



Citizen CARAT BALANCES

CT103, CT503

Electronic Carat Scales
Operating Instructions

GERMAN
PRODUCT



2
YEARS WARRANTY

Getting Started

Storage and Shipping Conditions

Do not expose the scale to shocks, vibrations, moisture or extreme temperatures.

Unpacking the Scale

- After unpacking the scale, check it immediately for any visible damage as a result of rough handling during shipment.

If you see any sign of damage, proceed as directed in the chapter entitled "Care and Maintenance," under the section on "Safety Inspection."

Save the box and all parts of the packaging until you have successfully installed your scale. Only the original packaging provides the best protection for shipment. Before packing your balance, unplug all connected cables to prevent damage.

Equipment Supplied

The equipment supplied includes the components listed below:

- Scale
- Weighing pan
- Pan support
- Shield ring
- Shield plate
- Gem tray
- AC adapter
- Dust cover
- Operating instructions

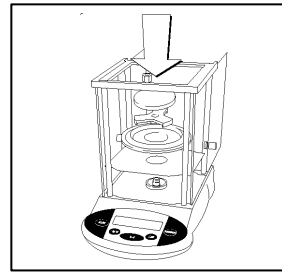
Installation Instructions

Your scale is designed to provide reliable weighing results under normal ambient conditions. When choosing a location to set up your scale, observe the following so that you will be able to work with added speed and accuracy:

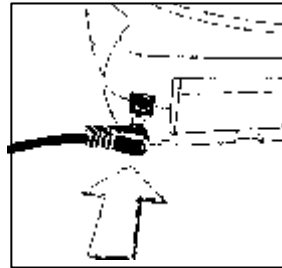
- Set up the scale on a stable, even surface
- Avoid placing the scale in close proximity to a heater or otherwise exposing the balance to heat or direct sunlight
- Protect the scale from drafts that come from open windows or doors
- Avoid exposing the scale to extreme vibrations during weighing
- Protect the scale from aggressive chemical vapors
- Do not expose the scale to extreme moisture over long periods

Conditioning the Scale:

Moisture in the air can condense on the surfaces of a cold scale whenever it is brought into a substantially warmer place. If you transfer the scale to a warmer area, make sure to condition it for about 2 hours at room temperature, leaving it unplugged from AC power.



- Place the components listed below inside the chamber in the order given:
 - Shield plate
 - Shield ring
 - Pan support
 - Weighing pan
 - Gem tray (not shown)



Connecting the Scale to AC Power/Safety Precautions

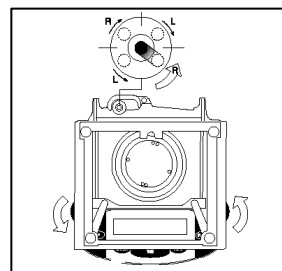
Use only original AC adapters:

- for Europe: 6971948
- for the US: 6971947
- for the RSA: 6971949
- for Australia: 6971950

- Insert the right-angle plug into the jack

- The AC adapter rated to Class 2 can be plugged into any wall outlet without requiring any additional safety precautions

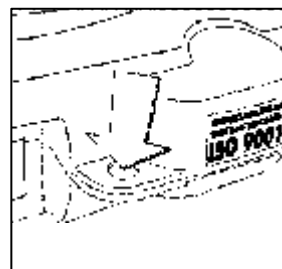
The ground is connected to the scale housing, which can be additionally grounded for operation.



Leveling the Scale

Level the scale any time you set it up in a new location. Use only the 2 front feet of the scale for leveling.

- Turn the 2 front feet as shown here in the illustration until the air bubble is centered in the level indicator
- > In most cases this will require several adjustment steps



Anti-theft Locking Device

To protect against theft, use the mounting lug on the rear panel of the scale.

- Secure the scale at the place of installation, for example with a chain or a lock

Setting up the Scale

Operating the Scale

Basic Weighing Function

Available Features

- Taring the scale
You can tare the scale within the entire weighing range.

Preparation

- Turn on the scale: Press [ON/OFF]
- To change configurations: See the chapter entitled "Configuring the Scale"
- To load factory-set configurations: See "Configuring the Scale," parameter 9-1

\$ To tare the scale: Press **t**

Additional Functions

- To turn off the scale: Press [ON/OFF]

Warmup Time

To deliver exact results, the scale must warm up for at least 30 minutes after initial connection to AC power. Only after this time will the scale have reached the required operating temperature.

Example

Basic weighing

Menu code settings: Factory-set codes

Step	Key (or instruction)	Display
1. Turn on the scale	[ON/OFF]	
Self-test is performed		
2. Place container on scale (here: 52 ct)		+ 52.000 ct
3. Tare the scale	t	+ 0.000 ct
4. Place sample in container on scale (here: 150.210 ct)		+150.210 ct

Calibration/Adjustment*

Always calibrate/adjust the scale after setting it up in a new location.

Available Features

- Calibration/adjustment can only be performed when
- there is no load on the scale,
 - the scale is tared,
 - the internal signal is stable.

If these conditions are not met, an error message is displayed.

The weight required for calibration/adjustment is displayed.

Example

Calibrate the scale

Menu code settings: Factory-set codes

Step	Key (or instruction)	Display
1. Turn on the scale	[ON/OFF]	
2. Tare the scale	t	0.000 ct
3. Begin calibration	[CAL/CF]	+100.000
Calibration weight is displayed without weight unit (here: 100 g)		
4. Place the indicated calibration weight on the scale		100.000
After calibration, the calibration weight is displayed with wt. unit		+500.000 ct
5. Remove the calibration weight		0.000 ct

* "Calibration" technically means to determine the difference between the scale readout and the actual weight on the pan to determine the accuracy. Adjustment means to bring a scale into the state of accuracy required for its use. Therefore, "calibration," as used in this manual, actually means "adjustment."

Application Programs

Counting

Purpose

With the Counting program you can determine the number of parts that each have approximately equal weight.

Available Features

- Store the current weight value to have it loaded as the preset reference sample quantity next time you initialize the Counting application
- The reference sample quantity can be changed in the operating menu: See "Configuring the Scale"
- The average piece weight is automatically output via the optional data interface port after initialization, if the menu code for "Printout with data ID codes" is set
- Press [FUNCTION] to toggle the display between piece count and weight

Factory Settings

Reference sample quantity: 10 (menu code 3. 3. 2)

Preparation

- Configure the Counting application in the operating menu:
See "Configuring the Scale"
Menu code 2. 1. 4 Counting
- Reference sample quantity:
Menu code 3. 3. 1 5 pcs
Menu code 3. 3. 2 10 pcs
Menu code 3. 3. 3 20 pcs
Menu code 3. 3. 4 50 pcs
Menu code 3. 3. 5 100 pcs




See also "Configuring the Scale"

Example

Determine an unknown piece count; weigh the preset reference sample quantity

Settings (changes in the factory settings required for this example):

Menu: Application program: Counting (2. 1. 4)
Reference sample quantity: 20 pcs (3. 3. 3)

Step	Key (or instruction)	Display
1. Turn on the scale	[ON/OFF]	
2. Tare the scale	t	0.000 ct
3. Display the reference sample quantity (here: 20 pcs)	[FUNCTION] > 2 sec.	ref 20 (briefly)
4. Place the reference sample quantity (20 pcs) on the scale (here: 16 ct)		+ 16.000 ct
5. Start the application; if the print format is set to include data ID codes, the following is printed	[FUNCTION]	+ 20 pcs wRef + 0.8000 ct
6. Weigh uncounted parts (here: 174 pcs)		+ 174 pcs
7. Display weight	[FUNCTION]	+ 139.200 ct
8. Display quantity	[FUNCTION]	+ 174 pcs
9. Unload the scale		0 pcs
10. Delete the reference value	[CAL/CF] > 2 sec.	
11. Repeat the procedure starting from Step 6, if desired.		

Weighing in Percent

Purpose

This application program allows you to obtain weight readouts in percent which are in proportion to a reference weight.

Available Features

- Store the current weight value to have it loaded as the preset reference percentage next time you initialize the Weighing in Percent application
- The reference percentage can be changed in the operating menu: See "Configuring the Scale"
- The reference percentage is automatically output via the optional data interface port after initialization, if the menu code for "Printout with data ID codes" is set
- Press [FUNCTION] to toggle the display between percentage and weight

Factory Settings

Reference percentage: 10 (menu code 3. 3. 2)

Preparation

- Configure the Weighing in percent application in the operating menu:
See "Configuring the Scale"
Menu code 2. 1. 5 Weighing in percent
- Reference percentage:
Menu code 3. 3. 1 5 %
Menu code 3. 3. 2 10 %
Menu code 3. 3. 3 20 %
Menu code 3. 3. 4 50 %
Menu code 3. 3. 5 100 %





See also "Configuring the Scale"

Example

Determine an unknown percentage; store the weight on the scale as a reference percentage

Settings (changes in the factory settings required for this example):

Menu: Application program: Weighing in percent (2.1.5)
Menu: Reference percentage 100 % (3.3.5)

Step	Key (or instruction)	Display
1. Turn on the scale	[ON/OFF]	
2. Tare the scale	t	0.000 ct
3. Display the reference percentage	[FUNCTION] > 2 sec.	ref100
4. Place the reference weight for 100% on the scale (here: 222.5 ct)	+ 	222.500 ct
5. Start application; if the print format is set to include data ID codes, the following is printed	[FUNCTION]	+ 100.00 % Wxx% + 222.500 ct
6. Place an unknown weight on the scale (here: 322.5 ct)	+ 	+ 144.94 %
7. Display weight	[FUNCTION]	+ 322.500 ct
8. Display percentage	[FUNCTION]	+ 144.94 %
9. Unload the scale		0.00 %
10. Delete the reference percentage	[CAL/CF] > 2 sec.	
11. Repeat the procedure starting from Step 6, if desired.		

Averaging

Purpose

Use this program to determine weights under unstable ambient conditions. In this program, the scale calculates the weight as the average value from a defined number of individual weighing operations. These weighing operations are also known as "subweighing operations" or "subweighs."

Available Features

- The measured result displayed is the arithmetic mean shown in the selected weight unit; a triangle under the plus or minus sign indicates that this is a calculated value
- You can set the number of subweighing operations performed in the operating menu:
See "Configuring the Scale"
- Press [FUNCTION] for at least 2 sec. to display the pre-set number of subweighing operations
- Press [FUNCTION] to toggle the display between the calculated result and the weight

Factory Settings

Number of subweighs for averaging: 10 (3. 3. 2)

Preparation

- Configure the Averaging application in the operating menu:
See "Configuring the Scale"
Menu code 2. 1. 12 Averaging
- Number of subweighs for averaging:
3. 3. 1 5 subweighs
3. 3. 2 10 subweighs
3. 3. 3 20 subweighs
3. 3. 4 50 subweighs
3. 3. 5 100 subweighs




See also "Configuring the Scale"

Example

Determine the weight of a sample in extremely unstable ambient conditions by calculating the average of 10 subweighing operations.

Settings (changes in the factory settings required for this example):

Menu: Application program: Averaging (menu code 2. 1. 12)

Step	Key (or instruction)	Display
1. Turn on the scale	[ON/OFF]	
2. Tare the scale	t	0.000 ct
3. Display the number of subweighs (here: 10)	[FUNCTION] > 2 sec.	ref 10 (briefly)
4. Place sample on the scale (weight readout fluctuates; here: around 275 ct)	+ 	+ 8888
5. Start measurement	[FUNCTION]	+ 8888 10 9 8 ... 1
After 10 subweighs		+275.500 ct ^G
		If the print format is set to include data ID codes, the following is printed RES + 275.500 g
6. Unload the scale		+275.500 ct ^G (stable display)
7. Delete the result	[CAL/CF] > 2 sec.	
8. Repeat the procedure starting from Step 4, if desired.		

Net-Total Formulation/ Second Tare Memory





With this application program you can weigh in components for formulation of a mixture.

Preparation

Configure the Net-total formulation/Second tare memory application in the operating menu: See "Configuring the Scale"

Menu code 2.1.3

Example

Step	Key (or instruction)	Display
1. Turn on the scale	[ON/OFF]	
2. Place an empty container on the scale		+ 65,000 ct
3. Tare the scale	t	
4. Add the first component		+ 120,500 ct
5. Store the first component weight	[FUNCTION]	0.000 ct _{NET}
If the print format is set to include data ID codes, the following is printed		
		N1 + 120.500 ct
6. Add the next component		+ 70,500 ct
7. Store the 2nd component weight	[FUNCTION]	0.000 ct _{NET}
8. Add further components, if desired	As described for Steps 5 and 6	
9. Display total weight and fill to desired final weight	[CAL/CF] > 2 sec.	+191,000 ct

Toggle between Weight Units

With this application program you can toggle the display of a weight value back and forth between two weight units.

Configure the "Toggle weight units" application in the operating menu:

See "Configuring the Scale" menu code 2.1.2 Toggle weight units

Menu code	Unit	Conversion factor	Abbr. on printout
1. 7. 2	3. 1. 2o	Grams	1.000000000000 g
1. 7. 3	3. 1. 3	Kilograms	0.001000000000 kg
1. 7. 4o	3. 1. 4	Carats	5.000000000000 ct
1. 7. 5	3. 1. 5	Pounds	0.00220462260 lb
1. 7. 6	3. 1. 6	Ounces	0.03527396200 oz
1. 7. 7	3. 1. 7	Troy ounces	0.03215074700 ozt
1. 7. 8	3. 1. 8	Hong Kong taels	0.02671725000 tlh
1. 7. 9	3. 1. 9	Singapore taels	0.02645544638 tls
1. 7. 10	3. 1. 10	Taiwanese taels	0.02666666000 tlt
1. 7. 11	3. 1. 11	Grains	15.43235835000 GN
1. 7. 12	3. 1. 12	Pennyweights	0.64301493100 dwt
1. 7. 13	3. 1. 13	Milligrams	1000.000000000000 mg
1. 7. 14	3. 1. 14	Parts per pound	1.12876677120 /lb
1. 7. 15	3. 1. 15	Chinese taels	0.02645547175 tlc
1. 7. 16	3. 1. 16	Mommes	0.266700000000 mom
1. 7. 17	3. 1. 17	Austrian carats	5.000000000000 K
1. 7. 18	3. 1. 18	Tola	0.08573333810 tol
1. 7. 19	3. 1. 19	Baht	0.06578947437 bat
1. 7. 20	3. 1. 20	Mesghal	0.217000000000 MS
1. 7. 22	3. 1. 22	lb/oz	0.03527396200 o

o = Factory setting

Function

- To toggle the display between the 1st and 2nd weight units: Press the [FUNCTION] key

Configuring the Scale

Setting the Parameters (Menu Codes)

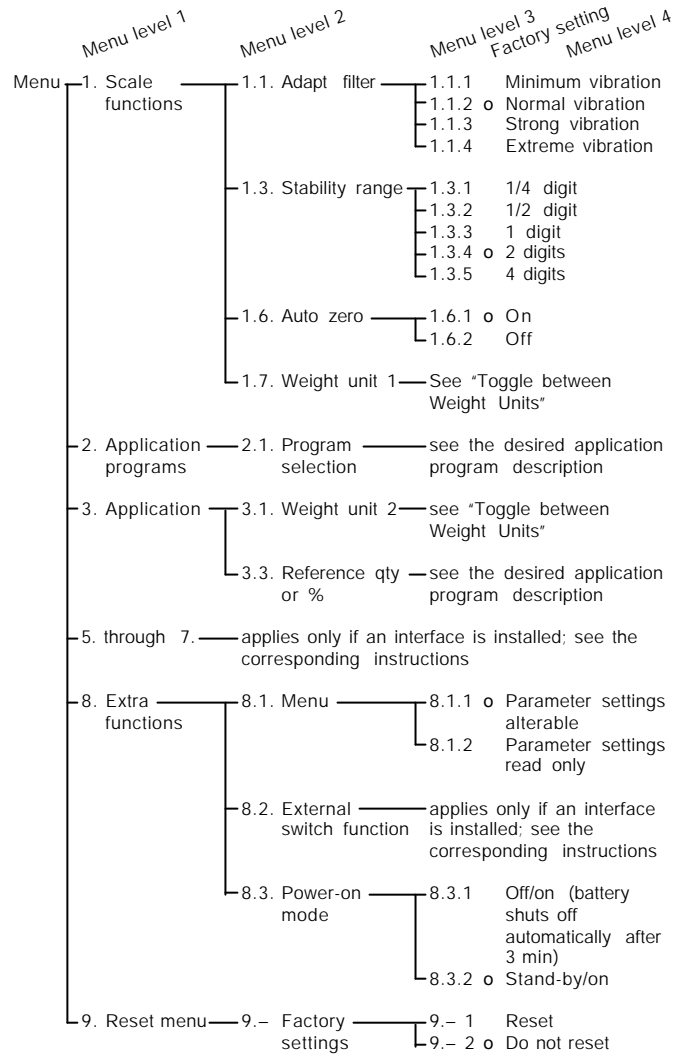
You can configure your CT scale to meet individual requirements by selecting from the parameters available in the menu.

Example: Adapt the scale to unstable ambient conditions:
Menu code 1.1.4

Step	Key (or instruction)	Display
1. Turn off the scale	[ON/OFF]	
2. Turn the scale back on	[ON/OFF]	
while all segments are displayed	t briefly	1.
§ To navigate within a menu level; the last menu option is followed by the first option	t repeatedly	2 9. 1.
3. Select the 2nd menu level	[PRINT]	1. 1.
4. Select the 3rd menu level	[PRINT]	1. 1. 2o
5. In Menu Level 3: Select the desired option	t repeatedly	1. 1. 4
6. Confirm new setting; the "o" indicates the currently set option	[PRINT] for 2 sec.	1. 1. 4o
§ Select the next menu level (here: move from the 3rd to the 1st level)	[PRINT]	1.
§ Set other menu codes, if desired	[PRINT], t	
7. Store parameter settings and exit operating menu	t for 2 sec.	
or		
§ Exit operating menu without storing changes	[ON/OFF]	
> Restart the application		0.000 ct

Scale Operating Menu (Overview)

- o Factory setting
- | User setting



Error Codes

Error codes are shown in the main display for approx. 2 seconds, after which the program automatically returns to the weighing mode.

Display	Cause	Solution
No segments appear on the display	No AC power is available The AC adapter is not plugged in Battery is dead	Check the AC power supply Plug in the AC adapter Replace the battery Recharge the battery using an external recharging device
h	The load exceeds the scale capacity	Unload the scale
l	The load plate is not in place Something is touching the load plate	Place the load plate on the scale Move the object that is touching the load plate
e 01	Display capacity exceeded: Value to be output cannot be shown on the display	Decrease the weight on the scale
e 02	Calibration parameter not met; e.g.: – scale not zeroed – scale is loaded	Calibrate only when zero is displayed Press t to tare the scale Unload the scale
e 09	When gross - zero, no tare	Tare the scale
e 10	The t key is blocked when there is data in the second tare memory (net-total) – only 1 tare function can be used at a time	Press [CAL/CF] > 2 sec. to clear the tare memory and release the tare key
e 11	Value input is not allowed for second tare memory	Press t
e 22	Weight is too light or there is no sample on the balance	Increase the reference quantity
e 30	Interface port for printer output is blocked	Contact your local Service Center
Max. weighing range is less than indicated under "Specifications"	The scale was turned on without the weighing pan in place	Place the weighing pan on the scale and press [ON/OFF] to turn on the scale
The weight readout is obviously wrong	The scale has not been calibrated/adjusted The scale was not tared before weighing	Calibrate/adjust the scale Tare before weighing

If any other errors occur, contact your local Service Center!

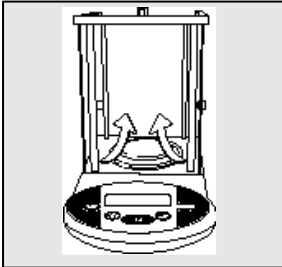
Care and Maintenance

Repairs

Repair work must be performed by trained service technicians. Any attempt by untrained persons to perform repairs may lead to hazards for the user.

Cleaning

- ! Disconnect the scale from the AC adapter and unplug any data cables that are connected to the scale
- ! Make sure that no liquid enters the scale housing
- ! Do not use any aggressive cleaning agents (solvents or similar agents)
- Clean the scale using a piece of cloth which has been wet with a mild detergent (soap)
- After cleaning, wipe down the scale with a soft, dry cloth



Removing and Cleaning the Weighing Pan

- Lift up and remove the weighing pan together with the pan support by gripping them from under the shield ring. Make sure that you do not damage the weighing system in doing so.

Safety Inspection

If there is any indication that safe operation of the scale with the AC adapter is no longer warranted:

- Turn off the power and disconnect the equipment from AC power immediately
- > Lock the equipment in a secure place to ensure that it cannot be used for the time being

Safe operation of the scale with the AC adapter is no longer ensured when:

- there is visible damage to the AC adapter
- the AC adapter no longer functions properly
- The AC adapter has been stored for a relatively long period under unfavorable conditions

In this case, notify your nearest Service Center or the International Technical Support Unit. Maintenance and repair work may only be performed by service technicians who are authorized by Citizen and who

- have access to the required maintenance manuals
- have attended the relevant service training courses

Instructions for Recycling the Packaging

To ensure safe shipment, your scale has been packaged using environmentally friendly materials. After successful installation of the scale, you should return this packaging for recycling.

For information on recycling options, including recycling of old weighing equipment, contact your municipal waste disposal center or local recycling depot.

Overview

Specifications

Model	CT103	CT503
Weighing capacity	101ct/36g	505ct/101g
Readability	0.001ct/0.2mg	0.001ct/0.2mg
Tare range (subtractive)	105ct/21g	505ct/101g
Repeatability	\pm 0.001ct/0.2mg	0.001ct/0.2mg
Linearity	\pm 0.002ct/0.4mg	0.002ct/0.4mg
Operating temperature range	+10...+30°C (50°F-86°F)	
Allowable ambient operating temperature	+5...+40°C	
Sensitivity drift within +10...+30°C \pm /K	2.10 ⁻⁶	
Response Time (average)	s 2	
Adaptation to ambient conditions	By selection of 1 of 4 optimized filter levels	
Display update (depends on the filter level selected)	s 0.2 - 0.4	
External calibration weight (of at least accuracy class...)	g 20 (F1)	100 (F1)
Net weight, approx.	kg/lb 2.8/6.2	
Pan size	mm	80Ø
	inches	3.3Ø
Weighing chamber height	mm	133
	inches	5.2
Dimensions (WxDxH)	mm	200 x 270 x 233
	inches	7.9 x 10.5 x 9.2
AC power source/ power requirements	AC adapter, 230 V or 115 V, +15%...20%	
Frequency	48 - 60 Hz	
Power requirements, direct current	V	10 to 20
Power consumption (average)	W	1

CE Marking

The **CE** marking affixed to the equipment indicates that the equipment meets the requirements of the following Directive(s):

Council Directive 89/336/EEC "Electromagnetic compatibility (EMC)"

Applicable European Standards:

Limitation of emissions: EN 50081-1 Residential, commercial and light industry
EN 50081-2 Industrial environment

Defined immunity to interference: EN 50082-1 Residential, commercial and light industry
EN 50082-2 Industrial environment

Important Note: The operator shall be responsible for any modifications to Citizen equipment and for any connections of cables or equipment not supplied by Citizen and must check and, if necessary, correct these modifications and connections. On request, Citizen will provide information on the minimum operating specifications (in accordance with the standards listed above for defined immunity to interference).

Council Directive 73/23/EEC "Electrical equipment designed for use within certain voltage limits"

Applicable European Standards:

EN 60950 Safety of information technology equipment including electrical business equipment
EN 61010 Safety requirements for electrical equipment for measurement, control and laboratory use
Part 1: General requirements

If you use electrical equipment in installations and under ambient conditions requiring higher safety standards, you must comply with the provisions as specified in the applicable regulations for installation in your country.

WORLDWIDE MARKETING :

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CITIZEN SCALE INC. reserves the right to change the specification without notice for the improvement of products.

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