

		Mass display	
(Example)		Execute the preset calibration method (see 10.2, 10.3.1)	
		WindowsDirect setting (down) (see 6.2.1)	
		WindowsDirect setting (right) (see 6.2.1)	
(Example)		Settings check display (see 7.4.1)	
		Standard mode	Settings for Stability and Response (see 11.2)
		Pouring mode	
		Anti-convection mode	
		High-stability mode	
		Entry to second level (application measurement, individual settings menu group)	
		Entry to second level (system settings menu group)	
		Entry to second level (communication settings menu group)	
		Mass display	

Application measurement, individual settings menu group (Select)

This second level menu group includes settings for selection and execution of alternative calibration method (see 10.2, 10.3.1), zero tracking on/off (see 11.4), stability detection band setting (see 11.3), unit selection/removal (see 12.1), Auto Print on/off, analog display on/off, auto-memory & zeroing mode on/off, and net total measurement mode on/off.

System settings menu group (Select)

This second level menu group includes various settings related to calibration such as settings for the type of regular-use calibration (see 10.3, 10.4), as well as information entries for mediums required for specific gravity measurement (see 13.2, 13.3) and settings related to the clock.

Communication settings menu group (Select)

This second level menu group includes settings for communication formats for connecting the balance to external devices (see 14.3). There are standard formats prepared beforehand and user-defined formats that allow itemized selection.

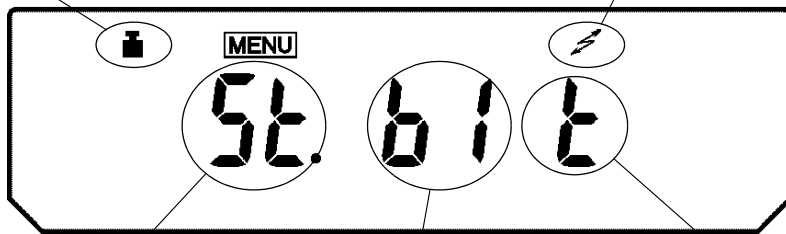
7.4 Useful Functions Related to Menu

7.4.1 Settings Check Display

From mass display, press the **[CAL]** key four times to display the confirmation of the current settings. Displayed as abbreviations are the three kinds of environmental settings(see 11.), ON/OFF for the fully-automatic span calibration(see 10.3.2,10.3.3), and ON/OFF for the GLP/GMP/ISO compliant calibration report output.(see 10.4.1)

Appears when the fully-automatic span calibration PSC or Clock-CAL is on.

Appears when the calibration report output is on



Stability and response setting

St : Standard mode
Co : Anti-convection mode
Hi : High-stability mode
Po.n : Pouring mode (normal environment)
Po.S : Pouring mode (very stable environment)
Po.U : Pouring mode (unstable environment)

Stability detection band setting

b1 : 1 count
b5 : 5 count
b10 : 10 count

Appears when zero tracking is on

The weight symbol appears when either or both of the fully-automatic span calibration PSC or Clock-CAL are on.

7.4.2 Returning to Default Settings (Menu reset)

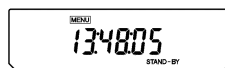
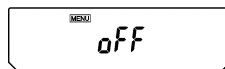
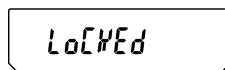
This will return all the settings to default. The reference value stored in previous use of piece counting or percentage conversion and the set time of Interval Timer function will also be cleared. The default settings are indicated with “#” on the Menu Map.



- 1** Press the **[CAL]** key repeatedly until “SEtting” appears. Press the **[O/T]** key. The display shows “CAL dEF”.
- 2** Press the **[CAL]** key repeatedly until the display shows “rESEt”. Press the **[O/T]** key. The display shows “rESEt?” for confirmation.
- 3** Press the **[O/T]** key one more time.

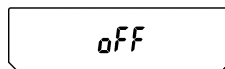
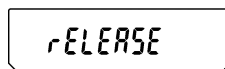
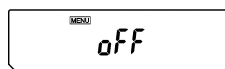
7.4.3 Menu Lock

The menu setting operations can be locked so that the settings cannot be inadvertently changed. This is called Menu Lock. WindowsDirect settings also lock. The menu lock is set with the following procedure.



(Time is not displayed with AUY.)

If a menu item selection is attempted in locked status, the message "LoCKEd" appears and the menu selection is not allowed. To allow menu selections again, follow this procedure.



How to lock the menu

- 1** Connect the balance to the power and wait.
- 2** When "oFF" appears, press and hold the [CAL] key for about three seconds. "LoCKEd" appears and the menu lock function is activated, returning to the "oFF" display. When the lock function is activated, the MENU mark appears.

When menu is locked, MENU symbol is illuminated at STAND-BY display, too.

How to remove menu lock

- 1** Disconnect the balance from power. Wait, then connect power again.
- 2** When "oFF" appears, press and hold the [CAL] key for about three seconds.
- 3** "rELEASE" appears and the menu lock is released.

8. Setting the Built-in Clock

(AUW-D/AUW/AUX series only)

AUW-D/AUW/AUX series are installed with a built-in clock. Set the clock before use of Clock-CAL (10.3.3) or Calibration report (10.4.1) functions. Note that the current time is displayed during STAND-BY mode (4.4).

8.1 Date

MENU
SEtting

MENU
CAL DEF

(Example)

MENU
d- 03 15
(Mar.15)

(Example)

MENU
0303 15
(Mar.15, 2003)

(Example)

MENU
04 1 02
(Nov.2, 2004)

1 From the mass display, press the **[CAL]** key repeatedly until “SEtting” appears, press the **[O/T]** key. “CAL dEF” will appear.

2 Press the **[CAL]** key repeatedly until “d-MM.DD” appears (MM and DD are each two digits representing month and date, respectively), and press the **[O/T]** key. In the upper part of the display, the **[MENU]** mark and the # symbol appear indicating number entry mode. Also, the current date setting appears as [YY.MM.DD] (YY is the year) with the leftmost digit blinking.

3 Pressing the **[UNIT]** key increases the blinking digit by one. Pressing the **[PRINT]** key moves the blinking digit one place to the right.

4 Press the **[O/T]** key when the desired date is shown in the display. The built-in clock will be set.

5 Press the **[POWER]** key repeatedly to return to the mass display.



Note

The actually outputted date format is not the same as the display during this setting. Select your desirable style of expressing year, month and date in 8.2.

8.2 Date Output Style

The order of the year, the month and the date in the external output can be selected from three styles.

MENU
SEtting

MENU
CAL DEF

MENU
StYLdAtE

MENU
→ y-m-d

(When YYYY-MM-DD is selected)

MENU
m-d-y

MENU
d-m-y

MENU
→ d-m-y

(When DD-MM-YYYY is selected)

MENU
StYLdAtE

1 From the mass display, press the **[CAL]** key repeatedly until “SEtting” appears, press the **[O/T]** key. “CAL DEF” will appear.

2 Press the **[CAL]** key repeatedly until “StYLdAtE” appears.

3 Press the **[O/T]** key.

The display shows “y-m-d”.

After this, pressing the **[CAL]** key cycles the displays in the order of “y-m-d” → “m-d-y” → “d-m-y” → “y-m-d”.

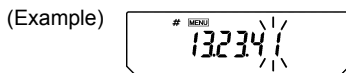
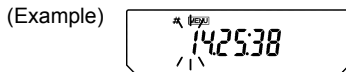
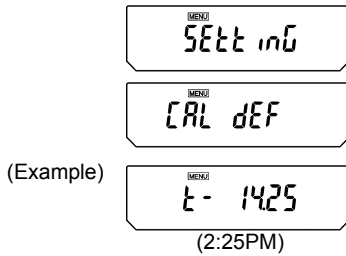
“y-m-d” is for setting YYYY-MM-DD, “m-d-y” is for MM-DD-YYYY and “d-m-y” is for DD-MM-YYYY.

When the current setting is displayed, the stability mark (→) appears. To change the setting, press the **[O/T]** key when the desired setting is on the display, or

4 Press the **[POWER]** key to return to “StYLdAtE” without changing the setting.

5 Pressing the **[POWER]** key again returns to the mass display.

8.3 Time



1 From the mass display, press the **[CAL]** key repeatedly until “SEttinG” appears. Press the **[O/T]** key. “CAL dEF” will appear.

2 Press the **[CAL]** key repeatedly until “t-HH.MM” appears (HH and MM are each two digits representing hour and minute, respectively), and press the **[O/T]** key.

3 In the upper part of the display, the **[MENU]** symbol and the # symbol appear indicating number entry status. Also, the current time setting appears as [HH.MM.SS] (HH is hours, MM is minutes, and SS is seconds) with the leftmost digit blinking.

4 Pressing the **[UNIT]** key increases the blinking digit by one. Pressing the **[PRINT]** key moves the blinking digit one place to the right.

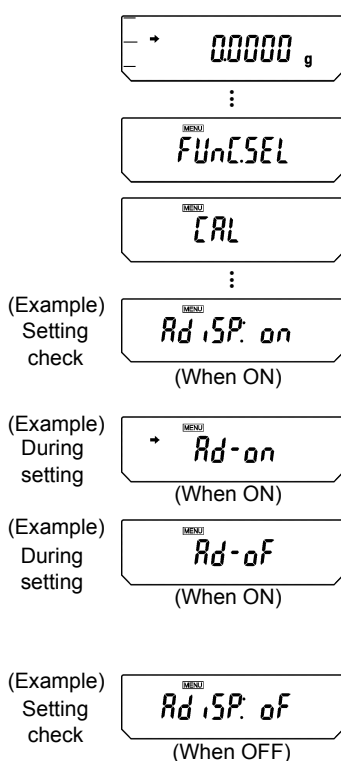
5 Press the **[O/T]** key when the desired time is shown in the display. The built-in clock will be set.

6 Press the **[POWER]** key repeatedly to return to the mass display.

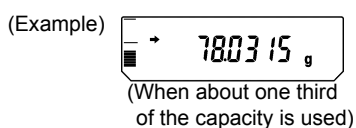
9. Display Settings

9.1 Bar Graph Display

This function displays a bar graph representation of the load on the pan. This may be used to prevent sudden appearance of “oL” (overload) during measurement. This bar graph display can be turned on or off.



Bar graph in weighing



Setting ON/OFF

- 1** Press the **[CAL]** key repeatedly from the mass display and when “Func.SEL” appears, press the **[O/T]** key. “CAL” is displayed.
- 2** Press the **[CAL]** key repeatedly until “AdiSP:**” appears. The ** position displays the current setting “on” or “oF”.
- 3** Press the **[O/T]** key. “Ad-on” is displayed. At this point, pressing the **[CAL]** key switches the display between “Ad-on” and “Ad-oF”. When the current setting is displayed, the stability mark (➔) appears. To change the setting, press the **[O/T]** key when the desired setting appears, and the display will return to “AdiSP:**”, indicating the new setting.
- 4** If no change is required, press the **[POWER]** key. The display returns to “AdiSP:**”.
- 5** Press the **[POWER]** key repeatedly to return to the mass display.

9.2 Changing the Minimum Display (AUW/AUX/AUY series only)

Not applicable to a verified balance as a legal measuring instrument in the EU

The AUW/AUX/AUY series allow the minimum display to be changed by one digit if desired. The last decimal place will be rounded and removed from the display.



1 (To change the minimum display by one digit)

Press the **[1d/10d]** key from the mass display. The minimum display digit will be displayed with only three decimal places.

2 (To return the minimum display to the standard setting)

Press the **[1d/10d]** key from the mass display. The minimum display digit will return to the previous setting.



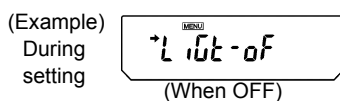
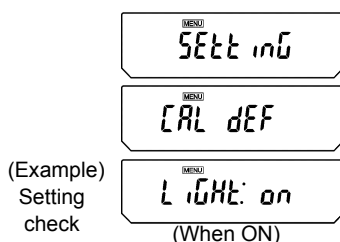
Note

The decimal point does not move. When the minimum display is changed by one decimal place, the final decimal place remains empty.

9.3 Turning the Backlight On and Off

(AUW series only) (Not for AUW-D)

The AUW series is equipped with a backlight for the display to allow easy viewing regardless of the surrounding lighting conditions. The backlight can be switched on and off.



- 1** Press the **[CAL]** key repeatedly from the mass display until “SEtting” appears. Press the **[O/T]** key. “CAL DEF” appears.
- 2** Press the **[CAL]** key and the display shows “LiGht:**. The ** position shows “on” for on, and “oF” for off.
- 3** To change the settings, press the **[O/T]** key when the “LiGht:**” appears. The display shows “LiGt-on”.
- 4** From that point, every time the **[CAL]** key is pressed, the display switches between “LiGt-on” (on), and “LiGt-oF” (off). Here, when the current setting is displayed, the stability mark (→) appears.
- 5** Press the **[O/T]** key when the desired setting appears, and the display will return to “LiGht:**”, indicating the new setting.
- 6** If no change is required, press the **[POWER]** key to return to “LiGht:**”.
- 7** Press the **[POWER]** key repeatedly to return to the mass display.



Note

When backlight is used for normal operations, any required “warm-up” should also be performed with backlight on. Leave the balance in mass display, rather than “STAND-BY” for the required warm-up period. (See 4.4)

10. Calibration

10.1 What is calibration?

10.1.1 The Necessity of Calibration

Calibration is required to accurately weigh items with an electric balance. Calibration must be performed in these conditions:

- When the location of the installation site is changed (even when moved within the same room).
- When the room temperature changes.
- Also, daily calibration before use is recommended.

The AUW-D/AUW/AUX series are set to operate fully-automatic span calibration PSC by default. The AUJ series requires span calibration using external weights.

The Essential Role of Span Calibration for the Use of Electronic Balances

The measurement desired when using an electronic balance is the measurement of mass. However, an electronic balance cannot detect mass directly. Instead, it detects the weight (the weight is the Earth's attraction on the item, gravity) and displays the mass as computed from the weight. The proportion of mass to weight depends on the gravitational acceleration at the location. By placing calibration weights of accurately known mass on the electronic balance, the corresponding weight for that mass can be recorded. This allows the mass of any item that is subsequently weighed to be computed from its weight and accurately displayed. The recording and setting of weight-mass relation is known as span calibration.

The necessity can be recognized this way for example, the gravitational acceleration in the Japanese cities of Kyoto and Tokyo are 979.70775 cm/s^2 and 979.76319 cm/s^2 respectively, with a difference of about 0.0057%. This means that if a balance is calibrated in Kyoto and the balance is moved to Tokyo, an object of 100.0000g mass will exhibit 100.0057g on the balance, generating an error of two digits.

Always perform span calibration at the installation site before using the balance to correct for this effect.

In addition, electronic balances use a permanent magnet and a coil in their weight detecting system. Even with compensation, a permanent magnet generates a sensitivity difference of up to $\pm 2 \text{ ppm}$ (two millionths) with every 1°C fluctuation in temperature. When measuring for example, a 100g object, this difference amounts to $\pm 2 \text{ mg}$, which means a possible error on the final two digits displayed on the electronic balance. If the temperature changes by 5°C after calibration, an object of 100.0000g may appear to increase to a maximum of 100.0010g. When there is a change in temperature, always calibrate again for accurate measurement.



Note

Using a verified balance as a legal measuring instrument in the EU:

The balance must be used within the temperature range indicated on the verification label.

When PSC (refer to [10.3.2](#)), fully-automatic span calibration, is not activated, operator must carry out span calibration (refer to [10.2](#)) upon blinking of the Weight Symbol.

10.1.2 Types of Calibration

Terms used in this manual:

- Span calibration Adjustment of the balance sensitivity using two weight values, zero and near-capacity
- Calibration test Comparing the current calibration mass reading to the calibration mass reading after the last span calibration.
- Calibration Specifies both span calibration and calibration test.

The AUW-D/AUW/AUX series have a built-in, motor-driven calibration weight. This weight allows easy key calibration operations (i-CAL, i-tEst) without having to maintain external weights and manually load and unload weights. These models are also equipped with functions for performing fully-automatic span calibration whenever necessary. The two functions are PSC, for executing automatic span calibration made necessary by temperature changes, and Clock-CAL, for performing automatic span calibration at set times. Calibration can also be done with external calibration weights (E-CAL, E-tEst). Calibration of the built-in calibration weight with external calibration weights (PCAL) is also possible. Calibration of the AUW series must be done with external calibration weights as this series does not have a built-in calibration weight.

Calibration					
Span calibration (Balance is adjusted)				Calibration test (Check only)	
Fully-automatic		Built-in	External	Built-in	External
PSC*1 (→10.3.2)	Clock-CAL (→10.3.3)	i-CAL*2 (→10.2.1)	E-CAL*3 (→10.2.2)	i-tEst (→10.2.3)	E-tEst (→10.2.4)
AUW-D AUW AUX	AUW-D AUW	AUW-D AUW AUX	AUW-D AUW AUX AUW	AUW-D AUW AUX	AUW-D AUW AUX AUW

Each calibration type is available for the listed series only.

*1 Default setting is ON for AUW-D / AUW / AUX

*2 Default preset calibration method for AUW-D/AUW/AUX

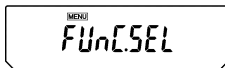
*3 Default preset calibration method for AUW

10.2 Executing Calibration

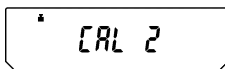
Perform calibration only after correct installation and thorough warm up. Also, make sure that nothing is on the pan and ensure conditions free from the influence of vibrations or wind.

10.2.1 Span Calibration With Built-in Weight (AUW-D/AUW/AUX series only)

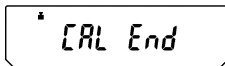
“i-CAL” (The balance will be adjusted with the built-in calibration weight.)





⋮




1 From the mass display, press the **[CAL]** key once. If the display shows “i-CAL” (Preset calibration method is “i-CAL”), jump to Step 5.

If the display shows another item (Preset calibration method is not “i-CAL”), go on to Step 2.

(Refer to [10.3.1](#) for preset calibration method)

2 Press the **[CAL]** key repeatedly until “FUnC.SEL” appears, then, press the **[O/T]** key to display “CAL”.

3 Press the **[O/T]** key again. The display shows “E CAL”.

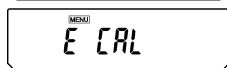
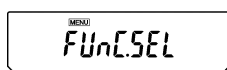
4 Press the **[CAL]** key twice. The display shows “i-CAL”.

5 Press the **[O/T]** key. The motor sound of weight loading system is heard and the display changes automatically in this order: “CAL 2”, “CAL 1”, “CAL 0”, and “CAL End”.

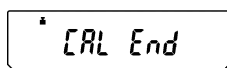
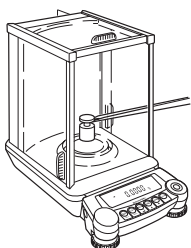
When the display returns to the mass display, span calibration is complete.

10.2.2 Span Calibration With External Weights

“E-CAL” (The balance will be adjusted with external calibration weights)



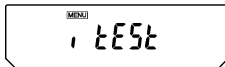
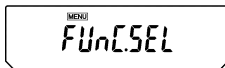
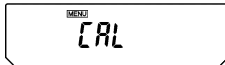
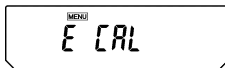
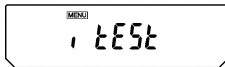
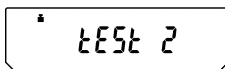
(Example)



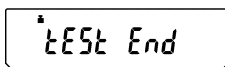
- 1** From the mass display, press the **[CAL]** key once. If the display shows “E CAL” (Preset calibration method is “E-CAL”), jump to Step 4. If the display shows another item (Preset calibration method is not “E-CAL”), go on to Step 2. (Refer to [10.3.1](#) for preset calibration method)
- 2** Press the **[CAL]** key repeatedly until “FUnC.SEL” appears, then press the **[O/T]** key to display “CAL”.
- 3** Press the **[O/T]** key. The display shows “E CAL”.
- 4** While “E-CAL” is shown, press the **[O/T]** key. Span calibration begins and the zero display blinks.
- 5** Recheck that there is nothing on the pan and wait.
- 6** The set weight value (Refer to [10.3.5](#)) appears, blinking.
- 7** Place the weight indicated on the pan. Wait until the blinking zero display reappears. (It may take about 30 seconds.)
- 8** Remove the calibration weight. After “CAL End” appears for several seconds, the display returns to the mass display and the span calibration is complete.

10.2.3 Calibration Check With Built-in Weight (AUW-D/AUW/AUX series only)

“i-tEst” (The balance is checked with the built-in weight but not adjusted.)

(Example)


1 From the mass display, press the **[CAL]** key once. If the display shows “i tEst” (Preset calibration method is “i-tEst”), jump to Step 5.

If the display shows another item (Preset calibration method is not “i-tEst”), go on to Step 2.

(Refer to [10.3.1](#) for preset calibration method)

2 Press the **[CAL]** key repeatedly until “FuNC.SEL” appears, then, press the **[O/T]** key to display “CAL”.

3 Press the **[O/T]** key again. The display shows “E CAL”.

4 Press the **[CAL]** key repeatedly until the display shows “i tEst”.

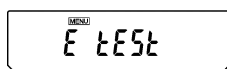
5 Press the **[O/T]** key. The display changes automatically in this order: “tEst 2”, “tEst 1”, and “tEst 0”. After that, the display shows the drift from the previous span calibration for several seconds.

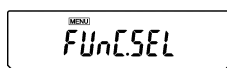
6 After “tEstEnd” appears for several seconds, the display returns to the mass display, and the calibration test is complete.

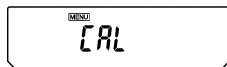
Note that the Calibration Test procedure DOES NOT adjust the balance, it only reports the drift from the previous span calibration.

10.2.4 Calibration Check With External Weights

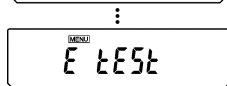
“E-tEst” (The balance is checked with external calibration weights but not adjusted.)

 E tEst

 FUnC.SEL

 CAL

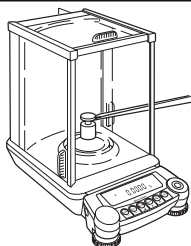
 E CAL

 E tEst

 000000

(Example)

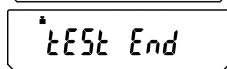
 2000000



 000000

(Example)

 0.00001 g

 tEst End

 000000 g

- 1** From the mass display, press the **[CAL]** key once. If the display shows “E tEst” (Preset calibration method is “E-tEst”), jump to Step 5. If the display shows another item (Preset calibration method is not “E-tEst”), go on to Step 2. (Refer to [10.3.1](#) for preset calibration method)
- 2** Press the **[CAL]** key repeatedly until “FUnC.SEL” appears, then, press the **[O/T]** key to display “CAL”.
- 3** Press the **[O/T]** key. The display shows “E CAL”.
- 4** Press the **[CAL]** key repeatedly until the display shows “E tEst”.
- 5** Press the **[O/T]** key. The calibration test begins and the zero display blinks.
- 6** Recheck that there is nothing on the pan and wait.
- 7** The set weight value (Refer to [10.3.5](#)) appears, blinking.
- 8** Place the weight indicated on the pan. Wait until the blinking zero display reappears. (It may take about 30 seconds.)
- 9** Remove the weight. The display shows the drift from the previous span calibration for several seconds. Then, after “tEst End” appears for several seconds, the display returns to the mass display, and the calibration test is complete. Note that the Calibration Test procedure DOES NOT adjust the balance, it only reports the drift from the previous span calibration.

10.3 Calibration Settings

One of the following four calibration methods listed in the below step **3** is selected as “preset calibration method”. Preset calibration method will be called with only one key touch from the mass display for convenience of frequent use. Select your most frequently used method here. The default setting is “i-CAL” (“E-CAL” for AUJ). The rest of the methods are alternative calibration methods, which can also be performed at any time by entering the function selection menu. Procedures for performing each calibration method as the preset or as an alternative calibration method are described in [10.2](#).

10.3.1 Selecting Preset Calibration Method



(Displays of four menu items)



1 From the mass display, press the **[CAL]** key repeatedly until the “SEtting” menu appears. Press the **[O/T]** key. “CAL dEF” appears.

2 When “CAL dEF” appears, press the **[O/T]** key. The “E CAL” display appear.

3 Press the **[CAL]** key repeatedly until the desired setting appears. Select from the following four types (or two types for AUJ series). The stability mark appears when the currently preset method is shown.

“E CAL”: Span Calibration with external weights (E-CAL)

“E tEst”: Calibration test with external weights (E-tEst)

“i CAL”: Span Calibration with built-in calibration weight (i-CAL)
(AUW-D/AUW/AUX series only)

“i tEst”: Calibration test with built-in calibration weight (i-tEst)
(AUW-D/AUW/AUX series only)

4 Press the **[O/T]** key when the desired calibration setting appears. “CAL dEF” appears when the setting is made.

5 Press the **[POWER]** key to return. The calibration type set here can be executed by simply pressing the **[CAL]** key followed by the **[O/T]** key from mass display.

10.3.2 PSC Fully-automatic span calibration (AUW-D/AUW/AUX series only)

Using a temperature sensor, this function performs fully-automatic span calibration with the built-in weight when a significant temperature change is detected.

If PSC turned ON, when there is a temperature change that would influence sensitivity, span calibration executes automatically to maintain the sensitivity of the balance. Span Calibration executes automatically in mass display mode under any of the following circumstances.

- (1) When there is a change in the surrounding temperature
- (2) When about four hours has passed since the previous calibration.
- (3) After either condition (1) or (2) above has been met during warm up at stand-by status, when the balance is switched to mass display mode.

In mass display mode, when any of the conditions above has been met, the weight symbol will blink for about two minutes as notification of span calibration before calibration begins.

The sensitivity before and after span calibration is slightly different. Also, no measurements can be made during span calibration. When you wish to avoid entering span calibration in the middle of one round of measurements, pressing the **[POWER]** key when the weight symbol is blinking will abort the automatic span calibration.



Note

Using a verified balance as a legal measuring instrument in the EU:

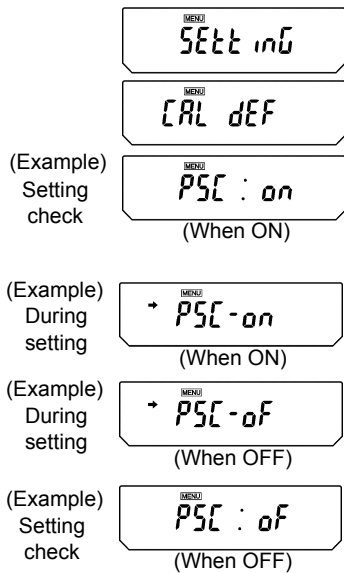
The balance must be used within the temperature range indicated on the verification label.

When PSC is not activated, operator must carry out span calibration (refer to [10.2](#)) upon blinking of the Weight Symbol.

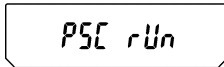


Caution

Make certain that no object is on the pan and all the doors are closed during span calibration. Never cause vibration of the balance during calibration.



Display at PSC operation



Setting PSC ON/OFF

- 1 From mass display, press the **[CAL]** key repeatedly until “SEtting” appears. Press the **[O/T]** key to display “CAL dEF”.
- 2 Press the **[CAL]** key repeatedly until “PSC:**” appears. The ** positions show the current setting, either “on” when on or “oF” when off.
- 3 To change the setting, press the **[O/T]** key when “PSC:**” appears.
- 4 “PSC-on” appears and from this point, every time the **[CAL]** key is pressed, the display switches between “PSC-oF” and “PSC-on”. Here, when the current setting is displayed, the stability mark (→) appears. When the desired setting appears, pressing the **[O/T]** key changes the current setting. Pressing the **[POWER]** key returns the setting to “PSC:**” without changing the setting.
- 5 Press the **[POWER]** key repeatedly to return to the mass display.

PSC and Clock-CAL can each be turned on and off independently. Weight symbol appears in the Settings Check Display (see 7.4.1) when either or both of PSC and Clock-CAL are on.

10.3.3 Clock-CAL Fully-automatic span calibration (AUW-D/AUW series only)

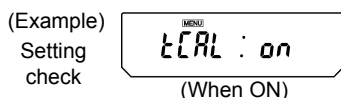
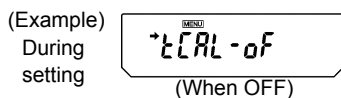
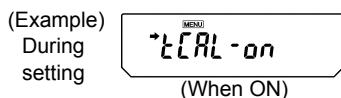
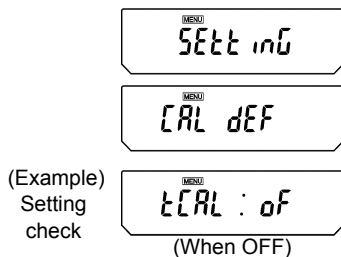
The balance can be set to execute fully-automatic span calibration at set times (up to three times a day) with the built-in weight and the built-in clock. Clock-CAL is a very convenient function, when calibration reports are desired for regular calibrations, or to schedule span calibrations during break times to avoid interruption of measurement work.

The weight symbol blinks for about two minutes as notification of span calibration before it begins. Pressing the **[POWER]** key during the notification blinking halts the automatic span calibration.



Caution

Make certain that no object is on the pan and all the doors are closed during span calibration. Never cause vibration of the balance during calibration.



Setting Clock-CAL ON/OFF

- 1** From mass display, press the **[CAL]** key repeatedly until “SEtting” appears. Press the **[O/T]** key to display “CAL DEF” .
- 2** Press the **[CAL]** key repeatedly until “tCAL:**” appears. The ** positions show the current setting, either “on” when on or “oF” when off.
- 3** To change the setting, press the **[O/T]** key when “tCAL:**” appears.
- 4** “tCAL-on” appears and from this point, every time the **[CAL]** key is pressed, the display switches between “tCAL-oF” and “tCAL-on”. Here, when the current setting is displayed, the stability mark (→) appears. When the desired setting appears, pressing the **[O/T]** key changes the current setting. Pressing the **[POWER]** key returns the setting to “tCAL:**” without changing the setting.
- 5** Press the **[POWER]** key repeatedly to return to the mass display.

(Example)

(For the t1 setting)

(Example)

(When setting for the first time)

(Example)

(Showing 12:30)

(Example)

(When set for 3:15 PM.)

Setting the time for Clock-CAL

- 1 From mass display, press the **[CAL]** key repeatedly until “SEtting” appears. Press the **[O/T]** key to display “CAL DEF”
- 2 Press the **[CAL]** key repeatedly until “tCAL t*” appears. Press the **[O/T]** key to display “t* HH:MM”. The * position shows the reference number of the time setting, a numeral from 1 to 3. The currently set time is displayed as “HH:MM” (HH is the hours and MM is the minutes), with the leftmost digit blinking. The time appears as _ : _ _ when no time is set. The **[MENU]** symbol, and the # symbol appear to indicate the display is in the numerical input mode.
- 3 The numeral of the blinking digit may be changed. Pressing the **[PRINT]** key moves the blinking digit one place to the right. Press the **[UNIT]** key to change the value of the blinking digit. When the **[UNIT]** key is pressed, the value of the blinking digit increases by 1 at a time. The numerals progress in this order: 0→1→2→...→9→_→0... Set the hours in the range from 00 to 23 and the minutes from 00 to 59. Press the **[O/T]** key to complete the setting. The display returns to “t CAL t *”.
- 4 To set another time, press the **[CAL]** key to move to the next “t CAL t*” setting and set the time in the same way.
- 5 After completing the setting, press the **[POWER]** key to return to the mass display.

Clearing the Settings

The Clock-CAL settings “tCAL t1” to “tCAL t3” may each be reset by using procedure 3 to set the time to _ : _ _.

PSC and Clock-CAL can each be set on and off independently. Weight mark appears in the settings Check Display (see 7.4.1) when either or both of PSC and Clock-CAL are on.

10.3.4 PCAL: Calibration of the Built-in Weight (AUW-D/AUW/AUX series only)



Note

Not applicable to a verified balance as a legal measuring instrument in the EU.

The built-in calibration weight is already calibrated before shipping but the operator can also calibrate the built-in calibration weight using their own external calibration weights. The calibration of the built-in calibration weight is called PCAL. Inputting the conventional mass value (s) of the operator's calibration weight (s) can provide the most accurate span calibration (refer to 10.3.6). Perform span calibration only after correct installation and thorough warm up. Also, make sure that nothing is on the pan and ensure conditions free from the influence of vibration or air flow.

SEtting

CAL DEF

PcAL

* PCAL

(Example)

2000000 g

00000 g

* PCAL 1

* PCAL 0

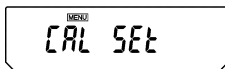
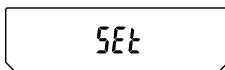
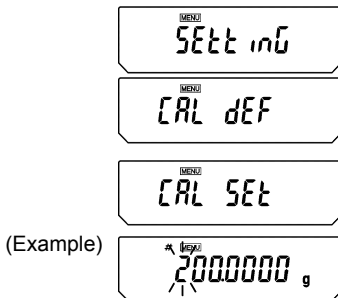
:

00000 g

- 1** From mass display, press the [CAL] key repeatedly until "SEtting" appears. Press the [O/T] key. "CAL DEF" appears.
- 2** Press the [CAL] key repeatedly until "PcAL" appears and press the [O/T] key. Calibration of the built-in calibration weight begins and the display shows "PCAL" (the C becomes capital).
- 3** When the display shows a value, "XXX.XXXX", place the weight of the value displayed on the pan. (Refer to 10.3.6)
- 4** After that, "0.0000" is displayed. Remove the calibration weights from the pan.
- 5** The display changes automatically from "PCAL 1" to "PCAL 0". (The built-in weight is being loaded and unloaded.)
- 6** When the display returns automatically to the mass display, the calibration is complete.

10.3.5 Inputting External Calibration Weight Value for E-CAL

The exact value (conventional mass value) of the operator's calibration weight to be used for E-CAL and E-tEst procedures can be entered.



1 From mass display, press the **[CAL]** key repeatedly until “SETtinG” appears. Press the **[O/T]** key. “CAL dEF” appears.

2 Press the **[CAL]** key repeatedly until “CAL SET” appears and press the **[O/T]** key. One of these numbers will appear, depending on the model: 50.0000g, 100.0000g, 200.0000g, or 300.0000g. In the upper part of the display panel, the **[MENU]** symbol and the **#** symbol appear in order to indicate numerical input mode. The leftmost numeral blinks. The blinking digit may be changed.

3 When the **[UNIT]** key is pressed, the value of the blinking digit increases by 1 at a time. Press the **[PRINT]** key to move the blinking digit one place to the right. Enter the desired value.

4 Press the **[O/T]** key to set the external calibration weight value. The display proceeds to “SET” and then to “CAL SET”.

5 Press the **[POWER]** key again to return to the mass display.

Calibration Weight Value Range

AUW-D series	220D	75g to capacity
	120D	35g to capacity
Other series	320	145g to capacity
	220	95g to capacity
	120	45g to capacity



Note

In the AUW-D series the conventional mass value may be input for up to five decimal places.

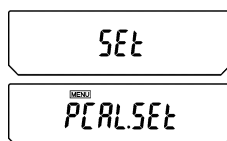
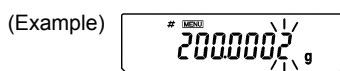
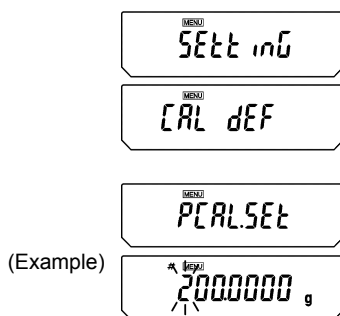
10.3.6 Inputting External Calibration Weight Value for PCAL



Note

Not applicable to a verified balance as a legal measuring instrument in the EU.

The exact value (conventional mass value) of the operator's calibration weight to be used for PCAL procedure can be entered.



- 1** From mass display, press the **[CAL]** key repeatedly until "SETtinG" appears. Press the **[O/T]** key. "CAL dEF" appears.
- 2** Press the **[CAL]** key repeatedly until "PCAL Set" appears and press the **[O/T]** key. One of these numbers will appear, depending on the machine model: 50.0000g, 100.0000g, 200.0000g, or 300.0000g. In the upper part of the display panel, the **[MENU]** symbol and the # symbol appear in order to show number entry mode. The leftmost numeral blinks. The blinking digit may be changed.
- 3** When the **[UNIT]** key is pressed, the value of the blinking digit increases by 1 at a time. Press the **[PRINT]** key to move the blinking digit one place to the right. Enter the desired value.
- 4** Press the **[O/T]** key to set the external calibration weight value for built-in weight calibration. The display proceeds to "Set", then to "PCAL SET".
- 5** Press the **[POWER]** key again to return to the mass display.

Calibration Weight Value Range

AUW-D series	220D	75g to capacity
	120D	35g to capacity
Others series	320	145g to capacity
	220	95g to capacity
	120	45g to capacity



Note

In the AUW-D series the conventional mass value may be input for up to five decimal places.

10.4 For GLP/GMP/ISO Compliance

10.4.1 Calibration Report Setting

Setting the calibration report provides an automatic calibration record output every time span calibration or calibration test is performed. An optional electronic printer (see 14.1) can save reports by printing them. Combination with Clock-CAL function (see 10.3.3) provides fully-automatic and periodical calibration and reports.

(Example) Setting check

MENU
SEtting

MENU
CAL dEF

(Example) Setting check

MENU
GLP : oF

(When OFF)

(Example) During setting

MENU
GLP-on

(When OFF)

(Example) During setting

MENU
→ GLP-on

(When ON)

(Example) Setting check

MENU
GLP : on

(When set to ON)

1 From mass display, press the **[CAL]** key repeatedly until “SEtting” appears. Press the **[O/T]** key. “CAL dEF” appears.

2 Press the **[CAL]** key repeatedly until “GLP: **” appears. The ** positions show the current setting, “on” when set and “oF” when unset.

3 To change the setting press the **[O/T]** key when “GLP: **” is showing. The display will show “GLP-on”. (The “:” becomes “-”)

4 From this point, every time the **[CAL]** key is pressed, the display will switch between “GLP-oF” and “GLP-on”. Here, when the current setting is displayed, the stability mark (→) appears.

5 To change the setting, press the **[O/T]** key when the desired setting appears, or

6 Press the **[POWER]** key to return to “GLP: **” without changing the setting.

7 Press the **[POWER]** key again to return to the mass display.

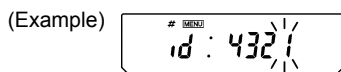
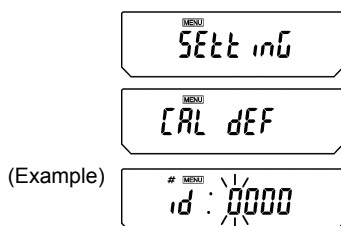


Note

Date output, ID number etc. of electronic printer EP-50 or EP-90 should be turned off when calibration report is produced.

10.4.2 Balance ID Setting

This setting is for the balance ID number that is output along with the calibration report.



- 1** From mass display, press the **[CAL]** key repeatedly until “SEtting” appears. Press the **[O/T]** key. “CAL DEF” appears.
- 2** Press the **[CAL]** key repeatedly until “id: ****” appears. (The **** is a number.) Press the **[O/T]** key. In the upper part of the display panel, the **[MENU]** symbol and the # symbol appear in order to indicate numerical input mode. The left-most digit of **** blinks. The numeral of the blinking digit can be changed.
- 3** Press the **[UNIT]** key to increase the value of the blinking digit by 1. Press the **[PRINT]** key to set that digit and move the blinking digit one place to the right. When the desired setting is entered, press the **[O/T]** key to confirm the balance ID number.
- 4** Press the **[POWER]** key to return to “id: ****”. (No blinking)
- 5** Press the **[POWER]** key again to return to the mass display.

10.4.3 Date Printout Setting

This setting determines whether or not the date and time on the balance's built-in clock is printed out along with the calibration report.

MENU
SEtting

MENU
CAL dEF

(Example)
Setting
check

MENU
Prtdt: on

(When ON)

(Example)
During
setting

MENU
*Prdt-on

(When ON)

(Example)
During
setting

MENU
*Prdt-of

(When OFF)

(Example)
Setting
check

MENU
Prtdt: of

(When OFF)

- 1** From mass display, press the **[CAL]** key repeatedly until "SEtting" appears. Press the **[O/T]** key. "CAL dEF" appears.
- 2** Press the **[CAL]** key repeatedly until "Prtdt:**" appears. The ** positions show the current setting, "on" when set (print) and "oF" when unset (do not print).
- 3** To change the setting, press the **[O/T]** key when "Prtdt:**" is showing. The display will show "Prdt-on". (The "." becomes "-")
- 4** From this point, every time the **[CAL]** key is pressed, the display will switch between "Prdt-oF" and "Prdt-on". Here, when the current setting is displayed, the stability mark (➔) appears.
- 5** To change the setting, press the **[O/T]** key when the desired setting appears, or
- 6** Press the **[POWER]** key to return to "Prtdt: **" without changing the setting.
- 7** Press the **[POWER]** key again to return to the mass display.

11. Environment Settings

11.1 What are environmental settings?

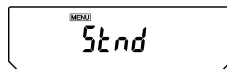
The response and other settings can be changed to adapt to the installation environment (for example, unavoidable vibrations or air currents) or measurement uses (for example, depending on whether solid objects, liquids, or powders are to be measured).

11.2 Settings for Stability and Response

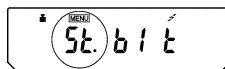
Generally, signal processing for greater stability slows the response and processing for higher response reduces stability. The AUW-D/AUW/AUX/AUY series are designed to have capability to provide both good response and high stability.

Most measurements can be done with the default settings, which is Standard mode. Depending on the environment and the objectives of using the balance, Anti-convection mode, High-stability mode and Pouring mode are also available. The currently set mode is easily checked by pressing the **[CAL]** key four times from mass display to produce the settings check display (see 7.4.1).

11.2.1 Standard mode



Settings Check Display



(When standard mode is selected)

This is the default setting. Use this mode unless stability or response is affected by environmental factors.

From the mass display, pressing the **[CAL]** key repeatedly until “Stnd” is displayed. Pressing the **[O/T]** key here sets the mode to Standard mode.

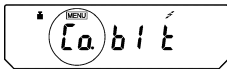
Setting of this mode can be confirmed only in settings check display (see 7.4.1).

11.2.2 Anti-convection mode



When ambient temperature changes (such as those due to air-conditioner cycling) are unavoidable during measurements, convection may occur in the weighing chamber and cause display fluctuation after the stability mark appears. The small range (minimum display of 0.01mg) of the AUW-D series is more likely to demonstrate this effect.

Settings Check Display



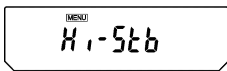
(When anti-convection mode is selected)

Anti-convection mode adjusts the timing of appearance of the stability mark. Note that when Anti-convection mode is selected, the stability mark will take longer to appear.

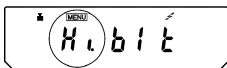
From the mass display, press the **[CAL]** key repeatedly until “ConvECT” is displayed. Pressing the **[O/T]** key here sets it to Anti-convection mode.

Setting of this mode can be confirmed only in settings check display (see 7.4.1).

11.2.3 High-stability Mode



Settings Check Display



(When high-stability mode is selected)

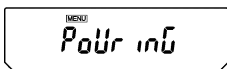
The AUW-D/AUW/AUX/AUY series is designed to minimize the effects of vibrations or air currents. However, if it must be set up in a location with poor conditions, use this function to reduce the effects of vibration or air current even further. The response will slow slightly but the display will be stabilized.

From the mass display, press the **[CAL]** key repeatedly until “Hi-Stb” is displayed. Press the **[O/T]** key here to enter High-stability mode. Setting of this mode can be confirmed only in settings check display (see 7.4.1).

11.2.4 Pouring Mode (fast response)

When using the balance for dosing or filling a specified quantity, Pouring mode will give sufficiently fast response. Note that the display will become very sensitive and unstable.

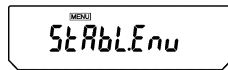
Pouring mode allows adjustments to the surrounding environment, too. You can specify the environment of the installation site choosing from “normal environment”, “stable environment”, and “unstable environment”.

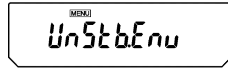


(when normal is selected)

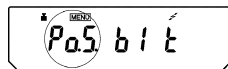
Press the **[CAL]** key repeatedly from the mass display until “Pouring” appears.

Pressing the **[O/T]** key here sets it to Pouring mode and proceeds to “normL.Env” display. the arrow mark indicates that the displayed environmental setting is currently selected. Press **[POWER]** key to return to the mass display.

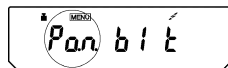

 A rectangular display box with a thin border. At the top center, the word "MENU" is written in small, spaced-out letters. Below it, the text "StAbLEnu" is displayed in a large, stylized, monospaced font.


 A rectangular display box with a thin border. At the top center, the word "MENU" is written in small, spaced-out letters. Below it, the text "UnStbLEnu" is displayed in a large, stylized, monospaced font.

(when normal is selected)


 A rectangular display box with a thin border. At the top center, the word "MENU" is written in small, spaced-out letters. Below it, the text "PoS bit" is displayed in a large, stylized, monospaced font.

(Pouring mode for stable environmental condition)


 A rectangular display box with a thin border. At the top center, the word "MENU" is written in small, spaced-out letters. Below it, the text "PoN bit" is displayed in a large, stylized, monospaced font.

(Pouring mode for normal environmental condition)


 A rectangular display box with a thin border. At the top center, the word "MENU" is written in small, spaced-out letters. Below it, the text "PoU bit" is displayed in a large, stylized, monospaced font.

(Pouring mode for unstable environmental condition)

Environmental setting menu

Or, press **[CAL]** key once or twice to display "StAbL.Env" (for very stable environmental condition) or "UnStb.Env" (for unstable environmental condition). Pressing **[O/T]** key at each display will select that environmental setting.

It is recommended to set "StAbL.Env" or "UnStb.Env" when you find the measurements are too slow or too unstable with the default "normL.Env".

Settings check display

Setting of Pouring mode can be confirmed only in the settings check display (see 7.4.1). Settings check display also shows the environmental setting for Pouring mode when this mode is selected.

11.3 Stability Detection Band

The appearance of the Stability Mark (➔) indicates that the mass display has been stabilized. The condition for judging stability is user-selectable. When the stability detection band is set to 1, the stability mark appears when the mass display stays within 1 count for a set period of time. The stability detection band setting may be selected from three levels: 1 count, 5 counts and 10 counts. The default setting is 1 count. One count is equal to 0.1mg when the minimum display is 0.1mg.

The setting of the stability detection band can be checked in the settings check display (see 7.4.1) by pressing the [CAL] key four times from mass display.

(Example)

(When setting is 1 count)

(Example)

(When setting is 1 count)

(Example)

(When set to 5 count)

(Example)

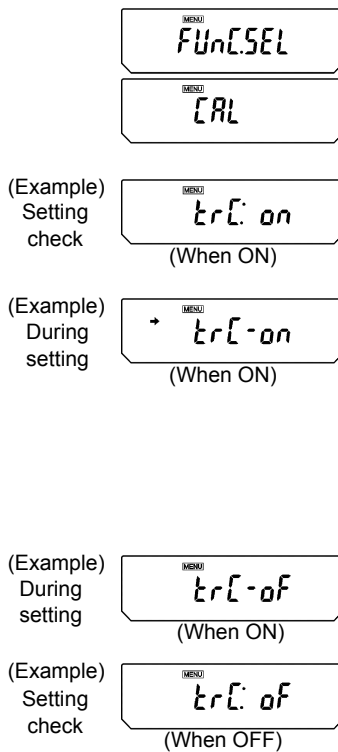
(When setting is 5 count)

Setting the Stability Detection Band

- 1 Press the [CAL] key repeatedly from the mass display. When “FUnC.SEL” appears, press the [O/T] key. “CAL” is displayed.
- 2 Press the [CAL] key twice. “bAnd:**” is shown. The ** part (single or double digits) shows the current stability detection band setting.
- 3 Press the [O/T] key. “b-1” appears. At this point, pressing the [CAL] key changes the display in this order: “b-1”, “b-5”, “b-10” representing stability detection bands of 1 count, 5 counts, and 10 counts, respectively. When the current setting is displayed, the stability mark (➔) appears.
- 4 Press the [O/T] key to select the stability detection band currently displayed, or
- 5 Press the [POWER] key to return to the “bAnd:**” display without changing the setting.
- 6 Press the [POWER] key to return to the mass display.

11.4 Zero Tracking

Using the zero tracking function allows the display to be kept at the current zero point by automatically canceling slight drifts from the zero point caused by environmental conditions. When measuring very slow change in mass such as liquid droplets and evaporation processes, it is recommended to turn zero tracking OFF.



Setting zero tracking ON/OFF

- 1** Press the **[CAL]** key repeatedly from the mass display and when "FUnC.SEL" appears, press the **[O/T]** key to display "CAL".
- 2** Press the **[CAL]** key once. "trC:**" is shown. The ** part shows the current setting as "on" for on and "of" for off.
- 3** Press the **[O/T]** key. "trC-on" appears (The ":" changes to "-"). At this point, pressing the **[CAL]** key changes the display between "trC-of" (zero tracking off) and "trC-on" (zero tracking on). When the current setting is displayed, the stability mark (➔) appears.
- 4** Press the **[O/T]** key to select the zero tracking setting currently displayed, or
- 5** Press the **[POWER]** key to return to the "trC:**" display without changing the setting.
- 6** Press the **[POWER]** key to return to the mass display.

11.5 Stability Mark Lighting Timing

Stability Mark Lighting Timing can be selected according to use or demand accuracy.

When "Stability Mark Lighting Timing" is set to [FAST]	A Stability Mark lights up at the same time stability is detected. Although it becomes easy to change the measurement value after Stability Mark lighting, since many samples are measurable one after another, the increase in efficiency of working can be attained.
When "Stability Mark Lighting Timing" is set to [ACCURACY]	After stability is detected, when the stable state continues for fixed time, a Stability Mark lights up. Since judgment for lighting of a stability mark becomes severe and the measurement value after stability mark lighting is more stabilized, it is correctly measurable.

MENU
FuNC.SEL

MENU
CAL

MENU
Stb SiGn

Accuracy

MENU
+ACCURACY

Fast (Quick)

MENU
FAST

- 1** In the gram(g) display, press **[CAL]** key several times until **[FuNC.SEL]** is displayed.
Press **[O/T]** key.
[CAL] is displayed.
- 2** Press **[CAL]** key several times until **[Stb SiGn]** is displayed.
- 3** Press **[O/T]** key. **[ACCURACY]** is displayed.
Pressing **[CAL]** key alternately, the display **[ACCURACY]** or **[FAST]** changes to another.
[ACCURACY] means "Accuracy". **[FAST]** means "Fast (Quick)".
Stability mark **[→]** appears and means the displayed item has been set up now.
- 4** When item to be set up is displayed, press **[O/T]** key.
The item is set up and **[Stb SiGn]** is displayed.
- 5** Press **[POWER]** key twice to return to the gram(g) display.

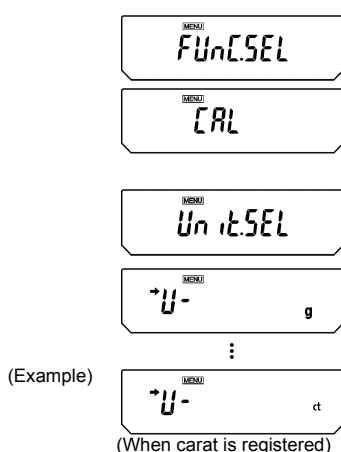
12. Units

The AUW-D/AUW/AUX/AUY series allow display of various mass units. Units that are registered beforehand can be called by simply pressing the **[UNIT]** key when in mass display.

The default units are gram, percentage, PCS, and carat. In order to use the other units included in the AUW-D/AUW/AUX/AUY series, register the units beforehand according to section 12.1. Units that are not needed can also be removed from registration.

Registration of units for piece counting and specific gravity measurements are also covered in section 12.1. For information about piece counting, refer to 13.1. Refer to 13.2 for solid specific gravity measurement and 13.3 for liquid density measurement.

12.1 Setting Units of Measurement



1 Press the **[CAL]** key repeatedly from the mass display until “FUnC.SEL” is showing. Press the **[O/T]** key to display “CAL”.

2 Press the **[CAL]** key repeatedly until “Unit.SEL” appears and press the **[O/T]** key. The display shows “U- g”.

At this point pressing the **[CAL]** key cycles the display in the order of the table below. The stability mark (➔) appears with the units and functions that are currently registered.

Menu display	Units or function	Reference
“U- g”	g (gram)	
“U- mg”	mg (milligram)**	
“U- %”	percentage conversion	See 12.2
“U- PCS”	piece counting	See 13.1
“U- ct”	ct (carat)	
“U- ,d”	solid specific gravity measurement	See 13.2
“U- d”	liquid density measurement	See 13.3
“U- mom”	monme*	
“U- Lb”	pound*	
“U- Oz”	ounce*	
“U- Ozt”	Troy ounce*	
“U- HK”	Hong Kong tael*	

(continued)

12. Units

"U- SporE"	Singapore tael*	
"U- tiwAn"	Taiwan tael*	
"U- ,mAL"	Malaysia tael*	
"U- ChinA"	Chinese tael*	
"U- dwt"	Pennyweight*	
"U- GN"	Grain*	
"U- m"	Mesghal*	
"U- b"	Baht*	
"U- t"	Tola*	
"U- o"	Parts Pound*	

* Depending on the legal restriction, these units are not always available.

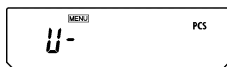
* **Using a verified balance as a legal measuring instrument in the EU:**

These units are not available for use.

** **Using a verified balance as a legal measuring instrument in the EU:**

This unit is not available for use.

(Example)



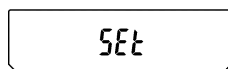
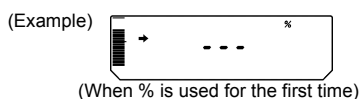
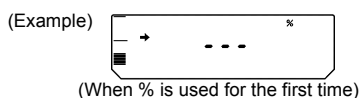
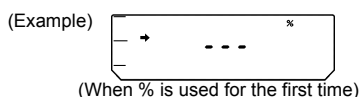
(When piece counting function is not registered)

3 Select the units to register by pressing the **[O/T]** key when the desired unit appears. To remove a registered unit, press the **[O/T]** key when the unit to be removed appears with stability mark.

A table of Unit Conversion Constants appears in Appendix A-5.

12.2 Percentage (%) Conversion

Setting a standard sample to 100% allows percentage conversions.



- 1** Register percentage unit beforehand. (See [12.1.](#)) Percentage unit is registered by default. Therefore, registration is not required if the default setting has not been changed.
- 2** From the mass display, press the **[UNIT]** key repeatedly to switch to the % display.
- 3** When a weighing vessel (container) is used, place the vessel on the pan and press the **[O/T]** key. (The display does not change.)
- 4** Load the item to serve as a standard (the item mass serves as 100% and must be at least 100 counts in gram display), and wait for the stability mark to appear.
- 5** Press the **[CAL]** key. After “SEt” is displayed, the mass of the standard item is set as 100%.
- 6** Remove the standard item and begin measurement by loading samples.
- 7** To return to the mass display, press the **[UNIT]** key several times.

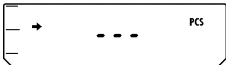


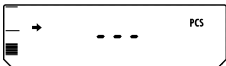
Notes

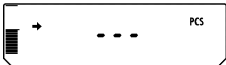
- When the **[UNIT]** key is pressed, the display returns to the mass display, with units such as g. The actual mass of the current sample can easily be displayed at any time this way.
- When changing the item to serve as a 100% standard, the process must be repeated from step 3.
- In steps 2 through 4, the display is output in percentage based on the last setting of percentage conversion.

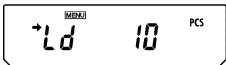
13. Application Functions


13.1 Piece Counting (PCS)

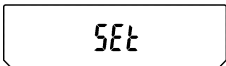
(Example) 
(When PCS is used for the first time)

(Example) 
(When PCS is used for the first time)

(Example) 
(When PCS is used for the first time)



(Example) 
(When loading 20 pieces)



(Example) 

1 Register PCS as one of the units beforehand. (See 12.1.) PCS is registered by default. Therefore, registration is not required if the default setting has not been changed.

2 From the mass display, press the **[UNIT]** key repeatedly to switch to the PCS display.

3 When a weighing vessel (container) is used, place the vessel on the pan and press the **[O/T]** key. (The display does not change.)

4 Count the 10 pieces (or 20, 50, 100 pieces) of the sample to be measured accurately and load them on the balance.

5 Press the **[CAL]** key. "Ld 10" is displayed.

6 Every time the **[CAL]** key is pressed, the display will change in this order: "Ld 10", "Ld 20", "Ld 50", and "Ld 100".

7 When the correct number of pieces on the balance is displayed and the stability mark has appeared, press the **[O/T]** key.

8 "SEt" appears for several seconds and the number of pieces is displayed.

9 Load the items to be measured and read the number of pieces.



Notes

- When the **[UNIT]** key is pressed, the display returns to the mass display, with units such as g. The actual mass of the current sample can easily be displayed at any time this way.
- When changing the item to be counted, the process must be repeated from step 3.
- In steps 2 through 4, the display is output in pieces based on the unit mass of the item measured in the previous use of PCS.

13.2 Solid Specific Gravity Measurement

Solid specific gravity measurement computes the density (or specific gravity) of a solid sample by measuring its weight in air and in a liquid of known density (or specific gravity).

The following is the procedure when using a hanging pan, a tank and a table allowing below balance weighing, prepared by the operator. Measurement of density or specific gravity can be done even more easily with an optional specific gravity measurement kit. When using the kit, follow the instruction manual provided with the kit.

- 1** Remove the below-weigh hook cover on the base of the balance, after removing the two fixing screws.
- 2** Hang the user-prepared hanging pan from the below-weigh hook and sink that hanging pan into the liquid of the tank.
- 3** Register “,d” (the solid specific gravity) as a unit, referring to 12.1.
- 4** Input the density of the liquid to be used for solid specific gravity measurement.
 - (a) Press the **[CAL]** key repeatedly from the mass display until the “SEttinG” appears. Press the **[O/T]** key. The display shows “CAL dEF”.
 - (b) Press the **[CAL]** key repeatedly until “LSG SET” appears and press the **[O/T]** key. The **[MENU]** symbol and the # symbol appearing in the upper part of the display panel indicates it is numerical entry mode. Also “SG*.****” appears (where the *.**** is a number). The leftmost digit of *. **** blinks. The blinking digit can be changed.
 - (c) Press the **[UNIT]** key to increase the value of the blinking digit by 1. Press the **[PRINT]** key to set that digit and move the blinking digit one place to the right. When the desired setting is entered, press the **[O/T]** key to confirm the density of the liquid to be used, or
 - (d) Press the **[POWER]** key to abort the setting and return to the “LSG SET” display.

MENU
SEtt inG

MENU
CAL dEF

MENU
LSG SET

(Example) # MENU
SG 10000

(Example) # MENU
SG 10051

MENU
LSG SET

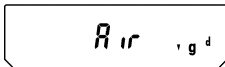
- (e) Select either the hold display mode or the continuous display mode for the specific gravity value display. Press the **[CAL]** key repeatedly until [SG Hold] appears.

Each time the **[O/T]** key is pressed the “→” symbol on the left side of the display turns on or turns off. The display is configured as shown below according to the on/off state of “→”.

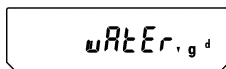
→ on: Hold display mode

→ off: Continuous display mode (the specific gravity value is updated according to the change of weight in water)

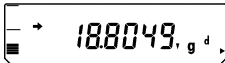
- (f) Press the **[POWER]** key repeatedly to return to the mass display.




(Example)



- 5** When the **[UNIT]** key is pressed a number of times from the mass display, [Air↕gd] appears for about two seconds. Afterward, the display switches to the [↕gd▶] display. This is the weight measurement in air mode. During weight measurement in air, “▶” turns on in the upper-right of the display.
- 6** Press the **[O/T]** key.
- 7** Place the items to be measured on the pan.
- 8** When the stability mark appears, press the **[CAL]** key. This measures the weight of the item being measured in air.
- 9** The display shows [wAtEr↕gd] for about two seconds. Afterward, the display switches to the [↕gd▶] display. This is the weight measurement in water mode. During weight measurement in water, “▶” turns on in the lower-right of the display.

(Example) 

(Example) 

(Hold display mode example)

10 Place the items to be measured on the immersed hanging pan. The display shows the weight value in water. Press the **[CAL]** key to show the specific gravity value in the set specific gravity value display mode.

Press the **[POWER]** key to return to 9. If air bubbles adhered to the item being measured and the result is a specific gravity value that differs from the expected value, you can recalculate the specific gravity value by retrying the weight measurement in water after removing the air bubbles from the item.

11 To make the next measurement, unload the pans, press **[CAL]**, and begin again at Step 5. When finished measuring specific gravity, press the **[UNIT]** key.



Notes

- Although the density display shows 4 decimal places, not all of these digits will stabilize depending on the conditions.
- When the items to be measured are placed in the liquid, they must be completely immersed and must not have bubbles adhering to the surface of the sample or the immersed hanging pan.

13.3 Liquid Density Measurement

Liquid density measurement computes the density of a liquid by measuring the weight of a sinker (solid) with a known volume in air and in the liquid.

The following is the procedure when using a hanging pan, a tank and a table allowing below balance weighing, prepared by the operator. Measurement of density can be done even more easily with an optional specific gravity measurement kit. When using the kit, follow the instruction manual provided with the kit.

- 1** Remove the below-weigh hook cover on the base of the balance, after removing the two fixing screws.
- 2** Hang the user-prepared hanging pan from the below-weigh hook and sink that hanging pan into the sample liquid in the tank.
- 3** Register “d” (liquid density) as a unit, referring to 12.1.
- 4** Input the sinker volume (in cm^3) for liquid density measurement.
 - (a) Press the **[CAL]** key repeatedly from the mass display until the “SETtinG” display appears. Press the **[O/T]** key. The display shows “CAL dEF”.
 - (b) Press the **[CAL]** key repeatedly until “Sv SET” appears and press the **[O/T]** key. *.****” appears (where the *.**** is a number). The **[MENU]** symbol and the # symbol appearing in the upper part of the display panel indicates it is numerical entry mode. The leftmost digit of *. **** blinks. The blinking digit can be changed.
 - (c) Press the **[UNIT]** key to increase the value of the blinking digit by 1. Press the **[PRINT]** key to set that place and move the blinking digit one place to the right. When the desired setting is entered, press the **[O/T]** key to confirm sinker volume (in cm^3) of the sinker to be used, or
 - (d) Press the **[POWER]** key to abort the setting and return to the “Sv SET” display.

