M054-E117D

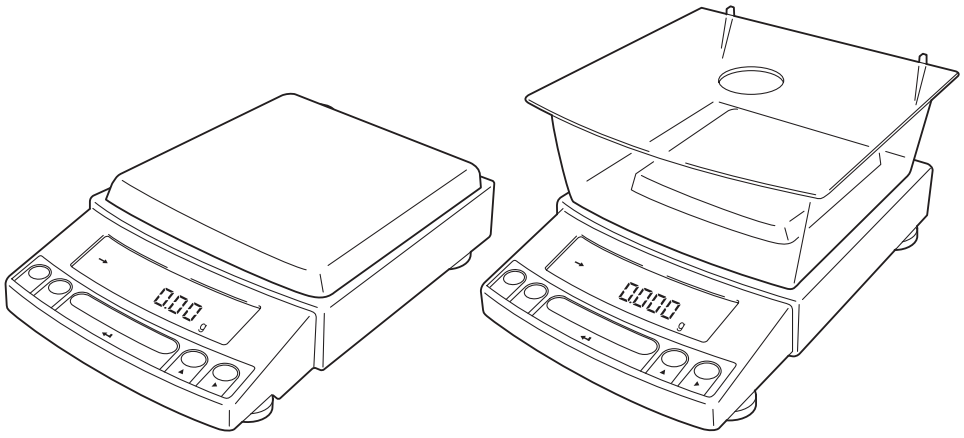
SHIMADZU

Uni Bloc

Read These Pages Before Installation

Electronic Balance Instruction Manual

UW series
UX series



READ AND UNDERSTAND THIS MANUAL BEFORE OPERATION. SAVE THIS MANUAL.

SHIMADZU CORPORATION
ANALYTICAL & MEASURING INSTRUMENTS DIVISION
KYOTO, JAPAN

Notation Conventions

Note

This instruction manual uses the following notation conventions to indicate Safety Precautions and additional information.

Caution — Indicates a potentially hazardous situation that may result in injury to personnel or equipment damage.

Note — Provides additional information needed to properly use the balance.

Other conventions used in this manual include:

Item	Description
1, 2, 3	Indicates the step number in a procedure or a sequence of changes in the balance display.
[ ] key	Indicates the operation key on the balance. See 2.2.
mass display	Indicates that the balance is in the weighing mode and mass is displayed in one of the weighing units.
	These sections include information to make using the balance more convenient.
No.	Indicates the menu item to be selected. The number in the ☐ is the number of the menu item on the Menu Map. See 7.2 “Menu Map”.

⚠ Safety Precautions

⚠ Caution

To ensure safe and proper operation of the balance, observe the following precautions.

- **Do not use the balance in hazardous areas.**
  This includes areas where the balance is expose to dust or flammable gases and liquids.
- **Use the AC adapter specified by Shimadzu.**
  To prevent electric shock, never disassemble the AC adapter.
  The AC adapter is designed for indoor use. Do not use the AC adapter in exterior environments or where it may be splashed by water.
  Ensure that the power supply voltage meets the indicated range of the AC adapter.
- **Handle the balance carefully.**
  The balance is a precision instrument of solid design.
- **Do not connect peripheral devices other than those recommended by Shimadzu.**
  The balance may not operate properly if peripheral devices other than those specified in this manual are used. The specifications of the RS-232C/AUX connector are described in Appendix 4. Connect the peripheral devices according to the methods described in this instruction manual.
- **Do not disassemble the balance, accessories, or peripheral unit**.

CE Declaration Of Conformity

Shimadzu Corporation declares that the following products:

UW Series and UX Series Electronic Balances

conform to the following directives.

Directives
EMC directive 89/336/EEC amended by 92/31/EEC, 93/68/EEC
EN55022: 1994 / A1: 1995 / A2: 1997 (Class B)
EN55024: 1998
EN61000-3-2: 1995 /A1: 1998 /A2: 1998, EN61000-3-3: 1995
Low Voltage directive 73/23/EEC amended by 93/68/EEC
EN60950: 1992 /A1: 1993 /A2: 1993

Weighing Instruments Department
Analytical & Measuring Instruments Division
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Shimadzu Balances and 21 CFR Part 11

21 CFR Part 11

21 CFR Part 11, Electronic Records, Electronic Signatures, Final Rule (often referred to as Part 11) is the United States Food and Drug Administration (FDA) regulation affecting computer resources and electronic records that are used for any document that is required to be kept and maintained by FDA regulations.
Requirements concerning computer resources security are key elements in Part 11.
The controls implemented as a result of security related requirements are intended to result in trusted records.

Shimadzu CLASS-Balance Agent

Shimadzu provides a means for compliance with 21 CFR Part 11 with Shimadzu CLASS-Balance Agent software, part of a comprehensive laboratory data management system, Shimadzu CLASS Agent.
Ask your Shimadzu representative about it.

Shimadzu WindowsDirect

When Shimadzu balances are integrated with laboratory software by means of our WindowsDirect function, no communication software is required or used.
The Shimadzu balance functions as a primary device in the system, just as a keyboard, mouse or other data entry hardware does.
For this reason, system validation and compliance may be greatly simplified with the use of Shimadzu balances.

Two-way Communication

Shimadzu balances have always been computer friendly and they can be set up for bi-directional communication as part of a fully automated production system or LIMS.
This manual includes the command codes and information needed by programmers to integrate Shimadzu balances with their software.

Contents

1. Introduction

Shimadzu UW/UX series of toploading balances are a product of our 80 year history of developing and manufacturing weighing instruments.

Shimadzu UW/UX series of toploading balances utilize the patented Shimadzu UniBloc sensor, introduced in 1989, to achieve high performance, fast response, and durability. Available features include multiple units of measure, piece counting, checkweighing functions, auto print, and GLP/GMP/ISO output including date and time data from a built-in clock.
The new series also features Shimadzu's WindowsDirect communication, requiring no software installation to quickly integrate balances with lab or business software. This function eliminates data input errors and offers extensive flexibility for application development without compromising compliance or data security.
The UW series balance incorporates a motor-driven built-in calibration weight that can automatically calibrate sensitivity without the use of external weights.

Read this manual carefully before using this instrument and keep it with the balance for future reference.

This manual refers to the different types of UW and UX series (UW/UX series) balances as follows:

H type: UW/UXxxxH
S type: UW/UXxxxS
Where: H indicates a balance with high resolution.
S indicates a balance with standard resolution.

The type of balance is classified as "large pan" or "small pan" depending on the size of the pan.

Large pan type: Balance model with a capacity of 2200g or more.
Small pan type: Balance model with a capacity of 820g or less.

2. Name and Function of Components

2.1 Components

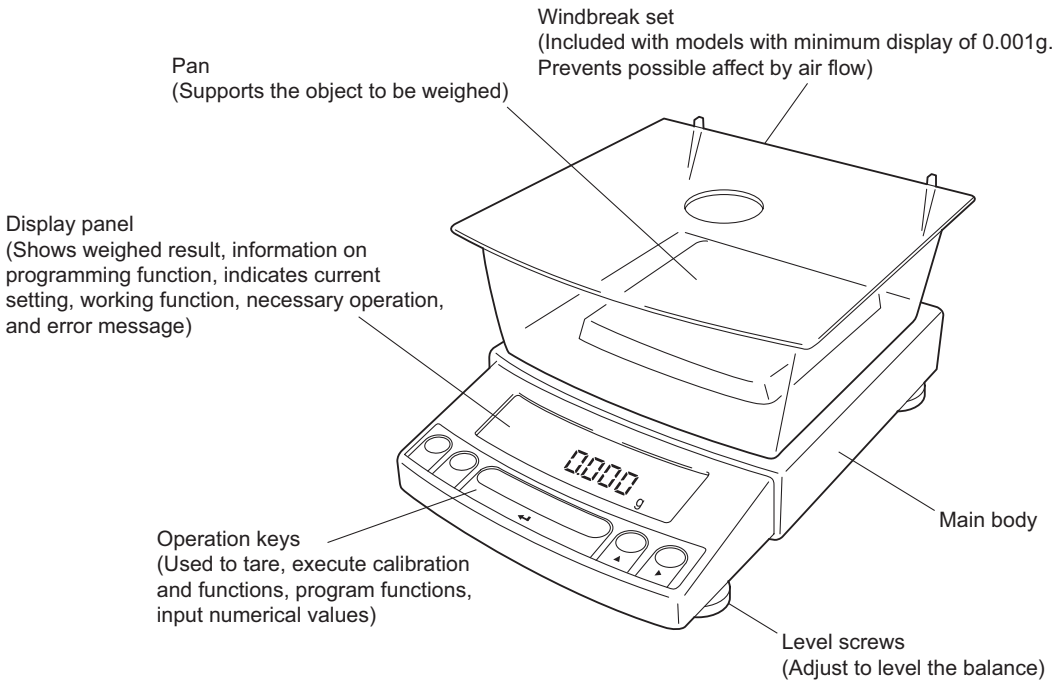
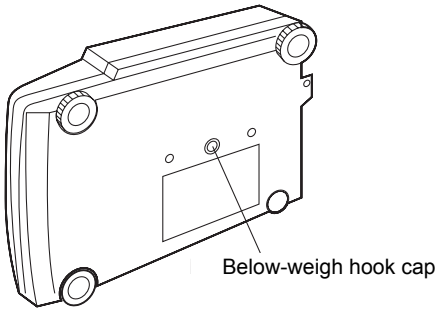
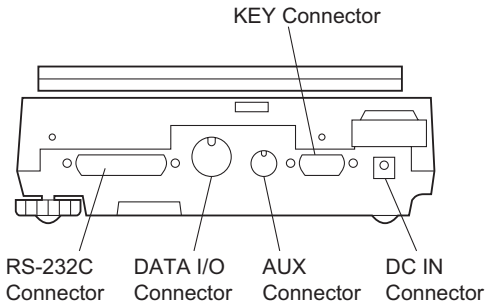


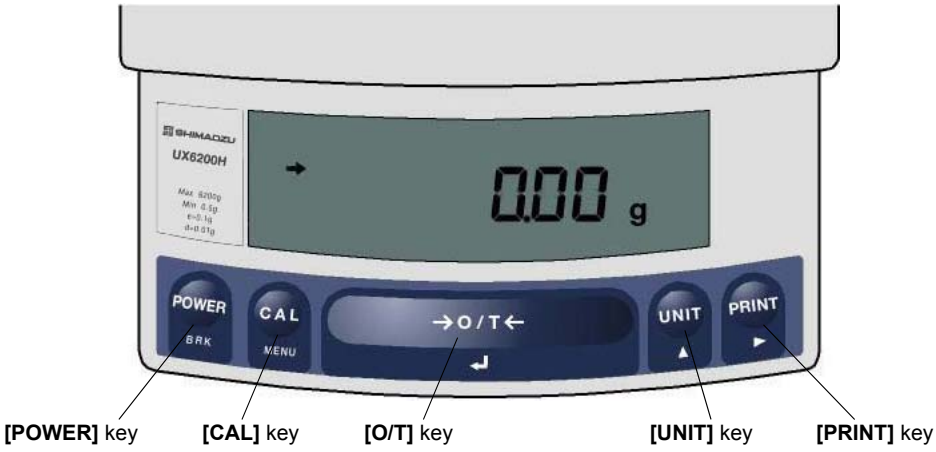
Figure shows a small pan model with a windbreak set.





(Connectors on the back)

2.2 Key Panel and Operation



Functions of the keys

Key	During Weighing	
	Press Once and Release	**Press and Hold for About 3 Seconds**
[POWER]	Switches between the operation and standby modes.	Exits the application function and returns to the mass display.
[CAL]	Enters span calibration or menu item selection. (*1)	Displays the last menu item that was set. (Last menu recall)
[O/T]	Tares the balance. (Displays zero.) (*2)	Displays the Pretare value.
[UNIT]	Changes the weighing unit or selects specific gravity measurement. (*3)	Switches between the 1d and 10d display. (*4)
[PRINT]	Sends the displayed value to a peripheral device.	Sends the date and time to a peripheral device.

*1 This key is used to set values when percent (%), number (PCS), solid specific gravity (▼d), or liquid specific gravity (d) are displayed.

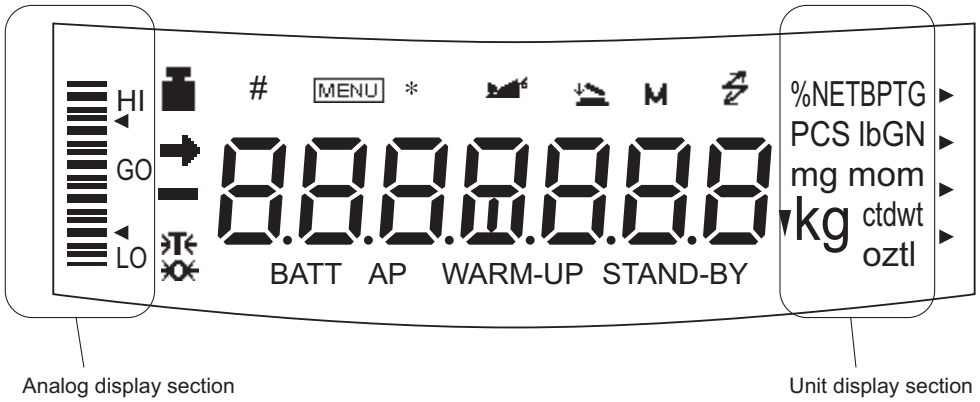
*2 When a Pretare value is set, zero is not displayed and [- Pretare value] is displayed.

*3 Units other than “g” must be set up before they can be used for measurement. Only gram (g), percent (%), and piece counting (PCS) are set-up before shipment. To set up other units or specific gravity measurement, refer to section 12., or 14.1, 14.2.

*4 When the unit is set to 10d, the resolution of the minimum display is decreased by one decimal place.

Key	During Menu Item Selection	
	Press Once and Release	**Press and Hold for About 3 Seconds**
[POWER]	Returns to the previous menu level	Returns to the mass display.
[CAL]	Moves to the next menu item.	Displays the last menu item that was set. (Last Menu Recall)
[O/T]	Selects or sets the currently displayed menu item, or enter into the displayed menu.	No operation.
[UNIT]	Increases the numeric value of the blinking digit by 1.	No operation.
[PRINT]	Moves to the next digit during numeric value entry.	No operation.

2.3 Balance Display and Function



Display	Name	Description
➡	Stability mark	Indicates that the weighed value is stable. (*1) In menu item selection, indicates currently selected item.
T	Tare symbol	Indicates that a Pretare value has been set.
	Weight symbol	Illuminates during span calibration. In menu selection, indicates setting related to calibration. Blinks before automatic span calibration starts.
#	Number symbol	Indicates numeric value entry.
MENU	Menu symbol	Indicates that the menu lock is on. Illuminates during menu item selection.
*	Asterisk	Indicates that the displayed numeric value is not a mass value.
	Communication symbol	Illuminates during communication to external equipment through the RS-232C or DATA I/O connector. In menu selection, indicates setting related to communication.
BATT	Battery symbol	When the balance is operated with the optional battery pack, this symbol illuminates to indicate that the battery voltage has dropped.
▼	Inverse triangle symbol	Indicates the set-up of solid specific gravity measurement. Used as a substitute for the decimal point.
	Zero symbol	Indicates the set-up of Auto Zero function.
	Animal symbol	Indicates the set-up of Animal Weighing function.
	Auto-Memory & Zeroing symbol	Indicates the set-up of Auto-Memory and Zeroing.
AP	Auto Print symbol	Indicates the set-up of Auto Print function.
STAND-BY	Stand-by symbol	Illuminates when the balance power is in the standby mode. Also illuminates when the application function has entered the standby mode.

*1 Stability symbol

The displayed value may change while the stability symbol remains illuminated if the load is changing slowly or if the stability detection band has been set to a large value.

3. Specifications

UW Series Model	UW220H	UW420H	UW620H	UW2200H	UW4200H	UW6200H	UW420S	UW820S	UW4200S	UW8200S
Capacity	220g	420g	620g	2200g	4200g	6200g	420g	820g	4200g	8200g
Minimum display	0.001g	0.001g	0.001g	0.01g	0.01g	0.01g	0.01g	0.01g	0.1g	0.1g
Calibration range with external weights	100 - 220g	100 - 420g	100 - 620g	1000 - 2200g	1000 - 4200g	1000 - 6200g	100 - 420g	100 - 820g	1000 - 4200g	1000 - 8200g
Repeatability (σ)	≤0.001g			≤0.01g			≤0.008g		≤0.08g	
Linearity	±0.002g			±0.02g			±0.01g		±0.1g	
Response time (s)	1.5 - 2.5						0.7 - 1.2			
Ambient temperature (°C)	5 - 40									
Temperature coefficient of sensitivity (ppm/°C) (10 - 30°C)	±3						±5			
Pan size (mm) approx.	108 X 105			170 X 180			108 X 105		170 X 180	
Main body dimensions (mm) approx.	190W X 317D X 78H									
Weight (kg) approx.	3.4			4.6			3.4		4.6	
Display	LCD with backlight									
Power requirements	DC, 10 to 15.5V, 500mA (plug polarity: center negative)									
Data I/O	RS-232C									
Features	WindowsDirect									
	PSC									
	Clock-CAL									
	GLP/GMP/ISO conformance									
	Analog display, % display, PCS, User unit, Animal weighing, Specific gravity measurement S/W, Checkweighing									

UX Series Model	UX220H	UX420H	UX620H	UX2200H	UX4200H	UX6200H	UX420S	UX820S	UX4200S	UX8200S
Capacity	220g	420g	620g	2200g	4200g	6200g	420g	820g	4200g	8200g
Minimum display	0.001g	0.001g	0.001g	0.01g	0.01g	0.01g	0.01g	0.01g	0.1g	0.1g
Calibration range with external weights	100 - 220g	100 - 420g	100 - 620g	1000 - 2200g	1000 - 4200g	1000 - 6200g	100 - 420g	100 - 820g	1000 - 4200g	1000 - 8200g
Repeatability (σ)	≤0.001g			≤0.01g			≤0.008g		≤0.08g	
Linearity	±0.002g			±0.02g			±0.01g		±0.1g	
Response time (s)	1.5 - 2.5						0.7 - 1.2			
Ambient temperature (°C)	5 - 40									
Temperature coefficient of sensitivity (ppm/°C) (10 - 30°C)	±3						±5			
Pan size (mm) approx.	108 X 105			170 X 180			108 X 105		170 X 180	
Main body dimensions (mm) approx.	190W X 317D X 78H									
Weight (kg) approx.	2.7			2.9			2.7		2.9	
Display	LCD with backlight									
Power requirement	12V 1A									
Data I/O	RS-232C									
Features	WindowsDirect									
	GLP/GMP/ISO conformance									
	Analog display, % display, PCS, User unit, Animal weighing, Specific gravity measurement S/W, Checkweighing									

4. Installation

4.1 Choosing the Installation Site

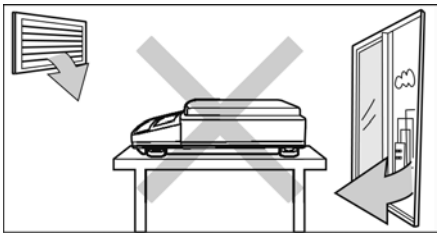
(1) Power supply

- Select an installation site that is near a power source to ensure that the attached AC adapter is used properly. If this is not possible, an optional battery pack is available as a special accessory.
- Verify that the supply power voltage conforms to that indicated on the AC adapter.

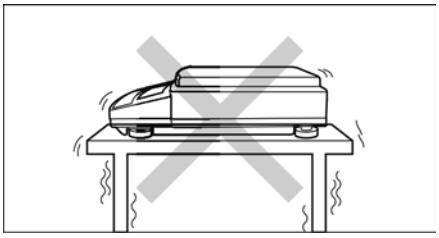
(2) Installation site

Caution

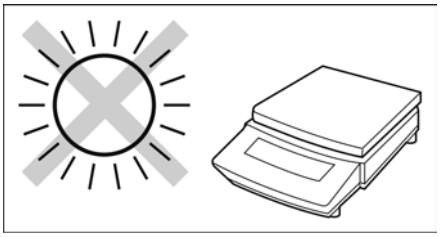
Avoid sites where the balance will be exposed to the following:



- Air flow from air-conditioner, open window, or ventilator



- Vibration



- Direct sunlight

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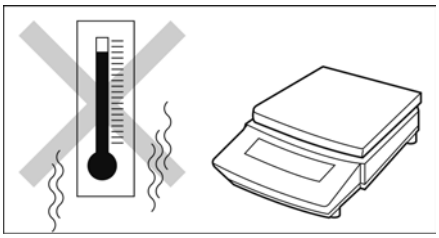


- Extreme temperature, temperature changes or humidity
- Corrosive or flammable gasses
- Dust, wind, electromagnetic waves, or magnetic fields

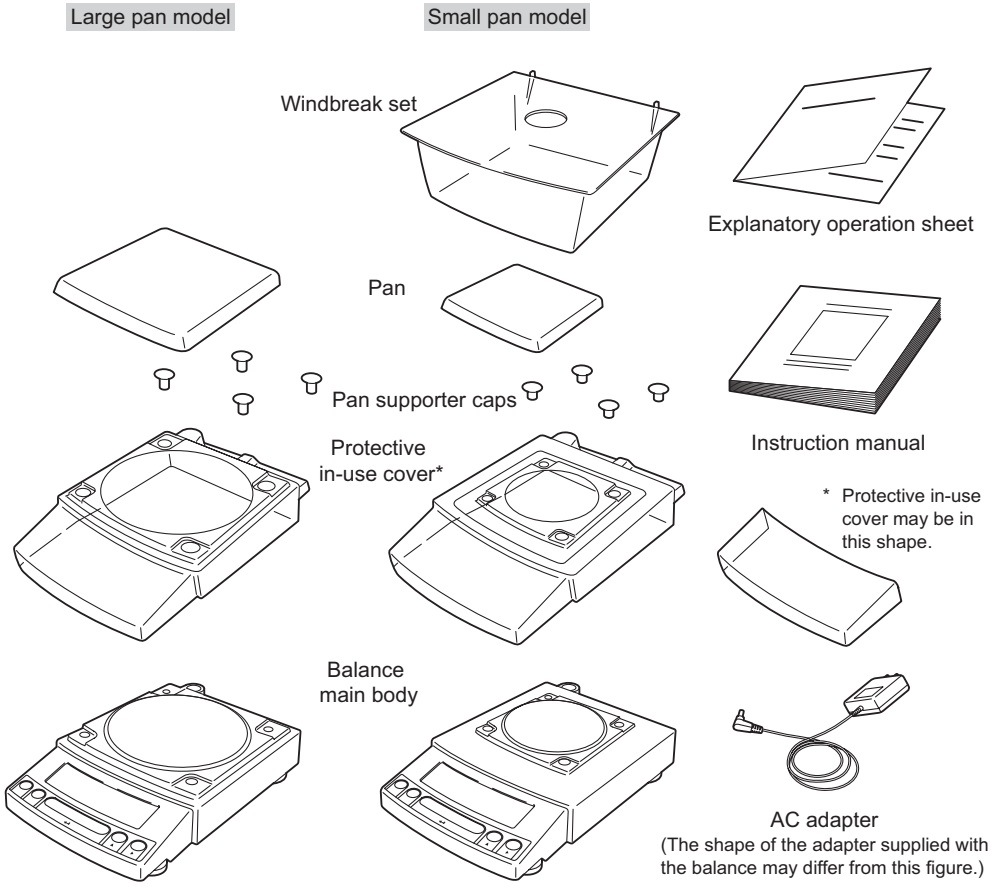
Large capacity balances should be installed on a sturdy floor and table that can support the total load of the balance AND object to be weighed.

4.2 Unpacking and Delivery Inspection

Unpack and remove all the items from the delivery box. Check if all the listed items are present and nothing has been damaged. Contact your local distributor in case of damaged or missing items.

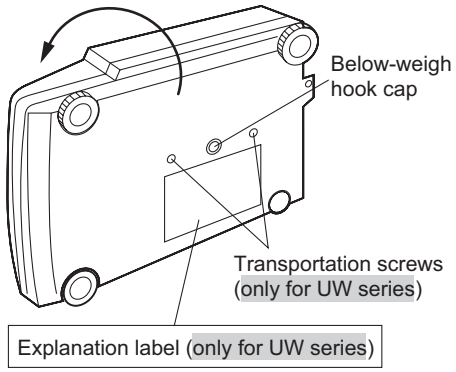
Standard Packing List (Number of item)

	Large pan model	Small pan model (Minimum display 0.01g)	Small pan model (Minimum display 0.001g)
Balance main body	1	1	1
Pan support cap	4	4	4
Pan	1	1	1
AC adapter	1	1	1
Protective in-use cover	1	1	1
Windbreak set	0	0	1
Instruction manual	1	1	1
Explanatory operation sheet	1	1	1



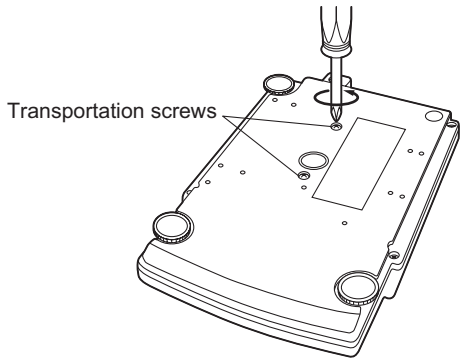
4.3 Installation

(Start at step **3** when installing a UX series balance. Prepare a plus (+) screw driver for a UW series balance.)



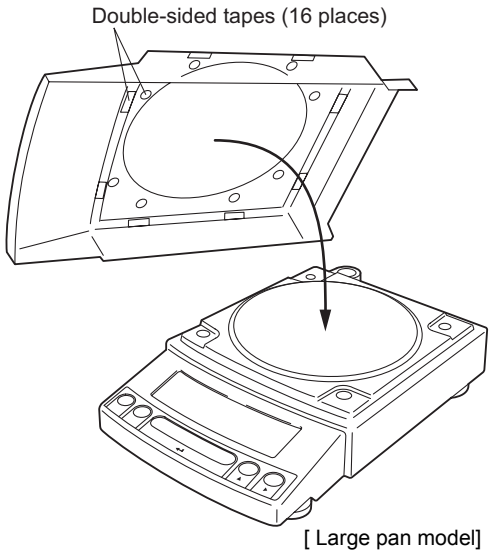
1 Place the balance main body upside down. (UW only)

> **Caution**
>
> Do not operate step **2** with the balance placed on its side.
> Place the balance on a smooth surface.



2 Referring to the explanation label on the bottom of the balance, turn the two transportation screws **counterclockwise until they tighten again.** (UW only)

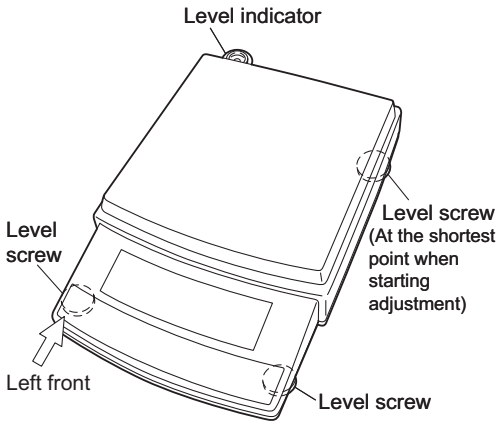
> **Caution**
>
> When moving the balance again, turn the two transportation screws clockwise until they tighen. (UW only)

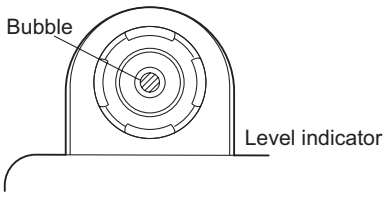


[Large pan model]

3 If you install the protective in-use cover, remove the paper to expose the double-sided tapes on it and place it on the balance main body. Press firm so that the cover does not touch the pan.

[The shape of the protective in-use cover may be different (See 4.2).]





4 Adjust the level.

This balance has four feet, three of which are adjustable. For efficient level adjustment, follow the procedure below.

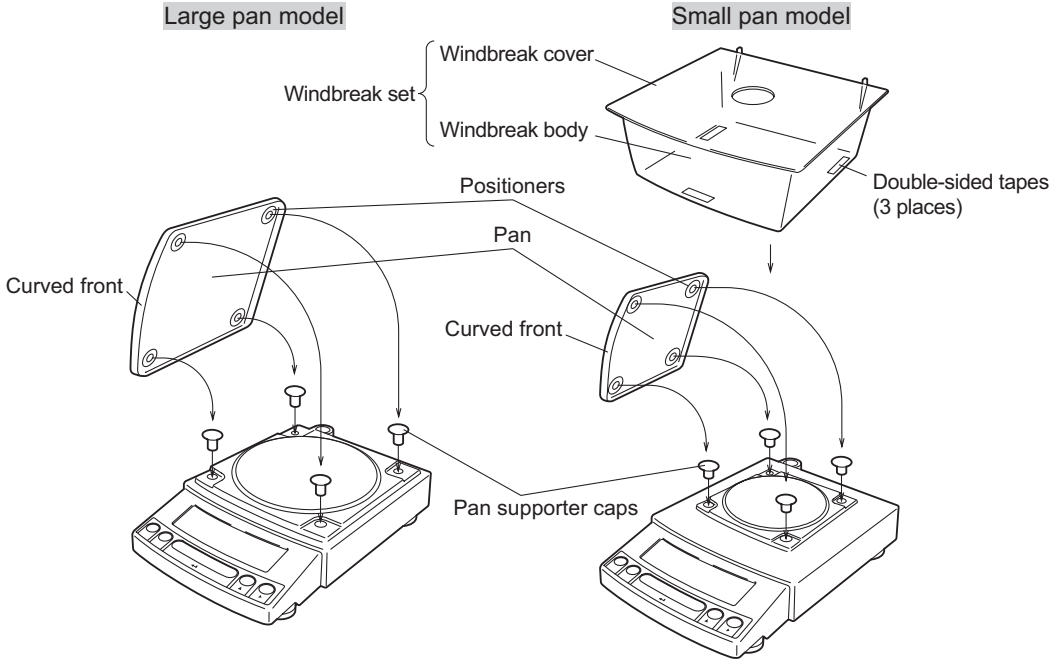
(1) First, verify that all three leveling screws are at their shortest point.

(2) While lightly pressing down on the left front of the balance, turn both of the front leveling screws to bring the air bubble into the center circle of the level indicator.

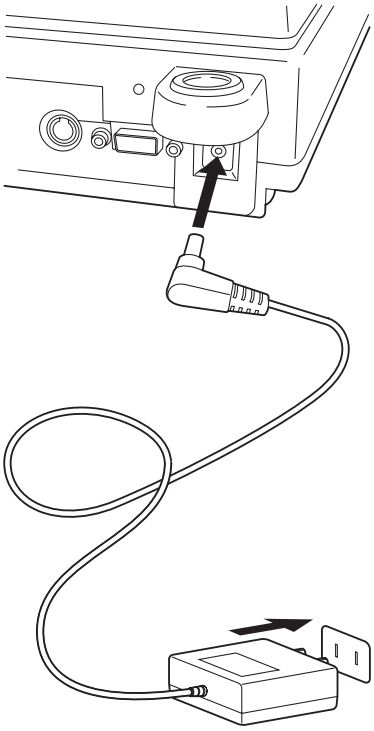
(3) Finally, while still pressing down on the front of the balance, adjust the leveling screw at the right rear of the balance until the balance is stable.

5 Insert the four pan supporter caps into the holes in the top of the balance. Place the pan on top of them. Positioners of the pan must fit pan supporter caps in this operation.

6 Before mounting the windbreak, remove the paper to expose the double-sided tapes on it. Attach the windbreak to the top of the balance. The windbreak is a standard accessory for models with a minimum display of 0.001g.



4.4 Turning ON the Power

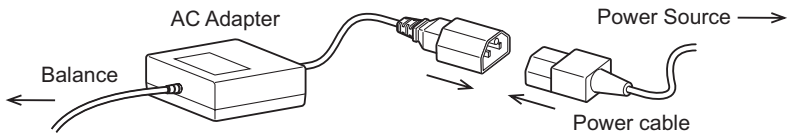


1 Insert the plug of the AC adapter into the DC IN connector on the rear of the balance.

2 Insert the AC adapter into the power source. The balance self-check is activated and the following messages are displayed in the order indicated. [HELLo], [CHE 5], [CHE 4], [CHE 3], [CHE2], [CHE1], [CHE0], whole lighting, [oFF] ([CHE 5] and [CHE 4] are not displayed for the UX series).

Note

A power cable may be necessary to connect the AC adapter to the power source, depending on the type of the AC adapter.



3 Press **[POWER]** key. The whole display illuminates and then the display changes to indicate the gram-display. The backlight is illuminated.

Note

When using the optional battery pack (special accessory), connect the fully charged battery pack to the DC IN connector of the balance using the cable attached to the battery pack.

4.5 Span Calibration

It is necessary to calibrate the balance after it is moved.
Verify that the balance is stable before performing the span calibration. To achieve a very stable state, ensure that the balance has been turned on with the gram-display for at least one hour, that the temperature is constant, that there are no breezes or vibrations and that the balance is in an area isolated from the normal traffic flow.

UW series [Span Calibration Using the Built-in Weight]

1 Verify that the balance is in gram-display and that the pan is empty.

2 Press the **[CAL]** key once. “i-CAL” is displayed.

3 Press the **[O/T]** key. After “i-CAL3”...“i-CAL1”, “Set”, “CALEnd” are displayed indicating the completion of span calibration, the gram-display will appear.

This is the standard calibration type. Refer to 10.3.1 for use of external weights.

Note

Span calibration is required again :
when the location of the balance is changed,
when the room temperature changes considerably,
periodically, according to the quality control plan of the user.

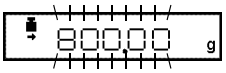
UX series [Span Calibration Using External Weights]

1 Verify that the balance is in gram-display and unload the sample from the pan.

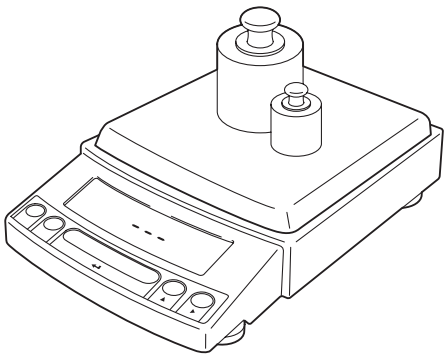
2 Press the **[CAL]** key once. “E-CAL” is displayed.

3 Press the **[O/T]** key.
The value of the correct calibration weight to be loaded is displayed and blinks.

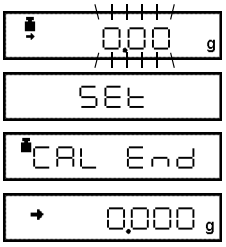
(Example)



4 Load the indicated calibration weight and press the **[O/T]** key.



5 When the zero display blinks, unload the weight from the pan and press the **[O/T]** key. “Set” is displayed briefly to indicate completion of span calibration. Then the gram-display will return.

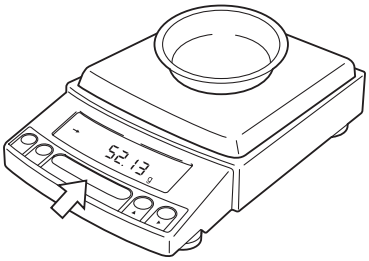


Note

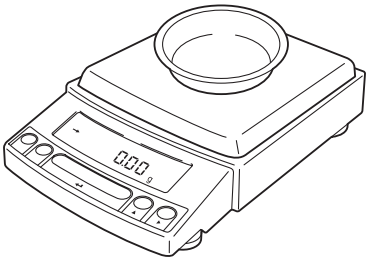
Span calibration is required again :
when the location of the balance is changed,
when the room temperature changes considerably,
periodically, according to the quality control plan of the user.

5. Basic Operation

5.1 Weighing

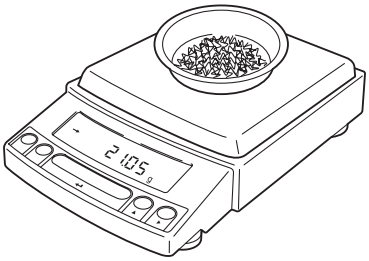


1 If a weighing vessel (tare) is used, place it on the pan and wait for the stability mark to illuminate.



2 Press the **[O/T]** key to zero the display. (This operation is called “taring”.)

3 Place the object to be weighed on the pan.



4 Read the displayed value after the stability mark is displayed.

Error Displays During Weighing

oL	Overload: Weighing capacity has been exceeded.
-oL	Negative Overload: The load on the balance is too light. The pan is not adjusted properly. For D-type balances, [-oL] will appear if the load is below the low capacity range.

5.2 Changing the Unit Display

Every time the **[UNIT]** key is pressed, the unit display changes sequentially among those set-up in 12.1 Unit Display Set-up. Gram, %, and PCS have been set-up before delivery.

Notes

- Before a unit can be displayed it must be registered in 12.1 Unit Display Set-up.
- The registered units are displayed sequentially according to the order of the 12.1 Unit Display Set-up.

6. WindowsDirect Function

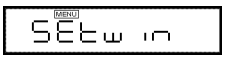
6.1 Introduction: *Experience it!*

The UW/UX series balance can transfer data directly to a personal computer running Lotus 1-2-3, Excel, or other applications running on a Windows®* operating system, as if the displayed value were typed from the keyboard. This function is called WindowsDirect. Because this function directly accesses the Windows® operating system, communication software-installation troubles are eliminated. A cable and a few simple settings are all that is needed to enable data transmission from the balance.

6.2 Set Up WindowsDirect

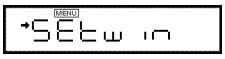
Simple settings are made for the balance and the computer. Connection is by RS-232C cable specified by shimadzu.

6.2.1 Setting Up the Balance



1 Press the **[MENU]** key twice from the gram-display. “Setwin” appears.

2 Press the **[O/T]** key. Verify the stability mark is illuminated with “Setwin” display. All the communication settings for WindowsDirect have been made.

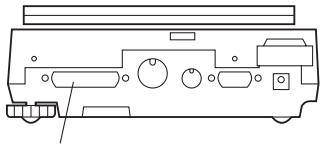


3 Go to “STAND-BY” by pressing the **[POWER]** key several times and unplug the AC adapter from the balance. Unpluging the balance once is necessary after the above setting.

Note

When WindowsDirect settings are made using the "SEtwin" setting, individual communications parameters can be changed using the Communications Settings menu (15.3). In this case, the → (stability mark) may still appear with the "SEtwin" display but WindowsDirect may not operate. To restore WindowsDirect optimal settings first go to the "SEtwin" display and remove the stability mark by pressing the [O/T] key. This restores the default Communications settings. Then, reset "SEtwin" following the procedure described in 6.2.1.

6.2.2 Cable Connection



RS-232C Connector

1 Verify the balance display is “STAND-BY”.

2 Turn off the computer and disconnect the power cord from the balance.

3 Connect the RS-232C cable to the balance.

4 Connect the RS-232C cable to the computer.

6.2.3 Setting Up the Computer

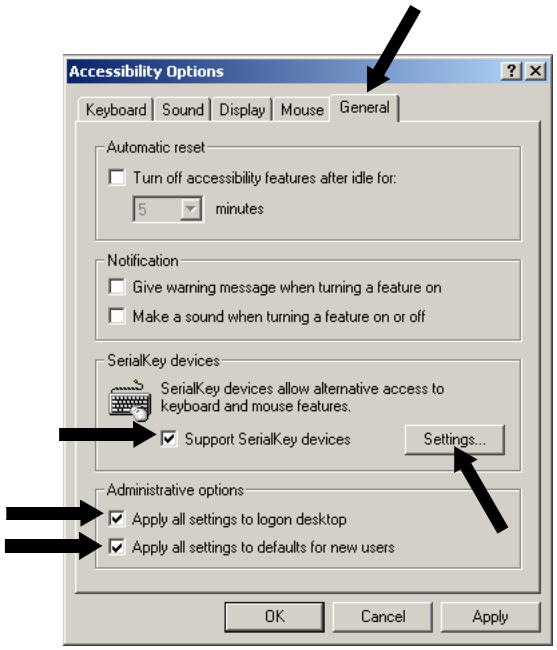
(leave the balance unplugged)

1 Turn ON the power to the computer and start Windows®*.

2 Click “Start”, choose “Settings”, and “Control Panel”.

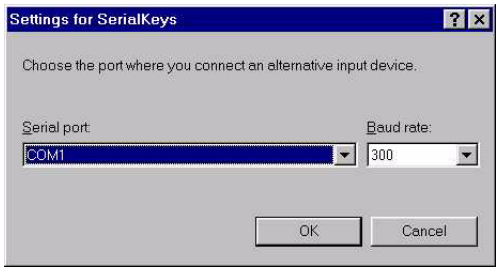
3 Select “Accessibility Options.”

4 Verify that there are no check marks for any items on all five tabs including “General.”



5 Put a check mark at “Support Serialkey device” in the “General” tab. This should be the only check mark on all the tabs of Accessibility Options unless “Administrative options” appears in the “General” tab. Put check marks at both the items of “Administrative options” to maintain the settings even after restarting Windows®.

6 Open “Settings”.

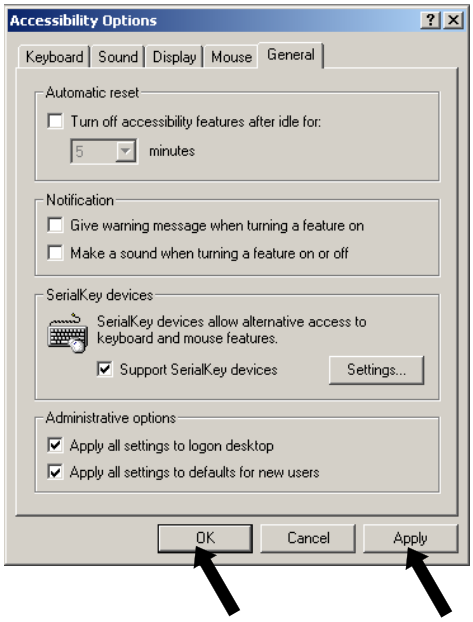


7 Select the serial port corresponding to the RS-232C port of your personal computer. (Serial port: any one of COM1 to 4. Usually, COM1)

8 Select a “Baud rate” of 300.

9 Click “OK”.

10 Click “Apply” and wait.



11 Click “OK”.

12 Click “Start”, point to “Shut Down” then select “Restart the computer?”.

It is not necessary to perform the Windows® control panel setting operation every time.

6.2.4 Start and Checking Operation

1 Start Windows®.

2 After Windows® has completely started, connect power cord from the AC adapter to the balance, when “oFF” is displayed, press the **[POWER]** key. The mass display appears.

Note

Turning ON the balance before Windows®* is completely activated may cause incorrect operation.

3 Open the “Note pad” accessory in Windows®* (or start the application you wish to use).

4 Press the **[PRINT]** key of the balance.
Verify that the numeric value displayed on the balance appears at the cursor position on the screen of computer. The effect is the same as typing the value from the computer keyboard and pressing the ENTER key. Characteristics indicating the unit of measure are not sent to the computer.

5 Test combination with Auto Print function, if you wish to use it.

6 End the operation using the standard close or exit procedure.

Windows®* = Windows® 95, Windows® 98, Windows® Me, Windows® 2000, and higher.

6.3 Troubleshooting

Notes

- This function may not operate on a computer on which a normal U.S. version of Microsoft Windows®* does not operate. Some types of personal computers may not be able to use this function or some features may be limited. Shimadzu does not guarantee that this function can be used on all computers without any problems currently or in the future.
- Shimadzu is not liable for any direct or indirect problems caused by this function. It is recommended that important data or programs on your computer be backed-up before using this function. For the operation of Windows®* or the computer, refer to commercial tutorials or the appropriate instruction manual.
- It is necessary to have the “Accessibility Options” function of Windows®* installed on the PC. To install “Accessibility Options”, select “Start” → “Setting” → “Control panel” → “Add /Remove Programs” and open the “Windows® Setup” tab. Place a check mark on “Accessibility Options.” For more information, see the Windows®* instruction manual.
- When “Support Serialkey device” is selected in Accessability Options, software which uses the same RS-232C port on that computer does not operate correctly, until Serialkey support is discontinued. If another device (an external modem, plotter or etc.) is to be connected, remove the check mark placed on “Support Serialkey device” and re-activate Windows® after the balance is disconnected.

When the WindowsDirect Function Does Not Operate At All:

- For some notebook computers, it is possible to shut off the RS-232C port for energy saving purposes. Set the computer so that the RS-232C port can be used.
- Try different COM port settings from 1 to 4. Re-start Windows®* after each setting change.
- Verify that the correct RS-232C cable is being used.

For Windows® 98 and higher, try setting the computer again without restarting.

For Windows® 95 Version 4.00.950B, see A-8., “Compatibility Notification Regarding Linking of “WindowsDirect” Function with WindowsR95 Version 4.00.950B.”.

Communication through LAN by other applications may interfere with Serialkey device set-up. Try without LAN connection.

Windows®* = Windows® 95, Windows® 98, Windows® Me, Windows® 2000, and higher.

When the WindowsDirect Function Intermittently Malfunctions:

- Use a communication speed of 300bps. Depending on the processing ability of the computer, this function may operate incorrectly if communication speed is too high.
- Send the next data only after the current one is displayed on the screen. Depending on the processing ability of the PC, this function may operate incorrectly if the interval of data transmission is too short.
- Do not touch the keyboard or the mouse while the balance is transmitting data.
- Stop the data transmission and confirm that no data is entering the computer before touching the keyboard or the mouse.

Notes

- This function may generate incorrect data when the displayed value is not a weight value (i.e. error code or time).
- The unit designation is not transmitted. The balance display unit selected and the unit required by the application should be set the same.
- This function may operate incorrectly depending on the settings of various lock keys of the keyboard such as the NUMLOCK or cursor key lock. Change the state of the lock and function keys on the computer keyboard.
- Peripheral devices connected to the DATA I/O such as Electric Printer EP-50 cannot be used with this function.
- When this function is used, a command cannot be sent from the peripheral device or computer to the balance.
- Set the data formats, such as decimal places and units, according to each application.

7. Menu Item Selection

7.1 What is the Menu?

The UW/UX series balance has many functions that can be selected to meet the requirements of the user. Menu Item selection is used to program these functions.

7.2 Menu Map

The menu of the UW/UX balance consists of seven groups and four levels. The Menu Map shows the structure clearly with menu item numbers to help access the desired function. Refer to the Menu Map on the operation explanatory sheet or in appendix when programming the functions in Chapter 8 through 15.

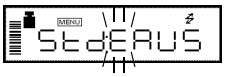
7.3 Menu Item Selection Procedure

This instruction manual identifies each menu item by a number. For example, the menu items of “Stability Detection Band ” of “11. Environment” are **27** through **33**.
Find the function to be programmed in the Menu Map, referring to the item number in square, **No.**.
To reach the item, operate the keys on the balance.

(1) Press the **[CAL]** key to cycle through the items within a menu level.
(↓ In the Menu Map)
(2) Press the **[O/T]** key to choose the current item or move to the next menu level.
(→ In the Menu Map)
(3) Press the **[POWER]** key to move back one menu level.
(4) Press and hold the **[POWER]** key to return to the gram-display.

> **Note**
>
> The MENU symbol is displayed during Menu Item selection.

Example: Select “Stability Detection Band” “4 counts”.
The menu item number is **29** on the Menu Map.

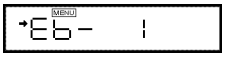


1 Press the **[CAL]** key 5 times from the gram-display. “Std:EAUS” and some symbols are displayed and “E” blinks.

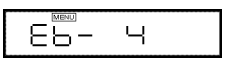
> **Note**
>
> Before entering the menu, set the balance to the gram-display using the **[UNIT]** key. It is also possible to enter the menu from other weighing units involving no further setting with the **[UNIT]** key.

2 Press the **[O/T]** key. “E” is selected and “A” of “E-AbtP8” blinks.

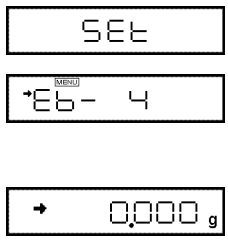
3 Press the **[CAL]** key to make “b” blink.



4 Press the **[O/T]** key. “b” is selected and “Eb-1” is displayed. The stability mark is lit if Eb-1 is the currently set option.



5 Press the **[CAL]** key twice. “Eb-4” is displayed.



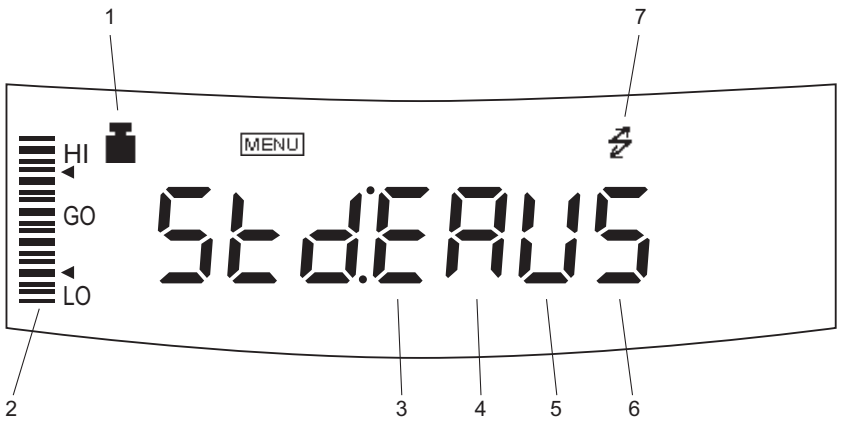
6 Press the **[O/T]** key to select this item. “SEt” is displayed and the stability mark now appears with “Eb-4”.

7 Return to the desired menu by pressing the **[POWER]** key. If pressed and held, it returns to the gram-display.

Once the menu items have been set based on the installation environment and weighing purpose, it is not necessary to select the menu items each time the balance is used. Once the contents of the menu are set, they are stored even if the balance is turned OFF or if the power is disconnected.

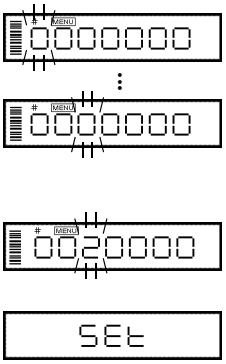
Major Menu Description

Menu Group	Symbol that blinks at beginning of menu	Menu Items Included
1		Calibration
2	(Graphic display)	Analog display, checkweighing, and target weighing
3	E	Installation environment and taring
4	A	Application measurements and automatic output
5	U	Unit conversion and specific gravity measurement
6	S	Clock set-up and calibration record
7		Communication with computer and external devices.



7.4 Setting Numeric Values

Some of UW/UX series balance menu items require numeric value setting.
For example, external calibration weight input, thresholds for checkweighing, and reference density in specific gravity measurements (see 10.2, 10.3, 13.1, 13.5, 13.8, 14.1, 14.2, 14.4 for detail of each item.)
The values can be set using the balance keys.
In a menu used to set numeric values, MENU and # are both illuminated and the digit to be input blinks.



1 Press the **[UNIT]** key to increase the value of the blinking digit by one. (0.....9, 0)

2 Press the **[PRINT]** key to move the blinking digit one place to the right.

3 Press the **[O/T]** key to store the displayed value in the balance memory.
"SEt" is displayed when the value has been successfully saved.
"Err" is displayed when the balance failed to save the value.

4 Press the **[POWER]** key to stop numeric entry.
"Abort" is displayed briefly and the display returns to the menu, one level up.

Notes: Setting a Decimal Point

A decimal point is only used when setting units for solid density weighing, liquid density weighing or when setting the multiplier for the user-defined unit. Set the decimal point while setting numerical values as follows.

- Press the **[PRINT]** key repeatedly until the last digit is blinking. Press the **[PRINT]** key once more to initiate decimal point setting mode. The ▼ symbol or current decimal point blinks.
- Press the **[UNIT]** key to move the blinking decimal point one digit at a time to the desired position.
- Press the **[O/T]** key to set the decimal point position.
  "SEt" is displayed briefly to indicate that the setting is completed.

Use the optional AKB-301 Application Keyboard to easily set numerical values and decimals.

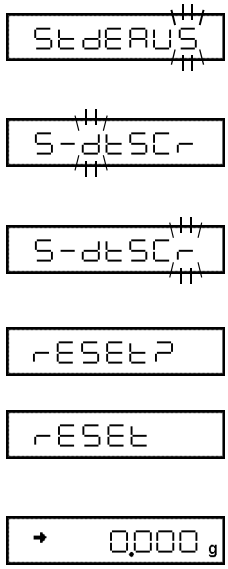
7.5 Related Useful Functions

7.5.1 Last Menu Recall

This function is convenient when an application requires frequent changes to a specific menu item. During mass display or menu selection, press and hold the **[CAL]** key for approximately three seconds. The last menu item that was changed or set is displayed.

7.5.2 Returning to the Default Settings (menu reset)

The procedure below describes how to reset the menu and return to the default settings.
Default settings are indicated with the ∗ symbol in the Menu Map.
Select menu item **72** to reset the menu.



1 In the gram-display, press the **[CAL]** key repeatedly until the “S” of “Std:EAUS” blinks.

2 Press the **[O/T]** key. The Menu Group 6 is selected.

3 Press the **[CAL]** key repeatedly until the “r” in “S-dtSCr” is blinking.

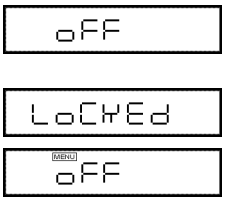
4 Press the **[O/T]** key to display “rESEt?” (“?” without the dot).

5 Press the **[O/T]** key again. “rESEt” is displayed to indicate menu reset completion.

6 Press the **[POWER]** key several times (or hold it for approximately 3 seconds) to return to the gram-display.

7.5.3 Menu Lock

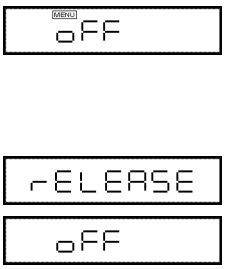
The UW/UX series balances have a “Menu Lock” function that locks the menu selections to avoid changes being made by mistake. WindowsDirect setting (6.2.1) is also locked.
The menu lock is toggled ON and OFF by pressing the **[CAL]** key during “oFF” display that appears after power is supplied to the balance.



1 Connect the balance to the power.

2 Press the **[CAL]** key during “oFF” display.
“LoCKEd”is displayed to indicate that the menu is locked.

Menu access is denied and “Err 22” is displayed when the user attempts to select a menu.
Use the following procedure to turn off the menu lock function and restore access to the menus.



1 Disconnect power from the balance and wait 10 seconds. Reconnect power to the balance.

2 When “oFF” is displayed, press the **[CAL]** key.

3 “rELEASE” is displayed to indicate that the menu lock has been turned off.

8. Built-in Clock Set-up

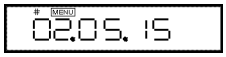
The built-in clock has to be set up in advance if a calibration record is to be produced or Clock-CAL function is to be used.

8.1 Date

1 Select menu item **63** and set the last two figures of the year, month and day, using the **[UNIT]** and **[PRINT]** keys.

Example:May 15th, 2002, set as “02.05.15”
Example:February 29th, 2004, set as “04.02.29”

(Example)



2 Then press the **[O/T]** key.

Notes

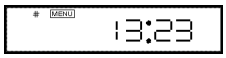
- The built-in clock corrects for the leap year automatically.
- The moment the **[O/T]** key is pressed to finish setting, seconds are set to zero. If the is set after setting the time, the second value will be incorrect. It is important to set the first and then the time, or to correct the seconds value using the ± second correcting function described in section 8.3.

8.2 Time

Select menu item **64** and set the time in the 24 hour system using the **[UNIT]** and **[PRINT]** keys, then press the **[O/T]** key.

Example: 1:23 in the afternoon, is set as “13:23”.

(Example)



Note

The moment the **[O/T]** key is pressed seconds are set to 00.

8.3 Setting Display During Stand-by

Determine what is to be displayed during stand-by.

To display the time during stand-by, select menu item **65**.

To display the date during stand-by, select menu item **66**.

To display neither during stand-by, select menu item **67**.

Notes

Convenient Functions of Time Display

The following functions are available when the time is displayed during stand-by.

- **Seconds display function**:
  Press the **[UNIT]** key to enable the display/non-display of seconds.
- **±30 seconds correction function**:
  Press the **[CAL]** key while seconds are displayed. If the value is between 00 - 29 seconds, the seconds are rounded down to zero. If the value is between 30 - 59 seconds, the value is rounded up one minute and 00 is displayed for seconds.

Read Chapter 7 Before Use of These Pages

9. Display Selection

9.1 Bar graph display

The relative amount of the load on the pan is displayed in the bar graph. This feature helps to prevent errors due to OL (overload) status. This is called Full Scale mode. This display can not be used with the Checkweighing or Target mode.
Select the menu item **11** to set up Full Scale mode.

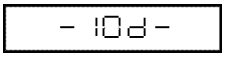
(Examples) (1) (2)

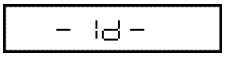
A bar displayed in the lower areas of the scale indicates that the load on the pan is small. (1)
A bar displayed up to the upper areas of the scale indicates that the load on the pan is close to the weighing capacity. (2)

To display no bar graph, select menu item **21**.

9.2 Changing the Minimum Display Digit (10d:1d)

It is possible to decrease the resolution of the minimum balance display by one decimal place if necessary.





1 Press and hold the **[UNIT]** key for approximately three seconds. “- 10d -” is displayed and the display is decreased by one decimal place.

2 Press and hold the **[UNIT]** key for approximately three seconds. “- 1d -” is displayed and the display returns to the original number of decimal places.

Note

The location of the decimal point in the display does not shift. In the “10d” display, the last digit is empty.

Read Chapter 7 Before Use of These Pages

10. Calibration

10.1 What is calibration?

Calibration is required to accurately weigh items with an electronic balance. Calibration should be performed:

- When the location of the balance is changed, even within the same room.
- When the room temperature changes considerably.
- Periodically, according to the quality control plan of the user.

Terms used in this manual:

Span Calibration: Adjustment of the balance to specifications using two weight values; zero and an appropriate value for the balance capacity.

Calibration Check: Comparing the current calibration weight reading to the calibration weight reading after the last span calibration.

Calibration: Pertains to both span calibration and calibration check.

Caution

Never plug off the balance when the following messages are displayed.
“i-CAL x”, “i-tESt x”, “wAit”, “Abort”, “CAL E x”(“x” represents a number).
With UW series, displaced built-in weight may cause damage to the mechanism.

10.2 Calibration Execution

Notes

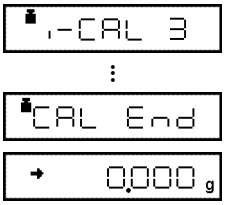
- Setting before shipment is as the following:
  UW series: Span calibration using the built-in weight
  UX series: Span calibration using external weights
  The type of calibration can be changed (See 10.3).
- Calibration will not be performed when the weight on the pan is not near zero, or the balance is not stable.

10.2.1 Span Calibration Using the Built-in Weight (UW Series Only)

Read Chapter 7 Before Use of These Pages

1 Verify that the balance is in mass display and that the pan is empty.

2 Press the **[CAL]** key once. “i-CAL” is displayed. (If “i-CAL” is not displayed, return to mass display and select menu item **1**.)



3 Press the **[O/T]** key.
After “i-CAL3”, “i-CAL2”, “i-CAL1”, “Set”, “CALEnd” the mass display will appear indicating the completion of span calibration.

10.2.2 Calibration Check Using the Built-in Weight (UW Series Only)

1 Verify that the balance is in mass display and that the pan is empty.

2 Press the **[CAL]** key once to display “i-tESt”.

(If “i-tESt” is not displayed, return to mass display and select menu item **2**.)

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

The display changes sequentially from “i-tESt 2” to the “d xxx” display. (xxx indicates a numeric value)

This “d” value indicates the difference between the current calibration weight reading and the calibration weight reading at the last span calibration.

4 To perform span calibration, change the “d” value to zero, by pressing the **[CAL]** key.

--Otherwise, Press the **[O/T]** key to avoid changing the “d” value to zero. (Pressing the **[POWER]** key interrupts calibration and does not change this value to zero.)

“CALEnd” is displayed, indicating the completion of the calibration check.

Note

Changing the “d” value to zero is equivalent to performing span calibration.

Notes

- Examples for interpreting the results of a Calibration Check:

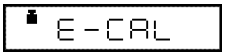
“d” Value	Actual Mass	Displayed Mass
−0.3	3000g	2999.7(3200g/0.1g balance)
+0.21	400g	400.21(420g/0.01g balance)

- Error codes that may be displayed:
  “d ouEr” (d OVER) indicates that the “d” value is 1000 counts or more.
  “d UndEr” indicates that the “d” value is -1000 counts or less.

Read Chapter 7 Before Use of These Pages

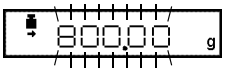
10.2.3 Span Calibration Using External Weights

1 Verify that the balance is in mass display and that the pan is empty.



2 Press the **[CAL]** key once. “E-CAL” is displayed.
(If “E-CAL” is not displayed, return to mass display and select menu item **3**.)

(Example)

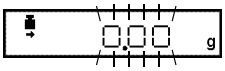


3 Press the **[O/T]** key.
The value of the correct calibration weight to be loaded is displayed and blinks.

Changing the Calibration Weight to be Used

Pressing the **[CAL]** key allows changes to the weight value. Modify the value using the **[UNIT]** key and **[PRINT]** key, then press the **[O/T]** key. To interrupt modification, press the **[POWER]** key.

4 Load the indicated calibration weight and press the **[O/T]** key.



5 Shortly, zero display blinks. Unload the weight from the pan and press the **[O/T]** key.
“SEt” is displayed briefly to indicate completion of span calibration.

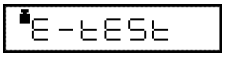
Note

OIML Class E2 or F1 calibration weight is recommended for calibration, depending on your accuracy demand.

Read Chapter 7 Before Use of These Pages

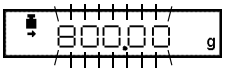
10.2.4 Calibration Check Using External Weights

1 Verify that the balance is in mass display and that the pan is empty.



2 Press the **[CAL]** key once to display “E-tESt”.
(If “E-tESt” is not displayed, select menu item 4.)

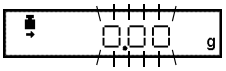
(Example)



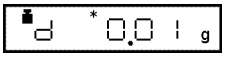
3 Press the **[O/T]** key.
The value of the correct calibration weight to be loaded is displayed and blinks.

Changing the Calibration Weight to be Used

Pressing the **[CAL]** key allows changes to the weight value. Modify the value using the **[UNIT]** key and **[PRINT]** key, then press the **[O/T]** key. To interrupt modification, press the **[POWER]** key.



4 Load the indicated calibration weight and press the **[O/T]** key.
The zero display blinks.



5 Unload the weight from the pan and press the **[O/T]** key.
The display changes to the “d xxx” display.
(xxx indicates a numeric value)

6 To perform span calibration, change the “d” value to zero by pressing the **[CAL]** key.

Otherwise, press the **[O/T]** key to avoid changing the “d” value to zero. (Pressing the **[POWER]** key interrupts calibration and does not change this value to zero.)
“CALEnd” is displayed, indicating the completion of the calibration check.

Note

Changing the “d” value to zero is equivalent to performing span calibration.
Refer to 10.2.2. for interpreting the results of a Calibration Check.

Read Chapter 7 Before Use of These Pages

10.3 Calibration Setting

10.3.1 Selecting the Calibration Type

Set the calibration type that will be used in Calibration Execution.

To set up “Span calibration using the built-in weight”,(UW only)	Select menu item **1**.
To set up “Calibration check using the built-in weight”,(UW only)	Select menu item **2**.
To set up “Span calibration using external weights”,	Select menu item **3**.
To set up “Calibration check using external weights”,	Select menu item **4**.

10.3.2 PSC Fully-automatic Calibration (UW series only)

With the PSC function, span calibration is performed automatically using the built-in calibration weight when the balance detects a temperature change that would affect weighing accuracy.

1 To turn ON the PSC function, Select menu item **5**.

2 To turn OFF the PSC function, Select menu item **6**.

Notes

- Blinking calibration symbol indicates an automatic calibration is about to start.
- If PSC starts while the balance is in use, press the **[POWER]** key to abort that cycle.

Read Chapter 7 Before Use of These Pages

10.3.3 Clock-CAL Fully-automatic Calibration (UW series only)

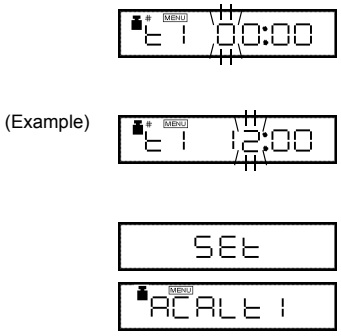
Span calibration is performed automatically using the built-in calibration weight at up to 3 specific, pre-set times during each day. The user selects the times. This function is named Clock-CAL.
It is possible to set up to three specific times for Clock-CAL (“ACALt1”, “ACALt2”, and “ACALt3”). Use the 24 hour system to set menu items 7, 8, and 9. Setting to“00:00” releases the function.

Notes

To execute Clock-CAL, all of the following conditions must be satisfied at the set time. If these conditions are not satisfied within one minute, the automatic span calibration is not executed and that cycle is skipped.

- The balance must be in mass display or the standby mode.
- The balance must be stable.
  (The stability symbol must be illuminated during mass display.)
- Load on the pan should be near zero.
- The balance should not already be in the process of span calibration.

Example: Setting “ACAL t1” to twelve noon.



(Example)

1 Select menu item 7.

2 Set the desired time.(Refer to 7.4 for numerical input.)

3 Press the **[O/T]** key. The set time will be stored.

4 Proceed to next time setting by the **[MENU]** key, or return by the **[POWER]** key.

Skipping Clock-CAL

If Clock-CAL starts while the balance is in use, press the **[POWER]** key to abort that cycle.

Turning Off Clock-CAL Function

When all three Clock-CAL times are set to “00:00”, the function is off.

Read Chapter 7 Before Use of These Pages

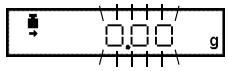
10.3.4 PCAL: Calibration of the Built-in Weight (UW series only)

PCAL is used to calibrate the built-in weight to a standard calibration weight that is correctly adjusted, traceable and/or certified. The PCAL procedure is password protected. The administrator should set this password (refer to 10.3.5).

> **Caution**
>
> Use a correctly controlled, precise calibration weight for this procedure. If it is performed without a correct calibration weight, span calibration and calibration checks using the built-in mass may not be correct in subsequent operations.

Read Chapter 7 Before Use of These Pages

(Example)



1 Unload the sample from the pan and verify a zero mass display.

2 Select the menu item **10**.
"PAS: 0000" is displayed.

3 Enter the PCAL password using the **[UNIT]** and **[PRINT]** keys, then press the **[O/T]** key.
The default password is 9999, set at shipment or upon menu reset.
After "PCAL 3" is displayed, the value of the standard weight to be loaded blinks.

4 Load the standard weight displayed, and press the **[O/T]** key.
Soon, zero is displayed and blinks.

5 Unload the weight and press the **[O/T]** key.
The display proceeds to "PCAL 0". When the mass display appears, calibration is complete.

Notes

- “SEt” is displayed during the process. Leave the balance in a stable state until the mass display appears as in step 5.
- In PCAL, the value of the “weight to be loaded” cannot be changed.
- Set the PCAL password using menu item **71**.

10.3.5 PCAL Password Setting (UW series only)

This password is necessary to access the PCAL function.
It is recommended that the balance administrator set this password to prevent an unauthorized person from incorrectly calibrating the built-in calibration weight.
Select menu item **71**. The numerical setting display appears.
Enter a 4-digit number from “0000” to “9999”.
Refer to 7.4 for numerical input.

Note

When the menu is reset, the PCAL password is reset to “9999”.

10.4 For GLP/GMP/ISO Conformance

These settings should be made by the administrator.

10.4.1 Calibration Report Setting

Turns the calibration report function ON/OFF. Use this to generate and output a calibration report as for GLP, GMP, or ISO9000. An electronic printer (optional accessory) is required to print the report.

To create calibration report, Select menu item **68**.

To turn off calibration report function, Select menu item **69**.

10.4.2 Balance ID Setting

Individual balances can be identified by the serial number on the main body of the balance. The user can add a four-digit ID number to the calibration report.
Select menu item **70**. Set a 4-digit number from “0000” to “9999”.

Read Chapter 7 Before Use of These Pages

11. Environment

11.1 Overview

Settings on the balance can be changed to compensate for the installation environment such as the degree of vibration or air movement or for the purpose of weighing a solid, liquid or powder.

11.2 Stability and Response (Averaging)

It is possible to match the stability of the display and the degree of response with the requirements of specific applications or the installation environment. One of the five modes can be selected. Note that adjustments for stability and response conflict with each other, although the UW/UX series is designed to meet both.

Auto mode: Select menu item **22**.
The balance automatically performs optimum averaging dynamically while observing the load data. This is the recommended setting and should be used unless special circumstances exist.

Pouring mode: Select menu item **23**.
This mode is only suitable for constant volume weighing of liquids or fluids. This mode is very sensitive to wind and vibration.

Standard mode: Select menu item **24**.
This mode is suitable for weighing in a normal environment. Averaging is fixed and does not change dynamically as in the Auto mode.

Anti-vibration mode: Select menu item **25**.
Use this mode when the balance is used in a location where there are large vibrations and the display fluctuates in the Auto mode.
Response is deteriorated at small mass amount changes.

Anti-wind mode: Select menu item **26**.
Use this mode when the balance is used in a location where it is exposed to airflow that causes the display to fluctuate in the Auto mode.
Response deteriorates further than the Anti-vibration mode, but weighing is comparatively stabilized.

Note

If weighing cannot be performed efficiently even with the Anti-wind mode, change the installation site of the balance or use the optional windbreak (large).

Read Chapter 7 Before Use of These Pages

11.3 Stability Detection Band

The conditions for indicating balance stability can be selected. If “1 count” is selected, when the display has remained constant (within one display count), the balance is regarded as stable and the stability mark illuminates. Stability detection band settings can be selected from 2 to 64 counts.
Select menu item **27** for “1 count”. **28** for 2 counts, **29** for 4, **30** for 8, **31** for 16, **32** for 32, and menu item **33** to set the band as 64 counts.

Note

Use “16 counts” to “64 counts” only when the Auto Print function is used and it is therefore required that the sensitivity to vibration be reduced to allow the balance to be regarded as stable and print the measurement value.
The balance may not operate properly if these settings are selected under normal use conditions and environment.

11.4 Tracking

Tracking is the function that will maintain the current displayed value as long as possible.

To turn ON this function, Select menu item **34**.

To turn OFF this function, Select menu item **35**.

Zero Tracking Function

When the display is zero, tracking functions as “zero tracking” to keep the zero display as long as possible. “Zero tracking” automatically cancels small zero drift.
It is recommended to set tracking off when measuring slight mass change such as in the process of drop addition or liquid evaporation.

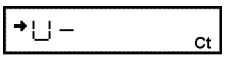
Read Chapter 7 Before Use of These Pages

12. Units

12.1 Unit Display Set-up

The UW/UX series balance can display weighed results in various weighing units.

(Example)



When menu item 58 (carat) has been selected.

1 It is possible to display units other than “g”. Press the **[UNIT]** key in mass display to sequentially change the selected units.

2 Before weighing, set the display units to be used. Gram, %, and PCS (piece counting) are set up before shipment. Set up the desired units by selecting menu from **54** to **62**.
For details of PCS and specific gravity measurement, refer to 13.3 and 14.1 to 14.2.

Notes

For the unit names, refer to the menu map.

- In the unit setting menu, the stability symbol is illuminated to indicate the currently set units.
- Set or release the unit by pressing the **[O/T]** key when the unit is displayed. Gram cannot be released.

User unit (menu item **62**): A numeric value (multiplier) is multiplied by the gram (g) weight of the unit.

Error Display

dSP oL	Display Overload: This display appears if the mass display exceeds 7 digits due to the choice of unit.

Read Chapter 7 Before Use of These Pages

12.2 Percentage (%) Conversion

1 Set the % unit with menu item **56** if it is not set up.
The % unit is set before shipment.

2 Press the **[UNIT]** key several times in the mass display until the % unit is displayed.

Setting the 100% reference

1 Press the **[O/T]** key to tare the balance.

2 Load the reference sample that corresponds to the 100% value. This value must be equivalent to 100 counts or more in the “g” unit.

3 When the stability mark illuminates, press the **[CAL]** key.
“SEt” is displayed briefly and the reference sample weight is displayed as 100%.
The weights of subsequent samples are displayed as a percentage of the reference sample weight.

Note

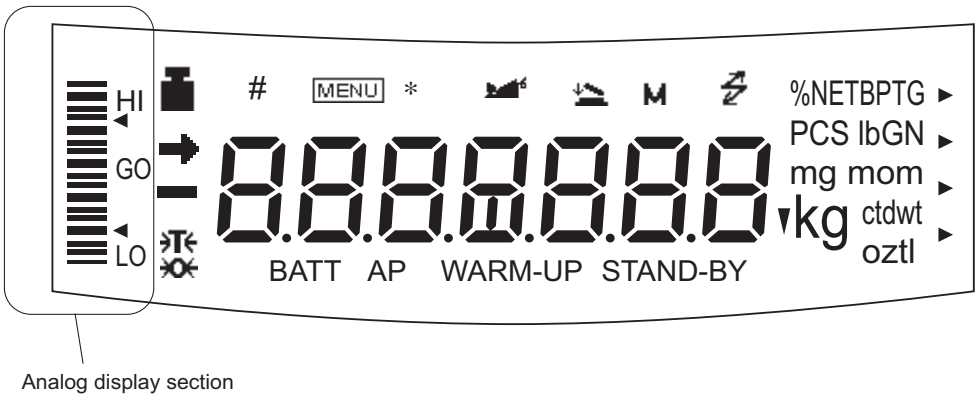
The numbers of digits displayed in the % unit and rounding off of the minimum digit vary depending on the mass value of the reference sample and the balance model. It is not possible to obtain resolution greater than that in the “g” unit.

Read Chapter 7 Before Use of These Pages

13. Enhancing Productivity

Functions that are useful mainly in production sites are described in this chapter.
Only one of the functions in the menu group 4 (Refer to 7.3) (41 to 53) can be used at a time. When one of the functions in menu group 4 is to be used with a weighing unit other than gram, select the function from the gram-display first. Then, change to the other unit with the **[UNIT]** key. To release this function, use the **[POWER]** key. For returning to the previous function, Last Menu Recall function is convenient. There are some other combinations of functions that can be used together. Some functions employ the value set in Zero Range setting (refer to 13.5).

13.1 Checkweighing and Target Display



The UW/UX series balance has an analog bar graph located on the left side of the display. This graph can be conveniently used for checkweighing or cumulative weighing.
The graphic display functions include the two display modes of checkweighing, the target mode, and full scale mode. Only one of them can be used at a time. Refer to 9.1 for the full scale mode and the no bar graph display.
Upon selection of either the checkweighing mode or the target mode, the numerical value for threshold or target is requested. Numeric values are memorized independently for each graphic display mode.
When one of the checkweighing modes is selected, a signal corresponding to HI, GO, or LO in the-graphic display can be transmitted via the RS-232C/AUX connector.
Target, limit, upper, and lower values are set as numeric values only. Set the correct numerical value for the unit that will be used for weighing.

- In weighing mode, changing the displayed unit does NOT change the target, limit, upper, or lower numeric values. For example, when the upper limit has been set at 10g, switching the unit from “g” to “kg” does not change the limit to 10kg. It will be 0.01kg.

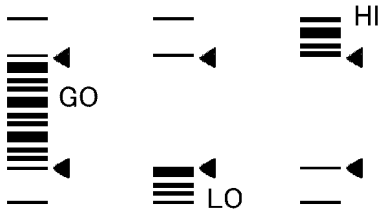
The decimal point is invisible in the value setting display. Determine its position based on the resolution of the balance. For example, if the balance’s minimum display is 0.01g, 150g must be set by inputting “15000” in the display.

Read Chapter 7 Before Use of These Pages

13.1.1 Checkweighing (Comparator) Display Type 1

This is the best mode to determine pass or failure judgment based on the sample weight.

Displays in use



1 Select menu map item **15**.

2 Set the upper threshold value, which corresponds to the upper triangle mark, with menu item **16**.

3 Set the lower threshold value, which corresponds to the lower triangle mark, with menu item **17**.

Note

Determination as follows:

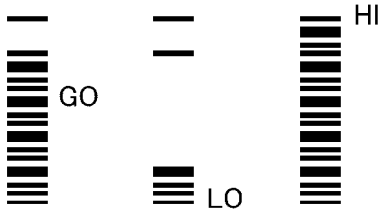
Upper threshold < Sample weight	HI
Lower threshold ≤ Sample weight ≤ Upper threshold	GO
Sample weight < Lower threshold	LO

Read Chapter 7 Before Use of These Pages

13.1.2 Checkweighing (Comparator) Display Type 2

Use this mode for classification based on the sample weight. The display looks like a bar graph, but also includes a checkweighing function.

Displays in use



1 Select menu map item **18**.

2 Set the upper threshold value, which corresponds to the upper triangle mark, with menu item **19**.

3 Set the lower threshold value, which corresponds to the lower triangle mark, with menu item **20**.

Upper threshold < Sample weight	HI
Lower threshold ≤ Sample weight ≤ Upper threshold	GO
Sample weight < Lower threshold	LO

13.1.3 Target Mode

This mode is useful for constant amount weighing of liquid or judgment of excess and shortage.
The target value is the numeric value that is the desired amount in the unit that is used for weighing. The limit value is the numeric amount above or below the target value that is acceptable. The target will be indicated as the center line in the analog display. The limits will be indicated as triangle marks. A moving bar represents the current weight on the pan.

Display examples in use

Without load

With a load within the limit range

1 Select the Target mode with menu item **12**.

2 Set the “target” value, which corresponds to the center line of the graphic display, with menu item **13**.

3 Set the “limit” value, which corresponds to the distance between the center line and upper or lower triangle marks, with menu item **14**.

Read Chapter 7 Before Use of These Pages

13.2 Piece Counting (PCS)

1 Set up the PCS with menu item **57** if it is not set.
(The PCS unit is set before shipment.)

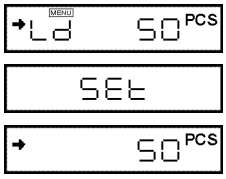
2 Press the **[UNIT]** key several times in the mass display until the PCS is displayed.

3 Load the container and press the **[O/T]** key to tare the balance.

4 Count exactly five pieces (or 10, 20, 50, 100, or 200 pieces) of sample to be measured and load them on the pan.

5 Press the **[CAL]** key.

(Example)



6 Every time the **[CAL]** key is pressed, the display sequentially changes as
"Ld 5pcs" ...."Ld 200pcs", "Ld 5pcs"...
The default setting is "Ld 10pcs".
Press the **[O/T]** key when the display is equivalent to the number of loaded pieces.

Example:If 50 pieces are loaded, press the **[O/T]** key when "Ld 50pcs" is displayed. This determines the unit weight or average weight per piece.
As sample is added or removed, the piece count (number of pieces) is displayed.

Note

Repeat steps 3 through 6 above when the sample or manufacturing lot is changed.

Piece Count Menu Display at Next Setting

In this example, when the **[CAL]** key is pressed in the next PCS menu, display starts from "Ld 50pcs".

Read Chapter 7 Before Use of These Pages

13.3 Auto Print

Auto Print function allows output of the data automatically without pressing the **[PRINT]** key for each sample. The “Auto-Print symbol is illuminated when the Auto Print function is activated.

Six types of Auto Print are possible. See 13.5 for Zero Range setting.

Print on loading: Select menu item **42**.

Load the sample when the value displayed is within the Zero Range. When the stability symbol has illuminated and the positive displayed value is more than 5 times the Zero Range, data is automatically output.

The next data output is not performed unless the display has returned to a value within the Zero Range by unloading the sample or pressing the **[O/T]** key.

Print on loading and unloading: Select menu item **43**.

Load or unload the sample when the displayed value is within the Zero Range. When the stability symbol has illuminated and the displayed positive or negative value is more than 5 times the Zero Range, data is automatically output.

The next data output is not performed unless the display has returned to a value within the Zero Range by unloading the sample or pressing the **[O/T]** key.

Print on loading and on zero: Select menu item **44**.

Load the sample when the value displayed is within the Zero Range. When the stability symbol has illuminated and the positive displayed value is more than 5 times the Zero Range, data is automatically output.

Unload the sample or press the **[O/T]** key. When the displayed value is within the Zero Range and the stability symbol has illuminated, data is output again.

Print on loading, unloading, and on zero: Select menu item **45**.

Load the sample when the value displayed is within the Zero Range. When the stability symbol has illuminated and the displayed positive or negative value is more than 5 times the Zero Range, data is automatically output.

Unload the sample or press the **[O/T]** key. When the displayed value is within the Zero Range and the stability symbol has illuminated, data is output again.

Print continuously: Select menu item **46**.

By pressing the **[PRINT]** key while the Auto-Print symbol and Stand-by symbol are lit, the Stand-by symbol goes out, the Communication symbol lights and the displayed data is continuously output.

Continuous output stops temporarily when the **[PRINT]** key is pressed.

Read Chapter 7 Before Use of These Pages

Notes

- During continuous output, the Communication symbol may appear to remain lit. If the transfer speed of the data output is slow, the display may flash. Increase the transfer speed as much as possible and set the handshake off (menu item **73**).
- Pretaring Value (13.7) function cannot be used with Auto Print functions.

Print on "GO" judge of checkweighing: Select menu item **47**.

When the graphic display is in one of the checkweighing modes and the stability symbol lights in the GO range, the data is output once.

The next data output is executed after the displayed value is within the Zero Range.

For automatic outputs at preset intervals, see 14.4 Interval Timer.

13.4 Auto Zero

When the displayed value is within the Zero Range and the stability mark has been illuminated, zeroing occurs automatically. The Zero symbol appears in the display when the Auto Zero function is active. Other keys function as expected with the Auto Zero function activated.

Select menu item **41** to activate it.

13.5 Zero Range

The "Zero Range" value is used in some of the application functions as a reference to identify whether the sample is loaded.

If the display is within the Zero Range, the balance determines that a sample is not loaded. If the display goes more than five times the Zero Range it determines that a sample is loaded. Application functions which involves judgment of whether a sample is loaded or not work in accordance with the Zero Range setting.

Set the "Zero Range" value in menu item **48** using the number of counts displayed in gram-display.

The setting range is 01 to 99 with 01 being the default value. Even when weighing will be done in another unit, Zero Range setting is made by only gram value.

Note

When a Pretare value is set, the value to determine that there is “no load” becomes “- Pretare ± Zero Range” during gram-display. The Zero Range function works as expected when attempting to weigh and Auto Print the mass of a bottled sample during gram-display.

13.6 Taring/Printing at Stability

Determine if the balance should wait for stability before printing when the **[PRINT]** key is pressed or displaying the zero point when the **[O/T]** key is pressed.

To print or tare without waiting for stability: (Immediately mode)
Select menu item **39**.

To have printing or taring take place after the stability is detected: (Waiting for stabilization)
Select menu item **40**.

Notes

While the balance is waiting for stabilization, ---- is displayed.

- When the **[O/T]** key has been pressed,
  “---” is displayed. At this occasion, press the **[POWER]** key if you desire to disable this function and abort taring.
- When the **[PRINT]** key has been pressed,
  Once the communication symbol and the Stand-by symbol are lit, then stability mark is waited. The data will be output after the stability mark is lit. If the **[POWER]** key is pressed during the waiting, the balance is brought to stand-by. The data will be printed upon stability in the next weighing.

Read Chapter 7 Before Use of These Pages

13.7 Pretaring Value

Notes

- If the weight of the tare (container) varies, accurate measurement with Pretaring Value function cannot made.
- Pretaring Value function cannot be used with Peak Hold, Auto-Memory and Zeroing, Animal Weighing, or Auto function.

This function is used to weigh the mass of a sample packed in a container such as a bottle or bag without opening the container. Pretare function should be used only if the mass of each container does not vary from sample to sample. Instead of zero, the pretare value is displayed (as a negative value) when the **[O/T]** key is pressed. The pretare value is then subtracted from the total load on the balance pan to display the weight of the sample.

1 Select menu item **36**.

2 Set the Pretare value. Refer to 7.4 for numerical value input.

Pretare Value

Cancel the Pretare value by setting the value to zero.
When a Pretare value other than zero has been set, the Tare symbol illuminates.
The Pretare value is set using the “g” unit. The maximum value is the weighing capacity of the balance.
Check the Pretare value by pressing and holding the **[O/T]** key for approximately 3 seconds during weighing.
Use the AKB-301 external keypad if you have to change the Pretare value frequently.

Read Chapter 7 Before Use of These Pages

14. Application Functions

Application measurement functions are described in this chapter.
Only one of the functions in the menu group 4 (Refer to 7.3) (41 to 53) can be used at a time. When one of the functions in menu group 4 is to be used with a weighing unit other than gram, select the function from the gram-display first. Then, change to the other unit with the **[UNIT]** key. To release this function, use the **[POWER]** key. For returning to the previous function, Last Menu Recall function is convenient. There are some other combinations of functions that can be used together. Some functions employ the value set in Zero Range setting (refer to 13.5).

14.1 Solid Specific Gravity Measurement

Solid specific gravity measurement refers to the measurement of the sample (solid) weight in the air and in a liquid of known specific gravity (or density) and the calculation of the sample specific gravity (or density).
The ▼d symbol is used to represent the solid specific gravity in this balance. The data output unit is DS.

> **Note**
>
> Use of the optional **SMK-101, or SMK-102 Specific Gravity Measurement Kit** (refer to A-3.) is recommended for efficient measurements. When using the SMK-101 or SMK-102, refer to the instruction manual of the kit. Follow the instruction below when a hanging pan and a tank are prepared by the user.

1 Select menu item 60 in advance.

> **Note**
>
> Enter the value of the specific gravity (or density (g/cm^3)) of the liquid (water, alcohol etc.) in which the sample is immersed. Refer to 7.4 for numerical value input. To cancel the set-up, set the value to zero.

2 Remove the below-weigh hook cap from the bottom of the balance to expose the below-weigh hook.

3 Hook the hanging pan, and then immerse the hanging pan in the tank filled with the liquid of known specific gravity (or density).

4 From mass display, press the **[UNIT]** key several times until ▼d (inverse triangle and "d") is displayed.

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

6 Load the sample on the balance pan (or in the hanging pan in air).

7 After the stability mark illuminates, press the **[CAL]** key.
"dSP oL" may be displayed but this does not indicate a malfunction.

8 Load the sample on the hanging pan immersed in the liquid. The specific gravity (or density) of the sample is displayed.

9 Repeat steps 5 through 8 for each additional sample.

Notes

- Up to four decimal places are displayed for specific gravity. When it is not possible to stabilize the balance in all 4 decimal places, use the 1d/10d switching function.
- When loading the sample on the pan in the liquid, ensure that the entire sample is immersed in the liquid.
- The balance does not re-zero when the **[O/T]** key is pressed in this function.
- The dimensions of the below-weigh hook are shown in A-7.

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14.2 Liquid Density Measurement

Liquid density measurement refers to the measurement of the weight of a reference solid of a known volume in air and in the sample liquid. Density of the liquid is calculated from these two values.
The display unit for liquid density is “d”. The data output unit is DL.

Note

Use of the optional **SMK-101, or SMK-102 Specific Gravity Measurement Kit** (refer to A-3.) is recommended for efficient measurements. When using the SMK-101 or SMK-102, refer to the instruction manual of the kit. Follow the instruction below when a hanging pan and a tank are prepared by the user.

1 Select menu item **61** in advance.

Note

Enter the value for the volume (cm^3) of the reference weight. Refer to 7.4 for numerical value input. To cancel the set-up, set the value to zero.

2 Remove the below-weigh hook cap from the bottom of the balance to expose the below-weigh hook.

3 Hook the hanging pan, and then immerse the hanging pan in a tank containing the sample liquid.

4 From mass display, press the **[UNIT]** key several times until “d” is displayed.

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

6 Load the reference weight on the pan of the balance.

7 After the stability mark illuminates, press the **[CAL]** key.
"dSP oL" may be displayed but this does not indicate a malfunction.

8 Load the reference weight on the hanging pan and immerse it in the sample liquid. The density of the sample liquid is displayed.

9 Repeat steps 5 through 8 for each additional sample.

Notes

- Up to four decimal places are displayed for density. When it is not possible to stabilize the balance in all 4 decimal places, use the 1d/10d switching function.
- When loading the reference weight on the pan in the liquid, ensure that the entire weight is immersed in the liquid.
- The dimensions of the below-weigh hook are shown in A-7.

Read Chapter 7 Before Use of These Pages

14.3 Peak Hold

Measures the displayed peak value. The “P” symbol (“P” of Auto-Print symbol) is illuminated when the Peak Hold function is activated. “Peak value” is the highest or lowest stable value displayed after the display has changed beyond five times the Zero Range.
Select menu item **49** in advance.

1 In the peak detection standby state with the “P” symbol and the Stand-by symbols illuminated, press the **[O/T]** key to tare the display.

2 Press the **[PRINT]** key.
The Stand-by symbol disappears and peak value detection starts.

3 The “P” symbol and Asterisk are simultaneously displayed after the peak value is detected, and the data is output. This display will not change regardless of the load on the pan.

4 Press the **[POWER]** key.
The balance returns to the peak detection standby state in step 1).

Notes

- Press the **[POWER]** key in the peak detection standby state to initiate the power standby state.
- Press the **[POWER]** key during detection of the peak to return to the peak detection standby state.
- Polarity of the peak value displayed is “polarity of the displayed value of the first change by five times or more of Zero Range from the display within Zero Range.”
- Usually the peak value is easily measured by selecting menu item **23** (Pouring mode). Depending on the weighting conditions and the sample type, this setting may not always be suitable.
- Pretaring Value (13.7) function cannot be used with Peak Hold function.

14.4 Interval Timer

Automatically outputs the displayed value at preset intervals. The “T” symbol (“T” of the Tare symbol) is illuminated when the Interval Timer is activated.
The optional AKB-301 Application Keyboard is convenient when the interval is changed frequently.

1 Select menu item **50** and set the output interval (00:01 = 1 sec to 99:59 = 99 minutes 59 seconds).

2 In the interval timer standby state when the “T” and the Stand-by symbols are both illuminated, press the **[PRINT]** key.
The first data is output. Data will be automatically output at the set time intervals thereafter.

3 To stop output, press the **[POWER]** key.
The balance returns to the interval timer standby state in step 1).

Notes

- Use the **[O/T]** key to erase the tare or zero the balance at any time.
- Pressing the **[POWER]** key in the interval timer standby state brings the power supply standby state.
- To release the interval timer function, keep pressing the **[POWER]** key. This does not reset the interval timer function to zero.
- Using the interval timer function to record data over a long period may cause data error due to balance drift.
- Some instruments receiving the data may not operate normally if the set time interval is short. To correct this, set the time interval to a longer period. When the set time interval is short and the instrument connected to DATA I/O is unknown, it is recommended to set the handshake to a setting other than “H-tm” **76**.

Read Chapter 7 Before Use of These Pages

14.5 Auto-Memory and Zeroing

Used to weigh a large number of individual samples. The “Auto-Memory and Zeroing” symbol is illuminated when this function is active.
Select menu item **52**.

1 Load the weighing vessel and press the **[O/T]** key in the Auto-Memory and Zeroing standby state (The “Auto-Memory and Zeroing” and the Stand-by symbols are lit).
Zeroing occurs.

2 Press the **[PRINT]** key.
The Stand-by symbol disappears, and Auto-Memory and Zeroing measurement starts.

3 Load the first sample. Each time the stability symbol is lit and the display is a value five times or more the Zero Range or when the **[PRINT]** key is pressed, the displayed value is output and zeroing occurs.

4 For the next sample, additional weighing is performed without pressing the **[O/T]** key.

5 Press the **[POWER]** key.
The balance returns to the Auto-Memory and Zeroing standby state and total mass on the pan without the tare is displayed.
Press the **[PRINT]** key to print this value.

Notes

- When the stability symbol is illuminated and the displayed value is within the Zero Range, zeroing occurs automatically.
- When the **[PRINT]** key is pressed and the displayed value is less than five times the Zero Range, zeroing occur after data output. (Manual loading)
- When the **[POWER]** key is pressed in the Auto-Memory and Zeroing standby state, the power supply standby state is initiated.
- Pretaring Value (13.7) function cannot be used with Auto-Memory and Zeroing function.

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14.6 Animal Weighing

Designed for weighing animals. The Animal symbol is illuminated when the Animal Weighing mode is active.
Select menu item **53**.

1 Load the weighing vessel and press the **[O/T]** key.

> **Note**
>
> Data may be output when the weighing vessel is loaded. This is not a malfunction.

2 Load the sample (animal etc.) with a mass more than 50 times the Zero Range.

3 When the weighed value is relatively stable, the value is automatically output.

4 Press the **[O/T]** key or unload the sample.

5 When the displayed value is stable and less than 10 times the Zero Range, automatic zeroing occurs.
Any residue remaining on the pan (excrement or fur) is automatically canceled and zeroing occurs. If zeroing does not occur, increase the value of the Zero Range (13.5).

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Notes

- Standby state is not available in the Animal Weighing mode.
- Press the **[POWER]** key to initiate the power supply standby state.
- On the premise of weighing animated objects, the stability detection band is automatically extended in the Animal Weighing mode. Reproducibility of the measurement data is slightly less than with other modes.
- When the animal being weighed cannot be controlled and the automatic printing does not occur, press the **[PRINT]** key to output the displayed value. Then unload the animal. Even if the stability symbol lights before the animal is removed, data is not printed again.
- By setting a larger stability detection band in the menu, the stability symbol will light more readily.
- If the balance is slow to return to the zero point, set a larger Zero Range value.
- Pretaring Value (13.7) function cannot be used with Animal Weighng function.

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15. Connecting Peripheral Instruments

(For WindowsDirect, refer to 6. “WindowsDirect Function”)

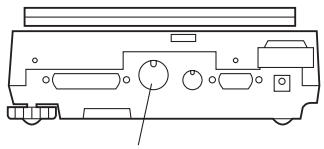
A variety of peripheral instruments are available for use with the UW/UX series balance, such as an electronic printer, keyboard or personal computer.
This chapter describes how to connect and communicate with peripheral instruments.
The details of the balance's communication settings are described in 15.3.

15.1 Electronic Printer EP-50/EP-60A

- EP-50 here includes EP-50WIN.

1 For the balance, select the default communication settings.

Menu item number	76	77	83	89	92	94
Setting	Handshaking, Timer	Format, EB type	Baud Rate, 1200 bps	Parity, None	Stop bit, 1 bit	Delimiter, CR



2 Disconnect the power to the balance and EP-50/EP-60A Electronic Printer.

3 Connect the DATA I/O connector of the balance to the EP-50/EP-60A using the attached cable of the EP-50/EP-60A.

4 First turn ON the power to the balance, then turn ON the power to the EP-50/EP-60A.

Notes

- Calculation functions of EP-50 (statistic calculation function, multiplication of constants etc.) cannot be used with the unit other than g, kg, mg, %, PCS, ct, and mom.
- Before printing the data other than normal measured value (date, report of sensitivity calibration etc.), turn off the number printing function (automatic count-up) of EP-50.

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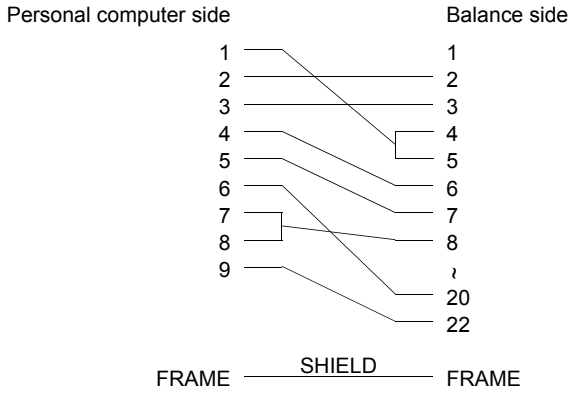
15.2 Personal Computer - RS-232C -

15.2.1 Connecting the Cable

Caution

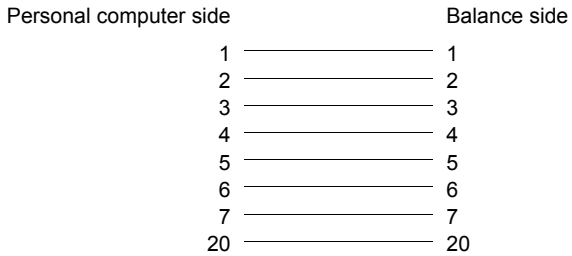
Signals other than RS-232C are also output by the UW/UX series balances through the RS-232C/AUX connector. If these signal lines are incorrectly connected, damage may occur to the personal computer or balance. Correctly connect an appropriate cable for communication between the balance and personal computer.
Some types of personal computers may not operate normally when connected with the optional RS-232C cable according to the diagram.

(1) IBM PC/AT and compatible personal computer (D-sub 9-pin)



(This wiring cable is not always necessary.)

(2) IEEE Standard (D-sub 25-pin)



15.2.2 Data Format

The following explanation is applied when menu item **77** (Format EB type) is selected.
For other formats, refer to the data corresponding to the compatible machine.

> **Note**
>
> □ indicates space code and <delimiter> indicates delimiter code.

(1) For the measured value

First character:	Minus: '–' Non-minus: space
2nd to 11th characters:	Numeric values or " [", "]" are flushed right. The position of the decimal point varies depending on the type of instrument.
12th to 13th characters:	Unit such as g□ or kg
14th to 15th characters:	Delimiter

> **Notes**
>
> - When the delimiter is CR or LF (menu item **94** or **95** is selected) the 13th character is not present.
> - When printing stability information, the following characters are put in front of the first character mentioned above.
>
> Stable time: S
>
> Unstable time: D
> - When menu item **97** or **98** is selected for Delimiter, the special format is used instead of that described above.

(2) For "oL" or "-oL"

"oL" □□□□□ OL □□□□□ <Delimiter>

"-oL" – □□□□ OL □□□□□ <Delimiter>

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15.2.3 Using Command Codes

Note

If communication conditions are incorrectly set, a communication error message “ComErr” is displayed.

(1) Commands that end with a number, character, or symbol other than [=]: Transmit to the balance with a delimiter for each command code.

Example 1: PRINT<CR> ... The same operation as pressing the **[PRINT]** key

(2) Commands that end with a [=]: Transmit the number to the balance with a delimiter.

Example 2: TIME=1234 <CR> .. 12:34 is set as the current time.

Example 3: P.TARE=1.23 <CR> (example of type of the second decimal place).
...1.23g is set as a Pretare value.

Example 4: P.TARE=0.00 <CR> (example of the second decimal place)
...Clears (cancels) the Pretare value.

Note

Number of digits, decimal point, position of decimal point of the numeral transmitted succeeding to ‘=’ are the same as the case of setting the numeric value using the AKB-301 Application Keyboard.
Use the same number of decimal places as in the gram-display.
This restriction does not apply to USER=, SOLID=, and LIQUID=.

Example 5: MENU=4630 <CR> (4-digit number after [=])
This is the same in the following operation.
.. from mass display, press the **[CAL]** key five times, then press the **[O/T]** key once and the press the **[CAL]** key six times. This returns to the same display as if the **[CAL]** key was never pressed.
Press the **[O/T]** key once, then **[CAL]** key three times, and the **[O/T]** key once more.
This example indicates that menu item **25** (Anti-vibration mode) is selected.

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Notes

- If there is 0 in the four-digit number, the setting is complete at that point and menu selection is ended.
- The result of this command varies depending on the type of the balance.

Example 6: #=2.56 <CR>

Example 7: #=12.345.67 <CR>

A personal computer can instruct the weighing and display a specific number on the balance.

With the commands in Example 6 &7, [#2.56] and [#12.345.67] are displayed on the balance. When the operator presses the **[PRINT]** key, the character string '2-56<CR>' and '12-345-67<CR> are output from the balance.

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(3) Echo back command

The balance again transmits the character strings of N pieces included between an echo back command '{' or '}' and the delimiter.

An unprocessed echo back command is not left in the receiving buffer of the balance, N ≤ 30.

Example 8: ABCDEFG12345<CR>

... After receiving this command, the balance outputs ABCDEFG12345<CR>. The printer can print this character string.

Note

Only capital alphabets and a part of symbols (decimal point, symbol etc.) can be used when printing with an electronic printer. A maximum of 15 characters per line.

(4) Command codes for Format EB type (menu item **77**) and Format Old EB type (menu item **78**)

(i) Commands related to output

D01	Continuous output
D03	Continuous output with stability information
D05	Single output
D06	Auto Print setting (type of Auto Print is set separately)
D07	Single output with stability information
D09	Release of continuous output and Auto Print

(ii) Commands related to operation keys

POWER	Equivalent to the **[POWER]** key.
Q	Equivalent to the **[POWER]** key.
MENU	Equivalent to the **[CAL]** key.
TARE	Equivalent to the **[O/T]** key.
T	Equivalent to the **[O/T]** key.
UNIT	Equivalent to the **[UNIT]** key.
PRINT	Equivalent to the **[PRINT]** key.
POWER+	Equivalent to holding the **[POWER]** key for approximately 3 seconds.
MENU+	Equivalent to holding the **[CAL]** key for approximately 3 seconds.
UNIT+	Equivalent to holding the **[UNIT]** key for approximately 3 seconds.
PRINT+	Equivalent to holding the **[PRINT]** key for approximately 3 seconds.
RECALC	Equivalent to the **[RECALC]** key of the AKB-301Application Keyboard.
C	Equivalent to the **[C]** key of the AKB-301 Application Keyboard.

(iii) Commands related to application measurement

PEAK	Sets the Peak Hold mode.
AZERO	Sets the Auto Zero mode ON.
INTERVAL	Sets the Interval Timer mode.
ADDON	Sets the Auto-Memory and Zeroing mode.
+	Immediately operates after setting the Auto-Memory and Zeroing mode.
A	Sets the Animal Weighing mode.
ANIMAL	Sets the Animal Weighing mode.
R	Releases the Application weighing mode.

(iv) Commands related to unit conversion

g	Switches to “g” unit.
kg	Registration of “kg” unit and switching.
mg	Registration of “mg” unit and switching.
PERCENT	Registration of “%” unit and switching.
%	Sets 100% when display is in “%” unit.
G	g ← → % switching.
PCS	Registration of “PCS” unit and switching.
CT	Registration of “carat” unit and switching.
MOM	Registration of “momme” unit and switching.
SDENSE	Registration of “solid density” unit and switching.
LDENSE	Registration of “liquid density” unit and switching.
CU	Switches to “user” unit (Set the conversion coefficient beforehand.).
RSTUNIT	Returns the default units.

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(v) Readout commands of set value

TARGET	Readout of target set value.
LIMIT	Readout of limit set value.
G.LO	Readout of lower limit set value in Checkweighing Display 1.
G.LO	Readout of upper limit set value in Checkweighing Display 1.
L.LO	Readout of lower limit set value in Checkweighing Display 2.
L.UP	Readout of upper limit set value in Checkweighing Display 2.
UW	Readout of unit weight set value.
G/PCS	Equivalent to g/PCS key.
CALWT	Readout of external weights set value for span calibration.
ACALT1	Readout of Clock-CAL time 1.
ACALT2	Readout of Clock-CAL time 2.
ACALT3	Readout of Clock-CAL time 3.
P.TARE	Readout of Pretare set value.
ZRNG	Readout of Zero Range set value.
USER	Readout of user unit conversion coefficient.
VOL	Readout of reference weight set value.
DENSE	Readout of surrounding liquid density set value.
I.TIME	Readout of Interval Timer set value.

(vi) Commands for numeric value setting

CALWT=	Sets external weights value for span calibration.
ACALT1=	Sets Clock-CAL time 1.
ACALT2=	Sets Clock-CAL time 2.
ACALT3=	Sets Clock-CAL time 3.
P.TARE=	Sets Pretare value.
ZRNG=	Sets Zero Range value.
UW=	Sets unit weight.
USER=	Sets user unit conversion coefficient.
VOL=	Sets volume of reference weight.
SDENSE=	Sets surrounding liquid density.
I.TIME=	Sets interval timer value.
DATE=	Sets the date.
TIME=	Sets the time.
TARGET=	Sets the target value.
LIMIT=	Sets the limit value.
G.LO=	Sets the lower limit value of Checkweighing Display 1.
G.UP=	Sets the upper limit value of Checkweighing Display 1.
L.LO=	Sets the lower limit value of Checkweighing Display 2.
L.UP=	Sets the upper limit value of Checkweighing Display 2.
PCS=	Sets the arbitrary loading piece.
#=	Corresponds to numeral keys of AKB-301 Application Keyboard.
ID=	Sets ID.
PASSSET=	Sets PCAL password.
PASS=	Inputs PCAL password.

(vii) Commands of special functions

CAL	Enters Span Calibration mode.
C18	Enters Span Calibration mode.
LOCK	Sets menu lock.
RELEASE	Releases menu lock.
TIME	Readout of date and time.
ADJCLK	Adjusts ± 30 seconds.
RSTMN	Menu reset.
MENU=	Sets arbitrary menu.
{	Echo back.
}	Echo back.
[α]	Sets to Multi-Connection mode. (α represents a lower-case alphabet character.)

Note

For Multi-Connection mode, refer to Section 15.2.4 “Multi-Connection Mode”.

(5) Compatible commands with Mettler Toledo® PR and SR series Electronic Balances

S	One time output at a stable state
SI	Immediate one time output
SIR	Continuous output
SR	Continuous output at a stable state
T	Taring after stabilized
TI	Immediate taring
Z	Zero setting (same as immediate taring)

(6) Compatible commands with Sartorius® IS series Electronic Balances

<ESC>P	One time output
<ESC>T	Taring

Note

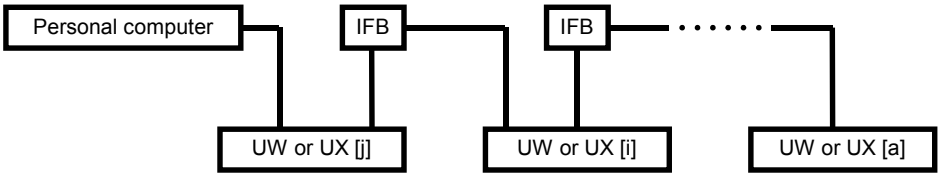
<ESC> indicates escape code (1BH).

15.2.4 Multi-Connection Mode

A maximum of 26 UW/UX series balances can be connected to one personal computer at the same time. This is called “Multi-Connection mode.” To use the balance in this mode, prepare RS-232C cables in the number of balances connected, and the optional IFB-102A RS-232C Interface.

Connecting Method

Example for connecting 10 units of UW/UX series balances to one personal computer is shown in the diagram below.



Assignment of Identification Name

In this example (10 balances connected to one computer), assign the identification name in lower-case alphabets.

Since 10th character of alphabet is “j,” assign “j” to the balance closest to the personal computer, “i” to next closest balance, and so on, back to “a.”

Setting to Multi-Connection Mode

1 Adjust the communication menu settings of all the balances to the specification of the personal computer, and then, turn off the power to all balances.

2 Start supplying the power to the whole system. Wait until all balances display OFF.

3 Send “[α] <delimiter>” from the personal computer.

α is the name of the balance next to the personal computer. In the example above, lower-case “j.”

This command is valid only one time after turning the power ON.

Respective balances automatically enter the Multi-Connection mode and the mass is displayed.

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On this process, the name smaller than the sent command by one, i.e. “[i] <delimiter>”, is returned.

4 This procedure completes the setting to the Multi-Connection mode.

BALANCE (No)	Command (PC)	RETURN DATA (PC)
a	[a] PRINT	[a] PRINT
		0.0g
b	[b] PRINT	[b] PRINT
		0.0g
c	[c] PRINT	[c] PRINT
		0.0g
d	[d] PRINT	0.0g
(nearest to PC)		(No Data)

Command Codes in the Multi-Connection Mode

Only the commands shown below are valid in the Multi-Connection mode.
(α is the name of the balances.)

[α]TARE	Same as the operation of pressing the **[O/T]** key of the balance “α”.
[α]T	Same as the operation of pressing the **[O/T]** key of the balance “α”.
[α]POWER	Same as the operation of pressing the **[POWER]** key of the balance “α”.
[α]Q	Same as the operation of pressing the **[POWER]** key of the balance “α”.
[α] PRINT	Same as the operation of pressing the **[PRINT]** key of the balance “α”.
[α]D05	Same as the operation of pressing the **[PRINT]** key of the balance “α”.
[α]D07	Same as sending the D07 command to the balance “α”.
[α]UNIT	Same as the operation of pressing the **[UNIT]** key of the balance “α”.
[α]CAL	Same operation as sending the CAL command to the balance “α”.
[α]UNIT+	Same as the state of holding down the **[UNIT]** key of the balance “α”.

Format of Output Data from the Balance

The output data from the balance “α” is performed with the following format.
“[α]” data <delimiter>
Format of the load data is the same as the normal output form (Format EB type).
Operation is not guaranteed for the data containing characters, such as printing of date, time, and calibration document etc.

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Restricted Items in the Multi-Connection Mode

- Multi-Connection mode is not designed for each balance to independently send the data.
  This mode is for sampling the data by control of multiple balances with one PC. This is not the function to support multiple balances for sending the data separately.
  When multiple number of data and commands exist on the system at the same time, the balance may not operate normally. For example, multiple data may exist simultaneously on the system when using multiple balances in the Application Measurement mode such as Auto Print or Continuous Output, or pressing the **[PRINT]** key. Normal operation cannot be guaranteed.
- Peripheral instruments connected to the DATA I/O or IFB-102A connector, such as an EP-50 Electronic Printer, cannot be used.
- The communication formats can only be used with “Format EB type”. Delimiters cannot be used with menu items **97** or **98** (setting for WindowsDirect).
- It will take an average 0.05×N seconds for the data from the personal computer to reach balance unit N, even at setting of 38400 bps. Also, it will take almost the same time for the data from the balance in the Nth position to reach the personal computer.

Cancellation of Multi-Connection mode

Multi-Connection mode cannot be canceled unless the power for all balances is turned OFF.

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15.3 Communication Setting

15.3.1 Overview

This menu is used to set the specifications for communication between the balance and a personal computer or electronic printer.

Note

This menu affects both the RS-232C and DATA I/O at the same time. For the instrument to be connected to the DATA I/O connector such as an electronic printer, select the communication setting of the balance to the default settings, which are menu items **76**, **77**, **83**, **89**, **92**, **94**.

15.3.2 Handshaking

Handshaking determines whether the peripheral equipment can receive communication data from the balance. This function does not relay the status of the balance to the peripheral equipment.
The balance is able to receive as long as there is space in the receiving buffer of the balance. This function operates once “oFF” is displayed, operation in other states is not guaranteed.
When the balance output is retained by handshaking, the display of the balance is locked. Determine the specifications for handshaking.

To have software handshaking not performed, select menu item **73**.

To have software handshaking performed as the following, select menu item **74**.
After the balance receives X-OFF (13H), the balance output is retained.
After the balance receives X-ON (11H), the balance output is initiated.

To have hardware handshaking performed as the following, select menu item **75**.
When DTR is OFF, the output from the balance is retained.
When DTR is ON, the output from the balance is initiated.

To have timed hardware handshaking performed, select menu item **76**.

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15.3.3 Format

Set the balance output data format.

The standard format for the Shimadzu electronic balance: Select menu item **77**.
The old output format for the Shimadzu electronic balance: Select menu item **78**.
The old output format is employed in the following models.
EB-500, 5000, 280, 2800, AEL-1600, EB-50K (except -15)

> **Note**
>
> In this format, the number of the lowest place of menu item **70** is assigned to identify the balance.

Compatible format for the PR and SR series of Mettler-Toledo electronic balances. Available commands, functions and responses are limited: Select menu item **79**.

Compatible format for the IS series of Sartorius electronic balances. Available commands, functions and responses are limited: Select menu item **80**.

15.3.4 Communication Speed

Select the communication speed (300, 600, 1200, 2400, 4800, 9600, 19200, or 38400 bps).
Number of “b-xxx” shows bps (bits/second). Baud rate and bps are the same value.
Select one of the menu items **81** to **88**.

15.3.5 Parity / Bit Length

Select the parity and bit length.

No parity, 8-bit length: Select menu item **89**.

Odd number parity, 7-bit length: Select menu item **90**.

Even number parity, 7-bit length: Select menu item **91**.

15.3.6 Stop Bit

Select the number of stop bits.

Stop bit 1: Select menu item **92**.

Stop bit 2: Select menu item **93**.

Read Chapter 7 Before Use of These Pages

15.3.7 Delimiter

The “delimiter” is used to separate individual pieces of data or commands. Set the delimiter as follows:

Set to CR(0DH): Select menu item **94**.

Set to LF(0AH): Select menu item **95**.

Set to CR+LF(0D0AH): Select menu item **96**.

Transfers the data directly to Microsoft® Windows®. This is equivalent to pressing the Enter key of the personal computer: Select menu item **97**.

Transfers the data directly to Microsoft® Windows®. This is equivalent to pressing the right cursor key of the personal computer: Select menu item **98**.

Note

Settings for “WindowsDirect” (menu items **97** and **98**.)
When these menu items are selected, it is not possible to send commands to the balance from the peripheral instruments. The personal computer and electronic printer cannot be used at the same time.

16. Maintenance and Transportation

16.1 Maintenance

Use a soft damp cloth containing a neutral detergent to clean the balance.
Avoid using organic solvents, chemicals, or dusting sprays as they may damage the coatings of the balance or the display panel.
Attach the protective in-use cover (standard accessory) when the balance is used in an environment where it is susceptible to being soiled.
The pan can be removed and washed with water. Verify that the pan is completely dry before replacing it on the balance.

16.2 Moving the Balance

To carry the balance, hold the balance firmly with both hands.
To transport the balance, use the shipping carton used to deliver the balance.

For UW balances: Before placing the balance into the shipping carton, remove the pan and pan supporter caps and verify that the transportation screws in the bottom of the balance have been tightened clockwise until they stop. Refer to 4.3.

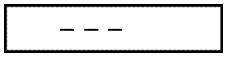
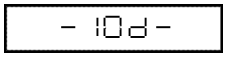
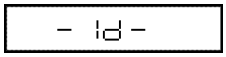
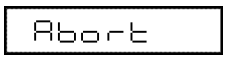
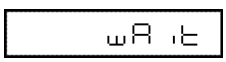
For UX balances: Remove the pan and pan supporter caps and place the balance in the packing case as it was shipped.

Caution

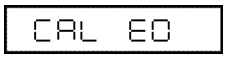
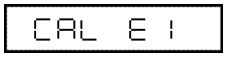
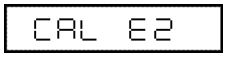
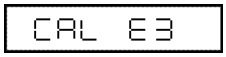
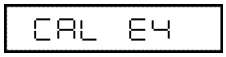
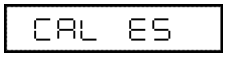
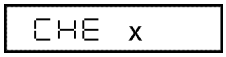
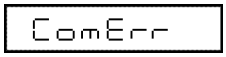
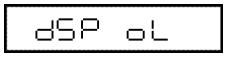
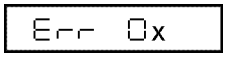
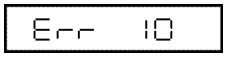
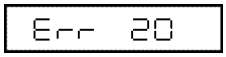
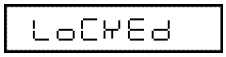
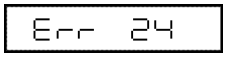
Failing to tighten the transportation screws, placing the balance on its side when turning the transportation screws, or failing to remove pan supporter caps before placing the balance upside down may cause serious damage to the mechanism.

17. Troubleshooting

17.1 General Display

Display	Description of message
	Wait for next display.
	Minimum display resolution is decreased by one decimal place.
	Minimum display digit is returned to original state.
	Date and time are being output.
	Operation was aborted.
	Application Measurement was released.
	Calibration check detects too large error. (Contact your Shimadzu representative.)
	Calibration check detects too large error. (Contact your Shimadzu representative.)
	Menu lock is applied.
	Menu lock is released.
	Menu was reset.
	Contents of new setting and coefficient were stored.
	Reset by power failure.
	Built-in weight is moving. Wait.
All numerals blinking	Place the displayed calibration weight.

17.2 Error Display

Error display	Description	Countermeasure
	Trouble in weight loading mechanism	Check transportation screws.
	The load on the pan is unstable at calibration.	Avoid wind and vibration.
	The drift of zero point is large at calibration.	Empty the pan.
	The drift is large at the time of PCAL.	Use correct weight.
	The drift is large at span calibration.	Use correct weight.
	Calibration weight is wrong.	Use correct weight.
	Failure in the balance (Stops when this is displayed)	*
	Received command code is not correct.	Check delimiter etc.
	Integer of the displayed unit exceeded 7 digits.	Decrease the load.
	Failure in the balance.	*
	PCAL password error.	Check the password.
	Attempted to set improper numeric value.	Review the numeric value and decimal places.
	**[CAL]** key was pressed during menu lock.	Release menu lock.
	Supply voltage is abnormal.	Check the supply voltage.

* Contact your Shimadzu representative.

17.3 Troubleshooting

Symptom	Probable cause(s)	Countermeasure
Nothing is displayed.	• The AC adapter is disconnected. • The breaker of the room is off. • The voltage is wrong.	Check the power and connect AC adapter correctly. (See 4.1)
“OL” or “-OL” is displayed.	Transportation screws haven’t been loosened.(UW only)	Turn them anti-clockwise until they stop. (See 4.3)
	The pan is displaced.	Place the pan properly.
	Pan supporter caps are not installed.	Install pan supporter caps. (See 4.3)
	The load on the pan is too large.	Use balance within its capacity.
Display does not change when pan is loaded.	Pan is displaced.	Place the pan properly.
Display fluctuates.	Affected by vibration or air flow.	Install the balance at a proper site. (See 4.1) Try changing environment settings. (See 11.)
	Protective in-use cover touches the pan.	Adhere the cover firm to the balance body. (See 4.3)
The weighed result is not accurate.	Span calibration has not been done.	Calibrate it properly. (See 10.)
	Taring has not been done.	Tare before weighing. (See 5.1)
Does not display the unit desired to use.	The unit has not been set up	Set it up in advance. (See 12.)
Menu item selection is rejected.	Menu Lock is ON.	Release Menu Lock. (See 7.5.3)
WindowsDirect does not work.		See 6. “WindowsDirect Function”
An error code is shown.		See 17.2 “Error Display”

17.4 LCD (Liquid Crystal Display) Check

By selecting the whole lighting mode, the LCD can be easily inspected upon power is connected.

To have the display stop and hold at whole lighting after power is connected, select the menu item **37**.
When the display holds, press the **[O/T]** key to proceed to the mass display.

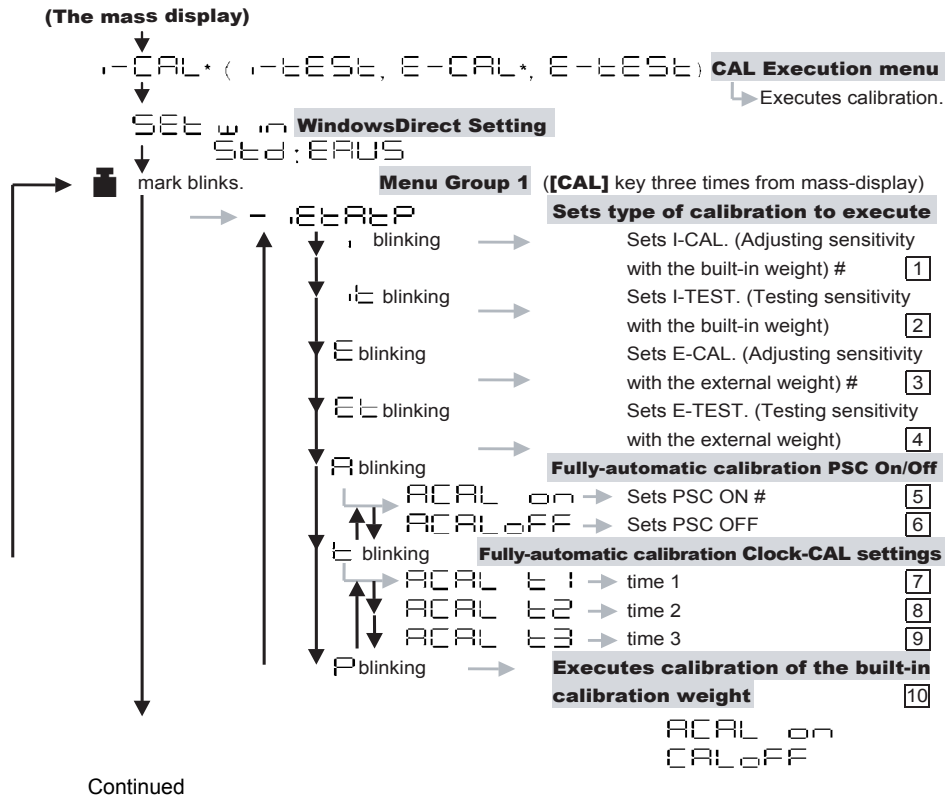
To have the display stop and proceeds to the mass display automatically, select the menu item **38**.

If the display is not the same as the figure in 2.3, contact your Shimadzu representative.

Appendix

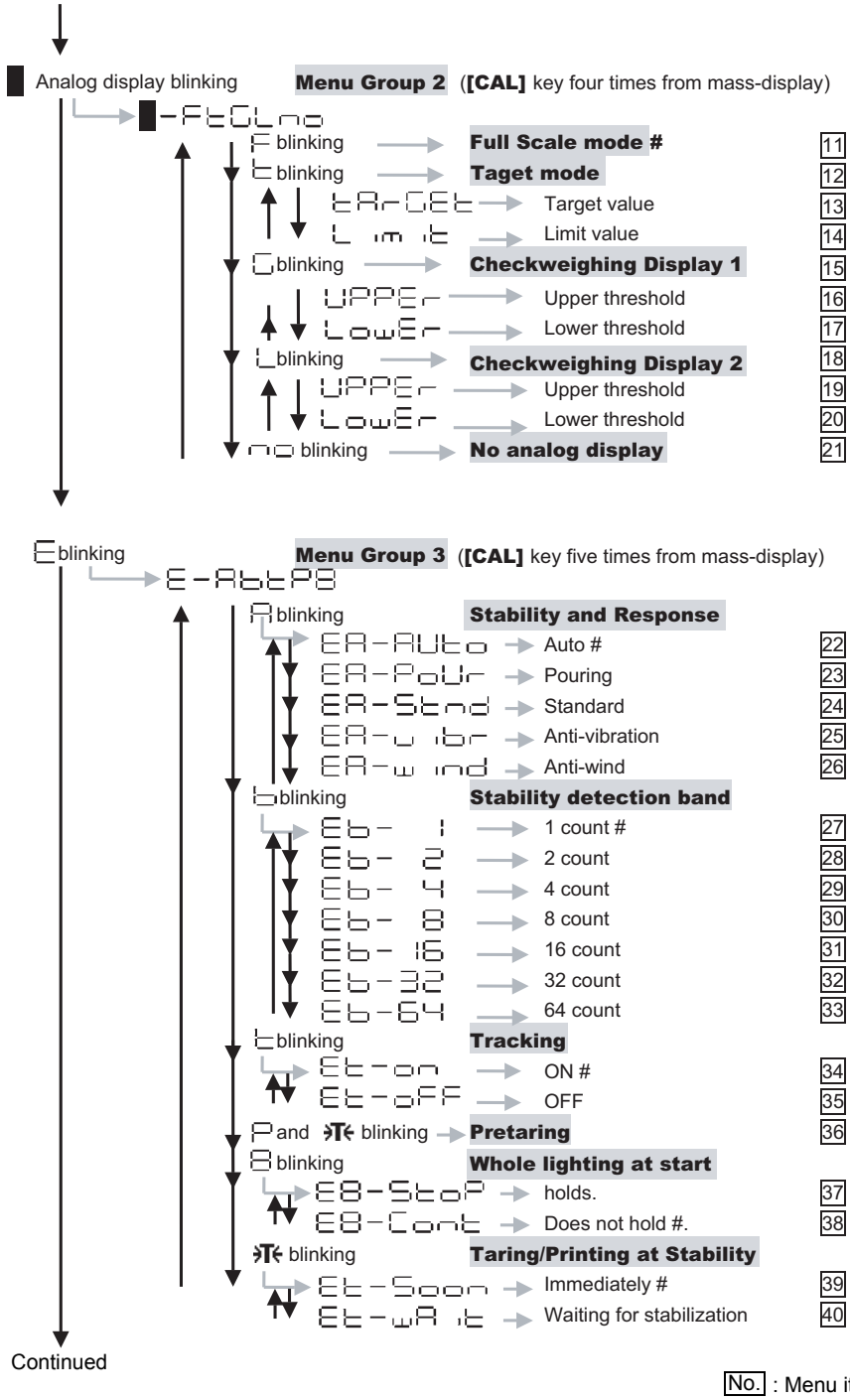
A-1. Menu Map

- Pressing **[CAL]** key moves to the next menu in the same hierarchy.
  (↓ in menu map)
- Pressing **[O/T]** key moves to the menu of one hierarchy down.
  (→ in menu map)
  When no menu exists in the menu of one hierarchy down, it is fixed.
- Pressing **[POWER]** key returns to the menu of one hierarchy up.
  (Unit other than %, PCS, ▼d, and d)
- The left raws in menu map show the balance display during menu item selection.

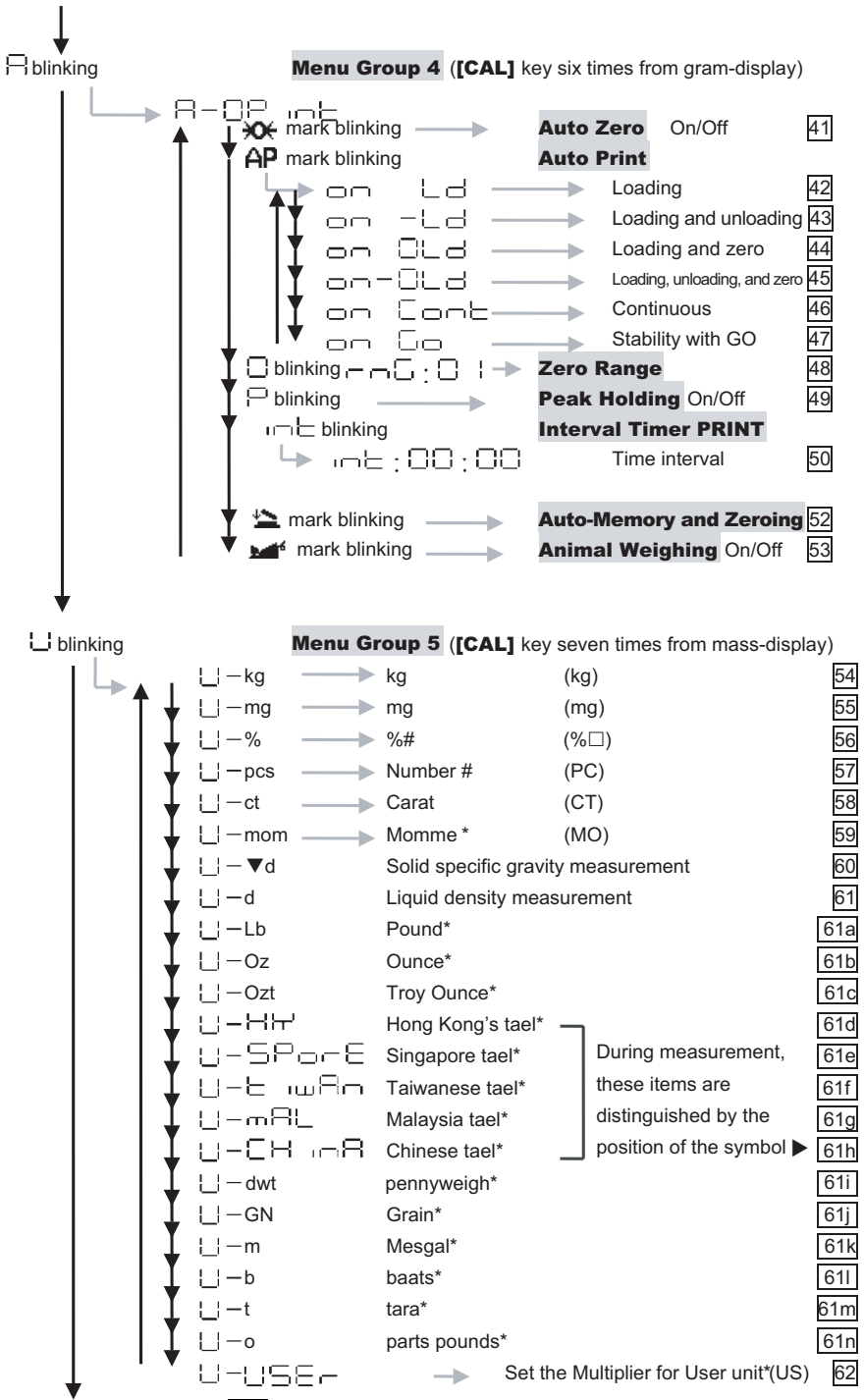


Continued

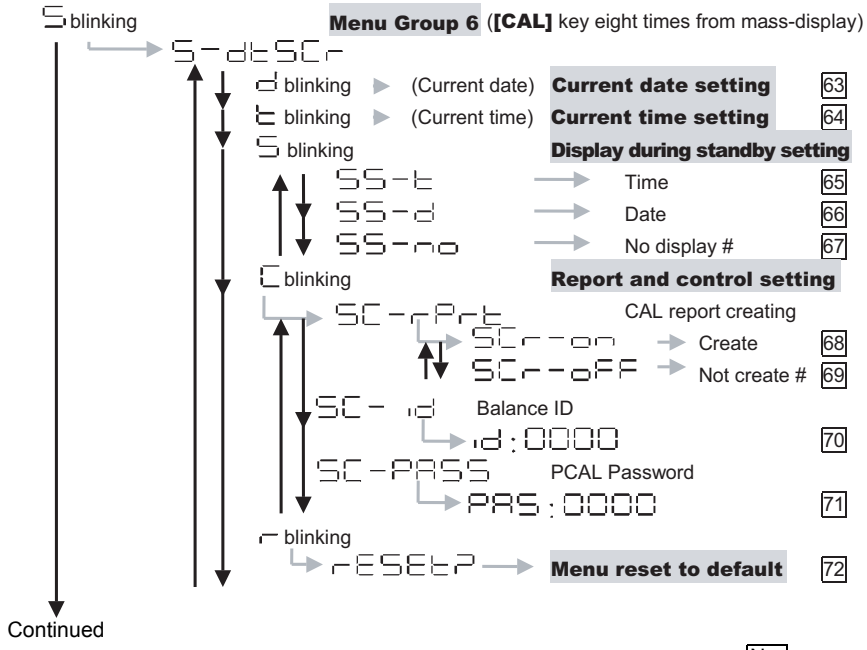
No. : Menu item number
: Default settings



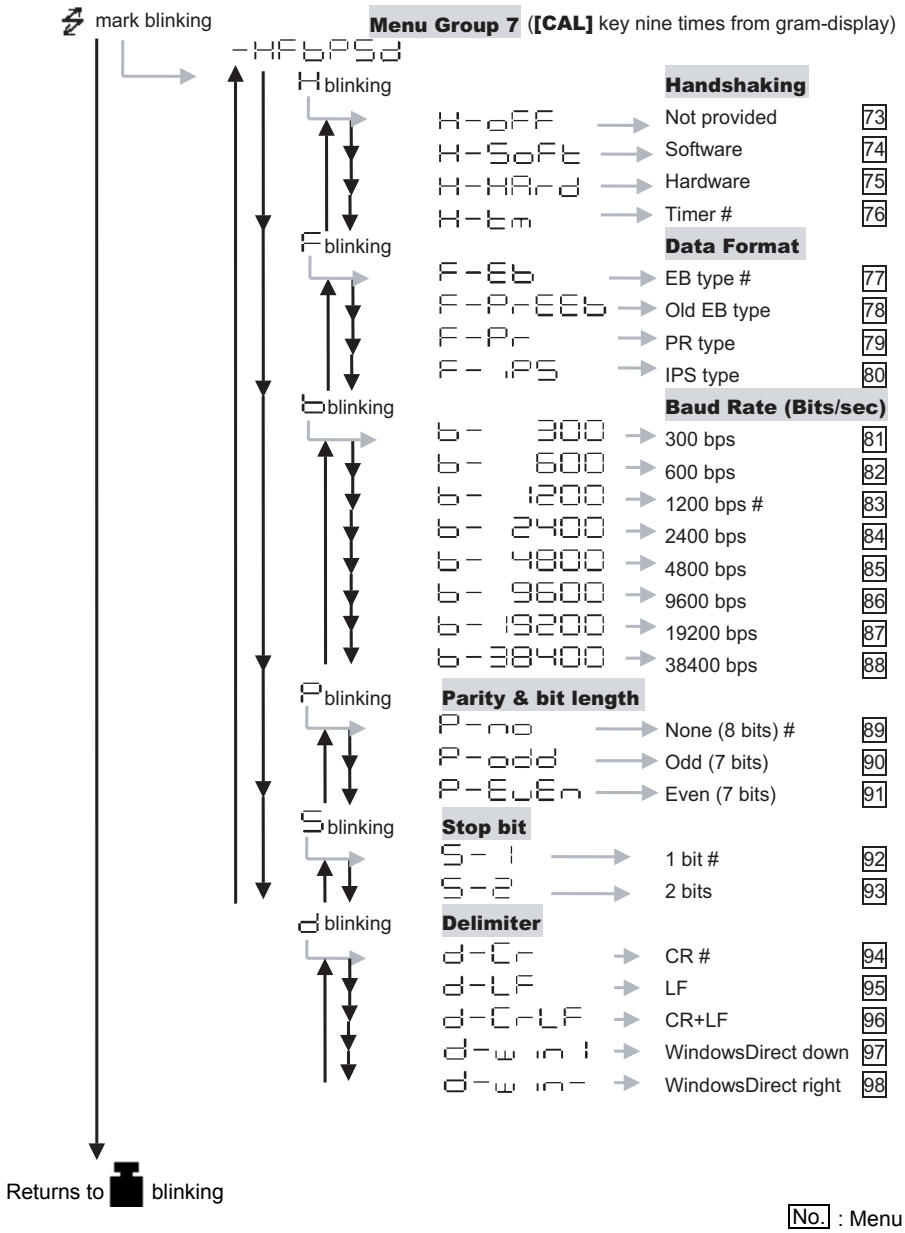
No. : Menu item number
: Default settings



No. : Menu item number
\# : Default settings
* : These units cannot be selected in some countries due to legal restriction.



No. : Menu item number
: Default settings



No. : Menu item numbe
: Default settings

A-2. Standard Accessories and Maintenance Parts List

Item	Part number	Description
Pan (large pan)	321-51555	
Pan (small pan)	321-51556	
Pan supporter cap (for large pan)	321-51552-02	
Pan supporter cap (for small pan)	321-51552-01	
Protective in-use cover (for large pan model)	321-53529-01	
Protective in-use cover (for small pan model)	321-53529-02	
Protective in-use cover (display and key)	321-62395	
Level screws	321-53530-30	
Windbreak body	321-55585	The combination is “Windbreak set” (321-60575), standard with models of 0.001g minimum display
Windbreak lid	321-55589	
AC adapter		
Below-weigh hook cap	321-51572-04	

A-3. Optional Accessories List

Item	Part number	Description
EP-50 Electronic Printer	321-34986-80 (w/o adapter)	Impact dot
EP-50WIN		Impact dot, for simultaneous print with Windows Direct function
EP-60A Electronic Printer	321-42008-90 (w/o adapter)	Thermal print
RS-232C Cable 25P-9P (1.5m)	321-60117-01	For PC/AT, DOS/V serial port
RS-232C Cable 25P-25P (1.5m)	321-60116-01	IEEE standard size
IFB-102A RS-232C Interface	321-41167-10	Necessary for multi-connection
IFB-102A-UNC RS-232C Interface	321-41167-20	Inch-size screws type, Necessary for multi-connection
AKB-301 Application Keyboard	321-53382-01	
Remote Display RDB-201	321-53600-01	With operation keys
Remote Display RDB-202	321-53600-02	Without operation keys
Windbreak Set	321-60575	Standard for models with minimum display of 0.001g
Windbreak (large)	321-53537	
FSB-102PK Foot Switch	321-60110-11	
FSB-102TK Foot Switch	321-60110-12	
Battery Pack		
Small Animal Bucket set	321-62150	For large pan models only
Specific Gravity Measurement Kit SMK-101	321-60576-01	For large pan models only. Capacity reducted 100g.
Specific Gravity Measurement Kit SMK-102	321-60576-02	For small pan models only. Capacity reducted 270g. Not for UW/UX 220H.
Comparator Lamp	321-60112	For output of checkweighing, IFB-RY1 and connection cable is necessary.
IFB-RY1 Relay Output Interface	321-54026	For comparator lamp
Comparator Connection Cable	321-62420	For comparator lamp

Note

Part number and specification are subject to change without notice.
It is not guaranteed that RS-232C cable will conform to all computers.

A-4. Specifications of the RS-232C Connector

Pin number	Use	Name	Function	Remarks
1	RS	FG	Frame ground	
2	RS	TXD	Data output	
3	RS	RXD	Data input	
4	RS	RTS	Internal connection with CTS	
5	RS	CTS	Internal connection with RTS	
6	RS	DSR	Handshake (receiving)	
7	RS	SG	Signal grounding	
8	NC	NC	Blank	
9	Foot switch	TARE	External TARE	To GND
10	NC	NC	Blank	
11	NC	NC	Blank	
12	NC	NC	Blank	
13	Spare	EXT	Extension input	Connection is prohibited
14	NC	NC	Blank	
15	NC	NC	Blank	
16	NC	NC	Blank	
17	NC	NC	Blank	
18	NC	NC	Blank	
19	NC	NC	Blank	
20	RS	DTR	Handshake (transmission)	
21	NC	NC	Blank	
22	NC	NC	Blank	
23	NC	NC	Blank	
24	NC	NC	Blank	
25	Foot switch	PRINT	External PRINT	To GND

A-5. Table of Unit Conversion Constants

Displayed during weighing

Displayed during Unit Display Set-up (See 12.1)

Menu item number	Display			Unit	Conversion coefficient (1g=)	Minimum display in the unit (models with minimum display of 0.01g, as examples)
	Center section (segmented character display)	Unit display section	Illuminated triangular symbols in the right end raw of the display; numbered from 1 to 4 from the top.			
54	***U-***	**kg**	**none**	kg*	0.001	0.00001
55	***U-***	**mg**	**none**	mg*	1000	10
56	***U-***	**%**	**none**	percentage	_____	_____
57	***U-***	**pcs**	**none**	piece counting	_____	1
58	***U-***	**ct**	**none**	carat	5	0.1
59	***U-***	**mom**	**none**	momme*	0.266667	0.005
60	***U-***	**▼ d**	**none**	solid specific gravity	_____	_____
61	***U-***	**d**	**none**	liquid density	_____	_____
61a	***U-***	**lb**	**none**	Lb (pound)*	0.00220462	0.00005
61b	***U-***	**oz**	**none**	Oz (ounce)*	0.035274	0.0005
61c	***U-***	**ozt**	**none**	Ozt (troy ounce)*	0.0321507	0.0005
61d	***U-HK***	**tl**	**1**	Hong Kong tael*	0.0267165	0.001
61e	***U-HK***	**tl**	**2,3,4**	Hong Kong tael (jewel) *	0.0267173	0.001
61f	***U-SPorE***	**tl**	**2**	Singapore tael*	0.0264554	0.001
61g	***U-twn***	**tl**	**3**	Taiwan tael*	0.0266667	0.001
61h	***U-twn***	**tl**	**1,2,4**	Taiwan tael*	0.0266667	0.0002
61i	***U- mAL***	**tl**	**4**	Malaysia tael*	0.0264600	0.0005
61j	***U-CHinA***	**tl**	**none**	China tael*	0.0266071	0.0005
61k	***U-CHinA***	**tl**	**1,2,3,4**	China tael*	0.0266071	0.001
61l	***U-***	**dwt**	**none**	dwt (pennyweight)*	0.643015	0.01
61m	***U-***	**GN**	**none**	GN (Grain)*	15.4324	0.2
61n	***U-***	**t**	**none**	tola*	0.0857339	0.001
62	***U-USEr***		**4**	User unit*	_____	_____

*These units cannot be selected in some countries due to legal restriction.

A-6. Performance Checks

Notes

- Performance checks should be conducted in a room where there are no sudden temperature changes. Refer to the installation guidelines for the environmental factors that assure optimal performance.
- The following is a standard method used to determine whether the balance is working properly.
- The specific criterion should be set according to each user's quality goal.

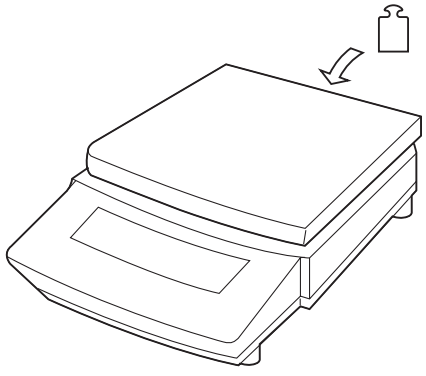
Repeatability

1 Allow the balance to warm up sufficiently by turning ON the power and leaving it at the gram-display at least two hours before starting the performance checks.

2 Choose a weight that is near half the capacity of the balance. Load and unload the weight five successive times and record the following items:
Xi: Displayed value when the weight is loaded.
Yi: Displayed value when the weight is unloaded.

3 Use the formulas shown below to calculate the values Rx and Ry.

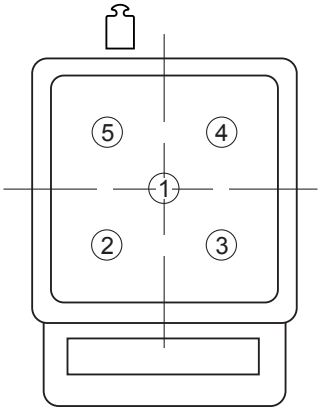
4 Balance repeatability is considered normal when both Rx and Ry are within five counts.
* One count corresponds to one minimum display unit of the balance model.



Load : $X_1, X_2, ...Xi, ...X_5$
↑
↓
Unload : $Y_1, Y_2, ...Yi, ...Y_5$

Rx = X (max) – X (min)
Ry = Y (max) – Y (min)

Cornerload Performance



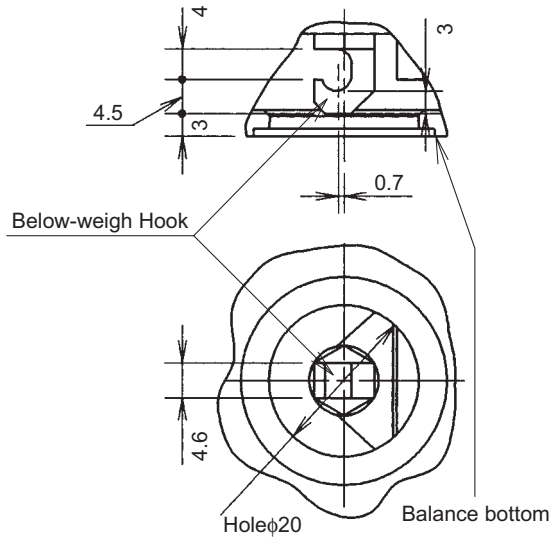
1 Allow the balance to warm up sufficiently by turning ON the power and leaving it at the gram-display at least two hours before starting the performance checks.

2 Use a weight that is approximately 1/4 of the balance capacity and place it sequentially at five different positions on the pan in the order shown. Record the readings in each of the five positions.

3 If the difference between the readings at the center position and each of the off-center positions (eccentric error) is within five counts, the balance cornerload performance is considered normal.

* One count corresponds to one minimum display unit of the balance model.

A-7. Below-Weigh Hook Dimensions



A-8. Notes on WindowsDirect

Compatibility Notification Regarding Linking of "WindowsDirect" Function with Windows®95 Version 4.00.950B

Microsoft Corporation announces that, when a personal computer's SerialKey Devices are set up, an OE error may occur, depending on the Windows® 95 version.
Before setting up your personal computer for "Linking with Windows® 95" function of Shimadzu's balances, be sure to check your Windows® 95 version and take appropriate precautionary measures according to this instruction, whenever required.

Caution

1 This information is provided only for the benefit of Shimadzu customers. It is the responsibility of the customers to take these precautionary measures on their own. Shimadzu Corporation as well as Microsoft Corporation does not have any responsibility for anything caused by the precautionary measures here.

2 If you have attempted to setup SerialKey Devices without taking these precautionary measures and Windows® 95 will not start normally, follow the procedure below:

- Restart your personal computer.
- While "Starting Windows® 95..." is being displayed on the screen, press **[F8]** key and then select "3 Safe mode" to start up the system.
- Select [Control Panel] > [Accessibility Options] > [General] and remove the check mark on the [Support SerialKey devices] check box.
- Restart Windows®95.

1. Confirmation of the Windows®95 Version

- Click [Start] > [Settings] > [Control Panel].
- Double-click [System].
- Read the [General] tab's system information.

If it is:

Microsoft Windows® 95
4.00.950B

go to "2. Precautionary Measures."

If not, perform setup according to the instruction manual of your balance without taking precautionary measures written here.

2. Precautionary Measures

For Microsoft Windows®95 ver. 4.00.950B only.

1. Close all of active software applications.
2. Select [Start], designate the file name, and click on [Run...].
3. Enter “regedit” in the “Open:” field via the keyboard.
4. Click [OK], and the Registry Editor will start up.
5. Double-click “HKEY_LOCAL_MACHINE”
6. Double-click [System]/
7. Double-click [CurrentControlSet].
8. Double-click [Service].
9. Double-click [Vxd].
10. Double-click [VCOMM].
11. Double-click “EnablePowerManagement” located on the right window.
12. Edit “0000 01 00 00 00” to “0000 00 00 00 00.”
13. Click [OK].
14. Click [Registry], then choose [Exit Registry Editor].
15. Select [Start] > [Shut Down...] > “Restart the computer?” then click [Yes].

The precautionary measures are complete. Perform setup according to the instruction manual for the balance.

This precautionary measure is effective automatically, whenever the Windows® 95 system is restarted. You will be required to perform the precautionary measure again if your Windows® 95 system is re-installed.

3. Reference

Microsoft Corporation provides information on this problem at the following site:

http://premium.microsoft.com/support/kb/articles/q170/8/45.asp/

A-9. Index

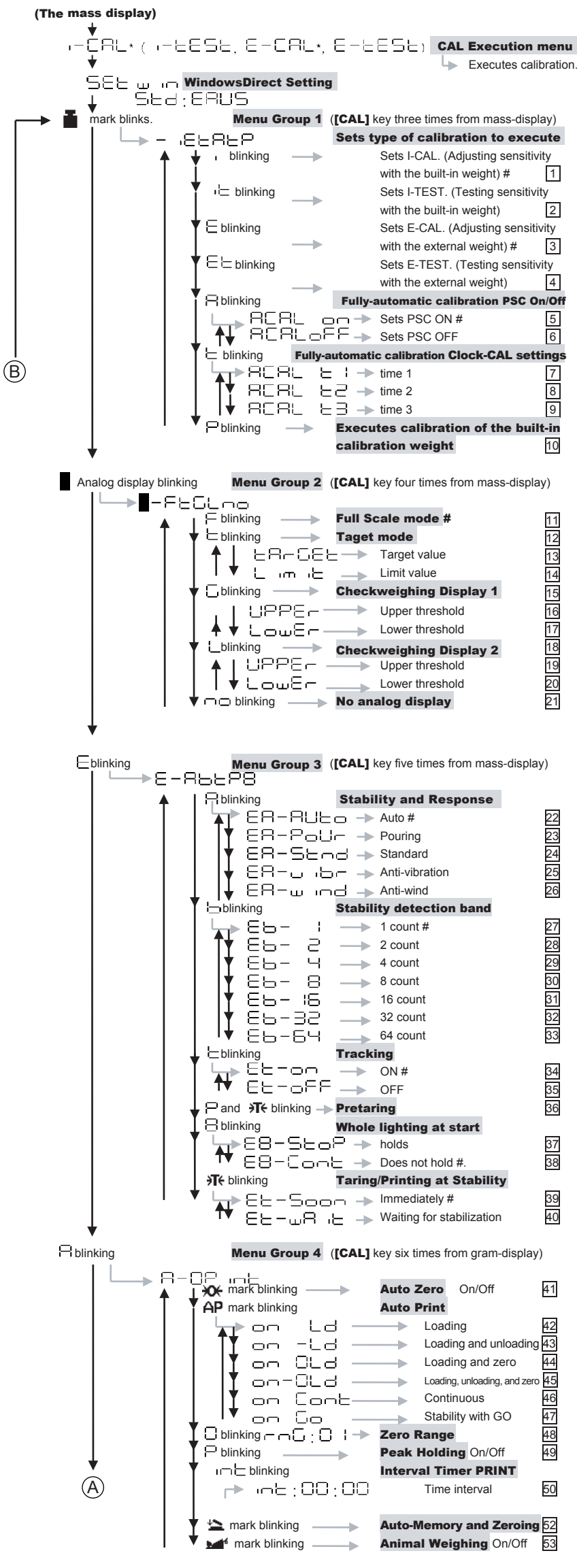
W

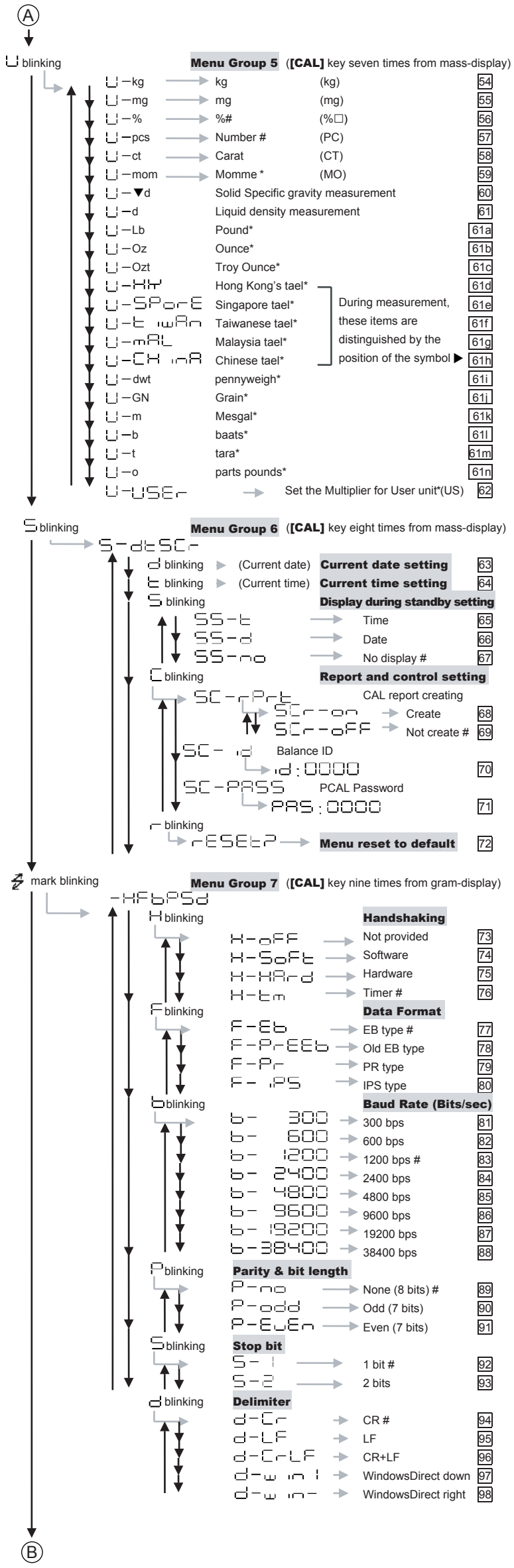
Z

Menu Map

- Pressing **[CAL]** key moves to the next menu in the same hierarchy. (↓ in the table below)
- Pressing **[O/T]** key moves to the menu of one hierarchy down. (→ in the table below)
  When no menu exists in the menu of one hierarchy down, it is fixed.
- Pressing **[POWER]** key returns to the menu of one hierarchy up.

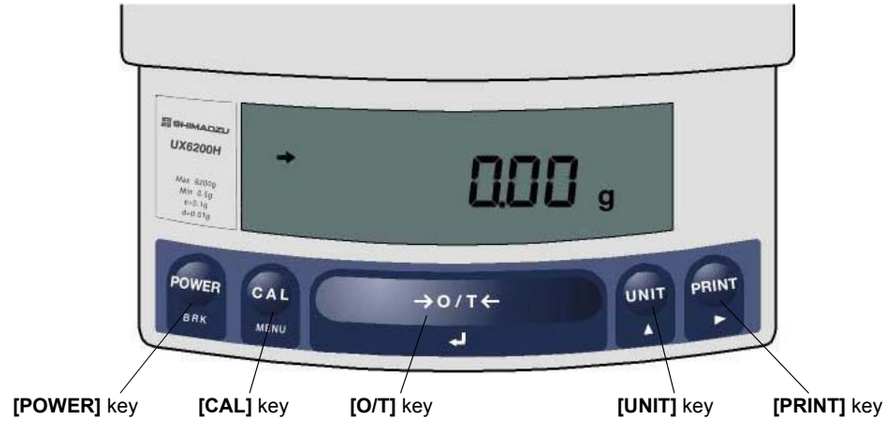
(Unit other than %, PCS, ▼d, and d)





No. : Menu item number
\# : Default settings
* : These units cannot be selected in some countries due to legal restriction.

Key Panel and Operation



Functions of the keys

Key	During Weighing	
	Press Once and Release	**Press and Hold for About 3 Seconds**
[POWER]	Switches between the operation and standby modes.	Exits the application function and returns to the mass display.
[CAL]	Enters span calibration or menu item selection. (*1)	Displays the last menu item that was set. (Last menu recall)
[O/T]	Tares the balance. (Displays zero.) (*2)	Displays the Pretare value.
[UNIT]	Changes the weighing unit or selects specific gravity measurement. (*3)	Switches between the 1d and 10d display. (*4)
[PRINT]	Sends the displayed value to a peripheral device.	Sends the date and time to a peripheral device.

*1 This key is used to set values when percent (%), number (PCS), solid specific gravity (▼d), or liquid specific gravity (d) are displayed.

*2 When a Pretare value is set, zero is not displayed and [- Pretare value] is displayed.

*3 Units other than “g” must be set up before they can be used for measurement. Only gram (g), percent (%), and piece counting (PCS) are set-up before shipment. To set up other units or specific gravity measurement, refer to section 12., or 14.1, 14.2.

*4 When the unit is set to 10d, the resolution of the minimum display is decreased by one decimal place.

Key	During Menu Item Selection	
	Press Once and Release	**Press and Hold for About 3 Seconds**
[POWER]	Returns to the previous menu level	Returns to the mass display.
[CAL]	Moves to the next menu item.	Displays the last menu item that was set. (Last Menu Recall)
[O/T]	Selects or sets the currently displayed menu item, or enter into the displayed menu.	No operation.
[UNIT]	Increases the numeric value of the blinking digit by 1.	No operation.
[PRINT]	Moves to the next digit during numeric value entry.	No operation.

Span Calibration Procedure

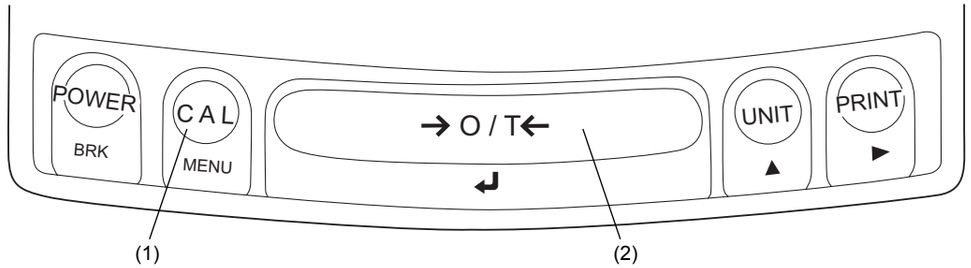
Calibration is required to accurately weigh items with an electronic balance.
Calibration should be performed:

- When the location of the balance is changed, even within the same room.
- When the room temperature changes considerably.
- Periodically, according to the quality control plan of the user.

Before span calibration, verify that the balance is in the mass-display and that the pan is empty.

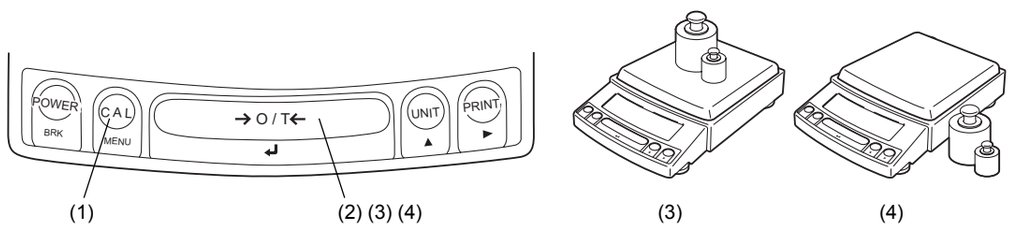
UW series [Span Calibration Using the Built-in Weight]

(1) Press the **[CAL]** key once. “i-CAL” is displayed.
(2) Press the **[O/T]** key. After “i-CAL3”...“i-CAL1”, and “SEt”, “CAL End” are displayed indicating the completion of span calibration, the mass-display will return.



* This is the calibration of default setting. Refer to 10.3.1 for the use of external weights.

UX series [Span Calibration Using External Weights]



(1) Press the **[CAL]** key once. “E-CAL” is displayed.
(2) Press the **[O/T]** key.
The value of the correct calibration weight to be loaded is displayed and blinks.
(3) Load the indicated calibration weight and press the **[O/T]** key.
(4) When the zero display blinks, unload the weight from the pan and press the **[O/T]** key. “SEt” is displayed briefly to indicate completion of span calibration. Then the mass-display will return.