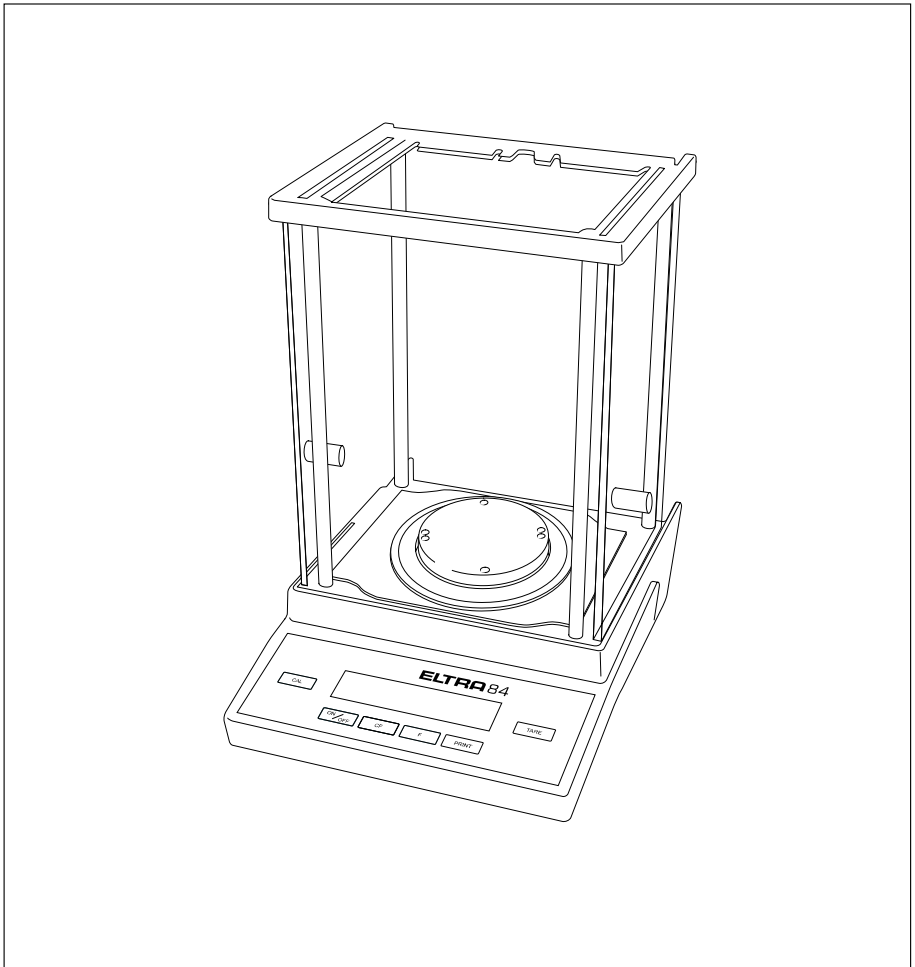


Operating Instructions

ELTRA 84

Electronic Analytical Balances



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Warnings and Safety Precautions

Safety

- To prevent damage to the equipment, please read these operating instructions carefully before using your balance.
- ⚠ Do not use this balance in a hazardous area/location.
- ⚠ Make absolutely sure to unplug the balance from AC power before you connect or disconnect a peripheral device.
- ⚠ Exposure to excessive electromagnetic disturbance can cause the readout value to change. Once the disturbance has ceased, the instrument can be used again in accordance with its intended use.

Setting up the Balance

- ⚠ Warning when using pre-wired RS-232 connecting cables: The pin assignments in RS-232 cables purchased from other manufacturers may be incompatible with ELTRA balances. Be sure to check the pin assignment against the chart on page 18 before connecting the cable, and disconnect any lines that do not match.
- Connect only ELTRA accessories and options, as these are optimally designed for use with your ELTRA balance.
Do not try to solve any problems on your own. The operator shall be responsible for any modifications to ELTRA equipment and for any connections of cables or equipment not supplied by ELTRA and must check and, if necessary, correct these modifications and connections. On request, ELTRA will provide information on the minimum operating specifications (in accordance with the standards for defined immunity to interference).
- Do not open the balance housing.
If the seal is broken, this will result in forfeiture of all claims under the manufacturer's warranty.

Getting Started

Storage and Shipping Conditions

- Do not expose the balance to extreme temperatures, blows, shocks, vibration or moisture.

Unpacking the Balance

- After unpacking the balance, check it immediately for any visible damage
- If you see any sign of damage, proceed as directed in the chapter entitled “Care and Maintenance,” under the section on “Safety Inspection”
- Save the box and all parts of the packaging until you have successfully installed your balance in case you need to return it. Before packing your balance, unplug all connected cables to prevent damage.

Equipment Supplied

- Balance
- Weighing pan
- Pan support
- AC adapter, plug type
- Shield ring
- Shield plate
- Dust cover
- 50-g calibration weight (F1)

Installation Instructions

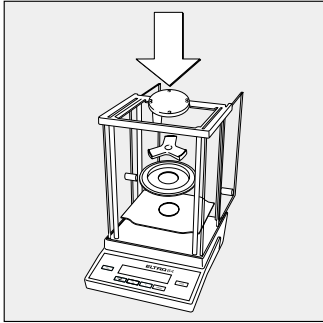
When choosing a location to set up your balance, observe the following:

- Avoid placing the balance in close proximity to a heater or otherwise exposing the balance to heat or direct sunlight
- Protect the balance from drafts that come from open windows or doors
- Avoid exposing the balance to extreme vibrations during weighing
- Do not expose the balance to extreme moisture over long periods

Conditioning the Balance

Moisture in the air can condense on the surfaces of a cold balance whenever it is brought into a substantially warmer place.

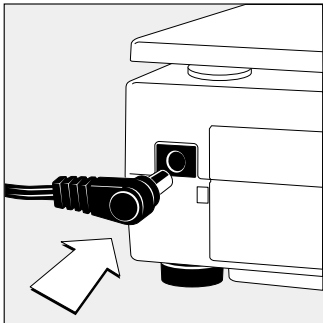
If you transfer the balance to a warmer area, make sure to condition it for about 2 hours at room temperature, leaving it unplugged from AC power.



Setting up the Balance

Balances with a draft shield chamber with sliding doors

- Place the components listed below inside the chamber in the order given:
 - Shield plate
 - Shield ring
 - Pan support
 - Weighing pan



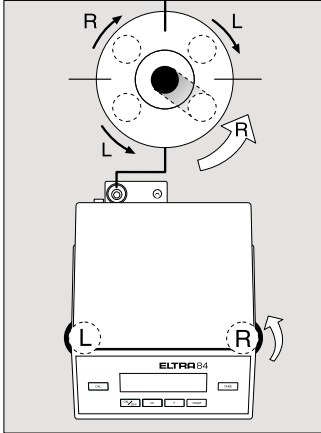
Connecting the Balance to AC Power/ Safety Precautions

Use only original AC adapters:

- for Europe: 6971948
- Insert the right-angle plug into the jack
- Plug AC adapter into electrical outlet

The AC adapter rated to Class 2 can be plugged into any wall outlet without requiring any additional safety precautions. The ground or earth terminal is connected to the balance housing, which can be additionally grounded, if required. The data interface is also electrically connected to the balance housing (ground).

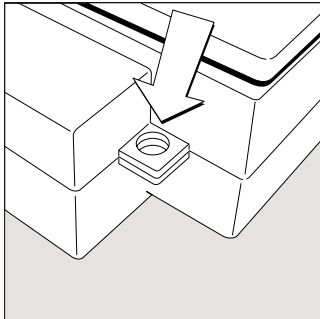
The ground terminal is connected to the balance housing, which can be additionally grounded for operation.



Leveling the Balance

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

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



Anti-theft Locking Device

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

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

Operating the Balance

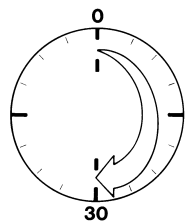
Basic Weighing Function

Preparation

- Turn on the balance: Press [ON/OFF]
- To change configurations: See the chapter entitled "Configuring the Balance"
- To tare the balance: Press [TARE]

Additional Functions:

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



Warmup Time

To ensure accurate results, the balance must warm up for 30 minutes before operation. Only after this time will the balance have reached the required operating temperature.

Example

Basic weighing

Step	Key (or instruction)	Display/Printout
1. Turn on the balance	[ON/OFF]	
Self-test is performed		
2. Place container on balance (here: 52.0 g)		+ 52.0 g
3. Tare the balance	[TARE]	+ 0.0 g
4. Place sample in container on balance (here: 150.2 g)		+ 150.2 g

Calibration/Adjustment

Available Features

Calibration/adjustment can only be performed when

- there is no load on the balance,
- the balance is tared,
- the internal signal is stable.

If these conditions are not met, an error message is displayed. Otherwise, the weight required for calibration/adjustment is displayed.

You can use the test weight provided for calibration/adjustment; however, we recommend using a weight of a higher accuracy class as listed below.


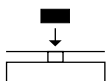
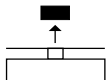
Weight Supplied/Recommended Weight:

Balance model	ELTRA 84
Test weight provided	50 g
Accuracy class/tolerance	F1/±0.3 mg
Recommended calibration weight	50 g
Accuracy class/tolerance	E2/±0.1 mg

You can use either of the following weight units to calibrate/adjust:
g, lb (menu code 1.4.x)

You can block calibration/adjustment of the balance (menu code 1.5.3)

Example

Step	Key (or instruction)	Display/Printout
1. Tare the balance		0.0 g
2. Begin calibration Calibration weight is displayed without weight unit (here: 1000 g)	[CAL]	+ 1000.0
3. Place the indicated calibration weight on the balance		1000.0
After calibration, the calibration weight is displayed with wt. unit		+ 1000.0 g
4. Remove the calibration weight		0.0 g

Application Programs

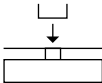
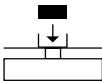
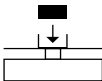
Net-Total Formulation/Second Tare Memory

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

Preparation

Configure the Net-Total Formulation/Second Tare Memory application in the operating menu: See "Configuring the Balance." Menu code: **2.13**

Example

Step	Key (or instruction)	Display/Printout
1. Place an empty container on the balance		+ 65.0 g
2. Tare the balance	TARE	+ 0.0 g
3. Add the first component		+ 120.5 g
4. Store the first component weight. If the print format is set to include data ID codes, the following is printed	F	0.0 g _{NET}
5. Add the next component		N1 + 120.5 g
6. Store the 2nd component weight	F	+ 70.5 g
7. Add further components, if desired	As described for steps 5 and 6	0.0 g _{NET}
8. Display total weight and fill to desired final weight	CF	+ 191.0 g

Counting

Purpose

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

Preparation

- Configure the Counting application in the operating menu:
See "Configuring the Balance"
Menu code: **2. 1. 4**

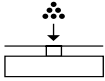
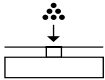
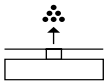
- Reference sample quantity:
Code **3. 3. 1** 5 pcs
Code **3. 3. 2** 10 pcs (factory setting)
Code **3. 3. 3** 20 pcs
Code **3. 3. 4** 50 pcs
Code **3. 3. 5** 100 pcs
- Storage parameter (display accuracy for counting)
Code **3. 4. 1** Standard resolution (factory setting)
Code **3. 4. 2** With 10 times higher resolution than standard
See also "Configuring the Balance"

Example

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

Menu: Application program: Counting (menu code **2. 1. 4**);

Reference sample quantity: 20 pcs (menu code **3. 3. 3**)

Step	Key (or instruction)	Display/Printout
1. Tare the balance	TARE	0.0 g
2. Display the reference sample quantity (here: 20 pcs)	F >2 sec.	rEF 20 (briefly)
3. Place the reference sample quantity (20 pcs) on the balance/scale (here: 66 g)		+ 66.0 g
4. Start the application; if the print format is set to include data ID codes, the following piece weight is printed	F	+ 20 pcs
5. Weigh uncounted parts (here: 174 pcs)		wRef + 3.300 g
6. Display weight	F	+ 574.2 g
7. Display quantity	F	+ 174 pcs
8. Unload the balance		0 pcs
9. Delete the reference value	CF	
10. Repeat the procedure starting from step 5, if desired.		

Weighing in Percent

Purpose

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

Preparation

- Configure the Weighing in Percent application in the operating menu:
See "Configuring the Balance."
Menu code: **2. 1. 5**

- Reference percentage:
Code **3. 3. 1** 5 %
Code **3. 3. 2** 10 % (factory setting)
Code **3. 3. 3** 20 %
Code **3. 3. 4** 50 %
Code **3. 3. 5** 100 %

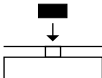
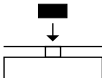
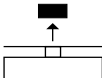
- Storage parameter (display accuracy for counting)
Code **3. 4. 1** Standard resolution: With stability (factory setting)
Code **3. 4. 2** With 10 times higher stability than standard
See also "Configuring the Balance"

Example

Determine an unknown percentage: store the weight on the balance as a reference percentage

Menu: Application program: Weighing in Percent (menu code **2. 1. 5**)

Menu: Reference percentage: 100 % (menu code **3. 3. 5**)

Step	Key (or instruction)	Display/Printout
1. Tare the balance	TARE	0.0 g
2. Display the reference percentage:	F >2 sec.	rEF 100
3. Place the reference weight for 100 % on the balance (here: 222.5 g)		+ 222.5 g
4. Start the application; if the print format is set to include data ID codes the following is printed	F	+ 100.00 % Wxx% + 222.500 g
5. Place an unknown weight on the balance (here: 322.5 g)		+ 144.94 %
6. Display weight	F	+ 322.5 g
7. Display percentage	F	+ 144.94 %
8. Unload the balance		0.00 %
9. Delete the reference percentage	CF	
10. Repeat the procedure starting from step 5, if desired.		

Weigh Averaging

Purpose

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

- Number of subweighs for weigh averaging:

3.3.1	5 subweighs
3.3.2	10 subweighs (factory setting)
3.3.3	20 subweighs
3.3.4	50 subweighs
3.3.5	100 subweighs

Preparation

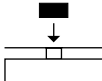
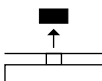
- Configure the Weigh Averaging application in the operating menu: See "Configuring the Balance."
Menu code: 2.1.i2

See also "Configuring the Balance"

Example

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

Menu: Application program: Weigh Averaging (menu code 2.1.i2)

Step	Key (or instruction)	Display/Printout
1. Tare the balance	TARE	0.0 g
2. Display the number of subweighs (here: 10)	F >2 sec.	rEF 10 (briefly)
3. Place sample on the balance (weight readout fluctuates)		8888
4. Start measurement	F	8888 10 9 8 ⋮
After 10 subweighs		+ 275.5 g Δ
If the print format is set to include data ID codes, the following is printed		Res + 275.5 g
5. Unload the balance		+ 275.5 g Δ (stable display)
6. Delete the result	CF	
7. Repeat the procedure starting from step 3, if desired.		

Toggle Between Weight Units

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

Configure the "Toggle Weight Units" application in the operating menu:
See "Configuring the Balance." Menu code **2.1.2**

Menu code	Unit	Conversion factor	Abbr. on printout
1.7.2 o 3.1.2 o	Grams	1	g
1.7.4 3.1.4	Carats	5	ct
1.7.5 3.1.5	Pounds	0.00220462260	lb
1.7.6 3.1.6	Ounces	0.03527396200	oz
1.7.7 3.1.7	Troy ounces	0.03215074700	ozt
1.7.8 3.1.8	Hongkong tael	0.02671725000	tlh
1.7.9 3.1.9	Singapore tael	0.02645544638	tls
1.7.10 3.1.10	Taiwanese tael	0.02666666000	tlt
1.7.11 3.1.11	Grains	15.43235835000	GN
1.7.12 3.1.12	Pennyweights	0.64301493100	dwt
1.7.13 3.1.13	Milligrams	1000	mg
1.7.14 3.1.14	Parts per pound	1.12876677120	/lb
1.7.15 3.1.15	Chinese tael	0.02645547175	tlc
1.7.16 3.1.16	Mommes	0.26670000000	mom
1.7.17 3.1.17	Austrian carats	5	K
1.7.18 3.1.18	Tola	0.08573333810	tol
1.7.19 3.1.19	Baht	0.06578947437	bat
1.7.20 3.1.20	Mesghal	0.21700000000	MS

o = Factory setting

Function

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

Configuring the Balance

Setting the Parameters (Menu Codes)

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

Example: Adapt the balance to unstable ambient conditions

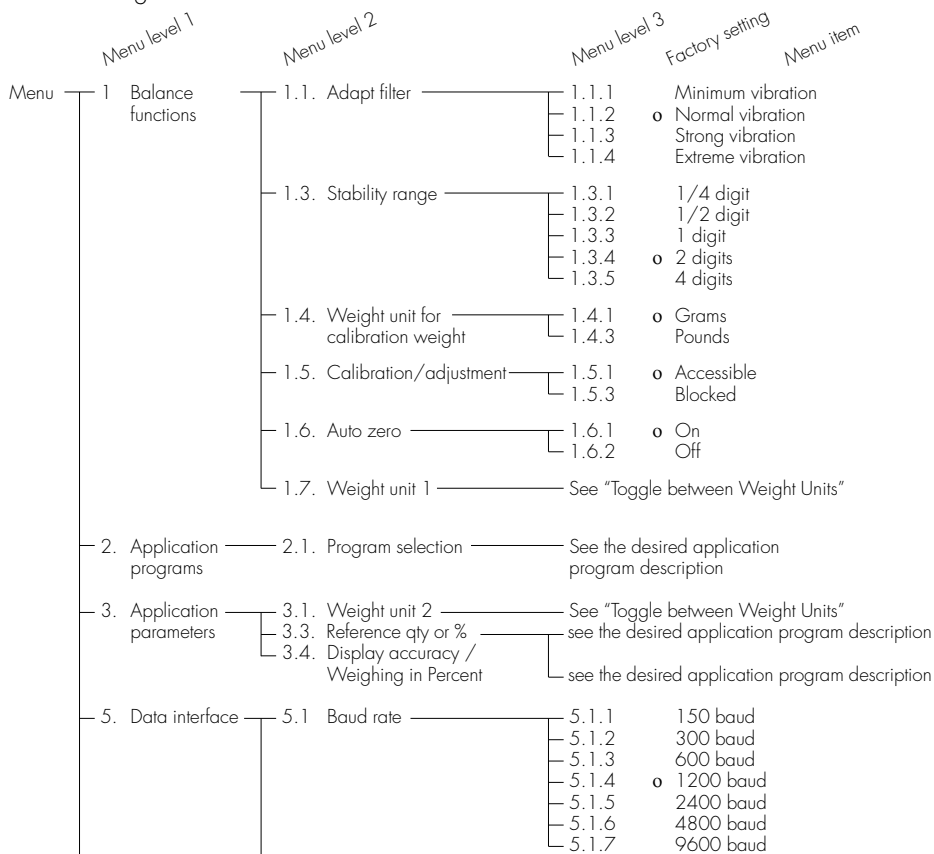
Menu code 1. 1. 4

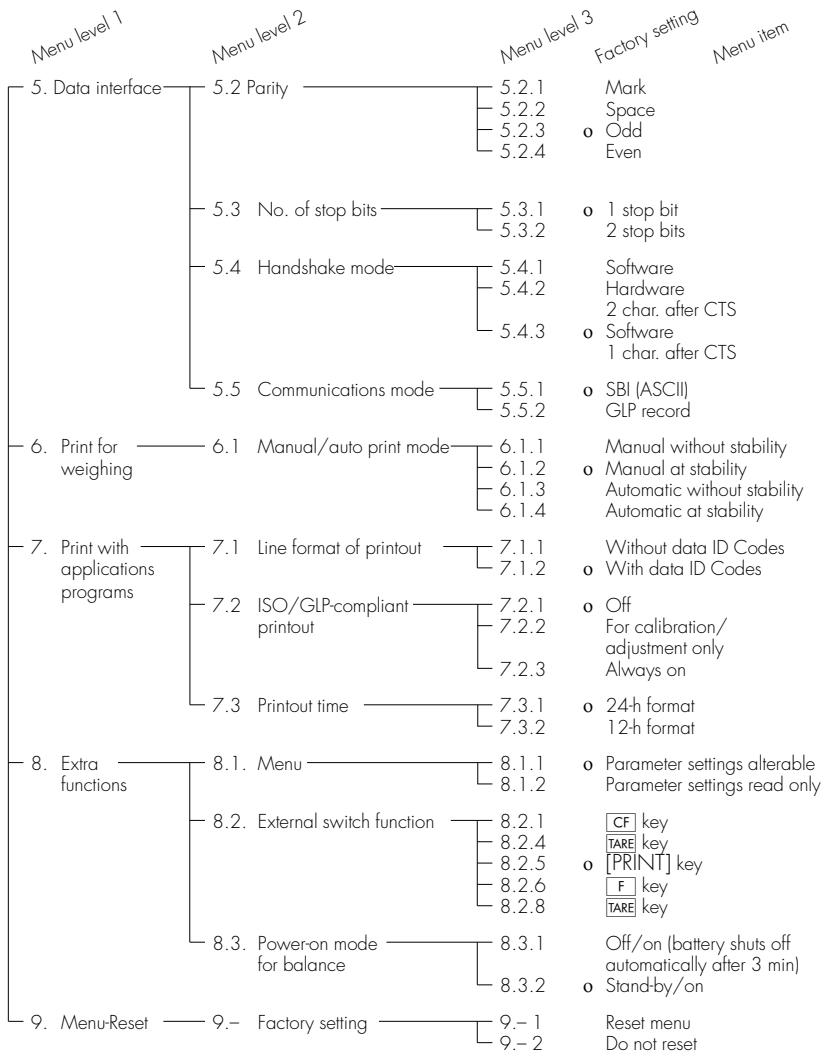
Step	Key (or instruction)	Display
1. Turn off the balance	[ON/OFF]	
2. Turn the balance back on; while all segments are displayed	[ON/OFF]	
<input type="checkbox"/> To navigate within a menu level; the last menu option is followed by the first option	[TARE] briefly	1.
	[TARE] repeatedly	2. : 9. 1.
3. Select the 2nd menu level	[PRINT]	1. 1.
4. Select the 3rd menu level	[PRINT]	1. 1. 2 o
5. In Menu Level 3: Select the desired option	[TARE] repeatedly	1. 1. 4
6. Confirm new setting; the "o" indicates the currently set option	[PRINT] >2 sec.	1. 1. 4 o
<input type="checkbox"/> Select the next menu level (here: move from the 3rd to the 1st level)	[PRINT]	1.
<input type="checkbox"/> Set other menu codes, if desired	[PRINT], [TARE]	
7. Store parameter settings and exit operating menu or	[TARE] >2 sec.	
<input type="checkbox"/> Exit operating menu without storing changes	[ON/OFF]	
> Restart the application		0.0 g

Balance Operating Menu (Overview)

o Factory setting

√ User setting





ISO/GLP-compliant Printout

Features

You can have the parameters pertaining to the ambient weighing conditions printed before (GLP header) and after (GLP footer) the values of a weighing series.

These parameters include:

GLP header:

- Date
- Time at beginning of measurement
- Balance manufacturer
- Balance model
- Balance serial number
- Software version number
- Identification number of the current sampling operation

GLP footer:

- Date
- Time at end of measurement
- Field for operator signature

⚠ The record can only be output to an ELTRA data printer, available from your ELTRA supplier.

Settings

- Set the following menu codes (see "Configuring the Balance"):
 - GLP-compliant record: menu code **5 5 2**
 - ISO/GLP-compliant record after calibration/adjustment only: menu code **7 2 2** or ISO/GLP-compliant record always on: menu code **7 2 3**
 - Line format for printout: With data ID codes – 22 characters: menu code **7 1 2**
 - Printout date/time:
 - 24-h format: menu code **7 3 1**
 - 12-h format: menu code **7 3 2**

⚠ No ISO/GLP-compliant record is output if any of the following settings are configured: menu codes **5 1 3**, **5 1 4** (automatic printout) and **7 1 1**

Function Keys

Press [PRINT] to output header and first measured value.

- > Header is output the first time [PRINT] is pressed

To output header and reference data automatically with an application program active: Press **[F]**

End application program:

End application program and output GLP footer: Press **[CF]**

The ISO/GLP-compliant record can contain the following lines:

-----		Dotted line
17-Jan-2003	10:15	Date/time (beginning of measurement)
ELTRA		Balance manufacturer
Mod.	ELTRA84	Balance model
Ser. no.	10105355	Balance serial number
Ver. no.	00-19-41	Software version
ID		ID
-----		Dotted line
L ID		Measurement series no.
wRef +	21.14 g	Counting: Reference weight
Qnt +	235 pcs	Counting result
Qnt +	567 pcs	Counting result
-----		Dotted line
17-Jan-2003	10:20	Date/time (end of measurement)
Name:		Field for operator signature
		Blank line
-----		Dotted line

ISO/GLP-compliant printout for external calibration/adjustment

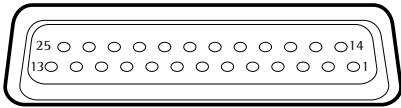
-----		Dotted line
17-Jan-2003	10:30	Date/time (beginning of measurement)
ELTRA		Balance manufacturer
Mod.	ELTRA84	Balance model
Ser. no.	10105355	Balance serial number
Ver. no.	00-19-41	Software version
ID		ID
-----		Dotted line
Cal. Extern		Calibration/adjustment mode
Set +	5000.0 g	Calibration weight
-----		Dotted line
17-Jan-2003	10:32	Date/time (end of measurement)
Name:		Field for operator signature
		Blank line
-----		Dotted line

Data Interface

Purpose

Your balance comes equipped with an interface port for connection to a computer or other peripheral device. You can use an on-line computer to change, start and/or monitor the functions of the balance and the application programs.

Female interface connector



Pin Assignment Chart, 25-pin female interface connector, RS-232:

- Pin 1: Shield
- Pin 2: Data output (TxD)
- Pin 3: Data input (Rx/D)
- Pin 4: Internal ground (GND)
- Pin 5: Clear to Send (CTS)
- Pin 6: Not connected
- Pin 7: Internal ground (GND)
- Pin 8: Internal ground (GND)
- Pin 9: Not connected
- Pin 10: Not connected
- Pin 11: Charging voltage for rechargeable battery pack
+12 ... +20 V (I_{out} 25mA)
- Pin 12: Reset _ Out *)
- Pin 13: +5 V output
- Pin 14: Internal ground (GND)
- Pin 15: Universal remote switch
- Pin 16: Not connected
- Pin 17: Not connected
- Pin 18: Not connected
- Pin 19: Not connected
- Pin 20: Data Terminal Ready (DTR)
- Pin 21: Internal ground (GND)
- Pin 22: Not connected
- Pin 23: Not connected
- Pin 24: Not connected
- Pin 25: +5 V output

Preparation

You can set these parameters for other devices in the Setup menu (see the chapter entitled "Configuring the Balance"). You will also find a detailed description of the available data interface commands in the file "Data Interface Descriptions for ELTRA 84", available from ELTRA.

The many and versatile properties of these balances/scales can be fully utilized for printing out records of the results when you connect your balance to a ELTRA data printer. The recording capability for print-outs makes it easy for you to work in compliance with ISO/GLP.

*) = Hardware restart

Error Codes

Error codes are shown on the main display for 2 seconds. The program then returns automatically to the previous mode (e.g., weighing).

Display	Cause	Solution
No segments appear on the display	No AC power is available The AC adapter is not plugged in	Check the AC power supply Plug in the AC adapter
H	The load exceeds the balance capacity	Unload the balance
L and E 54	The weighing pan is not in place Something is touching the weighing pan	Place the weighing pan on the balance Move that object that is touching the weighing pan
E 02	Calibration parameter not met, e.g.: – balance not zeroed – balance is loaded	Unload the balance Press TARE to tare the balance Calibrate only when zero is displayed
E 09	When gross value \leq zero; no tare	Tare the balance
E 10	The TARE key is blocked when there is data in the second tare memory (net-total). Only 1 tare function can be used at a time	Press CF to clear the tare memory and release the tare key
E 11	Value input is not allowed for second tare memory	Press TARE
E 22	Weight is too light or there is no sample on the balance	Increase the weight on the balance
E 30	Interface port for printer output is blocked	Contact your local ELTRA Service Center
Max. weighing capacity is less than indicated under "Specifications"	The balance was turned on without the weighing pan in place	Place the weighing pan on the balance and press [ON/OFF] to turn the balance back on
The weight readout is obviously wrong	The balance has not been calibrated/adjusted The balance was not tared before weighing	Calibrate/adjust the balance Tare the balance

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

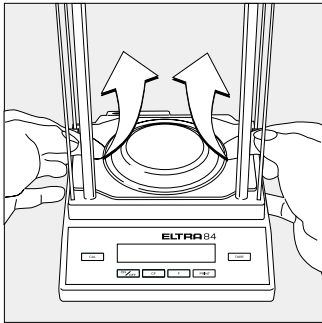
Care and Maintenance

Service

Regular servicing by a ELTRA technician will extend the service life of your balance and ensure its continued weighing accuracy. ELTRA can offer you service contracts, with your choice of regular maintenance intervals ranging. The optimum maintenance interval depends on the operating conditions at the place of installation and on the individual tolerance requirements.

Repairs

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



Cleaning

- Unplug the AC adapter from the wall outlet (mains supply). If you have an interface cable connected to the balance port, unplug it from the port,
- Clean the balance using a piece of cloth which has been wet with a mild detergent (soap)
- After cleaning, wipe down the balance with a soft, dry cloth.

Removing and Cleaning the Weighing Pan:

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

- ⚠ Make sure that no liquid enters the balance housing.
- ⚠ Do not use any aggressive cleaning agents (solvents or similar agents).

Cleaning Stainless Steel Surfaces

Clean all stainless steel parts regularly. Remove the stainless steel weighing pan and thoroughly clean it separately. Use a damp cloth or sponge to clean any stainless steel parts on the balance. Only use commercially available household cleaning agent that is suitable for use on stainless steel. Clean stainless steel surfaces by wiping them down. Then rinse thoroughly, making sure to remove all residues. Afterwards, allow the balance to dry. If desired, you can apply oil to the cleaned surfaces as additional protection. Solvents are permitted for use only on stainless steel parts.

Safety Inspection

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

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

In this case, notify your nearest ELTRA dealer. Maintenance and repair work may only be performed by trained service technicians.

Instructions for Recycling

To ensure adequate protection for safe shipment, your balance has been packaged to the extent necessary using environmentally friendly materials. After successful installation of the balance, you should return this packaging for recycling because it is a valuable source of secondary raw material. For information on recycling options, including recycling of old weighing equipment, contact your municipal waste disposal center or local recycling depot.

Overview

Specifications

Model	ELTRA 84	
Weighing capacity	g	80
Readability	mg	0.1
Tare range (subtractive)	g	80
Repeatability	≤±mg	0.1
Linearity	≤±mg	0.2
Operating temperature range		+10...+30 °C
Sensitivity drift within +10...+30 °C (50°F–86°F)	≥±/K	2·10 ⁻⁶
Response time (average)	s	3
Adaptation to ambient conditions		By selection to 1 of 4 optimized filter levels
Display update (depends on the filter level selected)	s	0.2–0.4
External calibration weight (of at least accuracy class)	g	50 (E2)
Net weight, approx.	kg	3.0
Pan size	mm	80 Ø
Weighing chamber height	mm	200
Dimensions (WxDxH)	mm	189×251×299
AC power source/power requirements		AC adapter 230 V or 115 V, +15%...– 20%
Frequency		48–60 Hz
AC power source, direct current	V	10 – 20
Power consumption (average)	W	1
Hours of operation with an external rechargeable battery pack	h	20

CE Marking

The equipment complies with the following Directives issued by the Council of the European Union:

Council Directive 89/336/EEC “Electromagnetic compatibility (EMC)”:

Electromagnetic Compatibility
Official Journal of the European Communities, No. 2001/C 105/03

EN 61326-1 Electrical equipment for measurement, control and laboratory use EMC requirements

Part 1: General requirements
Defined immunity to interference: Industrial areas, continuous non-monitored operation
Limitation of emissions: Residential areas, Class B

Important Note:

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

73/23/EEC “Electrical equipment designed for use within certain voltage limits”

Applicable European Standards:

EN 60950 Safety of information technology equipment including electrical business equipment

EN 61010 Safety requirements for electrical equipment for measurement, control and laboratory use
Part 1: General requirements

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

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