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exploded view drawing A 200 S

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This service manual is based on model A 200 S. Setting and repair instructions can be used for all Sartorius balances of the Analytic series. Later modifications for the purpose of product improvement are not covered.

File this service manual together with the:
- service manual Sartorius Analytic part 2
- installation and operating instructions
- MP8-4-2 interface description
- circuit diagrams
- service information

Use spare parts list: Sartorius Analytic A 200 S and A 200 S-*D1
Service tools

Please remember that proper service work requires not only the appropriate tools but also a clean and stable bench, plus total absence of vibrations and drafts.

A complete home service workshop should have the following devices:

- set of weights accuracy (OIML) order no.
  class E2 6714-00
- 1 separating transformer or
- 1 fault current breaker 6738-33
- 1 digital volt meter, if possible
  with 4 and a half digit indication
- a stable voltage source such
  as Analogic AN 3100
- instant adhesive cement (e.g. Cyanolit)

Servicing the measuring cell requires the following special tools:

- 2 support plates VM173/1 6739-21
- 1 mounting device VM173/2 6739-20
  with 2 blocks and
  4 straining screws
- 1 mounting device for VM175-1 6739-23
  leaf springs
- 1 auxiliary guide VM164 6739-22
- 1 support for VM165 6739-24
  measuring cell
- 1 auxiliary coupling 6739-25
  rod
- 1 grip for holding 6739-26
  measuring cell
- 2 spacing gauges 0.05mm 6739-34
- 1 spacing gauge for leaf 6738-92
  spring assembly

Repairs of Sartorius Analytic balances requires special knowledge of the measuring cell.
Repairs of the measuring cell and in the analog part of the electronics can considerably change the technical data. Please check always, whether a exchange of the entire balance or the repair at the home service center or Göttingen wouldn’t be more favorable.
1.
General remarks

1.1
The new Sartorius Analytic series

These are the special features of the new Sartorius Analytic.

- MP8-4 electronics.
- Cornerload screws have no counterpieces and can be set through the housing.
- Preload setting is done with preload weights (no preload springs).
- Internal calibration function with integrated reference weight.
- External calibration function for adaption to external reference weights.
- The internal calibration value can be overwritten with the value of the external reference weight.
- External AC/DC adapter.
- LC display.
- MP8-4-2 microprocessor with expanded menu program.

Option: Data output or Data Input.
1.2 Working with the Sartorius Analytic

When checking or fine adjusting the balance, watch the following instructions:

- The weighing room must be free of drafts and temperature fluctuations.

- The balance has to be line-connected for more than half a day.

Electrostatic chargings may influence the weighing result.

Causes for electrostatic chargings can be:

- plastic coverings on the floor or the table
- the object to be measured
- auxiliary tools or the clothes of the user
- the pin under the weighing pan has no conducting connection to the measuring cell.
1.3 Table of adjustment data

<table>
<thead>
<tr>
<th></th>
<th>A 120 S</th>
<th>A 200 S</th>
</tr>
</thead>
<tbody>
<tr>
<td>capacity</td>
<td>121 g</td>
<td>202 g</td>
</tr>
<tr>
<td>readability</td>
<td>±10.1 mg</td>
<td></td>
</tr>
<tr>
<td>reproducibility</td>
<td>±0.1 mg</td>
<td></td>
</tr>
<tr>
<td>linearity deviation</td>
<td>±0.2 mg</td>
<td></td>
</tr>
<tr>
<td>CAL weight</td>
<td>150 g</td>
<td>100 g</td>
</tr>
<tr>
<td>corner load weight</td>
<td>200 g</td>
<td>120 g</td>
</tr>
<tr>
<td>corner load tolerance</td>
<td></td>
<td>±0.0003 g</td>
</tr>
<tr>
<td>preload weight</td>
<td>100 g</td>
<td>100 g</td>
</tr>
<tr>
<td>preload voltage at precision</td>
<td>0 V</td>
<td>0 V</td>
</tr>
<tr>
<td>resistor</td>
<td>±10 mV</td>
<td>±20 mV</td>
</tr>
</tbody>
</table>

These ratings are guidelines for service and repair work, which can only be attained if the factory-trained service technician uses the prescribed tools and devices for service jobs.

Note: file this manual with:
- the operator manual
- the interface description
- circuit diagrams
- service bulletins
1.4 MP8-4-2 POWER-ON routine, error messages

After power-on, the microprocessor directs a test of all vital balance functions. The test stages are shown by the following brief display messages in the indicated sequence:

1. Display segments bright
2. Display segments dark
3. CH0: read/write test of the RAM in the μP
4. CH1: synchronization between the μP and the A/D converter
5. CH2: transfer of the weight result from the gate array to the μP, including an internal counter test
6. CH3: has no function
7. CH4: shunt of the CAL switch inside the balance
8. CH5: keyboard shunt of the tare and PRINT keys accessible via the data interface
9. CH6: has no function
10 CH7: faulty data in the fixed memory section of the EEPROM
11 CH8: faulty data in the menu section of the EEPROM
12 CH9: communication breakdown with the keyboard processor (this message will only appear if a keyboard processor is built in or connected)
13 The display is being zeroed automatically. Balance is ready to operate with the decimal point in the correct position and with display of the "g" symbol confirming stability. If an error exists, the appropriate error message remains stationary in the display.
**Flashing display:** Balance is not calibrated, no calibration value filed in the parameter-EEPROM. A non-flashing display signalizes that a value is stored in the EEPROM.

**BUSY:** The balance processor is busy and will not accept other commands at this time.

**STANDBY:** The balance was switched off with the ON/OFF button and is now in the STANDBY mode.

**POWER-OFF:** The balance was separated from line power (fresh connection, power failure).

**L:** Either underload or pan is not in place.

**H:** Overload.

**CAL.\[1\]:** The calibration function has been called.

**C,CC:** Internal calibration in progress.

**CE:** Calibration error, reset with tare bar.

**L xxx:** "List" mode of the menu program.

**C xxx:** "Change" mode of the menu program.

**E1:** Display format overflow.

**E2:** Faulty data from analog-digital converter.

**E4:** Calculator or keyboard operating error.

**E8:** Transmission error between keyboard processor and balance processor.
2. Balance operating program (menu)

2.1 How to call the balance operating program.

The balance operating program permits adaption of your toploader to various ambient conditions at the point of use and to different weighing requirements, plus selection of various weight units. 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" is the information carrier of the operating program. It consists of three digits: one each for the page, the line and the word.

Access to the balance operating program:

Press the ON/OFF button while depressing the tare bar at the same time. After completion of the automatic power-on test, the status of the balance operating program appears in the weight display: "L" stands for the list mode. In this mode, you can only verify the code setting, but you cannot program new codes. If you want to change a program code, you must first unlock the program access.

To do so, slide the menu access switch located at the forward right of your toploader in the direction of the arrow. The display will signal "C" representing the change mode, and you can now proceed to make the necessary code changes.

After the balance operating program has been called, the display will show a continuous numerical sequence from 0 to 5 representing the "page" selection, in addition to the status code letter "L" or "C."
When your selected number for the "page" appears, push the tare button. The "page" code number now stops in the display, and the numerical sequence for the "line" starts. Again press the tare bar to stop the code number of your choice in the display, and your desired selection will be entered. Next, the numerical sequence for the "word" appears.

The appearance of the o-symbol indicates the actual setting.
To make changes ("C" mode), press the tare bar when the appropriate code appears.
Brief display of BUSY and the o-symbol confirms your selection, followed by return to the "zero" representing the line.

To return to the weighing program: push the tare bar each time a 0 appears in the numerical sequence (word, line, page). If you have made code changes, your code entry is stored as soon as the display returns to the weighing mode.

Lock the balance operating program with the access switch (display "L") and replace the protective cap.
2.2
Balance operating program MP8-4-2

C 1 3 1

page line word

Code Environment
C 111 very stable
C 112 stable
C 113 unstable
C 114 very unstable

Code Stability range
C 121 0.25 digit
C 122 0.5 digit
C 123 1 digit
C 124 2 digits
C 125 4 digits
C 126 8 digits
C 127 16 digits
C 128 32 digits
C 129 64 digits

Code Display format
C 131 last decimal ON
C 132 last decimal OFF
C 133 last decimal at stability
C 134 all decimals at stability

Code Tare mode
C 141 without stability
C 142 at stability

Code Auto zero
C151 EIN
C152 AUS

Code External calibration
C 161 accessible
C 162 locked
### Code | Description
--- | ---
C171 | Internal calibration accessible
C172 | Locked

### Code | Description
--- | ---
C181 | Polyrange balance +
C182 | Superrrange

#### Data output

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C211</td>
<td>output mode ext. print command without stability</td>
</tr>
<tr>
<td>C212</td>
<td>ext. print command after stability</td>
</tr>
<tr>
<td>C213</td>
<td>automatic/synch. to display without stability</td>
</tr>
<tr>
<td>C214</td>
<td>automatic/synch. to display after stability</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Baud rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>C221</td>
<td>150 Bd</td>
</tr>
<tr>
<td>C222</td>
<td>300 Bd</td>
</tr>
<tr>
<td>C223</td>
<td>600 Bd</td>
</tr>
<tr>
<td>C224</td>
<td>1200 Bd</td>
</tr>
<tr>
<td>C225</td>
<td>2400 Bd</td>
</tr>
<tr>
<td>C226</td>
<td>4800 Bd</td>
</tr>
<tr>
<td>C227</td>
<td>9600 Bd</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C231</td>
<td>Parity bit mark</td>
</tr>
<tr>
<td>C232</td>
<td>space</td>
</tr>
<tr>
<td>C233</td>
<td>odd</td>
</tr>
<tr>
<td>C234</td>
<td>even</td>
</tr>
<tr>
<td>C230</td>
<td>call program line</td>
</tr>
<tr>
<td>C20</td>
<td>call program page</td>
</tr>
</tbody>
</table>

### Code | Data Input
--- | ---
3... | (for details, please consult the Data Input operator manual)

+ cannot be changed
Special information

Code Program lock
C 411 OFF
C 412 ON

Code Index for Data Input
C42...

Code Beeper
C 431 ON
C 432 OFF

Code Auto OFF
C441 ON
C442 OFF

Code Weight units
C 511 g grams
C 512 kg kilograms
C 513 ct carats
C 514 lb pounds
C 515 oz ounces
C 516 ozt troy ounces
C 517 o < /lb> parts/pound
C 521 tl <tlh> taels Hongkong
C 522 tl <tls> taels Singapore
C 523 tl <tt> taels Taiwan
C 524 gr grains
C 525 dwt pennyweight
C 526 o <mom> mommes
C 527 o <mg> milligrams
C 528 o <kt> karats

C 520 call program line
C 50 call program page

C 0 end of programming

Angular brackets <> denote that the displayed symbol varies from the printed symbol.
3. Description of the functions

3.1 Functional principle
The Sartorius Analytic functions to the principle of electromagnetic force compensation. A load on the pan changes the current in the coil until an equilibrium is attained between the weight force and the electromagnetically generated force. An operational amplifier in conjunction with a null indicator (optical scanner) assures that the measuring cell returns to the zero position. A high grade precision resistor $R_m$ is switched in series with the coil. The coil current flowing through the precision resistor generates a voltage drop $U$ proportional to the load on the pan. Before it goes to the microprocessor, the measuring voltage is digitalized by an analog/digital converter as the gross weight value.

The same value is available in serial format at the data output (RS 232). The microprocessor carries out a multitude of different commands and calculator operations. A number of special functions such as conversion into various weight units or parts counting are enabled through connection of Data Input keyboards.

3.2 Schematic of the load cell
1. pan support
2. upper and lower guide
3. null indicator (capacitive scanner)
4. lever
5. preload weight
6. compensation coil
7. permanent magnet
8. coupling band
9. leaf spring
10. coupling piece
11. weight switching mechanism
3.3 Schematic of the circuitry

W measuring cell
N null indicator
R operational amplifier
R_m precision resistor
REF source for the reference voltage
F active low pass filter and linearity compensation
TK temperature compensation

A/D A/D converter
GA 3 controller IC
μP balance processor
M motor for integrated calibration
K keyboard PCB (optional)
KμP keyboard PCB (optional) with μP

sartorius
4. Function check of the balance

4.1 Function check
1. Make it a point to poll the balance operator for any complaints.

2. Check the following functions while balance is still closed and write down the tolerances you have found:
   - auto zero OFF (C 152, refer to balance operating program)
   - reproducibility: repeatedly load weight pieces within the entire weighing range
   - tare function
   - corner load check: at four different points on the pan
   - linearity: at half/full load
   - sensitivity
   - external/internal calibration
   - if necessary, check Data output or Data input (keyboard function).

4.2 Decision: adjustment or repair?
Minor deviations in linearity, corner load and sensitivity can, as a rule, be remedied easily by adjustment.

If you detect the following problems:
   - poor reproducibility
   - display hysteresis
   - nonreproducible corner load
   - permanent "L" in the display
   - skipping display
you are very likely dealing with a mechanical fault.

If you find
   - error message in the display
   - display dark or display segments missing
you are very likely dealing with an electronic error.
5. Adjustment

5.1 Sequence of the adjustment procedures

Check/adjust in the following sequence:

1. Stability position of the null indicator
2. Preload
3. Corner load
4. Linearity
5. Sensitivity
6. External/internal calibration

5.2 How to open the balance

Do not touch the inner side of the LCD cover. Fingerprints cannot be removed.

- Remove weighing pan(101), ring(102), shield plate(103) and base plate(104) from the balance.
- Unscrew the three screws(136) in the hood(120).
- Carefully lift hood to the right and place it next to the balance.

Caution: The LC display and the glass may break!

Broken LCDs are toxic and are to be treated as special refuse.
5.3
Null indicator adjustment

Screws 302 and 353 form the upper and the lower stop of the lever(306). They may only be removed in case of repair. Check the symmetrical stability position of the lever. The lever stops are adjusted for a stroke of ±0.05mm.

Adjust the null indicator in the following sequence:

- Open the balance --> 5.2
- Connect the voltmeter to Bu 1/1
- Place weighing pan and switch the balance on.
- Carefully press lever to the upper and the lower stop.

The indicated voltages are only approx. values. The voltage stroke has to be symmetrically around the stability position.
Stability position: -6V ±0.5 V

Note:
Be very careful when working with the lever. It can be moved freely and is only limited by the stops.

When the stability position is not symmetrical, proceed as follows:

- Slightly loosen the diaphragm(352) at the fixing screws(305).
- Set diaphragm until the voltage stroke is symmetrical.
- Screw-fasten diaphragm very carefully and check whether stability position is symmetrical.
5.4 Preload adjustment
The preload setting affects display behavior at the beginning and end of the weighing range.
If the preload is too small, you will read "L" when you load small weight pieces.
If it is too great, you will read "H" when you load the maximum weight.

- Fix digital voltmeter parallely to the precision resistor(222).
- Switch balance on.
- Place weight in the center of the pan for preload adjustment.
- Change the compensation weights(350, 351) at the lever until the digital voltmeter reads a value within the tolerance.

A120S    A200S

<table>
<thead>
<tr>
<th>Weight for preload adjustment</th>
<th>100g</th>
<th>100g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preload voltage</td>
<td>0V</td>
<td>0V</td>
</tr>
<tr>
<td></td>
<td>+10mV</td>
<td>+20mV</td>
</tr>
</tbody>
</table>

- Close the balance.

If the load cell oscillates, you must check the functions of the scanner and the control amplifier.
5.5 Corner load adjustment

Note:
This adjustment can also be done on the closed balance. The corner load screws become accessible once you remove the base plate(104) from the housing cover. When the base plate has been removed, air drafts can influence on the weight result. Fine compensation is reliable only with the base plate and the hood being in place.

Corner load: A120S A200S

<table>
<thead>
<tr>
<th>test weight</th>
<th>120 g</th>
<th>200 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>corner load tolerance</td>
<td>+0.0003 g</td>
<td></td>
</tr>
</tbody>
</table>

3 point adjustment (coarse adjustment):

Adjust the corner load only slightly. An adjustment by just one rotation has a great influence on the corner load.

Check and adjust in small steps!

- switch balance on;
- set weight in position 1;
- zero display;
- check the tolerances in positions 2 and 3 and write them down.

Example:

| position 1 | 0.0000 g |
| position 2 | +0.0007 g |
| position 3 | -0.0005 g |

Adjust plus tolerances by tightening screw(324). ☑

Adjust minus tolerances by loosening screw. ☐
4 point adjustment (fine adjustment)

- Compare checking positions 1 and 2.
- Change the settings of positions 1 and 2 until the above tolerance is attained.
- Compare positions 3 and 4.
- Change their settings up or down uniformly until the tolerance is attained.

If the corner load cannot be adjusted, the measuring cell has to be reassembled.

5.6 Linearity/sensitivity adjustment

Note:
You can do linearity adjustment on the closed balance, too. Use a weight set of the class E2 (order no. 6714-00) with a density of 8.00 g/cm³.
Adjustment can be performed only when the balance has warmed up and is ready to operate!

Do the corner load adjustment prior to the sensitivity adjustment.
During linearity adjustment, there is no need for the sensitivity to be exactly on target, because this will be accomplished automatically during external or internal calibration.
- Take off the black cap(220) on the forward left edge of the balance.
- Switch on with the pan in position.
- Zero the display.
- Center a maximum weight on the pan.
- Write down readout.
- Center a weight equal to half the range on the pan.
- Write down readout.
- Correct the readout value with potentiometer(224).
- Repeat the linearity check with 1/4, 1/2, 3/4, 4/4 load. Nonlinearity may be caused by stress in the load cell or by an incorrectly installed coupling rod. Check the linearity throughout the weighing range.

5.7
External calibration

The balance accepts every calibration value that lies within a tolerance of approx. 2%. Use therefore a weight set to accuracy class (OIML class) 2.

Calibrate in the weight unit grams.

- Allow for at least half-a-day-warmup.
- Switch on the closed balance with the pan in position.
- Keep the tare bar depressed until the required weight appears in the display, "+ weight value".

The prefix signals:
"+": loaded weight to light
"-": loaded weight to heavy

- Set the required weight piece in the center of the pan. The +/- minus prefix disappears from the readout, followed by "the weight value" and "g" in the display. This completes external calibration.

If the balance doesn't accept the calibration value, ...

- ...the 2% tolerance limit is bigger or smaller than the correct calibration value. The display reads + or -. The symbols disappear only when the calibration value is again within the 2% tolerance.

Remedy:
- repeat external calibration procedure several times. In small steps get nearer to the correct calibration value using the + and - prefix as guide.

- ...you are dealing with an error or the external calibration is not accessible because of the wrong menu setting.
5.8
Internal calibration

- Allow for at least half-a-day warmup.
- Switch on the closed balance with the pan in position.
- As soon as 0.0000g appears in the display, push the calibration button. Display will read in brief sequence: "C", "CC","0.000g".

If you read "CE", then display did not read 0.0000g.

- repeat the procedure by first zeroing the display, then calibrating.

Note:
If the balance has been installed at an unfavorable site, the display will read "C" or "CC" for a longer time. Switch the balance off and back on again. The calibration procedure has to be repeated.

Place the balance at another site. Check and if necessary change the settings "installation site" and "stability range" in the balance operating menu.
5.9 How to overwrite the internal calibration weight

Overwriting becomes necessary whenever ...
- a new parameter EEPROM is installed (CH7)
- the internal calibration weight value is faulty, i.e. after doing internal calibration you detect a difference between the indicated internal calibration value and the test weight.

Proceed as follows and watch the display!

<table>
<thead>
<tr>
<th>Procedure:</th>
<th>Display:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlock the menu!</td>
<td>segment check, multiple 8 check, 0.0000 g (depends on resolution)</td>
</tr>
<tr>
<td>1. External calibration:</td>
<td>BUSY, CAL.ʼ</td>
</tr>
<tr>
<td>- switch balance on</td>
<td>+, calibration weight value</td>
</tr>
<tr>
<td>- keep the tare button depressed</td>
<td>BUSY; CAL.ʼ</td>
</tr>
<tr>
<td>- load the required test weight (if you are outside the 2% tolerance, the display will read &quot;+&quot; or &quot;-&quot;), &quot;+&quot; means to add weight, &quot;-&quot; means to take off weight</td>
<td>calibration weight value</td>
</tr>
<tr>
<td>(+/- has no significance, if a new EEPROM was installed)</td>
<td>prefix disappears, &quot;g&quot; appears</td>
</tr>
<tr>
<td>- remove the test weight</td>
<td>0.0000 g</td>
</tr>
<tr>
<td>2. Store the test weight value</td>
<td>STANDBY</td>
</tr>
<tr>
<td>- switch balance off</td>
<td>multiple 8 check to CH4</td>
</tr>
<tr>
<td>- depress CAL button, keep it depressed</td>
<td>CH4, CAL.ʼ</td>
</tr>
<tr>
<td>- use second hand to</td>
<td>BUSY, CAL.ʼ</td>
</tr>
<tr>
<td>- briefly push ON/OFF</td>
<td>0.0000g</td>
</tr>
<tr>
<td>- briefly push tare bar (2nd hand), release CAL button</td>
<td></td>
</tr>
<tr>
<td>3. Internal calibration/overwriting the weight value</td>
<td>CAL.ʼ,C</td>
</tr>
<tr>
<td>- briefly depress CAL button</td>
<td>CAL.ʼ,CC</td>
</tr>
<tr>
<td></td>
<td>0.0000g</td>
</tr>
<tr>
<td>4. If you have replaced the EEPROM, you have to call the internal calibration function once again.</td>
<td></td>
</tr>
<tr>
<td>- Call program 6 in the menu</td>
<td>alternately read 6 1° and 6 2°</td>
</tr>
<tr>
<td>- Push the zero button at 6 2</td>
<td></td>
</tr>
<tr>
<td>- When you read a 0 in the last digit, push the zero button</td>
<td></td>
</tr>
<tr>
<td>- Now lock the menu with the menu access switch</td>
<td></td>
</tr>
</tbody>
</table>

Your signal that the calibration value was accepted successfully: after internal calibration, the display must show the weight of a test piece correctly.
6. Repair

Manipulations inside the balance are to be performed by Sartorius-trained technicians only!

Substantial repair work will alter specifications such as the temperature compensation, the zero point and the sensitivity coefficients, requiring fresh compensation in a Sartorius home service shop.

After repair, the balance function should be monitored over a sufficiently long period of time, including drift, zero point and calibration behavior.

Exchange badly damaged balances or measuring cells.
6.1 How to exchange the display panel

Note: The display panel includes the tare pcb, when the balance has basic equipment. It includes the keyboard pcb, when the balance features the integrated Data Input.

- Remove the keyboard overlay(134) in the display panel(132).
- Remove screw(135) in the display panel.
- Open the balance --> 5.2

Do not touch the screen with your fingers. It is coated with a protective film.

- Unplug connection(129)
  With Balances with Data Input unplug the connection(201) keyboard(130) - terminal pcb(228).

- Remove the 8 screws.
- Carefully take off display panel.
- Assemble display panel in inverse sequence.
6.2 Exchanging the tare key overlay

Overlay with touchpad for balances without keyboard (Data Input), spare part number: 69 A200 07

Overlay with touchpad for balances with keyboard (Data Input), spare part number: 69 H122 32

- Open the balance --> 5.2

Do not touch the screen in the display panel with your fingers. It is coated with a protective film.

- Unplug connection between the tare key overlay (133) and the keyboard pcb (130). Caution: the foil must not be folded or torn!
- Remove three clamps (1).
- Remove overlay from the display panel.
- Take off the protective cover from the new overlay with touchpad.
- Insert tare key overlay with the 3 ground connections in the display panel und fix it with glue.
- Place the 3 clamps for the contact of the ground connection tare key overlay-display panel.
- Plug connection between tare key overlay and keyboard pcb.
- Check new tare key overlay.
- Reassemble display panel with eight screws (2).
- Use perenator (6908646) to seal the joint around the tare key overlay and allow for several hours drying time.
6.3
Resistor acceptance for temperature compensation after main pcb exchange

If errors cannot be removed within a certain time, the pcb has to be exchanged. For this purpose the resistors corresponding to the TC compensation have to be taken from the defective pcb.

- Unscrew the sheet at the base plate (125).
- Write down resistor positions.
- Solder resistors onto the new main pcb in the same position.

Make sure the new pcb has the same "SAT" number and components as the defective one.

Take over the following resistors:

For both areas:
R 119

Zero point:
R 120, R 121

Sensitivity compensation:
R 117, R 118
6.4 General, what to do if...

Fundamental troubleshooting

Mechanical faults will reveal themselves by:
- poor reproducibility
- display hysteresis
- drifting
- impossibility to set corner load
- "L" in display when coupling band is broken
- dirt in the magnet.

Balance checking/repair:

Before you attempt any repair, do a thorough visual check of the measuring cell and check all cable and plug connections, the IC and main PCB.

If you decide that you cannot repair the balance within reasonable time, ship it to a home service station or to the factory.

Check, measure, test or replace (depending on the fault):

Display blank:
1) microprocessor IC111, 2) display AZ101

Display flashing:
1) calibrate, 2) overwrite the calibration value, 3) parameter prom IC113, 4) IC111

Display "CR":
1) operator error, review operator manual, 2) calibrate 3) IC113
Display 0.00:
1) load cell, 2) null indicator, 3) A/D converter 4) IC111, 5) AZ101.

Display "L" or "H":
1) load cell, 2) null indicator, 3) preload, 4) A/D converter 5) IC111

Display segments missing:
1)IC111, 2) AZ101.

Display nonlinear:
1) linearity potentiometer R136, 2) corner load, 3) measuring cell.

Display skips or doesn't reproduce:
1) measuring cell, 2) corner load, 3) A/D converter.

CH0:
1) IC111, 2) A/D converter.

CH1:
1) A/D converter, 2) IC111.

CH2:
1) measuring cell, 2) weighing pan, 3) null indicator, 4) IC111, 5) A/D converter.

CH4, 5, 6:
1) unplug peripheral connections, 2) CAL button, 3) tare bar, 4) print button and the connection lines.

CH7:
IC113.

CH8:
Settings - balance operating program

CH9:
1) separate peripherals from balance, 2) data output, 3) IC111.

Defective tare function:
1) tare bar, cable, plug connections 2) IC111.
Defective calibration function:
1) calibration button or cable, 2) separate peripherals, 3) calibrate, 4) operator error, review operator manual, 5) IC111, 6) menu setting, review operator manual, 7) motor, calibration mechanics, microswitch.

Defective stability symbol:
1) unstable operating environment, 2) operator error, review operator manual, 3) separate peripherals, 4) measuring cell, 5) indicator, 6) air gap between coil/magnet, 7) clean magnet, 8) corner load, 9) A/D converter.

Measuring cell doesn't stabilize:
1) measuring cell, 2) null indicator, 3) A/D converter.

Load cell oscillates:
1) measuring cell, 2) null indicator.

Balance compensates only high loads:
1) null indicator, 2) preload, 3) operational amplifier IC 101, T 101, T 102.

Corner load error:
1) load cell, 2) corner load.

Zero point - sensitivity drift:
1) load cell, 2) A/D converter

Data input/output:
1) separate peripherals, 2) data output, 3) IC111, 4) peripheral devices.
6.5
Electronics, what to do if...

To check/repair the main pcb:

before starting repairs, check the power supply and plug connections for positive and correct fit and contacts. Temperature errors and errors that occur off and on can be narrowed down with a hair dryer (higher temperature range) or refrigeration spray (lower temperature range).

IC-designations:

AZ 101  LC display
IC 101  control amplifier
IC 102  low pass-linearity
IC 103  temperature compensation
IC 117  generates the reference voltage
IC 111  balance processor
IC 110  gate array
IC 113  EEPROM (holds balance parameters)
IC 112  reset component
IC 114, 115, 116 voltage stabilizer
IC 301, 302 data line drivers
IC 501  oscillator of the null indicator

The number behind the slash represents the pin on that component.

Depending on the error, please check, measure, test or replace the following:

Blank display:
1)IC 111, 2) reset socket 2/5, 3) AZ 101.

Display 0.00:
1) at LD 501 are approx. 1.2 V 2) approx. +/- 100mV at socket 1/10, 3) measuring voltage at R 1 and meas. voltage at IC 102/6, 4) ref. voltage approx. +7 V at IC105/3, 5) A/D converter 6) IC110, 7) reset plug 2/5 from "high" to "low", 9) IC111.

Display L or H:
1) LD502, T501, FD501 2) IC501/6 approx. +100 mV, 3) meas. voltage at R1 approx. +/-1.5 V, 4) ref. voltage approx. +7V IC 105/3, 5) IC110, 7) IC111,
CH0:
IC 111

CH1:
1) Q101, 2) IC110, 3) IC111.

CH2:
1) preload, 2) IC110, 3) IC111

CH4 and 5:
1) detach peripherals, 2) keyboard lines.

CH7:
IC113

CH8:
Setting - balance operating manual

CH9:
1) data output and peripherals.

E1:
1) menu setting, 2) detach peripherals, 3) terminal pcb, 4) IC111.

E2:
1) A/D converter, 2) IC110.

E4:
1) IC111, 2) IC301 and IC302, 3) terminal pcb, 4) peripherals.

E8:
1) IC111, 2) terminal pcb, 4) peripherals.

Flashing display:
1) calibrate, 2) IC113, 3) internal weight switching mechanism, 4) M401 and control thereof, 5) IC111, 6) overwrite calibration weight.

No tare function:
1) tare key overlay, 2) IC111/1 from "high" to "low", 3) IC111.
Faulty or missing display segments:
1) display plug connection, 2) voltage supply to AZ101, 3) reset socket 2/5, 4) AZ101, 5) IC111.

Unstable display:
1) detach measuring cell from electronics section, 2) apply voltage from Analogic AN 3100, 3) A/D converter section with low pass IC102/6; IC105/3; (hair dryer / refrig spray - defined temp. change on components).

Drifting display:
1) IC103 and circuit, 2) T1; T2 3) approx. 4.8V socket 1/12, 4.8V at socket Bu1/10, 4) A/D converter (dryer/refrig.spray - defined temp. change on components).

Faulty calibration:
1) keyboard pcb, 2) activate CAL button, and test IC111/4 3) micro switches S401, S402,4) IC 111/38, 5) briefly apply motor M401 approx. +5V to socket 4/6 (function check).

Balance does not compensate rated load:
1) control amplifier IC101/1/7 emitter T102/T101, 2) carrier coil (approx. 150 Ohm), 3) current input cables.

Load cell oscillation:
1) IC501, 2) T501, 3) LD501, 4) FD501, 5) connect carrier coil to ground.
7.
Installation of accessories (optional)

7.1
Data output YDO 01A

- Open the balance --> 5.2.
- Unscrew shield plate (1).
- Take out the cover plate on the rear panel.
- Insert data output in the base plate of the balance.
- Plug data line to data output pcb (blue line on pin 1 of the plug).

- Make the plug connection data output to main pcb(2).
- Screw-fasten data output to the base plate at the black cover plate.
- Close the balance.
- Screw-attach the shield plate.
- Switch balance on and check data output e.g. with a connected printer Data Print YDP 01.
7.2 Data Input (keyboard) YDI 01A-**F

The installation of the Data Input requires the installation of the data output YDO 01A (with 25 pin socket). It is delivered together with the Data Input.

- Open the balance --> 5.2
- Exchange display panel --> 6.1
- Installation of the data output YDO 01A (pcb with 25 pin plug) --> 7.1.
- Unplug data output line (refer to 7.1).
- Plug terminal pcb (228) to main pcb.

- Plug data output line to terminal pcb (blue marked line to the mark).
- Make plug connection(201) keyboard pcb - terminal pcb (red marked line at pin 1 of the keyboard pcb.
- Plug 4-pin plug(129) of the keyboard pcb to main pcb.
- Close the balance.
- Insert the required keyboard overlay e.g. PRO 22F into the display panel.
- Start the balance.
- Select the appropriate code for your program card (PROxx) in the balance menu program.
- Make a check of all balance and keyboard functions.
- Balance is ready to be operated.