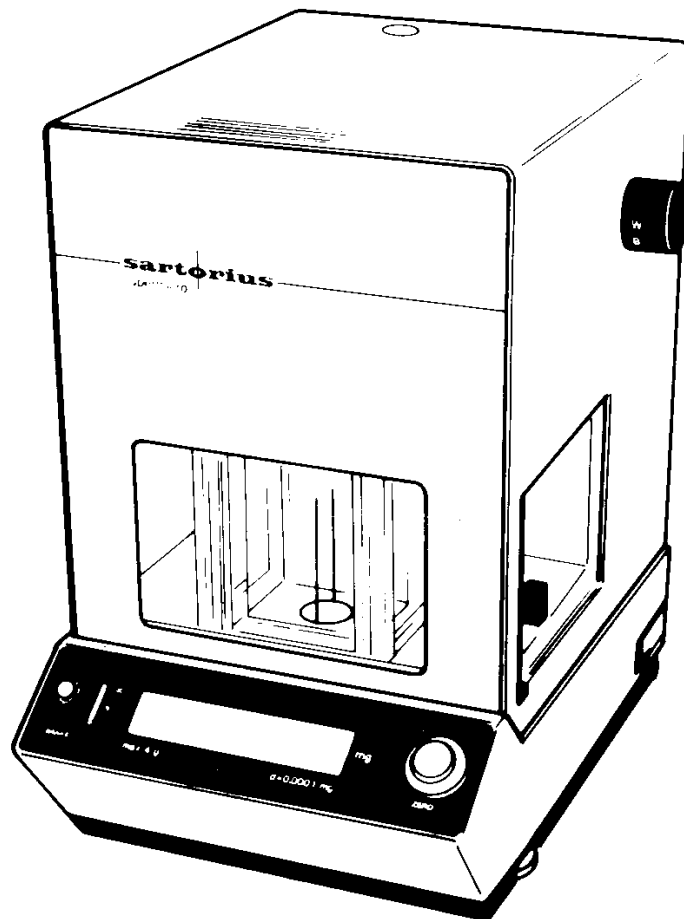


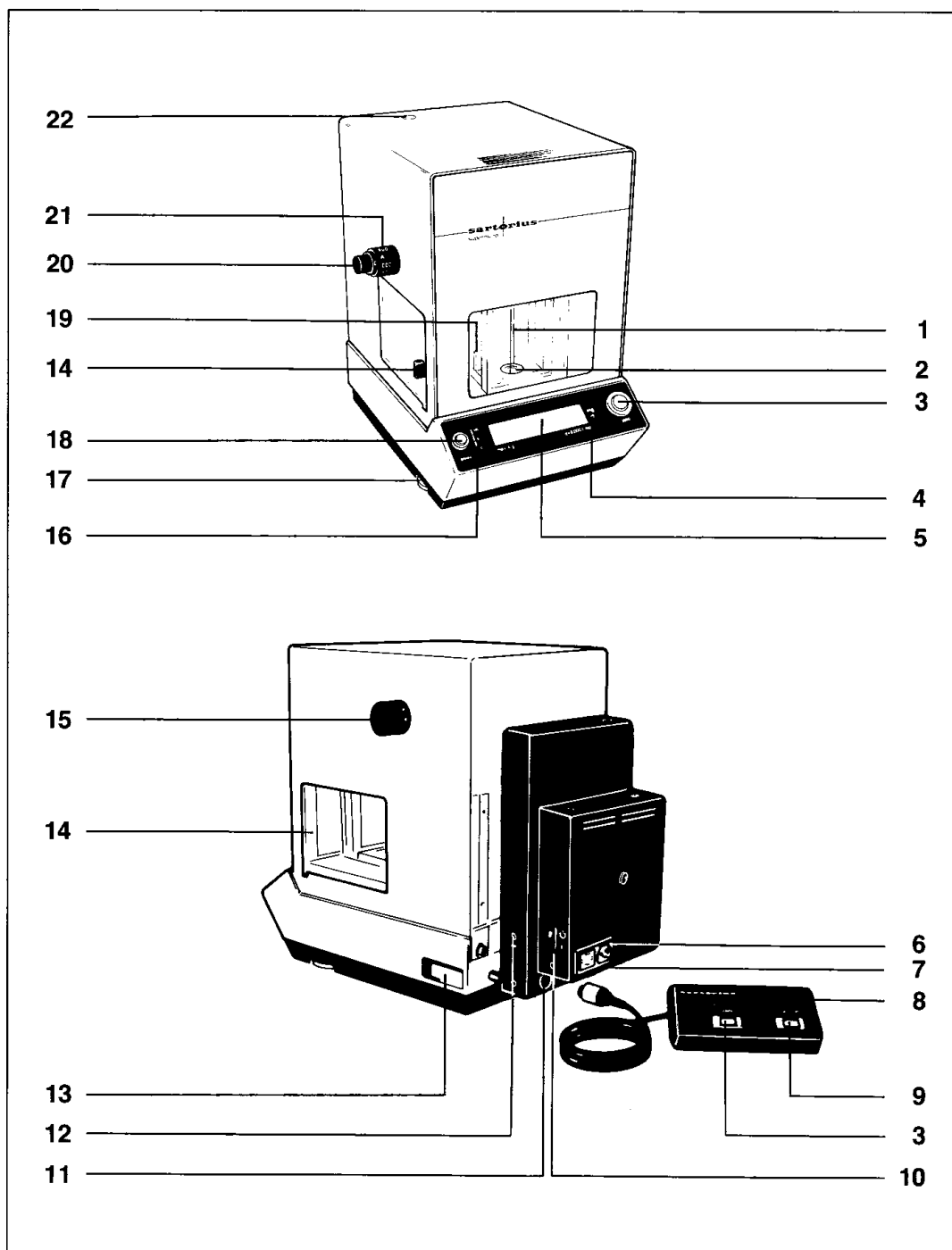
---

# Sartorius Supermicro. S4.



Electronic Ultramicro Balance  
Installation and Operating Instructions

**sartorius**



- |   |   |
|---|---|
| 1 Pan stirrup   | 2 Pan   |
| 3 ZERO button   | 4 Stability indicator                                 |
| 5 Arrestment knob                                     | 6 Power receptacle, fuse, voltage selector            |
| 7 Interface   | 8 Manual switch unit                                  |
| 9 MOTOR switch  | 10 Power switch                                       |
| 11 Socket (6-terminal)                                | 12 CAL button   |
| 13 Manufacturer's label                               | 14 Sliding door - side                                |
| 15 Arrestment knob                                    | 16 Range indicator                                    |
| 17 Leveling foot                                      | 18 BRAKE button                                       |
| 19 Front sliding door                                 | 20 Weight application selector (1000-mg tare weights) |
| 21 Weight application selector (1000-mg tare weights) | 22 Level indicator                                    |

# Sartorius Supermicro. S4.

With this Sartorius Balance you have acquired a sophisticated, top-of-the-line weighing instrument that will help ease your dally work load.

Before you operate your new balance, please read these Instal-  
lation and operating instructions carefully.

This equipment complies with the requirements in Part 15 of FCC Rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.

## Contents.

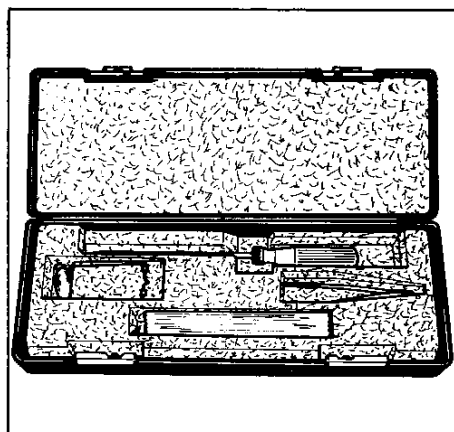
Equipment	4
How to Handle Your Ultramicro Balance	5
Startup	7
Operation	10
Calibration	11
Indicators and Controls	13
Weighing	15
Balance Operating Program	17
Troubleshooting Guide	20
Accessories	22
Specifications	23

## Equipment Supplied.

Do not miss out on the benefits of our warranty.  
Please fill out the warranty card, indicating the date of installation, and return the card to your Sartorius dealer.



The equipment supplied comprises the components shown on the left.



Save the packaging materials and the box for shipping your balance to prevent any damage caused during transportation.

The accessory kit in a case contains the following:

- Weighing pan
- Pan stirrup
- Screwdriver
- Forceps
- Cloth

# How to Handle Your Ultramicro Balance.

## General Installation Instructions

Ultramicro balances are highly precise and very sensitive measuring instruments. Therefore, please choose a suitable place to set up your balance. It should not be exposed to the following:

- heat radiation
- components in the atmosphere that have a corrosive or aggressive effect
- vibrations
- drafts.

Set up your balance on a suitable balance table or use a wall console (see "Accessories").

Your Sartorius Balance will provide accurate readouts even when it is exposed to unfavorable ambient conditions. You can adapt it to your requirements simply by changing the menu code settings in the balance operating program. For this purpose, please refer to pages 17 to 19.

## **Maintenance and Care**

To ensure proper care of your electronic S 4 ultramicro balance, all you need to do is regularly calibrate it and clean the weighing pan.

Maintenance of your balance should be done at least once a year by a Sartorius service technician. If you happen to have any trouble with your balance, please contact your nearest Sartorius service center.

### **Directions for Working with Ultramicros**

Before you Start weighing, please observe the following:

After plugging your balance into a wall outlet, make sure to allow between 24 to 48 hours warmup (conditioning time).

Working with an ultramicro balance requires a steady hand and a smooth, uninterrupted technique.

Use forceps or other suitable Utensils to load your sample on the pan.

Do a few trial weighing procedures before you begin with actual weighing of your sample.

The sliding door on the right side (14) may remain open if the weighing chamber is conditioned, dust-free and not exposed to drafts or turbulence. If the weighing chamber has not been opened for a relatively long period, it may have a temperature which is different from that of the balance's surrounding environment. Therefore, as soon as you open the weighing chamber, a change in temperature will inevitably occur and may show up as a change in the weight readout. In this case, we recommend that before you begin with an actual repetitive weighing procedure you open and close the weighing chamber at the same rate as you will be doing during such a procedure.

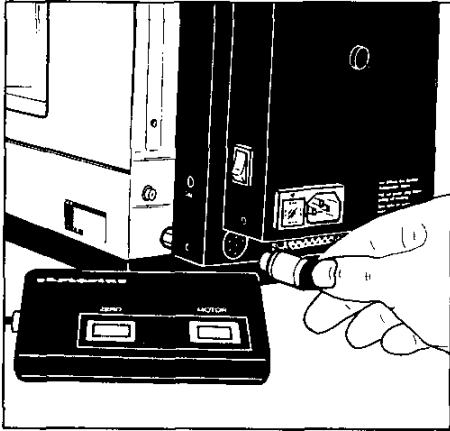
Carefully place your sample on the pan and, if necessary, remove it along with the pan.

The accuracy of the resulting weight readouts will increase as the degree of consistency is increased for successive weighing procedures.

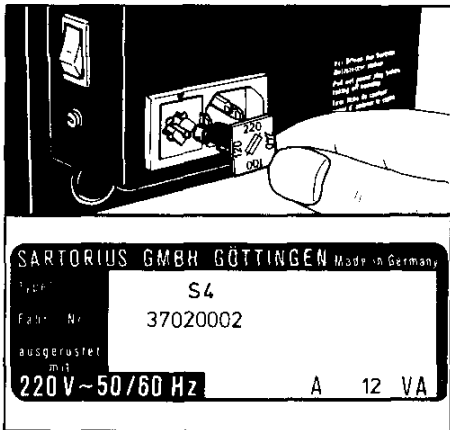
## **Important Note**

Unplug your balance before you connect or disconnect peripherals.

## Startup.



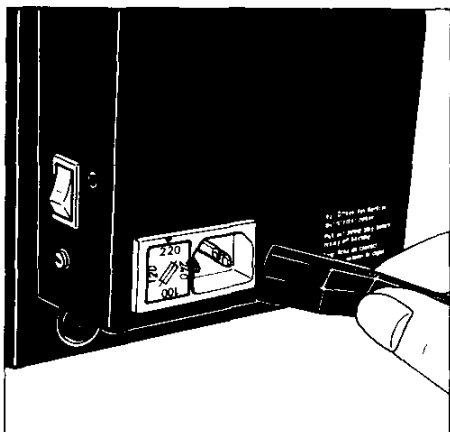
Insert the plug of the manual switch unit (8) in the socket (11) located on the rear panel of the balance. Secure the connection by tightening the knurled collar.



The balance has been set to 220 volts.

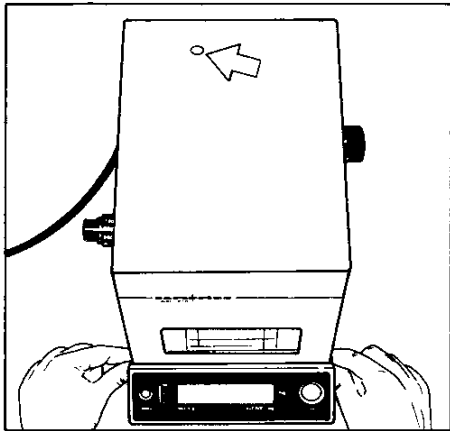
How to change the voltage setting:

Adjust the voltage selector (6) to your local line voltage. The setting on top must match your local line voltage rating. Write the new setting on the manufacturer's label (13).

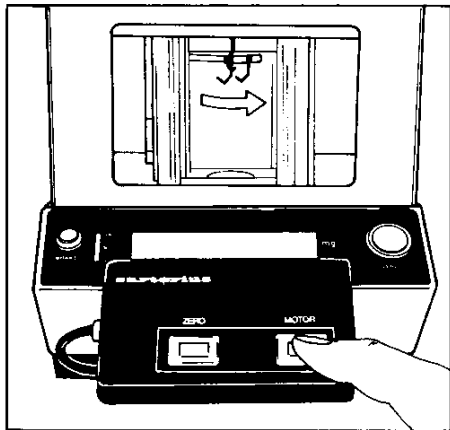


At the point of use, plug the line cord (power lead) of the balance into a properly installed electrical or wall outlet.

If you use a wall outlet that does not have a protective grounding conductor, make sure to ground your balance.

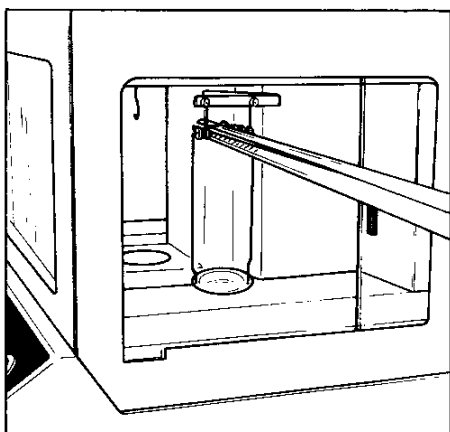


At the point of use, level the balance using the leveling feet (17) such that the air bubble is centered within the circle of the level indicator (22).



### How to Hook the Weighing Pan

Press the MOTOR switch (9) to have the pan extractor arm automatically moved outside.



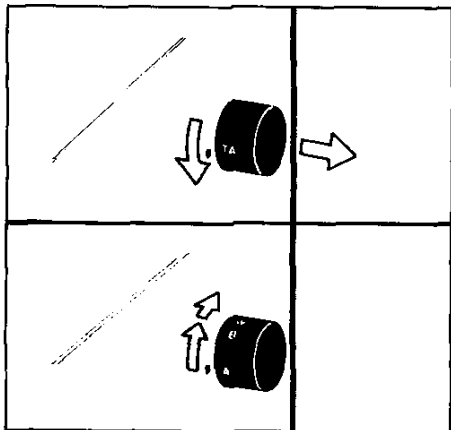
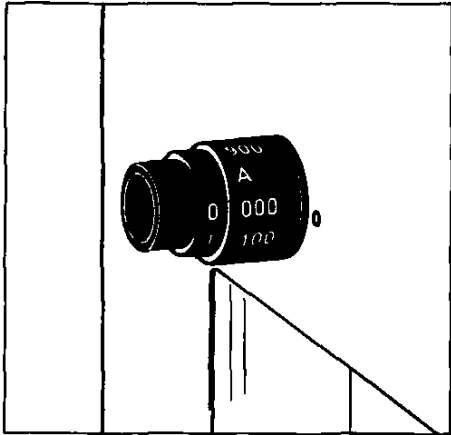
Position the weighing pan (2) in the pan stirrup (1), and hook the pan stirrup on the pan extractor arm.

Press the MOTOR switch to retract the pan.



### Releasing the Transport Arrestment

Turn both weight application selectors (20 and 21) to the setting **"0000."**



Pull out arrestment knob (15) toward the right and push it in at setting **"A."** You should hear an audible click.

If you wish to start weighing, turn the arrestment knob to the setting marked **"W."**

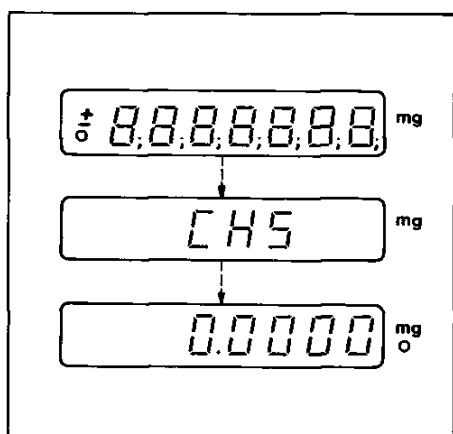
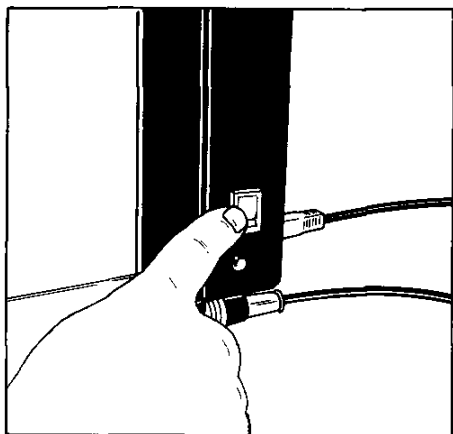
Briefly leave the arrestment knob in setting **"B"** to prevent the weighing pan from rocking back and forth.

## Operation.

Please leave the balance connected to line power for your convenience.

Use the power switch (10) to turn your balance on or off.

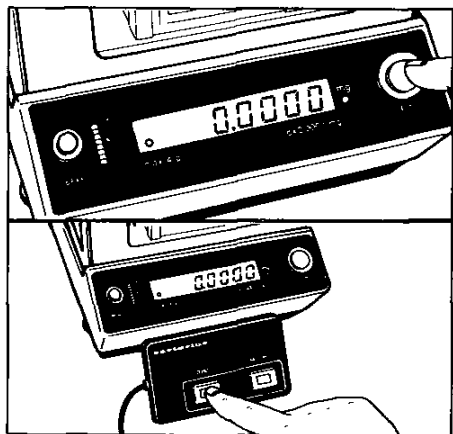
After the balance has been plugged into an electrical outlet, the weight display will go out. All other electronic circuits of the balance will remain energized (standby state). This means the balance is immediately ready to operate without requiring warmup the next time you switch it on.



After the power is turned on, a test of all essential electronic circuits is automatically run.

The self-test ends with the readout 0.0000 mg.

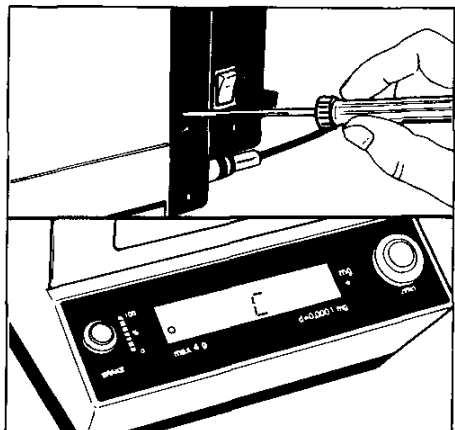
Now place your sample on the pan (2) to determine its weight (extract and retract the pan to do so). Read off the weight in the display (5) as soon as the stability indicator (4) lights up.



If the weight display does not indicate 0.0000 mg before you begin to weigh, press the ZERO button (3) to zero it.

## Calibration.

Unload the weighing pan, and close the doors of the weighing chamber. Check the level indicator and level the balance, if necessary.

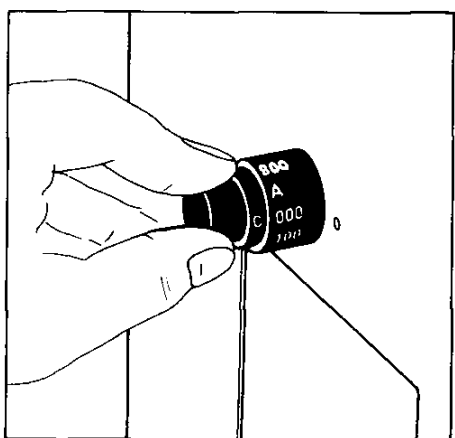


Adjust the arrestment knob (15) to the setting marked **"W"** and zero the display.

As soon as you obtain a zero readout and the stability indicator (4) lights up, use the screw drive supplied along with the balance to press the CAL button (12). **"C"** will now appear in the weight display.

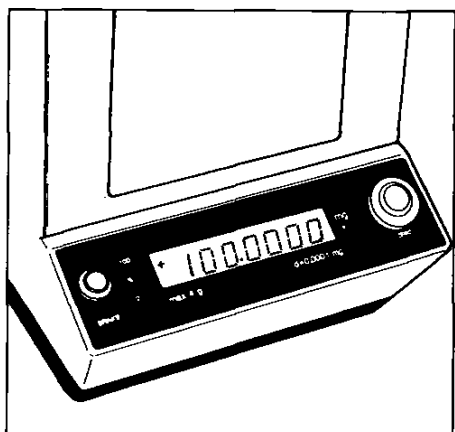
If "CE" is displayed, tare the balance (zero the display) and press the CAL button again.

## Internal Calibration



The internal calibration weight (100 mg) has an accuracy of  $\pm 1 \mu\text{g}$ .

Turn the weight application selector (20) to the setting marked **"C"** and, if necessary, press the pan BRAKE button (18) until the weighing pan stops rocking back and forth.



After approx. 20 seconds, **"C"** will flash and then the calibration weight will be displayed. An acoustic signal indicates the end of the calibration procedure.

Turn the weight application selector (20) back to setting **"0."**.

## External Calibration

- only possible with an accurate calibration weight (100 mg)-

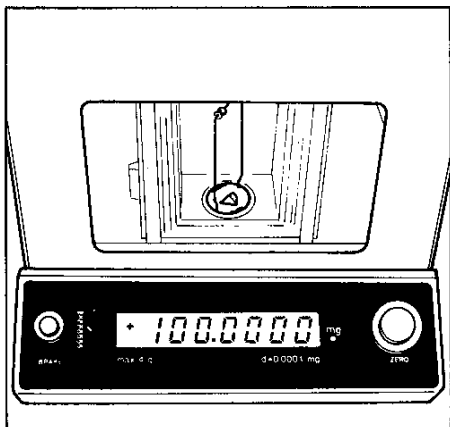
External calibration is recommended when you are using several balances that have to be calibrated with the same weight for test series.

The calibration weight should be deposited in the chamber between the front and side doors to ensure that it adapts to the temperature inside.

Call the calibration mode readout "**C**" (see previous page for instructions). Press the MOTOR switch (9) and then center the calibration weight on the weighing pan.

Press the MOTOR switch again (to automatically retract the weighing pan). If the weighing pan still rocks, push the BRAKE button - pan brake (18).

After approx. 20 seconds, "**C**" will flash and then the calibration weight readout will appear in the display. An acoustic signal indicates the end of the calibration procedure.



Press the MOTOR switch again (to automatically extract the weighing pan) and remove the calibration weight from the weighing pan.

# Indicators and Controls

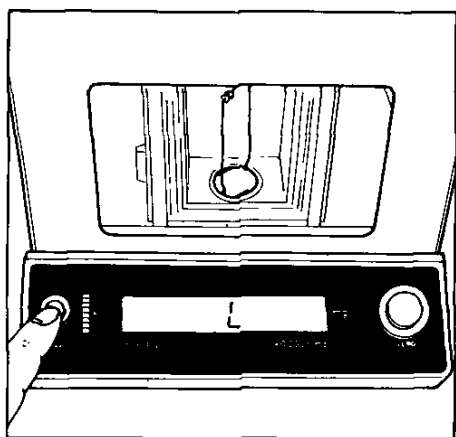
## 1. Range Indicator

The range indicator (16) shows how much of the electric weighing range is used (120 mg). It operates independently of the weight display.

The range indicator must light up at **"0 %"** when the weight application selectors are set to zero, the arrestment knob is in setting **"W,"** the weighing chamber is closed, and the weighing pan is empty.

## 2. BRAKE Button

Press the BRAKE button (18) to stop the weighing pan from rocking. Whenever you press the MOTOR switch to retract the weighing pan, the pan brake is automatically activated.



## 3. Arrestment Knob

### »TA« = Transport Arrestment

Adjust the arrestment knob (15) to **"TA"** only if you wish to transport the balance.

### »A« = Arrestment

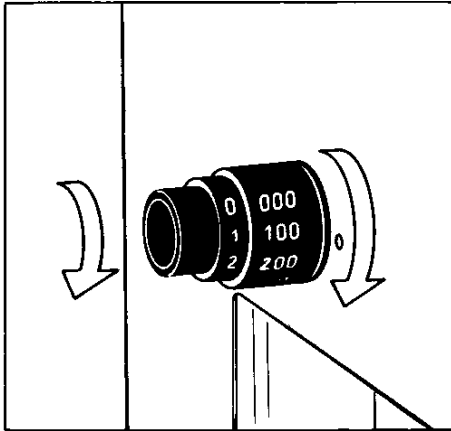
- For leveling the balance using the level indicator as a guide
- For loading a tare container with an unknown weight

### »B« = Brake Pan Brake

- Prevents the weighing pan from rocking

### »W« = Weighing

#### 4. Weight Application Selectors



Your balance has built-in weights (tare weights) which can be used to mechanically apply a load up to **3,900 mg**. The left weight application selector (20) applies the 1,000-mg weights and the right weight application selector (21) the 100-mg weights.

#### Important Note

Turn the weight application selectors to, „**TA**“ **only** if the balance to be transported.

# Weighing.

## 1. Absolute Weighing

The arrestment knob (15) is adjusted to **"W."**

Weight application selectors (20 and 21) are set to zero. Tare the balance, if necessary. Press the MOTOR switch (9) to extract the weighing pan. Now you can place your sample on the pan. Close the side door (14).

Press the MOTOR switch to retract the weighing pan. Read off the weight shown in the weight display as soon as the stability indicator (4) lights up.

## 2. Weighing > 120 mg

If the weight display (5) indicates an **"H"** the electric weighing range of 120 mg has been exceeded. Turn the 1,000-mg weight application selector (20) until the range indicator (16) goes out, and then turn the selector back one setting. Turn the 100-mg weight application selector (21) until the range indicator goes out, and then turn the selector back one setting. Press the BRAKE button (18) until the weighing pan stops rocking. As soon as the stability indicator lights up, read off the weight displayed.

Add the weight displayed to the weights applied.

### Important Note:

The tare weights have an accuracy of:

Weight application levels	mg 1000	100
Standard set of weights	$\mu\text{g} \leq \pm 60$	$\mu\text{g} \leq \pm 60$
Set of weights (option) and S 4-**VJA	$\mu\text{g} \leq \pm 20$	$\mu\text{g} \leq \pm 10$

### 3. Weighing with a Tare Container (4 g max.)

- Adjust arrestment knob to "W."
- Set weight application selectors to zero.
- Press the ZERO button.
- The weight display shows "0.0000" and the stability indicator lights up.
- Press the MOTOR switch to extract the weighing pan.
- Place tare container on the weighing pan.
- Press the MOTOR switch and dose the side door (14) of the weighing chamber.
- "H" lights up in the weight display when ever the weight of the tare Container exceeds the weighing range (120 mg).
- Turn the 1,000-mg weight application selector (20) until the range indicator goes out, and then turn the selector back one setting.
- Turn the 100-mg weight application selector (21) until the range indicator goes out, and then turn the selector back one setting.
- Press the BRAKE button until the weighing pan stops rocking.
- As soon as the stability indicator lights up, press the ZERO button;
- The weight display now shows 0.0000 mg.
- Weighing in (see "1. Absolute Weighing")

#### Important Note

**If you wish to weigh several components one after the other in the same tare Container, you can zero the display (tare) after weighing in each component to always weigh starting from zero.**

#### 4. Back Weighing

Back weighing, also called reweighing, is done when the weight of a sample has to be determined before and after a test or experiment.

To determine the difference in weight, you must backweigh on the same weighing pan and with the same tare Container and the same balance you used for initial weighing.



## Balance Operating Program.

The balance operating program lets you adapt your balance to various ambient conditions and weighing applications.

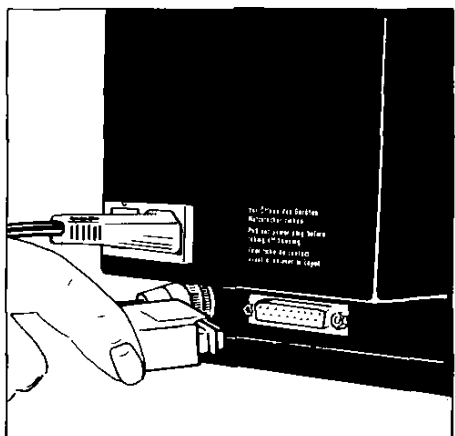
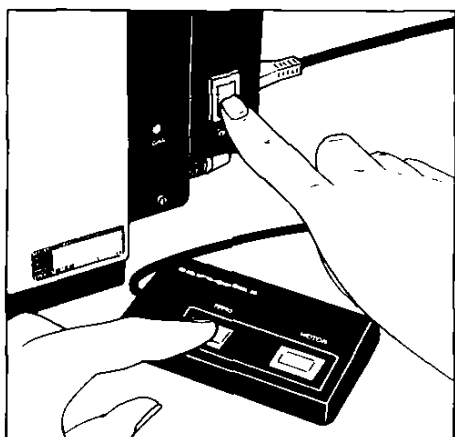
At the factory, we have set the codes for a Standard program, which is protected by a locking function to prevent accidental changes.

The **"code"** contains the information of the operating program. It consists of three digits, one each for the page, the line and the word.

How to access the menu of the balance operating program:

Turn off the balance. Hold down the ZERO button (3) and simultaneously press the power switch (10). Upon completion of the automatic self-test, release the ZERO button as soon as **"CH5"** is displayed. The Status of the balance operating program will be indicated in the weight display: the letter **"L"** stands for the list mode. In this mode you can check the code setting, but you cannot change it.

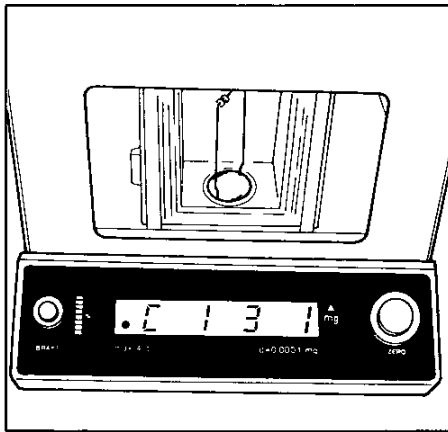
If you wish to change a program code, you must first unlock the program access function.



To do so, switch off the balance (use power switch). Plug the menu access connector (order no. 6738-58) into the female connector (7) of the interface. Hold down the ZERO button (3) again and simultaneously press the power switch (10). Upon completion of the automatic self-test, release the ZERO button as soon as **"CH5"** is displayed. The display will now show **"C,"** representing the change mode, which means you can now change the setting.

After the balance operating program has been called, the display will show a continuous numerical sequence from 0-4, representing the "page" selection, in addition to the Status code letter "L" or "C."

When the code number you wish to check or change appears, press the ZERO button. The "page" code number will now stop in the display, and a series of numbers for the "lines" will begin to cycle. Again, press the ZERO button to stop the code number of your choice in the display. Next, the numbers for the "word" will cycle in the display.



The  $\Delta$  symbol that appears above the "mg" symbol indicates the actual setting.

To change any setting ("C" mode), press the ZERO button as soon as the appropriate numerical code appears.

Brief display of the "o" symbol confirms your selection followed by a return to "zero" representing the line.

How to return to the weighing program:

Press the ZERO button each time a 0 appears in the numerical sequence (word, line, page). If you have made code changes, your code entry will be stored as soon as the display returns to the weighing mode.

Relock the balance weighing program by unplugging the menu access connector.

If you want to be able to access the operating program at any time, please enter the code 411.

[ 1 1 1 1 ]	[ 1 3 1 ]
page	line word

## Menu of the Balance Operating Program (active parameters)

### Code Ambient Conditions

[ 1 1 1 ]
[ 1 1 2 ]
[ 1 1 3 ]
[ 1 1 4 ]

Very stable  
Stable  
Unstable  
Very unstable

factory  
setting

■

### Code Ambient Conditions

[ 1 2 1 ]
[ 1 2 2 ]
[ 1 2 3 ]
[ 1 2 4 ]
[ 1 2 5 ]
[ 1 2 6 ]
[ 1 2 7 ]
[ 1 2 8 ]
[ 1 2 9 ]

0,25 digit  
0,5 digit  
1 digit  
2 digits  
4 digits  
8 digits  
16 digits  
32 digits  
64 digits

■

### Code Display Format

[ 1 3 1 ]
[ 1 3 2 ]
[ 1 3 3 ]
[ 1 3 4 ]

Last decimal ON  
Last decimal OFF  
Last decimal at stability  
All decimals at stability

■

### Code Tare Mode

[ 1 4 1 ]
[ 1 4 2 ]

With stability  
At stability

■

### Code Data Output

[ 2 1 1 ]
[ 2 1 2 ]
[ 2 1 3 ]
[ 2 1 4 ]

Ext. print command  
without stability  
Ext. print command  
at stability  
Autom./synchron. with  
display without stability  
Autom./synchron. with  
display at stability

■

### Code Baud Rate

[ 2 2 1 ]
[ 2 2 2 ]
[ 2 2 3 ]
[ 2 2 4 ]
[ 2 2 5 ]
[ 2 2 6 ]
[ 2 2 7 ]

150 Bd  
300 Bd  
600 Bd  
1200 Bd  
2400 Bd  
4800 Bd  
9600 Bd

factory  
setting

■

### Code Parity-Bit

[ 2 3 1 ]
[ 2 3 2 ]
[ 2 3 3 ]
[ 2 3 4 ]

Mark-Parity  
Space-Parity  
Odd-Parity  
Even-Parity

■

### Special Information

#### Code Program Lock

[ 4 1 1 ]
[ 4 1 2 ]

OFF  
ON

■

[ 4 1 0 ]
[ 4 0 ]

Call program line  
Call program page

[ 0 ]
-------

End of Programming

Additional parameters involve the data output format of the interface and calculation programs that can be run external keyboard (if required, please ask for our special information). – Please refer to the “Accessories.” -

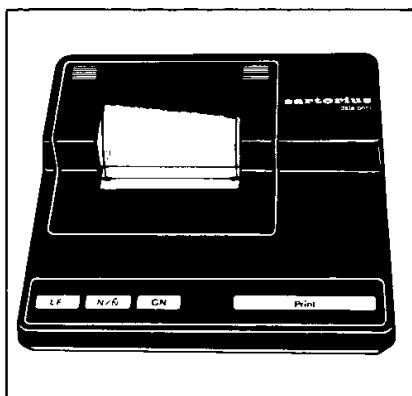
## Troubleshooting Guide.

Problem ...	Causes ...	Remedy
The weight display (5) and the range indicator (16) do not light up.	<ul style="list-style-type: none"> <li>- No line voltage available</li> <li>- Line cord has not been plugged in</li> <li>- Incorrect setting of the voltage selector (6)</li> <li>- Defective (6) (If the problem reoccurs contact your nearest Sartorius service center)</li> </ul>	<ul style="list-style-type: none"> <li>- Check current supply</li> <li>- Plug in line cord</li> <li>- Check setting of voltage selector and readjust, if necessary</li> <li>- replace fuse</li> </ul>
The display cannot be zeroed	<ul style="list-style-type: none"> <li>- The arrestment knob is not set to <b>“W”</b></li> <li>- the weight application selector (20 and/or 21) is not set to <b>»0000«</b></li> <li>- The air bubble of the level indicator (22) is not centered</li> </ul>	<ul style="list-style-type: none"> <li>- Push in arrestment knob at <b>“W”</b> setting</li> <li>- Turn weight application selector to <b>»0000«</b></li> <li>- Level balance</li> </ul>
The weight display shows <b>“L”</b> and/or the range indicator does not light up.	<ul style="list-style-type: none"> <li>- The weight application selector (20 and/or 21) is set to <b>“T, A or TA”</b></li> <li>- Too much weight has been applied</li> <li>- The arrestment knob (15) is set to <b>»B«</b></li> <li>- The weighing pan is extracted</li> <li>- The weighing pan has not been hooked on place</li> <li>- Check the weighing pan</li> </ul>	<ul style="list-style-type: none"> <li>- Turn weight application selector too <b>»0000«</b></li> <li>- Turn weight application selector (20 and/or 21) back by one setting</li> <li>- Push in arrestment knob at the <b>“W”</b> setting</li> <li>- press MOTOR switch (9)</li> <li>- Make sure it does not touch any part inside the chamber</li> </ul>

## Troubleshooting Guide.

The weight display shows “H.”	<ul style="list-style-type: none"> <li>- The electric weighing range (&gt; 120 mg) has been exceeded</li> <li>- The maximum loading capacity been exceeded</li> <li>- The arrestment knob (15) is set to “TA”</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust weight application selectors (20 and/or 21) (see “Weighing”)</li> <li>- Unload balance</li> <li>- Push in arrestment knob at the “W” setting</li> </ul>
The weight readout changes constantly or the stability indicator (4) does not light up.	<ul style="list-style-type: none"> <li>- The balance has not been properly leveled; air bubble is not centered in the level indicator (22)</li> <li>- Extremely unstable ambient conditions</li> <li>- Too much vibration or balance is exposed to a draft</li> <li>-</li> <li>- Check the weighing pan</li> <li>- A door of the weighing chamber is not completely closed</li> <li>- The arrestment knob (15) is set to “A”</li> <li>- Sample does not have a stable weight (absorbs moisture or moisture content evaporates)</li> </ul>	<ul style="list-style-type: none"> <li>- Level balance</li> <li>- Set up balance in another area</li> <li>- Access menu to adjust the proper code for the particular type of ambient conditions</li> <li>- Make sure it does touch any part inside the weighing chamber</li> <li>- Close doors of the weighing chamber</li> <li>- Push in arrestment knob at the “W” setting</li> </ul>
The weight display shows “CE.”	<ul style="list-style-type: none"> <li>- The CAL button (12) was not pressed when the display showed a zero readout</li> <li>- The weighing pan is loaded</li> </ul>	<ul style="list-style-type: none"> <li>- Press the ZERO button (3) and re-press the CAL button</li> <li>- Unload weighing pan</li> </ul>
The weight readout is obviously wrong	<ul style="list-style-type: none"> <li>- The arrestment knob (15) is set to “A”</li> <li>- Balance has not been calibrated</li> <li>- Balance has not been tared before weighing</li> <li>- The air bubble of the level indicator (22) is not centered within the circle</li> </ul>	<ul style="list-style-type: none"> <li>- Push in arrestment knob at the “W” setting</li> <li>- Calibrate balance</li> <li>- Tare before weighing</li> <li>- Level balance</li> </ul>

## Accessories (Options).



Data Printer

YDP 01

Data Printer with date/time  
and statistics functions

YDP 01-\*D

Print speed  
approx. lines/sec.

0,7

printer housing  
(W x D x H)  
on mm

150 x 138 x 38



Foot switch  
with MOTOR and ZERO switch

7252 1

Menu access connector	6738-58
Carrying case	6067 11
balance table	YWT 01
Extension with 2 drawers for balance table	6802
Wall console	6804
Set of weights; rated to accuracy class E2/NBS-M	69 45149
Digital/analog converter	YDA 01 Z
IEC converter	7253 16
BCD parallel converter	7253 18
RS 422 converter	7253 19
Dust cover	69 6076

### Interface

See the Interface Description MP 8-1.

## Specifications.

Model		S 4	
Electric weighing range	mg	120	
Max. loading capacity	mg	4020	
Readability	µg	0,1	
Tare range (electr.)	mg	120	
Set of internal weights (mechanical)	mg	3900	
Accuracy of the set of weights:			
Application levels	mg	1000	100
Standard set of weights	µg	≤± 60	≤± 60
Set of weights (option) and S 4-**VJA	µg	≤± 20	≤± 10
Calibration weight, 100 mg	µg	±≤ 1	
Standard deviation	µg	±≤ 0,2	
Max. linearity	µg	±≤ 0,3	
Stabilization time (typical)	s	10	
Adaptation to environment and application		4 optimized filter levels	
Stability range	d	0,25 ... 64 (menu-selectable)	
Ambient temperature range	°C	+ 15°C bis +30°C	
Sensitivity drift	/K	±≤ 2 · 10 <sup>-6</sup>	
Pan size	mm	Ø 22	
Stirrup with/height	mm	25/60	
Balance (W x D x H)	mm	203 x 380 x 326	
Net weight, approx.	kg	14,5	
line voltage (mains); frquency		100 V/ 120 V / 220 V 240 V 50-60 Hz	
Allowable voltage fluctuation		-15% ... +10%	
Power consumption	VA	12 (typ.)	
Interface		RS 232 C-S/ V 24 – V 28 /RS 423 / V 10; 7-bit; parity: -even, -mark, -odd, -space; transmission rates: 150 ... 9600 Baud	

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