

EK Series

Compact Balances

**EK-122 / EK-222 / EK-322 / EK-422 /
EK-622 / EK-1201 / EK-2201 / EK-3201 /
EK-4201 / EK-6201 / EK-6200 / EK-12000**

INSTRUCTION MANUAL




A&D Company, Ltd.

1WMPD4005573A

Warning Definition

The warnings described in this manual have the following meanings:

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

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1. Compliance

1.1. Compliance with FCC Rules

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

2. Introduction

Thank you for choosing A&D's electronic balance. For your better understanding and usage of Compact Balance EK Series, we would like you to read this instruction manual in advance.

3. Outline and Features

EK Series have the following features:

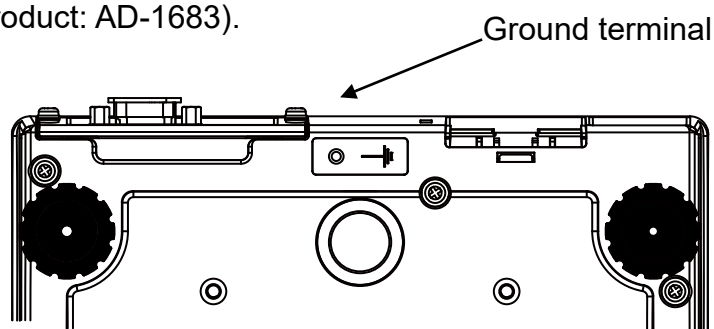
- This is an electronic balance with high resolution of 1/6,000 to 1/60,000.
- Counting mode, percent mode and comparator mode are available.
- Back light LCD is equipped for measurement in a dark place
- Power source can be AC adaptor, USB or dry cell battery
- RS-232C serial interface is equipped as standard, for connection to printer and PC
- With separate options, USB and *Bluetooth*[®] interfaces can be expanded.
- With serial interface, data for GLP can be output.
- The counting function is available to count the quantity of an item with same mass, which calculates pieces from the mass.
- Comparator function is available to indicate the results, comparing the preset comparative value and the actual weight value.
- Maximum 20 settings of comparator comparative value can be stored.
- Display lock function is available to hold weight value on the display for easy reading.
- Shock detection function (ISD) is equipped to display shock level on the mass sensor.
- Auto-tare function is available. The function is used with the comparator, automatically deducting tare and taking off one OK-range weight after another for weighing.
- Sonic communication function is equipped to receive weight value with a built-in buzzer, via a specialized application.
- The comparator buzzer and the sonic communication cannot be used at the same time.
- The following setting and data remains in the memory even after the power shut-off.

Unit mass in the counting function
Upper/lower limit value of the comparator
Sensitivity adjustment data
Function table

4. Precautions for Use

4.1. Precautions for Setting

- EK is not water-proof. Set it up in a place free of water splash
- Do not set it in a place with corrosive gas and flammable gas.
- Do not put stress on the cable.
- Be cautious not to drop the balance as it has heavy weight.
- To make much of the balance performance, take the following setting conditions into account:
- Ideal setting conditions are stable temperature and humidity, nice and flat floors, places without wind and vibration, indoor without direct sunshine, stable power, and so on.
- Do not set it on a soft floor or in a place with vibration.
- Do not set it in a place with wind and changeable temperature.
- Avoid a place with direct sunshine.
- Do not set it in a place with strong magnetism and electric wave
- Do not set it in a place with static electricity to occur easily. If humidity is less than 45% R.H., it causes friction on insulating material like plastic and makes it easy to build up static electricity.
- In general, if humidity is less than 45% R.H., insulating material like plastic is encouraged to build up static electricity, which causes deviation in weighing. Take the following measures if necessary. Also, set up balances, using ground terminal.
 - Keep relative humidity high at the setting location.
 - Keep weighing object in a metal container with conductivity and weigh it.
 - Wipe statically charged material like plastic, with a wet cloth to restrain static electricity.
 - Remove static electricity off the weighing object directly, using a static eliminator (Optional product: AD-1683).



- Unstable AC power causes disfunction.
- Use the weighing pan, taking its protection film off.
- This product is for indoor use only. If it is used outdoor, it may suffer lightning surge which is beyond its discharge tolerance. In this case, the product is not able to resist lightning energy, possibly getting damaged.
- Sensitivity adjustment is recommended for more accurate weighing, if the balance is initially set up or moved far away.

4.2. Precautions for Weighing

- Do not set more load than the weighing capacity, on the weighing pan.
- Regular sensitivity adjustment is recommended to maintain accurate weighing (See “15. Sensitivity Adjustment”).
- Do not impose shock on the weighing pan, or not drop anything on it.
- Press the buttons with a finger, not with anything sharp like a pen.
- Pressing [RE-ZERO] key is recommended for each weighing, to minimize weighing deviation.
- Do not weigh with the balance immersed in water. Regularly check if weighing is performed correctly.

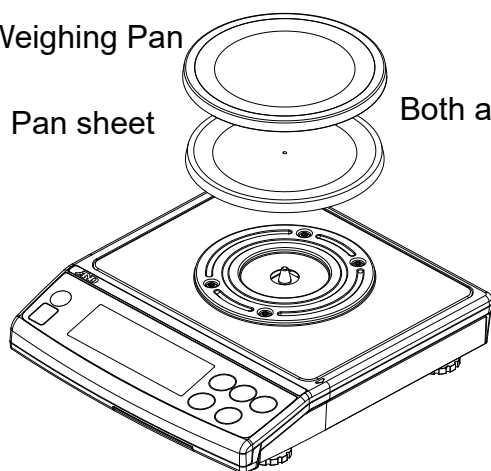
4.3. Precautions for Storage

- Do not disassemble this product.
- Wipe using a soft cloth slightly moistened with a mild detergent when cleaning the scale. Do not use organic solvents.
- Please use the original package for transportation.

5. Contents of Package

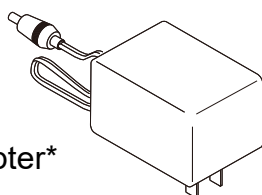
Contents of Package

Weighing Pan



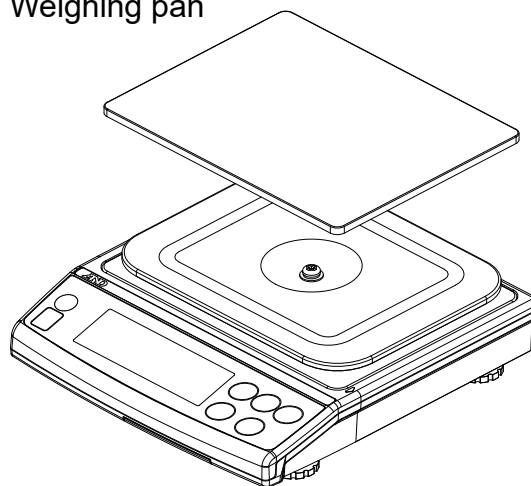
EK-122 /EK-222 /EK-322
EK-422 /EK-622

AC Adapter*



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

Weighing pan

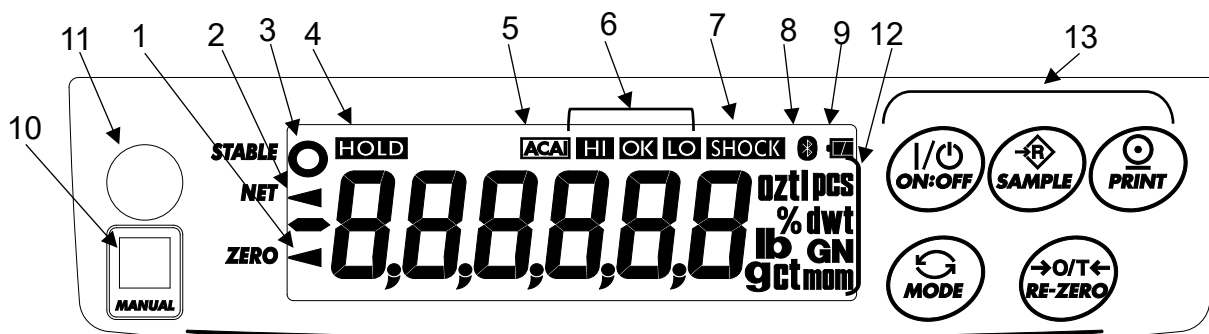


EK-1201 /EK-2201 /EK-3201 /EK-4201
EK-6201 /EK-6200 /EK-12000



Quick Start Guide

6. Descriptions of Parts



No.	Name
1	Zero indicator
2	Net (Tare) indicator
3	Stable indicator
4	Hold indicator
5	ACAI indicator
6	Comparator results
7	Shock indicator

No.	Name
8	Bluetooth® indicator
9	Battery level indicator
10	Instruction manual QR code
11	Bubble spirit level
12	Weighing unit
13	Keys






Indicator / Symbol	Description
STABLE ○	Turns on when the weight value is stable and readable.
NET ◀	Turns on when the net weight is displayed (with tare weight deducted).
ZERO ◀	Turns on when zero is displayed.
Weighing units	Refer to "8.2. Units".
HOLD	Turns on while the display is held.
SHOCK	Turns on when the mass sensor detects shock.
Bluetooth	Turns on when the option, EKW-27 (Bluetooth communication interface) and the weighing device get completely connected for Bluetooth communication.
HI/OK/LO	Displays results of the comparison with the set-up upper and lower limit values, when using the comparator function.
Battery indicator	Displays remaining battery capacity in three levels.

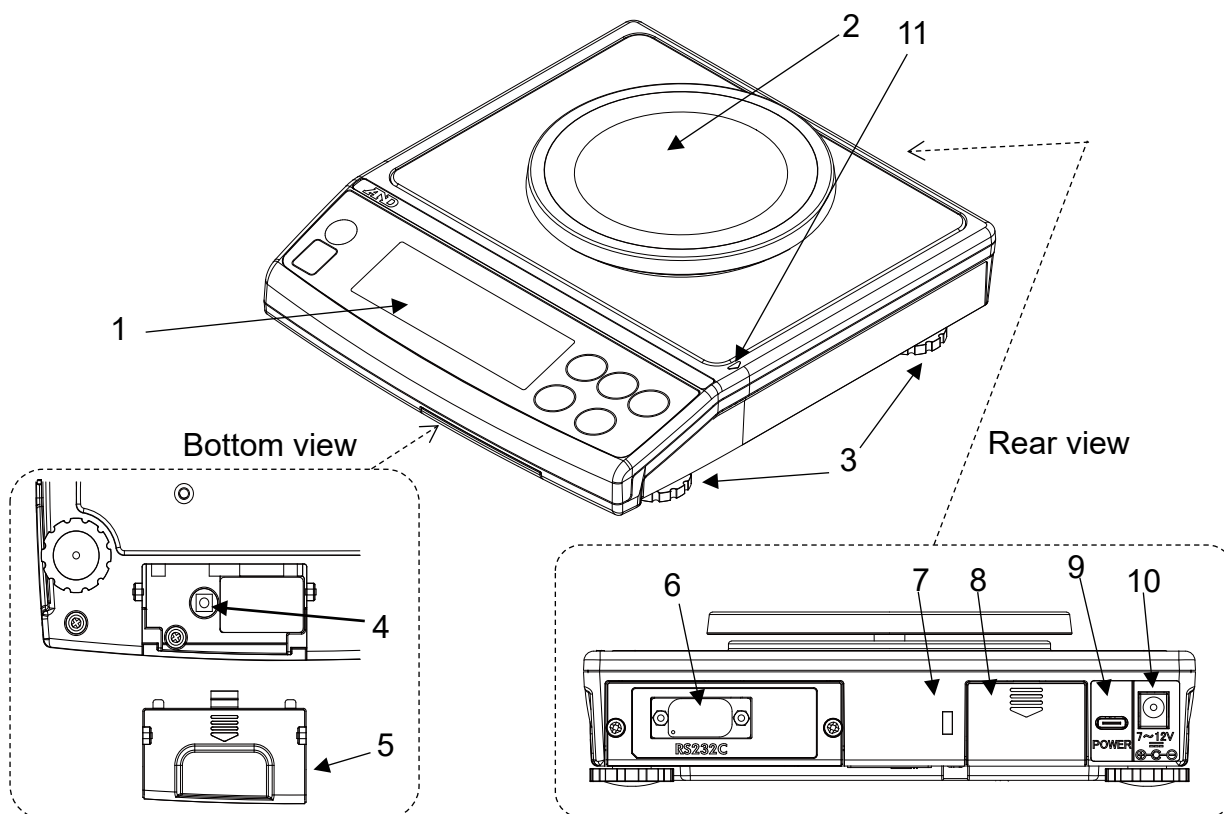
RE-ZERO Key Model

Operation key	Description	Operation key	Description
	Turns on / off the power.		Switches the display unit. When configuring various settings, this key returns the display to weighing mode. Pressing and holding this key activates the comparator upper/lower limit setting mode.
	Pressing and holding this key activates function table mode. In counting mode, this key is used to store the unit weight. In percentage mode, it stores the 100% reference weight.		Sets the displayed value to zero. When configuring various settings, this key changes the setting value or increases the blinking digit by +1.
	Outputs the weighing value to a printer or PC. When configuring various settings, this key confirms or selects the setting value.		

ZERO/TARE Separation Model



Operation key	Description	Operation key	Description
	Turns the power on and zero the balance in weighing mode. Continue to press to turn the power off.		Switches the display unit. When configuring various settings, this key returns the display to weighing mode. Pressing and holding this key activates the comparator upper/lower limit setting mode.
	Pressing and holding this key activates function table mode. In counting mode, this key is used to store the unit weight. In percentage mode, it stores the 100% reference weight.		Subtracts tare (container) weight on the weighing pan. When configuring various settings, this key changes the setting value or increases the blinking digit by +1. In the following text, it serves the same function as the RE-ZERO key.
	Outputs the weighing value to a printer or PC. When configuring various settings, this key confirms or selects the setting value.		



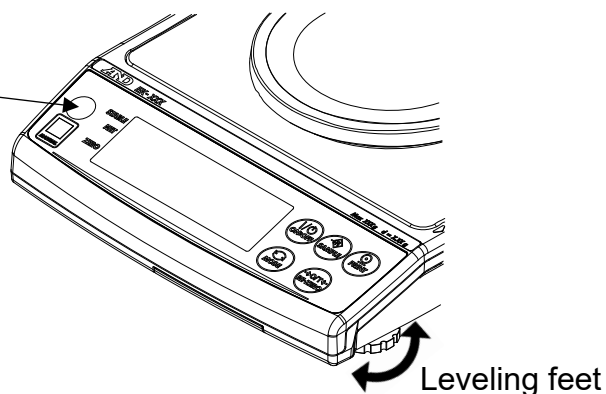
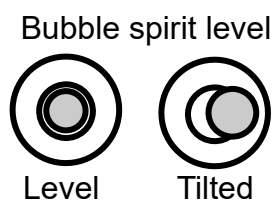
No.	Name
1	LCD display *1
2	Weighing pan *2
3	Leveling feet *3
4	CAL key
5	CAL key cover

No.	Name
6	RS-232C interface connector
7	Security slot
8	Battery box
9	Power connector (USB Type-C)
10	Power connector (DC jack)
11	Buzzer output mark

- *1 If a protective film is attached to the LCD screen, please remove it before use.
- *2 If a blue protective film is attached to the weighing pan, please remove it before use.
- *3 Adjust the four leveling feet as needed until the bubble is centered in the bubble spirit level.

7. Preparation for Setting

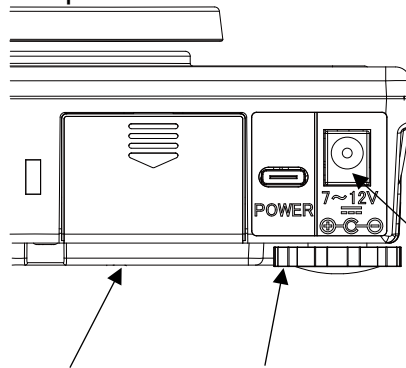
1. Set the weighing pan on the pan sheet.
2. Take “4.1. Precautions for Setting” into account and decide a setting location.
3. In order to keep the bubble spirit in the center, adjust the levelling feet (installed in 4 locations), turning them.



8. Basic Operations

8.1. Power ON/OFF

1. Insert the enclosed AC adaptor to the DC jack to connect to the power.
 - Confirm if the AC adaptor is the correct one.



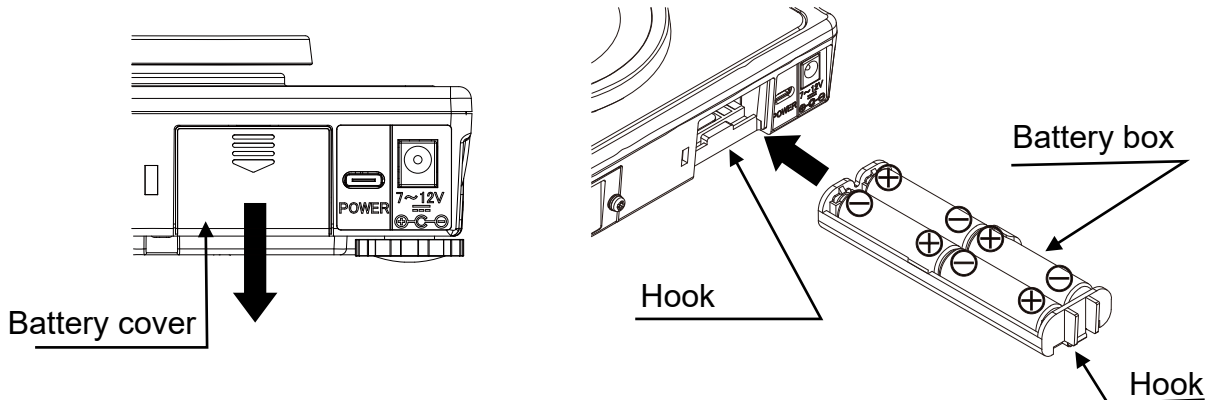
Battery box Power connector (USB) DC jack

- You can have USB power supply from the power connector (USB), using the optional USB adaptor and USB cable which is available at a store. The power connector installed on the weighing device as standard is for power supply only, not for communication. For USB communication, use the option, EKW-02.
- Power supply with mobile battery is also possible, as it is connected to the standard power connector of the weighing device. Max. consecutive operating time is approx. 50 hours for 1000 mAh mobile battery (with no communication). This is for reference. As for remaining battery capacity, check the mobile battery you are using.
- In case the mobile battery runs out automatically, refer to “16. Function Table” and set for $bAt = 1$. For other than mobile battery connection, set back for $bAt = 0$, as the max consecutive operating time (with Mobile battery mode ON) becomes shorter.
- Operations for all mobile batteries are not guaranteed.
- Check specifications of mobile battery before using the balance. Defect caused by mobile battery is out of guarantee.
- As power source, dry cell battery can be used. Stop using the battery if “LbD” is displayed and replace for a new one.

Installing Batteries

This balance can be powered using four batteries (LR6/R6P, AA size).

1. Turn off the balance and disconnect the AC adapter if using batteries.
2. Slide the battery cover off in the direction indicated by the arrow.
3. Push the battery box hook upward while pushing the box to unhook and pull out the battery box.
4. Insert new four batteries (LR6/R6P, AA size) into the battery box, noting their polarities.
5. Push the battery box back into the balance.
6. Re-attach the battery cover.



- Insert the batteries according to the polarity markings (+/-) shown in the battery holder.
- AA batteries are not included. Please purchase them separately.
- Always replace all four AA batteries at the same time.
- When using rechargeable batteries such as nickel-metal hydride (NiMH), the battery level indicator may not show full even when the batteries are fully charged.
- Always close the battery cover when using the balance.
- Do not mix different types of batteries or old and new batteries. Doing so may cause leakage, fire, or rupture.
- Battery life will vary depending on usage conditions and ambient temperature.
- If the balance will not be used for an extended period or is powered via AC adapter or USB, remove the batteries.

2. The display turns on if [ON:OFF] key is pressed. All the signs turn on, and the balance waits for the weight value to stabilize. When it gets stable, the display shows zero with ZERO indicator ON (Power ON Zero).
 - ❑ The scope for Power ON Zero is within $\pm 50\%$ ($\pm 10\%$ for the Legal for Trade models) of the weighing capacity against zero at the sensitivity adjustment. If you load the balance, exceeding this scope and turning on the power, it deducts tare with NET indicator and ZERO indicator turning on (Power ON Tare Deduction).
 - ❑ Power ON Tare Deduction works against zero at the last Power ON Zero. The scope is within $+100\%$ against zero at the sensitivity adjustment. If anything exceeding this is loaded on the weighing pan with the power turned on, "E" is displayed. If the weight value is not stable, "Error!" is displayed.

Note: Power ON Tare can not be performed on the Legal for Trade models.

Auto Power ON

With this function, the display turns on automatically when powered. Refer to "16. Function Table", and set up for $P_{ON} = 1$.

3. Press [ON:OFF] key with the display ON, and it turns off.

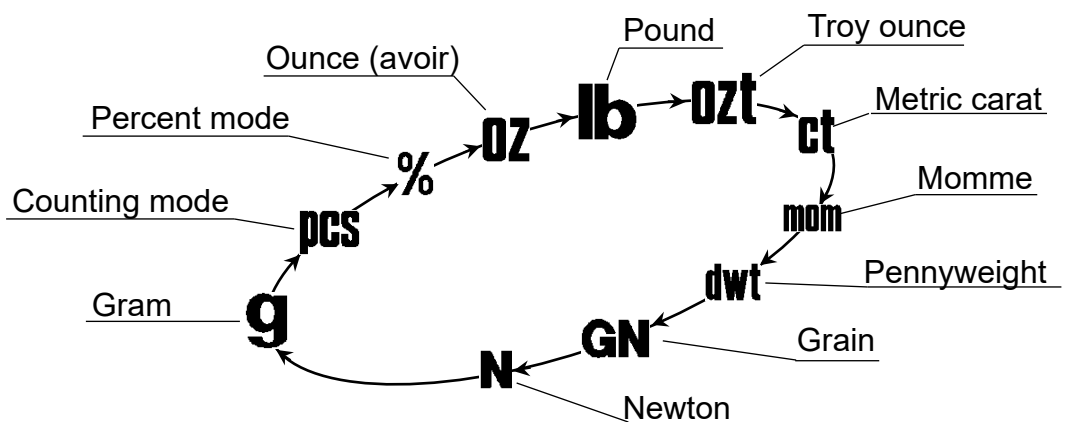
Auto Power OFF

With this function, if the weight value is stable or there are no key strokes, the display turns off after the designated time. Refer to "16. Function Table" and set up for $P_{OFF} = 1$ through 5

8.2. Units

The most common unit of weight used around the world is the gram, but there is often a need to shift to alternative units specific to the country where the balance is used or to select modes such as counting or percent.

The units and the order they appear in the display are as follows:



Among the units, those available for the user have been set at the factory before shipping. The unit can be selected in the function setting mode. The order of the units available is the same as above.

□ Note

It is possible to store only the units that will be actually used from the units available. It is also possible to specify the unit that will be shown first when the power is switched ON. For details, see “16.2. Entering Mode”.

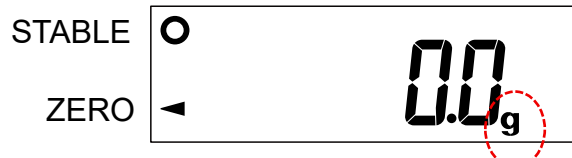
Conversion table

Units	Name	Conversion to gram
oz	Ounce (avoir)	28.349523125 g
lb	Pound (UK)	453.59237 g
ozt	Troy ounce	31.1034768 g
ct	Metric carat	0.2 g
mom	momme	3.75 g
dwt	Pennyweight	1.55517384 g
GN	Grain (UK)	0.06479891 g
t	tola	11.6638038 g
tl	tael (Hong Kong general, Singapore)	37.7994 g
tl	tael (Hong Kong jewelry)	37.4290 g
tl	tael (Taiwan)	37.5 g

- “Newton” is the value calculated by “(weight in grams) x (9.80665 m/s²) / 1000”.
- The unit “t (tola)” and three kinds of “tl (tael)” are for special versions only. One of them can be selected and installed at the factory.

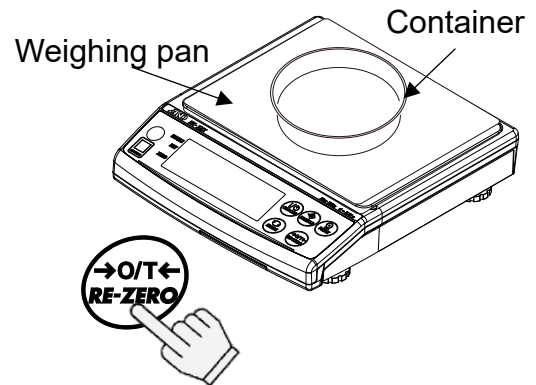
Mode Switch

If you press [MODE] key with the power ON, you can switch the unit.

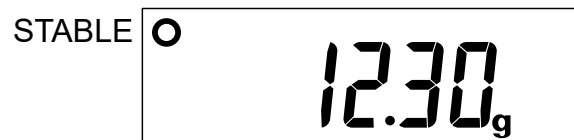
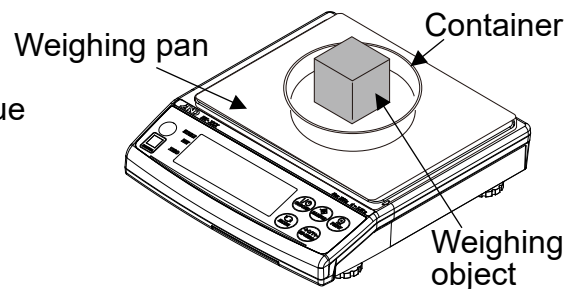


8.3. Weighing

1. Turn on the power and confirm the display shows zero.
 - ❑ If the display is not zero, press [RE-ZERO] key for zero indication.
2. In case of using a container, set it on the weighing pan and press [RE-ZERO] key for zero.



3. Set weighing object and read weight value after STABLE indicator turns on.



4. Take off the weighing object.

- ❑ With [RE-ZERO] key pressed, zero point is set on the balance if the weight value is within $\pm 2\%$ of the weighing capacity, against zero at Power ON. In this case, ZERO indicator turns on. If the weight value exceeds $+2\%$ of the capacity, tare deduction is performed with ZERO and NET indicators turning on.
- ❑ From ZERO point, weighing can be performed up to the weighing capacity. From ZERO point after the tare deduction, it can be done up to the point with deduction of tare weight from the capacity.

9. Counting Function

With this function, unit weight is saved from the mass of known quantity of sample. Then, the sample count is calculated from that value and the total mass, and is displayed.

- The unit weight is saved even after turning off the power.

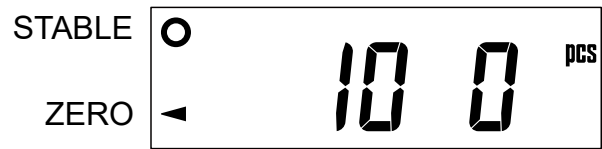


1. Press [MODE] key, setting weighing unit for "pcs" ("pcs" = pieces).



<Entering Unit Weight>

2. Press [SAMPLE] key, and the display changes for entering unit weight. The figure on the left digit is the number of the sample. To change it, press [SAMPLE] key once more. You can select one out of 5, 10, 25, 50 and 100 pcs.



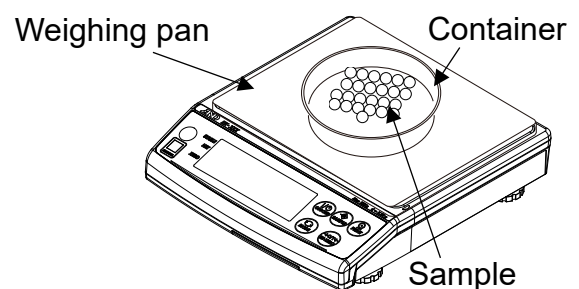
Select sample qty.



3. To align the zero point, press [RE-ZERO] key. If a container is used, put it on the weighing pan, press [RE-ZERO] key and confirm the figure on the right digit is zero.



4. Set the displayed pcs of the sample on the weighing pan or in the container.



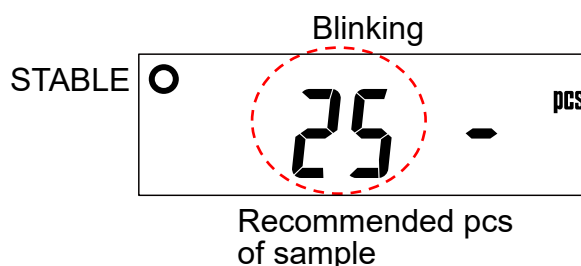
5. Confirm STABLE indicator is on and press [PRINT] key, and the unit weight is calculated and is saved.

Also, the display changes for pcs indication, using the saved unit weight. Remove the sample.



- Minimum mass of the sample can be selected from the function setting, $RP F_{nc} U_{\bar{n}in}$ (See “16. Function Table”).

If the sample mass is insufficient, “** -” shows up and blinks. (“**” is recommended pcs of sample). If no sample is added with [PRINT] key pressed one more time, unit weight can be entered with the latest pcs, which causes remarkable weighing deviation. To enter more accurate unit weight, add sample to meet the quantity indicated in “**”, and enter it, pressing [PRINT] key after the stabilization.



- The display returns to the weighing indication if the above-mentioned minimum mass is not reached with [MODE] key pressed.
- If the unit weight is below the minimum unit weight weighable, “Lo” is displayed, and the display returns to the original indication. The unit mass is too small to be entered.
- In function setting, select the following items (See “16. Function Table”):

Item		Description
$RP F_{nc}$	$ACAI$	ACAI function ON/OFF
	$U_{\bar{n}in}$	Select minimum unit of sample to enter for pcs calculation
	$S_{\bar{n}PL}$	Quantity of sample to enter for pcs calculation

<Counting>

6. Set on the weighing pan, weighing object to count. Based on the entered unit weight, quantity of weighing object is displayed.



<ACAI (Automatic Counting Accuracy Improvement) >

When unit weight is calculated, the more the sample is, the less the deviation of weight / pcs is, as it is averaged. However, it is hard to accurately count lots of sample. The function to cope with this, is ACAI (Automatic Counting Accuracy Improvement), which starts the calculation with a little number of sample, and re-calculates and updates on sample added within a range causing no counting deviation.

7. ACAI indicator turns on, as sample is added little by little for counting.

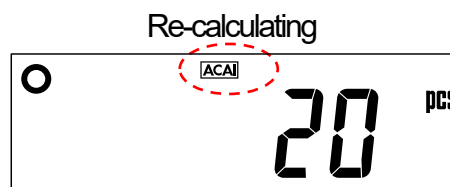
- When ACAI blinks, the unit weight entered at the procedure 5, is re-calculated.

When the calculation is done, the indicator turns off.

Do not touch the balance or move the weighing object, while the indicator is blinking.

- If you set weighing object all together too quickly, ACAI does not function. Add similar quantity to the indicated quantity.

8. As this action is repeated with the unit weight re-calculated, counting accuracy is expected to be improved.



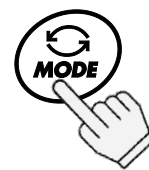
Precautions for ACAI Use

- Be sure to use this function after entering unit weight. Also, keep sample staying on the weighing pan.
- Do not unload the sample once set, until ACAI operation is done.
- Additional sample does not have to be counted accurately. Quantity range which can be added, is the range for ACAI indicator to turn on.
- Repeat ACAI operation until getting close to max quantity that is supposed to be counted.

10. Percent Function

If the base mass of the sample is 100%, this function displays % for the weighing object against it.

1. Press [MODE] key and set the unit for %.



<Entering 100% Mass>

2. Press [SAMPLE] key, and the display will be for entering 100% mass.

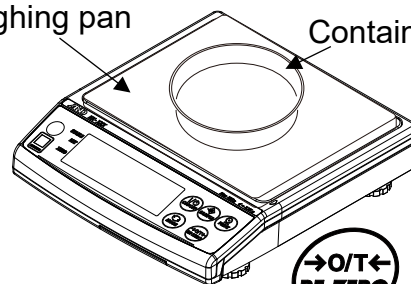


Mass entering screen



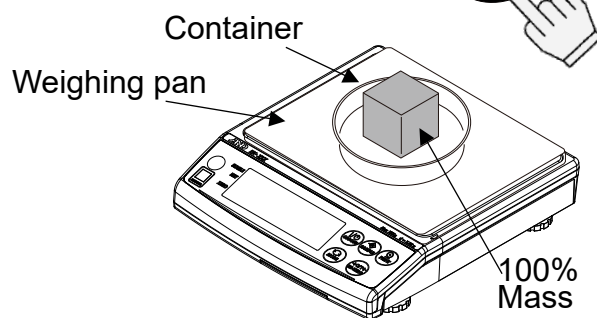
3. If the zero point is off, press [RE-ZERO] key. If you use a container, set it on the weighing pan, press [RE-ZERO] key, and confirm the figure on the right digit is zero.

Weighing pan Container



4. Set sample equivalent to 100%.

5. Confirm STABLE indicator turns on and press [PRINT] key, and 100% mass is entered and is indicated in %. Remove the sample.



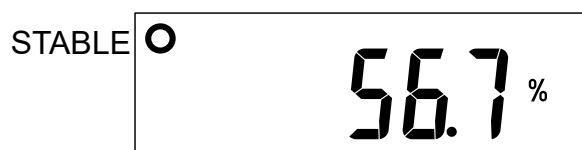
- ❑ If the sample weight is too small, "L 0" is displayed for several seconds, returning to the original indication.

- ❑ 100% mass has to be greater than 100d (d=minimum indication [g]).

<Percent Weighing>

6. Set weighing object on the weighing pan. Based on the entered 100% mass, percent value for the weighing object, is displayed.

Weighing



11. Comparator Function

Comparator function compares set value and weighed value, displaying the results in HI/OK/LO. The comparison is performed on the formula in the following table, and the results are displayed and are output. To use the comparator buzzer, turn off the sonic communication function.

Result	Formula
HI	HI limit value (Upper limit) < Displayed value (or at + over)
OK	LO limit value (Lower limit) <= Displayed value <= HI limit value (Upper limit)
LO	Displayed value < LO limit value (Lower limit) (or at – over)

Select the following items on the function setting (See “16. Function Table”).

Item	Description	Set Value	
[P] Fnc	[P]	Comparator Comparison Condition	
	[P-P]	Comparator Regular comparison / Minus comparison	
	[P-r]	Add comparator comparison result	1 to output results
	bEP	Comparator buzzer output	
	b-1	Comparator buzzer volume	
dout	SndF Sonic communication.	0 except for bEP = 0.	

[P] Fnc [P] About Comparison Condition

Set Value	Description
0	No comparison (Comparator not functioning)
1	Compare all weight values whether they are stable or unstable.
2	Compare all stable weight values.
3	Compare weight values whether they are stable or unstable, except for -4d through +4d
4	Compare all stable weight values, except for -4d through +4d.
5	Compare weight values greater than +5d, whether they are stable or unstable.
6	Compare stable weight values greater than +5d.

*d = Minimum indication

- Upper limit / lower limit is saved even after the power is shut off.
- Upper limit / lower limit is common for mass indication and pcs. indication respectively.
- Upper limit / lower limit can be saved in each of 0 to 19 memories.

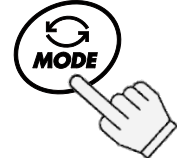
In case the set value is "001000"

	Set value	Note
d=0.01g model	10.00 g	Decimal point is displayed when setting.
d=0.1g model	100.0 g	Decimal point is displayed when setting.
d=1g model	1000 g	
Counting mode	1000 pcs	

<Operating Procedure for Comparator>

1. On the weighing display, press and hold [MODE] key (approx. 2 seconds), the comparator setting mode shows up.

Press and hold (approx. 2 sec.)



2. Currently selected memory numbers (0 to 19) are displayed.
3. Each time [RE-ZERO] is pressed, memory number indication changes. STABLE indicator turns on for the currently selected memory number

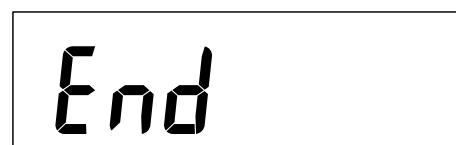
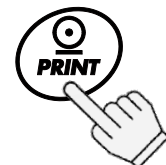
STABLE ○



<Select Memory Number>

Refer to the comparator operation procedures 1 to 3, entering the comparator setting mode.

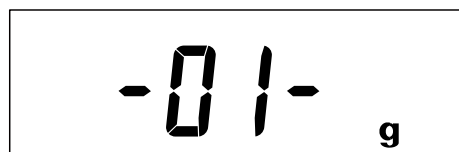
4. Press [RE-ZERO] key to indicate the selected memory number.
5. Press [PRINT] key to set for the indicated memory number, returning to the weighing indication after the "End" is displayed.
6. Start the comparison with the changed memory number.



<Setting Procedure for Lower / Upper limit Value>

Refer to the comparator operation procedures 1 to 3, entering the comparator setting mode.

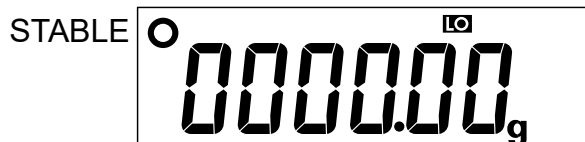
4. Press [RE-ZERO] key to indicate a memory number to select.



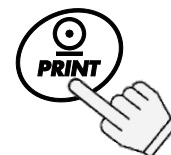
5. Press [SAMPLE] key, and [LO] turns on the LCD display with lower limit of comparison value indicated



- (Press [SAMPLE] key again, and [HI] turns on with upper limit of comparison value indicated. Move on to Procedure 7.).



6. Press [PRINT] key, and a digit of figure blinks. Input the comparison values, following the below table.



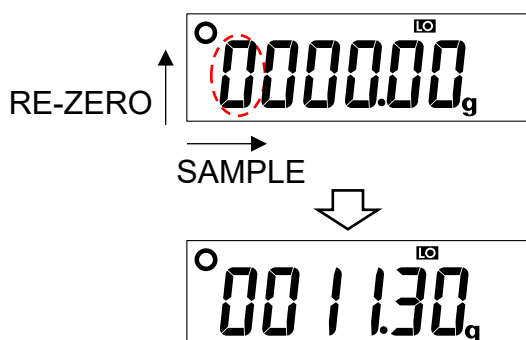
Key	Description
SAMPLE	Move to and from a blinking digit of figure.
RE-ZERO	Set a blinking digit of figure by +1. Press and hold (approx. 2 seconds) to change the code (+/-).
PRINT	Finalize the set value.



Blinking

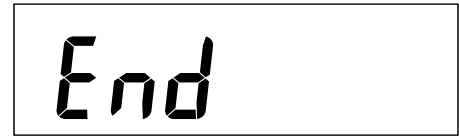
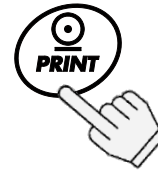


- Example of Setting Change



*Depending on the model, positions of decimal points are different (or some models do not have any.).

7. Press [PRINT] key, and after the indication of “End”, the upper limit of comparison value is displayed with a digit of figure blinking.



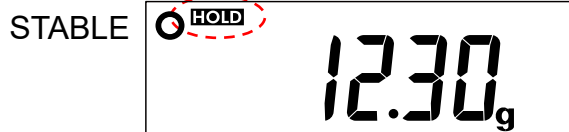
8. Input the upper limit of comparison value in the same way as the lower limit at the procedure 6.



9. Press [PRINT] key, returning to the memory number display after the “End” indication.
10. Press [PRINT] key, returning to the weighing mode (At this moment, the comparison starts with the changed memory number.).

12. Display Hold Function

On the condition with the weight value set, it is held on the display. During the display hold, the display hold indicator, [HOLD] turns on.



<Condition for Display Hold>

This function works for stability with the load off the zero display zone (over +5d, below -5d)

Also, it works for the variation within 2 seconds of "Display hold range", with the load off the zero display zone (over +5d, below -5d)

<Condition for Cancelling Display Hold>

The display hold gets cancelled with "Time for display hold cancellation" reached, if the weight value varies from the display hold value by 10 times of "Display hold range", or if it gets to the zero display zone (over -4d, below +4d).

*d= Minimum indication

- On the function setting, select the following items (See "16. Function Table".)

Item	Description	Set Value
RP Fnc	Hold	Display hold range
	Hd-t	Time for display hold cancellation
		□ for not using the function

13. Shock Detection Function

The weighing device is equipped with the function to detect shock imposed on the mass sensor area and to display the shock level. The [SHOCK] indicator turns on if the function detects shock which can damage the weighing sensor.

- On the function setting, select the following item (See “16. Function Table”.)

Item		Description
<i>bR5Fnc</i>	<i>,5d</i>	Shock detection

- There is no buzzer sound or saving function for shock detected.
- Shock detection function works for not only shock from the weighing pan at the time of loading, but also shock from the table the balance is set on.

14. Auto Tare Function

This weighing device has auto tare function to deduct tare automatically along with the comparator function used, constantly taking off mass in the OK range for weighing. First, set a container on the weighing pan, press [RE-ZERO] key for tare deduction, and start with zero on the display. Add (or remove) material little by little until the comparison result shows OK. The auto tare function repeatedly compares and weighs, as it automatically deducts tare with the OK result and the set weighing stable time reached, returning to the zero indication for next weighing available.

☐ On the function setting, select the following items (See “16. Function Table”.)

Item		Description	Set Value
[P Fnc	[P	Comparator comparison condition	(or select another set-up, depending on the usage)
RP Fnc	Rt	Auto tare function	0 for not using the function
	Rt-t	Auto tare condition	Select weighing stable time.

<Comparative Weighing with Removal>

This is the comparative weighing method to set a container with material on the weighing pan, to deduct tare, to gradually remove that material in the OK result range, and to compare against minus mass value.

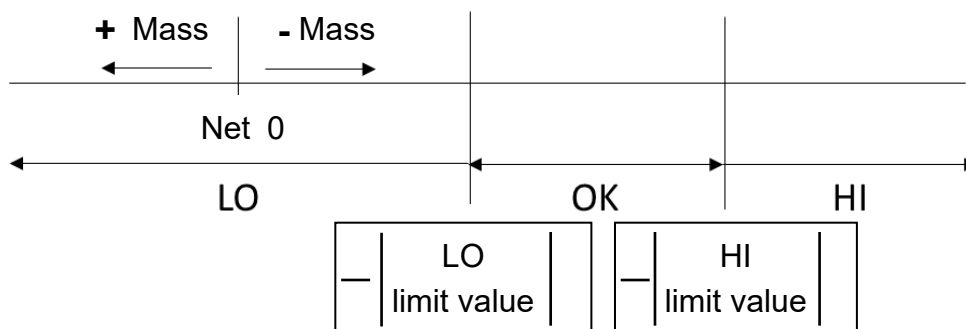
☐ On the function setting, select the following items (See “16. Function Table”.)

Item		Description	Set Value
[P Fnc	[P-P	Comparator Standard comparison / Minus comparison	
RP Fnc	Rt	Auto tare function	

On the standard comparison, the same operation procedure can be taken. But, the comparison result starts with HI. As more material is taken off, the result changes as HI -> OK -> LO.

For users' better understanding, you can set the minus comparison, which indicates results in the order for LO -> OK -> HI as more material is taken off.

The comparator function is supposed to be set with the auto tare function. In this setting, the polarity (+/-) for upper and lower limit values is ignored, and the results are indicated as the following chart:



<Automatic Tare Deduction of Initial Load>

In case of using auto tare function, a container with initial material, is first set on the weighing pan. Then, tare deduction needs to be done with [RE-ZERO] key.

- ❑ On the function setting, select the following item (See “16. Function Table”.)

Item		Description	Set value
RP Fnc	At-F	Tare deduction of initial load	1

On the above-mentioned setting, the mass of the loaded container is automatically deducted after the zero point confirmation. If everything is taken off the weighing pan after the weighing is done, the tare-deducted weight is cleared automatically, with the display returning to zero. If the display is not back in the zero point, press [RE-ZERO] key for the zero setting to clear the figure.

15. Sensitivity Adjustment

Sensitivity adjustment is a function to adjust the balance to indicate correct weight. Implement this function in the following cases:

- The balance is set up for the first time.
- The balance is moved to an area far away.
- The surrounding environment changes remarkably.
- For regular sensitivity adjustments

Note: Sensitivity adjustment can not be performed on the Legal for Trade models.

15.1. Sensitivity Adjustment items

Sensitivity adjustment mode has 3 functions:

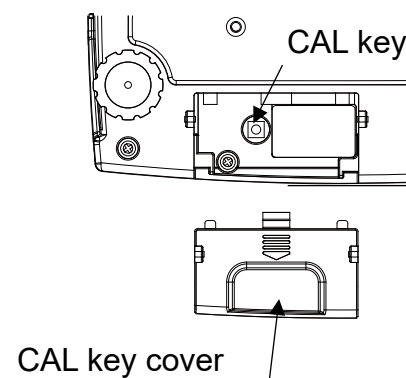
- Sensitivity adjustment with weight
- Correction of gravity acceleration
- Reset of sensitivity adjustment value for default

<How to Enter Sensitivity Adjustment Mode>

1. Confirm the balance is in the weighing mode (indicating the weighing unit).
2. Take off the CAL key cover at the bottom.
3. Press and hold CAL key inside and release it when “[RL]” is displayed. (Then, move on to “15.2. Sensitivity Adjustment with Weight” and “15.3. Correct Gravity Acceleration”

*To end the sensitivity adjustment mode, press [MODE] key, and the balance returns to the weighing mode.

Note: The load cell / CAL Cover for the Legal for Trade models has been sealed using wire locked screws. The CAL switch does not work on the Legal for Trade models.



15.2. Sensitivity Adjustment with Weight

When a balance is initiated or when it is moved to another location, it needs to be adjusted with sensitivity adjustment weight. If the weight cannot be prepared, the balance can be adjusted by correcting gravity acceleration.

Refer to the gravity acceleration map attached at the end of this document (See “Gravity Acceleration”), and change the value of the gravity acceleration recorded on the balance, for the correct local value.

CAUTION

- Prepare sensitivity adjustment weight. (The sensitivity adjustment weight is recommended to be equivalent to the weighing capacity of the balance. However, setting of the sensitivity adjustment weight value can be changed.)

1. Turn on the display to be powered for over 30 minutes.

- Change the function setting to disable the auto power-off function. ($bRSF_{nc}$ P_{oFF} = \square See “16. Function Table”.)



Press and hold (approx.. 2 sec.).

2. "CAL" is displayed if you refer to "15.1. Sensitivity Adjustment items", entering the sensitivity adjustment mode.

3. "CAL 0" is displayed if you release the key.

❑ Except for "INF 1 / INF 2 = 0", "CAL" and "0" are displayed alternately while pressing and holding CAL key. Release it when "CAL" is displayed.

4. In case of using sensitivity adjustment weight different from the weighing capacity, press [SAMPLE] key and move to the screen for changing sensitivity adjustment weight. Make change, using the following keys.

Key	Description
SAMPLE	Move on blinking digits
RE-ZERO	Set a blinking figure by +1.
PRINT	Finalize the set value.

❑ As a rule, sensitivity adjustment weight equivalent to the weighing capacity should be used. If the sensitivity adjustment weight is different, it is recommended to be more than 2/3 of the weighing capacity.

❑ You can save the sensitivity adjustment weight by pressing [PRINT] key, and return to "CAL 0" screen, after "End" is displayed.

4. Confirm if nothing is on the weighing pan, press [PRINT] key, and the balance records zero point, displaying sensitivity adjustment weight.

❑ Sensitivity adjustment weight is supposed to be the same as the weighing capacity (Initial setting). For change, follow the procedure 4.

❑ For the sensitivity adjustment at the zero point only, skip the procedure 6 and later, and turn off the display to end.

CAL



CAL 0



060000.0



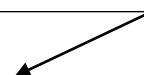
STABLE ○ Recording zero point

CAL 0



Sensitivity adjustment weight value

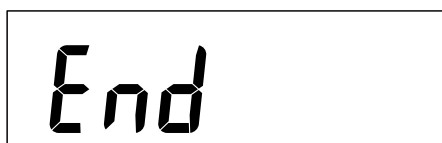
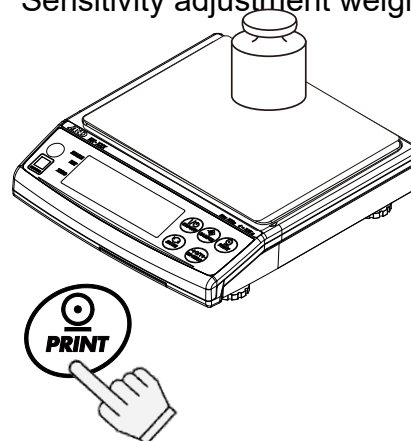
60000.0



- Set in the center of the weighing pan, sensitivity adjustment weight with the same value as displayed.
- Press [PRINT] key to complete the sensitivity adjustment, and “End” is displayed. To end the setting, press [MODE] key, and the balance returns to the weighing mode.

Note: The above operation is disabled for the Legal for Trade models. The Legal for Trade models cannot enter the calibration mode.

Sensitivity adjustment weight



CAUTION

- After the sensitivity adjustment, if the balance is moved to a far location, adjust the gravity acceleration value for the area to move to. Then, conduct sensitivity adjustment on the new value. Regarding the setting of gravity acceleration value, refer to the following chapter.

15.3. Correct Gravity Acceleration

CAUTION

- Correction of gravity acceleration is not necessary if sensitivity adjustment is conducted with sensitivity adjustment weight in the place where the balance is used.

- “CAL” is displayed if you refer to “15.1. Sensitivity Adjustment items”, entering the sensitivity adjustment mode. “CAL 0” is displayed if you release the key.
- Press [RE-ZERO] key to display the set value of gravity acceleration (i.e. “9.7985 g”).
- To change the gravity acceleration value on the display, use the following keys:

Key	Description
SAMPLE	Move on blinking digits.
RE-ZERO	Set a blinking figure by +1.
PRINT	Finalize the set value.



Blinking.

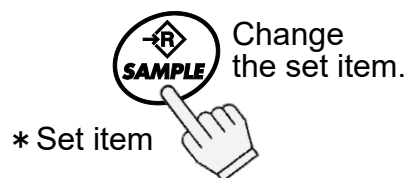


- Press [PRINT] key, and “End” is displayed with the set value recorded.
- If sensitivity adjustment is conducted with sensitivity adjustment weight, go back to “15.2. Sensitivity Adjustment with Weight” in the procedure 3. To end the setting, press [MODE] key, and the balance returns to the weighing mode.

Note: The above operation is disabled for the Legal for Trade models.

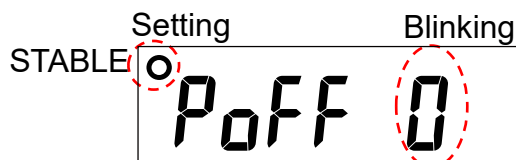
6. Every time, you press [SAMPLE] key, set items included in the selected category item, are displayed in order.

- ☐ Regarding the displaying order of set items, refer to “16.4. Function Item List”.

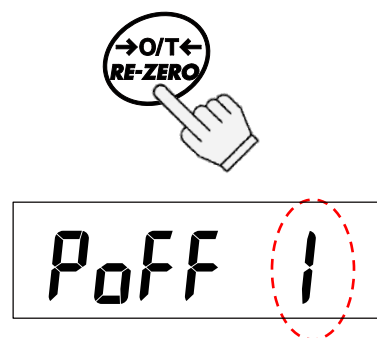


7. You can display a set item for your purpose and change it by pressing [RE-ZERO] key.

- ☐ STABLE indicator turns on for the set value currently selected.

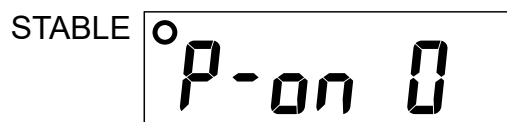


Key	Description
SAMPLE	Change an item.
RE-ZERO	Change the set value
PRINT	Select a category item and determine the set value
MODE	Return to the select screen for category items. Return to the weighing mode.



8. You can move to next set item, pressing [SAMPLE] key.

- ☐ To re-select from the category items, press MODE key to return to the procedure 4.



9. When you complete all the setting changes for your purpose, press [PRINT] key, and “End” is displayed with the set value recorded.



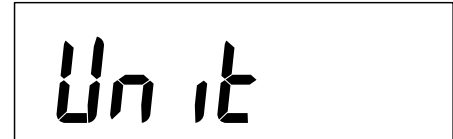
10. Press [MODE] key to return to the weighing mode.



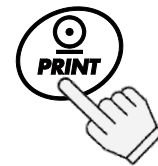
16.2. Entering Mode

It is possible to store the weighing units that will be actually used from the units available. For the units available, see “8.2. Units”. Select and store the weighing units as described below:

1. Enter the function setting mode, following the procedures 1 to 3 of “16.1. Setting Procedure”.



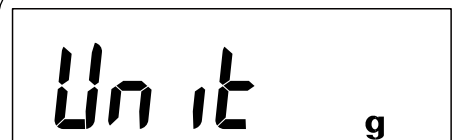
2. Press [SAMPLE] key several times to display “Unit”.



3. Press [PRINT] key.

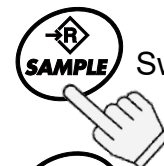
4. Press [SAMPLE] key to select a weighing unit. Each pressing switches the units available in the order described on “8.2. Units”.

5. Press [RE-ZERO] key to enter the selected unit. When it is selected, [STABLE] indicator turns on.



6. Repeat the procedures 4 and 5 to enter all the units to use.

Repeat.

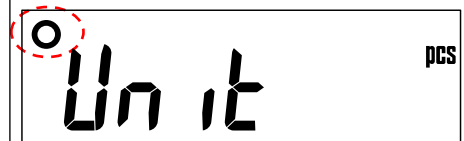


Switch a unit.



Select a unit.

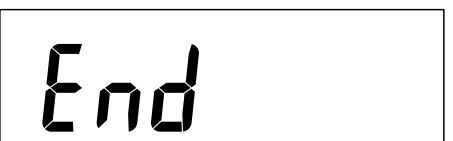
Selected



7. Press [PRINT] key, and “End” is displayed for the set value to be recorded.

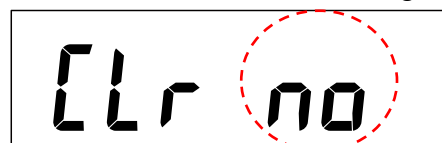
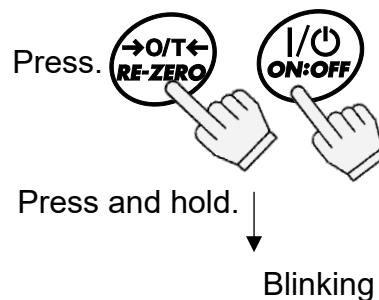


8. Press [MODE] key to return to the weighing mode.
 From next time on, when the balance is reactivated by [ON:OFF] key, the unit entered at the procedure 5, is displayed.



16.3. Reset Function Setting for default

1. Turn off the display.
2. Press [ON:OFF] key to turn on the display, pressing [RE-ZERO] key. Press and hold [RE-ZERO] key, not releasing it.
Then, “ $[\text{Lr } \text{no}]$ ” is displayed (“ no ” blinks.).

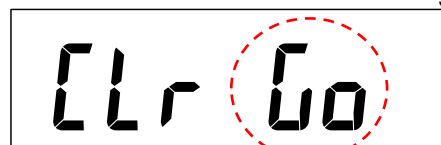


3. Press [RE-ZERO] to switch to “ $[\text{Lr } \text{Go}]$ ” (“ Go ” blinks.).



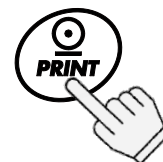
4. When “ $[\text{Lr } \text{Go}]$ ” is displayed, press [PRINT] key to return the function setting to default.
After “ End ” is displayed, the balance automatically re-activates, returning to the weighing mode.

Blinking



- ❑ To stop the operation, press [MODE] key, and the balance returns to the weighing mode.

- ❑ Besides the function setting, the unit weight of the counting function, the compared value of the comparator function, and the 100% mass return to the default setting (The sensitivity adjustment data from the sensitivity adjustment conducted after the factory shipment, is not erased.).



16.4. Function Item List

Category	Setting Item	Set Value	Description
<i>bASFnC</i>	<i>PaFF</i> Auto Power Off	■ 0	None
		1	5 min. later
		2	10 min. later
		3	15 min. later
		4	30 min. later
		5	60 min. later
	<i>P-on</i> Auto Power On	■ 0	On
		1	Off
	<i>Land</i> Weighing stability / Response speed	0	Weak stability / Fast response
		1	↑↓
		■ 2	Normal stability / normal response
		3	↑↓
		4	↑↓
		5	Strong stability / Slow response
	<i>St-b</i> Stability detection range	■ 0	±0.5d (Range 1d)
		1	±1.0d (Range 2d)
		2	±2.0d (Range 4d)
	<i>St-t</i> Stability detection time	■ 0	0.2 sec.
		1	0.5 sec.
		2	1.0 sec.
	<i>trc</i> Zero tracking	0	Off
		■ 1	Normal
		2	A little strong
		3	Strong
	<i>Pnt</i> Decimal point	■ 0	Dot
		1	Comma
	<i>L-L</i> Backlight LED Lightness	0	Dark
		■ 1	↑↓
		2	↑↓
		3	Light
	<i>Sd</i> Shock detection	0	On
		■ 1	Off
	<i>bAt</i> Mobile battery	■ 0	None
		1	Available

Category	Set Item	Set Value	Description				
<i>[P Fnc</i>	<i>[P</i> Comparative comparison condition	■ 0	Stop comparator function.				
		1	Compare all data.				
		2	Compare all stable data.				
		3	Compare all data except -4d to +4d.				
		4	Compare stable data except -4d to +4d.				
		5	Compare all data more than +5d				
		6	Compare all stable data more than +5d				
	<i>[P-P</i> Comparator Normal comparison / Minus comparison	■ 0	Normal comparison				
		1	Minus comparison				
	<i>[P-r</i> Addition of comparator comparison result	■ 0	Off				
		1	On				
	<i>bEP</i> Comparator buzzer output	■ 0	HI×	OK×	LO×	No beep	
		1	HI×	OK×	LO○	For “LO” only	
		2	HI×	OK○	LO×	For “OK” only	
		3	HI×	OK○	LO○	For “OK” and “LO”	
		4	HI○	OK×	LO×	For “HI” only	
		5	HI○	OK×	LO○	For “HI” and “LO”	
		6	HI○	OK○	LO×	For “HI” and “OK”	
		7	HI○	OK○	LO○	Beep for any	
	<i>vol</i> Comparator buzzer volume	■ 0	Normal				
		1	High				
	<i>dout</i>	<i>Pr t1</i> [CH1] Output mode	0	Stream mode / Command mode			
			■ 1	Key mode / Command mode			
2			Auto print mode / Key mode / Command mode				
3			Command mode only				
<i>Pr t2</i> [CH2] Output mode		0	Stream mode / Command mode				
		■ 1	Key mode / Command mode				
		2	Auto print mode / Key mode / Command mode				
		3	Command mode only				
<i>5ndF</i> Sonic communication		■ 0	None				
		1	Key mode				
		2	Auto print mode / Key mode				

Category	Set Item	Set Value	Description	
<i>dout</i>	<i>κP</i> Key mode operation *Sonic communication common for CH1 and CH2	■ 0	Key mode A	
		1	Key mode B (Instant output)	
		2	Key mode C (Stable output)	
	<i>RP</i> Auto print operation *Sonic communication common for CH1 and CH2.	■ 0	Auto print A (Base = Zero point)	
		1	Auto print B (Base = Last stable value)	
		2	Auto print A for comparator "OK" (Base = Zero point)	
		3	Auto print B for comparator OK (Base = Last stable value)	
	<i>RP-P</i> Auto print polarity *Sonic communication common for CH1 and CH2	■ 0	Plus only	
		1	Minus only	
		2	Bipolarity	
	<i>RP-b</i> Auto print range *Sonic communication common for CH1 and CH2	■ 0	10 d	
		1	100 d	
		2	1000 d	
	<i>mF1</i> [CH1] GLP output	■ 0	No output	
		1	Output (ESC D, ESC T output) *AD-8129 TH format posed 1.6 sec.	
		2	Output (DATE, Time output) *General format	
	<i>mF2</i> [CH2] GLP output	■ 0	No output	
		1	Output (ESC D, ESC T output) *AD-8129 TH format posed 1.6 sec.	
		2	Output (DATE, Time output) *General format	
	<i>5,F</i>	<i>bP51</i> [CH1] Baud rate	■ 0	2400 bps
			1	4800 bps
2			9600 bps	
3			1200 bps	
<i>bP1</i> [CH1] Data bit / Parity		■ 0	7bit/EVEN Parity	
		1	7bit/ODD Parity	
		2	8bit/ No parity	
<i>tYP1</i> [CH1] Data format		■ 0	A&D standard format	
		1	NU2 format	
		2	ZPL Format 1	
		3	ZPL Format 2	
		4	ZPL Format 3	
<i>Er[1]</i> [CH1] AK, error code		0	Off	
		1	<AK>, Reply with error code	
		■ 2	Echo back	

Category	Set Item	Set Value	Description
5 <i>rF</i>	<i>bP52</i> [CH2] Baud rate	■ 0	2400 bps
		1	4800 bps
		2	9600 bps
		3	1200 bps
	<i>b4P2</i> [CH2] Data bit / Parity	■ 0	7bit / EVEN Parity
		1	7bit / ODD Parity
		2	8bit / No parity
	<i>t4P2</i> [CH2] Data format	■ 0	A&D Standard format
		1	NU2 Format
		2	ZPL format 1
		3	ZPL format 2
		4	ZPL format 3
	<i>Er22</i> [CH2] AK, error code	0	Off
		1	<AK>, Reply with error code.
		■ 2	Echo back
<i>RP Fnc</i>	<i>RCR1</i> ACAI Function On/Off	0	Off
		■ 1	On
	<i>Un1n</i> Select minimum unit for entering counting sample	■ 0	Unit mass $\geq 1d$
		1	Unit mass $\geq 1/10d$
		2	Total sample weight $\geq 5d$
	<i>SnPL</i> Sample quantity for entering counting sample	■ 0	10 pcs.
		1	25 pcs
		2	50 pcs
		3	100 pcs
		4	5 pcs
	<i>Rt</i> Auto tare function	■ 0	Stop auto tare function
		1	Operate auto tare function
	<i>Rt-t</i> Auto tare condition	0	OK/Display stability instantly
		1	OK/Display stability continued 0.5 sec
		■ 2	OK/Display stability continued 1.0 sec
		3	OK/Display stability continued 1.5 sec
		4	OK/Display stability continued 2.0 sec
		5	OK/Display stability continued 2.5 sec
		6	OK/Display stability continued 3.0 sec
		7	OK/Display stability continued 4.0 sec

Category	Set Item	Set Value	Description
<i>RP Fnc</i>	<i>Rt-t</i> Auto tare condition	8	OK/Display stability continued 5.0 sec
		9	OK/Display stability continued 6.0 sec
	<i>Rt-f</i> Tare deduction of initial unit weight	■ 0	Stop function
		1	Deduct tare of initial unit weight automatically.
	<i>Hold</i> Display hold range	■ 0	No display hold function
		1	Display hold for stability only
		2	±10d
		3	±20d
		4	±50d
		5	±100d
	<i>Hd-t</i> Cancel display hold time	0	Cancel instantly
		1	5 sec later
		■ 2	10 sec later
		3	15 sec later
		4	20 sec later
		5	30 sec later
		6	1 min later
		7	2 min later
		8	5 min later
		9	10 min later
	<i>bLEF</i> Bluetooth communication mode with EKW-27 used	■ 0	HID
		1	Bidirectional (AD8931/AD8541-PC/A&D WeiV)
	<i>[on1]</i> Input #1 with external contact Used for EKW-04	■ 0	None
		1	ON:OFF
		2	SAMPLE
		3	PRINT
		4	MODE
		5	RE-ZERO
	<i>[on2]</i> Input #2 with external contact Used for EKW-04	■ 0	None
		1	ON:OFF
		2	SAMPLE

Category	Set Item	Set Value	Description
RP Fnc	L _{on2} Input #2 with external contact Used for EKW-04	3	PRINT
		4	MODE
		5	RE-ZERO
Unit	Unit Enter unit (mode)		Select weighing unit.
id	ID number		Set ID number.
PASSYd	L _{ock} Lock function	■ 0	No password lock for function setting
		1	Password lock for function setting
		2	Password lock + key restriction for function setting Available for RE-ZERO and ON:OFF only
	PASSno Password setting		Input managers' password.

■ : Default setting

d : Minimum display

Note: In some countries or areas, “L_{and}”, “St-b”, “St-t”, “trc” and “CP-P” are not available for the Legal for Trade models.

Auto power off

Turns off the display at the designated time reached with the weight value stable and the keys untouched.

Stability detection range

STABLE indicator turns on as the weight value is judged to be stable if it stays in the set range (Stability detection range) for the set period of time (Stability detection time). Set a smaller number for strict stability judgement, and a larger number for less strict stability.

Stability detection time

STABLE indicator turns on as the weight value is judged to be stable if it stays in the set range (Stability detection range) for the set period of time (Stability detection time). Set a larger number for strict stability judgement, and a smaller number for less strict stability.

Zero tracking

This is the function to track a zero point to keep the display zero.

Password lock function

Prior to changing a function setting, this function requires a manager to register her/his password by the password setting discussed at “<Setting Password>”.

Password setting

Input a password required to use “20. Password Lock Function”.

17. Communication

This is the interface to connect the EK series balance to a printer and PC. The balance outputs displayed weight value as data.

17.1. RS232C Interface

RS232C serial interface has 4 kinds of modes as follows:

Stream mode	Continuous data output
Key mode	Press [PRINT] key for one time output of data
Auto print mode	Data output with auto the print condition satisfied
Command mode	Control the balance by command from the computer.

*For Key mode and Auto print mode, output is notified with weight value blinking once.

Select the following items by the function setting (See “16. Function Table”).

There are maximum 2 channels ([CH1] and [CH2]) available for the communications.

For standard RS232C communication, the function setting [CH1] is applicable.

To add a communication type with a separate package of option, check for an applicable channel and set up.

On [CH2], the same selection as below, can be done, but some options require a special setting. For optional communication channels and recommended settings, refer to each option's instruction manual.

Item		Description	Note
<i>dout</i>	<i>Prtl</i>	[CH1] Output mode	Select out of the fore-mentioned 4 kinds of modes.
<i>5if</i>	<i>bP5l</i>	[CH1]Baud rate	Select out of 1200/2400/4800/9200 bps.
	<i>btp1</i>	[CH1] Data bit/Parity	Select out of 7bit,even/7bit,odd/8bit,non
	<i>bYP1</i>	[CH1] Data format	See “17.3. Data Format”

<Key Mode>

You can select 3 kinds of operations as listed below.

Item		Description
<i>dout</i>	<i>YP</i>	Key mode operation

YP set value

0	Key mode A	Data output by [PRINT] key when weight value is stable.
1	Key mode B	Data output by [PRINT] key whether stable or unstable.
2	Key mode C	Data output by [PRINT] key: - Immediate output for stable value - Output after stabilized, for unstable value

<Auto Print Mode>

You can select 4 kinds of operations as follows:

Item		Description
<i>dout</i>	<i>RP</i>	Auto print operation

RP set value

0	Auto print A	Weight value is output once, if it exceeds the designated scope of auto print polarity and range from the base (“Zero indication”), and if STABLE indicator turns on. Also, weight value is output once with [PRINT] key pressed, when STABLE indicator is on.
1	Auto print B	Weight value is output once, if it exceeds the designated scope of auto print polarity and range from “The latest value with STABLE indication” and if STABLE indicator turns on. Also, weight value is output once with [PRINT] key pressed, when STABLE indicator is on.
2	Auto print A for Comparator OK	Weight value is output once if it exceeds the designated scope of auto print polarity and range from the base (“Zero indication”), if the comparator result is OK, and if the STABLE indicator turns on. Also, weight value is output once with [PRINT] key pressed, when STABLE indicator is on.
3	Auto print B for Comparator OK	Weight value is output once, if it exceeds the designated scope of auto print polarity and range from “The latest value with STABLE indication”, if the comparator result is OK, and if the STABLE indicator turns on. Also, weight value is output once with [PRINT] key pressed, when STABLE indicator is on.

With auto print mode, the polarity and the range can be changed as well as the operation, if necessary.

Item		Description	Set value	
<i>dout</i>	<i>RP-P</i>	Auto print polarity	0	Plus only
			1	Minus only
			2	Bi-polarity
	<i>RP-b</i>	Auto print range	0	10 d
			1	100 d
			2	1000 d

d : Minimum display

<Stream Mode>

Weight value is output at all times, whether STABLE indicator is on or not.

<Command Mode>

Effective at all times, whether the function setting, *data Prt l* is set or not (See “17.4. Commands”).

You can select response to implementation command, other than data output.

Item		Description
<i>5 rF</i>	<i>Er l</i>	[CH1] AK, error code operation

Er l set value

0	Off	No response
1	<AK>, Reply with error code	<AK> for accepted, <AK> for implemented. Response with an error code, when not implemented.
2	Echo back	Just replied with the command if it is accepted. No reply or response with an error, if not implemented.

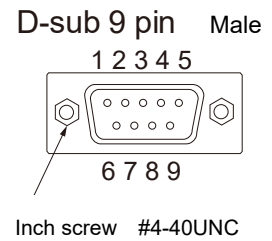
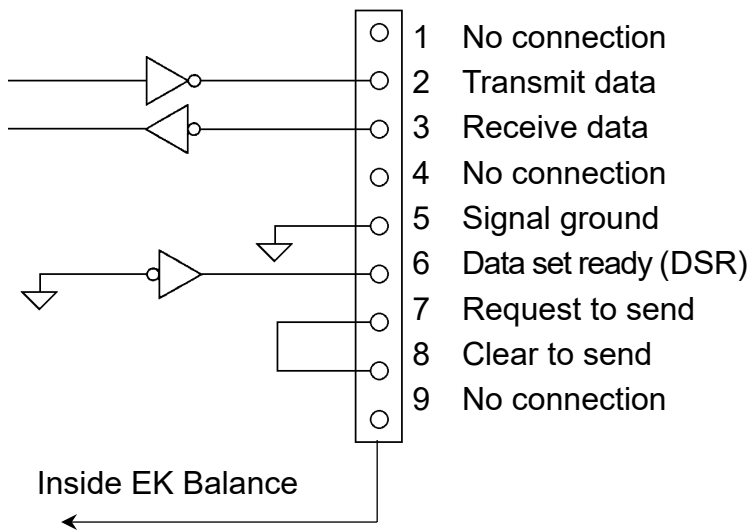
- Only Z and R for <AK> re-sent when implemented
- For [CH2], you can select in the same way as above (Function setting *Er l 2*)

17.2. Interface Specification

Input/Output	EIA RS-232C		
Transmission	Asynchronous communication, bi-directional, half-duplex		
Signal	Baud rate:	1200, 2400, 4800, 9600 bps	
	Data bit:	7bit + parity 1 bit (even or odd) or 8 bit (no parity)	
	Start bit:	1bit	
	Stop bit:	1bit	
	Code:	ASCII	
	Terminator:	CRLF (C _R : 0Dh, L _F : 0Ah)	

Pin configuration

D-sub 9pin male connector



- D-sub 9 pin cable (straight) is used for the connection to printer / PC.
- To input weighing data to PC, the software WinCT is available. Download it on our website, [A&D Company, Limited](#).

17.3. Data Format

- There are 6 kinds of data format to select (See “16. Function Table”.)

Item		Description	Note
S iF	tYP1	[CH1] Data format	Standard RS-232C communication, Separate option for some communications
	tYP2	[CH2] Data format	Additional communication such as separate option, USB, etc.
[P Fnc	[P-r	Addition of comparator comparison result	No addition for NU2 format.

*Set up to meet with a communication channel to use ([CH1], [CH2])

- Standard RS232C communication is on [CH1] in the function setting.
- For optional communication channels, refer to each option’s instruction manual.

<A&D Standard Format>

Function

S iF	tYP1 / 2	0
------	----------	---

 Setting

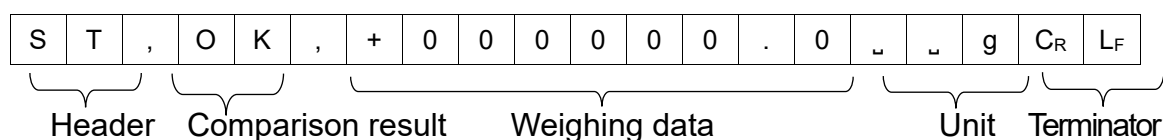


*"▬" represents space.

<A&D Standard Format > (with Comparator)

Function setting

S iF	tYP1 / 2	0
[P Fnc	[P-r	1
	[P	1 ~ 6



- Header has 4 kinds as follows:
 - ST : Data stable in the mass weighing
 - QT : Data stable in the counting mode
 - US : Data unstable (Counting mode included)
 - OL : Data overloaded (beyond the weighing capacity)

❑ Comparison result has 3 kinds as follows:

- HI : in HI
- OK : in OK
- LO : in LO
- : No comparison

❑ Data is generally composed of 9 digits including a code and a decimal point. The position of a decimal point is different, depending on the model.

❑ There are 13 types of units:

- ┌┐ g : Weighing data "gram"
- ┌ PC : Counting data "pcs"
- ┌┐ % : Percentage data "%"
- ┌ o z : Weighing data "decimal ounce"
- ┌ l b : Weighing data "decimal pound"
- o z t : Weighing data "troy ounce"
- ┌ c t : Weighing data "carat"
- mom : Weighing data "momme"
- d w t : Weighing data "penny weight"
- ┌GN : Weighing data "grain"
- ┌┐ N : Force data "Newton"
- ┌ t l : Weighing data "tael"
- ┌┐ t : Weighing data "tola"

❑ Terminator is supposed to output CRLF at all times.

❑ Examples of Output Data

At 123.4 g	S	T	,	+	0	0	0	1	2	3	.	4	┌	┌	g	C _R	L _F			
At 1234 pcs	Q	T	,	+	0	0	0	0	1	2	3	4	┌	P	C	C _R	L _F			
At 56.7%	S	T	,	+	0	0	0	0	5	6	.	7	┌	┌	%	C _R	L _F			
Data unstable	U	S	,	+	0	0	0	1	2	3	.	4	┌	┌	g	C _R	L _F			
Comparison result LO	S	T	,	L	O	,	+	0	0	0	1	2	3	.	4	┌	┌	g	C _R	L _F
Comparison result -	S	T	,	-	-	,	+	0	0	0	1	2	3	.	4	┌	┌	g	C _R	L _F
Mass overloaded	O	L	,	+	9	9	9	9	9	9	9	9	┌	┌	g	C _R	L _F			

< NU2 Format >

Output of header, unit and no +code.

Function	5 iF	tYP 1 / 2	1
----------	------	-----------	---

setting

i.e. Weight value
123.4g

1	2	3	.	4	C _R	L _F
---	---	---	---	---	----------------	----------------

i.e. Weight value
- 123.4g

-	1	2	3	.	4	C _R	L _F
---	---	---	---	---	---	----------------	----------------

<ZPL format 1>

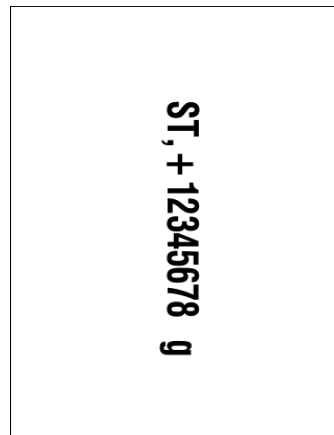
Function setting

5, F	LYP1 / 2	2
------	----------	---

Output code

^	X	A	^	P	W	3	2	0	^	L	L	4	8	0	^
F	O	1	4	0	,	1	0	4	^	A	0	R	,	4	0
,	4	0	^	F	D	S	T	,	+	1	2	3	4	5	6
7	8	_	_	g	^	F	S	^	P	Q	1	^	X	Z	

*Red letter can change, depending on the weight value.



< ZPL Format 2>

Function setting

5, F	LYP1 / 2	3
------	----------	---

Output code

^	X	A	^	P	W	3	2	0	^	L	L	4	8	0	^
F	O	1	2	0	,	1	6	0	^	A	0	R	,	4	0
,	4	0	^	F	D	S	T	,	+	1	2	3	4	5	6
7	8	_	_	g	^	F	S	^	F	O	1	2	0	,	4
0	^	B	Q	,	,	3	^	F	H	_	^	F	D	Q	A
,	S	T	,	+	1	2	3	4	5	6	7	8	_	_	g
^	F	S	^	P	Q	1	^	X	Z						

*Red letter can change, depending on the weight value.

setting Output image



< ZPL Format 3>

Function setting

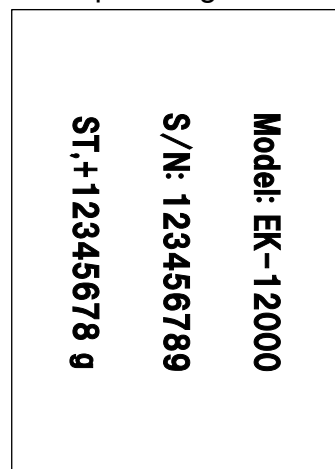
5, F	LYP1 / 2	4
------	----------	---

Output code

^	X	A	^	P	W	3	2	0	^	L	L	4	8	0
^	F	O	2	2	0	,	1	0	4	^	A	0	R	,
4	0	,	4	0	^	F	D	M	o	d	e	l	:	_
E	K	-	1	2	0	0	0	^	F	S	^	F	O	1
4	0	,	1	0	4	^	A	0	R	,	4	0	,	4
0	^	F	D	S	/	N	:	_	1	2	3	4	5	6
7	8	9	^	F	S	^	F	O	6	0	,	1	0	4
^	A	0	R	,	4	0	,	4	0	^	F	D	S	T
,	+	1	2	3	4	5	6	7	8	_	_	g	^	F
S	^	P	Q	1	^	X	Z							

*Red letter can change, depending on the weight value.

setting Output image



17.4. Commands

With Command mode, the balance can be controlled by command from external device such as PC, etc.

<Command List>

Command	Description	Note
Q	Requests data. Outputs data immediately.	
P	Turns off the power.	Same operation with [ON:OFF] key
U	Switches weighing unit.	Same operation with [MODE] key
SMP	Switches to unit weight / 100% mass entering mode.	Same operation with [SAMPLE] key.
PRT	Outputs data, following the output mode setting	Same operation with [PRINT] key
Z	Sets for zero or deducts tare when the weight value is stable.	Same operation with [RE-ZERO] key
R		
T	Deducts tare when the weight value is stable.	
HI:*****g	Sets the upper limit value.	Not accept if different from the unit used
LO:*****g	Sets the lower limit value.	
?HI	Requests the set upper limit value	
?LO	Requests the set lower limit value.	
CN:n	Recalls the upper/lower limit of n Memory.	
?CN	Requests the memory number of the comparator currently used.	
ID:*****	Sets ID number.	
?ID	Requests ID number.	

<Examples of Response to Commands> *Space is represented by “_”

Request weighing data.

Command

Q	C _R	L _F
---	----------------	----------------

Response

S	T	,	+	0	0	1	2	3	.	4	5	_	_	g	C _R	L _F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

(See “17.3. Data Format”)

Zero or tare deduction.

Command

Z	C _R	L _F
---	----------------	----------------

Response

<AK>	C _R	L _F
------	----------------	----------------

 $E_r[1/2]=1$ if zero operation is possible (when received /implemented)

Z	C _R	L _F
---	----------------	----------------

 $E_r[1/2]=2$ if zero operation is possible (when received)
 $(E_r[1/2]=0$ No response)

Switch weighing unit

Command

U	C _R	L _F
---	----------------	----------------

Response

<AK>	C _R	L _F
------	----------------	----------------

 $E_r[L]/Z=1$ if switch operation is possible

U	C _R	L _F
---	----------------	----------------

 $E_r[L]/Z=2$ if switch operation is possible

($E_r[L]/Z=0$ No response)

Set ID number

Command

I	D	:	0	0	0	0	0	1	C _R	L _F
---	---	---	---	---	---	---	---	---	----------------	----------------

Response

<AK>	C _R	L _F
------	----------------	----------------

 $E_r[L]/Z=1$ if setting is possible.

I	D	:	0	0	0	0	0	1	C _R	L _F
---	---	---	---	---	---	---	---	---	----------------	----------------

 $E_r[L]/Z=2$ if setting is possible.

($E_r[L]/Z=0$ No response)

Request ID number

Command

?	I	D	C _R	L _F
---	---	---	----------------	----------------

Response

I	D	,	0	0	0	0	0	1	C _R	L _F
---	---	---	---	---	---	---	---	---	----------------	----------------

Set upper limit value

Command

H	I	:	+	0	0	5	0	0	0	.	.	g	C _R	L _F
---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

(Figures less than 9 digits, including code and decimal point. + code and zero can be abbreviated.
Input the unit used, in three digits.)

Response

<AK>	C _R	L _F
------	----------------	----------------

 $E_r[L]/Z=1$ if setting operation is possible

H	I	:	+	0	0	5	0	0	0	.	.	g	C _R	L _F
---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

 $E_r[L]/Z=2$ if setting operation is possible

($E_r[L]/Z=0$ No response)

Set lower limit value

Command

L	O	:	+	0	0	0	0	5	.	6	7	_	_	g	C _R	L _F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

Figures less than 9 digits, including code and decimal point. + code and zero can be abbreviated. Input the unit used, in three digits.)

Response

<AK>	C _R	L _F
------	----------------	----------------

$E_r[1/2]=1$ if setting operation is possible.

L	O	:	+	0	0	0	0	5	.	6	7	_	_	g	C _R	L _F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

$E_r[1/2]=2$ if setting operation is possible.

($E_r[1/2]=0$ No response)

Switch comparator memories.

Command

C	N	:	X	X	C _R	L _F
---	---	---	---	---	----------------	----------------

XX represents memory number (00~09).

Response

<AK>	C _R	L _F
------	----------------	----------------

$E_r[1/2]=1$ if switching is possible.

C	N	:	X	X	C _R	L _F
---	---	---	---	---	----------------	----------------

$E_r[1/2]=2$ if switching is possible.

($E_r[1/2]=0$ No response)

Output the upper limit value currently used.

Command

?	H	I	C _R	L _F
---	---	---	----------------	----------------

Response

H	I	,	+	0	0	0	1	2	.	3	4	_	_	g	C _R	L _F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

(All 17 digits including code and decimal point, with the unit used and represented in 3 digits)

Output the lower limit value currently used.

Command

?	L	O	C _R	L _F
---	---	---	----------------	----------------

Response

L	O	,	+	0	0	0	0	5	.	6	7	_	_	g	C _R	L _F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

(All 17 digits including code and decimal point, with the unit used and represented in 3 digits)

Request the comparator memory number currently used.

Command

?	C	N	C _R	L _F
---	---	---	----------------	----------------

Response

C	N	,	X	X	C _R	L _F
---	---	---	---	---	----------------	----------------

XX represents memory number.

- ❑ If commands cannot be implemented due to instability with the display of the balance mass, or if the received command cannot be used, response is made with an error code as listed in the following chart:

<Error Codes> (at $E_r[E1/2=1]$)

Error Code	Description and Solutions
EC,E00	Communication error Check the mat and the baud rate.
EC,E01	Undefined command error Undefined command is detected. Check the transmit command.
EC,E02	Unimplementable. Unimplementable command is detected. i.e. Weight value is requested by Q command during the re-zero implementation. Check the transmission timing of the command.
EC,E06	Format error The format of the received command is not correct. i.e. The number of the digit of the figures is not correct. There is an alphabet in the input spot for numbers. Check the transmit command.
EC,E07	Set value error The number of the received command, exceeds the allowable value. Check the number of the command.
EC,E11	Weighing instability error The weight value is too unstable to implement with zero. Improve the environment of the setting area for the balance.

<Error Response> (at $E_r[E1/2=2]$)

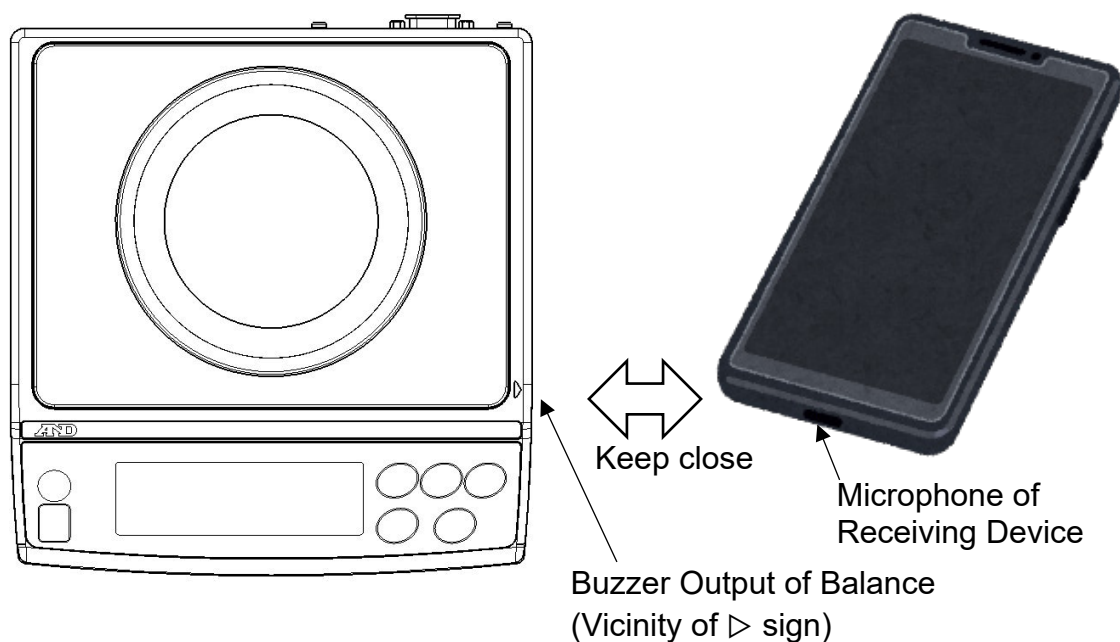
Response	Description
?	Undefined command error Undefined command is detected.
!	Format error The format of the command is not correct. i.e. The digit of the number is not correct. i.e. There is an alphabet in the input spot for numbers.

17.5. Sonic Communication

Sonic communication is wireless communication which outputs weighing data with sound by using a buzzer built in the balance.

17.5.1. Precautions for Sonic Communication

- ❑ Sonic communication and comparator buzzer output cannot be used at the same time.
- ❑ For receiving data, a special application needs to be installed on a smart phone or a tablet.
- ❑ The communication only takes output from the balance to a receiving device, not bi-directional communication.
- ❑ Stream mode cannot be used for output setting.
Select key mode or auto print mode.
- ❑ Data output takes frequency sound in 16 to 17 kHz range.
If the same frequency range sound is beeping in the surrounding environment, receiving output data can be interfered.
- ❑ If the output sound is irritating or affects your health, refrain from using sonic communication. Switch to cable communication or Bluetooth communication (Separate option).
- ❑ Effective scope for sonic communication is approx. 15cm in circumference.
However, it is subject to the microphone quality and the surrounding environment.
If it is difficult to receive data, keep the microphone of the receiving device, closer to the balance.
Especially, the right side of the balance (around the ▷ sign) has good reception.



17.5.2. Usage for Sonic Communication

<Preparation>

- ❑ Install a special application on a smart phone or a tablet for receiving data.

A&D Weiv®

iOS version : Version 1.06 or later

Android version : Check if the version is 1.06 or later.

On A&D Weiv with the above-mentioned versions or later, both Bluetooth and sonic communication can be used with one application (NOT at the same time).

For using *Bluetooth*® communication, bi-directional communication can be performed by the installation on tablet / smart phone built in with *Bluetooth*® and the pairing with a weighing device connected with EKW-27 (See “19.3. EKW-27 *Bluetooth*® Communication Interface”).

Scan the following barcode and download/install:

- App Store

<https://apps.apple.com/app/a-d-weiv/id6443930190>



- Google Play

<https://play.google.com/store/apps/details?id=jp.co.aandd.balanceapp&hl=en>



- ❑ Select the following items on the function setting (See “16. Function Table”).

Item		Description	Remark
<i>dout</i>	<i>5ndF</i>	Sonic Communication	0 when not used
	<i>YP</i>	Key Mode operation	Set for <i>5ndF</i> = 1/2
	<i>RP</i>	Auto Print operation	Set for <i>5ndF</i> = 2

For the operations of Key Mode and Auto Print, See “17.1. RS232C Interface”.

- ❑ The output format is A&D standard format regardless of the *5IF tYP-* setting (See “17.3. Data Format”).

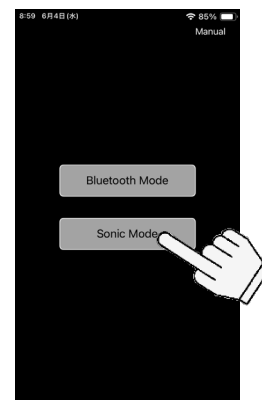
<Communication Procedure>

Activated the application.

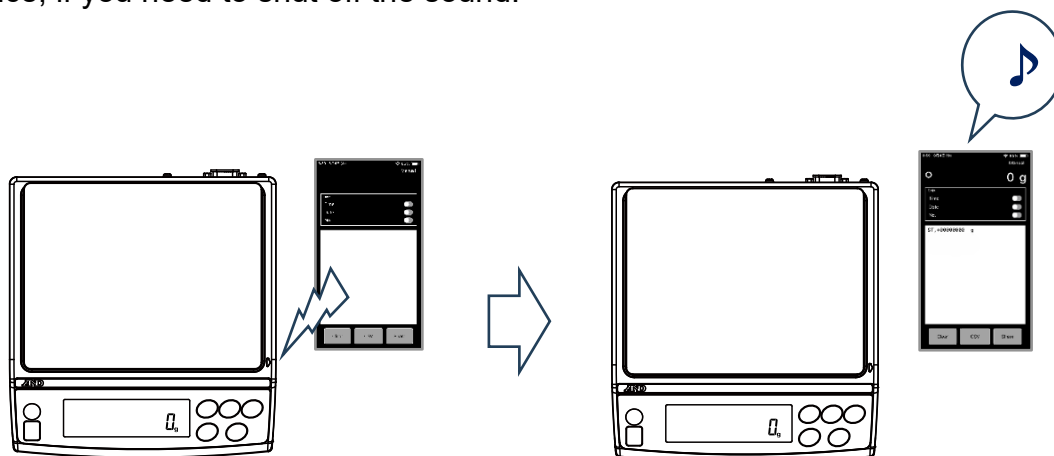
1. Activate the application installed on the receiving device (smart phone or tablet)
2. After the activation, select “Sonic Mode” on the first selection screen, and the microphone of the receiving device automatically turns on.
3. Turn on the power of the balance, keep it close to the receiving device and output weighing data.
4. Weighing result is displayed on the application of the receiving device.



Mode Selection Screen



- It takes 1 to 3 seconds of interval for the process from the output to the reception. The receiving timing is different, depending on the output.
- During the data output, there are some cases of receiving difficulty if the receiving device is moved.
- During the sonic communication output, LED of the leveler turns on (approx.. 3 seconds per data). During this period, next data cannot be output. Output after confirming the LED turns off.
- When the data reception is completed, the receiving device beeps. Adjust the volume on the volume setting of the receiving device. Since there is no OFF setting in the application, set for mute on the receiving device, if you need to shut off the sound.



When the application turns out to be home screen, output data, keeping close to the receiving device (Be careful not to move it during the output.).

When data is received, the receiving device beeps with weight value displayed on the application.

- For detail, refer to A&D WeiV® Instruction Manual.

18. ID Number and GMP/GLP

ID number is used as a number to distinguish the balance for the output for GMP (Good Manufacturing Practice) and GLP (Good Laboratory Practice). Next data for GMP and GLP, can be output to PC by using serial interface cable.

- Sensitivity adjustment implementation record (Sensitivity Adjustment Report)
- Sensitivity adjustment status record (Calibration Test Report)
- Grouping to manage series of data for better understanding (“Title”, “End”).

18.1. Setting ID Number

Select the following item on the function setting (See “16. Function Table”.):

Item		Description	Remark
<i>id</i>	<i>id</i>	Setting ID number	Setting 6 digits of letters arbitrarily.

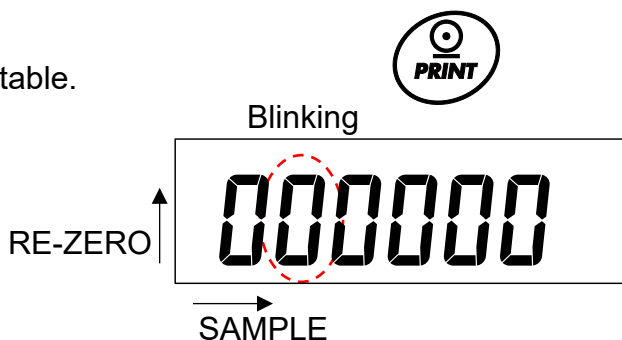
<How to set ID Number>

Refer to the procedures 1 to 5 of “16.1. Setting Procedure” and enter the function setting mode for *id*.



- When “000000” (or currently set ID) is displayed, input ID, following the below table.

Key	Description
SAMPLE	Move on blinking digits.
RE-ZERO	Set a figure of blinking digit by +1.
PRINT	Finalize the set value.



- Press [PRINT] key, and “End” is displayed with the set value recorded.
- Press [MODE] key to return to the weighing mode.



Cross Reference for Display

0	1	2	3	4	5	6	7	8	9	-	_	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z		
0	1	2	3	4	5	6	7	8	9	-	_	À	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï	ò	ó	ô	õ	ö	÷	ü	ý	ÿ	ÿ	ÿ	ÿ

18.2. GMP / GLP Report

- Select the following items on the function setting (See “16. Function Table”).

Item		Description	Note
dout	inf 1	[CH1] GLP Output	Set for 1 or 2.
	inf 2	[CH2] GLP Output	Set for 1 or 2.

*Set for a channel ([CH1], [CH2]) to use. [CH1] on the function setting, is applicable for standard RS-232C communication.

inf 1 / 2 = set value

0	No GLP output
1	Output PC date for DATE and TIME
2	Blank DATE and TIME (Hand-writing)

<Sensitivity Adjustment Report>

1. Conduct sensitivity adjustment, following “15.2. Sensitivity Adjustment with Weight”.
2. Upon the completion of the sensitivity adjustment, “End” is displayed.
3. Output Sensitivity Adjustment Report after “GLP” showed up on the display.
4. “End” is displayed.
5. Remove the sensitivity adjustment weight and press [MODE] key to return to the weighing mode.

Sensitivity adjustment completed

End



STABLE

° GLP

GLP Output



End

Format *mf* // ? = 1

Format *mf* // ? = 2

```

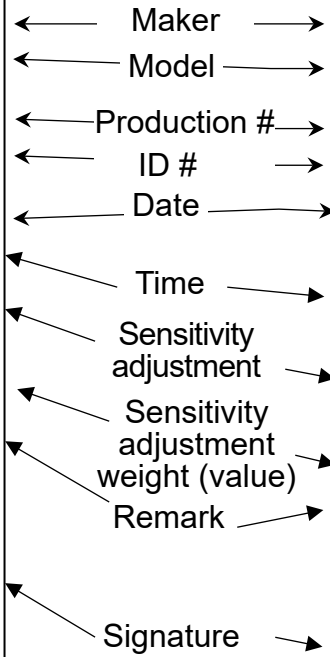
.....A_&_D<CRLF>
MODEL.....EK-622<CRLF>
S/N.....000000000<CRLF>
ID.....000000<CRLF>
2025-05-12<CRLF>
15:34:30<CRLF>
ADJUSTED (EXT.) <CRLF>
CAL.WEIGHT<CRLF>
.....+600.00_ _g<CRLF>
REMARKS<CRLF>
<CRLF>
<CRLF>
SIGNATURE<CRLF>
<CRLF>
<CRLF>
- _ _ _ _ _ _ _ _ _ _ <CRLF>
<CRLF>
<CRLF>

```

```

.....A_&_D<CRLF>
MODEL.....EK-622<CRLF>
S/N.....000000000<CRLF>
ID.....000000<CRLF>
DATE<CRLF>
<CRLF>
TIME<CRLF>
<CRLF>
ADJUSTED (EXT.) <CRLF>
CAL.WEIGHT<CRLF>
.....+600.00_ _g<CRLF>
REMARKS<CRLF>
<CRLF>
<CRLF>
SIGNATURE<CRLF>
<CRLF>
<CRLF>
----- _ <CRLF>
<CRLF>
<CRLF>

```



_ : Space ASCII 20h
 CR : Carriage Return ASCII 0Dh
 LF : Line Feed ASCII 0Ah

<Calibration Test Report>

Calibration Test Report is to compare and confirm the sensitivity adjustment weight value and the weighing result, weighing sensitivity adjustment weight on the balance. This test is not an actual performance of sensitivity adjustment.

1. Press and hold [CAL] key on the weighing display.
When "LL" is displayed, release the key.

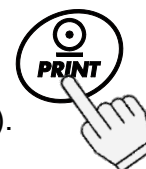


- While pressing and holding [CAL] key, "RL" and "LL" are displayed interchangeably. When "LL" is displayed, release the key.
- For $INF1 / INF2 = 0$, calibration test cannot be conducted.

2. "LL 0" is displayed.



3. Change sensitivity adjustment value if necessary. Press [SAMPLE] key to move to the screen for changing sensitivity adjustment weight value. Make the change, using the following keys (Same as the procedure 4 of "15.2. Sensitivity Adjustment with Weight").



Key	Description
SAMPLE	Move on blinking digits.
RE-ZERO	Set a figure of blinking digit by +1.
PRINT	Finalize the set value.

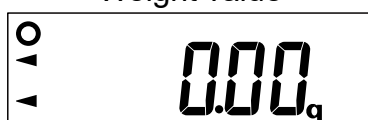
STABLE



4. When "LL 0" is displayed, confirm there is nothing on the weighing pan, and press [PRINT] key. The weight value is displayed for several seconds, changing into sensitivity adjustment weight value (The weight value is displayed with the unit, "g").

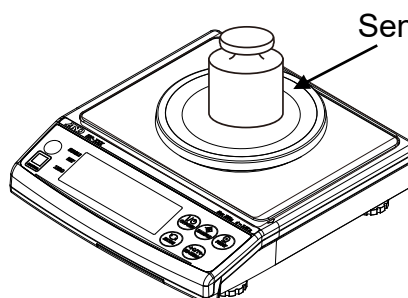
STABLE
NET
ZERO

Weight value



5. Set on the weighing pan, sensitivity adjustment weight with the same value as displayed, and press [PRINT] key. The balance weighs the sensitivity adjustment weight, showing the result for several seconds (The weight value is displayed with the unit, "g").

Sensitivity adjustment weight value



Sensitivity adjustment weight



<Output of "Title">

You can first add "Title" if you record series of weight value as GLP Report.

1. Press and hold [PRINT] key and release it when "StArt" is displayed. Output "Title", and "End" is displayed to return to the weighing screen.

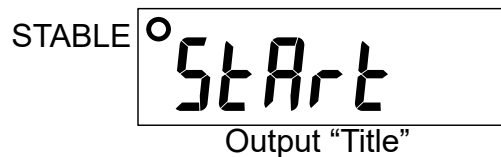
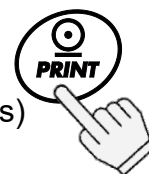
2. Press [PRINT] or output weight value by auto print mode.

<Output of "End" >

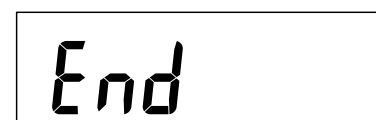
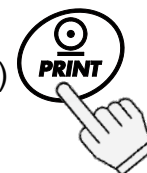
You can add "End" at the end, if you record series of weight value as GLP Report.

1. Press and hold [PRINT] key and release it when "rEcEnd" is displayed. Output "End".
2. "End" is displayed. Press [MODE] to return to the weighing mode.

Press and hold
(approx. 2 seconds)



Press and hold
(approx. 2 seconds)



19. Option

The following options are available with EK series:

EKW-02	USB+RS232C Interface
EKW-03	RS232C Interface (Same interface as that connected to weighing device as standard)
EKW-04	Comparator output interface
EKW-27	Bluetooth® Low Energy +RS232C Interface
EKW-07i	Underhook assembly
AX-KO7215-150	USB A to C cable, 1.5m
EJ-12	Carrying case

19.1. EKW-02 USB Interface

EKW-02 is a USB and RS232C communication option specialized for EK series.

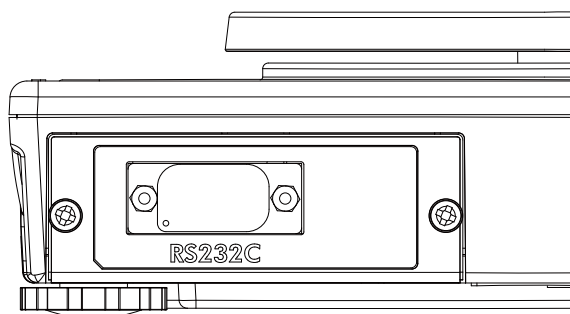
Bi-directional communication can be performed on USB and RS232C.

[CH1] RS232C is the same as the standard interface of the weighing device.

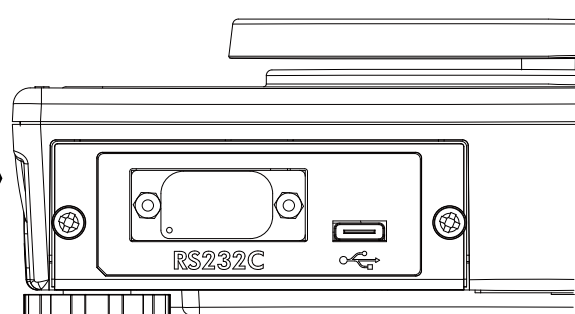
[CH2] USB interface (connected with Type-C connector / USB2.0)

- ❑ This is not an expansion of one RS232C to the standard RS232C interface of the weighing device, but an option to replace the standard communication slot completely. It cannot be used with another communication option at the same time.

Standard



EKW-02



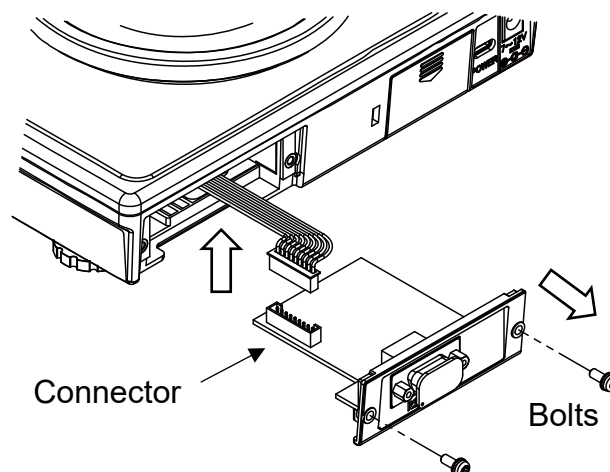
<How to detach communication slot>

1. Take off the two bolts on both ends of the communication slot.
2. Pull the whole panel out and take the connector off.

<How to attach communication slot>

Take the opposite procedure to above:

1. Plug the connector in.
2. Insert the slot to the weighing device, being careful not to pinch the cable.
3. Tighten up the bolts at the two locations.



- ❑ For detail, see the instruction manual of the option.

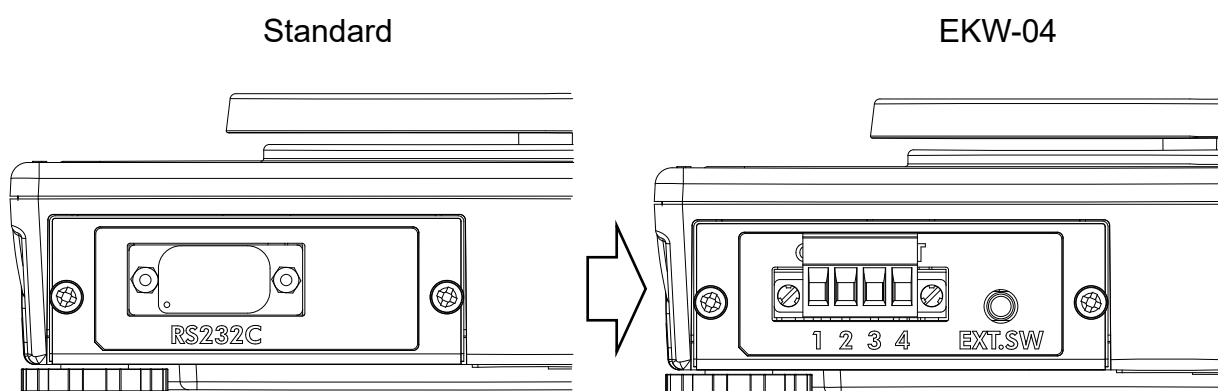
19.2. EKW-04 Comparator Output Interface

EKW-04 is an option of comparator output and external input connector, specialized for EK series.

[CH1] Comparator output and external input

[CH2] Not used

- ❑ Regarding how to attach/detach the communication slot, refer to “[19.1. EKW-02 USB Interface](#)”.
- ❑ This is not an expansion of one RS232C to the standard RS232C interface of the weighing device, but an option to replace the standard communication slot completely. It cannot be used with another communication option at the same time.



<Comparator Output>

Signals of HI/OK/LO of the comparator comparison result, can be taken out externally as solid state relay output.

- Turn on the comparator function (See “11. Comparator Function”).
- Select the following items on the function setting (See “16. Function Table”).

Item		Description	Set value
$[P Fnc]$	$[P-r]$	Addition of Comparator comparison result	1
$S iF$	$bP5 l$	[CH1] Baud rate	0 : 2400
	$btP l$	[CH1] Data bit / parity	0 : 7bit, even
$dout$	$Prt l$	[CH1] Output mode	0 : Stream mode for sequential output of judgement result

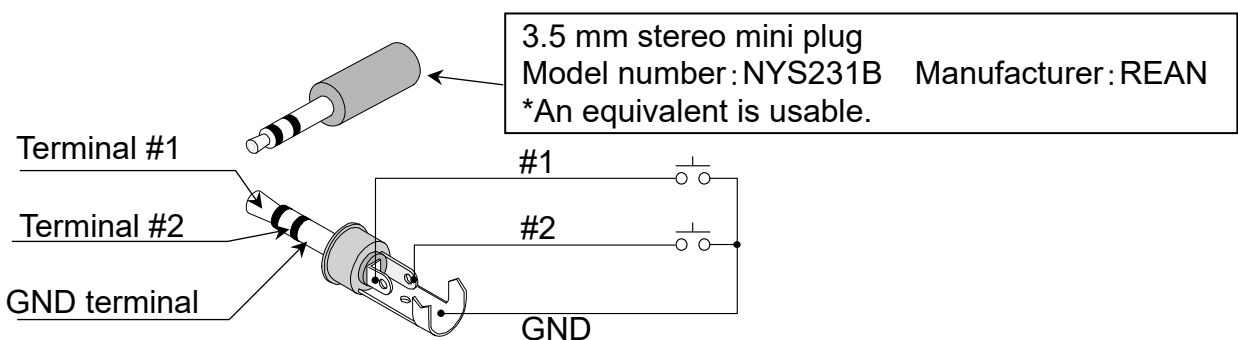
<External Input>

The balance can be controlled by such external switch as a foot switch connected to the external input connector.

- Select the following items on the function setting (See “16. Function Table”).

Item		Description	Set value
$S iF$	$bP5 l$	[CH1] Baud rate	0 : 2400
	$btP l$	[CH1] Data bit / parity	0 : 7bit, even
$RP Fnc$	$[on 1]$	External contact input #1	Set a key to operate when an external switch is pressed.
	$[on 2]$	External contact input #2	Set a key to operate when an external switch is pressed.

- Contacts of maximum 2 channels (#1, #2) can be set.



- For detail, refer to the instruction manual of the option.

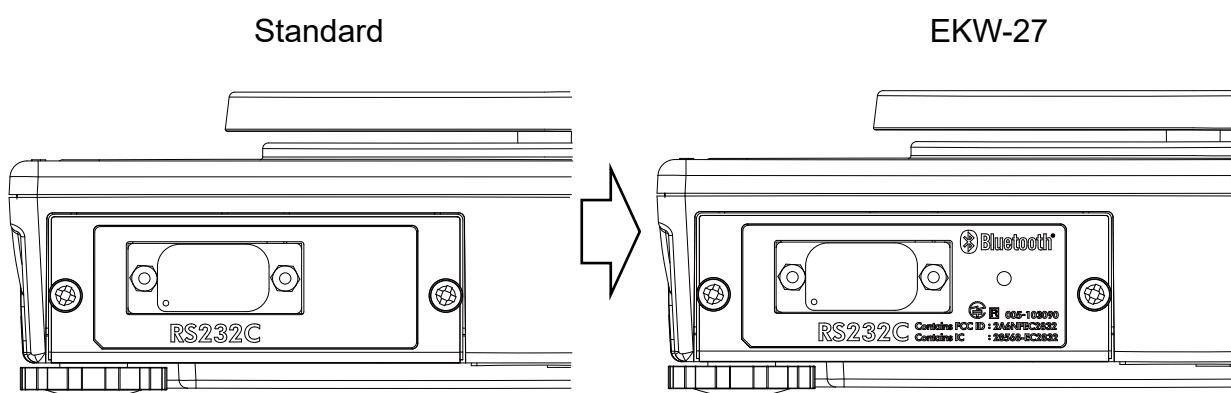
19.3. EKW-27 *Bluetooth*[®] Communication Interface

EKW-27 is an option of wireless communication and RS232C communication, specialized for EK series. *Bluetooth*[®] and RS232C communications can be performed.

[CH1] RS232C is the same as the standard interface of the weighing device.

[CH2] *Bluetooth*[®] Interface (Bi-directional communication with HID function or virtual COM, can be selected.)

- For how to attach/detach the communication slot, refer to “19.1. EKW-02 USB Interface”.
- This is not an expansion of one RS232C to the standard RS232C interface of the weighing device, but an option to replace the standard communication slot completely. It cannot be used with another communication option at the same time.



< *Bluetooth*[®] Communication >

- Select the following items on the function setting (See “16. Function Table”.):

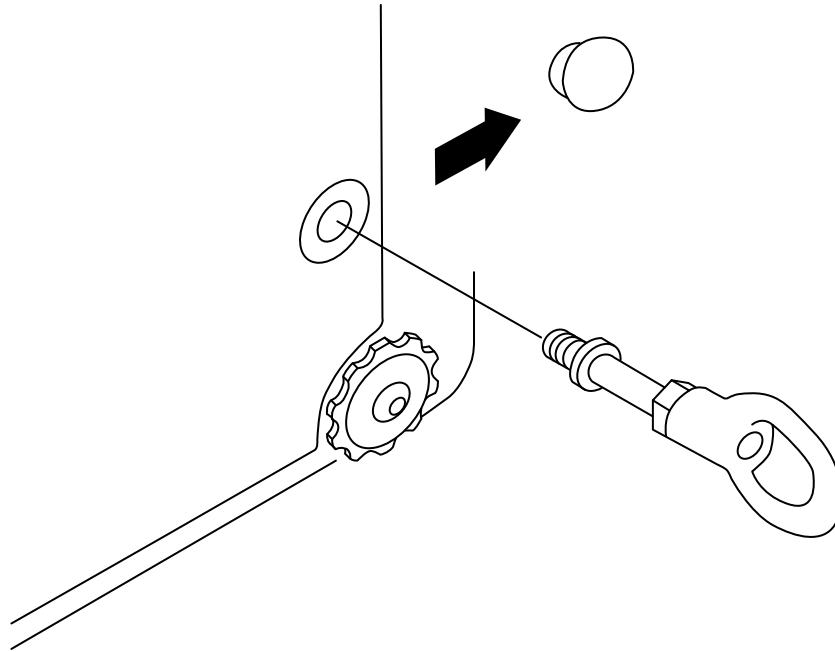
Item		Description	Set value
<i>AP Fnc</i>	<i>bLEF</i>	<i>Bluetooth</i> [®] communication operation mode	Set to meet with the connected device
<i>S iF</i>	<i>bP5?</i>	[CH2] Baud rate	\bar{U} : 2400
	<i>btP?</i>	[CH2] Data bit / Parity	\bar{U} : 7bit,even
<i>dout</i>	<i>Prt?</i>	[CH2] Output mode	Set to meet with the connected device

- For detail, refer to the instruction manual of the option.

19.4. Underhook Assembly

By attaching this underhook assembly at the bottom of the balance, an object which is too big to set on the weighing pan, can be hung down for weighing.

- ❑ EKW-07i is an option specified for the models with more than 4 kg weighing capacity (EK-4201/EK-6201/EK-6200/EK-12000).
- ❑ For accurate weighing, sensitivity adjustment needs to be performed with sensitivity adjustment weight hung down on the assembly.



20. Password Lock Function

Password Lock is a function to restrict changes on the function setting for the balance. It is disabled at the default setting.

20.1. Setting Procedure

- For activating/de-activating Password Lock Function and setting a password, select the following items (See “16. Function Table”.):

Item	Menu	Set value	Description
PASSYd	Lock	1	Password lock available
		2	Password lock and key restriction available (i.e. While weighing, only [RE-ZERO] key and [ON:OFF] key can be operated.).
PASSno	Password setting		Set a password arbitrarily (4 digits of numbers)

<Setting Password>

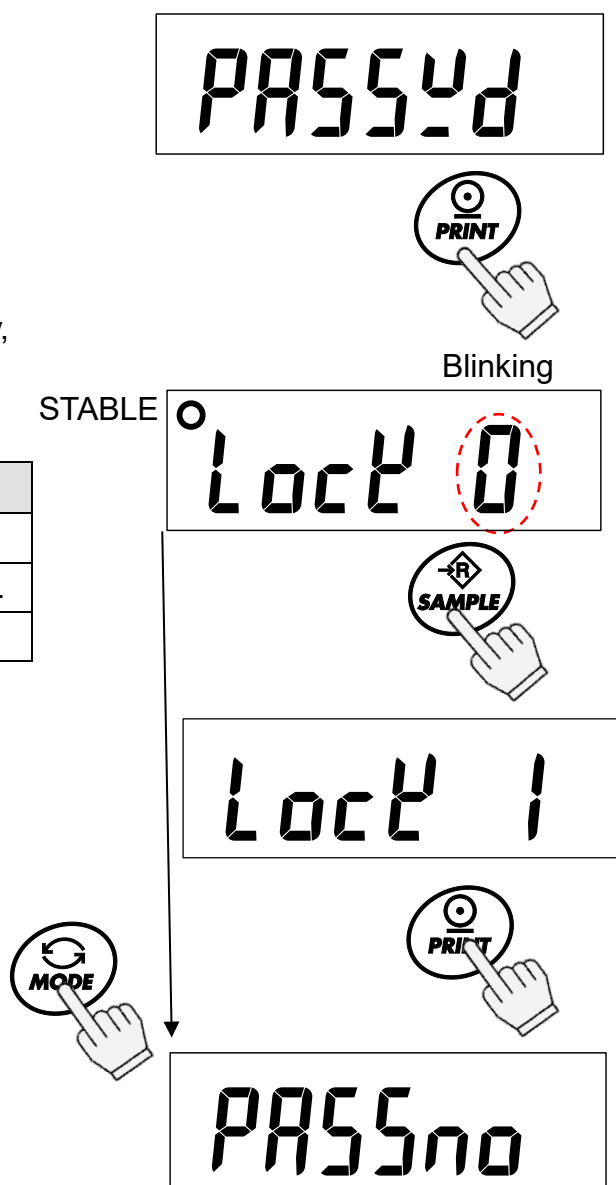
Refer to the procedures 1 to 5 of “16.1. Setting Procedure”

- Press [PRINT] key. When “Lock 0” is displayed, set for 1 or 2, following the below table (For password change only, press [MODE] key and refer to the procedure 3):

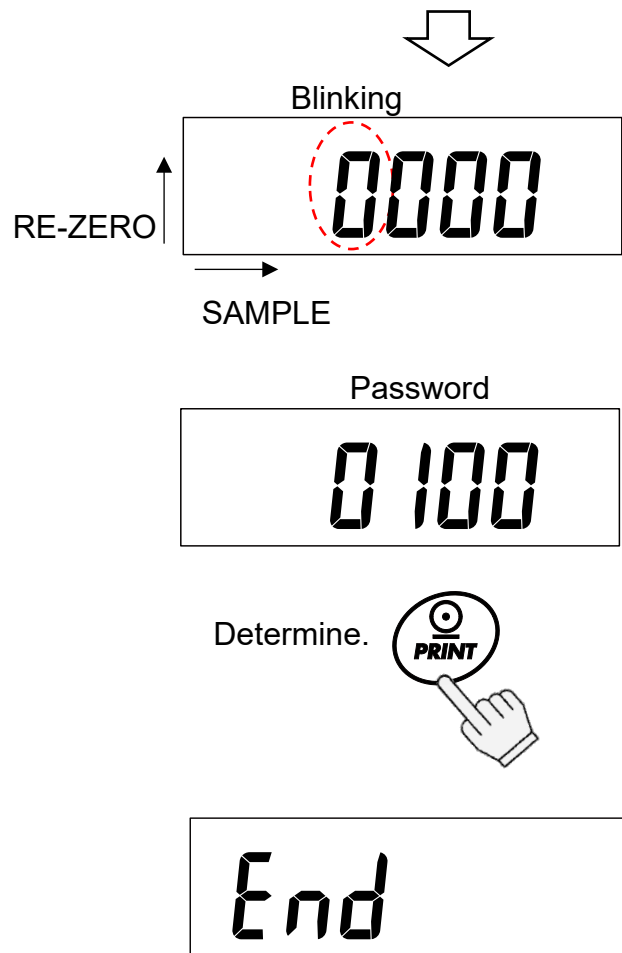
Key	Description
SAMPLE	Move on blinking digits.
RE-ZERO	Set a figure of blinking digit by +1.
PRINT	Finalize the set value.

- Press [PRINT] key, and the set value is recorded.

- When “PASSno” is displayed, it turns to be the password input screen in 2 seconds.



4. By the same key operation as fore-mentioned, set a password. Press [PRINT] key, and “End” is displayed with the password stored.



5. Press [MODE] key to return to the weighing mode.

20.2. Forgetting Password

In case you forget the password, it needs to be initialized. Refer to “[16.3. Reset Function Setting for default](#)” and initialize.

- ❑ If the password is initialized, function settings and comparator value need to be reset as they are also initialized.

20.3. Changing Function Setting after setting $LocL = 1$ or 2

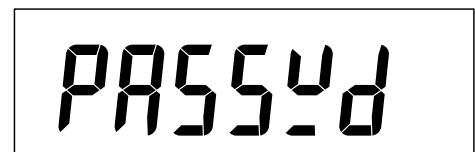
1. Press and hold [SAMPLE] key with the display on, and the software version shows up as P-X.XX.



Press and hold (approx. 2 seconds)

- Also, it shows up if you press and hold [RE-ZERO] key with the power off.

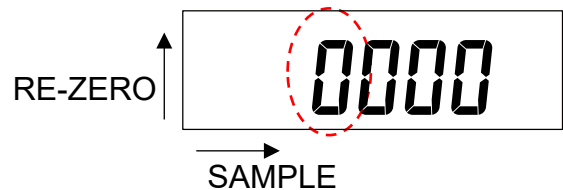
*Software version



2. "PASSYd" is displayed, which turns to be the password input screen in approx. two seconds. Input a password according to the following table, and press [PRINT].

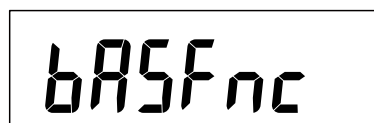
If the password is correct, "bASFnC" (the function setting mode) shows up. If it is wrong, "FRIL" is displayed.

- After "FRIL" is displayed, the screen returns to the password input screen.



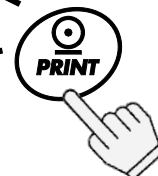
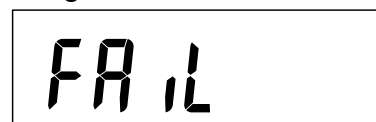
Item	Description
SAMPLE	Move on blinking digits.
RE-ZERO	Set a figure of blinking digit by +1.
PRINT	Finalize the set value.
MODE	Return to the weighing mode.

If correct...
(Move on to the function setting mode.)



Input a password.

If wrong...



21. Maintenance

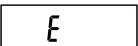
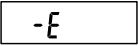

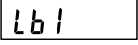
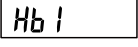

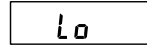
Take “4. Precautions for Use” into account.

- Regarding the error indication, refer to “21.3. Error Code Table”.
- Regularly check if the balance weighs correctly.

21.1. Repair






Do not attempt to repair the balance yourself. Doing so may not only void the warranty but also result in electric shock or damage to the device. For repairs, please contact your local A&D dealer.

21.2. Error Indication

Symptoms	Check the following
The power does not turn on. Nothing is displayed.	<ul style="list-style-type: none"> ➤ Is the AC adapter or USB cable securely connected? ➤ Are the batteries installed correctly?
The display does not show zero when turned on.	<ul style="list-style-type: none"> ➤ Is anything touching the balance? ➤ Remove the item from the pan.
	➤ Overload: Remove the item from the pan.
	➤ Underload: Check that the item is properly placed on the pan.
	➤ Insufficient power supply: Replace the batteries with new ones.
	➤ Insufficient power supply: Check that the adapter is correct.
	➤ Excessive power supply: Check that the adapter is correct.
The display is unresponsive.	<ul style="list-style-type: none"> ➤ Check whether the Hold indicator is turned on. ➤ Try turning the power off and on again. ➤ Try removing and replacing the batteries.
	➤ Warning to indicate that calibration has been canceled because the calibration weight is too light.
	➤ The unit / 100% weight is too light in the counting / % mode.

21.3. Error Code Table

If any of the following error messages appear, turn the balance off and then on again.

Display	Content
	The temperature sensor has failed. Unplug the power cord and reset it.
	Warning to indicate that the weight value is not stable and the balance cannot display it. Prevent vibration and drafts. Press the MODE key to return to the weighing mode.
	The memory (circuit) has failed.
	The internal circuitry has failed.
	The mass sensor has failed.

22. Specification

22.1. Specification Table

Model	EK-122	EK-222	EK-322	EK-422	EK-622
Weighing capacity	122 g	220 g	320 g	420 g	620 g
Maximum display	122.08 g	220.08 g	320.08 g	420.08 g	620.08 g
Readability	0.01 g				
Weighing units	g, pcs, %, ozt, tl, tola, lb, oz, dwt, N, GN, ct, mom				
Maximum count [pcs.]	12,200	22,000	32,000	42,000	62,000
Minimum weighable unit mass	0.01 g				
Minimum % display	0.1%				
Minimum 100% mass	1 g				
Repeatability (Standard deviation)	0.01 g				
Linearity	±0.01 g		±0.02 g		
Temperature drift	±20 ppm / °C typ. (10°C to 30°C)				
Display	7-segment LCD (character height: 18 mm)				
Display update	Approx. 10 times per second				
Stabilization time	Approx. 0.8 seconds (Load setting = 0, at 100 g)				
Operating conditions	-10°C to 40°C, up to 85% R.H. (non-condensing)				
Power supply	AC adapter 4 x AA size dry-cell batteries (R6P/LR6) USB Type-C port				
Battery operation	Approx. 20 hours (at 25°C, backlight L-, setting = 0, using alkaline batteries)				
Power consumption	9 V, 90 mA (0.81 W) (backlight L-, setting = 3, mobile battery mode OFF)				
Volume	38 dB (Load setting = 0) / 50 dB (Load setting = 1)				
Weighing pan size	Round pan: φ116 mm				
Dimensions (W × D × H)	190(W) × 205(D) × 55(H) mm				
Weight	Approx. 1.1 kg				
Materials	ABS (base), SUS304 (weighing pan), Polyester film (display sheet), Elastomer (leveling feet)				

□ Specifications are subject to change without prior notice.

Model	EK-1201	EK-2201	EK-3201	EK-4201	EK-6201	EK-6200	EK-12000
Weighing capacity	1220 g	2200 g	3200 g	4200 g	6200 g	6200 g	12200 g
Maximum display	1220.8 g	2200.8 g	3200.8 g	4200.8 g	6200.8 g	6208 g	12208 g
Readability	0.1 g					1 g	
Weighing units	g, pcs, %, ozt, tl, tola, lb, oz, dwt, N, GN, ct, mom						
Maximum count [pcs.]	12,200	22,000	32,000	42,000	62,000	6,200	12,200
Minimum weighable unit mass	0.1 g					1 g	
Minimum % display	0.1%						
Minimum 100% mass	10 g					100 g	
Repeatability (Standard deviation)	0.1 g					1 g	
Linearity	±0.1 g		±0.2 g			±1 g	
Temperature drift	±20 ppm/°C typ. (10°C to 30°C)						
Display	7-segment LCD (character height: 18 mm)						
Display update	Approx. 10 times per second						
Stabilization time	Approx. 0.8 seconds ([mode] setting = 0, at 1000 g)						
Operating conditions	-10°C to 40°C, up to 85% R.H. (non-condensing)						
Power supply	AC adapter 4 x AA size dry-cell batteries (R6P/LR6) USB Type-C port						
Battery operation	Approx. 20 hours (at 25°C, backlight L -, setting = 0, using alkaline batteries)						
Power consumption	9 V, 90 mA (0.81 W) (backlight L -, setting = 3, mobile battery mode OFF)						
Volume	38 dB (μoL setting = 0) / 50 dB (μoL setting = 1)						
Weighing pan size	Square pan: 170 × 133 mm						
Dimensions (W × D × H)	190(W) × 205(D) × 54(H) mm						
Weight	Approx. 1.5 kg						
Materials	ABS (base), SUS304 (weighing pan), Polyester film (display sheet), Elastomer (leveling feet)						

□ Specifications are subject to change without prior notice.

23. Other Weighing Units

Model		EK-122	EK-222	EK-322	EK-422	EK-622	EK-1201
oz.	Capacity	4.3035	7.7605	11.2875	14.8150	21.8700	43.035
	Min. display	0.0005	0.0005	0.0005	0.0005	0.0005	0.005
lb	Capacity	-	-	-	0.92595	1.36685	2.6895
	Min. display	-	-	-	0.00005	0.00005	0.0005
ozt	Capacity	3.9225	7.0730	10.2880	13.5035	19.9335	39.225
	Min. display	0.0005	0.0005	0.0005	0.0005	0.0005	0.005
ct	Capacity	610.00	1100.00	1600.00	2100.00	3100.00	6100.0
	Min. display	0.05	0.05	0.05	0.05	0.05	0.5
mom	Capacity	32.535	58.665	85.335	112.000	165.335	325.35
	Min. display	0.005	0.005	0.005	0.005	0.005	0.05
dwt	Capacity	78.45	141.46	205.76	270.07	398.67	784.5
	Min. display	0.01	0.01	0.01	0.01	0.01	0.1
GN	Capacity	1882.8	3395.2	4938.4	6481.6	9568.0	18828
	Min. display	0.2	0.2	0.2	0.2	0.2	2
tola	Capacity	10.460	18.862	27.435	36.009	53.156	104.60
	Min. display	0.001	0.001	0.001	0.001	0.001	0.01
tl (HG)**	Capacity	3.2275	5.8200	8.4655	11.1115	16.4025	32.275
	Min. display	0.0005	0.0005	0.0005	0.0005	0.0005	0.005
tl (HJ)**	Capacity	3.2595	5.8780	8.5495	11.2210	16.5645	32.595
	Min. display	0.0005	0.0005	0.0005	0.0005	0.0005	0.005
tl (T)**	Capacity	3.2535	5.8665	8.5335	11.2000	16.5335	32.533
	Min. display	0.0005	0.0005	0.0005	0.0005	0.0005	0.001

Model		EK-2201	EK-3201	EK-4201	EK-6201	EK-6200	EK-12000
oz.	Capacity	77.605	112.875	148.150	218.700	218.70	430.35
	Min. display	0.005	0.005	0.005	0.005	0.05	0.05
lb	Capacity	4.8500	7.0550	9.2595	13.6685	13.670	26.895
	Min. display	0.0005	0.0005	0.0005	0.0005	0.005	0.005
ozt	Capacity	70.730	102.880	135.035	199.335	199.35	392.25
	Min. display	0.005	0.005	0.005	0.005	0.05	0.05
ct	Capacity	11000.0	16000.0	21000.0	31000.0	-	-
	Min. display	0.5	0.5	0.5	0.5	-	-
mom	Capacity	586.65	853.35	1120.00	1653.35	1653.5	3253.5
	Min. display	0.05	0.05	0.05	0.05	0.5	0.5
dwt	Capacity	1414.6	2057.6	2700.7	3986.7	3987	7845
	Min. display	0.1	0.1	0.1	0.1	1	1
GN	Capacity	33952	49384	64816	95680	-	-
	Min. display	2	2	2	2	-	-
tola	Capacity	188.62	274.35	360.09	531.56	531.6	1046.0
	Min. display	0.01	0.01	0.01	0.01	0.1	0.1
tl (HG)**	Capacity	58.200	84.655	111.115	164.025	164.00	322.75
	Min. display	0.005	0.005	0.005	0.005	0.05	0.05
tl (HJ)**	Capacity	58.780	85.495	112.210	165.645	165.65	325.95
	Min. display	0.005	0.005	0.005	0.005	0.05	0.05
tl (T)**	Capacity	58.665	85.335	112.000	165.335	165.35	325.35
	Min. display	0.005	0.005	0.005	0.005	0.05	0.05

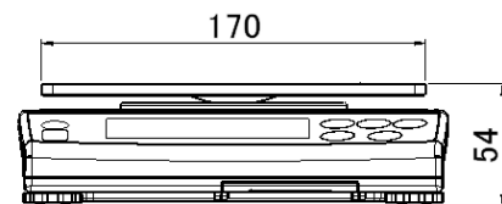
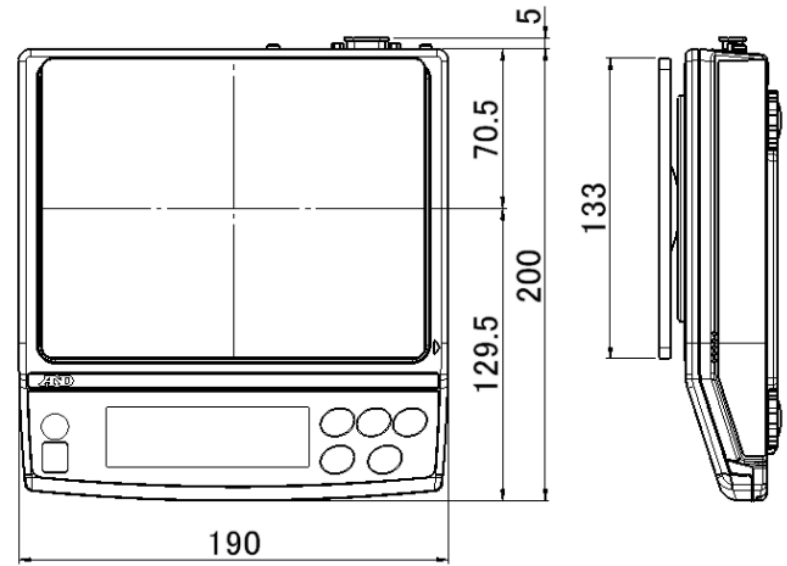
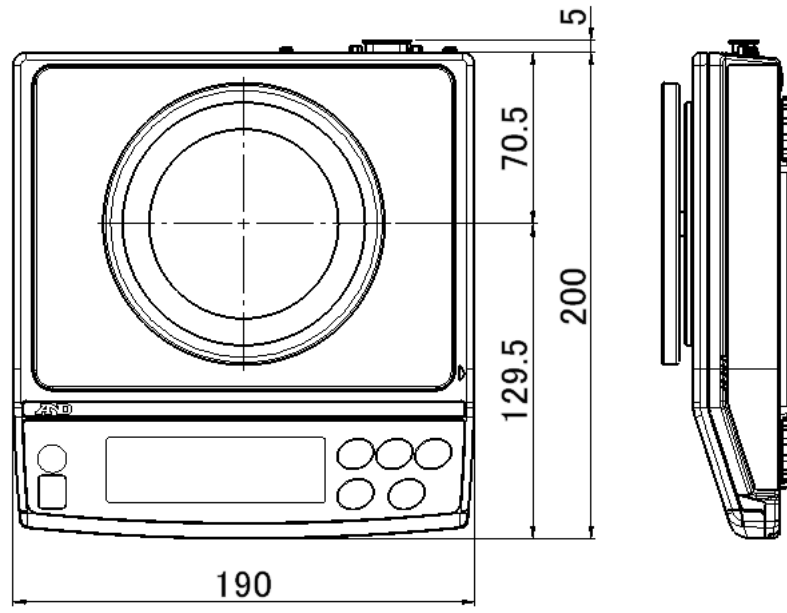
****The unit “tola” and three kinds of “tl” are for special versions and only one of them will be available.**

tl (HG): Hong Kong General / Singapore tael

tl (HJ): Hong Kong Jewelry tael

tl (T): Taiwan tael

External Dimensions



Unit : mm

Gravity Acceleration

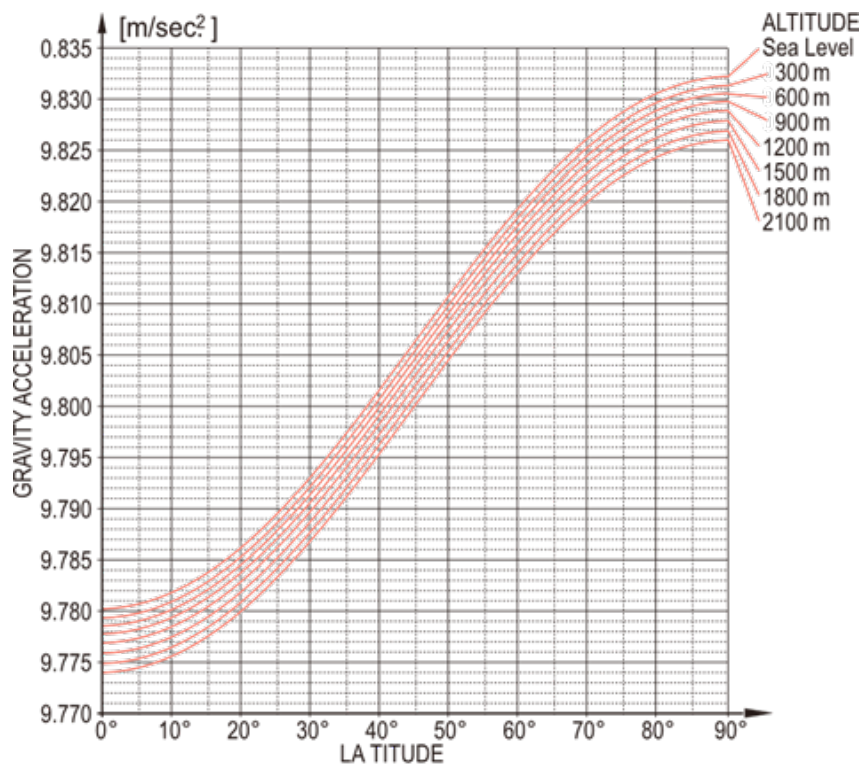
The gravity acceleration values of principal regions are as follows :

Please contact your local dealer if you want to know the region for your scale.

The unit is [m/s²].

Amsterdam	9.813
Athens	9.800
Auckland, NZ	9.799
Bangkok	9.783
Birmingham	9.813
Brussels	9.811
Buenos Aires	9.797
Calcutta	9.788
Chicago	9.803
Copenhagen	9.815
Cyprus	9.797
Djakarta	9.781
Frankfurt	9.810
Glasgow	9.816
Havana	9.788
Helsinki	9.819
Kuwait	9.793
Lisbon	9.801
London (Greenwich)	9.812
Los Angeles	9.796
Madrid	9.800

Manila	9.784
Melbourne	9.800
Mexico	9.779
Milan	9.806
New York	9.802
Oslo	9.819
Ottawa	9.806
Paris	9.809
Rio de Janeiro	9.788
Rome	9.803
San Francisco	9.800
Singapore	9.781
Stockholm	9.818
Sydney	9.797
Tainan	9.788
Taipei	9.790
Tokyo	9.798
Vancouver, BC	9.809
Washington, DC	9.801
Wellington, NZ	9.803
Zurich	9.807



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