

HF SERIES

INSTRUCTION MANUAL

PRECISION BALANCE

HF-200G

HF-300G

HF-1200G

HF-2000G

HF-3000G

HF-6000G

AND

A&D Company, Limited



This is information mark that inform to you about the operation of balance.



This is notice mark that inform to you on the operation of balance.



This is hazard mark.



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Introduction

*Thank You For Your **AD** Purchase*

Electronic Balances are easy to use, yet they are rather complex in that they are high technology products. This manual will tell you in simple language how this balance works and how to get the most out of it in terms of performance.

Features

- The HF series can be easily adapted to most operating environments through simple adjustments from the keyboard.
- The OP-03 serial interface is able to control the balance or transmit weighing data from the balance to computer or printer.
- Ten hour operation is possible using the optional battery pack, OP-09.
- Good Laboratory Practices (GLP) calibration output with OP-03 serial interface.
- A calibration mass correction function, allows precise input of the calibration mass.
- Digital Tare, allows the input of a tare value from the keyboard or via the RS-232C interface.
- Security, the serial number of the balance is available using the RS-232C interface.

Options and Accessoires

- OP-03 Serial interface, Bi-directional RS-232C/ Current Loop.
- OP-05 Printer interface, Current Loop.
- OP-09 Ni-MH battery pack.
- AD-8121A multi-function printer. This printer can print weighing data, total weighing counting and standard deviation, along with the time and date. Includes statistic calculation.
- OP-10 Glass weighing chamber (except HF-6000G).

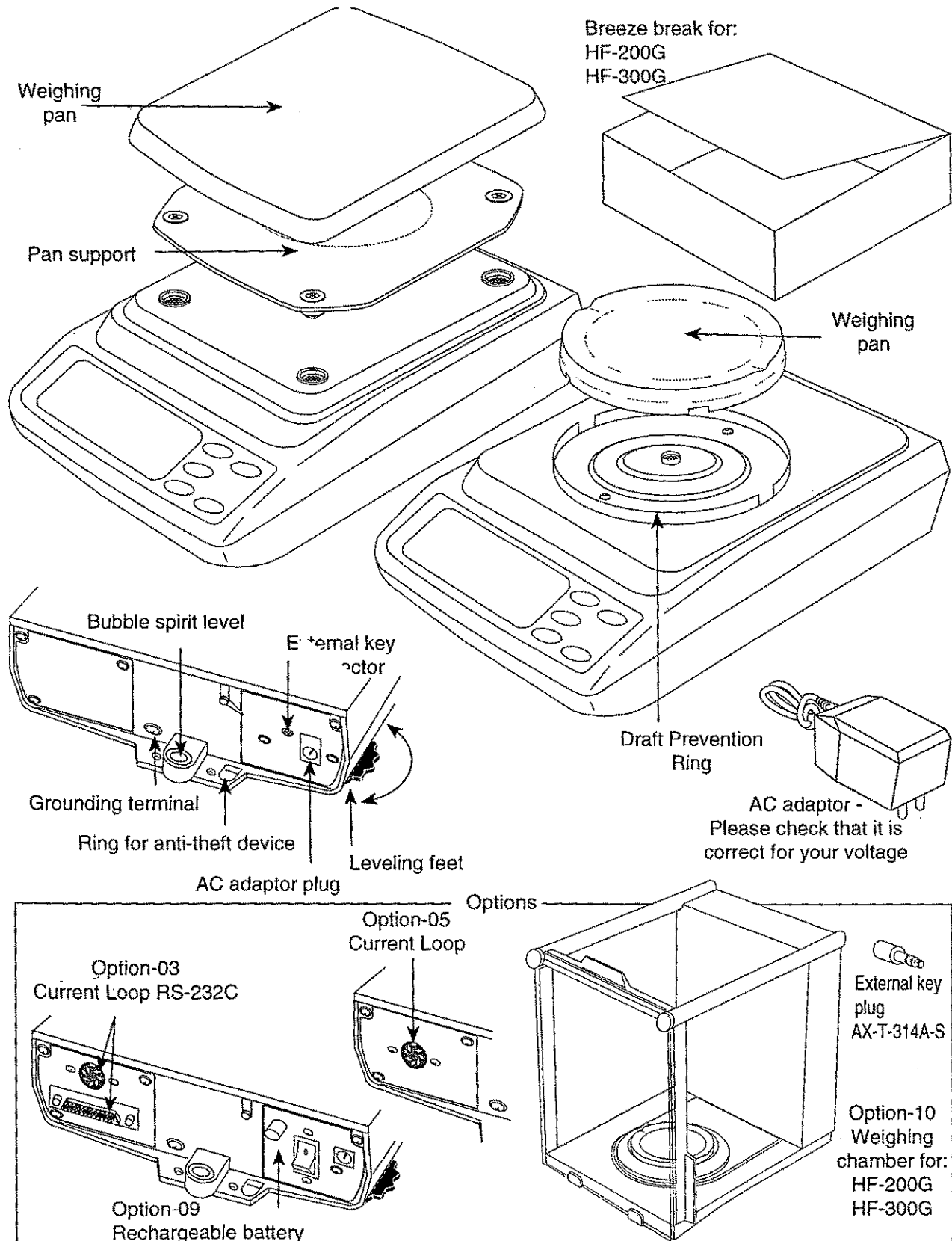
Compliance with FCC Rules

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



Unpacking Your Balance

- ❑ Unpack the balance carefully and keep the packing material if you want to transport the balance again in the future.
- ❑ In the carton you should find this manual plus:



Balance Location

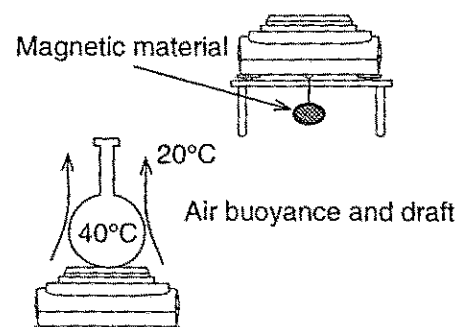
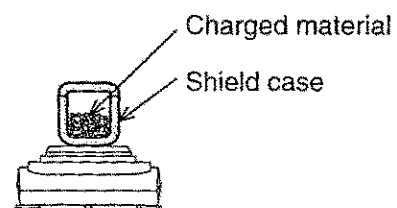
- The weighing table should be solid and free from vibration, drafts (such as frequently opening doors or windows) and as level as possible.
- Corners of rooms are best as they are less prone to vibrations.
- Don't install the balance near heaters or air conditioners.
- Don't install the balance in direct sunshine.
- Don't use the balance near other equipment which produces magnetic fields.
- Try to ensure a stable AC power supply when using an adaptor.
- Best operating temperature is about 20°C/68°F at about 50% Relative Humidity.

Best conditions for weighing



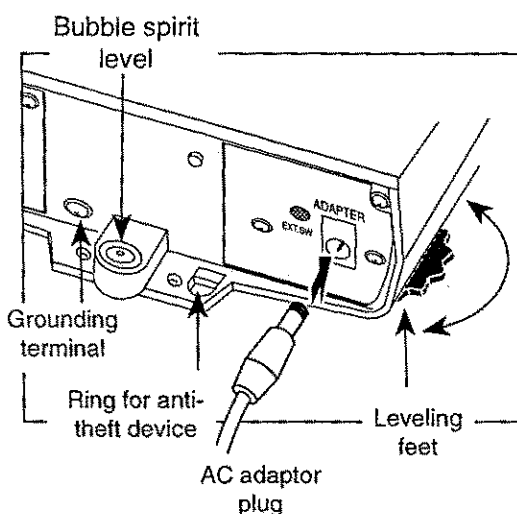
To ensure that you get the most from your balance, please try to follow these conditions as closely as possible:

- Please warm-up (plug-in) the balance for at least one hour.
- The weighing room should be kept clean and dry.
- Please **RE-ZERO** the balance before each use to prevent possible error.
- Make each weighing as quick as possible to avoid errors due to environmental conditions.
- Use a breeze break to keep out drafts.
- Do not drop things upon the weighing pan, or place a weight beyond the range of the balance on the weighing pan.
- Do not use a sharp instrument (such as a pencil or ball pen) to press the keys, use only your finger.
- Use caution when weighing items that could contain a static charge (plastics, isolator, etc.), as the weight of a material that has a static charge is influenced by its surroundings. Try to keep the ambient humidity above 45%RH.
- This balance uses a strong magnet as part of the balance assembly, so please use caution when measuring magnetic material. If there is a problem, use the underhook assembly (on the bottom of the balance) to suspend the material away from the influence of the magnet.
- When weighing a sample that is either warmer or cooler than the ambient temperature, the sample can set up a draft in the chamber due to the air rising or falling next to the sample. This draft can cause a shift in the weight of the sample.
- Due to the affect of air buoyancy on a sample, please take this into account when absolute accuracy is required.



Setting up your Balance

- Place the balance on a firm weighing table and turn the adjustable feet until the balance is level (check the spirit level on the rear of balance).
- Install weighing pan, base unit and breeze break ring on the balance (see the "Unpacking Your Balance" section).
- Plug in the AC adaptor. The adaptor's input requirements could be 100, 120, 220 or 240 Volts (50/60Hz) depending on where you are in the world, so please check that the adaptor is correct. Earth the balance chassis for electrostatic discharge if static electricity could be a problem.



Taking care of the Balance

- Don't disassemble the balance. Contact your local A&D dealer if your balance needs service or repair.
- Don't use solvents to clean the balance. Warm water with a mild detergent using a lint free cloth is best for cleaning.
- Keep equipment containing magnets away from the balance.
- If you use the battery and "Lb" is displayed, charge the battery as soon as possible.
- To preserve battery life, do not recharge the battery until the "Lb" display is on.
- Protect the internal parts from liquid spills and excessive dust.
- Please use a very precise calibration mass.

Power Supply

When the AC adaptor is connected, current will flow through the balance. This does not harm the balance and is a normal state. We recommend that you plug in your balance for at least an hour before use so it can warm up.

Display ON:OFF & Power Errors

- The balance does a self check when you connect the AC adaptor or press the **ON:OFF** key. If there is a problem, you will get an error display. Please refer to the error code table.

Keys and Display



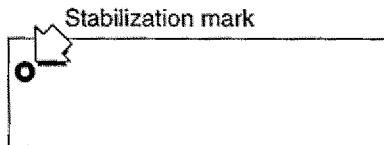
This section explains the keys and displays for the weighing mode.

Displays

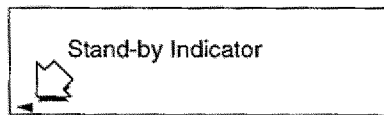


Normal weighing display of zero. Please read weighing data only after the stabilization mark is displayed.

Note: the number of decimal places depend on the model in use (HF-200G illustrated).



This round symbol is the stabilization mark. It is displayed when the balance is stable and the weighing data can be read. Refer to "Stability Band Width" of the Functions.



This is the Stand-by Indicator. This mark is displayed when you turn the display off, and the AC adaptor still connected.

Keys



The **[ON:OFF]** key switches the display ON and OFF but does not cut the power to the balance. The balance will remain on standby (warm up) while the AC adaptor remains connected.



The **[RE-ZERO]** key is used to zero the display within the range of the balance. This key returns the balance to the center of zero when the weighing pan is empty, and can also tare total weight (container and sample). Please use this key before each weighing to cancel possible error.



The **[RANGE]** key can also be used to hide or show the minimum figure alternatively



If you press and hold the **[MODE]** key, the balance changes the adjustment mode to a new weighing environment. This mode sets the response of the balance. This parameter is common to the "Response / Environment" function and "Condition of response". Refer to this function and "Condition of response".



The **[PRINT]** key can be used to output data to a printer or personal computer if the RS-232C or current loop is installed. Please refer to section "Functions" for details of output format and setting up the balance.



Weighing



For accurate weighing, please warm up the balance for an hour before use and try to meet "Best conditions for weighing".



Simple Weighing

- 1 Turn the display on using the **ON:OFF** key. After a moment "zero" will be displayed.

(The number of decimal places on the display depends on the model in use.)

- 2 If you are using a tare container, place it on the weighing pan. The display will show the container weight.

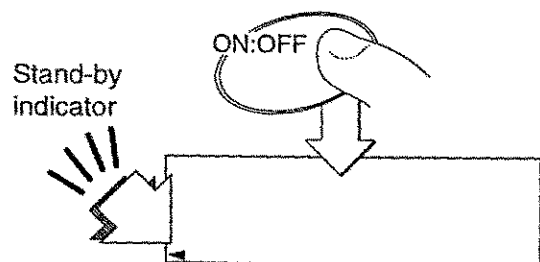
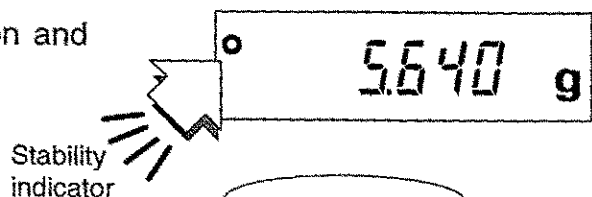
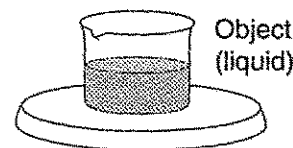
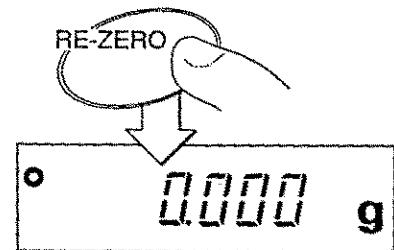
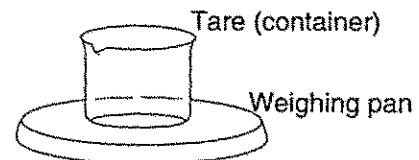
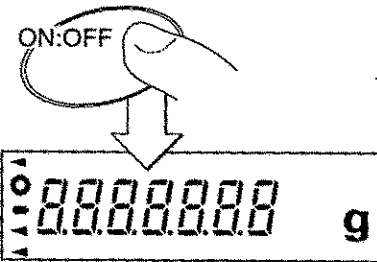
- 3 Press the **RE-ZERO** key to cancel the weight.

- 4 Place the object to be weighed in the container.

- 5 Wait for the stabilization mark to come on and read the weight.

- 6 Remove the object from the pan.

- 7 Turn the display off using the **ON:OFF** key. The display will show the stand-by indicator.



Environment Response Adjustment

The HF series has three functions to adapt the balance to environmental changes.

Conditions respond rate Use this setting when you want a reading as quickly as possible or a reading as stable as possible. This parameter is common data with the "Response / Environment" function. Refer to "Functions" and the Condition of Response procedure.

Calibration This mode allows recalibration, canceling possible weighing error due to gravity, altitude, air pressure, ambient temperature and humidity using a calibration mass. Please use a calibration mass sufficiently precise to recalibrate the smallest digit of the display.

Please calibrate the balance when you move the balance or perform the periodical maintenance. Refer to "Calibration".

Function The HF series has a number of internal software parameters so that you are able to select the best weighing features for your needs. Refer to "Function".

Conditions of response

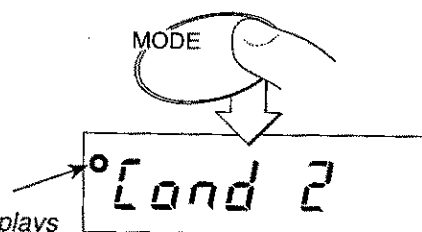


In this procedure, If you do not complete the next steps within five seconds, the balance will return to weighing mode without saving the new parameter.

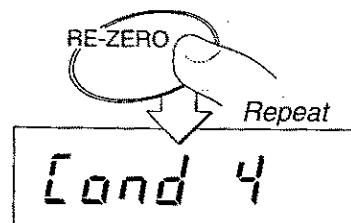
Conditions Determining Response Rate

Parameter setting		
Cond	0	better weighing conditions ↑ worse weighing conditions ↓
	1	
	2	
	3	
	4	

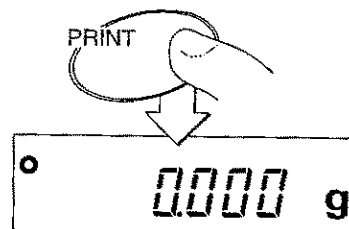
1 Press and hold the **MODE** key. The balance will change to the "Condition of response" mode and the display will show the "Cond".



2 Press the **RE-ZERO** key several times until the parameter you want is displayed.



3 Press the **PRINT** key. The balance will change to weighing mode, saving the new parameter. This is stored in the balance memory, even if the AC adaptor or optional battery is removed from the balance.





Calibration



Prevent vibrations, drafts, and ambient temperature changes from affecting the balance during calibration.

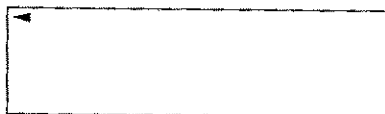
- To get the output for Good Laboratory Practice (GLP) set "output of Calibration" (E-4, INF 0, page 19, *Option Manual*) before you perform the calibration.
- Please use a very precise calibration mass. The precision of your balance is decided by this calibration mass.
- If you want only zero-point-calibration, a calibration mass is not needed.
- Please select your calibration mass from following table.

Model - Calibration mass

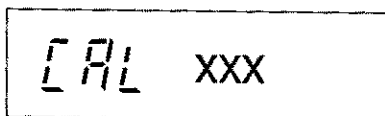
HF-200G	100g	200g				
HF-300G		200g	300g			
HF-1200G			500g	1000g		
HF-2000G				1000g	2000g	
HF-3000G					2000g	3000g
HF-6000G						3000g 4000g 5000g 6000g



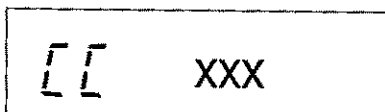
Displays and cancelling calibration



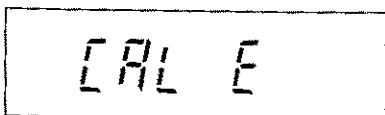
This mark means the balance is proofing calibration data. Do not allow vibrations or drafts to affect the balance while this mark is displayed.



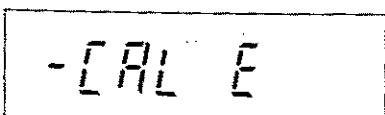
- XXX = [] balance is executing zero-point-calibration.
- XXX = (except zero) show the required calibration mass weight and means to be executing full-scale-calibration.



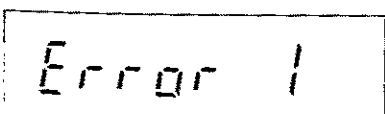
- XXX = [] means to be executing zero-point-check.
- XXX = (except zero) show the required calibration mass weight and the balance is executing full-scale-check.



"CAL E" will be displayed if the calibration mass is too heavy.



"-CAL E" will be displayed if the calibration mass is too light.



Warning of instability due to vibration or draft. Please check ambient conditions. See also the conditions. If you choose eg. Cond 3 or 4 you are likely to have a more stable reading.

ON:OFF



The **ON:OFF** key cancels the execution of calibration without saving new data and the display turns off.

Manual Calibration

This procedure performs manual calibration using your own calibration mass. This assumes that parameter "[-3, CAL 1 or 2" is set to "Permission of key operation", and that parameter "[-4, INF 0" is set to "No output". This illustration is for model HF-200G.

1 Warm up the balance for at least one hour with nothing on the weighing pan. Turn the display on.

2 Press and hold the **[RE-ZERO]** key to enter calibration mode.

3 Press and hold the **[RE-ZERO]** key until "[AL" is displayed. Release the **[RE-ZERO]** key. "[AL" appears to indicate that the balance is in calibration mode. If the balance enters another mode, press the **[ON:OFF]** key and restart the procedure.

"[AL EST" is the function to output the calibration condition serially (conforming to GLP) and is only for the balance with the serial output equipped. For details, see the options manual.

4 If you do not want to change the calibration mass weight, proceed to step 8.

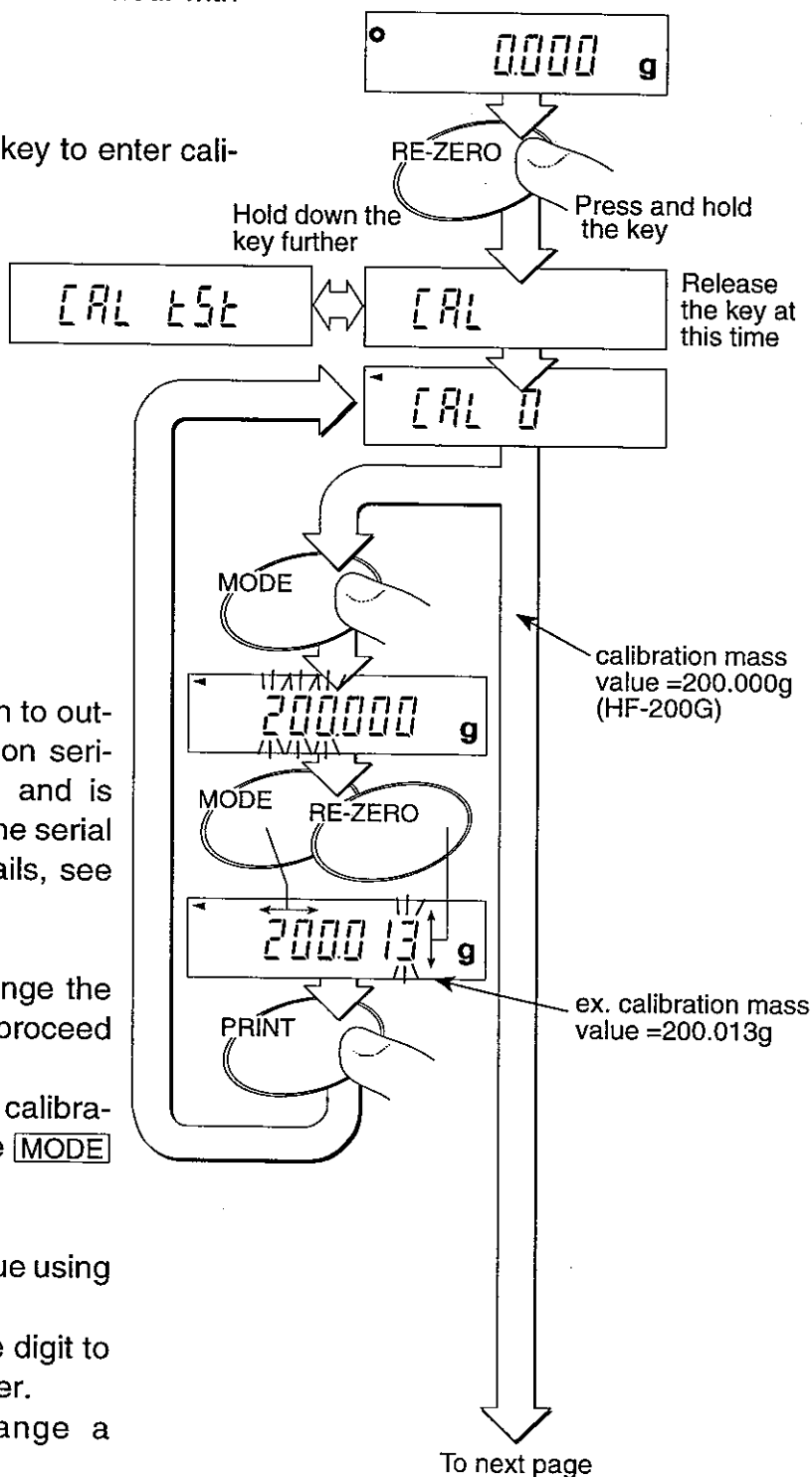
If you want to change the calibration mass value, press the **[MODE]** key.

5 Enter the calibration mass value using the following keys.

[MODE] key Used to move digit to enter a number.

[RE-ZERO] key Used to change a number.

6 Press the **[PRINT]** key. The balance registers the new calibration mass value.



7 In case of storing a new parameter again, return to step 4.
Otherwise, proceed to step 8.

8 Verify that there is nothing on the weighing pan.

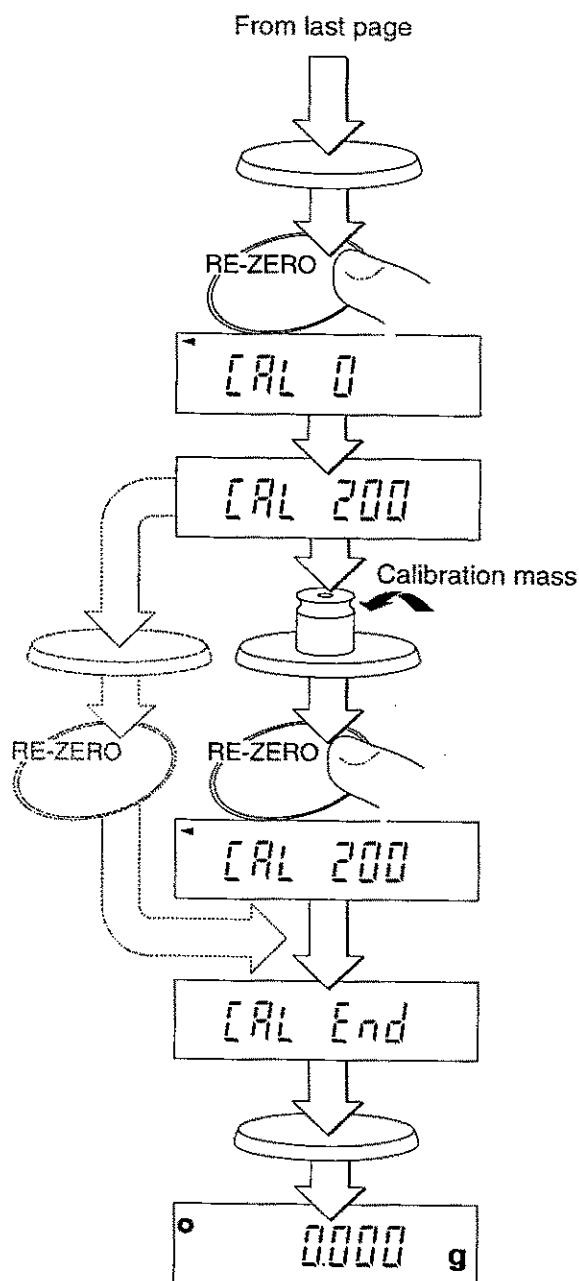
9 Press the **[RE-ZERO]** key.
The balance measures the zero-point.

10 The balance will display the calibration mass. (**[CAL 200]**)
Place the calibration mass on the pan.
Press the **[RE-ZERO]** key.
(If you want to perform zero-point-calibration only, press the **[RE-ZERO]** key without calibration mass and proceed to step 11.)

The balance measures the calibration mass value.

The manual calibration is finished.

11 Remove the calibration mass from the pan. The balance will return to normal weighing mode automatically.



Zero-point-calibration

If the balance displays **[-E]** when the balance is turned on, with the weighing pan that is in the correct position and on which nothing is placed, it means that the zero point has shifted. It is necessary to perform the Zero-calibration. Refer to the following page.

Caution The decimal point position and/or weight values are different depending on the balance model. The following procedure assumes that the internal settings are set at **[-3] [CAL 2]** and **[-4] [INF 0]** (manufactures setting). Please confirm that you have the proper settings before attempting zero-calibration.

1 Connect the AC adapter and then turn off the display. Confirm that there is nothing on the weighing pan.

2 Press the **ON:OFF** key to turn on the balance.

When the balance displays **-E**, you must perform zero-point-calibration

3 Press the **RE-ZERO** key.

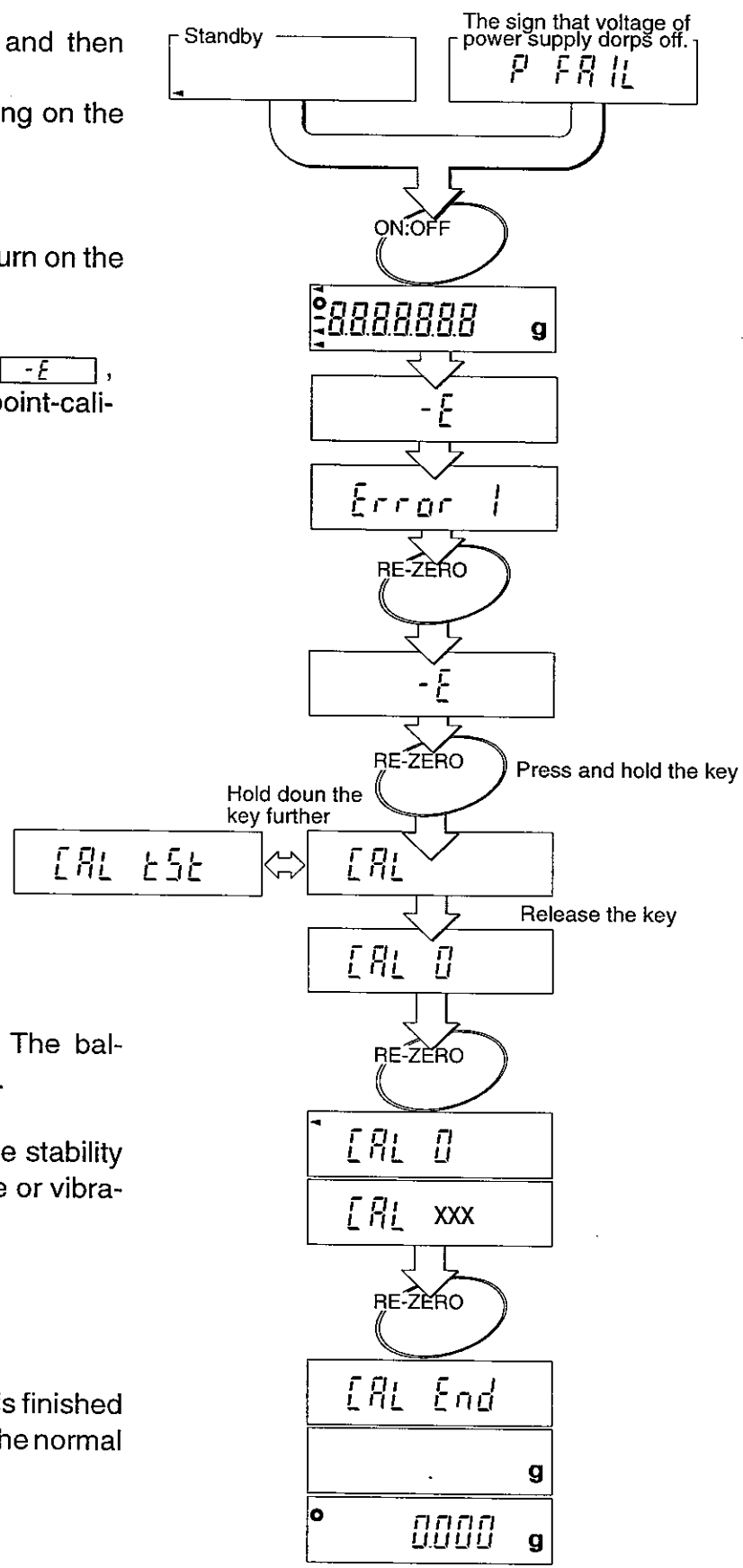
4 Press and hold the **RE-ZERO** key until the balance displays **CAL**. Then release the **RE-ZERO** key. The balance enters calibration mode.

5 Press the **RE-ZERO** key. The balance measures zero point.

Make sure that the balance stability is not influenced by breeze or vibration.

6 Press the **RE-ZERO** key.

The zero-point-calibration is finished and the balance returns to the normal weighing mode.





Functions



Your HF balance has a number of internal software parameters that enable you to select the best weighing features for your needs. These settings control how you want the balance to respond to its environment, various commands, operations and options. An overall parameters table is shown below.

All of the parameters have initial settings from the factory, or possibly from your dealer. You may easily change these settings as you need them, or conditions vary.

These settings are stored in the balance until the next change even without the AC adaptor or optional battery. The section keys and displays of C-parameters explains how to change the parameter. The individual settings for each group are detailed in the following section C-parameters settings.

Group Number	Item and Item Number							
	Group	0	1	2	3	4	5	6
0	C-0 Environment	Stb-b Stability band	Cond Resp. / Environ.	trc Zero tracking				
1	C-1 Display	SPEED Refresh rate	Point Decimal point	P-on Auto start function	RANGE Minimum figure			
2	C-2 Auto re-zero	Ar-0 Auto re-zero on/off	Ar-b Auto re-zero band	Ar-t Detection time				
3	C-3 Calibration	CAL Calibration inhibit						
4	C-4 Data out	Print Data out mode	AP-P Auto print polarity	AP-b Auto print band	PAUSE Data pause	At-f Auto feed	Ar-d Zero after data out	Info Cal verification
5	C-5 Serial interface	bPS Baud rate	bt-Pr Parity bit	Cr-LF Terminator	TYPE Data format	t-UP Receive time	E-Cod Error code	CTS CTS control
6	C-6	Response/environment is common data with the condition of response accessible using the keyboard. If a value is set in the C parameters, it will be changed if new conditions of response are set.						
7	C-7							
8	C-8							
9	C-9 Parameter control	Pn ID protect	PF Parameter protect					



C-parameter keys and displays



This mark appears when the memorized parameter is shown in the display.

MODE

The **MODE** key is used to select the group of C-parameters.

RANGE

The **RANGE** key is used to select the item from the group selected by the **MODE** key.

RE-ZERO

The **RE-ZERO** key is used to select a parameter for the item selected by the **MODE** and **RANGE** keys.

PRINT

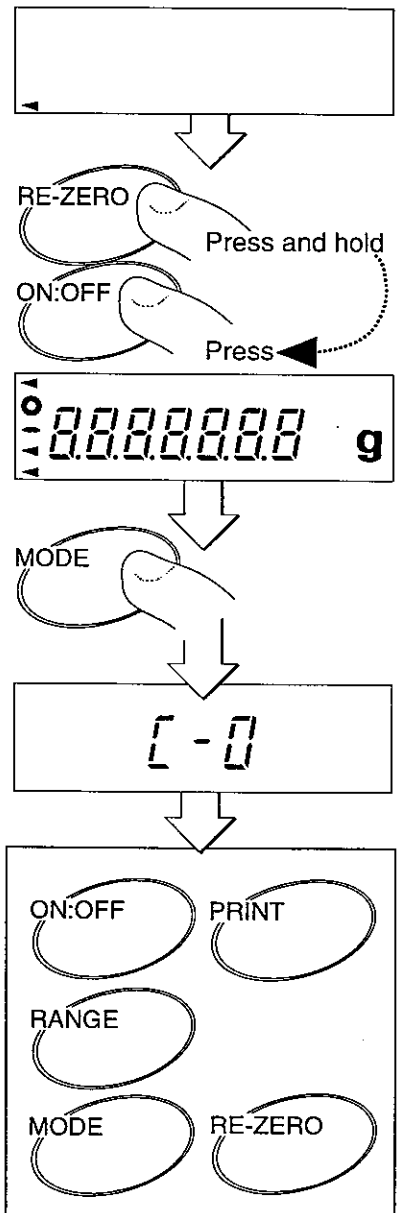
The **PRINT** key is used to save the new C-parameter settings and to exit to the weighing mode.

ON:OFF

The **ON:OFF** key cancels the new C-parameter settings and turns the display off.






Internal parameter setting

- 1** Turn the display off.
- 2** Press and hold the **RE-ZERO** key and press the **ON:OFF** key. Release both keys.
- 3** Press the **MODE** key. The balance enters the function setting mode and **[- 0]** will be displayed.
- 4** Set the C-parameter using the keys described on the preceding page.



C-Parameter Settings

[- 0] Environment: The settings adjust the balance to your environment.



		 The Stability indicator lights when the display fluctuation is within the range set below	
Stb-b Stability band width	0	Stable when within ± 1 digit per second.	To measure most precisely, but slow to stabilize  To eliminate vibration and to stabilize quickly
	*1	Stable when within ± 2 digits per second.	
	2	Stable when within ± 3 digits per second.	
Cond Response / Environment	0	Better weighing conditions faster weighing response 	Worse weighing conditions slower weighing response 
	1		
	*2		
	3		
	4		
trc Zero tracking	0	Weak zero tracking  Strong zero tracking	The balance tracks zero-drift caused by change of temperature, humidity, air pressure, etc., and stabilizes the ZERO point. Display continues to ZERO if the drift is less than 1 digit per average. If weighing very light samples, select a lower number (weak tracking).
	1		
	*2		
	3		
	4		

* Factory setting.

[- 1] Display Update, Decimal Point and Auto Start

SPEED Display update rate	*0	Display is refreshed at normal speed when the stabilization mark is on. Display is refreshed at high speed when the stabilization mark is off.	
	1	Display is refreshed at normal speed.	
	2	Display is refreshed at high speed.	
Point Decimal point display	*0	Point (.)	
	1	Comma (,)	
P-on Auto start function	*0	No auto start	Chose whether the display is to come on automatically without using the ON:OFF key when power is supplied.
	1	Auto start	
r-RANGE Minimum figure	*0	The minimum figure is displayed at turn on	The setting to display the minimum figure when you start weighing. The minimum figure can be turned on or off by pressing the RANGE key.
	1	The minimum figure is not displayed at turn on	

[- 2] Auto Re-ZERO Function

<i>Ar - 0</i> Auto Re-Zero function when near Zero	*0	Auto Re-ZERO off	
	1	Auto Re-ZERO on	•Auto Re-ZERO occurs when display is ±'Ar-b' digits for the time 'Ar-t'
<i>Ar - b</i> Auto re-zero band	*0	Zero when within ±5 digits of the zero-point.	slow Re-ZERO
	1	Zero when within ±50 digits of the zero-point.	
	2	Zero when within ±500 digits of the zero-point.	
<i>Ar - t</i> Time for auto zero determination	*0	Re-ZERO when near zero for more than a half second.	fast Re-ZERO
	1	Re-ZERO when near zero for more than 1 second.	
	2	Re-ZERO when near zero for more than 2 seconds.	
	3	Re-ZERO when near zero for more than 4 seconds.	

[- 3] Keys that can be used for calibration.

<i>[AL]</i> Calibration keys accepted	0	Keyboard and EXT. switch can not be used.
	1	Keyboard can be used, EXT. switch can not be used.
	*2	Keyboard and EXT. switch can be used.

[- 4] [- 5]: refer to the instructions for the separately available options

[- 9]

C-parameter control

<i>Pn</i> ID protect	parameter	Parameter definition and use. Determines whether a change is permitted to the ID number
	*0	Permits a change to the ID number
	1	Inhibits a change to the ID number
<i>PF</i> Parameter protect	parameter	Parameter definition and use.
	*0	Permits a change to the C-parameters
	1	Inhibits a change to the C-parameters.
	2	The balance is initialised, and C-parameter are changed to factory settings.


* factory setting

The ID number and GLP

- The ID number is used to identify the balance when using Good Laboratory Practice (GLP).
- Option 03 or 05 is necessary to output the balance ID number using the ID number.
- The data can be transmitted to an AD-8121 printer or a computer using option 03 or 05.
- Verifying the calibration executes using the date, time, ID number and weighing data after the calibration.

Setting the ID number

The ID number is saved in the balance memory without the AC adaptor or optional battery connected and is effective until the next change.
The ID number was set to `00000000` at the factory.

 If you do not complete steps 2 within five seconds, the balance returns to the weighing mode without saving the new ID number.

- 1** Turn the display off.
- 2** Press and hold the `RANGE` key and press the `ON:OFF` key.
- 3** Press the `MODE` key. The ID number will blink.

Set your ID number using following keys.

`RE-ZERO` The `RE-ZERO` key is used to change the character that is displayed. You can select following characters.

`0-9`, `-`, (space mark), and `A-Z`.

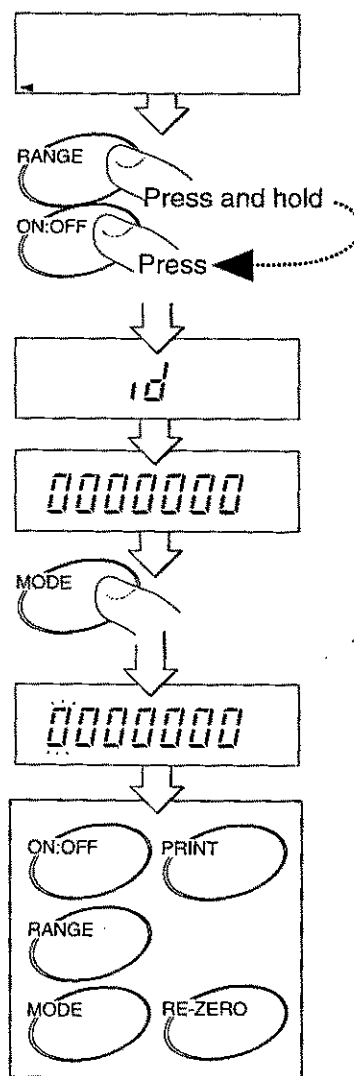
Refer to the following table of 'Display Character Set'.

`RANGE` Switches between numbers and letters.

`MODE` The `MODE` key is used to shift the character that is displayed.

`PRINT` The `PRINT` key saves the new ID number and returns to the weighing mode.

`ON:OFF` The `ON:OFF` key turns the display off without saving the new ID number.



Display Character Set:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z

1	2	3	4	5	6	7	8	9	0	-	(Space)
1	2	3	4	5	6	7	8	9	0	-	

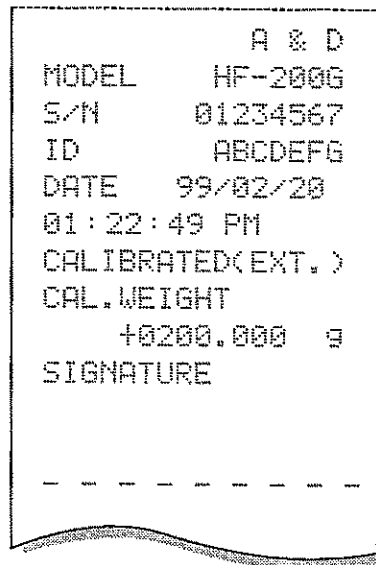
Format for calibration report

This is the "verifying the calibration" output format.

Set the function [- 4 "verifying the calibration" to *INF0 1* or *INF0 2* to output this data.

If set to *INF0 1* (AD-8121 format)

This sample uses an HF-200G balance and an AD-8121 printer (Mode 3). Date and Time use printer data. S/N is the serial number of the balance.



If set to *INF0 2* (Data format)

This format is used when the balance transmits to a computer.

This sample uses an HF-200G balance.

I_F is line feed mark. C_R is carriage return mark. $_$ is space mark.

```

A & D C_R L_F
MODEL HF-200G C_R L_F
S/N 01234567 C_R L_F
ID ABCDEFG C_R L_F
DATE C_R L_F
C_R L_F
TIME C_R L_F
C_R L_F
CALIBRATED(EXT.) C_R L_F
CAL.WEIGHT C_R L_F
+0200.000 g C_R L_F
SIGNATURE
C_R L_F
C_R L_F
----- C_R L_F
C_R L_F
C_R L_F
    
```

Miscellaneous

Digital Tare



Instead of placing a container on the balance and pressing the **RE-ZERO** key, you can enter the weight of the container via this Digital Tare.

The Digital Tare range is from zero to maximum capacity.

! If you press the **RE-ZERO** key, The Digital Tare is updated to the value to get zero-display automatically.

- 1** Turn the display on.
- 2** Press and hold the **RANGE** key until the balance displays **Pt**. (Preset Tare)
- 3** Press the **RE-ZERO** key. The value of digital tare will be displayed. If you want to change the value, press the **MODE** key.
- 4** Set the digital tare that you want using following keys.

MODE

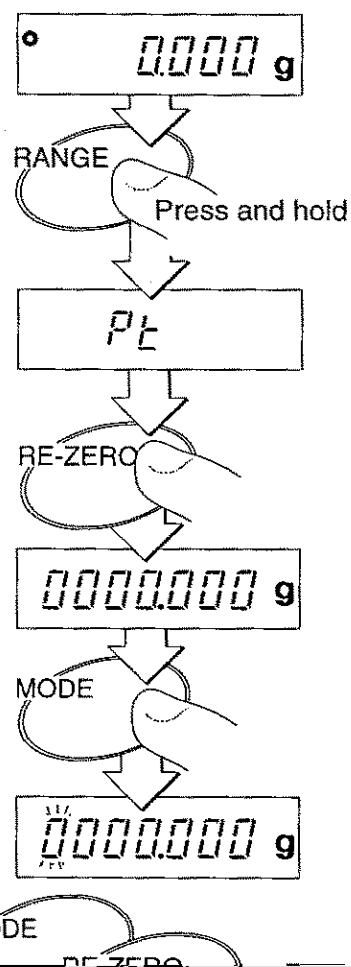
The **MODE** key is used to select the figure to be changed.

RE-ZERO

The **RE-ZERO** key is used to change the number that is displayed.

PRINT

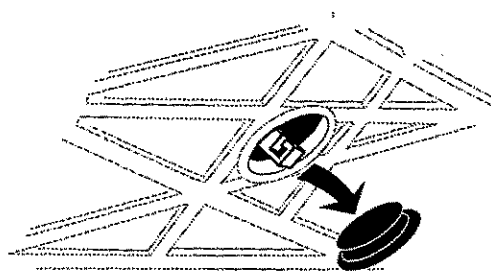
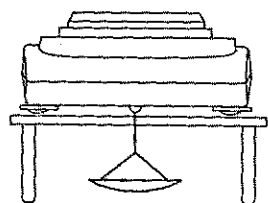
The **PRINT** key saves the new Digital Tare value and returns to the weighing mode.



Underhook Weighing

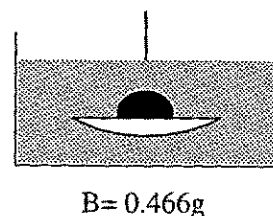
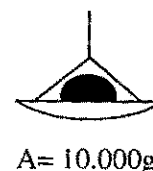
The HF series balances are equipped with a standard built-in underhook. This makes density determination a relatively simple matter. Also use the underhook to weigh magnetic material.

- 1** You can find the underhook behind the plastic plug on the under-side of your balance.
- 2** Place the balance on a weighing table with a hole cut in it or place it on a firm metal stand designed for underhook weighing.
- 3** Hang a light-weight weighing harness from this hole or thread a strand of thin string /wire through it.
- 4** For best results recalibrate the balance with the harness in place.



An Example of Underhook Weighing

- 1** Place the material on the harness.
- 2** Find the weight *A* of the material in air. $A = 10.000\text{g}$
Press the **RE-ZERO** key.
- 3** Lower the material into water at 10 °C.
Find the weight *B* of the material in water. $B = -0.466\text{g}$
- 4** Find a water density *C* from following table. $C = 0.466\text{ cm}^3$



0°	0.99984 g/cm ³	
4	0.99997	
10	0.99970	
15	0.99910	
20	0.99821	
25	0.99705	
30	0.99565	Reference

Compute: $10.000\text{g} \div 0.466\text{cm}^3 = 21.46\text{g/cm}^3$. This material is most likely platinum.

6

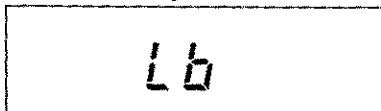


Errors and Specifications



Errors

- Low battery



This low battery mark indicates that the battery power has become too weak for reliable weighing. If you find this **Lb** mark, stop the operation and charge the battery, using the AC adaptor.

- Over load Error



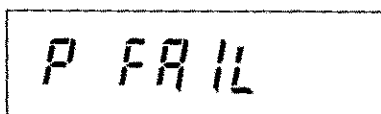
This display indicates that the weight placed on the pan is beyond the balance capacity.

- Weighing pan Error



This display indicates that the weighing pan or the pan support are not properly installed.

- Power failure Error



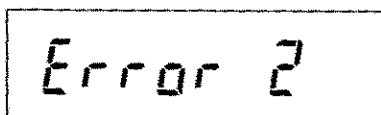
This display indicates that power was interrupted during weighing the last time the balance was used. Press the **ON:OFF** key to clear.

- Stability Error



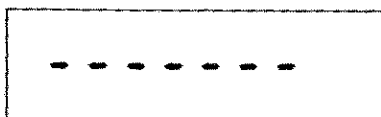
This display indicates that the balance can not become stable while zeroing or weighing. Check for excessive vibration or drafts. Press the **RE-ZERO** key to clear.

- Digital Re-Zero Error



This display indicates that an unacceptable Digital Re-Zero was input. Press the **RE-ZERO** key to clear.

- Zero-point Error

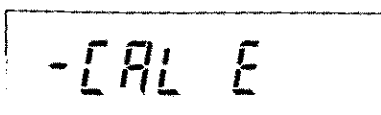


This display indicates that the zero-point of weighing has drifted from last calibrating zero-point (**CAL 0**), make certain that there is nothing on the weighing pan. Execute calibration to reset the zero-point (**CAL 0**).

- CAL Errors



This display indicates that the calibration mass is too heavy.



This display indicates that the calibration mass is too light.

Specifications

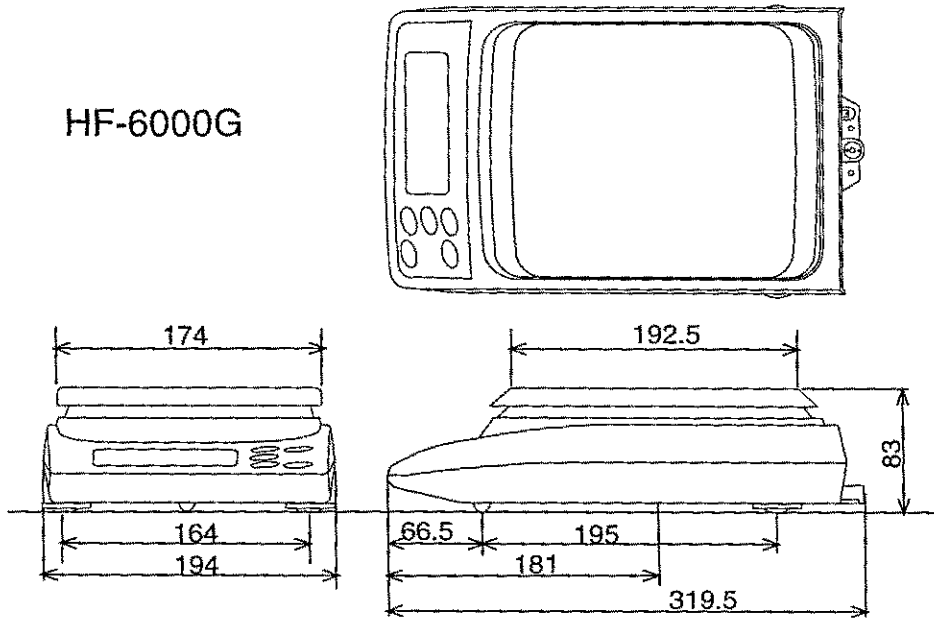
Model		HF-200G	HF-300G	HF-1200G	HF-2000G
Weighing Capacity	g	210	310	1250	2100
Min. weighing Display	g	0.001		0.01	
Repeatability (Standard Deviation)	g	0.001		0.01	
Linearity	g	± 0.002		± 0.02	
Sensitivity Drift	ppm/°C	± 2 *			
Stabilisation Time	sec.	2			
Pan Size	mm	ø 120		ø 155	
Calibration Mass	g	100	200	500	1000
		200	300	1000	2000
Net Weight	kg	3.3		3.6	
Operating Temperature		0°C - 40°C, RH < 85%, do not allow condensation to form			
Power Supply		AC adaptor, 11VA approximately or optional battery pack			
Display Update Rate		10 times/second, 5 times/second			

Model		HF-3000G	HF-6000G	
Weighing Capacity	g	3100	6100	
Min. weighing Display	g	0.01	0.1	
Repeatability (Standard Deviation)	g	0.01	0.1	
Linearity	g	± 0.02	± 0.1	
Sensitivity Drift	ppm/°C	± 2 *	± 5 *	
Stabilisation Time	sec.	2	1.5	
Pan Size	mm	ø 155	192,5 x 174	
Calibration Mass	g	2000	3000	
		3000	4000	
			5000	
			6000	
Net Weight	kg	3.6	3.9	
Operating Temperature		0°C - 40°C, RH < 85%, do not allow condensation to form		
Power Supply		AC adaptor, 11VA approximately or optional battery pack		
Display Update Rate		10 times/second, 5 times/second		

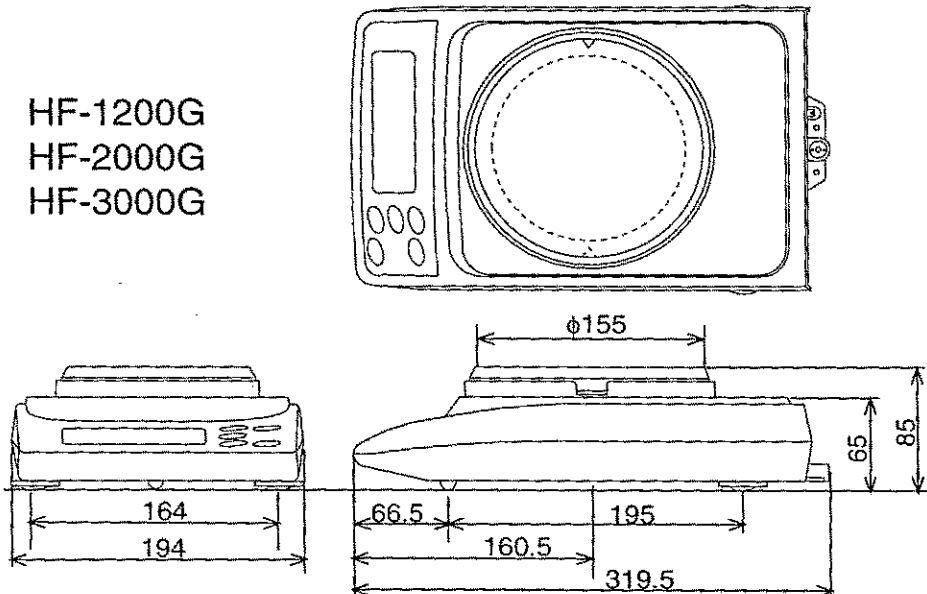
* Temperature range of Sensitivity Drift is 10°C - 30°C.

Dimensions

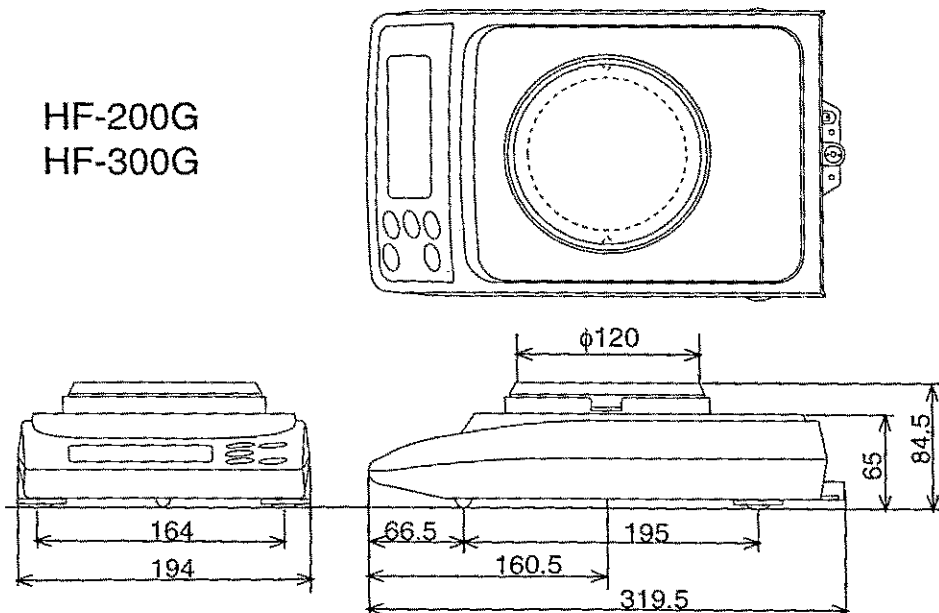
HF-6000G



HF-1200G
HF-2000G
HF-3000G

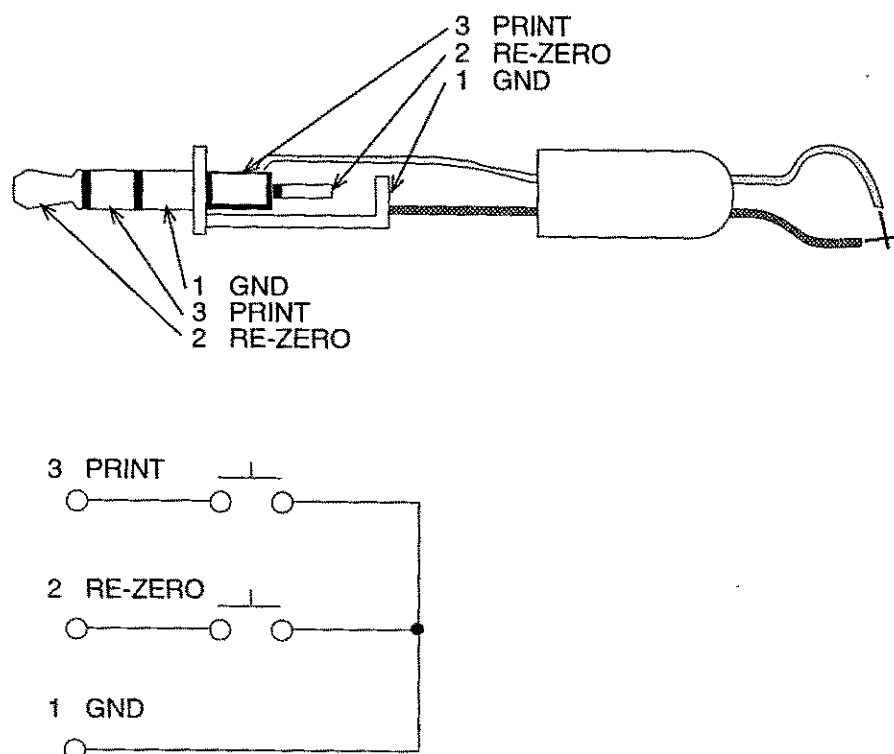


HF-200G
HF-300G



External key connector

An external connector plug is available, to enable remote control of the balance. When this plug is connected to the external key jack, **RE-ZERO** and **PRINT** instructions can be sent to the balance. Refer to the diagram below. You must short the GND line for at least 100ms. In the following example, the Print switch is turned on.



The external key plug is sold separately as an optional item.
Part name: AX-T-314A-S

----- 22

A

AC adaptor-----4,23
 AD-8121 -----3,19
 AP-b -----14
 AP-P -----14
 Ar-O -----14,16
 Ar-b -----14,26
 Ar-d -----14
 Ar-t -----14,16
 At-F -----14

B

bt-Pr -----14
 bPS -----14

C

C-O -----14,16
 C-1 -----14,16
 C-2 -----14,16
 C-3 -----14,12
 C-4 -----14
 C-5 -----14
 C-9 -----14,17
 CARL -----10,12
 -CARL E -----22
 CARL E -----22
 CE -----13
 Cand -----14,16
 Cr-LF -----14
 CTS -----14

E

E -----22
 -E -----22
 E-Cad -----14
 Error 1 -----22
 Error 2 -----22

G

GLP -----3,18
 Gram -----8

I

ID -----18
 id -----18
 info -----14,19
 info 1 -----19
 info 2 -----19

L

Lb -----7,22

P

P FAIL -----22
 P-on -----14,16
 PAUSE -----14
 PF -----14,16
 Pn -----14,16
 Po int -----14,16
 Pr int -----14
 Pt -----20

R

RS-232C -----3

S

SPEED -----14,16
 Stb-b -----14,16

T

t-UP -----14
 Trc -----14,16
 TYPE -----14