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Servicemanual
Electronic Moisture Analyzer

KERN TDLG-A

Version 1.1

05/2026

GB



GB

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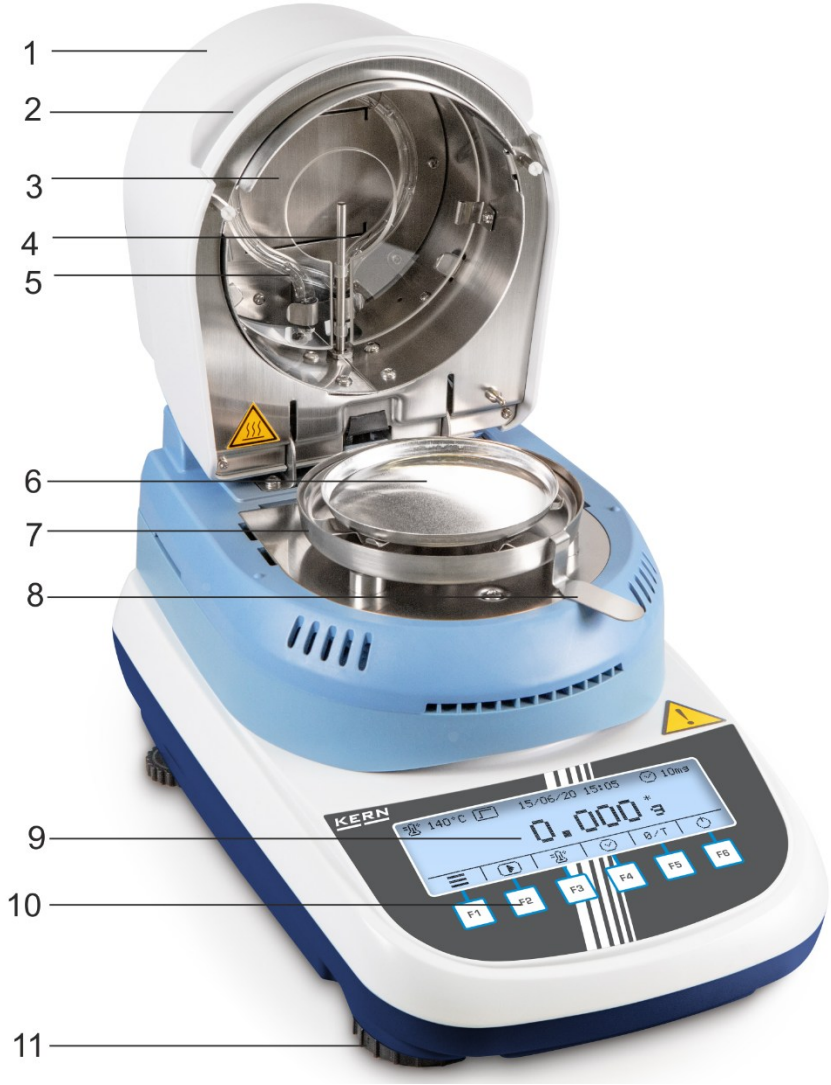
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1 TOTAL VIEW

1.1 Components



Pos.	Designation
1	Heater module
2	Opening handle
3	Protective glass guard
4	Temperature sensor
5	Halogen lamp
6	Sample tray
7	Windshield
8	Removal aid
9	Display
10	Keyboard
11	Levelling screw

Rear view:

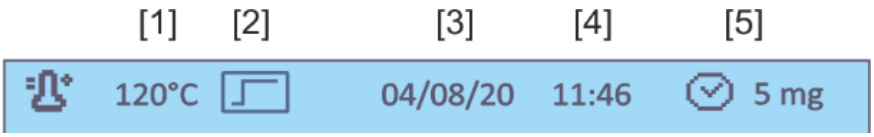


Pos.	Designation
12	Connection of connecting cable „Heating module / Scales
13	
14	Serial Interface RS 232C
15	Mains connection socket
16	Bubble level

1.2 Keyboard and display overview



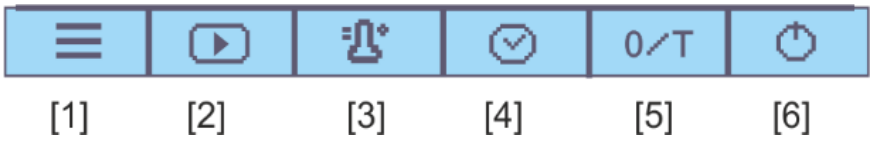
Status bar:



Pos.	Designation
[1]	Set drying temperature
[2]	Active heating profile
[3]	Current date
[4]	Current time
[5]	Active switch off criterion

Toolbar:
The displayed icons in the toolbar depend on the process being executed at this moment.
By pressing the respective functions key (F1 – F6) below the icon, either the function is executed or the settings are taken over.

Toolbar „Start display“



Pos.	Designation
[1]	Call up menu
[2]	Start measurement
[3]	Select drying temperature
[4]	Select switch off criterion
[5]	Set to zero/taring
[6]	Turn on/off

Toolbar during measurement



[7] [8] [9] [10]

Pos.	Designation
[7]	Interrupt the drying process
[8]	Stopping the drying process
[9]	Display the current drying parameters
[10]	Switch over the unit of the results display (% moisture □ %dry content □%Atro□ resid.weight [g]

Toolbar „Display of results“



[11] [12] [13] [14] [15]

Pos.	Designation
[11]	Exit the drying program / back to start display
[12]	Print out the measurement log
[13]	(de)activate, edit GLP parameters
[14]	Display of start- and residual weight including date and time
[15]	Switch over the unit of the results display, (% moisture □ %dry content □%Atro□ resid.weight [g]

2 Technical data

Data	DLB 60-4A	DLB 160-3A	DLB 160-3A110V
Item no. / Type	TDLG 60-4-A	TDLG 160-3-A	TDLG 160-3-A110V
Radiator	Halogen (1 x 400 W)		
Temperature range	35°C - 160°C 1°C steps selectable		
Maximum load (Max)	60 g	160 g	
Readability (d)	0,0001 g	0.001 g (weighing mode)	
	0,001%	0.01% (moisture content)	
Reproducibility (weighing mode)	0,0001 g	0,001 g	
Reproducibility Moisture content (depending on application)	Weighing 2 g 0,18 %	Weighing 2 g	0,15 %
	Weighing 10 g 0,05 %	Weighing 10 g	0,05 %
Linearity	± 0,0003 g	± 0,003 g	
Stabilization time (typical)	4 sec		
Smallest sample size	50 mg		
Recommended calibration weight, not included (class)	20 g (E2)	100g (E2)	
Warm-up time	240 min	120 min	
Environmental conditions	5°C ... +35°C Ambient temperature 45% - 70% humidity non-condensing		
Heating profiles		Standard drying	
		Quick drying	

Shutoff criterion	• Automatic, selectable 1 mg/30s - 10 mg/30s • Time-controlled, selectable 1 min - 99 min • Manual switch-off at the touch of a button		
Sample trays	Ø 100 mm		
Result displays	[%] Moisture content [%] Dry content [g] Residual weight in grams ATRO		
Interface	RS 232		
Dimensions (W x D x H)	Housing 215 x 345 x 235 mm		
Available Drying room	Ø 92 mm, 25 mm high		
Net weight	4.7 kg		
Power supply	220 - 240 V AC 50/60 Hz	220 - 240 V AC 50/60 Hz	100 - 120 V AC 50/60 Hz
Languages operator guide	German, English, French, Italian, Spanish, Portuguese		

3 TROUBLE SHOOTING / ERROR CODES

ERR01	Weight value instable or zeroing not possible. Check the environmental conditions.
ERR02	Adjustment error, e.g. instable environmental conditions
ERR03	Adjustment error e.g. incorrect adjustment weight
ERR05	Data transfer not possible, as weighing value is instable. Check the environmental conditions.
ERR07	Faulty data reading
ERR10	Instable display when drying starts, check environmental conditions
ERR11	Sample weight too small
"**UNLOAD**":	Sample or sample dish wrongly positioned.
"**Err thb**"	Heating top does not work, check current supply
	Weighing range exceeded, placed load exceeds the capacity of the appliance. Unload appliance.
	Weighing range not reached, e.g. Dish holder / removal help is missing.

Unstable reading	• Check if the load cell touched the base plate • Check if something comes in contact with plate • Check the input and output signal of load cell (see chapter 4 "measuring points on main board")
Only zero – no weighing results	• Delete linearization values (see chapter 3.2 "delete linearity and calibration values) • Check the input and output signal of load cell (see chapter 4 "measuring points on main board")
Display don't work correctly	• Check cable connection • Check power signal (see chapter 4 "measuring points on main board") • Change display board
Keyboard failure	• Check cable connection • Change keyboard
Off-center load error	• Do off-center load adjustment (see chapter 6) • Check if the load cell is bent
Linearity error	• Do linearity adjustment (see chapter 3) • Check if the load cell is bent

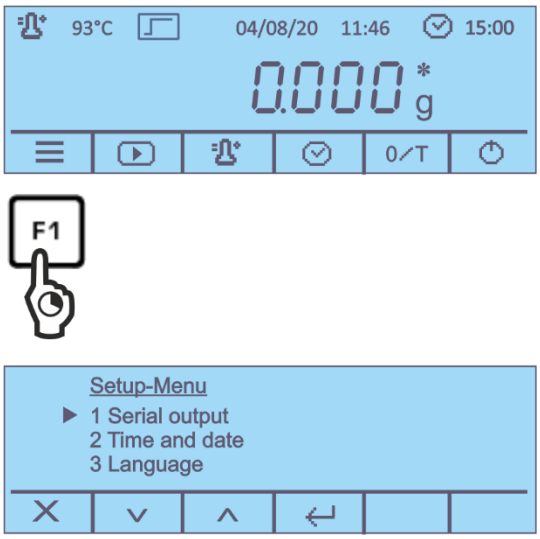
Fault	Possible cause
Display is not lit up.	• The appliance is not switched on. • The mains supply connection has been interrupted (mains cable not plugged in/faulty). • Power supply interrupted. • Fuse has blown
The display does not change when a sample is being loaded	• Sample tray / tray holder is fitted incorrectly.
The weight display changes constantly / the stability display does not appear.	• Sample tray has contact with wind protection device or heated cover. • Draught/air movement • Table/floor vibrations • Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)
Incorrect measuring result	• Check adjustment • No resetting to zero before loading the sample
Measurement is taking too long	• Incorrect shut-down criteria set
Measurement is not reproducible	• Sample is not homogenous • Drying time is too short • Drying temperature too high (e.g. oxidation sample material, boiling point of sample exceeded) • Temperature sensor soiled or defective
Drying does not start	• Heated cover open • The mains supply connection has been interrupted (mains cable not plugged in/faulty).

4 SETUP MENU

4.1 Navigation in the menu

Access to menu

In the start display keep pressed the F1-key for 2 seconds, then release. The setup menu is displayed.



The cursor ▶ on the left of the text shows the active menu item.

Select menu items

It is possible to select the single menu items one by one with the buttons F2 and F3 under the icons .

Change settings

Acknowledge the selected menu item using the F4 button under the icon , the available settings are displayed.

Every time the buttons F2 and F3 under the icons  are pressed, the following setting will be displayed.

Save settings

Take over the selection using the F4 button under the icon .

Weighing balance returns to menu. Either make more settings in the menu or go back to menu mode as follows.

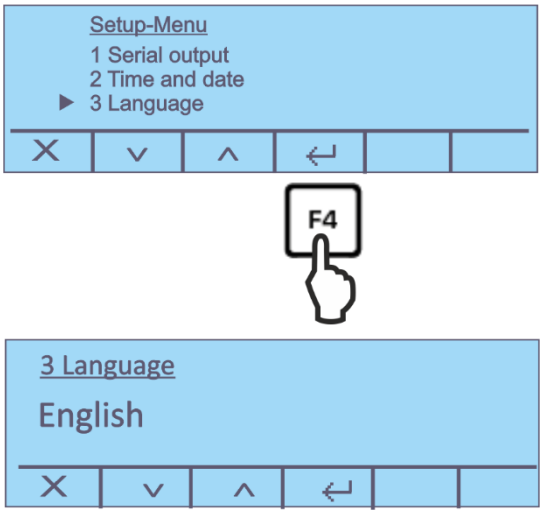
Finish the menu/ back to the start display

Press the F1 button under the icon 

4.2 Description of individual functions

4.2.1 User language

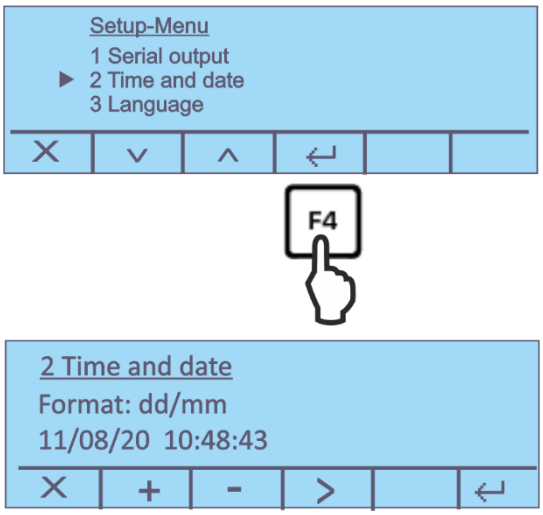
⇨ Press [v^] to select the menu item **<3 Language>** and acknowledge by [↵].



Acknowledge selection by [↵].

4.2.2 Setting time and date

⇨ Press [v^] to select the menu item <2 Time and Date> and acknowledge by [↵].



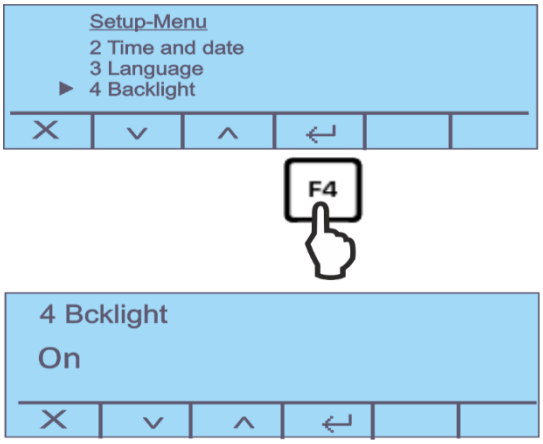
⇨ Press [+] [-] to set the desired format.

⇨ Press [>] to select time / date and adjust by [+] [-].
The active digit is underlined.

⇨ Confirm input by [↵].

4.2.3 Switch on and off the background illumination

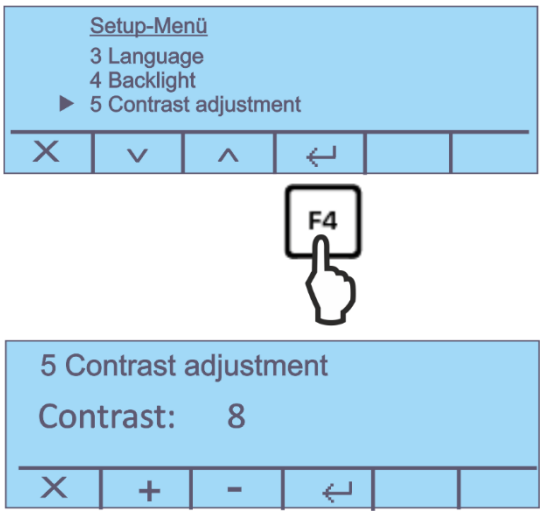
⇨ Press [v^] to select the menu item <4 Backlight> and acknowledge by [↵].



⇨ Acknowledge selection by [↵] .

4.2.4 Setting the contrast of the display

⇨ Press [v^] to select the menu item <5 Contrast adjustment> and acknowledge by [↵].

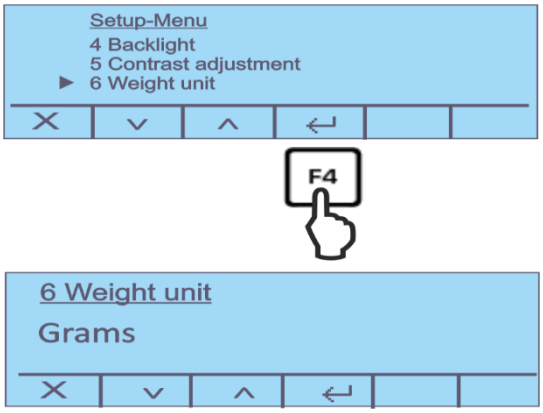


⇨ Press [+] [-] to increase or to reduce the value.
Adjustment range 0 -15

⇨ Acknowledge selection by [↵] .

4.2.5 **Weighing unit [g / mg]**

⇨ Press [v^] to select the menu item <6 Weight unit> and acknowledge by [↵].



⇨ Use [v^] to adjust <Gram> or <Milligram>

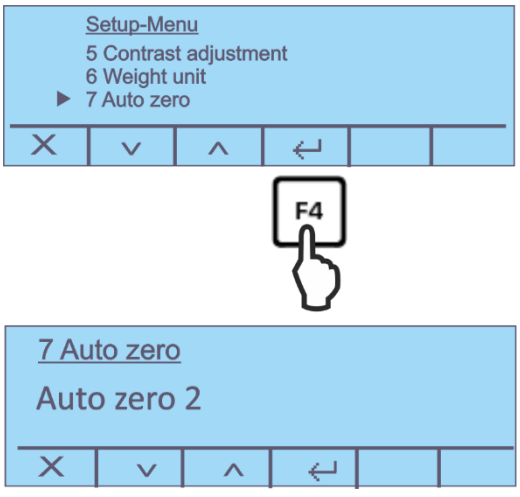
⇨ Acknowledge selection by [↵] .

4.2.6 **Auto zero**

Under this menu item the automatic zero-point correction can be switched on or off. In switched-on-state the zero point is automatically corrected at drift or when dirty.

Note:
In the event that small quantities are removed or added to the material to be weighed, incorrect weighing results can be displayed due to the “stability compensation “. (e.g. slow flow of liquids from a container placed on the balance, evaporating processes).
When apportioning involves small variations of weight, it is advisable to switch off this function.

⇨ Press [v^] to select the menu item <7 Auto zero> and acknowledge by [↵].



⇨ Press [v^] to select the desired setting.

Options:

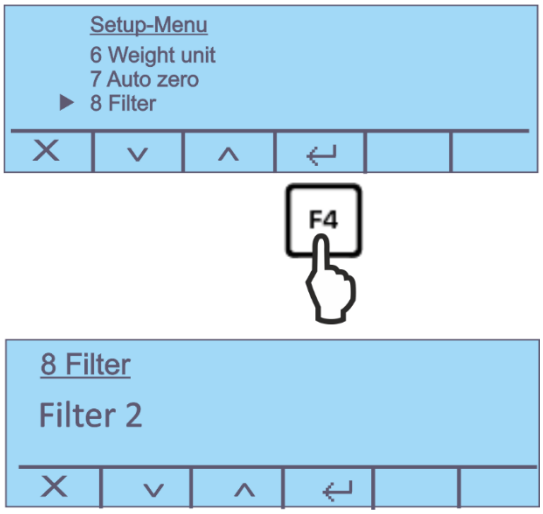
Auto zero off	Auto Zero switched off
Auto zero 1	Auto Zero range ± ½ Digit
Auto zero 2	Auto Zero range ± 3 Digits
Auto zero 3	Auto Zero range ± 7 Digits
Auto zero 3E	Auto Zero range ± 7 digits in the whole weighing range

⇨ Acknowledge selection by ↵ .

4.2.7 **Setting the filter**

This menu item allows the balance to be set according to specific ambient conditions and measuring purposes.

⇨ Press v^ to select the menu item <8 Filter> and acknowledge by ↵.



⇨ Press v^ to select the desired setting.

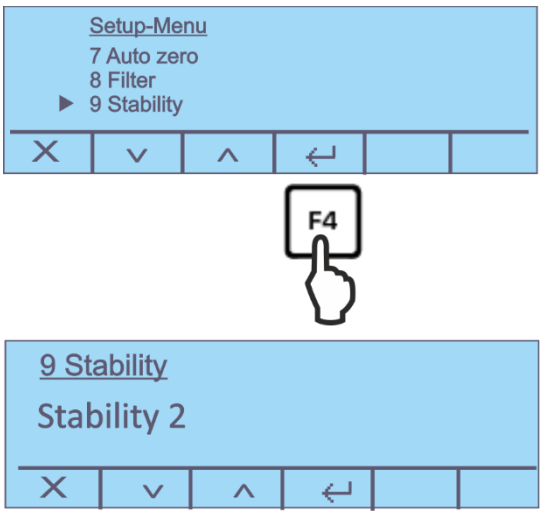
Options:

Filter 1	Setting for dosage
Filter 2	The balance reacts quickly and in a sensitive manner, very quiet set-up location
Filter 3	The balance reacts slowly and in a robust manner, busy set-up location

⇨ Acknowledge selection by ↵ .

4.2.8 **Setting the stability**

⇨ Press [v^] to select the menu item <9 Stability > and acknowledge by [↵].



⇨ Press [v^] to select the desired setting.

Options:

Stability 1	Standstill control fast / very quiet set-up location
Stability 2	Standstill control fast + exact / quiet set-up location
Stability 3	Standstill control exact / very busy set-up location

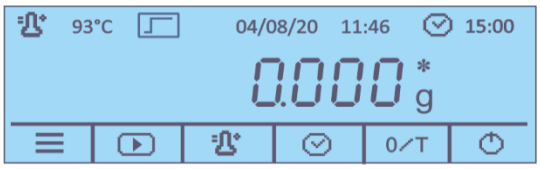
⇨ Acknowledge selection by [↵] .

4.3 Application menu <Moisture analysis>

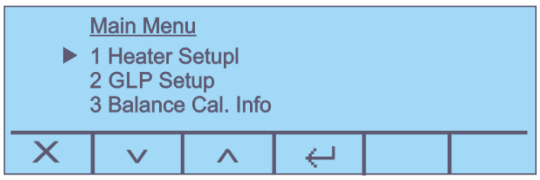
In this menu all settings and parameters, which influence the moisture analysis and the heating module, are adjusted.

Invoke main menu:

⇨ In the start display press the F1-key, the main menu will appear.







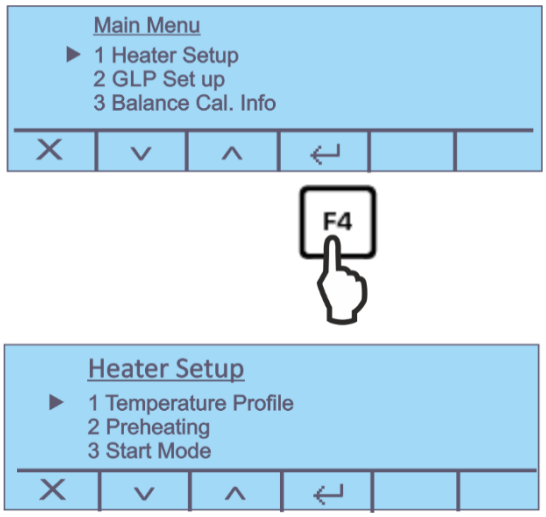
The following submenus are available:

1. For settings of heating module
2. For GLP settings
3. Balance adjustment log
4. Heating module adjustment log
5. Balance adjustment
6. Temperature test
7. Heating module adjustment

⇨ Select submenu with  and acknowledge by .

4.3.1 **Settings of the heating module**

⇨ In the main menu press [v^] to select the menu item **<1 Heater Setup>** and confirm by [↵].



The following functions are available:

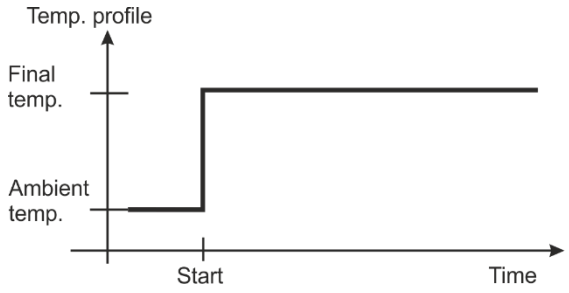
1. Heating profile
2. Preheating
3. Start mode
4. Start delay
5. Stability test

⇨ Select desired function with [v^] and acknowledge by [↵].

4.3.2 Setting the heating profile

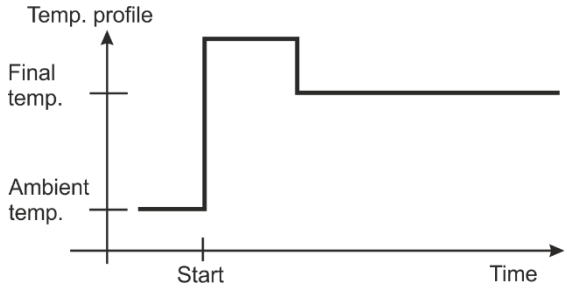
Two options are available to adapt the drying characteristics optimally to the sample being used:

Standard drying



This heating profile is suitable for most samples. The sample is heated to the set temperature at normal output and is then kept at this temperature.

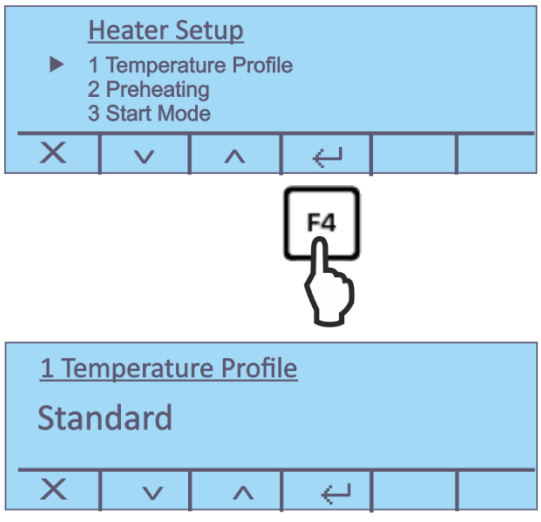
Quick drying



Quick drying is first and foremost suitable for samples with a moisture content of more than 30%. After start-up the temperature will be rising fast and exceed the set drying temperature by approx. 30% for about two minutes. This compensates the evaporation coldness and that way the drying process will be accelerated.

Then the temperature is controlled down to the set value.

⇨ Press [v^] to select the menu item **<1 Temperature Profile>** and acknowledge by [↵].



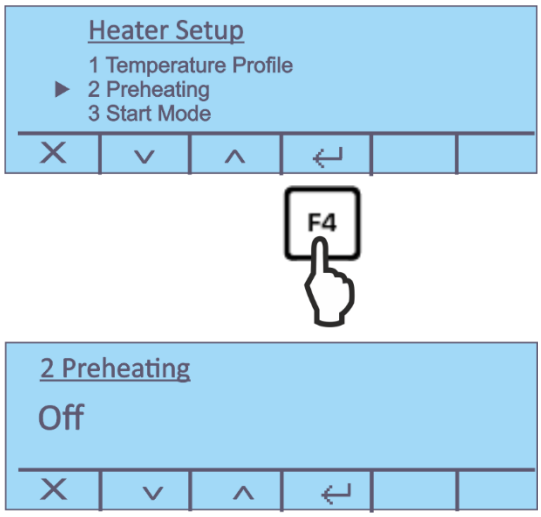
⇨ Select desired setting with [v^] and acknowledge by [↵].

4.3.3 Connect the preheating stage

If necessary, the function „Preheating“ can be activated for preheating the sample chamber before starting the measurement.

A preheated device may influence the reproducibility of the results as the device is in the same temperature status at every measurement.

⇨ Press [v^] to select the menu item **<2 Preheating>** and acknowledge by [↵].



⇨ Mit Press [v^] to switch on or off the preheating stage and confirm by [↵] .

Procedure with activated function:

⇨ In the start display press the button under [▶] and follow the user-guide instructions. Close the lid
Wait until the set temperature is reached.

⇨ When the **<Ready>** display appears, press the button under [>].

⇨ Put the empty sample tray in the sample chamber. Close the lid, the scale will automatically be reset to zero.

⇨ Weigh-in the prepared sample and close the lid. Measurement will be started automatically.

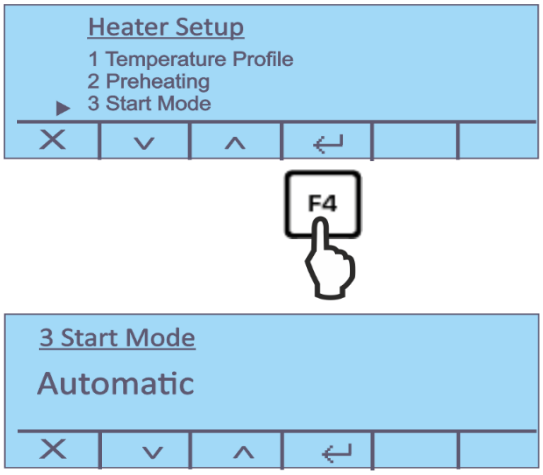
ℹ For standard applications, a preheating normally is not required.

4.3.4 Start mode

Two options there are available:

Automatic	Measurement starts automatically after closing the lid.
Manual	Measurement starts after having pressed ↵.

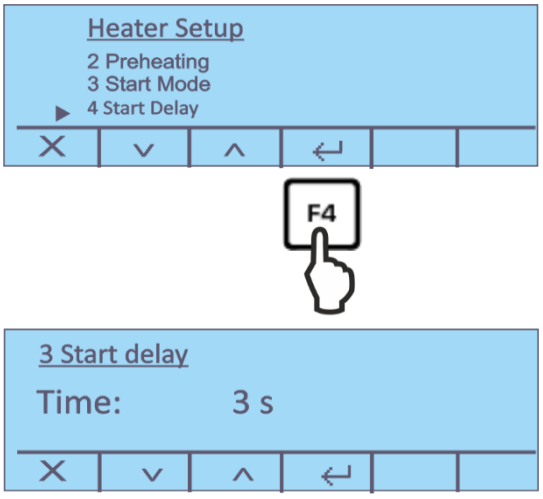
⇨ Press ∨∧ to select the menu item **<3 Start Mode>** and acknowledge by ↵.



⇨ Select desired setting with ∨∧ and acknowledge by ↵.

4.3.5 Start delay

⇨ Press ∨∧ to select the menu item **<4 Start Delay>** and acknowledge by ↵.



⇨ Select desired setting with ∨∧ and acknowledge by ↵.

Setting range: 0 – 15 s

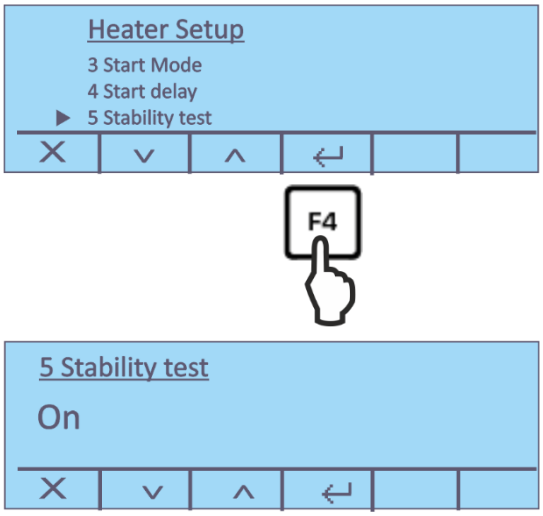
4.3.6 **Stability test**

Two options there are available:

On Measurement starts only after a successful stability test

Off Measurement starts without stability test

⇨ Press [v^] to select the menu item **<4 Stability test>** and acknowledge by [↵].

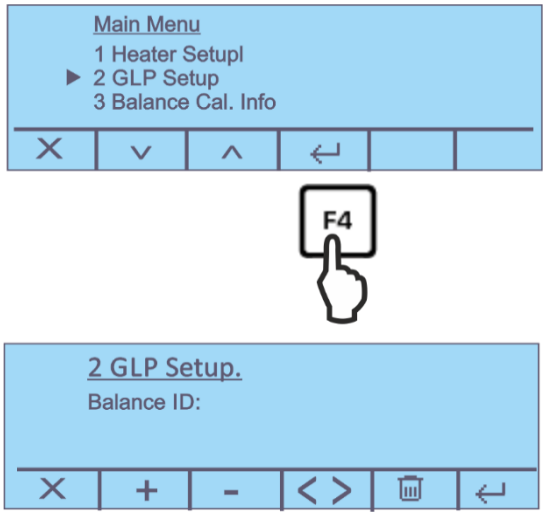


⇨ Press [v^] to switch on or off the stability test and confirm by [↵].

4.4 GLP settings

This menu item is used to define which information is to be printed in the header of the weighing logs.

⇨ In the main menu press [v^] to select the menu item **<2 GLP Setup>** and confirm by [↵].



The following parameters are available:

1. ID Balance
2. ID User
3. ID Project

⇨ Acknowledge by [↵] and enter the text subsequently as follows.
The active digit is underlined.

[< >]	Select cipher
[+]	Increase cipher (0 – 9) or character (A – Z), (/ . -). Press the key long time to switch over between capital letters and lower case letters.
[-]	Reduce cipher (0 – 9) or character (, [blank], -, A – Z). Press the key long time to switch over between capital letters and lower case letters.
[🗑]	Press the button once to delete the underlined character. Press the key long time to delete the whole text.
[↵]	Confirm input
[X]	Cancel input

5 Moisture analysis

5.1 Define the drying method

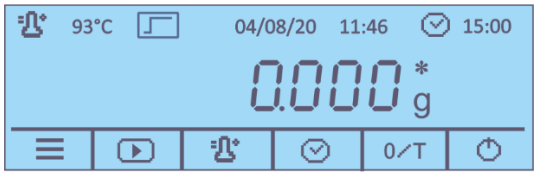
The optimum drying parameters (drying temperature and drying period) depend on the type and size of the sample and the required accuracy of the measuring result.
In most cases it is only possible to find out the sample-specific parameters by trial and error.
or
Guidance is available in form of existing standards, in-house directives or recommendations.
For examples please also refer to our application manual which you can download from our KERN- Homepage (www.kern-sohn.com).

The following parameters can be set for defining a method:

- Drying temperature
- Switch-off criterion
- Heating profile
- Result display

5.2 Setting the drying temperature

The drying temperature influences considerably the measuring time. It must be selected in a way that the sample neither does decay nor changes its chemical structure. A too deep drying temperature lengthens in necessarily the drying time.



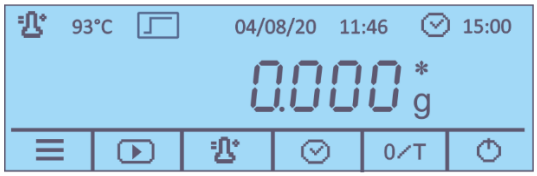
⇨ In the start display press , the current setting will be displayed



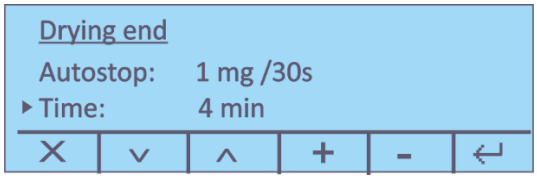
⇨ Select the desired temperature with + - and confirm by , setting range 35 °C – 160°C.

5.3 Adjust the switch-off criterion

A switch-off criterion defines under which conditions the device is supposed to cancel the drying process. Cut-off criteria save continuous time checks and manual cancelling of drying. Furthermore, they ensure that measurements are always carried out under the same conditions and provide for reproducible measurements. Two different switch-off criteria can be selected: either automatic or time-controlled



⇨ In the start display press [▶], the current setting will be displayed;
The cursor ▶displays the current setting



⇨ Press [v^] to select the switch-off criterion and adjust by [+] [-].

Autostop The integrated scale continuously determines the weight loss of the sample during drying. If the loss of weight per time unit (30 s) drops below the set nominal value, drying will be cancelled automatically and the measurement result displayed. Setting range:

- Auto (3mg/30s; factory setting)
- 1 mg/30 s – 10 mg/30 s, selectable

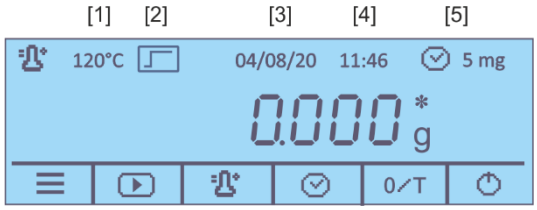
Time When this switch-off criterion is selected, the measurement will continue until the set drying time has elapsed.
Setting range: 1 min – 99 min.

⇨ Acknowledge selection by [↵] .

5.4 Carrying Out Measurement

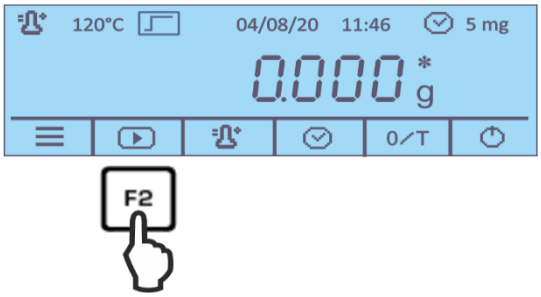
Having defined the drying parameter for your sample, measurement can be started. The display shows the current settings and guides you step by step through the measurement process.

Display before starting the measurement:



Pos.	Designation
[1]	Set drying temperature
[2]	Active heating profile
[3]	Current date
[4]	Current time
[5]	Active switch off criterion

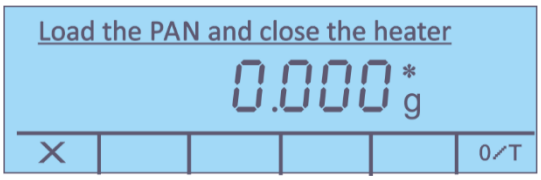
Start measurement:



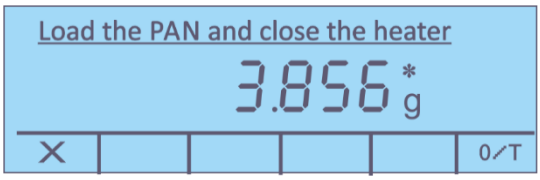
⇨ Press the button under  and follow the instructions of the operator guidance



When the preheating stage is connected, wait until the set temperature is reached.

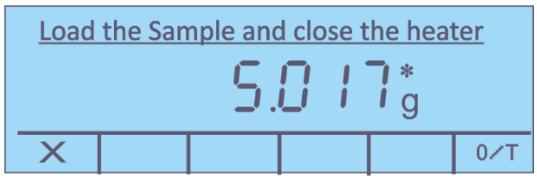


⇨ Place the empty sample tray on the removal aid and put into the sample chamber.



⇨ Close the lid and wait until the scale will automatically be reset to zero.

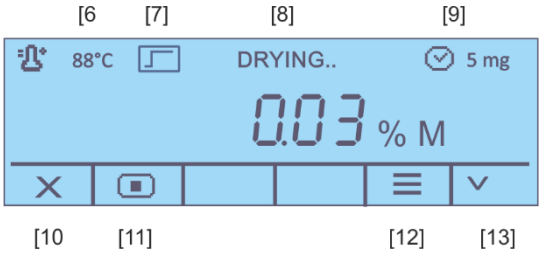
⇨ Weigh-in the prepared sample and close the lid. Measurement will be started automatically.



- If measuring does not start automatically, the equipment is preset for manual start. Press ↵ for start.
- Manual or automatic start can be selected in the menu
- Observe hazard information

⇨ When connecting an optional printer and activating the GLP-function, the edition of a measurement log will start, depending on the setting in the menu.

⇨ The measurement process can be monitored in the display.



Pos.	Designation
[6]	Current temperature
[7]	Active heating profile
[8]	Status <Drying process is running>
[9]	Active switch off criterion
[10]	Interrupt the drying process
[11]	Stopping the drying process
[12]	Display the current drying parameters
[13]	Switch over the unit of the results display (% moisture □ %dry content □%Atro□ resid.weight [g]

When drying is finished, you will hear an acoustic signal and the heating will be shut off.

The result is displayed.



Pos.	Designation
[14]	Exit the drying program / back to start display
[15]	Print out the measurement log
[16]	(de)activate, edit GLP parameters
[17]	Display of start- and residual weight including date and time
[18]	Switch over the unit of the results display (% moisture □ %dry content □%Atro□ resid.weight [g]

Finish the measurement:

⇨ Open lid and remove the sample with the help of the removal aid.
Caution: Caution! Sample tray and all parts of the sample chamber are hot!

⇨ For further measurements press [X] and confirm the inquiry **<Are you sure>** by [✔]. The result is deleted from the display, the start display appears.

5.5 Sample logs (KERN YKB-01N)

➢ **Unit „Display of results“**
When an optional printer is connected, an adjustment log can be edited by pressing [🖶].

GLP <on->	GLP <off->
---------- 13/08/20 10:14:28 ---------- ID Waage: WIC201234 ---------- ID User: MUSTERMANN ---------- ID Projekt: KERN ---------- Standard 160°C Autostop 0 5 mg/30s ---------- 13/08/20 10:05:15 G.Start 6.316 g ---------- 13/08/20 10:11:18 G.Ende 5.004 g ---------- Feuchte 20.77 % M Unterschrift: ----------	---------- 13/08/20 10:21:48 ---------- Standard 160°C Autostop 0 5 mg/30s ---------- 13/08/20 10:05:15 G.Start 6.316 g ---------- 13/08/20 10:11:18 G.Ende 5.004 g ---------- Feuchte 20.77 % M

- **Sample log during measurement**
  When connecting an optional printer and activating the GLP-function, the edition of a measurement log will start, depending on the setting in the setup menu.

Menu setting: SetupRS232 Printout time 30 s

```
------------------------
13/08/20 10:05:15
------------------------
ID Waage:
WIC201234
------------------------
ID User:
MUSTERMANN
------------------------
ID Projekt:
KERN
------------------------
Standard          160' C
Autostop     0 5 mg/30s
------------------------
13/08/20 10:05:15
G.Start         6.316 g
------------------------
10:05:45         0.46 % M
10:06:15         1.93 % M
10:06:45         3.94 % M
10:07:15         6.24 % M
10:07:45         8.68 % M
10:08:15        11.22 % M
10:08:46        13.79 % M
10:09:16        16.38 % M
10:09:46        18.65 % M
10:10:16        20.32 % M
10:10:46        20.72 % M
10:11:16        20.77 % M
------------------------
13/08/20 10:11:18
G.Ende          5.004 g
------------------------
Feuchte         20.77 % M

Unterschrift:

------------------------
```

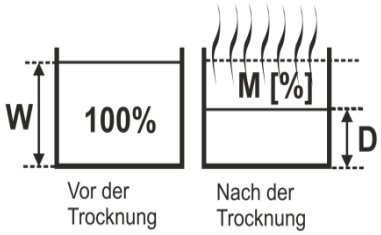
The display values are transferred to the PC in the previously defined output interval in connection with our transfer software Balance connection (KERN SCD 4.0).

In the same time a drying curve can be represented graphically. It shows the progress of the drying procedure in real time and can help you to check and evaluate the results.

5.6 Results display

During and after the measurement, the display can be switched over to the different units by 

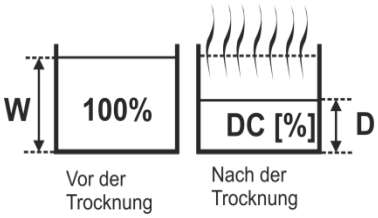
% Moisture





The moisture content of the sample will be displayed in percentages of the wet weight (= initial weight).

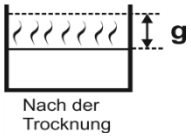
% Dry material content





The dry material content (DC) of the sample will be displayed in percentages of the wet weight (=initial weight)

Residual weight in grams





Display shows the weight of the sample in grams.

ATRO



ATRO is a unit which is exclusively used in the timber industry.

6 CONFIGURATION AND ADJUSTMENT

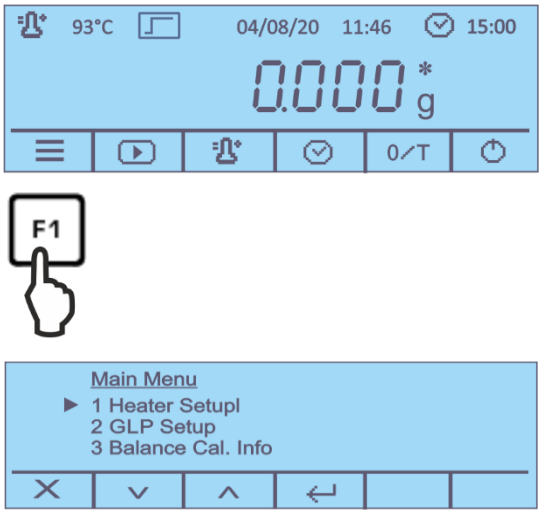
6.1 Weight Adjustment

The weight adjustment of the integrated balance is not necessary for a correct moisture analysis as this measurement can only be made relatively. The instrument measures the weight of the sample before and after the drying process and the moisture content is determined by the relation between wet and dry weight.
The instrument however should be adjusted, if this is required by the quality system which you apply.

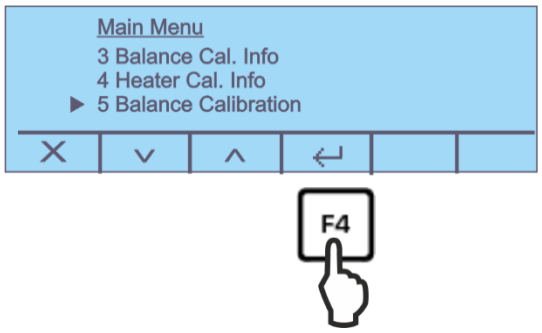
Procedure:

- Observe stable environmental conditions. A warmup time (see chapter 1) is required for stabilization.
- Carry out adjustment with placed sample tray. Ensure that no objects are within the sample tray.
- Carry out adjustment as near as possible to the balance's maximum weight. Info about test weights can be found on the Internet at: http://www.kern-sohn.com.

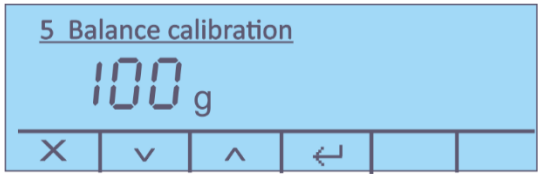
1. In the start display press the F1-key, the main menu will appear.



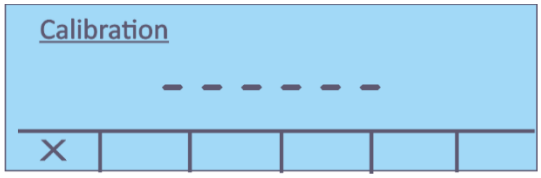
2. Use the buttons under V^ to select the menu item <5-Balance Calibration> and acknowledge by ↵ .

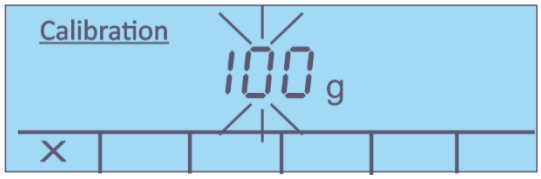


3. The weight value of the required adjustment weight will be displayed.



4. Acknowledge with ↵.





5. During the flashing weight display put the required adjustment weight carefully in the centre of the sample tray.
   The flashing display disappears.
   After successful adjustment the balance automatically returns to weighing mode, „100.000 g“ is displayed. Take away adjustment weight.



6.2 Calibrate / adjust the temperature of the heating module

We recommend sometimes to check the temperature value of the device using the optional temperature calibrating set DLB-A01N. Before you do this, allow the device to cool down for at least 30 minutes after the last heating phase.

Preparation:

⇨ Turn on moisture analyzer

⇨ Install temperature calibrating set as per illustration



1.



2.



3.





⇨ Turn on moisture analyzer.

⇨ Close heating cover.

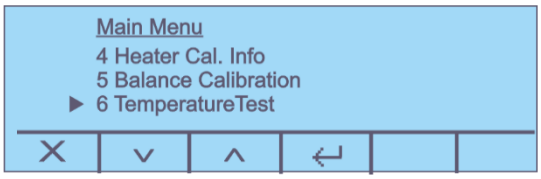
6.2.1 **Calibration of temperature value**

During temperature calibration only a check is carried out, i.e. no values are changed.

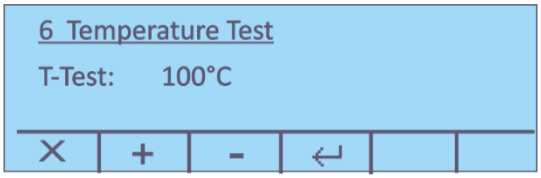
1. In the start display press the F1-key, the main menu will appear.



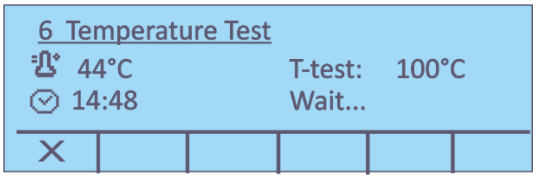
2. Press [v^] to select the menu item **<6 - Temperature Test>**



3. Acknowledge by [↵].
   Press [✔] to acknowledge the following instruction how to use a temperature calibration set DLB-A01N. The current setting is displayed



4. Select desired test temperature with [v^] and acknowledge by [↵]. The device heats up the set temperature.

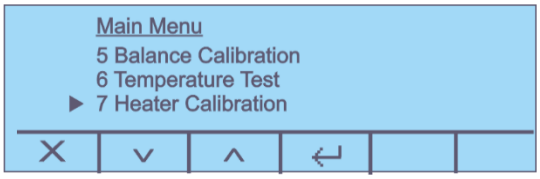


5. After 15 minutes the test is finished, an acoustic signal sounds. Compare the test temperature with the displayed temperature of the DLB-A01N. If the two values do not match, we recommend a temperature adjustment
6. Press [X] to cancel the calibration.

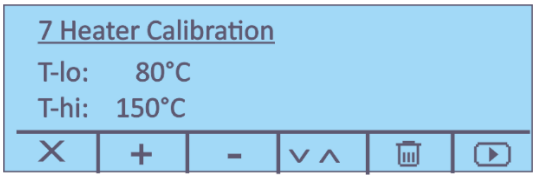
6.2.2 **Adjust temperature**

If in temperature calibration the admitted divergence is exceeded or not reached, the temperature of the instrument can be adjusted as described below.

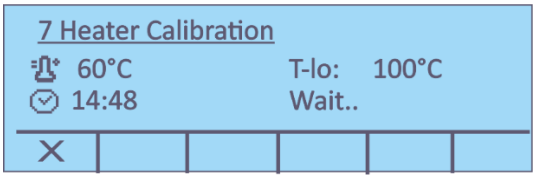
1. Select menu item **<7 – Heater Calibration>** and confirm by ↵.



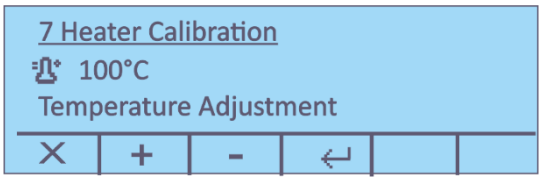
2. Confirm the inquiries <Are you sure> and the following instruction how to use a temperature calibration set by ✔.
   The current settings of the both temperature points T-lo / T-hi are displayed.



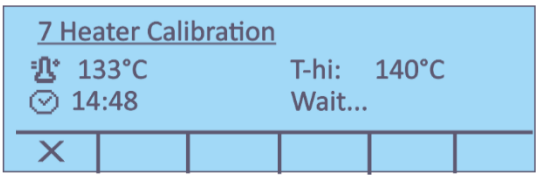
3. Press + - to select the desired test temperature and press ∨∧ to select between <T-lo> and <T-hi>. Acknowledge with ↵.
4. Press ▶, the first heating phase is started.



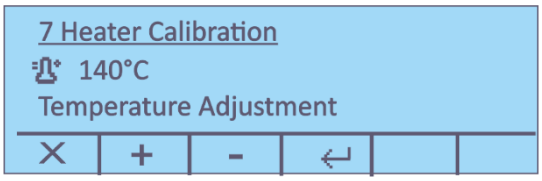
5. Temperature calibration for the first point takes 15 min. Compare the temperature displayed on the DLB-A01N with that of the moisture analyzer. If the two values do not match, correct with + -.



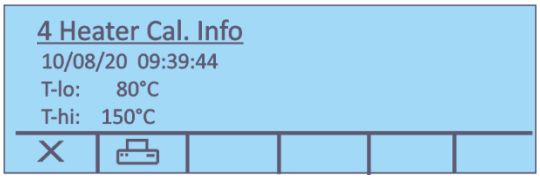
6. Confirm by ↵, the second heating phase is started.



7. Temperature calibration for the second point takes 15 min. Compare the temperature displayed on the DLB-A01N with that of the moisture analyzer.



If the two values do not match, correct with the help of + - and confirm by ↵.



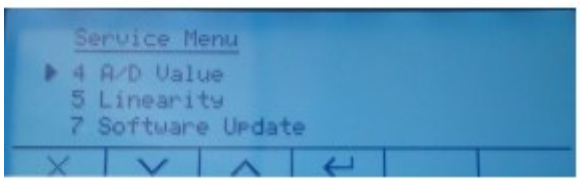
8. When an optional printer is connected, an adjustment log can be edited.
9. Press × to return into menu / start display.

6.3 Linearity Adjustment

Procedure

1. Check that the instrument is level. If necessary, adjust the feet until the bubble indicator is correctly positioned.
2. Switch on balance and after 2 hours press ON/OFF button.
3. When the display shows the weight indication ("0.0") Press sequentially buttons F6 – F3 – F3



	You will see "Service Menu" on the display, and you use the arrows to select the function "**Linearity**" Press ↵ key to confirm
	The display show on the **"Weight: 01 UP"** with plate empty wait stability and after 3 seconds press ↵ to confirm.
	When the balance show "**Weight: 02 UP**" put first weight, (according to the table weight for linearity) wait stability and after 3 seconds press ↵ to confirm.
	When the balance shows **"Weight: 03 UP"** put second weight, (table weight for linearity) wait stability and after 3 seconds press ↵ to confirm.
	When the balance show **"Weight: 04 UP"** put third weight, (table weight for linearity) wait stability and after 3 seconds press ↵ to confirm.
	When the balance and show **"Weight: 05 UP"** press ↵ and keep it pressed until the display show **"Weight: 03 DW"**
	Now remove the last weight loaded on the pan, wait stability and press CAL button.

	When the balance shows **"Weight: 02 DW"** remove the second weight loaded on the pan, wait stability and press ↵ button.
	When the balance shows **"Weight: 01 DW"** remove the first weight loaded on the pan, wait stability and press ↵ button. Now the pan is unloaded.
	The balance automatic restart. Press On/Off key and after calibrated the balance and check the linearity
	Attention: when you do linearity in "up and down mode" load incremental weights as shown in the table weights. For example load 100g then add another 100g and so on as you reach the last value, and then unload the weights in reverse order.

Table 1

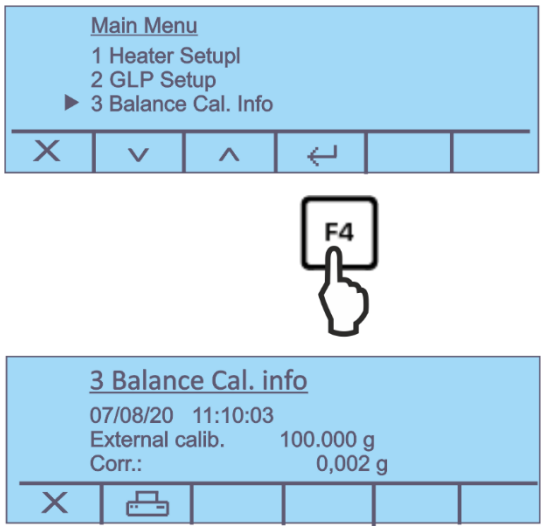
MODEL	RANGE (g)	RES. (g)	LINEARITY (g) UP	LINEARITY (g) DOWN
TDLG 160-3-A	160	0,001	0 – 50 – 100 – 150	150 – 100 – 50 – 0
TDLG 60-4-A	60	0,0001	0 – 20 – 40 – 60	60 – 40 – 20 – 0

6.4 Delete linearity and calibration values

1. Switch on balance.
2. Press sequentially buttons ON/OFF – F3 – F3
3. You will see **"Lin"** on display, press ↵ to confirm.
4. The display shows on left side the number "1". Press 🗑 key and keep it pressed until the display shows **CLEAR.**

6.5 View / print out adjustment logs

⇨ In the main menu press [V^] to select the menu item <3 Balance Cal. Info> or <4 Heater Cal. Info.> and acknowledge by [↵].

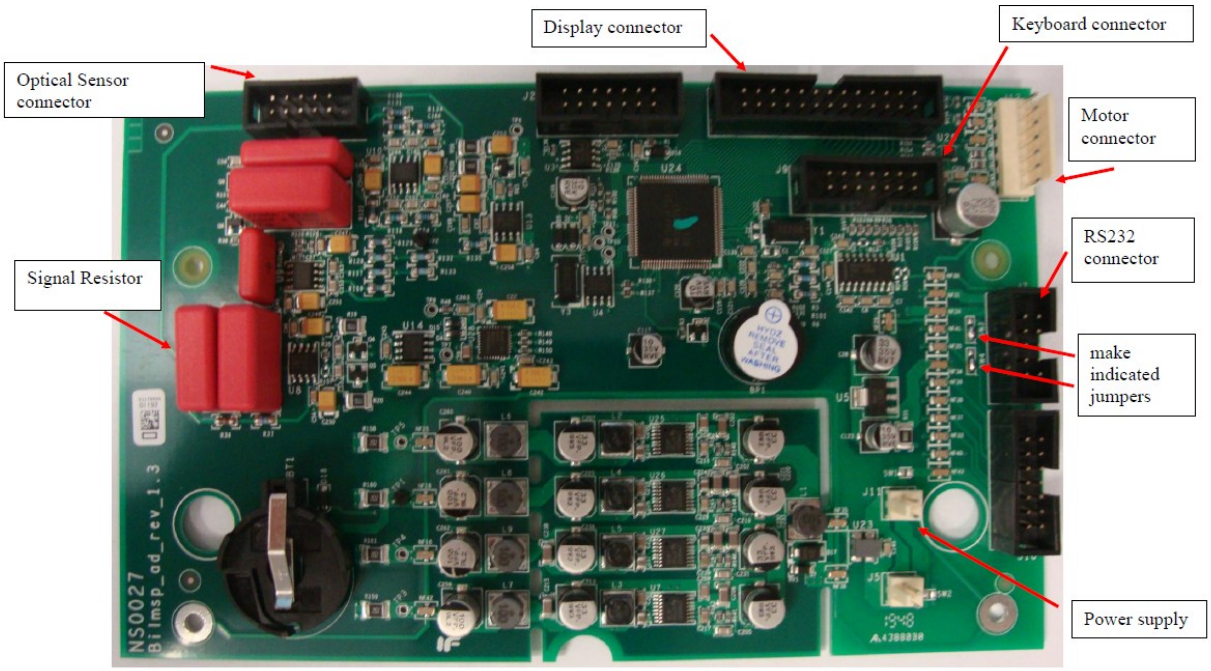


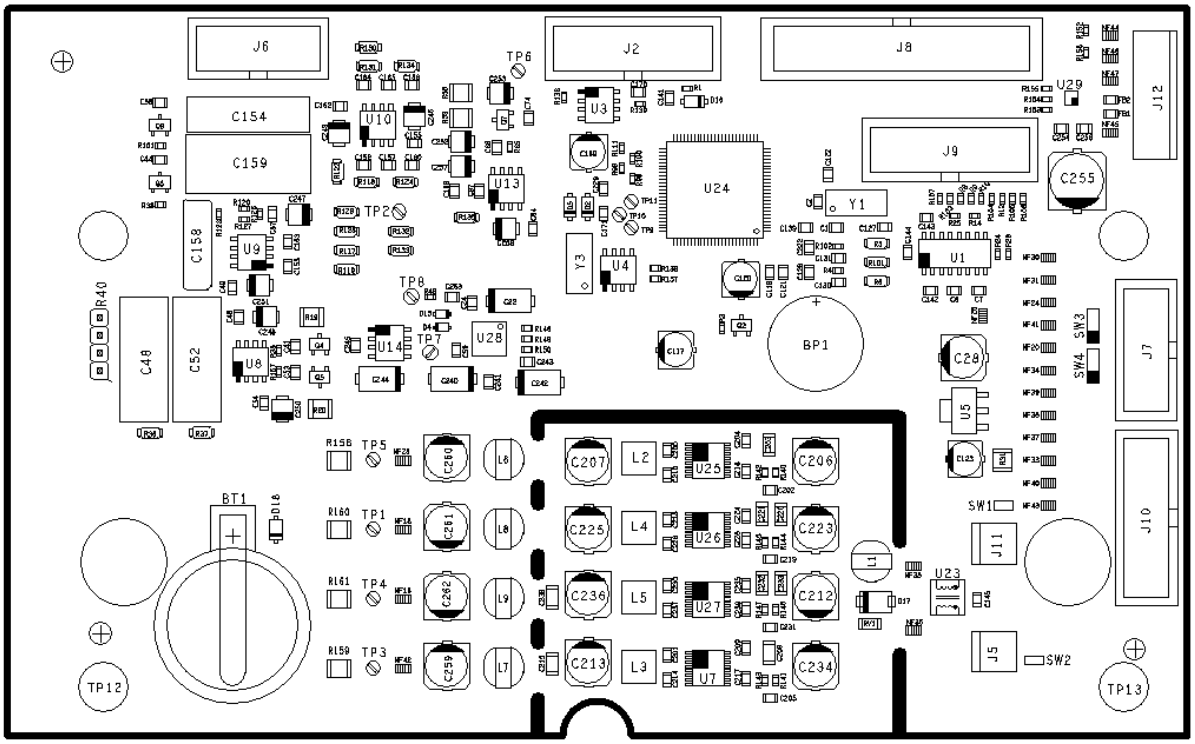
⇨ The adjustment protocol will be displayed.

⇨ When an optional printer is connected, an adjustment log can be edited by pressing [🖶].

Sample log (KERN YKB-01N) External adjustment	**Sample log (KERN YKB-01N) Temperature adjustment**
---------- 13/08/20 09:53:12 ---------- ID Waage: WIC201234 ---------- ID User: MUSTERMANN ---------- ID Projekt: KERN ---------- Justiermodus: 10/08/20 09:39:47 T-lo: 100° C T-hi: 140° C Unterschrift: ----------	---------- 13/08/20 09:53:40 ---------- ID Waage: WIC201234 ---------- ID User: MUSTERMANN ---------- ID Projekt: KERN ---------- Justiermodus: 07/08/20 11:10:11 Externe Justier. 100.000 g Korr. : 0.002 g Unterschrift: ----------

7 Component Placement on the Main Board



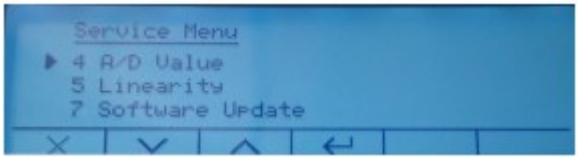


7.1 Test Point

Modality tester	Number test point		Value	If not correct value
V DC	Tp1 (-)	Tp7 (+)	+ 5 Volt DC	Check MAX 6250 (U7)
V DC	Tp1 (-)	Tp5 (+)	+ 5 Volt DC	Check LM22671 ADJ (U25)
V DC	Tp1 (-)	Tp6 (+)	+ 3,3 Volt DC	Check LM3940 (U5)
V DC	Tp2 (-)	Tp3 (+)	+ 12 Volt DC	Check LM22671-5.0 (U26)
V DC	Tp2 (-)	Tp4 (+)	- 12 Volt DC	Check LM22671-5.0 (U28)
V DC	J3 (pin1)	J3(pin2)	24 Volt DC	Check Power supply
mV DC	Tp2 (-)	Tp8 (+)	With unload plate Max -2,300 V	Check Mechanical group
mV DC	Tp2 (-)	Tp8 (+)	With maximum range on plate Max +2,300 V	Check Mechanical group

7.2 Check value A/D balance

When the display shows the weight indication ("0.0") Press sequentially buttons ON/OFF – F3 – F3



You will see "Service Menu" on the display, and you use the arrows to select the function **"A/D Value"**



Press ↵ key to confirm
The **a/d value** must be bigger than "0,05mV" without any weight loaded on the plate.

Press ✕ to Exit

8 REPLACING PARTS

8.1 Mechanical Service Procedure (0,1mg model)

1. Remove the screw from the heater chamber
2. Remove the fixed and adjustable feet from the rear side of the scale.
3. Remove the bushing screw from the mounting hole
4. Remove the four screws from the bottom cover

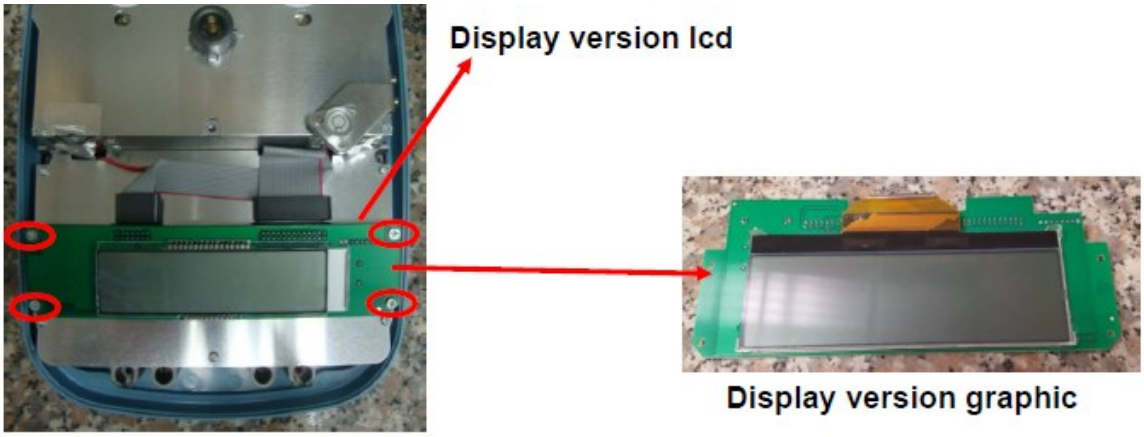




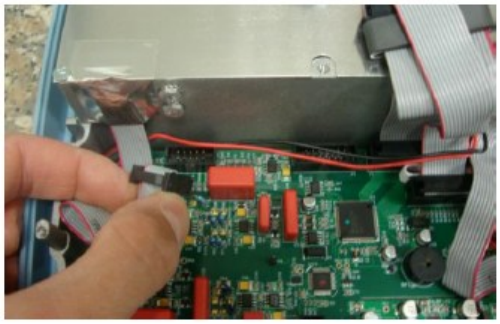




5. Remove the top cover.
6. Remove the flat cable of keyboard.
7. Remove the display (remove four screws, cable of display and keyboard) and the board shield.



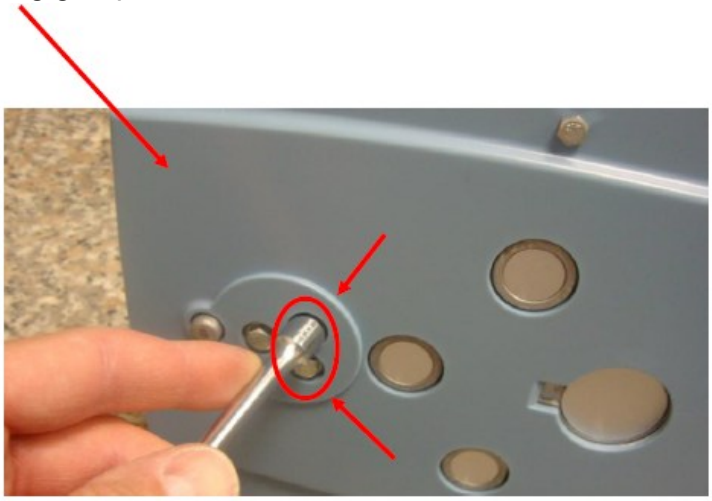
8. Remove cable of optical sensor.
9. Remove the cover shield of mechanical group



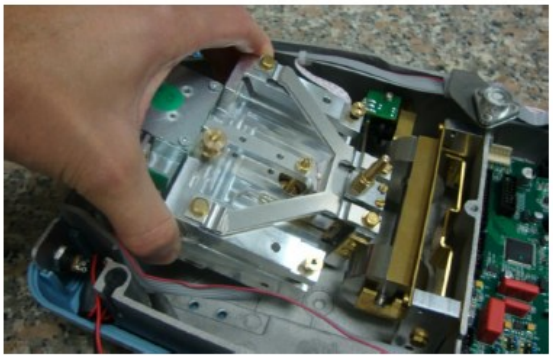


10. After removing the plate, unscrew the two screws positioned in the lower part of the base to remove the weighing group.





11. Remove the mechanical group by lifting it first at the rear.



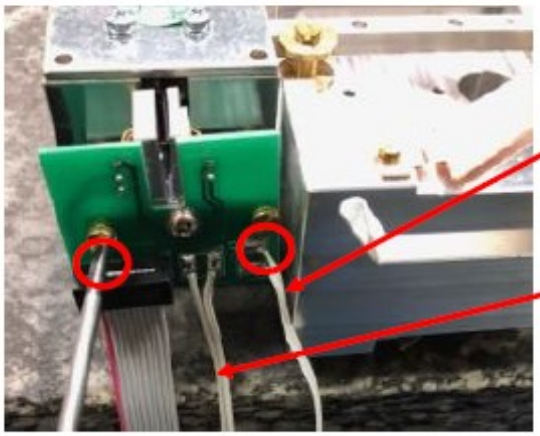
8.2 Procedure for Part Replacement (0,1mg model)



1. Turn the group down.
2. Put the support part with the two screws.



3. Turn the group up.



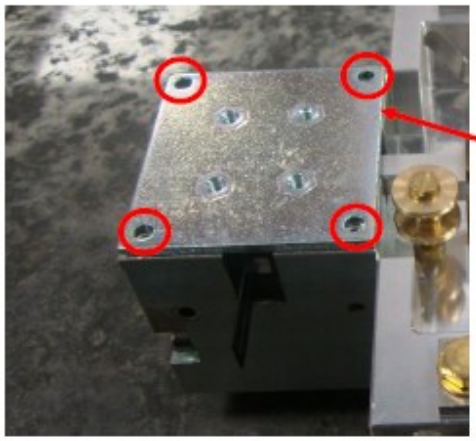
4. Unsolder the two coil wires. Mark the correct position of the wires. (Do not reverse the position).
5. Unsolder the two temperature sensor wires and tow coil wires.



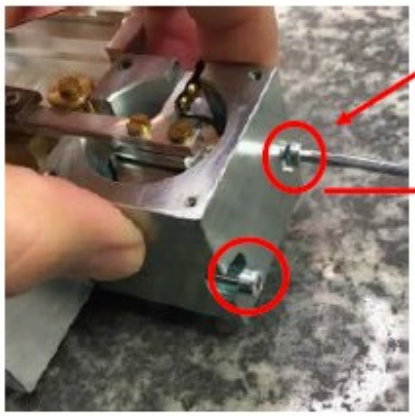
6. Now remove the optical group.



7. Insert the lever fixing jig, and lock the two fixing screws jigs for the lever

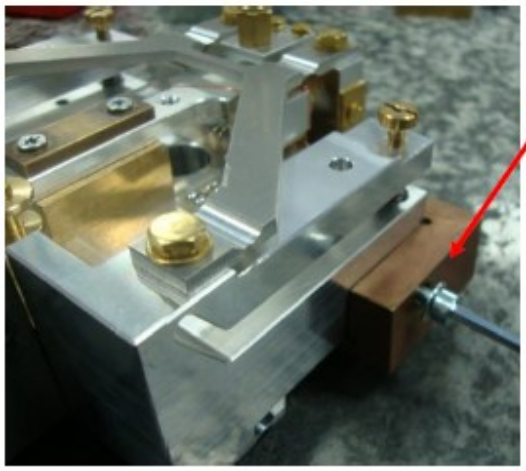


8. Remove the magnet cover screen by removing the 4 screws.



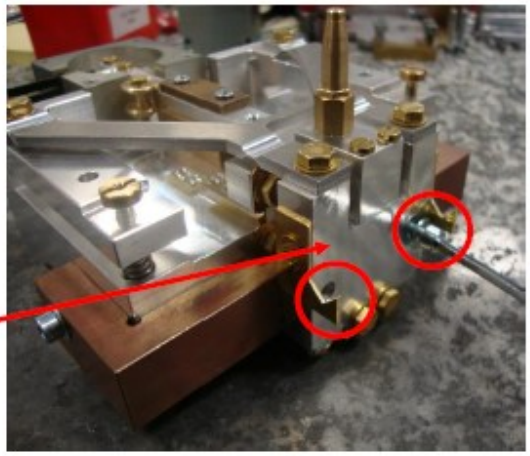
9. Now remove the magnetic assembly. Remove the two fixing screws.



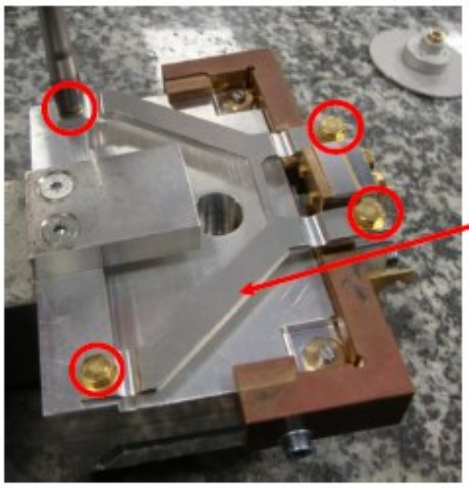


10. Position the moving pillar jig (right) and attach it with one side screw.

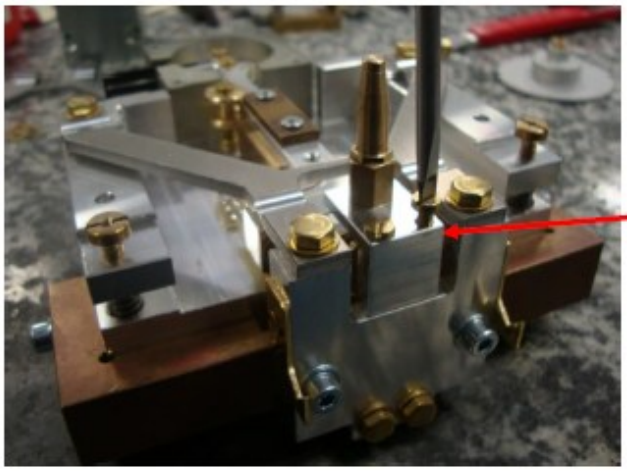
11. Position the moving pillar jig (left) and attach it with one side screw and one front screw.



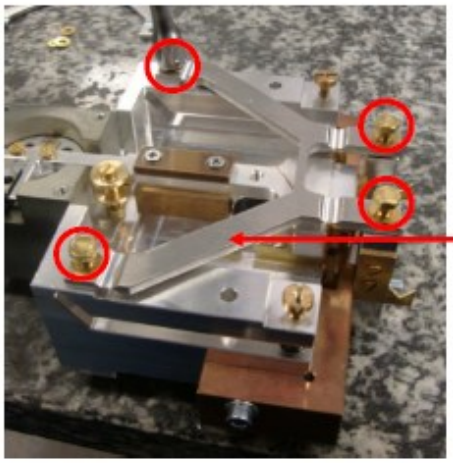
12. Attach the moving pillar to the jig with the two screws.



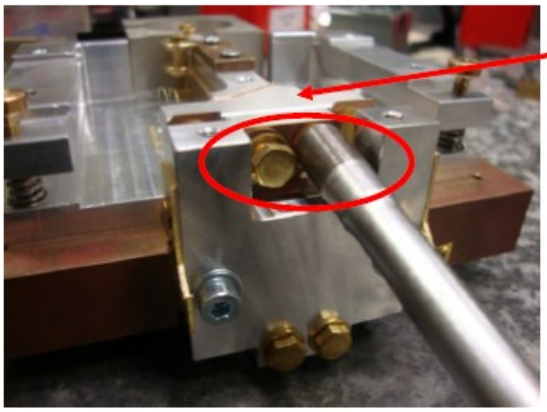
13. Turn the group down
14. Remove the four screws of bottom parallelogram guide
15. Remove parallelogram, handling it carefully



16. Turn the group up
17. Remove the two screws in order to remove the cone support.



18. Remove the four screws of bottom parallelogram guide
19. Remove parallelogram, handling it carefully



20. Remove two screws of vertical spring and the spacer positioned behind in the lower part.

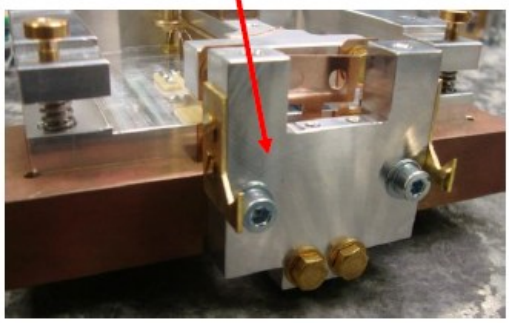
21. Remove vertical spring.



22. Remove two screws of moving pillar.

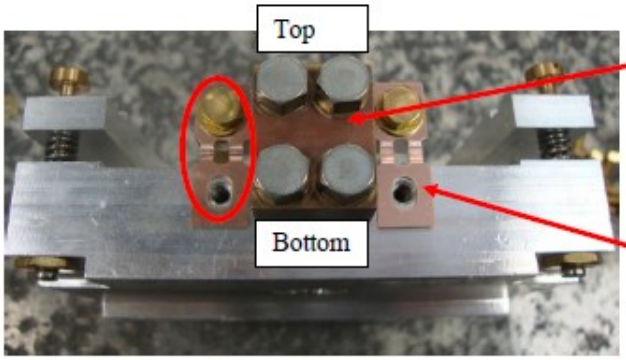
23. Remove moving pillar.







24. Remove jigs for moving pillar.



25. Put the jig on the lever
26. Insert two screws in to monobloc and two in to lever
27. Fix the screws: first the bottom ones then the top ones
28. Remove n°4 screws that fix the fulcrum flexures.

Cod. NM0054
FULCRUM SPRING BERYLLIUM COPPER 0,5/0,07mm.

29. Replace damaged spring and secure with the 4 screws



30. Clean the magnet with air
31. Take a taper and precision tweezer
32. Put taper on the top of precision tweezer so that adhesive side is outside





33. Clean deeply the magnet turning precision tweezer around of magnet

Assemble the mechanical group, then reassemble the weighing unit by reversing the disassembly steps.



1. Put the magnet to the monobloc and fixed with n°2 screws

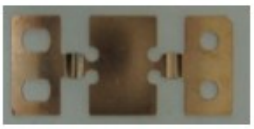


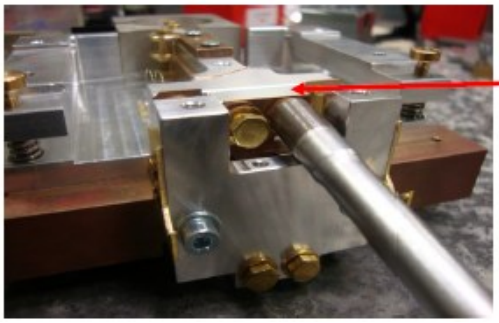
2. Position the moving pillar jig (right) and attach it with one side screw.
3. Position the moving pillar jig (left) and attach it with one side screw.



4. Attach the moving pillar with two screws
5. Position the new vertical spring if the removed one is damaged and attach with the two screws.

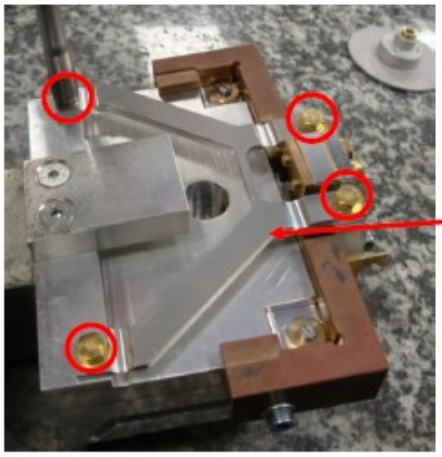
Cod. NM0056
VERTICAL SPRING BERYLLIUM
COPPER 0,5/0,09mm WIDTH
COIN. 4,5mm DIS. 02.08.0687/0





6. Position the spacer behind the vertical spring in the top part and attach the vertical spring with toe screws.

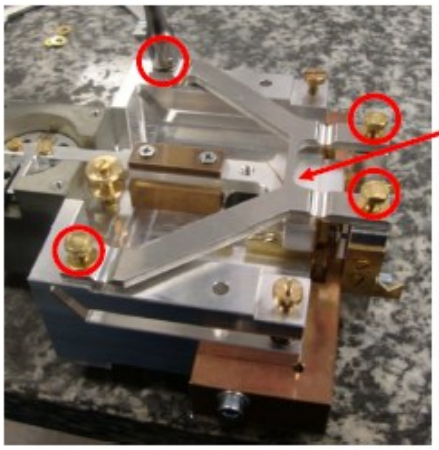




7. Turn the group down

8. Position the bottom parallelogram guide (replace it if necessary if the disassembled one is damaged) and fix it with four screws.

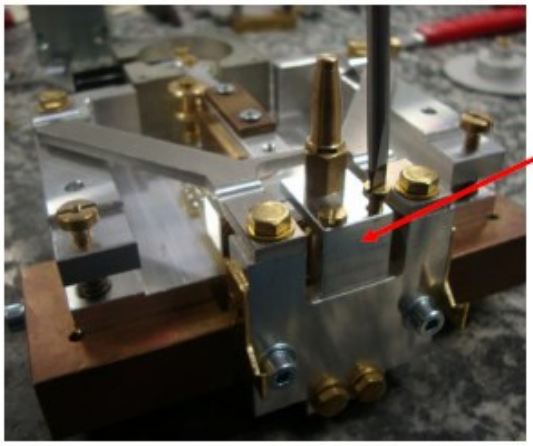
Cod. NM0283 PARALLEL GUIDE 0.10 FOR SMART BLOCK 108 DIS.02.06.0747/0



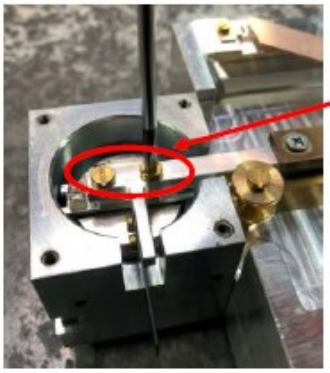
9. Turn the group up

10. Position the top parallelogram guide (replace it if necessary if the disassembled one is damaged), and attach it with four screws

Cod. NM0283 PARALLEL GUIDE 0.10 FOR SMART BLOCK 108 DIS.02.06.0747/0

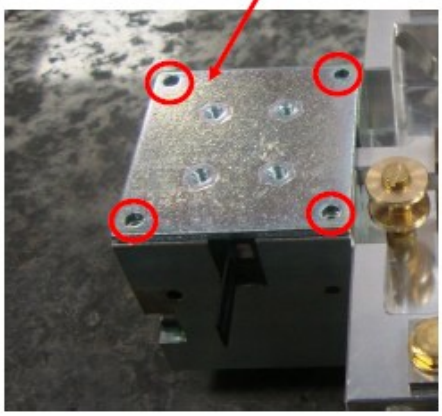


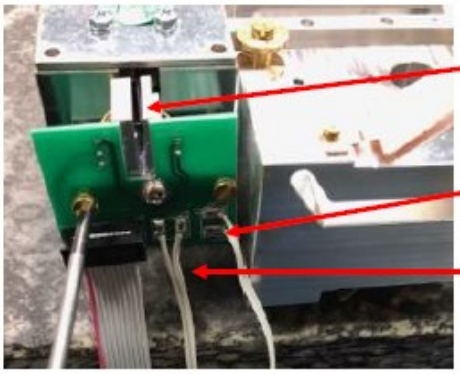
11. Position the cone support and attach it with the two screws.



12. Check that the coil is perfectly positioned in the center and, if necessary, correct the position by loosening the two screws indicated in the figure.

13. Now place the magnet cover and attach it with the four screws.

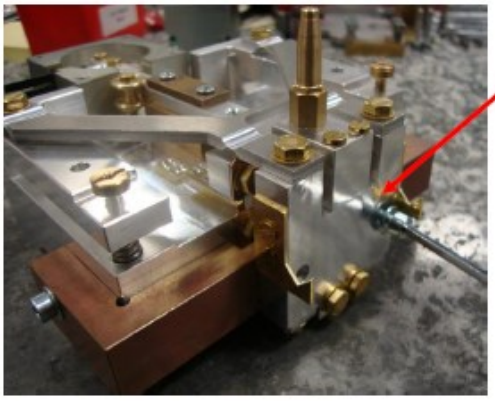




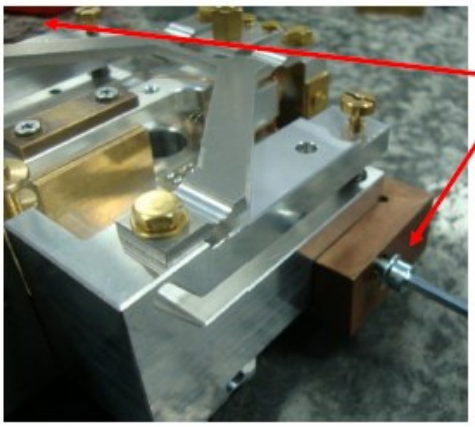
14. Attach now the optical group. **Place the flag in the center of the slot**

15. Solder the two coil wires. (Do not reverse the position).

16. Solder the two temperature sensor wires.

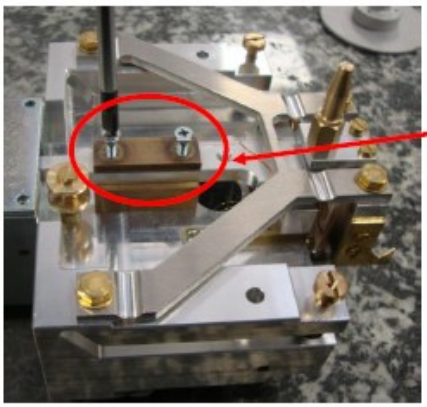


17. Remove the two screws that secure the moving pillar to the jig.

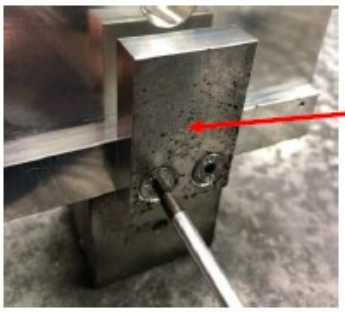


18. Remove now the moving pillar jig (left and right)





19. Remove the jig of lever.

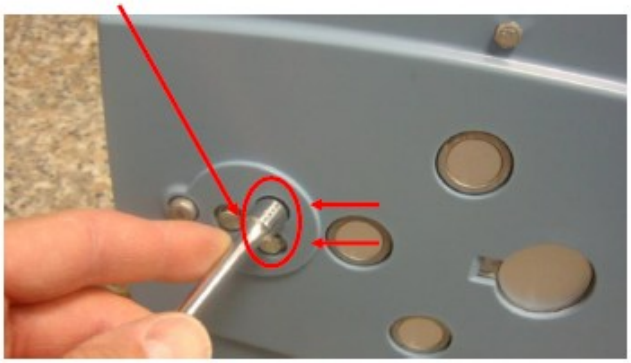


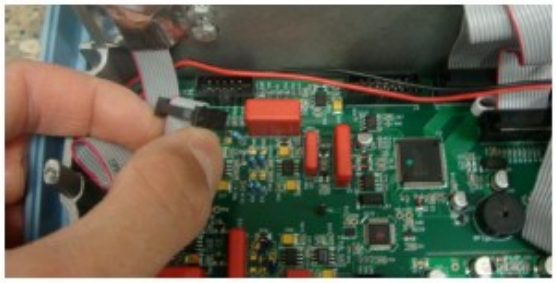
20. Remove the unit support with the two screws.

23. Insert the mechanical unit into the base.



24. Attach the group with the two screws to the base.





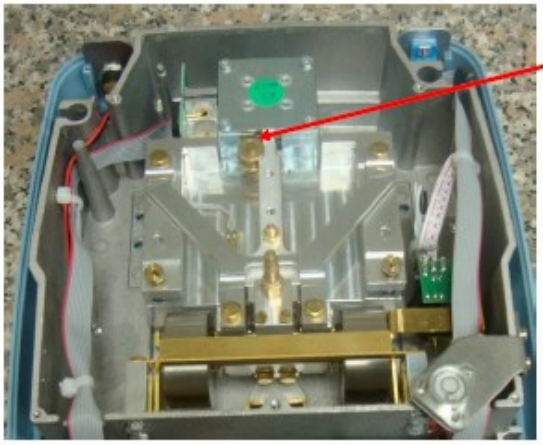
25. Connect the optical group cable.



26. Place the card cover plate and attach it with the five screws.

27. Connect the display and secure it with the four screws.



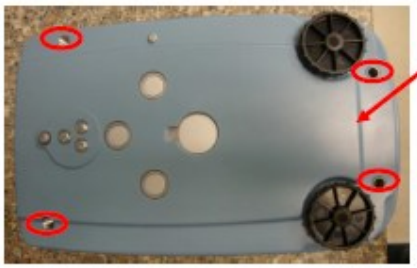


28. .Power up the scale and check that the lever is positioned in the center of the end stroke. If the lever is not centered, screw or unscrew the end stroke until it is positioned in the center.



29. Now position the group cover plate and attach it with the four screws. power from the scale and position the group cover screen and attach it with 4 screws.

30. Place the top cover of the scale.



31. Insert the four closing screws.

32. Inser the bush from the hole.





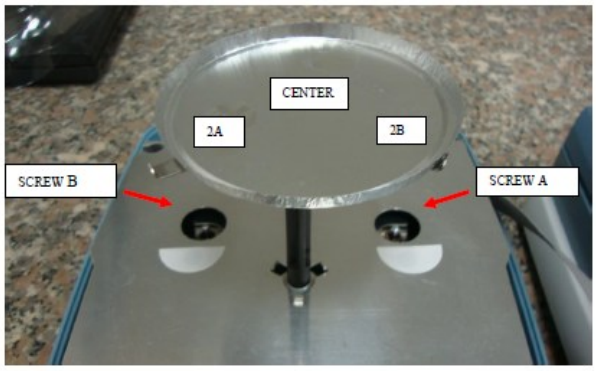
33. Insert the adjustable foot on the left and the fixed foot on the right

34. Install the heater

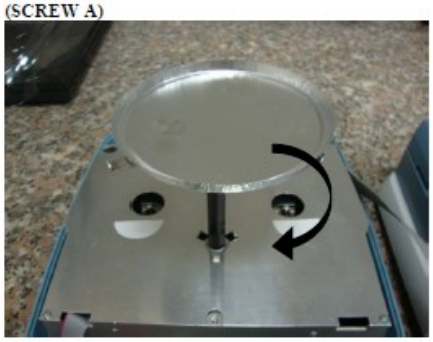
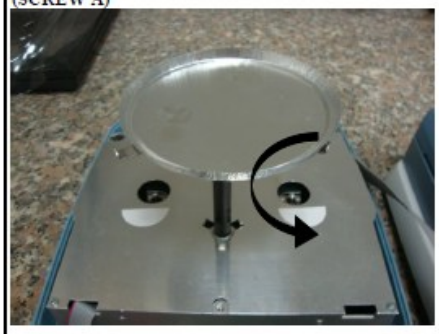
8.3 Corner Adjustment (0,1mg model)

For Corner Adjustment





1. Remove the cover with heater of balance (To see chapter 8.1).
2. Leave the oven/balance connection cable and the connection cables to the display installed. Switch on the scale
3. Put weight to check in the center of the plate and press tare.
4. Move the weight in the point 2a, read and write down the value.
5. Move the weigth in the center and press tare.
6. Move the weight in the point 2b, read and write down the value.
7. Take the rasp tool and scratch as illustrated.

IF THE CORNER 2A IS POSITIVE(+) TURN THE TOOL CLOCKWISE (SCREW A) 	IF THE CORNER 2A IS NEGATIVE(-) TURN THE TOOL ANTICLOCKWISE (SCREW A) 
IF THE CORNER 2B IS POSITIVE(+) TURN THE TOOL CLOCKWISE (SCREW B) 	IF THE CORNER 2B IS NEGATIVE(-) TURN THE TOOL ANTICLOCKWISE (SCREW B) 

Attention: if the corner opposite can not corrected, check if the mechanical group is ok..

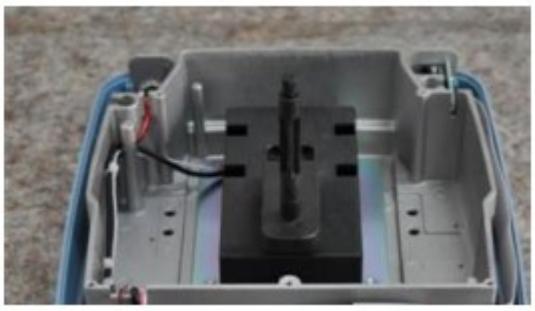
8.4 Load Cell Replacement (1mg model)

1. Remove the cover incl. heather of balance. Remove the fixed and adjustable foot on the back of the scale. Remover the bush from the hole. Remove four screws on the





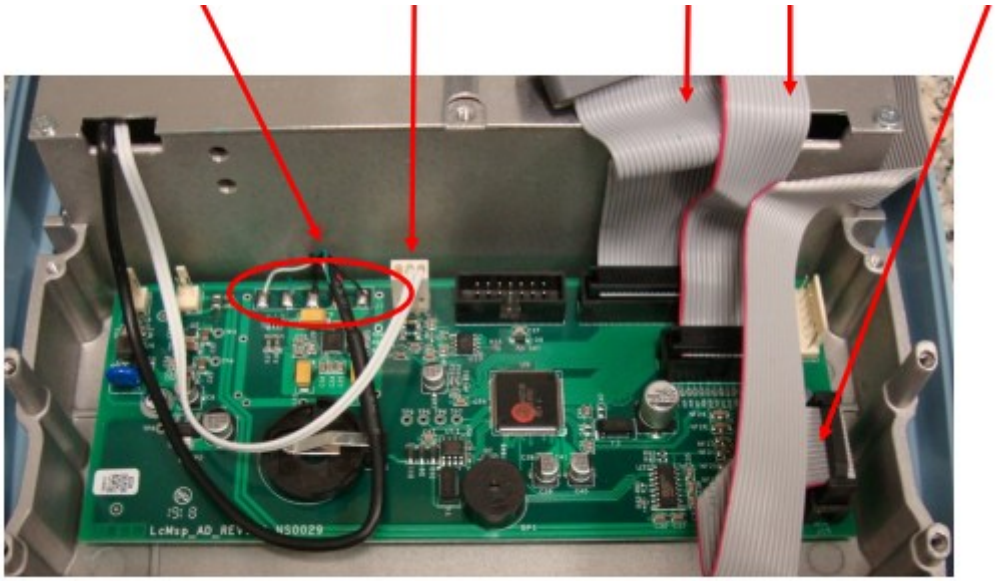

2. Remove the load cell shield

3. Remove the display and the main board shield

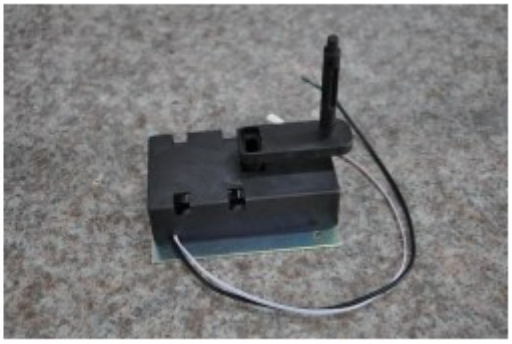



4. Unsolder load cell, disconnect temperature sensor, display cable and heater cable

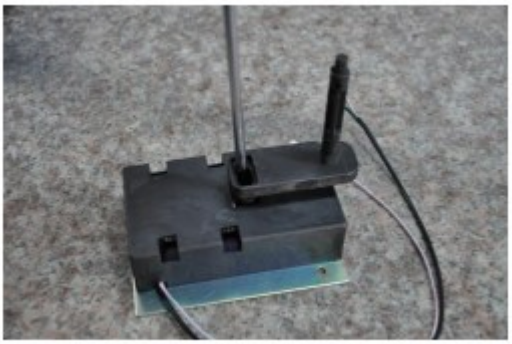


5. Remove load cell support (remove the screws on the bottom)



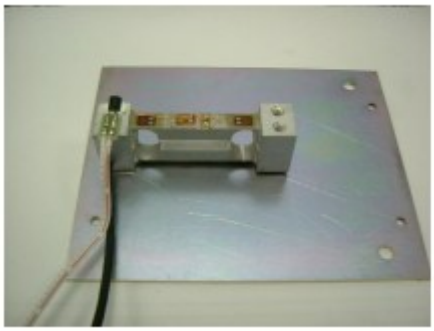


6. Remove the cone support
7. Remove plastic cover for load cell





8. Remove load cell from the support





9. Remove temperature sensor and board from the load cell

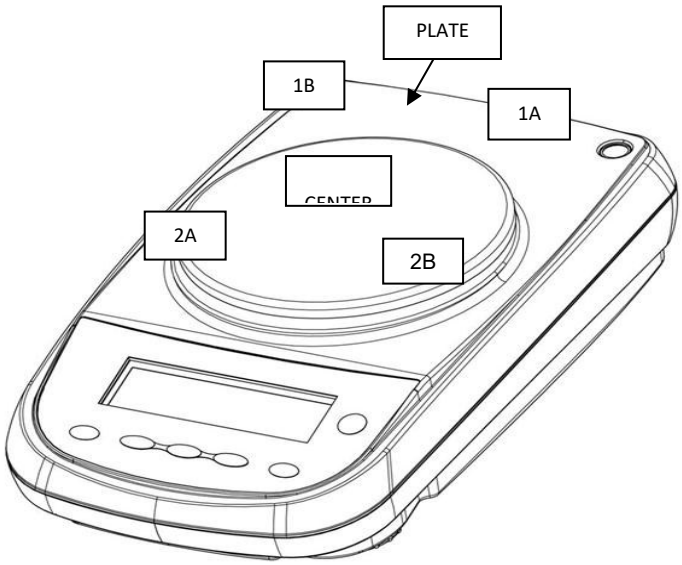


NOW YOU CAN ASSEMBLE THE NEW LOAD CELL:

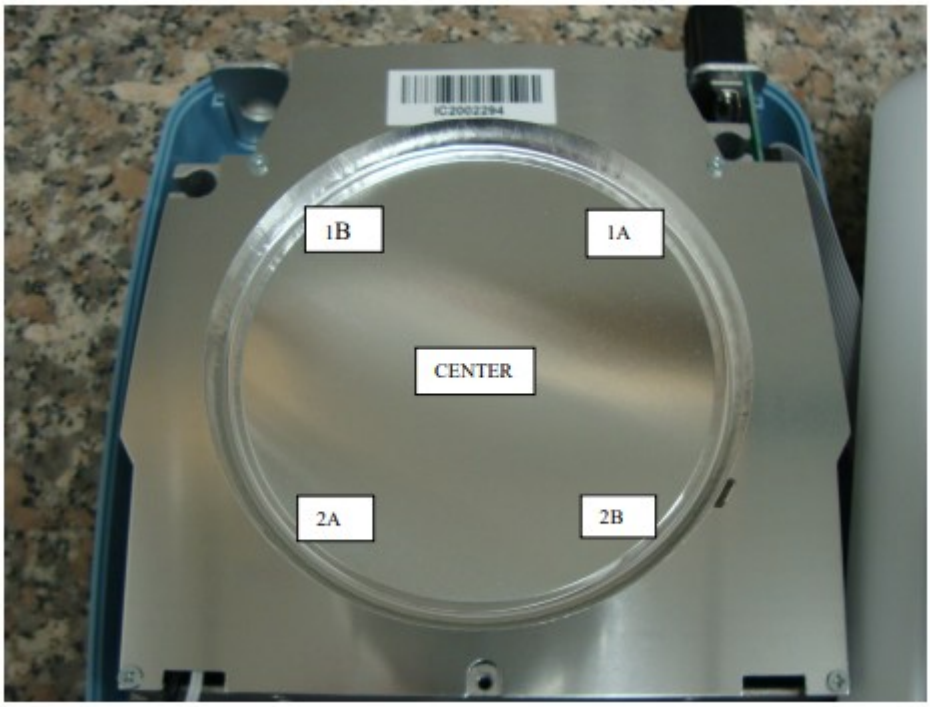
10. Fix temperature sensor and board to the load cell
11. Place cone support
12. Place the load cell to the support.
13. Place plastic cover for load cell.
14. Place load cell's support to the base of balance.
15. Connect cable of sensor temperature, display, keyboard, heater and sold load cell's cable.
16. Place the board shield and display.
17. Check and regulate corner load error and linearity.
18. Place the load cell shield.
19. Place the cover of balance.
20. Insert the bush from the rear hole
21. Insert the rear fixed and adjustable foot.

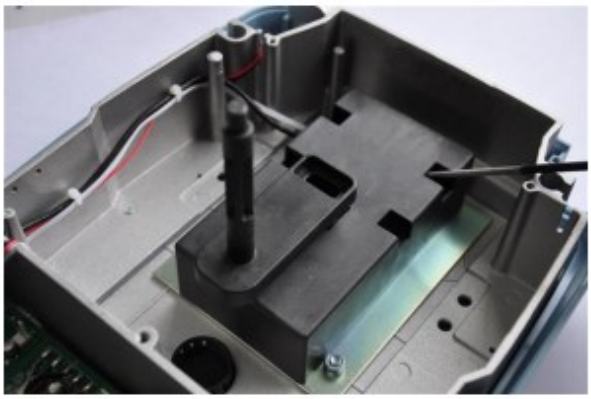
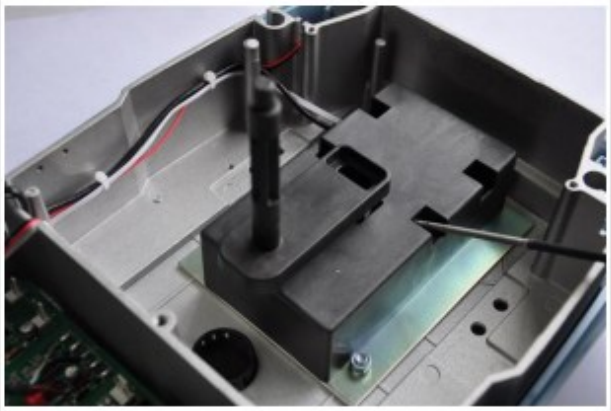
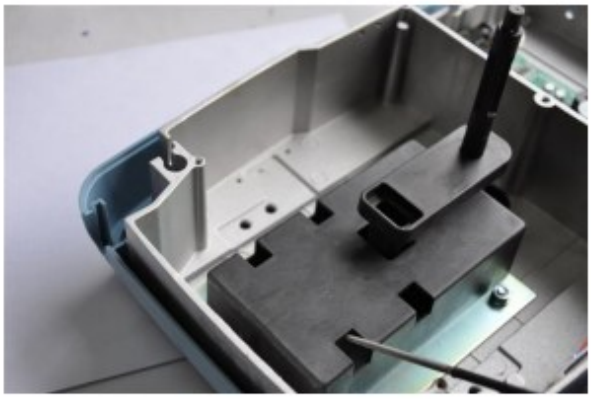
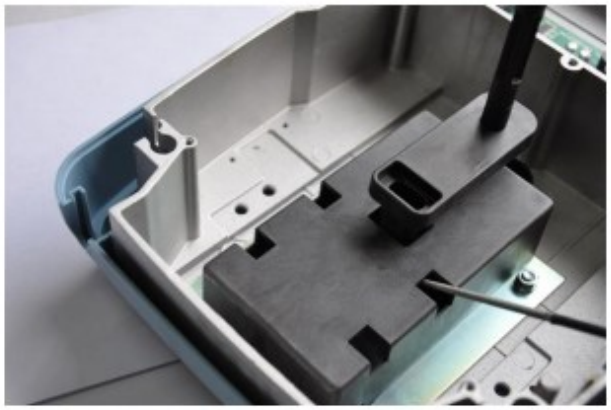
8.5 Corner Adjustment (1mg model)

Top view

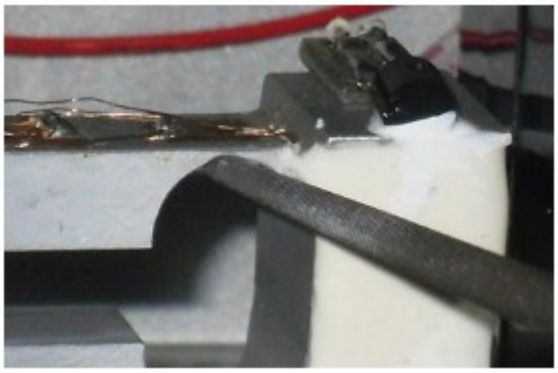


8. Remove the cover with heater of balance (To see page 16).
9. Now remove the cover of load cell
10. Put weight to check in the center of the plate, and press tare.
11. Move the weight in the point 2a, read and write down the value.
12. Move the weigth in the center and press tare.
13. Move the weight in the point 2b, read and write down the value.
14. Take the rasp tool and scratch as illustrated.



IF 2A POSITIVE (+) THEN SCRATCH SIDE 1A (Rear Right of load cell) 	**IF 2A NEGATIVE (-) THEN SCRATCH SIDE 2A** (Front Right of load cell) 
IF 2B POSITIVE (+) THEN SCRATCH SIDE 1B (Rear Left of load cell) 	**IF 2B NEGATIVE (-) THEN SCRATCH SIDE 2B** (Front Left of load cell) 

Attention: scratch only the upper side.



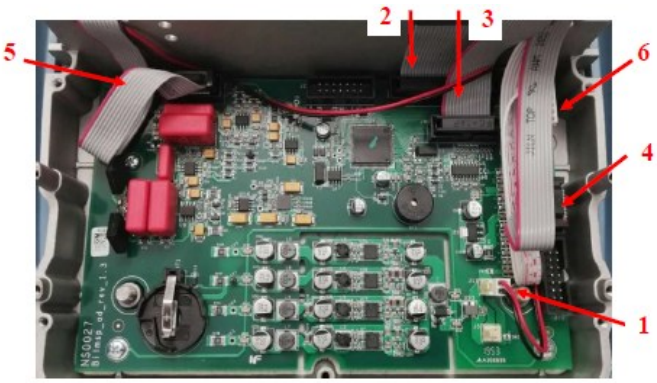
Attention:if the corner 1A or 1B can not corrected, check if the load cell is ok.

8.6 Main board replacement

When replacing the motherboard, when ordering it is necessary to provide the data shown on the bar code label inside the instrument.



1. Remove the cover of balance, display and cover shield of board.(to see chapter 8).
2. Disconnect cables of power(1), display(2), keyboard(3), RS232(4), mechanical group(5) and motor(6) if present.



3. Remove main board. (Remove four screws)



Now you can install the new main board.

1. Attach the mainboard.
2. Connect cables of power(1), display(2), keyboard(3), RS232(4), mechanical group(5) and motor(6) if present.
3. Attach cover shield of board and display
4. Attach the cover of balance.
5. Check the power supplies and the A / d value are correct.
6. Check and if necessary, regulate linearity and calibration.

8.7 Replacement of Temperature Sensor Heater

1. Remove heater from the cover of balance. (remove the screws on the top)

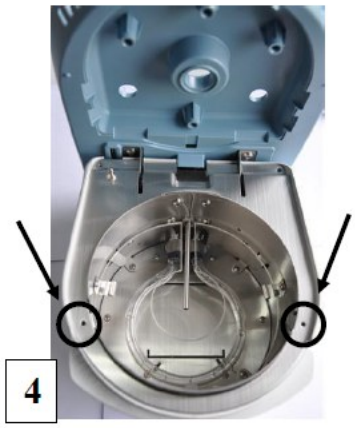




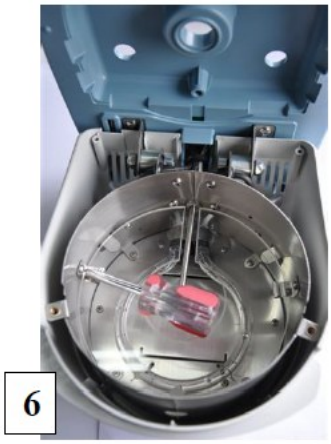
2. Unsolder temperature sensor cable



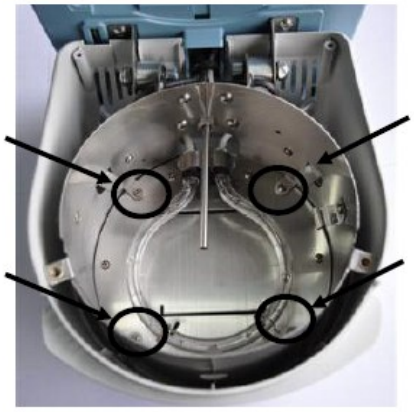
3. Put the heater upside down
4. Remove 2 screws and 2 towers to keep the top metal cover.
5. Remove top metal cover of the heater.
6. Remove the screw fixing the spring lock glass.





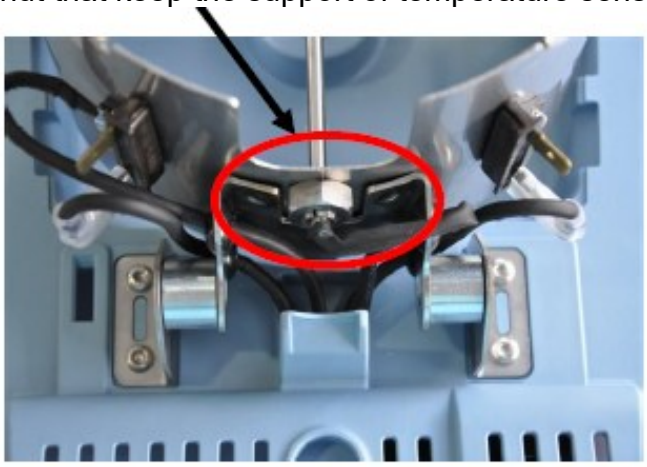


7. Remove 4 screws that keep the plastic cover of heater and remove the cover





8. Remove the nut that keep the support of temperature sensor



9. Remove the temperature sensor. Carefully guide the wire through the opening where the sensor was previously installed.

10. Insert the new temperature sensor into the designated support and secure it with the retaining nut.

The heater can now be reassembled:

11. Position the plastic cover of the heater and fasten it with the four screws.

12. Install the metal top cover and secure it with the two rear screws and the two front spacer posts (which function as the mechanical stop limit of the heater).

13. Insert the glass and secure it using the screw and the spring retainer.

14. Position the heater on the balance.

15. Fasten the heater using the three screws inserted into their respective spacers. Finally, install and tighten the front screw without a spacer.

8.8 Replacement of the Heater Main Board

1.Remove the heater from the cover of balance. Remove the screws on the top





2. Reverse the heater
3. Unsolder temperature sensor cable

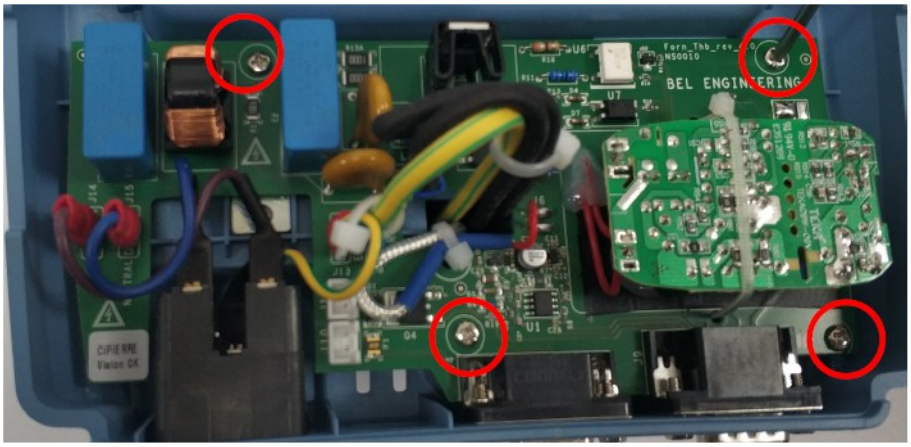


4. Remove form their connectors the cable of the lamp and the cable of power supply (230V or 110V)



5.Remove the 4 screws fixing the main board

6.Remove the main board of heater



Now proceed to the change of main board:

7. Position the new main board and attach it with the 4 screws.

8. Solder the cable of the temperature sensor.

9. Insert the cables of power supply 230v and of the lamp.

10. Attach the heater with the 3 screws inserted in their own spacers, and at the end the front screw without spacer.

8.9 Replacing the Graphic Display

1. Remove the screw on the top
2. Remove the fixed and adjustable foot on the back of the scale.
3. Remove the bush from the hole
4. Remove four screws on the bottom).









5. Remove the four screws that secure the display the four screws to place display.
6. Remove keyboard cable and display cable



Now you can assemble the new display.

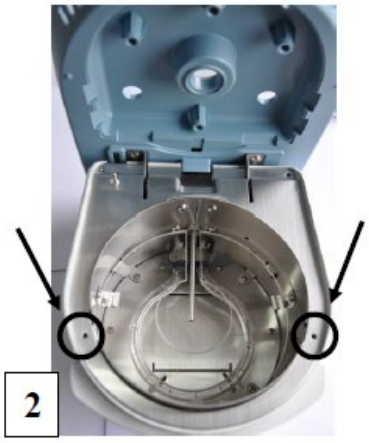
7. Place the cover of balance.
8. Insert the bushing into the rear hole
9. Install the rear fixed foot and the adjustable foot

8.10 Replacing the lamp heater

1. Remove heater from the cover of balance. Remove the screws on the top
2. Remove 2 screws and 2 towers fixed to metal top cover of heater.
3. Remove close metal top case heater
4. Remove the screw fixing the spring lock glass.



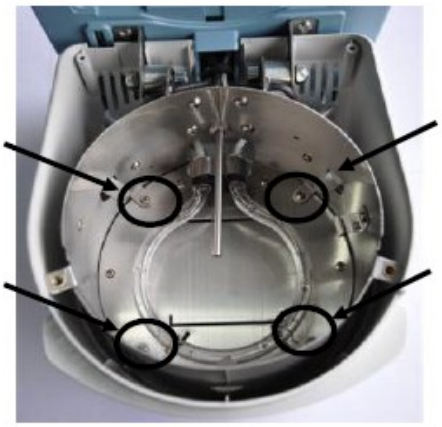






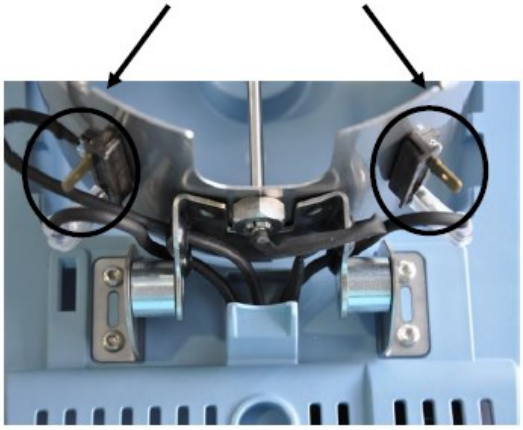


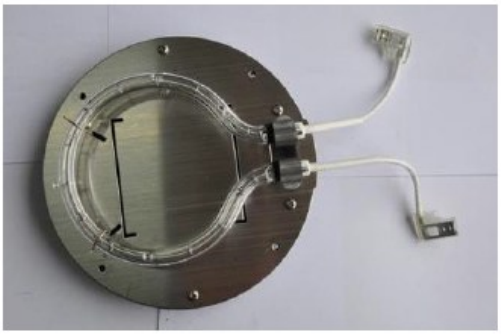
5. Remove the 4 screws that keep the plastic cover of heater and remove the cover.





6. Disconnect wire of lamp from thermal fuse. (if you need change the thermal fuse remove now and change.)
7. Remove the lamp sub-group (lamp+support)





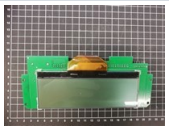
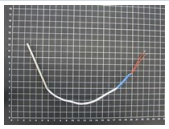
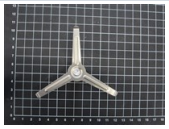
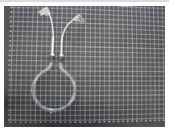
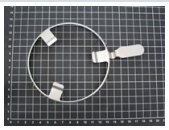
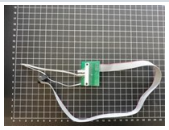
8. Remove the lamp.



Now you can assemble the new lamp:

1. Insert the lamp to its support.
2. Position this sub-group (lamp+support) and connect the wire from thermal fuse.
3. Position and attach it with 4 screws to the plastic cover heater.
4. Insert the glass and with screw fixed spring lock glass.
5. Insert the metal top case of heater and attach it with 2 screws and 2 towers.
6. Attach the complete heater group to the top cover of balance with 4 screws.

9 SPARE PART LIST

Article no.	Description	Image	Discount (EUR)	Limitations
822-903	Power cord (UK) Input:			
ALJ-A01	Protective working cover for KERN ALJ			
RALJG-2001	Displayboard for TALJG-/TALSG-/TDLG-/TPLJG-/TPLSG-A Graphic Displayboard for PLJ-G/ALJ-G			
RDLB-2002	Temperature sensor for DLB 160-3A			
RDLB-2003	thermal fuse for DLB 160-3A			
RDLB-2006	main board THB REV4.00 heater for DLB			
RDLB-5002	cable connection balance/heater for DLB 15 pin			
RDLB-6001	pan supporter for DLB			
RDLB-8001	protection glas heater for DLB 160-3A			
RDLB-9001	Halogen lamp 230V for DLB			
RDLB-9002	Extractor plate for DLB 160-3A			
RTALSG-2002	Board, position sensor for TALJG-A, TDLG 60-4-A			
RTDLG-1001	Drawstring			

RTDLG-1002	Hängelager für TDLG 60-4-A			

Spare parts TDLG 60-4-A

Article no.	Description	Image	Discount (EUR)	Limitations
RTDLG-1003	Handlebar für TDLG 60-4-A			
RTDLG-2001	Main board for TDLG 60-4-A			
RTDLG-4002	Display Ooverlay für TDLG 60-4-A			
RTDLG-5001	Board RS232 für TDLG 60-4-A			
RTDLG-8002	Level Indicator für TDLG 60-4-A			
RTDLG-9001	Underplate für TDLG 60-4-A			
RTDLG-9002	Holder for sample plates für TDLG 60-4-A			
YKK-01	Cold-device cable CH			