



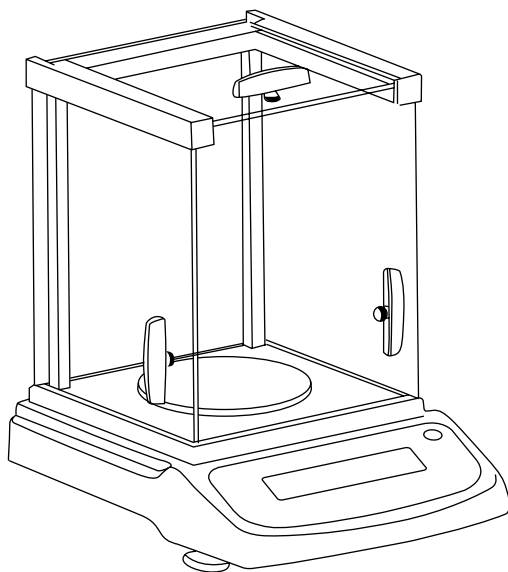
# GRAM



SERIES

**FR**

320 / 500 / 3200 / 5000



EN



OPERATION MANUAL



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## **ENGLISH**

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### **SAFETY INFORMATION**

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- To avoid unnecessary damage to the balance, please pay attention to the following tips.
- Please do not use this balance in dangerous area.
- Only the trained technicians could operate this balance.
- Please turn off the power of the balance before connect it or disconnect it with other facilities.
- If the environment requires a higher safety standard, please follow the relevant installation instructions.
- Excessive electromagnetic interference will make the displayed value in this balance change. Once the interference is dismissed, the balance could operate in normal way.
- Please avoid any liquid on the surface of the balance. A piece of lightly damp cloth is allowed to wipe the balance.

### **INSTALLATION**

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- Please make sure the local voltage is in line with the rated voltage on the name board.
- Please pay special attention when use RS-232 as the pins location might be incompatible with our facilities. Please check the pins locations before the connection and turn off the connection of different configuration.
- If the facility or the power cord has apparent damage, please turn off the

power, put it or them in a safe place and do not use it or them before they are fixed.

- This balance could only be connected to our accessories or optional fittings. We are not responsible for any modification the operator makes to our balance, including using the facilities and cable which are not supplied by us. However, we are always ready to offer the operation norms information.
- Please do not open the balance. If the guarantee label is damaged, our quality guarantee will automatically cease being effective.
- If the balance does not work well, please contact your local distributor or our customer service center.

## **PREPARATORY BEFORE USING**

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### **Storage**

This balance requires an environment which is free from excessive high or low temperature, corrosive, vibration, air current and collision.

### **Unfolding the package**

- Unfold the package and check if there is any outer damage of the balance.
- If there is outer damage, please refer to section routine maintenance and troubleshooting.
- Please keep all the package for possible transportation in the future. When pack the balance, please remove all the cables to avoid unnecessary damage.

## Package list

- The balance
- Weighing pan
- Pan support
- Power adapter
- User manual

## INSTALLATION OF THE BALANCE

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Put it in a proper place, please avoid the following situations:

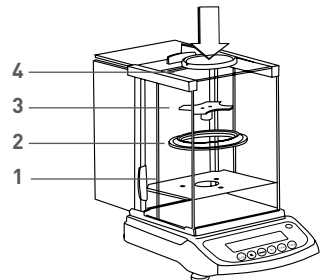
- Much heat and direct sunlight.
- Air currents and vibrations.
- Excessive moisture.

### **Usage Conditions**

Please do not lay the balance in a quite damp palce for a long time. If the balance is transferred from a lower temperature environment to a higher temperature environment, please lay it there with power off foraround 2 hours.

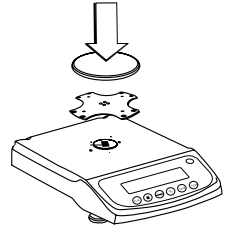
## Install the balance with wind shield

- Assemble the parts in the indicated order.



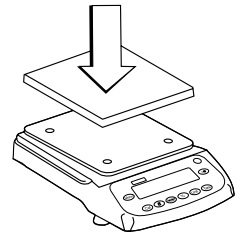
## Install the balance with round weighing pan

- Installation Sequence.
- Pan support.
- Weighing pan.



## Install the balance with square weighing pan

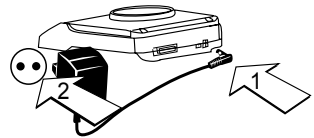
- Installation Sequence
- Pan support
- Weighing pan



## Connect the Power Adapter

Only the power adapter offered by us is allowed.

- Connect the power adapter to the balance.
- Connect the power adapter to the power socket.



## Install the External Facilities

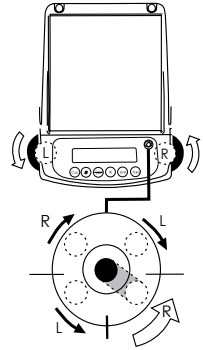
Turn off the balance before connect it or disconnectit with external facilities such as the printer or the computer).

## Warm-up Time

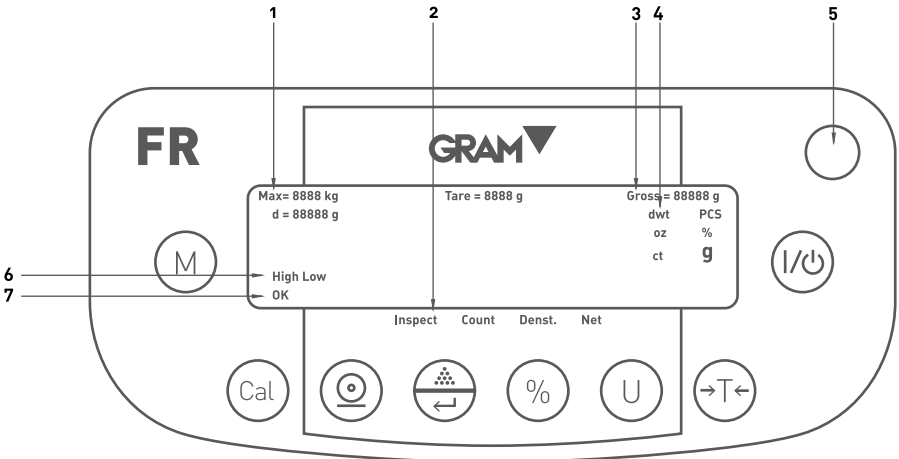
To assure the measure accuracy, the balance must be warmed up for 30 minutes before normal operation.

## Adjust the Level Gauge Purpose

- Adjust the level gauge of the balance. The level gauge needs to be adjusted once its place is changed. The two front bottom bolts are used to adjust the level gauge.
- Spin the two bolts as shown in the figure until the bubble in the level gauge is in the center of the circle.
- Normally, it needs to be adjusted repeatedly.



## DISPLAY AND KEYS DESCRIPTION





1. Capacity and readability.
2. Weighing mode signs: **Inspect** - inspect mode.  
**Count** - counting pieces mode.  
**Denst** - density mode.  
**Net** - Tare weight / Gross weight/ Net weight.
3. Tare weight / Gross weight sign.
4. Weighing units.
5. Level gauge.
6. High / Low warning signs.
7. OK indicator (stable display).

**OK** - Reading shown is stable.

**g** - Reading shown is given in grams.

**OZ** - Reading shown is given in ounces (1g = 0.03527396200 oz).

**ct** - Reading shown is given in carats (1g = 5.0000000000 ct).

**dwt** - Reading shown is given in pennyweight (1g = 0.64301493100 dwt).

**%** - Reading shown is given in percent weight.

**PCS** - Reading shown is given in as a counting.

**-----** The balance is developing a stable reading.









**UNABLE** - Error operation.

**HHHHH** - The weight on the pan exceeds the capacity of the balance.

**LLLLLL** - The pan is not properly seated or has been removed.

## KEYS DESCRIPTION

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	Calibration / Adjustment Key
	Print / Output Key
	Count / Function confirmation Key
	Percentage Key
	Unit conversion key
	Tare Key
	Menu Key
	Power Key

## CALIBRATION

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To decide the accuracy of the balance through test the difference between thereading and the actual weight of the object on the weighing pan.




### Prerequisite of calibration:

1. There is no loading on the weighing pan.
2. Press the  key.
3. The interior signals are stable.

### Procedure

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1. Adjust the level guage and warm it up for 25 minutes.
2. Press the  key.

3. Press the  key, the display will read its full range, such as 3000.
4. Press the  key repeatedly, it reads the calibration point within the range (such as 2000, 1000...).
5. Choose one calibration point and place the right weight on the pan. Press the  key, the display will show **CAL---**.
6. When the external calibration is finished, the balance reads the value of the weight on the pan (such as 3000).

## **BASIC WEIGHING**

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### **Procedure**







1. Press the key , the balance will automatically proceed system initialization and deduct the tare weight.
2. Place the container on the weighing pan
3. Press the  key.
4. Place the simple object in the container.
5. Print the weight value pressing the  key.

## **COUNTING MODE**

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Displayed sign: **PCS**

## Procedure



1. Place the empty container on the weighing pan.
2. Press the  key.
3. Choose the amount of the reference samples. Press the  key, the balance reads “**qTy10**”, press the  key, choose the number of samples (10, 25, 50, 100). The bigger number, the more accurate for the counting results. The choosed reference number will be saved until a new reference number is set or the power is off.
4. Place the right samples on the weighing pan or in the container.
5. Press  key, the balance reads the amount number of the samples.
6. Add the rest of ítems, the balance will show the total pieces.
7. If you want print the result, press the  key.
8. To return to normal weighing mode, press the  key, the symbol **PCS** disappears.


## PERCENT DEVIATION

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Displayed sign: %

## Procedure

1. Press the  key.
2. Put the reference object on the weighing pan. When the reading is stable, press the  key, it reads “**100.000**” or “**100.00**”, which relates to the accuracy 100.00% of the balance. Meanwhile, it displays %.

3. Remove the reference object, the balance reads **“0.000”** or **“0.00”**.
4. Place the goal object on the weighing pan.
5. Wait for the **OK** on the display, read the display, the display indicates percent deviation from the reference.
6. Press the  key, the balance returns to normal weighing mode.

To test the percentage a weight in a container varies from a reference, please follow the below steps:

1. Put a empty container on the weighing pan. Press the  key.
2. Place the standard object into the container.
3. Press the  key. Wait for the stable display, it reads **“100.000”** or **“100.00”**.
4. Remove the container with standard object. Put another same container on the weighing pan, wait for the stable display, it reads **“0.000”** or **“0.00”**.
5. Add the goal object in the container, wait for tyhe stable display, the value displayed is the percentage the weight of the goal object varies from the standard weight.
6. Press the  key to return to normal weighing mode.
7. If necessary, the weight of the goal object could be printed out.

## LIMITS FUNCTION















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To decide if the weight of the goal object is within the range.

Display signs: **LOW / HIGH** (with warning sound of buzzer or OK).


Set up the highest and lowest weight values and start the limits function.


## Procedure

1. Enter into menu mode pressing the  key.
2. Press the  key repeatedly until the display reads **"INSPCT"**.
3. Press  key.
4. Choose inspect mode pressing  key.
5. Set up the highest limit pressing  key.
6. Set up the decimal position pressing the  key repeatedly until it goes to right decimal point.
7. Confirm the accuracy pressing  key.
8. Set up the highest value as follows:
  -  (to increase the value).
  -  (to decrease the value).
  -  value glittering.
  -  to confirm.
9. Set up the lowest value, press the  key.
10. Choose decimal point position pressing  key.
11. Press  key repeatedly until it goes to the right decimal position.

12. Confirm the accuracy pressing  key.

13. Set up the lowest value as follows:

 (to increase the value).

 (to decrease the value).

 value glittering.


 to confirm.

### Set up no warning value without loading


1. Press  key repeatedly until to see “NoNres”.

2. Press  key.

3. Set up the value as follows:


 (to increase the value).


 (to decrease the value).



 value glittering.

 to confirm.






### Activate the limits mode

1. Press the  key repeatedly until the display reads “ENABLE”.





2. Press the  key.

3. Press the  key.
4. Put the goal object on the weighing pan
5. If the display shows **“LOW”** it indicates that the goal object weight is lower than the low limit, if it reads **“HI”** also with buzzer warning sound, it means the the goal object weigh is higher than high limit value, if it ‘s reads **“OK”** means that goal object weight is within the low and high limits value.
6. If necessary, the limits result could be printed out pressing the  key.
7. Remove the goal object from the balance.


### To exit the limits mode

1. press the  key.
2. Press the  key repeatedly (**“InSPCT”**).
3. Press the  key (**“SET HI”**).
4. Press the  key repeatedly (**“DISABLE”**).
5. Press the  key, the balance exits from Limits function.

### To clear the low and high limits values

1. Press the  key (**“PrInt”**).
2. Press the  key repeatedly (**“InSPCT”**).
3. Press the  key (**“SET HI”**).
4. Press the  key repeatedly (**“CLEAR”**).








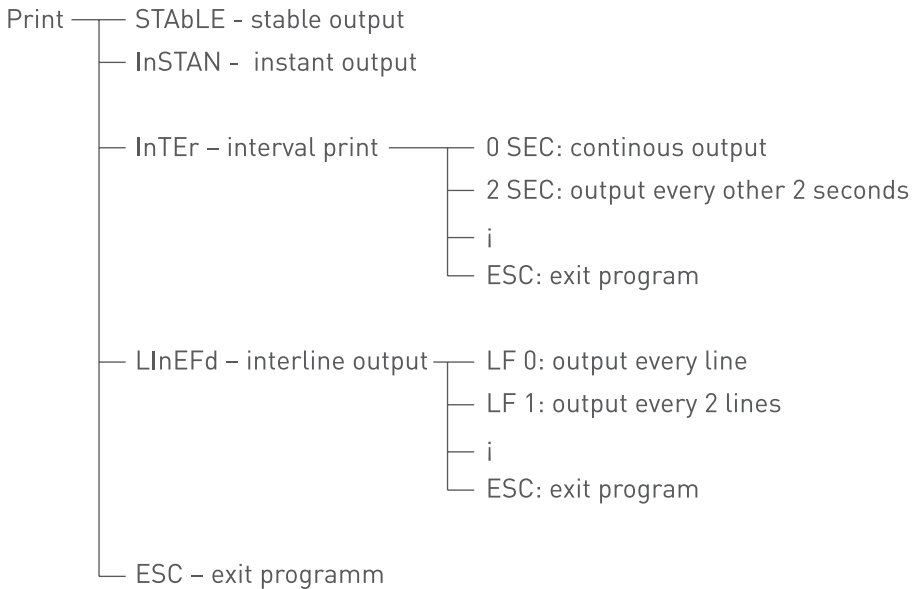
- Press the  key to clear the limits value.

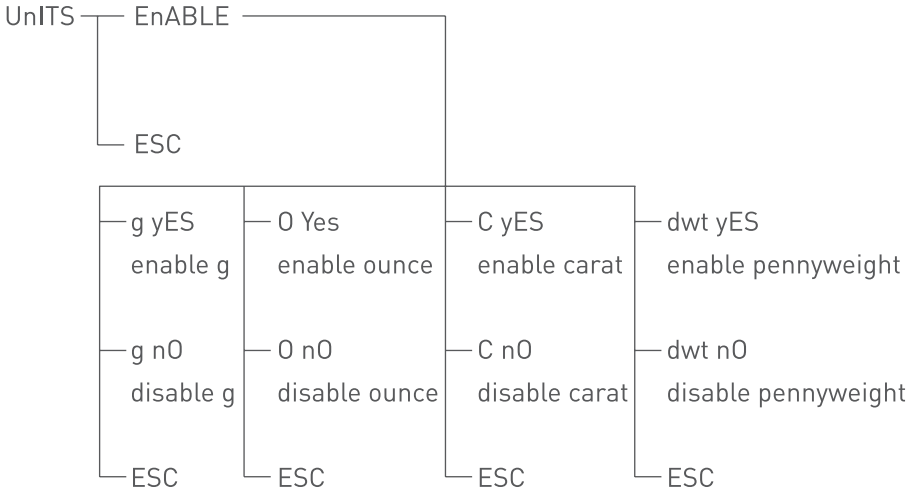
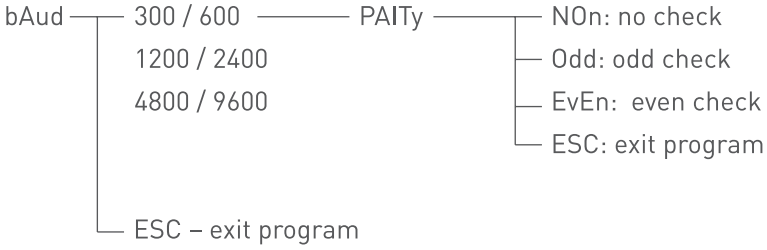
## USER SETUPS

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The balance could be set up to meet individual requirement.

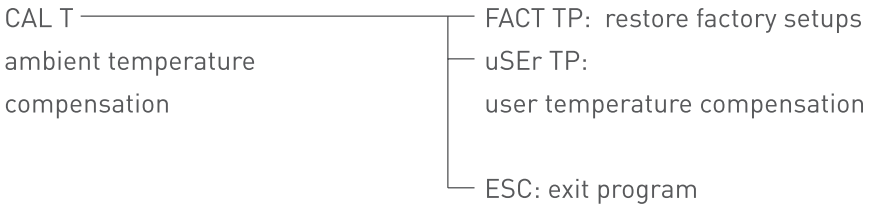
- Press the  key to enter setup program.
- Press the  key to choose the parameter to be set up and then press the  key to confirm.
- Anytime to exit the setup program, press the  key, it reads “ESC”, then press the  to confirm.





VEr — TEST 20

Firmware Version



BLIghT — 1 nIn backlight for 1 minute  
 —  
 — ESC: exit program

InSPCT — SET HI — SET Dp — SET Dp  
 — set high limit — set decimal position —  
 — SET LO  
 — set low limit  
 — nOnrES 50  
 — set no warning percentage of the lowest  
 — CLEAR - clear setups  
 — EnAbLE - enable  
 — DISAbLE - disable  
 — ESC - exit

nET  
 mode — nET — Y enable NET mode  
 — nET — N disable NET mode  
 — ESC - exit

ESC - exit

## PRINT SETUPS

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There are three print types:












**STABLE Print:** print a stable reading when it is attained.

**INSTANT Print:** print immediately after press the  key.

**INTERVAL Print:** print at predetermined time intervals.






**Note:** The print function is separate from the line feed setup, i.e set the print function first then set the number of line feeds.

To set the print type, use the following procedure:




1. Press the  key the display will show **"Print"**.
2. Press the  key, the display will show **"STABLE"**, which indicates stable print as the default.
3. Press the  key to choose the print type and confirm pressing the .
4. Press the  key until the display reads **"InTER"**, press the  key, the display will show **"SEC"**.
5. Press the  key repeatedly to see the predetermined time interval and press the  to confirm. The message **"0 SEC"** means continuous print.
6. Press the  key to return to weighing mode.
7. After entering print setup, press the  key repeatedly to see predetermined line feed (1-18) choose proper line feed and press the  to return to normal weighing mode.

## SETTING THE BAUD RATE

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1. Press the  key.
2. Press the  key, the balance reads **"bAud"**.
3. Press the  key, the balance reads **"300"**.
4. Press the  key repeatedly, the balance display the other baud rates. Choose the proper rate and press  key to confirm. The balance reads







“**ParITy**” and begins parity check.

5. Press the  key, the balance reads “**nOnE**” (no check) for the first.
6. Press the  key, it reads the other check types; “**Odd**” indicates odd check and “**EvEn**” indicates even check.
7. Choose the proper check type and press the  key to confirm, the balance now returns to normal weighing mode.

## **ENABLING WEIGHING UNITS**




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The units function can be programmed to turn certain weighing units on or off. To enable or disable certain units of measure, perform the following procedure:

1. Press the  key, the display will show “**PrInT**”.
2. Press the  key repeatedly until it reads “**uniT**”.
3. Press the  key the display reads “**g yes**” which means **g** is available for use. Press the  key to confirm. To disable **g** as the unit, press the  key, the display will show “**g no**”, press the  key to confirm.
4. Follow the steps above mentioned to enable or disable **Oz**, **Ct** or **dwt** as the unit of measure.

## **RESTORING THE FACTORY DEFAULT SETUP**






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1. Press the  key, the display will show “**PrInT**”.
2. Press the  key repeatedly until it reads “**IniTIA**”.
3. Press the  key to confirm, the display reads “**BUSY**” and the returns

to weighing mode. Factory default setup is finished.

## BACKLIGHT SETUP









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1. Press the  key, the display will show **"PrInT"**.
2. Press the  key repeatedly until it reads **"bLgHT"**, press the  key to confirm, the display will show **"1 nIn"** which indicates the backlight will be off in 1 minute.
3. Press the  key repeatedly to choose the desired backlight time: 1,2,3,5,10,15,30,60 min.
4. Press the  key to confirm and the balance returns to weighing mode.





## LIMITS SETUP

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Set up the high and low limits values:










1. Press the  key.
2. Press the  key repeatedly until the display shows **"InSpCT"**.
3. Press the  key to confirm, then the balance enters limits setup and the display reads **"SET HI"** (to set the high limit value).
4. Press the  key, the display reads **"50"** (initialization value).
5. Press the  key, the display reads **"SET Dp"** (to set decimal position)  
Press the  key repeatedly to choose the decimal position.
6. Press the  key to confirm the decimal position. The balance will display the initialization value. Press the  key to increase the value

and the  key to decrease it.





7. Set the desired value, press the  key then the choosed value glitters. To continue the modification, press the  key, to confirm the value press the  key, the display will show **"SET HI"**.
8. Press the  key, the display reads **"SET LO"** (to set the low limit value), then follow the steps above mentioned.

### No warning setup








no warning when there is no loading on the pan or the weight is lower than the lowest limit value.

1. Press the  key.
2. Press the  key repeatedly until it reads **"InSPCT"**.
3. Press the  key the display will show **"SET HI"**.
4. Press the  key repeatedly until it reads **"n0nrES"**.
5. Press the  key the display will show **"50"** (the initialization value which indicates no warning when the real weight is lower than 50% of the lowest weight).
6. Press the  key to increase the value or the  key to decrease it.
7. Choose the desired value, press the  key then the desired value glitters.
8. Press the  key to confirm, the display will show **"SET HI"**.





## Enabling the limit setup

1. Press the  key repeatedly until the display reads “EnAbLE”.
2. Press the  key to confirm.
3. To disable limit setup, press the  key repeatedly until display shows “dISAbL”.
4. Press the  key to confirm, the balance returns to weighing mode.

## Checking the high and low weight limits

1. Press the  key, the display reads “PrINT”.
2. Press repeatedly the  until it reads “InSPCT”.
3. Press the  key, the display will show “SET HI”.
4. Press the  key, the display will read the high weight limit.
5. Press the  key, the display returns to read “SET HI”.
6. Press the  key, the display reads “SET LO”.
7. Press the  key, the display will read the low weight limit.

### Note:

1. To escape the menu setup anytime during the operation, press the  key until the display reads “ESC”, press the  key to confirm.
2. To clear the high and low limits values, press the  keys repeatedly until the display reads “CLEAR”, press the  key, then the limits value



both return to zero.

3. After any modification of the high and low weight limits, the balance needs to enter limits mode again.
4. The high and low weight limits would be saved in the balance. There is no need to set up the limits for the next start-up of the balance.

## **ADDITIONAL FUNCTIONS**

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### **Bottom hook weighing**

There is a hole at the bottom of the balance for the optional weighing hook (It is not allowed to use the bottom part to balance in Legal Metrology)

1. Open the bottom cover of the balance (please lay the side of the balance downwards to open the bottom cover, do not make the upside down)
2. To use the hook in the accessories: screw the hook clockwise in the bottom tapped hole. Stop at once to proceed if there is any resistance.
3. Put the goal object to the hook with a line a suspension line, for example.
4. If necessary, set a safety guard to avoid air current.


## **COMMUNICATION WITH A COMPUTER**

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The balance keyboard functions can be accessed via the RS-232 interface. The following commands are available:

**U** -  : units conversion

**T** -  : tare function

**C** -  : calibration with external standard weight

**P** -  : print function

**%** -  : percent function

**#** -  : instant print

**M** -  : counting function

When a balance is connected to a computer, it is suggested that immediate print # be used. In response to this command the balance will transmit whatever number or message appears on the balance display.

The string format output is shown below:

**A B C D E F G H I J K L M**

**A - +/-:** Signs field, usually no display as a space when it is a positive number, “-” is displayed when it is a negative number.

**B - G:** Number and decimal field, spaces are used when there are less than six digits.

**H - I:** Spaces fields.

**J:** Unit field, it describes the units of the number being transmitted. Your balance will transmit **G** for grams, **O** for ounces and **C** for carats.

**K:** Stable character, it corresponds to the **OK** indicator on the display. **S** means the reading is stable, space means the reading is not stable.

**L:** Return character.

**M:** Line feeds character, it indicates the line feeds.

## RS-232 INTERFACE HARDWARE

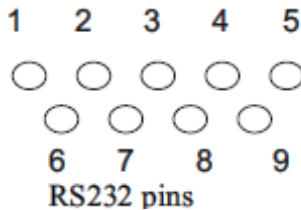
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This balance adopts the transmit and receive lines of standard RS-232.

The data format is:

- 1 start bit.
- 8 data bits include parity.
- 1 stop bit.

The instruction to connect the balance to external device is as follows:



### Pin description

- 2 – TXD - - - scale transmits data
- 3 – RXD - - - scale receives data
- 5 – GRD - - - signal ground

**Note:** “Handshake” signals, such as “clear to send” (CTS) are not used. The peripheral must have a minimum buffer (15 characters).

It is suggested that the maximum recommended cable length is 15 meters, the load impedance of the device connected should be between 3000 and 7000 ohms with no more than 2500 pf shunt capacitance.

## **ROUTINE MAINTENANCE AND TROUBLESHOOTING**

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### **Troubleshooting**

Only the trained professionals are allowed to do repair work. There is a risk for the user if non-professionals do the repair.

### **Clearance**

- Turn off the balance and unplug the data cables.
- Avoid the liquid into the balance.
- Any corrosive cleaner (solvent) is forbidden to use.
- Wipe the balance with a piece of soft cloth.
- Remove the weighing pan before wipe the balance.
- Remove the shield ring and pan support with the weighing pan which helps avoid damage to the weighing system.

### **Clearing the stainless steel surface**

All the stainless Steel components need to clean regularly. Remove the weighing pan and thorough clean it with a damp cloth or sponge. The cleaner applicable to stainless Steel are recommended. Wipe the stainless Steel surface of the balance first and then clear the stainless Steel weighing pan. Make sure there is no dirt and then wipe the stainless Steel component again. Dry the balance by air. If necessary, smear the proper oil on the surface as additional protection.


**Note:** After remove the weighing pan and the pan support, avoid any liquid or solid pellet into the installation hole.

## Safety check

If the balance could not work normally:

- Cut off the power immediatelly, keep and do not use it again.
- Keep it in a safe place to make sure it won´t be used for the moment.
- Inform the nearest Service Center or your Distributor. The repairman must have had profesional training.

## TROUBLESHOOTING

DISPLAY	REASON	SOLUTION
-----	The balance could not get a stable reading or the transducer is damaged.	Contact your local service center.
HHHHH	The real weight is 5% higher than its capacity or the transducer is damaged.	Unload or contact your local service center.
LLLLLLL	a) The weighing pan is not on. b) There is wrong connect with the pan. c) The transducer is damaged.	a) Install the right weighing pan and press the  key. b) Clear the connect. c) Contact your local service center.

<p><b>NOCAL</b></p>	<p>Calibration is unresponsive.</p>	<p>Refer to calibration section, check if it is the right calibration weight.</p>
<p><b>UNABLE</b></p>	<p>Lack of data or wrong data with which the balance could not perform the function.</p>	<p>Refer to user manual.</p>
<p><b>UNSTABLE READING</b></p>	<p>Unstable the ambient environment (excessive vibration or air current) or there is wrong connect with the pan.</p>	<p>Put the balance in another place. Clear the wrong connect.</p>
<p><b>NO DISPLAY</b></p>	<p>No work voltage no connection with transformer.</p>	<p>Check the power supply circuit and the instrument, connect the transformer.</p>
<p><b>Apparent wrong weighing display</b></p>	<p>No calibration or the tare weight is deducted.</p>	<p>Calibrate the balance Deduct the tare weight before weighing.</p>

If there is any other trouble, please contact your local distributor or service center.

## TECHNICAL CONDITIONS

AC power, voltage, AC frequency	AC-DC Adapter, input 220V/110V, output 7.5V (+15% to -20%) 48-60Hz
Power consumption	Maximam = 16W, average = 8W
Work temperature range Temperature range allowed The balance could assure the normal work	+10°C to +30°C (50° F to 86° F) +5°C to +40°C (41° F to 104° F) +5°C to +40°C (41° F to 104° F)

## TECHNICAL PARAMETERS

Model	FR-320	FR-500	FR-3200	FR-5000
Capacity	320g	500g	3200g	5000g
Readability	0.001g	0.001g	0.01g	0.01g
Tare range	320g	500g	3200g	5000g
Repeatability	0.001g		0.01g	
Reponse time	2.5s			
External calibration value	100 or 200g	100, 200 or 500g	1, 2 or 3kg	1, 2 or 5kg
Minimum accuracy level calibration weight	Class F1	Class F1	Class F1	Class F1
Net weight	4.0kg		2.3kg	
Pan size	115mm diam		160mm diam	
Inferior shield height	230mm			
Shape size	230x310x330mm		230x310x90mm	

## **GUARANTEE**

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This scale is guaranteed for one year from the delivery date. The guarantee covers any fabrication defect of the material.

During this period **GRAM PRECISION, SL**, covers the manpower and the spare parts necessary for the reparation of the scale.

This guarantee does not cover the failures caused by an inappropriate use or overcharge.

**The guarantee does not cover the freight cost (transport) necessary to repair the scale.**



**NOTAS**

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