



**Professional Weighing  
Equipment**

**Operating Manual**

**HRB Series intelligent weighing machine**

**HIGH RESOLUTION BALANCE**



HRB 103 / 203 / 303



HRB 602 / 1002



HRB 3002 / 3001 / 6001 / 10001



HRB 10001LP / 20001



HRB 1002TL

**NOTE: THIS PRODUCT HAS BEEN  
CALIBRATED IN THE FACTORY.  
PLEASE REFER TO THE MANUAL  
BEFORE RE-CALIBRATING  
PRODUCT!**

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# Declaration of Conformity


Declaration of conformity for apparatus with CE mark

We hereby declare that the product to which this declaration refers conforms to the following standards.

Electronic scale: HRB - High Resolution Balances

Models:

HRB 103  
HRB 203  
HRB 303  
HRB 602  
HRB 1002  
HRB 1002TL  
HRB 3002  
HRB 3001  
HRB 6001  
HRB 10001  
HRB 10001LP  
HRB 20001

Mark applied	EU Directive	Standards
	2004/108/EC	EN 61326-1: 2006

Signature:



Boon Lim, R & D Manager

Date: 06.27.16

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# Customer Service

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## Introduction

What you should know about these Operating Instructions:

Tree® Professional Weighing Equipment products are simple to operate.

Nevertheless, you should read through these operating instructions in their entirety, so that you can make optimum use of the full potential and the diverse possibilities of the weighing machine in your daily work.

These operating instructions contain guidance with the aid of pictures and keyboard diagrams, which should help you in finding the required information:

For the labelling of potential hazards and advice, please see Safety below.

# Safety

## Representations and symbols

Important instructions, which involve safety, are highlighted with the appropriate mark:



## Safety recommendations

When using the weighing equipment in surroundings with increased safety requirements, the corresponding regulations must be observed.

The weighing machine may only be used with the power adapter supplied exclusively for use with the weighing machine.

Before inserting the power adapter, the user must ensure that the operating voltage stated on the power adapter agrees with the mains voltage.

If not, please contact Customer Service at the address above.

If the power adapter or its cable is damaged, the weighing machine must immediately be disconnected from the electricity supply (pull out the power adapter).

The weighing machine may only be operated from mains electricity supply with a power adapter which is in perfect condition.

If there should be any reason to believe that it is no longer possible to operate the weighing machine without danger, the weighing machine is to be immediately unplugged from the electricity supply (pull out power adapter) and secured against inadvertent operation.

In carrying out maintenance work, it is essential to follow the recommendations in Chapter 11 Maintenance and servicing.

The weighing machine must not be operated in an area subject to explosion risks.

Care must be taken when weighing liquids to ensure that no liquid is spilt into the inside of the weighing machine or into connections on the rear of the equipment or the power adapter. If liquid is spilt on the weighing machine, it must immediately be unplugged from the mains electricity supply (pull out power adapter).

The weighing machine may be operated after it has first been re-checked by a service technician.

These operating instructions must be read by each operator of the equipment and must be available at the workplace at all times.

# Your weighing machine

## Construction and functions

### Construction of the weighing machine

The weighing machine consists of the weighing machine body (1), the scale-pan (2), the adapter (3) and this operating manual.

Figure 2.1 Your weighing machine



## Functions

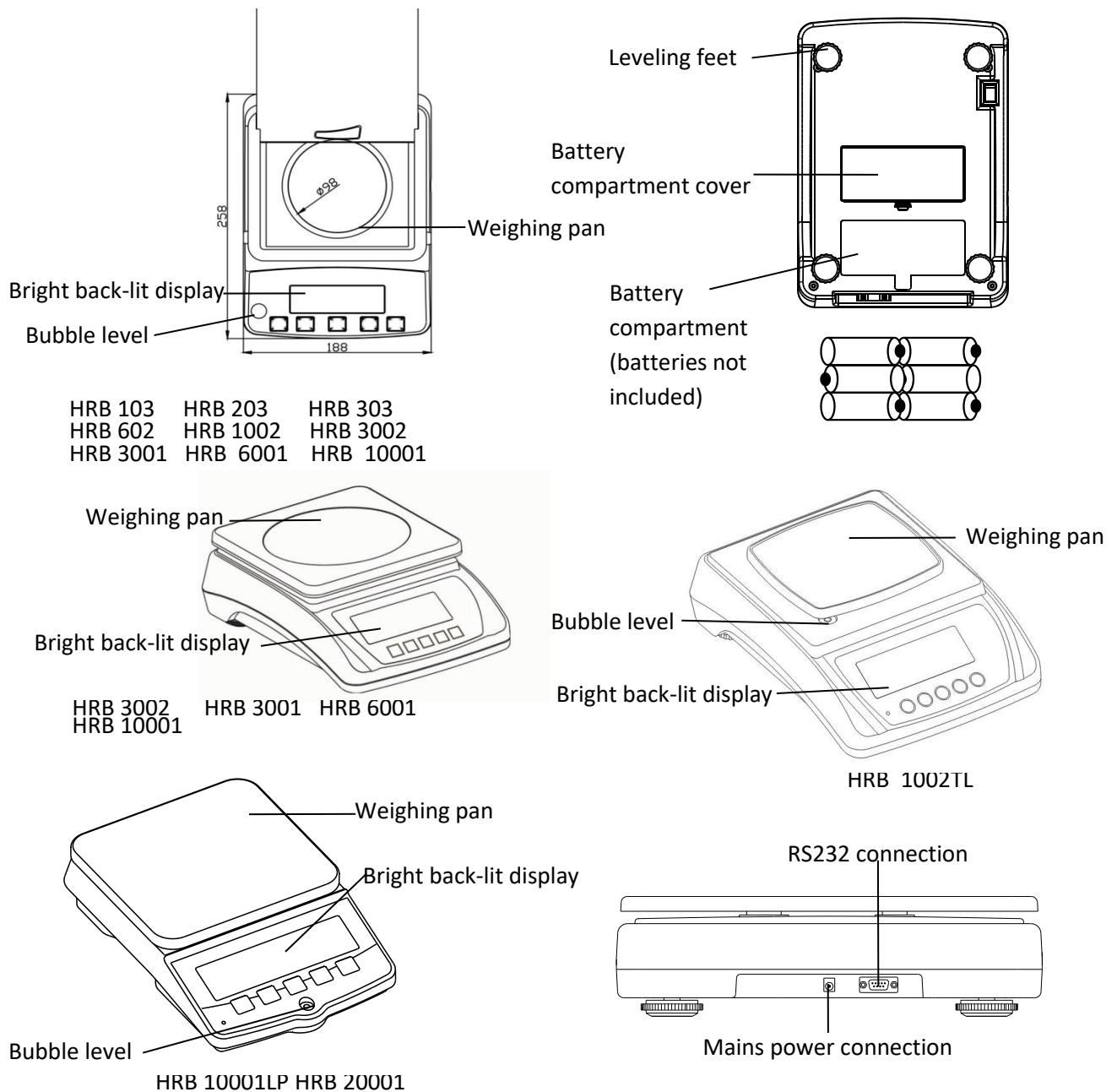
The HRB Series are high-quality electronic precision weighing machines with the following specifications

Model number	Capacity	Graduation	Weighing pan Size
HRB103	100g	0.001g	Φ98mm
HRB203	200g	0.001g	Φ98mm
HRB303	300g	0.001g	Φ98mm
HRB 602	600g	0.01g	135mm x 120mm
HRB 1002	1000g	0.01g	135mm x 120mm
HRB 1002TL	1000g	0.01g	135mm x 120mm
HRB 3001	3000g	0.1g	180mm x 170mm
HRB 6001	6000g	0.1g	180mm x 170mm
HRB10001	10000g	0.1g	180mm x 170mm
HRB10001LP	10000g	0.1g	215mm x 198mm
HRB 20001	20000g	0.1g	215mm x 198mm
Net/gross weight	<b>HRB 103 / 203 / 303 / 602 / 1002:</b> 2.2kg / 3.1kg <b>HRB 602 / HRB 1002:</b> 2.2kg / 3.1kg <b>HRB 602 / 1002:</b> 1.4kg / 2.2kg <b>HRB 1002:</b> 1.4kg / 2.2kg <b>HRB 3001 / 6001 / 10001:</b> 1.4kg / 2.2kg <b>HRB 10001LP / 20001:</b> 3.2kg / 3.9kg		
Package (Standard carton)	<b>HRB 103 / 203 / 303:</b> 35 x 28 x35 (cm <sup>3</sup> ) <b>HRB 602 /1002:</b> 35 x 28 x35 (cm <sup>3</sup> ) <b>HRB 602 / 1002:</b> 36 x 23 x14 (cm <sup>3</sup> ) <b>HRB 1002TL:</b> 36 x 23 x14 (cm <sup>3</sup> ) <b>HRB 3001 / 6001 / 10001:</b> 36 x 23 x14 (cm <sup>3</sup> ) <b>HRB 10001LP / 20001:</b> 37 x 27 x16 (cm <sup>3</sup> )		
Package (Master carton)	<b>HRB 103 / 203 / 303 / HRB 602 / 1002:</b> 2 units in one box: 59x38x39 (cm <sup>3</sup> ) <b>HRB 602 / 1002 / HRB 1002TL:</b> 6 units in one box: 54x35x40 (cm <sup>3</sup> ) <b>HRB 3001 / 6001 / 10001:</b> 6 units in one box: 54x35x40 (cm <sup>3</sup> ) <b>HRB 10001LP / 20001:</b> 4 units in one box: 56x39x34 (cm <sup>3</sup> )		
Operating Temp.	0-40°C (32-104°F)		
Power source	6 x AA dry cells(not included) or AC/DC Adapter 12V/500mA		

## FEATURES

- Auto zero tracking
- Low battery indication
- Large bright backlit LCD
- Large stainless steel pan
- Stability indication
- Auto calibration
- Selectable auto back light
- Less than 1s display setting time
- Selectable beeper
- Selectable beeper
- Unit switching: g, oz, lb, dwt ... ..
- 1.3 million internal resolution
- 200,000 display resolution
- 24 bit A/D processor
- Highest quality sensor used

Figure 2.2 Details of your weighing machine





# Application & Conformity

## Correct use of the weighing machine

The weighing machine may only be used for the weighing of solid-materials and of liquids filled into secure containers.

The maximum allowable load of the weighing machine must never be exceeded, otherwise the weighing machine may be damaged.

In using the weighing machine in combination with other appliances as well as with appliances produced by other manufacturers, the appropriate regulations for the safe use of the relevant attachments and their application in accordance with instructions must be observed.

## Conformity

The weighing machine has been manufactured and tested in accordance with the standards and recommendations set out in the declaration of conformity.

The power adapter produced for the operation of the weighing machine and intended exclusively for this application, complies with the appropriate electrical protection class.

# Data and parameters

## Technical data

The following applies to HRB series

Power supply:

- . Input: 110 or 230V AC (+/-15-20%); 50 to 60Hz
- . Output: 12v DC 500mA

Allowable ambient conditions

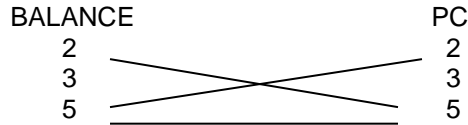
Temperature: 5°C . 40°C

Relative humidity: 25%... 85%, non-condensing

If you have any questions on the technical data or require detailed technical information on your balance, please contact your technical representative.

## RS232 Data interface

1. Connector: DB9



2. Transmissions Settings

Mode: Simplex Asynchronous Serial  
 Data Bit: 8  
 Stop Bit: 1

Baud Rate: 9600  
 Parity Bit: None  
 Data Format: ASCII

3. Transmission Information Format : 20 Byte , blank=20H

1~2	3	4~13	14~18	19	20
'W: '	P	DATA	UNIT	CR	LF

W: Start of Data Transmission=57H+3AH

P : Polarity '+' = 2BH = Positive '-' = 2DH =Negative

DATA: ' 12.345' = 20H+20H+20H+20H+31H+32H+2EH+33H+34H+35H

UNIT: 'g' =67H+20H+20H+20H+20H

'oz' =6FH+7AH+20H+20H+20H

'lb' =6CH+62H+20H+20H+20H

'dwt' =64H+77H+74H+20H+20H

'ozt' =6FH+7AH+74H+20H+20H

'ct' =63H+74H+20H+20H+20H

'tl.T' =74H+6CH+2EH+54H+20H

'tl.H' =74H+6CH+2EH+48H+20H

'tl.J' =74H+6CH+2EH+4AH+20H

'GN' =47H+4EH+20H+20H+20H

'dr' =64H+72H+20H+20H+20H

'MM' =4DH+4DH+20H+20H+20H

'tola' =74H+6FH+6CH+61H+20H

'gsm' =67H+73H+6DH+20H+20H

'T/A/R' =54H+2FH+41H+2FH+52H

'T/M/R' =54H+2FH+4DH+2FH+52H

'pcs' =50H+43H+53H+20H+20H

CR: = 0DH

LF: = 0AH

# Getting started

## Unpacking the equipment

The machine is delivered in an environmentally-friendly carton, specifically developed for this precision instrument, which provides optimum protection for the balance during transportation.

We suggest that you retain the original packaging in order to avoid transportation damage if shipping or transporting the balance and to allow the unit to be stored in the best conditions if it is out of operation for an extended period.

In order to avoid damage, attention must be given to the following points when unpacking the balance:

Unpack the weighing machine carefully. It is a precision instrument.

When outside temperatures are very low, the balance should first be stored for some hours in the unopened transport package in a dry room at normal temperature, so that no condensation settles on the unit when unpacking.

Check the weighing machine immediately after unpacking for externally visible damage. If you should find transport damage, please inform your service representative immediately.

If the unit is not to be used immediately after purchase but only at a later time, it should be stored in a dry place where fluctuations in temperature are as low as possible (see Chapter 12 .Transport, storage.).

Read through these operating instructions, even if you already have prior experience with weighing equipment, before you work with the unit and pay attention to the Safety recommendations (see Chapter 1 .Safety).

## Scope of delivery

Inspect delivery for completeness immediately on unpacking all components.

### **Checklist for complete delivery**

	<b>Component delivered present</b> yes / no
Weighing unit body	
Weighing pan	
Power adapter	
Operating manual	

## Assembling your weighing machine

The weighing machine is delivered in partly dismantled condition. Assemble the individual components in the following sequence:

- Place the unit holder in position and add the weighing pan
- Insert the power adapter cable plug into the socket at the rear of the balance.

## Choice of a suitable location

The environment in which your weighing machine is used is very important. Air movement, temperature changes, vibrations, direct sunlight, etc. all influence the performance of high precision weighing machines. Therefore, place your weighing machine on a solid, sturdy surface that is free of air currents, vibration and not in direct sunlight. The surface should not be magnetic and should be located away from doors, windows, heaters, air conditioners and fans.

To summarize:

- Put the weighing machine on a solid, firm and preferably vibration-proof, horizontal base
- Make sure that the weighing machine cannot be shaken or knocked over
- Protect from direct solar radiation
- Avoid drafts and excessive temperature fluctuations

## Checking the mains voltage

The following Safety recommendations must be observed when connecting the balance to the mains:



The balance may only be operated with the power adapter supplied.

Check before connecting the power adapter to the mains supply, that the operating voltage stated on the power adapter agrees with the local mains voltage.

If the operating voltage is not the same as the mains voltage, the power adapter must on no account be connected to the mains supply. Contact customer service.

## Leveling the weighing machine

To function properly, the balance must be precisely horizontal. The balance is fitted with one bubble level, and adjustable feet for level-control, with the aid of which it is possible to compensate for small height differences and / or any unevenness in the surface on which the balance is positioned.

The screw feet must be adjusted so that the air bubble is precisely in the center of the sight glass of the bubble level (see Fig. 3.2)

Place the scale horizontally and keep the bubble inside the bubble level aligned with the red circle (See Fig.3.2). In order to get exact measurements, the balance must again be carefully leveled after each relocation.



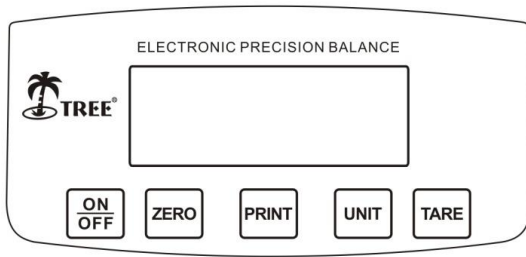
Fig. 3.2 Correct leveling with the aid of the bubble level

## Calibration of the weighing machine

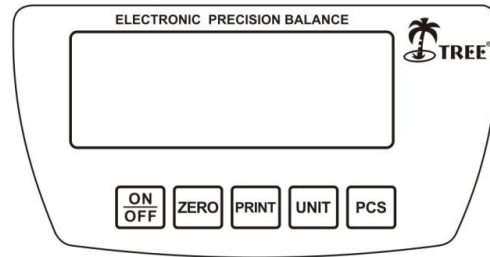
Since the effect of the Earth's gravity is not the same everywhere every balance must be adjusted to compensate for the gravity differences at each location in accordance with the underlying physical weighing principles which apply to accurate weighing machines. This adjustment process is known as calibration and must be carried out on initial installation, regularly in accordance with internal quality systems and after each subsequent relocation.

In order to ensure best measurement results it is recommended that the balance should be calibrated regularly and often using a known external calibration weight (see Section 5 below).

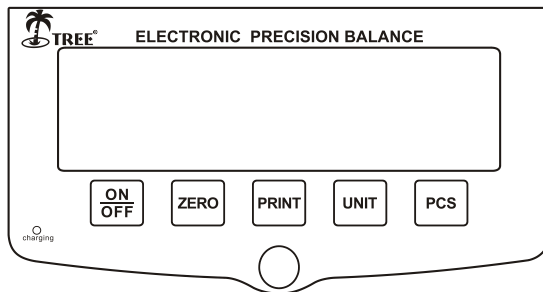
# Application Menu



HRB 103 HRB 203 HRB 303  
HRB 602 HRB 1002



HRB 3002 HRB 3001 HRB 6001  
HRB 1002TL HRB 10001



HRB 10001LP HRB 20001

## Display messages and key functions

### Display messages:



### Key Functions:

1. The On/Off key is to turn the Balance On or Off (Note: it has an On/Off hard switch at the bottom)
2. The ZERO key allows the subtraction of multiple container values through the weighing range and is used to set or re-adjust the weighing machine in correct zero position.
3. The Print key is send data to external device through RS232 connector.
4. The UNIT key is to toggle between different weighing units.
5. The TARE allows the user to subtract the container value and returns the display to zero
6. The PCS key is for piece counting

## Program options

Please see our web-site at <http://lwmeasurements.com> for practical demonstrations of application usage.

## Interface Settings

- Press [ON/OFF] to turn on the scale, when instrument displays -----
- Press [PRINT], the display will show b xxx value
- Press [UNIT] to select among (1200,2400,4800,9600), default setting is 9600
- Press [ZERO] to enter Parity mode, the display will show P xxx
- *Press [UNIT] to select odd, even or none ( odd stands for 7 data bits with odd parity, even stands for 7 data bits with even parity, none stands for 8 data bit without parity), default setting is none*
- Press [ZERO] to enter Print mode, the display will show n xxx
- Press [UNIT] to select CON,OFF, KEY, STB
  - a) OFF stands for serial data output disabled
  - b) KEY stands for manual mode by pressing [PRINT]
  - c) STB stands for automatic print when scale is stable
  - d) CON stands for continuous print

Default setting is KEY

- Press [ZERO] again to return to weighing mode.

## Parameter settings

### Setting Zero range when power on

Press ON/OFF key, and when “- - - - -” shows, press TARE(or PCS) key, display will show “Pzr x.x”, press UNIT key to select, factory default setting is 20

### Setting Zero range of ZERO key

Press ON/OFF key, and when“- - - - -”shows, press TARE(or PCS) key, and then press ZERO key, display shows “Kzr xx”, press UNIT key to select, factory default setting is 4

### Setting Zero range of TARE key

Press ON/OFF key, and when“- - - - -”shows, press TARE(or PCS) key, and then press ZERO key multiple times till display shows “Ktr xxx”, press UNIT key to select, factory default setting is 100

### Setting overload range

Press ON/OFF key, and when“- - - - -”shows, press TARE(or PCS) key, and then press ZERO key multiple times till display shows “Ovr xx”, press UNIT key to select, factory default setting is 9d

### Setting Beeper

Press ON/OFF key, and when“- - - - -”shows, press TARE(or PCS) key, and then press ZERO key multiple times till display shows “b2 ON” or “b2 OFF”, press UNIT key to switch it ON or OFF.

### Setting ZERO and TARE function merge function

Press ON/OFF key, and when“- - - - -”shows, press TARE(or PCS) key, and then press ZERO key multiple times till display shows “Zt ON” or “Zt OFF”, press UNIT key to switch it ON or OFF.

### Setting Auto Shut off

Press ON/OFF key, and when“- - - - -”shows, press TARE(or PCS) key, and then press ZERO key multiple times till display shows “A ON” or “A OFF”, Press UNIT key to select Auto shut off mode “ON” or “OFF”.

### Setting Backlight

Press ON/OFF key, and when“- - - - -”shows, press TARE(or PCS) key, and then press ZERO key multiple times till display shows “L ON”, “L OFF” or “L AU”, Press UNIT key to select backlight to be “On”, “Off” or “Auto”.



# Calibration

## Using an External Calibration Weight

Calibration is required when the weighing machine is initially installed or if the balance is moved to a substantial distance from the original location or if ambient conditions change considerably. 30 minutes' warm-up of the balance is always needed before weighing and calibration.

- Turn the Balance on and when display shows “-----”, press ZERO key
- The display will show “CAL”
- Press ZERO key again, the display will show “X000.00”, “X” is the flashing digit
- Press UNIT key, the flashing digit will move to right
- Press the TARE (or PCS, depending on the model) key to increase the value of the flashing digit (“X” is the calibration weight can be set according to users' requirements, we recommend a minimum weight of at least 50% of the Balance capacity)
- Press the ZERO key, the display will show a series of digits known as the A/D value, these numbers will continuously move, once the display shows the stable indicator (please see page 16 for help locating the stable indicator), press the UNIT key, the display will then show -----, then “X00.00” or “X000.00” depending on the model and capacity.
- Place the corresponding test weight on the center of the pan
- The display backlight lights up and returns to weighing mode
- Now the calibration is completed
- Turn off the power, then turn on the power again, place a known weight on the platform to verify if it is accurate.
- If the weight displayed does not correspond with the value of the calibration weight, please repeat above steps.

## Maintenance & Service

The weighing machine must be treated carefully and cleaned regularly. It is a precision instrument.



**DANGER**

For maintenance-work, the balance must be separated from the power supply (remove power adapter plug from socket). Also ensure that the balance cannot be reconnected to the power supply during the work by a third party.

Take care during cleaning that no liquid penetrates into the appliance. If liquid is spilt on the balance, the latter must immediately be disconnected from the electricity supply. The balance may only be used again after it has first been checked by a service engineer.

The connections on the rear of the appliance and the power adapter may not come into contact with liquids.

Regularly dismantle the weighing pan and the weighing pan holder and remove any dirt or dust from under the weighing pan and on the weighing machine housing with a soft brush or a soft, lint-free cloth, moistened with a mild soap solution. The scale and the holder can be cleaned under running water. Take care that both parts are completely dry before they are re-installed on the scale.



**CAUTION**

Never use solvents, acids, alkalis, paint thinners, scouring powders or other aggressive or corrosive chemicals for cleaning, since these substances attack the surfaces of the scale housing and can cause damage.

# Transport & Storage

## Transportation and shipping of the weighing machine

Your weighing machine is a precision instrument. Treat it carefully. Avoid shaking, severe impacts and vibration during the transportation.

Take care that there are no marked temperature fluctuations during the transportation and that the weighing machine does not become damp (condensation).

## Storage of the weighing machine

If you would like to take the weighing machine out of service for an extended period, disconnect it from the electricity supply, clean it thoroughly (see Section 6 .Maintenance and servicing.) and store it in a place which meets the following conditions:

- No violent shaking, no vibrations
- Minimum temperature fluctuations
- No direct solar radiation
- Minimum moisture

The weighing machine should preferably be dispatched and transported in the original packaging to avoid transportation damage.

The weighing machine should preferably be stored in the original packaging, since this provides optimal protection for the weighing machine.

# HRB Series Conversions Of Various International Weight Units

Model UNIT Resolut ion	103	203	303	602 1002 1002TL	602 1002 1002TL	3002	3001 6001 10001 10001LP 20001
g	0.001g	0.001g	0.001g	0.01g	0.01g	0.01	0.1g
oz	0.00005	0.00005	0.0001	0.0005	0.0005	0.001	0.005
lb	0.00001	0.00001	0.00001	0.00002	0.00002	0.00005	0.0002
dwt	0.001	0.001	0.001	0.01	0.01	0.01	0.1
ozt	0.00005	0.00005	0.00005	0.0005	0.0005	0.0005	0.005
ct	0.005	0.01	0.01	0.05	0.05	0.1	0.5
tlT	0.00005	0.00005	0.00005	0.0005	0.0005	0.0005	0.005
tlH	0.00005	0.00005	0.00005	0.0005	0.0005	0.0005	0.005
tlJ	0.00005	0.00005	0.00005	0.0005	0.0005	0.0005	0.005
gn	0.02	0.02	0.02	0.2	0.2	0.2	2
dr	0.001	0.001	0.001	0.01	0.01	0.1	0.1
MM	0.0005	0.0005	0.0005	0.005	0.005	0.005	0.05
tola	0.0001	0.0001	0.0001	0.001	0.001	0.001	0.01
gsm	0.1	0.1	0.1	0.1	0.1	1	10
T/A/R	0.01	0.1	0.1	0.1	0.1	1	1
T/M/R	0.01	0.1	0.1	0.1	0.1	1	1