

# HJ Density Measurement Option Operation Manual

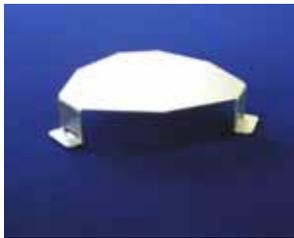
# Introduction

Thank you for your purchasing the Density Measurement option. This Density Measurement option Operation Manual is intended to describe only density measurements. Please use this operation manual together with the operation manual of the main unit.

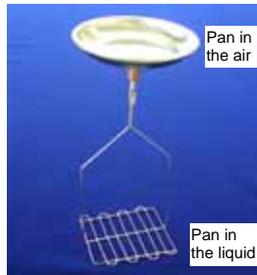
## Check for the following items before use

### Density measurement kit

Water tank platform



Measurement pan



Pan cradle



Height adjuster



Water tank



Tweezers



Thermometer

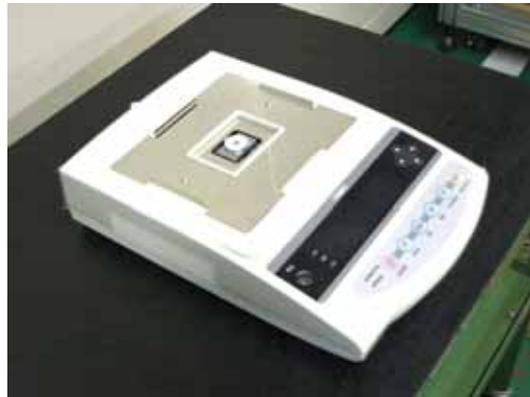


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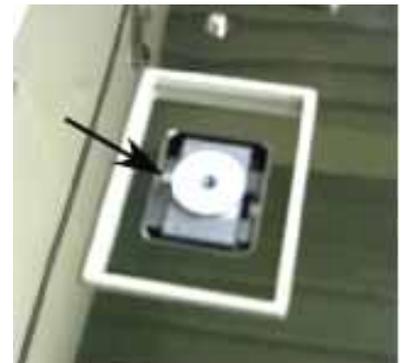
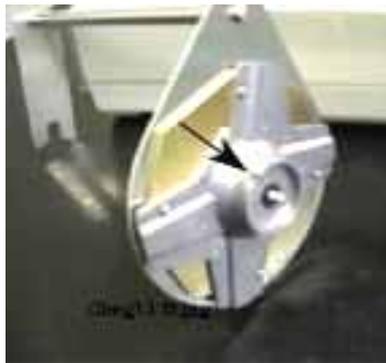
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# 1 Assembly Procedure for the Density Measurement Kit

- 1 Remove the measurement pan and Pan base.



- 2 Attach the pan cradle as shown to the right.



- 3 Attach the water tank platform as shown to the right.



- 4 Put the water tank in position as shown to the right.



- 5 Set the measurement pan in position as shown to the right.



## 2 Procedure for Use

### 2.1 Measuring solid density

- 1 Set-up Function 1. (See operation manual of the balance 「4 Function 1」)
  - Set the system in the solid density measurement mode [ *15E L* 5].
  - Select the media to be used. If water is to be used, set [ *1 17E d*] to [0].  
If any other medium to be used, set to [ *1*].
  - For enabling data output, set Output Data [ *1 2 d.o.d*] and Automatic Output [ *1 3 R.o.*].
- 2 Put water or other medium into the accessory tank as appropriate.
- 3 If water is used, measure the water temperature using accessory thermometer.
- 4 Set applicable coefficients ( See "5 Coefficient Setting" ).  
If the water is used
- 5 Set the density measurement kit and the water tank in the place. Turn off the balance power and then turn it on again.
- 6 Measure the density of a solid object according to "3 Solid Density measurement mode".

### 2.2 Precautions relating to Use

- 1 If water is used as medium, check the water temperature as frequently as appropriate.
- 2 Be careful not to spill water or other liquid on the balance. If liquids is spilled on the balance, wipe off immediately with soft cloth.
- 3 If water is used as medium, add one or two drops of surface-active agent (liquid detergent for kitchen use). It will effectively prevent air bubbles from adhering to any measurement object.

#### ☆ Hints ☆

Measurements with smaller size samples may result in some variations in the measured specific gravity values. In particular, any sample whose specific gravity is larger tends to show more variation.

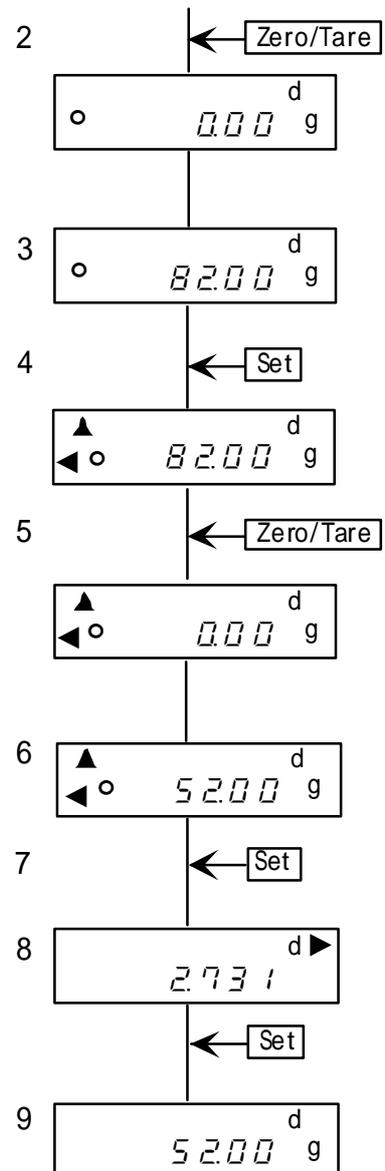
Use as large a sample as possible for obtaining more stable measurements.

### 3 Solid Density Measurement Mode

If you want to interrupt an operation, press the **Print** key. The display will show **[5 t OP]** for a few seconds and then go back into the Weight mode.

#### 3.1 Measurement for samples that sink down in the medium

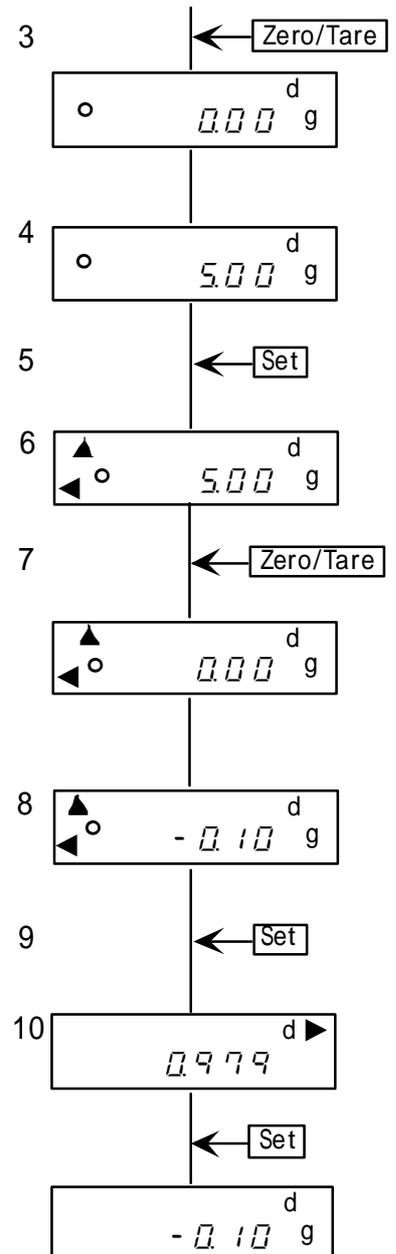
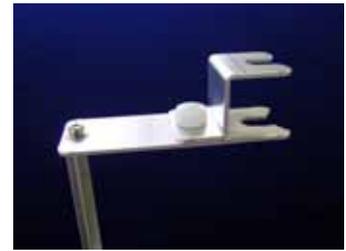
- 1 Set the density measurement kit and press the **ON/OFF** key to turn on the balance.
- 2 Push **Zero/Tare** key for zero adjustment or for tare range.
- 3 Put a sample to weigh on the pan in the air.
- 4 When the safety mark(**○**) is displayed, press the **Set** key.
- 5 Push **Zero/Tare** key for zero adjustment or for tare range.
- 6 Put the sample on the pan submerged in the medium. Make sure the sample is free from air bubbles.
- 7 Push **Set** key when (**○**) mark is displayed. Then measure the weight in the medium.
- 8 When the measurement is finished, the density is displayed. The symbol **[▶]** is lit in the top of the right of the display while the density is displayed.
- 9 Press **Set** key to return to the weight display.



### 3.2 Measurement for samples that can float in the medium

- 1 Attach the height adjuster on top of the pan cradle as shown to the right.
- 2 Set the density measurement kit and press the **ON/OFF** key to turn on the balance.
- 3 Push **Zero/Tare** key for zero adjustment or for tare range.
- 4 Put a sample to weight on the pan in the air.
- 5 When the safety mark(●) is displayed, press **Set** key.
- 6 When the measurement is done, the weight measured In the air will be displayed for a few seconds.
- 7 Push **Zero/Tare** key for zero adjustment for tare range.
- 8 Put the sample under the pan submerged in the medium. Make sure that the measurement pan is not floating, and that the sample is free from air bubbles.
- 9 When the safety mark(●) is displayed, press **Set** key. Measurement will be made in the water.
- 10 After the measurement is done, it displays the density. The symbol ► is lit on the display when the density is displayed.

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## 4 Function 1

The following paragraphs describe Function 1 items to be set for the density measurement mode. Also refer to “Section 6.6” of the operation manual of the balance.

### 4.1 Item details

- Media**                      The medium to be used in solid density measurements is set for this item. If it is specified to use water, it is necessary to set the water temperature upon the measurement. Otherwise, it is necessary to set the density of the alternative medium. Refer to “5.2 Coefficient Setting”.
- Output data**                Output items of measurement results are to be set. This item is functional only for solid density measurement mode. When it is set to  $\square$ , only the display value of the sample is output. When set to  $\square$ , mass of the sample, water temperature (or the density of the medium if any other medium is used) are printed in addition to the density value. Refer to “7 Print Details” for details of output data.
- Auto output**                The timing to output measurement result is set. When “Auto Output” is disabled, pressing the Print key upon weight display (after density measurement is done) will print the results. The most recent measurement before the output timing will be printed. Don't press the Print key after power on and before any density measurement is made. You cannot expect normal values to be printed if no measurement has been made. When “Auto Output” is enabled, the results will be printed upon returning to the weight display after finishing the density measurement. Regardless of the Auto Output setting, the items set in the above “Output Data” setting will be printed.

## 5 Coefficient Setting

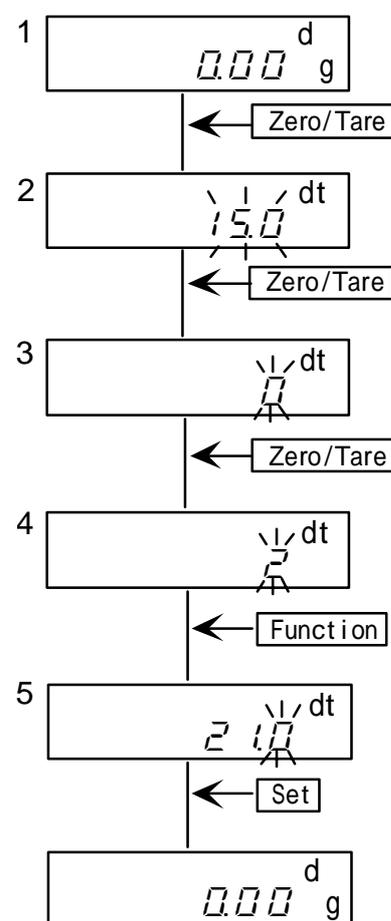
### 5.1 Coefficient setting items

The following coefficients must be set before density measurement. The setting values are different depending on the mode and medium selected. Note that the values once set are held in the balance even after power is turned off.

Water as media	Setting value : Temperature of the water used Displayed Unit : t Setting Range : 0.0 ~ 99.9
Media other than Water	Setting value : Density of the liquid used Displayed Unit : ►(upper), ◄(lower) Setting Range : 0.0001 ~ 9.9999

### 5.2 Coefficient setting

- 1 Keep pressing the **Zero/Tare** key until the applicable setting value (\*1) is displayed  
\*1 Refer to “5.1 Coefficient setting items”
- 2 Press **Zero/Tare** key to initiate the numerical setting mode.
- 3 Every time you press the **Zero/Tare** key, the number of the flashing digit(the digit for value entry) will increment. Select an appropriate number by pressing the key as many times as required.
- 4 Press the **Function** key to move the flashing digit (the digit for value entry).
- 5 Press the **Set** key liquid density, the item will be shifted from “Water temperature (media density)” to “Mass of weight”. Repeat the above steps 2 to 5.



## 6 Display

### 6.1 Minimum indication

Minimum indication values of density is as follows; 0.0001

### 6.2 Unit notation

- d To be indicated in density measurement mode
- ▶(Upper) To be indicated when density is displayed
- ◀(Lower) To be indicated while density measurement is in progress

## 7 Gravimeter measurement data output

### (1) Output before gravimeter measurement

With the gravimeter function, the operation is with the [5 1.0.c. 7] (output once when Print key is pressed after it is stabilized) mode, regardless of the setting by [5 1.0.c.].

### (2) Output while specific gravity is displayed

[12.0.d.] is used for selecting the output contents.

The output method can also be selected by [13 R.d.].

### (3) Output (print) format

When "specific gravity, weight, and actual water temperature or density of media" are all selected in [12.0.d.], .... If "specific gravity only" is selected, only the second line value will be output.

In addition, if any statistical calculation is made for the printer, the values in the second line will be printed being prefixed by a serial number.

Language selection between English and Japanese for printing is made by the GLP function [E 3 P.F.] of Function 1.

#### 1) When water is selected

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	D	E	N	S	I	T	Y		S	O	L	I	D		
2								x	x	.	x	x	x		
3	S	A	M	P	L	E		W	E	I	G	H	T		
4					x	x	x	x	x	.	x	x	x		g
5	T	E	M	P	E	R	A	T	U	R	E		N	O	W
6					x	x	x	x	x	x	.	x			C
7															

#### 2) When other than water is selected

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	D	E	N	S	I	T	Y		S	O	L	I	D		
2								x	x	.	x	x	x		
3	S	A	M	P	L	E		W	E	I	G	H	T		
4					x	x	x	x	x	.	x	x	x		g
5	D	E	N	S	I	T	Y		M	E	D	.	L	I	Q
6					x	x	x	x	.	x	x	x	x		
7															