Intrinsically Safe Explosion-proof Electronic Balance

AZ Series

Operation Manual

WARNING

- 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.

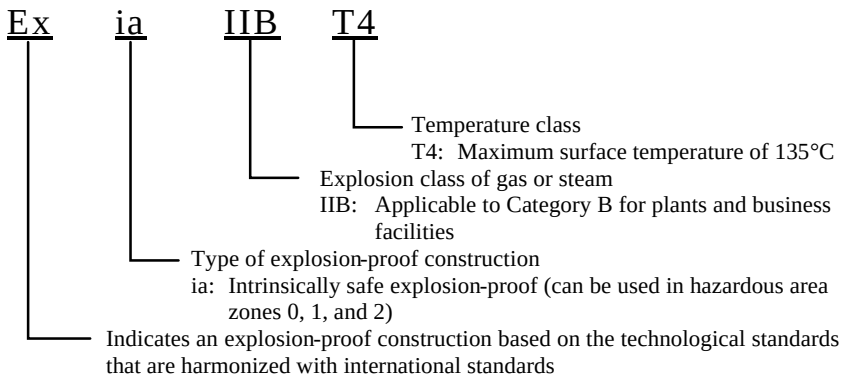
SHINKO DENSHI CO., LTD.

Introduction

This product is an explosion-proof electronic balance conforming to the Constructional Requirements for Electrical Equipment for Explosive Atmospheres by the Ministry of Health, Labour and Welfare of Japan.
It has been confirmed that the balance does not generate electric sparks or explode due to a rise in the temperature of its parts whether in a normal or abnormal (failure) state when used in an explosive gas atmosphere.

This document explains the operation and notes on the use of the AZ Series intrinsically safe explosion-proof electronic balance.
Carefully read this document before using the balance in order to use it efficiently. After reading this document, please keep it at hand for future reference.

[Certified explosion-proof class]



Instructions

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- We will provide support services in accordance with individual maintenance contracts for any failure of the main unit or system. However, we are not responsible for any losses or damages including the suspension of your work resulting from a failure of the main unit or system.
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Important Notice

WARNING

- Please be aware that the balance is potentially hazardous. When installing, operating, maintaining, or inspecting the balance, be sure to do so in accordance with this document.
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- The current industrial equipment industry is faced with an increasing number of potential risks due to the use of new materials or processes, and increase in the speed of machines used. It is not possible to predict the circumstances surrounding all of these risks. In addition, because there are a number of things that cannot or should not be performed with the balance, it is not possible to list them all in this operation manual. For this reason, assume any action not explicitly described as possible is not possible. When installing, operating, or maintaining/inspecting the balance, please take sufficient safety measures in addition to observing the instructions in this document and notes displayed on the balance.
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- If you have a question on this document or need further information, please contact the Sales Office at which you purchased your unit and inform them of the model number and manufacturer's serial number.

Laws and Regulations Pertaining to Balances

NOTE

- Please note that you cannot use the balance you have purchased for trading and certification.

How to Use This Manual

■ Symbols used in this manual

Understand what the following symbols indicate and follow the instructions in this document.

Symbol	Meaning
WARNING	WARNING is used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	CAUTION is used to indicate a situation which, if not avoided, will cause damage to equipment or devices, or corruption, erasure or overwriting of data.
NOTE	NOTE is used to call particular attention to or emphasize information.
Reference	Reference is used for useful information for the operation of the balance.
	Indicates a “prohibited” action.
	Indicates a “mandatory” action that must be executed without fail.

■ How to read this manual

This manual comprises the following chapters:

Chapter 1 How to Begin	This chapter gives introductory information such as how to assemble and install the balance, and how to turn the power on and off. For your first use of the balance, be sure to read this chapter.
Chapter 2 Basic Operation	This chapter gives basic instructions for how to weigh objects. The procedures for setting the function capabilities used to set various functions are also described.
Chapter 3 Various Measuring Methods	This chapter describes how to use various measuring methods available for the balance, such as parts counting and percentage weighing.
Chapter 4 Adjusting the Balance	The balance needs adjustment depending on where and when it is used. This chapter describes how to calibrate the balance.
Chapter 5 Function Setting	This chapter describes how to set various functions of the balance, such as setting units and minimum readability.
Chapter 6 Troubleshooting	This chapter describes how to troubleshoot problems occurring with the balance, including actions required for errors, and trouble remedies.
Appendixes	Required data including the specifications of the balance is described.
Index of Terms	Relevant pages can be searched for through indexed terms.

■ Notational conventions

In this manual, the following notation is used.

The balance	Refers to an AZ series product.
Measure	Refers to measuring a sample by placing it on the pan. Other expressions such as “weigh” and “measure weight” may also be used.
[Function] key	The names of the operation keys provided on the front of the main unit are expressed in brackets [ ].
“Func”	The messages shown on the display are expressed in quotation marks “ ”.
Press the key.	Refers to giving a light press of the key.
Press and hold the key.	Refers to holding down the operation key and releasing the key after an intended display is obtained.

Contents

(Notes)

1 How to Begin

1-1 Instructions for Proper Use

WARNING

■ Do not disassemble or modify the unit

Unless otherwise noted in this document, do not disassemble, modify, install unspecified parts, or remove any parts of the unit. Doing so could cause serious accidents leading to injury.

■ Do not use the unit in unusual conditions

If smoke or any unusual smell is detected, please contact our Sales Office or Technical Service Division for repair of the unit. Continuing to use the unit could result in fire or an electrical shock. In addition, never repair the unit by yourself as it is dangerous.

■ Do not touch the electrodes with wet hands

Electrical shock or short circuit could be caused.

CAUTION

■ Never use thinner and the like to clean the unit

The unit may be discolored. Wipe with a dry, soft cloth, or use a neutral detergent.

■ Do not apply a physical shock to the balance

Doing so could cause damage to the unit and deteriorate its measuring performance.

■ Do not submerge the balance in water

This balance cannot resist high hydrostatic pressure due to submersion in water, etc.

■ Do not leave the balance with samples on the pan

Doing so could cause the balance to malfunction or deteriorate its measuring performance.

■ Always use the balance in a horizontal position

An inclination of the balance may cause errors, resulting in inaccurate measurements.
Install the balance on a solid place (Refer to “Section 1-8: Assembling and Installing the Balance” (P. 11)).

DANGER (Warnings regarding batteries)

	■ **Replace batteries at "nonhazardous places"** Replacing batteries at hazardous places could cause accidents, such as explosion or fire.
	■ **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.

CAUTION (Cautions regarding batteries)

	■ **Do not mix old and new batteries, or batteries of different types or manufacturers** Such mishandling could damage the batteries, or cause the balance to fail.
	■ **Do not use batteries that leak**
	■ **Dispose of batteries in accordance with local regulations**
	■ **Do not put the batteries into a fire** They may explode.
	■ **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**

1-2 Instructions for Proper Installation

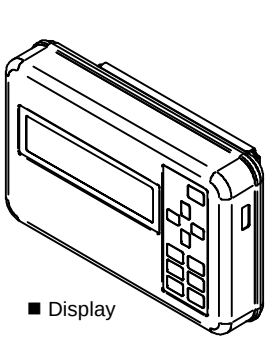
Avoid installing the balance in the following places. Installing the balance in such places may result in inaccurate measurements.

- Places where the temperature is low or high, or the humidity is high
- Places where the balance will be subjected to direct sunlight
- Places where there is much vibration (including places where the floor or base is unstable)
- Places where the balance will be directly exposed to wind, cool air, or heated air (places where the balance will be directly exposed to cool air from air conditioners or refrigerators, heated air from air conditioners or heaters, or wind from fans, etc.)
- Places where there is excessive dust
- Places where there are high levels of noise
- When carrying the balance, hold the lower parts of the pole base and weighing section to lift the balance. Holding other parts such as the pole to carry the balance may damage the balance.
- After installing the balance, leave it for a while at room temperature before using it.

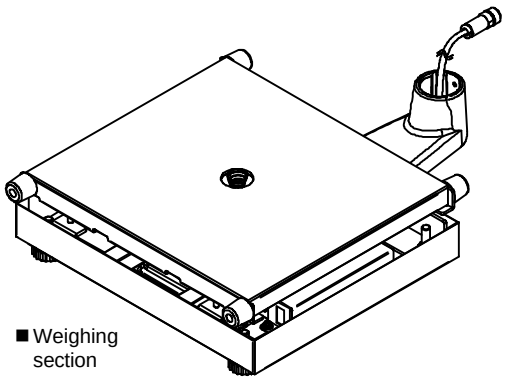
1-3 Checking Supplied Items

The following items are contained in the box. In the unlikely event of problems such as missing or broken items, please contact the retailer from whom the balance was purchased.

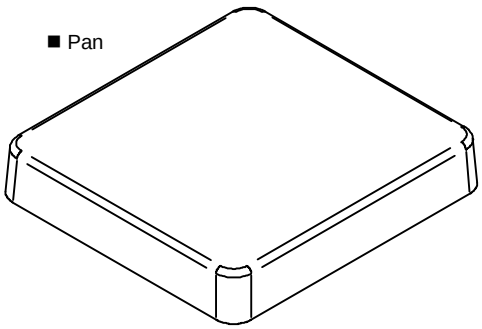
● AZ-B6000 to AZ-B150K



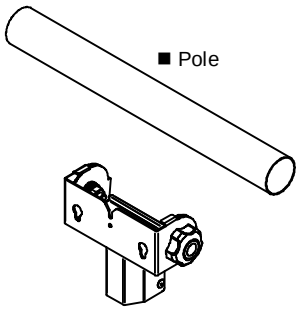
■ Display



■ Weighing section

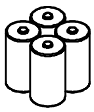


■ Pan



■ Pole

■ Angle adjuster



D batteries
(4)

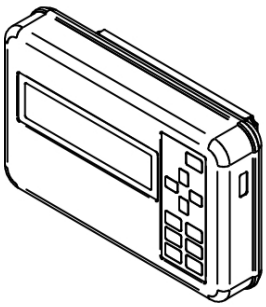
* Batteries that come with the balance are for checking operation.

Display fixing screw
(1)

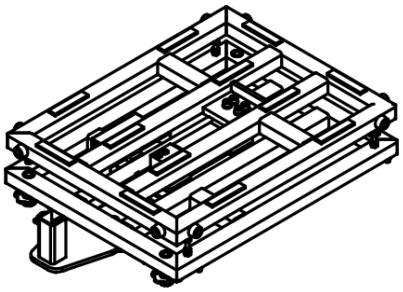
Pole fixing screws
(4)

Hexagonal wrench
(2.5 mm/3 mm)

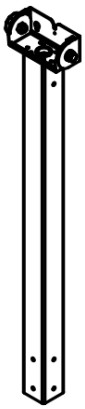
● AZ-B450K



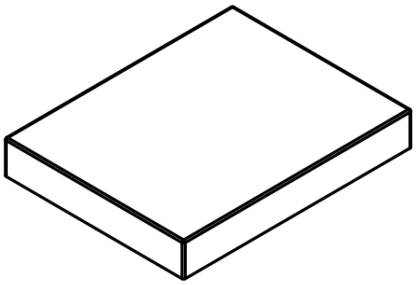
■ Display



■ Weighing section

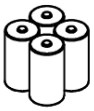


■ Pole



■ Pan

Hexagonal wrench
(3 mm)



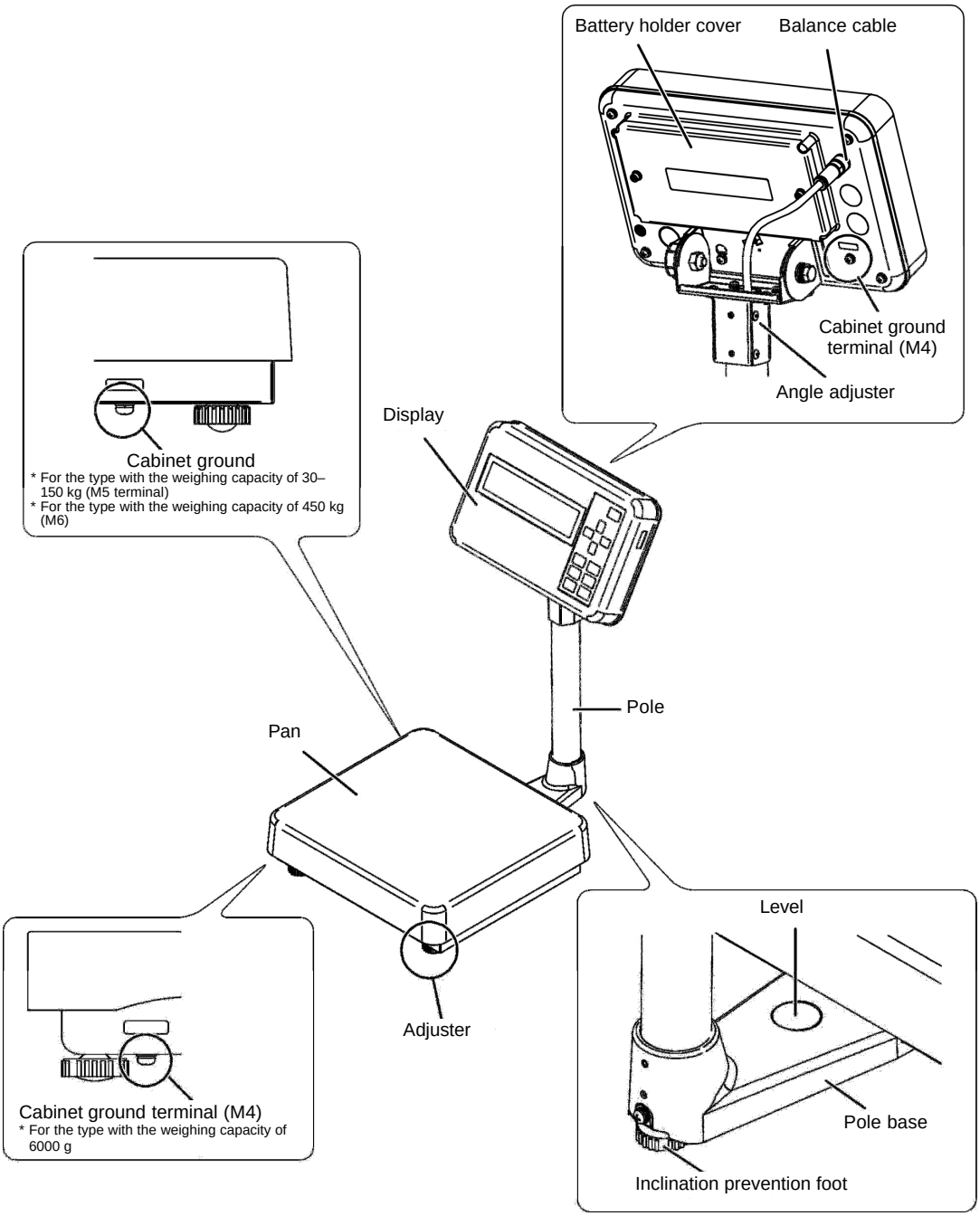
D batteries
(4)

* Batteries that come with the balance are for checking operation.

Display fixing screw
(1)

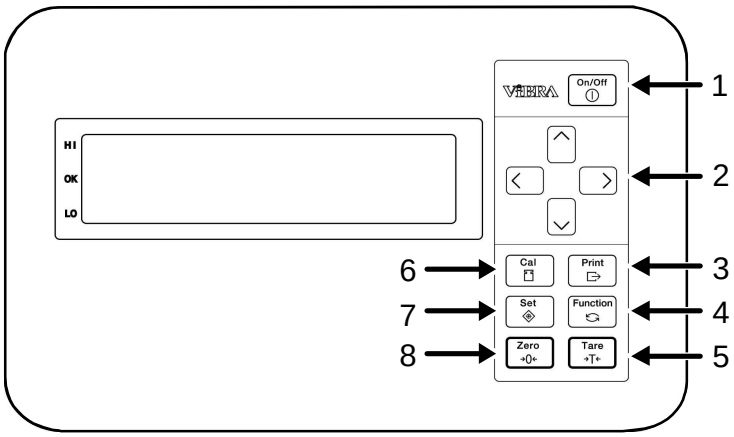
Pole fixing screws
(M4 × 10, double sems, 4)

1-4 Names and Functions of Component Parts



1-5 Workings of Operation Keys

The operation keys are provided on the front of the main unit. Use these keys to operate and set the balance.



Types and names of keys		Function
1	[On/Off] key	Use to power on/off the balance.
2	Direction key	Use to set the function setting, etc.
3	[Print] key	Use for printing or other purposes.
4	[Function] key	Use to switch measurement modes and to call a function.
5	[Tare] key	Use to set the tare range.
6	[Cal] key	Use to start calibration.
7	[Set] key	Use to start settings.
8	[Zero] key	Use to adjust the zero-point.

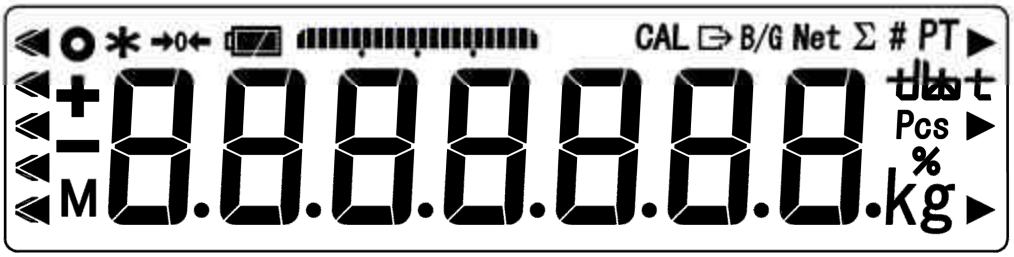
Reference

In some operation keys, executed functions depend on how they are pressed.
In this manual, how keys are pressed is expressed as follows:

- Quick press: Lightly press and then quickly release the key. “Press a key” refers to quick press.
- Press and hold: Hold the key down and release it after the appropriate display is obtained.

1-6 How to Read Displayed Signs

Each of the signs displayed on the front of the main unit has the following meanings:

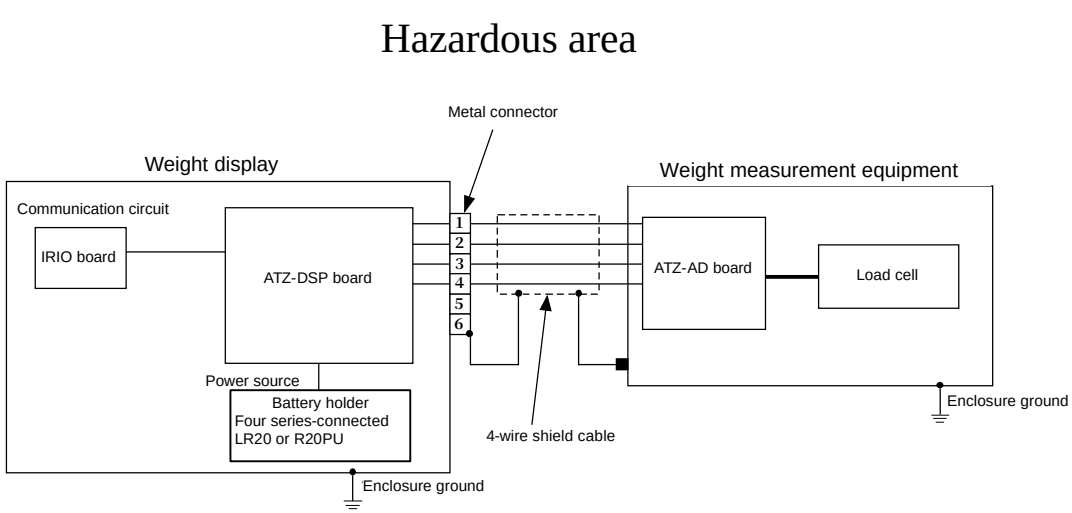


Displayed sign	Description
◎	The stable state indicator (lights up when the balance is stable).
−	Minus.
M	Indicates that settings are being saved, the zero-point is being adjusted, and the balance is waiting for stabilization upon tare range setting.
→0←	Zero-point.
Net	Indicates that a tare range is being set and indicates net weight.
B/G	Indicates total weight (gross weight).
PT	Indicates preset tare.
CAL	Indicates that calibration is being executed.
◀	Indicates that the limit function is being used.
	Bar graph.
⎘	Indicates that measurement data and a GLP compliance form is being output.
Pcs	Parts counting mode.
%	Percentage weighing mode.
#	Unit covering mode.

Σ	Indicates sum totals.
*	Indicates that the addition function is enabled when the balance is in addition mode. Indicates that the balance is standing by.
◀ (Upper)	Indicates that an ID number is being displayed or entered.
d	Indicates that weight is being displayed in the gravimeter mode.
dt	Indicates that actual water temperature (unit: °C) is being entered in the gravimeter mode.
(Lower) ◀ d	Indicates that midair weight has been saved in the gravimeter mode.
d ▶ (Upper)	Indicates that the balance is displaying in gravimeter mode (no units).
d ▶ (Lower)	Indicates that the density of a medium (unit: g/cm^3) is being entered.
g	Grams
kg	Kilograms
	Displayed when the balance is powered by batteries. As remaining battery time declines, the display changes  →  →  (blinking). When  (blinking) is displayed, replace the batteries soon.

1-7 Installation Requirements and Instructions

1-7-1 Installation requirements (Explosion-proof specification)



- The inductance of the special cable (balance cable): 1 mH or less
- The capacitance of the special cable (balance cable): 1 µF or less
- Use one of the following batteries as these can be installed in the battery case:

D alkaline battery (LR20): four series-connected
D manganese battery (R20PU): four series-connected

- Replacing batteries in hazardous areas is prohibited.

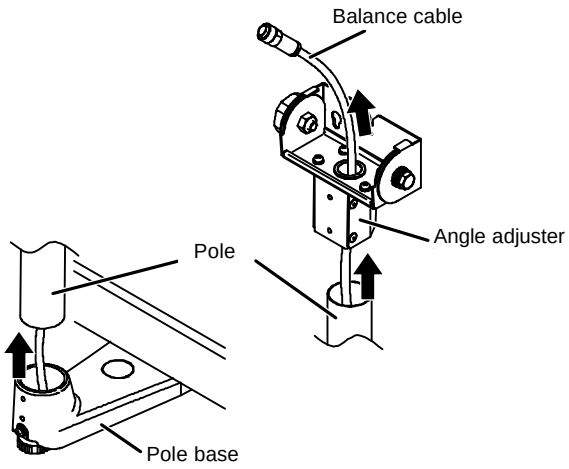
1-7-2 Instructions for proper installation

1. Be sure to replace batteries in non-hazardous areas.
   D alkaline batteries or D manganese batteries (black) can be used.
2. Separate the balance cable from the motor power line and other wiring cables.
   Otherwise, electrostatic induction and electromagnetic induction may damage the intrinsically safe explosion-proof performance. Wire the balance cable with sufficient distance from other cables.

1-8 Assembling and Installing the Balance

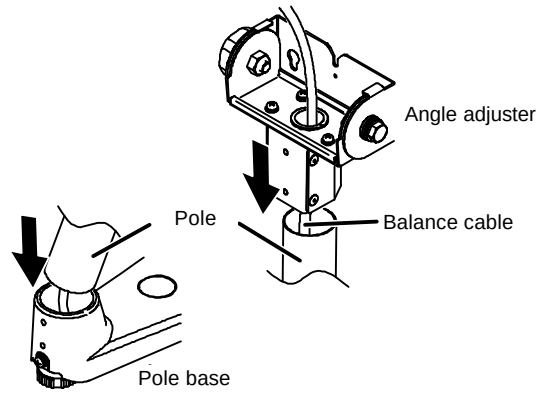
1-8-1 Attaching the pole (AZ-B6000 to AZ-B150K)

1 Thread the balance cable.



Thread the balance cable that comes out from the pole base through the pole and the angle adjuster.

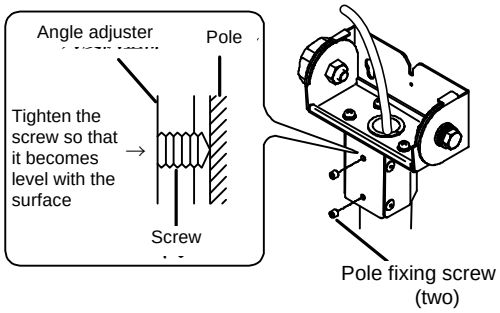
2 Attach the pole and the angle adjuster.



Insert the pole into the pole base hole with the cable in it.

Then, insert the angle adjuster into the pole head.

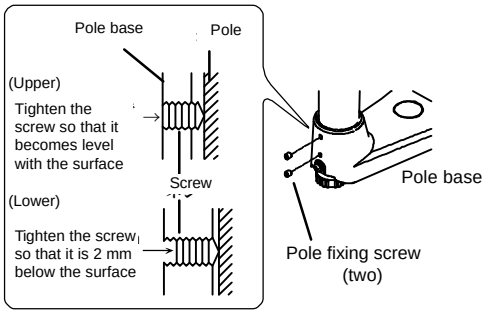
3 Fix the angle adjuster.



Use the pole fixing screws to fix the angle adjuster to the pole. Use a 2.5 mm hexagonal wrench.

Tighten the pole fixing screws so that they are level with the surface of the angle adjuster.

4 Fix the pole.



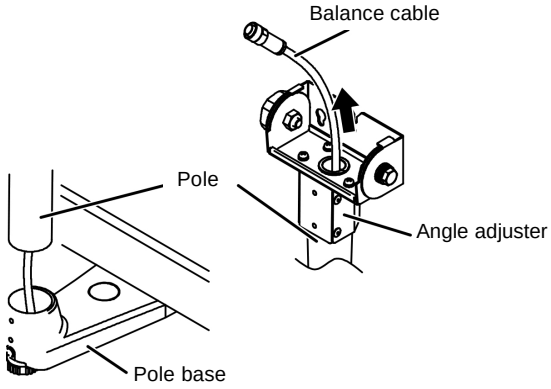
Use the pole fixing screws to fix the pole to the pole base. Use a 2.5 mm hexagonal wrench.

Tighten the upper pole fixing screw so that it is level with the surface of the pole base.

Tighten the lower pole fixing screw so that it is 2 mm below the surface of the pole base.

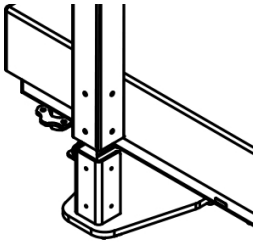
1-8-2 Attaching the pole (AZ-B450K)

1 Thread the balance cable.



Thread the balance cable that comes out from the pole base through the pole and the angle adjuster.

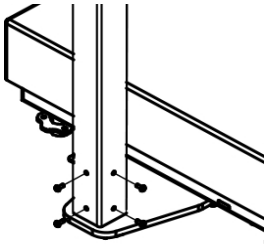
2 Attach the pole to the pole base.



Insert the pole into the pole base with the cable in it.

> **CAUTION**
>
> Be careful not to pinch the balance cable.

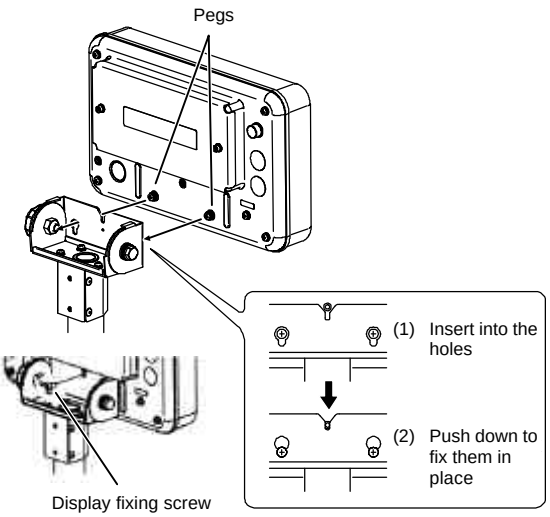
3 Fix the pole.



Use the pole fixing screws to fix the pole to the pole base (at four points).

1-8-3 Attaching the display

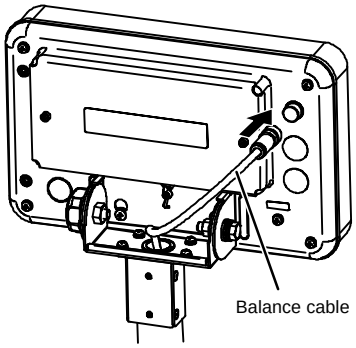
1 Attach the display.



Insert the two pegs provided on the lower part of the back of the display into the holes of the angle adjuster and push the display downward.

Use the display fixing screw to fix the display in place.

2 Connect the cable.



Connect the balance cable to the port on the back of the display.

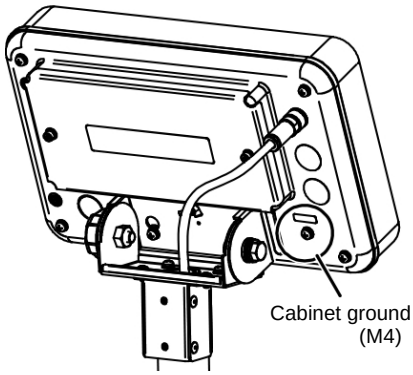
Tighten the connector screw to fix the cable in place.

CAUTION

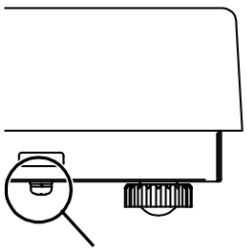
Securely fix the balance cable.

3 Connect the cabinet ground terminal.

■ Back of the display



■ B Bottom of the weighing section



Cabinet ground terminal
M4 = Weighing capacity: 6000 g
M5 = Weighing capacity: 30–150 kg
M6 = Weighing capacity: 450 kg
* Location of the terminal varies depending on the model.
(Refer to P. 6.)

Use the screw that comes with the ground terminal or a screw equivalent to it to connect the terminal.

The location of the ground terminal at the bottom of the weighing section and the type of screw to be used vary depending on the model. Refer to “Section 1-4: Names and Functions of Component Parts” (P. 6) for the location of the ground terminal.

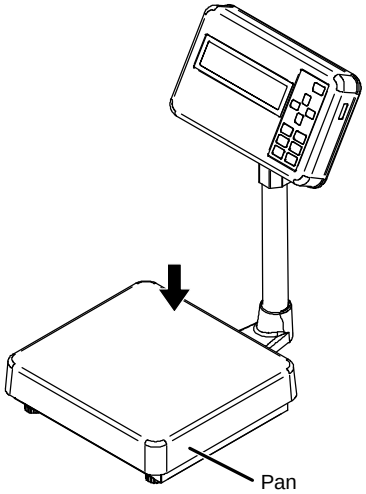
? Screw type

M4: M4 × 10, pan head, flat, with spring washer, made of stainless steel

M5: M5 × 12, pan head, flat, with spring washer, made of stainless steel

M6: M6 × 20, pan head, flat, with spring washer, made of stainless steel

4 Put the pan on the balance.

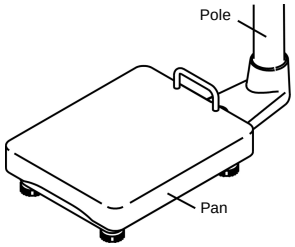


Put the pan on the weighing section.

Be careful of the orientation of the pan.

● When the weighing capacity is 6000 g

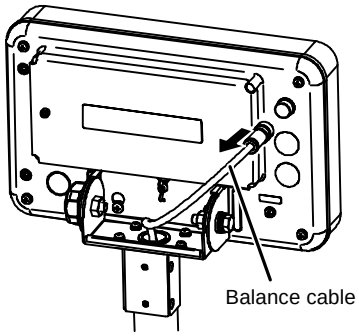
Put the pan as shown in the figure below, so that the bar mounted on the pan is on the pole side.

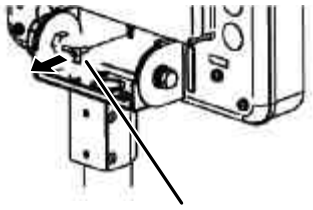


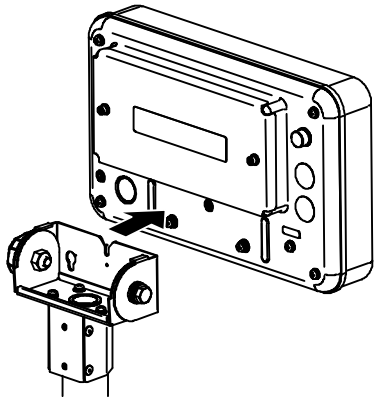
1-9 Replacing the Batteries

!	■ **When replacing the batteries, be sure to move the detached display to a nonhazardous area.** Replacing the batteries in hazardous areas can cause accidents, such as explosion or fire.
	■ **D manganese batteries (black) (R20PU) or D alkaline batteries (LR20) can be used.**

1 Remove the display.



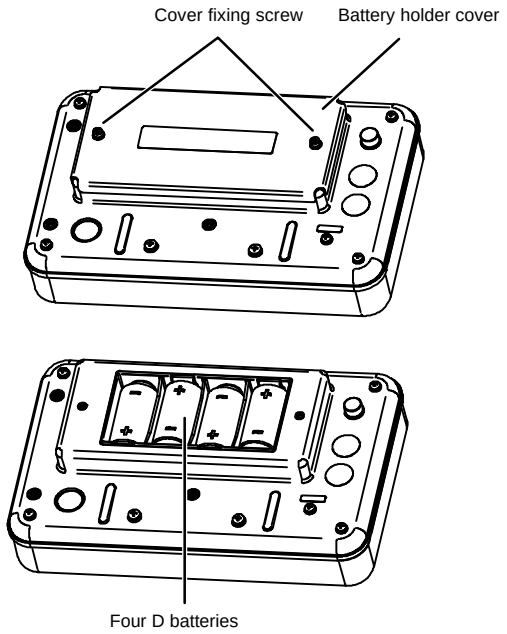




Remove the balance cable from the port on the back of the display.

Remove the display fixing screw from the back of the display and remove the display from the angle adjuster.

2 Remove the battery holder cover and replace the batteries.



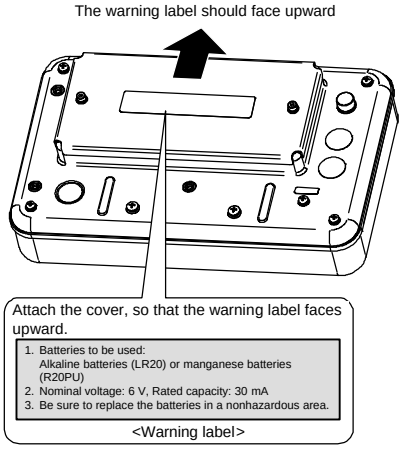
> **CAUTION**
>
> Be sure to move the display to a nonhazardous area before replacing the batteries.

Use a 3 mm hexagonal wrench to remove the two cover fixing screws from the back of the display and then remove the battery holder cover.

Place four new D batteries in the correct directions after checking the polarity (+ and -).

> **CAUTION**
>
> Use the cover fixing screws that come with the balance or equivalent screws. M4 × 10, hexagon socket head cap screw, flat, with spring washer, made of stainless steel

3 Use the screws to fix the battery holder cover and fix the display to the angle adjuster.



Put the battery holder cover on and use the cover fixing screws to fix it.

Attach the display to the angle adjuster and use the display fixing screws to fix the display.

> **CAUTION**
>
> Attach the battery holder cover, so that the letters on the warning label face upward.

1-10 Leveling the Balance

Use the balance in a horizontal position.

● AZ-B6000

Level the main unit by adjusting the two adjusters located under the front of the main unit and the inclination prevention foot under the pole base.

Use the level provided on the pole base to check if the main unit is level. When the air bubble in the level is within the circle, the main unit is level.

After the main unit is level, lower the other two adjusters, so that they lightly contact the floor.

● AZ-B30K to AZ-B150K

Level the main unit by adjusting the adjusters located on the bottom of the main unit.

Use the level provided on the pole base to check if the main unit is level. When the air bubble in the level is within the circle, the main unit is level.

After the main unit is level, lightly push each of the four corners of the balance to make sure that it is not wobbly.

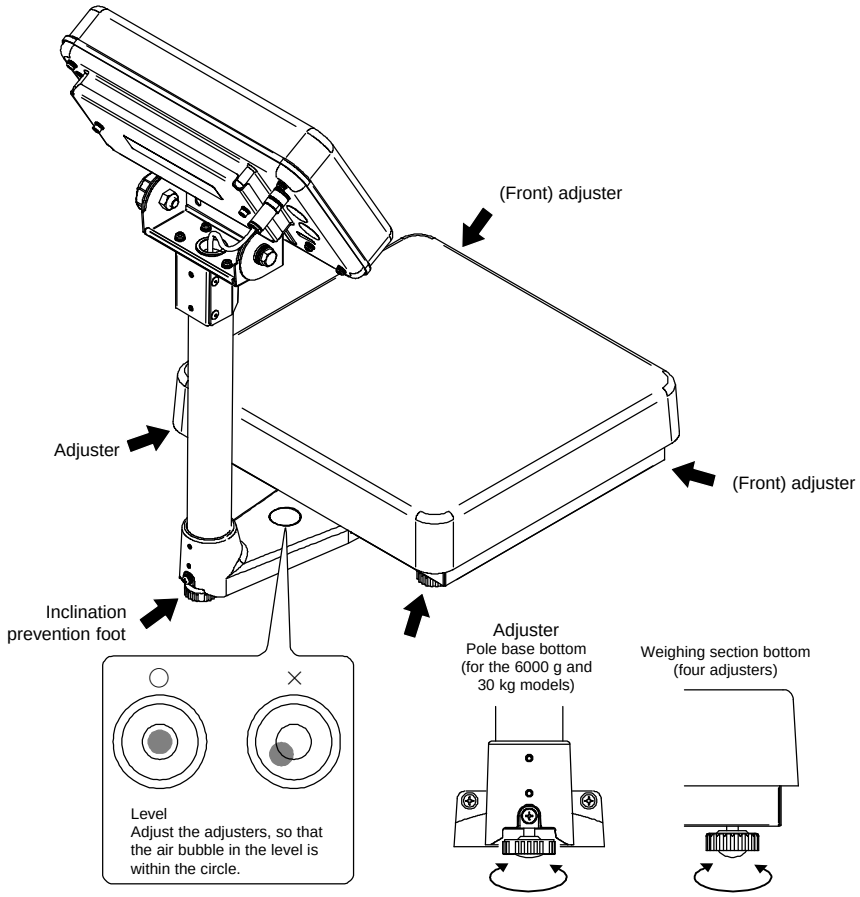
After adjusting the adjusters, lower the inclination prevention foot, so that it lightly contacts the floor.

● AZ-B450K

Level the main unit by adjusting the adjusters located on the bottom of the main unit.

When the air bubble in the level is within the circle, the main unit is level.

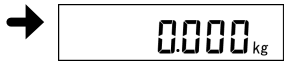
After the main unit is level, lightly push each of the four corners of the balance to make sure that it is not wobbly.



2 Basic Operation

2-1 Powering On/Off the Balance and Checking Operation

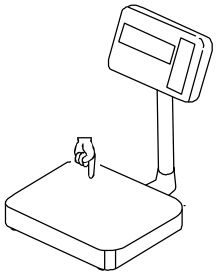
1 Turn the power on.

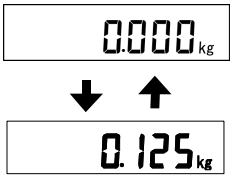


Press the [On/Off] key.

The balance is switched on and the measurement mode is displayed.

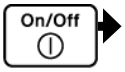
2 Check operation.

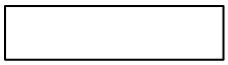




Lightly push the pan in order to check that the displayed readout changes.

3 Turn the power off.





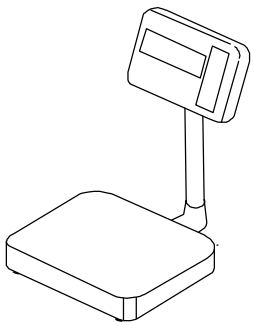
Press the [On/Off] key again.

The display lights out.

2-2 Adjusting the Zero-point

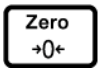
Resetting the readout when it has become offset is called “zero-point adjustment”.

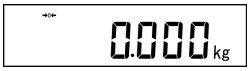
1 Check the pan.



Check that there is nothing on the pan.

2 Start the zero-point adjustment.





Press the [Zero] key.

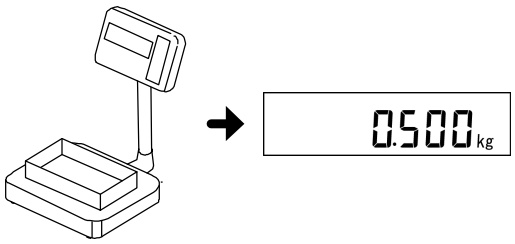
The readout becomes zero and “→0←” lights up.

- When there is something on the pan, the zero-point may not be able to be adjusted properly. In that case, refer to “Section 2-3: Weighing by Placing a Sample in a Container (Tare)” (P. 23) and set the tare range.
- Whether to wait for stabilization upon zero-point adjustment can be set by the function item “Wait for stabilization”.
  When it is set to “Operate after the balance is stable”, “M” blinks as it waits for the balance to stabilize. While “M” is blinking, protect the balance from external influences such as wind and vibration.

2-3 Weighing by Placing a Sample in a Container (Tare)

When measuring mass with the sample in a container (tare), only the sample is weighed by subtracting the mass of the tare. This is called “tare.”

1 Place the container on the pan.



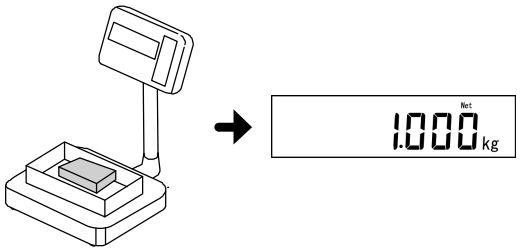
The mass of the container (tare) is displayed.

2 Set the tare.

Press the [Tare] key.

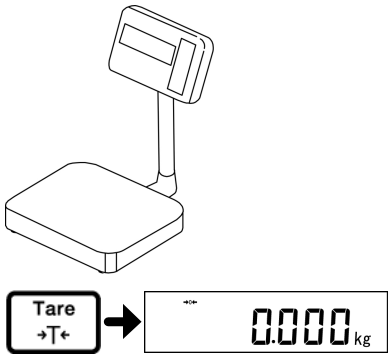
The readout becomes zero and “**Net**” lights up (tare range setting).

3 Place the sample in the container.



The mass of only the sample is displayed.

4 Clear the tare.



Remove the container and the sample from the pan and press the [Tare] key or the [Zero] key.

The readout becomes zero and "Net" turns off.

Reference

- When a tare range is set, the weighable range is reduced by the mass of the tare.

  Weighable range = original weighing capacity – pan weight

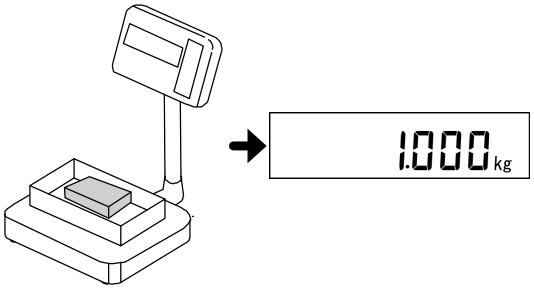
- Whether to wait for stabilization upon tare range setting can be set by the function item "Wait for stabilization".
  When it is set to "Operate after the balance is stable", "M" blinks as it waits for the balance to stabilize.

- Tare range cannot be set when a gross weight is displayed.

2-4 Weighing an Added Sample

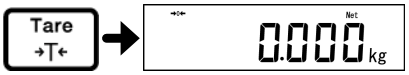
Place an additional sample. Only the added weight is measured.
By setting the tare while a sample that has been measured is still on the pan, the mass of an additional sample can be measured without removing the first sample.

1 Place the sample.



The mass of the placed sample is displayed.

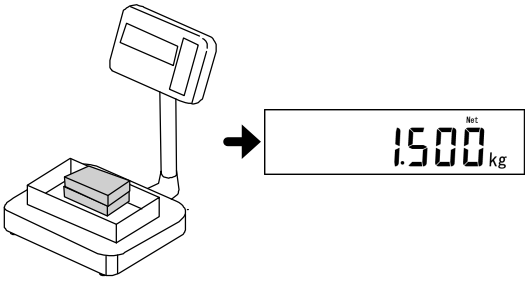
2 Set the tare.



Press the [Tare] key.

The readout becomes zero (tare range setting).

3 Place the additional sample.



The mass of only the added sample is displayed.

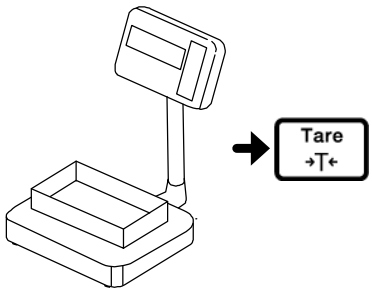
2-5 Displaying the Sum of the Sample and the Container

The sum weight of the sample and the container is displayed (gross weight readout).

Reference

A gross weight can only be displayed when the balance functions as a weighing machine. For more information on weighing machine mode, refer to “Section 3-1: Weighing (Weighing Machine)” (P. 31).

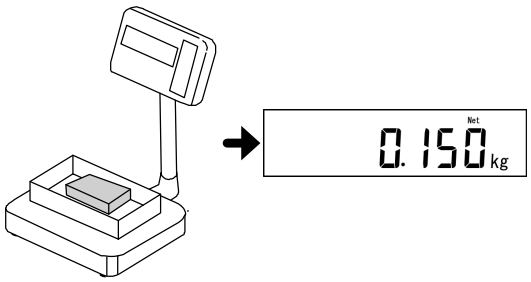
1 Place the container and then set the tare.



Place the container and press the [Tare] key.

The tare range is set and the readout becomes zero.

2 Place the sample.



The mass (net weight) of only the sample is displayed (net readout).

3 Display the sum (gross readout).

Press the [Function] key.

The sum weight of the container and the sample is displayed (gross readout).

When a gross weight is displayed, “B/G” lights up.

Return to the net weight display (net readout).

Press the [Function] key again.

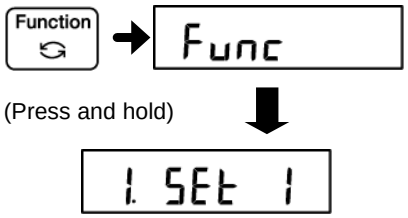
The mass (net weight) of the sample is displayed (net readout).

Pressing the [Function] key toggles the display between net and gross.

2-6 Basic Operation of Functions

Functions are used to set and change various settings of the balance.
This section describes the basic operations of each function.

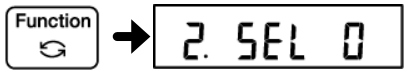
1 Set to the function setting mode.



Press and hold the [Function] key. After "Func" is displayed, release the key.

The first function item is displayed.

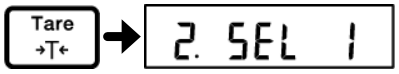
2 Select a setting item.



Pressing the [Function] key advances the item by one.

When the last item is reached, it returns to the first one.

3 Select a setting.



Pressing the [Tare] key selects a setting.

Pressing the key toggles the settings in turn.

After the last setting is displayed, the next setting displayed is the first one.

4 Save the setting.

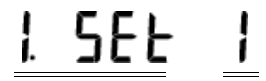
Press the [Set] key.

The setting is saved and the function setting is completed.

The balance returns to measurement mode.

Reference

- The configuration of a displayed function is as follows.

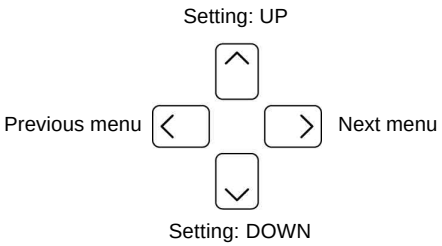


Item No. and name Setting

Refer to “Appendix 1: Function Setting List” (P. 81).

- Function setting is possible with the direction keys.
  After switching to the function setting mode with step 1, use the direction keys to change setting items and settings.

To complete the setting, press the [Set] key.



(Notes)

3 Various Measuring Methods

3-1 Weighing (Weighing Machine)

By default, the balance is set to “weighing machine” mode. To return to weighing machine mode from other weighing modes, use the following operation:

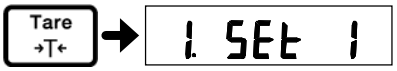
1 Set to the function setting mode.

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

Press and hold the [Function] key. After “Func” is displayed, release the key.

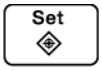
“1.SEt” is displayed.

2 Select “Weighing Machine”.



Press the [Tare] key several times to select “1.SEt 1”.

3 Save the setting.



Press the [Set] key.

The setting is saved and the display returns to showing the sample’s normal weight.

3-2 Counting Parts Count

The balance saves sample weight (unit weight) using the automatic memory update method (simplified SCS method) to count the number of samples.
First, place a set number of samples. Next, place an appropriate number of additional samples that is less than two times the set number. Then, the balance will automatically update the average sample weight. Repeating this step allows accurate counting.

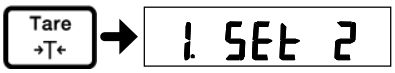
Displaying average sample weight
When the balance is set to the parts counting mode, pressing the [Function] key displays the average sample weight.
Pressing the [Function] key cycles the display through the number of samples, average sample weight, and total weight.

1 Set to the function setting mode.

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

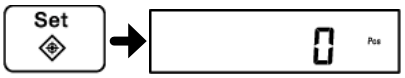
Press and hold the [Function] key. After “Func” is displayed, release the key.

2 Select “Parts Counting.”



Press the [Tare] key several times to select “1.SEt 2”.

3 Save the weighing mode.



Press the [Set] key.

The “parts counting” mode is set, displaying “Pcs”.

When “Pcs” is not displayed, press the [Function] key.

4 Start sampling.

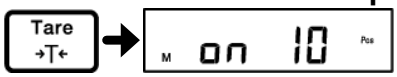
(Press and hold)

Press and hold the [Function] key. After “U. SEt” is displayed, release the key.

The “on 10 Pcs” display indicates using ten samples.

Pressing the [Print] key during sampling can cancel the sampling.

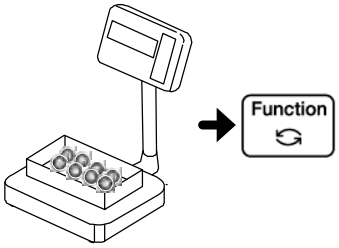
5 Select the number of samples.



Each press of the [Tare] key can select the sample count between 5, 10, 30, and 100.

If the samples vary considerably in size or are lightweight, set a greater number of samples.

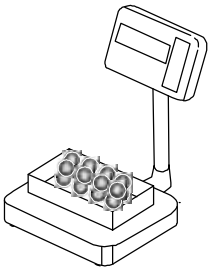
6 Weigh the samples.



Place the set number of samples on the pan and then press the [Function] key.

The displayed sample quantity (Example: “10 Pcs”) blinks.

7 Put additional samples.



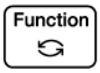
Put additional samples. The number of additional samples is less than two times the set number of samples.

For example, if “10 Pcs” is set, add 20 or less samples.

Reference

Repeating this sample addition step can improve the resolution of parts counting.

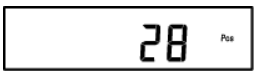
8 Finish sampling.



Press the [Function] key.

The average sample weight is saved and the balance returns to measurement mode.

9 Place samples to count them.



Pressing the [Function] key toggles the display between number of samples, average sample weight, and total weight.

- The “Sub” display indicates that you added more than two 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.
- The “Add” display indicates that the number of added samples is too small. Increase the number of additional samples.
- Even when these indications are displayed, sampling is possible. In this case, however, counting accuracy is low.
- [L-Err] is displayed to indicate that the average sample weight is smaller than the weighable unit weight (Refer to “Appendix 3: Specifications” (P. 88)).
- When “L-Err” is displayed, pressing the [Function] key returns to the measurement mode.

3-3 Measuring Percentage

With respect to the reference sample weight, the weight of a sample is shown in percentage.

A reference sample weight can be set by weighing an actual sample (setting a reference weight by weighing an actual sample) or entering a value (setting a reference weight by entering a value).

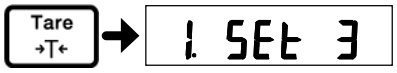
Setting a reference weight by weighing an actual sample

1 Set to the function setting mode.

(Refer to "Section 2-6: Basic Operation of Functions" (P. 28).)

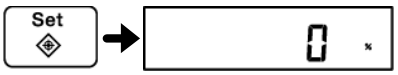
Press and hold the [Function] key. After "Func" is displayed, release the key.

2 Select "Percentage Weighing".



Press the [Tare] key several times to select "1.SEt 3".

3 Save the weighing mode.

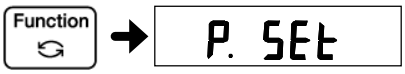


Press the [Set] key.

The "percent weighing" mode is set, displaying "%".

When percent is not displayed, press the [Function] key.

4 Start measuring the reference weight.

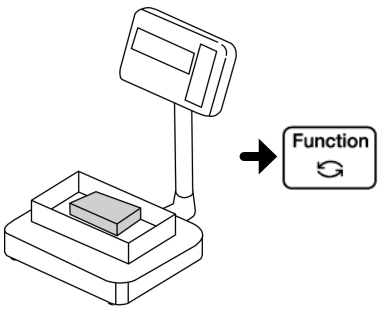


(Press and hold)

Press and hold the [Function] key. After "P.SEt" is displayed, release the key.

The previously-saved reference sample weight blinks.

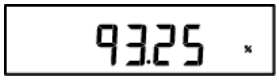
5 Save the reference weight.



Put the reference sample on the balance and then press the [Function] key.

The reference weight is saved.

6 Weigh.



The display indicates the percentage of the sample with respect to the reference sample weight.

Pressing the [Function] key toggles the display between percentage weight and total weight.

- The minimum unit is automatically set based on the saved reference weight.

Min. Indication	Range of Reference Weight
1%	Lower weight limit ≤ Reference weight < Lower weight limit × 10
0.1%	Lower weight limit × 10 ≤ Reference weight < Lower weight limit × 100
0.01%	Lower weight limit × 100 ≤ Reference weight

- The “L-Err” display indicates that the reference weight is below the lower weight limit, where weighing is impossible.
- For more information on the weight limit in percentage weighing, refer to “Appendix 3: Specifications” (P. 88).
- When “L-Err” is displayed, pressing the [Function] key returns to the measurement mode.

Setting a reference weight by entering a value

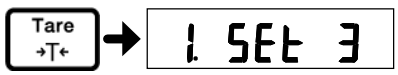
Sample weights can be displayed as percentages of a reference sample weight by directly entering a reference sample weight that is defined as 100%.

1 Set to the function setting mode.

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

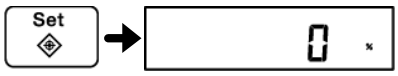
Press and hold the [Function] key. After “Func” is displayed, release the key.

2 Select “Percentage Weighing”.



Press the [Tare] key several times to select “1.SEt 3”.

3 Save the weighing mode.

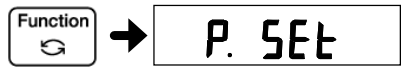


Press the [Set] key.

The “percent weighing” mode is set, displaying “%”.

When percent is not displayed, press the [Function] key.

4 Display the reference weight.



(Press and hold)

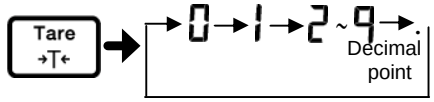
After checking that "%" lights up, press and hold the [Function] key (it is not necessary to remove the container.) After "P.SEt" is displayed, release the key.
The previously-saved reference sample weight blinks.

5 Enter a reference weight.

Press the [Tare] key.

The rightmost digit blinks.

6 Select a number.



Press the [Tare] key.

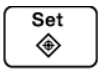
Pressing the [Tare] key advances the number by one as shown in the figure on the left.

7 Select the digit of the reference weight.

Pressing the [Function] key moves the blinking digit to the left so that higher order digits can be set.

When the leftmost digit is blinking, pressing the [Function] key returns the blinking digit to the rightmost place.

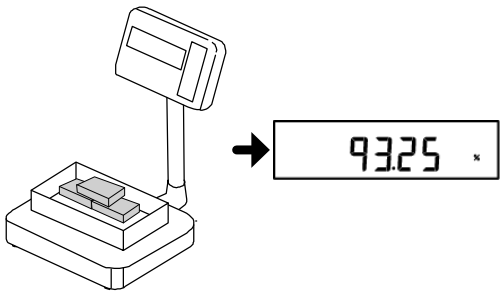
8 Save the reference weight.



Press the [Set] key.

Pressing the [Print] key can cancel the setting.

9 Place the sample.

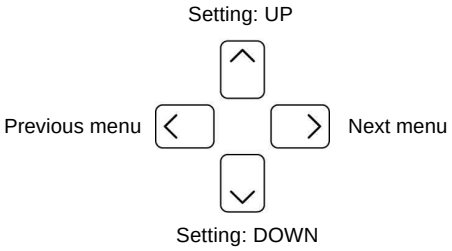


Place the sample.
The display indicates the percentage of the sample with respect to the reference sample weight.

Pressing the [Function] key toggles the display between percentage weight and total weight.

Reference

The direction keys can also be used to enter numbers in steps 6 and 7 above.



3-4 Obtaining Weight Multiplied by Coefficient

Measured weight is multiplied by a set coefficient, and the result can be displayed.

For example, if “2.35” is set for the coefficient, and the weight of the sample is “2.000 kg,” the given readout is “4.700”.

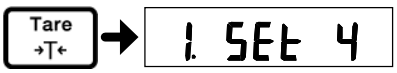
(Example) Sample (2.000 kg) × Coefficient (2.35) → Readout (4.700)

1 **Set to the function setting mode.**

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

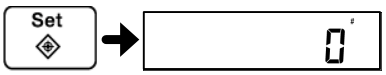
Press and hold the [Function] key. After “Func” is displayed, release the key.

2 **Select “Unit Converting”.**



Press the [Tare] key several times to select “1.SEt 4”.

3 **Save the weighing mode.**



Press the [Set] key.

The “unit converting” mode is set, displaying “#”.

When “#” is not displayed, press the [Function] key.

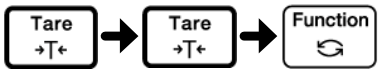
4 **Set to the coefficient setting mode.**

(Press and hold)

Press and hold the [Function] key. After “C. SEt” is displayed, release the key.

The previously-saved coefficient is displayed.

5 Enter a coefficient.



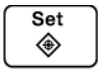
Set a coefficient with the following steps:

1. Press the [Tare] key.
   The digit furthest to the right side of the value blinks.
2. Select a number by pressing the [Tare] key.
   Pressing the key toggles the number between 0 and 9, and decimal point.
3. Pressing the [Function] key selects the number and the next digit blinks.

Set the coefficient by repeating steps 2 and 3. In step 3, after setting the number digits, pressing the [Function] key makes it possible to set the sign. Pressing the [Function] key one more time returns to the rightmost digit.

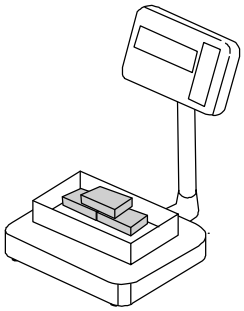
Pressing the [Print] key can cancel the setting.

6 Save the coefficient.



Press the [Set] key.

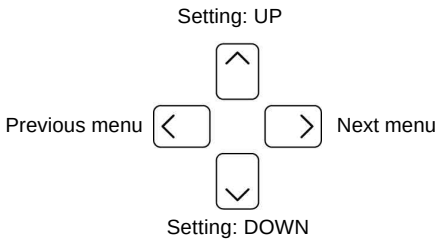
7 Weigh.



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

Reference

- The increment of the minimum readability is automatically set to 1, 2, or 5 depending on the entered coefficient.
- The direction keys can also be used to enter the coefficient in parts 2 and 3 of step 5.



3-5 Adding Multiple Measurements

Multiple samples are weighed consecutively and the sum is displayed.
The weighing method can be selected from reloading samples (cumulate function) or without replacing samples (net addition function).

Reference

The addition function can be used in the following weighing modes: weighing machine, parts counting, percentage weighing, and unit converting.

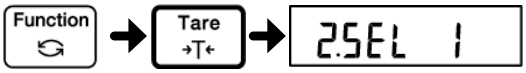
3-5-1 Addition function setting

1 Set to the function setting mode.

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

Press and hold the [Function] key. After “Func” is displayed, release the key.

2 Select Addition Function.



Press the [Function] key several times to select “2.SEL”.

Press the [Tare] key to select “2.SEL 1”.

Reference

When using both the cumulate and limit functions together, select “2.SEL 3”.

For more information on the limit function, refer to “Section 3-6: Judging “Above” and “Below”” (P. 46).

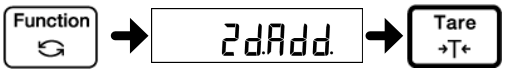
3 Select cumulate or net addition.

Press the [Function] key. After “2C.Ad.” is displayed, press the [Tare] key to set the value.

1: Cumulate function

2: Net addition function

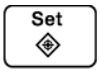
4 Select addition of loaded sample weights or unloaded sample weights.



Press the [Function] key. When “2d.Add.” is displayed, press the [Tare] key to change the setting.

Addition of loaded sample weights
= 1
Addition of unloaded sample weights
= 2

5 Finish setting.

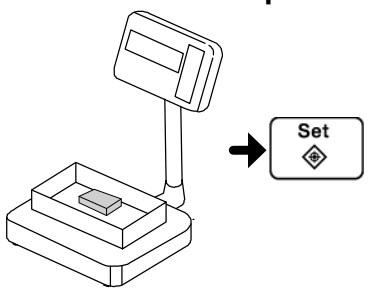


Press the [Set] key.

The addition function is set.

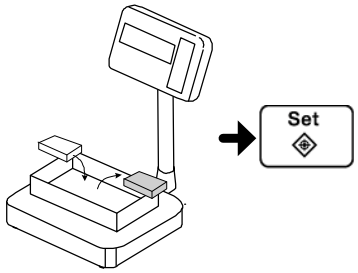
3-5-2 Weighing with addition function (addition of loaded sample weights)

1 Place the first sample.



After an asterisk (*) is displayed, press the [Set] key. The measured value is saved and a sigma [Σ] sign is displayed for several seconds.

2 Place another sample (cumulative).

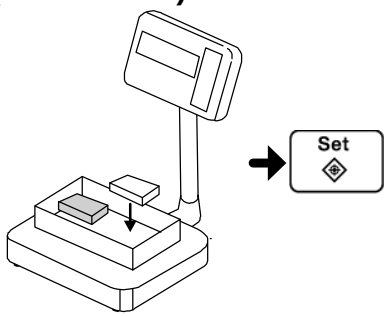


After an asterisk (*) is displayed, press the [Set] key. The measured value is saved, and a [Σ] sign and the cumulative weight are displayed for several seconds. Repeat this operation to weigh all the samples to be summed.

CAUTION
After unloading the previous sample, check that the display indicates “0”, and place the next sample.

Reference
Cumulating weight is also possible as follows: Press the [Tare] key without unloading the balance and then place next samples.

Place additional samples (net addition).



After an asterisk (*) is displayed, press the [Set] key. After the cumulative weight is displayed for several seconds, the balance goes back to normal display, and then a tare range is automatically set.
Repeat this operation to weigh all the samples to be summed.

3 Display the cumulative weight.

Function (Press twice)

Press the [Function] key twice.

A [Σ] sign and the cumulative weight are displayed.

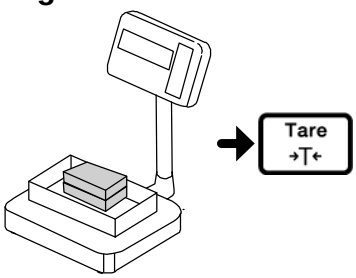
Reference

- Pressing the [Tare] key when a cumulative weight is displayed clears the cumulative weight.
- You can add samples when an asterisk (*) is displayed.
- When “t-Err” is displayed after the [Set] key is pressed, it indicates that you unloaded some samples.
- The function setting “J. tA.” can be used for turning ON/OFF the function to wait for stabilization upon additions (Refer to “Appendix 1: Function Setting List” (P. 81)).

3-5-3 Weighing with addition function (addition of unloaded sample weights)

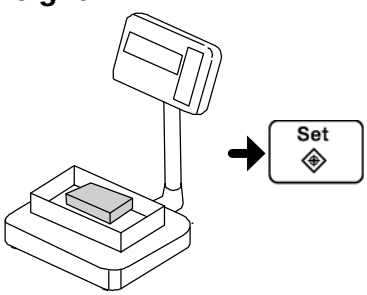
Use this function to add unloaded sample weights and obtain the total weight.

1 Place a sample and set the tare range.



Press the [Tare] key to set the tare range.

2 Unload the sample and add the weight.

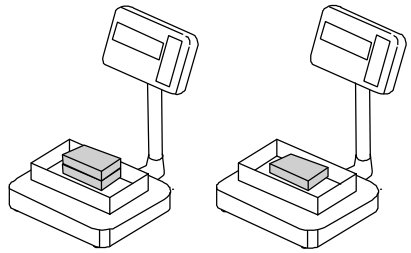


Unload the sample. When an asterisk (*) is displayed, press the [Set] key.

The measured value is saved and the cumulative weight is displayed for several seconds.

The cumulative weight is displayed as a negative value and the [S] sign lights up during the display.

3 Unload the second sample and add the weight.



\+ +

Tare →T← Set

(Cumulative)

Place the second sample. When cumulate is selected, after setting the tare range by pressing the [Tare] key, unload the sample. When an asterisk (*) is displayed, press the [Set] key.

The measured value is saved and the cumulative weight is displayed for several seconds.

The [S] sign lights up while the cumulative weight is being displayed.

4 Display the cumulative weight.

Function → -37.000 Σ kg

Press the [Function] key several times.

The [S] sign and the cumulative weight are displayed.

Then, press the [Function] key several times. The display switches to the measurement mode (addition mode).

Reference

- A sample weight can be added when an asterisk (*) lights up.
- When “t-Err” is displayed after the [Set] key is pressed, it indicates that you put additional samples on twice, you loaded some samples, or you pressed the key without loading a sample.
- Whether to wait for stabilization upon addition can be set by the function item “Wait for stabilization”.
- Pressing the [Tare] key when a cumulative weight is displayed clears the cumulative weight.
- When the power is turned off and then on, the cumulative weight is cleared.

3-6 Judging “Above” and “Below” (Limit Function)

The limit function is for saving limit values in the balance in order to judge measured values with respect to them. In Function 1 of the limit function, “2. SEL *” is set to “2” or “3”.

The result of limit judgment is indicated by the position of “◀”. Judgment points can be set from one to four.

■ Limit function setting

Use Function 1 to set various settings of the limit function. Since there are many settings, refer to “Detailed function setting” (P. 47) to set the items.

■ How to judge measured values and set limit values

The following two methods are provided to judge measured values by limit values and the method can be selected in Function 1.

1. Absolute value judgment: Upper and lower weights are directly specified.
2. Deviation value judgment: A reference weight and an upper limit and/or a lower limit range with respect to this reference weight are specified.

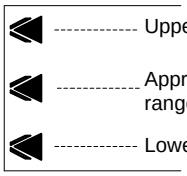
The following two methods are provided to set limit values. When using method 1, you can also use method 2 and vice versa.

1. Putting actual samples on the balance: After weighing an actual sample on the balance, save the weight as a limit value.
2. Entering values: Set limit values by entering numbers using the keys.
   - The entered limit values are retained after the balance is switched off.
   - Limit values can be individually set for each of the following weighing modes: weighing machine, parts counting, percentage weighing, and unit converting.

Note that when limit values are entered using the keys, the meaning of limit values in absolute value judgment is different from that of deviation value judgment (Refer to “NOTE” (P. 52)).

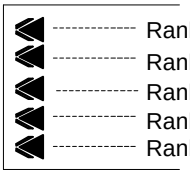
¦ Displaying judgment results

In the one point and two points settings, “◀” lights up to indicate one of three items on the left side of the indicator based on the judgment result.



Judgment result	When one point (lower limit) is set	When two points (lower and upper limits) are set
Above the upper limit	N/A	Upper limit < Weight
Appropriate range	Lower limit ≤ Weight	Lower limit ≤ Weight ≤ Upper limit
Below the lower limit	Weight < Lower limit	Weight < Lower limit

In the three points and four points settings, "◀" lights up to indicate one of four or five ranks on the indicator based on the judgment result.



Judgment result	When three or four points are set
Rank 5 (when four points are set)	The fourth point ≤ Weight
Rank 4	The third point ≤ Weight < The fourth point
Rank 3	The second point ≤ Weight < The third point
Rank 2	The first point ≤ Weight < The second point
Rank 1	Weight < The first point

Based on the specified judgment points, the "<" sign that corresponds to the rank that "◀" indicates lights up all the time.

3-6-1 Judging by absolute values

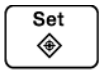
■ Detailed function setting

In the function setting function, the limit function can be set in detail.
When the function setting "2.SEL" is "2" or "3", pressing the [Function] key can set the following: Set these items as required.

Condition	21.Co.	1: Always judge. 2: Judge only when the balance is stable.
Range to Cover	22.Li	0: Detect when the limit is exceeded by more than five divisions 1: Detect when the limit is exceeded by more than 50 divisions. 2: Detect both when the limit is exceeded and when it is not reached.
Point Scale	23.Pi	1: 1-point scale (OK and LO are judged.) 1: 1-point scale (HI and OK are judged.) 2: 2-point scale (HI, OK, and LO are judged.) 3: 3-point scale (Rank 1 to 4 are judged.) 4: 4-point scale (Rank 1 to 5 are judged.)
Judge by	24.tP.	1: Judge by absolute values. 2: Judge by deviation values.
How to indicate results	2A.LG.	1: Indicates the upper and lower limits or the rank 2: 2-point bar graph (Available only for 2-point scale)

■ How to set limit values for the two points setting by weighing an actual sample - absolute value judgment -

1 Start the limit value setting.



(Press and hold)

Press and hold the [Set] key. After "L.SEt" is displayed, release the key.

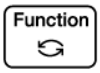
The lower limit that is currently saved blinks.

2 Place the sample to be used to set the lower limit.

Place the sample to be used to set the lower limit on the pan.

Cumulating weight is also possible as follows: Press the [Tare] key without unloading the balance and then place next samples.

3 Save the lower limit.



Press the [Function] key.

When the lower limit is saved, the value is displayed for a short time and the setting goes on to the next step.

* For one point setting, the setting is completed by pressing the [Function] key.

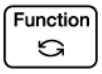
4 Go on to the upper limit setting.

"H. SEt" is displayed and the upper limit can be set.

The upper limit that is currently saved blinks.

5 Place the sample to be used to set the upper limit.

6 Save the upper limit.



Press the [Function] key.

When the upper limit is saved, the value is displayed for a short time and the balance returns to the measurement mode.

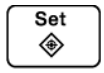
* In order to set a 3-point scale or 4-point scale, repeat steps 2 and 3 above.
Saved limit values are displayed as "L1 SEt" to "L3 SEt" or "L1 SEt" to "L4 SEt", instead of "L. SEt" and "H. SEt". At the same time, "◀" on the left side of the indicator lights up to indicate the rank.

◀ —— "L4 SEt" (The fourth point)
◀ —— "L3 SEt" (The third point)

◀ —— "L2 SEt" (The second point)
◀ —— "L1 SEt" (The first point)

■ How to set limit values for the two points setting by entering numbers - absolute value judgment -

1 Start the limit value setting.



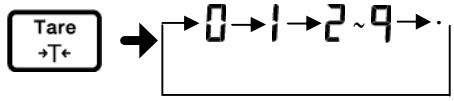
Press and hold the [Set] key. After “L.SEt” is displayed, release the key.

The lower limit that is currently saved blinks.

2 Start entering numbers.

Press the [Tare] key. The rightmost digit blinks.

3 Select a number.



Press the [Tare] key.
Pressing the [Tare] key advances the number by one as shown in the figure on the left.

Pressing the ⌃ key also advances the number by one like the [Tare] key. Pressing the ⌄ key reduces the number by one as 9 ? 8? 7….

4 Enter the next digit.

Press the [Function] key.
The blinking digit moves to the left and the next higher order digit can be set.

After setting the digits, pressing the [Function] key makes it possible to set the minus sign “M”. Pressing the [Function] key one more time moves the blinking digit to the rightmost digit.

Pressing the ‹ key moves the digit to be set like the [Function] key. Pressing the › key moves the digit to the right.

5 Save the lower limit.

Press the [Set] key.

The entered lower limit is displayed for a short time and the setting goes on to the next step.

* For one point setting, the setting is completed by pressing the [Set] key.

6 Enter the upper limit.

“H. SEt” is automatically displayed and the upper limit that is currently saved blinks.

Enter the upper limit according to steps 2 to 4 above.

After entering the upper limit, press the [Set] key.

* In order to set a 3-point scale or 4-point scale, repeat steps 2 to 5 above.
Saved limit values are displayed as “L1 SEt” to “L3 SEt” or “L1 SEt” to “L4 SEt”, instead of “L. SEt” and “H. SEt”. At the same time, “◀” on the left side of the indicator lights up to indicate the rank.
When entering numbers for absolute value judgment, enter the actual upper and lower limit values.

(Ex.) When a sample is to be judged based on a lower weight of 17.000 kg and an upper weight of 25.000 kg, the limit values to be entered for the two points setting are as follows.

	Lower limit	Upper limit
Judgment scale	17.000 kg	25.000 kg
Values to be entered	17.000 kg	25.000 kg

3-6-2 Judging by deviation values

■ How to set limit values for the two points setting by weighing an actual sample - deviation value judgment -

1 Start the limit value setting.

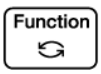
(Press and hold)

Press and hold the [Set] key.

After “r.SEt” is displayed, release the key.

The current reference weight blinks.

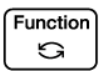
2 Enter the reference weight.



Place the sample to be used to set the reference weight on the pan and press the [Function] key.

When the reference weight is saved, the value is displayed for a short time and the setting goes on to the next item.

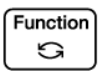
3 Enter the lower limit.



“L. SEt” is displayed and the lower limit that is currently saved blinks. Place the sample to be used to set the lower limit on the pan and press the [Function] key.

The difference between the reference weight and the lower limit is displayed for a short time and the setting goes on to the upper limit setting.

4 Enter the upper limit.



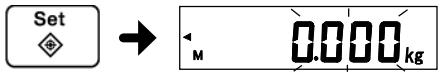
“H. SEt” is displayed and the upper limit that is currently saved blinks. Place the sample to be used to set the upper limit on the pan and press the [Function] key.

The difference between the reference weight and the upper limit is displayed for a short time and the balance returns to the measurement mode.

* In order to set a 3-point scale or 4-point scale, repeat steps 2 to 5 above.
Saved limit values are displayed as “L1 SEt” to “L3 SEt” or “L1 SEt” to “L4 SEt”, instead of “L. SEt” and “H. SEt”. At the same time, the “◀” on the left side of the indicator lights up to indicate the rank.

■ How to set limit values for the two points setting by entering numbers - deviation value judgment -

1 Start the limit value setting.



Press and hold the [Set] key.

After “r.SEt” is displayed, release the key.

The current reference weight blinks.

2 Select the mode to enter numbers.

Press the [Tare] key.

The rightmost “0” blinks.

3 Enter the reference weight.

Enter the reference weight using the same procedures as those described in steps 3 and 4 in “How to set limit values for the two points setting by entering numbers - absolute value judgment -” (P. 47).

After entering the reference weight, press the [Set] key to save the value.

4 Enter the lower limit.

Enter the lower limit by following the same procedures as those described in step 3 above.

After entering the lower limit, press the [Set] key. (When setting the one point setting, the balance returns to the measurement mode.)

When entering numbers for deviation value judgment, enter the difference between the upper and lower values with respect to the reference weight.

(Ex.) When a sample is to be judged based on a reference weight of 20.000 kg, the lower limit of 17.000 kg, and the upper limit of 25.000 kg, the limit values to be entered for the two points setting are as follows.

	Reference weight	Lower limit	Upper limit
Judgment scale	20.000 kg	17.000 kg	25.000 kg
Values to be entered	20.000 kg	- 3.000 kg	5.000 kg

5 Enter the upper limit.

Save the upper limit by following the same procedures as those described in step 3 above.

After entering the upper limit, press the [Set] key.

* In order to set a 3-point scale or 4-point scale, repeat steps 2 to 5 above.
Saved limit values are displayed as “L1 SEt” to “L3 SEt” or “L1 SEt” to “L4 SEt”, instead of “L. SEt” and “H. SEt”. At the same time, the “◀” on the left side of the indicator lights up to indicate the rank.

◀ —— “L4 SEt” (The fourth point)
◀ —— “L3 SEt” (The third point)
◀ —— “r3 SEt”
◀ —— “L2 SEt” (The second point)
◀ —— “L1 SEt” (The first point)

CAUTION

1. The default for all limit values is zero.

2. Limit values can be individually set for each of the following weighing modes: weighing machine, parts counting, percentage weighing, and unit converting. However, limit values for absolute value judgment and deviation value judgment are stored in the same region of memory, so when the judgment type is switched between absolute value judgment and deviation value judgment, even in the same weighing mode, the limit values are cleared.

3. When the balance is not set to a measurement mode such as when it is displaying a cumulative value, the balance does not switch to the limit value setting mode even when the keys for that mode are pressed.

4. In the limit value setting mode, zero-point adjustment and tare range setting are not executed in the first step (they are executed when a sample is weighed in the parts counting mode and percentage weighing mode). Before setting limit values, adjust the zero-point or set a tare range as required.

5. Saved limit values are checked by pressing the [Set] key.
   The lower limit is displayed after “L. SEt” is displayed and the upper limit is displayed after “H. SEt” is displayed.
   For the three points and four points settings, saved limit values are displayed using “L1 SEt” to “L3 SEt” or “L1 SEt” to “L4 SEt”, instead of “L. SEt” and “H. SEt”.

6. Press the [Print] key when you have made a mistake. Pressing the [Print] key cancels the setting, so that you can start again from the first step.

7. When numbers are blinking, set the actual weight of the sample placed on the pan by pressing the [Function] key. At this time, pressing the [Tare] key returns to the number entry mode.

8. If the entered limit values are not lined up in order of magnitude, three “◀” signs will light up regardless of the point scale. Check the values you want to enter and enter the limit values again.

9. When limit values are entered using the keys, the meanings of the limit values in absolute value judgment are different from that of deviation value judgment.
   In absolute value judgment, the actual weights to be used to judge a sample are entered, while in deviation value judgment, the difference between the upper and lower values with respect to the reference weight is entered.
   (Ex.)
   When a sample is to be judged based on a reference weight of 20.000 kg, a lower limit of 17.000 kg, and an upper limit of 25.000 kg, the limit values to be entered for the two points setting are as follows.

	Reference weight	Lower limit	Upper limit
Judgment scale	20.000 kg	17.000 kg	25.000 kg
Absolute value judgment	20.000 kg	17.000 kg	25.000 kg
Deviation value judgment	20.000 kg	-3.000 kg	5.000 kg

3-6-3 Displaying 2-point bar graph

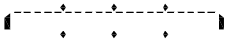
This function displays a weight that is within the appropriate range set for the two points setting in a bar graph using part of the limit function.
This function can be used in each of the following weighing modes: weighing machine, parts counting, percentage weighing, and unit converting (gravity weighing is not supported.)

The upper and lower limits can be set both by weighing an actual sample and by entering numbers.
In addition, the function can be used in both the absolute value judgment and the deviation value judgment.

While a 2-point bar graph is being displayed, the "<" sign on the left side of the indicator lights up.

(When the 2-point bar graph display is used)

How the bar graph is displayed is shown in the following table.

Bar graph display	Weight scale	Display
	Upper limit < Weight	Displays full scale
	Lower limit = Weight = Upper limit	Displays based on the weight
	Weight < lower limit	Not displayed

CAUTION

- When the lower limit and the upper limit are the same value, the bar graph is not displayed.
- When the 2-point bar graph display is used, the regular bar graph representing the ratio to the weighing capacity cannot be used.
- When the 2-point bar graph display is used, the limit function does not work.

(Notes)

4 Adjusting the Balance

4-1 How to Adjust

To adjust the span is to reduce the difference between the indicated value and the true value (the mass). Be sure to perform span adjustment for highly accurate measurements.
An electronic balance is influenced by the acceleration of gravity. For this reason, you should adjust your balance every time you relocate it. You should also adjust it after a long time of use or when it does not indicate correct values.
Use an external weight to adjust the span.

CAUTION

- To adjust the span, wait at least 30 minutes after the balance is powered on.

Reference

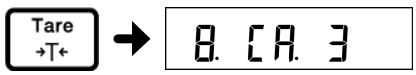
- Use a weight for calibration that weighs 50% of the weighing capacity or heavier. To calibrate more accurately, use a weight that is equivalent to the weighing capacity.
- Please contact us if you wish to inquire about or place an order for calibration weights.

1 Set to the function setting mode.

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

Press and hold the [Function] key. After “Func” is displayed, release the key.

2 Select “Span adjustment with external weight”.



Press the [Function] key several times to select “8.CA.”

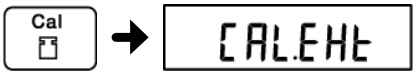
Press the [Tare] key several times to select “8.CA. 3”.

3 Save the setting and return to the measurement mode.

Press the [Set] key.

Save the setting and return to the measurement mode.

4 Start span adjustment.

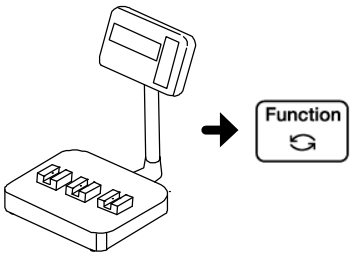


Press the [Cal] key.

"CAL.EXt" is displayed.

"on 0" will blink.

5 Place the weight on the pan.



When "on F.S." is displayed, place a weight on the pan.

When "Push F" is displayed, press the [Function] key after placing a weight.

"on F.S." will blink.

6 Span adjustment finishes.

Reference

After the span adjustment finishes, "End" is displayed and the balance returns to the measurement mode.

- The "1-Err" display indicates that you used a weight weighing less than 10% of the weighing capacity.
- The "2-Err" display indicates that an error over 1.0% was detected, or the balance failed.
- When an error message is displayed, calibration is not executed.
- When an error message is displayed, pressing the [Function] key returns to the measurement mode.

5 Function Setting

5-1 Using Two Expression Units by Switching Them

You can set two units (unit A and unit B) and switch between the units.

Reference

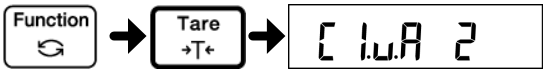
Unit A can be used in all measurement modes. Unit B can be used only in weighing machine mode. Refer to “Appendix 3: Specifications” (P. 88) for the weighing capacity and the minimum readability of each unit.

1 Set to the function setting mode.

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

Press and hold the [Function] key. After “Func” is displayed, release the key.

2 Set unit A.

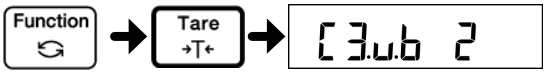


Press the [Function] key several times to select “Cl.u.A”.

Select unit from the following numbers by pressing the [Tare] key.
1: g/2: kg

When setting only the unit A, press the [Set] key in this step to save the setting.

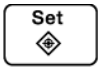
3 Set unit B.



Press the [Function] key several times to select “C3.u.b”.

Select unit from the following numbers by pressing the [Tare] key.
0: None/1: g/2: kg

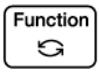
4 Save the setting.



Press the [Set] key.

The balance goes back to normal display.

5 How to switch between unit A and unit B.



Pressing the [Function] key during measurement switches from unit A to unit A (gross) then to unit B.

Reference

Refer to “Section 1-6: How to Read Displayed Signs” (P. 8) for the displays and signs of each unit.

Grams cannot be selected as a unit for the AZ-B150K and AZ-B450K.

5-2 Minimum Readability Setting

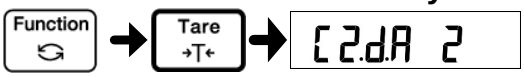
Use this function to set the minimum readability. The larger the minimum readability becomes, the less the balance is affected by external influences. In addition, it takes less time for the balance reading to become stable. Each unit has different minimum readability.

1 Set to the function setting mode.

(Refer to "Section 2-6: Basic Operation of Functions" (P. 28).)

Press and hold the [Function] key. After "Func" is displayed, release the key.

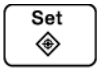
2 Select the minimum readability.



Press the [Function] key several times to select "C2.d.A".

Select from 1 through 5 by pressing the [Tare] key.

3 Save the setting.



Press the [Set] key.

The balance goes back to normal display.

To set the minimum readability of unit B, select "C4.d.b" in step 2.

You can also set the same unit for unit A and unit B, and set different minimum readability, so that unit A and unit B can be used to switch the minimum readability.

■ Minimum readability list

Setting value	AZ-B6000		AZ-B30K		AZ-B60K		AZ-B150K	AZ-B450K
	g	kg	g	kg	g	kg	kg	kg
1	1	0.001	5	0.005	10	0.01	0.02	0.1
2	2	0.002	10	0.01	20	0.02	0.05	0.2
3	5	0.005	20	0.02	50	0.05	0.1	0.5
4	10	0.01	50	0.05	50	0.1	0.2	1
5	20	0.02	50	0.1	50	0.2	0.5	2

* For the AZ-B150K and AZ-B450K, only kg can be used.
* The interval of the minimum readability cannot be set larger than 50.

5-3 Saving Container (Tare) Weight

Use this function to set a tare range when the balance is powered on using the latest saved tare weight. Use this function when you turn the balance on or off with a sample and tare put on the pan.

Reference

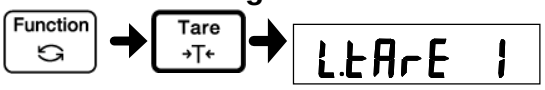
Leaving the balance loaded with a substance and tare for a long period may result in a larger error in weighing. You should set the tare range regularly.

1 **Set to the function setting mode.**

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

Press and hold the [Function] key. After “Func” is displayed, release the key.

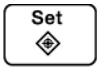
2 **Set the tare saving.**



Press the [Function] key several times to select “L.tArE.”

Select “1” by pressing the [Tare] key.

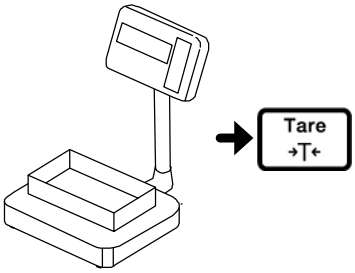
3 **Save the setting.**



Press the [Set] key.

The balance goes back to normal display.

4 **Save the tare weight.**



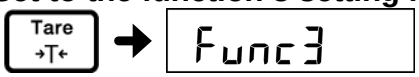
Place the container (tare) to be saved for weight and then measure the tare.

The saved tare weight is updated every time a tare range is set.

5-4 Using Preset Tare Range

Use this function to set a tare range in advance (preset tare range) by saving a tare weight.
Use this function in the weighing machine mode.

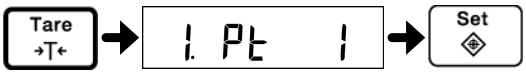
1 Set to the function 3 setting mode.



Press and hold the [Tare] key. After “Func3” is displayed, release the key.

“1.Pt” is displayed.

2 Set to “Preset tare: Enabled and set”.

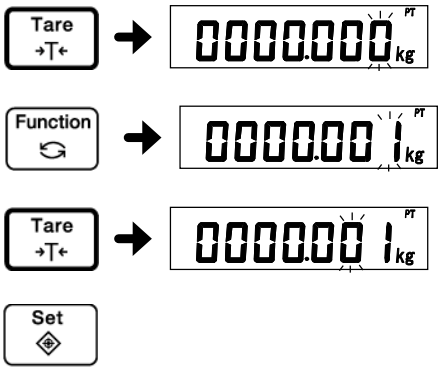


Set “1.Pt” to “1” of “Preset tare: Enabled and set” by pressing the [Tare] key. Then press the [Set] key.

The preset tare that was saved last time blinks.

When the preset tare is displayed, “PT” lights up and blinks.

3 Enter the preset tare.



Enter the preset tare according to the following procedures.

1. Press the [Tare] key.

   The rightmost digit blinks.

2. Select a number by pressing the [Tare] key.

   Pressing the [Tare] key advances the number by one (0 to 9).

3. Pressing the [Function] key moves the digit to be set (blinking digit) to the left.

   Once the focus reaches the leftmost digit, pressing the [Function] key one more time moves the focus to the rightmost digit.

4. Press the [Set] key to save the preset tare.

The set value is displayed for a short time.

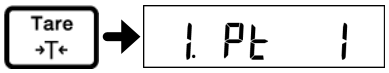
4 Return to the measurement mode.

Return to the measurement mode.

The mass after the preset tare is deducted is displayed.

"**Net**" lights up.

5 Clear the preset rare range.



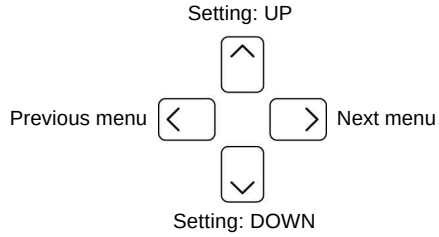
Repeat the procedures in step 1 above to display "1.Pt".

Set to "1.Pt 0" by pressing the [Tare] key. Then press the [Set] key.

The balance returns to the measurement mode and the preset tare range is cleared.

Reference

- After the preset tare range is set, a tare range cannot be set by pressing the [Tare] key.
- When a tare range is set, a preset tare cannot be set and the saved preset tare cannot be changed, nor can the preset tare range be executed. In order to set a preset tare, clear the tare (Refer to "Section 2-3: Weighing by Placing a Sample in a Container (Tare)" (P. 23)).
- When a gross weight is displayed, a preset tare cannot be set and the saved preset tare cannot be changed.
  Display the net weight and set the preset tare (Refer to "Section 2-5: Displaying the Sum of the Sample and the Container" (P. 26)).
- When the preset tare is set to zero, the item "1.Pt" becomes "1.Pt 0".
- The "r-Err" display indicates that the preset tare is over the weighing capacity. The preset tare should be equal to or less than the weighing capacity.
- When the balance is switched off and then on, the preset tare range is cleared (set to "1. Pt 0").
- When the preset tare range is set and the data after the preset tare is deducted is output, the preset tare is output following the data. (When special-purpose format "6. I.F. 4" is selected, the preset tare is not output.)
- The direction keys can also be used to enter numbers in parts 1 to 3 of step 3 above.



5-5 Auto Backlight Off Setting

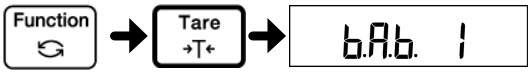
This function automatically turns off the backlight if the balance is left untouched in the measurement mode for a certain period of time.

1 **Set to the function setting mode.**

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

Press and hold the [Function] key. After “Func” is displayed, release the key.

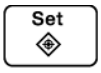
2 **Set the auto backlight off.**



Press the [Function] key several times to select “b.A.b.”

Select “1” by pressing the [Tare] key.

3 **Save the setting.**



Press the [Set] key.

The balance goes back to normal display.

The auto backlight off function does not work under the following conditions:

- Function settings are set.
- An object is placed on the pan, and display is not stable.

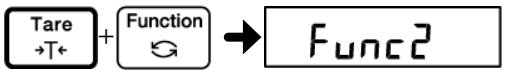
Placing an object on the pan or pressing any key turns the backlight on again automatically.

5-6 ID No. Setting

In situations such as when the same model is used, you can assign numbers that allow you to control them easily.
When an ID number is set, the "◀" indicator located in the upper left of the display lights up.

You can use up to six digits in an ID number. The characters that you can use are as follows:
Space (blank), 0 to 9, A to F, -

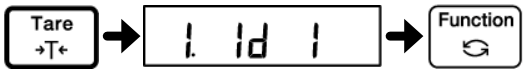
1 Set to the function 2 setting mode.



Press the [Function] key while pressing the [Tare] key. Release the key when "Func2" is displayed.

The function 2 setting mode is set, displaying "1.Id 0".

2 Set to the ID number setting mode.



Select "1" by pressing the [Tare] key.
Press the [Function] key.

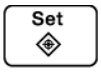
3 Enter the ID number.

Enter the ID number with the following steps:

1. Press the [Tare] key.
   The leftmost digit blinks.
2. Select a character by pressing the [Tare] key.
   Pressing the key toggles between space, 0 to 9, A to F, and – (minus).
3. Pressing the [Function] key blinks the next digit.

Set the ID number by repeating steps 2 and 3.
Press the [Set] key.
Display changes to "2.ArE."

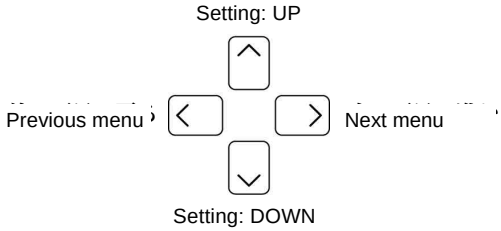
4 Save the ID number.



Pressing the [Set] key again returns the balance to normal display.

Reference

The direction keys can also be used to enter ID numbers.



5-7 Improving the Stability of the Balance

When the balance is stable, "○" is lit in the upper left of the display.
When displayed values flicker and stabilized display blinks, it indicates that the balance is influenced by wind or vibration. In these situations, making a setting change can improve stability.
As greater values are set in the "stability judgment scope (4A.S.h.)", "number of stability judgment times (4b.S.C.)", "response speed (number of moving average times) (5A.r.E.)", "weight updating interval (5b.ti.)" and "response speed (signal processing) (5C.Fr.)" function settings, stability will increase. In addition, in order to reduce flickering of the zero point, switch Auto-zero (3.A.0) on and off.

- Relationship between each function setting and wind/vibration influences

Wind/vibration influences	Stability judgment scope	Number of stability judgment times	Response speed (number of moving average times)	Weight updating interval	Response speed (signal processing)	Auto-zero
Small | Big	1 | 8	1 | 6	0 | 4	1 | 4	1 | 4	0 (off) 1 (on)

Reference

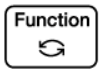
In each of the functions, if wind and vibration influences are small, select 0 to 2. Set 3 to 8 for great influences.

1 Set to the function setting mode.

(Refer to "Section 2-6: Basic Operation of Functions" (P. 28).)

Press and hold the [Function] key. After "Func" is displayed, release the key.

2 Select each function.



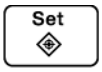
Press the [Function] key several times to select the functions (See the above table).

4A.S.h.= Stability judgment scope
4b.S.C.= Number of stability judgment times
5A.r.E. = Response speed (number of moving average times)
5b.ti. = Weight updating interval
5C.Fr. =Response speed (signal processing)
3.A.0. = Auto-zero

3 Select a setting.

Press the [Tare] key to select the setting values of each function (See the above table).

4 Save the setting.



Press the [Set] key.

The balance goes back to normal display.

5-8 Key Control

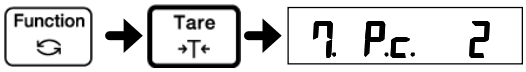
This function locks keys to prevent unintended key presses.

1 Set to the function setting mode.

(Refer to “Section 2-6: Basic Operation of Functions” (P. 28).)

Press and hold the [Function] key. After “Func” is displayed, release the key.

2 Set “Key control”.



Press the [Function] key several times to select “7. P.c.”

Select a set value by pressing the [Tare] key.

1: All of the keys are locked.

(Only the [Function] key when it is pressed and held and the On/Off key can be used.)

2: All of the keys can be used.

3 Save the setting and return to the measurement mode.

Press the [Set] key.

Save the setting and return to the measurement mode.

6 Troubleshooting

6-1 Error Messages

Message	Cause	Remedy
o-Err	• The weight of the sample is over the weighing capacity	• Unload the sample to weigh it in some portioned-out measurements. • Replace the tare with a lighter one. • If the error message does not disappear even when nothing is placed on the pan, mechanical parts may have failed. Contact our Sales Office or Technical Service Division.
	• The number of digits in the addition result or calculation result went over the number that can be displayed.	• First, clear the addition result. Then execute addition again. • The coefficient used in unit converting is too small. Set a greater coefficient.
u-Err	The minus-value load exceeded the lower limit.	• The pan or the pan base may not be properly set. Check them, paying attention to whether they are in contact with an external object. • If the error message does not disappear even if the pan and the pan base are properly set, mechanical parts may have failed. Contact our Sales Office or Technical Service Division.
1-Err	The reference weight used during span adjustment with an external weight is far less than 50% of the weighing capacity.	For span adjustment with an external weight, use a weight that weighs as close to the weighing capacity as possible.
2-Err	An error over 1.0% was detected in span adjustment with an external weight, or the balance failed.	For span adjustment with an external weight, check that a correct weight is placed and that no objects other than the weight are placed. Then, execute span adjustment again.
b-Err	The balance is influenced by static electricity or noise.	• Turn the power off and then on. • If this error occurs again, electric components may have failed. Contact our Sales Office or Technical Service Division.
d-Err	The balance is influenced by static electricity or noise.	• Turn the power off and then on. • If this error occurs again, electric components may have failed. Contact our Sales Office or Technical Service Division.

L-Err	The weight of a sample is too light at a sampling during parts counting, or reference weight saving during percentage weighing.	Use a heavier sample by referring to “Appendix 3: Specifications” (P. 88) to check the minimum unit weight and the percentage weighing weight limit.
t-Err	• At addition operation, you placed additional samples on twice. • At addition operation, you pressed the key without adding samples or you did the opposite of the setting.	• After setting the display to “0” (by unloading the previous sample), place the next sample to continue addition operation. • Addition operation is impossible when 0 or a negative value is displayed. Place a sample to continue addition operation.
E 1-Err	• No inputs are sent from the weight sensor. • The weighing section does not connect to the display.	• Turn the power off and then on. • Check that the weighing section is properly connected to the display. • If this error occurs again, the sensor may have failed. Contact our Sales Office or Technical Service Division.
E2-Err	Because the balance is unstable, initialization cannot be completed.	The balance may be affected by an external influence such as wind and vibration. Relocate the balance by referring to the section “Section 1-2: Instructions for Proper Installation” (P. 3).
E4-Err	The weighing section is not initialized.	Check that the weighing section is properly connected to the display and turn the power off and then on.
E5-Err	The model of the weighing section is different from that of the display.	Check that the product number on the nameplate attached on the weighing section is the same as that on the nameplate of the display. Connect a weighing section the product number of which is the same as that of the display to the display and turn the power off and then on.

6-2 Troubleshooting

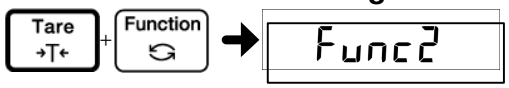
Problem	Cause	Remedy
Nothing is displayed even when the balance is powered on.	The batteries are exhausted.	• Replace the batteries. • If nothing is displayed even if the batteries are replaced, the electric components of the balance may have failed. • Contact the retailer from whom the balance was purchased.
Display flickers.	The balance may be affected by an external influence such as wind and vibration.	Increase the setting values of relevant functions by referring to “Section 5-7: Improving the Stability of the Balance” (P. 65).
Weight indication contains an error.	The display error is caused because the balance has not been used for a long period of time or has been relocated to another location.	Perform span adjustment.
	The adjusters are not settled, and the balance is not kept horizontal.	Check that the balance is kept horizontal.
	The tare weight is set or not.	Unload the sample from the pan and then zero the readout by pressing the [Tare] key to continue measurement.
Weight indication contains an error even after adjusted.	The balance may have been affected by an external influence such as wind and vibration during adjustment.	The balance may be affected by an external influence such as wind and vibration. Take remedial actions or relocate the balance by referring to the section “Section 1-2: Instructions for Proper Installation” (P. 3). Then adjust again.
	The weight used for adjustment is slightly different in mass from the weight used for checking.	Use the same weight during adjustment and checking.

The display does not move with the M sign flashing. (When the [Tare] key is pressed, during a sampling in parts counting mode, etc.)	The balance may be affected by an external influence such as wind and vibration.	The balance may be affected by an external influence such as wind and vibration. Take remedial actions or relocate the balance by referring to the section “Section 1-2: Instructions for Proper Installation” (P. 3).
The current settings of the balance are unknown.		You can initialize the balance (Refer to “Section 7-3: Initializing” (P. 79)).
The weighing capacity cannot be measured.	The tare range is set. (The Net sign lights up.)	When a tare range is set, the measurable range is reduced (Refer to “Section 2-3: Weighing by Placing a Sample in a Container (Tare)” (P.23)). Remove the tare from the pan and turn the power off and then on (Refer to “Section 2-1: Powering On/Off the Balance and Checking Operation” (P.21)).

6-3 Initializing

The settings of the balance can be initialized with the following steps:

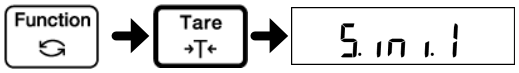
1 **Set to the function 2 setting mode.**



Press the [Function] key while pressing the [Tare] key. Release the key when “Func2” is displayed.

The function 2 setting mode is set, displaying “1. Id 0”.

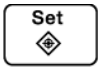
2 **Set the function initialization.**



Select “5. ini.” by pressing the [Function] key.

Select “1” by pressing the [Tare] key.

3 **Save the setting.**



Press the [Set] key.

The balance goes back to normal display.

CAUTION

All function settings are initialized, discarding all data including ID numbers, limit values, data of parts counting, percentage weighing, unit converting, and gravimeter.
Restoring the current status will be impossible. Before initializing the balance, record necessary function settings in a memo or otherwise.

6-4 Maintenance

When taking care of the balance, be careful of the following:

For heavy dirt

If the balance is very dirty, remove the pan and the display and clean them.

> CAUTION Removing parts other than the pan and the display damages functions of the balance, resulting in possible failure.

How to take care of the balance

To clean the main unit, use a piece of dry soft cloth.
If the unit is very dirty, use a cloth soaked in a small quantity of neutral detergent or cleaning solvent.

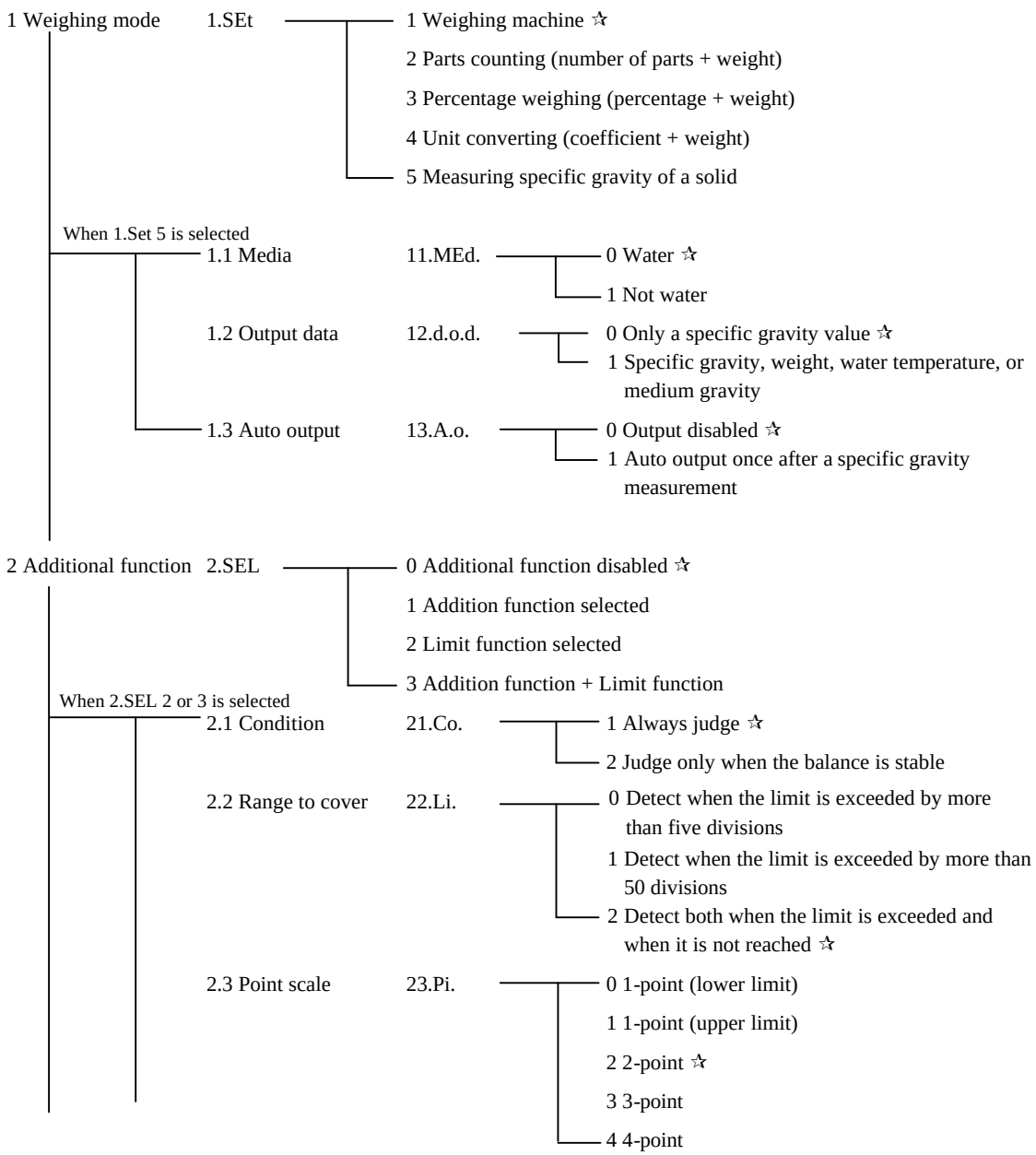
> CAUTION Do not pour water on the main unit.

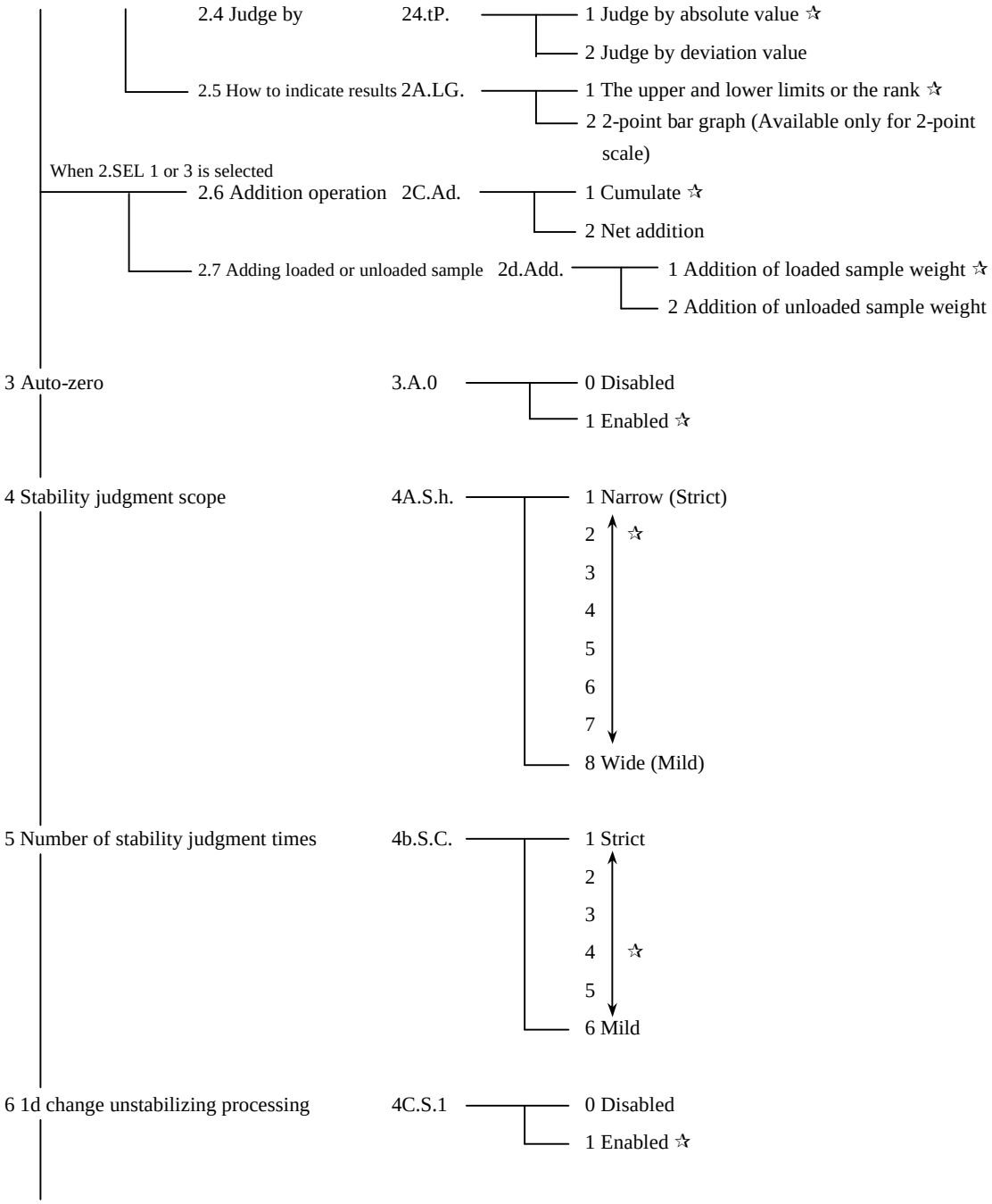
Appendixes

Appendix 1 Function Setting List

A star (☆) denotes an initial value.

[Function 1]




2.4 Judge by
24.tP.
1 Judge by absolute value ☆
2 Judge by deviation value
2.5 How to indicate results
2A.LG.
1 The upper and lower limits or the rank ☆
2 2-point bar graph (Available only for 2-point scale)
When 2.SEL 1 or 3 is selected
2.6 Addition operation
2C.Ad.
1 Cumulate ☆
2 Net addition
2.7 Adding loaded or unloaded sample
2d.Add.
1 Addition of loaded sample weight ☆
2 Addition of unloaded sample weight
3 Auto-zero
3.A.0
0 Disabled
1 Enabled ☆
4 Stability judgment scope
4A.S.h.
1 Narrow (Strict)
2 ☆
3
4
5
6
7
8 Wide (Mild)
5 Number of stability judgment times
4b.S.C.
1 Strict
2
3
4 ☆
5
6 Mild
6 1d change unstabilizing processing
4C.S.1
0 Disabled
1 Enabled ☆

7 Response speed 5A.rE.
(Number of moving average times)
- 0 Normal ☆
- 1 Fast
- 2
- 3
- 4
- 5
- 6
- 7 Slow

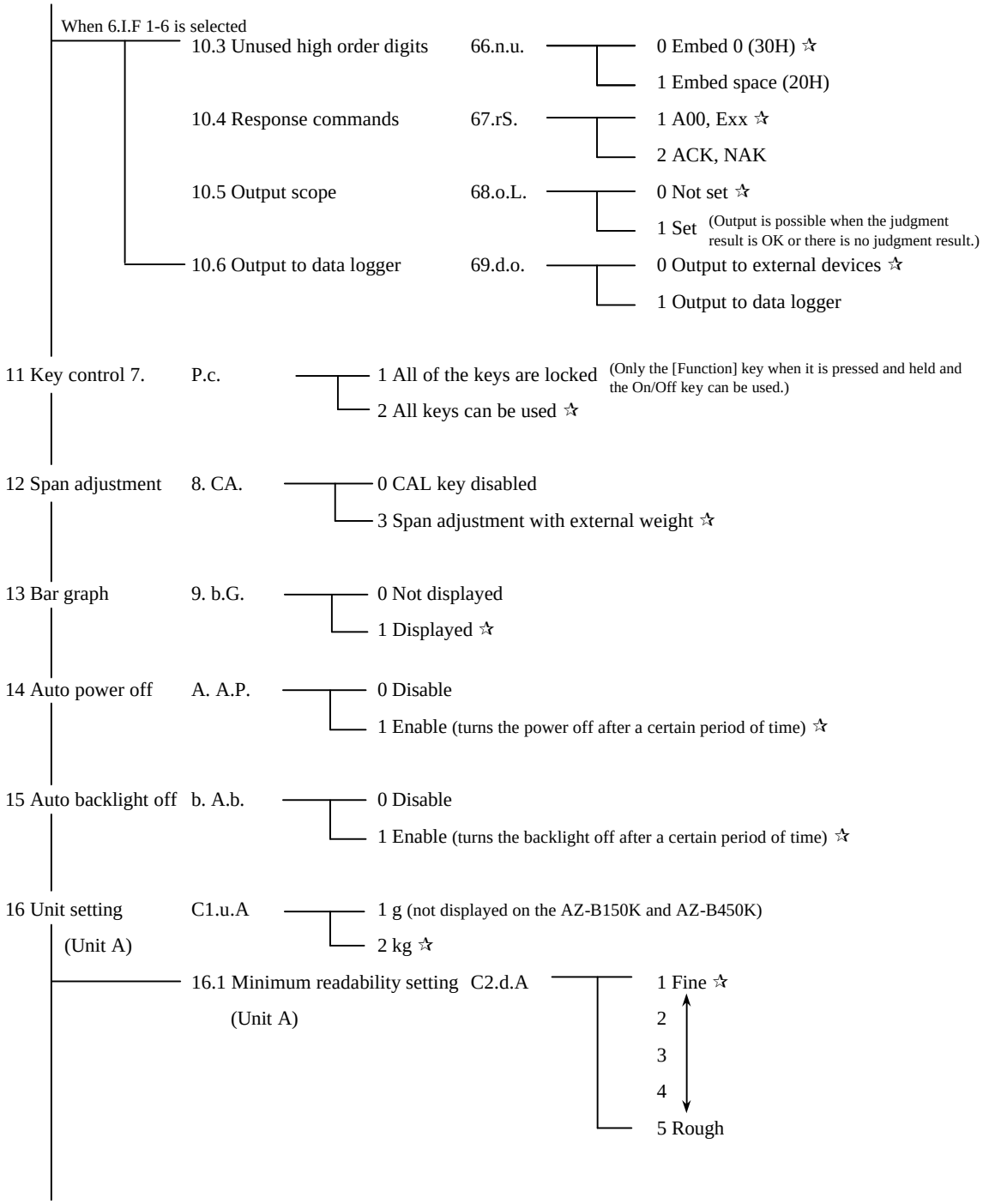
8 Weight updating interval 5b.ti.
- 1 0.1s
- 2 0.2s ☆
- 3 0.4s
- 4 0.8s

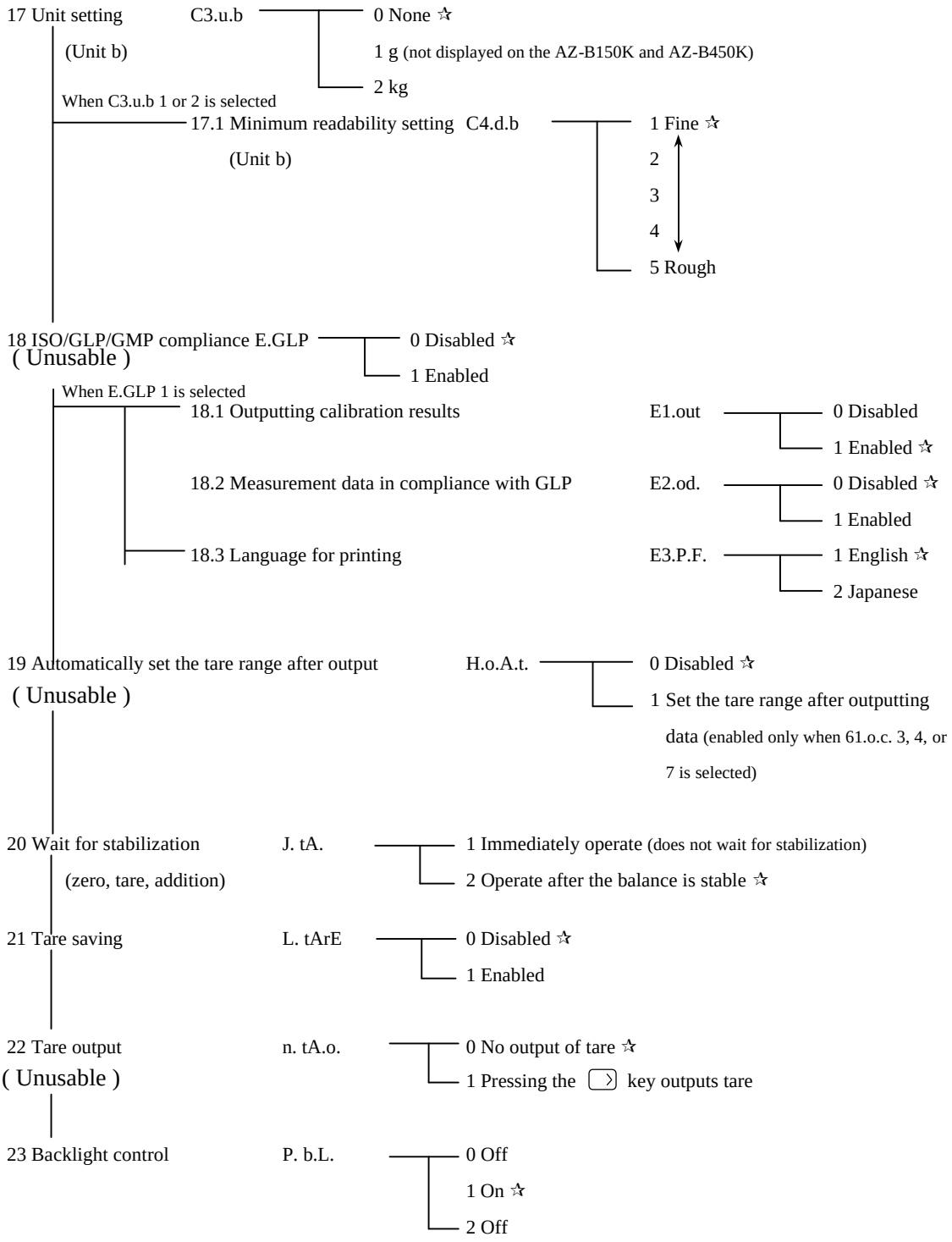
9 Response speed 5C.Fr.
(Signal processing)
- 1 Fast
- 2 ☆
- 3
- 4 Slow

10 Interface 6. I.F.
(Unusable)
- 0 Stop input/output
- 1 Numeric 6-digit format ☆
- 2 Numeric 7-digit format
- 4 Special-purpose format
- 5 Special format 1
- 6 Special format 2

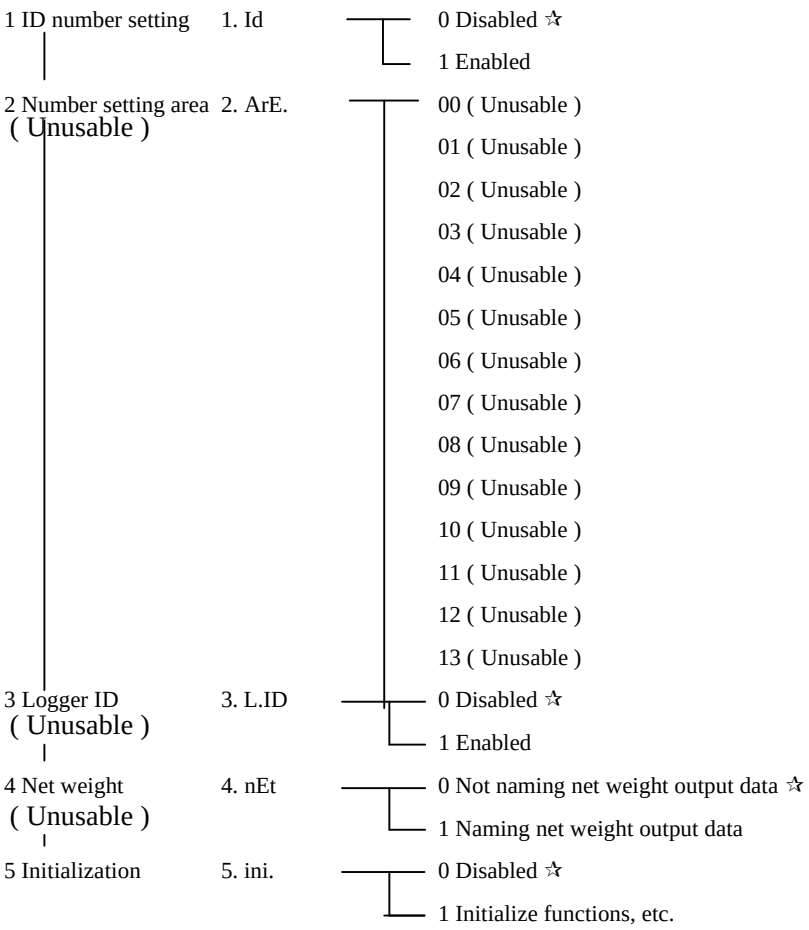
When 6.I.F. 4 is selected
10.1 Special-purpose format 6. I.F.
- 41 Special-purpose format 1 ☆
- 42 Special-purpose format 2

When 6.I.F 1-6 is selected
10.2 Output control 61.o.c.
- 0 Stop output.
- 1 Output continuously. (The data output interval depends on the weight updating interval.)
- 2 Output continuously if stable.
- 3 Output once when the [Print] key is pressed.
- 4 Automatically output once when the balance is stable.
- 5 Output once when the balance is stable. Stop output when unstable.
- 6 Output once when the balance is stable. Output continuously when unstable.
- 7 Output continuously when unstable. ☆

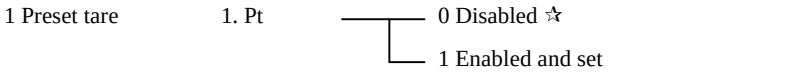

When 6.I.F 1-6 is selected
10.3 Unused high order digits
66.n.u.
0 Embed 0 (30H) ☆
1 Embed space (20H)
10.4 Response commands
67.rS.
1 A00, Exx ☆
2 ACK, NAK
10.5 Output scope
68.o.L.
0 Not set ☆
1 Set (Output is possible when the judgment result is OK or there is no judgment result.)
10.6 Output to data logger
69.d.o.
0 Output to external devices ☆
1 Output to data logger
11 Key control 7.
P.c.
1 All of the keys are locked (Only the [Function] key when it is pressed and held and the On/Off key can be used.)
2 All keys can be used ☆
12 Span adjustment
8. CA.
0 CAL key disabled
3 Span adjustment with external weight ☆
13 Bar graph
9. b.G.
0 Not displayed
1 Displayed ☆
14 Auto power off
A. A.P.
0 Disable
1 Enable (turns the power off after a certain period of time) ☆
15 Auto backlight off
b. A.b.
0 Disable
1 Enable (turns the backlight off after a certain period of time) ☆
16 Unit setting
(Unit A)
C1.u.A
1 g (not displayed on the AZ-B150K and AZ-B450K)
2 kg ☆
16.1 Minimum readability setting
(Unit A)
C2.d.A
1 Fine ☆
2
3
4
5 Rough


17 Unit setting
(Unit b)
C3.u.b
0 None ☆
1 g (not displayed on the AZ-B150K and AZ-B450K)
2 kg
When C3.u.b 1 or 2 is selected
17.1 Minimum readability setting
(Unit b)
C4.d.b
1 Fine ☆
2
3
4
5 Rough
18 ISO/GLP/GMP compliance
(Unusable)
E.GLP
0 Disabled ☆
1 Enabled
When E.GLP 1 is selected
18.1 Outputting calibration results
E1.out
0 Disabled
1 Enabled ☆
18.2 Measurement data in compliance with GLP
E2.od.
0 Disabled ☆
1 Enabled
18.3 Language for printing
E3.P.F.
1 English ☆
2 Japanese
19 Automatically set the tare range after output
(Unusable)
H.o.A.t.
0 Disabled ☆
1 Set the tare range after outputting data (enabled only when 61.o.c. 3, 4, or 7 is selected)
20 Wait for stabilization
(zero, tare, addition)
J. tA.
1 Immediately operate (does not wait for stabilization)
2 Operate after the balance is stable ☆
21 Tare saving
L. tArE
0 Disabled ☆
1 Enabled
22 Tare output
(Unusable)
n. tA.o.
0 No output of tare ☆
1 Pressing the key outputs tare
23 Backlight control
P. b.L.
0 Off
1 On ☆
2 Off

[Function 2]



[Function 3]



Appendix 2 Measurement Mode List

In each weighing mode, pressing the [Function] key can toggle the function displayed. Displayable functions differ between modes. The additional functions usable concurrently in each function also differ.

Weighing mode	Displayed functions switched at each [Function] key press				Additional function usable in each function		Remarks
	Switching order	Displayed function	Unit used	Displayed sign	Addition	Limit	
Weighing machine	1	Weight measuring	Unit A		○	○	
	2	Gross weight	Unit A	B/G	×	×	
	3	Weight measuring	Unit B		×	×	Displayed only when unit B is selected
	4	Cumulative weight	Unit A	S	Cumulative value	×	Displayed only when addition function is selected
Parts counting	1	Parts counting	Pcs		○	○	
	2	Cumulative count	Pcs	S	Cumulative value	×	Displayed only when addition function is selected
	3	Average unit weight	Unit A	Pcs	×	×	
	4	Weight measuring	Unit A		×	×	
Percentage weighing	1	Percentage measuring	%		○	○	
	2	Cumulative percent	%	S	Cumulative value	×	Displayed only when addition function is selected
	3	Weight measuring	Unit A		×	×	
Unit converting	1	Coefficient multiplying	#		○	○	
	2	Cumulative sum	#	S	Cumulative value	×	Displayed only when addition function is selected
	3	Weight measuring	Unit A		×	×	
Gravimeter	1	Measurement of specific gravity	kg		×	×	Unit for weight fixed to kg

- For more information on unit A and unit B, refer to “Section 5-1: Using Two Expression Units by Switching Them” (P. 57).

Appendix 3 Specifications

■ Basic specifications

Model	Weighing capacity	Minimum readability	Parts counting Minimum unit weight	Percentage weighing Weight limit	Dimensions of pan (mm)	Power
AZ-B6000	6 kg	0.001 kg	0.001 kg	0.1 kg	200×250	Four D batteries
AZ-B30K	30 kg	0.005 kg	0.005 kg	0.5 kg	330×310	
AZ-B60K	60 kg	0.01 kg	0.01 kg	1 kg	380×530	
AZ-B150K	150 kg	0.02 kg	0.02 kg	2 kg		
AZ-B450K	450 kg	0.1 kg	0.1 kg	10 kg	550×700	

■ Common specifications

Weighing system	Electric resistance wire type load cell
Explosion-proof construction	Intrinsically safe explosion-proof type Ex ia IIB T4 Type approval No.: TC19402
Weighing mode	Weighing machine/Parts counting/Percentage weighing/Unit converting/Gravimeter (only measuring specific gravity of a solid)
Function	Addition function (cumulate function, net addition, addition of loaded sample weight, addition of unloaded sample weight)/ Limit (5-point scale judgment with 4-point setting, absolute/deviation value judgment)/ Unit display converting (Unit A and B are set in advance and they are switched in the measurement mode.)/ ISO/GLP/GMP compliant/ Tare saving/Preset tare range/Tare output/ Unit weight display/Gross weight display/ Auto backlight off/Service area setting
Display	LCD with backlight Segment: Height: 25 mm, width: 12.5 mm, 3-degree slant/Seven digits for weight/ Can display seven digits for various messages and a bar graph of up to 20 bars
Zero-point adjustment and tare range setting	Zero-point adjustment: The zero-point is adjusted using the [Zero] key (Whether to wait for stabilization or not can be switched.) Tare range setting: Tare range is set and the actual weight is obtained simply by pressing the [Tare] key (Whether to wait for stabilization or not can be switched.)/Preset tare range
Zero tracking	Disabled by setting.
Display when overloaded	“o-Err” is displayed when the weighing capacity is exceeded by 9 divisions.
Span adjustment	Span adjustment with external weights (Weights used are at least 50% of the weighing capacity)

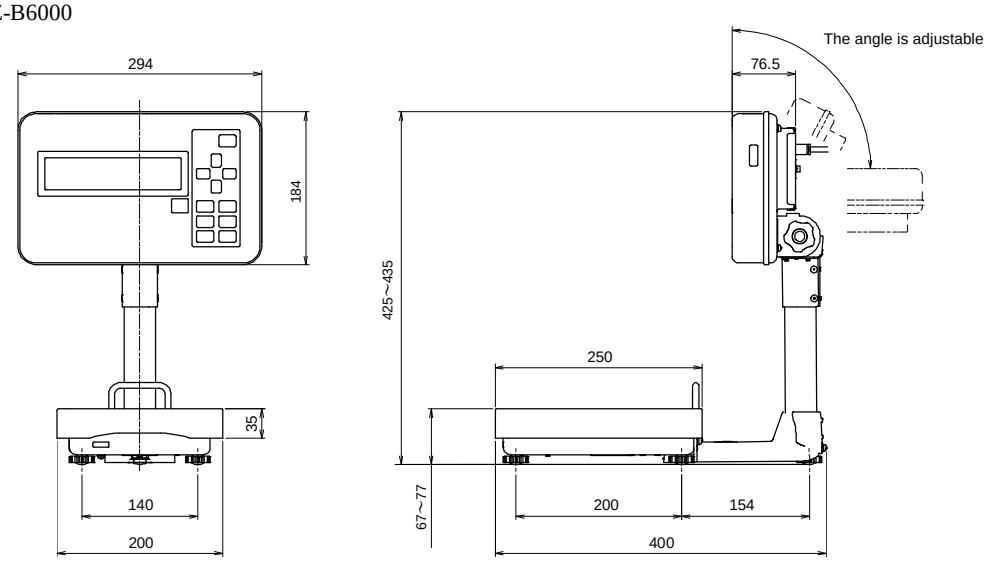
Power	Batteries Four D alkaline batteries (LR20) or Four D manganese batteries (black) (R20PU)
Weight of the main unit	Display: Approximately 1.7 kg (excluding the batteries) Weighing section (parts other than the display): AZ-B6000: Approximately 4.5 kg AZ-B30K: Approximately 7.5 kg AZ-B60K/150K: Approximately 14.5 kg AZ-B450K: Approximately 43 kg
Operating temperature/ humidity	Temperature: +5 to +35°C, Humidity: 80%rh or less (No condensation allowed)
Battery life	Approximately 1,000 hours (When alkaline batteries are used, the balance is set to not output data, and the backlight is turned off.)
Options	Stainless steel adjuster Stainless steel hand truck (only for the AZ-B450K)

■ Weighing capacity and minimum readability of each model

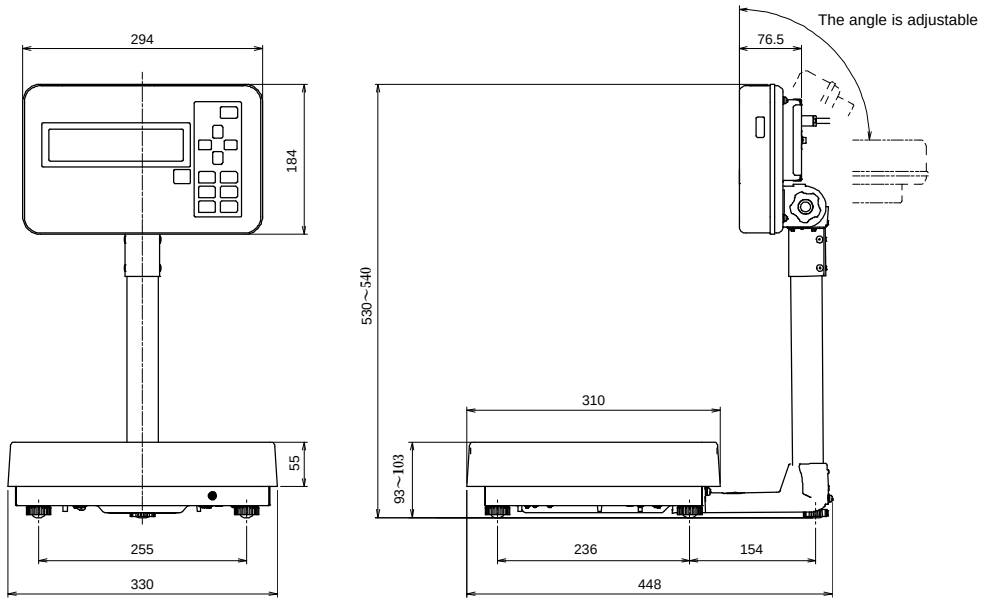
		g	kg
AZ-B6000	Weighing capacity	6000	6
	Minimum readability	1	0.001
AZ-B30K	Weighing capacity	30000	30
	Minimum readability	5	0.005
AZ-B60K	Weighing capacity	60000	60
	Minimum readability	10	0.01
AZ-B150K	Weighing capacity		150
	Minimum readability		0.02
AZ-B450K	Weighing capacity		450
	Minimum readability		0.1

■ Full view (unit: mm)

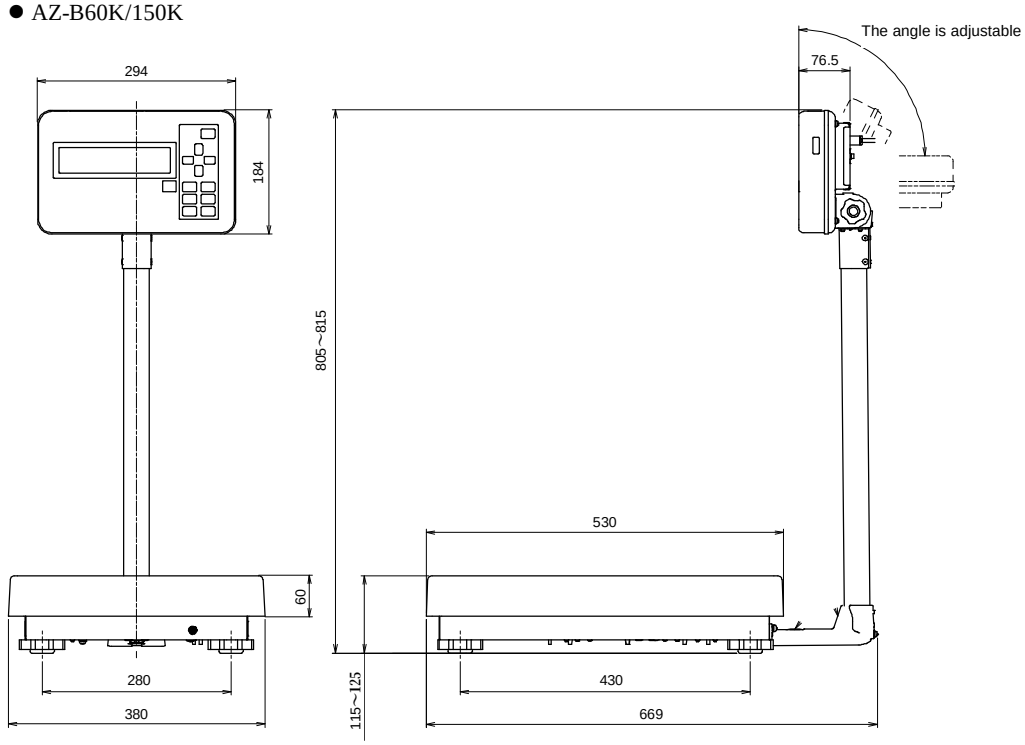
● AZ-B6000



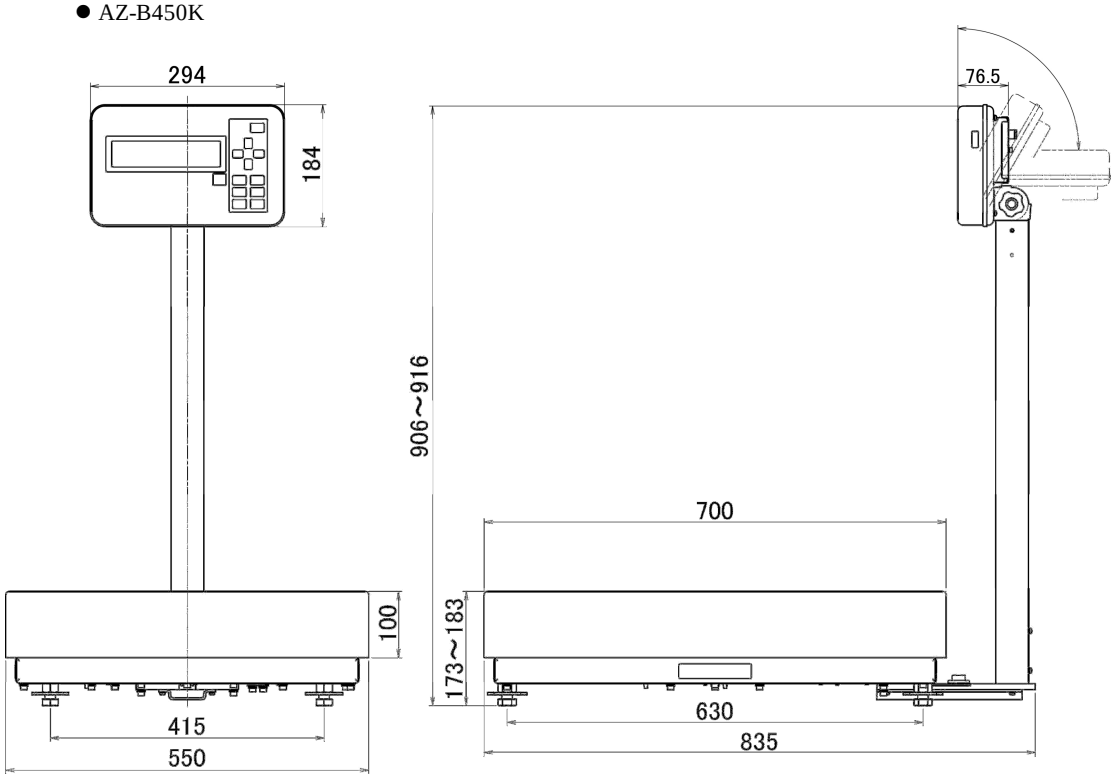
● AZ-B30K



● AZ-B60K/150K



● AZ-B450K



Appendix 4 Usable Gases

Acrylic aldehyde
Ethyl acrylate
Methyl acrylate
Acrylonitrile
Acetylacetone
Acetaldehyde
Ethyl acetoacetate
Acetonitrile
Acetone
Aniline
2-Ethanolamine
Amphetamine
Ammonia
Carbon monoxide
Ethanol
Ethane
Ethanethiol
Ethylcyclobutane
Ethylcyclohexane
Ethylcyclopentane
Ethylbenzene
Methyl ethyl ether
Methyl ethyl ketone
Ethylene
Ethylene oxide
2-Ethoxyethanol
Epichlorohydrin
1,2-Epoxypropane
Acetyl chloride
Allyl chloride
Ethyl chloride
Vinyl chloride
Butyl chloride
Propyl chloride
Benzyl chloride
Methyl chloride
1-Octyl alcohol
Octane
Ethyl formate
Methyl formate
0-Xylene
Cumene
0-Methylphenol
Crotonaldehyde
2-Chloroethanol
Chlorobenzene
Acetic acid
Ethyl acetate
Vinyl acetate
Butyl acetate
Propyl acetate
Amyl acetate
Methyl acetate
Diacetone alcohol
Hydrogen cyanide
Diaminoethane
2-Dimethylaminoethanol
Diethylamine
Diethyl ether
1,4-Dioxane
1,3-Dioxolan
Cyclobutane
Cyclopropane
Cyclohexanol
Cyclohexanone
Cyclohexane
Cyclohexylamine
Cycloheptane
Cyclopentane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloropropane
0-Dichlorobenzene
Dichloromethane
Dibutyl ether
Dipropyl ether
Dimethylamine
N,N-Dimethylaniline
Dimethyl ether
p-Cymene
Ethyl bromide
Butyl bromide
Nitric acid isopropyl
Styrene
Thiophene
trans-Decahydronaphthalene
Decane
Tetrahydrothiophene
Tetrahydrofuran
Tetrahydrofurfuryl alcohol
Tetrafluoroethylene
Triethylamine
1,3,5-Trioxane
Triethylamine
1,2,4-Trimethylbenzene
0-Toluidine
Toluene
Naphthalene
Nitroethane
Nitromethane
Nonanol
Nonane
Pyridine
Phenol
1,3-Butadiene
1-Butanol
Butane
n-Butylamine
Butyl glycolate
Butyl methyl ketone
Furan
1-Propanol
Propane
Propylamine
Methyl propyl ketone
Propyl mercaptan
Propylene
Propyne
1-Hexanol
Hexane
2-Heptanol
2-Heptanone
Heptane
Benzene
Benzotrifluoride
1-Pentanol
Pentane
Metaldehyde
Ethyl methacrylate
Methyl methacrylate
Methanol
Methane
Methylamine
Methylcyclobutane
Methylcyclohexanol
Methylcyclohexane
Methylcyclopentane
α-Methylstyrene
Gasoline
Kerosene
Coke oven gas
Coal tar naphtha
Naphtha
Turpentine oil

* Excerpts from “Explosion-proof electrical apparatus inspection guidelines” issued by the Japanese Technology Institution of Industrial Safety in 1990.

Index of Terms

(Notes)