
Measuring mode switching



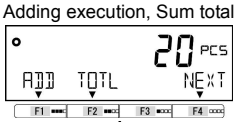
Return to the first menu item

Counting mode

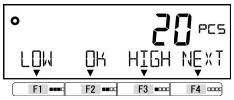
Counting mode menu



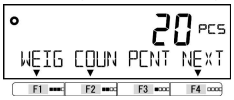
Adding execution, Sum total



Comparator setting menu



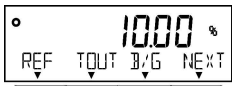
Measuring mode switching



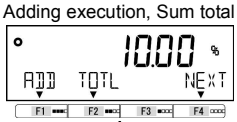
Return to the first menu item

Percentage mode

Percentage mode menu

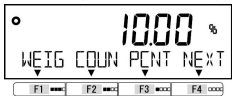


Adding execution, Sum total



Comparator setting menu

Measuring mode switching

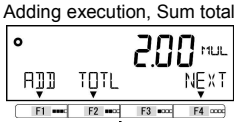


Return to the first menu item

Multiplied by Coefficient mode

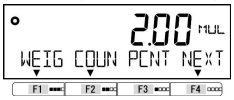
Multiplied by Coefficient mode menu

Adding execution, Sum total



Comparator setting menu

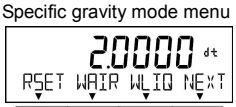
Measuring mode switching



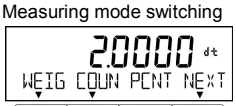
Return to the first menu item

Specific gravity mode

Specific gravity mode menu



Measuring mode switching

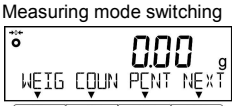


Return to the first menu item

Statistics mode

Statistics mode menu

Measuring mode switching

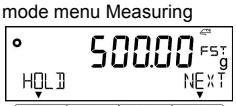


Return to the first menu item

Animal mode

Animal mode menu Animal

mode menu Measuring



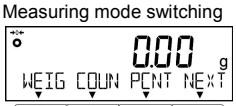
mode switching

Return to the first menu item

Formulation mode

Formulation mode menu

Measuring mode switching



Return to the first menu item

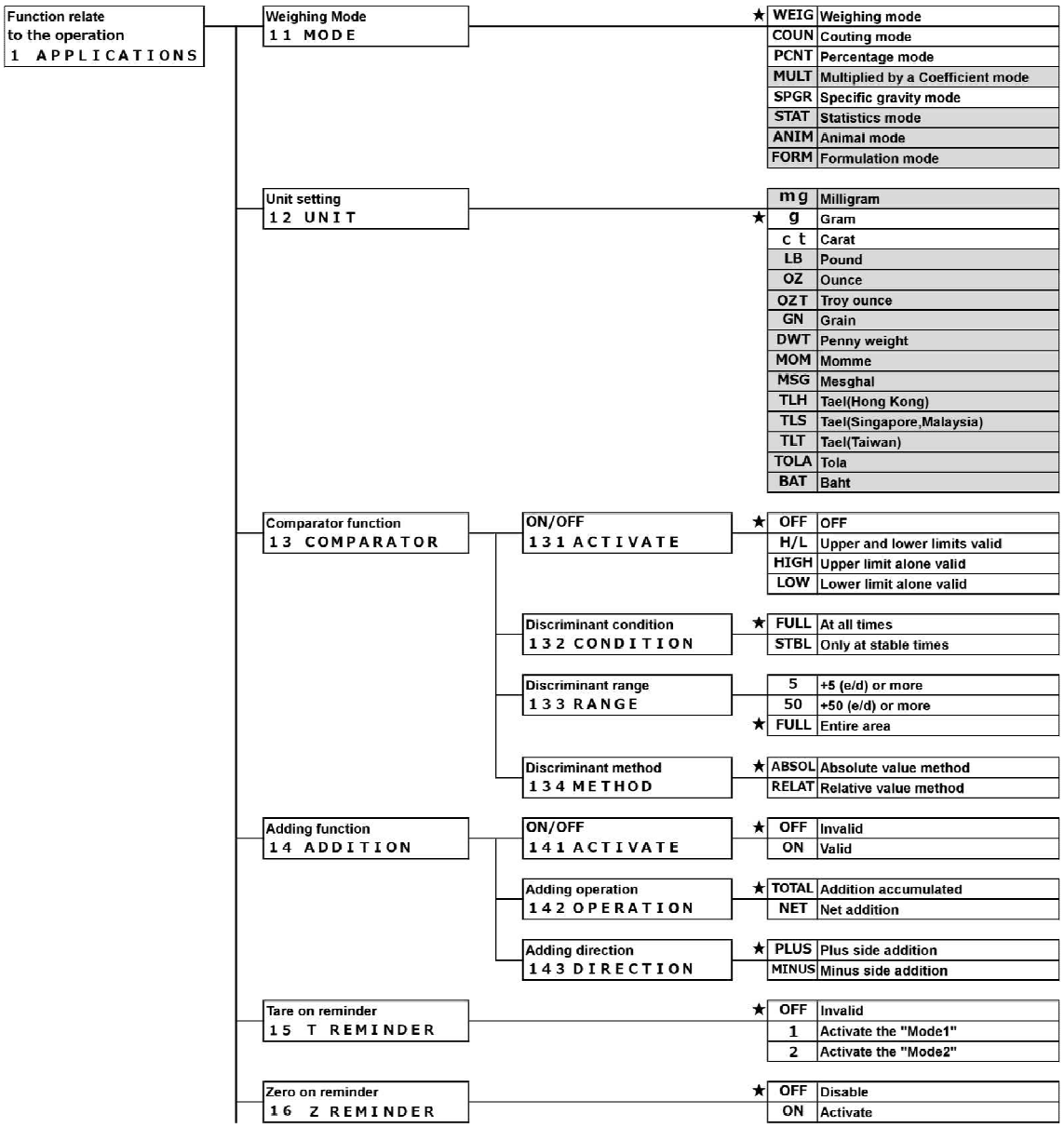
3 Functions related to the operation

Settings to change the balance operations.

3-1 Hierarchy of functions related to the operation

Legal Metrology : Not indicated.

★: Initial setting value



Stability waiting 17 WT STABLE	OFF	Invalid
	★ ON	Valid
Bar graph indication 18 BARGRAPH	OFF	Invalid
	★ ON	Valid
Back Light 1A BACKLIGHT	OFF	Invalid
	★ 3MIN	3 minutes
	5MIN	5 minutes
	10MIN	10 minutes
	30MIN	30 minutes
	ON	Always ON
Auto power-off 1B AUTO OFF	★ OFF	Invalid
	3MIN	3 minutes
	5MIN	5 minutes
	10MIN	10 minutes
	30MIN	30 minutes
Simplified SCS 1C SIMPLE SCS	★ OFF	Invalid
	ON	Valid

3-2 Various measuring modes of the balance

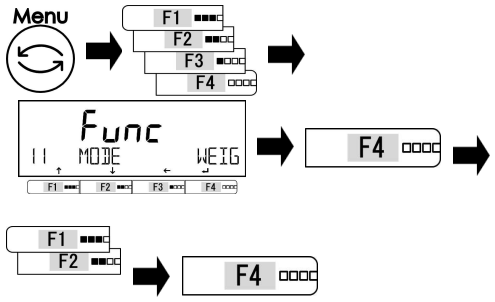
Reference Refer to “6 External input/output functions” to output the measuring data to other devices.

3-2-1 Weighing mode

Weighing mode is the basic mode for weighing.

Reference Various functions can be used with weighing mode by pushing the “Free key”. Please refer to “8-3 Free key setting”.

1 **Select the weighing mode.**



Push [Menu] key, then push [F1-F4] keys to go to <11 MODE>.

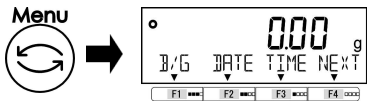
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

WEIG: Weighing mode

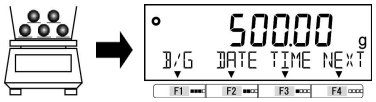
Push [F4] key to fix.

2 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

3 **Weigh the sample.**



Place the weighed.

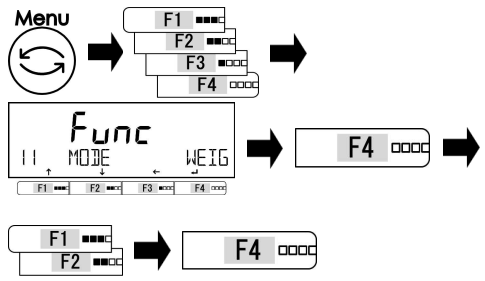
The weighing result is displayed.

3-2-2 Counting mode

Counting mode can count the number of items by placing the items for which sampling has been completed on the balance and dividing the total weight of those items by the recorded unit weight. There are two methods to input the unit weight;

- Actual value setting method: Place the specified number of samples on the balance to record the average unit weight.
- Numeric value setting method: Input numeric value of the unit weight by key operation.

1 **Select the Counting mode.**



Push [Menu] key, then push [F1-F4] keys to go to <11 MODE>.

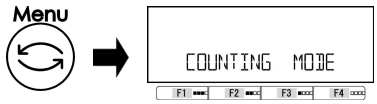
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

COUN: Counting mode

Push [F4] key to fix.

2 **Exit the setting menu.**

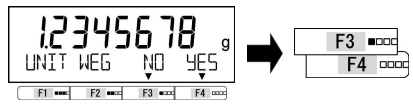


Push [Menu] key to shift to the Counting mode.

3-2-2 (1) Actual value setting method

Place the specified number of samples on the balance to record the average unit weight internally.

1 **Select whether or not employ the previous recorded unit weight.**



Push [F3/F4] key to select whether or not employ the previous data.

When there is no data record, this step is skipped.

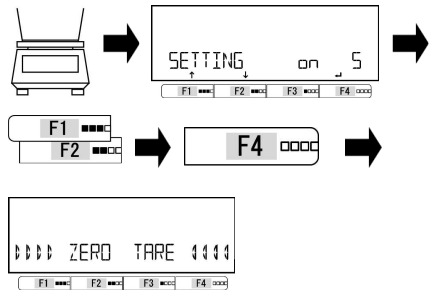
Push [F3/F4] key to select.

NO: Change

YES: Not Change

When <OK> is selected, go to step 5.

2 **Select the "number of samples mode".**



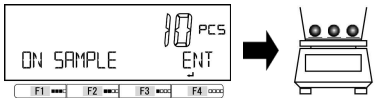
Push [F1/F2] key to select.

on	5:	5 PCS
on	10:	10 PCS
on	30:	30 PCS
on	50:	50 PCS
on	100:	100 PCS
on	VAR:	1 – 999 PCS

Push [F4] key to fix.

Zero-point adjustment or tare is set automatically.

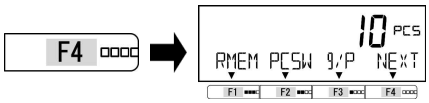
3 Place the samples.



Place a container (tare) on the weighing pan.
Push [Tare] key.

Place the set number of samples on the weighing pan.

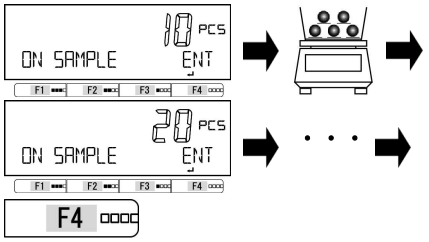
4 Record the unit weight.



Push [F4] key to fix.

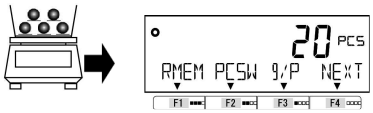
The unit weight is recorded.

4' Simple SCS method (When enabled).



This function operates when <1C Simple SCS> is valid.
Add more samples. The number of additional samples can be up to two times the set number of samples.
For example, when "10 Pcs" is set, add 30 or less samples.
Push [F4] key to update.

5 Put samples in place to count them.



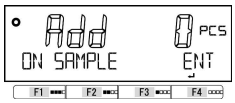
Place the samples.
Count result is displayed.

Reference

"Simple SCS method" is available when <1C SIMPLE SCS> is activated and "3-2-2 Actual value setting" is selected.

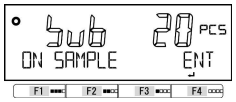
(1) Add samples up to three times the pieces of which are already counted, then unit weight is updated automatically after the weighing becomes stable.

(2) If the unit weight of the samples is less than the "Minimum unit weight" — 99 times of the minimum readability (d x 99) —, <Add> blinks on the display.



Model	Readability d (g)	Minimum unit weight (g)
GAL 620	0.001	0.099
GAL 6200	0.01	0.99
GAL 15000	0.1	9.9

(3) If <Sub> is displayed, it indicates that you added more than three times as many samples as the set number. Decrease the number of additional samples. Starting from a small number of samples, gradually increase the number of samples to increase counting accuracy.

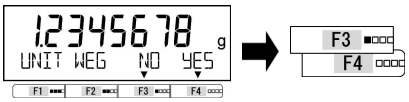


(4) When <on VAR> is selected in step 2, select the specified number of the sample among 1 to 999 by operating [F1/F2] keys.

3-2-2 (2) Numeric value setting method

Input numeric value of the the unit weight by key operation.

1 **Select whether or not employ the previous recorded unit weight.**



Push [F3/F4] key to select whether or not employ the previous data.

When there is no data record, this step is skipped.

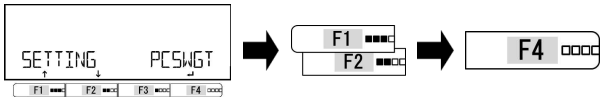
Push [F3/F4] key to select.

NO: Change

YES: Not Change

When <OK> is selected, go to step 4.

2 **Select the "unit weight value input mode".**

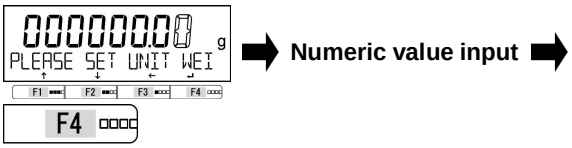


Push [F1/F2] key to select.

PCSWGT: Unit weight value input

Push [F4] key to fix.

3 **Input the unit weight.**

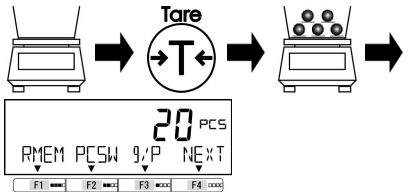


(Refer to "2-5-3 Numeric value input")

Input the unit weight.

Push [F4] key to fix.

4 **Put samples in place to count result.**



Place a container (tare) on the weight pan.

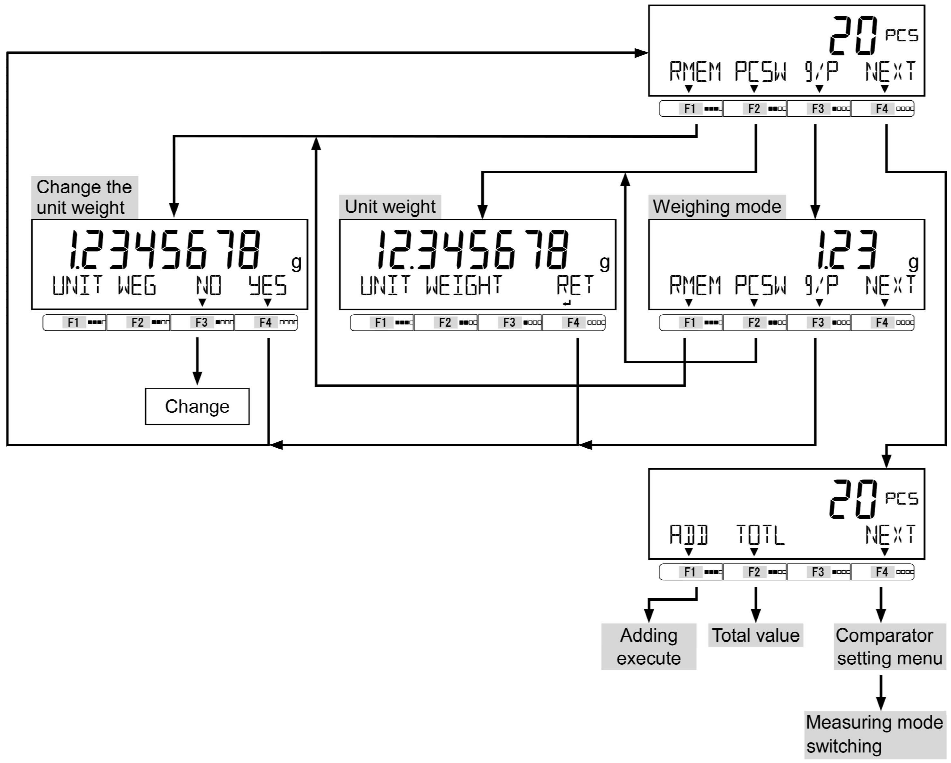
Push [Tare] key.

Place the samples.

The count result is displayed.

3-2-2 (3) Switching the display at Counting mode

1 **Push [F1-F4] keys to switch the display.**



Reference <ADD> and <TOTL> can be used when the <14 ADDITION> is "Valid".

3-3 Percentage mode

The weight of a sample to be weighed is indicated in percent relative to the reference weight.
There are two methods to input the reference weight;

- Actual value setting method ([onW]): Place the reference weight on the balance to record the weight.
- Numeric value setting method ([NUM]): Input numeric value of the the reference weight by key operation.

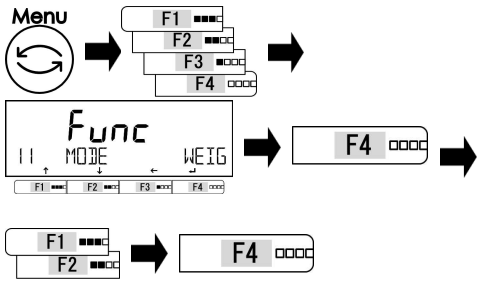
Reference (1) Weight limit.

Models	d (g)	Weight limit (g)
GAL 620	0.001	0.100
GAL 6200	0.01	1.00
GAL 15000	0.1	10.0

(2) The minimum percent to be displayed is automatically set according to the recorded reference weight.

Readability (%)	Range of reference weight
1	Lower weight limit <= Reference weight < Lower weight limit X 10
0.1	Lower weight limit X 10 <= Reference weight < Lower weight limit X 100
0.01	Lower weight limit X 100 <= Reference weight

1 **Select the percentage mode.**

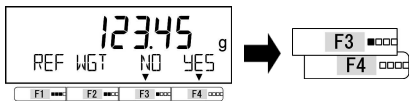


Push [Menu] key, then push [F1-F4] keys to go to <11 MODE>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.
PCNT : Percentage mode
Push [F4] key to fix.

2 **Exit the setting menu.**

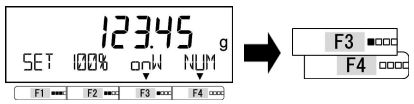
Push [Menu] key to shift to the percentage mode.

3 **Select whether or not employ the previous recorded reference value.**



Push [F3/F4] key to select whether or not employ the previous data.
When there is no data record, this step is skipped.
Push [F3/F4] key to select.
NO: Change
YES: Not Change
When <OK> is selected, go to step 6.

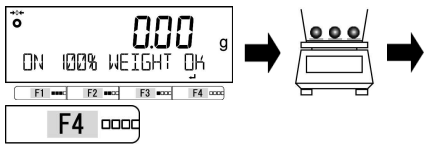
4 **Select the method of setting the reference value.**



Push [F3/F4] key to select.
onW : Actual value
NUM : Numeric value

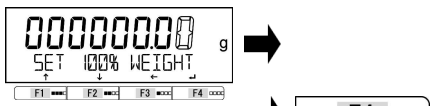
5 **Save the reference value.**

In the case of [onW].



Place the reference weight on the balance.
Push [F4] key to record.

In the case of [NUM].

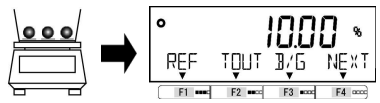


Numeric value input F4

(Refer to “2-5-3 Numeric value input”)

Input the reference value.
Push [F4] key to fix.

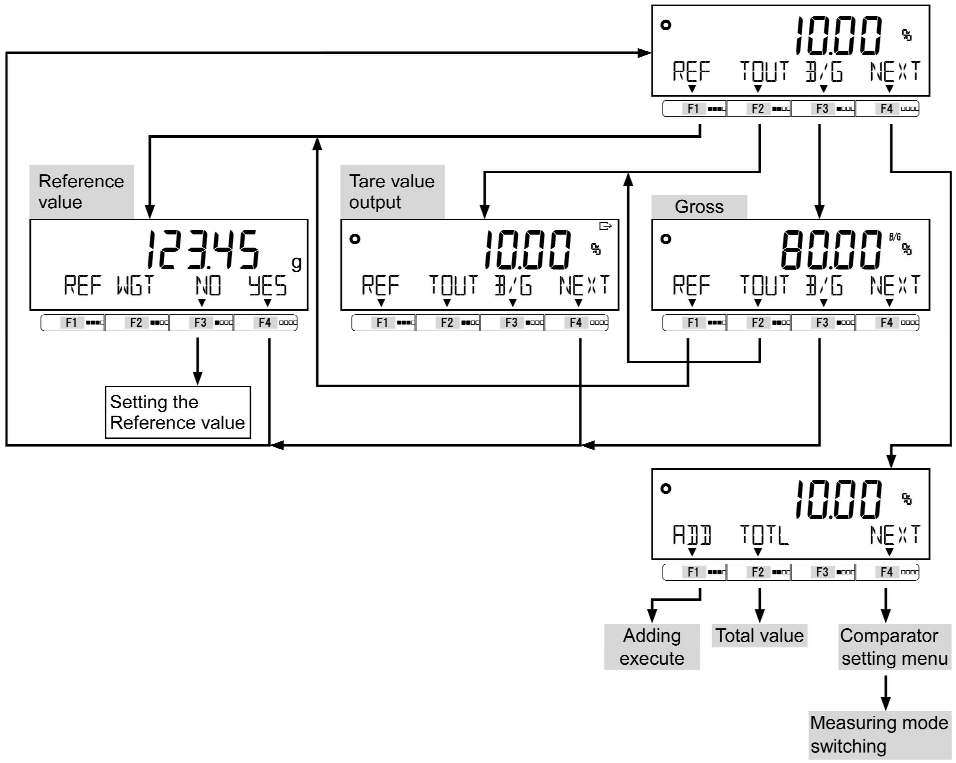
6 **Weigh the samples.**



The ratio of the weight of the sample to the reference weight is indicated in percent.

3-3-1 Switching the display at percentage mode

1 **Push [F1-F4] keys to switch the display.**



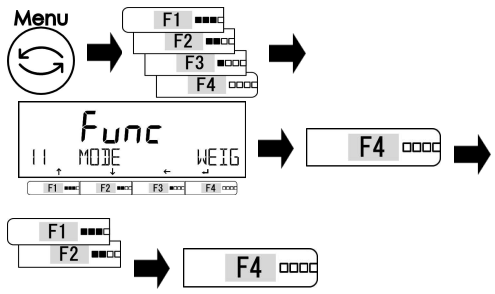
Reference <ADD> and <TOTL> can be used when the <14 ADDITION> is "Valid".

3-4 Multiplied by Coefficient mode

Measured weight is multiplied by the preset coefficient, and the result be displayed.

Legal Metrology This mode is not available.

1 **Select the Multiplied by Coefficient mode.**



Push [Menu] key, then push [F1-F4] keys to go to <11 MODE>.

Push [F4] key to change the setting value.

Push [F1/F2] key to select.

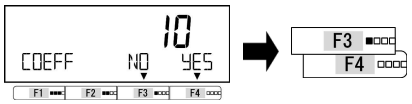
MULT : Multiplied by Coefficient mode

Push [F4] key to fix.

2 **Exit the setting menu.**

Push [Menu] key to shift to the Multiplied by Coefficient mode.

3 **Select whether or not employ the previous recorded coefficient.**



Push [F3/F4] key to select whether or not employ the previous data.

When there is no data record, this step is skipped.

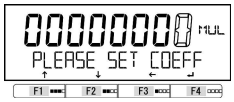
Push [F3/F4] key to select.

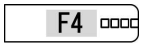
NO: Change

YES: Not Change

When <OK> is selected, go to step 6.

4 **Set the coefficient.**



Numeric value input 

(Refer to “2-5-3 Numeric value input”)

Input the coefficient.

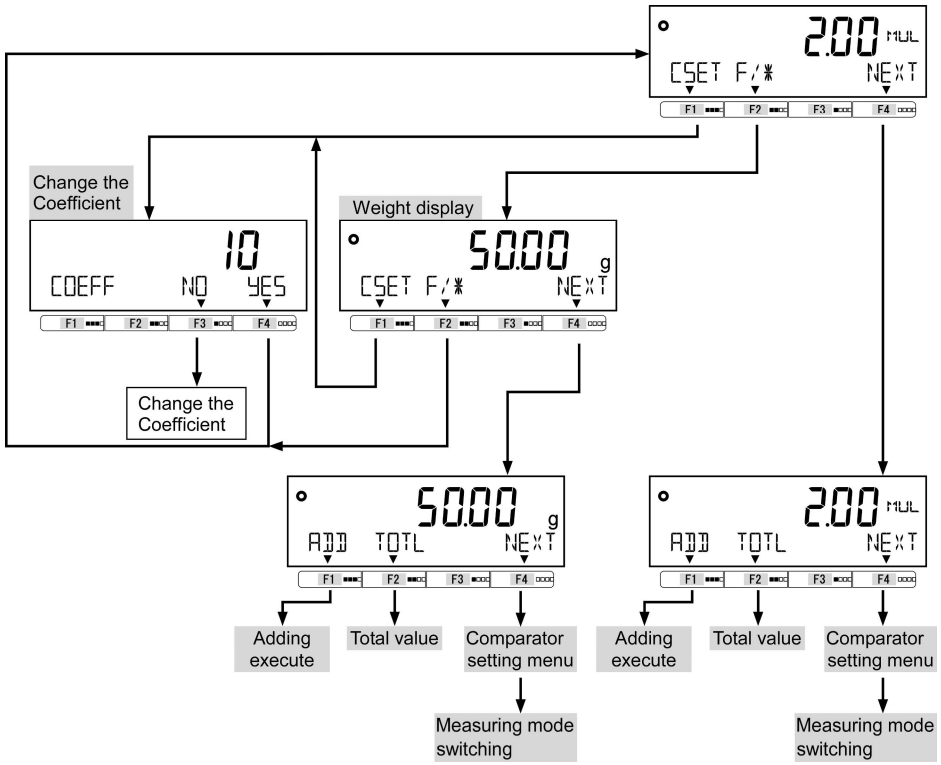
Push [F4] key to fix.

5 **Weigh the samples.**

The weight of the sample is multiplied by the coefficient and the result is displayed.

3-4-1 Switching the display at Multiplied by Coefficient

1 **Push [F1-F4] keys to switch the display.**



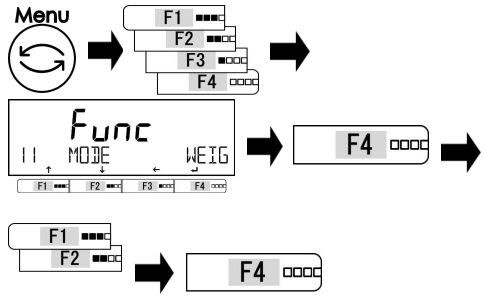
Reference <ADD> and <TOTL> can be used when the <14 ADDITION> is "Valid".

3-5 Specific gravity mode

In the specific gravity mode, the ratio of the density of a substance to the density of water at its densest (4°C) for liquids is calculated.
Prepare the equipments — a water tank, hanging string/wire, net/basket for placing the sample, thermometer etc.— in accordance with the samples to be measured.
Procedure to measure the specific gravity:

1. Prepare the equipments
2. Input the water temperature or the specific gravity of the reference liquid.
3. Measure the sample weight in the air.
4. Compensate the buoyancy acting on the net/basket.
5. Measure the sample weight in the water/liquid.
6. The specific gravity of the sample is displayed.

1 **Select the specific gravity mode.**



Push [Menu] key, then push [F1-F4] keys to go to <11 MODE>

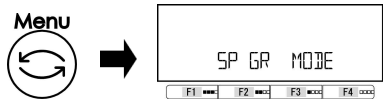
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

SPGR: specific gravity mode

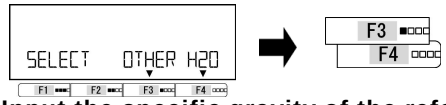
Push [F4] key to fix.

2 **Exit the setting menu.**



Push [Menu] key to shift to the specific gravity mode.

3 **Select the reference liquid.**

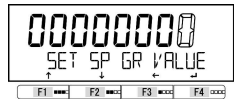


Push [F3/F4] key to select the reference liquid.

OTHER: Liquid other than water
H20: water

4 **Input the specific gravity of the reference liquid or the temperature of the water.**

<OTHER>: Liquid other than water

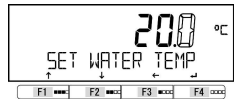


Numeric value input → F4

(Refer to “2-5-3 Numeric value input”)

Enter the specific gravity of the reference liquid and push [F4] key to fix.

<H20>: Water

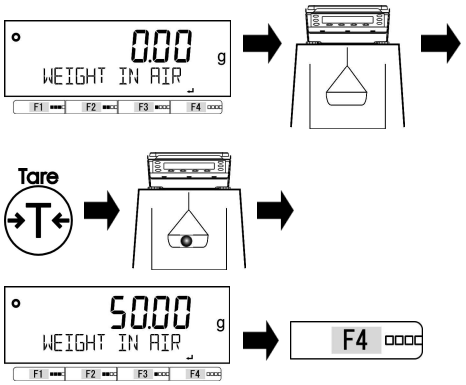


Numeric value input → F4

(Refer to “2-5-3 Numeric value input”)

Enter the temperature of the water and push [F4] key to fix.

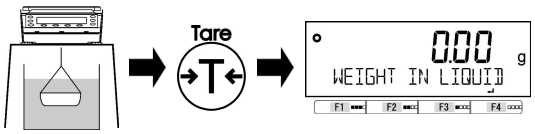
5 **Measure the sample weight in the air.**



Set the net/basket on the balance and push [Tare] key.

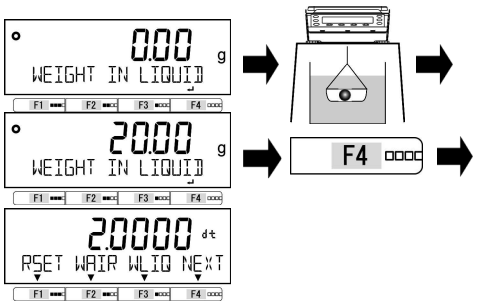
Load the on the net/basket to measure the weight of the sample in the air, then push [F4] key to record it.

6 **Compensate the buoyancy acting on the net/basket.**



Remove the sample on the net/basket and push [Tare] key to tare, then sink the net/basket into the water/liquid. Push [Tare] key to compensate the buoyancy acting on the net/basket.

7 **Measure the sample weight in the water/liquid.**

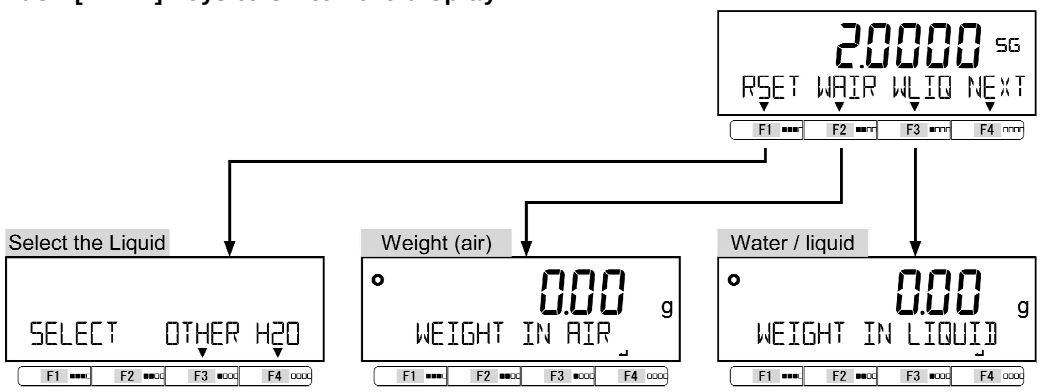


Put the sample on the net/basket in the water/liquid, then push [F4] key to record.

The specific gravity of the sample (for the 4°C water) is automatically calculated and displayed.

3-5-1 Switching the display at “Specific gravity mode”

1 **Push [F1-F4] keys to switch the display.**



3-6 Statistics mode

The statistical operation function collects weight data and indicates maximum, average, and other statistical values.

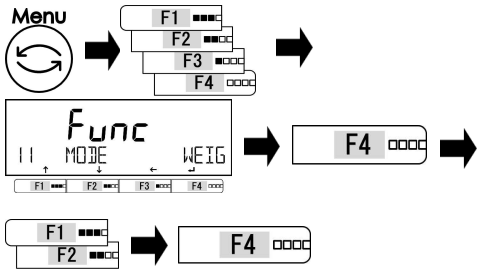
Legal Metrology This mode is not available.

Reference
(1) Only “mg” or “g” can be used.
(2) Each calculation result except “CV” follows the smallest readability among which are used to record the weighing data.
(3) Up to 999 weight data can be saved.

CAUTION The output timing is fixed to “Once at stable/immediately after [Output] key is pushed” regardless of the setting value of “413/423 CONDITION” of “6 External input/output function”.

The setting of “17 WT STABLE”	The output condition
ON	Once at stable after [Output] key is pushed
OFF	Once immediately after [Output] key is pushed

1 Select the statistics mode.

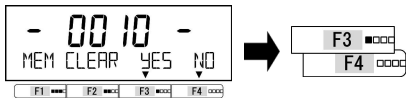


Push [Menu] key, then push [F1-F4] keys to go to <11 MODE>.
Push [F4] key to change the setting value.
Push [F4] key to select.
STAT: Statistics mode
Push [F4] key to fix.

2 Exit the setting menu.

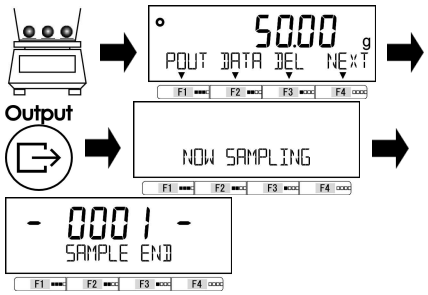
Push [Menu] key to shift to the statistics mode.

3 Choose whether or not clear all the data.



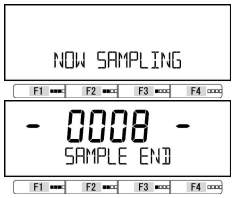
Push [F3/F4] key to select whether or not clear all the data.
When there is no data stored, this step is skipped.
YES : Clear
NO : Not clear
When <NO> is selected, weighing step of the next statistics data starts.

4 Store weighing data.



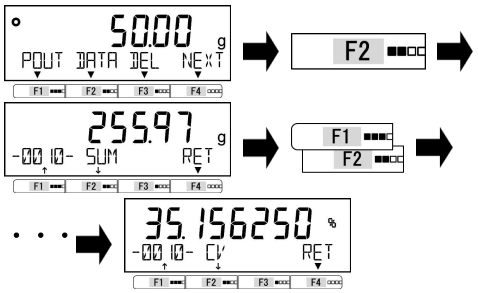
Place the sample in the weighing pan.
Push [Output] key to store the sample weight.
Weighing data is collected and then output.

5 **Collect more weighing data.**

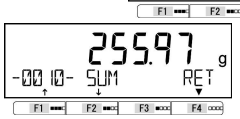


Store data in the same way as in step 4.
Repeat placing samples, storing data, and removing the samples until the required number of data items are collected.

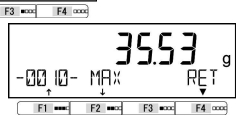
6 **Display the statistical operation result.**



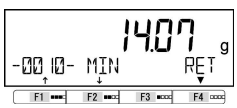
Push [F2] key (<DATA>).
The display changes to the statistical operation display
Push [F1/F2] key to switch to another calculated item.



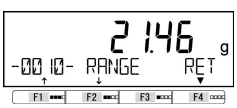
Sum total



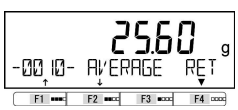
Maximum value



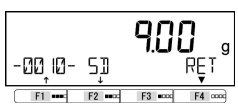
Minimum value



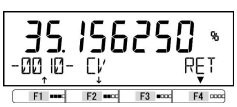
Range (Max – Min)



Average value



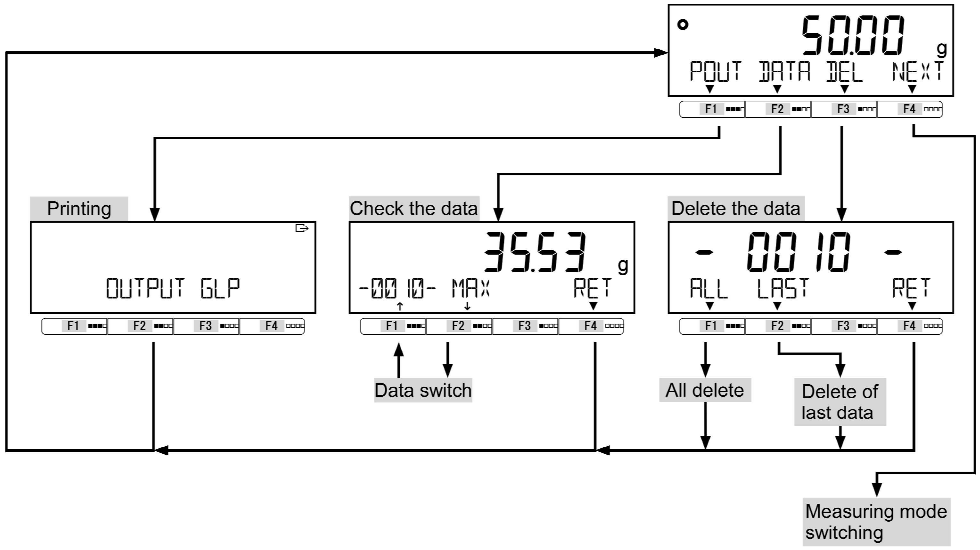
Standard deviation



Coefficient of variation

3-6-1 Switching the display at “Statistics mode”

1 **Push [F1-F4] keys to switch the display.**



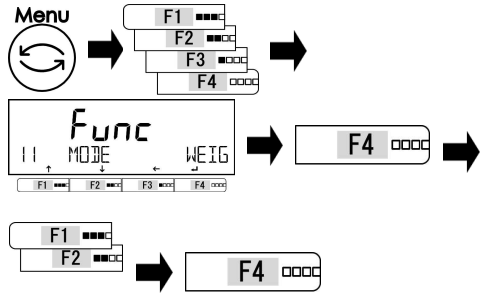
3-7 Animal mode

The balance can accurately weigh animals and other samples that move during measurement.
Even when animals and other samples move during measurement, when weight variations fit within the set value range, the indication is held (hold) and the measurement result can be read.

Legal Metrology This mode is not available.

Reference
When the external output is activated, the output condition is fixed as following;
(1) Output once after the indication is held except when the <HOLD> is pushed (step 4-b).
(2) Output once after the [Output] key is pushed during the indication is held.

1 Select the animal mode.

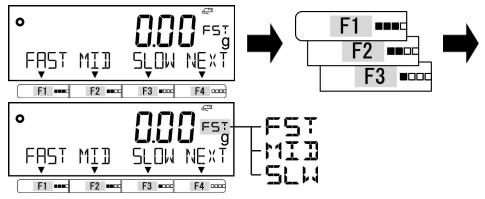


Push [Menu] key, then push [F1-F4] keys to go to <11 MODE>.
Push [F4] key to change the setting menu.
Push [F1/F2] key to select.
ANIM: Animal mode
Push [F4] key to fix.

2 Exit the setting menu.

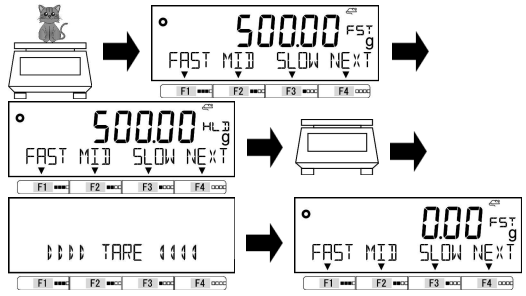
Push [Menu] key to shift to the animal mode.

3 Select the activity level .



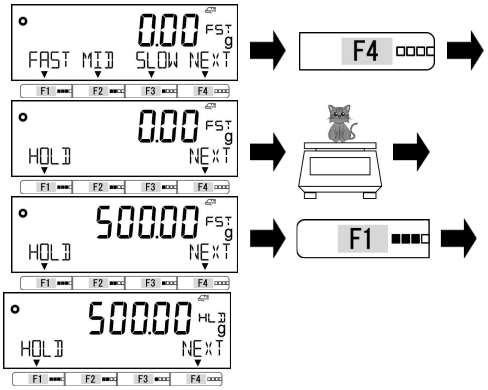
Push [F1-F3] keys to select.
FAST: Wild
MID: In-between
SLOW: Quiet

4 a) Weigh the animal.



Place the animal on the weighing pan.
After the weight variations fit within the set range, the weighing indication is held and <HLD> indication appears.
Remove the animal, then automatically tare subtracted.

4 **b) Weigh the animal using manual <HOLD> key.**



Push [F4] <NEXT> key to display the <HOLD> menu on [F1] key.

Place the animal on the weighing pan.

Push [F1] <HOLD> key, then the weighing indication is held and <HLD> indication appears.

Remove the animal, then automatically tare subtracted.

3-8 Formulation mode

"Formulation mode" can store and refer the weight of each component compounded.

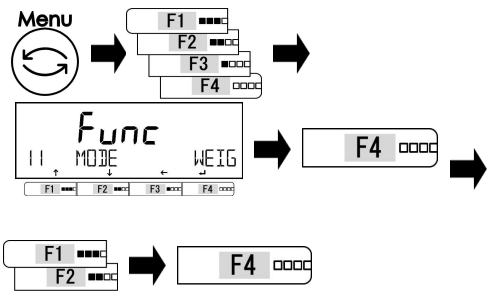
Legal Metrology This mode is not available.

Reference
(1) Only "mg" or "g" can be used.
(2) Up to 30 components can be stored.
(3) "Preset tare function" cannot be used.

CAUTION The output timing is fixed to "Once at stable/immediately after [Output] key is pushed" regardless of the setting value of "413/423 CONDITION" of "6 External input/output function".

The setting of "17 WT STABLE"	The output condition
ON	Once at stable after [Output] key is pushed
OFF	Once immediately after [Output] key is pushed

1 **Select the formulation mode.**



Push [Menu] key, then push [F1-F4] keys to go to <11 MODE>.

Push [F4] key to change the setting value.

Push [F1/F2] key to select.

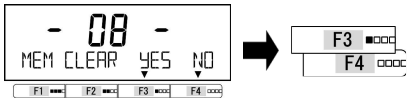
FORM: Formulation mode

Push [F4] key to fix.

2 **Exit the setting menu.**

Push [Menu] key to shift to the Formulation mode.

3 **Choose whether or not clear all the data.**

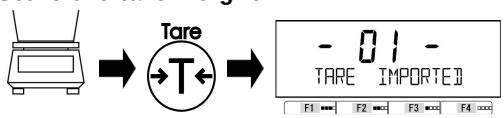


Push [F3/F4] key to select whether or not clear the data. When there is no data stored, this step is skipped.

<YES>: Clear
<NO>: Not clear

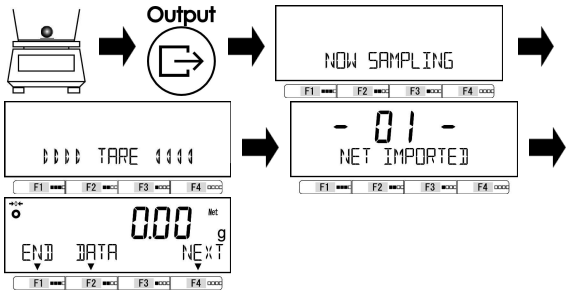
When <NO> is selected, weighing step of the next component starts.

4 **Store the tare weight.**



Load the tare and push [Tare] key to store the tare weight.

5 **Store the sample weight.**

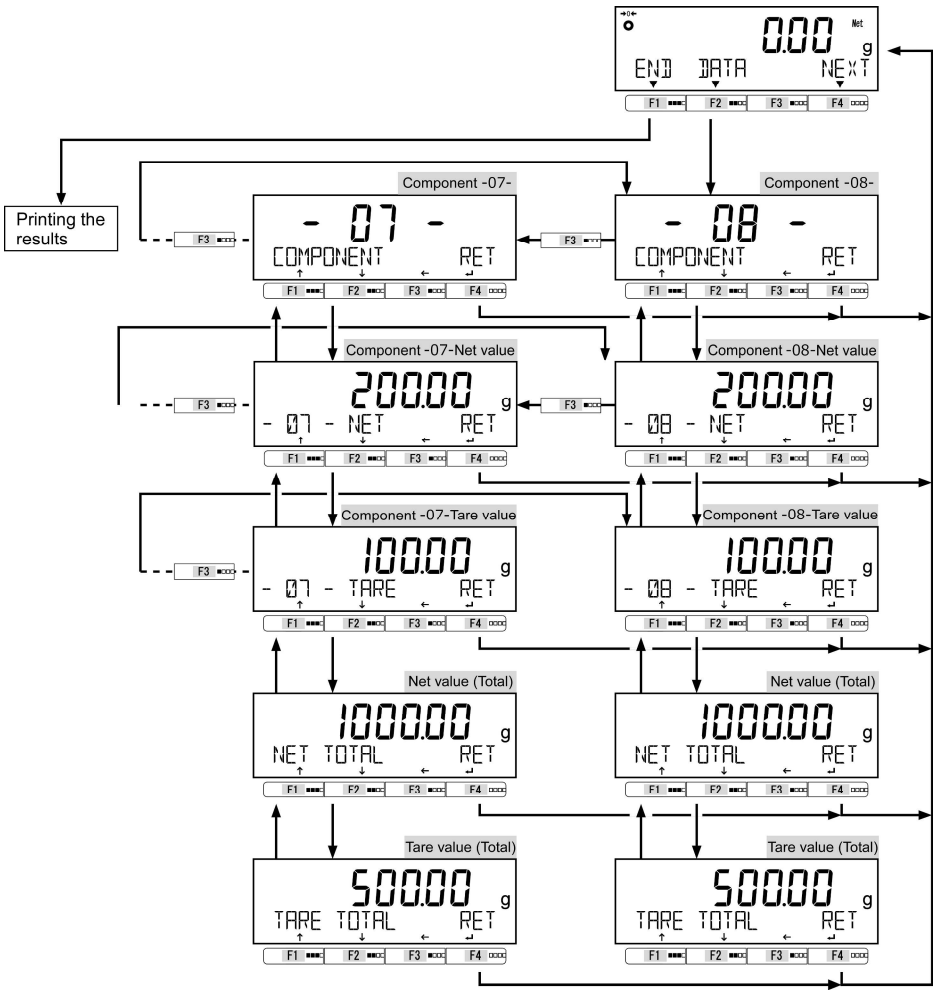


Put the sample on the tare and push [Output] key to store the sample weight.

Repeat the steps 4-5 for all the samples to be compounded.

3-8-1 Check the stored data of each component

1 **Push [F1-F4] keys to check the weight of each component.**

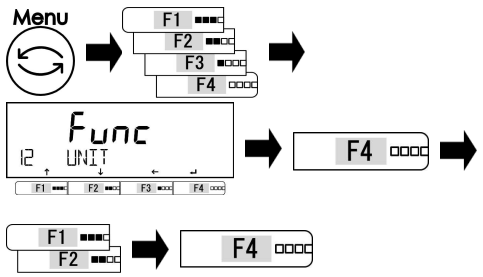


3-9 Unit setting

Various units can be selected. Please also refer to "Appendix 3 Unit conversion table" and "Appendix 4 Weighing capacity and readability by unit"

Legal Metrology	Only "g" and "ct" are available.

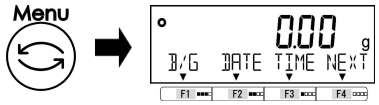
1 **Select the unit setting.**



Push [Menu] key, then push [F1-F4] keys to go to <12 UNIT>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select the unit (Refer to Unit Setting List).
Push [F4] key to fix.

Unit Setting List			
mg : milligram	g : gram	ct : carat	LB : pound
OZ : ounce	OZT : troy ounce	GN : grain	DWT : penny weight
MOM : momme	MSG : mesghal	TLH : Hong Kong tael	TLT : Taiwan tael
TLS : Singapore, Malaysia tael		TOLA : tola	BAT : baht

2 **Exit the setting menu.**



Push [Menu] key to shift to the measuring modes.

3-10 Comparator function

It is possible to preset threshold values (limits) and determine whether or not a measured value is within the range defined by the preset values.

Reference	The comparator function can be used in weighing mode, Percentage mode, Counting mode, and Multiplied by Coefficient mode.

3-10-1 How to perform discrimination

Set the lower and the upper limits. Then, whether the weight of a sample to be weighed is “LOW” (lower than the lower limit), “OK” (appropriate) or “HIGH” (higher than the upper limit), is indicated on the LCD with “16-segment messages”.

16-segment messages

LOW OK HIGH NEXT

Discrimination	Single point setting (lower limit)	Single point setting (upper limit)	Two-point setting (upper and lower limits)
Over the upper limit	< OK > Blinking	< HIGH > Blinking	< HIGH > Blinking
Appropriate amount	< OK > Blinking	< OK > Blinking	< OK > Blinking
Below the lower limit	< LOW > Blinking	< OK > Blinking	< LOW > Blinking

The discrimination is performed according to the following criteria:

- Absolute value: The discrimination is performed based on the upper and lower limit values that have been set in advance.
- Relative value: A reference numeric value is set in advance, and the discrimination is performed based on the range defined by the upper and lower limit values that have been set for the reference numeric value.

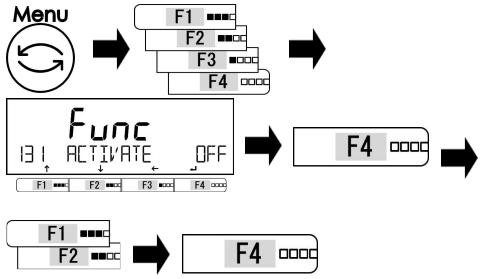
（For example） Two-point (upper and lower limits) setting, Reference value = 1000.00g, Lower limit value = 900.00 g, Upper limit value = 1200.00 g

Discrimination method	Reference value	Lower limit value	Upper limit value
	1000.00 g	900.00 g	1200.00 g
Absolute value		900.00 g	1200.00 g
Relative value	1000.00 g	-100.00 g	200.00 g

3-10-2 Comparator function setting

Reference For the setting of the reference value and upper and lower limit values, refer to “5 User information setting”.

1 **Select the comparator function.**



Push [Menu] key, then push [F1-F4] keys to go to <131 ACTIVATE>

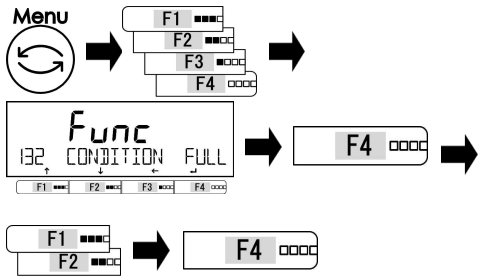
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

OFF: OFF
H / L: Upper and lower limits valid
HIGH: Upper limit alone valid
LOW: Lower limit alone valid

Push [F4] key to fix.

2 **Select the discriminant condition.**



Push [F1-F4] keys to go to <132 CONDITION>

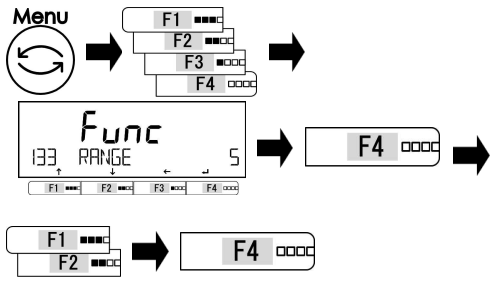
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

FULL: At all times
STBL: Only at stable times

Push [F4] key to fix.

3 **Select the discriminant range.**



Push [F1-F4] keys to go to <133 RANGE>

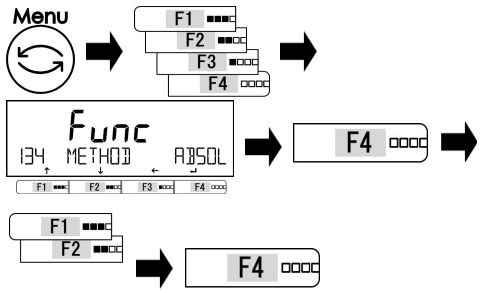
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

5: +5 (e/d) or more
50: +50 (e/d) or more
FULL: Entire area

Push [F4] key to fix.

4 **Select the discriminant method.**



Push [F1-F4] keys to go to <134 METHOD>

Push [F4] key to change the setting value.

Push [F1/F2] key to select.

ABSOL: Absolution value method
RELAT : Relative value method

Push [F4] key to fix.

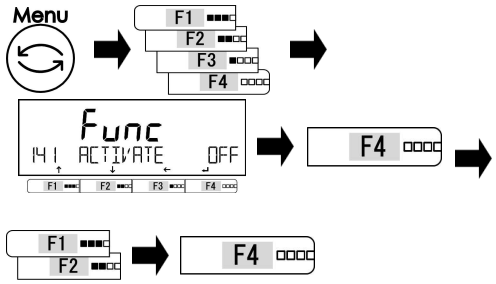
3-11 Adding function

Weigh a plurality of samples to be weighed in sequence and indicates its total value.
The adding function includes two ways of calculating method.

- Method of weighing samples to be weighed while replacing the samples: Addition accumulating function.
- Method of weighing samples to be weighed without replacing the samples: Net adding function.

Reference The adding function can be used in Weighing mode, Percentage mode, Counting mode, and Multiplied by Coefficient mode.

1 **Select the adding function.**



Push [Menu] key, then push [F1-F4] keys to go to <141 ACTIVATE>

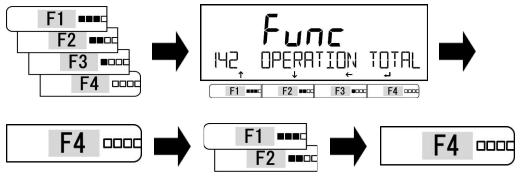
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

OFF: Invalid
ON: Valid

Push [F4] key to fix.

2 **Select the adding operation.**



Push [F1-F4] keys to go to <142 OPERATION>

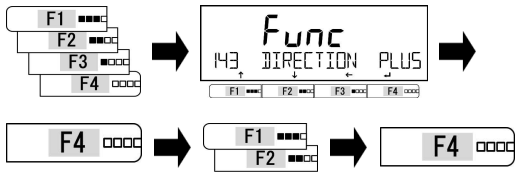
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

TOTAL: Addition accumulated
NET: Net addition

Push [F4] key to fix.

3 **Select the adding direction.**



Push [F1-F4] keys to go to <143 DIRECTION>

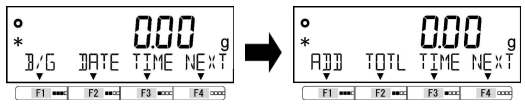
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

PLUS : Plus side addition
MINUS : Minus side addition

Push [F4] key to fix.

4 **Set the “Free key”.**



Set the following function to the <<F1-F6>> (Free keys).

<62* F* KEY ADD> : Adding execute
<62* F* KEY TOTL> : Total indication

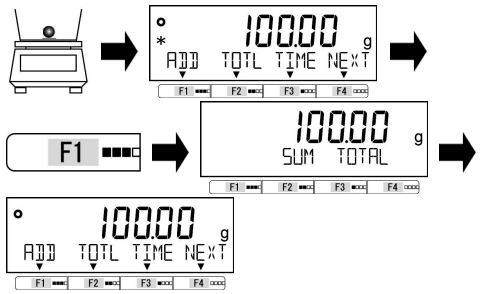
(Refer to “8 Controlling and adjustment functions” for setting the free keys.)

Reference Step 5 is required only when you are using an adding function on the weighing mode.

3-11-1 Weighing by means of the plus side addition

When <ADD> is assigned to [F1] key and <TOTL> is assigned to [F2] key.

1 **Place a first sample to be weighed.**

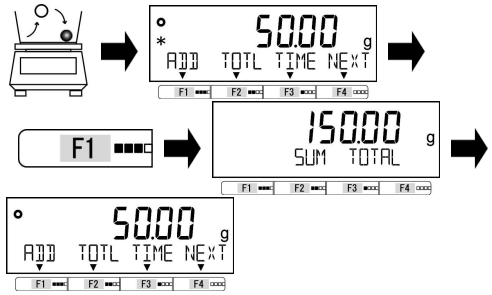


Place a first sample to be weighed.
After <✻> appears, push [F1] key.

The weighed value is stored and <ADDTION TOTAL> is indicated for a few seconds.

2 **In the case of the addition accumulating**

Replace a sample to be weighed with a new one.

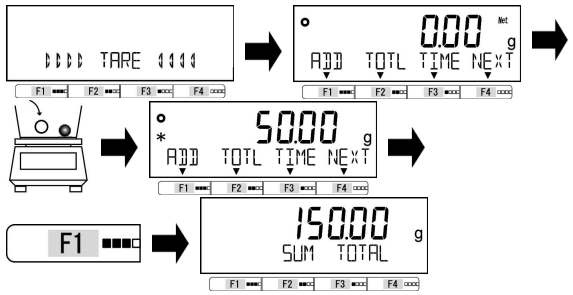


Remove the previous sample to be weighed to return the indication to zero and then place a next sample to be weighed.
After <✻> appears, push [F1] key.

The weighed value is stored and <ADDTION TOTAL> is indicated for a few seconds.
Repeat this operation to perform addition.

In the case of the net addition

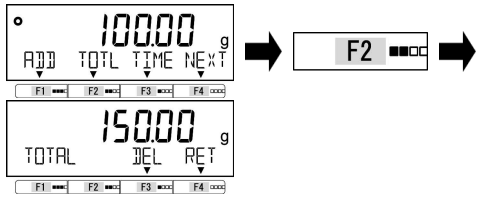
Add a sample to be weighed.



Add a sample to be weighed without doing any other operation.
After <✻> appears, push [F1] key.

After indicating <ADDTION TOTAL> and the accumulated value for a few seconds, the scale returns to the weight indication, followed by the automatic tare.
Repeat this operation to perform addition.

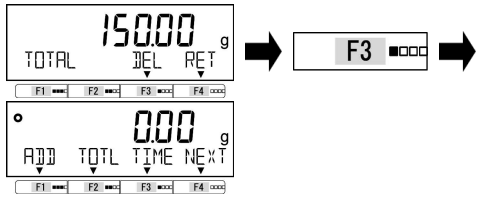
3 **Indicate the total value.**



Push [F2] key.

Total value is indicated.

4 **Delete the total value.**



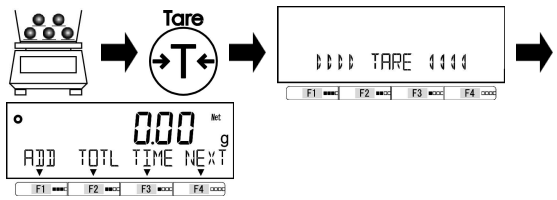
Push [F3] key.

The total value is deleted.

3-11-2 Weighing by means of the minus side addition

When <ADD> is assigned to [F1] key and <TOTL> is assigned to [F2] key.

1 **Place a sample to be weighed.**

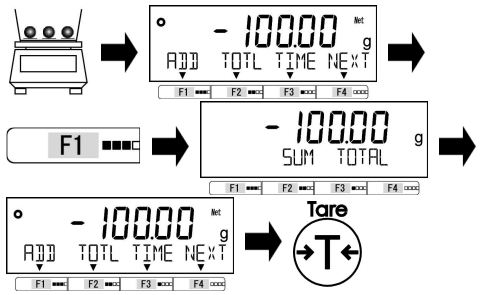


Place a sample to be weighed.

Push [Tare] key.

2 **In the case of the addition accumulating**

Remove the sample to be weighed and perform adding.



Remove the sample to be weighed.

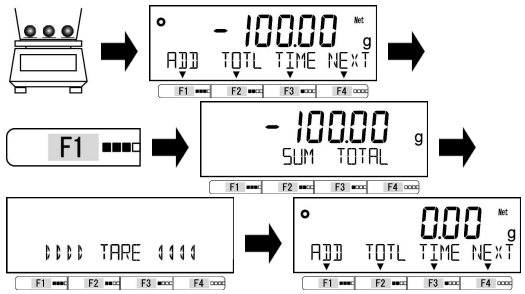
After <✳> appears, push [F1] key.

The weighed value is stored and <ADDTION TOTAL> is indicated for a few seconds.

Repeat this operation to perform addition.

3 **In the case of the net addition**

Remove the sample.



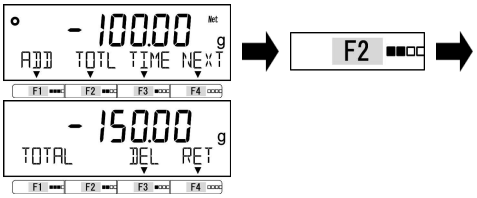
Remove the sample to be weighed.

After <✳> appears, push [F1] key.

After indicating <ADDTION TOTAL> and the accumulated value for a few seconds, the scale returns to the weight indication, followed by the automatic tare.

Repeat this operation to perform addition.

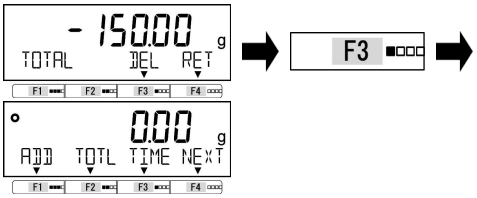
4 **Indicate the total value.**



Push [F2] key.

Total value is indicated.

5 **Delete the total value.**



Push [F3] key.

The total value is deleted.

3-12 Tare-subtraction reminder function

When the “tare-subtraction reminder” is activated, <PUSH TARE> alert is displayed when the tare (container) is loaded.

CAUTION	When the zero-point-adjustment reminder operates at the same time, the zero-point adjustment reminder has priority.

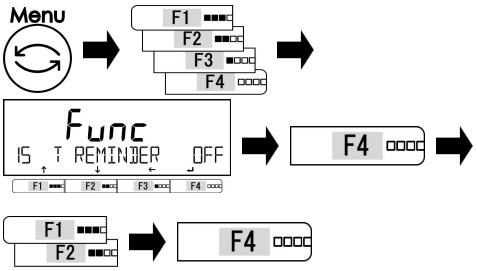
Reference

There are two modes in the tare-subtraction reminder function;

(1) 1 (Mode 1): <PUSH TARE> is indicated when the weighing indication is over the zero-point-adjustment range.

(2) 2 (Mode 2): <PUSH TARE> is indicated when the weighing indication is over the zero-point-adjustment range before tare subtraction, and when the net indication is negative after tare subtraction.

1 **Select the “tare-subtraction reminder function”.**



Push [Menu] key, then push [F1-F4] keys to go to <15 T REMINDER>.

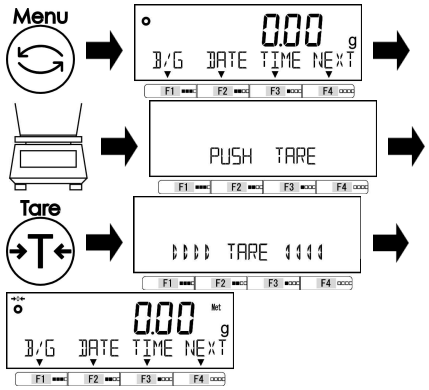
Push [F4] key to change the setting menu.

Push [F1/F2] key to select.

OFF : Invalid
1 : Activate the “Mode 1”
2 : Activate the “Mode 2”

Push [F4] key.

2 **Exit the setting menu and operate with "tare-subtraction reminder function".**



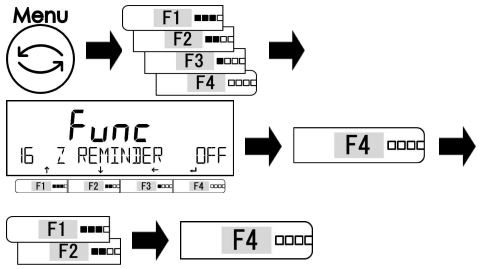
Push [Menu] key to exit the setting menu.

Place a tare (container) on the weighing pan, then <PUSH TARE> alert is displayed.
The alert disappears after [Tare] key is pushed and tare-subtraction is completed.
Therefore, the indication becomes zero and <Net> indication appears.

3-13 Zero-point-adjustment reminder function

When the "zero-point-adjustment reminder" is activated, <PUSH ZERO> alert is displayed when the load return to within the "zero-point adjustment range" after the load is once over the range.

1 **Activate the "zero-point-adjustment reminder".**



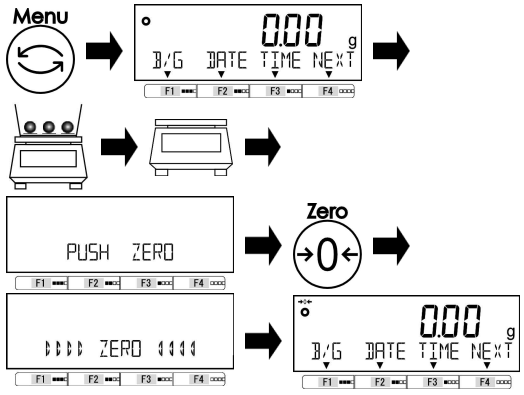
Push [Menu] key, then push [F1-F4] keys to go to <16 Z REMINDER>, and then push [F4] key to change the setting.

Push [F1/F2] key to select activate or disable the function.

OFF: Disable
ON: Activate

Push [F4] key to fix.

2 **Exit the setting menu and operate with "zero-point adjustment reminder".**



Push [Menu] key to exit the setting menu.

Put the samples on the weighing pan then remove it, then the <PUSH ZERO> alert is displayed.
The alert disappears after [Zero] key is pushed and zero-point adjustment is completed.

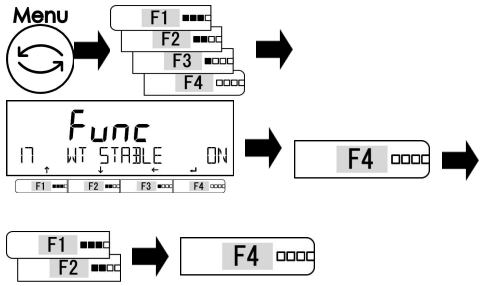
3-14 Stabilization wait setting

Set when to indicate the weighed value after the zero-point adjustment or tare; either after or before the weighed value stabilizes.

Legal Metrology

(1) This setting menu is not available.
(2) The balance always wait stabilization before indicating weighed value after the zero-point adjustment or tare.

1 **Select the stabilization wait setting.**

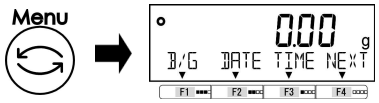


Push [Menu] key, then push [F1-F4] keys to go to <17 WT STABLE>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.

OFF: Invalid
ON: Valid

Push [F4] key to fix.

2 **Exit the setting menu.**

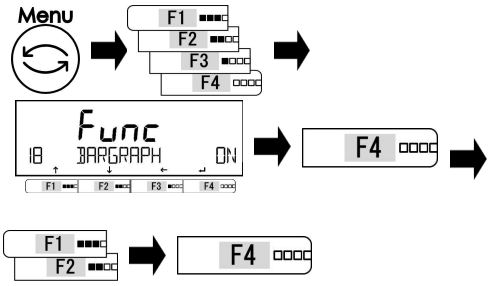


Push [Menu] key to shift to the measuring mode.

3-15 Bar graph indication

Set the indication/non-indication of the bar graph.

1 **Select the bar graph indication.**

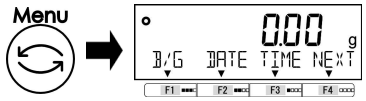


Push [Menu] key, then push [F1-F4] keys to go to <17 BARGRAPH>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.

OFF: Invalid
ON: valid

Push [F4] key to fix.

2 **Exit the setting menu.**

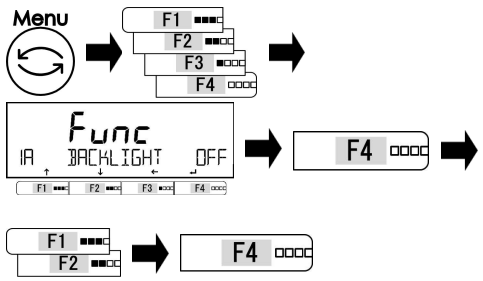


Push [Menu] key to shift to the measuring mode.

3-16 Backlight setting

Setting the backlight control.

1 **Select the backlight setting.**



Push [Menu] key, then push [F1-F4] keys to go to <1A BACKLIGHT>.

Push [F4] key to change the setting value.

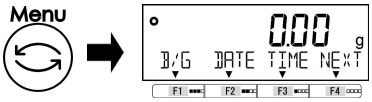
Push [F1/F2] key to select.

Refer to the “Set List”.

Push [F4] key to fix.

Set List		
OFF : Invalid	3MIN : 3 minutes	5MIN : 5 minutes
10MIN : 10 minutes	30MIN : 30 minutes	ON : Always ON

2 **Exit the setting menu.**

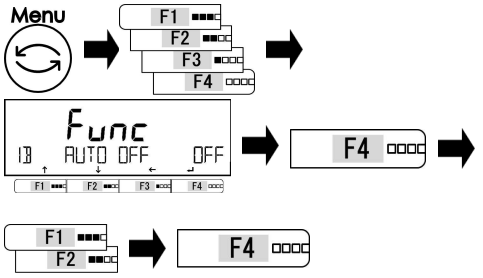


Push [Menu] key to shift to the measuring mode.

3-17 Auto power-off

This function is to automatically turn off the power for the balance.

1 **Select the auto power-off.**



Push [Menu] key, then push [F1-F4] keys to go to <1B AUTO OFF>.

Push [F4] key to change the setting value.

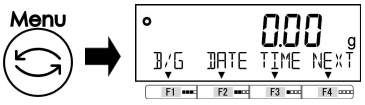
Push [F1/F2] key to select.

Refer to the “Set List”.

Push [F4] key to fix.

Set List		
OFF : Invalid	3MIN : 3 minutes	5MIN : 5 minutes
10MIN : 10 minutes	30MIN : 30 minutes	

2 **Exit the setting menu.**



Push [Menu] key to shift to the measuring mode.

Reference

The “Backlight setting” and “Auto power-off” function does not work under the following conditions:

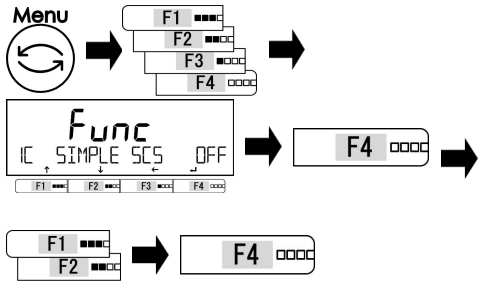
(1) Setting menu is being displayed.

(2) A sample is placed on the weighing pan and the display is not stable (<**o**> When not displayed.).

3-18 “Simple SCS(Self Counting System) method” setting

First, put a set number of samples in place. Next, put up to two times the set number of additional samples in place. The balance will automatically update the average sample weight. Repeating this step allows accurate counting.

1 **Select the simple SCS.**



Push [Menu] key, then push [F1-F4] keys to go to <1C SIMPLE SCS>.

Push [F4] key to change the setting value.

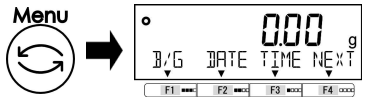
Push [F1/F2] key to select.

OFF: Invalid

ON: valid

Push [F4] key to fix.

2 **Exit the setting menu.**



Push [Menu] key to shift to the measuring mode.

4 Functions related to the performance

Set the balance indication stability and response speed.

4-1 Hierarchy of functions related to the performance

Legal Metrology : Not indicated.

★: Initial setting value

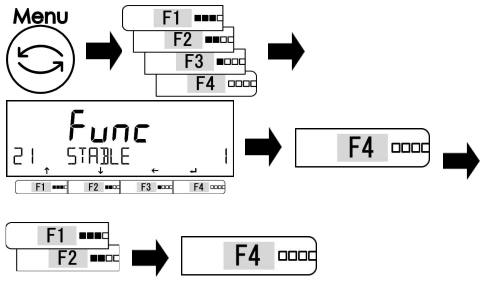
Functions related to the performance 2 PERFORMANCE			
Stability discrimination width 21 STABLE		0.5	0.5 d
	★	1	1 d
		2	2 d
		4	4 d
Response speed 22 RESPONSE		1	Fast
	★	2	Medium fast
		3	Medium
		4	Medium slow
		5	Slow
Zero tracking 23 ZERO TRAC		OFF	Invalid
	★	0.5	0.5 d
		1	1 d
		2	2 d
		4	4 d

4-2 Stability discrimination width

When the larger numeric value is set in this setting menu, the laxer stability judgment is applied and the balance indicate "Stable mark" <o> in more unstable conditions.

Legal Metrology <21 STABLE 2,4> cannot be selected.

1 **Select the stability discrimination width.**



Push [Menu] key, then push [F1-F4] keys to go to <21 STABLE>.

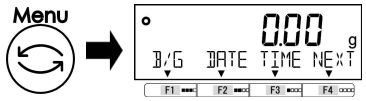
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

0.5: 0.5d
1: 1.0d
2: 2.0d
4: 4.0d

Push [F4] key to fix.

2 **Exit the setting menu.**

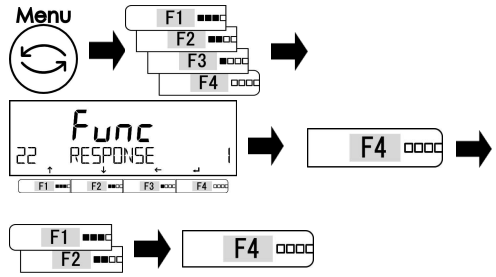


Push [Menu] key to shift to the measuring mode.

4-3 Response speed

The larger numeric value is set in this setting menu, the more stable the balance indication becomes in unstable conditions.

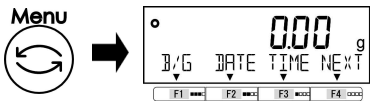
1 **Select the response speed.**



Push [Menu] key, then push [F1-F4] keys to go to <22 RESPONSE>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.
Refer to Set List.
Push [F4] key to fix.

Set list		
1 : Fast	2 : Medium fast	3 : Medium
4 : Medium slow	5 : Slow	

2 **Exit the setting menu.**



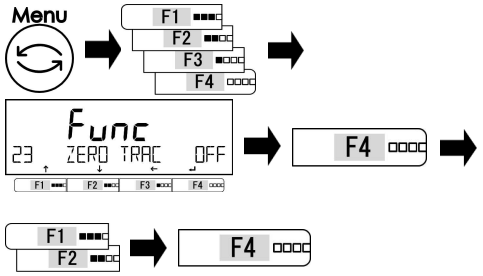
Push [Menu] key to shift to the measuring mode.

4-4 Zero tracking

Setting to the zero tracking function makes it possible to automatically correct the zero-point fluctuation caused by the temperature fluctuation, etc. when “0” is indicated, through which the “0” indication is maintained.

Legal Metrology	<23 ZERO TRAC 1, 2 and 4> cannot be selected.

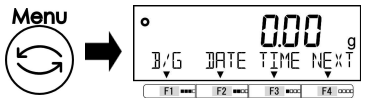
1 **Select the zero tracking.**



Push [Menu] key, then push [F1-F4] keys to go to <23 ZERO TRAC>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.
Refer to Set List.
Push [F4] key to fix.

Set list		
OFF : Invalid	0.5 : 0.5d	1 : 1d
2 : 2d	4 : 4d	

2 **Exit the setting menu.**



Push [Menu] key to shift to the measuring mode.

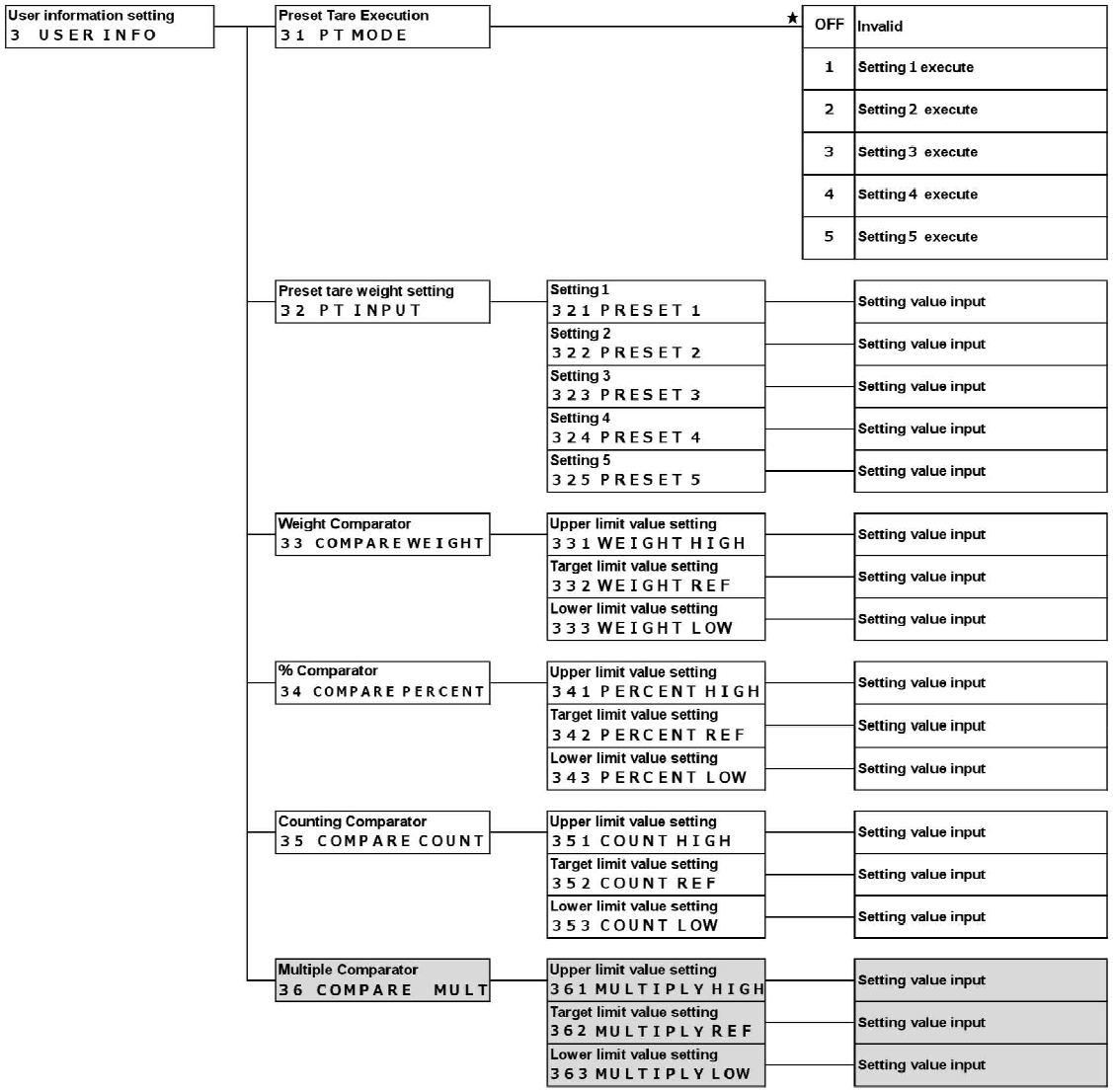
5 User information setting

Describes about setting items related to the comparator function and preset tare weight.

5-1 Hierarchy of user information setting

Legal Metrology : Not indicated.

★: Initial setting value

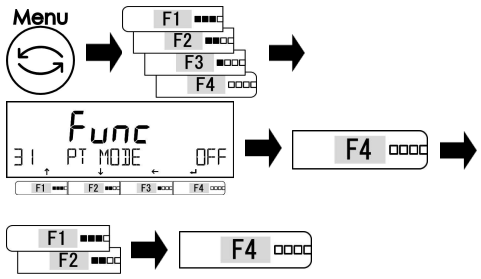


5-2 Preset tare

When using a tare whose tare weight is already known, the tare subtraction can be performed in advance by inputting its tare weight (preset tare weight). Five preset tare weight values can be registered.

5-2-1 Preset tare setting

1 **Select the Preset tare setting.**



Push [Menu] key, then push [F1-F4] keys to go to <31 PT MODE>.

Push [F4] key to change the setting value.

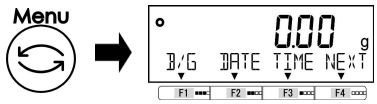
Push [F1/F2] key to select.

Refer to Set List.

Push [F4] key to fix.

Set list		
OFF : Invalid	1 : Setting 1 execute	2 : Setting 2 execute
3 : Setting 3 execute	4 : Setting 4 execute	5 : Setting 5 execute

2 **Exit the setting menu.**



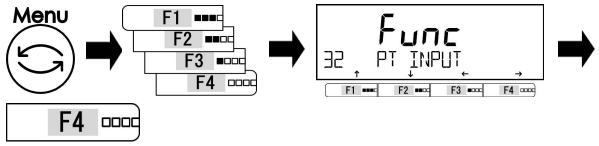
Push [Menu] key to shift to the measuring mode.

5-2-2 Inputting of a preset tare weight value

There are two ways of inputting a preset tare weight value. described below:

- Actual value setting method: Weighing a sample with a scale and then making it a setting value.
- Numeric value setting method: Inputting a setting value directly via key operation.

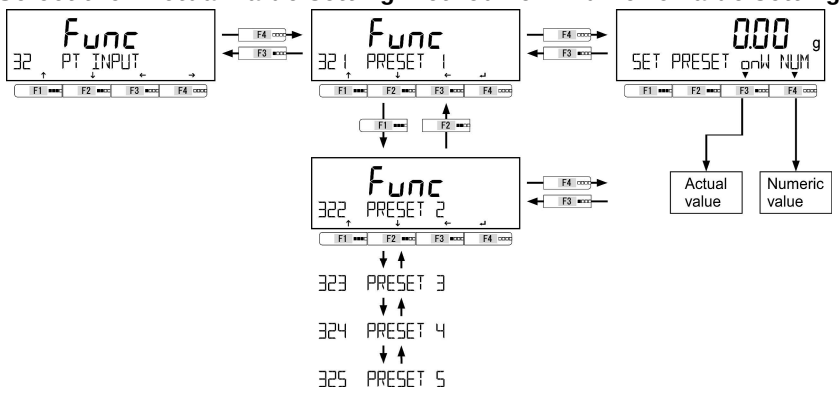
1 **Select the preset tare weight setting.**



Push [Menu] key, then push [F1-F4] keys to go to <32 PT INPUT>.

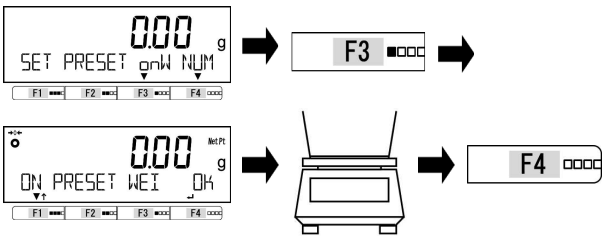
Push [F4] key.

2 **Select the "Actual value setting method" or "Numeric value setting method".**



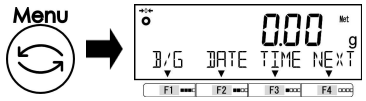
5-2-2 (1) Actual value setting method

1 **Set a preset tare weight value.**



Push [F3] key to select.
onW : Actual value
<Net Pt> is indicated.
Place a sample to be weighed that is equivalent to the tare weight value.
Push [F4] key to fix.
The preset tare weight value is stored.

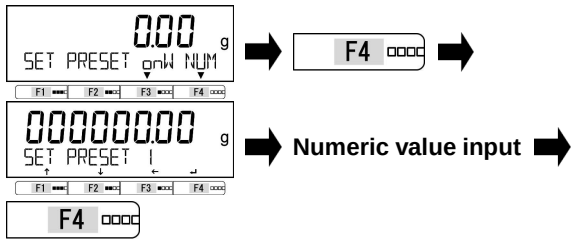
2 **Exit the setting menu.**



Push [Menu] key to shift to the measuring mode.
<Net Pt> is indicated.

5-2-2 (2) Numeric value setting method

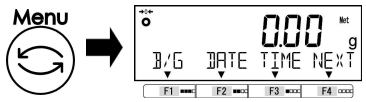
1 **Set a preset tare weight value.**



(Refer to “2-5-3 Numeric value input”)

Push [F4] key to select.
NUM : Numeric value
Input the preset tare value.
Push [F4] key to fix.
The preset tare weight value is stored.

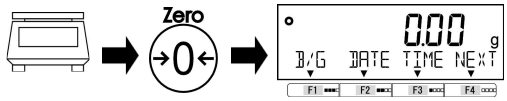
2 **Exit the setting menu.**



Push [Menu] key to shift to the measuring mode.
<Net Pt> is indicated.

5-2-2 (3) Exiting the preset tare mode

1 **To exit the preset tare mode.**



Make sure that nothing is placed on the weighing pan.
Push [Zero] key.
Then <Net Pt> disappears and the preset tare mode has exited.

5-3 Setting of the discrimination value of the comparator function

There are two ways of inputting a reference value and upper and lower limit values as described below:

- Actual value setting method: Weighing a sample with a scale and then making it a setting value.
- Numeric value setting method: Inputting a setting value directly via key operation.

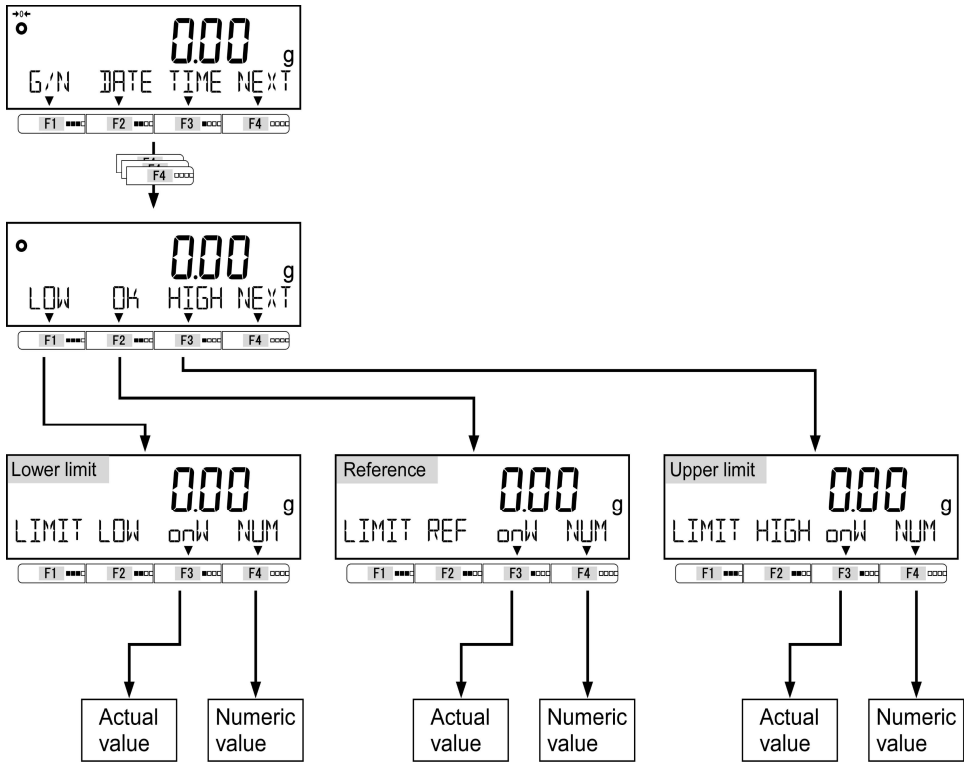
The discrimination is performed according to the following criteria:

- Absolute value: The discrimination is performed based on the upper and lower limit values that have been set in advance.
- Relative value: A reference numeric value is set in advance, and the discrimination is performed based on the range defined by the upper and lower limit values that have been set for the reference numeric value.

（For example） Two-point (upper and lower limits) setting, Reference value = 1000.00g, Lower limit value = 900.00 g, Upper limit value = 1200.00 g

Discrimination method	Reference value	Lower limit value	Upper limit value
	1000.00 g	900.00 g	1200.00 g
Absolute value		900.00 g	1200.00 g
Relative value	1000.00 g	-100.00 g	200.00 g

1 **Select the “Actual value setting method” or “Numeric value setting method”.**



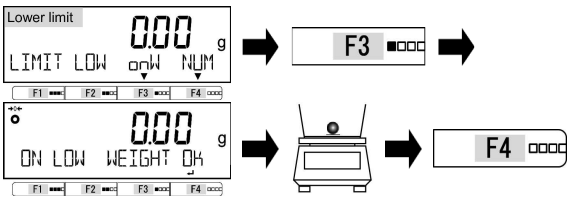
Reference

(1) Reference value, Lower limit value and Upper limit value can be set also via Setting menu below.
- Comparator setting for Weighing mode: 33 COMPARE WEIGHT
- Comparator setting for Percentage mode:34 COMPARE PERCENT
- Comparator setting for Counting mode:35 COMPARE COUNT
- Comparator setting for Multiplied by Coefficient mode:36 COMPARE MULT

(2) Comparator function is available in Weighing mode, Percentage mode, Counting mode and Multiplied by Coefficient mode.

5-3-1 Actual value setting method

1 **Set a lower limit value.**



Push [F3] key to select.

onW : Actual value

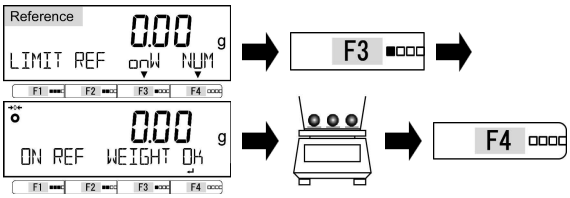
Place a sample to be weighed that is equivalent to the lower limit value.

Push [F4] key to fix.

The lower limit value is recorded.

2 **Set a reference value.**

(In the case of the relative value discrimination)



Push [F3] key to select.

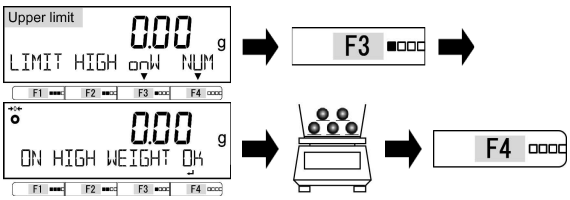
onW : Actual value

Place a sample to be weighed that is equivalent to the reference limit value.

Push [F4] key to fix.

The reference value is recorded.

3 **Set an upper limit value.**



Push [F3] key to select.

onW : Actual value

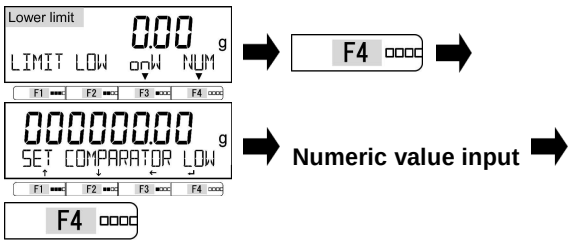
Place a sample to be weighed that is equivalent to the upper limit value.

Push [F4] key to fix.

The upper limit value is recorded.

5-3-2 Numeric value setting method

1 **Set a lower limit value.**

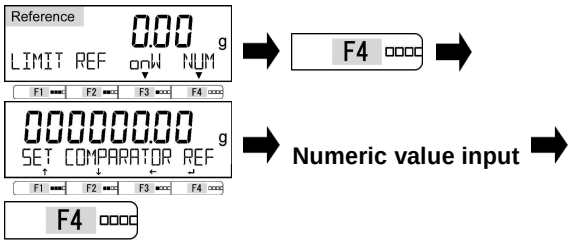


Push [F4] key to select.
NUM : Numeric value
Input the lower limit value.
Push [F4] key to fix.
The lower limit value is saved.

(Refer to “2-5-3 Numeric value input”)

2 **Set a reference value.**

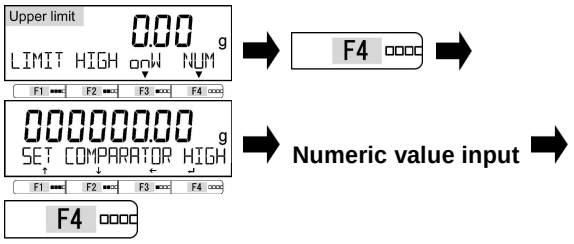
(In the case of the relative value discrimination)



Push [F4] key to select.
NUM : Numeric value
Input the reference value.
Push [F4] key to fix.
The reference value is saved.

(Refer to “2-5-3 Numeric value input”)

3 **Set an upper limit value.**



Push [F4] key to select.
NUM : Numeric value
Input the upper limit value.
Push [F4] key to fix.
The upper limit value is saved.

(Refer to “2-5-3 Numeric value input”)

6 External input/output functions

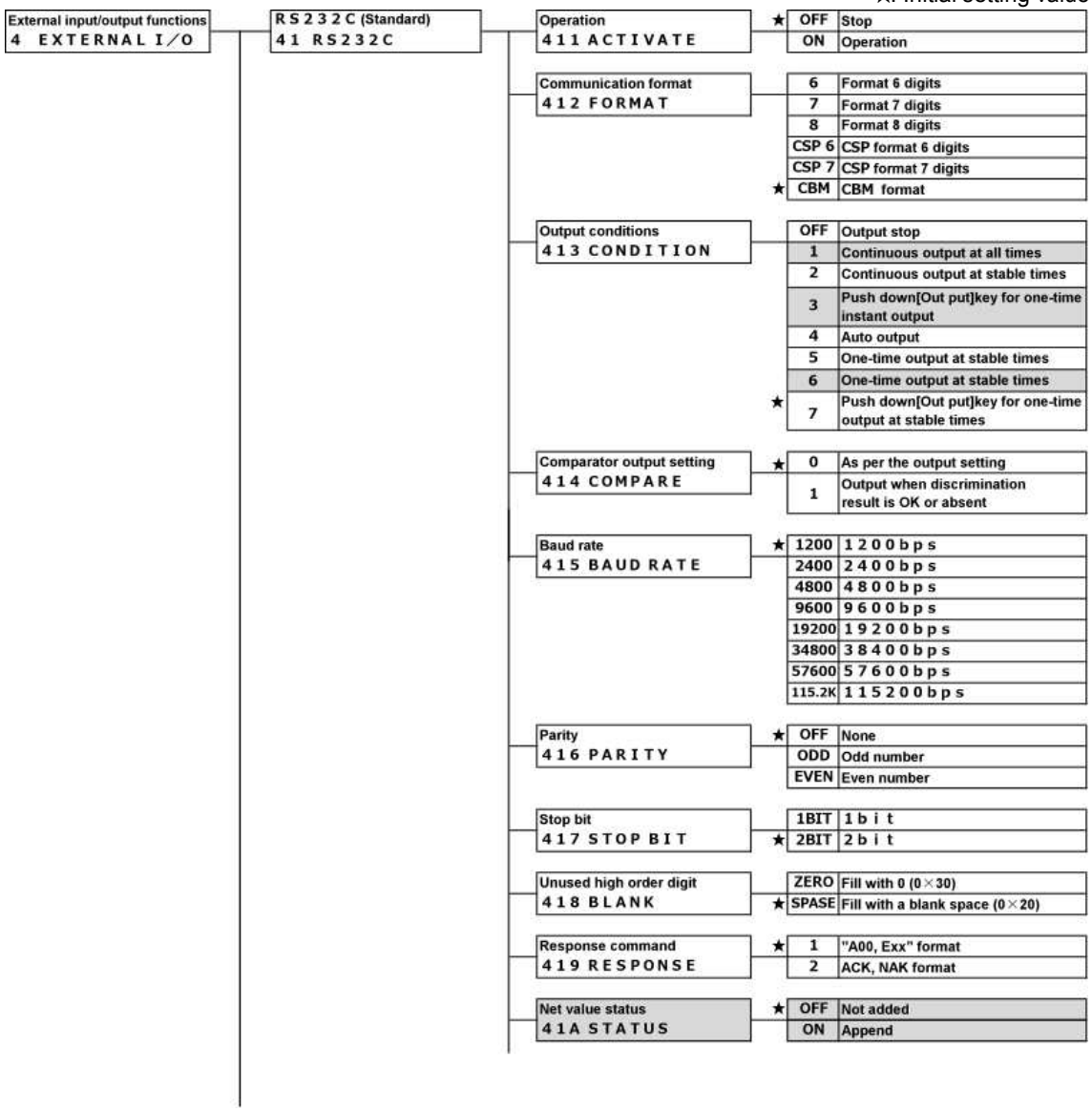
This function is used for communication through the external peripheral devices. There are RS-232C (D-SUB 9P) and USB (Type B) interface as standard equipment, and each interface slot for option.

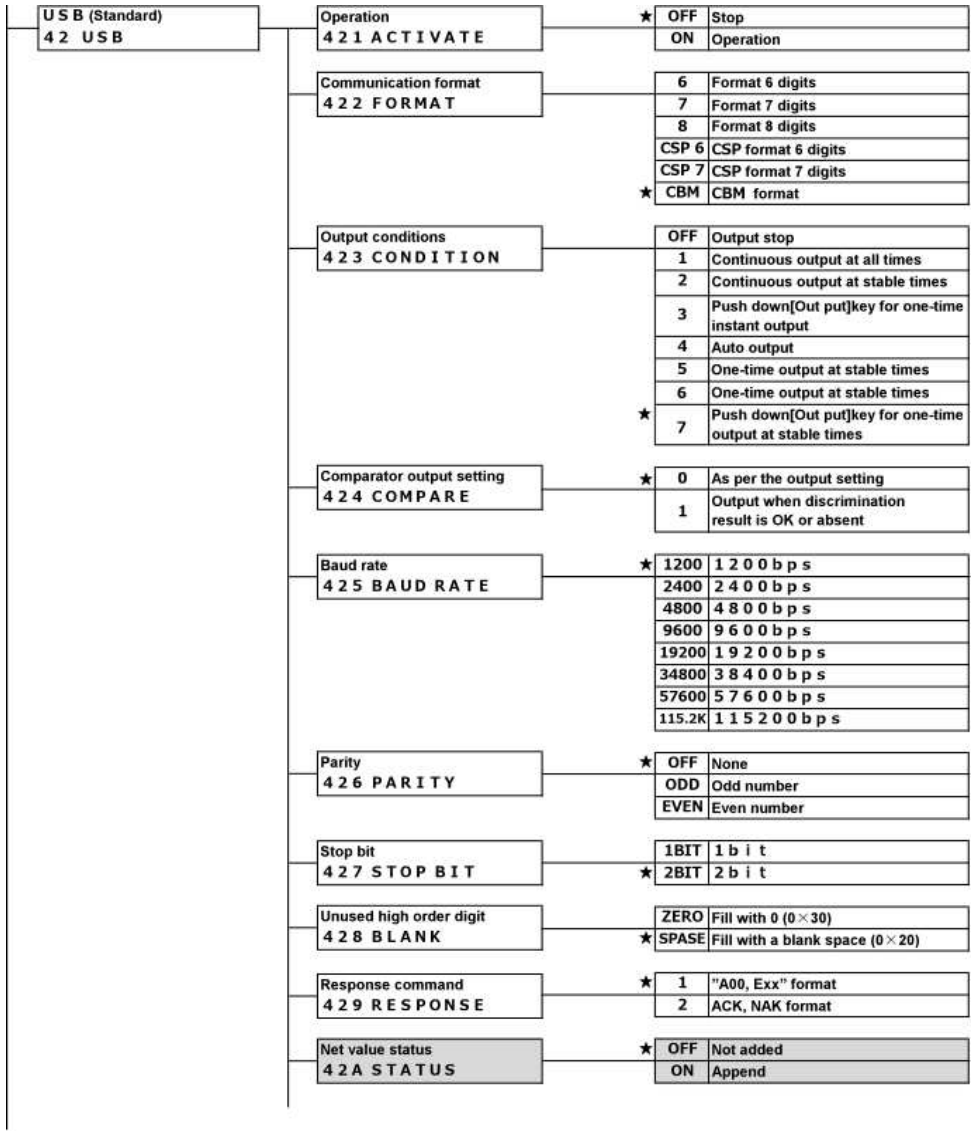
6-1 Hierarchy of the external input / output functions

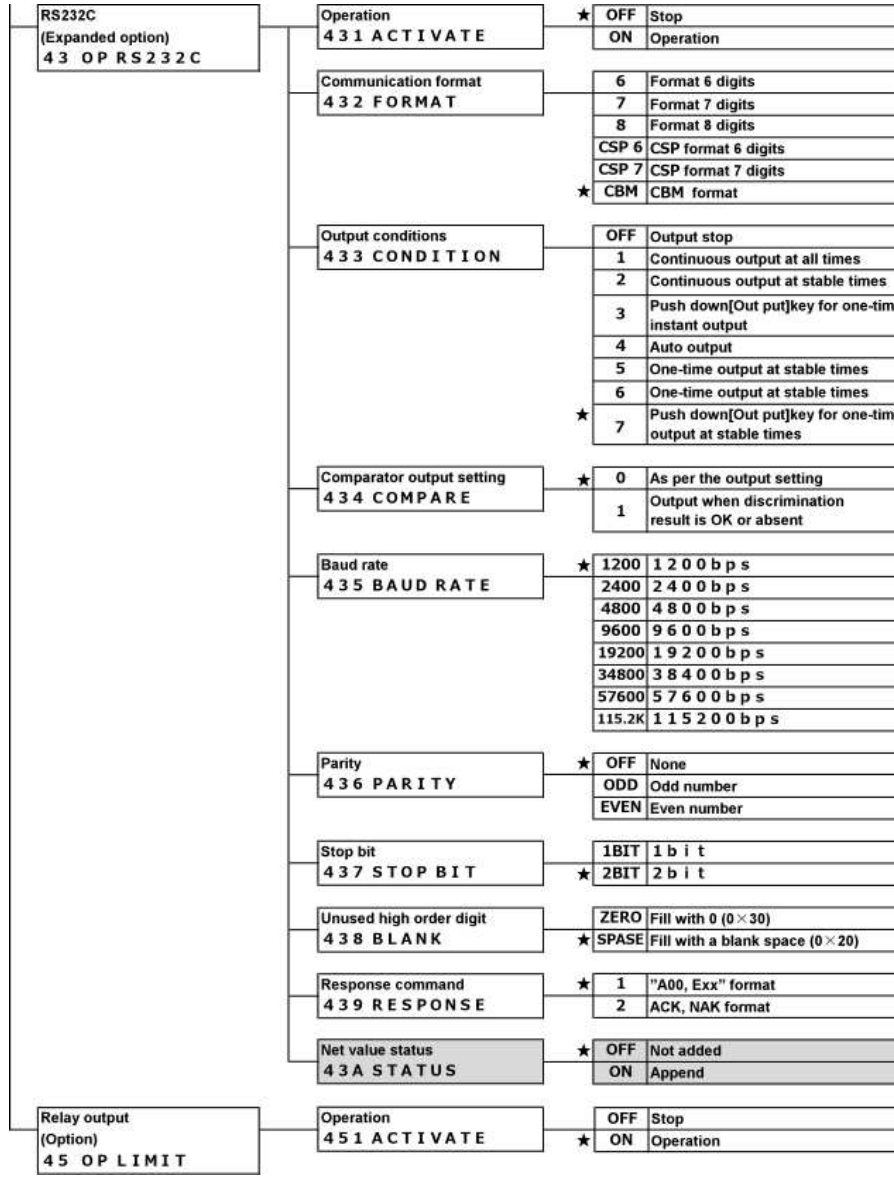
Reference
- <43 OP RS232C> settings except <434 COMPARE> are valid only for the product with "Extension RS232C option" or "Ethernet option".
- <44 OP RELAY> setting is valid only for the product with "Relay Contact option".

Legal Metrology
: Not indicated.
(1) <41A/42A/43A STATUS>: ON.
(2) <433 CONDITION 1,3,6>: Not indicated only when Extension RS232C option is connected.

★: Initial setting value



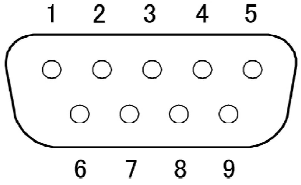

USB (Standard)
42 USB
Operation
421 ACTIVATE
★ OFF Stop
ON Operation
Communication format
422 FORMAT
6 Format 6 digits
7 Format 7 digits
8 Format 8 digits
CSP 6 CSP format 6 digits
CSP 7 CSP format 7 digits
★ CBM CBM format
Output conditions
423 CONDITION
OFF Output stop
1 Continuous output at all times
2 Continuous output at stable times
3 Push down[Out put]key for one-time instant output
4 Auto output
5 One-time output at stable times
6 One-time output at stable times
★ 7 Push down[Out put]key for one-time output at stable times
Comparator output setting
424 COMPARE
★ 0 As per the output setting
1 Output when discrimination result is OK or absent
Baud rate
425 BAUD RATE
★ 1200 1200bps
2400 2400bps
4800 4800bps
9600 9600bps
19200 19200bps
34800 38400bps
57600 57600bps
115.2K 115200bps
Parity
426 PARITY
★ OFF None
ODD Odd number
EVEN Even number
Stop bit
427 STOP BIT
1BIT 1bit
★ 2BIT 2bit
Unused high order digit
428 BLANK
ZERO Fill with 0 (0×30)
★ SPASE Fill with a blank space (0×20)
Response command
429 RESPONSE
★ 1 "A00, Exx" format
2 ACK, NAK format
Net value status
42A STATUS
★ OFF Not added
ON Append


RS232C
(Expanded option)
43 OP RS232C
Operation
431 ACTIVATE
★ OFF Stop
ON Operation
Communication format
432 FORMAT
6 Format 6 digits
7 Format 7 digits
8 Format 8 digits
CSP 6 CSP format 6 digits
CSP 7 CSP format 7 digits
★ CBM CBM format
Output conditions
433 CONDITION
OFF Output stop
1 Continuous output at all times
2 Continuous output at stable times
3 Push down[Out put]key for one-time instant output
4 Auto output
5 One-time output at stable times
6 One-time output at stable times
★ 7 Push down[Out put]key for one-time output at stable times
Comparator output setting
434 COMPARE
★ 0 As per the output setting
1 Output when discrimination result is OK or absent
Baud rate
435 BAUD RATE
★ 1200 1200bps
2400 2400bps
4800 4800bps
9600 9600bps
19200 19200bps
34800 38400bps
57600 57600bps
115.2K 115200bps
Parity
436 PARITY
★ OFF None
ODD Odd number
EVEN Even number
Stop bit
437 STOP BIT
1BIT 1bit
★ 2BIT 2bit
Unused high order digit
438 BLANK
ZERO Fill with 0 (0×30)
★ SPASE Fill with a blank space (0×20)
Response command
439 RESPONSE
★ 1 "A00, Exx" format
2 ACK, NAK format
Net value status
43A STATUS
★ OFF Not added
ON Append
Relay output
(Option)
45 OP LIMIT
Operation
451 ACTIVATE
OFF Stop
★ ON Operation

6-2 Standard RS-232C Connecter terminal numbers and their functions

The RS-232C connector pin alignment for this product is as shown below:

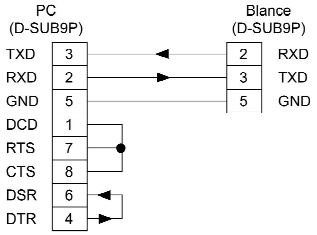
D-SUB9P male connector
Cable fixing screw : No.4-40 UNC



Terminal no	Signal name	Input/output	Function
1	—	—	—
2	RXD	Input	Receiving data
3	TXD	Output	Transmitting data
4	DTR	Output	HIGH (When the balance is powered ON)
5	GND	—	Signal grounding
6	—	—	—
7	—	—	—
8	—	—	—
9	EXT. TARE	Input	External tare range setting

Reference

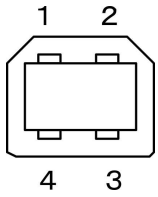
(1) Use the following examples as a guide to connect the balance to external devices using the cable.
- Sample connection with a PC/AT compatible machine



(2) D-sub9P Connecter can set a tare range or adjust the zero-point from an external device by connecting a contact or a transistor switch between the pin for externally setting a tare range (Pin 9) and the signal ground pin (Pin 5).
When doing so, allow at least 400 ms for connection (ON) time (Maximum voltage: 15 V when the balance is turned OFF, sink current: 20 mA when it is turned ON).

6-3 Standard USB Connecter terminal numbers and their functions

The USB (Type B) connector pin alignment for this product is as shown below:



Terminal no.	Signal name	Function
1	V_{BUS}	Bus power input Rating: 4.75 V - 5.25 V
2	D−	Data signal
3	D+	Data signal
4	GND	Signal grounding

6-4 Communication format

6-4-1 Basic communication specification

Items		Description
Communication method		RS-232C: Full-duplex communication method USB: Half-duplex communication method
Synchronization method		Asynchronous communication method
Electrical specification		RS-232C: EIA-232-D/E USB: USB2.0
Baud rate		1200/2400/4800/9600/ 19200/38400/57600/115200bps
Transmission code Composition	Start bit	1 bit
	Parity bit	None/Odd number/Even number
	Data bit	8 bit
	Stop bit	1 bit/2 bit

6-4-2 Basic data output format

- 6-digit numeric format

Consists of 14 characters, including terminators (CR=0xDH/LF=0xAH).

1	2	3	4	5	6	7	8	9	10	11	12	13	14
P1	D1	D2	D3	D4	D5	D6	D7	U1	U2	S1	S2	CR	LF

- 7-digit numeric format

Consists of 15 characters, including terminators (CR=0xDH/LF=0xAH).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P1	D1	D2	D3	D4	D5	D6	D7	D8	U1	U2	S1	S2	CR	LF

- 8-digit numeric format

Consists of 16 characters, including terminators (CR=0xDH/LF=0xAH).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
P1	D1	D2	D3	D4	D5	D6	D7	D8	D9	U1	U2	S1	S2	CR	LF

Reference Date bit: 8 bit, Parity bit/Stop bit: Can be changed.

6-4-3 Meaning of the data

Symbol		Code		Description
[P1] (one character) Indicates the polarity of data.				
+		0x2B		Zero or positive data
-		0x2D		Negative data
[D1 to D7/D8/D9] (seven or eight or nine characters) Stores numeric data.				
0－9		0x30－0x39		0 to 9(numeric)
.		0x2E		- Decimal point (floating)
(SP)		0x20		- A space at the top of a numeric value - Output to the least significant digit in the absence of a decimal point - Unused high-order digit
[U1, U2] (two characters) Indicates the unit used to show numeric data.				
M	G	0x4D	0x47	mg (milligram)
(SP)	G	0x20	0x47	g (gram) ct
C	T	0x43	0x54	(carat)
M	O	0x4D	0x4F	mom (momme)
O	Z	0x4F	0x5A	oz (ounce)
L	B	0x4C	0x42	lb (pound)
O	T	0x4F	0x54	ozt (troy ounce)
D	W	0x44	0x57	dwt (penny weight)
G	R	0x47	0x52	GN (grain)
T	L	0x54	0x4C	tlH (Hong Kong tael)
T	L	0x54	0x4C	tlS (Singapore, Malaysia tael)
T	L	0x54	0x4C	tlT (Taiwan tael)
t	o	0x74	0x6F	to (tola)
M	S	0x4D	0x53	MSG (mesghal
B	A	0x42	0x41	BAt (baht)
P	C	0x50	0x43	PCS (parts counting)
(SP)	%	0x20	0x25	% (percentage weighing)
(SP)	#	0x20	0x23	# (Multiplied by Coefficient)
[S1] (one character) Indicates the judgment result when the limit function is used.				
L		0x4C		Shortage（LOW）
G		0x47		proper（OK）
H		0x48		Over（HIGH）
(SP)		0x20		No judgment result or data type specified
e		0x65		Net weight
f		0x66		Tare weight
P		0x50		Preset tare weight
T		0x54		Total value (Accumulated value)
U		0X55		Unit weight
d		0x64		Gross
[S2] (one character) Indicates the status.				
S		0x53		Data stable
U		0x55		Date unstable
E		0x45		Data error (Indicates that data other than S2 is invalid)
(SP)		0x20		No status specified

6-4-4 CBM data output format

Composed of 26 characters including a terminator (CR=0xDH/LF=0xAH)
(Date bit: 8 bit, Parity bit/Stop bit: Can be changed.)

1	2	3	4	5	6	7	8	9	10	11	12	13	(SP): space
S1	C1	(SP)	T1	T2	T3	T4	T5	T6	D1	D2	D3	D4	
14	15	16	17	18	19	20	21	22	23	24	25	26	
D5	D6	D7	D8	D9	D10	D11	D12	U1	U2	(SP)	CR	LF	

ERROR

1	2	3	4	5	6	7	8	9	10	11	12	13	(SP): space
*	*	(SP)	E	R	R	O	R	(SP)	*	*	*	*	
14	15	16	17	18	19	20	21	22	23	24	25	26	
*	*	*	*	*	*	*	*	*	*	(SP)	CR	LF	

6-4-5 Meaning of the data

Symbol	Code	Description
[S1] (1 character) Represents the status.		
(SP)	0x20	Data stable
*	0x2A	Data unstable
[C1] (1 character) Represents the result of comparator function.		
(SP)	0x20	Comparator result: Proper(OK) or No result
H	0x48	Over(HIGH)
L	0x4C	Shortage(LOW)

[T1-T6] (6 characters) Represents the type of the data.

(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	0x20	0x20	0x20	0x20	0x20	0x20	Net weight (not tared)
N	E	T	(SP)	(SP)	(SP)	0x4E	0x45	0x54	0x20	0x20	0x20	Net weight (tared)
P	T	(SP)	(SP)	(SP)	(SP)	0x50	0x54	0x20	0x20	0x20	0x20	Preset tare weight
T	A	R	E	(SP)	(SP)	0x54	0x41	0x52	0x45	0x20	0x20	Tare weight
T	O	T	A	L	(SP)	0x54	0x4F	0x54	0x41	0x4C	0x20	Total value (Accumulated value)
G	R	O	S	S	(SP)	0x47	0x52	0x4F	0x53	0x53	0x20	Gross
U	N	I	T	(SP)	(SP)	0x55	0x4E	0x49	0x54	0x20	0x20	Unit weight

[D1-D12] (12 characters) Numeric value data is stored.		
+	0x2B	When the data are 0 or positive
-	0x2D	When the data are negative
0 – 9	0x30 – 0x39	Numeric value (0 – 9)
.	0x2E	Decimal point (floating decimal point)
[	0x5B	The number surrounded by '[' and ']' means auxiliary indication
]	0x5D	
(SP)		- Spaces fill the top of the data. - Output to the least significant digit in the absence of a decimal point - Unused high-oder digit

Symbol		Code		Description	
[U1, U2] (2 characters) Represents the unit of numeric value data.					
M	G	0x4D	0x47	mg	(milligram)
(SP)	G	0x20	0x47	g	(gram)
C	T	0x43	0x54	ct	(carat)
M	O	0x4D	0x4F	mom	(momme)
O	Z	0x4F	0x5A	oz	(ounce)
L	B	0x4C	0x42	lb	(pound)
O	T	0x4F	0x54	ozt	(troy ounce)
D	W	0x44	0x57	dwt	(penny weight)
G	R	0x47	0x52	GN	(grain)
T	L	0x54	0x4C	tlH	(Hong Kong tael)
T	L	0x54	0x4C	tlS	(Singapore, Malaysia tael)
T	L	0x54	0x4C	tlT	(Taiwan tael)
t	o	0x74	0x6F	to	(tola)
M	S	0x4D	0x53	MSG	(mesghal)
B	A	0x42	0x41	BAt	(baht)
P	C	0x50	0x43	PCS	(parts counting)
(SP)	%	0x20	0x25	%	(percentage weighing)
(SP)	#	0x20	0x23	#	(Multiplied by Coefficient)

6-5 Input command

6-5-1 Transmission procedure

1 Send an input command from an external device to the balance.

The table below shows the enable/disable of input commands in each measuring mode.

	Commands		
Measuring mode	Zero-point adjustment, Tare subtraction, Date/Time output	Output control, Comparator setting, Preset tare setting, Interval time setting	External contact input
Weighing	x	x	x
Counting	x	x	x
Percentage	x	x	x
Multiply	x	x	x
Specific gravity	x	-	x
Statistics	x	-	x
Animal	x	-	x
Formulation	-	-	-

2 Upon successful completion of an input command, the balance will send either a normal completion response or the result data requested by the command to the external device.

- If the operation has not resulted in successful completion, or if the command is invalid (an error), the balance will transmit an error response.
- When the balance is in normal display mode, it usually sends a response to a command within one second of receiving the command. For the tare range, span adjustment or span test commands, a response is sent after the commands are completely processed.

CAUTION

(1) After you have sent an input command, the balance return the response command approximately in 1 second.

(2) Do not send another command to the balance until the external device receives a response from the balance.

Reference

(1) In the case below, the balance can need additional response time.

(2) In the case that <17 WT STABLE> is <ON>, the balance waits the weighing stability after receiving Tare-subtraction command/Zero-point adjustment command.

(3) If the balance receives a command when you are setting a function, when the balance is under span adjustment, or the balance is busy for other reasons, the command is executed after the current operation has been completed.

6-5-2 Input command composition 1

Composed of four characters including a terminator (CR=0xDH/LF=0xAH).

1	2	3	4
C1	C2	CR	LF

6-5-3 Command format

6-5-3 (1) Zero-point adjustment/Tare/Output control setting command

CAUTION Please take care not to take alphabetical “O” for Arabic number “0”.

C1	C2	Code (C1)	Code (C2)	Description	Response	
					A00/Exx format	ACK/NAK format
T	(SP)	0x54	0x20	Tare	A00: Normal response E01: Abnormal response	ACK: Normal response NAK: Abnormal response
Z	(SP)	0x5a	0x20	Zero-point adjustment		
O	0	0x4f	0x30	Stop output.		
O	1	0x4f	0x31	Continuous output at all times		
O	2	0x4f	0x32	Continuous output at stable times (Output stop at unstable times)		
O	3	0x4f	0x33	Push down [Output] key for one-time instant output.		
O	4	0x4f	0x34	Auto output		
O	5	0x4f	0x35	One-time output at stable times (Output stop at unstable times)		
O	6	0x4f	0x36	One-time output at stable times (Continuous output at unstable times)		
O	7	0x4f	0x37	Push down [Output] key for one-time output at stable times.		
O	8	0x4f	0x38	One-time instant output		
O	9	0x4f	0x39	One-time output after stability is obtained		
O	A	0x4f	0x41	Interval function (Output once each time the output time has elapsed)		
O	B	0x4f	0x42	Interval function (Output once during stabilization, each time the output time has elapsed)		

Reference

(1) Commands O0 to O7 have the same functions as the output control set by the setting menu.

(2) Commands O8 and O9 are used to request data from the balance.

(3) Once the O0 to O7 commands are executed, that state is maintained. However, the status is reset to the setting menu when the balance is turned on again.

(4) When the OA or OB command is input, the interval function starts, and when input again, the interval function ends.

(5) After the O8 or O9 command is executed, it returns to “O0.”

6-5-3 (2) Date output request and time output request

C1	C2	Code (C1)	Code (C2)	Description	Response
D	D	0x44	0x44	Date output request	Date data
D	T	0x44	0x54	Time output request	Time data

6-5-4 Input command composition 2

Composed of 15 characters including a terminator (CR=0xDH/LF=0xAH)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C1	C2	,	C3	C3	C3	C3	C3	C3	C3	C3	C3	C3	CR	LF

6-5-5 Command format

Reference

(1) 'C3' is maximum ten-digit (including the polarity +/-, comma and point) numeric data.
Example) Upper limit input 1200.00g: "LA,1200.00"
Preset tare input 1000.00g: "PT,1000.00"
Interval time input 12:34:56: "IA,12,34,56" (marked off by commas)

(2) Make sure not input the measuring unit (g, ct, etc.).

(3) Input the command when Weighing mode, Percentage mode, Counting mode or Multiplied by Coefficient mode is operating.
If it is input while the other mode operation, the balance output an abnormal response.

(4) If the input value is invalid, the balance output an abnormal response.

6-5-5 (1) Comparator setting command

C1	C2	Code (C1)	Code (C2)	Description	C3	Response	
						A00/Exx format	ACK/NAK format
L	A	0x4C	0x41	Upper limit value setting	Numeric value setting	A00: Normal response E01: Abnormal response	ACK: Normal response NAK: Abnormal response
L	B	0x4C	0x42	lower limit value setting	Numeric value setting		
L	C	0x4C	0x43	Reference value setting	Numeric value setting		

6-5-5 (2) Preset tare value setting command

C1	C2	Code (C1)	Code (C2)	Description	C3	Response	
						A00/Exx format	A00/Exx format
P	T	0x50	0x54	Preset tare value setting	Numeric value setting	A00: Normal response E01: Abnormal response	ACK: Normal response NAK: Abnormal response

Reference

(1) When the normal response, the preset tare value is input in <321 PRESET 1> and the balance operates Preset tare.

(2) If the input value is "0" at Preset tare setting value command, the preset tare operation is canceled.

6-5-5 (3) Interval (output) time setting command

C1	C2	Code (C1)	Code (C2)	Description	C3	Response	
						A00/Exx format	A00/Exx format
I	A	0x49	0x41	Interval (output) time setting	Numeric value setting	A00: Normal response E01: Abnormal response	ACK: Normal response NAK: Abnormal response

6-6 Response

6-6-1 Response command format (“A00”/“Exx” format)

Consists of five characters including terminators.

1	2	3	4	5
A1	A2	A3	CR	LF

6-6-2 Response command

A1	A2	A3	code(A1)	code(A2)	code(A3)	Description
A	0	0	0x41	0x30	0x30	Normal response
E	0	1	0x45	0x30	0x31	Abnormal response

6-6-3 Response command format (“ACK”/“NAK” format)

Consists of one character without a terminator.

1
A1

6-6-4 Response command

A1	code(A1)	Description
ACK	0×06	Normal response
NAK	0×15	Abnormal response

6-7 External contact input

D-sub9P Connecter can set a tare range or adjust the zero-point from an external device by connecting a contact or a transistor switch between the pin for externally setting a tare range (Pin 9) and the signal ground pin (Pin 5). When doing so, allow at least 400 ms for connection (ON) time (Maximum voltage: 15 V when the balance is turned OFF, sink current: 20 mA when it is turned ON).

CAUTION

(1) While external contact input is selected, command input is not available.

(2) There is no response command corresponding to external contact input.

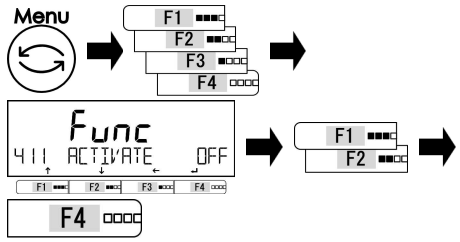
6-8 Communication setting

6-8-1 Standard RS232C/USB and optional Extension RS232/Ethernet

Legal Metrology

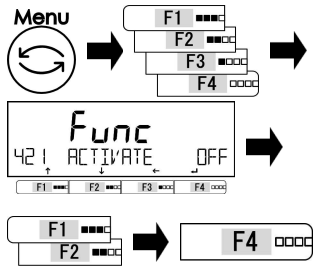
(1) Output condition <413 CONDITION 1,3,6>, cannot be selected.
(2) <433 CONDITION 1,3,6> cannot be selected only when Extension RS232C option is connected.
(3) <41A STATUS>, <42A STATUS> and <43A STATUS> cannot be selected. The net value status is always appended.

1 **Select the standard RS-232C communication operation.**



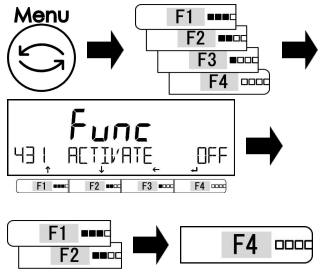
Push [Menu] key, then push [F1-F4] keys to go to <411 ACTIVATE>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.
OFF: Stop
ON: Operation
Push [F4] key to fix.

Select the standard USB communication operation.



Push [Menu] key, then push [F1-F4] keys to go to <421 ACTIVATE>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.
OFF: Stop
ON: Operation
Push [F4] key to fix.

Select the Extension RS-232C communication/Ethernet operation (option).



Push [Menu] key, then push [F1-F4] keys to go to <431 ACTIVATE>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.
OFF: Stop
ON: Operation
Push [F4] key to fix.

2 Select the communication setting.

Refer to the step 1 to key operation for setting.

Select the communication condition.

4 12 FORMAT / 422 FORMAT / 432 FORMAT

Set list

6 : Shinko format 6 digits	7 : Shinko format 7 digits	8 : Shinko format 8 digits
CSP6 : CSP format 6 digits	CSP7 : CSP format 7 digits	CBM : CBM format

Select the output conditions.

4 13 CONDITION / 423 CONDITION / 433 CONDITION

Set list

0 : Output stop	1 : Continuous output at all times	2 : Continuous output at stable times (Output stop at unstable times)
3 : Push down [Output] key for one-time instant output.	4 : Auto output	5 : One-time output at stable times (Output stop at unstable times)
6 : One-time output at stable times (Continuous output at unstable times)	7 : Push down [Output] key for one-time output at stable times	

Select the comparator output.

4 14 COMPARE / 424 COMPARE / 434 COMPARE

Set list

0 : As per the output setting	1 : Output when discrimination result is OK or absent

Select the baud rate.

4 15 BAUD RATE / 425 BAUD RATE / 435 BAUD RATE

Set list

1200 : 1200 bps	2400 : 2400 bps	4800 : 4800 bps
9600 : 9600 bps	19200 : 19200 bps	38400 : 38400 bps
57600 : 57600 bps	115.2 k : 115200 kbps	

Select the parity bit.

4 16 PARITY / 426 PARITY / 436 PARITY

Set list

OFF : None	ODD : Odd number	EVEN : Even number

Select the stop bit.

4 17 STOP BIT / 427 STOP BIT / 437 STOP BIT

Set list

1BIT : 1 bit	2BIT : 2 bit	

Select unused high order digit.

4 18 BLANK / 428 BLANK / 438 BLANK

Set list

ZERO : Full with 0 (0x30)	SPACE : Full with a blank space (0x20)

Select the response command format.

4 19 RESPONSE / 429 RESPONSE / 439 RESPONSE

Set list

1 : "A00/Exx" format	2 : "ACK/NAK" format	

Select the net value status.

4 1A STATUS / 42A STATUS / 42A STATUS

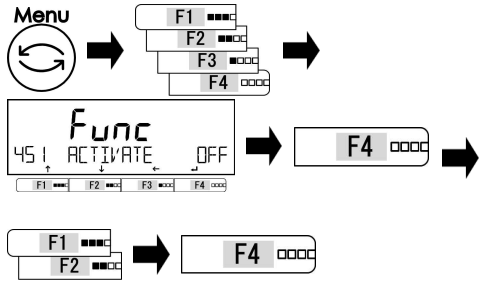
Set list

OFF : Not append	ON : Append	

6-8-2 Relay Contact output (option)

Reference External tare function is always valid.

1 **Select the Relay Contact output operation.**



Push [Menu] key, then push [F1-F4] keys to go to <451 ACTIVATE>.

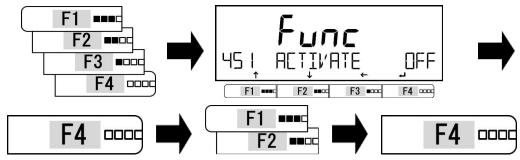
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

OFF: Stop
ON: Operation

Push [F4] key to fix.

2 **Select the compare output setting.**



Push [F1-F4] keys to go to <434 COMPARE>.

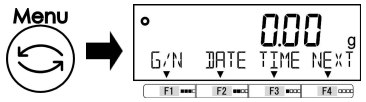
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

0: As per the comparator setting (Refer to “3-10 Comparator action”)
1: Output when discrimination result is OK or absent

Push [F4] key to fix.

3 **Exit the setting menu.**



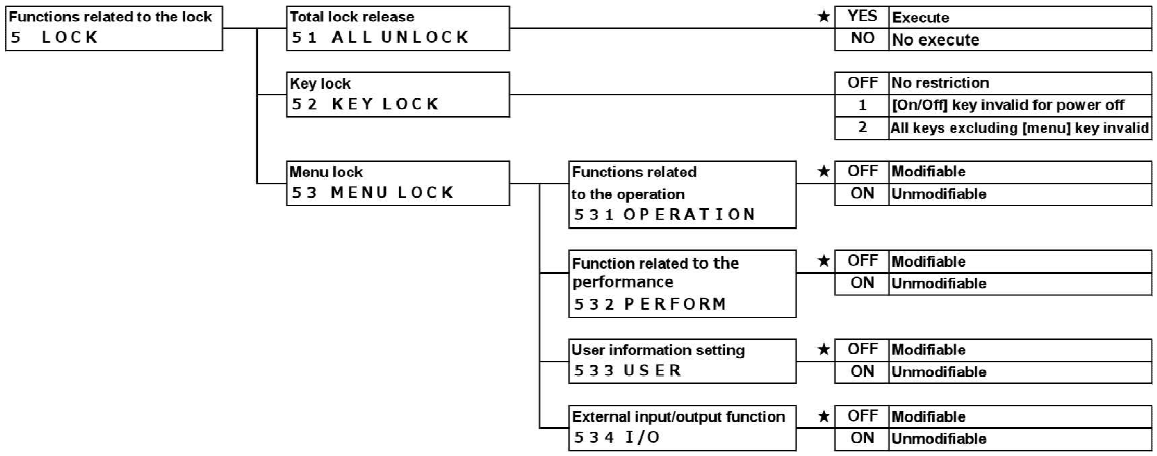
Push [Menu] key to shift to the measuring mode.

7 Functions related to the lock

Impose limitations on key operation and accessing the menu items, etc.

7-1 Hierarchy of functions related to the lock

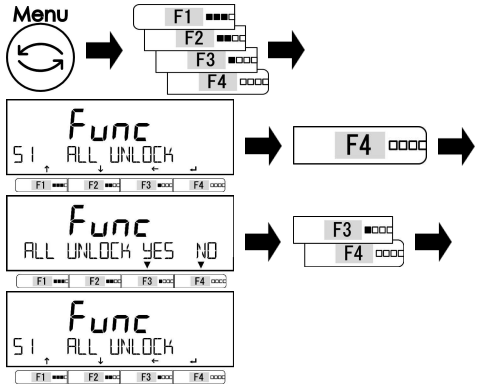
★: Initial setting value



7-2 Total lock release

All locks that have been set can be released.

1 **Select the total lock release.**



Push [Menu] key, then push [F1-F4] keys to go to <51 ALL UNLOCK>.

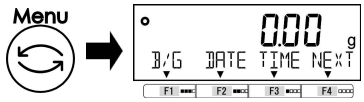
Push [F4] key.

Push [F1/F2] key to select.

YES: Execute
NO: NO execute

Unlock all the settings.

2 **Exit the setting menu.**

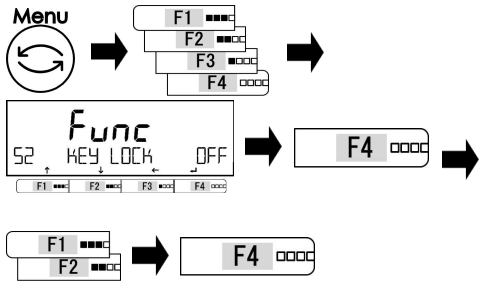


Push [Menu] key to shift to the measuring mode.

7-3 Key lock function

Key operation can be locked.

1 **Select the key lock function.**



Push [Menu] key, then push [F1-F4] keys to go to <52 KEY LOCK>.

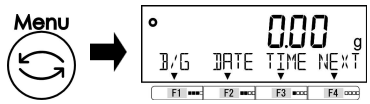
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

OFF: No restriction
1: [On/Off] key invalid for power off
2: All keys excluding [Menu] key invalid (Except in Setting menu)

Push [F4] key to fix.

2 **Exit the setting menu.**

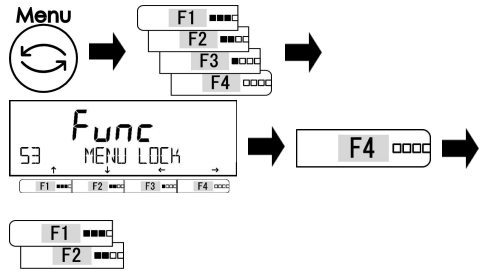


Push [Menu] key to shift to the measuring mode.

7-4 Menu lock function

Various setting menus can be locked.

1 **Select the menu lock function.**



Push [Menu] key, then push [F1-F4] keys to go to <53 MENU LOCK>.

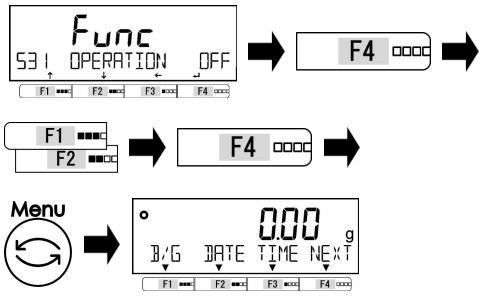
Push [F4] key to change.

Push [F1/F2] key to select.

Refer to Set List.

Set list	
531 OPERATION : Function related to the operation <1 APPLICATIONS>	532 PERFORM : Function related to the performance <2 PERFORMANCE>
533 USER : User information setting <3 USER INFO>	534 I/O : External input/output functions <4 EXTERNAL I/O>

2 **Select modifiable/unmodifiable of each menu.**



Push [F4] key to change the setting value.

Push [F1/F2] key to select.

OFF: Modifiable
ON: Unmodifiable

Push [F4] key to fix.

Push [Menu] key to shift to the weighing mode.

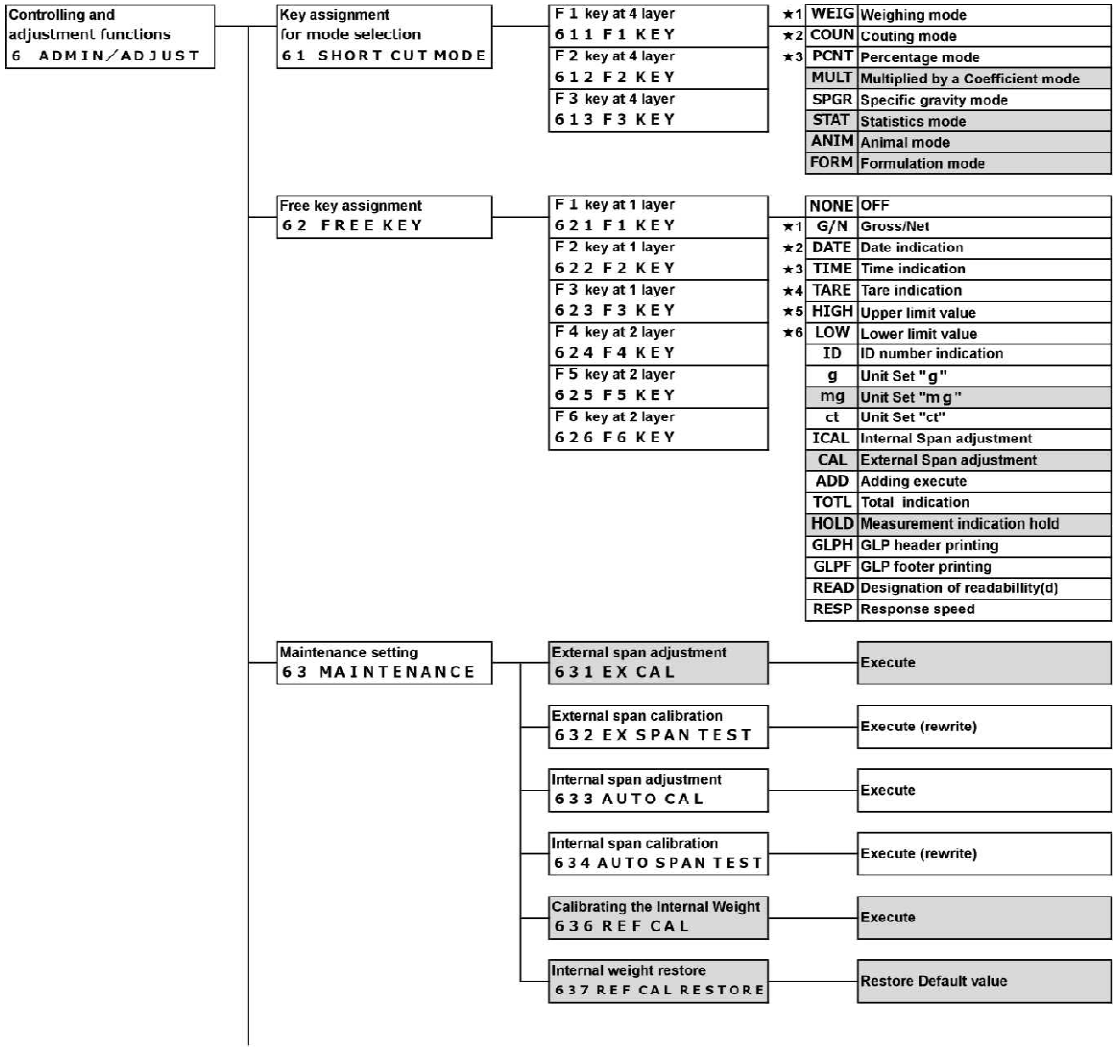
8 Controlling and adjustment functions

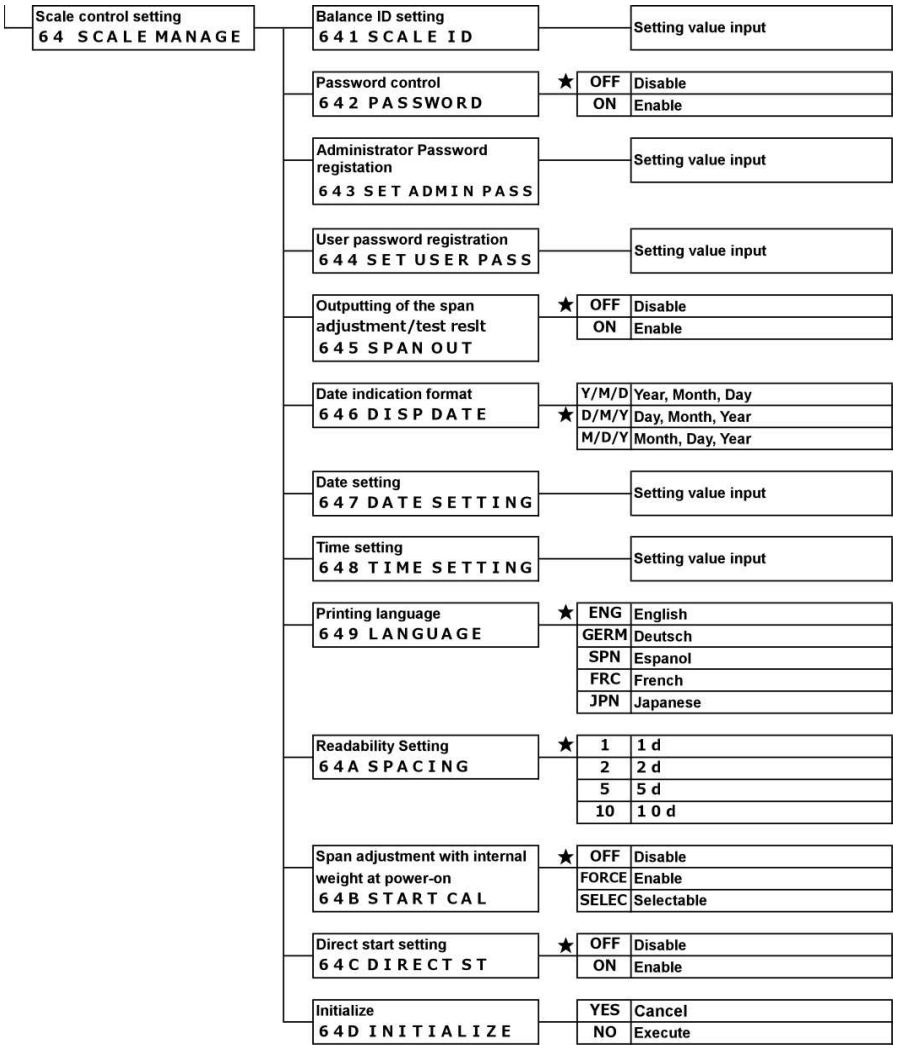
Perform setting of the scale ID, the span adjustment and the date and time.

8-1 Hierarchy of controlling and adjustment functions

Legal Metrology : Not indicated.

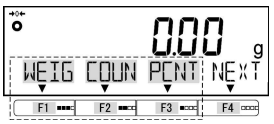
★: Initial setting value




Scale control setting
64 SCALE MANAGE
Balance ID setting
641 SCALE ID
Setting value input
Password control
642 PASSWORD
★ OFF Disable
ON Enable
Administrator Password registation
643 SET ADMIN PASS
Setting value input
User password registration
644 SET USER PASS
Setting value input
Outputting of the span adjustment/test resIt
645 SPAN OUT
★ OFF Disable
ON Enable
Date indication format
646 DISP DATE
Y/M/D Year, Month, Day
★ D/M/Y Day, Month, Year
M/D/Y Month, Day, Year
Date setting
647 DATE SETTING
Setting value input
Time setting
648 TIME SETTING
Setting value input
Printing language
649 LANGUAGE
★ ENG English
GERM Deutsch
SPN Espanol
FRC French
JPN Japanese
Readability Setting
64A SPACING
★ 1 1 d
2 2 d
5 5 d
10 10 d
Span adjustment with internal weight at power-on
64B START CAL
★ OFF Disable
FORCE Enable
SELEC Selectable
Direct start setting
64C DIRECT ST
★ OFF Disable
ON Enable
Initialize
64D INITIALIZE
YES Cancel
NO Execute

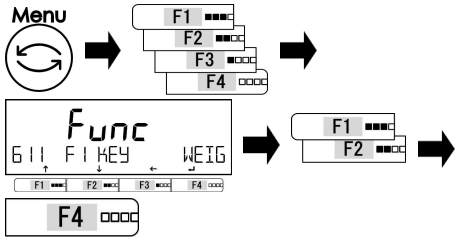
8-2 Shortcut setting for accessing various measuring modes

Shortcuts for various measuring mode can be assigned to <<F1-F3>> which are displayed above [F1-F3] key.



Legal Metrology Only Weighing mode <WEIG>, Counting mode <COUN>, Percentage mode <PCNT> and Specific gravity mode <SPGR> can be selected.

1 Select <<F1-F3>>.



Push [Menu] key, then push [F1-F4] keys to go to <611 F1 KEY>.

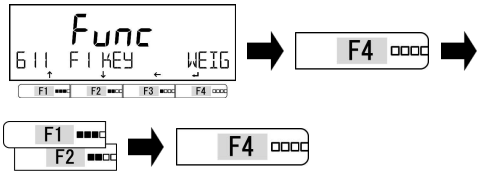
Push [F4] key to change.

Push [F1/F2] key to select.

611 F1 KEY: <<F1>> above [F1] key
612 F2 KEY: <<F2>> above [F2] key
613 F3 KEY: <<F3>> above [F3] key

Push [F4] key to fix.

2 Select the measuring modes.



Push [F4] key to change the setting value.

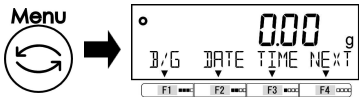
Push [F1/F2] key to select.

Refer to Set List.

Push [F4] key to fix.

Set list		
WEIG : Weighing mode	COUN : Counting mode	PCNT : Percentage mode
MULT : Multiplied by Coefficient mode	SPGR : Specific gravity mode	STAT : Statistics mode
ANIM : Animal mode	COMP : Formulation mode	

3 Exit the setting menu.



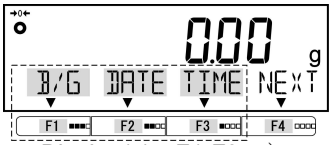
Push [Menu] key to shift to the weighing mode.

8-3 Free key setting

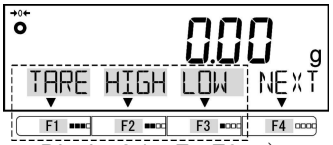
CAUTION Free key setting is valid only in the weighing mode.

Legal Metrology
(1) <CAL> cannot be selected except ALE1203(R).
(2) <mg> and <HOLD> cannot be selected.

Various function can be assigned to the <<F1-F6>> (Free key), which are displayed above the [F1-F3] keys.

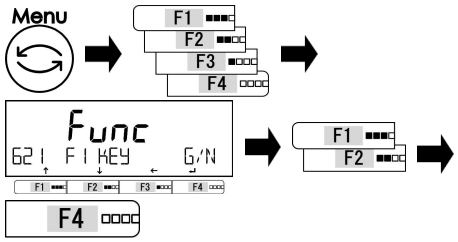


Display1 (<<F1-F3>>)



Display2 (<<F4-F6>>)

1 Select the <<F1-F6>> setting menu.



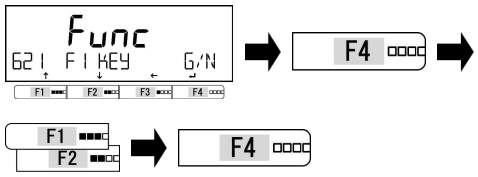
Push [Menu] key, then push [F1-F4] keys to go to <621 F1 KEY>.

Push [F1/F2] key to select each Free key setting menu.

Refer to “Free key setting menu list”.

Free key setting menu list		
621 F1 KEY : <<F1>>	622 F2 KEY : <<F2>>	623 F3 KEY : <<F3>>
624 F4 KEY : <<F4>>	625 F5 KEY : <<F5>>	626 F6 KEY : <<F6>>

2 Select the function to assign to the Free key.



Push [F4] key to change the setting value.

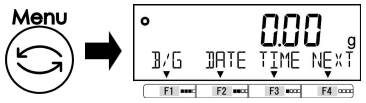
Push [F1/F2] key to select.

Refer to Set List.

Push [F4] key to fix.

Set list	
62* F* KEY NONE : OFF	62* F* KEY B/G : Gross/Net
62* F* KEY DATE : Date indication	62* F* KEY TIME : Time indication
62* F* KEY TARE : Tare value indication	62* F* KEY HIGH : Upper limit value
62* F* KEY LOW : Lower limit value	62* F* KEY ID : ID number indication
62* F* KEY g : Unit set “g”	62* F* KEY mg : Unit set “mg”
62* F* KEY ct : Unit set “ct”	62* F* KEY ICAL : Internal span adjustment
62* F* KEY CAL : External span adjustment	62* F* KEY ADD : Adding execute
62* F* KEY TOTL : Total indication	62* F* KEY HOLD : Measurement indication hold
62* F* KEY GLPH : GLP header printing	62* F* KEY GLPF : GLP footer printing
62* F* KEY READ : Designation of readability(d)	62* F* KEY RESP : Response speed

3 Exit the setting menu.



Push [Menu] key to shift to the weighing mode.

8-4 Maintenance settings

8-4-1 Span adjustment and span test

Span adjustment is to “decrease” the difference between an indicated value and the true value (mass), and span test is to “check” the difference between an indicated value and the true value.
This must be performed without fail in the case of doing high-accuracy weighing work.
Because an electronic balance is affected by the acceleration of gravity, adjustment/test is needed at every weighing location. The adjustment/test is also needed when (1) using a long period and (2) an accurate indication does not appear any longer.

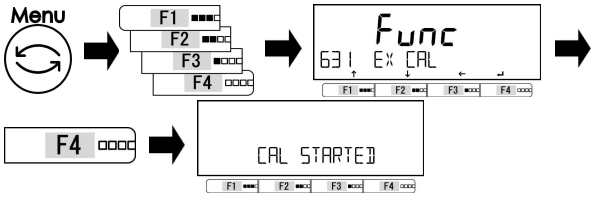
CAUTION

(1) An external weight used for the span adjustment shall be the one equivalent to the OIML F1 class.

(2) The span adjustment significantly affects the weighing accuracy. Please read this procedure carefully before getting to the adjustment.

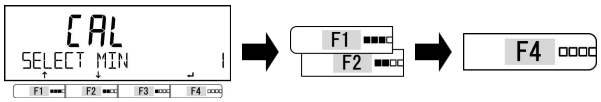
8-4-1(1) Span adjustment with external weight

1 **Select the span adjustment with external weight.**



Push [Menu] key, then push [F1-F4] keys to go to <631 EX CAL>.
Push [F4] key to execute.

2 **Select the minimum interval for rounding the weight of the external weight.**

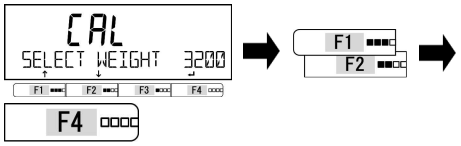


Push [F1/F2] key to select

1: 1d
2: 2d
5: 5d
10: 10d

Push [F1/F2] key to fix.

3 **Select a weight used for the span adjustment.**

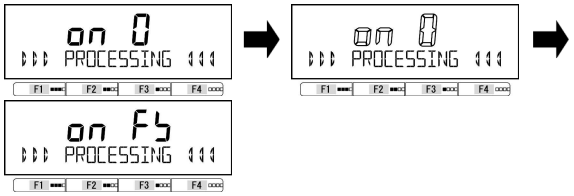


Push [F1/F2] key and select a weight used for the span adjustment.

(Refer to List of “weights used for the span adjustment by model”)

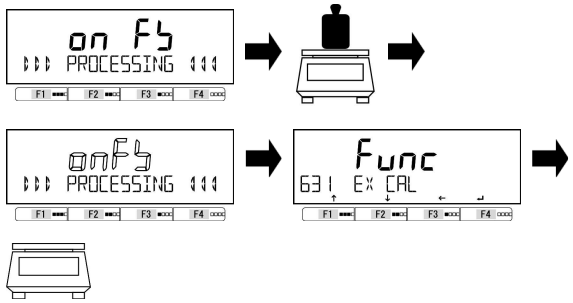
Push [F4] key to fix.

4 **Zero-point adjustment starts.**



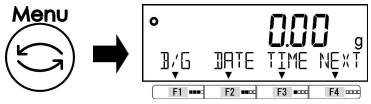
Display changes to the order of <on 0> → “blinking of <on 0>”.
On completion of the zero-point adjustment, the display automatically changes to <on FS>.

5 The span adjustment starts.



Place the weight in the center of the weighing pan.
Display changes to the order of <on FS> → "blinking of <on FS>".
Start of the span adjustment.
On completion of the span adjustment, the display automatically changes to <631 EX CAL>.
Unload the weight from the weighing pan.

6 Exit the setting menu.



Push [Menu] key to shift to the weighing mode.

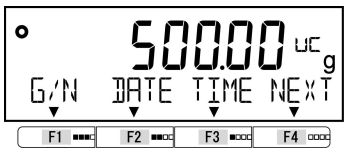
Reference

(1) List of weights used for the span adjustment by model (Unit: g).

Model	GAL620	GAL6200	GAL15000
Selectable weight	620 600 500 200 100 10	6200 6000 5000 2000 1000 100	15000 15000 10000 5000 2000 200
VAR selection	1 to 620	1 to 6200	1 to 15000

(2) The span adjustment by the use of a weight less than the weighing capacity may possibly indicate <UC> on the display. When this is the case, the weighing accuracy is not guaranteed.
Conditions under which <UC> is indicated;

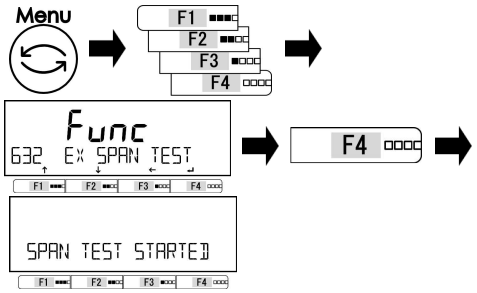
- When a sample that is more than two times heavier than the weight that was used for the span adjustment is weighed, and
- When the readability (minimum indication) setting <64A READABILIT>, which is finer than the minimum interval for rounding setting <SELECT MIN> selected for the span adjustment, is performed.



8-4-1(2) Span test with external weight

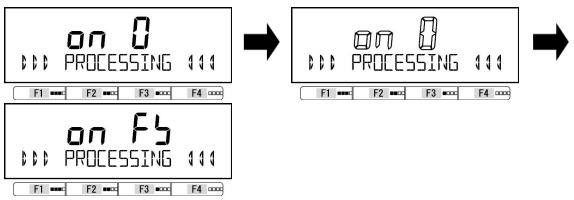
CAUTION Make sure to use the external weight which is equal to the weighing capacity of each model.

1 **Select the span test with external weight.**



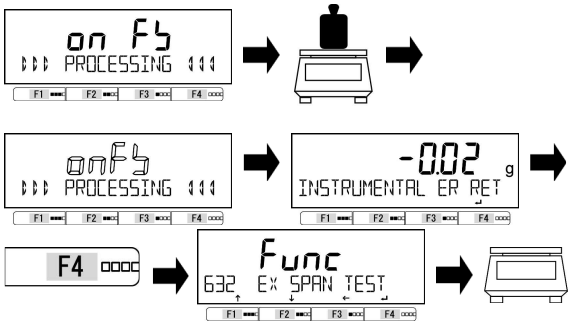
Push [Menu] key, then push [F1-F4] keys to go to <632 EX SPAN TEST>.
Push [F4] key to execute.

2 **Zero-point adjustment starts.**



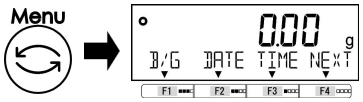
Display changes to the order of <on 0> → "blinking of <on 0>".
On completion of the zero-point adjustment, the display automatically changes to <on FS>.

3 **The span test starts.**



Place the weight in the center of the weighing pan.
Display changes to the order of <on FS> → "blinking of <on FS>".
Start of the span test.
On completion of the span test, the display automatically changes to <INSTRUMENTAL ER> and the instrumental error of the balance is displayed.
Push [F4] key.
<632 EX SPAN TEST> is displayed.
Unload the weight from the weighing pan.

4 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

8-4-1(3) Span adjustment with internal weight

CAUTION

(1) Do not power-off the balance while this function is operating.

(2) Span adjustment operation of this product is semi-automatic span adjustment, not automatic span adjustment, so the balance doesn't automatically start span adjustment by detecting temperature change or time course.

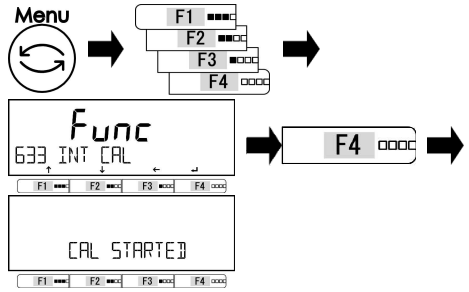
Reference

- This function does not operate when the balance is power supplied from USB only or from USB and dry-cell batteries.
- Make sure to connect AC adapter, or insert dry-cell batteries and disconnect USB to operate this function.

1 **Select the span adjustment with internal weight.**

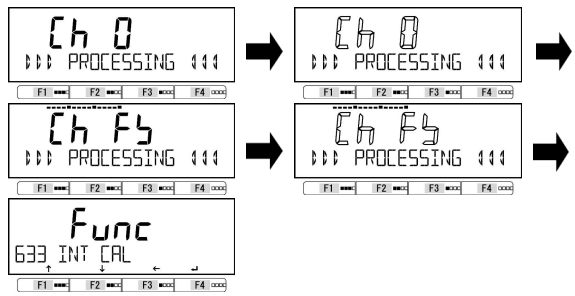
Push [Menu] key, then push [F1-F4] keys to go to <633 INT CAL>.

Push [F4] key to execute.



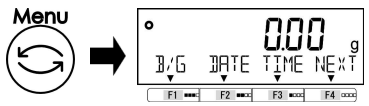
2 **The span adjustment starts.**

Display changes to the order of <Ch 0> → "blinking of <Ch 0>" → <Ch FS> → "blinking of <Ch FS>" → <633 INT CAL>.



3 **Exit the setting menu.**

Push [Menu] key to shift to the weighing mode.



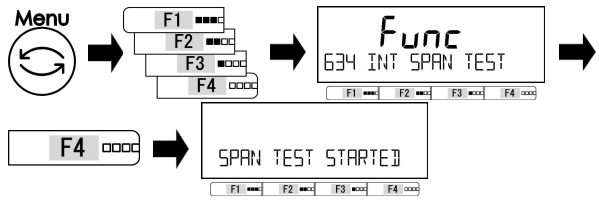
8-4-1(4) Span test with internal weight

CAUTION Do not power-off the balance while this function is operating.

Reference

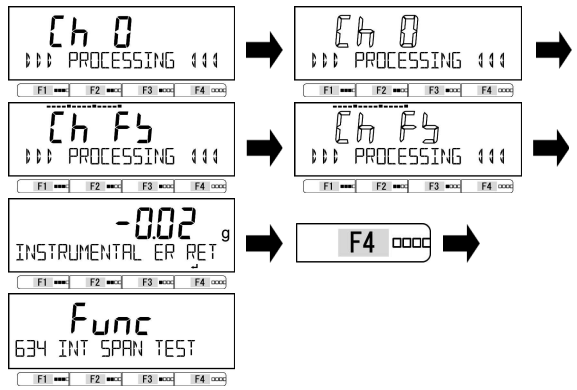
- This function does not operate when the balance is power supplied from USB only or from both USB and dry-cell batteries.
- Make sure to connect AC adapter, or insert dry-cell batteries and disconnect USB to operate this function.

1 **Select the span test with internal weight.**



Push [Menu] key, then push [F1-F4] keys to go to <634 INT SPAN TEST>.
Push [F4] key to execute.

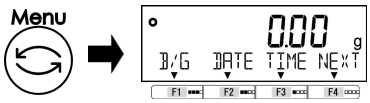
2 **The span test starts.**



Display changes to the order of <Ch 0> → "blinking of <Ch 0>" → <Ch FS> → "blinking of <Ch FS>" → <INSTRUMENTAL ER> and the instrumental error of the balance is displayed.
Push [F4] key.

<634 INT SPAN TEST> is displayed.

3 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

8-4-2 Calibrating the internal weight

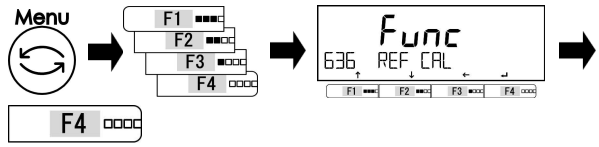
Use this function to calibrate the internal weight by external weight.

CAUTION

(1) To calibrate more accurately, use a weight that is equivalent to the weighing capacity (Max).
(2) An external weight used for the span adjustment shall be the one equivalent to the OIML F1 class.
(3) The calibrating the internal weight significantly affects the weighing accuracy. Please read this procedure carefully before getting to the adjustment.

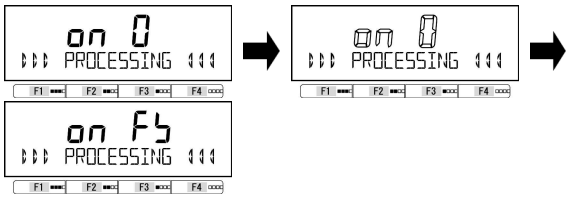
Legal Metrology

1 **Select the calibration of the internal weight.**



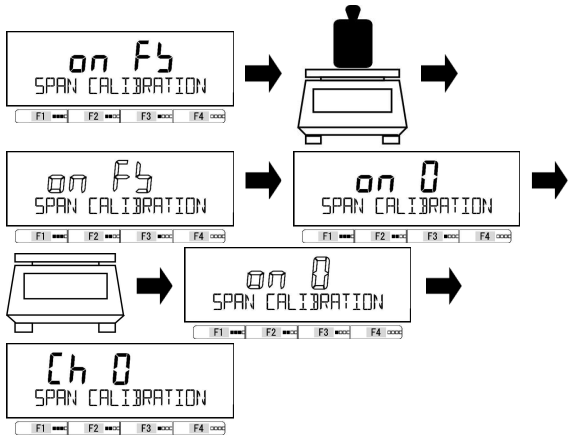
Push [Menu] key, then push [F1-F4] keys to go to <636 REF CAL>.
Push [F4] key to execute.

2 **Zero-point adjustment starts.**



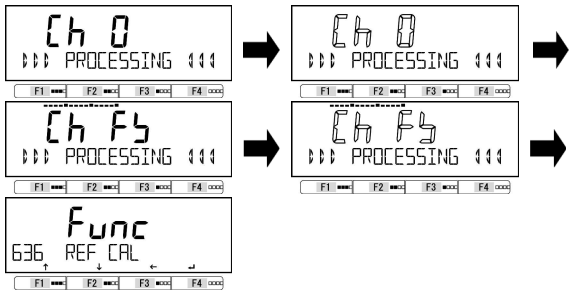
Display changes to the order of <on 0> → "blinking of <on 0>".
On completion of the zero-point adjustment, the display automatically changes to <on FS>.

3 **The span adjustment starts.**



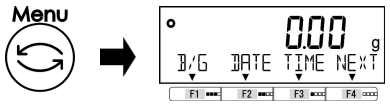
Place the weight in the center of the weighing pan.
Display changes to the order of <on FS> → “blinking of <on FS>”.
Start of the span adjustment.
On completion of the span adjustment, the display automatically changes to <on 0>.
Unload the weight from the weighing pan.
Display automatically changes to “blinking of <on 0>” and zero-point adjustment starts.
On completion of the zero-point adjustment, the display automatically changes to “blinking of <Ch 0>”.

4 **The calibrating the internal weight starts.**



Display changes to the order of “blinking of <Ch 0>” → <Ch FS> →
“blinking of <Ch FS>.
On completion of the calibrating the internal weight, the display automatically changes to <636 REF CAL>.

5 **Exit the setting menu.**

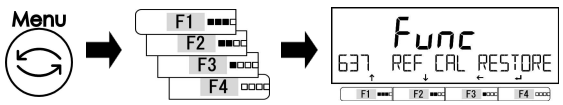


Push [Menu] key to shift to the weighing mode.

8-4-3 Restore the internal weight calibration value to default

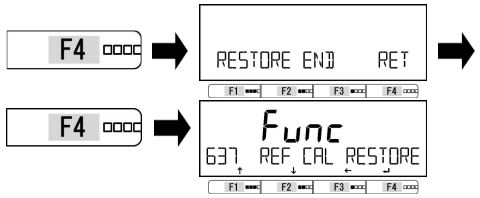
Legal Metrology This mode is not available.

1 **Select the restore.**



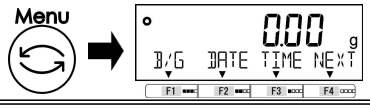
Push [Menu] key, then push [F1-F4] keys to go to <637 REF CAL RESTORE>.

2 **Execute the restore.**



Push [F4] key to execute.
The internal weight calibration value is restored to default (factory setting).
Push [F4] key.
<637 REF CAL RESTORE> is displayed.

3 **Exit the setting menu.**



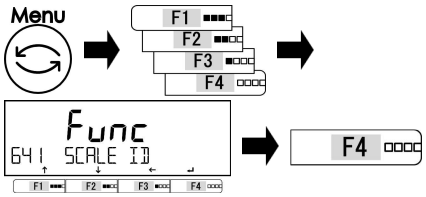
Push [Menu] key to shift to the weighing mode.

8-5 Balance control setting

8-5-1 Balance ID setting

A balance ID (Scale ID) can be set to discriminate the balance.

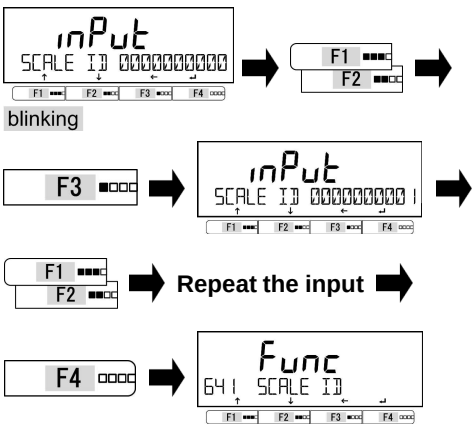
1 **Select the balance ID setting.**



Push [Menu] key, then push [F1-F4] keys to go to <641 SCALE ID>.

Push [F4] key.

2 **Input the balance ID.**



The digit for inputting is blinking.

Push [F1/F2] key to increment/decrement the digit to select.

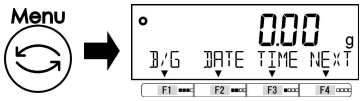
Push [F3] key to input the next digit.

Push [F1/F2] key.

Repeat the input by the procedure above.

Push [F4] key to fix the balance ID and shift to <641 SCALE ID>.

3 **Exit the setting menu.**



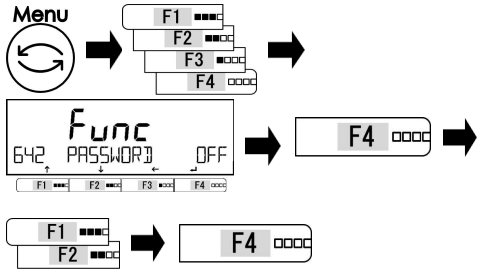
Push [Menu] key to shift to the weighing mode.

8-5-2 Password control

Enable/disable the password protection.

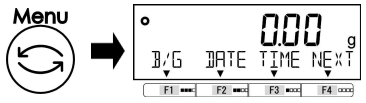
Reference
(1) Refer to “8-5-2 Administrator password registration” and “8-5-3 User password registration” for password registration/changing.
(2) Refer to “Appendix 8 Balance operation with password control function” for using the balance with password control.

1 Enable/disable the password protection.



Push [Menu] key, then push [F1-F4] keys to go to <642 PASSWORD>.
Push [F4] key to change.
Push [F1/F2] keys to select;
OFF : Disable
ON : Enable
Push [F4] key to fix.

2 Exit the setting menu.



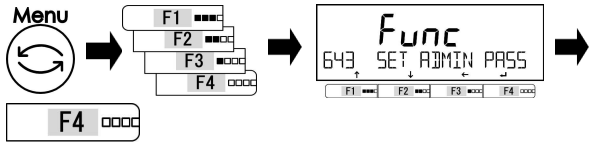
Push [Menu] key to shift to the measuring mode.
Password input display appears from next power on.

8-5-2 (1) Administrator password registration

CAUTION
(1) Make sure not to forget the administrator password.
(2) In case that the administrator password is lost, please contact the store where you purchased the product.

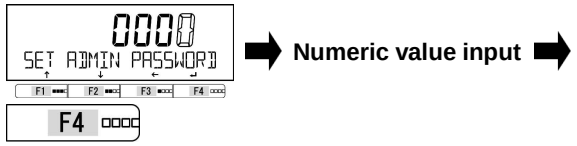
Reference Only one password can be set for administrator.

1 Select the Administrator password registration.



Push [Menu] key, then push [F1-F4] keys to go to <643 SET ADMIN PASS>.
Push [F4] key to input the password.

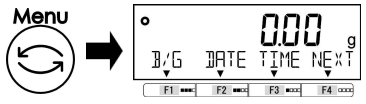
2 Input the password to register.



Input to set the password.
Four digits of 0-9 can be selected.
Push [F4] key to fix.

(Refer to “2-5-3 Numeric value input”)

3 Exit the setting menu.



Push [Menu] key to shift to the measuring mode.

8-5-2 (2) User password registration

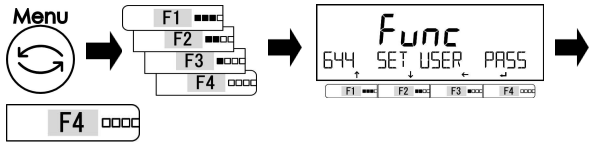
Administrator can register the user password for each user(operator).

Reference

(1) Refer to “Appendix 8 Balance operation with password control function” for setting each user’s authority.

(2) Two users can be registered.

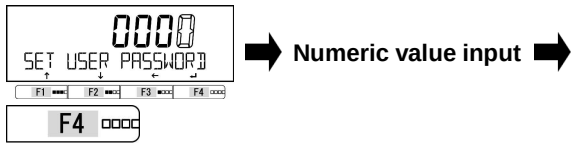
1 **Select the User password registration.**



Push [Menu] key, then push [F1-F4] keys to go to <644 SET USER PASS>.

Push [F4] key to input the password.

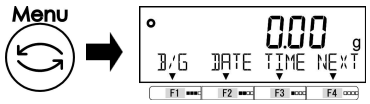
2 **Input the password to register.**



Input to set the password.
Four digits of 0-9 can be selected.
Push [F4] key to fix.

(Refer to “2-5-3 Numeric value input”)

3 **Exit the setting menu.**



Push [Menu] key to shift to the measuring mode.

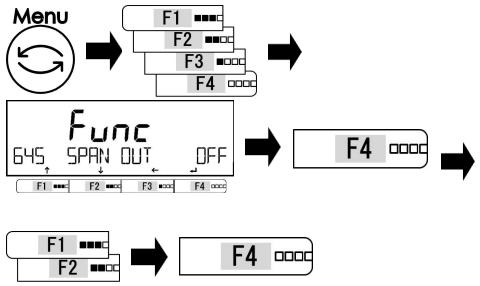
8-5-3 Outputting of the span adjustment/ test result

After span adjustment/test, the result can be output automatically.

Reference

Make sure to activate <41 RS232C> and/or <42 USB> and/or <43 OP RS232C> (Extension RS232C or Ethernet) to output the data.

1 **Select the outputting.**



Push [Menu] key, then push [F1-F4] keys to go to <645 SPAN OUT>.

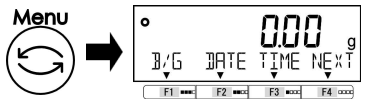
Push [F4] key to change the setting menu.

Push [F1/F2] key to select.

OFF: Disable
ON: Enable

Push [F4] key to fix.

2 **Exit the setting menu.**

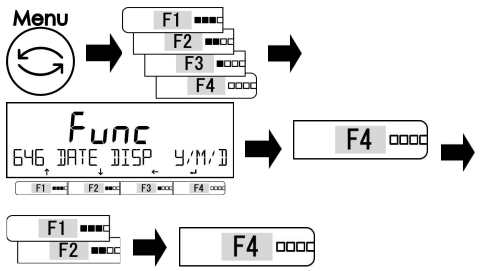


Push [Menu] key to shift to the weighing mode.

8-5-4 Date indication format

Date indication format can be selected.

1 **Select the Date indication format.**



Push [Menu] key, then push [F1-F4] keys to go to <646 DISP DATE>.

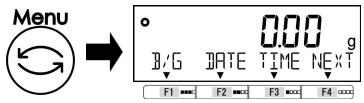
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

Y/M/D: Year, Month, Day
D/M/Y: Day, Month, Year
M/D/Y: Month, Day, Year

Push [F4] key to fix.

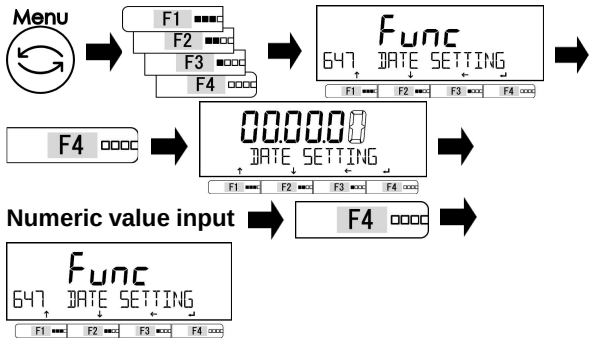
2 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

8-5-5 Date setting

1 **Select the date setting.**



(Refer to “2-5-3 Numeric value input”)

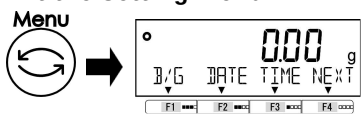
Push [Menu] key, then push [F1-F4] keys to go to <647 DATE SETTING>.

Push [F4] key to change the setting value.

The digit for inputting is blinking.
Input the date.

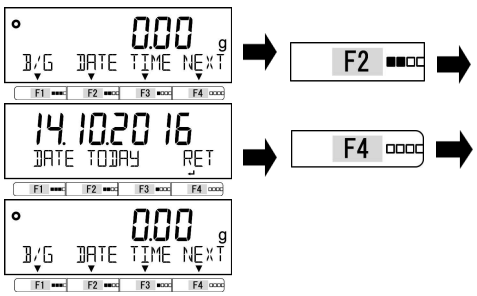
Push [F4] key to fix the date setting.

2 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

3 **Indication of the date.**



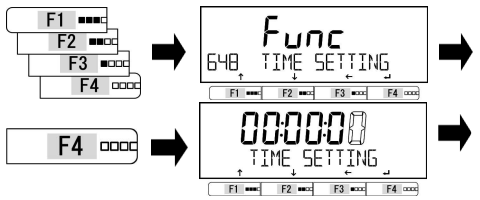
Push [F2] (<DATE>) key.

The date is indicated.

Push [F4] key to return to the measuring mode.

8-5-6 Time setting

1 **Select the time setting.**



(Refer to “2-5-3 Numeric value input”)

Push [Menu] key, then push [F1-F4] keys to go to <648 TIME SETTING>.

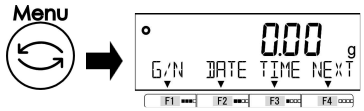
Push [F4] key to change the setting menu.

The digit for inputting is blinking.

Input the time.

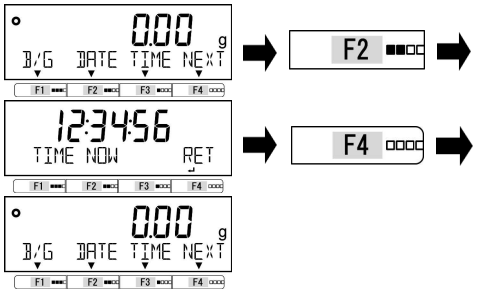
Push [F4] key to fix the time setting.

2 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

3 **Indication of the time.**



Push [F3] (<TIME>) key.

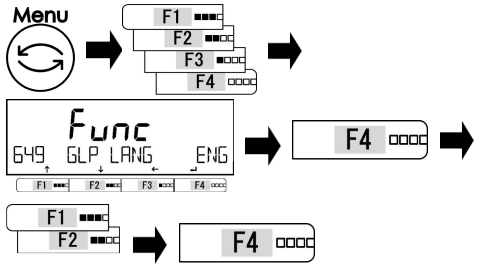
The time is indicated.

Push [F4] key to return to the measuring mode.

8-5-7 Printing language

Printing language can be select from five languages.

1 **Select the language.**



Push [Menu] key, then push [F1-F4] keys to go to <64 PRT LANG>.

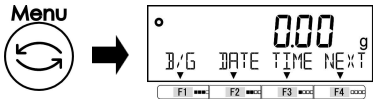
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

ENG: English
DEU: German
ESP: Spanish
FRC: French
JPN: Japanese

Push [F4] key to fix.

2 **Exit the setting menu.**



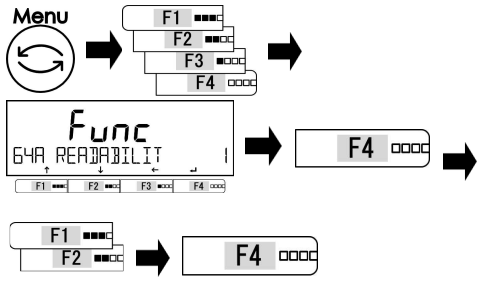
Push [Menu] key to shift to the weighing mode.

Reference Refer to “6 External input/output functions” for setting to communicate with other devices.

8-5-8 Readability Setting

The larger the readability becomes, the less the balance is affected by external influences. In addition, it takes less time for the balance reading to stabilize.

1 **Select the readability setting.**



Push [Menu] key, then push [F1-F4] keys to go to <64A READABILIT>.

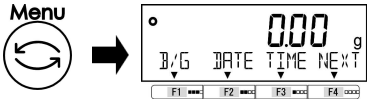
Push [F4] key to change the setting value.

Push [F1/F2] key to select.

1: 1d
2: 2d
5: 5d
10: 10d

Push [F4] key to fix.

2 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

8-5-9 Span adjustment with internal weight at power-on

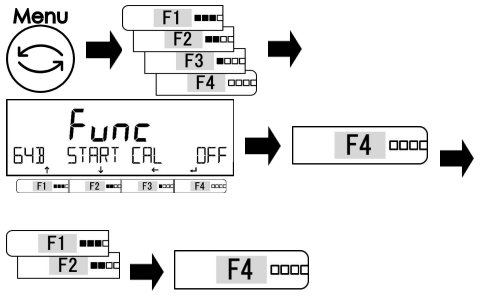
Reference

(1) Only for models with internal calibration device.

(2) When this function is enabled, it operates according to the power the balance is supplied.

Power supply	Operation
AC adapter	Operates at the first power-on after the AC adapter is connected.
USB only, or USB and battery	Disabled
Battery only	Operates at every power-on.

1 **Select the span adjustment at power-on.**



Push [Menu] key, then push [F1-F4] keys to go to <64B START CAL>.

Push [F4] key to change the setting value.

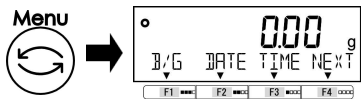
Push [F1/F2] key to select.

OFF: Disable
FORCE: Enable
Always when the power is ON.

SELEC: Selectable
Message is displayed.

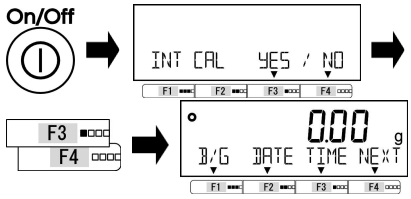
Push [F4] key to fix.

2 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

3 **Operate span adjustment at power-on.**



Push [On/Off] key to turn on the balance.
When <SELEC> is selected at step 1, select whether or not execute span adjustment by pushing [F3/F4] key.

YES: Execute
NO: Not execute

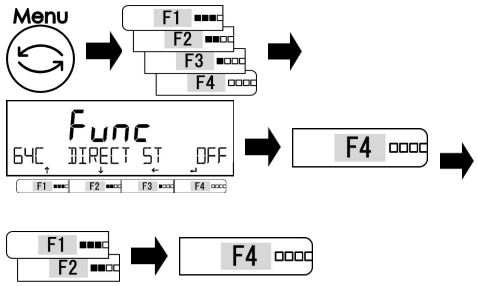
The balance executes span adjustment by internal weight and then shifts to measuring mode.

8-5-10 Direct start setting

This is a function to turn on the balance automatically without pushing [On/Off] key when it is connected to the AC power or USB bus powered from PC. You can use this function when the balance is used in conjunction with other devices.

Reference This function does not operate when the balance is power-supplied ONLY from dry-cell batteries.

1 **Select the direct start.**

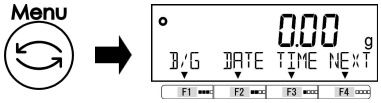


Push [Menu] key, then push [F1-F4] keys to go to <64C DIRECT ST>.
Push [F4] key to change the setting value.
Push [F1/F2] key to select.

OFF: Disable
ON: Enable

Push [F4] key to fix.

2 **Exit the setting menu.**

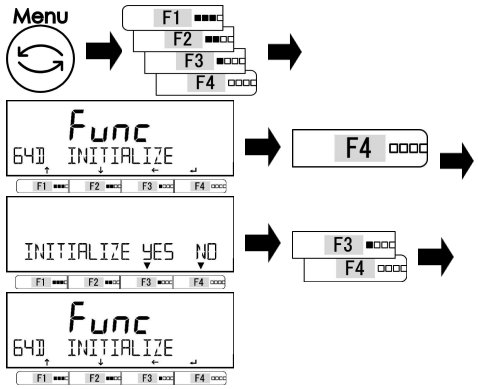


Push [Menu] key to shift to the weighing mode.

8-5-11 Initialize

This function is to initialize the balance to the factory settings except the date and time setting.

1 **Select the initialize.**

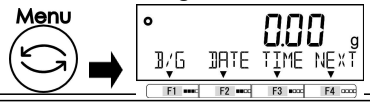


Push [Menu] key, then push [F1-F4] keys to go to <64D INITIALIZE>.
Push [F4] key.
Push [F3/F4] key to select.

NO: Cancel
YES: Execute

<64D INITIALIZE> is displayed.

2 **Exit the setting menu.**



Push [Menu] key to shift to the weighing mode.

9 Troubleshooting

Reference If the trouble persists after following the procedures below, please contact the store you purchased.

9-1 Error message

Error Message/ Error Code	Cause	Coping method
OVER ERROR	- The weight of the sample to be weighed is in excess of the maximum capacity. - The addition result or calculation result has exceeded the maximum display digit.	- Split the sample into several pieces and weigh them. - Replace the tare with a lighter one. - Clear the calculation result, and then re-execute the addition/computation while being careful of the display digit.
UNDER ERROR	The negative load is below the lower limit.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. Use the dedicated weighing pan and pan base only.
DATA MAX ERROR	Number of the data is over the memory	Clear the data.
DISPLAY ERROR / DSP OVER	The addition result or calculation result has exceeded the maximum display digit.	Clear the calculation result, and then re-execute the addition/computation while being careful of the display digit.
LOWER ERROR	The unit/reference weight in Counting/Percentage mode is below the lower limit.	Choose the samples of which unit weight/reference weight is larger than the lower limit.
ERR001～ ERR099	System error	Record the error code and notify the store where you purchased the product.
ERR703	- The operation key was pushed at the time of starting from the standby status. If the error message is displayed nevertheless the operation key wasn't pushed, there is something wrong with the hardware.	Do not push the operation key while the scale is in the process of starting from the standby status.
ERR705	Initial zero adjustment error. The initial zero adjustment was not completed in the process of starting from the standby status because of the unstable load.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR706	The load is out of the initial zero adjustment range.	- Do not put any load on the weighing pan at the power-on of the balance.
ERR709 ERR710 ERR711	- The load is unstable at the zero adjustment/tare subtraction. - Span adjustment time-out error.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR717	The mass of the calibration weight is 1% differ from the designated mass at the external span adjustment.	Check the calibration value of the weight and use the proper calibration weight.
ERR718	The mass of the calibration weight is under 50% of the maximum capacity at "span adjustment" or "internal span adjustment weight adjustment" by external calibration weight.	Use the calibration weight of which weight is equal to the maximum capacity.

Error Message/ Error Code	Cause	Coping method
ERR719	The adjust value by “external span adjustment” or “internal span adjustment” is over 1% of the maximum capacity.	- Execute <637 REF CAL RESTORE>, then execute internal span adjustment. - Check the mass of the weight used for the external span adjustment. - Execute <636 REF CAL>.
ERR722	- Tare key is pushed during the Preset tare operation.	Do not push the Tare key during the Preset tare operation.
ERR723	Out of Zero adjustment range (1.5% of the maximum capacity)	Make sure nothing on the weighing pan while executing zero adjustment.
ERR724	Out of Tare subtraction range (0g to the maximum capacity)	Chose the tare of which weight is within the tare subtraction range.
ERR734	Weight of the sample is out of the importing range at actual value setting method at Percent weighing mode (lower limit to maximum capacity).	Load the sample of which weight is within the importing range.
ERR735	Time-out error of importing the sample weight in the actual value setting method at Percent weighing mode.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR736	The setting value is out of the setting range at numeric value setting method at Percent weighing mode (lower limit to maximum capacity).	Set the value within the range.
ERR737	- Sample weight in the air is out of the importing range at specific gravity mode (over 0g to maximum capacity). - Sample weight in the water/liquid is out of the importing range at specific gravity mode (“0 – maximum capacity” to “maximum capacity”).	- Divide the sample so as to its weight in the air is within the importing range. - Divide the sample so as to its weight in the air is within the importing range.
ERR738	Time-out error of importing the sample weight in the water/liquid at specific gravity mode.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR739	Time-out error of importing the sample weight in the actual value setting method at Preset tare setting.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR740	The setting value is out of the setting range at numeric value setting method or actual value setting method at Preset tare setting (0g to maximum capacity).	Set the tare of which weight is within the tare subtraction range.
ERR741	<631 EX CAL> is executed while the external span adjustment function is disabled.	Contact the store where you purchased the product.
ERR742	- <633 INT CAL> or <634 INT SPAN TEST> or <636 REF CAL> is executed while the balance is power supplied only from USB. - Internal span adjustment device is out of working order.	- Connect the AC adapter; or insert dry cell batteries and disconnect the USB cable. - Contact the store where you purchased the product.
ERR743	Battery power supply is lacking to execute <633 INT CAL> or <634 INT SPAN TEST> or <636 REF CAL>.	Replace batteries to new ones.
ERR746	Invalid date or time was input at <647 DATE SETTING” or <648 TIME SETTING>.	Set the date and time correctly.

Error Code	Cause	Coping method
ERR747	Time-out error of importing the sample weight in the actual value setting method at Comparator function.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR748	The setting value is out of the setting range at numeric value setting method or actual value setting method at Comparator mode (“0 – maximum capacity” to “maximum capacity”).	Set the value within the range.
ERR749	Time-out error of importing the sample weight in the actual value setting method at Adding function.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR750	- Weight of the sample to add is out of the importing range (“0 – maximum capacity” to “maximum capacity”). - The total value has exceeded the maximum display digit.	- Choose the sample of which weight is within the importing range. - Clear the total value.
ERR751	The unit weight of the samples is lighter than the minimum interval of the balance at Counting mode.	Choose the samples of which unit weight is larger than the minimum interval of the balance.
ERR752	The unit weight of the samples is 0g and under at Counting mode.	- Choose the samples of which unit weight is larger than the minimum interval of the balance. - Counting mode cannot operate subtractive counting.
ERR753	Time-out error of importing the unit weight at Counting mode.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR754	Deleted the latest data then executed deleting operation of the second latest data at statistic mode.	- Only the latest data can be deleted. - Select <ALL> to delete all the other data.
ERR755	Time-out error of importing the sample weight at Statistics/Formulation mode.	- Improper setting of the weighing pan or pan base is suspected. - Check for contact with other object. - Check for any wind or vibration.
ERR756	Weight of the sample is out of the importing range at Statistics/Formulation mode (0g to maximum capacity).	Choose the sample of which weight is within the importing range.
ERR757	Bluetooth connection error.	Disconnect and then reconnect the Bluetooth communication.
ERR758	Bluetooth hardware error.	Contact the store where you purchased the product.
ERR760	Adding operation is executed while the Adding function is disabled.	Set <141 ACTIVATE> ON then execute the adding operation.
ERR761	An error occurred at <636 REF CAL>.	Re-execute <636 REF CAL>.
ERR763	The calculation error of the specific gravity of the sample at specific gravity mode.	Re-execute the specific gravity function.
ERR764	External weight used for <631 EX CAL> is different from the selected weight range at <SELECT WEIGHT>.	Use the external weight of which weight is within the selected range.

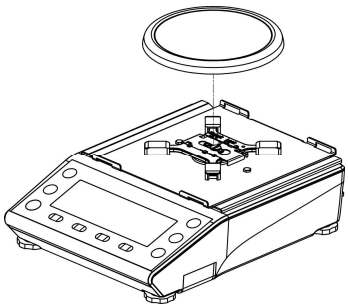
10 How to maintain

10-1 Simple Method for Maintenance (Round pan type Max 620g)

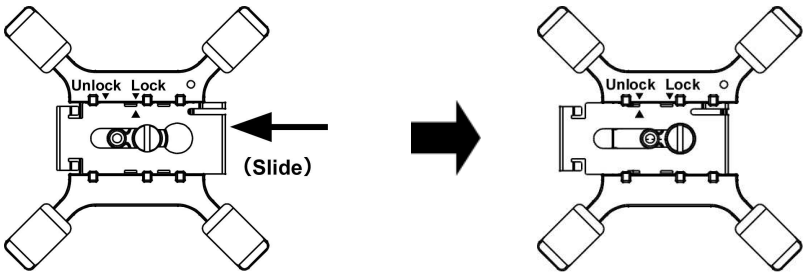
1 **Remove the windshield.**

(1) Refer to “Windshield assembly instructions” to remove the windshield.

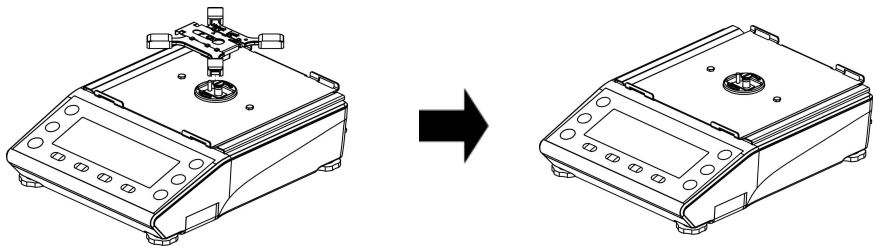
2 **Remove the round pan.**



3 **Move the slider to “Unlock” side.**



4 **Remove the pan-base.**



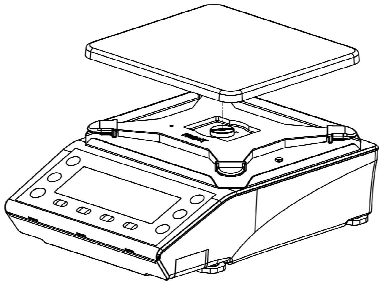
5 **Maintenance method.**

(1) Wipe dirt with dry and soft cloth to the balance.

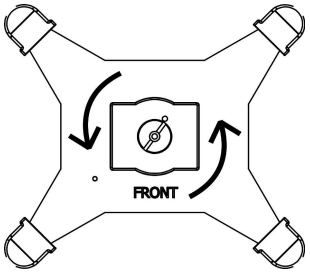
(2) In the case of heavy soil, dismount the weighing pan and/or the pan-base and clean them with a piece of cloth slightly wet with neutral detergent or solvent.

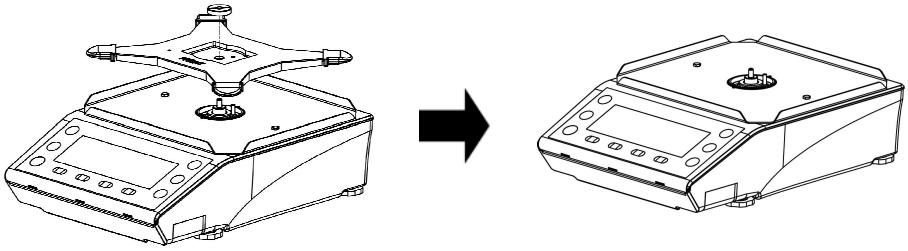
10-2 Simple Method for Maintenance (Square pan type Max 6200–15000g)

1 **Remove the square pan.**



2 **Remove the pan-base.**





3 **Maintenance method.**

(1) Wipe dirt with dry and soft cloth to the balance.

(2) In the case of heavy soil, dismount the weighing pan and/or the pan-base and clean them with a piece of cloth slightly wet with neutral detergent or solvent.

Appendix

Appendix1 Specification

Appendix1-1 Basic Specification

Model	Max (g)	e (g)	d (g)	Weighing range (g)	Accuracy Class	Windshield	Span adjustment
GAL620	620	0.01	0.001	0 - 620.090	II	X	External
GAL6200	6200	0.1	0.01	0 - 6200.90		-	
GAL15000	15000	1	0.1	0 - 15009.0			

Legal Metrology

Span adjustment is limited in accordance with the model.

Model	External	Internal
GAL620	-	-
GAL15000	-	-

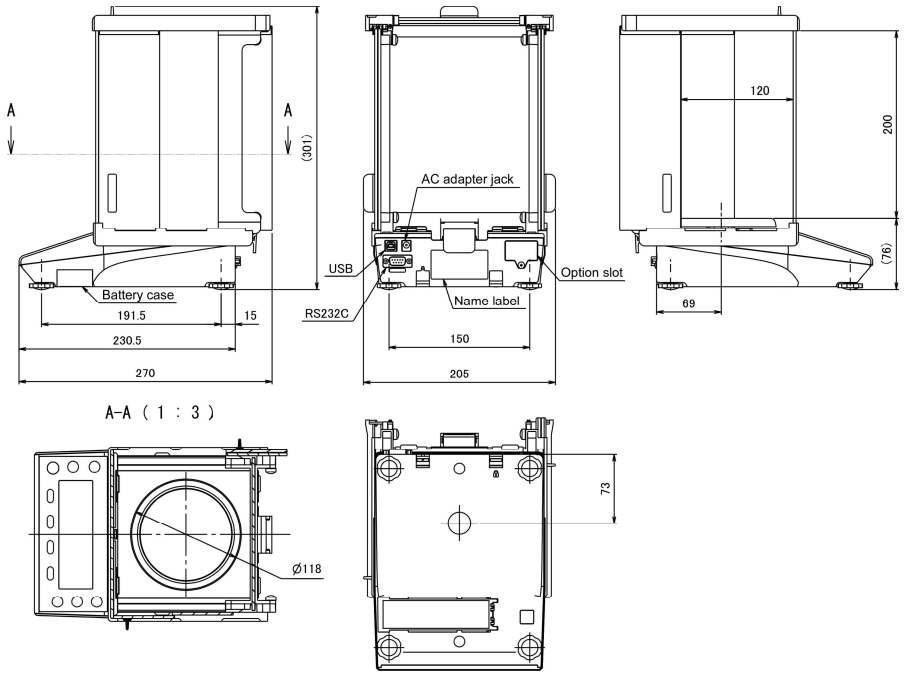
Appendix1-2 Functional specification

Item	Description
Weighing system	Tuning-fork vibration method
Weighing mode	Weighing/Counting/Percentage/Multiplied by Coefficient/animal/Specific gravity (solid)/Statistic/Formulation mode
Function	- Function related to the operation Comparator/Adding/Tare-subtraction reminder/Zero-point adjustment reminder/Stability waiting/Bar graph/Backlight/Auto power-off/Simple SCS
	- Function related to the performance Stability discrimination width/Response speed/Zero tracking
	- User information setting Preset tare/Weight/Percentage/Counting/ Multiplied by Coefficient Comparator
	- Functions related to the lock Total lock release/Key lock/Menu lock
	- Controlling and adjustment functions Key assignment for mode selection/Free key/balance ID/Password/ISO/GLP/GMP output (English, German, Spanish, French, Japanese)/Date/Time setting/Designation of minimum indication/Span adjustment at power on/Direct start
Display	LCD with backlight 7-segment : Maximum 8-digit/Segment height up to 16.5mm 16-segment : Maximum 20-digit/Segment height up to 8.5mm Bar graph : 40-step
Tare range setting	Actual weight subtraction with [Tare] key (Stability waiting: yes/no selectable)
Zero tracking	Provided (Can be disabled via setting)
Display when overloaded	When indication limit is exceeded, <OVER ERROR> is indicated. (See Appendix 1-1 “Basic Specification”.)
Output	RS-232C compliant output is equipped as standard (D-sub9P Male connector) USB (Type B connector)
Span adjustment	External span adjustment and calibration
Counting mode minimum unit weight	GAL620 : 0.001 g GAL6200 : 0.01 g GAL15000 : 0.1 g
Percentage mode Weight limit	GAL620 : 0.1 g GAL6200 : 1 g GAL15000 : 10 g

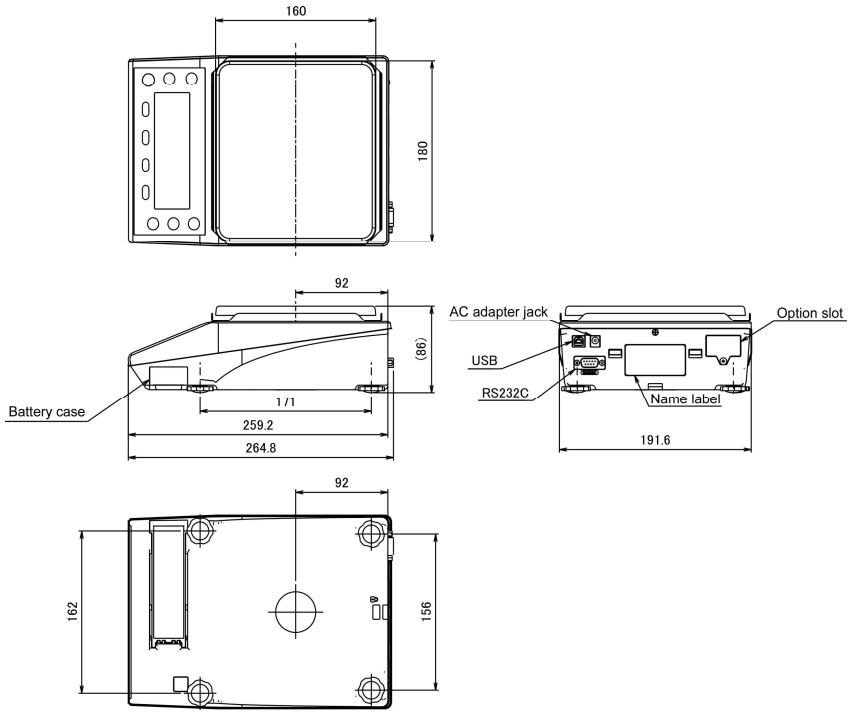
Item	Description
Power	Dedicated AC adapter (100-240VAC / 50-60Hz) Dry cell batteries USB bus power: Connected with PC in which the driver is installed
Ratings	AC adapter jack : 4-6VDC 0.3A Battery box (4 AA batteries) : 4-6VDC 0.3A USB bus power : 5VDC 0.3A (Maximum current consumption)
Dimensions of the weighing pan	GAL620 : φ118mm GAL6200 – GAL15000 : 160 x 180mm
Weight of the balance (NET) (Approximately)	GAL620 : 2.6 kg GAL6200 – GAL15000 : 2.7 kg
Operating condition	Temperature : 5-35° Humidity : 85% RH or lower (no condensation) Pollution degree : 2 Altitude : 2000m or less above sea level location of use : Indoor use only
Option	Extension RS-232C, Relay Contact, Ethernet

Appendix2 Dimensional outline drawing

■ GAL620



■ GAL6200 – GAL15000



Appendix3 Unit conversion table

Unit indication	Conversion coefficient
1 g (gram)	1.00000000E+00
1 ct (carat)	5.00000000E+00
1 lb (pound)	2.20462260E-03
1 oz (ounce)	3.52739610E-02
1 ozt (troy ounce)	3.21507460E-02
1 GN (grain)	1.54323580E+01
1 dwt (penny weight)	6.43014930E-01
1 mom (momme)	2.66666670E-01
1 MSG (mesghal)	2.16999761E-01
1 tlHK (Hong Kong tael)	2.67172510E-02
1 tlSG (Singapore, Malaysia tael)	2.64554710E-02
1 tlTW (Taiwan tael)	2.66666670E-02
1 to (tola)	8.57353240E-02
1 BAHT (baht)	6.59630607E-02
1 mg (milligram)	1.00000000E+03

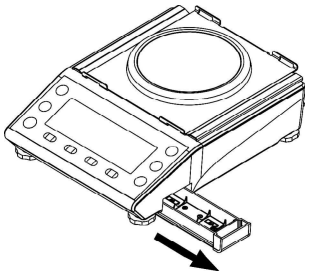
Appendix4 Weighing capacity and readability by unit

Unit	Modello		
	GAL620	GAL6200	GAL15000
g	620 0.001	6200 0.01	15000 0.1
ct	3100 0.01	31000 0.1	75000 1
:b	1.3 0.00001	13 0.0001	33 0.001
oz	21 0.0001	210 0.001	520 0.01
ozt	19 0.0001	190 0.001	480 0.01
GN	9500 0.1	95000 1	230000 10
dwt	390 0.001	3900 0.01	9600 0.1
mom	160 0.001	1600 0.01	4000 0.1
MSG	130 0.001	1300 0.01	3200 0.1
t:H	16 0.0001	160 0.001	400 0.01
t:S	16 0.0001	160 0.001	390 0.01
t:T	16 0.0001	160 0.001	400 0.01
to	53 0.0001	530 0.001	1200 0.01
BAt	40 0.0001	400 0.001	980 0.01
mg	620000 1	6200000 10	15000000 100

Appendix5 Installation of batteries

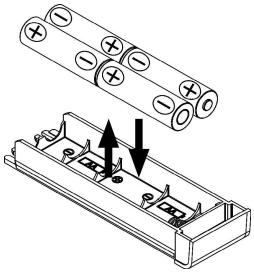
This product can operate with four AA batteries.
Alkaline, manganese, Nickel-metal hydride batteries can be used.

1 Pull out the battery case.



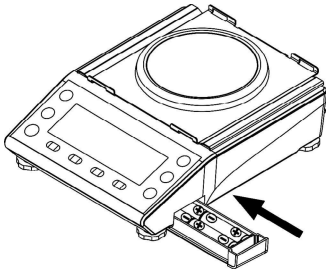
2 Put four AA batteries.

Make sure insert batteries with the positive and negative poles correctly inserted.



3 Insert the battery case.

Insert the battery case until it clicks in place.



When the balance is battery-operated, "" is displayed. It changes in accordance with the remaining battery capacity.

Mark	Description
	The battery level is sufficient.
	The battery level is low.
	The batteries have run down. Replace them with new ones.

Reference Continuous battery runtime: About 150 hours (Alkaline batteries. Backlight and external output: off).

Appendix6 USB communication and bus power input

This product can communicate/power supplied through USB.

CAUTION The internal calibration device cannot be driven with power supplied from USB.

1 Download the USB driver on your PC.

Go to the Website below and download the USB driver.

http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx

2 Install the USB driver on your PC.

Install the USB drive by referring to the Website.

3 Connect the balance to the PC.

Connect the balance with the PC and power on the balance.

4 Set the communication setting of the PC.

For Windows 7:

1) Open the “Device Manager Window”.

1-1) How to open the “Device Manager Window”

Go to “Start Menu”

> Right click the “Computer”

> “Properties”

> “Device Manager”

2) Click the “Port (COM and LPT)” to open the thread and double click the “Silicon Labs CP210x USB to UART Bridge(COM*)” to open the properties window.

3)Go to the “Port” tab

4)Input the communication setting in accordance with the communication settings of the balance (See “6 External input/output functions”).

5 Set the USB power setting of the PC to avoid unexpected shutting down of the balance.

For Windows 7:

1) Go to the “Power Management” tab of the “Silicon Labs CP210x USB to UART Bridge(COM*)” properties window.

2) Uncheck the checkbox of “Allow the computer to turn off this device to save power”, then click the OK button.

Appendix7 Print sample

■GLP header

Japanese	English	French	German	Spanish
ｶﾀｼｷ: ｾｲﾊﾞﾝ ID: ｶｲｼ ﾋﾂﾞｹ: . . ｼﾞｺｸ: :	TYPE: S/N: ID: START DATE: . . TIME: :	TYPE: N.S. ID: DEBUT DATE: . . HEURE: :	TYP: S.NR. ID: START DATUM . . ZEIT: :	TIPO: No S. ID.: INICIO FECHA . . HORA: :

■GLP footer

Japanese	English	French	German	Spanish
ｼｭｳﾘｮｳ ﾋﾂﾞｹ: . . ｼﾞｺｸ: : ｼｮﾒｲ **********	END DATE: . . TIME: : SIGNATURE **********	FIN DATE: . . HEURE: : SIGNATURE **********	ENDE DATUM . . ZEIT: : UNTERSCHRIFT **********	FIN FECHA . . HORA: : FIRMA **********

■Date and Time

Japanese	English	French	German	Spanish
ﾋﾂﾞｹ: . .	DATE: . .	DATE: . .	DATUM . .	FECHA . .
ｼﾞｺｸ: : :	TIME: : :	HEURE: : :	ZEIT: : :	HORA: : :

■Specific Gravity measurement mode (In the case of water temperature input.)

Japanese	English	French	German	Spanish
ｺﾀｲﾋｼﾞｭｳ ｼﾞｭｳﾘｮｳ ｼﾞｽｲｵﾝ	SAMPLE SP GR SAMPLE WEIGHT WATER TEMP	ECHANT.GRAV.SP POIDS ECHANT. TEMPERATURE EAU	BSP. SPEZ. GW. BEISPIELGEWICHT WASSER TEMP.	MUESTRA SP.GR PESO MUESTRA TEMP. DE AGUA

■Specific Gravity measurement mode (In the case of specific gravity of the liquid input.)

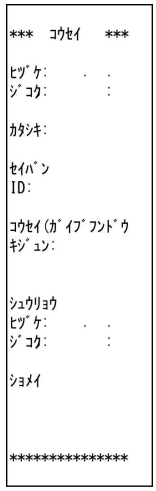
Japanese	English	French	German	Spanish
ｺﾀｲﾋｼﾞｭｳ ｼﾞｭｳﾘｮｳ ﾊﾞｲﾀｲﾋｼﾞｭｳ	SAMPLE SP GR SAMPLE WEIGHT MED.LIQ SP GR	ECHANT.GRAV.SP POIDS ECHANT. LIQU.GRAV.SP	BSP. SPEZ. GW. BEISPIELGEWICHT FL. SPEZ. GW.	MUESTRA SP.GR PESO MUESTRA MED.LIQU.SP.GR

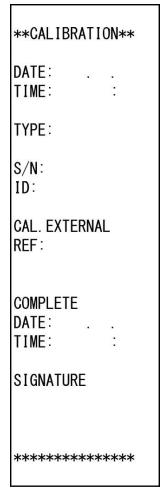
■Statistics mode header

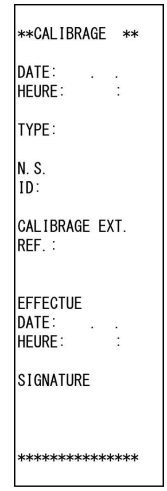
Japanese	English	French	German	Spanish
*** ﾄｳｹｲ ***	**STATISTICS***	* STATISTIQUES*	**WERTE **	* ESTADISTICAS*
ﾋﾂﾞｹ: . .	DATE: . .	DATE: . .	DATUM . .	FECHA . .
ｼﾞｺｸ: :	TIME: :	HEURE: :	ZEIT: :	HORA: :
ｶﾀｼｷ:	TYPE:	TYPE:	TYP:	TIPO:
ｾｲﾊﾞﾝ	S/N:	N.S.	S.NR.	No S.
ID:	ID:	ID:	ID:	ID.:
**********	**********	**********	**********	**********
N	N	N	N	N
SUM	SUM	SUM	SUM	SUM
MAX	MAX	MAX	MAX	MAX
MIN	MIN	MIN	MIN	MIN
R	R	R	R	R
AVE	AVE	AVE	AVE	AVE
SD	SD	SD	SD	SD
CV	CV	CV	CV	CV
**********	**********	**********	**********	**********

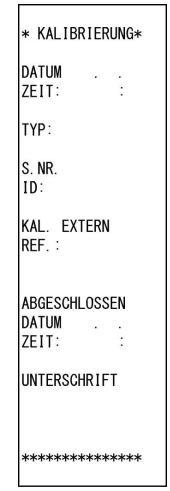
Japanese	English	French	German	Spanish

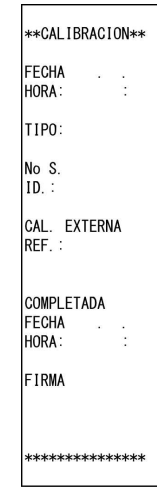
■Span adjustment result output with an external weight



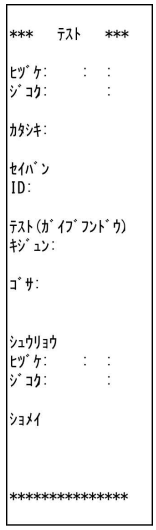


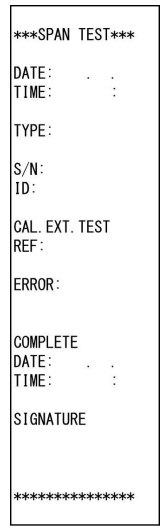


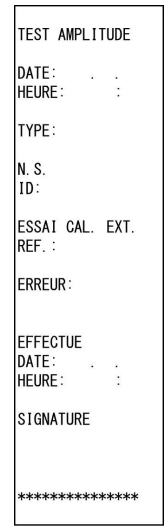


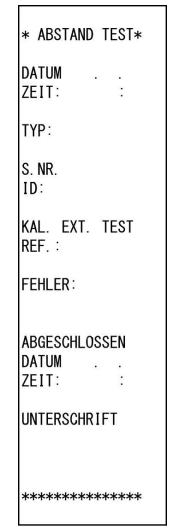


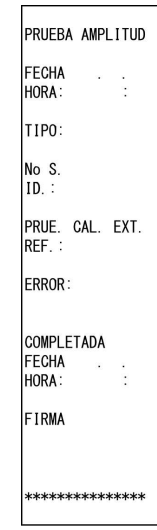
■Span test result output with an external weight











■Span adjustment result output with an internal weight

Japanese	English	French	German	Spanish
*** ｺｳｾｲ ***	**CALIBRATION**	**CALIBRAGE **	* KALIBRIERUNG*	**CALIBRACION**
ﾋﾂﾞｹ: . .	DATE: . .	DATE: . .	DATUM . .	FECHA . .
ｼﾞｺｸ: :	TIME: :	HEURE: :	ZEIT: :	HORA: :
ｶﾀｼｷ:	TYPE:	TYPE:	TYP:	TIPO:
ｾｲﾊﾞﾝ	S/N:	N.S.	S.NR.	No S.
ID:	ID:	ID:	ID:	ID.:
ｺｳｾｲ(ﾅｲﾌﾞﾌﾝﾄﾞｳ)	CAL.INTERNAL	CALIBRAGE INT.	KAL. INTERN	CAL. INTERNA
ｷｼﾞｭﾝ:	REF:	REF.:	REF.:	REF.:
ｼｭｳﾘｮｳ	COMPLETE	EFFECTUE	ABGESCHLOSSEN	COMPLETADA
ﾋﾂﾞｹ: . .	DATE: . .	DATE: . .	DATUM . .	FECHA . .
ｼﾞｺｸ: :	TIME: :	HEURE: :	ZEIT: :	HORA: :
ｼｮﾒｲ	SIGNATURE	SIGNATURE	UNTERSCHRIFT	FIRMA
**********	**********	**********	**********	**********

■Span test result output with an internal weight

*** ﾃｽﾄ ***	***SPAN TEST***	TEST AMPLITUDE	* ABSTAND TEST*	PRUEBA AMPLITUD
ﾋﾂﾞｹ: : :	DATE: . .	DATE: . .	DATUM . .	FECHA . .
ｼﾞｺｸ: :	TIME: :	HEURE: :	ZEIT: :	HORA: :
ｶﾀｼｷ:	TYPE:	TYPE:	TYP:	TIPO:
ｾｲﾊﾞﾝ	S/N:	N.S.	S.NR.	No S.
ID:	ID:	ID:	ID:	ID.:
ﾃｽﾄ(ﾅｲﾌﾞﾌﾝﾄﾞｳ)	CAL.INT.TEST	ESSAI CAL. INT.	KAL. INT. TEST	PRUE. CAL. INT.
ｷｼﾞｭﾝ:	REF:	REF.:	REF.:	REF.:
ｺﾞｻ:	ERROR:	ERREUR:	FEHLER:	ERROR:
ｼｭｳﾘｮｳ	COMPLETE	EFFECTUE	ABGESCHLOSSEN	COMPLETADA
ﾋﾂﾞｹ: : :	DATE: . .	DATE: . .	DATUM . .	FECHA . .
ｼﾞｺｸ: :	TIME: :	HEURE: :	ZEIT: :	HORA: :
ｼｮﾒｲ	SIGNATURE	SIGNATURE	UNTERSCHRIFT	FIRMA
**********	**********	**********	**********	**********

■Calibration result output of the internal weight

Japanese	English	French	German	Spanish
ﾅｲﾌﾞﾌﾝﾄﾞｳｺｳｾｲ ﾋﾂﾞｹ: : : ｼﾞｺｸ: : ｶﾀｼｷ: ｾｲﾊﾞﾝ ID: ｷｼﾞｭﾝ: ｼｭｳﾘｮｳ ﾋﾂﾞｹ: : : ｼﾞｺｸ: : ｼｮﾒｲ **********	****REF.CAL**** DATE: . . TIME: : TYPE: S/N: ID: REF: COMPLETE DATE: . . TIME: : SIGNATURE **********	**REF.CAL. ** DATE: . . HEURE: : TYPE: N.S. ID: REF.: EFFECTUE DATE: . . HEURE: : SIGNATURE **********	**REF.KAL. ** DATUM . . ZEIT: : TYP: S.NR. ID: REF.: ABGESCHLOSSEN DATUM . . ZEIT: : UNTERSCHRIFT **********	**REF.CAL. ** FECHA . . HORA: : TIPO: No S. ID.: REF.: COMPLETADA FECHA . . HORA: : FIRMA **********

■Formulation mode header

*** ﾊｲｺﾞｳ *** ﾋﾂﾞｹ: : : ｼﾞｺｸ: : ｶﾀｼｷ: ｾｲﾊﾞﾝ ID: **********	**FORMULATION** DATE: . . TIME: : TYPE: S/N: ID: **********	**FORMULATION** DATE: . . HEURE: : TYPE: N.S. ID: **********	* FORMULIERUNG* DATUM . . ZEIT: : TYP: S.NR. ID: **********	**FORMULACION** FECHA . . HORA: : TIPO: No S. ID.: **********

■Formulation mode footer

N T ｺﾞｳｹｲ N ｺﾞｳｹｲ ｼｮﾒｲ **********	N T TOTAL N TOTAL SIGNATURE **********	N TOTAL BRUT TOTAL NET SIGNATURE **********	N TARA GESAMT NETTO GESAMT UNTERSCHRIFT **********	N TOTAL TARA TOTAL NETO FIRMA **********

■Net value and tare value output in Formulation mode

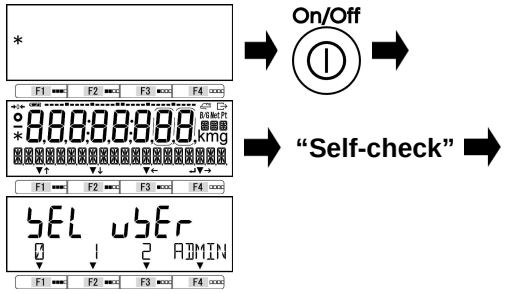
N	N	N	N	N
T	T	B	T	T

Appendix8 Balance operation with password control function

This chapter describes how to use the balance with “8-5-2 Password control”. This function is useful for setting different authority for each user/guest.

Appendix8-1 User’s authority setting

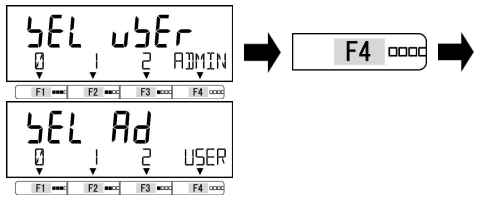
1 Power on the balance.



Enable the <642 PASSWORD> and regist the administrator password in <643 SET ADMIN PASS>, then power-off the balance.

Push [On/Off] key, then the balance shifts to User login mode after start-up operation.

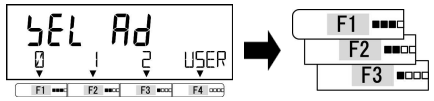
2 Go to the Administrator login mode.



Push [F4] key to go to “Administrator login mode”.

<SEL Ad> is indicated on the 7-segment display.

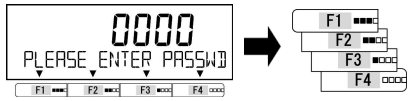
3 Select the user to set the authority.



Select the user

0 : Guest user
1 : User 1
2 : User 2
USER : Shift to the User login mode

4 Input the administrator password.



Input the administrator password by pushing [F1-F4] keys.

Each digit increment as “0, 1, …, 8, 9, 0” by pushing each [F] key.

First digit from the left : [F1] key
Second digit from the left : [F2] key
Third digit from the left : [F3] key
Fourth digit from the left : [F4] key

5 Start up the balance.

Push [Zero] key.

When the password is authenticated, the balance starts up.

6 Register the user password.

Refer to “8-5-2 User password registration”.

Reference

(1) The user password of which selected in Step 3 is registered.
(2) When “0: Guest user” is selected at step 3, skip this step.

7 **Set the functions and setting values which are intended to be fixed.**

Refer to “3 Functions related to the operation”, “4 Functions related to the performance”, “5 User information setting”, “6 External input/output functions” and “8 Controlling and adjustment functions” to set functions/setting values to be fixed.

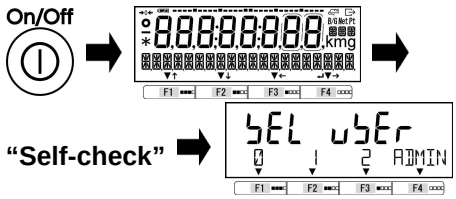
Reference	<5 LOCK> and <6 ADMIN/ADJUST> are displayed only for the administrator. When to authorize each user to operate “Span adjustment with internal/external weight”, “Adding function”, etc., please assign the functions to <<F1-F6>> (Free key). (Refer to “8-3 Free key settings”.)

8 **Set the user’s authority (Lock setting).**

Refer to “7 Functions related to the lock” to set user’s authority for key operation and/or accessing to setting menus.

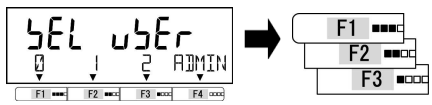
Appendix8-2 User/guest login

1 **Power on the balance and go to the User login mode.**



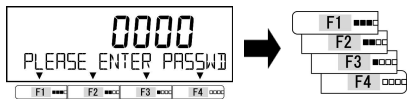
Push [On/Off] key, then the balance shifts to User login mode after start-up operation.
<SEL USER> is indicated on the 7-segment display.

2 **Select the user number.**



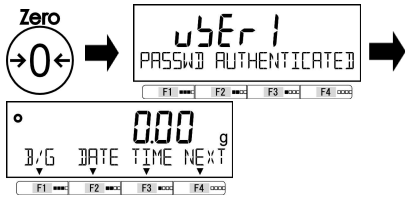
Select the user (operator) number;
0: Guest user
1: User 1
2: User 2
ADMIN: Shift to the Administrator login mode

3 **Input the user password.**



Input the user password by pushing [F1-F4] keys.
Each digit increment as “0, 1, …, 8, 9, 0” by pushing each [F] key.
First digit from the left : [F1] key
Second digit from the left : [F2] key
Third digit from the left : [F3] key
Fourth digit from the left : [F4] key

4 **Start up the balance.**



Push [Zero] key.
When the password is authenticated, the balance starts up.

5 **Use the balance with the user’s/guest’s authority.**

Lock setting configured by administrator is reflected.

Reference	When “0: Guest user” is selected at step 2, step 3 and 4 are skipped.

Appendix9 Abbreviations

Abbreviations in the 16-segment messages	Descriptions
ANIM	Animal mode
B/G	Net/Gross display switching
CAL	Span adjustment(Calibration) by external weight
COEF	Coefficient
COEFF	Coefficient
COEFF NO YES	Employ(YES) or not(NO) the displayed coefficient
COUN	Counting mode
CSET	Indicate the settled coefficient
CV RET	Coefficient of Variation
DEL	Delete
DIRECT ST	Direct start
DISP	Display
DSP OVER RET	The addition result or calculation result has exceeded the maximum display digit
F/*	Weight / Weight multiplied by coefficient display switching
FORM	Formulation mode
GLPF	GLP footer output
GLPH	GLP header output
g/P	Weight of samples /Number of samples display switching
HI	High
HIGH	Exceeding the upper limit / Upper limit setting
H/L	High/Low
ICAL	Span adjustment(Calibration) with internal weight
ID	Identity Number of the balance
INPUT CAL WEIGHT	Input the calibration weight used for span adjustment by external weight
INSTRUMENTAL ER RET	Instrumental error result indication
INT CAL	Span adjustment(Calibration) with internal weight
INT SPAN TEST	Span test with internal weight
MAX RET	Maximum
MEM CLEAR YES NO	Memory clear(YES) or not(NO)
MID	The activation of the animal is medium
MIN RET	Minimum
MULT	Multiplied by Coefficient mode
MULTIPLY MODE	Multiplied by Coefficient mode
NUM	Numeric value setting
LO	Lower limit
LOW	Below the lower limit / Lower limit setting
ON 100% WEIGHT OK	Put the reference weight on the weighing pan to set at Percentage mode
ON HIGH WEIGHT OK	Put the weight on the weighing pan to set the upper limit
ON LOW WEIGHT OK	Put the weight on the weighing pan to set the lower limit
ON PRESET WEI OK	Put the tare on the weighing pan to set at Preset tare mode
ON REF WEIGHT OK	Put the reference weight on the weighing pan to set at Comparator mode
ON SAMPLE ENT	Put the samples on the weighing pan to calculate unit weight at Counting mode
onW	Actual value setting
OP	Optional interface

Abbreviations in the 16-segment messages	Descriptions
PCNT	Percentage mode
PCSW	Unit weight
PLEASE SET COEFF	Please input the coefficient
PLEASE SET UNIT WEI	Please input the unit weight
POUT	Printout the result
PRT LANG	Printing Language
READ	Readability setting
READABILIT	Readability
REF WGT NO YES	Employ(YES) or not(NO) the displayed reference weight
RELAY	Relay Contact output
RET	Return / Fix the input
REF	Reference
RESP	Response speed setting
RMEM	Change the unit weight
RSET	RESET
SD RET	Standard Deviation
SELECT MIN	Select the minimum interval for rounding the weight of the external weight
SET 100%	Set reference weight of Percentage mode
SET ADMIN PASSWORD	Register the administrator password
SET SP GR VALUE	Input the specific gravity of the media liquid
SETTING on VAR	Set number of the samples manually
SETTING PCSWGT	Input the unit weight by numeric input
SG	Specific gravity (Relative density)
SPAN OUT	Output the span adjustment /test result
SP GR	Specific gravity (Relative density)
SPGR	Specific gravity (Relative density) measuring mode
STAT	Statistics mode
TARE	Tare subtraction
TOTL	Sum total
TOUT	Output the Tare weight
T REMINDER	Tare subtraction reminder
UNIT WGT NO YES	Employ(YES) or not(NO) the displayed unit weight
WAIR	Weight in the air
WEI	Weight
WEG	Weight
WEIG	Weighing
WGT	Weight
WLIQ	Weight in the media liquid/water
ZERO	Zero-point adjustment
Z REMINDER	Zero-point adjustment reminder

Index of Terms