



Lab Manual

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Sartorius A200S Electronic Analytical Balance

1.0 Title

Sartorius A200S Electronic Analytical Balance

2.0 Purpose

The Sartorius A200S is a sophisticated, benchtop sized, top-loading electronic balance with auto tare and auto calibration capabilities. Technical specifications are summarized as follows:

Weighing Range	202 g
Readability	0.0001 g
Tare Range	202 g
Standard Deviation	± 0.0001 g
Stabilization Time (typical)	3 s
Display Update Rate	0.1 – 0.8 s (selectable)
Sensitivity Drift (283 to 313K)	$\pm 2 \times 10^{-6}$ K
Pan Dimension	90 mm radius

3.0 Scope

This document outlines the proper procedure for the use of this balance to measure the weight of samples weighing up to 202 g.

4.0 Applicable Documents

[Revision History](#)

5.0 Definitions & Process Terminology

5.1 Pan: The location on the balance where the sample (and its vessel) sits to be weighed.

5.2 Zero: To define the empty pan as the zero point of the balance's measurement scale.

5.3 Tare: To zero the balance when the pan is not empty. This is a standard weighing method whereby the weight of the vessel holding a sample is automatically subtracted from the total weight of vessel and sample together, by first zeroing the balance while the empty vessel sits on the pan. After such an operation, a balance may display a negative number when the pan is empty of both vessel and sample. When the sample is subsequently weighed in the vessel on the pan, the balance will display the weight of the sample only.

6.0 Safety

There are no safety concerns associated with this instrument.

7.0 Statistical/Process Data

N/A

8.0 Process Notes

Anything weighing up to 202 g which can fit inside the balance enclosure and sit stably on the pan may be weighed on the Sartorius A200S. The enclosure doors should be closed before taking measurements, in order to minimize error from air currents.

9.0 Operating Procedure

9.1 **Clean the Chamber and Pan**

- 9.1.1 Open the chamber door and clear the chamber of any residue left behind by irresponsible users. Be very careful not to hit the pan.
- 9.1.2 Use a soft brush or cleanroom wipe to **gently** brush the pan free of loose particles. This is a sensitive area – be careful not to damage the sensors with excessive force to the pan.

9.2 **Level the Balance**

- 9.2.1 In order to obtain accurate results, the unit must be level. Observe the leveling bubble at the rear right of the chamber. If the bubble is not resting entirely within the black circle, then the unit is not level.
- 9.2.2 To level the balance, change the height of the two rear feet of the unit by adjusting the knurled black ring around each foot. Each foot is simply a threaded screw, so height is adjusted by screwing into or out of the base. There is only one other (stationary) foot at the front of the unit, so keep in mind while watching the bubble move that you are adjusting two points of a three point arrangement.
- 9.2.3 If the ring around a foot will not turn, it may be screwed all the way in or out. Try turning it the other way a few turns to give more room for adjustments. If this is not possible, do not force it. Contact lab staff for assistance.
- 9.2.4 If the balance cannot be leveled within the range of adjustments of the feet, the unit may be resting on a part of the benchtop which is too uneven. Slide the unit an inch or two over to the side, and try leveling again.

9.3 **Turn Power On**

- 9.3.1 When the power is off and the unit is plugged into the wall power socket, the display should show “STANDBY.”
- 9.3.2 Confirm that the pan is empty and the doors are shut. If the unit is set for auto-zero, it will zero the balance at the time power is switched on. This should be done with an empty pan. Tare should be done after zeroing, as it is not generally the same process.
- 9.3.3 Push the “ON/OFF” button. There is an automatic test of all electronic functions. The display will blink, run through some numbers very quickly, and then show “BUSY” for a few moments.
- 9.3.4 When it is done starting up, the display will show “0.0000” and the current measurement unit (see section 9.8 to change units).

9.4 **Tare the Balance (optional)**

- 9.4.1 If you wish to tare the balance, place your empty vessel on the pan.
- 9.4.2 Be sure all the enclosure doors are shut.
- 9.4.3 Press the “T” bar. Wait for the display to read “0.0000”.
- 9.4.4 Remove the vessel. The display should show a negative number equal to the weight of the vessel.

9.5 **Measure the Samples**

- 9.5.1 Open one of the sliding doors of the enclosure.
- 9.5.2 Place your sample on the pan (to tare the balance, see section 9.4).
- 9.5.3 Close all the doors of the enclosure.
- 9.5.4 Wait for the displayed value to settle. You do not need to press any buttons.
- 9.5.5 Record the measurement.
- 9.5.6 Open a sliding door and remove your sample.
- 9.5.7 If you have more samples go back to 9.5.2, otherwise close the door.

9.6 Turn Power Off

- 9.6.1 Push the "ON/OFF" button.
- 9.6.2 The display should read "STANDBY."

9.7 Clean the Chamber and Pan

- 9.7.1 When you are finished, be courteous. Clean out the pan and chamber of any spills or residue
- 9.7.2 Close all chamber doors.

9.8 Change Parameters (optional)

- 9.8.1 Certain parameters of the operation of the unit are easily changeable by the user. These parameters are summarized in the table below.

Code	Environment	Factory Setting
C111	Very stable	
C112	Stable	x
C113	Unstable	
C114	Very unstable	
Code	Stability Range	Factory Setting
C121	0.25 digit	
C122	0.5 digit	
C123	1 digit	
C124	2 digits	
C125	54 digits	x
C126	8 digits	
C127	16 digits	
C128	32 digits	
C129	64 digits	
Code	Display Format	Factory Setting
C131	last decimal on	x
C132	last decimal off	
C133	last decimal at stability	
C134	all decimals at stability	
Code	Tare Mode	Factory Setting
C141	without stability	
C142	at stability	x
Code	Auto-Zero	Factory Setting

C151	On	x
C152	Off	
Code	External Calibration	Factory Setting
C161	Accessible	x
C162	Inaccessible	
Code	Internal Calibration	Factory Setting
C171	Accessible	x
C172	Inaccessible	
Special Information		
Code	Program Lock	Factory Setting
C411	Off	
C412	On	x
Code	Beeper	Factory Setting
C431	On	x
C432	Off	
Code	Weight Units	Factory Setting
C511	Grams	
C512	Kilograms	
C513	Carats	
C514	Pounds	
C515	Ounces	
C516	Troy Ounces	
C517	Parts/Pound	
C521	Taels Hong Kong	
C522	Taels Singapore	
C523	Taels Taiwan	
C524	Grains	
C525	Pennyweights	
C526	Momnes	
C527	Milligrams	
C528	Karats	
Code	Function	
Cxx0	Back up to second level	
Cx0	Back up to first level	
C0	End parameter change	

9.8.2 To change any of these parameters, the instrument must be put into a special mode.

9.8.2.1 Start with the instrument turned off (see section 9.3.1).

9.8.2.2 Push "T" and do not release.

9.8.2.3 Push and release "ON/OFF." Keep holding "T".

9.8.2.4 Wait a few moments for the display to read "CH 5".

9.8.2.5 Release "T". The display should now read "C 0", and will change about every second to cycle through "C 1", "C 2", etc.

- 9.8.3 Parameters are set by specifying the code, one digit at a time. Available digits cycle through each place at a rate of about one per second.
 - 9.8.3.1 Allow the digit to change to the value desired.
 - 9.8.3.2 Set the digit by pressing “T” when the correct digit is displayed.
 - 9.8.3.3 When the “0” digit is displayed, pressing “T” will back the code up one place.
 - 9.8.3.4 When any other digit is displayed, pressing “T” will select that digit and advance the code to the next place.
 - 9.8.3.5 When three digits have been selected, the parameter will be set and the display will go back to “C 0” (as in section 9.8.2.5).
 - 9.8.3.6 Current parameter settings are marked by a “ ° ” symbol in the upper right of the display.
- 9.8.4 When finished changing parameters and the display goes back to “C 0”, press “T” while the display reads “C 0”.
- 9.8.5 The display will read “BUSY” while it saves the settings. When it shows “0.0000” and the unit of measurement (as in section 9.3.4), the balance is ready with the new settings.

10.0 Troubleshooting Guidelines

10.1 The instrument will not turn on.

- 10.1.1 If the screen is totally blank, the unit may not be plugged in. Check the power cord.
- 10.1.2 If the screen says “STANDBY”, but cannot be turned on, consult lab staff.

10.2 The leveling rings won’t turn.

- 10.2.1 See section 9.2.3. Do not force the rings. Turn the rings the other direction a few times and try leveling again.

10.3 The instrument cannot be leveled (the bubble won’t go in the circle).

- 10.3.1 See section 9.2.4. Slide the instrument over an inch or two and try again.

10.4 The balance is using the wrong measurement units.

- 10.4.1 The unit of measurement is a user-changeable parameter. See section 9.8 about changing parameters.

10.5 The pan is empty but the balance does not read zero.

- 10.5.1 Clean the pan. See section 9.1.2.
- 10.5.2 Close the chamber doors to prevent error from air currents.
- 10.5.3 Turn the instrument off, and back on again. Unless the setting has been changed (see section 9.8.1), the balance automatically zeroes at startup.

11.0 Figures & Schematics

11.1 Sartorius A200S Electronic Balance



11.2 Close-up of Control Panel

