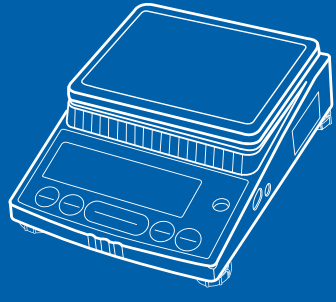
LABORATORY WEIGHING SOLUTION™

CBL SERIES

Precision Balance



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OWNER'S MANUAL

CAS

CONTENTS

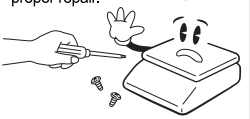
PRECAUTIONS

Warning

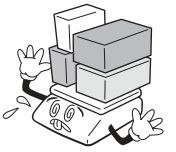
Precautions when installing the scale. To ensure that you get the most from your scale, please follow these instruction.

Do not disassemble the scale.

When any damage or defect occurs, contact your CAS authorized dealer immediately for proper repair.



Do not overload beyond the maximum weight limit.

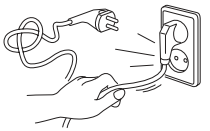


Scale must be grounded to minimize electricity static.

This will minimize defect or electric shock.

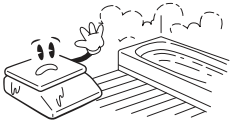
Do not pull the plug by its cord when unplugging.

Damaged cord could cause electric shock or fire.

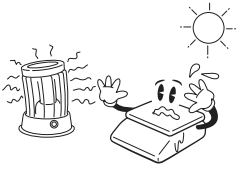


To prevent from fire occurring, Do not place or use the scale near flammable or corrosive gas.

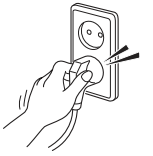
To reduce electric shock or incorrect reading, Do not spill water on the scale or place it in humid condition.



Avoid placing the scale near heater or in direct sunlight.

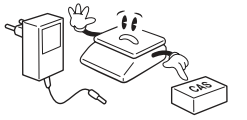


Insert plug firmly to wall outlet to prevent electric shock.



Use proper Adapter.

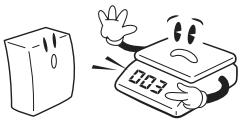
Incorrect adapter could damage the scale.



⚠ Attention

Make sure to plug your scal into the proper power outlet. For maximum performance, plug into a power outlet 30 minutes before the usage for warm up.

For consistent and accurate reading, maintain periodical check by your CAS authorized dealer.



Avoid sudden shock to the scale.

Grab on the bottom of the scale when moving.

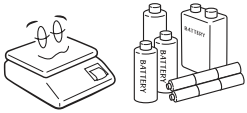
Keep the scale away from other electromagnetic enerating devices.

This may interfere with accurate reading.

Place the scale on firm and temperature consistent environment.

By adjusting 4 comers of the scale, set the scale even using the built in scale leveling indicator.

Take the battery out when scale is not in use for long time. Leakage from the batteries is hazardous.

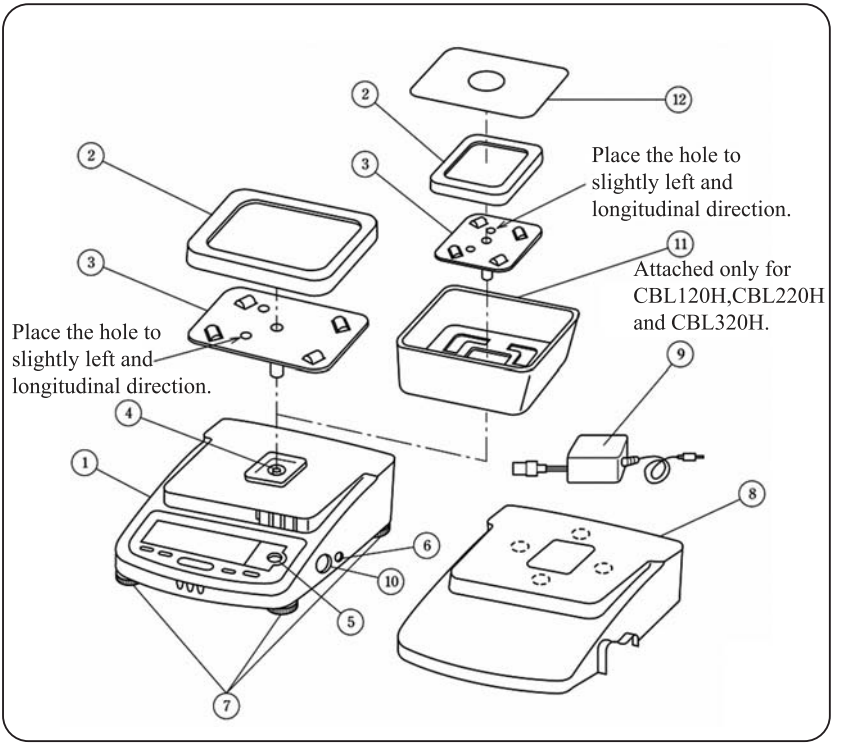


COMPONENTS AND THEIR NAMES

Components

- Included with every balance are one of the following items.

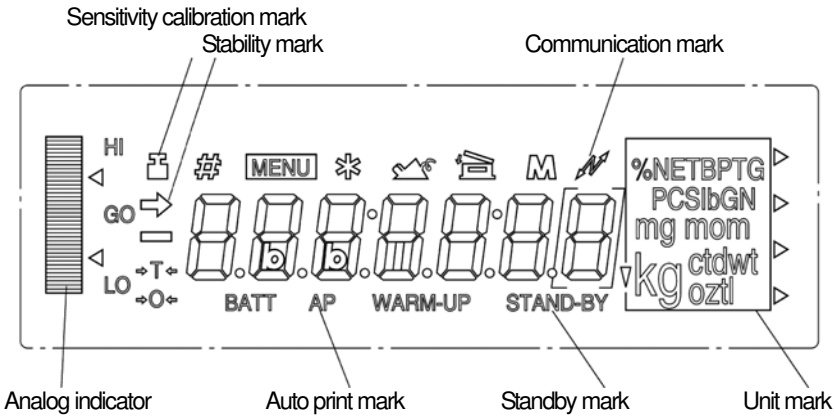
● Balance body ● AC adapter(Option) ● Protection cover ● Pan
● Pan supporter ● Instruction manual ● Inspection certificate
● Breeze guard (Only type CBL120H, CBL 220H and CBL320H).



① Balance body ② Pan ③ Pan supporter ④ Pan shaft ⑤ Level gauge
⑥ Power jack ⑦ Level screws (3 places) ⑧ Protection cover
⑨ AC adapter (option) ⑩ Data I/O connector
⑪ Breeze guard (Only CBL120H, CBL220H and CBL320H)
⑫ Breeze guard cover (Only CBL120H, CBL220H and CBL320H)

Display and keypad

Display



Keypad

KEY	FUNCTION
POWER/BAK	Selects Operation / Warm-up. Cancels calibration or menu.
CAL/MENU	Performs calibration. Selects a menu.
TARE	Clears the display to zero. Sets a menu.
UNIT	Selects a unit. Sets % or No. of pieces. Sets a value of sensitivity calibration weight.
PRINT	Outputs the displayed value to a printer or orther extemal equipment. Sets a value of sensitivity calibration weight.

INSTALLATION

Check power voltage

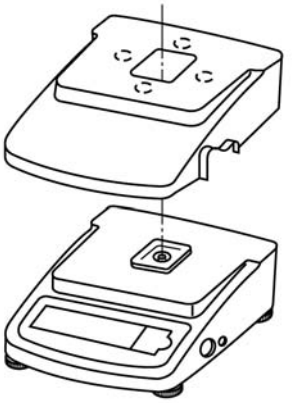
- ▶ Use only the AC adapter that supplys the output of 12VDC or the AC adapter provided by the distributor who is authorized by CAS Corporation.
- ▶ Check the power supply voltage.
- ▶ Check that the supplied power voltage satisfies the displayed value on the AC adaptor.
- ▶ In order to prevent electric shock when connecting the power, use a 3P plug with a grounding line or a 2P plug after connecting the grounding wire to the screw at the back of the case.
- ▶ Do not place anything that makes it difficult to pull the AC adapter off the outlet.

Site

Avoid installing the balance in a place where:

- ▶ It is exposed to corrosive gas or flammable gas;
- ▶ It is exposed dust, wind, vibration, electromagnetic waves, or a magnetic field;
- ▶ It is exposed to direct sunlight or a sudden change in temperature; or
- ▶ It is exposed to extremely high or low temperature or humidity.

Installation



(1) Remove the protection seals (4 places) from the protection cover and then put it on the balance body.

(2) Turn the level screw so that the air bubble on the level gauge is positioned at the center of the red circle. Make sure that the balance never jolt.

For easy adjustment, insert the level screw on the right back forcibly to the balance body. Then while lightly pressing the balance top with your hand, adjust the horizontal level with the level screws on the right front and left front.

Finally, in order to make the balance stable, adjust the right back screw to touch the floor.

This procedure allows you to level the balance quickly.

(3) Place the pan supporter on the pan shaft and then the pan on the pan supporter.

(4) Plug the AC adapter into the outlet. The balance shows "oFF" after self-checking.

(5) Press the **POWER/BRK** key. All displays light for one minute. Then the display automatically shows "zero" and the balance enters measurement ready state.

(6) Press the **POWER/BRK** key again. The standby mark lights up and the balance enters standby state.

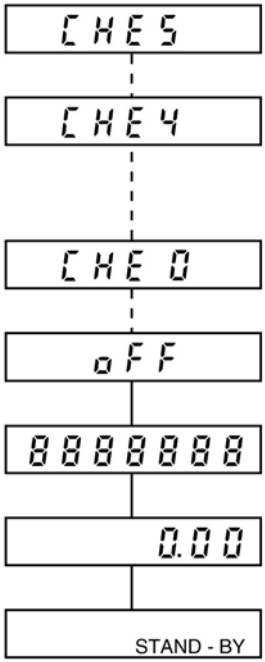
(7) Warm up the balance.

(8) Calibrate the sensitivity.

Refer to "7. SENSITIVITY CALIBRATION".

(9) Check the performance.

Refer to "11. PERFORMANCE CHECKS"



WARM-UP

- Apply power in advance for one hour or more. This will allow you to immediately make an accurate measurement.
- Even if the balance is not used, keep the standby mark lit (warm-up state) by pressing the **POWER/BRK** key without disconnecting the AC adapter.
- If the balance is not used for one month or more, disconnect the AC adapter.

CAUTION NOTES

- put water, metal pin or any thing in the balance;
- open the balance case;
- leave anything exceeding the weighing capacity on the pan;
- expose the balance to anything magnetized;
- connect anything other than the specified equipment to the connector on the rear side of the balance; and.
- give a shock to the pan.

MEASUREMENT PROCEDURE

Warm up the balance.

Preparation for Weighing Making a measure-ment mode

(1) Press the **POWER/BRK** key. The standby mark goes off and all displays light. Check that there is no segment which is not lit.

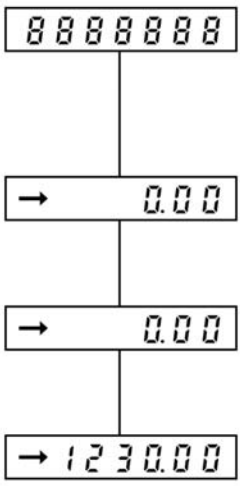
(2) The balance shows zero and enters the measurement mode

Measurement

(1) When using a tare, load the tare on the pan and press the **TARE** key after a stability mark is lit.

(2) Check that the display shows zero.

(3) Load a sample. When the stability mark is lit, read the display. If the total mass of the sample and tare exceeds the weighing capacity, " o L " will be displayed.



※ Tare : A sample container or other.
Stability mark(→) : Lights when the displayed value falls within the stability band. When the load change is slow, the displayed value will fluctuate with the stability mark lit.

MENU SELECTION

This balance is designed to permit selection of the measuring conditions to compensate for vibration and other conditions present at the installation site. This feather permits greater weighing efficiency and accuracy, and is referred to as "Menu Selection".
Also in CBL series, setting the balance to " Std " (standard measurement mode) makes a normal measurement and requires no other setting.
The menu in the CBL series consists of three classifications. Basically press the **TARE** key to go to lower hierarchy, and press the **POWER/BRK** key to return to upper hierarchy. Continuously pressing the **POWER/BRK** key returns the display to weight display from each hierarchy with single operation.

Step

(1) Press the **CAL/MENU** key during the weight display.
(2) " CAL " will be displayed.
(3) Every time the **CAL/MENU** key is subsequently pressed, the display be changed in the order shown below.
(4) Select the desired condition and press the **TARE** key. Then, it will be set or enter into the lower hierarchy.

0.000	Weight display
CAL	Sensitivity calibration mode
St bit	Currently set condition
Stnd	Standard mode
SAmPLE	Sample pouring mode
Hi-Stb	High stability mode
FUnC. SEL	Enters second hierarchy menu. Advanced measurement, unit registration, and individual setting mode ☞ Refer to Section 6.1 "Menu selection when "FUnC. SEL" is selected".
CAL SEt	Enter second hierarchy menu. Setting the value of sensitivity calibration weight ☞ Refer to Section 7.2 " Setting the value of sensitivity calibration weight".
intFACE	Enter second hierarchy menu. Input/output format setting mode ☞ Refer to Section 6.2 " Menu selection when "intFACE" is selected".
0.000	Weight display

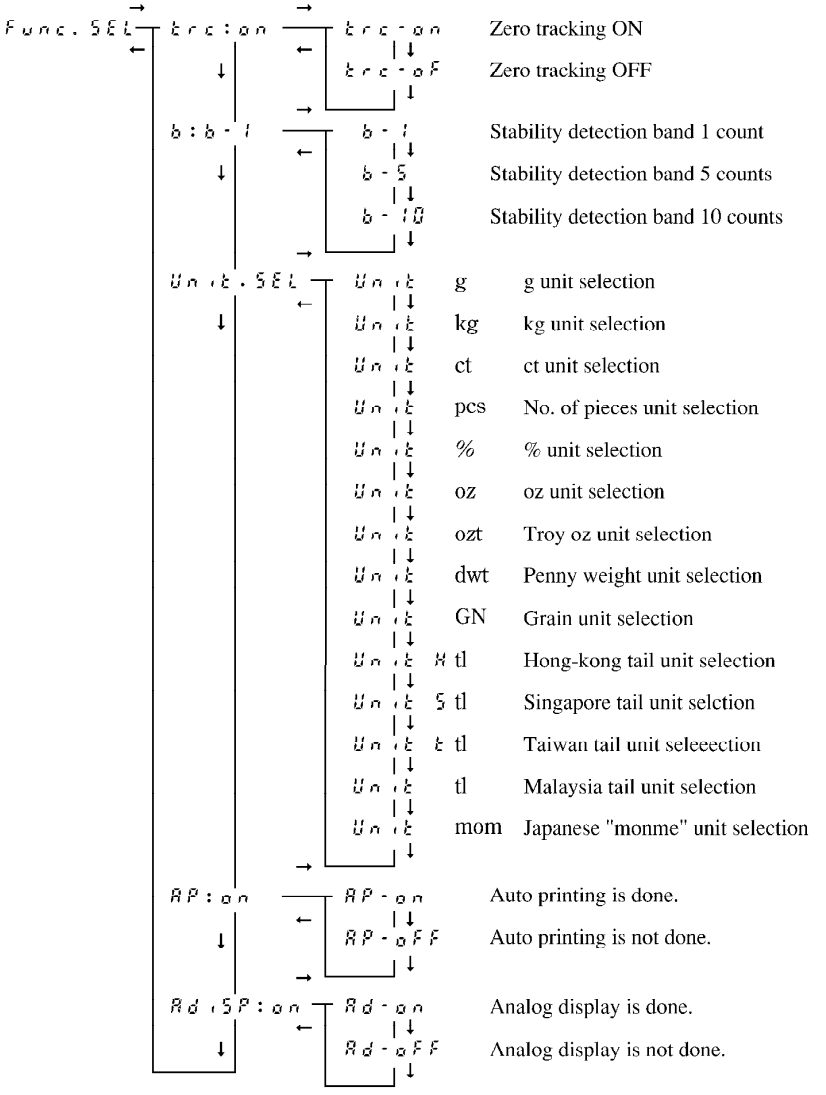
▶ If the measurement is done at severe measurement environment and the stability of the display is not so good, set the balance to "Hi-Stb" (high-stability mode).

▶ When the high-speed sample pouring mode is executed, or the small mount of sample pouring is done, set the balance to "SAmPLE" (sample mode).

1. Menu selection when "FUnC. SEL" is selected

Pressing the **TARE** key when the "FUnC. SEL" is displayed at 1st hierarchy menu enters 2nd hierarchy menu.
In this menu, ON/OFF of zero tracking, setting the stability detection band, registration/cancel of unit, ON/OFF of auto print, and ON/OFF of analog display are made.

Key operation and each setting are made as follows.



(→) : Press the **TARE** key.
(←) : Press the **POWER/BRK** key.
(↓) : Press the **CAL/MENU** key.

◆ When set to b - 1, satisfactory for most use, the stability mark lights when the display stays within +/-1 unit (the resolution value of the balance) for a fixed period time.

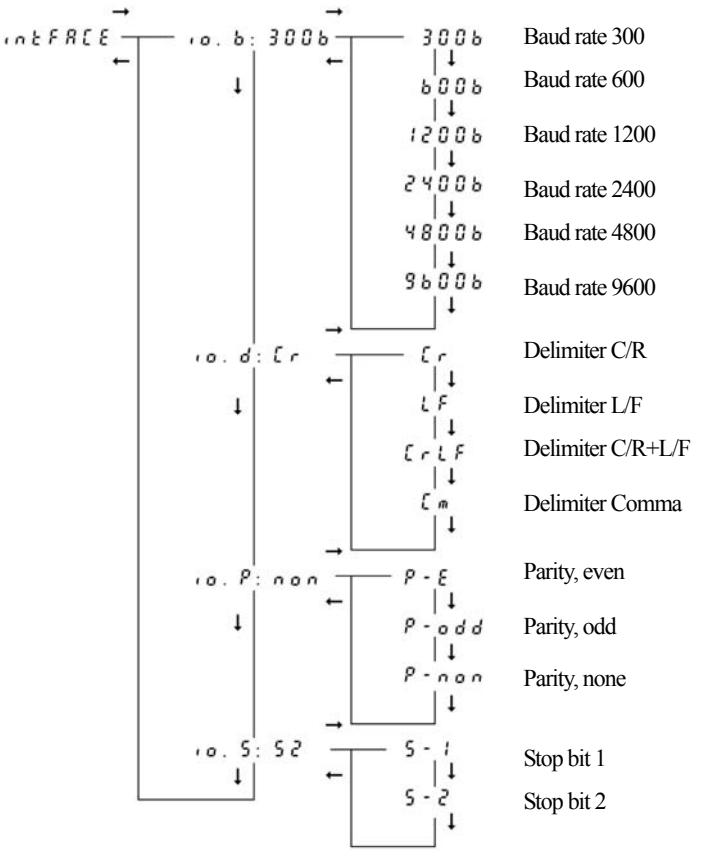
◆ When the display shows "trC **, b : b - *, AP **, Ad .SP **", the currently set conditions are displayed on **.

◆ Zero tracking eliminates zero drift, and should be on (trc - on) for normal weighing. When measuring weight changes over time, or when slowly adding a liquid or powder to the balance, turn off (trc - oFF) the zero tracking feature.

2. Menu display when intFACE is selected

Pressing the **TARE** key when the "intFACE" is displayed at 1st hierarchy menu enters 2nd hierarchy menu.

In this menu, the input/output format can be set.



(→) : Press the **TARE** key.
(←) : Press the **POWER/BRK** key.
(↓) : Press the **CAL/MENU** key.

◆ When the display shows "no.b **", "no.d **", "no.P **", "no.S **", the currently set conditions are displayed on **.

SENSITIVITY CALIBRATION

The electronic balance measures mass by electronicity compensating for terrestrial gravitation.
Since gravitation varies slightly in different regions, span calibration (sensitivity calibration) is required when the balance is installed. Temperature also effects balance accuracy, and calibration must be performed whenever a significant change occurs. It is good practice to calibrate the balance whenever the balance is moved or unexpected shock is applied to the balance such that an article drops on the pan.

1. Setting the value of sensitivity calibration weight

In this balance, the value for sensitivity calibration weight can be set freely within the specified range.
Using the weight having known value, sensitivity calibration can be made.
Set the weight value using at sensitivity calibration as follows.

Step

(1) Following the menu selection, press the **CAL/MENU** key to make the display " CAL SET ".

(2) Press the **TARE** key to set the balance to weight set mode.

(3) The weight value currently set is displayed and the digit to be set blinks. When the weight value is not changed, press the **TARE** key.

(4) Pressing the **PRINT** key shifts the blinking digit.

(5) Pressing the **UNIT** key counts up the blinking displayed value.

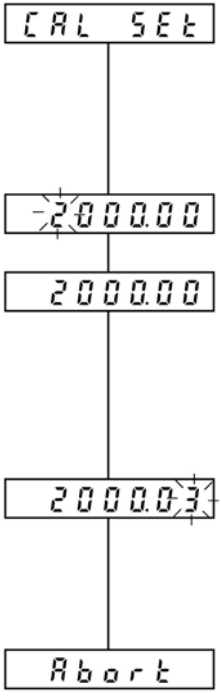
(6) Repeats the steps (4) and (5) to set the weight value.

(7) When aborting the setting, press the **POWER/BRK** key. Then "Abort" is displayed for several seconds, the balance stops the setting of weight value and returns to weight display.

(8) After the setting of weight value is completed, press the **TARE** key.

(9) "SET" is displayed for several seconds and the balance returns to weight display.

(10) When setting the weight value exceeding the specified range, "Err 20" is displayed and then the balance returns to weight display.



The settable weight value is follows.

CBL-220S	More than 100g and less than weighing capacity.	CBL-220H	More than 100g and less than weighing capacity.
CBL-320S	More than 150g and less than weighing capacity.	CBL-320H	More than 150g and less than weighing capacity.
CBL-620S	More than 300g and less than weighing capacity.	CBL-1200H	More than 500g and less than weighing capacity.
CBL-2200S	More than 1000g and less than weighing capacity.	CBL-2200H	More than 1000g and less than weighing capacity.
CBL-3200S	More than 1500g and less than weighing capacity.	CBL-3200H CBL-3200HL	More than 1500g and less than weighing capacity.
CBL-120H	More than 50g and less than weighing capacity.		

2. Sensitivity Calibration

Perform the sensitivity calibration as follows.

Step

(1) Warm up the balance well. Refer to "3. WARM-UP".

(2) Check leveling.

(3) Unload the sample on the pan and press the **TARE** key to zero the display

(4) Following the menu selection, press the **CAL/MENU** key to display "CAL".

(5) Press the **TARE** key to start the sensitivity calibration.

(6) The set weight value appears and blinks

(7) Make sure that the stability mark is lit.

(8) Place the calibration weight on the pan. At this time, the stability mark will once disappear.

(9) When the stability mark is lit again, press the **TARE** key.

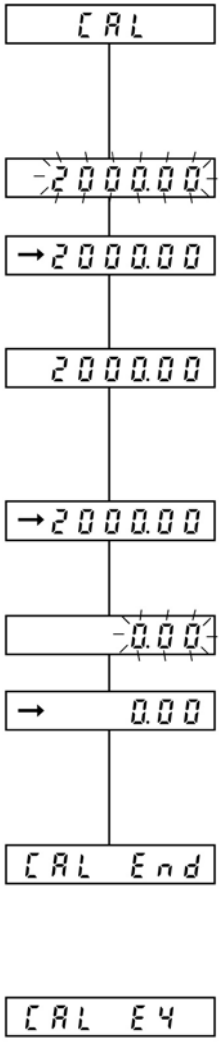
(10) The display shows zero and blinks. Make sure that the stability mark is lit.

(11) Unload the weight.

(12) When the stability mark is lit again, press the **TARE** key.

(13) "CAL End" is displayed for several seconds and the balance returns to weight display. This completes the sensitivity calibration.

(14) If the different weight is used for this sensitivity calibration, "CAL E4" is displayed for several seconds and the balance returns to weight display. Check the weight and retry the sensitivity calibration.



REGISTRATION, CANCEL, AND CHANGE OF UNIT

Step for registration

(1) Press the **CAL/MENU** key and select "FUnC. SEL" display.
(Press the **TARE** key.)

(2) Press the **CAL/MENU** key and select "Unit. SEL" display.
(Press the **TARE** key.)

(3) The registrable unit is displayed by every pressing the **CAL/MENU** key. The registerable units are three kinds which are selected from the following 14 kinds.
g, kg, ct. pcs, %, oz, ozt, dwt, GN, Hong-kong tail, Singapore tail, Taiwan tail, Maraysia tail, and Japanese "monme"
However, % and pcs (No. of pieces) cannot be registered simultaneously.
The stability mark is lit on the unit display currently registered.

(4) Press the **TARE** key on the unit display to be registered. That unit is registered.
When three kinds of unit are already registered, a new registration deletes the oldest registration among the three registered units. However, % and pcs (No. of pieces) cannot be registered simultaneously. Then deletes unnecessary one.

(5) Continuously pressing the **POWER/BRK** key returns the display to weight display.

Step for cancel

(1) Carry out the same operation described (1) to (3) above to set unit display. Selecting the same one of the unit display which is currently registered (stability mark is lit) cancels the registration.

Step for change

(1) Pressing the **UNIT** key changes the unit which is already registered.
However, even if the unit of % and pcs is already registered, the display does not change to this unit unless making a setting of reference value.

% SETTING

This balance serves percent (%) display by setting the reference sample to 100%.

Step

(1) Register the % unit. (Refer to "8. Registration, cancel, and change of unit". When % unit has been already registered, it is not necessary to register again.

(2) Place the tare on the pan and press the **TARE** key.

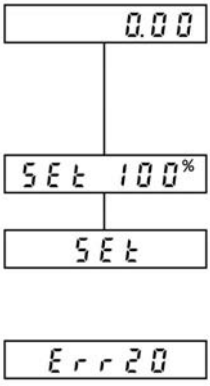
(3) Load the reference sample.

(4) Continuously press the **UNIT** key to display "SEt 100%".

(5) After the stability mark is lit, press the **TARE** key.

(6) "SEt" is displayed for several seconds and the balance enters the % unit display. Minimum displayed value changes as follows depending on reference sample weight (REF.)

If the % conversion is not possible, "Err 20" is displayed for several seconds and the balance returns to weight display.



H Type

REF. < Minimum displayed value × 100	% conversion impossible
Minimum displayed value × 100 < REF. < Minimum displayed value × 1000	100%
Minimum displayed value × 1000 < REF. < Minimum displayed value × 10000	100.0%
Minimum displayed value × 10000 < REF. < Minimum displayed value × 100000	100.00%
Minimum displayed value × 100000 < REF.	100.000%

S Type

REF. < Minimum displayed value × 100	% conversion impossible
Minimum displayed value × 100 < REF. < Minimum displayed value × 1000	100%
Minimum displayed value × 1000 < REF. < Minimum displayed value × 10000	100.0%
Minimum displayed value × 10000 < REF.	100.00%

PCS(No. of pieces) SETTING

This balance can perform No. of pieces measurement(unit PCS.)
No. of standard pieces is 10 pcs, 20 pcs, 50 pcs or 100 pcs. When the No. of pieces is increased, the accuracy is improved.

Step

(1) Register the PCS unit following the unit registration. (Refer to "8. Registration, cancel, and change of unit".) When PCS unit has been already registered, it is not necessary to register again.

(2) Place the tare on the pan and press the **TARE** key.

(3) Load the standard sample with required pieces.

(4) Check that the stability mark is lit.

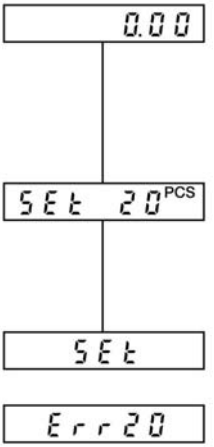
(5) When pressing the **UNIT** key continuously, the display will change as follows:

"SEt 10 PCS", "SEt 20 PCS"

"SEt 50 PCS", "SEt 100 PCS"

(6) Select the desired PCS display and press the **TARE** key.

(7) "SEt" is displayed for several seconds and the balance enters the PCS unit display. When the reference sample weight is less than "readability x No. of set pieces", the PCS setting is not made. In this case, "Err 20" is displayed for several seconds and the balance returns to weight display.



PERFORMANCE CHECKS

Conduct performance checks in a room where the temperature does not change suddenly. These checks are used to determine if the balance conforms to specifications, and should be performed with the greatest care.

Preparation

※ Warm up the balance well.

※ Set the measurement condition as follows:

▶ Stnd

▶ b - 1

▶ trc - oFF

Repeatability

(1) Load and unload 10 successive times, an weight which is near the capacity of the balance. Then record the following items:

Xi : Displayed value when the weight is loaded after stability mark is lit.

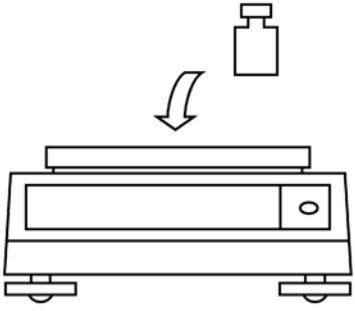
Yi : Displayed value when the weight is unloaded after stability mark is lit.

(2) Calculate the standard deviation of x and y using the formulas shown right.

Load : X1, X2, …, Xi, …, X10

↕

Unload : Y1, Y2, …, Yi, …, Y10



$$\sigma x = \sqrt{\frac{\sum_{i=1}^{10} (Xi - \overline{X})^2}{9}} \qquad \sigma y = \sqrt{\frac{\sum_{i=1}^{10} (Yi - \overline{Y})^2}{9}}$$

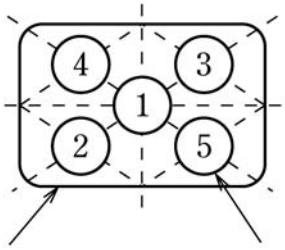
Where : $\overline{X}$, $\overline{Y}$ Average value

(3) Balance operation is normal when the standard deviation is less than 1.5 times the value specified.

Eccentric error

(1) Prepare a sample which weights approximately ¼ of the balance capacity and move it on the pan in the order as shown right. Record the results of X1 to X5 in this order.

(2) If the difference (eccentric error) between readings at the center position and the off center positions is as follows:



Pan Position of weight

320H, 3200H, 3200HL	7 Counts
H Series	4 Counts
S Series	2 Counts

MAINTENANCE

When fouled

- When the balance becomes dirty, wipe it off using a soft cloth with a small amount of mild detergent.
- Organic solvents or chemical dusters should not be used as they may damage painted surfaces and the display panel.
- When the balance is placed in a dusty or dirty environment, use the protection cover of standard accessory.
- The pan can be washed with water. Dry the pan sufficiently and mount to the balance.

TROUBLESHOOTING

For countermeasures having an asterisk, contact the nearest CAS sales or service center.

When	What trouble	Cause -> Countermeasure
Before Weighing	▶ Nothing is displayed by connecting the AC adapter to the outlet. ▶ Err 05 is displayed.	▶ The AC adapter is disconnected. ▶ The electrical board is turned OFF. ▶ There is an internal error in the balance. ⇒ *
During Weighing	▶ oL is displayed. ▶ -oL is displayed. ▶ The display fluctuates. ▶ The display does not change from zero even if a sample having the weight near readability is loaded. ▶ The display slowly changes when small amount of sample is loaded. (Normal: readability/1 sec.) ▶ oFF has appeared suddenly. ▶ Data communication cannot be made.	▶ The mass on the pan is too heavy. ▶ Sensitivity is not correct. ▶ The pan or the pan supporter is not in place. ▶ Influence from vibration or wind ☞ Improve the installation site. ☞ Change the measurement mode to High-stability mode. ▶ Influence from electric noise or electromagnetic wave ☞ Maintain a proper distance from the noise source. ▶ Zero tracking works. ☞ Refer to “6. Menu Selection”. ▶ The averaging processing is in High-stability mode. ☞ Change the measurement mode if necessary. ▶ There has been an instantaneous power failure. ☞ Press the **POWER/BRK** key (the balance enters weight display mode). ▶ Setting of communication parameter is wrong. ☞ Refer to “16.4 Setting the input/output format” ▶ Wiring of RS-232C cable is wrong.
During PCS or % setting	▶ Err 20 has displayed.	▶ Set value exceeds the specified range. ☞ " Refer to “9. % setting” and “10. PCS setting”.
During sensitivity calibration	▶ Does not proceed to next step. (The stability mark does not light) ▶ CALEY has displayed.	▶ Influence from vibration or wind ☞ Improve the installation site. ☞ Change the measurement mode to High- stability mode. ▶ The weight used for sensitivity calibration is wrong. ☞ Check the weight and retry the sensitivity calibration. ▶ There is an internal error in the balance. *

SPECIFICATIONS

Model	CBL-220S	CBL-320S	CBL-620S	CBL-2200S	CBL-3200S
Weighing capacity	220g	320g	620g	2200g	3200g
Readability	0.01g		0.01g	0.1g	
Standard deviation	0.006g		0.01g	0.06g	
Linearity	0.01g		0.02g	0.1g	
Calibration weight (*)	200g	200g 300g	500g 600g	2000g	2000g 3000g
Pan diameter(mm)	100×100		160×124		
Main body size(mm)	Approx. 170W×240D×75H				
Main body weight	Approx. 2.2kg				
Stability of sensitivity (10℃~35℃)	±10ppm/℃				
Applicable tem perature range	5~40℃				
Power supply	AC adapter: 100~250VAC, 47~63Hz, Balance : 12VDC, 0.1A				

Model	CBL-120H	CBL-220H	CBL-320H	CBL-1200H	CBL-2200S	CBL-3200H(L)
Weighing capacity	120g	220g	320g	1200g	2200g	3200g
Readability	0.001g			0.01g		
Standard deviation	0.001g			0.01g		
Linearity	0.002g		0.003g	0.02g		0.03g
Calibration weight (*)	100g	200g	300g	1000g	2000g	3000g
Pan diameter(mm)	100×100 (With the guard)			160×124		
Main body size(mm)	Approx. 170W×240D×114H			Approx. 170W×240D×75H		
Main body weight	Approx. 2.2kg					
Stability of sensitivity (10℃~35℃)	±3ppm/℃		±5ppm/℃ (10℃~30℃)	±3ppm/℃		±5ppm/℃ (10℃~30℃)
Applicable tem perature range	5~40℃					
Power supply	AC adapter: 100~250VAC, 47~63Hz, Balance : 12VDC, 0.1A(*2)					

*1 : Refer to "7.1 Setting the Sensitivity Calibration Weight".

*2 : 12VDC, 1A ONLY FOR BL3200HL

PARTS LIST

Optional accessories

Peripheral devices

Parts name		Parts No.	Remarks
Printer EP-60A		321-42008-10	
RS-232C interface IFB-102A		321-4116-710	
Calibration weigh (OIML F1class in the box)	100g	321-53445	For CBL-120H
	200g	321-53446	For CBL-220S For CBL-220H/320H For CBL-320S
	500g	321-53447	For CBL-620S
	1kg	321-53448	For CBL-1200H
	2kg	321-53449	For CBL-2200S For CBL-2200H/3200H(L) For CBL-3200S

Maintenance parts

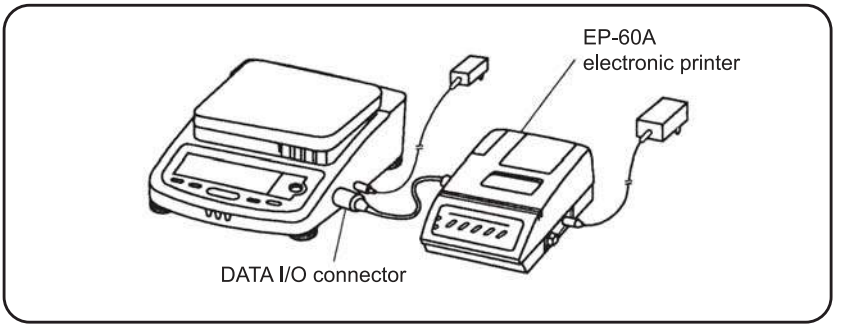
Parts name	Parts No.	Remarks
Pan(small) : For 220S, 320S, 120H, 220H, 320H	321-54847	
Pan(Large) : For 620S, 2200S, 3200S, 1200H, 2200H, 3200H(L)	321-54846	
Pan supporter(small) : For 220S, 320S, 120H, 220H, 320H	321-53908-11	
Pan supporter(Large) : For 620S, 2200S, 1200H, 2200H	321-53908-01	
Pan supporter(Large) : For 3200S, 3200H(L)	321-53908-02	
Guard	321-53901	
Guard cover	321-55654	
Protection cover	321-53902	
Level screw	321-53530	
AC adapter		OPTION

PERIPHERAL DEVICES

1. The EP-60A Electronic Printer

Connection

When connecting this balance to the EP-60A, first be sure to pull up the AC adapter for the balance and EP-60A. Then connect to data I/O connector as shown below.



Functions

Manual printing

The displayed value is printed whenever the **PRINT** key is pressed.

Autoprint

In the g display of the balance, when the display is within zero ± 3 count, the display is stabled when the sample over 20 counts of g display is loaded, the balance automatically prints out. Unload this sample and wait for the display falls into within zero ± 3 counts, then load a next sample.

Statistic calculation

Pressing the **STAT** key statistically calculates and prints the data until next pressing of the **STAT** key.

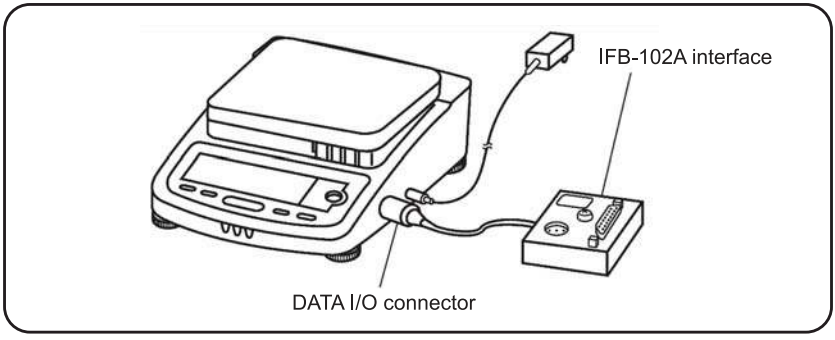
See Instruction Manual for Electronic Printer EP-60A for further details.

2. The IFB-102A RS-232C Interface

The IFB-102A is used when the balance is connected to a personal computer.

Connection

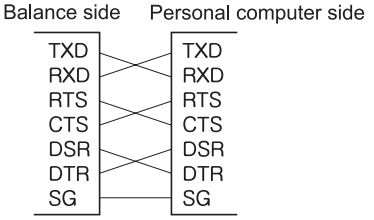
When connecting the IFB-102A to the balance, be sure to pull up the AC adapter for the balance. Then insert the plug of IFB-102A into the DATA I/O connector of the balance.



Signal

Pin No.	Signal	I/O	Function
1	FG		Ground
2	TXD	Output	Data output
3	RXD	Input	Data Input
4	RTS		
5	CTS		
6	DSR	Input	Transmitting is possible with(+) polarity.
7	SG		Ground
20	DTR	Output	Receiving is possible with (+) polarity

Example of connection



The above connection is one of examples. This may be different slightly depending on the personal computer connected to be balance.

Example of programming

The following example deals with such a program that the display value of balance is being displayed on the personal compute screen whenever the (SPACE) key of personal computer is pressed.

Baud rate : 1200 bps
Parity : none
Delimiter : CR
(" ␣ " means space.)

◆ IBM PC/AT

```
10 ␣ OPEN ␣ "COM1:1200,N,8,1" ␣ AS ␣ #1
20 ␣ Z$=INKEY$
30 ␣ IF Z$≠" ␣ " ␣ THEN ␣ 20
40 ␣ PRINT ␣ #1,"D05"
50 ␣ INPUT ␣ #1,A$
60 ␣ PRINT ␣ A$
70 ␣ GOTO ␣ 20
```

◆ NEC PC-9801 VM2

```
10 ␣ OPEN ␣ ""COM:N81NN" ␣ AS ␣ #1
```

(20 line and under the same IBM/PC/AT)
Setting baud rate (1200BPS) by personal computer's memory switch.

3. Input/output Format

␣ means space and DL means delimiter.

Input data

Command code + DL → Refer to "16.5 Command Code".

Output data

◆ For mass display

S - ␣ 1000.00g ␣ DL		
Unit	At 1-byte	Unit + ␣
	At 2-byte	Unit
	At 3-byte	Unit
Polarity	At plus	Space(␣)
	At minus	Minus(-)
Stability information (only at output with stability information)	At stable	S
	At unstable	U

◆ For 0L, -0L display

U- ␣␣␣␣ 0L ␣␣␣␣ DL		
Polarity	At plus	Space(␣)
	At minus	Minus(-)
Stability information (only at output with stability information)	At stable	S
	At unstable	U

Data format

◆ ASCII(JIS) code
◆ Baud rate, parity, and delimiter change depending on menu selection.

4. Command Code

Described in this section are the command codes which can be used when your CBL balance is connected to a computer via the IFB-102A RS-232C interface.

CAUTION : The use of characters other than those described here will cause errors in weighing and data transfer procedures. If an improper code is mistakenly entered, disconnect the balance power cable for 10 seconds, then reconnect.

Command code	Function	Description
T	Taring	Equivalent to the **TARE** key
D05	Print (output once)	Equivalent to the **PRINT** key
D06	Autoprint	Refer to "16.1 The EP-60A Electronic Printer".
D01	Continuous output	Continuous output of data in the balance at every approx. 100 ms. For less than 1200 bps, it becomes approx. 150 ms.
D09	Output stop	Autoprint or continuous output is canceled.
D07	Single output with stability Information	Printing is made once with stability information.
D03	Continuous output with stability information	Continuous printing is made with stability information.
Q	ON/OFF selection	Toggles between standby state and measurement state.

{
 	
}
	Echo back	Characters from these command codes until delimiter are received and transmitted by every character.
		By use this command, message of personal computer is able to print out EP-60A.
		Characters length is under 16 characters, including delimiter.

MEMO

MEMO

CBL SERIES
Precision Balance

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